5.0 GOLD HILL

5.1 RISK AND HAZARD ASSESSMENT

Gold Hill is located at 6,000 feet in the Virginia Range in the heart of a very large historic mining district and is adjoined to the north by Virginia City. The town does not have its own fire department and is served by the Storey County Fire Station #1 in Virginia City. The town is situated two-thirds of the way up Gold Canyon at the base of steep, west-facing slopes, which contribute to a high fire behavior potential. Gold Hill was classified in the **High Hazard category** (72 points). Elements affecting the hazard rating were steep secondary roads, poor defensible space, and the potential hazard presented by some overhead utilities. Scores for Gold Hill are included at the end of this chapter in Table 5-2.

5.1.1 Community Design

The area surrounding Gold Hill is classified as an intermix wildland-urban interface condition. The RCI Project Team observed a total of 25 structures scattered throughout the wildland area with no clear line of demarcation between wildland fuels and the buildings. There is undeveloped open space throughout the community. Approximately two-thirds of the lots assessed were less than one acre. The remaining parcels were between one and ten acres in size. As such, most structures are spaced closely together, though a few structures are surrounded by sizeable expanses of vacant land.

Roads: State Route 342 is the primary access road for the community. This road is paved at least 24 feet wide and provides adequate turnaround space for fire suppression equipment. Approximately twenty percent of the secondary roads have grades steeper than five percent.

Signage: Street signs were present along all but one street. Residential addresses were clearly visible on approximately half of the houses.

Utilities: All of the utilities are above ground. Many areas within power line corridors are in need of vegetation clearing and thinning.

5.1.2 Construction Materials

The majority of the homes observed in the interface were not built with fire resistant siding materials. All homes had fire resistant roofing materials such as composition roofing, metal, or tile. Approximately one half of the homes observed had unenclosed balconies, porches, decks, or other architectural features that create drafts and provide areas where sparks and embers can accumulate, smolder, ignite, and rapidly spread fire to the home.

5.1.3 Defensible Space

Approximately 36 percent of the residences assessed have landscaping that meets the minimum defensible space requirement to help protect a home from damage and minimize loss during a wildfire. The nature of the fuels surrounding a home and the slope of the home site will determine the specifications for defensible space. Fuels in the area are generally moderate and discontinuous in and around town. Some slopes in the canyon reach seventy

to eighty percent. See the Defensible Space Guidelines and the Homeowner's Annual Checklist in Appendix E for specific information on defensible space.

5.1.4 Suppression Capabilities

The first alarm response to a fire in Gold Hill comes from Fire Station #1 in Virginia City, which is staffed by a combination of paid and volunteer firefighters with a payroll of six fire professionals and seventeen volunteers at the time of inquiry (G. Hames, pers. comm.).

Central Lyon County Fire Protection District-Silver City Station #34 automatically aids the Storey County Fire Station #1 in all fire events. Resource availability and mutual aid agreements with Storey County Fire Protection District are described in Section 4.1.1.

Water Sources and Infrastructure

- Gold Hill has 500 gpm water hydrants within 500 feet of the structures.
- There are several water tanks totaling 3-million gallons. A new 2-million gallon tank will be installed in 2005 in Virginia City.

All water originates from Marlette Lake and is transported to the municipal system via pipeline. The water system is run by both gravity and electric pumps with an emergency back-up generator. The water systems meet or exceed the current codes.

5.1.5 Factors Affecting Fire Behavior

The vegetation fuel hazard in the Gold Hill interface area is predominantly moderate to high as shown in Figure 5-2. Pinyon and juniper occur on the steep slopes east, southwest, and northwest of Highway 342 where the fuel hazard is high. Areas considered a moderate fuel hazard consist mostly of shrubs two to three feet tall including big sagebrush, bitterbrush, rabbitbrush, and desert peach. Cheatgrass is intermixed with native bunchgrass species throughout most of the interface, which presents a readily ignitable fuel bed and can elevate shrublands to a high fuel hazard in wet years. The fuel condition of greatest concern is located within the most densely occupied residential area along Highway 342 where dense fuels and steep slopes coincide with structures built of highly combustible materials. Fuel hazard photographs are included in Figure 5-3.

Slopes in the area reach seventy to eighty percent. Steep conditions are conducive to the uphill spread of fire. West and south-facing aspect slopes tend to be drier and are therefore more receptive to ignition. There is a moderate fire history in the vicinity of Gold Hill: one fire burned within less than a mile of town to the south and to the east in 1983 and a subsequent fire consumed an area to the south west of town in 1996. The prevailing winds in the area are from the south, a condition that would be a major factor in the worst-case wildfire scenario.

5.1.6 Fire Behavior Worst-case Scenario

The worst-case wildfire scenario would be a fire that starts south of town on a windy summer afternoon with heavy tourist traffic in the area. Gold Hill is positioned about two-thirds of the way up Gold Canyon, which is a topographic feature that could create a chimney effect concentrating upslope winds from the south. An ignition point south of town caused by one of many sources (e.g. lightning, auto fire, power line) would be rapidly

pushed upslope into the community and into structures before fire suppression resources could take an effective defensive position. A fire in the canyon would also block the downhill escape route along Highway 342 and potentially threaten Virginia City to the north. An accelerated wind-driven fire along the drier east side (west aspect) of Gold Canyon would tend to put more property at risk, as the majority of homes and buildings are concentrated there.

5.1.7 Ignition Risk Assessment

Gold Hill was determined to have a high ignition risk rating due in part to heavy traffic in the narrow canyon during tourist season and due to the popular and easily accessible four-wheel drive trails in the area.

5.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS AND RESPONSIBILITIES

The responsibility to keep a community fire safe falls not only on the local fire protection district but also on the residents of the community, businesses, and local governments. The recommendations for Gold Hill focus primarily on efforts that property owners and community members can undertake to increase wildfire safety through reduction of hazardous fuels in town. The recommendations are detailed below and summarized in Table 5-1.

5.2.1 Defensible Space Treatments

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home, thereby lowering the potential to burn and to provide firefighters a safer working area to defend the home or outbuilding during a wildland fire. Guidelines for improving defensible space around residences and structures in the community are given below and are described in detail in Appendix E.

Property Owner Responsibilities

- Remove, reduce, and replace vegetation to create defensible space around homes according to the guidelines in Appendix E. This area should be kept:

  Lean – There are only small amounts of flammable vegetation,

  Clean – There is no accumulation of dead vegetation or other flammable debris, and

  Green – Existing plants are healthy and green during the fire season.
- Store firewood a minimum distance of thirty feet from structures.
- Mow or remove brush growing within ten feet of fences in the community.
- Maintain areas under wood decks and porches free of weeds and other flammable debris. Install screens around unenclosed overhangs where possible.
- Clear all vegetation and combustible materials around propane tanks for a minimum distance of ten feet.
- Clear weeds and brush to a width of ten feet along both sides of the driveways.

- Maintain a minimum clearance distance of thirty feet from the crown of trees to structures and other tree crowns that remain within the defensible space zone. Keep this area free of smaller trees, shrubs, and other ladder fuels.
- Trim and remove tree branches a minimum of four feet from the ground to reduce ladder fuels on all deciduous and coniferous trees within the defensible space zone. Prune and remove all dead and diseased branches.
- Prune all tree branches to a minimum distance of fifteen feet from buildings, paying special attention around chimneys.
- Thin sagebrush and other shrubs to a distance of twice their height between shrubs.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire hazard if left on site.
- Where possible, irrigate all trees and large shrubs that remain in close proximity to structures to increase their fire resiliency. This is especially important during drought conditions.
- Maintain the defensible space as needed.

