Revised Draft SEIR Appendix 5.14a

Fire Protection Plan

Fire Protection Plan

Entrada South and Valencia Commerce Center Project

APRIL 2025

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ASTM	American Society of Testing and Materials
CAL FIRE	California Department of Forestry and Fire Protection
CBC	California Building Code
CDFW	California Department of Fish and Wildlife
CFC	California Fire Code
CFPP	Construction Fire Protection Plan
County	County of Los Angeles
County Fire	Los Angeles County Fire Department
EIR	State-certified Environmental Impact Report
FMP	Fire Management Plan
FMZ	Fuel Modification Zone
FPP	Fire Protection Plan
FRAP	Fire and Resource Assessment Program
GHG	Greenhouse Gas
HOA	Homeowner’s Association
LACBC	Los Angeles County Building Code
LASD	Los Angeles Sheriff Department
NFPA	National Fire Protection Association
OAERP	Operational Area Emergency Response Plan
OVOV Area Plan	Santa Clarita Valley Area Plan: One Valley One Vision
RMDP	Resource Management and Development Plan
SCE	Southern California Edison
SCP	Spineflower Conservation Plan
SFM	State Fire Marshall
SRA	State Responsibility Area
VCC	Valencia Commerce Center
VHFHSZ	Very High Fire Hazard Severity Zone
WFEP	Wildland Fire Evacuation Plan
WUI	wildland/urban interface

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Executive Summary

This Fire Protection Plan (FPP) has been prepared for the Entrada South and Valencia Commerce Center (VCC) Project, which implements the development facilitated by the State-approved Newhall Ranch Resource Management and Development Plan and Spineflower Conservation Plan (RMDP/SCP) within the Entrada and VCC Planning Areas in the County of Los Angeles (County). The Project incorporates minor changes and refinements to the development of the Entrada and VCC Planning Areas, as compared to what was evaluated in the State-certified Environmental Impact Report (EIR) (SCH No. 2000011025; June 2017; hereafter referred to as the "State-certified EIR" or "2017 Approved Project"). As such, the Entrada South and VCC Project are referred to herein as the "Modified Project."

The Modified Project Site is located in an unincorporated portion of Santa Clarita Valley in northwestern Los Angeles County. The development proposed by the Modified Project within the Entrada Planning Area includes 1,574 dwelling units and 730,000 square feet of non-residential development, as compared to 1,725 dwelling units and 450,000 square feet of non-residential development for the 2017 Approved Project. The VCC Planning Area consists of approximately 321 acres of an undeveloped portion of the partially completed VCC industrial park/commercial center located west of I-5 and north of Henry Mayo Drive and the Santa Clara River. The State-certified EIR analyzed the environmental implications of 3.4 million square feet of industrial/commercial space on approximately 164 acres, approximately 144 acres of open space, and about 13.7 acres of public facilities. No changes to the proposed 3.4 million square feet of industrial/business park space within the VCC Planning Area are proposed as part of the Modified Project.

The Entrada and VCC planning areas are located with State Responsibility Areas designated as Very High Fire Hazard Severity Zone (VHFHSZ) by the California Department of Forestry and Fire Protection (CAL FIRE) (FRAP 2025) (Figure 2 Fire Hazard Severity Zones). The State-certified EIR analyzed wildfire impacts as part of Section 4.17 Hazards, Hazardous Materials, and Public Safety. The State-certified EIR determined that the Project would have a less than significant impact on adopted emergency response plans or emergency evacuation plans based on the location of fire states, a system of improved roads, and fire flows for the Project. The State-certified EIR also considered whether the Project would result in significant impacts from wildfire and found that while the Project provided sufficient access, water supply, fuel management, wildfire buffers and home sitting, the potential for a significant wildland fire hazard would still exist and require mitigation. However, with regulatory compliance and incorporation of mitigation measures, the State-certified EIR determined the Project would have a less than significant impact.

This FPP provides a comprehensive evaluation of the wildfire risks associated with the Modified Project and measures employed by the Modified Project to reduce such risks. The FPP assesses reducing fire risk for the Project, preventing off-site ignitions, and minimizing the demand for fire protection services associated with the Modified Project. To that end, the fire protection detailed in this FPP employs a systematic, project-wide approach that includes redundant layering of measures, including pre-planning, fire prevention, fire protection, passive and active suppression, and related measures proven to reduce fire risk and prevent Project-related ignitions. The fire protection system planned for the Modified Project has proven, through real-life wildfire encroachment examples throughout Southern California, to reduce the fire risk associated with this type of hardened, ignition resistant, and fire aware residential community and commercial development.

The FPP addresses the following overall topics:

- **Environmental Setting: Existing Conditions and Fire History.** – The FPP summarizes the existing environmental setting, climatic and topographic conditions, and the history of fire patterns at the site.
- **Regulatory Compliance and Mitigation Measures Applicable to the Modified Project** – The FPP details the extensive regulatory requirements that are mandatory upon the Modified Project based on compliance with the 2020 Los Angeles County Fire Code (Title 32) and the 2022 California Fire and Building Codes, as well as the fire protection-related adopted codes in effect at the time of building construction. Additionally, the Modified project is consistent with the LACoFD 2022 Strategic Fire Plan and the County of Los Angeles General Plan._The County of Los Angeles General Plan provides the policy framework and guides development decisions in unincorporated Los Angeles County. The Land Use Element designates the proposed general distribution and general location and extent of uses while also providing the “blue print” for how land will be used to accommodate growth and change throughout the unincorporated areas of the County. The Safety Element of the General Plan provides an overview of fire hazards in the County, including wildland fires, flooding, and mud and debris flows.

Accordingly, the FPP evaluates regulatory requirements and mitigation to reduce such risk to less than significant levels by employing risk-reduction measures related to fuel modification, building design and construction, site layout, water supply, evacuation, and other pertinent criteria for fire protection. Further, the FPP recommends additional mitigation measures to further reduce wildfire risks. Applicable regulatory requirements include but are not limited to:

- State-of-the-art, ignition-resistant construction standards for all new residential, non-residential, and public facility buildings meeting Chapter 7A of the California Building Code (CBC), Title 26 of the County of Los Angeles Building Code (LACBC), and the Los Angeles County Fire Department (County Fire) requirements. These standards require, among many other measures, fire-resistant roofing to resist ignition from embers or building-to-building fires, vent covering and opening limitations to avoid ember intrusion, noncombustible or ignition-resistant exterior walls, ignition-resistant eaves, and porch ceilings, insulated windows and exterior doors, fire-resistant exterior decks and walkways, and ignition-resistant under-flooring and appendages. These standards have proven to substantially reduce the risk of buildings catching fire or spreading fires during a wildfire event.
- FMZs of 100- to 200- horizontal feet, depending on County Fire direction and geographic constraints around the perimeter of the Modified Project to provide defensible space to protect against encroaching fires and minimize the risk of fires from the project moving offsite. The fuel modification zones are based on County Fire requirements and confirmed with site-specific modeling. The zones will be implemented by knowledgeable professionals, inspected by third-party inspectors, and maintained in perpetuity by the HOA.
- Ongoing, funded maintenance, inspections, and enforcement of fuel modification zones and other fire protection features by the HOA or similar organization funded by an assessment or tax on parcels within the Modified Project.
- Existing and planned firefighting capabilities to ensure a response to fire and medical emergencies.
- In all structures, additional fire protection systems, including internal fire sprinkler systems.
- Fire-resistant landscaping requirements.
- Multiple access routes for fire apparatus and emergency vehicles.
- Multiple evacuation routes during a wildfire event.

- Water capacity, delivery, and availability.
- Ongoing resident fire safety education and evacuation planning.
- **"Worst Case" Wildfire Risk Modeling to Predict Flame Lengths During Extreme Events and Benefits of Regulatory Compliance and Mitigation Measures** – The FPP completes detailed modeling of "worst-case" fire conditions to determine flame lengths that may impact the site from worst-case scenarios, under both pre-development and post-development conditions (with regulatory compliance and mitigation implemented).
- **County Fire Emergency Response Times** – The FPP assesses the impacts of the Modified Project on County Fire's response times based on existing and planned fire stations.
- **Impact Analysis Based on CEQA Significance Criteria** – The FPP evaluates whether the Modified Project would result in a significant environmental impact under CEQA, including impacts related to wildfire encroaching onto the site, the potential for the Modified Project to exacerbate fire risks by increasing ignition sources, and evacuation planning.

The Modified Project site has long been designated by the Los Angeles County General Plan (through the One Valley One Vision Area Plan) and Zoning Ordinance for residential and commercial development consistent with the proposed land uses for the Modified Project. Further, the Modified Project is largely surrounded by existing development, roads, and infrastructure. The Entrada planning area is bounded by I-5 to the east, Magic Mountain to the north, the Mission Village development (fully graded and under development) to the west, and the existing Westridge community to the south. The Valencia planning area is bounded by I-5 to the east, existing business park development to the north, SR-126 to the south, and the Chiquita Canyon and other developments to the west.

Nevertheless, the Modified Project site is located with the VHFHSZ and is currently undeveloped; therefore, the potential exists for wildfires to encroach on the site, as demonstrated by the history of wildfires in the area. Based on an analysis of fire history data, specifically, the average interval between wildfires within 5 miles of the Modified Project Site's boundaries was calculated to be one year with intervals ranging between 0 (multiple fires in the same year) and 2 years.

Site-specific modeling was completed for this FPP by using the BehavePlus software in accordance with standard industry practice for evaluating fire behavior variables and objectively predicting flame lengths, fire intensity, and fire spread rates under a "worst-case" wildfire event (e.g., a wildfire during a strong wind Santa Ana event). The modeling evaluates both existing conditions and post-development conditions with fuel modification zones in place (assuming a 100- to 200-foot fuel modification zone in accordance with applicable standards). The modeling demonstrates the fuel modification zone's reduced flame length and intensity.

- *Entrada Planning Area*: The 46.0-foot (Coastal scrub fuel bed) and 39.9-foot (grass fuel bed) tall flames predicted during pre-development extreme weather conditions are reduced to less than 10.6 feet tall at the outer edges and less than 3.0 feet within the planned development (i.e., within irrigated "Zone A" of the fuel modification zone). Fuel model assignments for all other areas remained the same as those classified for the existing condition.
- *VCC Planning Area*: The 46.0-foot tall flames predicted during pre-treatment modeling for the VCC site during extreme weather conditions are reduced to 10.6 feet tall at the outer edges of the FMZ and 3.0 feet (i.e., within irrigated "Zone A" of the fuel modification zone). During onshore weather conditions, a fire approaching from the west would be reduced from 14.8-foot tall flames to less than 2.3 feet tall in both the irrigated and thinning zones with much lower fire intensity due to the higher live and dead fuel moisture contents.

Based on the predicted flame lengths and intensities following implementation of the fuel modification zones, encroaching wildfires would not present a significant risk of directly intruding into the Modified Project even during extreme events (e.g., strong Santa Ana winds). Even if windblown embers were to fly over the fuel modification zones, the ignition-resistant buildings and fire-resistant landscaping would minimize the likelihood of any fires starting onsite, and even if isolated fires occurred, they would be unlikely to spread quickly or be of high intensity given the limited fuel sources. As described above, new communities with buildings built to the latest fire code standards have proven extremely resistant to burning even during extreme fire events.

The Modified Project is unlikely to exacerbate fire risks to surrounding areas. The ignition-resistant buildings and fire-resistant landscaping are unlikely to initiate a fire that would spread to surrounding areas, particularly because the fuel modification zones would limit the ability of any fire to move offsite. Because onsite fires are unlikely to occur and, even if so, would likely be low-intensity fires due to lack of fuel sources, the Modified Project is unlikely to produce embers that would fly across the fuel modification zones to surrounding areas.

County Fire has adequate existing and planned fire stations and apparatus in the near vicinity to provide fire services and emergency response for the Modified Project. Based on calculated increases in calls for an emergency response associated with the Modified Project and referencing County Fire's crawl maps, the estimated County Fire response times would be consistent with County Fire's goals for suburban uses.

The Modified Project is consistent with the EIR for One Valley One Vision (OVOV), the Santa Clarita Area Plan. As described in Traffic Analysis of the EIR the Regional Traffic Analysis analyzed the traffic impacts related to the built-out region. The Modified Project would not conflict with the regional traffic analysis in the OVOV EIR which determined the built-out region would not significantly impact vertical roadways or intersections. The Modified Project is also consistent with the policies identified in OVOV and includes a reduced population and reduced vehicle numbers from the previously approved project. OVOV also includes a number of evacuation and emergency access policies with which the Modified Project is consistent. As an additional Project Design Feature, the Modified Project also includes a project-specific evacuation plan under a separate cover and described in Section 7 of the FPP (Dudek 2022).

As detailed below, the FPP evaluates the Modified Project's potential to result in significant impacts based on the CEQA Appendix G questions. The FPP evaluates the Modified Project's potential to increase human-caused or related ignitions and considers the historical causes of wildfires in the area and Southern California as well as potential ignition sources presented by the type of proposed land uses. The FPP also considers whether these risks are addressed through the Modified Project's compliance with regulatory requirements and mitigation measures, including fuel modification zones, hardened homes, robust resident education, public outreach, and fire safety monitoring, amongst others described in detail herein. The modifications associated with the Modified Project do not result in any reduction of fire protection measures or fire resiliency. The Modified Project includes enhanced fire protection measures as compared to what was considered in the State-certified EIR wildfire analysis.

As detailed below, the FPP concludes that there are no new significant impacts associated with the Modified Project with the implementation of regulatory compliance measures and recommended measures. The FPP also concludes that the Modified Project does not result in a new significant impact related to increasing or exacerbating wildfire impacts on surrounding areas. Although the Modified Project is sufficiently mitigated by the identified regulatory compliance measures and mitigation measures, the FPP also determines that Newhall's historic and ongoing agricultural and grazing operations have the additional benefit of further reducing wildfire risks to the Modified Project and surrounding areas, thereby providing additional environmental benefits with respect to wildfire prevention.

1 Introduction

This Fire Protection Plan (FPP) was prepared for the Entrada South and Valencia Commerce Center (VCC) Project. The purpose of this FPP is to evaluate the potential impacts resulting from wildland fire hazards to and from the Modified Project and identify design features to adequately mitigate those risks to a level consistent with the County of Los Angeles (County) standards. Additionally, this FPP generates and memorializes the fire safety requirements of the fire authority having jurisdiction, which is the Los Angeles County Fire Department (County Fire). The FPP recommends protection features and measures to be incorporated into the Modified Project or made conditions of Project approval to ensure fire safety. Requirements and recommendations detailed in this FPP are based on site-specific characteristics, applicable code requirements, and input from the applicant and County Fire. This FPP also evaluates potential CEQA-level environmental impacts from the Project on the local fire environment, habitats, and existing communities.

As part of the assessment, this FPP includes an evaluation of, among other site factors, the property location, topography, combustible vegetation (fuel types), climatic conditions, and the area's fire history. This FPP addresses water supply, access, structural ignitability, ignition-resistive building features, fire protection systems and equipment, potential impacts on existing emergency services, defensible space, and vegetation management. It also identifies and prioritizes areas for potentially hazardous fuel reduction treatments and recommends the types and methods of treatment to protect the community and essential infrastructure while minimizing the potential for off-site ignitions. This FPP also recommends measures that property owners should and the Homeowner's Association (HOA) will take to reduce the probability of structure and vegetation ignitions throughout the area.

The Entrada South and VCC Project are located within the boundaries of the County Fire in the unincorporated portion of the County. This FPP addresses County Fire's response capabilities and response travel time within the Project Area.

The following tasks were performed to complete this FPP:

- Gather site-specific climate, terrain, and fuel data.
- Process and analyze the data using the latest geographical information system (GIS) technology.
- Predict fire behavior using scientifically based fire behavior models, comparisons with actual wildfires in similar terrain and fuels, and experienced judgment.
- Analyze and guide the design of the proposed infrastructure.
- Analyze the existing emergency response capabilities.
- Assess the risk associated with the Project.
- Collect site photographs and map fuel conditions using 200-scale aerial images. Field observations were used to augment existing digital site data in generating the fire behavior models and formulating the recommendations presented in this FPP. Refer to Appendix A for site photographs of existing site conditions.
- Research and evaluate vegetation fire ignition sources.
- Evaluate nearby firefighting and emergency medical resources.

Prepare this FPP detailing how fire risk would be minimized through a system of fuel modification, structural ignition resistance enhancements, and fire protection delivery system upgrades.

1.1 Intent

The intent of this FPP is to provide fire protection planning guidance and requirements for reducing fire risk for the Project, preventing off-site ignitions, and minimizing the demand for fire protection services associated with the Project. To that end, the fire protection "system" detailed in this FPP includes redundant layering of measures, including pre-planning, fire prevention, fire protection, passive and active suppression, and related measures proven to reduce fire risk and prevent Project-related ignitions. The fire protection system planned for the Project has been proven, through real-life wildfire encroachment examples throughout Southern California, to reduce the fire risk associated with this type of hardened, ignition resistant, and fire aware residential community and commercial development.

1.2 Project Summary

1.2.1 Location

The Project Site is located in an unincorporated portion of Santa Clarita Valley in northwestern Los Angeles County as shown in Figure 1, Project Location. The Entrada and VCC planning areas are within with State Responsibility Areas designated as VHFHSZ by the CAL FIRE as seen in Figure 2, Fire Hazard Severity Zones (FRAP 2025).

The Project's region is located in a broad ecological and biogeographic transition zone for the coastal and mountain ecoregions. This alluvial Santa Clara River Valley also provides access via the Santa Clara River to the edges of the Mojave Desert and the foothills of the San Gabriel Mountains. While much of the region has been subject to rapid urbanization and historical agricultural and oil development practices, large areas of open space and natural lands border the region. The Los Padres National Forest is located to the north of the Project Site and the Angeles National Forest lies to the north and east. The Santa Susana Mountains, a region of gently rolling hills and sharp, steep-walled canyons, is south of the Modified Project Site.

The Project Site Is within the planning boundary of the State-approved Newhall Ranch Resource Management and Development Plan and Spineflower Conservation Plan (RMDP/SCP), which was the subject of a State-certified Environmental Impact Report (EIR) (SCH No. 2000011025; hereafter referred to as the State-certified EIR). In the State-certified EIR for the RMDP/SCP, the Project Site is identified as the "Entrada Planning Area" and the "VCC Planning Area." The Entrada Planning Area is also sometimes referred to as Entrada South.

Entrada Planning Area: The Entrada Planning Area consists of approximately 382 acres located west of Interstate 5 (I-5) and the City of Santa Clarita and south of the Santa Clara River and the Six Flags Magic Mountain theme park (Figure 1). The Entrada Planning Area is located in the U.S. Geological Survey (USGS) 7.5-minute Newhall quadrangle map, Township 4 North, Range 16 West, and generally in Sections 19, 20, and 30.

VCC Planning Area: The VCC Planning Area consists of approximately 321 acres of an undeveloped portion of the partially completed VCC industrial park/commercial center located west of I-5 and north of Henry Mayo Drive (State Route-126) and the Santa Clara River (Figure 1). The VCC Planning Area is located in the U.S.G.S. 7.5-minute Newhall quadrangle map, Township 4 North, Range 17 West, and generally in Sections 11 and 12.

1.2.2 General Plan and Zoning for Modified Project Site

The Modified Project site has long been designated for residential and commercial development consistent with the proposed land uses for the Modified Project.

Per the Santa Clarita Valley Area Plan: One Valley One Vision 2012 (OVOV Area Plan), the Modified Project is designated as follows: H5—Residential 5, south of Magic Mountain Parkway; CM—Major Commercial, north of Magic Mountain Parkway; OS-PR—Parks and Recreation, south of the Southern California Edison electric transmission lines; and IO—Industrial Office as shown in Figure 3a & 3b, Entrada South and Valencia Commerce Center OVOV Land Use Designations. The OVOV Area Plan is a component of the Los Angeles County General Plan intended to provide focused goals, policies, and maps to guide the regulation and development of unincorporated portions of the Santa Clarita Valley. Finalized in 2012, the OVOV Area Plan included extensive public input and resulted from a cooperative effort between the County and the City of Santa Clarita to create a unified plan for the buildout of the Santa Clarita Valley. The OVOV Area Plan was the subject of a Programmatic EIR (SCH No. 2008071119) (OVOV EIR), which included projections for the number of dwelling units, non-residential square footage, population, and employment in the OVOV Area Plan. The OVOV EIR analyzed potential environmental impacts associated with the buildout of the OVOV Area Plan based on the identified land use designations.

Zoning for the site includes the following: R-1—Single-Family Residence, south of Magic Mountain Parkway; C-3—General Commercial, north of Magic Mountain Parkway; C-R—Commercial Recreation, south of the Southern California Edison electric transmission lines; and M-1.5-DP—Restricted Heavy Manufacturing/Development Program as shown in Figure 4a & 4b, Entrada South and Valencia Commerce Center Zoning Designations.

1.2.3 Modified Project Description

1.2.3.1 Overview and Background

The Entrada South and VCC Modified Project implement the development facilitated by the approved RMDP/SCP within the Entrada and VCC Planning Areas. The California Department of Fish and Wildlife (CDFW) certified the State-certified EIR in June 2017, at which time it also approved the RMDP/SCP and related State permits. The County was a responsible agency for the RMDP/SCP and participated in the State-certified EIR process through the receipt and review of the Draft and Final EIRs as well as the Draft and Final Additional Environmental Analysis and the submittal of comments, which were addressed by CDFW.

The proposed Entrada South and VCC Modified Project reflect minor changes and refinements to the development of the Entrada and VCC Planning Areas, as compared to what was evaluated in the State-certified EIR. As such, the Entrada South and VCC Project are referred to herein as the "Modified Project." The Supplemental EIR that will be prepared for the Modified Project will facilitate consideration by the County and other responsible agencies of additional discretionary entitlements needed to develop the Entrada and VCC Planning Areas under the Modified Project.

As described below, the modifications associated with the Modified Project do not result in any reduction of fire protection measures or fire resiliency. The slight changes in land use mix between residential and commercial uses within the Entrada Planning Area do not materially affect the wildfire analysis. In fact, the Modified Project includes enhanced fire protection measures as compared to what was considered in the State-certified EIR wildfire analysis, including, but not limited to the following:

- More stringent building and fire-resistance requirements for new construction as defined in Chapter 7A of the California Fire Code
- Enhanced fuel break and buffer zones around homes and businesses as required by the California Fire Code and County Fire standards
- Design features addressing potential ignitions sources from construction and addressing long term compliance and maintenance of fuel modification
- Customized education program and evacuation plan to raise wildfire risk awareness of potential project occupants and residents

1.2.3.2 Modified Project Description

Entrada Planning Area

The State-certified EIR for the 2017 Approved Project evaluated the environmental impacts of 1,725 dwelling units, 450,000 square feet of non-residential development, a public facilities area for a neighborhood park and a potential school site, private recreational amenities, a spineflower preserve, and trails and infrastructure within the Entrada Planning Area.

The proposed minor changes and refinements under the Modified Project, as compared to the 2017 Approved Project analyzed in the State-certified EIR, include:

Refinements to the Balance of Residential and Non-Residential Development. The Modified Project includes 1,574 dwelling units, 730,000 square feet of non-residential development, a public park and potential school site, a spineflower preserve, and trails and infrastructure within the Entrada Planning Area. As such, this analysis considers the environmental implications of reducing the number of residences by 151 units and increasing the amount of non-residential development by 280,000 square feet. These minor refinements do not substantially change the scope of the Entrada South land-use plan when comparing the Modified Project to the 2017 Approved Project. Non-residential development could include any allowable uses consistent with the C-3 zoning designation, including but not limited to commercial, office, retail, and hotel uses. If a school site is not ultimately needed in Entrada South, that area would become available for residential development provided the overall number of allowable units (1,574 dwelling units) is not exceeded. The Conceptual Land Use Plan for the Entrada Planning Area is shown in Figure 3a, Conceptual Land Use Plan—Entrada South.

Enhanced Environmental Protections. The Modified Project increases environmental protections for wetlands and related biological resources within the Entrada Planning Area. The Modified Project enhances and restores the majority of a drainage channel referred to as Unnamed Canyon 2. With the proposed design refinements, portions of Unnamed Canyon 2—from the natural drainages at the southern Entrada boundary to Magic Mountain Parkway—would be enhanced and restored as a natural, open, vegetated drainage channel with grade control structures that would retain the look and feel of a natural canyon, thus reducing permanent impacts to biological resources and jurisdictional waters and providing additional open space within the developed portions of the Modified Project Site. This environmentally beneficial modification would result in increased open space, restored drainage areas, and habitat for species as compared to that evaluated in the State-certified EIR.

VCC Planning Area

The State-certified EIR analyzed the environmental implications of 3.4 million square feet of industrial/commercial space on approximately 164 acres, approximately 144 acres of open space, and about 13.7 acres of public facilities. No changes to the proposed 3.4 million square feet of industrial/commercial space within the VCC Planning Area are proposed as part of the Modified Project.

The proposed minor changes and refinements under the Modified Project, as compared to the 2017 Approved Project analyzed in the State-certified EIR, include:

Enhanced Environmental Protections The proposed minor changes and refinements within the VCC Planning Area include additional environmental protections. More specifically, to provide increased environmental protections to wetlands and related biological resources within the VCC Planning Area, the Modified Project involves a reduction in permanent impacts to Hasley Creek and Castaic Creek (although such areas may be temporarily impacted during construction, as analyzed in the State-certified EIR, but would be restored and revegetated after construction based on the Modified Project design) which traverse the VCC Planning Area, including a reduction of permanent impacts to certain vegetation communities and jurisdictional stream habitat. This environmentally beneficial modification would result in increased open space, restored drainage areas, and habitat for species.

VCC was approved for development by Los Angeles County through the issuance of various entitlements and certification of an EIR (SCH No. 1987-123005) in 1991 (referred to herein as the County-certified VCC EIR), which is incorporated by reference. The County's existing entitlement allows approximately 12.6 million square feet of industrial/commercial space at build-out, of which approximately 9 million square feet have been constructed. The VCC Planning Area evaluated herein is comprised of approximately 321 acres of an undeveloped portion of the partially completed VCC industrial park/commercial center. The VCC Planning Area will be developed with up to 3.4 million square feet of non-residential development under the Modified Project. Additional portions of the VCC also are undeveloped and, while not part of the Modified Project, may be built out as allowed by the County's 1991 approval of the VCC entitlements. The Conceptual Land Use Plan for the VCC Planning Area is shown in Figure 3b, Valencia Commerce Center Conceptual Land Use Plan.

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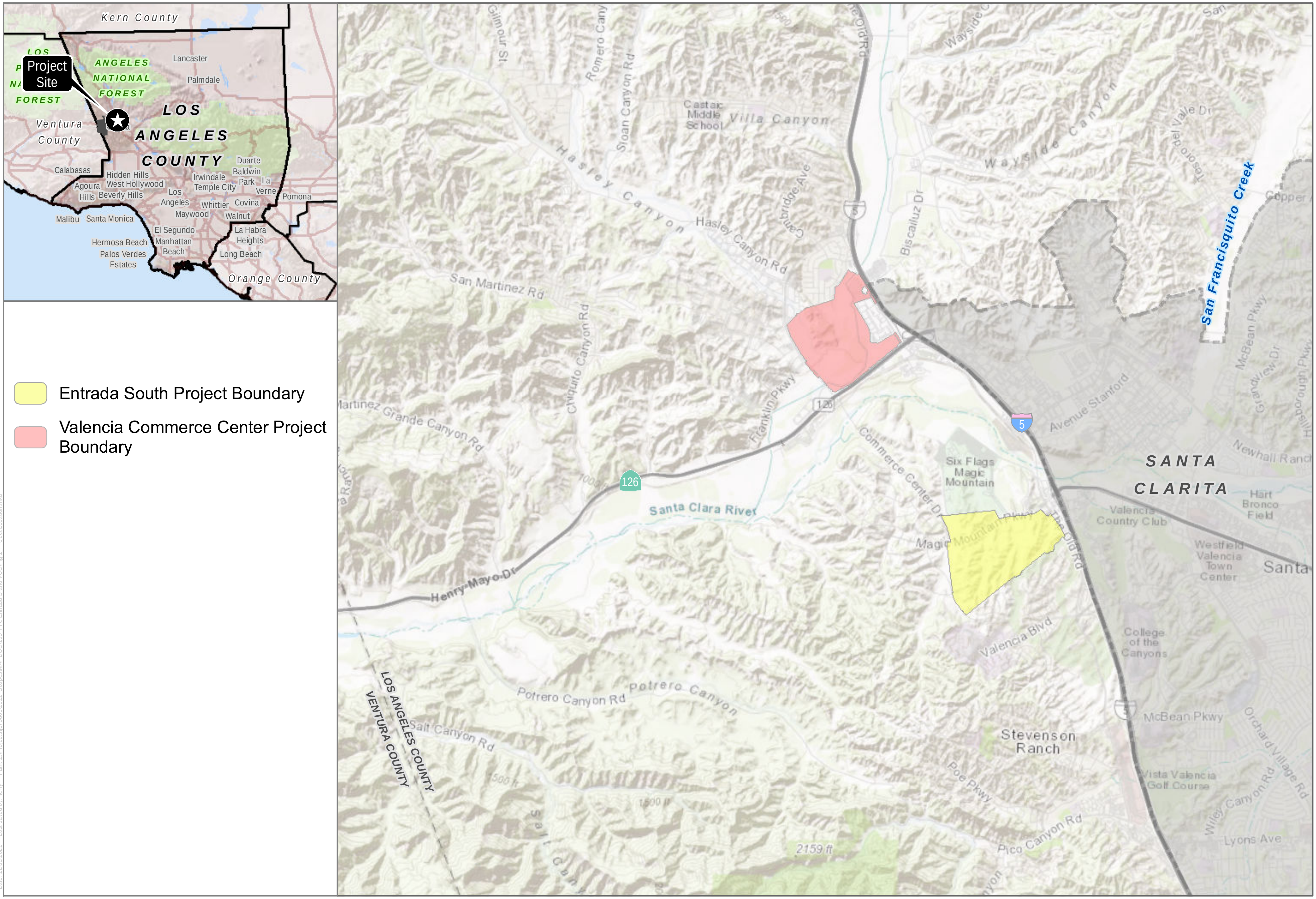

SOURCE: ESRI 2019; Hunsaker 2019

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0 0.5 1 Miles

FIGURE 1

Project Location

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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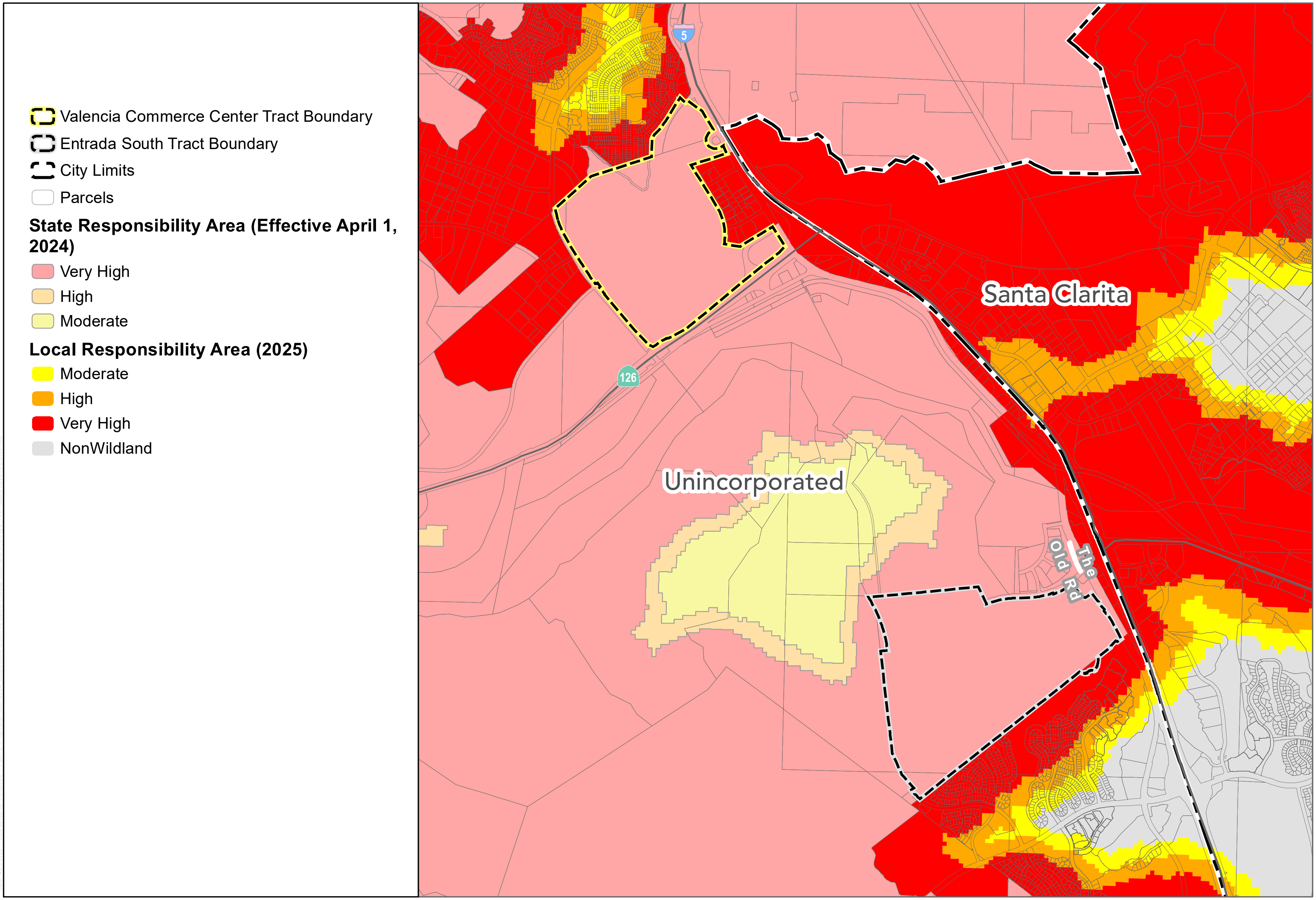

SOURCE: County of Los Angeles/CAL FIRE 2024-2025

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0 1,500 3,000 Feet

FIGURE 2

Fire Hazard Severity Zones

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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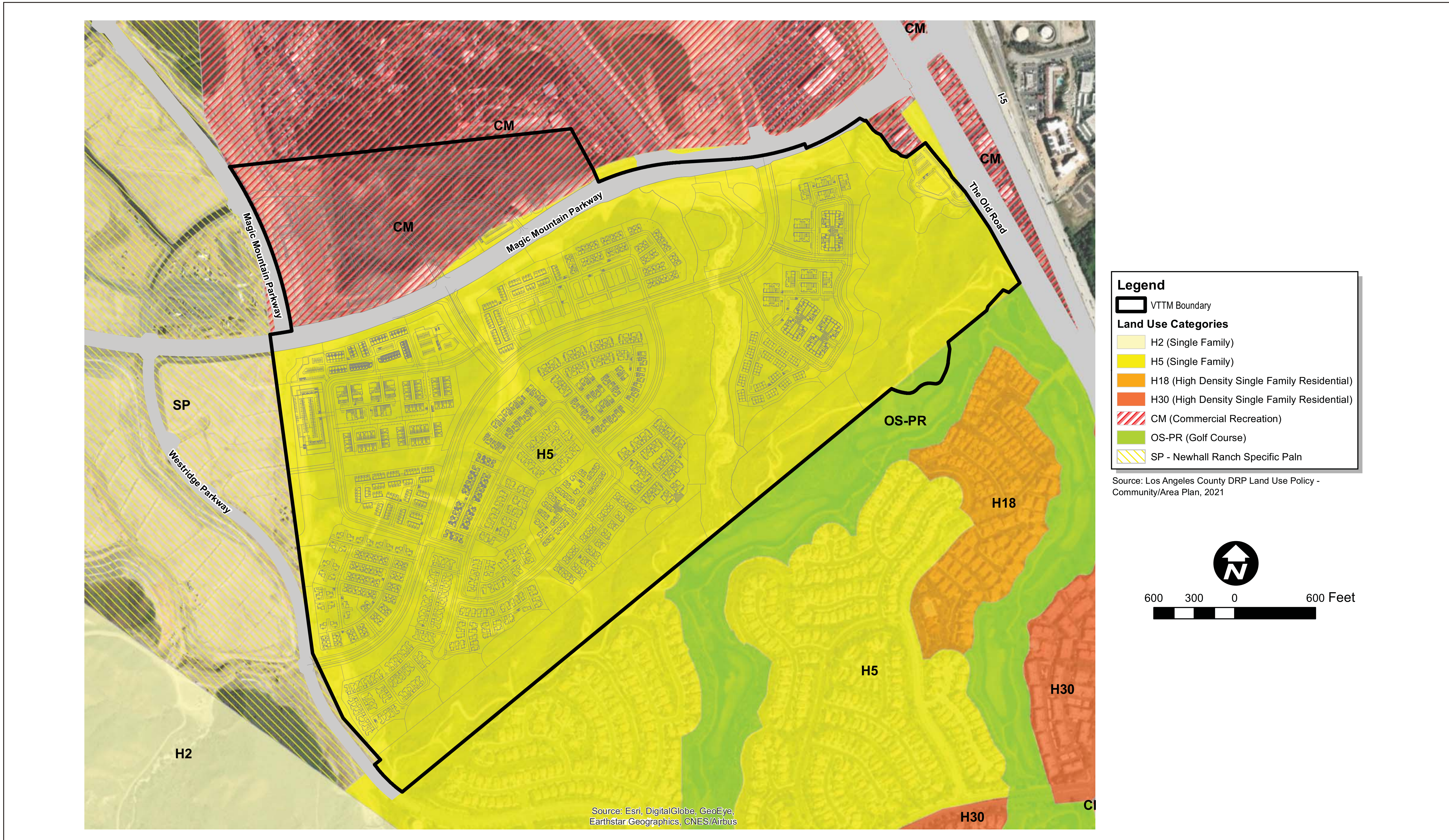

SOURCE: FIVEPOINT 2021

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FIGURE 3a

Entrada South OVOV Land Use Designations

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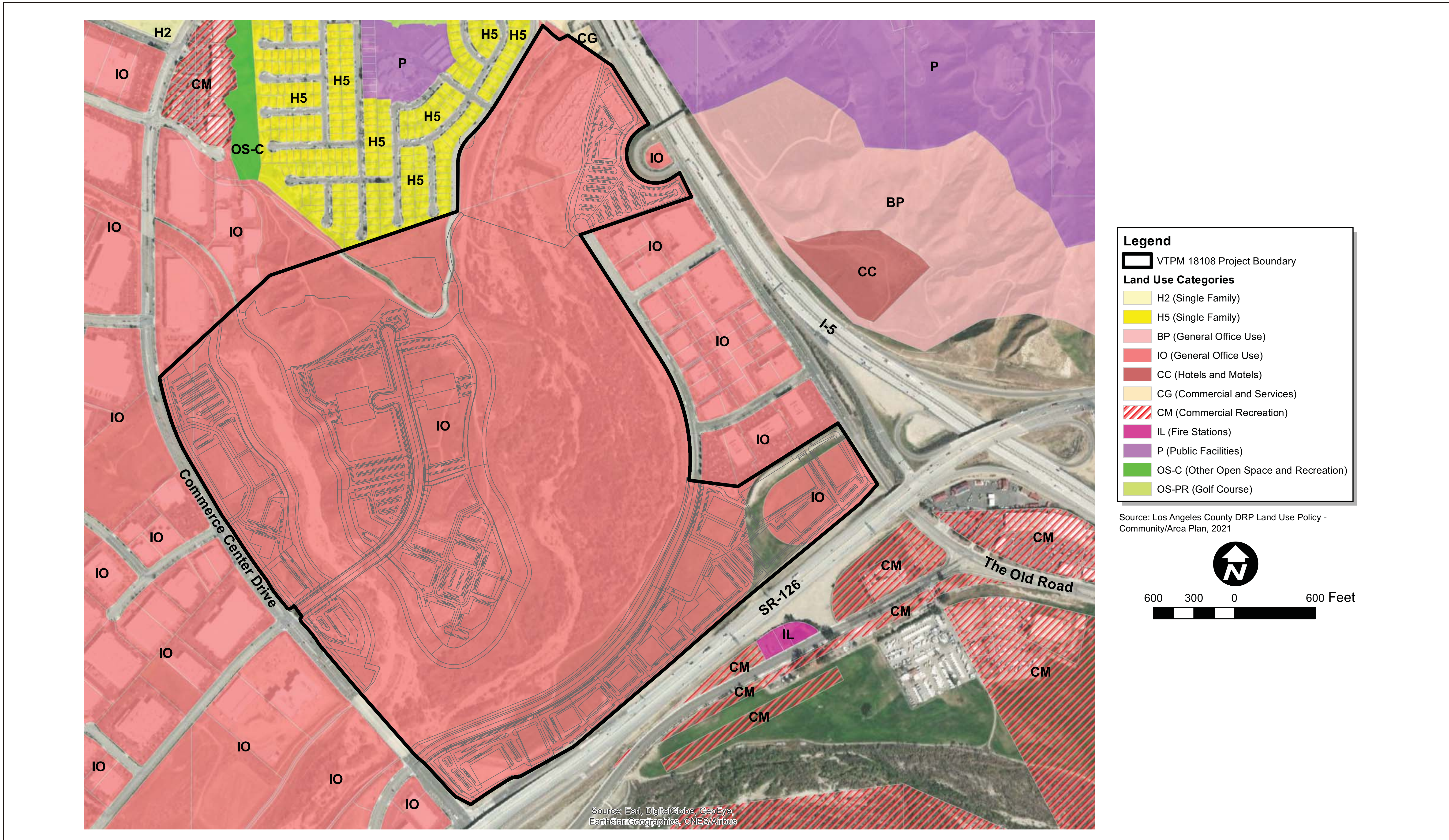

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FIGURE 3b

Valencia Commerce Center OVOV Land Use Designations

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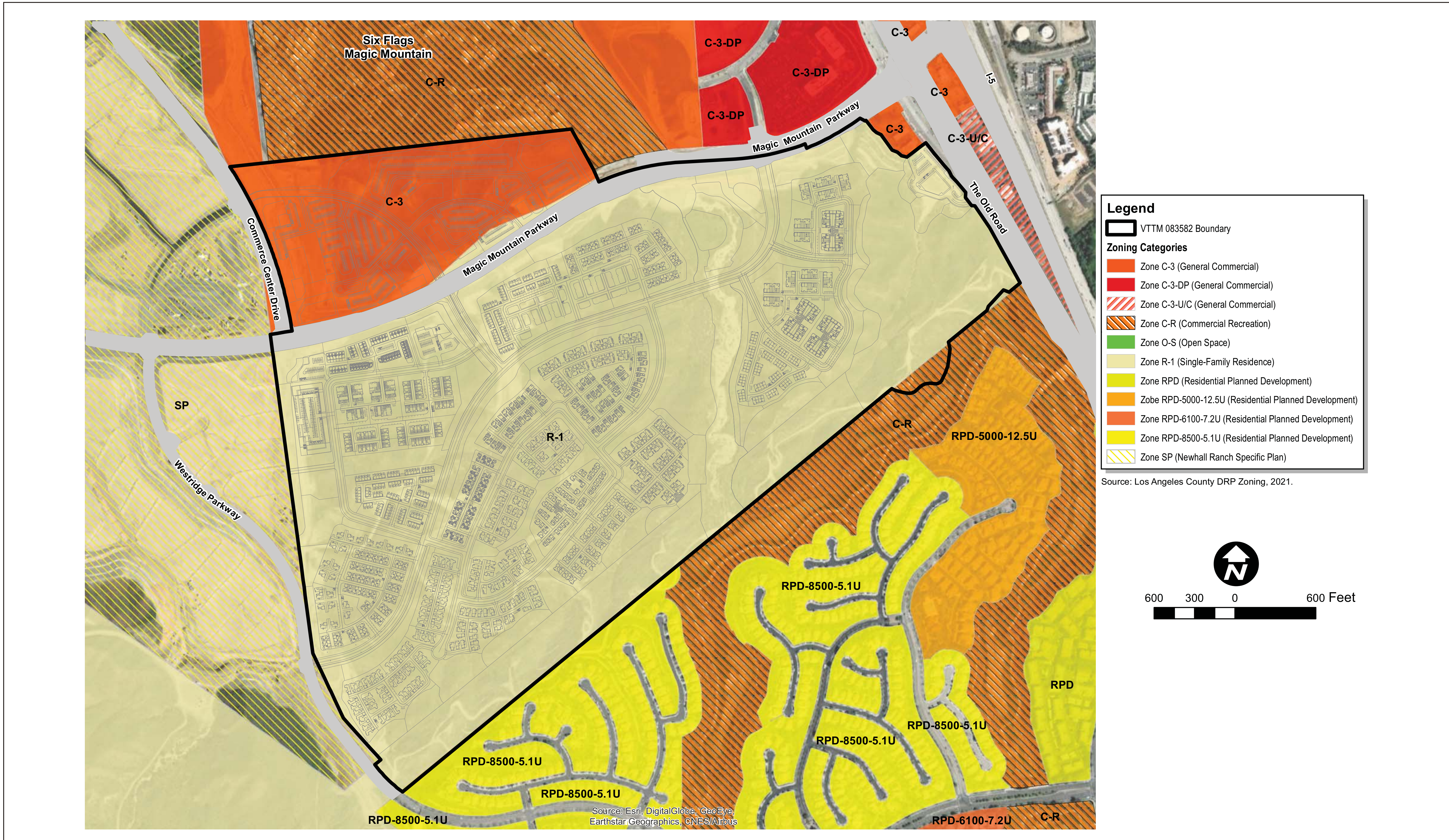

SOURCE: FIVEPOINT 2021

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FIGURE 4a

Entrada South Zoning Designations

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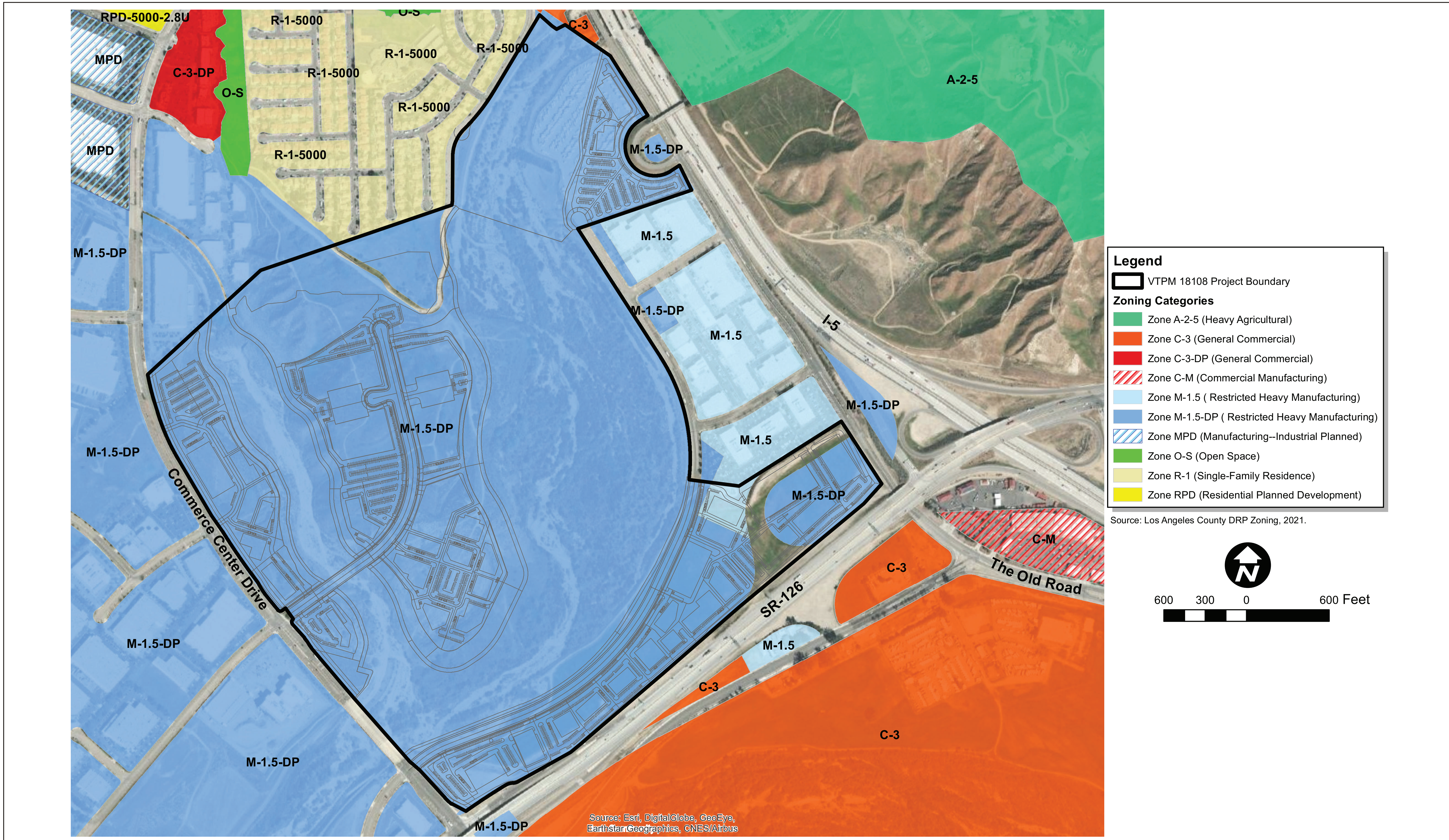

SOURCE: FIVEPOINT 2021

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FIGURE 4b

Valencia Commerce Center Zoning Designations

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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1.3 State-Certified EIR Analysis of Wildfire and Evacuation Impacts Associated with the 2017 Approved Project

In 2010, the California Department and Fish and Wildlife and the United States Army Corps of Engineers prepared a joint EIS/EIR to analyze the development of the Newhall Ranch Specific Plan area along with the Entrada South and VCC planning areas. The Project was first approved in December of 2010 however, in 2015 the California Supreme Court identified that additional environmental analysis was required. In June of 2017, the Project was re-approved and certified by the California Department of Fish and Wildlife. In the State-certified EIR, wildfire impacts were discussed in Section 4.17 Hazards, Hazardous Materials, and Public Safety. The existing conditions identified that at the time of the EIR, the area from SR-126 to the south of the Santa Clara River was a moderate fire hazard while the remainder of the site was classified as a high fire hazard, based on vegetative cover, water availability, access, and topography. Wildfire impact was analyzed under two criteria:

- Significance Criterion 4 – Would the project impact the implementation of or interfere with an adopted emergency response plan or evacuation plan?
- Significance Criterion 6 – Would the project expose people or structures to a significant risk of loss, injury, or death involving wildfires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Regarding Significance Criteria 4, the State-certified EIR analyzed whether the 2017 Approved would impact an adopted emergency response or evacuation plan. While the 2017 Approved Project would increase demand on emergency response, firefighting capabilities would be provided by existing and planned fire stations over buildout. The Project would also provide a system of improved roads meeting County standards. The State-certified EIR determined that the circulation system was found to serve the safety needs of the community based on the access design and compliance with applicable County safety standards to be met at the time of the building permit issuance. In addition, the 2017 Approved Project would comply with mitigation measure PH-7 requiring secondary access routes to ensure that potential impacts to public safety related to emergency access responsive services and emergency evacuation within the Entrada and VCC Planning areas were reduced to less than significant levels.[1] PH-7 applies to the Modified Project and is provided as follows: “All development of the Newhall Ranch Specific Plan site and the VCC and Entrada planning areas shall be in compliance with the provisions of the Los Angeles County Code, Title 21, Section 24.020 for secondary evacuation access.”

Regarding Significance Criteria 4, the State-certified EIR found that impacts from wildland fires were significant but mitigable. The impact was analyzed based on how the development would contribute to or impact limited access, lack of adequate water supplies, type of vegetative cover, and topography. The Project would provide access that would be consistent with County Code and include provisions for secondary access for evacuation. Water supply for the Project would be provided for both domestic and non-domestic uses including supporting fire suppression activities. The Project would include water mains, fire hydrants, and fire flow per County standards and no significant water-related fire hazards would occur. Topographically, the Project area includes a steep canyon covered in combustible vegetation however development would only occur within the central and northern portion of the site where slopes are moderate. However, portions of the proposed development would be adjacent to heavy vegetative cover comprised of highly combustible plant communities, posing a potentially

1 Final State-certified EIR, p. 4.17-60.

significant fire protection impact. As the development occurs the fire hazard associated with the natural vegetation would be replaced with irrigated and less combustible plants however, the potential for wildfire fire would still exist at the wildland-urban interface. This is based on the presence of brush, increased human activity, and the potential for fires due to accidental and arson-related causes. However, the Project would implement Mitigation Measure PH-14 requiring the development of a Wildfire Fuel Modification Plan to reduce the wildfire hazard in the interface zone. With adherence to regulatory compliance obligations and the implementation of Mitigation Measure PH-14, the State-Certified EIR found that the impact for Significance Criterion 6 was less than significant.[2] PH-14 applies to the Modified Project and is provided as follows:

> At the time of final subdivision maps permitting construction in development areas that are adjacent to Open Area and the High Country SMAs, a Wildfire Fuel Modification plan shall be prepared in accordance with the fuel modification ordinance standards in effect at that time and shall be submitted for approval to the Los Angeles County Fire Department. The Wildfire Fuel Modification plan shall depict a fuel modification zone, the size of which shall be consistent with the Los Angeles County fuel modification ordinance requirements. Within the zone, tree pruning, removal of dead plant material, and weed and grass cutting shall take place as required by the fuel modification ordinance. The Wildfire Fuel Modification plan shall include the following construction period requirements: (a) a fire watch during welding operations; (b) spark arresters on all equipment or vehicles operating in a high fire hazard area; (c) designated smoking and non-smoking areas; and (d) water availability pursuant to the Los Angeles County Fire Department requirements. The fuel modification zone will not extend onto any spineflower preserve.

The State-certified EIR also analyzed the potential for development of the Entrada and VCC Planning Areas to cause offsite impacts related to both emergency response and emergency evacuation plans and related to wildland fires. The State-certified EIR determined that the 2017 Approved Project would not result in significant off-site impacts related to these topics.[3]

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2 Final State-certified EIR, p. 4.17-60 4.17-61.
3 Final State-certified EIR, p. 4.17-62.

2 Existing Setting: Project Study Area Conditions, Risk Factors, and Fire History

2.1 Field Assessment

Following a review of available digital Study Area information, including topography, vegetation types, fire history, and the Project's development footprint, Dudek fire protection planners conducted a field assessment of the Study Area on December 18, 2019, and again during September and October 2021. Dudek's assessment was aided by Dudek's staff biologists who conducted numerous biological surveys specific to the Project Site since 2002 and again in 2019 (Dudek 2019a, 2019b).

Among the field tasks completed were the following:

- Vegetation estimates and mapping refinements
- Fuel load analysis
- Topographic features documentation
- Regional land uses, existing communities, potential vulnerabilities
- Photograph documentation
- Confirmation/verification of hazard assumptions
- Ingress/egress documentation

Study Area photographs were collected (Appendix A), and fuel conditions were mapped using aerial images. Field observations augmented existing Study Area data in generating the fire behavior models and formulating the requirements provided in this FPP.

2.2 Study Area Characteristics and Fire Environment

The following sections discuss the characteristics of the Study Area on a regional scale. Evaluating conditions at this macro-scale provides a better understanding of the regional fire environment, which represents the fuel bed for wildfires that may ignite in the vicinity of, and burn toward, the Modified Project's planned and maintained fire buffers, landscapes, and ignition-resistant structures. This area also presents the habitat and fuel load that is the focus of fire prevention efforts and features that are part of the Modified Project's design and ongoing maintenance planning efforts.

2.2.1 Climate

The Modified Project Site is situated at relatively low elevations within the Santa Clara River Valley. The climate of this region is influenced by both the arid continental climate to the east and the moister Mediterranean climate to the west; therefore, the region is described as having a hot-to-cold and semi-arid to sub-humid climate. As such, temperatures are subject to much more variability on a daily and seasonal basis. Typically, the area has hot dry summers followed by cold wet winters. In the summer months and early fall daily, highs can range from 78°F to over 95°F. According to the Piru 2 ESE (East-South-East) weather station[4] in Los Angeles County, the mean annual rainfall for the region is 17.2 inches of rain per year (WRCC 2019); however, some portions of the region remain in the rain shadow of the Santa Susana Mountains and receive considerably less rainfall than areas north of the Santa Clara River.

From a regional perspective, the fire risk in southern California can be divided into three distinct "seasons" (Nichols et al. 2011, Baltar et al 2014). The first season, the most active season and covering the summer months, extends from 25 May to 26 September. This is followed by an intense fall season characterized by fewer but larger fires. This season begins on 27 September and continues until 7 November. The remaining months, 8 November to 24 May cover the mostly dormant, winter season. Mensing et al. (1999) and Keeley and Zedler (2009) found that large fires in the region consistently occur at the end of wet periods and the beginning of droughts.

Prevailing winds on the Modified Project site are from the east-northeast and average 14 miles per hour. The winds are influenced by the Pacific Ocean which causes a diurnal wind pattern known as the land/sea breeze system. Winds in the summer season have higher average speeds than during the winter season due to greater pressure gradient forces. Typically, the highest fire danger in southern California coincides with Santa Ana winds. During recent major fires near the Modified Project under Santa Ana wind conditions, sustained wind speeds were recorded exceeding 19 mph with gusts over 50 mph (Los Angeles Times, 2019). The Santa Ana wind conditions are a reversal of the prevailing southwesterly winds that usually occur on a region-wide basis near the end of fire season during late summer and early fall. They are dry, warm winds that flow from the higher desert elevations in the east through the mountain passes and canyons. As they converge through the canyons, their velocities increase. Consequently, peak velocities are highest at the mouths of canyons and dissipate as they spread across valley floors. Localized wind patterns on the Modified Project Site are strongly affected by both regional and local topography. The Modified Project Site is occasionally subject to strong Santa Ana wind events.

2.2.1.1 Climate Change

A rapidly warming climate is expected to impact California and the Western U.S. from both direct and indirect effects. Since 2006, the State has monitored and created climate change assessments to assess the impacts and risks of climate change. Based on California's Fourth Climate Change Assessment, published in 2019, the current average annual maximum daily temperature is projected to increase between 5.6 and 8.8 degrees by 2100 (State of California, 2019a). The rising temperature is expected to result in increased heat waves in cities by 2050. The increased temperature and increased probability of heat waves that will impact electricity demand, especially in inland and Southern California. Climate change is also predicted to, directly and indirectly, increase the risk associated with public health resulting in earlier deaths and increased illnesses. Currently, there is not a strong consensus on how California as a whole will be impacted by changes in precipitation. The general trend indicates that the northern part of California will become wetter while the southern portion of California will become drier (State of California, 2019a). However, water supply from snowpack is projected to decline by at least 2/3 by 2100 due to less precipitation falling as snow; with water shortages occurring by 2050. Further, over 3,000 miles of highways are projected to be exposed to temporary flooding because of increased 100-year storm events (State of California, 2021).

[4] Piru weather station is 709 feet above mean sea level and located at 34.42° North 118.79° West.

A major factor in climate change is greenhouse gas (GHG) emissions and wildfires can contribute to emissions as well. The California Air Quality Resource Board in 2020 completed a public draft assessment of the GHG and carbon impacts of wildfire and forest management activities (CARB, 2020a). The report is a result of SB 901 which required CARB to assess and report the GHG emissions associated with wildfire and forest management activities. Wildfire CO_2 emissions vary annually with annual emissions ranging from 1 million metric tons (MMT) of CO_2 in 2010 to 39 MMT of CO_2 in 2018 with an overall average CO_2 emission of 14 MMT from 2000-to 2019. Fires in forests and woodlands were the largest contributors to wildfire-caused emissions due to higher fuel loads than in areas dominated by shrubs and grasses. While in 2017, forest and shrublands had roughly equal areas of burned acres the fires in the forest created more than double the emissions. The 2020 fire season resulted in multiple large fires in forest areas and created record-high emissions with over 106 MMT of CO_2 (CARB, 2020b).

Because wildfires can contribute to climate change via GHG emissions and be affected by climate change, the Fourth Climate Assessment also examined how climate change is expected to impact wildfires across the State. Fire frequency and intensity are expected to be impacted by the rapidly changing climate; however, as wildfires are affected by multiple complex drivers the projections range from modest to large increases in wildfire regimes. The area burned by wildfire has been found to increase parallel to the increasing air temperatures. The average area burned may increase by 77% by 2100, if emissions continue to rise. The statewide maximum burn area is projected to rise by 178% and extreme wildfires are predicted to occur 50% more often by the end of the century. However, model projections regarding wildfire intensity, spread, and duration are limited. The changes to temperature, loss of snowpack, and earlier snowmelt are expected to result in dryer "dry" seasons and result in more susceptible forests. Wildfires are occurring at higher elevations and this trend is expected to be exacerbated by climate change. Late Santa Ana winds will continue to be most frequent in December and January. However, there is a lack of consensus on how Santa Ana wind-driven wildfires will change. Additional research is needed to better understand the effect of climate change on extreme wind events and wildfires (State of California, 2019a).

Wildfire simulations found that forested areas, especially the Sierra Nevada, are projected to have the greatest increases in burned areas under extreme weather (State of California, 2018). The burned area is likely to increase in conjunction with warming temperatures and has a stronger effect on montane forests in the northern two-thirds of the State. The increased burned areas were also found to be consistent with current experiences and trends already exhibited in the State and the western U.S. Impacts to tree mortality as a result of fine fuels encroaching on forest canopy areas were only expected to have a small increase from 1-7% in the near future and within the systems natural variability. It was also found that depending on vegetation type and fuel amount the impact from climate viability changed demonstrating great spatial diversity in wildfire response to climate change (State of California, 2018).

The Fourth Climate Assessment also prepared assessments based on regions to capture region-specific effects of climate change (State of California, 2019b). The Los Angeles Region includes all of Ventura, Los Angeles, and Orange Counties as well as the urbanized areas of San Bernardino and Riverside Counties. This region has a highly variable topography ranging from coastal plains to mountain ranges to desert areas. In the Los Angeles region, average maximum temperatures are projected to increase around 4-5 degrees by 2050 and 5-8 degrees by 2100. As a result, the number of extremely hot days is also expected to increase across the region. By the late century, the hottest day of the year is predicted to be up to 10° F hotter for most locations across the region. Precipitation is projected to only exhibit small changes in average precipitation amounts. However, extreme precipitation events, both wet and dry, are expected to increase. Areas are projected to experience a 25-30% rise in the wettest day of the year by the end of the century. As a result, the atmospheric river events are expected to see an increase in frequency and severity (State of California, 2019b).

Within southern California, Santa Ana winds are a unique climatic feature. These winds result in strong northeasterly downslope offshore winds that can be a catalyst for wildfire within the region. Currently, Santa Ana winds are most frequent in December and the strongest in January. These events have significant interannual variability and there have been no significant trends yet regarding a decline in their intensity, duration, and frequency. How climate change may impact future Santa Ana wind events is uncertain and inconclusive. Some studies have exhibited the wind events increasing while others have shown them to decrease with climate change.

Wildfires in the Modified Project area are influenced by the Mediterranean climate, Santa Ana winds, drought, type and spatial distribution of vegetation, topography, large WUI interfaces, fire suppression, and human activities within the Los Angeles region. Nearly 80% of all wildfires currently occur in the summer and fall with a quarto of those fires happening under Santa Ana wind conditions. However, there remains significant uncertainty over how climate change will affect fire frequency and intensity in the region. Some future projections indicate that wildfires in the Los Angeles area will increase in burned are by the mid-21st century with the burned area increasing 60% for Santa Ana-based fires and 75% for non-Santa Ana-based fires. However, other climate projections using different statistical models found the average area burned to be much lower and that the annual area burned by the mid-century to increase by over 2000 hectares. Further, similar yet slight lower increases in wildfire areas burned were also projected to occur by the late 21st century as continued warming could cause an overall fuel decline in the region. These discrepancies highlight that there while wildfires are projected to increase in the Los Angeles Region there is still a large uncertainty about how exactly climate change will affect fires in this region and to what degree will wildfire frequency change (State of California, 2019b).

The effect climate change will have on future fire regimes is not unilateral, especially in Southern California (Keeley & Syphard, 2016). Future fire regimes are not only changing in response to climate change but also in response to ignitions, with human ignitions complicating the role of climate change in driving wildfires. In Southern, California humans account for 95% of fires and have altered the timing of wildfires by increasing the probability of ignitions during Santa Ana wind events. Although there are no studies to date that link fire-hardened, master-planned communities with new ignitions. While research has indicated that climate change will affect montane forests lower elevation landscapes, like the Los Angeles Region are not strongly climate limited as in these regions the primary driver of wildfire is human-caused ignitions. The regional analysis demonstrates that in Southern California climate drivers are eclipsed by human ignition drivers and increased population on the landscape-altering future climate regimes (Keeley & Syphard, 2016).

2.2.2 Topography

The Modified Project Site is located in the Santa Clara River Valley, between the Santa Susana Mountains to the south and the Topatopa Mountains to the north. The Modified Project Site is topographically diverse with slope gradients ranging from moderate to steep on the hillsides to very gentle in the Santa Clara River floodplain and major tributary canyons.

The Entrada Planning Area is located south of the Santa Clara River on rugged terrain dominated by steep slopes. It is dissected by four south–north-trending tributaries to the Santa Clara River, including one along Magic Mountain Canyon and three unnamed tributaries (Figure 5a, Topography). All four tributaries exit the Entrada Planning Area through natural drainages before eventually discharging into the Santa Clara River. Topographically, the southern portion of the site is dominated by north–south-trending ridges. A narrow panhandle (roughly 330 feet wide) extends along the western portion of the site to a fairly level former pasture area.

The VCC Planning Area is located north of the Santa Clara River and is dissected by two south–north-trending tributaries to the Santa Clara River: Castaic Creek and Hasley Creek (Figure 5b). Both tributaries exit the VCC Planning Area through natural drainages before eventually discharging into the Santa Clara River. Topographically, the site is situated in relatively flat areas along Castaic Creek and within the lower elevations of Hasley Canyon. The remaining portions of the site have greater topographic relief. Site elevations range from approximately 990 feet amsl along the Castaic Creek bottom to approximately 1,210 feet amsl at the top of the north-central ridge (Dudek 2020).

Topography influences fire risk by affecting fire spread rates. Typically, steep terrain results in faster fire spread up-slope and slower spread down-slope. Terrain that forms a funneling effect, such as chimneys, chutes, or saddles on the landscape can result in especially intense fire behavior, including faster spread and higher intensity. Conversely, flat terrain tends to have little effect on fire spread, resulting in fires that are driven by vegetation and wind. Topographic features that may present a fire spread facilitator are the slope and canyon alignments, which may serve to funnel or channel winds, thus increasing their velocity and potential for influencing wildfire behavior. From a regional perspective, the alignment of the Santa Clara River floodplain, tributary canyons, and dominant ridges are conducive to channeling and funneling wind, thereby increasing the potential for more extreme wildfire behavior in the region. Additionally, slope failures, mudflows, and landslides are common in areas with steep hillsides and embankments. These conditions would be exacerbated in a post-fire environment where vegetation cover has been burned off. Given the Project's location in a fire-prone area, occupants and structures could be exposed to downslope or downstream flooding or landslides are a result of post-fire conditions. As discussed in Section 2.2.5 Historic Wildland Fires, the Rye Fire in 2017 was the most recent fire to burn onto the Modified Project Site. Surveys conducted by Dudek in 2019 concluded that the vegetation has regenerated since the 2017 Rye Fire, thus stabilizing the surrounding slopes. Both planning areas are within identified liquefaction zones; the Entrada South Planning Area is bisected by a liquefaction zone and the Valencia Planning Area is almost completely zoned as a liquefaction area (County of Los Angeles, 2020). Many of the ridgelines in the planning areas are also identified as having the potential for earthquake-induced landslides (County of Los Angeles, 2021). However, neither planning area shows evidence of landslide or slope slippage activity (California Geologic Survey, 2020). Grazing measures and mitigation would be incorporated into the construction to address any landslide hazards or related issues.

2.2.3 Existing Land Uses

2.2.3.1 Entrada South Planning Area

Most of the Entrada Planning Area is undeveloped due to its rugged terrain, but there is direct disturbance from past and ongoing oil and natural gas operations on about 26% (approximately 130 acres) of the site, including associated dirt roads and oil pad ground clearance zones. The northernmost of the Entrada Planning Area next to the Santa Clara River is an agricultural field used as non-irrigated pasture. The southeastern corner of the Entrada Planning Area is dedicated to a 29.17-acre spineflower preserve.

There is significant development influence near the Entrada Planning Area, including I-5 to the east, State Route 126 (SR-126) to the north, and secondary road infrastructure to the south, east, and north. The Westridge development, medium-density residential housing, and an integrated golf course are adjacent to the site on the south and southeast, and major commercial land use adjacent to the north and east includes the Six Flags Magic Mountain theme park. The planned development, including the Mission Village and Legacy Village communities, within the Newhall Ranch Specific Plan area, is located to the west and southwest, respectively. The approved Mission Village community, which will provide a new fire station, is under construction. Additionally, the proposed Entrada North community would be to the north. Southern California Edison (SCE) and Southern California Gas

Company have transmission corridors within easements along the southern boundary of the site. SCE actively maintains the easements/transmission lines and access roads. The Westridge golf course is south of the SCE transmission line easement.

2.2.3.2 Valencia Commerce Center Planning Area

Most of the VCC Planning Area is undeveloped, but there is direct disturbance from sand and gravel production, cattle grazing, and agricultural operations on about 27% (approximately 169 acres) of the site, including associated dirt roads and graded areas. There is also an existing parking lot associated with Castaic Junction along the eastern boundary of the site. Paved roads connecting to commercial development north of the VCC Planning Area also occur on the site. The southern portion of the site includes ongoing agricultural uses. In addition, SCE and Southern California Gas Company have distribution lines and access roads within easements on the site.

Land uses surrounding the VCC Planning Area include commercial and residential development as well as vacant land. Castaic Junction is located immediately east of the Planning Area. Beyond that is vacant land. Residential development is immediately north of the VCC Planning Area. Commercial development is north, northwest, and west of the Planning Area in addition to vacant land. The Valencia Travel Village is south of the Planning Area between the SR-126 and the Santa Clara River. A commercial center and the California Highway Patrol Newhall Station are located southeast of the site between The Old Road and I-5. Hotel and commercial uses are located to the southeast across The Old Road. Los Angeles County Fire Station 76 and a small gas station are located between Henry Mayo Drive and SR-126, immediately west of the Castaic Junction off-ramp exiting SR-126. The development currently planned on vacant land south of the VCC Planning Area includes the proposed Entrada North community (Vesting Tentative Tract Map (VTTM) 071377) and the approved Mission Village community (VTTM 061105) within the Specific Plan area.

2.2.3.3 Historic and Ongoing Grazing Program

Newhall has engaged in historic and ongoing grazing of certain lands adjacent to and in the vicinity of the Modified Project. The historic grazing program has occurred around the Entrada South site as a part of the stewardship of ranchlands. The grazing program functions as a thinning zone by reducing fuel loads adjacent to the built environment resulting in a large buffer. Grazing has been shown to regulate the accumulation of fuel loads and aid in fuel management and complement standard wildland fire hazard reduction techniques (Starns et al., 2019). Grazing programs can not only reduce the risk of catastrophic wildfire but provide environmental benefits such as enhancing native grassland planets, maintaining grassland, and preventing shrub intrusion (University of California Agriculture and Natural Resources, 2021). The intent of the grazing program complements the Modified Project features and further setbacks wildland/unmaintained fuels from the Modified Project, however, it is not required to lower the fire behavior. As indicated in Section 4 Modeling: Anticipated Fire Behavior for Worst-Case Fire Conditions the implementation of the Modified Project setbacks, construction measures, and defensible space result in reduced fire behavior. The grazing program facilitates the historic land use and stewardship of the area while also maintaining and reducing the vegetative fuels. Because of the variability of the historic grazing practices, this FPP considers the grazing program as an additional environmental benefit but, conservatively, this FPP does not rely upon those benefits when determining the Modified Project’s potential impacts under CEQA.

2.2.4 Vegetation (Fuels)

Extensive vegetation type mapping is useful for fire planning because it enables each vegetation community to be assigned a fuel model, which is used in a software program to predict fire behavior characteristics, as discussed in Section 4 Modeling: Anticipated Fire Behavior for Worst-Case Fire Conditions. Generally, WUI interfaces with shrubland-dominated vegetation are found to be more fire-prone than those with grasslands or other natural spaces (Elia et al., 2019). The Modified Project Site's vegetative fuels are primarily annual grassland, scrub and chaparral habitat, and riparian forest. Man-made land cover types, such as agriculture and disturbed land were also previously mapped on the Entrada and VCC Planning Areas. These vegetation community and land cover types were confirmed by Dudek fire protection planners in the field and the dominant vegetation types were assigned fuel models for use during fire behavior modeling (see Section 4.1.1 Fire Behavior Modeling Analysis). The vegetation communities are shown in Figure 6a for the Entrada Planning Area and Figure 6b for the VCC Planning Area.

Post-development vegetation composition proximate to the Entrada South and VCC footprints is expected to be significantly different than current conditions. Following build-out, irrigated landscape vegetation associated with fuel modification zones (FMZ) are expected to cover the immediate area surrounding the Modified Project Site, extending 100- to 200- horizontal feet from each of the structures, depending on County Fire direction and geographic constraints . Consistent with requirements, native and naturalized vegetation occurring within FMZ Zone C is not expected to be irrigated, although overall fuel volumes will be reduced by removing dead and dying plants, non-natives, highly flammable species, and thinning the remaining plants so they would not readily facilitate the spread of fire on an ongoing basis. The provided FMZ areas will be maintained in order to comply with County Fire Fuel Modification Plan guidelines.

2.2.4.1 Vegetation Dynamics

Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (leaf size, branching patterns), and overall fuel loading. For example, the native shrublands that compose the coastal scrub community on the Modified Project sites are a high potential hazard based on such criteria.

Existing vegetation distribution throughout the Modified Project Site varies by location and topography. Areas, where the proposed development is located, are primarily disturbed or covered with non-native grasses, while the adjacent slopes support coastal scrub cover. The importance of vegetative cover in fire suppression efforts is its role in affecting fire behavior. For example, fire burning in grasslands may have shorter flame lengths than those burning in coastal scrub; however, fire in grasslands, due to its flashy (easily ignited when dry) nature, often spreads more rapidly than fire in other vegetation types.

As described, vegetation plays a significant role in fire behavior. A critical factor to consider is the dynamic nature of vegetation communities. Fire presence and absence at varying cycles or regimes affect plant community succession. A succession of plant communities, most notably the gradual conversion of shrublands to grasslands with high-frequency fires and grasslands to shrublands with fire exclusion, is highly dependent on the fire regime. Biomass and associated fuel loading will increase over time, assuming that disturbance or fuel reduction efforts are not diligently implemented.

Wildfire disturbances can also have dramatic impacts on plants and plant composition. Heat shock, accumulation of post-fire charred wood, and change in photoperiods due to removal of shrub canopies may all stimulate seed germination. The post-fire response for most species is vegetative reproduction and stimulation of flowering and fruiting. The combustion of aboveground biomass alters seedbeds and temporarily eliminates competition for moisture, nutrients, heat, and light. Species that can rapidly take advantage of the available resources will flourish. It is possible to alter successional pathways for varying plant communities through manual alteration. This concept is a key component in the overall establishment and maintenance of the proposed FMZs on the Modified Project Site. FMZs are modified landscape areas that minimize fire spread progressively through various restrictions, treatments, and maintenance. FMZs provide a buffer between off-site fuels and the urbanized landscapes that have the dual benefit of protecting communities while also protecting habitats by minimizing the potential for project-related ignitions.

SOURCE: USGS, 7.5 MINUTE SERIES, NEWHALL QUADRANGLE

DUDEK

0 360 720 Feet

FIGURE 5a

Entrada South Topography

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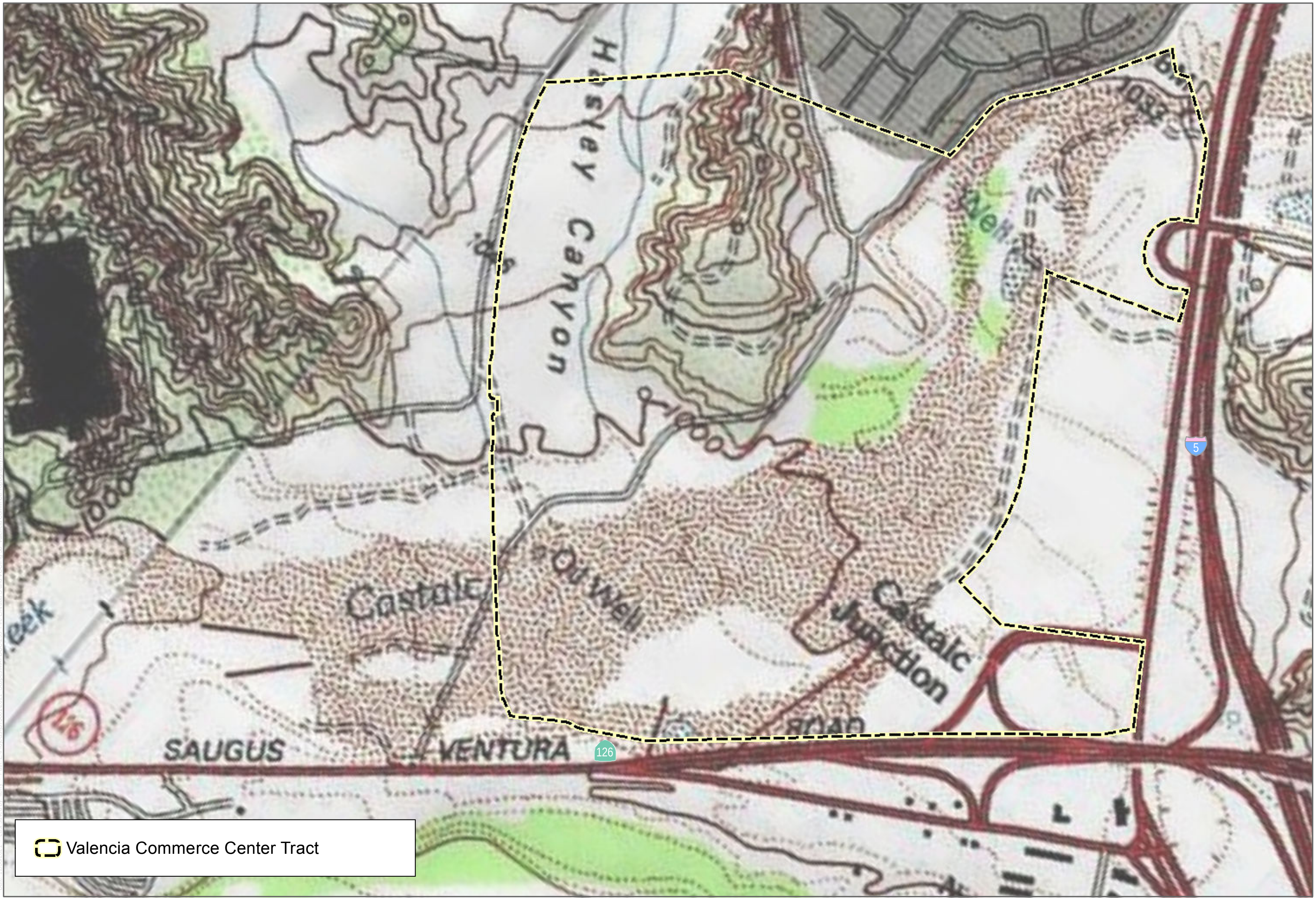

SOURCE: USGS, 7.5 MINUTE SERIES, NEWHALL AND VAIL VERDE QUADRANGLES

DUDEK

0 405 810 Feet

FIGURE 5b

Valencia Commerce Center Topography

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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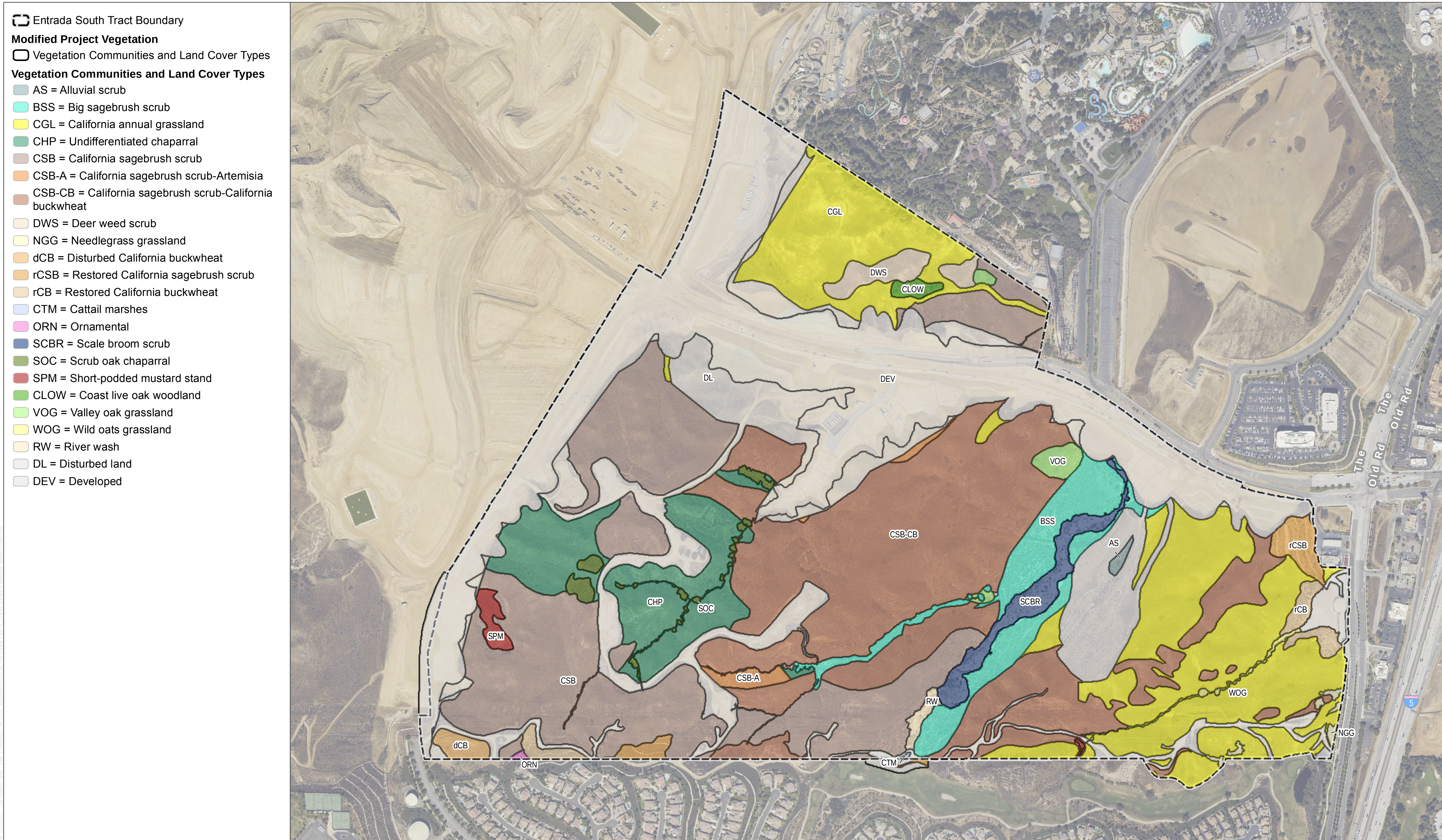

SOURCE: ESRI 2019; Hunsaker 2019

DUDEK

0 295 590 Feet

FIGURE 6a

Entrada Planning Area's Vegetation Communities and Land Cover Types

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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Modified Project

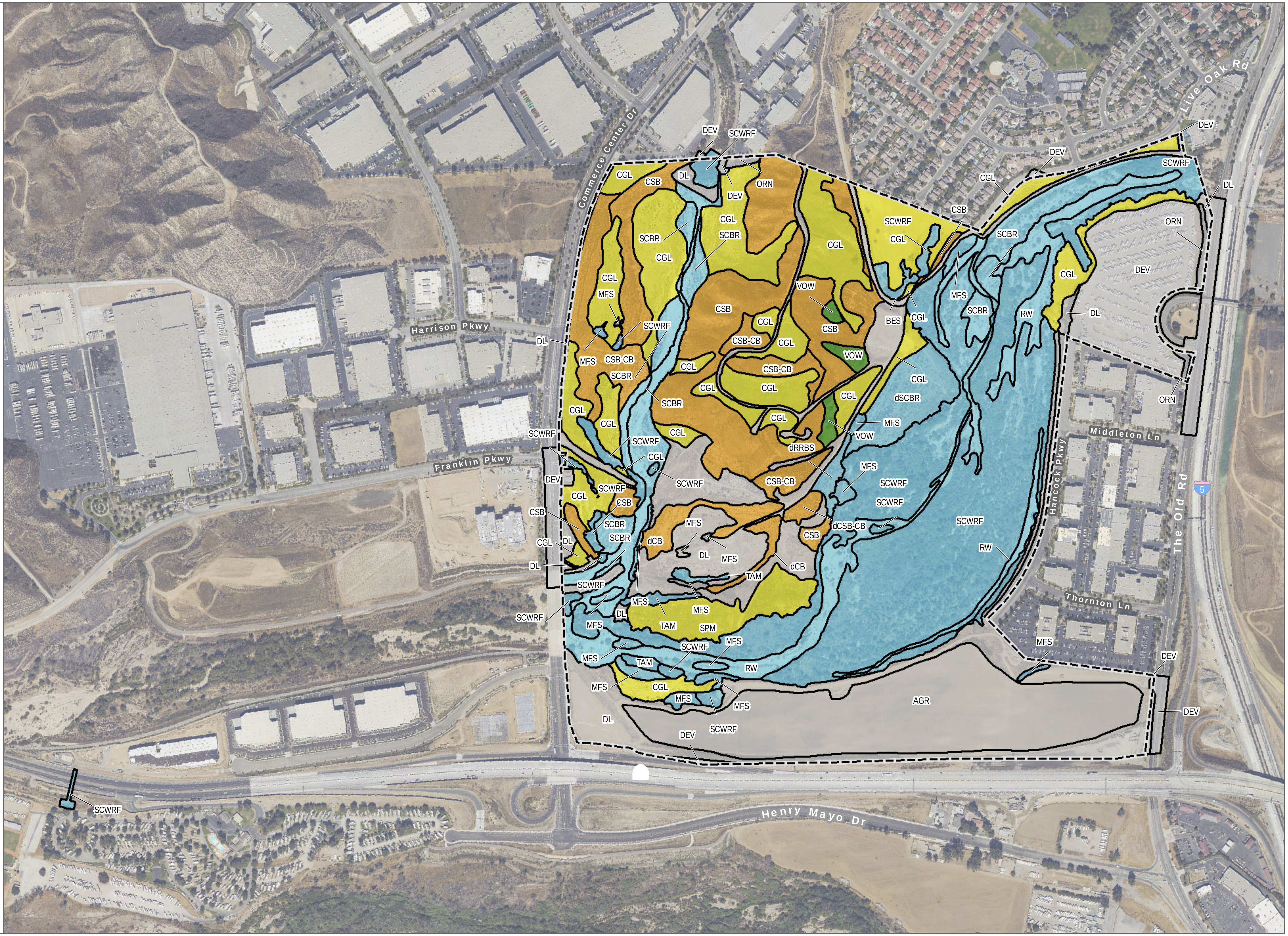
- Off-Site Project Impact
- Valencia Commerce Center Tract Boundary

General Vegetation Communities and Land Cover Types

- Coastal Scrub
- Grass and Herb Dominated Communities
- Oak woodland
- Riparian
- Man-made land cover

Specific Vegetation Communities and Land Cover Types

AGR = Agriculture
BES = Blue elderberry stands
CGL = California annual grassland
CSB = California sagebrush scrub
CSB-CB = California sagebrush scrub-California buckwheat
DEV = Developed
DL = Disturbed land
MFS = Mulefat scrub
ORN = Ornamental
RW = River wash
SCBR = Scale broom scrub
SCWRF = Southern cottonwood-willow riparian forest
SPM = Short-podded mustard stand
TAM = Tamarisk scrub
VOW = Valley oak woodland
dCB = Disturbed California buckwheat
dCSB-CB = Disturbed California sagebrush scrub-California buckwheat
dRRBS = Disturbed rubber rabbitbrush scrub
dSCBR = Disturbed scale broom scrub



SOURCE: ESRI 2019; Hunsaker 2019

DUDEK

0 400 800 Feet

FIGURE 6b

VCC Planning Area's Vegetation Communities and Land Cover Types

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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2.2.5 Historic Wildland Fires

Fire history is an important component of an FPP. Historic fire data provides valuable information regarding fire spread, fire frequency, fire type, most vulnerable Modified Project areas, and significant ignition sources, amongst others. One important use for this information is as a tool for pre-planning. It is advantageous to know which areas may have burned recently and therefore may provide a tactical defense position, what type of fire burned on the site, and how a fire may spread. Fire history represented in this FPP utilizes the California Department of Forestry and Fire Protection (CAL FIRE) Fire and Resource Assessment Program (FRAP) database. FRAP summarizes fire perimeter data dating to the late 1800s, but it is incomplete due to the fact that it includes only fires over 10 acres in size and has incomplete perimeter data, especially for the first half of the 20th century (Syphard and Keeley 2016). However, the data does provide a summary of recorded fires and can be used to show whether large fires have occurred in the Modified Project Area, which indicates whether they may be possible in the future.

