USDA-FOREST SERVICE FS-2500-8
(6/06)

Date of Report: 6/14/18

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated emergency stabilization funds
[] 2. Accomplishment Report
[] 3. No Treatment Recommendation

B. Type of Action

[X] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

[] 2. Interim Report # ____
[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: 377

B. Fire Number: AZ-ASF-000484

C. State: AZ

D. County: Navajo

E. Region: 3

F. Forest: Apache-Sitgreaves National Forests

G. District: Black Mesa

H. Fire Incident Job Code: P3LUE2 - 0301

I. Date Fire Started: 6-4-2018

J. Date Fire Contained: 6-15-2018

K. Suppression Cost: $1,260,000.00

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles): estimated to be 13 miles at 8 ft. wide
2. Fireline seeded (miles): TBD Approx. 25 acres of dozer line, primarily in arch sites, will be seeded.
3. Other (identify): NA

M. Watershed Number: 150200080104 Lower Phoenix Park Wash (508 acres or 11%), 150200100207 Lower Pierce Wash (1,539 acres or 34%), 150200080103 Scott Wash (1,295 acre or 28%), and 150200080102 Upper Phoenix Park Wash (1,222 acres or 27%)

N. Total Acres Burned: 4,564
NFS Acres (4,252) Other Federal ( ) State (312) Private ( )

*O. Vegetation Types: Cotton-Willow Riparian Forest (57 acres or 1%), Great Basin Grassland (2,878 acres or 68%), and Pinyon-Juniper Woodland (1,316 acres or 31%)

*P. Dominant Soils: Fluventic Haplustolls (203 acres or 5%), Lithic Calciustolls (574 acres or 13%), Lithic Haplustepts (754 acres or 18%), Typic Haplustalfs (2,178 acres or 51%), and Typic Haplustepts (543 acres or 13%)

*Q. Geologic Types: Limestone (936 acres), Sandstone (1,854 acres), and Old Alluvium (1,462 acres)

R. Miles of Stream Channels by Order or Class: Intermittent (9.6 miles) and Ephemeral (2.5 miles)

*S. Transportation System

Trails: 0.0 miles Roads: 15.3 miles

* = Values reported are for NFS lands only.

PART III - WATERSHED CONDITION

A. Burn Severity (acres & % of burned area): 819 or 18% (Unburned) 2,302 or 51% (Low) 1,022 or 22% (Moderate) 421 or 9% (High)

*B. Water-Repellent Soil (acres): 932

*C. Soil Erosion Hazard Rating (acres): 3,385 (Slight) 867 (Moderate) 0 (Severe)

*D. Erosion Potential (Moderate and High Burn Severity Areas): 2.0 tons/acre

*E. Sediment Potential (Moderate and High Burn Severity Areas): 4.7 cubic yards / square mile

* = Values reported are for NFS lands only.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 1-5 years

B. Design Chance of Success, (percent): 80

C. Equivalent Design Recurrence Interval, (years): 5

D. Design Storm Duration, (hours): 1

E. Design Storm Magnitude, (inches): 1.25

F. Design Flow, (cubic feet / second/ square mile): 49

G. Estimated Reduction in Infiltration, (percent): 10

H. Adjusted Design Flow, (cfs per square mile): 218

PART V - SUMMARY OF ANALYSIS

A. Describe Critical Values/Resources and Threats:

Critical Values identified (FSM 2523.1 Exhibit 01) during the BAER assessment are: Human life and safety, property, natural resources and cultural resources. The risk to those critical values was evaluated using the BAER Risk Assessment Matrix (FSM 23235.1 Exhibit 02):

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	**Very High**	**Very High**	**Low**
Likely	**Very High**	**High**	**Low**
Possible	**High**	**Intermediate**	**Low**
Unlikely	**Intermediate**	**Low**	**Very Low**

Risk to Human Life and Safety

There is decent access to maintenance level 2 roads off of AZ Highway 277 on the southern end of the fire perimeter and along AZ Highway 377 that falls within much of the fire's interior. FS Roads 9886W, 377B, 9887X, and a powerline road all intersect with at least one intermittent or emphemeral wash which are generally flashy in nature. FS Road 9886E runs along the western bank of Pierce Wash which already had stability issues pre-fire. While it is not expected that flows will increase too much from pre-fire conditions, there is typically the possibility of post-fire hazards (flooding, debris flows, etc.) when uplands adjacent to "flashy" systems burn moderate / high severity. Therefore, it is the assessment of the BAER team that the probability of damage or loss is possible and the magnitude of consequence is major which rates risk as High.

Risk to Property / Infrastructure

Roads:

FS Roads 9886W, 9886E, 9886D, 9887X, and 377B were the main roads assessed (and crossings if they intersected a wash) that occurred within the interior of the fire. Road crossing intersections downstream of the fire on FS Road 265 along Scott Wash and on FS Roads 265F and 265A in Pierce Wash were also investigated. The main road of concern is FS Road 9886E which runs immediately along Pierce Wash where moderate / high burn severity occurred on uplands adjacent to the road and wash. This road had stability issues pre-fire and it is possible this could be exacerbated by the burn conditions.

Per consultation with forest engineer, he expressed no concerns stemming from the burned conditions which would warrant emergency stabilization measures. A lot of the issues present on roads within the burned area are from pre-existing conditions in which regular maintenance could address in the future. Overall, for the roads assessed, the probability of damage or loss is possible and the magnitude of consequence is moderate which rates risk as Intermediate.

