FIRE PROTECTION PLAN
Beaumont Pointe Specific Plan
County of Riverside

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Executive Summary

This Fire Protection Plan (FPP) has been prepared for the Beaumont Pointe Specific Plan (Project) located in the unincorporated County of Riverside, California. This FPP evaluates and identifies the potential fire risk associated with the Project's land uses and identifies requirements for water supply, fuel modification and defensible space, access, building ignition and fire resistance, and fire protection systems, among other pertinent fire protection criteria, including a conceptual development plan for the Project site described below. The purpose of this plan is to generate and memorialize the fire safety requirements and standards of the Riverside County Fire Department (RCFD) along with Project-specific design features and implementation measures based on the Project site, its intended use, and its fire environment, including both the conceptual land use plan and any modifications to buildings permitted pursuant to the Specific Plan.

This document provides analysis of the Project site's fire environment and its potential impact on the Project as well as the Project's potential impact on the existing fire protection service. Requirements and recommendations herein are based on Project site-specific fire environment analysis and Project characteristics and incorporates area fire planning documents, Project site risk analysis, and standard principles of fire protection planning.

As determined during the analysis of the Project site and its fire environment, in its current condition, may include characteristics that, under favorable weather conditions, could have the potential to facilitate fire spread. Under extreme conditions, wind-driven wildfires from nearby undeveloped land could cast embers onto the property. Once the Project is built, the Project's on-site fire potential will be much lower than its current condition due to conversion of wildland fuels to buildings, parking areas, managed landscapes, fuel modification areas, improved accessibility for fire personnel, and structures built to the latest ignition and ember resistant fire codes.

It is important to note that the fire safety requirements that will be implemented on the Project site, including ignition resistant construction standards, along with requirements for water supply, fire apparatus access, fuel modification and defensible space, interior fire sprinklers and five minute or less fire response travel times were integrated into the code requirements and internal guidelines based on results of post-fire assessments, similar to the After Action Reports that are now prepared after large fire events. When it became clear that specifics of how structures were built, how fire and embers contributed to ignition of structures, what effects fuel modification had on structure ignition, how fast firefighters could respond, and how much (and how reliable) water was available, were critically important to structure survivability, the Fire and Building codes were revised appropriately. Riverside County now boasts some of the most restrictive codes for building within Wildland Urban Interface (WUI) areas that focus on preventing structure ignition from heat, flame, and burning embers.

The developed portion of this property is proposed for improvements that include construction of approximately 5,241,000 square feet of industrial and commercial development plus a 125-room hotel on 533.41 acres. The entire Project site has been designed with fire protection as a key objective. The Project site improvements are designed to facilitate emergency apparatus and personnel access throughout the Project site. Driveway and road improvements with fire apparatus turnarounds provide access to the sides of every building. Water availability and flow will be consistent with requirements including fire flow and hydrant distribution required by local and state codes. These features along with the ignition resistance of all buildings, the interior sprinklers, and the pre-planning, training and awareness will assist responding firefighters through prevention, protection, and suppression capabilities.

As detailed in this FPP, the Project site's fire protection systems will include a redundant layering of protection methods that have proven to reduce overall fire risk. The requirements and recommendations included herein are performance based and Project site–specific, considering the Project site's unique characteristics rather than a prescriptive, one-size-fits-all approach. The fire protection systems are designed to increase occupant and building safety, reduce the fire risk on site, to minimize risks associated with typical uses, and aid the responding firefighters during an emergency. No singular measure is intended to be relied upon for the Project site's fire protection, but rather, a system of fire protection measures, methods, and features combine to result in enhanced fire safety, reduced fire potential, and improved safety in the development.

Early evacuation for any type of wildfire emergency at the Project is the preferred method of providing for occupant and business safety, consistent with the Owner's and RCFD current approach for evacuation. As such, the Project's Owner and Property Management Company will formally adopt, practice, and implement a "Ready, Set, Go!" (Riverside County Fire Department 2020) approach to Project site evacuation. The "Ready, Set, Go!" concept is widely known and encouraged by the state of California and most fire agencies, including; Pre-planning for emergencies, including wildfire emergencies, focuses on being prepared, having a well-defined plan, minimizing potential for errors, maintaining the Project site's fire protection systems, and implementing a conservative (evacuate as early as possible) approach to evacuation and Project site uses during periods of fire weather extremes.

Based on the results of this FPP's analysis and findings, the following FPP implementation measures will be provided by Beaumont Pointe Specific Plan Project as part of the proposed development plan. These measures are discussed in more detail throughout this FPP.

The following measures shall be established to the satisfaction of the City for each Planning Area prior and as a condition to issuance of a building permit for any building on that Planning Area.

1. Project buildings will be constructed of ignition resistant[1] construction materials and include automatic fire sprinkler systems based on the latest adopted Building and Fire Codes for occupancy types.
2. Fuel Modification will be provided as needed around the perimeter of the Project site within Planning Areas 1-8, as required by RCFD and will be a minimum of 100 feet wide. If an area exists where 100 feet of fuel modification cannot be achieved, exterior building construction will be further enhanced in order that each building complies with the fire protection standards required by applicable codes, and as approved by the RCFD, including 1-hour to 2-hour rated exterior wall with no openings, or with fire rated and protected door openings and/or construction of a non-combustible wall at the top of slope as a fire protection feature.
3. For any Planning Area in which the square footage or footprint of a proposed building has been modified from that described in this fire protection plan, the applicant shall submit and the RCFD shall have approved the revised fire protection plan for the Planning Area, consistent with Item 2 above.
4. Landscape plantings will not utilize prohibited plants that have been found to be highly flammable.
5. Fire apparatus access roads (i.e., public and private streets) will be provided throughout the commercial development and will vary in width and configuration, but will all provide at least the minimum required unobstructed travel lanes, lengths, turnouts, turnarounds, and clearances required by applicable codes. Primary access and internal circulation will comply with the requirements of the RCFD.

[1] A type of building material that resists ignition or sustained flaming combustion sufficiently to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with wildfire exposure of burning embers and small flames, as prescribed in CBC, Chapter 7A and State Fire Marshal Standard 12-7A-5, Ignition-Resistant Materials.

6. Buildings will be equipped with automatic commercial fire sprinkler systems meeting RCFD requirements.
7. The Project shall demonstrate provision of water capacity and delivery to ensure a reliable water source for operations and during emergencies which may require extended fire flow.
8. Should future iterations of the Project's site plan result in buildings that do not achieve a minimum of 100 feet of defensible space, then alternative materials and methods may be proposed to provide the functional equivalency of a full 100 feet of defensible space. Alternative materials and methods will be to the satisfaction of the RCFD and may include structural hardening enhancements or landscape features, like non-combustible walls.

The following measures shall be established in the CC&Rs for the Project and implemented by the Property Management Company. Annual maintenance should occur before May 1st of each year and inspected by RCFD or an approved third party.

9. On-going maintenance of all fuel modification will be managed by Owner's, Property Management Company, or another approved entity, at least annually or as needed.
10. The Property Owner's or Property Management Company, will provide business owners informational brochures at time of occupancy, which will include an outreach and educational role to ensure fire safety measures detailed in this FPP have been implemented and prepare development-wide "Ready, Set, Go!" plans.

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1 Introduction

This Fire Protection Plan (FPP) has been prepared for the proposed Beaumont Pointe Specific Pan Project (Project) in Riverside County (County), California, and within the City of Beaumont Sphere of Influence. This FPP evaluates and identifies the potential fire risk associated with the Project's land uses and identifies requirements for water supply, fuel modification and defensible space, access, building ignition and fire resistance, and fire protection systems, among other pertinent fire protection criteria, including a conceptual development plan for the Project site described below. The purpose of this plan is to generate and memorialize the fire safety requirements and standards of the Riverside County Fire Department (RCFD) along with Project-specific design features and implementation measures based on the Project site, its intended use, and its fire environment, including both the conceptual land use plan and any modifications to buildings permitted pursuant to the Specific Plan

As part of the assessment, the plan has considered the property location, topography, surrounding combustible vegetation (fuel types), climatic conditions, and fire history for the Project site and the surrounding area. The plan addresses water supply, access, structural ignitability and fire resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management for the Project site and to address potential fire impacts to the surrounding area. The plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect structures and essential infrastructures within the Project site. The following tasks were performed toward completion of this plan:

- Gather Project site specific climate, terrain, and fuel data;
- Collect Project site photographs;
- Process and analyze the data using the latest GIS technology;
- Predict fire behavior using scientifically based fire behavior models, comparisons with actual wildfires in similar terrain and fuels, and experienced judgment;
- Analyze and guide design of proposed infrastructure;
- Analyze the existing emergency response capabilities;
- Assess the potential fire risk posed by the construction and operation of the Project to the Project site and surrounding area; and
- Prepare this FPP detailing how fire risk will be mitigated on the Project site and in the surrounding area through a system of fuel modification, structural ignition resistance enhancements, and fire protection delivery system upgrades.

Field observations were utilized to augment existing digital Project site data in generating the fire behavior models and formulating the recommendations presented in this FPP. Refer to Appendix A for Project site photographs of existing conditions.

1.1 Applicable Codes/Existing Regulations

This FPP demonstrates that Beaumont Pointe Specific Plan Project will comply with applicable portions of RCFD, Fire Prevention Standards and County Ordinances No. 460 and No. 787-8. The Project will also be consistent with the 2019 edition of the California Building Code (CBC), Chapter 7A; 2019 edition of the California Fire Code (CFC), Chapter 49; and the 2018 edition of the International Fire Code (IFC); or applicable code as adopted and amended by RCFD and the City of Beaumont at the time of construction. Additionally, RCFD references Fire Prevention Standards for informational purposes in clarifying and interpreting provisions of the CFC, National Fire Protection Association (NFPA) and California Public Resources Code (PRC). The Project will also comply with Chapter 7A of the CBC which focuses primarily on preventing ember penetration into buildings, a leading cause of structure loss from wildfires.

Compliance with the above building and fire code requirements is an important component of the requirements of this FPP given the Project's wildland-urban interface (WUI) location is primarily in an area statutorily designated as a Very High Fire Hazard Severity Zone (VHFHSZ) and High Fire Hazard Severity Zone (HFHSZ) (Figure 1) state responsibility area (SRA) by California Department of Forestry and Fire Protection (CAL FIRE) (FRAP 2008). Adjacent to the Project site, within the City of Beaumont's jurisdictional boundary, the land is primarily designated as a Very High Fire Hazard Severity Zone (VHFHSZ) and High Fire Hazard Severity Zone (HFHSZ) local responsibility area (LRA). After being annexed to the City of Beaumont, it is possible that the Project site could be re-designated as LRA in a future update of CAL FIRE's Hazard Severity Zone maps. The designations of Fire Hazards are based on topography, vegetation, and weather, amongst other factors with more hazardous sites, which include steep terrain, un-maintained fuels/vegetation, and WUI locations. As described in this FPP, the Project will meet all applicable fire and building code requirements for building in these higher fire hazard areas or meet the intent of the code through the application of Project site-specific fire protection measures. These codes have been developed through decades of after fire structure save and loss evaluations to determine what causes building loss during wildfires. The resulting fire codes now focus on mitigating former structural vulnerabilities through construction techniques and materials so that the buildings are resistant to ignitions from direct flames, heat, and embers, as indicated in the 2019 California Building Code (Chapter 7A, Section 701A Scope, Purpose and Application).

1.2 Project Summary

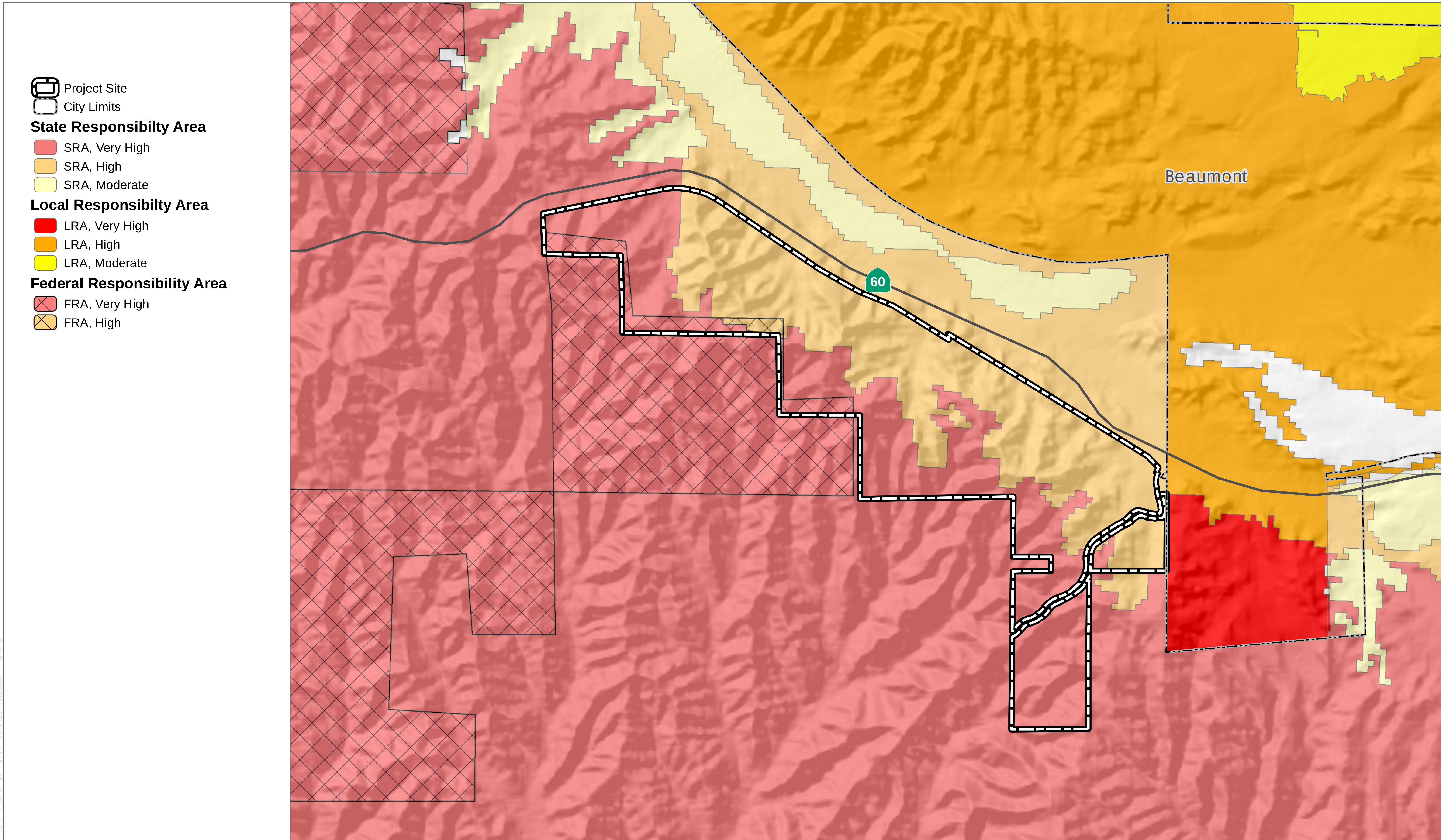
1.2.1 Project Overview

The Project provides for a logistical industrial center, commercial-recreation center, hospitality facility and conserved open space, on approximately 533.41 acres (See Project Description, below).

1.2.2 Location

The 533.41-acre Project site is in the City of Beaumont Sphere of Influence area in Riverside County. The Project site is along the southern portion of the western Beaumont city limits. (Figure 2, Project Location Map). More specifically, the Project site is located, immediately south of SR-60, west of Jack Rabbit Trail, and immediately north of the San Timoteo Badlands. The Project site is situated within Sections 1, 2 and 12 of Township 3 South, and Range 2 West on the El Casco, California, United States Geological Survey (USGS), 7.5-minute topographic map.

The Beaumont Pointe Specific Plan Project site is located on the following Riverside County Assessors Parcels: 422-06-2; 422-06-05; 422-06-09; 422-06-10; 422-06-16; 422-06-17; 422-06-18; 422-06-21; 422-06-22; 422-17-05; 422-17-07; 422-17-08; 422-17-09; 422-17-10; 422-17-11.



SOURCE: CAL FIRE, 2009

DUDEK

0 750 1,500 Feet

FIGURE 1

Very High Fire Hazard Severity Zones

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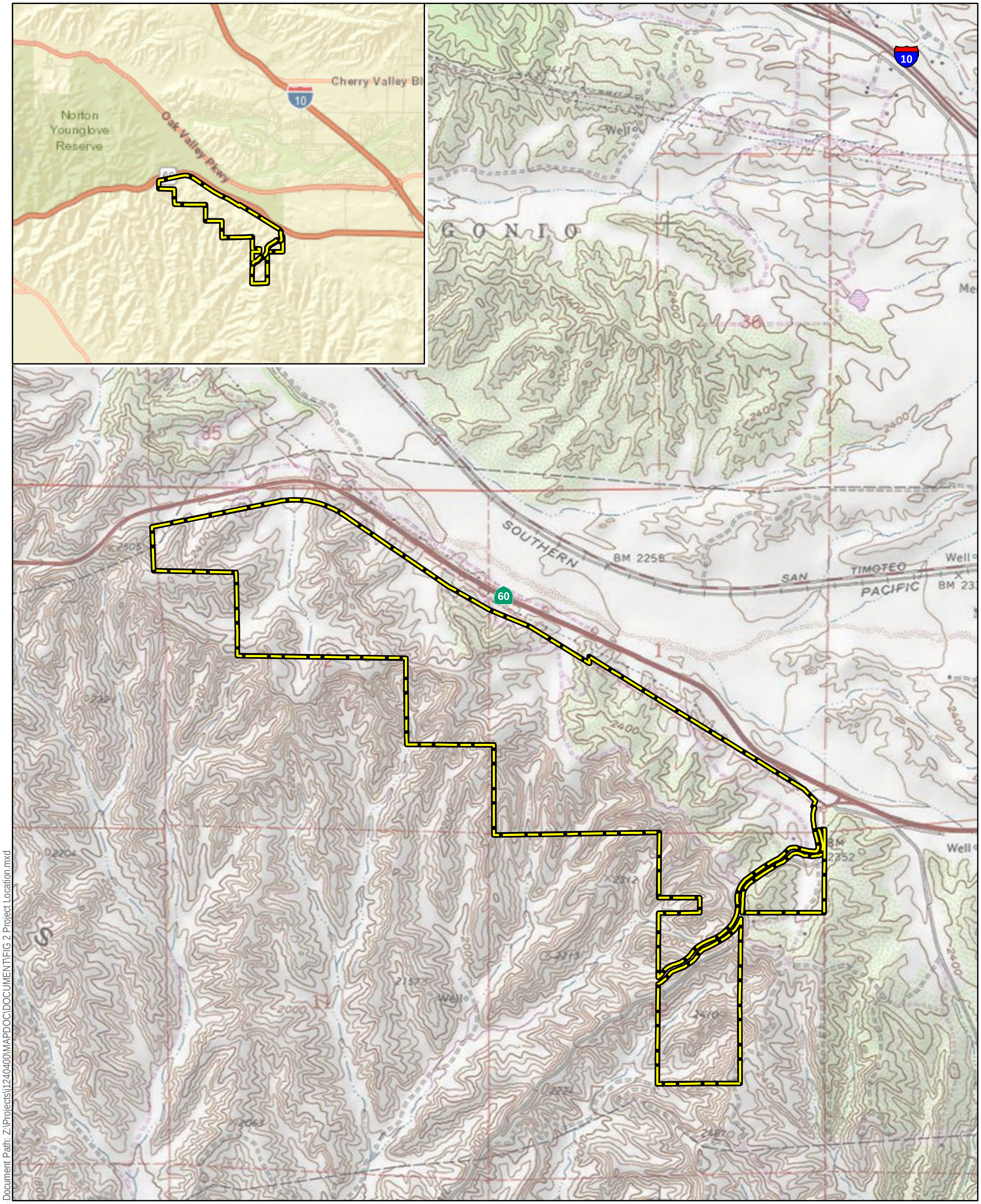

Document Path: Z:\Projects\j1240400\MAPDOC\DOCUMENT\FIG 2 Project Location.mxd

SOURCE: USGS 7.5 MINUTE SERIES, EL CASCO QUADRANGLE
TOWNSHIP 3 SOUTH, RANGE 2 WEST, SECTIONS 1, 2, AND 12

DUDEK

0 1,000 2,000 Feet

FIGURE 2

Project Location

Fire Protection Plan for the Beaumont Pointe Specific Plan

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1.2.3 Existing Land Use

The Project site is currently undeveloped land that has been subject to disturbances from various sources including off-road vehicles and isolated trash dumping. The Project area is primarily vegetated with non-native grasses and sage scrub. Numerous dirt roads and trails were observed throughout the Project site. The Project site is characterized by rugged steep ridges and hillsides with narrow canyons that are generally situated on the southwest portion of the site and relatively gentle ridges and broad canyons/valleys on the northwest portion of the Project site. A roughly northwest trending drainage divide directs drainage to the north into San Timoteo Canyon and south through the badlands into San Jacinto Valley.

Surrounding Land uses that lie adjacent to the Project site include the Fairway Canyon SCPGA golf course (Specific Plan, project under development) and Sun Cal project (Specific Plan approved and under construction), Heartland project (homes under construction) to the northeast and north of SR-60. Additionally, Hidden Canyon industrial project (grading currently underway) to the east, and undeveloped, vacant land to the south and west. The SR-60 Freeway existing follows the northern boundary of the Project site with Coopers Creek, Union Pacific Railroad and San Timoteo Canyon Road a short distance away. The San Timoteo Badlands are just to the south of the southern boundary of the Project.