According to available data from CAL FIRE's FRAP (CAL FIRE 2025)[5], 185 wildland fires have burned in a 5-mile vicinity of the Modified Project Area since the beginning of the historical fire data records. Recorded wildfires range from 0.1 acres to 115,537 acres (1970 Clampitt Fire). However, the average fire size is 3,482 acres.[6] The 2020 Hasley Fire (6.7 acres) and the 2020 Equestrian Fire (85 acres) are the most recent fires that occurred adjacent to the Entrada South and VCC Planning Areas. County Fire may have data regarding smaller fires (less than 10 acres) that have occurred on or near the Modified Project Site that have not been included herein. In addition to the Rye Fire, the 2007 Magic Fire (2,825 acres) and 2013 Magic Fire (145 acres) burned onto the Entrada Planning Area. The 1962 Golden Fire and the 1979 Hasley Fire with a total burned area of approximately 9,233 acres and 656 acres, respectively, burned onto the VCC Planning Area. Fire history for the general vicinity of the Modified Project Site is illustrated in the map in Appendix B. One of the most recent fires, the 2025 Hughes Fire, occurred approximately 2 to 3 miles north of VCC. According to CAL FIRE, the Hughes Fire near Castaic totaled 10,425 acres and was an active fire for 8 days between January 22 and January 30. The cause of the fire remains under investigation, but the fire ignited east of Castaic Lake near Lake Hughes Road and temporarily caused the closure of all lanes of the I-5 through the Grapevine on Wednesday, January 22.

The fire caused evacuation orders and warnings to be issued in nearby communities in all direction surrounding the fire area. Occupants were directed to evacuate to Valencia High School, then later instructed to evacuate to Hart High School. Occupants with pets were directed to evacuate to various shelters including the Lancaster Animal Care Center for large animals and the Palmdale Animal Care Center for small animals.

While traffic congestion occurred on various surface streets due to the rerouting of I-5 traffic, re-routed vehicles remained safe and out of harm's way due to enactment of pre-planned procedures (see Operations Snowflake) that provide for gate closures across the I-5 and pre-planned re-routing of traffic. Evacuations almost always include traffic congestion, but emergency managers employ technical resources for situation awareness and then manage traffic movement through intersection control based on potential threat and vulnerability. Generally, traffic that is not moving is not within a high threat area and they have been placed in a hold so that populations that are in higher threat areas can be moved first.

5 Based on polygon GIS data from CAL FIRE's FRAP, which includes data from CAL FIRE, USDA Forest Service Region 5, BLM, NPS, Contract Counties and other agencies. The data set is a comprehensive fire perimeter GIS layer for public and private lands throughout the state and covers fires 10 acres and greater between 1878–2020.

6 This calculation does not include the 1970 Fire or fires smaller than 10 acres.

Another example of the employment of available resources that helped reduce the Hughes Fire's potential impacts, including those on traffic congestion, was the deployment of the contract aerial firefighting force. Available resources, including helicopters that can operate at night, reduced the fire size significantly, aiding the ability to reopen I-5.

Based on an analysis of this fire history data set, specifically, the years in which the fires burned, the average interval between wildfires within 5 miles of the Modified Project Site's boundaries was calculated to be one year with intervals ranging between 0 (multiple fires in the same year) and 2 years. Based on an analysis of fire history, it is expected that wildfire may burn within 5 miles of the Project at least every year. Following proposed development activity in the area, would break up large expanses of non-maintained fuels, however, the proximity of the Modified Project Site to large expanses of open space to the south in the Santa Susana Mountains and potential ignition sources along I-5, SR-126, and surface streets in the Stevenson Ranch, Valencia, and Santa Clarita there remains an increased wildfire hazard in the area. Additionally, the terrain within the Santa Clara River Valley, including multiple sub-drainages and canyons, has the potential to funnel Santa Ana winds, thereby increasing local wind speeds and increasing wildfire hazards in the region.

Note that once the Entrada South and VCC Planning Areas are built out, the fire spread patterns on the property would be modified, as both developments would present substantial fuel breaks, significantly interrupting the continuous fuels across the Planning Areas.

2.3 Existing Fire Hazard

Based on the existing conditions, the existing fire hazard in the Modified Project is significant. The current conditions as they relate to topography, climate, land use, and vegetation have the potential to facilitate a significant wildfire. Additionally, as described above in Section 2.2.5 Historic Wildland Fires, the area has been subject to a large number of fires with an average return interval of one year. Further, it is expected the wildfires will continue to burn within the Modified Project's vicinity.

3 Fire Safety Requirements – Regulatory Requirements and Recommended Project Design Features

3.1 Applicable Codes/Existing Regulations

This FPP demonstrates that the Project would comply with applicable portions of Title 32 of the Los Angeles County Code, as amended, which adopts by reference the 2019 edition of the California Fire Code (CFC) with July 2021 Supplement. Title 32 is hereafter referred to as the Los Angeles County Fire Code (2020 or current edition) or "Fire Code". The Project also shall comply with Chapter 7A of the 2019 California Building Code (CBC) with July 2021 Supplement; the 2019 California Residential Code, Section 237; and the 2018 Edition of the International Fire Code as adopted by the County. The Project would also be subject to the provisions of section 4291 of the Public Resources Code regarding brush clearance standards around structures and the Los Angeles County Fire Department guidelines for Fuel Modification Plans.

Chapter 7-A of the CBC addresses exterior structural ignition resistance and ember penetration into homes, a leading cause of structure loss from wildfires (California Building Standards Commission 2019). Thus, code compliance is an important component of the requirements of this FPP, given the Project's wildland-urban interface (WUI) location that is within an area statutorily designated as a State Responsibility Area (SRA) Very High Fire Hazard Severity Zone (VHFHSZ) by the California Department of Forestry and Fire Protection (CAL FIRE) (FRAP 2025). Fire hazard designations are based on topography, vegetation, and weather, among other factors with more hazardous sites, including steep terrain, unmaintained fuels/vegetation, and WUI locations. Projects situated in VHFHSZ require fire hazard analysis and the application of fire protection measures to create defensible communities within these WUI locations.

As described in this FPP, the Project would meet applicable code requirements for building in these higher fire hazard areas or meet the intent of the code through the application of site-specific fire protection measures. These codes have been developed through decades of wildfire structure save and loss evaluations to determine why buildings were lost to fire or why they survived. The resulting fire codes now focus on mitigating former structural vulnerabilities through construction techniques and materials so that the buildings are resistant to ignitions from direct flames, heat, and embers, as indicated in the 2019 California Building Code (Chapter 7-A, Section 701A Scope, Purpose, and Application) (California Building Standards Commission 2019).

3.1.1 California Attorney General's Office Best Practices for Analyzing and Mitigating Wildfire Impacts of Development Projects Under the California Environmental Quality Act

The California Office of the Attorney General issued (October 2022) guidance (Guidance) outlining best practices for analyzing and mitigating wildfire impacts of development projects under the California Environmental Quality Act (CEQA). The Guidance does not impose additional legal requirements on local governments, nor does it alter any applicable laws or regulations. Instead, the Guidance is intended to help local governments' evaluation and approval considerations for development projects in fire-prone areas, and to help project design in a way that minimizes wildfire ignition and incorporates emergency access and evacuation measures. The following provides an overview of the Guidance and relevant elements of the Project. A discussion of the Guidance regarding evacuations measures is addressed in the Entrada South and Valencia Commerce Center Wildfire Evacuation Plan (Dudek 2023).

Attorney General Guidance for Analyzing Project's Impacts on Wildfire Risks

Baseline Conditions

The Guidance states that an EIR's discussion of existing environmental (baseline) conditions should include information about open space areas and habitats within the project area that may be fire prone, a discussion of fire history and fuels on the project site and a description of existing available water supplies for fire-fighting. This FPP provides details regarding each of these baseline conditions, including indicating there are no on-site open space habitat areas, analysis of the off-site preserved areas, a detailed assessment of fire history within 5 miles of the Project, and confirmation that the Project will be provided water necessary for fire-fighting.

Modeling

The Guidance encourages modeling fire scenarios to "quantify" increased wildfire risks resulting from a project adding more people to wildfire prone areas and assessing risks. This FPP models fire scenarios utilizing BehavePlus fire behavior model to estimate fire intensity, flame lengths, and spread rates. Modeled scenarios included fires igniting near the Project within the preserved conservation areas and including extreme weather conditions. The models confirm that the Project's provided defensible space buffers and walls are sufficient to slow wildfire spread and keep it from impacting the site. These same results, coupled with the fire protection features detailed in this FPP are shown to perform a dual role of 1) minimizing the potential for fire starts on site, 2) providing suppression capabilities both within structures and by nearby firefighting resources to quickly control ignitions that do occur, 3) creating and maintaining wide fuel modification buffers that reduce fire intensity and slow fire spread – all of which minimize the likelihood of a Project fire spreading off-site into open space areas. Likewise, neighboring developed areas and their provided protections required by LACoFD perform a similar function during wildfires in the Project area.

Qualitative Assessment

The Guidance indicates that an EIR qualitatively assess relevant variables on the risk of wildfire, including:

Project Density – Project density influences how likely a fire is to start or spread and how likely it is that occupants will be in danger. The Guidance states that "Fire spread and structure loss is more likely to occur in low- to intermediate-density developments." The Project is a walkable, urban influenced master-planned community that clusters development on areas long planned for residential and commercial uses, converting the developed area to ignition resistant landscapes with no inclusion of unmaintained vegetation within the converted footprint. The Project is largely surrounded by existing development or roadways. The nearest open space vegetation is separated from the site's ignition resistive structures by 100- to 200- feet wide fuel modification zones. The buildings and development footprint are clustered and present one, defensible interface, unlike lower density development which incorporates fuels within and around buildings and multiple building interfaces, a condition that is significantly harder to defend and creates multiple exposures when compared with the Project's master planned community condition.

Location in the Landscape – Where a project's structures are placed in the landscape relative to fire environment features (vegetation, topographical features, and wind alignments) also influences wildfire risk. The Project is largely surrounded by existing development or roadways. The nearest open space vegetation is separated from the site's ignition resistive structures by 100- to 200- feet wide fuel modification zones. The Project creates a flat pad on which the Project's structures and infrastructure are placed. Fuels in the Project area are not conducive of extreme fire intensity and terrain varies but does not include extreme steep slopes and has been comprehensively evaluated and confirmed that even under the extreme weather conditions that have been recorded in the area, the provided defensible space and ignition resistant structures are appropriately designed to minimize the potential for structure ignitions.

Water Supply and Infrastructure – Water supply and infrastructure to address firefighting within the project site are relevant to evaluating wildfire risk. The Project water supplier prepared a detailed Water Supply Assessment under SB 610 that confirms that it has capacity needed for domestic and firefighting needs. As indicated in the FPP, the Project will provide internal waterlines supplying sufficient fire flows and pressure to meet the demands for required on-site fire hydrants and interior fire sprinkler systems for all structures to meet LACoFD requirements.

Mitigating Wildfire Risk – Potential Measures

The Guidance identifies potential mitigation measures and design features that may reduce a project's wildfire risk impacts, such as:

- Avoiding and minimizing low-density development patterns or "leapfrog-type" developments with undeveloped wildland between developed areas. The Project is consistent with the OVOV, constituting infill development within existing developed areas and roadways (e.g., within the existing Valencia Commerce Center and adjacent to existing development at Mission Village, Magic Mountain and Westridge) and thereby avoiding leapfrog development. OVOV accounted for the planned buildout of the Santa Clarita Valley area and accounted for wildfire and evacuation risks. The Project relies on a clustering design to increase density and open space areas.
- Decreasing a project's "edge" or wildland interface area and creating buffer zones and defensible space measures within and adjacent to the project. The Entrada South and VCC Planning Areas are surrounded by existing development or roadways and do not have an intermixed, extended "edge" with a wildland interface area. The Project involves a clustered design and complies with the requirements found to protect communities within fire hazard severity zones. The Project would provide FMZ and specific methods to reduce the potential for wildfire encroachment. The FMZ will be maintained over the life of the project through the Project's HOA.
- Undergrounding power lines. The Project's power lines will be undergrounded, eliminating the potential for electrical transmission line-caused fires on the site.
- Upgrading building materials and installation techniques to increase a structure's resistance to heat, flames and embers (i.e. "fire hardening") and requiring fire-hardened communication facilities to the project site. The Project's buildings will be designed in conformance with the latest ignition-resistant building design measures California Building Code Chapter 7-A and [list other relevant code measures]. As discussed in this FPP, structures constructed to current Fire Code standards and located within a master-planned community have proven to be highly resistant to ignition during a wildfire. Communication infrastructure including telephone and internet will be provided via underground or protected above ground conduits.

- Requiring adequate water supplies during a wildfire. The Project water supplier prepared a detailed Water Supply Assessment under SB 610 that confirms that it has capacity needed for domestic and firefighting needs. The Project provides connections from internal waterlines to significant water main lines that will supply sufficient fire flows and pressure to meet the demands for required onsite fire hydrants and interior fire sprinkler systems for all structures. Water supply must meet a 2-hour fire flow requirement of 2,500 gpm, which must be over and above the daily maximum water requirements for this development. Water utilities will be connected prior to any construction.
- Parking limitations to ensure access roads are not clogged with parked vehicles. The Project provides for parking restrictions and an HOA to enforce parking restrictions. Fire apparatus access roads are not obstructed by designated parking areas and where parking is prohibited, signage and/or curb marking will be provided.
- Placement of development close to adequate emergency services, existing or planned ingress/egress, and designated evacuation routes. The Project is located adjacent to regional transportation networks with multiple points of access. The Project is consistent with OVOV, which accounting for wildfire and evacuation risks. The Project is within an acceptable distance to existing and planned fire stations with fast response to all planned structures. The Project provides new surface streets and connects to existing streets and is near major highway/freeway corridors, facilitating emergency vehicle ingress.

As described above and consistent with the Guidance, this FPP, the Evacuation Plan, and the Supplemental EIR provide an in-depth analysis of the Project's potential wildfire impacts.

3.2 Defensible Space and Vegetation Management Regulatory Requirements

3.2.1 Fuel Modification Zones

An important component of a fire protection system for the Modified Project Site is the provision of fire-resistant landscapes and modified vegetation buffers. Fuel modification zones (FMZ) are designed to provide vegetation buffers that gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones and irrigated zones adjacent to each other on the perimeter of the WUI exposed structures. FMZs not only help protect new communities and structures from external wildfire risks, but FMZs also reduce the risk of fire originating from such new communities or structures and spreading to surrounding natural resources/habitat areas (Braziunas et al., 2021; Cochrane et al., 2012; Price et al., 2021).[7] FMZs thereby provide a duel benefit of buffering communities and structures from encroaching wildfires while separating the new community and structures (and potential introduction of new ignition sources associated with the new community) from surrounding open space, fuel sources, or habitat areas (Bhandary & Muller, 2009; Braziunas et al., 2021; Cochrane et al., 2012; Fox et al., 2018). Research has also indicated that the likelihood of ignitions occurring in a given location is significantly influenced by the existing vegetation/fuel available (Elia et al., 2019). In addition to protecting structures, fuel treatments, and defensible space, when utilized in conjunction with place-based fire-hardened design also act as a buffer for natural areas and surrounding communities (Safford et al., 2009a; Scott et al., 2016).

7 Historically, CAL FIRE originated as a conservation agency implemented brush management, like fuel modification and fire breaks to protect natural resource areas from fires originating in developed areas, such as the Ponderosa Way a 800 mile fire break in the Sierra Nevada Mountain Range (CAL Fire, Thorton, 1995; Gafni 2021).

Based on the modeled extreme weather flame lengths for the Modified Project Site, average wildfire flame lengths in the un-maintained fuel beds are projected to be approximately 40 to 46 feet high in limited areas of Development Footprints-adjacent grasslands, and coastal scrub fuels. The fire behavior modeling system used to predict these flame lengths was not intended to determine sufficient FMZ widths, but it does provide the average predicted length of the flames, which is a key element for determining “defensible space” distances for providing firefighters with room to work and minimizing structure ignition. Implementing defensible space can reduce the likelihood of structural ignition and support landscape-level risk reduction (Mockrin et al., 2020; Warziniack et al., 2019). Defensible space also serves to decrease the chance of spot fires and allows firefighters to operate around the home (Price et al., 2021). For the Entrada South and VCC Planning Areas, the FMZ widths outside the lot lines would be 100- to 200- horizontal feet depending on County Fire direction and geographic constraints, ranging from 2.0 to 5 times the modeled flame lengths based on the fuel type represented adjacent to the Development Footprint and meeting the industry guidelines for acceptable defensible space.

3.2.1.1 State Responsibility Areas Fuel Modification Zone Standards

An FMZ is a strip of land where combustible vegetation has been removed and/or modified and partially or totally replaced with more adequately spaced, drought-tolerant, low-fuel-volume plants in order to provide a reasonable level of protection to structures from wildland fire. The purpose of this section is to document SRA standards and make them available for reference. The State Fire Code Section 4906 requires defensible space to be maintained around all buildings and structures in all unincorporated land designated by the State Board of Forestry and Fire Protection as SRA per PRC 4290 and “SRA Fire Safe Regulations” California Code of Regulations, Title 14, Division 1.5, Chapter 7, Subchapter 2, Section 1270. County Fire contracts with CAL FIRE to manage State Responsibility Areas within Los Angeles County. County Fire’s 2022 Strategic Fire Plan summarizes the Los Angeles County Unit, its Mission, Values, and Vision, and its role in reducing wildfires within Los Angeles County.

County Fire’s 2022 Strategic Fire Plan describes the local fire environment and actions the Los Angeles County Unit has conducted to prioritize hazards and its efforts to target highest priority areas for hazard reduction efforts, such as landscapes featuring, urban populations, water supplies, and threatened ecosystems. Specifically, the plan identifies structures, major roads, and transmission lines as the highest priority assets for County Fire, emphasizing the importance of fire access roads the fact that power delivery and communication sites susceptible to extended loss of service due to fire or interruption of these services is a public safety and welfare issue. With respect to water quality, the plan explains that watersheds can burn in the dry season and then discharge torrents of debris into downstream-populated plains during subsequent severe, wet-season storms. The plan also outlines the Unit’s efforts to prevent fires through passive protections, pre-fire planning, pre-fire engineering, community support, and structural fire hardening requirements. Examples include educating communities on benefits of proper safety practices and identifying and eliminating all types of hazardous conditions posing a threat to life, property, and the environment, safety inspections, and defensible space management, hazard fuel reduction, proper brush clearance, fire-resistive landscaping, fire-resistive construction, and good housekeeping around structures plays a critical role in increasing survivability in a wildfire. The plan further describes County Fire’s vegetation management strategies, the designated Fuel Modification Unit that reviews new development defensible space, and discusses its fire suppression philosophy. For example, the Forestry Division’s Fuel Modification Unit’s objective is to create defensible space necessary for effective fire protection in newly constructed and/or remodeled homes within the FHSZ. Once homes are constructed, inspections confirm implementation of the approved landscape plan and fuel modification parcels are subsequently moved into a “Brush Clearance Inspection Program.”

As noted above, the County will be reviewing the Modified Project on behalf of the State, and a fuel modification plan shall be submitted and have preliminary approval prior to any subdivision of land; or, have final approval prior to the issuance of a permit for any permanent structure used for habitation; where, such structure or subdivision is located within areas designated as a Fire Hazard Severity Zone within State Responsibility Areas (Los Angeles County Fire Code Title 32, Section 4908.1). As designated by PRC 4291 a fuel modification typically consists of at least 100 feet, measured in a horizontal plane, from the exterior façade of all structures towards the undeveloped areas. The Modified Project includes FMZ widths of 100- to 200- horizontal feet depending on County Fire direction and geographic constraints. Although not currently required by law, the Modified Project will also include an Ember Resistant Zone (ERZ) within Zone A, consistent with Assembly Bill 3074 which amends PRC 4291 to include more intense fuels reduction within the immediate vicinity of structures.[8] The ERZ is from the 5 feet of a building and includes the area under and around all attached decks.

A Fuel Modification Plan shall be reviewed and approved by the Forestry Division of the County Fire for consistency with defensible space and fire safety guidelines on behalf of the State. Figures 7a and 7b display FMZ Zones A and B for the Entrada South and VCC Planning Areas that are consistent with County Fire requirements pending final approval from the Forestry Division.

To ensure long-term identification and maintenance, a fuel modification area shall be identified by a permanent zone marker meeting the approval of County Fire. All markers will be located along the perimeter of the fuel modification area at a minimum of 500 feet apart or at any direction change of the fuel modification zone boundary. FMZs will be maintained on at least an annual basis or more often as needed to maintain the fuel modification buffer function.

An on-site inspection will be conducted by staff of the Forestry Division of the County Fire upon completion of landscape installation before a certificate of occupancy is granted by the County's building code official.

Zone 0/ERZ – 0 to 5 feet from the structure

Zone 0, also known as the ember resistant zone (ERZ), per PRC 4291, is designed to keep fire or embers from igniting materials that can spread to structures. It includes the area under and around all attached decks and requires more stringent wildfire fuel reduction. In 2020, the concept of the ERZ was added to PRC 4291 to designate a more intense fuel reduction area immediately adjacent to homes and/or structures to reduce the likelihood of ember-based home ignition. However, the requirement for an ERZ under PRC 4291 will not take effect for new structures until the Board of Forestry releases updated regulations and guidance documents by January 1, 2023. Although not currently required, CALFIRE's website recommends the following guidance for the ERZ, and in anticipation of the regulation going into effect, the ERZ has been included in the Modified Project. Per PRC 4291, the ERZ is measured from building, structures, decks, etc. outward 5 feet (horizontal distance) and includes the following:

1. Hardscape, such as gravel, pavers, concrete, and other non-combustible materials are permitted within this zone.
2. The use of combustible bark or mulch is prohibited.

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8 Assembly Bill 3074, passed into law in 2020, which requires a third zone for defensible space and amends PRC 4291. The amendment requires the Board of Forestry and Fire Protection to develop the regulation for new ember-resistant zone (ERZ) within 0 to 5 feet of a structure by January 1, 2023. CAL FIRE currently recommends the implementation of an ERZ. In anticipation of the ERZ requirements becoming codified in PRC 4291 the ERZ has been included in the defensible space requirements for the Modified Project. The above listed requirements are based on the current recommendations for creating an ERZ detailed on CAL FIRE Defensible Space website (https://www.fire.ca.gov/programs/communications/defensible-space-prc-4291/). These requirements will be reviewed and updated once the Board of Forestry and Fire Protection updates the regulations for the ERZ in PRC 4291.

3. This zone shall be free of all dead and dying weeds, grass, plant, shrubs, trees, branches, and vegetative debris.
4. Plants should be limited to low growing, nonwoody, and be irrigated and maintained.
5. Combustible items within this zone, including on decks, should be limited.
6. Any firewood or lumber should be relocated within Zone B.
7. Fencing, gates, and arbors attached to homes or structures should be made with non-combustible materials.
8. Garbage and recycling containers should not be kept within this zone.
9. Create separation between trees, shrubs, and items that could catch fire, such as patio furniture, wood piles, swing sets, etc.

Zone A – minimum 30 feet from the structure

Zone A is an irrigated, limited planting area measured from the outermost edge of the structure or appendage outward to 30 feet (horizontal distance), or the property line for perimeter lots adjacent to native vegetation.

1. Zone A should be planted with plants from Appendix D: Acceptable Plant List by Fuel Modification Zone[9]. Plant selection for Zone A should consist of small herbaceous or succulent plants less than two to three feet in height or regularly irrigated and mowed lawns.
2. Plants identified as "Target" or undesirable plants (See Appendix E: Fuel Modification Zone Undesirable Plant List[10]) by County Fire shall not be planted within Zone A.
3. Trees should be spaced to allow a minimum 10-foot canopy clearance at full maturity to the structure.
4. Inorganic mulches, such as gravel, shall be used within 10 inches of the structure.
5. A 5-foot wide pathway shall be provided around and abutting any structures for firefighter access.

Zone B – from the outer edge of Zone A up to 100 feet from the structure

Zone B is the area (maybe irrigated or not irrigated) measured horizontally from the outer edge of Zone A to 100 feet from the structure or property line, whichever is first.

1. Zone B can be planted with a slightly higher plant density than Zone A as long as the landscape does not create any horizontal or vertical fuel ladders (e.g., fuel that can spread fire from the ground to trees).
2. Exception: Screen plantings are permissible if used to hide unsightly views. However, hedging is discouraged as it promotes the accumulation of dead litter inside the live hedge.
3. Trees found in Appendix D can be planted, if they are Zone B appropriate and the tree canopies at maturity are not continuous.
4. Plants identified as "Target" or undesirable plants (See Appendix E) by County Fire shall not be planted within Zone B.
5. Avoid planting woody plant species taller than 3 feet in height at maturity directly underneath any tree canopy
6. Zone B may not be landscaped, but it is still subject to brush clearance standards (https://www.fire.lacounty.gov/forestry-division/fire-hazard-reduction-programs/)

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9 (County Fire 2021)
10 (County Fire 2020)

Zones C and D - from the outer edge of Zone B up to 200 feet from the structure

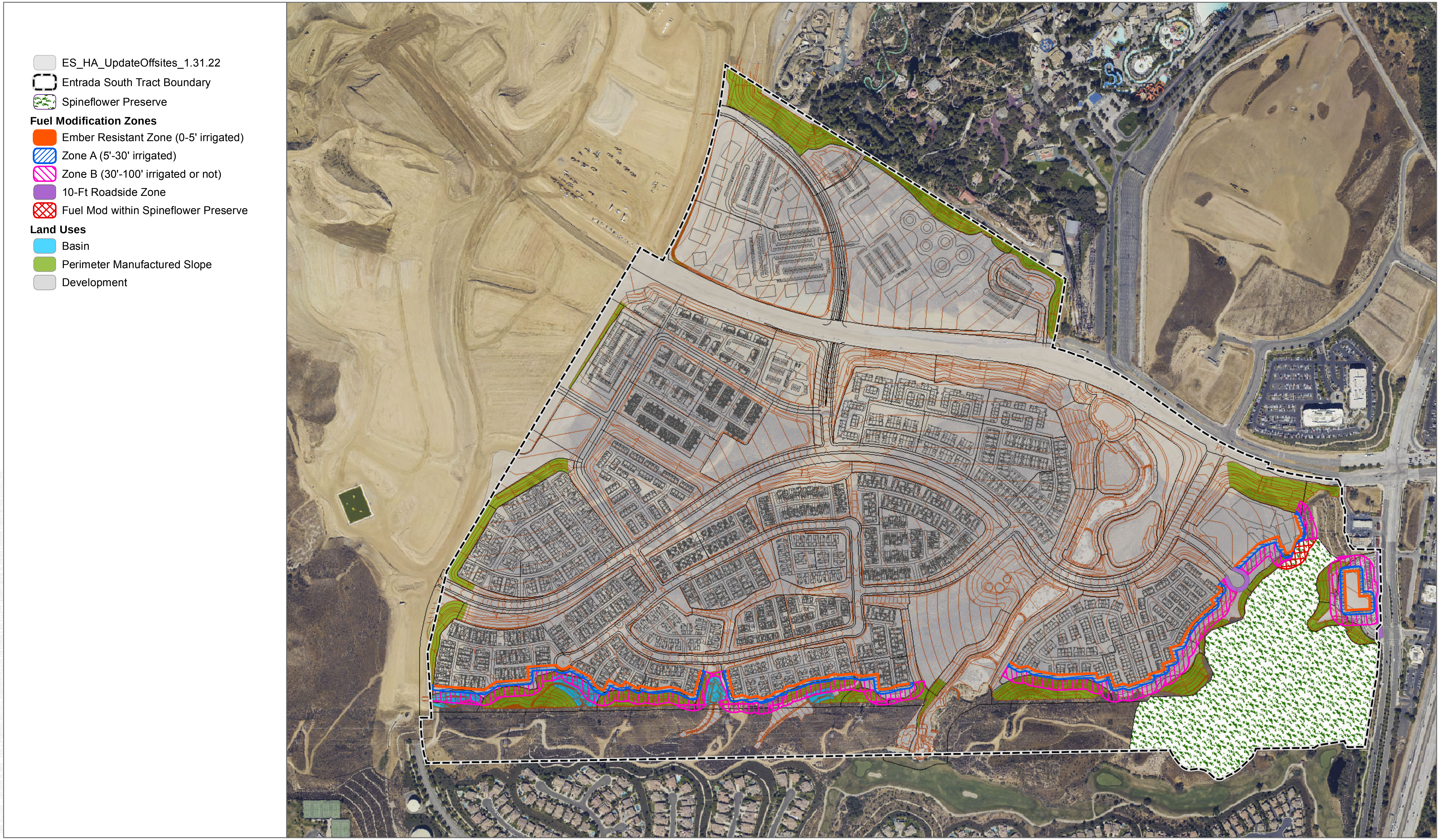
Zones C and D would be provided and detailed on a fuel modification plan, and would extend FMZ from 100 to 200 feet, if required by LACoFD and subject to geographic constraints.

3.2.1.2 Annual Fuel Modification Maintenance

In order to ensure that fuel modification is appropriately maintained, the Modified Project would require the Modified Project HOA or equivalent organization to maintain the FMZs in perpetuity. All vegetation management within the FMZs shall be completed annually by May 1 of each year and more often as needed for fire safety, as determined by County Fire. The Modified Project HOA shall be responsible for all vegetation management throughout the common areas of the Modified Project site, in compliance with the requirements detailed herein and County Fire fuel modification guidelines. Any water quality basins, flood control basins, channels, and waterways would be kept clear of flammable vegetation, subject to Section 3.3.2 Stormwater Basins. (See Section 9: Project Specific Recommended Design Features)

3.2.1.3 Annual Fuel Modification Inspection

To ensure that the Modified Project HOA carries out its FMZ maintenance duties, the Modified Project will require that a third-party inspector, hired by the Modified Project HOA or equivalent entity, will conduct an annual inspection by June 1 of each year. The inspector will evaluate the FMZs, including the ERZ, ensuring that they meet regulations and are performing accordingly. The inspector will notify the HOA of any non-compliant FMZs and recommend measures for remediation. An inspection report will be submitted to County Fire each year. The Modified Project HOA shall be responsible for ensuring the long-term funding of the inspections. (See Section 9: Project Specific Recommended Design Features.)



SOURCE: ESRI 2019; Hunsaker 2019

DUDEK

0 285 570 Feet

FIGURE 7a

Entrada South Fuel Modification Map

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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SOURCE: ESRI 2019; Hunsaker 2021

DUDEK

FIGURE 7b

VCC Fuel Modification Map

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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3.3 Other Vegetation Management Regulatory Requirements

3.3.1 Roadway Fuel Modification Zones

As required under the Los Angeles County Fire Code, fire engine apparatus roads will be maintained with a minimum 20-foot wide roadway that is clear to the sky. All flammable vegetation or other combustible growth shall be removed on each side of the roadway for a minimum of 10 feet (Title 32 Section 325.10). The clearance of 10 feet does not apply to single specimen trees, ornamental shrubbery, or cultivated ground cover, such as grass, ivy, succulents, or similar plants used as ground cover, provided that they do not form a means of readily transmitting fire. The minimum clearance of 10 feet may be increased if the fire code official determines additional clearance is required to provide reasonable fire safety.

Roadside fuel modification for the Entrada South and VCC Planning Areas consists of mowing grasses to less than 4-inches in height and/or maintaining ornamental landscapes, including trees, clear of dead and dying plant materials. Roadside fuel modification shall be maintained by the HOA.

3.3.1.1 Existing Roadside Fuel Modification Projects

Within the vicinity of the Project, there are existing roadside fuel modification projects. Two CAL Fire Projects have been completed within the Project area. The first is a right of way clearance treatment that is part of the Santa Clarita System Project. This project is part of CAL FIRE's Fire Plan Program. From April 22, 2019, to October 6, 2021, the project resulted in 59.0 treatment acres. The second project is also a right-of-way treatment project which is part of the High Country System Project. The High Country System Project treated 69.1 acres from February 5, 2019, to October 27, 2021. Both projects are considered active and ongoing (CAL FIRE, 2021).

3.3.2 Stormwater Basins

Fire-safe vegetation management will be performed within the basins on a yearly basis in accordance with the following guidelines.

1. Groundcovers or shrubs included in the basin shall be low-growing with a maximum height at maturity of 36 inches. Single tree specimens or groupings of two to three trees per grouping of fire-resistive trees or tree form shrubs may exceed this limitation if they are located to reduce the chance of transmitting fire from vegetation to habitable structures and if the vertical distance between the lowest branches of the large, trees or tree form shrubs and the tops of adjacent plants are three times the height of the adjacent plants to reduce the spread of fire through ladder fueling.
2. All trees shall be planted and maintained at a minimum of 10 feet from the tree's mature drip line to any combustible structure.
3. The water detention basin area will be irrigated and maintained to brush management Zone A standards.
4. Grasses must be maintained/mowed to 6 inches in height.
5. The water quality basins will not be re-vegetated with plant species that are found in Appendix D.
6. This area shall be maintained annually free of dying and dead vegetation.

3.3.3 Southern California Edison Transmission Easement

A Southern California Edison (SCE) transmission easement occurs along the southern edge of the Entrada Planning Area. This easement will be maintained by SCE in accordance with its vegetation management program and standard policies mandated by the California Public Utilities Commission (CPUC), including the General Order (GO) 95 (e.g., vegetation maintenance requirements) (CPUC 2015a) and GO 165 (e.g., inspection protocols of electric distribution lines) rules (CPUC 2015b). Accordingly, hazardous fuel conditions will be addressed by SCE in a timely manner. The Entrada South FMZs adjacent to this area account for the native fuels that occur within this easement.

3.3.4 Spineflower Preserve Fire Management Plan

A Fire Management Plan (FMP) (Dudek 2014) for the Newhall Ranch Spineflower Preserves was developed to avoid and minimize direct and indirect impacts on the San Fernando Valley spineflower (*Chorizanthe parryi var. Fernandina*), a state-listed endangered species. The FMP was developed to be consistent with the SCP (Dudek 2010) and mitigation measures (MM SP-4.6-72 and BIO-26) outlined in the State-certified EIR. The FMP is specific to the seven spineflower preserves identified in the RMDP-SCP and includes the Entrada Planning Area. The Entrada Spineflower Preserve encompasses 27.19 acres located in the southeastern corner of the Entrada Planning Area. (There is no spineflower preserve within the VCC Planning Area.) In accordance with MM SP-4.6-72, limited fuel modification activities within the spineflower preserves will be restricted to selective thinning with hand tools to allow the maximum preservation of Newhall Ranch spineflower populations. The portion of the FMZ that overlaps with the Entrada Spineflower Preserve would require annual thinning and will implement the approved FMP MM SP-4.6-72 and proposes no modifications thereto. No other fuel modification or clearance activities shall be allowed in the Newhall Ranch spineflower preserve(s). Controlled burning may be allowed in the future within the Newhall Ranch preserve(s) and buffers, provided that it is based upon a burn plan approved by the County Fire and California Department of Fish and Wildlife. The Modified Project applicant, or its designee, shall also be responsible for annual maintenance of fuel modification zones, including, but not limited to, removal of undesirable non-native plants, revegetation with acceptable locally indigenous plants, and clearing of trash and other debris in accordance with the County Fire.

3.3.5 Undesirable Plants

Certain plants are considered prohibited in the landscape due to characteristics that make them highly flammable. These characteristics can be physical (structure promotes ignition or combustion) or chemical (volatile chemicals increase flammability or combustion characteristics). The plants included in the FMZ Undesirable Plant List (refer to Appendix E) are unacceptable from a fire safety standpoint, and will not be planted or allowed to establish opportunistically within FMZs or landscaped areas.

3.3.6 Construction Phase Vegetation Management

Vegetation management requirements shall be implemented at commencement and throughout the construction phase for each phase. Vegetation management shall be performed pursuant to County Fire on all building locations prior to the start of work and prior to any import of combustible construction materials. Adequate fuel breaks shall be created around all grading, site work, and other construction activities in areas where there is flammable vegetation.

3.4 Fire Apparatus Access Regulatory Requirements

3.4.1 Access

Modified Project Site access, including road widths and connectivity, will be consistent with the County's roadway standards (Title 21) and the 2020 CFC Section 503 for both the Entrada and VCC Planning Areas and will include:

- The Modified Project Site's primary routes are accessed through a series of internal neighborhood roadways, which connect with the primary ingress/egress roads (e.g., Magic Mountain Parkway, CommerceCenter Drive, and The Old Road) that intersect off-site primary and major transportation routes. There are multiple primary ingress/egress routes in each Planning Area.

Entrada South Primary Ingress/Egress Routes:

- Eastern Primary Route: Magic Mountain Parkway, or to The Old Road or I-5 to the north or south.
- Southern Primary Route: Westridge Parkway to Valencia Blvd then east to The Old Road or I-5.

Valencia Commerce Center Primary Ingress/Egress Routes:

- Southern Primary Route: Commerce Center Drive to SR-126 to the east or west.
- Northern Primary Route: Commerce Center Drive to Hasley Canyon Road to The Old Road or I-5 to the north or south.
- Western Primary Route: Franklin Parkway to Wolcott Way to SR-126 to the east or west.
- Eastern Secondary Routes: Hancock Parkway to Turnberry Lane or Muirfield Lane to The Old Road to the north or south.
- Interior circulation streets include all roadways that are considered common or primary roadways for traffic flow through the site and fire department access serving all proposed residential and commercial structures. Any dead-end streets serving new buildings or dwellings that are longer than 150 feet shall have approved provisions for fire apparatus turnaround.
- Typical, interior Modified Project roads, including collector and local roads, will be constructed to a minimum of 24-foot, unobstructed widths and shall be improved with aggregate cement or asphalt paving materials. Private or public streets that provide fire apparatus access to buildings three stories or more in height shall be improved to 30 feet unobstructed width. All interior residential streets will be designed to accommodate a minimum of 75,000-lb. fire apparatus load. Fire apparatus access roads shall not exceed 15 percent in grades.
- Fire apparatus access roads shall not be obstructed in any manner, including parking of vehicles or use of traffic calming devices, including but not limited to speed bumps or speed humps. The widths and clearances in Sections 503.2.1 and 503.2.2 shall be maintained at all times.
- Private and public streets for each phase shall meet all project-approved fire code requirements and/or mitigated exceptions for maximum allowable dead-end distance, paving, and fuel management prior to combustibles being brought to the site.
- The vertical clearance of vegetation (lowest-hanging tree limbs), along roadways, will be maintained a minimum 20-foot wide path that is clear to the sky.
- Roads with a median or center divider will have 20 feet of unobstructed width on both sides of the center median or divider.

- Cul-de-sacs and fire apparatus turnarounds will meet requirements and County Fire cul-de-sac length restrictions (County Code Section 21.24.190) as follows:
  - 500 feet in length, when serving land zoned for industrial or commercial use.
  - 700 feet in length, when serving land zoned for residential uses having a density of more than four dwelling units per net acre.
  - 1,000 feet in length, when serving land zoned for residential uses having a density of four or fewer dwelling units per net acre.
- End of cul-de-sac streets and fire apparatus turnarounds for dead-end alleys will meet the requirements of County Fire cul-de-sac length restrictions and County Code Section 21.24.180.
- Any roads that have traffic lights shall have approved traffic pre-emption devices (Opticom) compatible with devices on the fire apparatus.
- Roadways and/or driveways will provide fire department access within 150 feet of all portions of the exterior walls of the first floor of each structure.
- Access roads shall be completed and paved prior to the issuance of building permits and prior to the occurrence of combustible construction.
- The developer will provide information illustrating the new roads, in a format acceptable to the County Fire for updating Fire Department response maps.

3.4.2 Gates

Gates on private roads are permitted but subject to Fire Code requirements and standards. Gates shall be equipped with conforming sensors for detecting emergency vehicle "54istory" strobe lights from any direction of approach if required. All entrance gates will be equipped with a key switch, which overrides all command functions and opens the gate. Gate activation devices will be equipped with a battery backup or manual mechanical disconnect in case of power failure. In addition, the gates would comply with AB 2911 which requires additional standards for comprehensive sire, and risk reduction requires roads to be unobstructed if being relied on for secondary access. As such, if gates are installed along the secondary access road then whit will be supplied with backup power and open upon the approach of a vehicle whether via pressor sensors or infrared sensors. In addition, should a gate be installed along the secondary access road it shall also comply with the minimum requirements set forth in this section per Title 32 Section 503.6 and CFC Section 503.6. Any gates within the Modified Project site will be:

- Minimum 20 feet wide of clearance for one-way traffic when fully open at the entrance.
- Gates shall be swinging or sliding type.
- Construction of gates shall be of materials that allow manual operation by one person.
- Gates shall be maintained in operative condition at all times and replaced/repaired when defective.
- Electric gates shall be listed in accordance with UL 325
- Gates intended for automatic operation shall be designed, constructed, and installed in accordance with American Society for Testing and Materials (ASTM) F2200.
- Minimum of two feet wider than road width at the exit.
- Constructed from non-combustible or exterior fire-rated treated wood materials.
- Inclusive of provisions for manual operation from both sides, if power fails. Gates will have the capability of manual activation from the development side or a vehicle (including a vehicle detection loop).

3.4.3 Premises Identification

Identification of roads and structures will comply with Fire Code as follows:

- All commercial/industrial structures are required to be identified by street address numbers at the structure. Numbers to be a minimum of 4 inches high with a ½-inch stroke, visible from the street. Numbers will contrast with the background and shall be electrically illuminated during the hours of darkness where building setbacks exceed 100 feet from the street or would otherwise be obstructed; numbers shall be displayed at the property entrance.
- All residential structures shall be identified by street address. Numbers shall be 4 inches in height, ½ -inch stroke, and located 6 to 8 feet above grade. Addresses on multi-residential buildings shall be 6 inches high with a ½-inch stroke. Numbers will contrast with the background.
- Multiple structures located off common driveways or roadways will include posting addresses on structures and the entrance to individual driveways/roads or at the entrance to the common driveway/ road for faster emergency response.
- Streets will have street names posted on non-combustible street signposts. Letters/numbers will be per County standards.

3.5 Structural Ignition Resistance Regulatory Requirements

In WUI areas, homes can be considered fuel as well as an ignition point for wildfires. The WUI fire problem is structural; therefore, the best mitigation is to reduce the likelihood of building ignition occurring. (Zhou, 2013). Structural characteristics play a large role in whether or not a building burns, which is important in WUI environments as ill-prepared structures may also serve as fuel (Gorte, 2011). Preventing the ignition of structures can result in the reduction of fire spread in surrounding WUI areas (Maranghides & Mell, 2012). The benefit of structure-based mitigation is that it not only lowers the onsite risk but also lowers the risk of wildfire across a landscape (Mockrin et al., 2020).

The proposed structures within the Modified Project will be built utilizing the most current construction methods designed to mitigate wildfire exposure, required by County Fire, at the time of construction. Within the limits established by law, construction methods intended to mitigate wildfire exposure will comply with the wildfire protection building construction requirements contained in the Los Angeles County Building Code and the 2022 CBC including the following:

1. California Building Code, Chapter 7A
2. Los Angeles County Building Code, Chapter 7A
3. Los Angeles County Residential Code, Section R327
4. Los Angeles County Referenced Standards Code, Chapter 12-7A

Construction practices respond to the requirements of the County Fire Code Title 32 and the Los Angeles County Building Code (Title 26, Chapter 7A), “Construction Methods for Exterior Wildfire Exposure.” These requirements include the ignition resistant requirements found in Chapter 12-7A of the Los Angeles County Referenced Standards Code. A key component to addressing the wildfire problem is to address the structural ignition. (Zhou, 2013). Addressing structural ignition potential is an effective mitigation strategy for preventing wildfires and increasing

WUI ignition resistance (Zhou, 2013). Research has found that structural characteristics, especially roofing, play a significant role in reducing a structure's vulnerability to fire and the likelihood of burning (Gorte, 2011; Knapp et al., 2021; Kolden & Henson, 2019; Manzello et al., 2011; Syphard et al., 2017; Zhou, 2013). Further, reducing a structure's likelihood of ignitions reduces the risk for the individual homeowners and the risk associated with fire spreading to other homes or wildland areas (Mockrin et al., 2020). While these standards will provide a high level of protection to structures in this development and should reduce or eliminate the need to order evacuations, there is no guarantee of assurance that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

The 7A Materials and Construction Methods for Exterior Wildfire Exposure (CBC) chapter detail the ignition resistant requirements for the following key components of building safely in wildland-urban interface and fire hazard severity zones. Each of the critical exterior building features summarized below has been addressed within Chapter 7A to minimize the potential for structural ignition from wildfire exposure as well as from airborne embers.

3.5.1 Roofing Assemblies

Roofing shall comply with Chapter 7A and Chapter 15 of the CBC. Roof assemblies shall be a Class A rating in accordance with ASTM E108 or UL790. Where the roof allows a space between the roof covering and roof decking the space shall be constructed to prevent the intrusion of embers, or is installed over a combustible deck, be fire stopped with a 72 In cap sheet meeting the ASTM D3909 Standard Specification for "Asphalt Rolled Roofing Surfaces with Mineral Granules", shall be installed over the roof deck. Bird stops are to be used at the eaves, and hip and ridge caps will be mudded in to prevent the intrusion of embers. Roof valley flashing shall be no less than 0.019 inches No. 26 gauge galvanized sheet corrosion-resistant metal installed over no less than one layer of minimum 72 lb. mineral surfaced nonperforated cap sheet compliant with ASTM D3909, at least 36 inches wide running the full length of the valley. Gutters shall be provided with means to prevent the accumulation of embers.

Wood shake shingles and wood shakes are prohibited in any Fire Hazard Severity Zone regardless of classification per LACBC Section 705A.2.

3.5.2 Vents and Openings

Any vent openings, enclosed eaves soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, and underfloor ventilation shall comply with Section 1203 and Section 706A.1 through 706A.3 of the CBC and Section 706A of the LACBC. All vents and openings shall be fully covered with Wildland Flame and Emer Resistant vents approved and listed by the California State Fire Marshal or WUI vents listed in ASTM E2886. This also applies to any gable ends, ridge ends, crawl spaces, foundations, and all other cents that mount onto a vertical wall. Vents shall not be installed on the underside of eaves or cornices unless they are WUI vents as described above.

3.5.3 Exterior Wall Covering

Exteriors walls shall comply with Section 707A.3 of the CBC and be either noncombustible or ignition-resistant. This applies to exterior wall coverings, exterior wall assembly, exposed undersides or eaves or soffits, undersides of porch ceilings, the underside of floor projections, and exterior underfloor areas.

3.5.4 Open Roof Eaves

Any exposed roof deck material on the underside of open roof eaves shall either be noncombustible, ignition resistant, one layer of 5/8 inch thick Type X gypsum, or 1-hour fire resistive exterior wall assembly designed for exteriors fire exposure using gypsum panel and sheeting in accordance with CBC Section 707A.4.

3.5.5 Closed Roof Eaves and Soffits

Enclosed eaves and soffits shall comply with CBC Section 707A.5. The exposed underside of enclosed eaves or soffits shall be protected by either noncombustible material, ignition-resistant material, one layer of 5/8 inch Type X gypsum sheeting, 1-hour fire restive exteriors wall assembly, assemblies that meet the performance criteria in Section 707A.10 or assemble that meet the performance criteria in State Fire Marshall (SFM) Standard 12-7A-3.

3.5.6 Floor Projections and Underfloor Protection

The underside of floor projections must comply with Section 707A.7 of the CBC. The exposed underside of a cantilevered floor projection, where a floor assembly extends over an exterior wall, must be protected by noncombustible materials, ignition-resistant materials, one layer of 5/8 in Type X gypsum, 1-hour fire resistive exterior wall assembly that meets the criteria in Section 707A.10, or meets performance criteria in SFM Standard 12-7A-3. The underfloor area of an elevated or overhanging building shall be enclosed in accordance with CBC Section 707A.8.

3.5.7 Underfloor Appendices

When required by County Fire, the underside of overhanging appendages shall be enclosed per CBC Section 707A.9. Or the underside of the exposed underfloor shall consist of noncombustible material, ignition-resistant material, one layer of 5/8 inch Type X gypsum, 1-hour fire resistive exterior wall assembly, or meets the performance criteria in SFM Standard 12-7A-3 or ASTM E2957.

3.5.8 Windows, Skylights, and Doors

Assemblies shall meet one of the following requirements:

- Be constructed of multiplane glazing with a minimum of one tempered pane meeting the requirements of Section 2406 Safety Glazing.
- Be constructed of glass block units.
- Have a fire-resistive rating of no less than 20 minutes per National Fire Protection Association (NFPA) 257.
- Be tested to meet the performance requirements of SFM Standard 12-7A-2.

Skylights shall be protected by a non-combustible mesh screen with openings of no more than 1/8 inches. Wall assemblies behind structural glass veneers shall comply with Section 707A.3 of the CBC.

3.5.9 Exterior Doors

Exterior doors shall be constructed as follows:

- Noncombustible material

- Ignition-resistant construction
- A solid wood core that has stiles and rails no less than 1 3/8-inch-thick and panels no less than 1 ¼ inch thick.
- Fire-resistance rating of no less than 20 minutes per NFPA 252
- Surface or cladding that meets the performance criteria of CBC Section 707A.3.1 when tested per ASTM E2707 or SFM Standard 12-7A-1.

Garage doors shall resist the intrusion of embers by preventing gaps between doors and roof openings at the top, bottom, and sides of doors. Gaps can not exceed 1/8 inch and shall be controlled by either weather stripping that meets ASTM D638 and ASTM G155, weather stripping shall also have a V-2 or better flammability rating, be constructed so that doors overlap onto jams and headers, or the garage door jams and headers are covered with metal flashing.

3.5.10 Decking

Any deck, porch, balcony, or stairs within 10 feet of a building shall comply with CBC Section 709A. The walking surface shall either comply with Section 709A.4 when tested per ASTM E2632 and ASTM E2726, ignition-resistant material, material that meets the criteria of SMF Standard 12-7A-4 and SFM Standard 12-7A-5, noncombustible material, any material that meets SFM Standard 12-7A-4A when attaches to exterior walls that are noncombustible or ignition-resistant or any material that meets Section 709A.5 and is attached to an exterior wall that is noncombustible or ignition-resistant.

3.5.11 Accessory Structures

Accessory structures are applied to buildings covered by LACBC Section 710A.3, Exception 1 as well as any building that requires a permit including but not limited to trellises, arbors, patio covers, gazebos, and similar structures within less than 3 feet of the building or otherwise determined by County Fire. Buildings that are less than 120 square feet in floor area and are more than 30 feet but less than 50 feet from structures shall be noncombustible or ignition-resistant per CBC Section 704A.2. No requirements shall apply to an accessory building or miscellaneous structures when located at least 50 feet from an applicable building. Applicable accessory buildings and attached miscellaneous structures, or detached miscellaneous structures that are installed at a distance of fewer than 3 feet from an applicable building, shall comply with LACBC Section 710A. Structures that meet the requirements of an accessory or miscellaneous structures shall be noncombustible or ignition resistant per CBC Section 704A.2.

3.6 Fire Protection Systems Regulatory Requirements

3.6.1 Water Supply

The Modified Project will be consistent with County Title 20, Section 20.16.060, and with County Title 32 Section 507 for fire flow and fire hydrant requirements within a VHFHSZ. The minimum fire flow and fire hydrant requirements shall be determined by the fire chief or fire marshal and be based upon 20 pounds per square inch (p.s.i.) residual operating pressure remaining from the street main from which the fire flow is being measured at the time of measurement. The minimum fire flow may be adjusted as determined by the fire chief or fire marshal based on local conditions, exposure, and/or congestion, and construction of buildings. Building permits shall be accompanied by evidence indicating to County Fire a reliable water supply and a certificate from County fire that there is sufficient water supply for fire protection. The water supply for the Modified Project shall be consistent with approved types of water supply such as reservoirs, pressure tanks, elevated tanks, water mains, or other fixed systems capable of providing required fire flow per Title 32 Section 507.2. Any water tanks and associated structures shall be installed and maintained in accordance with NFPA 22 and County Fire.

Within the internal roadways of each Planning Area, additional 12-inch water supply lines will provide the main water supply to commercial and domestic services to each structure and common landscape area. These internal waterlines will also supply sufficient fire flows and pressure to meet the demands for required onsite fire hydrants and interior fire sprinkler systems for all structures.

In addition, County Fire helicopters can obtain water for dropping on wildland fires from Castaic Lake to the north of the VCC Planning Area or from numerous ponds that are located throughout the golf course immediately south of the Entrada Planning Area.

The Modified Project would meet all water and water pressure requirements for fire flow.

3.6.2 Hydrants

Fire Hydrants shall be located along fire access roadways as determined by the Fire Chief or Fire Marshal and current fire code requirements to meet operational needs. The required fire hydrant spacing will be no more than 600 feet apart for single-family residential. The required fire hydrant spacing for multi-family residential, commercial, and institutions within the Modified Project Site will be 300 feet apart. If cul-de-sac length exceeds 450 feet (residential) or 200 feet (commercial) hydrants shall be required at mid-block.

Fire Hydrants will be consistent with applicable County Design Standards. Hydrants will have one 2.5-inch outlet and one 4- inch outlet and be of bronze construction per the County fire code. Fire hydrants will be constructed within four feet by four feet by four inches concrete base. A 4-foot clear space shall be maintained around the circumference of fire hydrants. Reflective blue dot hydrant markers shall be installed in the street to indicate the location of the hydrant. Crash posts will be provided where needed in on-site areas where vehicles could strike fire hydrants or fire department connections. Prior to the issuance of building permits, the appropriate number of fire hydrants and their specific locations will be approved by County Fire.

3.6.3 Automatic Fire Sprinkler Systems

All structures in the Modified Project, of any occupancy type, in accordance with County Fire and National Fire Protection Association (NFPA) Standards 13, 13R, and 13D will include automatic sprinklers. This is crucial in preventing off-site impacts as embers can also be generated by a structure fire and can be blown over the fuel modification into native fuels. Automatic sprinklers can isolate a fire to the point of origin, limit its ability to spread to the rest of the building, and even extinguish a fire before the responding firefighters arrive, thus damping the likelihood of ember production (NFPA, 2021). Automatic sprinklers have an extremely high success rate in controlling or suppressing interior structure fires (NFPA, 2021). This also reduces impacts on fire response capacity as the automatic sprinklers will allow firefighters to focus on reducing additional ignitions beyond the point of origin. The Modified Project is inclusive of both protection measures including components to resist ignitions from wildland fuels, and the built environment.

3.7 Pre-Construction Regulatory Requirements

Per Los Angeles County Fire Code, 4908.1, A fuel modification plan shall be submitted and have preliminary approval prior to any subdivision of land; or, have final approval prior to the issuance of a permit for any permanent structure used for habitation; where, such structure or subdivision is located within areas designated as a Fire Hazard Severity Zone within State Responsibility Areas or Very High Fire Hazard Severity Zone within the Local Responsibility areas, applicable Fire Hazard Zone maps, and Appendix M of this code at the time of application. An on-site inspection must be conducted by the personnel of the Forestry Division of the Fire Department and final approval of the fuel modification plan issued by the Forestry Division prior to a certificate of occupancy being granted by the building code official. Construction activities would also comply with Chapter 33 of the CFC, Fire Safety During Construction and Demolition, and with the Modified Project's Construction Fire Protection Plan (CFPP).

3.7.1 Construction Fire Prevention Plan

To reduce potential ignition sources due to construction activities, the Modified Project will require that prior to bringing combustible materials to residential or commercial structure buildings, improvements, including utilities, operable hydrants, and access roads with an approved temporary roadway surface, and fuel modification zones, be established. Note that combustible materials related to pre-building construction may be brought onto the site (e.g., forms for cast-in-place concrete or others, as needed). LACoFD will approve site conditions prior to the construction of any structures being undertaken. (See Section 9: Project Specific Recommended Design Features.)

3.8 Regulatory Requirements Applicable to Activities in a Hazardous Fire Area

The Modified Project will comply with County Fire requirements for activities per Section 326 Activities in Wildfire Risk Areas of Title 32:

1. Permits shall be required for the following similar activities: recreational activities such as but not limited to rifle ranges, carnivals, public assembly events, fireworks, open burning, stands for cooking, or other activities which could provide an ignition source.

2. The following but not limited to fire protection facilities/conditions shall be required to maintain fire safety during activities:
   a. Adequate water supply
   b. Firebreaks
   c. No smoking signs
   d. Removal of dry grass and weeds along roadways, parking areas, or other areas accessible to the public/participants of the activity
   e. Fire watch or fireguards when the activity is taking place
   f. Adequate access and parking facilities to prevent congestion, permit adequate egress for evacuation, and permit movement of fire apparatus equipment
   g. Restriction of activities during periods of high fire hazard weather conditions
   h. Fencing
   i. Other conditions, limitations, or provisions to maintain reasonable fire safety

3. Any portion of public or private land in a wildfire risk area may be closed to the public by the fire code official at the request of the owners when in the opinion of the fire official the closure is necessary to prevent fires.
4. No person shall use or operate in, upon, or within a wildfire risk area any tractors, construction equipment, machinery, or any steam, oil, or gasoline operated stationary or mobile equipment unless said equipment is provided with a qualified device or spark arrestor.
5. Any chimney to a fireplace, incinerator, or heating appliance that uses a solid or liquid fuel within a wildfire risk area shall be maintained with a spark arrestor with heavy wire mesh or other non-combustible material with no more than ½ inch openings.
6. No person shall operate or use an open flame device within a wildfire risk area.
7. No person except for a public officer shall drive or park a motorcycle, motor scooter, or motor vehicle upon any fire road or firebreak, obstruct the entrance to a fire road or firebreak, or install or maintain radio or television aerials or any other obstruction on a fire road or fire break that is less than 16 feet above said fire road or fire break.

In addition, a construction fire prevention plan will be prepared for the Modified Project and will designate fire safety measures to reduce the possibility of fires during construction activities based on performance criteria established by the County Fire. The plan shall include the following measures to reduce fire risks during construction: fire watch/ fire guards during hot works and heavy machinery activities, hose lines attached to hydrants or a water tender, Red flag period restrictions, required on-site fire resources, and others as determined necessary. Maintenance to the Modified Project utilities such as fuel modification, roads, vegetation management, and utilities would comply with all CFC and Title 32 requirements including requirements for activities in Hazardous Fire Area, CFC Chapter 33, and the Modified Project's CFPP.

3.9 Examples of Communities Designed Against Wildfire

When communities incorporate the regulatory requirements and wildfire-resistance measures like the ones described above, they can offer a safer landscape that is resistant to WUI fire disasters. Researchers and fire professionals are increasingly emphasizing the importance of not only fire-resilient homes but also fire-resilient neighborhoods, which can be achieved through planned development that is less vulnerable to fire (Moritz & Bustic, 2020; Ewing & Maier, 2016). Wildfire impacts on neighborhoods can be mitigated through the pattern and layout of new developments, the incorporation of community-wide design features and protective measures, and compliance with modern fire-protective building codes (Barrett, 2019; Ewing & Maier, 2016). Data from past wildfire events supports that mitigation induced by modern building codes yields significant benefits to neighboring structures, which can decrease structure-to-structure spread (Baylis & Boomhower, 2021).

The 2017 Thomas Fire in Santa Barbara and Ventura Counties consumed over 1,000 homes predominately during the high wind events in the first few days of the incident (Kolden & Henson, 2019). The unincorporated area of Montecito is classified as VHFHSZ and has significant fire history inclusive of home loss (Kolden & Henson, 2019). Two decades prior to the Thomas Fire, the Montecito Fire Protection District started to address wildfire vulnerability in the community using place-based reduction strategies (Kolden & Henson, 2019). These strategies focused on recurring structural ignition potential, fire-resistant materials, structural modifications, increasing defensible space, fire scaping, and developing a fire protection code (Kolden & Henson, 2019). As a result, when the Thomas Fire, during Sundowner winds, spread to Montecito the area experienced minimal damage and was largely passed over (Kolden & Henson, 2019). By having mitigation not be isolated to wildland areas or just to homes, but implemented on multiple scales, Montecito was able to effectively protect not just the WUI areas, but the entire community.

The 2007 Witch Creek fire was one of the most destructive fires in California's history and destroyed thousands of homes in San Diego County (Mutch et al., 2011). However, after the 1990 Paint Fire in Santa Barbara County and the 1991 Oakland Hills Tunnel Fire the San Diego community started efforts to become adaptive to a very high fire hazard environment (Mutch et al., 2011). Developers of five master-planned communities (the Bridges, the Crosby, Cielo, Santa Fe Valley, and 4S Ranch) worked with the Rancho Santa Fe Fire Protection District to build the communities specifically with wildfire in mind (IBHS, 2008). They implemented fire codes, and developed restricted defensible space rules, home hardening measures, and vegetation restrictions; all of which were maintained and enforced by the HOA (Mutch et al., 2011). As a result, when the Witch Creek fire spread to Rancho Santa Fe in the five communities that adopted this approach no homes were lost versus the older communities which were heavily impacted (Mutch et al., 2011).

Additionally, the following communities which feature similar fire protection measures as the Modified Project, have experienced minimal to no fire encroachment as a result of their design:

- Casino Ridge, Yorba Linda (2008 Freeway Complex Fire)[11]
- Serrano Heights, Anaheim Hills (2007 Santiago Fire)[12]
- Cielo, Rancho Santa Fe (2007 Witch Creek Fire)[13]
- 4S Ranch, San Diego (2016 brush fire, 2007 Witch Creek Fire)[14]
- Stevenson Ranch Fire, Santa Clarita (2003 Simi Fire)[15]
- Orchard Hills, Irvine (2020 Silverado Fire) [16]

This data supports that master-planned wildfire-resilient communities built to modern standards provide resilient and fire-resistant housing. Design features that comply with Chapter 7A of the California Building Code decrease the wildfire vulnerability of individual buildings (Quarles & Pohl, 2019). When these features are adopted on a community-wide scale, and coupled with fuel modification zones and community-level buffers, the features enhance overall wildfire resilience of the community (IBHS, 2021). This community-wide approach is critical in reducing fire risk because of the importance of preventing structure-to-structure ignition within a neighborhood in order to prevent conflagrations (Moritz & Bustic, 2020).

Analysis of the State Fire Marshal's statistics also indicates that homes built to CBC Chapter 7A standards effectively reduce fire risks for homes built in the WUI (Grijalva, 2025, attached as Appendix H to this Fire Protection Plan). A study that focused on the 2018 Camp Fire found that homes built in 1997 or later fared substantially better than homes built prior to 1997 (Valachovic et al., 2021). Another source indicates that a 2008 or newer home in California is substantially less likely to be destroyed than a 1990 home experiencing identical wildfire exposure, and that that there is strong evidence that these effects are due to state and local building code changes (Baylis & Boomhower, 2021).

New master-planned wildfire-resilient communities in very high fire severity zones are planned, approved and implemented with numerous fire-safety features and measures. These fire safety features and measures contrast with some older built environments impacted by the 2025 fires in Los Angeles County. See Exhibit 1, which

11 (Orange County Fire Authority, 2008)
12 (FEMA, n.d.)
13 (Mutch et al., 2011)
14 (Audencial, 2016)
15 (Murphy 2003)
16 (Grijalva, 2025, attached as Appendix H to this Fire Protection Plan)

evaluates risk factors associated with some older built environments impacted by the 2025 fires in Los Angeles County and distinguishes those risk factors with wildfire resistance measures in a modern, master-planned wildfire-resilient community (Orchard Hills) that did not suffer significant structural damage despite being directly impacted by the 2020 Silverado Fire during an extreme wind event.[17] As shown in Exhibit 1, modern, master-planned wildfire-resilient communities in very high fire hazard severity zones within the County, such as the Modified Project, include key wildfire safety features and measures, such as:

- Chapter 7A ignition resistant construction
- Annually maintained fuel modification zone
- Ember resistant chapter 7A structures
- Modern code compliant roadways
- Multiple ingress/egress points
- Modern code compliant turnarounds
- Modern code compliant roadways
- HOA maintained landscaping
- Minimal vegetation between structures
- Irrigated landscaping
- Modern code compliant road widths that allow emergency access

In contrast, some of the older built environments impacted by the 2025 fires lacked many of these safety features and were characterized by higher-risk attributes, such as:

- Non-modern structures that lack ember resistance
- Construction not designed for exterior wildfire exposure or resistance to embers
- No fuel modification zones or lack of fuel modification zone maintenance
- Lack of interior landscaping area maintenance
- Narrow road widths (non-compliant with modern codes)
- Hazardous vegetation between structures

In sum, the Modified Project site is designed and planned as a master-planned, wildfire-resilient community that will be implemented and maintained compliant with regulatory requirements and mitigation under the oversight of Los Angeles County Fire. The Modified Project takes a multi-scaled approach to fire protection through wildfire education, ignition prevention, fuels management, increased response capacity, and ignition-resistant construction. The Modified Project has been designed to ensure adequate water supply to ensure consistency for fire protection purposes. The water supply system, encompassing reservoirs, pressure tanks, elevated tanks, water mains, and other fixed systems, would be installed and maintained according to state and NFPA standards and would be

[17] Exhibits 2 and 3 specifically evaluate the 2025 Palisades Fire and Eaton Fire due to the extreme damages from these fires. Exhibits 2 and 3 are also representative of potential risk factors to other older built communities affected by the 2025 fires, including without limitation, the Hurst Fire, Hughes (Castaic) Fire, and Lidia Fire located in and around the Santa Clarita Valley. The Hurst Fire (approximately 799 acres burned), Hughes (Castaic) Fire (approximately 10,425 acres burned), and Lidia Fire (approximately 395 acres burned) resulted in rapid responses by fire-fighting professionals and evacuation orders, but structural impacts were not substantial, particularly when compared to damages in other areas of the County.

capable of providing the required fire flow.[18] The dual benefit of creating a development that can prevent a fire is that it offers protection to the surrounding communities and the environment. The requirements and recommendations outlined in the FPP have been designed specifically for the proposed construction in VHFHSZ and HFHSZ areas and can significantly reduce the potential threat to offsite areas.

[18] The Modified Project will include design features such as 12-inch-diameter water supply lines within internal roadways, fire hydrants spaced no more than 600 feet apart for single-family residential and no more than 300 feet apart for multi-family residential, commercial, and institutions, and NFPA 13, 13R, and 13D automatic sprinkler systems for all structures of any occupancy type.

Exhibit 1. Planned Wildfire Resilient Community Features

Exhibit 2. Palisades Community Features

Exhibit 3. Eaton Community Features

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4 Modeling: Anticipated Fire Behavior for Worst-Case Fire Conditions

4.1 Fire Behavior Modeling

Fire behavior modeling was conducted to document the type and intensity of a fire that would be expected adjacent to the Entrada South and VCC Planning Areas, given characteristic site features such as topography, vegetation, and weather during "worst case" fire conditions (e.g., during Santa Ana winds). For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design.

With this FPP, Dudek utilized BehavePlus software package version 5.05 (Andrews, Bevins, and Seli 2008) to analyze potential fire behavior for the northern, eastern, southern, and western edges as appropriate of the sites, with assumptions made for the pre-and post-project fuel conditions. Results are provided below and a more detailed presentation and explanation of the BehavePlus analysis, including fuel moisture and weather input variables, is provided in Appendix C.

4.1.1 Fire Behavior Modeling Analysis

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and to objectively predict flame lengths, intensities, and spread rates for three modeling scenarios for Entrada South and three modeling scenarios for VCC. These fire scenarios incorporated observed fuel types representing the dominant on-site and off-site vegetation on vacant land adjacent to the proposed developments, in addition to measured slope gradients, and wind and fuel moisture values derived from Remote Automated Weather Stations (RAWs) weather data sets (Del Valle Station, ID No. 045445) for both the 50th percentile weather (on-shore winds) and the 97th percentile weather (off-shore winds). Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent to the site. Identification of fire scenarios' locations is presented graphically in Figure 8a for Entrada South and Figure 8b for VCC.

Baseline vegetation types, which were derived from the field assessment for the Modified Project Site, were classified into a fuel model. Fuel Models are simply tools to help fire experts realistically estimate fire behavior for a vegetation type. Fuel models are selected by their vegetation type; fuel stratum most likely to carry the fire; and depth and compactness of the fuels. Fire behavior modeling was conducted for vegetative types that surround the proposed development. Fuel models were selected from *Standard Fire Behavior Fuel Models: a Comprehensive Set for Use with Rothermel's Surface Fire Spread Model* (Scott and Burgan 2005). Fuel models were also assigned to the perimeter fuel management areas to illustrate post-project fire behavior changes. Based on the anticipated pre- and post-project vegetation conditions, six different fuel models were used in the fire behavior modeling effort presented herein. Fuel model attributes are summarized in Table 1.

Table 1. Baseline Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
8	Zone A – irrigated, landscapes	Perimeter fuel modification zone	<3.0 ft.
Gr1	Zone B: grasses cut to 6 inches in height	Perimeter fuel modification zone	<0.5 ft.

Table 1. Baseline Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
Gr4	Non-native grasslands	Hillsides surrounding the sites	<2.0 ft.
Sh1	Zone B: 50% thinning shrubs	Perimeter fuel modification zone	—
Sh4	Southern cottonwood-willow riparian, Shrubby understory	Riverbed or drainages	<8.0 ft. = understory 35+ ft. = tree heights
Sh5	Coastal scrub	Occurs on hillsides on both sites	<4.0 ft.

The results of baseline fire behavior modeling analysis are presented in Tables 2 and 3 for pre-project conditions and Tables 4 and 5 for post-project conditions. Post-project conditions include modified fuel model characteristics to represent the reduced fuels, high plant moisture, and engineered landscapes that result in reduced flame lengths, spread rates, and fire intensity.

Table 2. BehavePlus Modeling Results – Pre-Project Baseline Conditions for Entrada Planning Area

Fire Scenarios	Flame Length (feet)	Fireline Intensity (Btu[1]/feet/second)	Spread Rate (mph[2])
Scenario 1:south-east-facing, 25% slope; Offshore 52 mph gusts (97th percentile)			
Valley oak/grass (Gr4)	39.9	17,131	17.9
Coastal scrub (Sh5)	46.0	23,393	7.2
Scenario 2: south-facing, 20% slope; Offshore 52 mph gusts (97th percentile)			
Coastal scrub (Sh5)	45.7	23,045	7.1
Scenario 3: north-facing, 27% slope; Onshore 14 mph winds (50th percentile)			

Notes (for Tables 2, 4, and 5):
1 Btu = British thermal unit(s)
2 mph = miles per hour
3 Spotting distance from a wind-driven surface fire

Table 3. BehavePlus Modeling Results – Pre-Project Baseline Conditions for VCC Planning Area

Fire Scenario	Flame Length (feet)	Spread Rate (mph[1])	Fireline Intensity (Btu[2]/ft/s)	Spotting Distance[3] (miles)	Surface Fire to Tree Crown Fire
Scenario 1: flat, <5% slope; Offshore 52 mph sustained gusts (97th percentile)					
Grass (Gr4)	39.7	17.7	16,929	2.3	No
Coastal scrub (Sh5)	45.7	7.1	23,043	2.5	No
Southern Cottonwood- Willow Riparian2,3 (Sh4)	24.5	4.5	5,938	1.6	Crowning [6]
Scenario 2: south-facing, 10% slope; Onshore 14 mph sustained winds (50th percentile)					
Grass (Gr4)	6.7	0.6	351	0.3	No
Coastal scrub (Sh5)	14.8	0.8	1,989	0.5	No

Table 3. BehavePlus Modeling Results – Pre-Project Baseline Conditions for VCC Planning Area

Fire Scenario	Flame Length (feet)	Spread Rate (mph[1])	Fireline Intensity (Btu[2]/ft/s)	Spotting Distance[3] (miles)	Surface Fire to Tree Crown Fire
Southern Cottonwood- Willow Riparian[4,5] (Sh4)	7.1	0.4	396	0.3	Crowning[6]
Scenario 3: north-facing, 40% slope; Offshore 52 mph sustained gusts (97th percentile)					
Coastal scrub (Sh5)	46.3	7.3	23,684	2.6	No

Notes (For Table 3):
1 mph = miles per hour
2 Btu = British thermal unit(s)
3 Wind-driven surface fire.
4 Riparian overstory torching increases fire intensity. Modeling included canopy fuel over Sh4, which represents surface fuels beneath the tree canopies.
5 A surface fire in the mixed willow riparian forest would transition into the tree canopies generating flame lengths higher than the average tree height (35 feet). Viable airborne embers could be carried downwind for approximately 1.0 miles and ignite receptive fuels.
6 Crowning= fire is spreading through the overstory crowns.

Table 4. BehavePlus Modeling Results – Post-Project Baseline Conditions for Entrada Planning Area

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Fuel treatments, South-east-facing, manufactured slopes, Offshore 52 mph gusts (97th percentile)				
Fuel modification zone A (FM8)	3.0	63	0.2	0.4
Fuel modification zone B (Sh1)	10.6	959	1.5	0.9
Fuel modification zone B (Gr1)	4.0	115	0.7	0.5
Scenario 2: Fuel Treatments, south-facing, manufactured slopes; Offshore 52 mph gusts (97th percentile)				
Fuel modification zone A (FM8)	3.0	63	0.2	0.4
Fuel modification zone B (Sh1)	10.6	959	1.5	0.9
Scenario 3: Fuel Treatments, north-facing, manufactured slopes; Onshore 14 mph winds (50th percentile)				
Fuel modification zone A (FM8)	1.3	10	0.03	0.1
Fuel modification zone B (Sh1)	0.9	4	0.03	0.1

Table 5. BehavPlus Modeling Results – Post-Project Baseline Conditions for VCC Planning Area

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Fuel treatments, manufactured slopes, Offshore 52 mph gusts (97th percentile)				
Fuel modification zone A (FM8)	3.0	63	0.2	0.4

Table 5. BehavPlus Modeling Results – Post-Project Baseline Conditions for VCC Planning Area

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Fuel modification zone B (Sh1)	10.6	959	1.5	0.9
Scenario 2: Fuel Treatments, manufactured slopes; Onshore 14 mph winds (50th percentile)				
Fuel modification zone A (FM8)	1.5	14	0.05	0.1
Fuel modification zone B (Gr1)	2.3	33	0.3	0.1
Scenario 3: Fuel Treatments, manufactured slopes; Offshore 52 mph gusts (97th Percentile)				
Fuel modification zone A (FM8)	3.0	63	0.2	0.4
Fuel modification zone B (Sh1)	10.6	959	1.5	0.9

The results presented in Tables 2 through 5, which are described in further detail below, Section 4.2, Wildfire Behavior Summary, depict values based on inputs to the BehavePlus software and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis, but the models provide a worst-case wildfire behavior condition as part of a conservative approach. Wind and weather data were processed using data from Remote Automated Weather Stations (RAWs) weather data sets (Del Valle Station, ID No. 045445) and analyzed with FireFamily Plus version 5.0 to determine weather conditions to be incorporated into modeling efforts (FireFamily Plus, 2019). The selected weather scenario used 97th percentile fire conditions which mimic a fire event during Santa Ana wind conditions. These weather values were then utilized in the BehavePlus software package in combination with site topography, fuel types, and fuel moistures in order to model fire under 97th percentile conditions. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design.[19]

4.2 Wildfire Behavior Summary

4.2.1 Pre-Project Baseline Conditions

4.2.1.1 Entrada Planning Area

As presented in Table 2, wildfire behavior in non-treated Coastal scrub, presented as a Fuel Model Sh5, represents the most extreme conditions, varying with different wind speeds. In this case, flame lengths can be expected to reach up to approximately 46.0 feet with 52 mph gusts (Offshore wind conditions) and 15.0 feet with 14 mph wind speeds (Onshore winds). Spread rates for Coastal scrub fuel beds range from less than 1.0 mph (Onshore winds) to 7.2 mph (Offshore winds). Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 0.5 miles to 2.5 miles. In comparison, a grass fuel type could generate flame lengths up to 39.9 feet high with a rapid spread rate of 17.9 mph. The fire could potentially be spotting from a distance of 2.3 miles.

19 Please note, model results should be used as a basis for planning only, as actual fire behavior for a given location would be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

4.2.1.2 Valencia Commerce Center Planning Area

As presented in Table 3, the maximum flame lengths anticipated in untreated, surface fuels, including grasslands and Coastal scrub, could reach 39.7 to 45.7 feet, respectively, in height with rates of the spread between 7.1 and 17.7 mph under extreme weather conditions, represented by Santa Ana winds blowing at gusts of 52 mph. Should ignition in the Castaic Creek riverbed occur, the riparian understory would be expected to burn aggressively due to the presence of large amounts of biomass from dense stands of shrubby willows. Modeling outputs indicate a transition to crown fire is expected from a fire burning in the riparian understory since the canopy heights to the lowest branch are roughly 3 feet above the ground and in most situations the canopies touch the ground. Under such conditions, expected surface flame lengths in peripheral riparian surface fuels could reach up to 24.5 feet and ignite the tree canopies with flame lengths in excess of 35 feet, and potentially up to 100 feet. Embers could be generated from both surface and crown fires resulting in the ignition of receptive fuel beds 1.6 to 2.6 miles downwind.

Fires burning from the west and pushed by ocean breezes exhibit less severe fire behavior. Under typical onshore weather conditions, a grass fire could have flame lengths of 6.7 feet in height and spread rates less than 1.0 mph. A wildfire in Coastal scrub could generate flame lengths of 14.8 and spread at less than 1.0 mph. Modeling outputs indicate flame lengths (7.1 feet) in the shrubby willow understory would transition to a crown fire with flame lengths in excess of 35 feet. Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 0.3 to 0.5 miles.

4.2.2 Post-Development Baseline Conditions

As presented in Table 4, Dudek conducted modeling of the Entrada Planning Area for post-FMZ fuel recommendations for this Modified Project. Fuel modification includes the establishment of irrigated and thinned zones on the periphery of the Modified Project's neighborhoods. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified for the FMZ 1 (Fuel Model 8) and FMZ 2 (50% thinning zones — Fuel Model Sh1). The FMZ areas experience a significant reduction in flame length and intensity. The 46.0-foot (Coastal scrub fuel bed) and 39.9-foot (grass fuel bed) tall flames predicted during pre-treatment modeling during extreme weather conditions are reduced to less than 10.6 feet tall at the outer edges and less than 3.0 feet in the FMZ 1 near the structures of the development due to the higher live and dead fuel moisture contents. Fuel model assignments for all other areas remained the same as those classified for the existing condition. As depicted, the fire intensity and flame lengths in untreated, Spineflower Preserve areas would remain the same.

Dudek also conducted modeling of the VCC Planning Area for post-FMZ fuels treatment recommendations as shown in Table 5. Fuel modification includes the establishment of irrigated landscaping on the periphery of the proposed commercial development. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified for the developed Fuel Modification Zone A (Fuel Model 8), and Fuel Modification Zone B (Fuel Model SH1 for thinning Coastal scrub and Gr1 for grasses cut to 6 inches in height). The FMZ areas experience a significant reduction in flame length and intensity. The 46.0-foot tall flames predicted during pre-treatment modeling for the VCC site during extreme weather conditions are reduced to 10.6 feet tall at the outer edges of the FMZ and 3.0 feet by the time the inner portions (i.e., irrigated, Zone A) of the FMZ are reached. During onshore weather conditions, a fire approaching from the west would be reduced from 14.8-foot tall flames to less than 2.3 feet tall in both the irrigated and thinning zones with much lower fire intensity due to the higher live and dead fuel moisture contents. Fuel model assignments for all other areas remained the same as those classified for the existing conditions. As depicted in Table 5, the fire intensity and flame lengths in untreated, biological open space areas (i.e., Coastal scrub and cottonwood-willow riparian areas) would remain the same.

