Fire Fuel Load Modeling Report

El Camino Real Assisted Living Facility Project

MARCH 2023; REVISED NOVEMBER 2024

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1 Introduction

In accordance with Section 142.0412 of the San Diego Municipal Code (Brush Management) and Section 104.9 of the 2019 California Fire Code (or current edition at the time of construction), we are requesting an alternate method of fire protection for the El Camino Real Assisted Living Facility Project (proposed project) located in the northern section of the City of San Diego (City), California at 13860 El Camino Real (APN 304-650-37-00), south of the San Dieguito River and north of Del Mar Heights Road. The study area is approximately 17.33 acres in size and is located within the North City Future Urbanizing Area (NCFUS) Subarea II Community Planning Area and is within the City's Multiple Species Conservation Program (MSCP) Subarea Plan (City of San Diego 1997). The project footprint is directly adjacent to the City's Multiple Habitat Preservation Area (MHPA), which occurs to the east within the open space. In addition, the eastern portion of the Assisted Living Facility parcel, approximately 1.12 acres, is located within the MHPA. The proposed project will be located within a 3.97-acre site (Assisted Living Facility parcel) which will be tied into the previously approved St. John Garabed Armenian Church (Church) Project site directly to the north. The Church project which included a 350-seat church and three accessory use buildings on the 13.36-acre site located at 13925 El Camino Real, San Diego; the Church is currently under construction. This report is in response to a meeting with the City of San Diego Deputy Fire Marshal and Planning Department Staff on December 22, 2022, during which we discussed the project site, the proposed facility, and our proposed modified brush management area.

The proposed project consists of the construction of a 105,568 square-foot structure that will house an assisted living facility for the elderly with 87 assisted living units, 18 memory care units, and associated common facilities (dining room, kitchen, spa, pool, fitness center, etc.). The project will also install a parking lot, sidewalks, patios, and landscaping around the structure. The construction will occur on the western portion of an approximately 3.97-acre parcel located at 13860 El Camino Real, San Diego, California. The project site is within the Coastal Overlay Zone and development under the project would not encroach into the MHPA or the 100-foot wetland buffer, located around existing wetland habitat to the east of the project footprint. No permanent development would occur within the MHPA; however, the Assisted Living Facility parcel would retain 1.12 acres in the eastern area of the parcel as open space in accordance with the existing designated MHPA area. This area would be covered by a Covenant of Easement and maintained as open space in perpetuity.

The project impact area and boundary will include the three-story assisted living facility structure, with 57 surface parking spaces, outdoor amenities, on-site landscaping, and brush management. Project grading and construction for the Assisted Living Facility is currently expected to take approximately 14 months to complete. Impacts to any areas of natural vegetation or habitat potentially suitable for special status plant species will be avoided. Based on species composition and general appearance, there were 5 vegetation communities and land covers identified within the study area, including eucalyptus woodland, disturbed habitat, non-native woodland, urban/developed land, and arundo-dominated riparian. The 3.97-acre Assisted Living Facility parcel is currently undeveloped; however, in the past, the property was used for agriculture. Due to the previous agricultural uses, the Assisted Living Facility parcel primarily consists of disturbed habitat. Current land uses within and immediately surrounding the study area include the approximately 13.36-acre Church parcel and parking lot area to the north, the El Camino Real roadway and the San Dieguito lagoon open space to the north/west/northwest, undeveloped lands to the east, residential uses to the south, and an existing church (Evangelical Formosan) to the west.

An important component of a fire protection system is the Brush Management Zones (BMZs). BMZs are typically designed to gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones and irrigated zones adjacent to each other on the perimeter of the Wildland Urban Interface (WUI) exposed structures. In a typical BMZ Zone, 1 extends 35 feet out from the habitable structure towards flammable vegetation

and occurs on all level portions of the property, and Zone 2 is the remaining 65 feet that extend beyond Zone 1. For the specific project, Zone 1 extends from the exterior of the structure to between 65 and 100 feet from the northern side of the structure, consisting of irrigated landscape areas and BMZ-equivalent hardscape areas; ~~on the west side of the proposed Assisted Living Facility structure, Zone 1 extends from the exterior of the structure up to approximately 60 feet to the western project boundary and the existing parking lot of the existing church; on the south side of the proposed Assisted Living Facility structure, Zone 1 extends from the exterior of the structure between 35 and 100 feet to the southern project boundary and the existing single family residential community;~~ and on the east side of the Assisted Living Facility structure, Zone 1 extends from the exterior of the structure up to 35 feet to the MHPA line. The entire Assisted Living Facility site will include paved hardscape with an irrigated landscape area. Sitewide brush management will be implemented all at once prior to construction of the Assisted Living Facility.

This Fire Fuel Load Modeling Report (FFLMR) discusses the project site and its fire environment, fire risk assessment, including fire behavior modeling, and based on the results from the study, requests a ~~variance~~ modified brush management program from the standard BMZ specifications with regard to the width of Zone 1 and elimination of Zone 2 for the proposed project. The existing conditions around the project area include the MHPA and a 100-foot wetland buffer to the east/northeast/southeast of the proposed Assisted Living Facility development. These areas create a condition where it is not possible to achieve a standard BMZ. As such, the FFLMR provides an alternative approach that provides for a modified Zone 1 within the building areas that includes significant horizontal separation of the developed area from off-site fuels. Per San Diego Municipal Code, the Fire Chief may modify standard requirements in consideration of the topography, existing and potential fuel load, and other characteristics of the site related to fire protection. As stated in the Municipal Code, (142.0412(i)), an applicant may request approval of alternative compliance for brush management in accordance with Process One if all of the following conditions exist:

1. The proposed alternative compliance provides sufficient defensible space between all structures on the premises and contiguous areas of native or naturalized vegetation as demonstrated to the satisfaction of the Fire Chief based on documentation that addresses the topography of the site, existing and potential fuel load, and other characteristics related to fire protection and the context of the proposed development.
2. The proposed alternative compliance minimizes impacts to undisturbed native or naturalized vegetation where possible while still meeting the purpose and intent of Section 142.0412 to reduce fire hazards around structures and providing a fire break with at least the same functional equivalency.
3. The proposed alternative compliance is not detrimental to the public health, safety, and welfare of persons residing or working in the area.

This report provides project information, a request for modification, and justifications for the modification.

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2 Project Information

In November 2008, the St. John Garabed Church congregation began planning for new church facilities that would follow Armenian tradition at the proposed project site. The Church project included a 350-seat church and three accessory use buildings on the approximately 13.36-acre site located at 13925 El Camino Real, San Diego (Assessor's Parcel Number [APN] 304-020-2400). Construction of the St. John Garabed Church component (Church component) was initiated in 2018 and is expected to be completed in phases over the next few years. Subsequent to the certification of the 2014 Church EIR, the St. John Garabed Church congregation acquired a neighboring parcel to the church (APN 304-650-3700). Presently the members are proposing the construction of the El Camino Real Assisted Living Facility (Assisted Living Facility) on the 3.97-acre site that would be associated with the Church. The original Church site lot and the more recently acquired Assisted Living Site lot would be joined together by a Lot Tie Agreement as a condition of project approval.

The project proposes the construction of a new three-story, "m" shaped Assisted Living Facility structure on the 3.97-acre parcel south of the Church parcel, at 13860 El Camino Real, in the northern section of the City of San Diego, California. The project is located approximately 0.75 miles east of Interstate 5 within the San Dieguito River watershed. The proposed project site is located just east of 13885 El Camino Real and directly north of an existing residential community and Rosecroft Way. Open Space associated with the northern extent of Gonzales Canyon lies to the east of the project footprint and the San Dieguito River Park lies to the west of El Camino Real. The project area falls within the western portion of Section 7 of Township 14 South, Range 3 West of the Del Mar, California 7.5-minute U.S. Geological Survey Topographic Quadrangle Map (see Figure 1, *Project Location Map and* Figure 2, *Project Area Map*). Furthermore, the project is within the Coastal Overlay Zone and the Multiple Habitat Planning Area (MHPA), the "hardline preserve" developed by the City of San Diego, is located directly east of the project footprint and to the west of El Camino Real.

Site Address: El Camino Real Assisted Living Facility Project
13860 El Camino Real
San Diego, California 92130
APN# 304-650-37-00

Contact: **PMB, LLC**
Nolan Weinberg, VP Development
(858) 794-1900

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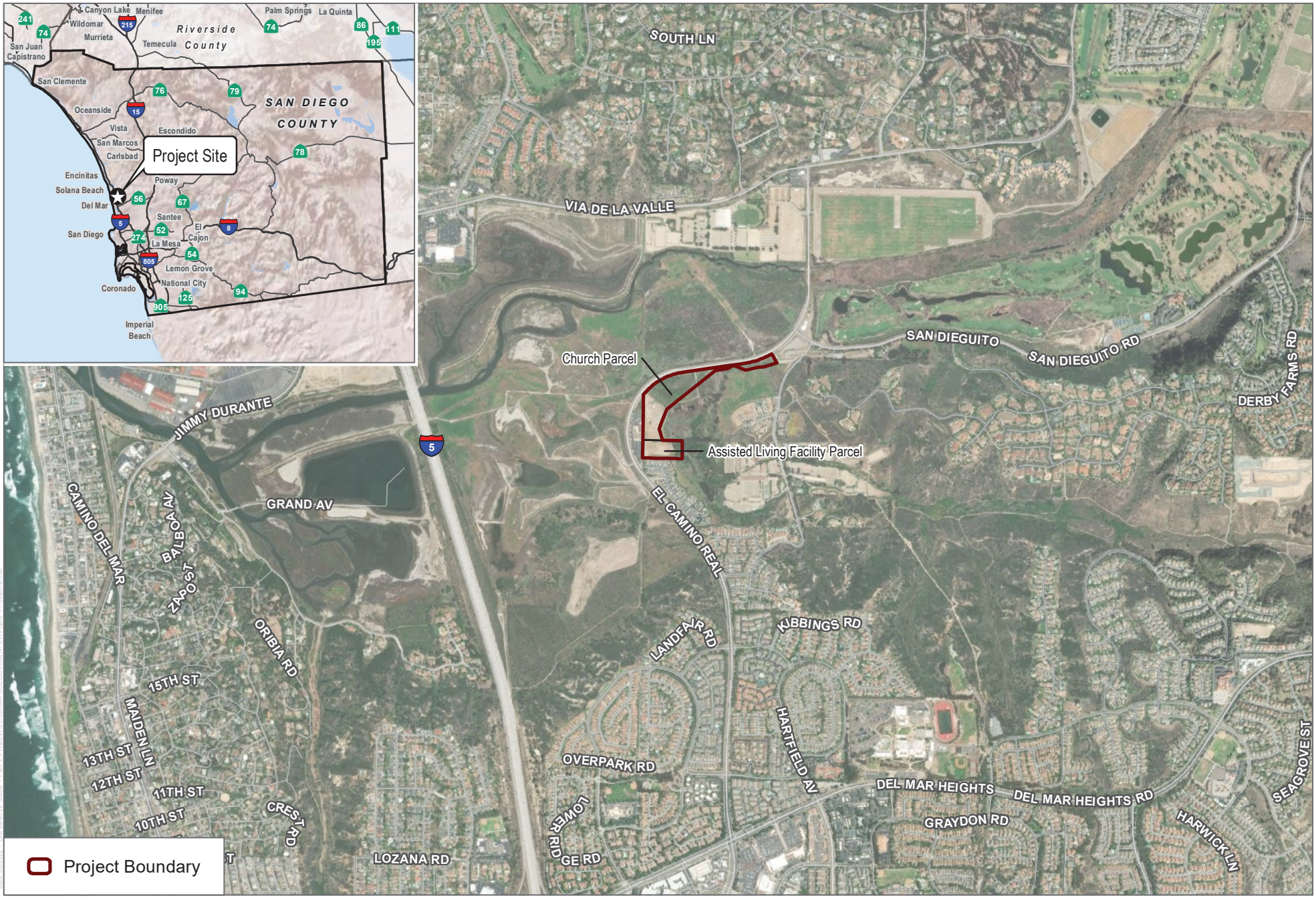

SOURCE: DigitalGlobe 2017

DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location Map

El Camino Real Assisted Living Facility Project - Fire Fuel Load Modeling Report

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SOURCE: SOURCE: USGS 7.5-Minute Series Del Mar Quadrangle

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0 175 350 Feet

FIGURE 2

Project Vicinity Map

El Camino Real Assisted Living Facility Project - Fire Fuel Load Modeling Report

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3 Project Description

The project consists of an expansion of the approved St. Garabed Church to include an Assisted Living Facility. The Assisted Living Facility is proposed to provide a facility within walking distance from the Church and to assist the Church with meeting their core values of a strong community and caring for the elderly and disabled by providing an assisted living facility that maximizes the number of beds. The approved St. Garabed Church component includes a 350-seat church and three accessory use buildings on a 13.36-acre parcel. The total area of the Church component is 51,680 square feet with lot coverage of 40,960 square feet. While the approved Church component is a part of the overall project, the associated discretionary actions are already approved, and the Church is under construction. Thus, this FFLMR focuses on the addition of the Assisted Living Facility, as described below.

3.1 Building and Site Design

The Assisted Living Facility would add 105 rooms and supporting amenities on the 3.97-acre parcel to the south of the Church, as shown in Figure 3, Proposed Site Plan. The Assisted Living Facility would be regulated as a Nursing Facility per San Diego Municipal Code (SDMC) Section 141.0413. The proposed three-story facility would be a "m" shaped building that includes four courtyard areas. The total area would be 105,568 square feet with lot coverage of 34,525 square feet. The building architectural style would be Mediterranean, with light-colored, adobe-like walls, and dark wood details. Wood details includes trellises and shutters. A varied roofline is proposed, with some areas including terracotta tiled roofs. The proposed balcony insets and pop-outs would also provide building articulation and visual interest.

The proposed Assisted Living Facility building would be 40 feet tall, which would exceed the baseline 30-foot height limit. An additional 10 feet of building height is allowed per each 10 feet increase of setbacks per SDMC 131.0344. The project would provide greater than the minimum 20-foot setback from adjacent properties in accordance with the zoning (AR-1-1). The project is providing setbacks of 45 feet 0 inches (north side yard), 187 feet 7 inches (back), 30 feet 0 inches (south side yard), and 63 feet 9 inches (front), which would allow for the increased height of 40 feet per SDMC 131.0344.

3.2 Assisted Living Units

The proposed 105 units would include 87 assisted living units and 18 memory care units. A total of 124 beds would be provided, including 104 assisted living beds and 20 memory care beds. The assisted living unit would include 15 studios, 55 one-bedroom units, and 17 two-bedroom units.

3.3 Recreational and Supporting Uses

The Assisted Living Facility would include interior and exterior common recreational and supporting uses for the residents of the facility. The interior common facilities would include a salon, dining room, kitchen, laundry room, staff room, offices, mail room, housekeeping room, and storage. The recreational amenities within the building would include a fitness center and multi-purpose room. Exterior recreational uses would include a memory care garden to the west, an outdoor seating courtyard to the south, a spa and pool to the southwest, and a pet area to the northwest. These recreational and supporting amenities would be for residents only.

3.4 Site Access and Parking

Access to the Assisted Living Facility parcel would be provided via one right-in/right-out only driveway along El Camino Real and an ingress/egress access easement through the Church parcel to the north. The Church internal access would be extended to the south and would include a vehicle turnaround at the entrance to the Assisted Living Facility. The turnaround would include enhanced pavement with concentric circles to direct traffic flow. A drop-off area would be provided at the southern side of the turnaround.

The Assisted Living Facility's emergency access route would be provided through the same site access as described above. Emergency vehicles would enter the site via El Camino Real and travel south to the Assisted Living Facility access point. The site includes two, 26-foot-wide turnaround areas adequate for a fire engine; one at the entrance area and one at the loading dock. Designated fire lanes (a.k.a., red curb) with aerial fire access would be located on the north and east sides of the building. All areas of the Assisted Living Facility would be accessible from the proposed hydrant and associated planned hose pulls.

The Assisted Living Facility provides an accessible path from El Camino Real, through the Church component, along the turnaround to the main building entrance. Internally, an exterior walkway would be located around the perimeter of the building. This internal walkway would connect to building access points and each of the exterior amenity areas.

Parking areas would be located to the south and east of the main site access entrance point. A total of 57 parking spaces would be provided, which exceeds the 42 spaces required by SDMC. Of those spaces, six spaces would be designated for carpool, four would be electric vehicle capable spaces, and three would be accessible parking spaces. The project would also include 12 short-term and 4 long-term bicycle parking spaces. In addition, a loading area would be provided adjacent to the proposed kitchen.