Property:

There is a private inholding within Pierce Wash adjacent to the Northwestern fire perimeter that will recieve runoff from the fire. The burn in this drainage basin (comprises of two subwatersheds) constitutes about 12%, and high severity comprising about 2% of the basin (Table 2). The fire is at the lower end of that basin. Several non-residential structures were observed on the alluvial terrace above the active, highly incised dry channel. These are situated some distance from the active channel and are unlikely to be affected by flooding. Therefore, the probability of damage or loss to property as a result of this fire is unlikely and the magnitude of consequence is low which rates risk as Very Low.

In addition, the probability of damage or loss to Forest Service property / infrastructure (e.g. roads, signs) as a result of this fire is unlikely and the magnitude of consequence is low which rates risk as Very Low.

Risk to Natural Resources

Soil Stability and Productivity

There is the probability that some increased level of soil erosion and sediment delivery can be expected in a few localized areas of moderate / high burn severity within the fire. Particularly within inherently flashy systems like Pierce, Scott, and Phoenix Park washes and their immediately adjacent uplands. High severity occurred on approximately 9 percent of the burned area and moderate burn severity accounted for about 22 percent.

Soil erosion modeling for locations that experienced moderate / high severity showed a combined increase in soil erosion from approximately 0.0 - 0.2 tons per acre pre-fire to roughly 2.0 – 5.1 tons per acre post-fire. Sedimentation showed a combined increase of approximately 0.0 – 0.1 tons per acre pre-fire to roughly 2.0 – 4.0 tons per acre post-fire in moderate / high severity locations. This may seem like a considerable increase, but when it is taken in the context of the overall extent of potential impacts across the entire burned area, implications for long-term soil stability / productivity are minimal.

Moderate severity, particularly in the pinyon-juniper and grassland vegetation types within this fire, generally only produces minor, short-term impacts to soil stability / productivity. Proper soil and vegetative function typically recovers to pre-fire conditions (or better) within a 2 to 3 year period. High severity fire can result in conditions that may impact long-term site stability / productivity for 5 years or more from exacerabated soil loss due to loss of vegetative canopy / ground cover and soil hydrophobicity in some cases, but the areal extent of these impacts across the fire is than 10 percent.

This fire does not have many locations where slopes exceed 40 percent with the majority of slopes in the 5 – 25 percent slope range. In addition, the slope lengths on gradients across the fire that are above 15 percent are relatively short. Generally speaking, the longer the slope length and steeper the gradient, the more potential for high erosion / sedimentation in moderate to high burn severity areas. So, the lack of these types of conditions across the fire as a whole is a positive for the outlook of potential soil erosion / sedimentation. In addition, more than ¾ of the soil types across the burned area have a “Slight” erosion hazard rating with the remaining soil types exhibiting a “Moderate” rating.

It was examined during soil burn severity validation fieldwork that while the vegetation burn intensity was moderate to high for over- and mid-story species in moderate burn severity locations, the were some positives identified when examining the impacts to ground cover and soils. Soils generally exhibited slight to moderate hydrophobicity, soil structural integrity and roots remained at least partially intact in most places, and vegetative ground cover was still present in some areas where existing vegetation basal area was not entirely consumed by the fire. There were even some locations of high severity that exhibited patchy mosaics of vegetation basal area still intact. Rock fragment content can be a component of effective ground cover for soils as well and the vast majority of area across the fire exhibit contents greater than 40 percent. This will add some needed stability for soils that burned high severity.

Overall, the probability of damage or loss to long-term soil stability / productivity is unlikely and the magnitude of consequence is moderate which rates risk as Low. Therefore, there are no soils related concerns associated with this fire that would warrant emergency stabilization measures for Soil Productivity as a BAER critical value.

Hydrologic Function

Burned areas occurred across portions of three sub-watersheds, namely Phoenix Park Wash, Pierce Wash and Scott Wash. Due to their large size, Phoenix Park Wash and Pierce Wash are subdivided into upper and lower portions. The table below shows the percent of area that burned in each sub-watershed by burn severity, including the aggregates of upper and lower Phoenix Park and upper and lower Pierce Wash. In any case, high and moderate burn severity occurred in less than 10% of the watershed areas.

Table 2. Fire severity by sub-watershed.

Sub-watershed	Sub-watershed Area (acres)	Burn Severity Area (acres)	% Sub-watershed
Lower Phoenix Park Wash	**31,031.6**	**507.9**	**1.64**
High		0.0	0.00
Moderate		1.4	<0.00
Low		274.0	0.88
Unburned - Very Low		232.5	0.75
Upper Phoenix Park Wash	**19,264.7**	**1,222.2**	**6.35**
High		10.8	0.06
Moderate		50.2	0.26
Low		804.6	4.18
Unburned - Very Low		356.6	1.85
Phoenix Park Wash[1]	**50,296.3**	**1,730.1**	**3.44**
High		10.8	0.02
Moderate		51.6	0.10
Low		1,078.6	2.14
Unburned - Very Low		589.1	1.17
Lower Pierce Wash	**12,479.3**	**1,539.0**	**12.3**
High		268.3	2.15
Moderate		572.6	4.59
Low		621.8	4.98
Unburned - Very Low		76.3	0.61
Upper Pierce Wash	**16,402.9**	**0**	**0**
Pierce Wash[2]	**28,882.2**	**1,539.0**	**5.33**
High		268.3	0.93
Moderate		572.6	1.98
Low		621.8	2.15
Unburned - Very Low		76.3	0.26
Scott Wash	**6,812.0**	**1,295.1**	**19.0**
High		142.1	2.09
Moderate		398.1	5.84
Low		601.1	8.82
Unburned - Very Low		153.8	2.26

1Aggregate of Upper and Lower Phoenix Park Wash

2Aggregate of Upper and Lower Pierce Wash

Our modeling results show an overall prediction of a 10% decrease in infiltration within these watersheds as a consequence of moderate and high burn severity areas. Therefore, we predict higher peak flows and that some minor soil loss may occur during high intensity, short duration rainfall events, such as are common during summer monsoonal events. However, we predict that vegetative recovery for these disturbed areas will be within 3 years, due to the natural regrowth of grasses and the proposed seeding. The regrowth of grasses are expected to improve infiltration, decrease runoff velocity, and increase soil stability. Climate predictions for this area are calling for average to above average precipitation for the immediate growing season (National Weather Service, 2018). Therefore, we expect a normal response in

vegetative regrowth, and associated recovery in the hydrological function of the watersheds. Additionally, we observed that Pierce Wash had a large, well defined stream channel, capable of handling intermittent and storm-driven flows. Therefore, we expect the drainage to be able to process the higher peak flows predicted during the post-fire recovery window.

Reference cited:
National Weather Service. 2018. Monthly and seasonal color outlook maps. Climate Prediction Center. Retrieved from http://www.cpc.ncep.noaa.gov/products/predictions//multi_season/13_seasonal_outlooks/color/churchill.php. Accessed [20 June 2018].

Threatened and Endangered Species

Per consultation with the district wildlife biologist, she identified that there is no critical habitat or suitable occupied habitat for federally-listed threatened or endangered terrestrial species on NFS lands within or in close proximity to the fire. Therefore, there are no concerns and an assessment of risk to this resource is not needed.

Aquatic Species Habitat

Per consultation with the district wildlife biologist, she identified that there is no critical habitat or suitable occupied habitat for federally-listed threatened or endangered aquatic species on NFS lands within or in close proximity to the fire. Therefore, there are no concerns and an assessment of risk to this resource is not needed.

Native Plant Communities

There are is a ~1.5 to 2 mile section of a tamarisk population that occurs upsteam of the burned area in Pierce Wash. Less than 0.01 acres of this population occurs within the burned area. As much of Pierce Wash within the burned area is ephemeral with some intermittent locations, the spread of tamarisk downstream is not very likely as it is well known tamarisk needs a good presence of water to exist and propogate. Due to the fact that essentially the entirety of the population is outside the burned area and upstream also makes spread unlikely. The probability of damage or loss to native plant communities is unlikely and the magnitude of consequence is minor which rates risk as Very Low.

Per consultation with the district wildlife biologist, it was identified that there are a few isolated cottonwood trees (both burned and unburned) and some false indigo bush within intermittent riparian areas along Pierce Wash that could be effected by sediment movement from post-fire run-off. However, the extent of these conditions is extremely small across the entire riparian area within the fire. Phoenix Park Wash had only a very small amount of its riparian area affected as well with the vast majority of burned conditions exhibiting low/unburned severity. The probably of damage or loss to riparian habitat is unlikely and the magnitude of consequence is moderate which rates risk as Low.

Risk to Cultural Resources

Wildfires impact cultural resources in numerous ways that are considered when assessing the Heritage values both during suppression efforts and afterwards. Fire can adversely affect archaeological sites by the following: 1) direct effects from the fire can destroy flammable materials or damage non-flammable materials due to intense heat (i.e. spalling on rock structures, degrading rock art); 2) ground disturbing suppression and rehabilitation activities can cause surface and subsurface damage to artifacts/features of a site (i.e. dozer line construction, motorized ground re-seeding); 3) effects caused by the fire can cause damage or destroy sites over a period of time that may occur after the fire has been suppressed (i.e. erosion due to lack of vegetation, damage from recreational use of ATV/UTVs due to lack of vegetation and loosened soils, looting/vandalism to sites due to lack of vegetation and high visibility of sites and artifacts).

These impacts stated above have the ability to completely destroy or damage cultural resource surface and subsurface contexts to the point where no further information stands to be gained from a scientific analysis

or interpretation. Destruction or damage to the these sites could also alter the context, historical, religious/sacred, or ceremonial significance of a site to the affiliated modern cultural groups who trace their history, culture, and religions through the use and preservation of these sites.

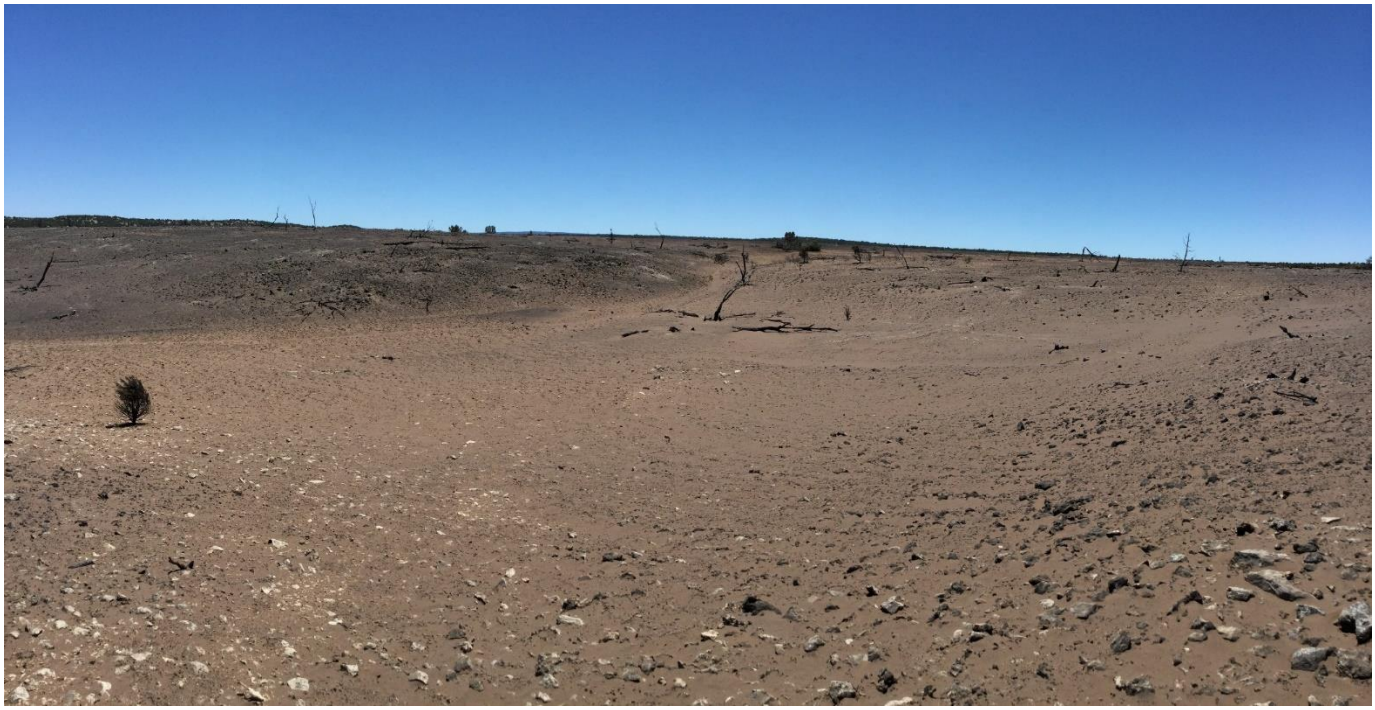

Figure 1. Photo of a site located at the head of a drainage. The site was originally recorded as being located on a gentle slope and wash in 2006. Vegetation community at the site at the time of recordation was Pinyon-Juniper woodland. Now, the soil is unstable and exposing artifacts and a new feature that were previously undocumented. Because of the nature and location of this site, it is threatened by OHV/ATV use and erosion if not treated and monitored.

Figure 2. Panoramic view of a high site density area where we are proposing to seed and monitor.

A total of 34 sites were found to be previously recorded within the fire area, excluding the sites adversely effected by the suppression activities (e.g. sites in the dozer line), that were burned to some extent. Work conducted by archaeologists for the BAER assessment of the sites concluded that adverse effects were caused to the sites and require treatment due to the following factors:

1. Site locations in areas of high burn severity where erosion factors from wind and water have the potential to continue to adversely affect the sites.
2. The overall lack of vegetation across the landscape will contribute not only to potential erosion but also cause adverse damage to the sites from recreational use of ATV/UTVs.
3. Sites located in the high to moderate burn areas are now highly visible to the public and now are high targets for looting; members of the public “pot hunting” have already been caught in

the fire perimeter and were escorted out by law enforcement.

RISK ASSESSMENT: Loss from wind and water erosion, recreational ATV/UTV use, and looting/vandalism are of a major concern.
PROBABILITY OF DAMAGE OR LOSS: Very likely
MAGNITDUE OF CONSEQUENCES: Major
RISK LEVEL: Very High

Critical Values Identified with Very High or High Risk

A. - Human Life and Safety - High
- Cultural Resources – Very High

B. Emergency Treatment Objectives:

The objective of the closure order is to reduce the risk to human life and safety, natural resources and cultural resources.

The recommendation for treatment to mitigate potential post-fire hazard (specifically flooding and debris flows) impacts to human life and safety is to prioritize warning signage locations that notify the public of such hazards. The priority is to locate post-fire hazard warning signage at entries to FS Roads off of AZ Highway 377 which enter the interior of the burned area AND/OR cross or run adjacent to washes either within the fire or immediately downstream.

The recommendation for treatment to mitigate potential resource degradation impacts to the many cultural resources identified within the burned area is to provide emergency stabilization in the form of seeding. This should help expedite the recovery and increase the vegetative canopy / ground cover amount on these sites to help stabilize as well as disguise them to discourage potential looting.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:

Land 90 % Channel N/A % Roads/Trails N/A % Protection/Safety 90 %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	75	90	-
Channel	N/A	N/A	N/A
Roads/Trails	N/A	N/A	N/A
Protection/Safety	90	90	90

E. Cost of No-Action (Including Loss): $99,962,288.5

Soil Loss Cost Estimate for Proposed Seeding Area Total of 82 Acres

Between the 11 proposed seeding treatment areas there is a total of 82 acres. Within that footprint, the pre-fire soil loss rate was approximately 0.2 tons per acre. Soil erosion modeling for the moderate and high burn severity locations within the total treatment area showed a combined increase of roughly 4.3 tons per acre post-fire. Therefore, it is anticipated that soil loss will increase by 4.1 tons per acre in the proposed treatment area if left untreated.

A quick Google search was performed to approximate the cost it would take to replace that amount of topsoil across the proposed treatment area. According to http://home.costhelper.com/soil.html, the range of total cost you can expect to pay in the U.S. for topsoil product and delivery is between $75 - $350 per five cubic yards. The median cost of this range is $212.50 per five cubic yards delivered for a cost of $42.50 per cubic yard of topsoil product / delivery cost. According to https://www.hunker.com/13406893/the-average-weight-of-a-cubic-yard-of-soil, one cubic yard of soil is equal to roughly 2,000 lbs. or 1 ton. Therefore, $42.50 is a rough estimate of the cost of one ton of topsoil product with delivery.

Since the increase in soil loss within the proposed treatment area is 4.1 tons per acre, $42.50 can be multiplied by this factor to produce the total cost per acre to replace the potential topsoil lost from pre-fire conditions within the proposed treatment area. When this value, $174.25, is multipied by the 82 total acres proposed for treatment, that puts the final total cost of potential topsoil lost if no treatment occurs at approximately $14,288.50.

Cultural Resource Loss Cost Estimate for Proposed Seeding Area Total of 82 Acres
Generally, it is very difficult to put a dollar value on cultural resource sites. Without treatment, we could end up losing the National Register characteristics of the sites, including the loss of integrity and loss of data through looting and erosion, which would make these sites ineligible for inclusion in the National Register of Historic Places. Cost of salvaging archaelogical sites that are damaged through natural or anthropogenic processes is typically estimated by the cost of data recovery, which is estimated by a dollar amount per cubic meter, plus administrative costs. If it is estimated that the sites have a cubic meter of depth, the 82 acres (33.31 hectares) would equal 333,135 cubic meters. If 10% of the total land mass at the sites were to be excavated, the number would equal 33,316 cubic meters. On average, the cost of a contracting firm to excavate one cubic meter is approximately $3,000.00. At $3,000.00 per cubic meter for 33,316 cubic meters, the estimated cost would be $99,948,000.00. This does not count administrative costs by the Forest Service to develop a data recovery plan and scope of work, consult with SHPO and tribes, or administer the contract.

F. Cost of Selected Alternative (Including Loss): $26,394.00

G. Skills Represented on Burned-Area Survey Team:

[**X**] Hydrology	[**X**] Soils	[**X**] Geology	[**X**] Range
[ ] Forestry	[**X**] Wildlife	[**X**] Fire Mgmt.	[**X**] Engineering
[ ] Contracting	[**X**] Ecology	[ ] Botany	[**X**] Archaeology
[ ] Fisheries	[ ] Research	[ ] Landscape Arch	[**X**] GIS

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H. **Treatment Narrative:**

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments: Prioritized, select cultural site locations should receive a certified, weed-free, low elevation native, perennial grass species mix consisting of sand dropseed (*Sporobolus cryptandrus*), sideoats grama (*Bouteloua curtipendula*), Galleta (*Hilaria* jamesii) and Sideoats grama (*Bouteloua curtipendula*) applied at a rate of 4 lbs/acre. This species mix and application rate has been used in the pinyon-juniper woodland and Colorado Plateau grassland vegetation types in the past (Potato Fire, Rodeo-Chediski Fire, etc.). This should occur on approximately 11 sites and comprises roughly 82 acres across the entire burned area. Due to the nature of this treatment recommendation being relatively specific to sites and small in extent, they will most likely be applied manually in a broadcast

fashion. No aerial seeding is being recommended for this treatment. The only cost to BAER funding would be seed product and time / salary for a crew to perform the work. A map of the seeding locations is attached to this document as Appendix A.

Wattles-Site stabilization: Four wattles total will be placed within two site locations were the need is greatest to prevent downhill erosion. The location of one has not been placed on the map and its location will be determined in the field once the seeding begins. See attached location map.

Channel Treatments: N/A

Road / Trail Treatments: N/A

Protection/Safety Treatments:

Forest closure order for the west side of the fire area below FR 377B / Despain Ranch Rd and north of Hwy 277. This area of the fire is where the high burn severity rates are mainly located and the highest density of the known sites are located. The closure order would provide the seeding and still intact vegetation an opportunity to regrow without disturbance, particular from recreational use of ATV/UTVs. Numerous user created trails and Forest roads exist within this area of the fire, with several passing through sites (see Figures 1-2). The closure and monitoring proposed by this mitigation strategy would help provide protection for the sites from further damage from recreation use, since the soils are extremely loose, as well as from looting. By closing off this area of the fire, looters/vandals who enter the area with the intent to damage and loot sites will be more noticeable and if not caught in the act of looting can be cited for violating the closure order.

Eight road locations across the fire will receive post-fire hazard warning signage. These are roads that enter the interior of the fire AND/OR cross a wash the occurs within the burned area or immediately downstream. The FR Roads to receive warning signage are as follows (a map of the locations is attached as Appendix B):

- FS Road 9886W that accesses the interior of the fire from Highway 377.
- FS Road 9886E at the intersection with 9886W within the burned area.
- FS Road 9886D which accesses the interior of the fire from the west side off of FS Road 488.
- The powerline road across from 9887X road.
- The 9887X road off of Highway 377.
- The 9887X road that enters the burned area on the east side just east of Phoenix Park Wash.
- The 377B road off of Highway 377 (Despain Ranch Rd.).
- The 265 road off of Highway 377. This entry has a location on 265 that crosses Scott Wash downstream of the fire and two spur roads (265A and 265F) which are crossed by Pierce Wash downstream of the fire.

