

APPENDIX J

Fire Protection Plan

Prepared by Dudek

A Fire Protection Plan (FPP) has been prepared for the Salvation Army Divisional Camp and Retreat, based on the site layout described in Alternative I. The purpose of the FPP is to generate and memorialize fire safety requirements that will provide a reduced level of risk for the Camp and its visitors and achieve the same practical effect in lieu of a secondary emergency access. The FPP identifies the fire risk associated with the proposed expansion land uses (as identified in MUP P70-379W2) and identifies requirements for water supply, fuel modification, access, building ignition and fire resistance, fire protection systems, defensible space, vegetation management, and emergency procedures among other pertinent criteria for fire protection.

**SALVATION ARMY DIVISIONAL CAMP
FIRE PROTECTION PLAN
County of San Diego, California**

Prepared for:

BRG CONSULTING, INC.

304 Ivy Street
San Diego, California 92101
Contact: Tim Gnibus

Prepared by:

DUDEK

605 Third Street
Encinitas, California 92024
Contact: Michael Huff, Manager

Peer Review Provided by:

Don Oaks, Fire Consultant
Viking Research

April 2008

INTENTIONALLY LEFT BLANK

Salvation Army Divisional Camp Fire Protection Plan

TABLE OF CONTENTS

<u>Section</u>	<u>Page No.</u>
1.0 INTRODUCTION.....	5
1.1 Salvation Army Fire Protection Plan Summary.....	5
1.2 Applicable Codes/Existing Regulations	7
1.3 Project Description	7
1.3.1 Location	7
2.0 SITE CHARACTERISTICS.....	11
2.1 Topography.....	11
2.2 Vegetation.....	12
2.3 Climate.....	13
2.4 Fire History	14
2.4.1 Land Use – Current.....	14
2.4.2 Land Use – Proposed	15
3.0 RISK ANALYSIS METHODOLOGY	16
3.1 Field Assessment	16
3.2 Fire Response.....	16
3.3 Estimated Calls and Demand for Service from the Project	17
3.3.1 Impacts on Fire Response	17
3.4 Fire Behavior Modeling.....	18
3.4.1 BehavePlus Fuel Model Inputs	21
3.4.2 Fuel Model Output Results	22
3.5 On-Site Risk Assessment.....	23
4.0 CURRENT FIRE PROTECTION STATUS.....	23
4.1 Existing Water Supply and Fire Flow.....	23
4.2 Existing Fire Access	24
4.3 Existing Building Fire and Ignition Resistance	24
4.4 Existing Fire Protection Systems.....	25
4.5 Existing Defensible Space/Vegetation Management.....	25
5.0 FIRE SAFETY REQUIREMENTS	25
5.1 Fuel Modification Zones.....	25
5.1.1 Zones and Permitted Vegetation.....	25
5.1.2 Fuel Modification Area Vegetation Maintenance	31
5.2 Roads.....	32
5.2.1 Access	32
5.2.2 Gates	34
5.2.3 Driveways	35

Salvation Army Divisional Camp Fire Protection Plan

<u>Section</u>	<u>Page No.</u>
5.3 Structures	36
5.3.1 Ignition-Resistant Structural Requirements.....	36
5.3.2 Fire Protection Systems	39
5.3.3 Additional Requirements and Recommendations Based on Occupancy Type	42
6.0 EMERGENCY PLANNING.....	44
6.1 Salvation Army Emergency Response Procedures.....	45
6.2 Relocation	45
6.3 Sheltering in Place	47
6.4 Wildfire Scenario	49
7.0 SAME PRACTICAL EFFECT FOR NON-CONFORMING SECONDARY ACCESS.....	50
8.0 CONCLUSION	51

LIST OF APPENDICES

A-1	Third-Party Reviewer Endorsement
A	Site Photographs
B	Site Vegetation Map
C	Fire History Exhibit
D	Project Facility Availability Form
E	FlamMap Fire Behavior and Fuel Modification Zone Exhibit
F	Approved Plant List
G	Prohibited Plant List
H	Water Availability Letter from Ramona Water District
I	Salvation Army Emergency Procedures Document
J	Exception to Road Standard Granted to Ramona Water District
K	Bill Moser Letter RE: Water Tank, Fire Flow Certification

Salvation Army Divisional Camp Fire Protection Plan

Page No.

LIST OF FIGURES

1	Area Map	9
---	----------------	---

LIST OF TABLES

1	Existing and Proposed Features	11
2	Vegetation Communities – Salvation Army Divisional Camp.....	12
3	Fuel Model Characteristics	21
4	BehavePlus Fire Behavior Inputs	22
5	BehavePlus Fire Behavior Modeling Results	23
6	Maximum Cul-de-Sac Lengths	34
7	Same Practical Effect for Non-Conforming Impacts.....	51

Salvation Army Divisional Camp Fire Protection Plan

INTENTIONALLY LEFT BLANK

Salvation Army Divisional Camp Fire Protection Plan

1.0 INTRODUCTION

This Fire Protection Plan (FPP) has been prepared for the Salvation Army Divisional Camp site in Ramona. This FPP identifies the fire risk associated with the proposed project's expansion land uses (County Major Use Permit P70-379W2) and identifies requirements for water supply, fuel modification, access, building ignition and fire resistance, fire protection systems, defensible space, and vegetation management, among other pertinent criteria for fire protection. The purpose of this plan is to generate and memorialize the fire safety requirements of the Fire Authority(ies) Having Jurisdiction (FAHJ), the Ramona Fire Department/Ramona Water District and the San Diego County Department of Land Use (DPLU) Fire Marshals. Requirements and recommendations are based on site-specific characteristics and incorporate input from the Salvation Army and the FAHJ.

1.1 Salvation Army Fire Protection Plan Summary

The Salvation Army Divisional Camp site is located off Mussey Grade Road and encompasses 578 acres. A portion of this property is proposed for improvements that include construction of buildings, facilities, and associated infrastructure that will expand the camp's usefulness for the Salvation Army.

As detailed in this FPP, the project site's fire protection system includes a redundant layering of protection methods that have proven to reduce risk. The combined fire protection system designed for structures on this site includes customized fuel modification zones with a minimum two times and up to 20 times the width of predicted flame length heights, enhanced, ignition-resistive construction, interior sprinklers, and infrastructural improvements only possible with the implementation of the proposed site plans. The system is designed to drastically reduce the wildfire risk on the site and to provide a safe area for sheltering during a wildfire, if necessary. The project incorporates the latest building and fire code protection components that have been identified and codified from state-wide post-fire damage assessments.

The camp will be considered a shelter-in-place facility. This means that when relocation of campers is not feasible, such as when adequate time to relocate campers is not possible, a designated area of the camp will be used to accommodate people on site during a wildfire emergency. Relocation of the site's campers will remain the preferred action during an emergency situation only when adequate time is available without burdening Mussey Grade Road traffic flow. When conditions would risk the safety of relocating campers or other Mussey Grade Road citizens evacuating the canyon, a shelter-in-place structure will be utilized to shelter campers and visitors until the threat has passed. The camp can also be utilized as an emergency evacuation center for Mussey Grade Road residents who, due to unsafe conditions during a

Salvation Army Divisional Camp Fire Protection Plan

wildfire emergency, are unable to evacuate via Mussey Grade Road. This FPP has been reviewed by a third party with special expertise relating to sheltering in place. The comment letter is provided as Appendix A-1.

All structures on site will include important ignition-resistant construction materials and methods, interior sprinklers, improved water availability, and improved fire department access, as well as customized fuel modification areas designed to reduce fire intensity and spread during wildfire. One (1) large occupancy structure, the Multipurpose Building, has been identified and designed as a designated shelter-in-place structure for use during wildfire emergencies. This structure offers 19,500 square feet of interior space, which could accommodate up to 1,300 people, twice the maximum 641 persons that may be on site (California Building Code [CBC]). Even at full capacity, the shelter-in-place plan will accommodate all camp visitors, personnel, and other Mussey Grade residents. The occupancy rate for this structure would enable residents from the Mussey Grade Road area to benefit from the surplus of available shelter, and they would be welcome to temporarily relocate to this structure during a wildfire emergency. Although wildfires can occur any time of the year, they are more likely to become uncontrollable (wildland fires) during the period of September to February, coinciding with the Santa Ana winds. The camp is proposed to accommodate up to 641 persons, but the typical camp population during the period of September to February will be much lower, around 200 persons, as children would be in school during this period and on site primarily during the summer.

This FPP is intended to guide the design, construction, and maintenance of project-related improvements in compliance with applicable fire codes. When properly implemented and maintained, the requirements and recommendations detailed herein are designed to result in fire hazard risk reduction. To that end, preparation of this FPP reflects completion of the following tasks:

- On-site risk assessment
- Fire behavior modeling
- Flam Map fuel modeling exhibits and other GIS analysis
- Fire history analysis
- Review of various project details/plans
- Review and incorporation of FAHJ Fire Codes
- Incorporation of project-specific recommendations.

Salvation Army Divisional Camp Fire Protection Plan

1.2 Applicable Codes/Existing Regulations

This FPP demonstrates that the Salvation Army Divisional Camp's proposed project shall be in compliance with the Ramona Fire Ordinance 02-245, which substantially conforms to the San Diego County Fire Code (County Fire Code) requirements. Further, it demonstrates compliance with Articles 86 and 86-A of the California Fire Code (CFC), which require an FPP for new development in the wildland/urban interface (WUI). This FPP also complies with the 2007 California Building Code and 2007 California Fire Code, , Title 14 of the California Code of Regulations, (SRA Fire Safe Regulations), and the DPLU requirements for fire protection plans and vegetation management plans.

As described in this FPP, the project will meet or exceed all applicable Code requirements *except* a designated secondary access at a location that is remote from the primary access, as recommended by the Ramona Water District. However, as designed, the project will provide *same practical effect* by (1) the camp expansion includes design and construction features that will allow shelter-in-place (SIP) if relocation/evacuation is not possible, thus reducing the need for a secondary access and the evacuation related traffic demand on Mussey Grade Road, (2) each structure will include interior sprinklers which will assist responding fire fighting personnel by minimizing resource allocation on the camp site, (3) improved water availability and fire flow throughout the Mussey Grade Road area which will further assist the Ramona Fire Department with their defense of structures from wildfire throughout the Mussey Grade Road canyon, and (4) extended fuel modification zones to reduce fire intensity in an effort to further assist the Ramona Fire Department by minimizing on-site consumption of fire fighting resources and evacuation related traffic demand on Mussey Grade Road.

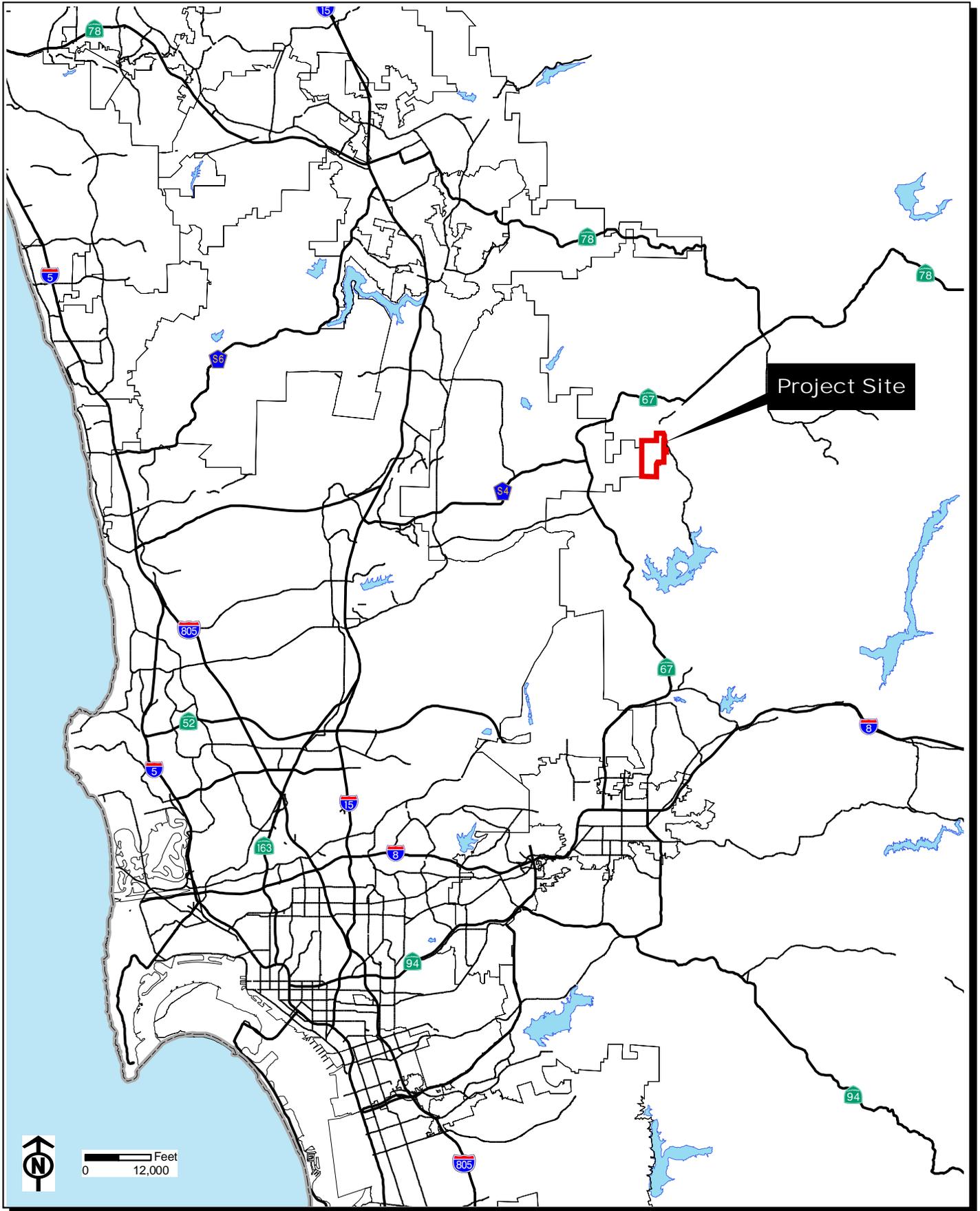
1.3 Project Description

1.3.1 Location

This FPP and related fire behavior modeling have been prepared for the Salvation Army's Divisional Camp. The camp is located in the southwestern portion of the Ramona Community Planning Area. The entrance to the camp is located at 14488 Mussey Grade Road. The property is situated to the west of Mussey Grade Road, south of State Route 67 and north of the San Vicente Reservoir. It is located in portions of Section 6, Township 14 South, Range 1 West and Sections 1 and 12, Township 14 South, Range 1 East, San Vicente Reservoir 7.5 minute USGS Quadrangle, San Bernardino Base Meridian (*Figure 1*). The property lies within an area designated as having a very high fire hazard potential by California Department of Forestry (Cal Fire) (2007 Proposed Fire Severity Mapping) and is located within the jurisdiction of the Ramona Fire Department, which contracts with Cal Fire.

Salvation Army Divisional Camp Fire Protection Plan

INTENTIONALLY LEFT BLANK



Salvation Army Divisional Camp Conceptual Fire Protection Plan
Area Map

FIGURE
1

Salvation Army Divisional Camp Fire Protection Plan

INTENTIONALLY LEFT BLANK

Salvation Army Divisional Camp Fire Protection Plan

The purpose of this plan is to generate and memorialize fire safety requirements that will provide a reduced level of risk for the camp and its visitors. Dudek’s recommendations are based on site-specific characteristics and incorporate input from the project’s environmental impact report (EIR) (prepared by BRG Consulting, Inc.), the Ramona Fire Department Fire Marshal, and the County of San Diego. The specification-consistent language herein is intended to become an ongoing requirement with the approval of this FPP by the FAHJ and the planning area having jurisdiction (PAHJ).

2.0 SITE CHARACTERISTICS

Table 1 identifies some of the Salvation Army Divisional camp project’s current and proposed features:

**TABLE 1
Existing and Proposed Features**

Attribute	Existing Condition	Post Expansion Condition
Gross property acreage	578	578
Building types	Older and newer construction	Enhanced, ignition-resistive construction; sprinklered, retrofitted older structures
Number of structures	28	61
Water supply	10,000-gallon private gravity tank	260,000-gallon public and 10,000-gallon private gravity tanks fed by and to surcharge the Ramona Municipal Water district water system
Fuel modification zones	Maximum 50-foot modified areas	Minimum 100- and maximum 175-foot modified areas with two distinct zones (irrigated and thinned) providing roughly three to four times the predicted flame length

2.1 Topography

The Salvation Army Camp is situated within an area referred to as the “foothill province” of San Diego County, occurring in a foothills area of the Cuyamaca Mountains. The project vicinity includes steep slopes in the western portions of the property that transition into rolling hills and flatter pasture-like areas, which are occasionally bisected by intermittent and ephemeral drainages. Elevations on the property range from 1,290 to 2,184 feet above mean sea level (AMSL). The northern and western portions of the 578-acre property contain steeper and more rugged terrain with slopes ranging from 30% to 45%. The central and eastern portion of the property, where most of the buildings associated with the camp’s expansion are proposed, is characterized by much flatter terrain with average slopes averaging approximately 10%.

Salvation Army Divisional Camp Fire Protection Plan

2.2 Vegetation

A total of 13 vegetation categories were delineated on site (Merkel & Associates 2006). The vegetation communities and their presence are summarized in *Table 2*.

TABLE 2
Vegetation Communities – Salvation Army Divisional Camp

Vegetation Type	Acreage	Corresponding Fuel Model
Non-native woodland	4.4	9
Disturbed	16.6	1*
Urban/developed	7.8	99
Diegan coastal sage scrub	16.4	SCAL 18
Southern mixed chaparral	402.6	Sh7
Mafic southern mixed chaparral	6.5	SCAL 17
Coastal sage-chaparral scrub	46.23	SCAL 18
Non-native grasslands	22.83	1
Emergent wetland	<0.1	98
Southern coast live oak riparian forest	33.6	TL 2
Mulefat scrub	< 0.1	SH 3
Southern willow scrub	0.7	9
Coast live oak woodland	20.3	8
Total	578	N/A

*Disturbed areas are considered a Fuel Model 1 to account for non-maintained condition converting to grassland

As presented, the majority of the vegetation on site is mixed chaparral, which dominates nearly 71% of the 578-acre property. This vegetation community is located primarily on steep slopes in the northern and western areas of the property. The vegetation adjacent to a large portion of the proposed camp improvements consists of oak savannah with grass understory and riparian oak communities. Coastal sage scrub communities combine to represent nearly 11% of the property, again located on steeper slopes on the property. Just over 14% of the property is characterized by grasses, including those areas classified as oak and non-native woodlands, as the understory is commonly limited to non-native grasses. The remaining vegetation types occur at low levels.

The project’s vegetation is illustrated in *Appendix A – Site Photographs* and *Appendix B – Site Vegetation Map*.

The vegetation characteristics described above and presented in *Table 2* are used to model fire behavior, discussed in *Section 3.4* of this FPP. Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (leaf size, branching

Salvation Army Divisional Camp Fire Protection Plan

patterns), and overall fuel loading. For example, the native shrub species that compose the chaparral and coastal sage–chaparral scrub plant communities on site are a high potential hazard based on such criteria.

Vegetation distribution throughout the site varies by location and topography. Riparian woodlands and scrub are concentrated in canyon bottoms and low, flatter areas, while upland areas typically support shrub cover (either coastal sage scrub or chaparral) or grass cover. The importance of vegetative cover on fire suppression efforts is its role in affecting fire behavior. For example, fire burning in grasslands may have shorter flame lengths than those burning in chaparral or coastal sage scrub, however, fire in grasslands often spread more rapidly than fire in other vegetation types. The distribution of vegetation on site is depicted in *Appendix B*.

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 affects plant community succession. Succession of plant communities, most notably the gradual conversion of shrublands to grasslands with high frequency fires and grasslands to shrublands with fire exclusion, is highly dependent on the fire regime. Biomass and associated fuel loading will increase over time, assuming that disturbance or fuel reduction efforts are not diligently implemented. The current vegetation composition and density on site will continue to change over time through increased volume.

Wildfire disturbances can also have dramatic impacts on plants and plant composition. Heat shock, accumulation of post-fire charred wood, and change in photoperiods due to removal of shrub canopies may all stimulate seed germination. The post-fire response for most species is vegetative reproduction and stimulation of flowering and fruiting. The combustion of aboveground biomass alters seedbeds and temporarily eliminates competition for moisture, nutrients, heat, and light. Species that can rapidly take advantage of the available resources will flourish. It is possible to alter successional pathways for varying plant communities through manual alteration. This concept is a key component in the overall establishment and maintenance of the proposed fuel modification zones on site.

2.3 Climate

The climate in the project area is typified by warm, dry summers and wetter winters. Precipitation typically occurs between December and March. The prevailing wind is an onshore flow with fall winds (Santa Ana Winds) from the northeast that may gust to 50 miles per hour (mph) or higher. The project area's climate has a large influence on the fire risk as drying vegetation during the summer months becomes fuel available to advancing flames should an

Salvation Army Divisional Camp Fire Protection Plan

ignition be realized. Extreme conditions, used in fire modeling for this site, include 95° temperatures in summer and wind gusts of 50 mph during the fall. Relative humidity of less than 10% is possible during fire season.