3.5 Landscaping and Brush Management

A total of 29,967 square feet of landscaped area is proposed within the Assisted Living Facility parcel. This landscaping would be throughout the facility but focuses heavy landscaping along the southern and eastern boundaries adjacent to the Villas at Stallions Crossing development and MHPA. The heavily landscaped area would include species such as California sagebrush, coyote brush, toyon, coast golden brush, sticky monkey-flower, deergrass, prickly pear cactus, and lemonade berry. A variety of trees would also be located within this heavy landscaped area, including evergreens and strawberry trees. The Assisted Living Facility also includes low water-use plant mix within the parking lot, medium-low plant mixes along the building perimeter, and medium-low enhanced shrub mix within the recreational amenity areas and entrance.

The Assisted Living Facility will not consist of ~~typical~~ standard San Diego Fire-Rescue Department (SDFRD) Brush Management Zones 1 and 2. Based on the project's site, land ownership, adjacent to mapped MHPA and wetland buffer areas, and grading plans, it is not feasible to achieve the City's standard BMZ widths along the project's perimeter boundaries. As such, the entire property will ~~be maintained as a Zone 1 that~~ will consist of an irrigated landscape area along with a paved hardscape development area surrounding all sides of the building to the property line/MHPA Line or 100 feet from the structure. ~~and will include all sides of the building to the property line/MHPA Line or 100 feet from the structure (as possible). Specifically,~~ Zone 1 extends from the exterior of the structure to between 65 and 100 feet from the northern side of the structure, consisting of irrigated landscape areas and BMZ-

equivalent hardscape areas; ~~on the west side of the proposed Assisted Living Facility structure, Zone 1 extends from the exterior of the structure up to approximately 60 feet to the western project boundary and the existing parking lot of the existing church; on the south side of the proposed Assisted Living Facility structure, Zone 1 extends from the exterior of the structure between 35 and 100 feet to the southern project boundary and the existing single-family residential community;~~ and on the east side of the Assisted Living Facility structure, Zone 1 extends from the exterior of the structure up to 35 feet to the MHPA line. There will be no Zone 2, and the Zone 1 width is ~~reduced~~ modified on the eastern side as it is not feasible to implement typical BMZ improvements because it will encroach into open space belonging to the State or the MHPA. The project is also within the Coastal Overlay Zone, which limits the maximum reduction of 30 feet if related to Zone 2. Further, the proposed alternative compliance minimizes the impacts to undisturbed native and/or naturalized vegetation while still meeting the purpose and intent of Section 142.0412 of the City Code (SDMC 142.0412(i)). This FFLMR provides both City and State fire and building code required elements for construction, as well as enhanced, code-exceeding measures along the eastern side of the structure where ~~non-conforming~~ modified Brush Management Zones occur adjacent to the MHPA. With that said, it is anticipated that the proposed structure will be able to withstand the short duration, low to moderate intensity fire and ember shower that is projected from off-site, adjacent fuels based on several factors, as discussed below.

3.6 Open Space

The eastern 1.12 acres of the Assisted Living Facility parcel would be retained as open space in accordance with the existing designated MHPA. This area would be covered by a Covenant of Easement in conformance with the City's Environmentally Sensitive Lands (ESL) regulations and maintained as open space in perpetuity. Considering the proposed development is adjacent to the MHPA, the Assisted Living Facility would be subject to the Land Use Adjacency Guidelines (City of San Diego 1997). The Land Use Agency Guidelines include specific restriction and design of drainage, toxics/project staging areas/equipment storage, lighting, noise control, barriers, invasives, brush management, and grading/land development to protect adjacent sensitive biological resources.

3.7 Utilities

The existing water, sewer, sewer force main, potable water, and fire lines are located in El Camino Real. These lines are extended through the project site and up to the Church parcel to the north. The existing sewer line loops through the Church parcel to the north back into the El Camino Real line. The Assisted Living Facility would connect to the sewer and fire existing lines at the northwestern area of the project site, as well as make connections to the existing fire and domestic water lines in the southwestern area of the project site. In addition, the Assisted Living Facility would connect to the utilities provided by the Church that are accessed from El Camino Real at the southern portion of the project site. This will provide irrigation water and domestic water to the site.

The existing overhead electrical lines would be retained as overhead lines. The Assisted Living Facility would include an emergency generator, emergency electrical equipment and other electrical equipment to ensure continued electrical service to the site considering the potential need for medical equipment. The emergency generator would be similar to the Cummins model 300DQDAC and would be tested for 1 hour each month to ensure adequate operations.

3.8 Grading and Construction

The Assisted Living Facility component involves grading 2.84 acres of the 3.97-acre site (71% of the site). The proposed grading would involve 26,435 cubic yards of cut with 125 cubic yards of fill, for an export of 26,310 cubic yards. The proposed maximum depth of cut is expected to be 12.4 feet, with the maximum depth of fill at approximately 1 foot. The maximum cut and fill slopes would be at a two to one ratio. The Assisted Living Facility requires three retaining walls to reduce grading, two along the southern boundary, and one along the eastern boundary. The maximum retaining wall length is 30 linear feet, and the maximum height is five feet.

Grading and construction for the Assisted Living Facility is expected to begin mid-2024 and take approximately 14 months to complete. The proposed grading phase would last approximately 2 months. Grading equipment would include dozers, scrapers, loaders, backhoes, and excavators. Standard construction equipment is expected to be utilized, including cranes, forklifts, generator sets, tractors, loaders, backhoes, welders, and bobcats. Paving would take approximately 2 months, and would involve pavers, paving equipment, and rollers. Architectural coatings would take approximately 3 months to apply. Construction of the Assisted Living Facility is expected to be completed near the end of 2025.

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SOURCE: AERIAL-BING MAPPING SERVICE 2022

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FIGURE 3

Proposed Site Plan

El Camino Real Assisted Living Facility Project - Fire Fuel Load Modeling Report

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4 Fire Risk Analysis

4.1 Field Assessment

A field assessment of the project, including on-site and off-site adjacent areas, was conducted by Dudek on November 26, 2022, in order to document existing site conditions and determine potential actions for addressing the protection of proposed El Camino Real Assisted Living Facility structure in the City of San Diego. Assessments of the area's topography, natural vegetation, and fuel loading, proposed Project impact areas, Zone 1 and Zone 2 BMZ areas, assets, fire history, and general susceptibility to wildfire formed the basis of the site risk assessment. Among the field tasks that were completed are:

- Vegetation measurements and mapping refinements
- Fuel load analysis
- Topographic features documentation
- Photograph documentation
- Confirmation/Verification of office-based hazard assumptions.

Site photographs were collected (Appendix A, *Photograph Log*). Field observations were utilized to augment existing site data in generating the fire behavior models and formulating the recommendations detailed in the report.

4.2 Fire Environment

Fire environments are dynamic systems and include many types of environmental factors. Fires can occur in any environment where conditions are conducive to ignition and fire movement. Areas of naturally vegetated open space are typically comprised of conditions that may be favorable to wildfire spread. The three major components of the fire environment are vegetation (fuels), climate, and topography. The state of each of these components and their interactions with each other determines the potential characteristics and behavior of a fire at any given moment. It is important to note that wildland fire may transition to urban fire if structures are receptive to ignition. Structure ignition depends on a variety of factors and can be prevented through a layered system of protective features including fuel modification directly adjacent to the structure(s), application of known ignition resistive materials and methods, and suitable infrastructure for firefighting purposes. Understanding the existing wildland vegetation and urban fuel conditions on and adjacent to the Project site is necessary to understand the potential for fire within and around the El Camino Real Assisted Living Facility Project.

4.3 Vegetation (Fuels)

Based on species composition and general physiognomy, the El Camino Real Assisted Living Facility parcel supports four non-native vegetation communities/land cover types and one wetland community, including eucalyptus woodland, disturbed habitat, non-native woodland, urban/developed land, and arundo-dominated riparian. The 3.97-acre Assisted Living Facility parcel is currently undeveloped; however, in the past, the property was used for agriculture. Due to the previous agricultural uses, the subject property primarily consists of disturbed habitat. The site's

vegetation fire risk is primarily determined by project-adjacent vegetation that will be preserved in the open space directly adjacent to the site's brush management zones to the east. The growth of vegetation types/fuel models is influenced by aspect (orientation), soil constituents, soil depth, soil moisture, and weather. The vegetation occurring on the slopes adjacent to the site represents the site's fuel load, an important component of the site's wildfire risk assessment. The photographs in Appendix A display the fuels on and adjacent to the property. Please refer to the project's Biological Technical Report for further detail regarding the Vegetation communities were determined from a site visit by a Dudek Biologist (Dudek, 2022).

The vegetation communities and land cover types recorded on the property are described in detail below and their acreages are presented in Table 1. Their spatial distributions are presented on the Biological Resources Map (Figure 4). Vegetation communities present on the property are described first followed by descriptions of habitat located off-site but within the study area.

Table 1. Existing Vegetation/Land Cover Types

Vegetation Community	Acreage Onsite	Percentage
Disturbed Habitat	3.11	78.54%
Eucalyptus Woodland	0.79	19.95%
Non-Native Woodland	0.01	0.25%
Urban/Developed Land	0.02	0.51%
Arundo-Dominated Riparian	0.03	0.75%
Total:	**3.97**	**100.0%**

4.3.1 Disturbed Habitat/Land

Disturbed land comprises majority of the project site, the active construction site to the north of the project site, and small strips of land around the existing development to the south. Disturbed lands are areas which have been subject to extensive physical anthropogenic disturbance and as a result cannot be identified as a native or naturalized vegetation association. However, these areas typically still have a recognizable soil substrate. The existing vegetation is typically composed of non-native ornamental or exotic species (Oberbauer et al. 2008).

Although some stands of non-native vegetation occur within the disturbed land in the study area, historical aerial imagery shows that the project footprint and most of the land to the north has been used as active agricultural land within the past 5 years (Google Earth 2020). Most of the disturbed land within the study area has been recently mowed, graded or used to store heavy machinery and equipment associated with the construction of the St. John Garabed Church on the parcel to the north. This land cover is ranked as Tier IV and is not considered sensitive under the City's Biology Guidelines (City of San Diego 2018a).

4.3.2 Eucalyptus Woodland

Eucalyptus Woodland occurs in the far eastern portion of the project site, outside of the project footprint, and is contiguous with eucalyptus woodland in the larger study area. Eucalyptus Woodland, according to Oberbauer et al. (2008), includes eucalyptus species (*Eucalyptus globulus*, *E. camaldulensis*, or *E.* spp.) planted as trees, groves, and windbreaks that form thickets with minimal shrubby understory to scattered trees with a well-developed understory. In most cases however, eucalyptus trees form dense stands with closed canopies where the understory is either depauperate or absent owing to shade and the possible allelopathic (toxic) properties of the eucalyptus

leaf litter. Although eucalyptus woodlands are of limited value to most native plants and animals, they frequently provide nesting and perching sites for several raptor species.

The understory of the eucalyptus woodland in the study area is quite mixed and consists of poison oak (*Toxicodendron diversilobum*), tree tobacco (*Nicotiana glauca*), lemonadeberry, blue elderberry (*Sambucus nigra* ssp. *caerulea*), Canary Island date palm (*Phoenix canariensis*), and hottentot-fig (*Carpobrotus edulis*). Eucalyptus woodland is classified as a Tier IV vegetation community under the City's Biology Guidelines (City of San Diego 2018a).

4.3.3 Non-native Woodland

Non-native woodland occurs in a small portion on the northeastern edge of the project site and extends north of the site into the larger study area. This vegetation community refers to areas of exotic trees, usually intentionally planted, which are not maintained or artificially irrigated (Oberbauer et al. 2008).

There are scattered olive (*Olea europaea*) and Mexican fan palm (*Washingtonia robusta*) trees in this community with an understory of non-native weedy species like black mustard (*Brassica nigra*). This vegetation community is not listed in the City's Biology Guidelines (City of San Diego 2018a) but most closely matches ornamental plantings which is ranked as Tier IV.

4.3.4 Arundo-Dominated Riparian/Disturbed Wetland

Arundo-dominated riparian comprises one dense stand of giant reed (*Arundo donax*) south of the Eucalyptus woodland in the far eastern portion of the project site and the larger study area. Arundo-dominated riparian is composed of monotypic or nearly monotypic stands of giant reed that are fairly widespread in Southern California. Typically, it occurs on moist soils and in streambeds and may be related directly to soil disturbance or the introduction of propagates by grading or flooding.

This land cover is considered synonymous with disturbed wetland according to the City's Biology Guidelines (City of San Diego 2018a).

4.3.5 Urban/Developed Land

Within the study area, urban/developed land includes the existing residential neighborhood, church, parking lots, associated roadways and other human-made structures; a small portion of this community falls along the project site boundaries. According to Oberbauer et al. 2008, urban/developed land represents areas that have been constructed upon or otherwise physically altered to an extent that native vegetation communities are not supported. This land cover type generally consists of semi-permanent structures, homes, parking lots, pavement or hardscape, and landscaped areas that require maintenance and irrigation (e.g., ornamental greenbelts). Typically, this land cover type is unvegetated or supports a variety of ornamental plants and landscaping.

This land cover is not ranked under the City's Biology Guidelines (City of San Diego 2018a) but is assumed to be considered Tier IV.

Note: It is important to note that the "climax" vegetation condition was utilized in our fire behavior modeling efforts. The vegetation adjacent the project is considered to be absent from human disturbances and therefore allowed to establish plants and move toward a "climax" or historical community. The climax community on the north-facing

and east-facing slopes is coastal sage scrub. The climax community on the flatlands is a wetland or marsh plant community. Invasive species may alter that climax condition if they outcompete native plants.

Each vegetation community corresponds to a designated fuel model (pre-determined vegetation type, densities, and structural characteristics) for fire behavior modeling purposes. Dudek has classified each of the cover types that will remain off-site and/or adjacent to the building footprints into fuel models, as discussed further below. Site-adjacent vegetation is important relative to wildfire as some vegetation, such as brush and grassland habitats are highly flammable while other vegetation, such as wetland communities or forest understory, is less flammable due to its higher plant moisture content, compact structure, and available shading from overstory tree canopies. The off-site, adjacent areas that will not be converted will represent the fire threat and were modeled to aid fire protection planning for this site.

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SOURCE: SANGIS 2017

0 50 100 Feet

FIGURE 4

Existing Biological Resources

El Camino Real Assisted Living Facility - Fire Fuel Load Modeling Report

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4.4 Climate

Northern San Diego and the project area are influenced by the Pacific Ocean and are frequently under the influence of a seasonal, migratory subtropical high-pressure cell known as the "Pacific High." Wet winters and dry summers, with mild seasonal changes, characterize the Southern California climate. This climate pattern is occasionally interrupted by extreme periods of hot weather, winter storms, or dry, easterly Santa Ana winds. The average high temperature for the San Diego area is approximately 70°F, with average highs in the summer and early fall months (July–October) reaching 77°F. The average precipitation for the area is approximately 11.0 inches per year, with the majority of rainfall concentrated in the months of December (1.8 inches), January (2.1 inches), February (2.6 inches), and March (1.8 inches), while smaller amounts of rain are experienced during the other months of the year (Weather Spark, 2022).

The prevailing wind pattern is from the west (on-shore), but the presence of the Pacific Ocean causes a diurnal wind pattern known as the land/sea breeze system. During the day, winds are from the west–southwest (sea), and at night winds are from the northeast (land), averaging 2 miles per hour (mph). During the summer season, the diurnal winds may average slightly higher (approximately 16 mph) than the winds during the winter season due to greater pressure gradient forces. Surface winds can also be influenced locally by topography and slope variations. The highest wind velocities are associated with downslope, canyon, and Santa Ana winds.

Typically, the highest fire danger is produced by the high-pressure systems that occur in the Great Basin which results in the Santa Ana winds of Southern California. Sustained wind speeds recorded during recent major fires in San Diego County exceeded 30 mph and may exceed 50 mph during extreme conditions. The Santa Ana wind conditions are a reversal of the prevailing southwesterly winds that usually occur on a region-wide basis during late summer and early fall. Santa Ana winds are warm winds that flow from the higher desert elevations in the north through the mountain passes and canyons. As they converge through the canyons, their velocities increase. Consequently, peak velocities are highest at the mouths of canyons and dissipate as they spread across valley floors or mesas. The El Camino Real Assisted Living Facility project is less affected by Santa Ana winds due to its location near the coast. Winds funneled through mountains and onto the flat mesas dissipate and produce lower average wind conditions. The project's proximity to the coast will result in higher humidity and lower temperatures for most of the year. When Santa Ana winds blow in the fall, humidity may drop and temperatures rise, but they will remain high than those found in more inland locations and will provide an "insulating" effect that helps reduce the likelihood of catastrophic wildfire on all but the most sever Red Flag Warning days.