5.2.2 Fuels Reduction Treatments

It is important to keep power line corridors and transformers clear of flammable vegetation, as fires have been known to start from arcing power lines during windy conditions or exploding transformers during periods of high electricity use. Damage by fire to power lines often creates power failures, which are especially dangerous to communities without a backup energy source. During a wildfire, energized power lines may fall and create additional hazards for citizens and firefighters, including blocked road access.

Utility Company Responsibilities

- Reduce and remove vegetation to maintain clearance around power lines. Clear vegetation within fifteen feet of utility poles near the community. Remove all tree limbs from power lines.

Storey County Fire Department Responsibilities

- Remove or mow vegetation within ten feet of fire hydrants to improve visibility and access by fire personnel.
- Implement a fuel reduction treatment on approximately 8.5 acres below the water treatment facility located west of Highway 342 between Gold Hill and Virginia City as shown in Figure 5-1. Break up the horizontal continuity of the fuel bed by thinning shrubs to spacing equivalent to twice their height. Revegetate interspaces with the procedures identified in Appendix E. Control cheatgrass if necessary by mowing prior to seed maturity.

Storey County and Nevada Department of Transportation Responsibilities

- Reduce and remove fuels along county roads, State Routes, and highways using brush hogs or mowers to reduce the vegetation height to four inches for a distance of 25 feet on both sides of the road or to the fenced right-of-way boundary.

5.2.3 Community Coordination

Property Owner Responsibilities

- Form a local chapter of the Nevada Fire Safe Council. The Nevada Fire Safe Council facilitates solutions to reduce the loss of lives and property from wildfire in Nevada's communities. Through the establishment of a local Chapter, local communities will become part of a large network for sharing information including notification of programs and funding opportunities for fire mitigation projects such as those listed in this report. The Nevada Fire Safe Council will accept and manage grants and contracts on the Chapter's behalf through its non-profit status. The Nevada Fire Safe Council will provide assistance and support to communities to complete fire safe plans, set priorities, educate and train community members, and promote success stories of its members. To form a local Chapter or for more information contact the:

  Nevada Fire Safe Council
  1187 Charles Drive
  Reno, Nevada 89509
  (775) 322-2413

- Assure that residential addresses are visible from the road. Address characters should be at least four inches high, reflective, and composed of non-flammable material. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate under smoky conditions in the event of a wildland fire.
- Read and become fully knowledgeable of evacuation procedures, fire safety zones, and safety procedures for sheltering in place in the event that evacuation is not possible.

Storey County Commissioner Responsibilities

- Require all future development in the County to meet the national fire codes with regard to community design aspects, building construction and spacing, road construction and design, water supply, and emergency access. Refer to Appendix F for an example of fire safe recommendations for planning new developments.

5.2.4 Public Education

Public education focused on increasing community fire safety is critical. A program that explains fire safe measures in clear and emphatic terms will have an impact on residents in the wildland-urban interface. Informed community members will be more inclined to take actions to effectively reduce fuels and other wildfire hazards around their homes and in their neighborhoods.

It is also critically important for residents to be fully knowledgeable of evacuation routes and procedures. A group of volunteers should be trained and prepared to assist in directing tourists to designated safe zones and evacuation routes in the event that emergency evacuation is necessary.

Storey County Fire Department

- Complete and distribute copies of the Gold Hill emergency evacuation plan to all residents. Conduct public workshops each year prior to the tourist and fire season to ensure that all residents are fully knowledgeable of evacuation routes, evacuation procedures, designated fire safe zones, and procedures for sheltering in place in case evacuation becomes infeasible during a fast moving fire storm.
- Distribute copies of the publication *Living with Fire* to all property owners. This publication is free of charge. Copies can be requested from the University of Nevada Cooperative Extension.
- Enforce or develop county laws, regulations, and ordinances that support implementation and maintenance of defensible space and establish fuel reduction responsibilities for absentee homeowners and vacant lots.
- Contact the University of Nevada Cooperative Extension and the BLM Carson City Field Office for assistance with public education.

5.3 SUMMARY OF RECOMMENDATIONS

Table 5-1. Gold Hill Priority Recommendations to Reduce Wildfire Risks and Hazards

RESPONSIBLE PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around home according to the defensible space guidelines in Appendix E.
	Community Coordination	Form a local chapter of the Nevada Fire Safe Council. Improve address visibility. Participate in public education opportunities and become knowledgeable of emergency evacuation procedures.
Utility Company	Fuels Reduction	Reduce and remove vegetation in power line corridors. Maintain fifteen feet of clearance around utility poles.
Storey County And NDOT	Fuels Reduction	Reduce and remove vegetation in county road, State Route, and highway right-of ways to maintain an average four-inch vegetation height. Reseed treated areas to minimize cheatgrass and noxious weed invasion.
Storey County Commissioners	Community Coordination	Require all future development in the County meet the national fire codes with regard to community design aspects, building construction and spacing, road construction and design, water supply, and emergency access.
Storey County Fire Department	Fuels Reduction	Remove or mow vegetation within ten feet of fire hydrants to improve visibility and access by firefighters. Implement fuels reduction treatment on 8.5 acres in the vicinity of the water treatment facility west of Highway 342.
	Public Education	Complete and distribute the Gold Hill emergency evacuation plan. Conduct annual workshops to train residents on evacuation procedures and safety procedures for sheltering in place. Enforce or develop county laws, regulations, and ordinances for defensible space and fuel reduction that include responsibilities for absentee homeowners, vacant lots, and new subdivisions. Distribute copies of the publication *"Living with Fire"* to all property owners. Contact the Nevada Cooperative Extension and BLM for assistance with public education.

Table 5-2 Gold Hill Wildfire Hazard Rating Summary

A. Urban Interface Condition ***2***

B. Community Design

1. Ingress / Egress	3	/5
2. Width of Road	1	/5
3. Accessibility	3	/3
4. Secondary Road	1	/5
5. Street Signs		/5
6. Address Signs	5	/5
7. Utilities	5	/5

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	5	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	7	/15