4.3 Modeling Results When Including Ongoing Livestock Grazing

The Modified Project, along with the larger region, benefits from reduced fire ignitions and fire behavior resulting from the ongoing Newhall Land agricultural and grazing activities. Specifically, the livestock grazing program utilizes practices implemented on the greater Ranch over the last several decades and continues these practices as part of the holistic land management approach and managing wildfire risk simultaneously. This modeling described above conservatively does not take into account any benefits from Newhall's ongoing grazing operations by analyzing the Modified Project area's fire behavior with a vegetation baseline condition that is assumed to be untreated/undisturbed, native fuel beds. This conservative approach ensures that the provided FMZ widths are adequate for protecting the structures and future populations even if the ongoing grazing operations were to cease in the future for a period of time.

However, for information purposes, the modeling also considered the scenario with ongoing livestock grazing, which results in reduced fire behavior in terms of flame lengths, fire spread rates, heat output, and overall intensity. For example, flame lengths are reduced throughout the treated area and the highest modeled flame lengths were reduced from 58 feet to 18 feet. It is anticipated that the livestock grazing program will continue to provide these benefits, but even if the program is halted at some future date, the Modified Project's planned FMZs provide the necessary setbacks and protection and do not rely on livestock treatments. Thus, the ongoing livestock grazing program provides additional benefits with respect to wildfire protection but is not necessary for the purpose of this FPP's evaluation.

4.4 Modified Project Area Fire Risk Assessment

Wildland fires are a common natural hazard in most of southern California with a long and extensive history. Southern California landscapes include a diverse range of plant communities, including vast tracts of grasslands and shrublands, like those found adjacent to the Modified Project Site. However, because the adjacent lands are part of a historic grazing operation, the fuels are lighter, spacing is less dense, and ongoing grazing maintains reduced fire behavior. Wildfire in Mediterranean-type ecosystems ultimately affects the structure and functions of vegetation communities (Keeley 1984) and will continue to have a substantial and recurring role (Keeley and Fotheringham 2003). Supporting this are the facts that 1) native landscapes, from forests to grasslands, become highly flammable each fall, and 2) the climate of southern California has been characterized by fire climatologists as the worst fire climate in the United States (Keeley 2004) with high winds (Santa Ana) occurring during autumn after a six-month drought period each year. The most common type of fire anticipated in the vicinity of the Modified Project Area is a wind-driven fire from the north/northeast, moving through the grazed remnants of non-native grasses and sage scrub shrubs found on the slopes and base east of I-5. With the conversion of the landscape to ignition-resistant development, wildfires may still encroach upon and drop embers on the Modified Project Site, but would not burn through the Site due to the lack of available fuels. Wildfires starting on the Modified Project Site would not be anticipated to increase from existing levels due to the ignition-resistant landscapes, and perimeter fuel modification zones which are designed to protect the Modified Project while also minimizing the likelihood that an on-site fire escapes into wildland areas.

Therefore, it will be critical that the latest fire protection requirements, developed through intensive research and real-world wildfire observations and findings by fire professionals, for both ignition-resistant construction and for creating defensible space are implemented and enforced. The Modified Project, once developed, would not facilitate wildfire spread and would reduce projected flame lengths to levels that would be manageable by firefighting resources for protecting the Modified Project Site's structures, especially given the ignition resistance of the structures and the planned ongoing maintenance of the Site's landscapes. In addition, the proposed 100- to 200- horizontal feet FMZ widths, depending on County Fire direction and geographic constraints and the fuel breaks provided by the grazed lands immediately adjacent to the Modified project provide a significant buffer and reduce wildfire intensity and flame lengths to levels that present a much lower threat to a hardened community like the Modified Project.

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Variables Used for Fire Behavior Modeling Efforts

Variable	Summer Weather Condition (Onshore Winds)	Extreme Weather Condition (offshore/Santa Ana Winds)
1h Moisture	4%	1%
10h Moisture	5%	2%
100h Moisture	10%	5%
Live Herbaceous Moisture	45%	30%
Live Woody Moisture	90%	60%
20-foot Wind Speed (upslope/downslope)	14 mph (sustained winds)	19 mph (sustained winds) and wind gusts of 52 mph
Wind Direction	225°	45°
Wind Adjustment Factor (BehavePlus)	0.4	0.4

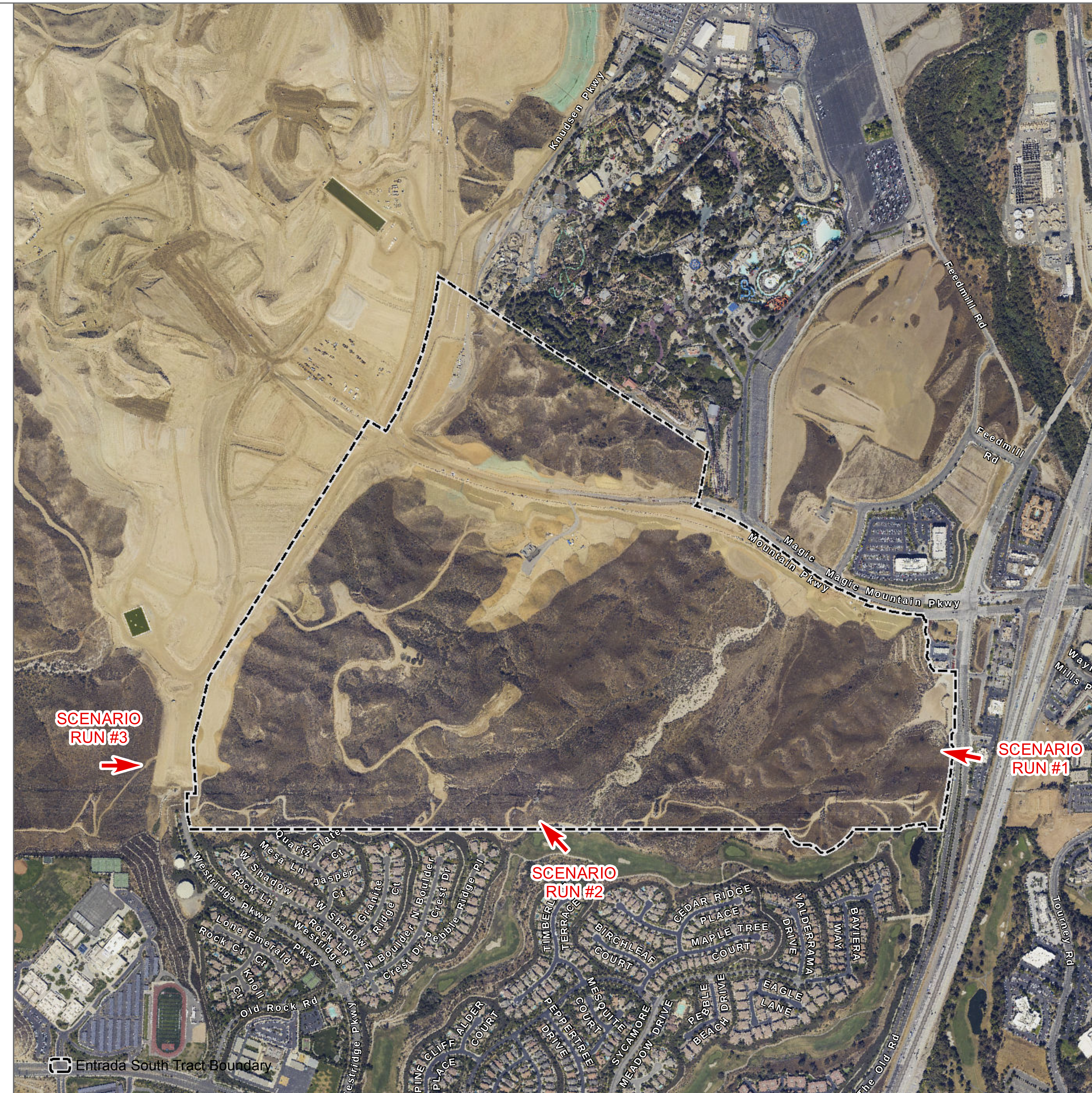
Source: Del Valle (045445) Remote Automated Weather Station

Fire Behavior Model Results—Existing Conditions for Entrada South

Fire Scenarios	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1:south-east-facing, 25% slope; Offshore 52 mph gusts (97th percentile)				
Valley oak/grass (Gr4)	39.9	17,131	17.9	2.3
Coastal scrub (Sh5)	46.0	23,393	7.2	2.5
Scenario 2: south-facing, 20% slope; Offshore 52 mph gusts (97th percentile)				
Coastal scrub (Sh5)	45.7	23,045	7.1	2.5
Scenario 3: north-facing, 27% slope; Onshore 14 mph winds (50th percentile)				
Coastal scrub (Sh5)	15.0	2,059	0.83	0.5

Fire Behavior Model Results—Post-Project Conditions for Entrada South

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Fuel treatments, South-east-facing ,manufactured slopes, Offshore 52 mph gusts (97th percentile)				
Fuel modification zone 1 (FM8)	3.0	63	0.2	0.4
Fuel modification zone 2 (Sh1)	10.6	959	1.5	0.9
Fuel modification zone 2 (Gr1)	4.0	115	0.7	0.5
Scenario 2: Fuel Treatments, south-facing, manufactured slopes; Offshore 52 mph gusts (97th percentile)				
Fuel modification zone 1 (FM8)	3.0	63	0.2	0.4
Fuel modification zone 2 (Sh1)	10.6	959	1.5	0.9
Scenario 3: Fuel Treatments, north-facing, manufactured slopes; Onshore 14 mph winds (50th percentile)				
Fuel modification zone 1 (FM8)	1.3	10	0.03	0.1
Fuel modification zone 2 (Sh1)	0.9	4	0.03	0.1



SOURCE: ESRI 2019; Hunsaker 2019

DUDEK

0 470 940 Feet

FIGURE 8a

BehavePlus Fire Behavior Analysis for Entrada Planning Area

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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Variables Used for Fire Behavior Modeling Efforts

Variable	Summer Weather Condition (Onshore Winds)	Extreme Weather Condition (offshore/Santa Ana Winds)
1h Moisture	4%	1%
10h Moisture	5%	2%
100h Moisture	10%	5%
Live Herbaceous Moisture	45%	30%
Live Woody Moisture	90%	60%
20-foot Wind Speed (upslope/downslope)	14 mph (sustained winds)	19 mph (sustained winds) and wind gusts of 52 mph
Wind Direction	225°	45°
Wind Adjustment Factor (BehavePlus)	0.4	0.4

Source: Del Valle (045445) Remote Automated Weather Station

Fire Behavior Model Results—Existing Conditions for Valencia Commerce Center

Fire Scenario	Flame Length[1] (feet)	Spread Rate[1] (mph)	Fireline Intensity[1] (Btu/ft/s)	Spot Fire[1] (miles)	Surface Fire to Tree Crown Fire
Scenario 1: flat, <5% slope; Offshore 52 mph sustained gusts (97th percentile)					
Grass (Gr4)	39.7	17.7	16,929	2.3	No
Coastal scrub (Sh5)	45.7	7.1	23,043	2.5	No
Southern Cottonwood- Willow Riparian[2,3] (Sh4)	24.5	4.5	5,938	1.6	Crowning [4]
Scenario 2: south-facing, 10% slope; Onshore 14 mph sustained winds (50th percentile)					
Grass (Gr4)	6.7	0.6	351	0.3	No
Coastal scrub (Sh5)	14.8	0.8	1,989	0.5	No
Southern Cottonwood- Willow Riparian[3,4] (Sh4)	7.1	0.4	396	0.3	Crowning[4]
Scenario 3: north-facing, 40% slope; Offshore 52 mph sustained gusts (97th percentile)					
Coastal scrub (Sh5)	46.3	7.3	23,684	2.6	No

Note:

1. Wind-driven surface fire.
2. Riparian overstory torching increases fire intensity. Modeling included canopy fuel over Sh4, which represents surface fuels beneath the tree canopies.
3. A surface fire in the mixed willow riparian forest would transition into the tree canopies generating flame lengths higher than the average tree height (35 feet). Viable airborne embers could be carried downwind for approximately 1.0 mile and ignite receptive fuels.
4. Crowning= fire is spreading through the overstory crowns.

Fire Behavior Model Results—Post-Project Conditions for Valencia Commerce Center

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Fuel treatments, manufactured slopes, Offshore 52 mph gusts (97th percentile)				
Fuel modification zone 1 (FM8)	3.0	63	0.2	0.4
Fuel modification zone 2 (Sh1)	10.6	959	1.5	0.9
Scenario 2: Fuel Treatments, manufactured slopes; Onshore 14 mph winds (50th percentile)				
Fuel modification zone 1 (FM8)	1.5	14	0.05	0.1
Fuel modification zone 2 (Gr1)	2.3	33	0.3	0.1
Scenario 3: Fuel Treatments, manufactured slopes; Offshore 52 mph gusts (97th Percentile)				
Fuel modification zone 1 (FM8)	3.0	63	0.2	0.4
Fuel modification zone 2 (Sh1)	10.6	959	1.5	0.9

SOURCE: AERIAL-EAGLE AERIAL 2018

DUDEK

0 462.5 925 Feet

FIGURE 8b

BehavePlus Fire Behavior Analysis for VCC Planning Area

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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5 Additional Factors for Considering Potential Wildfire Risks Associated with the Modified Project's Introduction of New Development

Research indicates that while humans can drive wildfire ignition risk in the WUI, comprehensive actions can be taken to mitigate such risks to less than significant levels (Elia et al., 2019). When fire protection is implemented at the parcel level and leverages ignition resistant building materials, infrastructure improvements, increased response capacity, and incorporates landscape design FMZs, the wildfire risk can be reduced not only within the proposed development but in the surrounding environment as well (Newman et al., 2013). The following section summarizes factors for determining wildfire risk from new development and potential opportunities to mitigate such risks.

Research has indicated that increased human activity in WUI areas can result in an increased likelihood of ignition (Keeley & Syphard, 2018; Syphard, Clayton, et al., 2007; Syphard & Keeley, 2015). As such, residential development within fire-prone areas is commonly characterized as the principal driver of wildfire risk (Keeley & Syphard, 2018; Syphard, Clayton, et al., 2007; Syphard & Keeley, 2015). However, as humans can drive wildfire risk they can in turn reduce it by household level or parcel level decisions, such as home siting, building materials, and landscape design that can reduce risk in the WUI environment (Newman et al., 2013). These decisions can take the form of reducing fire ignition risks by converting fire-prone areas to ignition-resistant, maintaining ground covers, constructing ignition-resistant homes and hardscapes, and increasing the development setback from the wildland-urban interface (Newman et al., 2013). This change occurs through the strategic implementation of fire protection measures that result in planned alterations to fuel, increased ignition resistant construction, enhanced fire protection features, higher wildfire risk awareness, and maintenance of fire protection features. When developments are planned accordingly, the fuel availability and fuel continuity decrease, while the probability of fire suppression increases (Fox et al., 2018).

The dual benefit of building a fire-hardened development is that the same features that protect the development from a wildfire also play a significant role in protecting wildlands and surrounding areas from Modified Project-related fires through ignition reduction.

5.1 Reducing Wildfire Risks Associated with Introducing Ignition Sources and increasing Human Activities in the WUI

As previously mentioned, in southern California humans play a major role in ignitions by influencing the timing and spatial pattern of fires (Keeley & Syphard, 2018). As a result, humans account for more than 95% of ignitions in the region (Keeley & Syphard, 2018). The relationship between human activities and natural dynamics has contributed to altering fire regimes (Syphard et al., 2007). One alteration is that urban development increases the risk of repeated fires on the landscape (Syphard, Clarke, et al., 2007). As humans move into landscapes with patterns of ignitions change as well (Syphard, Clarke, et al., 2007). However, the number of ignitions and the area burned varies by an ignition source (Syphard & Keeley, 2015). Overall, human-caused ignitions peaked in 1980 and have since dropped likely due to increased efficiencies in fire prevention, changes in infrastructure, a decline in smoking, neighborhood watch program, penalties for arsonists, and new developmental rules (Keeley & Syphard, 2018). However, while the number of ignitions has decreased the area burned has not changed, indicating while fires are fewer they are larger in magnitude (Keeley & Syphard, 2018). The relationship between ignitions and human development is complex. While human-caused ignitions increase as populations and development expand into the WUI this increase reaches a peak and then declines at the point at which development or impervious surfaces (hardscape) outweigh the wildland fuels (Keeley & Syphard, 2018).

By analyzing all wildfire ignitions included in the CAL FIRE Fire and Resource Assessment Program (FRAP) database dating back over 100 years it was found that in the case of one Southern California county (San Diego County), equipment-caused fires were by far the most numerous (Syphard & Keeley, 2015). These ignitions accounted for most of the area burned, followed closely by the area burned by power line fires (Syphard & Keeley, 2015). This pattern is consistent beyond San Diego County and is applicable in Los Angeles County. In Los Angeles County a common source of wildfire ignition stems from human activities such as smoking, playing with fire, and powerlines (Keeley & Syphard, 2018). Ignitions are classified as equipment caused resulted from exhaust or sparks from power saws or other equipment with gas or electric motors, such as lawnmowers, trimmers, or tractors. In San Diego County and Los Angeles County, ignitions were more likely to occur close to roads and structures, and intermediate structure densities (Syphard & Keeley, 2015). Powerline-based ignitions that have caused or contributed to recent fires, such as the Camp Fire in 2018, have demonstrated how the presence of powerlines (particularly the lower height distribution lines) can result in significant wildfire ignitions. Part of the challenge is that as humans push into WUI areas powerlines are often located in areas where access is difficult creating challenges for firefighting tactics (Syphard & Keeley, 2015). Research has indicated that important factors in structure loss are the coincidence of human-caused ignitions with severe weather and the location and pattern of housing development (Schwartz & Syphard, 2021). However, it is important to note that often these themes are researched in isolation with small proportions studying two more themes limiting our understanding of the interactions and dependencies (Price et al., 2021).

Given the number and intensity of wildfires in recent years, there has been an increasing focus on wildfires and reducing the size of wildfires (Syphard et al., 2014). However, addressing wildfires in the WUI with fuels reduction and prescribed burning is often faced with challenges related to private property constrictions (Schwartz & Syphard, 2021). Studies have shown that land-use decision-making, defensible space, homeowner preparation, and ignition prevention can complement traditional management in reducing wildfires and addressing fuels management (Schwartz & Syphard, 2021; Syphard et al., 2017). Further, given the importance of the WUI and often the lack of capacity for large-scale fuels reduction creating safer spaces within the WUI is critical (Schwartz & Syphard, 2021). Because most fires are caused by humans ignition reduction is a powerful management strategy (Syphard & Keeley, 2015). Given that we are moving into a more hazardous wildfire future land-use planning and ignition prevention represent the most effective long term solutions while traditional management and fuel breaks still play a role in addressing the coincidence of human-caused ignitions and severe fire weather (Schwartz & Syphard, 2021; Syphard et al., 2017).

To minimize the negative effects, the Modified Project has designed multi-scaled fire protection features to address the existing fire hazard, reduce ignition probability, and lower the fire risk for the Modified Project and the surrounding area. As discussed above, one of the most effective solutions to wildfire problems in the WUI is to address the wildfire hazard through land-use planning and ignition prevention. In terms of land use planning, the Modified Project is located in areas of the OVOV Area Plan that have long been designated for commercial and residential use, and the Modified Project would result in the conversion of readily ignitable fuels, such as coastal sage scrub and grasses, to irrigated/thinned landscaping and development. Notably, the Modified Project minimizes ignition risk by incorporating 100- to 200- horizontal feet FMZs, depending on County Fire direction and geographic constraints around the entire project perimeter, which will provide defensible space and reduce fire intensity and flame lengths in the event of ignition occurring. These FMZs, which are based on County Fire requirements and confirmed with site-specific modeling, will be implemented by knowledgeable professionals, inspected by third-party inspectors, and maintained in perpetuity by the Modified Project HOA. Additionally, other fuel modification/landscaping requirements like the Modified Project's roadway fuel modification zones, stormwater basin vegetation management, and the prohibition of certain highly flammable plants will further reduce the risk of fire ignition and spread despite the introduction of additional humans in the area. Critically, the structures in the Modified Project will also be built in accordance with the most state-of-the-art, ignition-resistant construction standards and building codes required by the County and the State, including Chapter 7A of the Los Angeles County Building Code (Title 26, Chapter 7A), which requires that the buildings are resistant to ignitions from direct flames, heat, and embers. Other structural requirements include fire-resistant roofing, vent covering and opening limitations, noncombustible or ignition-resistant exterior walls, ignition-resistant eaves, and porch ceilings, insulated windows and exterior doors, and other measures that have proven to substantially reduce the risk of building ignition and fire spread. Finally, a key component of reducing the chances of fire ignition and spread involves educating residents to have a high fire risk awareness. In this respect, the Modified Project includes as mitigation a robust education awareness program that will provide residents with wildfire safety information and create greater risk awareness for occupants and their employees. Through this program, residents will learn about necessary landscape maintenance, activities in a wildfire risk area, preventing wildfires, structural-based fire protection features, and wildfire evacuation information.

As evidenced by these measures and the other measures described in Section 3 Fire Safety Requirements – Regulations and Design Features, the Modified Project has outlined steps in which it will implement ignition reduction from common anthropogenic ignition sources, leverage its capacity for implementing fuels reduction including defensible space, and consider both onsite and offsite wildfire risk. Still, there are other project-specific anthropogenic fire risks that are worthy of being highlighted for the purposes of this FPP. These include powerlines, vehicles, and machinery. Each is discussed below.

5.1.1 Powerlines

Common ignition sources in southern California are related to powerlines and many destructive fires across the State have been caused by powerlines (Keeley & Syphard, 2018). However, this risk can be mitigated by burying powerlines. The Modified Project will underground all project-related distribution power lines on the Modified Project site.

5.1.2 Vehicles

A potential source of vegetation ignitions in the Modified Project area is the existing Interstate (I-5), Magic Mountain Parkway, Valencia Boulevard, and other roads used by Modified Project residents and occupants. However, the Modified Project is not increasing vehicle trips compared to the State-certified EIR. Further, the Modified Project is not anticipated to increase the number of cars on the existing roadways compared to the 2017 Approved Project and therefore will not raise the existing potential for vehicle-based ignitions. Even so, the Modified Project provides roadside fuel modification via the removal of flammable vegetation and provisions for landscaping along roads it controls. Additionally, the Newhall's historic grazing program in areas adjacent to developed and developing areas reduces fuel loads adjacent to Valencia Boulevard, I-5, and Magic Mountain Parkway. The Modified Project includes provisions for creating increased separation from potential roadside ignition sources and potential fuel beds that will not only protect the Modified Project but also adjacent communities such as Stevenson Ranch. These efforts reduce or minimize the ability of a vehicle-related spark, catalytic converter failure, or another ignition source to ignite and spread fire from the roadsides into unmaintained fuels. Ongoing maintenance along I-5 is provided by CalTrans and is expected to continue, if not increase in frequency as part of overall fire reduction efforts that are beyond the control of the Modified Project As such, the Modified Project is not expected to significantly increase the already known fire risk associated the preexisting roads. The onsite roadways would comply with all fire department access requirements and be adjacent to fuel modification. Further, the Interior roadways are also not expected to result in significant vehicle ignitions. Therefore, even if ignition were to occur within the Modified Project it is highly unlikely it would be sustained or spread beyond the Modified Project site due to the hardened landscapes, hardscape, and adjacent fuel modifications areas. Additional analysis of the Modified Project's potential impacts compared to the 2017 Approved Project is provided in Section 8.

5.1.3 Machinery

The use of equipment in WUI areas is another common source of modern-day human-caused ignitions. This is due to heated machinery, sparks, hot fluids, or exhaust igniting vegetation. Potential ignitions due to equipment use can occur during construction activities or ongoing operational risk.

5.1.3.1 Construction Activities

Construction activities associated with the Modified Project would introduce potential ignition sources to the Modified Project sire. However, the Modified Project would comply with County Fire requirements for activities in hazardous fire areas and the CFC. Spark arrestors would be required on all equipment with a solid or liquid fuel motor used on the Modified Project Site. The Modified Project would also comply with Section 326.12.1 of the Fire Code which prohibits the use or operation of any tractor, construction equipment, engine, machinery, or any steam, oil, or gasoline-operated stationery or mobile equipment, from which a spark or fire may originate unless such equipment is provided with a qualified device or spark arrester installed in or attached to the exhaust pipe which will prevent the escape of fire or sparks. Further construction activities would comply with Chapter 33 of the CFC Fire Safety During Construction and Demolition. Per Section 3304 the Modified Project would take precautions against ignitions such as but not limited to prohibiting smoking except in approved areas, preventing the accumulation of and removing combustible debris, implementing fire watch personnel where required by the fire code official, having approved water supply onsite, and maintaining vehicle access for firefighting to all construction and demolition area. Additionally, the Modified project would prepare a Construction Fire Protection Plan (CFPP) that will address fire safety practices to reduce the possibility of fire during construction activities. However, due to the existing conditions and the that the Modified Project is located in a VHFHSZ, there is a potential for a significant fire hazard due to construction activities. As such, additional construction Design Features would be implemented by the Modified Project to lower the potential fire hazard below the level of significance. This would require that prior to combustible being brought on-site utilities, access roads, and fuel modification zones would be first established. The design features, CFPP, and regulatory requirements would reduce the risk of wildfire ignition and spread from the Modified Project during construction activities. Additional analysis of the Modified Project's potential impacts compared to the 2017 Approved Project is provided in Section 8.

5.1.3.2 Operational Activities

Operational activities associated with maintenance or use of the Modified Project site also have the potential to introduce ignitions to the area. The operational activities would also be required to comply with the CFC spark arrestor requirements, Chapter 33 Fire Safety During Construction and Demolition for any post-development construction, maintenance, or renovations, and other applicable codes and requirements based on the activity type. Operational activities would also comply with County Fire requirements for activities in fire hazard areas as described above. FMZs and landscaping within the Modified Project site would require ongoing maintenance. These common area landscapes and perimeter FMZs would be managed and maintained by the HOA through a qualified contractor. The contractor would be required to meet fire safety requirements regarding equipment, the timing of maintenance, and fire suppression capabilities. This type of maintenance program is far safer and more controlled than if each homeowner provided their own maintenance of FMZ areas. Additionally, maintaining the FMZs and landscaping accordingly would allow them to continue their function purpose of reducing potential ignition and fire spread both from fire onsite or offsite in origin. Further, even if the equipment were to cause a fire it is unlikely it would spread offsite due to the adjacent FMZs and ignition resistant landscape. A robust wildfire education program would provide residents and occupants with ongoing education regarding wildfire, as described in Section 7.2. The education program would be implemented by the HOA and have a layered approach to wildfire awareness that includes both passive and active features. The educational program would cover a wide range of information such as residential evacuation planning, defensible space guidelines, how to maintain fire protection features, activities in a fire risk area, and more, all provided in easy-to-understand, graphically based materials. This would education regarding safe activities in wildfire risk areas, including the appropriate use of machinery, during red flag warning days, restrictions on the use of machinery in the Modified Project area would be implemented. This requirement, in conjunction with the Modified Project Design and regulation compliance, will significantly reduce potential ignitions both in the Modified Project area and limit the potential impact on the surrounding area. Additional analysis of the Modified Project's potential impacts compared to the 2017 Approved Project is provided in Section 8.

5.1.4 Project Features Addressing Fire Risk Associated with Increasing Human Activities in the WUI

5.1.4.1 Vegetation Management

The fuel conditions immediately adjacent to the Modified Project will also be addressed through FMZs. The existing hazardous fuel, mostly shrub fuels, on the Modified Project site and within FMZ areas would be converted into hardscape and or modified to reduce fuel densities that are managed and maintained. In an FMZ, combustible vegetation would be removed and/or modified and partially or totally replaced with more appropriately spaced drought-tolerant, fire-resistant plants including an irrigated zone. This would provide a managed area where fire spread is not facilitated toward the Modified Project or away from the Modified Project into wildland areas by redistributing the fire risk on a landscape and altering the interaction between fire, fuels, and weather (Cochrane et al., 2012). FMZs would also reduce the likelihood of canopy fires, lower ember cast, and have a shadow effect on the untreated landscape by reducing the probability of burning and the potential fire size (Cochrane et al., 2012). As such, the Modified Project would lower ignition potential in the area by reducing and altering the available fuel scape to a less flammable managed condition not conducive to fire spread and increasing the probability of fire suppression if ignition occurs (Fox et al., 2018). Further, Modified Project benefits from Newhall's historic grazing program which maintains adjacent grassland and addresses larger scale landscape fuel conditions. As a result, the risk of a structure being destroyed, whether from a fire from within the development or outside the development, is significantly lower when defensible space is implemented. Studies have also indicated that treatments in close proximity to residential buildings provide greater protection (Syphard et al., 2014). Accordingly, the Modified Project will provide an ERZ which is a 5-foot wide non-combustible zone around all structures to address the potential for ember-caused ignitions next to structures.

The Modified Project FMZs and fuels management will serve to create defensible space around the structures. Defensible space adjacent to structures also functions to limit the spread of fire from the built environment into off-site vegetation (Warziniack et al., 2019). The FMZ areas and historic grazing areas function as fuel breaks which are crucial in reducing fire risk and facilitating effective fire prevention (Wang et al., 2021) The irrigated zone acts as a green barrier that uses specific vegetation growth, such as high-internal moisture, fire-resistive species, to reduce fire spread (Wang et al., 2021). The high internal moisture and spacing between plant groups make it more difficult for ignition to occur and fires to spread from plant to plant. This affects fire behavior by reducing flame lengths, slowing spread rates, and lowering fire intensity. If a fire from a structure or vehicle spread to the irrigated zone, the fire-resistive species in this zone would be less likely to ignite and reduce the likelihood of the fire spreading off-site (Wang et al., 2021). The use of irrigated areas to reduce wildfire impacts can achieve wildfire mitigation and offer wildfire protection in fire-prone areas beyond the Modified Project site (Wang et al., 2021). Further fuel treatments also have an ecological benefit by reducing the potential fire severity which can result in high post-fire litter cover, higher herbaceous plant cover, higher biodiversity, and lower levels of invasive pests, benefiting adjacent open space areas (Safford et al., 2009b). The benefits of defensible space and FMZs are not solely limited to the built environment. Positioning the low plant density, irrigated zone directly adjacent to the development pad, and implementing defensible space provides a significant buffer between structures and open space areas. These techniques aid in preventing ignitions in the built environment but also across the larger landscape.

However, long-term protection of the development and the surrounding area is dependent on the maintenance of fuel modification as even fire-safe designs can degrade over time. To alleviate this concern, the Modified Project will conduct annual assessments of the FMZs and the Modified Project HOA will be responsible for the long-term funding of fire protection features. During this maintenance, dead and dying material and undesirable plants will be removed. Thinning will also be conducted as necessary to maintain plant spacing and fuel densities. This will keep the FMZs and landscaped areas in a highly fire-resistive condition free of accumulated flammable debris and plants.

These features will further reduce the potential for wildfire in open space areas and potential impacts on surrounding communities. Additional analysis of the Modified Project's potential impacts compared to the 2017 Approved Project is provided in Section 8.

5.1.4.2 Ignition Resistant Construction

With the incorporation of ignition-resistant construction, the likelihood of structural ignition occurring within the Modified Project area is minimized. Ignition-resistant construction is critical in preventing building ignitions from windblown embers. The Modified Project will comply with Chapter 7A of the Los Angeles County Building Code (Title 26, Chapter 7A), "Construction Methods for Exterior Wildfire Exposure" so that the buildings are resistant to ignitions from direct flames, heat, and embers. The Modified Project, based on its location and ember potential, is required to include the latest ignition and ember resistant construction materials and methods for roof assemblies, walls, vents, windows, and appendages, as mandated by the County Fire and the County's Fire and Building Codes (e.g., Chapter 7A). The structure design is crucial against wind-driven fires and newer homes are more likely to survive. Dual paned windows were significant in protecting against thermal exposure. (Syphard et al., 2017). This lowers the threat of onsite fires impacting offsite areas as the structures themselves are very unlikely to act as fuel which will minimize the potential for home-to-home ignitions, reducing the likelihood of an onsite fire spreading within the community or toward open space. Additionally, the adjacent fuel modification will aid in isolating onsite structure fires or accidental ignitions to the Modified Project area should they occur.

Structure design, such as the Modified Project's, is crucial in protecting an area against wind-driven fires. The Modified Project provides features that not only prevent fire intrusion but prevent structures fires from escaping into offsite areas. This allows the Modified Project to not only protect the immediate area but the surrounding environment.

5.2 Site Specific Assessment of Offsite Ignition Risk

The following section summarizes the assessment of the constructed and inhabited Project resulting in an increased likelihood of wildfire ignitions that impact existing land uses in the Project's proximity. This assessment has been conducted as part of the Project's proactive approach to fire safety.

To date, there is no single recognized method for analyzing off-site ignition risk impacts from a proposed master planned community. The following evaluates the potential off-site ignition and spread related impacts for a new master planned community in a fire hazard severity zone.

As explained in this FPP, the changes to the Modified Project from the 2017 Approved Project are not expected to increase the risk of offsite wildfire impacts. As with the 2017 Approved Project, the Modified Project site is generally surrounded by development and not entirely adjacent to undeveloped, high fuel areas. As described in Section 2.2.3, there is significant development near the Entrada Planning Area, including I-5 to the east, Six Flags Magic Mountain theme park and State Route 126 (SR-126) to the north, Mission Village to the west, and the existing Westridge community to the south, along with secondary road infrastructure to the south, east, and north. Land uses surrounding the VCC Planning Area include commercial and residential development as well as vacant land with limited vegetative cover. Existing mixed-use development is located immediately north of the VCC Planning Area and commercial development is north, northwest, and west of the VCC Planning Area, along with SR-126 to the south. The surrounding development and lack of extensive vegetative cover immediately adjacent to the Modified Project site reduces the risk of both encroaching fires and offsite fire spread, including offsite spread from windblown embers.

5.2.1 Entrada South and Valencia Commerce Center Offsite Wildfire Risk Potential

The Dudek Fire Protection Planning Team developed this assessment method of evaluating potential offsite fire risks utilizing best practices, extensive research, publicly available and project-specific fire environment data, and years of professional experience to quantify and weight the various fire protection measures. The approach is comprised of two main sections which are each divided into fire risk categories or "modules."

1. Potential Wildfire Hazard and Offsite Risks

The Wildfire Hazard and Offsite Risk section of this evaluation considers the relative wildfire hazard and risk to offsite communities.

   a. Project Surroundings

The Project Surroundings module accounts for the inherent nature of the land surrounding a proposed project which may have characteristics that influence the vulnerability of the adjacent lands/communities that may be a risk from a fire originating at the proposed Project site. The current land uses, and management practices may have an impact as well. Assessing these factors can help to determine the likelihood and potential fire behavior of a wildland fire if it were to ignite from within a proposed Project and spread to its surroundings compared to the existing conditions without the proposed Project. Features and characteristics within the surroundings module include but are not limited to topography, climate, fire history, and State Fire Hazard Severity Zone designations.

b. Project Site

The inherent nature of a Project's site may have characteristics that affect wildland fire behavior. Assessing and mitigating these factors can help to reduce potential ignitions and ultimately wildland fire behavior. The project site module includes features that account for the project site's specific fire environment, development design characteristics and their conformance with applicable wildfire risk mitigation regulations, project size, and FHSZ classification.

c. Potential Indirect Project Related Risks

This module includes features that are indirect to the project's design and wildfire risk reduction approach. Specifically, the approach features project uses and activities that may influence the potential for offsite ignitions including homesite activities, open space recreation, and increased use of offsite roadways.

2. Project Specific Features to Mitigate Wildfire Risk Potential

As noted above, the changes to the Modified Project from the 2017 Approved Project are not expected to increase the risk of offsite wildfire impacts. This Project Specific Features to Mitigate Wildfire Risk section assesses key features associated with development in the WUI that have influence in determining the risk of offsite ignitions. Project features include design characteristics and regulatory requirements that have been similarly recognized at the state and local level as they are featured in multiple regulatory documents (California Fire Code, LA County Fire Code, California Building Code, and California Public Resources Code).

a. Project WUI Mitigation Strategies

This module incudes WUI mitigation strategies that reduce wildfire risk. WUI mitigation strategies help to reduce the potential of a fire igniting within the Project site's landscaping or spreading outwardly through the landscaping if the structure were to ignite. Important evaluation topics include whether or not the project has an approved FPP, code compliant landscape plans, and code compliant defensible space surrounding development areas, in addition to robust fire response features including adequate water supply and fire department access.

b. Vegetation

The vegetation module accounts for the characteristics of perimeter FMZs. FMZs have been a proven method for mitigating wildfire risks associated with offsite wildfires encroaching upon master planned communities, and they also function to prevent or minimize the passage of fire or airborne embers originating from the Project area itself into offsite areas. The effectiveness of FMZs for mitigating offsite wildfires and airborne embers is accounted for in this module through the width of the FMZ and the characteristics of the vegetation within the FMZ (i.e., natural or landscaped vegetation).

c. Structures

The structures module includes building construction features that influence structural ignitability. While construction in compliance with Chapter 7A of the CBC has been proven extremely effective in reducing the potential for structures to ignite from wildfires, these requirements also reduce the likelihood of structure fires igniting from non-wildfire sources, therefor limiting the potential for onsite structure fires to transition into offsite areas. Buildings constructed to exterior wildfire exposure standards can help to reduce the potential of a fire originating within the structure from escaping its confines. In addition, if a structure were to ignite, these construction methods could reduce the potential of a fire from passing to adjacent structures or even becoming a conflagration with multiple structures involved. Specific building construction features assessed in this module include the type of roofing, vents, windows, and others.

5.2.1.1 Project Specific Assessment of Offsite Wildfire Risk Potential

This section provides a project specific assessment corresponding to each module within their respective section.

1. Potential Wildfire Hazard and Offsite Risks
    a. Project Site Module

As discussed above, while the Project Site is occasionally subject to strong Santa Ana wind events, the location of planned development areas in relationship to surrounding open spaces and development areas limits the potential for onsite fires to be driven offsite by Santa Ana winds. For example, the Entrada South planning area is surrounded on all sides by development including Magic Mountain Parkway to the north, The Old Road and Interstate-5 to the East, the Westridge Community to the south, and the Mission Village Project to the west which is currently being developed. The VCC planning area is similarly surrounded by areas of development including industrial areas, the Hasley Canyon Community, Highway 126, and Interstate-5. These adjacent areas of development function as fuel breaks and limit potential for wildfire to spread away from the proposed Project.

Generally, the risk of wildfire spreading offsite is dependent on its severity. For example, low severity fires burning within the proposed Project's undeveloped areas with natural fuels would most likely be extinguished quickly due to slow rates of spread and rapid emergency response from nearby fire stations. Wildfire severity of fires burning within the proposed Project is likely to be driven by climate as previously mentioned, in addition to topography and fuels/vegetation.

Topography:

Topography influences fire risk by affecting fire spread rates. Typically, steep terrain results in faster fire spread up-slope and slower spread down-slope. Terrain that forms a funneling effect, such as chimneys, chutes, or saddles on the landscape can result in especially intense fire behavior, including faster spread and higher intensity. The Entrada Planning Area is located south of the Santa Clara River on rugged terrain dominated by steep slopes which have the potential to increase wildfire severity, whereas the VCC Planning Area is situated in relatively flat to rolling areas.

Fuels/Vegetation:

The Project Site's vegetative fuels are primarily annual grassland, scrub and chaparral habitat, and riparian forest. Man-made land cover types, such as agriculture and disturbed land were also previously mapped on the Entrada and VCC Planning Areas. As described in section 2.2.4.1. Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability. The native shrublands that compose the coastal scrub community on the Modified Project sites are a high potential hazard based on such criteria. However, post-development vegetation composition proximate to the Entrada South and VCC footprints would be significantly different than current conditions. Following build-out, irrigated landscape vegetation associated with fuel modification zones (FMZ) A and B are expected to cover the immediate area surrounding of the Project Site. Consistent with requirements, native and naturalized vegetation occurring within FMZ Zone C is not expected to be irrigated, although overall fuel volumes will be reduced by removing dead and dying plants, non-natives, highly flammable species, and thinning the remaining plants so they would not readily facilitate the spread of fire on an ongoing basis. High hazard plant communities will be reduced in size given extensive development of the VCC and Entrada South planning areas.

b. Potential Indirect Project Related Risks Module

The Modified Project will not result in increased use of roadways compared to the 2017 Approved Project. Roadside fuel modification zones will be implemented to mitigate the potential for wildfires originating from roadways. In addition to onsite roadside fuels reduction, other offsite roadside fuel modification has occurred surrounding the proposed Project including two CAL Fire Projects within the Project area, in addition to treatments associated from the adjacent Mission Village Project.

The proposed Project will include approximately 144 acres of open space with trails for recreational use. Human activity within open space leads to increased risk of ignitions in these areas. However, as previously described, the Entrada South and VCC planning areas are surrounded by areas of development including community areas, industrial parks, and major roadways. These fuel breaks reduce the risks of wildfires originating in onsite open spaces from spreading offsite. Additionally, development surrounding the Project's open spaces also increases the likelihood of early wildfire detection, as many people will always be present. Early detection allows firefighting agencies to respond quickly, enabling them to contain and suppress wildfires before they grow in size and intensity. Detecting wildfires in their initial stages increases the chances of successful containment and minimizes the resources required to extinguish them. Early wildfire detection also enables the identification and suppression of smaller fires or spot fires that may ignite from embers or sparks carried by the wind. By preventing these secondary fires, the overall spread of the wildfire can be minimized.

Homesite activities result in multiple introduced ignition sources. Activates that could start onsite fires include cooking, outdoor recreational fires, mechanical equipment use, or playing with fire. However, the Project includes the following design features that limit the potential for urban wildfires spreading offsite.

- High density clustered development which limits natural vegetation between structures
- Highly ignition resistant construction to reduce structure fires and urban conflagrations.
- Large onsite and offsite population to report illegal or risky activities that may result in a wildfire.
- Code compliant and routinely maintained perimeter FMZs which will not include plants listed on LA County Fire Department's Prohibited Plant List.
- Ignition resistant landscaping, much of which will be irrigated.

Module Assessment Results:

The Modified Project will not increase population compared to the 2017 Approved Project; in fact, the Modified Project entails a slight reduction in residential units. In addition, the Modified Project's design features, and multi-layered mitigation approach reduce these offsite fire risks:

- Roadside fuels reduction will be implemented to mitigate risks from increased vehicle traffic on the Project's roadways.
- Project open spaces are surrounded by development which prevents wildfires from burning into offsite vegetation.

- Early wildfire detection and response.
- Offsite ignitions from homesite activities are substantially mitigated through a clustered development footprint, ignition resistant construction, and ignition resistant landscaping and FMZs.

c. Surroundings Module

While much of the surrounding region has been subject to rapid urbanization and historical agricultural and oil development practices, large areas of open space and natural lands border the region. The Los Padres National Forest is located to the north of the Project Site and the Angeles National Forest lies to the north and east. The Santa Susana Mountains, a region of gently rolling hills and sharp, steep-walled canyons, is south of the Modified Project Site. Local climate, topography, and fire adapted vegetation communities make surrounding undeveloped regions highly conducive to wildfire spread. According to available data from CAL FIRE's FRAP (CAL FIRE 2020)[20], 180 wildland fires have burned in a 5-mile vicinity of the Modified Project Area since the beginning of the historical fire data records.

Major community areas surrounding the Project include Castaic Junction, Val Verde, Stevenson Ranch, Valencia, Westridge, and others. The susceptibility of communities from wildfire threats is highly variable and largely dependent on various community characteristics as described throughout this FPP.

These communities feature a high-density master planned design. Housing density directly influences susceptibility to fire because in higher density developments, there is one interface (the community perimeter) with the wildlands whereas lower density development creates more structural exposure to wildlands, less or no ongoing landscape maintenance (an intermix rather than interface), and consequently more difficulty for limited fire resources to protect well-spaced homes. The intermix includes housing amongst the unmaintained fuels whereas the proposed project converts all fuels within the footprint and provides a wide, managed fuel modification zone separating homes from unmaintained fuel and creating a condition that makes defense easier (Syphard et al. 2013). Syphard and Keeley found that "The WUI, where housing density is low to intermediate is an apparent influence in most ignition maps," enforcing the conclusion that lower density housing poses a higher ignition risk than higher density communities. Other studies have also concluded that higher density master planned developments are far more fire safe compared to lower density intermix development (Caggiano et al. 2020, Syphard et al. 2012, Kramer et al. 2018, Alexandre et al. 2016). Therefore existing master planned communities within the region are well suited to withstand impacts from wildfires, as evidenced by Stevenson Ranch (a master-planned community located proximate to the Modified Project) withstanding the direct impact of a large 2003 fire with no structural damage (Murphy, 2003).

Module Assessment Results:

Surrounding undeveloped areas are prone to wildfires due to the local climate, topography, and fire-prone vegetation. However, developed areas surrounding the Modified Project are largely comprised of roadways, amusement parks, commercial areas, and master planned communities. Existing master planned communities in the region are well-suited to withstand wildfire impacts, and have demonstrated success in withstanding direct wildfire events, based on their design and density (Murphy, 2003).

2. Project Specific Features to Mitigate Wildfire Risk Potential
   a. WUI Mitigation Strategies Module

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20 Based on polygon GIS data from CAL FIRE's FRAP, which includes data from CAL FIRE, USDA Forest Service Region 5, BLM, NPS, Contract Counties and other agencies. The data set is a comprehensive fire perimeter GIS layer for public and private lands throughout the state and covers fires 10 acres and greater between 1878–2020.

As noted above, the changes to the Modified Project from the 2017 Approved Project are not expected to increase the risk of offsite wildfire impacts. Further, the Modified Project will employ a range of WUI mitigation strategies known to reduce the risk of damages from wildfires. These strategies prevent fires from entering into development areas, while also limiting the capacity for onsite fires to spread into offsite areas. These strategies are described in detail throughout this FPP and include compliant defensible space and fuel modification zones, adequate fire access and capacity for rapid emergency response from nearby fire stations, and mitigation measures to prevent ignitions during the construction period. In addition, all Project related electrical distribution lines will be undergrounded, removing utility lines as a potential ignition source.

The Project site is designed to not only be hardened against fire but designed to prevent fires from occurring and quickly suppress fires when they do occur. The Modified Project takes a multi-scaled approach to fire protection through wildfire education, ignition prevention, fuels management, increased response capacity, and ignition-resistant construction. The dual benefit of creating a development that can prevent a fire is that it offers protection to the surrounding communities and the environment. The requirements and recommendations outlined in the FPP have been designed specifically for the proposed construction in VHFHSZ and can significantly reduce the potential threat to offsite areas.

Module Assessment Results:

The Modified Project incorporates multiple WUI mitigation strategies that have been well proven to decrease the risk of damages from wildfires. As described, these mitigation measures are determined to have a dual benefit of mitigating offsite wildfire risk.

b. Vegetation Module

Post-development vegetation composition proximate to the Entrada South and VCC footprints is expected to be significantly different than current conditions. The Entrada South and Valencia Commerce Center Projects incorporate fuel modification zones that adhere to code regulations, strategically developed to mitigate the spread of wildfires towards and away from the Project Site. The FMZ widths outside the lot lines would be 100- to 200-horizontal feet depending on County Fire direction and geographic constraints, ranging from 2.0 to 5.0 times the modeled flame lengths based on the fuel type represented adjacent to the Development Footprint and meeting the industry guidelines for acceptable defensible space. A fuel modification plan will be submitted to the LA County Fire Department and will have preliminary approval prior to any subdivision of land or permit issuance. In order to ensure that fuel modification is appropriately maintained, the Modified Project would require the Modified Project HOA or equivalent organization to maintain the FMZs in perpetuity.

Following build-out, irrigated landscape vegetation associated with fuel modification zones (FMZ) A and B will cover the immediate area surrounding of the Project Site. Consistent with requirements, native and naturalized vegetation occurring within FMZ Zone C will be reduced by removing dead and dying plants, non-natives, highly flammable species, and thinning the remaining plants so they would not readily facilitate the spread of fire on an ongoing basis. High hazard plant communities will be reduced in size given extensive development of the VCC and Entrada South planning areas.

An assessment of previous regional wildfire ignitions highlights a strong spatial relationship with major roadways, with the majority of wildfire ignitions occurring along Interstate-5 (NIFC, 2022). In addition to fuel modification along lot lines, the Project would also conduct roadside fuel modification, removing all flammable vegetation or other combustible growth on each side of the roadway for a minimum of 10 feet (Title 32 Section 325.10). The minimum clearance of 10 feet may be increased if the fire code official determines additional clearance is required to provide reasonable fire safety.

Module Assessment Results:

Extensive vegetation management at the Project Site achieved through perimeter FMZs, roadside fuels reduction, and ignition resistant landscaping, will result in a low offsite wildfire risk caused by fires or airborne embers associated with the Project. FMZs have been a proven method for mitigating wildfire risks associated with offsite wildfires encroaching upon master planned communities, and they also function to prevent or minimize the passage of fire or airborne embers originating from the Project area itself into offsite areas.

c. Structures Module

As described in detail in section 3.5, the Entrada South and Valencia Commerce Center Project will include structural requirements mandated by the following state and local building codes which provide specific measures for developments in WUI areas.

- California Building Code, Chapter 7A
- Los Angeles County Building Code, Chapter 7A
- Los Angeles County Residential Code, Section R327
- Los Angeles County Referenced Standards Code, Chapter 12-7A

Module Assessment Results:

Structures at the Project Site will be constructed in accordance with fire safety requirements outlined in applicable state and local codes, which create a well-tested and high degree of ignition resistance, as described in detail in section 3.5 and throughout this FPP. In particular, as detailed above, properly designed master-planned communities built to current code standards have a proven track record of being highly resistant to wildfire damage, which also translates into a low risk of causing or contributing to offsite fire or airborne ember impacts on surrounding communities. Therefore, it is determined that these requirements result in a low offsite wildfire and airborne ember risk from the Project and structures within the Project Site.

Overall Potential Offsite Risk Assessment Results:

As noted above, the changes to the Modified Project are not expected to increase the risk of offsite wildfires or airborne embers compared to the 2017 Approved Project. While regional characteristics including climate, shrub dominated vegetation, and variable topography result in significant wildfire hazard, the multi-layered mitigation approached implemented by the Modified Project, as well as features of adjacent communities, result in an overall low offsite wildfire risk. Specifically, the Dudek wildfire protection planning team's analysis indicates that the overall offsite risk based on the fire environment is considered to be low. When the fire protection and prevention features that are required for the Modified Project site are applied, the risk of fire ignitions and airborne embers is considered to be reduced to an even lower level. The resulting potential for off-site ignitions is well within the range of acceptance and is supported by the lack of documented wildfire ignitions from a fire hardened, master planned community. As described in detail throughout this FPP, the Project is well prepared to withstand impacts from wildfires encroaching onto the Project. These design features and other mitigations addressing wildfire protection also serve to reduce the risk of wildfires and airborne embers originating from the Project and spreading offsite. See Section 8 for discussion of the Modified Project's potential wildfire impacts.

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6 Emergency Response and Service

The following sections analyze the Entrada South and VCC Modified Project in terms of current County Fire Service capabilities and resources to provide Fire Protection and Emergency Services. The analysis that follows examines the ability of the existing County fire stations to adequately serve the Modified Project. Although it is anticipated the planned new permanent or temporary fire station or temporary fire station[21] (Station 46) within the Mission Village community will be operational by the time Entrada South begins operations, to be conservative, this analysis assumes this station will not be operational by the time Entrada South begins operations. Response times were evaluated using Modified Project build-out conditions. It was assumed that phased construction would include access roads to the newly constructed buildings and that the shortest access route to those structures would be utilized.

6.1 Fire Facilities

The Modified Project is located within the County Fire's jurisdictional response area. Regionally, County Fire provides fire, emergency medical, and rescue services from 173 stations. The Department serves over 4 million residents throughout 59 cities and all unincorporated portions of Los Angeles County. The Modified Project Site lies within the North Operations Bureau, Division 3. Fire Stations 76, 124, 126, 143, and 156 would provide an initial response; however, all 22 Stations within the County Fire's Division 3 are available to service the Modified Project, if needed. These five existing stations were analyzed herein due to their proximity to the Modified Project Site. Figure 9 illustrates the locations of these stations and Table 6 provides a summary of the County fire and medical delivery system for Fire Stations 76, 124, 126, 143 And 156. For informational purposes, the planned new fire station in Mission Village (Station 46) is also described in this analysis.

The first due engine is typically the closest engine to an incident and would be the initial response unit. It is common for multiple engines to respond to emergency calls, based on availability and proximity.

Table 6. Closest Fire Stations to the Modified Project Site

Fire Station	Address	Staffing	Apparatus
76	27223 Henry Mayo Drive Valencia, California 91355	3 person engine crew	Paramedic engine and brush patrol
124	25870 Hemingway Ave. Stevenson Ranch, California 91381	3 person engine crew; 2 person paramedic squad	Paramedic engine and paramedic squad
126	26320 Citrus Street Santa Clarita, California 91355	3 person engine crew; 4 person Quint[1] crew; battalion chief	Paramedic Engine; Quint[1], BC command vehicle, incident command post, and RAC[2] 126
143	28580 Hasley Canyon Rd. Castaic, California 91355	3 person engine crew	Paramedic engine

21 To be conservative, this analysis does not assume that Station 46 will be operational by the time Entrada South begins operations.

Table 6. Closest Fire Stations to the Modified Project Site

Fire Station	Address	Staffing	Apparatus
156	24525 Copperhill Drive Santa Clarita, California 91354	4 person engine crew	Paramedic engine; a water tender
46[3]	Mission Village	3 person engine crew; 4 person Quint[1] crew	Paramedic engine; Quint[1];

Notes

1 A quintuple combination pumper or "quint" is a fire-service apparatus that serves the dual purpose of an engine and a ladder truck.
2 RAC= Rapid Air Cushion
3 Memorandum of Understanding Regarding Fire Stations for the Newhall Ranch Specific Plan

The closest existing fire station to the Entrada Planning Area is Station 126 located at 26320 Citrus Street, which includes a paramedic engine staffed with a captain, a firefighter specialist, and a firefighter/paramedic 24-hours per day/seven days per week. Station 76, located at 27223 Henry Mayo Drive, is the next closest station and staffs a minimum of eight firefighters and a battalion chief 24-hours per day/seven days per week and houses a 4-person paramedic engine, a 4 person Quint, a Rapid Air Cushion vehicle, and a command vehicle. The stations are approximately 3.3 and 3.4 miles from the furthest unit on site, respectively. Once built, Station 46 in Mission Village will provide an initial response to Entrada South (anticipated to be staffed with a 3-person paramedic engine, a 4-person quint, and a battalion chief); however, to be conservative, this report assumes that Station 46 will not be available when Entrada South begins operations.

The VCC Planning Area would be served by Stations 76 and 143, as well as other regional stations. Station 76 would provide an initial response with Station 143 providing a secondary response. Station 43 is located at 28580 Hasley Canyon Road and houses a 3-person paramedic engine. Station 124 located at 25870 Hemingway Avenue, and Station 156 located at 24525 Copperhill Drive could provide an effective firefighting force for both Planning Areas. Station 124 houses a 3-person paramedic engine and a 2-person paramedic squad, whereas Station 156 staffs a 4-person paramedic engine.

SOURCE: AERIAL-EAGLE AERIAL 2018

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0 1,500 3,000 Feet

FIGURE 9

Fire Station Locations

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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6.2 Estimated Calls and Demand for Service from the Modified Project

Emergency call volumes related to typical projects, such as new residential and commercial developments, can be reliably estimated based on the historical per-capita call volume from a particular fire jurisdiction. County Fire documented 403,924 incidents for 2021[22] generated by a County-wide service area total population of approximately 4,100,000 persons[23]. The County's per capita annual call volume is approximately 89 calls per 1,000 persons. The resulting per capita call volume is 0.099.

Based on the proposed development plans for Entrada South, the Modified Project's estimated population within Entrada South is calculated to generate up to 495 calls per year (1.4 calls per day). The estimated incident call volume at buildout from Entrada South is based on a conservative estimate of the maximum potential number of persons on site at any given time (considered a "worst-case" scenario). As previously described, the Modified Project's development of Entrada South includes up to 1,574 residential units with an average unit occupancy of 3.15 people per dwelling unit, which calculates to a total population of 4,958 people (3.15 x 1,574 DU = 4,958)[24]. The Entrada South development also includes 730,000 square feet of non-residential development, including retail and office space with 2,500 workers and potentially an elementary school with an estimated population of 50 staff and up to 200 students. This analysis uses total population estimates during daylight hours. Therefore, the worst-case condition is estimated to be a nighttime event, which would preclude the school and office/retail populations but would include all residents at home. Conversely, a daytime event would include the school and office/retail populations, but a large percentage of residents would not be on site. Using Los Angeles County fire agencies' estimate of 99 annual calls per 1,000 population, the Entrada South development's estimated 5,000 people would generate on a "worst case" basis up to 495 calls per year or 1.4 calls per day. The type of call would be expected to be primarily medical-related, with approximately 77 percent of all calls involving medical emergencies (LACoFD 2022 Statistical Summary); therefore, the vast majority of calls do not relate to fire hazards.

For the VCC Planning Area, the combined industrial and commercial service population is based on a conservative total of 10,200 occupants.[7] The onsite population for each building and areas of use within the building will vary based on occupancy classification and use. The number may likely be up to two-thirds lower than the estimate (10,200 workers) provided, due to employee shift work, estimated transient population, and operating hours of individual businesses. Based on this information, the total maximum estimated population of the VCC Planning Area is projected to be 3,465 persons (total occupant load for all buildings). Based on this population estimate and using the County's per capita call volume of 0.099, the service population of 3,465 for the VCC Planning Area people would generate up to 343 calls per year (0.9 calls per day) on a worst-case basis.

Accordingly, the total call volume anticipated to be generated by the Modified Project (combined Entrada South and VCC Planning Areas) is 838 calls per year or 2.3 calls per day on a worst case basis.

As presented in Table 7, using 2020 call volume data (Lamas, pers. Comm. 2022), Engines 76, 124, 126, 143, and 156, the five closest fire stations, ran calls in 2020 averaging 3, 7,7, 2, and 4 calls per day, respectively. Both the Quint 126 and Squad 124 with larger response jurisdictions ran 3 and 9 calls per day.

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22 https//www.fire.lacounty.gov/lacofd-releases-2021-statistics-for-incidents.
23 Los Angeles County Fire Department Strategic Plan 2022.
24 Resident and worker population estimates for the Modified Project were obtained from the Project Team.

Table 7. County Fire 2020 Call Volume Totals for Closest Fire Stations

Response Jurisdiction	Engine 76	Engine 124	Squad 124	Engine 126	Quint 126	Engine 143	Engine 156
Fire	126	159	44	189	103	79	110
Medical Aid (EMS)	604	1,730	2,916	1,716	611	395	888
Other	264	655	212	544	244	196	374
Annual Total Response	**994**	**2,544**	**3,172**	**2,449**	**958**	**670**	**1,372**
Total Calls Per Day	**3**	**7**	**9**	**7**	**3**	**2**	**4**

Source: County Fire Planning Division, January 2022
Note:
Engine numbers correspond to Fire Stations. Fire Stations may have more than one engine or apparatus (see Station 126) that responds to calls so for consistency with the provided call data, each Fire Station's apparatus is referenced rather than referring generally to Fire Station numbers.

The available firefighting and emergency medical resources in the vicinity of the Modified Project Site include an assortment of fire apparatus and equipment considered fully capable of responding to the type of fires and emergency medical calls potentially occurring within and adjacent to the Entrada South and VCC Planning Areas.

As Shown above, the level of service demand for the Modified Project raises overall call volume by a relatively small amount of 2.3 calls per day on a worst-case basis. As noted above, the vast majority of these calls are not related to fire hazards.

Further, it is noted that when Fire Station 46 becomes available, it would respond to an additional 2.3 calls per day, further lowering the demand on the existing fire stations, even assuming the conservative assumptions noted above about the population and calls per capita data used in this estimate.[25]

6.3 Emergency Response Travel Time Coverage

The Modified Project would be substantially similar to the 2017 Approved Project with respect to demand for fire protection services. The slight changes in land uses for the Modified Project compared to the 2017 Approved Project would not substantially change the response times by County Fire. Nevertheless, to provide additional information about response times, the FPP considered total response times based on the full buildout of the Modified Project.

Land use in the Santa Clarita Valley varies greatly from urbanized and suburban clusters to vast rural areas. County Fire's response time goals by land-use type are[26]:

- 5 minutes or less for urban areas
- 8 minutes or less for suburban areas
- 12 minutes or less for rural areas

The Modified Project is located in a suburban area, which corresponds to County Fire's 8-minute or less response time target for suburban areas. Emergency response time target thresholds include travel time along with dispatch and turnout time, which can add an additional two minutes to travel time.

25 The Mission Village Fire Station 46 may be staggered first as a temporary station and then followed by construction of the permanent station.

26 County of Los Angeles 2023-2024 Performance Measures https://ceo.lacounty.gov/wp-content/uploads/2024/01/2023-24-Performance-Measures.pdf; *see also* OVOV, One Valley One Vision Draft Program EIR, p. 3.15-2.

Entrada South – As indicated in Table 8, response to the Entrada Planning Area from the closest existing County fire stations (Stations 76 or 126) conforms to the response time goals. Both Station 76 at 27223 Henry Mayo Drive and Station 126 at 26320 Citrus Street could provide an initial response to the Entrada South site. Travel time for each of these stations to the Entrada South site was modeled using Network Analyst within the ESRI ArcGIS platform. Modeling results are presented in Figures 10 through 13. Modeling estimated response times using two methodologies: (1) using posted speed limits along the most direct route from the station to the site and 2) using an average 35 mph speed. Modeling included response to the project boundary (or entrance point) as well as the most remote developed portions of the Entrada South site as a conservative metric. Note, this conservatively assumes that Commerce Center Drive is not available for responses by assuming the absence of a bridge across the Santa Clara River for Commerce Center Drive.

- Station 126 —When measured to the farthest developed portion of the Entrada Planning Area, total response time (travel time + 2 minutes for dispatch and turnout) to Entrada South from Station 126 is modeled at 6 minutes, 41 seconds at posted speed limits and 7 minutes 47 seconds at average speed of 35 mph. Thus, Station 126 can respond to the developed areas of Entrada South in under 8 minutes total response time, consistent with the County Fire's 8-minute or less response target for suburban areas.
- Station 76 — Station 76 total response times were modeled responding to the Project in under 8 minutes using the posted speed limits methodology, which conforms with the County Fire 8-minute or less response target. Similarly, Station 76 can respond to 95% of the Entrada South site (all but southwest corner where only a portion of the area would be developed) in under 8 minutes using an average speed of 35 mph methodology, which substantially conforms to the County Fire 8-minute or less response target.
- Station 46 (Informational) — Lastly, although not necessary for this analysis, it is noted that the future Mission Village station (Station 46) will provide additional coverage once it becomes operational, responding to the project boundary/entrance in under 5 minutes and all developed portions of the project in under 8 minutes, although Station 46 is conservatively assumed not to be available for purposes of this analysis.[27]

VCC –The VCC response calculations are based on the ISO average response speed of 35 mph formula. If modeled at posted speed limits, the response times would be reduced by up to one minute. As shown in Table 8, response to the VCC Planning Area from the closest existing County fire stations (Stations 76 or 143) conforms to the response time goals.

- Station 76 — When measured to the Project's entrance, Stations 76 can respond in under 5 minutes and several stations can respond within 8 minutes. Further, based on the proximity of Fire Station 76 (1.7 miles), response to the most remote developed portion of VCC is accomplished within 5.5 minutes total response time, which conforms with County Fire's 8-minute or less response target for suburban areas.
- Station 143 — Fire Station 143 is the next closest station and, when measured to the Project's entrance, Stations 143 can respond in under 5 minutes. Station 143 can respond to the entire developed area of the VCC Planning Area with a total response time of 7.2 minutes, which conforms with County Fire's 8-minute or less response target.

27 Fire Station 46 will be sized, staffed, and equipped based on County Fire specifications and as approved by County Fire. The station would be staffed 24/7 with career firefighters who would provide an initial response. The total response time from the new station (Station 46) approved for development in the Mission Village community to the most remote (distant) lot within the Entrada South Planning Area is calculated at 5 minutes 22 seconds.

Consistent with Table 8 and Figures 10-14, County Fire produces Crawl Maps that show similar response capabilities for Fire Stations 126, 76, and 46, especially with implementation of Fire Station 46 (See Exhibits 4-6). Based on these calculations, the Modified Project's development within the Entrada Planning Area is consistent with the County's 8-minute response time goal for suburban land uses from existing fire stations.

Table 8. Entrada South and VCC Emergency Response Analysis (Closest Two Existing Stations Bolded)

County Fire Station No.	Entrada South				Valencia Commerce Center			
	Maximum Travel Distance	Travel Time (posted speed / 35 mph	Total Response Time to Entrada South (most remote building) (posted speed / 35 mph)	Total Response Time Entrada South (Project Entrance – posted speed / 35 mph)	Max Travel Distance	Travel Time (35 mph)	Total Response Time to VCC (most remote structure)	Total Response Time Valencia Commerce Center (Project Entrance – posted speed / 35 mph)
76	**3.4 miles**	**5.2 min/ 6.4 min**	**7.3 min/8.4 min**	**5.2 min/6.5 min**	**1.7 miles**	**3.5 minutes**	**5.5 minutes**	**3.1 min/3.3 min**
124	4.1 miles	7.6 minutes	9.6 minutes	5.8/7.4 min	7.0 miles	12.5 minutes	14.5 minutes	8.6 min/ 12.2 min
126	**3.3 miles**	**4.7 min/ 5.8 min**	**6.7 min/7.8 min**	**4.7 min/5.9 min**	5.7	10.3 minutes	12.34 minutes	7.7 min/ 10.5 min
143	5.4 miles	9.9 minutes	11.9 minutes	8.0 min/8.4 min	**2.7 miles**	**5.2 minutes**	**7.2 minutes**	**4.3 min/5.0 min**
156	4.0 miles	7.5 minutes	9.5 minutes	6.5 min/7.0 min	5.01 miles	9.2 minutes	11.2 minutes	6.5 min/8.2 min
46	1.6 miles	3.4 minutes	5.4 minutes	2.9 min/3.1 min	5.0 miles	9.2 minutes	11.2 minutes	5.0 min/5.8 min

Notes:
1 Assumes travel distance and time to the furthest developed point within the Modified Project Site from the fire station.
2 The modeling conservatively assumes that the planned bridge along Commerce Center Drive is not constructed, and therefore, Commerce Center Drive is not available for emergency response, which results in a longer response distance and additional travel time.
2 Emergency response time target thresholds include travel time along with dispatch and turnout time, which can add an additional two minutes to travel time.
3 Entrada South response from Stations 126 and 76 were modeled using Network Analyst, a geographic information system application using likely response routes and either averaged 35 mph speeds or posted speed limits.
4 The modeling and calculations presented conservatively assume that Station 46 would not be available by the time Entrada South becomes operational.
5 Response time to project entrance includes fastest time to closest Project entrance. Where more than one entrance is available, the entrance located further from the station is not included.

Exhibit 4. Fire Station 126 Crawl Map

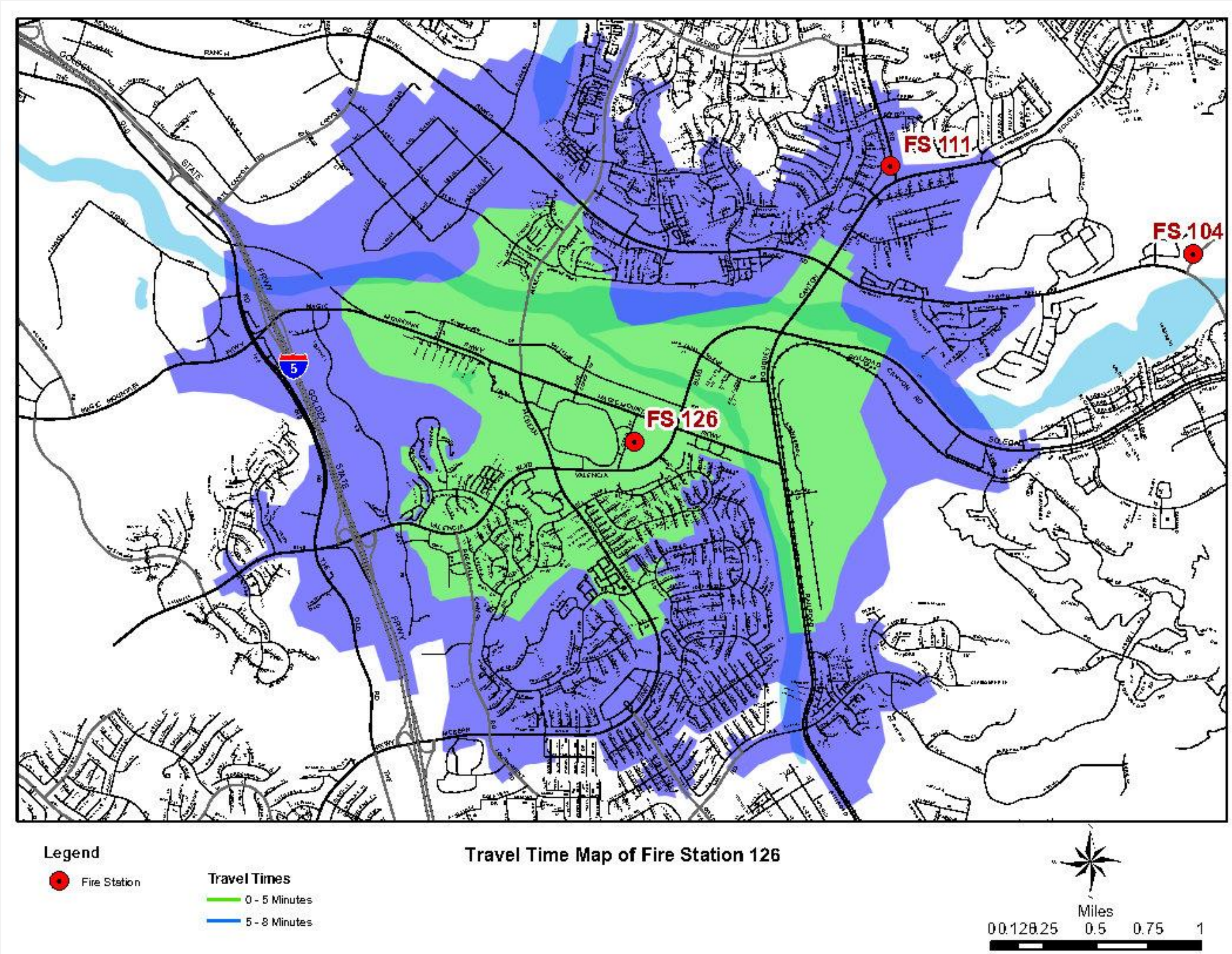


Exhibit 5. Fire Station 76 Crawl Map

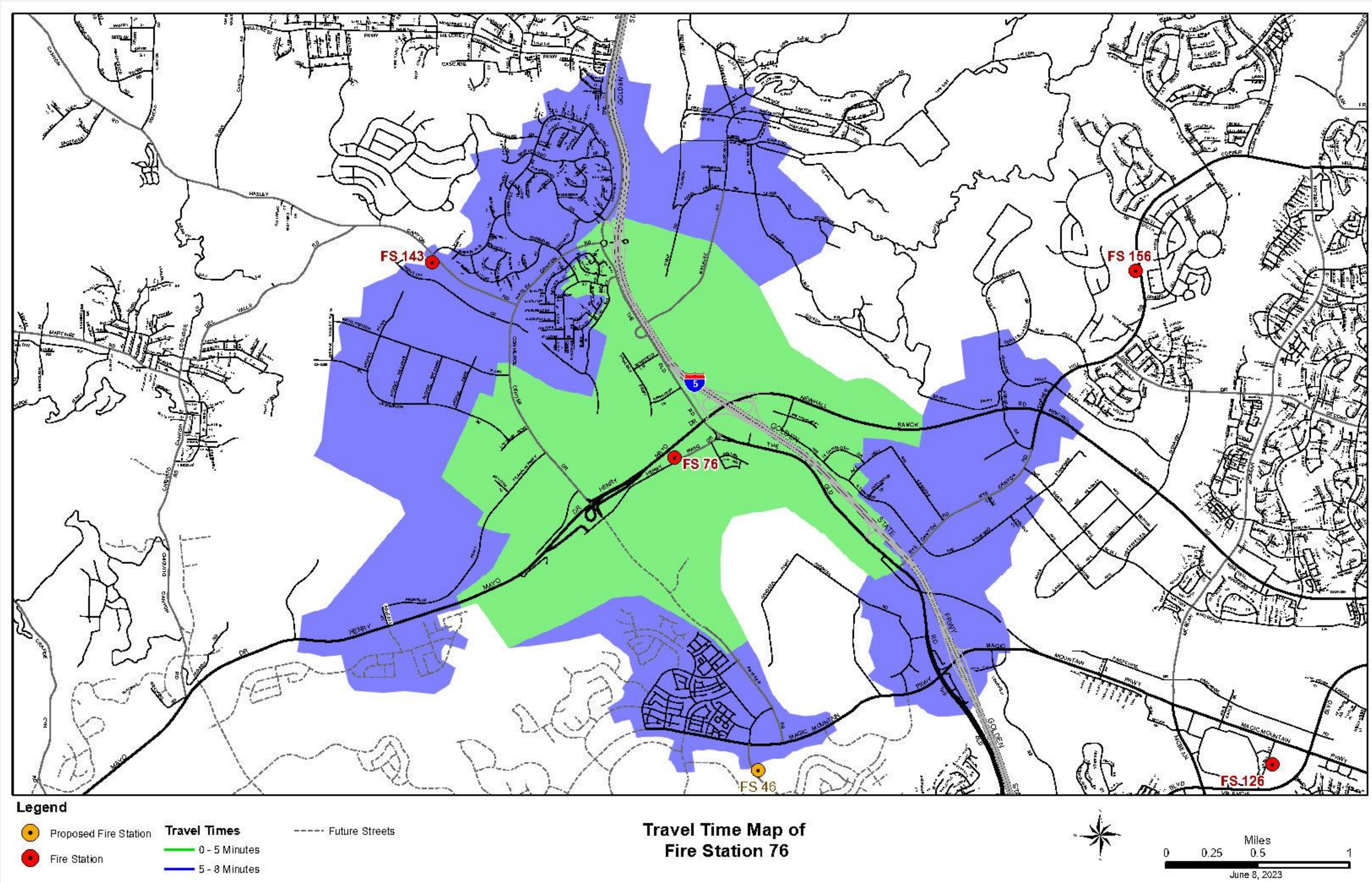
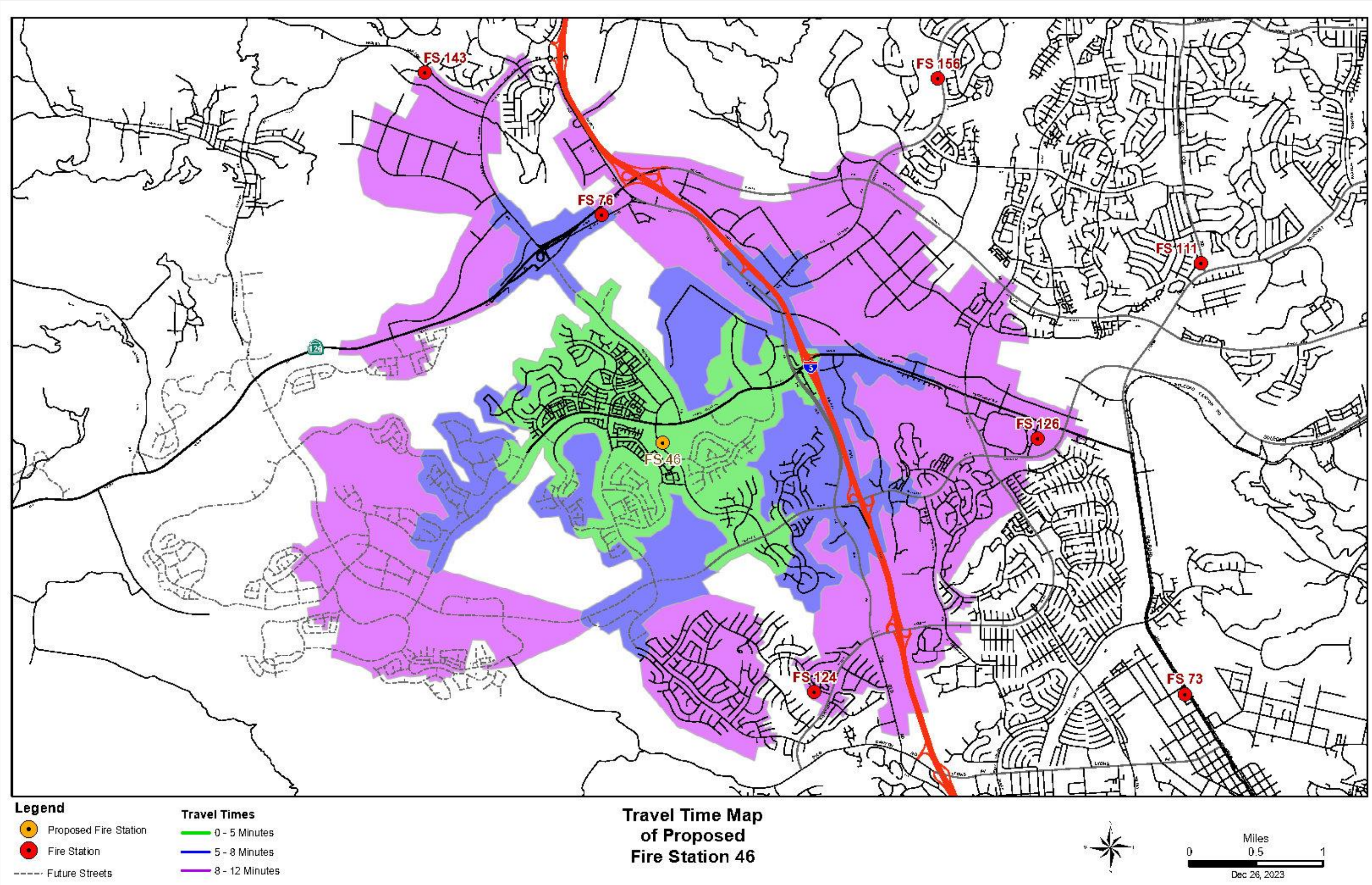


Exhibit 6. Fire Station 46 Crawl Map



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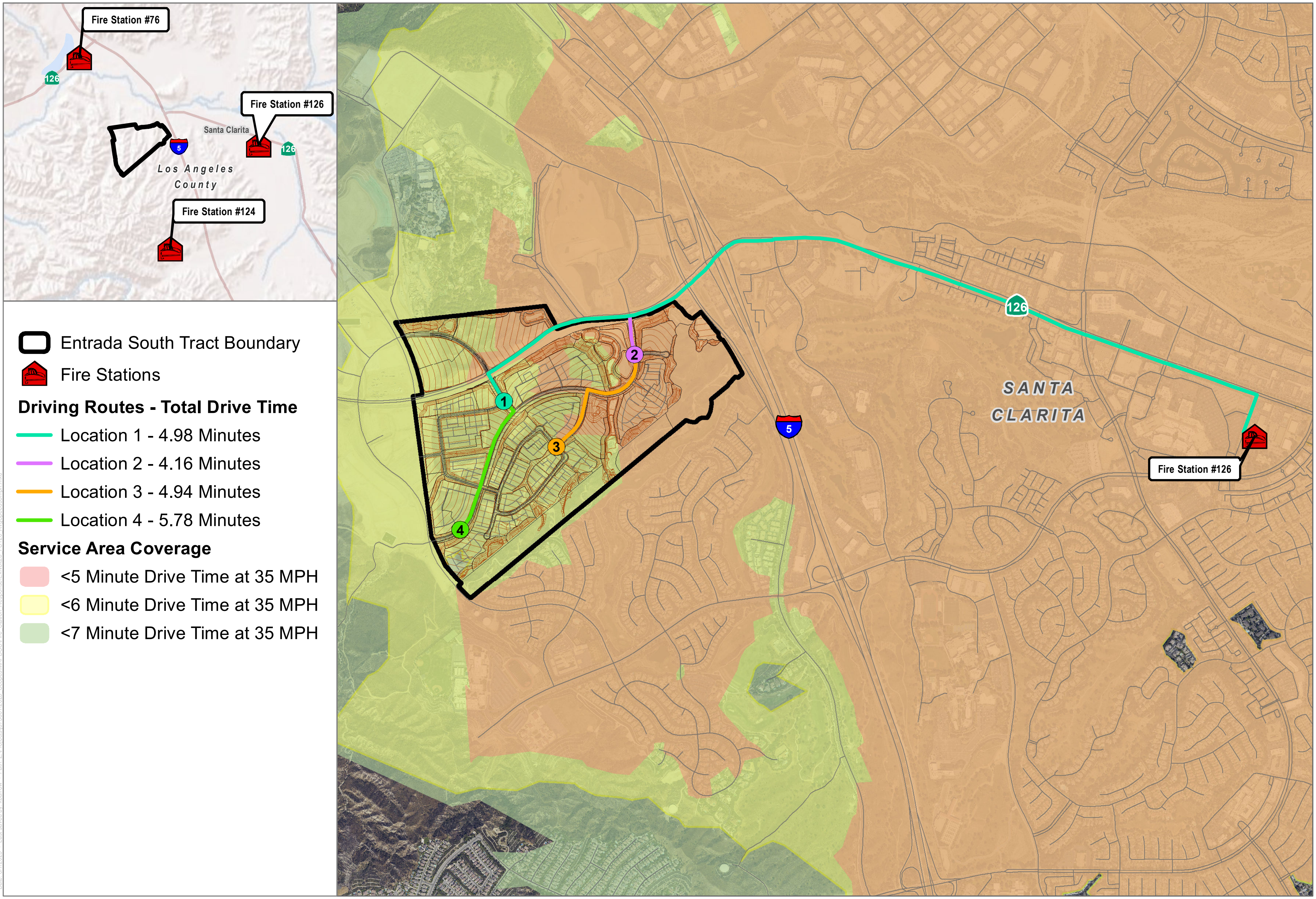

SOURCE: Eagle Aerial Solutions 2018; Hunsaker 2019

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FIGURE 10

Modeled Response Times from Fire Station 126 (Avg 35 mph)

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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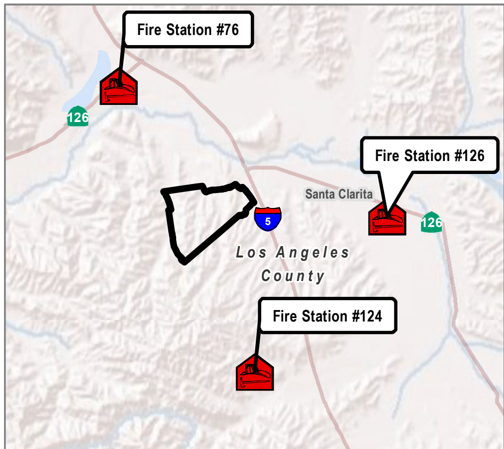


