Burned Area Emergency Response
Roads/Engineering Report

Erskine Fire

Sequoia National Forest
July 10, 2016

Prepared by: _____/s/ Marcos D Rios_____
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Erskine Fire (SQF) BAER Engineering Report

Resource Specialty: Engineering
Fire Name: Erskine (SQF) CA-CND-001415
Month and Year: July 2016
Author(s) Name and Home Unite: Marcos D. Rios, Transportation Engineer, Sequoia N.F.

I. Potential Values at Risk (identified prior to the on-the-ground survey)

A. Critical Values:

Life and Safety; Risk to road users on 28S24 and 28S24D.
Property; Damage to the invested road improvements, loss of road functions, and forest users' access to recreation opportunities.

B. Resource Condition Assessment

(a) Resource Setting:

National Forest Service System Roads (NFSR) within the burn perimeter are listed in INFRA database as Maintenance Levels (ML) 2 and 3 single lane with native surface. ML 2 roads are maintained for High Clearance Vehicles. ML 3 roads are maintained for Passenger Cars. Road designs are both in-slope and out-slope with road way ditch lines, rolling dips with associated led-off ditches. Most road segments are constructed with cross drains and culverts varying in size from 18" to 24" in diameter. Approximately 4.22 miles of NFSR were accessible and surveyed for the purposes of this report.

Table 1 Transportation System inside the Burned Perimeter

Maintenance Level	Definition	Miles
2	High Clearance Vehicles	3.92
3	Suitable for Passenger Cars	0.30
	TOTAL	**4.22**

(b) **Findings of the On-The-Ground Survey:** The Erskine Fire started June 23, 2016 and burned a total of 48,019 acres south of Lake Isabella Reservoir in the Piute Mountain area and the Kelso Creek drainage. The fire burned over Private, BLM, and National Forest Land. The fire progression was extreme due to strong winds and light, flashy fuels and moved east from the town of Lake Isabella to South Lake within a few hours of ignition, eventually reaching more than 35,000 acres in less than 24 hours. The soils burn severity map shows 48,019 Acres of which the Burn Severity consisted of (1%) of Acres in High, (43%) of Acres in Moderate, and (56%) of Acres in Low/Very Low.

The field survey was conducted over July 7 – July 9 (3 days) by the road engineer along with field coordination with the Hydrologist, Geologist, and Archeologist. Dominate Forest Service road within the fire perimeter;

28S24 Woolstaff Meadow: Provides access to Wooolstaff Meadow, private property, grazing allotments, hunting, disperse camping along the road, and varies OHV trails. This road is a single lane native surface inventoried as Maintenance Level 2. Most of the road segments have inside ditch, culverts ranging from 18" to 24" in diameter, rolling dips, over-side drains, and run-off ditches.

Other secondary roads were also surveyed in the burned area for the purposes of this report; these roads are in the moderate burn severity. Approximately 4.22 miles of Forest Service roads are proposed for treatments.

(c) Consequences of the fire on values at risk

- **Life and Safety (28S24 & 28S24D)**; As a result of the burned watershed, it has been determined through the BAER risk assessment process/matrix, that the risk to road users along the Woolstaff Meadow Road is considered High with major consequence due to the burned slopes above the road creating the potential for debris flows, and washouts during the first winter season or until the post burn watershed stabilizes.

- **Property (28S24 & 28S24D);** As a result of the burned watersheds, it has been determined through the BAER risk assessment process/matrix, that the risk to Forest Service Roads is considered High with moderate consequences. Damage to the invested road improvements, loss of road functions, and forest users' access to recreation opportunities. Downslope movement of fine ash, sediments and rock would affect the drainage features and function of the road system.

II. BAER Risk Assessment Refer to: Chapter 2520 - Watershed Protection and Management

Value (Life/Property/ Resources)	Value At Risk	Probability of Damage or Loss	Magnitude of Consequences	Risk	Types of Treatments
• Life and Safety; Injury to Humans by Use of Road During Storms.	Road • 28S24 • 28S24D	• Possible; Road Failure, Washouts, Gullies, Debris Flow.	Major	High	Install BAER Warning Signs Install Information Sign Install Closure and Information Sign Boulder Barriers
• Property; Road Investment.	Road • 28S24 • 28S24D	• Likely; Road Failure, Washouts, Ruts, Gullies, Debris Flow.	Moderate	High	Install Drainage Armor (Class 2) Install Critical Dip Remove and Salvage Culvert 18" Install Dip for Low Water Crossing Storm Patrol (pickup) Storm Damage Response (equipment crew) Storm Clean-Up (spring)

A. Summary:

a) Emergency Determination:

This assessment determines an emergency and high risk related to life-safety and property related to the Forest developed road system.