The wind information used for fire behavior modeling for this site includes actual data from a Remote Automated Weather Station (RAWS) located in a similar coastal location in San Diego County (Mission Valley RAWS Station).

4.5 Topography

Topography is generally flat in the central and western portion of the study area but a short, steep hill to the east of the project footprint drops into the MHPA and associated woodland, scrub and wetland habitats to the east. The elevation in the study area ranges from approximately 15 feet to 60 feet above mean sea level. The eastern boundary of the project footprint is located immediately adjacent to the MHPA and the 100-foot wetland buffer. The northern section of the 300-foot study area immediately north of the project footprint is currently an active construction site related to the St. John Garabed Church project. The entire project study area is within the City Coastal Zone (City of San Diego 2012).

Current land uses within and immediately surrounding the study area include existing single-family residential development, the Harvest Evangelical Church, an active construction site, El Camino Real and other neighborhood streets, sidewalks, traffic (vehicle and pedestrian), and open space associated with the MHPA to the east and the San Dieguito River Park to the west. Off-site, on the adjacent properties, terrain varies from flat to moderately steep. For instance, to the south and west, terrain is flat and is dominated by low intensity, flashy fuels. Short slopes to the north and east run down and away from the project and are up to 60%. However, these slopes are short in total run length, averaging about 75 total horizontal feet from top of slope to bottom and the slopes are vegetated with an inconsistent grass shrub community. Most of the disturbed land within the study area has been recently mowed, graded or used to store heavy machinery and equipment associated with the construction of the St. John Garabed Church on the parcel to the north.

Topography affects wildfire movement and spread. Steep terrain typically results in faster fire spread due to pre-heating (and drying) of uphill vegetation. Flat areas typically result in slower fire spread, absence of windy conditions. Topography may form unique conditions which result in concentrated winds or localized fire funneling, such as saddles, canyons, and chimneys (land formations that collect and funnel heated air upward along a slope). Similarly, terrain may slow the spread of fire. For example, fire generally moves slower downslope than upslope. Terrain may buffer or redirect winds away from some areas based on canyons or formations on the landscape. The occurrences of terrain features that may affect fire behavior on the Project site were analyzed and incorporated into the risk assessment and in the development of fire protection features.

4.6 Fire History

Fire history data provides valuable information regarding fire spread, fire frequency, ignition sources, and vegetation/fuel mosaics across a given landscape. Fire frequency, behavior, and ignition sources are important for fire response and planning purposes. One important use for this information is as a tool for pre-planning. It is advantageous to know which areas may have burned recently and, therefore, may provide a tactical defense position, or, what type of fire burned on the site, and how a fire may spread. According to available data from the California Department of Forestry and Fire Protection's (CAL FIRE) Fire and Resource Assessment Program (FRAP 2022), approximately sixteen (16) fires have burned within 5 miles of the project area since the beginning of the historical fire data record (Refer to Appendix B, *Fire History Map*). These fires occurred between 1943 and 2014. The largest fire was the 2007 Witch Fire which was approximately 197,990 acres and occurred approximately 4.0 miles northeast of the project site. The average fire size was approximately 15,860 acres (including the 2007 Witch Fire) and approximately 3,485.7 acres (excluding the 2007 Witch Fire). There have been no fires in the historical record that burned onto the El Camino Real Assisted Living Facility Project site. The San Diego Fire and Rescue Department (SDFRD) may have data regarding smaller fires (less than 10 acres) that have occurred near the site that are not included in CAL FIRE's dataset.

Based on an analysis of the fire history data set, specifically, the years in which the fires burned, the average interval between wildfires burning within a 5-mile radius of the project site was calculated to be approximately 4 years with intervals ranging between 0 (multiple fires in the same year) and 24 years. Based on this analysis, along with changes in the watershed (fireshed) over the last few decades that resulted in conversion of fuels to lower flammability urbanization, the area is not expected to be subject to regular wildfire, but may burn during extreme weather conditions. The proximity of the project site to El Camino Real and I-5 to the west provide potential for roadway caused ignitions. However, typical weather and wetland fuels in the area includes higher humidity, cooler temperatures, and higher fuel moistures, which would tend to produce less aggressive wildfires, as indicated during fire behavior modeling efforts.

4.7 Analysis of Wildfire Risk - New Development

Humans (i.e., human related activities or human created features, services (i.e., powerlines and electrical equipment), or processes) are responsible for the majority of California wildfires (Syphard et al. 2007, 2008; Romero-Calcerrada et al. 2008). Certain human activities result in sparks, flames, or heat that may ignite vegetative fuels without proper prevention measures in place. In addition to these ignition sources, roadways are a particularly high source of wildfire ignitions due to high usage and vehicle-caused fires (catalytic converter failure, overheated brakes, dragging chains, tossed cigarette, and others) (Romero-Calcerrada et al. 2008)). In Southern California, the population living at, working in, or traveling through the wildland urban interface ~~is vast and~~ provides an ~~significant~~ opportunity for ignitions ~~every day~~. However, it is a relatively rare event when they cause a wildfire ~~occurs~~, and an even rarer event when a wildfire escapes initial containment efforts. Approximately 90 to 95 percent of wildfires are controlled below 10 acres (CAL FIRE 2019).

Research indicates that the type of contained development project like the El Camino Real Assisted Living Facility Project, are not associated with increased vegetation ignitions. Syphard and Keeley (2015) summarize all wildfire ignitions included in the CALFIRE Fire and Resource Assessment Program (FRAP) database dating back over 100 years. They found that equipment-caused fires were by far the most numerous – and these also accounted for most of the area burned – followed closely by the area burned by above-ground powerline fires. Ignitions classified as equipment caused frequently resulted from exhaust or sparks from power saws or other equipment with gas or electrical motors, such as lawn mowers, trimmers or tractors and associated with lower density housing. In San Diego County, and in areas like the open space areas near the Project site, ignitions were more likely to occur close to roads and structures, and at intermediate density land uses and structure densities.

As Figures 5 through 7 illustrate, new development directly influences susceptibility to fire because in high density projects, there is one interface (the Project perimeter) with the wildlands whereas lower density development creates more structural exposure to wildlands, less or no ongoing landscape maintenance (an intermix rather than interface), and consequently more difficulty for limited fire resources to protect well-spaced buildings. The intermix includes development amongst the unmaintained fuels whereas the proposed Project converts all fuels within the footprint and provides a wide, managed fuel modification zone and code-exceeding mitigations, separating the building from unmaintained fuel and creating a condition that makes defense easier. Syphard and Keeley go on to state that “The WUI, where housing density is low to intermediate is an apparent influence in most ignition maps,” further enforcing the conclusion that lower density housing/development poses a higher ignition risk than higher density development. They also state that “Development of low-density, exurban housing may also lead to more homes being destroyed by fire” (Syphard et al. 2013). A wildland urban intermix area already exists south and east of the Project, dominated by older, more fire-vulnerable structures, likely constructed before stringent fire code requirements were imposed, with varying levels of maintained fuel modification buffers. The Project site is a planned ignition—resistant facility designed to include professionally managed and maintained fire protection components, and modern fire code compliant safety features that will greatly reduce the hazard of fire spreading from the wildlands to the Project or from the Project to the adjacent wildlands. The conversion of the land within the current Project footprint to the proposed condition ~~to~~ will result in an ignition-resistant structure and project perimeter. Therefore, the development of the Project would not be expected to materially increase the risk of vegetation ignitions and would rather be expected to have reduced ignition potential compared to the adjacent area’s current condition of low-density residential development.

Figure 5. Example higher density development. Homes are ignition resistant and excludes readily ignitable vegetative fuels throughout and provides a perimeter fuel modification zone. This type of new development requires fewer fire resources to defend and can minimize the likelihood of on-site fires spreading off-site.

Figure 6. Example of "moderate density" development. Homes are located on larger properties and include varying levels of ignition resistance and landscape / fuel modification provision and maintenance. This type of development results in a higher wildland exposure level for all homes and does not provide the same buffers from wildfire encroaching onto the site, or starting at a structure and moving into the wildlands as a higher density project.

Figure 7. Example of "lower density" development. Homes are interspersed amongst wildland fuels, are of varying ages, and include varying levels of fuel modification zone setbacks. Homes are exposed on most or all sides by flammable vegetation and properties rely solely on owners for maintenance, are often far distances from the nearest fire station, and have minimal buffer from on-site fire spreading to wildlands.

Moreover, frequent fires and lower density housing growth may lead to the expansion of highly flammable exotic grasses that can further increase the probability of ignitions (Keeley et al. 2012). This is not the case with the Proposed Project as the landscape areas shall be managed and maintained to remove exotic fuels that may establish over time consistent with Compliance Measure ~~(~~CM-BIO-1 for the Project~~)~~. CM-BIO-1 is required for Project compliance with the City of San Diego Multiple Habitat Planning Area (MHPA) Land Use Adjacency Guidelines (City of San Diego 1997):

CM-BIO-1: The Assisted Living Facility shall adhere to and implement the following mandatory measures contained in the MHPA Land Use Adjacency Guidelines (City of San Diego 1997):

- **Drainage**: The proposed parking lots and developed areas in and adjacent to the preserve must not drain directly into the MHPA. All developed and paved areas must prevent the release of toxins, chemicals, petroleum products, exotic plant materials and other elements that might degrade or harm the natural environment or ecosystem processes within the MHPA. This can be accomplished using a variety of methods including natural detention basins, grass swales or mechanical trapping devices. These systems should be maintained approximately once a year, or as often as needed, to ensure proper functioning. Maintenance should include dredging out sediments if needed, removing exotic plant materials, and adding chemical-neutralizing compounds (e.g., clay compounds) when necessary and appropriate.

- **Toxics/Project Staging Areas/Equipment Storage**: Land uses, such as recreation and agriculture, that use chemicals or generate by-products such as manure, that are potentially toxic or impactive to wildlife, sensitive species, habitat, or water quality need to incorporate measures to reduce impacts caused by the application and/or drainage of such materials into the MHPA. Such

measures should include drainage/detention basins, swales, or holding areas with non-invasive grasses or wetland-type native vegetation to filter out the toxic materials. Regular maintenance should be provided. Where applicable, this requirement should be incorporated into leases on publicly owned property as leases come up for renewal.

As discussed above, research indicates that it is less likely for higher density developments to be impacted by wildfires than lower density developments. The same protections that starve wildfire of fuels and minimize or prevent wildfire from transitioning into a contained, fuel-converted Project, such as this Project, also serve to minimize or prevent on-site fires from transitioning into the wildlands. Customized project Brush Management Zones are crucial as the strategic design and placement of fuels treatments can disrupt or slow fire spread, reduce fire intensity, and facilitate fire suppression within a landscape (Braziunas et al., 2021). This is true regardless of the direction a vegetation fire may be burning – whether toward a development and/or community or from within a development and/or community. The risk of a structure being destroyed is significantly lower when defensible space/BMZs are implemented on both shallow and steep properties (Syphard et al., 2014). Even if just half the landscape is treated, the percentage of structures exposed to fire can decrease from 51% to 16% (Braziunas et al., 2021). Moreover, when BMZs are designed properly, they not only protect structures but also the surrounding environment. For example, when the Tahoe Basin experienced the Angora Fire in 2007, fuel treatments had the dual effect of saving homes and increasing forest survival. (Safford et al., 2009.) In areas where fuel management had been carried out prior to the Angora Fire, home loss was significantly reduced in the adjacent community and 85% of the trees survived, as compared to the 22% that survived in untreated areas. (Safford et al., 2009.) Fuel management treatments also facilitated the ecological benefit of reduced fire severity, including higher post-fire soil litter cover, higher herbaceous plant cover, higher diversity, and lower levels of invasive beetles. (Safford et al., 2009.) At a minimum, managing defensible space can reduce risk across multiple scales by damping fire risk, reducing the impact of fire, and in turn reducing annual fire risk. (Braziunas et al., 2021.)

Further, the requirement that the Assisted Living Facility structure will include the installation of an automatic interior fire sprinkler system in accordance with ~~(~~CM-FIRE-2~~)~~ significantly reduces the likelihood that a building fire spreads to the point of flashover, where a structure will burn beyond control and produce embers. The NFPA 13 automatic sprinkler system will be installed in accordance with Section 903.3.1.1 (including subsections 903.3.1.1.1 and 903.3.1.1.2) of the 2019 CFC. Interior sprinklers are very efficient, keeping fires to the room of origin, or extinguishing the fire before the responding firefighters arrive. Similarly, the irrigated brush management zones are positioned around the perimeter of the facility. Irrigated zones include plants with high internal moisture and spacing between plants and plant groups that 1) make it difficult to ignite and 2) make it difficult for fire to spread plant to plant. Further, much of the project area will be converted to non-combustible paved surfaces where no fires can ignite or spread. Lastly, the additional humans on the site result in fast detection of fires and fast firefighter response, a key in limiting the growth of fires beyond the incipient stage.

4.8 Off-site Wildfire Impacts

It is a relatively rare event when a wildfire occurs, and an even rarer event when a wildfire escapes initial containment efforts. Approximately 90 to 95% of wildfires are controlled below 10 acres (CAL FIRE 2019). Studies (Keeley & Syphard 2018; Syphard et al. 2007; Syphard & Keeley 2015) show the ignition resistance and fire safety awareness of the Project and its population influences the likelihood of fire ignitions and the potential for fire to spread off-site into adjacent wildland fuels and negatively impact existing communities. As the research indicates, humans can drive wildfire ignition risk, but not discussed, they can also reduce it. When fire protection is implemented at the

parcel level and leverages ignition resistant building materials, infrastructure improvements, and landscape design, the wildfire risk can be significantly reduced in the surrounding environment (Newman et al., 2013). When wildfire is planned for and incorporated into the building design, such as with the Project, it can not only withstand wildfire, but prevent it. This prevention benefits the Project and the surrounding areas by reducing the landscape level fire risk. Further, given the Project's multi-scaled approach to fire protection, ~~it is unlikely that~~ the Project would not be a substantial source of ignitions or~~and~~ result in increased off-site impacts related to wildfire, as discussed herein.

Common on-site or nearby ignition sources in southern California are related to overhead powerlines and vehicles (Keeley & Syphard, 2018). Powerlines-based ignitions are a concern with respect to off-site wildfire impacts. The remaining highest likelihood of vegetation ignitions in the Project area would be related to existing roadways such as El Camino Real to the west and the interior roadways of the community to the south. However, as the site plan shows, the Project provides an all-irrigated landscape and non-combustible hardscape areas throughout the development site, which will be well-maintained with drought-tolerant, fire-resistant plant species (PDF-FIRE-2). Ongoing maintenance of these irrigated landscapes will continue in perpetuity as part of the Project. These efforts reduce or minimize the ability for an on-site or nearby vehicle-–related spark, catalytic converter failure, or other ignition source to ignite and spread fire from the roadsides towards the Project. Furthermore, the existing roadways leading to the Project site are generally void of easily ignitable vegetation, reducing the overall fire risk. The Project does not propose or require the addition of new roadways into the Project site.

Regarding other potential on-site ignition sources, all fire pit and BBQ areas are proposed as propane/natural gas only (no wood-burning), and would be located on non-combustible surfaces; no wood-burning fire places or BBQ areas will be allowed on-site. Per assisted living facility standards, no smoking is permitted on the grounds and Conditions of Approval require posting of No Smoking signage throughout the outdoor areas of the Project to ensure all residents and visitors are aware of this restriction. ~~Potential fire risks exist within and adjacent to the Project facility, however, T~~through Project design and measures contained in this report, impacts would not rise to the level of significance. The Project is not expected to significantly increase the already known fire risk associated with existing roads and in fact the Project- and road-adjacent brush management along El Camino Real would aid in reducing the preexisting risk. Interior roadways such as the driveways, parking and loading areas, and the fire access lane are also not expected to result in significant vehicle ignitions. The on-site roadways would comply with all fire department access requirements and be encompassed by the ignition-resistant construction of the building, non-combustible paved surfaces, and irrigated landscaping. Therefore, even if ignition were to occur on the Project interior roadways it is highly unlikely, and less likely than current conditions,~~.~~ that it would spread beyond the Project site due to the level of hardscape and the adjacent BMZ areas.

