Fire Protection and Management Plan
Paradise Valley Ranch

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1.0 Introduction

This Fire Protection Plan is provided as part of the development review and approval requirements for the County of Riverside for the approximately 48-acre Paradise Valley Ranch property, located in unincorporated southwest Riverside County, east of the City of Hemet, approximately 4 miles east of State Street, at the terminus of Cactus Valley Road. The site address is 43700 Cactus Valley Road. Currently, the County of Riverside is processing a Lot Line Adjustment (LLA) involving three parcels [Assessor Parcel Numbers (APN) 569-020-024, -025, and -026] on the Paradise Valley Ranch property. Once this LLA has been processed (LLA210115), one of the three parcels (approximately 48-acres) will be used for a Conditional Use Permit that is required for the proposed project. The ultimate APN for the CUP parcel will be determined upon the finalization and recordation of the LLA. This will include major renovations on two existing facilities, minor modifications to five existing structures, the potential future development of two new structures, and the reuse of two existing barn facilities. The major use for this property includes the development of the west coast "Center of Excellence" for firefighter drug and alcohol addiction recovery and a research/training site for the Wildfire Conservancy, hereafter known collectively as the Proposed Project or Project.

The core of the property (where all facilities are located) is designated as a High Fire Hazard Zone. Areas surrounding the core are designated as a Very High Fire Hazard Severity Zone. As such, our project complies with the California Code of Regulations (CCR), Title 24, Part 2 and California Building Code, CBC and CFC in effect at time of permits issuance as well as Title 14 Fire Safe Regulations. All new and temporary buildings shall comply with all sections of California Building Code Chapter 7A standards. This project will also comply with all local amendments by the County of Riverside related to defensible space, fuels management, ignition resistance, and landscaping guidelines described within the Multi-Species Habitat Conservation Plan (MSHCP, 2003).

Industry standard fire protection planning and fire behavior modeling for the project was provided by Dudek (Appendix A). The BEHAVE Plus (v6) was used to predict fire risk and identify the rate of spread and spotting potential under three extreme fire scenarios. Based on these results, site specific analysis, and our understanding of fire risk and behavior, the protection standards and design features provided herein meet or exceed industry standards for the level of protection necessary for development in this area, including (among other features) the creation of a 100-foot fuel modification zone (FMZ) around all facilities and critical infrastructure. An additional 50-feet of FMZ are included at each facility out of an abundance of caution, where practicable, and contingent on adjacent land use constraints (e.g. biological/cultural resources, property ownership, or other issues).

While many of the facilities currently on site were constructed prior to January 1, 2008, due to the importance of this site to firefighters, and the research/training focus on wildfires and the wildland urban interface (WUI), the development of this project, including the remodeling of those existing facilities is intended to meet, and in many cases exceed, the requirements meant to mitigate wildfire vulnerabilities. As such, this plan is designed so that structure and human survival in wildfire-prone areas will occur through the effective implementation of a coupled approach where 1) vegetation (and other combustible materials) on the property are thoughtfully selected and managed, located, and maintained; and 2) materials and design features of the facilities (for new, temporary, and retrofitted buildings) reduce vulnerability to potential wildfire incidents to the maximum extent practicable. This project recognizes not only the threat of direct flame and radiant heat impingement on the facilities and landscaping, but the additional threat wind-blown embers. Our goal is to avoid, minimize, and mitigate the likelihood of

radiant heat or flame contact exposure, harden the property to reduce ember/fire brand risk, and implement an effective defensible space and fuels management program, ensuring the selection, location, and maintenance of vegetation and other combustible materials on the property to reduce overall risk and exposure. In addition, our goal is to ensure that in the event of a wildfire, the property is designed and managed to facilitate access by firefighters, minimize hazards, risks, and avoid unnecessary occupational exposures that can place our firefighters at risk.

2.0 Definitions

Many of the terms used in this document are often used interchangeably or have vague definitions. Different codes may have discrepancies in their definitions. The following terms are provided to establish a shared understanding of the terms and how they are used herein.

Defensible Space: A term used to describe the careful selection, location and maintenance of vegetation and other combustible materials on the property. The purpose of defensible space is to: Minimize the pathways of wildfire to burn directly to the home, reduce radiant heat exposures to the home and structures, and provide safe areas and access to key points of defense/attack against encroaching wildfires or escaping structure fires.

Fire or Fuel Break - Removal of growth, usually in strips, around at-risk areas, and developments to prevent a fire from spreading to the structures from open land or vice versa.

Fire-Resistant: Materials and systems that resist the spread of fire from the fire-exposed to a non- exposed side of an assembly (i.e., a wall or roof).

Fire-Resistant Plant - Any plant will burn with enough heat and proper conditions. Resistance is relative comparative term relating to the ability of a plant to resist ignition and combustion. These plants often have characteristics of low fuel volume, fire resistance, and drought tolerance which make them desirable for planting in areas of high fire danger.

Fuel Modification Zone (FMZ): An area where vegetation has been removed, planted, or modified in conjunction with an approved fuel modification plan that increases the likelihood that a structure will survive a wildfire, improve the defensible space around the structure for firefighting activities, and prevents direct flame contact with structures. In addition, our FMZ also attempts to minimize occupational exposure risk to firefighters by avoiding or minimizing the use of any potentially combustible materials known to contain compounds that are carcinogenic, toxic, or otherwise hazardous when they burn. Fuel modification activities can include complete removal, partial or total replacement of existing plants with adequately spaced drought-tolerant and fire-resistive species and thinning of existing or proposed native or ornamental species.

Ignition-Resistant: Material that resists ignition or sustained flaming combustion. Materials designated ignition-resistant have passed a standard test that evaluates flame spread on the material.

Noncombustible: Material of which no part will ignite or burn when subjected to fire or heat, even after exposure to moisture or the effects of age. Materials designated noncombustible have passed a standard test.

Safety Zone: A safety zone is a location where a person can find adequate refuge from an approaching fire without using a fire shelter or other protection device.

Wildland Urban Interface (WUI): The wildland urban interface is a zone of transition between natural areas and/or wilderness and land developed by human activity. This can include homes, businesses, and infrastructure.

Wildfire-Resistant: A general term used in this report to describe a material and design feature that can reduce the vulnerability of a building to ignite, either from wind-blown embers or other wildfire exposures.

3.0 Development, Construction, and Redevelopment Standards

Construction requirements and compliance with the code standards divide the home or building into component parts (such as roof, exterior wall, vents, and decking) and provide material or assembly (i.e., "system") options for the component (or assembly). An example of an assembly would be an exterior wall that includes the siding material, sheathing, framing, and other components used in the wall construction. In many cases, multiple options for complying with the provisions for a given component are provided. The goal of this section is to provide clear conditions under which the new facilities will be developed, and identify key materials, mitigation measures, and features that will be added to both the new and existing facilities to comply with code, reduce fire risk, and increase their fire resistance and resilience. All materials used shall have been tested and certified to be in compliance with Section 703A.7, standards of quality of the CBC (and as referenced in the California Referenced Standards Code, Part 12 and Chapter 35).

While Chapter 7A generally refers to new construction, under this fire plan, it is recommended to implement retrofit/remodel standards that meet or exceed the standards for new construction. In 2020, CAL FIRE updated their recommended measures for retrofits (Updated 1/31/2020) that includes the following updates for the Chaparral and Ponderosa buildings:

- Replace roof with fire-resistant Class A roof material
- Block any spaces between roof covering and sheathing (e.g. bird stops)
- Install non-combustible corrosion resistant metal gutter covers on gutters to prevent the accumulation of leaves and debris in the gutter
- Cover chimney and stovepipe outlets with noncombustible corrosion corrosion-resistant metal mesh screen (spark arrestor), with 3/8-inch to 1/2-inch openings
- Cover all vent openings with 1/16-inch to 1/8-inch noncombustible corrosion resistant metal mesh screens
- Caulk and plug gaps greater than 1/16-inch around exposed rafters and blocking to prevent ember intrusion
- Inspect exterior siding for dry rot, gaps, cracks, and warping; caulk or plug gaps greater than 1/16-inch in siding and replace any damaged boards, including those with dry rot
- Install weather stripping to gaps greater than 1/16-inch in garage doors to prevent ember intrusion; the stripping shall be compliant with UL Standard 10C
- For window replacements, they shall be replaced with multi-paned windows with at least one pane of tempered glass
- The replacement of the siding shall use compliant noncombustible, ignition-resistant, or other materials approved by the Office of the State Fire Marshal (OSFM)
- Exposed wood shall be treated with fire-resistant coatings compliant with NFPA 703

As described in the following sections, all new construction (new lodge and administration buildings) shall meet all the required features (inclusive of Section 3.1 through 4.0). In addition, we have highlighted in ***red text*** those areas where the facility remodel/retrofit shall meet those same standards (for the Chaparral and Ponderosa buildings). The following existing facilities shall be updated as appropriate to improve fire resistance (Silverado, Garage/Future Kitchen, and Pool House/Fitness Center). These facilities are newer construction, and already meet the higher standards. As such, a summary description of the features that shall be used in all phases of construction and redevelopment for each facility are identified in the matrix below:

ID	Name	Proposed Use	Phase	Area (sqft)	Construction Type	Applicable Sections									
						3.1 Roofs	3.2 Exterior Coverings	3.3. Wall and Eave Assemplies	3.4 Other Experior Components	3.5 Windows	3.6 Exterior Doors	3.7 Vents	3.8 Decking	3.9 Accessory Buildings	4.0 Water Resources
Existing Facility 1	Silverado Lodge	Treatment Facility	1A	8,490	Minor Renovations	Will comply with all listed conditions	No proposed updates - exterior siding meets standards; shall comply with vertical non-combustable zone of at least six inches between the ground and the start of the siding; fire-resistant coatings shall be applied to exposed wood.	Will comply with all listed conditions	Existing/exposed wood shall be treated with fire-resistant coating	All existing windows (including those made of vinyl) to remain; any new or replaced windows shall meet listed standards	All gaps between frames and walls will be sealed; all doors will have ignitionresistant weatherstripping;all new doors installedshall meet listed conditions	Existing vents and openings shall be evaluated for necessity; if any vents are deemed unnecessary, they shall be covered or removed where possible; all existing vents shall be updated for mesh size if needed (1/16th inch screening)	N/A	None Proposed	Rooftop sprinklers and/or misters shall be installed; hydrants shall be installed; connections to the pools shall be provided
Existing Facility 2	Garage	Kitchen and Dining Room	1A	2,400	Minor Renovations	Will comply with all listed conditions	No proposed updates - exterior siding meets standards; shall comply with vertical non-combustable zone of at least six inches between the ground and the start of the siding; fire-resistant coatings shall be applied to exposed wood.	Will comply with all listed conditions	N/A - no exterior exposed wood	All existing windows (including those made of vinyl) to remain; any new or replaced windows shall meet listed standards	All gaps between frames and walls will be sealed; all doors will have ignitionresistant weatherstripping;all new doors installedshall meet listed conditions	Existing vents and openings shall be evaluated for necessity; if any vents are deemed unnecessary, they shall be covered or removed where possible; all existing vents shall be updated for mesh size if needed (1/16th inch screening)	N/A	None Proposed	Rooftop sprinklers and/or misters shall be installed; hydrants shall be installed; connections to the pools shall be provided
Existing Facility 3	Pool House	Pool House and Gym	1A	945	Minor Renovations	Will comply with all listed conditions	No proposed updates - exterior siding meets standards; shall comply with vertical non-combustable zone of at least six inches between the ground and the start of the siding; fire-resistant coatings shall be applied to exposed wood.	Will comply with all listed conditions	Existing/exposed wood shall be treated with fire-resistant coating	All existing windows (including those made of vinyl) to remain; any new or replaced windows shall meet listed standards	All gaps between frames and walls will be sealed; all doors will have ignitionresistant weatherstripping;all new doors installedshall meet listed conditions	Existing vents and openings shall be evaluated for necessity; if any vents are deemed unnecessary, they shall be covered or removed where possible; all existing vents shall be updated for mesh size if needed (1/16th inch screening)	N/A	None Proposed	Rooftop sprinklers and/or misters shall be installed; hydrants shall be installed; connections to the pools shall be provided
Existing Facility 4	Chaparral Lodge	Treatment Facility	1B	2,160	Major Renovations	Will comply with all listed conditions	Wildfire-resistant siding and installation features, tempered glass windows, wildfire resistant doors, andweather-stripping shall be used. Exterior materials shall consist of those that are 1-hour rated from foundation to roof. Shall comply with vertical non-combustable zone of at least six inches betweenthe ground andthe start of the siding.	Will comply with all listed conditions	N/A	All windows and doors will be replaced and will comply with listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	N/A	None Proposed	Rooftop sprinklers and/or misters shall be installed; hydrants shall be installed; connections to the pools shall be provided
Existing Facility 5	Ponderosa Lodge	Treatment Facility	1B	11,849	Major Renovations	Will comply with all listed conditions	Wildfire-resistant siding and installation features, tempered glass windows, wildfire resistant doors, andweather-stripping shall be used. Exterior materials shall consist of those that are 1-hour rated from foundation to roof. Shall comply with vertical non-combustable zone of at least six inches betweenthe ground andthe start of the siding.	Will comply with all listed conditions	N/A	All windows and doors will be replaced and will comply with listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	N/A	None Proposed	Rooftop sprinklers and/or misters shall be installed; hydrants shall be installed; connections to the pools shall be provided
Proposed Faility 6	New Lodge	Treatment Facility	2	16,777	New Construction	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions
Proposed Facility 7	Temporary Office/Admin	Office/Admin/Intake	1A/B	16,777	New Construction/Temporary Facilities	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions
Proposed New Office/Admin	Permanent Office/Admin	Office/Admin/Intake	2	16,777	New Construction	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions	Will comply with all listed conditions
Existing Hacienda House	Hacienda House	Wildfire Conservancy Offices	1B	2,000	Minor Renovations	Will comply with all listed conditions	No proposed updates - shall comply with vertical non-combustable zone of at least six inches between the ground and the start of the siding; fire-resistant coatings shall be appliedtoexposed wood.	N/A	Existing/exposed wood shall be treated with fire-resistant coating	All existing windows (including those made of vinyl) to remain; any new or replaced windows shall meet listed standards	All gaps between frames and walls will be sealed; all doors will have ignitionresistant weatherstripping;all new doors installedshall meet listed conditions	Existing vents and openings shall be evaluated for necessity; if any vents are deemed unnecessary, they shall be covered or removed where possible; all existing vents shall be updated for mesh size if needed (1/16th inch screening)	N/A	None Proposed	Rooftop sprinklers and/or misters shall be installed
Existing Guest Cottage	Guest Cottage	Unchanged	N/A	838	No Work Proposed	Will comply with all listed conditions	No proposed updates - shall comply with vertical non-combustable zone of at least six inches between the ground and the start of the siding; fire-resistant coatings shall be appliedtoexposed wood.	N/A	Existing/exposed wood shall be treated with fire-resistant coating	All existing windows (including those made of vinyl) to remain; any new or replaced windows shall meet listed standards - if renovations occur in the future	All gaps between frames and walls will be sealed; all doors will have ignitionresistant weatherstripping;all new doors installedshall meet listed conditions	Existing vents and openings shall be evaluated for necessity; if any vents are deemed unnecessary, they shall be covered or removed where possible; all existing vents shall be updated for mesh size if needed (1/16th inch screening)	N/A	None Proposed	Rooftop sprinklers and/or misters shall be installed if renovations occur in the future
Existing Equestrian Facility	Barn/Horse Facility	Equestrian Facilities/Maintenance	N/A	4,350	No Work Proposed	Will comply with all listed conditions if renovations occur in the future	N/A	N/A	Existing/exposed wood shall be treated with fire-resistant coating - if renovations occur on building in the future	N/A	N/A	Existing vents and openings shall be evaluated for necessity; if any vents are deemed unnecessary, they shall be covered or removed where possible; all existing vents shall be updated for mesh size if needed (1/16th inch screening)	N/A	N/A	Rooftop sprinklers and/or misters shall be installed if renovations occur in the future
Existing Barn	Barn-unnamed	Barn/Storage/Maintenance	N/A	2,560	No Work Proposed	Will comply with all listed conditions if renovations occur in the future	N/A	N/A	Existing/exposed wood shall be treated with fire-resistant coating - if renovations occur on building in the future	N/A	N/A	Existing vents and openings shall be evaluated for necessity; if any vents are deemed unnecessary, they shall be covered or removed where possible; all existing vents shall be updated for mesh size if needed (1/16th inch screening)	N/A	N/A	Rooftop sprinklers and/or misters shall be installed if renovations occur in the future