F. Fire Behavior

1. Fuels	3	/5
2. Fire Behavior	7	/10
3. Slope	10	/10
4. Aspect	7	/10

E. Suppression Capabilities

1. Water Source	1	/10
2. Department	3	/10

TALLIES

25 Total Houses

B6. Address Signs

12 not visible | 13 visible | 52% visible

C1. Roofs

0 combust | 25 not combust | 100% not combust

C2. Siding

24 combust | 1 not combust | 4% not combust

C3. Unenclosed Structures on Lot

14 not enclosed | 11 enclosed | 56% not enclosed

D1. Lot Sizes

16 <1ac | 9 >1ac <10ac | 0 >10ac

D2. Defensible Space

16 not adequat | 9 adequate | 36% adequate

Score **72** /128

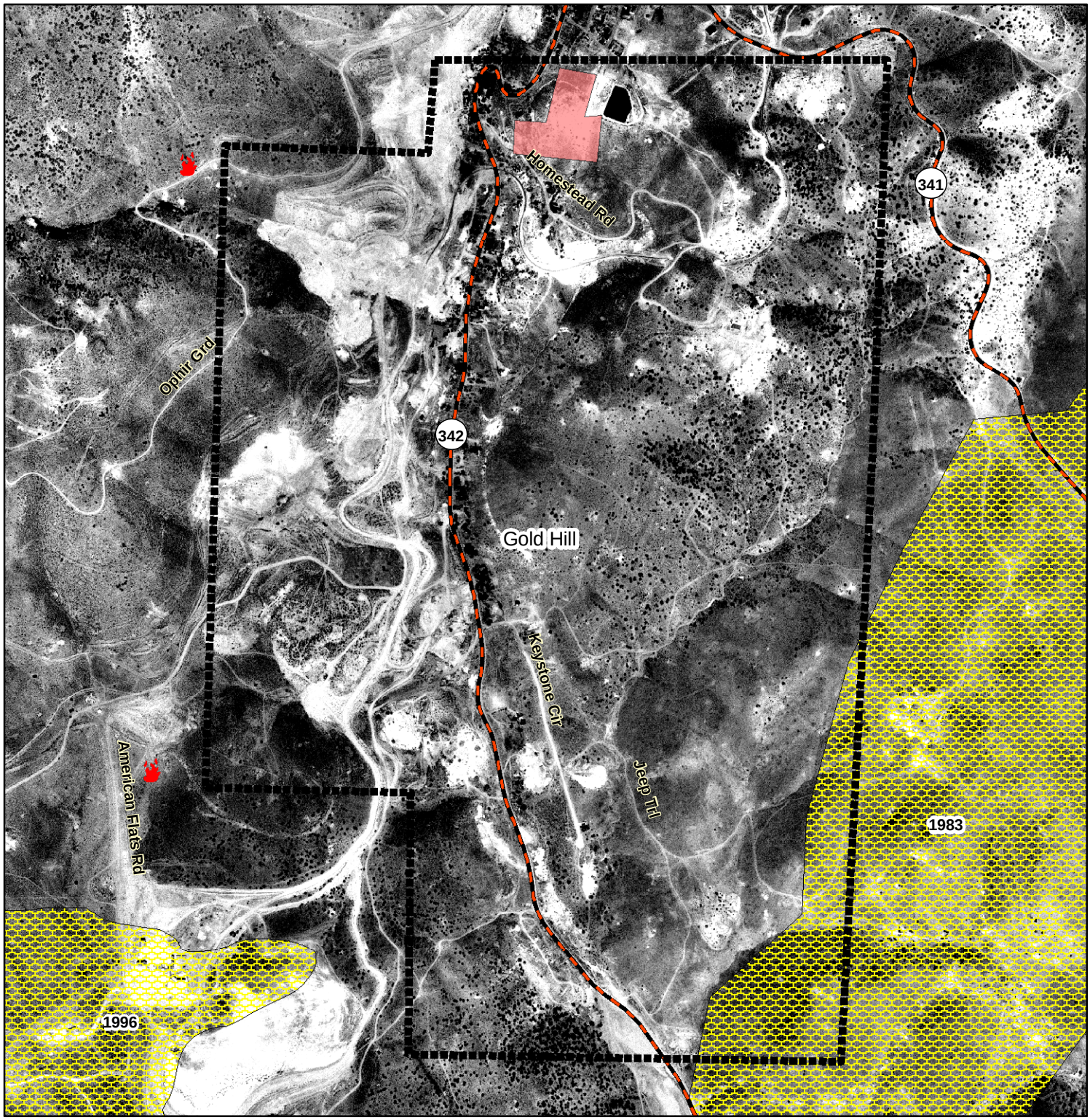


Figure 5-1. Gold Hill
Fire History and Proposed Mitigation Projects

Legend

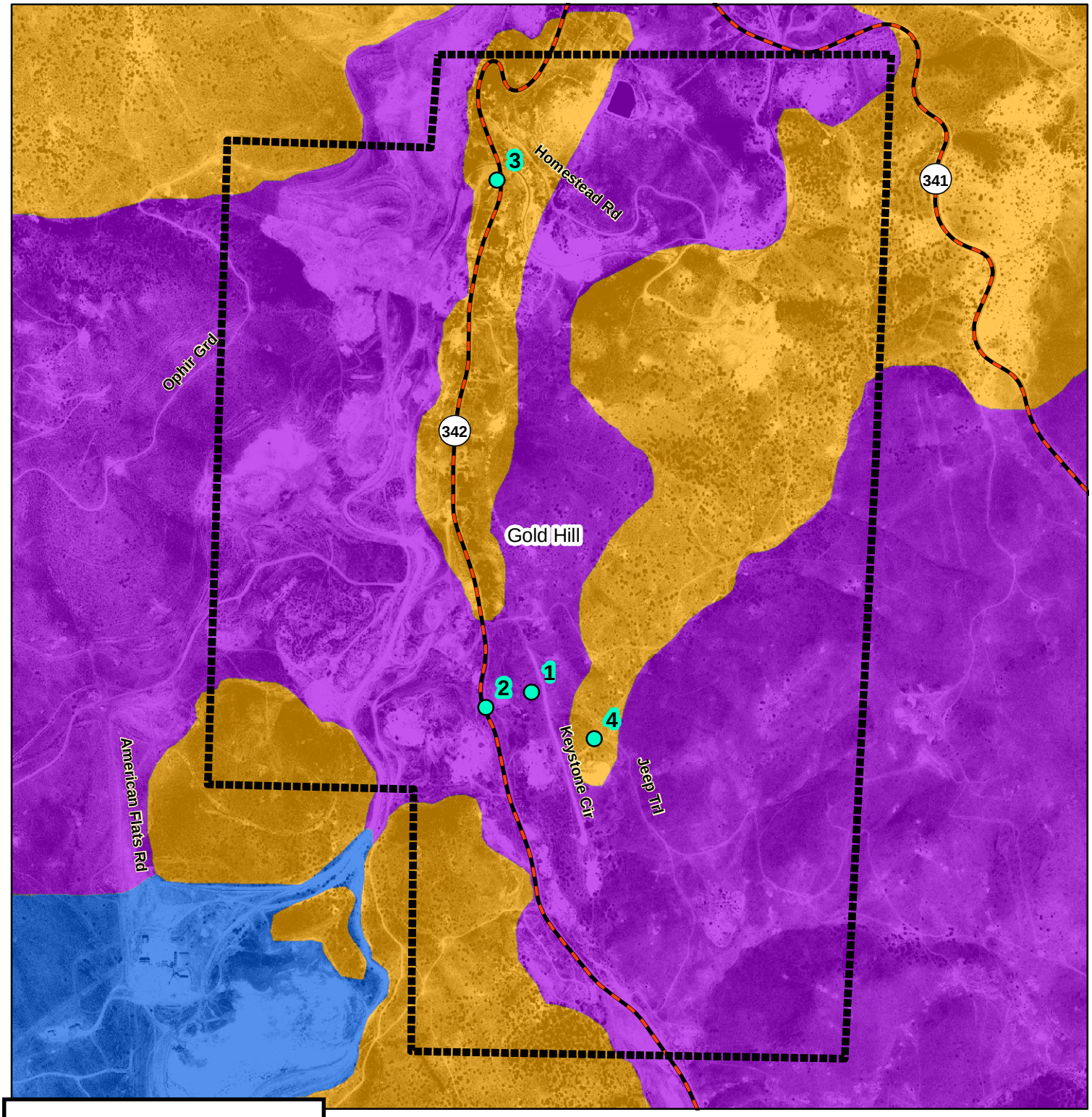
- Community Boundary
- Fuel Reduction Treatment
- Fire Ignition
- Fire Boundary and Date
- Highways and State Routes

N
W E
S

0 500 1,000 2,000
Feet

Resource Concepts, Inc.
340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project



Legend

- Community Boundary
- Highways and State Routes

Fuel Hazard

- Extreme
- High
- Low
- Moderate
- Fuel Photo Point

Figure 5-2. Gold Hill
Fuel Hazard Classification

N
W E
S

0 500 1,000 2,000
Feet

Resource Concepts, Inc.
340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project

Figure 5-3. Gold Hill Fuel Hazard Photo Points

Photo Point 1. 0271040N. 4351229E. Direction 160°SSE. Moderate fuel hazard. Typical fuels include cheatgrass and sagebrush with scattered pinyon and juniper trees. The fuel hazard can escalate in a wet year to a high or extreme hazard condition as a result of high cheatgrass production.