Reducing WUI exposure can address protection of a wide range of highly valued resources and can offer protection to critical resources, habitat communities, and landscapes (Scott et al., 2016). Despite the potential for more frequent fire ignitions from developments, when developments are planned accordingly, such as the Project, the fuel availability and fuel continuity decrease, while the probability of fire suppression increases (Fox et al., 2018). This is a result of planned alterations to fuel, increased ignition–resistant construction, enhanced fire protection features, higher wildfire risk awareness, and maintenance of fire protection features. The dual benefit of building a fire-hardened project, like the El Camino Real Assisted Living Facility, is that the same features that protect the development from a wildfire also play a significant role in protecting wildlands and surrounding areas from Project-related fires.

4.9 Fire Behavior Modeling

4.9.1 Fire Behavior Modeling Background

Fire behavior modeling has been used by researchers for approximately 50+ years to predict how a fire will move through a landscape given specified fuels, terrain, and weather (Linn 2003). The models have had varied complexities and applications throughout the years. One model has become the most widely used for predicting fire behavior on a given landscape. That model, known as "Behave," was developed by the U.S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. Since that time, it has undergone continued research, improvements, and refinement. The current version, BehavePlus 6.0, includes the latest updates incorporating years of research and testing. Numerous studies have been completed testing the validity of the fire behavior models' ability to predict fire behavior given site-specific inputs. One of the most successful ways the model has been improved has been through post-wildfire modeling (Brown 1972; Lawson 1972; Sneeuwjagt and Frandsen 1977; Andrews 2005; Brown 1982; Rothermel and Rinehart 1983; Bushey 1985; McAlpine and Xanthopoulos 1989; Grabner et al. 1994; Marsden-Smedley and Catchpole 1995; Grabner 1996; Alexander 1998; Granber et al. 2001; Arca et al. 2005). In this type of study, Behave is used to model fire behavior based on pre-fire conditions in an area that has recently burned. Real-world fire behavior, documented during the wildfire, can then be compared to the prediction results of Behave and refinements to the fuel models incorporated, retested, and so on.

Fire behavior modeling conducted on the site includes a relatively high level of detail and analysis which results in reasonably accurate representations of how wildfire may move through available fuels on and adjacent to the property. Fire behavior calculations are based on site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths, spread rates, and fireline intensities, the analysis incorporated predominant fuel characteristics, slope percentages, and representative fuel models observed on site. The BehavePlus fire behavior fuel modeling system[1] was used to analyze anticipated fire behavior within and adjacent to key areas just outside of the proposed BMZs.

As Rothermel[2] summarized, predicting wildland fire behavior is not an exact science. As such, the movement of fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful fire prevention and protection planning information. To be used effectively, the basic assumptions and limitations of BehavePlus must be understood.

- First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is dead fuels less than one-quarter inch in diameter. These are the fine fuels that carry fire. Fuels greater than one inch have little effect while fuels greater than three inches have no effect on fire behavior.
- Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within six feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.

[1] Andrews, Patricia L., Collin D. Bevins, and Robert C. Seli. 2004. BehavePlus fire modeling system, version 3.0: User's Guide. Gen. Tech. Rep. RMRS-GTR-106 Ogden, UT: Department of Agriculture, Forest Service, Rocky Mountain Research Station. 132p.
[2] Rothermel, R.C. 1983. How to Predict the Spread and Intensity of Forest and Range Fires. USDA Forest Service Gen. Tech. Report INT-143. Intermountain Forest and Range Experiment, Ogden, UT.

- Third, the software assumes that weather and topography are uniforms. However, because wildfires almost always burn under non-uniform conditions, the length of the projection period and choice of fuel model must be carefully considered to obtain useful predictions.
- Fourth, the BehavePlus fire behavior computer modeling system was not intended for determining sufficient fuel modification zone/defensible space widths. However, it does provide the average length of the flames, which is a key element for determining "defensible space" distances for minimizing structure ignition.

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

The seven fuel characteristics help define the 13 standard fire behavior fuel models[3] and the five more recent custom fuel models developed for Southern California[4]. According to the model classifications, fuel models used in BehavePlus have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface to volume ratio. Observation of the fuels in the field (on-site) determines which fuel models should be applied in modeling efforts. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models (SCAL):

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

In addition, the aforementioned fuel characteristics were utilized in the development of 40 new fire behavior fuel models[5] developed for use in BehavePlus modeling efforts. These new models attempt to improve the accuracy of the standard 13 fuel models outside of severe fire season conditions and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the new 40 fuel models:

- Non-Burnable Models NB1, NB2, NB3, NB 8, NB9

[3] Anderson, Hal E. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. USDA Forest Service Gen. Tech. Report INT-122. Intermountain Forest and Range Experiment Station, Ogden, UT.
[4] Weise, D.R. and J. Regelbrugge. 1997. Recent chaparral fuel modeling efforts. Prescribed Fire and Effects Research Unit, Riverside Fire Laboratory, Pacific Southwest Research Station. 5p.
[5] Scott, Joe H. and Robert E. Burgan. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

- Grass Models GR1 through GR9
- Grass Shrub Models GS1 through GS4
- Shrub Models SH1 through SH9
- Timber Understory Models TU1 through TU5
- Timber Litter Models TL1 through TL9
- Slash Blowdown Models SB1 through SB4

BehavePlus software was used in the development of the El Camino Real Assisted Living Facility Project Fuel Load Modeling Report (FFLMR) in order to evaluate potential fire behavior for the wildland adjacent to the project site. Existing site conditions were evaluated, and local weather data was incorporated into the BehavePlus modeling runs.

4.9.2 Fire Behavior Modeling Approach

Dudek utilized the BehavePlus software package to analyze fire behavior potential for the project site. Refer to Figure ~~6~~8, *Fire Behavior Modeling Map* for fire modeling scenario locations. As is customary for this type of analysis, five fire scenarios were evaluated, including two Summer, onshore weather condition (northwest and southwest from the project site), and three extreme Fall, offshore weather condition (north, east, and southeast of the project site) models. Fuels and terrain beyond that distance can produce flying embers that may affect the Project, but the structure and surrounding landscape will be built to extreme ignition and ember resistant standards which will minimize the possibility of ignition. It is the fuels next to the BMZs and within the BMZs that would have the potential to affect the project's structure from a radiant and convective heat perspective as well as from direct flame impingement but based on the site's terrain, the all-irrigated BMZ Zone 1 and hardscape, the vertical separation between vegetative fuels and the site's structures is significant.

BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The output variables used in this analysis include flame length (feet), rate of spread (feet/minute), fireline intensity (BTU/feet/second), and spotting distance (miles). The following provides a description of the input variables used in processing the BehavePlus models for the project site. In addition, data sources are cited, and any assumptions made during the modeling process are described.

4.9.2.1 Vegetation (Fuels)

To support the fire behavior modeling efforts conducted for the FFLMR, the different vegetation types observed adjacent to the site were classified into the aforementioned numeric fuel models. As is customary for this type of analysis, the terrain and fuels directly adjacent to the property are used for determining flame lengths and fire spread. It is these fuels that would have the potential to affect the project's structures from a radiant and convective heat perspective as well as from direct flame impingement.

Vegetation types were derived from a site visit that was conducted in November 2022 by a Dudek Fire Protection Planner as well as based on the Vegetation Communities outlined in the project's Biological Technical Report (Dudek, 2022). Based on the site visit, eight different fuel models were used in the fire behavior modeling effort presented herein to describe the existing vegetation; one more fuel model was used in the fire modeling efforts to

describe the anticipated vegetation after the brush management zones (BMZs) are in place. Fuel model attributes are summarized in Tables 2 and 3. Modeled areas include a small eucalyptus/riparian forest area within the MHPA area east of the development (Fuel Model Tu2 = Moderate load, humid climate timber-shrub). Mature tree canopies for existing eucalyptus trees are assumed to have a canopy base height of approximately 20 feet off the ground. Canopy bulk density, the weight of canopy fuels per cubic foot of volume, is assumed to be the maximum allowable value in BehavePlus to represent broadleaf trees which, given canopy density and leaf size, have more weight per area than conifer trees (the standard for this value input in BehavePlus (Heinsch and Andrews 2010)). Foliar moisture, the moisture content of canopy foliage, is assumed to be 100%, a reasonable estimate in lieu of site-specific data (Scott and Reinhardt 2001).

Table 2: Existing Fuel Model Characteristics

Fuel Model	Description	Location	Fuel Bed Depth (Feet)
Gr2	Low Load, Dry Climate Grass	Represents the vegetation communities located in the open space areas north/northwest of the project site without maintenance.	<2.0 ft.
Gs1	Low Load, Dry Climate Grass-shrub	Represents the vegetation communities located in the open space areas northwest of the project site without maintenance.	<1.0 ft.
Gs2	Moderate Load, Dry Climate Grass-shrub	Represents the vegetation communities located throughout the nearby areas surrounding the project site without maintenance.	<2.0 ft.
Sh2	Moderate load, dry climate shrub	Represents the vegetation communities located throughout the nearby areas surrounding the project site without maintenance.	<3.0 ft.
Sh3	Moderate load, humid climate shrub	Represents the understory within the eucalyptus woodland/riparian habitat that exists east of the project.	>3.0 ft.
Sh4	Low load, humid climate timber-shrub	Represents the eucalyptus woodland/riparian habitat that exists northwest of the project site	>8.0 ft.
Sh5	High Load, Dry Climate Shrub	Represents the vegetation communities located throughout the nearby areas surrounding the project site without maintenance	>4.0 ft.
Tu2	Moderate load, humid climate timber-shrub	Represents the understory within the eucalyptus woodland/riparian habitat that exists east of the project.	>3.0 ft.

Dudek also conducted modeling of the site for post-Brush Management Zones' (BMZ) recommendations for this proposed project (Refer to Table 3 for post-BMZ fuel model descriptions). Brush management includes establishment of an irrigated zone on the periphery of the development as well as interior landscape requirements. For modeling the post-BMZ treatment condition, fuel model assignment was re-classified for the BMZs 1 (FM 8).

Table 3. Post-development Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
8	Compact litter	Brush Management Zone 1: irrigated landscape and hardscape parking areas	<1.0 ft.

The results of the analysis were utilized in generating the Brush Management Zone maps. The analysis models fire behavior outside of proposed BMZs (off-site) as these areas would be the influencing wildfire areas post-development of the site. The following section presents the fire weather and fuel moisture inputs utilized for the fire behavior modeling conducted for the project.

4.9.2.2 Topography

Slope is a measure of an angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or downhill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. Slope values ranging between 3 to 6% were measured around the perimeter of the proposed project site from U.S. Geological Survey (USGS) topographic maps. Slope gradients for landscape areas are assumed to be flat (less than 3%) or 50% (2:1 Manufactured slopes), as presented on the project's site plan.

4.9.2.3 Weather Analysis

Historical weather data for the San Diego region was utilized in determining appropriate fire behavior modeling inputs for the project area fire behavior evaluations. To evaluate different scenarios, data from both the 50th and 97th percentile moisture values were derived from a Remote Automated Weather Station (RAWS) and utilized in the fire behavior modeling efforts conducted in support of the report. Weather data sets from the Mission Valley RAWS[6] were utilized in the fire modeling runs.

RAWS fuel moisture and wind speed data were processed utilizing the Fire Family Plus software package to determine atypical (97th percentile) and typical (50th percentile) weather conditions. Data from the RAWS was evaluated from August 1 through November 30 for each year between 2016 and 2020 (extent of available data record) for 97th percentile weather conditions and from June 1 through September 30 for each year between 2016 and 2020 for 50th percentile weather conditions.

Following analysis in Fire Family Plus, fuel moisture information was incorporated into the Initial Fuel Moisture file used as an input in BehavePlus. Wind speed data resulting from the Fire Family Plus analysis was also determined. Initial wind direction and wind speed values for the two BehavePlus runs were manually entered during the data input phase. The input wind speed and direction is roughly an average surface wind at 20 feet above the vegetation over the analysis area. Table 4 summarizes the wind and weather input variables used in the Fire BehavePlus modeling efforts.

Table 4: Variables Used for Fire Behavior Modeling

Model Variable	Summer Weather (50th Percentile)	Peak Weather (97th Percentile)
Fuel Models	Gr2, Gs1, Sh2, & Sh5	Gr2, Gs2, Sh2, Sh3, Sh4, Sh5, & Tu2
1 h fuel moisture	8%	2%
10 h fuel moisture	9%	4%
100 h fuel moisture	15%	8%

[6] https://wrcc.dri.edu/cgi-bin/rawMAIN.pl?caCMVA
Latitude: 32.783191 Longitude: -117.136046; Elevation: 300 ft.)

Model Variable	Summer Weather (50th Percentile)	Peak Weather (97th Percentile)
Live herbaceous moisture	58%	30%
Live woody moisture	117%	60%
20 ft. wind speed	12 mph (sustained winds)	14 mph (sustained winds); wind gusts of 50 mph
Wind Directions from north (degrees)	230 & 300	30, 90, and 165
Wind adjustment factor	0.4	0.4
Slope (uphill)	3 to 4%	3 to 6%

4.9.2.4 BehavePlus Fire Behavior Modeling Effort

As mentioned, the BehavePlus fire behavior modeling software package was utilized in evaluating anticipated fire behavior adjacent to the project site. Five focused analyses were completed, each assuming worst-case fire weather conditions for a fire approaching the project site from the north, northwest, east/northeast, southeast, and southwest. The results of the modeling effort included anticipated values for surface fires (flame length (feet), rate of spread (mph), and fireline intensity (Btu/ft/s)) and crown fires (critical surface intensity (Btu/ft/s), critical surface flame length (feet), transition ratio (ratio: surface fireline intensity divided by critical surface intensity), transition to crown fire (yes or no), crown fire rate of spread (mph), crown fire flame length (feet), and fire type (surface, torching, conditional crown, or crowning)) for a fire going through the small eucalyptus woodland/riparian area east of the project site. The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2008). Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in the initial attack and fire suppression efforts (Rothermel and Rinehart 1983). Spotting distance is the distance a firebrand or ember can travel downwind and ignite receptive fuel beds. Five fire modeling scenario locations were selected to better understand the different fire behavior that may be experienced on or adjacent to the site based on slope and fuel conditions; these four fire scenarios are explained in more detail below:

- **Scenario 1:** A summer, on-shore fire (50th percentile weather condition) burning in low load grass-grass shrub vegetation northwest of the project site. The terrain is flat (approximately 4% slope) with potential ignition sources from embers spotting in the already graded area or from a vehicle fire originating on I-5 or El Camino Real. This type of fire would be of low intensity and typically spread slowly towards the project site.

- **Scenario 2:** A fall, off-shore fire (97th percentile weather condition) burning in low to high load grass-grass shrub vegetation north of the project site. The terrain is flat (approximately 3% slope) with potential ignition sources from embers spotting in the vegetated area or from a vehicle fire originating on El Camino Real. This type of fire would typically spread moderately fast before reaching the developed portion of the project site.

- **Scenario 3:** A fall, off-shore fire (97th percentile weather condition) burning in moderate to high load shrub and chaparral dominated vegetation with a small intermix of non-native grassland located north/northeast of the project development. The terrain is flat (approximately 5% slope) with potential

ignition sources from embers spotting in the vegetated area or from a vehicle fire originating on El Camino Real. This type of fire would typically spread moderately fast before reaching the developed portion of the project site.

- **Scenario 4:** A fall, off-shore fire (97th percentile weather condition) burning through the approximately 30-foot tall eucalyptus tree woodland and riparian habitat area east of the proposed project site. The terrain is flat (up to 6% slope) with tall eucalyptus trees and potential ignition sources from a structure fire in the adjacent single-family community to the south and further east or from embers from a wildland fire from the east/northeast of the proposed development. This type of fire would typically spread through the high moisture understory of the eucalyptus forest slowly with the potential of embers igniting the canopies of the eucalyptus trees.

- **Scenario 5:** A summer, on-shore fire (50th percentile weather condition) burning in moderate to high load shrub and chaparral dominated vegetation with a small intermix of non-native grassland located southeast of the Project development. The terrain is flat (approximately 3% slope) with potential ignition sources from embers spotting in the naturally-vegetated area or from a vehicle fire originating on I-5 or El Camino Real. This type of fire would be of low intensity and typically spread slowly towards the project site.