2.4 Fire History

Fire history is an important component of a site-specific FPP. Fire history information can provide an understanding of fire frequency, fire type, most vulnerable project areas, and significant ignition sources, amongst others. *Appendix C – Fire History Exhibit* presents a fire history exhibit for the Salvation Army Divisional Camp project vicinity. As presented in the exhibit, there have been several fires recorded by fire agencies both on and in the direct vicinity of the project area. Fire history data was obtained via the California Department of Forestry and Fire Protection (CDF) Fire and Resource Assessment Program (FRAP)¹ database. The most recent fire, the Witch Creek Fire, occurred in the Ramona area in October 2007. This fire burned well north and east of the project site, and did not reach the Mussey Grade area. Prior to that fire, the Cedar Fire of 2003 burned across the Salvation Army site and included damage to several older structures built prior to code updates intended to reduce risk of ignition. Prior to the Cedar Fire, the 1995 Poway Fire burned the southwestern portion of the property, the 1972 Klondike Fire burned the northern portion of the property, the 1958 Pearson Peak Fire burned the northwestern portion of the property, and an unnamed fire in 1913 burned the entirety of the property. Based on a review of this information, fire return intervals from the documented 1913 fire to the 2003 Cedar Fire have generally become shorter over time, with 45, 14, 23, and 8 years separating documented fire events on site, respectively, but with an average fire frequency of approximately every 30 years. While ignition location data was not evaluated, a review of fire perimeter data indicates that fires burning onto the property have originated off site.

2.4.1 Land Use – Current

The camp site has functioned as a camp and retreat for several decades under the original County Major Use Permit (MUP P70-379) and modification (MUP P70-379W). The camp presently includes 28 structures, including cabins, dome-shaped and hard-sided tent structures, housing, offices/administrative, restrooms, and other related buildings. The current land use includes disturbed and urban areas totaling 24.4 acres. Most of the existing structures have been built since 1997, when the Salvation Army took possession of the property. Several of the original buildings were destroyed in the 2003 Cedar Fire and have since been replaced with ignition-resistant construction. The camp is situated in a relatively flat area of the 578-acre property, with non-native grasslands, native oak woodland/savannah, and chaparral on the adjacent slopes.

¹ California Department of Forestry and Fire Protection Fire and Resource Assessment Program (<http://frap.cdf.ca.gov/>).

Salvation Army Divisional Camp Fire Protection Plan

Other land uses include paved and improved roads and parking areas, with decomposed granite as the most common road surface. There is one swimming pool, recreational courts, and a large recreational irrigated turf area. Currently, thinning and fuel modification work occurs along the primary access road, on the perimeter, and within the camp where mowing is feasible.

2.4.2 Land Use – Proposed

The proposed project will be a low-density camping facility with clustered development, resulting in the majority of the site being left undisturbed. The camp, as proposed, would accommodate up to 641 people at the end of the 20-year expansion plan and would include up to 61 structures (all types). The camp is intended to provide retreat opportunities for surrounding communities and youth. Please refer to the project EIR for detailed information regarding the proposed project's land uses.

In summary, the proposed project would include the following land uses:

- Thirteen structures at the “Cabin Camp” – 2,450 square feet per cabin and up to 20 occupants; 2,500 square feet for arts and crafts building with up to 135 occupants.
- Ten structures at the “Nature Study/Educational Camp” – 3,200 square feet per cabin and up to 22 occupants; 2,500 square feet for classroom building and up to 235 occupants.
- Eight structures for the “Staff Housing” – 1,225 to 6,000 square feet with four to seven occupants each.
- Two structures for “Maintenance Facilities” – 1,200- and 3,600-square-foot shops, not for occupants; two aboveground, UL-2085 tanks for diesel and gasoline fuel storage tanks.
- Eight structures as “Support Facilities” – 2,000 to 21,000 square feet with five to 600 occupants for camp use. The two largest structures (19,500 and 21,000 square feet, respectively) are capable of accommodating up to 2,700 (1,300 and 1,400, respectively) people at a time (CBC Table 10-A, Section 1003.2.2). As described in detail in this FPP, the 19,500-square-foot multipurpose building is a designated shelter-in-place “safe area” that may be used by campers and other Mussey Grade Road residents during a wildfire conflagration when relocation/evacuation is not possible.
- Eight structures at the “Retreat Center” – 2,500 to 10,800 square feet with 35 to 144 occupants.
- One building at the “Recreation” area – 2,500-square-foot bathroom/shower, not for occupants.
- A 30,000 gallon swimming pool – available for fire fighting use, as necessary.

Salvation Army Divisional Camp Fire Protection Plan

In addition, recreation courts and a swimming pool would be added to the facility as well as an area for occasional tent camping. Roads would be improved, many paved or provided DG, all-weather surfaces and new roads added to gain access to the new development areas, and paved parking areas would be added. In all, up to 94 acres (20% of the entire site and all of the built-upon areas) would be converted to urban, lower fire hazard uses.

The proposed land use improvements described above would be completed according to the CFC and specifically Article 86 and would include enhanced, ignition-resistive construction, interior sprinklers, structure set-backs, and required fire flow, along with a designated fuel modification area, among other requirements as described further in this FPP.

3.0 RISK ANALYSIS METHODOLOGY

3.1 Field Assessment

Dudek conducted a field assessment of the Salvation Army Camp project area in order to document existing site conditions and potential risk and to determine potential actions for addressing the protection or relocation of the camp's staff and visitors. While on site, Dudek assessed the area's topography, natural vegetation and fuel loading, available setback areas, structures, and general susceptibility to wildfire.

Site photographs were collected and fuel conditions were mapped using 100-scale aerial images. Field observations were utilized to augment existing digital site data in generating the fire behavior models and formulating the recommendations contained in this FPP. Refer to *Appendix A* for site photographs and brief discussions of existing site conditions.

3.2 Fire Response

The Project is located within the Ramona Fire Department/Ramona Municipal Water District (RFD) and the County of San Diego. Initial response is from Ramona Fire Department, which is under contract with Cal Fire. The RFD operates three Fire Stations within the District that could serve the site. Initial response to the area is currently provided from Fire Station 82, located at 3410 Dye Road, which staffs a minimum of three firefighters at all times and has the following apparatus: one Type I Engine.

Secondary response would be provided from other Ramona Fire Department Fire Stations as needed. Cal Fire's Mt. Woodson Station, a "Cal Fire Schedule B Station," includes one Type III engine with three personnel at all times with two engines and engine companies scheduled for the peak fire season, which occurs from April 15th to December 1st each year. Mutual aid agreements are in place and would include Cal Fire's air attack capabilities, if necessary.

Salvation Army Divisional Camp Fire Protection Plan

Fire Station No. 82 currently responds to an average of 1.1 calls per day within its primary response area. Fire Station No. 82 is located approximately 2.4 miles from the Project site's access gate or 3.7 miles from the primary site parking lot. The structures proposed on this site do not exceed height limits above which a ladder truck would be required.

The Project Facility Availability Form (*Appendix D*) provided by the Ramona Fire Department Fire Marshal (June 2006) provides Fire Department input regarding response time. The form states that "Based on the capacity and capability of the District's existing and planned facilities, fire protection facilities are currently adequate or will be adequate to serve the proposed project. The expected emergency travel time to the proposed project is 4½ minutes." According to calculations, the linear distance of 19,536 feet from Fire Station No. 82 to the camp's entrance would require an average response speed of just less than 50 mph for a 4.5-minute response time. It is estimated that average speed would be closer to 40 mph, resulting in an estimated response time of 5.5 minutes.

3.3 Estimated Calls and Demand for Service from the Project

Using San Diego County fire agencies' estimate of 82 annual calls per 1,000 population, the Project's estimated 641 maximum visitors and guests, which will vary throughout the year and will likely average 150 throughout the course of the year, would generate up to 13 calls per year (less than 0.04 calls per day), 85% of which (11 per year) are expected to be medical-related calls. Over the last 3 years, there have been no fire calls and an estimated nine medical-related calls (personal communication with Dave Patton, Salvation Army), or three per year. This is based on an average population of approximately 50 people at the camp over this time frame and compares favorably with the projected demand associated with the camp expansion.

Response Capability Impact Assessment and Mitigation

It is anticipated that the fire-related calls will decrease while medical-related calls would increase slightly. Service level requirements are not expected to be significantly impacted with the increase of less than 0.04 calls per day for a station that currently responds to just over 1 call per day in its primary service area. Therefore, the project is not expected to cause a decline in the RFPD response times. The requirements described in this FPP are intended to aid firefighting personnel and minimize the demand placed on the existing emergency service system.

3.3.1 Impacts on Fire Response

Cumulative impacts from this type of project can cause fire response service decline and must be analyzed for each project. The camp and its proposed usage of up to 641 people present throughout parts of the year, primarily during the summer, represent an increase in service

Salvation Army Divisional Camp Fire Protection Plan

demand. The requirements described in this FPP, including ignition-resistive construction, fire protection systems, pre-planning, visitor education and training, and fuel modification/vegetation management, are designed to aid firefighting personnel such that camp staff and visitors are protected and impacts to the RFD are minimal. However, to ensure that the special fire hazard reduction project features proposed for this project remain functional, the camp's participation in a CFD will fund ongoing monitoring by RFD staff or equivalent. The CFD will be a funding source for the ongoing Fire Department inspections of the Salvation Army fire protection systems. It will be formally established and will meet County/Ramona requirements for this type of service district.

3.4 Fire Behavior Modeling

Following site evaluation and vegetative fuels data collection efforts, fire behavior modeling was conducted to document the type and intensity of fire that would be expected on the project site given characteristic site features including topography, vegetation, and weather. Previous BehavePlus modeling had been provided to the Salvation Army by the San Diego County Fire Marshal. Dudek verified the BehavePlus model results and incorporated modeling input variables into a FlamMap model, which is a graphics-based GIS model that utilizes the same fire spread algorithms contained in the BehavePlus software package. The advantage of FlamMap modeling is that it evaluates anticipated site-wide fire intensity and flame length values based on variations in topography and vegetative cover and provides a graphical output that can be evaluated on site maps, whereas BehavePlus provides only a tabular output.

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, intensities, and spread rates, the BehavePlus 3.0.1 fire behavior fuel modeling system was applied using expected low fuel moisture values during peak fire season, variable wind speeds, high slope values, and two representative fuel models observed on site (chaparral and coastal sage scrub). Additionally, FlamMap, a GIS-based fire behavior software application, provides a useful graphical display of the modeling output, and was used to evaluate potential fire behavior conditions across the site. Results from FlamMap modeling efforts are presented in *Appendix E*.

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

Salvation Army Divisional Camp Fire Protection Plan

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 are the dead fuels less than 0.25 inch in diameter. These are the fine fuels that carry fire. Fuels greater than 1 inch have little effect while fuels greater than 3 inches have no effect on fire behavior.
- Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within 6 feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
- 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 models² and the more recent custom fuel models developed for Southern California³. According to the model

² Anderson, H.E. 1982. *Aids to Determining Fuel Models for Estimating Fire Behavior*. Gen. Tech. Rep. INT-122. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 28 pp.

³ Andrews, Patricia L.; Bevins, Collin D.; Seli, Robert C. 2004. *BehavePlus Fire Modeling System, Version 3.0: User's Guide*. Gen. Tech. Rep. RMRS-GTR-106 Ogden, UT: Department of Agriculture, Forest Service, Rocky Mountain Research Station. 132 pp.

Salvation Army Divisional Camp Fire Protection Plan

classifications, fuel models used in BehavePlus and FlamMap have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface-to-volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in modeling efforts. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models:

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

In addition, the aforementioned fuel characteristics were utilized in the recent development of 40 new fire behavior fuel models⁴ developed for use in BehavePlus modeling efforts. These new models attempt to improve the accuracy of the 13 standard fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the 40 new fuel models:

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

FlamMap software was used in the development of this FPP in order to graphically depict fire modeling results for the project site. Existing site conditions were evaluated, and, to maintain consistency with BehavePlus fire modeling efforts conducted for the site, the same weather and fuel input variables were incorporated into the FlamMap modeling runs. *Table 3* provides a description of the fuel models observed on site and their corresponding vegetation

⁴ Scott, Joe H.; Burgan, Robert E. 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 pp.

Salvation Army Divisional Camp Fire Protection Plan

classifications. These model values were used in the BehavePlus and FlamMap analyses for this project.

**TABLE 3
Fuel Model Characteristics**

Fuel Model	Description	Land Cover Classification
1	Short grass	Non-native grasslands, disturbed areas
8	Closed timber litter	Coast live oak woodland
9	Hardwood litter	Non-native woodland, southern willow scrub
SH3	Moderate load, humid climate shrub	Mulefat scrub
Sh7	Mixed chaparral	Southern mixed chaparral
TL2	Low load broadleaf litter	Southern coast live oak riparian forest
SCAL17	Chamise	Mafic southern mixed chaparral
SCAL 18	Coastal sage scrub, California sage and buckwheat dominated	Diegan coastal sage scrub, coastal sage-chaparral scrub
98	Non-combustible	Emergent wetland
99	Non-combustible	Urban/developed

3.4.1 BehavePlus Fuel Model Inputs

To support the fire behavior modeling efforts conducted for this FPP, the different vegetation types observed on site were classified into the aforementioned numeric fuel models. As indicated in *Table 3*, fuel model values were assigned to each vegetation type. The site is dominated primarily by mixed chaparral (SH7 and SCAL 17) and coastal sage scrub communities (Fuel Model SCAL 18). Oak woodland communities (Fuel Model 8) and grasslands (Fuel Model 1) are present, but represent a smaller percentage cover of the site. Riparian communities, including oak riparian forest (Fuel Model TL2), southern willow scrub (Fuel Model 9), and mulefat scrub (Fuel Model SH3), are present at lower elevations in the eastern portion of the property and typically have higher fuel moisture levels. Finally, urban/developed cover is considered non-fuel, while areas classified as disturbed (dirt roads, exposed soil) have been classified as a grass model (Fuel Model 1) to account for conversion over time should maintenance or access be eliminated following project development.

The weather and wind input variables used in the fire behavior analysis were consistent with those utilized by the San Diego County Fire Marshal in his modeling efforts for the site, although Dudek included an evaluation of spotting distance not included in the initial runs. *Table 4* provides a description of the input variables used in the BehavePlus and FlamMap modeling efforts.

Salvation Army Divisional Camp Fire Protection Plan

TABLE 4
BehavePlus Fire Behavior Inputs

Input Name	Value
Fuel model	1, 8, 9, sh3, Sh7, t12, SCAL17, SCAL18
Canopy height	6 ft.
1 h fuel moisture	2%
10 h fuel moisture	3%
100 h fuel moisture	4%
Live herbaceous moisture	30%
Live woody moisture	50%
20 ft. wind speed (mph)	three wind scenarios: 12 mph, 18 mph, 24 mph
Wind adjustment factor	1
Slope steepness	BehavePlus: 0%; FlamMap: variable
Fuel shading*	0
Ridge–valley elev. difference	700 ft.
Ridge–valley horiz. difference	0.6 miles
Spotting source location	Ridge top

3.4.2 Fuel Model Output Results

The results from the BehavePlus fire behavior model are presented in *Table 5*. As presented, wildfire behavior in non-treated heavy chaparral, presented as a Fuel Model 4, represents the most extreme conditions, varying with different wind speeds. In this case, flame lengths can be expected to reach up to approximately 45 feet with 24 mph wind speeds (*Appendix E*). Flame lengths for fires burning in coastal sage scrub, represented as a Fuel Model SCAL18, with wind speeds of 24 mph can be expected to reach 44 feet. While the maximum flame length values for a fire in grassland (Fuel Model 1) with 24 mph winds is 13 feet (majority of camp under oak savanna and woodland – *Appendix E*), the rate of spread reaches 8.3 mph, which is the fastest spreading fire with the next highest spread rate for sage fuels (5.6 mph). Spotting is projected to occur up to 1.5 miles during a fire with 24 mph winds burning in mixed chaparral (Fuel Model SH7). *Table 5* presents the results of the BehavePlus modeling efforts for the site.

It should be noted that the results presented in *Table 5* depict values based on inputs to the BehavePlus software. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis. 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.

Salvation Army Divisional Camp Fire Protection Plan

TABLE 5
BehavePlus Fire Behavior Modeling Results

Fuel Model	Flame Length (ft.)			Rate of Spread (mph)			Spotting Distance (miles)		
	12	18	24	12	18	24	12	18	24
1	12.7	12.7	12.7	8.32	8.32	8.32	0.4	0.5	0.6
8	2.6	2.6	2.6	0.13	0.13	0.13	0.1	0.2	0.2
9	7.9	01.8	13.5	0.70	1.39	2.28	0.3	0.5	0.6
SH3	12.8	16.1	18.9	0.66	1.08	1.55	0.4	0.6	0.8
SH7	31.3	38.9	45.4	2.49	3.99	5.58	0.7	1.1	1.5
TL2	1.6	1.6	1.6	0.59	0.59	0.59	0.1	0.1	0.1
SCAL17	17.7	22.9	27.4	2.18	3.79	5.63	0.5	0.8	1.0
SCAL18	32.7	38.8	43.7	1.74	2.52	3.28	0.7	1.1	1.5

3.5 On-Site Risk Assessment

As experienced as recently as 2003, the Salvation Army Divisional Camp site is vulnerable to wildfire, given the climatic, vegetation, WUI location, and topographical characteristics of the area, along with the fire history and behavior modeling results previously discussed in this FPP. The most common type of fire anticipated in the vicinity of the project area is a wind-driven fire from the north/northeast during the fall. Flame lengths can be over 45 feet.

4.0 CURRENT FIRE PROTECTION STATUS

The following sections summarize the status of existing fire protection at the Salvation Army Divisional Camp site. The status of fire protection features prior to the 2003 wildfire, which burned the site causing the loss of several structures, was very different from the current status. Since the 2003 fire, the Salvation Army has implemented fuel modification (brush clearance) and has replaced burned buildings with new, ignition-resistant construction. The proposed project would include even stricter code requirements along with a more aggressive fuel modification area. *Section 5.0* below provides a discussion of proposed additional requirements and recommended measures that will reduce the potential hazard for deficient fire protection features.

4.1 Existing Water Supply and Fire Flow

- A 10,000-gallon water tank is situated north of the existing administrative building at an elevation 100 feet higher than the remainder of the camp.
- Fire flow – gravity fed, pressure varies by camp location.
- A 30,000-gallon swimming pool is located adjacent to the recreational field.

Salvation Army Divisional Camp Fire Protection Plan

- San Vicente reservoir is located 3.6 miles south of the camp.
- An approximately 3-acre pond is located adjacent to the property's southern boundary on an off-site parcel.
- An approximately 2-acre pond in Dos Picos Park is located 1.4 miles north of the existing administrative building.

4.2 Existing Fire Access

As mentioned, the site is accessed off Mussey Grade Road via an existing driveway road that includes intermittent paving and packed decomposed granite surface. From Mussey Grade Road, the site's primary access road passes through an existing gate and traverses 1.3 miles to the existing parking lot area. The road has been placed to take advantage of the terrain, following a natural drainage bottom area around steeper hillsides on either side until it enters a flatter meadow area approximately 0.5 linear mile from Mussey Grade Road. The road takes a sharp turn to the west before it terminates at a large paved parking area (*Appendix E*).

Alternative ingress/egress can be an important component to fire protection and safety. The project site does not include feasible secondary access for fire department apparatus. Access via existing site roads to the east and south all lead to Mussey Grade Road south of the main entrance and are not considered suitable secondary ingress/egress routes. Creation of secondary ingress/egress to the west and north is infeasible due to environmental, geological, ownership and financial considerations. . The site does not include a dedicated secondary access, but is providing same practical effect as described in this FPP to minimize potential impact to Mussey Grade Road and to minimize traffic on the site's access during a shelter-in-place emergency, enabling unencumbered fire department access to the site and to other properties along Mussey Grade Road.

4.3 Existing Building Fire and Ignition Resistance

The 28 structures currently existing at the camp were constructed with varying degrees of ignition resistance. Newer structures, constructed after the 2003 wildfires, are built in accordance with codes which require ignition-resistant construction. A very low percentage of homes (3%) built according to 2001 or newer codes were lost in the County during the Cedar fire. Maintenance facilities on-site are metal sided and fire proof. Older structures do contain some features consistent with ignition-resistant construction, but also include wood siding, unboxed eaves, and other potentially vulnerable features. These structures will be made safer by including interior sprinklers in attics and placement of 1/4-inch mesh in attic, eaves, and crawl space vents, along with enhanced fuel modification.

Salvation Army Divisional Camp Fire Protection Plan

4.4 Existing Fire Protection Systems

The following are the existing fire protection systems at the camp:

- Approximately one-half (14) of the 28 existing structures include interior fire sprinklers.
- Three fire hoses and outlet attachments are located throughout the camp's developed areas – fed by gravity from the camp's 10,000-gallon water tank.
- Smoking is prohibited on site.

4.5 Existing Defensible Space/Vegetation Management

Defensible space at the camp site consists of the following:

- Primary-access-road shoulder is mowed to the extent possible, including up to 100 feet in open meadow areas.
- Property perimeter is mowed, especially along north–south circulation road.
- Large grass fields are tilled along their perimeter and on their interior to break up light, flashy fuel continuity.

The following section details the fire safety requirements that will apply to the Salvation Army Divisional Camp proposed expansion project. All new structures will be constructed to RFD and County Fire Code standards, including assembly occupancy standards for high-occupancy structures.

5.0 FIRE SAFETY REQUIREMENTS

5.1 Fuel Modification Zones

5.1.1 Zones and Permitted Vegetation

As indicated in preceding sections of this FPP, an important component of a fire protection system is the fuel modification area. Fuel modification areas are designed to gradually reduce fire intensity and flame lengths from advancing fire by placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other on the perimeter of all structures and adjacent open space areas.