1.2.4 Project Description

The Beaumont Pointe Specific Plan Project proposes development of approximately 533.41 acres for a master-planned, industrial, commercial, hospitality and recreational development (refer to Figure 3, Land Use Plan, for proposed land uses and building locations). The Center provides for: Industrial building space of approximately 4,533,000 square feet on approximately 223.86 acres; Commercial Retail uses of approximately 246,000 square feet of building space on approximately 26.0 acres; Hospitality use of approximately 90,000 square feet on approximately 4.2 acres; approximately 128.8 acres of Open Space; approximately 134.7 acres of Open Space-Conservation. The proposed circulation pattern of arterial roads and access to proposed parking areas will divide the Project site into 10 Planning Areas: PA 1 and PA 2 are General Commercial; PA 3 through PA 8 are Industrial; PA 9 is Open Space; and PA 10 is Open Space – Conservation.

The Project includes multiple structures composed of individual planning areas, which indicate the location of proposed uses for Industrial, Commercial-Recreation, Hospitality, Open Space. Development within Project site will be formed in part by individual land uses and internal street patterns. However, these delineations could change during the development process. The accompanying infrastructure will consist of an internal road circulation system, water, sewer, and storm water drainage systems, and utilities.

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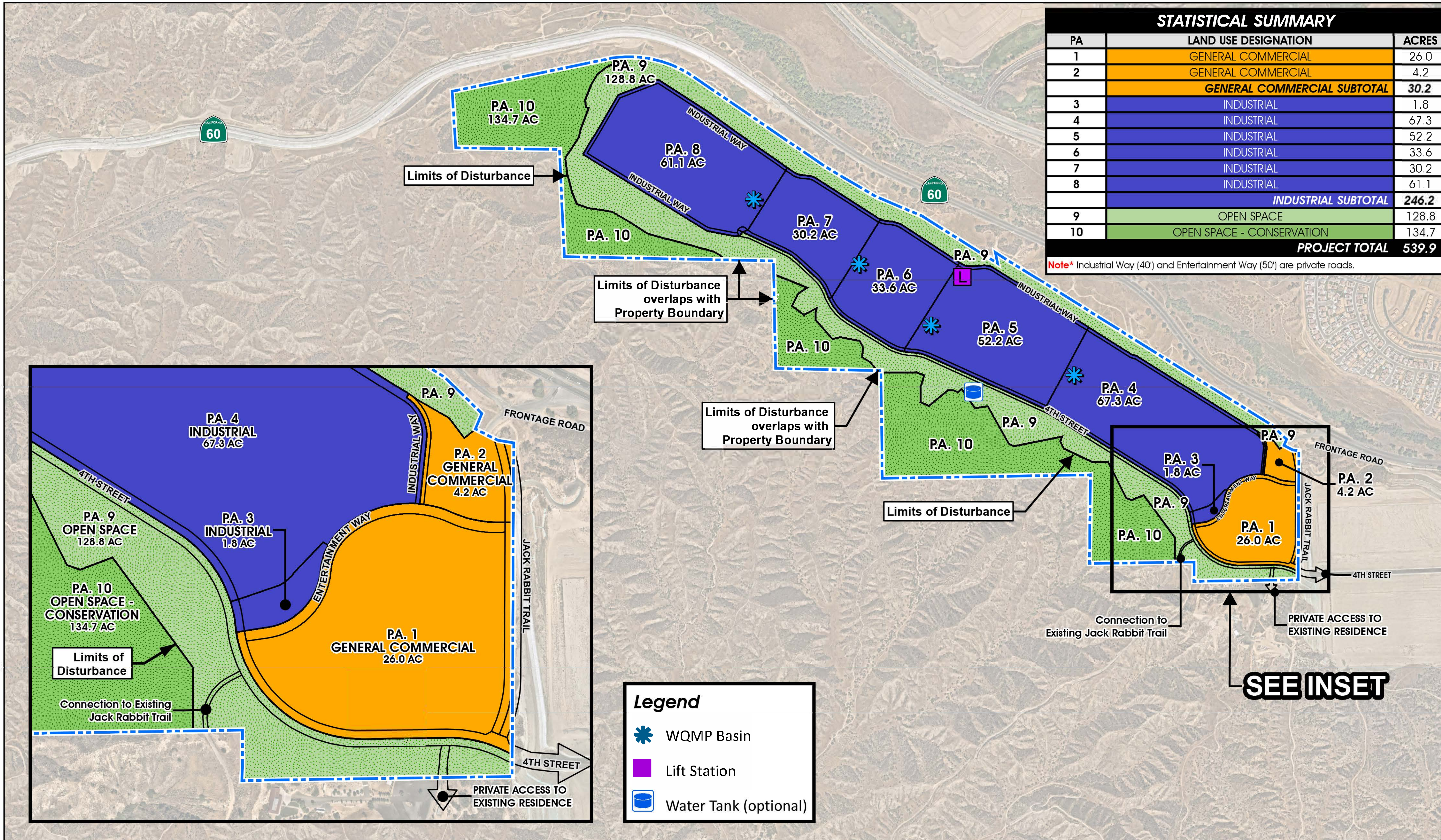

STATISTICAL SUMMARY

PA	LAND USE DESIGNATION	ACRES
1	GENERAL COMMERCIAL	26.0
2	GENERAL COMMERCIAL	4.2
	GENERAL COMMERCIAL SUBTOTAL	***30.2***
3	INDUSTRIAL	1.8
4	INDUSTRIAL	67.3
5	INDUSTRIAL	52.2
6	INDUSTRIAL	33.6
7	INDUSTRIAL	30.2
8	INDUSTRIAL	61.1
	INDUSTRIAL SUBTOTAL	***246.2***
9	OPEN SPACE	128.8
10	OPEN SPACE - CONSERVATION	134.7
	PROJECT TOTAL	***539.9***

Note* Industrial Way (40') and Entertainment Way (50') are private roads.

Source(s): ESRI, RCTLMA (2021), City of Beaumont (2004), Nearmap Imagery (2021)
Composite: Proactive Engineering Consultants (2020), Herdman Architecture (07-09-2021)

Figure 2-1

0 300 600 1,200 Feet

Conceptual Land Use Plan

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2 Project Site Risk Analysis

2.1 Field Assessment

A field assessment of the Beaumont Pointe specific Plan Project area was conducted on April 1, 2020 in order to confirm/acquire Project site information, document existing conditions, and to determine potential actions for addressing the protection of the Project's structures. While on the Project site, Dudek's Fire Protection Planner assessed the area's topography, natural vegetation and fuel loading, surrounding land use and general susceptibility to wildfire. Among the field tasks that were completed are:

- Vegetation estimates and mapping refinements
- Fuel load analysis
- Topographic features documentation
- Photograph documentation
- Confirmation/verification of hazard assumptions
- Ingress/egress documentation.
- Nearby Fire Station reconnaissance

Field observations were utilized to augment existing Project site data in generating the fire behavior models and formulating the recommendations detailed in this report.

2.2 Project Site Characteristics and Fire Environment

Fire environments are dynamic systems and include many types of environmental factors and Project site characteristics. 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 fire environment are topography, climate, and vegetation (fuels). 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 fire resistive landscapes 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 Project site.

The following sections discuss the Project site characteristics, local climate, and fire history within and surrounding the Project site. The Beaumont Pointe Specific Plan Project is similar concerning topography, vegetative cover, and proximity to adjacent residential areas, available access, and planned use. The following sections discuss the characteristics of the Project site at a regional scale. The intent of evaluating conditions at this macro-scale is providing a better understanding of the regional fire environment, which is not constrained by property boundary delineations.

2.2.1 Topography

Topography influences fire risk by affecting fire spread rates. Typically, steep terrain results in faster fire spread up-slope and slower fire spread down-slope in the absence of wind. Flat terrain tends to have little effect on fire spread, resulting in fires that are driven by wind. The Project site is situated along the northeasterly edge of an accumulation of sedimentary deposits that form an extensive hillside area known as "The Badlands". The Project site is characterized by rugged steep ridges and hillsides with narrow canyons that are generally situated on the southwest portion of the Project site and relatively gentle ridges and broad canyons/valleys on the northern portions of the Project site. A roughly northwest trending drainage divide directs drainage to the north into San Timoteo Canyon and south through the badlands into San Jacinto Valley. The elevations on the Project site range from approximately 2,230 feet above mean sea level (amsl) in the northwest portion of the Project site to approximately 2,510 feet amsl in the southeast portion of the Project site.

2.2.2 Climate

Throughout southern California, and specifically at the Project site, climate has a large influence on fire risk. The climate of Riverside County is typical of a Mediterranean area, with warm, dry summers and cold, wet winters. Temperatures average (average annual) around 61° F and reach up to 100°F. Precipitation has been averaging less than 16 inches and typically occurs between December and March. The prevailing wind is an on-shore flow between 7 and 11 mph from the Pacific Ocean.

Fires can be a significant issue during summer and fall, before the rainy period, especially during dry Santa Ana wind events. The seasonal Santa Ana winds can be particularly strong in the Project area as warm and dry air is channeled through the San Gorgonio Pass from the dry, desert land to the east. Although Santa Ana events can occur anytime of the year, they generally occur during the autumn months, although the last few years have resulted in spring (April - May) and summer events. Santa Ana winds may gust up to 75 miles per hour (mph) or higher. This phenomenon markedly increases the wildfire danger and intensity in the Project area by drying out and preheating vegetation (fuel moisture of less than 5% for 1-hour fuels is possible) as well as accelerating oxygen supply, and thereby, making possible the burning of fuels that otherwise might not burn under cooler, moister conditions.

2.2.3 Vegetation

2.2.3.1 Fuels (Vegetation)

The Project property and surrounding areas primarily support sage scrub plant community, non-native grasslands and disturbed habitat. Vegetation types were derived from an on-site field assessment of the Project site. The majority of the south facing slopes adjacent to the Project site are vegetated with sage scrub interspersed with grasses which are more predominant in the low-lying valleys. The vegetation cover types were assigned corresponding fuel models for use during Project site fire behavior modeling. Section 3.0 describes the fire modeling conducted for the Project Area.

2.2.3.2 Vegetation Dynamics

The vegetation characteristics described above are used to model fire behavior, discussed in Section 3.0 of this FPP. Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (bark thickness, leaf size, branching patterns), and overall fuel loading. For example, non-native grass dominated plant communities become seasonally prone to ignition and produce lower intensity, higher spread rate fires. In comparison, sage scrub can produce higher heat intensity and higher flame lengths under strong, dry wind patterns, but does not typically ignite or spread as quickly as light, flashy grass fuels.

As described, vegetation plays a significant role in fire behavior, and is an important component to the fire behavior models discussed in this report. A critical factor to consider is the dynamic nature of vegetation communities. Fire presence and absence at varying cycles or regimes disrupts plant succession, setting plant communities to an earlier state where less fuel is present for a period of time as the plant community begins its succession again. In summary, high frequency fires tend to convert shrublands to grasslands or maintain grasslands, while fire exclusion tends to convert grasslands to shrublands, over time. In general, biomass and associated fuel loading will increase over time, assuming that disturbance (fire, or grading) or fuel reduction efforts are not diligently implemented. It is possible to alter successional pathways for varying plant communities through manual alteration. This concept is a key component in the overall establishment and maintenance of the proposed fuel modification zones on-site. The fuel modification zones on the Project site will consist of irrigated and maintained landscapes as well as thinned native fuel zones that will be subject to regular “disturbance” in the form of maintenance and will not be allowed to accumulate excessive biomass (live or dead) over time, which results in reduced fire ignition, spread rates, and intensity. Conditions adjacent to the Project’s footprint (outside the fuel modification zones), where the wildfire threat will exist post-development, are classified as low to medium fuel loads due to the dominance of sage scrub-grass fuels.

2.2.4 Fire History

Fire history is an important component of an FPP. Fire history data provides valuable information regarding fire spread, fire frequency, most vulnerable areas, and significant ignition sources, amongst others. In turn, this understanding of why fires occur in an area and how they typically spread can then be used for pre-planning and designing defensible communities.

Fire history represented in this FPP uses the Fire and Resource Assessment Program (FRAP) database. FRAP summarizes fire perimeter data dating to the late 1800s, but which is incomplete due to the fact that it only includes fires over 10 acres in size and has incomplete perimeter data, especially for the first half of the 20th century (Syphard and Keeley 2016). However, the data does provide a summary of recorded fires and can be used to show whether large fires have occurred in the Project area, which indicates whether they may be possible in the future.

Appendix B – Project Vicinity Fire History exhibit, presents a graphical view of the Project area’s recorded fire history. As presented in the exhibit, there have been 101 fires recorded since 1900 by CALFIRE in their FRAP database (FRAP 2021) [2] in the vicinity of the Project, including in the upper northwest third of the Project site. These fires, occurring in 1900, 1914, 1951, 1957 (x3), **1962**[3] (x3), **1965**, 1967 (x2), **1968** (x4), 1969, 1970 (x3), 1973, **1975** (x2), 1979 (x11), **1980** (x7), 1981 (x3), 1982 (x2), 1983, 1985, 1986 (x2), 1987 (x2), 1988 (x4), 1989 (x2), 1990, 1992, **1993**, 1994 (x2), **1996** (x3), **1997** (x3), **1998** (x2), 2005 (x3), 2006 (x2), 2007, **2009** (x4), 2010 (x2), 2011, 2012, 2013 (x4), **2015** (x3), 2017 (x5), 2019 (x2) and 2020 burned within a five mile radius of the Project area. Approximately thirteen fires have burned onto a portion of the Project site. Based on an analysis of the CAL FIRE FRAP fire history data set, specifically the years in which the fires burned, the average interval between wildfires in the area

2 Based on polygon GIS data from CAL FIRE’s FRAP, which includes data from CAL FIRE, USDA Forest Service Region 5, BLM, NPS, Contract Counties and other agencies. The data set is a comprehensive fire perimeter GIS layer for public and private lands throughout the state and covers fires 10 acres and greater between 1878–2018.

3 Years in bold indicates a fire burned onsite, both 1968 and 1975 had two onsite fires.

(includes areas up to roughly 5 miles from the Project site) was calculated to be one year with intervals ranging between zero and seven years. Based on this analysis, it is expected that wildfire that could impact the Project may occur, if weather conditions coincide, roughly every year with the realistic possibility of shorter or longer interval occurrences, as observed in the fire history records.

2.3 Analysis of Wildfire Risk from Adding 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. These ignitions predominantly occur as accidents, but may also be purposeful, such as in the case of arson. Equipment and powerlines cause a significant number of fires in Riverside County. After that, roadways are a particularly high source for 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 a significant opportunity for ignitions every day. However, 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; Santa Barbara County Fire Department 2019).

Research indicates that the type of clustered, contained development project like Beaumont Point Specific Plan, 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 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. Ignitions were more likely to occur close to roads and structures, and at intermediate density land uses and structure densities.

As exhibits 1 through 3 illustrate, development density directly influences susceptibility to fire because in higher density developments (like the Project), 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 separating buildings 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 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 vast wildland urban interface already exists in the area adjacent to the Project, dominated by older, more fire-vulnerable structures, constructed before stringent fire code requirements were imposed, with varying levels of maintained fuel modification buffers. As discussed in detail throughout this FPP, the Project is an ignition resistant development designed to include professionally managed and maintained fire protection components, modern fire code compliant safety features and specific measures provided where ignitions are most likely to occur (such as along roadways). Therefore the development of the Project would not be expected to materially increase the risk of vegetation ignitions.

Exhibit 1. Example of "lower density" development where 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

Exhibit 2. 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

Exhibit 3. Example higher density development that is 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.

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 landscapes are managed and maintained to remove exotic fuels that may establish over time.

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 higher density Project, such as Beaumont Pointe also serve to minimize or prevent on-site fires from transitioning into the wildlands. Customized project FMZs 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 community or from within a community. The risk of a structure being destroyed is significantly lower when defensible space is implemented on both shallow and steep properties (Syphard et al., 2014). Even if just half the landscape is treated, the percentage of houses exposed to fire can decrease from 51% to 16% (Braziunas et al., 2021). Moreover, when FMZs are designed properly, they not only protect homes 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 all structures will include interior fire sprinklers significantly reduces the likelihood that a building fire spreads to the point of flashover, where a structure will burn beyond control and produce embers. Interior sprinklers are very efficient, keeping fires to the room of origin, or extinguishing the fire before the responding firefighters arrive. Similarly, the irrigated fuel modification zones are positioned throughout the development areas as well as the first zones on the perimeter of the project. 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. Lastly, the on-site fire station and 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.

2.4 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 be a significant source of ignitions and result in increased off-site impacts related to wildfire, as discussed herein.

Common ignition sources in southern California are related to powerlines and vehicles (Keeley & Syphard, 2018). Powerlines-based ignitions are a major concern with respect to off-site wildfire impacts. However, this risk can be mitigated by burying powerlines, as they would be on the Project. Burying powerlines significantly eliminates a potential ignition source within the Project site and benefits the larger vicinity. The remaining highest likelihood of vegetation ignitions in the Project area would be related to existing Highway 60 and other roads used by Project employees. However, the Project provides roadside fuel modification along all roads it creates and neighboring development is converting fuels along the primary access road such that it will be free of flammable roadside fuel beds. Ongoing maintenance along Highway 60 is provided and is expected to continue, if not increase in frequency as part of overall fire reduction efforts not within the control of the Project. These efforts reduce or minimize the ability for a vehicle related spark, catalytic converter failure, or other ignition source to ignite and spread fire from the roadsides into unmaintained fuels. The Project is not expected to significantly increase the already known fire risk associated with roads and in fact the Project- and road-adjacent fuel modification would aid in reducing the preexisting risk. Interior roadways are also not expected to result in significant vehicle ignitions. Jack Rabbit Trail will be restricted to serve as an emergency access road only; all but eliminating the fire risk associated with vehicle use on that road. The on-site roadways would comply with all fire department access requirements and be adjacent to fuel modification. Therefore, even if ignition were to occur on the Project interior roadways it is highly unlikely it would spread beyond the Project site and due to the level of hardscape and the adjacent fuel modifications areas, would result in patchy and slow fire spread and reduced fire intensity.

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 development, like the Project, 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.

2.4.1 Vegetation management

A study in Southern Italy found that the ignition potential of an area was significantly influenced by landcover types and human drivers were low or inconsistent (Elia et al., 2019). Urban interfaces with shrubland-dominated vegetation were found to be more fire-prone than those with grasslands or other natural spaces (Elia et al., 2019). The Project area is a mixture of shrublands, grasslands, and disturbed habitats. All the existing fuel on the site and within FMZ areas will be converted into hardscape and or modified to reduce fuel densities that are managed and maintained. The fuel conditions will be addressed through various vegetation management techniques, such as fuel modification zones (FMZs). The original intent of FMZs, also known as defensible space, was to protect natural resources from fires in developed areas and have since evolved to protecting communities and structures. In an FMZ, combustible vegetation would be removed and/or modified and partially or totally replaced with more appropriately spaced drought-tolerant, fire-resistant plants. The goal is to provide a managed area where fire spread is not facilitated toward the Project or away from the Project into wildland areas. Fuel modification works by redistributing the fire risk on a landscape and altering the interaction between fire, fuels, and weather (Cochrane et al., 2012). FMZs typically target surface fires but can also reduce the likelihood of canopy fires, lower ember cast, and have a shadow effect on the untreated landscape by lowing the probability of burning and the potential fire size (Cochrane et al., 2012). As a result, the risk of a structure being destroyed, whether from a fire from with the development or outside the development, is significantly lower when defensible space is implemented. However, other fuel management methods can be used to provide the functional equivalent to a traditional FMZ, such as a fuel modification area (FMA) or fuel maintenance zone (refer to Sections 5.4.2.2 and 5.4.2.3). These are also capable of not only providing protection from wildfires to the Project but also minimizing the potential for an on-site fire spreading offsite. In addition to a 100-foot Fuel Modification Area (FMA), the Project will provide a 20-foot wide fuel maintenance zone around the perimeter of the Project's wildland exposures. The fuel maintenance zone will be landscaped and irrigated to the pad edge, extending the protections provided by the FMA.

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

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

Fuel treatments and defensible space do more than just protect structures. When they are a component of a place-based fire-hardened design, such as the Project, they can not only serve to protect structures from wildfire but act as a buffer for natural areas and surrounding communities. These features will further reduce the potential for wildfire in open space areas and potential impacts on surrounding communities.

2.4.2 Firefighter Response

As discussed in Section 4 the Project is not anticipated to have a negative impact on response capacity. Further, the on-site roads would be able to provide sufficient access for fire apparatus in a high-risk area. The Project also provides water supply and fire flow which are critical resources in firefighting. The Project defensible space areas will allow firefighters to safely position themselves at the development edge and begin tactical protection efforts (Warziniack et al., 2019). This allows firefighters to not only readily protect structures and reduce the likelihood of building ignition but also gives them a safe position to respond to offsite wildfires. Using the Project's fire protection features firefighters would be able to use the Project as a tactical resource for protecting open space areas, whether it be from an on-site or off-site fires. The Project would create additional access for fire apparatuses that were not previously existing. Enhancing firefighters' ability to respond to an incident increases their ability to suppress a fire whether both on-site and off-site. The presence of on-site fire resources increases response capacity and could be the difference between a small fire or a full conflagration.

2.4.3 Ignition Resistant/Noncombustible Construction

The WUI fire problem is structures lacking ignition resistant features (i.e., ember resistant vents, interior sprinklers); therefore, the best mitigation is to reduce the likelihood of building ignition occurring (Zhou, 2013). Structural characteristics play a large role in whether a building burns, which is important in WUI environments as structures also serve as fuel (Gorte, 2011). The benefit of structure-based mitigation is that it not only lowers the on-site risk but also lowers the risk of wildfire across a landscape (Mockrin et al., 2020). In WUI areas, this is because structures are also fuels that can spread a fire into open space. With the incorporation of ignition-resistant construction, the likelihood of structural ignition occurring within the Project area is minimized. The Project will provide form in place concrete buildings that are non-combustible from direct wildfire flames, heat, and embers. This lowers the threat from on-site fires impacting off-site areas as the structures themselves are very unlikely to act as fuel. While the Project includes vent coverings to prevent ember penetration the Project buildings will also include NFPA 13 commercial automatic sprinklers in every building. This is crucial in preventing off-site impacts as embers can also be generated by a structure fire and can be blown over the fuel modification into native fuels. Automatic sprinklers can isolate a fire to the point of origin, limit its ability to spread to the rest of the building, and even extinguish a fire before the responding firefighters arrive, thus damping the likelihood of ember production. Commercial sprinklers are structure protection level sprinklers that have an extremely high success rate of controlling or suppressing interior structure fires. This also reduces impacts on fire response capacity as the automatic sprinklers will allow firefighters to focus on reducing additional ignitions beyond the point of origin.