- **Life and Safety (28S24 & 28S24D) -** Risk to road users is determined to be high with major consequences on Forest Service Roads. Potential for debris flows, and washouts are considered to be possible the first winter due to the burned watershed on slopes above road segments on these roads. Based on Travel Management, these roads are open year round for wheel traffic and over snow vehicles. It is recommended to post BAER warning signs and information signs on the road to caution road users of potential debris flow and washouts in the area.

- **Property (28S24 & 28S24D) -** Risk to road improvements and loss of road functions is considered to be possible with major consequences on segments of these roads. Diversion of uncontrolled water from road drainage courses on to the road surface results in degradation and unacceptable erosion, gullies, loss of road functions, and denial of access to road users.

b) Treatments to Mitigate the Emergency:

- **Life and Safety (28S24 & 28S24D) -** Proposed BAER treatments to mitigate the emergency for these roads are; Install BAER warning signs (entering burned watershed beyond this point) at main entry points of road, install information sign, install rock barriers on road 28S24D to discourage traffic use, inspect road after damaging storms for debris flows and washouts, identify problem areas and respond as needed with personnel and equipment to insure road is safe to access.

- **Property (28S24 & 28S24D) -** Proposed BAER treatments to mitigate the emergency to invested road improvements, road functions, and assure access are; Installing drainage armor (riprap), critical dips, armor low water crossings, culvert removal on selected locations, and restore drainage functions on selected locations.

- **Cultural Resources:** It has been determined that the road related emergency and consequences described above, could have potential impacts on cultural resources adjacent to these roads. Thus, coordination with the district archeologist is recommended for mitigations to perform treatments. See Archeology report for further details.

- **It is recognized that BAER is NOT intended to correct past maintenance deficiencies. The changed conditions due to fire activity has created an urgency for correction and storm proofing of some of these drainage features on segments along the road.**

Accepted BAER road treatments along these road segments include:

- Install Information and BAER Warning Signs on (28S24).
- Install Road Closure and Information Signs on (28S24D).
- Boulder Barriers on (28S24D).

- ❖ Install Drainage Armor (class 2).
- ❖ Install Critical Dips.
- ❖ Remove and Salvage of Existing Culvert (selected locations).
- ❖ Install Low Water Crossing w/ Drainage Armor (class 2).
- ❖ Restore Drainage Functions (culvert inlets and outlets, roadway ditch lines rolling dips and water bars w/ run-off-ditch, maintain cross slopes of roads in-slope & out-slope).
- ❖ Storm Patrol (pickup).
- ❖ Storm Damage Response (equipment crew).
- ❖ Storm Cleanup (spring).

(a) Treatment Type – Accepted and economical BAER road treatments as described but not limited to chapter 4 BAER catalog.

(b) Treatment Objective – mitigate risks to life and safety and the invested Sequoia National Forest road improvements.

(c) Treatment Description – Install accepted and economical BAER road treatments as described above and outlined in chapter 4 of the BAER catalog.

(d) Treatment Cost – estimated treatment cost by road:

Miles Treated	
Road #	**Miles**
28S24	3.92
28S24D	0.30
TOTAL	**4.22**

- There are approximately 4.22 miles of FS Roads proposed for treatment.

(e) The proposed BAER road treatments are recommended for private contractors. The probability of completing treatment in first year prior to damaging storms or events is considered to be high and achievable.

(f) The proposed BAER road treatments will restore drainage features to full capacity. The probability of the proposed road treatments is considered to be at the 80 to 90 percent success rate depending on the 2016/17 winter storm cycle.

III. Discussion/Summary/Recommendations

- ❖ Implement BAER road treatments before the first damaging storm events of the season.
- ❖ Coordinate BAER warning signs, size, wording, and exact locations on the ground with the Forest Engineer or Road Engineer from the Sequoia National Forest.
- ❖ Install Closure and Information Signs on roads that are being recommended for closure.
- ❖ Identify and Fall Hazard trees in adjacent to working areas.
- ❖ Coordinate with CALTRANS and Kern County on potential impacts to the road system from post fire watershed conditions. Recommended treatments are; storm patrol and restore drainage features.

- ❖ Coordinate with private land owners on replacement of existing culvert. (See hydrology report for location).

IV. Contacts and References

- ❖ INFRA Travel Routes Inventory and Quad Maps.
- ❖ Federal Standards for the Construction of Roads and Bridges.
- ❖ Culvert Nomograph.
- ❖ BAER Catalog (chapter 4).
- ❖ BAER Team Meetings and Discussions.
- ❖ Al Watson, District Ranger, Sequoia National Forest, Kern River Ranger District.
- ❖ Steven Ray, Forest Engineer, Sequoia National Forest, Porterville Work Center.
- ❖ Steve Anderson, Lead READ, Sequoia National Forest, Kern River Ranger District.
- ❖ Bob Frenes, Assistant Recreation Officer, Sequoia National Forest, Kern River Ranger District.

V. Appendices

A. Roads Treatment Cost Estimate
B. Road Treatment Specifications
C. Road treatment map.
D. Power Point
E. BLM Road Assessment Summary