The fuel modification area is an important part of the fire protection system designed for this site. On this site, the fuel modification areas are at minimum twice the predicted flame lengths and up to 20 times wider than the predicted flame lengths in specific locations. The fuel modification area works in tandem with the other components of the fire protection system,

Salvation Army Divisional Camp Fire Protection Plan

including enhanced, ignition-resistive construction, interior sprinklers, infrastructure upgrades, and water supply, among others, to provide the ability for visitors to shelter-in-place within designated structures.

As discussed in the following sections, a minimum of 100 feet of fuel modification area is required by San Diego County and the state Public Resources Code in SRAs. The proposed fuel modification zones for Salvation Army were designed to meet the County and State requirement where flame lengths modeling results would allow at least twice the fuel modification area width as the highest predicted flame lengths. In other areas, where flame lengths were predicted to be higher, the FPP requires up to six times the width for actively managed fuel modification zones.

Fuel Modification Zones

The following recommendations are provided for fuel modification zones. These zones are presented graphically in *Appendix E*. In addition, an Approved Plant List is provided in *Appendix F*. Each zone would include permanent field markers to delineate the zones, aiding ongoing maintenance activities that will occur on site.

Structural Shelter-in-Place – Fuel Modification Width

Typical fuel modification widths in California and San Diego County for structures adjacent to the WUI are at minimum 100 feet and can be wider for steeper terrain and heavy, highly flammable fuels, such as chaparral. For shelter-in-place structures, it is prudent to provide more than 100 feet of fuel modification zone protection, up to as much as four times the predicted flame lengths. On the Salvation Army site, the longest flame length under worst case conditions is predicted to be 45 feet (*Appendix E*), primarily on the slopes to the north and west of the project site. Based on the terrain and other site-specific characteristics, the maximum fuel modification width prescribed for this site adjacent to the mixed chaparral is 175 feet in the steepest and heaviest fuel areas, such as just north of the cluster of buildings proposed in the northernmost area which is located to the south of a natural landform known as a “saddle.” Other areas are prescribed for the standard 100-foot fuel modification zone (*Appendix E*). In all cases, fuel modification zones that are a minimum of two times the predicted maximum flame length will be provided. In the highest severity areas, up to six times the flame length will be provided. Based on positioning of green areas, recreation fields, and other urbanized landscapes, fuel modification widths of 20 times predicted flame lengths have will be provided in some areas based on the positioning of low-flame length generating fuels (such as grass) adjacent to extensive irrigated and maintained areas (*Appendix E*).

The designated shelter-in-place structure, one of the largest facilities planned for the site, a 19,500-square-foot multipurpose structure, includes fuel modification zones equaling nearly six

Salvation Army Divisional Camp Fire Protection Plan

times the predicted flame length to the northwest of the structure and up to 20 times predicted flame lengths on the other exposures. This structure would accommodate up to 1,300 people, as calculated according to the CBC, Table 10-A, Building Code Section 1003.2.2. Based on the number of camp visitors and staff expected on site at any one time, there would be a surplus of shelter-in-place space that would be available to local residents of Mussey Grade Road in case of fire emergencies.

Zone 1 – Non-Flammable, Irrigated Zone (structure to 50 feet and open area safety zones)

Zone 1 is applicable site wide for every structure and is measured from the structure outward in all directions. It includes the following key components:

- Irrigated wet zone
- High-leaf-moisture plants as ground cover, less than 4 inches high
- No trees within 10 feet of structures
- Tree spacing of a minimum 10 feet between canopies
- No tree limb encroachment within 10 feet of a structure or chimney, including outside barbecues or fireplaces
- Tree maintenance includes limbing-up (canopy raising) 6 feet or one-third the height of the tree
- Shrubs less than 2 feet tall, on 5-foot centers
- Vegetation/Landscape Plan prepared and submitted in compliance with this plan.

Zone 2 – Non-Flammable, Reduced-Fuel Zone (51 to 100 feet from structure)

Zone 2 is applicable site wide for every structure and is measured from the structure outward in all directions. It includes the following key components:

- Ground cover less than 6 inches high
- Minimum 20 feet between tree canopies
- Shrubs less than 3 feet high, 20 feet on center
- Single-specimen native shrubs, exclusive of chamise and sage, may be retained 20 feet on center.

Salvation Army Divisional Camp Fire Protection Plan

Zone 3 – Modified Fuel Modification Zone for Shelter-in-Place and Highest Potential Hazard Areas (101 to 175 feet)

Zone 3 applies only to areas identified on the exhibit in *Appendix E* as requiring customized fuel modification zones. These areas, due to vegetation and terrain, indicate flame lengths as high as 45 feet during worst-case conditions. In addition, the primary shelter-in-place building proposed for this site would be provided extended fuel modification zones. This zone is meant to provide 50% thinning within the furthest extents of the fuel modification zone in the highest risk vegetation and terrain areas that are adjacent proposed construction on the Salvation Army site.

The shelter-in-place structure will receive 175 feet (six times predicted flame lengths) of fuel modification to the northeast, the side exposed to the wildlands, and much more than that in all other directions.

It includes the following key components:

- Ground cover less than 6 inches high
- No shrubs, except single-specimen native shrubs, exclusive of chamise and sage, 20 feet on center
- No trees, except sycamore (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), or Engelmann oak (*Quercus engelmannii*)
- No vegetation found on the Prohibited Plant List (*Appendix G*) shall be planted or remain in any Fuel Modification Zone.

Other Vegetation Management

Roadside Fuel Modification Zones

- All roads in the camp will be subject to flammable vegetation clearance for 10 feet on each side
- Flammable vegetation, including flammable shrubs and trees, shall be removed
- Canopies shall be interrupted to provide discontinuous fuels
- Grass shall be mowed to 4 inches stubble height
- Single specimens of trees, ignition-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.

Salvation Army Divisional Camp Fire Protection Plan

Trees may be placed within the Roadside Vegetation Management Zones. The following criteria must be followed:

- Tree spacing to be 20 feet between mature canopies (30 feet if adjacent to a slope steeper than 41%)
- Trees must be limbed up 1/3 the height of the mature tree or 6 feet, whichever is greater
- No tree canopies lower than 15 feet over roadways
- No tree trunks intruding into roadway width
- No trees shall be planted that are listed on the Prohibited Plant List (*Appendix G*)
- No flammable understory is permitted beneath trees
- Any vegetation under trees to be ignition resistive and kept to 2 feet in height or lower, and no more than 1/3 the height of the lowest limb/branch on the tree
- No tree limbs/branches are permitted within 10 feet of a structure
- No vegetation found on the Prohibited Plant List (*Appendix G*) shall be planted or remain in this zone.

Trail Vegetation Management

- A 10-foot vegetation modification zone is required on both sides of pedestrian/golf cart trails on the perimeter of the property.
- Ignition-resistive vegetation should be utilized, unless existing natural vegetation is needed for soil and slope stability and to prevent erosion.
- Grasses must be kept mowed to 4 inches or less.
- Certain trees may be planted if they are not prohibited in this plan. Approved trees include coast live oak, Engelmann oak (*Quercus engelmannii*), and sycamore (*Platanus racemosa*).
- Trees within vegetation management zones must be properly spaced and maintained with no flammable understory.

Central Green Spaces, Ball Fields, Parks

Fire-safe vegetation management is recommended within green spaces, parks, and open space areas in compliance with the guidelines in this plan.

- Flammable vegetation must be removed.
- Grasses must be maintained/mowed to 4 inches stubble height.

Salvation Army Divisional Camp Fire Protection Plan

- Types and spacing of trees, plants, and shrubs to comply with the criteria in this plan.
- Plant materials included in the Prohibited Plant List (*Appendix G*) are prohibited in this area.
- Areas shall be maintained free of downed and dead vegetation.
- Flammable vegetation and flammable trees shall be removed and prohibited.
- Trees to be properly limbed and spaced and not of a prohibited type (identified in this plan).

Pre-Construction Structure Locations

- Vegetation management on structure locations will not be required until construction begins, unless it is located within the fuel modification zone of a structure under construction or completed.
- Perimeter Vegetation Management Zones must be implemented prior to commencement of construction utilizing combustible materials.
- Prior to issuance of a permit for any construction, grading, trenching, or installation of fences, the outermost 30 feet of each structure location is to be maintained as a Vegetation Management Zone.
- Existing flammable vegetation shall be reduced by 60% on vacant lots upon commencement of construction.
- Dead fuel, ladder fuel (fuel which can spread fire from ground to trees), and downed fuel shall be removed and trees/shrubs shall be properly limbed, pruned, and spaced per this plan.
- The remainder of the Vegetation Management Zones required for the particular lot shall be installed and maintained prior to combustible materials being brought onto any lot under construction.

Environmentally Sensitive Areas/Riparian Areas

Fuel modification in environmentally sensitive areas will require approval from the County and the appropriate resource agencies (California Department of Fish and Game, U.S. Fish and Wildlife Service, Army Corps of Engineers) prior to any vegetation management activities occurring within those areas.

Salvation Army Divisional Camp Fire Protection Plan

Undesirable Plants

Certain plants are considered to be undesirable in the landscape due to characteristics that make them highly flammable. These characteristics can be physical or chemical.

The plants included in the Prohibited Plant List (*Appendix G*) are unacceptable from a fire safety standpoint, and should not be planted on the site unless otherwise approved by the RFD.

5.1.2 Fuel Modification Area Vegetation Maintenance

All fuel modification area vegetation management shall be completed annually by May 1 of each year and more often as needed for fire safety, as determined by the RFD. The Salvation Army shall be responsible for all vegetation management throughout the project site, in compliance with the requirements detailed herein and FAHJ requirements. The Salvation Army shall be responsible for ensuring long-term funding and ongoing compliance with all provisions of this FPP, including vegetation planting, fuel modification, vegetation management, and maintenance requirements throughout the Divisional Retreat camp site.

The Salvation Army shall obtain an inspection and report from a RFD-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 plan. This report will be funded by the Salvation Army and submitted to the County DPLU for Fire Marshal approval.

Construction Phase Vegetation Management

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

In addition to the requirements outlined above, the project will comply with the following important risk-reducing vegetation management guidelines:

- All new power lines shall be underground for fire safety during high wind conditions or during fires on a right-of-way that can expose aboveground power lines.
- Vegetation management zones cannot extend beyond the Salvation Army ownership without written, legal permission of off-site landowners, and shall not extend into biological open space or other sensitive biological areas, or other areas controlled by the County

Salvation Army Divisional Camp Fire Protection Plan

and/or resource agencies, without first having written formal permission from all applicable agencies.

- Caution must be used not to cause 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.
- All structures will be in strict ongoing compliance with all Fire District and DPLU Fire and Building Division requirements for Basic and Enhanced Fire Protection, as defined in Appendix II-A, Division II, Section 26, of the CFC.

5.2 Roads

5.2.1 Access

Site access will comply with the requirements of the CFC (Section 902.2). In summary:

Road widths and circulation

- All new roads will be constructed to current RFD and County Road standards, including minimum 24-foot road widths unobstructed by parking (902.2.2.1), and shall be improved with asphalt paving materials, except as noted where an all-weather decomposed granite surface will be used. There is one primary point of access with one additional ingress route available to the fire department. All interior residential streets will be designed to accommodate apparatus expected to respond, including water tenders. Roadways, including bridges, other than interior residential streets shall be designed to accommodate larger apparatus, such as dozer transports. Oak trees along primary access road cause the existing road to narrow at some locations, especially where it intersects drainages. The road narrows to 20 feet in these locations and this has been deemed acceptable to the RFD (*Appendix E*). The Ramona Water District requested and the County of San Diego granted an Exception to Road Standards (*Appendix J*).
- Parking will be restricted along interior circulation streets. All parking will be in designated parking areas. Parking will be restricted by posting of signs stating “No Parking; Fire Lane” to preserve the 24-foot unobstructed width for emergency response.

Secondary access

As previously described, secondary access is not necessary or feasible for this site due to logistical, topographical, or financial constraints. The project’s EIR presents a thorough discussion of the infeasibility of the Ramona Water District recommended secondary access. Consistent with County standards, same practical effect has been outlined within this FPP.

Salvation Army Divisional Camp

Fire Protection Plan

Interior Circulation Roads

- 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.
- Fire apparatus turnarounds to include turning radius of a minimum 28 feet, measured to inside edge of improved width, per County Fire Code.
- The longest dead-end road (cul-de-sac) shall not exceed 5,280 feet, per the County Fire Code and State Title 19. The Code prohibits dead-end roads (cul-de-sacs) exceeding the distances shown in *Table 6, Maximum Cul-de-Sac Lengths*, and secondary access from those points may be required.
- Minimum paved radius width for a cul-de-sac is 36 feet. It is recommended that cul-de-sac bulbs be posted “No Parking; Fire Lane.”
- Roadways and/or driveways shall provide fire department access to within 200 feet of all portions of the exterior walls of the first floor of the structures (all structures are sprinklered). **EXCEPTION** – Two cabins in the southwestern portion of the site exceed 200 feet from roads, up to 250 feet. A fire hydrant and a permanent 300 foot hose (1.5-inch thread, National Standard – or to RFD specifications) housed in an ignition-resistive storage structure will be provided as mitigation for the non-conformance.
- Cul-de-sac bulbs are required on dead-end roads in residential areas where roadways serve more than two residences.
- Roadside 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 shall not be installed or allowed to remain on roadways (RFD and County Fire Code).
- Vertical clearance of vegetation along roadways is required to be 13.5 feet. Proper maintenance is required to ensure that vegetation and trees on roadsides do not grow over or into the roadway and impede emergency apparatus access. No mature tree trunks shall intrude into the road. The type of vegetation shall be fire resistant and comply with this plan. Native oak and other trees along roads will be trimmed as necessary according to industry standards by a certified arborist and conducted outside of the migratory bird treaty act and breeding seasons.
- All interior circulation roads shall maintain a 10 foot buffer along either side where fuel modification/reduction is completed on an annual basis according to specifications

Salvation Army Divisional Camp Fire Protection Plan

provided in this FPP, consistent with the Exception to Roadway Standards, approved by the County.

- Angle of approach/departure shall not exceed 7 degrees (12%) per RFD, unless mitigated to approval by the Fire Chief.
- Applicant shall provide information showing the new roads, in a format acceptable to the Fire District, for updating of Fire District maps (County Fire Code, Section 902.5).
- Road grades will not exceed 15%, unless mitigated to approval by the Fire Chief (maximum 20%).
- A lighted map directory shall be provided at every intersection within the proposed project denoting, with numbers, the areas on site that the particular road leads to (Ramona Fire Department Fire Marshal requirement).
- A response map update in a format compatible with current department mapping shall be provided to the Ramona Fire Department (RFD Fire Code Ordinance).

**TABLE 6
Maximum Cul-de-Sac Lengths**

Zoned Parcel Size	Maximum Length
Less than 1 acre	800 feet
1 acre to 4.99 acres	1,320 feet
5 acres to 19.99 acres	2,640 feet
20 acres or larger	5,280 feet

5.2.2 Gates

Access gates will comply with County Fire Code and RFD, Section 902.2.4.3. Public roads shall not be gated, per the County Fire Code. Gates on private roads, such as that on the primary access road, shall comply with Fire District standards for electric gates, namely:

- Access gates will be equipped with a KNOX key switch, which overrides all command functions and opens the gate. Gates serving more than four parcels shall be equipped with sensors for detecting emergency vehicle “opticom” strobe lights from any direction of approach. Strobe detection and key switches shall be provided on the interior and exterior of gates.
- Switches shall be dual keyed, or two switches provided, for Fire Department and Law Enforcement.

Salvation Army Divisional Camp Fire Protection Plan

- Gate activation devices will be equipped with a battery backup or manual mechanical disconnect in case of power failure.

Further, it is recommended that the gate(s):

- Include area lighting and that the width of the gated area be 2 feet wider than the road that is gated.
- Be constructed from noncombustible materials.
- Have provisions for manual operation from both sides, if power fails. Gates shall have the capability of manual activation from the development side, via contact by a person or a vehicle (including a traffic pressure tripping loop).
- Be located 30 feet from any intersecting road.

5.2.3 Driveways

Any new structure that is 200 feet or more from a common road in the camp shall have a paved driveway meeting the following specifications:

- Grades shall be less than 20%.
- Approved fire apparatus turnaround with radius no less than 36 feet.
- Driveways serving two structures or less shall be 16 feet wide unobstructed and have a fire apparatus turnaround. Driveways serving more than two structures shall be 24 feet unobstructed.
- Lighted cabin addresses or identifying placards shall be posted at the entrance to each driveway.
- Driveway gates shall comply with this section.
- Driveways shall have 20-foot vegetation management zone on each side.

Identification of roads and structures will comply with RFD and CFC, Section 901.4.4.1, as follows:

- All structures shall be identified by structure identification (in lieu of street address) at the structure. Numbers shall be 4 inches in height, 0.375-inch stroke, and located 6 to 8 feet above grade. Addresses on other than residential buildings shall be 6 inches high with 0.5-inch stroke. Numbers will contrast with background.

Salvation Army Divisional Camp

Fire Protection Plan

- Multiple structures located off common driveways will include posting structure identification on structures, on the entrance to individual driveways, and at the entrance to the common driveway.
- If the structure is 100 feet from the roadway, structure identification should also be located at the entrance to the driveway.
- Access roads shall be completed and paved prior to issuance of building permits and prior to combustible construction occurring.

5.3 Structures

5.3.1 Ignition-Resistant Structural Requirements

This section outlines ignition-resistant construction (for all structures) that will meet the requirements of the RFD (California Fire Code) and the County Fire Code. The following construction practices respond to the requirements of the 2006 International Urban/Wildland Interface Code and Appendix 11-A, Division 11, “Suppression and Control of Hazardous Fire Areas,” of the County of San Diego Fire Code. These requirements include the Basic and Enhanced requirements found in Appendix II-A, Division II, Section 26, of the District and CFC, “Ignition-Resistive Construction in a Wildland/Urban Interface Area.” Enhanced construction requirements are included in the following list of “structural hardening” practices. Where “Section” is used, it refers to the Section in Appendix II-A, Division II, of the CFC and refers to the RFD Fire Code, as the requirements in each are virtually the same with the exception that the County Code includes more detail and a more comprehensive list of requirements.

Although not specifically noted, this section also addresses building ignition and fire resistance, as listed in Article 86 and Article 86-B (May 30, 2006) of the Fire Code, and Chapter 7-A (emergency supplement June 21, 2006). While these standards will provide a high level of protection to structures in this development, and should reduce or eliminate the need to order evacuations, there is no guarantee of assurance that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

1. Exterior walls of all structures shall be approved noncombustible (stucco, masonry, or approved cement fiber board) or ignition-resistant material (heavy timber) from grade to underside of roof system, per the Building Code. Wood shingle and shake wall covering is prohibited. Any unenclosed under-floor areas shall have the same protection as exterior walls. Wall coverings shall extend from top of foundation to the roof. The underside of any cantilevered or overhanging appendages and floor projections shall maintain the ignition-resistant integrity of exterior walls, or projection shall be enclosed to grade. The Fire Code allows 0.375-inch plywood or 0.75-inch drop siding if there is an underlayment of 0.5-inch

Salvation Army Divisional Camp Fire Protection Plan

fire rated gypsum sheathing tightly butted or taped and mudded (CFC Division II; Section 26.2.3).

2. If eaves are installed, eaves shall be properly constructed and enclosed as required in Section 26.2.5 and Section 29 of the CFC for enhanced ignition-resistive construction. Eave, fascia, and soffit construction shall be enclosed as required per DPLU Guide #198 for enhanced ignition-resistive eave construction. See *Appendix D* (County Fire Code, Section 29).
3. Two-inch nominal solid blocking shall be provided between rafters at all roof overhangs under exterior wall covering (County Fire Code, Section 26.3.3).
4. There shall be no use of paper-faced insulation or combustible installation in attics or other ventilated areas (RFPD Fire Code, Section 26.3.5, and County Fire Code, Section 26.2.8). Where older structures cannot meet this requirement, they will be mitigated with attic sprinklers, as described in the mitigating measures section of this FPP.
5. All roofs shall be a Class “A” listed and fire-rated roof assembly, installed per manufacturer’s instructions, to approval of the Fire District and the DPLU. Any openings on ends of roof tiles shall be enclosed to prevent intrusion of burning debris. When provided, roof valley flashings shall not be less than 0.016-inch (No. 28 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of No. 72 ASTM cap sheet running the full length of the valley (California Fire Code [CFC], Section 26.2.6, and CFC, Article 86-B, May 30, 2006; California Building Code [CBC] Chapter 7-A, June 21, 2006).
6. No attic ventilation openings or ventilation louvers shall be permitted in soffits, rakes, eaves, cornices, eave overhangs, or between rafters at eaves, or in other overhanging areas in the WUI area. Attic or foundation ventilation openings or ventilation openings in vertical walls or other similar ventilated openings shall be louvered and covered with corrosion-resistant metal screening or other approved material that offers equivalent protection. Vents are required to have a 0.25-inch mesh and shall not exceed 144 square inches each. Attic and foundation ventilation shall also comply with the requirements of the CBC, including emergency supplement Chapter 7-A, June 21, 2006, and CFC emergency supplement Article 86-B, May 30, 2006.
7. Vents shall not be placed on roofs unless they are approved for Class “A” roof assemblies or are otherwise approved by the FAHJ.
8. It is recommended that attic vents not face the non-maintained natural vegetation areas of the camp. Where vents must be positioned on the exposed side of structures, an alternative vent shall be used that includes low-profile wire mesh, such as a Harcon (manufacturer) vent or similar.