Structure design, such as the Project's, is crucial in protecting an area against wind-driven fires. The Project not only incorporates necessary codes to prevent structural ignition but exceeds them (e.g., 100-foot paved/irrigated Fuel Modification Area, 20-foot Fuel Maintenance Zone); thus, lowering the probability of ignition and offsite impacts even more. The Project provides features that not only prevent fire intrusion but prevent structures fires from escaping into off-site areas. This allows the Project to not only protect the immediate area but the surrounding environment.

2.4.4 Shelter in Place Capability

Sheltering-in-place is the practice of going or remaining indoors during or following an emergency event. This procedure is recommended if there is little time for the public to react to an incident and it is safer for the public to stay indoors for a short time rather than travel outdoors. According to common Emergency Operations Plan language, shelter-in-place is an approach that has been used and is actively contemplated for emergencies, including wildfires. Shelter-in-place advises people to stay secure at their current location.

Consistent with the Project's approach, this tactic shall only be used if an evacuation will cause a higher potential for loss of life. Consideration should be given to assigning incident personnel to monitor the safety of citizens remaining in place. The concept of shelter-in-place is an available option in those instances where physical evacuation is impractical. This procedure is particularly effective for concrete commercial buildings. Sheltering-in-place provides a safe haven within the impacted area.

This Fire Protection Plan provides significant evaluation and conclusions regarding the shelter-in-place capability of the Project's buildings. Among other things, the Project has been designed to include ignition-resistant structures with the use of non-combustible construction materials (e.g., concrete), effective defensible space and fuel management zones, ember protection, and other redundant structure, infrastructure, building code, and water supply and flow requirements established as containing adequate protective features to act as temporary shelters during wildfires. All the on-site structures could be utilized for temporary refuge during a wildfire. In addition, there may be protected open-air areas that would be enhanced to serve as temporary sheltering sites as a contingency plan if evacuation is considered undesirable. These sites would be designated with input from RCFD and may include green spaces, lee-side of buildings, or other protected areas.

Sheltering-in-place also has many advantages because it can be implemented immediately, allowing people to remain in their familiar surroundings, and providing individuals with everyday necessities such as telephone, radio, television, food, and clothing. However, the amount of time people can stay sheltered-in-place is dependent upon availability of food, water, medical care, utilities, and access to accurate and reliable information. It is not anticipated that any wildfire related shelter-in-place action would require longer than a few hours of on-site refuge.

The decision on whether to evacuate or shelter-in-place is carefully considered with the timing and nature of the incident. Sheltering-in-place is the preferred method of protection for people that are not directly impacted or in the direct path of a hazard. This will reduce congestion and transportation demand on the major transportation routes for those that have been directed to evacuate by police or fire personnel. Like with most new developments that incorporate ignition resistant construction, wide fuel modification zones, ember protection, and fire defensibility throughout, responding fire and law enforcement personnel will be able to direct persons to temporarily refuge on-site in designated buildings in the rare situation where shelter-in-place is determined to be safer than evacuating.

Shelter-in-place at this location in the planned structures will also be an option available to emergency managers during a wildfire event. A shelter-in-place plan will be prepared and provided to all on-site personnel outlining the actions to take if a shelter in place notification is provided by emergency management sources.

The Project buildings will be constructed of concrete which is non-combustible and highly resistant to heat. Because of the concrete/ignition resistant construction, fuel modification zone setbacks and the type of lower fire intensity vegetative fuels in the vicinity of the site, sheltering in place is considered to be a safe option if a fast-moving wildfire precludes complete evacuation of the Project site. The heat flux produced by the nearest unmaintained vegetative fuels is not at a high enough temperature to ignite a concrete building even if it is directly next to the building. In this case, the heat would dissipate rapidly in the provided building setbacks that range between 33 and over 350 feet wide and the concrete structures would be capable of absorbing any residual heated air that may intersect with the buildings. The primary concern is anticipated to be with smoke and air quality rather than exposure to flames and heated air. Measures to safely refuge persons within the buildings and minimize smoke and air quality issues would be enacted in this scenario. For example, when wildfire ignites, it is common for HVAC systems to be turned off and they can be fitted with sensors that turn them off automatically when smoke is detected. This minimizes the potential for drafting smoke through the ventilation system into the buildings.

Project Design Feature: The Project will include features to turn off the HVAC system when smoke is detected or will prepare an emergency response plan that directs this action to be taken if a wildfire produces smoke that is impacting the Project site.

Most of the primary components of the Project's layered fire protection system are required by Fire and Building codes, because they have been tested in the lab and in real-time wildfires and found to result in saved structures. They are worth listing because they have been proven effective for minimizing structural vulnerability to wildfire. They also make shelter-in-place possible as an evacuation contingency option when evacuation is not possible.

Even though current Building and Fire Codes require these measures, at one time, many of them were used as mitigation measures for buildings in fire hazard areas, because they were known to reduce structure vulnerability to wildfire. These measures were adopted into the 2007 California Building Code and have been retained and enhanced in code updates since then. The following Project features are required for new development in fire hazard areas and would form the basis of the system to provide adequate access by emergency responders and provide the protection necessary to minimize structural ignitions:

- Application of the latest adopted ignition-resistant building codes;
  - Non-flammable roofs, which would be Class "C" listed and fire-rated roof assembly, installed per manufacturer's instructions, to approval of the City. Roofs would be made tight with no gaps or openings on ends or in valleys, or elsewhere between roof covering and decking, in order to prevent intrusion of flame and embers. Any openings on ends of roof tiles would be enclosed to prevent intrusion of burning debris. When provided, roof valley flashings would not be less than 0.019 inch (No. 26 gage galvanized sheet) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of 72 pound ASTM 3909 cap sheet running the full length of the valley.
- Exterior wall coverings are to be non-combustible form in place concrete;

- Multipane glazing with a minimum of one tempered pane;
- Ember-resistant vents (recommend BrandGuard, O'Hagin, or similar vents);
- Interior, automatic fire sprinklers to code for occupancy type;
- No eaves or soffits
- There would be no use of paper-faced insulation or combustible installation in attics or other ventilated areas;
- There would be no use of plastic, vinyl (with the exception of vinyl windows with metal reinforcement and welded corners), or light wood on the exterior.
  - Any vinyl frames to have welded corners and metal reinforcement in the interlock area to maintain integrity of the frame certified to ANSI/AAMA/NWWDA 101/I.S 2 97 requirements.
- Skylights to be tempered glass.
- Rain gutters and downspouts to be non-combustible. They would be designed to prevent the accumulation of leaf litter or debris, which can ignite roof edges.
- Doors to be of approved noncombustible construction or would be solid core wood having stiles and rails not less than 1 3/8 inches thick or have a 20-minute fire rating. Doors to comply with City Building Code,
- There would be no combustible awnings, canopies, or similar combustible overhangs.
- No combustible fences to be allowed within 5 feet of structures.
- All chimneys and other vents on heating appliances using solid or liquid fuel, including outdoor fireplaces and permanent barbeques and grills, to have spark arrestors that comply with the City Fire Code. The code requires that openings would not exceed 1/4-inch. Arrestors would be visible from the ground.
- Modern infrastructure, access roads, and water delivery system;
- Maintained FMZs;

Notably, interior fire sprinklers, which would be provided in all structures (required by code since 2010), have an extremely high reliability track record (NFPA 2021) of controlling fire in 96% of reported fires, and statistics indicate that fires in structures with sprinklers resulted in 82% lower property damage and 68% lower loss of life (Hall 2013). NFPA 13 fire sprinklers are designed for structure protection and life safety. For wildland fire defense, should embers succeed in entering a structure, sprinklers provide an additional layer of life safety and structure protection.

Sheltering In Place as an Active Emergency Option at Beaumont Pointe Logistics Center

Sheltering in place or providing temporary refuge when evacuation is considered undesirable is not a new idea. Sheltering in place has been a useful tool in the emergency management toolbox since the 1950's. In some wildfire scenarios, temporarily sheltering in a protected structure is safer than evacuating. Huntzinger (2010) states that: "If sheltering in place can provide the community with the same level of protection from an emergency incident as mass evacuation, this will be the recommended practice to use." Many civilian deaths have occurred when the population evacuated late and was exposed to wildfire on unprotected roadways (Braun, 2002, CFA 2004). By contrast, fire hardened communities/projects that have implemented similar fire protection, setback, and building standards have fared well in fire events, making them suitable for temporary shelter. Developments constructed in accordance with modern fire-safe development standards also survived the 2003 Simi Fire, the 2008 Freeway Complex Fire, and the 2020 Silverado Fire without a single building lost. (Nasiatke (2003) points out that another advantage to sheltering in place in an appropriately protected location is that there would be a substantial reduction in the number of evacuees that would need to be managed, allowing those evacuees at greater risk (i.e., in older, less protected communities) to more quickly evacuate.

2.4.5 Wildfire Risk Awareness Education

The Project includes an education awareness program that is a key piece in wildfire prevention in the area (Steffey et al., 2020). This program will provide wildfire information for the area and create greater risk awareness for occupants and their employees. The wildfire education program will be facilitated by the business owners of the Project and will disclose the potential wildfire risk and the requirements of the FPP. The educational program will also include information regarding the necessary landscape maintenance and structural-based fire protection features. Having ongoing education included in the Project creates a heightened level of wildfire risk awareness and fire protection measures. This benefits both the Project and the surrounding areas as people would be more aware of the wildfire risk and potential impacts. Further, it decreases the likelihood the Project occupants and users would cause an uncontrolled ignition and they would be aware of what steps to take if they observe an ignition. As such the impact on off-site areas would be further lowered by reducing the probability of ignition.

As described above it is not as simple to say development in areas with high fire hazards will equate to increased wildfire risk. It is possible to develop in these areas when fire is incorporated into Project design and create a site that is not only hardened against fire but designed to prevent fires. The dual benefit of creating a development that can prevent a fire is that it offers protection to the surrounding communities and the environment. The requirements and recommendations outlined in the FPP have been designed specifically for the proposed construction in the Project's location and can significantly reduce the potential threat to off-site areas.

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3 Anticipated Fire Behavior

3.1 Fire Behavior Modeling

Following field data collection efforts and available data analysis, fire behavior modeling was conducted to document the type and intensity of fire that would be expected adjacent to the Project site given characteristic features such as topography, vegetation, and weather. Dudek utilized BehavePlus software package version 6 (Andrews, Bevins, and Seli 2008) to analyze potential fire behavior for the northern, eastern, southern, and western edges of the Project site, with assumptions made for the pre- and post-Project slope and fuel conditions. Results are provided below and a more detailed presentation of the BehavePlus analysis, including fuel moisture and weather input variables, is provided in Appendix C. In addition, FlamMap geographic information system-based, fire spread modeling was utilized to determine the time of fire arrival at the site from RCFD-directed ignition points. BehavePlus modeling is described below followed by the fire spread modeling details.

3.2 Fire Behavior Modeling Analysis

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and to objectively predict flame lengths, intensities, and spread rates for four modeling scenarios. These fire scenarios incorporated observed fuel types representing the dominant on-site and off-site vegetation on vacant land to the north, east, south and west, in addition to slope gradients, and wind and fuel moisture values for both the 50th percentile weather (summer, on-shore winds) and the 97th percentile weather (fall, off-shore winds). Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent to the Project site.

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

Table 1. Fuel Model Characteristics

Fuel Model Assignment	Description	Tons/acre, Btu/lb.	Fuel Bed Depth (Feet)
8	Irrigated, landscapes	5.0 tons/acre; 8,000 Btu/lb.	<0.5
GR4	Moderate Load, Dry Climate Grass	0.4 tons/acre; 8,000 Btu/lb.	<2.0 ft.
SH5	Dry Climate Shrub (sage scrub)	6.4 tons/acre; 8,000 Btu/lb.	<6.0 ft.

The results of fire behavior modeling analysis for pre- and post-Project conditions are presented in Tables 2 and 3, respectively. Identification of modeling run (fire scenarios) locations is presented graphically in Figure 5, Fire Behavior Analysis Map.

Table 2. Fire Behavior Modeling Results for Existing Conditions

Fire Scenarios	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph[2])	Spotting Distance[3] (miles)
Scenario 1: grasslands, 5% uphill slope, 40 mph high wind speed				
Fuel Model Gr4	30.5	9,554	10.0	1.5
Scenario 2: Sage scrub, 5% uphill slope, 40 mph high wind speeds				
Fuel Model Sh5	42.5	19,662	6.0	2.0
Scenario 3: sage scrub-grasslands, 80% uphill to 20% downhill slopes, 20 mph sustained winds				
Fuel Model Sh5- sage scrub	20.9	4,209	1.8	0.8
Fuel Model Gr4- grasses	13.5	1,629	2.3	0.6
Scenario 4: Sage scrub, 30% downhill slope, 20 mph sustained winds				
Fuel Model Sh5- sage scrub	18.0	3,042	1.3	0.7

Note:
1 Spotting distance from a wind driven surface fire

Table 3. Fire Behavior Modeling Results for Post-Project Conditions

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph[2])	Spotting Distance[2] (miles)
Scenario 1: Irrigated landscaping, 20% uphill slope, 40 mph high wind speed				
Irrigated landscaping/pavement (FM8)	3.0	62	0.2	0.3
Scenario 2: Irrigated landscaping, 3% uphill slope, 40 mph high wind speeds				
Irrigated landscaping/pavement (FM8)	3.0	62	0.2	0.3
Scenario 3: Sage scrub (open space); irrigated landscaping, 80% uphill to 20% downhill slopes, 20 mph sustained winds				
Sage scrub (FMSh5)	20.9	4,209	1.8	0.8
Irrigated landscaping/pavement (FM8)	1.6	16	0.1	0.1
Scenario 4: Sage scrub, 20% uphill slope, 20 mph sustained winds				
Irrigated landscaping/pavement (FM8)	1.6	16	0.1	0.1

Note:
1 Spotting distance from a wind driven surface fire.

A CONCEPTUAL SITE PLAN
SCALE: 1" = 300'

PROJECT INFORMATION - SCHEME 20			08.31.2022
GROSS SITE AREA	23,235,239 SF	533.41 AC	
PAD AREA (SELLABLE AREA) - EXCLUDING RETAIL	9,751,529 SF	223.864 AC	
TOTAL BUILDING AREA	4,533,000 SF		
NET FAR		46.49%	
MAX FAR		NONE	
ZONE		(M)-MANUFACTURING	
STREET FRONT BLDG. SETBACK		25 FT	
STREET SIDE BLDG. SETBACK		NONE	
STREET FRONT PARKING SETBACK		50 FT	
STREET FRONT LANDSCAPE SETBACK		NONE	
INT/REAR BLDG SETBACK		NONE	
PARKING REQUIRED (9X19)		4,683	
SUGGESTED: PARKING REQUIRED		1,876	
TRAILER PARKING REQUIRED (12X55)		778	
SUGGESTED: PARKIGN REQUIRED		177	
PARKING PROVIDED		1,971	
TRAILERS PROVIDED		944	
LANDSCAPE REQUIRED (EXCL. OF BUILDINGS)	**15%**	**786,529 SF**	
LANDSCAPE PROVIDED	**30.0%**	**1,575,262 SF**	

	BUILDING 5	BUILDING 4	BUILDING 3	BUILDING 2	BUILDING 1
NET AREA	**46.62** 2,030,672 SF	**28.96** 1,261,423 SF	**32.49** 1,415,455 SF	**50.91** 2,217,425 SF	**64.89** 2,826,553 SF
FAR	43.2%	46.2%	47.2%	46.2%	48.9%
BUILDING AREA	**876,920 SF**	**582,920 SF**	**668,040 SF**	**1,024,200 SF**	**1,380,920 SF**
FOOTPRINT	871,920 SF	577,920 SF	663,040 SF	1,019,200 SF	1,375,920 SF
WAREHOUSE	866,920 SF	572,920 SF	658,040 SF	1,014,200 SF	1,370,920 SF
OFFICE	5,000 SF	5,000 SF	5,000 SF	5,000 SF	5,000 SF
MEZZANINE	5,000 SF	5,000 SF	5,000 SF	5,000 SF	5,000 SF
OFFICE	5,000 SF	5,000 SF	5,000 SF	5,000 SF	5,000 SF
PARKING REQUIRED PER ZONING (9X19)	907	613	698	1,054	1,411
WAREHOUSE @ 1/1000	867	573	658	1,014	1,371
OFFICE @ 1/250 (Building 5); OFFICE @ 1/,250 (Buildings 4, 3, 2, 1)	40	40	40	40	40
1 TRAILER STALL / DOCK DOOR	168	106	112	154	238
SUGGESTED: PARKING REQUIRED	*363*	*246*	*280*	*422*	*565*
WAREHOUSE @ 1/1,000 < 20,000 SF	*20*	*20*	*20*	*20*	*20*
WAREHOUSE @ 1/2,500 > 20,000 SF	*343*	*226*	*260*	*402*	*545*
OFFICE <10%	*0*	*0*	*0*	*0*	*0*
SUGGESTED: TRAILER PARKING REQUIRED					
TRAILER @ 1/4 DOCK DOORS	*30*	*27*	*27*	*36*	*57*
PARKING PROVIDED	363	288	282	472	566
TRAILER PROVIDED	202	106	134	200	302
LANDSCAPE REQUIRED (EXCL. OF BUILDING)	**15% 173,813 SF**	**15% 102,525 SF**	**15% 112,862 SF**	**15% 179,734 SF**	**15% 217,595 SF**
LANDSCAPE PROVIDED	**28.6% 330,871 SF**	**27.9% 190,686 SF**	**35.5% 266,881 SF**	**36.8% 440,730 SF**	**23.9% 346,093 SF**

SOURCE: HERDMAN ARCHITECTURE & DESIGN 2022

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FIGURE 4

Conceptual Site Plan

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The results presented in Tables 2 and 3 depict values based on inputs to the BehavePlus software and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis; rather, the models provide a worst-case wildfire behavior condition as part of a conservative approach. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design. Model results should be used as a basis for planning only, as actual fire behavior for a given location would be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

3.3 BehavePlus Fire Behavior Summary

3.3.1 Existing Condition

As presented in the Fire Modeling Analysis Map (Figure 5), wildfire behavior in sage scrub, modeled as Sh5, and annual grasslands, modeled as Gr4, varies based on timing of fire (refer to Table 2, Fire Behavior Results for Existing Conditions). A worst-case fire under gusty Santa Ana winds and low fuel moistures is expected to be fast moving between 6.0 (sage scrub fuel type) and 10.0 mph (grass fuel type). Flame length values with intense radiant heat would range between 30.5 feet to 42.5 feet for grass and sage scrub fuels burning, respectively, in specific portions adjacent to the property. Spotting is projected to occur up to nearly 0.8 miles during a fire influenced by onshore winds and nearly 2.0 miles during a fire fanned by offshore, gusty winds.

3.3.2 Post-development Condition

As presented in Table 3, Fire Behavior Results for Existing Conditions, Dudek conducted modeling of the Project site for post-development fuel recommendations for the Project. The fuel modification area includes paved streets, parking lots and irrigated landscaping on the periphery of the proposed commercial development. [Note: fuel modification areas are designated throughout the Project site that will be maintained per specified requirements of this FPP, but do not consist of traditional fuel modification zones, which are typically vegetation only, with some of the areas on this site consisting of pavement, hardscape or similar.] For modeling the post-development condition, fuel model assignments were re-classified for the fuel modification area as Fuel Model 8. Fuel model assignments for all other areas remained the same as those classified for the existing condition.

As depicted, the fire intensity and flame lengths in untreated, preserved open space areas would remain the same. Conversely, the fuel modification area experienced a significant reduction in flame length and intensity. The flames predicted during pre-development modeling during extreme weather conditions are reduced to less than 3.0 feet tall at the outer edges of the development due to the lack of combustible material present and the higher live and dead fuel moisture content for the irrigated landscaping.

3.4 Project Area Fire Risk Assessment

Wildland fires are a common natural hazard in most of southern California with a long and extensive history. Southern California landscapes include a diverse range of plant communities, including vast tracts of grasslands and shrublands, like those found adjacent to the Project site. Wildfire in this Mediterranean-type ecosystem ultimately affects the structure and functions of vegetation communities (Keeley 1984) and will continue to have a substantial and recurring role (Keeley and Fotheringham 2003). Supporting this are the facts that 1) native landscapes, from forest to grasslands, become highly flammable each fall and 2) the climate of southern California has been characterized by fire climatologists as the worst fire climate in the United States (Keeley 2004) with high winds (Santa Ana) occurring during autumn after a six-month drought period each year. Based on this research, the anticipated growing population of northwest Riverside County WUI areas, and the regions fire history, it can be anticipated that periodic wildfires may start on, burn onto, or spot into the Project site. The most common type of fire anticipated in the vicinity of the Project area is a wind-driven fire from the south moving through the annual grasses and sage scrub shrubs found in the San Timoteo Badlands south of the Project site.

Therefore, it will be critical that the latest fire protection technologies, developed through intensive research and real world wildfire observations and findings by fire professionals, for both ignition resistant construction and for creating defensible space in the ever-expanding WUI areas, are implemented and enforced. The Project, once developed, would not facilitate wildfire spread and would reduce projected flame lengths to levels that would be manageable by firefighting resources for protecting the Project site's structures, especially given the ignition resistance of the structures and the planned ongoing maintenance of the entire Project site landscape.

