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FIRE Safe MARIN

VEGETATION MANAGEMENT PLAN

for

Rotary Valley Senior Village

Prepared for:

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PURPOSE

Urban Forestry Associates (UFA) was hired to inspect the landscape and wildland vegetation at the Rotary Valley Senior Village in Lucas Valley at the request of Todd Lando on July 30, 2015. The purpose was to assess the condition of the vegetation for fire safety and to provide recommendations on fire risk mitigation through vegetation management.

OBSERVATIONS

The property is located inside the **Wildland Urban Interface (WUI)**. This is an area of transition between urban development and open space where structures are at an elevated risk of damage from wildfires. Homes in the WUI are subject to strict regulations to mitigate fire risk and protect the residences as well as first responders in the event of a wildfire.

Fortunately, the property is relatively flat and is not surrounded by particularly dense vegetation.

There is, however, hazardous vegetation fuel loads along roads serving the Village and a fairly heavy fuel load presence of **fire-prone plants** in the landscape. These are plants whose characteristics promote the ignition and spread of fire and are not recommended for use. These characteristics include volatile oils; an accumulation of fine, dead material; and **high surface to volume ratios** in the foliage and stems (small leaves, needles and fine twigs). See Appendix A for a list of fire-prone vs. fire-resistant plants.

The fire risk conditions on the property are average to slightly above average in its current state. None of the issues observed were extreme or irreparable, although there is substantial work to be done. The main focus was “ember-catchers” close to buildings and along paths to residential units.

The large parking area in the center of the property is an ideal place for residents to gather for protection or evacuation during a wildfire if their homes become threatened and are no longer safe.

DISCUSSION

Fire Apparatus Clear Zone (FACZ)

The area adjacent to roads and driveways is known as the Fire Apparatus Clear Zone (FACZ) and vegetation management in this area is critical to safe access/egress during a wildfire event. Many of the commonly used plants in the FACZ are fire-prone and juniper is particularly popular yet hazardous. The entrance to the property has a dense juniper hedge, leading up to a stand of mature trees including redwoods and bays. This is known as a **fuel ladder**. Roadsides are particularly vulnerable to ignitions and the juniper hedge, which burns intensely would preheat the normally fire-resistant redwood canopies. These canopies also extend all the way to the ground, known as **continuous ground to crown fuel continuity**.

Figure 1. Juniper fuel ladder at entrance.

County Frontage Along Mt. Lassen
The trees planted between Mt. Lassen and the HOA are *Eucalyptus globulus* and *Eucalyptus globulus* var. *compacta*. These are notoriously fire-prone species with a great deal of volatile oils that can explode when exposed to fire under high fire risk conditions. Compacta specifically is prone to crown fires as it forms a dense canopy very low to the ground full of twiggy material (high surface to volume ratio) and accumulated debris.

The north most in this line of three eucalyptuses is a compacta adjacent to a fire hydrant as well as a structure. While the area beneath this tree is quite open, safe access to that hydrant could be crucial during a fire and so safeguarding the area is of utmost importance. At the very least, this tree should be limbed to a height of 15' above grade, if not totally removed. The same is true for the other two eucalyptuses in the line.

Dense Shrubs Bordering Paths
At several locations on the property, there are hedges of fire-prone shrubs planted along the access paths (Figure 2). During a fire, these could ignite from embers and burn with great intensity, making safe emergency access or egress along these paths impossible. As some of the residents require regular care and are not able to rapidly exit the area under their own power, they should not be placed in a situation where they are required to shelter in place. Evacuation should be possible minimal assistance. This cannot be done with the current hedge conditions. These hedges should be progressively removed and replaces with fire resistant landscaping.