The forest plans on using post-fire hazard warning signage already on the forest. There are enough to cover the amount of locations for warning signage being proposed for this fire. The work will be performed “in-house” with crews from our Engineering shop as the task should take no more than a day or two to complete. No BAER funding for this treatment is proposed.

Barricades- Seven barricads (see table and map)

I. **Monitoring Narrative:**

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.):

Monitoring is needed to evaluate the effectiveness of seeding the archaeological sites and the effectiveness of treatments used to disguise and protect sites through seeding and through patrolling.

A total of 14 sites within the High Burn Severity have been choosen to seed. Seeded and untreated cultural resource sites will be monitored for effectiveness of the seeding operations compared to natural regeneration at the untreated sites. Additionally, plots will be set up outside site boundaries in treated and untreated severely burned areas to assess the effectiveness of seeding versus natural regeneration of vegetation.

Proposed site monitoring could have a duration of three years, and a frequency of three times a year for the first year, two times a year for the second year, and once per year for the third year, during times when the area is most heavily used (typically in the spring, summer, and fall hunting season), unless there is a need to monitor the sites more frequently.

Part VI – Emergency Stabilization Treatments and Source of Funds **Interim # N/A**

			NFS Lands				Other Lands				All
		Unit	# of		Other		# of	Fed	# of	Non Fed	Total
Line Items	Units	Cost	Units	BAER$	$		units	$	Units	$	$
A. Land Treatments											
CR Hand seeding	acres	$ 161.46	82	$13,240	$0			$0		$0	$13,240
wattles	sites	725	2	$1,450	$0			$0		$0	$1,450
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Land Treatments				$14,690	$0			$0		$0	$14,690
B. Channel Treatments											
				$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Channel Treat.				$0	$0			$0		$0	$0
C. Road and Trails											
				$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Road & Trails				$0	$0			$0		$0	$0
D. Protection & Safety											
Site protection-barricades	each	850.29	7	$5,952	$0			$0		$0	$5,952
warning signs	each		8	$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Structures				$5,952	$0			$0		$0	$5,952
E. BAER Evaluation											
Assessment				$0	$0			$0		$0	$0
				$0	$0			$0		$0	$0
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Evaluation				$0	$0			$0		$0	$0
F. Monitoring											
Seeding effectiveness	year	1438	1	$1,438	$0			$0		$0	$1,438
Insert new items above this line!				$0	$0			$0		$0	$0
Subtotal Monitoring				$1,438	$0			$0		$0	$1,438
G. Totals				**$22,080**	**$0**			**$0**		**$0**	**$22,080**

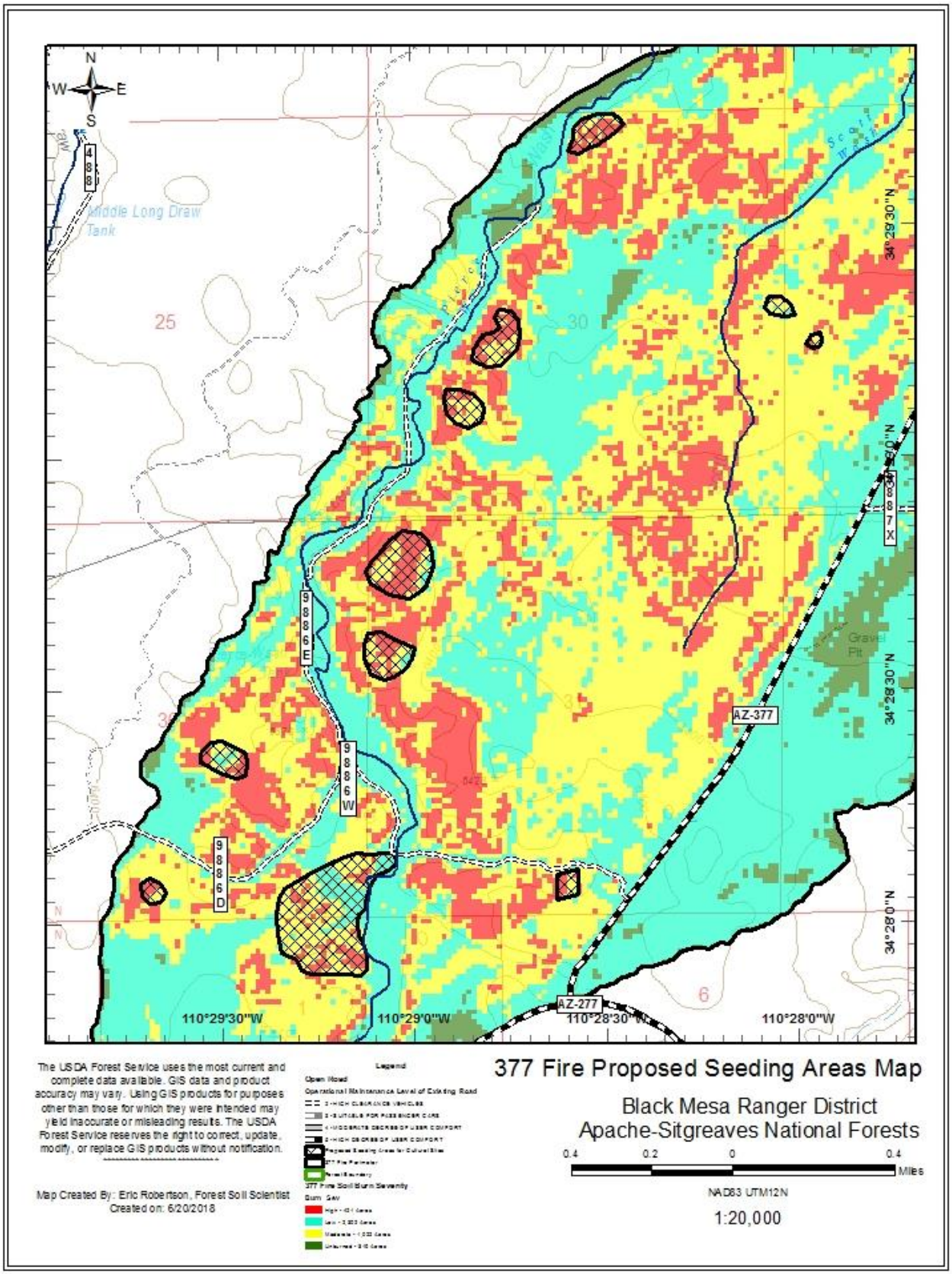
See also attached budget spreadsheets Appendix C.