4.9.2.5 BehavePlus Fire Behavior Modeling Results

The results presented in Tables 5 and 6 depict values based on inputs to the BehavePlus software and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in the 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 will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

As presented in Table 5, wildfire behavior on the project site is expected to be primarily of low intensity throughout the non-maintained surface shrub and chaparral dominated fuels within the eucalyptus woodland area/eucalyptus trees east of the project site. Worst-case fire behavior from the eucalyptus tree woodland is expected under peak weather conditions (represented by Fall Weather, Scenario 4), while worst-case surface fire behavior is expected under peak weather conditions within the non-maintained shrubs and chaparrals vegetated areas (represented by Scenario 3). The fire is anticipated to be a wind-driven fire from the east/northeast during the fall. Under such conditions, expected surface flame length could potentially reach approximately 41 feet with wind speeds of 50+ mph. Under this scenario, fireline intensities reach 18,090 BTU/feet/second with moderate spread rates of 6.1 mph and could have a spotting distance up to 2.3 miles away. Because embers could spot within 2.3 miles of the project site, a crown fire could potentially occur within the small eucalyptus woodland area located approximately 150 feet east of the developed portion of the project site. Potential crown fire flame lengths could reach 100 feet or more with wind gusts of 50+ mph.

Wildfire behavior in non-maintained shrubs and chaparral southwest of the project site, modeled as Sh2 and Sh5 being fanned by 14 mph sustained, on-shore winds. Fires burning from the west/northwest and pushed by ocean breezes typically exhibit less severe fire behavior due to lower wind speeds and higher humidity. Under typical onshore weather conditions, a moderate- to- high-load shrub/chaparral vegetation fire could have flame lengths between approximately 4 feet and 12 feet in height and spread rates between 0.2 and 0.5 mph. Spotting distances, where airborne embers can ignite new fires downwind or within the small eucalyptus woodland area east of the developed portion of the project site, range from 0.2 to 0.4 miles.

Based on the BehavePlus analysis, post development fire behavior expected in the hardscape/irrigated and replanted with plants that are acceptable with the San Diego Fire-Rescue Department (SDFRD) (BMZ Zone 1 – FM8) under peak weather conditions (represented by Fall Weather, Scenario 2) is presented in Table 6. Under such conditions, expected surface flame length is expected to be significantly lower, with flames lengths reaching approximately 3 feet with wind speeds of 50+ mph. Under this scenario, fireline intensities reach 45 BTU/feet/second with relatively slow spread rates of 0.2 mph and could have a spotting distance up to 0.3 miles away. The El Camino Real Assisted Living Facility Project is less affected by Santa Ana winds due to its location near the coast. The project's proximity to the coast will result in higher humidity and lower temperatures for most of the year. When Santa Ana winds blow in the fall, humidity may drop and temperatures rise, but they will remain high than those found in more inland locations and will provide an "insulating" effect that helps reduce the likelihood of catastrophic wildfire on all but the most sever Red Flag Warning days. Therefore, the modified BMZ along with acceptable alternative/mitigated materials and methods of construction proposed for the El Camino Real Assisted Living Facility Project would provide adequate defensible space to augment a wildfire approaching the perimeter of the project site.

Table 5: RAWS BehavePlus Fire Behavior Model Results – Existing Conditions

Fire Scenario	Flame Length[1] (feet)	Spread Rate[1] (mph[3])	Fireline Intensity[1] (Btu/ft/s)	Spot Fire[1] (miles)	Surface Fire to Tree Crown Fire	Tree Crown Fire Rate of Spread (mph)	Crown Fire Flame Length (feet)
Scenario 1: 4% slope; Summer onshore wind from the northwest with 12 mph sustained winds (50th percentile)							
Low load, dry climate grass (Gr2)	4.3’	0.4	136	0.2	N/A	N/A	N/A
Low load, dry climate grass-shrub (Gs1)	1.4’	0.1	11	0.1	N/A	N/A	N/A
Scenario 2: 3% slope; Fall offshore extreme wind from the N with 14 mph sustained winds (50+ mph gusts) (97th percentile)							
Low load, dry climate grass (Gr2)	7.7’ (14.1’)[4]	1.1 (4.2)	479 (1,791)	0.3 (1.1)	N/A	N/A	N/A
Moderate load, dry climate grass-shrub (Gs2)	8.1’ (18.8’)	0.6 (3.8)	540 (3,337)	0.3 (1.3)	N/A	N/A	N/A
Moderate load, dry climate Chaparral scrub (Sh2)	6.8’ (15.0’)	0.2 (0.9)	371 (2,048)	0.3 (1.1)	N/A	N/A	N/A
High load, dry climate Chaparral scrub (Sh5)	20.6’ (40.9’)	1.4 (6.1)	4,092 (18,090)	0.6 (2.3)	N/A	N/A	N/A
Scenario 3: 5% slope; Fall offshore extreme wind from the E with 14 mph sustained winds (50+ mph gusts) (97th percentile)							
Moderate load, dry climate grass-shrub (Gs2)	8.1’ (18.8’)	0.6 (3.8)	540 (3,337)	0.3 (1.3)	N/A	N/A	N/A
Moderate load, dry climate Chaparral scrub (Sh2)	6.8’ (15.0’)	0.2 (0.9)	371 (2,048)	0.3 (1.1)	N/A	N/A	N/A
High load, dry climate Chaparral scrub (Sh5)	20.6’ (40.9’)	1.4 (6.1)	4,089 (18,087)	0.6 (2.3)	N/A	N/A	N/A
Scenario 4: 6% slope; Fall offshore extreme wind from the SE with 14 mph sustained winds (50+ mph gusts) (97th percentile)							
Moderate load, humid climate timber-shrub (Tu2)	5.1’ (11.5’)	0.3 (1.6)	195 (1,155)	0.4	No	0.7 (4.1)	81.4
Moderate load, humid climate shrub (Sh3)	3.4’ (6.9’)	0.1 (0.4)	81 (382)	0.4	No[2]	0.7 (4.1)	82.1’
Eucalyptus woodland/Riparian Habitat (Sh4)	10.3’ (23.1’)	0.7 (4.1)	912 (5,228)	0.4	Yes[2]	0.7 (4.1)	84.0’
Scenario 5: 3% slope; Summer onshore wind from the southwest with 12 mph sustained winds (50th percentile)							
Moderate load, dry climate grass-shrub (Gs2)	3.4’	0.2	82	0.2	N/A	N/A	N/A
Moderate load, dry climate Chaparral scrub (Sh2)	1.4’	0.0	11	0.1	N/A	N/A	N/A
High load, dry climate Chaparral scrub (Sh5)	11.6’	0.5	1,164	0.4	N/A	N/A	N/A

Note:

1. Wind-driven surface fire.

2. Crowning= fire is spreading through the overstory crowns.
3. MPH=miles per hour
4. Spotting distance from a wind-driven surface fire; it should be noted that the wind mph in parenthesis represent peak gusts of 50 mph.

Table 6: RAWS BehavePlus Fire Behavior Model Results – Post BMZ Conditions

Fire Scenario	Flame Length (feet)	Spread Rate (mph)[1]	Fireline Intensity (Btu/ft./sec)	Spot Fire (Miles) [2]
Scenario 1: 4% slope; Summer onshore wind from the northwest with 12 mph sustained winds (50th percentile)				
BMZ Zone 1 – Irrigated (FM8)	1.0'	0.0	5	0.1
Scenario 2: 3% slope; Fall offshore extreme wind from the N with 14 mph sustained winds (50+ mph gusts) (97th percentile)				
BMZ Zone 1 - Irrigated (FM8)	1.6' (2.6')	0.0 (0.1)	15 (45)	0.1 (0.3)
Scenario 3: 5% slope; Fall offshore extreme wind from the E with 14 mph sustained winds (50+ mph gusts) (97th percentile)				
BMZ Zone 1 - Irrigated (FM8)	1.6' (2.6')	0.0 (0.1)	15 (45)	0.1 (0.3)
Scenario 4: 6% slope; Fall offshore extreme wind from the SE with 14 mph sustained winds (50+ mphgusts) (97th percentile)				
BMZ Zone 1 - Irrigated (FM8)	1.6' (2.6')	0.0 (0.1)	15 (45)	0.1 (0.3)
Moderate load, dry climate Chaparral scrub (Sh2) within MHPA area	6.8' (15.0')	0.2 (0.9)	371 (2,048)	0.3 (1.1)
Scenario 5: 3% slope; Summer onshore wind from the southwest with 12 mph sustained winds (50th percentile)				
BMZ Zone 1 - Irrigated (FM8)	1.0'	0.0	5	0.1

Note:

1. MPH=miles per hour
2. Spotting distance from a wind-driven surface fire; it should be noted that the wind mph in parenthesis represent peak gusts of 50 mph.

The following describes the fire behavior variables (Heisch and Andrews 2010) as presented in Tables 5 and 6:

Surface Fire:

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

Crown Fire:

- Transition to Crown Fire: Indicates whether conditions for the transition from surface to crown fire are likely. The calculation depends on the transition ratio. If the transition ratio is greater than or equal to 1, then transition to crown fire is Yes. If the transition ratio is less than 1, then transition to crown fire is No.
- Crown Fire Rate of Spread (mph): The forward spread rate of a crown fire. It is the overall spread for a sustained run over several hours. The spread rate includes the effects of spotting. It is calculated from 20-ft wind speed and surface fuel moisture values. It does not consider a description of the overstory.

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

The information in Table 7 presents an interpretation of the outputs for five fire behavior variables as related to fire suppression efforts. The results of fire behavior modeling efforts are presented in Tables 5 and 6. Identification of modeling run locations is presented graphically in Figure 8 of the report.

Table 7: Fire Suppression Interpretation

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

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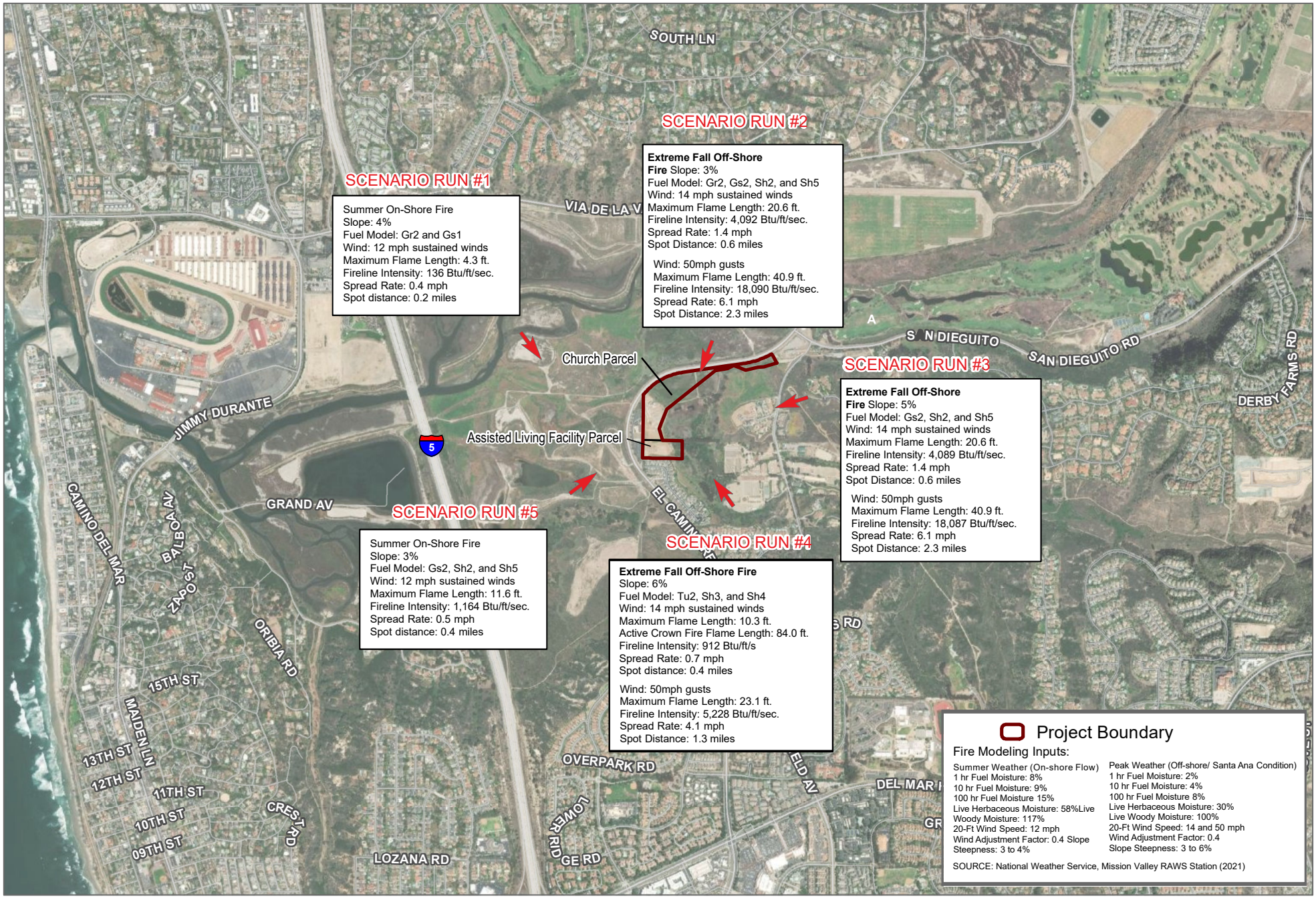

SOURCE: DigitalGlobe 2017

DUDEK

0 1,000 2,000 Feet

FIGURE 8

BehavePlus Fire Behavior Analysis Map

El Camino Real Assisted Living Facility Project - Fire Fuel Load Modeling Report

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5 Fire Safety Goals

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

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

6 Project Specific Risk Summary

6.1 Fire Risk

Fire risks must be assessed based upon the potential frequency (probability of an incident occurring) and consequence (potential damage should an event occur). The evaluation of fire risks must take into account the frequency and severity of fires and other significant incidents. This includes common risks and heightened sources of risk.

Common risks that result in emergency calls include accidental injuries (residential, vehicle, other), medical related incidents including heart attacks, strokes and other serious conditions and illnesses, accidental vegetation fires, and occasional structure fires. The study area also includes a major transportation corridor risk category that has a higher occurrence rate than commonly realized in other areas. Vehicle related incidents along El Camino Real may result in higher levels in the Project area. Roadside fires are also a risk with spread into the adjacent wildlands possible.

Among the listed potential causes of fire incidents involving construction of ~~a residential community~~ the Assisted Living Facility that are relevant for this study are:

- Explosion/Arcs, arc flashing, electrical shorts, sparking, motor or other machinery fire, wiring and harnessing fire, overheated junction boxes, rodents chewing on wires and causing arcing, etc.
- Collapse of supporting structure causing electrical shorts and fire.
- Overgrown vegetative fuel.
- Equipment and supplies storage.
- Trash cans, smoking areas, and other combustible storage around construction sites.
- The Project's fire risks are associated with the following:

6.1.1 Construction Phase Risks

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

Existing law already requires a "Site-Specific Safety Manual" and "Fire Protection Plan" to prevent onsite ignitable sources during construction. Cal/OSHA 1910.39 and California Fire Code (CFC) Chapter 33.- Like all projects, the Project is required to be constructed in a manner follows all existing laws and regulations. Here, consistent with Cal/OSHA 1910.39 and California Fire Code (CFC) Chapter 33, the City has taken the extra step to condition that all construction permit plans include a note requiring the construction Contractor to institute the following prevention measures:

Fire Prevention Measures for all Construction Activities:

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

- Perform "hot work" according to fire safe practices in a controlled environment and with fire suppression equipment at the job site. A fire watch person (Fire Patrol), with extinguishing capability (e.g., fire extinguishers), should be in place for all 'Hot Work" activities during construction. Ensure hot work adheres to the guidelines provided.
- Dispose of combustible waste promptly and according to applicable laws and regulations.
- Report and repair all fuel leaks without delay.
- Do not overload circuits or rely on extension cords where other options would be safer.
- Turn off and unplug electrical equipment when not in use.
- Direct contractors on site to restrict use of chainsaws, chippers, vegetation masticators, grinders, drill rigs, tractors, torches, and explosives to outside during RFW. When the above tools and equipment are used, water trucks (4,000-gallon capacity) equipped with hoses, shovels, Pulaski's, and McLeod's shall easily be accessible to personnel.
- Equip all construction-related vehicles with a 10-pound 4A:80 BC Dry Chemical Fire Extinguisher, a 5-gallon backpack pump or water fire extinguisher, a 46-inch round point shovel, and a first-aid kit.
- When an evacuation has been called, all site personnel will gather at the designated assembly area and the Site Safety Officer (SSO) will account for all personnel. Once all personnel are accounted for, the vehicles will safely convoy from the site to safe zones, which are generally areas off-site away from the threat.
- Vehicles equipped with fire prevention equipment:
  - 10-pound, 4A:80BC dry chemical fire extinguisher.
  - 46-inch round point shovel.
  - 5-gallons of water or a 5-gallon water backpack.
  - First-aid kit.
- No driving (cars, trucks, ATVs or similar) over unmaintained and dry vegetation.
- Vehicles can be parked a minimum of 10 feet from any vegetation if the vehicle is parked in an area devoid of any vegetation.
- Site activities limited during Red Flag Warning Weather periods; stay alert to fire and weather conditions and evacuate employees, if safe to do so.
- Consultants/Contractors will conduct operations safely to limit the risk of fire.
- Hot Work shall adhere to the guidelines provided below in Section 7.5.
- During significant emergency situations, an evacuation notice may be issued by the site manager/supervisor or SSO. When an evacuation has been called, all consultant or contractor employees will gather at the designated assembly area and the SSO will account for all personnel. Once all employees are accounted for, the vehicles will safely convoy from the site to safe zones, which are generally areas off-site away from the threat.