Entrada South Tract Boundary

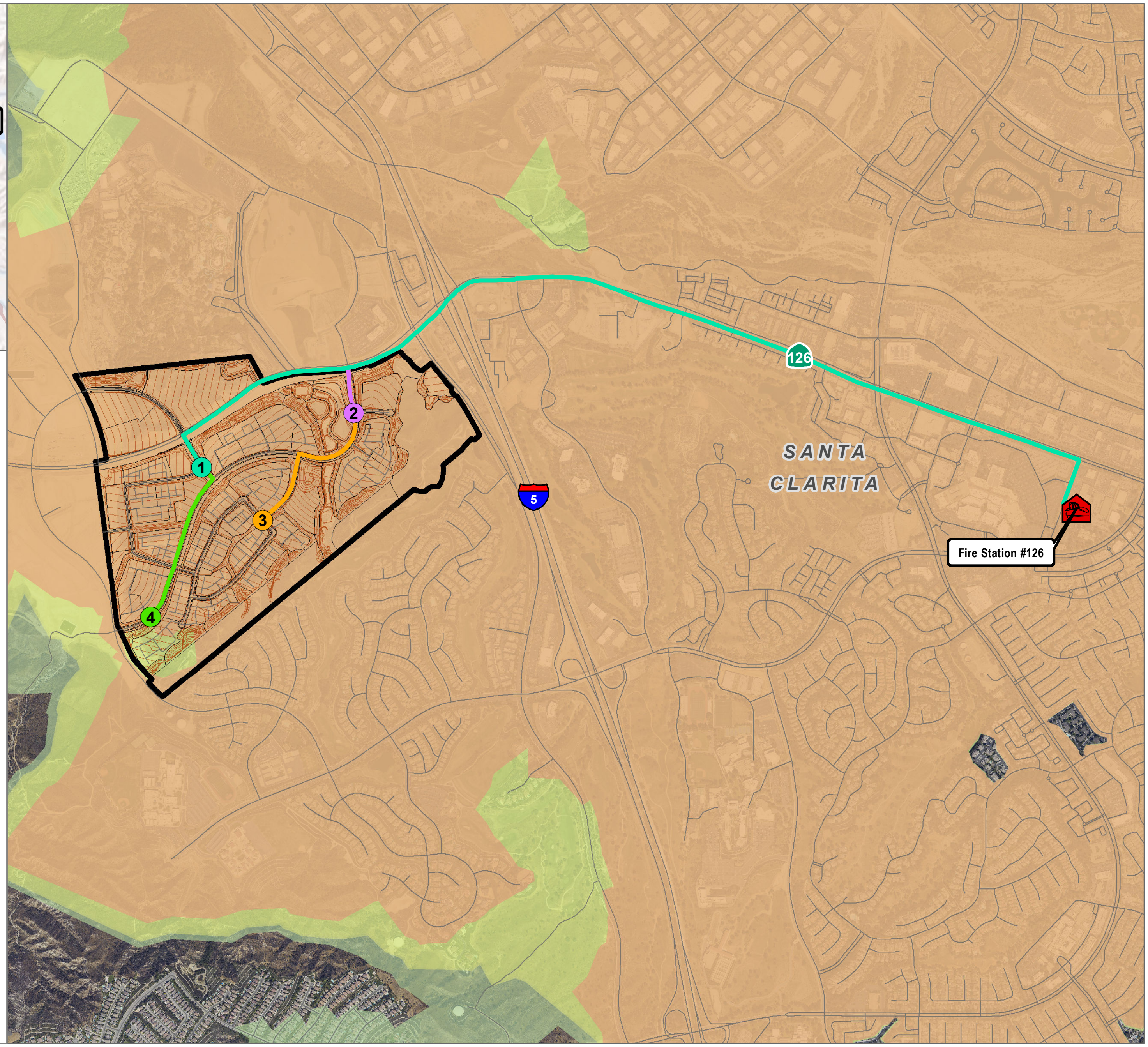
Fire Stations

Driving Routes - Total Drive Time

- Location 1 - 3.56 Minutes
- Location 2 - 3.02 Minutes
- Location 3 - 4.11 Minutes
- Location 4 - 4.68 Minutes

Service Area Coverage

- <5 Minute Drive Time at Posted Speed Limits
- <6 Minute Drive Time at Posted Speed Limits
- <7 Minute Drive Time at Posted Speed Limits



SOURCE: Eagle Aerial Solutions 2018; Hunsaker 2019

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FIGURE 11

Modeled Response Times from Fire Station 126 (Posted Speed Limits)

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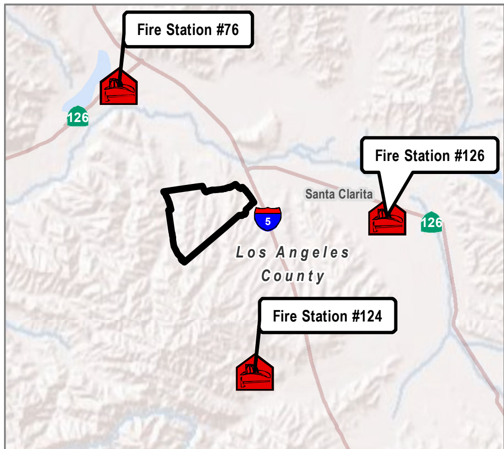


Entrada South Tract Boundary

Fire Stations

Driving Routes - Total Drive Time

Location 1 - 5.57 Minutes

Location 2 - 4.76 Minutes

Location 3 - 5.53 Minutes

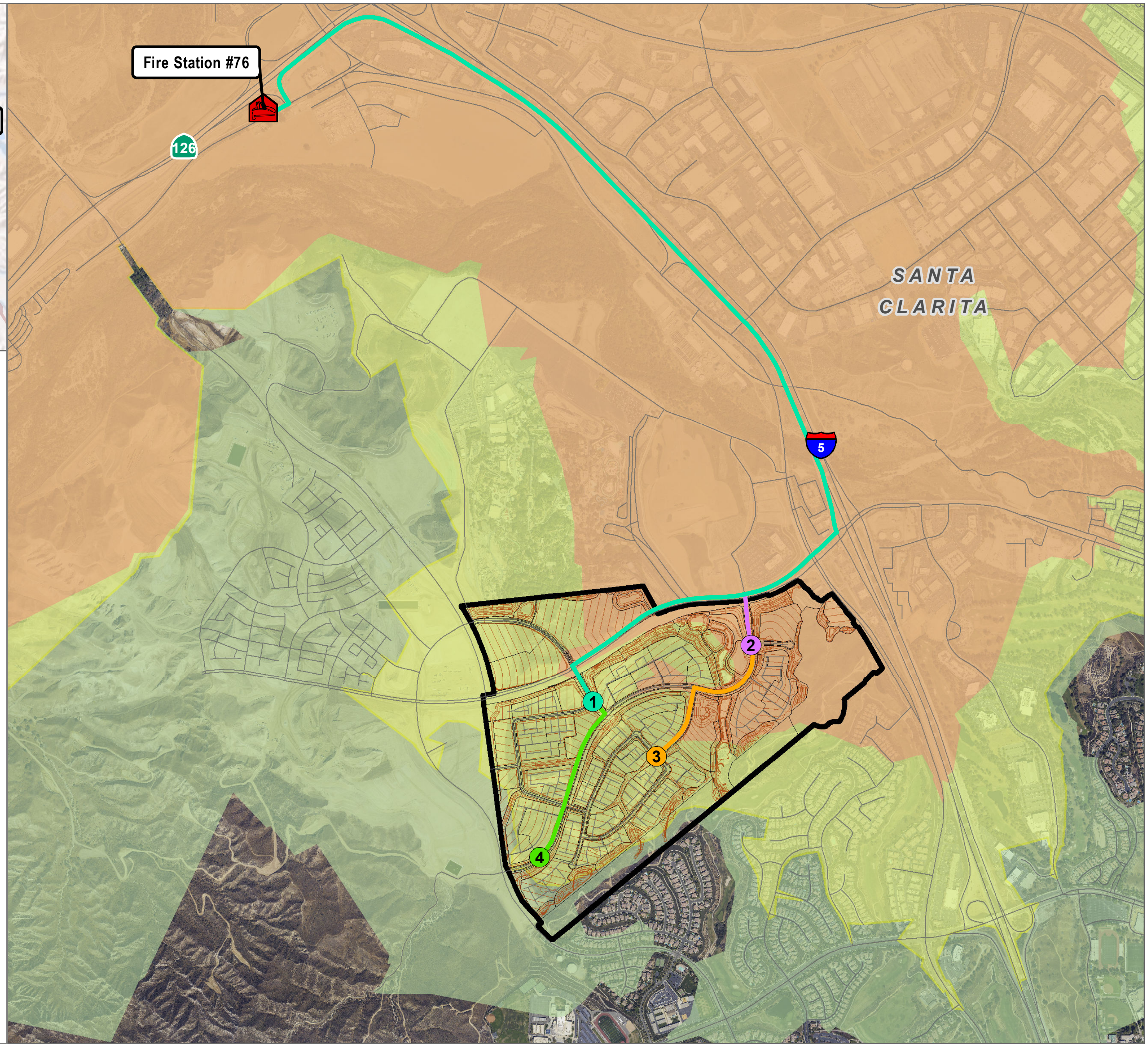
Location 4 - 6.37 Minutes

Service Area Coverage

<5 Minute Drive Time at 35 MPH

<6 Minute Drive Time at 35 MPH

<7 Minute Drive Time at 35 MPH



SOURCE: Eagle Aerial Solutions 2018; Hunsaker 2019

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FIGURE 12

Modeled Response Times from Fire Station 76 (Avg 35 mph)

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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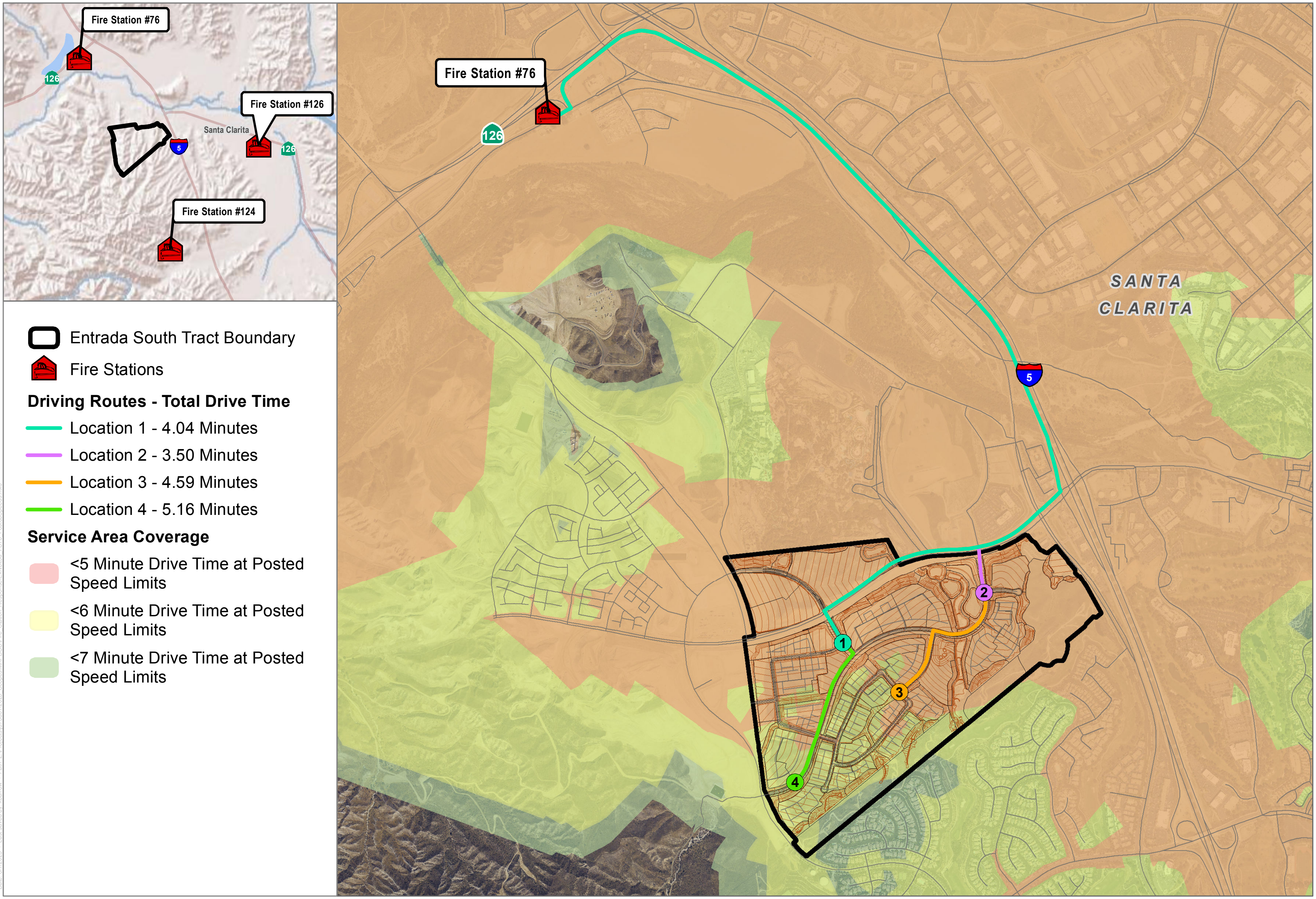

SOURCE: Eagle Aerial Solutions 2018; Hunsaker 2019

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FIGURE 13

Modeled Response Times from Fire Station 76 (Posted Speed Limits)

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

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7 Wildland Fire Evacuation Plan and Education Program

Early evacuation for any type of wildfire emergency at the Modified Project Site is the preferred method of providing for resident safety, consistent with the County Fire's current approach within Los Angeles County. With early, evacuation, evacuations often take place over a staggered period of time and are adjusted as authorities watch fire events. Under this strategy, the goal is to focus on evacuating strategic areas depending on the risk (Chen and Zhan 2008). This allows for evacuations to flow more smoothly and reduce the likelihood of significant congestion. Staged evacuations have also increased in practice with many cities and judication implementing staged evacuation tools such as Zonehaven. Staged evacuation is also generally more effective in areas where population density is high, such as in the Santa Clarita Valley (Chen and Zhan 2008). Given that the Modified Project is surrounded by exiting development and infrastructure and located in a relatively high-density area it is more likely that if evacuation were to occur it would occur in a stagged manner. However, it is also important to note that stagged evacuation is not always possible and there is always a potential for a stagged evacuation to evolve into a simultaneous evacuation. County Fire and the Los Angeles County Sheriff Department (LASD) have extensive experience with evacuating large masses of people during wildfire events under both types of scenarios. During the Woolsey fire in 2017 LASD and other law enforcement were able to successfully coordinate the mass evacuation of over 250,000 people (County of Los Angeles, 2019). For perspective, the Modified Project's estimated population is 4,958 people. The Modified Project is within the Los Angeles County Operational Area Emergency Response Plan (OAERP) (County of Los Angeles, 2012). The OAERP addresses the coordinated response to an emergency within the County. The Modified Project is created with wildfire in mind and this includes the potential for an evacuation. The Modified Project is located in major traffic corridors, such as the I-5, Old Road, Magic Mountain Parkway, and State Route 126, that would allow for evacuations to occur in multiple directions. Additionally, the Modified Project would provide multiple areas for ingress and egress as well as improved firefighter access.

The Modified Project is consistent with the EIR for One Valley One Vision (OVOV), the Santa Clarita Area Plan. The Regional Traffic Analysis of the OVOV EIR analyzed the traffic impacts related to the built-out region. The Modified Project would not conflict with the regional traffic analysis in the OVOV EIR which determined the built-out region would not significantly impact vertical roadways or intersections. The Modified Project is also consistent with the policies identified in OVOV and includes a reduced population and fewer vehicles than the previously approved project. Further, within OVOV evacuation impacts are identified as being mitigated by detour roes implemented throughout the Santa Clarita Valley, alternative evacuation routes through the City of Santa Clarita, the opening of the Cross Valley Connector, and the requiring of two means of ingress and egress for all development projects. The 2017 Approved project EIR determent that the regional impacts regarding vehicle miles traveled (VMT) was less than significant. When compared to the 2017 Approved Project EIR the VMT for the Modified Project is further reduced. The Modified Project also complies with mitigation measure PH 7 which requires that there be secondary access to the Project Site. As an additional project Design Feature, the Modified Project also includes a project-specific evacuation plan further described below and under a separate cover (Dudek 2022).

As such, the Modified Project's HOA would formally adopt, practice, and implement a "Ready, Set, Go!" approach to evacuation. The "Ready, Set, Go!" concept is widely known and encouraged by the State of California and County Fire. Pre-planning for emergencies, including wildfire emergencies, focuses on being prepared, having a well-defined plan, minimizing the potential for errors, maintaining the Modified Project Site's fire protection systems, and implementing a conservative (evacuate as early as possible) approach to evacuation and Modified Project Area activities during periods of fire weather extremes. Additionally, the ignition-resistant rating of the structures, incorporation of expensive fuel modification, and urbanized landscape would allow for emergency managers to direct residents to take temporary refuge within their protected residences.

"Ready! Set! Go!" is the County Fire adaptation of the State "Ready, Set, Go!" wildfire evacuation preparedness program. The goal of the program is to aid residents of the County to prepare to leave their homes as early and with confidence that they have done everything reasonably possible to protect their homes from wildfire. The "Ready!" aspect of the campaign is centered around preparing your home for wildfire through defensible space implementation and home hardening. The "Set!" component educates residents on how to create a wildfire action plan. Wildfire action plans are prepared in advance of a wildfire and include information for the household such as important phone numbers, what to take, evacuation preparation, emergency supply kits, and pre-evacuation steps to take. Finally, the "Go!" aspect of the campaign is about the steps to take when evacuating from a wildfire. The goal is for residents to leave as early as possible during a wildfire. Within the "Go!" campaign there is also information on what to do if you become trapped, whether on foot, in a car, or at home.

Support for the "Ready, Set, Go!" model has been provided by the preparation of a Wildland Fire Evacuation Plan (WFEP) for the Project Site, which is available under separate cover (Dudek, 2022). The WFEP is based on standard evacuation planning used by the Los Angeles County Office of Emergency Services. The WFEP provides Project residents and occupants with potential egress route information and instructions for following the "Ready, Set, Go!" model. The WFEP provides Project Area-specific procedures for wildfire evacuations, and would be provided to the Entrada South and VCC residents and commercial tenants, and posted on the community website. The WFEP would be reviewed by residents at least annually through organized meetings and educational outreach by the HOA, Community Services District, or other means. Evacuation information would be disseminated to residents through a variety of means such as bi-annual mailers, online, workshops, and more detailed below. Among the important concepts that would be included in evacuation, education is the Modified Project Area's fire environment, mitigation strategies, roles and responsibilities, homeowner education materials, preparedness checklist, route planning, and specific procedures for early relocation and contingency planning for situations where evacuation is considered unsafe.

As described above and consistent with the State-certified EIR, the Modified Project EIR would not result in any new impacts or increase impacts to an adopted emergency response plan or emergency evacuation plan.

7.1 Wildfire Education Project Design Feature

As part of the Project, the Modified Project residents and occupants would be provided ongoing education regarding wildfire, the WFEP, and this FPP's requirements. This educational information would support the fire safety and evacuation features/plans designed for this community. Informational handouts, community website pages, mailers, fire-safe council participation, inspections, and seasonal reminders are some methods that would be used to disseminate wildfire and relocation awareness information. County Fire would review and approve all wildfire educational material/programs before printing and distribution.

The Newhall Ranch Wildfire Education Program's goal is to provide targeted outreach to residents and other site occupants living in a fire risk area in order to foster a community that has fire adaptive capacity. The educational program would cover a wide range of information such as residential evacuation planning, defensible space guidelines, how to maintain fire protection features, activities in a fire risk area, and more, all provided in easy-to-understand, graphically based materials. The educational program will be based on a layered approach to wildfire awareness that includes both passive and active features. The program will be ongoing in order to maintain high wildfire awareness even as the community grows and evolves. Program features are as follows:

1. Bi-annual email and mailers: Residents and occupants will be provided with bi-annual emails and mailers in May and in August. They will include information such as reminders about annual defensible space inspections, maintaining the ERZ, how to prepare for wildfire season, evacuation information, and how to prevent wildfires. There will also be links to various resources on where to get trusted information such as County Fire, 211 LA County, and Ready LA County.
2. Website: There will be a dedicated community website with more detailed information and resources about wildfire awareness and prevention. The website will serve as a centralized resource for the fire education program and include information from the FPP. The website will also have fire watch and red flag warning alerts, as well as information on restrictions during fire weather conditions. Residents will also be able to use the website to sign up for an annual residential defensible space inspection from the HOA Fire Committee.
3. Community workshops and webinars: Two times a year there will be either in-person or virtual community workshops. The goal of the workshops will be to cover various fire topics more in-depth. For example, this could include having a County Fire representative come to meet the community, a workshop on how to make a go-bag, a workshop on how to make a residential evacuation plan, or how to maintain the home ignition zone.
4. New resident packet: All residents and new residents in the future will also be presented with a wildfire awareness and safety package upon purchase or rental of a home. This will also be given to businesses as part of their employee training program. Within the package will be a memory stick with the evacuation plan, a list of fire protection features, information on the regional fire hazard, prohibited activities in fire risk areas, how to build a go-bag, and a list of agencies and resources for receiving trusted information.
5. Emergency alert campaign: Residents and businesses will be encouraged to sign up for Alert LA County. Alert LA County is the mass notification system for emergency alerts, weather alerts, health notifications, building alerts, and other updates from County, State, and Federal agencies. The campaign will occur annually and encourage residents to sign up for Alert La County. Reminders will also be sent out in the bi-annual mailers and emails, on the community website, in the workshops, and in the new resident package.
6. Fire watch groups: Within the community, there will also be volunteer fire watch groups. These will be residents or businesses who volunteer to participate in a fire watch group for the community. During red flag warning days, this group will be responsible for reminding businesses and residents of fire-safe practices and restrictions. During red flag warning days, the fire watch group will also maintain vigilance of potential fires and will be trained on procedures for alerting County Fire in the event of a fire.
7. HOA fire safety committee: The fire safety committee will be responsible for overseeing the maintenance of community-wide fire protection features. Residents will be able to report fire hazards or hazardous fuel conditions to the HOA committee for remediation. The committee will be responsible for the coordination of the 3rd party FMZ inspections and the volunteer residential defensible space inspections. The committee will also be responsible for organizing and coordinating an annual education workshop on how to maintain the ERZ. The committee will also be responsible for the creation and distribution of the educational program for the Modified Project. The committee will serve as a communication link between County Fire and the community.

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8 Analysis of the Modified Project's Potential Wildfire Impacts

8.1 Appendix G EIR Questions

8.1.1 Threshold: Due to Slope, Prevailing Winds, and Other Factors, Would the Modified Project Exacerbate Wildfire Risks and Expose Project Occupants to Pollutant Concentrations from a Wildfire or the Uncontrolled Spread of a Wildfire?

As described in Section 2 Existing Setting: Project Study Area, Risk Factors, and Fire History, the existing topography and climate may present conditions that facilitate the spread of wildfire. Additionally, development in fire-prone environments can potentially introduce factors that could exacerbate wildfire risk. Accordingly, the Modified Project has the potential to result in a new significant impact related to this threshold compared to the 2017 Approved Project as analyzed in the State-certified EIR.

The State-certified EIR analyzed wildfire impacts as part of Section 4.17 Hazards, Hazardous Materials, and Public Safety and found that while the Project provided sufficient access, water supply, siting of homes and buildings, and vegetation management, the potential for wildland fire hazards would still exist and require mitigation. However, after regulatory compliance and incorporation of Mitigation Measure PH-14, the State-certified EIR determined that the 2017 Approved Project would have a less than significant impact related to wildfires.[28] Further, the State-certified EIR also determined that the Project would have a less than significant impact with mitigation on adopted emergency response plans or emergency evacuation plans based on the location of fire stations, a system of improved roads, with the implementation of Mitigation Measures PH-7.[29]

The Modified Project does not include modifications from the 2017 Approved Project that would substantially increase fire risks compared to the analysis of wildfires presented in the State-certified EIR. However, to better gauge how particular activities may impact the environment on and offsite, the following analysis considers onsite and offsite wildfire risks during construction and operations.

8.1.1.1 Construction Impacts

As discussed in Section 1.3, the Modified Project's construction activities will be substantially similar to the 2017 Approved Project's construction activities and the Modified Project does not include construction-related modifications from the 2017 Approved Project that would substantially increase fire risks compared to the analysis of wildfire impacts presented in the State-certified EIR. As with the 2017 Approved Project, construction activities associated with the Modified Project would introduce potential ignition sources related to construction activities,

28 See Final State-certified EIR, p. 4.17-60 – 4.17-61.
29 See Final State-certified EIR, p. 4.17-60.

construction equipment, and construction-related vehicle use, and other factors described in Section 5, resulting in the potential for significant wildfire impacts during construction.

As with the 2017 Approved Project, the Modified Project would comply with Mitigation Measure PH-14 to reduce wildfire risks as well as comply with County Fire requirements for activities in hazardous fire areas and the California Fire Code (CFC), which ensures a variety of construction measures to reduce fire risk, requiring spark arrestors on all equipment with a solid or liquid fuel motor used on the Modified Project Site. Further, as with the 2017 Approved Project, the Modified Project would comply with Section 326.12.1 of the County Fire Code, which prohibits the use or operation of any tractor, construction equipment, engine, machinery, or any steam, oil, or gasoline-operated stationery or mobile equipment, from which a spark or fire may originate unless such equipment is provided with a qualified device or spark arrester installed in or attached to the exhaust pipe which will prevent the escape of fire or sparks. Construction activities would also comply with Chapter 33 of the CFC Fire Safety During Construction and Demolition, including Section 3304 thereof, which obligates the Modified Project to satisfy various standards that limit ignitions, such as but not limited, to prohibiting smoking except in approved areas, preventing the accumulation of and removing combustible debris, implementing fire watch personnel (where recommended by the County Fire Code official), providing onsite water supplies, and maintaining vehicle access for firefighting to all construction and demolition area.

The State-certified EIR analyzed the potential for off-site wildfire risks. As with the 2017 Approved Project, construction of the Modified Project would introduce new ignition sources that have the potential to increase fire off-site either by spreading directly from the Modified Project Site or through airborne embers. However, the State-certified EIR determined that such impacts were less than significant with Mitigation Measure PH-14 and regulatory compliance.[30] As noted above, the changes to the Modified Project from the 2017 Approved Project are not expected to increase the risk of offsite wildfire impacts. As with the 2017 Approved Project, the Modified Project site is generally surrounded by development and not entirely adjacent to undeveloped, high fuel areas. As described in Section 2.2.3, there is significant development near the Entrada Planning Area, including I-5 to the east, Six Flags Magic Mountain theme park and State Route 126 (SR-126) to the north, Mission Village to the west, and the existing Westridge community to the south, along with secondary road infrastructure to the south, east, and north. Land uses surrounding the VCC Planning Area include commercial and residential development as well as vacant land with limited vegetative cover. Existing mixed-use development is located, immediately north of the VCC Planning Area and commercial development is north, northwest, and west of the VCC Planning Area, along with SR-126 to the south. The surrounding development and lack of extensive vegetative cover immediately adjacent to the Modified Project site reduces the risk of both encroaching fires and offsite fire spread, including offsite spread from windblown embers.

In addition to Mitigation Measure PH-14 and the regulatory compliance identified in the State-certified EIR, the Modified Project includes features that would enhance wildfire safety. Specifically, potential impacts from the Modified Project caused by construction, both onsite and offsite, would provide an additional benefit by implementing **PDF-1** and **PDF-2**. First, pursuant to **PDF-1**, prior to any construction activities, a detailed Construction Fire Prevention Plan (CFPP) would be implemented for the Project and submitted to the County of Los Angeles for review and approval. The CFPP will designate fire safety measures to reduce the possibility of fires during construction activities, including fire watch during hot works and heavy machinery activities (e.g., welding), spark arresters on all equipment, water supply via hose lines attached to hydrants, or a water tender pursuant to County Fire requirements, red flag period restrictions, and mandatory on-site fire. The CFPP would also require employees

30 See Final State-certified EIR, p. 4.17-63.

to be presented with basic prevention fire training, which would consist of the Modified Project FPP requirements, review of Occupation Safety and Health Administration (OSHA) Fire Protection and Prevention, proper response and notification of a fire, and the use of fire extinguishing equipment.

Second, **PDF-2** requires that prior to bringing lumber or combustible materials related to building construction onto the Modified Project Site, site improvements within the active development area must be in place, including utilities, operable fire hydrants, and an approved, temporary roadway surface and fuel modification zones. Combustible materials would only be utilized onsite prior to stated site improvements as needed for providing the improvements themselves (e.g., wood forms for cast-in-place concrete). These same features that reduce the risk of a fire beginning on the Modified Project site during construction also reduce the risk of fire spreading offsite. FMZs implemented under **PDF-2** would reduce the risk that a fire that began on the Modified Project Site during construction would migrate offsite, and the ignition reduction requirements imposed by applicable regulations and the CFPP, as well as the fire-watch and employee education aspects of the CFPP, would minimize the risk of airborne embers originating on the Modified Project Site migrating offsite.

The State-certified EIR determined that wildfire impacts associated with the construction of uses within the Entrada and VCC Planning Areas would result in less than significant impacts with mitigation.[31] In addition to Mitigation Measure PH-14 and the regulatory compliance identified in the State-certified EIR, **PDF-1** and **PDF-2** would further enhance the reduction of potential for wildfire impacts during construction. Accordingly, as with the 2017 Approved Project, potential wildfire impacts due to onsite construction **would be less than significant**. The Modified Project would not result in any new significant wildfire impacts related to construction activities.

8.1.1.2 Operational Impacts

As described above, the existing topography and climate may present conditions that facilitate the spread of wildfire. Additionally, development in fire-prone environments can potentially introduce factors that could exacerbate wildfire risk. Accordingly, the Modified Project has the potential to result in a significant impact related to this threshold. The State-certified EIR analyzed wildfire impacts as part of Section 4.17 Hazards, Hazardous Materials, and Public Safety and found that while the Project provided sufficient access, water supply, siting of homes and buildings, and vegetation management, the potential for wildland fire hazards would still exist and require mitigation. The State-certified EIR ultimately determined that impacts from the 2017 Approved Project would be less than significant with regulatory compliance and the implementation of Mitigation Measures PH-7 and PH-14.

As discussed in Section 1.3, the Modified Project does not include land use or other operational modifications from the 2017 Approved Project that would substantially increase onsite or offsite fire risks compared to the analysis of wildfires impacts presented in the State-certified EIR. The Modified Project would not increase development or bring more people to the WUI compared to the 2017 Approved Project. The Modified Protect includes 151 fewer residential units compared to the 2017 Approved Project. However, as with the 2017 Approved Project, the Modified Project has the potential to contribute to wildfire impacts as described in Section 5.

As with the 2017 Approved Project, the Modified Project would comply with applicable regulations and Mitigation Measure 4-14. Even though the State-certified EIR determined that wildfire impacts would be less than significant with mitigation and regulatory compliance, the Modified Project includes additional Project Design Features (PDFs) to further reduce wildfire risks, both on-site and off-site. To start, **PDF-3** and **PDF-4** aid in addressing wildfire exposure to Modified Project residents and structures by ensuring active maintenance of FMZs. **PDF-3** would require

31 See Final State-certified EIR, p. 4.17-60 – 4.17-61.

that all vegetation management with the FMZs and common must be completed annually under the responsibility of the Modified Project HOA or equivalent entity. Likewise, individual property owners would be responsible for maintaining the Ember Resistant Zone (ERZ) and any fuel modification within their property. Maintenance activities would include but not be limited to removing dead and dying material, removing undesirable plant species, and conducting thinning activities to maintain adequate spacing requirements. PDF-4 compliments PDF-3 by requiring that every year a third-party inspector hired by the Modified Project HOA or equivalent entity will conduct an annual inspection of the FMZs (including ERZs) and evaluate the FMZs for compliance with regulations and that they are operating accordingly. PDF-3 and PDF-4 would also help address potential offsite impacts by ensuring that the FMZs and defensible space features are in regulatory compliance and provide lasting protection to off-site areas through ongoing maintenance and management. Accordingly, PDF-3 and PDF-4 would prevent on-site and off-site impacts associated with the operational function of the FMZs from degrading over time.

PDF-5 benefits the Modified Project by addressing the risk of human-caused ignitions related to the Modified Projection increasing human activity in the area during operation by ensuring that residents are educated about wildfire risks and safety. The Wildfire Education Program described in Section 7 Wildland Fire Evacuation and Education Program and required by PDF-5, provides a project-specific approach for raising wildfire awareness and preparedness for living in a fire-prone environment. Residents and occupants would not only be more aware of the risk in the area but also be provided with tools such as how to maintain the ERZ, how to prepare for wildfire season, and how to make a residential evacuation plan. Active features of the Wildfire Education Program are targeted at preventing human-caused ignitions. Further to directly limit the potential for accidental ignitions during red flag warning days residents and occupants would be prohibited from carrying out ignition risk activities when the weather is conducive for wildfire.

The Modified Project's reduction of onsite or offsite wildfire spread or exacerbate wildfire risk is demonstrated by the fire behavior modeling analysis presented above and throughout the FPP. The location and direction of the various fire scenarios analyzed for Entrada South and VCC are presented in Figure 8a, BehavePlus Fire Behavior Analysis for Entrada Planning Area, and Figure 8b, BehavePlus Fire Behavior Analysis for VCC Planning Area. The results of the wildfire behavior modeling for three different fire scenarios near the Entrada South Planning Area and the VCC Planning Area under existing conditions are presented in Table 2 and Table 3.

For the Entrada South Planning Area wildfire in non-treated coastal scrub with varying wind speeds represents the most extreme conditions with expected flame lengths to reach up to approximately 46 feet with 52 mph gusts (offshore winds) and 15 feet with 14 mph wind speeds (onshore winds). Spread rates for coastal scrub fuel beds range from less than 1 mph (onshore winds) to 7.2 mph (offshore winds). Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, would range from 0.5 miles to 2.5 miles.

For the VCC Planning Area maximum flame lengths were anticipated to be in untreated, surface fuels, including grasslands and coastal scrub, could reach up to 39.7 to 45.7 feet in height, respectively, with spread rates between 7.1 and 17.7 mph under extreme weather conditions, represented by Santa Ana winds blowing at gusts of 52 mph. Additionally, modeling fire behavior based on the existing conditions demonstrated that the riparian understory could burn aggressively due to the presence of large amounts of biomass from dense stands of shrubby willows and potentially transition to a crown fire. Embers could be generated from both surfaces and tree crown fires, resulting in the ignition of receptive fuel beds 1.6 to 2.6 miles downwind.

The modeling results for the post-development conditions of the Entrada South Planning Area and the VCC Planning area were significantly different as presented in Table 4 and Table 5. The built-out conditions of the Entrada South Planning Area, including the FMZs, resulted in a reduction of the existing condition fire behavior to less than

10.6 feet tall at the outer edges and less than 3 feet in Zone A near the structures of the development due to the higher fuel moisture content. Spotting distance of embers would also be reduced from a maximum of 2.5 miles under pre-Project conditions down to a maximum distance of 0.9 miles under post-development conditions.

For the VCC Planning Area the post-development conditions, inclusive of the FMZs, reduced the 46-foot-tall flames predicted during pre-Project conditions under extreme weather conditions to 10.6 feet tall at the outer edges of Zone B and up to 3 feet by the time the inner portions (i.e., irrigated Zone A) of the fuel modification zone are reached. Spotting distance of embers would also be reduced from a maximum of 2.6 miles under pre-Project conditions down to a maximum distance of 1.5 miles under post-development conditions. Additionally, the Project would be required to comply with all provisions in the Los Angeles County Code regulating development in a Very High FHSZ. With the conversion of the undeveloped landscape to ignition-resistant development and landscaping, wildfires may still encroach upon and drop embers on the Modified Project Site, but would not be expected to burn through the Project Site due to the lack of available fuels and the typical ember decay rate. Further, in the event of a fire starting on the Modified Project Site, the fire would not be anticipated to result in a wildfire that would spread to off-site wildlands due to the buffer created by the proposed fuel modification zones.

As such the Modified Project's FMZs would provide protection to both on-site structures and off-site areas. Additionally, per PDF-2, the FMZs would be implemented prior to construction and therefore not only provide protection during the Modified Project's operation but construction phase as well.

Additionally, a Wildland Fire Evacuation Plan (WFEP), per PDF—6 has been prepared for the Modified Project and would be provided to the Entrada South and VCC residents and commercial tenants and posted on the community website. The WFEP would aid in making residents and occupants more aware of evacuation procedures increasing their likelihood of leaving quickly during an evacuation event. With mitigation in place, the impact associated with increased human activity during operation would be significantly lowered.

Although it is not being analyzed under this significance determination, it is also worth noting that the Modified Project, along with the larger region, benefits from reduced fire ignitions and fire behavior resulting from the ongoing Newhall grazing activities. As described in Section 4.3, the livestock grazing program utilizes practices implemented in the greater Newhall Ranch area over the last several decades and continues these practices as part of the holistic land management approach. The modeling that includes the ongoing livestock grazing demonstrates substantially reduced fire behavior in terms of flame lengths, fire spread rates, heat output, and overall intensity. Thus, the ongoing livestock grazing program provides additional environmental benefits with respect to wildfire protection but is not necessary for the purpose of this FPP's evaluation.

The following analysis also considers how common human-based ignition sources in the region are related to powerlines, vehicles, construction, operation, and human activities in wildland areas have the potential to increase wildfire risks (Keeley & Syphard, 2018). Each of these sources, with the exception of construction (see above), is discussed below.

- Operation and Human Activities. Operational activities and human activities related to project use have the potential to be ignition sources. Like the 2017 Approved Project, however, the Modified Project will be built according to the strictest wildfire standards and will incorporate numerous design features that reduce the potential for operation and human activities to cause wildfire onsite. Structures in the Modified Project area would comply with Chapter 7A ignition resistant construction requirements and the Los Angeles County Building Code (Title 26, Chapter 7A), "Construction Methods for Exterior Wildfire Exposure" as described in Section 3.5 Structural Ignition Resistance Regulations. Homes and structures would also be equipped with

National Fire Protection Association (NFPA) Standards 13, 13R, and 13D, which contain structure fires to the point of origin, can extinguish a fire prior to the responding firefighters' arrival, and dampen the likelihood of ember production (NFPA, 2021). Additionally, the Modified Project, as with the 2017 Approved Project, would be required to comply with all provisions in the Los Angeles County Code regulating development in a VHFHSZ. With the conversion of the undeveloped landscape to ignition-resistant development and landscaping, wildfires may still encroach upon and drop embers on the Modified Project Site but would be unlikely to burn through the site due to the lack of available fuels and the typical ember decay rate, as substantiated by the BehavePlus Fire Behavior Analysis described above.

- Like the 2017 Approved Project, the Modified Project also includes fuel modification and vegetation management components to form buffers between project residents and encroaching wildfires. The Modified Project provides 100- to 200- feet of fuel modification zones divided into the ERZ, Zones Athrough D as described in Section 3.2 Defensible Space and Vegetation Management Regulatory Requirements. These zones function by redistributing fire risk on a landscape through the alteration of the interaction between fire, fuels, and weather (Cochrane et al., 2012). The Modified Project's fuel modification would function as fuel breaks to reduce fire risk and facilitate effective fire prevention (Wang et al., 2021). The FMZs would create a buffer between developed areas and natural areas created by the fuel modification zones, fires that ignite in a developed area or adjacent wildlands would not easily spread through the fuel modification zones (Warziniack et al., 2019). Critically, based on the fire behavior modeling conducted in Section 4 Modeling: Anticipated Fire Behavior for Worst-Case Fire Conditions, indicates that the fuel modification zones (Zones A and B) would reduce flame lengths and slow fire spread rates to a level that would be manageable by fire crews, thereby mitigating risks of encroaching fires onto the Modified Project site as well as the potential spread of flames from the Modified Project site to surrounding areas. Additionally, the ERZ would keep fire or embers from igniting materials that can spread to structures (Price et al., 2021).
- Powerlines. In southern California, powerline-related fires are common and have resulted in destructive fires (Keeley & Syphard, 2018). The Modified Project does not increase powerline impacts compared to the 2017 Approved Project. For the Modified Project, as with the 2017 Approved Project, however, this risk is addressed because Project-related powerlines would be buried underground.
- Vehicles. With respect to vehicle ignitions, the Modified Project would not increase vehicle trips compared to the 2017 Approved Project as analyzed in the State-certified EIR. State Certified EIR and therefore would not raise the potential for vehicle-based ignitions. In fact, the Modified Project reduces trips compared to the 2017 Approved Project analyzed in the State-certified EIR, as described in the Transportation section of the Supplemental Environmental Impact Report. As with the 2017 Approved Project, new roads would be provided with roadside fuel modification, removing flammable vegetation and/or combustible growth on each side of the roadway with a minimum width of 10 feet. Roads would also be adjacent to on-site FMZs and ignition-resistant construction. On-site roads would comply with County Fire access requirements and standards as described in Section 3.4 of this FPP.
- Introducing New Development in the WUI As with the 2017 Approved Project, the Modified Project will introduce new development and people to the WUI. Although the Modified Project includes fewer residential units than were analyzed in the State-Certified EIR, the Modified Project still has the potential to result in an onsite wildfire that could then spread offsite. As discussed, common human-based ignition sources in the region are related to powerlines, vehicles, construction, operation, and human activities in wildland areas (Keeley & Syphard, 2018). Section 8.1.1.1.3 explains how operational onsite wildfire risk is reduced due to compliance with all applicable building requirements, fire-resistant construction, required fuel modification, and Mitigation Measure PH-14. In addition, PDF-3 and PDF-4 would ensure active

maintenance of FMZs providing additional protection to the Modified Project. PDF-3 would require that all vegetation management with the FMZs and common must be completed annually under the responsibility of the Modified Project HOA or equivalent entity. Likewise, individual property owners would be responsible for maintaining the Ember Resistant Zone (ERZ) and any fuel modification within their property. Maintenance activities would include but not be limited to removing dead and dying material, removing undesirable plant species, and conducting thinning activities to maintain adequate spacing requirements. PDF-4 compliments PDF-3 by requiring that every year a third-party inspector hired by the Modified Project HOA or equivalent entity will conduct an annual inspection of the FMZs (including ERZs) and evaluate the FMZs for compliance with regulations and that they are operating accordingly. PDF-3 and PDF-4 would also benefit the Modified Project by addressing potential offsite impacts by ensuring that the FMZs and defensible space features are in regulatory compliance and provide lasting protection to off-site areas through ongoing maintenance and management. By addressing the risk of fire ignition and spread onsite, these design features provide additional benefits to the project as they relate to preventing fires from spreading offsite. As described above, with the conversion of the landscape to ignition-resistant development, fires are unlikely to burn through the Site due to the lack of available fuels, and wildfires starting on the Modified Project Site would not be anticipated to increase from existing levels due to the ignition-resistant landscapes, perimeter fuel modification zones which are designed to protect the Modified Project. This would thereby minimize the likelihood that an on-site fire escapes into wildland areas, despite the presence of new people and development. In effect, the Modified Project's fire-hardened landscape and 100- to 200-foot wide FMZs will act as a barrier to wildfire spreading off-site. Accordingly, the implementation of PDFs described in this Fire Protection Plan would provide increased benefits to the Modified Project by enhancing how the Modified Project addressed the impacts of bringing development into the WUI in comparison to the 2017 Approved Project.

- Embers Like the 2017 Approved Project, embers caused by sparks, fires, and other human activity on the Modified Project also have the potential to migrate off-site and cause wildfires in adjacent, undeveloped areas. On-site ember would most likely originate from a structure fire. However, the same requirements that project structures and residents of the Modified Project (i.e., fire-hardened structures, FMZs, etc.) also reduce the likelihood of a structure fire occurring and embers migrating off the Modified Project Site. As described above, PDF-3 and PDF-4 ensure that the FMZs and defensible space features are in regulatory compliance and provide lasting protection to off-site areas through ongoing maintenance and management which enhances the benefits of FMZs. Further, FMZs have been shown to lower ember cast and have a shadow effect on the untreated landscape by reducing the probability of burning and the potential fire size (Cochrane et al., 2012). Because on-site fires are unlikely to occur and, even if so, would likely be low-intensity fires due to a lack of fuel sources, the Modified Project is unlikely to produce embers that would fly across the fuel modification zones to surrounding areas.

The State-certified EIR determined that wildfire impacts would be less than significant with mitigation. The Modified Project does not include features that would increase such fire risk and, in fact, reduces the number of residences being constructed and includes PDFs that would further reduce wildfire risks. The Modified Project would not result in new significant impacts with respect to wildfire risks as compared to the analysis presented in the State-certified EIR and the impact is **less than significant.**

8.1.2 Threshold: Would the Modified Project Require the Installation or Maintenance of Associated Infrastructure (Such as Roads, Fuel Breaks, Emergency Water Sources, Power Lines, or Other Utilities) that May Exacerbate Fire Risk or that May Result In Temporary or Ongoing Impacts to the Environment?

In Section 4.17 Hazards, Hazardous Materials, and Public Safety the State-certified EIR analyzed wildfire impacts. The State-certified EIR found that the development of the Project sites would potentially reduce the likelihood of wildfire in the area and that the access, water supply, and fuel modification features of the Project would minimize the potential for wildfire impacts. And as previously described the combination of regulatory compliance and the incorporation of Mitigation Measure PH-14 from the 2017 Approved Project determined that the associated wildfire impact would be less than significant. The Modified Project does not include modifications from the 2017 Approved Project associated with the installation or maintenance of associated infrastructure that would exacerbate wildlife risk or result in temporary or ongoing impacts as compared to the analysis of the wildfire impacts presented in the State-certified EIR. However, to better determine how the Modified Project may impact the environment the following analysis considers the wildfire risk associated with the installation or maintenance of the Modified Project associated infrastructure.

The Modified Project would involve the development of 1,574 dwelling units, 730,000 square feet of non-residential development, a public park and potential school site, a spineflower preserve, trails and infrastructure within the Entrada Planning Area, and 3.4 million square feet of industrial/commercial space on approximately 164 acres, approximately 144 acres of open space, and approximately 13.7 acres of public facilities within the VCC Planning Area. The Modified Project would implement the development facilitated by the approved Newhall Ranch Resource Management and Development Plan, and Spineflower Conservation Plan within the Entrada and VCC Planning Areas. The Modified Project would involve the installation and maintenance of associated infrastructure, including fuel breaks (e.g., fuel modification zones), roads and trails, service utilities (e.g., water, wastewater, stormwater drainage, electric power, natural gas, and telecommunications services), water drainage, and water quality improvements (e.g., stormwater basins), as discussed in further detail below.

8.1.2.1 Construction Requirements

A system of roads and trails, fuel modification zones, water quality improvements, and service utilities would be installed as part of the Project construction. As discussed in Threshold 5.13.2 the Project would require substantially similar construction-related activities as to the 2017 Approved Project and construction activities associated with the Modified Project would introduce potential ignition sources. As with 2017 Approved Project and described above the Modified Project would comply with Mitigation Measure PH-14 to reduce wildfire risk, the CFC, and the County Fire Code. As described in Threshold 5.13.2 Modified Project would include **PDF-1** and **PDF-2** which would enhance regulatory compliance and further reduce the potential for potential construction-related ignitions. Further, as noted in Threshold 5.13.2 the State-certified EIR analyzed off-site wildfire risk and determined while the construction of the Approved Project would introduce construction-based ignitions the impact would be less than significant with regulatory compliance and the implementation of Mitigation Measure PH-17. Implementation of the regulatory standards, Mitigation Measure PH-14, **PDF-1** and **PDF-2** would reduce the risk of wildfire ignition and spread on the Modified Project Site. As such, the Modified Project is consistent with the determination of the

State-certified EIR and does not include a substantial change that would increase wildfire risk associated with construction-based ignition sources thereby construction activities would not exacerbate wildfire risk and the impact would be **less than significant.**

8.1.2.2 Fuel Breaks / Vegetation Management

As previously discussed, the Modified Project Site is located in a Very High FHSZ, and implementation of a Fuel Modification Plan is required. The State-certified EIR determined that the impacts from the Approved Project would be less than significant with regulatory compliance, including vegetation management, and the implementation of mitigation measures. The Modified Project does not include a substantial change to the fuel vegetation management activities that would exacerbate wildfire risk when compared to the Approved Project. A preliminary Fuel Modification Plan has been prepared for the Modified Project consistent with the County Fire's Fuel Modification Plan Guidelines (County Fire 1998, 2019). In accordance with County Fire Code provisions, the Fuel Modification Plan would be submitted for approval to the County Fire and would include the vegetation management activities described below.

As described in Threshold 5.13.2 the Modified Project includes fuel modification zones that consist of Zones A and B would be required around all habitable structures within the Planning Areas. The Modified Project includes design features to ensure the FMZs retain their functionality throughout the life of the Modified Project. **PDF-3** and **PDF-4** include provisions so that vegetation management provides last protection both to the Modified Project and off-site areas. In accordance with County Fire Code provisions, the Fuel Modification Plan would be reviewed and approved by the Forestry Division of the County Fire for consistency with defensible space and fire safety guidelines. As such, the impacts associated with the installation of fuel breaks and vegetation management would not exacerbate wildfire risk nor include a substantial change beyond what was analyzed in the state-certified EIR. Therefore, as discussed above the Modified Project would not include a substantially different change regarding fuel breaks and vegetation management compared to the 2017 Approved Project. The Modified Project would not result in any new significant impacts related to fuel breaks and vegetation management compared to the Sate-certified EIR and the impact is **less than significant.**

8.1.2.3 Roads and Trails

As with the 2017 Approved Project, the Modified Project would involve the extension of existing roadways and the installation of an interior circulation network and trail networks. The roadway network on the Modified Project Site would be integrated into the broader roadway network throughout the west side of the Santa Clarita Valley. The presence of vehicles and human activity along newly installed roads would introduce new potential ignition sources to the Project area. As required under the Los Angeles County Fire Code, fire engine apparatus roads would be maintained with a minimum 20-foot-wide roadway that is clear to the sky, and all flammable vegetation or other combustible growth would be removed for a minimum of 10 feet on each side of the roadway (Title 32 Section 325.10). Additionally, roads would include roadside fuel modification, be adjacent to FMZs, and ignition resistant constructs further making it unlikely that a vehicle-based ignition would occur or spread to off-site or on-site areas as discussed in Threshold 5.13-2. Adherence to these regulatory requirements would reduce the risk of fire ignition along roadways and ensure ease of accessibility for ingress and egress of fire apparatus. However, the Modified Project does not include a substantially different change to the road system nor does it result in a substantially different fire risk than was analyzed in the State-certified EIR. Further, the State-certified EIR determined wildfire impacts to be less than significant. Therefore, as the Modified Project would not result in any new significant impacts related to roads or trails installation than compared to the State-certified EIR the impact is **less than significant.**

8.1.2.4 Utilities

As part of the Modified Project, utility service lines, including those for water, wastewater, stormwater drainage, electric power, natural gas, and telecommunications services, would be extended from their current locations to the Project structures. However, the Modified Project would not increase or substantially change utility installation and maintenance requirements compared to the 2017 Approved Project. As further discussed in Section 5.XX, Utilities and Services Systems, of the SEIR, the Modified Project would not increase the need to relocate or construct utilities as compared to the 2017 Approved Project. As discussed in Threshold 5.13-2 the Modified Project would bury powerlines, effectively eliminating a significant ignition source for the area. As utility installation and maintenance often require demolition and construction-related activities, all activities of this nature would be required to adhere to the regulations for fire prevention and PDF-1 and PDF-2 as described above and in Threshold 5.13.2. All maintenance activities would be conducted according to regulatory requirements and occur adjacent to the Modified Project's fuel modification zones which would occur prior to the start of construction and throughout the life of the Project, per PDF-2, PDF-3, and PDF-4. Consequently, new infrastructure would not exacerbate fire risk provided that fuel modification zones and other vegetation management activities are implemented and enforced according to County Fire requirements. As such, the installation of Modified Project roads, service utilities, fuel modification zones, drainage, and water quality improvements, and other associated infrastructure would not exacerbate wildfire risks and the Modified Project would adhere to appropriate fire prevention, access, and vegetation management activities discussed throughout the FPP and described in Threshold 5.13-2.

Given that the activities involved with the installation or maintenance of associated infrastructure would require ground disturbance and the use of heavy machinery associated with trenching, grading, site work, and other construction and maintenance activities, the installation of related infrastructure could potentially result in temporary or ongoing impacts to the environment. However, the installation and maintenance of roads, fuel modification zones, service utilities, and drainage and water quality improvements are part of the Project analyzed herein. As such, any potential temporary or ongoing environmental impacts related to these components of the Modified Project were already accounted for in the 2017 Approved Project, and any modifications would be analyzed in the SEIR for the Modified Project. The Modified Project would not include a substantially different change regarding utilities that were analyzed in the State-certified EIR. The Modified Project would not result in any new significant impacts related to utility installation.

Additionally, the Modified Project would enhance environmental areas for wetlands and related biological resources within the Entrada South and VCC Planning Areas. For instance, the Modified Project would include enhancing and restoring various drainage channels and waterways. Although such areas may be temporarily impacted during construction, as analyzed in the State-certified EIR for the Approved Project, they would be revegetated after construction based on the Modified Project design. This would ultimately reduce permanent impacts on certain vegetation communities and jurisdictional stream habitats, as discussed in further detail in Section 5.2, Biological Resources, of this SEIR. This environmentally beneficial modification would result in increased open space, restored drainage areas and habitat for species compared to the 2017 Approved Project.

In summary, the Modified Project falls within the disturbance footprint analyzed for the 2017 Approved Project and would be consistent with the general scope and intensity of development that was studied in the State-certified EIR for the Approved Project. The Modified Project's impacts on the environment related to installation and maintenance of associated infrastructure would remain substantially similar to those identified for the 2017 Approved Project, and any new potential impacts have been appropriately mitigated throughout the SEIR. The Modified Project's impacts related to exacerbating wildfire risk due to the installation of associated infrastructure would be appropriately addressed with adherence to all regulatory requirements, and fire safety practices outlined in the FPP and enhanced with the implementation of the PDFs. Therefore, as the Modified Project does not include any substantially different changes to the installation and maintenance of associated infrastructure compared to the State-certified EIR, the Modified Project would not result in any new significant impacts compared to the 2017 Approved Project as analyzed in the State-certified EIR.

8.1.3 Threshold 5.13-4: Would the Modified Project Expose People or Structures to Significant Risks, Including Downslope or Downstream Flooding or Landslides, as a Result of Runoff, Post-Fire Slope Instability, or Drainage Changes?

As discussed in the State-certified EIR for the 2017 Approved Project it was concluded that potential impacts from landslide hazards associated with the construction of the 2017 Approved Project would be reduced to less than significant through the implementation of mitigation measures similar to SP-4.1-15 through SP-4.1-24, the State-certified EIR required Mitigation Measure VCC-GEO-3, and compliance with Los Angeles County's Building Code and the 2019 California Building Code, which is based on International Building Code standards. The Modified Project would occur in the same disturbance footprint and does not include features that constitute a substantial change as related to downslope or downstream flooding or landslides as a result of runoff, post-fire slope instability, or drainage changes compared to the State-certified EIR. However, the following discussion is included to assess how the Modified Project activities may impact as related to exposing people or structures to significant risk resulting from post-fire slope instability or drainage changes.

In addition to the Modified Project's location in a fire-prone area of Southern California, the Modified Project Site and surrounding area are topographically diverse, with slope gradients ranging from moderate to steep. The Entrada Planning Area is located south of the Santa Clara River on rugged terrain dominated by several steep north-south-trending slopes, with elevations ranging from approximately 1,000 feet amsl to approximately 1,438 feet amsl. The Entrada Planning Area contains portions of four drainage channels: Magic Mountain Canyon and three unnamed drainages. All four tributaries exit the Entrada Planning Area through natural drainages before eventually discharging into the Santa Clara River. The VCC Planning Area is located north of the Santa Clara River in relatively flat areas along Castaic Creek and within the lower elevations of Hasley Canyon, with site elevations ranging from approximately 945 feet amsl to approximately 1,470 feet amsl. The VCC Planning Area is dissected by two south–north-trending tributaries to the Santa Clara River: Castaic Creek and Hasley Creek. Both tributaries exit the VCC Planning Area through natural drainages before eventually discharging into the Santa Clara River.

Slope failures, mudflows, and landslides are common in areas where steep hillsides and embankments are present, and such conditions would be exacerbated in a post-fire environment where the vegetative cover has been removed. Vegetation plays a vital role in maintaining existing drainage patterns and the stability of soils. Plant roots stabilize the soil, and leaves, stems, and branches intercept and slow water, allowing it to more effectively percolate into the soil. Removal of surface vegetation reduces the ability of the soil surface to absorb rainwater and can allow for increased runoff that may include large amounts of debris and mudflows. If hydrophobic conditions exist post-fire, the rate of surface water runoff is increased since water percolation into the soil is reduced (Moench and

Fusaro 2012). The potential for surface runoff and debris flows, therefore, increases significantly for areas recently burned by large wildfires (Moench and Fusaro 2012). Given the Project's location in fire-prone Southern California, Modified Project occupants and structures could be exposed to downslope or downstream flooding or landslides as a result of post-fire conditions. As discussed above and shown in Figure 5.13-2, the 2017 Rye Fire (6,048 acres) is the most recent fire to have burned in the Project area. Based on field surveys conducted by Dudek in 2019 (see Appendix 5.13), because the vegetation communities in the Project area are composed of native species that have adapted to periodic fires and thus can rapidly regenerate after a fire, vegetation has regenerated since the 2017 Rye Fire, thereby aiding in stabilizing surrounding slopes.

In addition, vegetation removal as a result of vegetation management, such as that proposed for the Modified Project, could result in changes to drainage patterns and slope stabilization. Caution must be used to avoid causing erosion, ground (including slope) instability, or water runoff due to vegetation removal, vegetation management, maintenance, landscaping, or irrigation. This would be accomplished through HOA landscape plan reviews, landscape contractor monitoring of irrigation components, adherence to fuel modification plan, and annual (or more often as required by County Fire) landscape and fuel modification zone inspection and maintenance conducted by the Project HOA detailed in PDF 3 and PDF 4. The FMZs would also function to reduce fire behavior and intensity as determined by the fire behavior modeling. As described in Threshold 5.13-2 the multi-layer fire protection approach of the Modified Project significantly reduces the wildfire risk and the likelihood of fire to the Modified Project and the area. As a result, if were to occur it is unlikely it would result in extreme fire severity and post-fire slope instability due to the lack of available fuels and fire protection measures.

Further, the fuel modification and vegetation management plans for the Modified Project would not be substantially different from the 2017 Approved Project which was analyzed by the State-certified EIR as discussed above and in Threshold 5.13-2. The State-certified EIR determined that the vegetation management for the Approved Project was a key component in reducing the wildfire-related impacts below the level of significance.

Apart from post-fire slope instability, the potential for landslides, runoff, flooding, or drainage changes and water quality improvements has been analyzed in the SEIR and the State-certified EIR for the Approved Project. As discussed in Section 5.5, Hydrology and Water Quality - Hydrology, of the SEIR, and in the Geology and Soils assessment presented in the Initial Study, the Modified Project would not result in new or increased impacts related to landslides, flooding, runoff, changes in drainage patterns, or slope stabilization compared to the 2017 Approved Project. According to the Geology and Geologic Hazards, Update prepared for the Modified Project, several potential landslide areas have been identified within the Modified Project Site as requiring supplemental subsurface investigations. ES/VCC-GEO-3, as identified in the Initial Study for the Modified Project, requires that a Corrective Grading Plan delineating these areas be prepared and submitted to the County of Los Angeles Department of Public Works, as required for regulatory compliance (Section 3.3.3.1 of the Manual for Preparation of Geotechnical Reports [County of Los Angeles 2013]). ES/VCC-GEO- requires mitigation of all areas subject to liquefaction and that landslides either be removed, stabilized, or buildings setback accordingly, ES/VCC-GEO-3 also requires that grading and engineering design requirements address the removal of unstable soil, stabilization of potential landslides area, and compaction of engineered fill to meet County requirements. The Initial Study for the Modified Project determined that with the implementation of Mitigation Measures ES/VCC-GEO-3 impact on landslides would be less than significant and that no supplemental analysis is required. With the implementation of these corrective grading measures and the adopted mitigation measures included in the 2017 Approved Project EIR, impacts associated with potential landslides would be reduced to less than significant and the Modified Project would not introduce any new impacts. As such, the Modified Project would not cause any new significant impacts related to landslides and the impact is less than significant.

The Modified Project would not increase impacts related to soil erosion or loss of topsoil compared to the 2017 Approved Project as identified in the Initial Study. The 2017 Approved Project EIR concluded that the effects of substantial soil erosion or loss of topsoil may include the undermining of structures and slopes, alterations of surface drainage patterns, steepening of slopes, and loss of setback areas and safety zones. Absent mitigation, such impacts would be significant. Although compliance with current regulatory requirements would reduce any adverse geological impacts, corrective grading measures (ES/VCC-GEO-3) would be designed to remove unstable soils, stabilize potential landslide areas, and compact engineered fill to meet County grading and soil compaction requirements. As such, the Modified Project does not result in a substantial change from the State-certified EIR and would not cause any new significant impacts related to soil erosion or loss of topsoil therefore the impact **is less than significant.**

As evaluated in the State-certified EIR for the Approved Project, hydrology impacts related to flooding/flood hazards and stormwater conveyance within the Modified Project Site would be less than significant. The State-certified EIR also determined that impacts related to drainage patterns, long-term erosion, channel stability, and downstream deposition would be less than significant with mitigation. Therefore, as the Modified Project does not result in a substantial change to the impacts analyzed in the State-certified ERI the impact is **less than significant.**

In summary, development areas within Entrada South and VCC would be stabilized during construction through the use of drainage improvements and bank stabilization. The Modified Project also falls within the disturbance footprint analyzed for the 2017 Approved Project and would be consistent with the general scope and intensity of development that was studied in the State-certified EIR for the Approved Project. Therefore, with adherence to regulatory requirements and applicable mitigation measures outlined in the State-certified EIR, and additional mitigation measures identified for the Modified Project (ES/VCC-GEO-3), the Modified Project would not expose people or structures to downslope or downstream flooding or landslides as a result of runoff, post-fire slope instability, or drainage changes nor introduce any substantially different impact as compared to the State-certified EIR. Further, because the Modified Project would not result in any new significant impacts related to downslope or downstream flooding or landslides as a result of runoff, post-fire slope instability, or drainage changes compared to the 2017 Approved Project the impact is **less than significant.**

8.1.4 Threshold 5.13-5: Would the Project Expose People or Structures Either Directly or Indirectly, to a Significant Risk of Loss, Injury, or Death Involving Wildland Fire?

and

Threshold 5.4-7: Would the Modified Project Expose People or Structures, Either Directly or Indirectly, to a Significant Risk of Loss, Injury, or Death Involving Fires, Because the Project is Located:

As previously described, the State-certified EIR determined that the 2017 Approved Project's wildfire impacts were less than significant. The State-certified EIR also determined that the Approved Project provided sufficient access, water supply, siting of homes and buildings, and vegetation management for the Approved Project's location in a

VHFSZ. Further, the Approved Project analysis found that compliance with all applicable regulations and implementation of Mitigation Measures PH-7 and PH-14 would further reduce any potential impact below the level of significance. The Modified Project does not include substantial modifications from the 2017 Approved Project that would result in a significant increase in the risk of wildfire. However, to better gauge how the Modified Project development may directly or indirectly expose people to wildfire risk the following analysis has been included.

8.1.4.1 Within a High Fire Hazard Area with Inadequate Access?

The access requirements were analyzed as part of the State-certified EIR and it was determined that the Approved Project would provide sufficient access. Further, as evaluated in the Initial Study, the Modified Project does not include any modifications to the 2017 Approved Project that would impair implementation of, or physically interfering with, an adopted emergency response plan or emergency evacuation plan, as described in response to Question 9(f) of the Initial Study:[32]

> **Less Than Significant Impact/No Changes or New Information Requiring Preparation of an EIR.** The State-certified EIR found that impacts to public safety related to emergency response were not significant for the Entrada and VCC Planning Areas. The Modified Project does not include any modifications to the 2017 Approved Project that would increase interference with an adopted emergency response plan or emergency evacuation plan. The Modified Project includes the same mix of uses as the 2017 Approved Project, with only changes to the residential and non-residential allocations for Entrada South that do not have the potential to impair an adopted emergency response plan or emergency evacuation plan. Like the 2017 Approved Project, Modified Project development in the Entrada and VCC Planning Areas would address fire and emergency access needs through the implementation of Mitigation Measure RMDP/SCP-PH-7, which requires compliance with Los Angeles County Code, Title 21, Chapter 21.24 regarding secondary evacuation access. Further, the Modified Project's circulation system would be designed and constructed in accordance with all applicable Los Angeles County Fire Department (LACFD) requirements. Therefore, the Modified Project would not result in new significant impacts or increase the severity of previously identified significant impacts for this topic area; no additional analysis in the Supplemental EIR is required.
>
> Additionally, PDF-HM-1, set forth in Section 17, Transportation, of this Initial Study, provides additional benefits for the Modified Project. PDF-HM-1 would require the submission of a detailed Construction Traffic Management Plan which would include provisions for adequate emergency access to all residences and businesses during construction activities. PDF-HM-1 is beneficial and is not relied upon to reach the conclusion that no additional analysis in the Supplemental EIR is required.

Further, the Initial Study determined in response to Question 17(d) that the Modified Project would not have the potential to cause new significant impacts related to emergency access:

> ***Less Than Significant Impact/No Changes or New Information Requiring Preparation of an EIR.*** Please refer to Response to Question 9.f, above. As discussed therein, the Modified Project would not result in new significant impacts or increase the severity of previously identified significant impacts with respect to emergency access. No additional analysis in the Supplemental EIR is required.

32 Initial Study, Entrada South and Valencia Commerce Center Project, October 7, 2021, p. 73.

Similarly, the Initial Study in response to Question 20(a) determined that the Modified Project would not have the potential to substantially impair an adopted emergency response plan or emergency evacuation plan:

> ***Less Than Significant Impact/No Changes or New Information Requiring Preparation of an EIR.*** The Modified Project would not increase impacts related to emergency response or evacuation as compared to the 2017 Approved Project. Please refer to Response to Question 9.f, above. As discussed therein, the Modified Project would not result in new significant impacts or increase the severity of previously identified significant impacts with respect to emergency access. No additional analysis in the Supplemental EIR is required.

This Fire Protection Plan further considers whether the Modified Project would expose people, either directly or indirectly, to a significant risk of loss, injury, or death involving fire or wildland fire related to access or evacuation because the Modified Project Site is located within a Very High FHSZ, as mapped by CAL FIRE and the County.

The Modified Project Site would be regionally accessible from I-5 and SR-126. A new network of roads would be implemented that would connect the Project Site to the existing road system. Further, as discussed in Threshold 5.13.2, the Modified Project does not include a substantial change to its access plan and road network and does not increase vehicle trips compared to the 2017 Approved Project. The Modified Project Site access, including road widths and connectivity, would be consistent with the County's roadway standards (Title 21), County Fire requirements, secondary access requirements, with the analysis of the 2017 Approved Project. and the California Fire Code (Section 503). The Modified Project Site's primary routes would be accessed through a series of internal neighborhood roadways that would connect with the primary ingress/egress roads (e.g., Magic Mountain Parkway, Commerce Center Drive, and The Old Road) that intersect off-site primary and major transportation routes. There would be multiple primary ingress/egress routes in each Planning Area, as described below.

Entrada South Primary Ingress/Egress Routes:

- Eastern Primary Route: Magic Mountain Parkway, or The Old Road or I-5 to the north or south.
- Southern Primary Route: Westridge Parkway to Valencia Boulevard then east to The Old Road or I-5.

Valencia Commerce Center Primary Ingress/Egress Routes:

- Southern Primary Route: Commerce Center Drive to SR-126 to the east or west.
- Northern Primary Route: Commerce Center Drive to Hasley Canyon Road to The Old Road or I-5 to the north or south.
- Western Primary Route: Franklin Parkway to Wolcott Way to SR-126 to the east or west.
- Eastern Secondary Routes: Hancock Parkway to Turnberry Lane or Muirfield Lane to The Old Road to the north or south.

In accordance with the County roadway standards, County Fire requirements, and the California Fire Code, interior the Modified Project roads would be constructed to allow for traffic flow through the Modified Project Site and for fire department access serving all proposed residential and commercial structures. Further, in accordance with PDF-2, access roads would be completed and paved prior to the issuance of building permits and prior to beginning any potentially combustible construction activities. A map depicting all proposed new roads would be submitted to the County Fire for review and approval, as well as to assist the County Fire with updating its response maps.

Stantec, the transportation consultant for the Modified Project, determined that the Modified Project is consistent with the EIR for the Santa Clarita Valley Area Plan (One Valley One Vision (OVOV)) which established area-wide circulation and transportation framework and took into account emergency access and evacuation that could occur during wildfires and other emergencies.[33] As describe in Stantec's memo (Appendix G), OVOV provides "[policies to ensure that the circulation system is safe, such as provision of emergency access and maintenance of evacuation routes, [which] are consistent with provisions of the Safety Element."[34] The OVOV EIR determined that the circulation framework, emergency access and evacuation planning for the OVOV area would result in less than significant impacts, as follows:

> [OVOV] policies are designed to maintain adequate emergency access throughout the County's [OVOV] Planning Area. They would promote mobility to allow for acceptable response times by emergency vehicles, and ensure emergency access to various types of properties. Additionally, the County would maintain a current evacuation plan. Since the proposed [OVOV] Area Plan would provide the framework to ensure adequate emergency access, impacts would be less than significant."[35]

Further, the OVOV EIR analyzed the impact of wildland fires on emergency access and evacuation related to buildout of the OVOV area.[36] The OVOV EIR concluded that OVOV's plans and policies would ensure that the buildout of the OVOV area would be consistent with existing and future LA County evacuation plans and procedures, ensuring safe egress and evacuation during emergencies, including emergencies caused by fires or wildfires.[37]

As such, the Modified Project is consistent with the land use plan and buildout contemplated by OVOV. The Modified Project is largely surrounded by existing development, roadways and infrastructure. Emergency access and evacuation associated with the Modified Project would be consistent with the area-wide circulation, access and evacuation framework established by the County's evacuation plans and OVOV, reducing the risk of loss, injury, or death involving fires or wildfires during an evacuation or related to access.

Accordingly, the Modified Project's planned community interior road network and the existing regional road system that it interconnects with would provide multi-directional primary and secondary emergency evacuation routes which would adhere to the County's access requirements detailed in Title 21 Section 24.020. Because the roadways are all designed to meet or exceed County requirements in Title 21 and Title 32 of the County Municipal Code and Section 503 of the CFC regarding unobstructed travel lane widths, shoulders, vehicle turnouts, adequate parking, turning radius, grade maximums, signals at intersections, and roadside fuel modification zones, potential conflicts that could reduce the roadway efficiency are minimized, allowing for smoother evacuations.

Per the Initial Study and the State-certified EIR the Modified Project does not constitute a substantial change that would results in a impact to emergency operations or evacuation; to further ensure the Modified Project would not impair emergency operations or evacuation planning a Wildland Fire Evacuation Plan for the Entrada South and Valencia Commerce Center Project has been prepared based on County Emergency Operations Procedures, which closely follow the County of Los Angeles Operational Area Emergency Operations Plan, including its Evacuation Annex per PDF-6. Thus, with the implementation of Mitigation Measures PH-7, RR-WF-1 through RR-WF-5 and other requirements outlined above, the Modified Project would provide adequate access and PDF-6 would provide additional

33 Stantec, *Los Angeles County and the Santa Clarita Area Plan (One Valley One Vision) Circulation, Evacuation and Emergency Access Summary*, May 2022.
34 *Id.;* OVOV, Circulation Element, p. 72.
35 OVOV Draft EIR, Chapter 3.2, Circulation and Transportation, p. 3.2-66.
36 OVOV Draft EIR, Chapter 3.11, Hazards and Hazardous Materials, pp. 3.11-28 to 3.11-29.
37 *Id*. at 3.11-30.

benefits through the preparation of a Wildland Fire Evacuation Plan. Therefore, the Modified Project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving fires or wildfires due to inadequate access. Further The Modified Project would not result in any new significant impacts related to access compared to the 2017 Approved Project. Therefore, the impact is **less than significant.**

8.1.4.2 Within an Area with Inadequate Water and Pressure to Meet Fire Flow Standards?

The State-certified EIR determined that the fire flow and water supply for the Approved Project was sufficient. The Modified Project is consistent with the 2017 Approved Project's fire flows and waters supply and does not include a substantial change to the water requirements that would result in an increased fire risk. The Modified Project would be required to comply with County Code Title 20, Section 20.16.060 for fire flow and fire hydrant requirements within a Very High FHSZ and with county Title 32 Section 507 for fire flow and hydrant requirements. The minimum fire flow and fire hydrant requirements for the Modified Project would be determined by the fire chief or fire marshal and be based upon 20 p.s.i. residual operating pressure, The minimum fire flow may be adjusted as determined by the Fire Chief or Fire Marshal based on location conditions, congestion, and construction buildings. Building permits for the Modified Project shall be accompanied by evidence of a reliable water supply and include a certificate from County Fire that the Modified Project includes a sufficient water supply for fire protection. The Modified Project would be consistent with the types of water supply such as reservoirs, pressure tanks, elevated tanks, water mains, or other fixed systems capable of providing required fire flow per Title 32 Section 507.2 and any water tanks or associated structures would be installed and maintained in accordance with NFPA 22 and County Fire Requirements.

Within the internal roadways of each Planning Area, additional 12-inch-diameter water supply lines would provide the main water supply to commercial and domestic service to each structure and common landscape areas. These internal waterlines would also supply sufficient fire flows and pressure to meet the demands for required on-site fire hydrants and interior fire sprinkler systems for all structures.

In addition, County Fire helicopters can obtain water for dropping on wildland fires from Castaic Lake, north of the VCC Planning Area, or from numerous ponds that are located throughout the golf course immediately south of the Entrada Planning Area.

The Modified Project would also include fire hydrants located along fire access roadways. The location of hydrants would be determined by the Fire Chief or Fire Marshal and be based on current fire code requirements to meet operational needs. Fire hydrants would be no more than 600 feet apart for single-family residential and no more than 300 feet apart for multi-family residential, commercial, and instructions. All Modified Project fire hydrants will be consistent with applicable County Design Standards and County Fire Code. Prior to the issuance of build permits the location and number of a fire hydrant for the Modified Project would be approved by County Fire.

Additionally, all structures in the Modified Project would include automatic fire sprinklers in accordance with County Fire and the National Fire Protection Association (NFPA) standards for 13, 13R, and 13D automatic sprinklers. Automatic fire sprinklers are crucial in preventing off-site or indirect impacts as ember generated by a structure fire can be blown into native fuels. Automatic sprinklers have been shown to isolate fires to the point of origin, limit fire ability to spread throughout the structure, and even extinguish a fire prior to the arrival of first responders and overall have a high success rate of controlling or suppression of structure fires (NFPA, 2021).

With adherence to the County Code, the Modified Project would meet all water and water pressure requirements to meet fire flow standards. Further, the Modified Project would not result in new or increased impacts related to water supply or pressure compared to the 2017 Approved Project which determined water supply to be sufficient. Therefore, the Modified Project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving fires due to inadequate water and pressure to meet fire flow standards nor would it result in a substantial change as compared to the State-certified EIR determination; as such impacts would be **less than significant.**

8.1.4.3 Within Proximity to Land Uses That Have the Potential for Dangerous Fire Hazards?

As with the 2017 Approved Project the Modified Project Site is located within proximity to open space areas that have the potential to present a dangerous fire hazard. Los Padres National Forest is located north of the Modified Project Site and Angeles National Forest lies north and east of the Modified Project Site. More specifically, the Modified Project Site is located in the Santa Clara River Valley between the Santa Susana Mountains to the south and the Topatopa Mountains to the north. Typically, steep terrain results in faster fire spread up-slope and slower spread down-slope. Terrain that forms a funneling effect, such as chimneys, chutes, or saddles, on the landscape can result in especially intense fire behavior, including faster spread and higher intensity. Conversely, flat terrain tends to have little effect on fire spread, resulting in fires that are driven by vegetation and wind. However, per the State-certified EIR the project design, adherence to regulatory requirements, and incorporation of applicable mitigation measures were determined to reduce the wildfire risk to a less than significant impact.

As demonstrated in the fire behavior modeling results discussed above (in response to Threshold 5.13-2), wildfires may occur in wildland areas that surround the Modified Project Site, but would not be significantly increased in frequency, duration, or size with the development of the Modified Project. The Modified Project would result in the conversion of fuels to maintained development and landscaping, with designated County Fire review of all landscaping, fuel modification areas, and ignition-resistant structures. As such, the Modified Project Site would be largely converted from readily ignitable fuels to ignition-resistant landscaping and structures that, consistent with state and County standards, provide defensible space, access for firefighters and early evacuations, water, and fire flow, and other fire protection features, as described above and throughout the FPP. Additionally, the Modified Project would implement **PDF 1** through **PDF 6,** which as discussed in Threshold 5.13.2, enhance the Modified Project wildfire hazard reduction features and regulatory compliance. Further, the Modified Project is consistent with the analysis and determination of the 2017 Approved Project. Therefore, although the Modified Project Site is located within a Very High FHSZ and is located in proximity to open space areas that have the potential for a dangerous fire hazard, due to the fire safety features that would be implemented as part of the Modified Project, the Modified Project would not result in increased impacts which were already analyzed in the 2017 Approved Project. Therefore as the Modified Project would not directly or indirectly result in exposing people or structures to a significant risk of loss, injury, or death involving fires due to location nor result in a substantial change to the determination established in the State-certified EIR the impacts would be **less than significant.**

As described above, the Modified Project is within a VHFSZ. However, as compared to the 2017 Approved Project, the Modified Project would not result in a significant increase in wildfire risk. The Modified Project provides adequate access to the site, and with adherence to regulatory requirements and enhanced fire protection provided by **PDF-1** through **PDF-6** would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving fires due to inadequate access. The Modified Project would also adhere to all regulatory requirements for fire flow and water supply and would improve result in an improvement of water supply for the area as described above. Further, though the Modified Project is adjacent to open space areas adherence to regulatory requirements, implementation of PDF 1 through PDF 6, and application of the FPP the Modified Project would result in a reduced fire hazard for the area as described above and in Threshold 5.13.2. Therefore, per the analysis above and throughout the wildfire analysis of this document the Modified Project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving fires, because the of where the project is located and the impact is **less than significant.**

8.1.5 Threshold 5.4-8: Does the Proposed Use Constitute a Potentially Dangerous Fire Hazard?

The State-certified EIR analyzed wildfire impacts as part of Section 4.17 Hazards, Hazardous Materials, and Public Safety. The State-certified EIR found that while the Approved Project provided sufficient access, water supply, siting of homes and buildings, and vegetation management, the potential for wildland fire hazards would still exist and require mitigation. However, after regulatory compliance and incorporation of Mitigation Measures PH-14 and PH-7, the 2017 Approved Project would have a less than significant impact. The Modified Project does not include substantial modifications from the Approved Project that would increase fire risk as compared to the analysis for the Approved Project.

The Modified Project is within an SRA VHFHZS as determined by CAL FIRE and the County. As described in Section 2 Study Area Characteristics and Findings the Modified Project is located within a regional area that is prone to wildfires due to climate, topographic conditions, and vegetation. Per Section 2.2.5 Historic Wildland Fires as recently as 2017 fires have occurred within the Modified Project's planning areas. The existing conditions of the Modified Project constitute a fire hazard that could potentially be exacerbated. However, as described in Threshold 5.13.2 the Modified Project includes multiple layered safeguards to reduce the potential for human-caused ignitions below the level of significance and the Modified Project is not substantially different from the 2017 Approved Project which the State-certified EIR determined did not constitute a significant fire hazard. Further, once the Entrada South and VCC Planning Areas are developed, the fire spread patterns on the Modified Project Site would be altered, since the Modified Project would result in substantial fuel breaks, significantly interrupting the continuous fuels across the Modified Project Site. The proposed 100- to 200-foot fuel modification zone widths, described in Section 4 Modeling: Anticipated Fire Behavior for Worst-Case Fire Conditions, would be approximately twice as wide as the longest calculated directly adjacent flame lengths during offshore wind conditions, and approximately six times wider than the calculated flame lengths for a fire during onshore wind conditions. The Modified Project's vegetation management plan not only provides protection to the Modified Project but to the surrounding area per Section 3.2 Defensible Space and Vegetation Management Regulatory Requirements. Additionally, per PDF-2 the vegetation management would be implemented prior to the issuance of the building permit and prior to bringing combustibles on-site, thus providing a benefit to the Modified Project and the area during the construction phase as well. PDF-3 and PDF-4 would also enhance the protection of the FMZs throughout the lifetime of the Modified Project through annual vegetation management maintenance and inspection to ensure the functionality of the FMZs. Thus, projected flame lengths would be reduced to levels that would be manageable by firefighting resources. Additionally, the Modified Project would be required to comply with all provisions in the Los Angeles County Code regulating development in a Very High FHSZ. These include requirements such as ignition-resistant building materials and systems, implementation and ongoing maintenance of fuel modification zones, fire flow and fire hydrant requirements (Title 20, Section 20.16.060), and road width and length restrictions.

In summary, the development of the Modified Project is consistent with the 2017 Approved Project which was determined that have a less than significant impact on wildfire. Any additional impacts associated with the Modified Project with respect to wildfire hazards have been analyzed herein and addressed. Additionally, per the analysis in Threshold 5.13-2 and in Threshold 5.13-4 and in the EIR the Modified Project with adherence to regulatory requirements, enhanced by the implementation of **PDF 1** through **PDF-6,** would not exacerbate wildfire risk nor constitutes a fire hazard. The Modified Project is consistent with the determination of the State-Certified EIR and with the analysis presented in the thresholds above. Per the analysis above, and discussed herein the Modified Project does not constitute a potentially dangerous fire hazard and does not result in a new significant impact compared to the State-certified EIR therefore the impact is **less than significant.**

8.1.6 Threshold XX: Would the Project Result in Substantial Adverse Physical Impacts Associated with the Provision of New or Physically Altered Governmental Facilities, or Result in the Need for New or Physically Altered Governmental Facilities, the Construction of Which Could Cause Significant Environmental Impacts, in Order to Maintain Acceptable Service Ratios, Response Times, or Other Performance Objectives for Fire Protection?

As with the 2017 Approved Project, the Modified Project would not involve the construction of new or physically altered government facilities. However, the need for new or expanded public services (such as fire protection facilities) is typically associated with a population increase. The State-certified EIR determined that the Project would have a less than significant impact with mitigation on adopted emergency response plans or emergency evacuation plans based on the location of fire stations, road improvements, and implementation of Mitigation Measure PH-7. The Modified Project would involve the development of new residential, industrial/commercial, recreational, and open space uses within the Entrada South and VCC Planning Areas however, the development is consistent with the development footprint of the 2017 Approved Project. As with the Approved Project, the development of the Modified Project would result in an increase in population in the area. However, as compared to the Approved Project the Modified Project would result in a decrease in VMT. The following analysis evaluates whether Modified Project development, and the resulting anticipated increase in population, would hinder the ability of County Fire to maintain acceptable service ratios, response times, or other performance objectives.

The Modified Project Site is located within the County Fire jurisdictional response area, within the North Operations Bureau, Division 3. As shown in Table 8 in Section 6 Emergency Response and Service, the closest County Fire stations to the Project Site are Stations 76, 124, 126, 143, 156, and 46 which would provide an initial response in the event of a call for service.[38] Typically the closest engine to an incident would be the initial response unit. However, it is common for multiple engines to respond to emergency calls based on availability and proximity. The closest existing fire stations to the Entrada Planning Area are Station 76 (27223 Henry Mayo Drive), located approximately 3.4 miles away, and Station 126 (26320 Citrus Street), located approximately 3.3 miles away. The

38 Once built, Station 46 in Mission Village will provide initial response to Entrada South; that station will be staffed with a three-person paramedic engine, a four-person quint, and a battalion chief.

closest existing fire stations to the VCC Planning Area are Stations 76 and 143 (28580 Hasley Canyon Road), located approximately 1.7 and 2.7 miles away, respectively.

For purposes of this analysis, Fire Stations 76, 126, and 143 are considered the first response in the event of a call for service to the Project Site. However, since the County Fire employs a regional approach to providing fire protection and emergency medical services, other nearby stations could provide additional support if additional resources were needed. As shown above, the level of service demand for the Modified Project raises overall call volume by a relatively small amount of 2.3 calls per day on a worst-case basis, and the vast majority of these calls are not related to fire hazards Further, it is noted that when Fire Station 46 becomes available, it would respond to an additional 2.3 calls per day, further lowering the demand on the existing fire stations.

The Modified Project would be substantially similar to the 2017 Approved Project with respect to demand for fire protection services. The slight changes in land uses for the Modified Project compared to the 2017 Approved Project would not substantially change the response times by County Fire. Nevertheless, to provide additional information about response times, the FPP considered total response times based on the full buildout of the Modified Project.