3.1 Roofs

Given the relatively large surface area of the roof, this component generally is considered the most vulnerable. Building codes rely on a standard test method to provide a fire rating for roof coverings. This standard test incorporates three separate components to evaluate the fire rating of the covering: (1) fire-resistance (fire-penetration), (2) flame spread, and (3) the ember generation potential of the roof covering and assembly. Roofs shall comply with the requirements of Chapter 7A and Chapter 15. Roofs shall have a roofing assembly installed in accordance with its listing and the manufacturer's installation instructions. Roof assemblies shall be a "Class A" rating when tested in accordance with ASTM E108 or UL790, providing the highest level of protection for all new and renovated facilities on the property.

3.1.1 Management and Design of Roof

Embers can ignite vegetative debris that has accumulated on the roof surface or in gutters. Embers also can enter the attic through roof and under-eave vents. Also, unenclosed eaves and overhangs can trap embers and heat. Codes acknowledge this vulnerability. Therefore, the following conditions shall be met:

- Any gaps between the roof covering and the roof deck at the edge shall be plugged with a fire-stop or "bird-stop" material. Use of a noncombustible material to plug gaps that can occur with certain roof coverings that create a gap between the covering and roof deck (e.g., barrel tile).
- A minimum 36-inch- wide cap sheet shall be installed under metal valley flashing. Where roof valley flashing is installed, the flashing shall be not less than 0.019-inch (0.48 mm) No. 26 gage galvanized sheet corrosion-resistant metal installed over not less than one layer of minimum 72-pound (32.4 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909, at least 36-inch-wide (914 mm) running the full length of the valley.
- Use of flashing where the roof meets other features will help reduce the vulnerability of materials at these locations to flame and radiant heat exposures. Examples include use of 1) metal drip edge at the roof edge (i.e., where gutter meets roof), and 2) metal flashing at the base of the wall where roof meets siding.
- Using aluminum gutters (rather than vinyl) and a metal drip edge to provide additional protection against flame and embers at the edge of the roof. A gutter cover device shall be added to reduce the accumulation of debris.
- Regular maintenance of the facilities will include monthly visual inspections of the roofs (conducted more frequently as dictated by seasonal vegetation accumulations or increased wildfire risk). This shall include the removal of debris from the roof and gutter on a regular basis to reduce the likelihood of ignition of this material from embers when wildfire threatens the house.

3.2 Exterior Coverings

Exterior walls and coverings are especially vulnerable from exposure to flames or prolonged exposure to radiant heat from burning vegetation or a neighboring structure. These exposures can potentially ignite combustible siding products. Some plastic siding products (e.g., vinyl) can also melt, exposing underlying sheathing. Wind-blown embers can accumulate in gaps or enter through openings around windows and doors. In addition, glass in a window or door can break from radiant heat or flame contact, exposing the interior of the home. Compliance with Chapter 7A (Section 707A) include the following facility features:

- Exterior wall covering material
- Exterior wall assembly
- Exterior exposed underside of roof eave overhangs
- Exterior exposed underside of roof eave soffits
- Exposed underside of exterior porch ceilings
- Exterior exposed underside of floor projections
- Exterior underfloor areas

Wildfire-resistant siding and installation design features, tempered glass in windows, wildfire-resistant doors, and ignition-resistant weather-stripping shall be used on all new facilities and those with major modifications (Chaparral and Ponderosa) to reduce vulnerability.

All new building construction shall comply with 707A.3, with preference for noncombustible or ignition-resistant materials. Wall assemblies shall be made from materials that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707 with the conditions of acceptance in Section 707A.3.1, or wall assemblies that meet the performance criteria in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in SFM Standard 12-7A-1. Exterior materials shall consist of those that are 1-hour rated from foundation to roof.

Exterior walls and components in the wall assembly can be vulnerable if exposed to flames or prolonged exposure to radiant heat from ignited items located relatively close to a home. Combustible items include bark mulch, vegetation, or nearby structures like neighboring homes, tool sheds, and fences. Fire can ignite combustible siding and penetrate gaps or joints in the siding and/or spread vertically and laterally to impinge on other wall components such as windows and the under-eave area. Walls that extend close to the ground can be vulnerable to ignition if embers accumulate at the base of the wall and ignite it or components in the wall assembly. Exterior wall coverings shall extend from the top of the foundation to the roof and terminate at 2-inch nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure. To minimize the chance of an ignition from an ember exposure, a vertical noncombustible zone of at least 6 inches shall be created and maintained between the ground and the start of the siding. This standard shall be applied to ALL facilities on the property, regardless of age or renovation level.

For ALL existing structures with exposed wood (as identified and described above), a fire-resistant treatment shall be applied that conforms to NFPA 703. Specifically the coatings shall remain stable and adhere to the material under all atmospheric conditions to which the material is exposed. The fire-retardant coatings shall be applied according to manufacturer directions and certified by the applicator as being in conformance with those directions for application. The coating shall not be coated over with

any material, unless both the fire-retardant coating and the overcoat have been tested as a system and are found to meet the requirements of a fire-retardant coating. These coatings shall be tested in accordance with ASTM E84 or ANSI/UL 723. Periodic monitoring and necessary maintenance shall be conducted on an annual basis to ensure compliance with, and integrity of, these specific fire mitigation measures.

3.3 Wall and Eave Assemblies

For wall and eave assemblies, building codes provide the option of using noncombustible materials or combustible materials that meet fire-resistance and/or flame spread test procedures. These tests address only one of the vulnerabilities of a wall—the ability of fire to penetrate from the outside to the inside of the building. They do not directly address flame spreading up or laterally over the siding.

Therefore, conservative use of combustible materials that meet fire-resistance test procedures shall be used. Eaves shall be enclosed with fire retardant- treated wood, ignition-resistant materials, noncombustible materials, or materials exhibiting resistance to wildfire penetration. A metal drip-edge shall be required on eave edges.

3.4 Other Exterior Components

Exterior wall architectural trim, embellishments, facias, and gutters do not require protection. However, for all facilities these features shall be made of noncombustible or ignition resistant materials, with preference for stone and/or masonry trim or embellishments, with metal drip edge of gutters at wood fascia.

Guardrails shall be made of ignition resistant material

Exposed Wood Beams: 1) Shall be sawn or glued laminated; 2) minimum 8 inches x 10 inches where supporting floor; 3) minimum 4 inches x 6 inches where supporting roof

Exposed wood columns: 1) shall be sawn or glued laminated; 2) minimum 8 inches x 8 inches where supporting floor; 3) minimum 8 inches x 6 inches where supporting roof

3.5 Windows

Four options for compliance exist: 1) multi-pane glazing with a minimum of one tempered pane, 2) glass block units, 3) fire-resistance rating of not less than 20 minutes, or 4) meeting performance requirements of SFM 12-7A-2. The standards below shall apply to all new facilities, and those undergoing major renovation (Chaparral and Ponderosa).

These standards shall extend to the following assemblies:

- Exterior windows.
- Exterior glazed doors

- Glazed openings within exterior doors
- Glazed openings within exterior garage doors
- Exterior structural glass veneers
- Skylights

Small gaps between the window and frame can also create opportunities for wind-blown embers to lodge and ignite the framing material. Research has consistently shown that glass is the most vulnerable component of window failure during a fire. Multi-pane tempered glass windows (meeting the requirements of Section 2406 Safety Glazing) shall be used to reduce the likelihood of a window breaking when exposed to radiant heat. Vinyl frames are more susceptible to damage from radiant heat than other frame types. Therefore, metal framed windows shall be used. If vinyl windows are used, then single- and double-hung windows shall include metal reinforcement in interlock members.

Aluminum or other metal window screens shall be used, as these can help protect against ember entry if the glass breaks or if a window is inadvertently left open. In addition, all facilities shall avoid using interior window coverings that include fabrics (e.g. curtains, sheers, etc.) as those can ignite from radiant heat or when window failure occurs.

3.6 Exterior Doors

Several options for compliance exist for exterior doors that shall be met for all new facilities and those undergoing major renovation (e.g. Chaparral and Ponderosa):

1) The exterior surface or cladding shall be of noncombustible or ignition-resistant material
2) The exterior door shall be constructed of solid core wood that complies with the following requirements:
    a. Stiles and rails shall not be less than 1 / inches thick
    b. Panels shall not be less than 1 / inches thick, except for the exterior perimeter of the panel that shall be permitted to taper to a tongue not less than / inch thick
3) The exterior door assembly shall have a fire-resistance rating of not less than 20 minutes when tested according to NFPA 252
4) The exterior surface or cladding shall be tested to meet the performance requirements of Section 707A.3.1 when tested in accordance with ASTM E2707, or
5) The exterior surface or cladding shall be tested to meet the performance requirements of SFM Standard 12-7A-1

For any doors that include windows, glazing in exterior doors shall comply with Section 708A.2.1. Small gaps between the door and frame can also create opportunities for wind-blown embers to lodge and ignite the door framing material and potentially the weather sealing material. Any significant gaps will be covered by noncombustible or ignition resistant material. Weather stripping around pedestrian and vehicle access doors can reduce the ability of embers to pass through openings between door and jamb but can also be vulnerable if embers accumulate against it and cause it to ignite or melt. The location of weather stripping on outswing doors is more vulnerable than inswing doors. The project shall utilize weather stripping containing fire retardants (where possible) which can reduce the vulnerability of this component.

3.6.1 Garage Doors

No Garage doors are proposed for the facilities – Existing garage doors shall be removed from all existing facilities during renovation.

3.7 Vents

Chapter 7A specifies screen mesh information, but also allows vents with design features that resist entry of embers and flames. A standard test method to evaluate resistance to embers and flame intrusion has been developed and published by the American Society for Testing and Materials (ASTM) and accepted for use by the California Office of the State Fire Marshal. Ventilation openings for enclosed attics, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, and underfloor ventilation shall be in accordance with Section 1203 and Sections 706A.1 through 706A.3 to resist building ignition from the intrusion of embers and flame through the ventilation openings.

Ventilation openings for enclosed attics, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, and underfloor ventilation openings shall be fully covered with Wildland Flame and Ember Resistant (WUI) vents approved and listed by the California State Fire Marshal, or WUI vents listed to ASTM E2886. These standards shall extend to ALL gable ends, ridge ends, crawl spaces, foundations, or other ventilation systems that mount on a vertical wall. Roof vents shall be O'Hagin type as approved by State Fire Marshall. Eaves, cornices, and soffits, including porches, shall be “boxed” with stucco or cement board finish.

For any existing facilities that are being renovated, the existing vents and openings shall be evaluated for necessity; if any vents (particularly those on the sides of the structure nearest high-fire risk areas) are deemed unnecessary, they shall be covered or removed where possible. Although removing vents eliminates the opportunity for ember entry, an unvented attic design can result in moisture-related performance issues. It is important to manage moisture movement from the occupied portion of the home into the attic space.

Chapter 7A allows the use of vents in under-eave areas if the specified provisions have been met. The restriction of vents in an under-eave area comes largely from anecdotal evidence that these areas would be vulnerable to ember entry. Recent testing at the IBHS Research Center and at NIST has demonstrated that ember entry was more dependent on the eave construction than on the general eave area. Vents in open-eave construction (i.e., vents in the between-joist blocking) were more vulnerable to ember entry than vents located in a soffited eave. Gable end vents were particularly vulnerable to ember entry. Therefore, vents shall not be installed on the underside of eaves and cornices unless those vents are Wildland Flame and Ember Resistant (WUI) vents approved and listed by the California State Fire Marshal, or WUI vents listed to meet ASTM E2886. In addition, 1/16-inch mesh screening of non-combustible and corrosion resistant material shall be used.

3.8 Decking

Embers can ignite vegetative debris or other combustible material stored or accumulated on top of the deck. If ignited, the burning deck could expose walls, windows, and doors to radiant heat. Embers can ignite decking materials directly when they accumulate on the surface of vulnerable decking, typically occurring in the gaps between deck boards. Decks can also ignite from below when vegetation or stored materials ignite beneath the deck. Mitigations to make a deck wildfire-resistant shall include using wildfire-resistant materials for walking surface, using foil-faced bitumen tape on the top surface of the support joists, and creating a noncombustible zone underneath the deck. Some wildfire-resistant decking materials can have a longer lifespan and require less maintenance than typical materials.

Treatment of decks and other attachments in the building codes is challenging and complex. Like walls and eave assemblies, building codes provide the option of using noncombustible materials or combustible materials that meet fire-resistance test procedures. There are few noncombustible decking products available, and many products that are non-wood based (e.g. Trex or similar composites) pose a significant risk for fire and hazardous occupational exposures. For this project, no wood decks shall be attached to or located within 50 feet of a facility or constructed from composite material. All stairs, decking and related structures for new facilities shall be made of metal.

There is only one large existing wood deck that exists on the property. It is located above the large lake, approximately 100-feet to the west, and downhill from the Chaparral facility. This deck shall be rebuilt following the conditions described below. The walking surface material of decks, porches, balconies, and stairs shall be constructed with one of the following materials:

1. Material that complies with the performance requirements of Section 709A.4 when tested in accordance with both ASTM E2632 and ASTM E2726.
2. Ignition-resistant material that complies with the performance requirements of 704A.3 when tested in accordance with ASTM E84 or UL 723.
3. Material that complies with the performance requirements of both SFM Standard 12-7A-4 and SFM Standard 12-7A-5.
4. Exterior fire-retardant-treated wood.
5. Noncombustible material.
6. Any material that complies with the performance requirements of SFM Standard 12-7A-4A when attached exterior wall covering is also composed of noncombustible or ignition-resistant material.

3.9 Accessory Buildings

According to Section 710A.3, no requirements shall apply to accessory buildings or miscellaneous structures when located at least 50 feet from an applicable building. While none of the accessory buildings are within 50 feet of another building, all renovations and remodeling of accessory structures shall (to the maximum extent practicable) incorporate fire resistant features, including the materials and standards used for roofing, exterior walls, windows, and vents. This includes the existing barns. However, as the two barns are remodeled in later phases, all efforts shall be made to reduce the ignitibility of the facility, exposed wood in high-fire ignition-prone areas of the facility shall be treated with a fire-resistant coating (per NFPA 703) and Class-A roofs shall be installed.

4.0 Fire Sprinklers, Hydrants, and other Water Resources

Existing water supply is via 4 existing wells, and 3 existing holding tanks. Water is pumped into the tanks from well #6, which is a permitted community well. From there it is fed to existing buildings for water supply. At building plan submittal, the project will prepare an official Alternate Methods and Materials application and package, along with a design for an on-site fire system. All new and major-remodeled residential structures shall have internal fire sprinkler systems, with coverage provided in enclosed porches. This construction package will include and rely on this Fire Management Plan currently being reviewed. These will also clearly outline for construction the new fire lines from the tank manifolds, existing and proposed pump systems, gallon per minute (GPM) capacity, and static pressure at each new fire hydrant. Proposed locations of hydrants are shown on the concept grading plan for the full project submittal, along with the existing well and tank locations.

The roofline for all facilities shall include "rooftop sprinklers" that can be deployed in the event of a wildfire. In addition, the exterior of the roofline/covered porches shall include misters. While these would normally be used to help keep outdoor seating areas and other activities cooler, these misters shall also be strategically located (to the maximum extent practicable) in key areas where the risk of fire brands, embers, and radiant heat are the highest (generally on the sides of the structure nearest the wildland urban interface), with these systems deployed to provide additional protection of the structures during a potential wildfire incident.

These water systems shall be able to provide 30 minutes of coverage, from a water source that does not interfere with the water requirements for serving structure fire standards.

Each facility (all new facilities, Silverado, Ponderosa, Chaparral, Kitchen, Pool House, Guest Cottage and Hacienda) shall have a standard 6-inch fire hydrant installed in an area easily accessible by firefighters. All weeds and plant material shall be removed from around the fire hydrant at all times. The hydrants shall be privately maintained with regular maintenance plan/standards as defined by County. These shall be located at least 50 feet from the front door of the facility. Each hydrant shall be located in areas necessary to achieve a 150' hose pull around each facility and served by a local water supply sufficient to meet necessary code requirements for structure fires. For some of the larger facilities, multiple hydrants shall be placed in order to meet this standard.

There are several pools and ponds located on the property (the large pond west of Chaparral, the large pool south of Silverado, and the pools located at Ponderosa and Chaparral). All swimming pools shall have a 2.5-inch gated fire department pumper connection on the drain line system or elsewhere on the pool, that shall be located at a point accessible to a fire engine.

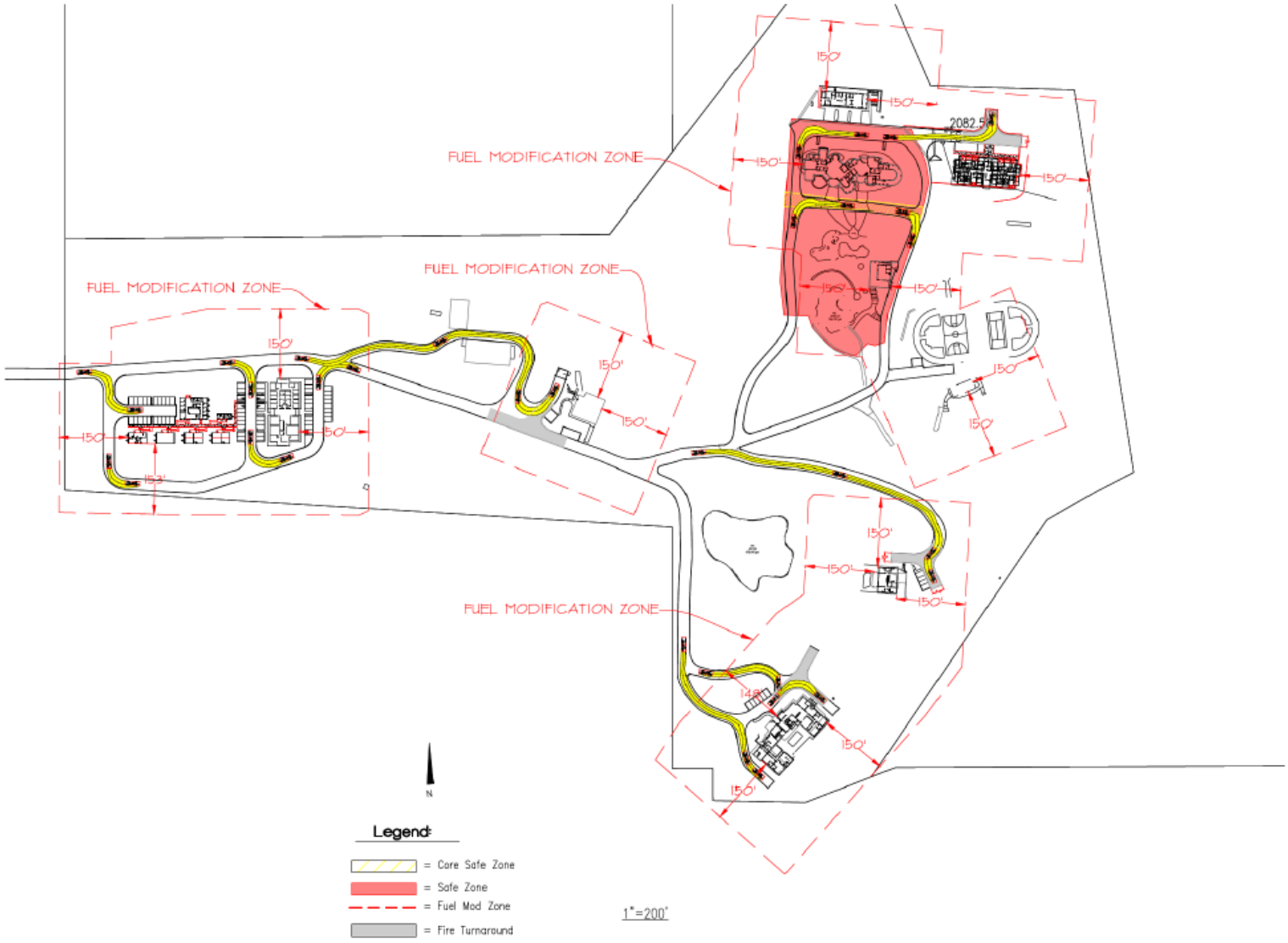
The large pond has historically used by fire engines for refilling but can also provide a dip pond for helitack resources. The property shall maintain and identify access points for vehicles (signage) and maintain open area and unobstructed access for helicopters if they deem this pond accessible and appropriate for water (recognizing any access issues due to overhead power lines).

5.0 Other Recommended Features:

- The property shall contain noncombustible, reflective street signs with clear indications of driving direction and facility name
- The address numbers for the property shall be internally illuminated. Noncombustible address numbers shall be legible from the street/main access road coming to the property.
- All firewood and flammable materials will be stored more than 50 feet from the structure; if enclosed in a structure over 100 feet away, the structure shall have sprinklers.
- No wood fences shall be installed or maintained on the property. All fences shall be solid block or steel. No plastic or vinyl fences or railings shall be used.
- Property management shall implement and enforce limitations and restrictions on site during Red Flag Warning periods from potential ignition related activities (e.g. hot work, lawn mowers/trimmers, vehicle uses off road, smoking, etc.) should be restricted during these times or conducted in safe areas with limited ignition risk.
- Throughout the property there will be solar ground-mounted systems installed to help offset energy needs on the property. These panels are being strategically located to provide an additional buffer from the wildland areas and help support ignition resistance for the adjacent facilities. The solar arrays shall maintain area beneath the panels with no weed growth or fuel buildup. The arrays shall also contain a 25-foot-wide area around the panels of limited vegetation to prevent any direct flame impingement.
- Spark arresters shall be required on all portable, gasoline-powered equipment. This includes tractors, harvesters, chainsaws, weed trimmers and mowers. Management shall ensure that the exhaust system, spark arresters and mower in proper working order and free of carbon buildup. For all equipment, management shall ensure that the equipment uses the recommended grade of fuel, and that staff don't top it off.
- Make sure that all vehicles are required to back into spaces, facilitating a more rapid and safe evacuation if needed. Install signage as appropriate to remind staff and visitors.

5.1 Safe Zone

In the event of a wildfire that threatens the property, or prevents a safe evacuation, a designated safe zone shall be created (see figure below). The safe zone is approximately eighty thousand square feet, and three hundred feet in rough diameter, and can safely support significantly more persons (using both indoor and outdoor space) than the property would ever contemplate having onsite at its maximum capacity. We calculated the total capacity based on the National Fire Protection Association (NFPA) assembly occupancy standard, that refers to "an occupancy used for a gathering of 50 or more persons, and the Use and Occupancy classifications established by the International Building Code, calculated by dividing the total area of the designated space by its prescribed unit of area per person. In this case we used the more conservative standard of 15 square feet per person, with a maximum capacity of 300 persons. In that event, we would require a total of 4,500 square feet of safe space, which is roughly 4% of the total area available for this safe zone. In fact, if the total number of persons are placed in the center of the safe zone, restricted to only the cement/asphalt area (as identified on the figure), that still provides over 5,000 square feet of protected and isolated area, with the nearest vegetated zone from the wildland located over 200 feet from the nearest facility (at the north of the existing garage), and over five hundred feet from the edge of the core of the safe zone. The safe zone includes both a large swimming pool and pond as well. The facilities are identified as locations for persons to gather, and the HVAC system is designed to provide suitable air filtration in the event of ambient smoke but can be shut down completely during an incident that creates a heavy inversion and hazardous air quality conditions.



