APPENDIX E:
AGRICULTURE PLAN

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The 1993 Otay Ranch Program EIR requires the preparation of an Agriculture Plan concurrent with the approval of any SPA affecting on-site agricultural resources. The Findings of Fact state that the Agricultural Plan shall indicate the type of agriculture activity being allowed as an interim use including buffering guidelines designed to prevent potential land use interface impacts related to noise, odors, dust, insects, rodents and chemicals that may accompany agricultural activities and operations.

1. Current Agricultural Use

The Main Campus Property was used historically for agriculture as evidenced by large areas of furrowed non native grassland in the western and central portions. The eastern portion of this parcel includes primarily disturbed and undisturbed areas of native habitat (e.g., Diegan coastal sage scrub), and has apparently not been used for agricultural activities in recent years. Current disturbances on the Main Campus Property include discing in the extreme west end, portions of an electrical transmission line right-of-way including several metal lattice towers and an access road, a series of storm water/drainage facilities, and recreational traffic by pedestrians and bicyclists. There is no farming or cattle grazing located on the site. All vehicle access points on the Main Campus Property are currently gated and locked.

The Lake Property currently supports a predominance of native habitat and is not reported as being been farmed in the past. Current disturbances in this parcel include vehicle traffic on unpaved utility roads, and recreational traffic by pedestrians and bicyclists. There is an un-gated access point on Wueste Road allowing vehicles to enter the Lake Property.

2. Permitted Agricultural Use

Consistent with the GDP the following agricultural standards will be employed for all educational crop production activities:

- A 200-foot distance buffer shall be maintained between developed property and any ongoing agricultural operations.
- Use of pesticides shall comply with federal, state and local regulations.

- In those areas where pesticides are to be applied, vegetation shall be utilized to shield adjacent urban development (within 400 feet) from agricultural activities.
- The applicant shall notify adjacent property owners of potential pesticide application through advertisements in newspapers of general circulation.
- Where necessary to ensure the safety of area residents, appropriate fencing shall be utilized.

No agricultural use or cattle grazing activities are permitted in the UI District. The following University-related crop production (research and small-scale production) activities may be allowed subject to the standards listed below:

- Horticulture nurseries.
- Greenhouses.
- Raising/harvesting of crops.
- Aquaculture.
- Agricultural processing.
- On-site sales.
- Keeping of small animals (no meat production).

These University-related crop production shall employ the following standards:

- A 200-foot distance buffer shall be maintained between developed property and any University-related crop production.
- Use of pesticides shall comply with federal, state and local regulations.
- In those areas where pesticides are to be applied, vegetation shall be utilized to shield adjacent urban development (within 400 feet) from agricultural activities.
- The applicant shall notify adjacent property owners of potential pesticide application through advertisements in newspapers of general circulation.
- Where necessary to ensure the safety of area residents, appropriate fencing shall be utilized.

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APPENDIX F:
FIRE PROTECTION PLAN

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FIRE PROTECTION PLAN
University Innovation District

Prepared for:

City of Chula Vista
Development Services Department
Advanced Planning Division
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APRIL 2017

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EXECUTIVE SUMMARY

This document addresses fire protection for the University Innovation District (UID) Project (proposed project) in the City of Chula Vista (City), San Diego County, California. The proposed project includes a total of approximately 383.8 acres of undeveloped land in the southeastern portion of the City. The proposed project includes development of two parcels within the Otay Ranch and Eastlake Developments. The two parcels are referred to as the Main Campus Property and Lake Property. On-site project improvements include a university campus and supporting academic uses, student housing, a research and development park, and public infrastructure (e.g., streets and utilities) to serve the proposed project.

This Fire Protection Plan (FPP) provides measures for fire protection that meet City Fire and Building Codes or provide the Chula Vista Fire Department (CVFD) the option of accepting equivalent protections where the code cannot be strictly achieved. Fire protection measures are provided based on code requirements and the analyzed fire risk associated with the Project's proposed land uses. The fire risk analysis forms the basis for identifying fuel modification, building design and construction and other pertinent development infrastructure criteria for fire protection. The primary focus of this FPP is providing an implementable framework for suitable protection of the planned project's structures and inhabitants. Tasks completed in the preparation of this FPP include data review, code review, site fire risk analysis, land use review, fire behavior modeling, and site-specific recommendations.

Ignition Resistant Buildings

This FPP provides details regarding site-specific policies and implementation measures concerning fire protection. Further, the FPP outlines a "systems approach" to fire prevention, protection, suppression, and emergency relocation to ensure proposed improvements and uses would reduce potential risks associated with fire hazard. The structures in this development would include ignition resistant materials per the latest (2016) California Fire and Building Codes. Structure protection would be complemented by a system of improved water availability, capacity and delivery; fire department access; monitored defensible space/fuel modification; interior fire sprinkler systems in all structures, monitored interior sprinklers in applicable structures; and other components to provide properly equipped and maintained structures with a high level of fire ignition resistance. Most of these features are required by code, but are specifically included because they address vulnerabilities noted in recent mega-fires in San Diego County and elsewhere. Structures built to the current fire and building codes are substantially less likely to be affected by fire and typically suffer less damage from fire than structures built under less–stringent codes.

Fire Behavior and Fuel Modification

The site fire risk analysis conducted for this project resulted in the determination that wildfire may occur in the open space preserve areas adjacent to the proposed project, and would be expected to have moderate overall intensity based on fuels and terrain. The modeling and fire risk analysis conducted for the Project site helps assess its unique fire risk and fire behavior, and this process helped determine that a 150-foot wide fuel modification zone adjacent to Preserve land would be suitable for the anticipated wildfire intensity. The fuel modification zones perform as designed if they are maintained to original specifications; therefore, the fuel modification zones would be maintained in perpetuity by a a funded entity, ensuring the required inspections and fuel reduction work occur annually.

Emergency Response

The City's current threshold for fire emergency response is 5 minutes travel time, 90% of responses and does not include dispatch and turnout time, which are commonly provided 1 minute each (resulting in a 7 minute total response time). The City's Fire Facility, Equipment, and Deployment Master Plan (FFMP) analyzes the need for new fire stations and the most efficient response coverage (City 2012). As the FFMP is implemented over the next 15 years, three new fire stations are to be constructed as funding becomes available. The anticipated population and number of commercial structures associated with the UID Project and the corresponding calculated medical and fire calls, would affect the response capabilities of CVFD's nearest existing stations. However, the Project is located in an area with nearby existing fire stations that can respond to portions of the UID Project within the City's travel time standards and once construction of two planned fire stations (EUC/Millenia station and Village 8 West) is completed, the entire main campus site will be within 2 to 5 minutes travel and the Lake site in just over the 5 minute travel standard.

The Project must comply with the approved Chula Vista FFMP (2012), as approved by the Chula Vista City Council. With the two proposed fire stations, construction of which will be supported on a fair share basis by the Project through property tax and payment of the Chula Vista Public Facility Development Impact Fee, the City's goal of 5 minutes driving time to 90% of all structure fires and medical emergency calls will be substantially conforming. An appropriate trigger will be negotiated and included in the projec'ts Public Facilities Finance Plan with regard to fair-share funding and commencement of any fire station necessary to serve the project. The Project's construction and occupancy schedules will align with the construction and staffing of the EUC/Millenia and Village 8 West fire stations, or an alternative for fire service, potentially a temporary station to CVFD's specifications, will be provided. In the case that the Millenia Fire Facility is not built/operational (and due to the project not meeting the Effective Firefighting Force response time), UID development can only occur on the parcel(s) that Fire Station 7 can respond to within five minutes, unil the Millenia Fire Facility is on-line.

1 INTRODUCTION

This Fire Protection Plan (FPP) was prepared for the University Innovation District (UID Project) and provides specific measures for fire protection which meet Chula Vista Fire Department (CVFD) Fire and ignition resistant Building Codes. It also identifies the fire risk associated with proposed land uses, and identifies requirements for fuel modification, building design and construction and other pertinent development infrastructure criteria for fire protection. The primary focus of this FPP is providing an implementable framework for suitable protection of the planned structures and the people living within and utilizing them.

The purpose of an FPP, as described in the International Code Council: Urban-Wildland Interface Code (Section 202) is:

> Fire Protection Plan: *A document prepared for a specific project or development proposed for the urban-wildland interface area. It describes ways to minimize and mitigate the fire problems created by the project or development, with the purpose of reducing impact on the community's fire protection delivery system.*

This FPP utilizes a "systems approach" for specifying fire protection measures. The measures consist of the components of fuel modification, passive and active structural protection, water supply, fire protection systems, access (ingress/egress), and emergency response. This FPP also provides additional details regarding wildfire risk assessment, fire history, fire behavior modeling, and construction and fire protection features that would be provided within this community.

1.1 Fire Protection Plan Summary

This FPP would guide the design, construction, and management of project-related improvements in compliance with applicable fire codes. When properly implemented and managed, the requirements and recommendations detailed herein are designed to result in fire hazard risk reduction and minimize the impact on the CVFD's fire protection system. To that end, preparation of this FPP reflects completion of the following tasks:

1. On-site risk assessment
2. Fire history analysis
3. Fire behavior modeling
4. Review of project site land use plans
5. Review of Chula Vista Fire Department's 2012 FFMP
6. Review and incorporation of 2016 California Fire Code (CFC) and 2016 California Building (CBC), as applicable

7. Emergency Response Travel Time Analysis
8. Generation of project-specific requirements and alternatives for fire protection.

1.2 Intent

The intent of this FPP is to provide management guidance and requirements for reducing fire risk and demand for fire protection services associated with the proposed project. To that end, the fire protection "system" detailed in this FPP includes a redundant layering of measures including: pre-planning, fire prevention, fire protection, passive and active suppression and related measures proven to reduce fire risk. The fire safety system that would be enacted by the proposed Project has proven through real-life wildfire encroachment examples to significantly reduce the fire risk associated with this type of project.

1.3 Fire History

Fire history is an important component of FPPs. Fire history information can provide an understanding of fire frequency, fire type, most vulnerable areas, and significant ignition sources. In turn, this understanding of why fires occur in an area and how they typically behave can be used for pre-planning and designing defensible communities or commercial developments. *Appendix B –the University Innovation District Project Vicinity Fire History* exhibit presents a graphical view of the project area's recorded fire history by California Department of Forestry and Fire Protection (CAL FIRE) in their Fire and Resource Assessment Program (FRAP) database (CAL FIRE FRAP 2016)[1]. As presented in the exhibit, The Main Campus property has been subject to one wildfire during the recorded fire history period. An un-named fire in 1979 burned in the northern portion of the property. No recorded wildfires have burned through the Lake property. In addition to the one fire burning on the Main Campus property, Appendix D illustrates that the majority of other large wildfires historically start east of the Project area and are typically contained east of Lower Otay Lake.

The lack of recent fire history does not indicate that fire cannot occur in the vegetation that would be adjacent to the proposed project. It is expected that fires have not consistently spread into the Project area due to two factors: 1) the position of urban development to the north which is newer and ignition resistant and acts as a fire break, and 2) the position of Lower Otay Lake to the east, presenting a very wide fire break.

[1] 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 1878–2016.

1.4 Applicable Codes/Existing Regulations

This FPP demonstrates compliance with 2016 Chula Vista Fire Code requirements, namely Title 15 – Building and Construction, Sections 15.34 (Fire Zones), 15.36 (Fire Code adopting by reference the 2016 CFC), and 15.38 (Urban Wildland Interface Code adopting the 2000 Urban Wildland Interface Code) and Section 15.08 adopting the 2016 CBC, specifically, Chapter 7A for development in WUI areas. Additionally, this FPP is consistent with the Chula Vista Fire Department's Fire Prevention Division's Fire Engineering Safety Detail and Specification Sheets. Lastly, this FPP conforms to the City's MSCP Subarea Plan Brush Management Guidelines and Resource Management Plan Preserve Edge Requirements. The project would comply with the applicable adopted codes in place at the time of construction. The majority of the UID property lies within the local responsibility area (LRA) Very HighFire Hazard Severity Zone (FHSZ), as designated by the CVFD and California Department of Forestry and Fire Protection (CAL FIRE 2016). The proposed fire protection measures for the Project would meet or under certain circumstances, exceed all applicable fire and building codes requirements.

1.5 Project Summary

1.5.1 Project Location

As depicted in Figure 1, *Regional Location Map* and Figure 2, *Project Vicinity*, the UID project site is located in the UID Planning Area of the City, approximately 13 miles southeast of downtown San Diego and 3.7 miles north of the U.S./Mexico International border. The UID project site consists of approximately 383.8 acres of land which has been divided into the Main Campus Property (353.8-acre parcel) and the Lake Property (30-acre parcel). The Main Campus Property is located north of future Village 10 development and Otay River Valley, east of future Village 9 development and south of the Millenia and Village 11 developments. The South Bay Expressway (SR-125) is located approximately 0.4 mile west of the Main Campus Property. Its northern boundary is south of Hunte Parkway roughly between Eastlake Parkway and Exploration Falls Drive. Eastlake Parkway and Hunte Parkway, which currently terminate at the northwestern boundary of the project site, provide access to the northern part of the Main Campus Property.

The Lake Property is located about 0.5 mile east of the Main Campus site along Wueste Road, just west of Lower Otay Lake and south of the U.S. Olympic Training Center. The Lake Property is accessed off Wueste Road near the Lower Otay Lake, City of San Diego Water Utilities Department boat ramp area.

The proposed project lies within the unsectioned lands of Township 18 South, Range 1 West, on the U's. Geological Survey (USGS) 7.5-minute Otay Mesa quadrangle.

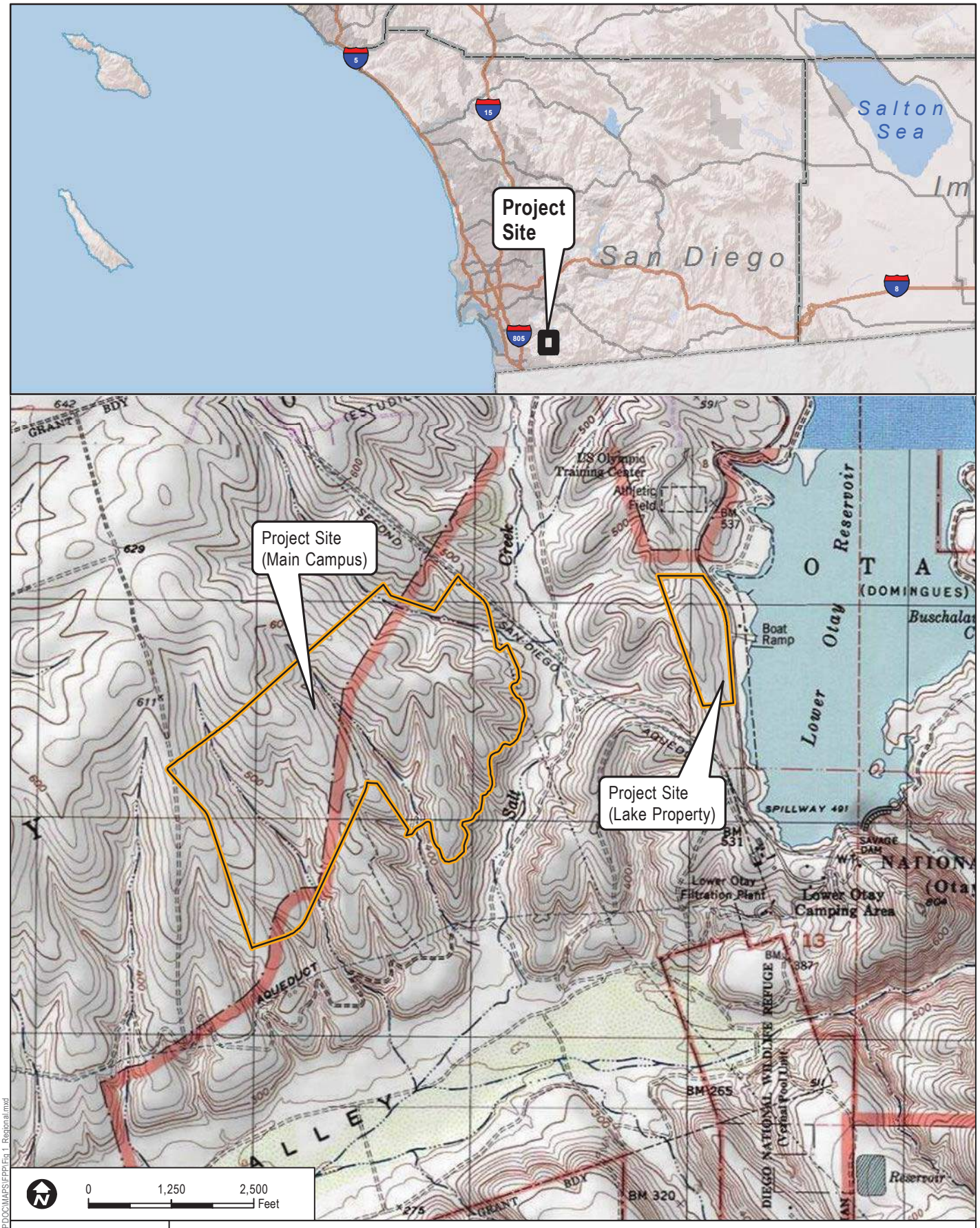
The UID project site is located on portions of the following Assessor Parcel Numbers:

643-040-06-00, 643-070-16-00, 644-070-10-00, 644-080-09-00, 644-080-15-00, 644-080-18-00, and 644-080-20-00.

1.5.2 Project Description

The UID Project proposes phased development of two parcels, the Main Campus Property and the Lake Property. The Project is a part of the Otay Ranch UID SPA Plan, which is consistent with the Otay Ranch General Development Plan. The UID SPA Plan is comprised of a mixed-use community of academic/university, office, hotel, retail, residential (including student housing and market-rate housing), recreational and open space/conservation uses through the year 2045. As illustrated in Figure 3, *Site Utilization Plan*, the university-related uses are could be located anywhere in the UID, but generally in the eastern half of the Main Campus Property with a transition into open space and habitat conservation areas around the campus edges. The western half of the Main Campus Property includes mixed-use development (residential, commercial, and office) that would relate and transition into the adjacent mixed-use Villages 9, 10, and Millenia development areas. The Proposed maximum development area for the UID is 10,066,200 square feet that would support a total of 34,000 people including a mix of students, faculty, staff, residents, and office/retail workers (City 2016b). The university is assumed to include up to 20,000 full-time students with approximately 6,000 campus faculty and staff. The innovation portion of the project, which includes a mix of offices, laboratories, and retail uses, would support up to 8,000 employees. Residents on the Main Campus site are anticipated to include up to 5,400 students and 2,000 employees.

The 30-acre Lake Property is characterized mostly by open space and habitat conservation. Development within this parcel would be limited to satellite academic uses with low or infrequent use, and could include a Chancellor's residence and/or Conference Center.



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SOURCE: USGS 7.5 Minute Series Topographic Maps

FIGURE 1
Vicinity Map

University Innovation District Fire Protection Plan

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SOURCE: AERIAL-SANDAG IMAGERY 2014

FIGURE 2
Project Vicinity

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University Innovation District Fire Protection Plan

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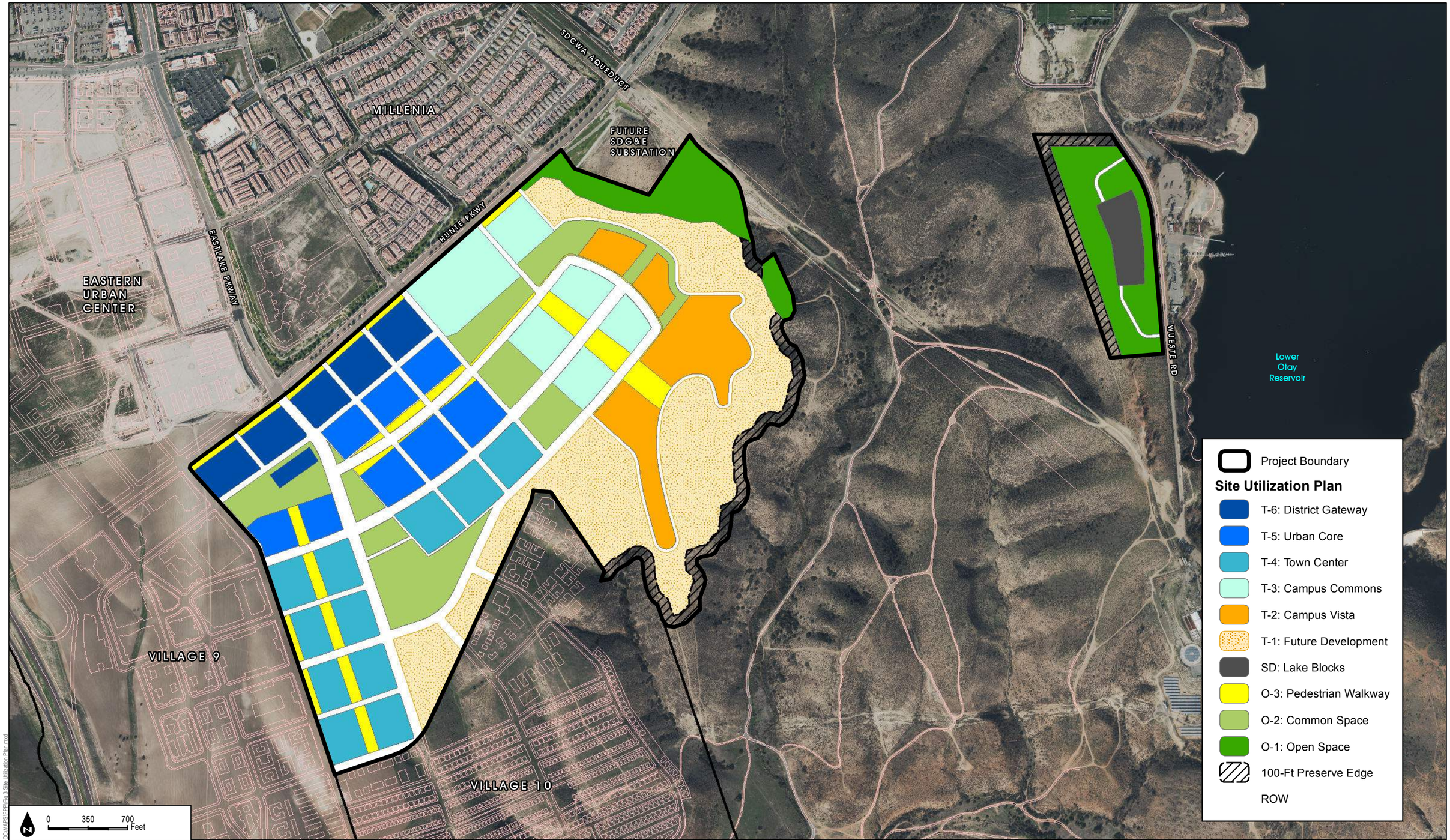

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SOURCE: Bing Maps 2014, City of Chula Vista 2017

FIGURE 3

Site Utilization Plan

University Innovation District Fire Protection Plan

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1.5.2.1 Development Infrastructure

The circulation system would consist of public roads consistent with the Otay Ranch GDP. Main Street/Hunte Parkway and Eastlake Parkway would serve as the primary entrances for the Main Campus Property. These main arterial roads also provide access to adjoining Villages 9, 10, 11 and Millenia development from SR-125 via two freeway access ramps. Main Street is proposed for a six-lane gateway road that would connect SR-125 and Villages 8 East to existing Hunte Parkway. A series of connector roadways are proposed within the Main Campus Property which would be designed to maximize connectivity within the site and to the primary arterial roads. Olympic Parkway and Wueste Road are the primary access roads for the Lake Property.

Water utilities would include a connection to the existing Otay Water District (OWD) water system. Current OWD policies regarding new development require the use of recycled water. The primary source of recycled water to the project site would be the South Bay Water Reclamation Facility. Consistent with the Otay Ranch GPD, landscaping, including fuel modification zone B, would be irrigated with recycled water, where available. Sanitary Sewer service for the project site would be provided by the City of Chula Vista and includes connection to the San Diego Metropolitan Sewerage System. Other utilities that are currently available to the site and that would be installed are gas, electrical, cable and phone service.

The proposed project would be required to complete off-site improvements. One off-site storm water conveyance line and detention basin is proposed south of the Main Campus Property in the Otay River Valley. Two off-site sewer conveyance lines are proposed to connect the Main Campus Property and the Lake Property to the Salt Creek Interceptor, Access to off-site facilities would be provided by an existing access road. Additionally, off-site storm water and sewer facilities are proposed to the east of the Lake Property within the City of San Diego's limits.

1.5.2.2 Additional Amenities

The project would include extensive pedestrian walk and trail system interconnected to squares, plazas, common spaces, natural areas, and recreation amenities. The project's trails would mostly follow roadways within the development footprint, but two trails cross open space: The Chula Vista Greenbelt and the Salt Creek Sewer interceptor /Greenbelt trail. Both trails follow existing roads. Multi-use trails would include existing dirt roads and paved utility access ways. The project would include access points to trail systems to facilitate emergency response. Trails would be managed and maintained by approved City-approved, funded entity.

The project would preserve approximately 41.09 acres of land as habitat conservation. These land areas are located in the northeastern corner of the Main Campus Property and the majority of the Lake Property area.

2 RISK ANALYSIS METHODS

2.1 Field Assessment

Field assessments of the proposed project area were conducted during August 2016 to document existing site conditions and for gathering necessary information to support overall fire risk evaluation. Assessments of the area's topography, natural vegetation and fuel loading, available setback areas, and general susceptibility to wildfire formed the basis of the site risk assessment.

Site photographs were collected (Appendix A) and fuel conditions were mapped using 100-scale aerial images. Field observations were utilized to augment existing site data in generating the fire behavior models and formulating the requirements provided in this FPP.

2.2 Site Characteristics and Fire Environment

2.2.1 Topography

Topography for the Main Campus property consists of a series of north-south trending mesa and drainage features that primarily drain to the south towards the Otay River Valley (Figure 2). Three unnamed drainage features traverse this parcel, of which two are tributaries to Salt Creek and one is a tributary to the Otay River. Elevations range from approximately 620 feet above mean sea level (amsl) at the north-central parcel boundary near Hunte Parkway to 360 amsl in the southwestern end of the project. Overall gradients are inclined up to 3% on mesa tops with drainages sloping at 17% in local sections.

The Lake Property is characterized by a narrow, generally flat-topped ridgeline extending north to south through the parcel. Elevations range from 500 to 570 feet amsl with a roughly 2% gradient trending north to south. Drainage within the parcel varies along the ridgetop, with flows eventually entering Lower Otay Reservoir to the east or the Otay River via Salt Creek to south.