Land use in the Santa Clarita Valley varies greatly from urbanized and suburban clusters to vast rural areas. County Fire's response time targets by land-use type are as follows[39]:

- 5 minutes or less for urban areas
- 8 minutes or less for suburban areas
- 12 minutes or less for rural areas

The Modified Project is located in a suburban area. Emergency response time target thresholds include travel time along with dispatch and turnout time, which can add an additional 2 minutes to travel time. As indicated in Table 8, total response time to the Entrada Planning Area from Station 126 to the project boundary would be under 5 minutes. Total response times from Stations 126 to all developed areas within the Entrada Planning Area would be under 8 minutes based on both modeling methodologies, consistent with County Fire's 8-minute or less response time for suburban areas. Total response times from Stations 76 to all developed areas within the Entrada Planning Area would be under 8 minutes based on the posted speed methodology and to 95% of the Entrada Planning area using the 35 mph methodology. Based on these calculations and modeling, the Project's development in the Entrada Planning Area would meet the County's response time standard for suburban areas from existing fire stations.

It is noted that Fire Station 46 would be completed by Newhall Land and be operational prior to the Modified Project contributing to the demand for fire services. However, to be conservative, the analysis assumes that Station 46 will not be operational prior to the operation of Entrada South.

As indicated in Table 8, Station 76 and Station 143 would be capable of responding to the VCC Planning Area project boundary and under 5 minutes. Station 76 would be capable of responding within 5 minutes 30 seconds, and Station 143 would be capable of responding within 7 minutes 14 seconds, to the farthest developed areas of VCC. Based on these response times, existing fires stations would be capable of responding to the VCC Planning Area within the County's 8-minute or less response time standard for suburban areas.

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39 County of Los Angeles 2023-2024 Performance Measures https://ceo.lacounty.gov/wp-content/uploads/2024/01/2023-24-Performance-Measures.pdf; *see also* OVOV, One Valley One Vision Draft Program EIR, p. 3.15-2.

The Modified Project would not result in any additional impacts associated with providing new or physically altered government facilities such as a new fire station. Further, the Modified Project would contribute to the funding of necessary fire apparatus and equipment through payment of the Fire Facility Fee, which funds the purchase of station sites, the construction of new stations and facility improvements, and the funding of capital equipment. Thus, compared to the 2017 Approved Project, the Modified Project would not result in new significant impacts related to the provision of new or physically altered governmental facilities or result in the need for new or physically altered governmental facilities other than those previously analyzed.

8.1.7 Cumulative Impacts

While the State-certified found the Approved Project to have less than significant impacts regarding wildfire it determined that the impacts related to wildland interface fires were cumulatively significant. This was based on the fire history in the region, and the potential for loss of structures, air quality, and traffic impacts to the residents of the project and cumulative projects. However, the State-certified EIR also determined that if the other projects were to implement mitigation measures such as SP-4.18-2 (fire flow capacities), SP-4.18-3 (comply with all applicable building and fire codes and hazard reduction programs), SP-4.18-4 (developer fees or fire station construction), PH-7 (secondary evacuation access) and PH-14 (Wildfire Fuel Modification Plan) then the impact would be mitigatable. However, the mitigation measures listed above are now required by the County Fire Code Title 32. Therefore, all projects that were previously analyzed are now required to include these features as a part of the project design, features which the State-certified EIR would be able to reduce wildfire impacts to less than significant.

The cumulative context considered for Project wildfire impacts is Los Angeles County, and more specifically, the Santa Clara River Valley. As discussed in Section 2, CAL FIRE has mapped areas of fire hazards in the state based on fuels, terrain, weather, and other relevant factors. As described above, the Modified Project Site is located in a Very High FHSZ. The Modified Project, combined with other projects in the region, would increase the population and/or activities and potential ignition sources in the Santa Clara River Valley, which may increase the potential of a wildfire and increase the number of people and structures exposed to the risk of loss, injury, or death from wildfires. Individual projects located within Los Angeles County are required to comply with applicable County fire and building codes, which have been increasingly strengthened as a result of severe wildfires that have occurred in the last two decades. The fire and building codes include fire prevention and protection features that reduce the likelihood of a fire igniting in a specific project and spreading to off-site vegetated areas. These codes also protect projects from wildfires that may occur in the area through the implementation of brush management and fuel management zones, ensuring adequate water supply, preparation of fire protection plans, and other measures.

Suggestions that placing new residential projects in the County's wildland-urban interface will increase the risk of fire ignition are not consistent with available research. According to the available evidence, no large fires in Southern California since 1990 were determined to have been started within a nearby master-planned, ignition-resistant subdivision or neighborhood. Syphard and Keeley (2015) summarized all wildfire ignitions included in the CAL FIRE FRAP database dating back over 100 years. They found that in San Diego County (similar to the Los Angeles County fire environment), equipment-caused fires were by far the most numerous, and these also accounted for most of the area burned; power-line fires were a close second. Ignitions classified as equipment-caused frequently resulted from exhaust or sparks from power saws or other equipment with gas or electric motors, such as lawnmowers, trimmers, or tractors (Syphard and Keeley 2015). These ignition sources are typically associated with lower-density housing, not higher-density housing such as that contemplated by the Modified Project. In addition, electrical transmission lines would be undergrounded in the Project area, mitigating the risk from electrical transmission line vegetation ignitions.

Data indicate that lower-density housing poses a greater ignition risk. In the Southern California study, ignitions were more likely to occur close to roads and structures, and at intermediate structure densities (Syphard and Keeley 2015). This is likely because lower-density housing creates a wildland-urban intermix rather than an interface. The intermix places housing among unmaintained fuels, whereas higher-density housing, such as the Modified Project, converts all fuels within the footprint and provides a wide, managed fuel modification zone separating homes from unmaintained fuel. Syphard and Keeley (2015) determined that "[t]he WUI [wildland-urban interface], where housing density is low to intermediate, is an apparent influence in most ignition maps." This further enforces the notion that lower-density housing is a larger ignition issue than higher-density communities. A different study found that the "development of low-density, exurban housing may also lead to more homes being destroyed by fire" (Syphard et al. 2013). Neither of these studies considered the fire hazard and risk reduction associated with HOA-managed fire modification zones and ignition-resistant structures. In addition, another study found that frequent fires and lower-density housing growth may lead to the expansion of highly flammable exotic grasses that can further increase the probability of ignitions (Keeley et al. 2012). This is not the case with the Project, where the landscapes would be managed and maintained to remove exotic fuels that may become established over time. The Fire Protection Plan plant palette restrictions, combined with HOA maintenance, would minimize the establishment and expansion of exotic plants, including grasses. Based on the research of the relevant literature and extensive conversations with active and retired fire operations and prevention officers, there is no substantial evidence that new residential neighborhoods built to the requirements of Los Angeles County's Fire and Building Codes increase the risk of wildfire ignition. Rather, the data indicate that roadways, electrical distribution lines, and lower-density residential projects (that do not have HOA-enforced restrictions and annual inspections) are the primary causes of increased wildfire ignition. The Modified Project would provide roadside fuel modification throughout the Project Site, and electrical lines would be subterranean.

Furthermore, other cumulatively considerable projects would be required to comply with the County's vegetation clearance requirements, as outlined in the County Municipal Code. The Los Angeles County Fire and Building Codes, along with project-specific needs assessments and fire prevention plan requirements, ensure that every project approved for construction includes adequate emergency access. Roads for all proposed projects are required to meet minimum widths, have an all-weather surface, and be capable of supporting the imposed loads of responding emergency apparatus. Therefore, because all projects are required to comply with these requirements, cumulative impacts related to wildfire hazards and emergency response and access would not result in new significant impacts.

Additionally, cumulative growth through 2030 (i.e., the Project build-out year) within County Fire's service area has the potential to increase the demand for fire protection and emergency medical services. The LACoFD employs a regional approach to providing fire protection and emergency medical services, wherein emergency response units are dispatched as needed to an incident anywhere in the County Fire's service territory based on distance and availability, without regard to jurisdictional or municipal boundaries.

As with the 2017 Approved Project, the Modified Project and all other future development projects in the service area would be subject to discretionary review by the County Fire and would be required to comply with the County Fire Code and other relevant County Code requirements and other applicable local codes (e.g., City of Santa Clarita Fire Code) and regulations related to fire safety, building construction, access, fire flow, and fuel modification. Payment of the Fire Facility Fee, which funds the purchase of station sites, the construction of new stations and facility improvements, and the funding of capital equipment, by the Project Applicant, would mitigate the Modified Project's contribution to cumulative impacts. Similarly, applicants for all future development projects in the area would be expected to pay the appropriate Fire Facility Fee. With the payment of such fees, no new significant cumulative impacts would result from the Modified Project.

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9 Project-Specific Design Features

9.1 Project Design Feature 1: Construction Fire Prevention Plan

Prior to any construction activities, a detailed Construction Fire Prevention Plan (CFPP) shall be implemented for the Project and submitted to the County of Los Angeles for review and approval prior to the issuance of the grading permit. The CFPP shall designate fire safety measures to reduce the possibility of fires during construction activities, including fire watch during hot works and heavy machinery activities (e.g., welding), spark arresters on all equipment, water supply via hose lines attached to hydrants, or a water tender pursuant to County Fire requirements, red flag period restrictions, and mandatory on-site fire resources as detailed in the CFPP in Appendix F. Employees would be presented with basic prevention fire training upon employment and the on-site safety officer and/or supervisor/foreman shall maintain documentation of training. Training shall consist of the Modified Project FPP requirements, review of Occupation Safety and Health Administration (OSHA) Fire Protection and Prevention, proper response and notification of a fire, and the use of fire extinguishing equipment. A site safety officer shall be responsible for the implementation of the CFPP, ensuring fire control equipment are maintained in good working conditions, monitoring combustibles onsite, conducting fire safety surveys, posting fire rules in an area visible to employees, stopping work activities that pose a fire hazard or are not in compliance with the CFPP, and reporting all fire ignited on-site to County Fire. County Fire shall review site fire safety conditions prior to the commencement of construction activities.

9.2 Project Design Feature 1: Pre-Construction Requirements

The applicant shall submit site improvement plans to County Fire prior to the issuance of the building permits. Prior to bringing lumber or combustible materials related to residential and nonresidential building construction onto the Modified Project Site, site improvements within the active development area shall be in place, including utilities, operable fire hydrants, and an approved, temporary roadway surface and fuel modification zones shall be established. Combustible materials may be utilized onsite prior to stated site improvements as needed for providing the improvements (e.g., wood forms for cast-in-place concrete) or for infrastructure constriction prior to utilities being installed (e.g. operable fire hydrants). County Fire shall review site fire safety conditions prior to the commencement of building activities.

9.3 Project Design Feature 3: Annual Fuel Modification Maintenance

All vegetation management with the FMZs and common areas shall be completed annually by May 1 of each year. Vegetation management may be completed more often for fire safety if determined necessary by County Fire. The Modified Project HOA or equivalent entity shall be responsible for the annual maintenance of all vegetation management within the Fuel Modification Zones (FMZs) in the common areas ensuring compliance with LACoFD fuel modification guidelines. Property owners will be responsible for maintaining the Ember Resistant Zone (ERZ) and any fuel modification within their property. The annual maintenance would be managed and maintained by the

Modified Project HOA through a qualified contractor that shall be required to meet fire safety requirements regarding equipment, the timing of maintenance, and fire suppression capabilities. Maintenance activities would include but not be limited to removing dead and dying material, removing undesirable plant species, and conducting thinning activities to maintain adequate spacing requirements. The Modified Project HOA or similar entity shall be responsible for ensuring the long-term funding and ongoing compliance with all provisions of the FPP including, vegetation planting, fuel modification of the perimeter areas, vegetation management on all common areas including roadsides, and open space areas under their control (if not considered Entrada Spineflower Preserve). The Modified Project HOA shall be responsible for the implementation of the annual FMZ maintenance subject to ongoing enforcement by County Fire. The HOA or and County Fire would enforce the vegetation management requirements detailed in the FPP and such requirements would be made a part of deed encumbrances and CC&Rs for each lot, as appropriate. Documentation, as part of the inspection report per PDF-4, on maintenance activities detailing the FMZS, maintenance operation, and consistency with current County brush clearance requirements shall be submitted to County Fire Bush Clearance Program.

9.4 Project Design Feature 4: Annual Fuel Modification Inspection

By June 1 of each year, a third-party inspector shall be hired by the Modified Project HOA or equivalent entity to conduct an annual inspection of the Fuel Modification Zones (FMZs), including the Ember Resistant Zone (ERZ) and FMZs that are within private property. The inspector would evaluate the FMZs for compliance with regulations and that they are operating accordingly. The inspector shall notify the HOA of any non-compliant FMZs, recommend measures for remediation, and a timeframe for reinspection. The Modified Project HOA shall be responsible for the long-term funding of the inspections. The HOA or and County Fire would enforce the vegetation management inspection requirements detailed in the FPP and such requirements would be made a part of deed encumbrances and CC&Rs for each lot, as appropriate. An inspection report shall be submitted to County Fire each year documenting inspection results and compliance with County FMZ requirements.

9.5 Project Design Feature 5: Wildfire Education Program

Within one year of occupancy permits being granted for Entrada South or VCC the Wildfire Education Program shall be established. The Modified Project residents and occupants shall be provided with ongoing education regarding wildfire, the FPP, and the Wildfire Evacuation Plan. The education program would support fire safety, evacuation practices, and fire safety features designed for the community. The Newhall Ranch Wildfire Education Program would provide target outreach to residents and occupants living in a fire risk area and would be a layered approach to maintaining high wildfire risk awareness that includes active and passive features. Contents of the educational program would be reviewed and approved by County Fire before printing and distribution. The Modified Project HOA or similar entity shall be responsible for the ongoing funding and maintenance of the wildfire education program. The HOA or similar entity shall enforce and maintain the education program requirements such requirements would be made a part of CC&Rs for the Modified Project. The educational program shall consist of the following:

1. **Bi-annual email and mailers:** Residents and occupants will be provided with bi-annual emails and mailers in May and in August. Mailers would be sent to each property address and property owners would receive digital copies. Property owners would be highly encouraged to share this information with tenants should they choose

to rent their property. The mailers and emails would include information such as reminders about annual defensible space inspections, maintaining the Ember Resistant Zone (ERZ), how to prepare for wildfire season, evacuation information, and how to prevent wildfires. There would also be links to various resources on where to get trusted information such as County Fire, 211 LA County, and Ready LA County.

2. **Website**: There shall be a dedicated community website with more detailed information and resources about wildfire awareness and prevention. The website would serve as a centralized resource for the fire education program and include information from the FPP. The website will also have fire watch and red flag warning alerts, as well as information on restrictions during fire weather conditions. Residents will also be able to use the website to sign up for an annual residential defensible space inspection from the HOA Fire Committee.
3. **Community workshops and webinars**: Two times a year there shall be either in-person or virtual community workshops. The goal of the workshops would be to cover various fire topics more in-depth. For example, this could include having a County Fire representative come to meet the community, a workshop on how to make a go-bag, a workshop on how to make a residential evacuation plan, or how to maintain the home ignition zone.
4. **New resident packet**: All residents and new residents in the future shall also be presented with a wildfire awareness and safety package upon purchase or rental of a home. This would also be given to businesses as part of their employee training program. Within the package will be a memory stick with the evacuation plan, a list of fire protection features, information on the regional fire hazard, prohibited activities in fire risk areas, how to build a go-bag, and a list of agencies and resources for receiving trusted information.
5. **Emergency alert campaign**: Residents and businesses would be encouraged to sign up for Alert LA County. Alert LA County is the mass notification system for emergency alerts, weather alerts, health notifications, building alerts, and other updates from County, State, and Federal agencies alerts, health notifications. The campaign shall occur annually and encourage residents to sign up for Alert La County. Reminders would also be sent out in the bi-annual mailers and emails, on the community website, in the workshops, and in the new resident package.
6. **Fire watch groups**: Within the community, there shall also be volunteer fire watch groups. These would be residents or businesses who volunteer to participate in a fire watch group for the community. During red flag warning days, this group would be responsible for reminding businesses and residents of fire-safe practices and restrictions. During red flag warning days, the fire watch group would also maintain vigilance of potential fires and would be trained on procedures for alerting County Fire in the event of a fire.
7. **HOA fire safety committee**: The fire safety committee shall be responsible for overseeing the maintenance of community-wide fire protection features. Residents would be able to report fire hazards or hazardous fuel conditions to the HOA committee for remediation. The committee will be responsible for the coordination of the 3rd party Fuel Modification Zone (FMZ) inspections and the volunteer residential defensible space inspections. The committee shall also be responsible for organizing and coordinating an annual education workshop on how to maintain the ERZ. The committee shall also be responsible for the creation and distribution of the educational program for the Modified Project. The committee would serve as a communication link between County Fire and the community.

9.6 Project Design Feature 6: Wildland Fire Evacuation Plan

Prior The Modified Project shall formally adopt, practice, and implement a “Ready!, Set!, Go!” approach to evacuation through the creation of a Wildland Fire Evacuation Plan (WFEP) for the Modified Project. The WFEP would be based on standard evacuation planning used by the Los Angeles County Office of Emergency Services and provide residents and occupants with potential egress route information and procedures. The WFEP would be provided to the Entrada South and VCC residents and commercial tenants and posted on the community website. The WFEP would be reviewed by residents at least annually through organized meetings and educational outreach by the HOA, Community Services District, or other means. Every ten years the WFEP will be reviewed and updated by the HOA or similar entity based on current land use, evacuation polies, and regulations. The WFEP will be available for review and input from County Fire and County sheriff.

10 Conclusion

The State-certified EIR for the 2017 Approved Project found that after regulatory compliance and incorporation of mitigation measures, the 2017 Approved Project's wildfire impacts would be less than significant.[40] The State-certified EIR also determined that the Project would have a less than significant impact on adopted emergency response plans or emergency evacuation plans based on the location of fire stations, a system of improved roads, and fire flows for the 2017 Approved Project.[41] The Modified Project is not anticipated to increase or exacerbate the wildfire risks analyzed in the State-certified EIR. Moreover, the requirements and recommendations set forth in this FPP meet fire safety, building design elements, infrastructure, fuel management/modification, and landscaping recommendations of the applicable codes defined in Section 3 Fire Safety Requirements – Regulatory Requirements and Recommended Design Features and summarized in Tables 10 and 11 below. The recommendations provided in this FPP also have been designed specifically for the proposed construction of structures within a VHFHSZ area. The goal of the fire protection features, both required and those offered above and beyond the Codes, provided for the Modified Project is to provide the structures with the ability to survive a wildland fire with little intervention from firefighting forces. The fire protection system provided for the Project site includes a redundant layering of code-compliant, fire-resistant construction materials, and methods that have been shown through post-fire damage assessments to reduce the risk of structural ignition. When properly implemented on an ongoing basis, the fire protection strategies proposed in this FPP, summarized in Tables 9 and Table 10, should significantly reduce the potential fire threat to the community, its structures, and the surrounding area. Additionally, the Modified Project should assist LACoFD in responding to emergencies through improved fire access, increased water capacity, and enhanced firefighting resources. Given the Modified Project's adherence to code and regulations and the inclusion of project-designed code exceeding features, the Modified Project is not expected to pose or be impacted significantly by wildfire.

Study Limitations

Note fire is a dynamic and somewhat unpredictable occurrence. As such the FPP does not guarantee that a fire will not occur or will not result in injury, loss of life, or loss of property. There are no warranties, expressed or implied, regarding the suitability or effectiveness of the recommendations and requirements in this FPP, under all circumstances. The Modified Project's developers, contractors, engineers, and architects are responsible for the proper implementation of the concepts and requirements set forth in the FPP. It will be extremely important for all homeowners, property managers, and occupants to comply with the recommendations and requirements described and required by the FPP on their property. Homeowners and property managers are also responsible for maintaining their structures and lots, including fuel modification and landscape, as required by this FPP, County Fire, and as required by the County Fire Code. It is recommended that the homeowners or other occupants who may reside within the Modified Project adopt a conservative approach to fire safety. The approach must include maintaining the landscape and structural components according to the appropriate standards and embracing a "Ready, Set, Go" stance on evacuation. The HOA or similar entity would be responsible for ongoing education and maintenance of the common areas, and County Fire would enforce the vegetation management requirements detailed in this FPP. Such requirements would be made a part of deed encumbrances and CC&Rs for each lot, as appropriate. Alternative methods of compliance with this FPP can be submitted to the fire authority for consideration.

40 See Final State-certified EIR, p. 4.17-60 – 4.17-61.
41 See Final State-certified EIR, p. 4.17-60.

Table 9. Primary Code Required Fire Safety Features

Feature No.	Description
1	**Proximity to Fire Stations.** The Modified Project is within County Fire's response time goals for initial response. The overall call volume has a less than significant impact on the existing response capacity. Response capacity would be further enhanced by a Fire Station in the Mission Village community that will provide a fast response throughout the Modified Project Area and Los Angeles County Fire includes several fire stations that are within a reasonable response timeframe. *(Section 6 Emergency Response and Service)*
2	**Ignition Resistant Construction.** All structures within the Modified Project are will be constructed of ignition-resistant construction materials consistent with wildfire protection building construction requirements contained in the Los Angeles Building Code including Los Angles Building Code Title 26 Chapter 7A, Los Angeles County Residential Code Section R327, and Los Angeles County Reference Standards Code Chapter 12-7A. These requirements include ignition resistance construction and are a key component in preventing structural ignition *(Section 3.5 Structural Ignition Resistance Regulatory Requirements).*
3	**Automatic Interior Fire Sprinklers.** Per County Fire Code all structures of any occupancy type within the Modified Project will be equipped with an NFPA 13, 13R, and 13D automatic sprinkler system. Automatic sprinklers prevent ember generation by structure fires, isolate fires to the point of origin, and limit fires from spreading within the building. *(Section 3.6.3 Automatic Fire Sprinkler System)*
4	**Fuel Modification Zones.** Per State Fire Code Section 4906 defensible space shall be maintained around all within and structures in all unincorporated land designated as SRA. Consistent with PRC 4290, SRA Fire Safe Regulations, California Code of Regulation Title 14 Division 1.4 Chapter 7 Subchapter 2 Section 1270, and Los Angeles County Fire Code Title 32 Section 4908.1 the Modified Project will provide 100- to 200- horizontal feet wide FMZs, depending on County Fire direction and geographic constraints feet from the exterior of structures toward the undeveloped wildland areas. The FMZs reduce fire intensity and flame lengths from fires in wildland areas advancing towards structures or vice versa. *(Section 3.2 Defensible space and Vegetation Management Regulatory Requirements)*
5	**Roadside Fuel Modification Zones.** The internal roadways will be maintained with a minimum of 20 feet total width of vegetation clearance that is clear to the sky to allow for fire apparatus access and prevent vehicle-based ignitions. All flammable vegetation or other combustible growth shall be removed on each side of the roadway for a minimum of 10 feet per County Fire Code Title 32 Section 325.10. *(Section 3.3.1 Roadway Fuel Modification Zones)*
6	**Fire Apparatus Access.** All Modified Project access will be consistent with County Roadway Standards defined in Title 21 and the 2020 CFC Section 503. Typical interior roads will have a minimum width of 24 feet width of unobstructed access. Private or public streets that provide fire apparatus access to buildings three stories or more in height shall be improved to 30 feet unobstructed width. All interior residential streets will be designed to accommodate a minimum of 75,000-lb. fire apparatus load. Fire apparatus access roads shall not exceed 15 percent in grades. Dead-end roads and cul-de-sacs will comply with Title 21 to ensure fire apparatus access. *(Section 3.4 Fire Apparatus Access Regulations)*
7	**Water Availability.** Water capacity and delivery will provide for a reliable water source for operations and during emergencies requiring extended fire flow. Water supply will be consistent with County Title 20, Section 20.16.060 for fire flow and fire hydrant requirements within a VHFHSZ. *(Section 3.6.1 Water Supply and Section 3.6.1 Hydrants)*

Table 9. Primary Code Required Fire Safety Features

Feature No.	Description
8	Ember Resistant Zone Although not currently required by law, the Modified Project will also include an Ember Resistant Zone (ERZ) within Zone A, consistent with PRC 4291 to include more intense fuels reduction within the immediate vicinity of structures.[42] The ERZ is from the 5 feet of a structure and includes the area under and around all attached decks. The ERZ forces on preventing structure ignition via ember showers by reducing/eliminating all combustible within this zone. *(Section 3.2 Defensible space and Vegetation Management Regulatory Requirements)*

Table 10. Fire Safety Project Design Features

Feature No.	Description	Implementation Timing	Responsible Party for Implementing	Responsible Party for Monitoring
1	Construction Fire Protection Plan. Prior to any construction activities, a detailed Construction Fire Prevention Plan (CFPP) shall be implemented for the Project and submitted to the County of Los Angeles for review and approval. The CFPP shall designate fire safety measures to reduce the possibility of fires during construction activities, including fire watch during hot works and heavy machinery activities (e.g., welding), spark arresters on all equipment, water supply via hose lines attached to hydrants, or a water tender pursuant to County Fire requirements, red flag period restrictions, and mandatory on-site fire resources as detailed in the CFPP in Appendix XX. Employees would be presented with basic prevention fire training upon employment and the on-site safety officer and/or supervisor/foreman shall maintain documentation of training. Training shall consist of the Modified Project FPP requirements, review of Occupation Safety and Health Administration (OSHA) Fire Protection and Prevention, proper response and notification of a fire, and the use of fire extinguishing equipment. A site safety office	Prior to and during construction	Applicant Contractor	County Fire

[42] Assembly Bill 3074, passed into law in 2020, which requires a third zone for defensible space and amends PRC 4291. The amendment requires the Board of Forestry and Fire Protection to develop the regulation for the new ember-resistant zone (ERZ) within 0 to 5 feet of a structure by January 1, 2023. CAL FIRE currently recommends the implementation of an ERZ. In anticipation of the ERZ requirements becoming codified in PRC 4291, the ERZ has been included in the defensible space requirements for the Modified Project. The above listed requirements are based on the current recommendations for creating an ERZ detailed on CAL FIRE Defensible Space website (https://www.fire.ca.gov/programs/communications/defensible-space-prc-4291/). These requirements will be reviewed and updated once the Board of Forestry and Fire Protection updates the regulations for the ERZ in PRC 4291.FIRE Defensible Space website (https://www.fire.ca.gov/programs/communications/defensible-space-prc-4291/). These requirements will be reviewed and updated once the Board of Forestry and Fire Protection updates the regulations for the ERZ in PRC 4291.

Table 10. Fire Safety Project Design Features

Feature No.	Description	Implementation Timing	Responsible Party for Implementing	Responsible Party for Monitoring
	shall be responsible for the implementation of the CFPP, ensuring fire control equipment is maintained in good working conditions, monitoring combustibles onsite, conducting fire safety surveys, posting fire rules in an area visible to employees, stopping work activities that pose a fire hazard or are not in compliance with the CFPP, and reporting all fire ignited on-site to County Fire. (*Section9: Project-Specific Recommend Mitigation Measures)*			
2	**Pre-Construction Requirement.** Prior to bringing lumber or combustible materials related to building construction onto the Modified Project Site, site improvements within the active development area shall be in place, including utilities, operable fire hydrants, and an approved, temporary roadway surface and fuel modification zones shall be established. Combustible materials may be utilized onsite prior to stated site improvements as needed for providing the improvements (e.g., wood forms for cast-in-place concrete). County Fire will approve site improvement prior to the issuance of the building permits. (*Section9: Project-Specific Recommend Mitigation Measures)*	Prior to issuance of a building permit	Applicant Contractor	County Fire
3	**Annual Fuel Modification Maintenance.** All vegetation management with the FMZs and common areas shall be completed annually by May 1 of each year. Vegetation management may be completed more often for fire safety if determined necessary by County Fire. The Modified Project HOA or equivalent entity shall be responsible for the annual maintenance of all vegetation management within the Fuel Modification Zones (FMZs) in the common areas ensuring compliance with County fuel modification guidelines. Property owners will be responsible for maintaining the Ember Resistant Zone (ERZ) and any fuel modification within their property. The annual maintenance would be managed and maintained by the Modified Project HOA through a qualified contractor that shall be required to meet fire safety requirements regarding equipment, the timing of	During Operation, Annually by May 1st	HOA	County Fire

Table 10. Fire Safety Project Design Features

Feature No.	Description	Implementation Timing	Responsible Party for Implementing	Responsible Party for Monitoring
	maintenance, and fire suppression capabilities. Maintenance activities would include but not be limited to removing dead and dying material, removing undesirable plant species, and conducting thinning activities to maintain adequate spacing requirements. The Modified Project HOA or similar entity shall be responsible for ensuring the long-term funding and ongoing compliance with all provisions of the FPP including, vegetation planting, fuel modification of the perimeter areas, vegetation management on all common areas including roadsides, and open space areas under their control (if not considered Entrada Spineflower Preserve). The Modified Project HOA shall be responsible for the implementation of the mitigation measure and County Fire shall be responsible for FMZ maintenance meets County requirements. (*Section9: Project-Specific Recommend Mitigation Measures)*			
4	Fuel Modification Zone 3rd Party Inspections. By June 1 of each year, a third-party inspector shall be hired by the Modified Project HOA or equivalent entity to conduct an annual inspection of the Fuel Modification Zones (FMZs), including the Ember Resistant Zone (ERZ) and FMZs that are within private property. The inspector would evaluate the FMZs for compliance with regulations and that they are operating accordingly. The inspector shall notify the HOA of any non-compliant FMZs, recommend measures for remediation, and a timeframe for reinspection. The Modified Project HOA shall be responsible for the long-term funding of the inspections. An inspection report shall be submitted to County Fire each year documenting inspection results to ensure compliance with County FMZ requirements. (*Section9: Project-Specific Recommend Mitigation Measures)*	During Operation, Annually by June 1st	HOA	County Fire
5	HOA Wildfire Education Program. The Modified Project residents and occupants shall be provided with ongoing education regarding wildfire, the FPP, and the Wildfire Evacuation Plan. The education program		HOA	County Fire

Table 10. Fire Safety Project Design Features

Feature No.	Description	Implementation Timing	Responsible Party for Implementing	Responsible Party for Monitoring
	would support fire safety, evacuation practices, and fire safety features designed for the community. The Newhall Ranch Wildfire Education Program would provide target outreach to residents and occupants living in a fire risk area and would be a layered approach to maintaining high wildfire risk awareness that includes active and passive features. Contents of the educational program would be reviewed and approved by County Fire before printing and distribution. The Modified Project HOA or similar entity shall be responsible for the ongoing funding and maintenance of the wildfire education program. The educational program shall consist of the following: 1. **Bi-annual email and mailers:** Residents and occupants will be provided with bi-annual emails and mailers in May and in August. Mailers would be sent to each property address and property owners would receive digital copies. Property owners would be highly encouraged to share this information with tenants should they choose to rent their property. The mailers and emails would include information such as reminders about annual defensible space inspections, maintaining the Ember Resistant Zone (ERZ), how to prepare for wildfire season, evacuation information, and how to prevent wildfires. There would also be links to various resources on where to get trusted information such as County Fire, 211 LA County, and Ready LA County. 2. **Website:** There shall be a dedicated community website with more detailed information and resources about wildfire awareness and prevention. The website would serve as a centralized resource for the fire education program and include information from the FPP. The website will also have fire watch and red flag warning alerts, as well as information on restrictions during fire weather conditions. Residents will also be able to use the website to sign up for			

Table 10. Fire Safety Project Design Features

Feature No.	Description	Implementation Timing	Responsible Party for Implementing	Responsible Party for Monitoring
	an annual residential defensible space inspection from the HOA Fire Committee. 3. **Community workshops and webinars**: Two times a year there shall be either in-person or virtual community workshops. The goal of the workshops would be to cover various fire topics more in-depth. For example, this could include having a County Fire representative come to meet the community, a workshop on how to make a go-bag, a workshop on how to make a residential evacuation plan, or how to maintain the home ignition zone. 4. **New resident packet:** All residents and new residents in the future shall also be presented with a wildfire awareness and safety package upon purchase or rental of a home. This would also be given to businesses as part of their employee training program. Within the package will be a memory stick with the evacuation plan, a list of fire protection features, information on the regional fire hazard, prohibited activities in fire risk areas, how to build a go-bag, and a list of agencies and resources for receiving trusted information. 5. **Emergency alert campaign**: Residents and businesses would be encouraged to sign up for Alert LA County. Alert LA County is the mass notification system for emergency alerts, weather alerts, health notifications, building alerts, and other updates from County, State, and Federal agencies. The campaign shall occur annually and encourage residents to sign up for Alert La County. Reminders would also be sent out in the bi-annual mailers and emails, on the community website, in the workshops, and in the new resident package. 6. **Fire watch groups:** Within the community, there shall also be volunteer fire watch groups. These would be residents or businesses who volunteer to participate in a fire watch group for the community. During red			

Table 10. Fire Safety Project Design Features

Feature No.	Description	Implementation Timing	Responsible Party for Implementing	Responsible Party for Monitoring
	flag warning days, this group would be responsible for reminding businesses and residents of fire-safe practices and restrictions. During red flag warning days, the fire watch group would also maintain vigilance of potential fires and would be trained on procedures for alerting County Fire in the event of a fire. 7. HOA fire safety committee: The fire safety committee shall be responsible for overseeing the maintenance of community-wide fire protection features. Residents would be able to report fire hazards or hazardous fuel conditions to the HOA committee for remediation. The committee will be responsible for the coordination of the 3rd party Fuel Modification Zone (FMZ) inspections and the volunteer residential defensible space inspections. The committee shall also be responsible for organizing and coordinating an annual education workshop on how to maintain the ERZ. The committee shall also be responsible for the creation and distribution of the educational program for the Modified Project. The committee would serve as a communication link between County Fire and the community. (*Section 7 Wildland Fire Evacuation and Education Program)*			
6	Community Evacuation Plan. The Modified Project shall formally adopt, practice, and implement a "Ready!, Set!, Go!" approach to evacuation through the creation of a Wildland Fire Evacuation Plan (WFEP) for the Modified Project. The WFEP would be based on standard evacuation planning used by the Los Angeles County Office of Emergency Services and provide residents and occupants with potential egress route information and procedures. The WFEP would be provided to the Entrada South and VCC residents and commercial tenants and posted on the community website. The	During Operation	HOA	County Fire and County Sheriff

Table 10. Fire Safety Project Design Features

Feature No.	Description	Implementation Timing	Responsible Party for Implementing	Responsible Party for Monitoring
	WFEP would be reviewed by residents at least annually through organized meetings and educational outreach by the HOA, Community Services District, or other means. The WFEP will be included in the CC&Rs for all property owners. (*Section9: Project-Specific Recommend Mitigation Measures)*			

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12 References Cited (Including References Cited in Appendices)

Alexander, M.E. 1998. *Crown Fire Thresholds in Exotic Pine Plantations of Australasia*. Australian National University, Canberra, Australian Capital Territory. Ph.D. Thesis. 228p.

Anderson, Hal E. 1982. *Aids to Determining Fuel Models for Estimating Fire Behavior*. USDA Forest Service Gen. Tech. Report INT-122. Intermountain Forest and Range Experiment St.

Andrews, P.L. 1980. "Testing the Fire Behavior Model." In *Proceedings 6th Conference on Fire and Forest Meteorology*. May 22–24, 1980. Seattle, Washington: Society of American Foresters. Pp. 70–77.

Andrews, Patricia L., Collin D. Bevins, and Robert C. Seli. 2008. *BehavePlus Fire Modeling System, Version 4.0: User's Guide*. Gen. Tech. Rep. RMRS-GTR-106WWW Revised. Ogden, Utah: Department of Agriculture, Forest Service, Rocky Mountain Research Station. 132p.

Andrews, Patricia L., and Richard C. Rothermel. 1982. *Charts for Interpreting Wildland Fire*. Behavior Characteristics. USDA Forest Service Gen. Tech. Report INT-131. Intermountain Forest and Range Experiment Station, Ogden, UT. September 1982. 21 p.

Audencial, K. 2016, May 26. 4S Ranch brush fire sparked by welders. *Fox 5 News*. https://fox5sandiego.com/instagram/crews-battle-brush-fire-in-4s-ranch/

Bagwell, L. 2020b. "Los Angeles County Fire Department Response Time Standards." Personal communication (phone conversation) with L. Bagwell (Planning Division) and Dudek. January 28, 2020.

Baltar, M., J.E. Keeley, and F. P. Schoenberg. 2014. County-level Analysis of the Impact of Temperature and Population Increases on California Wildfire Data. *Environmetrics* 25; 397-405.

Barrett, Kimiko. 2019. "Reducing Wildfire Risk in the Wildland-Urban Interface: Policy, Trends, and Solutions." 55 IDAHO L. REV. 3, pp. 21-22. https://headwaterseconomics.org/wp-content/uploads/Barrett-2019-Idaho-Law-Review.pdf.

Baylis P. W., & Boomhower, J. 2021. "Mandated vs. Voluntary Adaptation to Natural Disasters: The Case of U.S. Wildfires." National Bureau of Economic Research Working Paper. http://www.nber.org/papers/w29621.

Brown, J.K. 1972. *Field Test of a Rate-of-Fire-Spread Model in Slash Fuels*. USDA Forest Service Res. Pap. Int-116. 24 p.

Brown, J.K. 1982. *Fuel and Fire Behavior Prediction in Big Sagebrush*. USDA Forest Service Res. Pap. INT-290. 10p.

Bushey, C.L. 1985. "Comparison of Observed and Predicted Fire Behavior in the Sagebrush/ Bunchgrass Vegetation-Type." In J.N. Long (ed.), *Fire Management: The Challenge of Protection and Use: Proceedings of a Symposium*. Society of American Foresters. Logan, UT. May 17–19, 1985. Pp. 187–201.

California Air Resource Board (CARB). 2020a. Public Comment Draft Greenhouse Gas Emissions of Contemporary Wildfire, Prescribed Fire, and Forest Management Activities. https://ww3.arb.ca.gov/cc/inventory/pubs/ca_ghg_wildfire_forestmanagement.pdf

CARB. 2020b. Wildfire Emission Estimates for 2020. https://ww2.arb.ca.gov/sites/default/files/2021-07/Wildfire%20Emission%20Estimates%20for%202020%20_Final.pdf

California Building Standards Commission. 2019. *California Building Standards Code* (California Code of Regulations, Title 24). Published July 1, 2019; effective January 1, 2019. http://www.bsc.ca.gov/Codes.aspx.

California Geologic Survey. 2020. Landslides Inventory Map. https://maps.conservation.ca.gov/cgs/lsi/app/

CAL FIRE. 2019. Strategic Plan 2019. California Department of Forestry and Fire Protection. https://www.fire.ca.gov/media/5504/strategicplan2019-final.pdf

CAL FIRE. 2021. Fuel Reduction Projects (Draft). Map Viewer. https://www.fire.ca.gov/fuels-reduction/

CAL FIRE; & Thornton, M. V. 1995. *History of CAL FIRE*. CAL FIRE.

Cochrane, M. A., Moran, C. J., Wimberly, M. C., Baer, A. D., Finney B, M. A., Beckendorf, K. L., Eidenshink, J., & Zhu, Z. 2012. Estimation of wildfire size and risk changes due to fuels treatments. *International Journal of Wildland Fire*, *21*, 357–367. https://doi.org/10.1071/WF11079

County of Los Angeles Fire Department (County Fire). 2020. Los Angeles County Fuel Modification Guidelines. https://fire.lacounty.gov/wp-content/uploads/2020/05/Plant-Selection-Guidelines.pdf

County Fire. 2021. Los Angeles County Fuel Modification Guidelines https://fire.lacounty.gov/wp-content/uploads/2022/02/Plant-Selection-Guidelines_10.2021.pdf

County of Los Angeles. 2012. Los Angeles County Operational Area Emergency Response Plan. https://ceo.lacounty.gov/wp-content/uploads/2019/12/OAERP-Approved-Adopted-Version-6-19-2012.pdf

County of Los Angeles. 2019. After Action Review of the Woolsey Fire Incident. http://file.lacounty.gov/SDSInter/bos/supdocs/144968.pdf

County of Los Angeles. 2020a. Liquefaction Zones Map. https://egis-lacounty.hub.arcgis.com/datasets/lacounty::liquefaction-zones/about

County of Los Angeles. 2021. Landslide Zones Map. https://egis-lacounty.hub.arcgis.com/datasets/landslide-zones/explore?location=34.432833%2C-118.606857%2C14.00

County of Los Angeles. 2024. 2023-2024 Performance Measures. Fire Departmental Performance Measures, pg. 93 (17.1). Accessed October 2024. https://ceo.lacounty.gov/wp-content/uploads/2024/01/2023-24-Performance-Measures.pdf

CPUC (California Public Utilities Commission). 2015a. General Order 95 – Rules for Overhead Electric Line Construction. http://www.cpuc.ca.gov/gos/GO95/go_95_startup_page.html.

CPUC. 2015b. General Order 165 – Inspection Requirements for Electric Distribution and Transmission Facilities. https://www.cpuc.ca.gov/gos/GO165/GO_165_startup.html

Dudek. 2010. Newhall Ranch Resource Management and Development Plan. Prepared for the Newhall Land and Farming Company. Valencia, California: Dudek. December 2010.

Dudek. 2012. 2012 Botanical Survey Results for the Entrada South Site, Los Angeles, California. Prepared for The Newhall Land and Farming Company. Valencia, California: Dudek. December 2012.

Dudek. 2014. Fire Management Plan for the Newhall Ranch Spineflower Preserves. Prepared for the Newhall Land and Farming Company. Valencia, California. October 2014.

Dudek. 2015. Biological Technical Report for the Entrada South Site, Los Angeles County, California. 809 pp.

Dudek. 2016. Biological Technical Report for the Valencia Commerce Center Project Site, Los Angeles County, California. 809 pp.

Dudek. 2019a. Draft Entrada South Project Supplemental Biological Resources Technical Report. Prepared for The Newhall Land and Farming Company. December 2019.

Dudek. 2019b. 2019 Sensitive Plant Survey Results for the Valencia Commerce Center Project Site, Los Angeles County, California. Prepared for FivePoint. December 2019.

Dudek. 2023. Entrada South and Valencia Commerce Center Wildfire Evacuation Plan. Prepared for the Newhall Land and Farming Company. March 2023.

Elia, M., Giannico, V., Lafortezza, R., & Sanesi, G. 2019. Modeling fire ignition patterns in Mediterranean urban interfaces. *Stochastic Environmental Research and Risk Assessment*, *33*(1), 169–181. https://doi.org/10.1007/s00477-018-1558-5

Ewing, R., and K. Maier. 2016. “Fire-Resilient Community Design: A New Planning Subfield?” American Planning Association, Planning Magazine. https://www.planning.org/planning/2016/nov/research/

FEMA. (n.d.). *Fuel Modification Protects Master-Planned Community*.

FireFamily Plus 2019. http://www.firelab.org/project/firefamilyplus.

Fox, D. M., Carrega, P., Ren, Y., Caillouet, P., Bouillon, C., & Robert, S. 2018. How wildfire risk is related to urban planning and Fire Weather Index in SE France (1990–2013). *Science of the Total Environment*, *621*, 120–129. https://doi.org/10.1016/j.scitotenv.2017.11.174

FRAP (Fire and Resource Assessment Program).2025. Fire Hazard Severity Zones in SRA. Adopted by California Department of Forestry and Fire Protection on November 7, 2007. Accessed November 2019. https://frap.fire.ca.gov

Gafni, M. 2021. An 800-mile firebreak once traversed California. What happened? *San Francisco Chronicle*.

Gorte, R. W. 2011. Wildfire protection in the Wildland-Urban interface. In *Wildfires and Wildfire Management*.

Grabner, K., J. Dwyer, and B. Cutter. 1994. Validation of Behave Fire Behavior Predictions in Oak Savannas Using Five Fuel Models. Proceedings from 11th Central Hardwood Forest Conference. 14 p.

Grabner, K.W. 1996. Validation of BEHAVE Fire Behavior Predictions in Established Oak Savannas. M.S. thesis. University of Missouri, Columbia.

Grabner, K.W., J.P. Dwyer, and B.E. Cutter. 2001. Fuel Model Selection for BEHAVE in Midwestern Oak Savannas. *Northern Journal of Applied Forestry*. 18: 74–80.

Grijalva, R. 2025. “Review of the Fire Protection Plan and Community Fire Evacuation Plan for the Proposed Entrada South and Valencia Commerce Center Modified Project.”

Heinsch, Faith Ann; Andrews, Patricia L. 2010. BehavePlus fire modeling system, version 5.0: Design and Features. General Technical Report RMRS-GTR-249. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 111 p.

Institute for Business and Home Safety (IBHS). 2008. “Mega Fires: The Case for Mitigation.” Pp. 14-15, 19. https://ibhs.org/wildfire/post-wildfire-investigations/.

Institute for Business & Home Safety (IBHS). 2021. “Suburban Wildfire Adaptation Roadmaps: A Path to Coexisting with Wildfires.” Pp. 25, 34. https://ibhs.org/wp-content/uploads/member_docs/ibhs-suburban-wildfire-adaptation-roadmaps.pdf.

Keeley, J.E., and P.H. Zedler. 2009. “Large, High-Intensity Fire Events in Southern California Shrublands: Debunking the Fine-Grain Age Patch Model.” *Ecological Applications* 19:69–94.

Keeley, J. E., & Syphard, A. D. 2016. Climate Change and Future Fire Regimes: Examples from California. *Geosciences*, *6*(37), 1–14. https://doi.org/10.3390/geosciences6030037

Keeley, J. E., & Syphard, A. D. 2018. Historical patterns of wildfire ignition sources in California ecosystems. *International Journal of Wildland Fire*, *27*(12), 781–799. https://doi.org/10.1071/WF18026

Knapp, E. E., Valachovic, Y. S., Quarles, S. L., & Johnson, N. G. (2021). Housing arrangement and vegetation factors associated with single-family home survival in the 2018 Camp Fire, California. *Fire Ecology*, *17*(25). https://doi.org/10.1186/s42408-021-00117-0

Kolden, C. A., & Henson, C. 2019. A socio-ecological approach to mitigating wildfire vulnerability in the wildland urban interface: a case study from the 2017 Thomas fire. *Fire*, *2*(1), 1–19. https://doi.org/10.3390/fire2010009

Lamas, E. 2021. “Los Angeles County Fire Department Apparatus Analysis Year 2020.” Personal communication (e-mail) with E. Lamas (Planning Division) and Dudek. January 07, 2021.

Lawson, B.D. 1972. *Fire Spread in Lodgepole Pine Stands. Missoula, Montana: University of Montana, Master's Thesis*. 110 p.

Linn, R. 2003. *Using Computer Simulations to Study Complex Fire Behavior*. Los Alamos National Laboratory, MS D401. Los Alamos, New Mexico.

Los Angeles County Fire Department (LACoFD). 1998. Fuel Modification Plan Guidelines. Appendix I, Undesirable Plant List, and Appendix II, Undesirable Plant List.

Los Angeles Times. 2019. "Tick Fire Near Santa Clarita is fueled by intense winds, heat that will worsen tonight." https://www.latimes.com/california/story/2019-10-24/tick-fire-near-santa-clarita-is-fueled-by-intense-winds-heat-that-will-worsen-tonight#:~:text=The%20Tick%20fire%20that%20was%20burning%20out%20of,and%20there%20was%20no%20immediate%20relief%20in%20sight.

Los Angeles County Fire Department. 2021. Annual Report. 24 pp. LACoFD-2020-Annual-Report_072822_ Final_Sm.pdf (lacounty.gov)

Los Angeles County Fire Department. 2022. Los Angeles County Fire Department 2022 Strategic Fire Plan. 47 pp. https://osfm.fire.ca.gov/media/ugwfw535/2022-los-angeles-county-unit-fire-plan.pdf

Manzello, S. L., Suzuki, S., & Hayashi, Y. (2011). NIST Special publication 1126: Summary of Full-scale Experiments to Determine Vulnerabilities of Building Components to Ignition by Firebrand Showers. In *NIST Special Publication*. https://doi.org/10.6028/NIST.SP.1126

Marsden-Smedley, J.B., and W.R. Catchpole. 1995. Fire Behaviour Modelling in Tasmanian Buttongrass Moorlands. II. Fire Behaviour. *International Journal of Wildland Fire*. Volume 5(4), pp. 215–228.

McAlpine, R.S., and G. Xanthopoulos. 1989. *Predicted vs. Observed Fire Spread Rates in Ponderosa Pine Fuel Beds: A Test of American and Canadian Systems*. In Proceedings 10th Conference on Fire and Forest Meteorology, May 17–21, 1989. Ottawa, Ontario. Pp. 287–294.

Mensing, S.A., J. Michaelsen, and R. Byrne. 1999. "A 560-Year Record of Santa Ana Fires Reconstructed from Charcoal Deposited in the Santa Barbara Basin, California." *Quaternary Research* 51:295–305.

Mockrin, M. H., Fishler, H. K., & Stewart, S. I. 2020. After the fire: Perceptions of land use planning to reduce wildfire risk in eight communities across the United States. *International Journal of Disaster Risk Reduction*, *45*(January), 101444. https://doi.org/10.1016/j.ijdrr.2019.101444

Moritz, M., & V. Bustic. 2020. Building to Coexist with Fire; Community Risk Reduction Measures for New Development in California. University of California Agricultural and Natural Resources. https://escholarship.org/uc/item/6n12m6pn.

Mutch, R.W., Rogers, M.J., Stephens, S.L, and Gill, A.M. 2011. Protecting Lives and Property in the Wildland Urban Interface: Communities in Montana and Southern California Adopt Australian Paradigm. *Fire Technology. 47*, 357-377. https://doi.org/10.0007/s10694-010-0171-z

Murphy, D. E. 2003 *In California's Inferno, an oasis of Fire Safety Planning Stands out*. The New York Times. https://www.nytimes.com/2003/11/02/us/in-california-s-inferno-an-oasis-of-fire-safety-planning-stands-out.html

National Fire Protection Association (NFPA). 2021. U.S. Experience with Sprinklers, *NFPA Research*, 1-18. https://www.nfpa.org//-/media/Files/News-and-Research/Fire-statistics-and-reports/Suppression/ossprinklers.pdf

Newman, S. M., Carroll, M. S., Jakes, P. J., & Paveglio, T. B. 2013. Land development patterns and adaptive capacity for wildfire: Three examples from Florida. *Journal of Forestry*, *111*(3), 167–174. https://doi.org/10.5849/jof.12-066

Nichols, K., F.P. Schoenberg, J. Keeley, and D. Diez. 2011. "The Application of Prototype Point Processes for the Summary and Description of California Wildfires." *Journal of Time Series Analysis* 32(4): 420–429.

Orange County Fire Authority. 2008. *After Action Report Freeway Complex Fire*.

Price, O. F., Whittaker, J., Gibbons, P., & Bradstock, R. 2021. Comprehensive examination of the determinants of damage to houses in two wildfires in eastern Australia in 2013. *Fire*, *4*(3), 1–18. https://doi.org/10.3390/fire4030044

Quarles, S.L., & K. Pohl. 2019. "Building a Wildfire Resistant Home: Codes and Costs," (Nov. 2019), available at: https://headwaterseconomics.org/wildfire/homes-risk/building-costs-codes.

Rothermel, R.C. 1983. How to predict the spread and intensity of forest and range fires. GTR INT-143. Ogden, Utah: USDA Forest Service Intermountain Research Station.161.

Rothermel, R.C., and G.C. Rinehart. 1983. Field Procedures for Verification and Adjustment of Fire Behavior Predictions. Res. Pap. INT-142. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 25 p.

Safford, H. D., Schmidt, D. A., & Carlson, C. H. 2009. Effects of fuel treatments on fire severity in an area of the wildland-urban interface, Angora Fire, Lake Tahoe Basin, California. *Forest Ecology and Management*, *258*, 773–787. https://doi.org/10.1016/j.foreco.2009.05.024

Scott, Joe H., and Robert E. Burgan. 2005. *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model*. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, Colorado: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

Scott, J. H., Thompson, M. P., & Gilbertson-Day, J. W. 2016. Examining alternative fuel management strategies and the relative contribution of National Forest System land to wildfire risk to adjacent homes - A pilot assessment on the Sierra National Forest, California, USA. *Forest Ecology and Management*, *362*, 29–37. https://doi.org/10.1016/j.foreco.2015.11.038

Schwartz, M. W., & Syphard, A. D. 2021. Fitting the solutions to the problems in managing extreme wildfire in California. *Environmental Research Communications*, *3*(8). https://doi.org/10.1088/2515-7620/ac15e1

State of California. 2019a. California's Fourth Climate Change Assessment Statewide Summary Report. https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf. Retrieved October 7, 2021.

State of California. 2019b. California's Fourth Climate Change Assessment Los Angeles Region Report. https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf. Retrieved October 7, 2021.

Steffey, E., Budruk, M., & Vogt, C. 2020. The Mitigated Neighborhood: Exploring Homeowner Associations' Role in Resident Wildfire-Mitigation Actions. *Journal of Forestry*, *118*(6), 613–624. https://doi.org/10.1093/jofore/fvaa019

Starns, H. D., Fuhlendorf, S. D., Elmore, R. D., Twidwell, D., Thacker, E. T., Hovick, T. J., & Luttbeg, B. (2019). Recoupling fire and grazing reduces wildland fuel loads on rangelands. *Ecosphere*, *10*(1). https://doi.org/10.1002/ecs2.2578

Syphard, A. D., Clayton, M. K., Hawbaker, T. J., Hammer, R. B., Radeloff, V. C., Keeley, J. E., & Stewart, S. I. (2007). Human Influence on California Fire Regimes. *Ecological Applications*, *17*(5), 1388–1402. https://doi.org/10.1890/06-1128.1

Syphard, A. D., & Keeley, J. E. 2015. Location, timing and extent of wildfire vary by cause of ignition. *International Journal of Wildland Fire*, *24*(1), 37–47. https://doi.org/10.1071/WF14024

Syphard, A. D., Brennan, T. J., & Keeley, J. E. 2017. The importance of building construction materials relative to other factors affecting structure survival during wildfire. *International Journal of Disaster Risk Reduction*, *21*(November 2016), 140–147. https://doi.org/10.1016/j.ijdrr.2016.11.011

U.S. Census Bureau. 2020. QuickFacts: Los Angeles County, California. https://www.census.gov/quickfacts/fact/table/losangelescountycalifornia,US/PST045219. Retrieved January 29, 2020.

Wang, H. H., Finney, M. A., Song, Z. L., Wang, Z. S., & Li, X. C. 2021. Ecological techniques for wildfire mitigation: Two distinct fuel break approaches and their fusion. *Forest Ecology and* Management, *495*(May), 119376. https://doi.org/10.1016/j.foreco.2021.119376

Warziniack, T., Champ, P., Meldrum, J., Brenkert-Smith, H., Barth, C. M., & Falk, L. C. (2019). Responding to Risky Neighbors: Testing for Spatial Spillover Effects for Defensible Space in a Fire-Prone WUI Community. *Environmental and Resource Economics*, *73*(4), 1023–1047. https://doi.org/10.1007/s10640-018-0286-0

Weise, D.R., and J. Regelbrugge. 1997. Recent Chaparral Fuel Modeling Efforts. Prescribed Fire and Effects Research Unit, Riverside Fire Laboratory, Pacific Southwest Research Station. 5p.

WRCC (Western Regional Climate Center). 2019. "Piru 2 ESE, CA, Monthly Sum of Precipitation (Inches) (046940)." Reno, Nevada: National Oceanic and Atmospheric Administration, National Climatic Data Center, WRCC. Accessed December 3, 2019. http://www.wrcc.dri.edu/cgibin/cliMAIN.pl?ca6940.

University of California Agriculture and Natural Resources. 2021. *Fire in California: Grazing*. Regents of the University of California.

Zhou, A. 2013. Performance evaluation of ignition-resistant materials for structure fire protection in the WUI. *Fire and Materials 2013 - 13th International Conference and Exhibition, Conference Proceedings*, *January 2013*, 355–366.

Appendix A
Representative Photographs

Appendix A

Representative Photographs

Photograph 1

Photograph 2

Photographs #1 and #2 (facing to the east) show the typical fuel types (sagebrush scrub and riparian) and fuel loading along the eastern edge of the Valencia Commerce Center (VCC) site. Both photographs illustrate the flat to gentle sloped terrain. These fuel types (sagebrush scrub- fuel model Sh5 and Southern cottonwood-willow riparian- fuel model Sh4) were modeled in BehavePlus Fire Scenario #1-VCC (See Appendix C, Fire Behavior Analysis).

Photograph 3

Photograph 4

Photographs #3 and #4 (facing to the south) show fuel types (grassland and riparian) and fuel loading along the southern edge of the VCC site. Both photographs illustrate the flat to moderately sloped terrain. These fuel types (sagebrush scrub, fuel model Gr4 and riparian, fuel model Sh4) were modeled in BehavePlus Fire Scenario #2-VCC.

Photograph 5

Photograph 6

Photographs #5 (facing north and looking downslope to northern border of site) and #6 (facing to the northwest and looking upslope from project site boundary) show fuel type (Sagebrush scrub, fuel model Sh5) and fuel loading along the northern edge of the VCC site. Both photographs illustrate the sagebrush-covered steep hillsides. This fuel type (Sagebrush scrub) was modeled in BehavePlus Fire Scenario #3-VCC.

Photograph 7

Photograph 8

Photographs #7 and #8 were taken facing to the west on ridgetop where light industrial/business park is proposed. Vegetative areas on either side of the river wash will be developed VCC site.

Photograph 9

Photograph 10

Photographs #9 and #10 (facing to the north) show the typical fuel types (sagebrush scrub and grassland) and fuel loading in the Entrada Spineflower Preserve. Both photographs illustrate the rolling hills in the northern portion of the Entrada South site. These fuel types (sagebrush scrub, fuel model Sh5 and grasslands, fuel model Gr4) were modeled in BehavePlus Fire Scenario #1-Entrada South.

Photograph 11

Photograph 12

Photographs #11 (looking south along eastern edge of site) and #12 (looking south along eastern edge of site) show the fuel type (sagebrush scrub) and fuel loading along eastern border. Both photographs illustrate the undulating, steep terrain. This fuel type (sagebrush scrub, fuel model Sh5) was modeled in BehavePlus Fire Scenario #2-Entrada South.

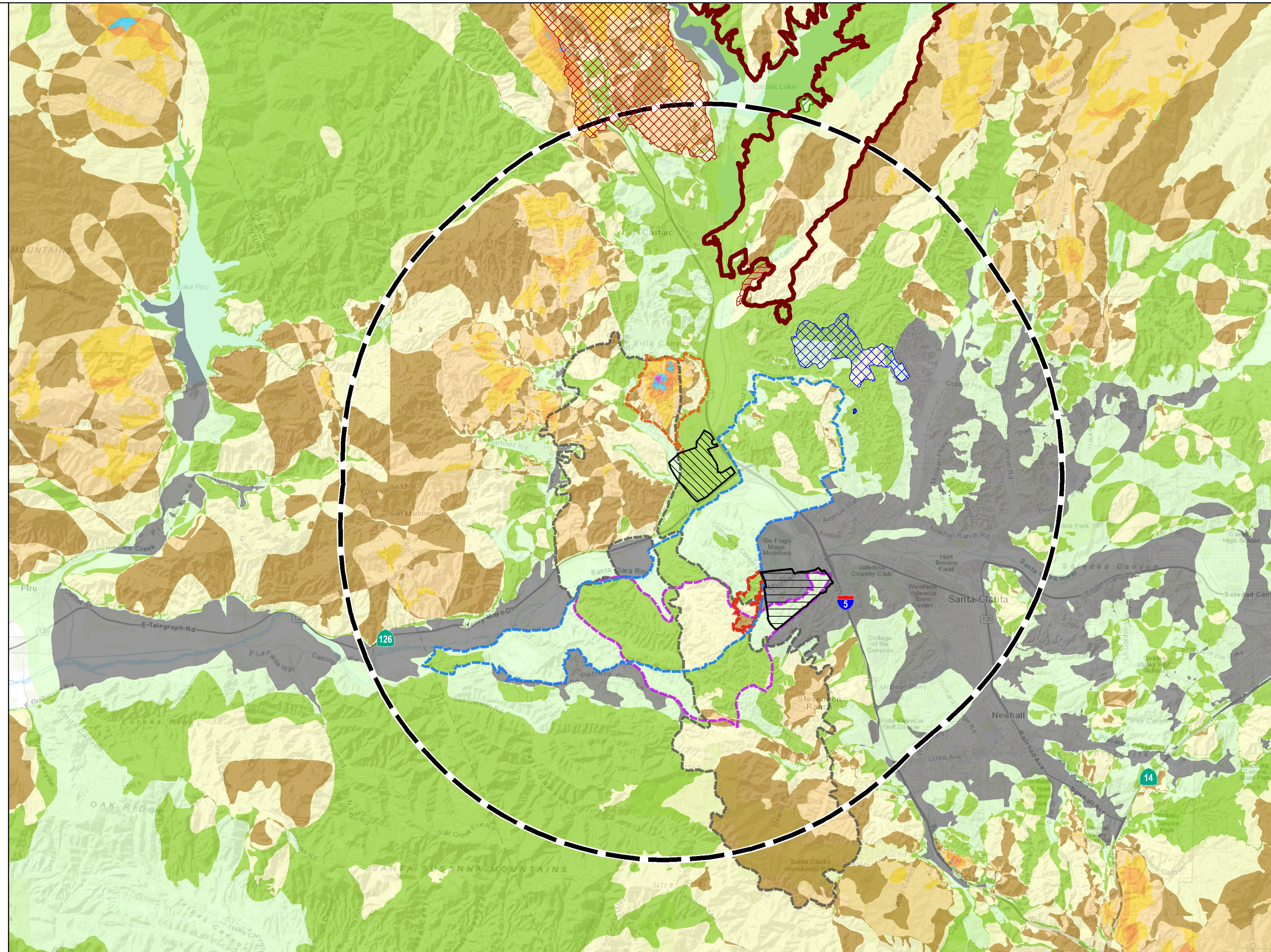
Photograph 13

Photograph 14

Photographs #13 and #14 (looking south) show the fuel type (sagebrush scrub) and steep terrain that is offsite along southern border of the Entrada South site. This fuel type (sagebrush scrub, fuel model Sh5) was modeled in BehavePlus Fire Scenario #3-Entrada South.

Appendix B

Fire History



5-Mile Buffer
Entrada South Project Boundary
Valencia Commerce Center Tract Boundary

2021-2025 Fires

- 2021, NORTH FIRE
- 2021, RYE FIRE
- 2022, QUAIL FIRE
- 2022, ROUTE FIRE
- 2023, DRY FIRE
- 2025, HUGHES FIRE

Onsite Historical Fires

- 1962, GOLDEN FIRE
- 1979, HASLEY FIRE
- 2007, MAGIC FIRE
- 2013, MAGIC FIRE
- 2017, RYE FIRE

Quantity of Times Burned

1
2
3
4
5
6
7
8
9
10
11

Aerial, ESRI Mapping Service, CAL FIRE, 2024, NIFC, 2025

DUDEK

0 1 2 Miles

APPENDIX B

Fire History Map

Fire Protection Plan for the Entrada South and Valencia Commerce Center Projects

Appendix C

BehavePlus Fire Behavior Analysis

1 Fire Behavior Modeling History

Fire behavior modeling has been used by researchers for approximately 50+ years to predict how a fire will move through a given landscape (Linn 2003). The models have had varied complexities and applications throughout the years. One model has become the most widely used for predicting fire behavior on a given landscape. That model, known as "BEHAVE", was developed by the U. S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. Since that time, it has undergone continued research, improvements, and refinement. The version, BehavePlus, V5.05, includes updates incorporating years of research and testing. Numerous studies have been completed testing the validity of the fire behavior models' ability to predict fire behavior given site specific inputs. One of the most successful ways the model has been improved has been through post-wildfire modeling (Brown 1972, Lawson 1972, Sneeuwjagt and Frandsen 1977, Andrews 1980, Brown 1982, Rothermel and Rinehart 1983, Bushey 1985, McAlpine and Xanthopoulos 1989, Grabner, et. al. 1994, Marsden-Smedley and Catchpole 1995, Grabner 1996, Alexander 1998, Grabner et al. 2001, Arca et al. 2005). In this type of study, BehavePlus is used to model fire behavior based on pre-fire conditions in an area that recently burned. Real-world fire behavior, documented during the wildfire, can then be compared to the prediction results of BehavePlus and refinements to the fuel models incorporated, retested, and so on.

Fire behavior modeling includes a high level of analysis and information detail to arrive at reasonably accurate representations of how wildfire would move through available fuels on a given site. Fire behavior calculations are based on site specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. Predicting wildland fire behavior is not an exact science. As such, the minute-by-minute movement of a fire will probably never be predictable, especially when considering the variable state of weather and the fact that weather conditions are typically estimated from forecasts made many hours before a fire. Nevertheless, field-tested and experienced judgment in assessing the fire environment, coupled with a systematic method of calculating fire behavior yields surprisingly accurate results. To be used effectively, the basic assumptions and limitations of fire behavior modeling applications must be understood.

1. First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is the dead fuels less than 0.25 inches in diameter. These are the fine fuels that carry fire. Fuels greater than 1 inch have little effect, while fuels greater than 3 inches have no effect on fire behavior.
2. Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within 6 feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
3. Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, creating their own weather, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.
4. Fourth, fire behavior computer modeling systems are not intended for determining sufficient fuel modification zone/defensible space widths. However, it does provide the average length of the flames, which is a key element for determining defensible space distances for minimizing structure ignition.

Although BehavePlus has limitations, it can still provide valuable fire behavior predictions, which can be used as a tool in the decision-making process. In order to make reliable estimates of fire behavior, one must understand the relationship of fuels to the fire environment and be able to recognize the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur in a particular landscape. The type and quantity will depend upon soil, climate, geographic features, and fire history. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

2 Modeling Inputs

2.1 Fuels

The seven fuel characteristics help define the 13 standard fire behavior fuel models (Anderson 1982) and the more recent custom fuel models developed for Southern California (Weise and Regelbrugge 1997). According to the model classifications, fuel models used for fire behavior modeling (BehavePlus) have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface-to-volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in modeling efforts. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models:

- Grasses Fuel Models 1 through 3
- Brush Fuel Models 4 through 7, SCAL 14 through 18
- Timber Fuel Models 8 through 10
- Logging slash Fuel Models 11 through 13.

In addition, the aforementioned fuel characteristics were utilized in the recent development of 40 new fire behavior fuel models (Scott and Burgan 2005) developed for use in the BehavePlus modeling system. These new models attempt to improve the accuracy of the 13 standard fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the 40 new fuel models:

- Non-burnable Models NB1, NB2, NB3, NB8, NB9
- Grass Models GR1 through GR9
- Grass shrub Models GS1 through GS4
- Shrub Models SH1 through SH9
- Timber understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4.

For the Entrada South and Valencia Commerce Center (VCC) project sites' BehavePlus analyses, fuel model assignments were based on observed field conditions. As is customary for this type of analysis, the terrain and fuels directly adjacent to the proposed development and fuel modification zones (FMZ) are used for determining flame lengths and fire spread. It is these fuels that would have the potential to affect the project's structures from a radiant and convective heat perspective as well as from direct flame impingement. Fuel beds, including sagebrush scrub, non-native grasslands, and Southern cottonwood-willow riparian were observed adjacent to the proposed residential and commercial developments. These fuel types can produce flying embers that may affect the project, but defenses have been built into the structures to prevent ember penetration. Table 1 provides a description of the three fuel models observed in the vicinity of the site that were subsequently used in the analysis for this project. Modeled areas include the riparian (Fuel Model Sh4) on the flat lands in the riverbed, grasslands (Gr4) and sagebrush scrub (Fuel Model Sh5), which were found on the steeper hillsides on both properties. Dudek also conducted modeling of the site for post-Fuel Modification Zones' (FMZ) recommendations for this project (Refer to Table 2 for post-FMZ fuel model descriptions). Fuel modification includes establishment of irrigated (Zone 1) and thinned zones (Zone 2) on the periphery of the project sites. For modeling the post-FMZ treatment condition, the fuel model assignments for sagebrush scrub, grasslands, riparian were re-classified according to the specific fuels management (e.g., irrigated vs, 50% thinned brush or cut grasses to 6 inches in height) treatment as described in the Project FPP.

Table 1. Existing Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
Gr4	Non-native Grasslands	Represents grasses on hillsides surrounding the sites.	<2.0 ft.
Sh4	Southern Cottonwood-Willow Riparian	Riverbed or drainages	< 8.0 ft. = understory; 35 ft. for tree heights
Sh5	Sagebrush Scrub	Sagebrush scrub occurs hillsides on both sites.	<4.0 ft.

Table 2. Post-development Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
8	Zone 1: irrigated landscapes	Perimeter Fuel Modification Zone 1	<3.0 ft.
Gr1	Zone 2: Grasses cut to 6 inches in height	Perimeter Fuel Modification Zone 2	< 0.5 ft.
Sh1	Zone 2: 50% thinning of sagebrush scrub	Perimeter Fuel Modification Zone 2	<4.0 ft.

2.2 Weather

Historical weather data for the region was processed and utilized to determine appropriate fire behavior weather input variables for the Entrada South and VCC project sites’ fire behavior evaluations. To evaluate different scenarios, data for both the 50th percentile weather (on-shore winds) and the 97th percentile weather (off-shore winds) conditions were analyzed using the FireFamily Plus software[1] package. Remote Automated Weather Station (RAWS) data from the Del Valle RAWS[2] was evaluated from June 1 through November 30 for all available data years. Available data years for the Del Valle RAWS include 1998 to 2018. Following analysis in FireFamily Plus, fuel moisture and wind speed information data was incorporated into the BehavePlus modeling runs. Initial wind direction and wind speed values for the BehavePlus modeling runs were manually entered during the data input phase. The input wind speed and direction is roughly an average surface wind at 20 feet above the vegetation over the analysis area. Table 3 summarizes the weather and wind input variables used in the BehavePlus modeling efforts.

1 https://www.firelab.org/project/firefamilyplus
2 RAWS ID # 045445; Latitude: 34°25’52” Longitude: 118°39’57”; Elevation: 1,278 ft. Del Valle Station is approximately 2.7 miles west of the VCC site and 3.9 miles northwest of the Entrada South site.

Table 3. Fuel Moisture and Wind Inputs

Variable	50th Percentile Weather Condition (Onshore Winds)	97th Percentile Weather Condition (Offshore Winds)
1h Moisture	4%	1%
10h Moisture	5%	2%
100h Moisture	10%	5%
Live Herbaceous Moisture	45%	30%
Live Woody Moisture	90%	60%
20-foot Wind Speed	14 mph[1] (sustained winds)	19 mph[1](sustained winds) and wind gusts of 52 mph
Wind Direction	225°	45°
BehavePlus Wind Adjustment Factor	0.4	0.4

Note:
1 mph = miles per hour

2.3 Slope

Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or downhill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. For the BehavePlus analysis, slope values were measured from google earth maps at the locations of each modeling scenario, and ranged in value between flat (<5%) to 40 percent.

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3 BehavePlus Analysis

To objectively predict flame lengths, intensities, and spread rates, the BehavePlus V5.05 fire behavior modeling system (Andrews, Bevins, and Seli 2004) was used in three modeling scenarios for Entrada South and three modeling scenarios for VCC and incorporated observed fuel types representing the dominant on-site and off-site vegetation, measured slope gradients, and wind and fuel moisture values derived from RAWS data sets. Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent the site. The results of fire behavior modeling analysis are presented in Tables 4 and 5 for pre-project conditions and Tables 6 and 7 for post-project conditions. Identification of modeling run (fire scenarios) locations is presented graphically in Figure 4 for Entrada South and Figure 5 for VCC in the Project's FPP.

Table 4: Fire Behavior Model Results - Existing Conditions for Entrada South

Fire Scenarios	Flame Length (feet)	Fireline Intensity (Btu[1]/feet/second)	Spread Rate (mph[2])	Spotting Distance[3] (miles)
Scenario 1:south-east-facing, 25% slope; Offshore 52 mph gusts (97th percentile)				
Valley oak/grass (Gr4)	39.9	17,131	17.9	2.3
Sagebrush scrub (Sh5)	46.0	23,393	7.2	2.5
Scenario 2: south-facing, 20% slope; Offshore 52 mph gusts (97th percentile)				
Sagebrush scrub (Sh5)	45.7	23,045	7.1	2.5
Scenario 3: north-facing, 27% slope; Onshore 14 mph winds (50th percentile)				
Sagebrush scrub (Sh5)	15.0	2,059	0.83	0.5

Notes:
1 Btu = British thermal unit(s)
2 mph = miles per hour
3 Spotting distance from a wind driven surface fire.

Table 5: Fire Behavior Model Results - Existing Conditions for Valencia Commerce Center

Fire Scenario	Flame Length (feet)	Spread Rate (mph)	Fireline Intensity (Btu/ft/s)	Spotting Distance[1] (miles)	Surface Fire to Tree Crown Fire
Scenario 1: flat, <5% slope; Offshore 52 mph sustained gusts (97th percentile)					
Grass (Gr4)	39.7	17.7	16,929	2.3	No
Sagebrush scrub (Sh5)	45.7	7.1	23,043	2.5	No
Southern Cottonwood- Willow Riparian2,3 (Sh4)	24.5	4.5	5,938	1.6	Crowning 4
Scenario 2: south-facing, 10% slope; Onshore 14 mph sustained winds (50th percentile)					
Grass (Gr4)	6.7	0.6	351	0.3	No
Sagebrush scrub (Sh5)	14.8	0.8	1,989	0.5	No

Table 5: Fire Behavior Model Results - Existing Conditions for Valencia Commerce Center

Fire Scenario	Flame Length (feet)	Spread Rate (mph)	Fireline Intensity (Btu/ft/s)	Spotting Distance[1] (miles)	Surface Fire to Tree Crown Fire
Southern Cottonwood- Willow Riparian3,4 (Sh4)	7.1	0.4	396	0.3	Crowning4
Scenario 3: north-facing, 40% slope; Offshore 52 mph sustained gusts (97th percentile)					
Sagebrush scrub (Sh5)	46.3	7.3	23,684	2.6	No

Note:

1. Wind-driven surface fire.
2. Riparian overstory torching increases fire intensity. Modeling included canopy fuel over Sh4, which represents surface fuels beneath the tree canopies.
3. A surface fire in the mixed willow riparian forest would transition into the tree canopies generating flame lengths higher than the average tree height (35 feet). Viable airborne embers could be carried downwind for approximately 1.0 mile and ignite receptive fuels.
4. Crowning= fire is spreading through the overstory crowns.

Table 6: Fire Behavior Model Results - Post-Project Conditions for Entrada South

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Fuel treatments, South-east-facing ,manufactured slopes, Offshore 52 mph gusts (97th percentile)				
Fuel modification zone 1 (FM8)	3.0	63	0.2	0.4
Fuel modification zone 2 (Sh1)	10.6	959	1.5	0.9
Fuel modification zone 2 (Gr1)	4.0	115	0.7	0.5
Scenario 2: Fuel Treatments, south-facing, manufactured slopes; Offshore 52 mph gusts (97th percentile)				
Fuel modification zone 1 (FM8)	3.0	63	0.2	0.4
Fuel modification zone 2 (Sh1)	10.6	959	1.5	0.9
Scenario 3: Fuel Treatments, north-facing, manufactured slopes; Onshore 14 mph winds (50th percentile)				
Fuel modification zone 1 (FM8)	1.3	10	0.03	0.1
Fuel modification zone 2 (Sh1)	0.9	4	0.03	0.1

Table 7: Fire Behavior Model Results - Post-Project Conditions for Valencia Commerce Center

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Fuel treatments, manufactured slopes, Offshore 52 mph gusts (97th percentile)				
Fuel modification zone 1 (FM8)	3.0	63	0.2	0.4
Fuel modification zone 2 (Sh1)	10.6	959	1.5	0.9

Table 7: Fire Behavior Model Results - Post-Project Conditions for Valencia Commerce Center

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 2: Fuel Treatments, manufactured slopes; Onshore 14 mph winds (50th percentile)				
Fuel modification zone 1 (FM8)	1.5	14	0.05	0.1
Fuel modification zone 2 (Gr1)	2.3	33	0.3	0.1
Scenario 3: Fuel Treatments, manufactured slopes; Offshore 52 mph gusts (97th Percentile)				
Fuel modification zone 1 (FM8)	3.0	63	0.2	0.4
Fuel modification zone 2 (Sh1)	10.6	959	1.5	0.9

It should be noted that the results presented in Tables 4 through 7 depict values based on inputs to the BehavePlus software. The fuels models used in this analysis are dynamic models that were designed by the U.S. Forest Service to more accurately represent southern California fuel beds. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

Interpretation of Fire Behavior Modeling Results

Fire type is one of the following four types: surface (e.g., understory fire), torching (e.g., passive crown fire; surface fire with occasional torching trees), conditional crown (e.g., active crown fire possible if the fire transitions to the overstory), and crowning (e.g., active crown fire; fire spreading through the overstory crowns). Dependent on the variables: transition to crown fire and active crown fire.

The following describes the fire behavior results (Heisch and Andrews 2010) as presented in Tables 4-7:

Surface Fire:

- Flame Length (feet): The flame length of a spreading surface fire within the flaming front is measured from midway in the active flaming combustion zone to the average tip of the flames.
- Fireline Intensity (Btu/ft/s): Fireline intensity is the heat energy release per unit time from a one-foot wide section of the fuel bed extending from the front to the rear of the flaming zone. Fireline intensity is a function of rate of spread and heat per unit area, and is directly related to flame length. Fireline intensity and the flame length are related to the heat felt by a person standing next to the flames.
- Surface Rate of Spread (mph): Surface rate of spread is the "speed" the fire travels through the surface fuels. Surface fuels include the litter, grass, brush and other dead and live vegetation within about 6 feet of the ground.

Crown Fire:

- Transition to Crown Fire: Indicates whether conditions for transition from surface to crown fire are likely.

The information in Table 8 pertains to interpretation of flame length and fireline intensity as it relates to fire suppression efforts for surface fires (Andrews and Rothermel 1982). Based on the post-development calculated flame lengths of under 3.0 feet tall, fire fighters should be able to conduct a direct attack on the fire within the FMZ Zone 1, but they would need retardant aircraft or dozers beyond Zone 1.

Table 8. Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 to 8 feet	100-500 BTU/ft/s	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 to 11 feet	500-1000 BTU/ft/s	Fires may present serious control problems – torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

4 Summary

Entrada South Site (Untreated Fuels)

As presented in Table 4, wildfire behavior in non-treated sagebrush scrub, presented as a Fuel Model Sh5, represents the most extreme conditions, varying with different wind speeds. In this case, flame lengths can be expected to reach up to approximately 46.0 feet with 52 mph gusts (Offshore wind conditions) and 15.0 feet with 14 mph wind speeds (Onshore winds). Spread rates for sagebrush scrub fuel beds range from less than 1.0 mph (Onshore winds) to 7.2 mph (Offshore winds). Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 0.5 miles to 2.5 miles. In comparison, a grass fuel type could generate flame lengths up to 39.9 feet high with a rapid spread rate of 17.9 mph. The fire could potentially be spotting for a distance of 2.3 miles.

As presented in Table 6, Dudek conducted modeling of the Entrada South site for post-FMZ fuel recommendations for this project. Fuel modification includes establishment of irrigated and thinned zones on the periphery of the project's neighborhoods. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified for the FMZ 1 (Fuel Model 8) and FMZ 2 (50% thinning zones - Fuel Model Sh1). Fuel model assignments for all other areas remained the same as those classified for the existing condition. As depicted, the fire intensity and flame lengths in untreated, Spineflower Preserve areas would remain the same. As such, the FMZ areas experience a significant reduction in flame length and intensity. The 46.0-foot (sagebrush scrub fuel bed) and 39.9-foot (grass fuel bed) tall flames predicted during pre-treatment modeling during extreme weather conditions are reduced to less than 10.6 feet tall at the outer edges and less than 3.0 feet in the FMZ 1 near the structures of the development due to the higher live and dead fuel moisture contents.

Valencia Commerce Center Site (Untreated Fuels)

Based on the fire behavior modeling results presented herein for the VCC site, the maximum flame lengths anticipated in untreated, surface fuels, including grasslands and sagebrush scrub, could reach 39.7 to 45.7 feet, respectively, in height with rates of spread between 7.1 and 17.7 mph under extreme weather conditions, represented by Santa Ana winds blowing at gusts of 52 mph. Should ignition in the Castaic Creek riverbed occur, the riparian understory would be expected to burn aggressively due to the presence of large amounts of biomass from dense stands of shrubby willows. Modeling outputs indicate a transition to crown fire is expected from a fire burning in the riparian understory, since the canopy heights to lowest branch are roughly 3 feet above ground and in most situations the canopies touch the ground. Under such conditions, expected surface flame lengths in peripheral riparian surface fuels could reach up to 24.5 feet and ignite the tree canopies with flame lengths in excess of 35 feet, and potentially up to 100 feet. Embers could be generated from both surface and crown fires resulting in ignition of receptive fuel beds 1.6 to 2.6 miles downwind.

Fires burning from the west and pushed by ocean breezes exhibit less severe fire behavior. Under typical onshore weather conditions, a grass fire could have flame lengths of 6.7 feet in height and spread rates less than 1.0 mph. A wildfire in sagebrush scrub could generate flame lengths of 14.8 and spread at less than 1.0 mph. Modeling outputs indicate flame lengths (7.1 feet) in the shrubby willow understory would transition to a crown fire with flame lengths in excess of the 35 feet. Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 0.3 to 0.5 mile.

As presented in Table 7, Dudek conducted modeling of the VCC site for post-FMZ fuels treatment recommendations. Fuel modification includes establishment of irrigated landscaping on the periphery of the proposed commercial development. For modeling the post-FMZ treatment condition, fuel model assignments were re-classified for the developed Fuel Modification Zone 1 (Fuel Model 8), and Fuel Modification Zone 2 (Fuel Model SH1 for thinning sagebrush scrub and Gr1 for grasses cut to 6 inches in height). Fuel model assignments for all other areas remained the same as those classified for the existing conditions. As depicted in tables 4 and 5, the fire intensity and flame lengths in untreated, biological open space areas (i.e., sagebrush scrub and cottonwood-willow riparian areas) would remain the same. Conversely, the FMZ areas experience a significant reduction in flame length and intensity. The 46.0-foot tall flames predicted during pre-treatment modeling for the Entrada site during extreme weather conditions are reduced to 10.6 feet tall at the outer edges of the FMZ and to 3.0 feet by the time the inner portions (i.e., irrigated, Zone 1) of the FMZ are reached. During onshore weather conditions, a fire approaching from the west would be reduced from 14.8-foot tall flames to less than 2.3 feet tall in both the irrigated and thinning zones with much lower fire intensity due to the higher live and dead fuel moisture contents.

5 References

Alexander, M.E. 1998. Crown fire thresholds in exotic pine plantations of Australasia. Australian National University, Canberra, Australian Capital Territory. Ph.D. Thesis. 228p.

Anderson, Hal E. 1982. *Aids to Determining Fuel Models for Estimating Fire Behavior*. USDA Forest Service Gen. Tech. Report INT-122. Intermountain Forest and Range Experiment Station, Ogden, UT. http://www.fs.fed.us/rm/pubs_int/int_gtr122.pdf

Andrews, P.L. 1980. Testing the fire behavior model. In Proceedings 6th conference on fire and forest meteorology. April 22–24, 1980. Seattle, WA: Society of American Foresters. Pp. 70–77.

Andrews, Patricia L., Collin D. Bevins, and Robert C. Seli. 2008. BehavePlus fire modeling system, version 4.0: User's Guide. Gen. Tech. Rep. RMRS-GTR-106WWW Revised. Ogden, UT: Department of Agriculture, Forest Service, Rocky Mountain Research Station. 132p.

Andrews, Patricia L., and Richard C. Rothermel. 1982. Charts for Interpreting Wildland Fire Behavior Characteristics. USDA Forest Service Gen. Tech. Report INT-131. Intermountain Forest and Range Experiment Station, Ogden, UT. September 1982. 21 p.

Brown, J.K. 1972. Field test of a rate-of-fire-spread model in slash fuels. USDA Forest Service Res. Pap. Int-116. 24 p.

Brown, J.K. 1982. Fuel and fire behavior prediction in big sagebrush. USDA Forest Service Res. Pap. INT-290. 10p.

Bushey, C.L. 1985. Comparison of observed and predicted fire behavior in the sagebrush/ bunchgrass vegetation-type. In J.N. Long (ed.), Fire management: The challenge of protection and use: Proceedings of a symposium. Society of American Foresters. Logan, UT. April 17–19, 1985. Pp. 187–201.

FireFamily Plus 2008. http://www.firelab.org/project/firefamilyplus.