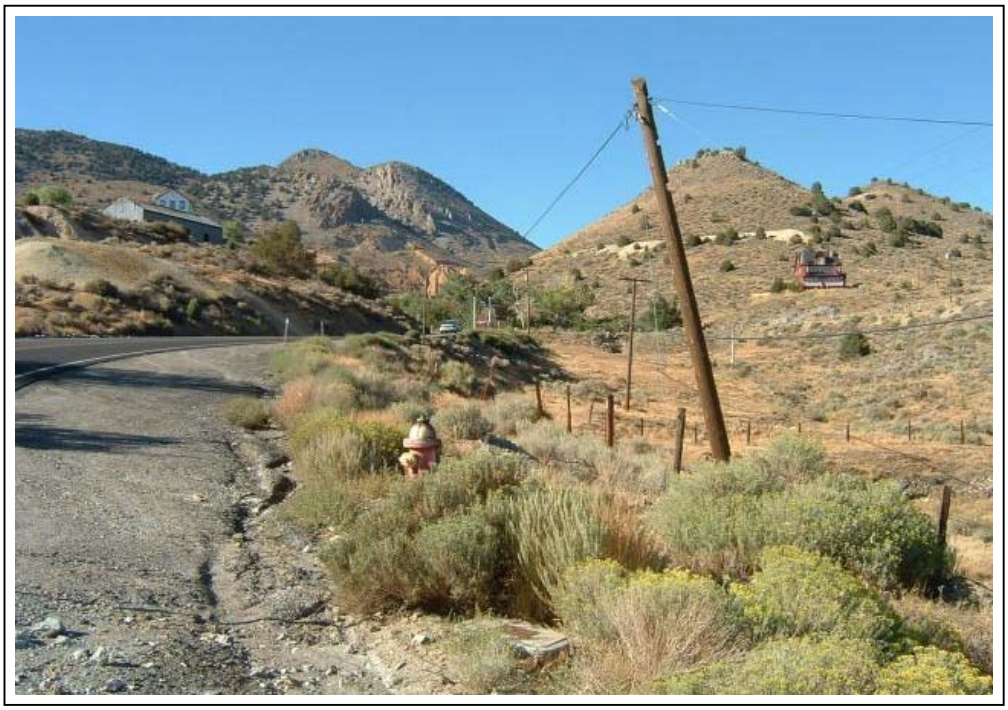


Photo Point 2. 0270922N. 4351190E. Direction 12°NNE. Moderate fuel hazard area. Recommendations for Gold Hill include reduction and removal of vegetation within ten feet of fire hydrants to improve visibility and access by fire personnel and removal of fuels along county roads using brush hogs or mowers to reduce vegetation height to four inches for a distance of 25 feet on both sides of the road or to the fenced right-of-way boundary.

Figure 5-3. Gold Hill Fuel Hazard Photo Points *(continued)*

Photo Point 3. 0270951N. 4352553E. Direction 171°SSE. High fuel hazard at the interface in Gold Hill. Continuous fuels of pinyon, juniper, and black locust on steep slopes extend to the edge of structures.

Photo Point 4. 0271202N. 4351109E. Direction 12°NNE. High fuel hazard consists of a pinyon and juniper woodland overstory with sagebrush and cheatgrass in the understory. Fuel reduction from a past fire in 1983 (right) still maintains a moderate fuel hazard as compared to the unburned pinyon-juniper woodland (left). If left untreated, the pinyon and juniper will continue to expand downslope and worsen the fuel hazard for Gold Hill.

6.0 LOCKWOOD

6.1 RISK AND HAZARD ASSESSMENT

Lockwood is located on a terrace bound on the north by the Truckee River and on the west by Long Valley Creek. The town is set against the steep north facing slopes of the Virginia Range. The risk assessment resulted in classifying Lockwood in the **Moderate Hazard category** (50 points). The moderate hazard rating is primarily attributed to a large percentage of homes built with combustible building material, a high density of homes on small lots, inadequate defensible space around a substantial proportion of structures, steep gradient access roads, inadequate address signage, and steep terrain in close proximity to the community that would intensify fire behavior. A summary of the factors that contributed to the hazard rating is included in Table 6-2.

6.1.1 Community Design

Lockwood has a classic wildland-urban interface condition with a clear line of demarcation between structures and wildland fuels. Wildland vegetation typically does not continue into developed areas. All of the 106 lots observed were less than one acre in size.

Roads: Interstate 80, exit number 22 provides the primary access for the community. This frontage road is paved, at least 24 feet wide, and has adequate turnaround space for fire suppression equipment. This road crosses over the Truckee River on a bridge that supports frequent heavy truck traffic. Several of the secondary roads have dead ends.

Signage: Street signs were present on all but four streets in Lockwood. Residential addresses were visible on approximately 77 percent of the houses surveyed.

Utilities: Electric utilities are above ground and are well maintained.

6.1.2 Construction Materials

Twenty-one percent of the homes assessed in the interface were built with fire resistant siding materials, and 98 percent of the homes assessed had fire resistant roofing materials such as composition roofing, metal, or tile. Approximately one-third of the homes observed had unenclosed balconies, porches, decks, or other architectural features that create drafts and provide areas where sparks and embers can accumulate, smolder, ignite, and rapidly spreading fire to the home.

6.1.3 Defensible Space

The defensible space requirement is based on vegetation and slope as illustrated in Appendix E. In general, the homes in the interface area are adjacent to sagebrush and bitterbrush fuels, downslope of steep terrain greater than thirty percent, on the west side of the community. The appropriate width of the defensible space zone can be determined from the guidelines in Appendix E. Approximately one half of the homes had landscaping that would meet the requirement for defensible space to protect the home from damage or loss during a wildfire.

6.1.4 Suppression Capabilities

Wildfire Protection Resources

Storey County Fire Station #4 in Lockwood provides first alarm response to the community. At the time of publication, this station was staffed by a combination of six career and twelve volunteer positions (G. Hames, pers. comm.). Resource availability and mutual aid agreements with Storey County Fire Protection District are described in Section 4.1.1.

Water Sources and Infrastructure

Lockwood has a variety of water resources for fire suppression including

- 500 gpm water hydrants within 500 feet of structures, and
- Two water tanks, one 2-million gallon capacity and one 1-million gallon capacity.

The water systems are powered by both gravity and pumps that are backed up with an emergency diesel generator. The fire main flow is 4,000 gpm and the residential flow is 2,000 gpm. Water systems meet or exceed the current codes.

6.1.5 Factors Affecting Fire Behavior

The fuel hazard in the interface area around Lockwood was considered low. Fuels in the area are mostly low-density sagebrush, typically one to two feet in height. Fuel loading was estimated to be less than one ton per acre. Fuels have been reduced in some places due to past fires. Slopes in the area reach eighty percent; however, the north aspect and light fuel loading reduce the risk to the community. Long Valley runs south to north and may create strong winds through the community. The predominant wind directions in the area are from the south and from the west.

6.1.6 Fire Behavior Worst-case Scenario

The worst-case wildfire scenario would be a fire that starts mid-afternoon during the summer months. Down-canyon winds from the south would drive the fire into the light sagebrush on the south side of Lockwood. An additional concern would be a fire burning downslope from the west behind the pellet factory. A fire approaching the factory yard could cause firebrands to ignite the stockpiled inventory of pellets in the yard and intensify fire behavior.

Any wildfire incident could be worsened if the one bridge that accesses Interstate 80 from the community were to become impassable, for example due to a car accident. Emergency vehicles would not be able to access the community and residents would not be able to evacuate.