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Currently, the Silverado House (large main residence) has a large footprint and contains suitable design features (and proposed upgrades) that will meet or exceed safety standards. That property is also over 500 feet away from native (unmanaged) vegetation/fuels and is surrounded by roughly three acres of low-risk area that includes an asphalt paved road (surrounding the entire site) a large swimming pool, and lawns comprised of fire-resistant artificial turf. As such, this facility shall serve as the temporary refuge/safety zone. This facility shall be maintained in an ignition resistant condition at all times and shall either consider installing an air handling system designed to exclude smoke or install a shutoff for the HVAC system to prevent the introduction of smoke into the facility from outside. This property will also be served by adjacent ground-mounted solar panels (on the north end) that will be able to provide the facility with power. It is anticipated that backup services may also include either an onsite generator and/or battery storage.

5.2 Evacuation Plan

The project shall prepare an evacuation plan (that is reviewed by CAL FIRE) that will detail all roles, responsibilities, contingencies, protocols, and measures taken in the event of an evacuation. This plan shall follow the "Ready, Set, Go" framework (as described below). This plan shall be provided to all staff and visitors, with a summary "poster" installed in conspicuous areas in all facilities. The evacuation plan shall be updated as needed as new facilities or infrastructure are phased in per the development plan. The evacuation plan and policy regarding the of the safe zone shall be provided to CAL FIRE and the County for review and approval prior to occupancy.

In an emergency it is easy to become confused or panicked. Preparing a wildfire action plan will help keep people focused and able to act quickly when evacuation is anticipated or needed.

The following key features shall be part of the preparation for wildfires:

- A designated emergency meeting location outside the fire or hazard area - this is critical to determine who has safely evacuated from the affected area
- Clearly identified routes from facilities - practice these often so everyone is familiar in case of emergency
- Have an evacuation plan and equipment for large animals such as horses
- Have fire extinguishers and fire hose on hand at each facility, along with PPE
- Ensure that staff knows where the gas, electric, and water main shut-off controls are located and how to safely shut them down in an emergency
- Assemble an Emergency Supply Kit for each person, as recommended by the American Red Cross
- Maintain a list of emergency contact numbers posted near your phone and in your emergency supply kit
- Have a portable radio or scanner so staff can stay updated on the fire

Leave as soon as evacuation is recommended by fire officials to avoid being caught in fire, smoke, or road congestion. Don't wait to be ordered by authorities to leave. Evacuating early also helps firefighters keep roads clear of congestion and lets them move more freely to do their job. Officials will determine the areas to be evacuated and escape routes to use depending upon the fire's location, behavior, winds, terrain, etc. Staff must take the initiative to stay informed and aware. Listen to the radio/TV or internet/social media services for announcements from law enforcement and emergency personnel.

Personnel may be directed to temporary assembly areas to await transfer to a safe location. The following features shall be part of the evacuation plan:

- Gather up flammable items from the exterior of the facility and bring them inside (patio furniture, door mats, trash cans, etc.) or place them in the pool - Ideally, none of these items should be near the facilities in the first place
- Turn off propane tanks
- Move propane BBQ appliances away from structures
- Connect garden hoses to outside water valves or spigots for use by firefighters - pre-attach fire hose to the hydrants or pool connections as appropriate
- Leave exterior lights on so the facility home is visible to firefighters in the smoke or darkness of night
- Put Emergency Supply Kits in vehicles
- Have a ladder available and place it at the corner of the house for firefighters to quickly access the roof
- Seal attic and ground vents with pre-cut plywood or commercial seals
- Monitor the property and the fire situation - don't wait for an evacuation order if you feel threatened and need to leave
- Shut all windows and doors, leaving them unlocked
- Remove flammable window shades and curtains (if any) - close metal shutters (if any)
- Move flammable furniture to the center of the room, away from windows and doors
- Shut off gas at the meter. Turn off pilot lights.
- Leave your lights on so firefighters can see your house under smoky conditions
- Shut off the air conditioning
- Prepare large animals for transport and think about moving them to a safe (predesignated) location early
- Have a designated person for each facility who oversees evacuations and response coordination – they should also be responsible to ensure complete evacuation and head counts

In addition to these features, the property should also consider the following:

- Maintain on-site shuttles with capacity to evacuate all residents in one evacuation trip (multiple shuttles or one large bus)
- Implement a site-wide notification system (PA system, siren, bell, etc.) so warnings can be broadcast to all employees, visitors, and guests

5.2 Roads and Ingress/Egress

Currently, access to the property is from Cactus Valley Road (off Sage Road). From the property gate, the first 0.25 miles (approximate) is maintained by the property owners. The road is graded, compacted, and maintained according to all standards for access by fire apparatus. This road shall be maintained at a minimum of 24-foot width, and vegetation along the road shall be removed and minimized. The next 1.2 miles (approximately) of the road are maintained by the County of Riverside, and are similarly graded and compacted, meeting the standards for access by fire apparatus. The final 1.25 miles to Sage Road are paved.

The entrance to the property currently includes a locking gate. The new gate shall provide a 26-foot-wide automatic opening with a Knox lock/gate switch for fire access. The entirety of the property shall include appropriate and visible roadside signage (both day and night visible) to primary buildings for emergency response. There shall be a lighted directory at main office/check in area installed as well.

Road improvements shall be developed and maintained, ensuring that all roads are properly signed, and directional arrows provided for those roads that are one-way. All two-way roads providing circulation and access to the facilities shall be a minimum width of 24 feet, and all one-way roads shall be at least 20 feet wide. Additionally, in the steeper sections of the roads, the project shall provide proper draining, minimizing any erosion or "rutting" and apply a base material that is properly compacted and maintained, with asphalt pavement or brushed concrete where necessary.

Roadside fuel management shall be conducted on all interior roads, which shall include the regular maintenance of adjacent vegetation. To ensure proper access, the project shall remove or lift overhanging branches (to 15 feet minimum) and minimize and maintain plants on either side of roads and throughout interior of project along with FMZs according to the standards described in Section 6.0 of this report.

For roads that are designated as one-way, appropriate signage shall be installed, and onsite management shall ensure compliance. The project shall provide roadside signage indicating the direction to primary buildings for emergency response. Additional signage shall be installed identifying evacuation routes and directions to the "safe zone" located at the Silverado House.

The internal network of roads provides access to all facilities and infrastructure. All access roads to the facilities shall include adequate turn arounds for fire access, and all roadways shall provide access to within 150 feet of all external walls of all structures so that hose pull lengths are met.

6.0 Vegetation Management and Landscaping

Chapter 7A acknowledges the importance of well-maintained near- home (landscaping) vegetation to a fire-safe building by requiring compliance with Public Resource Code (PRC) 4291 and Government Code (GC) 51182. PRC 4291 applies to SRA and LRA land and GC 51182 applies to LRA land. According to the analysis and modeling provided by Dudek (Appendix A), they recommend a minimum of 100 feet for a fuel modification zone (FMZ).

Currently the law requires two zones that make up the 100 feet of defensible space. Assembly Bill 3074, passed into law in 2020, requires a third zone for defensible space. This law requires the Board of Forestry and Fire Protection to develop the regulation for a new ember-resistant zone (Zone 0) within 0 to 5 feet of the home by January 1, 2023. All facilities on site will follow the following prescriptions for vegetation management:

The BEHAVE Plus (v6) was used to predict fire risk and identify the rate of spread and spotting potential under three extreme fire scenarios. Based on these results, site specific analysis, and our understanding of fire risk and behavior, the protection standards and design features provided herein meet or exceed industry standards for the level of protection necessary for development in this area, including (among other features) the creation of a 100-foot fuel modification zone (FMZ) around all facilities and critical

infrastructure. An additional 50-feet of FMZ are included at each facility out of an abundance of caution, where practicable, and contingent on adjacent land use constraints (e.g. biological/cultural resources, property ownership, or other issues). This shall include three distinct zones or defensible space as described below:

- Zone 1: 0-5 feet – Near Home Zone
- Zone 2: 5-50 feet – Irrigated Wet Zone
- Zone 3: 50-150 feet – Fuel Management Zone

It should be noted that the Ponderosa Lodge, located at the south end of the property is close enough to the property line (to the south) that the full FMZ is not possible on the property currently under ownership (the full FMZ on site is approximately 75 feet). The adjacent parcel is owned and managed by the Riverside County Resources Conservation Agency (RCA) as part of their preserve system. The property owner and the RCA have agreed that each party shall manage their property to provide fuels reduction and management as recommended by the County of Riverside and CAL FIRE, to maintain the 150-foot buffer recommended in this plan. A copy of this agreement shall be filed with the County. The fuel modification zones are provided in the figure shown on page 16. It should also be noted that the areas that are located in between the facilities shall continue to be managed for fuels reduction as they are currently being managed today, with minimal vegetation and in compliance with the Zone 3 standards.

6.1 Zone 1: Near Home Zone

Also called the near-home zone or the "noncombustible zone," Zone 1 includes the 0- to 5-foot area immediately adjacent to the home where, if ignited, landscaping and other combustible materials could spread to and ignite the home. Although the near-home noncombustible zone has been incorporated into educational materials developed and distributed by education and outreach organizations, including NFPA-FireWise, this guidance is not explicitly specified in any of the codes or standards. The vulnerability of the near-home zone is important when considering ember accumulation exposures either on or adjacent to exterior materials and assemblies. The strong likelihood of ember attack in most wildland fire events means that homes are most vulnerable to ignition in this near-home area. The following features shall be followed:

- Use hardscape like gravel, pavers, concrete, and other noncombustible mulch materials. No combustible bark or mulch
- Remove all dead and dying weeds, grass, plants, shrubs, trees, branches, and vegetative debris (leaves, needles, cones, bark, etc.); Check your roofs, gutters, decks, porches, stairways, etc.
- Remove all branches within 10 feet of any chimney, stovepipe outlet, or roofline
- Limit plants in this area to low growing, nonwoody, properly watered and maintained plants
- Remove all combustible items (outdoor furniture, planters, etc.)
- Do not store any firewood or lumber
- Replace combustible fencing, gates, and arbors attach to the home with noncombustible alternatives (ideally metal)
- Relocate garbage and recycling containers outside this zone
- Relocate any boats, RVs, vehicles, and other combustible items outside this zone
- Remove plants and shrubs near windows

Although a completely noncombustible zone is desirable (e.g., use of rock mulch or other hardscape features), vegetation considered to be less combustible could also be used. This “less-combustible” vegetation would be restricted to an irrigated lawn and non-woody, low-growing, herbaceous vegetation, both of which must be well-maintained. Given the ability of wind-blown embers to pass over the defensible space created on most properties, incorporating a noncombustible zone provides additional protection by reducing the opportunity for a flame to directly contact the home because of ember-ignited combustibles located immediately adjacent to the home.

6.2 Zone 2: Irrigated Wet Zone

Reducing potential fire energy and spread in Zone 2 (5-50 feet) involves selecting and maintaining vegetation, creating separation between plant groupings, and eliminating vertical continuity of fuels, also known as ladder fuels. Within this zone, the vegetation shall be an “irrigated wet zone” with plants that prevent or slow down fire spread from natural, flammable vegetation. “Outbuildings” and Liquid Propane Gas (LPG) storage tanks shall have 10 feet of clearance to bare mineral soil and no flammable vegetation for an additional 10 feet around their exterior. These storage tanks can be screened with concrete or stone block materials for additional protection to meet these protection standards.

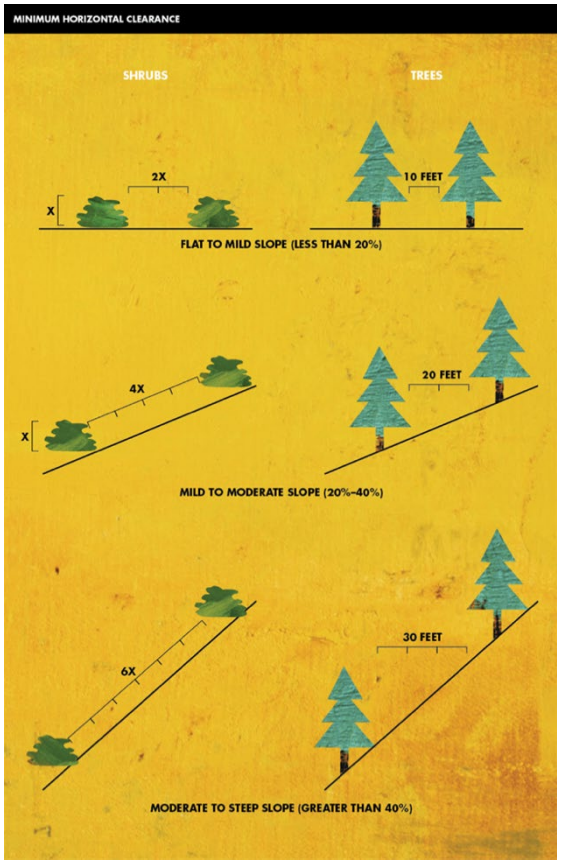
The additional "wet" or irrigated zone shall include the following conditions:

- Ground covers shall be maintained at less than 6" in height
- Shrubs shall be maintained at less than 18" in height with at least five feet of spacing between
- No hedges are allowed in this zone
- shrubs may be grouped together, but cannot exceed three shrubs per group; the 5’ of separation must be strictly followed
- Trees shall have at least 20 feet of clearance between the canopies and be pruned up 1/3 the height of the tree or 8' above ground
- There shall be no buildup of litter or debris
- No bark or other combustible materials shall be used
- Remove any trees that are adjacent to the structures, or that may impede fire apparatus access or evacuation roads
- Remove all dead plants, grass, and weeds (vegetation)
- Remove dead or dry leaves and pine needles
- Trim trees regularly to keep branches a minimum of 10 feet from other trees.
- No wood piles or similar fuel collections
- Remove vegetation and items that could catch fire from around and under decks, balconies, and stairs.
- Create a separation between trees, shrubs and items that could catch fire, such as patio furniture, wood piles, swing sets, etc.