3.5 Fire Spread Modeling - FlamMap

3.5.1 Modeling Analysis

The FlamMap software package (v. 6.1) was used to evaluate potential fire progression from four distinct ignition points located near the proposed project site. FlamMap utilizes the same fire spread equations built into the BehavePlus software package, but allows for a geographical presentation of fire behavior outputs as it applies the calculations to each pixel in the associated GIS landscape. Specifically, FlamMap's Minimum Travel Time tool was used in order to evaluate the amount of time necessary for a fire to reach the two entrance road locations for the proposed project. In addition, the BehavePlus software package was used to model potential fire behavior from one location where GIS data constraints limited the FlamMap analysis.

3.5.2 Modeling Inputs

FlamMap requires a minimum of five (5) separate input files that represent field conditions in the analysis area, including elevation, slope, aspect, fuel model, and canopy cover. Each of these data files was obtained from the LANDFIRE (Landscape Fire and Resource Management Planning Tools) data distribution site. LANDFIRE is shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior and provides landscape-scale, GIS data layers, including those representing elevation, slope, aspect, fuel model, and canopy cover. The LANDFIRE data was from the 2016 Refresh data set and has a ground resolution of 30 meters. The fuel model input file was edited to reflect current field conditions and anticipated post-development conditions. Specifically, fuel models in the two areas currently being developed (east and northeast of the project's entry) were reclassified to a non-burnable model value (NB91). Fuel models in the paved, built, and landscaped portions of the proposed site plan were also reclassified to a non-burnable model value (NB91). In addition to the Landscape file, wind and weather data were incorporated into the model inputs.

The Minimum Travel Time (MTT) tool in the FlamMap software package is a two-dimensional fire growth model which calculates fire growth based on calculated fire spread rates from an ignition source (point, line, or polygon). The MTT tool uses fire spread rates to find minimum travel paths between data cells in the GIS landscape, with an output data file representing the number of minutes for a wildfire to reach a particular location from the ignition source. As FlamMap provides a static representation of fire behavior, modeling using the MTT tool holds wind and weather inputs constant over the modeling period.

The following summarizes the inputs for each of the four modeling runs:

- **Run 1:** Summer weather condition (50th percentile); 20mph wind speed, wind direction of 190 degrees; spot fire growth set at 20%; ignition point located near the intersection of Gilman Springs Road and Jack Rabbit Trail (18,300’ from the 4th Street entrance; 19,500’ from the Entertainment Way entrance).
- **Run 2:** Peak weather condition (97th percentile); 40mph wind speed, wind direction of 20 degrees; spot fire growth set at 20%; ignition point located near the end of the east-bound Highway 60 offramp at Jack Rabbit Trail (1,730’ from the 4th Street entrance; 430’ from the Entertainment Way entrance).
- **Run 3:** Peak weather condition (97th percentile); 40mph wind speed, wind direction of 20 degrees; spot fire growth set at 20%; ignition point located near the new residential development along San Timoteo Wash, near the end of Artisan Place (4,100’ from the 4th Street entrance; 2,770’ from the Enterprise Way entrance).
- **Run 4:** Peak weather condition (97th percentile); 40mph wind speed, wind direction of 120 degrees; spot fire growth set at 20%; ignition point located along an existing dirt road extending south of new residential development located east of proposed project, opposite Jack Rabbit Trail (2,000’ from the 4th Street entrance; 3,150’ from the Enterprise Way entrance).

FlamMap also requires wind and weather inputs. The fuel moisture and wind speed values for this analysis are consistent with those used in the projects Fire Protection Plan (Table C-3, Appendix C). Wind direction was input into the FlamMap model, as noted above.

Run #2 was also modeled using the BehavePlus software package. As noted, the LANDFIRE data set has a ground resolution of 30 meters. Due to the proximity of the ignition point to the proposed development area, the LANDFIRE data allowed for only a limited analysis in this area. The BehavePlus analysis used the same wind and weather data as that used in the Fire Protection Plan and used site topography and proposed grading data to calculate a slope value of 15% along the project’s frontage between the modeled ignition location and the Enterprise Way entrance. This area would be partially graded to accommodate the development and this slope value includes manufactured slopes. Fuel models GR2 (grass) and GS2 (grass/shrub) were both analyzed in this modeling effort. These models exist in the area currently and it was assumed for modeling purposes that manufactured slopes would support native vegetation post-development. The modeling area is outside any proposed fuel modification zones.

3.5.3 Modeling Outputs

The output files generated for each of the four FlamMap runs included one grid and one contour file representing fire progression over time, considering modeling inputs and ignition location. The files include data presenting time (in minutes) for a modeled fire to reach a specific location. This data was analyzed to determine the time necessary for a fire to burn from its ignition point to each of the two project entry roads (Entertainment Way and 4th Street). For some runs, the modeled fire did not reach one of the entrances. This is due to the classification of non-burnable fuel models associated with paved, built, and landscaped portions of the site. Table 4 summarizes these fire progression times for each model run. Table values of “n/a” indicate that the modeled fire did not reach the entrance. Maps depicting the fire progression outputs are included in Appendices D-1 through D-8.

Table 4. FlamMap Modeling Run Times to Project Entrances

Modeling Run	Arrival Time (minutes)	
	Entertainment Way (North Entrance)	*4th Street (South Entrance)*
1 (Appendices D-1 and D-2)	n/a	717
2 (Appendices D-3 and D-4)	10	n/a
3 (Appendices D-5 and D-6)	62	n/a
4 (Appendices D-7 and D-8)	n/a	33

For the BehavePlus modeling analysis for Run #2, the model resulted in spread rates for GR2 (grass) of 369 feet/minute and for GS2 (grass/shrub) of 276 feet/minute. Based on a distance of 295 feet from the Enterprise Way entrance to the modeled ignition location, a fire igniting in this area would reach the site in 0.8 minutes (in grass fuels) and 1.1 minutes in grass/shrub fuels. This analysis assumes that wind is pushing the fire directly from the ignition point toward the entrance (wind is aligned with the axis between the 2 points). In the FlamMap analysis, wind speed was roughly perpendicular to the axis between the two points resulting in lateral fire movement. This explains the time difference between the two modeling approaches.

Fuel Moisture and Wind Inputs

Variable	Summer Weather Condition (50th Percentile)	Peak Weather Condition (97th Percentile)
1h Moisture	5%	1%
10h Moisture	6%	2%
100h Moisture	12%	6%
Live Herbaceous Moisture	48%	30%
Live Woody Moisture	96%	50%
20-foot Wind Speed (mph)	20	40
BehavePlus Wind Adjustment Factor	0.4	0.4

Fire Behavior Modeling Results for Existing Conditions

Fire Scenarios	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: grasslands, 5% uphill slope, 40 mph high wind speed				
Fuel Model Gr4	30.5	9,554	10.0	1.5
Scenario 2: Sage scrub, 5% uphill slope, 40 mph high wind speeds				
Fuel Model Sh5	42.5	19,662	6.0	2.0
Scenario 3: sage scrub-grasslands, 80% uphill to 20% downhill slopes, 20 mph sustained winds				
Fuel Model Sh5- sage scrub	20.9	4,209	1.8	0.8
Fuel Model Gr4- grasses	13.5	1,629	2.3	0.6
Scenario 4: Sage scrub, 30% downhill slope, 20 mph sustained winds				
Fuel Model Sh5- sage scrub	18.0	3,042	1.3	0.7

Notes:

1. Spotting distance from a wind driven surface fire.

Fire Behavior Modeling Results for Post-Project Conditions

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Irrigated landscaping, 20% uphill slope, 40 mph high wind speed				
Irrigated landscaping/pavement (FM8)	3.0	62	0.2	0.3
Scenario 2: Irrigated landscaping, 3% uphill slope, 40 mph high wind speeds				
Irrigated landscaping/pavement (FM8)	3.0	62	0.2	0.3
Scenario 3: Sage scrub (open space); irrigated landscaping, 80% uphill to 20% downhill slopes, 20 mph sustained winds				
Sage scrub (FMSh5)	20.9	4,209	1.8	0.8
Irrigated landscaping/pavement (FM8)	1.6	16	0.1	0.1
Scenario 4: Sage scrub, 20% uphill slope, 20 mph sustained winds				
Irrigated landscaping/pavement (FM8)	1.6	16	0.1	0.1

SOURCE: AERIAL-BING MAPPING SERVICE

DUDEK 0 350 700 1,400 Feet

FIGURE 5

BehavePlus Analysis Map

Fire Protection Plan for the Beaumont Pointe Specific Plan

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4 Emergency Response and Service

4.1 Emergency Response

The Project site is located within RCFD response area, which includes Beaumont's corporate limits and the County areas within the City's sphere of influence. The City of Beaumont contracts with RCFD for emergency and administrative services. Table 5, Closest Responding RCFD Fire Stations Summary, presents a summary of the location, equipment, staffing levels, maximum travel distance, and travel time for the two closest, existing RCFD stations responding to the Project. Travel distances are derived from Google road data while travel times are calculated applying the nationally recognized Insurance Services Office (ISO) Public Protection Classification Program's Response Time Standard formula (T=0.65 + 1.7 D, where T= time and D = distance). The ISO response travel time formula discounts speed for intersections, vehicle deceleration and acceleration, and does not include turnout time.

Table 5. Closest Responding RCFD Fire Stations Summary

Station No.	Location	Equipment	Staffing*	Maximum Travel Distance**	Travel Time**
66	628 Maple Avenue Beaumont, CA 92223	E66	One staffed Type 1 engine; three staff total.	3.7 miles	6.94
20	1550 E. 6th Street Beaumont, CA 92223	E20, E3160, E3170	One staffed Type 1 engine, two staffed Type 3 engines; 11 staff total.	5.0 miles	9.15

Note:
* Staffing levels from 2016 Riverside County Fire Department Tri Data Report.
** Assumes travel distance and time to the Project site entrance.

RCFD Beaumont Station 66 is staffed 24/7 with career firefighters, would provide initial response, and is located at 628 Maple Avenue. Station 66 has one staffed Type 1 engine, one Type I engine (unstaffed reserve), and one squad unit (also not staffed). Secondary response would be provided from RCFD Station 20, which is located at 1550 E. 6th Street in Beaumont and can respond within 9 minutes to the entrance. Beaumont Station 20 has one staffed Type 1 engine, two staffed Type 3 engines, and a state-owned dozer and dozer tender, and will be capable of responding within 7 minutes to the proposed entrance of the Project.

Within the area's emergency services system, fire and emergency medical services are also provided by other RCFD Fire Stations. Generally, each agency is responsible for structural fire protection and wildland fire protection within their area of responsibility. However, mutual aid agreements enable non-lead fire agencies to respond to fire emergencies outside their district boundaries. In the Project area, fire agencies cooperate under a statewide master mutual aid agreement for wildland fires. There are also mutual aid agreements in place with neighboring fire agencies and typically include interdependencies that exist among the region's fire protection agencies for structural and medical responses but are primarily associated with the peripheral "edges" of each agency's boundary.

On March 7, 2017, the Riverside County Board of Supervisors (Board) received and filed RCFD's "Alternative Staffing Model Recommendation." The Alternative Staffing Model Recommendation was fiscally driven and developed by RCFD due to funding difficulties to retain 3-person engine companies. The RCFD FY 17-18 Service

Alternatives report, dated March 7, 2017, recommends the following response times based on four Board Approved Land Use Classifications as described in Table 6:

Table 6. Land Use Classification Information with Staffing/Time Response Standards

Land Classification	Population Density	Fire Staffing Characteristics	Response Time
HEAVY URBAN	>700 per square mile	Land use includes large commercial and industrial complexes, large business parks, high-rise and wide rise community centers and high-density residential dwelling units of 10 to 20 units per acre.	5:00 minutes, 90% of the time
URBAN	>500 per square mile	Land use includes large commercial and industrial complexes, large business parks, high-rise and wide rise community centers and high-density residential dwelling units of 8 to 20 units per acre.	6:30 minutes, 90% of the time
RURAL	100 to 500 per square mile	Light industrial zones, small community centers and residential dwelling unit density of 2 to 8 units per acre.	10:30 minutes, 90% of the time
OUTLYING	<100 per square mile	Areas of rural mountain and desert, agricultural uses, small scale commercial, industrial and manufacturing, service commercial, medium industrial and low density residential dwelling units; 1 dwelling unit per acre to 1 dwelling unit per 5 acres.	17:30 minutes, 90% of the time

Source: Riverside County Fire Department FY 17-18 Service Alternatives. March 7, 2017.

Based on the Project area's inclusion of large commercial and industrial complexes, it is assumed that the Project is be classified as "Heavy Urban," with a 5.0-minute first-in fire engine response time. As previously mentioned, response to the Project site from the closest existing Fire Station (Station 66) would achieve a 7-minute travel time to the entrance of the Project. The Project may not adversely impact the overall goal achievement due to the low number of calls (discussed below) that are projected.

According to the RCFD 2016 TriData Report[4], units should travel to calls within the defined response time goal for the appropriate population density classification 80% of the time. As noted in the report, Station 66 was in compliance of meeting the defined response time 81.4% of the time and Station 20 was in compliance 83.9% of the time. Additionally, areas that have fewer units available or are farther from neighboring stations are more impacted than others by an increase in emergency calls. They have greater workload sensitivity– as the workload increases their ability to meet the demand decreases. Station 66 is considered to have a low sensitivity workload, and Station 20 is considered to have moderate sensitivity with the capacity for more workload.

4 Riverside County Fire Department, Operational, Standards of Cover, and Contract Fee Analysis, March 2016, TriData LLC

4.2 Estimated Calls and Demand for Service from the Project

The following estimated annual emergency call volume generated by the Project (Commercial-Industrial products) is based upon per capita data for 2017 from RCFD calls within their jurisdiction[5].

- Total population served by: 46,712 (as of 2015, RCFD 2016 TriData Report)
- Total annual calls: 3,225. Per capita call generation: 0.07
- Total annual fire calls, including structure, vegetation, vehicle fires, and other fire calls (2.60% of total calls): 84. Per capita call generation: 0.002
- Total annual Emergency Medical Services (75% of total calls): 2,429. Per capita call generation: 0.052
- Total other calls (Rescue, Traffic Collisions, Hazardous Materials, Public Service, etc.; 22.1% of total calls): 712. Per capita call generation: 0.015

Using the data above, the estimated annual emergency call volume for the Project site was calculated (Table 7). In order to provide this conceptual estimate, Dudek made assumptions regarding industrial/mixed-use populations within Beaumont Pointe Specific Plan Project. The Project's Environmental Impact Report estimates the total number of permanent jobs to be 5,456. The number on-site at any given time may likely be half the estimated employee population, due to employee shift work, estimated transient population and operating hours of individual businesses. Based on this information, the total maximum estimated total population (which includes employees and transient use) of the Project site at any given time, is projected to be 2,728 persons . Based on this population estimate, the calculated call volumes by type of call are provided in Table 5, Land Use Classification Information with Staffing/Time Response Standards.

Table 7. Conceptual Calculated Call Volume

Type of Call	Per Capita Call Generation Factor	Number of Estimated Annual Calls (2,728 persons)
Total Other Calls	0.015	41
Total Fires	0.002	6
Total EMS Calls	0.052	142
Total Calls	0.07	191

As mentioned, the new industrial/commercial development will increase the call volume at a rate of a conservatively calculated up to 191 calls per year (4 calls per week or 16 calls per month). Fire Stations 66 and 20 combined emergency responses in 2017 totaled 4,943 calls per year (1,982 and 2,961 respectively[6]), or 5.43 and 8.11 calls per day per station respectively. The level of service demand for the Project raises overall call volume but is not anticipated to impact the existing fire stations to a point that they cannot meet the demand. For perspective, five calls per day are typical in an urban or suburban area. A busy fire station company would be one with 10 to 15 or more calls per day. When the Project site is built out, Fire Station 66 could potentially respond to an additional 4 calls per week, although the number will likely be lower than that based on the conservative nature of the population and calls per capita data used in this estimate.

5 2017 Riverside County Fire Department Annual Report and City of Beaumont Incidents for fiscal year 2017, Page 14
6 RCFD TriData Report

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5 Fire Safety Requirements-Infrastructure, Building Ignition Resistance, and Defensible Space

The RCFD Fire Code and 2019 CFC and 2019 CBC adopted by reference (with several modifications) governs the building, infrastructure, and defensible space requirements detailed in this FPP. The Project will meet applicable codes or will provide alternative materials and/or methods, if warranted. The following summaries highlight important fire protection features.

Prior to bringing combustible materials onto the Project site, utilities shall be in place, fire hydrants operational, an approved all-weather roadway, or an approved road surface alternative in place, and interim fuel modification zones established and approved.

A response map update, including roads and fire hydrant locations, in a format compatible with current RCFD mapping shall be provided to RCFD (CAL Fire)

5.1 Roads

5.1.1 Access

Project site access, including road widths and connectivity, will comply with the requirements of the Road Circulation and Design Guidelines and will include:

- Primary access to the Project site is currently provided by Jack Rabbit Trail with immediate access from/to SR-60 and this route will be restricted to providing emergency access only after the Project is constructed. The project will build an internal "Jack Rabbit Trail" road which will connect to the existing Jack Rabbit Trail at the southern edge of the Caltrans ROW in its current location. The emergency-access-only gate will be located immediately south of the Caltrans ROW where the new Jack Rabbit Trail road connects with the existing Jack Rabbit Trail road. The gate is proposed to limit access to Jack Rabbit Trail for fire and emergency access only, but will not represent an obstructed roadway as there will be various RCFD-approved remote and on-site methods for opening the gate in an emergency, including fitment with sensors, remote opening via cell technology, 3rd party monitoring and gate control (24/7 security company, or others as preferred by RCFD). Fourth Street will be extended into the Project site and will serve as the primary access (78 feet wide) and designed to meet fire department access requirements including approved provisions for fire apparatus turnaround.
- All roads comply with access road standards of not less than 24 feet, unobstructed width and are capable of supporting an imposed load of at least 75,000 pounds.
- Interior circulation streets and parking lot roadways that are considered roadways for traffic flow through the Project site will meet fire department access requirements when serving the proposed structures.
- Typical, interior Project roads, including collector and local roads, will be constructed to minimum 24-foot, unobstructed widths and shall be improved with aggregate cement or asphalt paving materials.

- Private or public streets that provide fire apparatus access to buildings three stories or more in height shall be improved to 30 feet unobstructed width.
- Private and public streets for each phase shall meet all Project approved fire code requirements, paving, and fuel management prior to combustible materials being brought to the Project site.
- Vertical clearance of vegetation (lowest-hanging tree limbs), along roadways will be maintained at clearances of 13 feet, 6 inches to allow fire apparatus passage.
- Cul-de-sacs and fire apparatus turnarounds will meet requirements and RCFD Fire Prevention Standards.
- Any roads that have traffic lights shall have approved traffic pre-emption devices (Opticom) compatible with devices on the Fire Apparatus.
- Roadways and/or driveways will provide fire department access to within 150 feet of all portions of the exterior walls of the first floor of each structure.
- Roadway design features (e.g., speed bumps, humps, speed control dips, planters, and fountains) that could interfere with emergency apparatus response speeds and required unobstructed access road widths will not be installed or allowed to remain on roadways.
- Access roads shall be usable by fire apparatus to the approval of RCFD prior to lumber drop onsite. Developer will provide information illustrating the new roads, in a format acceptable to the RCFD for updating of Fire Department response maps.

5.1.2 Maximum Dead-End Road (cul-de-sac) Length

- Each planning area varies in the number of ingress/egress roads or streets. Dead end streets no longer than 350 feet shall have approved provisions for fire apparatus turnaround or cul-de-sac. Cul-de-sac streets may exceed 350 feet, but not 600 feet in length with provisions for appropriate mitigations to the approval of the Fire Marshal or Fire Chief.
- Fire apparatus turnarounds to include turning radius of a minimum 45 feet, measured to inside edge of improved width (RCFD Fire Prevention Standard).

5.1.3 Gates

Gates on private roads are permitted, but subject to Fire Code requirements and standards, including:

- Gates, including the one proposed for Jack Rabbit Trail, shall be equipped with conforming sensors for detecting emergency vehicle “Opticom” strobe lights from any direction of approach, if required.
- Jack Rabbit Trail emergency gate will be fitted with RCFD-approved technology that enables remote (or on-site) gate control 24/7 such that it does not represent an obstructed roadway.
- All entrance gates will be equipped with a key switch, which overrides all command functions and opens the gate.
- Gate activation devices will be equipped with a battery backup or manual mechanical disconnect in case of power failure.
- Further, gates will be:
  - Minimum 20 feet wide of clearance for one-way traffic when fully open at entrance.
  - Minimum of two feet wider than road width at exit.
  - Constructed from non-combustible or exterior fire-rated treated wood materials.
  - Inclusive of provisions for manual operation from both sides if power fails. Gates will have the capability of manual activation from the development side or a vehicle (including a vehicle detection loop).

5.1.4 Driveways

Any structure that is 150 feet or more from a common street in the development shall have a paved fire apparatus access road meeting the following specifications:

- Grades 15% or less with surfacing and sub-base consistent with Riverside CFC.

5.1.5 Premises Identification

Identification of roads and structures will comply with RCFD Fire Prevention Standards, as follows:

- All commercial/industrial structures required to be identified by street address numbers at the structure. Numbers to be minimum eight inches high with one-inch stroke, visible from the street. Numbers will contrast with background and shall be electrically illuminated during the hours of darkness where building setbacks exceed 100 feet from the street or would otherwise be obstructed; numbers shall be displayed at the property entrance. Numbers will contrast with background.
- Multiple structures located off common driveways or roadways will include posting addresses on structures and on the entrance to individual driveway/road or at the entrance to the common driveway/ road for faster emergency response.
- Proposed private and public streets within the development will be named, with the proper signage installed at intersections to satisfaction of the Department of Public Works.
- Streets will have street names posted on non-combustible street signposts; letters/numbers will be per RCFD standards.
- Temporary street signs shall be installed on all street corners within the Project prior to the placing of combustible materials on-site. Permanent signs shall be installed prior to occupancy of buildings.

5.1.6 Ongoing Infrastructure Maintenance

Project Owner/Property Management Company shall be responsible for long term funding and maintenance of internal private roads and fuel modification zones.

5.1.7 Pre-Construction Requirements

Prior to bringing lumber or combustible materials onto the Project site, improvements within the active development area shall be in place, including utilities, operable fire hydrants, an approved, temporary roadway surface, and construction phase fuel modification zones established. These features will be approved by the fire department or their designee prior to combustibles being brought on-site.

5.2 Ignition Resistant Construction and Fire Protection Systems

All new structures within the Project site will be constructed to Fire Code standards. Each of the proposed buildings will comply with the enhanced ignition-resistant construction standards of the 2019 CBC (Chapter 7A). These requirements address roofs, eaves, exterior walls, vents, appendages, windows, and doors and result in hardened structures that have been proven to perform at high levels (resist ignition) during the typically short duration of exposure to burning vegetation from wildfires. Appendix E provides a summary of the requirements for ignition resistant construction.

While these standards will provide a high level of protection to structures in this development, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

5.3 Fire Protection Systems

5.3.1 Water Supply

Water service for the Beaumont Pointe Specific Plan Project site will be provided by Beaumont Cherry Valley Water District. The Project site is within the District's Sphere of Influence and will be annexed into the District's water supply system boundary. A new water tank will be installed as part of the nearby Legacy Highland project that will be used to serve the Project's water demand. An 18-inch waterline will be extended westerly along 4th Street. The internal waterlines will supply sufficient fire flows and pressure to meet the demands for required on-site fire hydrants and interior fire sprinkler systems for all structures.

5.3.2 Hydrants

Fire Hydrants shall be located along fire access roadways and adjacent to each structure, as determined by the RCFD Fire Marshal and current fire code requirements to meet operational needs. Fire Hydrants will be consistent with applicable Design Standards.

5.3.3 Fire Sprinklers

All structures, of any occupancy type, will be protected by an automatic, internal fire sprinkler system. Fire sprinklers systems shall be in accordance with RCFD, and National Fire Protection Association (NFPA) Standard 13. Fire sprinkler plans for each structure will be submitted and reviewed by RCFD for compliance with the applicable fire and life safety regulations, codes, and ordinances as well as the RCFD Fire Prevention Standards for fire protection systems.

5.4 Defensible Space and Vegetation Management

5.4.1 Defensible Space

WUI fire protection requires a systems approach, which includes the components of infrastructure and water, structural safeguards (addressed in the FPP), and adequate defensible space setbacks. This section provides defensible space details for the Project.

5.4.2 Fuel Maintenance Zone and Fuel Modification Area Requirements

A typical fuel modification zone (FMZ) is a strip of land where combustible vegetation has been removed and/or modified and partially or totally replaced with more appropriately spaced, drought-tolerant, fire resistant plants in order to provide a reasonable level of protection to structures from wildland fire. A typical landscape/fuel modification installation requires a 100-foot wide fuel modification zone from the side or rear lot boundary extending outwards towards undeveloped areas. Although an FMZ is the typical method used to provide mitigation for potential wildfire impacts, other fuel management methods can be used to provide the functional equivalent to a traditional FMZ, such as a fuel modification area (FMA) or fuel maintenance zone (refer to Sections 5.4.2.2 and 5.4.2.3). In addition to a 100-foot Fuel Modification Area (FMA), the Project will provide a 20-foot wide fuel maintenance zone. An FMA occurs around the perimeter of the Project's wildland exposures and a fuel maintenance zone is measured outward from the edge of the developed pad. The fuel maintenance zone will be irrigated and landscaped area to the pad edge, extending the protections provided by the FMA. For the Project, the FMA will be 100 feet wide starting from the edge of the developed pad and moving inward.

Defensible space is defined as managed and maintained areas adjacent to structures that enable fire suppression activities through the removal of flammable fuels and maintenance of landscapes that would not readily transmit wildfire. Defensible space enables firefighters to safely position themselves at the development edge and begin tactical protection efforts. Defensible space on this Project includes modified fuel areas in two managed zones, a fuel maintenance zone, and a fuel modification area (FMA). The fuel maintenance zone would provide 20 feet of irrigated vegetation around the perimeter of the developed P.A.s (P.A. 1 through P.A. 8) and the FMA would provide 100 feet of paved surface and/or irrigated landscape from the fuel maintenance zone inward toward Project structures. As a wildfire burns into the irrigated zone, fire behavior is affected substantially reducing flame lengths, spread rates and intensity, thus causing wildfires to become spotty. Fuel modification zones (FMZs) or "brush management" was initially made part of the Public Resources Code 4290 and 4291 to protect natural resources from fires originating in neighboring developed areas and have since become focused on protecting communities and structures. However, FMZs and fuel maintenance zone and FMAs, or fuel modification areas, as will be used for the Project, continue to have the same benefit of buffering preserved open space areas from accidental ignitions within communities. Positioning the low plant density, irrigated zone directly adjacent to the development pad provides a significant buffer between structures and other landscape fire and native vegetation. The same way that fuel modification will setback a wildland fire from structures, the fuel modification will setback a structure fire from the more burnable native plants. Embers can be generated by a structure fire and can be blown over the fuel modification into native fuels, but the inclusion of automatic sprinklers in every building combined with the presence of staffed fire stations with fast response significantly reduces the potential for a structure fire to reach a size that would produce significant impacts. The highest likelihood of vegetation ignitions would be related to roadways. Further, as depicted in the fire behavior modeling for existing and post-Project conditions, the Project at buildout would reduce the overall risk of wildfire spreading offsite with implementation of the fire safety requirements, defensible space, and vegetation management outlined in this FPP.

Should future iterations of the site plan result in buildings that do not achieve a minimum of 100 feet of defensible space, then alternative materials and methods may be proposed to provide the functional equivalency of a full 100 feet of defensible space. Alternative materials and methods will be to the satisfaction of the RCFD and may include structural hardening enhancements or landscape features, like non-combustible walls.

Cohen (1995) performed structure ignition fire research studies that suggest, as a rule-of-thumb, larger flame lengths and widths require wider fuel modification zones to reduce structure ignition. For example, valid Structure Ignition Assessment Modeling 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). For this fire study example, bare wood was used, which is more combustible unlike the fire rated concrete masonry unit (CMU) exterior wall designs to be implemented on the project's building. For the Project, assuming 45-foot flame lengths, reduced fuel modification zones are justifiable for limited areas.

Based on the conceptual Project site plan, the buildings have more than adequate on-site defensible space (FMA and fuel maintenance zone), which consists of asphalt roadways, parking stalls, loading zones, irrigated landscaping, and irrigated slope protection landscaping.

Planning Area 1 – Hospitality. The single proposed hospitality building is surrounded by paved parking lots, streets, driveways, irrigated landscaping a minimum of 200 feet wide, and adjacent buildings, the closest of which is about 80 feet away.

Planning Area 2 – Commercial. There are seven proposed buildings in the commercial Planning Area with 11 different occupancies proposed in the conceptual plan. The east side of the buildings is bordered by a 75-foot-wide street and an approved development (grading underway) across the street. The south side is bordered by a 75-foot-wide street and irrigated slopes across the street. The west side is adjacent to a large parking lot at least 500 feet wide. The north side is adjacent to the hospitality building about 80 feet away.

Planning Area 3 through Planning Area 8 – Industrial. In the conceptual plan, there are five industrial buildings each of which is set back from the edge of the developed pad between 195 and 405 feet; in between are asphalt roadways, parking stalls, loading zones, and irrigated landscaping. Along the entire southern perimeter of the developed pad and Planning Areas 3 through 8 is the 78-foot wide 4th Street fire apparatus access road.

- Building 1 has a 243-foot setback on the north side with adjacent irrigated slopes an average of 65 feet wide and 284 foot setback on the south with adjacent irrigated slopes an average of 176 feet wide; the east and west exposures have adjacent buildings.
- Building 2 has a 286-foot setback on the north side with adjacent irrigated slopes an average of 132 feet wide and 330 feet on the south with adjacent irrigated slopes an average of 308 feet wide; the east and west exposures have adjacent buildings. In addition, a water tank and lift station are proposed south of Building 2.
- Building 3 has a 140-foot setback on the north side with adjacent irrigated slopes an average of 179 feet wide and 178 feet on the south with adjacent irrigated slopes an average of 182 feet wide; the east and west exposures have adjacent buildings.
- Building 4 has a 248-foot setback on the north side with adjacent irrigated slopes an average of 20 feet wide and 296 feet on the south with adjacent irrigated slopes an average of 50 feet wide; the east and west exposures have adjacent buildings.
- Building 5 has a 250 foot setback on the north side with adjacent irrigated slopes an average of 252 feet wide, 278 feet on the south with adjacent irrigated slopes an average of 190 feet wide, and 215 feet on the west side with adjacent irrigated slopes an average of 234 feet wide; the east exposure has an adjacent building. The 20-foot fuel maintenance zone is achieved on the north, west and south sides of the Building 5 pad. Based on the structure's ignition resistance and the modeled flame lengths, the achievable FMA and fuel maintenance zone is sufficient.

Appendix F, Conceptual Site Fuel Modification Plan shows the locations where the fuel modification area is to be located.

Vegetation management will also be implemented as an interim fuel management area throughout the construction phases for each structure as there may be a period as long as one or more years where developing phases are exposed on multiple sides to wildland fuels. The FMA and fuel maintenance area will be implemented according to the following requirements for the entire Project.

5.4.2.1 Fuel Modification Area – Irrigated/Paved Zone (100 feet wide)

The Fuel Modification Area is applicable sitewide for every perimeter structure. Most of the interior landscaped areas will meet FMA standards. The FMA occurs around the perimeter of the Project's wildland exposures at Project build out. The FMA will be 100 feet wide starting from the edge of the developed pad and moving inward. All highly flammable native vegetation, especially found on the Prohibited Plant List (Appendix G) shall be removed except for species approved by the fire marshal. This area will be paved or have irrigated landscaping. The Project's plant palette will be approved by the fire department. A permanent, automatic irrigation system will be installed throughout the Project to maintain hydrated plants.

FMA includes the following key components:

- All trees shall be planted and maintained at a minimum of 10 feet from the tree's drip line to any combustible structure.
- Tree spacing of a minimum 10 feet between canopies.
- Mature trees shall be limbed to eight feet or three times the height of understory plants to prevent ladder fuels, whichever is greater. No tree limb encroachment within 10 feet of a structure or chimney, including outside barbecues or fireplaces.
- Tree maintenance includes limbing-up (canopy raising) six feet or one-third the height of the tree.
- Maintenance including ongoing removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying plantings, maintenance of the programming and functionality of the irrigation system, regular trimming to prevent ladder fuels[7].
- A minimum of 36 inches wide pathway with unobstructed vertical clearance around the exterior of each structure (360°) provided for firefighter access (2019 CFC, Section 503.1.1). Within this clearance area, landscape such as low ground covers and shrubs are permitted so long as their placement and mature height do not impede firefighter access, consistent with purpose of this guideline.
- Trees and tree form shrub species that naturally grow to heights that exceed two feet shall be vertically pruned to prevent ladder fuels.
- Grasses shall be cut to four inches in height. Native grasses can be cut after going to seed.
- Ground covers within first three feet from structure restricted to non-flammable materials, including stone, rock, concrete, bare soil, or other. Combustible ground covers, such as mulch or wood chips, are prohibited adjacent to structures with an exterior stucco wall and weep screed.

5.4.2.2 Fuel Maintenance Zone (20 feet wide)

The fuel maintenance zone reduces the fuel load of a wildland area adjacent to the FMA, and thereby, reduces heat and ember production from wildland fires, slows fire spread, and reduces fire intensity. The fuel maintenance zone

7 Plant material that can carry a fire burning in low-growing vegetation to taller vegetation is called ladder fuel. Examples of ladder fuels include low-lying tree branches and shrubs, climbing vines, and tree-form shrubs underneath the canopy of a large tree.

is measured 20 feet outward from the edge of the developed pad for the Project. Some areas within this zone may have irrigated vegetation on manufactured slopes, others may have native vegetation.

The fuel maintenance zone includes the following key components if maintenance of native vegetation is required:

- Requires regular maintenance such as thinning or removal of plants focusing on removal of dead annual grasses.
- Fuel continuity should be interrupted so that groupings of shrubs are separated from adjacent groupings.
- Maintenance including ongoing removal and thinning of dead/dying planting, and regular trimming to prevent ladder fuels.
- Trees and tree-form shrub species that naturally grow to heights that exceed four feet shall be vertically pruned to prevent ladder fuels.
- Grasses shall be cut to four inches in height. Native grasses can be cut after going to seed.
- Single specimen native shrubs, exclusive of chamise and sage, may be retained, on 20-foot centers.
- No vegetation found on the Prohibited Plant List (Appendix G) shall remain in the fuel maintenance zone.

5.4.3 Vegetation Management Maintenance

Vegetation management, i.e., assessment of the fuel modification zone and fuel modification area's condition and removal of dead and dying and undesirable species; as well as thinning as necessary to maintain specified plant spacing and fuel densities, shall be completed annually by May 1 of each year, and more often as needed for fire safety, as determined by the RCFD. The vegetation management will be funded by the Project and shall be conducted by their contractor(s). The Project shall be responsible for all vegetation management throughout the development, in compliance with the Project FPP that is consistent with requirements.

The permanent FMA and fuel maintenance zone required for the Project will be maintained by the applicant during construction and by the owner of each pad or a Property Management Association which will be responsible for vegetation management once the Project is built out and the adjacent areas are developed. The Owner or Property Manager will be responsible for streetscape and vegetation management in perpetuity.

On-going/as-needed fuel modification maintenance during the interim period while the Project is built out and adjacent parcels are developed, which may be one or more years, will include necessary measures for consistency with the FPP, including:

- Regular Maintenance of dedicated Open Space.
- Removal or thinning of undesirable combustible vegetation and replacement of dead or dying landscaping.
- Maintaining ground cover at a height not to exceed 18 inches. Annual grasses and weeds shall be maintained at a height not to exceed three inches.
- Removing accumulated plant litter and dead wood. Debris and trimmings produced by thinning and pruning should be removed from the Project site or chipped and evenly dispersed in the same area to a maximum depth of four inches.
- Maintaining manual and automatic irrigation systems for operational integrity and programming. Effectiveness should be regularly evaluated to avoid over or under-watering.
- Complying with these FPP requirements on a year-round basis. Annual inspections are conducted following the natural drying of grasses and fine fuels, between the months of May and June, depending on precipitation during the winter and spring months.

5.4.4 Environmentally Sensitive Areas/Open Space

There should not be a need to modify the FMA and fuel maintenance zone as both are planned to meet the fuel management needs of the Project site and comply with the fire code. However, if unforeseen circumstances were to arise that require hazard reduction within an area considered environmentally sensitive or part of the Multispecies Conservation Plan, it may require approval from the County and the appropriate resource agencies (California Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers) prior to any vegetation management activities occurring within those areas.

5.4.5 Prohibited Plants

Certain plants are considered prohibited in the landscape due to characteristics that make them highly flammable. These characteristics can be physical (structure promotes ignition or combustion) or chemical (volatile chemicals increase flammability or combustion characteristics). The plants included in the Prohibited Plant List (Appendix G) are unacceptable from a fire safety standpoint and will not be planted on the Project site or allowed to establish opportunistically within fuel modification zones or landscaped areas.

5.4.6 Construction Phase Vegetation Management

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

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6 Wildfire Education Program

The business owners of the Beaumont Pointe Specific Plan Project will be provided a proactive educational component disclosing the potential wildfire risk and this report's requirements. This educational information must include maintaining the landscape and structural components according to the appropriate standards and embracing a "Ready, Set, Go!" stance on evacuation. Additionally, management of on-site entities occupying the site's structures will be required to register for emergency alerts via the Alert RivCo messaging system (Register | Registration Portal (genasys.com). Personnel and employees will be strongly encouraged to also register to receive emergency alerts.

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7 Evacuation Analysis

An evacuation analysis was prepared by CR Associates with technical input provided by Dudek (July 2022). Please refer to that separate technical report for details regarding evacuation planning, timing available and needed to evacuate the site, and discussion of other available contingency options that may be employed by emergency managers.

In summary, the evacuation analysis results indicate that depending on the wildfire scenario, which includes various locations and weather conditions, the site can be evacuated within a reasonable timeframe and enables emergency managers with contingency options by providing two evacuation routes and the ability to temporarily refuge the entire, or a portion of the anticipated on-site population within the hardened buildings and ignition resistant landscape/hardscape throughout the site.

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8 Conclusion

This FPP for the Beaumont Pointe Specific Plan Project provides guidance for vegetation maintenance for the proposed FMA, fuel maintenance zone and landscaped areas on the Project site. As described, vegetation maintenance measures will be provided on all sides of the proposed development. The requirements and recommendations provided in this FPP have been designed specifically for the Project. This analysis and its fire protection justifications are supported by fire science research, results from previous wildfire incidents, and fire agencies that have approved these concepts. The Project design features, asphalt roads and parking stalls, and a fully irrigated landscape, would provide a level of safety equal to a 100-foot wide FMZ. The Project is considered to represent a low wildfire risk to its occupants based on its ability to provide for evacuations and contingency on-site shelter in place.

Ultimately, it is the intent of this FPP to guide the fire protection efforts for the Project in a comprehensive manner. Implementation of the measures detailed in this FPP will reduce the risk of wildfire spreading from the Project site into surrounding areas and will improve the ability of firefighters to fight fires on the protect property and neighboring properties and resources, irrespective of the cause or location of ignition.

It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not be exposed to wildfire or embers. Precautions and minimizing actions identified in this report are designed to reduce the likelihood that fire will impinge upon the Project’s assets or threaten its visitors. Additionally, there are no guarantees that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property. Implementation of the required enhanced construction features provided by the applicable codes and the fuel modification requirements provided in this FPP will reduce the Project site's vulnerability to wildfire and help to limit the spread of fire from the Project site to surrounding areas. It will also help accomplish the goal of this FPP to assist firefighters in their efforts to defend structures.

It is recommended that the Beaumont Pointe Specific Plan maintain a conservative approach to fire safety. This approach must include maintaining the landscape and structural components according to the appropriate standards and embracing a “Ready, Set, Go!” stance on evacuation. The Project is not to be considered a shelter-in-place development. However, the fire agencies and/or law enforcement officials may, during an emergency, as they would for any new development providing the layers of fire protection as the Project, determine that it is safer to temporarily refuge employees or visitors on the Project site. When an evacuation is ordered, it will occur according to pre-established evacuation decision points or as soon as notice to evacuate is received, which may vary depending on many environmental and other factors. Fire is a dynamic and somewhat unpredictable occurrence and it is important for anyone living at the WUI to educate themselves on practices that will improve safety.

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Appendix A

Representative Project Site Photographs

Beaumont Point Specific Plan Project

PHOTOGRAPH LOG

PHOTOS TAKEN APRIL 1, 2020

Photograph 1. View to the west from east of Jack Rabbit Trail (traversing bottom of photo). The main project entrance would be in the lower right corner; 4th Street entrance would be on the left side of the photo.

Photograph 2. View of typical vegetation (grassland, scattered scrub) on small valley onsite.

Photograph 3. View of typical vegetation (grassland, scattered scrub) on rolling hillsides and flat valley onsite.

Beaumont Pointe Specific Plan Project
Photograph Log

Photograph 4. View of typical vegetation (grassland) onsite.

Photograph 5. View of typical vegetation (grassland, sage scrub) onsite.

Beaumont Pointe Specific Plan Project
Photograph Log

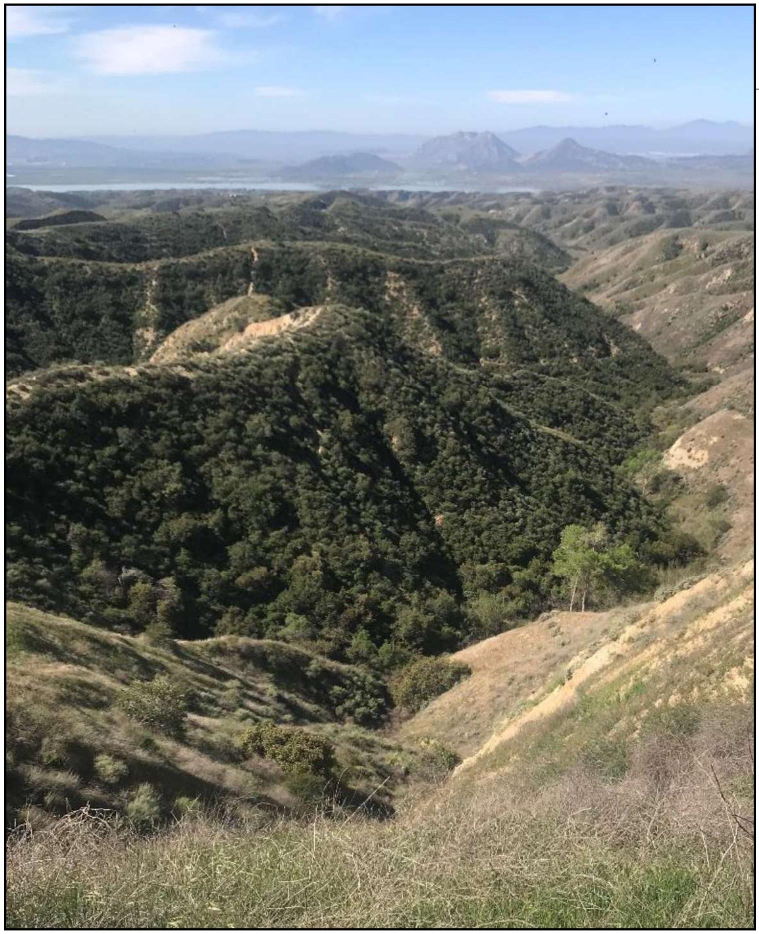
Photograph 6. View of unauthorized trail use onsite.

Photograph 7. View of unauthorized trail use onsite

Beaumont Pointe Specific Plan Project
Photograph Log

Photograph 8. View of the Badlands canyons south of the Project site.

Photograph 9. View of the Badlands canyons south of the Project site.



Photograph 10. View of typical coastal sage scrub vegetation on a west aspect slope in the Badlands south of the Project site.

Photograph 11. View of typical sparse scrub vegetation on an east aspect slope in the Badlands south of the Project site.

Photograph 12. View of the Hidden Canyon development currently in the grading phase east of the Project site.

Photograph 13. View of the Highlands Development to the northeast of the Project site.

Photograph 14. View of Coopers Creek and the Sun Cal development currently in the grading phase north of the Project site.

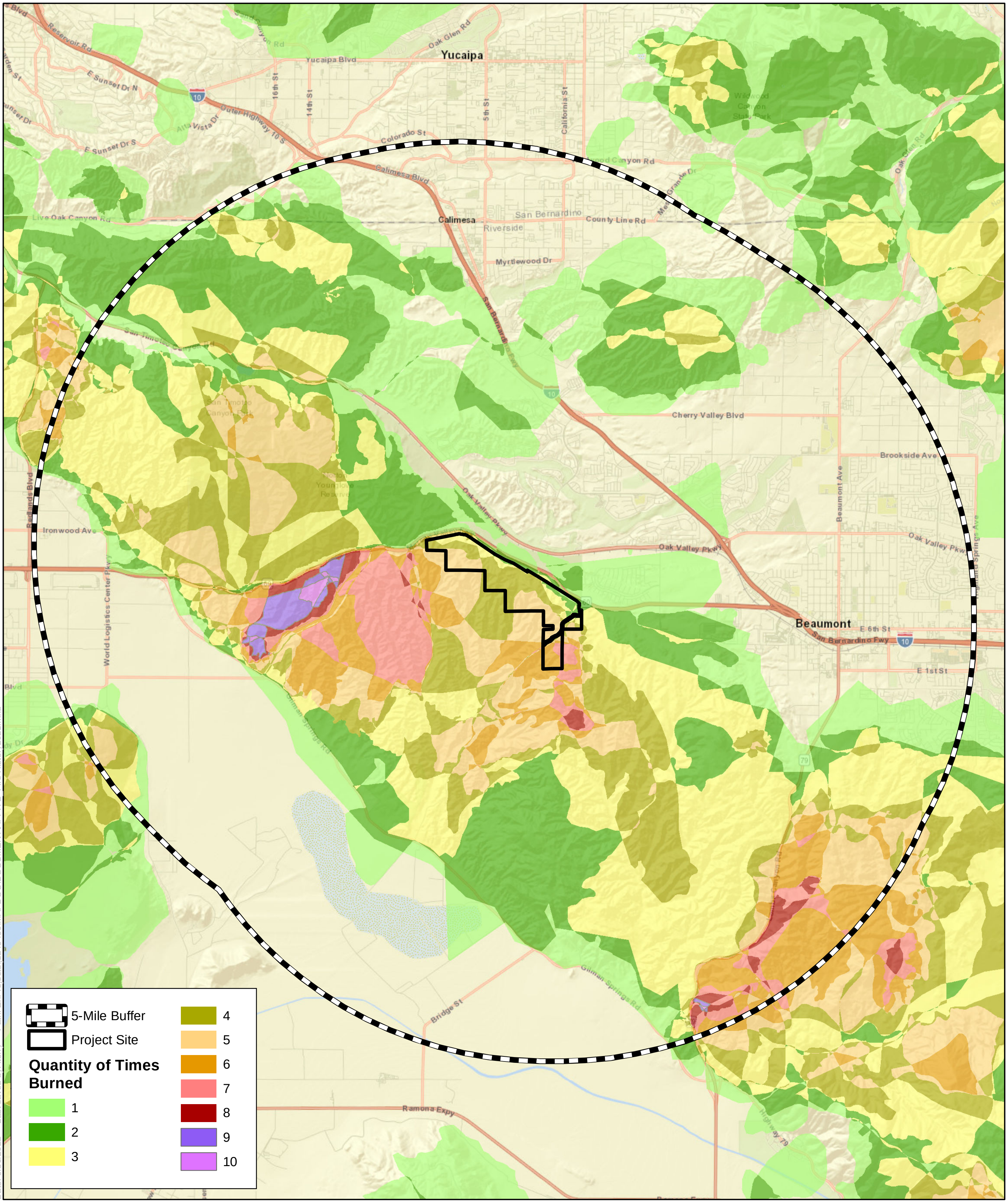
Photograph 15. View of the Heartland development north of the Project site across from Jack Rabbit Trail roadway.

Photograph 16. Looking northwest from the Project site toward SR-60, Oak Valley Parkway (San Timoteo Road), and the San Gorgoino Summit.

Photograph 17. View of terrain west of the Project site.

Appendix B

Beaumont Pointe Specific Plan
Project Vicinity Fire History Map



SOURCE: BASE- ESRI; FIRE DATA-CALFIRE 2021

DUDEK

0 1 2 Miles

APPENDIX B

Fire History Map

Fire Protection Plan for the Beaumont Pointe Specific Plan

Appendix C

BehavePlus Fire Behavior Analysis

1 Fire Behavior Modeling History

Fire behavior modeling has been used by researchers for approximately 50+ years to predict how a fire will move through a given landscape (Linn 2003). The models have had varied complexities and applications throughout the years. One model has become the most widely used for predicting fire behavior on a given landscape. That model, known as "BEHAVE," was developed by the U. S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. Since that time, it has undergone continued research, improvements, and refinement. The current version, BehavePlus, V6, 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 1980, Brown 1982, Rothermel and Rinehart 1983, Bushey 1985, McAlpine and Xanthopoulos 1989, Grabner, et. al. 1994, Marsden-Smedley and Catchpole 1995, Grabner 1996, Alexander 1998, Grabner et al. 2001, Arca et al. 2005). In this type of study, BehavePlus is used to model fire behavior based on pre-fire conditions in an area that recently burned. Real-world fire behavior, documented during the wildfire, can then be compared to the prediction results of BehavePlus and refinements to the fuel models incorporated, retested, and so on.

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

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

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

2 Modeling Inputs

2.1 Fuels

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

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

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

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

For the Beaumont Pointe Specific Plan Project BehavePlus analyses, fuel model assignments were based on observed field conditions. As is customary for this type of analysis, the terrain and fuels directly adjacent to the proposed development and fuel modification zones (FMZ) are used for determining flame lengths and fire spread. It is these fuels that would have the potential to affect the project's structures from a radiant and convective heat perspective as well as from direct flame impingement. Fuel beds, including sage scrub and non-native grasslands were observed adjacent to the proposed development. These fuel types can produce flying embers that may affect the project, but defenses have been built into the structures to prevent ember penetration. Table C-1 provides a description of the two fuel models observed in the vicinity of the site that were subsequently used in the analysis for this project. Modeled areas include the grasslands (Fuel Model Gr4) on the flat lands in all directions and sage scrub (Fuel Model Sh5), which were found on the steeper hillsides to the south and west of the property. Dudek also conducted modeling of the site for post-development recommendations for this project (refer to Table C-2 for post-development fuel model descriptions). Fuel modification includes paved parking lots, paved streets and irrigated landscaping on the periphery of the Project as well as maintenance of annual grasses within 20 feet of the Project perimeter on an as needed basis where applicable. For modeling the post-development condition, fuel model assignments were re-classified from Gr4 and Sh5 to Fuel Model 8.

Table C-1. Existing Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
Gr4	Moderate Load, Dry Climate Grass	Represents grasses on flat lands surrounding the property.	<2.0 ft.
Sh5	High Load Dry Climate Shrub	Sage scrub occurs on hillside along the southern and western edges of property.	<6.0 ft.

Table C-2. Post-development Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)
8	Compact litter	Irrigated landscapes and parking areas in proposed development.	<0.5 ft.

2.2 Weather

To evaluate different scenarios, analyses were conducted for both the 50th percentile weather (summer, on-shore winds) and the 97th percentile weather (fall, off-shore winds) conditions. Fuel moisture and wind speed information data was incorporated into the BehavePlus modeling runs. The input wind speed and direction is roughly an average surface wind at 20 feet above the vegetation over the analysis area. Table C-3 summarizes the weather and wind input variables used in the BehavePlus modeling efforts.

Table C-3. Fuel Moisture and Wind Inputs

Variable	Summer Weather Condition (50th Percentile)	Peak Weather Condition (97th Percentile)
1h Moisture	5%	1%
10h Moisture	6%	2%
100h Moisture	12%	6%
Live Herbaceous Moisture	48%	30%
Live Woody Moisture	96%	50%
20-foot Wind Speed (mph)	20	40
BehavePlus Wind Adjustment Factor	0.4	0.4

2.3 Slope

Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or downhill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. For the BehavePlus analysis, slope values were determined by field observation at the locations for each modeling scenario, and ranged in value between 3 to 80 percent. Slope gradients for landscaped areas are assumed to be relatively flat (3%).

3 BehavePlus Analysis

To objectively predict flame lengths, intensities, and spread rates, the BehavePlus V6 fire behavior modeling system (Andrews, Bevins, and Seli 2004) was used in four modeling scenarios and incorporated observed fuel types representing the dominant on-site and off-site vegetation, slope gradients, and wind and fuel moisture values. Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent to the site. The results of fire behavior modeling analysis for pre- and post-development conditions are presented in Tables C-4 and C-5, respectively. Identification of modeling run (fire scenarios) locations is presented graphically in Figure 4, BehavePlus Fire Behavior Analysis Map exhibit in the Project's FPP.

Fire Scenario locations and descriptions:

- Scenario 1. Fire flaming front approaching from the northeast around the vicinity of SR-60 the existing grassland vegetation (Fuel Model GR4) adjacent to and on the northern portion of the project, with strong northeastern Santa Ana winds. Post-development includes the irrigated manufactured slopes, paved parking area and irrigated landscaping (Fuel Model 8).
- Scenario 2. Fire flaming front approaching from the east from along the SR-60 corridor towards the northeast corner of the project, near the intersection of SR-60 and Jack Rabbit Trail, through the existing scrub vegetation (Fuel Model SH5), with strong northeastern Santa Ana winds. Post-development includes the irrigated manufactured slopes, paved parking area and irrigated landscaping (Fuel Model 8).
- Scenario 3. Fire flaming front approaching from the southwest across the adjacent open space (Badlands area) towards the southern Project boundary, entering the site through the sparse scrub vegetation in the open space preserve area (SH5), annual grasslands (Fuel Model GR4), with moderate westerly onshore winds. Post-development includes sparse scrub vegetation in the open space preserve (SH5), irrigated manufactured slopes, paved parking area and irrigated landscaping (Fuel Model 8).
- Scenario 4. Fire flaming front approaching from the west-northwest, again from near SR-60, through scrub vegetation (SH5) (offsite and onsite) approaching the western Project boundary, with moderate westerly onshore winds. Post-development includes scrub vegetation in the open space preserve (SH5), irrigated manufactured slopes, paved parking area and irrigated landscaping (Fuel Model 8).

Table C-4. Fire Behavior Modeling Results for Existing Conditions

Fire Scenarios	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: grasslands, 5% uphill slope, 40 mph high wind speed				
Fuel Model Gr4	30.5	9,554	10.0	1.5
Scenario 2: Sage scrub, 5% uphill slope, 40 mph high wind speeds				
Fuel Model Sh5	42.5	19,662	6.0	2.0
Scenario 3: sage scrub-grasslands, 80% uphill to 20% downhill slopes, 20 mph sustained winds				
Fuel Model Sh5- sage scrub	20.9	4,209	1.8	0.8
Fuel Model Gr4- grasses	13.5	1,629	2.3	0.6
Scenario 4: Sage scrub, 30% downhill slope, 20 mph sustained winds				
Fuel Model Sh5- sage scrub	18.0	3,042	1.3	0.7

Notes:
1. Spotting distance from a wind driven surface fire.

Table C-5. Fire Behavior Modeling Results for Post-Project Conditions

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Irrigated landscaping, 20% uphill slope, 40 mph high wind speed				
Irrigated landscaping/pavement (FM8)	3.0	62	0.2	0.3
Scenario 2: Irrigated landscaping, 3% uphill slope, 40 mph high wind speeds				
Irrigated landscaping/pavement (FM8)	3.0	62	0.2	0.3
Scenario 3: Sage scrub (open space); irrigated landscaping, 80% uphill to 20% downhill slopes, 20 mph sustained winds				
Sage scrub (FMSh5)	20.9	4,209	1.8	0.8
Irrigated landscaping/pavement (FM8)	1.6	16	0.1	0.1
Scenario 4: Sage scrub, 20% uphill slope, 20 mph sustained winds				
Irrigated landscaping/pavement (FM8)	1.6	16	0.1	0.1

As presented in Table C-4, wildfire behavior in sage scrub, presented as a Fuel Model Sh5, represents the most extreme conditions, varying with different wind speeds. In this case, flame lengths can be expected to reach up to approximately 42.5 feet with 40 mph winds (extreme fire weather conditions) and 20.9 feet with 20 mph wind speeds (onshore winds). Spread rates for sage scrub fuel beds range from 1.3 mph (summer onshore winds) to 6.0 mph (extreme offshore winds). Spotting distances, where airborne embers can ignite new fires downwind of the initial fire, range from 0.8 miles to 2.0 miles. In comparison, a grass fuel type could generate flame lengths up to 30.5 feet high with a spread rate of 10.0 mph. The fire could potentially be spotting for a distance of 1.5 miles.

As presented in Table C-5, Dudek conducted modeling of the site for post-development fuel recommendations for this project. Fuel modification includes paved parking lots, paved streets and irrigated landscaping on the periphery of the Project as well as maintenance of annual grasses within 20 feet of the Project perimeter on an as needed basis where applicable. For modeling the post-development condition, fuel model assignments were re-classified for the irrigated landscaping (Fuel Model 8). Fuel model assignments for all other areas remained the same as those classified for the existing condition. As depicted, the fire intensity and flame lengths in untreated, biological open space areas would remain the same. Conversely, the FMZ areas experience a significant reduction in flame length and intensity. The 42.5-foot (sage scrub fuel bed) and 30.5-foot (grass fuel bed) tall flames predicted during pre-development modeling during extreme weather conditions are reduced to less than 3.0 feet tall at the outer edges of the development due to the higher live and dead fuel moisture contents (the flame lengths in the in the open space preserve scrub vegetation remains at 20.9 feet).

It should be noted that the results presented in Tables C-4 and C-5 depict values based on inputs to the BehavePlus software. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis, but models provide a worst-case wildfire condition as part of a conservative approach. Further, this modeling analysis assumes a correlation between the project site vegetation and fuel model characteristics. 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.

The information in Table C-6 pertains to interpretation of flame length and fireline intensity as it relates to fire suppression efforts. Based on the post-development calculated flame lengths of under 3.0 feet tall, fire fighters should be able to conduct a direct attack on the fire.

Table C-6. Fire Suppression Interpretation

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

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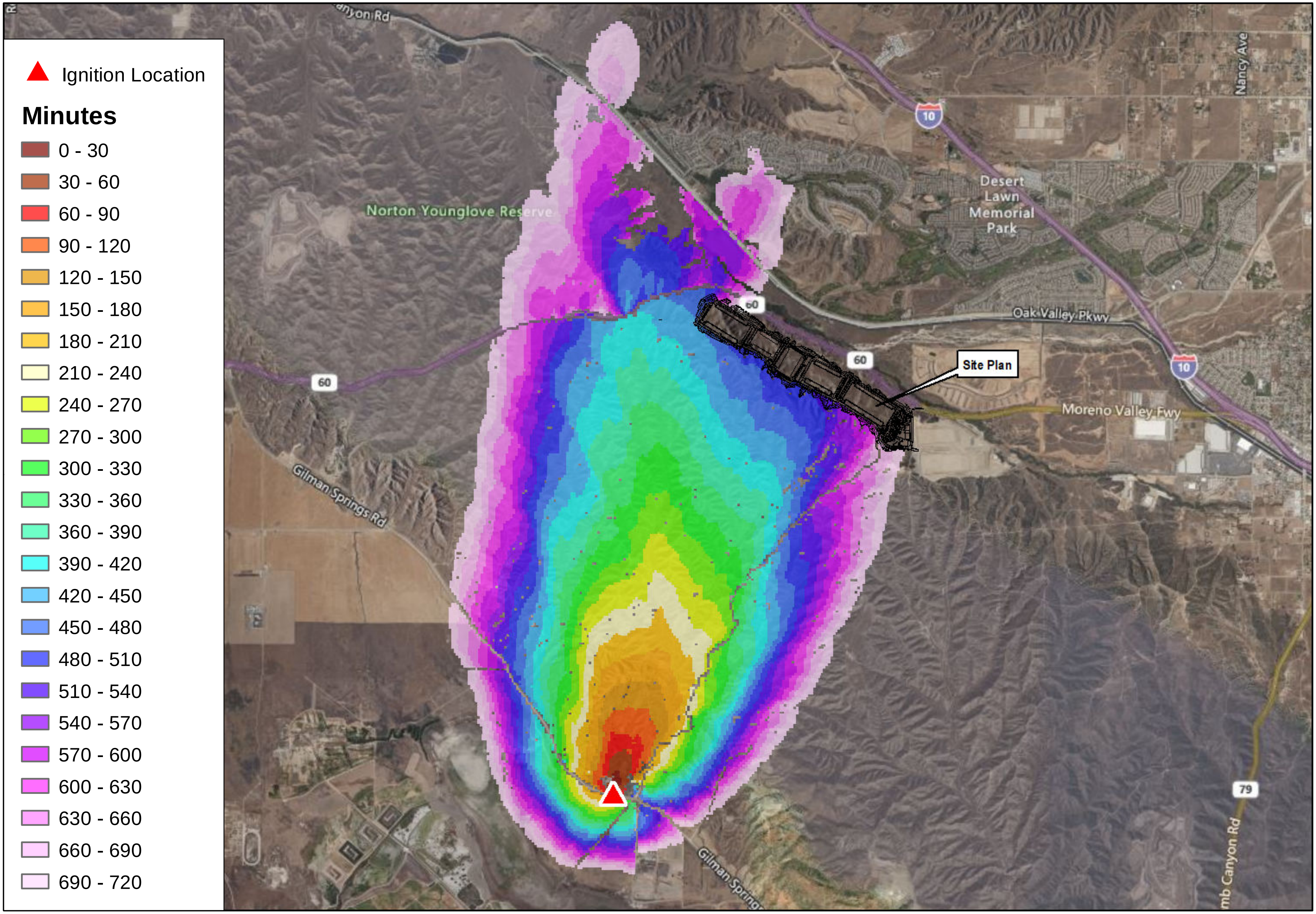
Appendices D-1 through D-8

FlamMap Fire Spread Modeling Results



SOURCE: AERIAL-BING MAPPING SERVICE

DUDEK

0 1 Miles

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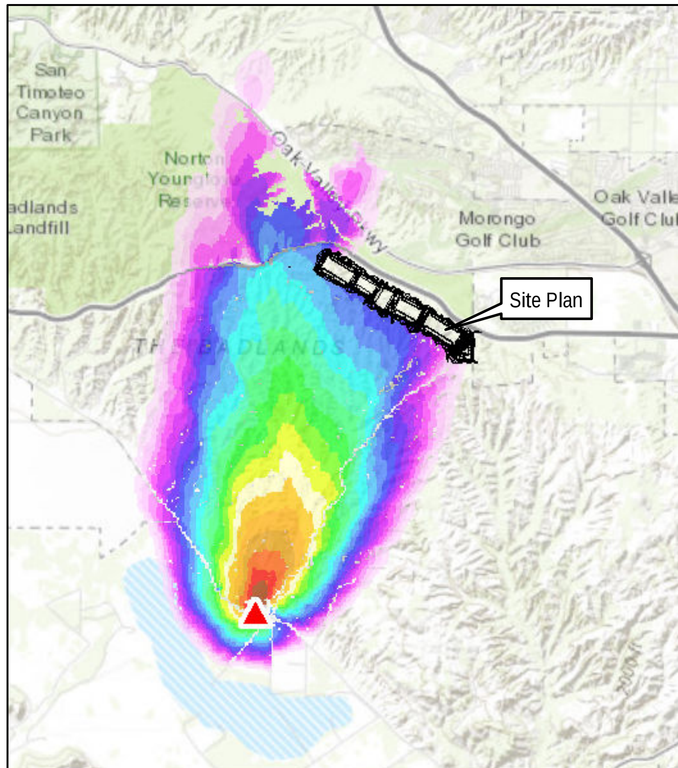
APPENDIX D-1

Fire Progression Modeling - Run 1 Overview

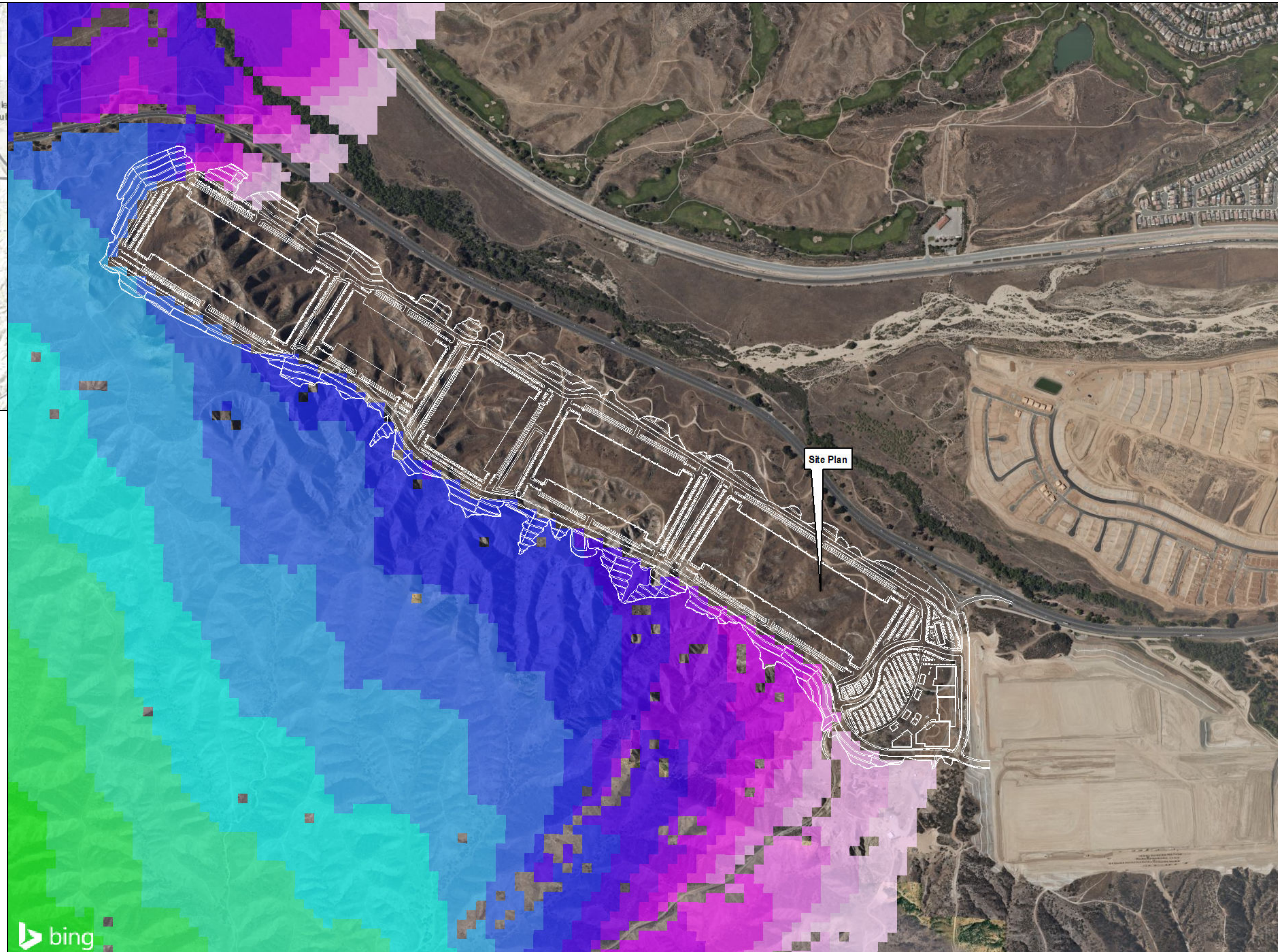
Fire Protection Plan for the Beaumont Pointe Specific Plan



Ignition Location

Minutes

0 - 30	330 - 360
30 - 60	360 - 390
60 - 90	390 - 420
90 - 120	420 - 450
120 - 150	450 - 480
150 - 180	480 - 510
180 - 210	510 - 540
210 - 240	540 - 570
240 - 270	570 - 600
270 - 300	600 - 630
300 - 330	630 - 660
	660 - 690
	690 - 720



SOURCE: AERIAL-BING MAPPING SERVICE

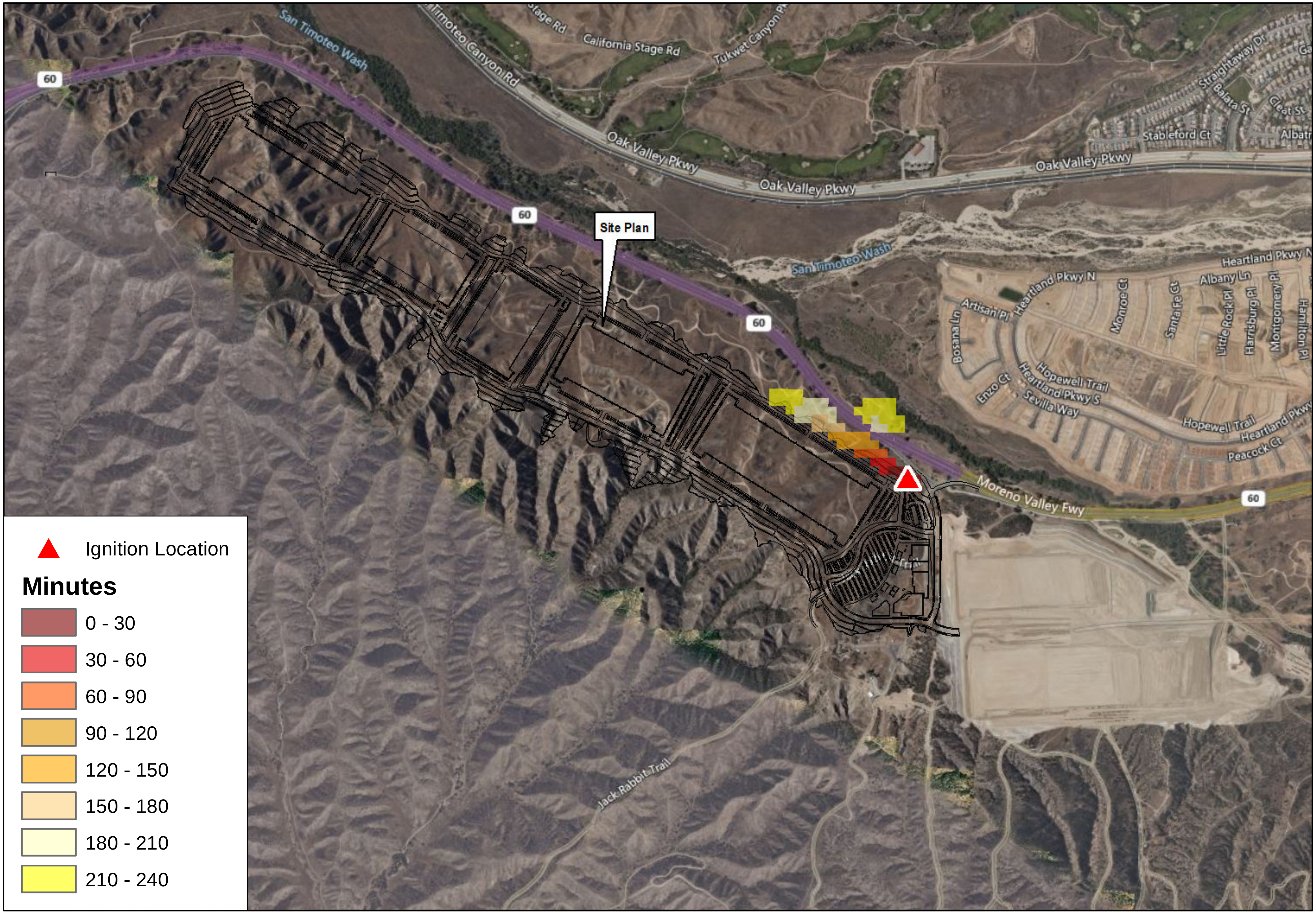
DUDEK

0 1 Miles

APPENDIX D-2

Fire Progression Modeling - Run 1 Project Site

Fire Protection Plan for the Beaumont Pointe Specific Plan



SOURCE: AERIAL-BING MAPPING SERVICE

DUDEK

0 0.25 Miles

APPENDIX D-3

Fire Progression Modeling - Run 2 Overview

Fire Protection Plan for the Beaumont Pointe Specific Plan

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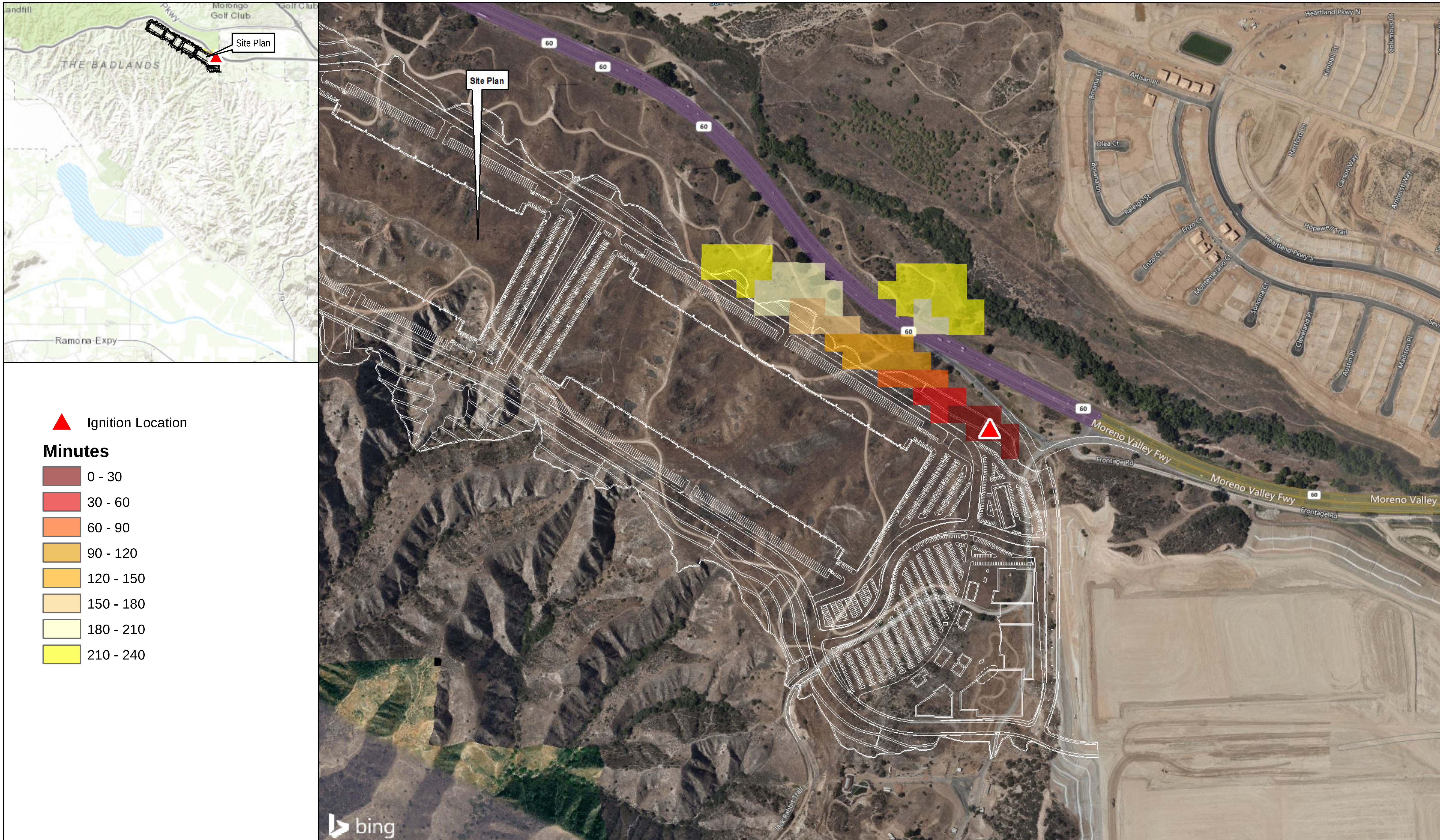


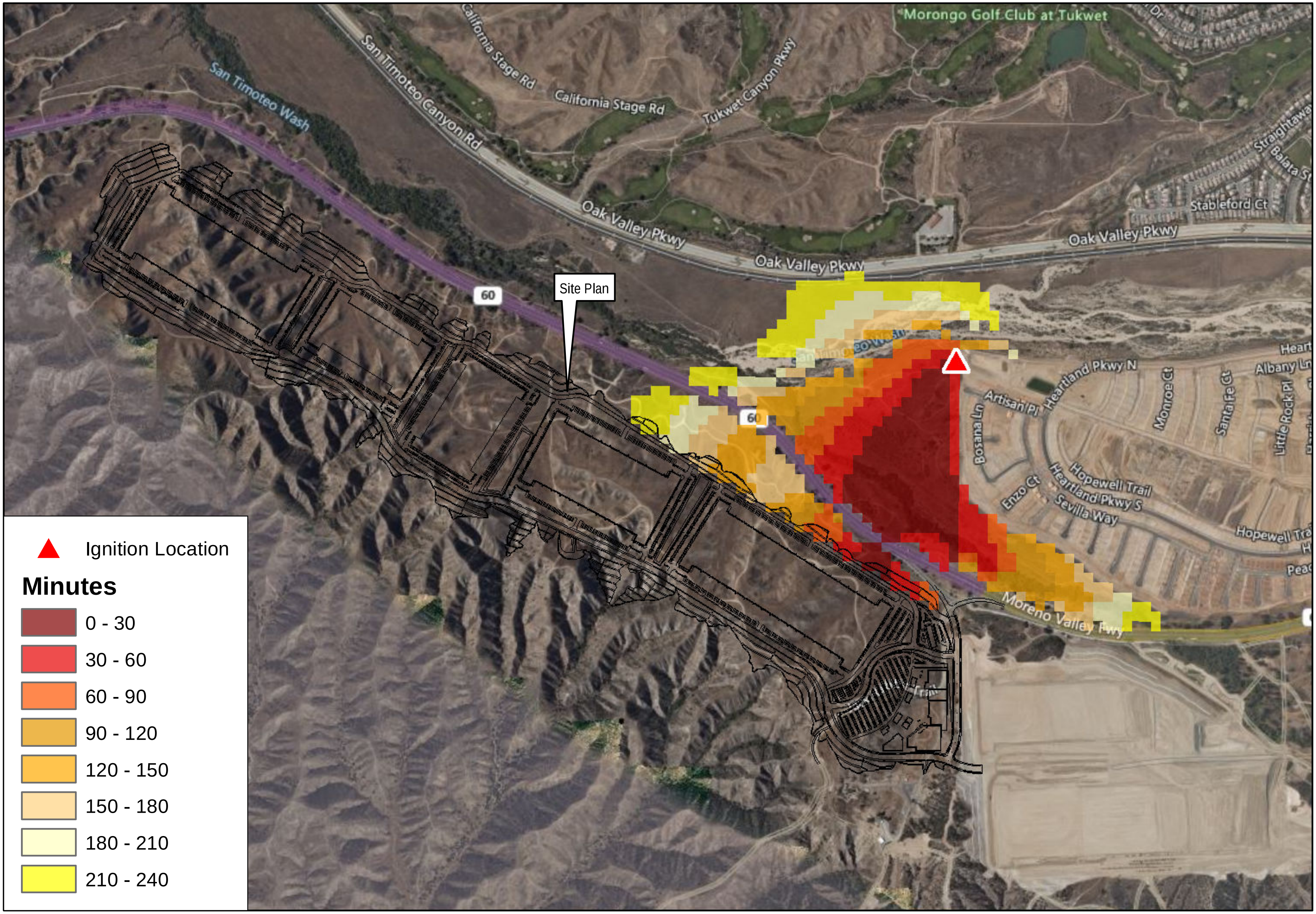
SOURCE: AERIAL-BING MAPPING SERVICE

DUDEK 0 500 Feet

APPENDIX D-4

Fire Progression Modeling - Run 2 Project Site

Fire Protection Plan for the Beaumont Pointe Specific Plan



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SOURCE: AERIAL-BING MAPPING SERVICE

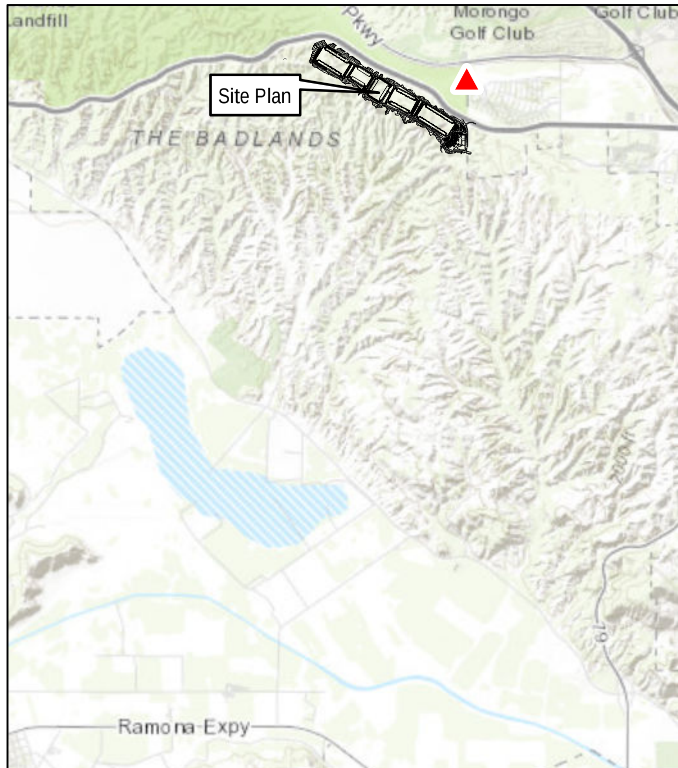
DUDEK

0 0.25 Miles

APPENDIX D-5

Fire Progression Modeling - Run 3

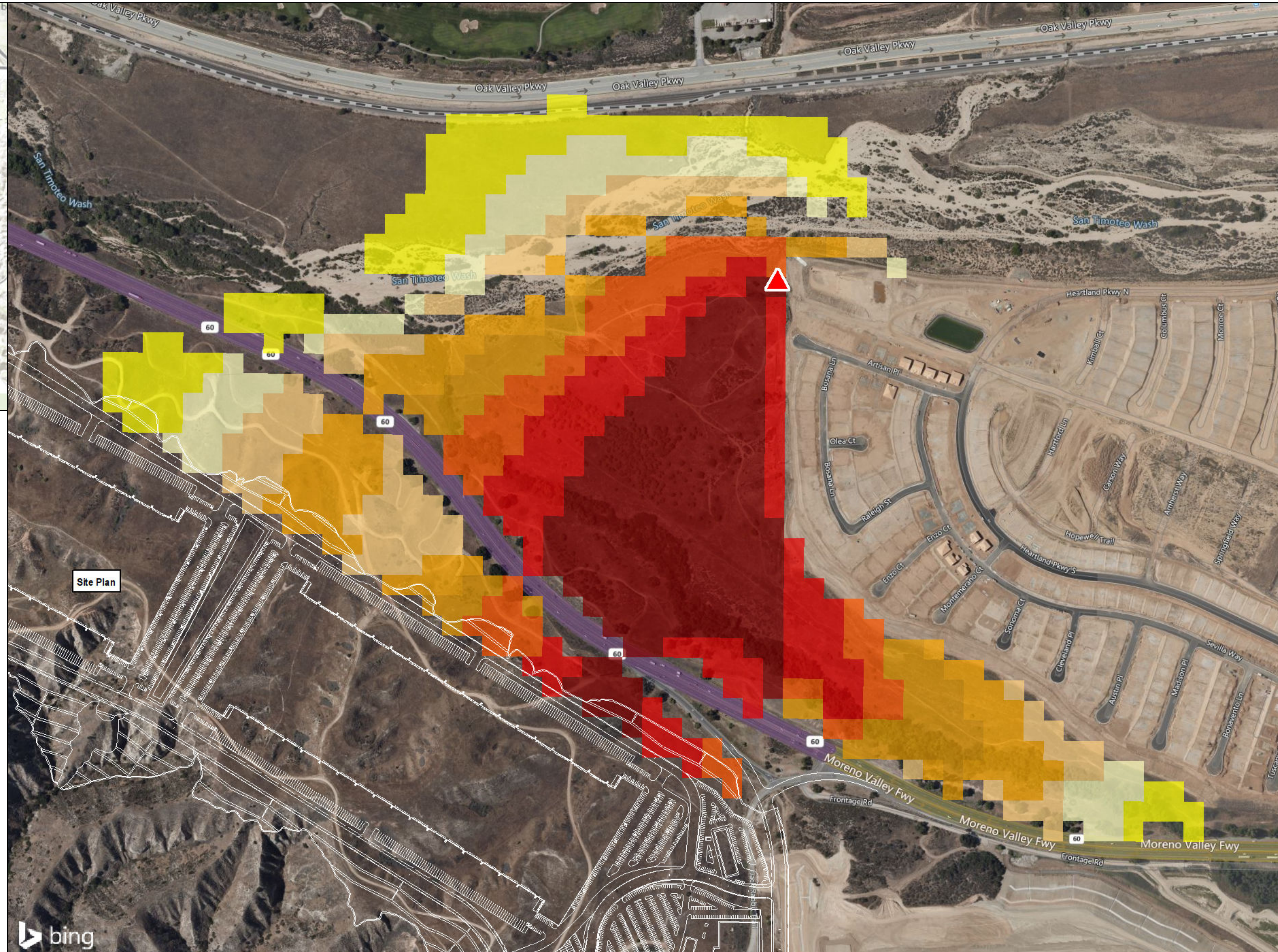
Fire Protection Plan for the Beaumont Pointe Specific Plan



Ignition Location

Minutes

- 0 - 30
- 30 - 60
- 60 - 90
- 90 - 120
- 120 - 150
- 150 - 180
- 180 - 210
- 210 - 240