Grabner, K., J. Dwyer, and B. Cutter. 1994. "Validation of Behave Fire Behavior Predictions in Oak Savannas Using Five Fuel Models." Proceedings from 11th Central Hardwood Forest Conference. 14 p.

Grabner, K.W. 1996. "Validation of BEHAVE fire behavior predictions in established oak savannas." M.S. thesis. University of Missouri, Columbia.

Grabner, K.W., J.P. Dwyer, and B.E. Cutter. 2001. "Fuel model selection for BEHAVE in midwestern oak savannas." *Northern Journal of Applied Forestry*. 18: 74–80.

Heinsch, Faith Ann; Andrews, Patricia L. 2010. BehavePlus fire modeling system, version 5.0: Design and Features. General Technical Report RMRS-GTR-249. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 111 p.

Lawson, B.D. 1972. Fire spread in lodgepole pine stands. Missoula, MT: University of Montana. 110 p. thesis.

Linn, R. 2003. "Using Computer Simulations to Study Complex Fire Behavior." Los Alamos National Laboratory, MS D401. Los Alamos, NM.

Marsden-Smedley, J.B. and W.R. Catchpole. 1995. Fire behaviour modelling in Tasmanian buttongrass moorlands. II. Fire behaviour. *International Journal of Wildland Fire*. Volume 5(4), pp. 215–228.

McAlpine, R.S. and G. Xanthopoulos. 1989. Predicted vs. observed fire spread rates in Ponderosa pine fuel beds: a test of American and Canadian systems. In Proceedings 10th conference on fire and forest meteorology, April 17–21, 1989. Ottawa, Ontario. pp. 287–294.

Rothermel, Richard C. 1983. How to predict the spread and intensity of forest and range fires. GTR INT-143. Ogden, Utah: USDA Forest Service Intermountain Research Station.161 Rothermel, R.C., and G.C. Rinehart. 1983. “Field procedures for verification and adjustment of fire behavior predictions.” Res. Pap. INT-142. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 25 p.

Rothermel, R.C., and G.C. Rinehart. 1983. “Field procedures for verification and adjustment of fire behavior predictions.” Res. Pap. INT-142. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 25 p.

Scott, Joe H. and Robert E. Burgan. 2005. *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel’s Surface Fire Spread Model*. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

Sneeuwjagt, R.J., and W.H. Frandsen. 1977. “Behavior of experimental grass fires vs. predictions based on Rothermel’s fire model.” *Canadian Journal of Forest Resources*. 7:357–367.

Weise, D.R. and J. Regelbrugge. 1997. Recent chaparral fuel modeling efforts. Prescribed Fire and Effects Research Unit, Riverside Fire Laboratory, Pacific Southwest Research Station. 5p.

Appendix D
Acceptable Plant List by Fuel Modification Zone

Fuel Modification Plant Selection Guidelines

Selecting and locating plants for a Fuel Modification Landscape plan is best done by first focusing on the density and arrangement of plants in relation to structures as a primary consideration. Second, but no less important is choosing zone appropriate plant species based on plant characteristics such as moisture content, resin/pitch and the production of dead litter from leaves, bark, seed pods etc. Avoid creating fuel ladders both vertically and horizontally throughout all zones (see basic fire behavior section below).

The following guidelines are intended to simplify this approach through zone specific compositions up to the property boundary.

5' Ember/Ignition resistant zone

- All efforts shall be made to eliminate any combustible materials including plants, organic mulches, patio furniture etc. This zone has been found to be the most important area to address during planning and future maintenance.

Zone A (30' from the edge of any qualifying structure)

- Zone A should be planted with the least density (limited use of large woody plants) and plant selections should consist of small herbaceous or succulent plants less than 2'-3' in height or regularly irrigated and mowed lawns.
- It is best not to use woody trees, shrubs, subshrubs, perennials or masses of un-mowed grasses over 12" tall within 10 feet of the structure; especially in front of windows, which are weak points in a structure.
- Occasional accents of woody plants can be used sparingly to soften hard edges of structures if the selections are widely spaced and zone appropriate.
- Consider locating hardscape features such as walkways, patios, driveways, sport courts etc. so they abut the structure itself. Potted plants can be used to soften walls if necessary.

Zone B (30'-100' from the edge of any qualifying structure)

- Zone B can be planted with a slightly higher density than Zone A. However, care should be taken not to create any horizontal or vertical fuel ladders.
- Screen plantings can be used to hide unsightly views. Hedging can be used provided the species of plant is acceptable and maintenance is performed regularly to minimize any accumulated leaf/twig litter.
- Zone B is the ideal location to introduce larger shade trees, provided they are zone appropriate and the canopies are not continuous.
- Avoid planting woody plant species larger than 2' at maturity directly beneath any tree canopy.

Zone C (100’-200’ from the edge of any qualifying structure; may be necessary only if an “extra hazard” has been identified by fuel modification personnel)

- Although Zone C is often not landscaped on many projects, it may still be subject to hazard reduction requirements (brush clearance section 325.2.2 “extra hazard”). Do not denude the property. http://www.readyforwildfire.org/
- If Zone C is to be landscaped, avoid creating a landscape that is as dense and hazardous as the unmaintained vegetation.
- A good rule of thumb is to follow the same guidelines as Zones A and B with a slight increase in density.

Adjacent to Access Roads

- Maintain apparatus access roads with a 20’ wide path that remains clear to the sky.
- Along roadsides, removal of cured annual grasses and weeds is required to be performed annually. Only well maintained and irrigated plants are allowed provided they do not hinder fire apparatus access.

Basic Fire Behavior – Fuel Ladders

Before selecting and locating plants on a Fuel Modification plan a basic understanding of wildland fire behavior is the key factor in properly arranging plants. Eliminating and avoiding the creation of fuel ladders should be the main focus. Understanding that anything planted in the landscape can become receptive fuel for wildfire and the way in which it is arranged and maintained will greatly influence the intensity of the fire. The following diagrams will aide in arranging appropriate plant compositions.

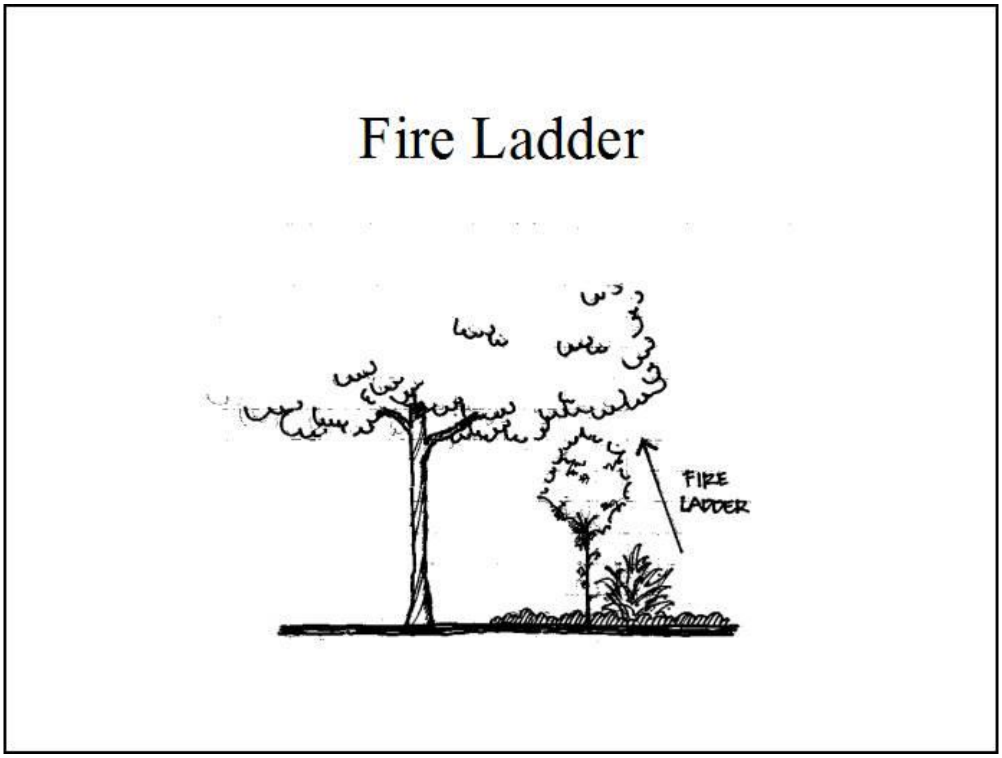

Figure 1: Fire Ladders or Fuel Ladders should be eliminated. The diagram above illustrates <u>what **not** to do</u>.

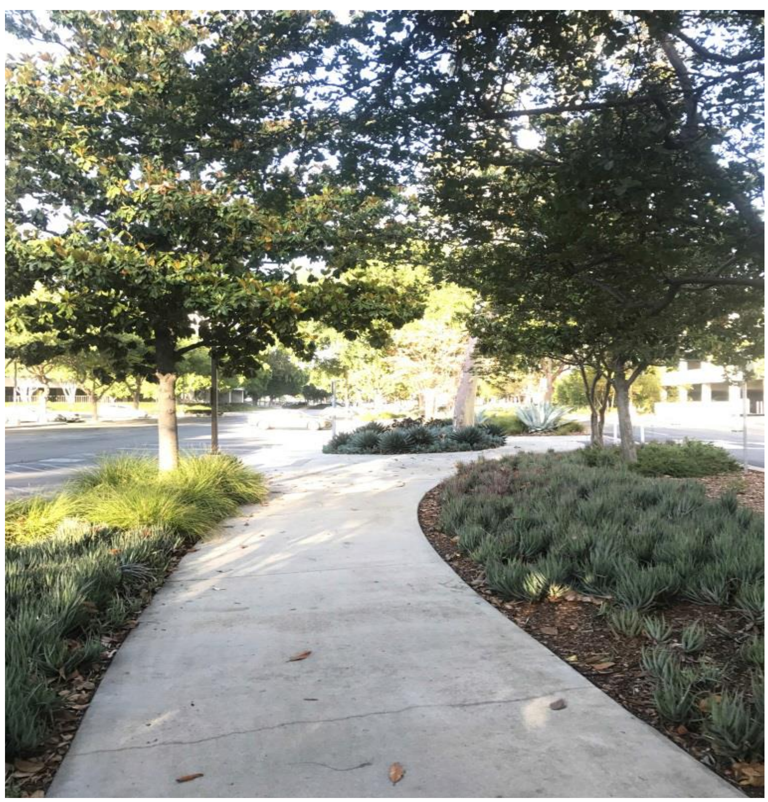

Figure 2: The concept of fuel ladders is crucial to planning a Fire-Wise landscape. No matter which plants are chosen, providing sufficient and defined separation between ground covers, shrubs and trees is the most crucial consideration in the design/plant-selection process. Do not use large shrubs or plants under tree canopies that may grow to a height greater than 2 feet at maturity. Pruning is not a long-term alternative to height appropriate plant selection.

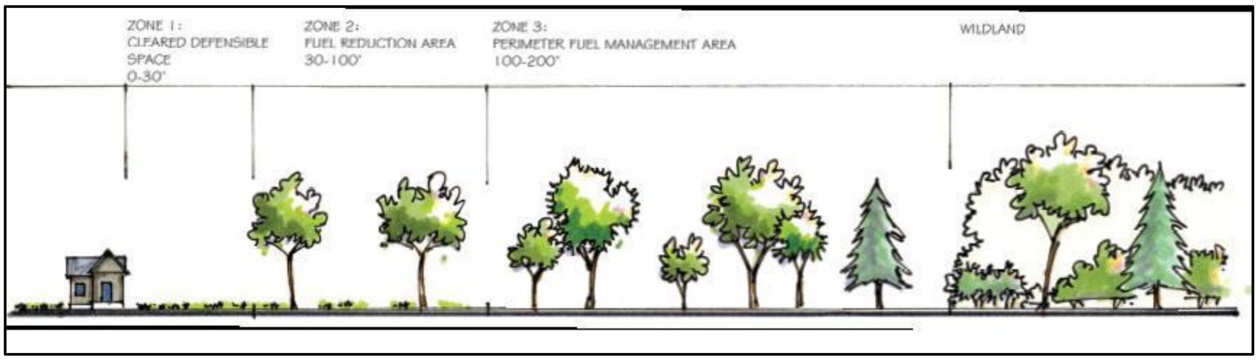

Figure 3: Note the progressive increase in density and arrangement moving away from the structure.

<u>Plant Placement Do's</u>

- Do use "mass plantings" of herbaceous/succulents as ground covers even if they are not traditionally used as such. If properly selected, mass plantings can eliminate fuel ladders.
- Do plant using spacing resulting in complete coverage at maturity, rather than hastening coverage with increased density (the only exception is manufactured slopes where quicker coverage is necessary in which case species selection is critical).
- Do consider using patio trees/un-sheared shrubs with an open habit as an informal screen in Zone A (Example: Toyon).
- Do consider vines as an alternative to hedges on walls or fences 10' from structures and unattached to structures.
- Do select varieties of plants that are slower growing and reach manageable sizes at maturity.
- Do use plants appropriately scaled to the size of the property and structure. E.g. a single story house does not need to be shaded by a 100' tall Sweetgum.

<u>Plant Placement Don'ts</u>

- Don't plant hedges directly against structures; this includes espaliers of large shrubs. Hedges taller than 6' and within 10' of the structure are not allowed.
- Don't plant large shrubs and trees in large masses in Zones A or B.
- Do not plant double hedge-rows.
- Don't plant at densities that result in an "instant landscape."
- Don't plant large plant species which would require pruning to reduce overall size.
- Don't plant vines on structures. Vines become receptive fuel beds for embers (fire brands).

- Don't assume any plant is "fire proof." All plants will burn and assuming a plant is ignition resistant can be very misleading.
- Don't use large woody species in mass plantings.

<u>Acceptable Plant Selections for Fuel Modification</u>

The plant list provided in the following pages is intended to be a ***representative sample*** of which types of plants are appropriate for each zone considering their size, moisture content, leaf litter production and chemical composition. This list is not a comprehensive list of plants available commercially. Designers may choose plants that are not on this list if the <u>plants physical characteristics are zone appropriate</u>. Selecting regionally appropriate plants, native species and the consideration of climate and microclimate adaptability is the responsibility of the designer.

> ***Important note:*** *This list is* ***not*** *a "pre-approved" list.* Any plant listed as appropriate within the designated zone at a designated distance from a structure must still follow restrictions based on the density and arrangement principles stated **above**. Planting densities may be requested to be reduced and plant selections may be asked to be removed when placed inappropriately.

Sample Fuel Modification Plant List			
Botanical Name	**Common Name**	**Zone**	**Minimum distance from structure**
Ground Cover			
Acacia redolens 'Desert Carpet'/'Low Boy'	Desert Carpet Acacia	B	30
Achillea tomentosa	Woolly Yarrow	A	
Ajuga reptans	Carpet Bugle	A	
Arctostaphylos (Prostrate Varieties)	Manzanita	B	
Artemisia californica (Cultivars)	Sagebrush - Prostrate Forms	B	30
Artemesia 'Powis Castle'	NCN	B	
Baccharis pilularis 'Pigeon Point'/'Twin Peaks'	Prostrate Coyote Brush	B	
Campanula poscharkyana	Serbian Bellflower	A	
Ceanothus gloriosus	Point Reyes Ceanothus	B	
Cerastium tomentosum	Snow-In-Summer	A	
Chamaemelum nobile	Chamomile	A	
Cistus salviifolius 'Prostratus'	Sageleaf Rockrose	B	
Coprosma kirkii	Mirror Plant	B	
Coreopsis auriculata 'Nana'	Tickseed	A	
Cotoneaster (Prostrate Varieties)	Cotoneaster	B	

Dalea greggii	Trailing Indigo Bush	B	
Delosperma alba	White Training Ice Plant	A	
Dichondra micrantha	Dichondra	A	
Drosanthemum floribundum	Rosea Ice Plant	A	
Duchesnea indica	Indian Mock Strawberry	A	
Dymondia margaretae	NCN	A	
Erigeron glaucus	Seaside Daisy	A	
E. karvinskianus	Santa Barbara Daisy	B	
Euonymus fortunei 'Colorata'	Purple-Leaf Winter Creeper	B	
Festuca cinerea(ovina'Glauca')	Blue Fescue	A	
F. rubra	Red Fescue	A	
Fragaria chiloensis	Wild Strawberrry	A	
Gazania Hybrids	Trailing Gazania	A	
Geranium incanum/sanguineum	Cranesbill	A	
Glechoma hederacea	Ground Ivy	A	
Helianthemum nummularium	Sunrose	A	
Herniaria glabra	Green Carpet	A	
Heuchera species and Cultivars	Coral Bells	A	
Hypericum calycinum/coris	Aaron's Beard	B	
Iberis sempervirens	Evergreen Candytuft	A	
Iva hayesiana	Poverty Weed	B	30
Juniperus (Prostrate species/cultivars)		B	
Laurentia fluviatilis	Blue Star Creeper	A	
Lysimachia nummularia	Moneywort	A	
Liriope spicata	Creeping Lily Turf	A	
Liriope muscari	Lily Turf	A	
Mahonia repens	Creeping Mahonia	B	
Myoporum 'Pacificum' & 'Putah Creek'	Pacific Myoporum	B	
M. parvifolium	NCN	A	
Oenothera berlandieri	Mexican Evening Primrose	B	
O. stubbei	Baja Evening Primrose	A	
Ophiopogon japonicus	Mondo Grass	A	
Pachysandra terminalis	Japanese Spurge	A	
Pelargonium peltatum/tomentosum	Ivy Geranium	A	
Persicaria capitata	Pink Clover	A	
Phlox subulata	Moss Pink	A	10
Phyla nodiflora (Lippia repens)	Lippia	A	
Potentilla tabernaemontanii	Spring Cinquefoil	A	
Ribes viburnifolium	Catalina Perfume	B	
Rosmarinus officinalis (Prostrate Varieties)	Prostrate Rosemary	B	30
Scaevola 'Mauve Clusters'	NCN	A	
Salvia sonomensis	Creeping Sage	B	

Sedum species	Stonecrops	A	
Senecio mandraliscae/serpens	Kleinia/Blue Chalksticks	A	
Soleirolia soleirolii	Baby's Tears	A	
Teucrium cossonii majoricum	Germander	A	
T. X lucidrys 'Prostratum'	Prostrate Germander	A	
Thymus species	Mother of Thyme	A	
Trachelospermum jasminoides	Star Jasmine	A	
Trifolium fragiferum	White Clover	A	
Verbena species (Prostrate Varities)	Garden Verbena	A	
Vinca minor	Dwarf Periwinkle	A	
Viola odorata	Sweet Violet	A	
Wedelia trilobata	Yellow Dot	B	
Zoysia tenuifolia	Korean Grass	A	
Miscellaneous Perennials, Grasses, Ferns etc.			
Acorous gramineous and Cultivars	Sweet Flag	A	
Agapanthus africanus	Lily of the Nile	A	
Alstroemeria cooperi	Peruvian Lily	A	
Armeria species	Thrifts	A	
Bouetella gracillis	Blue Gramma	A	10
Bergenia cordifolia	Heart Leaf Bergenia	A	
Cycas species	Cycads	A	
Cyrtomium falcatum	Holly Fern	A	
Davalia tricomanoides	Rabbits Foot Fern	A	
Epilobium canum	California Fuchia	B	
Helictotrichon sempervirens	Blue Oat Grass	A	15
Hemerocallis hybrids	Daylily	A	
Iris douglassiana	Coastal Iris	A	
Iris germanica	Bearded Iris	A	
Kalanchoe species	Kalanchoe	A	
Leymus condensatus 'Canyon Prince'	Canyon Prince Wild Rye	A	20
Lobelia laxiflora		A	15
Pelargonium species	Geranium	A	
Penstemon species	Beard Tongue	A	
Plumeria	Plumeria	A	
Phlebodium aureum	Rabbits Foot Fern	A	
Tulbaghia violacea	Society Garlic	A	
Zephyranthes candida	Zephyr Lily	A	
Shrubs			

Abelia grandiflora (Prostrata)	Glossy Abelia	A	10
Abutilon hybridum	Flowering Maple	A	10
Acanthus mollis	Bear's Breech	A	
Agave species	Agave	A	
Aloe species	Aloe	A	
Alyogyne huegelii	Blue Hibiscus	A	10
Arbutus unedo (Dwarf Cultivars)	Dwarf Strawberry Tree	A	10
Arctostaphylos species	Manzanita	B	
Aucuba japonica	Japanese Aucuba	A	
Baccharis species	Various	B	
Berberis thunbergii	Japanese Barberry	B	
B. thunbergii ' prostrate cultivars'		A	10
Bougainvillea sp.	Bougainvillea	B	
Buddleja davidii	Butterfly Bush	B	
Buxus microphylla japonica	Japanese Boxwood	A	10
Caesalpinia (Shrub Forms)	Bird of Paradise Bush	A	10
Camellia species	Camellia	A	10
Calliandra californica/eriophylla	Baja Fairy Duster	B	
Callistemon citrinus	Lemon Bottlebrush	B	
C. viminalis "Little John"	NCN	A	10
Calycanthus occidentalis	Western Spice Bush	B	
Carissa macrocarpa and Cultivars	Natal Plum	A	10
Carpenteria californica	Bush Anemone	A	10
Cassia artemisioides	Feathery Cassia	A	30
Ceanothus species	Wild Lilac	B	30
Cercocarpus betuiloides	Mountain Mahogany	B	30
Choisya ternata	Mexican orange	B	
Cistus species	Rockrose	B	
Comarostaphylis diversifolia	Summer Holly	B	
Convolvulus cneorum	Bush Morning Glory	B	
Coprosma pumila/repens	Mirror Plant	B	
Cotoneaster species & cultivars	Cotoneaster	B	
Crassula species	NCN	A	
Cuphea hyssopifolia	False Heather	A	10
Cycas revoluta	Sago Palm	A	
Dasylirion quadrangulatum/wheeleri	Mexican Grass Tree	A	10
Dendromecon harfordii	Island Bush Poppy	B	
Dietes bicolor/irioides	Fortnight Lily	A	
Dodonaea viscosa (Purpurea)	Hopseed Bush	B	
Elaeagnus pungens & cultivars	Silverberry	B	

Encelia californica	Coast Sunflower	B	
E. farinosa	Brittle Bush	B	
Erigonum giganteum	St. Catherine's Lace	B	
Escallonia species	Escallonia	A	10
Euonymus japonica & cultivars	Evergreen Euonymus	A	10
Euphorbia species		A	
Euryops pectinatus	NCN	A	
Fatsia japonica	Japanese Aralia	A	
Fouquieria splendens	Ocotillo	A	
Fremontodendron species & cultivars	Flannel Bush	B	
Gardenia jasminoides	Gardenia	A	
Garrya elliptica	Coast Silktassel	B	
Grevillea species & cultivars	Grevillea	B	
Grewia occidentalis	Lavender Starflower	B	
Hakea suaveolens	Sweet Hakea	B	
Hebe species & cultivars	Hebe	A	10
Hesperaloe parviflora	Red Yucca	A	
Hibiscus rosa - sinensis	Chinese Hibiscus	A	10
Ilex species	Holly	B	
Juniperus species	Juniper	B	
Justicia brandegeana	Shrimp Plant	A	10
J. californica	Chuparosa	B	
Keckiella cordifolia	Heart-Leaved Penstemon	B	
Kniphofia uvaria	Red-Hot Poker	A	
Lantana Camara & hybrids	Lantana	A	10
Larrea tridentata	Creosote Bush	B	
Lavandula species	Lavender	A	10
Lavatera assurgentiflora/maritima	California Tree Mallow	B	
Leonotis leonrus	Lion's Tail	B	
Leptospermum scoparium & varities	New Zealand Tea Tree	B	
Leucophyllum species		B	
Ligustrum japonicum	Wax-leaf Privet	A	10
Lupinus species	Lupine	B	
Mahonia aquifolium ('Compacta')	Oregon Grape	A	10
M. fremontii	Desert Mahonia	B	
M. 'Golden Abundance'	NCN	B	
M. lomariifolia	Venetian Blind Mahonia	A	
Malosma - See Rhus			
Malva species	Mallow	A	10
Melaleuca nesophila	Pink Melaleuca	A	10
Mimulus species (Diplacus)	Monkey Flower	A	10

Myrica californica	Pacific Wax Myrtle	B	
Myrsine africana	African Boxwood	A	10
Myrtus communis 'Compacta'	Dwarf Myrtle	A	10
Nandina domestica (including dwarf varieties)	Heavenly Bamboo	A	
Nerium oleander	Oleander	B	
N.o. 'Petite Salmon'	NCN	A	10
Opuntia species	Prickly Pear, Cholla etc.	A	
Phlomis fruticosa	Jerusalem Sage	A	
Phoenix roebelenii	Pygmy Date Palm	B	50
Phormium tenax and Cultivars	New Zealand Flax	A	
Photinia fraseri	Photinia	B	
Pittosporum tobira ('Variegata')	Tobira	B	
P.t.'Wheeler's Dwarf'	Dwarf Pittosporum	A	
Punica granatum 'Nana'	Dwarf Pomegranate	A	10
Prunus ilicifolia	Hollyleaf Cherry	B	
Pyracantha species	Firethorn	B	
Rhamnus california/crocea	Coffeeberry	B	
Rhaphiolepis indica and Cultivars	India Hawthorn	A	10
Rhus integrifolia/laurina	Lemonade Berry	B	40
R. ovata	Sugar Bush	B	30
Ribes species	Currant/Gooseberry	A	10
Romneya coulteri	Matilija Poppy	B	
Rosa species (except R. californica)	Rose	A	
Rosmarinus officinalis & cultivars	Rosemary	B	
Salvia species - native varieties	Sage	B	
S. greggii/leucantha	Autumn Sage	A	10
Santolina chamaecyparissus/rosmarinifolius	Lavender Cotton	A	10
Simmondsia chinensis	Jojoba	B	
Strelitzia nicolai/regina	Bird of Paradise	A	
Tagetes lemmonii	Copper Canyon Daisy	B	
Tibouchina urvilleana	Princess Flower	A	10
Trichostema lanatum	Wooly Blue Curls	B	
Viburnum species	Viburnum	A	10
Westringia fruticosa	Coast Rosemary	A	10
Xylosma congestum	Shiny Xylosma	B	
X.c. 'Compacta'	Compact Xylosma	A	10
Yucca species	Yucca	B	
Trees			
Acacia farnesiana	Sweet Acacia	A	15

A. greggii	Catclaw Acacia	B	
A. salicina	Willow Acacia	A	15
A. smallii	NCN	A	15
A. stenophylla	Shoestring Acacia	A	15
Acer negundo	Box Elder	B	
A. palmatum	Japanese Maple	A	
A. saccharinum	Silver Maple	B	40
Aesculus californica	California Buckeye	B	
Agonis flexuosa	Peppermint Tree	B	
Albizia julibrissin	Silk Tree	B	
Alnus rhombifolia	Alder	B	
Arbutus unedo ('Marina')	Strawberry Tree	A	15
Archontophoenix cunninghamiana	King Palm	30	
Bauhinia variegata	Purple Orchid Tree	B	
Betula pendula	European White Birch	A	15
Brachychiton acerifolius/populneus	Flame Tree/Bottle Tree	B	
Callistemon citrinus	Lemon Bottlebrush	B	
C. viminalis	Weeping Bottlebrush	A	15
Calocedrus decurrens	Incense Cedar	B	
Calodendrum capense	Cape Chestnut	B	
Cedrus deodara	Deodar Cedar	B	40
Ceratonia siliqua	Carob	B	30
Cercidium floridum/microphyllum	Blue Palo Verde	A	
Cercis occidentalis/canadensis	Western Redbud	A	10
Chilopsis linearis	Desert Willow	A	15
Chionanthus retusus	Chinese Fringe Tree	A	10
Chitalpa X tashkentensis	Chitalpa	A	10
Chorisia speciosa	Floss Silk Tree	B	
Cinnamomum camphora	Camphor Tree	B	30
Citrus species	Citrus	A	10
Cocculus laurifolius	Laurel Leaf Snail Seed	B	
Cordyline australis	Giant Dracaena	A	
Cyathea cooperi	Australian Tree Fern	A	
Dicksonia antarctica	Tazmanian Tree Fern	A	
Dracaena draco	Dragon Tree	A	
Eriobotrya deflexa/japonica	Bronze Loquat/Loquat	A	10
Erythrina species	Coral Tree	B	
Feijoa sellowiana	Pineapple Guava	A	10
Ficus species	Fig	B	50
Fraxinus species	Ash	B	30
Geijera parviflora	Australian Willow	A	15

Ginkgo biloba	Maidenhair Tree	A	15
Gleditsia triacanthos	Honey Locust	A	15
Grevillea robusta	Silk Oak	B	
Heteromeles arbutifolia	Toyon	A	15
Hymenosporum flavum	Sweetshade Tree	A	15
Jacaranda mimosifolia	Jacaranda	B	
Juglans californica	Black Walnut	B	
Koelreuteria bipinnata/paniculata	Chinese Flame Tree	B	
Lagerstroemia indica	Crape Myrtle	A	10
Laurus nobilis	Sweet Bay	B	
Leptospermum laevigatum	Australian Tea Tree	A	15
Liquidambar formosana	Chinese Sweet Gum	A	15
L. styraciflua	American Sweet Gum	B	
Liriodendron tulipfera	Tulip Tree	B	
Lithocarpus densiflorus	Tanbark Oak	B	
Lophpstemon confertus (Tristania)	Brisbane Box	A	15
Lyonothamnus floribundus	Catalina Ironwood	A	15
Magnolia grandiflora	Southern Magnolia	B	
M. X soulangeana	Saucer Magnolia	A	10
Maytenus boaria	Mayten Tree	A	10
Melaleuca quinquenervia	Cajeput Tree	A	15
Metasequoia glypstroboides	Dawn Redwood	A	15
Metrosideros excelsus	New Zealand Christmas Tree	A	10
Morus alba	White Mulberry	B	
Olea europea	Olive - Fruitless only	A	15
Parkinsonia aculeata	Jerusalem Thorn	A	10
Pinus species	Pine	B	75
Pistacia chinensis	Chinese Pistache	B	
Pittosporum phillyraeoides	Willow Pittosporum	A	10
P. rhombifolium	Queensland Pittosporum	B	
Platanus racemosa	California Sycamore	B	
Podocarpus gracilior/macrophyllus	Fern Pine/Yew Pine	B	
Populus fremontii	Fremont Cottonwood	B	50
Prosopis chilensis	Chilean Mesquite	B	
P. glandulosa	Honey Mesquite	A	15
Prunus cerasifera 'Atropurpurea'	Purple-leaf Plum	A	10
Punica granatum	Pomegranate	B	
Pyrus calleryana/kawakamii	Ornamental Pear	A	15
Quercus species	Oak	B	30
Rhus lancea	African Sumac	B	
Robinia ambigua	Locust	B	

Sapium sebiferum	Chinese Tallow Tree	B	
Schefflera actinophylla	Queensland Unbrella Tree	A	
Sophora japonica	Japanese Pagoda Tree	B	
Stenocarpus sinuatus	Firewheel Tree	A	10
Tabebuia species	Trumpet Tree	A	15
Tipuana tipu	Tipu Tree	B	
Tupidanthus calyptratus	Tupidanthus	A	
Umbellularia californica	California Bay	B	
Zelkova serrata	Sawleaf Zelkova	B	

Appendix E
Fuel Modification Zone Undesirable Plant List

Botanical Name	Common Name	Comment*
Adenostoma fasciculatum	Chamise	F
Adenostoma sparsifolium	Red Shank	F
Artemesia californica	California Sagebrush	F
Carpobrotus edulis	Hottentot-fig	F, I
Cortaderia spp.	Pampas Grass	F, I
Cupressus spp.	Cypress	F
Eriogonum fasciculatum	Common Buckwheat	F
Eucalyptus spp.	Eucalyptus	F
Jasminum humile	Italian Jasmine	F
Plumbago auriculata	Cape Plumbago	F
Tecoma capensis	Cape Honeysuckle	F

*F = flammable, I = Invasive

Notes:

1. Certain plants are considered to be undesirable in the landscape due to characteristics that make them highly flammable. These characteristics can be either physical or chemical. Physical properties would include large amounts of dead material retained within the plant, rough or peeling bark, and the production of copious amounts of litter. Chemical properties include the presence of volatile substances such as oils, resins, wax, and pitch. Plants with these characteristics should not be planted close to structures in fire hazard areas. These species are typically referred to as "Target Species" since their complete or partial removal from the landscape is a critical part of hazard reduction. Therefore, any plant listed in the above table is not allowed as part of an acceptable Fuel Modification Plan.
2. Plants on this list that are considered invasive are a partial list of commonly found plants. There are many other plants considered invasive that should not be planted in a fuel modification zone and they can be found on The California Invasive Plant Council's Website www.cal-ipc.org/ip/inventory/index.php. Other plants not considered invasive at this time may be determined to be invasive after further study.
3. For the purpose of using this list as a guide in selecting plant material, it is stipulated that all plant material will burn under various conditions.
4. The absence of a particular plant, shrub, groundcover, or tree, from this list does not necessarily mean it is fire resistive.
5. All vegetation used in Fuel Modification Zones and elsewhere in the Entrada South or Valencia Commerce Center project sites shall be subject to approval of the L.A. County Fire Department's Fuel Modification Unit or Fire Code official.

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Appendix F

Construction Fire Prevention Plan

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Entrada South and Valencia Commerce Center – Modified Project

Construction Fire Prevention Plan

JULY 2022

Prepared for:

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FIGURES

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AMSL	Above Mean Sea Level
CAL FIRE	California Department of Forestry and Fire Protection
CFC	California Fire Code (2016)
CFD	Community Facilities District
CFPP	Construction Fire Prevention Plan
CFR	Code of Federal Regulations
FAHJ	Fire Authority Having Jurisdiction
IC	Incident Command or Incident Commander
Modified Project	Entrada South and Valencia Commerce Center Project
NFPA	National Fire Protection Association
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
RFW	Red Flag Warning
LACoFD	Los Angeles County Fire Department
SSO	Site Safety Officer/Fire Safety Coordinator
TBD	To be determined
USGS	U.S. Geological Survey

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Definitions

1. **Activity Risk:** Activity risks include those actions that present a risk of igniting a wildfire.
2. **Fire Patrol:** A Newhall Ranch or designated contractor individual will be assigned as "Fire Patrol" specifically to monitor work activities when an Activity Risk exists for fire compliance. The Fire Patrol personnel shall regularly monitor the area for any signs of fire or unsafe practices.
3. **Fire Season:** Fire season is no longer officially designated by the wildland fire agencies. Southern California is considered to be in fire season on a yearlong basis. CALFIRE adjusts their staffing patterns as fire conditions moderate or escalate and this can be used as an indicator of potential fire activity.
4. **Fire Tools:** Essential firefighting tools to be staged near work activities are a 46-inch round point shovel, Pulaski, McLeod, 5-gallon "Indian" Backpack hand pump or water fire extinguisher, and a minimum 10-pound 4A:80BC Dry Chemical Fire extinguisher.
5. **Incident Commander (IC):** The Incident Commander is the agency representative in the leadership role for a wildfire event that reaches the level of establishment of the Incident Command system. This is not a responsibility of the Project and is implemented by the applicable agencies responding to a particular incident.
6. **Incident Command System (ICS):** The Incident Command System is "a systematic tool used for the command, control, and coordination of emergency response" according to the United States Federal Highway Administration. A more detailed definition of an ICS according to the United States Center for Excellence in Disaster Management & Humanitarian Assistance is "a set of personnel, policies, procedures, facilities, and equipment, integrated into a common organizational structure designed to improve emergency response operations of all types and complexities. This is not a responsibility of the Project and is implement by the applicable agencies responding to a particular incident.
7. **Plan:** The Construction Fire Prevention Plan (CFPP).
8. **Red Flag Warning (RFW):** A Red Flag Warning is issued for a stated period of time by the National Weather Service using pre-determined criteria to identify particularly critical wildfire danger in a particular geographic area. See Section 8 for construction and maintenance measures that must be implemented during RFWs.
9. **Site Safety Officer (SSO):** The Site Safety Officer or Fire Safety Coordinator is a Project representative that serves as a liaison to the emergency service agencies and all contractors or inspectors on the jobsite for the utilities on emergency incidents and construction-related activities. The SSO has the authority to stop any project work that appears to pose a particular fire risk or hazard.

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1 Summary

This Construction Fire Prevention Plan (CFPP) provides direction for fire safety awareness on the Entrada South and Valencia Commerce Center Project (Modified Project) sites during construction. CFPPs do not anticipate every potential fire scenario that may occur during construction, but aim to educate site personnel to potential risks associated with fire ignitions and the procedures that when implemented consistently will minimize the potential for a vegetation ignition. This CFPP provides standard protocols and approaches for reducing the potential of ignitions for typical construction site activities. When consistently employed, the concepts discussed herein will help minimize and avoid ignitions as well as extinguish any ignitions while they are small and controllable.

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2 Introduction

This Construction Fire Protection Plan (CFPP) provides detailed guidance on construction phase fire safety with a goal of minimizing the likelihood of fire ignitions within the construction area through mandated protocols and prevention measures to be employed by all on-site personnel during construction. This CFPP has been prepared for the Entrada South and Valencia Commerce Center project (Modified Project) and considers its fire environment (locations, weather, fuels, and ignition sources) in development of the specific measures to be implemented during construction.

The Modified Project Site is located in an unincorporated portion of Santa Clarita Valley in northwestern Los Angeles County (Figure 1). The development proposed by the Modified Project within the Entrada Planning Area includes 1,574 dwelling units and 730,000 square feet of non-residential development, as compared to 1,725 dwelling units and 450,000 square feet of non-residential development for the 2017 Approved Project. The VCC Planning Area consists of approximately 321 acres of an undeveloped portion of the partially completed VCC industrial park/commercial center located west of Interstate 5 (I-5) and north of Henry Mayo Drive and the Santa Clara River. The State-certified EIR analyzed the environmental implications of 3.4 million square feet of industrial/commercial space.

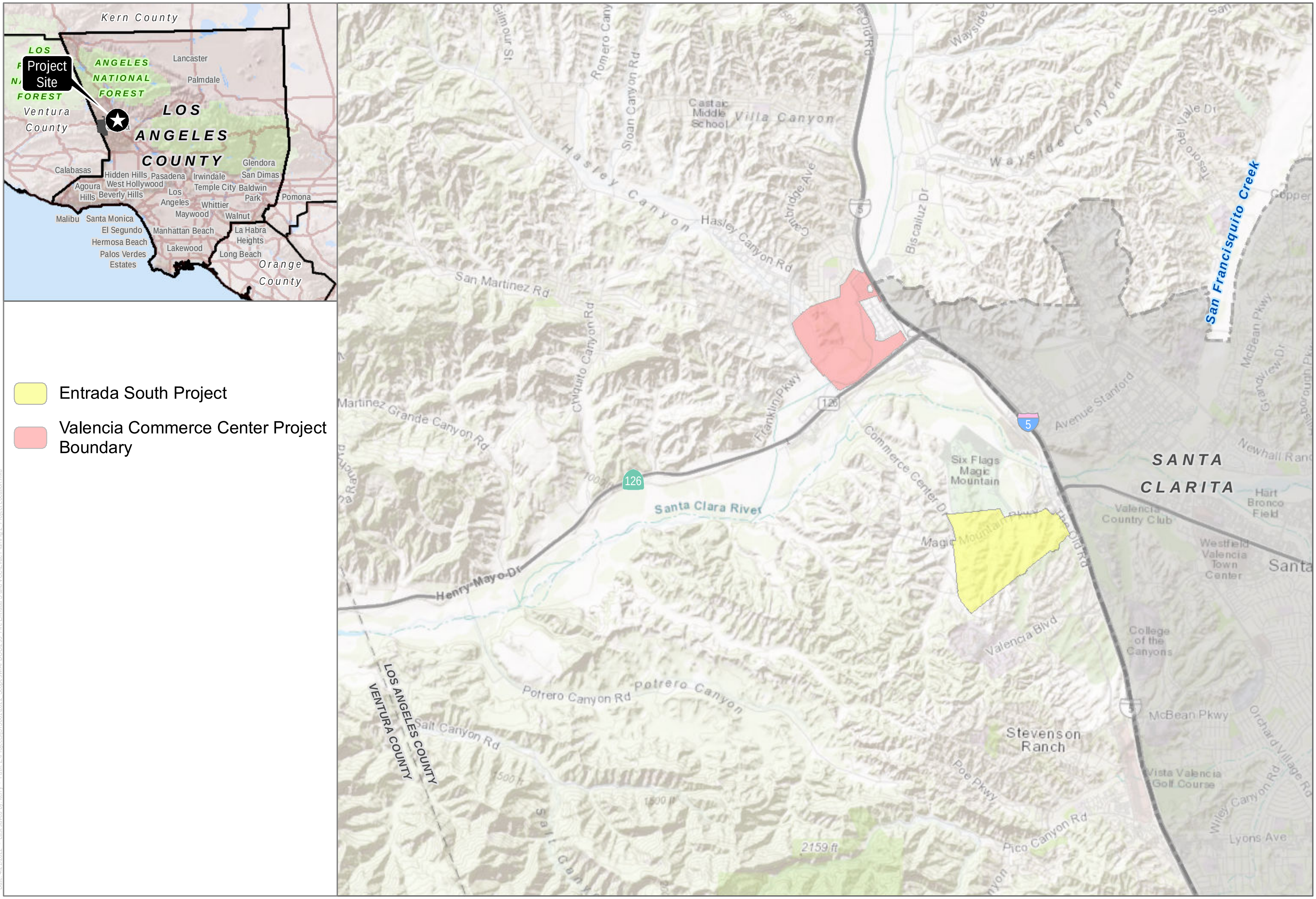
The Entrada and VCC planning areas are located within State Responsibility Areas designated as Very High Fire Hazard Severity Zone (VHFHSZ) by the California Department of Forestry and Fire Protection (CAL FIRE) (FRAP 2007). The State-certified EIR analyzed wildfire impacts as part of Section 4.17 Hazards, Hazardous Materials, and Public Safety.

The Project's region is located in a broad ecological and biogeographic transition zone for the coastal and mountain ecoregions. This alluvial Santa Clara River Valley also provides access via the Santa Clara River to the edges of the Mojave Desert and the foothills of the San Gabriel Mountains. While much of the region has been subject to rapid urbanization and historical agricultural and oil development practices, large areas of open space and natural lands border the region. The Los Padres National Forest is located to the north of the Project Site and the Angeles National Forest lies to the north and east. The Santa Susana Mountains, a region of gently rolling hills and sharp, steep-walled canyons, is south of the Modified Project Site.

The Project Site is within the planning boundary of the State-approved Newhall Ranch Resource Management and Development Plan and Spineflower Conservation Plan (RMDP/SCP), which was the subject of a State-certified Environmental Impact Report (EIR) (SCH No. 2000011025; hereafter referred to as the State-certified EIR). In the State-certified EIR for the RMDP/SCP, the Project Site is identified as the "Entrada Planning Area" and the "VCC Planning Area." The Entrada Planning Area is also sometimes referred to as Entrada South. The State-certified EIR determined that the Project would have a less than significant impact on adopted emergency response plans or emergency evacuation plans based on the location of fire states, a system of improved roads, and fire flows for the Project. The State-certified EIR also determined the Project would result in less than significant impacts related to wildfire with regulatory compliance and incorporation of mitigation measures.

Entrada Planning Area: The Entrada Planning Area consists of approximately 382 acres located west of I-5 and the City of Santa Clarita and south of the Santa Clara River and the Six Flags Magic Mountain theme park (Figure 1). The Entrada Planning Area is located in the U.S. Geological Survey (USGS) 7.5-minute Newhall quadrangle map, Township 4 North, Range 16 West, and generally in Sections 19, 20, and 30.

VCC Planning Area: The VCC Planning Area consists of approximately 321 acres of an undeveloped portion of the partially completed VCC industrial park/commercial center located west of I-5 and north of Henry Mayo Drive (State Route-126 [SR-126]) and the Santa Clara River (Figure 1). The VCC Planning Area is located in the U.S.G.S. 7.5-minute Newhall quadrangle map, Township 4 North, Range 17 West, and generally in Sections 11 and 12.



SOURCE: ESRI 2022; Hunsaker 2021

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0 0.5 1 Miles

FIGURE 1

Modified Project Location Map

Construction Fire Protection Plan for the Entrada South and Valencia Commerce Center Project

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3 Emergency Notification Procedures

Any fire event at or near the site will trigger the emergency notification procedures identified in this section. Fire reporting is critical for tracking where, when, how, and why fire ignitions occur and will help the fire agencies develop protocols for reducing their occurrence.

3.1 First Call = 9-1-1

Reporting fires and other emergencies: The first call should be to 9-1-1 so that appropriate apparatus can be dispatched.

Technical Staff Contact: *Project contact information will be provided to Los Angeles County Fire Department local stations to assist responding firefighters during an emergency.*

The first call should be to 9-1-1 so that emergency responders can be dispatched. Travel times to the site require notification of 9-1-1 as early as possible after the fire or other emergency has been observed.

For Non-Emergencies, contacts near the site include:

- Fire/Emergency Medical (Los Angeles County Fire Department, Battalion 6) - 661.753.9710
- Santa Clarita Police and Sheriff (Santa Clarita Office) – 661.255.1121
- California Highway Patrol (Valencia Office) – 661.600.1600
- Hospital – Henry Mayo Santa Clarita – 23845 McBean Parkway: 661.200.2000

To facilitate the arrival of fire services during construction, an emergency response meeting point will be established with the local Los Angeles County Fire Department (LACoFD) personnel. The Site Safety Officer (SSO) or designee will meet the emergency response team at the meeting point, likely the Project's main entrance, to lead them into the site. The meeting point will be selected with fire agency input.

3.2 Evacuation Procedures

During significant emergency situations at or near the Project site during construction, the site manager and/or SSO, in consultation with law or fire authorities, as possible, may issue an evacuation notice to construction personnel. When an evacuation has been called, all site employees will gather at a designated assembly area and the SSO will account for all personnel, as time allows. Once all employees are accounted for, or sooner if dictated by the emergency, the vehicles will safely convoy from the site to safe zones, which are generally areas off-site away from the threat. Should there still be persons within the site after the evacuation has been called, the SSO will send convened personnel off site to safe zones and the SSO and supervisors will perform a sweep of the project site to locate persons and reconvene at the assembly area. Once all personnel are accounted for, they will exit the site. Should a structure or wildland fire (or other emergency) occur that threatens the primary assembly area; other locations may be designated as secondary assembly areas by the SSO or supervisors, as dictated by the situation. The SSO and/or Site Supervisors should be prepared to be available to the Incident Commander (IC) throughout the Incident to facilitate information exchange.

3.2.1 Evacuation Routes

Depending on the type and severity of the emergency, along with weather and/or localized site conditions, roadways designated on Figures 2a and 2b for Entrada and VCC Planning Areas, respectively, and will be used for evacuating the area during construction.

The Modified Project's primary evacuation routes are accessed through a series of roadways, which connect with the primary ingress/egress roads (i.e., Magic Mountain Parkway, Commerce Center Drive, Hasley Canyon Road, and The Old Road) that intersect off-site primary and major evacuation routes.

Entrada Planning Area Primary and Secondary Emergency Ingress/Egress

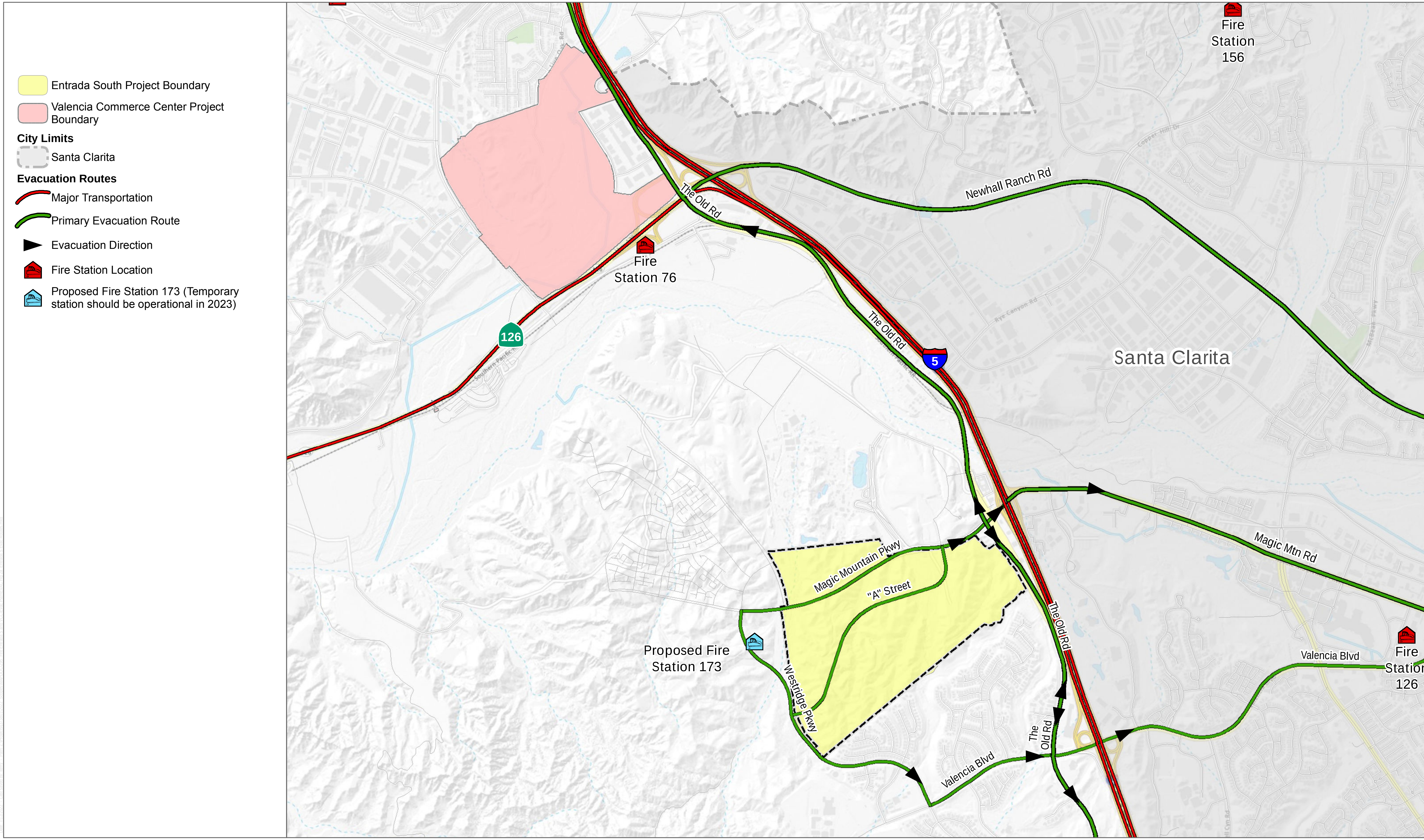
- **Primary Route:** Magic Mountain Parkway, or to The Old Road or I-5 to the north or south.
- **Secondary Route:** Westridge Parkway to Valencia Blvd then east to The Old Road or I-5.

VCC Planning Area Primary and Secondary Emergency Ingress/Egress

- **Primary Route:** Commerce Center Drive to Hasley Canyon Road to The Old Road or I-5 to the north or south.
- **Primary Route:** Commerce Center Drive to SR-126 to the east or west.
- **Secondary Route:** Hancock Parkway to Turnberry Lane or Muirfield Lane to The Old Road to the north or south.

Depending on the nature of the emergency requiring evacuation, it is anticipated that the construction personnel in the Entrada Planning Area traffic would exit the Modified Project Site via Magic Mountain Parkway, which is the direct route out of the Modified Project Site and onto other down-stream roadways. In a typical evacuation that allows several hours or more time, traffic may be directed in several directions to the north or south to I-5 and away from a west or east/northeast wind driven fire determined mostly by the fire's location, its spread rate and direction, time available before it could threaten evacuation routes, traffic levels, and others. If less time is available, or one or more potential routes are considered unsafe, fire and law enforcement officials may direct all traffic in one direction.

The SSO and site managers are primarily responsible for evacuations. They will employ procedures to determine the emergency, talk with fire officials, as possible, and declare the emergency status. Foreman level supervisors shall assist in accounting for personnel.



SOURCE: ESRI; COUNTY OF LOS ANGELES GIS 2021

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0 1,000 2,000 Feet

FIGURE 2a

Entrada South Community Evacuation Map

Fire Evacuation Plan for the Entrada South and Valencia Commerce Center Projects

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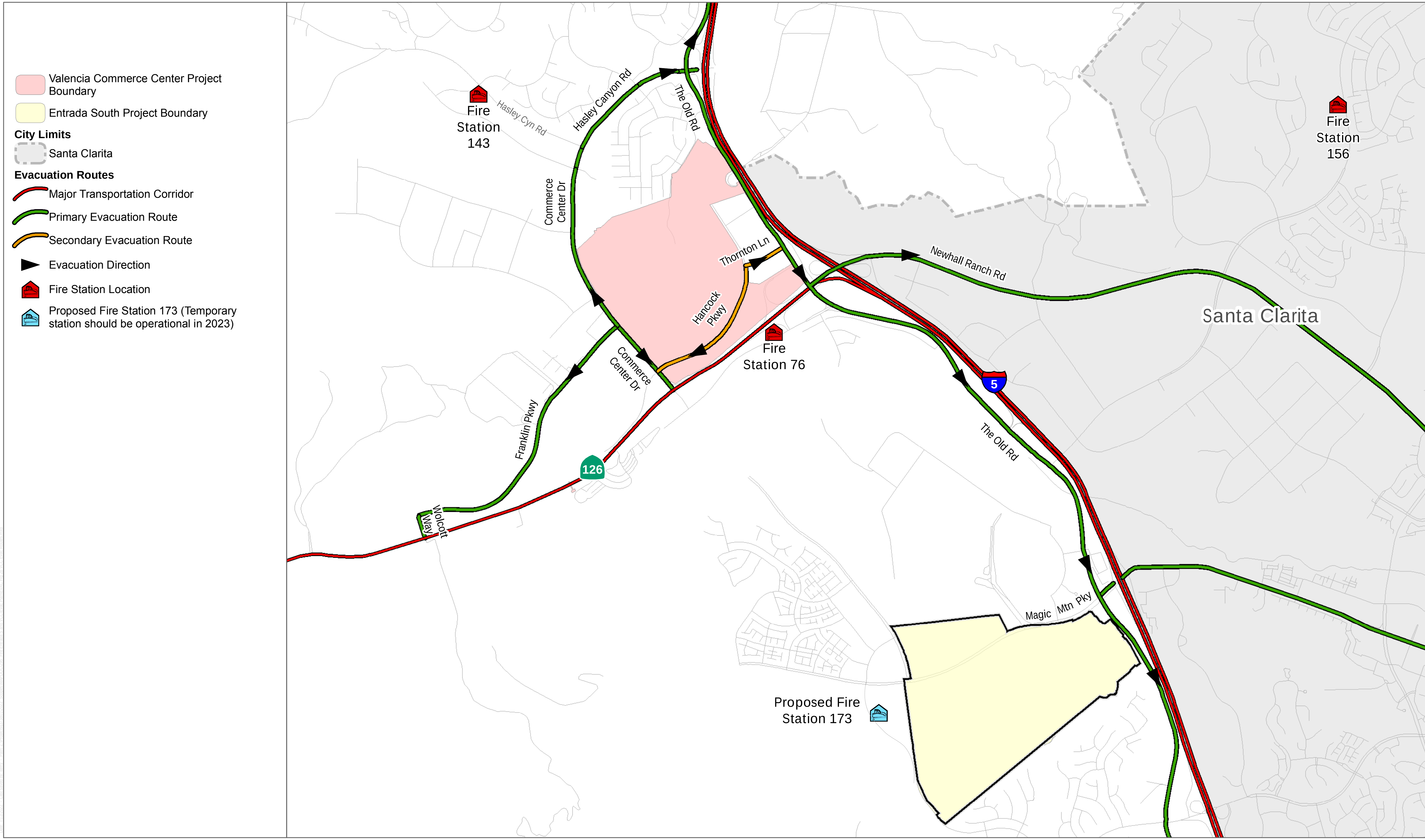

SOURCE: ESRI; COUNTY OF LOS ANGELES GIS 2021

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0 1,050 2,100 Feet

FIGURE 2b

Valencia Commerce Center Evacuation Map

Fire Evacuation Plan for the Entrada South and Valencia Commerce Center Projects

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4 Modified Project Roles and Responsibilities

All employees should know how to prevent and respond to fires, and are responsible for adhering to policies regarding fire emergencies. In particular, the following sections detail general responsibilities, by position.

4.1 Project Applicant

The Supplemental Environmental Impact Report for the Modified Project includes a site-specific Fire Protection Plan (FPP) and a Wildfire Evacuation Planto determine overall fire risk and a Wildfire Evacuation Plan to assist future residents, were prepared and approved for the Project. The Project is required to implement measures to reduce the risk and comply with federal, state, and local fire safety/protection policies. Additionally, the SSO or a designated Site Fire Safety Coordinator will conduct training and make equipment available to provide a safe working environment for employees and contractors.

4.2 Site Safety Officer

The SSO or a designated Site Fire Safety Coordinator will manage the Project's FPP and this CFPP during construction. Among the other responsibilities of the SSO are:

- Understanding the CFPP and its mandates for training, fire prevention, fire suppression, and evacuation.
- Understanding the fire risk associated with the site and with activities that will occur on site.
- Developing and administering the fire prevention and safety training program.
- Ensuring that fire control equipment and systems are properly maintained and in good working condition.
- Monitoring combustibles on the site and managing where they are stored.
- Conducting fire safety surveys and making recommendations.
- Posting fire rules on the project bulletin board at the contractor's field office and areas visible to employees.
- Stopping project work activities that pose a fire hazard or are not in compliance with this CFPP.
- Reporting all fires ignited on the site, whether structural, vegetation, electrical, or other to LACoFD.

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5 Fire Safety Plan Goals

The primary goals of this CFPP are to address the identified ignition sources and risks so that the personnel involved with constructing the Project have clearly defined protocols and procedures for reducing fire risk and maintaining a fire safe worksite. Among the goals developed for the Project site are:

- Prevent/minimize fires during construction, operation and decommissioning
- Provide a safe work-site for all employees, contractors, visitors and emergency personnel
- Prevent shock to emergency responders, workers, and unauthorized trespassers
- Prevent arcing or sparking, which could ignite vegetation on site
- Prevent or minimize dollar loss to the equipment
- Prevent or minimize potential for a fire starting on site to spread off site
- Provide water, appropriate fire extinguishers and access for firefighters
- Provide adequate signage and shut off devices to stop power feed into power lines in the event of a line failure, or fire in right of way
- Provide water trucks equipped with fire extinguishers, hoses, shovels, and Pulaski's (fire fighting hand tool) when work involves the use of chainsaws, chippers, vegetation masticators, grinders, drill rigs, tractors, torches, and/or explosives.
- Provide the ability to report a fire or other emergency to 9-1-1 without delay and to make contact with internet websites and personnel
- Report all fire ignitions, regardless of size, to the LACoFD

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6 Site and Project Description

6.1 Location

The Project's region is located in a broad ecological and biogeographic transition zone for the coastal and mountain ecoregions. This alluvial Santa Clara River Valley also provides access via the Santa Clara River to the edges of the Mojave Desert and the foothills of the San Gabriel Mountains. While much of the region has been subject to rapid urbanization and historical agricultural and oil development practices, large areas of open space and natural lands border the region. The Los Padres National Forest is located to the north of the Project Site and the Angeles National Forest lies to the north and east. The Santa Susana Mountains, a region of gently rolling hills and sharp, steep-walled canyons, is south of the Modified Project Site.

6.2 Vegetation and Topography

6.2.1 Vegetation

Extensive vegetation type mapping is useful for fire planning because it enables each vegetation community to be assigned a fuel model, which is used in a software program to predict fire behavior characteristics, as discussed in Section 4 Modeling: Anticipated Fire Behavior for Worst-Case Fire Conditions. Generally, wildland-urban interfaces with shrubland-dominated vegetation are found to be more fire-prone than those with grasslands or other natural spaces (Elia et al., 2019). The Modified Project Site's vegetative fuels are primarily annual grassland, scrub and chaparral habitat, and riparian forest. Man-made land cover types, such as agriculture and disturbed land were also previously mapped on the Entrada and VCC Planning Areas. These vegetation community and land cover types were confirmed by Dudek fire protection planners in the field and the dominant vegetation types were assigned fuel models for use during fire behavior modeling (see Section 4.1.1 Fire Behavior Modeling Analysis). The vegetation communities are shown in Figure 3a for the Entrada Planning Area and Figure 3b for the VCC Planning Area.

Post-development vegetation composition proximate to the Entrada and VCC Planning Area footprints is expected to be significantly different than current conditions. Following build-out, irrigated landscape vegetation associated with fuel modification zones (FMZ) A and B are expected to cover the immediate area surrounding the Modified Project Site, extending 100 horizontal feet from each of the structures. Consistent with requirements, native and naturalized vegetation occurring within FMZ Zone C is not expected to be irrigated, although overall fuel volumes will be reduced by removing dead and dying plants, non-natives, highly flammable species, and thinning the remaining plants so they would not readily facilitate the spread of fire on an ongoing basis. The provided FMZ areas will be maintained in order to comply with County Fire Fuel Modification Plan guidelines.

6.2.2 Topography

The Modified Project Site is located in the Santa Clara River Valley, between the Santa Susana Mountains to the south and the Topatopa Mountains to the north. The Modified Project Site is topographically diverse with slope gradients ranging from moderate to steep on the hillsides to very gentle in the Santa Clara River floodplain and major tributary canyons.

The Entrada Planning Area is located south of the Santa Clara River on rugged terrain dominated by steep slopes. It is dissected by four south–north-trending tributaries to the Santa Clara River, including one along Magic Mountain Canyon and three unnamed tributaries (Figure 4a, Topography). All four tributaries exit the Entrada Planning Area through natural drainages before eventually discharging into the Santa Clara River. Topographically, the southern portion of the site is dominated by north–south-trending ridges. A narrow panhandle (roughly 330 feet wide) extends along the western portion of the site to a fairly level former pasture area.

The VCC Planning Area is located north of the Santa Clara River and is dissected by two south–north-trending tributaries to the Santa Clara River: Castaic Creek and Hasley Creek (Figure 4b). Both tributaries exit the VCC Planning Area through natural drainages before eventually discharging into the Santa Clara River. Topographically, the site is situated in relatively flat areas along Castaic Creek and within the lower elevations of Hasley Canyon. The remaining portions of the site have greater topographic relief. Site elevations range from approximately 990 feet amsl along the Castaic Creek bottom to approximately 1,210 feet amsl at the top of the north-central ridge (Dudek 2020).

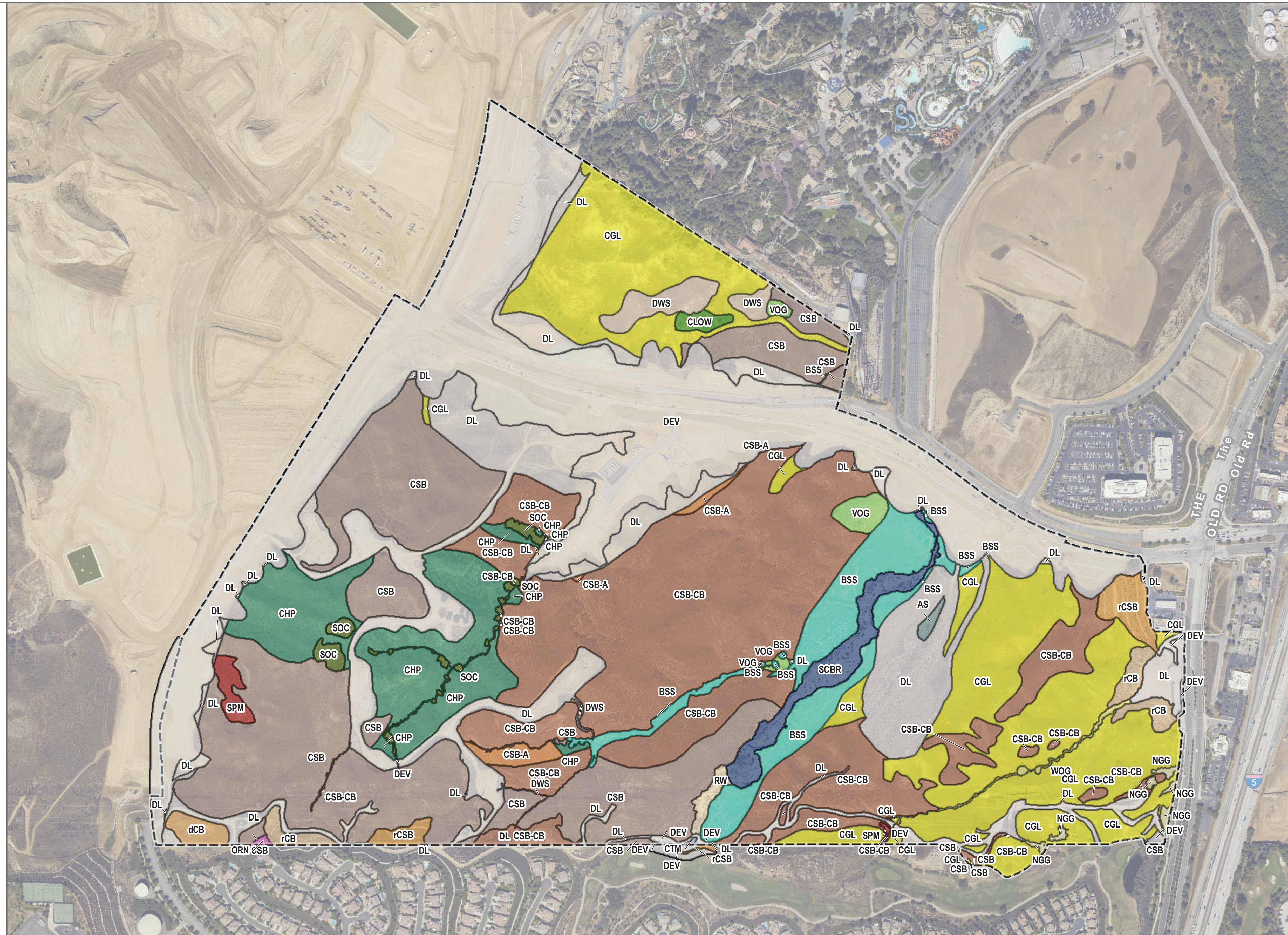
Entrada South Tract Boundary

Modified Project Vegetation

Vegetation Communities and Land Cover Types

Vegetation Communities and Land Cover Types

- AS = Alluvial scrub
- BSS = Big sagebrush scrub
- CGL = California annual grassland
- CHP = Undifferentiated chaparral
- CSB = California sagebrush scrub
- CSB-A = California sagebrush scrub-Artemisia
- CSB-CB = California sagebrush scrub-California buckwheat
- DWS = Deer weed scrub
- NGG = Needlegrass grassland
- dCB = Disturbed California buckwheat
- rCSB = Restored California sagebrush scrub
- rCB = Restored California buckwheat
- CTM = Cattail marshes
- ORN = Ornamental
- SCBR = Scale broom scrub
- SOC = Scrub oak chaparral
- SPM = Short-podded mustard stand
- CLOW = Coast live oak woodland
- VOG = Valley oak grassland
- WOG = Wild oats grassland
- RW = River wash
- DL = Disturbed land
- DEV = Developed



SOURCE: ESRI 2019; Hunsaker 2019

DUDEK

0 295 590 Feet

FIGURE 3a

Entrada Planning Area's Vegetation Communities and Land Cover Types

Construction Fire Prevention Plan for the Entrada South and Valencia Commerce Center Projects

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Modified Project

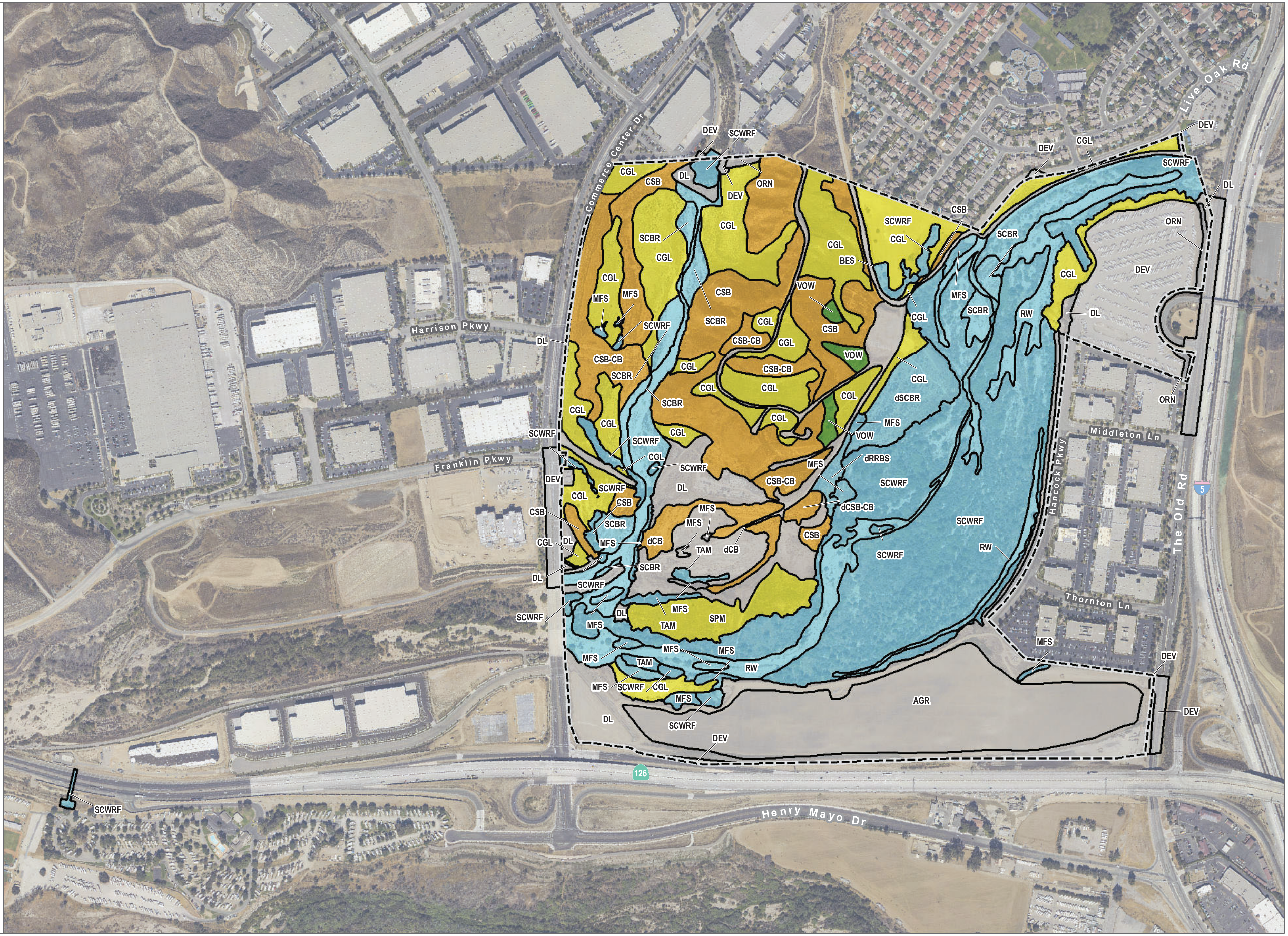
- Off-Site Project Impact Area
- Valencia Commerce Center Tract Boundary

General Vegetation Communities and Land Cover Types

- Coastal Scrub
- Grass and Herb Dominated Communities
- Oak woodland
- Riparian
- Man-made land cover

Specific Vegetation Communities and Land Cover Types

AGR = Agriculture
BES = Blue elderberry stands
CGL = California annual grassland
CSB = California sagebrush scrub
CSB-CB = California sagebrush scrub-California buckwheat
DEV = Developed
DL = Disturbed land
MFS = Mulefat scrub
ORN = Ornamental
RW = River wash
SCBR = Scale broom scrub
SCWRF = Southern cottonwood-willow riparian forest
SPM = Short-podded mustard stand
TAM = Tamarisk scrub
VOW = Valley oak woodland
dCB = Disturbed California buckwheat
dCSB-CB = Disturbed California sagebrush scrub-California buckwheat
dRRBS = Disturbed rubber rabbitbrush scrub
dSCBR = Disturbed scale broom scrub



SOURCE: ESRI 2019; Hunsaker 2019

DUDEK

0 400 800 Feet

FIGURE 3b

VCC Planning Area's Vegetation Communities and Land Cover Types

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SOURCE: USGS, 7.5 MINUTE SERIES, NEWHALL QUADRANGLE

DUDEK

0 360 720 Feet

FIGURE 4a

Entrada South Topography

Construction Fire Prevention Plan for the Entrada South and Valencia Commerce Center Project

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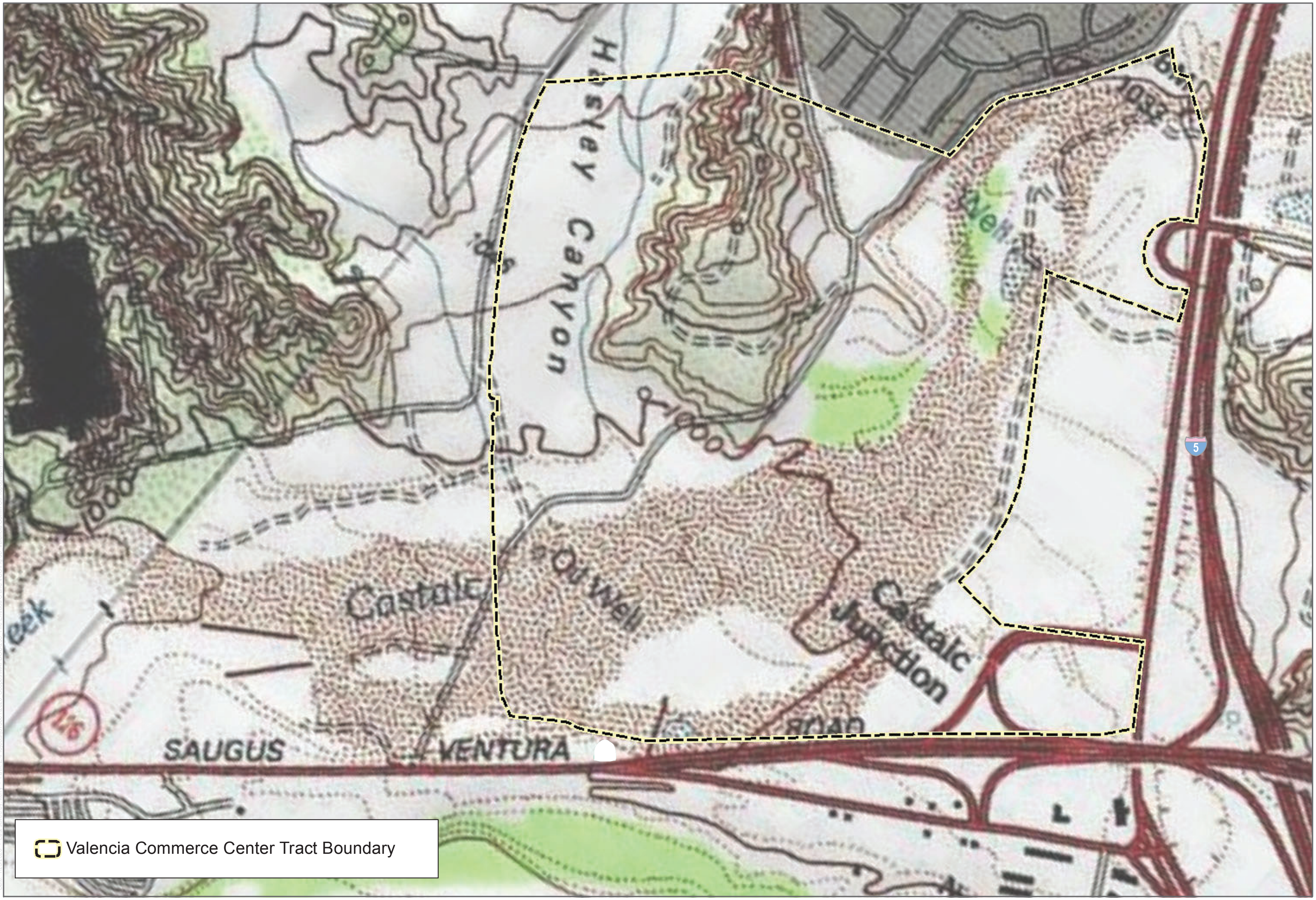

SOURCE: USGS, 7.5 MINUTE SERIES, NEWHALL AND VAIL VERDE QUADRANGLES

DUDEK

0 400 800 Feet

FIGURE 4b

Valencia Commerce Center Topography

Construction Fire Prevention Plan for the Entrada South and Valencia Commerce Center Project

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7 Project Specific Risk Summary

7.1 Fire Risk

Fire risks must be assessed based upon the potential frequency (probability of an incident occurring) and consequence (potential damage should an event occur). The evaluation of fire risks must take into account the frequency and severity of fires.

The Project's fire risks are associated with the following:

7.1.1 Construction Phase Risks

- **Earth-moving equipment** – have potential to create sparks, heat sources, fuel or hydraulic leaks, etc.
- **Chainsaws and small combustible engines** – have the potential to result in vegetation ignition from overheating, spark, fuel leak, etc.
- **Vehicles** – have the potential for heated exhausts/catalytic converters in contact with vegetation may result in ignition
- **Welders** – have the potential to create an open heat source may result in metallic spark coming into contact with vegetation
- **Wood chippers** – have the potential to include flammable fuels and hydraulic fluid that may leak and spray onto vegetation with a hose failure
- **Compost piles** – have the potential to create large piles that are allowed to dry and are left on-site for extended periods may result in combustion and potential for embers landing in adjacent vegetation
- **Grinders** – have the potential for sparks from grinding metal components may land on a receptive fuel bed
- **Torches** – have the potential to act as a heat source, open flame, and resulting heated metal shards may come in contact with vegetation
- **Dynamite/blasting** – if necessary, blasting has the potential to cause vegetation ignition from open flame, excessive heat or contact of heated material on dry vegetation
- **Other human-caused accidental ignitions** – have the potential for ignitions related to discarded cigarettes, matches, temporary electrical connections, inappropriately placed generators, poor maintenance of equipment, and others

Fire Prevention Measures for all Construction Activities:

- Minimize combustible and flammable materials storage on site.
- Store any combustible or flammable materials that need to be on site away from ignition sources.
- Parking areas shall be cleared of all grass and brush to a distance of at least 10 feet beyond the parking area.
- Keep evacuation routes free of obstructions.
- Label all containers of potentially hazardous materials with their contents and stored in the same location as flammable or combustible liquids.

- Perform "hot work" according to fire safe practices in a controlled environment and with fire suppression equipment at the job site. A fire watch person (Fire Patrol), with extinguishing capability (e.g., fire extinguishers), should be in place for all 'Hot Work" and heavy machinery activities during construction. Ensure hot work adheres to the guidelines provided.
- Dispose of combustible waste promptly and according to applicable laws and regulations.
- Report and repair all fuel leaks without delay.
- Do not overload circuits or rely on extension cords where other options would be safer.
- Turn off and unplug electrical equipment when not in use.
- Direct contractors on site to restrict use of chainsaws, chippers, vegetation masticators, grinders, drill rigs, tractors, torches, and explosives during RFW in accordance with Section 8, below. When the above tools and equipment are used near substantial fuel sources, water trucks/tenders (per project design feature (PDF-WF-1 as identified in the SEIR for the Modified Project)) (4,000 gallon capacity) equipped with hoses, shovels, Pulaski's, and McLeod's shall be accessible to personnel.
- Equip all construction-related vehicles located near substantial fuel sources with a 10 pound 4A:80 BC Dry Chemical Fire Extinguisher, a 5-gallon backpack pump or water fire extinguisher, a 46-inch round point shovel, and a first-aid kit.
- When an evacuation has been called, all site personnel will gather at the designated assembly area and the SSO will account for all personnel to the extent practicable. Once all personnel are accounted for, the vehicles will safely convoy from the site to safe zones to the extent practicable.

7.1.2 Consultants and Contractor On-site Risk

Consultants and contractors should know how to prevent and respond to fires, and are responsible for adhering to fire safety standards and best practices.

Fire Prevention Measures for Consultants/Contractors:

- All vehicles brought onto the site and located near substantial fuel sources shall be equipped with fire prevention equipment:
  - 10 pound, 4A:80BC dry chemical fire extinguisher
  - 46-inch round point shovel
  - 5-gallons of water or a 5-gallon water backpack
  - First-aid kit
- No driving (cars, trucks, ATVs or similar) over unmaintained and dry vegetation.
- Vehicles to be parked a minimum of 10 feet from nearest vegetation within an area devoid of any vegetation.
- Site activities limited during Red Flag Warning Weather periods in accordance with Section 8, below; stay alert to fire and weather conditions and evacuate employees, if safe to do so.
- Consultants/Contractors will conduct operations safely to limit the risk of fire
- Hot Work shall adhere to the guidelines provided below in Section 7.5.
- During significant emergency situations, an evacuation notice may be issued by the site manager/supervisor or SSO to the extent practicable. When an evacuation has been called, all consultant or contractor employees will gather at the designated assembly area and the SSO will account for all

personnel. Once all employees are accounted for, the vehicles will safely convoy from the site to safe zones to the extent practicable, which are generally areas off-site away from the threat.

7.3 Best Practices to Reduce Construction Risks

The SEIR includes measures to be employed as PDFs and mitigation measures (MMs). The following constitute best practices during construction that are Fire Code required measures or recommended as part of this plan during construction to reduce the risk of ignitions. These measures may be monitored through the SSO and ongoing worker safety training.

- Fire rules posted on the project bulletin board at the contractor's field office and areas visible to employees. This shall include all consultants, contractors and subcontractors if more than one.
- Fires ignited on site reported to LACoFD.
- The engineering, procurement, and construction contracts for the project identify fire safety requirements.
- All internal combustion engines used at the Modified Project Site should be equipped with spark arrestors that are in good working order.
- Once initial two-track roads have been cut, light trucks and cars are recommended only on roads where the roadway is substantially cleared of vegetation. Mufflers on all cars and light trucks shall be maintained in good working order.
- During construction, the Project should be equipped with at least one water tender. Each truck should be equipped with 50 feet of 0.25-inch fast response hose w/fog nozzles. Any hose size greater than 1 ½" shall use National Hose (NH) couplings.
- A cache of shovels, McLeod's, and Pulaski's is recommended to be available at staging sites. Additionally, on-site pickup trucks should be equipped with first-aid kits, fire extinguishers and shovels if located near high fuel areas.
- Equipment parking areas and small stationary engine sites to be cleared of all extraneous flammable materials.
- The on-site contractor must restrict use of chainsaws, chippers, vegetation masticators, grinders, drill rigs, tractors, torches, and explosives during RFW conditions in accordance with Section 8. When the above tools and equipment are used, water tenders equipped with hoses, shovels, McLeod and Pulaski shall be accessible to personnel.
- A fire watch (person responsible for monitoring for ignitions) will be provided during hot works and heavy machinery activities and is recommended to monitor for a minimum of 30 minutes following completion of the hot work activities.
- Smoking and vaping should not occur in wildland areas or within 50 feet of combustible materials storage, and shall be limited to designated areas or areas cleared of all vegetation.
- Each project construction site (if construction occurs simultaneously at various locations) to be equipped with fire extinguishers and firefighting equipment sufficient to extinguish small fires.
- Construction workers at the site to receive training on the proper use of firefighting equipment and procedures to be followed in the event of a fire. Training records shall be maintained and be available for review by the LACoFD.

7.4 Daily Fire Prevention Measures

To limit the risk of fires, all site staff, employees, and contractors are recommended to take the following precautions:

- Fire safety to be a component of daily tailgate meetings. Foremen will remind employees of fire safety, prevention, and emergency protocols on a daily basis.
- No Smoking or vaping allowed on site except in designated smoking areas which include cleared area with no combustible vegetation or materials and approved butt receptacles (noncombustible containment of cigarette butts). Smoking or vaping inside closed vehicles at the site may be allowed in designated areas away from vegetation, at the discretion of the SSO.
- Combustible materials to be stored in areas away from native vegetation. Whenever combustibles are being stored in the open air, the SSO shall be informed of the situation.
- Evacuation routes to be maintained free of obstructions that would block evacuations. Unavoidable evacuation route blockages shall be coordinated such that a secondary route is identified and available.
- Disposal of combustible waste in accordance with all applicable laws and regulations.
- Use and store flammable materials in areas away from ignition sources.
- Proper storage of chemicals, such that incompatible (i.e., chemically reactive) substances would be separated appropriately, shall be required.
- Performance of hot work (i.e., welding or working with an open flame or other ignition sources) in controlled areas under the supervision of a fire watch shall be required. Hot work permits are required and will be reviewed and granted by the SSO for all hot work.
- Equipment shall be kept in good working order by inspecting electrical wiring and appliances regularly and maintaining motors and tools free of excessive dust and grease.
- Immediate reporting of fuel or petroleum leaks to be required. The site mechanic shall ensure that all leaks are repaired immediately upon notification.
- Immediate repair and cleanup of flammable liquid leaks to be required.
- Extension cords not to be relied on if wiring improvements are needed, and overloading of circuits with multiple pieces of equipment shall be prohibited.
- Turning off and unplugging electrical equipment when not in use.

7.4.1 Fire Prevention/Protection System Maintenance

The SSO (or trained specialist, when necessary) is recommended to ensure that fire suppression and related equipment is maintained according to manufacturers' specifications. National Fire Protection Association (NFPA) guidelines shall be implemented for specific equipment.

Per Fire Code, the following equipment is subject to ongoing maintenance, inspection, and testing procedures:

- Portable fire extinguishers;
- Fire alarm and suppression systems;
- Water trucks and associated equipment; and
- Emergency backup generators/systems and the equipment they support.

7.5 Hot Work

These requirements are primarily from 2019 California Fire Code (CFC) Chapter 35, Welding and other Hot Work, and NFPA 51B, Fire Prevention During Welding, Cutting and other Hot Work. Hot work is defined in the CFC as operations involving cutting, welding, thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, or other similar operations. Hot work areas are defined as the areas exposed to sparks, hot slag, radiant heat, or convective heat because of the hot work.

A Hot Work Permit shall be obtained for all hot work regardless of location from the SSO, following guidelines from the LACoFD. In accordance with NFPA 51B and the CFC Chapter 26, hot work shall only be done in fire safe areas designated by the SSO and shall comply with the following:

- All personnel involved in Hot Work shall be trained in safe operation of the equipment by the SSO. This will include providing training at “tailgate safety meetings”. They shall also be made aware of the risks involved and emergency procedures, such as how to transmit an alarm and who is responsible to call 9-1-1.
- Signage required in areas where workers may enter indicating “Caution; Hot Work in progress; Stay Clear” would be posted on site.
- Hot work would not be done on any containers which contain or have contained flammable liquids, gases, or solids until containers have been thoroughly cleaned, purged, or inerted.
- A dry chemical fire extinguisher with a minimum rating of 4A:80BC, a 5-gallon backpack pump or water fire extinguisher, and a 46-inch round point shovel, shall be readily accessible within 25 feet of hot work area.
- The SSO or safety manager shall inspect the hot work area before issuing a permit and shall then make daily inspections.
- Welding and cutting would comply with 2019 CFC) Chapter 35- welding and Hot Work.
- Electric arc hot work would comply with CFC Chapter 35.
- Piping manifolds and Hose Systems for Fuel Gases and Oxygen would comply with CFC Section 3509.
- Cylinder use and storage shall comply with 2019 CFC Chapter 53, “Compressed Gases.”
- Equipment to be consistent with LACoFD guidance for construction equipment, including torches, manifolds, regulators, or pressure reducing valves, and any acetylene generators.
- Personal Protective Clothing would be selected to minimize the potential for ignition, burning, trapping hot sparks, and electric shock.
- A fire watch will be in place for a minimum of 30 minutes, or longer as considered necessary by the SSO, following any hot work.
- Any ignitions would be immediately extinguished (as possible) by site personnel and LACoFD would be notified of the incident.

The SSO shall have the responsibility to assure safe Hot Work operations and shall have the authority to modify hot work activities associated with construction and/ maintenance activities, and to exceed the requirements in NFPA 51B and 2019 CFC, to the degree necessary to prevent fire ignition. Workers must be trained on the hot work information and criteria in this CFPP.

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8 Red Flag Warning Protocol

Red Flag Warnings are issued by the National Weather Service and indicate that conditions are such (low humidity, high winds) that wildfire ignitions and spread may be facilitated. To ensure compliance with Red Flag Warning restrictions, the National Weather Service website would be monitored at the site (http://www.srh.noaa.gov/ridge2/fire/briefing.php). During Red Flag Warnings, construction related activities would be limited and precautions may be taken on site during periods of a Red Flag Warning, when conditions such as low humidity and high winds are present. Upon announcement of a Red Flag Warning, red flags will be prominently displayed at the entrance gate and main office, indicating to employees and contractors that restrictions are in place. Any hot work (work that could result in ignition sources or increase fire risk), grading in native vegetated areas, or any other work near native or unmaintained vegetation that could result in heat, flame, sparks, or may cause an ignition to vegetation shall be prohibited during Red Flag Warning conditions unless the result would be less safe without completing the task. If vehicles are required to be used during Red Flag Warning conditions, vehicles shall remain only on designated access roads on the site or areas of the site not located near native or unmaintained vegetation.

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9 Fire Safety Briefings, Inspections, and Training

9.1 Briefings and Inspections

The SSO would conduct routine, unannounced inspections a minimum of once, weekly. The SSO would develop an inspection check list to document these inspections.

Prior to Project construction, Project personnel would receive training on the contents of this CFPP, along with additional fire safety and fire prevention information provided by an informed SSO (or designee). As possible, firefighters from LACoFD will attend these meetings and provide input, which has a dual benefit of informing site personnel and providing Project familiarity for the firefighters.

Site supervisors/foremen will be responsible for sharing CFPP content with consultants and construction personnel throughout the duration of the Project. A review of the content of this CFPP would take place at a formal safety briefing at a minimum of once per month.

Each daily safety tailgate session should include an assessment of the day's fire-related risks or hazards and the mitigation for each.

Compliance, including monitoring compliance, with this CFPP is mandatory. All levels of project management have the authority to shut down any operation that presents an inappropriate amount of fire risk or hazard until it can be properly mitigated.

Violations of any of the requirements of this CFPP would be addressed by the SSO or other supervisory personnel, immediately. Appropriate consequences for repeated or serious negligence in respect to this CFPP would be dealt with accordingly. All Project-related vegetation fires, regardless of size, shall be promptly reported to the SSO and LACoFD to determine if appropriate mitigation measures are being taken.

9.2 Training Requirements

9.2.1 Basic Fire Safety Training

The SSO and or site supervisors/foremen would present basic fire prevention training to employees upon employment, and shall maintain documentation of the training, which includes the following:

- The Project-specific FPP
- Review of the Occupational Safety and Health Administration (OSHA) Fire Protection and Prevention (29 CFR 1926.24)
- Proper response and notification in the event of a fire;
- Instruction on the use of portable fire extinguishers (as determined by company policy in the Emergency Action Plan), and hand tools, such as shovels, and recognition of potential fire hazards.

The SSO would train persons entering the site on the fire hazards associated with the specific materials and processes to which they are exposed, and will maintain documentation of the training. Employees would receive this training at the following times:

- Upon first entering the facility
- Annually during a pre-planned meeting
- When changes in work processes necessitate additional training

Upon returning to the site after having been gone longer than 90 days

9.2.2 Site Supervisor Fire Safety Training

Prior to Project construction, site supervisors would receive a minimum of 1 hour training on wildland fire prevention and safety. This training would be provided by the SSO or qualified designee. This training would then be shared with all construction personnel by the site supervisor or the SSO.

Each site supervisor would be trained on the following:

- Fire reporting
- Extinguishing small fires in order to prevent them from growing into more serious threats.
- Fire prevention
- Identifying work activities that may result in a fire hazard

9.2.3 Communication

The ability to communicate with personnel working on the Modified Project Site is mandatory. Construction crews would be required to have a cell phone or satellite phone, and/or radios that are operational within the area of work to report an emergency. Contact information for lead construction personnel would be provided to respective agencies. Communication pathways and equipment would be tested and confirmed operational each day prior to initiating construction activities. Fires and medical emergencies would be immediately reported to LACoFD via 9-1-1.

Each on-site worker would carry at all times a laminated, CFPP card listing 24-hour contact information, including telephone numbers for reporting an emergency and immediate steps to take if an incident occurs. Information on the CFPP card would be updated as needed and redistributed to all workers before the initiation of any construction activities. The Project's compliance monitor would provide the CFPP cards to the site's SSO prior to construction kick-off so that all site staff can be provided training and receive their cards.

10 Project Personnel Fire Fighting Limitations

Responding to fires at the Modified Project Site, whether structural, wildland, or other, is the responsibility of LACoFD. Because their response to the site may require several minutes or more, Project employees and contractors should provide only initial firefighting efforts, and only if they have had appropriate training. No employee shall fight a fire beyond the incipient stage and the arrival of professional fire suppression personnel. Involvement in firefighting is voluntary and should only be attempted by trained, qualified individuals.

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Appendix G

Stantec OVOV Analysis

Stantec

Memo

To:	File	From:	Daryl Zerfass
			Irvine
Project/File:	2042604600	Date:	April 20, 2022

Reference: Entrada South and Valencia Commerce Center Modified Project's Consistency with the Santa Clarita Area Plan (One Valley One Vision) Circulation, Emergency Access, and Evacuation Framework

1 Introduction and Executive Summary

This memorandum analyzes the Entrada South and Valencia Commerce Center Modified Project's consistency with the circulation, emergency access, and evacuation framework established by Los Angeles County for the Santa Clarita Valley area. For context, this analysis summarizes relevant information and policies related to circulation, emergency access, and evacuation from the:

- Los Angeles County Westside Bridge and Major Thoroughfare District
- Santa Clarita Valley Area Plan (One Valley One Vision)
- State-Certified EIR
- Initial Study for the Modified Project

As summarized below, Los Angeles County has engaged in extensive planning for the circulation and transportation framework of the Santa Clarita Valley area. These efforts include the Santa Clarita Valley Area Plan (One Valley One Vision), jointly approved by Los Angeles County and the City of Santa Clarita in 2012, which established the long-term land use and circulation framework for the area, which took in account the need to provide adequate emergency access and evacuation as the Santa Clarita Valley area is built out over time. The Modified Project is consistent with the land use designations and circulation framework established by the Santa Clarita Area Plan, including the Area Plan's transportation policies related to emergency access and evacuation.

2 Discussion

2.1 Los Angeles County Westside Bridge and Major Thoroughfare District

The Los Angeles County Westside Bridge and Major Thoroughfare District was approved in 2011 for the purpose of financing for specific improvements in the westside area of the Santa Clarita Valley. Improvements include, but are not limited to new and improved roadways, bridges, intersections, and interchanges. An illustration of the District boundaries and key facilities is attached for reference. The

District helps ensure that infrastructure, roadways, bridges, intersection and interchange are funded and constructed in a manner to ensure the orderly development of the Santa Clarita Valley area. The circulation system contemplated by the District is consistent with applicable Los Angeles County long-range plans for the area. The Modified Project would comply with the District's fee requirements and would be consistent with the purpose of the District.

2.2 Santa Clarita Valley Area Plan (One Valley One Vision)

In 2012, Los Angeles County and the City of Santa Clarita jointly approved the Santa Clarita Valley Area Plan, One Valley One Vision (OVOV) to ensure the orderly development of the Santa Clarita Valley. OVOV established area-wide circulation and transportation framework and took into account emergency access and evacuation during wildfires and other emergencies. An illustration of the OVOV circulation plan is attached for reference.

OVOV provides "[p]olicies to ensure that the circulation system is safe, such as provision of emergency access and maintenance of evacuation routes, [which] are consistent with provisions of the Safety Element."[1] The OVOV EIR determined that the circulation framework, emergency access, and evacuation planning for the OVOV area would result in less than significant impacts, as follows:

> *"[OVOV] policies are designed to maintain adequate emergency access throughout the County's [OVOV] Planning Area. They would promote mobility to allow for acceptable response times by emergency vehicles, and ensure emergency access to various types of properties. Additionally, the County would maintain a current evacuation plan. Since the proposed [OVOV] Area Plan would provide the framework to ensure adequate emergency access, impacts would be less than significant."*[2]

Further, the OVOV EIR analyzed the impact of wildland fires on emergency access and evacuation related to buildout of the OVOV area.[3] The OVOV EIR concluded that OVOV's plans and policies would ensure that the buildout of the OVOV area would be consistent with existing and future LA County evacuation plans and procedures, ensuring safe egress and evacuation during emergencies, including emergencies caused by fires or wildfires.[4]

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[1] Santa Clarita Valley Area Plan, One Valley One Vision, 2012, Circulation Element, p. 72.
[2] OVOV Draft EIR, Nov. 2010, Chapter 3.2, Circulation and Transportation, p. 3.2-66, available at https://planning.lacounty.gov/ovov.
[3] OVOV Draft EIR, Nov. 2010, Chapter 3.11, Hazards and Hazardous Materials, pp. 3.11-28 to 3.11-29, available at https://planning.lacounty.gov/ovov.
[4] *Id.* at 3.11-30.

Relevant transportation-related policies in OVOV and the Modified Project's consistency assessment is provided as follows:

OVOV Policy	Modified Project Consistency Assessment
Objective C-2.1: Implement the Circulation Plan (as shown on [OVOV] Exhibit C-2) for streets and highways to meet existing and future travel demands for mobility, access, connectivity, and capacity.	"[OVOV] contains several policies intended to ensure that adequate emergency access is maintained throughout the Santa Clarita Valley. In order to promote mobility within the roadway network, the proposed Area Plan seeks to limit excessive cross traffic, access points, and turning movements on arterial highways; and enforce the appropriate spacing of traffic signals (Policy C 2.1.1), enhance connectivity of the roadway network through such methods as grade separations and bridges (Policy C 2.1.2), enhance the capacity of the roadway system by upgrading intersections when necessary (Policy C 2.1.3), ensure that the future dedication and acquisitions of roadways are based on projected demand (Policy C 2.1.5), and implement the construction of paved crossover points through medians for emergency vehicles (Policy C 2.2.9)."[5] The Modified Project is designed to implement and be consistent with the circulation system established by OVOV. The State-certified EIR determined that the 2017 Approved Project would not significantly interfere with an emergency access or evacuation with mitigation. As stated below, the Initial Study for the Modified Project determined that the Modified Project would not impair implementation of the County's evacuation plan. The Modified Project is consistent with this objective and the related policies.
Policy C 2.1.1: Protect mobility on arterial highways by limiting excessive cross traffic, access points, and turning movements; traffic signals on arterial highways should be spaced at least ½-mile apart, and the minimum allowable separation should be at least ¼-mile.	*See above discussion for Objective C.2.1.*
Policy C 2.1.2: Enhance connectivity of the roadway network to the extent feasible given the constraints of topography, existing development patterns, and environmental resources, by constructing grade separations and bridges; connecting discontinuous streets; extending secondary access into areas where needed; prohibiting gates on public streets; and other improvements as deemed appropriate based on traffic analysis.	*See above discussion for Objective C.2.1.*

[5] *Id.* at 3.2-65.

Reference: Entrada South and Valencia Commerce Center Modified Project's Consistency with the Santa Clarita Area Plan (One Valley One Vision) Circulation, Emergency Access, and Evacuation Framework

OVOV Policy	Modified Project Consistency Assessment
Policy C 2.1.3: Protect and enhance the capacity of the roadway system by upgrading intersections to meet level of service standards, widening and/or restriping for additional lanes, synchronizing traffic signals, and other means as appropriate.	*See above discussion for Objective C.2.1.*
Policy C 2.1.4: Ensure that future dedication and acquisition of right-of-way is based on the adopted Circulation Plan, proposed land uses, and projected demand.	*See above discussion for Objective C.2.1.*
Policy C 2.2.9: Medians constructed in arterial streets should be provided with paved crossover points for emergency vehicles, where deemed necessary by the Fire Department.	*See above discussion for Objective C.2.1.*
Objective C-2.5: Consider the needs for emergency access in transportation planning.	"[OVOV] would facilitate consideration of the needs for emergency access in transportation planning. The County would maintain a current evacuation plan (Policy C 2.5.1), ensure that new development is provided with adequate emergency and/or secondary access, including two points of ingress and egress for most subdivisions (Policy C 2.5.2), require visible street name signage (Policy C 2.5.3), and provide directional signage to the I-5 and SR-14 freeways at key intersections to assist in emergency evacuation operations (Policy C 2.5.4)."[6] In addition, as discussed below, the Initial Study for the Modified Project determined that the Modified Project would not impair implementation of the County's evacuation plan. The Modified Project is consistent with this objective and the related policies.
Policy C-2.5.1: Maintain a current evacuation plan as part of emergency response planning.	*See above discussion for Objective C.2.5*
Policy C-2.5.2: Ensure that new development is provided with adequate emergency and/or secondary access for purposes of evacuation and emergency response; require two points of ingress and egress for every subdivision or phase thereof, except as otherwise approved for small subdivisions where physical constraints preclude a second access point.	*See above discussion for Objective C.2.5*
Policy C 2.5.3: Require provision of visible street name signs and addresses on all development to aid in emergency response.	*See above discussion for Objective C.2.5*

[6] *Id.*

OVOV Policy	Modified Project Consistency Assessment
Policy C 2.5.4: Provide directional signage to Interstate 5 and State Route 14 at key intersections in the Valley, to assist emergency evacuation operations.	*See above discussion for Objective C.2.5*

The Modified Project is consistent with the land use plan and buildout contemplated by OVOV. The Modified Project is largely surrounded by existing development, roadways, and infrastructure. Emergency access and evacuation associated with the Modified Project would be consistent with the area-wide circulation, access and evacuation framework established by the County's evacuation plans and OVOV.

2.3 Summary: State-Certified EIR – Emergency Access and Evacuation

The State-certified EIR concluded that the circulation system will serve the safety needs of the community by providing adequate access in the event of fire or other emergencies. The following summarizes the State-certified EIR's conclusions related to emergency access or evacuations.

The State-certified EIR (page 4.17-62 of the Final EIR) concluded that the circulation system will serve the safety needs of the community by providing adequate access in the event of fire or other emergencies and that impacts related to emergency response would be less than significant with mitigation:

> The roadway network of the Newhall Ranch Specific Plan's Mobility Plan has been designed as an extension of the regional circulation element. The circulation system will also serve the safety needs of the community by providing adequate access in the event of fire or other emergencies. In addition, all applicable safety standards pursuant to Los Angeles County codes would be met at the time of the building permit issuance. An illustration of the Newhall Ranch Specific Plan's circulation plan is attached for reference.
>
> Through the expansion of the on-site highway system and the provision of three additional fire stations as required by Section 2.5.3 (Public Services and Facilities Plan -- Public Facilities/Services), the Newhall Ranch Specific Plan ensures that emergency response will be expanded in conjunction with the additional demands placed on the emergency response personnel. In addition, the proposed Project would comply with Mitigation Measure PH-7, which requires the provision of secondary route access where necessary. With implementation of these Project-incorporated mitigation measures, impacts to public safety related to emergency response services would be less than significant relative to Significance Criterion 4.

The State-certified EIR (page 4.17-62 of the Final EIR) determined that project-related impacts related to offsite emergency services would be reduced to a less-than-significant level with the implementation of identified road improvements:

> Development provided on the Specific Plan site may occasionally require emergency services from Los Angeles County fire stations located beyond the project site boundaries. As described in Subsection 4.8.9 (Traffic Mitigation), project-related impacts to off-site roadways would be reduced to a less-than-significant level with the implementation of identified road improvements. In addition, the Specific Plan development would be required to comply with applicable Los Angeles County secondary access/evacuation requirements (Mitigation Measure PH-7). With the implementation of proposed roadway operation and access requirements, the circulation system in the project region

would be adequate to provide emergency response services to the Specific Plan site. Therefore, secondary emergency response or evacuation impacts would not be significant and no additional mitigation measures are required.

With the implementation of mitigation measures provided in Subsection 4.8.9, roadways located beyond the boundary of the Project site would provide adequate capacity to accommodate anticipated traffic volumes generated by facilitated development located on the Specific Plan, VCC, and Entrada project sites. With implementation of the identified measures, the off-site roadway system would operate at acceptable levels, provide adequate emergency vehicle access, and not result in significant impacts to emergency vehicle response times. No additional mitigation measures are required.

2.4 Summary: Initial Study for the Modified Project – Emergency Access and Evacuation

The Initial Study for the Modified Project concluded that the Modified Project does not include any modifications to the 2017 Approved Project that would impair implementation of, or physically interfering with, an adopted emergency response plan or emergency evacuation plan. The following summarizes the Initial Study's conclusions.

Specifically, in response to Question 9(f) of the Initial Study, the Initial Study determined:[7]

Less Than Significant Impact/No Changes or New Information Requiring Preparation of an EIR. The State-certified EIR found that impacts to public safety related to emergency response were not significant for the Entrada and VCC Planning Areas. The Modified Project does not include any modifications to the 2017 Approved Project that would increase interference with an adopted emergency response plan or emergency evacuation plan. The Modified Project includes the same mix of uses as the 2017 Approved Project, with only changes to the residential and non-residential allocations for Entrada South that do not have the potential to impair an adopted emergency response plan or emergency evacuation plan. Like the 2017 Approved Project, Modified Project development in the Entrada and VCC Planning Areas would address fire and emergency access needs through the implementation of Mitigation Measure RMDP/SCP-PH-7, which requires compliance with Los Angeles County Code, Title 21, Chapter 21.24 regarding secondary evacuation access. Further, the Modified Project's circulation system would be designed and constructed in accordance with all applicable Los Angeles County Fire Department (LACFD) requirements. Therefore, the Modified Project would not result in new significant impacts or increase the severity of previously identified significant impacts for this topic area; no additional analysis in the Supplemental EIR is required.

Additionally, PDF-HM-1, set forth in Section 17, Transportation, of this Initial Study, provides additional benefits for the Modified Project. PDF-HM-1 would require the submission of a detailed Construction Traffic Management Plan which would include provisions for adequate emergency access to all residences and businesses during construction activities. PDF-HM-1 is beneficial and

[7] Initial Study, Entrada South and Valencia Commerce Center Project, October 7, 2021, p. 73.

Reference: Entrada South and Valencia Commerce Center Modified Project's Consistency with the Santa Clarita Area Plan (One Valley One Vision) Circulation, Emergency Access, and Evacuation Framework

> is not relied upon to reach the conclusion that no additional analysis in the Supplemental EIR is required.

Further, the Initial Study determined in response to Question 17(d) that the Modified Project would not have the potential to cause new significant impacts related to emergency access:

> Less Than Significant Impact/No Changes or New Information Requiring Preparation of an EIR. Please refer to Response to Question 9.f, above. As discussed therein, the Modified Project would not result in new significant impacts or increase the severity of previously identified significant impacts with respect to emergency access. No additional analysis in the Supplemental EIR is required.

Similarly, the Initial Study in response to Question 20(a) determined that the Modified Project would not have the potential to substantially impair an adopted emergency response plan or emergency evacuation plan:

> Less Than Significant Impact/No Changes or New Information Requiring Preparation of an EIR. The Modified Project would not increase impacts related to emergency response or evacuation as compared to the 2017 Approved Project. Please refer to Response to Question 9.f, above. As discussed therein, the Modified Project would not result in new significant impacts or increase the severity of previously identified significant impacts with respect to emergency access. No additional analysis in the Supplemental EIR is required.

As shown by the information above, planning efforts by Los Angeles County and the City of Santa Clarita, which established the long-term land use and circulation framework for the area, took in account the need to provide adequate emergency access and evacuation as the Santa Clarita Valley area is built out over time. The Modified Project is consistent with the land use designations and circulation framework established by the Santa Clarita Area Plan, including the Area Plan's transportation policies related to emergency access and evacuation.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Daryl Zerfass PE, PTP
Principal, Transportation Planning & Traffic Engineering
Mobile: (949) 302-8995
daryl.zerfass@stantec.com

Attachments: Westside Bridge and Major Thoroughfare District - Links, Bridges, and Interchanges
Santa Clarita Valley Area Plan - Circulation Plan of Streets and Highways
Newhall Ranch Specific Plan - Master Circulation Plan
Newhall Ranch Specific Plan - Regional Access

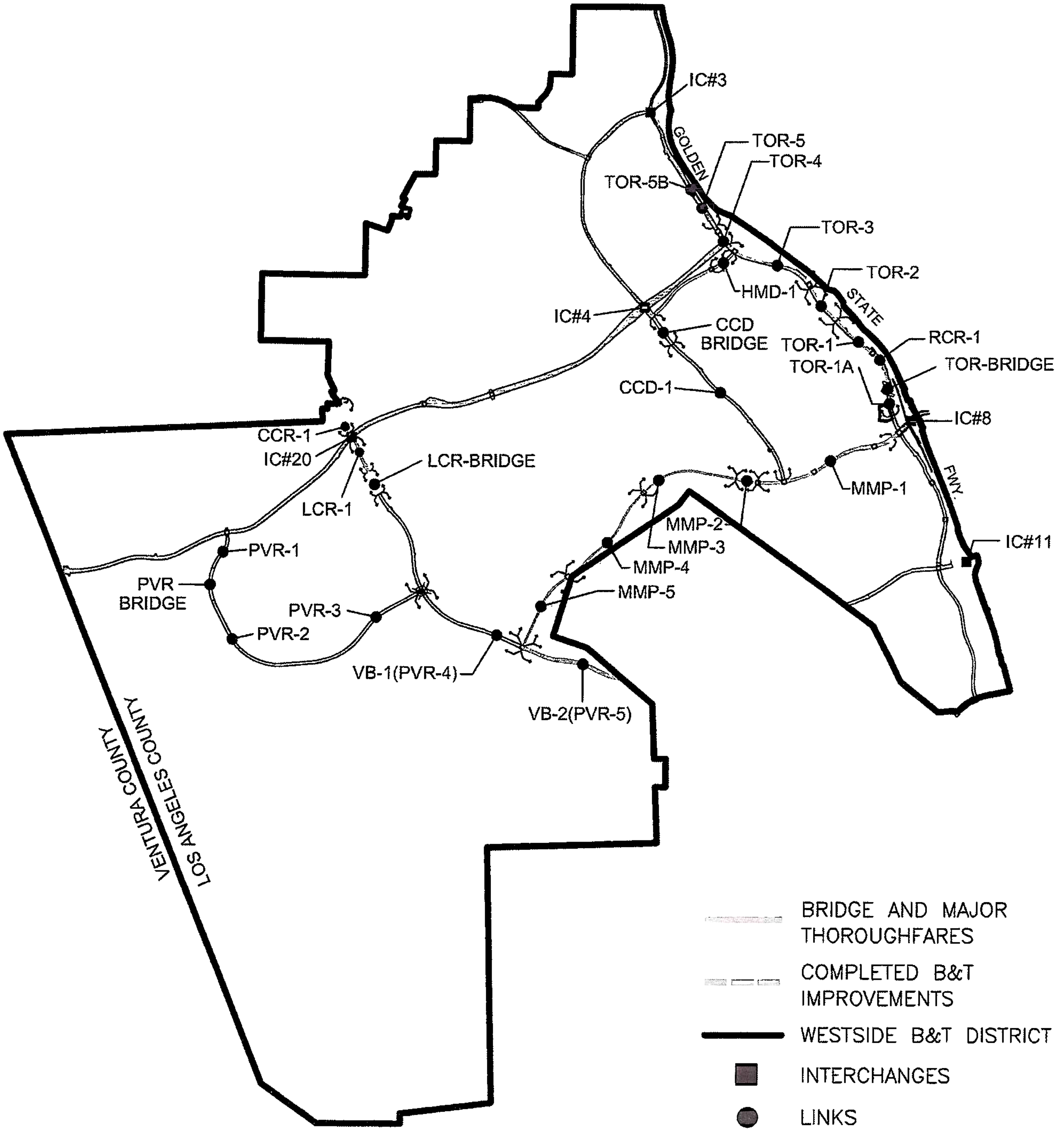


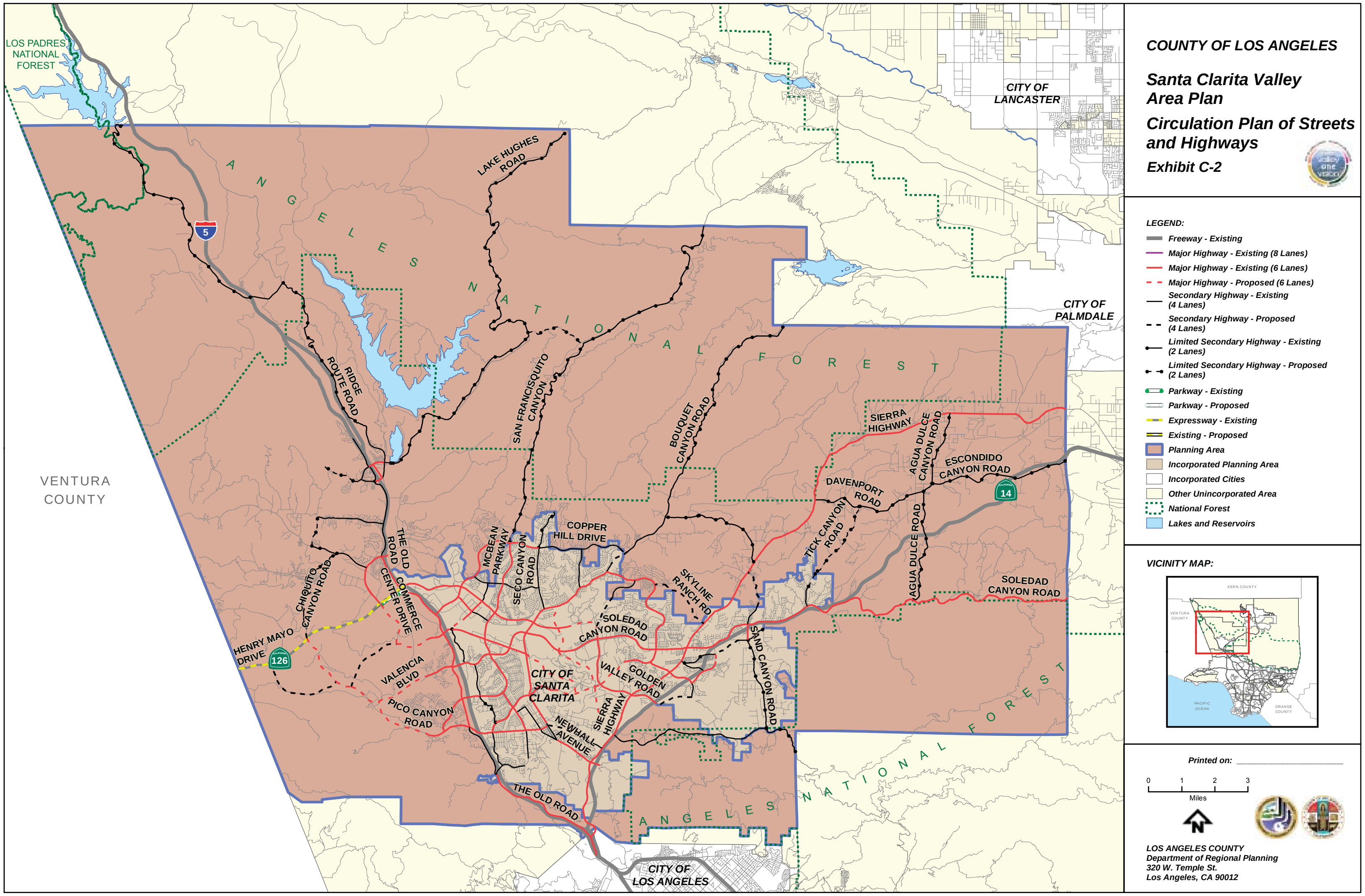
FIGURE 2
PROPOSED LINKS, BRIDGES AND INTERCHANGES
WESTSIDE B&T DISTRICT
COUNTY OF LOS ANGELES

6000' 3000' 0 6000'
1" ½" 0" 1"

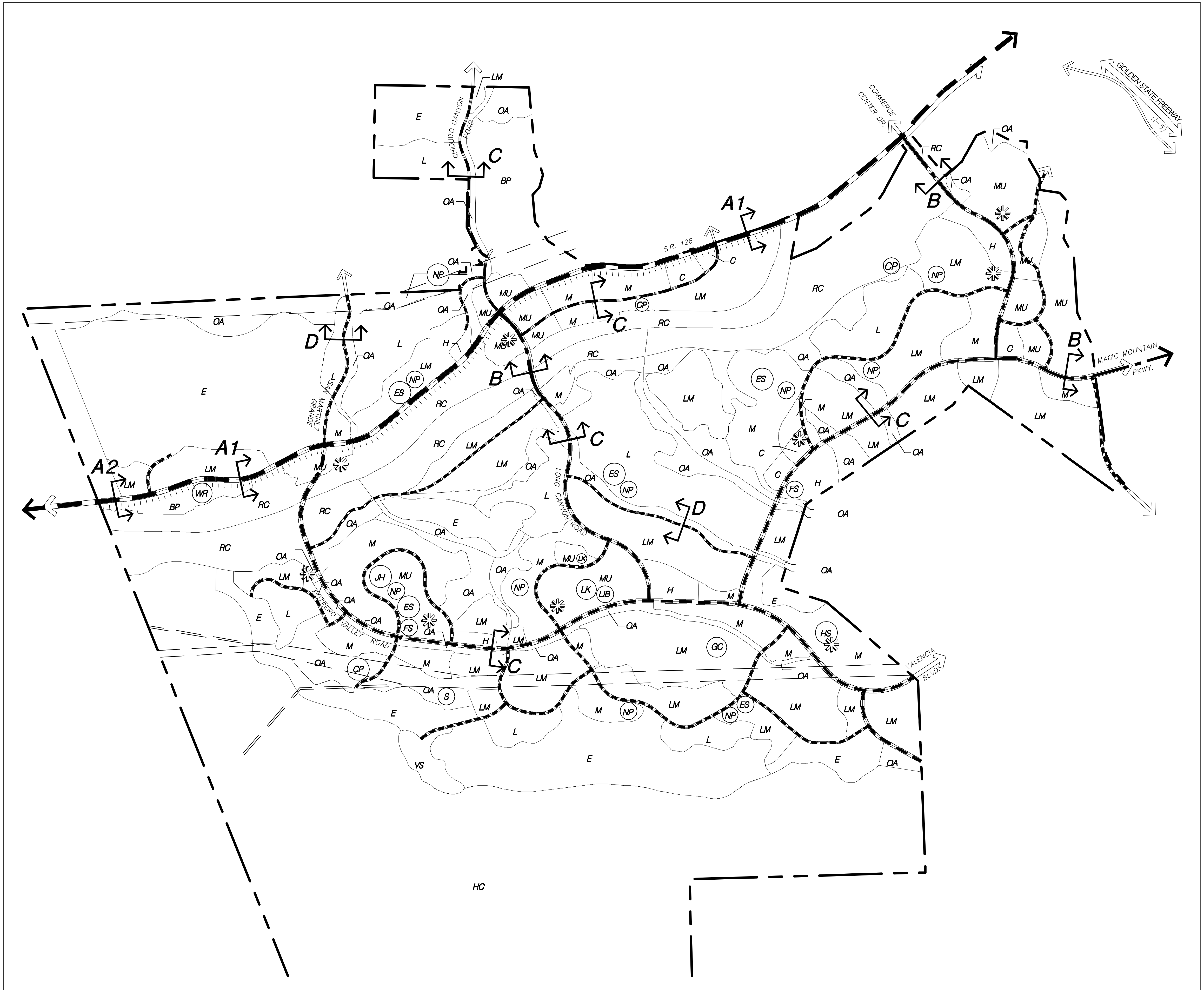
DATE: 09-27-2010 REVISED ON: 01-11-2011
SHEET 1 OF 1

G:\Westside B&T Dist - 0015-054-001\Exh\HWS002-01.dwg Plotted on Jan 11, 2011 by jangs

HWS002-01.dwg



OVOV_C2_Circulation_Plan_11x17.mxd



NEWHALL RANCH
SPECIFIC PLAN

Prepared For: Newhall Ranch Company

LEGEND

- STATE HIGHWAY
- MAJOR HIGHWAY
- SECONDARY HIGHWAY
- COLLECTOR
- POSSIBLE FUTURE COLLECTOR ALIGNMENT
- BUS PULL-IN

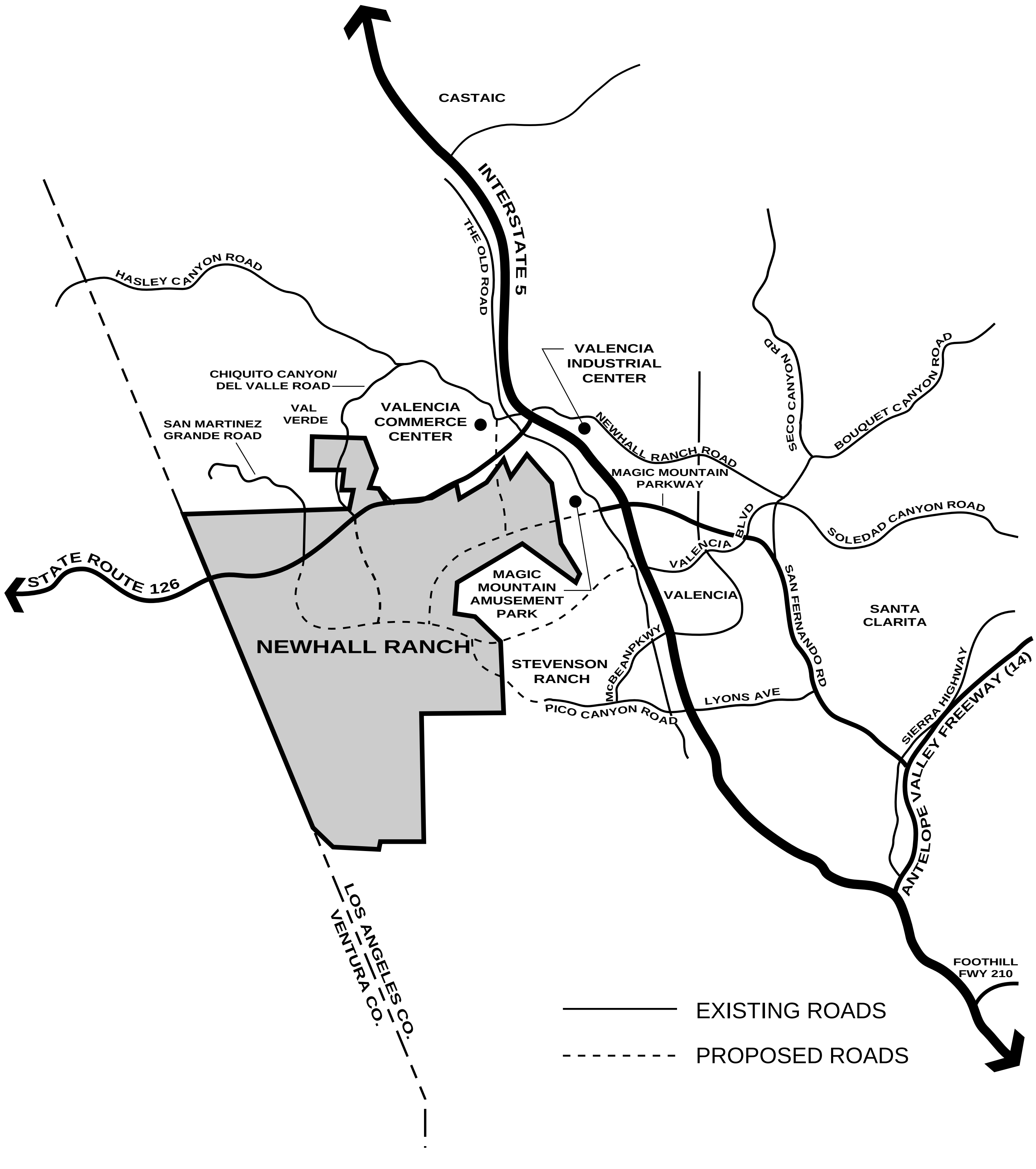
STREET SECTIONS

SECTIONS A1 & A2	EXHIBIT 2.4-3
SECTIONS B, C & D	EXHIBIT 2.4-4

English 0 1000' 2000'
Metric 0 225m 450m 900m
10 ACRES 40 ACRES
NORTH
Computer Mapping by FORMA Systems

EXHIBIT 2.4-2
MASTER CIRCULATION PLAN

MAY 2003
m:\newhall1\sp-revise-0403\circ.dwg



NEWHALL RANCH™
SPECIFIC PLAN

Prepared For: Newhall Ranch Company

EXHIBIT 2.4-1

REGIONAL ACCESS

Computer Mapping by FORMA Systems

Appendix H
Grijalva Technical Memo

Technical Memorandum

From: Ruben Grijalva, former State Fire Marshal and Director of CalFIRE

RE: Review of the Fire Protection Plan and Community Wildfire Evacuation Plan for the proposed Entrada South and Valencia Commerce Center Modified Project

Date: February 2025

As a former State Fire Marshal and Director of the California Department of Forestry and Fire Protection (CalFIRE), I have reviewed the Fire Protection Plan and Community Wildfire Evacuation Plan for the proposed Entrada South and Valencia Commerce Center Modified Project. The Modified Project incorporates minor changes and refinements to the development of the Entrada and VCC Planning Areas, as compared to what was evaluated in a prior Environmental Impact Report (EIR) (SCH No. 2000011025; June 2017). The Modified Project is located within State Responsibility Areas designated as Very High Fire Hazard Severity Zone (VHFHSZ) by the CalFIRE.

The prior EIR analyzed wildfire impacts and determined the project would have a less than significant impact on adopted emergency response plans or emergency evacuation plans based on the location of fire stations, a system of improved roads, and fire flows for the project. The prior EIR also determined that, with regulatory compliance and incorporation of mitigation measures, the project would not result in significant impacts related to wildfire or evacuation.

The Modified Project site has long been designated by the Los Angeles County General Plan (through the Santa Clarita Valley Area Plan) and Zoning Ordinance for residential and commercial development consistent with the proposed land uses for the Modified Project. The Area Plan established a comprehensive, regional circulation system that accounted for evacuation and emergency access factors. The Modified Project is largely surrounded by existing development, roads, and infrastructure. The Entrada planning area is bounded by I-5 to the east, Magic Mountain to the north, the Mission Village development (fully graded and under development) to the west, and the existing Westridge community to the south. The Valencia planning area is bounded by I-5 to the east, existing business park development to the north, SR-126 to the south, and the Chiquita Canyon and other developments to the west.

Based on my experience, properly designed master-planned communities built to modern standards present significant opportunities to deliver critical, resilient, and fire-safe housing to Californians.[1] This experience is substantiated by a detailed case study by Patrick Baylis & Judson Boomhower circulated by the National Bureau of Economic Research (NBER) analyzing the benefits of modern building code standards to reduce wildfire risk ("Boomhower and Baylis Case Study" included in Exhibit A).

The Boomhower and Baylis Case Study analyzed the effects of California's wildfire building code standards particularly focusing on the benefits of code-induced mitigation for neighboring properties. The study analyzed the reduction in risk to homes built after the 2008 adoption of the California Building Code standards in Chapter 7A, finding that code compliance significantly

---

[1] See list on pages 2-3 below for examples of fire safety measures typically included in properly designed master planned communities; see also Moritz, M. & Bustic, V., "Building to Coexist with Fire; Community Risk Reduction Measures for New Development in California," (2020) available at https://escholarship.org/uc/item/6n12m6pn.

enhanced the resilience of structures against wildfires, not only for the buildings directly adhering to these standards but also for adjacent properties. These findings are particularly relevant for new master-planned communities where homes are built to modern standards, offering a substantial opportunity to deliver fire-resistant housing compared to pre-Chapter 7A homes.

The research found that a home constructed in 2008 or later (under California's modern wildfire building codes) is significantly less likely to be destroyed in a wildfire than a home built in 1990.[2] Importantly, the study also reveals that code-compliance provides spillover benefits to neighboring properties. Specifically, the presence of a code-compliant home within 10 meters can reduce the likelihood of destruction for a neighboring home. Notably, these benefits increase when a home has multiple code-compliant neighbors nearby, such as would be case for the Modified Project as a modern, master-planned community.

These findings underscore the critical role that new development, built to modern building standards can play in enhancing community resilience to wildfires. Wildfire building codes not only enhance the resilience of the individual homes built under these standards but also provide significant protective benefits to neighboring properties by reducing the likelihood of fire spread. This evidence supports the development of master-planned communities, such as the Modified Project, that adhere to these standards and apply fire-resistant features at the community scale.

Similarly, an analysis of the State Fire Marshal's statistics[3] demonstrates that California Building Code standards adopted in Chapter 7A effectively reduce fire risks to homes built in the wildland urban interface (WUI). Newer homes that are built as part of a properly planned and mitigated master-planned communities, have performed significantly better than older homes during recent California wildfires.[4] Based on an extensive analysis of State Fire Marshal data regarding recent impacts from California's mega-fires, the data shows that over 98.5% of structural damage or loss occurred with homes built before modern Chapter 7A standards, and even of those new homes that were damaged, most involved isolated new construction surrounded by existing, high-risk homes.[5] The data also suggests that no properly designed and located master-planned community in California, built after the adoption of California Building Code Chapter 7A, has suffered extensive structural losses from recent wildfires.[6] Accordingly, much of the risk of destruction or damage from wildfires stems from existing home stock built before modern Chapter 7A standards and in high-risk areas.

In contrast, new, properly designed master-planned communities are typically planned, approved, and implemented with numerous fire-safety features and measures, such as:

- Fire-hardened homes built to the latest Chapter 7A standards;
- Community-wide fuel breaks, fire-resistant landscaping, and green belting;

---

[2] See Exhibit A, at p. 3. California began strengthening its state and local building codes following the 1991 Oakland Tunnel Fire, and further strengthened the California Building Code in 2008 with the adoption of Chapter 7A standards.

[3] See attached Exhibit C (State Fire Marshal Housing Data Analysis).

[4] See Exhibit C; Exhibit D (L.A. Times Article); see also Knapp, E.E., Valachovic, Y.S., Quarles, S.L. *et al.*, "Housing arrangement and vegetation factors associated with single-family home survival in the 2018 Camp Fire, California," Fire Ecol 17, 25 (2021). https://doi.org/10.1186/s42408-021-00117-0 [analysis of single-family home survival during the 2018 Camp Fire indicated that homes constructed before 1997 had a significantly lower survival rate compared to those built in 1997 and later]; Institute for Business and Home Safety (IBHS), "Mega Fires: The Case for Mitigation," (Jul. 2008) pp. 14-15, 19, available at: https://ibhs.org/wildfire/post-wildfire-investigations/.

[5] Exhibit C.

[6] See e.g. attached Exhibit B (Master-Planned Community Case Studies).

- Long-term funding, maintenance and enforcement through an HOA;
- Appropriate and reliable fire access and evacuation routes;
- Adequate water supplies (studied pursuant to SB 610);
- Residential fire sprinklers;
- Undergrounded project utilities;
- Community design and siting to minimize fire risks (e.g., slope setbacks); and
- New fire stations and fire equipment.

The fire-resistance benefits of a properly designed master-planned community were highlighted by a Los Angeles Times article, which describes how the Orchard Hills master-planned community in Irvine withstood a direct impact from the Silverado Fire without any loss of structures or material damage.[7] In October 2020, the Silverado Fire erupted during a Santa Ana wind event, with winds reaching speeds of up to 80 mph. The article describes how the fire advanced to the perimeter of Irvine's Orchard Hills neighborhood, but did not destroy a single home or result in any significant damage to the community. The article describes how the community was planned with wildfire in mind – detailing the various measures that contributed to the community's success, including the implementation of fuel modification zones, the use of fire-resistant building materials, stringent HOA guidelines, and ample emergency ingress and egress, among other features.

Based on my review of the Modified Project's Fire Protection Plan and Community Wildfire Evacuation Plan, the Modified Project includes numerous protective measures and locational attributes that will make it highly resistant to wildfires, protecting both onsite residents and offsite existing communities. The Modified Project includes all the general safety measures described above for master-planned communities, while also providing specific additional enhancements, such as a master homeowners association, funded in perpetuity, that provide for maintenance of fuel modifications over time and educational services to residents about wildfire preparation and evacuation plans.

Further, the Los Angeles County Fire Department (County Fire) requires stringent standards for construction, operations, and evacuation, which the Modified Project must satisfy. CalFIRE has delegated initial responsibility of State Responsibility Areas to County Fire, meaning CalFIRE has entrusted County Fire as the first line of defense against wildfires impacting the Modified Project site. By complying with and going beyond County Fire's requirements, the Modified Project represents a state-of-the-art master-planned community that will be highly resistant to wildfires compared to older homes built before Chapter 7A standards.

In the Santa Clarita Valley Area Plan, the County accounted for evacuation and emergency access factors when designing the growth patterns and circulation system for the area surrounding the Modified Project. The Modified Project will be constructed in accordance with the Area Plan policies and circulation system. In contrast with many older neighborhoods, the Modified Project will feature code-compliant, wider roadways and multiple points of ingress/egress, which will allow for quicker emergency access and evacuation. In this way, the Modified Project stands in contrast to

[7] See attached Exhibit D (L.A. Times article).

development that has limited access and does not align with regional circulation plans. The Modified Project is largely surrounded by newer, existing development and infrastructure that is also built to recent standards and is consistent with the Area Plan.

The measures and strategies identified in the Fire Protection Plan and Community Wildfire Evacuation Plan are consistent with providing a fire-safe, master-planned community, based on my experience as the State Fire Marshal and CalFIRE Director. In the midst of a deepening housing crisis, there is a critical need to provide fire-resistant housing, particularly given the unprecedented wildfires we have witnessed in recent years and the growing threat of climate change. The Modified Project presents an opportunity for resilient and fire-resistant housing compared to older homes built before Chapter 7A standards.

Exhibit A

Baylis, P. & Boomhower J. "Mandated vs. Voluntary Adaptation to Natural Disasters: The Case of U.S. Wildfires," National Bureau of Economic Research, No. 29621, (Dec. 2021)

NBER WORKING PAPER SERIES

MANDATED VS. VOLUNTARY ADAPTATION TO NATURAL DISASTERS: THE CASE OF U.S. WILDFIRES

Patrick W. Baylis
Judson Boomhower

Working Paper 29621
http://www.nber.org/papers/w29621

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 2021

We are grateful to seminar participants at the NBER EEE Spring Meeting, the UC Environment and Energy seminar, Georgetown University, and the Ostrom Workshop. Richard Carson, Julie Cullen, Meredith Fowlie, Rebecca Fraenkel, Josh Graff Zivin, Andrew Plantinga, Matt Wibbenmeyer, and Amy Work provided helpful input, and Kate Dargan, Scott Witt, and numerous county assessors and CAL FIRE staff provided guidance and helped us access data. Kevin Winseck and Wesley Howden provided excellent research assistance. Property data were provided by Zillow through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at http://www.zillow.com/ztrax. The results and opinions are those of the authors and do not reflect the position of the Zillow Group or the National Bureau of Economic Research.

Mandated vs. Voluntary Adaptation to Natural Disasters: The Case of U.S. Wildfires
Patrick W. Baylis and Judson Boomhower
NBER Working Paper No. 29621
December 2021
JEL No. H12,H23,K32,Q54,Q58

ABSTRACT

Despite escalating disaster losses and predicted increases in weather-related catastrophes, takeup of protective technologies and behaviors appears limited by myopia, externalities, and other factors. One response to such frictions is to mandate adaptive investment. We measure the effect of California's wildfire building codes on own- and neighboring structure survival using administrative damage and assessment data for most US homes experiencing wildfires since 2000. Differences across jurisdictions and vintages reveal remarkable resilience effects of building codes initially prompted by the deadly 1991 Oakland Firestorm. Codes also benefit neighbors. We use the results to estimate net social benefits of wildfire building standards.

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A data appendix is available at http://www.nber.org/data-appendix/w29621

Worldwide natural disaster losses averaged $218 billion per year during 2016–2020, a 60% increase in real terms over the preceding 30 years.[1] This trend is predicted to accelerate under future climate change. Efficient investment in adaptation is essential in the face of these escalating risks. Yet takeup of protective technologies and behaviors appears to be hindered by a constellation of market frictions. Homeowners misperceive disaster risks and thus the value of protective investments (Hallstrom and Smith 2005; Donovan, Champ, and Butry 2007; Gallagher 2014; McCoy and Walsh 2018; Bakkensen and Barrage, Forthcoming). Monitoring costs and other insurance market imperfections mean that mitigation behaviors may not be accurately reflected in property insurance prices (Kunreuther and Michel-Kerjan 2011; California Department of Insurance 2018; Wagner, Forthcoming). Public disaster spending programs may reduce private incentives for property protection (Kousky, Luttmer, and Zeckhauser 2006; Deryugina 2017; Baylis and Boomhower 2019). And in some settings, spatial externalities across neighboring properties lead to diverging private and social benefits of mitigation (Shafran 2008; Costello, Quérou, and Tomini 2017).

One widely-adopted approach to these market failures is to provide information and subsidies to increase voluntary takeup.[2] A more controversial but increasingly common alternative is to *mandate* investments in resilience.[3] Mandatory standards ensure wider adoption. However, if the regulator misjudges the effectiveness of the required actions, the level of the hazard, or individual risk

1. Loss data are from Munich RE and are in 2020 dollars.

2. Examples in the U.S. include the Ready campaign and Ready.gov website; the Community Rating System under the National Flood Insurance Program; the StormReady, Hurricane Protection Week, and National Tsunami Hazard Mitigation programs; the Firewise USA program; and the Community Wildfire Protection Plan program.

3. Florida has construction standards for hurricane winds, and codes also exist in various regions for winter storms and non-weather disasters such as earthquakes and tsunamis (Federal Emergency Management Agency 2020). In flood-prone areas, U.S. federal rules require homes to be elevated and some localities have imposed even stricter requirements. California, Utah, Nevada, and Pennsylvania have statewide wildfire building standards while in other states, notably Colorado, wildfire codes have been adopted at the local level (Insurance Institute for Business and Home Safety 2019). Australia, New Zealand, France, and Italy also have wildfire building codes (Intini et al. 2020).

preferences, some individuals may be compelled to make costly investments they would have preferred to avoid even if fully informed and fully accountable. Implementing mandatory standards is also more politically challenging.[4] Despite the important differences between these instruments, there is little empirical evidence about outcomes under a mandated resilience regime compared to a counterfactual of purely voluntary takeup.

In this paper, we consider the case of wildfire building codes in California. California has suffered over $40 billion dollars in wildfire property damages in the past 5 years. The state also has among the strictest wildfire building codes in the world. We provide the first comprehensive evaluation of the effect of these codes on own-structure survival as well as neighbor spillovers via structure to structure fire spread. We then embed these empirical estimates in an economic model to calculate net social benefits of wildfire building codes as a function of local wildfire hazard and number of close neighbors.

This analysis takes advantage of a new dataset that includes property-level data for almost all U.S. homes exposed to wildfire between 2000 and 2020. We compiled the data by requesting post-incident damage censuses from numerous emergency management agencies and individual county assessors. We merged these lists of damaged homes to assessor data for the universe of (destroyed and surviving) homes inside wildfire burn areas. The data show that even during catastrophic wildfires, more than 50% of exposed homes survive. One of the key advantages of the new data is the ability to observe and learn from these surviving homes. The property-level loss information also distinguishes the wildfire data from floods and other disasters where loss data are typically available at the zip code or Census tract level. In addition to the new loss data, the empirical work also leverages emerging tools in spatial analysis, including high-resolution aerial imagery and precise "rooftop" geocoding of structure locations.

The empirical design leverages rich variation in building code requirements

4. For example, efforts to adopt statewide wildfire building standards in Oregon and Colorado have failed politically (Sommer 2020).

across space and over time. The complex nature of building regulation in California creates a patchwork of wildfire standards across localities. We also observe fires in other states that do not have wildfire building codes. In all of these places, we observe homes built before and after changes in California's codes. This identifying variation yields credible counterfactual predictions for how homes would have performed in the absence of California's standards. Our preferred statistical model is a fixed effects regression that compares the likelihood of survival for homes of different vintages on the same residential street during the same wildfire event. These street fixed effects allow us to compare groups of homes that experience essentially identical wildfire exposures.

We find remarkable vintage effects for California homes subject to the state's wildfire standards. A 2008 or newer home is about 16 percentage points (40%) less likely to be destroyed than a 1990 home experiencing an identical wildfire exposure. There is strong evidence that these effects are due to state and local building code changes - first after the deadly 1991 Oakland Firestorm, and again with the strengthening of wildfire codes in 2008. The observed vintage effects are highly nonlinear, appearing immediately for homes built after building code changes. There are no similar effects in areas of California not subject to these codes or in other states that lack wildfire codes.

We also find that code-induced mitigation benefits neighboring homes, consistent with reduced structure-to-structure spread. These neighbor effects are in keeping with anecdotal reports of home-to-home spread as a factor in urban conflagrations (Cohen 2000; Cohen and Stratton 2008; Cohen 2010).[5] Our results imply that, all else equal, code-induced mitigation by a neighbor located less than 10 meters away (within the distance fire experts refer to as the home ignition zone) reduces a home's likelihood of destruction during a wildfire by about 2.5 percentage points (6%). This benefit is even larger when homes have multiple close neighbors.

5. We are also aware of at least one insurance company which will not sell homeowners insurance to homes located next to a home with a wood roof in high-risk areas (Allstate Indemnity Company 2018).

Finally, we embed our estimates of building code benefits in an economic model and calculate the approximate net social benefits of such a policy for a random sample of California homes in wildfire hazard areas. Like other disaster risks, many homeowners are only partially insured (or in the extreme, wholly uninsured) against the full cost of replacing a structure destroyed by wildfire (Klein 2018; California Department of Insurance 2018). This means that the benefits of building codes include not only reductions in expected losses but also additional insurance value due to reduced household exposure to uninsured risk. Our calculations find that wildfire building codes deliver unambiguously positive benefits in the most fire-prone areas of the state, especially where homes are clustered closely together and thus create large risk spillovers. In areas with more moderate wildfire risk, building standards for new homes can also be justified given reasonable assumptions about household risk aversion, future increases in wildfire hazard, and/or co-benefits of building codes (such as reductions in public expenditures on wildland firefighting). On the other hand, the costs of retrofitting existing homes to meet current wildfire building standards are substantial and our analysis suggest full retrofits are only economic in areas with extreme wildfire hazard.

These results are broadly relevant to natural disaster management. In this important setting, a standards-based approach achieved substantially greater compliance with risk mitigation practices. The policy nearly halves loss risk when structures are exposed to the hazard. Moreover, a cost-benefit calculation implies that low takeup in the absence of standards is likely driven by market failures as opposed to a lack of cost-effectiveness. These facts can inform policies to mitigate other risks like floods, hurricanes, tornadoes, and heat waves, where voluntary takeup of adaptation investments also appears to be limited.

This work also has immediate implications for wildfire policy. Our results imply there are gains to be realized from strengthening building codes in other states and countries to match California's. This evidence is relevant to current proposals in Oregon, Washington, and other states.[6] Meanwhile, California is moving to expand the geographic coverage of designated wildfire hazard zones and reduce the ability of local jurisdictions to opt out of recommended standards.[7] Separately, new California legislation from 2020 provides financial incentives for retrofits of existing homes in wildfire-prone areas.[8] The law specifically calls for support of "cost effective" retrofits, a concept for which the evidence in this study is essential. Additionally, policymakers are confronting pressing issues of insurance rate reform in response to mounting wildfire losses. One key debate is the degree to which individual investments improve structure survival and should thus be rewarded through regulated insurance discounts (California Department of Insurance 2018). This paper's evidence on the effectiveness of such investments during real wildfires bears directly on this question.

Our work builds on previous studies of natural hazard mitigation. For wildfires, a number of engineering and forestry studies describe the effects of construction materials and vegetation management on structure resilience (Gibbons et al. 2012; Syphard et al. 2012; Syphard, Brennan, and Keeley 2014; Alexandre et al. 2016; Syphard, Brennan, and Keeley 2017; Kramer et al. 2018; Syphard and Keeley 2019). Our paper focuses on the effects of a mandatory mitigation policy, while these previous studies measure technology effectiveness (i.e., survival of homes whose owners did vs. did not choose to take mitigation measures). Two studies on the related topic of hurricanes do consider building codes, with conflicting results. Dehring and Halek (2013) is a small case study of several hundred homes during Hurricane Charley in 2004. Simmons, Czajkowski, and Done (2018) study aggregate zip-code level data on annual insurance claims by homes built in different decades to infer benefits of hurricane building codes in Florida. In contrast, our study uses highly

6. See, e.g., Profita, Cassandra. "The Labor Day Fires Burned Towns and Homes. Oregon Has a Plan to Avoid a Repeat." Oregon Public Broadcasting, September 7, 2021.

7. S.B. 63, 2021–2022, California. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB63.

8. A.B. 38, 2019–2020, California. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB38.

granular property- and event-level loss data for a large sample of wildfires covering several states. Across a range of natural hazards, a parallel engineering literature attempts to calculate the value of building codes through modeling and simulation (e.g. Federal Emergency Management Agency 2020). Finally, our work is methodologically related to a separate literature in economics on building codes and household energy consumption (Jacobsen and Kotchen 2013; Levinson 2016).

This study makes five contributions. First, we provide the first comprehensive evaluation of the effects of wildfire building codes on structure survival. Beyond the wildfire context, this result improves our understanding of disaster resilience under standards-based vs. voluntary policies. Second, we provide the first empirical estimates of the spillover benefits of wildfire mitigation investments to neighboring properties. Third, we compile a comprehensive dataset of structure-level outcomes in wildfires across several states that, to our knowledge, is the most complete accounting in existence. This new dataset will enable future work on the economics of catastrophic wildfire risk. Fourth, we approach the topic in a causal framework with an explicit empirical design, where previous work is primarily descriptive or relies on regression adjustment. Finally, we embed the empirical estimates in an economic model to calculate net social benefits that account for local hazard, neighbor externalities, and household risk aversion.

The rest of the paper proceeds as follows. Section 1 discusses structure survival in wildfires and California's history of building code updates. Section 2 describes the data and spatial analysis. Section 3 outlines the empirical strategy, and Section 4 presents the results. Section 5 develops the model of net social benefits and Section 6 concludes.

1 Wildfire Building Codes in California and Other States

> *"Unlike a flash flood or an avalanche, in which a mass engulfs objects in its path, fire spreads because the requirements for com-*

> *bustion are satisfied at locations along the path... A wildland fire cannot spread to homes unless the homes and their adjacent surroundings meet those combustion requirements."* Jack D. Cohen, *Journal of Forestry*, 2000.

Established forestry and engineering evidence supports the importance of the so-called home ignition zone in determining structure resilience to wildfires. The home ignition zone includes the design of the home itself as well as an imagined area extending 30 meters away from the structure. Fire scientists emphasize the elimination of flammable materials inside this zone (e.g., Cohen 2000, 2010; Calkin et al. 2014). This guidance applies to both vegetation around the home ("defensible space") and the construction of the home itself, especially the roof.

Among U.S. states, California has gone the furthest in mandating takeup of wildfire resilience investments by property owners. However, the application of these codes varies throughout the state. In areas where CAL FIRE provides firefighting services (State Responsibility Area or SRA), the state directly determines building standards. Within incorporated cities and other areas with their own fire departments (Local Responsibility Area or LRA), local governments have historically had greater control over code requirements.

The development of the modern standards began with the Oakland Hills Firestorm of 1991, which killed 25 people and caused $1.5 billion in property damage. The tragedy led to a series of legislative actions during the mid-1990s that required more fire-resistant roofing and maintenance of vegetation immediately adjacent to the home. The first of these was the so-called Bates Bill of 1992 (Assembly Bill 337). Among other changes, the Bates Bill encouraged stronger building standards in LRA areas by requiring CAL FIRE to produce maps of recommended Very High Fire Hazard Severity Zones (VHFHSZ). In LRA areas, local governments could then choose whether or not to adopt these recommended hazard maps (and thus the accompanying building standards). This designation process unfolded over several years, with hundreds of local governments adopting or rejecting CAL FIRE's proposed VHFHSZ maps at different times. According to Troy 2007, 151 of 208 local governments (73%) either adopted the VHFHSZ regulations or claimed to have promulgated equally strong existing rules.[9]

On the heels of the Bates Bill, Assembly Bill 3819 of 1994 increased requirements for ignition-resistant roofs. These requirements applied in all SRA areas and in the subset of LRA areas where local governments had adopted recommended VHFHSZs. Roofing materials are rated Class A, B, C, or unrated.[10] Starting in 1995, the law required Class B roofs on newly-constructed or reroofed homes in regulated areas. In 1997, the requirement increased to Class A roofs in high-hazard areas (a substantial improvement in fire resistance). Finally, Assembly Bill 423 in 1999 simplified enforcement of the new roofing codes by outlawing the use of unrated roofing materials throughout the state.

The collective effect of these mid-1990s building code reforms was to substantially increase the fire resistance of roofs on newly-constructed homes in regulated areas after about 1997. The roofing requirements also applied to existing homes, but only at the time of roof replacement. Any homeowner in a regulated area who replaced more than 50% of the roof surface in a single year was in principle obligated to comply. The defensible space provisions also applied to existing and new homes. However, in practice, the primary point of enforcement for these codes was at the time of new construction; enforcement effort for existing homes was limited (see e.g., Maclay 1997).

California strengthened its wildfire codes again in 2008 with the so-called Chapter 7A standards of the California Building Code. These requirements apply to all homes built in 2008 or later in SRA areas and in LRA areas where proposed VHFHSZ designations have been accepted. The codes apply to many dimensions of new homes. Roofs must be rated class A or B, eaves

9. For a detailed qualitative study of the determinants of local VHFHSZ adoption decisions, see Miller, Field, and Mach (2020).

10. These ratings are earned through laboratory testing; for example, the Class A test involves placing a 12-inch by 12-inch burning brand on the roof material under high wind conditions. The material must not ignite for 90 minutes.

and exterior siding must be fire resistant, vents must covered by a fine wire mesh to resist ember intrusion, windows and doors must resist fire for at least 20 minutes, and decks and other building appendages must be built of non-combustible materials. Chapter 7A also includes additional requirements for defensible space.

The damage data collected for this study also include wildfires in Arizona, Colorado, Oregon, and Washington. None of these had statewide wildfire building standards at the time of the included fires (Insurance Institute for Business and Home Safety 2019). Some local governments – particularly in Colorado – have adopted local standards that include a diverse mix of rules about roofs, other construction materials, and/or defensible space. Our empirical analysis excludes a small number of fires in the comparison states that overlap areas known to have local wildfire building standards.[11]

While the non-California homes in this study are not subject to mandatory standards, they are targeted by a range of information and incentive programs that seek to increase voluntary home hardening. Programs active in these states include FireWise USA (National Fire Protection Association), the Community Wildfire Protection Plan program (United States Forest Service and Department of Interior), the Fire Adapted Communities Coalition (numerous public agencies and NGOs), the Ready, Set, Go! program (International Association of Fire Chiefs), and numerous other initiatives.

2 Data and Spatial Analysis

This section describes the construction of the database of wildfire damages, property tax assessment information, and structure locations.

11. These are the 2012 Waldo Canyon Fire, 2013 Black Forest Fire, and 2018 Mile Marker 117 Fire in El Paso County, Colorado (Quarles et al. 2013) and the 2012 High Park Fire and 2020 Cameron Peak Fire in Larimer County, Colorado (Larimer County 2020).

2.1 Homes and Damage Data

Damage Inspection Data

We sought to assemble as comprehensive a database as possible of administrative records for homes destroyed or damaged by wildfire in the United States. For recent wildfires in California, this information is managed by CAL FIRE. For earlier California fires and for fires in other states, we contacted individual county assessors (who track these damages in order to update property tax assessments) and other agencies to request historical records of structure damages. To our knowledge, the resulting database is the most complete accounting that exists of U.S. homes lost to wildfire.

California 2013–2020: In California, the CAL FIRE Damage Inspection (DINS) database is a census of destroyed and damaged homes following significant wildfire incidents during 2013–2020. The data include street address and assessor parcel number (APN); limited structure characteristics; and for some fires, an additional sample of undamaged homes. The damage variable has four levels: destroyed ($> 50\%$ damage), major (26–50%), minor (10–25%), and affected (1%–9%). Of these, "destroyed" is the most commonly reported damage category and the only category that appears consistently across all fires. The lack of partially-destroyed structures is consistent with case study observations in Cohen (2000) and subsequent research. We thus follow the literature and focus on "destroyed" as our primary outcome.

California 2003–2013: Data for pre-2013 wildfires in California come from two sources. For the 2003 and 2007 San Diego fire storms, we received damage assessment data from San Diego County. For other counties, CAL FIRE staff provided us with a large collection of unformatted historical damage assessment reports that we compiled and standardized to be usable for research.

Other States: Using ICS-209 incident reports, we identified the 15 counties in states other than California with the greatest number of structures lost to wildfire since 2010. We then contacted county assessors in each of these counties to request damage data. We have successfully received structure-level damage data from 11 of these 15 counties.

Appendix Table 6 includes the full list of wildfires in the dataset.

Property Tax Assessment Data

We merge the damage records to comprehensive assessment data for all U.S. homes from the Zillow ZTRAX database. The ZTRAX data include information on year built, effective year built (in the case of remodels), building square footage, and other property characteristics. The merge from damage data to ZTRAX uses assessor parcel numbers, and we validate the accuracy of this merge by comparing street addresses across the two datasets. We restrict the data to include only single family homes, which account for most properties inside the wildfire perimeters in our sample. For each incident, we merge the damage data to the most recent historical assessment data from the pre-fire period. In other words, we merge to the population of single family homes that existed immediately prior to the start of the fire. Appendix Table 6 shows the number of single family homes inside of each wildfire perimeter and the share destroyed.

2.2 Spatial Analysis and Dataset Construction

Identifying Structure Rooftop Locations

This study uses the physical locations of the homes in the data in two ways. First, homes must be spatially assigned to building code jurisdictions and to wildfire burned areas. Second, the measurement of spillovers across properties requires precise distances between neighboring structures. The street address-based geocoding methods typically used in academic research are not sufficiently detailed for this second purpose, which requires accurate structure locations at a meter scale. We solved this challenge by combining several spatial datasets to identify precise rooftop locations. First, we limit the population of ZTRAX homes to all homes in zip codes where at least one home was destroyed. We then merge these ZTRAX records to parcel boundary maps from county assessors using assessor parcel numbers. This yields a parcel polygon for each home. We then use comprehensive building footprint maps from Microsoft to identify the largest structure overlaying each parcel.[12] We call this location the "footprint location." Figure 1 shows an example for Redding, California in the area of the 2018 Carr Fire. Gray lines are parcel boundaries from the Shasta County Assessor. Blue polygons are building footprints. The purple and yellow markers show the assigned rooftop locations for each structure. Yellow markers show homes that are reported as destroyed in the damage data.

This rooftop geocoding method generates highly accurate locations, but it is dependent on the availability of high-quality parcel boundary GIS data. In areas where such data are not available (representing 13% of homes in the final analysis dataset), we instead geocode home locations using the ESRI StreetMap Premium geolocator, a commercially-available address-based product. Our quality checking shows that these locations (henceforth "address-based locations") are generally reliable to the parcel level but not always to the structure rooftop level. Appendix Section C describes the geocoding in more detail.

Validating Locations and Damage Reports

We quality check the calculated property locations and the damage report data using high-resolution aerial imagery from NearMap. The base image in Figure 1 shows an example. The detailed imagery allows us to manually confirm the accuracy of structure locations, which closely coincide with the blue building footprints in the figure. In addition, the NearMap imagery includes post-fire surveys for many of the incidents in our database. Figure 1 illustrates how destroyed properties are readily visible in these surveys, which allows us to confirm the accuracy and completeness of the damage data. Appendix Table 4 reports accuracy rates in a random sample of homes. For damage reports, 99%

12. The Microsoft U.S. Building Footprints Database is publicly available at https://github.com/microsoft/USBuildingFootprints.

of reported outcomes match the ground truth imagery. For rooftop locations, 98% of the assigned structure locations are on top of the structure rooftop in the ground truth imagery (with 99%+ accuracy in densely developed areas). Locations that rely on street address based geocoding tended to be accurate to the parcel but not always to the actual structure rooftop – about 75% of these assigned locations are on top of the structure rooftop in the ground truth imagery.

Spatial Merge to Wildfire Perimeters and Code Jurisdictions

We restrict the dataset to homes located within final wildfire perimeters (plus a 20-meter buffer). Depending on the state and time period, these digital perimeter maps come from the California Forest and Range Assessment Program (FRAP), the Monitoring Trends in Burn Severity (MTBS) dataset, or the National Interagency Fire Center (NIFC). We merge the homes data to spatial data on fire protection responsibility (SRA vs. LRA) and designated fire hazard (FHSZ) that together determine building codes in a given location in California. We use historical GIS maps provided by CAL FIRE to assign homes to code regimes according to the codes in effect when the home was built.[13]

Calculating Distances Between Neighboring Homes

We construct two measures of distance between homes. The first is the minimum distance between the building footprint polygons associated with the two structures (henceforth the "wall-to-wall" distance). This measure is only available for homes where we assign locations based on building footprints. The second metric uses the distance between assigned point locations, which are available for all homes in the dataset. We call this metric the "centroid to centroid" distance because these points are meant to correspond to the center of the roof. The wall to wall distance is our preferred measure because it more

13. For SRA/LRA boundaries, the historical map data include updates in 1990, 1996, 2003, 2005, and annually from 2010–2020. For FHSZ, the historical map data include updates in 1985, 1998, 2007, and 2008.

accurately captures space between homes and because the footprint-geocoded locations are more accurate than the address-based location points (Appendix Table 4). Our main estimates of neighbor spillovers use the restricted sample of homes for which wall to wall distances are available. For robustness, we also show specifications that use centroid to centroid distances and the full sample of homes.

We identify up to 15 nearest neighbors within one kilometer for each home in the final dataset. Panel (b) of Figure 1 shows two examples. Each image shows wall-to-wall distances (in meters) from the structure marked "0". Appendix Table 2 summarizes the distribution of number of neighbors at various distances.

Data Summary

The final dataset includes 55,408 single family homes exposed to 112 wildfires in California, Arizona, Colorado, Oregon, and Washington between 2003 and 2020. Thirty-nine percent of these were destroyed. Appendix Figure 1 shows the distribution of year built and fraction destroyed by year built for the full dataset. Appendix Table 6 reports the number of exposed and destroyed homes for each fire.

3 Empirical Strategy

This section describes the empirical design used to measure the effect of wildfire building codes on structure survival. To fix ideas, Figure 2 provides an example of the merged dataset for the 2018 Woolsey Fire in Los Angeles County. The green and purple markers indicate locations of surviving and destroyed single family homes inside the final fire perimeter. The street map data give a sense of development density. The intensity of losses varies significantly within the burned area. Near Malibu, a large share of affected homes were lost. Further north, however, there are several areas where most homes inside the fire perimeter escaped destruction. These differences reflect varying fire conditions, firefighter response times, landscape vulnerability, structure characteristics, and potentially numerous other factors. This heterogeneity adds noise to empirical analysis of structure survival. It may also introduce bias if year built or other structure traits vary similarly within burned areas. We address these challenges using an empirical design that compares the likelihood of survival for homes of different vintages on the same residential street during the same wildfire. We attribute these vintage effects to building codes by comparing vintage effects across jurisdictions with and without wildfire building codes.

3.1 Treatment Groups

Throughout the rest of the paper, we consider three types of jurisdiction. The first is SRA, where compliance with California building codes was mandatory. The second is LRA areas that were ever recommended by CAL FIRE as VHFHSZ areas (henceforth, "LRA-VHFHSZ"). To be clear, this group includes all proposed VHFHSZ regardless of whether local governments accepted the designation. There is no centralized database that records local VHFHSZ adoption decisions, but Troy (2007) reports high rates of adoption.[14] The final treatment group is areas without wildfire building codes (henceforth, "no-codes"). This includes LRA areas in California that were never recommended for consideration as VHFHSZ, as well as fires in areas of Arizona, Colorado, Oregon, and Washington without any state or local wildfire building codes. Appendix Table 1 reports the number of homes in each treatment group.

14. In addition, historical news accounts show that cities that rejected the official VHFHSZ designation often still adopted the underlying code requirements in the recommended areas. This seems to have been an attempt to achieve the state-recommended resilience requirements while avoiding the VHFHSZ label due to fears about property values (Sullivan 1995; Snyder 1995; Stewart 1995; Yost 1996; Grad 1996). One state fire official's response: "We didn't care if they called it a nuclear-free zone, as long as they adopted the regulations" (Maclay 1997).

3.2 Own-structure survival

Event study figures

We begin the regression analysis with the following event study-style model for home i on street s exposed to wildfire incident f. We estimate this model separately for the SRA, LRA-VHFHSZ, and no-codes groups.

$$1[Destroyed]_{isf} = \sum_{v=v_0}^{v=V} \beta_v D_i^v + \gamma_{sf} + X_i \alpha + \epsilon_{isf} \tag{1}$$

The outcome variable is equal to one for destroyed homes and zero otherwise. The V variables $D_i^{v_0}, ..., D_i^V$ are indicator variables equal to one if house i's year built falls into bin v. The main parameters of interest are the coefficients β that correspond to these vintage bins. These give the effect of each vintage on probability of survival when exposed to wildfire. The street fixed effects γ_{sf} include separate indicator variables for each street name-zip code combination within fire perimeter f. These fixed effects sweep away arbitrary patterns of damage across streets within the fire perimeter, so that the model is identified by average differences in survival between homes of different vintages on the same street. We also estimate models with finer and coarser fixed effects, including models with incident instead of street fixed effects.

The additional control variables X_i include controls for wildfire vulnerability at the home site. These include ground slope, aspect, and vegetation type from LANDFIRE (Rollins 2009). Some specifications also include property characteristics (lot size, building square footage, number of bedrooms).

Difference in differences

We summarize the overall effects of the wildfire building standards using a difference-in-differences (DiD) model that pools jurisdictions and time periods. We divide the sample into 3 time periods: before 1998; 1998–2007; and 2008 onwards. The latter two periods correspond to the end of the mid-1990s roofing reforms and the introduction of the Chapter 7A requirements.

3.3 Structure to structure spread

To measure the effect of code-driven mitigation on likelihood of structure-to-structure spread, we estimate the effect of building vintage on likelihood of survival for neighboring homes. Our regression models are of the form,

$$1[Destroyed]_{isf} = \sum_{j=1}^{J} \rho_j NoCode_j + \sum_{j=1}^{J} \phi_j Code_j + \sum_{v=v_0}^{V} \beta_v D_i^v + \gamma_{sf} + X_i \alpha + \epsilon_{isf} \tag{2}$$

Like Equation (1), this specification controls for own year of construction and street-by-incident fixed effects. The additional regressors $NoCode_j$ and $Code_j$ are the number of neighbors within various distance bins j that were built before and after wildfire building codes. Homes are considered post-code in 1998 in SRA areas and in the year the area was first recommended as a VHFHSZ in LRA VHFHSZ areas. The coefficients ρ_j and ϕ_j for $j = 1, ..., J$ give the effect of these neighbors on own-structure survival. Our preferred specification uses 10-meter bins of wall-to-wall distance. For robustness, we also estimate a specification using centroid to centroid distances. With this latter measure, we define the closest bin as 0-30 meters because 30 meters roughly corresponds to 10 meters of wall-to-wall distance.[15] We apply some additional sample exclusions when estimating Equation 2: The sample is restricted to California since we can only reliably calculate footprint locations for California homes. We further drop condominiums and townhomes to focus on detached single family homes.

This regression identifies the causal effect of code-induced mitigation by neighboring homes if the code regime for neighboring homes is uncorrelated with other determinants of structure- and neighborhood-level risk. This assumption is bolstered by the street fixed effects, which focus on highly local variation.

15. The median building footprint area in the sample is 260 m^2. A hypothetical circular roof would thus have a radius of 9.1 meters and the centroid-to-centroid distance between two such homes would be 18.2 + wall-to-wall distance.

Intuitively, this specification compares homes on the same street during the same wildfire whose nearest neighbors were built in different years. One might still worry, however, that even within these narrow comparisons and even after controlling for own age, the age of a home's neighbors may still be correlated with other wildfire risk factors. We address this concern by exploring estimates for homes located slightly further away as a placebo check. Properties located 50 to 100 meters away are outside of the 30-meter home ignition zone and so present more limited direct ignition threat, but should otherwise be subject to the same potential omitted variables as directly adjacent homes.

4 Results and Discussion

4.1 Own-structure survival

4.1.1 Graphical Evidence

Figure 3 shows the raw mean of *Destroyed* for State Responsibility Area homes according to year of construction. About 35% of exposed homes built prior to the mid-1990s were destroyed. These destruction probabilities begin to fall for homes built after the mid-1990s, decreasing quickly to about 20%. This sharp improvement in resilience corresponds in time to the post-Oakland Firestorm building reforms.

There is also some evidence in Figure 3 that homes built before about 1980 may be less likely to be destroyed than homes built just prior to the roof requirements. This may reflect the fact these older homes are more likely to have been re-roofed at least once after the mid-1990s and complied with the requirement for ignition-resistant materials at roof replacement. This pattern would imply a replacement cycle of about 30-40 years. Actual data on roof service lifetimes is scarce, but this period is within the range proposed by the National Association of Home Builders and other sources (National Association of Home Builders 2007). To the extent that some pre-building code homes may be re-roofed with code-compliant materials, our estimates of building code effects are conservative.

Appendix Figure 2 shows that homes built before and after the building code changes are otherwise comparable. There are no meaningful changes in site-level predictors of fire risk, like ground slope, or in structure characteristics such as building square footage.

Figure 4 presents the event study estimates from Equation (1). The top panel shows homes in SRA, where WUI building codes are mandatory. The markers show estimates and 95% confidence intervals for two-year vintage bins. The omitted bin is 1987-1988, so that these estimates can be interpreted as percentage-point differences in likelihood of destruction relative to a 1987 home. The vintage effects are flat prior to about 1993, and then begin to decrease clearly during the 1995–1999 period. The point estimates suggest additional reductions in loss probability following the adoption of the Chapter 7A codes in 2008, although the small number of homes in those bins leads to somewhat noisy vintage estimates. The overall difference in loss probability between a 1987 home and a 2008+ home is about 15 percentage points.

The middle panel shows homes in LRA areas that CAL FIRE recommended for Very High Fire Hazard Severity Zone designation. These areas again show flat trends in resilience prior to the 1991 Oakland Firestorm and subsequent Bates Bill. After the Bates Bill takes effect, the figure shows steady improvements that persist for about 12 years. The slope of these improvements appears more gradual than in SRA areas, which would be consistent with varied timing of adoption of the recommended codes across hundreds of individual municipalities. The post-2008 estimates are again noisy but imply further improvements in resilience following adoption of the Chapter 7A bulding codes.

Finally, the bottom panel of Figure 4 shows vintage effects for homes in areas not subject to California's codes. This includes fires in areas of Arizona, Colorado, Oregon, and Washington with no state or local wildfire building codes. It also includes LRA areas in California that were never recommended as Very High Fire Hazard Severity Zones. There are relatively few homes in these groups (Appendix Table 1), so we pool them together and use wider ten-year vintage bins to increase precision. Unlike the top two panels, there is little evidence of improved resilience for homes built since the mid 1990s in areas without wildfire building codes.