PART VII - APPROVALS

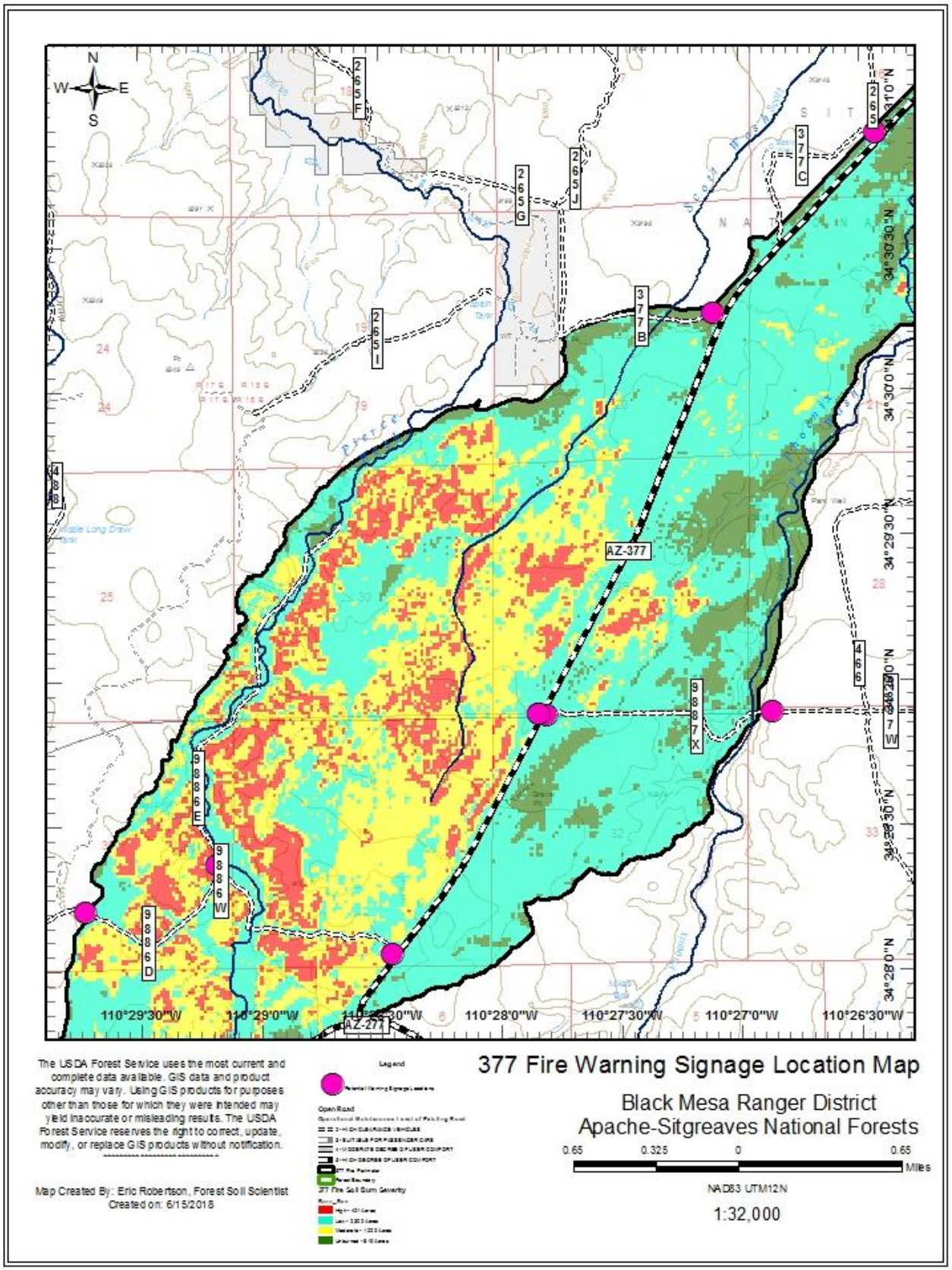
1. _____ _____
Forest Supervisor (signature) Date

2. _____ _____
Regional Forester (signature) Date

Appendix A. Proposed Seeding Areas for Cultural Site Stabilization and Protection



Appendix B. Potential Locations for Post-fire Hazard Warning Signs



Appendix C. Budget by Treatment

Seed Request:

Total Acres	Lbs. / acre	Totals lbs
80	15	1200

Seed Mix:	Cost per lb.	lbs / acre	Total lbs	Cost
Sideoats grama (Bouteloua curtipendula)	$6.50	4.5	360	$2,340.00
Galleta (Hilaria jamesii)	$19.00	4.5	360	$6,840.00
Western wheatgrass (Agropyron smithii)	$5.20	4.5	360	$1,872.00
Sand dropseed (Sporobolus cryptandrus)	$5.00	1.5	120	$600.00
Subtotal		**15**	**1200**	**$11,652.00**

Supplies	# of Items	Est. Rate
Hay wattles	5	$800.00
hand seeder	5	$250.00
Shipping		$400.00
Subtotal		**$1,450.00**

Personnel	Pay Scale	Hourly Base	12 Hrs
Archaeology Tech	GS-07	$19.89	$238.68
	GS-05	$16.06	$192.72
	GS-05	$16.06	$192.72
	GS-05	$16.06	$192.72
Archaeology Tech	GS-05	$16.06	$192.72
	GS-05	$16.06	$192.72
	GS-05	$16.06	$192.72
	GS-05	$16.06	$192.72
Subtotal			**$1,587.72**

OVERALL SEEDING COST:	**$14,689.72**

Closure Order / Monitoring Cost Sheet:

Personnel	Pay Scale	Hourly Base	40 Hrs	80 Hrs
	GS-11	$29.43	$1,177.20	$2,354.40
	GS-09	$24.33	$973.20	$1,946.40
	GS-07	$19.89	$795.60	$1,591.20
	GS-05	$16.06	$642.40	$1,284.80
Archaeology Tech	GS-07	$19.89	$795.60	$1,591.20
Archaeology Tech	GS-05	$16.06	$642.40	$1,284.80

Closing Roads	Task	Hours	Personnel	Base Rate
	Barricades/Signing	20	GS-11	$588.60
		20	GS-09	$486.60
		20	GS-07	$397.80
		20	GS-07	$397.80
		20	GS-07	$397.80
		20	GS-05	$321.20
		20	GS-05	$321.20
		20	GS-05	$321.20
		20	GS-05	$321.20
		20	GS-05	$321.20
		20	GS-05	$321.20
		20	GS-05	$321.20
Subtotal		**240**		**$4,517.00**

Supplies	Item Amount	Est. Rate
6' Type 3 Barricade w/ wood rails	5	$650.00
45" x 24" folding barricade	5	$475.00
Caution tape (3" x 200" roll)	2	$10.00
Shipping		$300.00
Subtotal		**$1,435.00**

Enforcemnt	Task	Hours	Personnel	Base Rate
	~~Patrolling~~	~~90~~	~~GS-07~~	~~$1,790.10~~
		~~90~~	~~GS-05~~	~~$1,445.40~~
FY 2018	Monitoring Sites	40	Arch Tech (07)	$795.60
		40	Arch Tech (05)	$642.40
FY 2019		20	Arch Tech (07)	$397.80
		20	Arch Tech (05)	$321.20
FY 2020		10	Arch Tech (07)	$198.90
		10	Arch Tech (05)	$160.60
Subtotal		**320**		**$5,752.00**

Total Closure / Monitorings Costs:	**$11,704.00**

TOTAL REQUEST: $26,394.00

Appendix D. Monitoring Plan

Closure Order/Monitoring for Heritage

It has been discussed with Black Mesa District Ranger to enact a temporary closure order for the west side of the fire area below FR 377B / Despain Ranch Rd and north of Hwy 277. This area of the fire is where the high burn severity rates are mainly located and the highest density of the known sites are located. The closure order would provide the seeding and still intact vegetation an opportunity to regrow without disturbance, particular from recreational use of ATV/UTVs. Numerous user created trails and Forest roads exist within this area of the fire, with several passing through sites (see Figures 1-2). The closure and monitoring proposed by this mitigation strategy would help provide protection for the sites from further damage from recreation use, since the soils are extremely loose, as well as from looting. By closing off this area of the fire, looters/vandals who enter the area with the intent to damage and loot sites will be more noticeable and if not caught in the act of looting can be cited for violating the closure order.

Figure 1: FR 9886E road bisecting a newly discovered site (rock alignment is a check dam feature).

Figure 2: Site with an ATV trail passing near a feature (feature has been looted fairly recently).

It is also proposed to monitor the conditions of the sites and the success of the grass growth over a period of three fiscal years to determine if the re-seeding was an effective mitigation tool. Natural regrowth in un-seeded areas within the fire area would also be monitored and compared with the seeded areas. This would provide reference as to whether or not the seeding is a viable choice for mitigating erosion for this particular landscape.

Monitoring would be conducted during FY 2018 by Black Mesa Heritage staff at three separate periods to determine the initial effectiveness of the seeding. For FY 2019, Heritage staff would monitor the sites twice during the year to continue assessing the growth of the grass. During the final fiscal year (FY 2020), one final monitoring of the sites would occur to determine the overall success of the grass seeding. Also, throughout the three years the assistant of the AZ Site Stewards group would be utilized to provide additional monitoring times throughout the year and would be done on a volunteer basis.

The funds requested for this portion would be to provide the wages for the personnel needed to enact the closure order along with the supplies need to block off the numerous roads in the area. Funds would also provide for the three year monitoring plan designed to monitor the success of the seeding.

Appendix E. Wattle and Barricade Locations: