



United States
Department of
Agriculture

Forest Service
Southwestern Region



Environmental Assessment

Resolution Copper Mining Pre-feasibility Activities Plan of Operations

Tonto National Forest
Globe Ranger District



APRIL 2009

ENVIRONMENTAL ASSESSMENT

**RESOLUTION PRE-FEASIBILITY ACTIVITIES
PLAN OF OPERATIONS**

APRIL 2009

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because of all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means of communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Printed on recycled paper

Digital copies are available for download from the Tonto National Forest website.

If printing a copy, please consider the environment and use recycled paper.

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS	v
1. Project Scope	1
1.1. Organization of the Environmental Assessment.....	1
1.2. Project Background and History	2
1.3. Purpose and Need for Action	4
1.4. Scope of the Federal Action.....	4
1.5. Decision Framework.....	12
1.6. Public Involvement	14
1.7. Issue Development.....	14
2. Comparison of Alternatives	19
2.1. Alternatives Considered in Detail in this EA.....	19
2.1.1. Alternative 1 – No Action.....	19
2.1.2. Alternative 2 – The Proposed Action.....	20
2.1.3. Alternative 3 – North OF-2 Exploration Drill Site	43
2.1.4. Alternative 4 – West Access Route 4a.....	46
2.1.5. Alternative 5 – West Access Route 4b.....	47
2.2. Alternatives Considered but Eliminated	48
2.3. Mitigation and Monitoring Measures	50
2.4. Comparison of Alternatives	54
3. Affected Environment and Environmental Consequences	71
3.1. Air Quality (Issue 1)	71
3.1.1. Affected Environment.....	71
3.1.2. Environmental Consequences: Direct and Indirect Effects.....	74
3.2. Erosion and Sedimentation (Issue 2)	79
3.2.1. Affected Environment.....	79
3.2.2. Environmental Consequences: Direct and Indirect Effects.....	80
3.3. Wildlife (Issue 3)	83
3.3.1. Affected Environment.....	83
3.3.2. Environmental Consequences: Direct and Indirect Effects.....	84
3.4. Arizona Hedgehog Cactus (Issue 4).....	86
3.4.1. Affected Environment.....	86
3.4.2. Environmental Consequences: Direct and Indirect Effects.....	87
3.5. Recreational Activities In and Around Oak Flat (Issue 5).....	89
3.5.1. Affected Environment.....	89

3.5.2. Environmental Consequences: Direct and Indirect Effects.....	94
3.6. Safety (Issue 6)	103
3.6.1. Affected Environment.....	103
3.6.2. Environmental Consequences: Direct and Indirect Effects.....	104
3.7. Conflicts the with Oak Flat Withdrawal Area (Issue 7).....	107
3.7.1. Affected Environment.....	107
3.7.2. Environmental Consequences: Direct and Indirect Effects.....	108
3.8. Travel Management (Issue 8)	110
3.8.1. Affected Environment.....	110
3.8.2. Environmental Consequences: Direct and Indirect Effects.....	110
3.9. Cultural Resources (Issue 9)	113
3.9.1. Affected Environment.....	113
3.9.2. Environmental Consequences: Direct and Indirect Effects.....	114
3.10. Native American Religious Practices (Issue 10).....	116
3.10.1. Affected Environment.....	116
3.10.2. Environmental Consequences: Direct and Indirect Effects.....	117
3.11. Cumulative Effects.....	119
3.11.1. Context: Past, Present, and Reasonably Foreseeable Future Actions	119
3.11.2. Air Quality (Issue 1)	127
3.11.3. Erosion and Sedimentation (Issue 2)	129
3.11.4. Wildlife (Issue 3)	130
3.11.5. Arizona Hedgehog Cactus (Issue 4).....	131
3.11.6. Recreational Activities In and Around Oak Flat (Issue 5).....	132
3.11.7. Safety (Issue 6)	134
3.11.8. Conflicts with Oak Flat Withdrawal Area (Issue 7).....	135
3.11.9. Travel Management (Issue 8)	136
3.11.10. Cultural Resources (Issue 9)	137
3.11.11. Native American Religious Practices (Issue 10).....	138
4. Consultation and Coordination	153
References.....	157
Glossary of Terms.....	161
Appendix A — Responses to Public Scoping Comments	A-1

LIST OF TABLES

Table 2-1	Estimated Disturbance Area for New Pre-feasibility Activities	21
Table 2-2	Pre-feasibility Activities Proposed Duration and Authorization Period	22
Table 2-3	Estimated Disturbance Area for New Exploration Drill Sites	23
Table 2-4	Estimated Disturbance Area for New Groundwater Testing and Monitoring Drill Sites.....	26
Table 2-5	Estimated Disturbance Area for New Tunnel Characterization Drill Sites	29
Table 2-6	Proposed Improvement to Existing Roads within National Forest System Lands	33
Table 2-7	Existing Roads within National Forest System Lands that do not Require Improvements but will Require Periodic Maintenance to Maintain Level 2 Maintenance Standard during Pre-feasibility Activities	36
Table 2-8	New Access Roads within Tonto National Forest	37
Table 2-9	Estimated Disturbance Area for Drill Sites Established as Part of the Previously Authorized Activities	38
Table 2-10	Proposed Drill Hole Abandonment Procedures	44
Table 2-11	RCM's Proposed Road Reclamation and Post Pre-feasibility Study Management Designation	45
Table 2-12	Comparison of Alternatives	55
Table 3-1	Annual Mean Daily Weather Conditions.....	71
Table 3-2	Natural and Current Background Visibility Data for Tonto National Monument Northeast of the Superstition Wilderness	73
Table 3-3	Drilling Rigs Operated by RCM for Exploration and Pre-feasibility Studies from 2001 through 2008	74
Table 3-4	Estimated Maximum Emissions for all Activities in Tons per Year	76
Table 3-5	Air Pollution Emissions Associated with West Access Routes 4a and 4b	77
Table 3-6	Total Miles Traveled during Maximum Predicted Vehicle Trips Per Day to Support Drilling Operations at Drill Sites M, OF-1, OF-3, and RES-13	78
Table 3-7	Approximate Acreage of New Disturbance within the Different Vegetation Communities found within the Pre-feasibility Activity Area	85
Table 3-8	Recreation Opportunity Spectrum, Tonto National Forest	91
Table 3-9	USDA Forest Service Visual Quality Objectives	92
Table 3-10	Predicted Sound Levels at Oak Flat and Dispersed Designated Campsites based on OF-1, North OF-2, OF-3, and Background Levels of 30, 35, and 40 dBA	97
Table 3-11	Predicted Sound Level at the Boulder Campsite as a Function of North OF-2 Drill Rig Orientation.....	102
Table 3-12	Past, Present, and Reasonably Foreseeable Future Activities.....	120

LIST OF FIGURES

Figure 1-1	Proposed Pre-feasibility Activities Location Map	17
Figure 2-1	Proposed Pre-feasibility Activities Overview.....	65
Figure 2-2	Conceptual Drill Site Layout	66
Figure 2-3	Schematic Diagram of Deep & Shallow Groundwater Testing and Monitoring Wells....	67
Figure 2-4	Original OF-2, OF-2, and North OF-2 Drill Site Locations	68
Figure 2-5	Alternative Access Route 4a and Drill Site Locations 4E and 4W	69
Figure 2-6	Alternative Access Route 4b and Drill Site Locations 4E and 4W.....	70

Figure 3-1	Eight-Hour Ozone Trends – Fourth Highest Concentration	141
Figure 3-2	One-Hour Ozone Trends – Maximum Concentration.....	142
Figure 3-3	Sound Level Contours Resulting from Noise Model of Alternative 1, the Proposed Action.....	143
Figure 3-4	Visual Assessment of OF-1, OF-2, OF-3 and North OF-2 from Designated Campsites at Oak Flat Campground	144
Figure 3-5	Visual Assessment of OF-1, OF-2, OF-3, and North OF-2 from Dispersed Campsites in the Oak Flat Withdrawal Area and at the Boulder Campsite.....	145
Figure 3-6	Visual Assessment of OF-1, OF-2, OF-3, and North OF-2 from Key Observation Points along the Oak Flat Withdrawal Area	146
Figure 3-7	Daily Traffic Generation as a Result of Pre-feasibility Activities using Proposed Action Routes	147
Figure 3-8	Sound Level Contours Resulting from Noise Model of Alternative 3 North OF-2.....	148
Figure 3-9	Schematic Layout of Drill Site D with Noise Measurement Results used to Evaluate Effects of Drill Orientation	149
Figure 3-10	Daily Traffic Generation as a Result of Pre-feasibility Activities Using Alternative Routes 4a or 4b	150
Figure 3-11	Past, Present, and Reasonably Foreseeable Future Actions for Cumulative Effects Analysis	151
Figure 3-12	Larger Geographic Context for Cumulative Effects, Particularly for Air Resources	152

ACRONYMS AND ABBREVIATIONS

ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AGFD	Arizona Game and Fish Department
AMA	Active Management Area
APS	Arizona Public Service
AZPDES	Arizona Pollutant Discharge Elimination System
BLM	Bureau of Land Management
BMPs	Best Management Practices
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act
dBA	A-weighted decibels
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
FONSI	Finding of No Significant Impact
Forest Plan	Tonto National Forest Land and Resource Management Plan
Forest Service	USDA Forest Service
FR	Forest Road
ID Team	Forest Service Interdisciplinary Team
IMPROVE	Interagency Monitoring of Protected Visual Environments
Legislative Land Exchange	Southeast Arizona Land Exchange and Conservation Act of 2009 (S 409)
MARRCO	Magma Arizona Railroad Company
MIS	Management Indicator Species
NAAQS	National Ambient Air Quality Standards

National Forest System Lands	Public Land Administered by the Forest Service
NEPA	National Environmental Policy Act
NMIDD	New Magma Irrigation and Drainage District
NOI	Notice of Intent
NO _x	Oxides of Nitrogen
NRHP	National Register of Historic Places
Oak Flat Withdrawal Area	Oak Flat Picnic and Campground Withdrawal Area
PAA	Pre-feasibility Activity Area
PLO	Public Land Order
Pre-feasibility Plan of Operations	Resolution Pre-feasibility Activities Plan of Operations
RCM	Resolution Copper Mining
ROS	Recreation Opportunity Spectrum
ROW	Right of Way
SO ₂	Sulfur Dioxide
SPCC	Spill Prevention, Control and Countermeasure
S.R. 177	State Route 177
SRP	Salt River Project
State lands	Land Owned and Administered by the Arizona State Land Department
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TNF	Tonto National Forest
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VQOs	Visual Quality Objectives
WQARF	Water Quality Assurance Revolving Fund
WRCC	Western Regional Climate Center
WWTP	Waste Water Treatment Plant

1. PROJECT SCOPE

This chapter introduces the proposed Federal action and provides background and general information regarding the project's history and location. Chapter 1 also reviews in detail the scope of this environmental review and the nature of the decision to be made by the Tonto National Forest (TNF), USDA Forest Service (Forest Service). At the end of this chapter we briefly review the public participation efforts and identify the key issues carried forward for analysis in this Environmental Assessment (EA).

1.1. Organization of the Environmental Assessment

In response to Resolution Copper Mining's (RCM) submittal of a plan of operations for prefeasibility activities, the Forest Service prepared this EA in compliance with the National Environmental Policy Act (NEPA). This EA discloses the direct, indirect and cumulative environmental impacts that would result from the proposed action and alternatives. The EA is presented in four chapters and contains an appendix.

- Chapter 1. Project Scope: Includes the history of the proposed project, the purpose and need for the project, and a summary of the results of public scoping and content analysis.
- Chapter 2. Comparison of Alternatives: Provides a detailed description of the proposed action and alternatives to the proposed action, including the no action alternative. This section concludes with mitigation and monitoring measures and a summary of the effects associated with each alternative.
- Chapter 3. Affected Environment and Environmental Consequences: Describes the affected environment and the environmental consequences of the no action, proposed action and other alternatives developed as part of our analysis of each of the key issues.
- Chapter 4. Consultation and Coordination: Provides a list of preparers and agencies consulted during the development of the EA.
- Appendix A: Responses to Public Scoping Comments: Provides specific responses to public scoping comments received during the public comment period and provides a response for each comment/concern identified in each letter, email, fax, or phone call received.

1.2. Project Background and History

Kennecott Exploration Company, RCM's predecessor in interest, first filed a plan of operations to pursue various exploration and pre-feasibility studies on the Globe Ranger District of the Tonto National Forests in February 2001. As the geologists, scientists and engineers involved in the pre-feasibility studies identified new targets for drilling and additional studies, the plan of operations was amended. Collectively this previous plan of operations, as amended, is referred to in this EA as the Previously Authorized Activities.

The Resolution Pre-feasibility Activities Plan of Operations (Pre-feasibility Plan of Operations; third submittal) with supplemental engineering and design information was submitted to the Forest Service in February 2008. In a letter dated June 3, 2008, the Forest Service concluded that RCM's Pre-feasibility Plan of Operations provided sufficient information to allow the Forest Service to initiate NEPA review.

**Terms Used in this
Environmental Assessment
Regarding the Oak Flat Area**

- Oak Flat: the area of rolling hills and basins that lies between Queen Creek Canyon and Apache Leap on the west and Devils Canyon on the east.
- Oak Flat Picnic and Campground Withdrawal Area (Oak Flat Withdrawal Area): the approximately 760 acres of land within Oak Flat that was withdrawn from all forms of appropriation in 1955 by Public Land Order (PLO) 1229 as modified in 1971 by PLO 5132. This area contains additional dispersed camping sites and recreational opportunities.
- Oak Flat Campground: the recreational area managed by Tonto National Forest that is comprised of 16 developed campsites and adjacent area that totals approximately 50 acres within the Oak Flat Withdrawal Area.

The Pre-feasibility Plan of Operations activities include:

- 1) Constructing five exploration drill sites that would impact approximately 1.14 acres and directional drilling on those sites;
- 2) Constructing eight drill sites to accommodate a total of three deep and six shallow groundwater testing and monitoring wells that would impact approximately 1.78 acres;
- 3) Constructing nine drill sites that would impact approximately 1.8 acres to accommodate a total of nine geotechnical characterization boreholes;
- 4) Continuing exploratory and monitoring activities at previously authorized drill sites that have impacted approximately 3.02 acres;
- 5) Completing necessary roadway improvements on approximately 16.97 miles of existing roads that would impact approximately 33.39 acres;
- 6) Construction of 0.33 mile of new roads that would impact 0.55 acre; and
- 7) Road maintenance for access to previously authorized drill sites and the new drill sites.

The proposed construction activities would occur on 38.66 acres and the Previously Authorized Activities have impacted 3.02 acres. Total impacts would be 41.68 acres of public land administered by the Forest Service (National Forest System Lands). Collectively, these activities described in the Pre-feasibility Plan of Operations are referred to in this EA as the Pre-feasibility Activities.

The Pre-feasibility Activities would be conducted in the western portion of the Pinal Mountains, east and south of the Town of Superior in Pinal and Gila counties. The Pre-feasibility Activities area includes the location of the proposed drill sites, previously authorized drill sites, existing roads that provide access to existing or proposed drill sites, and proposed new roads (Pre-feasibility Activity Area [PAA], Figure 1-1). The majority of the PAA would be located east of the escarpment known as Apache Leap to the steeper terrain between Devils and Rawhide Canyons. The northern and easternmost limit of the PAA is located near the town of Top of the World. An isolated western section of the PAA is located adjacent to the town of Superior where Cross Canyon intersects State Route 177 (S.R. 177). The southernmost portion of the PAA is located approximately 4 miles south of Superior. Pre-feasibility Activities would occur in these non-contiguous areas of National Forest System Lands in the following Townships, Ranges and Sections of the Gila and Salt River Baseline and Meridian:

Stages of a Mine Project

The mining process starts with the discovery of an ore body. To determine if the ore body can be technically and economically mined requires the implementation of a series of distinct stages of planning and development. The first step in this process is **exploration**. During exploration an ore body is determined to exist and preliminary estimates of the extent, location, and value of the ore body are made. This information is used by the mining company to initiate **pre-feasibility studies**. During pre-feasibility studies, the mining company determines the preliminary economics of the ore body, identifies potential risks, and establishes where further work and studies are required. This information is used to determine if additional financial investments are warranted. Once pre-feasibility investigations are completed, **feasibility studies** are initiated. Feasibility studies identify a conceptual project and develop costs for it. A feasibility study determines with a greater degree of certainty whether the project is viable and identifies with more precision than was available during the pre-feasibility study phase, the technical, and financial risks associated with project development. At this point the mining company makes a final determination whether or not to proceed with mine development. The detailed studies completed during this stage of mine planning include determination of the economically recoverable portion of the ore deposit, detailed metallurgical studies to determine ore recoverability, engineering design, determination of process and infrastructure costs and finance and equity requirements. If the feasibility study determines that the ore body is worth recovering, mine development can begin once all appropriate environmental permits are obtained. Various types of environmental permits may be needed at any project stage, for example NEPA compliance to authorize pre-feasibility investigations of Federal land. However, **environmental permitting** for construction of a new mine should begin once sufficient information is gathered during planning to define the mine plan with some certainty. This would typically occur near the end of the pre-feasibility study phase of a mine project and extend well into the feasibility phase of mine planning.

- Township 1 South, Range 13 East in portions of Sections 11, 13, 21 through 24, 26 through 29; and 32 through 35;
- Township 1 South, Range 14 East in portions of Sections 5, 7, and 8;
- Township 2 South, Range 12 East in portions of Sections 1, 2, 3, and 25; and
- Township 2 South, Range 13 East in portions of Sections 6, 7, 19, 20, and 30.

1.3. Purpose and Need for Action

The purpose of the Pre-feasibility Plan of Operations is to gather and evaluate geologic, geotechnical, and hydrologic data to support pre-feasibility studies being conducted by RCM for their planned development of a deep copper ore deposit. RCM is entitled to conduct operations that are reasonably incident to exploration and development of mineral deposits on its unpatented mining claims pursuant to U.S. Mining Laws. Under regulations of the U.S. Secretary of Agriculture, RCM must conduct mining operations in accordance with the requirements found at 36 Code of Federal Regulations (CFR) Part 228A, and in accordance with a plan of operations that has been approved by the Forest Service. The need for the proposed Federal action is a requirement that the Forest Service respond to a proposed plan of operations to conduct mining operations on National Forest System Lands pursuant to U.S. Mining Laws.

Under 36 CFR Part 228.5, the Forest Service must determine whether to approve the Pre-feasibility Plan of Operations submitted by RCM as it is proposed, or to require changes or additions deemed necessary to meet the requirements of the regulations for environmental protection. The purpose of the proposed action and the evaluation of alternatives to the proposed action are to determine if changes or additions to the Pre-feasibility Plan of Operations are required to meet the requirements of the regulations for environmental protection set forth in 36 CFR Part 228.8.

1.4. Scope of the Federal Action

The Council of Environmental Quality's (CEQ's) NEPA regulations (40 CFR Part 1500) were followed in developing the scope of review. These regulations provide specific guidance for the scope of a NEPA review which is defined as the range of actions, alternatives, and impacts to be considered in an environmental analysis (CEQ Guidance at 1508.25). In determining the scope, three types of alternatives, three types of impacts, and three types of actions, were considered. As described more below, the scope of analysis was fully considered and defined in response to the application by RCM and the decision to be made by the Forest Service.

Three types of alternatives were considered in this EA: the no action alternative, the proposed action, and alternatives to the proposed action. NEPA requires consideration of a no action alternative and it is considered in this EA in accordance with those requirements and Forest Service policy. Under the no action alternative, no Pre-feasibility Activities would be authorized on National Forest System Lands. RCM would initiate reclamation and closure requirements for existing drill sites and user-created roads in accordance with the requirements of their previously authorized plan of operations. However, the statutory right of RCM to explore and develop mineral resources on Federally administered lands is recognized in the General Mining Law of 1872 and is consistent with the Tonto National Forest Land and Resource Management Plan (Forest Plan) of 1985. Section 1.5 provides additional discussion regarding

the framework of the decision to be made by the Forest Service. The evaluation of the no action alternative provides a baseline from which the other alternatives can be compared.

This EA considers the proposed action, identifies the range of alternatives considered but eliminated from detailed analysis in this EA, and evaluates alternatives to the proposed action that directly respond to public comments provided during scoping. This EA identifies mitigation and monitoring measures that were developed to minimize potential adverse impacts of the Pre-feasibility Activities. This EA also considers three types of impacts: direct, indirect, and cumulative, in the evaluation of issues identified during public and agency scoping for each of the alternatives considered in detail.

Three types of actions: connected, cumulative, and similar actions (40 CFR Part 1508.25[a]), were also considered in the development of the scope of analysis. Connected actions are defined by CEQ as closely related actions that “(i) Automatically trigger other actions which may require environmental impact statements, (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously, (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.” CEQ also requires that cumulative actions, when viewed with other proposed actions¹, should be discussed in the same environmental analysis if they would have cumulatively significant impacts. Similar actions are those reasonably foreseeable or proposed agency actions which have similarities, such as timing or geography, which provide a basis for evaluating their environmental consequences together in the same environmental analysis.

No agency actions were identified that fit the definition of similar actions or cumulative actions in developing the scope of analysis for this EA. In regard to the question of connected actions, other activities related to the development of the mine that are ongoing, proposed, or being considered by RCM to determine if they meet the CEQ definition of a connected action have been evaluated. The activities considered, all of which are associated with RCM’s ultimate goal of developing a new underground copper mine, are:

- 1) RCM’s pursuit of a legislative land exchange to acquire Oak Flat Picnic and Campground Withdrawal area (Oak Flat Withdrawal Area) and National Forest System Lands.
- 2) RCM’s dewatering of the No. 9 Shaft and RCM’s development of new shaft on private lands at the Superior East Plant Site for mine planning studies.
- 3) Issuance of a special use permit (MES749) by the Forest Service to RCM to place a water pipeline within the Magma Arizona Railroad Company (MARRCO) right-of-way to transport water collected from the No. 9 Shaft. The water is currently treated at an existing water treatment facility on RCM private property and transported to an irrigation canal operated by the New Magma Irrigation and Drainage District (NMIDD) near Florence, Arizona.

¹ Proposed actions in the context of cumulative actions are considered proposed Federal actions or proposed activities over which an agency has discretionary authority and are subject to NEPA review.

- 4) Construction of exploration and groundwater testing and monitoring well drill sites on private lands and land owned and administered by the Arizona State Land Department (State lands) and improvements to Forest Service roads for access.
- 5) Construction of exploration and groundwater testing and monitoring well drill sites on National Forest System Lands and improvements to roads on State or private lands.
- 6) Development of RCM's deep copper ore body.

Each of these activities is reviewed in the following paragraphs in the context of the CEQ regulation regarding connected actions.

(1) Legislative Land Exchange. RCM has been pursuing a legislative land exchange to acquire National Forest System Lands adjacent to their existing private holdings. In exchange they have offered private lands located throughout Arizona that RCM has identified as having important environmental values. The Southeast Arizona Land Exchange and Conservation Act of 2009 (S.409) (the Legislative Land Exchange) is not a Forest Service action subject to review and decision by the Forest Service and at this time its passage is speculative. Analysis of this action as a connected action to the Pre-feasibility Activities follows:

(i) Do the Legislative Land Exchange or Pre-feasibility Activities automatically trigger the implementation of the other? The Pre-feasibility Activities do not automatically trigger the Legislative Land Exchange. The results of the investigations planned on National Forest System Lands have no bearing on the deliberations and considerations in Congress. Similarly, the Legislative Land Exchange does not cause or prompt the initiation of the pre-feasibility studies. RCM continues to make capital investments in various pre-feasibility studies regardless of the limited activity by Congress on the Legislative Land Exchange over the past several years.

(ii) Do the Legislative Land Exchange and the Pre-feasibility Activities have to proceed in a specific order or simultaneously with one another? The Pre-feasibility Activities can proceed with or without Congressional action on the Legislative Land Exchange, and similarly, the Legislative Land Exchange does not require RCM to proceed with the Pre-feasibility Activities. Completion of the Pre-feasibility Activities will provide information for future mine planning activities and may strengthen RCM's resolve to secure title to the selected Federal lands. However, the information obtained during these studies is not required for Congress to proceed with its approval or denial of the Legislative Land Exchange.

(iii) Are the Pre-feasibility Activities dependent on the Legislative Land Exchange? The Pre-feasibility Activities do not depend on the Legislative Land Exchange to justify their implementation. Similarly, the investment in these studies and the data collected should not justify Congress taking any particular action with regard to the Legislative Land Exchange. The Pre-feasibility Activities do not preclude future consideration of alternative land exchange configurations by Congress should they not authorize the current proposal or even the consideration of an administrative land exchange by the Forest Service if

proposed by RCM at some future time. The Legislative Land Exchange and the Pre-feasibility Activities do not create a but for situation where implementation of one action would not occur but for the other.

The Legislative Land Exchange before Congress is not considered a connected action in the context of this environmental assessment of the Pre-feasibility Activities.

(2) No. 9 Shaft Dewatering and Development of a New Shaft. The No. 9 Shaft was constructed on private lands in the early to mid-1970s as part of ongoing mining operations by the Magma Copper Company. When mining operations and dewatering activities ceased in the early 1990s, the underground workings began to fill with water. RCM has commenced dewatering operations at the No. 9 Shaft and construction of a new shaft nearby. The new shaft and the renovation of the No. 9 Shaft are being completed to conduct deep underground testing and exploration activities of the targeted copper ore body. Analysis of this action as a connected action to the Pre-feasibility Activities follows:

(i) Do construction of the new shaft and the dewatering of the No. 9 Shaft automatically trigger the Pre-feasibility Activities or do the Pre-feasibility Activities automatically trigger new shaft construction and dewatering of the No. 9 Shaft? Construction of the new shaft and completion of the dewatering of the No. 9 Shaft are not caused by, nor is their initiation prompted by, the Pre-feasibility Activities. Similarly, the implementation of the Pre-feasibility Activities is not prompted by development of a new deep shaft and implementation of No. 9 Shaft dewatering. Even if the Forest Service were able to select the no action alternative outlined in this EA, it would have no bearing on the outcome, approach, or scope of shaft dewatering and development activities on RCM properties.

(ii) Do the new shaft construction/No. 9 Shaft dewatering and the Pre-feasibility Activities have to proceed in a specific order or simultaneously with one another? These actions are physically, temporally, and logistically independent. One does not have to happen before or simultaneously with the others to enable or allow it to proceed. Should RCM stop its dewatering activities or construction of the new shaft for business or other reasons, the Pre-feasibility Activities could continue without change.

(iii) Are the Pre-feasibility Activities dependent on the new shaft construction and No. 9 Shaft dewatering activities? The Pre-feasibility Activities and the new shaft construction and dewatering of the No. 9 Shaft all provide information necessary to evaluate the feasibility of mine development. The data collected from each endeavor add to the body of knowledge available to RCM to make informed decisions regarding the viability of future mine development. These actions are related in that they each provide data that will inform mine planning activities, but they are not interdependent parts of a larger activity. That is, they do not rely on nor are they dependent on each other for their justification. From either perspective, the shaft dewatering and development activities on private lands and the Pre-feasibility Activities on public lands do not create a “but for” situation where implementation of one action would not occur but for implementation of the other.

The No. 9 Shaft dewatering and the construction of a new shaft nearby on private lands are not considered a connected action in the context of this environmental assessment of the Pre-feasibility Activities.

(3) MARRCO Pipeline. The construction and operation of the MARRCO pipeline conveys treated water from the No. 9 Shaft to NMIDD for irrigation use. In response to RCM's submitted request for a special use permit application, the Forest Service recently evaluated information provided by RCM regarding the construction of this pipeline within the MARRCO right of way and the dewatering of the No. 9 Shaft. It was determined that the dewatering of the No. 9 Shaft would not adversely affect forest resources. The Forest Service recently granted a special use permit for the construction and operation of the MAARCO pipeline (MES749). The analysis of this action as a connected action to the Pre-feasibility Activities follows:

(i) Does construction of the MARRCO Pipeline automatically trigger the Pre-feasibility Activities or do the Pre-feasibility Activities automatically trigger construction of the MARRCO Pipeline? The MARRCO pipeline does not prompt or cause implementation of the Pre-feasibility Activities. The MARRCO Pipeline provides an alternative means of disposing of treated water pumped from the No. 9 Shaft. It is not physically connected to the Pre-feasibility Activities. The Pre-feasibility Activities do not automatically trigger the implementation of the MARRCO Pipeline project and if the Pre-feasibility Activities were not initiated the configuration or implementation of the MARRCO Pipeline project would not be affected.

(ii) Do the MARRCO Pipeline and the Pre-feasibility Activities have to proceed in a specific order or simultaneously with one another? These two actions are physically, temporally, and logistically independent of each other. The Pre-feasibility Activities and the MARRCO pipeline project do not have to occur simultaneously nor does one have to be completed before the other to justify or enable the implementation of the other.

(iii) Are the Pre-feasibility Activities dependent on construction of the MARRCO Pipeline? The Pre-feasibility Activities are not an interdependent part of the MARRCO Pipeline project and do not depend upon the construction of the pipeline for justification. Conversely, the MARRCO Pipeline is not an interdependent part of the Pre-feasibility Activities and it is not dependent upon the Pre-feasibility Activities to justify its construction and operation. That is, these actions do not rely on nor are they dependent upon each other. The construction of the MARRCO Pipeline and the implementation of the Pre-feasibility Activities do not create a "but for" situation where implementation of one action would not occur but for implementation of the other.

The MARRCO pipeline project is not considered a connected action in the context of this EA.

(4) Construction of Exploration and Groundwater Testing and Monitoring Well Sites on Private and State Lands Requiring Improvements of Forest Roads for Access. A number of exploration drill

sites and groundwater testing and monitoring wells have been constructed or will be constructed on State lands located south of U.S. Highway 60 and east of S.R. 177. Examples of these sites follow.

RES-13 is an existing exploration drill site located on State land south of the Oak Flat Withdrawal Area. RES-13 is accessed through the Oak Flat Campground and other portions of the Oak Flat Withdrawal Area on Forest Road (FR 2438). Ongoing maintenance of FR 2438, user-created roads, and FR 3153 within the Oak Flat Withdrawal area are proposed as part of the Pre-Feasibility Activities.

Drill site H-H, proposed for construction on State land, will be used for construction of a shallow groundwater testing and monitoring well. Drill site H-H would be accessed from FR 2466 and the extension of FR 2466 south onto State lands. Improvements to FR 2466 are included in the Pre-feasibility Activities.

Several existing and proposed drill sites are located along the extension of FR 315 on State lands. Ongoing maintenance of FR 315 from Magma Mine Road south to provide access to some of these drill sites and construction of improvements of FR 315 on National Forest System Lands from S.R. 177 north to State lands is part of the proposed Pre-feasibility Activities. (Improvements to FR 315 from S.R. 177 would also facilitate access to drill site H-C located on National Forest System Lands.)

A drill site that is located on a small private in-holding south of the Site. Improvements were made to a user-created road from the Magma Mine Road to this parcel. Ongoing maintenance of this road would be conducted to provide access to this drill site and the private parcel of land as part of the Pre-feasibility Activities.

Analysis of drill sites on State or private lands that are accessed using roads that cross National Forest System Lands as a connected action to the Pre-feasibility Activities follows:

(i) Does the construction of drill sites on State or private lands automatically trigger construction of road improvements on National Forest System Lands? While the access routes outlined in the Pre-feasibility Activities to access drill sites on State and private lands may be most cost effective for mobilizing equipment and personnel at a particular site, other options exist to access these remote locations. For example, RCM has indicated in its Resolution Pre-feasibility Activities Plan of Operations that, should it not be able to secure access across private lands for its PVT-7 drill site located on National Forest System Lands, it will use helicopters to transport drilling equipment and workers to the site. The converse can also be reasonably assumed for the construction of drill sites on State or private lands: should Forest Service not authorize road improvements on National Forest System Lands that will be used to access drill sites on State or private lands, those sites could be accessed via helicopter or a combination of helicopter and four-wheel drive vehicles on the existing road system.

(ii) Does the construction of a drill sites on private or State land and road improvements on National Forest Lands to gain access to those drill sites have to proceed in a specific order or simultaneously with one another? The two actions as described are physically connected and it is expected that they would

occur in a specific sequence where road construction or repair would occur before construction of a drill site and subsequent drilling activities. There is a physical, temporal, and logistical relationship between the road improvements on lands owned and managed by one entity and the construction of drill sites on lands owned and managed by another. While this practical relationship exists, it does not rise to the level of dependence on a specific order for construction because of the availability of other means of gaining access to a drill site for construction and drilling operations.

(iii) Do the drill sites on State and private lands dependent on construction of the Pre-feasibility Activities, including the road improvements on National Forest System Lands proposed to access these drill sites? The proposed Pre-feasibility Activities, specifically the construction of road improvements and drill sites on National Forest System Lands, are not an interdependent part of the drilling programs being conducted on State and private lands and the drilling programs being conducted on State and private lands do not depend upon the drilling programs on National Forest Lands to justify their existence. Certainly, the data collected from all of the drill sites will be considered as a whole, however the data collected from the State and private lands also contributes independently to the overall understanding of the physical resources of the region. The data collected from drill sites on State and private lands still has value even if data were not available from the drill sites located on National Forest System Lands. The construction of drill sites on State and private lands are part of a larger suite of pre-feasibility studies but they are not dependent upon the other studies for their justification. The construction of drill sites on State or private lands and the implementation of the Pre-feasibility Activities on National Forest System Lands do not create a “but for” situation where implementation of one action would not occur but for implementation of the other.

The drill site development on State and private lands and the Pre-feasibility Activities, including road improvements on National Forest System Lands that will be used to access these drill sites, are not considered connected actions in the context of this EA.

(5) Construction of Exploration and Groundwater Testing and Monitoring Well Drill Sites on National Forest System Lands that require Improvements of Roads on State or Private Lands.

Examples of drill sites that will be constructed on National Forest System Lands but will be accessed by improved roads on State or private lands follows.

Drill site H-I is located on National Forest System Lands and will be accessed by vehicle from drill site H-H on an existing State land road. This road, which will be improved to facilitate access to H-I, becomes FR 2469 as it crosses onto National Forest System Lands going north. Improvements to H-I and FR 2469 within National Forest System Lands are part of the proposed Pre-feasibility Activities.

Drill sites QC-04 and MB-03 are located on National Forest System Lands and are accessed by FR 2440. Improvements of FR 2440 and the re-construction of QC-04 and MB-03 are part of the proposed Pre-feasibility Activities. FR-2440 crosses private lands and the segment of FR 2440 that crosses private lands will require improvement as well.

Drill site H-E would be accessed from FR 315. Improvements and maintenance of FR 315 is part of the Previously Authorized Activities included in the proposed Pre-feasibility Activities. After FR 315 enters State land, a short segment of user-created road on State lands will be improved before this existing user-created road re-enters National Forest System Lands. The continuation of improvements to this user-created road on National Forest System Lands is part of the proposed Pre-feasibility Activities.

South Access Alternatives 4a and 4b, which are action alternatives that were developed to provide an alternative access route to drill sites OF-1, OF-3, and M on National Forest System Lands and will cross a short segment of State land west of RES-13.

PVT-7, which will be accessed by helicopter unless agreement is reached with nearby private land owners. If agreement is reached, PVT-7 would be accessed either through the Pinal Ranch or the JI Ranch.

APV-8, which will be accessed from FR 898. Access to FR 898 from U.S. Highway 60 crosses private land and improvements to this road on private lands will be made to allow the drilling equipment to access FR 898 on National Forest System Lands.

Analysis of improvements and use of roads on State and private lands to access drill sites on National Forest System Lands as a connected action to the Pre-feasibility Activities follows:

(i) Does construction of drill sites on National Forest Lands that use or will use access roads on State or privately held land automatically trigger the required road improvements on State or private lands? No. For example, RCM has already indicated in its Pre-feasibility Plan of Operations that if it cannot secure access across private lands for its PVT-7 drill site located on National Forest System Lands, it will use helicopters or helicopters plus small four wheel drive vehicles on existing roads within National Forest System Lands to transport drilling equipment and workers to the site.

(ii) Do the construction of a drill sites on National Forest System Lands and road improvements on State or private lands to access those drill sites have to proceed in a specific order or simultaneously with one another? The two actions as described are physically connected and it is expected that they would occur in a specific sequence where road construction or repair would occur before construction of a drill site and subsequent drilling activities. There is a physical, temporal, and logistical relationship between the contemplated road improvements on lands owned and managed by one entity and the construction of drill sites on lands owned and managed by another. While this practical relationship exists, it does not depend on a specific order or simultaneous execution for construction because of the availability of other means of gaining access to a drill site for construction and drilling operations.

(iii) Do the Pre-feasibility Activities proposed on National Forest System Lands depend on construction of road improvements or drill sites on State or private lands? The proposed Pre-feasibility Activities, specifically the construction of drill sites on National Forest System Lands, are not an interdependent part of the drilling programs being conducted on State and private lands. Conversely, the drilling programs

being conducted on State and private lands do not depend upon the drilling programs on National Forest System Lands to justify their existence. Certainly, the data collected from all of the drill sites will be considered as a whole; however the data collected from the National Forest System Lands proposed in the Resolution Pre-feasibility Activities Plan of Operations contributes independently to the overall understanding of the physical resources of the region. The data collected from drill sites on National Forest System Lands still has value, even if data were not available from the drill sites located on State and private lands. The construction of drill sites on National Forest System Lands for exploration, groundwater testing and monitoring, and tunnel characterization work are part of a larger suite of pre-feasibility studies, but they are not dependent upon those other studies for their justification. The construction of drill sites as part of the proposed Pre-feasibility Activities and the construction of drill sites for pre-feasibility studies on State or private lands do not create a “but for” situation where implementation of one action would not occur but for implementation of the other.

The Pre-feasibility Activities and drill site development on State and private lands, including road improvements on State and private lands that will be used to access some Pre-feasibility Activity drill sites, are not considered connected actions in the context of this EA.

(6) Development of the Deep Copper Ore Body. RCM has stated publicly on numerous occasions that its ultimate intention is to pursue required permits and permissions to mine the deep copper ore body that underlies both its privately held lands and National Forest System Lands. To date, there has been no formal proposal submitted to the Forest Service for development of this ore body on National Forest System Lands or to use National Forest System Lands to support development of this ore body. There are a series of planning stages that must proceed in the logical progression prior to the initiation of mine development. Among them is the determination that mining the ore body is technically and economically feasible. The implementation of the proposed exploration and pre-feasibility studies is required to collect data necessary to support RCM’s analysis of the mine’s feasibility. Mine development is not automatically triggered by the Pre-feasibility Activities. In fact, the opposite could occur, and RCM, in this case, could determine that mine development is not technically or economically feasible. RCM has clearly made a business decision to proceed with pre-feasibility studies, including the Pre-feasibility Activities, based upon current knowledge of the deep copper ore body and the technical and logistical constraints associated with its development. While further analysis of mine development will require completion of the Pre-feasibility Activities, the implementation of the Pre-feasibility Activities does not depend upon the mine. The Pre-feasibility Activities are a calculated, risk-based business decision by RCM and it is not certain that mining the deep copper ore body will be technically or economically viable.

1.5. Decision Framework

The Tonto National Forest Supervisor is the deciding officer with regard to the Pre-feasibility Plan of Operations. Based on the analysis in this EA, the Forest Supervisor would first determine if an

Environmental Impact Statement (EIS) is required. If an EIS is not required, the Forest Supervisor's final decision notice would be a finding of no significant impact (FONSI). The Forest Supervisor will also determine if approval of the Pre-feasibility Plan of Operation would be consistent with the Forest Plan, or if an amendment to the Forest Plan is required.

A FONSI is appropriate if the agency's decision is not likely to *significantly* affect the environment (40 CFR Part 1508.27). In gauging significance, the agency must consider both *context* and *intensity*. *Context* recognizes that significance varies depending on whether impacts are local, regional, global, or affect a particular subset of the population. *Intensity* refers to the severity of the impacts, and must consider: beneficial as well as adverse impacts; whether impacts are highly unknown or risky, are highly controversial, or whether the action will establish a precedent; the effect on public health and safety, and whether the action violates Federal, State, or local law protecting the environment; effects on unique geographical areas such as historic or cultural resources, areas or objects listed on the National Register of Historic Places (NRHP), parks, prime farmlands, wetlands, wild and scenic rivers, or places of highly scientific value; effects on threatened or endangered species; and whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Given the purpose and need for Federal action, the Forest Supervisor will review the proposed Pre-feasibility Activities Plan of Operations, alternatives, and environmental consequence to make the following decisions:

- 1) Approve the project as proposed; or
- 2) Notify RCM of changes or additions to the Pre-feasibility Plan of Operations necessary to minimize or eliminate adverse environmental impacts from mineral development activities on National Forest System Lands, as required by Forest Service regulations (36 CFR Part 228A); and
- 3) Determine the appropriate type and amount of financial assurance to cover costs of reclamation.

The Forest Supervisor's decision on the proposed action would be appealable. RCM may appeal the decision pursuant to 36 CFR Part 215 or 251. Other parties may appeal the decision pursuant to 36 CFR Part 215.

Following issuance of a FONSI and decision notice and resolution of any appeal, RCM must revise the Pre-feasibility Plan of Operations to conform to the decision notice. The revised Pre-feasibility Plan of Operations must be resubmitted to the Forest Service along with a reclamation bond or other acceptable form of financial assurance. The financial assurance instrument provided to the Forest Service will ensure that the National Forest System Lands involved with the Pre-feasibility Activities are reclaimed in accordance with the decision notice, the revised Pre-feasibility Plan of Operation, and Forest Service reclamation requirements (36 CFR Parts 228.8 and 228.13). Once the Forest Service determines that the revised Pre-feasibility Plan of Operations has been changed to conform to the decision notice and that the financial assurance instrument is acceptable, it will notify RCM that the Pre-feasibility Plan of Operations is approved.

1.6. Public Involvement

The Pre-feasibility Plan of Operations was listed in the Forest Service Schedule of Proposed Actions on June 11, 2008. A Notice of Intent (NOI) to prepare an EA and invitation to attend a public open house was published on June 11, 2008, in five area newspapers: *Scottsdale Tribune*, *East Valley Tribune*, *Arizona Silver Belt*, *Copper Basin News*, and the *Superior Sun*. A general scoping letter was sent to 135 individuals and organizations on June 9, 2008. Scoping letters were sent to 18 officials at 10 Native American tribes. The scoping information was also posted on the Forest Service website. The NOI and scoping letters provided information about RCM's Pre-feasibility Plan of Operations, described how interested members of the public could obtain more information and provide comment, and announced the open house hosted by the Forest Service. The open house was held on June 25, 2008, at the Junior/Senior High School in Superior, Arizona, to provide an opportunity for the public to learn more about the Pre-feasibility Activities and to provide comment. The public scoping period for this action closed on July 18, 2008.

Public comments received during the open house or submitted during the public scoping period by email, fax, surface mail or private mail service, are collectively referred to here as Comment Letters. Thirty-one Comment Letters were received. The Forest Service Interdisciplinary Team (ID Team) discussed and analyzed the individual comments or concerns expressed within each Comment Letter to identify the key issues that would be addressed in this EA. A response to each comment/concern identified in the Comment Letters submitted during public scoping is provided in Appendix A.

1.7. Issue Development

Using the comments from the public, the Tribes, and other agencies and organizations, the ID Team developed a list of issues to address in the environmental analysis. CEQ regulations specify that only significant or key issues be analyzed. Therefore, the ID Team placed each issue into one of two groups: key issues and non-significant issues. Issues were considered non-significant if they were:

- Beyond the scope of the proposed action.
- Irrelevant to the decision to be made.
- Already decided by law, regulation, or policy.
- Conjectural in nature or not supported by scientific evidence.

Key issues were then used to formulate alternatives to the proposed action, prescribe mitigation and monitoring measures, and to guide the analysis of environmental effects of the proposed action and alternatives.

Ten key issues were identified during scoping and this analysis. They include:

Issue 1: Air Quality. Road and drill site maintenance, construction, and drilling activities may cause an undue increase in particulate matter, regional haze, and ozone.

Issue 2: Erosion and Sedimentation. Pre-feasibility Activities, specifically the improvement, construction, and maintenance of roads and drill sites, drilling, and testing and monitoring activities, may increase erosion and sediment runoff from the PAA and unduly affect surface water quality.

Issue 3: Wildlife. Pre-feasibility Activities may cause undue impacts to wildlife within or in the vicinity of the PAA.

Issue 4: Arizona Hedgehog Cactus. Road widening, construction of new roads, or construction of new drill sites may impact Arizona hedgehog cactus and/or its habitat in the PAA.²

Issue 5: Recreational Activities In and Around Oak Flat (Issue 8). Implementation of the Pre-feasibility Activities may adversely impact the recreational user's experience within the Oak Flat Withdrawal Area and adjacent dispersed recreational areas. Adverse impacts may include restriction of access, an increase in traffic and noise, and degradation of visual resources.

Issue 6: Safety. The conflicts between recreational users and drilling and construction crews responsible for implementation of the Pre-feasibility Activities may increase risks of traffic accidents on National Forest System Lands, particularly in the vicinity of Oak Flat Campground.

Issue 7: Conflicts with Oak Flat Withdrawal Area. The use of directional drilling may allow RCM to drill under the Oak Flat Withdrawal Area in violation of the public land order that removed this area from appropriation under U.S. Mining Laws.

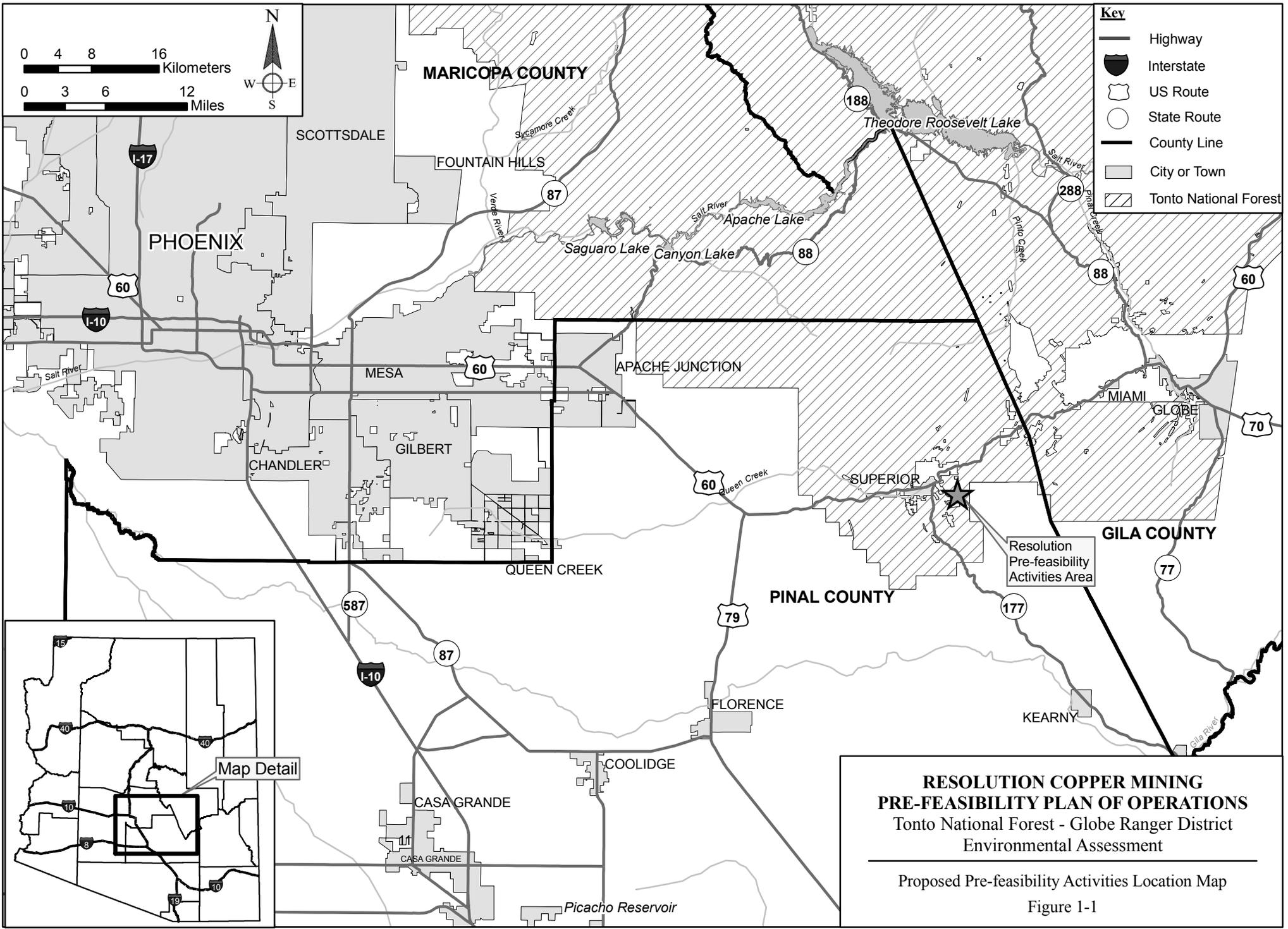
Issue 8: Travel Management. The road system utilized by RCM during Pre-feasibility Activity operations and reclamation and closure proposed in the Pre-feasibility Plan of Operations may not conform to Forest Service's Travel Management goals that may become established as part of the Forest Service's current planning efforts.

Issue 9: Cultural Resources. The Pre-feasibility Activities may have an undue impact on prehistoric, historic, and other cultural resources within or in the vicinity of the PAA.

Issue 10: Native American Religious Practices. The Pre-feasibility Activities may have an undue impact on Native Americans' free exercise of religion at sites identified as sacred within or in the vicinity of the PAA.

² The Forest Service has determined that the proposed action may affect but is not likely to adversely affect Arizona hedgehog cactus. Informal consultation in accordance with the requirements of Section 7 of the Endangered Species Act with the United States Fish and Wildlife Service has been initiated by the Forest Service.

The affected environment and the direct, indirect, and cumulative effects of the no action, proposed action and other alternatives developed as part of our analysis of each of these key issues are summarized in Chapter 2 and described in greater detail in Chapter 3.



Key

- Highway
- Interstate
- US Route
- State Route
- County Line
- City or Town
- Tonto National Forest



**RESOLUTION COPPER MINING
 PRE-FEASIBILITY PLAN OF OPERATIONS**
 Tonto National Forest - Globe Ranger District
 Environmental Assessment

Proposed Pre-feasibility Activities Location Map
 Figure 1-1

Page intentionally left blank

2. COMPARISON OF ALTERNATIVES

This chapter describes and compares the alternatives considered for the Pre-feasibility Plan of Operations. It defines the differences between the alternatives and provides the basis for evaluation of the alternatives. Section 2.1 describes the no action, the proposed action, and other alternatives considered in detail. Section 2.2 describes the alternatives considered but eliminated from detailed analysis during the preparation of this EA. Section 2.3 describes various mitigation and monitoring measures developed by the Forest Service during the course of our environmental analysis and review. Section 2.4 provides a concise comparison of the effects of the alternatives considered in detail.

Two sets of alternatives are identified. The first set of alternatives, including the no action alternative and the proposed action alternative, are considered detailed in this EA. This set includes the no action alternative, the proposed action alternative and three alternatives for specific components or elements of the proposed Pre-feasibility Activities that have been identified by the ID Team in response to specific scoping comments. The second set of alternatives are those alternative pre-feasibility elements that were identified during our analysis, but for administrative, environmental, or technical reasons have been eliminated from further analysis.

2.1. Alternatives Considered in Detail in this EA

2.1.1. Alternative 1 – No Action

NEPA requires consideration of a no action alternative. However, under Forest Service mining regulations at 36 CFR Part 228, Subpart A, this option can only be considered for comparison purposes in processing a plan of operations and cannot be selected by the Forest Service. Section 1.5 provides additional discussion regarding the Forest Service's decision framework.

Under the no action alternative, none of the Pre-feasibility Activities would be authorized on public lands administered by the Forest Service (National Forest System Lands). RCM would initiate reclamation and closure requirements for existing drill sites and user-created roads in accordance with the requirements of their previously authorized exploration and monitoring activities.

RCM would continue with their pre-feasibility studies on private and State lands. The Forest Service is required to provide reasonable access under U.S. Mining Laws. Drilling activities at RES-13 are expected to continue and access through the Oak Flat Withdrawal Area is considered the most reasonable existing

means of access. Activities at the Superior East Plant Site such as the dewatering of the Number 9 Shaft and the Sinking of the Number 10 Shaft would continue and RCM would continue to use Magma Mine Road to access this site

2.1.2. Alternative 2 – The Proposed Action

This alternative consists of those activities proposed by RCM in the Pre-feasibility Plan of Operations submitted in February 2008. Based on questions provided during public scoping, the Forest Service requested that clarifications of certain aspects of the Pre-feasibility Plan of Operations be provided by RCM. These clarifications have been included in the description of the proposed action.

The proposed action is described here in four subsections. First we present a general description of the Pre-feasibility Activities with a description of each element. The following section presents RCM's proposed water resource management activities, including the source and quantity of water required to implement various Pre-feasibility Activities. Proposed environmental protection measures identified by RCM in their Pre-feasibility Plan of Operations are presented then followed by proposed reclamation and closure measures.

Pre-Feasibility Activities

The Pre-feasibility Plan of Operations activities include:

- 1) Constructing five exploration drill sites that would impact approximately 1.14 acres and directional drilling on those sites;
- 2) Constructing eight drill sites to accommodate a total of three deep and six shallow groundwater testing and monitoring wells that would impact approximately 1.78 acres;
- 3) Constructing nine drill sites that would impact approximately 1.8 acres to accommodate a total of nine geotechnical characterization boreholes;
- 4) Continuing exploratory and monitoring activities at previously authorized drill sites that have impacted approximately 3.02 acres;
- 5) Completing necessary roadway improvements on approximately 16.97 miles of existing roads that would impact approximately 33.39 acres;
- 6) Construction of 0.33 mile of new roads that would impact 0.55 acre; and
- 7) Road maintenance for access to previously authorized drill sites and the new drill sites.

The proposed construction activities would occur on 38.66 acres and the Previously Authorized Activities have impacted 3.02 acres. Total impacts would be 41.68 acres of National Forest System Lands. Collectively, these activities described in the Pre-feasibility Plan of Operations are referred to in this EA as the Pre-feasibility Activities.

Each of the exploration and groundwater testing and monitoring drill sites would have an approximate 80-foot by 100-foot work area for the placement of drill pads and associated equipment, mud pits, temporary storage structures, and portable toilets (Figure 2-2). The actual dimensions of each site and the anticipated surface disturbance from construction of each site may be as much as 0.12 acre more than the minimum area requirement because of topographic and site constraints. The tunnel characterization drill sites will have a 60-foot by 100-foot work area. The requirements for cut and fill slopes to create a flat working area at these sites would result in up to 0.16 acre increase in disturbance foot print beyond the required footprint for the working area. The approximate area of impact identified for each of the sites is based on 2007 aerial photographs and 10-foot contour intervals (provided in Appendix D of the Pre-feasibility Plan of Operations). Roadway improvements would be necessary to gain access to many of the proposed drill sites. Table 2-1 provides a summary of surface disturbance for the proposed new Pre-feasibility Activities. Table 2-2 describes the expected occupancy period and authorization period for each of the Pre-feasibility Activities.

Table 2-1. Estimated Disturbance Area for New Pre-feasibility Activities

Pre-feasibility Activity Type	Disturbance Area (acres)
New Drill Site Disturbance	4.72
Existing Access Road Improvements	33.39
New Access Road Construction	0.55
Total Disturbance Area	38.66

The following sections provide general descriptions of the exploration drilling activities, the groundwater testing and monitoring well construction and testing and monitoring activities, the tunnel characterization drilling activities, and each of the drill sites associated with these Pre-feasibility Activities.

Exploration Drilling

A total of five exploration drill sites (QC-04, MB-03, OF-1, OF-2, and OF-3) are proposed as part of the Pre-feasibility Activities. Three of the drill sites, QC-04, MB-03, and OF-2, would be placed on previously disturbed National Forest System Lands. Each of these sites would be drilled for the purpose of mineral exploration. At exploration drill sites OF-1, OF-2, and OF-3, up to four trunk holes, or pre-collar holes, would be drilled to a depth of approximately 3,000 feet using the rotary drilling technique. Multiple core holes would then be drilled from each trunk hole to approximately 7,000 feet using diamond drilling. No directional drilling would be conducted under the Oak Flat Withdrawal Area. Exploration drill sites QC-04 and MB-03 would be used to collect geologic data regarding the North Boundary Fault. At each of these sites up to four exploration core holes would be drilled.

Table 2-2. Pre-feasibility Activities Proposed Duration and Authorization Period. Note that reclamation activities would commence the end of the authorization period.

Pre-Feasibility Activity	Drill Site Activity and Occupancy Periods	Authorization Period
Exploration Drilling (OF-1, OF-2, OF-3, North OF-2 alternative, MB-03, QC-04)	Continuous occupancy throughout the authorization period for all exploration drill sites with multiple re-occupancy allowed. However, occupancy for MB-03 and QC-04 is proposed for one continuous period that would not exceed 9 months.	December 31, 2014
Deep Groundwater Testing and Monitoring Well Construction (H-L, H-K, H-N)	Approximately 6 to 9 weeks of drilling activity during a maximum 9-month continuous occupancy period for each well.	December 31, 2014
Shallow Groundwater Testing and Monitoring Well Construction (H-C, H-E, H-F, H-G, H-I, H-K)	Approximately 6 to 9 weeks of drilling activity during a maximum 9-month occupancy period for each well.	December 31, 2014
Tunnel Characterization Geotechnical Borehole Drilling (PVT-3, PVT-4, PVT-5, PVT-6, PVT-7, PVT-8, PVT-9, APV-6, APV-8)	Approximately 3 to 5 weeks of drilling activity during a maximum 6-month occupancy period for each geotechnical borehole.	December 31, 2016
Groundwater Testing and Monitoring Activities	Throughout the authorization period for testing and monitoring purposes	December 31, 2025
Road and Drill Site Construction for Exploration and Deep and Shallow Groundwater Monitoring Wells	N/A	December 31, 2014
Road and Drill Site Construction for Tunnel Characterization Bore Holes	N/A	December 31, 2016
Road Maintenance for Groundwater Testing and Monitoring	N/A	December 31, 2025

Common Used Drilling Terms

- **Diamond Drilling:** A diamond bit on a hollow steel rod is driven into rock using a high speed rotary motion. Yields core sample for geologic analysis.
- **Directional Drilling:** Using specialized equipment to drill curved boreholes.
- **Rotary Drilling:** Using a rotary drill rig, an open hole is created by grinding up material in the hole which is brought up to the surface by air or water.
- **Trunk Hole:** A large diameter cased bore hole. Directional core drilling can be completed from the bottom of the trunk hole.

Drilling operations at exploration drill sites would end by December 31, 2014. Some of these exploration drill holes would be equipped with electronic monitoring instruments and long-term groundwater monitoring would continue through December 2025. After completion of drilling and testing activities, those sites not selected for monitoring would be graded and reclaimed.

Table 2-3 summarizes the total estimated surface disturbance expected for each of the exploration drill sites. Descriptions of each of the exploration drill sites follows.

Table 2-3. Estimated Disturbance Area for New Exploration Drill Sites. The typical working area dimension for exploration drill sites is 80 feet by 100 feet (0.18 acre) Because of topographic constraints, some drill sites would have a larger footprint than others. The area of disturbance for each proposed exploration drill site is based upon the drawings provided in Appendix D of the Pre-feasibility Plan of Operations. Total surface disturbance is reported, whether previously disturbed or not.

Drill Site	Acres of Disturbance
QC-041	0.26
MB-031	0.25
OF-1	0.18
OF-2 ¹	0.22
OF-3	0.23
Total	1.14

¹ QC-04, MB-03, and OF-2 are located on previously disturbed sites.

Drill Site QC-04. QC-04 would be located on previously disturbed National Forest System Lands along the west side of Apache Leap in Township 2 South, Range 12 East, in the SE¹/₄, NE¹/₄, NE¹/₄ of Section 2. Up to four exploration boreholes would be drilled at this site to collect geologic information about the West Boundary Fault. The total estimated surface disturbance for the construction of this drill site is 0.26 acre. QC-04 would be accessed from FR 2440 and an existing user-created road that continues to the drill site. FR 2440 would require improvements on approximately 0.9 mile of existing road. The existing user-created road from FR 2440 to QC-04 would require an additional 0.1 mile of improvements.

Drill Site MB-03. MB-03 would be located on previously disturbed National Forest System Lands along the west side of Apache Leap in Township 2 South, Range 12 East, in the NW¹/₄, NW¹/₄, SW¹/₄ of Section 1. Up to four exploration boreholes would be drilled at this site to collect geologic information about the West Boundary Fault. The estimated surface disturbance for the construction of this drill site is 0.25 acre. MB-03 would be accessed from FR 2440 and 0.4 mile of additional improvement would be required for this road beyond the turn-off for QC-04.

Drill Site OF-1. OF-1 would be located on previously undisturbed National Forest System Lands south of the Oak Flat Withdrawal Area in Township 1 South, Range 13 East, in the NW¹/₄, SW¹/₄, SE¹/₄ of Section 33. Up to three pre-collar rotary holes would be drilled within the footprint of disturbance and multiple core holes would be drilled from each of the pre-collar holes. A long-term groundwater monitoring well may be established within one of the core holes. Directional drilling would not be conducted under the Oak Flat Withdrawal Area. The estimated surface disturbance for the construction of this drill site is 0.18 acre. OF-1 would be accessed from Magma Mine Road within the Oak Flat Withdrawal Area by turning east on FR 2438, turning southwest on an existing user-created road, turning south on FR 3153, and then traveling 0.20 mile north along a proposed new access road segment.

Drill Site OF-2. OF-2 would be located on previously disturbed land west of the Oak Flat Withdrawal Area along Magma Mine Road in Township 1 South, Range 13 East, in the SE¹/₄, NW¹/₄, NE¹/₄ of Section 32. Up to three pre-collar rotary holes would be drilled within the footprint of this drill pad and multiple core holes would be drilled from each of the pre-collar holes. A long-term groundwater

monitoring well may be established within one of the core holes. Directional drilling would not be conducted under the Oak Flat Withdrawal Area. The estimated surface disturbance for the construction of this drill site is 0.22 acre. OF-2 would be accessed from the Magma Mine Road. An access road from Magma Mine Road to the site already exists but would require approximately 75 feet of roadway improvements.

Drill Site OF-3. OF-3 would be located west of OF-1 and south of the Oak Flat Withdrawal Area on undisturbed National Forest System Lands in Township 1 South, Range 13 East, NE $\frac{1}{4}$, SW $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 33. Up to three pre-collar rotary holes would be drilled within the footprint of this drill site and multiple core holes would be drilled from each of the pre-collar holes. A long-term groundwater monitoring well may be established within one of the core holes. Directional drilling would not be conducted under the Oak Flat Withdrawal Area. The estimated surface disturbance for the construction of this drill site is 0.23 acre. Access to OF-3 would be accessed from the Magma Mine Road within the Oak Flat Withdrawal Area by turning east on FR 2438, then turning to the southwest along an existing user-created road, and then turning south on FR 3153. OF-3 is located immediately adjacent to FR 3153.

Groundwater Testing and Monitoring Wells

Deep and shallow groundwater testing and monitoring wells are proposed for construction as part of the Pre-feasibility Activities. Each of these well types and proposed testing and monitoring procedures is described in greater detail below.

Deep Groundwater Testing and Monitoring Wells.

Three deep groundwater testing and monitoring wells are proposed. Well DHTW-01 would be located at H-L, well DHTW-02 would be located at H-K, and well DHTW-03 would be located at H-N. The purpose of the deep groundwater testing and monitoring wells is to obtain geologic and groundwater data, including: 1) depth to groundwater level; 2) lithology of drill cuttings; 3) aquifer hydraulic parameters, including transmissivity, hydraulic conductivity, and storage coefficients; and 4) chemical quality of groundwater. Drilling and well construction is expected to take from 6 to 8 weeks.

Construction of each deep groundwater testing and monitoring well would begin with a 16-inch diameter hole that would be drilled to a minimum of 20 feet followed by the placement of a 12-inch diameter steel surface casing that would be set and cemented into place. Once the surface casing is established, a vertical 12 7/8-inch diameter borehole would be drilled to a depth of 1,476 to 4,600 feet using the reverse-circulation air-drilling technique. When drilling is complete, a 7-inch steel casing would be installed. A specialized grout mixture would be used to fix four to six vibrating wire piezometers between

Common Terms

- Air Drilling: using compressed air or nitrogen to cool the drill bit and lift cuttings out of the bore hole.
- Casing: A large diameter pipe inserted into borehole and cemented into place.
- Drilling Mud: A fluid used to clean and cool the drill bit.
- Geophysical Logging: Making a detailed record of the geologic formations penetrated by a bore hole.
- Reverse Circulation Drilling: A method to bring the sample to the surface inside the drill rods to reduce contamination.

the 7-inch casing and the borehole wall. The location of the vibrating wire piezometers would be determined by inspecting the geophysical logs. Once the grout is cured, rotary drilling would resume and a 6 3/4-inch borehole would be drilled to a depth of approximately 7,000 feet. Upon completion of geophysical logging of this lower segment of the monitoring well, 4-inch blank and slotted casing would be installed. The depths of slotted casing would be based on geophysical logging. Electronic monitoring instruments to monitor depth to groundwater would be installed in the lower portion of the deep groundwater testing and monitoring wells. Figure 2-3 depicts a vertical cross section for the deep groundwater testing and monitoring wells. A 3-foot by 3-foot concrete pad would be constructed around the monitoring well surface casing once well construction is completed.

During drilling and well construction, careful observation of any formation water entering the borehole would be made. Drilling may be paused periodically to evaluate the quantity and quality of the groundwater entering the borehole. Airlift pumping would be used to raise the water to the surface to be evaluated. A hydrologist would monitor the drilling operations and a full suite of geophysical well logs would be documented before the casing is installed. As part of the well development process, open borehole airlift operations would provide: 1) development of the borehole to reduce impacts of the drilling process; 2) specific capacity of the well prior to well construction; 3) an estimate of aquifer transmissivity based on constant-rate pumping and recovery analysis; and, 4) an opportunity for collection of representative water samples for chemical analysis.

Well construction and development activities are not expected to exceed 9 months for each well. Construction of the three deep groundwater testing and monitoring wells would be completed by December 2014. Monitoring activities would be completed by December 2025.

Shallow Groundwater Testing and Monitoring Wells. Six shallow groundwater testing and monitoring wells are proposed in the Pre-feasibility Plan of Operations. The six shallow groundwater monitoring and testing wells would be located at drill sites H-C, H-E, H-F, H-G, H-I, and H-K. The purpose of the shallow monitoring wells is to obtain groundwater data, such as the direction and magnitude of water level gradients and aquifer parameters for geologic units. The monitoring wells would support environmental baseline data collection and long-term monitoring for pre-feasibility studies.

Construction of each shallow groundwater testing and monitoring well begins with a 16-inch diameter hole that would be drilled to a minimum 20-foot depth followed by the placement of a 12-inch diameter steel surface casing that would be set and cemented into place. Once the surface casing is established, a 6 3/4-inch borehole would be drilled to a depth of approximately 1,500 feet. Upon completion of geophysical logging, a 4-inch blank and slotted steel casing would be installed to the depth of each well. Determination of the interval(s) for placement of slotted casing would be based on geophysical logging and the results of well development testing. Well development would be conducted in the same manner as the deep groundwater testing and monitoring wells. A 3-foot by 3-foot concrete pad would be constructed around the monitoring well surface casing once well construction is complete. Monitoring activities

would be completed by December 2025. Figure 2-3 depicts a typical vertical cross section of a shallow groundwater testing and monitoring well.

Well construction and development activities are expected to take 6 to 9 weeks. Construction of the six shallow groundwater testing and monitoring wells would be completed by December 2014.

Groundwater Testing and Monitoring Procedures. The deep and shallow groundwater testing and monitoring wells would utilize similar testing and monitoring procedures. Quarterly testing would be conducted at each well to collect groundwater quality data. Groundwater for testing purposes would be collected from each well using a small-capacity electric submersible pump. These pumps would not be permanently installed in each testing and monitoring well, but would be placed into each well as needed for collection of water samples for chemical testing. Permanently installed electronic monitoring instruments and vibrating wire piezometers (in the deep testing and monitoring wells) would be used to measure groundwater elevation. RCM would provide the Forest Service with information collected from the deep and shallow groundwater testing and monitoring wells.

Analysis of groundwater draw down and recovery data obtained during constant-rate pumping tests would be periodically conducted to evaluate aquifer condition and function. The frequency and duration of aquifer testing would be based on the data needs for modeling in support of continuing pre-feasibility studies.

Groundwater Testing and Monitoring Well Drill Sites. Eight groundwater testing and monitoring well drill sites are proposed for construction as part of the Pre-feasibility Activities. Table 2-4 summarizes the total estimated surface disturbance expected for each of the groundwater testing and monitoring drill sites.

Table 2-4. Estimated Disturbance Area for New Groundwater Testing and Monitoring Drill Sites. The typical working area dimension for groundwater testing and monitoring drill sites is 80 feet by 100 feet (0.18 acre). Because of topographic constraints, some drill sites would have a larger footprint than others. The area of disturbance for each proposed drill site is based upon the drawings provided in Appendix D of the Pre-feasibility Plan of Operations.

Drill Site	Acres of Disturbance
H-C	0.27
H-E	0.16
H-F	0.25
H-G	0.20
H-I	0.18
H-K	0.30
H-L	0.15
H-N	0.27
Total Drill Site Disturbance Area	1.78

A description of each of the groundwater testing and monitoring drill sites follows.

Drill Site H-C. H-C would be developed for groundwater monitoring and testing and would be located along FR 3139 on undisturbed National Forest System Lands in Township 2 South, Range 13 East, in the SE $\frac{1}{4}$, NE $\frac{1}{4}$, NE $\frac{1}{4}$ of Section 20. Shallow groundwater testing and monitoring well HRES-C would be drilled at H-C. Groundwater in underlying units of Whitetail Conglomerate where Apache Leap Tuff is absent would be evaluated to determine the direction and magnitude of water level gradients and define aquifer parameters. The total estimated surface disturbance for the construction of this drill site is 0.27 acre. H-C would be accessed from S.R. 177 by turning onto FR 315, turning north on to FR 2261, and then traveling east along FR 3139. FR 315 and FR 2261 would require 3.6 miles and 0.3 mile of improvements, respectively. Improvements would also be necessary along a 0.4-mile segment of FR 3139. These roads would be maintained to accommodate long-term groundwater testing and monitoring.

Drill Site H-E. H-E would be developed for groundwater monitoring and testing and would be located adjacent to a user-created road on undisturbed National Forest System Lands in Township 2 South, Range 13 East, in the SE $\frac{1}{4}$, NW $\frac{1}{4}$, NE $\frac{1}{4}$ of Section 7. Shallow groundwater testing and monitoring well HRES-E would be drilled at H-E to evaluate existing aquifer conditions in the Apache Leap Tuff, Whitetail Conglomerate, and older units near the edge of Apache Leap. The estimated surface disturbance for the construction of this drill site is 0.16 acre. H-E would be accessed from the Magma Mine Road by turning south on FR 315, and then turning to the southwest on to an existing user-created road shortly after crossing over on State land. Approximately 0.8 mile of the user-created road would need to be improved.

Drill Site H-F. H-F would be developed for groundwater monitoring and testing and would be located adjacent to a user-created road on undisturbed National Forest System Lands, southeast of U.S. Highway 60 and east of Devils Canyon in Township 1 South, Range 13 East, in the SW $\frac{1}{4}$, NW $\frac{1}{4}$, SE $\frac{1}{4}$ of Section 27. Shallow groundwater testing and monitoring well HRES-F would be drilled at H-F to evaluate fracturing on the downthrown side of a north-south fault east of Devils Canyon and to determine aquifer parameters including the direction and magnitude of water-level gradients of the Apache Leap Tuff. The total estimated surface disturbance for the construction of this drill site would be 0.25 acre. H-F would be accessed from U.S. Highway 60 by turning south on FR 2466 and then turning northwest on an existing user-created road. Approximately 4.2 miles of roadway improvements would be required along FR 2466 and approximately 0.7 mile of improvements would be required for the user-created road to gain access to the drill site.

Drill Site H-G. H-G would be located adjacent to FR 2466, east of U.S. Highway 60 and Devils Canyon on undisturbed National Forest System Lands in Township 1 South, Range 13 East, in the NE $\frac{1}{4}$, NW $\frac{1}{4}$, SE $\frac{1}{4}$ of Section 22. Shallow groundwater monitoring well HRES-G would be drilled at H-G to evaluate fracturing on the downthrown side of a north-south fault east of Devils Canyon and to determine aquifer parameters, including the direction and magnitude of water-level gradients, of the Apache Leap Tuff. The estimated surface disturbance for the construction of this drill site would be 0.20 acre. H-G would be accessed from FR 2466. The access from U.S. Highway 60 would be improved by relocating the existing

cattle guard on FR 2466 just east of U.S. Highway 60 to allow large trucks to pull completely off the highway while gaining access to FR 2466. FR 2466 would be maintained through the duration of groundwater testing and monitoring activities to provide access to this site and other groundwater monitoring well sites accessed from FR 2466.

Drill Site H-I. H-I would be located on undisturbed National Forest System Lands adjacent to Rawhide Canyon along FR 2469 in Township 1 South, Range 13 East, in the SW¹/₄, NW¹/₄, SE¹/₄ of Section 26. Shallow groundwater testing and monitoring well HRES-I would be drilled in the Apache Leap Tuff to collect aquifer data, including the direction and magnitude of water-level gradients in the eastern portions of the Devils Canyon drainage basin. The total estimated surface disturbance for the construction of this drill site would be 0.18 acre. H-I would be accessed from U.S. Highway 60 by turning south on FR 2466 to FR 2469. A 1.7-mile section of FR 2469 would require improvement to gain access to this site and portions of FR 2466 south of H-F would also need improvement.

Drill Site H-K. H-K would be located on previously undisturbed National Forest System Lands adjacent to FR 2458 in Township 1 South, Range 13 East, in the SW¹/₄, NW¹/₄, SW¹/₄ of Section 21. Shallow groundwater testing and monitoring well HRES-K and a deep groundwater testing and monitoring well, DHTW-02, would be drilled at site H-K. HRES-K would be drilled to establish aquifer parameters within this portion of the Apache Leap Tuff, including the direction and magnitude of water-level gradients. DHTW-02 would be drilled to establish deep aquifer characteristics. The total estimated surface disturbance for the construction of this drill site would be 0.3 acre. H-K would be accessed from U.S. Highway 60 by turning north on FR 2458. Two new access road segments, one approximately 150 feet long and the other approximately 175 feet long, would be constructed from FR 2458 to H-K.

Drill Site H-L. H-L would be located on previously disturbed National Forest System Lands between the Oak Flat Withdrawal Area and U.S. Highway 60 in Township 1 South, Range 13 East, in the NE¹/₄, NE¹/₄, SE¹/₄ of Section 28. Deep groundwater testing monitoring well DHTW-01 would be drilled at H-L to establish deep aquifer characteristics. The total estimated surface disturbance for the construction of this drill site would be 0.15 acre. H-L would be located on an existing user-created road accessed from FR 2438 in the Oak Flat Withdrawal Area. No road improvements would be required for access to this drill site.

Drill Site H-N. H-N is located on previously disturbed National Forest System Lands adjacent to FR 2466 east of Devils Canyon in Township 1 South, Range 13 East, in the SW¹/₄, SW¹/₄, SW¹/₄ of Section 26. Deep groundwater testing and monitoring well DHTW-03 would be drilled at H-N to establish deep aquifer parameters. The total estimated surface disturbance for the construction of this drill site would be approximately 0.30 acre. H-N would be accessed from U.S. Highway 60 by turning south on FR 2466. Roadway improvements to FR 2466 would be required to access H-N and other nearby drill sites. Two short segments of new access road, each approximately 75 feet in length, would be constructed from FR 2466 to H-N. These segments would approach the site from the east and the west.

Tunnel Characterization Boreholes

One borehole would be located at each of nine tunnel characterization drill sites (PVT-3, PVT-4, PVT-5, PVT-6, PVT-7, PVT-8, PVT-9, APV-6, and APV-8) on National Forest System Lands. These boreholes are proposed to determine subsurface rock conditions along two possible tunnel alignments. Tunnel characterization boreholes would be drilled to depths ranging from approximately 990 to 1,670 feet. The geotechnical boreholes would be core drilled with the same techniques used for the exploration boreholes. Geotechnical boreholes would be 3 to 6 inches in diameter depending upon the final specification to be provided by the geotechnical engineer. Drilling activities and geotechnical testing at each drill site are expected to take 4 to 5 weeks. The maximum period of occupancy at each site would be 6 months. Drilling at these sites would be completed prior to December 2016. Upon completion of borehole drilling, each of the geotechnical boreholes could be used for groundwater testing and monitoring, if appropriate. Groundwater monitoring of selected boreholes would continue through December 31, 2025.

Nine tunnel characterization drill sites are proposed for construction as part of the Pre-feasibility Activities. Table 2-5 summarizes the total estimated surface disturbance expected for each of the tunnel characterization drill sites.

Table 2-5. Estimated Disturbance Area for New Tunnel Characterization Drill Sites.
The typical working area dimension for groundwater testing and monitoring drill sites is 60 feet by 100 feet (0.14 acre). Because of topographic constraints, some drill sites would have a larger footprint than others. The area of disturbance for each proposed drill site is based upon the drawings provided in Appendix D of the Pre-feasibility Plan of Operations.

Drill Site	Acres of Disturbance
PVT-3	0.14
PVT-4	0.15
PVT-5	0.2
PVT-6	0.18
PVT-7	0.3
PVT-8	0.24
PVT-9	0.16
APV-6	0.14
APV-8	0.29
Total Drill Site Disturbance Area	1.8

A description of each of the tunnel characterization drill sites follows.

Drill Site PVT-3. PVT-3 would be located on partially disturbed National Forest System Lands adjacent to but outside of the northern boundary of the Oak Flat Withdrawal Area in Township 1 South, Range 13 East, in the SE¹/₄, NE¹/₄, SE¹/₄ of Section 29. Geotechnical borehole PVT-3A would be drilled at PVT-3 and the disturbance from construction of this drill site would be approximately 0.14 acre. PVT-3 would be accessed from Magma Mine Road and an existing user-created road. No improvements are proposed for these access roads.

Drill Site PVT-4. This drill site would be located on partially disturbed National Forest System Lands northeast of Oak Flat and south of U.S. Highway 60 in Township 1 South, Range 13 East, in the SW $\frac{1}{4}$, SW $\frac{1}{4}$, NW $\frac{1}{4}$ of Section 27. Geotechnical borehole PVT-4A would be drilled at PVT-4 and the disturbance from construction of this drill site would be approximately 0.15 acre. PVT-4 would be accessed from via the Magma Mine Road by turning east on FR 2438 in the Oak Flat Withdrawal Area and then north onto an existing user-created road. No improvements are proposed for these roads.

Drill Site PVT-5. This drill site would be located on partially disturbed National Forest System Lands, east of U.S. Highway 60 and Devils Canyon in Township 1 South, Range 13 East, in the NW $\frac{1}{4}$, NW $\frac{1}{4}$, NE $\frac{1}{4}$ of Section 27. Geotechnical borehole PVT-5A would be drilled at PVT-5 and the disturbance from construction of this drill site would be approximately 0.20 acre. PVT-5 would be accessed from U.S. Highway 60 by turning east on FR 2466 then turning west on FR 2461 to a proposed new access road. Approximately 0.9 mile of FR 2461 would require improvements and approximately 330 feet of new access road would need to be constructed.

Drill Site PVT-6. This drill site would be located on previously disturbed National Forest System Lands southeast of U.S. Highway 60 and approximately 1.25 miles east of Devils Canyon in Township 1 South, Range 13 East, in the SE $\frac{1}{4}$, SW $\frac{1}{4}$, NE $\frac{1}{4}$ of Section 23. Geotechnical borehole PVT-6A would be drilled at PVT-6 and the disturbance from construction of this drill site would be approximately 0.18 acre. PVT-6 would be accessed from U.S. Highway 60 by turning east on FR 2466 turning east on FR 2463 where FR 2466 turns to the south. Approximately 0.5 mile of FR 2463 would require improvements to access this drill site.

Drill Site PVT-7. This drill site would be located on partially disturbed National Forest System Lands south of Pinal Ranch and approximately 0.5 mile south of U.S. Highway 60 in Township 1 South, Range 13 East, in the NW $\frac{1}{4}$, NE $\frac{1}{4}$, NW $\frac{1}{4}$ of Section 24. Geotechnical borehole PVT-7A would be drilled at PVT-7 and the disturbance from construction of this drill site would be approximately 0.30 acre. Approximately 0.5 mile of improvements to FR 2511 would be required for access to this drill site. Drilling equipment would be transported to PVT-7 via FR 2511 and a newly constructed access road from privately owned lands on Pinal Ranch. If access through Pinal Ranch cannot be secured, equipment would be transported to the site via helicopter. Crew and service equipment would reach the site by helicopter or by an improved trail from privately owned lands on the JI Ranch located west of PVT-7. The improved trail would achieve the management standards of a Level 1 Forest Service road, and would be maintained for high-clearance, four-wheel drive vehicles moving at low speeds. The road would not be suitable for passenger cars and would be closed to the public. The impacts associated with helipad construction, if necessary, are included in the calculation of impacts for improvement along FR 2511. If access is secured from Pinal Ranch, approximately 0.21 acre would be impacted on National Forest System Lands through the construction of an access road to FR 2511. If the trail from JI Ranch is improved for crew and service equipment access, approximately 0.40 acre would be impacted on National Forest System Lands.

Drill Site PVT-8. This drill site would be located on disturbed National Forest System Lands east of U.S. Highway 60 and northeast of Top of the World at the intersection of FR 320 and FR 2577 in Township 1 South, Range 14 East, in the NW¹/₄, NE¹/₄, SE¹/₄ of Section 7. Geotechnical borehole PVT-8A would be drilled at PVT-8 and the disturbance from construction of this drill site would be approximately 0.24 acre. PVT-8 would be accessed from U.S. Highway 60 by turning east on FR 320. Approximately 0.6 mile of FR 320 would require improvement to provide access for equipment to this drill site.

Drill Site PVT-9. PVT-9 would be located on previously disturbed National Forest System Lands, south of U.S. Highway 60 and northeast of Top of the World in Township 1 South, Range 14 East, in the NE¹/₄, NW¹/₄, NW¹/₄ of Section 8. Geotechnical borehole PVT-9A would be drilled at PVT-9 and the disturbance from construction of this drill site would be approximately 0.16 acre. PVT-9 would be accessed from U.S. Highway 60 turning south on an existing user-created road. Approximately 0.1 mile of this short road would require minor improvements.

Drill Site APV-6. This drill site would be located on previously disturbed National Forest System Lands approximately 1.25 miles east of Devils Canyon in Township 1 South, Range 13 East, in the NE¹/₄, SW¹/₄, SE¹/₄ of Section 23. Geotechnical borehole APV-6A would be drilled at the APV-6 and the disturbance from construction of this drill site would be approximately 0.14 acre. APV-6 would be accessed from U.S. Highway 60 by turning east on FR 2466 and then turning west on FR 2505. Approximately 0.5 mile of FR 2505 and the intersection of FR 2505 and FR 2466 would require improvements to gain access to this drill site.

Drill Site APV-8. This drill site would be located on previously disturbed National Forest System Lands north of U.S. Highway 60 and east of Devils Canyon in Township 1 South, Range 13 East, in the SE¹/₄, NW¹/₄, SE¹/₄ of Section 11. A geotechnical borehole, APV-8A, would be drilled at APV-8 and the disturbance from construction of this drill site would be 0.29 acre. APV-8 would be accessed from U.S. Highway 60 by turning north on FR 898 and then east on an existing user-created road. Approximately 0.7 mile of FR 898 and 0.1 mile of the user-created road would require improvements to access this drill site.

Access Road Improvement, Construction, and Maintenance

Most of the previously approved and proposed drill sites would be accessed from U.S. Highway 60 and Forest Service system and user-created roads. Three sites would be accessed from S.R. 177 and Forest Service system and user-created roads. If access from private lands is not secured for PVT-7, it would be accessed via helicopter. Seventeen Forest Service system and user-created roads totaling approximately 16.97 miles would require improvements to provide access to the proposed drill sites. In addition, four new access road segments totaling approximately 0.33 mile are planned.

Improvements to Existing Access Roads. Road Improvement Classifications: Three levels of roadway improvements were assumed in determining the maximum area of proposed roadway improvement impacts identified in the Pre-feasibility Plan of Operations. In this EA we refer to them as Level A, Level B and Level C road improvements.

Level A road improvements would require surface grading, minor road dressing, and edge treatment resulting in an average disturbance width of 6 feet, 3 feet on either side of the existing road.

Level B road improvements are more intensive than Level A improvements because of the topography of the existing road, state of repair, or geologic substrate. Level B road improvements would include surface grading, road dressing, and edge treatments resulting in an average disturbance width of 10 feet, with 5 feet on both sides of the existing road.

Level C road improvements are those areas identified in the Pre-feasibility Plan of Operations that have specifically identified disturbance boundaries. These areas were identified by RCM and called out in the Plan because of specifically identified needs to widen specific turns, widen narrow stretches of road, reduce road grade, and construct safety turn-outs and/or turn-arounds. Where Level C road improvements are located on a road designated for Level A improvements, 6 feet of additional disturbance has been assumed for impact calculation in the Level C area. Similarly, when a Level C road improvement is located on a road designated for Level B improvements, 10 feet of additional disturbance have been assumed for the Level C area.

Level A, B, and C road improvements would be made along portions of approximately 16.97 miles of existing access roads. Approximately 11.50 miles of existing access road would require Level A road improvements and approximately 5.47 miles of roadways would require Level B road improvements. Table 2-6 provides a summary of the proposed road improvements on National Forest System Lands.

Some existing roads would not require improvements to achieve the Level 2 High Clearance Vehicles maintenance standard; however, these roads would require periodic maintenance. Maintenance activities would not result in additional surface disturbance to maintain access to the Pre-feasibility Activities drill sites. Table 2-7 provides a summary of proposed maintenance activities by road.

Magma Mine Road is an existing two-lane, paved road that was originally constructed to provide access to the Superior East Plant Site in the 1970s. This road would continue to be used to access a number of existing drill sites on National Forest System Lands and the Superior East Plant Site. To maintain visibility for the transport of heavy equipment, the vegetation immediately adjacent to the paved roadway section would be cleared or trimmed regularly, as has been the practice in prior years.

Table 2-6. Proposed Improvement to Existing Roads within National Forest System Lands. All distances are distances within National Forest System Lands.

Level 1 (Basic Custodial Care) roads may be of any type, class or construction standard, and may be managed at any other maintenance level during the time they are open for traffic; however, while maintained at Level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses.

Level 2 (High Clearance Vehicles) roads are open for use by high clearance vehicles and have low traffic volume and speed. These roads typically are local and connect collector roadways, have at-grade drainage treatment; are not subject to the requirements of the Highway Safety Act; do not provide surface smoothness; and are not suitable for passenger cars.

Level 3 (Suitable for Passenger Cars) roads typically have low speed and a single lane with turnouts and spot surfacing. These roads have low to moderate traffic volume, typically connect to arterial and collector roads, and may include some dispersed recreation roads.

Level 4 (Moderate Degree of User Comfort) roads provide a moderate degree of user comfort and convenience at moderate travel speeds. These roads typically may connect to county roads, are usually considered collector roads, can be double-lane, aggregate surfaced, and dust-abated, and have culverts for drainage treatment.

Level 5 (High Degree of User Comfort) roads provide a high degree of user comfort and convenience. These roads provide the highest traffic volume and speeds, are usually arterial or collector roadways, and are normally double-lane, paved facilities. Some may be aggregate surfaced and dust abated.

Road	Forest Service Road Maintenance Level ^{1,2}	Planned Road Condition During Pre-feasibility Plan of Operations Implementation Plan of Operation Activities ²	Length ^{4,5}	
			Feet	Miles
FR 315	Level 4 – Moderate Degree of User Comfort	Maintain and repair road segments that currently meet the Moderate Degree of User Comfort standard if they are damaged or adversely affected by planned activities and improve road segments where its condition is not sufficient to provide required access. When necessary, degraded road segments would be brought up to a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	19,164	3.63
FR 320	Level 2 – High Clearance Vehicles	Maintain and repair road segments that currently meet the Level 2 maintenance standard if they are damaged or adversely affected by planned activities and improve road segments where this current condition is not met to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	3,174	0.60
FR 898	Level 2 – High Clearance Vehicles	Maintain and repair road segments that currently meet the Level 2 maintenance standard if they are damaged or adversely affected by planned activities and improve road segments where this current condition is not met to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	2,979	0.56
Existing Road from FR 898 to APV-8	User-Created ³	Improve road segment to generally achieve the Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	486	0.09

Table 2-6. (Continued)

Road	Forest Service Road Maintenance Level ^{1,2}	Planned Road Condition During Pre-feasibility Plan of Operations Implementation Plan of Operation Activities ²	Length ^{4,5}	
			Feet	Miles
FR 2261	Level 2 – High Clearance Vehicles	Maintain and repair road segments that currently meet the Level 2 maintenance standard if they are damaged or adversely affected by planned activities and improve road segments where this current condition is not met to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	1,466	0.28
FR 2440	Level 1 – Basic Custodial Care	Improve road segments to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	6,554	1.24
FR 2461	Level 2 – High Clearance Vehicles	Maintain and repair road segments that currently meet the Level 2 maintenance standard if they are damaged or adversely affected by planned activities and improve road segments where this current condition is not met to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	2,106	0.40
Existing Extension of 2461	User-Created (3)	Improve road segments to generally achieve the Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	2,477	0.47
FR 2463	Level 1 – Basic Custodial Care	Improve road segments to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	2,606	0.49
FR 2466 (and small portion of FR 2467)	Level 2 – High Clearance Vehicles	Maintain and repair road segments that currently meet the Level 2 maintenance standard if they are damaged or adversely affected by planned activities and improve road segments where this current condition is not met to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	22,285	4.22
FR 2469	Level 1 – Basic Custodial Care	Improve road segments to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	9,029	1.71
FR 2505	Level 1 – Basic Custodial Care	Improve road segments to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	2,523	0.48
FR 2511	Level 1 – Basic Custodial Care	Improve road segments to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	2,640	0.50
FR 3139	Level 1 – Basic Custodial Care	Improve road segments to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	2283	0.43
FR 3153	Level 2 – High Clearance Vehicles	Improve road segments to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	373	0.07

Table 2-6. (Continued)

Road	Forest Service Road Maintenance Level ^{1,2}	Planned Road Condition During Pre-feasibility Plan of Operations Implementation Plan of Operation Activities ²	Length ^{4,5}	
			Feet	Miles
Existing Road from FR 315 to H-E	User-Created ³	Improve road segments to generally achieve the Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	4,183	0.79
Existing Road from FR 2440 to QC-04	User-Created ³	Improve road segments to generally achieve the Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	522	0.10
Existing Road from FR 2466 to H-F	User-Created ³	Improve road segments to generally achieve the Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	3,746	0.71
Existing Road from U.S. Highway 60 to PVT-9	User-Created ³	Improve road segments to generally achieve the Level maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	336	0.06
Existing Road from Magma Mine Road to private holding	User-Created ³	Improve road segments to generally achieve the Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	651	0.12
Total			89,583	16.97

¹ Data provided as a shape file by TNF on December 4, 2007 (Globerd_rds.shp). These are transportation management designations and do not necessarily reflect the current condition or drivability of the specific road segment.

² Forest Service Transportation Management Maintenance Standards are defined in FSH 7709.58, 10, 12.3:

³ User-Created is the Forest Service terminology for roads that were not created and maintained under the Forest Road management plan. In all cases these roads existed prior RCM activities in the region

⁴ These values reflect an estimate of the linear distance of Forest Roads that would be used to access the PAA. As indicated on Sheets 1 to 53 in Appendix D of the Pre-feasibility Plan of Operations, various levels of improvement would be needed along these road segments. Improvements would range from minor dressing and maintenance activities to relatively extensive reconstruction to achieve the desired condition required to provide access for Pre-feasibility Activities. These reconstruction and maintenance levels are referred to as Level A, B, and C in the detailed summary provided in Appendix A of this EA.

⁵ In addition to the proposed access improvements on TNF, approximately 3.2 miles of existing roads would be improved on State and privately owned lands to access proposed activities on National Forest System Lands.

Table 2-7. Existing Roads within National Forest System Lands that do not Require Improvements but will Require Periodic Maintenance to Maintain Level 2 Maintenance Standard during Pre-feasibility Activities. For definition of terms and notes see Table 2-6. All distances are distance within National Forest System Lands. Magma Mine Road has multiple Forest Service road designations. For purposes of this discussion and analysis the Magma Mine Road begins at its intersection with U.S. Highway 60 and ends at the Superior East Plant Site.

Road	Forest Service Road Maintenance Level ^{1,2}	Planned Road Condition During Pre-feasibility Plan of Operations Implementation Plan of Operation Activities ²	Length ^{4,5}	
			Feet	Miles
Magma Mine Road	Level 5	Vegetation trimming and clearing to maintain visibility for heavy equipment transport.	10,842	2.05
Existing Road from Magma Mine Road, near Superior East Plant Site south to private in-holding.	User-Created	Continue to maintain this road segment to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	562	0.11
Existing Road From Magma Mine Road to Site #1	User-Created	Continue to maintain this road segment to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	699	0.13
Existing User-Created Road From Magma Mine Road north to Drill Site PVT-3	User-Created	Continue to maintain this road segment to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	743	0.14
FR 2438 from Magma Mine Road east to a user-created bypass Road to FR 3153	Level 2	Continue to maintain this road segment to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	2,562	0.49
User-created bypass road from FR 2438 to FR 3153	User-Created	Continue to maintain this road segment to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	2,533	0.48
User-created road (old U.S. Highway 60) from 2438 to Drill Sites H-L and PVT-4	User-Created	Continue to maintain this road segment to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	4,100	0.78
FR 3153 south to proposed new road to OF-1	Level 2	Continue to maintain this road segment to generally achieve a Level 2 maintenance standard suitable to provide access for the equipment required to accomplish planned activities.	5,002	0.95
Total			27,043	5.13

Within the Oak Flat Withdrawal Area, RCM would continue to maintain the existing roads to access drill site M and an existing drill site on State lands south of the withdrawal boundary. In the past, most of RCM’s road maintenance efforts within the Oak Flat Withdrawal Area have focused on FR 3153. This section of road has been maintained with sand from the north intersection with FR 2438 and with coarse fill material made from crushed boulders within the roadway. In the future, coarse fill would be provided from the Superior East Plant Site using Apache Leap Tuff. Existing roadway alignments within the Oak Flat Withdrawal Area would not be altered and a hammer hoe or similar equipment would not be used for maintenance of FR 3153. A user-created road exists in Oak Flat between FR 2438 and FR 3153.

Construction of New Access Road Segments. The total estimated surface disturbance area for the 0.33 mile of new access road is approximately 0.55 acre. This was calculated based upon a maximum disturbance width of 15 feet. A summary of proposed new access roads is provided in Table 2-8.

Table 2-8. New Access Roads within Tonto National Forest

Road	Road Management Classification	Planned Road Condition During Pre-feasibility Plan of Operation Activities	Length	
			Feet	Miles
Two New Access Roads from FR 2458 to Drill Site H-K	No Classification	Improve road segments to generally achieve the High Clearance Vehicles management standard suitable for the equipment required to accomplish planned activities	177	0.04
	No Classification	Improve road segments to generally achieve the High Clearance Vehicles management standard suitable for the equipment required to accomplish planned activities	151	0.03
New Access from FR 2461 to Drill Site PVT-5	No Classification	Improve road segments to generally achieve the High Clearance Vehicles management standard suitable for the equipment required to accomplish planned activities	330	0.06
New Access from FR 3153 to Drill Site OF-1	No Classification	Improve road segments to generally achieve the High Clearance Vehicles management standard suitable for the equipment required to accomplish planned activities	1,069	0.20
Total Length of New Access			1,727	0.33

Public Access and Traffic Management. The contractors hired to conduct road maintenance and construction activities would be responsible for public access in road construction areas. No roadway closures are planned. Short duration travel restrictions would be enforced during some periods of road construction to protect the public and limit the extent of surface disturbance associated with road construction and maintenance activities. Traffic control signage would be posted to notify the public of these travel restrictions and to identify alternative routes for public access. Where possible, turn-outs would be provided along roadways to allow the public to pass construction areas. The contractors responsible for road improvements would prepare and provide a traffic control plan for Forest Service approval prior to initiation of any road improvements. Signage used for construction and access management would comply with the guidelines in the Manual on Uniform Traffic Control Devices (FSM 7103.3).

Continuation of Previously Authorized Activities

Previously authorized exploration activities were approved by the Forest Service under the Resolution Project Exploratory Drilling Plan of Operations No. 01-12-02-002. The Previously Authorized Activities include: 1) nine combination exploration and groundwater monitoring well sites (Drill sites A, B, C, D, F, M, #1, #2, and #3); 2) one groundwater monitoring well (HRES-3 on the DOE Well Site); 3) improvement and maintenance of six Forest Service system and user-created roads for drill site access; and, 4) the placement of aboveground plastic pipe and tanks for potable water transfer and storage.

All of the approved drill site construction, roadway improvements and water system construction activities have been completed, except at Site F, which remains unoccupied. The disturbance footprints for the constructed drill sites vary. Any additional drilling at these sites would be planned for completion by December 2014. Access for groundwater testing and monitoring wells would be maintained through 2025. Table 2.9 provides a summary of the surface disturbance associated with the drill sites established as part of the Previously Authorized Activities.

Table 2-9. Estimated Disturbance Area for Drill Sites Established as Part of the Previously Authorized Activities. These estimates were made from recently flown aerial photography. (Site F has not been impacted at this time but it is included in this analysis as acres of previously authorized disturbance. The DOE Well Site was developed by the Department of Energy in 1990. Total disturbed area is approximately 0.66 acre. No additional clearing or site development was required to construct HRES-3 at this site).

Drill Site	Acres of Disturbance
Drill Site A	0.25
Drill Site B	0.07
Drill Site C	0.27
Drill Site D	0.21
Drill Site F	0.15
Drill Site M	0.55
Drill Site #1	0.94
Drill Site #2	0.28
Drill Site #3	0.30
DOE Well Site	No New Disturbance
Total Area	3.02

A brief description of the Previously Authorized Activity drill sites follows.

Drill Site A. Drill site A is located along FR 315 in Township 1 South, Range 13 East, in the SE¹/₄, NW¹/₄, SE¹/₄ of Section 32. Two pre-collar holes (RES-4 and RES-7) with multiple core holes and one deep groundwater testing well (DHRES-2) have been developed at this drill site. Future activities at this drill site would include construction of up to two new pre-collar holes, A-3 and A-4, each with multiple core holes and ongoing monitoring at DHRES-2. New exploration pre-collar drill holes could be constructed within the footprint of the existing drill pad and no changes to the configuration of this drill site are proposed.

Drill Site B. Drill site B is located along FR 315 south of Magma Mine Road in Township 1 South, Range 13 East, in the SE $\frac{1}{4}$, SW $\frac{1}{4}$, SE $\frac{1}{4}$ of Section 32. RES-3 is an exploration drill hole developed at this drill site and consists of a single a pre-collar hole with multiple core holes. Future activities at this drill site would include construction of up to two new pre-collar holes, labeled B-2 and B-3, each with multiple core holes. RES-3 has been equipped with an electronic monitoring instrument for continual groundwater monitoring. New exploration pre-collar drill holes could be constructed within the footprint of the existing site and no changes to the configuration of this site are proposed.

Drill Site C. Drill site C is a previously approved site located along FR 315 south of Magma Mine Road in Township 2 South, Range 13 East, in a portion of Lot 3 in Section 6. Pre-collar exploration holes RES-2 and RES-17 have been constructed at the site and each has multiple core holes. Future activities at this drill site would include continued drilling of core holes at RES-2 and RES-17 and construction of one new pre-collar hole, labeled C-3, with multiple core holes. New exploration pre-collar drill holes could be constructed within the footprint of the existing drill site and no changes to the configuration of this drill site are proposed.

Drill Site D. Drill site D is located along FR 315, south of Magma Mine Road in Township 2 South, Range 13 East, in a portion of Lot 4 in Section 6. Pre-collar exploration holes RES-1 and RES-14 have been developed at this site and each has multiple core holes. Planned activities would include continued drilling of core holes at RES-1 and RES-14 and construction of one new pre-collar hole, D-3, with multiple core holes. New exploration pre-collar drill holes could be constructed within the footprint of the existing drill pad and no changes to the configuration of this drill site are proposed.

Drill Site F. Drill site F is located along FR 315, south of Magma Mine Road in Township 2 South, Range 13 East, in portions of Lot 4 in Section 6. Drilling activities have not been initiated at this drill site. Planned activities would include construction of one pre-collar hole, labeled F-1, with multiple core holes. The disturbance from construction of this drill site would be approximately 0.18 acre.

Drill Site M. Drill site M is located south of the Oak Flat Withdrawal Area and east of FR 3153 in Township 1 South, Range 13 East, in the SE $\frac{1}{4}$, SW $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 33. Two exploration pre-collar holes (RES-5 and RES-15) with multiple core holes, one shallow groundwater testing and monitoring well (HRES-4), and one deep groundwater testing and monitoring well (DHRES-1) have been constructed at this drill site. Groundwater testing and monitoring is ongoing. Planned activities would include continued drilling of core holes from RES-5 and RES-15 and construction of up to two new pre-collar holes, labeled M-3 and M-4, with multiple core holes. Groundwater monitoring and testing would continue at HRES-4 and DHRES-1. New exploration pre-collar drill holes could be constructed within the footprint of the existing drill pad and no changes to the configuration of this drill site are proposed.

Drill Site #1. Drill site #1 is located southeast of the Superior East Plant Site, north of the Magma Mine Road in Township 1 South, Range 13 East, in the SE $\frac{1}{4}$, SE $\frac{1}{4}$, NW $\frac{1}{4}$ of Section 32. Exploration drill hole RES-6 with multiple core holes has been developed at this drill site. Future activities would include

continued drilling of core holes at RES-6 and construction of up to two new pre-collar holes, labeled #1-2 and #1-3, with multiple cores. New exploration pre-collar drill holes could be constructed within the footprint of the existing drill site and no changes to the configuration of this drill site are proposed.

Drill Site #2. Drill site #2 is located along FR 315, south of Magma Mine Road in Township 1 South, Range 13 East, in the NE $\frac{1}{4}$, SW $\frac{1}{4}$, SE $\frac{1}{4}$ of Section 32. Exploration drill hole RES-9 with multiple core holes and shallow groundwater monitoring well HRES-2 have been developed at this site. Future activities would include continued drilling of multiple core holes at RES-9, continued groundwater testing and monitoring of HRES-2, and construction of a new pre-collar hole, labeled #2-2, with multiple deflection core holes. New exploration pre-collar drill holes could be constructed within the footprint of the existing drill site and no changes to the configuration of this site are proposed.

Drill Site #3. Drill site #3 is located along FR 315 in Township 2 South, Range 13 East, in the SE $\frac{1}{4}$, NE $\frac{1}{4}$, SE $\frac{1}{4}$ of Section 6. Exploration pre-collar holes RES-10, RES-11, and RES-16 have been constructed at this drill site, each with multiple core holes. Planned activities would include drilling additional deflection core holes at each of the three existing pre-collar holes and construction of one new pre-collar hole, labeled #3-4, with multiple core holes. New exploration pre-collar drill holes could be constructed within the footprint of the existing drill site and no changes to the configuration of this drill site are proposed.

DOE Well Site. This drill site is located within the Oak Flat Withdrawal Area along FR 2438 in Township 1 South, Range 13 East, in the SW $\frac{1}{4}$, SE $\frac{1}{4}$, SE $\frac{1}{4}$ of Section 28. The site contains two hydrology monitoring wells, HRES-3 and DOE well #USWUZP-5. HRES-3 and DOE well #USWUZP-5 are each completed into the Apache Leap Tuff and neither hole is drilled deep enough to penetrate into the ore body. The DOE well is approximately 936 feet deep and HRES-3 is approximately 1,200 feet deep. Planned activities at this site are limited to groundwater testing and monitoring.

Water Management

The Pre-feasibility Activities require water for dust suppression and drilling processes. Water for these activities would be obtained from the following sources:

- Superior East Plant Site No. 9 Shaft (ADWR #59-524492)
- Superior West Plant Site
- Well A-06 (ADWR #55-214967) on State lands (T2S, R13E, NW $\frac{1}{4}$ of Section 4)
- Arizona Water Company

Previously authorized exploration drill sites #1, #2, A, B, C, D, F, and M all occur within the Phoenix Active Management Area (AMA) and are served by an existing 2-inch polyethylene water line from the No. 9 Shaft. This same line would be extended to OF-1 and OF-3. OF-2 and PVT-3 would be served by a 2-inch polyethylene water line from the No. 9 Shaft. This line would be placed on top of the ground along Magma Mine Road. For QC-04 and MB-03, water would be pumped from a tank set up on private lands along FR 2440. This tank would be filled by a water truck with water from the Superior West Plant site. H-K is within the Phoenix AMA and would be serviced by water trucks. Within the AMA, RCM will monitor and report its industrial water uses annually to ADWR in accordance with their established reporting requirements.

Outside of the Phoenix AMA, Well A-06 would be used for Pre-feasibility Activities along FR 2466 and FR 2469, principally drill sites H-F, H-I, and H-N. These sites may also be serviced by water purchased from the Arizona Water Company. Drill sites #3, H-C, H-E, H-L, H-G, PVT-4, PVT-5, PVT-6, PVT-7, PVT-8, PVT-9 APV-6, and APV-8 are also outside of the Phoenix AMA and water would be provided by Arizona Water Company.

The quantity of water needed for Pre-feasibility Activities varies by activity type. The shallow groundwater testing and monitoring wells would use an air drill and water would only be required for dust control of cycloned rock fragments from drilling activities and other miscellaneous site needs. The deep groundwater testing and monitoring wells, the geotechnical boreholes, and the exploration drill holes would require both rotary and core drilling techniques and would use, on average, 6,000 gallons of water per day. This water would be provided by water “made”³ during the drilling process and supplemented with water from one of the appropriate water sources described above. On average, one 5,000-gallon water-truck trip per day would be required to support an active drill rig.

Drill rigs use drilling mud to cool and lubricate the rods and the diamond bit and to help carry cuttings to the surface. Drilling mud would be collected in large storage tanks (with 9,500 to 22,000 gallon capacities) and/or in settling pits constructed within the footprint of each drill site. The mud tanks and/or settling pits would be used during drilling operations to hold drilling mud that is re-circulated down the borehole. RCM would collect excess cuttings and drilling mud generated during drilling activities and remove them from National Forest System Lands. These materials would be disposed of in accordance with applicable Arizona law.

Applicant Proposed Environmental Protection Measures

The following environmental protection measures were identified by RCM in their Pre-feasibility Plan of Operations.

Air Quality. RCM proposes to minimize impacts to air quality using the following dust suppression techniques: 1) applying water and DusTreat DC9112 during road construction activities; 2) using water at

³ Minor amounts of water generated during drilling activities.

all times during the active drilling process; and 3) driving slowly when in service vehicles on dirt roads and adjusting speed depending on conditions to avoid creating a dust trail.

Water Quality. RCM would collect excess cuttings and mud generated during drilling activities and remove them from National Forest System Lands. These materials would be disposed of in accordance with applicable Arizona law.

RCM would develop and implement a construction Stormwater Pollution Prevention Plan (SWPPP) for road improvements and drill site construction activities. The effects of erosion and sediment discharge into off-site drainages would be mitigated through the use of water bars on the steeper sections of roadway and silt fences or other best management practices.

RCM would obtain authorization under the Arizona Pollutant Discharge Elimination System (AZPDES) *de minimus* General Permit from Arizona Department of Environmental Quality (ADEQ) for well development and testing activities.

In accordance with ADWR requirements, the strategic installation of bentonite seals and professional drilling practices would minimize potential impacts of the drilling activities to the existing groundwater aquifer system.

Solid Wastes. As part of its drilling program, RCM would collect cuttings and mud generated during the drilling process, contain them, transport them off National Forest System Lands, and dispose of them in accordance with applicable Arizona law. All other wastes, such as paper and food waste, would be stored in garbage sacks and removed from the site each day. A portable toilet would be placed at each active drill site and serviced periodically by a contractor.

Scenic Values. Scenic values would be protected by good housekeeping practices, minimizing disturbance, and reclaiming the sites in a timely manner.

Hazardous Substances/Petroleum Products/Drilling Materials. RCM would use a Spill Prevention Control, and Countermeasures SPCC plan to guide implementation of appropriate practices to prevent releases when handling and storing petroleum products. At the active drill sites, small secondary containment structures would be used to store one or two 5-gallon containers of hydraulic oil, a 5-gallon container of diesel, two 5-gallon containers of gasoline, tubes of grease, a 5-gallon bucket of grease, and other miscellaneous small containers, such as spray lubricants, typically found on drill sites. Fifty-gallon drums for storing used oil and oily rags would be placed in secondary containment structures within the drill site. Large quantities of fuel associated with the rig and mud mixing equipment would be held in fuel tanks, all within secondary containment structures. An adequate supply of fire extinguishers would be placed at these containment structures and each active rig would maintain enough spill supplies for any incidental releases. During drilling operations, drill rigs would be parked on top of plastic sheeting overlain by absorbent material. Plastic and absorbent materials would also be used under other gas or diesel motors, or other equipment that may leak oil, as needed. Refuse containers designated for disposal

of the absorbent materials would be located at each drill rig. This material would be disposed of off site in accordance with applicable laws and regulations.

Reclamation and Closure

Drill Sites. RCM would notify the Forest Service prior to the commencement of reclamation activities. Following the completion of all drilling, solids and desiccated drilling mud in the mud pits would be excavated and removed from the site. These inert materials would be disposed of in accordance with applicable regulations. The drill sites and mud pits would then be returned to natural grade with a track hoe using rocks and soil set aside during site construction and mud pit excavation. Each drill site would be mulched and seeded in accordance with National Forest Service guidelines using approved seed mixes of native species.

After completion of drilling activities for groundwater testing and monitoring wells and exploration drill holes and geotechnical bore holes selected for groundwater testing and monitoring, a portion of each of the drill sites would be re-graded and reclaimed. The remaining portion of the drill site would be maintained to allow vehicle access, including pumping rigs and support vehicles for periodic groundwater monitoring and testing.

Drill Holes. Drill hole abandonment would be conducted in accordance with AAC R12-15 and ARS Title 45, Chapter 2, Article 10, as administered by the ADWR. In general, the procedures for each type of drill hole are provided in Table 2-10.

Roads. Table 2-11 identifies the Forest Service Road Maintenance Level for each segment of access roadway and describes the proposed reclamation and the post Pre-feasibility Activity condition of the roadways based on the existing Forest Service Travel Management Guidelines for Road Maintenance Levels.

Appurtenances. Pumps, signs, and any other items would be removed from National Forest System Lands.

2.1.3. Alternative 3 – North OF-2 Exploration Drill Site

The North OF-2 exploration drill site is located approximately 1,000 feet north of the proposed OF-2 site, both of which are west of Magma Mine Road (Figure 2-4). This site was identified as an alternative to the proposed OF-2 site provided in the Plan of Operations to avoid impacts to the Boulder Campsite and Campground Boulder, popular recreation and climbing area, located at the OF-2 drill site.

Table 2-10. Proposed Drill Hole Abandonment Procedures

Drill Hole Type	Abandonment Timing	Abandonment Procedures
Exploration	Holes developed for groundwater monitoring would be immediately abandoned at the end of monitoring. Holes not developed for groundwater monitoring would be abandoned by the end of 2014.	<p>Drill hole abandonment would be conducted in accordance with AAC R12-15, ARS Title 45, Chapter 2, Article 10, administered by the Arizona Department of Water Resources (ADWR) In general, this procedure includes the following steps:</p> <p>After completion of each deflection, that portion of the hole would be filled with bentonite mud of sufficient density to prevent movement of groundwater between any aquifers.</p> <p>After completion of all deflections, the cased trunk holes would be filled with bentonite mud and a cement grout plug would be placed extending from 2 feet below grade to a minimum of 20 feet below grade.</p>
Deep Groundwater	At the end of monitoring wells would be immediately abandoned. Abandonment would be conducted immediately in the event of a lost hole or insufficient data collection from a well.	Wells would be abandoned in accordance with the same ADWR procedures as the RCM exploration holes.
Tunnel Characterization	Drill holes developed for groundwater monitoring would be abandoned at the end of monitoring. Drill holes not necessary for groundwater studies would be abandoned immediately after geotechnical data is obtained.	<p>Once selected for abandonment these holes would be abandoned in accordance with ADWR standards similar to the exploration holes with slight modifications due to the relatively shallow depth and absence of deflections.</p> <p>A bentonite cement plug would be placed in the bottom 40 feet of the hole. Bentonite grout would fill the entire hole with the exception of the top 20 feet. A cement plug would be placed from 2 feet below grade to a minimum of 20 feet below grade.</p>
Shallow Groundwater	At the end of monitoring wells would be immediately abandoned in accordance with the same ADWR procedures as the RCM exploration holes. Abandonment would be conducted immediately in the event of a lost hole or insufficient data collection from a well.	Wells would be abandoned in accordance with the same ADWR procedures as the tunnel characterization holes.

Table 2-11. RCM’s Proposed Road Reclamation and Post Pre-feasibility Study Management Designation

Road	Current Forest Service Road Maintenance Level	Post Pre-feasibility Study Forest Service Road Maintenance Level and Reclamation Activities
FR 315	Level 4 – Moderate Degree of User Comfort	The road would retain its current Forest Service designation subject to Forest Service maintenance and repair activities. No reclamation or restoration is proposed for the roadway travel area.
FR 320	Level 2 – High Clearance Vehicles	The road would retain its current Forest Service designation subject to Forest Service maintenance and repair activities. No reclamation or restoration is proposed for the roadway travel area.
FR 898	Level 2 – High Clearance Vehicles	The road would retain its current Forest Service designation subject to Forest Service maintenance and repair activities. No reclamation or restoration is proposed for the roadway travel area.
Existing Road from FR 898 to APV-8	User-created	Level 1 closure would be accomplished by placing an earthen berm at the start of this user-created road’s intersection with FR 898 when the roadway is no longer required for access to pre-feasibility study activities.
FR 2261	Level 2 – High Clearance Vehicles	The road would retain its current Forest Service designation subject to Forest Service maintenance and repair activities. No reclamation or restoration is proposed for the roadway travel area.
FR 2440	Level 1 – Basic Custodial Care	Level 1 closure would be accomplished by placing an earthen berm at the start of FR 2440 when the roadway is no longer required for access to pre-feasibility study activities.
FR 2461	Level 2 – High Clearance Vehicles	The road would retain its current Forest Service designation subject to Forest Service maintenance and repair activities. No reclamation or restoration is proposed for the roadway travel area.
FR 2440	Level 1 – Basic Custodial Care	Level 1 closure would be accomplished by placing an earthen berm at the start of FR 2440 when the roadway is no longer required for access to pre-feasibility study activities.
FR 2461	Level 2 – High Clearance Vehicles	The road would retain its current Forest Service designation subject to Forest Service maintenance and repair activities. No reclamation or restoration is proposed for the roadway travel area.
Existing Extension of 2461	User-created	Level 1 closure of this extension of FR 2461 would be accomplished by construction of an earthen berm at the start of the user-created roadway when the roadway is no longer required for access to pre-feasibility study activities.
FR 2463	Level 1 – Basic Custodial Care	The road would retain its current Forest Service designation. Level 1 closure would be accomplished by placing an earthen berm at the start of FR 2463 when the roadway is no longer required for access to pre-feasibility study activities.
FR 2466 (and small portion of FR 2467)	Level 2 – High Clearance Vehicles	The road would retain its current Forest Service designation subject to Forest Service maintenance and repair activities. No reclamation or restoration is proposed for the roadway travel area.

Table 2-11. (Continued)

Road	Current Forest Service Road Maintenance Level	Post Pre-feasibility Study Forest Service Road Maintenance Level and Reclamation Activities
FR 2469	Level 1 – Basic Custodial Care	The road would retain its current Forest Service designation. Level 1 closure would be accomplished by placing an earthen berm at the start of FR 2469 when the roadway is no longer required for access to pre-feasibility study activities.
FR 2505	Level 1 – Basic Custodial Care	The road would retain its current Forest Service designation. Level 1 closure would be accomplished by placing an earthen berm at the start of FR 2505 when the roadway is no longer required for access to pre-feasibility study activities.
FR 2511	Level 1 – Basic Custodial Care	The road would retain its current Forest Service designation. Level 1 closure would be accomplished by placing an earthen berm at the start of FR 2511 when the roadway is no longer required for access to pre-feasibility study activities.
FR 3139	Level 1 – Basic Custodial Care	The road would retain its current Forest Service designation. Level 1 closure would be accomplished by placing an earthen berm at the start of FR 3139 when the roadway is no longer required for access to pre-feasibility study activities.
FR 3786	Level 1 – Basic Custodial Care	The road would retain its current Forest Service designation. Level 1 closure would be accomplished by placing an earthen berm at the start of FR 3786 when the roadway is no longer required for access to pre-feasibility study activities.
Existing Road from FR 315 to H-E	User-created	Level 1 closure would be accomplished by placing an earthen berm at the start of this user-created road’s intersection with FR 315 when the roadway is no longer required for access to pre-feasibility study activities.
Existing Road from FR 2440 to QC-04	User-created	Level 1 closure would be accomplished by placing an earthen berm at the start of this user-created roads, intersection with FR 2440 when the roadway is no longer required for access to pre-feasibility study activities.

2.1.4. Alternative 4 – West Access Route 4a

West Access Route 4a has been identified as alternative to the existing roads within the Oak Flat Withdrawal Area and would be used to gain access to OF-1, OF-3, M, and RES-13 (Figures 2-5). This alternative was developed in response to public scoping comments that suggested an alternative route be built off FR 315 to avoid traffic concerns in the Oak Flat Withdrawal Area. West Access Route 4a would initiate at FR 315 and would terminate at drill site RES-13 on State lands. The total length of new road along West Access Route 4a would be approximately 4,211 feet. Construction of the road would impact 2.31 acres of National Forest System Lands and 0.41 acres of State land. Total disturbed area from construction of the West Access Route 4a would be 2.72 acres. The turn offs for this route at FR 315 and at RES-13 would be gated to prevent public use.

RCM would construct two additional exploration drill sites that would be accessible from this road, 4W and 4E. Both would be located on the south side of the West Access Route 4a alignment (Figures 2-5). Drill site 4W would occupy 0.23 acre and drill site 4E would occupy 0.28 acre and both are immediately adjacent to the West Access Route 4a alignment. The allowed occupancy period of drill sites 4W and 4E would be the same as allowed for the other exploration drill sites (see Table 2-2). The West Access Route 4a and the two drill sites would be closed and reclaimed at the end of the Pre-feasibility Activities in accordance with the requirements outlined for the proposed action and a final closure plan approved by the Forest Service.

As part of this alternative, RCM would also limit the time of year that drilling activities could occur at drill sites PVT-3, PVT-4, and H-L. Drilling activities at these sites would be restricted from October 1 through March 31 of the following calendar year, the primary season of use at the Oak Flat Campground. There would be no seasonal limitation for access to groundwater testing and monitoring well sites for testing and monitoring purposes. Drill sites OF-1, OF-3, M, and RES-13 would not be reoccupied for drilling activities until this alternative access route is constructed. Use of roads within the Oak Flat Withdrawal Area for emergency vehicle access to drill sites and emergency evacuation from drill sites south of the Oak Flat Withdrawal Area are allowed as part of this alternative.

2.1.5. Alternative 5 – West Access Route 4b

Access Route 4b has been identified as an alternative to the existing roads within the Oak Flat Withdrawal Area and would be used to gain access to OF-1, OF-3, M, and RES-13 (Figures 2-6). This alternative was developed in response to public scoping comments that suggested an alternative route be built off FR 315 to avoid traffic concerns in Oak Flat. West Access Route 4b would initiate at FR 315 and extend to RES-13. The total length of new road along West Access Route 4a would be approximately 4,999 feet. Construction of the road would impact 2.76 acres of National Forest System Lands and 0.41 acre of State land. Total disturbed area from construction of West Access Route 4a would be 3.27 acres. The turn offs for this route at FR 315 and at RES-13 would be gated to prevent public use of this roadway.

RCM would construct two additional exploration drill sites that would be accessible from this road, 4W and 4E. These drill sites would be placed on the north side of the West Access Route 4b alignment (Figure 2-6). Drill site 4W would occupy 0.25 acre and drill site 4E would occupy 0.23 acre. Both sites are immediately adjacent to the West Access Route 4b alignment. The allowed occupancy period of drill sites 4W and 4E would be the same as the other exploration drill sites (see Table 2-2). The West Access Route 4b and the two drill sites would be closed and reclaimed at the end of the Pre-feasibility Plan of Operations in accordance with the requirements outlined for the proposed action and a final closure plan approved by the Forest Service.

As part of this alternative, RCM would also limit the time of year that drilling activities could occur at drill sites PVT-3, PVT-4, and H-L. Drilling activities at these sites would not be allowed from October 1 through March 31 of the following calendar year, the primary season of use at the Oak Flat Campground.

There would be no seasonal limitation for access to groundwater testing and monitoring well sites for testing and monitoring purposes. Drill sites OF-1, OF-3, M, and RES-13 would not be reoccupied for drilling activities until this alternative access route is constructed. Use of roads within the Oak Flat Withdrawal Area for emergency vehicle access to drill sites and emergency evacuation from drill sites south of the Oak Flat Withdrawal Area is allowed as part of this alternative.

2.2. Alternatives Considered but Eliminated

During RCM's development of the Plan of Operations, Forest Service plan completeness review, and in response to public scoping comments, a number of alternatives to proposed plan elements were identified and then eliminated from further consideration because of administrative, environmental and/or technical concerns. Each of these is described in the following sections.

Elimination of all Drill Sites or Selected Drill Sites Adjacent to the Oak Flat Picnic and Campground Withdrawal Area. In light of public comments regarding the relationship of proposed Pre-feasibility Activities to the Oak Flat Withdrawal Area and the Oak Flat Campground several alternatives that eliminated drill sites proximate to the Oak Flat Withdrawal Area were considered, including:

- Elimination of OF-1, OF-2 and OF-3
- Elimination of PVT-3, PVT-4 and H-L
- Elimination of OF-1, OF-2, OF-3, PVT-3, PVT-4, and H-L

These various combinations would have reduced traffic levels through the Oak Flat Withdrawal Area and the Oak Flat Campground and addressed impacts to recreational users and safety concerns. The removal of OF-1 and OF-3 would have reduced visibility impacts to some dispersed campsites and roads within the Oak Flat Withdrawal Area. However, this alternative would be inconsistent with RCM's rights under U.S. Mining Laws. After considering these various alternatives and the scoping issues associated with them, it was determined that the issues of concern and potential impacts to recreational users could be addressed by the development of other alternatives, as well as mitigation and monitoring measures. For these reasons, this alternative was eliminated from further consideration.

Helicopter Access to Drill Sites. RCM has indicated in their Pre-feasibility Plan of Operations that it can access PVT-7 by helicopter if access through nearby private lands is not obtained. Based upon their assertion, consideration was given to whether or not access to a larger group or all of the drill sites that require roads on National Forest System Lands for vehicular access could be achieved using helicopters and smaller four-wheel-drive vehicles to minimize surface disturbance. This alternative was determined not to be reasonable from a logistical perspective after considering the extent of existing road

infrastructure that exists within the PAA and the frequency that drill sites need to be accessed while drilling operations are ongoing. This alternative means of accessing all or some of the existing and proposed drill sites has been eliminated from further consideration.

Original Location for Drill Site OF-2. OF-2 was originally proposed to be located immediately east of Magma Mine Road, near to the west boundary of the Oak Flat Withdrawal Area (Figure 2-4). Because of the extent of vegetation removal associated with the development of this site and the availability of a previously disturbed alternative location, the original location of OF-2 was eliminated from further consideration.

Original Location for Drill Site H-C. H-C was originally proposed to be located south of its currently proposed location. Early in the Pre-feasibility Plan of Operations development by RCM, cultural resources were discovered in the vicinity of the originally proposed drill site location. H-C, as currently proposed in RCM's Pre-feasibility Plan of Operations, avoids impacts to cultural resources and the original location of H-C was eliminated from further consideration.

Original Location for Drill Site H-L. The original location for H-L was identified at the end of an existing dirt road approximately 300 feet east of Oak Flat Withdrawal Area's east boundary. During the Pre-feasibility Plan of Operations completeness review, the Forest Service suggested that RCM identify an alternate site that would be less visible to recreational users of designated campsites within the Oak Flat Campground and dispersed camping sites within the Oak Flat Withdrawal Area. As a result, an alternative location for H-L was identified and included in the Pre-feasibility Plan of Operations. The original location of H-L was eliminated from further consideration.

South Access Route to Drill Sites OF-1, OF-3, M, and RES-13. In response to public comments, a systematic search for another access route to OF-1, OF-3, M, and RES-13 was initiated. The South Access Route initially proposed followed FR 315 from Magma Mine Road for approximately 1.5 miles, and then turned to the north along an existing road through State lands for approximately 1 mile. RCM expressed concerns about the logistics of using this route, including increased travel time to and from the sites, and additional fuel consumption, and increased costs. The Forest Service eliminated the South Access Route from further consideration upon review of the probable extent of cut and fill required to establish a maximum grade of 15 percent along the northernmost portion of the alignment.

West Access Routes 1, 2, and 3 to Drill Sites OF-1, OF-3, M, and RES-13. In addition to the identification and review of the South Access Route to OF-1, OF-3, M, and RES-13, three of five western access routes from FR-315 were eliminated from further consideration because of potential adverse impacts to cultural resources.

Original Location for Drill Site H-G. The location of H-G was originally proposed on the north side of FR 2466. During plan completeness review by the Forest Service, this site was relocated south of

FR 2466 to avoid impacts to an adjacent ephemeral drainage and two Arizona hedgehog cacti identified during survey.

Original Location for Drill Site PVT-4. PVT-4 was originally located on the west side of a user-created road near the intersection with U.S. Highway 60. During early coordination efforts with the Forest Service, this drill site was relocated avoid potential impacts known archaeological resources.

Original Access to Drill Site PVT-7. PVT-7, located south of Pinal Ranch, was originally proposed to be accessed from U.S. Highway 60, south along FR 3 for approximately 1 mile and then west along FR 2511 for approximately 0.5 mile. This access route was eliminated from further consideration because it occurs along the western boundary of an area that has been set aside by the Forest Service as mitigation for the endangered Arizona hedgehog cactus.

2.3. Mitigation and Monitoring Measures

In response to public comments on the proposal and Forest review and evaluation of project impacts, the following list of proposed mitigation and monitoring measures was developed. The issues referenced here refer to the issues identified in Section 1.7.

1. Minimize Dust Emissions Along Access Roads (Issue 1). Unpaved access roads will be watered as necessary during periods of regular use by RCM employees or contractors.

2. Limit Air Emissions at Drill Sites (Issue 1). Drill rigs and other mobile and stationary sources of air emissions at drill sites must be operated consistently with past practices to limit oxides of nitrogen (NO_x) emissions from Pre-feasibility Activities to peak estimated emission levels reported in this EA. Using readily available data, RCM will document their conformance with this requirement annually to the Forest Service.

3. RCM will Reduce Vehicle Traffic to the Extent Practical (Issue 1 and 5). To the extent practical and consistent with the efficient and safe implementation of Pre-feasibility Activities, RCM will reduce vehicle traffic on National Forest System Lands.

4. Erosion Control (Issue 2). Prior to implementation of any ground disturbing activities, the SWPPP will be provided to the Forest Service for review and approval.

5. Water Quality (Issue 2). RCM will provide the Forest Service with copies of all applicable water quality permits required for well development and testing prior to ground disturbing activities at drill sites.

6. Stormwater and Spill Prevention Plan (Issue 2). Exploration and Pre-Feasibility activities would not result in the release of any hazardous or nuisance substances to the environment and, if such release occurs, immediate corrective actions will be taken by RCM. An SPCC plan would be prepared in accordance with ADEQ regulations and incorporated into the Pre-feasibility Plan of Operations prior to ground disturbing activity.

7. Temporary and Interim Reclamation Measures (Issue 2). RCM will be required to develop both temporary shutdown and interim reclamation plans for review and approval by the Forest Service. These plans will address periods of non-activity at exploration drill sites and partial reclamation of drill sites that are transitioning from active drilling phases to groundwater monitoring phases. Upon approval by the Forest Service these plans will be incorporated into the Pre-feasibility Plan of Operations. Final reclamation will be conducted on all sites not selected for groundwater monitoring immediately after completion of drilling activities.

8. Minimize Safety Pull-out Size (Issues 2, 3, and 4). RCM will coordinate with the Forest Service prior to construction of any Safety pull-outs identified in the Pre-feasibility Plan of Operations to ensure that the size of the pull-out is minimized to the extent practical.

9. Use of Rock Riprap and Aggregate Surfacing Material (Issue 2 and 5). Riprap or aggregate used during road preparation will be angular and the color will match native soil. Non-native aggregate surfacing placed on drill sites will be removed or buried at closure.

10. Biological Monitoring (Issues 3 & 4). During construction of road improvements along FR 2466, RCM will provide a qualified biologist who will monitor immediately prior to and during initial grading and clearing activities to establish and verify the location of fencing at the grading limits. The biological monitor would be responsible for ensuring that construction activities do not impact any Arizona hedgehog cacti. A qualified biologist, provided by RCM, will also be required to conduct this monitoring during interim or final reclamation. In the unlikely event that Arizona hedgehog cacti are identified in the footprint of planned construction or reclamation activities, activities in that vicinity would stop until a means of construction that avoids any adverse impact to Arizona hedgehog cacti is identified and implemented.

11. Fire Plan (Issues 3 and 4). Fire restrictions and provisions of the Tonto National Forest Fire Plan will be incorporated into the Pre-feasibility Plan of Operations. This may include shut down to comply with red-flag conditions unless measures to minimize the risk of fire are employed and agreed to prior to fire seasons.

12. Management of Noxious Weeds (Issue 3 and 4). All seed mixes to be used in reclamation are required to be certified weed free of seeds listed on the Tonto National Forest weed list. All equipment must be cleaned prior to use on the project. Cleaning will remove all dirt, plant parts, and material that could carry noxious weed seeds. Only equipment cleaned and inspected will be allowed to operate in the

PAA and RCM must provide an annual record of this activity to the Forest Service. Cleaning must occur off National Forest System Lands. This requirement does not apply to service vehicles used for transportation to and from the reclamation sites.

13. Well and Borehole Abandonment (Issue 3 and 6). All wells and boreholes will be abandoned in accordance with the State of Arizona well abandonment rules (Arizona Administrative Code Rule R12-15-816). Copies of Arizona Well Drill Reports and Well Log Forms and Well Abandonment Completion Reports will be provided to the Forest Service annually.

14. Down-gradient Rock Guards (Issue 4). RCM will provide a qualified biologist to survey for the presence of Arizona hedgehog cacti at any locations adjacent to road or drill pad construction areas where there is potential for rock to be dislodged and roll downhill. The qualified biologist would ensure that in these locations appropriately constructed metal guards would be placed over the individual Arizona hedgehog cactus and secured prior to initiation of construction activities in uphill locations. The metal guards will remain in place during construction activities in these areas. A qualified biologist, provided by RCM, will also be required to re-survey for the presence of any Arizona hedgehog cacti and ensure their safety during required interim and final reclamation.

15. Configuration of North OF-2 Drilling Equipment (Issue 5). The drilling equipment at the North OF-2 drill site will be configured so that the power pack, or the engine of the drill if it is integral to the rig, is oriented away from Boulder Campsite to minimize noise impacts to the recreational users at that campsite.

16. Visual Screening (Issue 5). An assessment of the need for screening will be made by the Forest following drill setup. RCM will place camouflage netting materials on exploration drill sites OF-1 and OF-3 where they face Oak Flat Campground, if screening from existing boulders or vegetation is not sufficient. The material will be placed so that views of the drill equipment to a maximum height of 15-feet from the Oak Flat Withdrawal Area will be blocked.

17. Retention of Existing Boulders at Drill Site OF-3 (Issue 5). At exploration drill site OF-3, RCM will leave the large boulders along the eastern edge of the proposed exploration drill pad nearest the road. These boulders could provide some screening and from the road and facilitate reclamation efforts upon completion of exploration drilling at this location.

18. Retention of Boulders at Drill Site H-N (Issue 5). At drill site H-N, RCM will leave the large boulders along the eastern edge of this drill site nearest the road to provide some screening to the road and to facilitate reclamation efforts.

19. Rock Treatment to Minimize Visual Impacts (Issue 5). Annually, RCM will work with the Forest Service to 1) identify any disturbed areas associated with the construction of new roads, improvements of existing roads, and construction of drill sites and 2) develop a rock staining (simulated desert varnish) implementation plan for the following year to reduce visual impacts.

20. Minimize Night Light Effects to Recreation Area (Issue 5). Lights used for night work and safety at drill sites will be directed or shielded to minimize night light effects to recreational areas.

21. Salvage and Stockpile Boulders for Reclamation (Issues 5 and 8). RCM will, to the extent practical, collect and set aside suitable boulders within the footprint of the proposed disturbance area for later use at drill sites or other reclamation activities. When used for closure and reclamation, salvaged boulders will be placed in a fashion or pattern that mimics boulder configuration in adjacent undisturbed areas.

22. Administrative Traffic Controls (Issue 6). RCM will work with the Forest Service to develop and implement an administrative access control plan to address safety concerns identified during public scoping. Specific items that could be addressed in the plan include, but may not be limited to: 1) signage, 2) training programs and documentation, 3) performance standards and specific policies to identify problems and discipline offenders, 4) plans for limiting traffic during periods of high-use public events, 5) plans to incorporate traffic safety issues into regular “lunch box” safety meetings on site, 6) a traffic monitor when and where appropriate, and 7) a collection agreement to fund Forest Service oversight of the traffic monitor.

23. Diligent Care and Maintenance of Magma Mine Road (Issue 6). RCM will be responsible for the maintenance and care of Magma Mine Road.

24. Restrict Travel to Certain Roads within the Oak Flat Withdrawal Area (Issue 6). When conducting Pre-feasibility Activities, RCM will restrict its use of roads within the Oak Flat Withdrawal Area to Magma Mine Road, FR 2438, the 2438 Bypass, FR 3153, and those portions of Old U.S. Highway 60 that are used to access drill sites PVT-3, PVT-4, and H-L.

25. Cadastral survey of the Oak Flat Withdrawal Boundary and Drill Site Monitoring (Issue 7). RCM will conduct a cadastral survey at proposal drill sites adjacent to the Oak Flat Withdrawal Area to ensure that exploration activities do not encroach on the withdrawal lands. Annual drilling information will be provided to the Forest Service for exploration drill holes in the vicinity of the Oak Flat Withdrawal Area that is of sufficient detail to document that directional drilling activities do not extend under the Oak Flat Withdrawal Area.

26. Travel Management (Issue 8). The road system utilized by the Pre-feasibility Activities will be required to conform to the Travel Management goals during use and at reclamation and closure. Reclamation activities will be conducted to achieve those goals.

27. Archaeological Monitor (Issue 9). During construction of road improvements for the West Access Routes 4a or 4b, the PVT-8 access route, the PVT-7 access route, and drill site construction pad improvements for H-C and PVT-8, RCM will provide a qualified archaeologist who will be present to ensure that the limits of construction are established and maintained during construction.

28. Placement of Outfall Structure to Protect Cultural Resource Site (Issue 9). A cultural resources site is located adjacent to H-C. The outfall structure for this well will be placed along the opposite wall of the drill pad to avoid water flow over the cultural resources site. Expelled water will flow along an eastward gradient from this location and will be intercepted by an existing livestock watering tank.

29. Avoidance of Unidentified Cultural Resources (Issue 9). If previously unidentified cultural resources are encountered during construction activities, work will cease at that location and Forest Service archaeologists will be contacted for instruction before work continues at that location.

30. Placement of Clean Fill in Potholes in the Early 1920's Superior-Miami Highway (Issue 9). This existing road segment will be used to access a drill site. RCM will fill the numerous existing potholes within this road with clean fill material to slow erosion of the historic highway.

2.4. Comparison of Alternatives

Table 2-12 provides a summary of the effects of implementing each alternative by key issue. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2-12. Comparison of Alternatives

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a	Alternative 5 West Access Route 4b
Issue 1 Air Quality	The no action alternative would result in no development of new drill sites on Forest Service lands and all drill activities would be restricted to State and private lands. In the short term drilling activities may equal peak activity levels outlined in proposed action. Air emissions would be equivalent during those periods of time. As the new drilling targets that provide quality data to support RCM's pre-feasibility studies diminishes, drilling activity would be reduced with associated reductions in air emissions.	Air emissions anticipated as a result of Pre-Feasibility Activities are analyzed, inventoried and totaled per activity and for the anticipated peak activity levels. All values are tons per year. Total Peak Year Combustion Emissions: CO = 42.5; NO _x = 190.6; PM ₁₀ = 13.4; PM _{2.5} = 12.5; SO _x = 12.5; VOC = 15.7 Total Peak Year Fugitive Emissions: PM ₁₀ = 43.1; PM _{2.5} = 4.4	Air emissions from the implementation of this alternative are not expected to be different from the emissions estimated using the OF-2 drill site.	Overall travel distance from the Superior East Plant Site to the intersection of FR 3153 and the user-created road that provides access to RES-13 would be 1.39 miles shorter than the proposed action and would result in fewer air emissions from vehicle travel than the proposed action. Additional emissions from construction of the road in tons per year are: Combustion Emissions: CO = 0.0656 NO _x = 0.2991 PM ₁₀ = 0.0219 PM _{2.5} = 0.0219 SO _x = 0.0219 VOC = 0.0219 Fugitive Emissions: PM ₁₀ = 0.1021 PM _{2.5} = 0.0073	Overall travel distance from the Superior East Plant Site to RES-13 would be 1.24 miles shorter than the proposed action and would result in fewer air emissions from vehicle travel than the proposed alternative but slightly more than West Access Route 4a. Additional emissions from construction of the road in tons per year are: Combustion Emissions: CO = 0.0754 NO _x = 0.3436 PM ₁₀ = 0.0251 PM _{2.5} = 0.0251 SO _x = 0.0251 VOC = 0.00251 Fugitive Emissions: PM ₁₀ = 0.1173 PM _{2.5} = 0.0084

Table 2-12. (Continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a	Alternative 5 West Access Route 4b
Issue 2 Roadway Sediment and Erosion Control	Implementation of the no action alternative would require RCM to reclaim drill sites developed as part of the Previously Authorized Activities. Existing Forest Roads would remain in their present condition. In the short term, erosion and soil loss from these roads would not change from the current condition.	<p>Much of the PAA is underlain by rock and would not be erodible; however, the overall footprint of disturbance within the vicinity of the PAA would be increased by 41.68 acres.</p> <p>Implementation of BMPs to control and limit erosion and sedimentation would reduce the overall volume of soil loss from the proposed road and drill site improvements. Ephemeral drainage systems and the few intermittent or perennial water courses in the vicinity of the PAA are not expected to be adversely impacted.</p>	<p>There would be less than an approximately 0.25 acre increase in overall surface disturbance in the PAA over the proposed action.</p> <p>Effects of mitigation would be the same as the proposed action.</p>	<p>A 2.82 acre increase in overall surface disturbance in the PAA; access road would cross a small ephemeral drainage; gating this road would limit use and reduce mechanical erosion from general recreational vehicle travel.</p> <p>This alternative would also reduce the vehicle trips on roads within the Oak Flat Withdrawal Area, reducing the rate of mechanical erosion on those roads.</p> <p>Effects of mitigation would be the same as the proposed action.</p>	<p>A 3.24 acre increase in overall surface disturbance in the PAA; West Access Route 4b would follow a small ephemeral drainage for approximately 1,100 feet; gating this road to limit public access and would reduce mechanical erosion from general recreational vehicle travel.</p> <p>This alternative would also reduce vehicle trips on roads within the Oak Flat Withdrawal, reducing the rate of mechanical erosion on those roads.</p> <p>Effects of mitigation would be the same as the proposed action.</p>
Issue 3 Wildlife	There would be no new surface disturbing activities. Closure and reclamation of existing, previously authorized drill sites on National Forest System Lands would commence in accordance with the previously authorized Plan of	Approximately 38.66 acres of previously undisturbed National Forest System Lands would be impacted, with the majority of the Impact Area immediately adjacent to previously disturbed areas.	This alternative component of the Pre-feasibility Activities would increase the acreage of Interior Chaparral habitat impacted by 0.25 acres over the proposed action.	This route and its associated drill sites would increase impacts to Interior Chaparral habitats in the vicinity of the PAA by 2.82 acres of National Forest System Lands and 0.41 acre of impact on State land.	This route and its associated drill sites would increase impacts to Interior Chaparral habitats in the vicinity of the PAA on National Forest System Lands by 3.24 acres. It would create approximately 0.95 mile

Table 2-12. (Continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a	Alternative 5 West Access Route 4b
	<p>Operations.</p> <p>The level of daily human activity, particularly along FR 315 would be decreased from current levels. Periods of peak use associated with four-wheel drive recreational traffic and other recreational uses may increase.</p>	<p>Approximately 28.58 acres of interior chaparral, 0.16 acres of Madrean evergreen woodland, and 9.92 acres of Sonoran desertscrub habitat would be affected, primarily along 16.97 miles of existing roadways.</p> <p>Some impacts to Management Indicator Species (MIS) individuals, but impacts to these species as a whole are expected to be transitory and extremely limited.</p> <p>Pre-feasibility Activities are not expected to result detectable population level impacts to MIS species.</p>		<p>It would create approximately 0.80 mile of new road between FR 315 and drill site RES-13; A total of 0.66 mile of new road would be constructed on National Forest System Lands.</p>	<p>of new road between FR 315 and drill site RES-13; A total of 0.81 mile of this new road would be constructed on National Forest System Lands.</p>
Issue 4 Arizona Hedgehog Cactus	<p>The no action alternative would not have any direct or indirect effect to Arizona hedgehog cactus.</p>	<p>The Forest Service has determined that the implementation of the Pre-feasibility Activities may affect but is not likely to adversely affect Arizona hedgehog cactus. No individuals are expected to be directly affected by the proposed action.</p> <p>Approximately 28.66 acres of potentially suitable habitat would be</p>	<p>Survey did not detect any Arizona hedgehog cacti on or in the vicinity of North OF-2 and implementation of this action. This alternative would not have any direct or indirect affect on Arizona hedgehog cactus.</p>	<p>Survey did not detect any Arizona hedgehog cacti on or in the vicinity of this access alternative and associated drill sites. This alternative access route and the two associated drill sites would not have any direct or indirect affect on Arizona hedgehog cactus.</p>	<p>Survey did not detect any Arizona hedgehog cacti on or in the vicinity of this access alternative and associated drill sites. This alternative access route and the two associated drill sites would not have any direct or indirect affect on Arizona hedgehog cactus.</p>

Table 2-12. (Continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a	Alternative 5 West Access Route 4b
		<p>disturbed by Pre-feasibility Activities.</p> <p>Monitoring activities and other mitigation measures would ensure avoidance of individual plants.</p>			
<p>Issue 5 Recreational Activities in and Around Oak Flat</p> <p>General Considerations</p>	<p>No new drill sites would be developed on National Forest System Lands. All drill activities would be restricted to State and private lands. Drill traffic would be limited to the use of Forest Roads to access private and State land.</p>	<p>Would preclude use of the Boulder Campsite and access point to Euro Dog Valley Climbing Area.</p>	<p>Selection of the North OF-2 exploration drill site would allow for the continued use of the Boulder Campsite. This would also maintain an existing access point to the Euro Dog Valley Climbing Area.</p>	<p>Would reduce impacts to recreational users of Oak Flat Campground by routing drill site traffic outside of the Oak Flat Withdrawal.</p>	<p>Would reduce impacts to recreational users of Oak Flat Campground by routing drill site traffic outside of the Oak Flat Withdrawal.</p>
<p>Issue 5 Recreational Activities in and Around Oak Flat</p> <p>Noise Effects</p>	<p>Under this alternative, noise levels in the Oak Flat Campgrounds are expected to stay at their current levels.</p>	<p>No increase in sound levels at the designated campsites in the Oak Flat Campground. Sound levels at dispersed campsites within the Oak Flat Withdrawal Area would increase by less than 1 dBA; 3 dBA is usually considered the minimum noticeable change in sound level.</p>	<p>Noise effects for designated and dispersed campsites within the Oak Flat Withdrawal Area are the same as the proposed action. Noise levels at the Boulder Campsite would range from 42 dBA at a background noise level of 30dBA to 44 dBA at a background noise level of 40 dBA.</p>	<p>Impacts to the recreational users of Oak Flat Campground from fixed drill site locations (e.g., OF-1, OF-2, and OF-3) would not change. Overall noise impacts to recreational users of Oak Flat Campground would be reduced because of the reduced traffic from drill site mobilization and demobilization activities, service vehicles, and shift changes.</p>	<p>Impacts to the recreational users of Oak Flat Campground from fixed drill site locations (eg OF-1, OF-2, and OF-3) would not change. Overall noise impacts to recreational users of Oak Flat Campground would be reduced because of the reduced traffic from drill site mobilization and demobilization activities, service vehicles, and shift changes.</p>

Table 2-12. (Continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a	Alternative 5 West Access Route 4b
Issue 5 Recreational Activities in and Around Oak Flat Visual Effects	There would be no new exploration drill rigs visible from the designated campsites, dispersed campsites, or the roadways within the Oak Flat Campground. RES-13 may be visible from FR 3153 and other areas within the Oak Flat Withdrawal Area when this drill site is being utilized.	Users of the designated campgrounds would not see drill sites OF-1, OF-2, and OF-3. Users of some dispersed campsites would see drill sites OF-1, OF-2, and OF-3. Drill site H-L and PVT-4 would be more visible to recreationists in the campground and drivers along U.S. Highway 60, but occupancy of these sites for drilling is relatively short term.	North OF-2 would not be visible from the designated campsites within Oak Flat Campground. The upper portion of the drill rig mast would be visible from the Boulder Campsite and portions of the Euro Dog Valley Rock Climbing Area would be able to see North OF-2. Users of one dispersed campsite would see North OF-2.	Based on a visual analysis that relies on topography, it appears that this route is not generally visible to the public, particularly in the Oak Flat Withdrawal Area. Forest users who travel FR 315 and travel south through the Oak Flat Withdrawal Area to State lands would be able to see portions of this road.	Based on a visual analysis that relies on topography, it appears that this route is not generally visible to the public, particularly in the Oak Flat Withdrawal Area. Forest users who travel FR 315 and travel south through the Oak Flat Withdrawal Area to State lands would be able to see portions of this road.
Issue 5 Recreational Activities in and Around Oak Flat Traffic Effects	One drill site, RES-13, located on State lands immediately south of the Oak Flat Campground would continue to be used for exploration drilling purposes. Access to this drill site for mobilization and demobilization drilling equipment, service vehicles and personnel is through Oak Flat Campground and would continue. The volume of traffic accessing this drill site would be approximately 6 to 14 trips per day.	Long term occupancy drill sites OF-1, OF-2, OF-3, Site M, and RES-13 on State land would be accessed via Forest Roads in Oak Flat Campground. Short term occupancy sites PVT-3, PVT-4, and H-L would also use Forest Roads but for a relatively short duration of time. Depending upon occupancy, the maximum increase in vehicle trips per day may be as high as 88 vehicle trips per day.	The North OF-2 Exploration Drill Site Location would not affect traffic within Oak Flat Campground and would not change the total number of vehicle trips per day on Magma Mine Road from the levels anticipated in the proposed action.	West Access Route 4a would reroute traffic that would otherwise utilize existing roads within the Oak Flat Campground. Construction of West Access Route 4a would eliminate drilling related traffic in Oak Flat associated with sites OF-1, OF-3, Site M, and RES-13. Short term traffic impacts associated with the construction of tunnel characterization bore holes PVT-3 and PVT-4 and deep groundwater testing and monitoring well at H-	Impacts would be the same as West Access Route 4b alternative.

Table 2-12. (Continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a	Alternative 5 West Access Route 4b
				L would occur. These effects are mitigated by seasonal restrictions on access to PVT-3, PVT-4 and H-L. After drilling at these sites, traffic would only occur for testing and monitoring.	
Issue 6 Safety	Safety concerns associated with the volume of traffic under the No Action Alternative would be at a maximum 75 percent less than that associated with the maximum traffic generated within the Oak Flat Campground by the proposed action. The only traffic generated within Oak Flat Campground by the selection of the No action Alternative would be the traffic used to access and service exploration drill site RES-13 on State lands immediately south of the Oak Flat Campground.	At its peak approximately 88 vehicle trips per day would be added to the base traffic condition on FR 2438. During much of the authorization period for the proposed action the actual number of vehicles using the roads in Oak Flat to service adjacent drill sites or access groundwater monitoring well sites would be much less.	Traffic safety consequences of this alternative would be the same as for the proposed action.	RCM vehicle use in the Oak Flat Campground for the Pre-feasibility Activities would be substantially less if West Access Route 4a was constructed. The only traffic use in Oak Flat Campground would be for the short period of construction at H-L and PVT-4. Construction would be seasonal and limited to periods of lowest use. Once drill sites are constructed, traffic through Oak Flat Campground would be for groundwater testing and monitoring at the DOE Well Site, HRES-3, H-L, and PVT-4.	The safety consequences of this alternative would be the same as for West Access Route 4a.

Table 2-12. (Continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a	Alternative 5 West Access Route 4b
<p>Issue 7 Conflicts with Oak Flat Withdrawal Area</p>	<p>Exploration drill sites OF-1, OF-2, and OF-3 would not be constructed, and exploration drilling activities would not take place on National Forest System Lands in proximity to the Oak Flat Withdrawal Area. Closure and reclamation of previously authorized drill site M would be implemented. There would be no directional drilling in these areas and the physical potential for RCM to directionally drill under the Oak Flat Withdrawal Area would be substantially eliminated.</p>	<p>Exploration drilling activities would occur at drill sites OF-1, OF-2, OF-3, and M as described in the Pre-feasibility Plan of Operations. Any exploration drilling under the Oak Flat Withdrawal Area would be considered a mineral entry or appropriation in violation of the withdrawal. RCM has committed to the Forest Service that it would not drill under the Oak Flat Withdrawal Area.</p> <p>The implementation of proposed mitigation would provide assurances to the Public that RCM is operating in conformance with the requirements of the Oak Flat Withdrawal Area.</p>	<p>Impacts would be the same as the proposed action.</p>	<p>Impacts would be the same as the proposed action.</p>	<p>Impacts would be the same as the proposed action.</p>
<p>Issue 8 Travel Management</p>	<p>There would no change in current use patterns or designations for the existing roads within National Forest System Lands.</p> <p>If a future closure determination is made for</p>	<p>Travel management planning is underway and the Forest Service cannot predict with certainty the outcome of this planning process with regard to any of the specific Forest Roads and user-created</p>	<p>Impacts would be the same as the proposed action.</p>	<p>Impacts would be the same as the proposed action.</p>	<p>Impacts would be the same as the proposed action.</p>

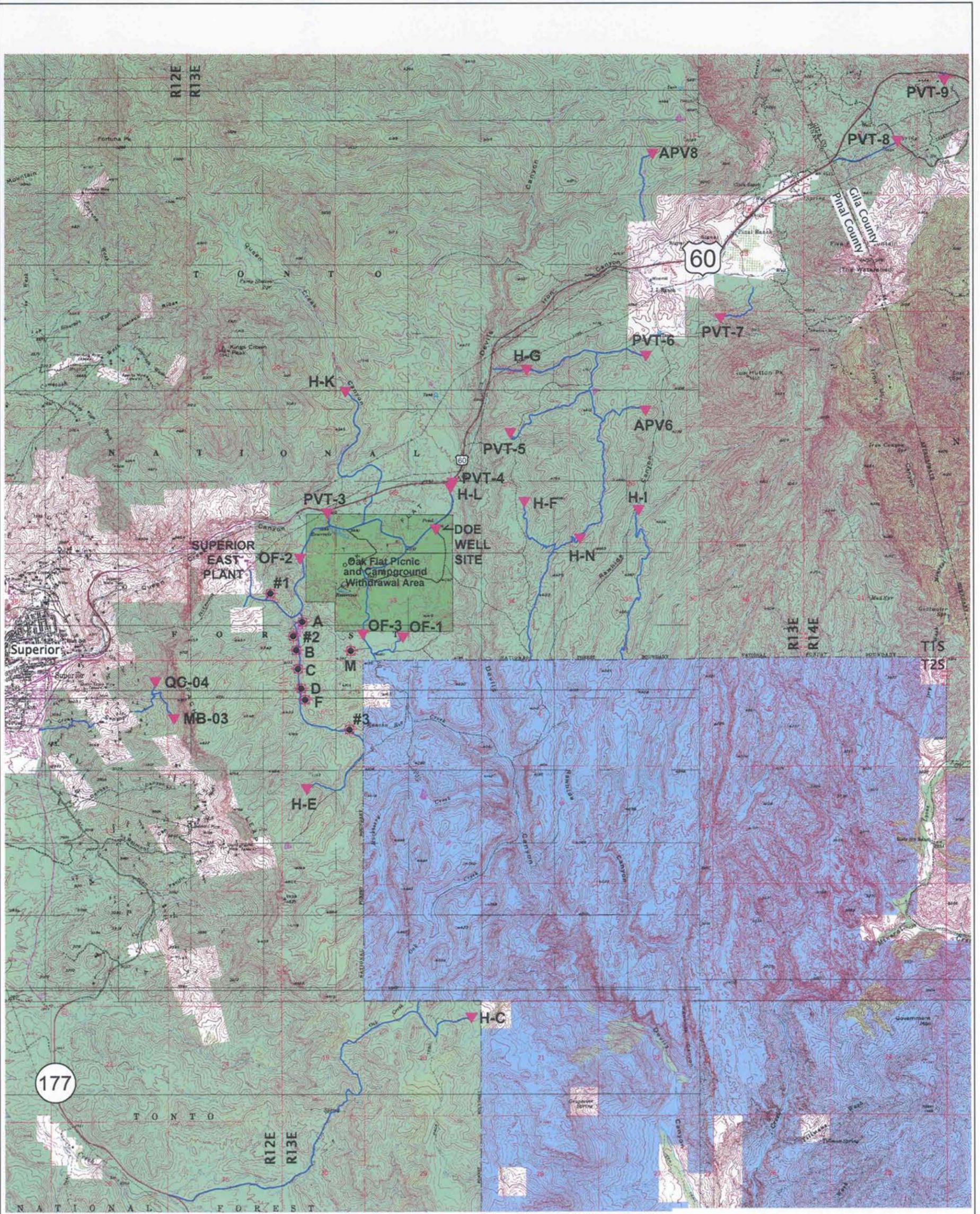
Table 2-12. (Continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a	Alternative 5 West Access Route 4b
	any of the roads through the Forest Service’s travel management planning process, the Forest Service would be responsible.	roads proposed for improvement, maintenance, or construction in the Pre-feasibility Plan of Operations. Mitigation measures would require that the road system utilized by the Pre-feasibility Activities conform to the Travel Management goals that may be developed during the time proposed for implementation of the Pre-feasibility Activities. This mitigation measure would apply during use and at reclamation and closure.			
Issue 9 Cultural Resources	The no action alternative would not adversely impact any cultural resource sites.	The proposed action would result in no adverse impacts to cultural resources. Monitoring activities and other mitigation measures would ensure avoidance.	The North OF-2 drill site alternative will not have any direct or indirect adverse impact to cultural resource sites. Monitoring activities and other mitigation measures would ensure avoidance.	West Access Route 4a would not have any adverse impact to cultural resource sites. Monitoring activities and other mitigation measures would ensure avoidance.	West Access Route 4b would not have any adverse impact to cultural resource sites. Monitoring activities and other mitigation measures would ensure avoidance.

Table 2-12. (Continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a	Alternative 5 West Access Route 4b
Issue 10 Native American Religious Practices	The no action alternative would not affect Native American religious practices. It is not expected to increase the accessibility of any sacred sites to Native Americans nor would it limit access.	<p>In a comment letter prepared by legal counsel for the San Carlos Apache, it was stated that “Oak Flat, Apache Leap, Devil’s Canyon and the related canyons, geologic formations, and springs in the area of proposed activity are holy, sacred, and consecrated lands.”</p> <p>During ongoing consultation, Native American Tribes have not provided information on any specific sacred sites within or near the PAA or any of the alternative sites considered in this EA.</p> <p>Native American groups will not be precluded from using the Oak Flat Withdrawal Area and surrounding National Forest Lands while the proposed Pre-feasibility Activities or any alternatives considered in this EA are underway.</p> <p>Some effect to subjective religious experience may occur from the proposed action but it is not anticipated that this experience would be substantially burdened.</p>			
Cost Comparisons	RCM would be responsible for completion of closure and reclamation activities in accordance with existing authorizations.	<p>Mitigation measures outlined in Section 2.3 would substantially increase implementation costs. The current estimated cost to provide a traffic monitor at the Oak Flat Campground during daylight hours, while drill sites are operable, is approximately \$440,000 for the five year drilling period.</p> <p>Cost estimates for rock staining, boulder salvage, and implementation of the other mitigation measures are not available at this time.</p>	This alternative is not expected to substantially change the implementation costs from the proposed action.	<p>This alternative would reduce the cost of implementation of mitigation measures by removing the requirement for a traffic monitor at Oak Flat Campground.</p> <p>The estimated cost to construct West Access Route 4a is \$145,000. The cost for reclamation using standard Bureau of Land Management (BLM) calculation factors is estimated to be \$11,000.</p> <p>Other costs for mitigation measures would be similar to the proposed action.</p>	<p>This alternative would reduce the cost of implementation of mitigation measures by removing the requirement for a traffic monitor at Oak Flat Campground.</p> <p>The estimated cost to construct West Access Route 4b is \$180,000. The cost for reclamation using standard Bureau of Land Management calculation factors is estimated to be \$13,000.</p> <p>Other costs for mitigation measures would be similar to the proposed action.</p>

Page intentionally left blank



LEGEND	
	Forest System and User-created Roads Utilized for Pre-feasibility Activities
	Proposed Drill Site
	Previously Approved Drill Site
	Oak Flat Picnic and Campground Withdrawal Area
	Tonto National Forest Land
	State Trust Land
	Private Land

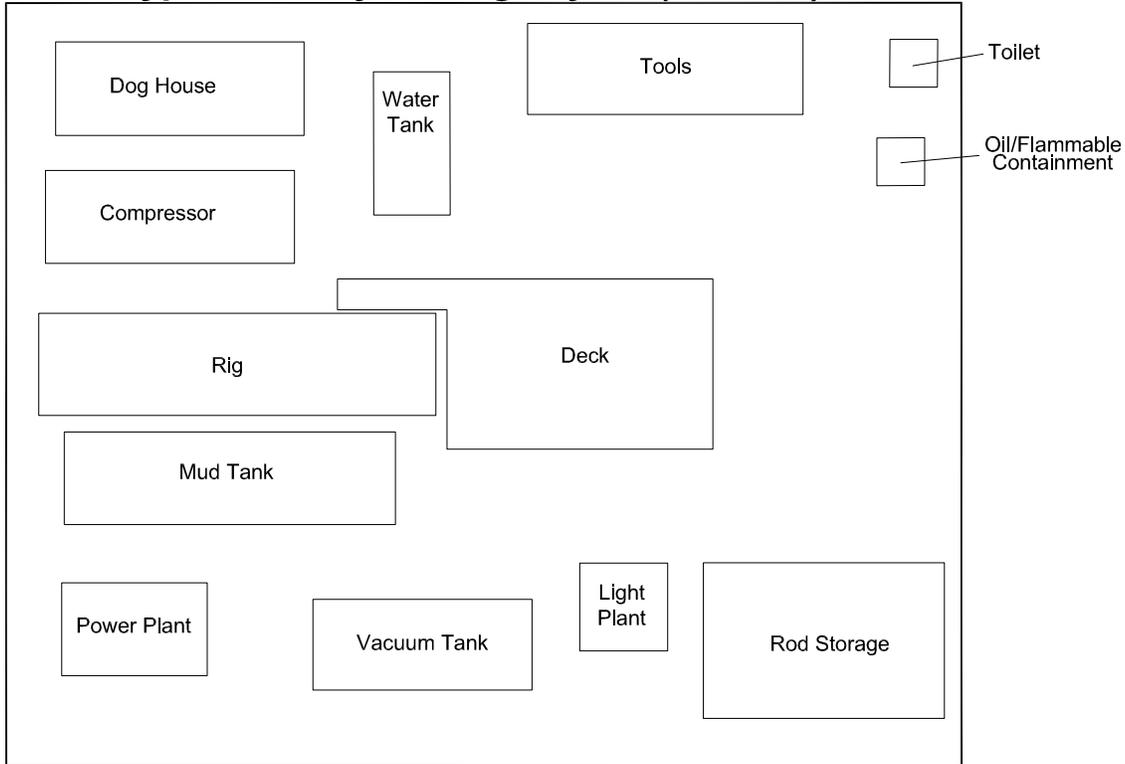


**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment

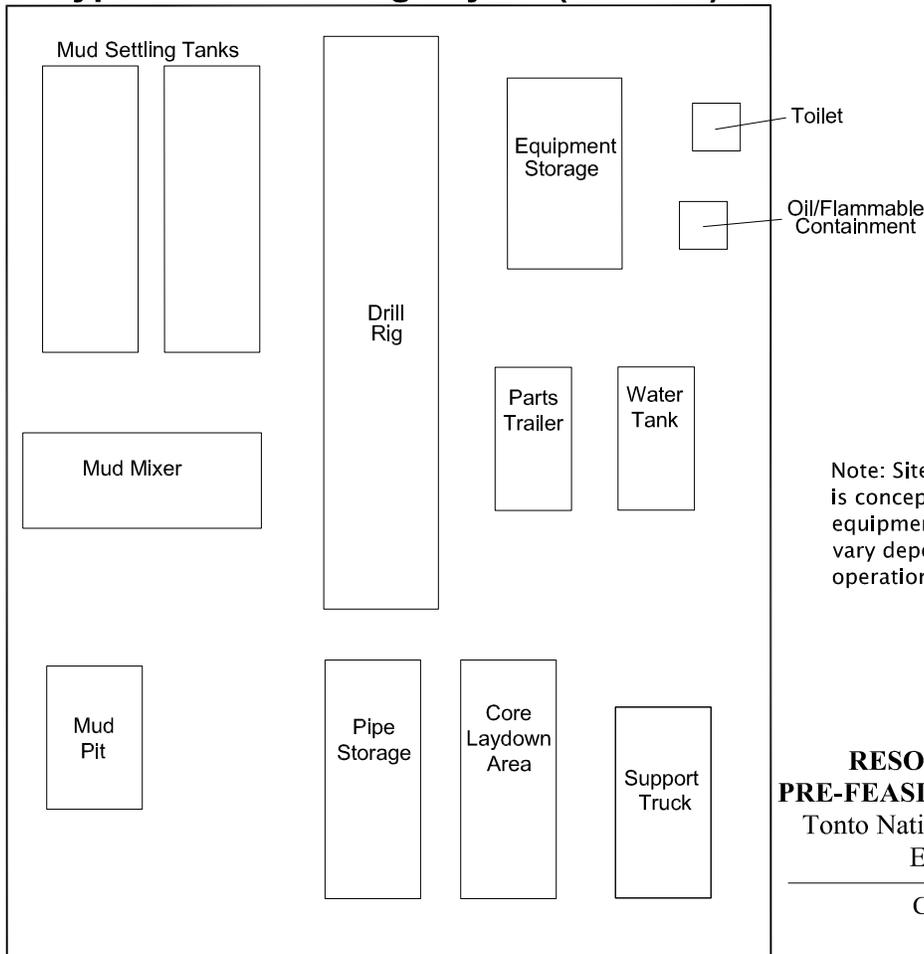
Proposed Pre-feasibility Activities Overview

Figure 2-1

Typical Rotary Drilling Layout (100'x80')



Typical Core Drilling Layout (80'x100')



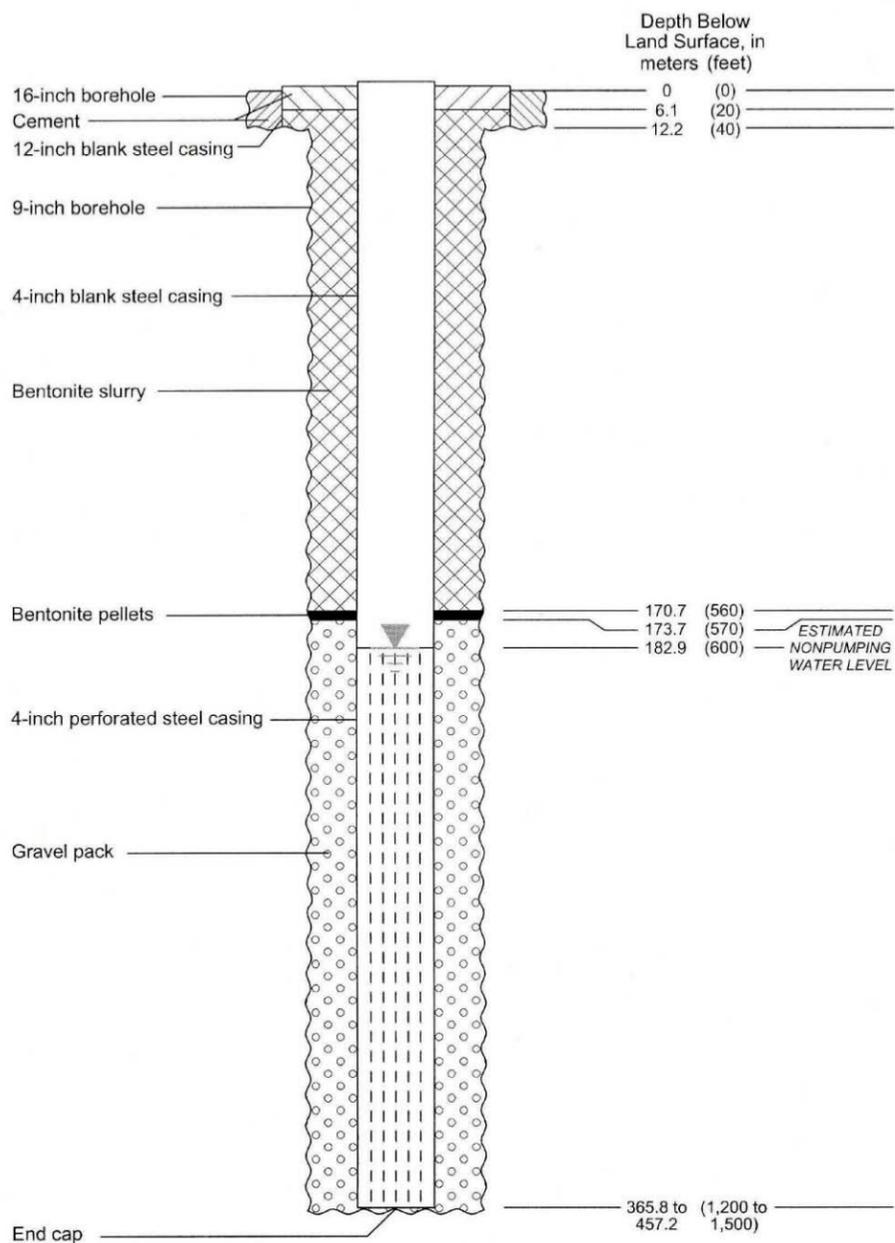
Note: Site configuration and equipment layout is conceptual. The actual site configuration and equipment layout used at each drill site will vary depending on site specific constraints and operational considerations.

**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment

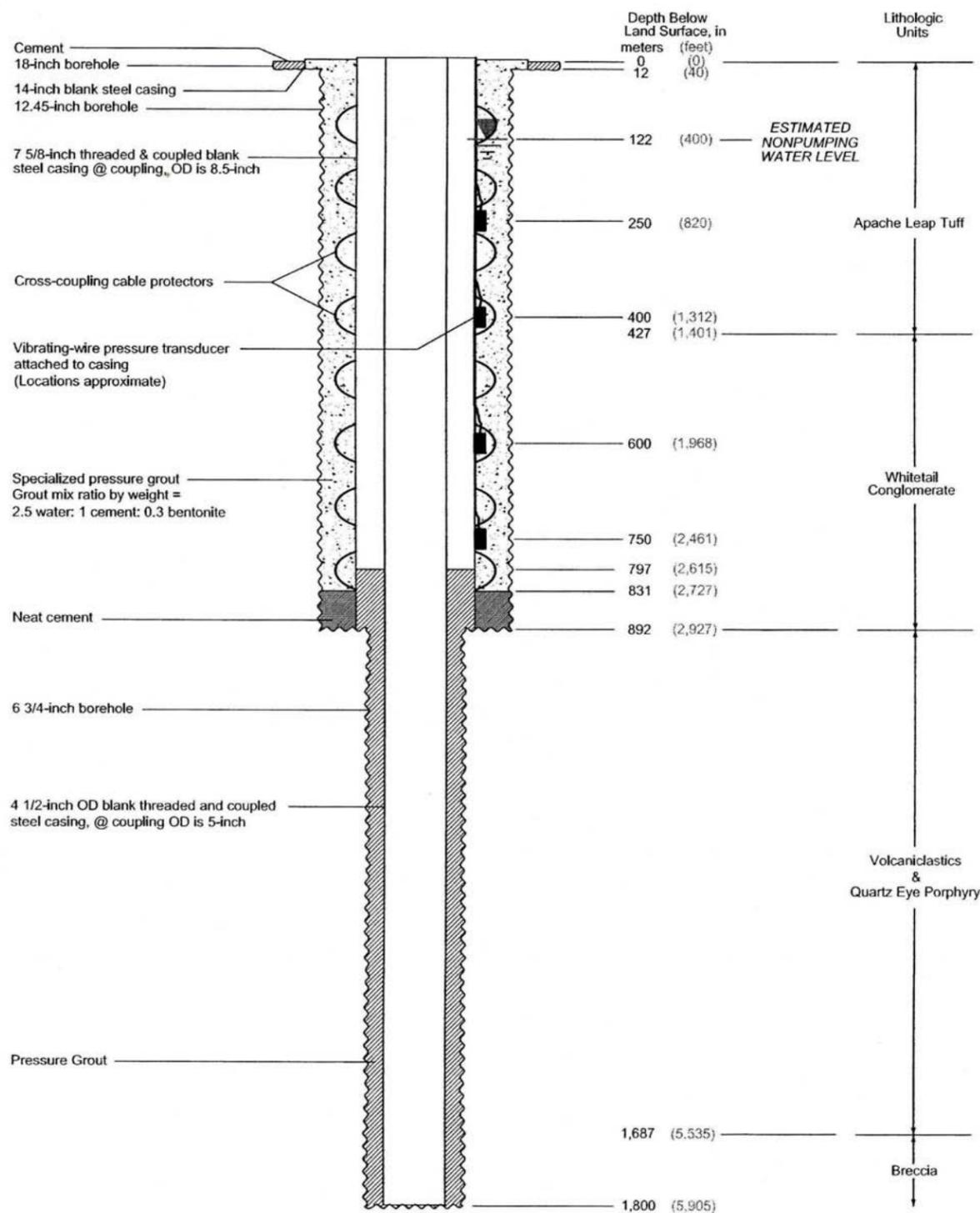
Conceptual Drill Site Layout

Figure 2-2

SCHEMATIC DIAGRAM OF SHALLOW HYDROLOGIC MONITORING WELL

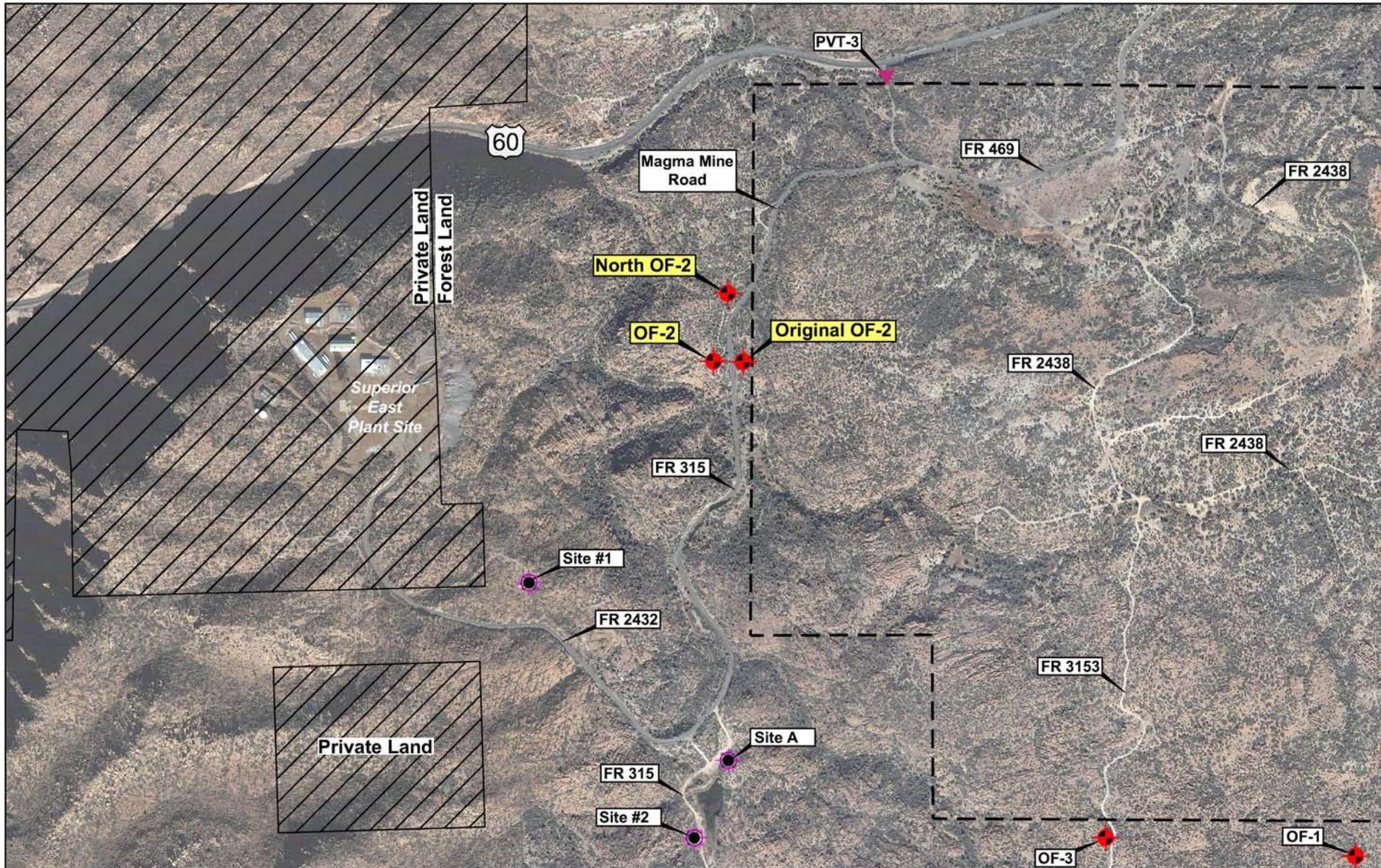


SCHEMATIC DIAGRAM OF DEEP HYDROGEOLOGY TESTING AND MONITORING WELL



**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment

Schematic Diagram of Deep & Shallow
Groundwater Testing and Monitoring Wells

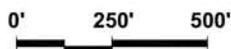
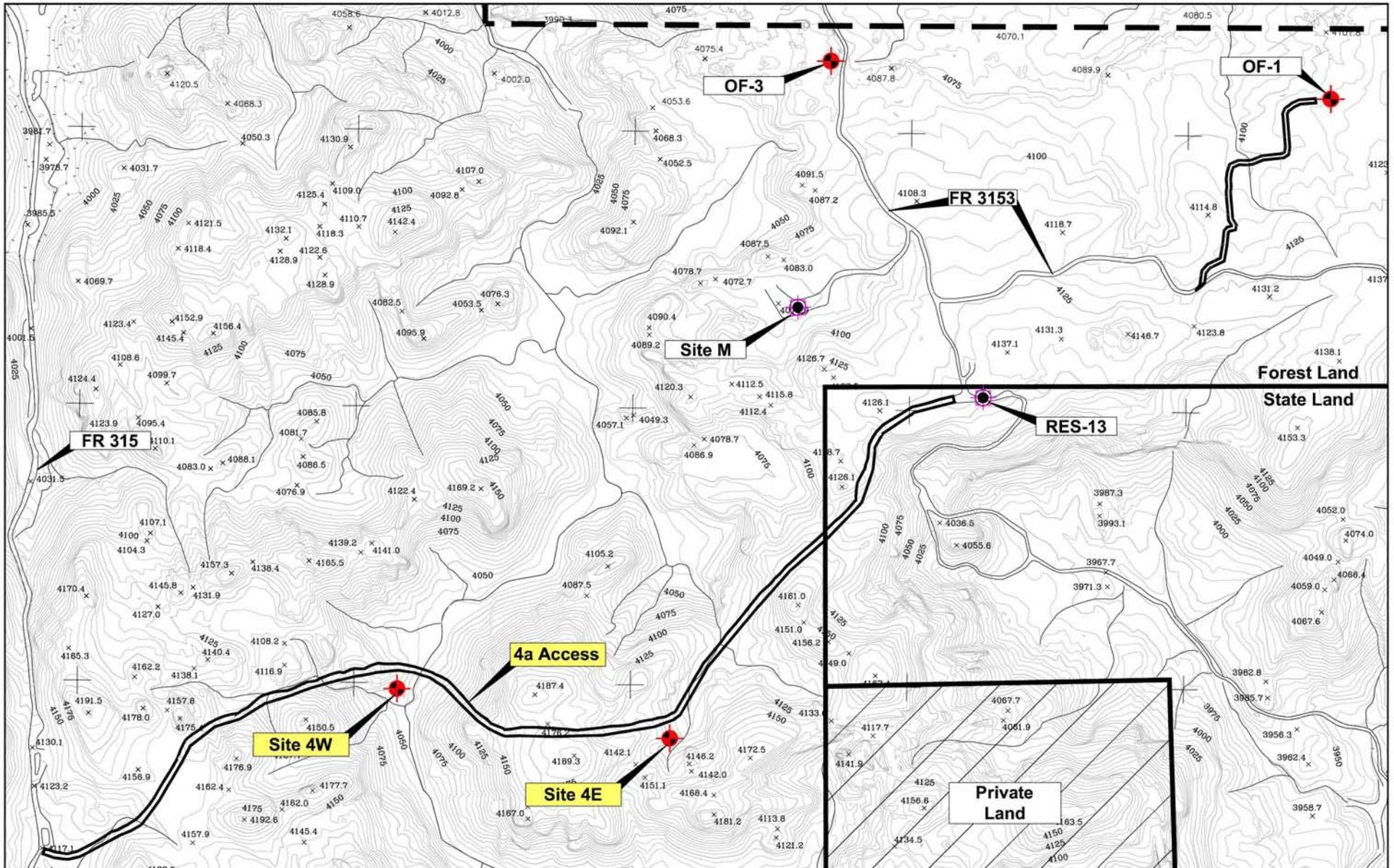


- LEGEND**
-  Proposed Exploration Drill Site
 -  Existing Exploration Drill Site
 -  Proposed Tunnel Characterization Bore Hole
 -  Oak Flat Picnic and Campground Withdrawal Boundary

**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS
Tonto National Forest - Globe Ranger District
Environmental Assessment**

Original OF-2, OF-2, and
North OF-2 Drill Site Locations

Figure 2-4

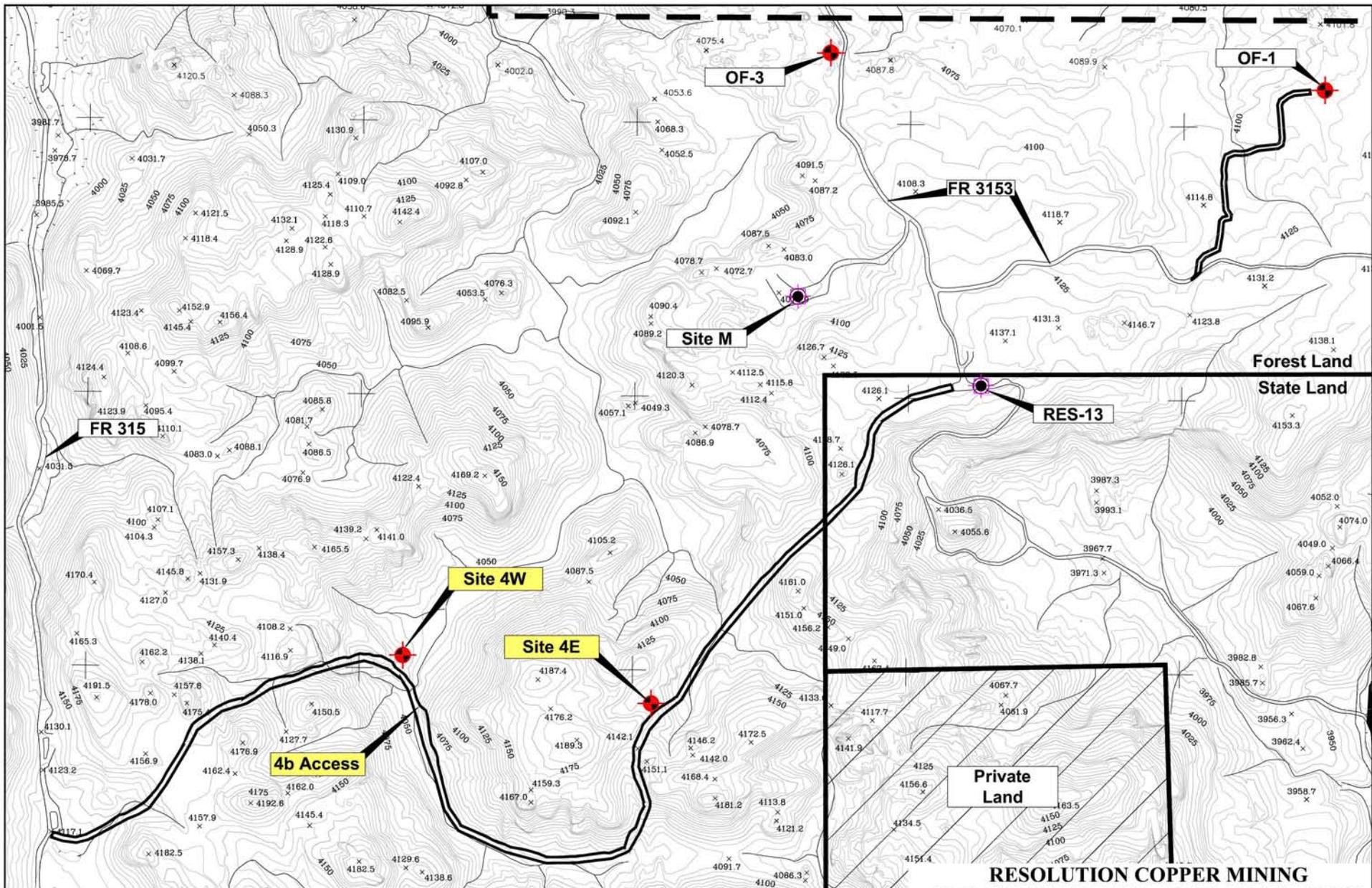


- LEGEND**
-  Proposed Exploration Drill Site
 -  Existing Exploration Drill Site
 -  Oak Flat Picnic and Campground Withdrawal Boundary
 -  Approximate Disturbance Limit of New Road

**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment

Alternative Access Route 4a and
Drill Site Locations 4E and 4W

Figure 2-5



0' 250' 500'



LEGEND

-  Proposed Exploration Drill Site
-  Existing Exploration Drill Site
-  Oak Flat Picnic and Campground Withdrawal Boundary
-  Approximate Disturbance Limit of New Road

**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**

Tonto National Forest - Globe Ranger District
Environmental Assessment

Alternative Access Route 4b and
Drill Site Locations 4E and 4W

Figure 2-6

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The first section of this chapter establishes baseline condition and identifies reasonably foreseeable future actions that collectively inform the analysis of cumulative effects. Following this discussion, this chapter describes the affected environment and the environmental consequences of the no action, proposed action and other alternatives developed as part of our analysis for each of the key issues. This presentation is organized by key issue and after describing the affected environment for a key issue, an analysis of the direct and indirect effects and the effects of mitigation is provided for each alternative. Following this discussion we provide our analysis of the cumulative effects for each alternative.

3.1. Air Quality (Issue 1)

3.1.1. Affected Environment

The regional climate is semi-arid (Green and Sellers 1964). Precipitation falls in a bimodal pattern: most of the annual rainfall within the region occurs during the winter and summer months, with dry periods characterizing spring and fall. The Western Regional Climate Center (WRCC 2008) maintains data records for weather stations within the United States. These stations include the Miami and Superior stations east and west of the PAA, respectively. Climatic data summarized on Table 3-1 are from the WRCC.

Table 3-1. Annual Mean Daily Weather Conditions

Weather Station	Project Area Distance from Weather Station (miles)	Mean Daily Average Temperature (F)	Mean Daily Maximum Temperature (F)	Mean Daily Minimum Temperature (F)	Mean Total Snow (inches)	Mean Total Precipitation Rates (inches)	Annual ET ¹ (inches)
Miami	6.8	63	77	51	3	19	55
Superior	1.2	70	79	59	1	19	63

¹ Evapotranspiration rate from Teclé and Yitayew (1990)

The far eastern portions of the PAA occur within the Miami Planning Area which was designated by Environmental Protection Agency (EPA) as a Nonattainment Area for PM₁₀.⁴ On March 28, 2007 EPA determined that the Miami Nonattainment Area met PM₁₀ (particulate matter with an aerodynamic diameter less than or equal to 10 microns) standards and qualified for redesignation as an Attainment Area. This action is pending (ADEQ 2009). The Hayden Nonattainment area for PM₁₀ extends north from Hayden, Arizona. The State Implementation Plan for this area was reviewed by EPA and given limited “approval/disapproval” in 1994 (59 FR Part 36116 as cited in ADEQ 2009). While still officially designated a Nonattainment Area, the last exceedance of the 24-hour PM₁₀ standard occurred in 1997 and the last annual standard exceedance occurred in 1988 (ADEQ 2009).

The Miami area has been designated an Attainment Area for sulphur dioxide (SO₂) with a Maintenance Plan (ADEQ 2009) and portions of the PAA located within Gila County are in this Attainment Area. ADEQ developed a State Implementation and Maintenance Plan in 2002 and EPA approved the plan in January of 2007 (72 FR 3061 cited in ADEQ 2009).

The PAA is within 50 miles of three Class I airsheds: the Superstition Wilderness is approximately 3 miles northwest, the Sierra Ancha Wilderness is approximately 27 miles north, and Mazatzal Wilderness is approximately 50 miles north-northwest. Prevailing winds in this area are generally from the west or southwest but may shift to the south or southeast during the summer monsoon season (Oliver and Fairbridge 1987). The CAA gives Federal land managers an affirmative responsibility to protect air quality values, including visibility in Class I areas.

Ozone is a natural component of the earth’s atmosphere and can be found as a pollutant produced through chemical reactions that involve volatile organic compounds, nitrogen oxides, and sunlight at the earth’s surface. Sources of volatile organic compounds include vehicles and other gasoline powered motors, industrial processes, and biogenic emissions from plants. Sources of nitrogen oxides include vehicles, construction equipment, trains, electric power plants, industrial sources, and biogenic emissions from soil (Pinal County 2008).

The latest revision to the ozone National Ambient Air Quality Standards (NAAQS) is dated March 12, 2008, when the 8-hour standard was lowered to 0.075 ppm. An area meets the revised standard if the 3-year average of the annual fourth-highest daily maximum 8-hour average at every ozone monitor is less than or equal to 0.075 ppm.

The closest Pinal County air quality monitoring site to the PAA is located at the Queen Valley water tank, approximately 20 miles west of the PAA, north of U.S. Highway 60 and 16 miles southeast of Apache Junction. The equipment at the site provides data regarding ozone transport from the Phoenix

⁴ The CAA requires EPA to set NAAQS for certain pollutants. To date, EPA has set NAAQS for six principal pollutants, which are called “criteria” pollutants. These pollutants are carbon monoxide, nitrogen dioxide, particulate matter (PM₁₀ and PM_{2.5} standards), ozone (1-hour and 8-hour standards), sulfur dioxide, and lead. Airsheds with ambient concentrations of these pollutants below the standards set by EPA are considered to be in “attainment” of the NAAQS. Areas with ambient concentrations above the standards are designated by EPA as Nonattainment Areas.

metropolitan area (Pinal County 2008). ADEQ operates instruments at this site to measure ozone, reactive nitrogen oxides (NO_x), and Photochemical Assessment Monitoring Station volatile organic compounds. Pinal County Air Quality Department is the operator for the Interagency Monitoring of Protected Visual Environments (IMPROVE) sampler located at this site. This sampler provides particulate matter data and speciation data for assessing the impact of particulates on visibility at the nearby Superstition Wilderness.

Figure 3-1 depicts the fourth highest 8-hour ozone average recorded at Apache Junction, Casa Grande, Queen Valley, Combs, Maricopa, and Pinal Air Park. It is generally assumed that a large portion of the ozone recorded at these six monitoring sites results from transportation to and from the Phoenix metropolitan area or elsewhere. Generally, the 8-hour average ozone concentrations have decreased over time at the Apache Junction and Casa Grande sites. Many of the sites show an increase between 2005 and 2006, followed by a smaller decrease. The daily maximum 8-hour averages remain elevated at Apache Junction and Queen Valley. The year 2006 was a high-ozone year across all networks in Arizona.

Although the 1-hour ozone standard has been revoked and is no longer used in the NAAQS, the 1-hour ozone measurement remains useful in showing trends. Figure 3-2 summarizes 1-hour ozone maximum concentration readings recorded at Apache Junction, Casa Grande, Queen Valley, Combs, Maricopa, and Pinal Air Park. The 1-hour ozone concentrations at these six sites have generally decreased from 1993 to 2007.

Natural and current background visibility data for the Superstition Wilderness Class I area is collected at the Tonto National Monument monitoring site, located 2.3 miles northeast of the Superstition Wilderness. Clearest, haziest and average annual, natural, and current background visibility data for the Superstition Wilderness Class I area is presented in Table 3-2. The average annual natural and annual average 2000-2004 baseline Standard Visual Range is 163 miles and 89 miles, respectively. This visibility data reflects conditions observed during aerosol monitoring at Tonto National Monument from 2000 to 2004 as part of the IMPROVE program.

Table 3-2. Natural and Current Background Visibility Data for Tonto National Monument Northeast of the Superstition Wilderness. [Data Source: http://www.fs.fed.us/air/technical/class_1/wilds.php?recordID=76]

Site Specific Rayleigh scattering coefficient: 10	Clearest 20% Natural	Clearest 20% 2000-2004 Baseline	Haziest 20% Natural	Haziest 20% 2000-2004 Baseline	Average Annual Natural	Annual Average 2000-2004 Baseline
Standard Visual Range (miles)	198	127	126	59	163	89
Haze Index (dv)	2.03	6.46	6.54	14.16	3.99	10.09

dv = deciview, a unit of measure for a visual range.

3.1.2. Environmental Consequences: Direct and Indirect Effects

Concern was expressed during public scoping that the Pre-feasibility Activities might cause an undue increase in particulate matter, regional haze, and ozone. The following sections provide our evaluation of the proposed action and alternative effects to air quality.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Air Quality

The no action alternative would result in no development of new drill sites on National Forest System Lands, all drill activities would be restricted to State and private lands. In the short term, drilling activities might approach the peak activity levels outlined in the proposed action. However, air emissions would likely be somewhat less than the emissions estimated for the peak activity level. Table 3-3 depicts the number of drilling rigs operated by RCM since 2001. The number of drilling rigs present in 2006 and 2007 is three less than the eight assumed for the maximum emissions scenario. The number of drilling rigs in 2008 is two less than maximum emissions scenario. As the need for new drilling targets on State and private lands that would provide new data to support RCM’s pre-feasibility studies diminishes, drilling activity is expected to be reduced with associated reductions in air emissions.

Table 3-3. Drilling Rigs Operated by RCM for Exploration and Pre-feasibility Studies from 2001 through 2008 on State, private, and National Forest System Lands (RCM 2009)

Year	Number of Drill Rigs	
	Peak During Year	Average for Year
2001	3	2
2002	4	3
2003	1	na
2004	1	na
2005	3	3
2006	5	4
2007	5	4
2008	6	5

Air Quality Effects of Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Air Quality

Air contaminant emissions anticipated as a result of Pre-Feasibility Activities were analyzed, inventoried and totaled per activity and for the anticipated peak emissions scenario in the *Air Emissions Inventory Development for Resolution Copper Mining Pre-Feasibility Activities Plan of Operation*, by Malcolm Pirnie, Inc., February 2009 (Malcolm Pirnie Inventory). Emissions from roadway and drill site improvement, drilling activities, and on-going monitoring were considered. Air contaminants analyzed include carbon monoxide (CO), NO_x, SO₂, particulate matter in the form of PM₁₀, PM_{2.5} (particulate matter with an aerodynamic diameter less than or equal to 2.5 microns), and volatile organic compounds.

To calculate air emissions for the Pre-feasibility Activities a peak emissions scenario was assumed based on the RCM drilling fleet and following operational assumptions:

- All road improvements, including construction of 0.33 mile of new road, occur in the first year.
- Five exploration drill sites would be operated throughout the first year.
- One deep groundwater testing and monitoring drill rig would be used to construct the three deep groundwater testing and monitoring wells during the first year.
- One shallow groundwater testing and monitoring drill rig would be used to construct the six shallow groundwater testing and monitoring wells during the first year.
- One geotechnical borehole drill rig would be used to construct the nine tunnel characterization bore holes during the first year.

A summary of emissions, expressed in tons per year, for the maximum emissions scenario is provided in Table 3-4.

Combustion and fugitive emissions under the maximum emissions scenario would be greater than the previous peak drilling periods. NO_x is an ozone precursor and contributes to the formation of haze causing deterioration of visibility measurements. The eight operating drill sites assumed to determine the estimated peak emissions for all activities is three more than were present in 2006 and 2007 and two more than were present in 2008, the three most active years since implementation of the Previously Authorized Activities (Table 3-3). The amount of construction activity that would be associated with the road improvements outlined in the Pre-feasibility Plan of Operations during a maximum year scenario when all of the proposed road improvements would be implemented is greater than the level of road work conducted in either 2006, 2007 or 2008. During 2006 and 2007 the general trend in ozone concentration was downward at the nearest monitoring station approximately 20 miles to the west (Figure 3-1 and 3-2). Under the peak emissions scenario, detectable increases in haze within the nearest Class I airsheds are unlikely. The prevailing winds in the region generally flow from the west or southwest, away from the nearest Class I airshed. The winds flow from the west particularly during the winter season when inversions are most likely. Together, the direction of the prevailing winds away from the Class I airsheds,

the distance to nearest Class I airshed from the PAA, and RCM’s proposed dust control measures would mitigate potential increases in haze in these areas.

Table 3-4. Estimated Maximum Emissions for all Activities in Tons per Year

Activity Type	Days of Operation	Combustion Emissions						Fugitive Emissions	
		CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	PM ₁₀	PM _{2.5}
		ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
Exploration Boreholes	1,825	17.4	77.8	5.4	5.1	5.1	6.4	19.4	2.0
Deep Hydrogeological Wells	168	10.4	47.6	3.3	3.1	3.1	3.9	5.0	0.5
Shallow Hydrologic Wells	168	10.5	47.6	3.3	3.1	3.1	3.9	6.5	0.7
Geotechnical Boreholes	315	3.2	13.6	0.9	0.9	0.9	1.1	6.5	0.7
Road Improvement	109	0.9	4.1	0.3	0.3	0.3	0.3	1.4	0.1
Deep Hydrogeological Well Monitoring	365	0.1	0.0	0.0	0.0	0.0	0.0	2.5	0.2
Shallow Hydrologic Well Monitoring	365	0.1	0.0	0.0	0.0	0.0	0.0	1.9	0.2
Totals		42.5	190.6	13.4	12.5	12.5	15.7	43.1	4.4

Combustion and fugitive emissions under the maximum emissions scenario would be greater than the previous peak drilling periods. NO_x is an ozone precursor and contributes to the formation of haze causing deterioration of visibility measurements. The eight operating drill sites assumed to determine the estimated peak emissions for all activities is three more than were present in 2006 and 2007 and two more than were present in 2008, the three most active years since implementation of the Previously Authorized Activities (Table 3-3). The amount of construction activity that would be associated with the road improvements outlined in the Pre-feasibility Plan of Operations during a maximum year scenario when all of the proposed road improvements would be implemented is greater than the level of road work conducted in either 2006, 2007 or 2008. During 2006 and 2007 the general trend in ozone concentration was downward at the nearest monitoring station approximately 20 miles to the west (Figure 3-1 and 3-2). Under the peak emissions scenario, detectable increases in haze within the nearest Class I airsheds are unlikely. The prevailing winds in the region generally flow from the west or southwest, away from the nearest Class I airshed during much of the year, including the winter season when inversions are most likely (Oliver and Fairbridge 1987). Together, the direction of the prevailing winds away from the Class I airsheds, the distance to nearest Class I airshed from the PAA, and RCM’s proposed dust control measures would mitigate potential increases in haze in these areas.

Air Quality Effects of Mitigation Implemented Under the Proposed Action Alternative

Mitigation measures identified in Section 2.3 would limit the maximum emissions from combustion sources to the levels estimated here for the maximum emissions scenario. Fugitive dust emissions would

be limited to the levels assumed in modeling by the requirement for implementation of dust suppression and control during road construction and maintenance activities.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Alternative to Air Quality

Air emissions from the implementation of the North OF-2 drill site are not expected to be different from the emissions estimated using the OF-2 drill site in the proposed action. Operations of the two drill sites would be the same and construction of both would require grading.

Air Quality Effects of Mitigation Implemented under the North OF-2 Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Air Quality

This access alternative would result in the construction of 0.66 mile (2.31 acre) of new drill road on National Forest System Lands. Construction of the road would result in additional generation of combustion and fugitive emissions. Assuming that the duration of construction and the emissions generated would be proportional to the area of disturbance, the expected increase in combustion and fugitive emissions over the worst case year emission estimate for the Pre-feasibility Activities is small (Table 3-5).

Table 3-5. Air Pollution Emissions Associated with West Access Routes 4a and 4b. Increased air pollution: calculated values assume that emissions from proposed road improvements/activities are proportionate by area to new road construction from west access routes.

Activity Type	Increased Combustion Emissions tons/year (Percentage Increase over Proposed Action)						Increased Fugitive Emissions tons/year (Percentage Increase over Proposed Action.)	
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	PM ₁₀	PM _{2.5}
West Access Route 4a	0.0656 (0.154%)	0.2991 (0.157%)	0.0219 (0.163%)	0.0219 (0.175%)	0.0219 (0.175%)	0.0219 (0.139%)	0.1021 (0.237%)	0.0073 (0.166%)
West Access Route 4b	0.0754 (0.177%)	0.3436 (0.180%)	0.0251 (0.188%)	0.0251 (0.201%)	0.0251 (0.201%)	0.0251 (0.160%)	0.1173 (0.272%)	0.0084 (0.190%)

Impacts during operation of the two drill sites that would be located along this alternative route and the use of these roads to access drill site M, OF-1, OF-3, and the RES-13 drill site on State lands is not expected to materially differ from the proposed action. Overall, travel distance from the Superior East Plant Site to the intersection of FR 3153 and the user-created road that provides access to RES-13 would be 1.39 miles shorter than the proposed action. From the Superior East Plant Site to the intersection of

FR 3153 and the user-created road accessing RES-13, the proposed action travel route through Oak Flat Withdrawal Area is 3.78 miles long; 2.0 miles of it is paved road and 1.78 miles is dirt road. From the Superior West Plant Site to this same point via West Access Route 4a requires 2.39 miles of travel; 0.75 mile of paved road and 1.64 miles of dirt road.

Vehicle trips to support drilling operations at drill sites, M, OF-1, OF-3, and RES-13 were estimated for various operating scenarios for the proposed action and the West Access Route 4a alternative (see Section 3.5.2). The maximum number of vehicle trips estimated through the Oak Flat Withdrawal Area to support drilling operations at these four drill sites is 56. Table 3-6 summarizes the total vehicle miles traveled, miles traveled on paved road surface, and miles traveled on unpaved road surface for the proposed action, the West Access Route 4a alternative, and the West Access Route 4b alternative. West Access Route 4a would result in approximately 77.9 fewer miles of vehicle travel per day than the proposed action to support drill sites M, OF-1, OF-3, and RES-13 during the peak operating scenario assumed for the impact analysis for traffic through the Oak Flat Withdrawal Area. This peak traffic scenario assumed that all four of these drill sites would be operating concurrently.

Table 3-6. Total Miles Traveled during Maximum Predicted Vehicle Trips Per Day to Support Drilling Operations at Drill Sites M, OF-1, OF-3, and RES-13

Road Surface	Proposed Action	West Access Route 4a Alternative	West Access Route 4b Alternative
Miles Paved	112.0	42.0	42.0
Miles Dirt	99.7	91.8	100.2
Total Miles	211.7	133.8	142.2

Air Quality Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of West Access Route 4b to Air Quality

This access alternative would result in the construction of 0.81 mile (2.76 acre) of new road on National Forest Service Lands. Construction of the road would result in additional generation of combustion and fugitive emissions. Assuming that the duration of construction and the emissions generated would be proportional to the area of disturbance, the expected increase in combustion and fugitive emissions over the worst case year emission estimate for the Pre-feasibility Activities is small (Table 3-5).

Impacts to air quality during operation of the two drill sites that would be located along this alternative route and the use of these roads to access drill site M, OF-1, OF-3, and the RES-13 drill site on State

lands is not expected to materially differ from the proposed action. From the Superior West Plant Site to the intersection of FR 3153 and the user-created road accessing RES-13 via West Access Route 4b would require 2.54 miles of travel, 1.24 miles shorter than the proposed action and 0.15 mile longer than West Access Route 4a. West Access Route 4b would utilize 0.75 miles of paved road and 1.79 miles of dirt road.

West Access Route 4b would result in approximately 69.5 fewer miles of vehicle travel per day than the proposed action to support drill sites M, OF-1, OF-3, and RES-13 during the peak operating scenario assumed for the impact analysis for traffic through the Oak Flat Withdrawal Area (Table 3-6).

Air Quality Effects of Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be the same as for the proposed action.

3.2. Erosion and Sedimentation (Issue 2)

3.2.1. Affected Environment

The characteristics of underlying geologic units can greatly affect the volume of sediment production and erosion potential of a landscape. There are a variety of geologic units underlying the PAA (Peterson 1960; Ransome 1903; Shafiqullah et. al. 1980). Although the majority of the PAA is located on Tertiary Apache Leap tuff, the northeastern portion is located primarily upon Tertiary Schultze Granite. The portions south and west of Apache Leap pass through a complex assemblage of additional geologic units. The units represent a wide span of geologic time, and include Older Precambrian Madera diorite; Younger Precambrian Troy quartzite, Ruin granite, Pioneer shale, Dripping Spring quartzite, and Mescal limestone; Devonian Martin formation; Mississippian Escabrosa and Pennsylvanian Naco limestones; Cretaceous Willow Springs granodiorite; Mid-Tertiary Whitetail conglomerate; and Quaternary-Tertiary basalt. FR 2440, directly west of Apache Leap, lies atop relatively recent (Quaternary) unconsolidated alluvium, talus, and colluvium at the mouth of Cross Canyon. Layers of varying depth are present along most drainages and flats.

The majority of the PAA is located within the Gila River watershed. The large basin west of Apache Leap drains into Queen Creek, a tributary of the Gila River. East of Apache Leap, ephemeral channels are separated by a visually indistinct drainage divide. The channels immediately east of Apache Leap follow a relatively shallow gradient toward Queen Creek, while those farther east eventually flow into Devils and Rawhide Canyons. These large canyons drain into Mineral Creek, another tributary of the Gila River, whose confluence lies approximately 12 miles south of the PAA, near the town of Kelvin. The only portions of the PAA falling within the Salt River watershed are north and east of Signal Mountain, near the Pinal/Gila County line.

Surface water flows within the PAA are restricted to a network of small to medium ephemeral drainages, most of which discharge indirectly into Queen Creek and Devils Canyon. There are no wetlands within the PAA, though wetlands likely occur along some reaches of perennial and intermittent drainages and in association with springs in the vicinity of the PAA. Both Queen Creek and Devils Canyon contain relatively small reaches of intermittent or perennial flow located downstream of most Pre-feasibility Activities. The only perennially flowing reach of Queen Creek is located west of the town of Superior, and is dependent upon effluent discharge from the town's wastewater treatment plant. A naturally occurring perennial segment of Devils Canyon is located approximately 5.6 miles upstream of the confluence with Mineral Creek and a very short intermittent section is located approximately 6.8 miles upstream of the Mineral Creek confluence. ADEQ (2008b) has designated Queen Creek as an impaired stream for recorded exceedances of dissolved copper.⁵

Relatively long distances separate the Pre-feasibility Activities from perennial or intermittent drainages. The unimproved road to drill site H-E is the nearest Pre-feasibility Activity to a perennial stream segment. It is located approximately 1.3 miles from a perennial reach of Devils Canyon, beginning at the Rancho Rio confluence. Drill site OF-1 is approximately 1.4 miles from this perennial reach of Devils Canyon at the Rancho Rio confluence.

Approximately 0.4 mile separate FR 2466 and the intermittent reach of Devils Canyon. Drill site OF-1 is approximately 0.7 mile from the nearest intermittent reach of Devils Canyon near the National Forest System Lands boundary with State land.

FR 2458 follows the portions of Queen Creek identified by ADEQ as an impaired water, crossing the Creek three times before arriving at drill site H-K. H-K is the closest drill site to the impaired reach of Queen Creek. It is approximately 280 feet from the Queen Creek. This portion of FR 2458 is closed for public use. OMYA Arizona, Inc., utilizes the road for access to its limestone quarry approximately 3 miles north of U.S. Highway 60. OMYA Arizona, Inc. has installed cement aprons at all crossings to eliminate sediment loading from FR 2458 road crossings into Queen Creek.

3.2.2. Environmental Consequences: Direct and Indirect Effects

Several commenters expressed concern that the Pre-feasibility Activities would increase erosion and sediment runoff from the PAA and adversely affect surface water quality. The following sections provide our evaluation of the effects of the proposed action and alternatives on erosion and sedimentation.

⁵ Queen Creek begins at the foot of Fortuna Peak, descends to the southwest through the town of Superior, and continues into the Roosevelt Irrigation Canal. Two reaches of Queen Creek are currently included on Arizona's 303(d) List of Impaired Waters due to recorded exceedances in dissolved copper. The upstream reach, an 8.8-mile segment from the Queen Creek headwaters to the Superior Waste Water Treatment Plant (WWTP), was first classified as Impaired in 2002. The 5.9-mile downstream reach, beginning at the Superior WWTP and ending at Potts Canyon, was added to the Impaired list in 2004. ADEQ (2008) states that dissolved copper loading has been found to exceed ADEQ surface water quality standards in both reaches in at least two of three sampling years between 2002 and 2005. A Total Maximum Daily Load (TMDL) analysis is currently being developed by ADEQ for Queen Creek to examine the source and extent of water quality impairment. The TMDL study is scheduled for completion by ADEQ in 2009, and will include an implementation plan outlining alternatives for restoring water quality (ADEQ 2008b).

Alternative 1 – No Action

Direct and Indirect Erosion and Sedimentation Impacts of the No Action Alternative

Implementation of the no action alternative would require RCM to reclaim drill sites developed as part of the Previously Authorized Activities. Over time, as reclamation activities became established, this would reduce sediment and erosion at these sites. Existing Forest Roads would remain in their present condition. In the short term, erosion and soil loss from these roads would not change from the current condition. User-created roads that provide access to previously authorized drill sites would be closed.

Erosion and Sedimentation Effects of Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Erosion and Sedimentation Impacts of the Proposed Action

Under the proposed action, RCM would complete necessary roadway improvements on approximately 16.97 miles of existing roads impacting approximately 33.39 acres. In addition, 0.33 mile of new roads would be constructed, impacting 0.55 acre. Construction of drill sites would disturb approximately 4.72 acres. The total area of disturbance would be 38.66 acres. Much of the PAA is underlain by rock and would not be erodible; however, the overall foot print of erodible surface within the vicinity of the PAA would be increased. RCM has included Best Management Practices (BMPs) in their proposal which would localize and minimize impacts. Roads and drill sites would be reclaimed when no longer needed. Ephemeral drainage systems and the few intermittent or perennial water courses in the vicinity of the PAA are not expected to be adversely impacted by the increased surface area of disturbance and runoff from these areas. Implementation of the mitigation measures, the relatively high percentage of rock substrate, vegetation cover and distance between the PAA and any potential receiving water body would eliminate the potential for sedimentation to reach those waterbodies.

Erosion and Sedimentation Effects of Mitigation Implemented Under the Proposed Action

Ensuring implementation of BMPs outlined in the SWPPP to control and limit erosion and sedimentation would mitigate soil loss from the proposed road and drill site improvements.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Erosion and Sedimentation Impacts of the North OF-2 Alternative

There would be an approximately 0.25 acre increase in overall surface disturbance in the PAA over the proposed action. The existing surface disturbance associated with the Boulder Campsite would remain the

same. This drill site would be reclaimed at the end of the authorized period of occupancy. The difference in any direct or indirect impacts compared to the proposed action would be negligible.

Erosion and Sedimentation Effects of Mitigation Implemented Under the North OF-2 Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Erosion and Sedimentation Impacts of West Access Route 4a Alternative

A 2.82-acre increase in overall surface disturbance in the PAA would occur from construction of West Access Route 4a and new drill sites 4W and 4E. This access road would cross a small ephemeral drainage. Gating this road would limit use and reduce mechanical erosion from general recreational vehicle travel. This alternative would also reduce the vehicle trips on roads within the Oak Flat Withdrawal Area, reducing the rate of mechanical erosion on those roads. The drill sites would be reclaimed at the end of the authorized period of occupancy when access to drill sites is no longer needed. With implementation of BMPs, the impacts associated with this alternative, when compared to the proposed action would be negligible.

Erosion and Sedimentation Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Erosion and Sedimentation Impacts of the West Access Route 4b Alternative

A 3.24-acre increase in overall surface disturbance in the PAA would occur from construction of West Access Route 4b and new drill sites 4W and 4E. Gating this road to limit public access would reduce mechanical erosion from general recreational vehicle travel. This alternative would also reduce the vehicle trips on roads within the Oak Flat Withdrawal Area, reducing the rate of mechanical erosion on those roads. The drill sites would be reclaimed at the end of the authorized period of occupancy when access to drill sites is no longer needed. This alternative route is longer than West Access Route 4a and follows a small drainage/swale for approximately 1,100 feet after it diverges from its common alignment with West Access Route 4a. With implementation of BMPs, the impacts associated with this alternative, when compared to the proposed action would be negligible.

Effects of Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be the same as for the proposed action.

3.3. Wildlife (Issue 3)

3.3.1. Affected Environment

The PAA is located within three different biotic communities (Brown 1980). The majority of the PAA lies within areas classified as interior chaparral, with a very small portion in the northeastern corner (near Top of the World) located in Madrean evergreen woodland. The portions of the PAA west and south of the Apache Leap escarpment are classified as the Arizona Upland subdivision of Sonoran desertscrub.

Additional biotic communities described by Brown (1994), including interior riparian deciduous forest and riparian scrublands, are also present in the PAA vicinity. While not present within the PAA itself, these hydriotic communities are patchily distributed along the perennial and intermittent drainages nearby (RCM 2008). Relatively isolated patches of xeroriparian and mesoriparian vegetation associated with ephemeral drainages are also located within and near the PAA.

Typical of the interior chaparral biotic community, vegetation in the central portion of the PAA is dominated by scrub live oak (*Quercus turbinella*), pointleaf manzanita (*Arctostaphylos pungens*), and catclaw mimosa (*Mimosa acerosa*). Due to high shrub cover, thin to absent soil, and low annual precipitation, this biotic community has a characteristically low density of herbaceous cover. Vegetation surrounding much of the central portion of the PAA has been impacted by recreation and cattle grazing. This is most evident along existing roadways, on the level areas adjacent to roadways, and around cattle tanks.

The far western portion of the PAA, located below the Apache Leap escarpment, is significantly lower in elevation than the rest of the PAA. This region supports vegetation consistent with the Arizona Upland subdivision of the Sonoran desertscrub biotic community. Typically wetter than other desert communities (averaging 12 to 18 inches annual rainfall), the Arizona Upland subdivision is characterized by its appearance as a scrubland or low woodland of leguminous trees with shrubs and perennial succulents in the open areas (Brown 1994). The Jojoba-Mixed Scrub series dominates the area west of the Apache Leap. Found at the upper limits of the Arizona Upland subdivision and in transition zones between Sonoran desertscrub and interior chaparral, this series is distinguished from other desertscrub series by its characteristic chaparral-like appearance.

Arizona is at the northern limit of Madrean evergreen woodland and this is one of the few regions where this biotic community forms an ecotone with the drier interior chaparral. A small section in the northeastern portions of the PAA are consistent with Brown's description of this woodland, with two oak species—Arizona white oak (*Quercus arizonica*) and Emory oak (*Quercus emoryi*)—dominating the canopy layer and five intolerant species such as one-seeded juniper (*Juniperus monosperma*). Understory layers in this region generally comprise chaparral-associated species, such as pointleaf manzanita, catclaw mimosa, scrub live oak, and skunkbush (*Rhus trilobata*).

The general vicinity of the PAA supports a variety of mammal species, although many of these species are rarely seen because they avoid contact with humans and/or are nocturnal. Seventeen species of bats are potentially found in this area, including the pallid bat (*Antrozous pallidus*), big brown bat (*Eptesicus fuscus*), and small-footed myotis (*Myotis ciliolabrum*) that were mist netted on the PAA in 2004 (WestLand 2004). Other mammals known or expected to be in the area include ungulates including the mule deer (*Odocoileus hemionus*) and white-collared peccary (*Pecari tajacu*), carnivores such as black bear and mountain lion, smaller carnivores such as the ringtail (*Bassariscus astutus*) and coati (*Nasua narica*), and numerous species of rodents such as the white-throated woodrat (*Neotoma albigula*), deer mouse (*Peromyscus maniculatus*), and rock squirrel (*Spermophilus variegatus*).

The PAA also provides suitable breeding habitat for a variety of bird species and additional species use the site during winter or migrations. Raptors, such as Cooper's hawk (*Accipiter cooperi*), peregrine falcon (*Falco peregrinus*), and zone-tailed hawk (*Buteo albonotatus*) are known to nest in vicinity of the PAA. Various surveys conducted in the vicinity of the PAA have identified 108 bird species from 33 families (54 species from 25 families in the winter and 94 species from 29 families during the breeding season).

3.3.2. Environmental Consequences: Direct and Indirect Effects

A number of commenters expressed concern regarding the impacts of the Pre-feasibility Activities to wildlife within or in the vicinity of the PAA. The sections that follow provide our analysis of effects to wildlife from the alternatives considered in this EA.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Wildlife

There would be no new surface disturbing activities from implementation of the Pre-feasibility Activities. Closure and reclamation of existing, previously authorized drill sites on National Forest Service Lands would be implemented. The level of daily human activity, particularly along FR 315 would be decreased from current levels, particularly during the work week when recreational uses are typically at their lowest levels.

Wildlife Effects of Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action Alternative to Wildlife

Pre-feasibility Activities would take place in non-contiguous areas dispersed across four townships. Within the PAA, approximately 38.66 acres of previously undisturbed National Forest System Lands would be impacted, with the majority of the Impact Area immediately adjacent to previously disturbed

roadway areas. Approximately 28.58 acres of interior chaparral, 0.16 acre of Madrean evergreen woodland, and 9.92 acres of Sonoran desertscrub habitat would be affected, primarily along 16.9 miles of existing roadways (Table 3-7). No mixed conifer, grassland, riparian, or aquatic habitat would be impacted by Pre-feasibility Activities.

Table 3-7. Approximate Acreage of New Disturbance within the Different Vegetation Communities found within the Pre-feasibility Activity Area

Vegetation Community	Sites	Acreage
Interior Chaparral	All except those noted below	28.58
Madrean Evergreen Woodland	Small portion of FR 320	0.16
Arizona Upland	QC-04, MB-03 and access (FR 2440), western portion of H-C access (FR 315)	9.92
Total		38.66

Some impacts to Management Indicator Species (MIS) individuals are possible during Pre-feasibility Activities, but impacts to these species as a whole are expected to be transitory and extremely limited. The marginal nature and relatively small size of the PAA makes it unlikely that the habitat disturbance associated with Pre-feasibility Activities would impact any MIS to a detectable degree. Because the relatively small impact area is spread over a very large area of National Forest System Lands, and because most of the impact area is located immediately adjacent to existing disturbance, Pre-feasibility Activities are not expected to result in detectable population level impacts to MIS species.

Wildlife Effects from Mitigation Implemented Under the Proposed Action

Four mitigation measures outlined in Chapter 2 would benefit wildlife. The implementation of biological monitoring during road and drill pad construction, implementation of the requirements of a fire plan, management actions required by the noxious weed management program, and minimizing the size of safety pull outs would further reduce the anticipated negligible impacts to wildlife habitat and benefit wildlife.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative to Wildlife

This alternative component of the Pre-feasibility Activities would increase the acreage of Interior Chaparral habitat impacted by approximately 0.25 acre. This increase is only 0.65 percent of the total impacts estimated for the Pre-feasibility Activities and only 0.88 percent of the total estimated impacts from implementation of the Pre-feasibility Activities that occur within Interior Chaparral. The difference in any direct or indirect impacts compared to the proposed action would be negligible.

Wildlife Effects of Mitigation Implemented Under the North OF-2 Drill Site Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Wildlife

This route and its associated drill sites would increase impacts to Interior Chaparral habitats on National Forest System Lands in the vicinity of the PAA by 2.82 acres (9.9 percent). It would create approximately 0.80 mile of new road on National Forest System Lands and State lands between FR 315 and drill site RES-13. The difference in any direct or indirect impacts compared to the proposed action would be negligible.

Wildlife Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Wildlife

This route and its associated drill sites would increase impacts to Interior Chaparral habitats in the vicinity of the PAA by 3.24 acres (11.4 percent). It would create approximately 0.95 mile of new road on National Forest System Lands and State lands between FR 315 and drill site RES-13. The difference in any direct or indirect impacts compared to the proposed action would be negligible.

Wildlife Effects from Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be the same as for the proposed action.

3.4. Arizona Hedgehog Cactus (Issue 4)

3.4.1. Affected Environment

The Arizona hedgehog cactus is classified by the U.S. Fish and Wildlife Service (USFWS) as an Endangered Species, without designated Critical Habitat. The PAA was surveyed for Arizona hedgehog cactus in July and September 2007 and in January, February, March, and September 2008. The survey area included the PAA, as well as buffer areas surrounding the PAA. The total width of the survey area along proposed access roads was 100 feet or more on the roadway centerline. Survey areas at proposed drill sites were approximately 200 feet by 200 feet, providing a survey buffer of at least 50 feet on all sides.

There is some confusion with regard to the identification of this taxon, as published descriptions vary significantly across the region (Cedar Creek Associates 1994). The Arizona hedgehog cactus, as currently defined, is found in Pinal County in the vicinity of Dripping Springs, the Superstition and Mescal mountains, the highlands between Globe and Superior, and in Devils Canyon and Queen Creek along the

Gila/Pinal County line (AGFD 2008). Known habitat requirements include open slopes (or the understory of a more open canopy) and cracks and crevices between boulders.

The distribution of the Arizona hedgehog cactus within its range appears to be closely associated with four major rock types: Tertiary Apache Leap tuff (dacite), Cretaceous or Tertiary Schultze granite, Precambrian Apache Group Pioneer quartzites, and Precambrian Pinal schist. Observations of more than 1,000 specimens located during field surveys for the nearby Carlota Project indicate that the Arizona hedgehog cactus prefers stable rock formations such as the Apache Leap tuff and Schultze granite (Cedar Creek Associates 1994). These rock types weather very slowly, form stable ridges and outcrops and provide opportunities for cacti to establish and grow. The remaining two rock types that are known to be associated with the Arizona hedgehog cactus are either poorly distributed within the known range of the species (Pioneer quartzites) or weather more rapidly (Pinal schist). These rock types create a soil substrate that is colonized by dense stands of vegetation and do not appear to be colonized by Arizona hedgehog cactus to the same extent as the tuff or granite. Notably, there are large areas of the various rock types typically associated with Arizona hedgehog cactus, such as Apache Leap Tuff, that have been surveyed extensively for this species where none have been detected. The geologic substrate should be considered informative as to habitat suitability but not determinative.

Sixty-three Arizona hedgehog cacti were located during survey of the PAA and buffer on National Forest System Lands. Twenty-six additional individuals were located and recorded just outside of the survey area and along FR 898, within privately owned lands. Generally, Arizona hedgehog cacti were found in the northeastern portions of the PAA, within areas that support vegetation that is consistent with interior chaparral as described by Brown (1994).

3.4.2. Environmental Consequences: Direct and Indirect Effects

Several commenters expressed concern that the proposed Pre-feasibility Activities; specifically the proposed road widening, construction of new roads and construction of new drill sites may impact Arizona hedgehog cactus and its habitat in the PAA. The Forest Service has determined that the proposed action may affect but it not likely to adversely affect Arizona hedgehog cactus, and we have initiated informal consultation with the USFWS. The sections that follow provide our analysis of the effects of the alternatives considered in this EA to Arizona hedgehog cactus.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Arizona Hedgehog Cactus

The no-action alternative would not have any direct or indirect affect to Arizona hedgehog cactus.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Arizona Hedgehog Cactus

The Forest Service has determined that the proposed action, the implementation of the Pre-feasibility activities may affect but is not likely to adversely affect Arizona hedgehog cactus. The modifications of proposed road improvements, relocation of drill sites, and implementation of mitigation and monitoring measures make the potential for direct and indirect impacts to Arizona hedgehog cactus insignificant and discountable. As a result of a comprehensive species-specific survey, sixty-three individual Arizona hedgehog cacti were found in the immediate vicinity of Pre-feasibility Activities. The locations of these individuals were provided to RCM during the planning of Pre-feasibility Activities, and these activities were designed to avoid direct effects to individual Arizona hedgehog cacti by avoiding the plants. Approximately 22.68 acres of potentially suitable habitat would be disturbed by Pre-feasibility Activities. As no Critical Habitat has been designated for this species, none would be affected by Pre-feasibility Activities.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the Proposed Action Alternative

Five mitigation measures outlined in Chapter 2 would benefit Arizona hedgehog cactus. The implementation of biological monitoring during road and drill pad construction, placement of rock guards over cactus on the down hill side of proposed road and drill site construction areas, implementation of the requirements a fire plan, management actions required by the noxious weed management program, and minimizing the size of safety pull-outs will avoid impacts to Arizona hedgehog cactus and minimize potential adverse impacts to its potential habitat.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative to Arizona Hedgehog Cactus

Survey did not detect any Arizona hedgehog cacti on or in the vicinity of North OF-2 and implementation of this alternative would not impact any hedgehog cacti.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the North OF-2 Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Arizona Hedgehog Cactus

Survey did not detect any Arizona hedgehog cacti on or in the vicinity of this access alternative and associated drill sites. Implementation of this action alternative site would be the same as the impacts of the proposed action.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Arizona Hedgehog Cactus

Survey did not detect any Arizona hedgehog cacti on or in the vicinity of this access alternative and associated drill sites. Implementation of this action alternative site would be the same as the impacts of the proposed action.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be the same as for the proposed action.

3.5. Recreational Activities In and Around Oak Flat (Issue 5)

3.5.1. Affected Environment

General Use Patterns. Recreation uses in the vicinity of the PAA include hiking, camping, hunting, bird watching, and four-wheel driving. Rock climbing is a popular recreational activity east of Apache Leap, in Devils Canyon, and several areas along U.S. Highway 60, in the general vicinity of the PAA. In addition to less formal, non-organized events, rock climbers participate in organized climbing events at Oak Flat, and until 2005 hundreds attended the Phoenix Boulder Blast, an outdoor climbing festival and bouldering competition. A smaller climbing event, the Flapper Fest, continues at Oak Flat (Coates 2007). A majority of this competition occurs west of Oak Flat Campground in Queen Creek Canyon and Euro Dog Valley Climbing Area.

The Oak Flat Withdrawal Area is approximately 4 miles east of the Town of Superior along U.S. Highway 60, and the Oak Flat Campground offers year-round, rustic camping but no drinking water. Designated and dispersed campsites within the Oak Flat Withdrawal Area can be accessed by a network of paved and dirt roads. The Oak Flat Withdrawal Area and surrounding National Forest System Lands are used for dispersed recreation including camping, four-wheel driving, hunting, and hiking. The primary season for recreational use is September through April. It is used by small groups and families for camping and picnicking and by larger groups for events. Other users include Boy Scout troops, rock climbers, off-road vehicle user groups, and fraternal organizations. The greatest degree of user activity in the vicinity of PAA is Oak Flat Campground and adjacent areas such as the Euro Dog Valley Climbing Area. There are no detailed data available regarding the number of people who use the designated and dispersed camping opportunities within the Withdrawal Area. One record reported that the current recreational usage at the Oak Flat Withdrawal Area was 6,600 Recreational User Days (Memo to Hilton Cass, Arizona Zone Office from Mr. James L. Kimball, Forest Supervisor Tonto National Forest, August 27, 1985).

To inventory and classify National Forest System Lands for planning and managing a range of recreational experiences and settings, the Forest Service commonly uses the Recreation Opportunity Spectrum (ROS). The ROS provides a framework for defining the types of outdoor recreation opportunities the public might desire, and identifies that portion of the spectrum that a given National Forest might provide. The ROS is based on three primary criteria: physical, social, and managerial. Each of these criteria can be classified along a range of values and once classified and considered together they help to establish the ROS. Table 3-8 summarizes Recreation Opportunity Spectrum classes.

In the vicinity of the PAA three Recreation Opportunity Spectrum classes are delineated. The majority of the Pre-feasibility Activities are located within areas designated as either Semi-Primitive Motorized or Roded Natural ROS class designation. PAA locations immediately adjacent to U.S. Highway 60 or S.R. 177 are primarily classified as Roded Natural while Pre-feasibility Activities farther from those major roads would generally take place within the Semi-Primitive Motorized class. The Oak Flat Withdrawal Area occurs within the Roded Natural ROS class, which is characterized by moderate evidence of anthropogenic activities or disturbance. A very small portion of the PAA near the town of Superior, along FR 2440, lies within an area classified as Urban on the ROS.

Noise. The sound environment in the Oak Flat Withdrawal Area is predominantly background natural sounds with sound from cars or trucks on U.S. Highway 60, Magma Mine Road, or within the Oak Flat Withdrawal Area. Sound level measurements were made at three locations within the Oak Flat Campground. Each measurement was taken for a 5-minute period, and the average sound level for each was 40 A-weighted decibels (dBA). The sound level stayed fairly constant during each 5-minute reading (WestLand 2009a). For comparison, 40 dBA is relatively quiet and can be equated to several conditions including the noise level of a residential area at night, background noise in a library or small conference room, or soft radio music in an apartment.

Table 3-8. Recreation Opportunity Spectrum, Tonto National Forest (Source: USFS 2005b)

Class	Setting Characteristics (for descriptive purposes only)
Primitive (P)	Area is characterized by essentially unmodified natural environment of fairly large size. Interactions between users are very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.
Semi-Primitive Non-Motorized (SPNM)	Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size, interactions between users are low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is not permitted.
Semi-Primitive Motorized (SPM)	Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is permitted.
Roaded Natural (RN)	Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interactions between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.
Rural (R)	Area is characterized by substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and interactions between users are often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities for intensified motorized use and parking are available.
Urban (U)	Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans, on-site, are predominant. Large numbers of users can be expected, both on-site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

Visual Resources. All lands in the Tonto National Forest have been characterized with respect to scenic quality, which, in turn, have been translated into management objectives. Visual Quality Objectives (VQOs), which are derived from public concerns for the scenic quality of a landscape and diversity of natural features, specify the degree to which alterations to that landscape are permissible. In general, the higher the scenic quality of a landscape, the less alternative is allowed. Conversely, a greater degree of landscape alteration is acceptable in landscapes that are characterized as less scenic, seen from a greater distance, or seen from less sensitive locations. Forest Service VQOs are provided in Table 3-9.

Table 3-9. USDA Forest Service Visual Quality Objectives

Preservation (P): Except for very low visual impact recreation facilities, management activities are prohibited. This VQO allows for only “ecological” changes and is applicable to wilderness areas, primitive areas, other special classified areas and some unique management units that do not justify other special classification.

Retention (R): Management activities must not be visible to the casual forest visitor. Modifications must repeat form, line, color and texture which are frequently found in the characteristic landscape.

Partial Retention (PR): Modifications must be integrated into and visually subordinate to the characteristic landscape. Activities may repeat form, line, color or texture common to the landscape, but they should be visually subordinate to the characteristic landscape.

Modification (M): Management activities may visually dominate the characteristic landscape; however, they must borrow from naturally established form, line, color or texture so that the visual characteristics are those of natural occurrences within the surrounding area.

Maximum Modification (MM): Modifications may visually dominate the characteristic landscape. However, when viewed from background distance, activities must appear as natural occurrences within the landscape. Alterations in foreground and middleground views may be out of scale or contain detail which is incongruent with natural occurrences.

The PAA falls within Management Area 2F of the Tonto National Forest Land Management Plan, which requires the Forest to manage the PAA for Retention and Partial Retention. The area is generally characterized by significant topographic variability and expansive views into mostly undeveloped open spaces. Within the vicinity of the PAA, evidence of human modifications to the landscape include utility lines and towers (one north of the Oak Flat Withdrawal and the other running through the Oak Flat Withdrawal along its eastern boundary), the Superior East Plant Site where the existing head frame is a prominent element of the views from Oak Flat to the west. A new head frame structure is under construction at the Superior East Plant Site and old exploration drill roads and drill sites, existing drilling activities, and the recreational improvements and roads within the Oak Flat Campground provide further evidence of human use of this landscape.

Viewer sensitivity reflects the degree of public concern for change in scenic quality of the landscape from key viewing areas. Type of viewpoint, the distance from the viewer and viewer concern for change, volume of use, public and agency concerns, influence of adjacent land use, and viewing duration all can affect viewer sensitivity. The most common viewers of the PAA are motorists on U.S. Highway 60, which include both commuters and tourists who have limited views of some of the drill sites. The majority of the Pre-feasibility Activities are not visible from U.S. Highway 60 or the Oak Flat Campground.

Visual character and scenic quality are determined by the views offered to visitors and residents in the region. While there is an inherent degree of subjectivity in ranking scenic quality, areas that are generally undeveloped and free from evidence of human activities are generally considered to have higher scenic value than developed areas. The PAA is located within the Central Highlands Physiographic Province and is topographically varied with generally expansive views of undeveloped open space. U.S. Highway 60 is a designated scenic roadway that supports high quality visual experience.

The segment of U.S. Highway 60 which runs between Superior and Miami is a heavily-traveled roadway of approximately 14 miles that skirts the northern edge of the PAA. Since it connects the Phoenix metropolitan area with Roosevelt Lake, the White Mountains, and other recreational destinations, many of the motorists traveling this roadway during weekends and holidays are likely pursuing leisure activities. Their sensitivity to the visual landscape will be high. During the week the roadway appears to be dominated by commercial traffic and viewers' sensitivity would be expected to generally be average to low for those individuals who routinely travel this highway. The posted speed limit along the road varies from 50 to 55 miles per hour and for most of its length it is a two-lane road. Along this stretch of U.S. Highway 60 there is little to no shoulder, no posted scenic view pull-outs, and numerous unpaved pull-outs, many of which appear to compromise traveler safety (WestLand 2009b). Due to the challenging roadway alignment, narrow pavement section, and the fact that many users appear to become impatient with slower-moving sightseers, it is difficult to safely enjoy the scenery that the roadway offers.

Traffic. Access to the Oak Flat Withdrawal Area and the Superior East Plant Site from U.S. Highway 60 is provided by Magma Mine Road.⁶ Magma Mine Road is a two-lane paved road that was constructed in 1974 to provide access to the Superior East Plant Site. Magma Mine Road enters the Oak Flat Withdrawal Area near the center of the northern boundary, turns to the west, crossing through the northwest portion of the Oak Flat Withdrawal Area, then south and eventually northwest to the Superior East Plant Site. Oak Flat Campground within the Oak Flat Withdrawal Area is also accessed from Magma Mine Road. Shortly after turning off of U.S. Highway 60, individuals wishing to access Oak Flat Campground, dispersed campsites within the Oak Flat Withdrawal Area, or to travel through the Oak Flat Withdrawal Area on one of several Forest Roads or user-created roads would turn left from Magma Mine Road into the Oak Flat Campground on FR 2438 or FR 469. Drill site M, one of the previously authorized exploration drill sites on National Forest System Lands and drill site RES-13 on State lands are located south of the Oak Flat Withdrawal Area are accessed using roads within the Oak Flat Withdrawal Area.