Salvation Army Divisional Camp Fire Protection Plan

9. Vents, such as roof vents, dormer vents, gable vents, foundation vent openings, vent openings in walls, or other similar vent openings, shall be covered with louvers and the required 0.25-inch mesh.
10. Turbine vents are not recommended.
11. Per CFC Section 26.2.1, glazing, including glass, or other transparent, translucent, or opaque glazing, or leaded glass, shall be one of the following: double pane, tempered, or glass block, or have a fire rating of 20 minutes. Plastic or vinyl window frames shall be of an approved type, which will not melt, ignite, or fail. Vinyl frames shall have welded corners and metal reinforcement in the interlock area to maintain integrity. They shall be certified to ANSI/AAMA/NWDA 101/I.S-2-97 structural requirements.
12. Skylights shall be tempered glass, in addition to all structures being sprinklered (RFD Fire Code, Section 26.3.2; CFC Section 26.2.2).
13. Rain gutters and downspouts shall be noncombustible and designed to prevent the accumulation of leaf litter or debris (CFC, Section 26.3.3, and CFC, Article 86-B).
14. Exterior doors shall be approved noncombustible or 1.75-inch solid-core wood or have a 20-minute fire rating. Windows within doors and glazed doors shall comply with Item 11 above (County Fire Code, Section 26.3.4).
15. Exterior balconies, carports, decks, patio covers, unenclosed roofs and floors, and similar architectural appendages (including gazebos, palapas, and large play structures) and projections shall be of approved noncombustible construction, approved fire-retardant wood, heavy timber (4-by-4-inch minimum with 6-by-6-inch posts; per consultant) or 1-hour fire-resistive construction. When such appendages and projections are attached to exterior fire-resistive walls, they shall be constructed to maintain the fire-resistive integrity of the exterior wall and shall have the same fire rating. The decking requirements in the CBC, Chapter 704A.4, June 21, 2006, shall also be followed.
 - i. There shall be no decks or overhangs over slopes. Decks will be constructed to the same ignition-resistive standards as the primary structure.
 - ii. There shall be no combustible awnings, canopies, or similar combustible overhangs (excluding heavy timber construction).
16. No wood fences shall be allowed.
17. All chimneys and other vents on heating appliances using solid or liquid fuel, including outdoor fireplaces and permanent barbecues and grills, shall have spark arrestors of a type approved by the Fire District and shall comply with the RFD Fire Code and the County

Salvation Army Divisional Camp Fire Protection Plan

Fire Code. The code requires that openings be maximum 0.5 inch. Arrestors shall be visible from the ground (Division 11, Appendix 11, Section 7, RFD and County Fire Code).

18. The structures will be set back as required by the County Building Code and DPLU requirements.
19. Liquefied petroleum gas (LPG) tanks (except small barbecue and outdoor heater tanks), firewood, storage sheds, and other combustibles shall be located at least 30 feet from structures and 30 feet from flammable vegetation. There shall be no flammable vegetation under or within 30 feet of LPG tanks or tanks shall be enclosed in an approved ignition-resistant enclosure with 10 feet clearance of flammable vegetation around it.
20. Storage sheds, barns, and outbuildings shall be of approved noncombustible construction (including heavy timber) with noncombustible Class A roofs that do not increase the risk of ignition to the primary structures.

Additionally, any of the above-listed detached structures that are 200 square feet or more in size shall be equipped with automatic fire sprinklers. Locations and required fuel modification zones will be subject to approval of Fire Marshal and the Building Official based on the size of the structure.

5.3.2 Fire Protection Systems

Infrastructure, Structural Fire Protection, and Fire Protection Systems

WUI fire protection requires a systems approach, which includes the components of vegetation management, structural safeguards (both previously addressed), and adequate infrastructure. This section provides recommendations for infrastructure components.

Infrastructure Requirements

The following recommendations are made in order to comply with RFD requirements, Chapter 47 of the County Fire Code; Chapter 7A, County Building Code, and nationally-accepted fire protection standards including the 2006 International Wildland-Urban Interface Code, as well as consultant's recommendations to assist in providing reasonable on-site fire protection. The applicable County Fire Code sections are listed.

Water supply requirements include (RFD Fire Code and County Fire Code, Section 903.3.2):

Salvation Army Divisional Camp Fire Protection Plan

Fire Hydrants

- Hydrant type and locations shall be subject to RFD approval and shall be located on the normal Fire Apparatus response side of the road.
- Hydrants shall have one 2.5-inch outlet and one 4-inch outlet and be of bronze construction per the County/District Fire Code. Hydrants at dining hall, multipurpose building, and retreat center lodging buildings to have one 4-inch outlet and two 2.5-inch outlets. Dry barrels may be necessary due to freezing and shall be installed to RMWD standards. The project engineer shall make this determination. *Appendix E* provides locations of fire hydrants proposed for the camp.
- The water system is public and metered by the Ramona Municipal Water District. *Appendix K* includes a letter prepared by NASLAND Engineering (November 2007) describing the water availability and fire flow analysis conducted for this project. Also, results of the hydraulic analysis conducted by the Ramona Municipal Water District Department of Engineering referred to in the NASLAND letter of the water system in Mussey Grade Road are detailed in a January 23, 2002 Report (RMWD Project Number 10022-1).

Based on that report, and as described in the NASLAND Engineering letter, The Ramona Water District's public water main in Mussey Grade Road is currently not adequate to effectively fight wildfire. As such, RMWD set and approved water system requirements for the campground expansion. Requirements include a 260,000 gallon tank connected to the existing main in Mussey Grade Road through two pipeline extensions in a five valve package. The water tank and all pipelines and appurtenances connecting to the main are to be public, dedicated to the RMWD. The water tank will be placed at an elevation of 1,665 feet AMSL (approximately 70 to 100 feet higher than the remainder of the camp near the existing 10,000-gallon tank, which will remain in service. The water will be delivered to the Salvation Army Camp buildings via a 10-inch main (private).

The proposed 260,000 gallon tank is larger than needed for the campground alone. In fact, the tank size is based on supplying both domestic and fire needs of all existing properties in the 2,217 acre service area between the campground and the end of the line at Fernbrook. Thus, the residents of the Mussey Grade Road corridor will benefit from the improved water pressure, availability and fire flow. The 2002 study report prepared for RMWD concluded that implementation of the water improvements associated with Salvation Army's project improves the Mussey Grade Road community water distribution system in several ways including:

- Dramatically improves the fire flow to the Mussey Grade Road fire hydrant locations

Salvation Army Divisional Camp Fire Protection Plan

- Allows for greater operational and emergency water storage should pipeline breaks or shut-downs occur
- Eliminates the need for the Mussey Grade pressure reducing valve
- Application of CBC fire flow calculations result in a 240,000-gallon requirement, assuming a Type III, 1-hour rated building, without applying the reduction available for an automatic fire sprinkler system. The code allows for up to a 75% reduction for sprinklers, subject to FAHJ approval.
- Fire flow in the mains for residential occupancies shall be at least 2,000 gpm in fire mains with a 20 psi residual at periods of maximum peak domestic demand. Fire flow for the multifamily, resort, and commercial occupancies shall be a minimum of 2,500 gpm in fire mains and shall be per Fire Code Table A-111-A-1 with a 50% credit for sprinklers. Duration of flow shall be 2 hours or more if required by the table based on the required flow. The amount of stored water for fire protection shall be for the required duration (minimum 2 hours) at the worst-case fire flow at times of maximum peak domestic and commercial demand (including farming). In addition, fire protection water systems should comply with AWWA Standard M-31, “Distribution Requirements for Fire Protection.”
- Prior to the issuance of building permits, the applicant shall submit to the County plans demonstrating a water system capable of handling the fire flow requirements – existing and proposed buildings (EIR page 2.3-4).
- Prior to issuance of building permits, the appropriate number of fire hydrants and their specific locations, approved by the County Fire Marshal, will be identified and they will be constructed accordingly (EIR page 2.3-4).
- Fire service laterals, valves, and meters will be installed on site as required by the Fire Marshal.
- Reflective blue dot hydrant markers shall be installed in the street to indicate location of the hydrant.
- Crash posts will be provided where needed in on site areas where vehicles could strike fire hydrants, fire department connections, etc.

Fire Sprinklers

- All structures, of any occupancy type, are required by the Fire District to have internal fire sprinklers. (Small sheds under 200 square feet may be exempted by Fire District.) Per the Fire District and Fire Code Section 1003.2: All single and multiple residences and attached garages or carports (less than 10 feet separation), and all other structures, shall have NFPA 13 internal fire sprinklers (RFPD requirement including Fire Code, Section 1003.2.12).

Salvation Army Divisional Camp Fire Protection Plan

One- and two-family residences may have NFPA 13-D systems. Residential structures 7,000 square feet and larger may be required to have a four-head calculation.

- Other occupancies, such as the dining hall, the multipurpose building, and the four large (10,800-square-foot) retreat area structures, as well as other cabin structures intended for 20 or more guests (up to 30 structures on this site), shall have a sprinkler system in compliance with UBC standard 9-1 or NFPA 13, per the District Fire Code Section 1003.2.9.1.
- Actual system design is subject to final building design and the occupancy types in the structure. All other occupancies in this development shall have fire sprinklers in compliance with the Fire District requirements and NFPA 13.
- All systems for structures larger than 7,000 square feet or accommodating 20 or more visitors to be remotely supervised by an approved 24/7 alarm company.
- A pressure of more than the minimum 20 psi will most likely be needed to supply fire sprinklers in certain structures, and definitely in the resort building. This must be determined in the water system design phase.

Fire Alarm Systems

- All residential units shall have electric-powered, hard-wired smoke detectors in compliance with Ramona Fire Code and County Fire Code.

Facility-Wide Alarm System

- There shall be a suitable, manually-activated, facility-wide emergency alarm system which is audible throughout the camp, such as a public address system or siren. The system shall have emergency power supply, will function as an alert system to be heard by all occupants and visitors, notifying them of an emergency situation such as a structural fire or wildfire, and will be a component of the regular fire emergency training and drills.

5.3.3 Additional Requirements and Recommendations Based on Occupancy Type

This section includes conceptual occupancy-specific recommendations based on the type of occupancy.

Additional Dining Hall/Multipurpose Building/High-Occupancy Building Requirements and Recommendations

- The multipurpose building (19,500 square feet) will be properly designed, as outlined in this FPP, to serve as a “shelter-in-place” structure as one of several measures providing “same practical effect” as two access roads. The building will accommodate up to 1,300

Salvation Army Divisional Camp Fire Protection Plan

people, according to the CBC. The structure shall include features to assist staff and visitors with communication and status updates, including:

- Several large-panel television monitors located where those interested may discreetly track newscasts during a wildfire event
 - Large computer monitors and capable computers for tracking fire incident status
 - Several computer terminals available for communicating via e-mail
 - Back-up power – battery banks that are “float” maintained and/or supported by solar panels
 - Second utility source or U.L.-rated diesel generator.
- The fire sprinkler system and valves will be remotely supervised to an approved alarm company. The riser and valves will be located on the exterior or in a 1-hour rated room directly accessible from the exterior.
 - The fire department sprinkler connection to be located at about 4 to 10 feet in from the curb of the main access road in front of the main building, 40 feet or more from building. A fire hydrant shall be located within 50 feet of the connection.
 - Approved 4-foot-wide firefighter foot and gurney access is needed to pool and recreation areas, from the closest parking location for an emergency vehicle.
 - A swimming pool fitted with a dry hydrant or a diesel powered portable firefighting pump should be maintained for additional fire fighting water supply.
 - There shall be no on-site, dead-end roads over 150 feet in length unless there is an approved fire truck turnaround.
 - Firefighter access doors should be provided at least every 100 feet around the perimeter of buildings.
 - There will be a Fire-District-approved method of smoke removal from buildings.
 - There should be 6-foot-wide firefighter access paths around the perimeters of buildings.
 - Hydrants, post-indicator valves, and fire department sprinkler connections will have adequate vehicle crash protection.
 - Restaurants shall have the appropriate fire-extinguishing systems where required for cooking operations.
 - Elevators and controls, if any, will be to Fire District approval.
 - Supervised smoke detection will be provided.

Salvation Army Divisional Camp Fire Protection Plan

- Manual fire alarms should be provided.
- Emergency announcement system should be provided if applicable to final design of buildings.
- Building identification will have minimum 6-inch-high characters with 1/2-inch stroke.
- All buildings to be clearly numbered with lighted characters readable from the access road.
- There will be a KNOX key box at main entrance
- There will be fire extinguishers as required.
- Occupancy design and layout will comply with the District Fire Code and Building Code.
- Vegetation management is required. Planting palettes and landscape plans will be subject to approval and are to comply with the Vegetation Management Criteria in this plan.
- All actual plans shall be to approval of the Fire District.
- There will be at least two exits to the exterior from each classroom with occupancy capability of over 30 students, and one exit for classrooms with occupancy capability of up to 30 students.
- Any bus storage, maintenance, and fueling operations to comply with the District Fire Code and be approved by the Fire District.
- Smoking will continue to be prohibited on site.
- Yurt structures and tent-like structures shall have metal skirting similar to that found on trailers or mobile homes.
- Two aboveground diesel and gasoline fuel storage tanks will be located at the proposed maintenance facility. The storage tanks shall be located in an aboveground ConVault system, which is a concrete enclosed structure equivalent in safety to an underground tank. The fuel modification around this ConVault tank system shall be 30 feet where all vegetation will comply with Zone 1 and will include no vegetation 10 feet in any direction.

6.0 EMERGENCY PLANNING

The RFD and the project EIR identify the following conditions for the Salvation Army Divisional Camp:

When children are attending camp, there shall be two large-capacity buses (60 people each) with drivers or other equivalent vans or buses on the premises (EIR page 2.3-5).

Salvation Army Divisional Camp Fire Protection Plan

The Salvation Army shall conduct a fire drill the first day of every camp period (EIR page 2.3-5).

The RFD has agreed to and shall observe an annual fire relocation drill/fire drill exercise to ensure proper safety measures have been implemented. After this annual observation and review, the fire department may require more than two large capacity school buses with drivers to be available to the camp for relocation purposes. One or more additional buses may be required to protect family or adult campers who were transported to the camp by bus or van. The RFD may also require other protective measures (EIR page 2.3-5). Camp staff shall receive annual training to coincide with the fire relocation drill. RFD shall provide training on various aspects of structural and wildfire emergencies.

Although wildfires can occur any time of the year, they are more likely to become uncontrollable during the period of September to February, coinciding with the Santa Ana winds. The proposed project could accommodate 615 persons, but the typical camp population during the period of September to February will be much lower, around 200 persons, as children would be in school during this period.

6.1 Salvation Army Emergency Response Procedures

The preceding conditions have been incorporated into the Salvation Army Emergency Procedures document (*Appendix I*). The emergency procedures document has been accepted by the RFD and is signed by the Fire Marshal.

The Salvation Army Divisional Camp is and will continue to be accredited by the American Camping Association. Requirements for this accreditation include written procedures specific to the site for various topics including response to storms, earthquakes, fire, or other emergencies. Written materials can be found posted within buildings throughout the camp.

6.2 Relocation

As identified in the approved Emergency Procedures Document, in case of fire, the preferred plan is relocation, assuming that sufficient time is available to relocate visitors and staff from site without impacting Mussey Grade Road. The plan includes policies and procedures to prevent serious fire risks, as well as a Fire Emergency Plan that details the relocation plan and emergency transportation plan.

The camp and its structures will be designed and constructed to withstand significant wildfire. Nevertheless, early notification of the camp administrators and subsequently of camp staff and visitors is critical to the timely and safe relocation to the designated evacuation areas. As

Salvation Army Divisional Camp Fire Protection Plan

realized during the October 2007 wildfires in San Diego County, evacuation of very large numbers of people can be accomplished successfully by the reverse 9-1-1 system and a conservative trigger point for initiating the evacuations. In the same manner, when conditions are such that distant wildfire may move toward the Mussey Grade Road area, evacuations will occur allowing as much as several hours to a day or more notice. There will not be a situation where evacuations occur as a last minute decision because in that scenario, shelter-in-place would be the selected action for the camp's visitors and personnel. The camp director will regularly communicate with RFD and undergo training for the rare occurrence that a decision regarding evacuation or shelter-in-place has to occur without RFD input. As such, the decision will be made by an informed individual considering numerous factors.

On the first day of every camp period including new campers, the Salvation Army will conduct a fire relocation/fire drill to train campers on what to do during a wildfire and where to assemble (CCR Title 19, section 3.13 c.). This drill will be observed by the RFD at least annually. RFD may require Salvation Army to revise the procedure as necessary to provide the most efficient and safest relocation process.

If a relocation of camp staff and visitors is required, the following procedures would be followed.

Since relocation of the camp and its visitors, at maximum usage, may require in excess of an hour, if adequate time is not available, the decision to remain in the shelter-in-place site will be made by the camp director or his appointed staff person, with the assistance of fire and law enforcement personnel, and relocations will cease. Relocations/evacuations will occur much as they did during the October 2007 San Diego County wildfires with OES personnel monitoring fire occurrences, weather forecasts, and fire behavior models to conservatively issue evacuations well in advance of wildfire direct threat to a particular area. Local residents of Mussey Grade Road who may not have a designated safe site will also be directed to the shelter-in-place facility, possibly by the Reverse 9-1-1 system but also by information dissemination throughout the year notifying local residents of the shelter-in-place option being provided.

A traffic study prepared by Linscott, Law and Greenspan Engineers (2007) assesses the impact the camp's visitors and staff may have on Mussey Grade Road during a wildfire emergency. The results indicate that the anticipated increased volumes with the camp expansion are still well within the capacity of Mussey Grade Road. More detail is provided in the project's EIR prepared by BRG Consultants.

Salvation Army Divisional Camp Fire Protection Plan

In an effort to reduce the impact on Mussey Grade Road, two large-capacity buses (120 total people, 60 people each) would be stationed at the camp at all times. These buses, along with other vans and personal vehicles, could be utilized during a relocation effort.

- Designated camp buses, vans, and passenger cars would be mobilized and loaded with camp visitors and staff. Again, this would occur over the course of hours as relocation/evacuation would only occur when substantial time is available to safely relocate people.
- The vehicles would exit the site via the primary site access off Mussey Grade Road.
- The vehicles would convoy north on Mussey Grade Road to the Ramona United Methodist church at 3394 Chapel Lane (Hwy 67 and Dye Road).
- Once unloaded, and given an update on the situation, the vehicles would either proceed back to the camp to relocate additional staff or remain at the church if conditions would not warrant a return.
- As long as conditions warranted return trips to relocate campers, the vehicles would make the approximately 12- to 15-minute round trip until all staff and visitors were relocated.
- If the maximum 640 people were on site and were to be relocated, between buses, vans and personal vehicles, it is estimated that 150 people could be relocated each trip. Round trip from Salvation Army Divisional Camp site to the United Methodist church and back requires approximately 12 to 15 minutes with open roads. At that rate, the camp staff, visitors, and campers could be relocated within approximately 1 hour.
- Persons relocated to the Church would be temporarily housed at the church until they could return to the camp or were relocated to their respective homes outside the area at risk.

6.3 Sheltering in Place

If relocation is not an option due to lack of adequate time availability, as determined by the RFD, other fire personnel, or camp administrators, the camp will implement the shelter-in-place (SIP) alternative.

Typically, an organized camp like Salvation Army's has a population that readily accepts instruction regarding safety rules, including fire requirements and the concept of "shelter-in-place". Under almost all circumstances, camps have leadership in place via camp counselors or group leaders. Mandatory orientation is provided within the first 24 hours (CCR Title 19 section 3.13) regarding the fire threat, the alarm signal (which is physically demonstrated), and the appropriate actions to take when campers hear it. Because the site is isolated, individuals are less

Salvation Army Divisional Camp Fire Protection Plan

likely to think they can “find their own way to safety” compared with a suburban or city setting, and thus, more accepting of direction including actions for SIP.

As detailed in this FPP, the project features, including site-specific fuel modification zones, enhanced, ignition-resistant construction, interior sprinklers, and infrastructure improvements is designed to provide safe areas for sheltering during a wildfire.

Because shelter-in-place is a relatively new concept, and to avoid the possibility that campers ignore shelter-in-place orders, Salvation Army will institute the following protocol for all visitors to the site as a means to enforce shelter-in-place when it is designated the safest alternative:

- Language will be added to contracts for groups who may rent facilities on the site indicating that during wildfire emergencies, licensed drivers may be precluded from their vehicles if shelter-in-place is required. The contract will include explanation that in the rare event that shelter-in-place is required, visitors will be safer in the multi-purpose room than attempting to evacuate the site.
- Educational material will be provided and thoroughly presented to visitors regarding the shelter-in-place capabilities of the multi-purpose room and the strict requirement that they follow directions in the event of an emergency.
- In a wildfire emergency requiring shelter-in-place, camp staff will proactively gather individuals and direct them to the shelter-in-place site and away from parking areas.

The multipurpose building has been identified as a large-capacity building that will be used for shelter-in-place. The building offers 19,500 square feet of interior space, which could easily accommodate the maximum 615 persons that may be on site. The structure could accommodate up to 1,300 persons according to the CBC. As such, residents from the Mussey Grade Road area could relocate to this structure during a wildfire emergency. Although the preferred shelter-in-place scenario includes temporarily housing all persons in the multipurpose building, all of the site’s structures will be built to the same standards and provided maintained fuel modification areas and could be used for temporary shelter, in an extreme situation.

As mentioned, additional amenities provided the SIP structure include:

- Several large-panel television monitors discreetly located so those that are interested may track newscasts during a wildfire event
- Large computer monitors and capable computers for tracking fire incident status
- Several computer terminals available for communicating via e-mail
- Back-up power – battery banks that are “float” maintained and/or supported by solar panels

Salvation Army Divisional Camp Fire Protection Plan

- Second utility source or U.L.-rated diesel generator
- Emergency preparedness kits to make brief shelter-in-place stay as comfortable as possible and including medical related equipment (i.e., supplemental oxygen, pain relievers, inhalers, etc.).

The Salvation Army Camp, following implementation of the requirements in this FPP, will provide its staff, campers, and visitors safe areas for sheltering during a wildfire. In addition, the facility will provide an available safe area for community members whose properties do not include the enhanced, fire-resistant construction and fuel modification features found on the Salvation Army Camp site. Additionally, should traffic on Mussey Grade Road during an emergency become slowed or blocked, the camp site will be an alternative relocation site, if necessary.

SIP requires all components of the system be maintained and in place. This FPP, when approved, provides the direction and nexus for that maintenance to occur. Specifically, the RFD will conduct 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. Hence, the SIP system will be functional at all times. A deed encumbrance detailing the conditions contained in this FPP shall be filed ensuring performance by current and subsequent purchasers. Modifications of the deed encumbrance shall be subject to fire department approval.

6.4 Wildfire Scenario

The following abbreviated outline provides a summary of what will occur from the moment a fire is reported to the local fire authority.

Wildfire call to 911

1. Fire authority notification of wildfire in jurisdiction, determination of activation of County's mass notification system.
2. Mass notification system activated – all telephone numbers within district notified via computer of the fire situation. System capability: 6,666 calls per minute, 400,000 calls per hour, capable of sending text messages and emails. There are approximately 100 residences along Mussey Grade Road; they could all be notified in less than 1 minute. The new system was operational in September 2007.
3. Salvation Army receives notification call within 1 minute of fire reporting.
4. Salvation Army manually activates its warning siren, notifying all campers, staff, and visitors of an emergency.

Salvation Army Divisional Camp Fire Protection Plan

5. Salvation Army’s internal emergency planning proceeds with all campers gathering in the designated SIP structure (multipurpose building), registries checked to ensure all accounted for.
6. If relocation required, Salvation Army follows its internal relocation plan and buses students to Ramona United Methodist Church, the designated relocation area away from fire, requiring approximately 1 hour for 641 people.
7. If shelter-in-place required, all campers and students are relocated to the designated multipurpose SIP building.
8. If contact with Fire Authority not possible, Salvation Army Camp Director or designated administrators determine location of fire and based on weather, makes determination to relocate or shelter-in-place—shelter-in-place would be the preferred reaction when unsure of fire location or spread.

7.0 SAME PRACTICAL EFFECT FOR NON-CONFORMING SECONDARY ACCESS

The mitigation measures provided in this FPP are designed to provide *same practical effect* for lack of conforming secondary access (County Fire Code and CCR Title 14 “SRA Fire Safe Regulations” section 1273.09). The concerns for secondary access include fire- or traffic-blocked resident egress and delayed or denied firefighter ingress. As such, the mitigation measures provided in this FPP include shelter-in-place construction, fuel modification standards, landscape plan reviews and approvals, annual landscape inspections and enforcement, and improved water capacity, supply and fire flow. The goal of the mitigating measures is to reduce the reliance of the camp on the primary access and lessening impacts on Mussey Grade Road by enabling the camp to keep visitors on site if necessary during a wildfire emergency. To that end, when sufficient relocation time is not available to ensure safety of camp visitors and Mussey Grade Road residents, the camp will provide shelter-in-place in a large multipurpose building that can accommodate up to 1,300 people. Shelter-in-place will be a second alternative to relocation, used only when wildfire occurs very near the camp and with weather conditions favorable to fire spread, but on this site, will be a viable option for campers, staff, visitors, and local residents. These measures achieve *same practical effect* by passive and active protection measures. These measures are proven to reduce fire spread, reduce radiant heat from burning landscaping, reduce the likelihood that fire will impinge on a structure, and minimizes risk to persons from interior fire. The summary in *Table 7* provides a brief description of the non-conforming impact and the measures provided for *same practical effect*.

Salvation Army Divisional Camp Fire Protection Plan

TABLE 7
Same Practical Effect for Non-Conforming Impact

Mitigation Measures for Non-Conforming Secondary Access
<p>County Fire Code and Building Code Requirements that assist in providing mitigation for secondary access due to their design for reduction of structure flammability:</p> <p>Enhanced, ignition-resistive construction including "Shelter-in-Place" components – all structures:</p> <ul style="list-style-type: none"> • Life Safety Interior sprinklers • Exterior fire-rated walls exceeding standards • Glazing, dual pane, tempered • Vent design, size, and placement • Appendage restrictions • Others per County and RFD Code.
<p>One designated shelter-in-place building –19,500 square feet that can accommodate up to 1,300 persons in an emergency. Available to the 641 campers and staff as well as the local residents off Mussey Grade Road.</p>
<p>Fuel Modification Zone Extension or Irrigated Zone Extension at highest risk locations to as much as six times the predicted flame length with a minimum of two times predicted flame lengths.</p>
<p>Upgraded public water supply and fire flow exceeding requirements and providing for an improved water situation throughout the Mussey Grade Road area.</p>
<p>Funded annual inspection/enforcement of fuel modification zone restrictions, requirements, maintenance by RFD.</p>
<p>Improved primary ingress/egress with road widening and paving.</p>
<p>RFD-approved Emergency Response Preparedness Document with camper and visitor training and fire department annual drills.</p>

8.0 CONCLUSION

This FPP is submitted in support of an application for renewal of a Major Use Permit for the expansion of the operation of the Divisional Retreat Camp operated by the Salvation Army. It is submitted as required in compliance with Ramona Fire Department’s and the County of San Diego’s conditions for the FPP requirement. The recommendations in this document meet fire safety, building design elements, fuel management/modification, and landscaping recommendations of the County of San Diego and RFD, unless otherwise stated herein. Non-conforming elements have been provided *same practical effect* mitigation measures. Fire and Building Codes and other local, county, and state regulations in effect at the time of each building permit application supersede these recommendations unless the FPP recommendation is more restrictive.

The recommendations provided in this FPP have been designed specifically for the proposed construction of structures adjacent the WUI zone at the Salvation Army Divisional Camp project site. The project site’s fire protection system includes a redundant layering of protection methods that have been shown through post-fire damage assessments to reduce risk. For wildfire emergencies, the first and preferred alternative will be relocation from the site, as overwhelmingly successfully occurred in many parts of San Diego County during the October

Salvation Army Divisional Camp Fire Protection Plan

2007 wildfires. This will be accomplished by early warning via mass notification or Reverse 9-1-1 and through a planned relocation/evacuation protocol utilizing high-capacity buses that will be stationed on site at all times campers are present. Relocation will be the first alternative for Salvation Army but will be implemented through camp administrators' consultation with RFD or other fire officials to minimize the likelihood that campers or staff would be exposed to high risk during the relocation process.

When relocation is not feasible, shelter-in-place will be the implemented alternative. All structures on the site will be constructed to the latest codes, including ignition-resistant exterior walls, roofs, eaves, and vents and interior sprinklers. Older structures will be made safer with retrofitting with specific measures, such as vent protection and sprinklers. One structure in particular will be designated the site's shelter-in-place facility: a 19,500-square-foot multipurpose building will be provided additional ignition-resistant features, communications capabilities, and fuel modification (from six to 20 times as wide as the predicted flame length heights) and would accommodate up to 1,300 persons. Because this SIP structure would accommodate a substantially higher number of people than are expected on site at any given time, it would be available to shelter local residents who may need refuge from advancing wildfire. There are also two large open air areas of modified fuels that would be available to emergency first responders for helicopters, staging areas or other discretionary use.

Fuel modification would occur throughout the site and would be at minimum 100 feet wide and range to over 600 feet wide. Portions of the development area that are exposed to the western foothills, where the highest intensity fire and highest flame lengths were modeled to occur, would be provided 175 feet of fuel-modified defensible space (nearly four times the predicted flame lengths) to set back the structures from the modeled 45-foot-tall flame lengths. The FMZ will be maintained and inspected annually, removing all dead and dying materials and maintaining appropriate horizontal and vertical spacing. In addition, plants that establish or are introduced to the FMZ that are not on the approved plant list will be removed.

The development is designed to enable emergency personnel access to the site with the required road improvements (widening, paving) and additional on-site roadways. Water availability and flow would be improved with additional fire hydrants throughout the camp and the 260,000-gallon water tank fed by the Ramona Municipal Water District and to be dedicated to RMWD as a public system.

Ultimately, it is the intent of this FPP to guide, through code and mitigation requirements, the construction of structures that are defensible from wildfire and, in turn, do not represent significant threat of ignition source for the adjacent native habitat. It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions

Salvation Army Divisional Camp Fire Protection Plan

and mitigating actions identified in this report are designed to reduce the likelihood that fire would impinge upon the proposed structures. There are no guarantees that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property. Implementation of the required enhanced construction features provided by the applicable codes and the mitigating fuel modification requirements provided in this FPP will accomplish the goal of this FPP to assist firefighters in their efforts to defend these structures and reduce the risk associated with this project's WUI location.

9.0 REFERENCES CITED

- Anderson, Hal E. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. USDA Forest Service Gen. Tech. Report INT-122. Intermountain Forest and Range Experiment Station, Ogden, UT. http://www.fs.fed.us/rm/pubs_int/int_gtr122.pdf
- Andrews, Patricia L.; Bevins, Collin D.; Seli, Robert C. 2004. BehavePlus fire modeling system, version 3.0:User's Guide. Gen. Tech. Rep. RMRS-GTR-106 Ogden, UT: Department of Agriculture, Forest Service, Rocky Mountain Research Station. 132p.
- Finney, M. A. 1998. FARSITE: Fire Area Simulator—model development and evaluation. Res. Pap. RMRS-RP-4, Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 47 p.
- Finney, M.A. 2004. FlamMap 3.0. Missoula, MT: USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory.
- Fire and Resource Assessment Program (FRAP). 2007. California Department of Forestry and Fire Protection. Website Accessed July 18. <http://frap.cdf.ca.gov/>
- FireFamily Plus. 2002. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 124 p
- Keeley, J.E. 2005. Fire history of the San Francisco East Bay region and implications for landscape patterns. *International Journal of Wildland Fire* 14:285-296. http://www.werc.usgs.gov/seki/pdfs/K2005_East%20Bay%20Fire%20History_IJWF.pdf
- McCreary, D. D. 2004. *Fire in California's Oak Woodlands*. University of California Cooperative Extension. Integrated Hardwood Range Management Program. 8 pp.
- Minnich, R.A. 1983. Fire mosaics in Southern California and northern Baja California. *Science*. 219:1287-1294.

Salvation Army Divisional Camp Fire Protection Plan

- Minnich, R.A. 1987. Fire behavior in Southern California chaparral before fire control: the Mount Wilson burns at the turn of the century. *Annals of the Association of American Geographers*. 77(4): 599-618.
- Minnich, R.A. and Chou Y.H. 1997. Wildland fire patch dynamics in the chaparral of Southern California and northern Baja California. *International Journal of Wildland Fire*. 7(3): 221-248.
- Moritz, M.A. 2003. Spatiotemporal analysis of controls on shrubland fire regimes: age dependency and fire hazard. *Ecology*. 84(2):351-361. http://nature.berkeley.edu/moritzlab/docs/Moritz_2003_Ecology.pdf
- Moritz, M.A., J.E. Keeley, E.A. Johnson, and A.A. Schaffner. 2004. Testing a basic assumption of shrubland fire management: How important is fuel age? *Frontiers in Ecology and the Environment* 2:65-70. <http://www.werc.usgs.gov/seki/pdfs/Link4106.pdf>
- Pavlik, Bruce M. Muick, Pamela C. Johnson, Sharon G. and Popper Marjorie. 1991. Oaks of California. Cachuma Press, Los Olivos, CA.
- Remote Automated Weather Stations (RAWS). 2007. <http://www.fs.fed.us/raws/>
- Rothermel, Richard C. 1983. *How to Predict the Spread and Intensity of Forest and Range Fires*. USDA Forest Service Gen. Tech. Report INT-143. Intermountain Forest and Range Experiment, Ogden, UT. <http://www.treesearch.fs.fed.us/pubs/24635>
- Shroeder, MJ. and C.C. Buck. 1970. Fire weather – A guide for application of meteorological information to forest fire control operation. USDA Forest Service Agricultural Handbook 36D.
- Scott, Joe H.; Burgan, Robert E. 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.
- Weise, D.R. and Regelbrugge, J. 1997. Recent chaparral fuel modeling efforts. Prescribed Fire and Effects Research Unit, Riverside Fire Laboratory, Pacific Southwest Research Station. 5p.
- Wright, H. E. and M. L. Heinselman. 1973. The ecological role of fire in natural conifer forests of western and northern North America; Introduction. *Quaternary Research* 3:317-328.

APPENDIX A-1

Third-Party Reviewer Endorsement

INTENTIONALLY LEFT BLANK

Viking Research
2650 Latigo Dr.
Solvang, California 93463
vikingresearch.net

Michael Huff, Manager
Urban & Community Forestry/Wildfire Prevention Planning
Dudek
605 Third Street
Encinitas, California 92024

August 29, 2007

Re: Salvation Army Proposed Fire Protection Plan

Having coined the phrase "Fire Protection Plan" in the late sixties, and subsequently pushed both its continued use by the fire service, and its acceptance and promulgation by California and national fire codes, I am in a singular position appropriate to providing an opinion on the quality of this effort. Good job! My original intent with the Fire Protection Plan was to address the unique and varied risks created by topography, climate, ground cover, and distance from urban infrastructure, and to utilize a varying mix of mitigation measures appropriate to those risks. Simply applying conventional wisdom and available codes and standards did not accomplish that end. The Fire Protection Plan, in concept, and this FPP in particular, accomplishes the goal of supporting the community fire protection delivery system, and, at the same time, provides optimum fire safety for the people and the built environment where no response organization is available. Your accomplishment is a result of recognition of values of established and time-proven codes and standards, combined with the values of innovative techniques and technologies. The synergy of those combined values result in a project that is considerably safer than the mere application of existing specification code.

The Shelter-in-Place component of your FPP is particularly well developed. It addresses the behavioral issues that are often overlooked in analysis of fire protection and population fire safety. It is reasonably simple and straightforward to construct a building that will withstand direct flame impingement, radiated heat, and flying brands and embers. It is not that simple to create a confidence and comfort level for the people you will be asking to stay in the potential path of fire. The efforts you describe to create awareness, in your served population, of the relative risks, combined with the provision of communication links to the outside in the form of radio, television, and the ubiquitous computer, suggest uncommon insight.

If I have a criticism, at all, it is that the plan suggests that, when made aware of a fire threat, the first choice is to leave. Your plan provides a protection level appropriate to make the first choice one of staying. Once again, good job.



Don Oaks, President
Viking Research
805 688-1121
donoaks@syv.com

INTENTIONALLY LEFT BLANK

APPENDIX A
Site Photographs

INTENTIONALLY LEFT BLANK



Photograph 1. View of paved section of existing primary access road at a point where it narrows to avoid impacts to an existing oak tree and a drainage crossing.



Photograph 2. View of primary access road near its intersection with Mussey Grade Road. This section of the road is currently unpaved but will be paved and 24 feet wide as part of the proposed Camp expansion.



Photograph 3. View of primary access road/driveway as it routes around a landform to the south (photo left). With the expansion project, the road would be paved and provided 24 foot width where possible and the trees and understory vegetation would be maintained to reduce vertical and horizontal fuel continuity as well as reducing the overall amount of fuel.



Photograph 4. Primary access road once clear of the topographical landform. The terrain opens up and flattens out and is being mowed as part of the current fuel management activities. This road would be paved and 24 feet wide with the project's implementation.



Photograph 5. View of the western portion of the property where steeper, boulder covered slopes with chaparral are located. The proposed expansion would occur in the flatter areas of the site.



Photograph 6. View of an area proposed for expansion. This area is flat and includes light fuels. Fuel modification zones would be installed extending into the adjacent brush areas.



Photograph 7. View of a saddle (red arrow) that presents significant fire risk. A cluster of buildings is proposed to be built on the south side of the saddle (not visible in photo). Extended fuel modification and structure set back from the saddle are proposed. Additionally, it is recommended that existing boulders be used as a natural fuel break by repositioning them near the top of the saddle.



Photograph 8. View of top of "saddle" area. The existing boulders can be used to provide a natural fire break which will enhance the extended fuel modification zone and structural setbacks in this area.



Photograph 9. An existing disturbed area proposed for expansion.



Photograph 10. View of chaparral/sage scrub burned in the 2003 Cedar Fire. Fuels are expected to reach densities and sizes found pre-2003 over time and have been modeled as such in this CFPP.



Photograph 11. View from one of two emergency ingress/egress routes down on Mussey Grade Road. This route is a paved road that exits to Mussey Grade Road approximately $\frac{1}{2}$ mile south of the primary access for the Salvation Army Divisional Camp site.



Photograph 12. Recovering chaparral adjacent the emergency ingress/egress route. The route would be subject to 20 feet of fuel modification on either side, as possible and appropriate, under this CFPP's requirements.



Photograph 13. View of existing turf green space near administrative buildings. This area suffered few effects from the 2003 fires. It is bordered to the north and northwest by a paved and packed DG parking area.



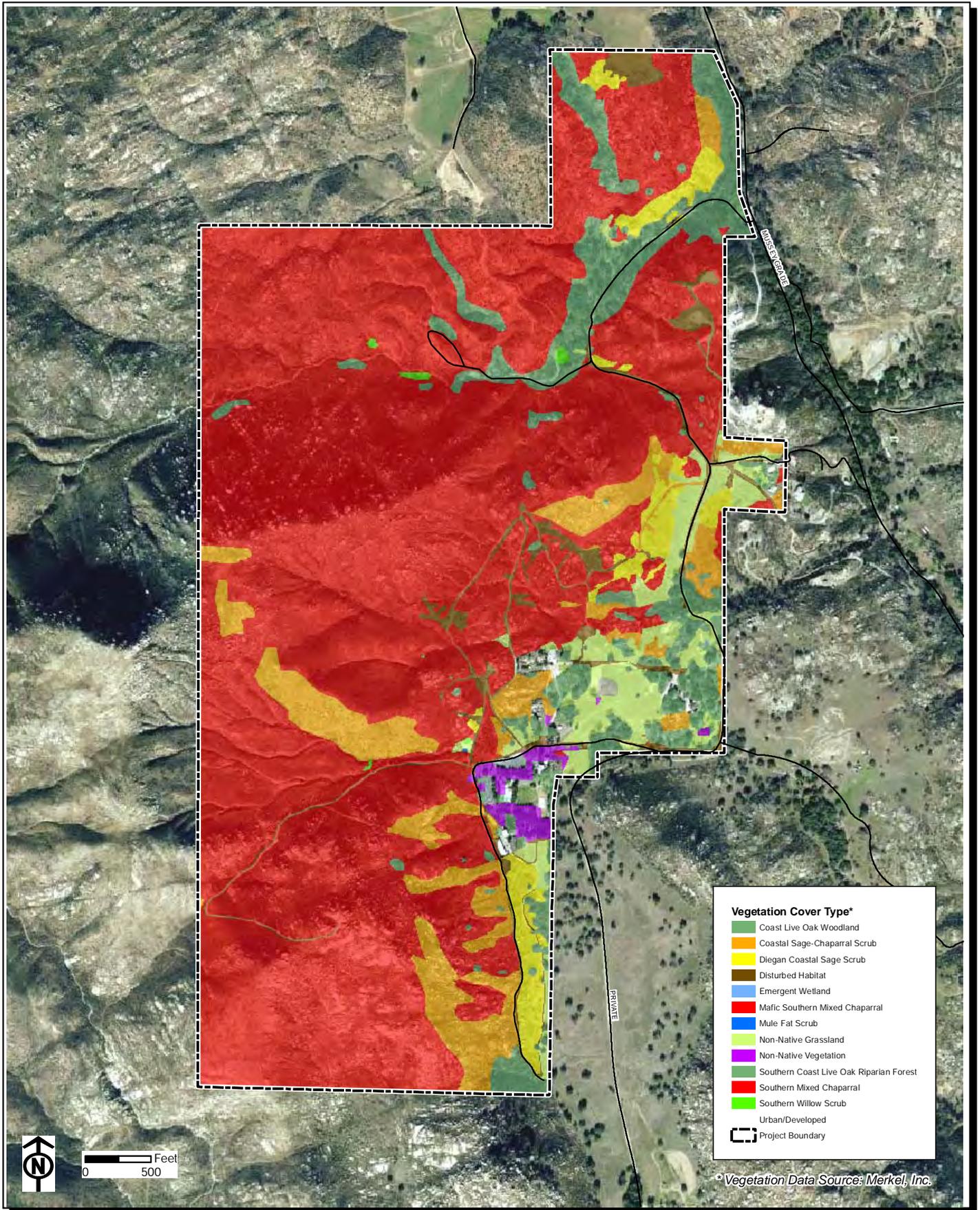
Photograph 14. View of existing structure. All structures proposed for preservation will be retrofitted with interior sprinklers and fire resistive features.



Photograph 15. View of three and one half year old chaparral adjacent the primary access road. Some species have obtained heights of nearly seven feet.