6.1.7 Ignition Risk Assessment

Lockwood was rated with a low ignition risk. Ignition history for the Lockwood area is concentrated along the I-80 corridor, with dispersed ignitions to the north of Interstate 80 as shown in Figure 6-1. The Truckee River effectively isolates the community from ignition risks associated with traffic. The Lockwood landfill presents a minor risk for ignition of waste material.

6.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS AND RESPONSIBILITIES

The risk and hazard reduction recommendations for Lockwood prioritize defensible space treatments within the community. Community coordination and public education are important recommendations that work in conjunction with each other to facilitate implementation and long-term maintenance of defensible space and fire safety awareness. Roles and responsibilities are summarized in Table 6-1.

6.2.1 Defensible Space Treatments

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home, thereby lowering the potential to burn and providing firefighters a safer working area from which to defend the home or outbuilding during a wildland fire. Guidelines for improving defensible space around residences and structures in the community are given below and are described in detail in Appendix E.

Property Owner Responsibilities

- Remove, reduce, and replace vegetation to create defensible space around homes according to the guidelines in Appendix E. This area should be kept:

  Lean – There are only small amounts of flammable vegetation,

  Clean – There is no accumulation of dead vegetation or other flammable debris, and

  Green – Existing plants are healthy and green during the fire season.
- Shrubs should be thinned to a spacing equal to twice their height.
- Clear weeds and brush for a width of ten feet along both sides of the driveway.
- Clear all vegetation and combustible materials around propane tanks for a minimum distance of ten feet.
- Prune trees so that branches are at least fifteen feet away from chimneys and structures. Maintain a minimum clearance distance of thirty feet from the crown of trees to structures and other tree crowns that remain within the defensible space zone. Prune and remove all dead and diseased branches from trees.
- Mow or remove brush growing within ten feet of fences in the community.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire hazard if left on site.
- Store firewood a minimum distance of thirty feet from structures
- Maintain areas under wood decks and porches free of weeds and other flammable debris. Install screens around unenclosed overhangs where possible.
- If possible, irrigate all trees and large shrubs in close proximity to structures to increase their fire resiliency. This is especially important during drought conditions.
- Maintain the defensible space annually.

6.2.2 Community Coordination

Many of the most effective activities aimed at reducing the threat of wildfire for the Lockwood Community require that individual property owners coordinate with each other and with local fire authorities. Defensible space, for example, is more effective in small communities when applied uniformly throughout entire neighborhoods. Public education and awareness, neighbors helping neighbors, and proactive individuals setting examples for others to follow are just some of the approaches that will be necessary to meet the fire safe goals in the community.

Property Owner Responsibility

- Assure that address signs are visible from the road. Address characters should be at least four inches high, reflective, and composed of non-flammable material. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate under smoky conditions during a wildland fire.

Storey County Commissioner Responsibilities

- Require all future development in the County to meet the national fire codes with regard to community design aspects, building construction and spacing; road construction and design, water supply, and emergency access. Refer to Appendix F for an example of fire safe recommendations for planning new developments.

6.2.3 Public Education

Public education about fire safety is critical. A program that explains fire safe measures in clear and emphatic terms will have an impact on residents in the wildland-urban interface. Informed community members will be more inclined to make efforts to effectively reducing the wildfire hazards to their homes and neighborhoods.

Priority recommendations for Lockwood are summarized in Table 6-1.

6.3 SUMMARY OF RECOMMENDATIONS

Table 6-1. Lockwood Priority Recommendations to Reduce Wildfire Risks and Hazards

RESPONSIBLE PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around home according to the defensible space guidelines in Appendix E.
	Community Coordination	Participate in public education opportunities and become knowledgeable of emergency evacuation procedures. Organize community clean-up events to remove weeds and debris in town. Expand the use of address and street signage where needed.
Storey County Fire Department	Public Education	Enforce or develop county laws, regulations, and ordinances for defensible space and fuel reduction that include responsibilities for absentee homeowners, vacant lots, and new subdivisions. Distribute copies of the publication *"Living with Fire"* to all property owners. Contact the Nevada Cooperative Extension and BLM for assistance with public education.
Storey County Commissioners	Community Coordination	Require all future development in the County meet the national fire codes with regard to community design aspects; building construction and spacing; road construction and design; water supply; and emergency access.

Table 6-2 Lockwood Wildfire Hazard Rating Summary

A. Urban Interface Condition ***1***

B. Community Design

1. Ingress / Egress	1	/5
2. Width of Road	1	/5
3. Accessibility	3	/3
4. Secondary Road	1	/5
5. Street Signs		/5
6. Address Signs	3	/5
7. Utilities	1	/5