2.2.2 Existing/Vicinity Land Use

Both parcels are mostly undeveloped. The Main Campus Property includes an approximately 10-acre K-12 charter school (High Tech Chula Vista) along Hunte Parkway near the north-central portion of the property. The remainder of the property includes extensive areas of previously cleared and farmed (e.g., tilled) land and undisturbed open space areas. On-site vegetation includes large areas of non-native grassland, primarily in the western and central portions of the parcel, diegan coastal sage scrub in the eastern and southwestern areas, and small patches of riparian habitat in portions of the canyon and drainages within the parcel. A number of dirt roads and trails are present that currently provide access within the parcel, including service roads for the existing transmission line in the northeastern portion of the parcel. The adjacent areas surrounding the Main Campus Property consist of portions of Otay Ranch and Eastlake developments to the north and northwest; undeveloped open

space areas to the south and west, which includes the future Otay Ranch Villages 9 and 10; and undeveloped areas to the east (habitat preserve land) (See Figure 3).

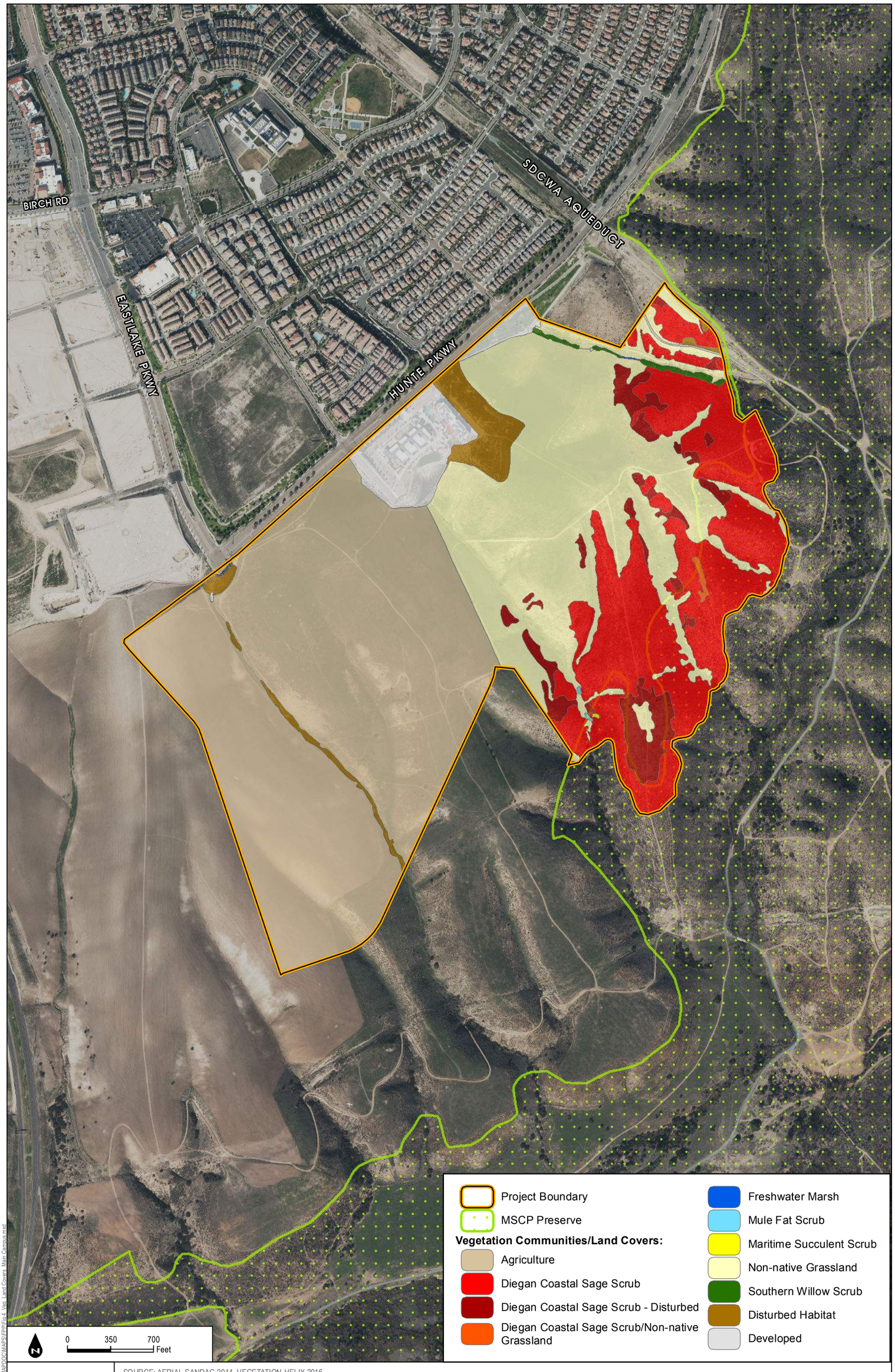
The Lake Property currently supports Diegan coastal sage scrub, non-native grasslands, and small groves of eucalyptus trees. There is no record of farming occurring on the property. Over the years, portions of the property have been used for various unauthorized land uses, including hiking, mountain biking, off-roading, and motorcycling. Existing land uses surrounding the Lake Property include the U.S. Olympic Training Center to the north, open space to the west (Salt Creek Canyon) and south, and Lower Otay Reservoir to the east.

2.2.3 Climate

Throughout Southern California, including at the project site, climate has a large influence on fire risk. The local climate is typical of a Mediterranean area, with warm, dry summers and wetter winters. Precipitation typically occurs between December and March. The prevailing wind is an on-shore flow from the Pacific Ocean, which is approximately 10.0 miles to the west, Santa Ana winds, which typically occur in the fall, from the northeast can gust to 50 miles per hour (mph) or higher. Drying vegetation (fuel moisture of less than 5% for 1-hour fuels is possible) during the summer months becomes fuel available to advancing flames should an ignition occur. Extreme conditions, used in fire modeling for this site, include 92°F temperatures in summer and winds of up to 50 mph during the fall. Relative humidity of 12% or less is possible during fire season. The site is within the coastal influence area and would be expected to, on average, include higher humidity and resulting plant moisture, than more inland areas.

2.2.4 Fuels (Vegetation)

The UID Project site (Main Campus and Lake properties) is currently undeveloped with eight native or naturalized vegetation communities that were mapped on the site by Helix Environmental Planning (City of Chula Vista 2016). Extensive vegetation type mapping is useful for fire planning because it enables each vegetation community to be assigned a fuel model, which is used by a software program to predict fire characteristics, as discussed in Section 2.4 and Appendix C. There are three dominant vegetation types mapped on the Main Campus property (Figure 4), including Diegan coastal sage scrub, non-native grasslands, and agriculture (fallow) which encompass approximately 22.2%, 25.5%, and 44.5% of the property, respectively. The Lake property consists primarily of Diegan coastal sage scrub (91%) as presented on Figure 5. Smaller pockets of eucalyptus woodland, Southern willow scrub, maritime succulent scrub, mulefat scrub, freshwater marsh, and vernal pool vegetation types are also present on the site. More detailed information regarding the site's plant communities is provided in the Biological Resources Technical Report for the University Innovation District Project (Helix Environmental Planning 2016).



SOURCE: AERIAL-SANDAG 2014, VEGETATION-HELIX 2016

Figure 4

Vegetation and Land Cover Map - Main Campus

University Innovation District Fire Protection Plan

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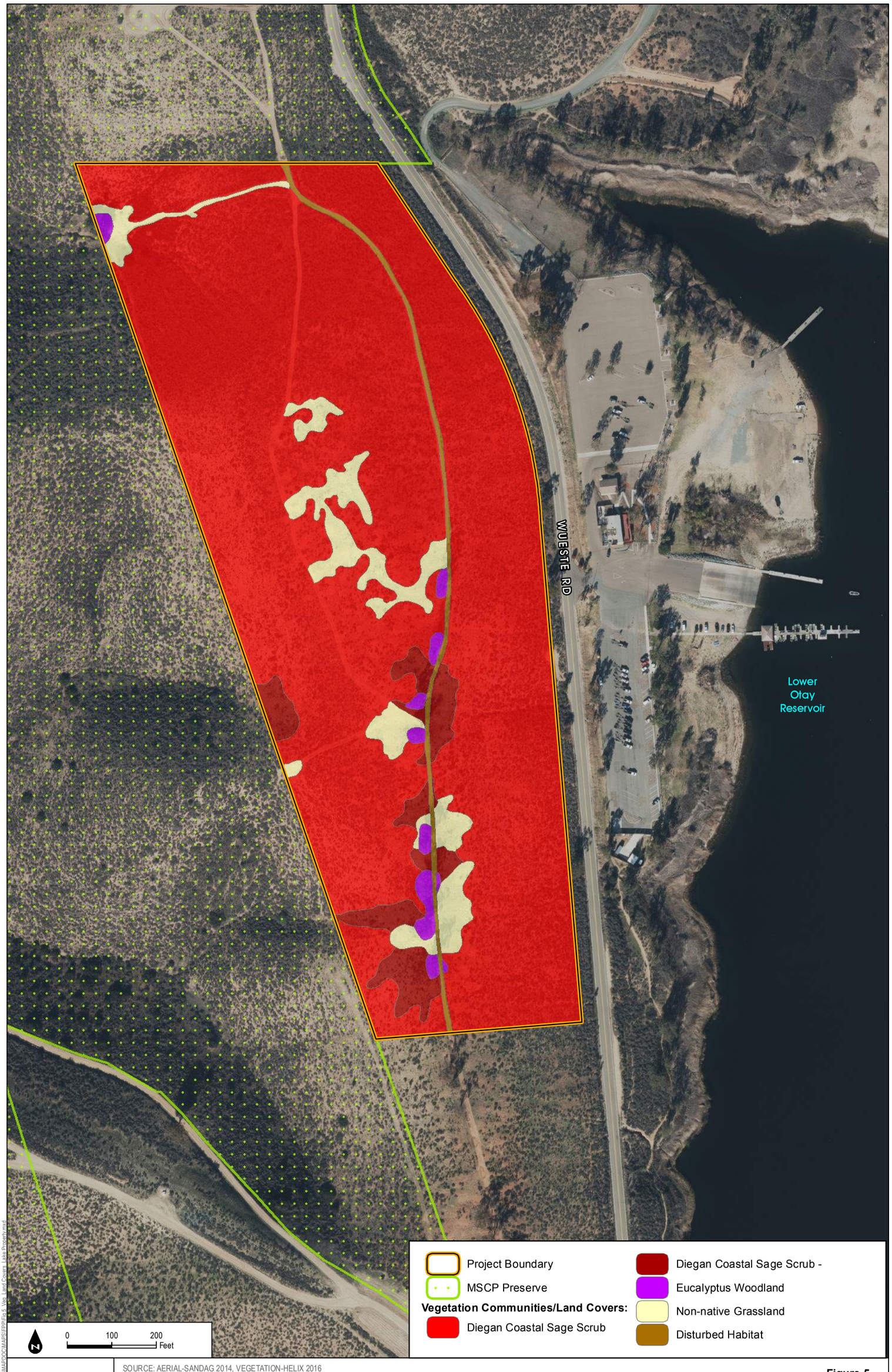

SOURCE: AERIAL-SANDAG 2014, VEGETATION-HELIX 2016

Figure 5

Vegetation and Land Cover Map - Lake Property

UNIVERSITY INNOVATION DISTRICT PROTECTION PLAN

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The area proposed for development would be converted to roads, structures, and landscape vegetation following the proposed project's completion. Any native vegetative fuels within fuel modification zones would also be modified as a result of development, altering their current densities, distributions, and species composition. Areas within the sphere of influence for direct fire affects (approximately 300 feet outside the proposed development footprint) and fuel modification zones would continue to be dominated by Diegan coastal sage scrub and non-native grassland fuel beds. These vegetation types were confirmed by Dudek fire protection planners in the field and assigned fuel models for use during fire behavior modeling (see section 2.3.1). These fuels are anticipated to remain in the areas adjacent to the project footprint (just outside the fuel modification zones), but have been planned and compensated for through a system of fire protection described throughout this FPP. Appendix A provides photographs of the site and adjacent vegetation.

2.2.5 Vegetation Dynamics

Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (bark thickness, leaf size, branching patterns), and overall fuel loading. For example, the native shrub species that compose the sage scrub communities in the Project vicinity would exhibit higher potential hazard (higher intensity heat and flame length) than grass dominated plant communities (fast moving, but lower intensity) if ignition occurred. The corresponding fuel models for each of these vegetation types are designed to capture these differences. Additionally, vegetative cover influences fire suppression efforts through its effect on fire behavior. For example, while fires burning in the non-native grasslands may exhibit lower flame lengths and heat outputs than those burning in native shrub habitats, fire spread rates in grasslands are often more rapid.

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 as shrubs sprout back or establish and are not disturbed by repeated fires. In general, biomass and associated fuel loading would increase over time, assuming that disturbance (fire, grazing, or disking) 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 this site would consist of irrigated and maintained landscapes as well as thinned native fuel zones that would be subject to regular "disturbance" in the form of maintenance and would not be allowed to accumulate excessive biomass over time, which results in reduced fire ignition, spread rates, and intensity.

Conditions adjacent to the Proposed Project's footprint (outside the fuel modification zones), where the wildfire threat would exist post-development, are currently classified as low to moderate fuel loads due to the higher percentage of non-native grasslands intermixed with stands of coastal sage scrub fuels. However, climax vegetation state (undisturbed brush stands that are not disturbed for an extended period 50 years or more) includes more uniform and dense stands of grasslands and sage scrub fuels, which were employed for a conservative modeling approach to represent worst-case (i.e., maximum fuels) wildfire scenarios around the perimeter of the Project.

2.3 Anticipated Fire Behavior

2.3.1 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 proposed project given characteristic site features such as topography, vegetation, and weather. The BehavePlus (version 5.0.5) fire behavior modeling software package, the latest version of the industry standard fire behavior prediction software, was utilized in evaluating anticipated fire behavior adjacent to proposed fuel modification zones for the perimeter of the proposed project's developed areas. Results are provided below and a more detailed presentation of the BehavePlus modeling and analysis, including fuel moisture and weather input variables, is provided in Appendix C.

2.3.2 BehavePlus Fire Behavior Modeling Effort

Fuel Models are tools to help fire behavior analysts estimate fire behavior for a given 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 occur within the open space areas adjacent to the UID site. The vegetation types are represented primarily by two fuel models: FM 1 (non-native grasslands) and SCAL 18 (coastal sage scrub). Other fuel models may exist, but not at quantities that significantly influence fire behavior in and around the site. Fuel models were selected from either Anderson's 13 standard fire behavior fuel models (Anderson 1982) or the *Standard Fire Behavior Fuel Models: a Comprehensive Set for Use with Rothermel's Surface Fire Spread Model* (Scott and Burgan 2005).

2.3.3 Fire Behavior Modeling Results

Three focused fire behavior scenarios were completed on the UID site. The locations of the BehavePlus modeling scenarios are provided in Figure 6. The modeling effort included an analysis of potential fire behavior under two weather scenarios, 50th percentile, which mimics typical conditions, and 97th percentile, which mimics an extreme Santa Ana wind condition. The results of the modeling effort included anticipated values for surface fires (flame length (feet), rate of spread (mph), and fire line intensity (Btu/ft/s)). Modeled fire behavior outputs derived from the BehavePlus modeling efforts are presented in Table 1.

Table 1
University Innovation District BehavePlus Fire Behavior Model Results

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: 50th percentile weather conditions (8 mph) on south-facing, 27% slope				
Grasslands (FM 1)	3.2	69	0.57	0.1
Diegan coastal sage scrub (SCAL 18)	11.9	1,231	0.27	0.3
Scenario 2: 97th percentile weather conditions (32 mph gusts) on southeast-facing, 27% slope				
Grasslands (FM 1)	12.7	1,415	8.3	0.7
Diegan coastal sage scrub (SCAL 18)	30.3	9,434	1.5	1.4
Scenario 3: 50th percentile weather conditions (8 mph) on west-facing, 19% slope				
Diegan coastal sage scrub (SCAL 18)	11.6	1,160	0.25	0.3

Based on the results of BehavePlus analysis, wildfires with the highest fire intensity would occur during off-shore wind patterns and are expected to be of moderate to high severity. Worst-case fire behavior is expected in Diegan sage scrub-non-native grasslands along the eastern edge of the Main Campus Property. Under extreme weather conditions (97th percentile), flame lengths range from 12 to 30 feet, depending on the fuel type. Although the sage scrub fuel types can produce higher heat intensity and higher flame lengths under strong, dry wind patterns, they typically do not ignite as easily or spread as quickly as the light, flashy grass fuels. Wildfires occurring in grass-sage scrub fuels during on-shore wind patterns (50th percentile) are expected to be of low intensity with flame lengths of 3 to 11 feet and slower spread rates (less than 1.0 mph) due to higher fuel moisture content and reduced wind speeds.

The results presented in Table 1 depict values based on inputs to the BehavePlus software at the specified model locations and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. For planning purposes, the averaged worst-case fire behavior is the most useful data for informing analysis of acceptable setbacks and implementation of conservative fuel modification design.

The results from this modeling effort were utilized to augment site observations and available data for determining which portions of UID site include risk levels where a 150-foot wide fuel modification zone is recommended and areas where the potential fire risk is low or moderate and reduced fuel modification zones would be appropriate for an interim fuel modification area until development occurs adjacent to the proposed project site.

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AERIAL SOURCE: SANDAG IMAGERY 2014

FIGURE 6

Behave Plus Fire Behavior Analysis

University Innovation District Fire Protection Plan

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3 FIRE RESPONSE CAPABILITIES

The analysis that follows examines the ability of the existing fire stations as well as fire stations planned in the approved Chula Vista FFMP to serve both the Main Campus and Lake Properties. Response times were evaluated using build-out conditions. It was assumed that phased construction would include access roads to the newly constructed buildings and that the shortest access route to those structures would be utilized.

3.1 Emergency Response

The UID Project Site is located within the City of Chula Vista Fire Department (CVFD) jurisdictional area. CVFD services 52 square miles and a population of approximately 267,500[2] in the City of Chula Vista. CVFD currently operates nine Fire Stations with 114 uniformed fire personnel (City of Chula Vista 2016a). For additional support, CVFD relies on numerous Automatic Aid agreements with jurisdictions adjoining the City.

Based on current Fire Station distribution, Fire Stations 7 and 8 are most likely to provide initial response. However, all stations within the CVFD are available to service the UID site, if necessary. Additionally, there are planned fire stations (Eastern Urban Core (EUC)/Millenia and Village 8 West) close to the Main Campus Property that would respond to emergency calls at UID. Figure 7 illustrates the location of these fire stations along with the planned EUC/Millenia and Village 8 West stations. Table 2 provides fire station information for existing CVFD stations 7 and 8 which are proximal to the UID Project Site.

As depicted in Table 2, CVFD Fire Station No. 7, located at 1640 Santa Venetia is the closest station that services the Main Campus Property. Station 7 is located 3.0 miles from the most northeastern portion of the property. Fire Station 8, as presented in Table 3, located at 1180 Woods Drive, is the closest station that services the Lake Property. It is located 2.8 miles from the most southern boundary of the parcel.

Dudek conducted GIS based emergency response modeling from existing and planned fire stations to the project to determine potential response coverage. The modeling utilized CVFD input variables that are consistent with the FFMP, but used an ESRI network response area model assuming 35 mph as standard speed and impedances (slowdowns) at each intersection for consistency with the Insurance Services Office (ISO) formula (T= 0.65 + 1.7 D, where D= travel distance). Emergency travel time for first arriving engines from each station to the Main Campus and Lake Properties are provided in Tables 2 and 3. Automatic and/or Mutual Aid agreements with surrounding fire departments are in place and would potentially result in additional resources that are not analyzed in this FPP.

[2] Source: Population data, Stefanie Balchak, Public Safety Analyst, Chula Vista Fire Department, March 9, 2017.

Table 2
CVFD Emergency Response Analysis for the Main Campus Property

Chula Vista Fire Department Station No.**	Total Mileage to Furthest Extent on Parcel	Estimated Response Travel Time	Firefighting Resources
6	5.2 miles	9 min., 25 sec.****	Engine 56; Brush 56 (*3 personnel/shift)*
7	3.0 miles	5 min., 53 sec.****	Engine 57; Truck 57: Battalion 52 *8 personnel/shift)*
8	4.5 miles	8 min, 20 sec.****	Engine 58 (*3 personnel/shift)*
Proposed Village 8 West (future road network)	2.2 miles	4 min., 20 sec.****	*Engine (4 personnel/shift)*
Approved EUC/Millenia*** (future road network)	1.7 miles	3 min. 32 sec.	Engine *(4 personnel/shift)*

Notes:

* Table 2 presents results of response travel time utilized the ISO formula (T=.65+1.7D) that discounts speed to account for slowing along the response route. Response times are to the furthest extent for the Main Campus Property.

** Response times for Stations 6, 7, and 8 are the same for existing and future road networks.

*** Note that the EUC/Millenia station was used for modeling since it was determined to be the optimal location for a new fire station (FFMP 2012)

**** The Effective Firefighting Force could include responses from all five stations with a best case assembly travel time of just under 6 minutes for future conditions and up to 9 minutes 25 seconds for current conditions.

Table 3
CVFD Emergency Response Analysis for the Lake Property

Chula Vista Fire Department Station No.**	Total Mileage to Furthest Extent on Parcel	Estimated Response Travel Time	Firefighting Resources
6	6.6 miles	11 min. 56 sec.****	Engine 56; Brush 56 (*3 personnel/shift)*
7	5.3 miles	9 min. 35 sec.****	Engine 57; Truck 57: Battalion 52 *(8 personnel/shift)*
8	2.8 miles	5 min. 28 sec.****	*Engine 58* (3 personnel/shift)
Proposed Village 8 West (future road network)	*5.4 miles*	*9 min. 51 sec.***	*Engine (4 personnel/shift)*
Approved EUC/Millenia *** (future road network)	4.4 miles	8 min. 8 sec.****	Engine *(4 personnel/shift)*

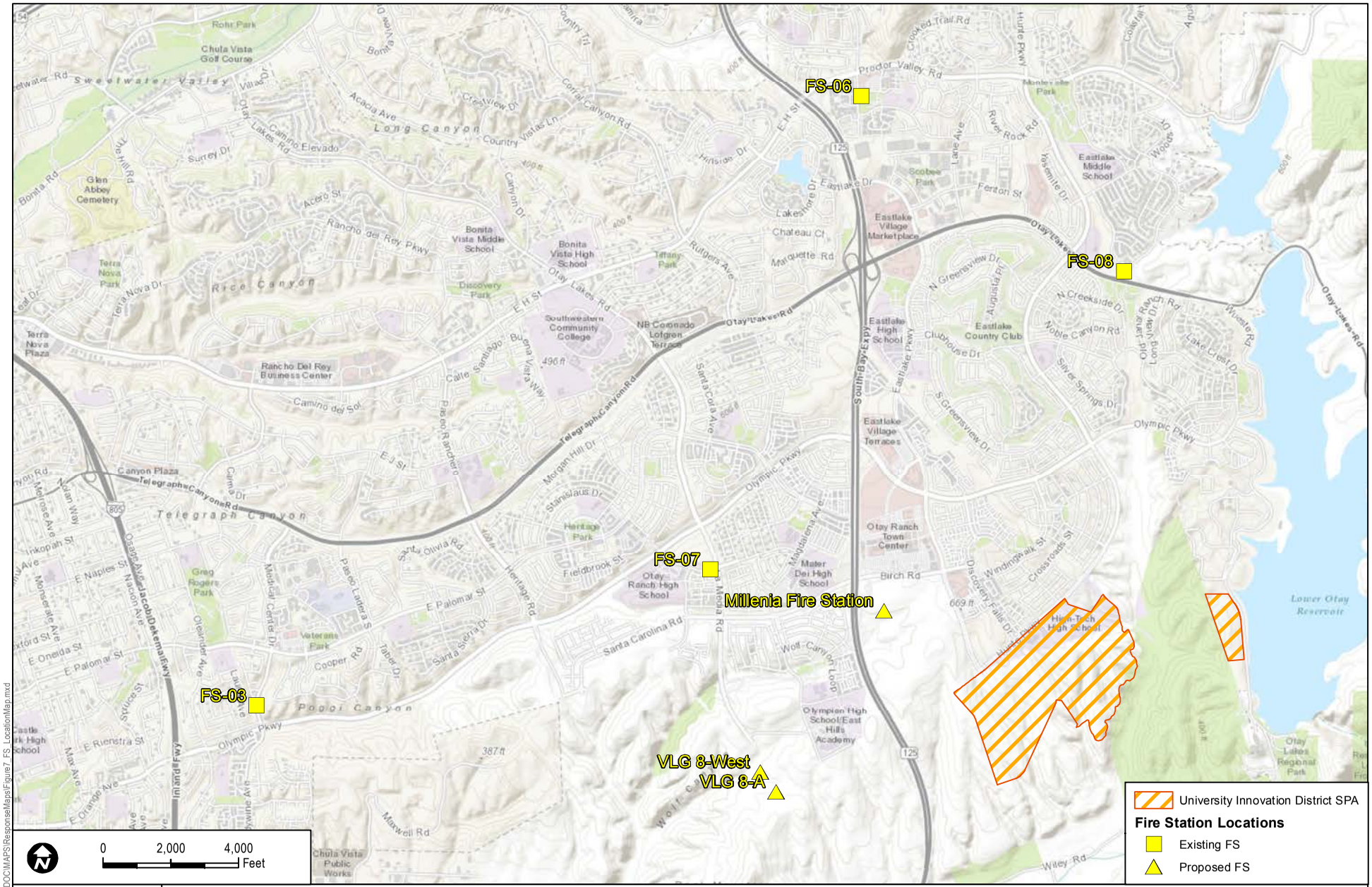
Notes:

* Table 3 presents results of response travel time utilized the ISO formula (T=.65+1.7D) that discounts speed to account for slowing along the response route. Response times are to the furthest extent for the Lake Property.

** Response times for Stations 6, 7, and 8 are the same for existing and future road networks.

*** Note that the EUC/Millenia station was used for modeling since it was determined to be the optimal location for a new fire station (FFMP 2012)

**** The Effective Firefighting Force could include responses from all five stations with a best case assembly travel time of 9 minutes 35 seconds for futre conditions and up to 12 minutesf or current conditions.



SOURCE: ESRI 2017, SanGIS 2016, Hunsaker 2016

FIGURE 7

Fire Station Location Map

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As indicated in Table 2 and Figures 8 through 12 , the first arriving engine from Station 7 with four firefighters onboard achieves a 5-minute 53 second travel time throughout the Main Campus development footprint. This first arriving response is approximately 53 seconds over the stated 5 minute travel time goal. Approximately 60% of the site's parcels would be over 5 minutes travel, but less than 6 minutes travel. The City's Occupational Safety and Health Administration (OSHA) two-in and two-out standard would however be met. If available to respond to an incident, Truck 57 with its complement of firefighters could respond to the Main Campus site within six minutes and provide additional manpower to comply with the OSHA staffing standard.

As indicated in Table 2, the current Effective Fighting Force (EFF) or first 3 engines, 1 truck and battalion chief for a total of 14 firefighters could be on-scene within roughly 9 minutes 25 seconds travel time from three existing stations. In this case, the proposed EUC/Millenia and Village 8 West stations (to the furthest Main Campus Property extent) would be approximately 2 minutes and 10 seconds and 4 minutes 20 seconds, respectively. Both new fire stations provide significant time savings, as both first arriving and EFF responses are within 5 minutes and under the 8-minute travel time goal.

The Lake Property as presented in Table 3 and Figures 8 through 12 would be served by existing Fire Station 8 with the first arriving engine achieving a 5-minute 28 second travel time to the southern portion of the parcel. This first arriving response substantially conforms with the approved response goal of 5 minutes 90% of the time, and it satisfies the OSHA two-in and two-out standard.

The EFF, including fire stations 6, 7, and 8, could be on-scene within roughly 11 minutes 56 seconds travel time. Once the EUC/Millenia station is built, the EFF response time improves to 9 minutes 35 seconds to the furthest Lake Property extent.

3.2 Estimated Calls and Demand for Service

The UID on-site population varies by time of year, week, and day. For purposes for this call volume analysis, the Project is evaluated using the maximum dwelling unit yield and gross square footage (SF) permitted by the SPA Plan. The proposed maximum development area for the UID is 10,066,200 SF that would support a total of 34,000 people including a mix of students, faculty, staff, residents, and retail/office workers. Data from the Chula Vista UID SPA EIR (City 2016b) indicates approximately 20,000 student enrollment and an additional 6,000 academic and staff employees. The approximate resident population is 5,400 students and 2,000 employees. Innovation uses would support up to 8,000 jobs. The calculated total of 34,000 people is an aggregate total, which combines all phases and all uses together and assumes they are all on the UID site at one time.

For this study's analysis, the closest fire station (Station 7) is evaluated as it provides perspective for the potential impacts from build out of the Main Campus Property, where the majority of the population would reside. Engine 57 responded to 1,512 calls and Truck 57 responded to 393 calls during 2016, primarily medical emergencies (67.8%) (City 2017). This calculates as 4 calls per day for Engine 57 and 1.1 calls per day for Truck 57. Construction of planned fire stations in the area would shift calls for a better balance among the UID proximal stations.

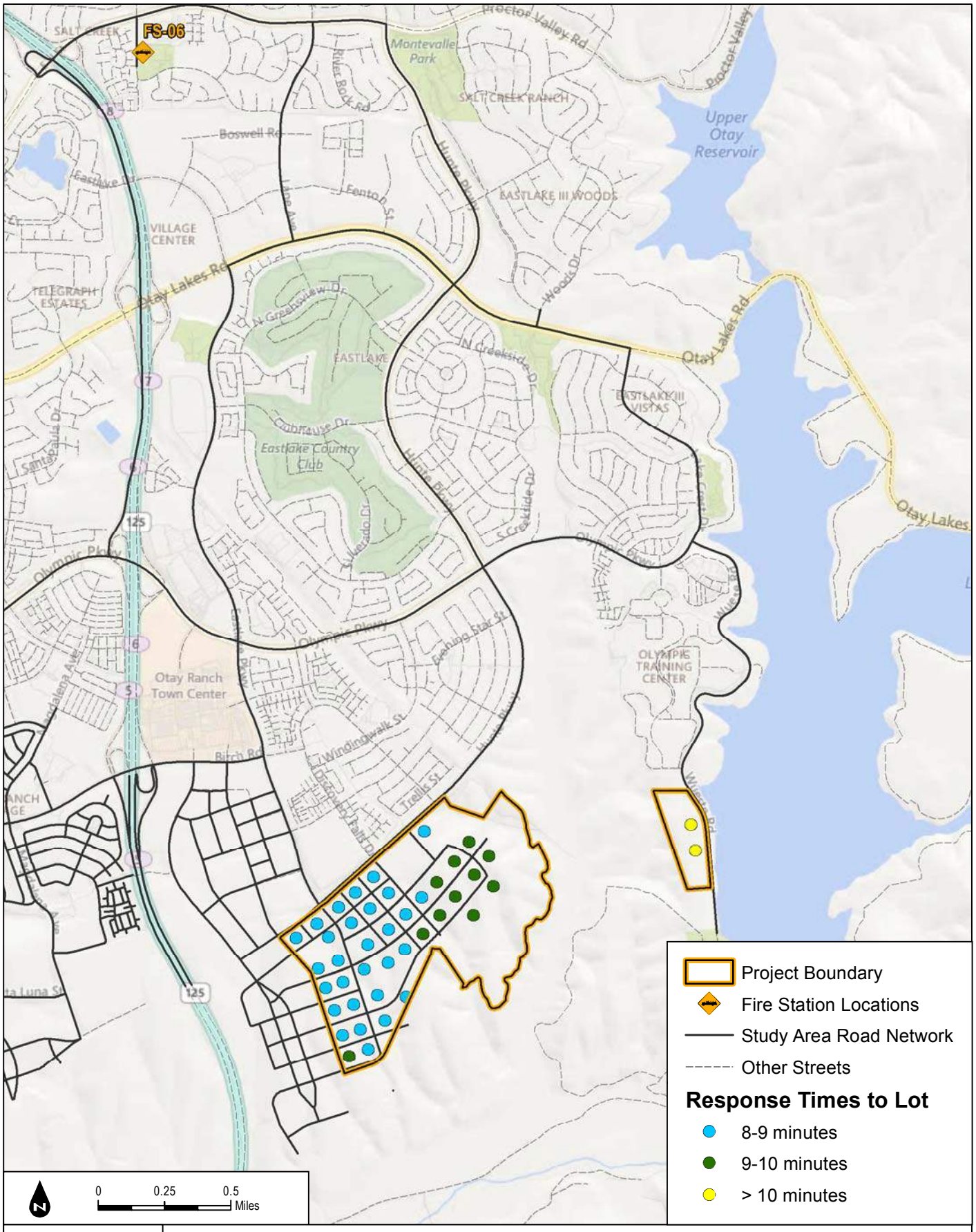
Determining the potential impact associated with the UID population increase is required in order to compare how many additional calls may be realized and determine what effects they may have on the available response resources. The estimated incident call volume of UID site implementation is based on a conservatively calculated estimate from the maximum potential number of additional persons that would be expected on site. As mentioned, there is expected to be an aggregate total of 34,000 people on site. This analysis indicates the "worst-case" scenario as calculated call volumes utilize the potential maximum population, even though a large portion of the population would not be on site during evening, night, and early morning hours.

As summarized in Table 4, using the CVFD estimate of 74 annual calls per 1,000 population[3,4], the Project's estimated 34,000 people would generate a very conservatively calculated 2,516 calls per year (about 6.9 calls per day), roughly 68% of which (1,705 call per day) is expected to be medical emergencies, based on past call statistics.

Table 4
Calculated Call Volume Associated with UID Project

Emergency Calls per 1,000 (2015 CVFD Incident Data)	Estimated Population	Avg. No. Calls per Year (34,000\1,000)x74	Avg. No. Calls per Day (2,516/365)
74	34,000	2,516	6.9
Type of call	**Per capita call generation factor**		**Number of estimated annual calls**
Total Calls	**100%**		**2,516**
Total Fires	**1.9%**		**47.8**
Total EMS Calls	**67.8%**		**1,705.8**
Total Rescue Calls	**0.33%**		**8.3**
Total Other Calls	**29.97%**		**754**

[3] City of Chula Vista estimated total population of 267,500 people (City of Chula Vista 2017).
[4] Chula Vista Fire Department 2016 Annual Stats Report: Total number of Incidents = 19,892



SOURCE: BING MAPPING SERVICE 2016

FIGURE 8

FS-06 Existing Fire Station Response Times

University Innovation District Fire Protection Plan

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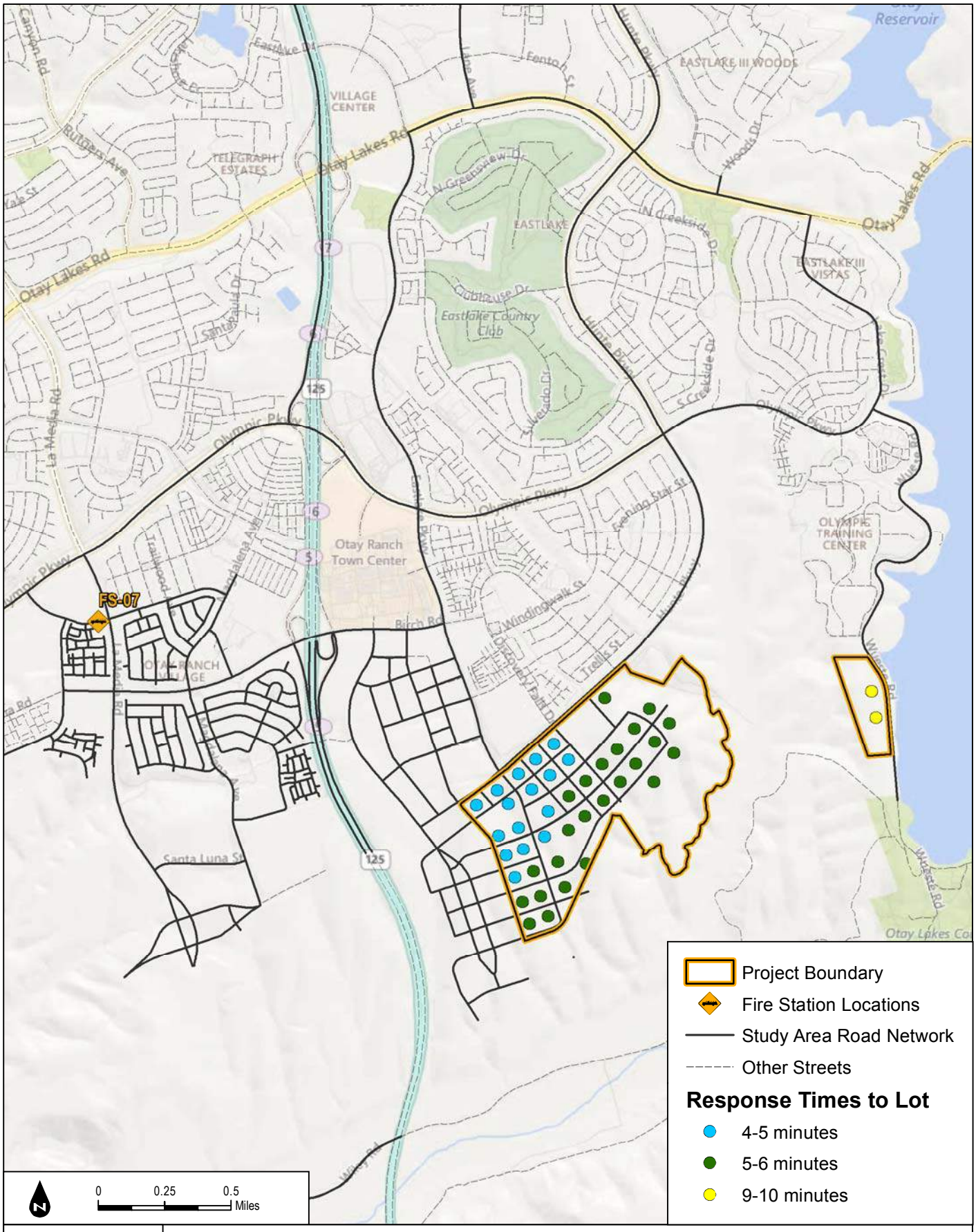

SOURCE: BING MAPPING SERVICE 2016

FIGURE 9

FS-07 Existing Fire Station Response Times

University Innovation District Fire Protection Plan

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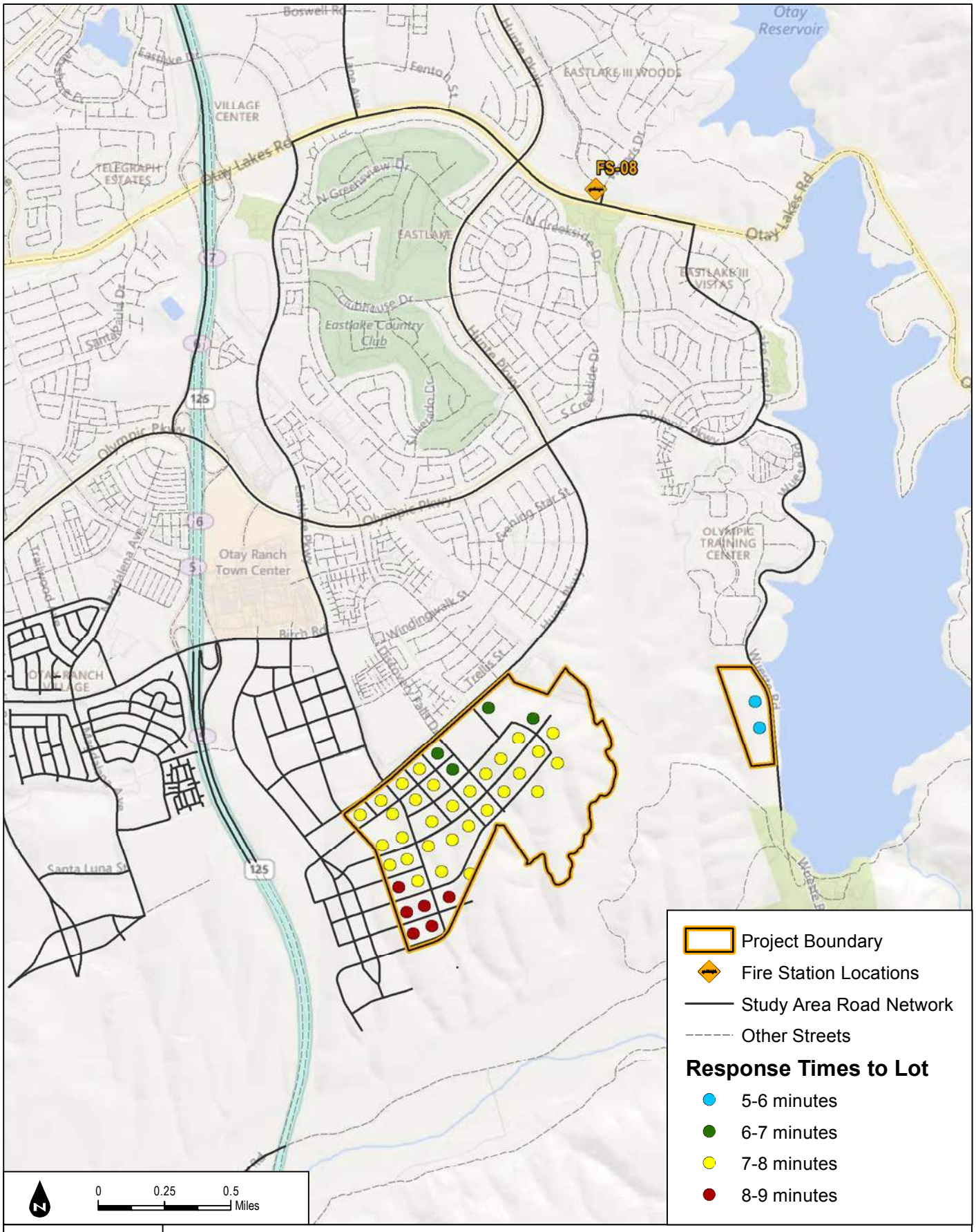

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SOURCE: BING MAPPING SERVICE 2016

FIGURE 10

FS-08 Existing Fire Station Response Times

University Innovation District Fire Protection Plan

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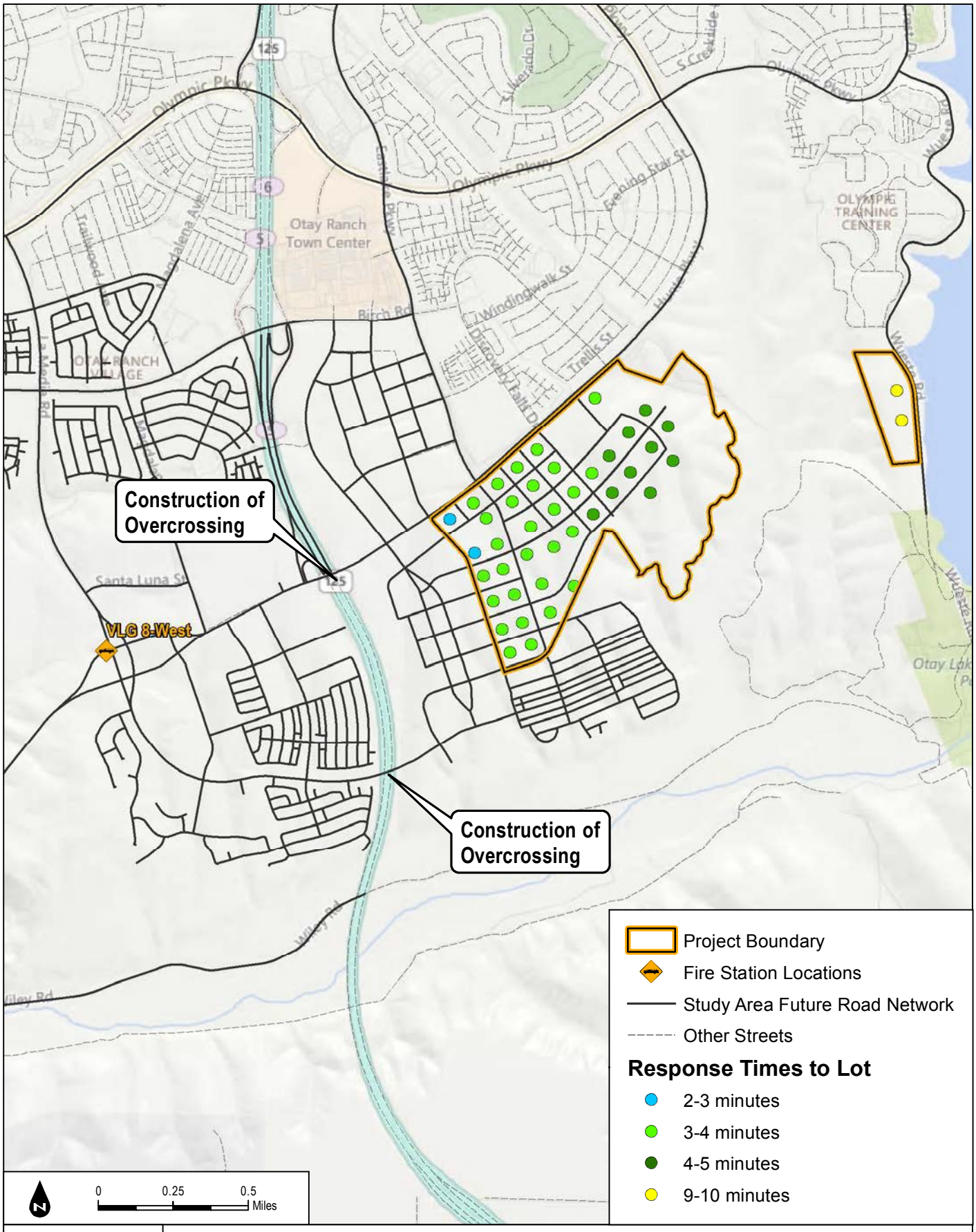

SOURCE: BING MAPPING SERVICE 2016

FIGURE 11

New Fire Station 8 West - Proposed Road Network - Response Times

University Innovation District Fire Protection Plan

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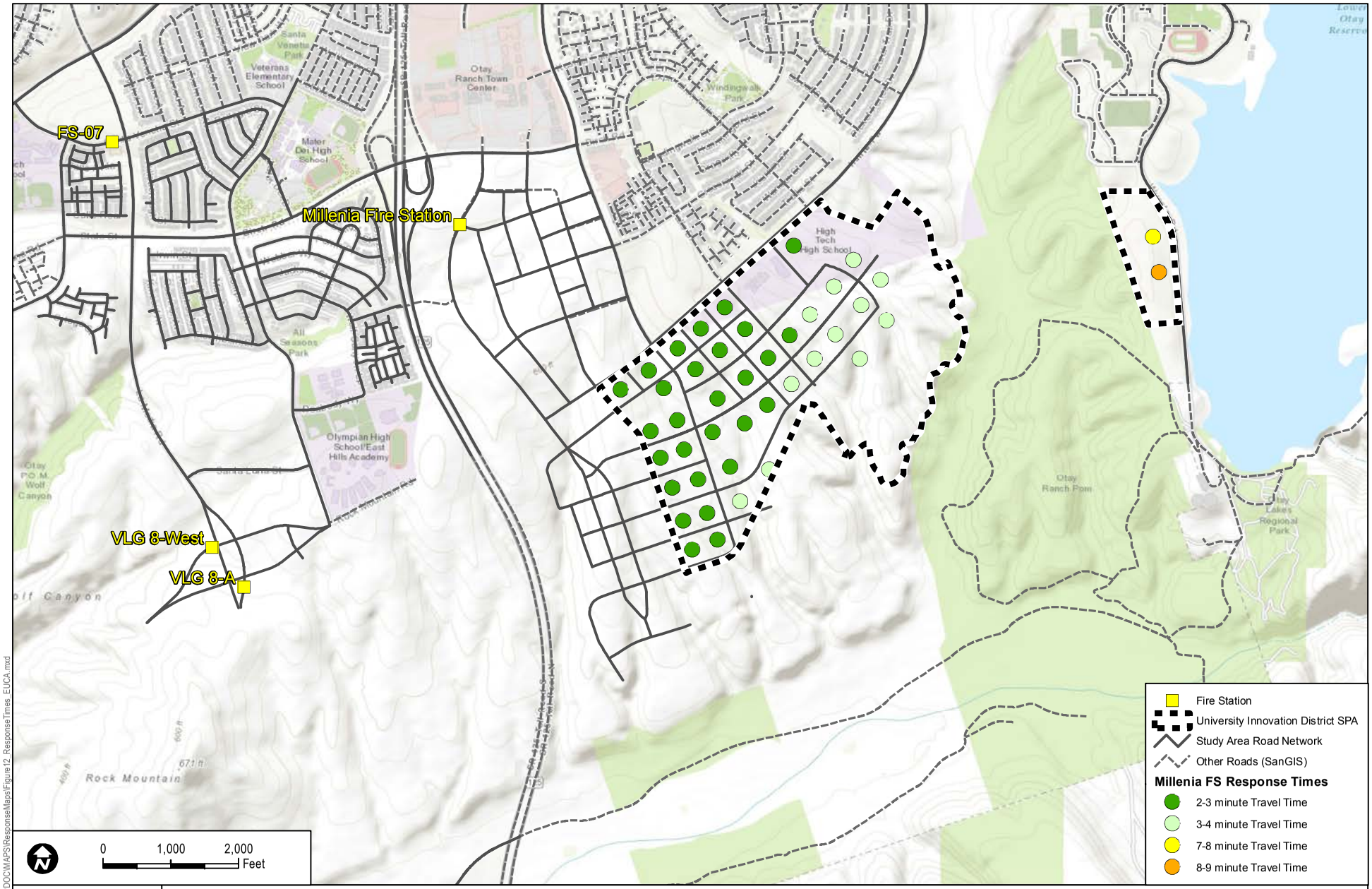

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SOURCE: ESRI 2016, SanGIS 2016, Hunsaker 2016

FIGURE 12

Millenia Fire Station Response Times

FIRE PROTECTION PLAN - UNIVERSITY INNOVATION DISTRICT SPA

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The addition of nearly 7 calls per day to a Fire Station that currently responds to approximately 5.1 calls per day is significant. Given that the actual call volume is estimated to be lower than 6.9 due to the 26,600 persons who would not be on-site during nighttime hours, and the additional fire response resources associated with planned new Fire Stations, it is anticipated that the UID calls can be absorbed and will not require additional fire station resources beyond existing and planned fire stations and ambulance coverage. With the addition of two planned fire stations in the area, as described herein, and the currently low call volume at Station 7, the additional calls associated with build out can be absorbed and still result in acceptable emergency response.

Station 7 is currently considered approximately average based on their roughly five or fewer calls per day. For perspective, a typical station averages around five calls per day and a busy station responds to about ten calls per day. Table 5 presents estimated call volume increases based on the demand from UID.

Table 5
Calculated Call Volume Increase Per Station Associated with UID Project

Chula Vista Fire Station	Current Daily Call Volume	Estimated Daily Call Volume Increase	Estimated Total Daily Call Volumes with proposed Project[1]
7	4.0 (engine) + 1.1 (truck)	Less than 6.9	Less than 12.0
8	3.0 (engine)2	Less than 6.9	Less than 10.0
EUC/Millenia	N/A	Up to 6.9	Greater than 6.9
Village 8 West	N/A	Less than 6.9	Greater than 6.9

Notes:
1 Estimated total daily call volume is based on existing volume in addition to the conservatively calculated 6.9 calls per day from UID. For Stations 7 and 8, it is assumed that the 6.9 calls per day associated with UID are maximum numbers that will not likely be experienced. For EUC/Millenia and Village 8 West stations, it is unkown what the call volume generated from their respective coverage areas will be at the time of this FPPs preparation.
2 Fire Station 8 responded to a total of 1,090 emergency calls in 2016 (City of Chula Vista 2017).

If based only on call volume, the existing stations would appear to be able to respond to UID call volume increases, although existing stations could see call volumes increase to busy levels. However, response times and the weight of response to Chula Vista's developing areas must also be considered when determining whether existing resources are adequate, or whether additional resources are necessary.

3.3 Impacts and Mitigation

3.3.1 Fire Response

The UID Project includes an increased number of new buildings and up to 34,000 people, although many of those people would not be on-site during at least 50% of time each day.

Service level requirements could, in the absence of additional fire facilities and resources improvements, cause a decline in the CVFD response times and capabilities. The requirements described in this FPP are intended to aid fire-fighting personnel and minimize the demand placed on the existing emergency service system.

Cumulative impacts from this type of project can cause fire response service decline and must be analyzed for each project. The UID Project represents a substantial increase in service demand due to the types of structures and land uses and the number of people living in or using the community and university. Based on the calculations presented in the preceding sections, and the estimated calls per day generated by the project, the UID Project is anticipated to have a significant impact on the response capability of the existing CVFD Fire Stations.

A second potential impact resulting from development in a WUI setting is related to the potential for increased exposure of residents to wildland fire. More people in a given area results in more opportunity for fire starts and subsequent exposure to dangerous conditions. The inclusion of homes adjacent to preserved open space areas and the potential for wildfire indicates the need for measures to minimize the likelihood of fire ignition and specialized wildland firefighting apparatus nearby should wildland fire occur.

The potential impacts to the firefighting and response resources and to the residents residing within this area are considered insignificant with respect to wildland fire. The project's inclusion of the most recent fire safety codes and a layered fire protection system, designed to reduce demands placed on the fire responders while minimizing exposure of humans to potentially harmful fire environments, would result in wildfire exposure levels that are below the significant threshold.

Features which are required and are therefore typically not considered mitigation, but that are relatively new Code requirements and play a critical role in minimizing structure ignition are; ignition resistant construction including roofs, walls and decks, vent restrictions, interior fire sprinklers, windows (dual pane/tempered), and fuel reduction areas. Although fire agencies do not provide "credit" for these features since they are required in the code, they do provide measureable safety improvements when used and are in the Code because they are so effective. Among other features that provide fire protection to the UID Project are:

1. Specialized firefighting apparatus within the CVFD fleet for wildland and structure fires along with highly trained firefighters;
2. Customized fuel modification zones that would be managed and maintained throughout the year; The term "customized fuel mod zone" refers to fuel modification zones that are customized to this project based on results of fire behavior, ignition sources, weather, and fire risk.

3. Highly restrictive Fire and Building Codes for both residential and commercial/industrial buildings; and
4. Robust mutual and automatic aid agreements that provide a large arsenal of firefighters, and ground- and aerial- based firefighting apparatus.

Even with these fire protection features, the project and the Otay Ranch Subarea would require construction, staffing and equipping of the two proposed fire stations discussed above to meet the demands created by build out of the Otay Ranch and enable CVFD to respond within the CVFD goal of 5-minute travel timeframe to 90% of incidents (first unit) and to assemble an EFF within 8 minutes. Overall phasing of the project and nearby projects (which all provide funding to these stations on a fair-share basis) would determine when additional fire stations are constructed. The Project must comply with the approved Chula Vista FFMP (2012), including fire facility siting, as approved by the Chula Vista City Council. With the two proposed fire stations within the Otay Ranch Subarea, construction of which would be supported on a fair share basis by the UID and residential portions of this Project through property tax and payment of the Chula Vista Public Facility Development Impact Fee, the City's goal of 5 minutes driving time to 90% of all structure fires and medical emergency calls would be conforming.

Fire Station 7 can respond to approximately 40% of the UID project within the 5 minute travel time. Areas that cannot be reached by Fire Station 7 within the 5 minutes travel time would depend on the EUC/Millenia Fire Station for conforming response. Timing of the Project's construction in relation to the operational availability of the EUC/Millenia Fire Station would determine the UID construction schedule. At the time of this FPPs preparation, it is estimated that the EUC/Millenia station will be operational by late 2018 or early 2019[5]. Should the EUC/Millenia fire station be operational prior to construction of the project exceeding the 5 minute travel time, then no additional measures would be necessary as there would be two responding engines, a truck, and a battalion chief that can provide under 5 minutes travel time response to all structures in the project and result in 13 firefighters on scene, meeting the OSHA two-in, two-out standard and almost achieve the EFF (14 firefighters). In the case that the Millenia Fire Facility is not built/operational, the Project is restricted by the CVFD to only develop parcel(s) that Fire Station 7 can respond to within five minutes, until the Millenia Fire Facility is on-line.

3.3.2 Medical Response

The number of estimated EMS calls per day represents a significant impact on current response capabilities and to the people who could require fast medical response for a variety of emergency

[5] Personal communication on December 7, 2016 with Justin Gipson, Deputy Fire Chief/Fire Marshal, CVFD

medical situations. Response times would increase, given the potential for up to 4.7 calls per day associated with UID and especially with build-out of the university, without additional resources. The combination of two additional fire stations with paramedic units, as proposed by CVFD, along with ambulance service unit increases is anticipated to result in sufficient resources to respond throughout the Otay Ranch Sub Area, including UID at build out.

Medical emergency response times cannot be mitigated for the most serious medical emergencies such as cardiac related emergencies. Advanced life support provided by paramedics on responding engines must arrive as quickly as possible, within 5.5–6 minutes to improve survivability (8 minutes if basic life support can be provided sooner). Six minutes includes the time to notify 911, for 911 to dispatch the closest engine, for the firefighters to "turnout", travel to the incident, locate the victim and engage medical treatments. It is common to require 60–90 seconds for dispatch and another 60–90 seconds for turnout. Travel times vary, but for UID, would be less than 6 minutes with the existing station 7 and approximately 2 minutes, once EUC/Millenia station is in operation, resulting in good response coverage and anticipated minimal impacts on the CVFD and emergency medical response provisions.

4 FIRE SAFETY REQUIREMENTS- DEFENSIBLE SPACE, INFRASTRUCTURE, AND BUILDING IGNITION RESISTANCE

The Chula Vista area experiences periodic conditions that can result in wildfire and there are dedicated preserve areas that provide wildland fuels adjacent to the UID site. Although the UID site has not burned since 1979, it is expected that wildfire could burn or spot onto the site because there will exist a wildland urban interface during and following project build-out. Additionally, structural fires and medical emergencies occur in urbanized areas and require response. As such, this FPP provides a summary of proposed and required infrastructure and special measures to provide fire protection.

4.1 Fuel Modification

WUI fire protection requires a systems approach, which includes the components of infrastructure and water, structural safeguards, and adequate fuel modification areas. This section provides FMZ requirements pursuant to the 2016 CFC and Section 7.4.4. Brush Management of the City's MSCP Subarea Plan.

4.1.1 Fuel Modification Zone Requirements

Definition

Fuel Modification Zone: A brush management area that is measured on a horizontal plane from the perimeter structures extending outwards towards Preserve land. All brush management zones and related fuel modification activities shall occur outside of the Preserve. Fuel modification zones (FMZ) shall be a minimum of 100 feet in width consisting of Zone 1 (0'-60') and a Zone 2 (61' to 100'). A 150-foot-wide FMZ would be installed for structures abutting designated Preserve Lands. The 150-foot FMZ would comprised of a 60-foot Zone 1 and a 61 to 150-foot wide Zone 2. To ensure long-term maintenance, each respective FMZ shall be identified by a permanent marker system meeting the approval of CVFD.

The goal of fuel modification zones is to eliminate highly flammable vegetation and replace it with fire resistant species with low BTU producing fire effects. Highly flammable species often include resins, chemicals, accumulation of litter like bark, leaves, and fine dead wood.

General Criteria

1. Vegetation included on the Prohibited Plant List (Appendix F) is prohibited in any Fuel Modification Zone.

2. All plant and seed material in Zones 2 to be locally sourced to the greatest extent possible to avoid genetically compromising the existing Preserve vegetation.
3. Plant 50%–70% of the overall fuel modification zone with deep rooting plant material.
4. Maintain all plant material in irrigated zones in a hydrated condition.
5. Remove debris and trimmings produced by thinning and pruning from the site, except for larger woody debris that may be chipped and left on site for weed and erosion control. Chips or mulch depth shall not exceed 4-inches and mulch chips should not be smaller than approximately 4- to 6-inches. Chipping/mulching of invasive species is prohibited. Dispose of cuttings and deadwood not chipped/mulched by hauling it to a local landfill.
6. There shall be no shrub plantings forming hedges (i.e., creating a "wick" effect) so that they do not form a means of rapidly transmitting fire from the native growth to the structures.
7. All mature trees must be limbed to ten feet or 3x the height of understory plants, whichever is greater.
8. Plant shrubs in clusters not exceeding a total of 400 square feet.
9. Prune vegetation to provide a minimum horizontal clearance between each shrub cluster that equals three times (3X) the height of the plant material or 20- feet, whichever is greater.
10. Provide "Avenues" devoid of shrubs a minimum width of 6 feet and spaced a distance of 200 linear feet on center to provide a clear access route from toe of slope to top of slope.
11. Combustible materials, including chipped biomass, bark, wood chips, should be no closer than 5 feet to structures unless of size and type shown to reduce potential ignitions.
12. Provide a minimum 30-foot distance between mature tree canopies for perimeter landscape areas adjacent to the urban wildland interface.
13. Thinning of any existing vegetation to remain shall be employed to reduce overall vegetative biomass by 30%-50%. Site specific conditions will dictate thinning percentages in relation to structures, building construction characteristics, topography, and vegetation type.
14. Remove non-native and invasive plants from the fuel modification zone to eliminate highly flammable species and reduce overall biomass levels. In some areas, removal of exotic species may be all that is required to meet thinning objectives.
15. Provide fire department access to FMZ every 1,000 lineal feet along portioins of the development adjacent to the WUI.

Zone 1 (0–60 feet from rear of structure)

Zone 1 – Definition:

All public and private areas located between a structure's edge and 60 feet outward. These areas may be located on public slopes, private open-space lots, or public streets, as illustrated on the landscape fuel modification exhibits.

Zone 1 – Specific Criteria:

1. Provide a permanent irrigation system within this irrigated wet zone.
2. Only those trees on the Approved Plant List (Appendix E) and those approved by the Director of Development Services as not being invasive are permitted within this zone.
3. Tree limbs shall not encroach within 10 feet of a structure or chimney, including outside barbecues or fireplaces.
4. Limit 75% of all groundcover and sprawling vine masses to a maximum height of 18 inches.
5. 25% of all groundcover and sprawling vine masses may reach a maximum height of 24 inches. Ground covers must be of high-leaf moisture content.
6. Shrubs shall be less than 2 feet tall and planted on 5-foot centers.
7. Randomly place approved succulent type plant material may exceed the height requirements, provided that they are spaced in groups of no more than three and a minimum of five feet away from described "clear access routes."
8. Vegetation/Landscape Plans shall be in compliance with this FPP.

Zone 2 (61–100 feet from structure or 61 to 150 feet from structure adjacent to Designated Preserve Lands)

Zone 2 – Definition:

All public and private areas located between the outside edge of Zone 1 and outward to 100 feet, per this FPP. These areas may be located on public slopes, private open-space lots, public streets, as defined in the landscape fuel management exhibits.

Exception: Combustible structures adjacent to Preserve lands require up to a 90 foot wide Zone 2 (from 61- to 150-foot) : sofor a total of 150 feet of fuel modification between the combustible structures and Preserve open space areas.

Zone 2 – Specific Criteria:

1. Utilize temporary irrigation to ensure the establishment of vegetation intended to stabilize the slopes and minimize erosion.
2. Trees may be located within this zone, provided they are planted in clusters of no more than three and provide a minimum of 30-foot distance between mature tree canopies.

   Only those trees on the Approved Plant List (Appendix E) and those approved by the Director of Development Services as not being invasive shall be permitted within this zone.
3. 100% of all groundcover and sprawling vine masses shall be limited to a maximum height of 36 inches.
4. Provide "Avenue" devoid of shrubs a minimum width of 6 feet and spaced a distance of 200 linear feet on center to provide a clear access route from toe of slope to tope of slope.
5. Shrubs may be planted in clusters not exceeding a total of 400 sq. ft.
6. Shrub clusters should occur as a "mosaic" in a "staggered" pattern for a more natural look. The mosaic of shrub cluster shall occur between the "avenues" devoid of shrubs.
7. When shrubs or other plants are planted underneath trees, the tree canopy shall be maintained at a height no less than three times the shrub or other plant's mature height (break up any fire laddering effect).

UID Site Specific FMZ Criteria

Fuel modification for the Main Campus Property and Lake Property provides at least 100 feet of defensible space adjacent to non-Preserve areas and 150 feet adjacent to Preserve areas, as required (Appendices D-1 and D-2). In addition, the fuel modification zones adjacent to many of the site's structures would consist of non-traditional, but effective placement of low-flammability land uses that function as fuel modification (e.g., parking, irrigated green space, or roadways) on the perimeter of the development footprint.

Main Campus Property FMZ Details follow:

1. Fuel modification would include at least 100 feet of modified fuels with a Zone 1 consisting of at least 60 feet of irrigated and restricted planting zone, and Zone 2, consisting of at least 40 feet of temporary irrigation reduced fuel and planting.
2. Fuel modification adjacent to Designated Preserve Lands (Appendix D-1) which occur along the eastern and southeastern edges of Main Campus Property development footprint would be at least 150 feet wide, consisting of at least 60 feet wide Zone 1 and at least 90 feet wide Zone 2.

Note: If future development as depicted on Figure 3 does occur along the eastern and southeastern edges of the Main Campus Property, a 150-foot wide FMZ will start at the Preserve edge and go back towards the buildings.

3. Fuel modification to the west of the Main Campus Property would tie into existing/proposed development area landscaping for Otay Ranch Village 9.
4. Fuel modification along the south edge of the Main Campus Property would tie into proposed development area landscaping for Otay Ranch Village 10 and a 85-foot wide street Right of Way with an additional 65 feet wide FMZs Zone 1 and 2.
5. The Main Campus Property is bordered by residential development to the north. No formal FMZ is needed.
6. The Project must comply with the landscape and fuel modification plant palette contained in Appendix E, Suggested Plant List for a Defensible Space.
7. **Interim Fuel Modification**:
    a. A minimum 100 feet of Zone 2 FMZ or mowing of grasses to maintain a four-inch stubble height would be required during interim period of construction of west or southwest edge of UID site development, depending on the timing of Villages 9 and 10 construction. At build out of Villages 9 and 10, the Main Campus Property would be bounded by residential development on the west and southwest sides as shown in Appendix D-1. Based on this final condition, no formal FMZ would be needed.
    b. Because development within UID may not proceed in a sequential pattern, and there may be areas under construction that are adjacent to native/natural fuels that will eventually be surrounded by development, interim fuel modification may be provided at these sites. Interim fuel modification would consist of a 100 foot wide Zone 2 or if grass, then the area would be mowed to maintain a maximum four-inch stubble height. The 100 foot wide zone would extend from the building outward, or at the periphery of the active construction area until the structure(s) is/are constructed.

Lake Property FMZ Details follow:

1. Fuel modification adjacent to Designated Preserve Lands (Appendix D-2), which occur along the northern, western and southern edges of the Lake Property development footprint, would be at least 150 feet wide, consisting of at least 60 feet wide Zone 1 and at least 90 feet wide Zone 2.

2. The proposed FMZ for the eastern boundary of the proposed Lake Property development consists of a 60-foot wide Zone 1 and 35 to 55 feet Zone 2. In addition, the development footprint would be bordered by a 24 feet wide paved road (Wueste Road), a parking lot, and the Otay Reservoir to the east.

4.1.2 Other Vegetation Management

A. Construction Phase Vegetation Management

Vegetation management requirements would be implemented at commencement and throughout the construction phases or individual projects. Vegetation management would be performed pursuant to CVFD requirements on all lots or areas prior to the start of work and prior to any import of combustible construction materials. Adequate, interim fuel reductions would occur through thinning, mowing, or blading around all grading, site work, and other construction activities in areas where there is flammable vegetation. These interim FMZs shall be at a minimum 100 feet in width around the perimeter of all structures that abut natural vegetation.

In addition to the requirements outlined above, phased projects would comply with the following important risk reducing vegetation management guidelines:

1. All new power lines would be underground, for fire safety during high wind conditions or during fires on a right-of-way which can expose aboveground power lines. Temporary overhead power/utility lines are permitted within construction zones.
2. Fuel modification zones would not extend into biological open space or other sensitive biological areas, or other areas controlled by the City and/or resource agencies.
3. Caution must be used to avoid erosion or ground (including slope) instability or water runoff due to vegetation removal, vegetation management, maintenance, landscaping, or irrigation. No uprooting of treated plants is necessary.
4. Vegetation management activities associated with facilities under construction within the MSCP Preserve shall be limited to the impact area identified and analyzed in the University Innovation District EIR. No vegetation management activities are permitted within the Preserve. Emergency brush management activities within the MSCP Preserve must comply with the Chula Vista MSCP Subarea Plan, Section 7.4.4.3 Emergency Brush Management.
5. All structures would be in strict, ongoing compliance with all Fire and Building Code requirements.

B. Roadside Fuel Modification Zones (Including Driveways)

1. High BTU producing flammable vegetation including shrubs and trees shall be 50% thinned or removed and replanted with approved fire resistive plant material within the roadside FMZs. All plants listed in the Prohibite Plant List (Appendix F) and any invasive species shall also be cleared and prohibited.
2. Tree and shrub canopies shall be spaced such that interruptions of tree crowns occur and horizontal spacing of 20 feet between mature canopies of trees or tree groups is maintained.
3. Mow/trim grass to 4 inches.
4. Single tree specimens, fire resistive shrubs, or cultivated ground cover such as green grass, succulents or similar plants used as ground covers may be used, provided they do not form a means of readily transmitting fire.
5. All fire access roadways s in the development will have the following FMZs widths as follows:
    a. Fire Access Roads – 30 feet from edge of pavement, but not within MSCP Preserve.
    b. New roads/driveways – 30 feet from edge of pavement, but not within MSCP Preserve.
    c. Existing roads/driveways – 20 feet from edge of pavement, but not within MSCP Preserve.
6. Trees are permitted within the Roadside Vegetation Management Zones, subject to following criteria:
    a. Provide 10 feet between mature tree canopies on slopes less than 40% (30 feet if adjacent to a slope steeper than 41%).
    b. Limb mature trees up to one-third the height of mature tree or 6 feet, whichever is greater.
    c. Tree canopies lower than 13 feet 6 inches are prohibited over roadways.
    d. Tree trunks may not intrude into roadway width.
    e. Comply with the Prohibited Plant List (Appendix F).
    f. Remove flammable understory beneath trees.
    g. Maintain vegetation under trees to 2 feet in height or below, and no more than one third the height of the lowest limb/branch on a mature tree, in order to keep the area fire resistive.

C. Open Space, Parks, etc.

1. Parks, if applicable, and open space landscape areas must comply with the guidelines in this FPP.

2. Remove flammable vegetation.
3. Maintain and mow/trim grasses to 4 inches.
4. Trees, plants, and shrubs must comply with the criteria in the FPP and the Suggested Plant List for a Defensible Space (Appendix E).
5. Comply with the Prohibited Plant List (Appendix F).
6. Remove down and dead vegetation as observed.
7. Properly plant and maintain trees consistent with this FPP.

D. Vacant Parcels and Lots

1. Vegetation management would not be required on vacant lots until construction begins. However, perimeter Vegetation Management Zones must be implemented prior to commencement of construction utilizing combustible materials.
2. Vacant lots adjacent to active construction areas/lots would be required to implement vegetation management if they are within 30 feet of the active construction area. Perimeter areas of the vacant lot shall be maintained as a Vegetation Management Zone extending 30 feet from roadways and adjacent construction areas.
3. Prior to issuance of a permit for any construction, grading, digging, installation of fences, etc., the 30 feet at the perimeter of the lot is to be maintained as a Vegetation Management Zone. However, this 30-foot vegetation management zone may not extend into the MSCP Preserve.
4. In addition to the establishment of a 30-foot-wide vegetation management zone prior to combustible materials being brought on site, existing vegetation on the lot shall be reduced by at least 60% upon commencement of construction.
5. Dead fuel, ladder fuel[6], and downed fuels shall be removed and trees/shrubs shall be properly limbed, pruned and spaced per this plan.

E. Preserve Areas

At the time of this FPP, there is no anticipated need to conduct vegetation management within adjacent Preserve areas. However, should conditions arise due to unforeseen or uncontrollable circumstances that leads to unsafe conditions, emergency brush management activities within the MSCP Preserve must comply with the Chula Vista MSCP Subarea Plan, Section 7.4.4.3 Emergency Brush Management.

[6] 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.

F. Alternative Methods

As fire protection technology continues to evolve and application of fire protection and suppression systems, materials, and methods become acceptable to fire agencies, this FPP provides an alternate means of providing defensible space. Builders or private lot owners may submit a site specific risk assessment and detailed Vegetation Management Plan (VMP) with an Alternative Materials and Methods justification, to the CVFD proposing alternative methods of fire protection and providing justification for any variance from the recommended vegetation management zones, if there is a practical difficulty, or environmental constraint, in providing the entire size of the necessary vegetation management zone detailed herein. The VMP would need to fully justify any alternative means and methods/mitigation measures proposed for reductions in the fuel modification areas and the CVFD Fire Marshal shall have full authority to approve or deny the requested variance.

G. Private Lots

This FPP provides direction for selecting lower flammability plant material along with planting and maintenance requirements. The 100 or 150 feet fuel modification zones are required to use low flammability plantings consistent with this FPP. In addition, it is recommended that none of the plant materials listed in the "Prohibited Plant List" (Appendix F) in this plan or otherwise known to be especially flammable be planted on private lots. This FPP or a summary of its key points would be provided to all buyers in a private property owner's guide to living in a fire environment. Deed restrictions would be recorded indicating the fuel modification zones on each private lot, as appropriate. Deed restrictions shall run with the land and be conveyed to any subsequent owner of the private lot. In addition, the project Codes, Covenants, and Regulations (CC&Rs) shall include a reference to the FPP to ensure compliance with the FPP.

All subsequent landscape plans and associated plant pallets prepared for areas located adjacent to the preserve are subject to the review and approval of the MSCP Section of the Development Services Department.

4.1.3 Maintenance

Vegetation management shall be completed annually by May 1 of each year and more often as needed for fire safety, as determined by the CVFD. Pruning and vegetation removal shall be limited to only those measures required to maintain the applicable requirements of the fuel modification zones. Homeowners and private lot owners shall be responsible for all vegetation management on their lots, in compliance with this FPP which is consistent with CVFD requirements. The "Approved Maintenance Entity" shall be responsible for and shall have the

authority to ensure long term funding, ongoing compliance with all provisions of this FPP, including vegetation planting, fuel modification, vegetation management, and maintenance requirements on all private lots, residences, parks, common areas, roadsides, and open space under their control (if not considered biological open space). Any water quality basins, flood control basins, channels, and waterways should be kept clear of flammable vegetation, subject to Section 4.1.2.D. The Approved Maintenance Entity shall obtain an inspection and report from a CVFD–authorized Wildland Fire Safety Inspector, in May of each year, certifying that vegetation management activities throughout the Project Site have been performed pursuant to this FPP and CVFD standards. This report would be funded by the Approved Maintenance Entity and submitted to CVFD Fire Marshal for approval.

Note: Maintenance activities in any environmentally sensitive areas that contain sensitive habitat including jurisdictional waters/wetlands are subject to the prior review and approval of the City and appropriate resource agency (i.e., California Department of Fish and Game, U.S. Fish and Wildlife Service, Army Corps of Engineers).

4.2 Infrastructure

4.2.1 Access

Site access, including fire lane, driveway, and entrance road widths, primary and secondary access, gates, turnarounds, turning radius, dead end lengths, signage, aerial fire apparatus access, surface, and other requirements would comply with the requirements of the 2016 California Fire Code and Appendices B and Cand CVFD Standards for fire accesswill be reviewed and approved by CVFD.

Regional vehicular access to the Main Campus Property is currently provided from SR-125 via Olympic Parkway to Eastlake Parkway. Eastlake Parkway currently terminates at its intersection with Hunte Parkway, which is located at the proposed gateway of the UID. Hunte Parkway is planned to extend westerly through Village 9 as Main Street and a new access ramp would connect Hunte Parkway/Main Street to Sr-125. This would provide direct access to the UID. A future access ramp would connect the Future Otay Valley Road to Sr-125, providing secondary access from the south through the future Village 10.

4.2.2 Roads

1. Primary access to the Main Campus site would be provided via Innovation Drive and Campus Drive to Eastlake Parkway. The Lake Property would be accessed from Wueste Road via Olympic Parkway. There would be no internal road directly connecting the Main Campus Property to the Lake Property.

2. Interior circulation roads include all roadways that are considered common or primary roadways for traffic flow through the site and for fire department access and serving in excess of two structures. Any dead-end roads serving new buildings that are longer than 150 feet shall have approved provisions for fire apparatus turnaround.
3. Cul-de-sac bulbs are required on dead-end roads in residential areas where roadways serve more than two residences and per City standards.
4. Road infrastructure improvements shall accommodate fire department apparatus turning capabilities per CVFD's Auto Turn detail, which can be downloaded at http://www.chulavista.ca.gov/home/showdocument?id=2844.
5. Roadways, driveways or firelanes would provide fire department access to within 150 feet of all portions of the exterior walls of the first floor of each structure, or as approved by CVFD.
6. Two means of access would be provided for buildings exceeding 30 feet in height measured from the grade plane and the highest roof surface. These access roads would be 26 feet wide and would be located between 15 and 30 feet from the building so that an aerial fire apparatus is positioned parallel to one entire side of the building, or to the approval of the CVFD.
7. Roadway design features (e.g., speed bumps, humps, speed control dips, planters, fountains) that could interfere with emergency apparatus response speeds and required unobstructed access road widths would not be installed or allowed to remain on roadways (CVFC). Traffic Calming features (i.e., raised intersections, intersection neck downs, roundabouts and parallel bay parking with landscape pop-outs) shall be allowed, subject to approval by the CVFD.
8. Vertical clearance of vegetation along roadways would be maintained at 13 feet, 6 inches. Vertical clearance in the commercial, school, and multi-family structure areas to be clear to the sky to allow aerial ladder truck operation. There shall be no power or utility lines over roadway at build out.
9. Angle of driveway/roadway approach/departure would not exceed 7° (12%) per CVFD.
10. Road grades would not exceed 10%, unless approved by the Fire Chief.
11. Developer would provide information illustrating the new roads, hydrants, and new structures in a format compatible with the City's current department mapping services.
12. Any roads that have traffic lights shall have Fire District–approved traffic preemption devices (Opticom) compatible with devices on the Fire Apparatus.

13. Fire Lanes would be identified by signs, curb painting or striping (with no curb) in accordance with Caltrans/FHWA standard (R26F) and/or CVFD design standards.

4.2.3 Gates

Access gates would comply with CVFC requirements applicable at the time of building plan approval.

4.2.4 Driveways

Any structure that is 150 feet or more from a common road in the development shall have a paved driveway meeting CVFC requirements as follows:

1. Grades 10% or less with surfacing and sub-base consistent with CVFC.
2. Driveways serving two houses or fewer would be 20 feet wide unobstructed with a fire apparatus turnaround. Driveways serving more than two houses would be a minimum 24 feet wide, unobstructed.
3. Lighted house addresses shall be posted at the entrance to each driveway if house numbers are not visible from the street.

4.2.5 Premises Identification

Identification of roads and structures would comply with CVFC and Fire Prevention Division Standards, as follows:

1. All structures required to be identified by street address numbers at the structure. Numbers to be minimum 6 inches high with 1-inch stroke (0 to 50 feet from face of curb), 10-inches high with 1.5-inch stroke (51 to 150 feet from face of curb), or 16 inches with 2-inch stroke (greater than 150 feet from face of curb). Numbers would contrast with background.
2. Multiple structures located off common driveways would include posting addresses on structures, on the entrance to individual driveways, and at the entrance to the common driveway for faster emergency response.
3. Proposed roads within the development would be named, with the proper signage installed at intersections to satisfaction of the CVFD and the Department of Public Works.
4. Streets would have street names posted on non-combustible street signposts. Letters/numbers would be 4 inches high, reflective, on a 6-inch-high backing. Signage would be 7 feet above grade. There would be street signs at the entrances to the development, all intersections, and elsewhere as needed subject to approval of the Fire Chief.

5. Access roads to private lots to be completed and paved prior to issuance of building permits and prior to the occurrence of combustible construction.

4.2.6 Illuminated Directory

The project shall provide a Lighted Directory Map within the development, near the main entry in a location that is approved by the CVFD. The Directory shall be designed and built to CVFD specifications (Chapter 19.60 of the City's Municipal Code) and City's Design Guidelines.

4.2.7 Knox Box/Vault

All commercial (single tenant or multi-tenant) and multi-family residential buildings would have knox box or vault. The location and number of knox boxes or vaults would be approved by CVFD's Fire Marshal.

4.3 Ignition Resistant Construction

All new structures within UID Project would be constructed to CVFD Fire Code standards. Each of the proposed buildings would comply with the enhanced ignition-resistant construction standards of the 2016 CBC (Chapter 7A) and Chapter 5 of the Urban-Wildland Interface code. 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.

While these standards would provide a high level of protection to structures in this development, and should reduce the potential for ordering evacuations in a wildfire, there is no guarantee that compliance with these standards would prevent damage or destruction of structures by fire in all cases.

4.3.1 Additional Requirements and Recommendations Based on Occupancy Type

All CFC and CBC requirements for higher occupancy structures would be provided to UID buildings that include higher occupancies. Included in the high occupancy category are multi-family residences over three units, attached condominiums, and multi-story buildings over two stories.

4.4 Fire Protection System Requirements

4.4.1 Water Supply

Water service would be provided by the Otay Water District. Water supply requirements specified in the Chula Vista Fire Code (Section 404 of the Wildland-Urban Interface Code and Appendix B – Fire Flow Requirements for Buildings, Appendix C – Fire Hydrant Locations and Distribution {Chula Vista revisions – Sections 15.36.055 and 15.36.065}) including for hydrants and interior sprinklers would be provided for UID site.

Hydrants shall be located along fire access roadways and cul-de-sacs as determined by the CVFD Fire Marshal to meet operational needs. Hydrants would be consistent with Section 15.36.065 of Chule Vista Fire Code and Table C102.1 of the 2016 CFC. Fire hydrants, Fire Department Connections (FDC) and Post indicating Values (PIV) would be protected by 4-inch diameter galvanized steel pot (1/4-inch wall) filled with concrete. A blue reflective marker would be placed per CVFD standard to identify fire hydrant location. PIVs and FDCs would be identified by a sign meeting CVFD signage standards.

4.4.2 Fire Sprinklers

All structures within UID project site would include interior sprinklers, per code requirements (Section R313.3 of the 2016 California Residential Code, Chapter 9, Section 903 of the 2016 CFC, and Section 602 of the Urban-Wildland Interface Code). Sprinklers would be specific to each occupancy type and based on the most recent NFPA 13, 13R, or 13D, requirements.

5 FIRE SAFETY AND EVACUATION AWARENESS

UID outreach to the university campus and resident population regarding fire safety and general evacuation procedures is important. There are aspects of fire safety and evacuation that require a significant level of awareness by the populace and emergency services in order to reduce and/or avoid problems with an effective evacuation. Avoiding potential impediments to successful evacuations requires focused and repeated information through a strong educational outreach program. UID can engage the populace through a variety of methods. This evacuation plan, or portions thereof, could be provided on-line via a university Website to augment the building pre-evacuation plans. Annual reminder notices should be provided to the student body, staff and faculty encouraging them to review the plan and be familiar with evacuation protocols. It is recommended that the university's campus Fire Marshal and/or Emergency Response personnel engage in annual fire safety and evacuation preparedness outreach efforts. One focus of this outreach should be on the importance of each person to prepare and be familiar with their own "Ready, Set, Go!" evacuation plan. The "Ready, Set, Go!" program is defined at: http://www.chulavistaca.gov/departments/fire-department/ready-set-go and information about preparing an individual Action Plan is provided in Appendix G.

The focus of the "Ready, Set, Go!" program is on public awareness and preparedness, especially for those students, staff and faculty living or working in the campus wildland-urban interface (WUI) areas. The program is designed to incorporate the local fire protection agency (CVFD) as part of the training and education process in order to ensure that evacuation preparedness information is disseminated to those subject to the potential impact from a wildfire. There are three components to the program:

- ***"READY"*** – Preparing for the Fire Threat: Take personal responsibility and prepare long before the threat of a wildfire so you and your landscape are ready when a wildfire occurs. Create defensible space by providing managed fuel modification zones (not brush clearing) as detailed within this FPP. Use only fire-resistant landscaping and maintain its ignition resistance. Assemble emergency supplies and belongings in a safe spot. Confirm registration with Reverse 911. Make sure all residents within the building are familiar with evacuation plan and escape routes.
- ***"SET"*** – Situational Awareness When a Fire Starts: If a wildfire occurs and there is potential for it to threaten portions of the university or UID site, pack important items and be ready to leave the area on-foot or by vehicle. Stay aware of the latest news from local media and your local fire department for updated information on the fire. If uncomfortable, leave the area.

- ***"GO!"*** – Leave Early! Following your Action Plan provides you with knowledge of the situation and how one would approach evacuation. Leaving early, well before a wildfire is directly threatening, provides you with the least delay and results in a situation where, if a majority of people also leave early, firefighters are now able to better maneuver, protect and defend structures, evacuate other residents who couldn't leave early, and focus on human safety.

"READY! SET! GO!" is predicated on the fact that being unprepared and attempting to flee an impending fire late (such as when the fire is physically close to your community) is dangerous and exacerbates an already confusing situation. This UID FPP provides key information that can be integrated into the individual Action Plans.

6 MAINTENANCE AND LIMITATIONS

In order to ensure that the proposed improvements and uses are provided suitable fire protection that would minimize risks associated with fire, all components of the fire protection system must be maintained and in place. This FPP, when approved, provides the direction and nexus for that maintenance to occur. Specifically, the HOA for residential areas or other funded management entity for the campus areas would be funded and authorized to ensure that at least annual inspections of the fuel modification areas, construction features, fire protection systems, and infrastructure to ensure that they meet the requirements specified in this FPP.

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7 CONCLUSION

This FPP for the proposed UID Project complies with the requirements of Chula Vista Fire Department and its adopted Fire Codes (2016 California Fire Code (with Appendices B and C) and 2000 Urban-Wildland Interface Code) and Building Codes (2016 CBC, Chapter 7A).

This FPP utilizes a "systems approach" for specifying fire protection measures. The measures consist of the components of fuel modification, structural protection, water supply, fire protection systems, access (ingress/egress), and well-planned emergency response. This FPP provides details regarding the general fire protection features as well as the site specific, restrictive policies that would govern the UID Project with regards to fire protection. In addition, this FPP incorporates and relies on the proposed fire station locations outlined in the 2014 Council-approved, Chula Vista FFMP. UID must comply with this plan.

The requirements and recommendations provided in this FPP have been designed specifically for the proposed improvements adjacent to the wildland urban interface zone at UID.

Ultimately, it is the intent of this FPP to guide the fire protection efforts for the UID in a comprehensive manner. Implementation of the measures detailed in this FPP would reduce the risk of wildfire at this site, would improve the ability to safely relocate people from the area during wildfire events or temporarily shelter them under emergency conditions, and would improve the ability to fight fires on the properties and protect property and neighboring 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 would not burn. Precautions and minimizing actions identified in this report are designed to reduce the likelihood that fire would impinge upon UID assets or threaten its residents or visitors. Additionally, there are no guarantees that fire would not occur in the area or that fire would 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 would reduce the site's vulnerability to wildfire. It would also help accomplish the goal of this FPP to assist firefighters in their efforts to defend existing structures and reduce overall fire risk.

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APPENDIX A

Photograph Log

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APPENDIX A
University Innovation District Photographs

Photograph 1. Panoramic view looking southwest of agriculture (dry crop) farming occurring in the western half of main campus property.

Photograph 2. Closer view of dry crop farming within the western portion of property. Photograph is taken looking south.

Photograph 3. Natural Diegan coastal sage covered slopes on southeast portion of main campus property. Non-native grasslands –sage scrub habitat is in foreground of picture.

Photograph 4. Close-up view of coastal sage scrub and non-native grasslands. Photograph is taken looking southeast.

APPENDIX B

Fire History

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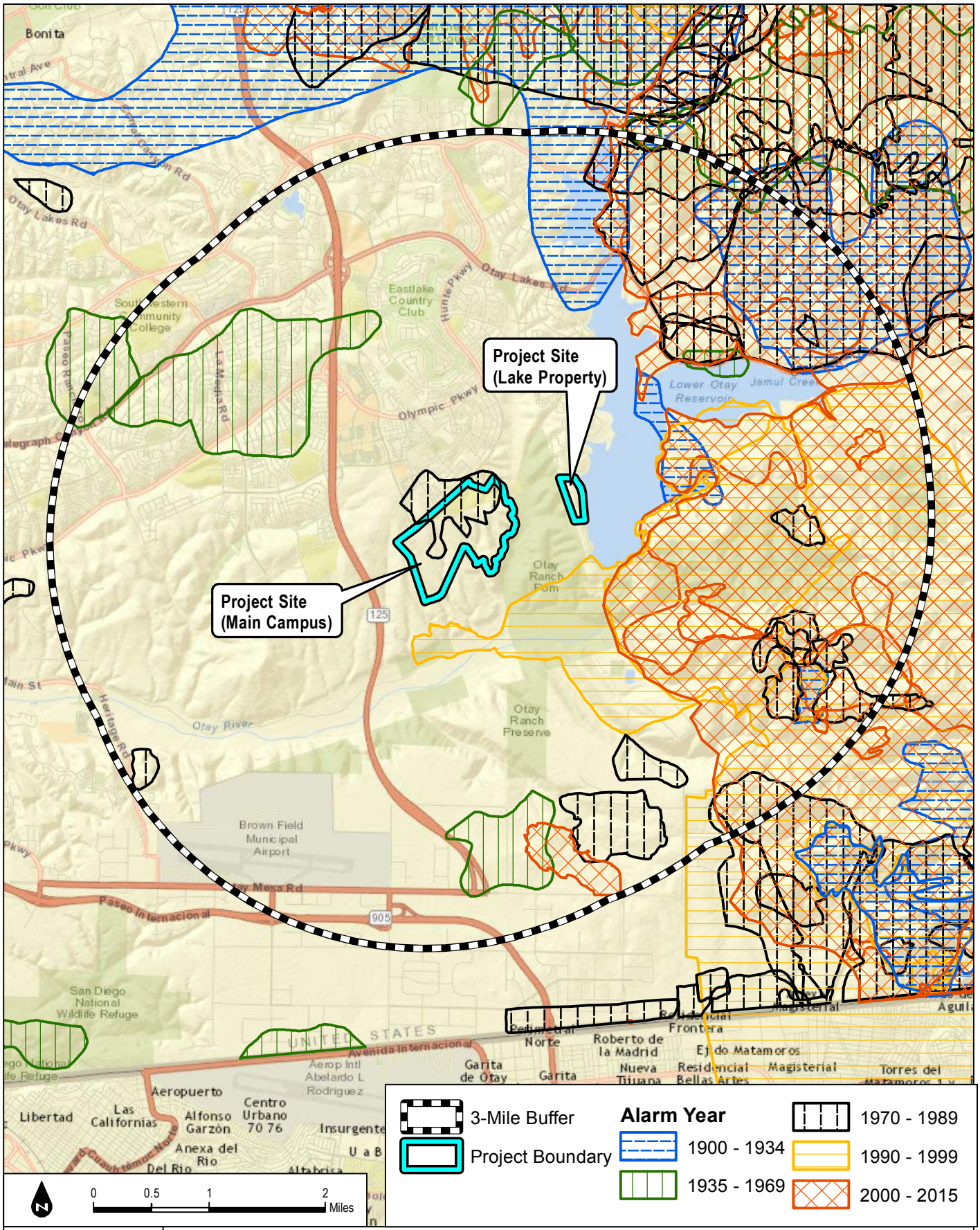

SOURCE: ESRI; Cal Fire 2015

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Appendix B

Fire History Exhibit

University Innovation District Fire Protection Plan

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APPENDIX C

Fire Behavior Modeling Technical Analysis

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APPENDIX C
Fire Behavior Modeling Technical Analysis
University Innovation District

BEHAVEPLUS FIRE BEHAVIOR MODELING

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. To objectively predict flame lengths, spread rates, and fireline intensities, the BehavePlus 5.0.5 fire behavior modeling system was applied using predominant fuel characteristics, slope percentages, and two representative fuel models observed on the University Innovation District (UID) site, which includes the Main Campus Property and Lake Property.

Predicting wildland fire behavior is not an exact science. As such, the movement of a fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire prevention planning information.

To be used effectively, the basic assumptions and limitations of BehavePlus must be understood.

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

Although BehavePlus has some limitations, it can still provide valuable fire behavior predictions which can be used as a tool in the decision-making process. In order to make reliable estimates of fire behavior, one must understand the relationship of fuels to the fire environment and be able

to recognize the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur on a site. The type and quantity will depend upon the soil, climate, geographic features, and the fire history of the site. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

The seven fuel characteristics help define the 13 standard fire behavior fuel models[1] and the more recent custom fuel models developed for Southern California[2]. According to the model classifications, fuel models used in BehavePlus have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface to volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in BehavePlus. 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[3] developed for use in BehavePlus modeling efforts. These new models attempt to improve the accuracy of the standard 13 fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the new 40 fuel models:

- Non-Burnable Models NB1, NB2, NB3, NB8, NB9
- Grass Models GR1 through GR9
- Grass-shrub Models GS1 through GS4
- Shrub Models SH1 through SH9

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

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

3 Scott, Joe H. and Robert E. Burgan. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

- Timber-understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4

BehavePlus software was used in the development of this fire protection plan (FPP) in order to evaluate potential fire behavior for the Project Site. Existing site conditions were evaluated, and local weather data was incorporated into the BehavePlus modeling runs.

BEHAVEPLUS FUEL MODEL INPUTS

Dudek utilized BehavePlus software to evaluate fire behavior potential for the UID site. Two weather scenarios were evaluated, including a summer, onshore weather condition (50th percentile) and a more extreme fall, offshore weather condition (97th percentile). BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The following provides a description of the input variables used in processing the BehavePlus models for the site. In addition, data sources are cited and any assumptions made during the modeling process are described.

Vegetation/Fuel Models

Vegetation types, which were derived from vegetation mapping data[4] for the project site, were classified into a fuel model. Vegetation mapping data was utilized in field assessment efforts to classify vegetation cover type with an appropriate fuel model. Table 1 provides a description of the fuel model(s) observed on the UID site and their corresponding vegetation classification. This value was used in the modeling analysis for the fuel type on and adjacent to the UID site. Further, while past disturbances (fire and farming) have altered fuel beds on the Main Campus Property, modeling efforts presented herein assume sage scrublands to more mature stand conditions. As such, fuel models representing mature Diegan coastal sage scrubland non-native grasslands were used for fire scenarios.

Table 1
Existing Fuel Model Characteristics

Fuel Model	Description	Tons/acre; Btu/lb	Fuel Bed Depth (Feet)
1	Short, Dry Climate Grass	0.74 tons/acre; 8,000 Btu/lb.	1.0 ft.
SCAL 18	Dry Climate Shrub (sagebrush/buckwheat)	6.4 tons/acre; 9,200 Btu/lb.	3.0 ft.

[4] University Innovation District Biological Technical Report,City of Chula Vista, San Diego County, California, Prepared byHelix Environmental Planning, Inc., April 29, 2016.

Topography

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. Slope values were calculated from Google Earth images and are presented in units of percent. Upslope gradients ranged from 5% to 27%.

Weather and Wind Analysis

Historical fuel moisture and wind speed data for the region was utilized in determining appropriate fire behavior modeling inputs for the project site. Specifically, 50th and 97th percentile values derived from the San Miguel Remote Automated Weather Station (RAWS) were determined and utilized in the fire behavior modeling efforts conducted in support of this FPP. RAWS fuel moisture and wind data were processed utilizing the FireFamily Plus software package (v. 4.1) to determine typical onshore air flow conditions (50th percentile) and atypical offshore/Santa Ana fire weather conditions (97th percentile). The San Miguel RAWS[5] is located at approximately 4.5 miles north of the UID site in a similar geographical setting. Data from the San Miguel RAWS was evaluated from May 1 through November 30 for each year between 2002 and 2015.

Wind speed values derived from RAWS data represent 20-foot wind speeds. As such, a wind adjustment factor of 0.4 was utilized to account for vertical differences in wind speed from the 20-foot recording height to mid-flame height prior to BehavePlus modeling efforts. Standard RAWS setup places the anemometer at 20 feet above ground, while wind affecting surface fire spread is that found at mid-flame height. A conservative wind adjustment factor of 0.4 indicates a fuel bed that is unsheltered from the wind with a fuel bed depth roughly 3.0 feet or higher. It should be noted that mid-flame wind speeds may be only 10% of the wind speeds recorded or predicted at 20 feet. Table 2 summarizes the weather and wind input variables used in the BehavePlus modeling efforts.

Table 2
BehavePlus Fire Behavior Model Variables

Variable	Summer Weather (Onshore Flow) 50th Percentile	Peak Weather (Offshore Flow) 97th Percentile
Fire Scenario	1 and 3	2
Fuel Model	1, SCAL 18	1, SCAL 18

[5] San Miguel RAWS: Latitude: 32.68611; Longitude: -116.97833; Elevation 425 feet amsl

Table 2
BehavePlus Fire Behavior Model Variables

Variable	Summer Weather (Onshore Flow) 50th Percentile	Peak Weather (Offshore Flow) 97th Percentile
1h Moisture	8%	2%
10h Moisture	10%	3%
100h Moisture	15%	7%
Live Herbaceous Moisture	62%	30%
Live Woody Moisture	121%	92%
20-ft Wind Speed	8 mph, average sustained wind	12 mph, average sustained wind (20 mph max. sustained high; 32 mph max. gusts)
Wind Adjustment Factor (BehavePlus)	0.4	0.4
Slope Steepness	5% to 27%	5% to 27%

Fire Modeling Scenarios

Focused fire behavior modeling utilizing BehavePlus 5.0.5 was conducted for the Project area. Fuel model typing was completed in the field concurrent with site hazard evaluations. Based on field analysis, three different fire modeling scenarios were evaluated for UID site.

- **Scenario 1:** Typical fire weather with on-shore wind (50th percentile weather conditions) and fire burning in preserved open space upslope from Otay Valley onto mesa top towards the southwestern portion of the Main Campus Property. This fire scenario will no longer exist after future Village 10 is built out.
- **Scenario 2:** Extreme fire weather with off-shore, Santa Ana winds (97th percentile weather conditions) and fire burning in the preserve open space in Salt Creek Canyon towards in southeastern edge of the Main Campus Property.
- **Scenario 3:** Fire weather with on-shore wind (50th percentile weather conditions) and fire burning in preserve open space along the western boundary of the Lake Property. The eastern border of this parcel is bound by Wueste Road and Lower Otay Lake.

FIRE BEHAVIOR MODELING OUTPUTS

As mentioned, the BehavePlus fire behavior modeling software package was utilized in evaluating anticipated fire behavior adjacent to proposed fuel modification zones for the UID Project site. Three focused analyses were completed in existing site conditions during Summer (50th percentile) and Peak (97th percentile) weather scenarios for average sustained and maximum wind speeds and gusts. Four fire behavior variables were selected as outputs from the

BehavePlus analysis conducted for the UID site, and include flame length (feet), rate of spread (mph), fireline intensity (BTU/feet/second), and spotting distance (miles). The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames[6]. It is a somewhat subjective and non-scientific measure of fire behavior, is extremely important to fireline personnel in evaluating fireline intensity, and is worth considering as an important fire variable[7]. The information in Table 3 presents an interpretation of flame length and its relationship to fire suppression efforts. Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in initial attack and fire suppression efforts. Spotting fire distance is the distance a firebrand could potentially travel to a receptive fuel bed. The results of fire behavior modeling efforts are presented in Table 4. Identification of modeling run locations is presented graphically in Figure 5 of the FPP.

Table 3
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.

Source: Based on: Roussopoulos, Peter J.and Von J. Johnson. Help in Making Fuel Management Decisions. Res. Pap. NC-112. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station; 1975. 16 p.

[6] Andrews, Patricia L., Collin D. Bevins, and Robert C. Seli. 2008. BehavePlus fire modeling system, version 3.0: User's Guide. Gen. Tech. Rep. RMRS-GTR-106 Ogden, Utah: Department of Agriculture, Forest Service, Rocky Mountain Research Station. 132p.

[7] Rothermel, R.C. 1983. How to Predict the Spread and Intensity of Forest and Range Fires. USDA Forest Service Gen. Tech. Report INT-143. Intermountain Forest and Range Experiment, Ogden, Utah.

Table 4
University Innovation District
BehavePlus Fire Behavior Model Results

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: 50th percentile weather conditions (8 mph) on south-facing, 27% slope				
Grasslands (FM 1)	3.2	69	0.57	0.1
Diegan coastal sage scrub (SCAL 18)	11.9	1,231	0.27	0.3
Scenario 2: 97th percentile weather conditions (32 mph gusts) on southeast-facing, 27% slope				
Grasslands (FM 1)	12.7	1,415	8.3	0.7
Diegan coastal sage scrub (SCAL 18)	30.3	9,434	1.5	1.4
Scenario 3: 50th percentile weather conditions (8 mph) on west-facing, 19% slope				
Diegan coastal sage scrub (SCAL 18)	11.6	1,160	0.25	0.3

Note: It should be noted that the results presented in Table 4 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. 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.

As presented in Table 4, worst-case fire behavior is expected in sage scrub fuels (Fuel Model SCAL 18) along the eastern edge of the proposed Main Campus Property during a strong (Santa Ana) wind-driven fire event (32 mph wind speed). Under such extreme weather conditions, flame lengths in the sage scrub/grassland fuel bed will vary from 12 to 30 feet with fire spread rates up to 8 mph due to high winds and very low fuel moistures. On the contrary, wildfires occurring during onshore wind patterns (Summer condition) with average wind speeds of 8 mph are expected to be of low to moderate severity with flames lengths reaching 11.9 feet for sage scrub fuels and 3.2 feet for grass fuels. Slower, fire spread rates (less than 1.0 mph) are a result of higher fuel moisture content and reduced wind speeds.

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APPENDIX D-1

Main Campus Property Fuel Modification Plan

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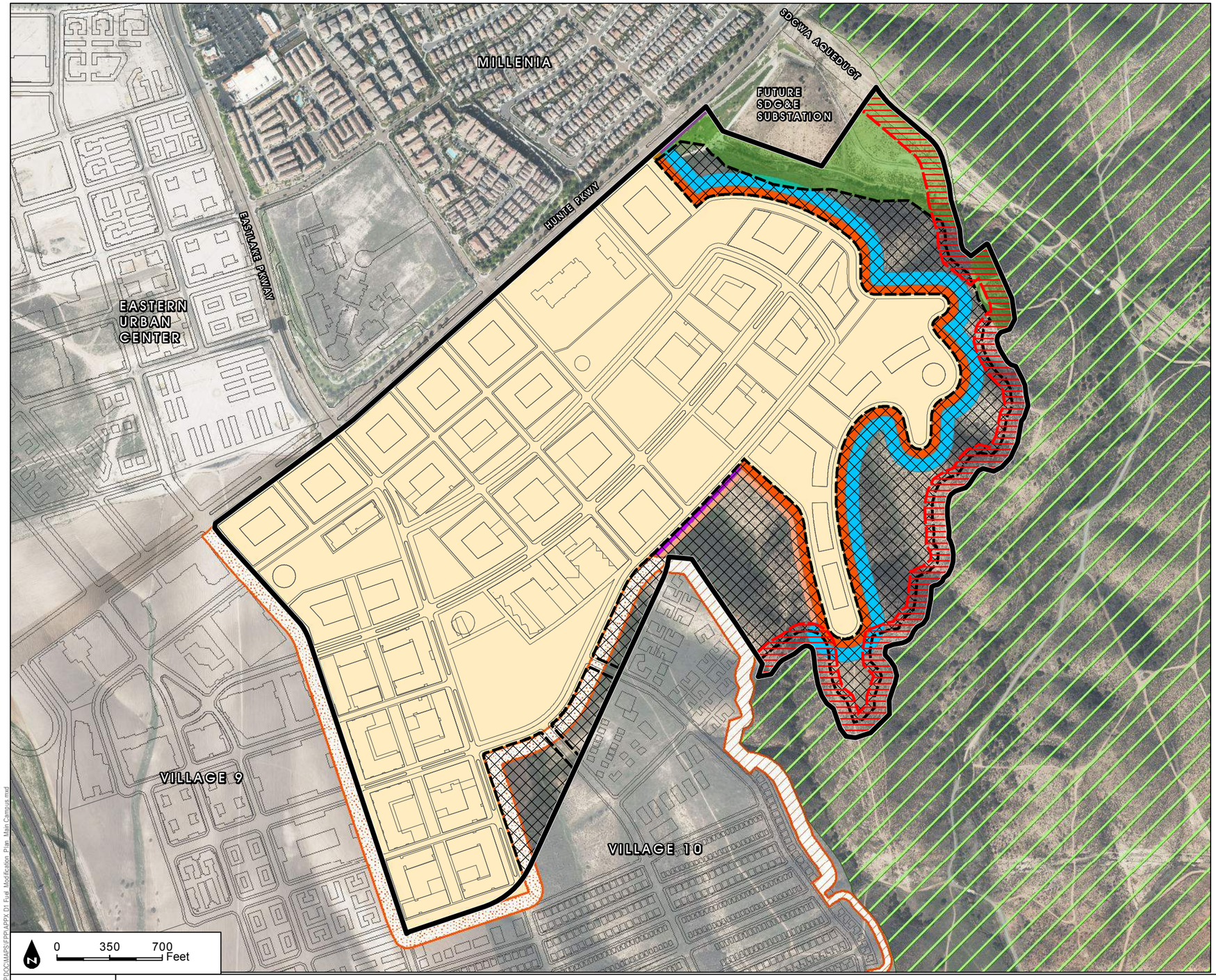

- Project Site
- Proposed Development
- Open Space
- Future Development
- MSCP Preserve

Fuel Modification Zones (FMZ)

- Proposed Village 10 FMZ
- 150-Ft FMZ Preserve Edge if Future Development Occurs
- Roadway Zone (30-Ft Main Campus Property)

Interim FMZ

- Zone 1 (irrigated 0'-60')
- Zone 2 not adjacent to Preserve (thinned 61'-100')
- Zone 2 adjacent to Preserve (thinned 61'-150')
- FMZ between Project Site and Villages 9 & 10 (cut grasses)

0 350 700 1,400 Feet

SOURCE: SANDAG IMAGERY 2014

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APPENDIX D-1

Main Campus Property Fuel Modification Plan

University Innovation District Fire Protection Plan

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APPENDIX D-2

Lake Property Fuel Modification Plan

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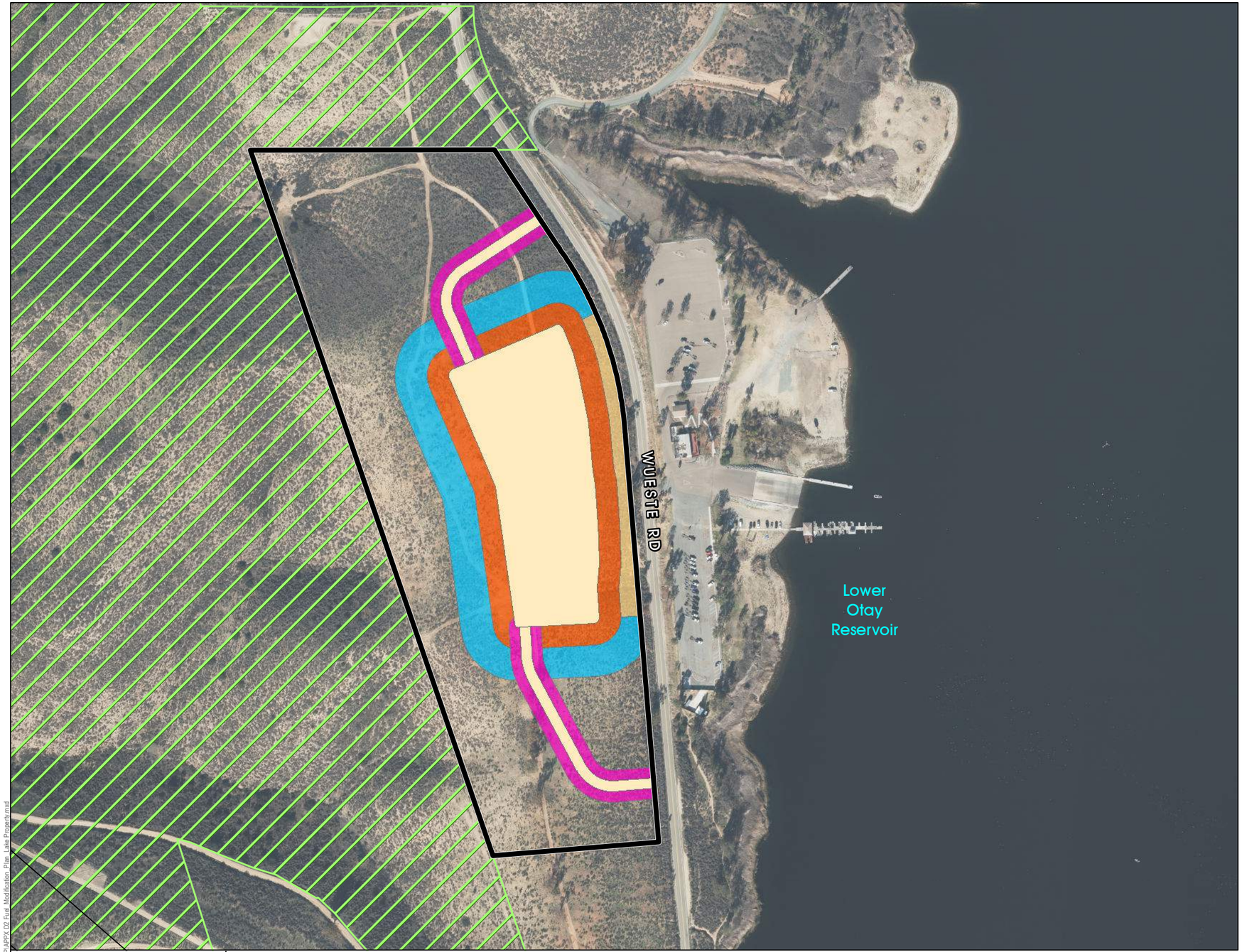

Project Site

Proposed Development

MSCP Preserve

Fuel Modification Zones

Zone 1 (irrigated 0'-60')

Zone 2 not adjacent to Preserve (thinned 61'-100')

Zone 2 adjacent to Preserve (thinned 61'-150')

Roadway Zone (30-Ft Lake Property)

N

0 150 300 600 Feet

SOURCE: SANDAG IMAGERY 2014

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APPENDIX D-2

Lake Property Fuel Modification Plan

University Innovation District Fire Protection Plan

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APPENDIX E

Suggested Plant List for Defensible Space

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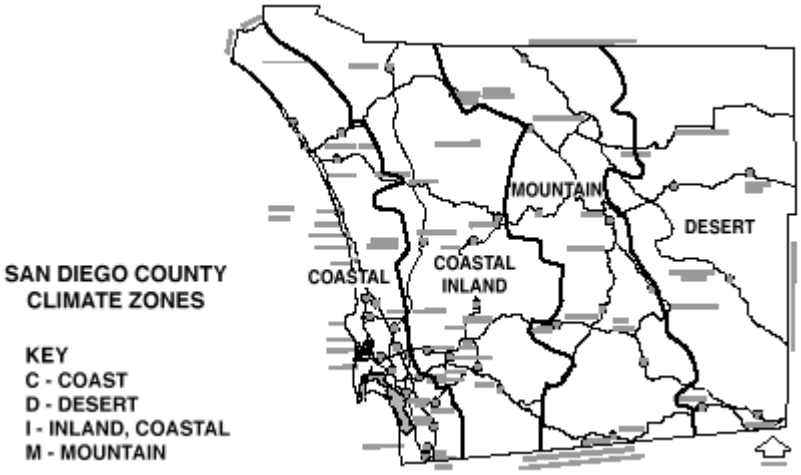
SUGGESTED PLANT LIST FOR ZONES 1 AND 2 [1]

All plants on the following list are considered drought-tolerant in the climate zone indicated. Remember, however, that no plant is totally fire resistant. Drought- tolerant plants are trees, shrubs, groundcovers, and other vegetation that can grow and reproduce with only natural moisture such as rainfall. Occasional irrigation is necessary only in extreme drought situations.



Plants that are indicated by the **"R"** are the least drought-tolerant plants on the list. These plants grow best in riparian areas. Riparian areas can be described as areas where the water table is very near the surface of the ground. Although the ground may be dry, the plants growing there will be green and lush all year around.

When first planting drought-tolerant plants, you need to water deeply to encourage the roots to find natural moisture in the soil. This type of watering needs to continue for at least three years. More water should be provided in summer and less (if any) in the winter. After three years, you should be watering the plants less and depending more on the natural rainfall to provide moisture.

Plants on the list which are noted with ** are San Diego County native or naturalizing plant species. These are types of plants native to or brought into the San Diego County area. These plants are able to grow and reproduce in the local climate and the natural rainfall is enough moisture.

[1] Source: County of San Diego, Department of Planning and Land Use, Building Division. *Fire, Plants, Defensible Space and You*.

BOTANICAL NAME	COMMON NAME	Climate Zone
TREES		
Acer		
platanoides	Norway Maple	M
rubrum	Red Maple	M
saccharinum	Silver Maple	M
saccarum	Sugar Maple	M
macrophyllum	Big Leaf Maple	C/ (R)
Alnus rhombifolia	White Alder	C/I/M (R)
Arbutus		
unedo	Strawberry Tree	All zones
Archontophoenix		
cunninghamiana	King Palm	C
Arctostaphylos spp.**	Manzanita	C/I/D
Brahea		
armata	Blue Hesper Palm	C/D
edulis	Guadalupe Palm	C/D
Ceratonia siliqua	Carob	C/I/D
Cerdidium floridum	Blue Palo Verde	D
Cercis occidentalis**	Western Redbud	C/I/M
Cornus		
nuttallii	Mountain Dogwood	I/M
stolonifera	Redtwig Dogwood	I/M
Eriobotrya		
japonica	Loquat	C/I/D
Erythrina caffra	Kaffirboom Coral Tree	C
Gingko biloba "Fairmount"	Fairmount Maidenhair Tree	I/M
Gleditisia triacanthos	Honey Locust	I/D/M
Juglans		
californica	California Walnut	I
hindsii	California Black Walnut	C/I
Lagerstroemia indica	Crape Myrtle	I/D/M
Ligustrum lucidum	Glossy Privet	I
Liquidambar styraciflua	Sweet Gum	C/I/M
Liriodendron tulipifera	Tulip Tree	I
Melaleuca spp.	Melaleuca	C/I/D
Parkinsonia aculeate	Mexican Palo Verde	C/I
Pistacia		
Chinensis	Chinese Pistache	C/I/D
Vera	Pistachio Nut	I

Pittosporum		
phillyraeoides	Willow Pittosporum	C/I/D
viridiflorum	Cape Pittosporum	C/I
Platanus		
acerifolia	London Plane Tree	All zones
racemosa**	California Sycamore	C/I/M
Populus		
alba	White Poplar	D/M
fremontii**	Western Cottonwood	I
trichocarpa	Black Cottonwood	I/M
Prunus		
xblireiana	Flowering Plum	M
ilicifolia**	Cherry Hollyleaf	C
serrulata 'Kwanzan'	Flowering Cherry	M
yedoensis 'Akebono'	Akebono Flowering Cherry	M
Quercus		
agrifolia**	Coast Live Oak	C/I
engelmannii	Engelmann Oak	I
Rhus		
lancea**	African Sumac	C/I/D
Salix spp.**	Willow	All zones (R)
Tristania conferta	Brisbane Box	C/I
Ulmus		
parvifolia	Chinese Elm	I/D
pumila	Siberian Elm	C/M
Umbellularia californica**	California Bay Laurel	C/I

SHRUBS		
Agave		
americana	Century Plant	D
deserti	Century Plant	D
shawi**	Shawis Century Plant	D
Amorpha fruticosa**	False Indigobush	I
Baccharis**		
glutinosa	Mule Fat	C/I
Carissa grandiflora	Natal Plum	C/I
Ceanothus spp.**	California Lilac	C/I/M
Cistus spp.	Rockrose	C/I/D
Cneoridium dumosum**	Bushrue	C
Comarostaphylis**		
diversifolia	Summer Holly	C
Convolvulus cneorum	Bush Morning Glory	C/I/M
Dalea		
orcuttii	Orcutt's Delea	D
spinosa**	Smoke Tree	I/D
Elaeagnus		
pungens	Silverberry	C/I/M
Encelia**		
californica	Coast Sunflower	C/I
farinose	White Brittlebush	D/I
Eriobotrya		
deflexa	Bronze Loquat	C/I
Eriophyllum		
confertiflorum**	Golden Yarrow	C/I
staechadifolium	Lizard Tail	C
Escallonia spp.	Escallonia	C/I
Feijoa sellowiana	Pineapple Guava	C/I/D
Fouqueria splendens	Ocotillo	D
Galvezia		
juncea	Baja Bush-Snapdragon	C
speciosa	Island Bush-Snapdragon	C
Garrya		
elliptica	Coast Silktassel	C/I
flavescens**	Ashy Silktassel	I/M

Heteromeles arbutifolia**	Toyon	C/I/M
Lantana spp.	Lantana	C/I/D
Lotus scoparius	Deerweed	C/I
Malacothamnus		
clementinus	San Clemente Island Bush Mallow	C
fasciculatus**	Mesa Bushmallow	C/I
Melaleuca spp.	Melaleuca	C/I/D
Mimulus spp.**	Monkeyflower	C/I (R)
Nolina		
parryi	Parry's Nolina	I
parryi ssp. wolfii	Wolf's Bear Grass	D
Photinia spp.	Photinia	All Zones
Pittosporum		
crassifolium		C/I
rhombifolium	Queensland Pittosporum	C/I
tobira 'Wheeleri'	Wheeler's Dwarf	C/I/D
viridiflorum	Cape Pittosporum	C/I
Plumbago auriculata	Cape Plumbago	C/I/D
Prunus		
caroliniana	Carolina Laurel Cherry	C
ilicifolia**	Hollyleaf Cherry	C
lyonii**	Catalina Cherry	C
Puncia granatum	Pomegranate	C/I/D
Pyracantha spp.	Firethorn	All Zones
Quercus		
dumosa**	Scrub Oak	C/I
Rhamus		
californica*	Coffeeberry	C/I/M
Rhaphiolepis spp.	Rhaphiolepis	C/I/D
Rhus		
integrifolia**	Lemonade Berry	C/I
ovata**	Sugarbush	I/M
trilobata**	Squawbush	I
Ribes		
viburnifolium	Evergreen Currant	C/I
speciosum**	Fuschia-Flowering Gooseberry	C/I/D
Rosa		
californica**	California Wild Rose	C/I
minutifolia	Baja California Wild Rose	C/I

	Sambucus spp.**	Elderberry	C/I/M
	Symphoricarpos mollis**	Creeping Snowberry	C/I
	Syringa vulgaris	Lilac	M
	Teucrium fruticans	Bush Germander	C/I
	Xylosma congestum	Shiny Xylosma	C/I

GROUNDCOVERS		
Aptenia cordifolia	Apteria	C
Ceanothus spp.**	California Lilac	C/I/M
Cerastium tomentosum	Snow-in-Summer	All Zones
Cotoneaster spp.	Redberry	All Zones
Drosanthemum hispidum	Rosea Ice Plant	C/I
Dudleya		
brittonii	Brittonis Chalk Dudleya	C
pulverulenta**	Chalk Dudleya	C/I
virens	Island Live Fore-ever	C
Eschscholzia californica**	California Poppy	All Zones
Euonymus fortunei		
'Carrierei'	Glossy Winter Creeper	M
'Coloratus'	Purple-Leaf Winter Creeper	M
Ferocactus viridescens**	Coast Barrel Cactus	C
Helianthemum spp.**	Sunrose	All Zones
Lantana spp.	Lantana	C/I/D
Lasthenia		
californica**	Common Goldfields	I
glabrata	Coastal Goldfields	C
Lupinus spp.**	Lupine	C/I/M
Myoporum spp.	Myoporum	C/I
Pyracantha spp.	Firethorn	All zones
Rosmarinus officinalis	Rosemary	C/I/D
Santolina		
chamaecyparissus	Lavender Cotton	All Zones
virens	Santolina	All Zones
Viguiera laciniata**	San Diego Sunflower	C/I

VINES		
Antigonon leptopus	San Miguel Coral Vine	C/I
Distictis buccinatoria	Blood-Red Trumpet Vine	C/I/D
Keckiella cordifolia**	Heart-Leaved Penstemon	C/I
Lonicera subspicata**	Chaparral Honeysuckle	C/I
Solanum jasminoides	Potato Vine	C/I/D

PERENNIALS		
Coreopsis gigantean	Giant Coreopsis	C
Coreopsis grandiflora	Coreopsis	All Zones
Coreopsis maritime	Sea Dahlia	C
Coreopsis verticillata	Coreopsis	C/I
Heuchera maxima	Island Coral Bells	C/I
Iris douglasiana**	Douglas Iris	C/M
Iva hayesiana**	Poverty Weed	C/I
Kniphofia uvaria	Red-Hot Poker	C/M
Lavandula spp.	Lavender	All Zones
Limonium californicum var. mexicanum	Coastal Statice	C
Oenothera spp.	Primrose	C/I/M
Satureja douglasii	Yerba Buena	C/I
Sisyrinchium bellum	Blue-Eyed Grass	C/I
Sisyrinchium californicum	Golden-Eyed Grass	C
Zauschneria californica**	California Fuschia Hoary	C/I
Zauschneria cana**	California Fuschia	C/I
‘Catalina’	Catalina Fuschia	C/I

ANNUALS		
Lupinus spp.**	Lupine	C/I/M

APPENDIX F

Prohibited Plant List

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APPENDIX F
Prohibited Plant List

Prohibited Trees

Botanical Name	Common Name	Resource
Abies species	Fir trees	S
Acacia species	Acacia	HS
Agonis juniperina	Juniper myrtle	S
Araucaria species	Norfolk island Pine	S
Callistemon species	Bottlebrush	H
Cedrus species	Cedar	HS
Chamaecyparis species	False cypress	S
Cinnamomum camphora	Camphor tree	H
Conifers	Evergreen trees	H
Cryptomeria japonica	Japanese cryptomeria	S
Cupressocyparis leylandii	Leylandii cypress	S
Cupressus forbesii	Tecate cypress	S
Cupressus glabra	Arizona cypress	S
Cupressus sempervirens	Italian cypress	S
Cupressus species	Cypress	H
Eucalyptus species	Eucalyptus	HS
Eucalyptus	Eucalyptus species	K
Juniperus species	Juniper	H
Larix species	Larch	S
Olea europea	Olive tree	H
Palmae species	Palms	HS
Parkinsonia aculeata	Mexican palo verde	K
Pinus species	Pine	HS
Pittosporum undulatum	Victorian box	K
Podocarpus species	Fern pine	S
Prunus caroliniana	Carolina cherry laurel	K
Prunus lyonil	Catalina cherry	K
Pseudotsuga menziesii	Douglas fir	S
Quercus engelmannii	Engelmann oak	K
Quercus suber	Cork Oak	K
Schinus molle	California Pepper Tree	H
Tamarix species	Tamarix	C
Taxodium species	Cypress	S
Taxus species	Yew	S
Tsuga species	Hemlock	S
Washingtonia filifera	California Fan Palm	H

Prohibited Groundcovers, Shrubs, and Vines

Botanical Name	Common Name	Resource
Acacia species	Acacia	HS
Achillea millefolium	Common yarrow	K
Adenostoma fasciculatum	Chamise	HS
Adenostoma sparsifolium	Red shanks	HS
Aeonium decorum	Aeonium	K
Aeonium simsii	NCN	K
Ajuga reptans	Carpet bugle	K
Anthemis cotula	Mayweed	H
Aptenia cordifolia x 'red apple'	Red apple	K
Arbutus menziesii	Madrone	H
Arctostaphylos species	Manzanita	H
Artemisia pycnocephala	Beach sagewort	K
Artemisia californica	California sagebrush	HS
Artemisia caucasica	Caucasica artemisia	H
Artemisia pycnocephala	Sandhill sage	H
Artemisia species	Sages	H
Arundo donax	Giant cane	C
Atriplex species	Saltbush	H
Atriplex canescens	Four-wing saltbush	K
Atriplex lentiformis ssp. *breweri*	Brewer saltbush	K
Baccharis pilularis consanguinea	Chaparral bloom	H
Baccharis pilularis var. *pilularis*	Twin peaks	K
Baccharis species	Coyote bush	H
Bambusa species	Bamboo	S
Bougainvillea species	Bougainvillea	H
Brassica nigra	Black mustard	H
Brassica rapa	Yellow mustard	H
Cardaria draba	Hoary cress, perennial peppergrass	H
Carpobrotus species	Ice plant, hottentot fig	H
Carpobrotus chilensis	Sea fig ice plant	K
Chrysanthemum leucanthemum	Oxeye daisy	K
Cirsium vulgare	Wild artichoke	H
Conyza canadensis	Horseweed	H
Coprosma pumila	Prostrate coprosma	S
Cortaderia selloana	Pampas grass	HC
Crassula lactea	NCN	K
Crassula multicava	NCN	K
Crassula ovata	Jade tree	K
Crassula tetragona	NCN	K
Cytisus spp.	Scotch broom, French broom, etc.	HC
Delosperma 'alba'	White trailing ice plant	K

Prohibited Groundcovers, Shrubs, and Vines

Botanical Name	Common Name	Resource
Dodonaea viscosa	Hopseed bush	S
Drosanthemum floribundum	Rosea ice plant	K
Drosanthemum hispidum	NCN	K
Drosanthemum speciosum	Dewflower	K
Eriogonum fasciculatum	Common buckwheat	H
Eriogonum species	Common buckwheat	HS
Eschscholzia mexicana	Mexican poppy	K
Fremontodendron species	Flannel bush	H
Gaillardia x grandiflora	Blanketflower	K
Gazania hybrids	South African daisy	K
Gazania rigens leucolaena	Trailing gazania	K
Hedera helix	English ivy	H
Helix canariensis	English ivy	K
Heterotheca grandiflora	Telegraph plant	HS
Hypericum calycinum	Aaron's beard	K
Juniperus species	Juniper	S
Lactuca serriola	Prickly lettuce	H
Lampranthus aurantiacus	Bush ice plant	K
Lampranthus filicaulis	Redondo creeper	K
Lampranthus spectabilis	Trailing ice plant	K
Limonium pectinatum	NCN	K
Limonium perezii	Sea lavender	K
Lonicera japonica	Japanese honeysuckle	S
Lonicera japonica 'halliana'	Hall's Japanese honeysuckle	K
Lotus corniculatus	Bird's foot trefoil	K
Mahonia species	Mahonia	H
Malephora luteola	Trailing ice plant	K
Miscanthus species	Eulalie grass	S
Muhlenbergia species	Deer grass	S
Nerium oleander	Oleander	K
Nicotania bigelovii	Indian tobacco	H
Nicotania glauca	Tree tobacco	H
Ophiopogon japonicus	Mondo grass	K
Osteospermum fruticosum	Trailing African daisy	K
Penstemon spectabilis	Beard tongue	K
Pennisetum setaceum	Fountain grass	C
Perovskia atriplicifolia	Russian sage	H
Pickeringia 'montana'	Chaparral pea	S
Plantago sempervirens	Evergreen plantain	K
Portulacaria afra	Elephant's food	K
Potentilla tabernaemontani	Spring cinquefoil	K

Prohibited Groundcovers, Shrubs, and Vines

Botanical Name	Common Name	Resource
Rhamnus alaternus	Italian buckhorn	K
Rhus diversiloba	Poison oak (worker/firefighter safety)	H
Rhus laurina	Laurel sumac	H
Rhus lentii	Pink flowering sumac	H
Ricinus communis	Castor bean	H
Romneya coulteri 'white cloud'	White cloud matilija poppy	K
Rosmarinus species	Rosemary	S
Salsola australis	Russian thistle	H
Salvia mellifera	Black sage	S
Salvia species	Sage	H
Sedum acre	Goldmoss sedum	K
Sedum album	Green stonecrop	K
Sedum confusum	NCN	K
Sedum lineare	NCN	K
Sedum x rubrotinctum	Pork and beans	K
Senecio serpens	NCN	K
Solanum xantii	Purple nightshade (toxic)	H
Silybum marianum	Milk thistle	H
Tamarix spp.	Tamarisk	K
Tecomaria capensis	Cape honeysuckle	K
Thuja species	Arborvitae	S
Trifolium hirtum 'hyron'	Hyron rose clover	K
Trifolium fragiferum 'o'connor's	O'Connor's legume	K
Urtica urens	Burning nettle	S
Verbena species	Verbena	K
Vinca major	Periwinkle	H
Vinca minor	Dwarf periwinkle	K
Vulpia myuros 'zorro'	Zorro annual fescue	K
Yucca species	Yucca	K

Exceptions:

1. The use of palm trees is prohibited within any Vegetation Management Zones, however Palm trees may be permitted within the interior of the development (in moderation), with prior approval from the CVFD. Proper spacing, irrigation and maintenance required.
2. Bougainvillea species may be used in certain interior areas (in very moderate amounts), with prior approval from the CVFD.

Notes:

1. Various documents are referenced as sources for plant material information in this list of prohibited plant material. The titles of some of those reference documents suggest that some of the plant materials may be somewhat "Fire Retardant." It must be understood that under various fire conditions, all plant materials will burn. Accordingly, some seemingly "Fire Retardant" plants appear in this Prohibited Plant List.
2. Plant species included on this Prohibited Plant List that also occur on the Landscape Concept Plan may be used in limited quantities in interior locations, with approval of the CVFD."Fire Resistant." Others are documented as "High Fire Risk." Notwithstanding any other descriptors, the preparers of this document have determined that plants in this Prohibited Plant List shall not be used within the Brush Management Zones within this project.
3. All vegetation used in Vegetation Management Zones and elsewhere in this development shall be subject to approval of the CVFD's Fire Marshal.
4. Any deviations from the Prohibited Plant List must be submitted to the CVFD's Fire Marshal for approval

Sources:

C: City of Chula Vista, Fire Retardant and/or Drought Tolerant Plant List, Landscape Manual, November 1994
H: Hunt Research Corporation Report, Otay Ranch, Village 7/2 - Fire Protection Plan, June 14, 2005
S: County of San Diego, Suggested Plant List for Defensible Space, http://www.sdcounty.ca.gov/dplu/dos/UndesirablePlants.pdf
K: Appendix K, City of Chula Vista MSCP Subarea Plan: San Diego County Fire Chief's Association Fuel Modification Zone Plant List, July 15, 1997

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APPENDIX G

Ready, Set, Go! Action Plan

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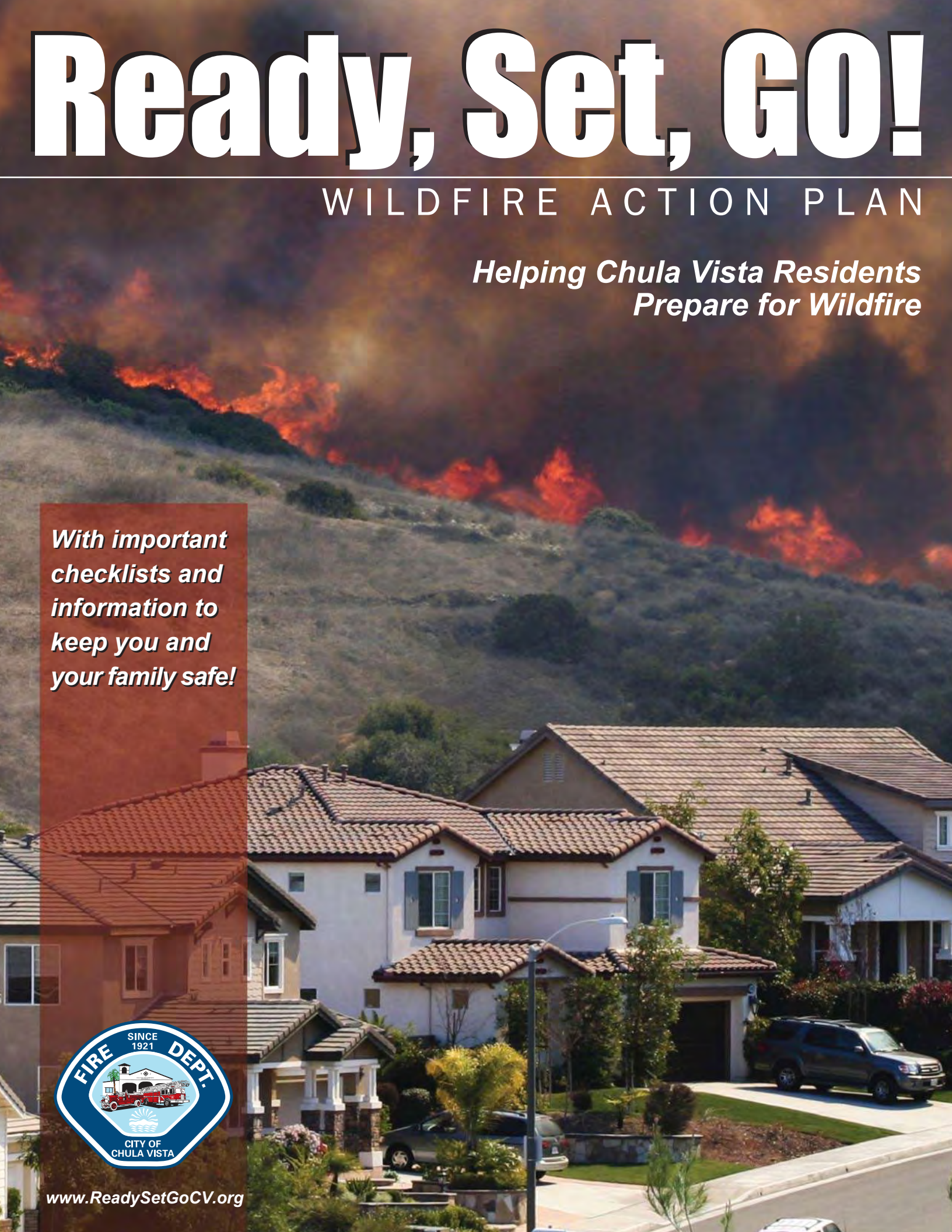
Ready, Set, GO!

WILDFIRE ACTION PLAN

Helping Chula Vista Residents Prepare for Wildfire



With important checklists and information to keep you and your family safe!

SINCE 1921
FIRE DEPT.
CITY OF CHULA VISTA

www.ReadySetGoCV.org

Ready, Set, GO!

WILDFIRE ACTION PLAN

Helping Chula Vista Residents Prepare for Wildfire

Dear Resident,

Chula Vista is a beautiful place to live, but it doesn't come without its risks. Fire season is now a year-round reality, requiring firefighters and residents to constantly be on heightened alert for the threat of wildfire.

Wildland fire, fueled by dry vegetation and driven by hot dry winds, are extremely dangerous and impossible to control. Many homes have been built and landscaped without a full understanding of the impact a fire could have on them. Very few people have adequately prepared their families for a quick evacuation, and many don't realize the potential consequences of choosing to ignore an evacuation order until it is too late.

It's not a question of "if" but "when" the next major wildfire will occur in San Diego County. The Chula Vista Fire Department (CVFD) takes every precaution to help protect you and your property from wildfire. However, in a major wildfire, there will not be enough fire engines or firefighters to defend every home in the early stages of the incident. That's why the most important person in protecting your life and property is not the firefighter, but you. Through advanced planning and preparation, we can all be ready for wildfire.

This guide will give you what you need to successfully plan ahead for a wildfire. To prepare your home, you'll find tips on retrofitting with fire resistant features and creating the necessary defensible space. To prepare you and your family, this guide will provide the checklists and information you need so you can evacuate before the wildfire gets too close. The CVFD always recommends that you comply with evacuation orders resulting from wildfire. When it happens, you'll be ready!

I hope you find this guide to be helpful in creating a heightened awareness and a more fire-safe environment for you and your family.

Justin Gipson

Justin Gipson
Deputy Fire Chief / Fire Marshal

INSIDE

FIRE DEPT. SINCE 1921 CITY OF CHULA VISTA

CITY OF CHULA VISTA

Living in the Wildland Urban Interface and the Ember Zone

If you live next to a natural area, the **Wildland Urban Interface**, you should provide firefighters with the defensible space they need to protect your home. The buffer zone you create by removing weeds, brush, and other vegetation helps keep the fire away from your home and reduces the risk from flying embers.

A home within one mile of a natural area is in the **Ember Zone**. Wind-driven embers can attack and destroy homes or neighborhoods far from the actual flame front of the wildland fire. You and your home must be prepared well before a fire occurs.

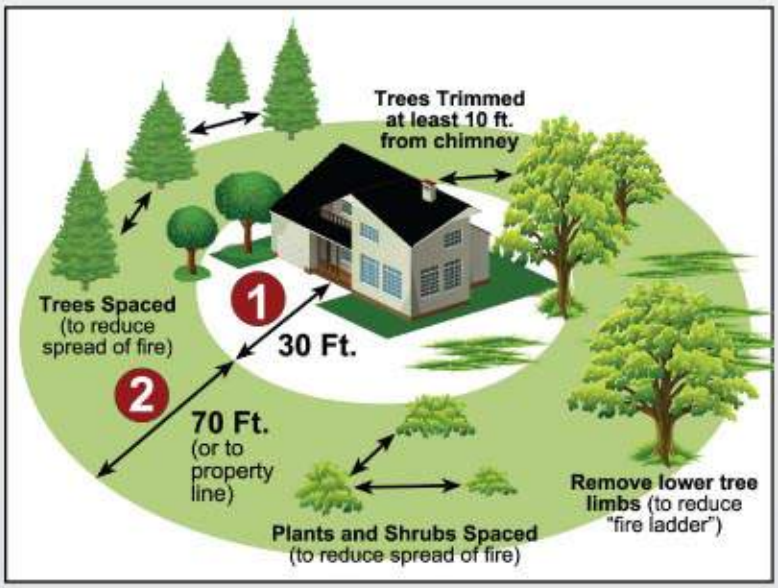
Get Ready

Create a Defensible Home

A defensible home has the greatest potential for survivability in the event of a wildfire during average wind conditions. Defensible homes are those that are in compliance with defensible space requirements or a fuel modification program and have been hardened in accordance with Chapter 7A of the California Building Code.

What is Defensible Space ?

Defensible space is the required distance between a structure and the wildland area that, under normal conditions, creates a sufficient buffer to slow or halt the spread of wildfire to a structure. It protects the home from igniting due to direct flame impingement and radiant heat. Compliance is essential for structure survivability during wildfire conditions. Defensible space requirements apply to all structures regardless of the year built.



ZONE 1

Extends 30 feet out from buildings, structures, decks, etc.

- Remove all dead or dying vegetation.
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from structures and other trees.
- Remove leaf litter (dry leaves and pine needles) from yard, roof, and rain gutters.
- Relocate woodpiles or other combustible materials into Zone 2.
- Remove combustible material and vegetation from around and under decks.
- Remove or prune vegetation near windows.
- Remove "ladder fuels" (low-level vegetation that allows the fire to spread from the ground to the tree canopy). Create a separation between low-level vegetation and tree branches. This can be done by reducing the height of low-level vegetation and/or trimming low tree branches.
- Keep plants and shrubs below 18 inches high.

ZONE 2

Extends 30-100 feet out from buildings, structures, and decks.

Reduce the continuity of fuels by removing dead material and removing/thinning vegetation. Minimum spacing between vegetation is 3 times the dimension of the plant.

- Remove "ladder fuels."
- Cut or mow annual grass down to a maximum height of 4 inches.
- Trim tree canopies regularly to keep their branches a minimum of 10 feet from other trees.

Note: If your property line is less than 100 feet from your home and you cannot maintain 100 feet of defensible space, your home may not be defensible. You are only responsible for defensible space on your own property.

What is a hardened home?

Construction materials and the quality of the defensible space surrounding a home are what give it the best chance to survive a wildfire. Embers from a wildfire will find the weak link in your home's fire protection scheme and gain the upper hand because of a small, overlooked or seemingly inconsequential factor. However, there are measures you can take to safeguard your home from wildfire. While you may not be able to accomplish all the measures listed below, each will increase your home's, and possibly your family's safety and survival during a wildfire.

ROOFS

Roofs are the most vulnerable surface where embers land because they can lodge and start a fire. Roof valleys, open ends of barrel tiles, and rain gutters are all a point of entry.

EAVES

Embers gather under open eaves and ignite exposed wood or other combustible material.

VENTS

Embers enter the attic or other concealed spaces and ignite combustible materials. Vents in eaves and cornices are particularly vulnerable, as are any unscreened vents.

WALLS

Combustible siding and other combustible or overlapping materials provide a surface and crevice for embers to nestle and ignite.

WINDOWS & DOORS

Embers can enter gaps in doors, including garage doors. Plants or combustible storage near windows can be ignited from embers and generate heat that can break windows and/or melt combustible frames.

BALCONIES & DECKS

Embers collect in or on combustible surfaces or undersides of decks and balconies, ignite the material, and enter the home through walls or windows.

To harden your home even further, consider protecting your homes with a residential fire sprinkler system. In addition to extinguishing a fire started by an ember that enters your home, it also protects you and your family 24/7, year-round, from any fire that may start in your home.

Tour Wildfire-Ready Homes

Address:
Make sure your address is clearly visible from the street.

Home Site and Yard:
Ensure you have at least a 100-foot radius of defensible space (cleared vegetation) around your home. Note that even more clearance may be needed for homes in severe hazard areas. This means looking past what you own to determine the impact a common slope or neighbor's yard will have on your property during a wildfire.

Cut dry weeds and grass before noon when temperatures are cooler to reduce the chance of sparking a fire.

Landscape with fire-resistant plants that have a high moisture content and are low-growing.

Keep woodpiles, propane tanks and combustible materials away from your home and other structures such as garages and sheds.

Ensure that trees are far away from power lines.

Inside:
Keep working fire extinguishers on hand.

Install smoke alarms on each level of your home and within bedrooms. Test them monthly and change the batteries twice a year.

Roof:
Your roof is the most vulnerable part of your home because it can easily catch fire from windblown embers. Homes with wood-shake or shingle roofs are at a higher risk of being destroyed during a wildfire than homes with fire-resistant roofs.

Build your roof or re-roof with fire-resistant materials that include composition, metal or tile. Block any spaces between roof decking and covering to prevent ember intrusion.

Cut any tree branches within ten feet of your roof.

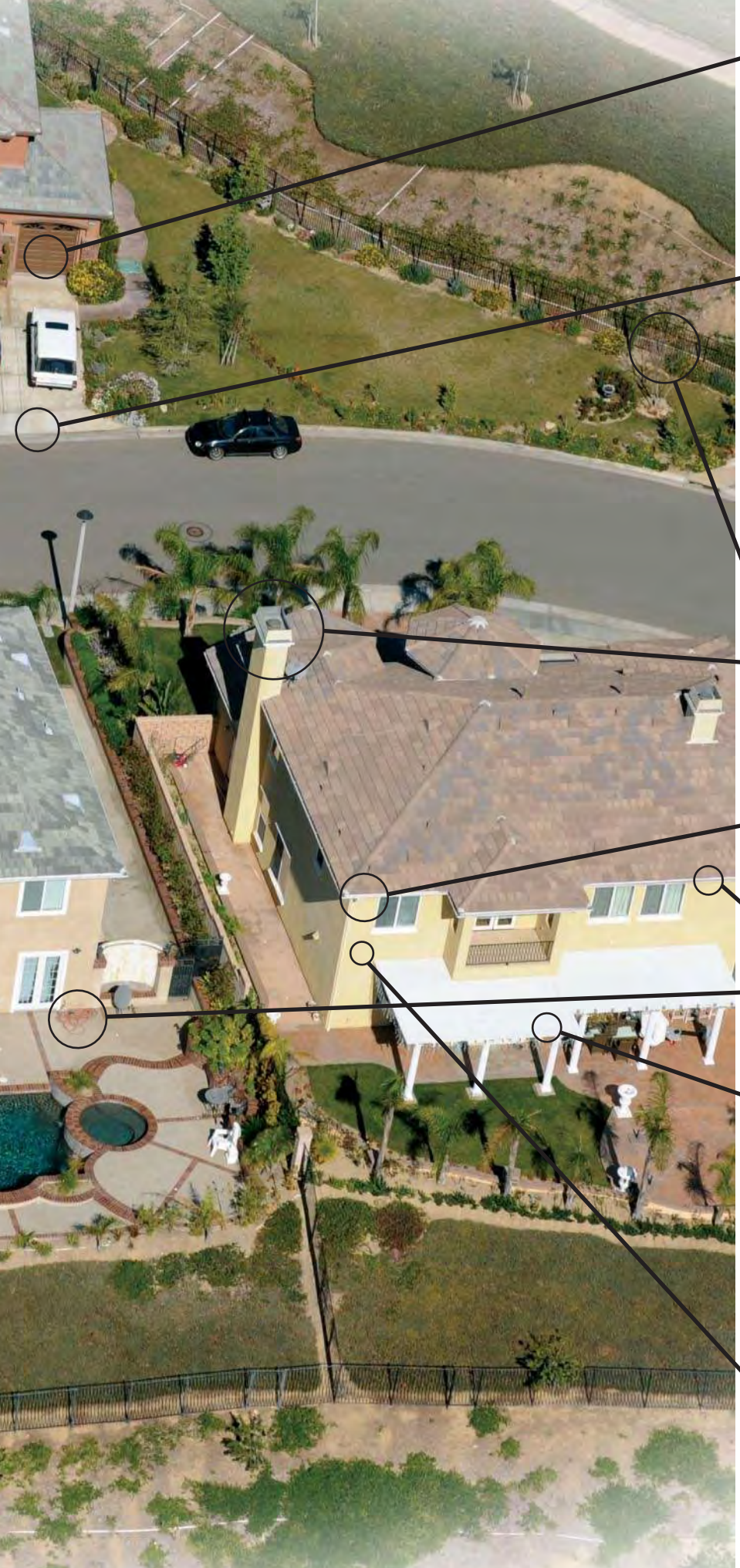
Vents:
Vents on homes are particularly vulnerable to flying embers. All vent openings should be covered with 1⁄8-inch metal mesh. Do not use fiberglass or plastic mesh because they can melt and burn.

Attic vents in eaves or cornices should be baffled or otherwise protected to prevent ember intrusion (mesh is not enough).

Windows:
Heat from a wildland fire can cause windows to break even before the home ignites. This allows burning embers to enter and start internal fires. Single-paned and large windows are particularly vulnerable.

Install dual-paned windows, with the exterior pane of tempered glass, to reduce the chance of breakage in a fire.

Limit the size and number of windows in your home that face large areas of vegetation.



Garage:
Have a fire extinguisher and tools such as a shovel, rake, bucket and hoe available for fire emergencies.

Install a solid door with self-closing hinges between living areas and the garage. Install weather stripping around and under doors to prevent ember intrusion.

Store all combustibles and flammable liquids away from ignition sources.

Driveways and Access Roads:
Driveways should be designed to allow fire and emergency vehicles and equipment to reach your house.

Access roads should have a minimum 10-foot clearance on either side of the traveled section of the roadway and should allow for two-way traffic.

Ensure that all gates open inward and are wide enough to accommodate emergency equipment.

Trim trees and shrubs overhanging the road to a minimum of 13 1⁄2 feet to allow emergency vehicles to pass.

Non-Combustible Fencing:
Make sure to use non-combustible fencing to protect your home during a wildland fire.

Chimney:
Cover your chimney outlet with a non-flammable screen of 1⁄4-inch wire mesh or smaller to prevent embers from escaping and igniting a fire.

Make sure that your chimney is at least 10 feet away from any tree branches.

Non-Combustible Boxed In Eaves:
Box in eaves with non-combustible materials to prevent accumulation of embers.

Rain Gutters:
Screen or enclose rain gutters to prevent accumulation of plant debris. If not screened, keep gutters clear of debris.

Water Supply:
Have multiple garden hoses that are long enough to reach any area of your home and other structures on your property.

Deck/Patio Cover:
Use heavy timber or non-flammable construction material for decks and patio covers.

Enclose the underside of balconies and decks with fire-resistant materials to prevent embers from blowing underneath, lodging and starting a fire.

Keep your deck clear of combustible items, such as baskets, dried flower arrangements and other debris.

The decking surface must be ignition resistant if it's within 10 feet of the home.

Walls:
Wood products, such as boards, panels or shingles, are common siding materials. However, they are combustible and not safe choices for fire-prone areas.

Build or remodel with fire-resistant building materials, such as brick, cement, masonry or stucco.

Be sure to extend materials from foundation to roof.

Get Set

Prepare Your Family: Create your own Action Plan

Now that you've done everything you can to protect your house, its time to prepare your family. Use these checklists to prepare your Wildfire Action Plan. Each family's plan will be different, depending on the situation. Once you finish your plan, rehearse it regularly with your family and keep it in a safe and accessible place for quick implementation.

For more information on property and home preparedness before a fire threat, review the preparedness checklist on the Firewise Communities website at www.firewise.org.

Get Set: Checklists

Before the Fire Starts

- ☐ Create a Personal Wildfire Evacuation Plan that includes meeting locations and communication plans and rehearse it regularly. Include the evacuation of large animals such as horses if applicable. (See page 10 for worksheet.)
- ☐ Have fire extinguishers on hand and train your family how to use them.
- ☐ Ensure that your family knows where your gas, electric, and water main shut-off controls are and how to use them.
- ☐ Plan several different escape routes.
- ☐ Designate an emergency meeting location outside the fire hazard area.
- ☐ Appoint an out-of-area friend or relative as a point of contact so you can communicate with family members who have relocated.
- ☐ Maintain a list of emergency contact numbers posted near your phone and in your emergency supply kit (see page 10).
- ☐ Have a portable radio or scanner so you can stay updated on the fire.
- ☐ Register with Alert San Diego. You can include your cell phone number and/or your email address to receive Reverse 9-1-1 notifications. In an emergency, this system automatically calls and emails registered users with updates and emergency information.
  Register at www.ReadySanDiego.org
- ☐ ***Tell your neighbors about Ready, Set, GO! and your Wildfire Action Plan.***

Create an Emergency Supply Kit

The American Red Cross recommends every family have an emergency supply kit assembled long before a wildland fire or other emergency occurs. Use the checklist below to help assemble yours. For more information on emergency supplies, visit the American Red Cross Web site at www.redcross.org.

- ☐ Three-day supply of water (one gallon per person per day)
- ☐ Non-perishable food for all family members and pets (three-day supply)
- ☐ First aid kit
- ☐ Flashlight, battery-powered radio, and extra batteries
- ☐ An extra set of car keys
- ☐ Cash or traveler's checks
- ☐ Sanitation supplies
- ☐ Extra eyeglasses or contact lenses
- ☐ Important contact numbers (see page 10)
- ☐ Map marked with evacuation routes
- ☐ Extra prescriptions or special medications
- ☐ Disks or devices that contain back-up information from computers or hard drives
- ☐ Chargers for cell phones, laptops, etc.
- ☐ *Keep a pair of old shoes and a flashlight handy in case of a sudden evacuation at night.*
- ☐ *Keep an extra Emergency Supply Kit in your car in case you can't get to your home because of fire.*

As the Fire Approaches:

☐ *Grab your Emergency Supply Kit*

(See page 8 for checklist.)

- ☐ Locate other items of value that you may want to bring (that are not in your kit, such as important documents, family photos, irreplaceable items, and easily carried valuables). Put your kit and all other items in a place where you can grab them in a hurry.

- ☐ Keep the six "Ps" ready, in case an immediate evacuation is required (those not included in your kit):
  - ☐ People and pets
  - ☐ Papers, phone numbers, and important documents
  - ☐ Prescriptions, vitamins, and eyeglasses
  - ☐ Pictures and irreplaceable memorabilia
  - ☐ Personal computers (hard drive and disks)
  - ☐ "Plastic" (credit cards, ATM cards) and cash

☐ *Alert Family and Neighbors*

(See page 10 for worksheet.)

☐ *Get Prepared to Leave*

- ☐ Dress in appropriate clothing (clothing made from natural fibers, such as cotton, and work boots). Have goggles and a dry bandana or particle mask handy.

- ☐ Stay tuned to your TV or local radio stations for updates, or check the City of Chula Vista's website at ***www.chulavistaca.gov***. In an emergency, the website will continually have updates.

- ☐ Remain close to your house, drink plenty of water and know where your family and pets are at all times.

☐ *Evacuate if asked to do so or if the threat is close to you.*

- ☐ Follow your Personal Wildfire Evacuation Plan so everyone in your family knows where to go to find each other. (See page 10 for worksheet.)

☐ *OUTSIDE CHECKLIST*

- ☐ Gather up flammable items from the exterior of the house and bring them inside (patio furniture, children's toys, door mats, etc.) or place them in your pool.

- ☐ Turn off propane tanks.

- ☐ Connect garden hoses to outside taps.

- ☐ Don't leave sprinklers on or water running, they can waste critical water pressure.

- ☐ Leave exterior lights on.

- ☐ Back your car into the garage. Shut doors and roll up windows.

- ☐ Have a ladder available.

- ☐ Patrol your property and extinguish all small fires.

- ☐ Seal attic and ground vents with pre-cut plywood or commercial seals.

☐ *INSIDE CHECKLIST*

- ☐ Shut all windows and doors.

- ☐ Remove flammable window shades and curtains and close metal shutters.

- ☐ Remove lightweight curtains.

- ☐ Move flammable furniture to the center of the room, away from windows and doors.

- ☐ Shut off gas at the meter. Turn off pilot lights.

- ☐ Leave your lights on so firefighters can see your house under smoky conditions.

- ☐ Shut off the air conditioning.

Personal Wildfire Evacuation Plan

Write up your Personal Wildfire Evacuation Plan and post it in a location where every member of your family can see it. Rehearse it with your family.

During high fire danger days in your area, monitor your local media for information and be ready to implement your plan. Hot, dry, and windy conditions create the perfect environment for a wildfire.

Emergency Contacts:

9-1-1 EMERGENCY	***619-691-5151*** POLICE (NON-EMERGENCY)	***619-691-5029*** FIRE (NON-EMERGENCY)	***619-397-6000*** PUBLIC WORKS (NON-EMERGENCY)
NEAREST HOSPITAL	PHONE	NAME	PHONE
NAME	PHONE	NAME	PHONE

School Contacts:

NAME	PHONE	NAME	PHONE

Family Contacts:

NAME	PHONE	NAME	PHONE
NAME	PHONE	NAME	PHONE

Friends or Neighbors:

NAME	PHONE	NAME	PHONE

WHEN to go:

_____

WHERE to go (meeting location for all family members):

_____

HOW to get there:

_____

_____

WHAT to bring *(insurance papers, important documents, photos, prescriptions, etc.)**:***

_____

_____

WHO to tell (before leaving and after arrival to new location):

_____

Leave Early

By leaving early, you give your family the best chance of surviving a wildfire. You also help firefighters by keeping roads clear of congestion, enabling them to move more freely and do their job.

WHEN TO LEAVE

Leave early enough to avoid being caught in fire, smoke or road congestion. Don't wait to be told by authorities to leave. In an intense wildfire, they may not have time to knock on every door. If you are advised to leave, don't hesitate!

WHERE TO GO

Leave to a predetermined location (it should be a low-risk area, such as a well-prepared neighbor or relative's house, a Red Cross shelter or evacuation center, motel, etc.)

HOW TO GET THERE

Have several travel routes in case one route is blocked by the fire or by emergency vehicles and equipment. Choose an escape route away from the fire.

WHAT TO TAKE

Take your Emergency Supply Kit containing your family and pet's necessary items, such as cash, water, clothing, food, first aid kits, and medications. Also, don't forget valuables such as your computer, photos and important documents.

Organize your family members and make arrangements for your pets.

If you are trapped: Survival Tips

- Shelter away from outside walls.
- Wear long sleeves and long pants made of natural fibers such as cotton.
- Stay hydrated.
- Ensure you can exit the home if it catches fire (remember if it's hot inside the house, it is four to five times hotter outside).
- After the fire has passed, check your roof and extinguish any fires, sparks or embers.
- Check inside the attic for hidden embers.
- Patrol your property and extinguish small fires.
  If there are fires that you cannot extinguish with a small amount of water or in a short period of time, call 9-1-1.

Residential Safety Checklist

BE PREPARED.

Tips to Help Your Family and Property Survive During a Wildland Fire

HOME

YES	NO	
☐	☐	Does your home have a metal, composition, or tile (or other non-combustible) roof with capped ends and covered fascia?
☐	☐	Are the rain gutters and roof free of leaves, needles and branches?
☐	☐	Are all vent openings screened with 1/8 inch (or smaller) mesh metal screen?
☐	☐	Does the house have non-combustible siding material?
☐	☐	Are the eaves “boxed in” and the decks enclosed?
☐	☐	Are the windows made of at least double-paned or tempered glass?
☐	☐	Are the decks, porches and other similar areas made of non-combustible material and free of easily combustible material (e.g. plastic furniture)?
☐	☐	Is all firewood at least 30 feet from the house?
☐	☐	Are approved spark arrestors on chimneys?

DEFENSIBLE SPACE

YES	NO	
☐	☐	Is dead vegetation cleared to the recommended defensible space area? (Consider adding distance due to slope of property.)
☐	☐	Is there separation between shrubs?
☐	☐	Are ladder fuels removed?
☐	☐	Is there a clean and green area extending at least 30 feet from the house?
☐	☐	Is there a non-combustible area within five feet of the house?
☐	☐	Is there separation between tree limbs and undergrowth?