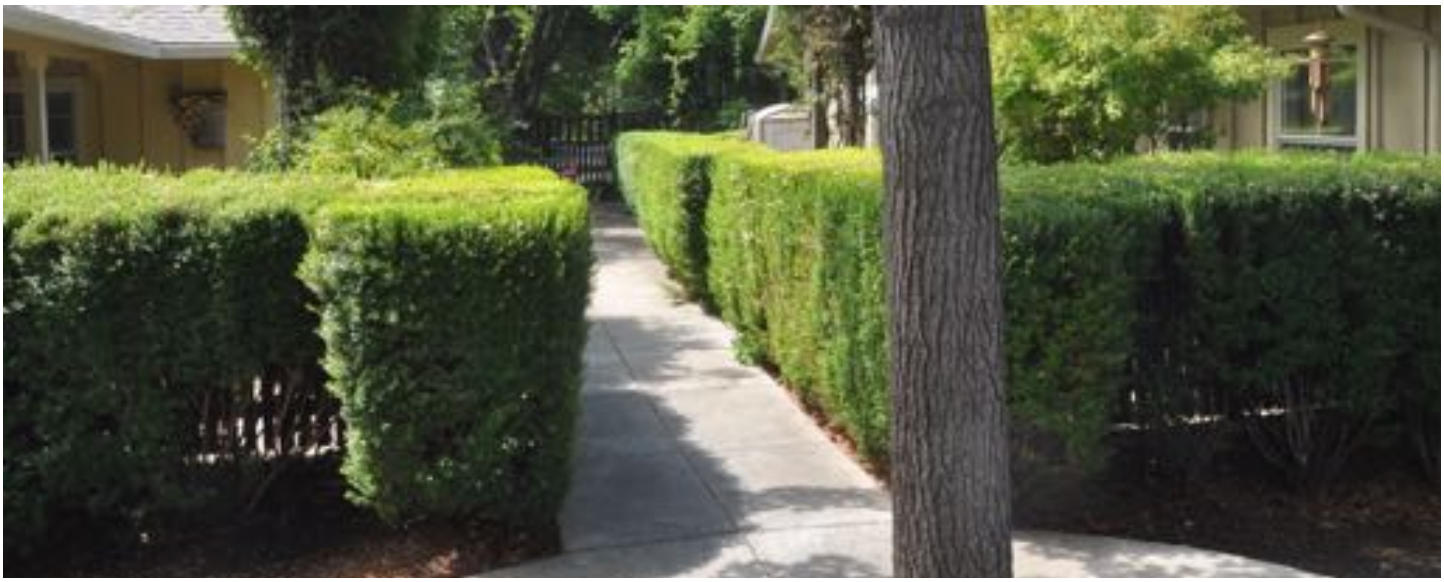


Figure 2. Fire-Prone Hedges

SPECIFIC TREATMENT RECOMMENDATIONS

- Remove any juniper hedges within ten feet (10') of any road or driveway. These may be replaced with a fire resistant plant listed in Appendix A.
- Remove all foliage and limbs under 3" diameter below 10' on any tree, provided this does not remove more than 1/3 of the canopy.
- Ideally, remove the *Eucalyptus globulus* var. *compacta* adjacent to the fire hydrant but at the very least, follow the recommendation above for removing limbs below 10'.
- The dense manzanitas should be thinned to have a more open form (Figure 3), and all deadwood should be removed in a timely manner.
- Dense, fire-prone hedges planted along walkways should be removed.
- Ask County to remove dead poplar if it is theirs.
- Remove pampas grass and thin out dense, twiggy manzanita.
- Clear leaves from inside corners and other "ember traps".
- Remove fine, twiggy shrubs form under adjacent to walls and under over-hangs.

Figure 3. Recommended Manzanita Treatment.