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	3	/5

D. Defensible Space

1. Lot Size	5	/5
2. Defensible Space	7	/15

F. Fire Behavior

1. Fuels	1	/5
2. Fire Behavior	3	/10
3. Slope	10	/10
4. Aspect	1	/10

E. Suppression Capabilities

1. Water Source	1	/10
2. Department	3	/10

TALLIES

106 Total Houses

B6. Address Signs

24 not visible | 82 visible | 77% visible

C1. Roofs

2 combust | 104 not combust | 98% not combust

C2. Siding

84 combust | 22 not combust | 21% not combust

C3. Unenclosed Structures on Lot

39 not enclosed | 67 enclosed | 37% not enclosed

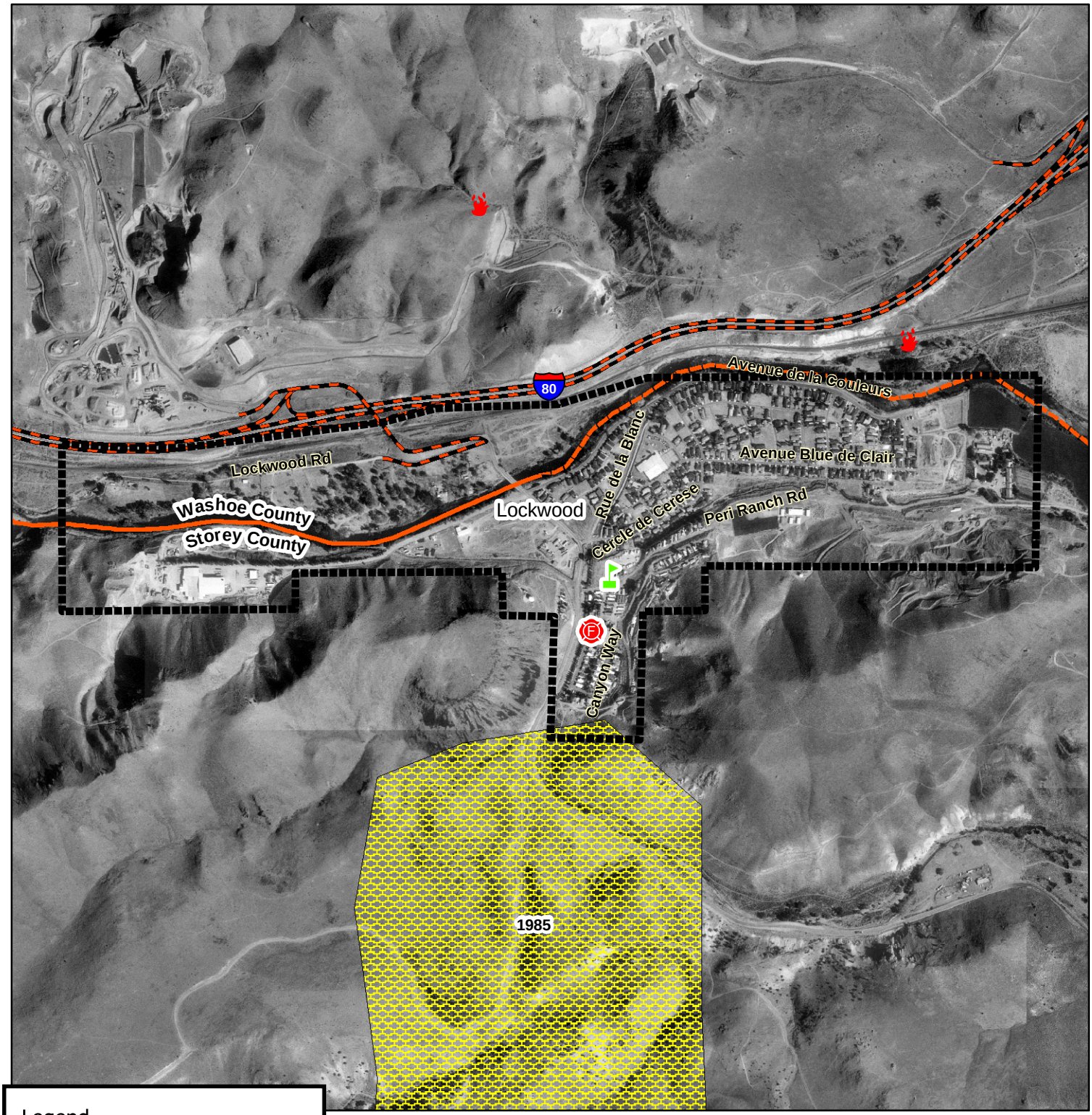
D1. Lot Sizes

106 <1ac | 0 >1ac <10ac | 0 >10ac

D2. Defensible Space

52 not adequat | 54 adequate | 51% adequate

Score **50** /128



Legend

- Community Boundary
- School
- Fire Station
- Fire Ignition
- Fire Boundary and Date
- County Boundary
- Highways and State Routes

Figure 6-1. Lockwood
Fire History, Suppression Resources,
and Critical Features

N
W E
S

0 500 1,000 2,000
Feet

Resource Concepts, Inc.
340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project

7.0 SIX MILE

7.1 RISK AND HAZARD ASSESSMENT

Six Mile is a community located at an elevation of 4,500 feet at the base of south facing slopes near the south end of the Virginia Range. The community is located just north of the Lyon-Storey County line adjoining the community of Mark Twain to the south in Lyon County (see the Lyon County Risk/Hazard Assessment report in this series for a discussion of Mark Twain). The risk assessment resulted in classifying Six Mile in the **Moderate Hazard category** (58 points). A low fire behavior potential, as well as and moderate levels of combustible building materials, architectural features, community accessibility, visibility of residential addresses, fire suppression infrastructure and resources, and structure density are some of the features that contributed to the moderate hazard score. A summary of the factors is included in Table 7-2.

7.1.1 Community Design

The wildland-urban interface condition surrounding Six Mile is intermixed. Structures are scattered throughout the wildland area with no clear line of demarcation between wildland fuels, buildings, and undeveloped open space throughout the community. Of the 260 residences evaluated in the community, 256 are on parcels ranging between one and ten acres and the remaining four residences are on parcels of greater than ten acres.

Roads: State Route 79, one of the primary access roads for the community, is moderately narrow (between 20 and 24 feet wide), paved, and has adequate turnaround space for fire suppression equipment. One percent of the secondary roads have grades steeper than five percent.

Signage: Street signs were present along all but one of the streets. Residential addresses were visible on about 75 percent of the houses.

Utilities: All of the utilities are above ground and well maintained.

7.1.2 Construction Materials

Of the 260 homes assessed, 83 percent had been built with fire resistant siding materials and nearly all of them have fire resistant roofing materials (composition, metal, or tile). Approximately half of the homes observed had unenclosed balconies, porches, decks, or other architectural features that can create drafts and provide areas where sparks and embers can accumulate, smolder, ignite, and rapidly spreading fire to the home.

7.1.3 Defensible Space

Approximately one quarter of the homes have landscaping that meets the defensible space requirement to protect the home from damage or to minimize loss during a wildfire. The defensible space requirement is based on vegetation and slope as illustrated in Appendix E of this report.

7.1.4 Suppression Capabilities

Wildfire Protection Resources

The Six Mile Volunteer Fire Department is based out of Storey County Fire Station #3 in Six Mile. At the time of inquiry, the Six Mile Volunteer Fire Department reported seventeen volunteers on call (G. Hames, pers. comm.). Resource availability and mutual aid agreements with Storey County Fire Protection District are described in Section 4.1.1.

Water sources and Infrastructure

There are no fire hydrants or community water systems in Six Mile. Supplemental water for fire suppression is in Lyon County with a twenty-minute turnaround time.

Community Preparedness

The Storey County Fire Department has an informational web page in development (www.storeyfire.com) and offers periodic programs for the public to increase community fire awareness and fire safety. The fire department also carries out building safety inspections on a regular basis.

7.1.5 Factors Affecting Fire Behavior

Slopes in the area are mild, between zero and ten percent. The interface slopes with south or southeast aspects contribute to more rapid drying and increased flammability of fuels. Reported wildland fire history shows a 1982 burn that extended in an east- west band across the foothills west of the community including what is now Huckleberry Way, the north extension of Sam Clemens Avenue, and part of Willie Way. The predominant wind directions in the area are south or southwest, although winds could come from any direction given the open terrain. Light to medium density fuels in the interface area are mostly sagebrush with some rabbitbrush, two to three feet in height. Fuel loading was estimated to be less than one ton per acre and was considered a low fuel hazard.

7.1.6 Fire Behavior Worst-case Scenario

The worst-case wildfire scenario would be a fire that starts mid-afternoon during the summer months when winds from any direction could drive the fire into the community. Winds 25-35 mph could drive flame lengths of eight to ten feet into residences and other structures of the community. Heavy tourist traffic en route to and from Virginia City would exacerbate the worst-case wildfire scenario.

7.1.7 Ignition Risk Assessment

Reported ignitions in the Six Mile area are scarce, as shown in Figure 7-1, resulting in a low ignition risk rating for the community.

7.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS AND RESPONSIBILITIES

The risk and hazard reduction recommendations for Six Mile prioritize defensible space treatments within the community. Community coordination and public education are important recommendations that work in conjunction with each other to facilitate

implementation and long-term maintenance of defensible space and fire safety awareness. Roles and responsibilities are summarized in Table 7-1.

7.2.1 Defensible Space

Vegetation density, type of fuel, and slope gradient around a home affect the potential fire exposure levels to the home. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home, thereby lowering the potential to burn, and to provide firefighters a safer working area from which to defend the home or outbuilding during a wildland fire. Guidelines for improving defensible space around residences and structures in the community are given below and are described in detail in Appendix E.

Property Owner Responsibilities

- Remove, reduce, and replace vegetation to create defensible space around homes according to the guidelines in Appendix E. This area should be kept:

  Lean – There are only small amounts of flammable vegetation,

  Clean – There is no accumulation of dead vegetation or other flammable debris, and

  Green – Existing plants are healthy and green during the fire season.
- Shrubs should be thinned to a spacing equal to twice their height.
- Prune any remaining trees so that branches are at least fifteen feet away from buildings and chimneys. Prune and remove all dead and diseased branches from trees.
- Maintain a minimum clearance of thirty feet from the crown of trees to structures and other tree crowns that remain within the defensible space zone. Keep this area free of smaller trees, shrubs, and other ladder fuels.
- Clear weeds and brush at a width of ten feet along both sides of driveways.
- Mow, prune, or remove brush growing within ten feet of fences in the community.
- Clear all vegetation and combustible materials around propane tanks for a minimum distance of ten feet.
- Store firewood a minimum distance of thirty feet from structures.
- Maintain areas under wood decks and porches free of weeds and other flammable debris. Install screens around unenclosed overhangs where possible.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire hazard if left on site.
- If possible, irrigate all remaining trees and large shrubs in close proximity to structures to increase their fire resiliency. This is especially important during drought conditions.
- Maintain defensible space annually.