EMERGENCY ACCESS

YES	NO	
☐	☐	Is the home address visible from the street?
☐	☐	Is the home address made of fire-resistant materials?
☐	☐	Are street signs present at every intersection leading to the house?
☐	☐	Are street signs made of fire-resistant materials?
☐	☐	Is flammable vegetation cleared within 10 feet of the driveway and are overhanging obstructions removed?
☐	☐	If a long driveway is present, does it have a suitable turnaround area?

SINCE 1921 FIRE DEPT. CITY OF CHULA VISTA

CITY OF CHULA VISTA

Chula Vista Fire Department
276 Fourth Avenue
Chula Vista, CA 91910

APPENDIX G:
WATER CONSERVATION PLAN

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UNIVERSITY
INNOVATION
DISTRICT (UID)

SECTIONAL PLANNING
AREA (SPA)

APPENDIX G

WATER CONSERVATION PLAN

June 2017

Prepared By:

City of Chula Vista
Development Services
Department

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ABBREVIATIONS

ac -	acre
ac-ft -	acre-foot
cfd -	community facilities district
cfs -	cubic feet per second
gpd -	gallons per day
gpf -	gallons per flush
gpm -	gallons per minute
HOA -	homeowner's association
mgd -	million gallons per day

USEFUL CONVERSIONS

1 acre-foot	=	325,829 gallons
1 mgd	=	1,000,000 gallons/day
1 cfs	=	448.8 gpm
1 cubic foot	=	7.48 gallons
1 mgd	=	694.4 gpm

1. EXECUTIVE SUMMARY

The City of Chula Vista's Growth Management Ordinance (CVMC 19.09.050C) requires that new development projects with the development potential of more than 12 or more acres of commercial, 24 or more acres of industrial, and the mixed-use potential for more than 50 residential dwelling units prepare a Water Conservation Plan (WCP) at the time of the Sectional Planning Area (SPA) plan preparation. This plan presents a review of presently available technologies and practices which result in water conservation in the University Innovation District (UID). This plan presents water conservation measures that will be incorporated into the planning and design of the UID SPA Planning area, including the requirements outlined in the Landscape Water Conservation Ordinance.

Proposed development within the UID includes just over 10 million gross square feet (gsf) of building development, including a 33.6-acre 2.9 million gsf Town Center, a 29.0-acre 1.6 million gsf Campus Commons, a 25.3-acre 2.7 million gsf Urban Core, a 20.0-acre 2.1 million gsf Gateway District and a 26.4-acre 575,600 gsf Campus Vista District. The project also includes a 5.2-acre Lake Blocks district with the potential for 47,600 gsf. Residential housing for students and faculty will be included, and there is potential for the transfer of up to 2,000 market rate residential units from Villages 9 and/or 10. The Otay Water District is the local water agency that will supply potable water and recycled water to the UID. The total estimated average potable and recycled water use for the project is 0.84 mgd and 0.16 mgd, respectively.

The State and local government have mandated a number of water conservation measures. The focus of this study is on the implementation of non-mandated water conservation measures. The project will install hot water pipe insulation and pressure reducing valves in all uses. Additionally, the developer will install dual flush toilets in all uses and utilize water efficient irrigation systems and evapotranspiration controllers for the non-residential sites. The project will be designed in compliance with the Water Conservation Ordinance. At buildout of the project, implementation of the above measures along with the use of recycled water would result in an estimated water savings of 196,255 gallons per day for the project.

2. INTRODUCTION

In recent years, the subject of water conservation has been given increased attention. The growing awareness of the need and value of water conservation has been sparked by local and regional water purveyors concerned about meeting the future water demands of their customers, particularly during drought conditions. Water conservation provides an alternative approach to the problem of finding new water sources to meet the water demand for a proposed community. The intent of water conservation is to manage water demand so that the customers receive adequate service but use less water.

Much has been done to educate consumers about limitations of water supply, the serious implications of a long-term drought and the need for water conservation, but there is a practical limit to the percentage reduction of water use in established communities. This limit is a result of the types of plumbing fixtures installed in existing homes as well as the difficulty in altering consumers' established patterns of water use. Any water conservation effort, voluntary or mandatory, requires the cooperation of the public. Public information should be utilized to inform and convince the consumer that a change in personal water use habits is in everyone's best interest.

In recent years, the private development sector has become more attuned to the concerns of water availability and has recognized the value of addressing water conservation issues throughout planned development projects. By incorporating low water use plumbing fixtures, promoting drought tolerant landscaping, and providing educational materials to homeowners within the development project, private developments can do much to cultivate an interest in water conservation and establish new patterns of water use. These efforts can have significant impacts with regard to reducing the need for securing and importing larger quantities of water for use in San Diego County. The Landscaping Water Conservation Ordinance went into effect on January 1, 2010 and requires homeowners to be efficient with the landscape systems and plant selection.

In 2006 the State repealed the Water Conservation in Landscaping Act and adopted a new Water Conservation in Landscaping Act, Government Code Sections 65591 et seq. The new Act requires the Department of Water Resources to update the previously adopted

model efficient landscape ordinance that provides for greater efforts at water conservation and more efficient use of water in landscaping. An updated Model Water Ordinance was approved in July 2015.

The City of Chula Vista City Council adopted an updated ordinance in 2015 that complies with the findings and declaration of the State's Water Conservation in Landscaping Act and is as effective as the State's updated model water efficient landscape ordinance. This water conservation plan incorporates the requirements of the City ordinance.

Except for the Lake Block, the entirety of the contiguous acreage of the University Innovation District (UID) is located within the Otay Ranch General Development Plan (GDP). The Otay Ranch GDP was adopted in 1993 and included objectives for water conservation to be incorporated into the development of Otay Ranch. These objectives include the implementation of water efficient fixtures, increased use of drought tolerant landscaping, and use of recycled water for irrigation. The objective of these measures is to reduce the per capita water use within Otay Ranch as compared to 1989 County wide per capita levels. This report will demonstrate how the City, in partnership with the Otay Water District and the development community are meeting these objectives.

3. PURPOSE

The State Legislature determined in the Water Conservation in Landscaping Act that the State's water resources are in limited supply. The Legislature also recognized that while landscaping is essential to the quality of life in California, landscape maintenance and design must be water efficient. The City of Chula Vista's Growth Management Ordinance requires that all major development projects as defined above prepare a Water Conservation Plan at the time of Sectional Planning Area Plan preparation. The City has adopted guidelines for the preparation and implementation of required water conservation plans.

Water conservation measures which will be incorporated into the planning and design of the project, including an estimate of the anticipated water savings. Approximately half of the water used by residences in California is used outdoors. For this reason, the City's Landscape Water Conservation Ordinance will be an important component of reduce water usage.

Although not covered in detail, there are several secondary benefits to conserving water that should be kept in mind when reviewing material in this report. These benefits include reduced sewage flows, reduced natural gas use, and reduced electricity use. Using less water in the shower, for example, reduces the amount of water input into the sewer system and reduces the amount of energy required to heat the water.

4. PROJECT DESCRIPTION

Proposed development within the University Innovation District includes a Town Center, Urban Core, a District Gateway, a Campus Commons, Campus Vista, the Lakes Blocks and future development that may include the transfer of up to 2,000 market rate residential within adjacent villages. Figure 1 provides the proposed land use plan for the project and Table 1 provides a land use summary.

TABLE 1
UNIVERSITY INNOVATION DISTRICT
SITE UTILIZATION SUMMARY

Area	Description	Gross Acres	Estimated Gross Square Footage of Development
T-1	Future Development [1]	99.8	0
T-2	Campus Vista	26.4	575,600
T-3	Campus Commons	29.0	1,642,400
T-4	Town Center	33.6	2,929,900
T-5	Urban Core	25.3	2,757,700
T-6	District Gateway	20.0	2,098,000
SD	Lake Blocks	5.2	47,600
O-1	Habitat Conservation	41.1	0
O-2	Common Space	39.5	15,000
O-3	Pedestrian Walk	14.5	0
ROW	Right-of-Way	49.3	0
TOTAL:		383.8	10,066,200

[1]Development will be focused in Areas T-2 through T-6, but up to 10% of total gross square footage may be transferred to T-1

FIGURE 1 LOCATION MAP

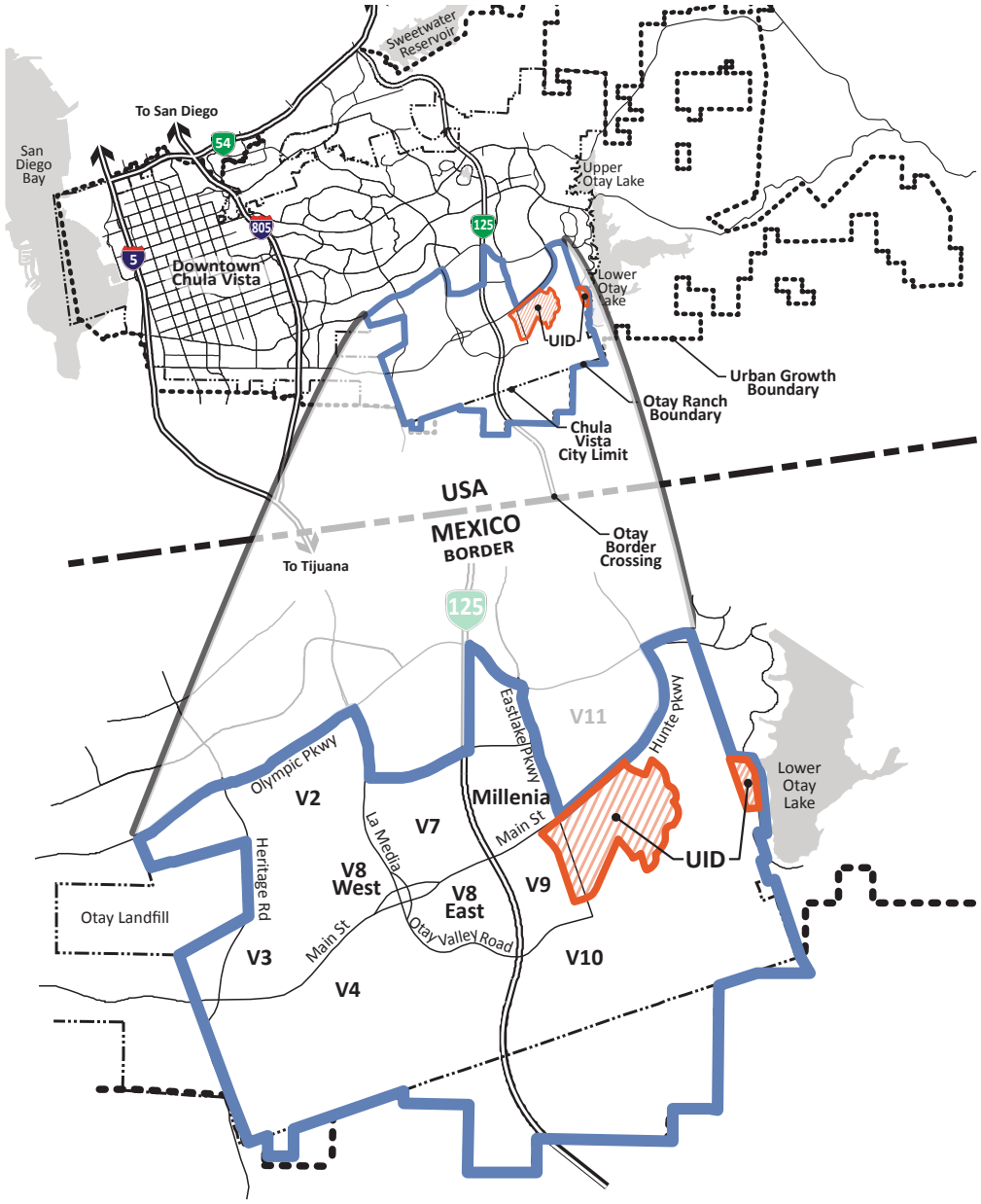
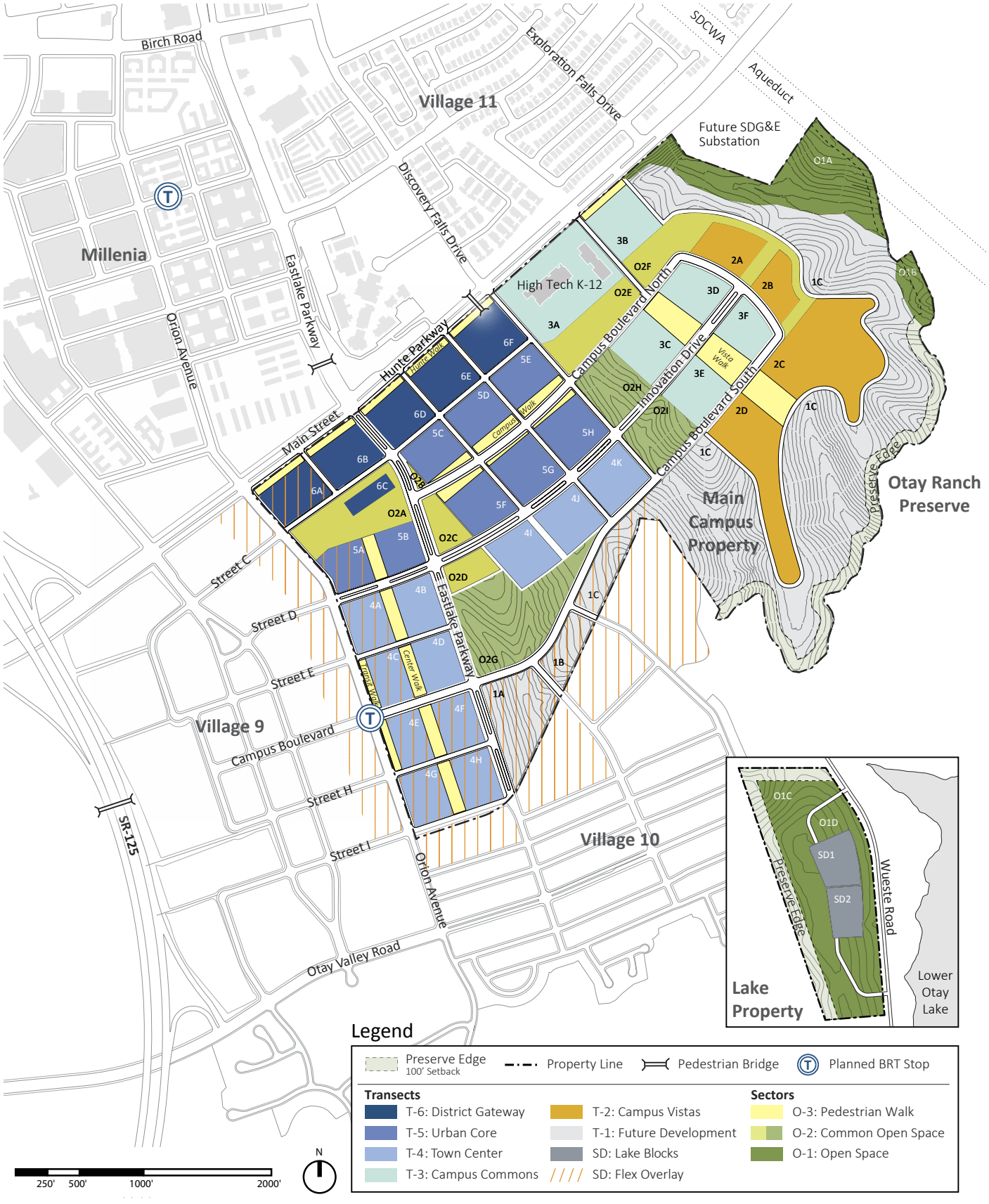


FIGURE 2 LAND USE PLAN



5. WATER SERVICE AND SUPPLY

The Otay Water District is the local water agency that will supply potable water and recycled water to University Innovation District. The Otay Water District relies solely on the San Diego County Water Authority (SDCWA) for its potable water supply. The SDCWA is the largest of 27 member agencies of the Metropolitan Water District of Southern California (MWD), which is the primary importer of domestic water in Southern California.

6. POTABLE WATER DEMAND

Water use is affected by, among other things, climate and the type of development. In California, recent trends towards the construction of more multi-unit housing, the general reduction in residential lot size, and a number of local agency water conservation programs in effect are all tending to reduce per capita water consumption.

Potable water demands were projected by taking the total development for each land use and multiplying by water use factors. Table 2 provides the projected potable water demand for University Innovation District. The total estimated potable water use is 0.84 mgd. The potable water usage will be reduced by the use of recycled water within common landscaped areas of the project and implementation of water conservation measures (see Tables 5 and 6). Potable water use factors were taken from the April 2013 Otay Water District Water Resources Master Plan.

TABLE 2 UNIVERSITY INNOVATION DISTRICT PROJECTED POTABLE WATER DEMANDS			
Area	Quantity	Water Duty Factor	Total Average Water Demand GPD
T-1	99.8 ac	1,428 gpd/ac	142,514
T-2	26.4 ac	1,428 gpd/ac	37,699
T-3	29.0 ac	1,428 gpd/ac	41,412
T-4	33.6 ac	1,428 gpd/ac	47,981
T-5	25.3 ac	1,428 gpd/ac	36,128
T-6	20.0 ac	1,428 gpd/ac	28,560
SD[1]	5.2 ac	1,785 gpd/ac	9,282
O-1	41.1 ac	0	0
O-2	39.5 ac	1,428 gpd/ac	56,406
O-3	14.5 ac	1,428 gpd/ac	20,706
Student Housing	6,000 students	50 gpd/student	300,000
Faculty Housing	1,200 faculty	100 gpd/faculty	120,000
TOTAL:			840,688

1 This area is not proposed to use recycled water for the irrigated areas.

7. RECYCLED WATER DEMAND

In accordance with Section 26 of the Otay Water District Code of Ordinances, the University Innovation District will utilize recycled water for the irrigation of open space slopes, parks, parkway and median landscaping, and the common areas of educational/institutional and residential sites. Table 3 provides the projected recycled water demand for University Innovation District. The total estimated recycled water use is 0.16 mgd.

TABLE 3

UNIVERSITY INNOVATION DISTRICT
PROJECTED RECYCLED WATER DEMANDS

Area	Gross Acres	Percentage to be Irrigated	Irrigated Acreage	Irrigation Factor	Average Recycled Water Demand GPD
T-1	99.8	20	20.0	2,155 gpd/ac	43,100
T-2	26.4	20	5.3	2,155 gpd/ac	11,422
T-3	29.0	20	5.8	2,155 gpd/ac	12,499
T-4	33.6	20	6.7	2,155 gpd/ac	14,439
T-5	25.3	20	5.1	2,155 gpd/ac	10,990
T-6	20.0	20	4.0	2,155 gpd/ac	8,620
SD[1]	5.2	0	0	2,155 gpd/ac	0
O-1	41.1	0	0	2,155 gpd/ac	0
O-2	39.5	50 [1]	19.75	2,155 gpd/ac	42,561
O-3	14.5	50 [1]	7.25	2,155 gpd/ac	15,624
TOTAL:					159,255

[1] It was assumed that 50 percent of the common space and pedestrian walks would be irrigated.

8. MANDATED WATER CONSERVATION MEASURES

The State and many local Governments have mandated a number of water conservation measures. Table 4 summarizes the conservation measures that are currently mandated by the State of California and also provides the requirements if the recently adopted 2016 California Green Building Standards Code is implemented.

TABLE 4

UNIVERSITY INNOVATION DISTRICT
MANDATED WATER CONSERVATION DEVICES

Device	Baseline Requirement	Green Building Code Requirement
Showerheads	2.5 gpm	2.0 gpm
Lavatory Faucets	2.2 gpm	0.5 gpm
Kitchen Faucets	2.2 gpm	1.8 gpm
Metering Faucets in Public Restrooms	0.25-0.75 gal J cycle	0.2 gal per cycle
Residential Water Closets	1.6 gpf	1.28 gpf
Commercial Water Closets	1.6 gpf	1.28 gpf
Urinals	1.0 gpf	1.25 gpf

9. LOCAL WATER CONSERVATION REQUIREMENTS

There are a number of water conserving measures required by the Otay Water District and City of Chula Vista Landscape Manual. These include the use of recycled water for the irrigation of parks, median landscaping, open space slopes, and common landscaped areas where feasible.

The Landscape Manual also requires some drought tolerant plant selection in the landscaping plan and the use of evapotranspiration controllers for parks and common landscaped areas. Additionally, the Landscape Water Conservation Ordinance is expected to reduce outdoor water usage,

The City of Chula Vista Water Conservation Plan Guidelines requires the following three indoor water conservation measures for non-residential land uses. These measures are mandatory.

10. MANDATORY NON-RESIDENTIAL MEASURES

1. Hot Water Pipe Insulation. This measure involves the insulation of hot water pipes with I-inch walled pipe insulation and separation of hot and cold water piping. This measure is estimated to result in annual savings of 1,200 gallons per equivalent

dwelling unit.

2. Pressure Reducing Valves. Setting the maximum service pressure to 60 psi reduces any leakage present and prevents excessive flow of water from all appliances and fixtures. This measure is estimated to result in annual water savings of 900 gallons per equivalent dwelling unit.

3. Compliance with Division 5.3 of the California Green Building Standards Code in effect at the time of plan submittal

11. NON-MANDATORY MEASURES

To comply with the City's current water conservation requirements, the developer must select at least one outdoor measure and one additional indoor or outdoor water conservation measure for non-residential development.

Water conservation measures not included in the City's Water Conservation Measures list may be proposed by the developer. The developer will implement, from the City's list of approved measures, the following two additional non-mandatory measures in all non-residential land uses.

1. Dual Flush Toilets. The developer will install dual flush toilets within the project. This measure is estimated to result in annual water savings of 2,000 gallons per year per equivalent dwelling unit (EDU).

2. Water Efficient Landscaping. The developer will comply with the City's Landscape Water Conservation Ordinance to reduce outdoor water use. This will include a more drought tolerant plant selection including less turf area as well as installation of water efficient irrigation systems. While the estimated savings from this measure is difficult to quantify at this stage of planning, it is estimated that outdoor water usage for non-residential land use could be reduced by a minimum of 10 percent.

12. ESTIMATED WATER CONSERVATION SAVINGS

The estimated water savings for water conservation measures are based on the estimates provided above. The potential water savings varies widely based on land use types. Non-residential uses have much less opportunity to implement additional water saving measures than single family residential units primarily because the common

landscaped areas are required to be irrigated with recycled water and as such there are no outdoor water conservation measures to directly offset potable water usage. Table 6 summarizes the total estimated water savings for the UID based on the proposed required and non-mandatory measures described above. In order to calculate the estimated savings for the non-residential University and Innovation District project, it has been assumed that 3,350 square feet of non-residential use is equivalent to one dwelling unit.

TABLE 5

UNIVERSITY INNOVATION DISTRICT
PROJECTED WATER CONSERVATION SAVINGS

Measure	Equivalent DU's	Savings/DU	Annual Conservation Estimate
Hot Water Pipe Insulation	3,305	1,200 g/yr	3.97 million
Pressure Reducing Valves	3,305	900 g/yr	2.97 million
Dual Flush Toilets	3,305	2,000 g/yr	6.61 million
TOTAL:			13.55 mg/yr
Average Daily Savings			0.037 million

13. WATER CONSERVATION SUMMARY

The UID project is committed to being water efficient through the use of recycled water for irrigation and utilizing other water conservation devices and measures. Table 6 summarizes the baseline potable water use if recycled water and water conservation measures were not utilized and provides the anticipated water savings outlined in this report. As shown, the use of recycled water and other water conservation measures is expected to reduce potable water usage by 196,255 gpd, or 23.3 percent.

As evidenced by the information contained in this study, the objectives of the Otay Ranch GPD to incorporate water saving fixtures, drought tolerant landscaping, and recycled water usage into the development are being met. Based on information contained in the 1989 San Diego County Water Authority Annual Report, average water use within the Otay Water District was 220 gallons per day per capita (20,469.7 AF for a population of 83,000). Based on 2007 data from the OWD 2008 Master Plan, per capita water usage has

dropped to approximately 189 gpd (33.26 mgd for a population of 186,000). These per capita numbers include non-residential demands, but clearly indicate the effectiveness that the above measures are having and this trend is expected to continue as adopted guidelines are increasingly focused on reducing per capita water use.

TABLE 6

UNIVERSITY INNOVATION DISTRICT
WATER CONSERVATION SUMMARY

Description	Average Use (gpd)
Total Water Use:	
Potable Water Use (Table 3)	840,688
Recycled Water Use	159,255
TOTAL BASELINE WATER USE:	999,943
Water Conservation Savings:	
Recycled Water	159,255
Mandatory and Non-Mandatory Measures	37,000
TOTAL CONSERVATION SAVINGS:	196,255
Net Potable Water Usage [1]	840,688-196,255= 644,433
Reduction from Baseline Usage	23.3%

[1]Potable water use (Table 2) minus water conservation savings (Tables 5).

14. IMPLEMENTATION MEASURES AND MONITORING

The non-mandated water conservation measures to be included in the residential component of the University Innovation District are listed in Section 11 and Table 5. The non-residential development within the project will utilize hot water pipe insulation, pressure reducing valves, water efficient landscape systems, and evapotranspiration controllers as well as meeting all requirements of Division 5.3 of the California Green Building Standards Code in effect at the time of plan submittal.

For the water conservation measures proposed to be incorporated into the University Innovation District, Table 7 summarizes the implementation timing for each measure, as well as the responsibility for monitoring the implementation of the measures.

TABLE 7

UNIVERSITY INNOVATION DISTRICT
IMPLEMENTATION & MONITORING PROGRAM

Water Conservation Measure	Responsibility for Implementation	Timing	Monitoring of the Implementation
Hot Water Pipe Insulation	Developer	Building Permit	Development Services
Pressure Reducing Valves	Developer	Building Permit	Development Services/ Otay Water District
Dual Flush Toilets	Developer	Building Permit	Development Services

15. REFERENCES

1. Bahman Sheikh, Water Use Efficiency, Strategies for Proposed Residential Developments, September 2001.

2. City of Chula Vista Water Conservation Plan Guidelines, adopted May 27, 2003.

3. Chapter 20.12 Chula Vista Landscape Water Conservation Ordinance (Ord. 3146) 2009 and (Ord. 3357) 2015

4. Overview of Water Service for City of Chula Vista University Innovation District, July 2016, Dexter Wilson Engineering, Inc.

5. Otay Water District Water Resources Master Plan, October 2008, PBS&J.

6. San Diego County Water Authority Annual Report, 1989.

7. California Green Building Standards Code 2016.