6.3 Zone 3: Fuel Management Zone

Because of the field types and risks associated with this area, further modification of the vegetation should occur in the zone from 101 feet up to 150 feet. This zone may be irrigated but does not have to meet the same standards as the “irrigated wet zone.” In this zone, the following standards must be followed:

- Ground covers shall be maintained at less than 6" inches in height
- Shrubs shall be maintained at less than 4 feet in height
- Distance between shrubs shall be maintained at a minimum of 10 feet
- Trees shall have 20 feet of clearance between canopies and pruned up 1/3 the height of the tree
- Cut or mow annual grass down to a maximum height of 4 inches.
- Create horizontal space between shrubs and trees (see figure below for reference)
- Create vertical space between grass, shrubs, and trees (see figure below for reference)
- Remove fallen leaves, needles, twigs, bark, cones, and small branches. However, they may be permitted to a depth of 3 inches.
- All exposed wood piles must have a minimum of 10 feet of clearance, down to bare mineral soil, in all directions.



6.4 Plant Species to Avoid

Landscaping used adjacent to the MSHCP Conservation Area shall consider the invasive, non-native plant species (Appendix B) and require that the final landscape plans exclude these species. The property contains some trees and shrubs, some of which are considered a high fire risk (e.g. *Eucalyptus sp.*) but are also identified on this list of species to avoid. These higher risk trees and shrubs should be removed where possible, or if desired for aesthetics, maintained to minimize lower limbs (at least 8 feet of clearance from the ground) and have all dead/diseased portions removed annually to reduce fuel load.

6.5 Recommended Plant List

The California Native Plant Society, and other jurisdictions have provided a list of plants that are not only native California species, but also have relatively fire-resistant features. It is recommended that the landscape plan for the property utilize this list. It is recommended to work closely with the project biologist to identify which species are most appropriate for the location, but also the topography, soils, microclimate, and annual maintenance and watering requirements. A full list of potential plants can be found at:

https://defensiblespace.org/plants/

6.5.1 Plant Characteristics to Reduce Ignition Risk

- There are no "fire-proof" plants. Select high-moisture plants that grow close to the ground and have a low sap or resin content
- Plants that are regularly watered, reducing dead leaves/duff production
- Large, green trees and shrubs maintained without dead branches and clusters of dead leaves (e.g. coast live oaks that can act as a shield against flying embers)
- Plants with high moisture content and easily bent leaves
- Plants with thick leaves
- Plants without fragrance
- Plants with silver or gray leaves
- Plant leaves without "hair"

6.6 Fuel Breaks

There is a useful network of roads and trails throughout the property that serve several purposes (outside of hiking and recreation). These features are strategically located within the project footprint to provide significant benefits for fire protection. It is recommended to continue maintaining these areas to continue serving this purpose. All access roads should be maintained with a minimum width of 20 feet, in a condition that would allow for a Type III engine to safely access the property.

DUDEK REPORT – RESPONSE TO COUNTY COMMENTS

Page 5

COUNTY COMMENT: This information from Dudek is not consistent with the proposed measurements or zones found in the main document

The plan as written goes well beyond the recommendations provided by Dudek. The FMZ was increased to 150 feet throughout the property, exceeding the recommendations by Dudek – in an abundance of caution, and as additional mitigation to ensure higher community resilience within the site and protection of structures – The Ponderosa building, in particular includes many features that are not typically required for renovations, however as described throughout the document, those facilities upgrades (Ponderosa and Chaparral) are intended to significantly increase resilience and fire protection standards. Finally, as noted in the report:

> *…the Ponderosa Lodge, located at the south end of the property is close enough to the property line (to the south) that the full FMZ is not possible on the property currently under ownership (the full FMZ on site is approximately 75 feet). The adjacent parcel is owned and managed by the Riverside County Resources Conservation Agency (RCA) as part of their preserve system. The property owner and the RCA have agreed that each party shall manage their property to provide fuels reduction and management as recommended by the County of Riverside and CAL FIRE, to maintain the 150-foot buffer recommended in this plan. A copy of this agreement shall be filed with the County.*

Page 6

COUNTY COMMENT: It appears that some of these recommendations were added to the main document and others not. Please clarify the purpose of this appendix.

The appendix was provided by Dudek as examples of additional mitigation measures or enhancements to improve fire protection and resilience on site. The plan has in most cases exceeded those requirements – specific comments for features not addressed in the plan are provided below:

1. Fuel Modification Maintenance
    1. Continue maintenance of large fuel breaks to the north and northeast.

        These areas are not part of the parcel or planning area for this project, and are considered “off site.” While the ownership of the parcels is held by the same entity, the County planning department specifically asked that all

references to off-site uses be removed from the document. There is every intention to keep those breaks in place, but because they are not part of this project, they could not be included. However, we do believe that all the additional features address any significant wildfire risk concerns and exceed traditional planning , management, or improvements.

    2. Expand fuel modified area to the east of Chaparral and Ponderosa to a minimum of 100 feet, more if possible. Included in Report - Expanded to 150 feet
    3. As possible, expand fuel modified areas on the southern property boundary – it would be beneficial to remove dead and dying fuels on a regular basis along the first 100 feet along the southern property (off-site). This area includes the heaviest unmaintained fuels and would produce the most aggressive fire behavior. Included in report - Expanded to 150 feet per agreement
    4. At minimum, maintain all Project site trees with raised crowns (at least six feet above ground) thinned canopies; no buildup of litter and debris. Included in report
    5. Consider removal of higher flammability trees that are adjacent to Project site structures and fire apparatus access/evacuation roads. Included in FMZ and report
2. Provide additional dip tank at key location on-site for helicopter use (accessible by helicopter), clear, away from buildings, possibly in the northeastern portion or southwestern portion of Project. Large pond identified as potential site for use
3. Maintain a 4x4 fire patrol vehicle with pump and water tank on-site for initial structure protection use by qualified persons during some types of wildfire events. Not included – additional measures provided on each facility -
4. Design the main residential building (existing "Hacienda" residence) as the Project's temporary refuge/shelter site. This includes maintaining the structure in an ignition resistant condition at all times (assess vents – install ember resistant vents throughout) and consider air handling system to exclude smoke. Included in report
5. As part of renovations on Ponderosa and Chaparral buildings – utilize CBC Chapter 7A for all new exterior, roofing, ventilation, and opening (windows and doors) construction components. Included in report
6. Where unable to achieve 100 feet of FMZ on-site, approach off-site land owner for easement or if not possible, then utilize a non-vegetated FMZ (parking areas, rock ground cover, etc. and where not adjacent an upslope, utilize a non-combustible wall (six feet tall) as landscape heat deflector/ember catcher. Included in report
7. Roads: It is advisable that road improvements are provided. All roads meet or exceed requirements per CAL FIRE/Riverside County - Included in report
    1. Particularly regarding surfacing on steeper sections – pavement or brushed concrete may be needed
    2. Widening at pinch points would be recommended.
    3. Roadside fuel management – remove or lift overhanging branches (13.5 feet minimum), maintain plants on either side of roads and throughout interior of Project along with FMZs.
    4. Designate one-way travel (with signs) to possibly help mitigate the potential for vehicles to pass on narrow roads.

5. Provide turnouts along roads at regular intervals to enable two vehicles to pass in opposite directions Included in report
6. Provide roadside signage to primary buildings for emergency response. Provide lighted directory at main office/check in area. Included in report

7. Utilize solar arrays as part of Project site FMZ: Must maintain area beneath the proposed solar panels as DG with no weed growth. Must provide 20 to 30 foot wide area around the array to prevent direct flame impingement. Included in report and site plan for solar footprints

8. Consider limitations and restrictions on-site during Red Flag Warning periods – potential ignition related activities (hot work, vehicle uses off road, smoking, etc.) should be restricted to specific, protected areas away from vegetation. Included in report

a. Include internal visual warning flags posted during Red Flag Warning weather to indicate restrictions.

9. Prepare an evacuation plan and familiarize all visitors with the plan, which should include signage, primary evacuation protocol and contingency plan. As possible, prepare the plan based on PACE approach and integrating Ready, Set, Go. Included in report and shall be completed and approved by county prior to occupancy
10. Consider maintaining on-site shuttles with capacity to evacuate all residents in one evacuation trip (multiple shuttles or one large bus). Included in report
11. Implement a Project site-wide notification system (PA system, siren, bell, etc.) so warnings can be broadcast to all employees, visitors, and guests. Included in report

APPENDIX A

FIRE MODELING REPORT

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August 6, 2021 13232

Rahn Conservation Consulting
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32787 Cleveland St.
Temecula, California 92592

Subject: Fire Protection Planning/Fire Behavior Modeling for Paradise Valley Ranch

Dear Dr. Rahn:

This letter report provides a summary of Dudek's evaluation of potential fire behavior characteristics for the Paradise Valley Ranch Project. Based on our evaluation, the primary focus is related to the anticipated fire behavior and the subsequent fuel modification/brush management planning required. In response to your request, Dudek has provided this fire behavior analysis as a stand-alone document to evaluate the Project site's anticipated fire behavior and to a limited extent, Fuel Modification Zone implications. Our analysis summarized herein is based on Project-related information provided by you, a field assessment, and the modeled fire behavior for the Project site.

Project Information

The Paradise Valley Ranch Project is located in the Cactus Valley region of western Riverside County, southeast of the City of Hemet, California (Figure 1). The 188-acre property is located at the eastern terminus of Cactus Valley Road, the primary access road, which is accessible from State Street. The Project includes transitioning the property from the existing organized group camp facility to a residential treatment facility, focusing on the core of the property; a large portion of the property will be reserved as open space.

The Project site consists of flat terrain, gently rolling slopes with some steeper small bluffs, and a stream channel bisecting the central portion of the property; graded dirt roads (some sections are paved) and footpaths traverse the Project site. Vegetation on-site consists of grassland, coastal sage scrub, chaparral, riparian, ornamental trees and shrubs, irrigated turf and fuel modification areas (Attachment 1, Photographs 1 through 14); adjacent off-site vegetation includes primarily coastal sage scrub and chaparral plant communities. Elevations range from approximately 2,000 feet above mean sea level (amsl) in the southwest portion of the property to 2,400 feet amsl along the northern boundary of property. The elevation in the core development area ranges from about 2,000 to 2,100 feet amsl.

Surrounding land uses include Riverside County Regional Conservation Authority (RCA) open space to the south and east, a private ranch and agriculture lands to the north and west. The Brown Canyon stream channel flows from the northeast through the southeast portion of the property, with a northeast to southwest alignment.

The Project area is subject to seasonal weather conditions that can heighten the likelihood of fire ignition and spread, and considering the off-site's terrain and vegetation, may result in fast moving and low to moderate-intensity wildfire. Per the recorded fire history that was obtained from California Department of Forestry and Fire Protection (CAL FIRE)

Fire and Resource Assessment Program (FRAP) database, the Project site has not been subject to wildfire (CAL FIRE FRAP 2019). Recorded wildfires within 5 miles range from less than oneacre (2012) to 60,175 acres (1928). The closest wildfires to the Project site were located adjacent to the property lines; one to the south and one to the southwest (Figure 2).

The County of Riverside has designated the core of the property as High Fire Hazard Severity Zone, along with the adjacent agricultural areas to the southwest; the remainder of the property and surrounding area (north, east, south) is designated as Very High Fire Hazard Severity Zone. Therefore, all new buildings (permanent buildings and temporary/portable structures) will be required to be constructed to California Building Code Chapter 7A standards, and local amendments, which focus on exterior ignition resistance.