7.2.2 Community Coordination

Many of the most effective activities aimed at reducing the threat of wildfire for the Six Mile Community require that individual property owners coordinate with each other and with local fire authorities. Defensible space, for example, is more effective in small communities when applied uniformly throughout entire neighborhoods. Public education and awareness, neighbors helping neighbors, and proactive individuals setting examples for others to follow are just some of the approaches that will be necessary to meet the fire safe goals in the community.

Disposal of biomass generated from defensible space treatments can often be most efficiently handled through community programs.

Property Owner Responsibility

- Cooperate with the neighboring community of Mark Twain (Lyon County) to form a local chapter of the Nevada Fire Safe Council. The Nevada Fire Safe Council facilitates solutions to reduce the loss of lives and property from wildfire in Nevada's communities. Through the establishment of a local Chapter, local communities will become part of a large network for sharing information, including notification of programs and funding opportunities for fire mitigation projects such as those listed in this report. The Nevada Fire Safe Council will accept and manage grants and contracts on the Chapter's behalf through its non-profit status. The Nevada Fire Safe Council will provide assistance and support to communities to complete fire safe plans, set priorities, educate and train community members, and promote success stories of its members. To form a local Chapter or for more information contact the:

  Nevada Fire Safe Council
  1187 Charles Drive
  Reno, Nevada 89509
  (775) 322-2413.

- Assure that address signs are visible from the road. Address characters should be at least four inches high, reflective, and composed of non-flammable material. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate under smoky conditions during a wildland fire.

Storey County Commissioner Responsibilities

- Require all future development in the County meet the national fire codes with regard to community design aspects; building construction and spacing; road construction and design; water supply; and emergency access. Refer to Appendix F for an example of fire safe recommendations for planning new developments.

7.2.3 Public Education

Public education about fire safety is critical. A program that explains fire safe measures in clear and emphatic terms will have an impact on residents of the wildland-urban interface. Informed community members will be more inclined to make efforts in effectively reducing the wildfire hazards to their homes and neighborhoods.

Storey County Fire Department Responsibilities

- Distribute copies of the publication *"Living with Fire"* to all property owners. This publication is free of charge. Copies can be requested from the University of Nevada Cooperative Extension.
- Enforce or develop county laws, regulations, and ordinances that support implementation and maintenance of defensible space, and address fuel reduction responsibilities for absentee homeowners and vacant lots.
- Contact the University of Nevada Cooperative Extension and the BLM Carson City Field Office for assistance with public education.

7.3 SUMMARY OF RECOMMENDATIONS

Table 7-1. Six Mile Priority Recommendations to Reduce Wildfire Risks and Hazards

RESPONSIBLE PARTY	RECOMMENDED TREATMENT	RECOMMENDATION DESCRIPTION
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around structures according to the defensible space guidelines in Appendix E. Improve address visibility from roads.
	Community Coordination	Coordinate with the community of Mark Twain to form a joint local chapter of the Nevada Fire Safe Council. Participate in public education opportunities and become knowledgeable of emergency evacuation procedures. Organize community clean-up events to remove weeds and debris in town and facilitate timely disposal of cleared vegetative fuels. Expand the use of address and street signage where needed.
Storey County Fire Department	Public Education	Allow burning only under a permit process or on designated community burning days. Enforce or develop county laws, regulations, and ordinances for defensible space and fuel reduction that include responsibilities for absentee homeowners, vacant lots, and new subdivisions. Distribute copies of the publication "*Living with Fire*" to all property owners. Contact the Nevada Cooperative Extension and BLM for assistance with public education.
Storey County Commissioners	Community Coordination	Require all future development in the County meet the national fire codes with regard to community design aspects, building construction and spacing, road construction and design, water supply, and emergency access.

Table 7-2 Six Mile Wildfire Hazard Rating Summary

A. Urban Interface Condition ***2***

B. Community Design

1. Ingress / Egress	1	/5
2. Width of Road	3	/5
3. Accessibility	3	/3
4. Secondary Road	1	/5
5. Street Signs	1	/5
6. Address Signs	3	/5
7. Utilities	1	/5

C. Construction Materials

1. Roofs	1	/10
2. Siding	5	/5
3. Unenclosed Structures	5	/5

D. Defensible Space

1. Lot Size	3	/5
2. Defensible Space	1	/15

F. Fire Behavior

1. Fuels	3	/5
2. Fire Behavior	3	/10
3. Slope	4	/10
4. Aspect	10	/10

E. Suppression Capabilities

1. Water Source	5	/10
2. Department	5	/10

TALLIES

260 Total Houses **15 Residential Streets**

B5. Street Signs

1 not visible | 14 visible | 93% visible

B6. Address Signs

60 not visible | 200 visible | 77% visible

C1. Roofs

2 combust | 258 not combust | 99% not combust

C2. Siding

216 combust | 44 not combust | 17% not combust

C3. Unenclosed Structures on Lot

140 not enclosed | 120 enclosed | 54% not enclosed

D1. Lot Sizes

0 <1ac | 256 >1ac <10ac | 4 >10ac

D2. Defensible Space

60 not adequat | 200 adequate | 77% adequate

Score **58** /128

Legend

- Community Boundary
- Fire Station
- Fire Ignition
- Fire Boundary and Date
- County Boundary

Figure 7-1. Six Mile
Fire History and Suppression Resources

N
W E
S

0 500 1,000 2,000
Feet

Resource Concepts, Inc.
340 N. Minnesota St.
Carson City, NV 89703
(775)-883-1600

Nevada Community Wildfire Risk / Hazard Assessment Project

8.0 VIRGINIA CITY

8.1 RISK AND HAZARD ASSESSMENT

Virginia City is located at 6,000 feet in the Virginia Range, mid-slope, generally on east facing aspects. The risk assessment resulted in classifying Virginia City in the **High Hazard** category (75 points). A summary of the factors that contributed to the hazard rating for Virginia City are presented in Table 8-2. The principal factors that influenced this rating were construction materials and the difficult access for fire suppression apparatus, often due to steep, narrow roads and dead ends with no turn-around space. Existing heavy fuels and common downslope winds on the west side of town also contributed to the hazard score.

8.1.1 Community Design

The urban interface condition surrounding Virginia City is intermixed. Structures are scattered throughout the wildland area; there is no clear line of demarcation between wildland fuels, buildings, and open space throughout the community. On the west side of town, the line of demarcation is more clearly defined, approximating a classic interface condition. Nearly all of the 262 structures assessed are on parcels of less than one acre.

Roads: State Routes 341 and 342 provide the primary access routes for the community. These roads are at least 24 feet wide, paved, and have adequate turnaround space for fire suppression equipment. Twelve percent of the secondary roads have grades steeper than five percent, which makes access difficult for suppression vehicles, especially those loaded with water.

Signage: Street signs were present along all of the streets. Residential addresses were easily visible on roughly half of the houses.

Utilities: All of the utilities are above ground. Many areas beneath power lines were in need of vegetation clearing and thinning.

8.1.2 Construction Materials

Approximately 78 percent of the homes assessed were built with non-combustible siding materials; nearly all of the homes have fire resistant (composition, metal, tile) roofing materials. Sixty-five percent of the homes observed had unenclosed balconies, porches, decks, or other architectural features that can create drafts and provide areas where sparks and embers can accumulate, smolder, ignite, and rapidly spread fire to the home.