6.2 El Camino Real Assisted Living Project Risk Rating

The estimated risk associated with the El Camino Real Assisted Living Project site is low to moderate during construction and decommissioning and low during operation, based on the successful application of risk reduction measures listed below and the fire environment in the landscape that includes sparse fuels.

The active construction phase results in higher potential for fires. Hot works, vegetation clearing, and other activities that may result in flame or heat sources can ignite vegetation, especially if non-native grasses have established and cured. Although there will be a potential for structural/equipment fires and wildfires, the risk is considered less than significant ~~manageable~~ as indicated by the low historic fire occurrence in similar development Projects and the requirement to follow the Project's permit conditions and Cal/OSHA 1910.39 and California Fire Code (CFC) Chapter 33.

6.3 Risk Reduction Measures

The Project would be conditioned to provide a "Site-Specific Safety Manual" and "Fire Protection Plan" that addresses onsite ignitable sources as required by Cal/OSHA 1910.39 and California Fire Code (CFC) Chapter 33. The Site-Specific Safety Manual and Fire Prevention Plan is to be posted onsite and would include the following prevention measures, as appropriate, during each phase of the project (construction, operation and maintenance and decommissioning) to reduce the risk of ignitions. These measures will be enforced through the Site Safety Officer (SSO) and ongoing worker safety training via the Site-Specific Safety Manual and Fire Prevention Plan as noted on all construction plans:

- Fire rules shall be posted on the project bulletin board at the contractor's field office and areas visible to employees. This shall include all consultants, contractors, and subcontractors if more than one.
- Fires ignited on site shall be immediately reported to SDFRD.
- The engineering, procurement, and construction contracts for the project shall clearly state the fire safety requirements that are the responsibility of any person who enters the site.
- All internal combustion engines used at the Project site shall be equipped with spark arrestors that are in good working order.
- Once initial two-track roads have been cut, light trucks and cars shall be used only on roads where the roadway is cleared of vegetation. Mufflers on all cars and light trucks shall be maintained in good working order.
- During construction, the Project will be equipped with at least one and up to three water trucks each of 4,000-gallon capacity. Each truck will be equipped with 50 feet of 0.25-inch fast response hose w/fog nozzles. Any hose size greater than 1 ½" shall use National Hose (NH) couplings.
- A cache of shovels, McLeod's, and Pulaski's shall be available at staging sites. The amount of equipment will be determined by consultation between SSO and SDFRD. Additionally, on-site pickup trucks will be equipped with first-aid kits, fire extinguishers and shovels. Contractor vehicles will be required to include the same basic equipment.
- Equipment parking areas and small stationary engine sites shall be cleared of all extraneous flammable materials.
- The on-site contractor shall try to restrict use of chainsaws, chippers, vegetation masticators, grinders, drill rigs, tractors, torches, and explosives during RFW conditions. When the above tools and equipment are used, water trucks equipped with hoses, shovels, McLeod and Pulaski shall be easily accessible to personnel.
- A fire watch (person responsible for monitoring for ignitions) will be provided during hot works and shall monitor for a minimum of 30 minutes following completion of the hot work activities.

- Smoking shall not be in wildland areas and within 50 feet of combustible materials storage and shall be limited to paved areas or areas cleared of all vegetation.
- Each project construction site (if construction occurs simultaneously at various locations) shall be equipped with fire extinguishers and firefighting equipment sufficient to extinguish small fires.
- The on-site contractor or Project staff shall coordinate with the SDFRD to create a training component for emergency first responders to prepare for specialized emergency incidents that may occur at the Project site.
- Construction workers at the site shall receive training on the proper use of firefighting equipment and procedures to be followed in the event of a fire. Training records shall be maintained and be available for review by the SDFRD.

6.4 Daily Fire Prevention Measures

To limit the risk of fires, all site staff, employees, and contractors shall take the following precautions as provided in the Site-Specific Safety Manual and Fire Prevention Plan for the Project and as noted on all construction plans:

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

6.4.1 Fire Prevention/Protection System Maintenance

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

As noted on the construction permit plans, t~~T~~he following equipment is subject to ongoing maintenance, inspection, and testing procedures:

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

6.5 Hot Work

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

A Hot Work Permit shall be obtained for all hot work regardless of location from the SSO, following guidelines from the VFD. The SSO will require hot work to be done per requirements in NFPA 51B and the CFC Chapter 35.

Hot work shall only be done in fire safe areas designated by the SSO and shall comply with the following as noted on all construction permit plans:

- All personnel involved in Hot Work shall be trained in safe operation of the equipment by the SSO. This will include providing training at "tailgate safety meetings". They shall also be made aware of the risks involved and emergency procedures, such as how to transmit an alarm and who is responsible to call 9-1-1.
- Signage required in areas where workers may enter indicating "Caution; Hot Work in progress; Stay Clear" would be posted on site.
- Hot work would not be done on any containers which contain or have contained flammable liquids, gases, or solids until containers have been thoroughly cleaned, purged, or inerted.
- A dry chemical fire extinguisher with a minimum rating of 4A:80BC, a 5-gallon backpack pump or water fire extinguisher, and a 46-inch round point shovel, shall be readily accessible within 25 feet of hot work area.
- The safety manager shall inspect the hot work area before issuing a permit and shall then make daily inspections.
- Welding and cutting would comply with 2022 CFC Chapter 35- welding and Hot Work.
- Electric arc hot work would comply with CFC Chapter 35.
- Piping manifolds and Hose Systems for Fuel Gases and Oxygen would comply with CFC Section 3509.
- Cylinder use and storage shall comply with 2022 CFC Chapter 53, "Compressed Gases."

- Equipment would be approved by SDFRD, including torches, manifolds, regulators, or pressure reducing valves, and any acetylene generators.
- Personal Protective Clothing would be selected to minimize the potential for ignition, burning, trapping hot sparks, and electric shock.
- A fire watch will be in place for a minimum of 30 minutes, or longer as considered necessary by the SSO, following any hot work.
- Any ignitions would be immediately extinguished (as possible) by site personnel and the fire department would be notified of the incident.
- The SSO shall have the responsibility to assure safe Hot Work operations and shall have the authority to modify hot work activities associated with construction and/ maintenance activities, and to exceed the requirements in NFPA 51B and 2022 CFC, to the degree necessary to prevent fire ignition. Workers must be trained on the hot work information and criteria in this report.

~~5~~7 Brush Management Zones

As indicated in the preceding sections of the report, an important component of a fire protection system is the Brush Management Zone (BMZ). BMZs are typically designed to gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones and irrigated zones adjacent to each other on the perimeter of the WUI exposed structure(s). BMZs are arguably more important when situated adjacent to older structures that were built prior to the latest ignition resistant codes and interior sprinkler requirements.

Based on the modeled predicted fire intensity and duration along with flame lengths for the El Camino Real Assisted Living Facility Project, the site's fire environment, and experienced judgment from similar projects, the highest concern may be from firebrands or embers as a principal ignition factor. To that end, this site, based on its location and ember potential, will include an all irrigated, ignition-resistant landscape that will be highly maintained on an on-going basis, as well as the latest ignition and ember resistant construction materials and methods for roofs, walls, vents, windows, and appendages, and interior fire sprinkler systems as mandated by SDFRD's Fire and Building Codes (Chapter 7A). In addition, to mitigate for the ~~reduced~~ modified BMZs along the eastern side of the development, code exceeding construction alternatives are proposed along the entire eastern side of the Assisted Living Facility, including dual pane dual tempered windows and the installation of an additional layer of 5/8-inch Type X fire rated gypsum sheathing applied behind the exterior covering or cladding (stucco or exterior siding) on the exterior side of the framing, from the foundation to the roof..

As mentioned above, a BMZ is a strip of land where combustible vegetation has been removed and/or modified in order to provide a reasonable level of setback and protection to structures from wildland fire. The fuels to the north, south, and west of the El Camino Real Assisted Living Facility project site have been converted to low flammability and intensity fuels associated with development of the parcels. Fuels farther to the north, west, and east are generally grass/shrub dominated with a non-native shrub and tree component. The BMZs proposed for portions of the project are not standard SDFRD widths, as some areas include reduced Zone 1 that are less than 100 feet, and no Zone 2 brush management is included. A typical landscape/brush management installation in the City of San Diego consists of a 35-foot-wide, irrigated Zone 1 and a 65-foot-wide, non-irrigated Zone 2. Zone 2 widths may be decreased by 1.5 feet for each 1 foot of increased Zone 1 width however, within the Coastal Overlay Zone a maximum reduction of 30 feet of Zone 2 is permitted. Based on the project's site, land ownership, adjacent to

mapped MHPA and wetland buffer areas to the east, and grading plans, it is not feasible to achieve the City's standard BMZ widths along the project's perimeter boundaries. As such, there will only be a Zone 1 that will consist of an irrigated landscape area along with a paved hardscape development area. BMZs will extend from the exterior of the structure to between 65 and 100 feet from the northern side of the structure; ~~on the west side of the proposed structure BMZ widths will extend from the exterior of the structure up to approximately 60 feet to the western project boundary and an existing parking lot; on the south side of the proposed structure BMZ widths will extend from the exterior of the structure between 35 and 100 feet to the southern project boundary/the existing single family residential community;~~ and on the east side of the structure BMZ widths will extend from the exterior of the structure 35 feet to the MHPA line (Figure 9, Proposed Brush Management Plan). The landscape areas adjacent to the structures are BMZ equivalent as they would predominantly be consistent of hardscape, irrigated plantings, have ongoing maintenance, and would not include species on the prohibited plant list (Appendix C). Due to adjacent MHPA and 100-foot wetland buffers, open space, and land ownership restrictions the BMZ widths have been ~~reduced~~ modified; no BMZ activities would occur within mapped MHPA or 100-foot wetland buffer areas.

The implementation of an all-irrigated Zone 1 brush management area, along with the code-required and code-exceeding ignition resistance of the assisted living facility is expected to provide a fire-hardened site. The irrigated zones and building construction provide a level of fire protection that is considered at least as robust as a standard BMZ, providing the same practical effect and enabling the deviation from the standard. Every part of the BMZ will be a critical component of the site's landscape theme, thereby ensuring that the plants will be maintained in a healthy and low flammability condition. All BMZs would be implemented at once prior to any on-site grading or construction.

BMZ Zone 1 Requirements – 0 to 100 feet from the structure

- The landscape area will be BMZ equivalent landscaping adjacent to the structures.
- Zone 1 will consist of primarily irrigated landscape along with a paved development area.
- Zone 1 width shall be provided between native or naturalized vegetation and any structure. The width shall be measured from the exteriors of the structure to the vegetation.
- There shall be no habitable structures, structures that are directly attached to habitable structures, or other combustible construction that can mean transmitting fire to habitable structures.
- Structures such as fences, gazebos, walls, palapas, play structures, and non-habitable gazebos with this zone shall be made of non-combustible, one hour-fire rated, or Type IV heavy timber as defined in the CBC.
- Plant species within Zone 1 shall be primarily low-growing and less than 4 feet in height with the exception of trees. Plants shall be low-fuel and not be fire facilitating species and comply with the prohibited plant list (Appendix C).
- Trees within Zone 1 shall be located away from structures to a minimum distance of 10 feet as measured from the structure to the drip line of the tree at maturity and spaced horizontally and vertically in accordance with the Landscape Standards of the Land Development Manual. All trees will not be fire facilitating species and comply with the prohibited plant list (Appendix C).
- Permanent irrigation is required for all planting areas within Zone 1 with the following exceptions:

  - When planting areas only contain species that do not grow taller than 24 inches in height
  - When planting areas contain only native or naturalized species that are not summer-dormant and have a maximum height at plant maturity of less than 24 inches.

- Zone 1 irrigation overspray and runoff shall not be allowed into adjacent areas of native or naturalized vegetation.
- Zone 1 shall be maintained regularly by pruning and thinning plants, controlling weeds, and maintain irrigation systems.

5.1 Fuel Modification Area Vegetation Maintenance

All fuel modification area vegetation management shall occur as needed for fire safety, compliance with the BMZ requirements detailed in the report, and as determined by the SDFRD. The Property Manager or similar, funded entity shall be responsible for all vegetation management throughout the project area, in compliance with the requirements detailed herein and SDFRD requirements (SD Municipal Code 54.02.06). The Property Manager or similar entity shall be responsible for ensuring long-term funding and ongoing compliance with all provisions of the report. The Property Manager or similar entity will be responsible for enforcing the landscape maintenance at least annually and prepare a report for submittal to the SDFRD.

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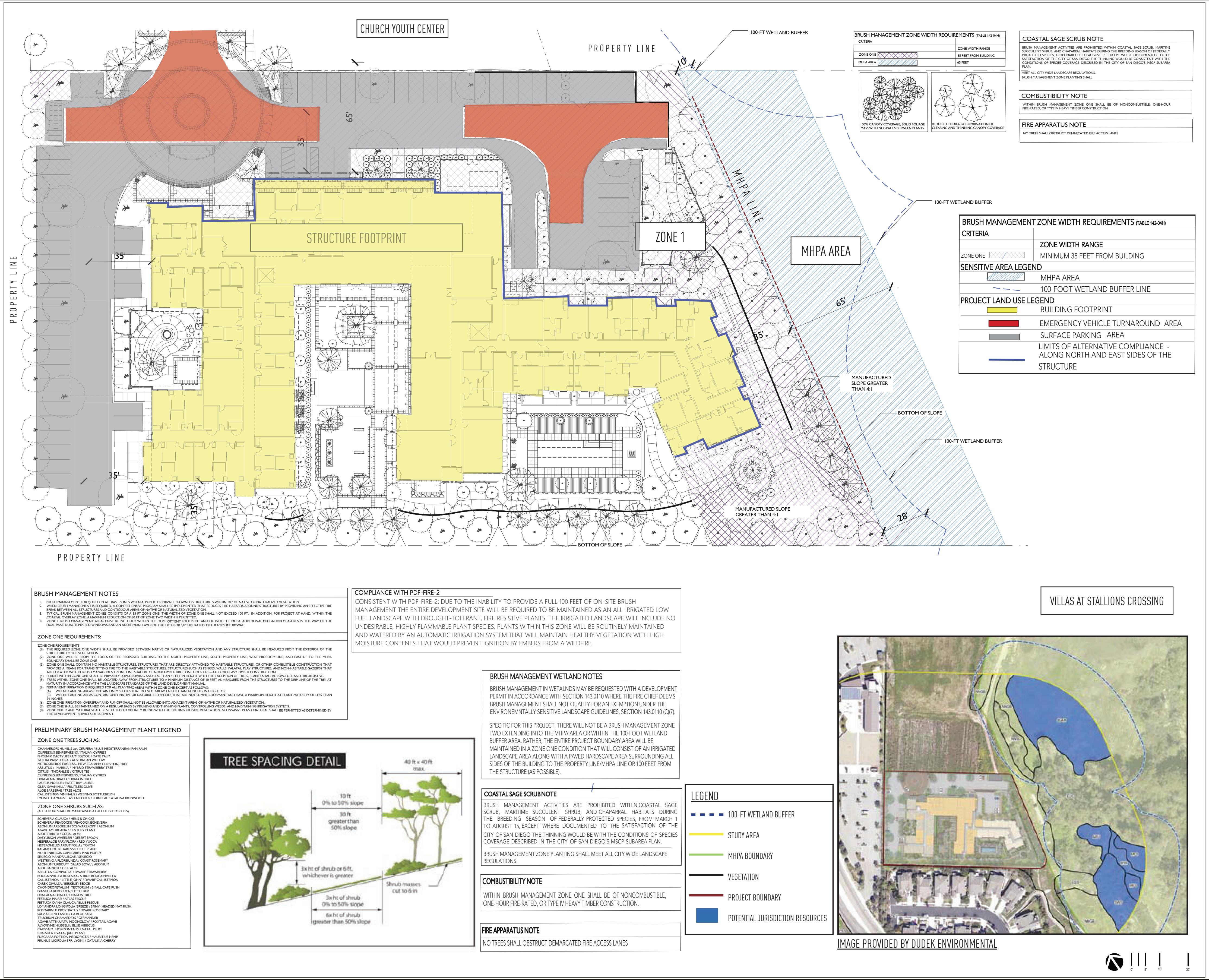

FIGURE 9

Brush Management Plan

El Camino Real Assisted Living Facility SEIR

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~~6~~8 Access

~~6.1~~8.1 Fire Apparatus Access Road Width and Circulation

~~6.1.1~~8.1.1 Primary

Project site access, including road widths and connectivity, will meet the City code requirements and be consistent with the 2019 California Fire Code (CFC). Additionally, adequate water supply and approved paved access roadways shall be installed prior to any combustibles being onsite. Access to the Assisted Living Facility parcel would be provided via one right-in/right-out only driveway along El Camino Real and an ingress/egress access easement through the Church parcel to the north. The Church internal access would be extended to the south and would include a vehicle turnaround at the entrance to the Assisted Living Facility. Parking areas would be located to the south and east of the main site access entrance point. A total of 57 parking spaces would be provided, which exceeds the 42 spaces required by SDMC. In addition, a loading area would be provided adjacent to the proposed kitchen.

The project access road will comply with all fire apparatus access road standards set forth in the CFC Section 503. The access roads will be designed to accommodate a 75,000-pound minimum imposed load of fire apparatus and shall be surfaced to provide all-weather capabilities. The fire apparatus access road shall have an unobstructed width of no less than 20-feet exclusive on shoulders and have an unobstructed vertical clearance of 13 feet and 6 inches (CFC Section 503.2.1).

~~6.1.2~~8.1.2 Dead-End Road

Per Section 503.2.5. of the CFC dead-end fire apparatus roads that exceed 150 feet in length shall have an approved turning area for fire apparatus. The Assisted Living Facility's emergency access route would be provided through the same site access as described above. Emergency vehicles would enter the site via El Camino Real and travel south to the Assisted Living Facility access point. The site includes two, 26-foot-wide turnaround areas adequate for a fire truck; one at the entrance area and one at the loading dock. Designated fire lanes (a.k.a., red curb) with aerial fire access would be located on the north and east sides of the building. The fire apparatus turn around will comply with San Diego Fire-Rescue Department's requirements for fire apparatus turnrounds radii.

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~~7~~9 Alternative Materials and Methods of Construction for ~~Reduced~~ Modified BMZs

As presented in the Fire Fuel Load Modeling Report, due to site constraints and the adjacent MHPA and wetland buffer areas to the east, the BMZs provided for the proposed El Camino Real Assisted Living Facility Project are not standard BMZs. Rather, the BMZs provided for the project include all irrigated Zone 1 brush management areas that vary ~~in~~ from 35 to 100 feet in width, with the eastern portion of the development achieving up to 35 feet of on-site Zone 1 BMZ due to adjacent MHPA/wetland buffer areas. This FFLMR provides both City and California State required fire and building code elements for constructing the Assisted Living Facility, as well as enhanced, code exceeding mitigation measures for the entire east side of the Assisted Living Facility structure exposed to the off-site wildland fuels. The code exceeding mitigation measures are customized for the project site based on the sites location, existing site fire environment conditions, and the fire behavior modeling analysis, and focus on meeting or exceeding the fire safety provided by the City defined 100 feet of brush management zones. The existing on-site vegetation will be replaced with permanently irrigated fire restive species and paved development, thus, significantly reducing surface flame lengths. There will be no Zone 2 proposed for the project. Further, the proposed alternative compliance minimizes the impacts to undisturbed native and/or naturalized vegetation while still meeting the purpose and intent of Section 142.0412 of the City Code (SDMC 142.0412.i). With that said, it is anticipated that the proposed structure will be able to withstand the short duration, low to moderate intensity fire and ember shower that is projected from off-site, adjacent fuels based on several factors, as discussed below.

As indicated in this report, the BMZs and additional fire protection measures proposed for the project provide equivalent wildfire buffer but are not standard zones. Rather, they are based on a variety of analysis criteria including predicted flame length, fire intensity (Btu), site topography and vegetation, extreme and typical weather, the position of structure, position of roadways, adjacent fuels, fire history, current vs. proposed land use, neighboring communities relative to the proposed project, and type of construction. The fire intensity research conducted by Cohen (1995), Cohen and Butler (1996), and Cohen and Saveland (1997), and Tran et al. (1992) supports the fuel modification alternatives proposed for this project.

~~7.1~~9.1 Additional Structure Protected Measures

The following are **City and California State fire and building code required measures** for building in wildland urban interface areas.

1. The Assisted Living Facility structure will be code compliant, ignition resistive, and fully-sprinklered in compliance with accordance with Section 142.0412 of the San Diego Municipal Code (Brush Management) and Section 104.9 of the 2019 California Fire Code (or current edition at the time of construction), as well as with the 2019 edition of the California Building Code (CBC), Chapter 7A (or current edition at the time of construction);

2. Each room and all enclosed spaces, including all closets, bathrooms, and hallways within the Assisted Living Facility will be provided with an NFPA 13 (Standard for the Installation of Sprinkler Systems) automatic fire sprinkler system. The NFPA 13 automatic sprinkler system will be installed in accordance with Section 903.3.1.1 (including subsections 903.3.1.1.1 and 903.3.1.1.2) of the 2019 CFC, which also requires sprinkler protection for exterior balconies, deck, and ground floor patios of sleeping units where the building is of Type V construction, as well as open-ended corridors and exterior stairways and ramps. The NFPA 13 system is required:

    a. To be designed by a licensed fire protection engineer or SDFRD-approved sprinkler contractor.
    b. To provide fire inspector's test value five feet above grade.
    c. To provide sufficient water supply as determined by fire sprinkler hydraulic calculations, which may require increased meter and piping size. If fire flow is insufficient for the designed system, alternative options, such as a fire pump designed to boost fire flow, may be considered, to the approval of SDFRD. Alternative options will be submitted to the SDFRD for approval before installation.
    d. Sidewall sprinklers that are used to protect exterior balconies, decks, and ground floor patios, shall be permitted to be located such that their deflectors are within 1-inch to 6-inches below the structural members and a maximum distance of 14-inches below the deck of exterior balconies that are constructed of open wood joist construction.
    e. Automatic or self-closing doors shall be installed and conform to the exterior door assembly standards addressed in Chapter 7 of the CBC, Section 708A.3.

3. Zone 1 requires a minimum 35 feet of on-site irrigated landscape planting with drought-tolerant, fire resistive plants. The landscape will be routinely maintained and will be watered by an automatic irrigation system that will maintain healthy vegetation with high moisture content that would prevent ignition of embers from a wildfire.

4. The facility design also provides an unimpeded, all-weather pathway (minimum three feet wide) on all sides of the buildings for firefighter access around the entire perimeter of the structure.

5. Areas requiring ventilation to the outside environment will require ember-resistant vents such as Brandguard, Vulcan, or O'Hagin brands. These vents exceed the code requirement of a minimum 1/16-inch not to exceed 1/8-inch openings. All vents used for this project will be approved by SDFRD.

The following **code exceeding fire protection measures** are being provided due to the inability of the eastern side of the project development to provide a full 100 feet of brush management requirements on site because of property boundaries and environmental constraints such as the MHPA and 100-foot wetland buffer areas**.** These code exceeding mitigations were found to meet or exceed the code required 100 feet BMZs through science and application and were accepted by numerous fire agencies throughout California.

1. Due to the inability to provide a full 100 feet of on-site brush management around the exterior of the Assisted Living Facility structure, the entire development site will be required to be maintained as an all-irrigated low fuel ~~Zone 1 BMZ~~ landscape with drought-tolerant, fire resistive plants. The irrigated Zone 1 landscape will include no undesirable, highly flammable plant species. Plants within this zone will be

routinely maintained and watered by an automatic irrigation system that will maintain healthy vegetation with high moisture contents that would prevent ignition by embers from a wildfire.

2. Due to the inability of the entire eastern side of the structure to provide a full 100 feet of on-site brush management due to the MHPA and 100-foot wetland buffer areas, all windows on the east side of the structure are required to provide exterior glazing in windows (and sliding glass doors) to be dual pane with both panes tempered glass. Dual pane, one pane tempered glass has been shown during testing and in after fire assessments to significantly decrease the risk of breakage and ember entry into structures. Therefore, requiring code-exceeding dual pane, both panes tempered is anticipated to be an important safety measure that provides enhanced structure protection and provides mitigation for ~~reduced~~ modified fuel modification zones and limited setbacks from adjacent structures. *The window upgrade also exceeds the requirements of Chapter 7A of the CBC and providing additional protection for the structure's most vulnerable, exterior side* **(CODE EXCEEDING FIRE PROTECTION MEASURE).**

3. Due to the inability of the entire eastern side of the structure to provide a full 100 feet of on-site brush management due to the MHPA and 100-foot wetland buffer areas, the entire east side of the structure is also required to include 5/8-inch Type X fire rated gypsum sheathing applied behind the exterior covering or cladding (stucco or exterior siding) on the exterior side of the framing, from the foundation to the roof for a facade facing the MHPA open space and naturally vegetated areas. 5/8-inch Type X fire rated gypsum sheathing is required to be manufactured in accordance with established ASTM standards defining type X wallboard sheathing as that which provides not less than one-hour fire resistance when tested in specified building assemblies and has been tested and certified as acceptable for use in a one-hour fire rated system. CertainTeed Type X Gypsum Board has a Flame Spread rating of 15 and Smoke Developed rating of 0, in accordance with ASTM E 84, (UL 723, UBC 8-1, NFPA 255, CAN/ULC-S102); UL classified for Fire Resistance (ANSL/UL 263; ASTM E119) and listed under UL File No. CKNX.R3660 (Certainteed, 2021). (**CODE EXCEEDING FIRE PROTECTION MEASURE).**

~~7.2~~9.2 Justification for ~~Reduced~~ Modified Brush Management Zones

An important component of a fire protection system for this project is the provision for ignition-resistant construction and modified vegetation buffers. The structure ignition resistance standards detailed in the 2019 California Fire Code and Chapter 7A of the 2019 California Building code will enable the new Assisted Living Facility structure to withstand the type of wildfire that may occur in the fuels outside the development footprint. Brush management zone requirements, including a minimum 35 feet of fully irrigated landscapes with drought- tolerant, fire resistive plantings (Zone 1) throughout, provide a reasonable level of wildfire protection to the ignition resistant structure. Additionally, undesirable, highly flammable plant species shall not be planted in BMZs.

For the east side of the structure that is unable to achieve the full 100-foot BMZ and adjacent to protected MHPA and wetland buffer areas, windows (and sliding glass doors, garage doors, or decorative or leaded glass doors) on the east side of the structure facing the open space and naturally vegetated areas will be required to be dual pane with both panes tempered glass. Additionally, the exposed sides of structure shall include 5/8-inch Type X fire rated gypsum sheathing applied behind the exterior covering or cladding (stucco or exterior siding) on the exterior side of the framing, from the foundation to the roof for a facade facing the open space and naturally vegetated areas. The

installation of the 5/8- inch Type X fire rated gypsum sheathing increases a wall's fire rating to a minimum of 1 hour, from the 30-minute rating for standard ½-inch drywall. Dudek has found that the code exceeding mitigation measures provided have been used for many other similar successful projects and demonstrate that they meet or exceed the code required 100 feet BMZs. Fire behavior modeling, as previously presented, was used to predict flame lengths and was not intended to determine sufficient fuel modification zone widths. However, the results of the fire modeling provide important fire behavior projections, which is key supporting information for determining buffer widths that would minimize structure ignition and provide "defensible space" for firefighters. With that said, it is anticipated that the proposed structure will be able to withstand the short duration, low to moderate intensity fire and ember shower that is projected from off-site, adjacent fuels based on several factors, as discussed below.

~~7.2.1~~9.2.1 Structure Ignition

There are two primary concerns for structure ignition: 1) radiant and/or convective heat and 2) burning embers (NFPA 1144 2008, IBHS 2008, and others). Burning embers have been a focus of building code updates for at least the last decade, and new structures in the WUI built to these codes have proven to be very ignition resistant. Likewise, radiant and convective heat impacts on structures have been minimized through Chapter 7A exterior fire ratings for walls, windows, and doors. Additionally, provisions for modified fuel areas separating wildland fuels from structures have reduced the number of fuel-related structure losses. As such, most of the primary components of the layered fire protection system provided for the El Camino Real Assisted Living Facility Project is required by the City of San Diego and state codes but are worth listing because they have been proven effective for minimizing structural vulnerability to wildfire and, with the inclusion of required interior sprinklers (required in the 2018 Building/Fire Code update), of extinguishing interior fires, should embers succeed in entering a structure. The structure would include highly resistant materials and construction methods that will be built to California Essential Services Buildings Standards, which are least as ignition resistant as Chapter 7A of the San Diego Building Code. Even though these measures are now required by the latest Building and Fire Codes, at one time, they were used as mitigation measures for buildings in WUI areas, because they were known to reduce structure vulnerability to wildfire. These measures performed so well, they were adopted into the code. The following project features are required for new development in WUI areas and form the basis of the system of protection necessary to minimize structural ignitions as well as providing adequate access by emergency responders:

1. Application of CBC Chapter 7A, ignition resistant building requirements
2. Exterior walls and doors to CBC Chapter 7A standards or equivalent
3. Multi- pane glazing with a minimum of one tempered pane, fire-resistance rating of not less than 20 minutes when tested according to NFPA 257, or be tested to meet the performance requirements of State Fire Marshal Standard 12-7A-2. For the east side of the structure where the full 100 feet of BMZs is not achievable, dual pane dual tempered glass windows will be installed on the exposed sides of the structure. Dual pane, one pane tempered glass has been shown during testing and in after fire assessments to significantly decrease the risk of breakage and ember entry into structures. Therefore, requiring code-exceeding dual pane, both panes tempered is anticipated to be an important safety measure that provides enhanced structure protection and provides mitigation for ~~reduced~~ modified BMZs. *The window upgrade also exceeds the requirements of Chapter 7A of the CBC and providing additional protection for the structure's most vulnerable, exterior side.*
4. Ember resistant vents (recommend BrandGuard or similar vents)

5. NFPA 13 automatic, interior fire sprinkler system to code for occupancy type.

~~7.2.2~~9.2.2 Fuel Separation

As experienced in numerous wildfires, including the most recent firestorms in San Diego County (2003 and 2007), structures in the WUI are potential fuel. The distance between the wildland fire that is consuming wildland fuels, and the structure ("urban fuel") is the primary factor for structure ignition (not including burning embers). The closer a fire is to a structure, the higher the level of heat exposure (Cohen 2000). However, studies indicate that given certain assumptions (e.g., 10 meters of low fuel landscape, no open windows), wildfire does not spread to the structures unless the fuel and heat requirements are sufficient for ignition and continued combustion (Cohen 1995, Alexander et al. 1998). Construction materials and methods can prevent or minimize ignitions. Similar case studies indicate that with nonflammable roofs and vegetation modification from 10 to 18 meters (roughly 32 to 60 feet) in southern California fires, 85% to 95% of the homes survived (Howard et al. 1973, Foote and Gilless 1996). Similarly, San Diego County after fire assessments indicates strongly that the building codes are working in preventing home and structure loss: of 15,000 structures within the 2003 fire perimeter, 17% (1,050) were damaged or destroyed. However, of the 400 structures built to the 2001 codes (the most recent at the time), only 4% (16) were damaged or destroyed. Further, of the 8,300 homes that were within the 2007 fire perimeter, 17% were damaged or destroyed. A much smaller percentage (3%) of the 789 homes that were built to 2001 codes were impacted and an even smaller percentage (2%) of the 1,218 structures built to the 2004 Codes were impacted (IBHS 2008). Damage to the structures built to the latest codes is likely from flammable landscape plantings or objects next to structures or open windows or doors (Hunter 2008).

These results support Cohen's (2000) findings that if a community's homes have sufficiently low home ignitability, the community can survive exposure to wildfire without major fire destruction. This provides the option of mitigating the wildland fire threat to homes/structures at the residential location without extensive wildland fuel reduction. Cohen's (1995) studies suggest as a rule-of-thumb, larger flame lengths and widths require wider fuel modification zones to reduce structure ignition. For example, valid SIAM results indicate that a 20-foot-high flame has minimal radiant heat to ignite a structure (bare wood) beyond 33 feet (horizontal distance). Whereas, a 70-foot-high flame requires about 130 feet of clearance to prevent structure ignitions from radiant heat (Cohen and Butler 1996). The study utilized bare wood, which is more combustible than the ignition-resistant exterior walls for structures built today. Obstacles, including steep terrain and non-combustible walls, can block or deflect all or part of the radiation and heat, thus making narrower fuel modification distances possible. Fires in ravines, chutes, coves, v-drainages and steep-sided canyons can, under specific conditions, result in an upward draft, similar to a fireplace chimney. Chimneys on the landscape are created when air is drawn in from lower elevations, creating strong upslope drafts. The result can be an acceleration of radiant and convective heat as well as the actual fire spread, similar to opening the damper in a fireplace chimney. Areas, where the terrain includes a restriction or narrowing, can result in this type of acceleration. The terrain features adjacent to the Stevenson site include few mild examples of these "chimneys" that are not expected to significantly alter fire behavior.

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10 Red Flag Warnings

Red Flag Warnings are issued by the National Weather Service and indicate that conditions are such (low humidity, high winds) that wildfire ignitions and spread may be facilitated. To ensure compliance with Red Flag Warnings restrictions, the National Weather Service website would be monitored at the site (http://www.srh.noaa.gov/ridge2/fire/briefing.php). During Red Flag Warnings, construction-related activities would be limited, and precautions may be taken on site during periods of a Red Flag Warning, when conditions such as low humidity and high winds are present. Upon announcement of a Red Flag Warning, red flags will be prominently displayed at the entrance gate and main office, indicating to employees and contractors that restrictions are in place. Any hot work (work that could result in ignition sources or increase fire risk), grading, or any other work that could result in heat, flame, sparks, or may cause an ignition to vegetation would be prohibited during Red Flag Warning conditions. Project areas may be evacuated where personnel may be exposed to higher risks. If vehicles are required to be used during Red Flag Warning conditions, vehicles shall remain only on designated access roads on the site.

~~8~~11 Conclusion

The goal of the BMZs along with the code-required and code-exceeding fire protection features provided for the El Camino Real Assisted Living Facility Project is to provide the structure with the ability to survive a wildland fire while minimizing intervention of firefighting forces. Preventing ignition to the structure will result in a reduction of the exposure of firefighters/visitors to hazards that threaten personal safety and will reduce property damage and losses. Mitigating ignition hazards and fire spread potential reduce the threat to the structure and can help the SDFRD optimize the deployment of personnel and apparatus during a wildfire. The analysis in the Fire Fuel Load Model Report provides support and justifications for acceptance of the proposed BMZ for the project based on the site-specific fire environment. As presented in the report, the alternative measures proposed for the proposed project's BMZ supplement the standard requirements and provide at least functional equivalency. The post-project condition will represent a significantly reduced fire hazard as well as a significantly hardened project site (landscape and structures) that will be at less risk than the current condition.

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~~9~~12 Limitations

The Fire Fuel Load Modeling Report does not provide a guarantee that occupants and visitors will be safe at all times because of the fire protection features it requires. There are many variables that may influence overall safety. The report provides requirements and recommendations for the implementation of the latest fire protection features that have proven to result in reduced wildfire-related risk and hazard.

For maximum benefit, the El Camino Real Assisted Living occupants and visitors, contractors, engineers, and architects are responsible for the proper implementation of the concepts and requirements set forth in the report. The Property Manager (or similar entity) is responsible for maintaining the structure and the proposed BMZs as required by the report, the applicable Fire Code, and the SDFRD, which helps protect against catastrophic loss as a result of a wildland fire.

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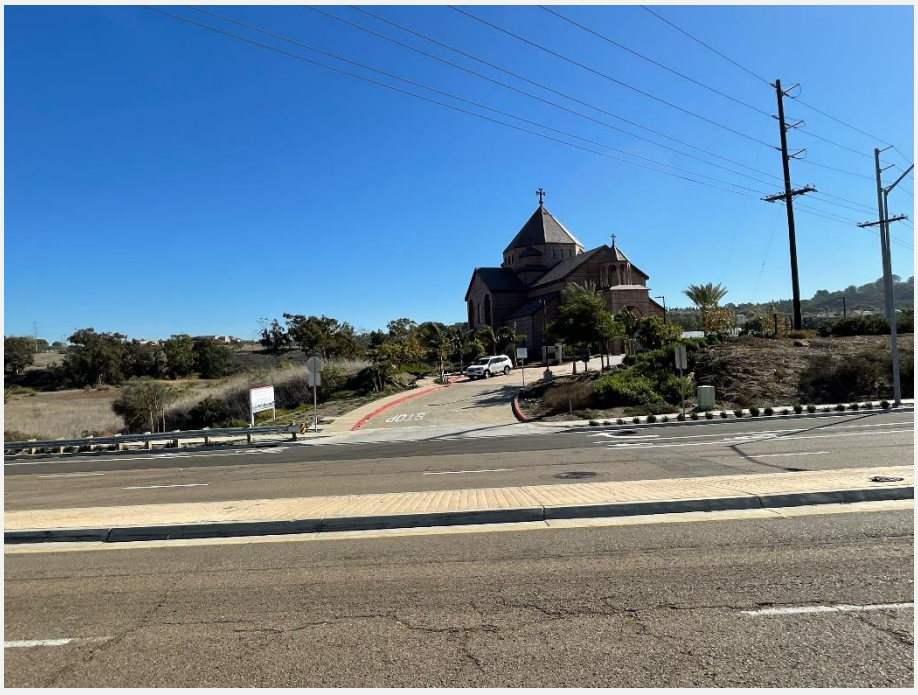
Appendix A

El Camino Real Assisted Living Facility Photograph Log

Photograph 1: Photograph looking south along El Camino Real towards the existing Church. The entrance into the Church will also provide access to the Proposed El Camino Real Assisted Living Facility site. Photograph taken standing across the street from the driveway entrance along El Camino Real.

Photograph 2: Photograph looking north along El Camino Real at the existing vegetation communities near the project area. Photograph taken standing across the street from the driveway entrance into the existing Church/proposed facility area along El Camino Real.

Photograph 3: Photograph of the existing vegetation and land use north/northwest of the project area. Photograph taken facing northwest across the graded parcel.



Photograph 4: Photograph looking east across El Camino Real at the driveway entrance into the project area and existing Church.

Photograph 5: Photograph looking north at the existing Church parcel that is currently partially under development, standing near the northern property boundary of the proposed El Camino Real Assisted Living Facility.

Photograph 6: Photograph looking west/northwest towards the existing Church parcel adjacent to the proposed project area, standing near the northern property boundary of the proposed El Camino Real Assisted Living Facility.

Photograph 7: Photograph looking west/southwest across the southern portion of the proposed Assisted Living Facility project area towards an existing residential community directly south of the proposed project.

Photograph 8: Photograph looking north/northwest across the vacant El Camino Real Assisted Living Facility parcel and towards the Church parcel that is currently partially under development, standing near the southeast corner of the proposed El Camino Real Assisted Living Facility.

Photograph 9: Photograph looking east across the vacant El Camino Real Assisted Living Facility parcel towards the adjacent MHPA area and the eucalyptus riparian forest area along the eastern property boundary.

Photograph 10: Photograph looking east towards the adjacent MHPA area and small eucalyptus riparian forest area east of the proposed El Camino Real Assisted Living Facility project area, standing near the southeast corner of the property.

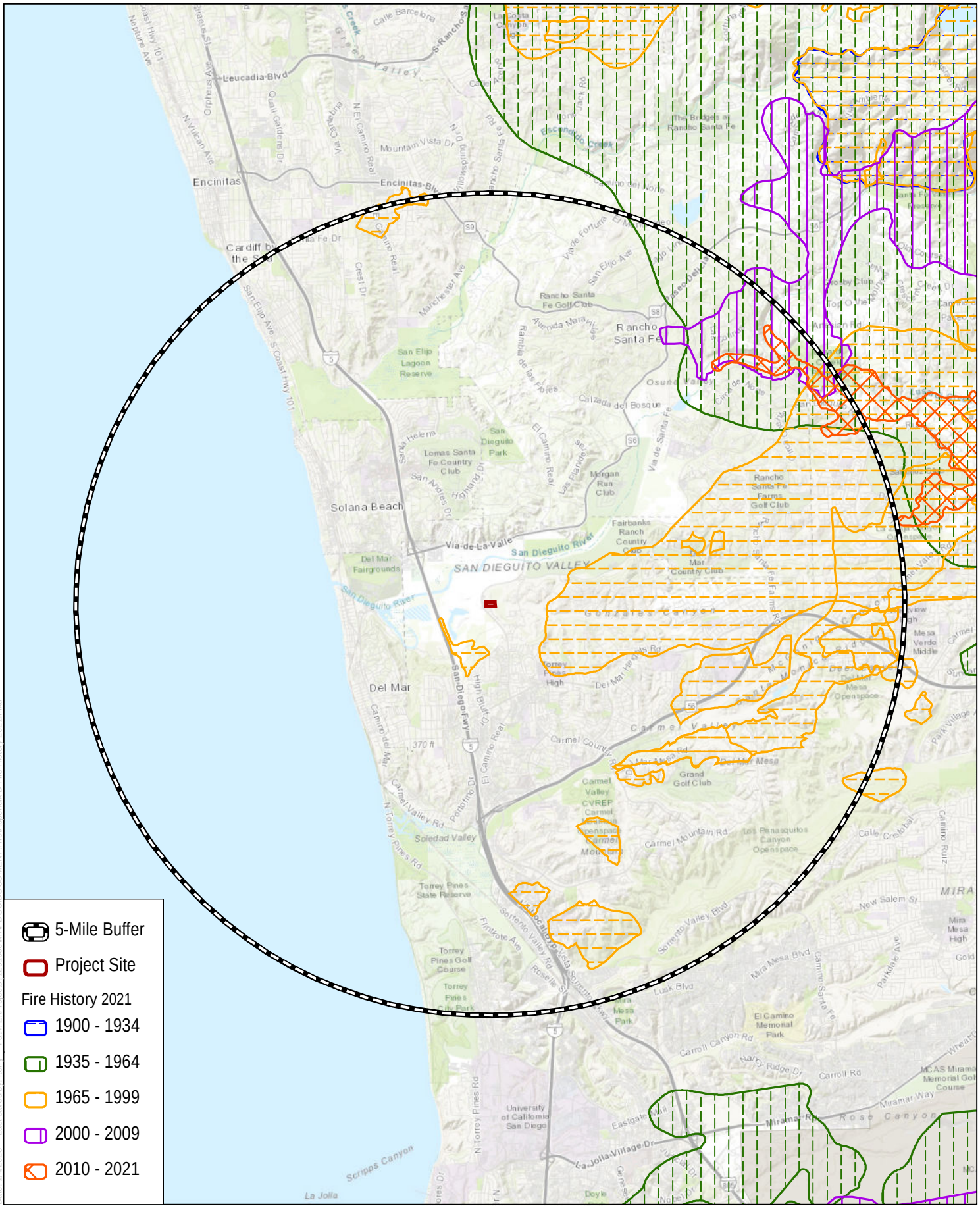
Photograph 11: Photograph taken facing northeast, standing behind the Church parcel towards the adjacent naturally-vegetated areas northeast of the project area. Note the adjacent fuels include an intermix of grass and grass-shrub fuels.

Photograph 12: Photograph taken facing south/southeast, standing behind the Church parcel towards the adjacent MHPA and eucalyptus riparian forest areas east of the project area.

Photograph 13: Photograph taken facing south/southwest, standing behind the Church parcel towards the northern property boundary of the proposed El Camino Real Assisted Living Facility. Note the southern portion of the Church parcel is still currently under construction (parking lot areas).

Appendix B

Fire History Map



SOURCE: BASE MAP- ESRI MAPPING SERVICE; FIRE DATA-CAL FIRE 2021

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APPENDIX B

Fire History Map

El Camino Real Assisted Living Facility Project - Fire Fuel Load Modeling Report

Appendix C

Prohibited Plant List

UNDESIRABLE PLANT LIST

The following species are highly flammable and should be avoided when planting within the first 50 feet adjacent to a structure. The plants listed below are more susceptible to burning, due to rough or peeling bark, production of large amounts of litter, vegetation that contains oils, resin, wax, or pitch, large amounts of dead material in the plant, or plantings with a high dead to live fuel ratio.

BOTANICAL NAME	COMMON NAME
Abies species	Fire Trees
Acacia species	Acacia (trees, shrubs, groundcovers)
*Adenostoma sparsifolium***	Red Shanks
*Adenostoma fasciculatum***	Chamise
Agonis juniperina	Juniper Myrtle
*Anthemis cotula****	Mayweed, Stinking Chamolile
Araucaria species	Monkey Puzzle, Norfolk Island Pine
*Arctostaphylos species***	Manzanita
*Artemesia californica***	California Sagebrush
Arundo donax	Giant Cane
Bambusa species	Bamboo
*Brassica species****	Mustard
Callistemon species	Bottlebrush
Calocedrus decurrens	Incense Cedar
*Cardaria draba****	Hoary Cress, Perennial Peppergrass
Ceanothus species	Ceanothus
Cedrus species	Cedar
Chamaecyparis species	False Cypress
Cinnamomum species	Camphor Tree
*Cirsium vulgare****	Wild Artichoke
*Conyza Canadensis****	Horseweed
Coprosma pumila	Prostate Coprosma
Cortaderia selloana	Pampas Grass
Cotoneaster lacteus	Cotoneaster
Cryptomeria japonica	Japanese Cryptomeria
Cupressocyparis leylandii	Leylandii Cypress
Cupressus forbesii	Tecate Cypress
Cupressus glabra	Arizona Cypress
Cupressus macrocarpa	Monterey Cypress
Cupressus sempervirens	Italian Cypress
*Cynara cardunculus****	Artichoke Thistle
Cytisus species	Scotch Broom, French Broom, etc.
Dodonea viscosa	Hopseed Bush

Elaeagnus angustifolia	Russian Olive
Elaeagnus pungens	Silverberry
*Eriogonum fasciculatum***	Common Buckwheat
Eucalyptus species	Eucalyptus
*Gensita species****	Broom
*Heterotheca grandiflora***	Telegraph Plant
Jubaea chilensis	Chilean Wine Palm
Juniperus species	Junipers
*Lactuca serriola****	Prickly Lettuce
Larix species	Larch
Lonicera japonica	Japanese Honeysuckle
Miscanthus species	Eulalia Grass
*Muehlenbergia species***	Deer Grass
Nicotiana species	Tree Tobacco
Palmae species	Palms
Pennisetum setaceum	Fountain Grass
Picea species	Spruce Trees
*Pickeringia Montana***	Chaparral Pea
Pinus species	Pines
Podocarpus species	Fern Pine
Pseudotsuga menziesii	Douglas Fir
Ricinus communis	Castor Bean
Rosmarinus species	Rosemary
*Salsola australis****	Russian Thistle, Tumbleweed
*Salvia species***	Sage
Schinus molle	California Pepper
Schinus terebinthifolius	Brazlilian Pepper
*Silybum marianum****	Milk Thistle
Spartium junceum	Spanish Broom
Tamarix species	Tamarisk
Taxodium species	Cypress
Taxus species	Yew
Thuja species	Arborvitae
Trachycarpus fortunei	Windmill Palm
Tsuga species	Hemlock
*Ulex europea****	Gorse
*Urtica urens***	Burning Nettle
Washingtonia species	California/Mexican Fan Palm

** San Diego County native species

*** Introduced weeds to San Diego County

California Department of Forestry and Fire Protection (619) 590-3100
United States Forest Service (619) 674-2901
County Fire Service Coordinator (858) 495-5092
County Farm and Home Advisor (858) 694-2845
Insurance Information Network of California -- Brochures

(www.iinc.org <http://www.iinc.org>) or call (800) 397-1679

REFERENCES

- Combustible Vegetation and Other Flammable Materials Ordinance. Sections 68.401 thru 86.406 of the County of San Diego's Zoning Ordinance.
- California Department of Fish and Game (858) 467-4201
- U.S. Fish and Wildlife Service (760) 431-9440
- Protecting Your Property From Soil Erosion (www.sdcounty.ca.gov/dpw/docs/fire/homeerosion.pdf <http://www.sdcounty.ca.gov/dpw/docs/fire/homeerosion.pdf>)
- Homeowner's Guide for Flood, Debris, and Erosion Control After Fires (www.sdcounty.ca.gov/dpw/docs/fire/AfterFire.pdf <http://www.sdcounty.ca.gov/dpw/docs/fire/AfterFire.pdf>)
- Burn Institute (www.burninstitute.org)