GENERIC TREATMENT RECOMMENDATIONS

VEGETATION FUELS MANAGEMENT STRATEGIES
Strategy: Select fire resistant plants
Actions:

- Remove any and all pyrophytic shrubs within the indicated Defensible Space Zone.
- Select listed fire resistant species, or consult the VMP specialist for other fire resistant landscaping plant recommendations.
- When replanting, select species with low surface to volume ratios (i.e., southern magnolia, tulip tree, rhododendron, Myoporum or English laurel vs trees like acacia, eucalyptus, pine, fir and juniper).
- Select broadleaf vs. needle-leaf species.
- Select clean looking species with stout branches and twigs (non-twiggy).
- Select species listed as pest and disease resistant.
- Select deciduous trees and shrubs with supple, moist foliage.
- Select species without volatile oils in their leaves (use the smell test). Sap is water-like and does not have a strong oil odor.

Strategy: Reduce fuel volumes.
Actions:

- Remove all deadwood from trees and shrubs.
- Thin oaks and bays to reduce production of ground litter and debris.
- Create shrub/grass/hardscape mosaics from continuous shrub masses.
- Remove shrubs beneath and around existing and emerging trees.
- Use low-growing, non-pyrophytic (fire resistant) shrubs and ground cover as replacement plants.
- Remove/reduce all lofty or loosely compacted litter accumulations, especially large debris such as branches and replace with compact, small particle mulch to prevent invasion of noxious weeds and elevate the live fuel moisture of retained plants.
- Vines, which tend to accumulate dead material, should be removed from trees and the home.

Strategy: Reduce fuel flammability.
Actions:

- Irrigate plants, appropriate to species, to maintain high live fuel moisture content.
- Use fire resistant mulch to increase ground and live fuel moisture.
- Remove dead material and leaf litter from all shrubs.
- Cut all grasses when 50% cured (dried), or no later than June 1.
- Replace annual grasses with plants that do not cure (dry out).
- Remove deadwood in trees and shrubs.
- Remove all dead and downed material each year by June 1, leaving compact leaf litter or mulch to a depth of not more than 2”.
- Remove shrubs that have a dead sub-canopy inside the surficial green canopy.
- Remove sick, dying, and dead shrubs and trees.

Strategy: Establish/maintain fuel discontinuity.
Actions:

- Remove/reduce “ladder” fuels (grass, to brush, to trees, low to high branches, lose flammable bark).
- Remove all Douglas fir and Monterey pine reproduction.
- Create shrub/grass mosaics from continuous masses by installing hardscape where possible.
- Remove shrubs from beneath and around existing and emerging trees.
- Thin thickets of small trees and tree reproduction from large tree understories.
- Create low fuel zones near structural vulnerabilities such as windows, decks, and large structural overhangs.

Strategy: Reduce the possibility of fire traveling through tree crowns.
Actions:

- Separate overlapping tree and large shrub canopies.
- Thin fire-prone tree canopies (Coast live oak, California bay laurel, Douglas fir, Monterey pine,) to open canopy structure. To maintain tree health, remove no more than 30% of foliage per-tree, per-year).
- Ensure that no shrubs or immature trees are allowed to grow beneath mature trees where they would create a fuel ladder.
- Remove all conifer reproduction on property. Retain existing conifers as recommended, with treatment (limb to recommended height and remove all deadwood).
- Prune out low hanging fire-available branches and twigs up to 3 inches in diameter to a minimum of 10 feet above ground under any portion of the canopy or to an elevation 10 feet above the highest ground elevation.
- Where it is not possible to separate crowns by at least 10 feet, prune low hanging fire-available branches and twigs up to 3 inches in diameter to a minimum of 10 feet above ground under any portion of the canopy or to an elevation 10 feet above the highest ground elevation if the height of the tree allows.
- Perform fuel volume reduction actions mentioned above.

FIRE APPARATUS CLEAR ZONE (FACZ)

Management Recommendations:

The FACZ is critical to safe access/egress during a wildfire event.

- All trees within 10' of roadways and driveways should be maintained so that no part of the tree's canopy extends laterally across the roadway or meets an opposing tree's canopy. This provides increased roadway clearance, and decreases the potential for flame impingement on the roadway.
- Tree canopy, where it extends over the roadway, should be raised to a minimum of 15 feet above the paved road surface to provide safe clearance for fire apparatus, and should not meet and opposing canopy.
- Vegetation within 10 feet of roadways should be restricted to fire resistant species (See attached list of fire resistant screen species). Plants should have low surface to volume ratio (Ex: pine is high, and magnolia is low) and should have low concentration of volatile oils, waxes, and fats (pine, fir & bay have high volatile oil content, redwood & oak have low volatile oil content, acacias have high volatility).
- All brush and brambles (blackberries) should be removed within 10 feet of roads to maintain the FACZ.
- Remaining roadside vegetation should be regularly deadwooded and irrigated where the plants are tolerant of summer water (even intolerant plants will tolerate infrequent deep irrigation).
- All dead and down material should be removed.
- Cured grasses and herbs should be cut to less than 4" from June 1 to November 1 or the onset of rain.

DRIVEWAY SIDE FUELS MANAGEMENT ZONE

- Trees adjacent to the driveway should be maintained to meet the same standards as the FACZ roadway, with 15' of vertical clearance from the driveway base and 5' laterally.
- All down and dead debris should be removed.
- Cured grasses and herbs should be cut to less than 4" from June 1 to November 1 or onset of rains.
- Brush, shrubs, and undergrowth should be removed at least 10' from the sides of the driveway.

LANDSCAPING AND MAINTENANCE

- All pyrophytic (fire-prone) shrubs should be removed inside the Defensible Space zone.
- In the defensible space zone, all shrubs will be maintained to a height of less than two feet where they might preheat aerial fuels or form ladder fuels to tree canopies. Shrubs shall be spaced so that no continuity exists between the ground fuels and tree crowns, to reduce the likelihood that a ground fire will extend into the tree canopy. Shrubs or shrub islands (no greater than 15 feet in diameter) shall be spaced a distance apart of two times the actual height of the shrub.
- Native grasses will be maintained, cut to a height of less than 4" from June 1 –October 31. Grasses may need to be cut more than once per season depending on ground moisture and annual growing conditions.
- A compact chipped wood mulch to a depth of 2 inches is recommended and may be applied throughout the landscape to provide water conservation, weed control, healthier and increased moisture content soil environment, increased plant health and higher live vegetation fuel moisture.
- Fire resistant woody plants shall be placed a distance apart at least equal to the mature height of the plants.
- If trees are planted they shall be planted such that when mature, their crowns will be separated by at least 10 feet.
- Only use fire resistant landscaping plants either listed in Appendix A (Fire Resistant Plants), or in compliance with fire resistant plant characteristics, or approved by the urban forester/fire ecologist.

Maintenance Schedule:
The vegetation fuels in the Defensible Space Zone, FACZ, and the Driveway Side Fuel Management Zone, should be maintained as recommended in this report, on an annual basis, prior to June 1 of each year or prior to the beginning of the stated fire season. **Roofing, including rain gutters and valleys, should be maintained completely free of all leaf litter, needles, and dead vegetation at all times**.

Check for accumulated leaf fall in the late summer and Fall regularly.

Irrigation systems should be inspected annually to ensure adequate moisture content is maintained in landscaping plants.

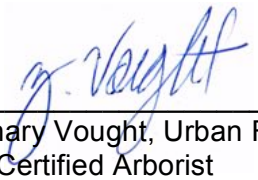
SCOPE OF WORK / LIMITATIONS

Information regarding property boundaries, land ownership, and tree ownership was evident from a land survey, property fencing and/or provided by the client. UFA has no personal or monetary interest in the outcome of this matter. All determinations reflected in this report are objective and to the best of our ability. All observations regarding the sites and trees were made by UFA personnel, independently, based on our education and experience. Determinations of the health and hazard potential of the subject trees are through visual inspection only and of our best professional judgment.

The health and hazard assessments in this report are limited by the visual nature of the assessment. Defects may be obscured by soil, brush, vines, aerial foliage, branches, multiple trunks or other trees. None of the subject trees were examined using invasive techniques such as increment coring or Resistograph® tests. The probability of tree failure is dependent on a number of factors including: topography, geology, soil characteristics, wind patterns, species characteristics (both visually evident and concealed), structural defects, and the characteristics of a specific storm. Structurally sound, healthy trees are wind thrown during severe storms. Consequently, a conclusion that a tree does not require corrective surgery or removal is not a guarantee of no risk, hazard, or sound health.

TREE WORK STANDARDS AND QUALIFICATION

All tree work, removal, pruning, planting, shall be performed using industry standards as established by the International Society of Arboriculture. Contractor must have a State of California Contractors License for Tree Service (C61-D49) or Landscaping (C-27) with general liability, worker's compensation, and commercial auto/equipment insurance.
Contractor standards of workmanship shall adhere to current Best Management Practices of the International Society of Arboriculture (ISA) and the American National Standards Institute (ANSI) for tree pruning, fertilization and safety (ANSI A300 and Z133.1).



Zachary Vought, Urban Forester
ISA Certified Arborist

Ray Moritz, Urban Forester SAF Cert #241
ISA Certified Tree Risk Assessor

SOURCES

- Field Inspection performed by Urban Forestry Associates on July 30, 2015.

APPENDIX A. Fire Resistant Plants

Shade Tolerant	
Species (scientific name)	*Common Name*
Agapanthus	Dwarf lily-of-the-Nile
Liriope	Lily turf
Vinca minor	Dwarf periwinkle
Herbs	
Galium odoratum	Sweet woodruff
Lavandula angustifolia	English lavender
Salvia chameadryoides	Sage
Teucrium chamaedrys	Germander
Thymus serpyllum	Thyme
Thymus vulgaris	Thyme
Thymus vulgaris 'Argenteus'	Silver thyme

Drought Tolerant	
Species (scientific name)	*Common Name*
Achillea millefolium	Common yarrow
Ceanothus 'concha'	Wild lilac
Ceanothus maritimus	Maritime ceanothus
Cistus purpureus	Orchid rockrose
Dietes fortnight	Llily
Lavandula dentata	French lavender
Limonium perezii statice	Sea lavender
Ribes viburnifolium	Catalina perfume
Solanum jasminoides	Potato vine
Tecomaria capensis	Cape honeysuckle

California Natives	
Species (scientific name)	*Common Name*
Carpenteria californica	Bush anemone
Eschscholzia californica	California poppy
Fremontodendron californica	Common flannel bush
Mahonia repens	Creeping mahonia
Mimulus longiflorus	Monkey flower
Polystichum munitum	Sword fern
Ribes sanguineum	Pink winter/red flowering currant
Salvia clevelandii	Sage
Salvia sonomensis	Sage
Zauschneria californica	California fuschia

Shrubs and Groundcovers	
Erigeron karvinskianus fleabane	Santa Barbara daisy
Festuca glauca	Fescue
Iris douglasiana	Douglas iris
Kniphofia uvaria 'DWF'	Red-hot poker, torch-lily
Lantana camara	Lantana
Lavandula angustifolia	English lavender
Rhamnus californica	Coffeeberry
Santolina virens	Santolina

Perennials	
Ajuga reptans	Carpet bugle
Chrysanthemum maximum	Shasta daisy
Echinacea purpurea	Purple coneflower
Prunus florabunda 'Robinson'	Flowering cherry
Rhododendron	Azalea
Rosa florabunda	Rose
Rudbeckia fulgida	Black-eyed susan
Teucrium cossoni	Germander

Hedges and Screens	
Species (scientific name)	*Common Name*
Acer ginnala	Amur Maple
Afrocarpus gracilior	Fern Pine
Arbutus unedo	Strawberry Tree
Camellia japonica	Camellia
Carissa grandiflora	Natal Plum
Ceritonia siliqua	Carob
Citrus species	Lemons, Limes, Oranges, etc.
Cocculus laurifolius	Cocculus
Cornus mas	Cornelian Red, Sorbet
Cornus stolonifera	Red-Osier Dogwood
Crataegus phaenopyrum	Washington Thorn
Elaegnus angustifolia	Russian Olive
Elaegnus pungens	Silverberry
Eriobotrya japonica	Loquat
Escallonia rubra	Escallonia
Eugenia species	Eugenia
Euonymus species	Euonymous
Feijoa sellowiana	Pineapple Guava
Hibiscus rosa-sinensis	Tropical Hibiscus
Hibiscus Syriacus	Rose of Sharon
Ligustrum lucidum	Glossy Privet
Ligustrum species	Privet

Hedges and Screens	
Species (scientific name)	*Common Name*
Magnolia species	Little Gem Magnolia
Malus species	Apple
Myoporum laetum	Myoporum
Myrica californica	Pacific Wax Myrtle
Nerium oleander	Oleander
Olea europaea	Swan Hill Olive
Osmanthus fragrans	Sweet Olive
Photiniax fraseri	Photinia
Pittosporum crassifolium	Karo
Pittosporum tobira	Mock Orange Pittosporum
Pittosporum undulatum	Victorian Box
Plumbago auriculaata	Cape Plumbago
Podocarpus macrophyllus	"Yew" Tree
Prunus caroliniana	Cherry Larel
Prunus ilicifolia	Hollyleaf Cherry
Prunus laurocerasus	English Laurel
Pyrus kawakamii	Evergreen Pear
Rhamnus species	Buckthorne
Rhododendron species	Azalea, Rhododendrons
Vaccinium species	Blueberry*
Viburnum tinus	Viburnum*
Xylosma congestum	Xylosma

APPENDIX B. Fire-Prone Plant List

High Fire Hazard Native Shrubs	
Species (scientific name)	*Common Name*
Adenostoma fasciculatum	Chamise, Greasewood
Arctostaphylos spp.	Manzanita
Artemisia californica	Sagebrush
Baccharis spp.	Covote Brush
Castanopsis chrysophylla	Chinquapin, Giant
Erigonumfasciculatum	California Buckwheat
Pickeringia montena	Chaparral Pea
Quercus spp.	Scrub Oak (brushy oaks)
Salvia mellifera	Black Sage
Vaccinium	Huckleberry

High Fire Hazard Native Trees	
Species (scientific name)	*Common Name*
Cupressus sargentii	Sargent Cypress
Lithocarpus densiflora	Tanoak
Pinus coulteri	Coulter Pine
Pinus attenuata	Knobcone Pine
Pinus radiata	Monterey Pine
Pinus muricata	Bishop Pine
Pseudotsuga menziesii	Douglas Fir
Umbellularia californica	California Bay

Fire Hazardous Exotics	
Species (scientific name)	*Common Name*
Apies spp.	Firs
Bambusa spp.	Bamboo
Cedrus spp.	Cedars
Chamaecyparis spp.	False Cypress
Juniperus spp.	Junipers
Larix spp.	Larch
Lonicera japonica	Japanese Honeysuckle
	Plam (if dry fronds)
Pennisetum spp.	Fountain Grass
Picea spp.	Spruces
Pinus spp.	Pines
Rosmarinus officinalis	Rosemary
Spartium junceum	Spanish Broom
Taxus spp.	Yew
Thuja spp.	Arborvitae
Tsuga spp.	Hemlock
Ulex europea	Gorse

High Fire Hazard Exotics	
Species (scientific name)	*Common Name*
Acacia spp.	Acacia Species
Cortaderia jubata	Jubata Grass
C. selloana	Pampas Grass
Cytisus scoparius	Scotch Broom
c. Monspessulanus	French Broom
Eucalyptus spp.	Most Eucalyptus
Pennisetum spp.	Fountan Grass
Spartium junceum	Spanish Broom
Ulex europea	Gorse