8.1.3 Defensible Space

The vegetative fuel loading in the Virginia City interface area is generally moderate. Fuels in the community consist primarily of sagebrush with inclusions of bitterbrush, rabbitbrush, desert peach, and cheatgrass. The terrain is steep with some slopes approaching eighty percent on the west side of town. Approximately thirty percent of the homes surveyed have landscaping that would meet the minimum requirement for defensible space to help protect the home from damage or minimize loss during a wildfire.

8.1.4 Suppression Capabilities

Wildfire Protection Resources

Storey County Fire Department Station #1 is located in Virginia City. At the time of inquiry, fire personnel included the fire chief, six career firefighters, seventeen volunteers, and the fire apparatus listed in Table 4-2 (G. Hames, pers. comm.). Resource availability and mutual aid agreements with the Storey County Fire Protection District are described in Section 4.1.1.

Water sources and Infrastructure

Virginia City has a variety of water resources:

- There are 500 gpm hydrants within 500 feet of the structures
- There are several water tanks totaling 3 million gallons. A new 2 million gallon tank will be installed in 2005 in Virginia City.

The community water system is operated by electric pumps and gravity flow. The pumps have an emergency electric generator for back up. The fire main flow is 3,000 gpm per hydrant. The water systems meet or exceed the current codes.

8.1.5 Factors Affecting Fire Behavior

The fire behavior potential in Virginia City is high on the west side of town. Continuous fuels in close proximity to structures and a fuel composition that includes a shrub layer with grass understory create the potential for high intensity surface fires. Slopes in the area reach eighty percent, with some south aspects that effectively preheat and dry vegetation during the day. Several past fires in the vicinity of Virginia City have destroyed and damaged buildings in the community. The location of Virginia City relative to the east facing slopes of Mt. Davidson, the Virginia Range, and Six Mile Canyon enhances its vulnerability to the predominant winds from the west that frequently blow downslope. Fuels in the area are mostly sagebrush, bitterbrush, desert peach, rabbitbrush, and cheatgrass. Fuels are moderately dense and shrubs are two to three feet in height. Fuel loading was estimated to be less than four tons per acre and was considered a high fuel hazard.

Fuels on the east side of town are discontinuous and interrupted by large expanses of mine tailings. Existing fuels in this area have been greatly reduced from past fires. A map of the fuel hazard condition for Virginia City is shown in Figure 8-2. Photographs of fuel conditions in the Virginia City interface area are included in Figure 8-3.

8.1.6 Fire Behavior Worst-Case Scenario

The worst-case wildfire scenario would be a fire that starts mid-afternoon during the summer months with dry lightning and a 25 to 35 mph wind. The possibility of lightning strikes in the area is high and afternoon downslope winds are common. A strike occurring in the drainage at the west end of Taylor Street, with west winds, would drive the fire east, causing a downslope fire that would rapidly spread into homes on the west side of town. High tourist volumes during the summer months are the cause for a serious evacuation concern. Gridlock from chaotic evacuation and poor visibility from smoke would exacerbate the problem and limit access by emergency vehicles, both local and those called in from automatic mutual aid and interagency dispatch.

The concern from a wildfire approaching on the east side of town burning upslope in Six Mile Canyon would be focused on firebrands. Burning embers blowing into town could ignite numerous spot fires around old wooden structures that could escalate into a catastrophic fire if not controlled and extinguished quickly by firefighters patrolling in town. The advancing fire burning upslope in Six Mile Canyon would be slowed when it reached mine tailings and low density fuels in previously burned areas. If the fire moved into Six Mile Canyon and burned upslope in a northwest direction it would miss the community of Virginia City. Fire and smoke under these circumstances would block two of the three evacuation routes out of town and limit emergency access to Virginia City.

8.1.7 Ignition Risk Assessment

Virginia City has a high ignition risk due to the high number of summertime visitors to the area. Human caused ignitions can come from a variety of sources. Fires can be started along highways and county roads by burning material thrown out of vehicle windows or as a result of auto accidents. The dirt roads and trails around Virginia City are commonly used by off-road vehicles. Based on ignition history data, the ignition risk from lightning strikes in the Virginia City area is low to moderate.

8.2 RISK AND HAZARD REDUCTION RECOMMENDATIONS AND RESPONSIBILITIES

The priority recommendations for Virginia City are for defensible space. Fuel reduction on the west side of town is designed to complete a continuous "fuelbreak" around the community in conjunction with existing mine tailings and old burns. Specific recommendations and responsibilities are summarized in Table 8-1.

8.2.1 Defensible Space

Defensible space treatments are an essential first line of defense for residential structures and are especially critical for those homes along the west side of Virginia City. The density and type of fuel around a home determines the potential fire exposure levels to the home. The goals of defensible space are to reduce the risk of property loss from wildfire by eliminating flammable vegetation near the home, thereby lowering the potential to burn and providing firefighters a safer working area from which to defend the home or outbuilding during a wildland fire. Guidelines for improving defensible space around residences and structures in the community are given below and in Appendix E.

Property Owner Responsibilities

- Remove, reduce, and replace vegetation to create defensible space around homes according to the guidelines in Appendix E. This area should be kept:

  Lean – There are only small amounts of flammable vegetation,

  Clean – There is no accumulation of dead vegetation or other flammable debris, and

  Green – Existing plants are healthy and green during the fire season.

- Clear weeds and brush to a width of ten feet along both sides of the driveways. Install turnouts and ensure space to turn around on long private driveways.

- Thin trees and shrubs to a spacing equal to twice their height.

- Prune remaining trees so that branches are at least fifteen feet away from buildings, especially near chimneys. Prune and remove all dead and diseased branches from trees. Remove pine needle duff from beneath remaining trees.
- If possible, irrigate all remaining trees and large shrubs in close proximity to structures to increase their fire resiliency. This is especially important during drought conditions.
- Maintain a minimum clearance distance of thirty feet from the crown of trees to structures and other tree crowns that remain within the defensible space zone. Keep this area free of smaller trees, shrubs, and other ladder fuels.
- Clear brush and weeds away from propane and oil tanks for a minimum distance of ten feet.
- Mow, prune, or remove brush growing within ten feet of fences in the community.
- Immediately dispose of cleared vegetation when implementing defensible space treatments. This material dries quickly and poses a fire hazard if left on site.
- Store firewood a minimum distance of thirty feet from structures.
- Maintain areas under wood decks and porches free of weeds and other flammable debris. Install screens around unenclosed overhangs where possible.
- Maintain this defensible space as needed.

8.2.2 Community Coordination

Many of the most effective activities aimed at reducing the threat of wildfire for the Virginia City Community require that individual property owners coordinate with each other and with local fire authorities. Effective defensible space, for example, is more effective in small communities when applied uniformly throughout entire neighborhoods. Public education and awareness, neighbors helping neighbors, and proactive individuals setting examples for others to follow are just some of the approaches that will be necessary to meet the fire safe goals in Virginia City. Disposal of biomass generated from defensible space treatments can sometimes be most efficiently handled through community programs.

Property Owner Responsibility

- Form a local chapter of the Nevada Fire Safe Council. The Nevada Fire Safe Council facilitates solutions to reduce the loss of lives and property from wildfire in Nevada's communities. Through the establishment of a local Chapter, local communities will become part of a large network for sharing information, including notification of programs and funding opportunities for fire mitigation projects such as those listed in this report. The Nevada Fire Safe Council will accept and manage grants and contracts on the Chapter's behalf through its non-profit status. The Nevada Fire Safe Council will provide assistance and support to communities to complete fire safe plans, set priorities, educate and train community members and promote success stories of its members. To form a local Chapter or for more information contact the: