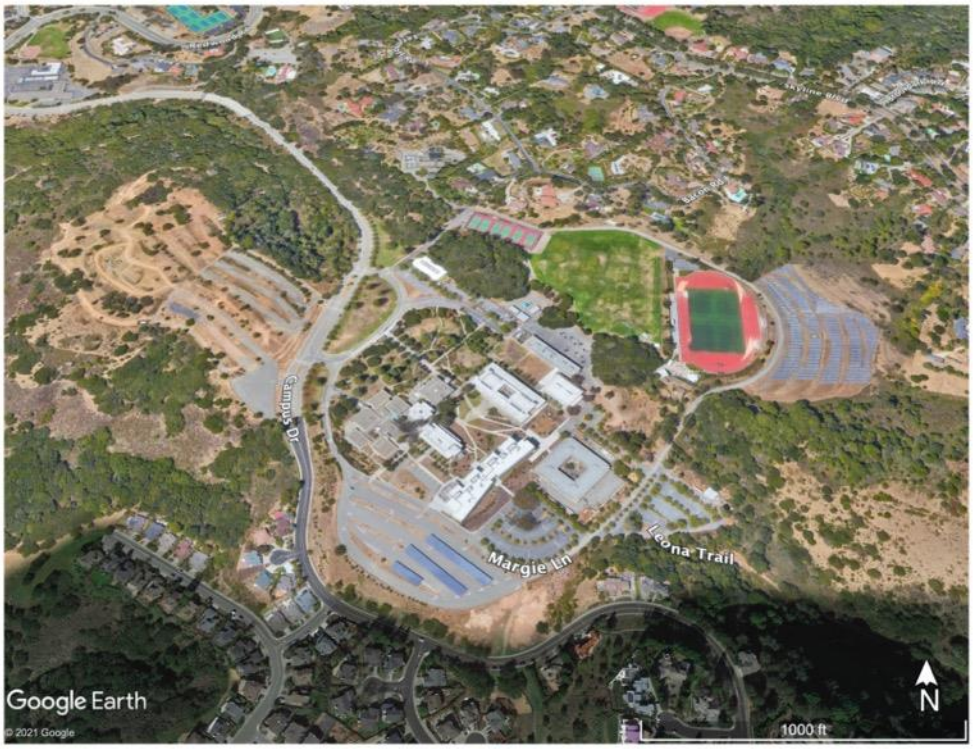
Merritt College Vegetation Management Plan

November 10, 2021



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Statement of Purpose

The overarching purpose of vegetation management is to reduce the potential for uncontrolled spread of wildfire and resulting damage at Merritt College.

The Merritt College Vegetation Management Plan was developed, in part, to fulfill a "condition of approval" for the new construction of the Merritt College Horticultural complex and Child Care Facility. The environmental review documents identify specific mitigation measures that have been incorporated into the plan (see Appendix). The purpose was expanded to guide vegetation management for the campus as one way to enhance its wildland fire safety.

Beyond compliance with conditions of approval for new construction, the Vegetation Management Plan has four goals:

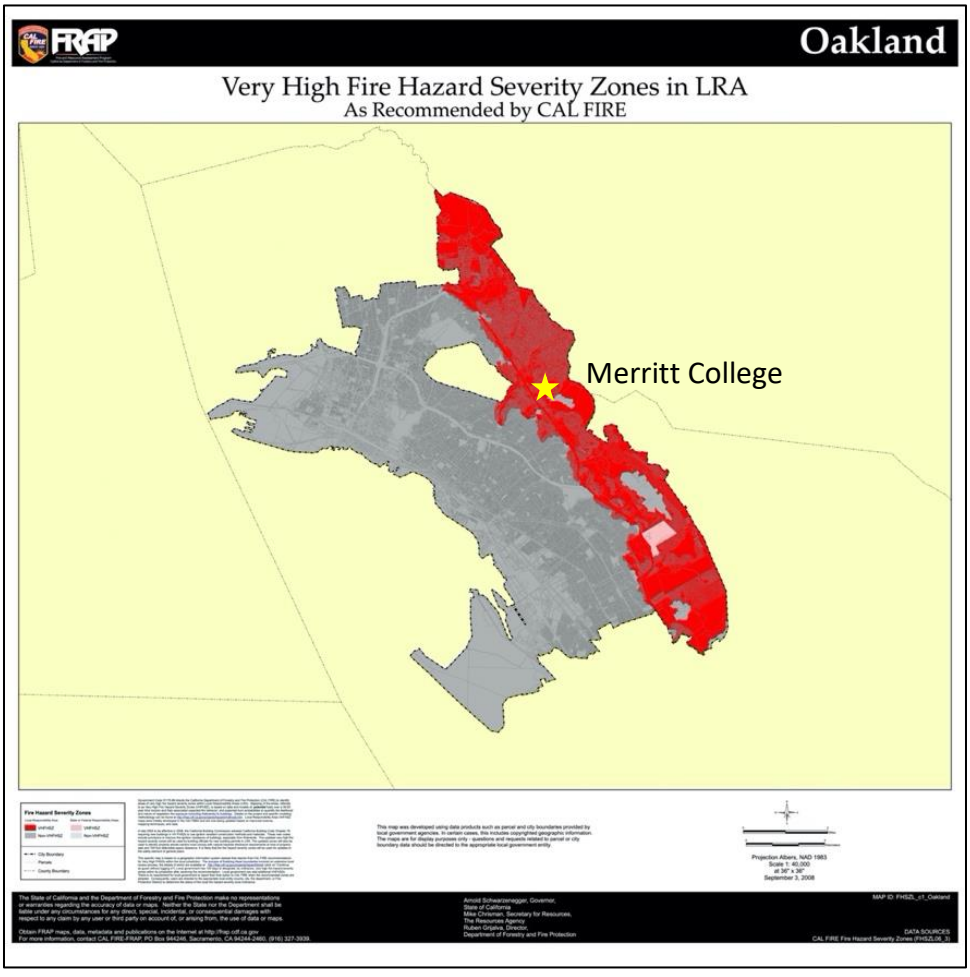
1. Life safety
2. Compliance with laws (in addition to Conditions of Approvals)
3. Reduce potential & liability for property damage
4. Resilience: Continuity of operations/ rapid recovery from wildfire

Life safety addresses Merritt College students, staff, and visitors on campus, as well as residents and visitors on adjacent properties. Compliance is required not only as Condition of Approvals for new construction, but also for local and state laws that relate to wildfire and vegetation management throughout the existing campus. The intent of vegetation management is to reduce both the potential for damage to campus facilities should a fire ignite off-site, as well as the Peralta Community College District's liability should a fire start on campus and move to neighboring properties. And finally, the campus's resiliency and ability to recover rapidly from a wildfire can be improved by undertaking the mitigation measures included in the plan. Comprehensive continuity planning is beyond the scope of this Vegetation Management Plan; however, the recommended mitigation measures were developed to support post-fire recovery.

Wildfire Hazards

CAL FIRE Very High Fire Hazard Severity Zone

Merritt College is located within a "very high fire hazard severity zone" as identified by the State of California Department of Forestry and Fire Protection (CAL FIRE)[1] and adopted by the City of Oakland. These designations indicate that due to slope, prevailing winds, and fuel volume, the potential is high for uncontrolled spread of wildfire. Both CAL FIRE and City of Oakland have requirements as a result of this designation to reduce hazards and improve emergency response and evacuation from the campus as detailed in this Vegetation Management Plan.

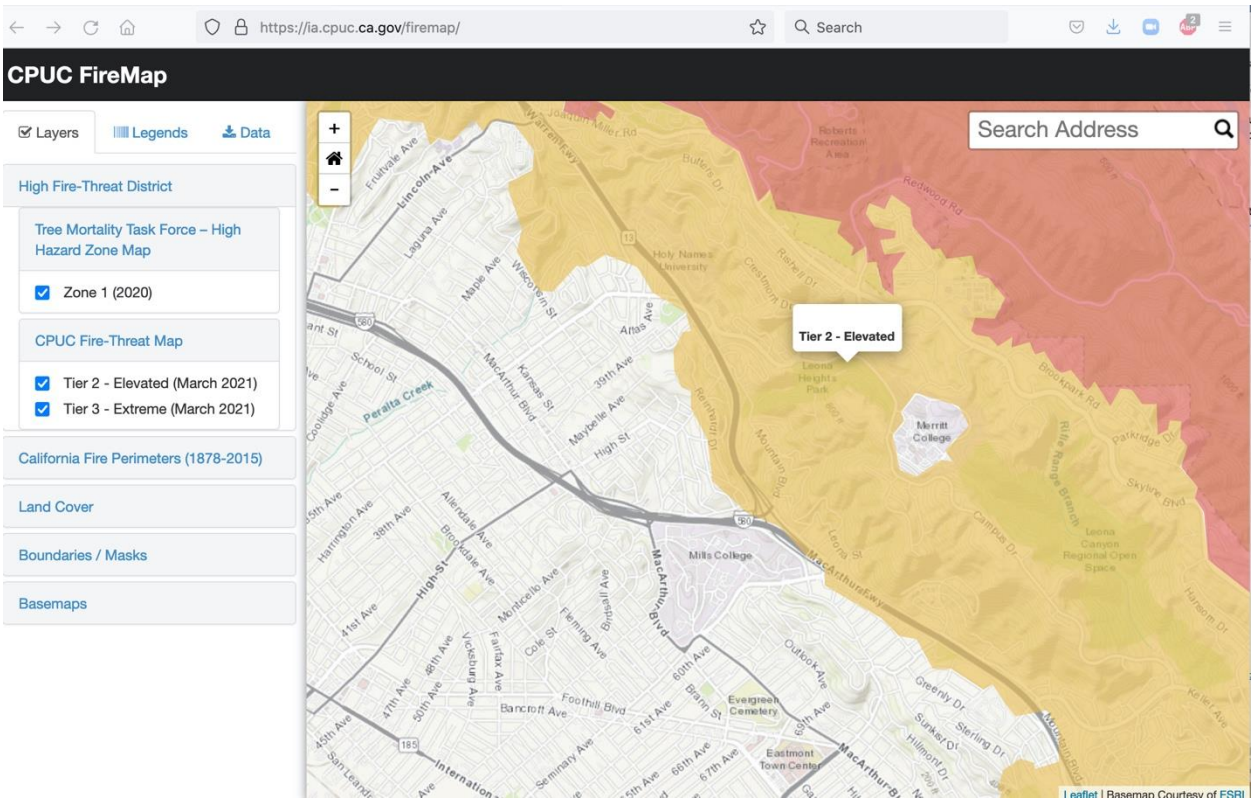


[1] CAL FIRE. *Fire Hazard Severity Zones*. https://osfm.fire.ca.gov/media/5606/oakland.pdf and City of Oakland Local Hazard Mitigation Plan 2016 https://www.oaklandca.gov/topics/2016-2021-local-hazard-mitigation-plan Accessed 8/24/21.

Merritt College CPUC Fire Threat Tier 2

In Oakland, the area around Merritt College also is identified as Tier 2 Elevated threat by the California Public Utilities Commission (CPUC) and Pacific Gas and Electric (PG&E).[2] Areas to the west of Skyline Boulevard are identified as Tier 3 Extreme threat.

Pacific Gas & Electric (PG&E) implements precautionary measures to help reduce the risk of wildfires as part of their Community Wildfire Safety Program.[3] If gusty winds and dry conditions, combined with a heightened fire risk, threaten a portion of the electric system, they may turn off electricity in the interest of public safety – a public safety power shut off (PSPS). The shut off may include both transmission and distribution lines within Tier 3 and 2 high fire threat areas.



[2] https://www.cpuc.ca.gov/industries-and-topics/wildfires/fire-threat-maps-and-fire-safety-rulemaking Accessed 8/10/21. In October 2007, devastating wildfires driven by strong Santa Ana winds burned hundreds of square miles in Southern California. Several of the worst wildfires were reportedly ignited by overhead utility power lines and aerial communication facilities in close proximity to power lines. Over the ensuing years, additional wildfire were found to be the cause of further wildfire ignitions. By December 21, 2017, the CPUC issued Decision (D.) 17-12-024 adopting regulations to enhance fire-safety in the High Fire Threat Districts. On January 19, 2018 the CPUC adopted, via Safety and Enforcement Division's (SED) disposition of a Tier 1 Advice Letter, the final CPUC Fire-Threat Map.

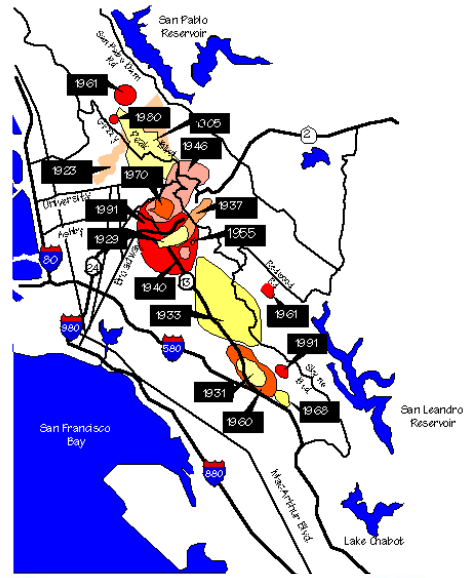
[3] https://www.pge.com/en_US/safety/emergency-preparedness/natural-disaster/wildfires/public-safety-power-shutoff-faq.page Accessed 8/10/21.

Fire History

The area around Merritt College experienced five large fires in recent recorded history[4]:

- 1931 Leona, 5 homes destroyed 1,800 acres burned. Diablo wind. Ignition: unknown.
- 1933 Redwood/ Joaquin Miller. 1 life. 5 homes, 1000 acres. Diablo wind. Ignition: smoker
- 1960 Leona. 2 homes 1,200 acres. Diablo wind. Ignition: unknown
- 1968 Oak Knoll. 204 acres. West wind. Ignition: unknown
- 1991 Leona. 200 acres. West wind. Ignition: vehicle accident.

More recently there have been smaller fires, such as the one on Sept 26, 2017 where more than 100 homes were evacuated, and on April 9 and 10, 2021 when there were two fires in two days near Keller Avenue and Mountain Boulevard[5].




KPIX CBS SF BayArea ≡ MENU NEWS WEATHER 55°

More Than 100 Homes Evacuated In Oakland Hills Grass Fire

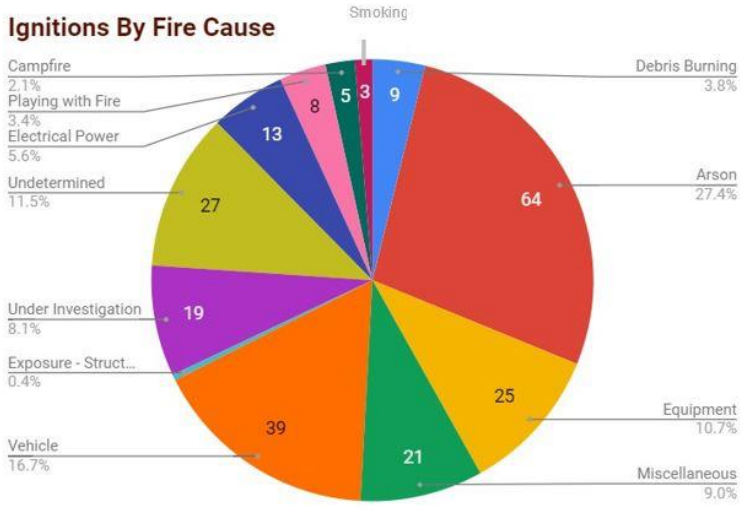
September 26, 2017 at 9:08 pm Filed Under: Grass fire, Oakland, Oakland Hills, Oakland Hills Fire

Oakland: Crews battle two brushfires in two days in the hills

OAKLAND, CA – April 9: Firefighters control a two-alarm blaze that ignited along the 580 Westbound hillside adjacent to the Keller Avenue exit in Oakland, Calif., on Friday, April 9, 2021. (Dylan Bouscher/Bay Area News Group)

The CAL FIRE Santa Clara Unit Strategic Fire Plan 2020[6] provides an analysis of ignition by fire cause. Alameda County is one of the 5 counties covered by this report. The top 3 causes are:

Arson 64%
Vehicle fires (39%)
Equipment (25)



[4] http://www.hillsemergencyforum.org/docs/fire%20history%20eastbay%20hills.pdf. Accessed 5/26/21.
[5] https://www.eastbaytimes.com/2021/04/09/oakland-crews-battle-two-brushfires-in-two-days-in-the-hills/. Accessed August, 25, 2021.
[6] CAL FIRE Santa Clara Unit 2020 Strategic Fire Plan. May 2020. https://osfm.fire.ca.gov/media/kevbpjji/2020-scu-fire-Replan.pdf Accessed 5/26/21.

Existing Conditions

Surrounding Context

Merritt College, 12500 Campus Drive, is located in the East Oakland Hills, east of the intersection of Interstate 580 and State Route 13. The 130-acre campus is located on a ridgeline with panoramic views of the downtown Oakland and San Francisco skylines, San Francisco Bay and the Marin Headlands to the west.

The Merritt College campus is in an urbanized area, zoned RH4 Hillside Residential (with lots of 6,500 to 8,000 square feet) (City of Oakland 2018[7]). Most of the nearby homes were built prior to the January 1, 2008 adoption of the California Chapter 7A wildfire exposure building code (also known as Wildland Urban Interface, WUI, building codes). This State building code applies to building materials, systems and/or assemblies used in the exterior design and construction of new buildings located within a Wildland-Urban Interface Fire Area. It establishes "minimum standards for the protection of life and property by increasing the ability of a building to resist the intrusion of flames or burning embers projected by a vegetation fire and contributes to a systematic reduction in conflagration losses."[8]

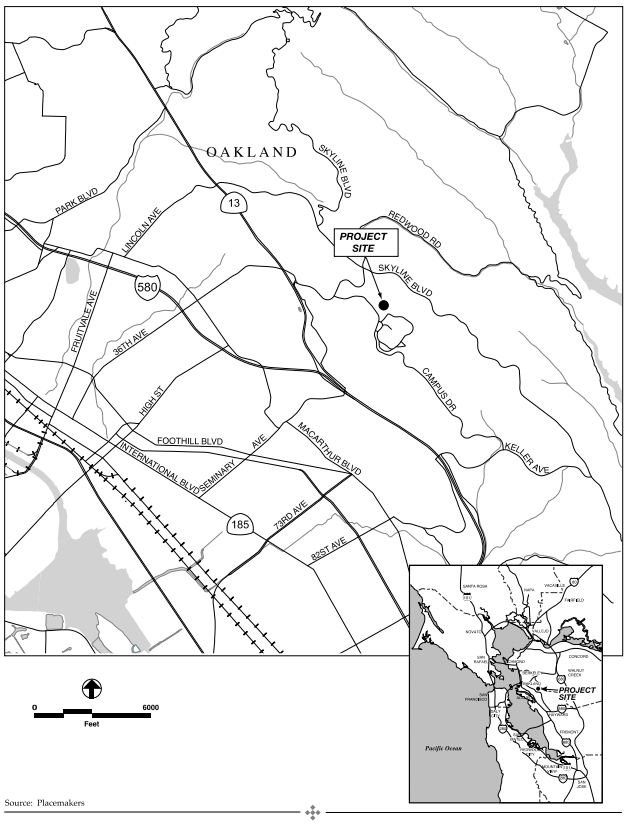


Figure 1
Regional and Project Location Map

To the northeast of the campus are custom built homes in the area identified as Skyline-Hillcrest Estates accessed off of Skyline Boulevard, Fernhoff Road and Bacon Roads. The homes were individually developed over the years on lots varying from 1 to 7 acres in size and values in excess of $1-$5 million. To

[7] City of Oakland. 2018. *City of Oakland Zoning and Estuary Policy Plan Maps.* https://cao-94612.s3.amazonaws.com/documents/Zoning_EPP_Map_20181211.pdf. Accessed 8/23/21.

[8] https://library.municode.com/ca/oakland/codes/code_of_ordinances?nodeId=TIT15BUCO_CH15.12OAFICO and https://up.codes/viewer/california/ca-building-code-2016/chapter/7A/sfm-materials-and-construction-methods-for-exterior-wildfire-exposure - 7A. Accessed 8/23/21.

the southwest of the campus are homes in the Caballo Hills and Ridgemont neighborhoods accessed off of Campus Drive, Ridgemont Drive and Viewcrest Drive. Developed in the late 1980s on lots approximately 1-acre in size, many of these homes are built close to the edge of the former quarry below. Further south on Campus Drive the Caballo neighborhood includes custom homes more recently built on larger lots.

The campus is adjacent to three open spaces.

Leona Heights Park is located below and north west of the campus. This 50-acre park is operated by the City of Oakland. It is situated along a drainage south of Redwood Road and Campus Drive east of SR 13. Much of the park is inaccessible due to its steep terrain with the exception of some trails, the main one being the York Trail. The York Trail connects the lower portion of the park at Mountain Boulevard to the upper portion near Merritt College, and

eventually joins a fire road from McDonnell Avenue. The Oakland parkland is managed for wildfire in accordance with the 2019 Draft Vegetation Management Plan.[9]

East Bay Regional Park District operates the 290- acre Leona Canyon Regional Open Space Preserve in the canyon to the east of Merritt College. Parking Lot E on Merritt Campus serves as the northern of the two trailheads for public access to the park. The second trailhead is located on Campus Drive near Keller Avenue. The East Bay Regional Park lands is managed for wildfire in accordance with the Wildfire Hazard Reduction and Resource Management Plan.[10]

The third open space is the Leona Quarry Geologic Hazard Abatement District (GHAD) which encompasses the Monte Vista Villas development, as well as 23-lots accessed from Campus Drive. The GHAD is located northeast of the MacArthur Freeway (Interstate 580) at its intersection with Edwards Avenue, in Oakland, California. The Leona Quarry GHAD was formed in 2002, with the Oakland City Council as its Board of Directors. As the landowner for selected parcels, the GHAD assumes responsibility for vegetation management, habitat management, erosion control, vegetation removal (fire suppression), trail maintenance, litter removal, and selected other maintenance tasks associated with open space.

Campus Buildings and Circulation

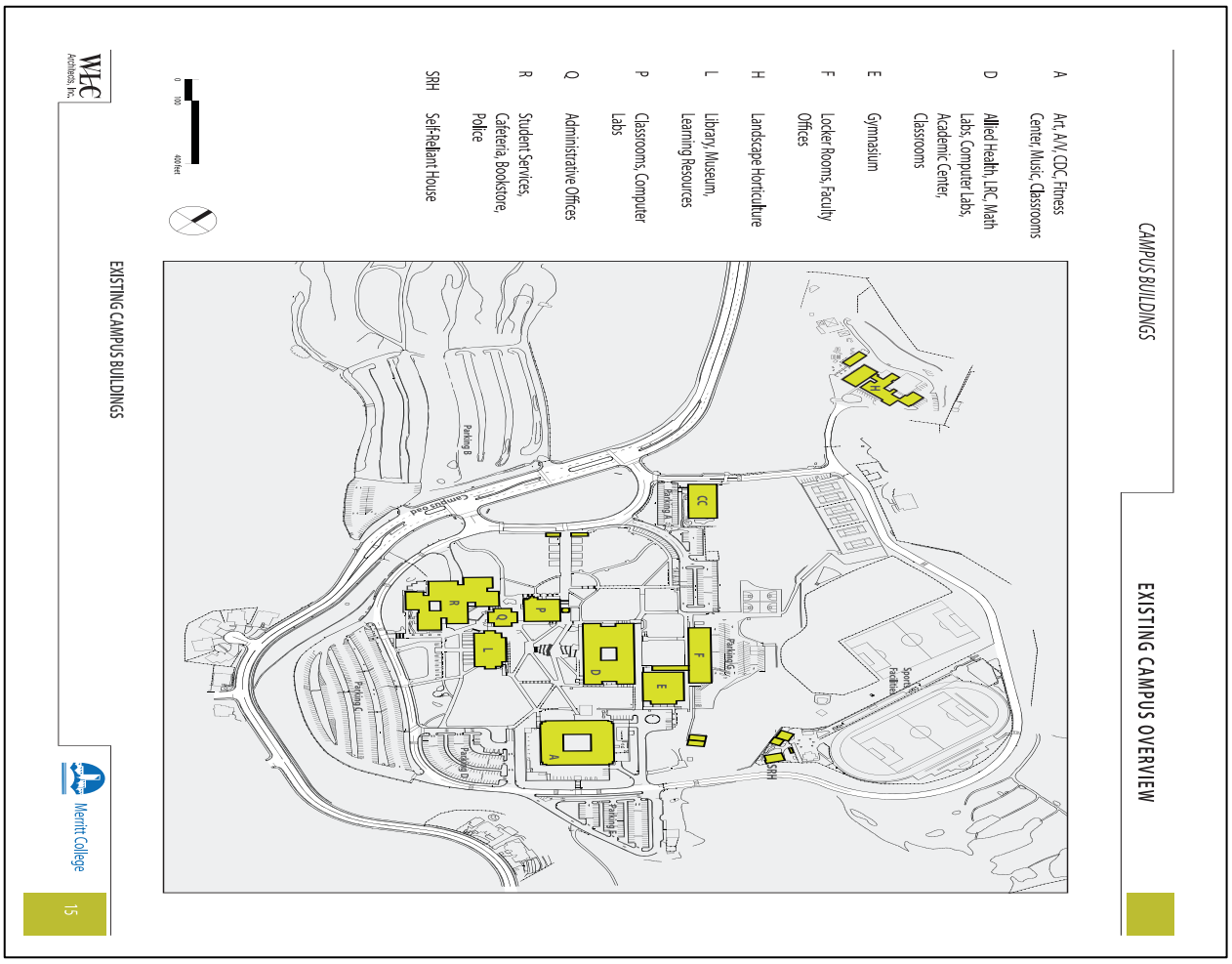
The campus currently has 11 permanent buildings and two grounds sheds for a gross square footage of 345,208 square feet on 130 acres.[11] Buildings are constructed primarily of precast concrete and were built between 1968 and 1978 prior to the WUI building codes. Nine of the buildings are centrally located on the campus within a ring of landscaping, ball fields, tennis courts and parking lots. The Horticultural Center, Child Care Services and Self-Reliant House are located remotely.

The buildings have the following general functions:

- Academic -Instructional facilities such as classrooms and labs.
- Academic Support - Libraries, computer labs, audio-visual and learning centers.
- Student Services - Health services, counseling, support for student development and financial aid.
- Administration - District management, staff, and community relations.
- Athletics and Recreation - Tracks, soccer and baseball fields and gymnasiums.
- Parking - Staff and students.

[9] City of Oakland. Revised Draft Vegetation Management Plan, City of Oakland. November 2019. Pg 175-6.
[10] East Bay Regional Park District. Wildfire Hazard Reduction and Resource Management Plan, 2010. https://www.ebparks.org/about/stewardship/fuelsplan/default.htm
[11] Peralta Community College District Department of General Services, Merritt College Facilities Master Plan, 2009. Page 14.

Note: Building A shown on the existing campus map has been demolished and replaced with the Barbara Lee Science & Allied Health Programs with 110,000 square foot opened in November 2020.



The vehicular circulation on the campus is awkward; consisting of a series of parking areas connected by a single campus loop road, Margie Lane, surrounding most of the campus. This loop road is currently gated at the tennis courts and by parking lot E to allow for only service and emergency access to the north west portions of campus. A smaller loop at the main entrance feeds several smaller parking lots within the campus and provides access to both ends of the main Campus Loop Road. An extension and parking lot off of the Campus Loop Road accesses the Horticultural Center in the northern corner of campus. There currently is inadequate fire access around the perimeter of the existing horticultural center. The access around the central campus is also awkward due to parking lots and grade changes.

Surrounding Topography

Topography is one of the three components that significantly contribute to damaging wildfire behavior. Steep slopes, canyons and chutes can increase the intensity of the fire as hot air preheats vegetative fuels and concentrates air flow resulting in erratic fire behavior. The East Bay Hills define the topographical and hydrological landscape surrounding the campus. Ridges run northeast to southwest, with the highest ridge located east of the Merritt College parallel to Skyline Boulevard (elevation 1100 to 1200±.)

The campus is sited on a spur ridgeline along Campus Drive that is several hundred feet in elevation below the primary ridge along Skyline Boulevard. Elevations on campus vary from 1070 to 620 feet elevation. Steep hillsides surround the campus, remnants of the former Leona Heights Quarry.[12] The campus facilities are spread across series of level areas, with graded hills in between.

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[12] Stone Quarries (Historical) - Oakland - LocalWiki https://localwiki.org/oakland/Stone_Quarries_(Historical) access ed 3/30/21. Leona Heights Quarry. *"E. B. & A. L. Stone Company, 900 Broadway, Oakland, owner; G. H.*

The campus is located at headwaters of two creeks that flow over 4 miles to the San Francisco Bay. Horseshoe Creek, the southern branch in the Lion Creek Watershed, flows in a steep canyon west of the campus. Rifle Range Creek, the northern branch in the Arroyo Viejo watershed, winds its way south east along the ridge turning west near Keller Avenue.

Natural drainage patterns across Merritt College have been substantially modified during the development of the campus. Storm water volumes have increased by reduced infiltration associated with impervious surfaces (roads, driveways, building roofs) and concentrated. Velocities have increased by constructed drains and culverts. These concentrated flows are discharged off campus into the two creeks and ultimately flow into the San Francisco Bay.

Area Weather and Climate Change

Weather is the second of the three components that significantly contribute to wildfire behavior. The campus is within the city limits of Oakland in western Alameda County, all in the Northern Alameda/Western Contra Costa climatological sub-region of the Bay Area. The climate is characterized as dry-summer subtropical (often referred to as Mediterranean), with cool wet winters and relatively warm dry summers. The campus is typically exposed to the steady westerly marine wind flow. Local wind flow patterns are constrained by the terrain of the East Bay hills. However, the region experiences regular seasonal episodes, locally called "Diablo winds," where the wind shifts to primarily out of the north or east. These "Diablo winds" bring critical fire conditions increasing the potential for a wildfire by increasing wind speed, temperature, and reducing the relative humidity. Under these conditions a small fire can rapidly grow in size and become difficult to control.

While wildfires are a natural part of California's landscape, the fire season in California and across the West is starting earlier and ending later each year.[13] Climate change has been considered a key factor in the recent increase the frequency and severity of catastrophic wildfires. The trend has been an increase in size, frequency and damage throughout California. Five of six largest fires since CAL FIRE began keeping records in the 1932 burned at the same

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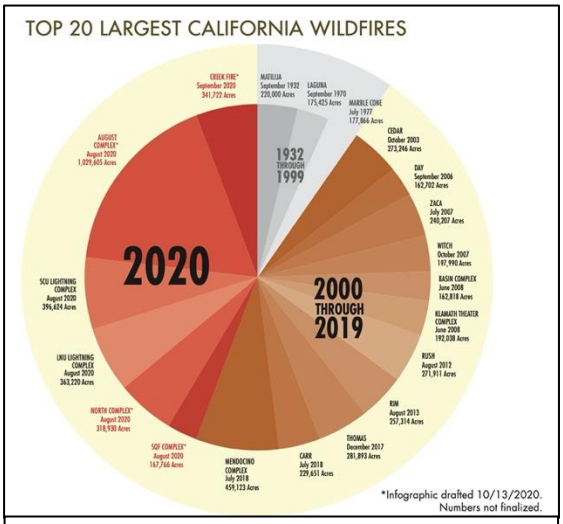
Luchs, superintendent. It was formerly the California Improvement Company's quarry. It is on Laundry Farm, on the summit of a prominent ridge, one mile north of Mills College. The rock is a fine-grained basalt, and is used for macadam and concrete. The quarry face is about 125 feet high. Two gravity trams, one 2500 feet long and the other 1200 feet, take the rock from the quarry to the crusher at the termini of the railroads, both narrow and broad gauge. About 300 yards a day are rushed by two Gates crushers. Electricity is used for power. Thirty-five men are at work in the quarry."(from The Structural and Industrial Materials of California, Bulletin No. 38, California, State Mining Bureau, San Francisco, California, 1906 available on archive.org) This site was reclaimed and is now occupied by Merritt College. For many years its largest pit was called Devil's Hole and used by residents for motorcycle exercises

[13] **Incidents Overview. 2021 Fire Season Outlook. https://www.fire.ca.gov/incidents**

time during 2020.[14] Warmer spring and summer temperatures, reduced snowpack, and earlier spring snowmelt create longer and more intense dry seasons that increase moisture stress on vegetation and make areas more susceptible to severe wildfire. The length of fire season is estimated to have increased by 75 days and seems to correspond with an increase in the extent of wildfires across the state.

Increased periods of drought, new pests and disease will continue to stress the aged landscape of the campus planted over 50 years ago. The District will need to focus on a developing over time a campus landscape that can withstand and adapt to wildfire, drought and a changing climate.



Source: https://www.fire.ca.gov/media/ps4p2vck/californiawildfireandforestresilienceactionplan.pdf

Vegetation – Biologic Conditions

Vegetation is the final of the three components that significantly contribute to wildfire behavior; providing fuel that can carry a wildfire. Vegetation communities can be used to define wildfire hazard mitigation and can help with identification of species that need to be protected during treatments.

The Campus landscape can be divided into 3 general types in terms of wildfire hazards:

- Planted landscape.
- Naturalized landscape
- Rudereal – abandoned, invasive exotic plants.

The planted landscape around the major buildings on the campus are a mix of native and non-native plant communities in both natural and formal arrangements. Plant species are typically drought tolerant, though there are large areas of mown lawns and playfields. While there are some individual plants and unmanaged areas within this landscape that present increased fire hazards and should be removed, most of this landscape requires only routine maintenance to be more fire resistant.

The campus also includes areas of naturalized landscapes that will need periodic management to reduce wildfire hazards.

[14] CAL FIRE Topn20 Largest California Wildfires. https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

California Annual grasslands. Annual grasslands occur throughout campus covering approximately 15% of the area[15]. These grasslands of primarily non-native grasses that die off in the summer and forbs. These grasslands include native perennial bunch grasses such as purple needlegrass and wildrye, as well as native forbs such as California poppy It is often intermixed with coastal scrub.

Coastal scrub. The west and south facing slopes include coastal scrub such as on the hillside above parking lot E, along portions of Margie Lane and on the slopes below the abandoned parking lots west of Campus Drive covering approximately 0.3% of the campus.[16] Coastal scrub includes a mix of species such as coyote brush, poison oak, blackberry, lupine, ceanothus, among others.

Oak/ shrub woodland. A largely intact coast oak woodland with understory shrub, dominated by *Quercus agrifolia*, is located across the campus starting on the hill south of the Horticultural Center picking up south of the playfields to join with Leona Regional Preserve to the east covering approximately 11% of the campus.[17]

Mixed conifer. At the edges of the Oak/ Shrub Woodland, between the tennis courts and Child Care Facility and at the formal entry to the campus are a mix of planted and naturalized pine, redwood, cedar and other mixed conifer species covering approximately 12.2% of the campus[18].

Riparian woodland. A small area of riparian woodland dominated by willow is located on north east of the playfields in a drainage covering less than 0.1% of the campus.[19]

The final area on campus are unmanaged, ruderal areas. These areas include many invasive exotics (such as French broom, blackberry, acacia) mixed in with annual grasses and forbs, such as on the parcel west of Campus Drive and at the perimeter of parking lot covering approximately 20% of the campus.[20]

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[15] California Annual Grasslands are modeled as GR1, GR3 and GR5 depending on fuel load in the Weather and Fire Behavior Analysis for Merritt College Technical Report. Note: This percentage of cover includes 36% urban and bare ground. Planted landscape areas are categorized using their fuel characteristics (grass, shrub, tree understory, timber) and included in those totals.

[16] Coastal Scrub are modeled as SH4 and SH9 depending on fuel load in the Weather and Fire Behavior Analysis for Merritt College Technical Report.

[17] Oak/ shrub woodland are modeled as TU2 and TU3 depending on fuel load in the Weather and Fire Behavior Analysis for Merritt College Technical Report.

[18] Mixed conifers are modeled as TL2, Tl3, TL5, TL6 and TL9 depending on fuel load in the Weather and Fire Behavior Analysis for Merritt College Technical Report.

[19] Riparian woodland is modeled as a custom fuel model in the Weather and Fire Behavior Analysis for Merritt College Technical Report.

[20] Ruderal areas are modeled as GS3 depending on fuel load in the Weather and Fire Behavior Analysis for Merritt College Technical Report.

Protected Species

Recent environmental studies included a record search of the California Natural Diversity Data Base (CNDDB) and the other relevant information sources. These reviews indicated that numerous plant and animal species with special status have either been recorded or are suspected to occur near Merritt College. Special-status species[1] are plants and animals that are legally protected under the State of California and/or federal Endangered Species Acts[2] or other regulations, as well as other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, nesting or denning locations, communal roosts, and other essential habitat.

According to the CNDDB records reviewed for the Horticultural Complex and Child Care Development Center environmental documentation reports[21], no specific occurrences of special-status plant or animal species have been reported from the campus immediate vicinity, but general occurrences have been recorded from the Oakland Hills. These include general occurrences of bent-flowered fiddleneck (*Amsinckia lunaris*), Presidio clarkia (*Clarkia franciscana*), dark-eyed gilia (*Gilia millefolita*), Diablo helianthella (*Helianthella castanea*), most beautiful jewelflower (*Streptanthus albidus* ssp. *peramoenus*), Bay checkerspot butterfly (*Euphydryas editha bayensis*), and American badger (*Taxidea taxus*), among others.
Figures 4 and 5 from the Initial Study for the Child Care Development Center Project show the distribution of special-status plant and animal species, respectively, as reported by the CNDDB within approximately five miles of the campus. A table with the name and status of each of these species is contained in the Appendix.

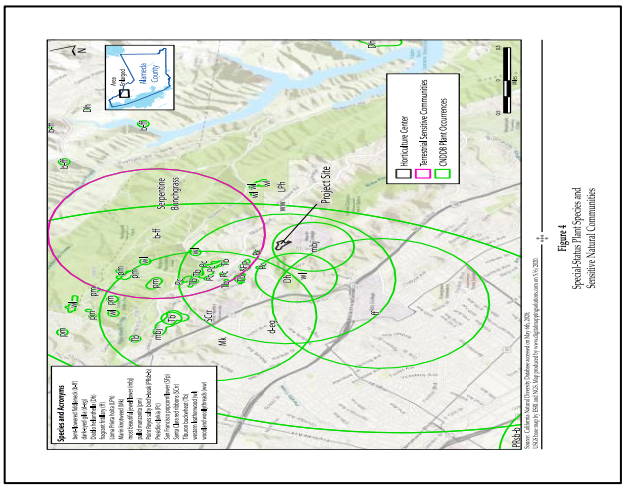

Figure 4
Special-Status Plant Species and Sensitive Natural Communities

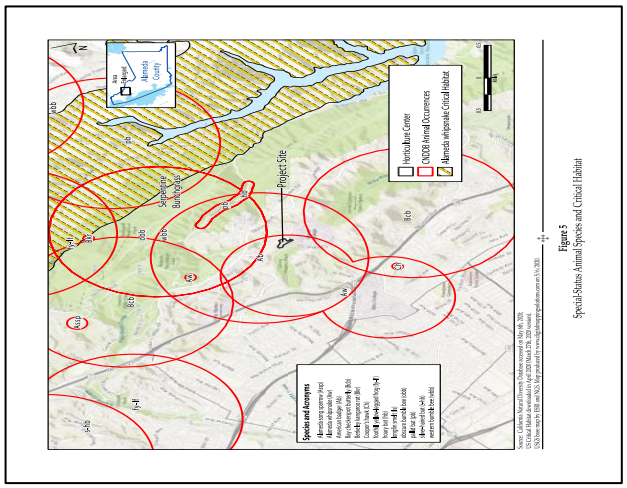

Figure 5
Special-Status Animal Species and Critical Habitat

[21] Initial Study/ Mitigated Negative Declaration Merritt Community College Child Care Development Center Project December 2019. Mitigated Negative Declaration Merritt College Horticulture Complex Project August 2020.

City of Oakland Tree Protection Ordinance

Title 12, Chapter 12.36 of the City of Oakland Municipal Code[22] identifies protected trees that require a permit for removal. According to the ordinance, a tree removal permit must be obtained to remove a "protected tree." A protected tree consists of any coast live oak measuring four inches in diameter at breast height (DBH) or any other tree species measuring nine inches DBH or larger, except non-native eucalyptus (*Eucalyptus* spp.) and Monterey pine (*Pinus radiata*). Replacement tree plantings are typically required where a protected tree is to be removed. Native protected trees proposed for removal must be replaced at a ratio of 1:1 if the replacement tree is a 24-inch box size and 3:1 if the replacement trees are 15-gallon size trees. Protected trees located within 30 feet of construction must be identified. Adequate protection must also be provided during the construction period for any trees that are to remain in the vicinity of proposed development.

Geology, Soils and Hydrology

The entire Merritt College campus underwent extensive site disturbance during construction of the college between 1968 and 1978. Many areas have over 25 feet of engineered fill placed during the initial development of the campus in the late 1960s. The engineered fill overlies bedrock of the Franciscan Complex, shales to the north and rhyolite (hard igneous rock) to the south.

[22] City of Oakland Tree Protection Ordinance. https://library.municode.com/ca/oakland/codes/code_of_ordinances?nodeId=TIT12STSIPUPL_CH12.36PRTR accessed 4/29/21

Serpentine soils often result in sparse vegetation and endemic protected plant species. While the presence of serpentine soil has not been formally identified in campus plans, outcrops are documented to north along Redwood Road, behind Lincoln Square shopping center, in Crestmont neighborhood, along Skyline Drive, and at the Serpentine Prairie on Skyline in Redwood Regional Park. Serpentine soils are suspected to also occur on the campus, and may host protected plant species.

Potential areas of serpentine outcrops were observed during field reconnaissance for this vegetation management plan on hillsides north east of the play fields.

Water quality and erosion control are required to be protected during fire hazard reduction management activities. The campus is located at the headwaters of two creeks as detailed in the section on Surrounding Topography. Stormwater discharges in Oakland are permitted under San Francisco Bay Regional Water Quality Control Board (RWQCB) which requires that local agencies to control erosion, prevent sediment and address both soluble and insoluble stormwater runoff pollutant discharges from entering the stormwater systems or discharging into nearby streams.

The RWQCB implements the Water Quality Control Plan (Basin Plan).[23] A master policy document for managing water quality issues in the region. No specific permits are required for most fuel reduction and vegetation management activities; however, Merritt College land managers are required to use erosion control practices to prevent sediment-laden discharges to receiving waters.[24] The RWQCB is empowered to levy considerable fines if erosion and sedimentation impact receiving waters as a result of land manager negligence. Activities would be required to be managed so the quality of receiving waters is protected in compliance with the general requirements of the Porter-Cologne Water Quality Control Act (California Water Code, Division 7).

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[23] San Francisco Bay Regional Water Quality Control Board, 2015. *Water Quality Control Plan*. https://www.waterboards.ca.gov/sanfranciscobay/basin_planning.html

[24] See Mitigation Measures for further detail

Fire Behavior Analysis

A fire behavior analysis was conducted to determine fire hazard onsite and in the surrounding area under current vegetative conditions in the properties that make up Merritt College, as outlined in magenta in Figure 1. A buffer area of 1000 feet from this boundary is the study area also included in this analysis. The total area covered by Merritt College totals 123.1 acres and the study area amounts to 456.3 acres.

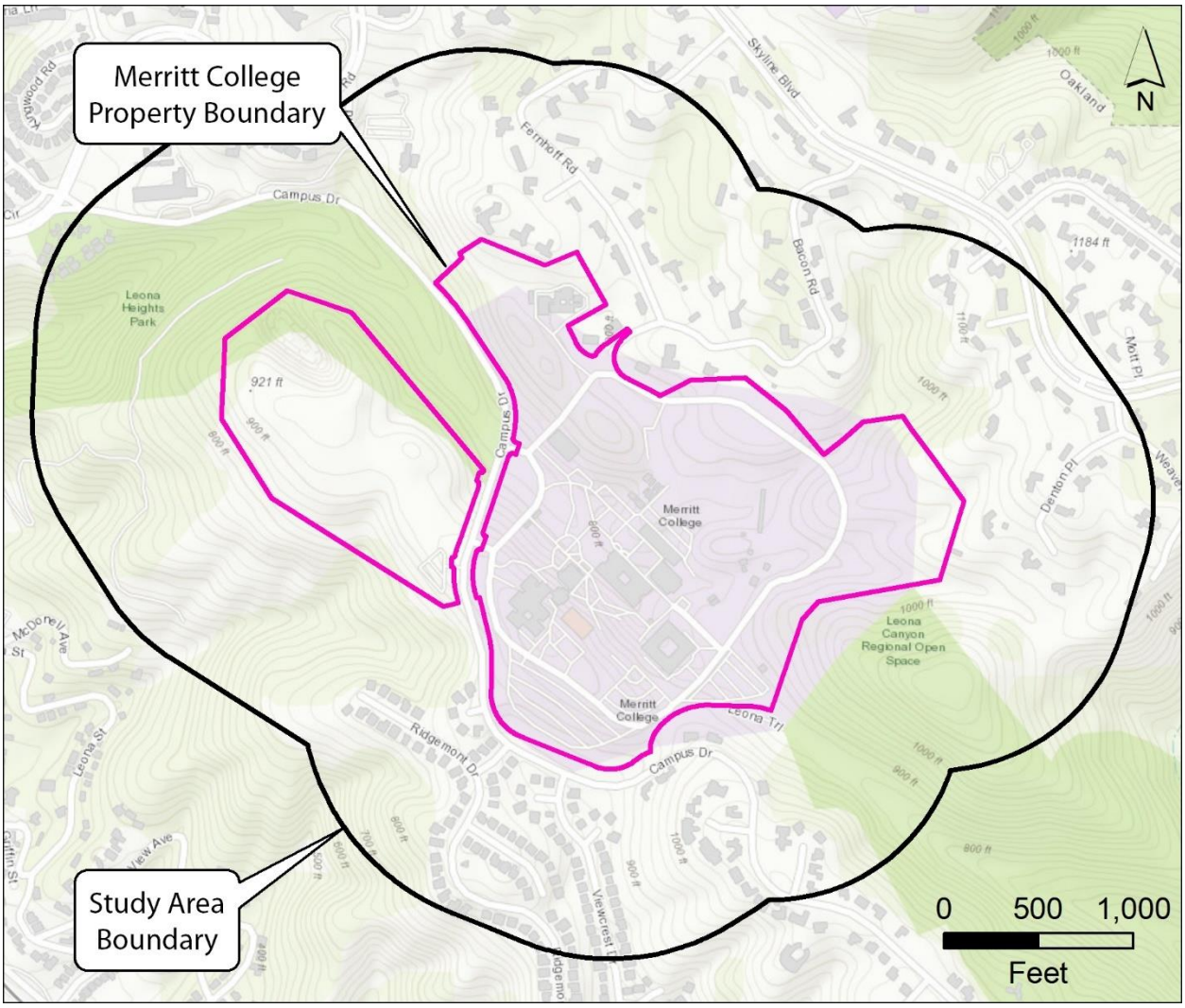


Figure 1. Study area boundary map.

Three essential data categories are needed:

1. Fuel model characteristics
2. Weather conditions
3. Fuel moisture conditions

For this analysis, we used readily available data purchased through the California Forest Observatory (CFO, 2020)[25]. We compiled 10 years of data weather data from a nearby Remote Automated Weather Station located just south of the Merritt College campus. to reflect conditions that may occur in Diablo (northeast) wind events such as what occurred during the recent North San Francisco Bay area fires as well as the OAKLAND fire of 1991. For all scenarios presented in this document, a fairly dry fuel moisture regime was used to model a "worst-case" scenario, though not necessarily the most extreme case. See Appendix XX for details of the analysis.

Fuel Models

Three grass models (GR1, GR3, and GR5) account for 15% of the area. All are located throughout Merritt College and represent areas where grass may be able to grow between paved surfaces. These fuel types are generally associated with low flame lengths; however, fire spread can be rapid in the right conditions.

Low Load Compact Conifer Litter, TL1 (181) accounts for 14% of Merritt College. This fuel models is shown in light blue and is located west of the main campus. It represents the wood chips broadcast across an old, decommissioned parking lot.

Very High Load Broadleaf Litter, TL9 (189) accounts for 12% of Merritt College. This fuel model is shown in dark cyan on Figure 2 and is located at the edges of grassy fields as well as between buildings. These likely represent planted heritage conifers such as redwood or Monterey pine found throughout the campus. This fuel model can produce relatively high flame lengths and rapid spread; however, it is generally not a source of embers.

There is a forest/shrub fuel type call ed Moderate Load, Humid Climate Timber-Shrub (TU2) that accounts for 10% of Merritt College. This fuel model represents forested areas with a grass or shrub understory. These timber types represent treed areas with a shrubby understory where the fire is carried by grass and shrubs under the tree canopy rather than forest litter. TU2 is found mainly southwest of the Horticultural building (east of Campus Drive), surrounding the parcel west of Campus Drive, and two small pockets east of the main campus. This fuel type can be associated with torching trees or crown fires because of its propensity to lead fires into the crown due to the abundant and relatively tall understory fuels.

[25] California Forest Observatory (2020). A Statewide Tree-Level Forest Monitoring System. Salo Sciences, Inc. San Francisco, CA. https://forestobservatory.com

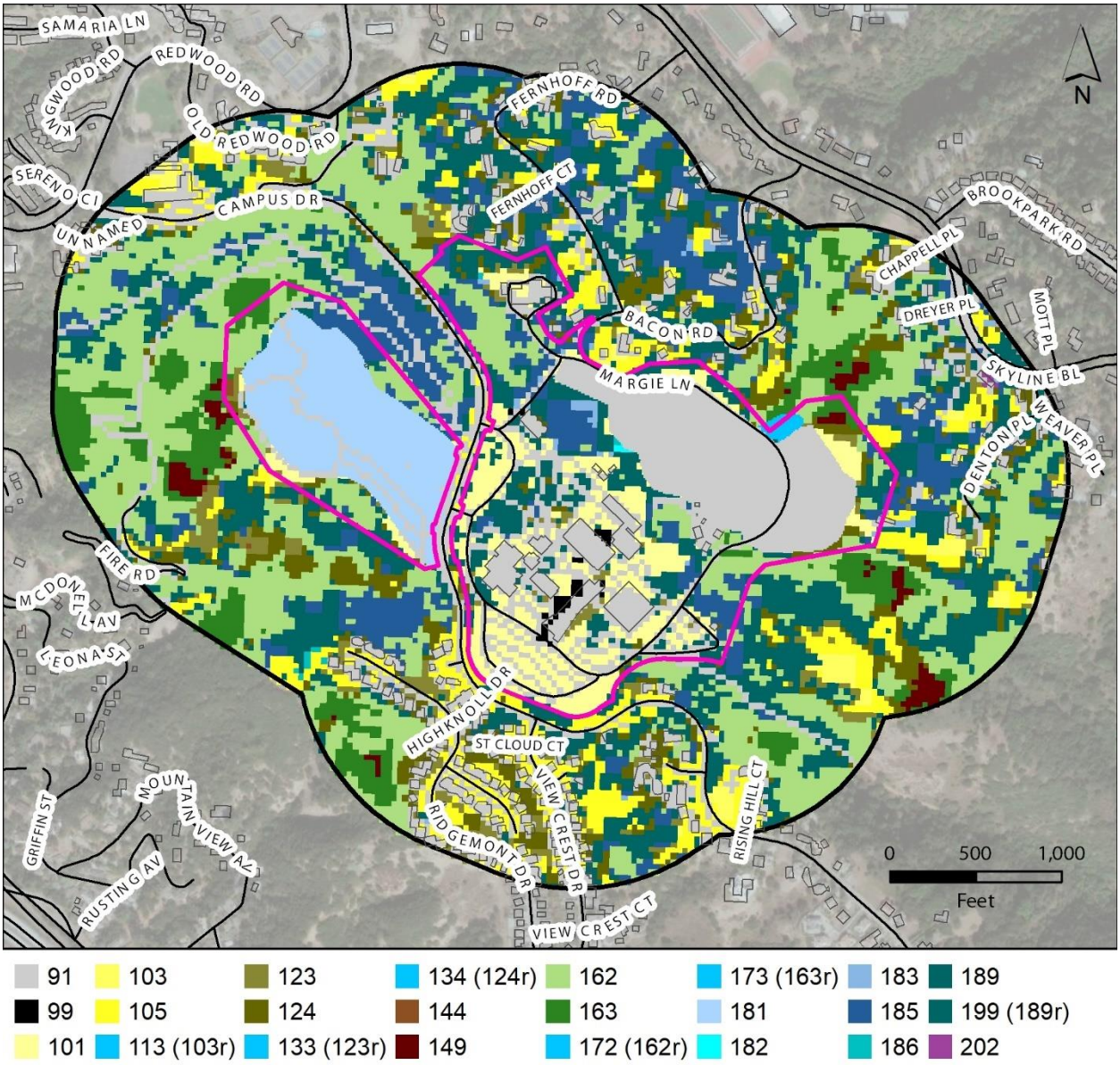


Figure 2. Surface fuel model map (CFO, 2020 altered by Wildland Res Mgt). Merritt College properties outlined in magenta. Study area outlined in black. See table 1 for legend description.

Table 1. Fuel model found within Merritt College only.

Value	Title	Acres	Percent
91	Urban/Developed	44.8	36%
99	Bare Ground	0.9	1%
101	Short, Sparse Dry Climate Grass	18.1	15%
103	Low Load, Very Coarse, Humid Climate Grass	0.04	0.03%
105	Low Load, Humid Climate Grass	0.1	0.1%
123	Moderate Load, Humid Climate Grass-Shrub	1.8	1%
124	Moderate Load, Dry Climate Grass	2.2	2%
144	Low Load, Humid Climate Timber-Shrub	0.1	0.1%

Value	Title	Acres	Percent
149	Very High Load, Humid Climate Shrub	0.2	0.2%
162	Moderate Load, Humid Climate Timber-Shrub	11.7	10%
163	Moderate Load, Humid Climate Timber-Grass-Shrub	1.6	1%
181	Low Load Compact Conifer Litter	17.8	14%
182	Low Load Broadleaf Litter	0.1	0.1%
183	Moderate Load Conifer Litter	0.7	1%
185	High Load Conifer Litter	8.6	7%
186	Moderate Load Broadleaf Litter	0.1	0.1%
189	Very High Load Broadleaf Litter	14.3	12%

Weather

The nearest Remote Automatic Weather Station to Merritt College is located just southeast of the campus off Skyline Blvd and is known as Oakland South.

Twenty-seven years of data were downloaded and analyzed in FireFlamily+. FireFamily+ is a software package used to calculate fuel moistures and indices from the US National Fire Danger Rating System (NFDRS) using hourly or daily fire weather[26].

The lowest fuel moistures occurred during the months of September through November; winds were analyzed during these months. **For all hours of the day**, the predominate wind direction in the area is from the southwest (24% of recordings). However, the strongest (fastest) winds recorded came from the north to northeast (over 25mph) (see Figure 4). The wind rose for the afternoon hours (from 1200 to 1500 hours), bears out these findings (see Figure 4).

Table 2. Wind direction and speed used for fire behavior prediction scenarios for Merritt College.

Scenario	Wind Direction	Wind Speed
Southwest	225 degrees	25 mph
North/Northeast	20 degrees	25 mph

A standard fuel moisture regime was chosen for both scenarios. The fuel moistures used were based on the average low 10-hr fuel moistures recorded in September for Oakland South. This number was 5.3%. All other fuel moistures were derived from the average low for September from the summary tables provided in FireFamily+ for each fuel size class. For the custom fuels models that represent the small riparian area in the northwest portion of the Athletic Field, fuel moistures were doubled.

[26] https://www.firelab.org/project/firefamilyplus

Table 3. Initial fuel moistures used for fire behavior prediction scenarios for Merritt College.

Scenario	Foliar Fuel Moisture	1 hr FM	10 hr FM	100 hr FM	Herbaceous FM	Live Woody FM
Southwest	70	4	5	10	40	60
North/Northeast	70	4	5	10	40	60
Riparian FMs	n/a	4	5	10	80	120

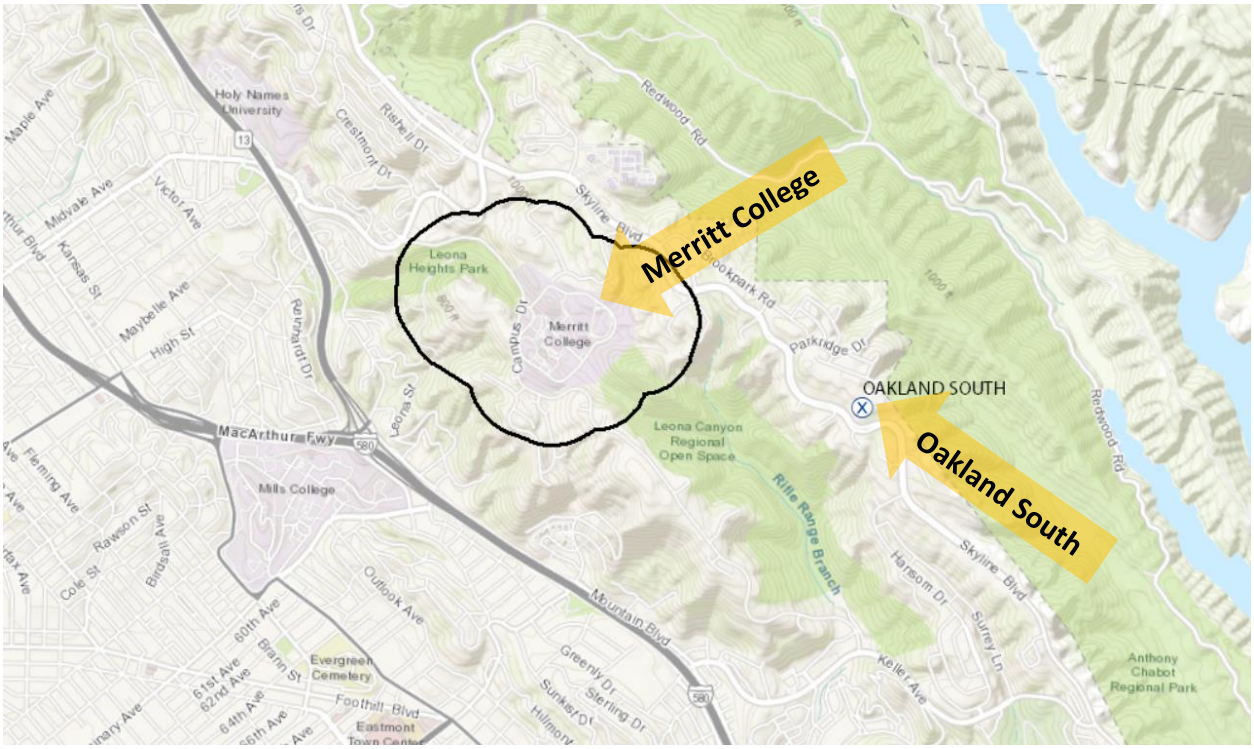


Figure 3. Map showing the weather station Oakland South in relation to the general location of Merritt College project area

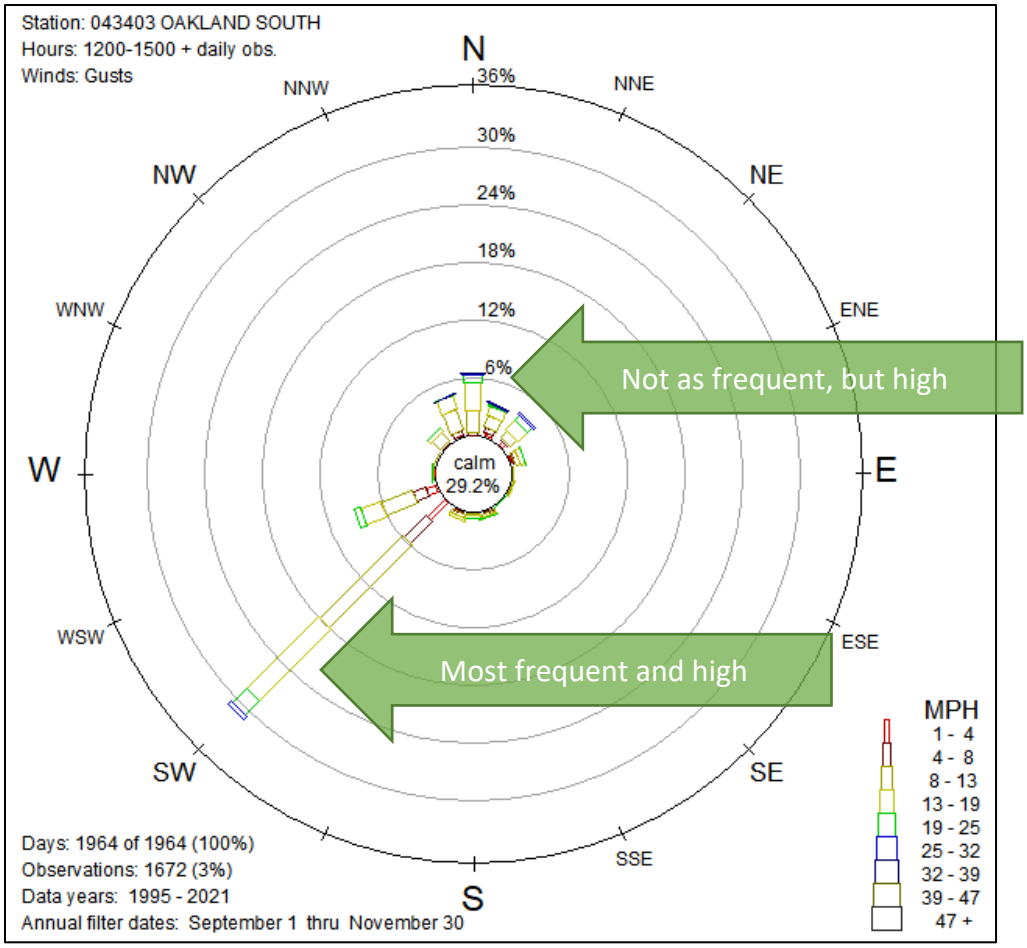


Figure 4. Wind rose for Oakland South for the months of Sept/Oct/Nov from 1995-2021.

Fire Behavior Modeling

A fire behavior model called FlamMap version 6.1 was used for this wildfire hazard assessment. FlamMap allows prediction of fire behavior on a spatial basis, portraying the locations of various flame lengths, heat release, and rate of spreads along with type of fire (crown fire, surface fire, or a fire that torches trees) *independently for each location*. Outputs are well-suited for landscape level comparisons of fuel treatment effectiveness because fuel is the only variable that changes. Outputs and comparisons can be used to identify combinations of hazardous fuel and topography, aiding in prioritizing fuel treatments[27].

[27] Source: https://www.fs.usda.gov/rmrs/tools/flammap (accessed on 7/26/2021).

Results

The results presented below are based on existing conditions. The following *fire potential* was predicted for the entire modeled area surrounding Merritt College for the near worst-case scenario.

In all models presented in this document, buildings and developed areas are **not** considered fuel and fire potential is not predicted where they exist, though in reality, buildings may burn.

Flame Length

Flame length is often correlated to the ability to control a fire. A flame length of eight feet is usually looked at as a cut-off point for strategic firefighting decisions on whether to attack the fire directly, or instead attempt control through indirect methods. Attacking the fire directly involves efforts to slow the flaming front at its head – where it is advancing fastest. Indirect attack involves fire control methods on the fire's flank or well ahead of the fire (using backfires or retardants).

High flame lengths are well correlated to structural damage. Fire intensity (a.k.a. flame length) was determined to be an important factor in many studies of structural damage from fire. Flame lengths are often used as a proxy for fire intensity because they are highly correlated to fire intensity.

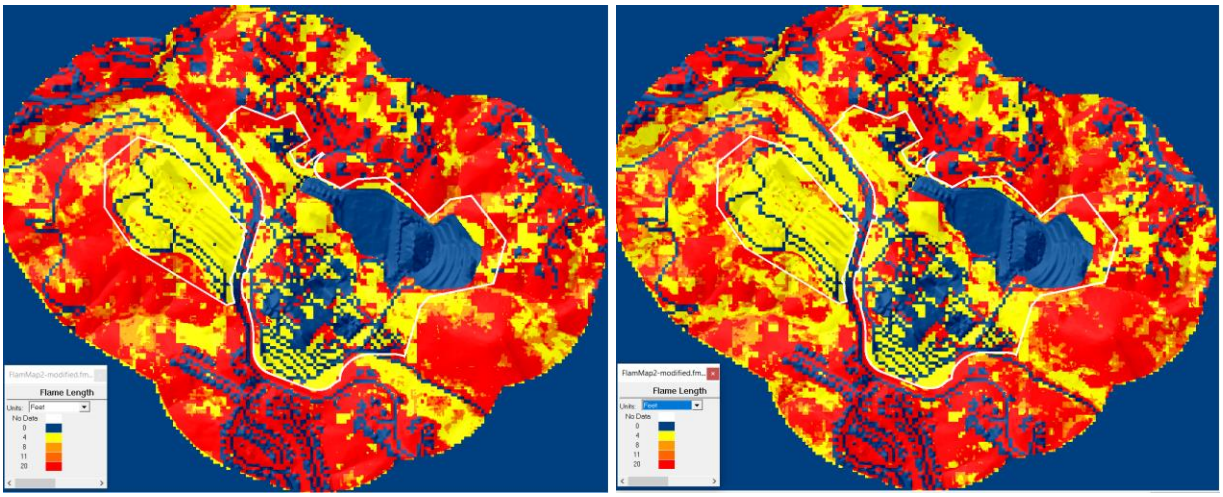


Figure 5. Predicted Flame Lengths (in feet). Merritt College boundary outlined in white.

For this scenario, no fire is predicted for the developed areas and along the roads (all considered a non-fuel in this predictive system). Under the scenario conditions, flame length is generally high, above 8 feet in length, with some of the college experiencing flame lengths over 20 feet, particularly surrounding the central campus buildings as well as the neighborhood to the south. Neighborhoods outside the college are also predicted to have flame lengths over 20 feet.

Grass can often exhibit large flame lengths, but fires generally move through grasslands quickly and do not generate a lot of embers. Whereas high flame lengths in forested or shrublands tend to be more damaging because the fire can get into the crowns of trees causing mortality and creating embers that can be lofted to great distances.

Table 4. Comparison of Acres by flame length category for Merritt College only (not entire study area) for the northeast and southwest wind scenarios described in table 2.

	Northeast		Southwest		
Flame Length Category	**Acres**	**Percent**	**Acres**	**Percent**	**Difference**
No predicted fire	46	37%	46	37%	None
< 4 feet	52	42%	50	40%	2% more
4 – 8 feet	5	4%	4	3%	1% more
8 – 11 feet	2	2%	2	2%	None
11-20 feet	5	4%	6	5%	1% less
> 20 feet	13	11%	15	12%	1% less
Total Acres	**123**		**123**		

Rate of Spread

Rate of spread is the relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of forward spread of the fire front, expressed in feet/minutes.

Again, the buildings and roads are considered a non-fuel and not predicted to burn.

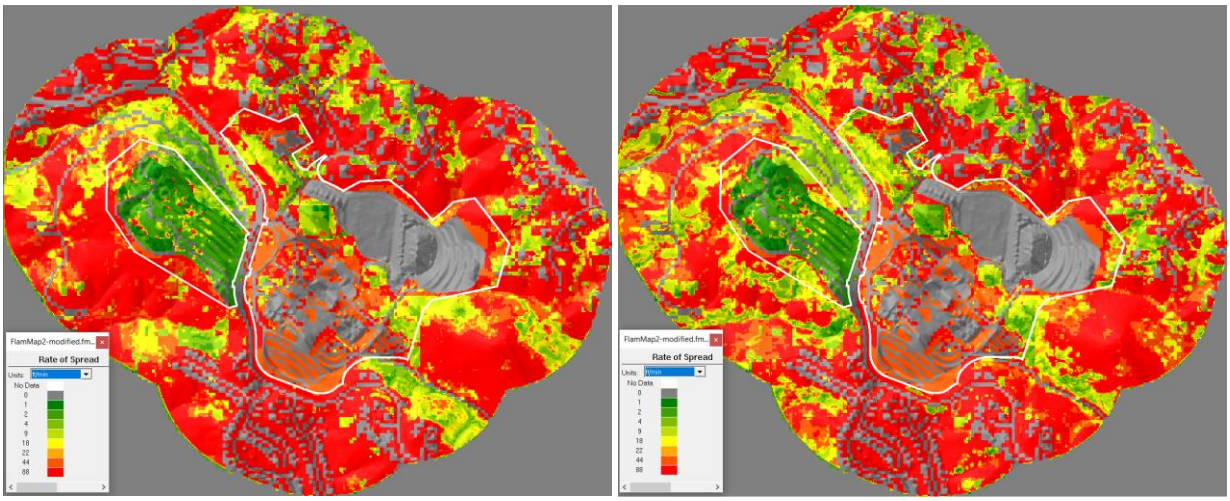


Figure 6. Predicted rate of spread (feet/minute). SW winds are displayed on the left, NE winds on the right.

Essentially, all other areas burned with a range of rate of spread, from low (around 1 ft/minute) to high (more than 80 feet/minute). The spread rates drop dramatically along creeks and areas with relatively high canopy cover.

Again, similar to the SW scenario, predicted rate of spread is very high throughout the study area and within the Merritt College property boundary. While in this NE scenario the amount of area predicted at over 40 feet/minute lessened, it still accounts for 57% of the Merritt College property. And again, the pattern of rate of spread magnitude remains the same, despite the wind direction change.

Table 5. Comparison acres by rate of spread category for Merritt College only (not entire study area) for the northeast and southwest wind scenario described in table 2.

	Northeast		Southwest		
Rate of Spread Category	**Acres**	**Percent**	**Acres**	**Percent**	**Difference**
No predicted fire	46	37%	46	37%	None
< 1 foot/minute	2	2%	3	2%	None
1 – 5 ft/min	22	18%	21	17%	1% more
5 – 10 ft/min	8	7%	7	6%	1% more
10 – 15 ft/min	3	3%	3	2%	1% more
15 – 20 ft/min	2	2%	1	1%	1% more
20 – 40 ft/min	22	18%	22	18%	None
> 40 ft/min	17	14%	20	17%	3% less
Total Acres	**123**		**123**		

Crown Fire

Crowning activity indicates locations where fire is expected to travel into and possibly consume the crowns. When a fire burns through tree crowns, countless embers are produced and are distributed, sometimes at long distances. These embers can start new fires, which can each grow and confound the finest fire suppression forces.

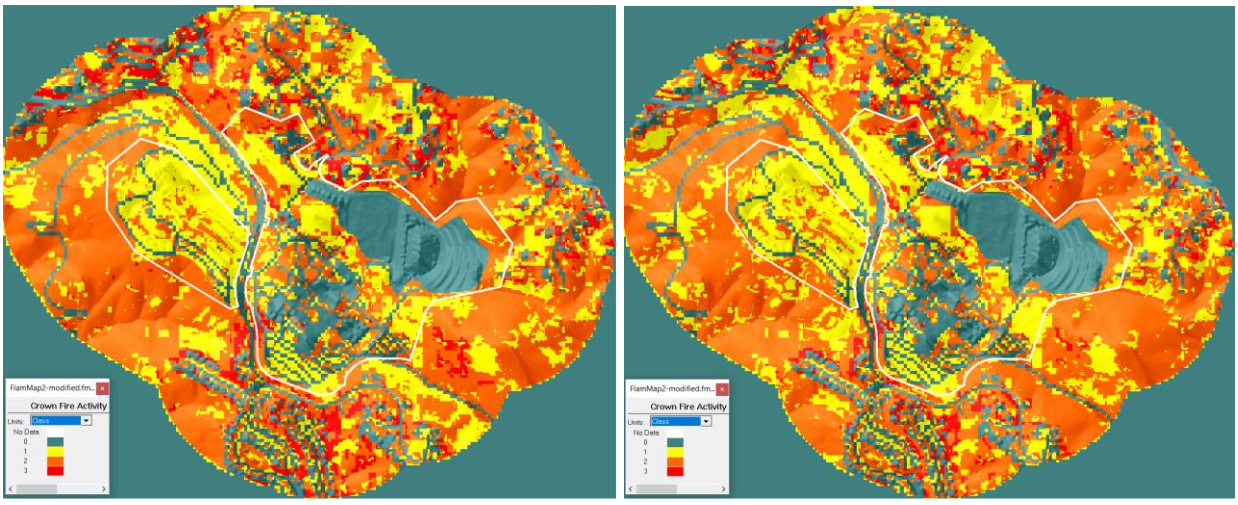


Figure 7. Predicted crown fire activity (0 = no fire, 1 = surface fire, 2 = torching fire, 3 = active crown fire). SW Left and NE Right.

As is the case in most places, an active crown fire is rare. However, at these conditions, it was predicted for about 2% of the Merritt College property. This occurs mainly along the edges or boundaries of one fuel type to another (i.e. between forest and grass with shrubs nearby). Combined with torching fire at 28%, fire in the treetops account for roughly a third of the area burned. This occurs throughout the property but most concerning surrounding the buildings on Merritt College.

The predicted crown fire activity for the northeast scenario bears the same pattern. There is a slight decrease in the worst fire behavior (Active crown fire diminished by 1%), but overall the high fire danger persists (39% of property is predicted to torch or crown at high wind speeds).

Table 6. Comparison of acres by crown fire activity category for Merritt College only (not entire study area) for the northeast and southwest wind scenario described in table 2.

	Northeast		Southwest		
Crown Fire Activity Category	**Acres**	**Percent**	**Acres**	**Percent**	**Difference**
No predicted fire	46	37%	46	37%	None
Surface fire (1)	42	34%	40	33%	1% more
Torching fire (2)	34	27%	35	28%	1% more
Active crown fire (3)	2	1%	2	2%	1% less
Total Acres	**123**		**123**		

Maximum Spotting Distance

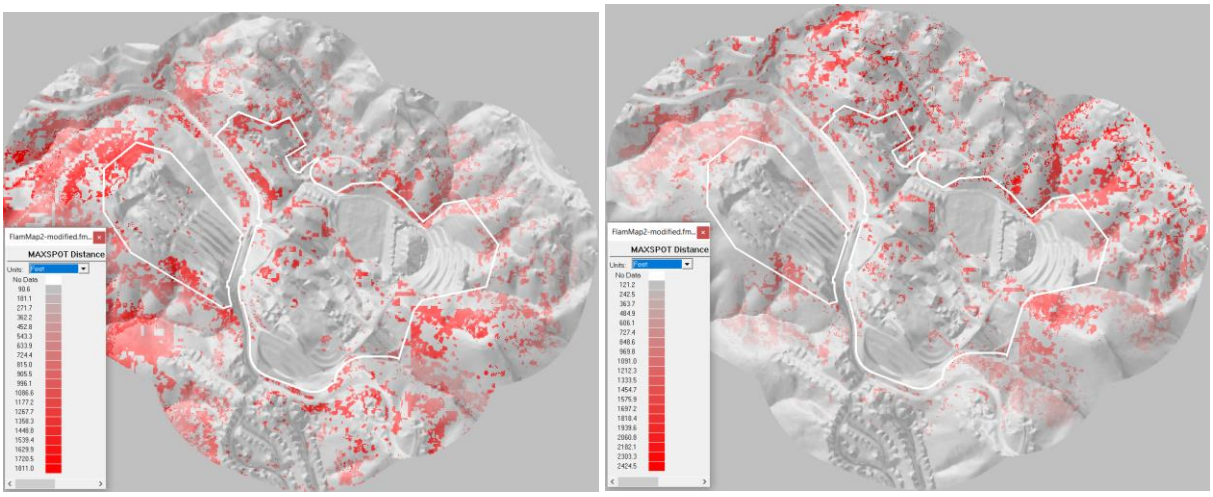


Figure 8. Predicted Maximum Spot Distance (shown in feet). SW Left and NE Right

Hot fires create embers that loft ahead of the flaming front that ignite new fires called “spot fires”. “Spotting potential” and “crowning potential” describe the propensity of vegetation to create and disburse embers that have the potential to start countless new fires well in advance of the main fire. Spotting is simulated only from torching trees for passive and active crown fire.

Maximum spot distances of embers are calculated for each pixel that is predicted to torch. This metric is not intended to simulate the numbers of embers, exact locations embers would land, or locations of resulting spot fires.

Table 7. Acres by predicted Maximum Spot Distance category for Merritt College only (not entire study area) for the northeast and southwest wind scenario described in table 4a.

MaxSpot Distance Category	Acres	Percent	Acres	Percent	Difference
No predicted fire	111	91%	108	88%	3% more
< 100 feet	0	0%	0	0%	None
100 – 500 feet	2	2%	2	1%	1% more
500 – 1,000 feet	5	4%	7	6%	2% less
1,000 – 1,500 feet	4	3%	6	5%	2% less
> 1,500 feet	1	1%	0.2	0.1%	1% more
Total Acres	**123**		**123**		

Project Description of New Buildings

The Peralta Community College District Merritt College Facilities and Technology Master Plan Update (2018) identifies new construction on the Merritt Campus. The District will begin construction on two new buildings late 2021. Conditions of approvals for these new buildings require mitigation measures during construction (See Fire Prevention Plan for details.) The new buildings will also require new areas be maintained to meet defensible space requirements.

Figure 3.1: 2017 Facilities Master Plan

Horticultural Complex

The Merritt College Horticulture Complex will replace the existing horticulture building complex comprising about 19,000 gross square feet (gsf) with new energy efficient facilities providing six classroom labs, a library, restrooms, office space and greenhouse facilities comprising 19,032gsf within the existing 2.5-acre complex.[28]

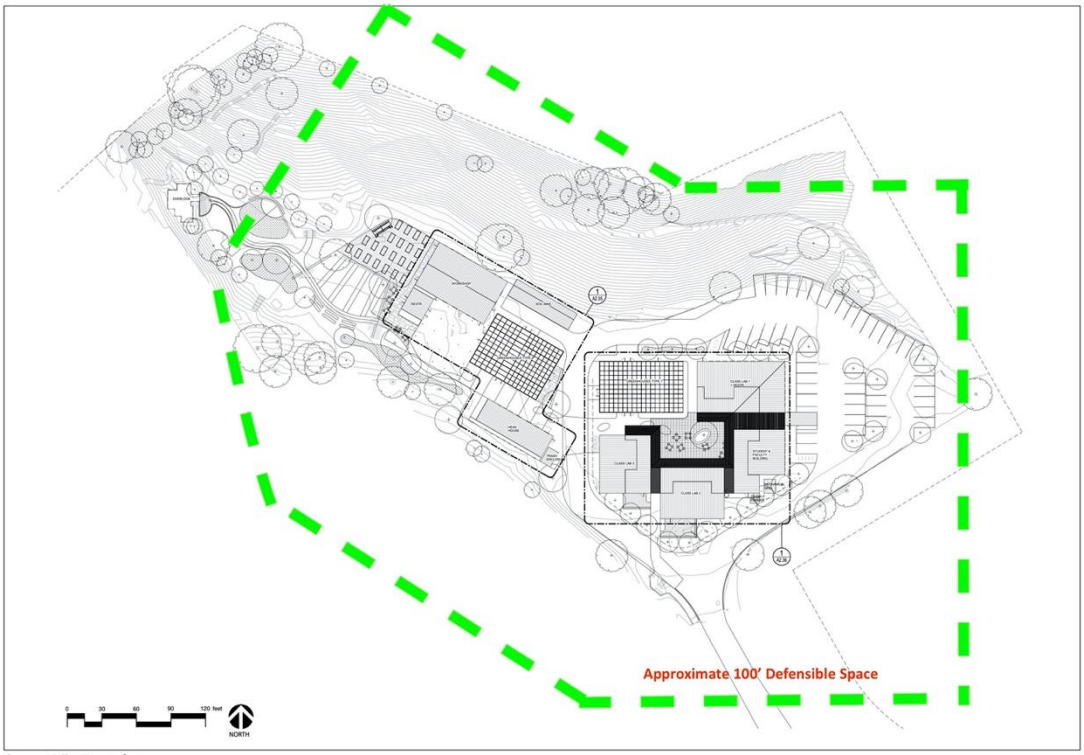
The footprint adapts to the site topography which rises steeply to the north and southwest, and drops away on the west and southeast. New retaining walls will supplement the existing retaining walls at the new parking and loop roadway. Site access and circulation will be

[28] Mitigated Negative Declaration Merritt College Horticulture Complex Project August 2020.

improved to comply with the Wildland Urban Interface requirements for the Oakland Hills. The proposed buildings will range in height from 12 feet to 24 feet.

Exterior building materials will include concrete masonry, wood siding, and cement plaster walls with metal roofs, alongside the greenhouses. Glazing for the buildings will be a non-reflective high-performance type. Outdoor lighting will be upgraded to provide improved safety and security. The existing irrigation system will be replaced with a more efficient system.

Because the footprint of the new building is different from the existing complex, areas of new defensible space treatments will be required.



Source: Noll & Tam Architects

Figure 3
Proposed Landscape Horticulture Complex Site Plan

Child Care Development Center

The Child Care Development Center (CCDC) will be two-story (30-foot-tall, excluding rooftop mechanical equipment and screening), located on a 90,000-square-foot project site east of existing Building E. The site was previously used for temporary portable classrooms. Site access will be from Margie Lane near Parking Lot E.[29]

[29] Initial Study/ Mitigated Negative Declaration Merritt Community College Child Care Development Center Project December 2019.

Similar to the existing Child Care Development daycare program on the campus, the new CCDC building will be licensed to accommodate up to 98 pre-school age students and toddlers/infants (ages 2.9 months to 5 years), 70 to 140 college-age students, and 15 full-time faculty/educational staff.

The 20,000-gross-square-foot building will have a footprint of approximately 10,000 square feet. The remaining portions of the site will be used for service access, entrance to the building, landscaping, hardscape play areas, softscape play areas, and pathways/circulation. All children's areas will be inside of a secure perimeter that will encompass interior spaces and the exterior play area. Access to outdoor play areas and play structure equipment will be through the first-floor classrooms. The second floor will house the adult classrooms, offices, and supporting spaces.

Exterior materials are expected to include a mixture of cement plaster, cement fiber board siding, or metal panel/screening systems. The roof is likely to be composed of a single-ply roofing system. Window design is expected to be clear vision glass in metal/aluminum frames. Skylights are not proposed.

Landscape plans for the CCDC have not yet been developed. A total of 7,000 square feet of outside softscape and hardscape play area is planned. This area will include play structures, pathways, walls, and turf (either natural or artificial). The area will be secured with metal and/or wood fencing that is about 6 feet in height. Because the footprint of the new building is in a currently undeveloped area, new defensible space treatments will be required in the surrounding portion of campus.

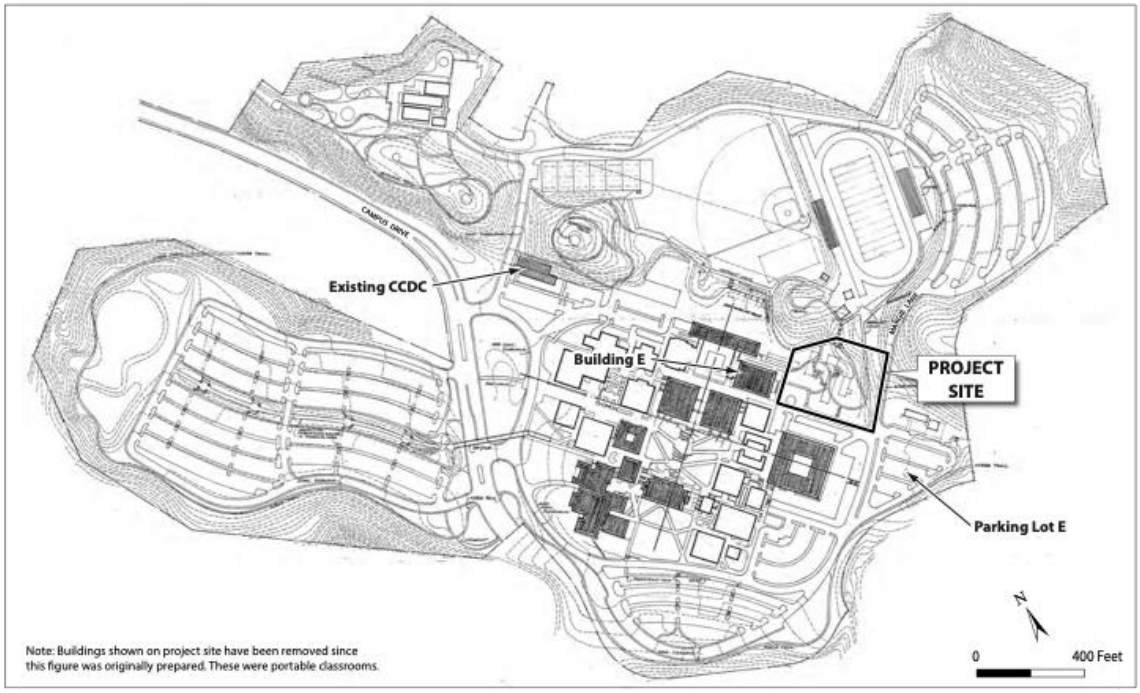


Figure 2

SOURCE: Reynolds and Chamberlain; Wurster, Bernardi and Emmons, 1976

MERRITT COMMUNITY COLLEGE CAMPUS MAP

AMY SKEWES-COX
ENVIRONMENTAL PLANNING

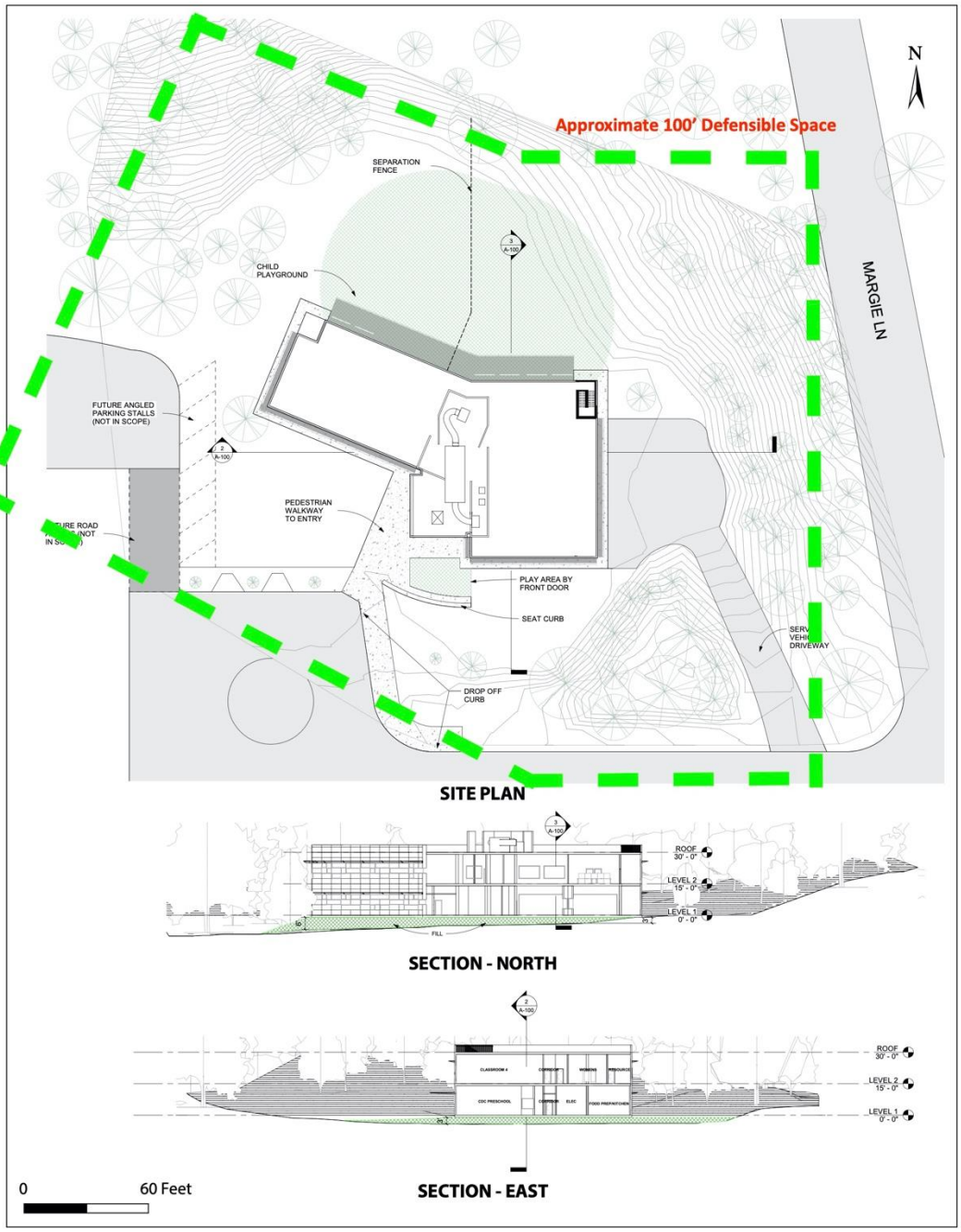


Figure 3

SOURCE: AE3 PARTNERS, 2019

SITE PLAN AND GRADING

AMY SKEWES-COX
ENVIRONMENTAL PLANNING

Figure 5
EXTERIOR ELEVATIONS NO. 2

SOURCE: AE3 PARTNERS, 2019

AMY SKEWES-COX
ENVIRONMENTAL PLANNING

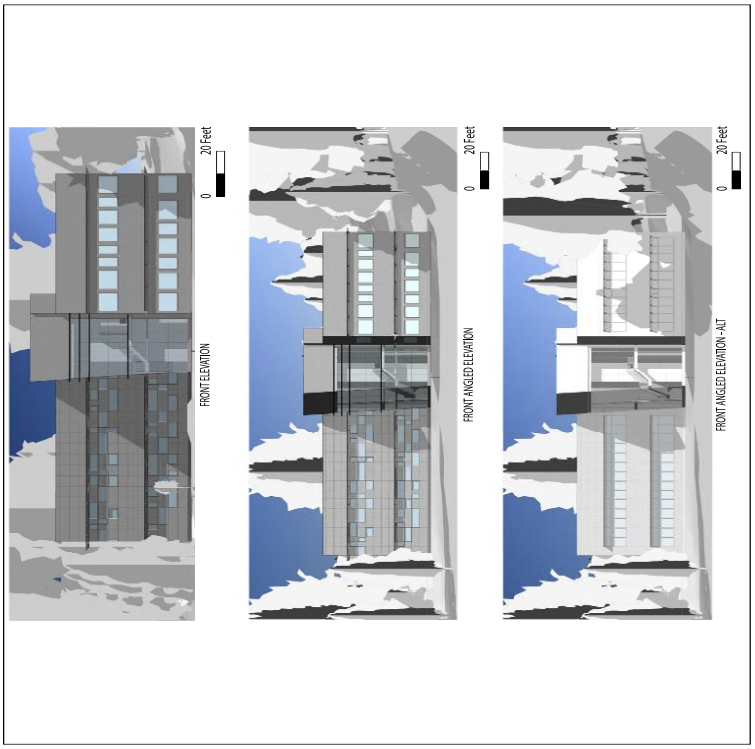


Figure 4
EXTERIOR ELEVATIONS NO. 1

SOURCE: AE3 PARTNERS, 2019

AMY SKEWES-COX
ENVIRONMENTAL PLANNING

Requirements for Operations of Newly Constructed Buildings

In addition to the mitigation measures required during construction as conditions of approval, a set of second mitigation measures are required for the operations of the new buildings. The environmental documents and conditions of approval require that: “Peralta Community College District shall develop a Vegetation Management and Fire Prevention Plan prior to the start of construction and shall implement the plan during construction and operation of the project. The Vegetation Management and Fire Prevention Plan shall include, at a minimum, the following measures:

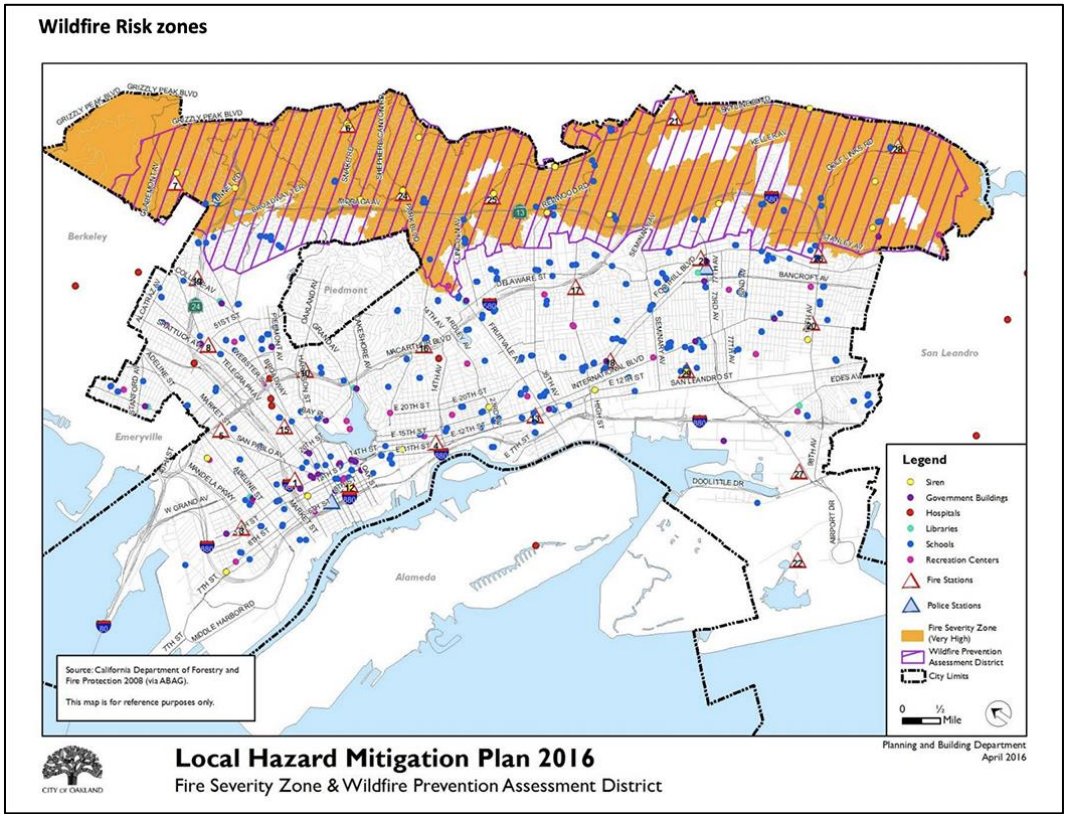
- Using spark arrestors on all vehicles and equipment used for vegetation management;
- Using fire-resistant plants when planting areas for erosion control;
- Pruning the lower branches of tall trees;
- Clearing out ground-level brush and debris; and
- Storing combustible materials away from vegetated areas.”

The Fuel Management Standards, Schedule of Vegetation Management, Mitigation Measures and Fire Prevention Plan sections that follow fulfill these requirements.

Plans, Policies, Programs and Regulations

Oakland General Plan, Open Space Conservation and Recreation Element

The Open Space Conservation and Recreation Element[30] of the City's General Plan is the official policy document addressing the management of open land, natural resources, and parks in Oakland. It includes policies regarding topics such as flood control and discharge, creek maintenance, tree removal, wildlife corridors, and transportation management, among others. The element also discusses fire prevention measures, flammable vegetation control, fire-resistant landscape guidelines, and public education on fire suppression.



City of Oakland 2021-2026 Local Hazard Mitigation Plan

The Local Hazard Mitigation Plan[31], adopted June 15, 2021, is intended to assess the risks to the City and to the people of Oakland from natural and human-caused hazards. The Local Hazard Mitigation Plan reviews risks from hazards, including wildfire hazards, identifies mitigation measures to reduce those risks, and presents an implementation program for the next 5 years.

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[30] Oakland General Plan, Open Space Conservation and Recreation Element. 1996. http://www2.oaklandnet.com/oakca1/groups/ceda/documents/webcontent/oak035249.pdf In 2021 City of Oakland is preparing for a General Plan update. https://www.oaklandca.gov/topics/city-of-oakland-general-plan

[31] 2021-2026 Local Hazard Mitigation Plan. https://www.oaklandca.gov/topics/2021-local-hazard-mitigation-plan The plan is required to be updated every 5 years.

The 2021–2026 Plan functions as an appendix to the 2004 Safety Element of the Oakland General Plan, is an update to the 2010–2015 and 2015-2021 Local Hazard Mitigation Plans and complements the City's ongoing disaster, emergency, and resilience planning efforts. The City Administrator's office and the OFD's Emergency Management Services Division are responsible for monitoring mitigation measures and annual review of the Local Hazard Mitigation Plan in partnership with staff from the Planning and Building Department.

Oakland Vegetation Management Plan (VMP) (revised draft Nov. 1, 2019)

The City of Oakland's 2019 Revised Draft Vegetation Management Plan[32] describes the actions that the Oakland Fire Department (OFD) will continue to take over the 10-year Plan timeframe to reduce fire hazard on 1,924 acres of City-owned land and along 308 miles of roadway in the City of Oakland's designated Very High Fire Hazard Severity Zone (VHFHSZ). The Oakland VMP has been developed to meet its stated goals of reducing wildfire hazard on City-owned land and along critical access/egress routes, reducing the likelihood of ignitions and extreme fire behavior to enhance public and firefighter safety, avoiding or minimizing impacts to natural resources, and contributing to regional efforts to reduce wildfire hazard in the Oakland Hills. The Oakland Hills presents a complex wildfire environment with a significant risk to public and firefighter safety and the built and natural environment. This area is one of the highest risk areas in the country for devastating wildland urban interface (WUI) fires, and is the location of one of the state's most destructive historic wildfires, the 1991 Tunnel Fire. Lessons learned from this and more recent, devastating wildfires in Northern California highlight the importance of managing vegetation to reduce wildfire hazard.

The 2019 Revised Draft VMP includes a detailed assessment of wildfire hazard, which was used to identify and map areas with high ignition potential or where extreme wildfire behavior would be expected, given current terrain and fuel conditions. VMP development included coordination with OFD personnel and significant public and stakeholder outreach to better understand current vegetation management activities in the VMP Area. Vegetation treatment projects were then identified and prioritized based on proximity to Plan Area structures, roads, ridgelines, and park access gates, where fire behavior is anticipated to be extreme (high flame lengths and/or crown fires), and where continuation of the City's goat grazing program would effectively maintain lower fuel loads. Identified priority projects total 1,366 acres within the VMP Area's 1,924 total acres. The revised draft Oakland VMP also prioritizes vegetation management along 30 miles of primary access/egress routes in the VMP Area. The VMP also outlines measurable vegetation treatment standards, by dominant vegetation type, and identifies a range of vegetation management tools that can be utilized by OFD, or its contractors, to reach these treatment standards. As vegetation is dynamic in nature, this VMP outlines an adaptive field assessment and work plan development process to be implemented

[32] City of Oakland, Revised Draft Oakland Vegetation Management Plan. November 2019. https://www.oaklandca.gov/documents/oakland-vegetation-management-plan-and-draft-environmental-impact-report-documents

by OFD annually, which accounts for the variability in vegetation condition project site conditions over time.

Oakland Fire Code

Oakland Municipal Code Chapter 15.12 (Oakland Fire Code)[33] and its amendments establish regulations regarding the hazard of fire and explosion arising from the storage, handling, or use of structures, materials or devices; conditions hazardous to life, property or public welfare in the occupancy of structures, or premises; fire hazards in the structure or on the premises from occupancy or operation; matters related to fire suppression or alarm systems; and conditions affecting the safety of firefighters and emergency responders during emergency operations.

The Oakland Fire Code also includes California Fire Code Chapter 49 (Wildland-Urban Interface Areas), which defines the City's VHFHSZ and outlines requirements for defensible space, hazardous vegetation management, electrical distribution line clearances, fire apparatus access, water supply, ignition source control, and combustible materials storage, among others. Specifically, Section 4906.3 states that vegetation around all applicable buildings and structures within the VHFHSZ shall be maintained in accordance with California Public Resources Code Section 4291, California Code of Regulations Title 14 – Natural Resources, Division 1.5 – Department of Forestry and Fire Protection, "General Guideline to Create Defensible Space," and California Government Code Section 51182. Because Merritt College is located in a Very High Fire Hazard Severity Zone, 100-feet of defensible space is required.

Oakland Fire Department Vegetation Inspection Program

The OFD Vegetation Management Unit (VMU)[34] serves to inspect properties in the Oakland Hills, much of which is designated as a Very High Fire Hazard Severity Zone (VHFHSZ). The VMU works under the Oakland Fire Department's Fire Prevention Bureau. The VMU is responsible for the inspections of over 20,000 homes and vacant parcels in the VHFHSZ. The purpose of these inspections is to identify and mitigate hazards that could contribute to the spread, growth, and intensity of wildfire. Inspections are done annually, and property owners are required to actively maintain their parcels in a fire-safe condition year-round. The Vegetation Management Unit does inspections to identify potential hazards in an area described as the Wildland-Urban Interface (WUI). The goal is to reduce the amount of fuel (combustible, flammable vegetation) that could contribute to the spread, growth, and intensity of wildfires.

Oakland's Emergency Procedures Plan, Roles and Responsibilities Handbook

Section 15, Title 8 of the California Code of Regulations requires that all employers establish and implement an Emergency Plan, with sufficient numbers of their employees oriented to the details of emergency preparedness and procedures to take positive action during an

[33] Oakland Municipal Code Chapter 15.12.
https://library.municode.com/ca/oakland/codes/code_of_ordinances?nodeId=TIT15BUCO_CH15.12OAFICO
[34] Oakland Vegetation Management Unit and Wildfire District Inspections.
https://www.oaklandca.gov/services/wildfire-district-inspections

emergency. The City of Oakland offers an emergency response handbook template[35] designed to assist employers and employees before and during an emergency. As part of the employer's ongoing concern for the safety of employees and others who may visit their buildings, the guidelines and procedures contained in the Emergency Plan handbook can be put into practice and maintained. Among these guidelines is an Emergency Evacuation Checklist, which recommends that evacuation not be initiated unless conditions in the area present a threat to life safety or if instructed by fire or police personnel or public address announcement, and to not automatically evacuate or relocate after an earthquake.

Merritt College Emergency Operations Plan

The *Merritt College Emergency Operations Plan* (Peralta Community College District 2014)[36] identifies wildfire as a natural threat to the campus and recognizes the need for mitigation without providing detailed recommendations. The plan also addresses evacuation, and indicates it is expected that most major streets would be open and as such, evacuation should be easily facilitated. The Safety Ele*ment* of the *City of Oakland General Plan* (City of Oakland) shows the emergency evacuation routes in the vicinity of the Merritt College campus include Redwood Road, Skyline Boulevard and Mountain Boulevard.

If vegetation on the campus site is not appropriately managed, the potential is high for ignition and fire occurring on campus and spreading to surrounding areas. Common ignition sources include arson, vehicles, equipment, electrical among others.[37] Of greatest concern on campus is equipment that could generate sparks and increase fire risks, such as vehicles, saws, mowers, and storage and use of related flammable materials (fuel and compressed gasses). Recent nearby campus ignitions have included automobile accidents on Highway 580 and construction work.

Currently there are no specific policies or training on ignition prevention. This could include information on red flag weather and protocols for when specific maintenance or construction operations should be stopped due to the increased potential of hazardous wild fire conditions. Ignition prevention training could include grounds crew or others operating equipment that could spark fires or undertaking work that generates sparks as metal cutting, torching and welding, or includes hot equipment or refueling.

[35] Emergency Procedures Plan, Roles and Responsibilities Handbook. https://cao-94612.s3.amazonaws.com/documents/oak038404.pdf

[36] Merritt College Emergency Operations Plan. https://www.merritt.edu/wp-content/uploads/sites/3/2014/11/MC-Emergency-Operations-Plan.pdf

[37] CAL FIRE Santa Clara Unit 2020 Strategic Fire Plan. May 2020. Page 7.

Fuel Management Standards

The following vegetation treatments are required to create sufficient defensible space within the Fuel Management Zones described in this section. Fuel treatments for areas in proximity to structures include: the Non-combustible Zone, the Landscaping Zone, the Roadway Zone and the Campus Perimeter Zone. The plant communities present determine the management actions required. For the purposes of this section, eight 'fuel management zones' are categorized according to proximity to roads, structures and depending on the vegetation type. Four general plant community type are addressed in this plan because of their presence in the Fuel Management Zones. The community types provide specifics for treatment standards for: Annual Grasslands, Coastal Scrub, Oak/Shrub Woodlands including Mixed Conifer, and Riparian Woodland, as defined further below.

In circumstances where slope, vegetation cover, building materials of existing buildings, or other circumstances beyond the control of Merritt College, the width of the relevant Fuel Management Zone may be expanded to address increased risk factors. In such cases, strategies other than vegetation removal, such as "structure hardening," should also be considered and incorporated to the extent feasible.

	Fuel Management Zone:	**Zone Area:**
1	Non-Combustible Zone	5 feet from structures
2	Landscaping Zone	entire landscaped area
3	Roadway Zone	15 to 30 feet from pavement
4	Campus Perimeter Zone	Site boundaries within 100 feet of adjacent homes
5	Annual Grassland Zone	30 feet from structures
6	Coastal Scrub Zone	100 feet from structures
7	Oak/Shrub Woodland and Mixed Conifer Zone	100 feet from structures
8	Riparian Woodland Zone	20-feet from top of creekbank

Non-Combustible Zone – To a Distance of 5 Feet from Structures

A non-combustible zone should be maintained within in a 5-foot buffer around structures.

Hardscape surfaces (such as patios, gravel, and bare soil), and landscape materials (such as lawn and succulent herbaceous plants) are examples of non-combustible surfaces. Wood mulch is not considered non-combustible. Maintenance staff and landscape architects are encouraged to make liberal use of hardscaping within 5 feet of structures. Care should be taken in the design phase to ensure there is adequate room for such treatments.

Note: On November 18, 2020, AB3074 was signed into law requiring "Zone 0" as an "ember-resistant," non-combustible zone by January 1, 2023.

Landscaping Zone – Within Entire Campus Landscaped Area

Ornamental landscaping often results in large amounts of shrubby flammable vegetation being planted near structures. Many commonly used landscape plants, such as conifers, flammable woody shrubs, and tall ornamental grasses, should be avoided because they may create a fire threat to a building that would otherwise be fire safe. In some areas of the campus the landscape is aged, with dead and dying plants that need to be removed or rejuvenated. All plant material that is removed from the landscaping must be composted or removed and disposed of properly.

The spacing between landscaping plants and volume of landscaping biomass should mimic the Oak/Shrub Woodland and Mixed Conifer Zone. Landscaping zone should be maintained according to the standards in the Oak/Shrub Woodland and Mixed Conifer Zone (see below).

Approved landscaping must be designed and maintained to minimize flammability. In some areas of the campus the landscape is aged, with dead and dying plants that need to be removed or rejuvenated.

Landscaping that generally complies with these standards.

Roadway Zone – 15 to 30 feet from Edge of Roadway Pavement

The Roadway Zone is important to create space for safe passage and to provide a location where firefighters can travel and engage in fire response. Treatment standards correspond to vegetation type along the roadway:

a. Grassland, and the understory of all Oak/Shrub Woodland vegetation should be mowed within 15 feet from the pavement edges, according to the standards in the Grassland Zone.

b. All Coastal Scrub, and Oak/Shrub Woodland and Mixed Conifer Zone vegetation should be treated to 30 feet from the pavement edge, according to their respective standards.
c. All tree branches extending over roadway surfaces should be pruned to ensure 15 feet of vertical clearance. Whenever possible, healthy overhanging branches higher than 15 feet should be left in place to shade roadway areas and thereby reduce weed and understory growth.
d. Ensure that every structure has a dedicated fire hydrant and a hammerhead or other safe turnaround for fire equipment access. Maintain vegetation around these facilities to ensure visibility and access. Vegetation must be cleared three feet around each fire hydrant. Maintain both 15 feet vertical and horizontal clearance at the hammerhead or other turnaround for fire equipment.

Roadway zone treatment requires removal of dead materials, French broom and pruning of lower branches on trees to allow for safe ingress and egress.

Campus Perimeter Zone

Where homes or other structures are located off-campus adjacent to the campus property boundary, Merritt College needs to manage fuels to reduce fire hazards created by campus vegetation. The width of this perimeter zone varies to provide 100 feet of defensible space from the adjacent structures (width depends on the distance from the adjacent structure to the campus property boundary). The treatment standard follows the standard for the corresponding vegetation type at the property boundary.

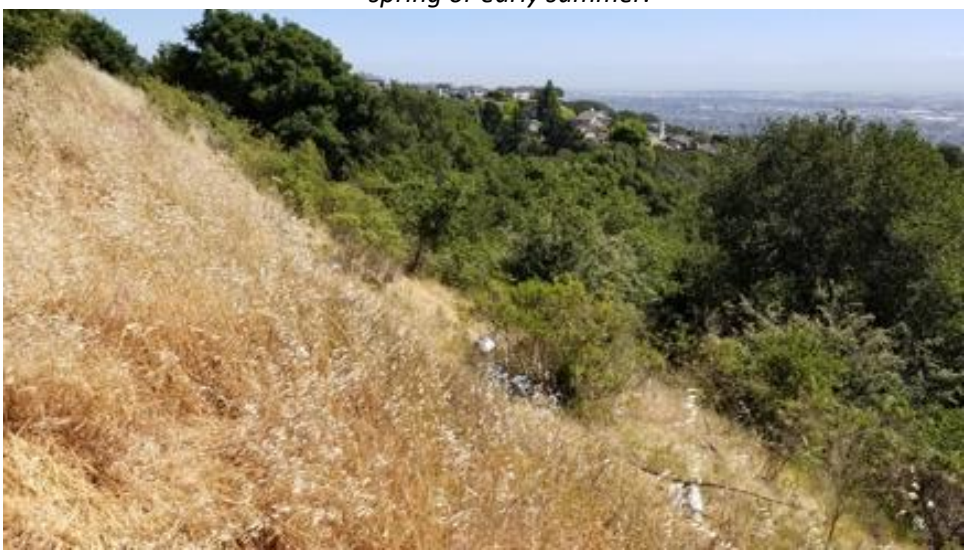
Annual Grassland Zone – To a Distance of 30 Feet from Structures

Because annual grasslands dry and become flammable at the start of every summer, grassland areas will need annual attention, typically by mowing prior to the beginning of each summer. By mowing in late spring, perennial native grasses and wildflowers are retained and may contribute in a lower-hazard condition. Invasive, non-native species such as acacia, French broom, poison hemlock, and thistles must be completely removed annually in the treated areas.

a. Within 30 feet from structures, all annual grassland areas should be mowed in early summer to maintain a minimum height of 4 inches during the summer. A second mowing may be needed if late rains allow the annual grass to continue to grow.

b. Native perennial grasses and wildflower stands should not be mowed more frequently than every 60 days, ideally shortly after they have set seed. This may require a delayed mowing schedule in wetter years to maintain their density.
c. Trees growing within the Annual Grassland Zone should be treated according to the standards made in the Oak/Shrub Woodland and Mixed Conifer Zone.
d. Coyote brush, and other shrub species growing within the grassland zone, should be cut or removed. Islands of shrubs should present less than 30% cover and be well spaced in the grasslands. Select invasive species (such as broom), common species (coyote brush, poison oak, and chamise) and aged shrubs for treatment to achieve desired spacing.

Annual grassland zones (or unirrigated lawns) must be mowed at least once annually in late spring or early summer.



Grassland within 30 feet of structures or campus perimeter should be mowed every year shortly after it cures.

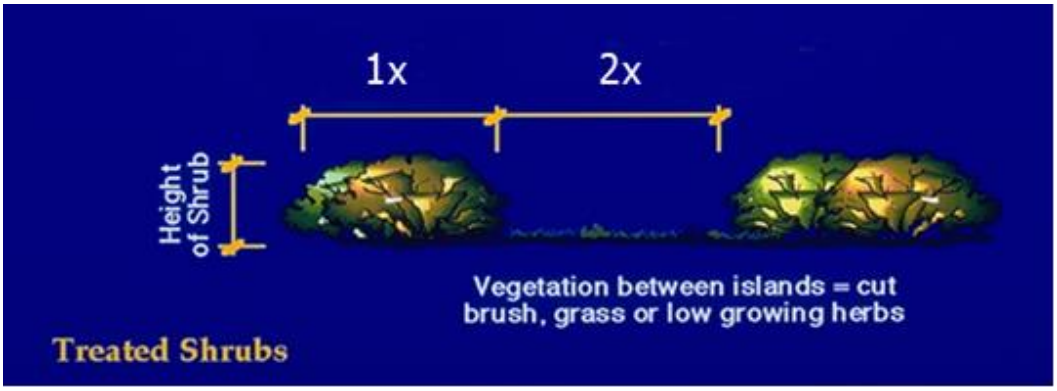
Coastal Scrub Zone – To a Distance of 100 Feet from Structures

Coastal scrub (also called California sagebrush scrub on this site) is composed of broad-leafed shrubs and bushes - species including coyote brush, native sage, blackberry, coffeeberry, and poison oak - that form dense thickets, and it is an important habitat type for wildlife. On Merritt Campus, French broom has invaded many of these areas. This vegetation type burns with great intensity and it poses a high fire hazard to adjacent structures both on and off campus. Many shrub species growing within coastal scrub habitat will stump-sprout vigorously when cut or burned, so coastal scrub zones will need to be retreated on a regular basis. In this vegetation type, defensible space is created by maintaining well-spaced shrubs with succulent young vegetation, and no dead branches.

All shrubs within coastal scrub must be thinned or mowed within 100 feet of structures.

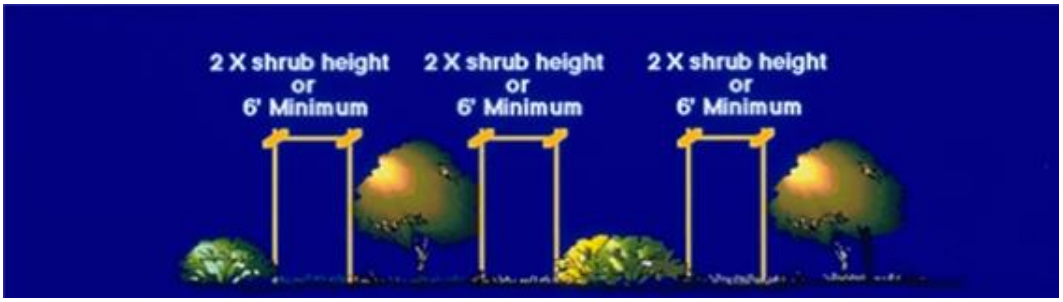
French broom has invaded areas of coastal scrub on Merritt campus. Maintain shrub masses to be discontinuous groups of shorter, younger, more succulent shrubs.

a. In open areas away from trees, within 100 feet of structures, change the mass of shrubs into discontinuous groups of shorter, younger, more succulent shrubs and ensure the distance between groups of shrubs is at least 2 times the height of the shrub patch.



Create groups of shrub groupings to provide horizontal separation between shrubs. Each group of shrubs should be no wider than 2 times its height, or less than 120 square feet in area. The space between shrub groups should be at least two times the height of the shrubs, or a distance of 10 feet, whichever is greater.

b. In coyote brush dominated stands, if other shrub species are present, target removal of the most common shrubs first, such as coyote brush or poison oak. Retain less-flammable desirable shrubs, such as toyon, currant, coffee berry, native rose, and sticky monkey flower.
c. It is not necessary to eliminate coyote brush within the fuel management zone. Instead, change the pattern into discontinuous groups of shorter, younger, more succulent shrubs.
d. Remove all dead branches from less-flammable desirable shrubs, such as ceanothus, currant, coffee berry, native rose, and sticky monkey flower.
e. All healthy trees should be retained. As trees increase in size and number within the coastal scrub, they provide a long-term reduction in shrub cover and fire hazard.



Create horizontal spacing between trees and shrubs, by removing shrubs from around trees within a radius that extends 3 feet from the tree's drip line. For trees taller than 6 feet, remove shrubs within a distance of 6 feet from the tree's drip line.

f. Trees growing within coastal scrub zones should be encouraged by removing shrubs from within an area around the tree.
   - When the tree is shorter than 6 feet high, all shrubs should be removed from within a distance of 3 feet from the tree's drip line.
   - When a tree is taller than 6 feet high, all shrubs should be removed from within a distance of 6 feet from tree crown edge.

Oak/Shrub Woodland and Mixed Conifer Zone – To a Distance of 100 Feet from Structures

In the Oak/ Shrub Woodland and Mixed Conifer Zone, annual grass must be mowed, understory plants must be kept short, and small lower tree branches must be removed.

Oak/ shrub woodland and mixed conifer zone that generally complies with these standards.

The understory of oak/shrub woodland and mixed conifer zone habitat includes shade tolerant shrubs and grasslands. The goal of this standard is to maintain an existing oak woodland and mixed conifer zone with a short-statured understory of herbaceous plants and shrubs, and a tree canopy at least 8 feet above the ground. An initial treatment will be required to prune smaller branches of trees up to 8 feet above the ground and to reduce density and stature of understory shrubs. After the initial treatment, annual maintenance will be needed to cut back shrub sprouts in order to maintain a maximum height of 2.5 feet. The same treatment goal and standards are used for areas of mixed conifer (redwood, Monterey pine, stone pine, firs and other conifers).

Mowing annual grass under and around trees reduces fire intensity and rate of spread of fire to an acceptable level and diminishes the possibility that fire can climb into the tree canopy. Pruning the small lower tree branches, as noted below, will reduce the possibility that fire can spread into the tree crowns. Invasive non-native species such as French broom, poison hemlock and thistles must be completely removed annually.

Prescriptions for grass mowing in oak/shrub woodland and mixed conifer:

a. Within 30 feet of structures, all grassland areas should be mowed in early summer to a height of four inches, according to the standards in the Grassland Zone.
b. Within 100 feet of structures, all grass growing under trees, out to 6 feet beyond the driplines of trees, should be mowed in early summer to a height of four inches.
c. Within 30-100 feet of structures (depending on slope and other factors), grass growing in the open, away from trees, does not need to be mowed.

Prescriptions for removing dead wood on the ground:

a. Throughout the Fuel Management Zones, remove all dead branches on the ground smaller than 8-inch diameter.
b. Large dead material may be removed or relocated. Dead limbs larger than 8 inches in diameter, in the Fuel Management Zones, should remain on the site if isolated from dead material that is smaller than 4 inches in diameter, if not under a tree canopy, or if moved at least 100 feet from the structure. Large woody material by itself does not ignite readily and does not produce long flames. Retaining these features in open areas serves a beneficial purpose of retaining soil moisture and supports important wildlife, including native pollinators. Once dead logs become rotted through and friable, they should be removed or scattered in the general area to avoid a concentration of lighter fuels.

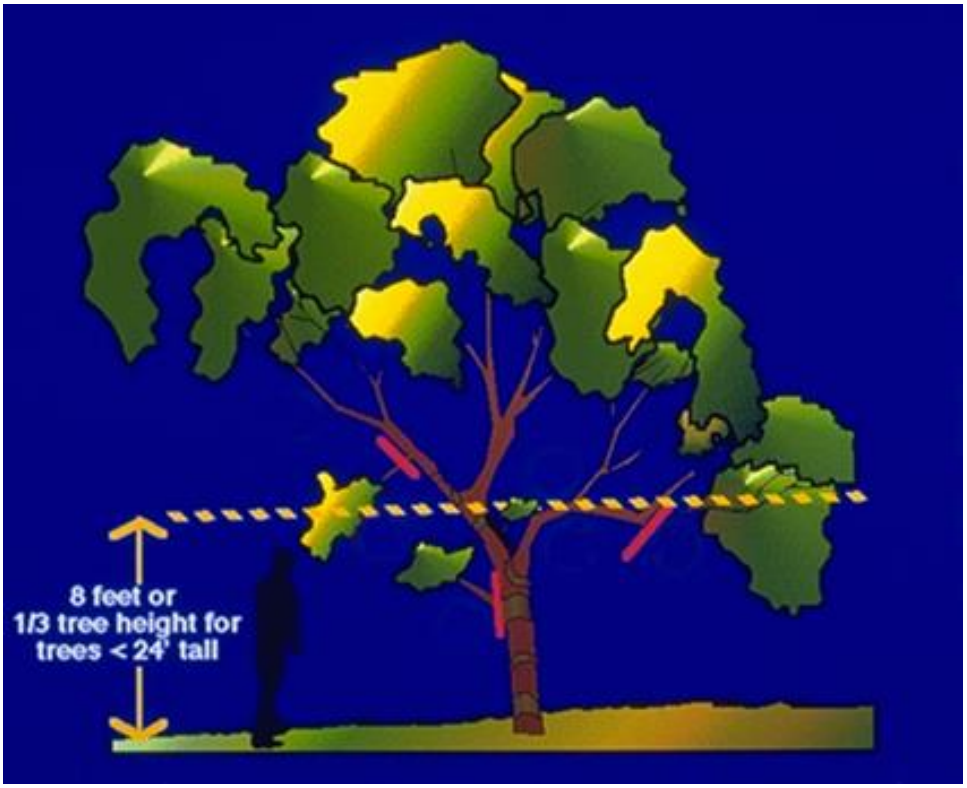
Prescriptions for understory maintenance:

a. Within 30 feet from structures, at the beginning of each summer, ensure that the herbaceous understory is maintained at a maximum height of 4 inches.
b. Understory vegetation should not be completely removed, with the exception of invasive exotic species. Instead, selectively remove flammable species like coyote brush, and prune-back and remove dead branches from less-flammable desirable species such as coffee berry, currant and wild rose.

c. Native understory shrubs are to be kept free of dead branches and no more than 2.5 feet in height. Taller shrubs may be retained in areas where there is no tree canopy cover.
d. Keep leaf litter depth no greater than 4 inches.
e. Remove volunteer pine and undesirable trees, such as invasive acacia or eucalyptus.

Prescriptions for tree pruning:

a. Remove all branches, living or dead, less than 3 inches in diameter and less than either 8 feet from the ground or three times the height of any understory shrubs whichever is greater.



Create vertical spacing under lower tree branches, by removing <u>small</u> tree branches from the bottom 8 feet of the tree, or from the bottom one-third of the tree, whichever is less.

b. Living branches that are greater than 3 inches in diameter but lower than 8 feet in height can be retained, provided that the area within the drip-line of trees is maintained clear. Oaks with live limbs resting on the ground need not be removed, but all ground debris around and beneath the limbs must be removed to reduce fire risk.
c. Dead limbs located less than 8 feet in height from the ground shall be removed.
d. In landscaped areas, healthy tree branches less than 3 inches in diameter or 8 inches diameter if split or diseased, should be removed to provide vertical clearance of 3 times the height of the understory plants, or 8 feet above understory plants, whichever is greater.
e. For trees shorter than 24 inches in height, remove lower 1/3 of branches smaller than 3 inches in diameter, or alternatively, treat as a shrub grouping.

f. Once initial pruning is accomplished, tree pruning is likely to be needed infrequently, on an interval of about once every 3 to 5 years.
g. Do not thin, or unnecessarily prune, the tree canopy, as this will promote more understory shrub growth as well as growth on lower parts of the tree and will result in increased risk that fire will spread to the tree canopy. Maintain canopy closure where possible.
h. Sometimes small trees may need to be cut to the ground in order to achieve the separation of the ground level from the tree canopy, or because mowing equipment cannot avoid the small trees.

Riparian Woodland Zone – Within 20 Feet from Top of Creekbank

The Riparian Zone is the area twenty feet either side of the top of bank and within the banks of the creek bed. Riparian woodland is designated as a sensitive habitat by the California Department of Fish and Wildlife (CDFW). In these areas special care should be taken not to trample riparian vegetation or alter the creek alignment or banks.

No fuel management should be performed inside the bank of the creek. Hand labor must be used to treat fuels within 20 feet of the top of bank of the creek.

Treatments for fire safety in the Riparian Woodland Zone are limited by concerns for wildlife habitat. Fortunately, foliage of vegetation in this area generally has higher moisture and can act to dampen fire intensity and spread. Fire management treatments that concentrate on dead material can enhance fire safety without compromising wildlife habitat.

Hand labor would need to be used in this area within 20-feet of the creekbank (willow trees indicate riparian area).

The following actions are to be taken in the Riparian Woodland Zone:

1. Remove dead vegetation, vines, and dry fuels such as dead lower branches of trees.
2. Remove all invasive non-native plants such as acacia, French broom, yellow star thistle, and Italian thistle.
3. Living trees and shrubs may not be removed or pruned.

Additional Areas of Concern

Ground fuels, piles of cut dead materials and chips

Throughout the campus are problem areas with deep ground fuels, piles of cut dead materials and chips. Some of this material may be due to illegal dumping, which is a regional problem. However, west of Campus Drive in the former parking lots and undeveloped land, Campus tree contractors have been authorized to stockpile chips. These piles of chips are 4 to 6 feet tall and have been invaded by annual grass and French broom increasing the risk of ignition and fire spread. These materials should be removed or spread throughout campus to a maximum depth of less than 4 inches.

Areas with deep ground fuels, piles of cut dead materials and chips represent fire hazards on campus.

Invasive Plants

Throughout the campus and surrounding areas invasive plants, such as French broom, acacia, Monterey pine, Himalayan blackberry, poison hemlock and thistle, increase the fuel load. Invasive plants are particularly evident in areas recently abandoned or disturbed, such as the former parking lots east of Campus Drive. Monitoring and removal of invasive plants is required on an annual basis to be effective. Timing and follow-up are critical. If treatment is too early,

they will continue to grow and defeat the management action. If undesirable material is removed too late, seeds already may have been produced and may be distributed to nearby sites, expanding the area of invasive species. Because of all these component to successful removal and prevention of invasive plants, treatment of invasive plants should be contracted to a professional entity. An integrated pest management program (IPM) approach should be developed for fuel management utilizing the strategies of prevention for pioneering species, containment, reduction and eradication for established populations (see Appendix).

Self Reliant House

The Self Reliant House presents a variety of wildfire hazards. The annual grasses and wood fencing wood could easily be ignited from embers that originate from either on or off campus. The unmanaged shrubs and dead tree branches once ignited could generate enough heat to ignite the house and other wooden structures. Fuel management for this area should follow the Landscaping Zone standards




The Self Reliant House presents a variety of wildfire hazards from vegetation and structures.

Schedule of Vegetation Management

First priority for the schedule of vegetation management actions is life safety. Focus vegetation management first on the:

1. Non combustible zones, starting from each building exit and working around the building to maintain a five-foot zone that reduces the chance of ignition immediately adjacent to buildings.
2. Roadways zones 15 to 30 feet from the edge of pavement to support access by first responders and evacuation of campus.

After life safety, property protection is second in priority.

3. Develop defensible space for each building with the landscaping zone and landscape type up to 100 feet from the structures.
4. Complete perimeter treatments where adjacent homes' defensible space is within the campus boundary (where property line is closer than 100 feet from home)

The final priority is natural resource protection that treats the annual grassland, coastal scrub, oak/ shrub woodland and riparian woodland to reduce the potential for ignition and overall fuel load. Natural resource protection treatments not only protect the natural landscape, but also reduces the chance of uncontrolled wildfire across the campus.

Mitigation Measures

Fire Hazard Mitigation

Vegetation management operations can increase the risk of wildfire due to the campus being in a fire hazard area. The following Fire Prevention Plan details mitigation measures to minimize the potential for accidental ignition both during construction of new buildings, and during regular vegetation management operations.

Biologic Surveys

Most of the special-status plant and animal species reported from the Oakland Hills vicinity occur in natural habitats such as riparian woodlands, serpentine grasslands, chaparral, and forest habitats. A number of special-status plant species also are known to occur in the open woodlands and grasslands of the Oakland Hills. It is recommended that a survey be completed prior to beginning vegetation management activities in those areas of the campus. The area of the survey is expected to be limited to areas not previously treated, especially near the riparian woodland and serpentine outcrops in areas shown in the photographs below.

Serpentine outcrops and riparian area should be surveyed for special status species before starting vegetation management in the area.

Areas where a biological survey should be undertaken, (e.g. where work has not been done previously, or in areas of serpentine soils or in riparian woodlands).

With the exception of possible presence of nesting birds protected under State and federal regulations when the nests are in active use, no special-status species are suspected to occur according to the existing environmental documentation. This includes absence of suitable habitat for the State and federally-threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*), the federally-threatened California red-legged frog (*Rana draytonii*), and the State and federally-endangered Presidio clarkia, among other special-status plant and animal species. Critical habitat for Alameda whipsnake designated by the USFWS occurs in the watershed lands about a mile and a half to the east, but suitable habitat for this species currently does not occur on the campus.

Nests of most bird species are protected under the federal Migratory Bird Treaty Act (MBTA) and California Fish and Game Code when in active use. Trees on and in the vicinity of the campus contain suitable nesting substrate for some bird species recognized as Species of Special Concern (SSC) by the California Department of Fish and Wildlife (CDFW), as well as more

common species, and new nests could be established in the future. Tree removal during the breeding season could result in the incidental loss of fertile eggs or nestlings or nest abandonment. Bird nesting surveys should be undertaken prior to any treatments that have the potential to disturb nests.[38] Nesting season is typically February 1 through August 31.

Hydrologic – Water Quality and Erosion Control Measures

The campus is located at the headwaters of two creeks and campus storm drains ultimately flow to the San Francisco Bay, as detailed in the section on Surrounding Topography. Water quality and erosion are required to be protected during fire hazard reduction management activities as detailed in the section on Geology, Soils and Hydrology.

Most standard fuel reduction and resource management activities (e.g., goat grazing, select tree removal, understory clearing) do not result in the complete removal of vegetation or forest litter down to bare soil over large areas. However, if any fuel reduction or resource management activities would disturb (i.e., denude vegetation down to bare soil) more than 1.0 acre, the District may be required to file a Notice of Intent (NOI) with the RWQCB to be covered under the State NPDES Construction General Permit for discharges of stormwater associated with construction activity. If applicable, managers of fuel removal activities must propose control measures that are consistent with the State General Permit.

A Stormwater Pollution Prevention Plan (SWPPP) must be developed and implemented for each site covered by the general permit. [39] A SWPPP should include Best Management Practices (BMPs) designed to reduce potential impacts to surface water quality during implementation of fuel reduction and resource management activities. Potential water quality impacts associated with sediment, oil and grease, petroleum hydrocarbons and metals could be of concerned. Potential impacts on water quality and erosion that could require mitigation measures include:

- Hand Labor. This option includes minor pruning, mulching, weed pulling by hand, and shrub removal. These activities generally pose a low risk of impacts to water quality because the disturbance would be minimal.
- Mechanical Treatment. This option generally includes grading, mowing, overstory removal, the use of landings, yarding, mechanical cutting, and mulching or chipping. These options often use large, tracked equipment that require site preparation of their operating areas or access corridors. As such, these options pose a high risk of impacts to water quality because soils could be deeply disturbed and vegetative cover removed, which could allow for substantial erosion and sedimentation.
- Chemical Treatment. This option includes the application of herbicides to control the growth of vegetation. This option generally poses little-to-no risk of ground disturbance since the application would predominantly be by hand. The potential for erosion-related water quality impacts using this treatment option would be low. Potential water quality

[38] See Appendix – Mitigation Measures from Recent Merritt College CEQA Documents for Nesting Birds detail.
[39] See Appendix – Mitigation Measures from Recent Merritt College CEQA Documents for Hydro-1 detail.

impacts related to pesticides entering runoff or directly landing on water bodies could cause water quality degradation.

- Prescribed Burning. This option includes the burning of larger areas (broadcast burning) or the burning of piles of cut brush (pile burning). This option poses little-to-no risk of ground disturbance, as ignition is done by hand. However, burning can expose soils to erosion where the majority of vegetation is removed.
- Grazing. This option includes the use of grazing animals to reduce the fuel load in a given area, primarily grasslands or shrublands. This option generally poses a low risk of ground disturbance, although cattle wallows or the creation of animal trails may result in soil displacement and subsequent erosion.

Implementation Recommendations

Implementation of vegetation management recommendations can be facilitated by cross training PCCD gardeners and maintenance staff on the standards included in this Vegetation Management Plan, as well as on the best practices of urban tree care. Development of a community-based course would bolster the spread of a culture of wildfire safety.

The District may benefit from hiring professional contracting firms with specialized skilled and equipment for many of the vegetation management activities recommended by the Plan. The fuel management standards in this vegetation management plan should be the foundation for a Request for Proposals for vegetation management on the campus. Combined, with the schedule of vegetation management and mitigation measures in this plan, these can serve as basis for technical specifications. In addition, the final specifications for the work should be clear and detailed, and targeted as much as possible to Merritt's needs especially up at the horticulture facility where trees and smaller plant material are used for instructional purposes.

Frequency of Fuels Management

	Non-combustible Zone	Landscaping Zone	Roadway Zone	Campus Perimeter Zone	Annual Grassland Zone	Coastal Scrub Zone	Oak/ shrub Woodland and Mixed Conifer Zone	Riparian Woodland Zone
Annual Management								
Remove all weeds and combustible materials.	*							
Mow or graze grass near structures and under trees.		*	*	*	*		*	
Remove shrubs and invasive plants to maintain grasslands standards.			*	*	*			
Remove shrubs and invasive plants to re-establish 30 feet of horizontal clearance from pavement edge and 100 feet of defensible space.		*	*	*	*	*	*	
Monitor facilities (hydrants + turnarounds) and manage to ensure visibility and access.		*	*			*	*	*
Inspect trees for deadwood and clearances and re-establish vertical and horizontal clearances.		*	*	*	*	*	*	
Monitor and manage storm damage, pest, disease and aging landscape.		*	*	*	*	*	*	*
Monitor site for highly flammable invasive plants and remove new invasions per IPM.		*	*	*	*	*	*	*
Management that will occur every three years								
Thin shrubs into discontinuous groupings.		*	*	*		*	*	
Cut shrubs to rejuvinate decadant stands and create horizontal spacing from trees.		*	*	*		*	*	
Remove new understory shrubs to maintain standards.						*	*	
Remove volunteer pine and other undesirable tree seedlings to maintain standards.						*	*	
Prune lower branches to reestablish vertical clearance.		*	*	*			*	
Monitor for deadwood, leaf litter or chip buildup.		*	*	*		*	*	*
Management after periodic major disturbances								
Monitor site after periodic major disturbances.	*	*	*	*	*	*	*	*
	Non-combustible Zone	Landscaping Zone	Roadway Zone	Campus Perimeter Zone	Annual Grassland Zone	Coastal Scrub Zone	Oak/ shrub Woodland and Mixed Conifer Zone	Riparian Woodland Zone

Frequency of Fuels Management

Annual Management

- Remove weeds and all combustible materials in Non-combustion Zone.
- Mow or graze grass near structures and under trees and shrubs in Landscaping Zone, Annual Grassland Zone, Roadway Zone, and Campus Perimeter Zone.
- Remove shrubs and invasive plants in Annual Grassland Zone to maintain Annual Grassland Zone with less than 30% shrub coverage.
- Remove shrubs and invasive plants in the Roadway Zone and Campus Perimeter Zone to re-establish 30 feet of horizontal clearance from pavement edge and defensible space for adjacent structures, according to their respective standards.
- Monitor all facilities (fire hydrants, turnarounds, etc.) and re-establish Roadway Zone standards to ensure visibility and access in Landscaping Zone and Roadway Zone.
- Inspect trees for deadwood and clearances. Remove deadwood and re-establish vertical clearance in Landscaping Zone, Roadway Zone, Oak/ Shrub Woodland and Mixed Conifer, and Riparian Woodland. Prune lower branches of immature, small trees to maintain standards as they grow in height.
- Monitor and manage storm damage, pest or disease that increase potential ignitions, or threaten overall health of plant materials.
- Monitor site for highly flammable invasive plants (French broom, acacia, thistle)and remove new invasions. Annually contain and reduce overall areas of invasive plants according to an Integrated Pest Management (IPM) plan (See Appendix).

Management that will Occur Every Three Years

- Thin shrubs in Coastal Scrub Zone into discontinuous groupings. Cut aged shrubs that resprout to remove dead wood (e.g. coyote brush). Remove invasive shrub species according to an IPM plan.
- Remove new understory shrubs below tree canopy in Oak/ Shrub and Mixed Conifer Zone.
- Remove volunteer pine and other undesirable tree seedlings, such as acacia and eucalyptus.
- Prune trees of lower branches of mature, large trees to re-establish vertical clearance. Once initial pruning is accomplished, tree pruning is likely to be needed infrequently, on an interval of about once every 3 to 5 years.
- Monitor campus for deadwood, leaf litter or chip buildup. Remove deadwood to meet “prescriptions for removing deadwood on the ground “in the Oak/ Shrub and Mixed Conifer Zone. Distribute leaf litter and chips to maximum depth less than 4 inches.

Management after Periodic Major Disturbances

The scheduling and funding of vegetation management to reduce wildfire hazards also needs to take into account periodic major disturbances that result in unexpected fire hazard conditions. These periodic major disturbances can be related to heavy winter rains that down trees, and cause flooding and erosion. High wind events can down branches, whole trees and powerlines that can spark wildfires or increase ease of future ignitions. Climate change impacts can include new pests or diseases that shorten the life of or kill off landscape plants, or spread invasive

plants increasing overall fuel loads. Drought, or abnormal seasonal fluctuations in heat or cold, can also result in unexpected die-off. And lastly the areas of the campus with their original landscape may have sudden increase in risk of fire from dead and dying plants that need to be removed or rejuvenated.

Fire Prevention Plan

During Maintenance and Construction Activities

Specific Fire Precautions

When working on Merritt College Campus maintenance workers and contractors shall meet minimum requirements of Sections 4427 and 4428 of the California Public Resources Code (PRC).[40]

> ***4427.*** *During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate any motor, engine, boiler, stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices from which a spark, fire, or flame may originate, which is located on or near any forest-covered land, brush-covered land, or grass-covered land, without doing both of the following:*
>
> *(a) First clearing away all flammable material, including snags, from the area around such operation for a distance of 10 feet.*
>
> *(b) Maintain one serviceable round point shovel with an overall length of not less than forty-six (46) inches and one backpack pump water-type fire extinguisher fully equipped and ready for use at the immediate area during the operation.*
>
> *This section does not apply to portable powersaws and other portable tools powered by a gasoline-fueled internal combustion engine.*
>
> ***4428.*** *No person, except any member of an emergency crew or except the driver or owner of any service vehicle owned or operated by or for, or operated under contract with, a publicly or privately owned utility, which is used in the construction, operation, removal, or repair of the property or facilities of such utility when engaged in emergency operations, shall use or operate any vehicle, machine, tool or equipment powered by an internal combustion engine operated on hydrocarbon fuels, in any industrial operation located on or near any forest, brush, or grass-covered land between April 1 and December 1 of any year, or at any other time when ground litter and vegetation will sustain combustion permitting the spread of fire, without providing and maintaining, for firefighting purposes only, suitable and serviceable tools in the amounts, manner and location prescribed in this section.*
>
> *(a) On any such operation a sealed box of tools shall be located, within the operating area, at a point accessible in the event of fire. This fire toolbox shall contain: one backpack pump-type fire extinguisher filled with water, two axes, two McLeod fire tools, and a sufficient number of shovels so that each employee at the operation can be equipped to fight fire.*
>
> *(b) One or more serviceable chainsaws of three and one-half or more horsepower with a cutting bar 20 inches in length or longer shall be immediately available within the operating*

[40] https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=4427.&lawCode=PRC and https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=4428.&lawCode=PRC

area, or, in the alternative, a full set of timber-felling tools shall be located in the fire toolbox, including one crosscut falling saw six feet in length, one double-bit ax with a 36-inch handle, one sledge hammer or maul with a head weight of six, or more, pounds and handle length of 32 inches, or more, and not less than two falling wedges.

(c) Each rail speeder and passenger vehicle, used on such operation shall be equipped with one shovel and one ax, and any other vehicle used on the operation shall be equipped with one shovel. Each tractor used in such operation shall be equipped with one shovel.

(d) As used in this section:

(1) "Vehicle" means a device by which any person or property may be propelled, moved, or drawn over any land surface, excepting a device moved by human power or used exclusively upon stationary rails or tracks.

(2) "Passenger vehicle" means a vehicle which is self-propelled and which is designed for carrying not more than 10 persons including the driver, and which is used or maintained for the transportation of persons, but does not include any motortruck or truck tractor.

Access

Maintenance workers' and contractors' will maintain access for emergency vehicles at all times all the way to any work or construction site.

Combustible Materials Storage

Store combustible materials away from vegetated areas.

Communications

In an emergency, always dial 911. Maintenance workers and contractors shall furnish a serviceable telephone, radio-telephone or radio system connecting each operating site with maintenance workers' and contractors' headquarters. The communication system shall provide prompt and reliable communication between maintenance workers' and contractors' headquarters and Emergency Services via commercial telephone. The communications system shall be operable during maintenance workers' and contractors' operations in times of Very High Fire Danger or greater.

There will be a daily fire meeting to inform crew of fire danger. The crew will know each day where to locate and how to use fire extinguishers, how to report lot address and location.

Equipment Maintenance

Any minor equipment maintenance shall take place in a designated area free of vegetation, with the equipment and materials to extinguish fires, and contain and clean up any spills (fuels, oils, fluids, etc.). All mechanical equipment shall be maintained off-site in good working order with regular fire prevention inspection to avoid issues such as: cracked insulation, loss or worn belts, worn or dry bearings or gears, flat tires, low fluid levels, overheating brakes, etc.

Fuel and Refueling
Fuel to operate equipment will be stored in properly ventilated metal containers. Refueling operations to take place in a designated area free of vegetation, with the equipment and materials to extinguish fires, and contain and clean up any spills (fuels, oils, fluids, etc.).

Fire Extinguishers
Maintenance workers and contractors shall equip each internal combustion engine, fuel truck and loader with a fire extinguisher for oil and grease fires.

Fire Patrolperson
Maintenance workers and contractors shall designate and furnish during operating hours a qualified Fire Patrolperson authorized to act on behalf of maintenance workers and contractors in fire prevention and suppression matters.

Power Saws
Each power saw shall be equipped with a spark arrester according to PRC Section 4442 or 4443 and shall be maintained in effective working order. Operators shall take care to not overheat equipment; underpowered equipment or dull chain can result in overheating. One fire extinguisher meeting specifications of PRC Section 4431 shall be kept with each operating power saw. A size 0 or larger shovel with an overall length of not less than 38 inches shall be kept with each gas can but not more than 300 ft from each power saw when used off cleared construction sites.

Smoking
Any smoking shall be done while sitting in an area at least 3 ft in diameter cleared of flammable materials, or in an enclosed vehicle or approved building with a fire extinguisher, metal trash can and metal ashtray. Burning tobacco and matches shall be extinguished before they are discarded.

Spark Arrestors
Maintenance workers and contractors shall equip each operating tractor, gas-powered string cutter, and any other internal combustion engine with a spark arrester, except for motor vehicles equipped with a maintained muffler or exhaust-operated turbochargers. Spark arresters shall be a model acceptable to the Oakland Fire Department and shall be maintained in good operating condition. Spark arrestors shall be cleaned and checked for holes and clogged mesh daily. Replacements shall be made available.

Tank Truck
Maintenance workers and contractors shall provide a water tank truck or trailer on or in proximity to Work Area during maintenance workers' and contractors' operations when fire danger is Very High or greater. When Fire Danger is Extreme, a tank truck or trailer shall be on or immediately adjacent to each maintenance or construction site.

The tank shall contain at least 300 gallons of water available for fire suppression. A water sprinkling tank truck will meet this requirement if provision is made to ensure that the minimum 300 gallons is available fire suppression at all times. Ample power shall be readily available for prompt and safely moving tank over roads serving the project area.

Vehicle Restrictions
Maintenance workers and contractors are prohibited from driving and parking in vegetative areas in times of Very High Fire Danger or greater (except for maintenance access on irrigated grasses). Construction access shall be on established routes cleared of flammable vegetation.

Work Area
Maintenance workers and contractors shall remove build-up of flammable materials from around the work areas on a regular basis to prevent fine sawdust and chips from being ignited by hot equipment.

Triggers for Changes in Operations

Emergency Precautions
Maintenance workers and contractors shall determine fire danger rating level each day of operations. Under Red Flag Warnings, all use of power saws, welding operations, and vegetation management equipment that could cause a spark (including mowers and weed whackers) shall stop.

Red Flag Warnings
The National Weather Service issues red flag warnings when critical fire conditions are present in the next 24 hours due to a combination of dry air, strong winds and warm temperatures. Obtain warnings at https://www.weather.gov/mtr/. Contractors and campus personnel can also sign up with AC Alert to receive notifications https://member.everbridge.net/453003085612570/login National Weather Services will also issue red flag alerts up to 72 hours before an anticipated red flag warning.

Fire Danger Rating
City of Oakland Fire Department establishes the fire danger rating (low, moderate, high, very high, extreme) throughout the season based on the National Fire Danger Rating System.[41] The nearest fire danger rating sign is located at Oakland Fire Station 21 at 13150 Skyline Drive.

[41]National Fire Danger Rating System.
https://www.fs.usda.gov/detail/cibola/landmanagement/resourcemanagement/?cid=stelprdb5368839

Conditions of Approvals from Environmental Review

Construction will involve the use of construction equipment that could generate sparks and will involve storage and use of flammable materials that will temporarily increase fire risks. Following construction, campus operations will involve the use of vegetation management equipment that could generate sparks and increase fire risks. As a condition of approvals for the new buildings, there are mitigation measures to reduce potential damage from wildfire both during and after construction.[42]

Requirements for Construction Periods

Approved mitigation measures require that construction contractors ensure the following measures are implemented to minimize the potential for accidental ignition of construction materials and vegetation:

1) flammable/combustible materials shall be stored away from vegetated areas;
2) spark arrestors shall be fitted on all construction vehicles and equipment;
3) work that generates sparks such metal cutting, torching, and welding shall only be performed in areas where vegetation has been sufficiently cleared and the ground surface has been wetted; and
4) an adequate water source and fire extinguishers shall be available at all times for fire suppression.

Signage

A construction sign will be posted at the driveway or entry of construction sites with address and lot numbers in lettering no smaller than 3-inches in height.

[42] Initial Study/ Mitigated Negative Declaration Merritt Community College Child Care Development Center Project December 2019. Mitigated Negative Declaration Merritt College Horticulture Complex Project August 2020.

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Appendices

A. **Fire Behavior Analysis**
B. **Conditions of Approval Mitigation Measures from Recent Merritt College CEQA Documents**
C. **Summary Table Report California Department of Fish and Wildlife California Natural Diversity Database**
D. **Invasive Non-native Plants and Integrated Pest Management (IPM) for Wildfire Hazard Reduction**

Appendix A: Fire Behavior Analysis

A fire behavior analysis was conducted to determine fire hazard onsite and in the surrounding area under current vegetative conditions in the properties that make up Merritt College, as outlined in magenta in Figure 1. A buffer area of 1000 feet from this boundary is the study area also included in this analysis. The total area covered by Merritt College totals 123.1 acres and the study area amounts to 456.3 acres.

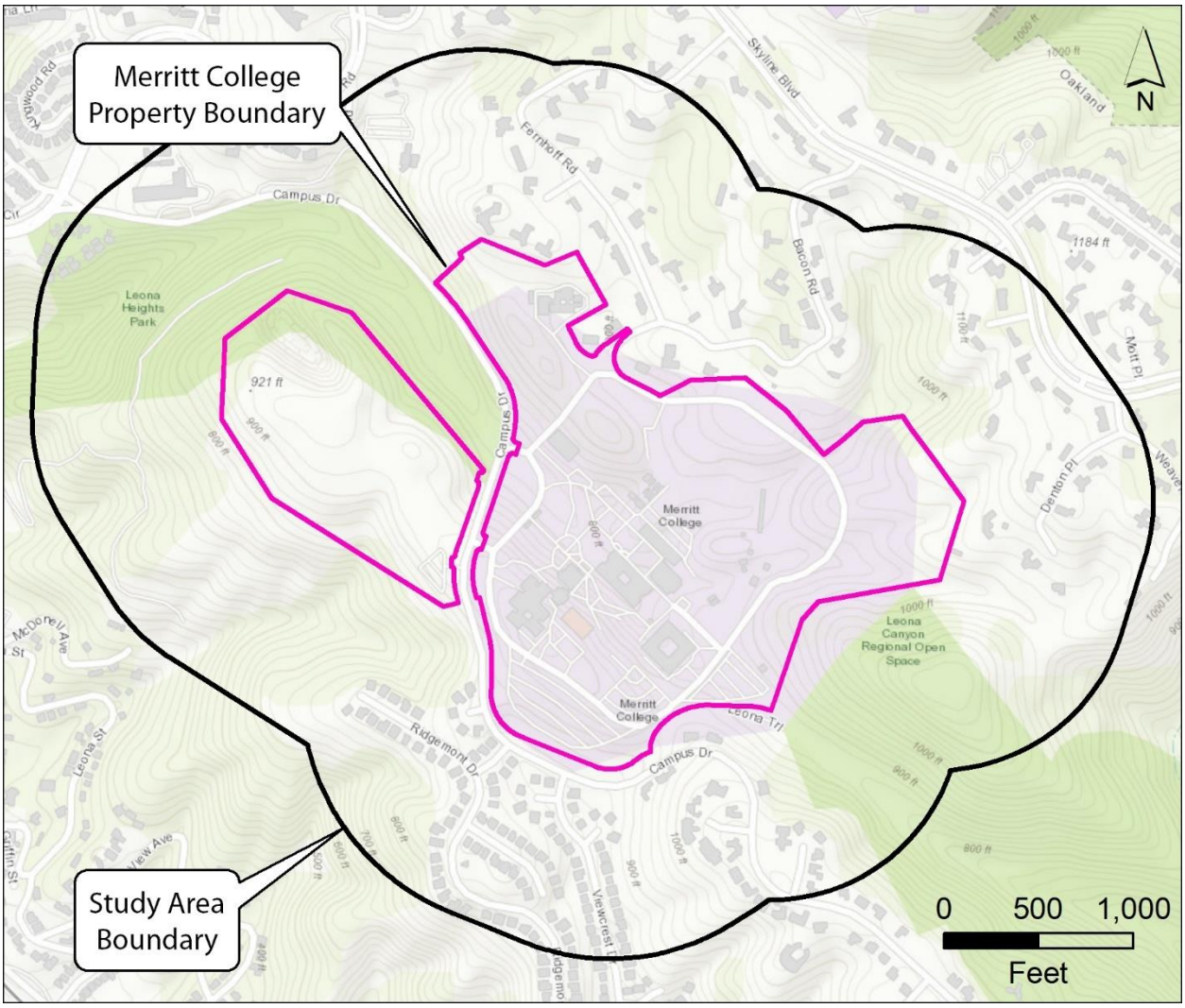

FIGURE 4. STUDY AREA BOUNDARY MAP.

Three essential data categories are needed:

4. Fuel model characteristics
5. Weather conditions
6. Fuel moisture conditions

For this analysis, we used readily available data purchased through the California Forest Observatory (CFO, 2020)[43].

We compiled 10 years of data weather data from a nearby Remote Automated Weather Station located just south of the Merritt College campus. to reflect conditions that may occur in Diablo (northeast) wind events such as what occurred during the recent North San Francisco Bay area fires as well as the OAKLAND fire of 1991.

For all scenarios presented in this document, a fairly dry fuel moisture regime was used to model a "worst-case" scenario, though not necessarily the most extreme case.

Fuel Model Characteristics

Maps of vegetative fuels were obtained from California Forest Observatory; this data set was derived from two data sources: airborne lidar and satellites. Vegetative canopy characteristics were determined with LiDar, while the surface vegetative fuel models were comprised of the latest LANDFIRE data. LANDFIRE is a national vegetation-mapping program accepted and updated by land management agencies. The important characteristics are:

- surface fuel model
- canopy cover (absolute cover)
- crown density
- height to live crown
- tree height

Three grass models (GR1, GR3, and GR5) account for 15% of the area. All are located throughout Merritt College and represent areas where grass may be able to grow between paved surfaces. These fuel types are generally associated with low flame lengths; however, fire spread can be rapid in the right conditions.

Low Load Compact Conifer Litter, TL1 (181) accounts for 14% of Merritt College. This fuel models is shown in light blue and is located west of the main campus. It represents the wood chips broadcast across an old, decommissioned parking lot.

Very High Load Broadleaf Litter, TL9 (189) accounts for 12% of Merritt College. This fuel model is shown in dark cyan on Figure 2 and is located at the edges of grassy fields as well as between buildings. These likely represent planted heritage conifers such as redwood or Monterey pine found throughout the campus. This fuel model can produce relatively high flame lengths and rapid spread; however, it is generally not a source of embers.

[43] California Forest Observatory (2020). A Statewide Tree-Level Forest Monitoring System. Salo Sciences, Inc. San Francisco, CA. https://forestobservatory.com

There is a forest/shrub fuel type call ed Moderate Load, Humid Climate Timber-Shrub (TU2) that accounts for 10% of Merritt College. This fuel model represents forested areas with a grass or shrub understory. These timber types represent treed areas with a shrubby understory where the fire is carried by grass and shrubs under the tree canopy rather than forest litter. TU2 is found mainly southwest of the Horticultural building (east of Campus Drive), surrounding the parcel west of Campus Drive, and two small pockets east of the main campus. This fuel type can be associated with torching trees or crown fires because of its propensity to lead fires into the crown due to the abundant and relatively tall understory fuels.

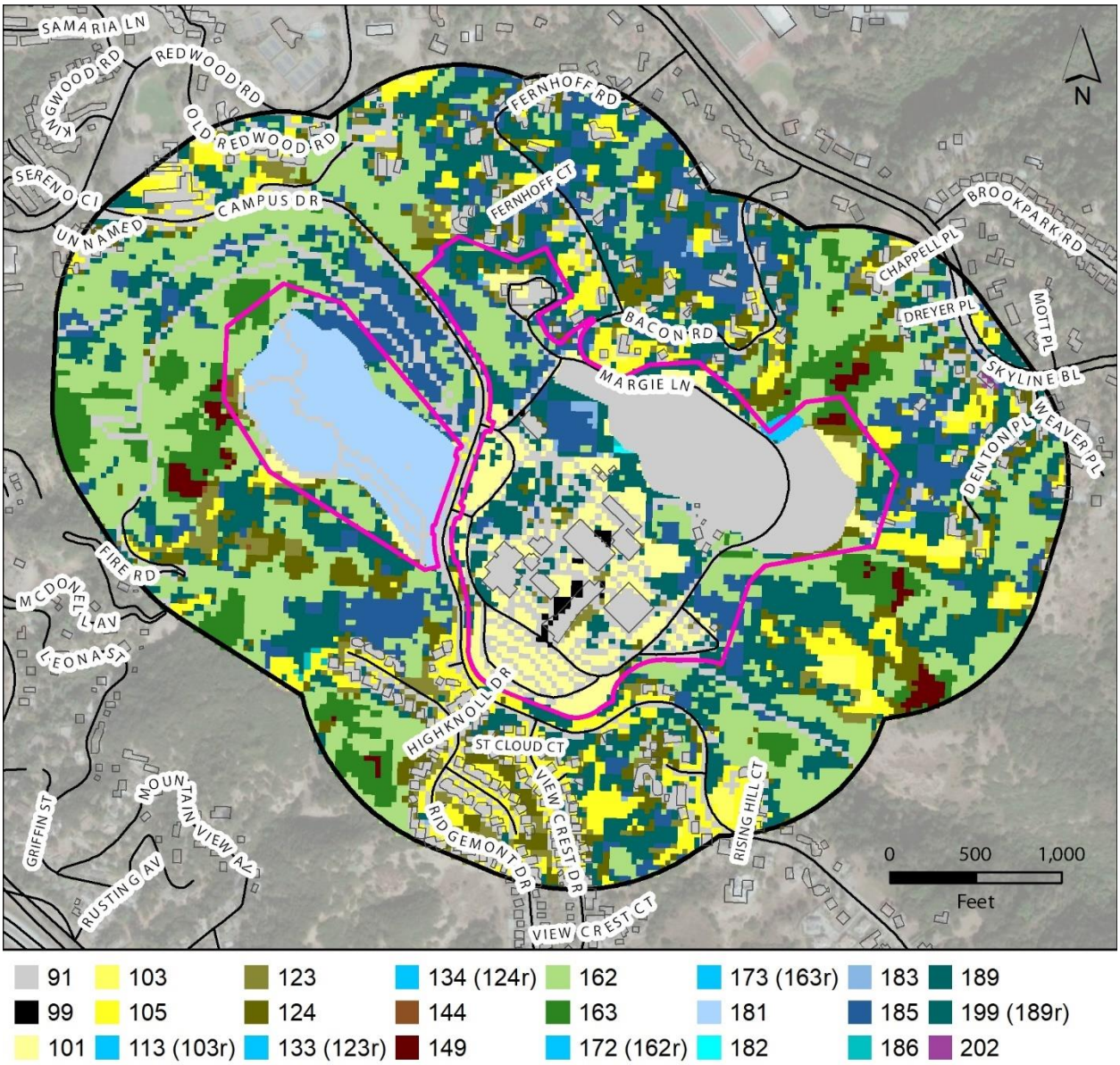

FIGURE 5. SURFACE FUEL MODEL MAP (CFO, 2020 ALTERED BY WILDLAND RES MGT). MERRITT COLLEGE PROPERTIES OUTLINED IN MAGENTA. STUDY AREA OUTLINED IN BLACK. SEE TABLE 1 FOR LEGEND DESCRIPTION.

TABLE 1 – FUEL MODEL FOUND WITHIN MERRITT COLLEGE ONLY.

Value	FBFM40	Title	Description	Acres	Percent
91	NB1	Urban/Developed	Urban/Developed	44.8	36%
99	NB9	Bare Ground	Barren, Roads, Other	0.9	1%
101	GR1	Short, Sparse Dry Climate Grass	Short, sparse dry climate grass is short, naturally or heavy grazing, predicted rate of fire spread and flame length low	18.1	15%
103	GR3	Low Load, Very Coarse, Humid Climate Grass	Low load, very coarse, humid climate grass continuous, coarse humid climate grass, any shrubs do not affect fire behavior	0.04	0.03%
105	GR5	Low Load, Humid Climate Grass	Low load, humid climate grass, fuelbed depth is about 1-2 feet	0.1	0.1%
123	GS3	Moderate Load, Humid Climate Grass-Shrub	Moderate load, humid climate grass-shrub, moderate grass/shrub load, grass/shrub depth is less than 2 feet, spread rate is high and flame length is moderate	1.8	1%
124	GS4	Moderate Load, Dry Climate Grass	Moderate load, dry climate grass, continuous, dry climate grass, fuelbed depth about 2 feet	2.2	2%
144	SH4	Low Load, Humid Climate Timber-Shrub	Low load, humid climate timber shrub, woody shrubs and shrub litter, low to moderate load, possible pine overstory, fuelbed depth about 3 feet, spread rate high and flame moderate	0.1	0.1%
149	SH9	Very High Load, Humid Climate Shrub	Very high load, humid climate shrub, woody shrubs and shrub litter, dense finely branched shrubs with fine	0.2	0.2%
162	TU2	Moderate Load, Humid Climate Timber-Shrub	Moderate load, humid climate timber-shrub, moderate litter load with some shrub, spread rate moderate and flame low	11.7	10%
163	TU3	Moderate Load, Humid Climate Timber-Grass-Shrub	Moderate load, humid climate timber grass shrub, moderate forest litter with some grass and shrub, spread rate high and flame moderate	1.6	1%
181	TL1	Low Load Compact Conifer Litter	Low load compact conifer litter, compact forest litter, light to moderate load, 1-2 inches deep, may represent a recent burn, spread rate and flame low	17.8	14%
182	TL2	Low Load Broadleaf Litter	Low load broadleaf litter, broadleaf, hardwood litter, spread rate and flame low	0.1	0.1%
183	TL3	Moderate Load Conifer Litter	Moderate load conifer litter, moderate load conifer litter, light load of coarse fuels, spread rate and flame low	0.7	1%
185	TL5	High Load Conifer Litter	High load conifer litter, light slash or dead fuel, spread rate and flame low	8.6	7%
186	TL6	Moderate Load Broadleaf Litter	Moderate load broadleaf litter, spread rate and flame moderate	0.1	0.1%
189	TL9	Very High Load Broadleaf Litter	Very high load broadleaf litter, may be heavy needle drape, spread rate and flame moderate	14.3	12%

Weather

The nearest Remote Automatic Weather Station to Merritt College is located just southeast of the campus off Skyline Blvd and is known as Oakland South, number 43403. The map below shows the RAWS weather station location in relation to the project site.

Twenty-seven years of data were downloaded and analyzed in FireFlamily+. FireFamily+ is a software package used to calculate fuel moistures and indices from the US National Fire Danger Rating System (NFDRS) using hourly or daily fire weather[44].

TABLE 2 – WIND DIRECTION AND SPEED USED FOR FIRE BEHAVIOR PREDICTION SCENARIOS FOR MERRITT COLLEGE.

Scenario	Wind Direction	Wind Speed
Southwest	225 degrees	25 mph
North/Northeast	20 degrees	25 mph

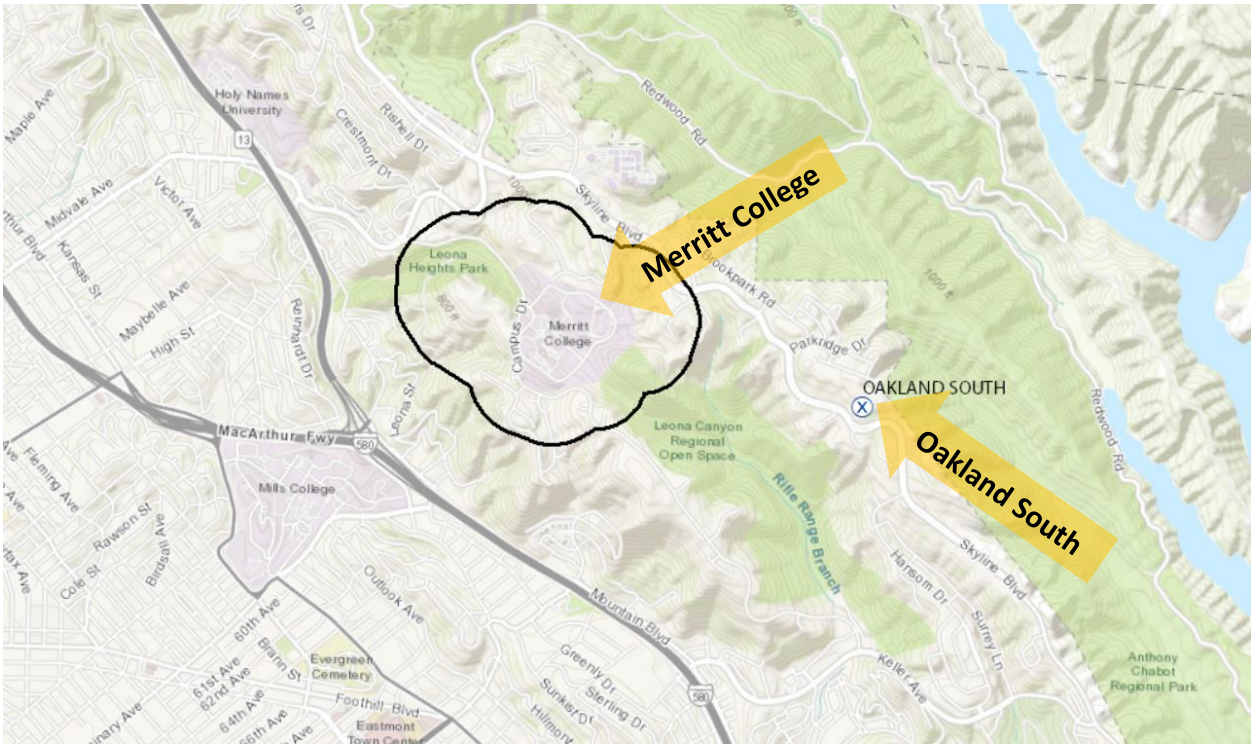

FIGURE 6. MAP SHOWING THE WEATHER STATION OAKLAND SOUTH IN RELATION TO THE GENERAL LOCATION OF MERRITT COLLEGE PROJECT AREA

The lowest fuel moistures occurred during the months of September through November; winds were analyzed during these months. A review of the historic winds recorded during the months of September, October, and November reveal that **for all hours of the day**, the predominate

[44] https://www.firelab.org/project/firefamilyplus

wind direction in the area is from the southwest (24% of recordings). However, the strongest (fastest) winds recorded came from the north to northeast (over 25mph) (see Figure 4). The wind rose for the afternoon hours (from 1200 to 1500 hours), bears out these findings (see Figure 4).

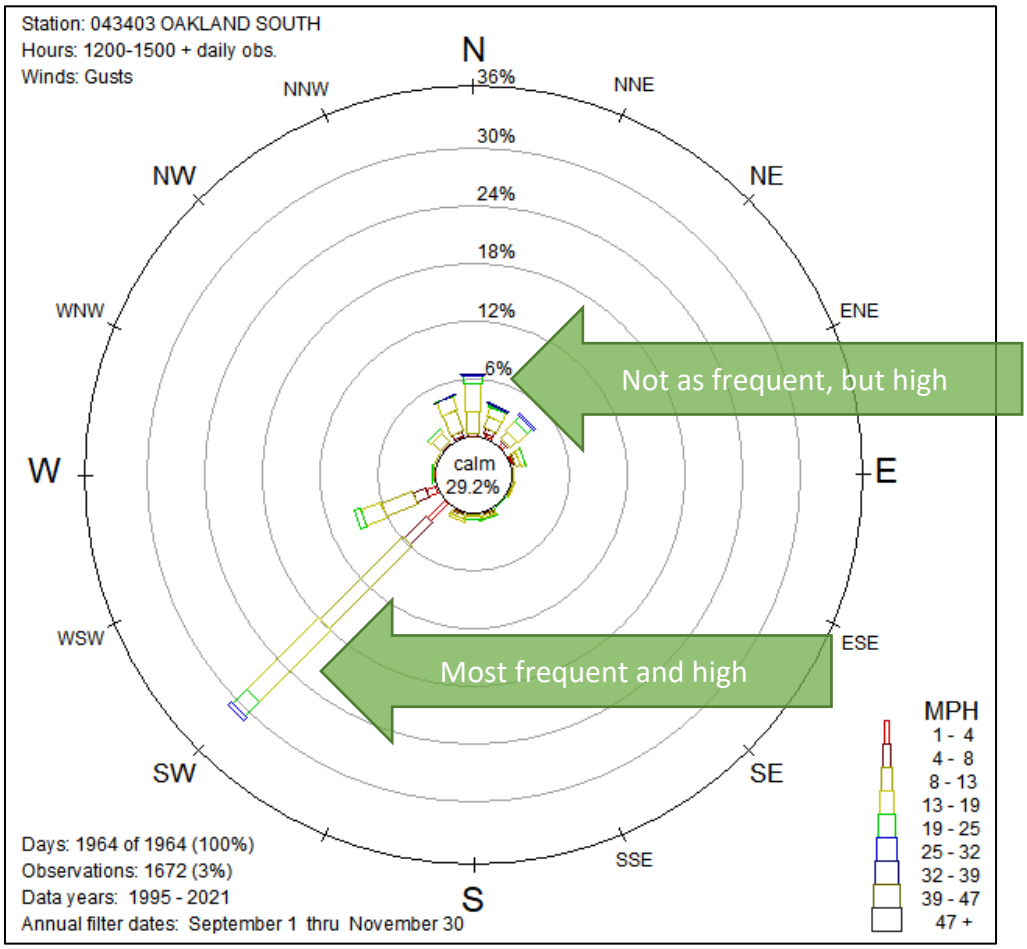

FIGURE 4. WIND ROSE FOR OAKLAND SOUTH FOR THE MONTHS OF SEPT/OCT/NOV FROM 1995-2021.

Though the Oakland South weather station most often recorded winds from the southwest, northeasterly winds (or Diablo winds[45]) can be especially conducive for transport of embers. The most extreme weather values typically are recorded during Diablo wind events in October, as was evident in the later part of October, 2019. The driest recorded relative humidity was 5%; the highest recorded temperature was 90° F, and the greatest recorded wind speed was 47 mph. Usually days with recorded relative humidity below 20% are associated with Diablo wind events. Diablo events generally last from 15 to 35 hours. During a Diablo wind event, the wind

[45] Diablo winds are offshore wind events that flow northeasterly over Northern California's Coast Ranges, often creating extreme fire danger for the San Francisco Bay Area. Diablo winds are driven by a surface pressure gradient that forms in response to an inverted pressure trough that develops over California. (Source: https://www.fireweather.org/diablo-winds)

direction is somewhat sporadic, sometimes even exhibiting a complete reversal for 2-4 hours. The wind speed ramps up slowly - from 1-2 mph up to its maximum speed, and then down again - similar to a bell-shaped curve.

Fuel Moisture

A standard fuel moisture regime was chosen for both scenarios. The fuel moistures used were based on the average low 10-hr fuel moistures recorded in September for Oakland South. This number was 5.3%. All other fuel moistures were derived from the average low for September from the summary tables provided in FireFamily+ for each fuel size class. For the custom fuels models that represent the small riparian area in the northwest portion of the Athletic Field, fuel moistures were doubled.

TABLE 3 – INITIAL FUEL MOISTURES USED FOR FIRE BEHAVIOR PREDICTION SCENARIOS FOR MERRITT COLLEGE.

Scenario	Foliar Fuel Moisture	1 hr FM	10 hr FM	100 hr FM	Herbaceous FM	Live Woody FM
Southwest	70	4	5	10	40	60
North/Northeast	70	4	5	10	40	60
Riparian FMs	n/a	4	5	10	80	120

Fire Behavior Modeling

A fire behavior model called FlamMap version 6.1 was used for this wildfire hazard assessment. FlamMap allows prediction of fire behavior on a spatial basis, portraying the locations of various flame lengths, heat release, and rate of spreads along with type of fire (crown fire, surface fire, or a fire that torches trees).

The FlamMap fire mapping and analysis system calculates fire behavior for each pixel within the landscape file *independently*. Outputs are well-suited for landscape level comparisons of fuel treatment effectiveness because fuel is the only variable that changes. Outputs and comparisons can be used to identify combinations of hazardous fuel and topography, aiding in prioritizing fuel treatments[46].

[46] Source: https://www.fs.usda.gov/rmrs/tools/flammap (accessed on 7/26/2021).

Results

The results presented below are based on existing conditions. The following *fire potential* was predicted for the entire modeled area surrounding Merritt College for the near worst-case scenario.

In all models presented in this document, buildings and developed areas are **not** considered fuel and fire potential is not predicted where they exist, though in reality, buildings may burn.

Flame Length

Flame length is often correlated to the ability to control a fire. A flame length of eight feet is usually looked at as a cut-off point for strategic firefighting decisions on whether to attack the fire directly, or instead attempt control through indirect methods. Attacking the fire directly involves efforts to slow the flaming front at its head – where it is advancing fastest. Indirect attack involves fire control methods on the fire's flank or well ahead of the fire (using backfires or retardants).

High flame lengths are well correlated to structural damage. Fire intensity (a.k.a. flame length) was determined to be an important factor in many studies of structural damage from fire. Flame lengths are often used as a proxy for fire intensity because they are highly correlated to fire intensity.

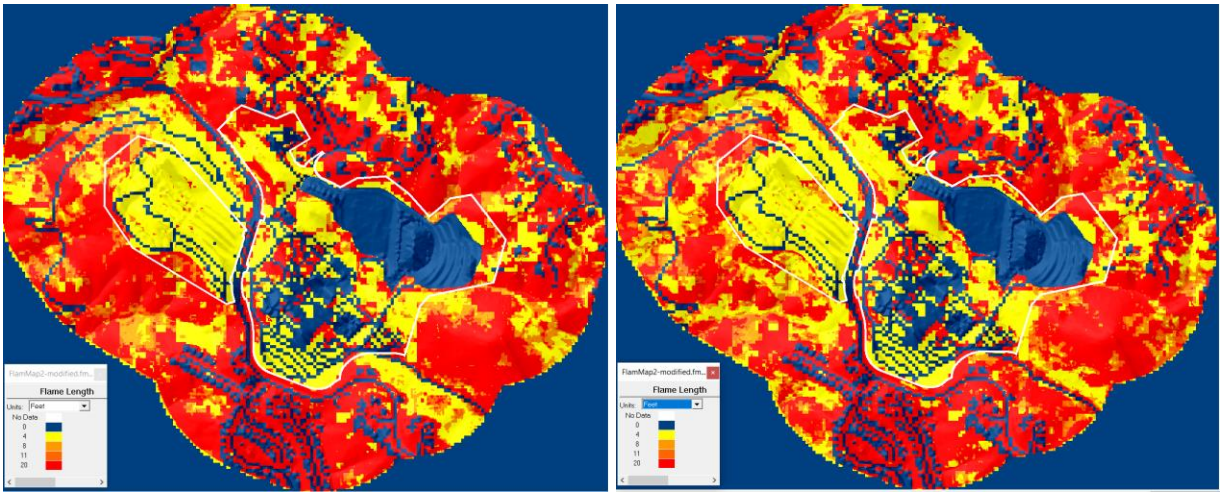

FIGURE 5. PREDICTED FLAME LENGTHS (IN FEET). MERRITT COLLEGE BOUNDARY OUTLINED IN WHITE.

For this scenario, no fire is predicted for the developed areas and along the roads (all considered a non-fuel in this predictive system). Under the scenario conditions, flame length is generally high, above 8 feet in length, with some of the college experiencing flame lengths over 20 feet, particularly surrounding the central campus buildings as well as the neighborhood to

the south. Neighborhoods outside the college are also predicted to have flame lengths over 20 feet.

Grass can often exhibit large flame lengths, but fires generally move through grasslands quickly and do not generate a lot of embers. Whereas high flame lengths in forested or shrublands tend to be more damaging because the fire can get into the crowns of trees causing mortality and creating embers that can be lofted to great distances.

TABLE 4 – COMPARISON OF ACRES BY FLAME LENGTH CATEGORY FOR MERRITT COLLEGE ONLY (NOT ENTIRE STUDY AREA) FOR THE NORTHEAST AND SOUTHWEST WIND SCENARIOS DESCRIBED IN TABLE 2.

	Northeast		Southwest		
Flame Length Category	**Acres**	**Percent**	**Acres**	**Percent**	**Difference**
No predicted fire	46	37%	46	37%	None
< 4 feet	52	42%	50	40%	2% more
4 – 8 feet	5	4%	4	3%	1% more
8 – 11 feet	2	2%	2	2%	None
11-20 feet	5	4%	6	5%	1% less
> 20 feet	13	11%	15	12%	1% less
Total Acres	**123**		**123**		

Rate of Spread

Rate of spread is the relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of forward spread of the fire front expressed in feet/minutes.

Again, the buildings and roads are considered a non-fuel and not predicted to burn.

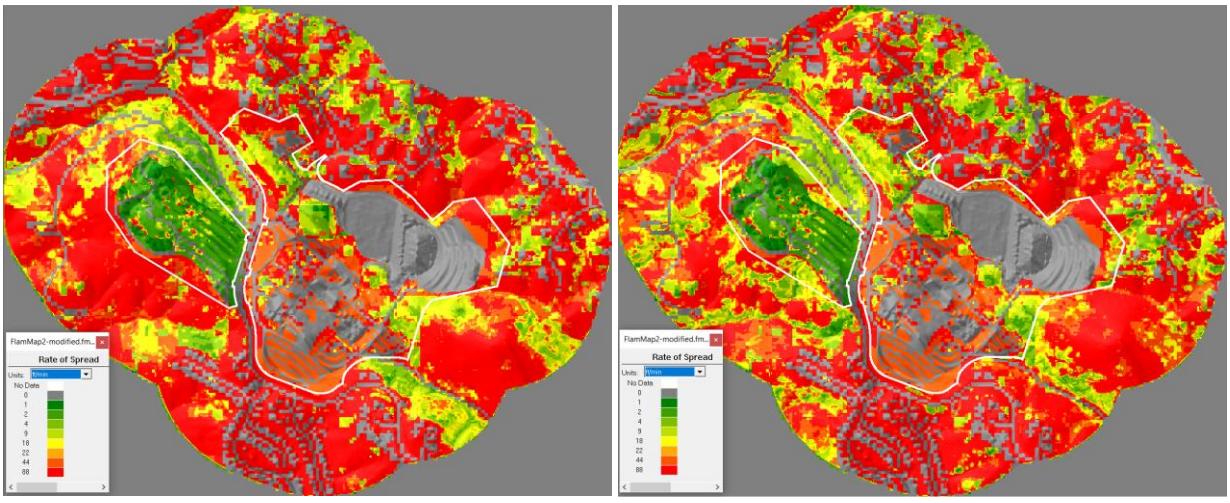

FIGURE 6. PREDICTED RATE OF SPREAD (FEET/MINUTE). SW WINDS ARE DISPLAYED ON THE LEFT, NE WINDS ON THE RIGHT.

Essentially, all other areas burned with a range of rate of spread, from low (around 1 ft/minute) to high (more than 80 feet/minute). The spread rates drop dramatically along creeks and areas with relatively high canopy cover.

Again, similar to the SW scenario, predicted rate of spread is very high throughout the study area and within the Merritt College property boundary. While in this NE scenario the amount of area predicted at over 40 feet/minute lessened, it still accounts for 57% of the Merritt College property. And again, the pattern of rate of spread magnitude remains the same, despite the wind direction change.

TABLE 5 – COMPARISON ACRES BY RATE OF SPREAD CATEGORY FOR MERRITT COLLEGE ONLY (NOT ENTIRE STUDY AREA) FOR THE NORTHEAST AND SOUTHWEST WIND SCENARIO DESCRIBED IN TABLE 2.

	Northeast		Southwest		
Rate of Spread Category	**Acres**	**Percent**	**Acres**	**Percent**	**Difference**
No predicted fire	46	37%	46	37%	None
< 1 foot/minute	2	2%	3	2%	None
1 – 5 ft/min	22	18%	21	17%	1% more
5 – 10 ft/min	8	7%	7	6%	1% more
10 – 15 ft/min	3	3%	3	2%	1% more
15 – 20 ft/min	2	2%	1	1%	1% more
20 – 40 ft/min	22	18%	22	18%	None
> 40 ft/min	17	14%	20	17%	3% less
Total Acres	**123**		**123**		

Crown Fire

Crowning activity indicates locations where fire is expected to travel into and possibly consume the crowns. When a fire burns through tree crowns, countless embers are produced and are distributed, sometimes at long distances. These embers can start new fires, which can each grow and confound the finest fire suppression forces.

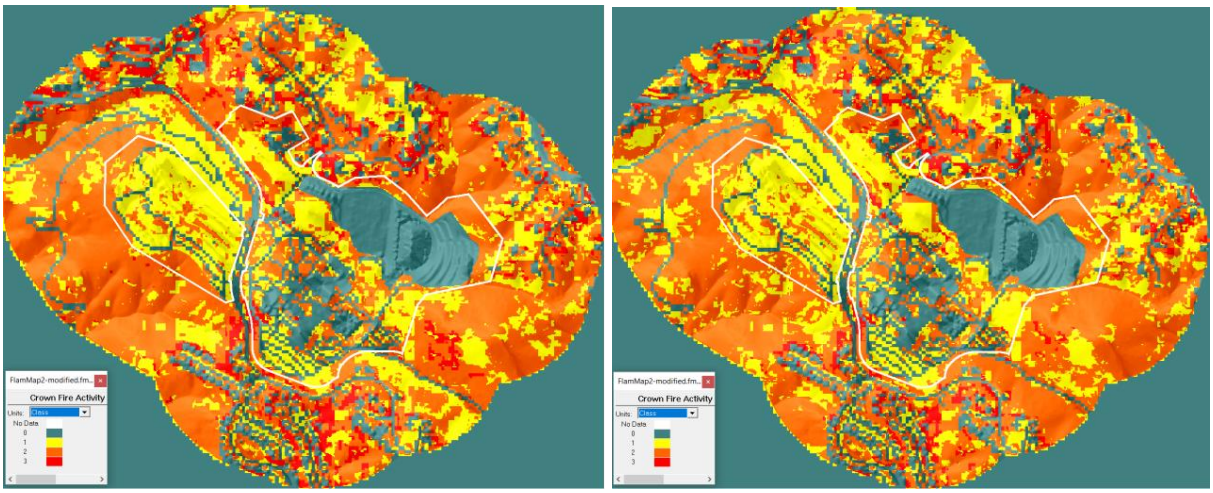

FIGURE 7. PREDICTED CROWN FIRE ACTIVITY (0 = NO FIRE, 1 = SURFACE FIRE, 2 = TORCHING FIRE, 3 = ACTIVE CROWN FIRE). SW LEFT AND NE RIGHT.

As is the case in most places, an active crown fire is rare. However, at these conditions, it was predicted for about 2% of the Merritt College property. This occurs mainly along the edges or boundaries of one fuel type to another (i.e. between forest and grass with shrubs nearby). Combined with torching fire at 28%, fire in the treetops account for roughly a third of the area burned. This occurs throughout the property but most concerning surrounding the buildings on Merritt College.

The predicted crown fire activity for the northeast scenario bears the same pattern. There is a slight decrease in the worst fire behavior (Active crown fire diminished by 1%), but overall the high fire danger persists (39% of property is predicted to torch or crown at high wind speeds).

TABLE 6 – COMPARISON OF ACRES BY CROWN FIRE ACTIVITY CATEGORY FOR MERRITT COLLEGE ONLY (NOT ENTIRE STUDY AREA) FOR THE NORTHEAST AND SOUTHWEST WIND SCENARIO DESCRIBED IN TABLE 2.

	Northeast		Southwest		
Crown Fire Activity Category	**Acres**	**Percent**	**Acres**	**Percent**	**Difference**
No predicted fire	46	37%	46	37%	None
Surface fire (1)	42	34%	40	33%	1% more
Torching fire (2)	34	27%	35	28%	1% more
Active crown fire (3)	2	1%	2	2%	1% less
Total Acres	**123**		**123**		

Maximum Spotting Distance

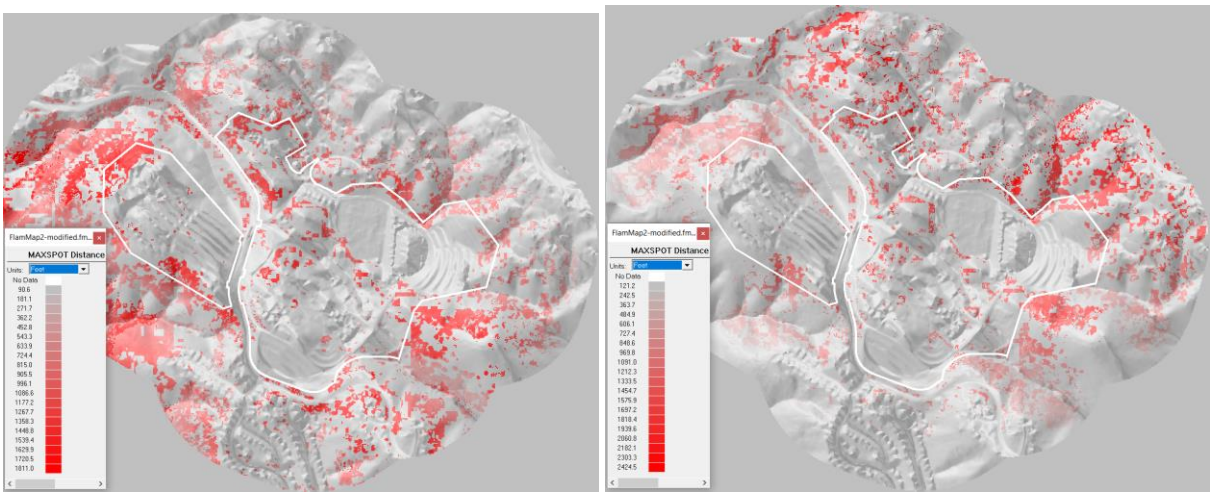

FIGURE 8. PREDICTED MAXIMUM SPOT DISTANCE (SHOWN IN FEET). SW Left and NE Right

Hot fires create embers that loft ahead of the flaming front that ignite new fires called "spot fires". "Spotting potential" and "crowning potential" describe the propensity of vegetation to create and disburse embers that have the potential to start countless new fires well in advance of the main fire. Spotting is simulated only from torching trees for passive and active crown fire. Maximum spot distances of embers are calculated for each pixel that is predicted to torch. This metric is not intended to simulate the numbers of embers, exact locations embers would land, or locations of resulting spot fires.

TABLE 7 – ACRES BY PREDICTED MAXIMUM SPOT DISTANCE CATEGORY FOR MERRITT COLLEGE ONLY (NOT ENTIRE STUDY AREA) FOR THE NORTHEAST AND SOUTHWEST WIND SCENARIO DESCRIBED IN TABLE 2.

MaxSpot Distance Category	Acres	Percent	Acres	Percent	Difference
No predicted fire	111	91%	108	88%	3% more
< 100 feet	0	0%	0	0%	None
100 – 500 feet	2	2%	2	1%	1% more
500 – 1,000 feet	5	4%	7	6%	2% less
1,000 – 1,500 feet	4	3%	6	5%	2% less
> 1,500 feet	1	1%	0.2	0.1%	1% more
Total Acres	**123**		**123**		

Appendix B: Conditions of Approval Mitigation Measures from Recent Merritt College CEQA documents

To comply with the California Environmental Quality Act (CEQA), Merritt Community College prepared environmental review documents for the Horticulture Complex Project and the Child Care Development Center Project.[47] The CEQA review identified impacts of proposed construction related to Hazards, Biology and Hydrology. The following mitigation measures were identified and have been incorporated into the Vegetation Management Plan.

Merritt College Horticulture Complex Project
H1 and H2 Hazards
Impact: The Merritt College campus is located in a High Fire Severity Zone. Project construction and operation could increase fire risk.
Haz 1: Construction contractors shall ensure the following measures are implemented to minimize the potential for accidental ignition of construction materials and vegetation:

- Flammable/combustible materials shall be stored away from vegetated areas;
- Spark arrestors shall be fitted on all construction vehicles and equipment;
- Work that generates sparks such metal cutting, torching, and welding shall only be performed in areas where vegetation has been sufficiently cleared and the ground surface has been wetted; and
- An adequate water source and fire extinguishers shall be available at all times for fire suppression.

Haz 2: The Peralta Community College District (PCCD) shall develop a Vegetation Management and Fire Prevention Plan prior to the start of construction, and shall implement the plan during construction and operation of the project. The Vegetation Management and Fire Prevention Plan shall include, at a minimum, the following measures:

- Using spark arrestors on all vehicles and equipment used for vegetation management;
- Using fire-resistant plants when planting areas for erosion control;
- Pruning the lower branches of tall trees;
- Clearing out ground-level brush and debris; and
- Storing combustible materials away from vegetated areas.

BIO-1 Protect Nesting Birds
Impact: Adequate measures shall be taken to avoid inadvertent take of raptor nests and other nesting birds protected under the Migratory Bird Treaty Act and State Fish and Game Code when in active use. This shall be accomplished by taking the following steps:

[47] Initial Study / Mitigated Negative Declaration for Merritt College Horticulture Complex Project. August 2020. Adopted by Peralta Community College District Resolution No. 20/21-08 on September 15, 2020.
Initial Study/ Mitigated Negative Declaration for Merritt Community College Child Care Development Center Project. December 2019.

- If activity is proposed during the nesting season (February through August), a focused survey for nesting raptors and other migratory birds shall be conducted by a qualified biologist within 14 days prior to the onset of tree removal or construction, in order to identify any active nests on the project sites and in the vicinity of proposed activity.
- If no active nests are identified during the survey period, or if development is initiated during the non-breeding season (September through February), activity may proceed with no restrictions.
- If bird nests are found, an adequate setback shall be established around the nest location and construction activities restricted within this no-disturbance zone until the qualified biologist has confirmed that any young birds have fledged and are able to function outside the nest location. Required setback distances for the no-disturbance zone shall be based on input received from the California Department of Fish and Wildlife (CDFW), and may vary depending on species and sensitivity to disturbance. As necessary, the no-disturbance zone shall be fenced with temporary orange construction fencing if activity is to be initiated on the remainder of the construction area.
- A report of findings shall be prepared by the qualified biologist and submitted to the Peralta Community College District for review and approval prior to initiation of activities within the no-disturbance zone during the nesting season (February through August). The report either shall confirm absence of any active nests or shall confirm that any young within a designated no-disturbance zone have fledged and construction can proceed.

HYDRO-1 Protect hydrology, water quality

Peralta Community College District and their contractors shall implement Best Management Practices (BMPs) to control erosion and sedimentation and prevent pollutants from entering the stormwater runoff during maintenance and construction. BMPs may include, but are not limited to:

- Conduct soil disturbing activities, including grading, during dry months (April – September).
- Cover disturbed areas with soil stabilizers, mulch, fiber roles, or temporary vegetation.
- Locate construction-related equipment or processes that contain or generate pollutants in secure areas, away from storm drains and gutters.
- Prevent or contain potential leakage or spilling from sanitary facilities by surrounding them with a berm and do not allow a direct connection to the storm drainage system.
- Park, fuel and clean all vehicles and equipment in one designated and contained area.

Merritt Community College Child Care Development Center Project

Risk of Wildfire

Impact HAZARDS-1: The proposed project could increase the risk of wildfire during both construction and operation due to the site being in a fire hazard area.

HAZARDS-1a: Construction contractors shall ensure the following measures are implemented to minimize the potential for accidental ignition of construction materials and vegetation: 1) flammable/combustible materials shall be stored away from vegetated areas; 2) spark arrestors shall be fitted on all construction vehicles and equipment; 3) work that generates sparks such metal cutting, torching, and welding shall only be performed in areas where vegetation has

been sufficiently cleared and the ground surface has been wetted; and 4) an adequate water source and fire extinguishers shall be available at all times for fire suppression.
Mitigation Measure HAZARDS-1b: The Peralta Community College District (PCCD) shall develop a Vegetation Management and Fire Prevention Plan prior to the start of construction, and shall implement the plan during construction and operation of the project. The Vegetation Management and Fire Prevention Plan shall include, at a minimum, the following measures:

- Using spark arrestors on all vehicles and equipment used for vegetation management;
- Using fire-resistant plants when planting areas for erosion control;
- Pruning the lower branches of tall trees;
- Clearing out ground-level brush and debris; and
- Storing combustible materials away from vegetated areas.

Implementation of Mitigation Measures HAZARDS-1a and HAZARDS-1b would ensure that the proposed project would result in less-than-significant impacts related to wildfires

Nesting Birds
Impact: Removal of trees and other activities during project construction may result in the inadvertent loss of bird nests in active use unless appropriate precautions are followed.

BIOLOGY-1: Adequate measures shall be taken to avoid inadvertent take of raptor nests and other nesting birds protected under the Migratory Bird Treaty Act when in the nests are active use. This shall be accomplished by taking the following steps:

- If construction is proposed during the nesting season (February through August), a focused survey for nesting raptors and other migratory birds shall be conducted by a qualified biologist within 14 days prior to the onset of tree removal or construction, in order to identify any active nests on the project site and in the vicinity of proposed construction.
- If no active nests are identified during the survey period, or if development is initiated during the non-breeding season (September through February), construction may proceed with no restrictions.
- If bird nests are found, an adequate setback shall be established around the nest location and construction activities restricted within this no-disturbance zone until the qualified biologist has confirmed that any young birds have fledged and are able to function outside the nest location. Required setback distances for the no-disturbance zone shall be based on input received from the California Department of Fish and Wildlife (CDFW), and may vary depending on species and sensitivity to disturbance. As necessary, the no-disturbance zone shall be fenced with temporary orange construction fencing if construction is to be initiated on the remainder of the construction area.
- A report of findings shall be prepared by the qualified biologist and submitted to the Peralta Community College District (PCCD) for review and approval prior to initiation of construction within the no-disturbance zone during the nesting season (February through August). The report either shall confirm absence of any active nests or shall confirm that any young within a designated no-disturbance zone have fledged and construction can proceed.

- Implementation of Mitigation Measure BIOLOGY-1 would reduce potentially *significant impacts on nesting birds to a less-than-significant level.*

Appendix C. Summary Table Report California Department of Fish and Wildlife California Natural Diversity Database

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Oakland East (3712272) OR Las Trampas Ridge (3712271))

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Accipiter cooperii Cooper's hawk	G5 S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	260 260	118 S:1	0	0	1	0	0	0	0	1	1	0	0
Ambystoma californiense California tiger salamander	G2G3 S2S3	Threatened Threatened	CDFW_WL-Watch List IUCN_VU-Vulnerable	20 1,111	1231 S:3	0	1	0	0	1	1	2	1	2	0	1
Amsinckia lunaris bent-flowered fiddleneck	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_UCBG-UC Botanical Garden at Berkeley SB_UCSC-UC Santa Cruz	575 1,611	93 S:12	0	1	1	0	0	10	1	11	12	0	0
Anomobryum julaceum slender silver moss	G5? S2	None None	Rare Plant Rank - 4.2		13 S:1	0	0	0	0	0	1	0	1	1	0	0
Antrozous pallidus pallid bat	G5 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	210 770	420 S:7	0	0	0	0	0	7	7	0	7	0	0
Aquila chrysaetos golden eagle	G5 S3	None None	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	1,560 1,560	321 S:1	0	1	0	0	0	0	1	0	1	0	0
Arctostaphylos pallida pallid manzanita	G1 S1	Threatened Endangered	Rare Plant Rank - 1B.1	1,120 1,500	9 S:6	0	0	4	1	1	0	1	5	5	1	0
Astragalus tener var. tener alkali milk-vetch	G2T1 S1	None None	Rare Plant Rank - 1B.2	20 20	65 S:1	0	0	0	0	1	0	1	0	0	1	0
Bombus caliginosus obscure bumble bee	G4? S1S2	None None	IUCN_VU-Vulnerable	300 1,200	181 S:4	0	0	0	0	0	4	4	0	4	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Bombus occidentalis western bumble bee	G2G3 S1	None Candidate Endangered	USFS_S-Sensitive XERCES_IM-Imperiled	350 1,000	279 S:5	0	0	0	0	0	5	5	0	5	0	0
Calochortus pulchellus Mt. Diablo fairy-lantern	G2 S2	None None	Rare Plant Rank - 1B.2	1,200 1,250	52 S:2	0	0	0	0	0	2	2	0	2	0	0
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	G4?T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive		76 S:1	0	0	0	0	1	0	1	0	0	1	0
Chorizanthe robusta var. robusta robust spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	30 30	20 S:1	0	0	0	0	1	0	1	0	0	1	0
Clarkia concinna ssp. automixa Santa Clara red ribbons	G5?T3 S3	None None	Rare Plant Rank - 4.3	400 400	20 S:1	0	0	0	0	0	1	1	0	1	0	0
Clarkia franciscana Presidio clarkia	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBG-UC Botanical Garden at Berkeley	1,000 1,000	4 S:1	0	1	0	0	0	0	0	1	1	0	0
Corynorhinus townsendii Townsend's big-eared bat	G3G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	710 710	635 S:1	0	0	0	0	1	0	1	0	0	1	0
Coturnicops noveboracensis yellow rail	G4 S1S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern NABCI_RWL-Red Watch List USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	20 20	45 S:1	0	0	0	0	0	1	1	0	1	0	0
Dipodomys heermanni berkeleyensis Berkeley kangaroo rat	G3G4T1 S1	None None		580 1,400	8 S:5	0	0	0	0	0	5	4	1	5	0	0
Dirca occidentalis western leatherwood	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	660 1,400	71 S:14	1	5	2	0	0	6	5	9	14	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Efferia antiochi Antioch efferian robberfly	G1G2 S1S2	None None		350 350	4 S:1	0	0	0	0	0	1	1	0	1	0	0
Emys marmorata western pond turtle	G3G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive	440 560	1385 S:2	1	0	0	0	0	1	1	1	2	0	0
Eriogonum luteolum var. caninum Tiburon buckwheat	G5T2 S2	None None	Rare Plant Rank - 1B.2	850 950	26 S:3	0	0	1	0	0	2	0	3	3	0	0
Eryngium jepsonii Jepson's coyote-thistle	G2 S2	None None	Rare Plant Rank - 1B.2	675 675	19 S:2	0	0	0	0	0	2	1	1	2	0	0
Eucyclogobius newberryi tidewater goby	G3 S3	Endangered None	AFS_EN-Endangered CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	5 5	127 S:1	0	0	0	0	0	1	1	0	1	0	0
Euphydryas editha bayensis Bay checkerspot butterfly	G5T1 S1	Threatened None	XERCES_CI-Critically Imperiled	500 1,300	30 S:2	0	0	0	0	2	0	2	0	0	0	2
Extriplex joaquinana San Joaquin spearscale	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden		127 S:1	0	0	0	0	1	0	1	0	0	1	0
Falco peregrinus anatum American peregrine falcon	G4T4 S3S4	Delisted Delisted	CDF_S-Sensitive CDFW_FP-Fully Protected USFWS_BCC-Birds of Conservation Concern	0 0	56 S:1	0	1	0	0	0	0	0	1	1	0	0
Fissidens pauperculus minute pocket moss	G3? S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	985 985	22 S:1	0	0	0	0	0	1	1	0	1	0	0
Fritillaria liliacea fragrant fritillary	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	200 200	82 S:3	0	0	0	0	1	2	3	0	2	1	0
Gilia millefoliata dark-eyed gilia	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive		54 S:1	0	0	0	0	1	0	1	0	0	0	1
Helianthella castanea Diablo helianthella	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	500 1,800	107 S:21	4	5	2	0	0	10	6	15	21	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks A	B	C	D	X	U	Population Status Historic > 20 yr	Recent <= 20 yr	Presence Extant	Poss. Extirp.	Extirp.
Helminthoglypta nickliniana bridgesi Bridges' coast range shoulderband	G3T1 S1S2	None None	IUCN_DD-Data Deficient	1,400 1,400	6 S:1	0	0	0	0	0	1	1	0	1	0	0
Holta strobilina Loma Prieta holta	G2? S2?	None None	Rare Plant Rank - 1B.1		34 S:1	0	0	0	0	0	1	1	0	1	0	0
Horkelia cuneata var. sericea Kellogg's horkelia	G4T1? S1?	None None	Rare Plant Rank - 1B.1 SB_UCSC-UC Santa Cruz USFS_S-Sensitive	20 20	58 S:1	0	0	0	0	1	0	1	0	0	1	0
Lasionycteris noctivagans silver-haired bat	G5 S3S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority	400 400	139 S:1	0	0	0	0	0	1	1	0	1	0	0
Lasiurus cinereus hoary bat	G5 S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority	325 660	238 S:2	0	0	0	0	0	2	2	0	2	0	0
Laterallus jamaicensis coturniculus California black rail	G3G4T1 S1	None Threatened	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_NT-Near Threatened NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	1 1	303 S:1	0	0	0	0	1	0	1	0	0	1	0
Masticophis lateralis euryxanthus Alameda whipsnake	G4T2 S2	Threatened Threatened		260 1,600	167 S:34	10	9	5	1	0	9	15	19	34	0	0
Meconella oregana Oregon meconella	G2G3 S2	None None	Rare Plant Rank - 1B.1	1,300 1,550	9 S:2	0	0	0	0	0	2	1	1	2	0	0
Melospiza melodia pusillula Alameda song sparrow	G5T2? S2S3	None None	CDFW_SSC-Species of Special Concern USFWS_BCC-Birds of Conservation Concern	20 1,300	38 S:3	0	0	0	0	0	3	2	1	3	0	0
Microcina leei Lee's micro-blind harvestman	G1 S1	None None		600 600	2 S:1	0	0	0	0	0	1	1	0	1	0	0
Monolopia gracilens woodland woollythreads	G3 S3	None None	Rare Plant Rank - 1B.2		68 S:1	0	0	0	0	0	1	1	0	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	G5T2T3 S2S3	None None	CDFW_SSC-Species of Special Concern	667 713	42 S:2	0	1	1	0	0	0	0	2	2	0	0
Northern Maritime Chaparral Northern Maritime Chaparral	G1 S1.2	None None		1,300 1,300	17 S:1	0	0	0	0	0	1	1	0	1	0	0
Plagiobothrys diffusus San Francisco popcornflower	G1Q S1	None Endangered	Rare Plant Rank - 1B.1 SB_UCSC-UC Santa Cruz	920 920	17 S:1	0	0	1	0	0	0	1	0	1	0	0
Polygonum marinense Marin knotweed	G2Q S2	None None	Rare Plant Rank - 3.1		32 S:1	0	0	0	0	0	1	1	0	1	0	0
Rallus obsoletus obsoletus California Ridgway's rail	G5T1 S1	Endangered Endangered	CDFW_FP-Fully Protected NABCI_RWL-Red Watch List	0 10	99 S:3	0	1	1	1	0	0	0	3	3	0	0
Rana boylii foothill yellow-legged frog	G3 S3	None Candidate Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened USFS_S-Sensitive	300 1,101	2468 S:6	0	1	0	0	5	0	6	0	1	0	5
Rana draytonii California red-legged frog	G2G3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	300 840	1543 S:8	2	4	1	0	0	1	5	3	8	0	0
Sanicula maritima adobe sanicle	G2 S2	None Rare	Rare Plant Rank - 1B.1 SB_SBBG-Santa Barbara Botanic Garden USFS_S-Sensitive		17 S:1	0	0	0	0	1	0	1	0	0	0	1
Scapanus latimanus parvus Alameda Island mole	G5THQ SH	None None	CDFW_SSC-Species of Special Concern	10 20	8 S:2	0	0	0	0	0	2	2	0	2	0	0
Serpentine Bunchgrass Serpentine Bunchgrass	G2 S2.2	None None		1,120 1,120	22 S:1	0	0	0	0	0	1	1	0	1	0	0
Spirinchus thaleichthys longfin smelt	G5 S1	Candidate Threatened		0 0	46 S:2	0	0	0	0	0	2	1	1	2	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Streptanthus albidus ssp. peramoenus	G2T2	None	Rare Plant Rank - 1B.2	800	103	0	0	1	0	0	4	3	2	5	0	0
most beautiful jewelflower	S2	None	SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCBG-UC Botanical Garden at Berkeley USFS_S-Sensitive	900	S:5											
Stuckenia filiformis ssp. alpina	G5T5	None	Rare Plant Rank - 2B.2	1,600	21	0	0	0	0	0	1	1	0	1	0	0
slender-leaved pondweed	S2S3	None		1,600	S:1											
Taxidea taxus	G5	None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	700	592	0	0	0	0	0	2	2	0	2	0	0
American badger	S3	None		1,000	S:2											
Trifolium hydrophilum	G2	None	Rare Plant Rank - 1B.2		56	0	0	0	0	1	0	1	0	0	0	1
saline clover	S2	None			S:1											
Tryonia imitator	G2	None	IUCN_DD-Data Deficient	0	39	0	0	0	0	1	0	1	0	0	0	1
mimic tryonia (=California brackishwater snail)	S2	None		0	S:1											
Viburnum ellipticum	G4G5	None	Rare Plant Rank - 2B.3	600	39	0	0	0	0	0	1	0	1	1	0	0
oval-leaved viburnum	S3?	None		600	S:1											

Appendix D: Invasive Non-native Plants and Integrated Pest Management (IPM) for Wildfire Hazard Reduction

Fire Hazard Concerns: One of the greatest challenges for fire hazard fuel management is the presence of plants such as French broom, fennel, cotoneaster, pampas grass, blackwood acacia and thistle that are not only invasive, but also easily ignited or highly flammable. Because of their rapid proliferation these species can add to the fuel load and fire hazard. Other species such as Algerian ivy, poison hemlock, Himalayan or evergreen blackberry are a threat as they outcompete native species. Issues concerning invasive species are of particular relevance to the Merritt College Vegetation Management Plan because vegetation management activities can inadvertently create conditions, such as disturbed soil or increased sunlight, that allows the invasive species to flourish.

Long-term Management Goals: Reduce spread of invasive non-native species. Work to control existing populations using Integrated Pest Management (IPM). Use principles of competitive autecology where timing and type of treatment are matched to growth stage of the plant to maximize its effectiveness. Prevent reinvasion of targeted weeds or invasion of other noxious species.

IPM is an approach that utilizes regular monitoring to determine if and when treatments are needed and employs, physical, mechanical, cultural, biological and educational tactics to keep pest numbers low enough to prevent intolerable damage or annoyance. Typically, least toxic chemical controls are used as a last resort. Treatments are chosen and timed to be most effective and least disruptive to natural pest controls.

Recommended Actions: Four levels of management strategies exist for invasive plants and noxious weeds: prevention, containment, reduction and eradication. Each results in a different level of control and reflects available resources and priorities.

- **Prevention**: New invasions are prevented by routine monitoring and removal activities. Adoption of “early detection rapid response” proactively deals with new outbreaks.
- **Containment**: Containment strategies, or the isolation of infestations from further spread, are typically used when large, aggressive infestations that cannot be eradicated threaten adjacent habitats.
- **Reduction**: Reduction strategies are the most commonly used strategy. They are typically used in high-value habitat areas that can greatly benefit from the reduction in the number of weedy competitors.
- **Eradication**: Eradication may be the goal for individual species. Even for more established species, eradication may be possible in smaller areas and is the most effective goal and strategy for small infestations. Successful eradication is a function of monitoring confidence and the life of the seed bank.

Prevention for pioneering species
Preventing a new weed from becoming established is an effective strategy. Focus first on the outlier population and remove all the plants, keeping track of locations, management strategies and results. Once the pioneering population has been removed, it's important to return every winter or spring until no more seeds are germinating. This is recommended for the isolated occurrences of invasive species seen in the campus Landscaping Zone. Early treatment prior to seed set eliminates not only the visible plants, but also potential seeds sources. Seed banks in the soil can remain viable for many decades in the case of French broom, or just a few years in the case of small-seeded plants like pampas grass.

Containment for established populations
When a particular weed has become widespread, eradication is often no longer a sensible strategy. Instead, the most effective action may be to containing its spread or lessen its impact. The aim of containment is not to eradicate the species, but to reduce its density and abundance to below an acceptable threshold.

A strategy of containment may be the best option for invasive plants like acacia or eucalyptus, which would require considerable cost and labor to fully eradicate and whose spread is often limited to areas in the immediate vicinity. For such plants, it's better to focus on containing the large infestations and eliminating all the outlier populations than to spend the high amount of money and time eradicating the main population. Containment works well with these two plants because their pattern is to spread outward from the edge of existing populations; with new seedlings and sprouts from trunks or roots.

Communicate with neighbors (including East Bay Regional Parks and City of Oakland) about weed areas, infestation levels, and control practices. Early treatment can prevent large infestations. Cooperation in adopting similar prevention practices on adjacent public and private property can reduce the spread of weeds into the campus. Adopt other weed control practices such as thoroughly cleaning the undercarriage of any vehicles or machinery. Require all vehicles, machinery and equipment coming into the area to be cleaned before entering. Many vegetation management companies have weed control measures and can steam clean the underside of machinery.

Reduction for established populations
Reduction strategies are the most commonly used strategy for species such as broom, blackberry or cotoneaster that have established populations. These strategies are typically used in high-value habitat areas, such as the riparian habitat that can greatly benefit from the reduction in the number of weedy competitors. Reduction can begin from the strategy of containment: keep working in from edges and allow adjacent native species to gradually reclaim cleared areas. It is important to keep track of the locations and size of the populations and be persistent about not only removing plants, but also about returning to the area until no more seeds germinate.

Eradication for established populations

Invasive plant species are targeted for eradication based on a high probability of success and the tolerance level for each species. A desirable goal is to obtain control of a small set of species, before targeting a different set. Recommended target invasive plant species are, blackwood acacia, young pines, Italian thistle and poison hemlock due to their rapid spread mechanisms. In other words, the population of these plants could be small, but they would cause an unacceptable impact due to their likely rapid spread or location in sensitive habitats.

Creating a database of location, extent, and characteristics of invasive populations can help track distribution patterns and efficacy of treatments over time. Photographs can also be linked to the database to help track progress. Geographic coordinates can be recorded using portable Global Positioning System (GPS) units and can be input a Geographic Information System (GIS). The GPS data collection can be done by volunteers or staff, but a systematic approach to data input must be coordinated with GIS staff. Digital maps can be produced as needed for staff or community presentations. The local invasive species data can also be linked to regional databases and applications for hand held devices such as smart phones. Additional sources for monitoring new outbreaks of invasive species in the bay area and detailed information on treatment recommendation by species see:

- California Invasive Plant Council (Cal IPC) http://www.cal-ipc.org/
- Bay Area Early Detection Network (BAEDN) http://www.baedn.org/

Treatment Cycles

Timing should be determined for each site and target invasive species. Match activity with season when the actions will be most effective to control the pest with the least effort, greatest benefit (or minimally impact) to surrounding native species (plants, animals, insects and other organisms) with the least effect on the work force (e.g. minimize exposure to poison oak). Follow up is critical to success with invasive species. Anticipate potential problems related to soil disturbance, erosion and need for follow-up treatments especially for persistent species or those with large seed banks (such French broom) or those that easily root from small pieces (such as capeivy). Many species can stump sprout or have seeds that are bird dispersed requiring continued annual management.