APPENDIX B
Site Vegetation Map

INTENTIONALLY LEFT BLANK



Salvation Army Divisional Camp Conceptual Fire Protection Plan
Site Vegetation Map

Appendix
B

INTENTIONALLY LEFT BLANK

APPENDIX C

Fire History Exhibit

INTENTIONALLY LEFT BLANK

INTENTIONALLY LEFT BLANK

APPENDIX D

Project Facility Availability Form

INTENTIONALLY LEFT BLANK

PROJECT FACILITY AVAILABILITY FORM

FIRE

Please type or use pen

<p>The Salvation Army (619) 231-6000</p> <p>Owner's Name _____ Phone _____</p> <p>825 Seventh Avenue</p> <p>Owner's Mailing Address _____ Street _____</p> <p>San Diego CA 92101</p> <p>City _____ State _____ Zip _____</p>	<p>ORG _____</p> <p>ACCT _____</p> <p>ACT _____</p> <p>TASK _____</p> <p>DATE _____ AMT \$ <u>15⁰⁰</u></p> <p style="text-align: center;"><i>DISTRICT CASHIER'S USE ONLY</i></p>
--	---



SECTION 1. PROJECT DESCRIPTION TO BE COMPLETED BY APPLICANT

<p>A. <input type="checkbox"/> Major Subdivision (TM) <input type="checkbox"/> Specific Plan or Specific Plan Amendment</p> <p><input type="checkbox"/> Minor Subdivision (TPM) <input type="checkbox"/> Certificate of Compliance: _____</p> <p><input checked="" type="checkbox"/> Boundary Adjustment</p> <p><input type="checkbox"/> Rezone (Reclassification) from _____ to _____ zone.</p> <p><input type="checkbox"/> Major Use Permit (MUP), purpose: _____</p> <p><input type="checkbox"/> Time Extension ... Case No. _____</p> <p><input type="checkbox"/> Expired Map ... Case No. _____</p> <p><input checked="" type="checkbox"/> Other <u>Modify Existing MUP</u></p> <p>B. <input type="checkbox"/> Residential Total number of dwelling units _____</p> <p><input type="checkbox"/> Commercial Gross floor area _____</p> <p><input type="checkbox"/> Industrial Gross floor area _____</p> <p><input checked="" type="checkbox"/> Other <u>Camp</u> Gross floor area <u>250,000 sqft.</u></p> <p>C. Total Project acreage <u>576</u> Total lots <u>1</u> Smallest proposed lot _____</p>	<p style="text-align: center;">Assessor's Parcel Number(s) (Add extra if necessary)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>3</td><td>2</td><td>2</td> <td>0</td><td>3</td><td>0</td> <td>0</td><td>1</td> </tr> <tr> <td>3</td><td>2</td><td>2</td> <td>0</td><td>3</td><td>0</td> <td>0</td><td>2</td> </tr> <tr> <td>3</td><td>2</td><td>2</td> <td>0</td><td>3</td><td>0</td> <td>1</td><td>0</td> </tr> <tr> <td>3</td><td>2</td><td>2</td> <td>0</td><td>3</td><td>1</td> <td>0</td><td>1</td> </tr> </table> <p>Thomas Bros. Page <u>1171</u> Grid <u>J6</u></p> <p>Project address <u>14488 Mussey Grade Rd</u></p> <p><u>Ramona CA 92065</u></p> <p style="text-align: center;"><small>Community Planning Area/Subregion Street Zip</small></p>	3	2	2	0	3	0	0	1	3	2	2	0	3	0	0	2	3	2	2	0	3	0	1	0	3	2	2	0	3	1	0	1
3	2	2	0	3	0	0	1																										
3	2	2	0	3	0	0	2																										
3	2	2	0	3	0	1	0																										
3	2	2	0	3	1	0	1																										

OWNER/APPLICANT AGREES TO COMPLETE ALL CONDITIONS REQUIRED BY THE DISTRICT.

Applicant's Signature: [Signature] Date: 5-4-2006

Address: 825 Seventh Ave San Diego CA 92101 Phone: 619-231-6000

(On completion of above, present to the district that provides fire protection to complete Sections 2 and 3 below.)

SECTION 2. FACILITY AVAILABILITY TO BE COMPLETED BY DISTRICT

District name: Ramona Fire/CDF

Indicate the location and distance of the primary fire station that will serve the proposed project: Station 82 - 3410 Dye Rd; Ramona 3 miles from project.

A. Project is in the District and eligible for service.

Project is not in the District but is within its Sphere of Influence boundary, owner must apply for annexation.

Project is not in the District and not within its Sphere of Influence boundary.

Project is not located entirely within the District and a potential boundary issue exists with the _____ District.

B. Based on the capacity and capability of the District's existing and planned facilities, fire protection facilities are currently adequate or will be adequate to serve the proposed project. The expected emergency travel time to the proposed project is 4 1/2 minutes.

Fire protection facilities are not expected to be adequate to serve the proposed development within the next five years.

C. District conditions are attached. Number of sheets attached: _____

District will submit conditions at a later date.

SECTION 3. FUELBREAK REQUIREMENTS

Note: The fuelbreak requirements prescribed by the fire district for the proposed project do not authorize any clearing prior to project approval by the Department of Planning and Land Use.

Within the proposed project _____ feet of clearing will be required around all structures.

The proposed project is located in a hazardous wildland fire area, and additional fuelbreak requirements may apply. Environmental mitigation requirements should be coordinated with the fire district to ensure that these requirements will not pose fire hazards.

This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted.

[Signature] James Hollingsworth Fire Marshal 760-788-2244 6-7-06

Authorized signature Print name and title Phone Date

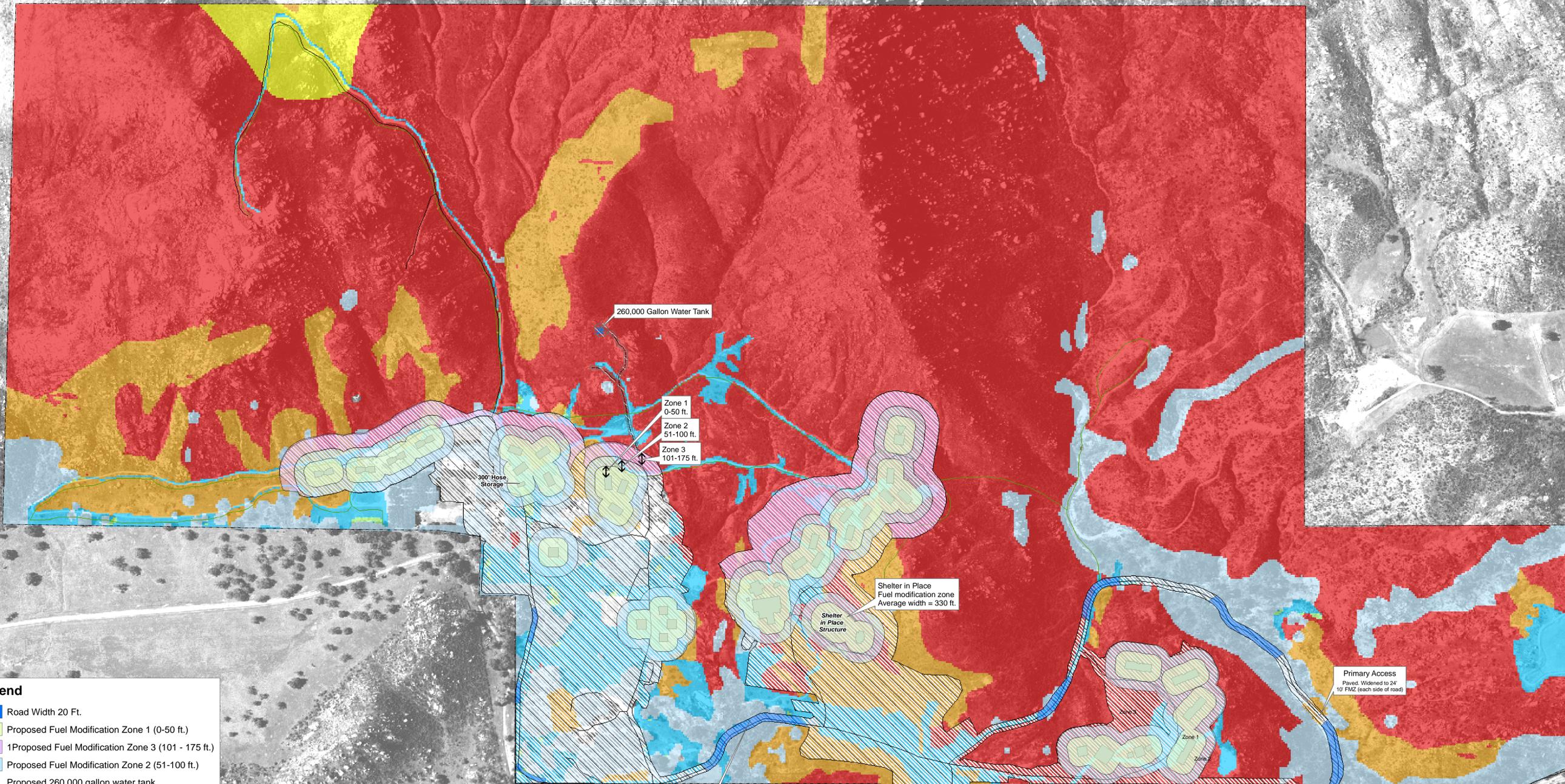
On completion of Sections 2 and 3 by the District, applicant is to submit this form with application to:
 Zoning Counter, Department of Planning and Land Use, 5201 Ruffin Road, Suite B, San Diego, CA 92123

INTENTIONALLY LEFT BLANK

APPENDIX E

*FlamMap Fire Behavior and
Fuel Modification Zone Exhibit*

INTENTIONALLY LEFT BLANK

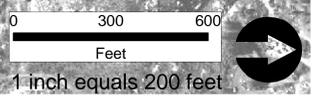


Legend

- Road Width 20 Ft.
- Proposed Fuel Modification Zone 1 (0-50 ft.)
- Proposed Fuel Modification Zone 3 (101 - 175 ft.)
- Proposed Fuel Modification Zone 2 (51-100 ft.)
- ★ Proposed 260,000 gallon water tank
- Roads - 24 ft. width
- Trails
- Property Limits

Expected Flame Length Values (ft.)

Value	Color
n/a	White
0 - 5	Light Blue
5 - 10	Blue
10 - 15	Light Green
15 - 20	Yellow
20 - 25	Orange
25 - 30	Dark Orange
30 - 48	Red



Emergency Relocation Area = Ramona United Methodist Church
 Distance = 2.5 Miles from primary access
 4.0 miles from camp interior

APPENDIX F
Approved Plant List

INTENTIONALLY LEFT BLANK

GUIDELINES FOR PLANTING IN FUEL MODIFICATION ZONES

Planting in fuel modification areas on private property shall be in accordance with the following guidelines:

1. Limit planting in large unbroken masses especially trees and large shrubs, while at the same time trying to achieve the desired screening required by the jurisdictional planning/building department. Groups should be two (2) or three (3) maximum, with mature foliage of any group separated horizontally by at least twenty (20) feet.*
2. Avoid massing of shrubs at bases of trees or larger shrubs.
3. Avoid massing of vegetation adjacent to structures especially under eaves, overhangs, decks, etc.
4. Limit the use of plants which have the following characteristics:
 - a. Are known to be especially combustible. (eg.: conifers, eucalyptus, acacias)
 - b. Have dry or deciduous foliage during part of the year.
 - c. Develop deciduous or shaggy bark.
 - d. Develop dry or dead undergrowth.
5. Conduct periodic maintenance to reduce fuel volumes, eliminate weeds, remove dead vegetation, etc.
6. Provide reliable automatic irrigation systems to maintain vegetation in a healthy, turgid state.
7. Avoid topping trees as this causes excessive branching, which can increase fire danger.
8. Adhere to the plant spacing guidelines on page 10 of these guidelines.
9. Avoid planting of trees within 10 feet of the roadway. Care should be given to the type of tree selected that will not encroach into the roadway, nor produce a canopy effect.
10. Avoid species that are known to be especially flammable such as conifers and eucalyptus

Planting vegetation adjacent to structures and within the Fuel Modification Zone when the zone is located on adjacent property is considered complementary to the fuel modification program and may be subject to periodic inspections by the enforcing agency.

*Agricultural crops, groves and orchards may be exempted from this requirement.

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
 FUEL MODIFICATION ZONE PLANT LIST
 July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
1	W	Abelia x grandiflora	Glossy Abelia	Shrub
2	☐	Acacia redolens	Desert Carpet	Shrub
3	☐	Acer macrophyllum	Big Leaf Maple	Tree
4	X	Achillea millefolium	Common Yarrow	Low shrub
5	W	Achillea Tomentosa	Woolly Yarrow	Low shrub
6	X	Aeonium decorum	Aeonium	Ground cover
7	X	Aeonium simsii	ncn	Ground cover
8	W	Agave attenuata	Century Plant	Succulent
9	☐	Agave shawii	Shaw's Century Plant	Succulent
10	N	Agave victoriae-reginae	ncn	Ground cover
11	X	Ajuga reptans	Carpet Bugle	Ground cover
12	W	Alnus cordata	Italian Alder	Tree
13	☐	Alnus rhombifolia	White Alder	Tree
14	N	Aleo arborescens	Tree Aloe	Shrub
15	N	Aloe aristata	ncn	Ground cover
16	N	Aloe brevifolia	ncn	Ground cover
17	W	Aloe vera	Medicinal Aloe	Succulent
18	W	Alyogyne huegelii	Blue Hibiscus	Shrub
19	☐	Ambrosia chamissonis	Beach Bur-Sage	Perennial
20	☐	Amorpha fruticosa	Western False Indigobush	Shrub

FUEL MODIFICATION ZONE PLANT LIST

July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
21	W	Anigozanthus flavidus	Kangaroo Paw	Perennial accent
22	<input type="checkbox"/>	Antirrhinum nuttalianum ssp. nuttalianum	ncn	Subshrub
23	X	Aptenia cordifolia x 'Red Apple'	Red Apple Aptenia	Ground cover
24	W	Arbutus unedo	Strawberry Tree	Tree
25	W	Arctostaphylos 'Pacific Mist'	Pacific Mist Manzanita	Ground cover
26	W	Arctostaphylos edmundsii	Little Sur Manzanita	Ground cover
27	<input type="checkbox"/>	Arctostaphylos glandulosa ssp.	Eastwood Manzanita	Shrub
28	W	Arctostaphylos hookeri 'Monterey Carpet'	Monterey carpet Manzanita	Low Shrub
29	N <input type="checkbox"/>	Arctostaphylos pungens		Shrub
30	N	Arctostaphylos refugioensis	Refugio Manzanita	Shrub
31	W	Arctostaphylos uva-ursi	Bearberry	Ground cover
32	W	Arctostaphylos x 'Greensphere'	Greensphere Manzanita	Shrub
33	N	Artemisia caucasica	Caucasian Artemisia	Ground cover
34	X	Artemisia pycnocephala	Beach Sagewort	Perennial
35	X	Atriplex canescens	Four-Wing Saltbush	Shrub
36	X <input type="checkbox"/>	Atriplex lentiformis ssp. breweri	Brewer Saltbush	Shrub
37	<input type="checkbox"/>	Baccharis emoryi	Emory Baccharis	Shrub
38	W <input type="checkbox"/>	Baccharis pilularis ssp. consanguinea	Chaparral Bloom	Shrub
39	X	Baccharis pilularis var. pilularis 'Twin Peaks#2'	Twin Peaks	Ground cover
40	<input type="checkbox"/>	Baccharis salicifolia	Mulefat	Shrub

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION

FUEL MODIFICATION ZONE PLANT LIST

July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
41	N	Baileya pauciradiata	Desert Marigold	Ground cover
42	W	Beaucarnea recurvata	Bottle Palm	Shrub/Small tree
43	N☐	Bougainvillea spectabilis	Bougainvillea	Shrub
44	N☐	Brahea armata	Mexican Blue Palm Blue Hesper Palm	Palm
45	N☐	Brahea brandegeei	San Jose Hesper Palm	Palm
46	N☐	Brahea edulis	Guadalupe Palm	Palm
47	☐	Brickellia californica		Subshrub
48	w ☐	Bromus carinatus	California Brome	Grass
49	☐	Camissonia cheiranthifolia	Beach Evening Primrose	Perennial subshrub
50	N	Carissa macrocarpa	Green Carpet Natal Plum	Ground cover/Shrub
51	X	Carpobrotus chilensis	Sea Fig Ice Plant	Ground cover
52	W	Ceanothus gloriosus 'Point Reyes'	Point Reyes Ceanothus	Shrub
53	W	Ceanothus griseus 'Louis Edmunds'	Louis Edmunds Ceanothus	Shrub
54	W	Ceanothus griseus horizontalis	Yankee Point	Ground Cover
55	W	Ceanothus griseus var. horizontalis	Carmel Creeper Ceanothus	Shrub
56	W	Ceanothus griseus var. Horizontalis 'Yankee Point'	Yankee Point Ceanothus	Shrub
57	☐	Ceanothus megacarpus	Big Pod Ceanothus	Shrub
58	W	Ceanothus prostratus	Squaw Carpet Ceanothus	Shrub
59	☐	Ceanothus spinosus	Green Bark Ceanothus	Shrub

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Comman Name	Plant Form
--	------	----------------	-------------	------------

60	N <input type="checkbox"/>	Ceanothus verrucosus	Wart-Stem Ceanothus	Shrub
61	W	Cerastium tomentosum	Snow-in-Summer	Ground cover/Shrub
62	W	Ceratonia siliqua	Carob	Tree
63	W <input type="checkbox"/>	Cercis occidentalis	Western Redbud	Shrub/Tree
64	X	Chrysanthemum leucanthemum	Oxeye Daisy	Ground cover
65	W	Cistus crispus	ncn	Ground cover
66	W	Cistus hybridus	White Rockrose	Shrub
67	W	Cistus incanus	ncn	Shrub
68	W	Cistus incanus ssp. corsicus	ncn	Shrub
69	W	Cistus salviifolius	Sageleaf Rockrose	Shrub
70	W	Cistus x purpureus	Orchid Rockrose	Shrub
71	W	Citrus species	Citrus	Tree
72	<input type="checkbox"/>	Clarkia purpurea or unguiculata	Showy Fairwell to spring	Annual
73	<input type="checkbox"/>	Cneoridium dumosum	Bushrue	Shrub
74	<input type="checkbox"/>	Collinsia heterophylla	Chinese Houses	Annual
75	w <input type="checkbox"/>	Comarostaphylis diversifolia	Summer Holly	Shrub
76	N	Convolvulus cneorum	Bush Morning Glory	Shrub
77	W	Coprosma kirkii	Creeping Coprosma	Ground cover/Shrub
78	W	Coprosma pumila	Prostrate Coprosma	Low Shrub
79	<input type="checkbox"/>	Coreopsis californica	California Coreopsis	Annual
80	W	Coreopsis Lanceolata	Coreopsis	Ground Cover

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
81	N	Correa pulchella	Australian Fushsia	Ground cover
82	W	Cotoneaster buxifolius	ncn	Shrub
83	W	Cotoneaster congestus 'Likiang'	Likiang Cotoneaster	Ground cover/Vine
84	W	Cotoneaster Parneyi	ncn	Shrub
85	X	Crassula Lactea	ncn	Ground cover
86	X	Crassula multicava	ncn	Ground cover
87	X	Crassula ovata	Jade Tree	Shrub
88	X	Crassula tetragona	ncn	Ground cover
89	w□	Croton californicus	California Croton	Ground cover
90	X	Delosperma 'alba'	White Trailing Ice Plant	Ground cover
91	□	Dendromecon rigida	Bush Poppy	Shrub
92	□	Dichelostemma Capitatum	Blue Dicks	Herb
93	N	Distictis buccinatoria	Blood-Red Trumpet Vine	Vine/Climbing vine
94	N	Dodonaea viscosa	Hopseed Bush	Shrub
95	X	Drosanthemum floribundum	Rosea Ice Plant	Ground cover
96	X	Drosanthemum hispidum	ncn	Ground cover
97	X	Drosanthemum speciosum	Dewflower	Ground cover
98	□	Dudleya lanceolata	Lance-leaved Dudleya	Succulent
99	□	Dudleya pulverulenta	Chalk Dudleya	Succulent
100	W	Elaeagnus pungens	Silverberry	Shrub
101	□	Encelia californica	California Encelia	Small Shrub

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
102	<input type="checkbox"/>	<i>Epilobium canum</i> (<i>Zauschneria californica</i>)	Hoary California Fuchsia	Shrub
103	<input type="checkbox"/>	<i>Eriastrum sapphirinum</i>	Majave Woolly Star	Annual
104	N	<i>Eriobotrya japonica</i>	Loquat	Tree
105	<input type="checkbox"/>	<i>Eriodictyon crassifolium</i>	Thick-Leaf Yerba Santa	Shrub
106	<input type="checkbox"/>	<i>Eriodictyon trichocalyx</i>	Yerba Santa	Shrub
107	w <input type="checkbox"/>	<i>Eriophyllum confertiflorum</i>	ncn	Shrub
108	W	<i>Erythrina</i> species	Coral Tree	Tree
109	N	<i>Escallonia</i> species	several varieties	Shrub
110	w <input type="checkbox"/>	<i>Eschscholzia californica</i>	California Poppy	Flower
111	X	<i>Eschscholzia mexicana</i>	Mexican Poppy	Herb
112	N	<i>Euonymus fortunei</i>	Winter Creeper Euonymus	Ground cover
113	N	<i>Feijoa sellowiana</i>	Pineapple Guava	Shrub/Tree
114	N	<i>Fragaria chiloensis</i>	Wild Strawberry /Sand Strawberry	Ground cover
115	<input type="checkbox"/>	<i>Frankenia salina</i>	Alkali Heath	Ground cover
116	W <input type="checkbox"/>	<i>Fremontodendron californicum</i>	California Flannelbush	Shrub
117	X	<i>Gaillardia x grandiflora</i>	Blanketflower	Ground cover
118	W	<i>Galvezia speciosa</i>	Bush Snapdragon	Shrub
119	W	<i>Garrya veatchii</i>	Silktassel	Shrub
120	X	<i>Gazania</i> hybrids	South African Daisy	Ground cover
121	X	<i>Gaxania rigens leucolaena</i>	Trailing Gazania	Ground cover