4.1.2 Difference-in-Differences Estimates and Robustness Checks

The regression estimates in Table 1 summarize the effects of building code regimes on structure resilience. We show estimates for SRA, LRA-VHFHSZ, and no-codes areas. The various group by time period estimates can be interpreted as percentage point differences in likelihood of destruction relative to the reference category, which is pre-1998 homes in no-code areas. Column (1) shows the results with street by fire fixed effects. The near-zero coefficient on SRA $*$ Before 1998 implies that SRA homes built before the end of the mid-1990s building codes reforms perform similarly to homes of the same vintage in no-code areas. In contrast, SRA homes built during 1998–2007 or 2008–2016 perform 11.2 percentage points and 15.9 percentage points better, respectively. Differencing the pre-post differences across code areas yields a DiD estimate of 13.1 percentage points. The same pattern exists for LRA VHFHSZ areas, with no difference before 1998 and substantial improvements in the post-code periods. The DiD estimate for LRA VHFHSZ areas is 12.2 percentage points. Lastly, these improvements are smaller or absent in the no-codes comparison group, where homes built in the latter two time periods show only minor improvements that are not statistically distinguishable from zero. This is further evidence that the improvements in the code areas are due to building codes as opposed to other time-varying factors. The regression also includes controls for topography and vegetation. As expected, slope steepness at the home site increases vulnerability. A home on a 10 degree slope would be six percentage points less likely to survive than an otherwise-identical home on flat ground. This specification also includes fixed effects for the dominant vegetation type in the area of the home.[16]

The remaining columns of Table 1 explore alternative specifications. Col-

16. We assign vegetation types as the most common fuel model in a 25-meter radius around the home.

umn (2) adds building characteristics from the assessor data. Building square footage, number of bedrooms, and lot size do not appear to have meaningful effects on survival after controlling for year built and street. Home characteristics data are missing for about 20% of homes, which shrinks the sample in this third column. The final three columns show different sets of fixed effects. Column (3) includes separate fixed effects for each group of 100 adjacent homes on each street (ordered by house number). This specification addresses a potential concern that some streets in the sample include many hundreds of homes. The more granular fixed effects do not materially change the estimates. Column (4) groups homes on the same street and side of the street, assuming that house numbers follow the convention of odd and even numbers on opposite sides. This specification also does not change the results. Finally, Column (5) omits the street fixed effects and instead uses incident fixed effects. These incident dummies absorb fire-specific severity and arbitrary time trends in preparedness, but unlike the street fixed effects they do not adjust for differences between exposed homes within the same wildfire incident. The point estimates are slightly larger in SRA areas and slightly smaller in LRA VHFHSZ areas. Notably, the R^2 with incident fixed effects is smaller than with street fixed effects (0.39 vs 0.63). This difference implies that the street fixed effects remove variation in fire severity and other factors within incidents that might otherwise threaten identification. Nevertheless, the estimates are broadly stable across specifications. None of the estimated effects in Columns (2) through (5) are statistically different from those in Column (1).

In principle, the street fixed effects design could underestimate the effect of building codes due to the spillover benefits that we document in the next section. If code-induced investments also benefit nearby pre-code homes, the difference in outcomes between post-code and pre-code homes will understate the true effect of codes on survival.[17] This attenuation could be exacerbated by street fixed effects, which by construction are focused on homes located relatively close to each other. Such reasoning might lead one to prefer incident

17. This is a violation of the Stable Unit Treatment Value Assumption, or SUTVA (Rubin 1980).

fixed effects. In practice, as we show in the next section, spillovers are highly localized and are small compared to the own-resilience effects. In the spirit of exhaustiveness, Appendix Table 3 investigates the quantitative significance of SUTVA concerns by controlling directly for the number of pre- and post-code near neighbors in the street fixed effects regression. Ultimately, the differences in the estimated building code effects across these approaches – street fixed effects, incident fixed effects, and street fixed effects directly controlling for spillovers – are small enough that the various results are not statistically different.

4.2 Spillovers to neighboring properties

This section discusses the spillover benefits of code-induced mitigation to neighboring homes. Figure 5 shows regression results for Equation (2). The top panel shows effects of the presence of pre-code neighbors at various wall-to-wall distances. One or more pre-code neighbors within 0-10 meters increases own-structure loss probability during a wildfire by about 3 percentage points. These effects attenuate with distance, going to zero at 30-40 meters. Notably, this is the distance that wildfire managers consider to be the home ignition zone - the distance within which flammable material presents a risk of structure ignition (Cohen 2000, 2010; Calkin et al. 2014). The near-zero estimates beyond 40 meters bolster the validity of our research design. If our estimates for the nearest neighbors were biased by omitted predictors of resilience that co-vary within neighborhoods, one would expect that bias to also appear in estimates for homes another few dozen meters away (Figure 1b provides a useful illustration of these small distances).

The bottom panel shows the estimates for post-code neighbors. The confidence intervals for these estimates are wider since we observe fewer post-code homes. However, the point estimates suggest that the presence of close neighbors built under WUI building codes does not increase own-structure loss probability. There is also no implied effect of further-away post-code neighbors on own survival, offering additional placebo evidence to support the identifying assumptions behind this regression.

Table 2 reports regression estimates for near neighbors that allow effects to vary with the number of neighbors. Column (1) considers neighbors at a wall-to-wall distance of less than 10 meters. A single pre-code neighbor increases own-structure loss risk by 2 percentage points. Two or more pre-code near neighbors increases the effect to 3.1 percentage points. This latter category mostly represents the effect of homes with two neighbors, given that very few homes have more than two neighbors within 10 meters (Appendix Table 2). The estimated effects of nearby post-code neighbors are close to zero. Column (2) shows the same regression using a restricted sample of areas where our measured distances between homes are likely to be particularly accurate. This sample includes denser areas (homes with at least 10 neighbors within a 200 meter radius; see Appendix Table 4) and fires since 2013 (for older incidents, it is more likely that parcel boundaries have changed since the fire). The estimated risk posed by pre-code neighbors is slightly larger in this specification, perhaps due to measurement error in wall-to-wall distances in the full sample. The estimates for post-code neighbors are again zero. As another robustness check, Columns (3) and (4) present similar results based on the centroid-to-centroid distance measure. One pre-code neighbor within 30 meters of centroid distance – roughly equivalent to 10 meters of wall distance – increases own loss risk by 2.6 percentage points, and two or more increases risk by 5 percentage points. Again, the point estimates for post-code neighbors are much smaller and close to zero.

5 Net Social Benefits of Building Standards

The empirical results show that compared to reliance on voluntary action alone, California's wildfire building codes substantially reduced average structure loss risk during a wildfire. They also reduced the risk to a close neighbor's home. Having documented these large resilience benefits, we now embed the results in a simple economic model in order to benchmark the approximate net social benefits of wildfire building codes. We use our estimates to explore the minimum annual disaster probability at which universal mitigation investment is welfare-improving, given various values of neighborhood density and household risk aversion. This exercise is intentionally simple and abstracts from many theoretical and practical details that warrant investigation in future work.[18]

5.1 An Empirical Model of Hazard Mitigation

N identical individuals own homes in a neighborhood with an annual probability p^F of a disaster. In the event of a disaster, each home i's baseline probability of destruction is p_0^D. Up-front investment in a binary mitigation measure with cost m by homeowner i reduces own loss risk during a disaster by τ_{ii} and also reduces loss risk by τ_{ji} for a subset of neighbors $j \neq i$ (for example, in our application τ_{ji} is non-zero for neighbors within some distance of home i and zero for the remaining homes). Mitigation benefits are additive so that a home's destruction probability during a disaster is $p_i^D = p_0^D - M_i\tau_{ii} - \sum_{j \neq i} M_j\tau_{ij}$, where $M_i \in \{0, 1\}$ is the homeowner's binary mitigation decision. We capture myopia with perceived disaster probabilities $\hat{p}_i^F \leq p^F$. These perceived probabilities vary across households.

Consistent with stylized facts (e.g., Klein (2018)), disaster losses are partially insured: destruction of the home imposes insured losses L^I for the insurer and uninsured losses L^U for the homeowner. We initially assume frictionless property insurance markets that offer coverage at actuarially fair annual premia $k_i = p^F p_i^D L^I$. The coexistence of uninsured risk exposure and actuarially fair premiums reflects uninsurable losses (for example, mental and emotional distress) and/or household myopia. The exposition in this section uses a static model with no discounting. Our actual calculations assume that households discount future costs and benefits at a 5% annual rate.

We define two potential measures of net benefit, *risk-neutral cost effectiveness* and *expected utility benefit*. Risk-neutral cost effectiveness is simply the

18. A more detailed theoretical treatment of private risk mitigation can be found in Costello, Quérou, and Tomini (2017).

difference in expected cost with and without mitigation. Expected utility benefit accounts for additional benefits from reduced exposure to uninsured risk. Appendix Section D presents a sketch of the expected utility model. Actually calculating expected utility requires strong assumptions about households' risk aversion, permanent income, ability to smooth across time periods, and other factors. We focus the derivation in this section on risk-neutral cost effectiveness (hereafter, "cost effectiveness"). We note that cost effectiveness is a lower bound on net benefits as long as homeowners are not risk-loving.

Total expected cost across households is,

$$\sum_{i=1}^{N}[p^F(p_0^D - \sum_{j=1}^{N} M_j\tau_{ij})(L^I + L^U) + M_i m] \tag{3}$$

The social benefit of mitigation by a homeowner is the sum of private and external benefits (reduced loss probability) minus mitigation costs,

$$p^F(\tau_{ii} + \sum_{j\neq i}\tau_{ji})(L^I + L^U) - m \tag{4}$$

In contrast, a homeowner's perceived change in private expected losses with mitigation is,

$$\hat{p}_i^F\tau_{ii}(L^I + L^U) - m \tag{5}$$

The presence of internalities ($\hat{p}_i^F$) and externalities (τ_{ji}) means that Expression (5) is weakly less than Expression (4). If households minimize perceived private expected cost, the voluntary takeup rate will be,

$$\mu = \frac{1}{N}\sum_{i=1}^{N}\mathbb{1}[\hat{p}_i^F\tau_{ii}(L^I + L^U) \geq m] \tag{6}$$

which depends on the distribution of perceived probabilities. Assuming $\hat{p}_i^F$ is independently distributed, total actual expected costs under voluntary takeup are $\sum_{i=1}^{N}[p^F(p_0^D - \sum_{j=1}^{N}\mu\tau_{ij})(L^I + L^U) + \mu m]$.

Now consider a policy requiring mitigation by all households. Total expected cost is given by setting $M_i = 1$ for all households in Expression (3). The difference in expected cost under the mandate vs. the voluntary regime is,

$$(1-\mu)\Big[p^F[\sum_{i=1}^{N}\sum_{j=1}^{N}\tau_{ij}(L^I + L^U)] - Nm\Big] \tag{7}$$

The Samuelson (1954)-style expression inside the outer brackets is the sum of private and external mitigation benefits minus total mitigation costs. The factor of $(1-\mu)$ reflects takeup by a fraction μ of the population without the mandate. A mandate weakly reduces total expected cost if the social value of mitigation (Expression 4) is positive and strictly increases expected cost if the social value of mitigation is negative.

Before proceeding, it is worth noting some restrictions in this model. We assume additive mitigation benefits. There is some support for this in the data - for example, the approximate linearity of risk spillovers for one vs. two near neighbors in Table 2. A more complex model could instead allow the benefits of mitigation to vary with mitigation effort by others, so that mitigation becomes a strategic game between homeowners.[19] We also assume identical homes and homeowners within the neighborhood and independently distributed perceived disaster probabilities. We explore heterogeneity in fire risk and neighborhood density across neighborhoods (zip codes) in the empirical implementation. Expanding the model to allow for greater heterogeneity within neighborhoods would allow a more nuanced exploration of the distribution of net benefits. We see these extensions as useful areas for future work, but prefer this simple and transparent model for the purposes of benchmarking approximate net benefits.

5.2 Implementation

We implement the model for a random sample of 100,000 homes in 424 California zip codes in wildfire hazard areas. Each zip code is modeled as a separate

19. Shafran (2008) develops such a model for vegetation maintenance in wildfire areas.

neighborhood with its own fire probability and number of close neighbors affected by risk spillovers.

Mitigation Benefits

The empirical results in Section 4 allow us to estimate τ_{ii} and τ_{ij}. The reduced form estimates of the effect of building codes on structure survival can be seen as intent-to-treat estimates of the effect of mitigation investment. Given a rate of voluntary takeup for the bundle of mitigation measures in the building code, the standard Wald estimator gives τ_{ii} and τ_{ij} as the ratio of the reduced form estimates and the difference in takeup rates in the codes and no-codes areas.[20] In the theoretical model, voluntary takeup μ depends on beliefs about fire risk and might thus be expected to vary between neighborhoods. In practice, survey data on voluntary mitigation is scarce and the available data do not allow us to calculate neighborhood-specific voluntary takeup rates. Our base calculation uses a voluntary takeup rate of one-third. Appendix Section E describes how we calculate this takeup rate based on CAL FIRE inspections of destroyed and surviving homes for a sample of recent California wildfires, including caveats about limitations of the data (which is nevertheless the best existing survey evidence for our purposes).

Our reduced form estimate for own survival benefit for SRA homes implies a value of τ_{ii} of 0.195 ($\frac{.13.1}{1-0.33} = 0.195$). For τ_{ij}, our reduced form estimate of neighbor benefits in Table 2 is 2.3 percentage points for neighbors up to 10 meters away in wall-to-wall distance (and close to zero beyond 10 meters). The effect also appears approximately linear in number of neighbors that mitigate, at least over the limited range of number of neighbors that we can observe in the data. Thus, our estimate of τ_{ij} is 0.034 for each neighbor within 10 meters ($\frac{-.0.023}{1-0.33} = -0.034$) and zero for all further-away neighbors.[21]

20. See e.g., Angrist and Pischke (2009) p. 127-133. This calculation assumes perfect compliance by homes subject to codes and a homogeneous effect of mitigation on structure survival.

21. In principle, mitigation at further-away homes also benefits home i through potential "domino effects": a near neighbor becomes less likely to ignite due to action by that neighbor's neighbor. Our estimates imply that these effects are small on average (on the order of

Sampling at-risk homes

Unlike the empirical analysis of building code effects, which uses homes located inside historical wildfire perimeters, the net benefits calculation considers a group of homes sampled randomly from *all* California homes in fire hazard areas. To construct this sample, we start from all California homes in designated wildfire severity zones (SRA or LRA) and filter out zip codes containing fewer than 100 homes. We then randomly draw $min(n, 250)$ homes from each remaining zip code where n is the number of homes in the zip code. This yields a sample of 100,230 homes subject to wildfire building codes in 424 zip codes.

We identify each home's annual wildfire exposure probability p^F using data from the United States Forest Service (USFS) Wildfire Risk to Communities project. This measure captures the annual probability of moderate to severe wildfire exposure (Scott et al. 2020).[22] We also identify each home's number of neighbors within 30 meters of centroid to centroid distance. This roughly corresponds to the number of neighbors within 10 meters of wall-to-wall distance (see footnote 15) and is less demanding to calculate in this new random sample of homes.

Costs and Losses

Our main estimates of mitigation costs come from Headwaters Economics (2018). That study uses construction estimating tools from R.S. Means to calculate the additional cost to build a home that complies with California's Chapter 7A wildfire code. Overall, that study reports zero cost difference between code-compliant and standard designs. This counter-intuitive result arises because one aspect of code-compliant construction (exterior siding) is substantially *less* expensive than standard designs. These savings offset increased costs for roofing, landscaping, and other areas. Our main estimate of

0.034^2).

22. We use the product of Burn Probability (the total annual wildfire probability) and Flame Length Exceedance Probability 4 (conditional on any fire, the probability that the fire will reach moderate or greater threat status).

code compliance costs ignores savings from code-compliant siding on the theory that owners would make this choice even without standards. This gives a cost estimate of $15,660. We also report results using alternative cost estimates from the National Association of Home Builders. Their estimated wildfire code compliance costs for newly-built California homes include a low scenario of $7,868 and a high scenario of $29,429 (Home Innovation Research Labs 2020).[23] Finally, we show a "retrofit" scenario based on Headwaters Economics' estimate of $62,760 to fully replace roofing and exterior walls on an existing home.

Our assumed losses for a home destroyed by wildfire include rebuilding costs, belongings and contents of the home, alternative living costs while the home is rebuilt, and costs for debris removal and hazardous waste cleanup. Rebuilding, contents, and alternative living arrangements costs come from the FEMA Hazus model (Federal Emergency Management Agency 2021). We match as closely as possible the characteristics of the model home used to estimate code compliance costs in Headwaters Economics (2018).[24] We regionally adjust these costs to California using geographic adjustment factors from R.S. Means provided in the Hazus model. The resulting cost of reconstruction and contents losses is $766,725. The Hazus cost for alternative living arrangements and disruption (e.g., moving costs) for 24 months is $61,696. For debris removal (which is borne by homeowners) and hazardous waste cleanup (borne by governments), we add a total of $150,000.[25]

We assume that mitigation investments have a protective lifetime of 40 years.

23. These are costs to meet the International Wildland Urban Interface Code, which is similar to the Chapter 7A code. In the low scenario, we ignore $3,839 of gross savings from code-compliant siding as we do for Headwaters Economics (2018).

24. The model home in Headwaters Economics (2018) is a 2,500 square-foot single-story home with 2-car garage constructed in Montana for $140 per square foot. We use Hazus cost estimates for the same size, number of stories, and garage in the "custom" construction class, the closest corresponding cost category.

25. For cleanup and debris removal costs, see Klein (2018); Lewis, Sukey, "Cleaning Up: Inside the Wildfire Debris Removal Job That Cost Taxpayers $1.3 Billion." *The California Report*, July 19, 2018; and Bizjak, Tony, "State's Effort to Clean Up After the Camp Fire is Off to a Rocky Start", *Sacramento Bee*, January 13, 2019.

In the absence of mitigation investment, the probability of loss when exposed to wildfire for a home with no close neighbors is 44%.[26] Households discount future costs and benefits at 5% per year.

5.3 Results of Net Benefit Calculation

Figure 6 illustrates the results of this calculation. The scatter plot shows zip code-level averages of annual wildfire hazard and number of near neighbors. The wildfire hazard reaches strikingly high levels: several zip codes face annual event probabilities above 2% per year, implying a significant wildfire exposure every 50 years on average. The color scale shows the social benefit of mitigation investment in each zip code following Expression (4). The dashed black line shows a threshold for positive net benefits of building standards. Homes to the right of this line have lower expected costs with mitigation investments than without. The threshold bends to the left as the average number of neighbors increases due to the spillover benefits of mitigation across properties. For a home with zero near neighbors, the break-even annual wildfire hazard is about 0.45%. The break-even annual hazard for a home with 1 near neighbor is 0.39% and for a home with 4 near neighbors it is 0.27%.

These cost effectiveness estimates are a lower bound on the net benefits of universal mitigation. One important reason for this is that many homeowners are substantially underinsured for natural disaster losses. Mitigation investments yield additional welfare benefits by reducing exposure to uninsured risk. Even for properties covered by homeowners insurance, Klein (2018) reports that coverage limits for wildfire-destroyed properties are often up to 50% below actual losses. Table 3 reports break-even annual wildfire probabilities for a home with 1.2 near neighbors (the sample mean) based on the expected utility model in Appendix Section D. Although this model requires additional strong assumptions, these back-of-the-envelope numbers depict how risk aversion might affect program benefits. For example, if code compliance costs $15,660, a homeowner

26. The approximate destruction probability for SRA homes under current codes is $0.4 - .156 = .244$ (Table 1). Combined with the own-structure mitigation effect, this gives the implied loss probability in the absence of mitigation: $.244 + .195 = 0.44$.

with a coefficient of relative risk aversion of 5 and an insurance policy covering two thirds of total losses would be better off investing in mitigation wherever the annual probability of a damaging wildfire exceeds 0.33%.[27]

Table 3 also reports results using other estimates of mitigation cost. The zero net cost estimate from Headwaters Economics (2018) leads to positive benefits for any level of hazard. The two additional estimates from Home Innovation Research Labs (2020) bracket the main cost estimate. Finally, the estimated retrofit cost of $62,760 results in much higher break-even hazard levels for existing homes. This kind of full retrofit to existing homes appears to generate positive benefits only for a handful of areas with extreme fire hazard.

Beyond risk aversion, WUI building codes likely have additional benefits that are not included in our calculations. These include reductions in public expenditures on firefighting during large wildfires (Baylis and Boomhower 2019), reduced demand for public assistance among fire victims (Deryugina 2017), avoided emotional and mental distress, and less need for public safety power shutoffs that interrupt electricity service during high fire-risk periods.[28] Moreover, if imperfections in property insurance markets cause premiums to systematically exceed expected damages, then mitigation becomes more attractive because it reduces the risk which must be insured in the imperfect insurance market. Scientists also agree that annual wildfire probabilities are increasing throughout North America such that net benefits of WUI building codes will grow in the future. On the other hand, a more detailed analysis would need to consider possible heterogeneity in household net benefits. If some individuals have very high perceived private costs of choosing fire resistant materials and landscaping (perhaps due to strong aesthetic preferences), building standards could be costly for these households.

27. Studies of the property insurance market generally report high implied levels of relative risk aversion. Cohen and Einav (2007) and Sydnor (2010) examine deductible choices in auto and homeowners insurance respectively and find double-digit values for the mean household across a variety of specifications. Evidence from other markets suggests values closer to the low single digits (e.g., Gertner 1993; Chetty 2006).

28. For a systematic review of catastrophic wildfire costs, see Feo et al. (2020).

In summary, our empirical estimates and model calculations suggest that wildfire building codes yield unambiguous benefits in the most fire-prone areas of California, especially when homes are clustered closely together such that there are large risk spillovers. For areas with lower fire risk, the sign of net benefits is more sensitive to modeling choices and the assumed co-benefits of building codes. Further work on the cost-effectiveness of wildfire mitigation measures in low- and moderate-risk areas is an important area for additional research.

6 Conclusion

Efficient investment in adaptation is essential in the face of rapidly accelerating disaster losses. Yet takeup of protective technologies and behaviors is thought to be constrained by misperception of risk, insurance market failures, spatial externalities, and other frictions. The pressing question facing researchers and policymakers is how to best respond to these market barriers. One suite of policies focuses on increasing voluntary takeup through information or subsidies. Another option is to override individual decisions and mandate certain investments in hazard areas. These policies may differ substantially in their effects and their political acceptability.

This study contributes evidence on the effects and net economic benefits of a mandatory adaptation policy. We provide the first comprehensive empirical evaluation of California's strict wildfire building codes. The analysis uses a new dataset of property-level data on U.S. homes destroyed by wildfire that was created for this study. The new data combine nationwide property characteristics information with post-fire damage assessment records collected from numerous local and state agencies. This resource has three important advantages: it collects and harmonizes previously disparate damage data; it contains a complete record of homes that survive as well as homes that are destroyed; and unlike data for floods and other losses, it is reported at the individual property level. Beyond this study, the new data will enable additional important research on disaster losses.

The empirical analysis in this study is bolstered by our ability to observe differences in building code regimes over time, across jurisdictions within California, and between California and other states. The empirical strategy isolates the effect of building code changes using a fixed effects design that compares outcomes for pre- and post-code homes on the same residential street. This approach narrows the comparison to homes experiencing essentially identical wildfire exposures.

The results show that compared to reliance on voluntary action alone, California's wildfire building codes reduced average structure loss risk during a wildfire by 16 percentage points, or about a 40% reduction. They also reduced the risk to a close neighbor's home by about 2 percentage points or 6%. These striking results imply materially different levels of resilience in communities with and without such codes. Moreover, the spatial externalities provide a classic rationale for public policy intervention even if homeowners were fully informed and rational about wildfire risk.

Having documented these large resilience benefits, we then show how the empirical results can be embedded in an economic model that accounts for mitigation costs, spatial spillovers, and risk preferences. We use our results and other values from the literature to provide a back-of-the-envelope approximation of the minimum annual wildfire risk at which universal mitigation generates positive net benefits. In the most fire-prone areas of California, the calculation shows large net benefits of building codes for new homes. Given the high cost of fully retrofitting existing homes to modern standards, full retrofits do not pass a benefit-cost test in most areas. An important task for future research is to identify individual low-cost investments that can cost-effectively improve the resilience of existing homes in high hazard areas.

In summary, the data show that an adaptation mandate substantially improved resilience to wildfires and a cost-benefit approximation suggests that low takeup without standards is more likely driven by market failures than by fully-informed individual decisionmaking. These results are immediately applicable to policy debates in the U.S., Canada, Australia, the European

Union, and other jurisdictions that are seeking to respond to escalating wildfire risk. More broadly, these facts should be of interest to policymakers and researchers confronting other hazards like floods, hurricanes, and heat waves where voluntary takeup of self-protective investments seems to be constrained by similar barriers. As climate change continues to increase disaster losses, this type of research on the role of public policy and market incentives in shaping adaptation is increasingly urgent.

References

Alexandre, Patricia M, Susan I Stewart, Nicholas S Keuler, Murray K Clayton, Miranda H Mockrin, Avi Bar-Massada, Alexandra D Syphard, and Volker C Radeloff. 2016. "Factors Related To Building Loss Due To Wildfires In The Conterminous United States." *Ecological Applications* 26 (7): 2323–2338.

Allstate Indemnity Company. 2018. *California Homeowner's Insurance Rate Filing 18-2993.* California Department of Insurance.

Angrist, Joshua D., and Jörn-Steffen Pischke. 2009. *Mostly Harmless Econometrics: An Empiricist's Companion.* Princeton University Press.

Bakkensen, Laura, and Lint Barrage. Forthcoming. "Going Under Water? Flood Risk Belief Heterogeneity And Coastal Home Price Dynamics." *The Review Of Financial Studies.*

Baylis, Patrick, and Judson Boomhower. 2019. *Moral Hazard, Wildfires, And The Economic Incidence Of Natural Disasters.* NBER Working Paper No. 26550.

California Department of Insurance. 2018. *The Availability And Affordability Of Coverage For Wildfire Loss In Residential Property Insurance In The Wildland-Urban Interface And Other High Risk Areas Of California.* Technical report.

Calkin, David E., Jack D. Cohen, Mark A. Finney, and Matthew P. Thompson. 2014. "How Risk Management Can Prevent Future Wildfire Disasters In The Wildland-Urban Interface." *Proceedings Of The National Academy Of Sciences* 111 (2): 746–751.

Chetty, Raj. 2006. "A New Method of Estimating Risk Aversion." *American Economic Review* 96, no. 5 (December): 1821–1834.

Cohen, Alma, and Liran Einav. 2007. "Estimating Risk Preferences from Deductible Choice." *American Economic Review* 97, no. 3 (June): 745–788.

Cohen, J.D., and R. Stratton. 2008. *Home Destruction Examination: Grass Valley Fire.* US Department of Agriculture, Forest Service, Report R5-TP-026b.

Cohen, Jack D. 2000. "Preventing Disaster: Home Ignitability In The Wildland-Urban Interface." *Journal Of Forestry* 98 (3): 15–21.

———. 2010. "The Wildland-Urban Interface Fire Problem." *Fremontia* 38 (2-3): 16–22.

Costello, Christopher, Nicolas Quérou, and Agnes Tomini. 2017. "Private Eradication Of Mobile Public Bads." *European Economic Review* 94:23–44.

Dehring, Carolyn A, and Martin Halek. 2013. "Coastal Building Codes And Hurricane Damage." *Land Economics* 89 (4): 597–613.

Deryugina, Tatyana. 2017. "The Fiscal Cost of Hurricanes: Disaster Aid versus Social Insurance." *American Economic Journal: Economic Policy* 9, no. 3 (August): 168–98.

Donovan, Geoffrey, Patricia Champ, and David Butry. 2007. "Wildfire Risk And Housing Prices: A Case Study From Colorado Springs." *Land Economics* 83 (2): 217–233.

Federal Emergency Management Agency. 2020. *Building Codes Save: A Nationwide Study,* November.

———. 2021. *Hazus Inventory Technical Manual,* February.

Feo, Teresa J., Samuel Evans, Amber J. Mace, Sarah E. Brady, and Brie Lindsey. 2020. *The Costs Of Wildfire In California: An Independent Review Of Scientific And Technical Information.* California Council on Science and Technology.

Gallagher, Justin. 2014. "Learning about an Infrequent Event: Evidence from Flood Insurance Take-Up in the United States." *American Economic Journal: Applied Economics* 6, no. 3 (July): 206–33.

Gertner, Robert. 1993. "Game Shows And Economic Behavior: Risk-Taking On "Card Sharks"." *The Quarterly Journal Of Economics* 108 (2): 507–521.

Gibbons, Philip, Linda Van Bommel, A Malcolm Gill, Geoffrey J Cary, Don A Driscoll, Ross A Bradstock, Emma Knight, Max A Moritz, Scott L Stephens, and David B Lindenmayer. 2012. "Land Management Practices Associated With House Loss In Wildfires." *Plos One* 7 (1): e29212.

Grad, Shelby. 1996. "O.C. Stopped Warning Of 'High-Hazard' For Fire Area." *Los Angeles Times* (October).

Hallstrom, Daniel G., and V. Kerry Smith. 2005. "Market Responses To Hurricanes." *Journal Of Environmental Economics And Management* 50 (3): 541–561.

Headwaters Economics. 2018. *Building A Wildfire-Resistant Home: Codes And Costs,* November.

Home Innovation Research Labs. 2020. *Cost Impact Of Building A House In Compliance With IWUIC.* Report No. CR1328-2 12302020, December.

Insurance Institute for Business and Home Safety. 2019. *Wildfire Codes & Standards: State-By-State Reference Guide.*

Intini, Paolo, Enrico Ronchi, Steven Gwynne, and Noureddine Bénichou. 2020. "Guidance On Design And Construction Of The Built Environment Against Wildland Urban Interface Fire Hazard: A Review." *Fire Technology* 56:1853–1883.

Jacobsen, Grant, and Matthew Kotchen. 2013. "Are Building Codes Effective At Saving Energy? Evidence From Residential Billing Data In Florida." *The Review Of Economics And Statistics* 95 (1): 34–49.

Klein, Kenneth S. 2018. "Minding The Protection Gap: Resolving Unintended, Pervasive, Profound Homeowner Underinsurance." *Connecticut Insurance Law Journal* 15.

Kousky, Carolyn, Erzo F. P. Luttmer, and Richard J. Zeckhauser. 2006. "Private Investment And Government Protection." *Journal Of Risk And Uncertainty* 33 (1): 73–100.

Kramer, H Anu, Miranda H Mockrin, Patricia M Alexandre, Susan I Stewart, and Volker C Radeloff. 2018. "Where Wildfires Destroy Buildings In The US Relative To The Wildland–Urban Interface And National Fire Outreach Programs." *International Journal Of Wildland Fire* 27 (5): 329–341.

Kunreuther, Howard C., and Erwann O. Michel-Kerjan. 2011. *At War With The Weather: Managing Large-Scale Risks in a New Era of Catastrophes.* MIT Press.

Larimer County. 2020. *Residential Requirements: A Guide For The General Contractor Or Home Builder.* Larimer County Community Development Division, June.

Levinson, Arik. 2016. "How Much Energy Do Building Energy Codes Save? Evidence from California Houses." *American Economic Review* 106, no. 10 (October): 2867–94.

Maclay, C.K. 1997. "State Fire Prevention Law Fizzles." *Contra Costa Times* (August).

McCoy, Shawn J., and Randall P. Walsh. 2018. "Wildfire Risk, Salience And Housing Demand." *Journal Of Environmental Economics And Management* 91:203–228.

Miller, Rebecca K, Christopher B Field, and Katharine J Mach. 2020. "Factors Influencing Adoption And Rejection Of Fire Hazard Severity Zone Maps In California." *International Journal Of Disaster Risk Reduction,* 101686.

National Association of Home Builders. 2007. *Study Of Life Expectancy Of Home Components,* February.

Quarles, Stephen, Pam Leschak, Rich Cowger, Keith Worley, Remington Brown, and Candace Iskowitz. 2013. *Lessons Learned From Waldo Canyon.* Insurance Institute for Business & Home Safety.

Rollins, Matthew G. 2009. "LANDFIRE: a nationally consistent vegetation, wildland fire, and fuel assessment." *International Journal of Wildland Fire* 18 (3): 235–249.

Rubin, Donald B. 1980. "Randomization Analysis Of Experimental Data: The Fisher Randomization Test Comment." *Journal Of The American Statistical Association* 75 (371): 591–593.

Samuelson, Paul A. 1954. "The Pure Theory Of Public Expenditure." *The Review Of Economics And Statistics* 36 (4): 387–389.

Scott, Joe H, Julie W Gilbertson-Day, Christopher Moran, Gregory K Dillon, Karen C Short, and Kevin C Vogler. 2020. *Wildfire Risk To Communities: Spatial Datasets Of Landscape-Wide Wildfire Risk Components For The United States.* Forest Service Research Data Archive.

Shafran, Aric P. 2008. "Risk Externalities And The Problem Of Wildfire Risk." *Journal Of Urban Economics* 64 (2): 488–495.

Simmons, Kevin M, Jeffrey Czajkowski, and James M Done. 2018. "Economic Effectiveness Of Implementing A Statewide Building Code: The Case Of Florida." *Land Economics* 94 (2): 155–174.

Snyder, Tom. 1995. "New Fire Safety , Roof Regulations Considered - City To Discuss Guidelines Oct. 3." *The Orange County Register* (September).

Sommer, Lauren. 2020. "Rebuilding After A Wildfire? Most States Don't Require Fire-Resistant Materials." *National Public Radio* (November).

Stewart, George. 1995. "North Tustin Spared From Fire Map." *The Orange County Register* (December).

Sullivan, Julie Fate. 1995. "City Spares Area From Fire Hazard Designation." *Los Angeles Times* (October).

Sydnor, Justin. 2010. "(Over)Insuring Modest Risks." *American Economic Journal: Applied Economics* 2 (4): 177–199.

Syphard, Alexandra D, Teresa J Brennan, and Jon E Keeley. 2014. "The Role Of Defensible Space For Residential Structure Protection During Wildfires." *International Journal Of Wildland Fire* 23 (8): 1165–1175.

———. 2017. "The Importance Of Building Construction Materials Relative To Other Factors Affecting Structure Survival During Wildfire." *International Journal Of Disaster Risk Reduction* 21:140–147.

Syphard, Alexandra D, and Jon E Keeley. 2019. "Factors Associated With Structure Loss In The 2013–2018 California Wildfires." *Fire* 2 (3): 49.

Syphard, Alexandra D, Jon E Keeley, Avi Bar Massada, Teresa J Brennan, and Volker C Radeloff. 2012. "Housing Arrangement And Location Determine The Likelihood Of Housing Loss Due To Wildfire." *Plos One* 7 (3): e33954.

Troy, Austin. 2007. "A Tale Of Two Policies: California Programs That Unintentionally Promote Development In Wildland Fire Hazard Zones." *Living On The Edge (Advances In The Economics Of Environmental Resources, Volume 6). Emerald Group Publishing Limited,* 127–140.

Wagner, Katherine R. H. Forthcoming. "Adaptation And Adverse Selection In Markets For Natural Disaster Insurance." *American Economic Journal: Economic Policy.*

Yost, Walt. 1996. "Accord Douses Controversy On Fire Protection." *Sacramento Bee* (October).

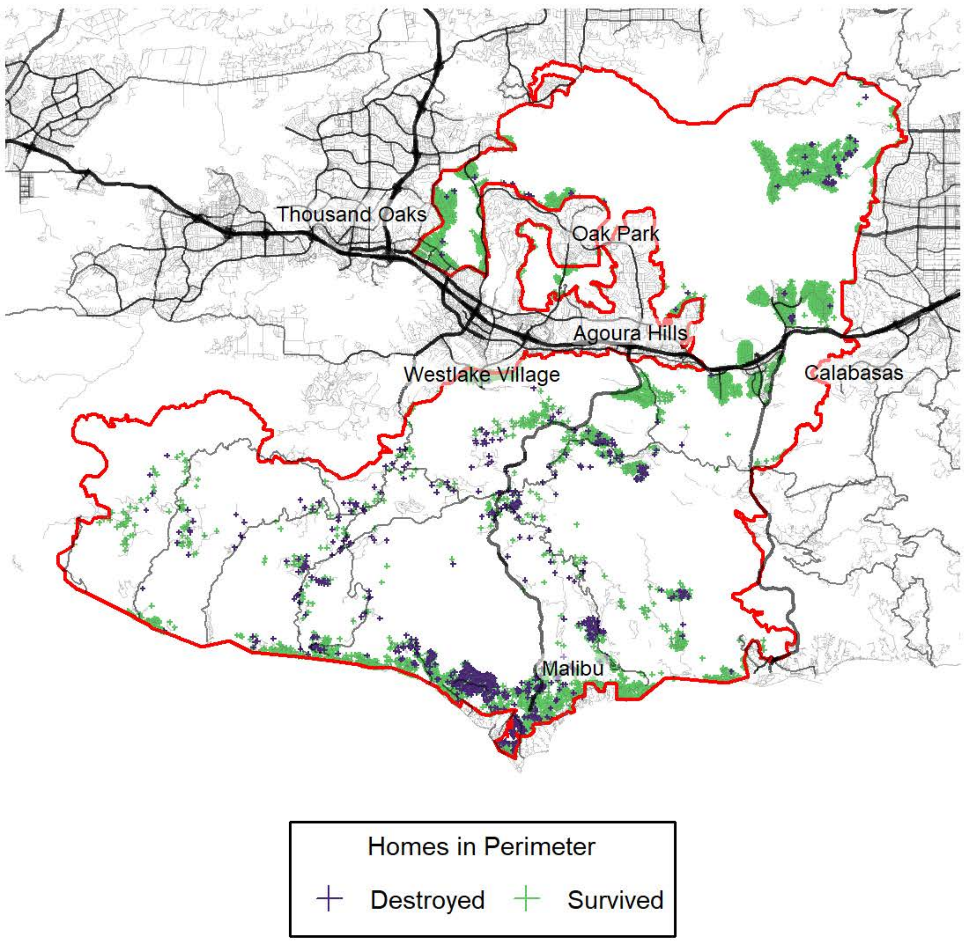
Figure 1: Building and Validating the Dataset

(a) Roof Locations and Damage Reports

(b) Distance Between Structures

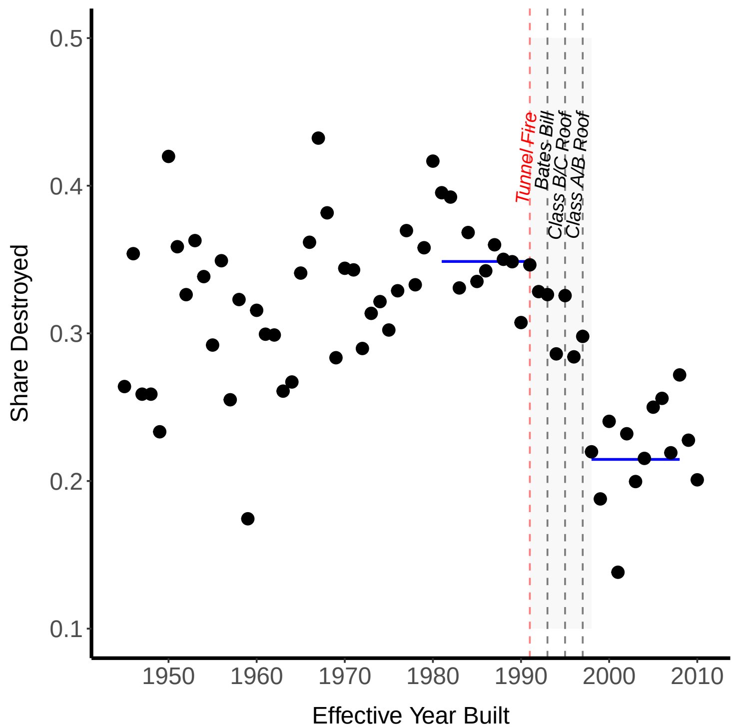
Notes: Best viewed in color. **(Panel a)** Homes affected by the Carr Fire (2018). Markers are geocoded structure locations. Green square markers are structures reported as destroyed in the damage inspection data; yellow circular markers are all other homes in the data. The background image is aerial imagery before and after the Carr Fire from NearMap. Blue building shapes and gray parcel outlines are the building footprint data and assessor parcel boundary data used to identify structure locations (see text for details). **(Panel b)** Examples of calculated distances between structure walls. Images are pre-fire aerial imagery of homes affected by the Thomas Fire (2017) and Tubbs Fire (2017). Figure shows the wall-to-wall distance from the structure marked '0' to the other homes.

Figure 2: Merged data example: Structure-level outcomes in the Woolsey Fire



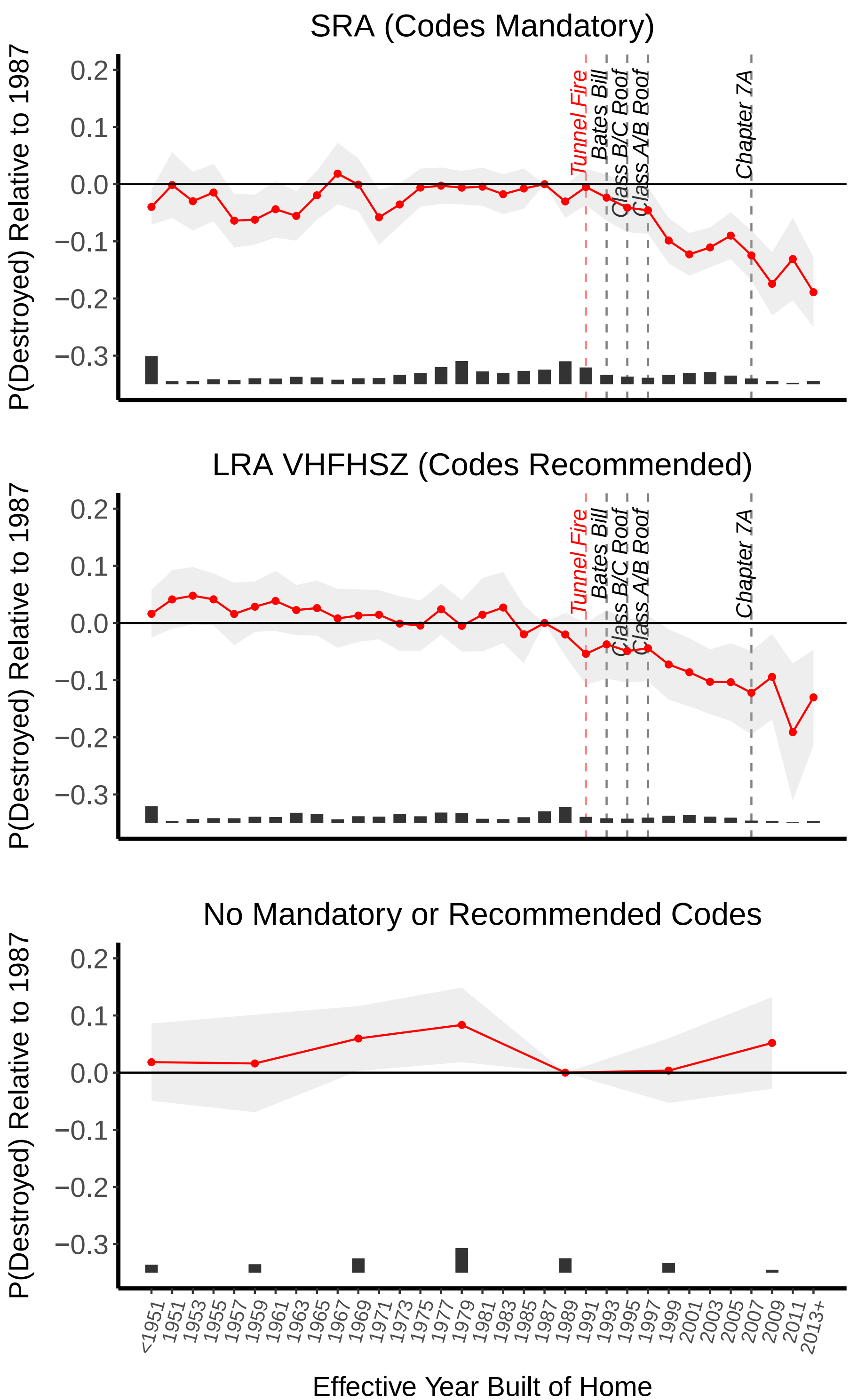
Notes: Best viewed in color. Example of merged inspection, assessor, and fire perimeter data for one fire in our dataset. Markers indicate the locations of single family homes inside the final Woolsey Fire perimeter (shown in red). Purple homes are reported destroyed in damage inspection data; green homes are all remaining homes in the ZTRAX assessment data. Street map data are from Open Street Map.

Figure 3: Share Destroyed by Year Built in Mandatory Code Areas



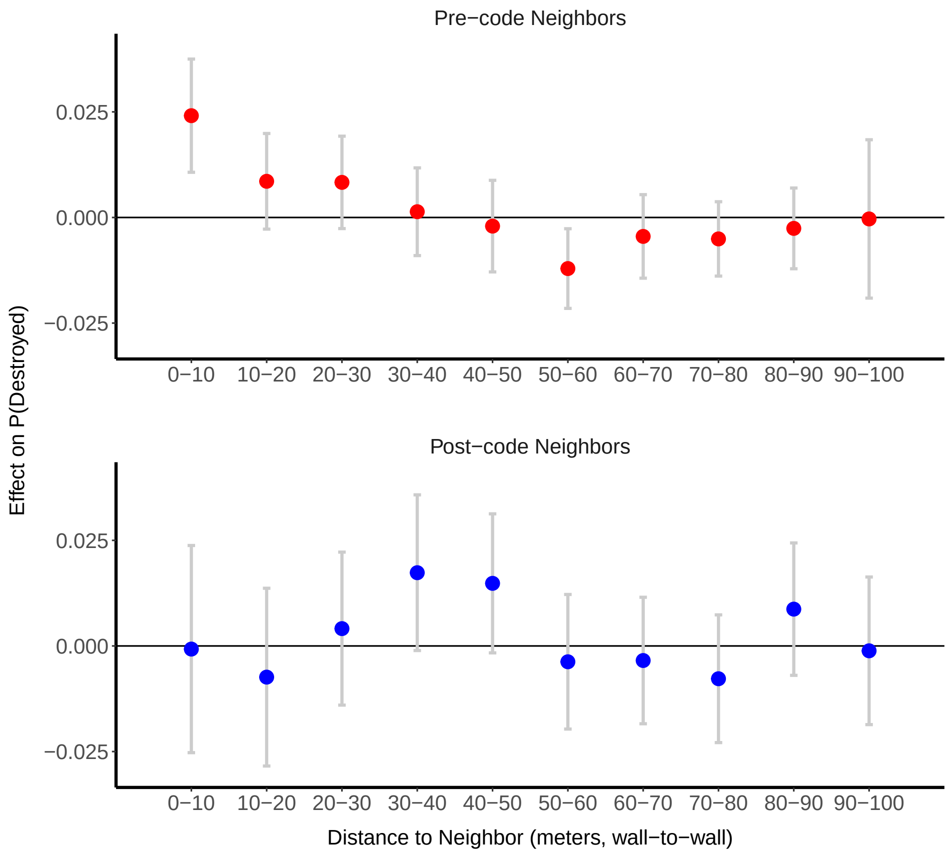
Notes: This figure shows the share of homes inside wildfire perimeters that were destroyed, according to the year that the home was built. The sample is limited to homes in State Responsibility Area. The blue lines show ten-year averages.

Figure 4: Estimated Vintage Effects by Building Code Jurisdiction



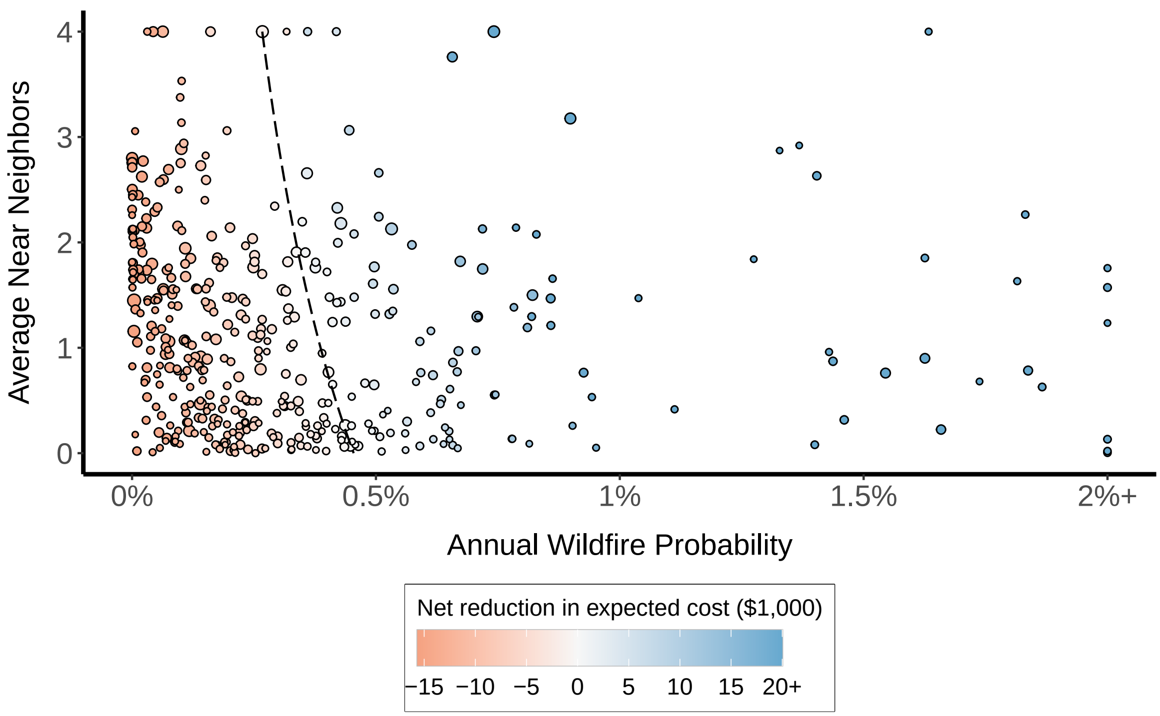
Notes: Figure plots point estimates and 95% confidence intervals from 3 separate OLS regressions of an indicator for Destroyed on bins of effective year built. Each regression includes street by incident fixed effects and other controls described in the text. Panel (a) shows homes in state responsibility area (SRA). Panel (b) shows homes in local responsibility area (LRA) inside state-recommended Very High Fire Hazard Severity Zones (VHFSZ). Panel (c) shows homes in states without wildfire building codes (AZ, CO, OR, WA) and LRA areas in California outside of state-recommended VHFHSZ. Standard errors are clustered by street. The histogram below each panel shows the relative number of observations in each bin.

Figure 5: The effect of neighboring homes on survival



Notes: Figure shows coefficients and 95% confidence intervals from a single OLS regression of "Destroyed" on the presence of pre- and post-code neighbors at various distances. The top panel shows estimates for indicator variables for the presence of one or more neighbors built without wildfire building codes. The bottom panel shows estimates for indicator variables for the presence of one or more neighbors built after wildfire building codes. The regression also includes own year built (in four year bins), street by incident fixed effects, and topographic controls. Distance to neighboring home is wall-to-wall distance. See text for details.

Figure 6: Lower-bound Net Benefits by Fire Hazard and Number of Neighbors



Notes: This figure plots the annual probability of a damaging wildfire and average number of close neighbors for a random sample of 100,230 California homes in areas subject to the Chapter 7A building codes. Markers represent zip-code averages. Marker color indicates average net benefits in the zip code using the cost-effectiveness measure, which is a conservative lower bound on total net benefits. Annual wildfire hazard is from Scott et al. (2020) and represents a snapshot as of 2014. Number of neighbors is the number of homes within a 30-meter centroid to centroid distance. Marker size is proportional to number of homes in the zip code. The dashed line shows a threshold for zero net reduction in expected cost. See text for discussion and alternative scenarios.

Table 1: Regression estimates of building code effects on own survival

	(1)	(2)	(3)	(4)	(5)
SRA * Before 1998	-0.022	-0.045	-0.027	-0.021	-0.029
	(0.033)	(0.041)	(0.029)	(0.037)	(0.020)
SRA * 1998–2007	-0.112***	-0.138***	-0.117***	-0.113***	-0.160***
	(0.034)	(0.043)	(0.031)	(0.039)	(0.022)
SRA * 2008–2016	-0.159***	-0.190***	-0.164***	-0.151***	-0.204***
	(0.036)	(0.044)	(0.033)	(0.041)	(0.027)
LRA VHFHSZ * Before 1998	-0.031	-0.048	-0.038	-0.028	-0.005
	(0.033)	(0.050)	(0.030)	(0.037)	(0.021)
LRA VHFHSZ * 1998–2007	-0.121***	-0.142***	-0.126***	-0.127***	-0.095***
	(0.034)	(0.048)	(0.032)	(0.038)	(0.025)
LRA VHFHSZ * 2008–2016	-0.159***	-0.178***	-0.162***	-0.163***	-0.130***
	(0.037)	(0.050)	(0.035)	(0.041)	(0.030)
No Codes * 1998–2007	-0.038	-0.029	-0.045*	-0.044*	-0.035
	(0.025)	(0.026)	(0.026)	(0.024)	(0.030)
No Codes * 2008–2016	-0.006	0.035	0.012	-0.010	-0.071
	(0.033)	(0.040)	(0.041)	(0.033)	(0.044)
Ground slope (degrees)	0.006***	0.005***	0.006***	0.006***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Lot size (acres)		-0.000			
		(0.000)			
Building square feet		-0.000			
		(0.000)			
Bedrooms		0.001			
		(0.003)			
Street FE	✓	✓			
Fuel model FE	✓	✓	✓	✓	✓
Street X 100 homes FE			✓		
Street X side of street FE				✓	
Incident FE					✓
Observations	48,843	38,991	48,843	48,843	48,843
R^2	0.62	0.63	0.63	0.66	0.39
Dep. Var. Mean	0.41	0.46	0.41	0.41	0.41

Notes: Table shows estimates and standard errors from five separate OLS regressions. The outcome variable is an indicator for Destroyed. Street fixed effects includes separate dummies for each street-by-incident. Incident fixed effects are dummies for each wildfire. Fuel model fixed effects are dummies for Anderson fire behavior fuel models. Standard errors are clustered by street.

Table 2: Neighbor Effects

	Destroyed			
	(1)	(2)	(3)	(4)
1 pre-code nearby homes	0.020***	0.023***	0.026***	0.027***
	(0.007)	(0.007)	(0.007)	(0.007)
2+ pre-code nearby homes	0.031***	0.039***	0.050***	0.051***
	(0.009)	(0.010)	(0.009)	(0.009)
1 post-code nearby home	0.001	0.002	0.010	0.001
	(0.013)	(0.013)	(0.012)	(0.013)
2+ post-code nearby homes	-0.001	0.001	0.003	-0.009
	(0.016)	(0.018)	(0.018)	(0.021)
Own Year Built	✓	✓	✓	✓
Topography	✓	✓	✓	✓
Street FE	✓	✓	✓	✓
Observations	38,226	23,564	44,923	26,842
R^2	0.64	0.68	0.63	0.68
Distances	Walls	Walls	Centroids	Centroids
Subsample		✓		✓
Dep. Var. Mean	0.40	0.49	0.40	0.51

Notes: Table shows estimates and standard errors from 4 separate OLS regressions. The outcome variable is an indicator for Destroyed, and each regression also includes dummy variables for own year built (in four year bins) and street-by-incident fixed effects. Columns (1) and (2) use wall-to-wall distances to assign neighbors, while Columns (3) and (4) use the centroid-to-centroid distance measure. Columns (1) and (3) use the full sample of single family homes, while columns (2) and (4) use a subsample in areas where our distance measures are likely to be particularly accurate. See text for details. Standard errors are clustered by street.

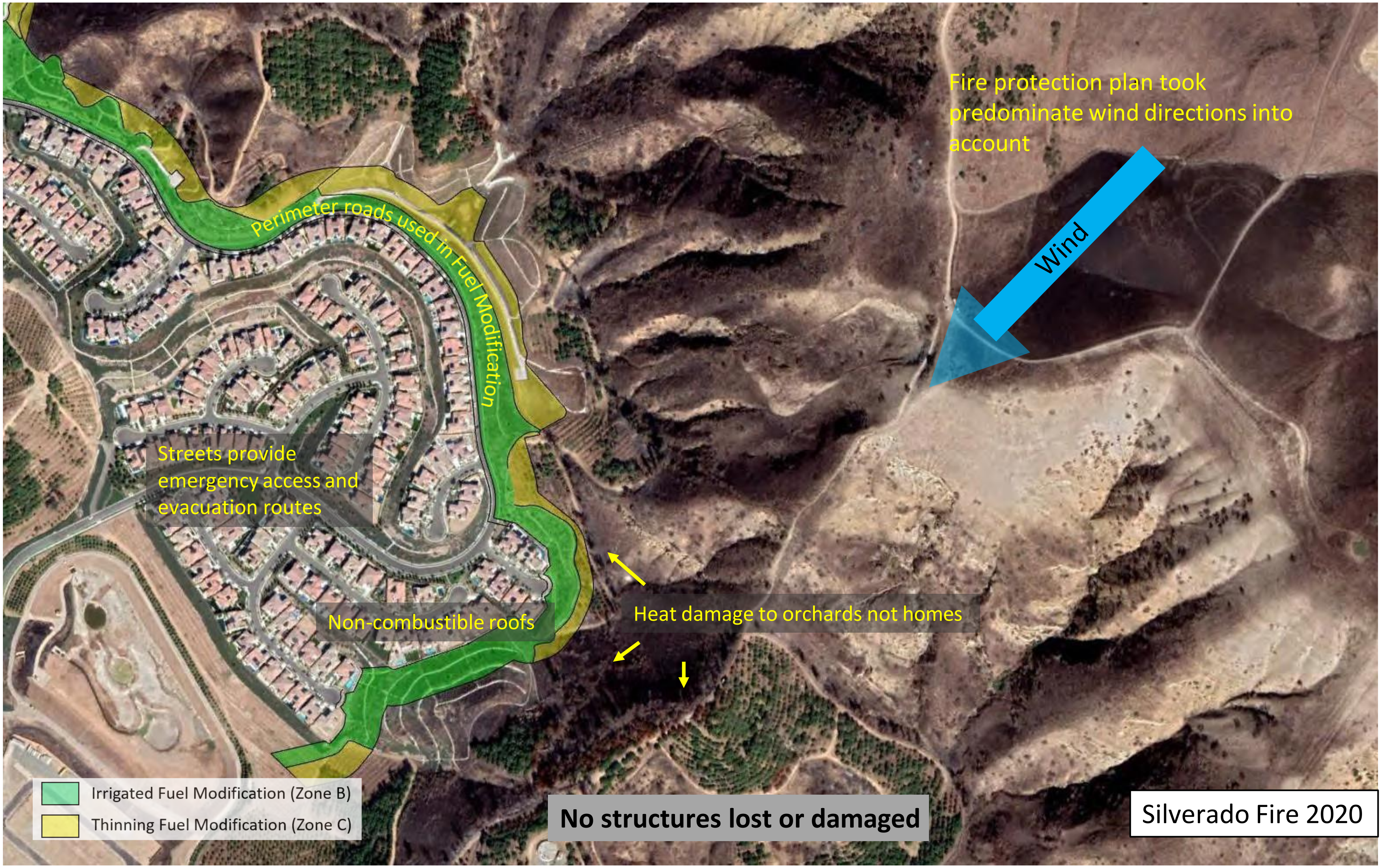
Table 3: Break-even Hazard under Risk Aversion and Alternative Costs

	Insured %	100	67		33	
			$\gamma = 2$	$\gamma = 5$	$\gamma = 2$	$\gamma = 5$
Cost Estimate	Source					
New Home						
$ 0	*HE-Low*	0	0	0	0	0
$ 4,029	*NAHB-Low*	0.10%	0.09%	0.08%	0.08%	0.05%
$15,660	*HE*	0.38%	0.36%	0.33%	0.30%	0.20%
$29,429	*NAHB-High*	0.71%	0.68%	0.63%	0.58%	0.41%
Retrofit						
$62,760	*HE*	1.50%	1.46%	1.40%	1.33%	1.15%

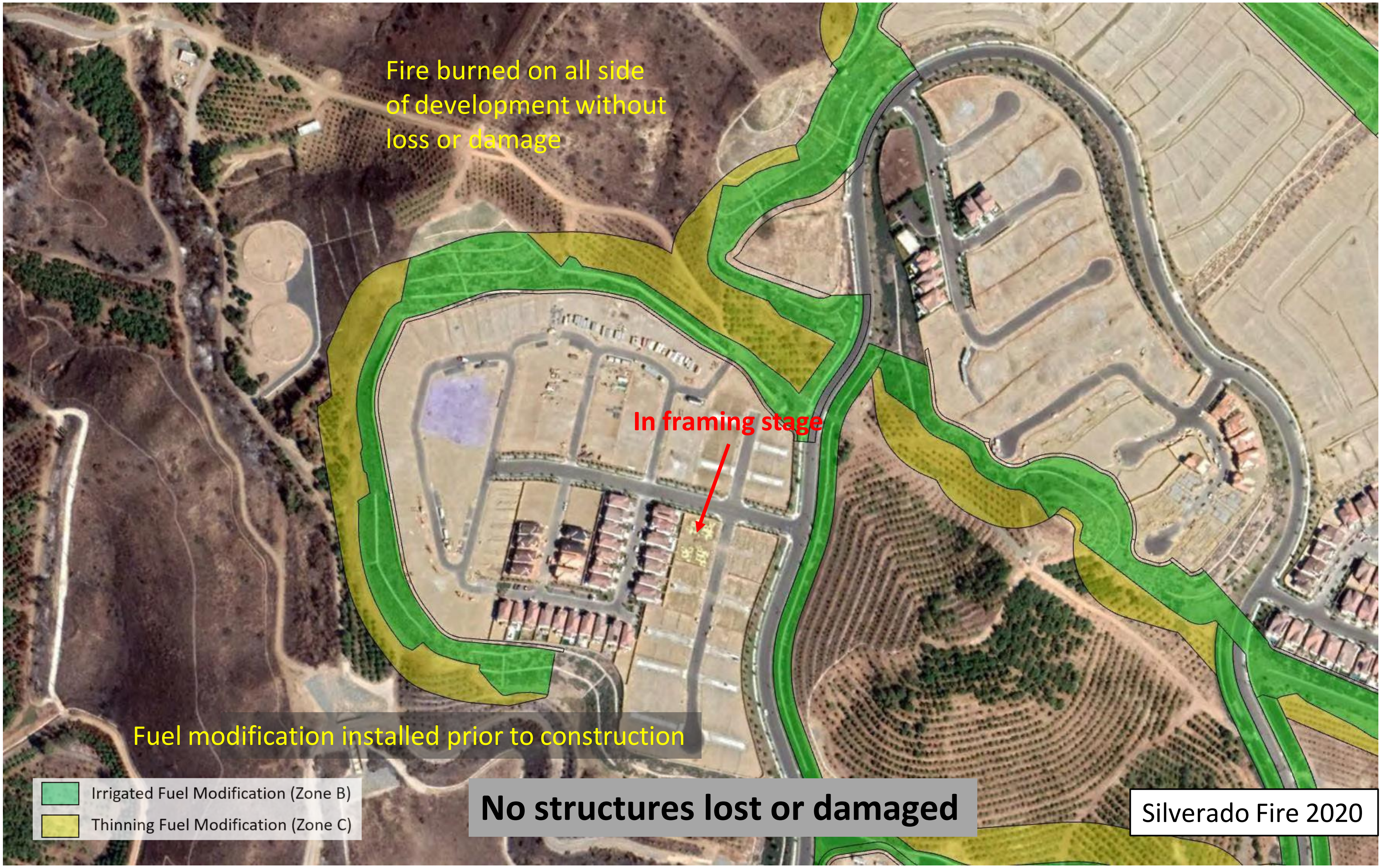
Notes: Table shows estimated minimum annual wildfire probability for which building standards yield positive net benefits under various assumptions about cost, share of losses insured, and risk aversion. Probabilities are reported as percentages (e.g., 0.32% per year). For partial insurance scenarios, γ is the coefficient of relative risk aversion. Calculations assume 1.2 near neighbors. See text for details of these calculations. Source code HE represents Headwaters Economics (2018) and NAHB represents Home Innovation Research Labs (2020).

Exhibit B – Master-Planned Community Case Studies

Defensible space, roads and vegetation-management areas (i.e., thinning zones and irrigated zones) create fire buffers around homes and defensible line for fire fighters.



Fire protection plan took predominate wind directions into account
Wind
Perimeter roads used in Fuel Modification
Streets provide emergency access and evacuation routes
Heat damage to orchards not homes
Non-combustible roofs
Irrigated Fuel Modification (Zone B)
Thinning Fuel Modification (Zone C)
No structures lost or damaged
Silverado Fire 2020


Fire burned on all side
of development without
loss or damage
In framing stage
Fuel modification installed prior to construction
Irrigated Fuel Modification (Zone B)
Thinning Fuel Modification (Zone C)
No structures lost or damaged
Silverado Fire 2020


Sreets provide emergency access and evacuation routes
Topography used to advantage
Wind
Fire protection plan took predominate wind directions into account
Multiple options for evacuation routes
Orchards used to advantage
Irrigated Fuel Modification (Zone B)
Thinning Fuel Modification (Zone C)
No structures lost or damaged
Silverado Fire 2020

Exhibit C – State Fire Marshall Housing Data Analysis

MEMORANDUM
January 18, 2022

To: Dan Dunmoyer, President and CEO of CBIA
From: Bob Raymer[1]
Subject: Analysis of State Fire Marshal Property Loss Data

This memorandum evaluates Office of the State Fire Marshal data to determine how new homes constructed after January 1, 2010 fared in the ten worst property-loss fires dating back to 2017, compared to homes built prior to 2010.

I. METHODS

The State Fire Marshal maintains an extensive data retrieval service of fire incidents across the state, including those related to fires occurring in the Wildland-Urban Interface (WUI).[2] For the nine worst property-loss fires dating back to 2017, CBIA requested residential data that identified:

- Whether the dwelling was single-family or multifamily;
- damage assessment (destroyed, major damage, affected, no damage);
- valuation of the structure; and
- year the structure was built

The data provided by the State Fire Marshal is attached hereto. Regulatory standards applicable to new construction include:

- The State Fire Marshal's "fire hardening" building standards[3]

[1] Bob Raymer has degrees in Mechanical Engineering (Bachelor of Science), Engineering Technology/Physics (Bachelor of Science and Environmental Science (Bachelor of Arts). He is a licensed Professional Engineer in the State of California and has been involved in building code development and implementation at the state and national level for 40+ years.

[2] See California Incident Data and Statistics Program, available at https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/california-incident-data-and-statistics-program/.

[3] Cal. Code. Regs Title 24, Part 2, Chapter 7A

- Defensible space mandates[4]
- Cal Fire's Fire Safe Development Standards[5]

We selected January 1, 2010 as a conservative date after which these rules were being consistently implemented in new construction in the WUI in California. The results of our analysis are provided below.

II. SUMMARY OF FINDINGS

On average, for the nine worst property-loss fires dating back to 2017, only approximately 1% of the homes and apartments destroyed, damaged, or affected were new dwellings (built after 1/1/10) even though new dwellings make up roughly 7% of the state's total housing stock.

Between 1/1/10-1/1/2020, roughly 1 million homes and apartments were built out of a total housing stock of 14 million, based on building permit data tracked by the Construction Industry Research Board (CIRB). For all these fires, evidence indicates that substantial, initial residential development took place in the period of 1945-1980, decades before these critical rules were put in place.[6]

New homes fared extremely well compared with older neighborhoods during these major fires. Of the 31,000 data points retrieved from the State Fire Marshal, it was extremely rare to see more than two new homes on the samestreet destroyed or affected by the fires, while it was commonplace for entire neighborhoods of older dwellings to be destroyed. As opposed to custom home production where a single home is done separate of others, production-style home development is done in phases, usually 8-15 homes at a time. This typical production-style construction creates blocks or areas of fire-resistant homes, which are much more effective at withstanding wildfire intrusion and decreasing home-to-home spread. Notably, we are not aware of any master-planned community in California constructed after January 1, 2010 (i.e., a planned community with all new homes and typically including measures such as fuel breaks) suffering significant structural loss even during extreme fire events.

As illustrated below, we analyzed data from the nine worst property loss fires over the past seven years, and there was no case of more than three "new homes" in the same contiguous area being destroyed. There was only one case where three new homes next to each other were destroyed. These findings are in stark contrast to older homes, where it was commonplace for groups of homes to be destroyed at the same time, even entire neighborhoods. In this way, new

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[4] Pub. Res. Code 4291.

[5] Cal. Code Regs. Title 14, Division 1.5, Chapter 7 Fire Protection, Subchapter 2, Articles 1-5 (SRA Fire Safe Regulations).

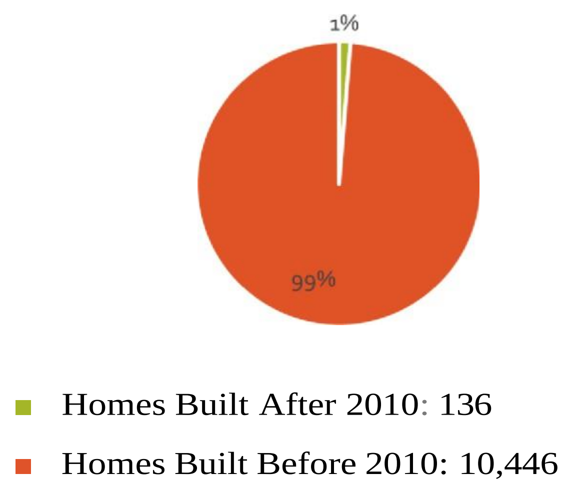
[6] See age-of-dwelling data provided by the State Fire Marshal as described herein.

homes not only are more fire protective individually as compared to older homes, but new homes (particularly aggregations of new homes) help resist the spread of fire within residential areas by decreasing home-to-home spread and ember intrusion-based spread.

III. FIRE SPECIFIC DATA[7]

A. Camp Fire

1. Total Structures Affected or Destroyed: 10,582



2. Data

Total Homes Destroyed/Major Damage/Affected: 10,582

Built after 1/1/10: 112 destroyed = 0.0106 (3 homes on same street)

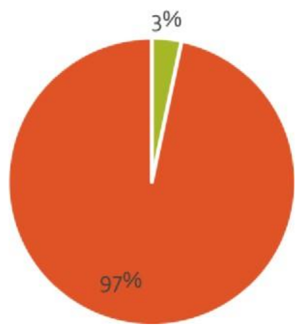
24 affected = 0.0022

136 total = 0.0129 or 1.3%

B. Carr Fire

1. Total Structures Affected or Destroyed: 1,082

[7] Information taken from State Fire Marshal data attached hereto.



- Homes Built After 2010: 36
- Homes Built Before 2010: 1,046

2. Data

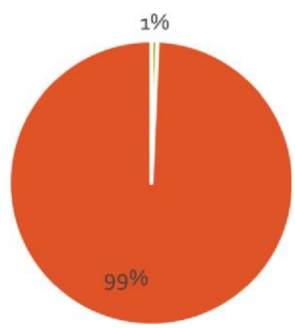
Total Homes Destroyed/Major Damage/Affected: 1,082

Built after 1/1/10: 24 destroyed **=** 0.0222 (9 homes on same street)

12 affected = 0.0111
36 total = 0.0333 or 3.3%

C. CZU Lightening Fire

1. Total Structures Affected or Destroyed: 998



- Homes Built After 2010: 7
- Homes Built Before 2010: 992

2. Data

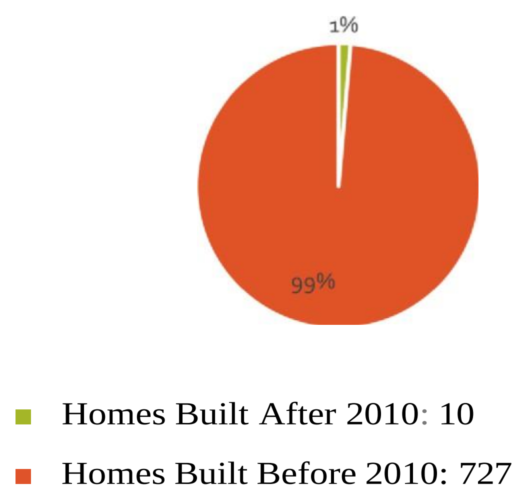
Total Homes Destroyed/Major Damage/Affected: 998

Built after 1/1/10: 5 destroyed **= 0.0050** (no homes on same street)

	1 affected	= 0.0010
	1 inaccessible	= 0.0010
	7 total	**= 0.0070 or 0.7%**

D. Glass Fire

1. Total Structures Affected or Destroyed: 737



2. Data

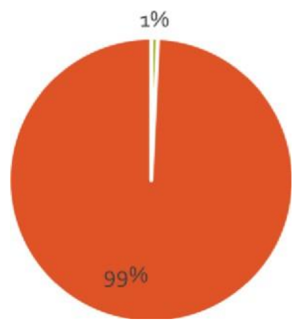
Total Homes Destroyed/Major Damage/Affected: 737

Built after 1/1/10: 4 destroyed = 0.0054 (No homes on same street)

	6 affected	= 0.0081
	10 Total	**= 0.0136 or 1.4%**

E. LNU Lightening Fire

1. Total Structures Affected or Destroyed: 1,559



- Homes Built After 2010: 12
- Homes Built Before 2010: 1,547

2. Data

Total Homes Destroyed/Major Damage/Affected: 1,559

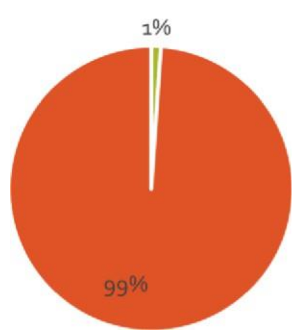
Built after 1/1/10: 5 destroyed = 0.0032 (2 homes on same street)

7 affected = 0.0045

12 Total = 0.0077 or 0.8%

F. North Complex Fire

1. Total Structures Affected or Destroyed: 732



- Homes Built After 2010: 8
- Homes Built Before 2010: 724

2. Data

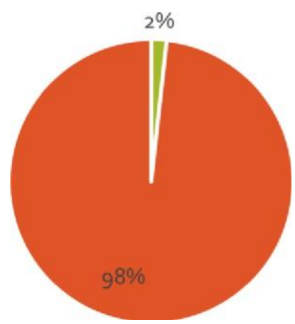
Total Homes Destroyed/Major Damage/Affected: 732

Built after 2010: 7 destroyed = 0.0096 (No homes on same street)

1 affected = 0.0014
8 Total = 0.0109 or 1.1%

G. Nuns Fire

1. Total Structures Affected or Destroyed: 687



- Homes Built After 2010: 12
- Homes Built Before 2010: 675

2. Data

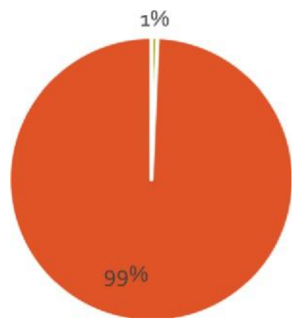
Total Homes Destroyed/Major Damage/Affected: 687

Built after 2010: 10 destroyed = 0.0146 (2 homes on same street)

2 affected = 0.0029
12 Total = 0.0175 or 1.8%

H. Thomas Fire

1. Total Structures Affected or Destroyed: 855



■ Homes Built After 2010: 6

■ Homes Built Before 2010: 848

2. Data

Total Homes Destroyed/Major Damage/Affected: 855

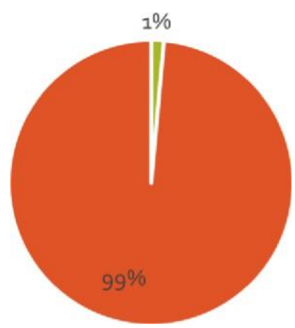
Built after 1/1/10: 5 destroyed = 0.0058 (4 homes on same street)

1 affected = 0.0012

6 Total = 0.0070 or 0.7%

I. Woolsey Fire

1. Total Structures Affected or Destroyed: 1,319



■ Homes Built After 2010: 19

■ Homes Built Before 2010: 1,300

2. Data

Total Homes Destroyed/Major Damage/Affected: 1,319

Built after 1/1/10:	12 destroyed	= 0.0091	(2 homes on same street)
	7 affected	= 0.0053	
	19 Total	**= 0.0144 or 1.4%**	

Exhibit D – Flemming, Jack, “Could this Irvine neighborhood be the blueprint for a more fire-resistant L.A.?” Los Angeles Times, (Feb. 2025).

CALIFORNIA

Could this Irvine neighborhood be the blueprint for a more fire-resistant L.A.?

An aerial view of Orchard Hills in Irvine, where homes were planned and built to be fire-resistant. The master-planned community, which straddles the wildland-urban interface, was in the path of the 2020 Silverado fire but escaped damage.

By Jack Flemming
Staff Writer
Photography by **Allen J. Schaben**

Feb. 19, 2025 3 AM PT

Four years before the Palisades and Eaton fires ravaged L.A., Irvine braced for a blaze of its own.

A bone-dry summer left the landscape parched and primed to ignite as Santa Ana winds roared through the region at 80 mph. On the morning of Oct. 26, 2020, the Silverado fire erupted.

Firefighters deployed. The city initiated its emergency plan. Residents of Orchard Hills — a master-planned community straddling the wildland-urban interface and sitting in the path of the quickly growing fire — fled, not knowing whether they'd ever see their homes again.

Orange County Fire Authority firefighters work to protect homes in the Orchard Hills neighborhood of Irvine during the Silverado fire in October 2020.

All of them would. The flames licked at the neighborhood's outskirts, toasting a few leaves at the perimeter, but didn't damage a single residence in the community.

The firefight was an unequivocal victory — a product of the meticulous planning of the neighborhood, the design of its homes and the painstaking plan set in place by the city.

As L.A. looks to fortify itself against future fires, Orchard Hills could serve as the road map to get there.

Of course, the comparison isn't exact. Irvine is a newer city with modern homes built using lessons learned from dozens of deadly fires over the years. Altadena and Pacific Palisades are communities with tree canopies and century-old houses navigated by narrow, sometimes winding roads chock-full of vegetation.

But as climate change sees Southern California burn time and time again, experts say that success stories should be extracted and mined for all they're worth.

You could argue that Orchard Hills' fire resistance began a century ago, when Irvine Valencia Growers planted an avocado orchard in the hills above the community. The orchard grew into one of the nation's largest avocado producers in the decades since, with roughly 100,000 trees across 800 acres.

It offers the neighborhood a lot more than guacamole.

"The orchards have a built-in irrigation system, so when a fire starts, the landscape is already watered," said Sean Doran, a fire captain with the Orange County Fire Authority.

Doran, who fought the Silverado fire, said his team had a leg up thanks to a decade-long partnership between Orchard Hills and the fire authority stretching back to when the developer, Irvine Co., broke ground in 2014.

In Irvine, building plans must go through the fire authority as a condition of a developer's conditional use permit.

"It's inherent in the process," Doran said. "If you're a developer, at some point you're going to be walking through our door."

The partnership between the developer and the fire authority brings strict rules for what can and can't be built, and many homebuyers are grateful for the regulations.

Ron Nestor, an Orchard Hills resident and senior principal at William Hezmalhalch Architects, noticed a small coil of smoke while walking his dog on the morning of the Silverado fire. An hour later, he evacuated his home.

Ron Nestor and his dog, Enzo, enjoy his backyard in Orchard Hills in Irvine this month.

He was gone for three days. When he returned, there was no damage whatsoever.

“It’s a testament to the way this place was planned,” he said.

When Nestor moved into Orchard Hills five months before, the neighborhood’s fire plan, which Irvine Co. touts on its website, was a factor for moving in. The parameters were created by the developer, the fire authority and a third-party fire behavior analyst who examined wind patterns, topography and fire history.

Orchard Hills is designed with numerous levels of defense for an oncoming fire: in the open land surrounding the neighborhood, in the yards and in the homes themselves.

It starts with the fuel modification zone — open space around the community that can be modified to reduce fire risk by replacing combustible vegetation with fire-resistant shrubs. Orchard Hills’ zone is filled with prickly pear cacti, Japanese honeysuckle and Formosa firethorn.

Orange County’s fire guidelines call for three different tiers of fuel modification zones, with different construction requirements and shrub removal rates typically extending up to 200 feet outside the perimeter. If a developer wants to tighten that zone down to 100 feet, they have to make up for it in other ways, such as building an exterior wall around the neighborhood, or adding extra fortification on homes at the edge of the neighborhood, so they don’t ignite and bring the fire inward.

Open space around Orchard Hills is filled with prickly pear cacti, Japanese honeysuckle and Formosa firethorn.

“Not everything is concrete, so we can give some leeway in one area and tighten up another,” Doran said. “We’re here to support a fire-hardened community. Whatever makes that happen is a success for both parties.”

In the case of Orchard Hills, the fire authority worked with farmers to tweak the spacing of avocado trees to have fewer trees per acre and cleared the brush and sage in the orchards to limit flammable objects in the 170-foot fuel modification zone.

The next level of defense comes where the open space meets the outer rim of homes.

Irvine Co. erected a 6-foot wall around an enclave on the north part of the neighborhood — where a Santa Ana wind-driven fire would most likely hit first — to protect the most vulnerable properties from radiant heat and keep low-flying embers out of the development.

It beefed up the homes along that rim beyond the fire-hardening standards required in the rest of the neighborhood. These sections call for fire-rated exterior doors and stringent guidelines on outdoor features such as decks and trellises.

The last line of defense comes inside the neighborhood.

You won't find wood-shingled Craftsmans in Orchard Hills. In fact, there's not much exposed wood at all, and if there is, it's treated to be fire-retardant. Masonry walls and vinyl fences separate properties, and the few wooden gates are isolated by metal posts so they can't spread fire to the house, Nestor said.

1

2

3

1. A view of asphalt shingle vents that are placed on roof tiles on homes. **2.** Masonry walls and vinyl fences separate properties, and the few wooden gates are isolated by metal posts so they can't spread fire to the house. **3.** Ron Nestor's home, which was built to be fire-resistant.

Orchard Hills homes are constructed with two factors in mind: radiant heat and ember intrusion. Radiant heat is the heat projected by fire; if a home's exterior is made of flammable materials, the house can heat up to the point of igniting. So houses are mostly Mediterranean, wrapped with stucco or fiber cement — noncombustible materials — with a few splashes of stone and brick thrown in.

The other factor, ember intrusion, is when embers enter a home through an opening and ignite it from within. Orchard Hills homes are outfitted with tempered glass, which is stronger than single-pane windows that tend to break in fires. Roof vents have mesh filters that block embers. And roofs are laid with either concrete or clay tile. The concrete tile lies flat, stopping embers from entering. With the barrel clay tiles, the opening on the bottom of each row is plugged with a bird stop, which keeps out birds — and embers.

The HOA guidelines are rigorous and firm, dictating acceptable plant types and where trees are allowed to be planted. Nestor said he appreciates the precautionary measures.

"People are confident that their homes will survive because when the neighborhood was put to the test, it held up," Nestor said. "Everything went exactly according to plan."

Doran said the fuel modification zone, combined with the wall, helped stop the Silverado fire in its tracks.

"I watched the fire burn up to the edge of the wall and then die down," he said.

Fire after fire has shown that one of the most crucial aspects of the emergency are the roads. In the Camp fire in 2018, eight of the 84 people who died were stuck in a traffic jam when the flames roared over them.

Most of Irvine is navigated by smooth, wide roads, making it much easier for people to evacuate and firetrucks to get to the fire. In Orchard Hills, 7-foot-wide paths run behind the properties, so fire crews and vehicles can better access the back sides of homes.

Bobby Simmons, Irvine's emergency services manager, helps coordinate the city's strategy.

In 2019, in the wake of the Camp and Woolsey fires and a year before the Silverado fire, Simmons helped form a 25-person initiative to create an all-inclusive wildfire plan so if one ever broke out in Irvine, every city department would know its role exactly.

Firefighters defend homes in Orchard Hills in 2020. The Silverado fire licked at the Irvine neighborhood's outskirts but didn't damage any houses in the community.

The police department dispatches patrols to specific intersections to aid evacuations. The traffic management center remotely controls signals, avoiding traffic jams by turning all the lights green for street lanes going away from the fire. Simmons said the Office of Emergency Management mobilizes an emergency operations center and activates an emergency landing page on its website leading to a real-time evacuation map — with bandwidth for more than 3 million visitors over three days without crashing.

"We developed the plan, challenged it and tested it so much that when rubber met the road on Oct. 26, we provided a structured process for a chaotic event," Simmons said. "All things considered, it went smoothly."

During the Silverado fire, the city evacuated 90,000 people in four hours from northern Irvine communities such as Orchard Hills and Portola Springs.

The Silverado fire turns the sky orange as it burns close to a home in Orchard Hills in 2020.

Ultimately, the Silverado fire still took a toll. Although there was no damage in Orchard Hills, five structures were destroyed elsewhere, 11 were damaged, and two firefighters were critically injured. And although traffic quickly flowed out of the neighborhoods, cars were backed up for more than a mile because the lights getting onto the 5 Freeway were controlled by Caltrans, not Irvine, and couldn't be programmed to accept the droves of cars coming from the northeast.

There's always more to learn.

"Now, we identify the lessons we learned to get ready for the next one," Simmons said.

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