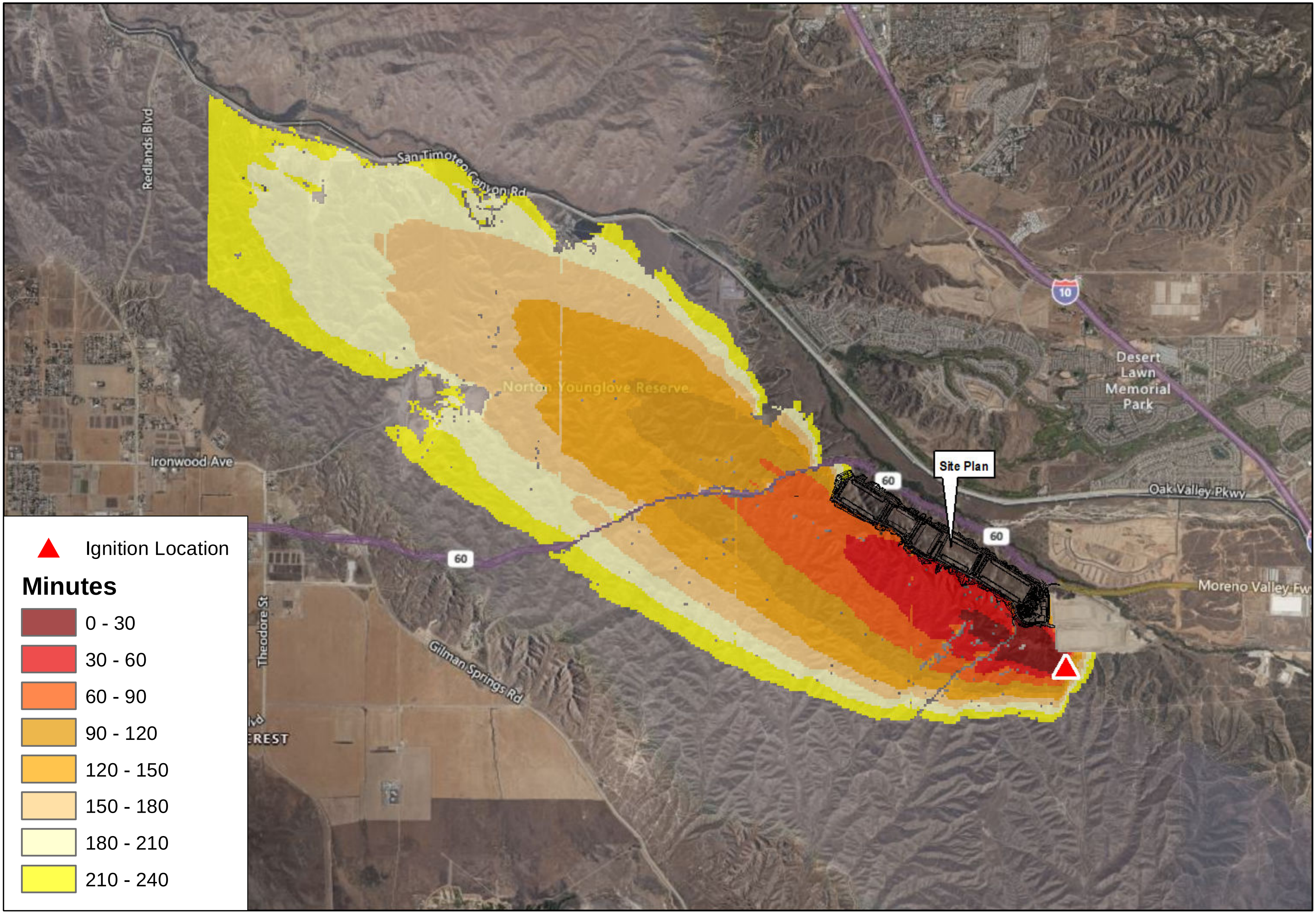
SOURCE: AERIAL-BING MAPPING SERVICE

DUDEK 0 1,000 Feet

APPENDIX D-6

Fire Progression Modeling - Run 3 Project Site

Fire Protection Plan for the Beaumont Pointe Specific Plan



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SOURCE: AERIAL-BING MAPPING SERVICE

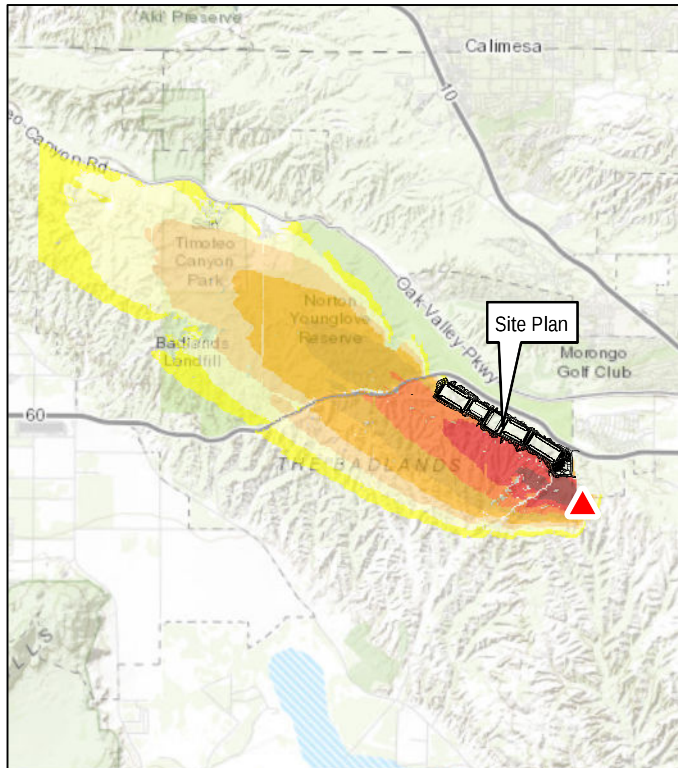
DUDEK

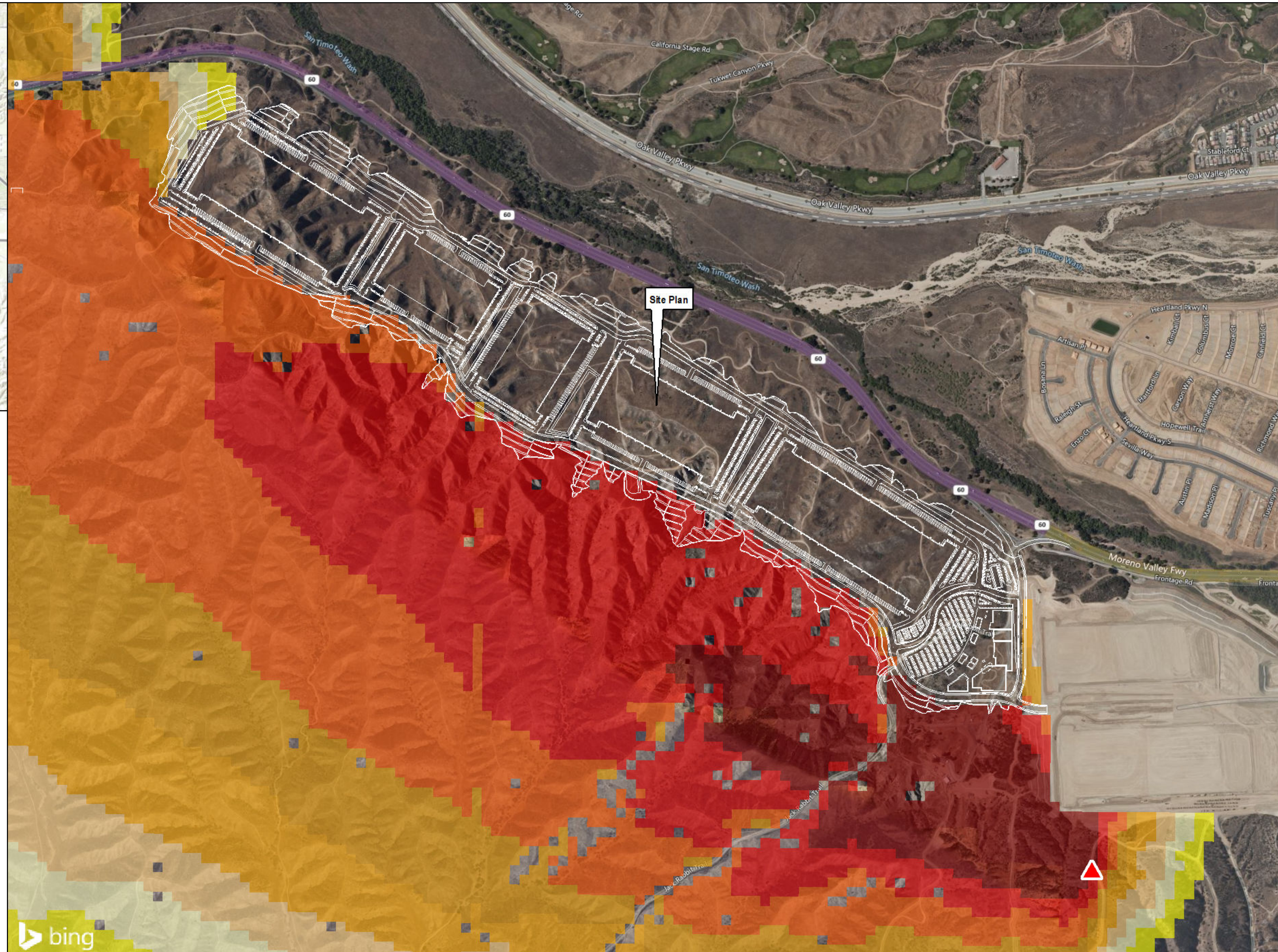
0 1 Miles

APPENDIX D-7

Fire Progression Modeling - Run 4 Overview

Fire Protection Plan for the Beaumont Pointe Specific Plan





▲ Ignition Location

Minutes

- 0 - 30
- 30 - 60
- 60 - 90
- 90 - 120
- 120 - 150
- 150 - 180
- 180 - 210
- 210 - 240

Path: Z:\Projects\j1240400\MAPDOC\DOCUMENT\Fire Progression Series\8-Attachment A_Fire Progression Modeling Run4 Project Site.mxd

SOURCE: AERIAL-BING MAPPING SERVICE

DUDEK

0 1,000 Feet

APPENDIX D-8

Fire Progression Modeling - Run 4 Project Site

Fire Protection Plan for the Beaumont Pointe Specific Plan

Appendix E

Ignition-Resistant Construction Requirements

As of the date of this fire protection plan, the following are the requirements for ignition resistant construction for The Proposed Project, including requirements under Chapter 7A of the California Building Code (CBC). In addition, exterior building construction including roofs, eaves, exterior walls, doors, windows, decks, and other attachments must meet the most current CBC Chapter 7A ignition resistance requirements at the time of building permit application.

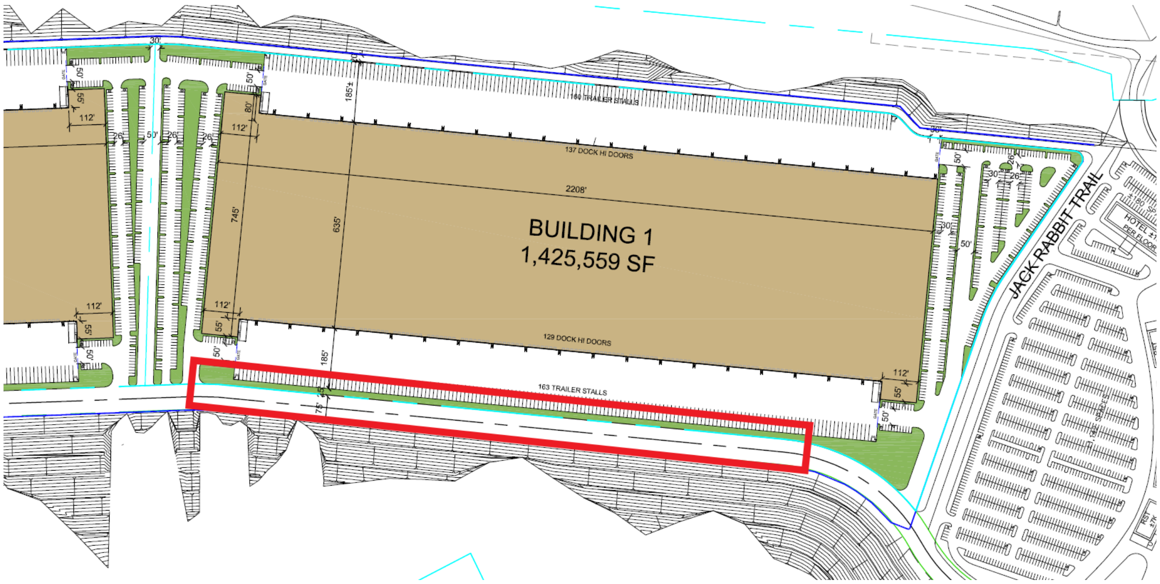
1. All structures will be built with a Class A roof assembly, including a Class A roof covering. Roofs shall have a roofing assembly installed in accordance with its listing and the manufacturer's installation instructions.
2. Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be fire stopped with approved materials or have one layer of minimum 72 pound mineral-surfaced non-perforated cap sheet complying with ASTM D 3909 installed over the combustible decking. However, openings on barrel tiles or similar roof coverings, must be fire stopped (bird stopped) with approved materials to prevent the accumulation of debris, bird nests, etc. between the tiles and decking material.
3. When provided, exposed valley flashings shall be not less than 0.019-inch (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of minimum 72 pound mineral-surfaced non-perforated cap sheet complying with ASTM D 3909 running the full length of the valley.
4. All rain gutters, down spouts and gutter hardware shall be constructed from metal or other non-combustible material to prevent wildfire ignition along eave assemblies.
5. All chimney, flue or stovepipe openings attached to a fireplace, stove, or other solid or liquid fuel burning equipment or device shall be equipped with an approved spark arrester. An approved spark arrester is defined as a device intended to prevent sparks from escaping into the atmosphere and constructed of nonflammable materials, having a 12-gauge minimum thicknesses with openings no greater than ½ inch, or other alternative material the Fontana Fire Protection District determines to provide equal or better protection. It shall be installed to be visible for the purposes of inspection and maintenance.
6. The exterior surface materials shall be non-combustible, including hard or ignition resistant, such as stucco. In all construction, exterior walls shall extend from the top of the foundation to the roof and terminate at 2-inch nominal solid blocking between rafters at all roof overhangs, or in the case of enclosed eaves, terminate at the enclosure.
7. All eaves, fascias, and soffits will be enclosed (boxed) with non-combustible materials. This shall apply to the entire perimeter of each structure. Eaves of heavy timber construction are not required to be enclosed as long as attic venting is not installed in the eaves. For the purposes of this section, heavy timber construction shall consist of a minimum of 4"x 6" rafter tails.
8. Paper-faced insulation shall be prohibited in attics or ventilated spaces.
9. Automatic interior fire sprinklers for commercial buildings shall be installed according to the National Fire Protection Association (NFPA) 13 requirements.
10. Roof vents, dormer vents, gable vents, foundation ventilation openings, ventilation openings in vertical walls, or other similar ventilation openings shall be louvered and covered with 1/16-inch, noncombustible, corrosion-resistant metal mesh or other approved material that offers equivalent protection.
11. Attic or foundation ventilation louvers or ventilation openings in vertical walls shall not exceed 144 square inches per opening and shall be covered with 1/16" inch mesh corrosion-resistant metal screen or other

approved material that offers equivalent protection. Ventilation louvers and openings may be incorporated as part of access assemblies.

12. No attic ventilation openings or ventilation louvers shall be permitted in soffits, in eave overhangs, between rafters at eaves, or in other overhanging areas.
13. All fences and gate assemblies (fences, gates, and fence posts) attached or within five feet of a structure shall be of non-combustible material or pressure-treated exterior fire-retardant wood.
14. All projections (exterior balconies, decks, patio covers, unenclosed roofs and floors, and similar architectural appendages and projections) or structures less than five feet from a building shall be of non-combustible material, one-hour fire resistive construction on the underside, heavy timber construction, pressure-treated exterior fire- retardant wood or ignition resistant construction. When such appendages and projections are attached to exterior fire- resistive walls, they shall be constructed to maintain same fire-resistant standards as the exterior walls of the structure.
15. Accessory structures attached to buildings with habitable spaces and projections shall be in accordance with Chapter 7A of the CBC.
16. Detached accessory structures located less than 50 feet from a building containing habitable space shall be constructed in accordance with Chapter 7A of the CBC.
    - *Exception: Accessory structures less than 120 square feet in floor area located at least 30 feet from a building containing a habitable space.*
17. Exterior doors shall be approved non-combustible construction, solid core wood and shall conform to the performance requirements of standard SFM 12-7A-1 or shall be of approved noncombustible construction, or solid core wood having stiles and rails not less than 1⅜ inches thick with interior field panel thickness no less than 1¼ inches thick, or shall have a fire-resistance rating of not less than 20 minutes when tested according to National Fire Protection Association (NFPA) 252.
18. All glass or other transparent, translucent or opaque glazing materials, that is used in exterior windows, including skylights, or exterior glazed door assemblies shall be constructed of multipane glazing with one tempered pane meeting the requirements of Section 2406 (2016 CBC) Safety Glazing. .
19. Vinyl window assemblies are deemed acceptable if the windows have the following characteristics:
    - Frame and sash are comprised of vinyl material with welded corners
    - Metal reinforcements in the interlock area
    - Glazed with insulating glass, annealed or tempered (one layer of which must be tempered glass).
    - Frame and sash profiles are certified in AAMA Lineal Certification Program.
    - Certified and labeled to ANSI/AAMA/NWWDA 101/LS2-97 for Structural Requirements.

Appendix F

Project Fuel Modification Plan



Sample of 100-foot-wide fuel modification area "overlay" location along south side of Building 1 over the proposed street, parking lot and irrigated landscaping.

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Appendix G

Prohibited Plant List

Botanical Name	Common Name	Comment*
Trees		
Abies species	Fir	F
Agonis juniperina	Juniper Myrtle	F
Casuarina cunninghamiana	River She-Oak	F
Chamaecyparis species (numerous)	False Cypress	F
Cryptomeria japonica	Japanese Cryptomeria	F
Cupressocyparis leylandii	Leyland Cypress	F
Cupressus species *(C. fobesii, C. glabra, C. sempervirens,)*	Cypress (Tecate, Arizona, Italian, others)	F
Eucalyptus species (numerous)	Eucalyptus	F, I
Juniperus species (numerous)	Juniper	F
Lithocarpus densiflorus	Tan Oak	F
Melaleuca species *(M. linariifolia, M. nesophila, M. quinquenervia)*	Melaleuca (Flaxleaf, Pink, Cajeput Tree)	F, I
Picea (numerous)	Spruce	F
Palm species (numerous)	Palm	F, I
Pinus species *(P. brutia, P. canariensis, P. b. eldarica, P. halepensis, P. pinea, P. radiata, numerous others)*	Pine (Calabrian, Canary Island, Mondell, Aleppo, Italian Stone, Monterey)	F
Platycladus orientalis	Oriental arborvitae	F
Pseudotsuga menziesii	Douglas Fir	F
Tamarix species *(T. africana, T. aphylla, T. chinensis, T. parviflora)*	Tamarix (Tamarisk, Athel Tree, Salt Cedar, Tamarisk)	F, I
Taxodium species *(T. ascendens, T. distichum, T. mucronatum)*	Cypress (Pond, Bald, Monarch, Montezuma)	F
Taxus species *(T. baccata, T. brevifolia, T. cuspidata)*	Yew (English, Western, Japanese)	F
Thuja species *(T. occidentalis, T. plicata)*	Arborvitae/Red Cedar	F
Groundcovers, Shrubs & Vines		
Acacia species	Acacia	F, I
Adenostoma fasciculatum	Chamise	F
Adenostoma sparsifolium	Red Shanks	F
Agropyron repens	Quackgrass	F, I
Anthemis cotula	Mayweed	F, I
Arctostaphylos species	Manzanita	F
Arundo donax	Giant Reed	F, I
Artemisia species *(A. abrotanium, A. absinthium, A. californica, A. caucasica, A. dracunculus, A. tridentata, A. pynocephala)*	Sagebrush (Southernwood, Wormwood, California, Silver, True tarragon, Big, Sandhill)	F
Atriplex species (numerous)	Saltbush	F, I
Avena fatua	Wild Oat	F
Baccharis pilularis	Coyote Bush	F
Bambusa species	Bamboo	F, I
Bougainvillea species	Bougainvillea	F, I
Brassica species *(B. campestris, B. nigra, B. rapa)*	Mustard (Field, Black, Yellow)	F, I

Botanical Name	Common Name	Comment*
Bromus rubens	Foxtail, Red brome	F, I
Castanopsis chrysophylla	Giant Chinquapin	F
Cardaria draba	Hoary Cress	I
Cirsium vulgare	Wild Artichoke	F,I
Conyza bonariensis	Horseweed	F
Coprosma pumila	Prostrate Coprosma	F
Cortaderia selloana	Pampas Grass	F, I
Cytisus scoparius	Scotch Broom	F, I
Eriogonum species *(E. fasciculatum)*	Buckwheat (California)	F
Fremontodendron species	Flannel Bush	F
Heterotheca grandiflora	Telegraph Plant	F
Hordeum leporinum	Wild barley	F, I
Juniperus species	Juniper	F
Lactuca serriola	Prickly Lettuce	I
Larrea tridentata	Creosote bush	F
Lolium multiflorum	Ryegrass	F, I
Lonicera japonica	Japanese Honeysuckle	F
Mimulus aurantiacus	Sticky Monkeyflower	F
Miscanthus species	Eulalie Grass	F
Muhlenbergia species	Deer Grass	F
Nicotiana species *(N. bigelovii, N. glauca)*	Tobacco (Indian, Tree)	F, I
Pennisetum setaceum	Fountain Grass	F, I
Perovskia atroplicifolia	Russian Sage	F
Phoradendron species	Mistletoe	F
Pickeringia montana	Chaparral Pea	F
Rhus (R. diversiloba, R. laurina, R. lentii)	Sumac (Poison oak, Laurel, Pink Flowering)	F
Ricinus communis	Castor Bean	F, I
Rhus Lentii	Pink Flowering Sumac	F
Salvia species (numerous)	Sage	F, I
Salsola australis	Russian Thistle	F, I
Solanum Xantii	Purple Nightshade (toxic)	I
Silybum marianum	Milk Thistle	F, I
Thuja species	Arborvitae	F
Urtica urens	Burning Nettle	F

*F = flammable, I = Invasive

Notes:

1. Plants on this list that are considered invasive are a partial list of commonly found plants. There are many other plants considered invasive that should not be planted in a fuel modification zone and they can be found on The California Invasive Plant Council's Website www.cal-ipc.org/ip/inventory/index.php. Other plants not considered invasive at this time may be determined to be invasive after further study.
2. For the purpose of using this list as a guide in selecting plant material, it is stipulated that all plant material will burn under various conditions.
3. The absence of a particular plant, shrub, groundcover, or tree, from this list does not necessarily mean it is fire resistive.
4. All vegetation used in Fuel Modification Zones and elsewhere in this development shall be subject to approval of the Fire Code Official.
5. Landscape architects may submit proposals for use of certain vegetation on a project specific basis. They shall also submit justifications as to the fire resistivity of the proposed vegetation.