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
122	<input type="checkbox"/>	<i>Gilia capitata</i>	Globe Gilia	Perennial
123	W	<i>Gilia leptantha</i>	Showy Gilia	Perennial
124	W	<i>Gilia tricolor</i>	Bird's Eyes	Perennial
125	W	<i>Ginkgo biloba</i>	Maidenhair Tree	Tree
126	<input type="checkbox"/>	<i>Gnaphalium californicum</i>	California Everlasting	Annual
127	W	<i>Grewia occidentalis</i>	Starflower	Shrub
128	<input type="checkbox"/>	<i>Grindelia camporum bracteosum</i>	Gum Plant	Ground cover
129	N <input checked="" type="checkbox"/>	<i>Hakea suaveolens</i>	Sweet Hakea	Shrub
130	W	<i>Hardenbergia comptoniana</i>	Lilac Vine	Shrub
131	N	<i>Helianthemum mutabile</i>	Sunrose	Ground cover /Shrub
132	<input type="checkbox"/>	<i>Helianthemum scoparium</i>	Rush Rose	Shrub
133	<input type="checkbox"/>	<i>Heliotropium curassavicum</i>	Salt Heliotrope	Ground cover
134	X	<i>Helix canariensis</i>	English Ivy	Ground cover
135	W	<i>Hesperaleo parviflora</i>	Red Yucca	Perennial
136	<input checked="" type="checkbox"/>	<i>Heteromeles arbutifolia</i>	Toyon	Shrub
137	X	<i>Hypericum calycinum</i>	Aaron's Beard	Shrub
138	N	<i>Iberis Sempervirens</i>	Edging Candytuft	Ground cover
139	N	<i>Iberis Umbellatum</i>	Globe Candytuft	Ground cover
140	<input type="checkbox"/>	<i>Isocoma menziesii</i>	Coastal Goldenbush	Small shrub
141	<input type="checkbox"/>	<i>Isomeris arborea</i>	Bladderpod	Shrub

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
 FUEL MODIFICATION ZONE PLANT LIST
 July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
142	W <input type="checkbox"/>	<i>Iva hayesiana</i>	Poverty Weed	Ground cover
143	N <input type="checkbox"/>	<i>Juglans californica</i>	California Black Walnut	Tree
144	<input type="checkbox"/>	<i>Juncus acutus</i>	Yellow Bush Penstemon	Subshrub
145	<input type="checkbox"/>	<i>Keckiella antirrhinoides</i>	Yellow Bush Penstemon	Subshrub
146	<input type="checkbox"/>	<i>Keckiella cordifolia</i>	Heart Leaved Penstemon	Subshrub
147	<input type="checkbox"/>	<i>Keckiella ternata</i>	Blue Stemmed Bush Penstemon	Subshrub
148	W	<i>Kniphofia uvaria</i>	Red Hot Poker	Perennial
149	W	<i>Lagerstroemia indica</i>	Crape Myrtle	Tree
150	W	<i>Lagunaria patersonii</i>	Primrose Tree	Tree
151	X	<i>Lampranthus aurantiacus</i>	Bush Ice Plant	Ground cover
152	X	<i>Lampranthus filicaulis</i>	Redondo Creeper	Ground cover
153	X	<i>Lampranthus spectabilis</i>	Trailing Ice Plant	Ground cover
154	W	<i>Lantana camara</i> cultivars	Yellow Sage	Shrub
155	W	<i>Lantana montevidensis</i>	Trailing Lantana	Shrub
156	<input type="checkbox"/>	<i>Lasthenia californica</i>	Dwarf Goldfields	Annual
157	W	<i>Lavandula dentata</i>	French Lavendar	Shrub
158	W	<i>Leptospermum laevigatum</i>	Australian Tea Tree	Shrub
159	W	<i>Leucophyllum frutescens</i>	Texas Ranger	Shrub
160	<input type="checkbox"/>	<i>Leymus condensatus</i>	Giant Wild Rye	Large grass
161	N	<i>Ligustrum japonicum</i>	Texas Privet	Shrub

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
--	------	----------------	-------------	------------

162	X	<i>Limonium pectinatum</i>	ncn	Ground cover
163	X	<i>Limonium perezii</i>	Sea Lavender	Shrub
164	w☐	<i>Liquidambar styraciflua</i>	American Sweet Gum	Tree
165	W	<i>Liriodendron tulipifera</i>	Tulip Tree	Tree
166	X	<i>Lonicera japonica</i> 'Halliana'	Hall's Japanese Honeysuckle	Vining shrub
167	☐	<i>Lonicera subspicata</i>	Wild Honeysuckle	Vining shrub
168	X	<i>Lotus corniculatus</i>	Bird's Foot Trefoil	Ground cover
169	☐	<i>Lotus heermannii</i>	Northern Woolly Lotus	Perennial
170	☐	<i>Lotus scoparius</i>	Deerweed	Shrub
171	W ☐	<i>Lupinus arizonicus</i>	Desert Lupine	Annual
172	W	<i>Lupinus benthamii</i>	Spider Lupine	Annual
173	☐	<i>Lupinus bicolor</i>	Sku Lupine	Flowering annual
174	☐	<i>Lupinus sparsiflorus</i>	Lupini/Coulter's Lupine	Annual
175	W	<i>Lyonothammus florbundus</i> ssp. <i>asplenifollus</i>	Fernleaf Ironwood	Tree
176	W	<i>Macadamia integrifolia</i>	Golden Abundance Oregon	Shrub
177	W	<i>Mahonia aquifolium</i> 'Golden Abundance'	Golden Abundance Oregon Grape	Shrub
178	W	<i>Mahonia nevinii</i>	Nevin Mahonia	Shrub
179	☐	<i>Malacothamnus fasciculatus</i>	Chaparral Mallow	Shrub
180	X	<i>Malephora luteola</i>	Trailing Ice Plant	Ground cover
181	W	<i>Maytenus boaria</i>	Mayten Tree	Tree

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
 FUEL MODIFICATION ZONE PLANT LIST
 July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
182	W	<i>Melaleuca nesophila</i>	Pink Melaleuca	Shrub

183	N	<i>Metrosideros excelsus</i>	New Zealand Christmas Tree	Tree
184	<input type="checkbox"/> *	<i>Mimulus aurantiacus</i>	Monkeyflower	Flower
185	<input type="checkbox"/>	<i>Mirabilis californica</i>	Wishbone Bush	Perennial
186	N	<i>Myoporum debile</i>	ncn	Shrub
187	N	<i>Myoporum insulare</i>	Boobyalla	Shrub
188	W	<i>Myoporum parvifolium</i>	ncn	Ground cover
189	W	<i>Myoporurn 'Pacificum'</i>	ncn	Shrub
190	<input type="checkbox"/>	<i>Nassella (=Stipa) lepida</i>	Foothill Needlegrass	Ground cover
191	<input type="checkbox"/>	<i>Nassella (=Stipa) pulchra</i>	Purple Needlegrass	Ground cover
192	<input type="checkbox"/>	<i>Nemophila menziesli</i>	Baby Blue Eyes	Annual
193	X	<i>Nerium oleander</i>	Oleander	Shrub
194	<input type="checkbox"/>	<i>Nolina cismontana</i>	Chaparral Nolina	Shrub
195	N	<i>Nolina bigelovii</i> , or <i>N. interrata</i>	Mexican Grasstree	Shrub
196	W	<i>Oenothera berlandieri</i>	Mexican Evening Primrose	Ground cover
197	N	<i>Oenothera hookeri</i>	California Evening Primrose	Flower
198	W	<i>Oenothera speciosa</i>	Showy Evening Primrose	Perennial
199	X	<i>Ophiopogon japonicus</i>	Mondo Grass	Ground cover
200	<input type="checkbox"/> *	<i>Opuntia littoralis</i>	Prickly Pear	Cactus
201	<input type="checkbox"/> *	<i>Opuntia oricola</i>	Oracle Cactus	Cactus

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
202	<input type="checkbox"/> *	<i>Opuntia polifera</i>	Coast Cholla	Cactus

203	W	<i>Osmanthus fragrans</i>	Sweet Olive	Shrub
204	X	<i>Osteospermum fruticosum</i>	Trailing African Daisy	Ground cover
205	X	<i>Parkinsonia aculeata</i>	Mexican Palo Verde	Tree
206	W	<i>Pelargonium peltatum</i>	Ivy Geranium	Ground cover
207	X	<i>Penstemon spectabilis</i>	Beard Tongue	Shrub
208	W	<i>Photinia fraseri</i>	ncn	Shrub
209	W	<i>Pistacla chinensis</i>	Chinese Pistache	Tree
210	X	<i>Pittosporum undulatum</i>	Victorian Box	Tree
211	<input type="checkbox"/>	<i>Plantago erecta</i>	California Plantain	Annual
212	**	<i>Plantago insularis</i>	Woolly Plantain	Annual
213	X	<i>Plantago sempervirens</i>	Evergreen Plantain	Ground cover
214	W <input type="checkbox"/>	<i>Platanus racemosa</i>	California Syoamore	Tree
215	W	<i>Plumbago auriculata</i>	Plumbago Cape	Shrub
216	<input type="checkbox"/>	<i>Populus fremontii</i>	Western Cottonwood	Tree
217	X	<i>Portulacaria afra</i>	Elephant's Food	Shrub
218	<input type="checkbox"/>	<i>Potentilla glandulosa</i>	Sticky Cinquefoil	Subshrub
219	X	<i>Potentilla tabernaemontanii</i>	Spring Cinquefoil	Ground cover
220	X	<i>Prunus caroliniana</i>	Carolina Cherry Laurel	Shrub/Tree
221	<input type="checkbox"/>	<i>Prunus ilicifolia</i> ssp. <i>ilicifolia</i>	Holly Leaved Cherry	Shrub

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
222	X	<i>Prunus lyonil</i>	Catalina Cherry	Shrub/Tree

223	N	<i>Punica granatum</i>	Pomegranate	Shrub/Tree
224	W	<i>Puya</i> species	Puya	Succulent/Shrub
225	W	<i>Pyracantha</i> species	Firethorn	Shrub
226	<input type="checkbox"/>	<i>Quercus agrifolia</i>	Coast Live Oak	Tree
227	<input type="checkbox"/> ●*	<i>Quercus berberdifolia</i>	California Scrub Oak	Shrub
228	<input type="checkbox"/> ●*	<i>Quercus dumosa</i>	Coastal Scrub Oak	Shrub
229	X <input type="checkbox"/>	<i>Quercus engelmannii</i>	Engelmann Oak	Tree
230	X	<i>Quercus suber</i>	Cork Oak	Tree
231	X	<i>Rhamnus alaternus</i>	Italian Buckthorn	Shrub
232	<input type="checkbox"/>	<i>Rhamnus californica</i>	California Coffee Berry	Shrub
233	<input type="checkbox"/>	<i>Rhamnus crocea</i>	Redberry	Shrub
234	<input type="checkbox"/>	<i>Rhamnus crocea</i> sp. <i>ilicifolia</i>	Hollyleaf Redberry	Shrub
235	N	<i>Rhaphiolepis</i> species	Indian Hawthorn	Shrub
236	<input type="checkbox"/>	<i>Rhus integrifolia</i>	Lemonade Berry	Shrub
237	N	<i>Rhus lancea</i>	African Sumac	Tree
238	<input type="checkbox"/> ●	<i>Rhus ovata</i>	Sugarbush	Shrub
239	<input type="checkbox"/>	<i>Ribes aureum</i>	Golden Currant	Shrub
240	<input type="checkbox"/>	<i>Ribes indecorum</i>	White Flowering Currant	Shrub
241	<input type="checkbox"/>	<i>Ribes speciosum</i>	Fuchsia Flowering Gooseberry	Shrub

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
242	W	<i>Ribes viburnifolium</i>	Evergreen Currant	Shrub

243	<input type="checkbox"/> *	<i>Romneya coulteri</i>	Matilija Poppy	Shrub
244	X	<i>Romneya coulteri</i> 'white cloud'	White Cloud Matilija Poppy	Shrub
245	w☐	<i>Rosmarinus officinalis</i>	Rosemary	Shrub
246	w☐	<i>Salvia greggii</i>	Autumn Sage	Shrub
247	w☐	<i>Salvia sonomensis</i>	Creeping Sage	Ground cover
248	<input type="checkbox"/>	<i>Sambucus mexicana</i>	Mexican Elderberry	Tree
249	W	<i>Santolina chamaecyparissus</i>	Lavender Cotton	Ground cover
250	W	<i>Santolina virens</i>	Green Lavender Cotton	Shrub
251	<input type="checkbox"/>	<i>Satureja chandleri</i>	San Miquel Savory	Perennial
252	<input type="checkbox"/>	<i>Scirpus acutus</i>	Hard-Stem Bulrush	Perennial
253	<input type="checkbox"/>	<i>Scirpus californicus</i>	California Bulrush	Perennial
254	X	<i>Sedum acre</i>	Goldmoss Sedum	Ground cover
255	X	<i>Sedum album</i>	Green Stonecrop	Ground cover
256	X	<i>Sedum confusum</i>	ncn	Ground cover
257	X	<i>Sedum ilineare</i>	ncn	Ground cover
258	X	<i>Sedum x rubrotinctum</i>	Pork and Beans	Ground cover
259	X	<i>Senecio serpens</i>	ncn	Ground cover
260	<input type="checkbox"/>	<i>Sisyrinchium bellum</i>	Blue-Eyed Grass	Ground cover
261	<input type="checkbox"/>	<i>Solanum douglasii</i>	Douglas Nightshade	Shrub

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
--	------	----------------	-------------	------------

262	<input type="checkbox"/>	<i>Solanum xanthii</i>	Purple Nightshade	Perennial
263	W	<i>Stenocarpus sinuatus</i>	Firewheel Tree	Tree
264	W	<i>Strelitzia nicolai</i>	Giant Bird of Paradise	Perennial
265	W	<i>Strelitzia reginae</i>	Bird of Paradise	Perennial
266	<input type="checkbox"/>	<i>Symphoricarpos mollis</i>	Creeping Snowberry	Shrub
267	W	<i>Tecoma stans</i> (<i>Stenolobium stans</i>)	Yellow Bells	Shrub/Small tree
268	X	<i>Tecomaria capensis</i>	Cape Honeysuckle	Ground cover
269	N	<i>Teucrium chamaedrys</i>	Germander	Ground cover
270	N	<i>Thymus serpyllum</i>	Lemon Thyme	Ground cover
271	N	<i>Trachelospermum jasminoides</i>	Star Jasmine	Shrub
272	<input type="checkbox"/>	<i>Trichostema lanatum</i>	Woolly Blue-Curis	Shrub
273	X	<i>Trifolium hirtum</i> 'Hyron'	Hyron Rose Clover	Ground cover
274	X	<i>Trifolium fragiferum</i> 'O'Connor's'	O'Connor's Legume	Ground cover
275	<input type="checkbox"/>	<i>Umbellularia californica</i>	California Laurel	Tree
276	<input type="checkbox"/>	<i>Verbena lasiostachys</i>	Western Vervain	Perennial
277	N	<i>Verbena peruviana</i>	ncn	Ground cover
278	X	<i>Verbena</i> species	Verbena	Ground cover
279	X	<i>Vinca minor</i>	Dwarf Periwinkle	Ground cover
280	<input type="checkbox"/>	<i>Vitis girdiana</i>	Desert Wild Grape	Vine
281	X	<i>Vulpia myuros</i> 'Zorro'	Zorro Annual Fescue	Grass

SAN DIEGO COUNTY FIRE CHIEF'S ASSOCIATION
FUEL MODIFICATION ZONE PLANT LIST
July 15, 1997

	Code	Botanical Name	Common Name	Plant Form
--	------	----------------	-------------	------------

282	W	Westringia fruticosa		Shrub
283	W	Xanthorrhoea species	Grass Tree	Perennial accent /Shrub
284	W	Xylosma congestum	Shiny Xylosma	Shrub
285	X	Yucca species	Yucca	Shrub
286	<input type="checkbox"/>	Yucca whipplei	Yucca	Shrub

*****Plants listed in gray boxes may not be appropriate for use in certain locations based on invasiveness and ability to hybridize and will be reviewed on a case by case bases by the appropriate jurisdiction.*

- X = Plant species prohibited in fuel modification zones adjacent to reserve lands. Acceptable on all other fuel modification locations and zones.
- W = Plant species appropriate for use in irrigated portions of fuel modification zones adjacent to reserve lands. Acceptable in all other fuel modification locations and zones.
- = Plant species native to San Diego County. Acceptable in all fuel modification zones in all locations.
- N = Plant species acceptable on a limited basis (maximum 30% of the area at time of planting) in irrigated portions of fuel modification zones adjacent to reserve lands. Acceptable in all other fuel modification locations and zones.
- * = If locally collected.
- ** = Not native but can be used in all zones.
- = Plant species acceptable on a limited use basis. Refer to qualification requirements following plant palette.

UNDESIRABLE PLANTS AND WEEDS

Within Fuel Modification Zone

BOTANIC NAME

Adenostoma fasciculatum

Adenostoma sparsifolium

COMMON NAME

Chamise

Red Shanks

APPENDIX G
Prohibited Plant List

INTENTIONALLY LEFT BLANK

D

Prohibited Plant List

Botanical Name	Common Name
Trees	
<i>Abies</i> species	Fir trees
<i>Acacia</i> species	Acacia
<i>Agonis juniperina</i>	Juniper myrtle
<i>Araucaria</i> species	Norfolk Island pine
<i>Callistemon</i> species	Bottlebrush
<i>Cedrus</i> species	Cedar
<i>Chamaecyparis</i> species	False cypress
<i>Cinnamomum camphora</i>	Camphor tree
<i>Cryptomeria japonica</i>	Japanese cryptomeria
<i>Cupressocyparis leylandii</i>	Leylandii cypress
<i>Cupressus forbesii</i>	Tecate cypress
<i>Cupressus glabra</i>	Arizona cypress
<i>Cupressus sempervirens</i>	Italian cypress
<i>Cupressus</i> species	Cypress
<i>Eucalyptus</i> species	Eucalyptus
<i>Juniperus</i> species	Juniper
<i>Larix</i> species	Larch
<i>Olea europaea</i>	Olive tree
<i>Palm</i> species	Palms
<i>Pinus</i> species	Pine
<i>Podocarpus</i> species	Fern pine
<i>Pseudotsuga menziesii</i>	Douglas fir
<i>Schinus molle</i>	California pepper tree
<i>Tamarix</i> species	Tamarisk
<i>Taxodium</i> species	Cypress
<i>Taxus</i> species	Yew
<i>Tsuga</i> species	Hemlock
<i>Washingtonia filifera</i>	California fan palm
Groundcovers, Shrubs, and Vines	
<i>Acacia</i> species	Acacia
<i>Adenostoma fasciculatum</i>	Chamise
<i>Adenostoma sparsifolium</i>	Red shanks
<i>Anthemis cotula</i>	Mayweed
<i>Arbutus menziesii</i>	Madrone

D n

Botanical Name	Common Name
<i>Arctostaphylos</i> species	Manzanita
<i>Arundo donax</i>	Giant reed
<i>Artemisia californica</i>	California sagebrush
<i>Artemisia caucasica</i>	Silver spreader
<i>Artemisia pycnocephala</i>	Sandhill sage
<i>Atriplex</i> species	Saltbush
<i>Baccharis pilularis consanguine</i>	Coyote bush
<i>Baccharis</i> species	Coyote bush
<i>Bambusa</i> species	Bamboo
<i>Bougainvillea</i> species	Bougainvillea
<i>Brassica nigra</i>	Black mustard
<i>Brassica rapa</i>	Yellow mustard
<i>Cardaria draba</i>	Hoary cress
<i>Carpobrotus</i> species	Ice plant, hottentot fig
<i>Cirsium vulgare</i>	Wild artichoke
<i>Conyza bonariensis</i>	Horseweed
<i>Coprosma pumila</i>	Prostrate coprosma
<i>Cortaderia selloana</i>	Pampas grass
<i>Cytisus scoparius</i>	Scotch broom
<i>Dodonaea viscosa</i>	Hopseed bush
<i>Eriogonum fasciculatum</i>	California buckwheat
<i>Eriogonum</i> species	Common buckwheat
<i>Fremontodendron</i> species	Flannel bush
<i>Hedera helix</i>	English ivy
<i>Heterotheca grandiflora</i>	Telegraph plant
<i>Juniperus</i> species	Juniper
<i>Lactuca serriola</i>	Prickly lettuce
<i>Lonicera japonica</i>	Japanese honeysuckle
<i>Mahonia</i> species	Mahonia
<i>Miscanthus</i> species	Eulalie grass
<i>Muhlenbergia</i> species	Deer grass
<i>Nicotiana bigelovii</i>	Indian tobacco
<i>Nicotiana glauca</i>	Tree tobacco
<i>Pennisetum setaceum</i>	Fountain grass
<i>Perovskia atriplicifolia</i>	Russian sage
<i>Pickeringia 'montana'</i>	Chaparral pea

D n

Botanical Name	Common Name
<i>Rhus diversiloba</i>	Poison oak (worker/firefighter safety)
<i>Rhus laurina</i>	Laurel sumac
<i>Rhus lentii</i>	Pink flowering sumac
<i>Ricinus communis</i>	Castor bean
<i>Rosmarinus</i> species	Rosemary
<i>Salsola australis</i>	Russian thistle
<i>Salvia mellifera</i>	Black sage
<i>Salvia</i> species	Sage
<i>Silybum marianum</i>	Milk thistle
<i>Solanum xanti</i>	Purple nightshade (toxic)
<i>Thuja</i> species	Arborvitae
<i>Urtica urens</i>	Burning nettle
<i>Vinca major</i>	Periwinkle

NOTES:

1. Anyone using this list as a guide in selecting plant material must consider that all plant material will burn under various conditions, but some plants are less likely to ignite due to chemical composition, retained moisture, fuel arrangement, or other factors.
2. This is not a complete list of plants that are flammable. Plants not on this list may not be approved for this site.
3. All vegetation used in Fuel Modification Areas and elsewhere in this development are subject to approval of the RFD Fire Marshal.