Project Site Observations

The following were observed during the site visit on March 11, 2021:

- Primary location of wildland fire threat: Canyon/stream channel (Brown Canyon) in alignment with NE wind directing potential fire towards the facility; stream channel traverses through central portion of property then alongside southern edge of property; fire may approach the facility then move south of the property towards ridge with heavy fuels.
- Secondary location of wildland fire threat: South of southern property line adjacent to playfield has heaviest fuel bed, mature chamise chaparral, that would likely threaten the facility during periods of strong SW winds.
- Anticipated Fire Behavior: fast moving, quick burning, short burn duration, some jackpot fuels will burn longer.
- Slopes on the north, east, and south of facility core all move up and away from the Project – beneficial to the Project from a fire spread perspective.
- Existing structures along the southern portion of the Project are within 100 feet of property line and adjacent open space/native vegetation.
- Existing structures on northern portion of proposed development have minimum 100 feet existing fuel modification; existing vegetation is low growing and sparse.
- Native unmodified vegetation on north side of property resembles sage scrub – low growing, sparse shrubs, grass intermix, significant rock cover component.
- Vegetation within the existing “camp” (facility core) has been significantly modified over many decades of use – only small islands or individual native plants remain.
- Scattered ornamental trees have been planted throughout the core for aesthetics, shade, wind protection and privacy (pine, eucalyptus, citrus, juniper, pepper).
- Eucalyptus along the playfields (southern property line) need deadwood pruning and shaping.
- The existing “Ponderosa” and “Chaparral” are older construction, closer to adjacent unmaintained fuels, and more vulnerable to ignitions from direct heat/flame and embers.
- Outbuildings have many openings that are unable to be closed i.e., (doors and windows no longer functioning) – making them more vulnerable to ember intrusion.
- There are piles of debris, fire wood, scrap lumber and discarded materials on the property presenting highly receptive fuel beds.

- Riverside County Regional Conservation Authority (RCA) conserved land is adjacent to the eastern and southern property borders.
- Wide fuel modification zones/fuel breaks currently provided on the north, northeast by the Silverado residence.
- Sizable pond on-site that has been used as a dip bucket water source during wildfire.
- Existing roads are all native soil (decomposed granite), except around the primary residence, which is paved. Roads are all narrow, below 16 feet wide.

Fire Behavior Analysis Methods

Dudek utilized the BehavePlus (v6) fire modeling system to analyze potential fire behavior for the Project site, with experienced judgement and assumptions made for the existing fuel conditions. The location of the fire scenarios and summary of fire modeling inputs is presented in Figure 3.

For this analysis, fuel moisture and wind values were appropriately modified from the guidelines and standards presented by an extensive County of San Diego, Department of Planning and Land Use[1] analysis. These guidelines identify acceptable fire weather inputs for extreme fire conditions during summer months and Santa Ana fire weather patterns in similar fuels and terrain as the Project site. The County analyzed and processed fire weather from Remote Automated Weather Stations (RAWS) between April 15 to December 31 in order to represent the general limits of the fire season. Data derived from the County's analysis included 1-hour, 10-hour, and 100-hour fuel moistures, live herbaceous moisture, live woody moisture, and 20-foot sustained wind speed for the Coastal weather zone.

The following summarizes the inputs, data sources, and assumptions for the fire behavior modeling analysis:

Weather and Wind Analysis: Historical weather data for the region was utilized in determining appropriate fire behavior modeling inputs for the Project site. For this analysis, fuel moisture and wind values were derived from readily available data (RAWS) and knowledge of the region. These data are used as fire weather inputs for extreme fire conditions during summer months and Santa Ana fire weather patterns.

Terrain: Slope gradients range from 3% to 40%.

Fuels: Vegetation types, which were derived from readily available data[1] and the field assessment for the Project site, were classified into fuel models. The fuel model values were used in the modeling analysis for the fuel types on and adjacent to the Project site.

The adjacent land to the south is vegetated with coastal sage scrub, chaparral and grassland; there is a narrow ephemeral stream bed with upland riparian vegetation near the property line. The southwestern area is a combination of sage scrub, grassland and agricultural land use. The vegetation on the eastern portion of the property, and adjacent land along the southeastern, eastern and northeastern property boundaries, includes

[1] County of San Diego Report Format and Content Requirements – Wildland Fire and Fire Protection (August 31, 2010). On-line at http://www.sdcounty.ca.gov/dplu/docs/Fire-Report-Format.pdf

[1] Riverside County Information Technology GIS, Riverside County Geographic Information Systems (GIS) (arcgis.com)

primarily chaparral, some coastal sage scrub, and woodland islands in the upper canyon/stream bed areas. The northwestern portion of the property and adjacent land is primarily sage scrub.

Modeling scenario locations were identified and fuel models selected based on the Project site characteristics, topography, fuels, weather patterns, and the design and layout of the Project. The models selected are the anticipated highest likelihood of generating the most aggressive types of fires. Three BehavePlus fire behavior modeling runs were identified: Scenario 1 and 3 from the NE and Scenario 2 from the SW, for existing and modified conditions.

- Existing grass-sage scrub: Fuel model Gs2 (Moderate load, dry climate grass-shrub)
- Existing chaparral-sage scrub: Fuel model Sh5 (High load, dry climate shrub)
- Fuel modification zone: Fuel model 8 (Closed canopy, compact litter layer)

Attachment 1: Project Site Photo Series provides representative photographs of the vegetation on and adjacent to the Project site.

Wildfire Potential Findings

Summary of the BehavePlus modeling outputs (Table 1):

- a wildfire driven by 40 mph offshore winds from the NE would result in a fire spreading in the grass/sage scrub at approximately 2.4 mph with 14.7 foot high flames (Figure 4) and 1.0 mile spotting distance (Figure 5) (Scenario 1);
- a wildfire driven by 20 mph onshore winds from the SW would result in a fire spreading in the chaparral-sage scrub at approximately 2.4 mph with 27.0 foot high flames and 0.9 mile spotting distance (Scenario 2);
- in the chaparral-sage scrub, a 40 mph wind from the NE would result in a fire spreading at approximately 5.4 mph with 39.1 foot high flames and 1.9 miles spotting distance (Scenario 3).

Within the fuel modification zones, using the same fuel modeling inputs, the resulting post-Project flame lengths in the FMZ areas nearest the structures would be significantly reduced. Once reaching the fuel modification zones, the wildfire behavior is altered noticeably; flame lengths are reduced to 2.0 to 2.6 feet, which are well within the recommended maximum 4.0 feet flame length for firefighter wildfire control through direct attack (Figures 6 through 8).

Table 1. Fire Behavior Modeling Results

Fire Scenarios	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: 20% slope, 40 mph NE wind (toward existing large residence)				
Fuel Model Gs2 (grass/sage scrub)	14.7	1,949	2.4	1.0
Scenario 1 Fuel Modification: 3% slope, 40 mph NE wind (approaching new dorms)				
Fuel Model 8 (irrigated landscaping)	2.6	46	0.1	0.3
Scenario 2: 20% slope, 20 mph SW wind (approaching play field)				
Fuel Model Sh5 (chaparral/sage scrub)	27.0	7,308	2.4	0.9
Scenario 2 Fuel Modification: 3% slope, 20 mph SW wind (approaching play field)				
Fuel Model 8 (irrigated landscaping)	2.0	25	0.1	0.2
Scenario 3: 20% slope, 40 mph NE wind (approaching new dorms through canyon)				
Fuel Model Sh5 (chaparral/sage scrub)	39.1	16,447	5.4	1.9
Scenario 3 Fuel Modification: 3% slope, 40 mph NE wind (approaching new dorms)				
Fuel Model 8 (irrigated landscaping)	2.6	46	0.1	0.3

Note: The results presented depict values based on inputs to the BehavePlus fire modeling system 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. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design. 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.

Fuel Modification Zones

A 100-foot-wide FMZ is required by Riverside County for defensible space in areas adjacent to open space lands. FMZ Zone 1, which is the first 30 feet, would be irrigated and landscaped with less flammable plant material. FMZ Zone 2, which is from 31 to 100 feet, would include modification of the native vegetation by thinning and pruning to maintain it in a fire resistant condition.

Based on our analysis, the standard 100-foot FMZ would be appropriate for the Project site, given the anticipated fire behavior produced by the unmaintained fuels adjacent some of the buildings. Considering the preliminary site plan, the Project site could achieve the required 100 foot wide FMZ on-site for all existing and proposed buildings aside from the existing Ponderosa Lodge; the Ponderosa Lodge is within 60 feet of the southern property line. Dudek does not find that these distances are adequate given the likelihood of wildfire through the heavier fuels to the south of the Project. One option would be to request a fuel modification easement from the adjacent property owner so that 100 feet is achievable. Without off-site fuel modification, alternative fire protection measures would be required in order to provide adequate fire safety and meet the intent of the code, i.e., the reduced FMZ will need to be mitigated such that the resulting building protection provides the same practical effect as providing the full 100 feet FMZs. This is

possible through one or more of the following: structure hardening, more restrictive landscape treatments, landscape walls, other systems, subject to RCFD acceptance.

Recommendations

Note: Dudek's scope of work is limited to fire behavior modeling. As an added value, we offer the following recommendations. Note that these recommendations are not based on a focused assessment, but on preliminary observations and experience mitigating wildfire risk.

1. Fuel Modification Maintenance
    a. Continue maintenance of large fuel breaks to the north and northeast.
    b. Expand fuel modified area to the east of Chaparral and Ponderosa to a minimum of 100 feet, more if possible.
    c. As possible, expand fuel modified areas on the southern property boundary – it would be beneficial to remove dead and dying fuels on a regular basis along the first 100 feet along the southern property (off-site). This area includes the heaviest unmaintained fuels and would produce the most aggressive fire behavior.
    d. At minimum, maintain all Project site trees with raised crowns (at least six feet above ground) thinned canopies; no buildup of litter and debris.
    e. Consider removal of higher flammability trees that are adjacent to Project site structures and fire apparatus access/evacuation roads.
2. Provide additional dip tank at key location on-site for helicopter use (accessible by helicopter), clear, away from buildings, possibly in the northeastern portion or southwestern portion of Project.
3. Maintain a 4x4 fire patrol vehicle with pump and water tank on-site for initial structure protection use by qualified persons during some types of wildfire events.
4. Design the main residential building (existing "Hacienda" residence) as the Project's temporary refuge/shelter site. This includes maintaining the structure in an ignition resistant condition at all times (assess vents – install ember resistant vents throughout) and consider air handling system to exclude smoke.
5. As part of renovations on Ponderosa and Chaparral buildings – utilize CBC Chapter 7A for all new exterior, roofing, ventilation, and opening (windows and doors) construction components.
6. Where unable to achieve 100 feet of FMZ on-site, approach off-site land owner for easement or if not possible, then utilize a non-vegetated FMZ (parking areas, rock ground cover, etc. and where not adjacent an upslope, utilize a non-combustible wall (six feet tall) as landscape heat deflector/ember catcher.
7. Roads: It is advisable that road improvements are provided.
    a. Particularly regarding surfacing on steeper sections – pavement or brushed concrete may be needed
    b. Widening at pinch points would be recommended.
    c. Roadside fuel management – remove or lift overhanging branches (13.5 feet minimum), maintain plants on either side of roads and throughout interior of Project along with FMZs.
    d. Designate one-way travel (with signs) to possibly help mitigate the potential for vehicles to pass on narrow roads.

   e. Provide turnouts along roads at regular intervals to enable two vehicles to pass in opposite directions
   f. Provide roadside signage to primary buildings for emergency response. Provide lighted directory at main office/check in area.
   g. Utilize solar arrays as part of Project site FMZ: Must maintain area beneath the proposed solar panels as DG with no weed growth. Must provide 20 to 30 foot wide area around the array to prevent direct flame impingement.
8. Consider limitations and restrictions on-site during Red Flag Warning periods – potential ignition related activities (hot work, vehicle uses off road, smoking, etc.) should be restricted to specific, protected areas away from vegetation.
   a. Include internal visual warning flags posted during Red Flag Warning weather to indicate restrictions.
9. Prepare an evacuation plan and familiarize all visitors with the plan, which should include signage, primary evacuation protocol and contingency plan. As possible, prepare the plan based on PACE approach and integrating Ready, Set, Go.
10. Consider maintaining on-site shuttles with capacity to evacuate all residents in one evacuation trip (multiple shuttles or one large bus).
11. Implement a Project site-wide notification system (PA system, siren, bell, etc.) so warnings can be broadcast to all employees, visitors, and guests.

Conclusion and Limitations

Our analysis of the Project leads us to believe that the most significant issues facing the Project from a fire protection planning perspective will be defensible space and fire access-related. First, FMZ reductions will require additional fire protection measures as suggested, above. Second, the roadways would need to provide access to within 150 feet of the "back" side of all structures so that hose pull lengths are met. We recommend that Dudek work closely with the Project engineers, planners and architect as the Project site plan is being developed so that fire apparatus access is addressed to meet the intent of the Fire Code.

Our analysis does not provide a guarantee that all residents and visitors will be safe at all times. There are many variables that may influence overall safety. It is recommended that the proposed development maintain a conservative approach to fire safety. This approach must include maintaining the landscape and structural components according to the appropriate standards described in this report and required by the current fire and building codes. Wildfire is a dynamic and somewhat unpredictable occurrence and it is important for anyone living in wildland urban interface areas to educate themselves on practices, including the County's Preparedness Program that will improve overall safety.

We look forward to continuing to work with you on this Project's fire safety considerations. If you have any questions regarding our fire analysis and recommendations, please contact us at 619.992.9161.

Sincerely,

Michael Huff
Urban Forestry Practice Director

Att. 1: Figures 1–8
Att. 2: Fuels Type Photo Series

References

California Department of Forestry and Fire Protection (CALFIRE). 2018. Fire Resource and Assessment Program (FRAP) Maps. Obtained GIS database at http://frap.fire.ca.gov/data/frapgismaps-subset.

Cohen, J.D. 1995. Structure ignition assessment model (SIAM). In: Weise, D.R.; Martin, R.E., technical coordinators. Proceedings of the Biswell symposium: fire issues and solutions in urban interface and wildland ecosystems. 1994 February 15–17; Walnut Creek, California. Gen. Tech. Rep. PSW-GTR-158. Albany, California: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 85–92.

Cohen, J.D. and Butler, B.W. 1996. Modeling potential ignitions from flame radiation exposure with implications for wildland/urban interface fire management. In: Proceedings of the 13th conference on fire and forest meteorology. October 27–31; Lorne, Victoria, Australia. Fairfield, Washington: International Association of Wildland Fire.

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.

Attachment 1

Figures 1–8

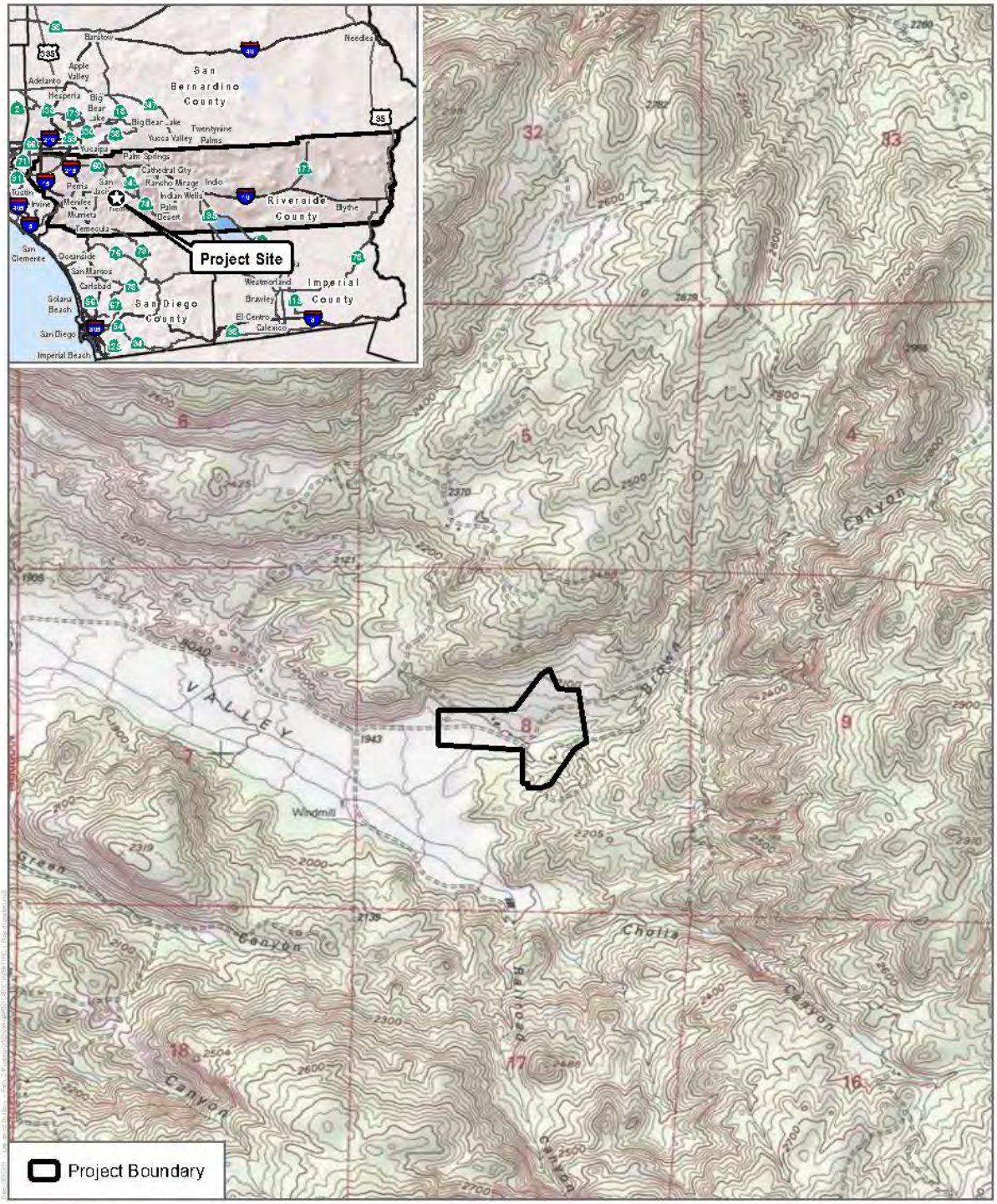
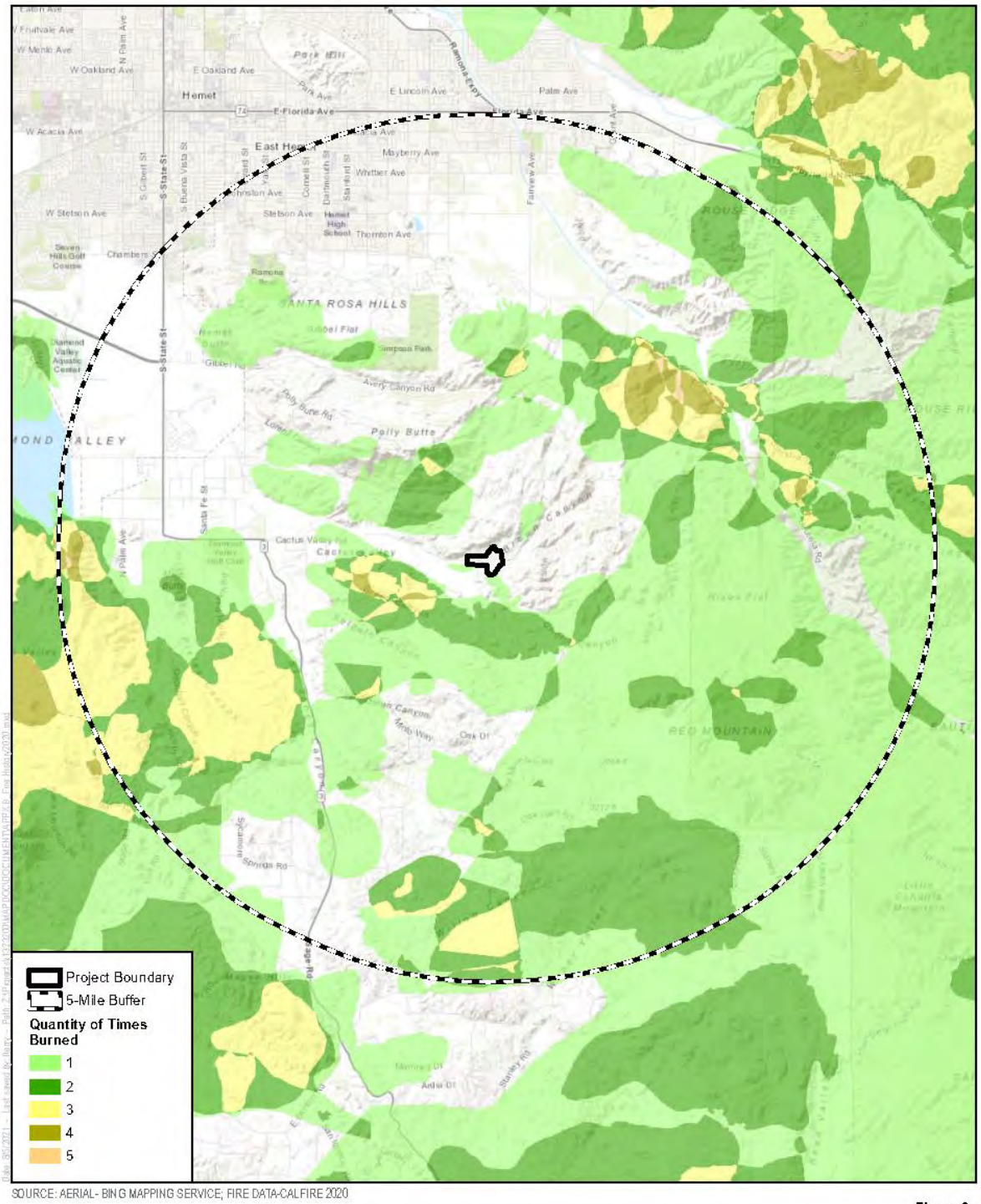


FIGURE 1
Project Location
Fire Protection Plan for the Paradise Valley Ranch



SOURCE: AERIAL- BING MAPPING SERVICE; FIRE DATA-CALFIRE 2020

DUDEK

0 1 2 Miles

Figure 2
Fire History Map
Fire Protection Plan for the Paradise Valley Ranch

Fire Behavior Modeling Results

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SOURCE: AERIAL-BING MAPPING SERVICE

DUDEK 0 350 700 1,400 Feet

FIGURE 3
BehavePlus Analysis Map
Fire Protection Plan for the Paradise Valley Ranch

Figure 4. Flame length

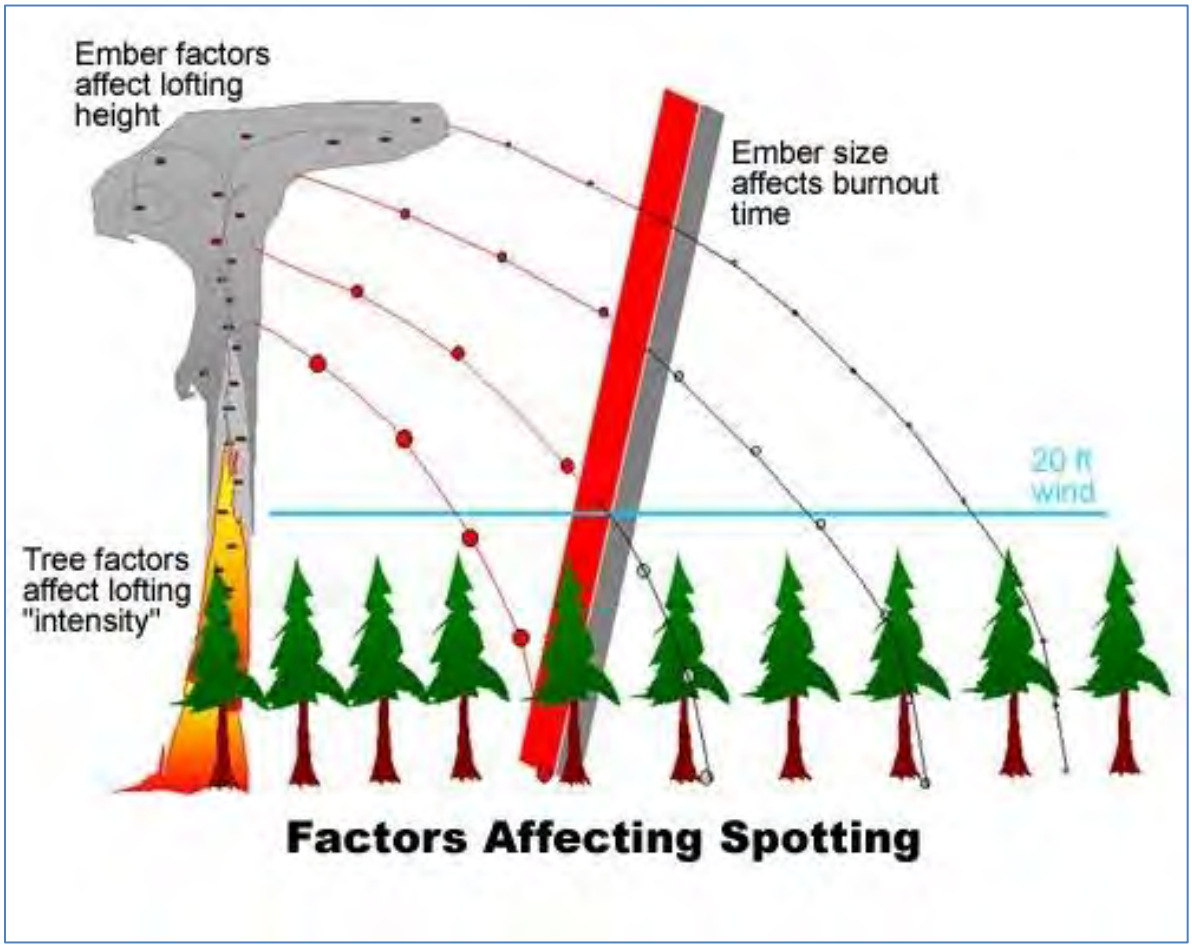

Figure 5. Factors affecting spotting

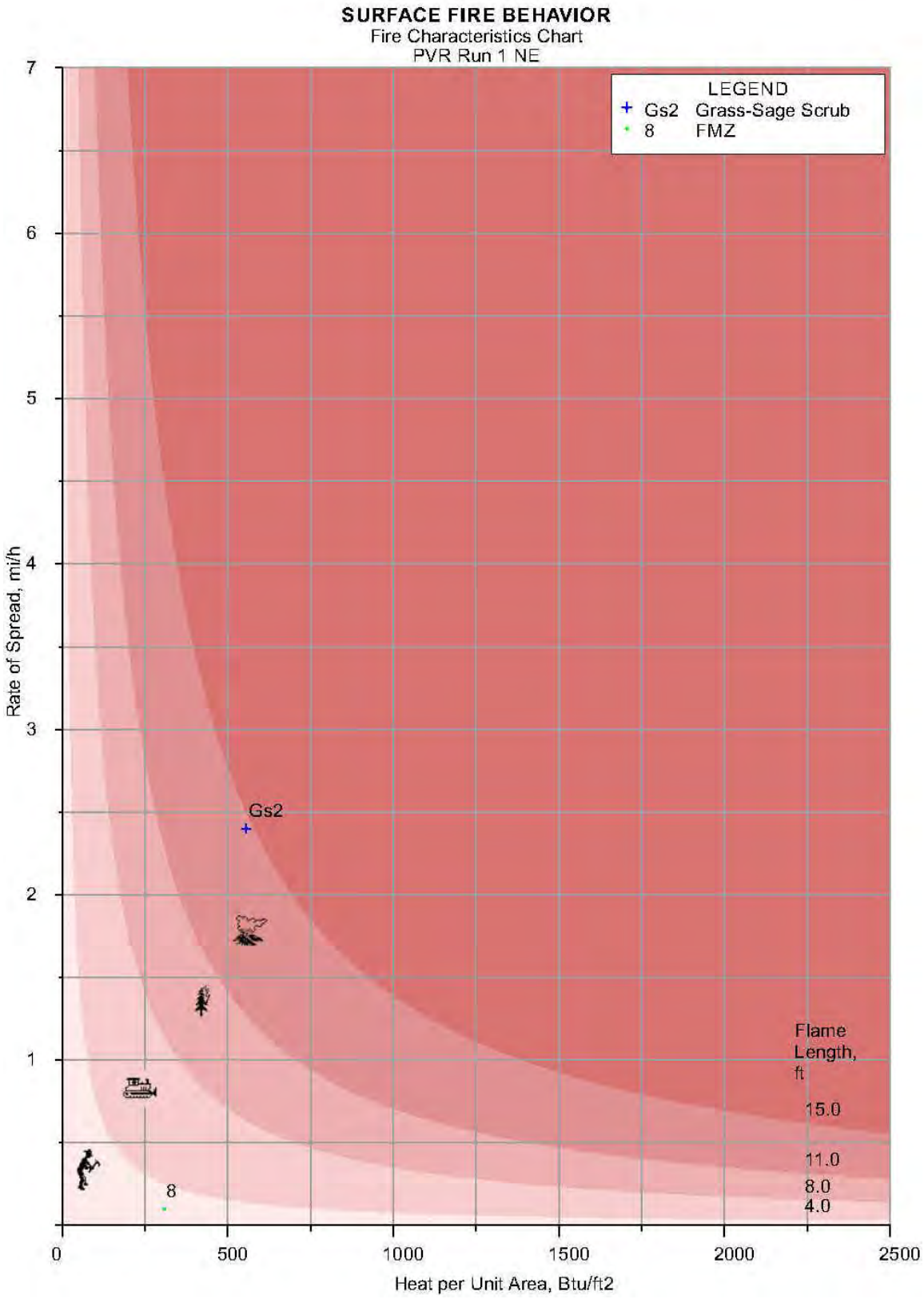

Figure 6. Scenario 1 - native and FMZ fuels

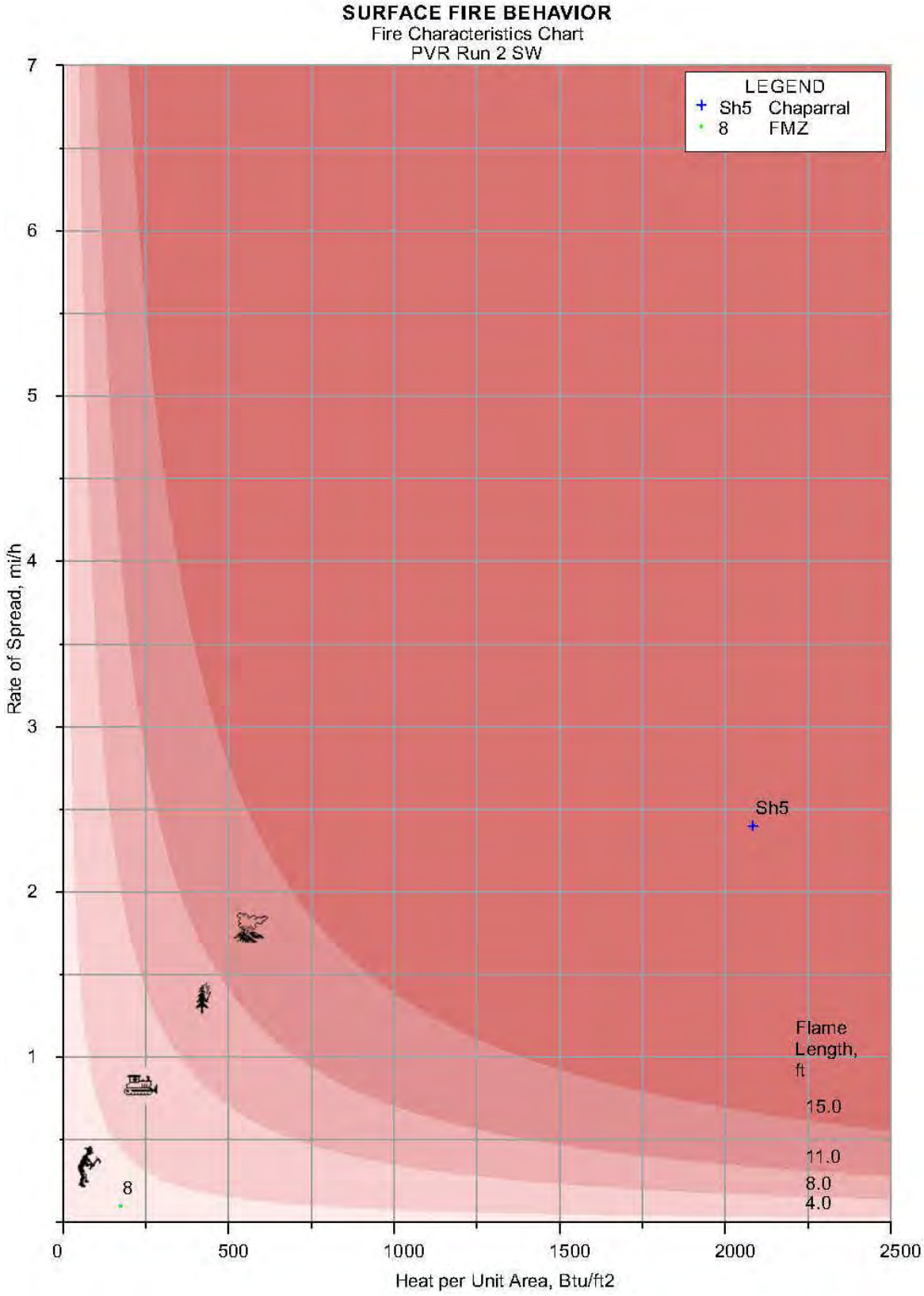

Figure 7. Scenario 2 -native and FMZ fuels

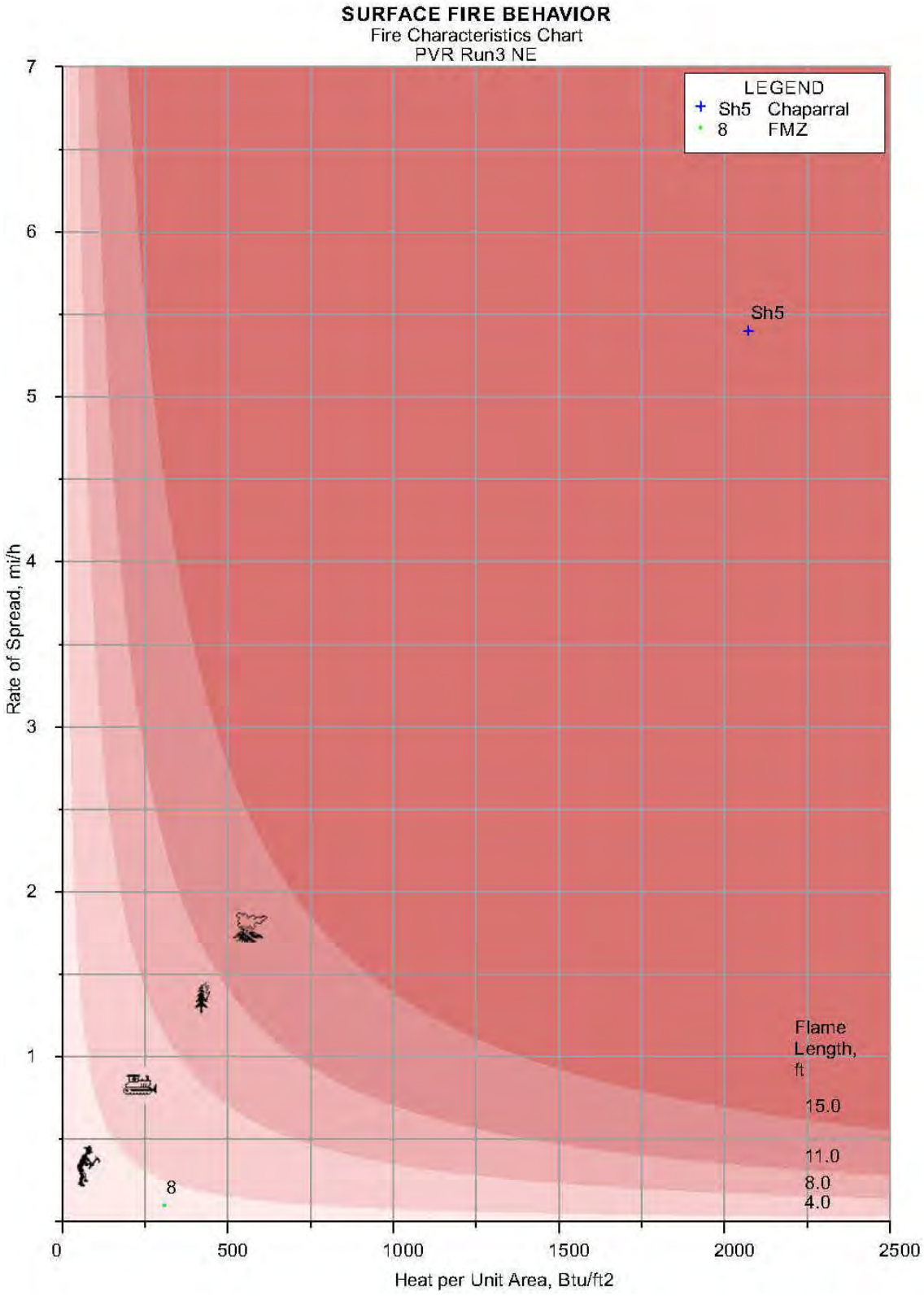

Figure 8. Scenario 3 - native and FMZ fuels

Attachment 2

Fuels Type Photo Series

Paradise Valley Ranch Project
Fuels Photo Series

MARCH 2021

Attachment 1

Paradise Valley Ranch Project
Fuels Photo Series

Photograph 1. The terrain and vegetation adjacent to the Ponderosa Lodge (looking south); chaparral and sage scrub on the offsite hillside.

Photograph 2. The terrain and vegetation to the rear of the Ponderosa Lodge (looking southwest).

Paradise Valley Ranch Project
Fuels Photo Series

Photograph 3. The terrain and vegetation (grass, chaparral, sage scrub) to the rear of the Ponderosa Lodge (looking southwest).

Photograph 4. The terrain and vegetation in the facility core; the Silverado lodge is in the distance (looking north from Ponderosa Lodge).

Paradise Valley Ranch Project
Fuels Photo Series

Photographs 5 and 6. Looking northeast through the facility core towards Brown Canyon (chaparral covered hillsides). The grassland vegetation is typical of the fuel types and fuel loading in the core of the property, aside from isolated ornamental trees.

Paradise Valley Ranch Project
Fuels Photo Series

Photograph 7. Terrain and vegetation north of the Silverado Lodge garage; fuel modification zone in the foreground; sage scrub on the hillside in the distance.

Photograph 8. Terrain and vegetation north of the Silverado Lodge garage; fuel modification zone in the foreground; sage scrub on the hillside in the distance.

Paradise Valley Ranch Project
Fuels Photo Series

Photograph 9. Looking south across the facility core; Silverado Lodge fuel mod and driveway in the foreground; RCA conserved open space in the distance.

Photograph 10. Looking south across the facility core; Silverado Lodge fuel mod in the foreground; RCA conserved open space in the distance.

Paradise Valley Ranch Project
Fuels Photo Series

Photograph 11. Looking south at the playfield, eucalyptus trees at the property line, and RCA open space in the distance. Photo taken from the Hacienda Lodge parking area.

Photograph 12. The terrain and vegetation on the western portion of the property in the corral area; the agricultural-based land uses have modified the fuels.

Paradise Valley Ranch Project
Fuels Photo Series

Photograph 13. Terrain and vegetation south of the southern property line adjacent to the playfield. Dry riparian stream channel in the foreground with chaparral and sage scrub on the hillsides (RCA open space).

Photograph 14. Main entrance to paradise Valley Ranch.