INTENTIONALLY LEFT BLANK

APPENDIX H

*Water Availability Letter from
Ramona Water District*

INTENTIONALLY LEFT BLANK

PROJECT FACILITY AVAILABILITY FORM

WATER

Please type or use pen

The Salvation Army	(619) 231-6000	ORG _____	W
Owner's Name	Phone	ACCT _____	
825 Seventh Avenue		ACT _____	
Owner's Mailing Address	Street	TASK _____	
San Diego	CA 92101	DATE _____ AMT \$ _____	
City	State	Zip	DISTRICT CASHIER'S USE ONLY

SECTION 1. PROJECT DESCRIPTION	TO BE COMPLETED BY APPLICANT																																
<p>A. <input type="checkbox"/> Major Subdivision (TM) <input type="checkbox"/> Specific Plan or Specific Plan Amendment <input type="checkbox"/> Minor Subdivision (TPM) <input type="checkbox"/> Certificate of Compliance: _____ <input checked="" type="checkbox"/> Boundary Adjustment Rezone (Reclassification) from _____ to _____ zone. <input type="checkbox"/> Major Use Permit (MUP), purpose: _____ <input type="checkbox"/> Time Extension ... Case No. _____ <input type="checkbox"/> Expired Map ... Case No. _____ <input checked="" type="checkbox"/> Other <u>Modify Existing MUP</u></p> <p>B. <input type="checkbox"/> Residential Total number of dwelling units _____ <input type="checkbox"/> Commercial Gross floor area _____ <input type="checkbox"/> Industrial Gross floor area _____ <input checked="" type="checkbox"/> Other <u>Camp</u> Gross floor area <u>± 256,000 sq ft</u></p> <p>C. Total Project acreage <u>576</u> Total number of lots <u>1</u></p> <p>D. Is the project proposing the use of groundwater? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is the project proposing the use of reclaimed water? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Owner/Applicant agrees to pay all necessary construction costs, dedicate all district required easements to extend service to the project and COMPLETE ALL CONDITIONS REQUIRED BY THE DISTRICT.</p> <p>Applicant's Signature: <u>[Signature]</u> Date: <u>5-4-2006</u> Address: <u>825 Seventh Ave San Diego CA 92101</u> Phone: <u>619-231-6000</u></p> <p style="text-align: center;">(On completion of above, present to the water district to establish facility availability. Section 2 below.)</p>	<p style="text-align: center;">Assessor's Parcel Number(s) (Add extra if necessary)</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">1</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">2</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">0</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">0</td> <td style="border: 1px solid black; padding: 2px;">1</td> </tr> </table> <p>Thomas Bros. Page <u>1171</u> Grid <u>J6</u> Project address <u>14488 Mussey Grade Rd</u> <u>Ramona</u> ^{Street} <u>CA 92065</u> Community Planning Area/Subregion _____ Zip _____</p>	3	2	2	0	3	0	0	1	3	2	2	0	3	0	0	2	3	2	2	0	3	0	1	0	3	2	2	0	3	1	0	1
3	2	2	0	3	0	0	1																										
3	2	2	0	3	0	0	2																										
3	2	2	0	3	0	1	0																										
3	2	2	0	3	1	0	1																										

SECTION 2. FACILITY AVAILABILITY	TO BE COMPLETED BY DISTRICT
<p>District name <u>RAMONA MUNICIPAL WATER DISTRICT</u> Service area _____</p> <p>A. <input type="checkbox"/> Project is in the district. <input type="checkbox"/> Project is not in the district but is within its Sphere of Influence boundary, owner must apply for annexation. <input type="checkbox"/> Project is not in the district and is not within its Sphere of Influence boundary. <input checked="" type="checkbox"/> The project is not located entirely within the district and a potential boundary issue exists with the <u>RAMONA MUNICIPAL WATER</u> District.</p> <p>B. <input checked="" type="checkbox"/> Facilities to serve the project <input checked="" type="checkbox"/> ARE <input type="checkbox"/> ARE NOT reasonably expected to be available within the next 5 years based on the capital facility plans of the district. Explain in space below or on attached _____ (Number of sheets) <input type="checkbox"/> Project will not be served for the following reason(s): <u>BASED ON WATER SYSTEM EVALUATION COMPLETED FOR PROJECT</u></p> <p>C. <input checked="" type="checkbox"/> District conditions are attached. Number of sheets attached: <u>1</u> <input type="checkbox"/> District has specific water reclamation conditions which are attached. Number of sheets attached: _____ <input type="checkbox"/> District will submit conditions at a later date.</p> <p>D. <input type="checkbox"/> How far will the pipeline(s) have to be extended to serve the project? _____</p> <p>This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted. EXPIRES 6/6/08</p> <p>Authorized signature: <u>Phillip Dauben</u> Print name: <u>PHILLIP DAUBEN</u> Print title: <u>CIVIL ENGINEER</u> Phone: <u>760-788-2260</u> Date: <u>6/6/06</u></p> <p style="text-align: center;">NOTE: THIS DOCUMENT IS NOT A COMMITMENT OF SERVICE OR FACILITIES BY THE DISTRICT. On completion of Section 2 by the district, applicant is to submit this form with application to the Zoning Counter at the Department of Planning and Land Use, 5201 Ruffin Road, Suite B, San Diego, CA 92123.</p>	<p>#</p>

Conditions for Water Availability Letter (Not in District)

- a. The project is not within the District and not within its Sphere of Influence.
- b. Water facilities are reasonably expected to become available within five (5) years, if the following conditions are met:
 - i. If a pre-annexation expansion agreement is signed by the owner/developer and approved by the District's Directors whereby the District will request consideration from LAFCO to expand the Water District to include the project area and the owner/developer will assure the District that all actual costs of the facilities required by the project, including, but not limited to, administrative costs, design costs, construction costs and the cost of a percentage of the value of the existing facilities, will be paid solely by the owner/developer in a timely fashion. The pre-annexation expansion agreement should state that the facilities required by the project will need to be completed before any connections shall be made.
 - ii. If the District adopts a resolution applying to LAFCO for expansion of its Water District to include the area.
 - iii. If LAFCO approves the annexation to include the area.
- c. Developer shall make a deposit (minimum of \$2,000) with the District to cover all costs for any planning, system evaluation, and annexation required by the District for addressing the facilities needed to serve this project. The amount of the deposit may vary depending on the project scope and additional deposit may be needed depending on actual costs. *The Water System Evaluation shall be completed and a Water Service Agreement or Pre-Annexation Agreement executed before the Draft California Environmental Quality Act (CEQA) documents are prepared and before the District will sign a "Project Facility Commitment Form".*
- d. Water availability and commitment letters are based on current ordinances, resolutions, rules, regulations, specifications, and guidelines of the District. *Should these ordinances, resolutions, rules, regulations, specification, guidelines, and system conditions change from time to time, the applicant for shall be subject to the requirements in effect at the time of applying for water service.*

APPENDIX I

Salvation Army Emergency Procedures Document

INTENTIONALLY LEFT BLANK



RAMONA MUNICIPAL WATER DISTRICT
In cooperation with the
CALIFORNIA DEPARTMENT OF FORESTRY
And FIRE PROTECTION

105 Earlham Street
Ramona, California 92065-1599

Telephone:
1-760-788-2244

RAMONA FIRE PREVENTION BUREAU

September 28, 2004

The Salvation Army, Sierra del Mar Division
Stephen A. Ball, Captain
2320 Fifth Avenue
San Diego, Ca. 92101

RE: Evacuation and Fire Safety Plan

Location: Salvation Army Camp, 14488 Mussey Grade Rd., Ramona, Ca. 92065

Dear Stephen,

The Evacuation and Fire Safety Plan that you have submitted has been reviewed by myself, and Chief Vogt of the Ramona Fire Department/CDF. All of the items that we requested were identified in the plan. We thank you for the hard work that went into putting together such a complete document. The Ramona Fire Department/CDF will accept the plan as it was submitted in the last draft dated 9-16-04.

Sincerely,


Steve Delgadillo/Fire Marshal
Ramona Fire Department/CDF

The Salvation Army
Sierra del Mar Divisional Camp and Retreat Center

EMERGENCY PROCEDURES

In the event of an emergency at the Sierra del Mar Divisional Camp and Conference Center, the following initial steps must be followed:

1. Notify on site assistance, including: Camp Nurse, Resident Director, Program Directors, and/or Divisional Youth Secretary.
2. Evaluate the situation; determine what requires immediate action and what can be given secondary attention.
3. Remember your overall responsibilities; you have a group of campers to look after as well as the need to assist in the emergency.
4. Make a plan and follow it; do not make hasty or haphazard attempts to help. Pause to think clearly.
5. If needed, dial **911** for emergency assistance from: Medics, Fire, Police. Each phone at camp allows this phone call to be made. Provide the camp location to the authorities.

Location: **The Salvation Army**
 Divisional Camp and Conference Center
 14488 Mussey Grade Road
 Ramona, CA 92065
 (Located 1.5 miles off Hwy. 67 on Mussey Grade Road; Camp Office is 1.6 miles from camp entrance)

Camp Phone: **760-788-3310** or **760-788-3311**

6. Send any available staff member to the MAIN GATE to direct emergency vehicle(s) into camp.

SPECIFIC POLICIES AND PROCEDURES

The danger of serious fire is high in the rural areas throughout San Diego County. Use extreme caution and take sensible precaution.

1. Prevent the accumulation of flammable rubbish and see that dried brush, grass, etc. are cleared from the immediate areas of all buildings to a distance of 100 feet.
2. Check cords of any small electrical appliances (no octopus type plug-ins).
3. Never start or permit the starting of fires with flammable liquids.
4. Carefully dispose of oil, paints, rags and all other combustible materials.
5. Be aware of and understand all Camp Fire Safety Policies and Procedures.
6. Conduct a Fire Drill the first day of every camp period. Review procedures with all staff and campers.
7. Conduct an annual Fire Drill/Fire Evacuation exercise with the Fire Department.

EMERGENCY TRANSPORTATION

In the event of an emergency, evacuation or transportation of a sick/injured camper, follow these guidelines:

1. If evacuation is necessary due to fire or other emergency, all persons will be transported by designated Salvation Army vehicles; These vehicles will consist of either two large capacity school buses or equivalent vans and buses and cars that are kept on the camp premises at all times when the camp has scheduled occupancy.
2. Sick or Injured campers or staff members: If an ambulance is not requested, a camp vehicle, designated as the Medical Van, will be available at all times for the use of emergency medical visits. Such trips must be arranged through the Administrative Staff. The vehicle will be maintained in a manner that will assure constant readiness for emergency use.

EVACUATION PLAN

In the event that an evacuation becomes necessary, all campers and staff will be evacuated in a safe, orderly manner as directed by the Resident Director or other designated representative.

1. As in the case of a fire emergency all campers and staff will assemble at the baseball field.
2. All Campers and staff must first be accounted for by conducting a roll call.
3. The designated buses and vans will be moved to the assembly field for loading.
4. The Camp Nurse will bring all camper and staff medical records to the assembly field and will distribute them to the appropriate Group Leader/Counselor prior to evacuation.
5. All campers will remain in cabin groups and will evacuate as a group. The Group Leader/Counselor will be given responsibility for the paperwork for each of his/her campers. These forms are to be held until the camper has been released into the custody of the Parent/or Legal Guardian.
6. It is the responsibility of all staff to maintain a feeling of calm and control in an emergency situation. Do not panic.
7. The Resident Director or other designated representative will direct the loading and evacuation of all vehicles to a predetermined drop-off location.
8. The Resident Director will communicate annually with Fire Department Personnel to determine which locations to designate as evacuation sites.
9. The Divisional Youth Secretary or Resident Director will call a designated person at Divisional Headquarters to inform them of the emergency and to ask for assistance where needed.
10. Once the camp is safely at the evacuation site, parents will be notified and arrangements made for campers to be picked up.

CAMPFIRES

Open campfires can only be used in designated campfire pits when the Fire Marshall has given his/her approval.

CAMPFIRES MUST:

1. Be approved by the Resident Director.
2. Have either a garden hose, large water-filled buckets or a fire extinguisher on hand.
3. Be built in a pit approved by the Fire Department.
4. Be supervised at all times.
5. Be completely extinguished and cool to touch before the leaving the area.

IN CASE OF A FIRE EMERGENCY

1. Sound the alarm throughout the camp.
2. Notify Fire Department (dial 911) and the Camp Administrative Staff.
3. Each staff member will report to the large, open baseball field with ALL campers for whom he/she is responsible.
4. Staff are to keep a watch for any stragglers or unaccompanied campers and encourage them to go immediately to the baseball field.
5. Once all are assembled specific staff will take charge and will assist in the emergency situation.
6. Both the *Camp Visitor Log* and the *Staff Sign-Out Log* will be taken to the baseball field by the Camp Secretary or other designated representative.
7. Camper and staff groups will form orderly single file lines so that an accurate accounting of all persons can be made.
8. The Resident Director or a designated representative will receive a report from each Camper or Staff Group Leader to determine if all persons in their group are present and/or accounted for. If any persons are missing, the Resident Director will appoint available staff to search for the individual(s). All staff will be notified and questioned about the whereabouts of any persons that are missing. Those searching for missing persons will look for the person(s) only as long as it is safe to do so or until directed by emergency personnel to return to the assembly area. If the missing persons cannot be located, the names will be reported to the Resident Director and Fire Department Personnel.
9. Campers and Staff will remain at this location until the Resident Director or Fire Department Personnel gives further instruction.
10. The Divisional Youth Secretary or Resident Director will call a designated person at Divisional Headquarters to inform them of the emergency and to ask for assistance where needed.

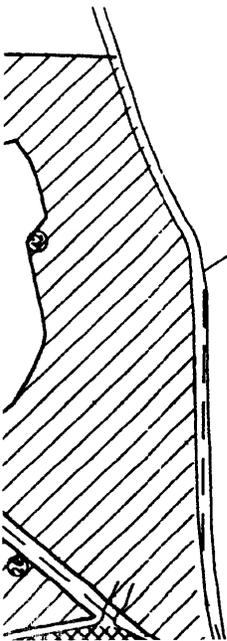
Note: *A large quantity of dust masks will be stored and maintained at the baseball field along with a heavy duty hose and spray nozzle.*

Most Importantly: **KEEP CALM!**

APPENDIX J

*Exception to Road Standard Granted to Ramona
Water District*

INTENTIONALLY LEFT BLANK



APPROVALS :

Steve Delgadillo 5-2-02
 STEVE DELGADILLO, FIRE MARSHAL
 RAMONA FIRE DEPARTMENT/CDF

Clifford F. Hunter 5-13-02
 CLIFFORD F. HUNTER, FIRE CODE SPECIALIST
 COUNTY OF SAN DIEGO

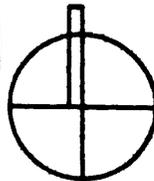
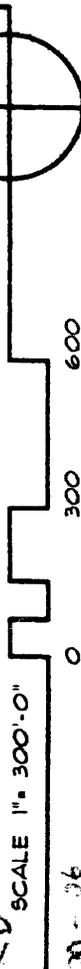
APPROVED

Steve Delgadillo 10-15-02

EXCEPTION

10/11/02

SCALE 1" = 300'-0"



APPROVED
 RAMONA FIRE DEPT.
 DATE: *10/15/02*

.....

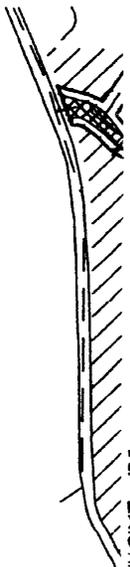
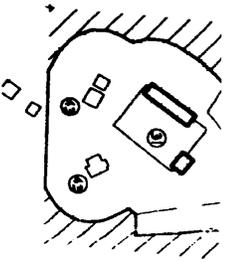
REVISIONS

SITE MEETING W/DELGADILLO & HUNTER 04.18.02
 WATER TANK RELOCATION 05.01.02
 MEETING WITH DELGADILLO FOR DEVIATION TO ROAD WIDTH STD. 9/25/02 10.01.02

DATE 01.15.02
 SCALE NOTED
 DRAWN BY: PV
 PROJECT NO: 97021.01

SHEET:

F



18. PROPOSED TENT CAMPING - SEE ENLARGED PLAN
19. PROPOSED MULTI-PURPOSE FACILITY - SEE ENLARGED PLAN
20. PROPOSED INDOOR MINI-THEATER - SEE ENLARGED PLAN
21. POND TO BE RECURBISHED
22. REPRESENTATION AREA
23. PROPOSED RETREAT - SEE ENLARGED PLAN
24. PROPOSED GATE HOUSE
25. EXISTING LANDFILL TO BE REMOVED
26. PROPOSED 10" PRIVATE WATER LINE (TO REPLACE EXISTING)
27. PROPOSED ROPE COURSE
28. PROPOSED 260,000 GALLON WATER TANK
29. EXISTING 10,000 GALLON WATER TANK

APPROVALS :

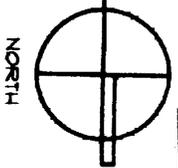
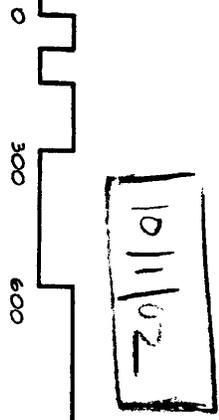
Steve Delgadillo
 STEVE DELGADILLO, FIRE MARSHAL
 RAMONA FIRE DEPARTMENT/CDP

Clifford F. Hunter
 CLIFFORD F. HUNTER, FIRE CODE SPECIALIST
 COUNTY OF SAN DIEGO

FIRE MARSHAL EXHIBIT: REQUEST FOR AN EXCEPTION
 TO A ROAD STANDARD
 PROPOSED SITE PLAN

MVP 70-371W² SP 00-06

SCALE 1" = 300'-0"



A
 DATE

APPENDIX K

ill *oser Letter* *ater an*
ire lo erti i ation

INTENTIONALLY LEFT BLANK



NASLAND ENGINEERING

CIVIL ENGINEERING • SURVEYING • LAND PLANNING

Job No. 196-222.2
November 20, 2007

Michael Huff, Manager
Dudek
605 Third Street
Encinitas, CA 92024

This letter summarizes the design parameters for the water system proposed for the Salvation Army campground in Ramona. The Ramona Water District's public water main in Mussey Grade Road is currently not adequate to effectively fight wildfires. The existing water main is a 6-inch diameter, dead-end pipe beneath Mussey Grade Road extending south to Fernbrook Drive. Although the static pressure in the system is adequate, properties to the south can not pull enough water through the pipe to fight major fires, and have a marginally reliable water supply at other times.

At the request of the Salvation Army, the Ramona Municipal Water District Department of Engineering commissioned a hydraulic analysis of the water system in Mussey Grade Road, including the effects of the proposed campground expansion. The results of that analysis and recommendations for improvements are contained in a report dated January 23, 2002 (RMWD Project Number 10022-1).

Based on the 2002 report, the RMWD has already set and approved water system requirements for the campground. The requirements include a 260,000 gallon tank (expandable to one million gallons) with a base level of 1665 feet. The tank will be connected to the existing main in Mussey Grade Road through two pipeline extensions in a five valve package. The water tank and all pipelines and appurtenances connecting to the main in Mussey Grade Road are to be public, dedicated to the Ramona Municipal Water District.

The proposed 260,000 gallon tank is larger than needed for the campground alone. In fact the tank size is based on supplying both domestic and fire needs of all the existing properties in the 2217 acre service area between the campground and the end of the line at Fernbrook. This includes all properties within the District boundaries along Mussey Grade Road.



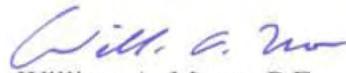
The 2002 study report prepared for the RMWD states as follows:

Implementation of this recommendation improves the Mussey Grade Road community water distribution system in the following ways:

- 1. Dramatically improves the fire flow to the Mussey Grade Road fire hydrant locations.*
- 2. Allows for greater operational and emergency water storage should pipeline breaks or shut-downs occur, and*
- 3. Eliminates the need for the Mussey Grade Pressure Reducing Valve....*

The new tank will thus improve the reliability of the water supply and allow much greater fire flow for all properties on Mussey Grade Road south of Dos Picos Park Road to the dead end.

Sincerely,
NASLAND ENGINEERING


William A. Moser, P.E.
Chief Engineer