Two groundwater monitoring wells, the DOE well and HRES-3 are located within the withdrawal area. The DOE well site was constructed by the Department of Energy in 1990 as part of a larger national effort to identify long term storage solutions for nuclear waste. According to ADWR records, the DOE well (ADWR Well Registry Number 526592) was drilled to a depth of 936 feet, has a 10-inch diameter, was completed on April 28, 1990, and is registered to the Forest Service. While ultimately another site was selected for development of a nuclear waste repository, the presence of the DOE well provided an opportunity to study groundwater movement in the underlying geological features. HRES-3 is a new well constructed adjacent to the existing DOE well. Construction of HRES-3 was authorized by the Forest Service in an August 2003 amendment of the Exploratory Drilling Plan of Operations No. 01-12-002. This well was constructed in 2004 and is approximately 1,200 feet in depth. HRES-3 was constructed

⁶ By convention, the road used to access the Oak Flat Campground and the Superior East Plant Site is referred to as the Magma Mine Road from its intersection with U.S. Highway 60 to the entrance of the Superior East Plant Site. The Magma Mine Road, as it was constructed in 1974, actually starts at Old U.S. Highway 60. The segment of road from U.S. Highway 60 to the Magma Mine Road is officially identified as FR 469 and FR 315 and is clearly present on aerial photographs that predate 1956. Throughout this document and in accordance with current convention, we will continue to refer to the entire length of the access route from U.S. Highway 60 to the Superior East Plant Site as the Magma Mine Road.

using current well construction technologies that will allow for more detailed and technologically advanced investigations of groundwater. This well was located next to the DOE well to build on the information provided by past studies at the DOE well site. RCM has reported that the location of the DOE well constructed in 1990 and HRES-3 constructed in 2004 have formed the basis for the location of other existing hydrologic monitoring wells and future monitoring wells proposed in the Pre-feasibility Plan of Operations. Both wells would be monitored as part of the Pre-feasibility Activities proposed by RCM. Monitoring activities have been ongoing since the wells were constructed. Typically, monitoring consists of quarterly testing to collect groundwater quality data. Groundwater for testing purposes would be collected from each well using a small-capacity electric submersible pump. Constant-rate pumping tests are also periodically conducted to evaluate aquifer condition and function.

Commercial, mine-related traffic on Magma Mine Road has fluctuated in the approximately 35 years since it was first constructed. Peak use of the road occurred during periods of operation of the underground mine at the Superior East Plant Site, when employees and contractors at this site used the road to get to and from work on a daily basis. Current commercial/mine-related traffic levels on this road includes providing access to the six drill sites located along FR 315 and the prefeasibility study activities at the Superior East Plant Site.

A draft traffic impact analysis was done by Aztec Engineering in January 2009 (U.S. Highway 60 and Magma Mine Road Intersection Improvements. APN: AZE0820-06). Aztec measured daily traffic to the Superior East Plant Site guard shack for a given week in November 2008 and average daily traffic on Magma Mine Road south of U.S. Highway 60 using a machine counter. The Monday through Friday peak two-way traffic to the Superior East Plant Site was 756 (328 entering and 328 exiting), and the Monday through Friday minimum was 558 (269 entering and 269 exiting). Peak hour traffic in the morning is assumed to be 30 percent trucks and the remaining traffic (70 percent) are employees and their personal vehicles. In the afternoon peak hour traffic is assumed to be 50 percent trucks.

3.5.2. Environmental Consequences: Direct and Indirect Effects

The public expressed concern during scoping that implementation of the Pre-feasibility Activities may adversely impact recreational users experience within the Oak Flat Withdrawal Area and adjacent dispersed recreational areas. We have evaluated the potential for adverse impacts to recreational users through specific studies of noise, visual impacts, and traffic effects.

Noise effects were estimated based upon actual field measurement of a working exploration drill rig and modeling sound attenuation for the OF-1, OF-2, North OF-2, and OF-3 drill sites (WestLand 2009a). The views to drill sites from designated campsites and roads within the Oak Flat Campground and dispersed campsites and roads within the larger Oak Flat Withdrawal Area were determined in the field by raising balloons. Four-foot helium filled weather balloons were raised to 12-foot and 80-foot elevations above the OF-1, OF-2, North OF-2, and OF-3 drill sites to simulate the height of drilling equipment. The balloon tethered at 80-feet represented the top of the drilling mast for an exploration drill rig. Observers at each

the designated and dispersed campsites and at selected observation points along roads within the Oak Flat Withdrawal Area then recorded which of the two balloons at each drill site could be seen. This determined the points where it was likely that drill rigs at the evaluated drill sites would be seen. Traffic impacts were determined for roads within Oak Flat Campground using trip data generated for the Air Emissions study (Malcolm Pirnie 2009). To understand the variation in potential traffic impacts to recreational users at the Oak Flat Campground and its vicinity, the total number of drill sites adjacent to the Oak Flat Withdrawal Area occupied at any given time varied from zero to six (WestLand 2009d).

The potential visual impacts of the Pre-feasibility Activities to motorists traveling on U.S. Highway 60 was evaluated using helium filled weather balloons that were 4 feet in diameter and were raised to the height of 80 feet, GIS analysis using USGS topographic data, and field observations along the U.S. Highway 60 corridor in the vicinity of the PAA (WestLand 2009b).

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Recreation

Noise Effects. Under this alternative, noise levels in the Oak Flat Campground are expected to stay at their current levels.

Visual Effects. Under this alternative there would be no drill rigs or drilling masts on National Forest System Lands visible from the designated campsites, dispersed campsites, or the roadways within the campground. The drilling mast of a drill rig at RES-13 on State land would continue to be visible from some dispersed campsites and along roads within the Oak Flat Withdrawal Area when this drill site is being utilized.

Traffic Effects. Under the no action alternative, current management plans would continue to guide management of the PAA and its general vicinity and RCM would continue with pre-feasibility studies on its private lands and on State lands. One drill site, RES-13, located on State lands immediately south of the Oak Flat Withdrawal Area, would continue to be used for exploration drilling purposes. Access to this drill site for mobilization and demobilization of drilling equipment, service vehicles and personnel is through Oak Flat Campground and would continue. The volume of traffic accessing this drill site would be approximately 6 to 14 vehicle trips per day. As the potential for viable drilling targets at RES-13 and State lands south of the Oak Flat Withdrawal Area diminish, the total number of vehicle trips to access these sites will be reduced.

Recreation Effects of Mitigation Implementation Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Recreation

The proposed action would establish three new exploration drill sites along the south (Sites OF-1 and OF-3) and west (Site OF-2) boundary of the Oak Flat Withdrawal Area. Access to Site OF-1 and Site OF-3 would be through Oak Flat Campground. When these drill sites are occupied, workers accessing these drill sites would add to the existing traffic by access requirements for Site M on Forest Service lands and Site RES-13 on State lands. This access is achieved by using the FR 2438 to the user-created 2438 Bypass,⁷ then south on FR 3153. Site OF-2 is located on what is known as the Boulder Campsite, a disturbed area on the west side of the Magma Mine Road. This is not an officially designated campsite within the Tonto National Forest, but is well known to the rock climbing community and provides access to the Euro Dog Valley Climbing Area to the west. The proposed action would preclude the use of this campsite and eliminate a parking and access point to the Euro Dog Valley Climbing area.

Monitoring of a groundwater well at the DOE Well Site has been ongoing within the Oak Flat Withdrawal Area since DOE first constructed a well in 1990. HRES-3 has been used for groundwater investigations since it was first constructed by RCM in 2004. Periodic groundwater monitoring and testing at this site would continue at this site near the Oak Flat Campground as part of the proposed action.

A more detailed discussion of the noise, visual, and traffic related effects to recreational users of the Oak Flat Campground follows.

Noise Effects. A computer model was used to determine sound levels within a study area that included the Oak Flat Withdrawal Area and the Euro Dog Valley Climbing Area (WestLand 2009a). The model had three noise sources representing exploration drill rigs at sites OF-1, OF-2, and OF-3 for the proposed action. For this model it was assumed that each noise source produced 81 dBA at 50 feet in all directions from the drill rig. The model was run with a background level of 40 dBA which was the daytime measured background levels within the Oak Flat Withdrawal Area and with assumed background noise levels of 30 and 35 dBA to simulate extremely quiet periods such as very still nights. The model was run using measured background noise levels of 40 dBA and assumed levels of 35 and 30 dBA is (Table 3-10).

Figure 3-3 shows sound level contours representing the results of the computer modeling at 40dBA background. According to the model, there would be no increase in sound levels at the designated campsites in Oak Flat Campground from drilling activities under the proposed alternative. The model predicted that sound levels at all of the dispersed campsites shown in Figure 3-3 would increase by less than 1 dBA; 3 dBA is usually considered the minimum noticeable change in sound level (ADOT 2009).

⁷ This user-created road has existed and is clearly evident on 1948 USGS topographic maps and earlier maps and photographs.

Table 3-10. Predicted Sound Levels at Oak Flat and Dispersed Designated Campsites based on OF-1, North OF-2, OF-3, and Background Levels of 30, 35, and 40 dBA (results rounded to nearest whole decibel). Campsite numbers refer to campsite labels provided on Figure 3-3.

Campsite ID	Predicted Sound Level (dBA)		
	30 dBA Background Level	35 dBA Background Level	40 dBA Background Level
21	30	35	40
22	30	35	40
23	30	35	40
24	30	35	40
25	30	35	40
29	42	43	44
30	31	35	40
33	30	35	40
40	31	35	40
42	31	35	40
44	31	35	40
46	31	35	40
47	31	35	40
60	30	35	40

Other sources of noise from the Pre-feasibility Activities that were not modeled include noise impacts from drill site mobilization and demobilization, service vehicles, and shift changes. These sources of noise are transitory and for lighter service vehicles and trucks used during shift changes would not be distinguishable from vehicle noise generated by other recreationists.

Visual Effects. The proposed Pre-Feasibility Activities are consistent with the current level of manmade alterations to the existing landscape and would not compromise the management goals set by Tonto National Forest for visual quality in the project vicinity. The majority of the drill sites identified in the Pre-feasibility Plan of Operations are of a more temporary nature (less than one year in duration) and/or is not within view of the campground area. A detailed analysis was undertaken to determine whether recreational visitors at designated campsites, dispersed campsites, and on the most highly used road areas within the Oak Flat Campground would see any of the proposed new exploration drill sites; OF-1, OF-2, and OF-3 (WestLand 2009c). This study determined that recreationists at all of the designated and some of the dispersed campsites cannot see any of these three drill sites. While views of these drill sites are largely screened from the campsites, drivers utilizing Forest Roads in the campground area would frequently view the proposed drill sites. However, several existing man-made features are currently visible from these same roads including ongoing mining operations and power lines. These existing features are composed of strongly vertical elements. A brief summary of a recreation user’s ability to see OF-1, OF-2, and OF-3 from key observation points at designated campsites, dispersed campsites, Forest Roads, and user-created roads within the Oak Flat Withdrawal area is provided below. The campsite and the road analysis view points are depicted on Figures 3-4, 3-5, and 3-6.

Drill site OF-1:

- The most distant from the designated campsites (about 0.75 mile); existing vegetation in the Oak Flat Campground blocked the views of all of the 4-foot weather balloons tethered 12 and 80 feet above the ground from the designated campsites evaluated.
- Both the 12-foot and 80-foot balloons were visible from dispersed campsites 40, 42, and 60.
- Both the 12-foot and 80-foot balloons at drill site OF-1 were visible while driving south on Forest Road 2438 (Points 39, 40, 12, 13, and 14). Both balloons were visible from a spur road heading west from Forest Road 2438 to several dispersed campsites (Points 31, 32, 41, 42). No balloons were visible at the end of the road where camping was noted (Points 43 and 44).
- Driving east on Forest Road 2438, the highest balloon at drill site OF-1 was visible from Points 49 through 51 and both balloons were visible from point 52. As Forest Road 2438 turns north and then west, OF-1 was no longer visible.
- From Forest Road 3153, both balloons at drill site OF-1 were visible from Points 5, 6, 7, 10, 31 and 32. Only the balloon tethered 80 feet above the ground surface was visible from Points 8 and 9.
- None of the balloons at drill site OF-1 were visible from the Magma Mine Road or from Forest Road 469.

Drill site OF-2:

- None of the balloons at OF-2 were visible from the designated campsites evaluated in the Oak Flat Campground.
- Both balloons were visible from dispersed campsite 29 and the 80-foot balloon was visible from dispersed campsite 44.
- Both balloons were visible from Magma Mine Road only at Point 29 (Boulder Campsite). Only the high balloon was visible from Point 28 along Magma Mine Road.
- From Points 16 and 17 on the spur road east of Forest Road 469, only the high balloon was visible.
- From Forest Road 2438, the high balloon was visible from Points 43, 44 and 52.
- None of the balloons at the OF-2 site were visible from any of the other observation points due to vegetation and topography.

Drill site OF-3:

- No balloons were visible from the designated campsites evaluated in Oak Flat Campground, Magma Mine Road, or FR 469 because of vegetation and topography.
- Both balloons were visible from dispersed campsites 40 and 60 and only the 80-foot balloon was visible from dispersed campsite 42.
- This site is visible from the following locations along FR 3153 and FR 2438. Points 10, 11, 13, 14, 32, and 40 all had views of both balloons. From Point 31 only the low balloon was visible, from Point 31, only the high balloon could be seen. From FR 3153, Points 0, 1, 5, 6, and 8 were able to see both balloons. Points 3, 4, and 7 could only see the high balloon.
- Heading west on FR 2438 both balloons were seen at OF3 from Points 45, 50, 51, 52, 55, 56, 57 and 60. Only the high balloons could be seen from Points 46 and 59.

Additional exploration of impacts to visual resources in the project vicinity was performed and described in Resolution Plan of Operations Pre-Feasibility Activities: Visual Management System Analysis (WestLand 2009b). Except for the four proposed drill sites near the Oak Flat Campground, all other drill sites would be of a temporary nature and/or not within view of the general public. Access roads to the drill sites may be visible to the general public, depending on location and orientation of the viewer.

Some of the drill sites and associated roads are visible from U.S. Highway 60; however, they are seen for very brief periods of time. In addition, the views are often perpendicular to the direction of the traveler. This makes it difficult for the driver to maintain visual contact with the site or road and safely navigate

All other proposed access roads and associated drill sites were not visible from the Superior to Miami segment of U.S. Highway 60.

Traffic Effects. Access to Pre-Feasibility Activity sites is required by several vehicle types including, but not limited to, drill rigs, service vehicles, and supervisor and worker vehicles. Some proposed action drill sites would require access via Forest Roads which traverse the Oak Flat Campground. The traffic increase on Forest Roads which traverse the Oak Flat Campground is outlined in the Resolution Plan of Operations Pre-feasibility Activities Oak Flat Campground Traffic Analysis memorandum by WestLand Resources (2009c).

There are several scenarios which exist for drill rig deployment on drill sites during the implementation of the proposed action. Only a portion of the proposed drill sites would impact campground traffic. To estimate traffic increase the Oak Flat Traffic Analysis quantifies five scenarios of rig activity ranging from the minimum campground traffic increase to the maximum increase. The road specific traffic increase for these five scenarios is shown on Figure 3-7. Analysis of the scenario which includes simultaneous drilling at all sites adjacent to the Oak Flat Campground (long-term exploration sites south

of Oak Flat Campground [sites OF-1, OF-3, M and RES-13]; deep groundwater well at site H-L; and tunnel characterization borehole PVT-4) indicated that these combined activities would generate approximately 88 vehicle trips entering the Oak Flat Campground on FR 2438 (WestLand 2009d). Approximately 32 of these vehicle trips would turn on the existing user-created road in the northeast corner of the FR 2438 loop and proceed to drill sites H-L and PVT-4. The remaining 56 vehicle trips would turn on the FR 2458 bypass and then head south out of the Oak Flat Campground on FR 3153 to drill sites OF-1, OF-3, M, and RES-13 (Figure 3-7).

Recreation Effects of Mitigation Implemented Under the Proposed Action

Numerous mitigation measures were identified to specifically address issues relating to recreational uses of the Oak Flat Withdrawal Area. RCM would be required to develop an administrative traffic control plan to reduce the risks of accidents between vehicles using campground roads to access drill sites and recreationists. Several mitigation measures were identified to minimize visual impacts. Boulders would be preserved in place along the eastern edge of OF-3, next to the existing Forest Road. An assessment of the need for visual screening would be made by the Forest Service following drill setup at OF-1 and OF-3. RCM would place camouflage netting materials on these exploration drill sites where they face Oak Flat Campground if screening from existing boulders or vegetation is not sufficient to block views if necessary. The material would be placed so that views of the drill equipment to a maximum height of 15-feet from the Oak Flat Withdrawal Area would be blocked. RCM shall, to the extent practical, collect and set aside suitable boulders within the footprint of the proposed disturbance areas, to be incorporated in the landscape during drill site and road reclamation activities. RCM would also minimize nightlighting effects by directing or shielding lights to minimize night-light effects to recreational areas. Where appropriate, RCM would identify any disturbed areas associated with the construction of new roads, improvements of existing roads, and construction of drill sites suitable for rock staining and stain those surfaces with simulated desert varnish to minimize visual impact. In addition, riprap and aggregate used for road preparation will be angular and the color shall match native soil color. Aggregate surfacing placed on drill sites will be removed or buried at closure. All of these measures would collectively minimize the adverse effects of the proposed action to recreational users in the general vicinity of Oak Flat.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative on Recreation

Selection of the North OF-2 exploration drill site alternative allows the continued use of the Boulder Campsite. This dispersed recreation campsite was identified in the Pre-feasibility Plan of Operations as the proposed location for drill site OF-2. This would also maintain an existing access point to the Euro Dog Valley Climbing Area.

Noise Effects. The noise effects for designated and dispersed campsites within the Oak Flat Withdrawal Area are the same as the proposed action. Noise levels at the Boulder Campsite would range from 42 dBA at a background noise level of 30dBA to 44 dBA at a background noise level of 40 dBA.

Visual Effects. A summary of the seen and unseen analysis of North OF-2 is provided below. The campsite locations and the analysis view points are depicted on Figures 3-4, 3-5, and 3-6.

- Topography and vegetation blocked the views of both balloons from the designated campsites in Oak Flat Campground.
- The 80-foot balloon was visible from the Boulder Campsite (Point 29).
- While detailed analysis was not completed, it appears that portions of the Euro Dog Valley Climbing Area would have views of North OF-2.
- Both the 12-foot and 80-foot balloons were visible from Magma Mine Road at Point 28.
- From FR 469, only the high balloon was visible from Point 19.
- From FR 2438 heading south, only the low balloon was visible at Point 38. Heading west on FR 2438, no balloons at North OF-2 were visible as topography hid both of them from view. The spur heading west of FR 2438 also did not have views of any balloons set at North OF-2. From Points 16 and 18, only the high balloon was visible.
- From Point 9, along FR 3153, only the high balloon was visible.

Traffic Effects. The North OF-2 Exploration Drill Site Location will not affect traffic within Oak Flat Campground or alter general patterns of traffic use or intensity on the Magma Mine Road.

Recreation Effects of Mitigation Implemented Under the North OF-2 Drill Site Alternative

The mitigation measures outlined for impacts of the proposed action to recreational resources would also apply to this alternative and the impacts would be the same. An additional mitigation measure would apply to the North OF-2 drill site. In the noise assessment (WestLand 2009a), it was assumed that each drill rig produced 81 dBA in every direction from the rig. As can be seen in Figure 3-8, this is a conservative estimate based on measurements made at an existing drill rig (WestLand 2009a). A supplemental study using the each of the four source values in Figure 3-9 was performed to see what effect the configuration of the drill site components on the North OF-2 drill site would have on the predicted sound levels at the Boulder Campsite. The results of that analysis are summarized in Table 3-11.

Table 3-11. Predicted Sound Level at the Boulder Campsite as a Function of North OF-2 Drill Rig Orientation. Reference sound level based on field measurements at Drill Site D (Figure 3-9).

Reference Sound Level 50 feet from North OF-2 Based on Orientation	Predicted Sound Level by Background Sound Level (dBA)		
	30 dBA Background Level	35 dBA Background Level	40 dBA Background Level
81	42	43	44
76	38	39	42
75	37	39	41
71	34	37	41

At a 30 or 35 dBA background noise level, which might be experienced on a quite night, the effective reduction in noise level at the Boulder Campsite would be substantial. Based upon the results of this investigation, the drilling equipment at the North OF-2 drill site would be configured so that the power pack is oriented away from the Boulder Campsite to minimize noise impacts to the recreational users at that location.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative on Recreation

Generally this alternative would reduce Pre-feasibility Activity impacts to recreational users of the Oak Flat Campground and the Oak Flat Withdrawal Area by routing drill site traffic outside of the campground.

Noise Effects. Noise impacts to the recreational users of Oak Flat Campground from fixed drill site locations (e.g., OF-1, OF-2, North OF-2 and OF-3) would be the same as the proposed alternative (Figure 3-3). While noise effects from fixed sources would be unchanged, the overall noise impacts to recreational users of Oak Flat Campground would be reduced because of the reduced volume of traffic from drill site mobilization and demobilization, service vehicles, and shift changes.

Visual Effects. The rough terrain through which the road would be constructed would require substantial grading efforts. Based on a visual analysis that relies on topography users who travel FR 315 may be able to see a short segment of this road. Users that travel south through the Oak Flat Withdrawal Area to State land may be able to see a small portion of this road on State land as they approach RES-13.

Traffic Effects. The West Access Route 4a alternative would route much of the Pre-feasibility Activity traffic associated with drilling activities outside of the Oak Flat Campground and total vehicle trips within the Oak Flat Campground generated by the Pre-feasibility Activities would be substantially less. The only drilling traffic use in Oak Flat Campground would be of relatively short duration and associated with the construction at H-L and PVT-4. Once these sites are constructed, travel through Oak Flat Campground

would be for groundwater monitoring at the DOE Well Site, H-L, and PVT-4, if it is selected for groundwater monitoring and testing. Figure 3-10 depicts the anticipated traffic patterns for the West Access Route and alternatives. Notably, implementation of the seasonal restriction for well and bore hole drilling at PVT-3, PVT-4 and H-L would further reduce traffic impacts to recreational users by limiting drilling activities at these two sites to the off-peak recreation season.

Recreation Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The effects of the mitigation measures implemented under the West Access Route 4a alternative would be the same as the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Recreation

Generally this alternative would reduce Pre-feasibility Activity impacts to visitors of Oak Flat Campground by routing exploration drill site traffic outside of the campground.

Noise Effects. Noise impacts at the Oak Flat Campground and dispersed campsites in the Oak Flat Withdrawal Area would be the same as the West Access Route 4a alternative.

Visual Effects. Visual impacts from FR 315 and FR 3153 would be the same as the West Access Route 4a alternative. The portion of West Access Route 4b that deviates from West Access Route 4a would be screened from views by topography and is expected to be less visible than West Access Route 4a.

Traffic Effects. The traffic impacts to recreational users in the Oak Flat Withdrawal Area would be the same as impacts associated with the West Access Route 4a alternative.

Recreation Effects of Mitigation Implemented Under the West Access Route 4b Alternative

The effects mitigation measures implemented in association with this alternative to recreation would be the same as the mitigation effects to recreation from implementation of the West Access Route 4a alternative.

3.6. Safety (Issue 6)

3.6.1. Affected Environment

The U.S. Highway 60/Magma Mine Road intersection is currently stop-sign controlled, with Magma Mine Road traffic stopping for U.S. Highway 60. Average daily traffic volumes on U.S. Highway 60 are

approximately 10,000 vehicles per day. There are approximately 400 vehicles per hour during the morning peak hour and 500 vehicles per hour during the afternoon peak hour. The peak hour for turning movements at this intersection occurs from 5:30 am to 6:30 am and 3:15 pm to 4:15 pm (Aztec 2009).

Traffic volume and speeds along U.S. Highway 60 created a safety issue at the Magma Mine Road turn-off when vehicles would turn from U.S. Highway 60 to the north to access the OMYA Superior Limestone Quarry and the Salt River Project substation, or to the south onto Magma Mine Road. In 2008, improvements were made at the intersection of Magma Mine Road and U.S. Highway 60 that included a right hand turn lane within the Arizona Department of Transportation (ADOT) right of way (ROW) of U.S. Highway 60. This addition of a turn lane has improved the safety for motorists at this intersection. Currently, Magma Mine Road is in need of maintenance and pavement rehabilitation.

Access to the Oak Flat Withdrawal Area and the Superior East Plant Site from U.S. Highway 60 is provided by Magma Mine Road. Magma Mine Road is a two-lane paved road that was constructed in 1974 to provide access to the Superior East Plant Site. Magma Mine Road enters the Oak Flat Withdrawal Area near the center of the northern boundary, turns to the west, crossing through the northwest portion of the Oak Flat Withdrawal Area, then turns south and eventually northwest to the Superior East Plant Site. The Forest Service's designated campsites within the Oak Flat Withdrawal Area is also accessed from Magma Mine Road. Shortly after turning off of U.S. Highway 60, individuals wishing to access the designated campsites at Oak Flat Campground, dispersed camping and picnicking sites within the Oak Flat Withdrawal Area, or to travel through the withdrawal on one of several Forest Roads would turn left from Magma Mine Road into the Oak Flat Campground on FR 2438. Drill site M, one of the previously authorized exploration drill sites on National Forest System Lands and drill site RES-13 on State lands are located south of the Oak Flat Withdrawal Area and are accessed using roads within the Oak Flat Withdrawal Area. One commenter during public scoping reported a near miss involving the commenter's personal vehicle and a truck associated with the Previously Authorized Activities within the Oak Flat Campground.

3.6.2. Environmental Consequences: Direct and Indirect Effects

Issues raised by the public concerning safety were associated with vehicle use of the Oak Flat Campground generated by the Pre-feasibility Activities. Traffic volumes associated with the proposed action and alternatives utilizing roads which traverse the Oak Flat Campground were evaluated in the Oak Flat Picnic and Campground Withdrawal Area Traffic Analysis (WestLand 2009d). Vehicles that would require access to drill sites include but are not limited to drill rigs; service vehicles such as water trucks and pipe trucks; and supervisor/worker vehicles. Number and types of vehicles and the frequency that they would need to access a particular drill site were obtained as weekly or bi-weekly estimates from RCM. One vehicle trip was defined as a vehicle traveling either to or from a specific location; a vehicle making a round trip was counted as two vehicle trips. Vehicle trips are presented in values which represent maximum numbers estimated during standard operating conditions for RCM.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Safety.

The Oak Flat Traffic Analysis indicated that approximately 6 to 14 vehicle trips per day would traverse the Oak Flat Campground. This volume would be associated with access and service to the existing exploration drill site RES-13 located on State lands immediately south of the Oak Flat Campground. All vehicles would enter the Oak Flat Campground on FR 2438 then turn southwest on an existing user-created route which bypasses the outer FR 2438 loop, and then south on FR 3153 to exit the Oak Flat Campground. Traffic would only occur during periods of active drilling at RES-13.

Traffic levels along the Magma Mine Road would not be expected to change from the existing conditions measured in November 2008 (Aztec Engineering 2009). The Monday through Friday peak two-way traffic to the guard shack at the Superior East Plant Site was 756 (328 entering and 328 exiting), and the Monday through Friday minimum was 558 (269 entering and 269 exiting). Entering peak hour traffic in the morning is assumed to be 30 percent trucks and the remaining traffic employee's personal vehicles. In the afternoon peak hour traffic is assumed to be 50 percent trucks. Similarly, traffic at the U.S. Highway 60/Magma Mine Road intersection would not change. This intersection is currently stop-sign controlled, with Magma Mine Road stopping for U.S. Highway 60.

The volumes of traffic and inherent safety risks associated with these measured volumes of traffic are not expected to change under the no action alternative.

Safety Effects of Mitigation Implemented Under the No Action Alternative

No mitigation and monitoring measures would be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Safety

Under the proposed action, all traffic would enter the Oak Flat Campground on FR 2438 from the Magma Mine Road. Vehicles supporting the geotechnical and groundwater drill sites PVT-4 and H-L would veer off Old U.S. Highway 60 in the northeast corner of the FR 2438. Vehicles supporting exploration drill sites OF-1, OF-3, M and RES-13 would turn on an existing user-created road which bypasses the outer FR 2438 loop then turn south on FR 3153 to the drill sites.

Safety and potential traffic conflicts to recreational users of the Oak Flat Campground are expected to be directly related to the volumes of traffic generated by the proposed action. Analysis of the scenario which includes simultaneous drilling at all sites adjacent to the Oak Flat Campground (long-term exploration sites south of Oak Flat Campground [sites OF-1, OF-3, M and RES-13]; deep groundwater well at site H-L; and tunnel characterization borehole PVT-4) indicated that these combined activities would generate approximately 44 to 88 vehicle trips entering the Oak Flat Campground on FR 2438 (WestLand 2009d). Approximately 32 of these vehicle trips would turn on the existing user-created road in the northeast

corner of the FR 2438 loop and proceed to drill sites H-L and PVT-4. The remaining 56 vehicle trips would turn on the FR 2438 Bypass and then head south out of the Oak Flat Campground on FR 3153 to drill sites OF-1, OF-3, M, and RES-13.

Vehicle support associated with the drilling of groundwater well DHTW-01 at site H-L would be needed for a period of 6 to 8 weeks. Vehicle support associated with the drilling of geotechnical boreholes at site PVT-4 would be needed for a period of 4 to 5 weeks. Vehicle support associated with the drilling activities at exploration sites OF-1, OF-3, M and RES-13 could be needed for a period up to 5 years.

Within the Oak Flat Campground the increased volumes of traffic associated with the proposed action is expected to result in a proportional increase in the risk of an accident between recreationists and vehicles traversing the Oak Flat Campground to access drill sites. This risk may increase because recreationists using the Oak Flat Campground may not be aware of or expect commercial traffic within these areas. Traffic volume along the Magma Mine Road is expected to remain within the general limits reported by Aztec Engineering (2009) summarized for the no action alternative.

Safety Effects of Mitigation Implemented Under the Proposed Action

Development of an administrative traffic control plan that would provide systematic means of implementing administrative traffic controls could include: 1) a signage plan, 2) training programs and documentation, 3) performance standards and specific policies to identify problems and terminate offenders, 4) plans for limiting traffic during periods of high-use public events, 5) plans to incorporate traffic safety issues into regular “lunch box” safety meetings on site, and 6) a plan to provide a traffic monitor when and where appropriate. These actions are intended to increase awareness of traffic related safety issues and provide specific mechanisms to enhance safety performance. These measures are expected to reduce the risks of accidents by increasing the awareness of all users of the campground of the risks of traffic related accidents potentially associated with increased use of the roads in the area. It would also provide a means of systematic enforcement and negative consequences for workers using the Oak Flat Campground to access drill sites constructed as part of the proposed action.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of North OF-2 Drill Site Alternative to Safety

Traffic safety consequences of this alternative would be the same as for the proposed action.

Safety Effects of Mitigation Implemented Under the North OF-2 Drill Site Alternative

The effects of mitigation implemented as part of the North OF-2 drill site alternative would be the same as the effects of mitigation implemented as part of the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Safety

The West Access Route 4a would re-route traffic that would otherwise utilize existing roads within the Oak Flat Campground. Vehicle use for the Pre-feasibility Activities within the Oak Flat Withdrawal Area and the Oak Flat Campground would be substantially less if the West Access Route 4a alternative was constructed. RCM's only traffic use in Oak Flat Campground would be for a relatively short period required for construction of a groundwater testing and monitoring well at H-L and a geotechnical bore hole PVT-4, which would be restricted to the off-season use of Oak Flat Campground. Once these are constructed, traffic associated with the Pre-feasibility Activities through Oak Flat Campground would be for groundwater monitoring at the DOE Well Site, H-L, and PVT-4 if it is selected for groundwater monitoring and testing. The West Access Route 4a alternative would substantially reduce the potential for vehicle related accidents between Pre-feasibility Activity service vehicles and recreationists.

Safety Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The general benefits of a traffic management plan would remain similar to those outlined in the proposed action.

Alternative 5 – West Access Route 4b

The direct and indirect consequences of this alternative to traffic related safety concerns would be the same as for West Access 4a alternative.

3.7. Conflicts the with Oak Flat Withdrawal Area (Issue 7)

3.7.1. Affected Environment

Portions of Oak Flat have been reserved for recreation purposes since the 1930s. A Forest Service 1930s/1940s recreation plan provides the following summary with regard to recreational uses at Oak Flat (USDA Forest Service 1947).

“One thousand acres of reasonably flat land at the head of Queen Creek has been fenced and reserved for public recreation use. It is traversed by U.S. Highway 80-70. A unit plan was prepared and approved on March 3, 1932. Reconstruction of the highway has been completed through the area. No improvements have been built north of the highway but to the south about two miles of service roads provide access to several developments. Two low dams trap flood water and creat[e] small lakes that are more or less permanent. Picnic and camping facilities

have been installed at several locations where shade is available. There are a total of 19 sets with ample garbage pits and latrines.....”

In May of 1952, President Truman issued executive order 10355 delegating authority to the Secretary of the Interior to withdrawal or reserve lands of the United States for public purposes. As part of this order, in October of 1952, the Forest Supervisor for the Crook National Forest sent a letter to the District Rangers in the Crook National Forest, informing them that former withdrawals by the regional or chief forester are revoked. He went on to inform the District Rangers that they “have received instructions to formally withdrawal our recreation areas, administrative sites, and wild and wilderness areas.” He further directed that “withdrawals should be limited to those areas where there is reasonable possibility of conflict with mining activities.” (Allan G. Watkin, Forest Supervisor, Crook, communication to district rangers, September 4, 1952). Mr. John Pomeroy responded and recommended three areas for withdrawal, including the “Big Oak Flat Forest Camp.” Following this, Public Land Order (PLO 1229) establishing the withdrawal of Oak Flat Picnic and Campground (the Oak Flat Withdrawal Area), as well as other areas in Arizona, was published in the Federal Register in October of 1955.

PLO 1229 dated September 27, 1955, and published in the Federal Register (20 FR 7336) on October 1, 1955 reserved 18 specifically described areas within National Forest System Lands in Arizona for use as campgrounds, recreation areas, or other public purposes. These areas, subject to valid existing rights were “withdrawn from all forms of appropriation under the public-land laws, including the mining but not the mineral-leasing laws, and reserved for use of the Forest Service, Department of Agriculture, as camp grounds, recreation areas, or for other public purposes as indicated.” In 1971 (Federal Register, Vol. 36. No. 187 – Saturday September 25, 1971) PLO 1229 was modified by PLO 5132. PLO 5132 specifically modified the restrictions of PLO 1229 for Jones Water Forest Camp, Oak Flat Picnic and Campground, Pioneer Pass Picnic Grounds, and Federal Highway 9-K Roadside Zone. For these sites PLO 5132 allowed “all forms of appropriation under the public land laws applicable to national forest lands, except under the U.S. mining laws.” PLO 5132 goes on to state that on October 20, 1971, these lands were “open[ed] to such forms of disposal as may by law be made of national forestlands except appropriation under the U.S. mining laws.”

The Oak Flat Withdrawal Area covers approximately 760 acres and contains over 3 miles of service roads which provide access to designated and dispersed camping and picnic sites.

3.7.2. Environmental Consequences: Direct and Indirect Effects

During scoping, the public expressed concern that directional drilling may allow RCM to drill under the Oak Flat Withdrawal Area in violation of PLO 1229 as modified by PLO 5132. This key issue is addressed for each of the five alternatives considered in this EA in the sections that follow.

Alternative 1 – No Action

Conflicts with Oak Flat Withdrawal Area, Direct and Indirect Impacts of the No Action Alternative

There would be no new surface disturbing activities and the proposed Pre-feasibility Activities would not be implemented. Exploration drill sites near the Oak Flat Withdrawal Area boundary would not be constructed and exploration drilling activities would not take place on National Forest System Lands in proximity to the Oak Flat Withdrawal Area. Closure and reclamation of existing, previously authorized drill sites on Forest Service Lands near the Oak Flat Withdrawal boundary, specifically, drill site M would be implemented. There would be no drilling in these areas and the potential for violations of the Oak Flat Withdrawal Area would be essentially eliminated.

Conflicts with Oak Flat Withdrawal Area, Effects of Mitigation for the No Action Alternative

No mitigation and monitoring measures would be implemented under the no action alternative.

Alternative 2 – Proposed Action

Conflicts with Oak Flat Withdrawal Area, Direct and Indirect Impacts of the Proposed Action

Exploration drilling activities would occur at drill sites OF-1, OF-2, OF-3, and M as described in the Pre-feasibility Plan of Operations. Any exploration drilling under the Oak Flat Withdrawal Area would be considered a mineral entry or appropriation in violation of the withdrawal. RCM has committed to the Forest Service that it would not drill under the Oak Flat Withdrawal Area.

Conflicts with the Oak Flat Withdrawal Area, Effects of Mitigation for the Proposed Action

Implementation of proposed mitigation that would require annual reporting to the Forest Service would provide assurances that RCM is operating in conformance with the requirements of PLO 1229 as modified by PLO 5132.

Alternative 3 – North OF-2 Drill Site

The direct and indirect effects of this alternative with regard to the Oak Flat Withdrawal Area and potential conflicts of drilling operations for mining adjacent to the Oak Flat Withdrawal Area would be as described for the proposed action.

Alternative 4 – West Access Route 4a

The direct and indirect effects of this alternative with regard to the Oak Flat Withdrawal and potential conflicts of drilling operations for mining adjacent to the Oak Flat Withdrawal Area would be as described for the proposed action.

Alternative 5 – West Access Route 4b

The direct, and indirect effects of this alternative with regard to the Oak Flat Withdrawal Area and potential conflicts of drilling operations for mining adjacent to the Oak Flat Withdrawal Area would be as described for the proposed action.

3.8. Travel Management (Issue 8)

3.8.1. Affected Environment

In 2005, the Forest Service published a new rule for providing motor vehicle access to National Forests and Grasslands. The final rule requires each National Forest and Grassland to designate those roads, trails, and areas open to motor vehicle use. Designated routes and areas will be identified on a motor vehicle use map. Motor vehicle use outside of designated routes and areas will be provided for fire, military, emergency, and law enforcement purposes and for use under Forest Service permit. The rule itself does not designate roads or areas for motor vehicles but provides a framework for making those decisions at the local level.

The Tonto National Forest, in coordination with the public and interested groups, state, county, and local governments, is currently in the process of designating roads, trails, and areas for motor vehicle use. Designations will include class of vehicle and, if appropriate, time of year. Some single-track trails may be designated for motorcycle use only. Other trails will accommodate a wider range of vehicles. Some trails will be managed for non-motorized use.

Many of the roads proposed for use in the Pre-feasibility Activities are part of the currently designated system of Forest Roads. Others are user-created roads, some of which have existed for many years and others will be constructed as part of the Pre-feasibility Activities. As the Forest Service proceeds with its Travel Management directive established by the 2005 rule, the ultimate designation of the roads that are part of the Pre-feasibility Activities will be established. Until this process is complete, final designations are not known.

3.8.2. Environmental Consequences: Direct and Indirect Effects

The scoping issue raised by the ID team during analysis of the Pre-feasibility Activities is related to the timing of this action and our Travel Management planning efforts. The roads that would be utilized by RCM during Pre-feasibility Activity operations and the reclamation and closure proposed in the Pre-feasibility Plan of Operations may not conform to Forest Service's Travel Management goals that may become established during the Forest Service's current planning effort.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Implementation of Travel Management

There would no change in current use patterns or designations for the existing roads within the National Forest System Lands. Forest Roads that would have been improved to a Level 2 maintenance standards by the proposed action or any of the action alternatives would remain in their current condition. Roads currently designated for Level 2 maintenance would continue to deteriorate absent management actions by the Forest Service. If a future closure determination is made for any of these roads through the Forest Services' travel management planning process, the Forest Service would be responsible for implementing closure as its budget allows. Similarly, if existing roads that do not meet their currently designated use/maintenance level, or if the use/maintenance level of a road is increased to make it more accessible to meet Forest Service Travel Management objectives, then the Forest Service would be responsible for management activities required to achieve desired road condition.

Travel Management, Effects of Mitigation for the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Implementation of Travel Management

The issue raised by the ID Team during scoping relating to access and roads was that implementation of the Pre-feasibility Activities may not conform to the Forest Service's final travel management plan currently under development. Travel management planning is underway and the Forest Service cannot predict with any certainty the outcome of this planning process with regard to any of the specific system and user-created roads proposed for improvement, maintenance, or construction in the Pre-feasibility Plan of Operations. In some cases a road proposed for use by RCM as part of their Pre-feasibility Activities may be identified for closure by the Forest Service at the conclusion of its travel management planning process. Or, conversely, travel management planning may identify a particular road proposed in this plan for improvement to a maintenance level greater than the level currently identified by the Forest Service or proposed as part of the maintenance plan proposed in the Pre-feasibility Plan of Operations. There is insufficient information available at this time to know the outcome of the travel management planning process with regard to the proposed action.

Travel Management, Effects of Mitigation for the Proposed Action

Mitigation measures outlined in Chapter 2 would require that the road system utilized by the Pre-feasibility Activities conform to the Travel Management goals that may be developed during the period of time proposed for implementation of the Pre-feasibility Activities. This mitigation measure would apply during use and at reclamation and closure. For example, if a road is selected for closure

during the period of use outlined in the Pre-feasibility Plan of Operations, gates or other suitable means would be used to close those roads or specific road segments to the public. Identification of a road identified by RCM for access to its drill sites for closure during travel management planning process would not preclude the use of that road identified by RCM, nor would it restrict maintenance activities to a level less than outlined in the Pre-feasibility Plan of Operations. Similarly, if a particular road was identified for a high level of service, RCM would not be required to construct/reconstruct that particular road to meet the new higher standard. At the conclusion of the Pre-feasibility Activities, reclamation of roads identified in the travel management planning process would have to meet the closure standards established by the Forest Service.

Alternative 3 – North OF-2 Drill Site

The direct and indirect effects of this alternative to the Forest Service’s travel management program would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Travel Management

The West Access Route 4a alternative will reroute traffic that would otherwise utilize existing roads within the Oak Flat Withdrawal Area, including the Oak Flat Campground, away from these areas reducing potential conflicts with recreation users of the Oak Flat Withdrawal Area. This would be a user-created road and would not be opened to the public. At the conclusion of the Pre-feasibility Activities, West Access Route 4a would be closed and reclaimed and would not become part of the Forest Road system unless it was determined during travel management planning that the West Access Route 4a should become a permanent part of the Forest Road system.

Travel Management, Effects of Mitigation for the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

The direct and indirect effects and the effects of mitigation for this alternative would be the same as for West Access Route 4a alternative.

3.9. Cultural Resources (Issue 9)

3.9.1. Affected Environment

The consideration of cultural resources has been and continues to be a critical component of Forest Service management of public lands within the National Forest System. As a matter of practice and regulatory requirement the Tonto National Forest has required the applicant to conduct a complete archaeological survey of the entire footprint of the Pre-feasibility Activities plus a buffer. These surveys were instrumental in determining the location of various elements of the Plan of Operations. Prior to our acceptance of their plan as administratively complete, RCM worked closely with us to move certain elements of the plan located near cultural resources to avoid adverse impacts to those resources. This has been an integral component of our review of the Pre-feasibility Plan of Operations.

Government to government and tribal consultation in accordance with the requirements of the National Historic Preservation Act were initiated shortly after a Plan of Operations was submitted to us and we determined that it was administratively complete. Prior to the public scoping meeting, the Forest Service sent letters inviting Tribal representatives from 10 Tribes to comment on the proposed action and informing them of the scheduled public meeting. Following this mailing and prior to the public open house, the Forest Service were invited to a meeting with the Western Apache Coalition to present information about the proposed action and answer any questions they may have had. Native American groups were also invited to attend the public open house held by the Forest Service in Superior during the public scoping period. On September 15, 2008, a copy of the Class III survey report for the PAA was provided to Native American groups seeking their comments on the report and specifically requesting their input regarding traditional cultural places and practices. Tribal consultation is ongoing and will formally conclude for this action when we make our final decision regarding RCM's Pre-feasibility Plan of Operations, although Tribal views may be considered at any time over the life of the Pre-feasibility Activities.

The Pinal Mountains contain a mixture of archaeological sites that represent prehistoric, protohistoric, and historic occupation of the region (MacNider and Effland 1989). The vicinity of the PAA includes the headwaters of Queen Creek, Mineral Creek, and Pinto Creek and these drainages provide possible routes of prehistoric human population movements, interaction, and communication westward to the Hohokam along the Gila River, northward to the Mogollon and Salado culture centers, and southward to the Hohokam and Salado culture areas along the middle Gila River and lower San Pedro River. Previous archaeological investigations within the Pinal Mountains, including block surveys and excavation projects, have revealed evidence of this diversity during the Ceramic Period (A.D. 1-1500). Few Archaic Period (6500 B.C. – A.D. 1) sites have been found in the region, suggesting a more limited occupation at this time. Prehistoric subsistence patterns relied on the region's natural resources that included the harvesting of acorns and agave caudices and the hunting of both large and small game. Dry farming also played an important role in the lives of Native Americans with the region's numerous upland alluvial basins providing an environment that was conducive to dry-farming.

The Pinal Mountains were within the territory of the Western Apache during the Protohistoric and Historic periods (A.D. 1500-1870s) (Goodwin 1942). Most of the Western Apache sites in these mountains are related to resource procurement and processing. Conflict between the Western Apaches and European and Hispanic settlers and the U.S. military in the late 1800s is a common theme that is reflected in the archaeological record of the region. The Pinal Mountains including the general vicinity of the PAA have been traditionally used by the Western Apache for resource procurement and religious practice. Apache still frequent this portion of the Pinal Mountains to collect acorns. In the PAA the areas most often visited include Oak Flat Campground, the Pinal Mountain area and nearby National Forest System Lands along U.S. Highway 60.

The historic occupation of the Pinal Mountains has been most closely tied to mining and ranching. Historic mining activities are represented on the landscape by small hand-dug test pits and extensive mine workings (Lindeman and Whitney 2005). Ranching in the Pinal Mountains has been ongoing since the late 1870s, and ranching-related features such as cattle tanks, ranch roads, and stone cattle fences pepper the landscape. In addition, historic features such as pack trails, highways, utility lines, and Civilian Conservation Corps camps, have left a tangible reminder of the early development of the area.

A Class III cultural resources survey of the proposed Pre-feasibility Activities and the alternatives has been completed (WestLand 2008). The survey buffer around the drill sites encompassed 200 feet and the access road surveys were 100 feet in width. Areas that had been previously surveyed were resurveyed to ensure that any sites or loci within sites were identified and mapped in relation to the Pre-feasibility Activities and action alternatives. Eighteen cultural resource sites were identified within the survey area. These sites are representative of the Salado, Western Apache, and historic occupations in the Western Pinal Mountains. Eleven of the identified sites are eligible for inclusion in the NRHP.

3.9.2. Environmental Consequences: Direct and Indirect Effects

Several commenters expressed concern that the proposed action would have any undue impact on prehistoric resources. In the sections that follow, we evaluate the effects of the proposed action and alternatives on cultural resources.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Cultural Resources

The no action alternative would not adversely impact any cultural resource sites.

Cultural Resource Effects from Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Cultural Resources

The proposed action will result in no direct effects to cultural resources. All of the cultural resources within the PAA that are eligible for inclusion in the NRHP will be avoided and/or protected by specific measures during project activities (WestLand 2008). The access road improvements could result in increased visitation to archaeological sites adjacent to or near these roadways. Increased site visitation can result in the loss of non-renewable cultural resources through amateur surface artifact collection and excavation. However, these effects on cultural resources are nearly impossible to predict or quantify.

Cultural Resource Effects from Mitigation Implemented Under the Proposed Action

Four mitigation measures have been identified to ensure that the Pre-feasibility Activities will not adversely affect any cultural resource sites. Because some Pre-feasibility Activities occur near known cultural resource sites, an archaeological monitor will be onsite during all road and drill site construction activities. If any previously undetected cultural resources are discovered during construction, construction activities would cease at that location and the Forest Service archaeologists would be contacted for instruction before work continues at that location. To avoid contributing to the ongoing degradation of the early 1920's Superior-Miami Highway, RCM will fill the numerous existing potholes with clean fill material prior to using the road to access a proposed drill site. The configuration of a particular drill site proposed for construction will be such that runoff from the site will not impact a known archaeological site detected during Class III survey. The effect of all of these mitigation measures is to avoid adverse direct effects to cultural resources during the implementation of the Pre-feasibility Activities.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative to Cultural Resources

The North OF-2 drill site alternative will not have any direct or indirect adverse impact to any identified cultural resources.

Cultural Resource Effects from Mitigation Implemented Under the North OF-2 Drill Site Alternative

The effects of mitigation would be similar to the mitigation effects described for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Cultural Resources

The West Access Route 4a alternative and drill sites 4E and 4W alternative would not have any direct or indirect adverse impact to cultural resource sites.

Cultural Resource Effects from Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be similar to the mitigation effects described for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Cultural Resources

The West Access Route 4b and drill sites 4E and 4W alternative would not have any direct or indirect adverse impact to cultural resource sites.

Cultural Resource Effects from Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be similar to the mitigation effects described for the proposed action.

3.10. Native American Religious Practices (Issue 10)

3.10.1. Affected Environment

EO 13007 requires that each executive branch agency with statutory or administrative responsibility for the management of Federal lands shall, as appropriate, promptly implement procedures for the purposes of carrying out the provisions of Section 1 of the order, including, where practicable and appropriate, procedures to ensure reasonable notice is provided of proposed actions or land management policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites. In all actions pursuant to this section, agencies shall comply with the Executive memorandum of April 29, 1994, "Government-to-Government Relations with Native American Tribal Governments." In the context of this executive order, a sacred site "means any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." Consultation to identify sacred sites that might be affected by the proposed action or any alternatives considered to the proposed action has been initiated. No specific sites were identified but in a comment letter prepared by Apache legal counsel, it was stated that "Oak Flat, Apache Leap, Devils Canyon and the related canyons, geologic formations, and springs in the area of proposed activity are holy, sacred, and consecrated lands."

3.10.2. Environmental Consequences: Direct and Indirect Effects

Concern was expressed during the scoping period that the Pre-feasibility activities may have an undue impact on Native Americans' free exercise of religion at sites identified as sacred within or in the vicinity of the PAA.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Native American Religious Practices

The no action alternative would not affect Native American religious practices. It is not expected to increase the accessibility of any sacred sites to Native Americans nor would it limit access.

Native American Religious Practices, Effects from Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Native American Religious Practices

A number of commenters have stated that the Oak Flat area is sacred to Native Americans affiliated with Apache cultural traditions. With the exception of the immediate footprint of the drill sites and for the specific areas of the roads being improved at any given time to provide access to the drill sites, Native American groups would not be precluded from using the Oak Flat Withdrawal Area and surrounding National Forest System Lands while the Pre-feasibility Activities are underway. Some effect to their subjective religious experience may occur from the proposed action but it is not anticipated that this experience would be substantially burdened. In the context of the Religious Freedom Restoration Act of 1993, a substantial burden would exist for the Tribes if the proposed activities forced them to violate their religious beliefs or if they were penalized for their religious activities. Neither of these conditions would arise as a consequence of the proposed drilling activities.

Native American Religious Practices, Effects from Mitigation Implemented Under the Proposed Action

During ongoing consultation, Native American Tribes have not provided information on specific sacred sites within or near the PAA. No mitigation measures have been proposed.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative to Native American Religious Practices

Information has not been provided that would suggest that this alternative drill site would affect access to a sacred site, or in any other way substantially burden a Native American Tribes expression of religious freedom.

Native American Religious Practices, Effects from Mitigation Implemented Under the North OF-2 Drill Site Alternative

During ongoing consultation, Native American Tribes have not provided information on specific sacred sites within or near the PAA. No mitigation measures have been proposed.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Native American Religious Practices

Information has not been provided that would suggest that this alternative access route and two new drill sites would affect access to a sacred site, or in any other way substantially burden a Native American Tribes expression of religious freedom.

Native American Religious Practices, Effects from Mitigation Implemented Under the West Access Route 4a Alternative

During ongoing consultation, Native American Tribes have not provided information on specific sacred sites within or near the PAA. No mitigation measures have been proposed.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Native American Religious Practices

No information that would suggest that West Access Route 4b and two new drill sites would affect access to or in any other way substantially burden a Native American Tribes expression of religious freedom has been provided.

Native American Religious Practices, Effects from Mitigation Implemented Under the West Access Route 4b Alternative

During ongoing consultation, Native American Tribes have not provided information on specific sacred sites within or near the PAA. No mitigation measures have been proposed.

3.11. Cumulative Effects

3.11.1. Context: Past, Present, and Reasonably Foreseeable Future Actions

As defined in 40 CFR Part 1508.7 (regulations for implementing NEPA) a cumulative effect is an impact to the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. In this section, context for the cumulative effects analysis is presented for each of the key issues. Past and present actions commonly influence the baseline condition and trend of a resource, while reasonably foreseeable future actions can be expected to influence future trends. Collectively, information regarding past, present, and reasonably foreseeable future actions and the baseline conditions provided in the effected environment section for each key issue provides the context for the cumulative effects analysis presented in this EA.

Past, present, and reasonably foreseeable future actions considered in this cumulative impacts assessment are identified in Table 3-12. Within Table 3-12, the spatial context of these activities is provided by zone. Zone A includes the PAA and land within 1 mile of the PAA; Zone B includes all of those lands from 1 to 5 miles from the PAA; Zone C is greater than 5 miles and less than 10 miles from the PAA; and Zone D is greater than 10 miles from the PAA. Past, present, and reasonably foreseeable future actions considered in our analysis are also depicted on Figure 3-11. A larger geographic context for this analysis, particularly with regard to air resources is provided in Figure 3-12.

Table 3-12. Past, Present, and Reasonably Foreseeable Future Activities. The identified activity and a brief description of the activity and its effects are provided in the first column. The second column is a summary of the cumulative effects context that includes the distance, by zone, from the PAA, a temporal context, and the potential cumulative effects. The locations of the activities considered here are depicted in Figure 3-11. Environmental resources listed in the cumulative effects context summary column in bold print indicate that potential or realized effects are considered beneficial to that resource. Resources listed twice, once in bold print and once in a normal print, indicate that both beneficial and adverse effects may have occurred. Surface disturbance estimates listed in this table were estimated using a 1"=3,000' National Agriculture Imagery Program aerial image flown in summer 2007.

Spatial Zones from the PAA:

Zone A encompasses the PAA and areas within a mile of the PAA.
Zone B is greater than 1 mile and less than or equal to 5 miles from the PAA.
Zone C is greater than 5 miles and less or equal to 10 miles from the PAA.
Zone D is greater than 10 miles from the PAA.

Resource Categories based on Key Issues indentified during public scoping:

AHC = Arizona Hedgehog Cactus NARP = Native American Religious Practices
AQ = Air Quality
AR = Access and Roads RA = Recreational Activities
CR = Cultural Resources S = Safety
ES = Erosion and Sedimentation W = Wildlife

Activity and Effects (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
<p>1. Pinto Valley Mine – Open pit copper mine located 4 miles north of the PAA. Currently under care and management with no new mining operations underway. Has not initiated closure activities, therefore, reasonably foreseeable future mining related activities are assumed. Largely private, but uses some National Forest System Lands for support facilities. The mine is approximately 2,300 acres of surface disturbance. Has existing ADEQ air permits and AZPDES permits for stormwater discharges. A tailings embankment failure at the mine impacted Pinto Creek. Pinto Creek drains north away from the PAA and is in a different watershed. Mine activities contribute to emissions affecting air quality and affecting wildlife by impacting wildlife habitat. Arizona hedgehog cactus surveys at the mine have been negative. Future operations that could expand the mine footprint may impact cultural resources and require mitigation.</p>	<p>Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, CR</p>
<p>2. Carlota Mine – Open pit copper mine located about 4 miles north of the PAA. In beginning phases of new mining and milling operations. Approximately 700 acres. Located on private and National Forest System Lands. A plan of operations was reviewed in accordance with the requirements of the NEPA. Impacted AHC and mitigation was provided as part of Forest Service Section 7 Consultation. Mine activities contribute to emissions affecting air quality. Affects wildlife and wildlife habitat. Implementation of data recovery for historic and pre-historic archaeological resources has been completed.</p>	<p>Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, CR</p>
<p>3. Harborlite Perlite Mining Operations – Open pit perlite mining operation located 2 miles west of the PAA. Approximately 50 acres of surface disturbance. Activities contribute to emissions affecting air quality and wildlife effects from direct loss of habitat. Not known if development adversely affected cultural resources.</p>	<p>Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, CR</p>

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
<p>4. Mine Properties near Miami, Arizona – Freeport McMoran Copper and BHP each own various mine properties that are contiguous or near one another near Miami, Arizona. Multiple open pit copper mines located 6 miles northeast of the PAA. BHP has initiated closure on portions of its facilities within this area. FMI Mining operations have ceased and smelter operations continue. Ongoing reclamation of the tailings at these facilities have reduced fugitive dust emissions. The FMI Miami Mining facility has not initiated closure activities, therefore, future mining activities could occur within portions of this complex of mine properties depending on market conditions. Combined, these mine properties are over 8,000 acres. Past mining activities contributed to groundwater impacts that resulted in Pinal Creek Water Quality Assurance Revolving Fund (WQARF) status. Pinal Creek is in a different watershed than the PAA. Activities associated with ongoing and future mining contribute to emissions of air pollutants affecting air quality and wildlife effects by loss of habitat. Mining activities over the past 100 years may have impacted Arizona hedgehog cactus and cultural resources,</p>	<p>Spatial Context: Zone C Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ/AQ, W, CR, AHC</p>
<p>5. Pinal Creek Remediation WQARF Project – Groundwater remediation project located 12 miles north-northeast of the PAA. Ongoing remediation project for monitoring, extraction, and treatment of contaminated groundwater in the Pinal Creek alluvial aquifer. Pinal Creek drains north away from the PAA and is in a different watershed. State Superfund project that operates under a consent order to improve groundwater quality in the alluvial Pinal Creek Aquifer. Resulted from decades of mining activities conducted before modern permitting or regulatory protections. Project includes both source control at participating mine properties and direct pump and treatment of impacted water in the aquifer. Have been substantial habitat benefits from the project associated with mitigation measures for the Clean Water Act (CWA) Section 404 permit required to implement remedial actions. Improvements of water quality and riparian habitat increases along lower Pinal Creek have resulted in substantial benefits to this watershed, which discharges into the Salt River through the Salt River Wilderness Area. Since the implementation of the remediation program, the reaches of Pinal Creek, Miami Wash, and Bloody Tanks Wash have been removed from the State’s list of impaired water bodies.</p>	<p>Spatial Context: Zone D Temporal Context: Past, Present, and Future Potential Cumulative Effects: W, ES</p>
<p>6. Old Dominion Mine Closure – Closed copper mine located 10 miles east-northeast of the PAA on private land. Mine closure and reclamation activities initiated 5 years ago. Reclamation and closure have benefitted wildlife species and contributed to source control in support of ongoing Pinal Creek Group activities. Stabilization of mine workings may have reduced fugitive dust emissions</p>	<p>Spatial Context: Zone D Temporal Context: Past Potential Cumulative Effects: W, AQ, ES</p>

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
<p>7. ASARCO Ray Mine Operations and Bureau of Land Management Land Exchange – Located approximately 8 miles southeast of the PAA. Activities include ongoing mining operations, a proposed land exchange with BLM (currently in litigation), and CWA reauthorization for activities associated with ongoing mining activities. Activities associated with the mine contribute to emissions affecting air quality and wildlife habitat. Previous permitting efforts in the mid 1980s required implementation of data recovery efforts to mitigate for unavoidable project impacts to cultural resource sites. Project established an off-site mitigation area along the San Pedro River that includes Cooks Lake to mitigate impacts of tailings, leach pads, and development rock stock piles to waters of U.S. Construction of diversion dam and tunnel to route unimpacted surface water flows around mine has benefited water quality downstream.</p>	<p>Spatial Context: Zone C Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, CR</p>
<p>8. RCM exploration and Well Development on State and Private Lands – Development of RCM exploration drill sites and well sites on State and private land to support ongoing exploration and groundwater studies. These activities would temporarily and locally affect air quality through dust emissions and increase in vehicle emissions during construction and monitoring periods. Other effects include surface disturbance, a temporary increase in noise in these areas, a temporary increase in local roadway travel, and a temporary effect on visual resources. Activities contribute to potential effects associated with erosion and sedimentation, wildlife, Arizona hedgehog cactus, cultural resources, recreational uses on Oak Flat, traffic safety, and Native American religious practices.</p>	<p>Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, ES, W, AHC, CR, OFR, S, NARP</p>
<p>9. Number 9 Shaft Dewatering and No. 10 Shaft Sinking – RCM Pre-feasibility Activities on private land. These activities would temporarily and locally affect air quality through dust emissions and an increase in vehicle emissions during construction. Increased roadway traffic on Magma Mine Road. New head frame visible from parts of Oak Flat Withdrawal Area. Conducted within existing disturbed areas.</p>	<p>Spatial Context: Zone A Temporal Context: Present and Future Potential Cumulative Effects: AQ, OFR, S</p>
<p>10. Superior West Plant Site closure – Stabilization and reclamation work. Stabilization work could temporarily contribute to dust emissions; however, the work will likely cause a decrease in dust emissions over time. Wildlife could be directly impacted during closure work and indirectly impacted from the noise associated with stabilization and closure.</p>	<p>Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, ES</p>
<p>11. RCM's MARRCO Waterline – Placement of a water pipeline within the MARRCO right-of-way to transport water collected from the No. 9 Shaft and treated at an existing water treatment facility on RCM property to an irrigation canal operated by NMIDD near Florence, Arizona. Construction activities result in impacts to Sonoran desertscrub habitat and would affect the wildlife using that habitat. Vegetation clearing activities would temporarily result in an increase in fugitive dust emissions and maintenance of the water line would temporarily result in minor increases in mobile sources of air pollution.</p>	<p>Spatial Context: Zones B, C, and D Temporal Context: Present and Future Potential Cumulative Effects: AQ, W</p>

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
<p>12. MARRCO Railroad – Past, present and potential future use of MARRCO railroad for mining or other commercial purpose. Railroad built between 1914 and 1915. Approximately 9.5 miles on TNF. Past steam operations and present diesel operation affects air quality. The railroad may also act as a barrier to some small wildlife species.</p>	<p>Spatial Context: Zones B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, CR</p>
<p>13. OMYA Superior Limestone Quarry – Ongoing limestone quarry located about 0.5 mile northwest of the PAA. Indirect effects to the Arizona hedgehog cactus from clearance of potential habitat. Approximately 90 acres of surface disturbance. Activities contribute to emissions affecting air quality and affecting wildlife habitat. Air emissions from fugitive and combustion sources. Access road crossings of Queen Creek stabilized to reduce sedimentation.</p>	<p>Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, ES/ES</p>
<p>14. RCM Previously authorized exploration activities – On private, state, and National Forest Service Lands. Previously authorized exploration activities approved by the Forest Service under Plan of Operations No. 01-12-02-002. Previously authorized activities include: 1) nine combination exploration and groundwater monitoring well sites; 2) one groundwater monitoring well; 3) improvement and maintenance of six Forest Service system and user-created roads for drill site access; and, 4) placement of aboveground plastic pipe and tanks for potable water transfer and storage. Approximately 4.34 acres of surface disturbance. Effects to air quality from fugitive dust emission and combustion emissions. Other effects include noise effects, increase in vehicle travel on roads, visual resource effects, erosion and sedimentation, wildlife, and traffic safety. Forest Service review of effects to Arizona hedgehog cactus, cultural resources, and Native American religious practices determined no adverse effect.</p>	<p>Spatial Context: Zone A Temporal Context: Past and Present Potential Cumulative Effects: AQ, ES, W, OFR, S</p>
<p>15. Hedgehog cactus withdrawal area – Approximately 400-acre area withdrawn from mineral entry as mitigation for Carlota Mine project. Located just outside the PAA. Removal of these lands from mineral entry provides a benefit to Arizona hedgehog cactus and wildlife.</p>	<p>Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: W, AHC</p>
<p>16. Development of a deep underground mine – It is anticipated that future mining activities would use underground mining methods as opposed to open pits. The surface disturbance associated with underground facilities would be substantially less than open pit mining. The surface disturbance would be dependent upon the amount of waste deposited to the surface, haul and access road requirements, and other surface facilities.</p>	<p>Spatial Context: Zone A Temporal Context: Future Potential Cumulative Effects: Unknown.</p>
<p>17. Future Pre-feasibility Drilling Activities –Future activities for exploration purposes could be pursued on private, State, and/or Forest Service Lands. These activities would temporarily and locally affect air quality through dust emissions, and an increase in vehicle emissions during construction and monitoring periods. Surface disturbance, a temporary increase in noise, a temporary increase in local roadway travel, and a temporary effect on visual resources; could all contribute to potential effects associated with roadway sediment and erosion control, wildlife, Arizona hedgehog cactus, cultural resources, recreational uses at Oak Flat, traffic safety, and Native American religious practices. Until a specific proposal would be submitted the location and nature of those effects would be speculative.</p>	<p>Spatial Context: Zone A Temporal Context: Future Potential Cumulative Effects: AQ, ES, W, AHC, OFR, S, CR, NARP</p>

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
<p>18. Turn lane off U.S. Highway 60 at Magma Mine Road – Turn lane constructed for safety reasons along east-bound U.S. Highway 60 at Magma Mine Road.</p>	<p>Spatial Context: Zone A Temporal Context: Past Potential Cumulative Effects: ES, OFR, S</p>
<p>19. U.S. Highway 60 realignment and improvements – Improvements planned along U.S. Highway 60 from Florence Junction to Globe. May provide safer access at Magma Mine Road. Planned improvements will not necessarily increase the frequency of animal-vehicle collisions, but will likely result in greater surface disturbance in areas used by wildlife. Construction activities could temporarily increase air emissions from combustion and fugitive dust sources. Direct impacts to Arizona hedgehog cactus are probable. Surface disturbance could potentially affect cultural resources and recreational uses in the Oak Flat area.</p>	<p>Spatial Context: Zones A, B, and C Temporal Context: Future Potential Cumulative Effects: AQ, RSEC, W, AHC, CR, OFR, S, NARP</p>
<p>20. U.S. Highway 60 improvements at Pinto Valley turn-off – Four-mile passing lane under construction between the Pinto Valley Mine turnoff and Top of the World. Temporary, local, dust emissions would affect air quality and erosion and sedimentation. Combustion emissions from construction equipment. Wildlife habitat impacts. Safety benefits are expected. Cultural resource clearance and review by Forest Service and ADOT</p>	<p>Spatial Context: Zone B Temporal Context: Present and Future Potential Cumulative Effects: AQ, ES, W, S</p>
<p>21. TNF Integrated Vegetation Management to Treat Noxious Weed Infestations - Forest Service proposes to authorize ADOT to conduct annual treatment programs using EPA approved herbicides to contain, control, or eradicate noxious, invasive, and native plant species that pose safety hazards or threaten native plant communities on road easements and National Forest System Lands up to 200 feet beyond the road easement. Treatments along roadways may affect roadway sediment and erosion control by reducing vegetation cover. Beneficial effects for native vegetation and wildlife. Potential reduction in fire risk.</p>	<p>Spatial Context: Zones A, B, C, and D Temporal Context: Present and Future Potential Cumulative Effects: ES, W, AHC, S</p>
<p>22. Salt River Project (SRP) and Arizona Public Service (APS) power lines and SRP substation – Several above-ground power lines occur in vicinity of the PAA. Existing APS 500 kV power line runs in a north-south direction east of Oak Flat (Cholla to Saguaro line). SRP received permission from the Forest Service for ROW (but has not yet been obtained) immediately to the west of this corridor to add a 230 kV line to service the Kerney/Ray Mine area. SRP Silver King Substation is located in Zone A and B. Existing 115 kV SRP power line runs from Silver King to Oak Flat. This segment ends at the Superior East Plant Site substation. Another existing SRP 115 kV line runs along Queen Creek and into Superior (Silver King to Trask line). Future construction of power lines in the region would temporarily affect air quality if their construction requires grading activities. Some impacts to wildlife. The presence of power lines affect visual aesthetics, which in turn affects recreational uses.</p>	<p>Spatial Context: Zones A and B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, CR, OFR, NARP</p>
<p>23. Grazing on Federal and State Land – Most Federal and State lands currently used for livestock grazing purposes. Livestock grazing has historically occurred in PAA and continues today. Surface disturbance and habitat modification associated with grazing have potential to affect wildlife, vegetation (including the Arizona hedgehog cactus), erosion and sedimentation, and cultural resources located on the surface.</p>	<p>Spatial Context: Zones A, B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: W, AHC, ES, CR</p>

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
<p>24. Wildfire – Natural wildfire is a form of disturbance common in many vegetation communities. Wildfire can affect air quality, wildlife, Arizona hedgehog cactus, erosion and sedimentation potential, and recreational uses. Long-term effect of fire on a landscape varies by vegetation type. Chaparral habitats are typically considered to be a fire-adapted plant community.</p>	<p>Spatial Context: Zones A, B, C, and D Temporal Context: Past and Future Potential Cumulative Effects: AQ, ES, W/W, AHC, CR, OFR, S</p>
<p>25. Development of State Lands –State lands periodically auctioned for development to fund public schools. Lands west of the PAA and east of Phoenix metropolitan area are largely State owned and could potentially be auctioned for development purposes to accommodate Arizona’s population growth. Short term air quality effects from construction activities would be expected and development would result in loss of wildlife habitat. Increased population and proximity will increase demands for recreational activities on National Forest System Lands and increase in number of recreational users and associated impacts to natural resources. Increased recreational activities may affect air quality through fugitive and combustion emissions, increase mechanical erosion from road surfaces, affect wildlife, and cultural resources.</p>	<p>Spatial Context: Zone D Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, ES, W, CR, OFR</p>
<p>26. Tonto National Forest Travel Management Planning – The Forest Service is updating its Travel Management designations to limit cross-country travel on Forest Roads that are designated for that use.</p>	<p>Spatial Context: Zones A, B, C, and D Temporal Context: Present and Future Potential Cumulative Effects: W, AHC, OFR, S, CR, NARP</p>
<p>27. Oak Flat recreational uses – The Oak Flat Withdrawal Area provides designated and dispersed recreation opportunities that can be accessed by a network of paved and dirt roads. Uses contribute to air pollution from combustion and fugitive emissions. Can affect native wildlife and vegetation. Safety concerns arise when the area experiences high-traffic loads due to recreational uses.</p>	<p>Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, OFR, S</p>
<p>28. Recreational uses of Forest and user-created road – Off-highway vehicle driving is a popular recreational use on National Forest System Lands in vicinity of PAA and throughout TNF. Contributes to air pollution from combustion and fugitive dust emissions. Can adversely affect wildlife and vegetation. Safety concerns arise when the area experiences high-traffic loads due to recreational uses. Cultural resources affected.</p>	<p>Spatial Context: Zones A, B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, OFR, S, CR</p>
<p>29. Wilderness Area recreational uses – Wilderness areas occur within the vicinity of the PAA; White Canyon Wilderness approximately 6 miles south, Superstition Wilderness approximately 6 miles northwest, Salt River Canyon Wilderness approximately 15 miles northwest, Sierra Ancha Wilderness approximately 26 miles northwest, Salome Wilderness approximately 26 miles north, and Four Peaks Wilderness approximately 22 miles northwest of the PAA. Recreational opportunities include camping, hiking, bird watching, and non-motorized vehicle use. While effects are generally less than on other National Forest System Lands, these uses contribute to air emissions associated with mobile sources from recreationists traveling to these area. Limitations of road access within these areas benefits wildlife and vegetation.</p>	<p>Spatial Context: Zones B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ/AQ, W/W, CR</p>

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
<p>30. Tonto National Forest Sonoran Desert Trail System Project – Project underway in the Mesa Ranger District to designate public access points for non-motorized use, a system of non-motorized trails, and trail and trailhead names to promote awareness of Sonoran Desert in the TNF. Provides accessible interpretive trail, reclamation of prospecting pits, open mines near proposed system trails, and installation of fencing and signage to deter motorized vehicle use.</p>	<p>Spatial Context: Zone D Temporal Context: Present and Future Potential Cumulative Effects: W/W, ES, OFR, CR/CR</p>
<p>31. Tonto National Forest Recreational Facility Analysis – Process to assist TNF in creating a sustainable program that aligns recreation sites and facilities with visitor needs.</p>	<p>Spatial Context: Zones A, B, C, and D Temporal Context: Present and Future Potential Cumulative Effects: OFR</p>
<p>32. Apache Leap recreational uses – Small user-created hiking trails have been placed from FR 315 northeast to the top of Apache Leap. Affect native wildlife and vegetation in the area.</p>	<p>Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: W, OFR</p>
<p>33. Devils Canyon recreational uses – Recreational uses include hiking, canoeing, bird watching, and canyoneering. These uses contribute to air emissions associated with mobile sources and affect native wildlife and vegetation in the area.</p>	<p>Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, OFR</p>
<p>34. Arizona Trail – Continuous 800+ mile trail across Arizona from Mexico to Utah. Traverses the Tonto National Forest Globe Ranger District approximately 3 miles west of Superior, approximately 7 miles west of PAA. The trail could potentially put humans in areas where interaction with wildlife becomes more likely.</p>	<p>Spatial Context: Zones B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: W</p>

3.11.2. Air Quality (Issue 1)

Cumulative Air Quality Effects of the No Action Alternative

The spatial scale for evaluating air quality cumulative effects is generally bounded by the Globe-Miami area to the east, the eastern Phoenix metropolitan area to the west, the Tortilla Mountains to the south, and the southern edge of the Salt River Canyon Wilderness Area to the north. All categories of past, present, and reasonably foreseeable future activities directly and indirectly contribute to air pollutant emissions in the region (Table 3-12). The biggest contributors have been urban growth of the Phoenix metropolitan area and Pinal County. Past mining activities in the region have affected air resources by their generation of combustion and fugitive dust emissions and point source discharges from smelters and other metals processing facilities.

As discussed in Section 3.1.2 of this EA, the airshed in the far eastern portion of the PAA, known as the Miami Planning Area, is designated by EPA as nonattainment for PM₁₀ particulate matter. The Hayden nonattainment area for PM₁₀ extends north from Hayden. While still officially designated as a nonattainment area, the last exceedance of the 24-hour standard occurred in 1997 and the last annual standard exceedance occurred in 1988. The 8-hour average ozone concentrations and one-hour ozone maximum concentrations in Pinal County have generally decreased from 1993 to 2007 (Figure 3-2 and Figure 3-3). Air quality trends support the notion that over time, impacts to air resources associated with past mining actions and mobile sources have become less substantial.

Dust and NO_x emissions associated with vehicular travel can be associated with all the present and reasonably foreseeable future activities; however, most of these activities that could substantially affect air quality would require compliance with applicable ADEQ air quality control regulations. Future activities, such as implementation of the Forest Service Travel Management planning activities, may or may not reduce the annual discharge of vehicular emissions and fugitive dust emissions. This would be due to an overall reduction in the number of recreational user miles traveled on Forest Roads. Some future actions, such as improvements to U.S. Highway 60, will likely result in an increase in short term combustion and fugitive dust emissions during construction activities. Increased population growth in the region and the associated increase in vehicle trips for work and recreation may cause an increase in fugitive and combustion emissions but these increases may be offset by increasing regulatory restrictions on air emissions from motor vehicles. Cumulatively, increasing regulatory requirements have resulted in improvements in process and control technologies that have reduced ozone and PM₁₀ levels in the region over time despite the increase in population throughout the State, particularly the Phoenix metropolitan area.

Development of the deep copper ore deposit that underlies portions of the PAA is a reasonably foreseeable future action. However, its development is speculative (refer to Section 1.4). Currently there is no proposed mining plan to develop the deep copper ore deposit. It is anticipated that future mining activities would use underground mining methods as opposed to open pits. The surface disturbance

associated with underground facilities would be substantially less than open pit mining. The surface disturbance would be dependent upon the amount of waste deposited to the surface, haul and access road requirements, and other surface facilities. While all of these elements of a mine have the potential to generate pollutants, this action is too speculative to attempt to identify how much or even where air pollutant emissions would occur. Temporally, air emissions from development of an underground mine would occur after any pre-feasibility activities on State and private lands are complete.

The cumulative effects associated with the no action alternative and the activities outlined in Table 3-12 are not expected to change the decreasing trend in ozone concentrations recorded in Pinal County or result in any exceedances of the PM₁₀ standard. The spatially and temporally separate emissions from this alternative and other past, present, and reasonably foreseeable actions would not result in significant cumulative impacts.

Cumulative Air Quality Effects of the Proposed Action

The regional trend in ambient pollution concentrations at the nearest measuring locations appears to be improving. Temporally, air emissions from development of an underground mine would occur after the Pre-feasibility Activities are complete. Therefore, implementation of the proposed action would have similar cumulative effects as the no action alternative and is not expected to result in significant cumulative impacts on air resources.

Cumulative Air Quality Effects of the North OF-2 Alternative

Air emissions from North OF-2 drill site are not expected to be different from the emissions estimated using the OF-2 drill site in the proposed action. Therefore, cumulative effects to air resources are expected to be similar to those associated with the proposed action.

Cumulative Air Quality Effects of the West Access Route 4a Alternative

The increase in air emissions from construction of this alternative, compared to the proposed action, would be minimal. The total miles traveled to access Pre-feasibility Activities drill sites south of the Oak Flat Withdrawal Area (OF-1, OF-3, M, and RES-13) over the duration of the Pre-feasibility Activities would be less than the proposed action. Therefore, cumulative impacts on air resources are expected to be less than those associated with the proposed action.

Cumulative Air Quality Effects of the West Access Route 4b Alternative

The difference in air emissions from construction of this alternative would be minimally greater than the proposed action. The miles traveled to access Pre-feasibility Activities drill sites south of the Oak Flat

Withdrawal Area (OF-1, OF-3, M, and RES-13) would be less than the proposed action and only slightly more than the West Access Route 4a alternative. Therefore, cumulative impacts on air resources are expected to be less than those associated with the proposed action and marginally greater than those associated with the West Access Route 4a alternative.

3.11.3. Erosion and Sedimentation (Issue 2)

Cumulative Erosion and Sedimentation Effects of the No Action Alternative

The spatial scale for evaluating cumulative effects associated with roadway sediment and erosion control includes Zone A. Existing recreational use patterns of the roads in Zone A may change based on future Travel Management designations. The nature of vegetation cover and extent of bedrock formations that extend to the surface in the PAA limit adverse impacts from these uses. No significant cumulative effects from sedimentation of drainages or erosion of land surfaces are anticipated.

Cumulative Erosion and Sedimentation Effects of the Proposed Action

Potential impacts resulting from the proposed action have been determined to be negligible. Therefore, there are no project related impacts to be added to past, present, or reasonably foreseeable future actions to determine whether significant cumulative impacts may occur.

Cumulative Erosion and Sedimentation Effects of the North OF-2 Alternative

Evaluation of the North OF-2 alternative is similar to the proposed action, no significant cumulative effects are anticipated.

Cumulative Erosion and Sedimentation Effects of the West Access Route 4a Alternative

Evaluation of the West Access Route 4a alternative is similar to the proposed action, no significant cumulative effects are anticipated.

Cumulative Erosion and Sedimentation Effects of West Access Route 4b Alternative

Evaluation of the West Access Route 4b alternative is similar to the proposed action, no significant cumulative effects are anticipated.

3.11.4. Wildlife (Issue 3)

Cumulative Wildlife Effects of the No Action Alternative

Because most wildlife are highly mobile, particularly avian species, the spatial scale for evaluating cumulative effects on wildlife resources includes Zones A, B, C, and D. Cumulative effects to wildlife within these four zones would result from the loss of habitat as a result of surface disturbance, mortalities from animal-vehicle collisions, and displacement caused by human intrusion. At the local scale, all four types of past, present, and reasonably foreseeable future actions affect wildlife (mining and mining-related activities; land use, access and road improvements; recreational uses; and utilities and infrastructure improvements), but at a regional scale, localized impacts that result or would result from these actions become less substantial. Negative impacts to wildlife resources from mining activities have been offset to some degree by remediation and reclamation projects in the region, such as the Pinal Creek remediation project and the Old Dominion Mine reclamation. Major roads in the region, such as U.S. Highway 60, continue to impact wildlife. The planned improvements to U.S. Highway 60 will not necessarily increase the frequency of animal-vehicle collisions, but will likely result in greater surface disturbance and encroachment into adjacent areas used by wildlife. Forest roads in the region are managed to limit cross country travel to areas that are designated for that use, which limits the probability of impacts to wildlife from traffic in more remote, less used areas. The presence of power lines located in the region may impact bird populations, particularly raptors. Newer pole and tower designs limit the risk of electrocution but older poles and towers that have not been updated pose electrocution risk, and losses from collisions are still likely.

Indirect effects associated with the no action alternative result from the level of daily human activity, particularly along FR 315. Traffic would be decreased from current levels, particularly during the work week when recreational uses are typically at their lowest levels, decreasing the likelihood of animal-disturbance. The slower road speeds of most Forest Roads limit the potential risk of vehicle collisions. However, periods of peak use associated with four-wheel drive recreational traffic and other recreational uses may increase because of the elimination of drilling activities along FR 315, increasing the likelihood of potential disturbance.

The no action alternative would not result in significant adverse cumulative effects to wildlife.

Cumulative Wildlife Effects of the Proposed Action

Cumulative effect analysis zones A, B, C, and D are largely comprised of public lands, primarily National Forest System Lands with Bureau of Land Management and State lands included as well. While State lands, particularly towards Florence and Florence Junction may be developed at some point in the future, the vast majority of lands in the analysis area is protected and will not be adversely impacted by the present and reasonably foreseeable future actions. The relative small area of impact from the Pre-feasibility Activities are spread over a large area of National Forest System Lands and are located

immediately adjacent to existing disturbance areas. Potential impacts resulting from the proposed action have been determined to be negligible, therefore there are no project related impacts to be added to past, present, or reasonably foreseeable future actions to determine whether significant cumulative impacts may occur.

Cumulative Wildlife Effects of the North OF-2 Drill Site Alternative

Because this alternative results in only a 0.65 percent increase in surface disturbance and the likelihood of animal-vehicle collision does not differ substantially from the Pre-feasibility Activities, the cumulative effects on wildlife do not substantially differ from those of the proposed action.

Cumulative Wildlife Effects of the West Access Route 4a Alternative

Because this alternative results in only a 9.9 percent increase in surface disturbance and the likelihood of animal-vehicle collision does not differ substantially from the proposed action, the cumulative effects on wildlife do not substantially differ from those of the proposed action.

Cumulative Wildlife Effects of the West Access Route 4b Alternative

Because this alternative results in only an 11.4 percent increase in surface disturbance over the proposed action and the likelihood of animal-vehicle collision does not differ substantially from the proposed action, the cumulative effects on wildlife do not substantially differ from those of the proposed action.

3.11.5. Arizona Hedgehog Cactus (Issue 4)

Cumulative Arizona Hedgehog Cactus Effects of the No Action Alternative

The spatial scale for evaluating cumulative affects to Arizona hedgehog cacti includes the species range, which is in Pinal County in the vicinity of Dripping Springs, the Superstition and Mescal mountains, the highlands between Globe and Superior, and in Devils Canyon and Queen Creek along the Gila/Pinal County line (AGFD, 2003). This area includes the northeastern portions of the PAA and areas north and east of the PAA and occur within portions of zones A, B, C and D identified in Table 3-12.

Mining and mining-related activities, land use access and road related activities, and recreational uses, all have the potential to directly and indirectly affect the Arizona hedgehog cactus in the PAA and its vicinity. Because of the patchy distribution of this species, some mining activities such as the Carlota Project, impacted a relatively large number of individuals, while other nearby properties, such as Pinto Valley, have not had any cactus detected in areas that have been contemplated for expansion over the past 10 to 15 years. Impacts from the Carlota Copper Project were offset by withdrawal of certain National Forest System Lands from mineral entry for Arizona hedgehog cactus conservation. Within the

cumulative effects analysis area for this species, private land ownership is a relatively small percentage of the overall land area. However, in these areas, private actions on private lands would not be subject to Endangered Species Act Section 7 consultation. Most recreational activities would not adversely impact this species because of its common habitat preference for steeper slopes in the cracks and crevices of boulders and rock outcrops. The implementation of travel management planning will likely have both beneficial and adverse effects to this species and those effects will vary across the species range.

The no action alternative would not have any direct or indirect effect on the Arizona hedgehog cactus; therefore, it would not contribute to any cumulative effects.

Cumulative Arizona Hedgehog Cactus Effects of the Proposed Action Alternative

Potential impacts resulting from the proposed action have been determined to be negligible, therefore there are no project related impacts to be added to past, present, and reasonably foreseeable future actions to determine whether significant cumulative impacts may occur.

Cumulative Arizona Hedgehog Cactus Effects from the North OF-2 Drill Site Alternative

The cumulative effects of the North OF-2 alternative would be the same as for the proposed action.

Cumulative Arizona Hedgehog Cactus Effects of the West Access Route 4a Alternative

The cumulative effects of construction of the West Access Route 4a alternative and drill sites 4W and 4E would be the same as for the proposed action.

Cumulative Arizona Hedgehog Cactus Effects of the West Access Route 4b Alternative

The cumulative effects of construction of the West Access Route 4a alternative and drill sites 4W and 4E would be the same as for the proposed action.

3.11.6. Recreational Activities In and Around Oak Flat (Issue 5)

Cumulative Recreation Effects of the No Action Alternative

The spatial scale and activities considered while evaluating cumulative effects associated with recreational uses in and around Oak Flat is represented by Zone A (Table 3-12 and Figure 3-11). Past and present mining and mining related activities have affected the visual resources of the area, which affects

visitors' recreational experiences; however, some of these impacts have been and will continue to be offset through reclamation and mitigation efforts. Most reasonably foreseeable future actions in the area would also cause relatively minor additional effects to visual resources and recreational uses in the area. Planned improvements to U.S. Highway 60 would result in both beneficial (improved access) and non-beneficial (increased traffic and traffic related noise) effects to recreational uses in the Oak Flat Campground. This alternative is not expected to cumulatively affect recreational uses in and around Oak Flat Campground.

Cumulative Recreation Effects of the Proposed Action

Cumulative effects analyses Zone A is largely comprised of public land that provide a variety of recreational opportunities (Table 3-12). Activities within this zone that influence the baseline/trend for determining cumulative recreation effects are provided in Table 3-12 and include commercial transportation, power transmission, and previous and ongoing mining activities that have occurred in the vicinity of the Oak Flat Campground. Superior is a mining town and mining activities near and adjacent to Oak Flat have been ongoing since the early 1970s when the underground workings at the Superior East Plant Site were constructed. In 1990, DOE constructed a well to collect groundwater data in support of its search for a long-term nuclear waste storage facility. U.S. Highway 60 is present on 1948 aerial topographic maps of the Oak Flat area and was and remains one of the principal highways connecting the Phoenix metropolitan area with eastern Arizona. The roads within Oak Flat depicted on the 1948 topographic map and the 1981 map are the same as those seen in recent aerial photographs. Telephone and power lines are clearly delineated on the 1981 topographic maps, immediately north of Oak Flat Withdrawal Area, along the U.S. Highway 60 corridor. The large transmission line that traverses the eastern side of the Oak Flat Withdrawal Area is not depicted on the 1981 topographic map but this transmission line and its substation are clearly present on more recent aerial photographs.

Implementation of the proposed action will adversely impact some users of the Oak Flat Campground while others may not perceive the presence of the drill rigs as a new intrusion on the landscape. The increased levels of vehicle traffic during periods of peak drilling activity will be noticed, primarily at shift changes, which may coincide with meal times for campers or times when bird watchers that frequent the campground would be likely to be most active. At these times, the recreational users of Oak Flat may be most sensitive to the additional vehicles using the roads within the Oak Flat Withdrawal Area to access drill sites outside of the withdrawal area. It should be noted that at these same times, the commercial truck traffic climbing the grade up the Queen Creek Canyon can be heard from within the Oak Flat Withdrawal Area and four-wheel drive vehicle enthusiasts may be traveling through the campground to access State land as well.

There will be impacts from implementation of the proposed action to the recreational users of the Oak Flat Withdrawal Area. These impacts will likely be perceived by individuals differently, but in the context of this assessment they would not result in significant adverse cumulative effects.

Cumulative Recreation Effects of the North OF-2 Drill Site Alternative

Cumulative impacts to the users of the Euro Dog Valley Climbing Area would be reduced under this alternative because access to the Boulder Campsite and Euro Dog Valley Climbing Area would be preserved. In addition, noise impacts from drilling activities at the North OF-2 drill site would be mitigated and maintained at relatively low levels—somewhat less than the sound of a dishwasher within the next room, within 3 to 4 dBA of the measured baseline condition. The cumulative effects of visual, noise, and traffic impacts from implementation of the North OF-2 alternative would not differ from the cumulative effects of the proposed action.

Cumulative Recreation Effects of the West Access Route 4a Alternative

The cumulative effects of traffic related impacts to recreational users of the Oak Flat Campground and the Oak Flat Withdrawal Area would be substantially reduced from the proposed action. The cumulative effects of visual and noise related impacts to recreational users of the Oak Flat Withdrawal Area from drill sites located adjacent to the Oak Flat Withdrawal Area would not differ from the proposed action and would not be significant.

Cumulative Recreation Effects of the West Access Route 4b Alternative

The cumulative effects of visual and noise related impacts to recreational users of the Oak Flat Withdrawal Area associated with this alternative would not differ substantially from the proposed action. The cumulative effects of traffic related impacts would be the same as West Access Route 4a.

3.11.7. Safety (Issue 6)

Cumulative Safety Effects of the No Action Alternative

There would be no change in the existing conditions and no adverse cumulative effects from implementation of the no action alternative.

Cumulative Safety Effects of the Proposed Action

Reasonably foreseeable future actions within Zone A would result in both beneficial and non-beneficial effects relating to traffic safety. Improvements along U.S. Highway 60 would certainly provide for safer ingress and egress from the Oak Flat area and to accommodate forecasted increase in traffic in this area that could result from continued population growth in the Phoenix Metropolitan Area and the State generally. Traffic volumes will increase within the PAA as a result of increased population growth in the region that will contribute to increased demands for recreational opportunities on public land. The

proposed action within the PAA will contribute to this increase in traffic volume during the authorization period, contributing cumulatively to safety issues relating to traffic. However, traffic safety measures would be incorporated into the proposed action and no significant cumulative effects would be realized.

Cumulative Safety Effects of the North OF-2 Drill Site Alternative

Cumulative effects associated with this alternative would be the same as those associated with the proposed action

Cumulative Safety Effects of the West Access Route 4a Alternative

Because this alternative results in less direct and indirect effects, its cumulative effects would be less than those associated with the proposed action.

Cumulative Safety Effects of the West Access Route 4b Alternative

The cumulative consequences of this alternative would be the same as for the West Access 4a alternative.

3.11.8. Conflicts with Oak Flat Withdrawal Area (Issue 7)

Conflicts with Oak Flat Withdrawal Area, Cumulative Effects of the No Action Alternative

No impacts would occur under the no action; therefore, no cumulative effects would occur as a result of this alternative.

Conflicts with the Oak Flat Withdrawal Area, Cumulative Effects of the Proposed Action

Impacts from the proposed action are not anticipated; therefore, no project related impacts can be added to past, present, or reasonably foreseeable actions to create cumulative effects.

Conflicts with the Oak Flat Withdrawal Area, Cumulative Effects of the North OF-2 Drill Site

The cumulative effects of this alternative would be as described for the proposed action.

Conflicts with the Oak Flat Withdrawal Area, Cumulative Effects of the West Access Route 4a Alternative

The cumulative effects of this alternative would be as described for the proposed action.

Conflicts with the Oak Flat Withdrawal Area, Cumulative Effects of the West Access Route 4b Alternative

The cumulative effects of this alternative would be as described for the proposed action.

3.11.9. Travel Management (Issue 8)

Travel Management, Cumulative Effects of the No Action Alternative

Selection of the no action alternative would not alter ongoing Forest Services Travel Management planning activities or the implementation of the Travel Management guidelines that will ultimately be developed for the Globe Ranger District. Selection of the no action alternative would not contribute to or result in any significant cumulative effects to the Forest Service's Travel Management planning effort.

Travel Management, Cumulative Effects of the Proposed Action

Selection of the proposed action alternative would not alter the Forest Service's planning and implementation of the Travel Management guidelines in the Globe Ranger District and thus would not contribute to or result in any significant cumulative effects. The activities designated during the Travel Management planning process would not be affected by the proposed Pre-feasibility Activities.

Travel Management, Cumulative Effects of the North OF-2 Drill Site

The cumulative effects of this alternative to the Forest Service's Travel Management program would be the same as for the proposed action.

Travel Management, Cumulative Effects of the West Access Route 4a Alternative

The cumulative effects would be the same as for the proposed action.

Travel Management, Cumulative Effects of the West Access Route 4b Alternative

The cumulative effects would be the same as for the proposed action.

3.11.10. Cultural Resources (Issue 9)

Cumulative Cultural Resource Effects of the No Action Alternative

The issue raised during public scoping pertained to impacts on historic, pre-historic, and other cultural resources within and in the vicinity of the PAA and we have evaluated potential cumulative effects within cumulative impact analysis Zones A, B, and C (Table 3-12). Pre-history cultures that are known from this area include Hohokam and Salado cultures. The area is also rich in historical cultural sites mainly associated with the Apache culture and historic mining and ranching. Prehistoric archaeological sites in the vicinity of the PAA are representative of the Salado, Western Apache, and historic occupations in the Western Pinal Mountains.

Roadway and cattle tank construction; mining and mineral exploration, livestock grazing, and recreational uses have impacted the surrounding landscape and have likely affected the integrity of cultural resources in the region. Past, present, and reasonably foreseeable mining and mining-related activities all have the potential to directly and indirectly affect cultural resources in the PAA and its vicinity. They include: land use, access and road improvements; recreational uses; and utilities and infrastructure improvements. Since the passage of the National Historic Preservation Act, many of these unavoidable impacts have been mitigated by avoidance of impacts or the implementation of specific data recovery efforts. Collectively this has helped to preserve information contained within these sites.

The no action alternative would not adversely impact any cultural resource sites and would not contribute to any cumulative effects to cultural resources.

Cumulative Cultural Resource Effects of the Proposed Action

The proposed action is not expected to adversely impact any cultural resource site. The mitigation measures outlined in this EA require active monitoring during construction of drill sites and roadway improvements to avoid adverse impacts to known cultural resource sites. If previously undetected cultural resource sites are detected, all construction activities would stop in the vicinity of the site until the Forest Service archaeologist has determined the appropriate treatment. The proposed action is not expected to adversely impact any known cultural resource site and would not result in any significant adverse impact to cultural resources.

Cumulative Cultural Resource Effects of the North OF-2 Drill Site Alternative

Cumulative effects associated with this alternative would be the same as those associated with the proposed action.

Cumulative Cultural Resource Effects of the West Access Route 4a Alternative

Cumulative effects associated with this alternative would be the same as those associated with the proposed action.

Cumulative Cultural Resource Effects of the West Access Route 4b Alternative

Cumulative effects associated with this alternative would be the same as those associated with the proposed action.

3.11.11. Native American Religious Practices (Issue 10)

Native American Religious Practices, Cumulative Effects of the No Action Alternative

The spatial scale for evaluating cumulative effects on Native American religious practices encompasses Oak Flat, Apache Leap, Devils Canyon, and the related canyons, geologic formations, and springs in the area of the Pre-feasibility Activities. Past actions within this area have included the construction of roadways; power lines and other infrastructure; mining and mining exploration activities; and a variety of recreational activities—all of which have contributed to surface impacts of this area. These past, present, and reasonably foreseeable activities may have had, and may in the future have an adverse impact on the subjective experience of Native American religious practices. However, information has not been provided regarding any instances when past and present activities have forced a Tribe to violate their religious beliefs or caused them to be penalized for their religious beliefs or activities. Nor has information been provided on any reasonably foreseeable future activities that would cause Native Americans to violate their religious beliefs or cause them to be penalized for their religious beliefs or activities.

Because the no action alternative would not affect Native American religious practices, it would not contribute to any cumulative effects on those practices.

Native American Religious Practices, Cumulative Effects of the Proposed Action

This alternative would not place a substantial burden on a Native American Tribe's religious practice and would therefore not result in significant adverse cumulative impact.

Native American Religious Practices, Cumulative Effects of the North OF-2 Drill Site Alternative

This alternative would not place a substantial burden on a Native American Tribe's religious practice and would therefore not result in significant adverse cumulative impact.

Native American Religious Practices, Cumulative Effects of the West Access Route 4a Alternative

This alternative would not place a substantial burden on a Native American Tribe's religious practice and would therefore not result in significant adverse cumulative impact.

Native American Religious Practices, Cumulative Effects of the West Access Route 4b Alternative

This alternative would not place a substantial burden on a Native American Tribe's religious practice and would therefore not result in significant adverse cumulative impact.

Page intentionally left blank

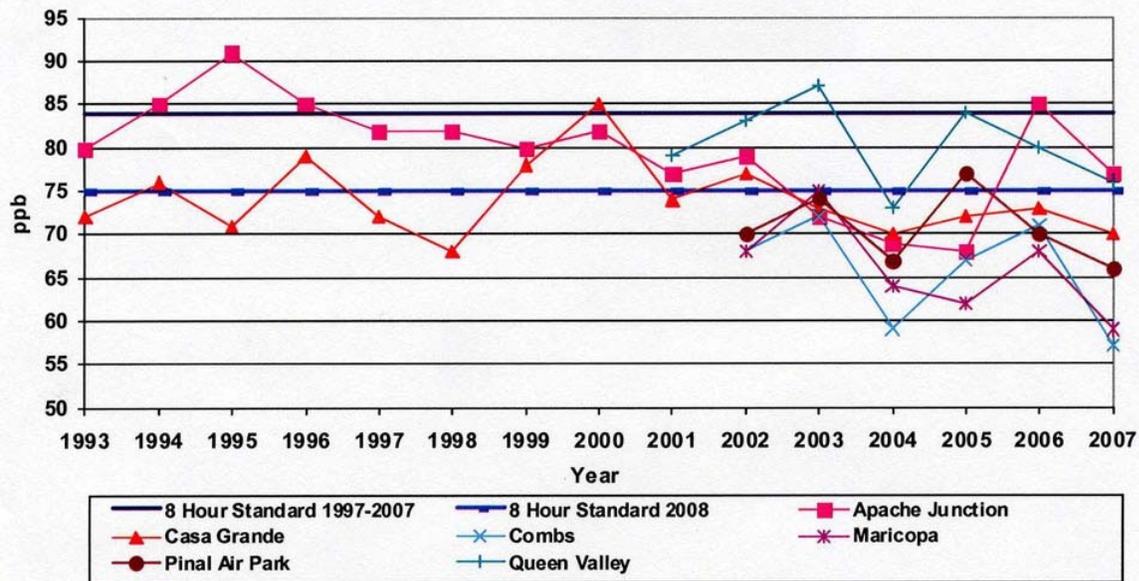


Figure 3-1. Eight-Hour Ozone Trends – Fourth Highest Concentration. [Source: Pinal County Air Quality Control District 2007 Ambient Monitoring Network Plan and Data Summary (final document dated June 16, 2008)]

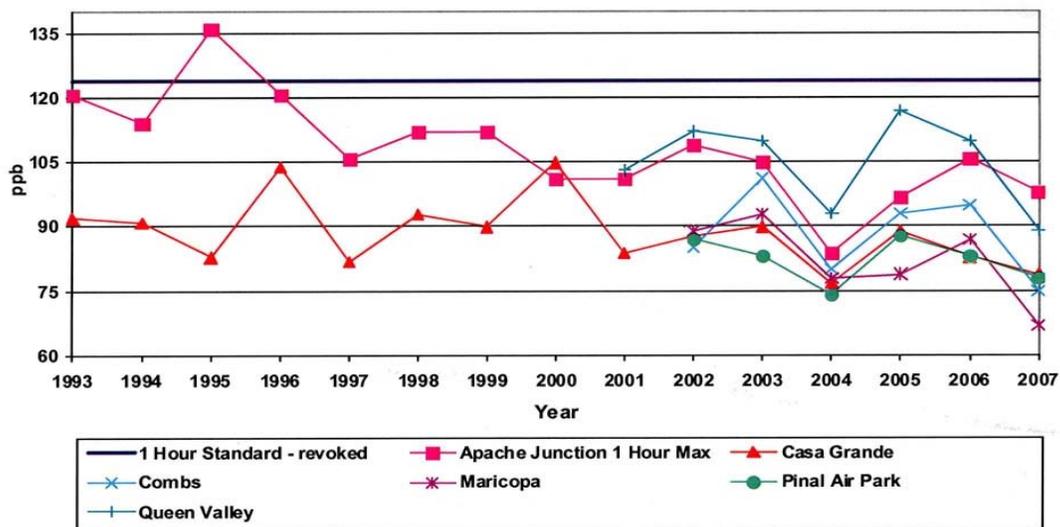


Figure 3-2. One-Hour Ozone Trends – Maximum Concentration. [Source: Pinal County Air Quality Control District 2007 Ambient Monitoring Network Plan and Data Summary (final document dated June 16, 2008)]

Sound Level Contours¹
A-weighted decibels (dBA)

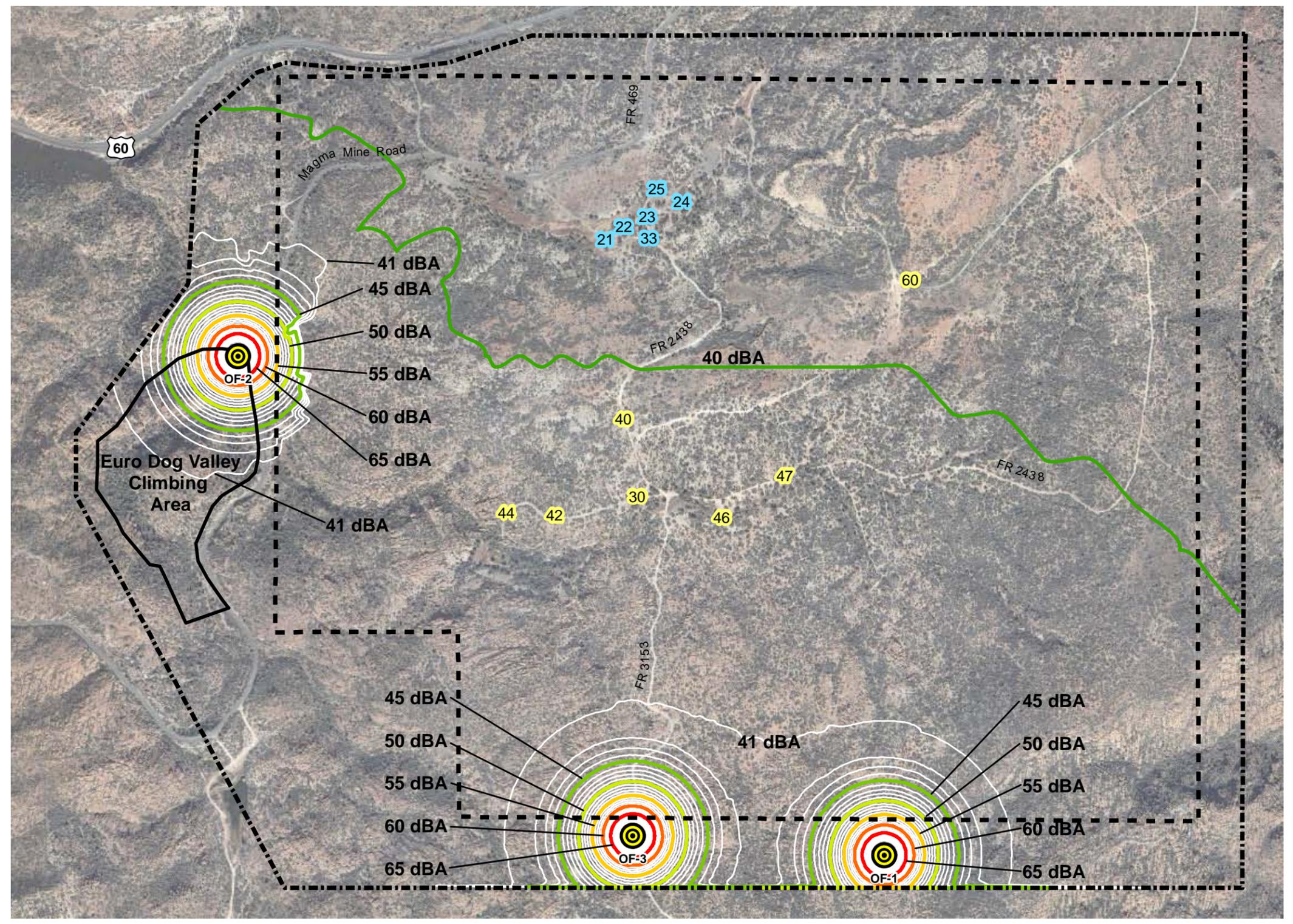
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA

- Oak Flat Picnic and Campground Withdrawal Area Boundary
- Study Area Boundary
- Proposed Exploration Drill Rigs

Campgrounds

- Oak Flat Campground Designated Campsites
- Large Dispersed Campsites As Determined In Field Reconnaissance

Notes:
 1. Results of computer model of Alternate 1: the simultaneous operation of drill rigs at sites OF-1, OF-2, and OF-3 plus a background sound level of 40 dBA.

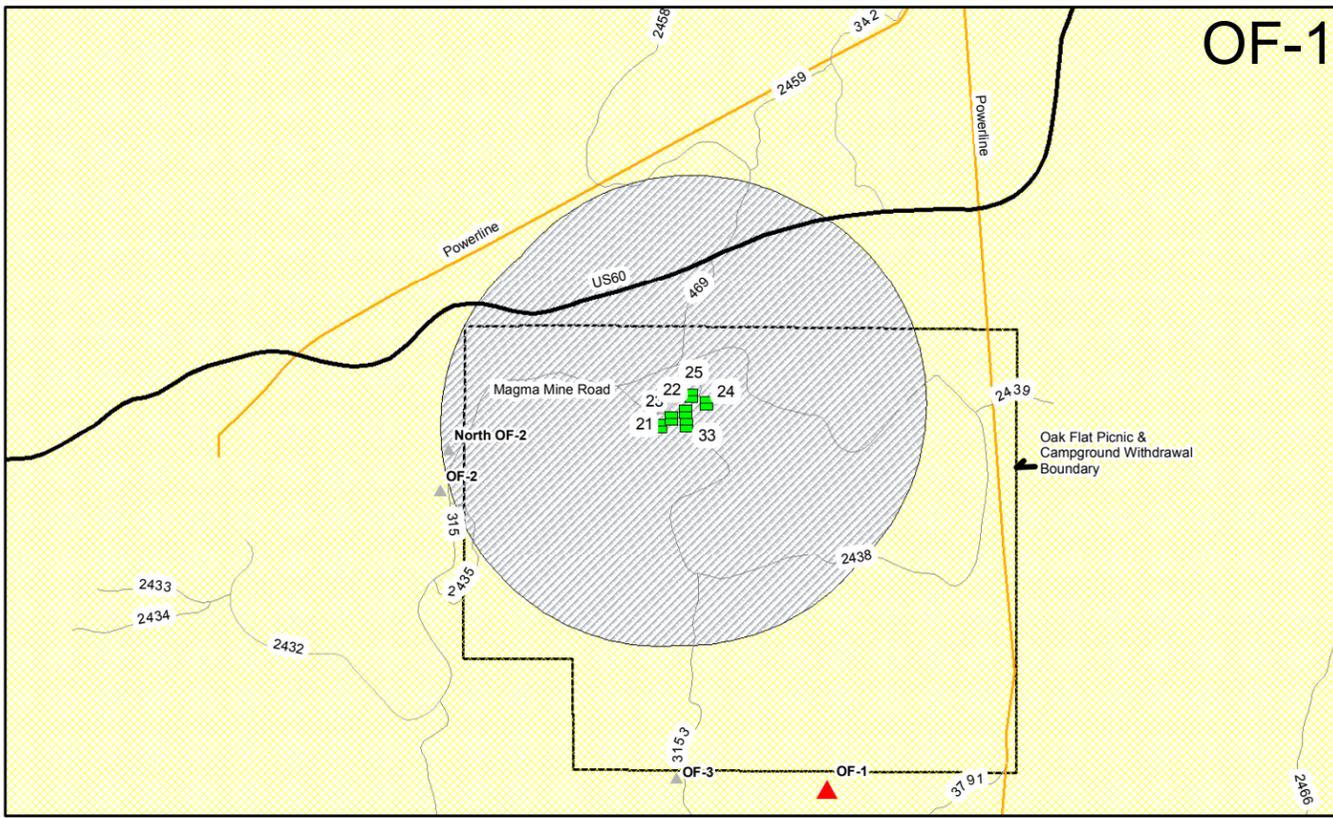


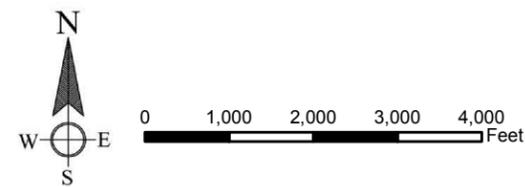
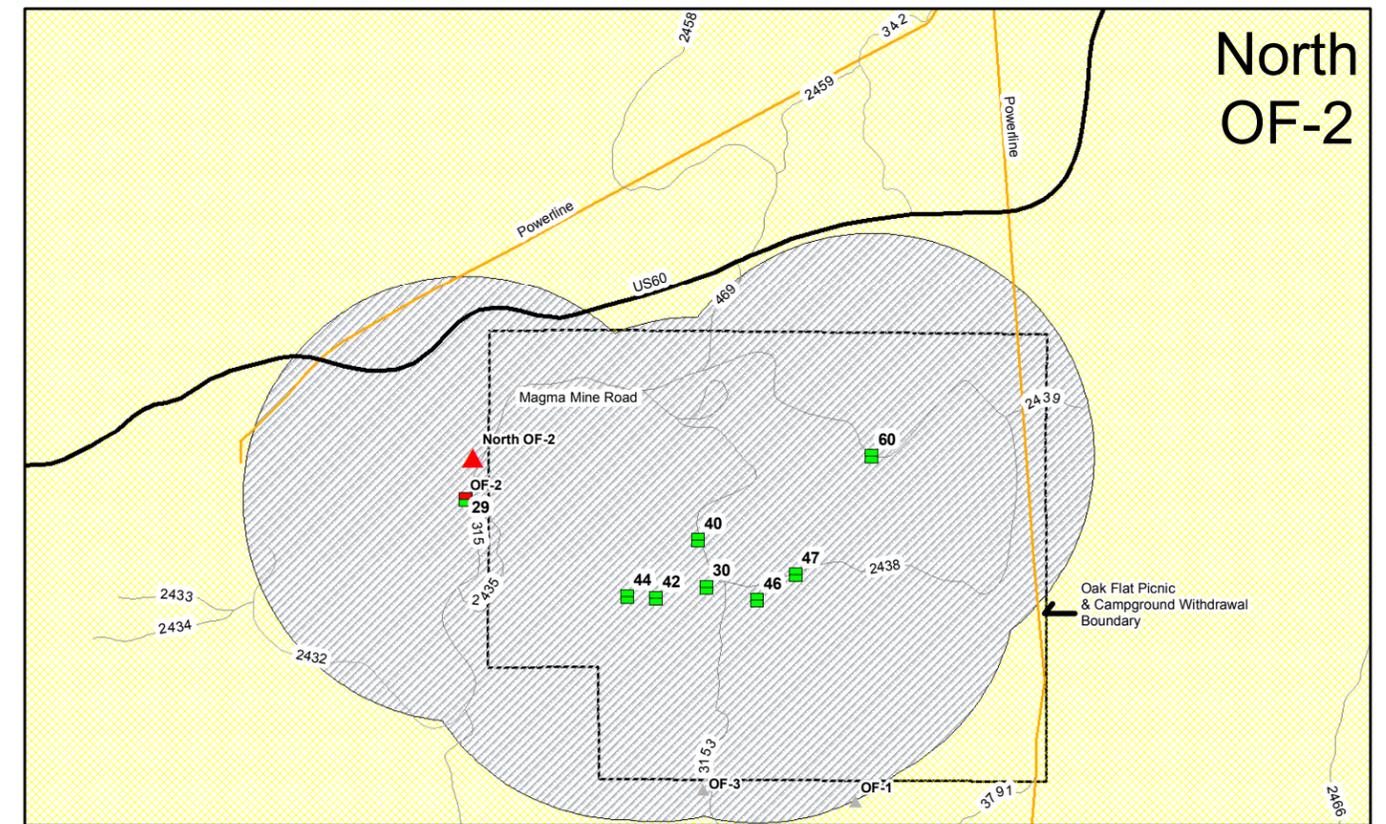
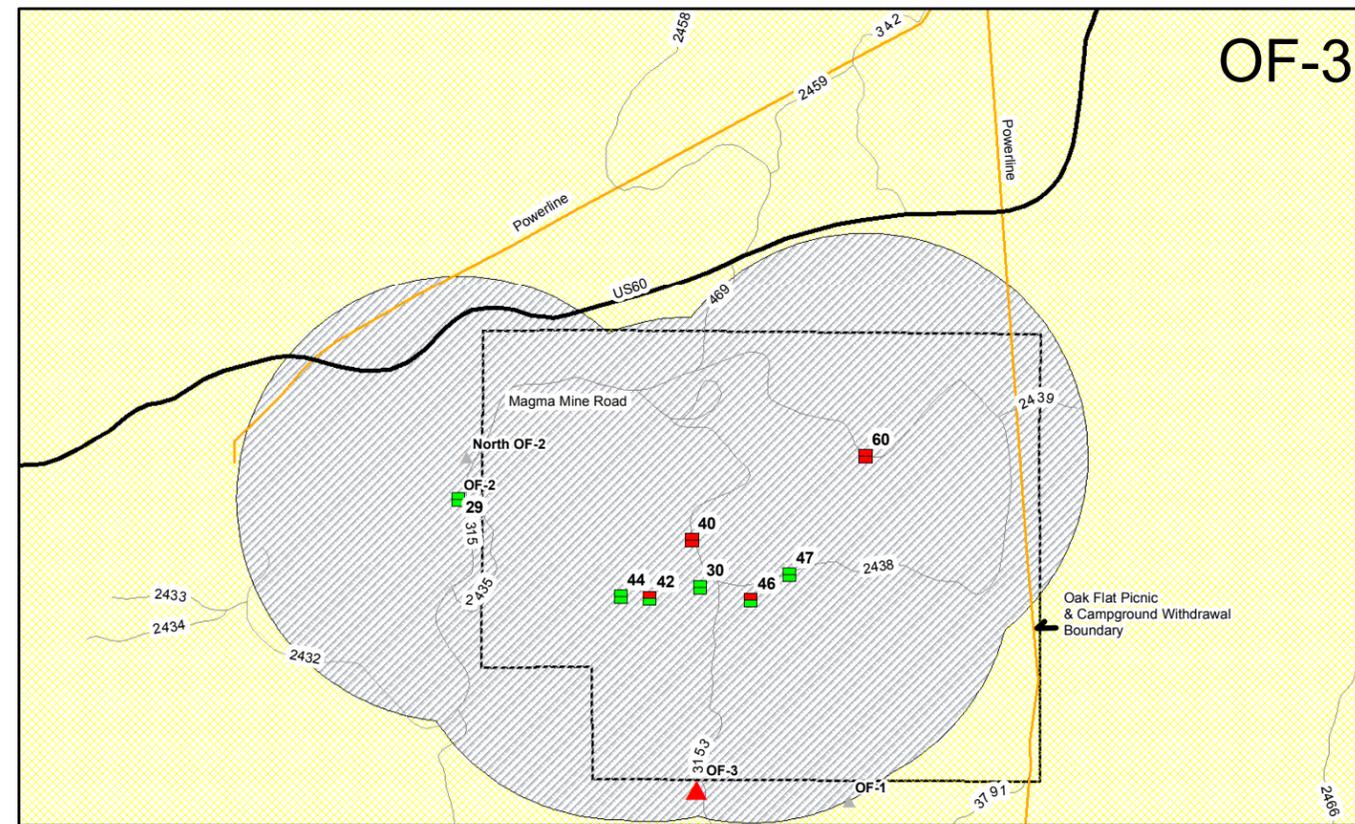
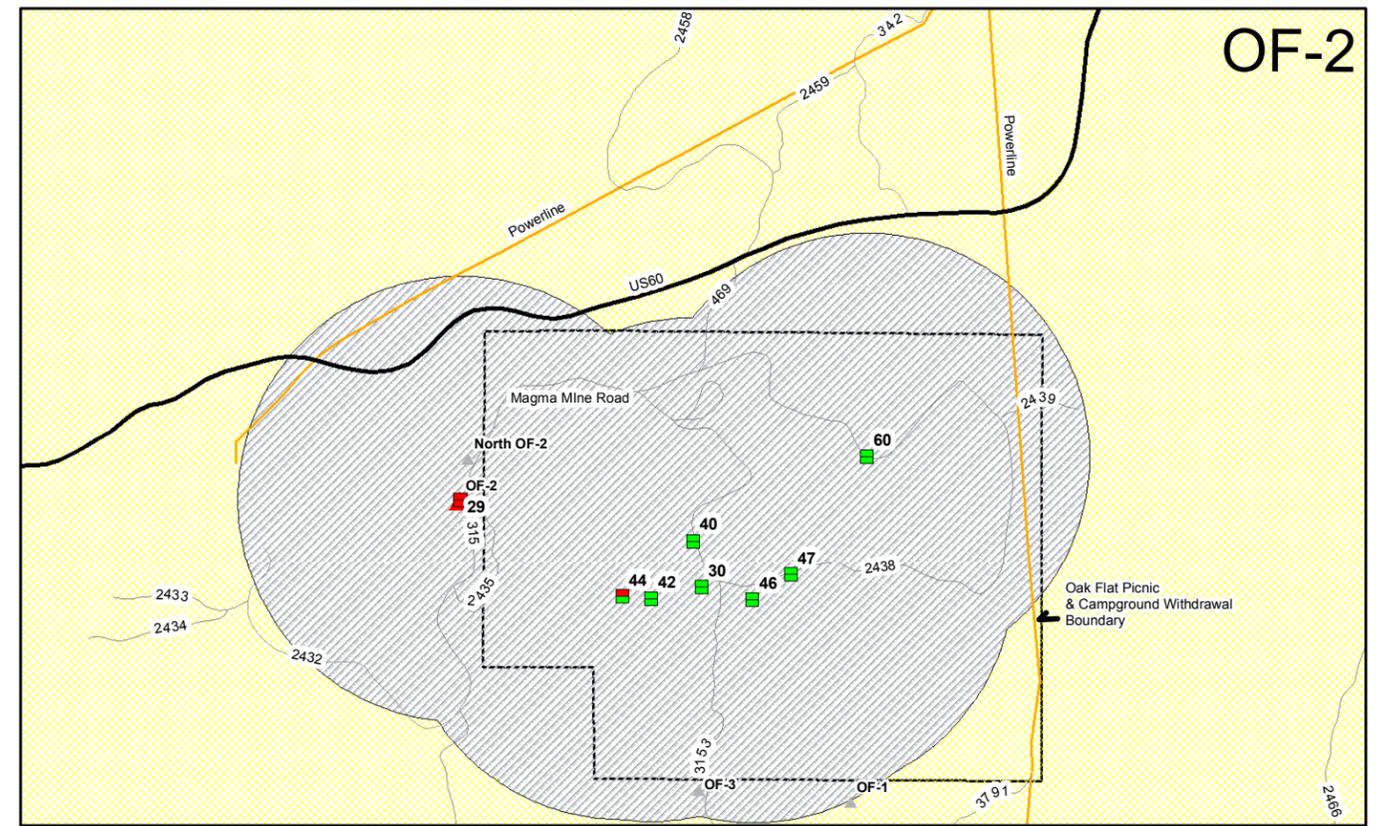
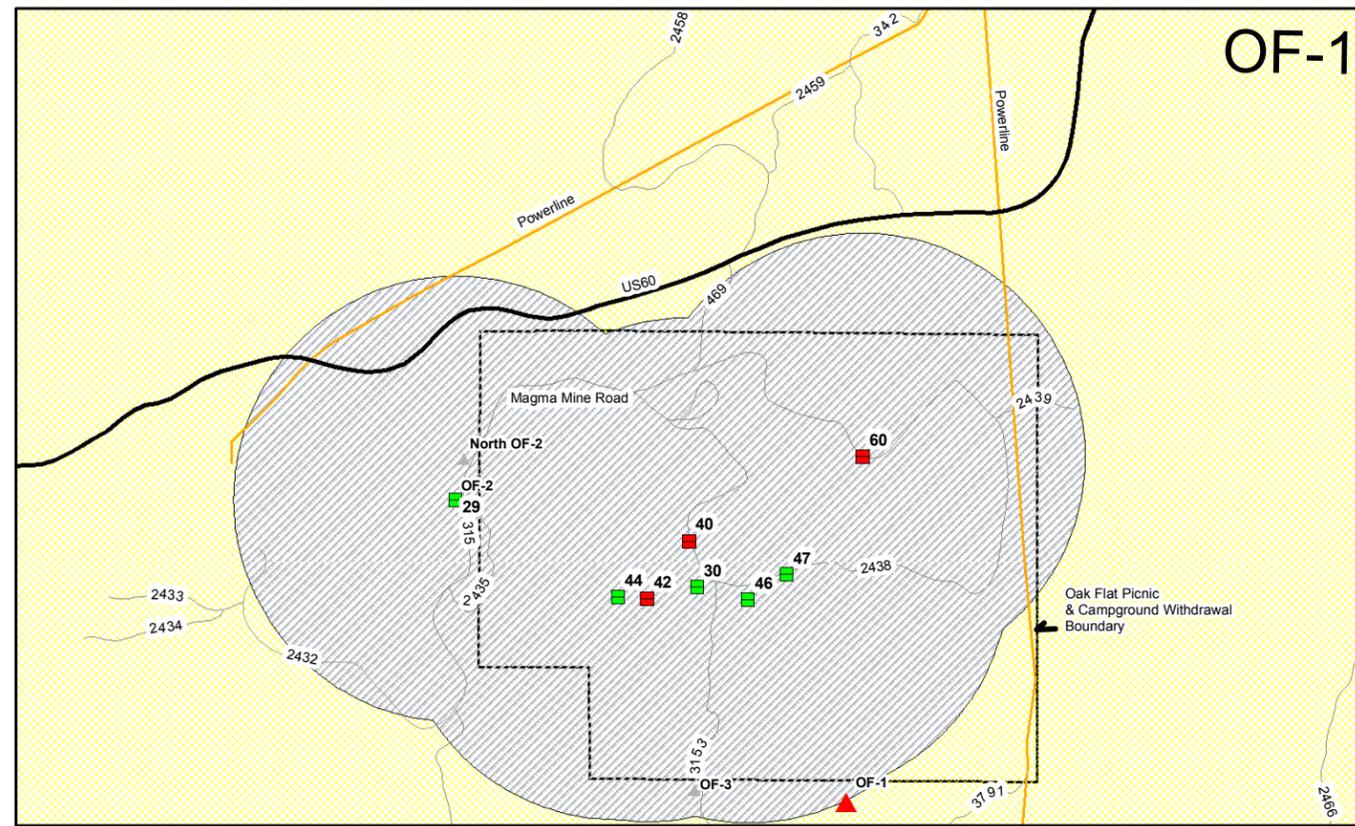
**RESOLUTION COPPER MINING
 PRE-FEASIBILITY PLAN OF OPERATIONS**
 Tonto National Forest – Globe Ranger District
 Environmental Assessment

Sound Level Contours Resulting from
 Noise Model of Alternate 1, the Proposed Action

Figure 3-3

OF-1





Legend

Key Observation Points

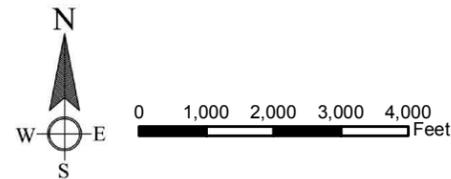
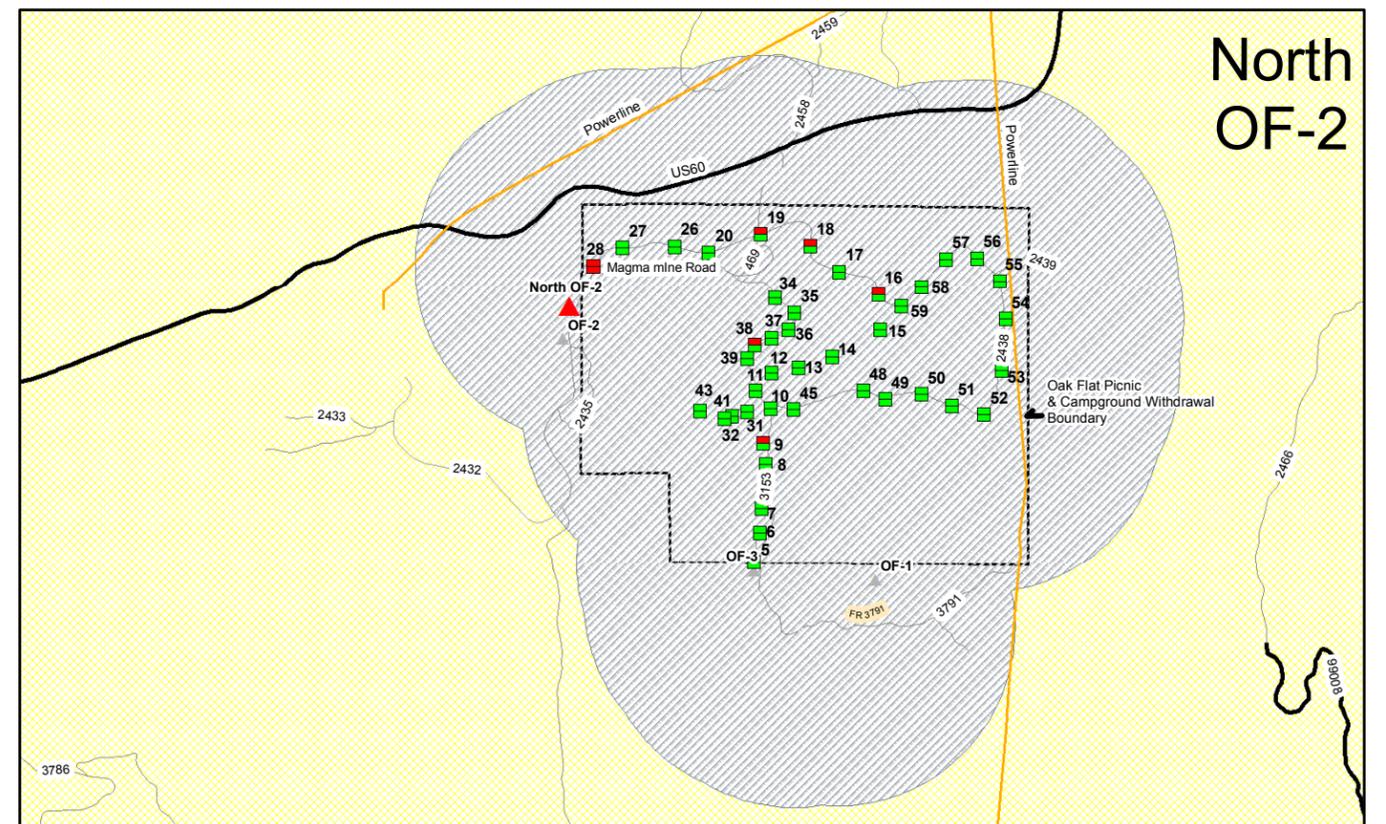
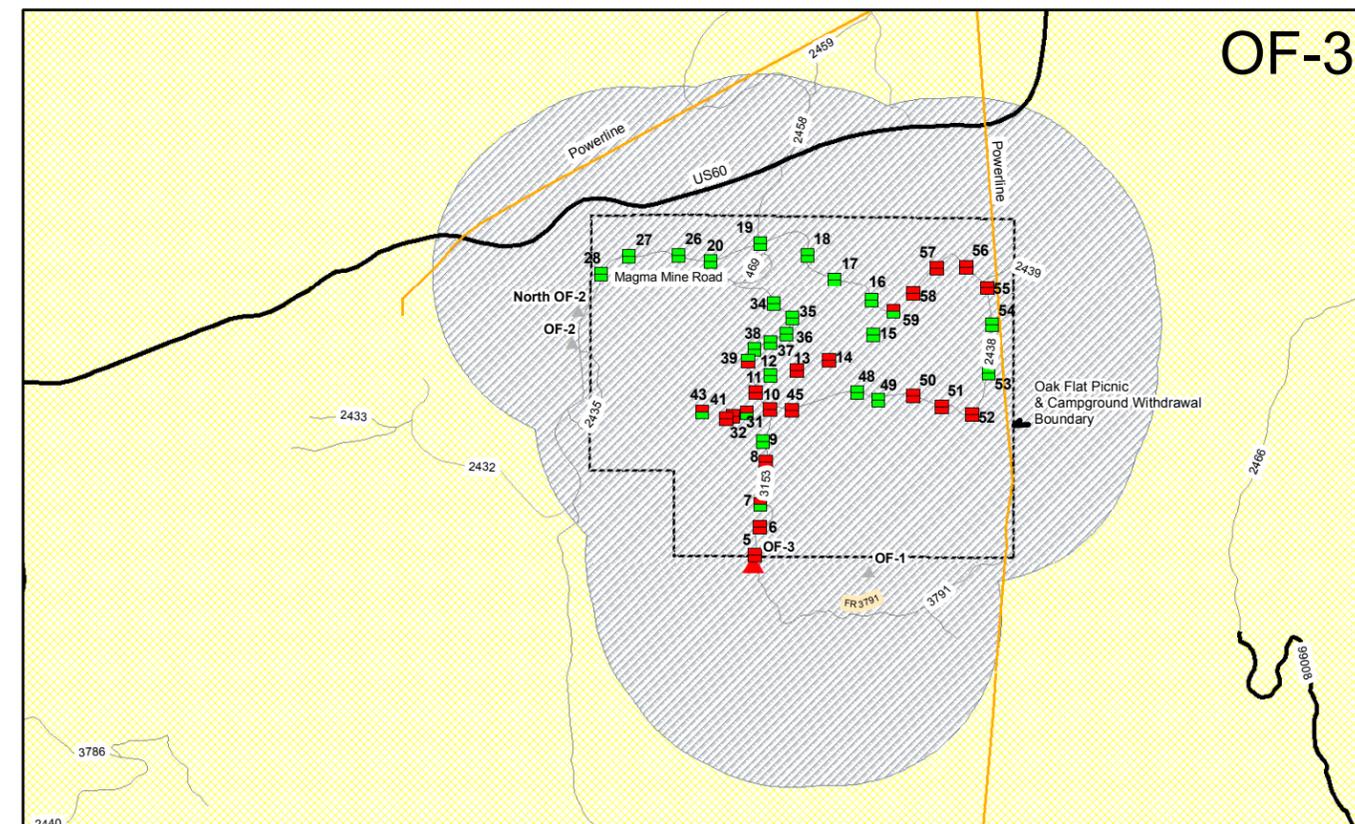
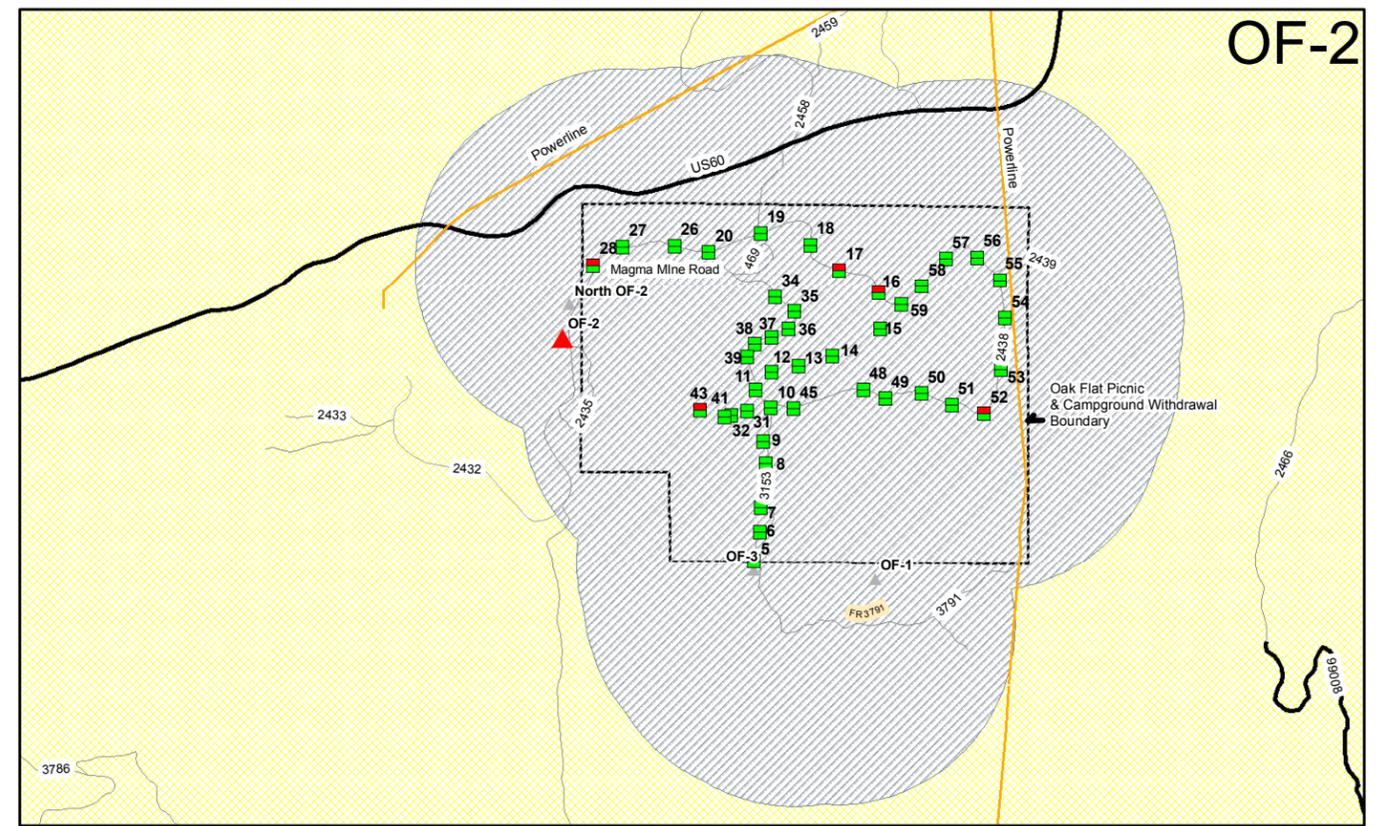
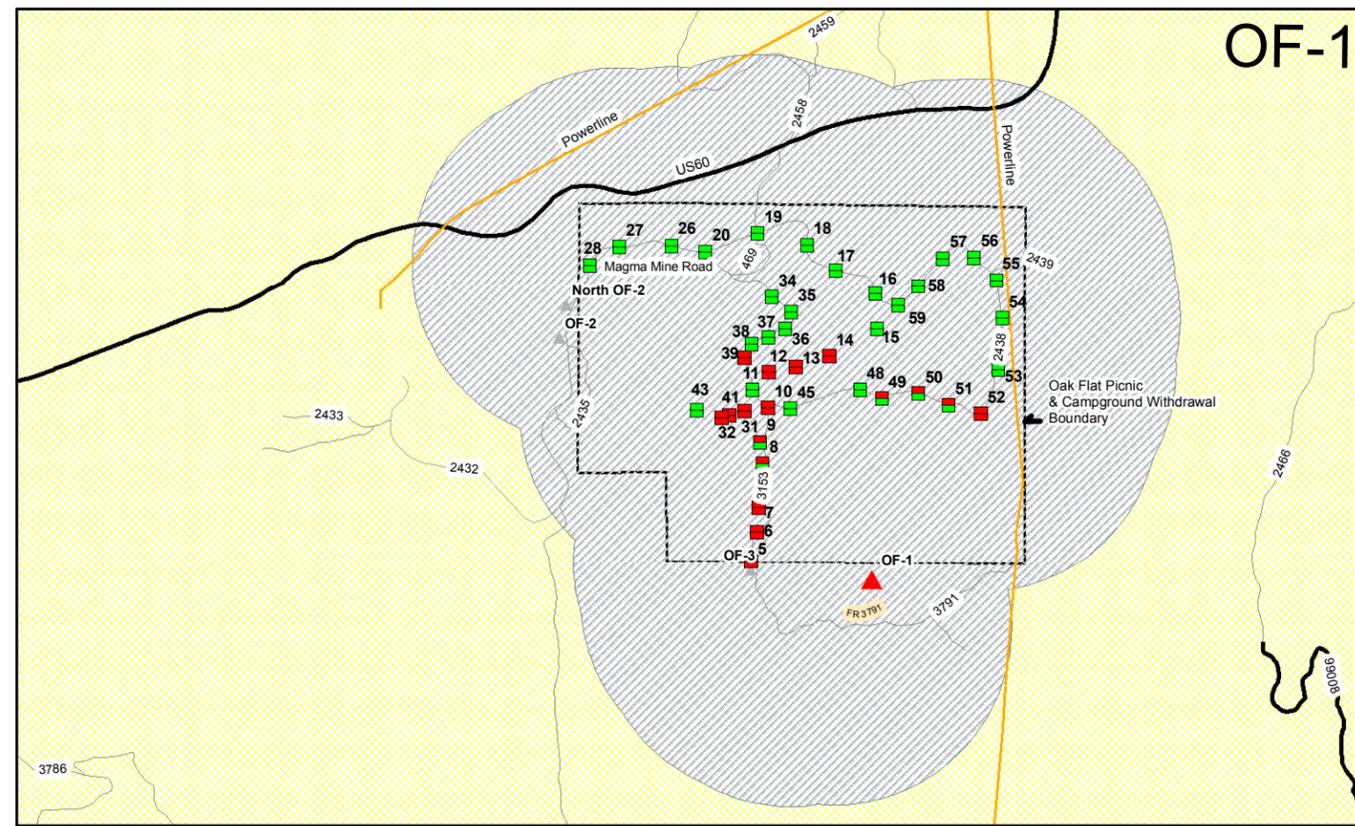
- No Balloons Sighted
- 80' Balloon Sighted
- 12' Balloon Sighted
- Both Balloons Sighted

- Foreground = 0 to 0.25 - 0.5 Miles From Observer
- Middleground = 0.25 - .05 Mile to 3-5 Miles From Observer
- ▲ Proposed Drill Site
- Forest Road

**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS
Tonto National Forest - Globe Ranger District
Environmental Assessment**

Visual Assessment of OF-1, OF-2, OF-3, and North OF-2 from Dispersed Campsites in the Oak Flat Withdrawal Area and the Boulder Campsite

Figure 3-5



Legend

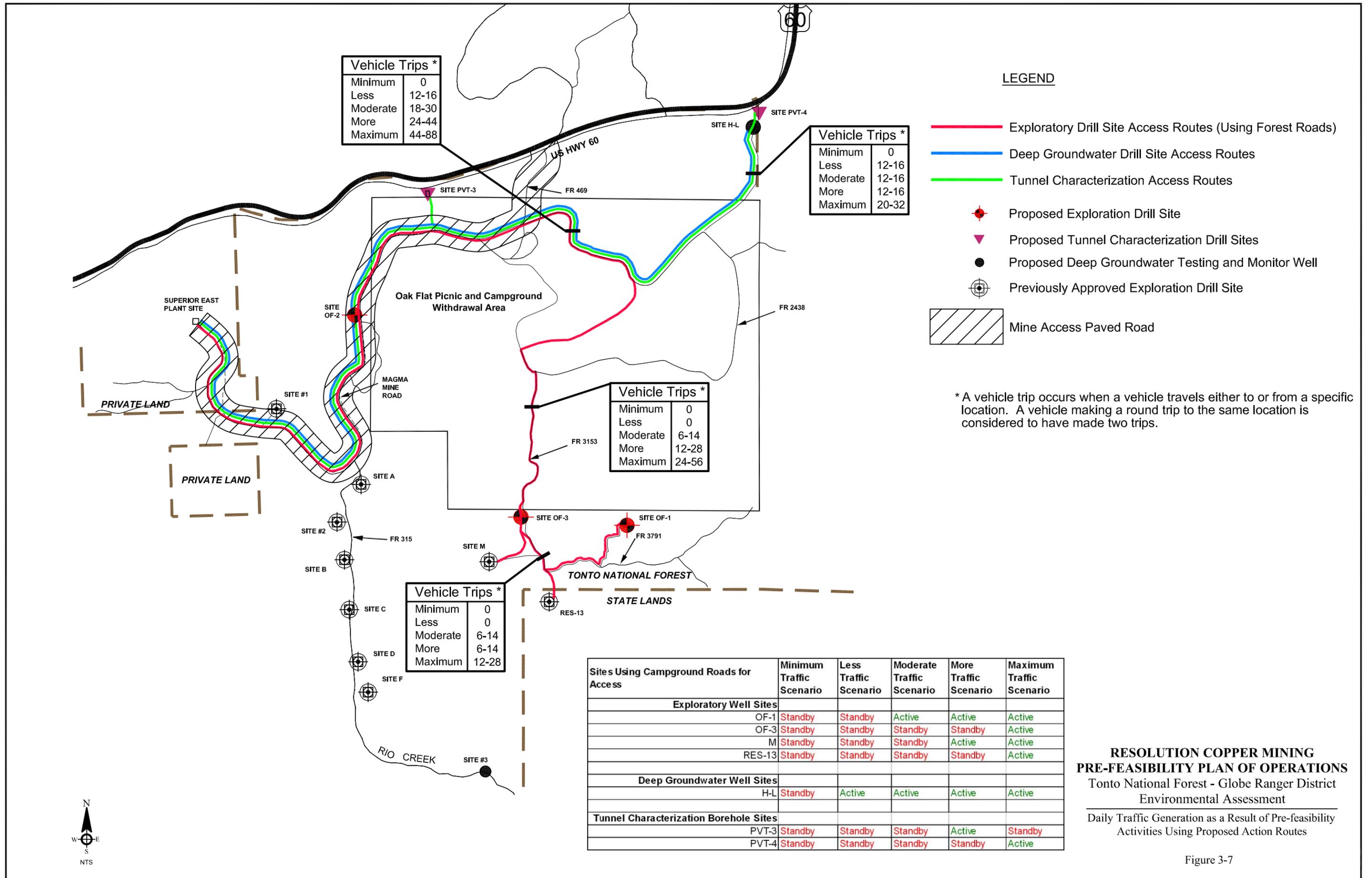
- Key Observation Points**
- No Balloons Sighted
 - 80' Balloon Sighted
 - 12' Balloon Sighted
 - Both Balloons Sighted

- Foreground = 0 to 0.25 - 0.50 Miles From Observer
- Middleground = 0.25 - 0.50 Mile to 3-5 Miles From Observer
- ▲ Proposed Drill Site
- Forest Road

**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment

Visual Assessment of OF-1, OF-2, OF-3, and North OF-2 from Key
Observation Points Along Roads within the Oak Flat Withdrawal Area

Figure 3-6



Vehicle Trips *	
Minimum	0
Less	12-16
Moderate	18-30
More	24-44
Maximum	44-88

Vehicle Trips *	
Minimum	0
Less	12-16
Moderate	12-16
More	12-16
Maximum	20-32

Vehicle Trips *	
Minimum	0
Less	0
Moderate	6-14
More	12-28
Maximum	24-56

Vehicle Trips *	
Minimum	0
Less	0
Moderate	6-14
More	6-14
Maximum	12-28

LEGEND

- Exploratory Drill Site Access Routes (Using Forest Roads)
- Deep Groundwater Drill Site Access Routes
- Tunnel Characterization Access Routes
- Proposed Exploration Drill Site
- ▼ Proposed Tunnel Characterization Drill Sites
- Proposed Deep Groundwater Testing and Monitor Well
- Previously Approved Exploration Drill Site
- Mine Access Paved Road

* A vehicle trip occurs when a vehicle travels either to or from a specific location. A vehicle making a round trip to the same location is considered to have made two trips.

Sites Using Campground Roads for Access	Minimum Traffic Scenario	Less Traffic Scenario	Moderate Traffic Scenario	More Traffic Scenario	Maximum Traffic Scenario
Exploratory Well Sites					
OF-1	Standby	Standby	Active	Active	Active
OF-3	Standby	Standby	Standby	Standby	Active
M	Standby	Standby	Standby	Active	Active
RES-13	Standby	Standby	Standby	Standby	Active
Deep Groundwater Well Sites					
H-L	Standby	Active	Active	Active	Active
Tunnel Characterization Borehole Sites					
PVT-3	Standby	Standby	Standby	Active	Standby
PVT-4	Standby	Standby	Standby	Standby	Active

**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment

Daily Traffic Generation as a Result of Pre-feasibility
Activities Using Proposed Action Routes

Figure 3-7

Sound Level Contours¹
A-weighted decibels (dBA)

- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA

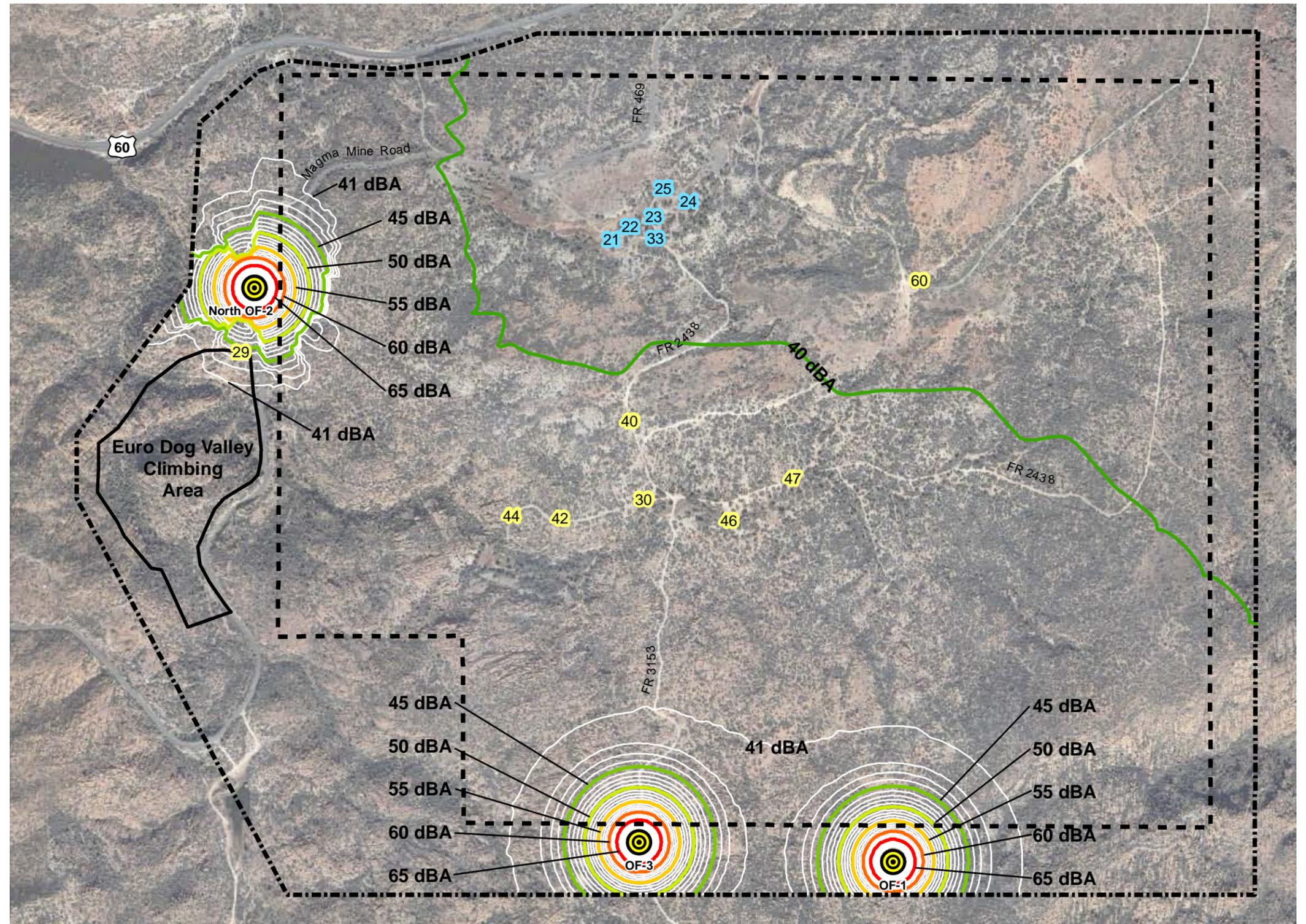
- Oak Flat Picnic and Campground Withdrawal Area Boundary
- - - Study Area Boundary
- ⊙ Proposed Exploration Drill Rigs

Campgrounds

- 22 Oak Flat Campground Designated Campsite
- 44 Large Dispersed Campsite As Determined In Field Reconnaissance

Notes:

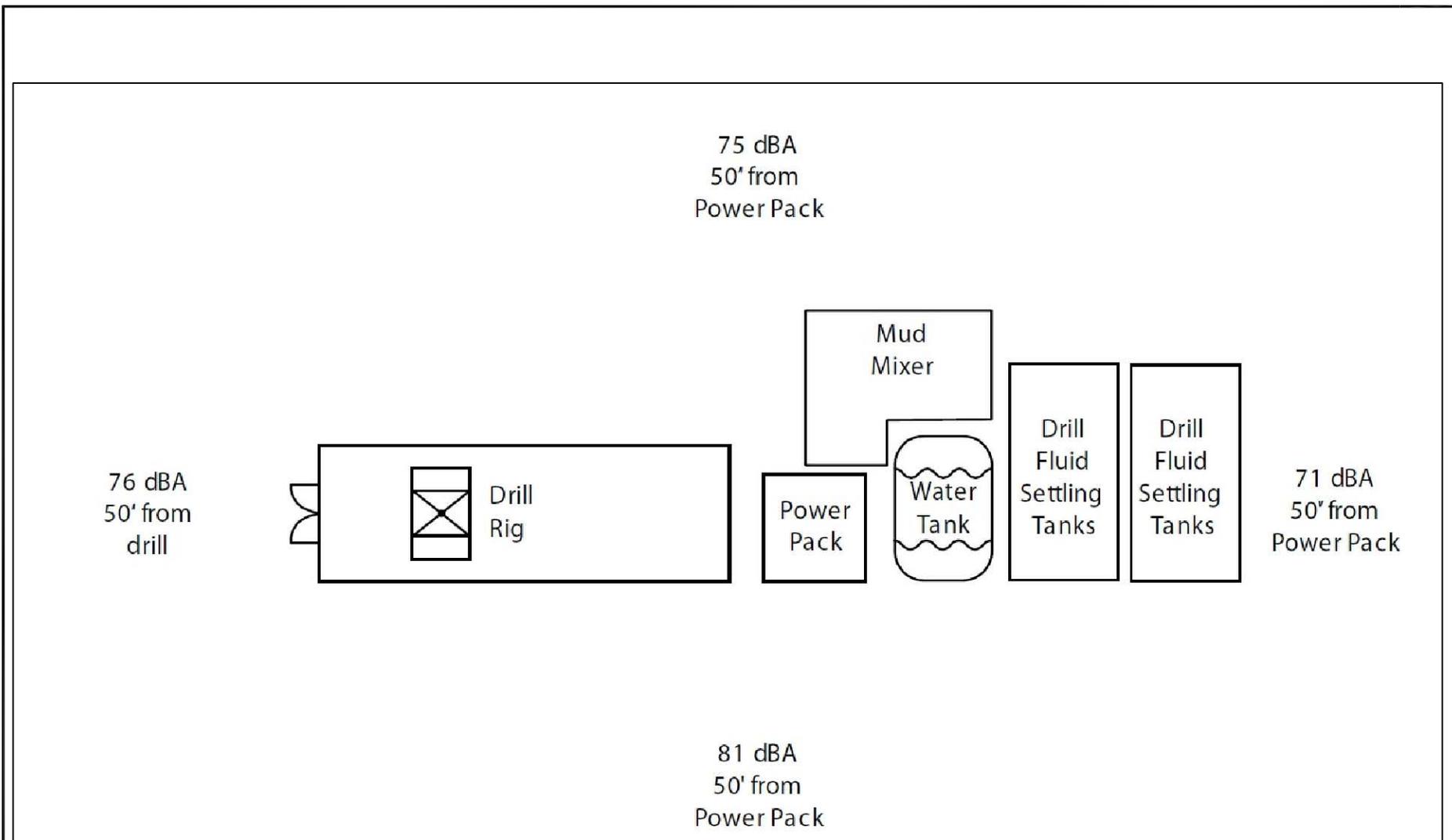
1. Results of computer model of Alternate-3: the simultaneous operation of drill rigs at sites OF-1, North OF-2, and OF-3 plus a background sound level of 40 dBA.



**RESOLUTION COPPER MINING
 PRE-FEASIBILITY PLAN OF OPERATIONS**
 Tonto National Forest – Globe Ranger District
 Environmental Assessment

Sound Level Contours Resulting from
 Noise Model of Alternate-3, North OF-2

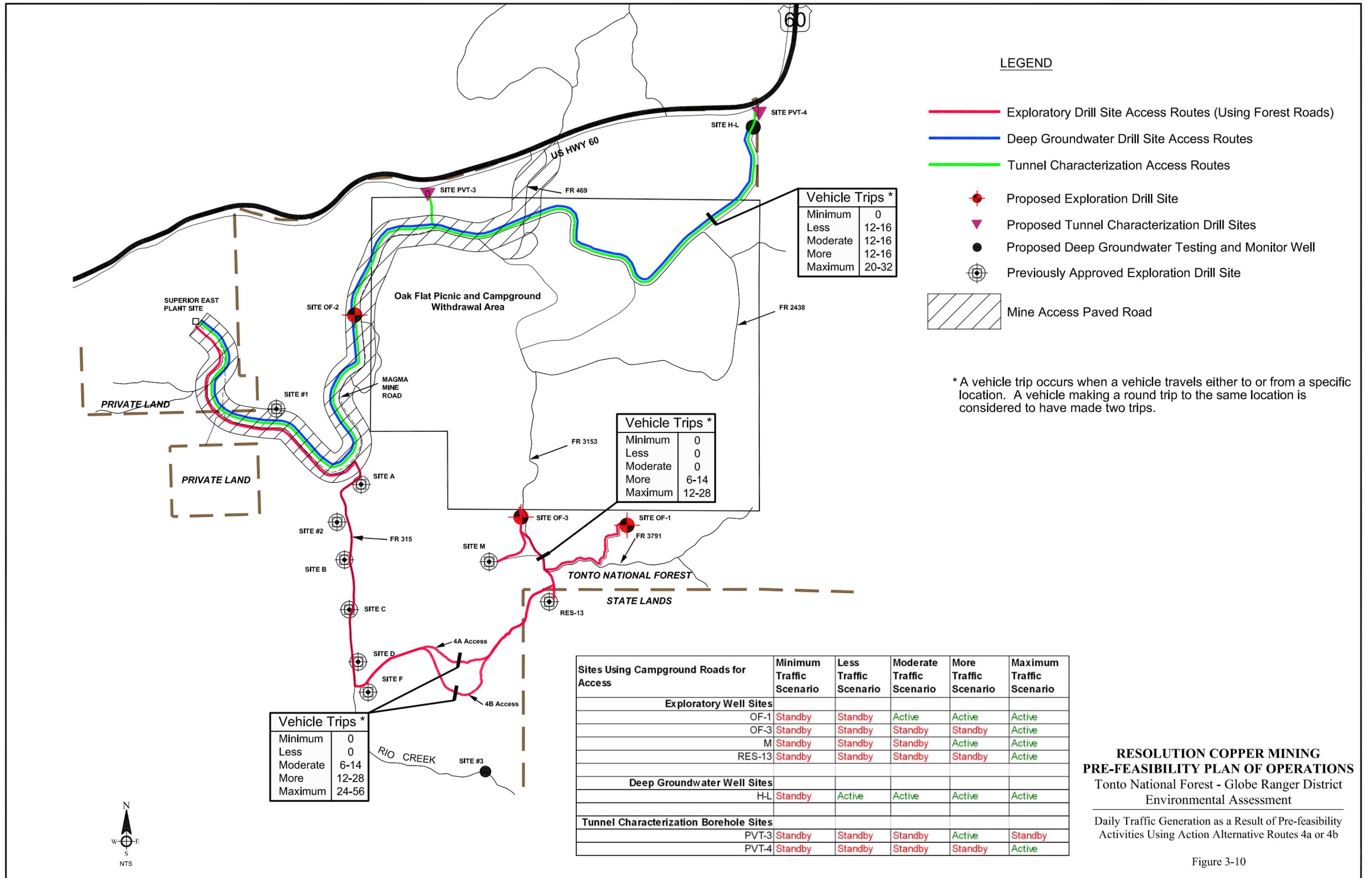
Figure 3-8



**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment

Schematic Layout Of Drill Site D With
Noise Measurement Results Used To
Evaluate Effects Of Drill Orientation

Figure 3-9



LEGEND

- Exploratory Drill Site Access Routes (Using Forest Roads)
- Deep Groundwater Drill Site Access Routes
- Tunnel Characterization Access Routes
- ★ Proposed Exploration Drill Site
- ▼ Proposed Tunnel Characterization Drill Sites
- Proposed Deep Groundwater Testing and Monitor Well
- ⊕ Previously Approved Exploration Drill Site
- ▨ Mine Access Paved Road

Vehicle Trips *	
Minimum	0
Less	12-16
Moderate	12-16
More	12-16
Maximum	20-32

Vehicle Trips *	
Minimum	0
Less	0
Moderate	0
More	6-14
Maximum	12-28

Vehicle Trips *	
Minimum	0
Less	0
Moderate	6-14
More	12-28
Maximum	24-56

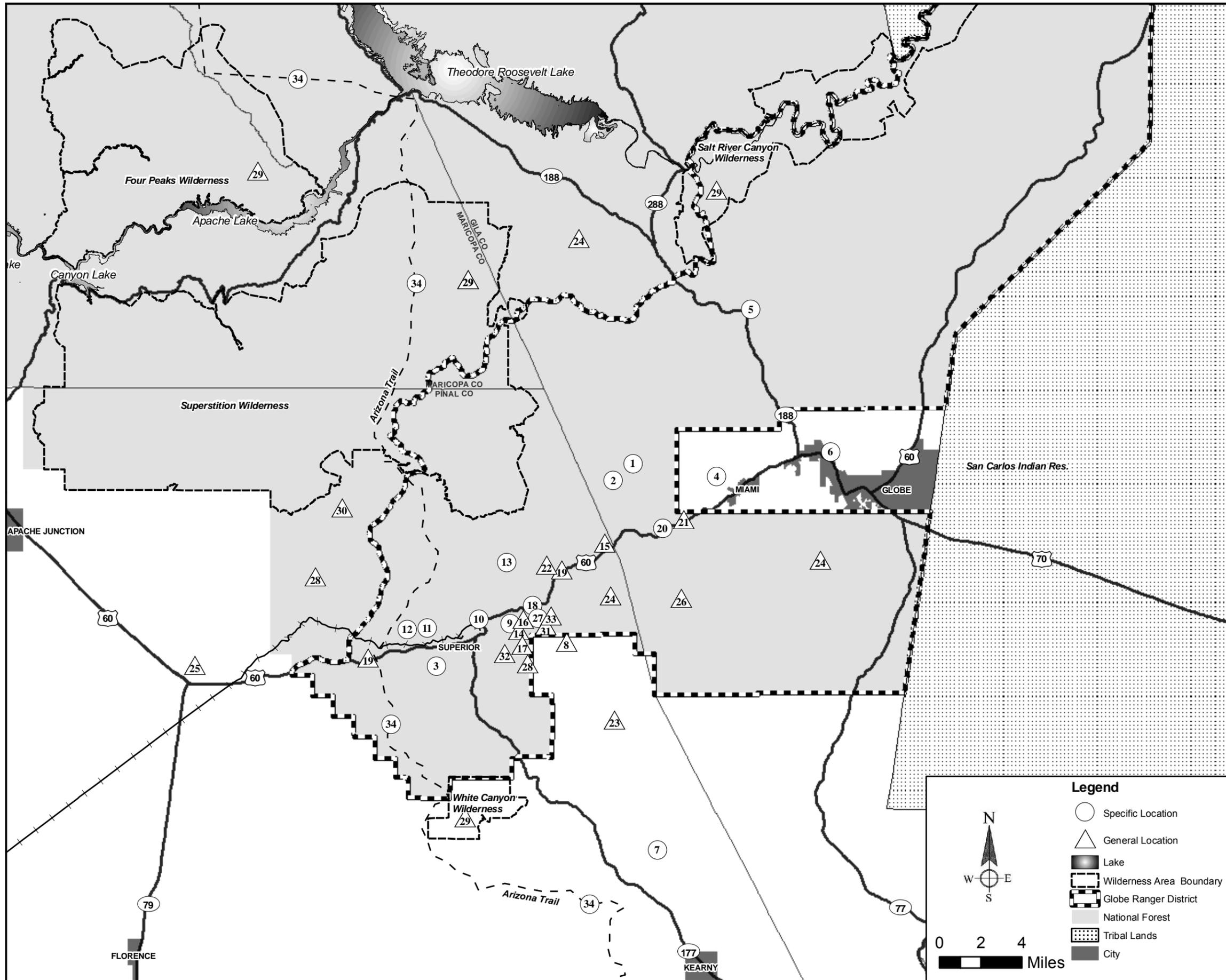
* A vehicle trip occurs when a vehicle travels either to or from a specific location. A vehicle making a round trip to the same location is considered to have made two trips.

Sites Using Campground Roads for Access	Minimum Traffic Scenario	Less Traffic Scenario	Moderate Traffic Scenario	More Traffic Scenario	Maximum Traffic Scenario
Exploratory Well Sites					
OF-1	Standby	Standby	Active	Active	Active
OF-3	Standby	Standby	Standby	Standby	Active
M	Standby	Standby	Standby	Active	Active
RES-13	Standby	Standby	Standby	Standby	Active
Deep Groundwater Well Sites					
H-L	Standby	Active	Active	Active	Active
Tunnel Characterization Borehole Sites					
PVT-3	Standby	Standby	Standby	Active	Standby
PVT-4	Standby	Standby	Standby	Standby	Active

**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment

Daily Traffic Generation as a Result of Pre-feasibility Activities Using Action Alternative Routes 4a or 4b

Figure 3-10



- ① Pinto Valley Mine
- ② Carlota Mine
- ③ Harborlite Perlite Mining Operations
- ④ Mine Properties near Miami, Arizona
- ⑤ Pinal Creek Remediation WQARF Project
- ⑥ Old Dominion Mine Closure
- ⑦ ASARCO Ray Mine Operations and BLM Land Exchange
- ⑧ RCM Exploration and Well Development on State and Private Lands
- ⑨ Number 9 Shaft Dewatering and No. 10 Shaft Sinking
- ⑩ Superior West Plant Site Closure
- ⑪ RCM's MARRCO Waterline
- ⑫ MARRCO Railroad
- ⑬ OMYA Superior Limestone Quarry
- ⑭ RCM Previously Authorized Exploration Activities
- ⑮ Hedgehog Cactus Withdrawal Area
- ⑯ Development of a Deep Underground Mine
- ⑰ Future Pre-feasibility Drilling Activities
- ⑱ Turn Lane off U.S. Highway 60 at Magma Mine Road
- ⑲ U.S. Highway 60 Realignment and Improvements
- ⑳ U.S. Highway 60 Improvements at Pinto Valley Turn-off
- ㉑ Tonto National Forest Integrated Vegetation Management to Treat Noxious Weed Infestations
- ㉒ SRP and APS Power Lines and SRP Substation
- ㉓ Grazing on Federal and State Land
- ㉔ Wildfire
- ㉕ Development of State Lands
- ㉖ Tonto National Forest Travel Management Planning
- ㉗ Oak Flat Recreational Uses
- ㉘ Recreational Uses of Forest Roads and User Created Roads
- ㉙ Wilderness Area Recreational Uses
- ㉚ Tonto National Forest Sonoran Desert Trail System
- ㉛ Tonto National Forest Recreational Facility Analysis
- ㉜ Apache Leap Recreational Uses
- ㉝ Devils Canyon Recreational Uses
- ㉞ Arizona Trail

NOTE: The locations of past, present, and reasonably foreseeable future actions are approximate

Legend

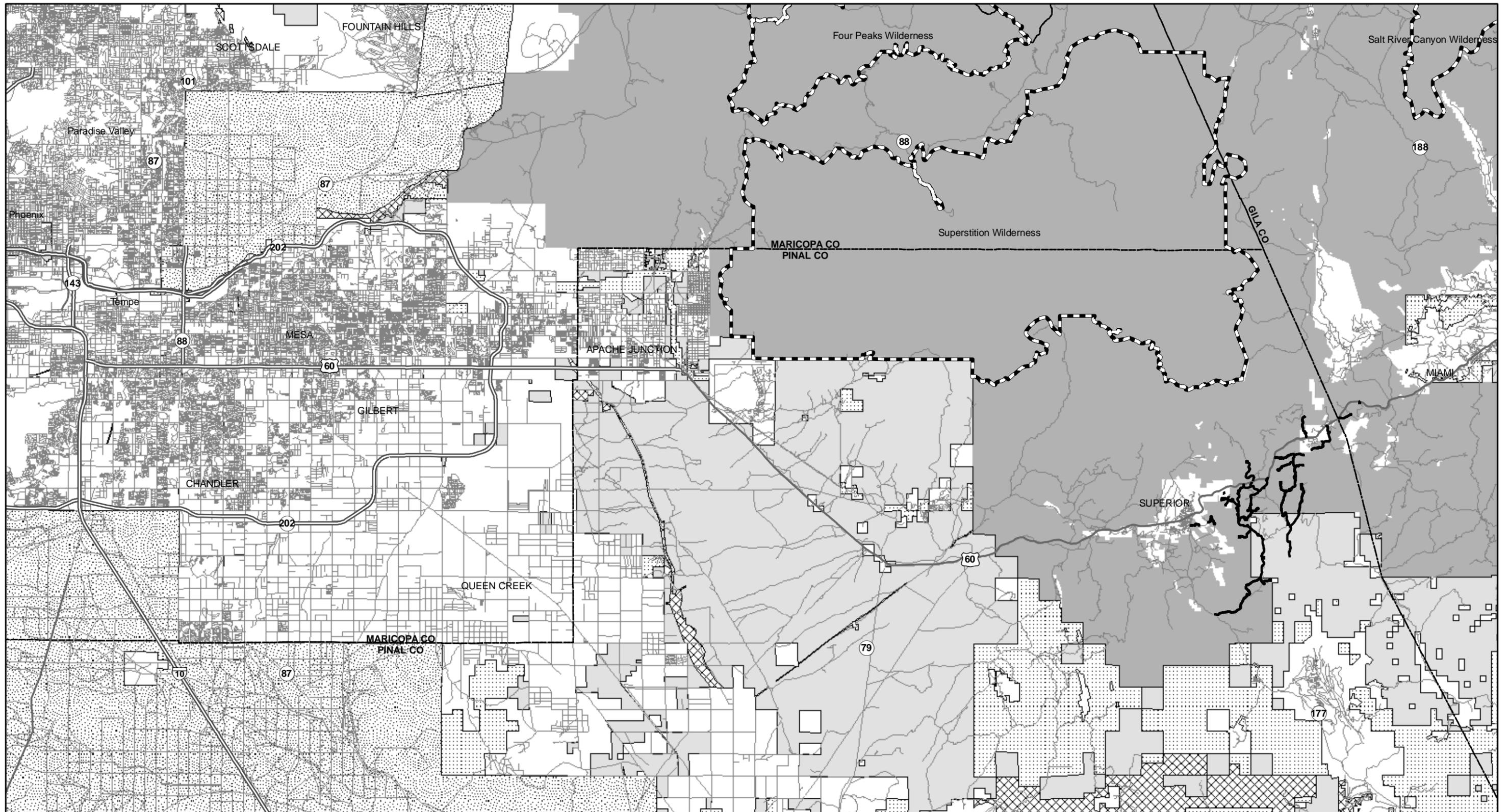
- Specific Location
- △ General Location
- Lake
- ▭ Wilderness Area Boundary
- ▭ Globe Ranger District
- ▭ National Forest
- ▭ Tribal Lands
- City

0 2 4 Miles

**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest – Globe Ranger District
Environmental Assessment

Past, Present, and Reasonably Foreseeable
Future Actions for Cumulative Effects Analysis

Figure 3-11



Data Source: Surface Management from http://www.blm.gov/az/st/en/prog/maps/gis_files.html



0 2 4
Miles

- Wilderness Area Boundary
- Bureau of Land Management (BLM)
- Bureau of Reclamation

- Tribal Lands
- State
- US Forest Service (USFS)

RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS
 Tonto National Forest – Globe Ranger District
 Environmental Assessment

Larger Geographic Context for Cumulative
 Effects, Particularly for Air Resources

Figure 3-12

4. CONSULTATION AND COORDINATION

List of Preparers

Forest Service Interdisciplinary Team Members

Karyn Harbour	Forest Geologist/Minerals Administrator
Daisy Kinsey	Forest Minerals NEPA Coordinator
Mark Fitch	Air Quality Specialist – Arizona Forests
Cliff Myers	Forest Safety Officer
Terry Brennan	Forest Engineer
Scott Wood	Forest Archeologist
Mark Taylor	Forest Minerals Biologist
W. Brad Johnson	Globe District Locatable Minerals Administrator
Connie Lane	Globe District Recreation/Lands/Mineral Materials/AML
Kim Vander Hoek	Forest Landscape Architect
Craig Woods	Globe District Biologist
Gabrielle Kenton	Assistant Forest Planner/NEPA Specialist
Jeanne L. Hoadley	Air and Water Quality Specialist – New Mexico Forests

WestLand Resources, Inc. – Third Party Consultant

James Tress	Principal/Biologist
Kimberly Otero	Senior Project Manager, Environmental Services
Robert Archer, P.E.	Senior Scientist, Engineer
Jon Boitano, P.E.	Project Engineer
Scott Hart	Biologist
Avi Buckles	Field Director, Archeological Services
John Anderson, R.L.A.	Landscape Architect
Thomas Lord	Biologist
Lynn Rae	Biologist
Michelle Mraz	Environmental Planner
Diana Shiel	Environmental Planner
Roger Felty, P.E.	Senior Project Engineer Malcolm Pirnie

List of Agencies and Organizations Notified

American Realty
Archaeological Consulting Services, Ltd.
Arizona Department of Commerce
Arizona Department of Environmental Quality
Arizona Department of Mines and Mineral Resources
Arizona Department of Transportation

Arizona Department of Water Resources
Arizona Game and Fish Department
Arizona Public Service
Arizona Silverbelt
Arizona State Land Department
Arizona State Mine Inspector
Arizona Trail Association
Arizona Wilderness Coalition
Arizona Wildlife Federation
ASU Polytechnic Campus
Audubon Society of Arizona
Boyce Thompson Arboretum
Cable One
Carlota Copper Company
Center for Biological Diversity
City of Globe
DC Cattle Company
Dirty SW Offroad Badboys Society
Fort McDowell Adventures
Fort McDowell Yavapai Nation
Freeport-McMoRan Copper & Cold - Miami
Gila Cooperative Extension
Gila County
Gila County Board of Supervisors
Gila County Board of Supervisors
Gila River Indian Community
Globe-Miami Regional Chamber of Commerce and Economic Development Cooperation
OMYA Arizona, Inc.
Pinal Mountain Cabin Owners
Pueblo of Zuni Heritage & Historic Preservation Office
Quadra Mining, Ltd.
Queen Creek Coalition
Red Mountain Mining
Salt River Pima-Maricopa Indian Community
Salt River Project
San Carlos Apache Tribe
Sierra Club
Sonoran Institute
Superior Development Company
Superstition Area Land Trust
The Hopi Tribe
The Nature Conservancy
The Trust for Public Land
The Wise Agent
Tonto Apache Tribe
Town of Hayden
Town of Kearny
Town of Miami

Town of Queen Creek
Town of Superior
Town of Winkelman
United Association of Plumbers & Pipefitters Local 741
US Army Corps of Engineers
US Bureau of Land Management
US Department of Transportation Federal Highway Administration
US Environmental Protection Agency
US Fish and Wildlife Service
Western Watersheds Project
White Mountain Apache Tribe
Wild Earth Guardians
Yavapai-Apache Nation
Yavapai-Prescott Tribe

Page intentionally left blank

REFERENCES

- Arizona Department of Environmental Quality. 2009. Air Quality Plans: Nonattainment Areas and Attainment Areas with Maintenance Plans. <http://www.azdeq.gov/environ/air/plan/notmeet.html>. Website accessed March 10, 2009.
- _____. 2008a. Glossary of English/Spanish Superfund and Water Quality Assurance Revolving Fund Terms. <http://www.azdeq.gov/web/download/glossary.pdf>; accessed March 24, 2009.
- _____. 2008b. 2006/2008 Status of Ambient Surface Water Quality in Arizona: Arizona's Integrated 305(b) Assessment and 303(d) Listing Report. Available online at: <http://www.azdeq.gov/environ/water/assessment/download/2008/binder1.pdf>
- Arizona Department of Transportation. 2009. Facts About Noise. http://www.adot.gov/highways/EPG/EPG_common/PDF/noise/noise_facts1.pdf
- Arizona Game and Fish Department (AGFD). 2008. Heritage Data Management System. Species abstracts and maps. Available at internet site: http://www.azgfd.com/w_c/edits/hdms_abstracts.shtml. Accessed multiple dates June-July 2008.
- _____. 2003. *Echinocereus triglochidiatus* var. *arizonicus* unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona.
- Aztec Engineering (Aztec). 2009. US 60 and Magma Mine Road Intersection Improvements - Traffic Impact Analysis. January 2009. Draft report prepared for Resolution Copper Mining.
- Brown, D. E. (ed). 1994. *Biotic Communities: Southwestern United States and Northwestern Mexico*. University of Utah Press. Salt Lake City, Utah.
- Brown, D. E. and C. H. Lowe. 1980. *Biotic Communities – Southwestern United States and Northwestern Mexico*. Map. University of Utah Press. Salt Lake City, Utah.
- Cedar Creek Associates. 1994. Biological Assessment & Evaluation for the Carlota Copper Project on the Tonto National Forest (Gila and Pinal Counties). Cedar Creek Associates. Fort Collins, Colorado.
- Coates, Bill. 2007. "What Lies Beneath Oak Flat? Resolution Copper Wants to Mine It". *Arizona Capital Times*. Published March 23, 2007. <http://www.azcapitoltimes.com/freestory.cfm?id=5142> (Accessed September 18, 2008)
- Council of Environmental Quality (CEQ). 2005. Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. Memorandum from James L. Cunnaghton to Heads for Federal Agencies. Washington D.C. June 24, 2005

- Environmental Protection Agency (EPA). 2006. Terms of Environment: Glossary, Abbreviations and Acronyms. <http://www.epa.gov/OCEPAt/terms/aterms.html>; accessed March 24, 2009.
- _____. 2004. "Meaningful Involvement and Fair Treatment by Tribal Environmental Regulatory Programs". A Report by the National Environmental Justice Advisory Council. November 2004. <http://epa.gov/oeaerth/resources/publications/ej/nejac/ips-final-report.pdf>. (Accessed March 18, 2008).
- Green, G. R., and W. D. Sellers. 1964. *The Climate of Arizona*. University of Arizona Press, Tucson.
- Goodwin, Grenville. 1942. *The Social Organization of the Western Apache*. The University of Chicago Press, Chicago.
- Lindeman, Michael W., and Gregory J. Whitney. 2005. *The Resolution Project: Results of an Archaeological Survey in Pinal County, Arizona*. Technical Report No. 2003-10. Desert Archaeology, Inc., Tucson.
- MacNider, Barbara S., and Richard W. Effland Jr. 1989. Cultural Resources Overview. In *Tonto National Forest Cultural Resource Assessment and Management Plan and Overview*, pp. 1–375. Cultural Resources Inventory Report No. 89-235. Tonto National Forest, Phoenix
- Malcolm Pirnie. 2009. Air Emissions Inventory Development for Resolution Copper Mining Pre-feasibility Activities Plan of Operations. Report prepared for WestLand Resources, Inc.
- Oliver, John E. and Rhodes W. Fairbridge, 1987, *The Encyclopedia of Climatology*, pp. 935-938.
Higgins, R.W., Y. Yao, and X.L. Yang, 1997, Influence of the North American Monsoon System on the U.S. Summer Precipitation Regime, *Journal of Climate*, Vol. 10, pp. 2600-2622.
- Peterson, D. W. 1960. *Geologic Map of the Superior Quadrangle, Pinal County, Arizona*. U.S. Geological Survey, Map GQ-818.
- Pinal County Air Quality Control District. 2008. *Ambient Monitoring Network Plan and Data Summary* (final document dated June 16, 2008).
- Ransome, F.L. 1903. *Geology of the Globe Copper District, Arizona*. US Geological Survey Professional Paper 12.
- Resolution Copper Mining, LLC (RCM). 2009. E-mail Correspondence from Carl Hehnke to Jim Tress (Westland Resources, Inc). February 13, 2009.
- _____. 2008. *Dewatering of Magma Mine Workings with Pipeline Delivery: Evaluation of Potential Hydrologic Impacts, Special Use Permit (FSM 2540)*. Report. RCM, Superior, Arizona.

- Shafiqullah, M., P. E. Damon, D. J. Lynch, S. J. Reynolds, W. A. Rehrig, and R. H. Raymond. 1980. K-Ar geochronology and geologic history of southwestern Arizona and adjacent area. In J. P. Jenney et al., eds. *Studies in Western Arizona*. Arizona Geological Society, Digest 12, pp. 201-260.
- Teclé, A. and M. Yitayew. 1990. Preference ranking of alternative irrigation technologies via a multi criterion decision-making procedure. *Trans. ASAE*. 33: 1509- 1517
- U.S. Census Bureau. 2008. Census 2000.
- USDA Forest Service. April 2008. Cost Estimating Guide for Road Construction", USDA Forest Service Intermountain, Southwestern and Rocky Mountain Regions, Engineering, April 2008.
- _____. 2005. Guidelines for Road Maintenance Levels. USDA Forest Service Technology and Development Program. December 2005.
- _____. 1947. R-3 Crook National Forest Recreation Plan. M.A. Daniels and Crook personnel, 1939. Revised, William H. Woods, 1947.
- U.S. Fish and Wildlife Service (USFWS). 1979. Endangered and Threatened Wildlife and Plants: Determination that *Echinocereus triglochidiatus* var. *arizonicus* is an Endangered Species. *Federal Register* 44: 61556-61558.
- _____. 1976. Endangered and Threatened Wildlife and Plants: Proposed Endangered status for some 1,700 US vascular plant taxa. *Federal Register* 41: 24523-24572
- Western Regional Climate Center (WRCC). 2008. Available at internet site: <http://www.wrcc.dri.edu/summary/Climsmaz.html>
- WestLand Resources, Inc. (WestLand). 2009a. Resolution Plan of Operations Pre-feasibility Activities: Oak Flat Campground and the Euro Dog Valley Climbing Area Noise Assessment (including Supplement No. 1: Boulder Campsite Noise Assessment). WestLand Resources, Inc. Tucson, Arizona.
- _____. 2009b. Resolution Plan of Operations Pre-feasibility Activities: Visual Management System Analysis. WestLand Resources, Inc. Tucson, Arizona.
- _____. 2009c. Resolution Plan of Operations Pre-feasibility Activities: Oak Flat Picnic and Campground Withdrawal Area Visibility Assessment. WestLand Resources, Inc. Tucson, Arizona.
- _____. 2009d. Resolution Plan of Operations Pre-feasibility Activities: Oak Flat Picnic and Campground Withdrawal Area Traffic Analysis. WestLand Resources, Inc. Tucson, Arizona.

- _____. 2009e. Resolution Plan of Operations Pre-feasibility Activities: Road Maintenance, Improvement, and Construction Summary. WestLand Resources, Inc. Tucson, Arizona.
- _____. 2008. A Class III Cultural Resources Inventory of Approximately 281 Ac in the Pinal Highlands Pinal and Gila Counties, Arizona. Report prepared for Resolution Copper Mining, LLC. WestLand Resources, Inc. Tucson, Arizona.
- _____. 2004 Bat Survey Federal Parcel, Pinal County, Arizona. Report prepared for Resolution Copper Mining, LLC. WestLand Resources, Inc. Tucson, Arizona.

GLOSSARY OF TERMS

Aquifer parameters. A term for the measured characteristics of an aquifer that quantify an aquifer's potential to transport and store water. These parameters are established using various aquifer testing, measuring, and monitoring methods.

Air drilling. A drilling technique where gases, typically compressed air or nitrogen, are used to cool the drill bit and lift cuttings out of the borehole instead of the more conventional use of liquids.

Airlift pump. A pump used for raising water from a well, consisting of a pipe which surrounds another of smaller diameter. Compressed air is injected into the smaller pipe, causing water to rise up the larger pipe.

Airshed. A geographic and political boundary for air quality standards.

Aquifer. An underground rock formation composed of such materials as sand, soil, or gravel, that can store groundwater and supply it to wells and springs. In aquifers, groundwater occurs in sufficient quantities to be used for drinking water, irrigation, and other purposes (ADEQ 2008).

Bentonite seal. The use of bentonite, an expandable clay, to form an impermeable layer above the sand filter pack of a monitoring well.

Borehole. Any long or deep drill-hole, often associated with a diamond drill.

Casing. A pipe that is assembled and inserted into a recently drilled section of a borehole and typically cemented into place.

Constant-rate pumping test. A test used to predict the hydraulic characteristics of an aquifer and to determine the size of the pump that is to be placed in the well. During the test, pumping levels are held constant and the progressive drawdown with time is recorded. The relation between drawdown and time is a function of the aquifer permeability.

Decibel. Unit that measures the intensity or loudness of sound.

Deflection. The drilling of an exploration hole at a predetermined angle from an existing trunk hole. Multiple deflections result in the intersection of the hydrologic study area at multiple points from the single trunk hole.

Diamond drilling. Drilling method using a diamond bit on a hollow steel rod that is driven into rock using high-speed rotary motion. This process yields a cylindrical core sample for geologic analysis.

Directional drilling. The use of specialized drill bits to advance curved boreholes in a controlled arc for installation of horizontal wells.

Downthrown. The side of a fault that appears to have moved downward compared with the opposite side of the fault.

Drill cuttings. Any material removed from a borehole while drilling a well or exploration hole.

Drill rig. A machine that creates boreholes and/or shafts to sample sub-surface mineral deposits, to test rock, soil and groundwater physical properties, and to install tunnels or wells.

Drilling mud. A drilling fluid used to drill boreholes. The mud cleans and cools the drill bit during drilling.

Formation water. Water that occurs naturally within the pores of rock. Water from fluids introduced to a formation through drilling or other interference does not constitute formation

Geologic unit. A volume of rock of identifiable origin and age range that is defined by the distinctive and dominant, easily mapped features that characterize it. Units must be mapable and distinct from one another.

Geophysical logging. Making a detailed record (a well log) of the geologic formations penetrated by a borehole.

Hydraulic conductivity. A property of soil or rock that describes the ease with which water can move through pore spaces or fractures. Conductivity depends on the intrinsic permeability of the material and on the degree of saturation.

Hydraulic gradient. Change in head per unit of distance measured in the direction of the steepest change.

Inert material. Material which is passively resistant to any change, particularly a material which is relatively unaffected by the action of heat or water.

Ore deposit. Rocks containing minerals that may be profitable to extract.

Packer. A device lowered into a borehole which automatically swells or can be made to swell at the correct time to produce a water tight joint against the side of the borehole or casing.

PM₁₀. Particulate matter with an aerodynamic diameter less than or equal to 10 micrometers.

Recovery analysis. The measurement of how long it takes for the water level in a pumped well to return to the original pre-pumped elevation of the water table. Measurements including the amount of water

pumped, how long it took and how far the water table moves are used to calculate common aquifer parameters such as storage, connectivity of fractures and flow characteristics.

Reverse circulation. A drilling method in which the sample is brought to the surface inside the drill rods, thereby reducing contamination.

Rotary drilling. A drilling method using a rotary drill rig. Open hole drilling does not result in the production of core, rather the material in the hole is ground up in the drilling process and brought to the surface with air or water pressure.

Specific capacity. The rate of discharge of water from a well divided by the drawdown of the water level within the well.

Storage coefficient. The volume of water released from storage in a confined aquifer. It is the product of the specific storage and the aquifer thickness.

Submersible pump. A centrifugal pump which may be driven by electricity or compressed air and may be totally submerged in water.

Track hoe. A tracked excavator consisting of an articulated arm, bucket and cab mounted on a pivot atop an undercarriage with tracks.

Transducer. An electrical device that converts one type of energy or physical attribute to another for purposes including measurement or information transfer.

Transmissivity. The amount of water that can flow horizontally through the entire saturated thickness of the aquifer under a hydraulic gradient of 1 meter/meter.

Trunk hole. A large (6- to 8-inch) diameter cased borehole which is drilled and completed prior to the initiation of exploration core drilling. Core drilling commences from the bottom of this trunk hole.

Understory. The layer formed by grasses, shrubs, and small trees under the canopy of larger trees and plants.

Vibrating wire piezometer. An instrument designed to measure the water within the pores of rock. The measure of pore water provides quantitative data on the magnitude and distribution of pore pressure. The piezometer is installed in a borehole and readings are obtained with a portable data logger.

Water bar. A ditch or hump on a road that diverts surface **water** off the road surface to avoid or minimize soil erosion.

Water level gradient. The slope of the water table or aquifer. The gradient influences the direction and rate of groundwater flow.

Wellhead. The area immediately surrounding the top of a well, or the top of the well casing.

APPENDIX A — RESPONSES TO PUBLIC SCOPING COMMENTS

This appendix provides our responses to the public comments received during our public scoping process. These comments were used by the Forest Service to identify issues of concern and help the ID Team formulate alternative to the proposed action and mitigation and monitoring measures.

The scoping process was initiated with the issuance of a Notice of Intent to Prepare an Environmental Assessment and invitation to a public open house on June 9, 2008. Concurrent with the publication of the notice in area newspapers, the scoping letters and invitations were mailed to approximately 135 interested public, including private citizens, non-government organizations and agencies including 18 Tribal officials representing 10 Indian Tribes. Chapter 1 provides a more detailed account of scoping efforts undertaken during this NEPA process. The comment period closed on July 18, 2008; no comments were received after that date.

Within the comment period, thirty-one letters, emails, faxes, or comment forms (collectively referred to as comment letters) were submitted to the TNF. All comment letters were reviewed and individual comments within each letter were identified and categorized for analysis. Table A-1 provides an alphabetical list of all of the commenters, the organization they represent, and the letter number assigned to their comment. Following this table we provide our response to the comments provided in each of these comment letters.

Table A-1. Alpha List of Commenters, the organization they represent, and their Letter Number

Name	Organization	Date	Letter Number
AmRhein, Fred	Solid Rock Climbing Gyms of Arizona	6/20/2008	7
		6/25/2008	11
		6/30/2008	16
		6/30/2008	17
Arnst, Diane L.	Arizona Department of Environmental Quality	6/25/2008	10
Bahr, Sandy	Sierra Club, Grand Canyon Chapter	7/18/2008	26
Barber, John		6/22/2008	8
Barrett, Sylvia		7/18/2008	29
Campana, Kathryn 'Sam'	Audubon Society of Arizona	7/18/2008	27
Card, Joan	Arizona Department of Environmental Quality	7/18/2008	24
Cecala, Rick	Queen Creek Coalition	7/18/2008	30
Duerr, Herb		6/25/2008	9
Fibel, Herbert S.		7/12/2008	28
Filsinger, Erik	Queen Creek Coalition	6/4/2008	12
Freeman, Nancy	Groundwater Awareness League	7/17/2008	25
Gutierrez, Hank		6/25/2008	6
Hagen, Harry W.			23
Hatch, Paul	Superior Jr. & Sr. High School	6/18/2008	3
Ingram, Floyd Sr.		6/27/2008	13
Magallanez, Elizabeth		7/2/2008	19
Miller, Rebecca		6/25/2008	4
Munoz, Henry C.		7/3/2008	20
Parker, Jeff J.		6/25/2008	5
Parsons, Scott		6/17/2008	2
Rangel, Manuel		6/27/2008	14
Singh, Madan	State of Arizona, Department of Mines and Mineral Resources	7/2/2008	18
Sparks, Joe P.	Sparks Law Firm, P.C.	6/18/2008	31
Thayer, Ted		6/17/2008	1
White, Linda		6/30/2008	15
Witzeman, Robert A., M.D.	Maricopa Audubon Society	6/26/2008	21
Witzeman, Robert A., M.D.	Maricopa Audubon Society	7/9/2008	22

Letter: 1 Commenter Thayer, Ted

Comment Number: 1 EA not needed to meet 404 provisions; refers to Carlotta "EA"; supports moving forward with the project.

Response: As a matter of law and policy the Forest Service must consider its actions using the procedures and requirements established by the National Environmental Policy Act (NEPA). We cannot rely on analysis of other, different projects to authorize new projects. Certainly past projects may inform our analysis but they cannot replace project specific review under NEPA. For additional discussion of the scope of this EA please refer to Section 1.4.

Comment Number: 2 Supports project and would like to see expedited progress.

Response: Thank you for your participation and response to the public notice. Personal preferences and opinions expressed by the public are one of many factors considered by the Forest Service when making decisions. The Forest Service thanks all who took the time and effort to participate in this NEPA process and hopes that they continue to provide input to further our efforts to manage important public resources.

Letter: 2 Commenter Parsons, Scott

Comment Number: 1 Oak Flat is special to the commenter's family; has been using it for recreation; "Find a way to get the copper that leaves this special place for future generations."

Response: Thank you for your participation and response to the public notice. Please refer to the response to Letter 1-Comment 2 (1-2) and Section 1.4 of this EA with regard to the scope of our analysis for the Pre-feasibility Activities. Recreation and impacts to recreation were considered in detail in this EA.

Letter: 3 Commenter Hatch, Paul Principal Superior Jr. & Sr. High School

Comment Number: 1 Supports mine and land exchange.

Response: Thank you for your participation and response to the public notice. Please refer to the response to 1-2.

Letter: 4 Commenter Miller, Rebecca

Comment Number: 1 There is too much detail in the Plan of Operations regarding cultural sites; requested additional information regarding check dams.

Response: The Pre-feasibility Plan of Operations does contain some information associated with the cultural resources. During our review of the Pre-feasibility Plan of Operations, we were careful to ensure that the public version of the document did not contain information regarding the specific location of archaeological sites or any other sensitive cultural resource information.

Comment Number: 2 Requested additional details regarding sediment and erosion control; "to me the greatest potential impact from this project will be due to lack of care taken for sediment and erosion control measures..."

Response: General information regarding sediment and erosion control was provided in the Pre-feasibility Plan of Operations. A mitigation measure has been added that will require RCM to prepare a SWPPP.

Comment Number: 3 Add reference to SWPPP to Plan of Operations

Response: Reference to the SWPPP is provided on page 25 of the proposed Pre-feasibility Plan of Operations.

Letter: 5 Commenter Parker, Jeff J.

Comment Number: 1 Supports project for economic reasons.

Response: Thank you for your participation and response to the public notice. Please refer to the response to 1-2.

Comment Number: 2 Supports land exchange.

Response: Any potential land exchange is not considered part of the scope of analysis for this EA. See discussion in Section 1.4 regarding the scope of analysis. A discussion of past, present, and reasonably foreseeable future activities is provided in Section 3.11.

Letter: 6 Commenter Gutierrez, Hank

Comment Number: 1 Supports Plan of Operations.

Response: Thank you for your participation and response to the public notice. Please refer to response to 1-2.

Letter: 7 Commenter AmRhein, Fred

Solid Rock Climbing Gyms of Arizona

Comment Number: 1 Requests clarification of acronym HRES-3 located at Oak Flat and future intended use at that site.

Response: HRES-3 refers to a Resolution groundwater well site. HRES-1 and HRES-2 are located outside of the Oak Flat Withdrawal Area. RCM's proposal includes periodic testing and monitoring of this well. HRES-3 is an existing hydrologic monitoring well located at the site of a Department of Energy (DOE) well constructed in 1990 and is within the Oak Flat Withdrawal Area. Public Land Order (PLO) 1229 dated September 27, 1955, and published in the Federal Register (20 FR 7336) on October 1, 1955, reserved 18 specifically described areas within National Forests for use of the Forest Service as camp grounds, recreation areas, or for other public purposes. These areas, subject to valid existing rights were "withdrawn from all forms of appropriation under the public land laws, including the mining but not the mineral-leasing laws, and reserved for use of the Forest Service, Department of Agriculture, as camp grounds, recreation areas, or for other public purposes as indicated." In 1971 (Federal Register, Vol. 36, No. 187, Saturday, September 25, 1971) PLO 1229 was modified by PLO 5132. PLO 5132 specifically modified PLO 1229 restrictions for Jones Water Forest Camp, Oak Flat Picnic and Campground, Pioneer Pass Picnic Grounds, and Federal Highway 9-K Roadside Zone. For these sites, PLO 5132 allowed "all forms of appropriation under the public land laws applicable to national forest lands, except under the U.S. mining laws." PLO 5132 goes on to state that on October 20, 1971, these lands were "open[ed] to such forms of disposal as may by law be made of national forestlands except appropriation under the U.S. mining laws." The original DOE well site was constructed as part of a larger national effort to identify long term storage solutions for nuclear waste. According to ADWR records, the DOE well (ADWR Well Registry Number 526592) was drilled to a depth of 936 feet, has a 10-inch diameter, was completed on April 28, 1990, and is owned by the Forest Service. While ultimately another site was selected for development of a nuclear waste repository, the presence of the DOE well provided an opportunity to study groundwater movement in the underlying geological features. A number of papers and theses have been published regarding these studies. The baseline of data provided by these studies is important to future analysis of impacts to the groundwater systems in the region by any future mine development proposals. HRES-3 is a new well constructed adjacent to the existing DOE well. Construction of HRES-3 was authorized by the Forest Service in an August 2003 amendment of the Exploratory Drilling Plan of Operations No. 01-12-002. This well was constructed in 2004 and is approximately 1,200 feet in depth. HRES-3 was constructed using current well construction technologies that will allow for more detailed and technologically advanced investigations of groundwater. This well was located next to the DOE well to build on the information provided by past studies at the DOE well site. The location of the DOE well constructed in 1990 and HRES-3 constructed in 2004 have formed the basis for the location of other existing hydrologic monitoring wells and future monitoring wells proposed for construction in RCM's proposed Pre-feasibility Plan of Operations. The operation of the DOE groundwater monitoring well has been ongoing at Oak Flat Campground since it was first constructed in 1990. It has been used and monitored for various hydrologic studies and is being monitored by RCM today. The HRES-3 well has been used for ground water investigations since it was constructed by RCM in 2004. The data collected from these wells will ultimately allow scientists to more effectively understand and evaluate potential hydrologic impacts of any future proposed mine activities in the region, if a sufficiently final and definite proposal for mine development is submitted. The availability of this hydrological information and continuation of data collection at these locations enhances the ability to monitor and predict the impacts of any future mining activity that might be proposed in the vicinity of Oak Flat Campground.

Comment Number: 2 Have any plans been submitted for the conveyor tunnel work?

Response: There have been no plans submitted to the Forest Service for construction of the conveyor tunnel. The geotechnical drill holes proposed in the Pre-feasibility Plan of Operations would provide RCM with information on whether a tunnel could be feasibly constructed.

Letter: 8 Commenter Barber, John

Comment Number: 1 Strongly recommends that the Forest Service accepts plan and issues permits and approvals.

Response: Thank you for your participation and response to the public notice. Please refer to the response to 1-2.

Comment Number: 2 Recommends approval of the land exchange.

Response: Any potential land exchange is not considered part of the scope of analysis for this EA. See discussion in Section 1.4 regarding the scope of analysis. A discussion of past, present, and reasonably foreseeable future activities is provided in Section 3.11.

Letter: 9 Commenter Duerr, Herb

Comment Number: 1 Supports the project; Plan of Operations adequately addresses environmental, social, and economic considerations; work is necessary to determine hydrogeologic details.

Response: Thank you for your participation and response to the public notice. Please refer to the response to 1-2.

Letter: 10 Commenter Arnst, Diane L.

Arizona Department of Environmental
Quality

Comment Number: 1 The proposed project activities raise concern regarding the effects of particulate matter of 10 parts per million (PM10) distributed by prevailing winds, increased regional haze (visibility), and ozone under the new 8-hour ozone standard of 0.075ppm. Please refer to Arizona Administrative Codes R18-2-604 through -607 and R18-2-804 for particulate matter and refer to www.azdeq.gov/environ/air/haze/index.html for Regional Haze in your feasibility study.

Response: A detailed emissions inventory was prepared in response to this comment. See Section 3.1 of this EA for further detail and discussion.

Comment Number: 2 To reduce ozone contamination impact, minimize vehicular activity as much as reasonably possible.

Response: Specific mitigation measures are included in the EA which address this issue.

Letter: 11 Commenter AmRhein, Fred

Solid Rock Climbing Gyms of Arizona

Comment Number: 1 Vehicle access to drill sites through Oak Flat may be a safety issue for recreators; suggests alternative route to access sites.

Response: In response to safety concerns, alternative routes that avoid or limit service-vehicle travel through Oak Flat Campground and the larger Oak Flat Withdrawal Area were identified and considered in this EA. In addition, the development of specific institutional controls, including signage, has been identified as a mitigation measure.

Comment Number: 2 Suggests an alternative access route to the drill sites.

Response: In response to this comment, six alternative routes were identified for consideration in this EA. Four of the routes were eliminated from detailed consideration because of other resource conflicts. Two of the routes have been evaluated in detail in this EA.

Comment Number: 3 Requests clarification on why drilling for the tunnel is being conducted as part of this proposal if the studies are primarily hydrologic and more exploration; currently there is no understanding of how the tunnel could be constructed underneath private property.

Response: Exploration and pre-feasibility studies are the initial stages of a logical and systematic process of mine planning and development. The purpose of these early stages of planning is to delineate the ore body, establish grade and reserves, and to allow collection of baseline data to support development of future detailed mine operating plans. We understand that RCM has proposed geotechnical drilling to obtain information needed to support future investigations that will determine whether tunnel construction is economically and technically feasible. No proposals for actual tunnel construction have been received by the Forest Service.

Comment Number: 4 Concerned about current location of OF-2 drill site at the access point to Euro Dog Canyon; suggests another location to drill that is "more respecting of the recreational climbing in that area."

Response: In response to this comment, the Forest Service has identified an alternative site, North OF-2, for consideration in this EA.

Letter: 12 Commenter Filsinger, Erik

Queen Creek Coalition

Comment Number: 1 Provided information regarding current drafts of a Statement of Understanding between the Queen Creek Coalition and RCM regarding the Legislative Land Exchange.

Response: Any Statement of Understanding between Queen Creek Coalition and RCM pertains to the Legislative Land Exchange and is beyond the scope of the proposed Pre-feasibility Activities. (See Section 1.4 of this EA for further discussion regarding scope of analysis and Section 3.11 regarding past, present, and reasonably foreseeable future activities.)

Letter: 13 Commenter Ingram, Floyd Sr.

Comment Number: 1 "I support mining exploration and development on public lands. I have enjoyed using access roads in the

Tonto that were constructed by previous exploration projects for many years. As a prospector, miner, and Exploration Geologist, these roads have helped me make a living for Myself and My family. These roads have also been great for hunting and recreation."

Response: Thank you for your participation and response to the public notice. Please refer to response to 1-2.

Comment Number: 2 Specifically expressed desire to keep all roads open for public use: "Stop closing roads to the public land and denying access to the public by motor vehicle." Notes that most roads described in the plan are existing roads that are scheduled to be improved. "Let's keep them open!"

Response: To the extent that is practicable and safe, roadway activities proposed as part of the Pre-feasibility Plan of Operations would allow continued use by the public. Temporary road access restrictions may occur for short periods of time during construction.

Letter: 14 **Commenter** Rangel, Manuel

Comment Number: 1 Concerned about placement of drilling rig at OF-2 where "Campground Boulder" climbing/recreation area resides. Please choose alternate location for digging.

Response: Please see response to comment 11-4.

Letter: 15 **Commenter** White, Linda

Comment Number: 1 "I hope that by the Forest Service stepping into the matter of Oak Flat and the RCC [RCM] mining, that our land will be the primary concern as it provides a lot of fulfillment to many that visit the Superior area!"

Response: The Forest Service must consider multiple uses of National Forest System Lands in its decision making process. The consideration of Pre-feasibility Plan of Operation impacts to recreational and other users of Oak Flat Campground and the larger Oak Flat Withdrawal Area has been analyzed in this EA and has driven the formulation of alternatives.

Comment Number: 2 "Devil's Canyon, Apache Leap and the road area is a huge part of the climbing world and provides us climbers with a large percentage of rock for our sport in the Central Arizona region. ... We need protect as much of the land and environment as possible and provide alternative access to area that will no longer have access due to the mining."

Response: The EA prepared for the proposed Pre-feasibility Activities considers alternative locations for the OF-2 exploration drill site in direct response to the comments received during public scoping. Access, except for short periods of time during road construction, is not anticipated to be restricted by the Pre-feasibility Activities.

Letter: 16 **Commenter** AmRhein, Fred

Solid Rock Climbing Gyms of Arizona

Comment Number: 1 Concerned about conflicts between recreational users and vehicular traffic associated with mining.

Response: A mitigation measure has been developed to address this issue. Please refer to Response to Comment 11-1.

Comment Number: 2 Safety issues on OF parcel lands; reported incident of near collision; recommend road closures to mine traffic.

Response: A mitigation measure has been developed to address this issue. Please refer to Response to Comment 11-1.

Comment Number: 3 Dust related to mine traffic—concerns related to traffic on OF parcel.

Response: Mitigation measures have been developed to address this issue. Please refer to Responses to Comments 10-1 and 10-2.

Comment Number: 4 Noise related to mine traffic—concerns related to traffic on OF parcel.

Response: In response to concerns regarding noise, alternative routes that avoid service-vehicle travel through the Oak Flat Withdrawal Area have been considered. An analysis of noise and traffic impacts from operation of the exploration drill sites near the Oak Flat Withdrawal Area is provided in this EA.

Comment Number: 5 Potential for spills of mine related substances—fuels, etc., associated with traffic crossing the OF parcel.

Response: The Pre-Feasibility Plan of Operation discusses the general treatment of fuels and other substances that are regularly used in drilling projects. It also includes a commitment by RCM to prepare a Spill Prevention, Control, and Countermeasures (SPCC) Plan that would detail practices used to prevent releases when transporting, handling and storing hazardous materials prior to the initiation of work. All vehicles used for Pre-Feasibility Activities would be required to comply with all applicable ADOT standards regarding the transportation of fuel oil and other materials required for the implementation of the Pre-feasibility Activities. Compliance with applicable regulations would minimize the potential for spill and discharge of

- pollutants within the Oak Flat Withdrawal Area and on other National Forest System Lands that will be used for these activities. The Forest Service will require a complete SPCC be prepared as a condition of any approval. Specific mitigation measures are included in this EA to address spill prevention measures.
- Comment Number: 6** Citing the example of FR 2458 north of Highway 60, the commenter expresses concern regarding road closures.
- Response:** No permanent road closures are anticipated. Short-term, temporary road restrictions limiting the use of some roads would likely be required during road improvement or movement of drilling equipment during the course of operations as outlined in the Pre-feasibility Plan of Operations.
- Comment Number: 7** Recommends entrance signage for safe alternative access to minimize collision hazards.
- Response:** Specific mitigation relative to signage is included in this EA. Please refer to Response to Comment 11-1, regarding traffic safety within Oak Flat Campground.
- Letter: 17 Commenter AmRhein, Fred Solid Rock Climbing Gyms of Arizona**
- Comment Number: 1** Concerned about the location of OF-2: located near the "Campground Boulder"; commenter recommends a specific site as alternative location for OF-2.
- Response:** An alternative site, North OF-2, has been evaluated. Please refer to Response to Comment 11-4.
- Letter: 18 Commenter Singh, Madan, Director State of Arizona, Department of Mines and Mineral Resources**
- Comment Number: 1** In favor of the Resolution Copper being able to continue its pre-feasibility studies in the Tonto National Forest. The plan as submitted has details of the measures that will be adopted to protect the environment. It would appear to me that this qualifies for a "Finding of No Significant Impact" (FONSI).
- Response:** Thank you for your comment. Please refer to the response to 1-2.
- Letter: 19 Commenter Magallanez, Elizabeth**
- Comment Number: 1** Supports the Pre-feasibility Project. Wants to see the Plan of Operations approved.
- Response:** Thank you for your comment. Please refer to the response to 1-2.
- Comment Number: 2** Opportunity for local residents to work and support their families.
- Response:** Thank you for your comment. Please refer to the response to 1-2.
- Letter: 20 Commenter Munoz, Henry C.**
- Comment Number: 1** Need "a full and complete NEPA study."
- Response:** An EA constitutes and full NEPA study. Please refer to discussion in Sections 1.4 and 1.5 for details regarding the scope and nature of the decision of this EA.
- Comment Number: 2** Concerned that block cave mining will disrupt water supply and result in subsidence.
- Response:** Actual mining of an ore body is not part of the proposed Pre-feasibility Activities and is therefore outside of the scope of this EA. Please refer to the discussion in Section 1.4 for details regarding the scope of analysis. Section 3.11 provides a discussion on past, present, and reasonably foreseeable future activities.
- Letter: 21 Commenter Witzeman, Robert A., M.D. Conservation Chair Maricopa Audubon Society**
- Comment Number: 1** The Forest Service's EA only evaluates the proposed test drilling sites, and excludes the land exchange with RCM, which is considered "piecemealing."
- Response:** Please see the discussion in Section 1.4 for further details regarding the scope of this analysis. Section 3.11 provides additional discussion on past, present, and reasonably foreseeable future activities.
- Comment Number: 2** An EA, followed by an EIS should be completed on the entire operation before there is any disturbance to any portion of land that will be impacted by this project.
- Response:** Based on the analysis in this EA, the Forest Service supervisor would determine whether an EIS would be required. Please see the discussion in Section 1.4 for further details regarding the scope of this analysis and the discussion in Section 1.5 regarding the nature of the decision to be made by the Forest Service. Additional discussion on past, present, and reasonably foreseeable future activities is provided in Section 3.11.

Comment Number: 3 Cultural resource studies triggered by the NHPA and EO 13007 and must be a part of the preliminary drilling and road building process.

Response: A Class III survey of the Pre-feasibility Activities has been completed in conformance with the NHPA. Pursuant to EO 13007 and the NHPA, information from Native American groups regarding the presence of any sacred sites within the area surveyed for the Pre-feasibility Activities has been requested. The consideration of cultural resources has been and continues to be a critical component of Forest Service management of public lands within the National Forest System. As a matter of practice and regulatory requirement, the Forest Service has required the applicant to conduct a complete archaeological survey of the entire footprint of disturbance, plus a buffer area for the proposed Pre-feasibility Activities. These surveys were instrumental in determining the location of various elements of the Pre-feasibility Plan of Operations. While developing its proposal, RCM worked closely with the Forest Service to relocate certain proposed Pre-feasibility Activities that were near cultural resources to avoid adverse impacts to those resources. Cultural resource protection has been an integral component of the Forest Service's review of the Pre-feasibility Plan of Operations.

Government-to-Government and Tribal consultation in accordance with the requirements of the National Historic Preservation Act were initiated shortly after the Pre-feasibility Plan of Operations was submitted and the Forest Service determined it to be sufficient in detail to initiate review in accordance with the requirements of NEPA. Prior to the public scoping meeting, the Forest Service sent letters inviting Tribal representatives from 10 Tribes to comment on the proposed action and inviting them to attend the scheduled public meeting in Superior Arizona during public scoping. Following this mailing and prior to the public open house, the Forest Service was invited to a meeting with the Western Apache Coalition to present information about the proposed action and answer any questions. On September 11, 2008, a copy of the Class III cultural resources inventory of the proposed Pre-Feasibility Plan of Operations was delivered to Native American groups seeking their comments. The Forest Service specifically requested their input regarding traditional cultural places and practices within the PAA. Tribal consultation is ongoing and will conclude when the Forest Service make its final decision regarding RCM's proposal.

EO 13007 requires that each executive branch agency with statutory or administrative responsibility for the management of Federal lands shall, as appropriate, promptly implement procedures for the purposes of carrying out the provisions of Section 1 of the order. Procedures include, where practicable and appropriate, ensuring reasonable notice is provided of proposed actions or land management policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites. In all actions pursuant to this section, agencies shall comply with the Executive memorandum, "Government-to-Government Relations with Native American Tribal Governments," dated April 29, 1994. In the context of this executive order, a sacred site "means any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the Tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." Consultation to identify sacred sites that might be affected by the proposed action or any alternatives considered to the proposed action has been completed. The proposed action and alternatives do not restrict access, future ceremonial use, or adversely affect the physical integrity of any sacred site identified during consultation.

A number of commenters have stated that Oak Flat is sacred to Native Americans affiliated with Apache cultural traditions. During ongoing consultation, Native American Tribes have not provided information on any specific sacred sites within or near the PAA or any of the alternative sites considered in this EA. With the exception of the immediate footprint of the drill pads, and for the specific areas of the roads that would be improved to provide access for exploration equipment, Native American groups will not be precluded from using Oak Flat Campground and surrounding National Forest System Lands while the Pre-feasibility Activities are underway. Some effect to Tribes' subjective religious experience may occur from the proposed Pre-feasibility Activities, but it is not anticipated that this experience would be substantially burdened. In the context of the Religious Freedom Restoration Act of 1993, a substantial burden would exist for the Tribes if the proposed activities forced them to violate their religious beliefs or if they were penalized for their religious activities (Navajo Nation v. USFS, 2008). Neither of these conditions would arise as a consequence of the proposed drilling activities.

Comment Number: 4 The many new roads outlined in the pre-feasibility drilling activities of RCM are troubling.

Response: The majority of roads that are proposed for use in the Pre-feasibility Plan of Operations are existing Forest Service System roads and/or are existing user-created roads on National Forest System Lands. Four new road segments are proposed ranging from 0.04 to 0.20 mile in length. The total length of these four new segments is 0.33 mile.

Comment Number: 5 The EA has not discussed the biological impacts of the road building and drilling to bird species identified on the American Bird Conservancy/National Audubon Society's WatchList, nor impacts to the water table, or long term future impacts of the mine as a whole. Oak Flat is of ecological significance for the survival of certain WatchListed species.

Response: The Biological Assessment and Evaluation prepared for this project considered threatened and endangered bird species, birds protected by the Migratory Bird Treaty Act, and Forest Sensitive Species. All of the WatchListed species identified by the commenter are protected by one or more of these regulations and the impacts of the proposed action and alternatives have been considered in our analysis. Regarding impacts of the mine, that analysis is considered beyond the scope of this EA, please refer to Section 1.4 for additional information.

Comment Number: 6 The Oak Flat area is a part of the annual Christmas Count Bird Census by the Maricopa Audubon Society for the past ten years, as a part of the Superior Christmas Bird Count. The area is suitable as an Important Bird Area (IBA)

Response: The Pre-feasibility Activities would not preclude access to this area for the annual Christmas Bird Count or the Superior Christmas Bird Count. The Forest Service is not aware of a proposal to formally designate the Oak Flat area as an IBA at this time.

Comment Number: 7 The Forest Service's writing of an EA for this project is piecemealing the process, overlooking the Trust Responsibility federal agencies have with Native American tribes and nations, and circumventing EO 13007.

Response: The commentor suggests that the Forest Service's EA piecemeals the assessment of the environmental review of the proposed action, is overlooking its Federal Trust Responsibility to Indian Tribes, and is circumventing its responsibility to comply with EO 13007. The Forest Service disagrees regarding piecemealing the analysis and review under NEPA. The scope of the NEPA analysis and the impacts of the proposed action and alternatives have been carefully analyzed to ensure that all connected, cumulative, and similar actions were considered in accordance with CEQ guidelines. Please refer to sections 1.4 and 1.5 of this EA for a detailed review of the scope of the Forest Service's analysis and the framework for its decision in this matter.

The commentor's suggestion that this type of NEPA review allows the Forest Service to overlook its Federal Trust Responsibility is incorrect. Whether a particular Federal action can be categorically excluded from formal NEPA review, or requires more in-depth analysis through the preparation of an EA or EIS, does not alter the Forest Service's Federal Trust Responsibility. While determination of the proper scope of analysis for a Federal action guides the analysis of project effects and the formulation of alternatives, it does not alter or modify the Forest Service's Trust Responsibility to Indian Tribes. With regard to the Federal Trust Responsibility and this project, the potential effects to Tribal interests have been analyzed, including those interests protected by EO 13007. The Forest Service takes its Federal Trust Responsibility seriously and continues consultation efforts with Native American groups that have expressed an interest in this project, or that may have a cultural affiliation to this area of the TNF. For additional information, please refer to the response to 21-3 regarding ongoing consultation efforts with Native American groups.

Comment Number: 8 ESA consultation with the USFWS is warranted by the Forest Service for the federally endangered Arizona Hedgehog Cactus (*Echinocereus triglochidiatus* var. *arizonicus*).

Response: A Biological Assessment and Evaluation was completed for the Pre-feasibility Activities wherein the effects of the project on all Federally-listed species, designated critical habitat, and Forest Service sensitive species were evaluated. The Arizona hedgehog cactus was included in this evaluation. A full pedestrian survey of the Pre-feasibility Activity Area and possible alternatives has been conducted. Arizona hedgehog cacti are known to occur in the vicinity of the Pre-feasibility Activity Area, but they do not occur uniformly, nor do they occur at any of the sites proposed for disturbance. Because of the proximity of Arizona hedgehog cacti to some of the Pre-feasibility Activities we determined that the Pre-feasibility Activities may affect but are not likely to adversely affect Arizona hedgehog cactus. Pursuant to this determination, informal consultation with the USFWS was initiated by the Forest Service.

Comment Number: 9 The minimal cactus species mitigation offered by RCM of the 266 acre JI Ranch at Top of the World pales in comparison with the thousands of acres in the land exchange.

Response: Any potential land exchange is not considered part of the scope of analysis considered in this EA. See the discussion in Section 1.4 for detail regarding the scope of analysis. A discussion of past, present, and reasonably foreseeable future activities is provided in Section 3.11.

Letter: 22 **Commenter:** Witzeman, Robert A., Conservation Chair Maricopa Audubon Society M.D.,

Comment Number: 1 The proposed action constitutes an undertaking as defined by NHPA and consultations in compliance with the NHPA Section 106 must be an integral part of the decision making process before preparing and circulating draft NEPA documentation.

Response: Please refer to the response to 21-3.

Comment Number: 2 The EA is being prepared by the Forest Service circumvents applicable laws of the United States.

Response: Pursuant to the NEPA, this EA prepared for the proposed Pre-feasibility Activities.

- Comment Number:** 3 Apache Leap is eligible as National Historic Landmark, and Section 110 of the NHPA imparts responsibilities on the Forest Service with regards to preserving Apache Leap and Oak Flat. EO 13007 requires federal land managing agencies "to protect the integrity" of Indian sacred sites.
- Response:** Please refer to response to 21-3.
- Comment Number:** 4 Pursuant to Executive Order 12898, Environmental Justice, the Forest Service must consider the implications and effects of the proposed undertaking on the Apache people. The proposal is causing undue stress and anxiety on the Apache community, who have borne a disproportionate burden of the adverse effects of Forest Service undertakings in the region.
- Response:** The effects of the Pre-feasibility Activities have specifically been considered and addressed in the context of EO 12898 and documented in this EA. The Forest Service has consulted, and will continue to consult, with the Apache people in accordance with EO 12898, EO 13007, NHPA, and NEPA.
- Comment Number:** 5 The Forest Service is violating its trust responsibility to affected Native Americans, The trust responsibility applies to all federal agencies and federal actions outside Indian reservations, and requires that the United States protect the interest of tribes.
- Response:** Please refer to response to Comment 21-3.
- Comment Number:** 6 The Forest Service is piecemealing the process by utilizing an EA, and this is critical due to the great cultural significance that Apache Leap and Oak Flat have to Apache people.
- Response:** Please refer to the response to Comment 21-3.
- Comment Number:** 7 The socio-cultural cumulative impacts of the mine and related activities would be adverse and permanent.
- Response:** The Forest Service has not received a proposal from RCM to develop a mine, and analysis of the socio-cultural impacts of a mine is outside the scope of analysis of this EA. Please see the discussion in Section 1.4 for further detail on the scope of analysis. A discussion of past, present, and reasonably foreseeable future activities is provided Section 3.11.
- Letter:** 23 **Commenter:** Hagen, Harry W.
- Comment Number:** 1 "...[S]tart bringing copper and other minerals out from under the hill." It will provide much needed income for this part of the state of Arizona. "Bringing copper and other metals out from under that hill will put beans on the tables for many hundreds of families."
- Response:** The future potential for development of a copper mine to access the deep copper ore deposit is speculative and beyond the scope of this analysis. Please refer to the response to 1-2 regarding expressions of personal preference and Section 1.4 for further detail on the scope of analysis. A discussion on past, present, and reasonably foreseeable future activities is provided in Section 3.11.
- Letter:** 24 **Commenter:** Card, Joan **Director:** Arizona Department of Environmental Quality
- Comment Number:** 1 Stormwater discharges associated with construction activities which disturb one acre or more must obtain a permit for said discharges under the Arizona Pollutant Discharge Elimination System (AZPDES) program. A Stormwater Pollution Prevention Plan (SWPPP) must be prepared and implemented during construction.
- Response:** The Pre-feasibility Plan of Operations submitted by RCM makes specific reference to preparing and implementing a SWPPP. RCM would obtain a permit under the AZPDES program. As mitigation measures, RCM will be required to provide the Forest Service with a SWPPP and copies of all applicable water quality permits prior to any ground disturbing activity.
- Comment Number:** 2 Queen Creek has been identified as an "impaired water" regarding the surface water quality standard for copper. Queen Creek's classification as an impaired water may affect other water quality permits, i.e., Clean Water Act (CWA) Section 401 Certification and AZPDES De Minimus General Permit (DGP).
- Response:** Please see response to comment 24-1. If a Section 404 permit is required under the Clean Water Act, a CWA Section 401 Certification will be obtained from ADEQ.
- Comment Number:** 3 Project activities which will occur inside the ordinary high water mark of any water of the U.S. may require a CWA Section 404 permit. If a CWA Section 404 permit is required, a CWA Section 401 certification will be required.
- Response:** Please see response to comments 24-1 and 24-2.
- Comment Number:** 4 Certain activities that will result in a discharge to surface waters will require coverage under the AZPDES permitting program, and depending on the activity, location and volume of discharge, an individual AZPDES may be required. Alternatively, activities which result in de minimus discharges will require

- authorization under the AZPDES DGP.
- Response:** Please see response to comments 24-1 and 24-2.
- Comment Number: 5** Activities which may result in the discharge of pollutants to the aquifer will require an area-wide individual Aquifer Protection Permit (APP). ADEQ is currently processing applications for the individual APP for the proposed mine.
- Response:** Please see response to comment 24-1. There are no pending applications from RCM for a proposed mine on National Forest System Lands.
- Comment Number: 6** The EA should indicate that an Arizona Department of Water Resources (ADWR) Notice of Intent to Drill (NOI) should be obtained prior to installing any wells.
- Response:** A mitigation measure has been added to ensure this.
- Comment Number: 7** There are inconsistencies in the Plan of Operations for the shallow and deep hydrogeology testing and monitoring wells, between what is shown on the figures and what is described in the text regarding how the wells will be constructed. The figures and text should be consistent and accurate.
- Response:** Comment noted. In the final Pre-feasibility Plan of Operations this discrepancy will be clarified.
- Comment Number: 8** The Plan of Operations indicates that excavated pits at each drilling site would contain water, drill cuttings, and potentially mud generated during drilling activities, and would function to evaporate and/or infiltrate the water generated during drilling. The Plan of Operations states that an ADEQ AZPDES DGP, pursuant to A.A.C. R18-9-B301D, these discharges are also authorized under a 1.04 General APP as long as the drilling and testing operations meet the rule requirements at each drilling location.
- Response:** Comment Noted.
- Comment Number: 9** EA should note that any monitoring well that is abandoned must be abandoned in accordance with ADWR abandonment regulations.
- Response:** As noted in the Pre-feasibility Plan of Operations and this EA, all monitoring and exploration drill sites will be closed and abandoned in accordance with applicable ADWR abandonment regulations. A mitigation measure has been added to ensure this.

Letter: 25 Commenter Freeman, Nancy Executive Director Groundwater Awareness League

- Comment Number: 1** It was ironic that I was advised to not cut the trees in Oak Flat for a campfire, while Forest Service, Bureau of Interior, and a congressman were considering turning over those trees to a mining company to destroy.
- Response:** Comment noted. The proposed Legislative Land Exchange is not considered part of the scope of analysis considered in this EA. Please refer to Section 1.4 for additional discussion regarding the scope of our analysis in this EA as it relates to the Legislative Land Exchange. A discussion of past, present, and reasonably foreseeable future activities is provided Section 3.11.
- Comment Number: 2** Why does RCM need to turn public lands into private lands? Could it be that RCM wants to turn the public land into a waste facility, or that they want to avoid public scrutiny when the trees die as a result of their proposed activities in the Oak Flat area?
- Response:** The Legislative Land Exchange is not a Forest Service activity and is considered outside of the scope of this EA. Please see Section 1.4 for a discussion of the scope of analysis for the EA, particularly as it relates to the Legislative Land Exchange. A discussion of past, present, and reasonably foreseeable future activities is provided Section 3.11.
- Comment Number: 3** The proposed dewatering of Shaft 9 by RCM could also draw water from the general region.
- Response:** RCM's dewatering of Shaft No. 9 is considered outside of the scope of this EA. Please refer to Chapter 1.4 for discussion of the scope of analysis for this EA, particularly with reference to the dewatering of Shaft No. 9 and other actions being considered or implemented by RCM on their private lands. A discussion on past, present, and reasonably foreseeable future activities is provided in Section 3.11.
- Comment Number: 4** PLO 1229 is still in force today as it was in 1955, and protects the Oak Flat region from mining. This order should be respected and protect Oak Flat region from exploration activities.
- Response:** The Oak Flat Withdrawal Area was withdrawn from mineral entry in 1955 by PLO 1229. PLO 5132 modified the language of PLO 1229 to allow "...all forms of appropriation under public land laws applicable to national forest lands, except under the U.S. mining laws." PLO 5132 goes on to state that these lands were "...open(ed) to such forms of disposal as may be made of national forestlands except appropriation under U.S. mining laws." PLO 1229 and 5132 refer to a specific, legally-defined area. These PLOs did not provide for, nor did they create a buffer that precludes or modifies otherwise lawful uses of public lands in the region adjacent to the Oak Flat Withdrawal Area. The impacts of the Pre-feasibility Activities on recreational uses of the Oak Flat Withdrawal Area have been carefully and thoroughly considered and

- evaluated in this EA.
- Comment Number:** 5 RCM has never conducted mining activities, and is in a partnership with two mining companies with the worst environmental record worldwide, including the U.S.
- Response:** Comment noted.
- Comment Number:** 6 RCM has demonstrated previously they have no interest and/or knowledge of Arizona water laws by proposing in 2007 to discharge water from the Magma Mine Shaft 9 into a stream that flows behind Boyce Thompson Arboretum State Park.
- Response:** Comment noted.
- Comment Number:** 7 RCM has stated they will not mine without control of the surface, which includes Oak Flat Campground.
- Response:** Any future land exchange and/or construction and operation of a mine are considered outside of the scope of analysis of this EA. Please refer to Section 1.4 for further detail regarding our scope of analysis.
- Comment Number:** 8 RCM has a total of 89 wells in the vicinity of Oak Flat, which would surely provide them with enough information without further disturbance of the land.
- Response:** The logical progress of mining activities includes exploration and pre-feasibility stages. The purpose of these stages is to delineate the ore body, establish grade and reserves, and to allow collection of baseline data to support future detailed mine operating plans. Pursuant to their rights under the U.S. Mining Laws, RCM has proposed additional drilling to collect groundwater, geotechnical, and geologic information about the targeted ore body that they have indicated will support their Pre-feasibility studies.
- Comment Number:** 9 A May 29, 2008 Rio Tinto media release indicated that they know how much copper is in the deposit.
- Response:** Two commenters expressed an opinion that, based upon recent press releases and public statements by RCM representatives, there was more than sufficient information available to develop a plan to mine the targeted deep copper ore body near Superior. As recently as September 17, 2008, Mr. David Salisbury, President of RCM, stated in the Copper Country News that "sufficient drilling has been completed on the deep copper deposit in Superior to report an inferred resource of 1.34 billion tons of ore." However, this statement does not support the commenter's statement that there is sufficient data to proceed with preparation of a mine proposal for mine development.
- An inferred resource is based upon a rather limited amount of quantifiable exploration information and is considered geologically speculative from an economic perspective. The U.S. Geologic Survey identifies three identified resource levels. These levels relate to the certainty and completeness of the geologic evidence available to estimate the location, grade, quality, and quantity of the resource. The three primary subdivisions are "Measured," "Indicated" and "Inferred." These subdivisions reflect differential degrees of geologic certainty. "Inferred" is the least certain of these categories and "Measured" is the most certain. Inferred resource is defined by the Forest Service as estimates based on an assumed continuity beyond Measured and/or Indicated resources, for which there is geologic evidence. Inferred resources may or may not be supported by samples or measurements. Based on this recent public statement, RCM is indicating that it lacks sufficient information to make fully informed decisions about the feasibility of recovering copper ore from the deep deposit near Superior, but based upon the evidence available to RCM today, it is willing to invest a substantial amount of money to secure this information. The Forest Service will not substitute its judgment for RCM's in regard to the level of exploration and geotechnical and hydrologic information required to determine the feasibility of future mine development activities.
- The stages of a mine project include exploration, pre-feasibility studies, feasibility studies and environmental permitting. This mining process starts with the discovery of an ore body. To determine if the ore body can be technically and economically mined requires the implementation of a series of distinct stages of planning and development. The first step in this process is exploration. During exploration, existence of an ore body is determined followed by preliminary estimates of its extent, location, and value. This information is used by the mining company to initiate pre-feasibility studies.
- During pre-feasibility studies, the mining company determines the preliminary economics of the ore body, identifies potential risks, and establishes where further work and studies are required. This information is used to determine if additional financial investments are warranted. Once pre-feasibility investigations are completed, feasibility studies are initiated. Feasibility studies identify a conceptual project and determine costs. A feasibility study determines, with a greater degree of certainty than the pre-feasibility phase, whether the project is viable. It also more precisely identifies the technical, and financial risks associated with project development. At this point, the mining company makes a final determination whether to proceed with mine development. The detailed studies completed during this stage of mine planning include determination of the economically recoverable portion of the ore deposit, detailed metallurgical studies to determine ore recoverability, engineering design, determination of process and infrastructure costs, and finance and equity requirements.
- If the feasibility study determines that recovering the ore body is economically and technically feasible, mine development may begin once all appropriate environmental permits are obtained. Various types of environmental permits may be needed at any project stage, for example NEPA compliance to authorize pre-

feasibility investigations on federal land. Pursuing environmental permitting for construction of a new mine should begin once sufficient information is gathered during planning which defines the mine plan with some certainty. This would typically occur near the end of the pre-feasibility study phase of a mine project and extend well into the feasibility phase of mine planning.

Comment Number: 10 Boreholes would cause a tripping and/or falling danger to animals and humans in the area. There are statutes in Arizona limiting the amount of disturbed land on potential mining sites, including exploration operations.

Response: Wildlife and safety issues have been considered in the EA. All boreholes would be drilled, maintained, and immediately abandoned in accordance with Arizona state regulations. We are unaware of any state statutes limiting mining disturbance on federal lands. The Arizona Mine Reclamation Law applies to private lands only. The State land statutes governing mining operations on State lands, do not apply to mining exploration activities on Federal lands.

Comment Number: 11 Doubt exists regarding the availability of water for RCM's needs. RCM plans to mine for 66 years, using 33,000 acre feet/year, which equates to 1,980,000 acre feet, enough to sustain the population of Tucson for 10 years. Eventually, RCM would have to pump groundwater from the old Magma well field north of Florence, within the Phoenix Active Management Area to sustain operations.

Response: The Forest Service has not received any proposal from RCM to develop a mine, and speculation about water use, potential impacts of water use, and applicable management authorities to secure water for speculative mine operations is considered outside of the scope of analysis for this EA. Please see Section 1.4 for a more detailed discussion of the scope of analysis in accordance with the requirements of NEPA. A discussion on past, present, and reasonably foreseeable future activities is provided in Section 3.11.

Comment Number: 12 Any exploration activity that will disturb public land should be postponed until the following has occurred:
1. PLO 1229 has been withdrawn
2. The land exchange has been finalized by the U.S. Congress
3. Shaft #9 has been accomplished and the effects of this action have been determined
4. An archeological-cultural survey should be required on lands involved in a land exchange, or NEPA process, or any proposed disturbance by mining.

Response: The Forest Service is required to evaluate exploration proposals submitted pursuant to U.S. mining laws and cannot defer these actions pending resolution of other, unconnected actions. Please refer to Section 1.4 of this EA for additional discussion of the scope of this NEPA analysis. Regarding item 1: PLO 1229 and related PLO 5132 do not provide a larger regional level of protection for National Forest System Lands outside the legally defined Oak Flat Withdrawal Area. PLO 5132, which modified the withdrawal originally established by PLO 1229, specifically allows "...all forms of appropriation under the public land laws applicable to national forest lands, except under the U.S. mining laws." The effects of proposed Pre-feasibility Activities on the Oak Flat Withdrawal Area, specifically on the recreational uses, have been evaluated in this EA. Regarding item 2: The Legislative Land Exchange is speculative and is not included in our review of the activities proposed in the Pre-feasibility Plan of Operations. The Forest Service is precluded by regulation and law from delaying review of the Pre-feasibility Plan of Operations pending the approval of a speculative, legislative action. Please see Section 1.4 for a more detailed description of the scope of analysis. Regarding item 3: Please see Section 1.4 for a more detailed description of the scope of analysis and Section 3.11 regarding past, present, and reasonably foreseeable future activities. Regarding item 4: A Class III survey of the Pre-feasibility Activities has been completed in conformance with NHPA.

Letter: 26 **Commenter:** Bahr, Sandy **Chapter Director:** Sierra Club, Grand Canyon Chapter

Comment Number: 1 We have a significant interest in this proposed mine, and are concerned about the significant negative and unmitigable impacts it will have on the air, land, wildlife, and water and the loss of recreational opportunities associated with it.

Response: Development of a mine is not considered part of the scope of review of this EA; please see Section 1.4 of this EA for a more detailed description of the scope of analysis. This EA has considered impacts of the Pre-feasibility Activities relative to air, land, wildlife, water, and recreational opportunities in Oak Flat Campground and larger Oak Flat Withdrawal Area.

Comment Number: 2 Oak Flat campground has been protected from mining by Executive Order. The focus of the Plan of Operations should be on mining this area without Oak Flat, and using different methods of mining.

Response: A proposal for mine development has not been submitted by RCM to the Forest Service and is considered outside the scope of analysis for this EA. Please see Section 1.4 for a more detailed description of the scope of analysis and Section 3.11 for more discussion on past, present, and reasonably foreseeable future activities.

Comment Number: 3 Oak Flat Campground has been withdrawn from mining since 1955 under Public Land Order 1229.

Response: The effects of the Pre-feasibility Activities on the Oak Flat Withdrawal Area, specifically on the recreational

uses of those lands have been evaluated in the EA. Public Land Order (PLO) 1229 dated September 27, 1955, and published in the Federal Register (20 FR 7336) on October 1, 1955, reserved 18 specifically described areas within National Forests for use of the Forest Service as camp grounds, recreation areas, or for other public purposes. These areas, subject to valid existing rights were "withdrawn from all forms of appropriation under the public land laws, including the mining but not the mineral-leasing laws, and reserved for use of the Forest Service, Department of Agriculture, as camp grounds, recreation areas, or for other public purposes as indicated." In 1971 (Federal Register, Vol. 36, No. 187, Saturday, September 25, 1971) PLO 1229 was modified by PLO 5132. PLO 5132 specifically modified PLO 1229 restrictions for Jones Water Forest Camp, Oak Flat Picnic and Campground, Pioneer Pass Picnic Grounds, and Federal Highway 9-K Roadside Zone. For these sites, PLO 5132 allowed "all forms of appropriation under the public land laws applicable to national forest lands, except under the U.S. mining laws." PLO 5132 goes on to state that on October 20, 1971, these lands were "open[ed] to such forms of disposal as may by law be made of national forestlands except appropriation under the U.S. mining laws."

Comment Number: 4 Per the National Environmental Policy Act of 1969, as amended, the Forest Service must look at both a reasonable range of alternatives and examine the impacts including current, future, and cumulative effects of the proposal. The special, unique, and spiritual importance of Oak Flat, Apache Leap, and Devils Canyon complex of lands warrant an Environmental Impact Statement (EIS).

Response: Pursuant to NEPA and the Forest Service's implementing regulations at 36 C.F.R. Part 228, the direct, indirect, and cumulative effects analyses were conducted on a reasonable range of project alternatives. Please see Section 1.5 for further details of the nature of the decision. A discussion of past, present, and reasonably foreseeable future activities is provided Section 3.11.

Comment Number: 5 The Forest Service should review this proposal carefully and thoroughly, as mining-related disturbance features currently exist adjacent to the withdrawn areas, and additional disturbances exist within about a mile from the campgrounds. RCM is attempting an end run around the withdrawn land which violates the spirit of the withdrawal. RCM is seeking to circumvent environmental and cultural laws by coordinating with Congress for title to Oak Flat land rather than working within Forest Service regulations for a mine proposal. This should be a focus of the EIS and grounds for throwing out the Plan of Operations in its entirety. If the Plan of Operations is approved, the Forest Service should ensure there are no mining activities in the withdrawn area.

Response: Pursuant to NEPA and the Forest Service's implementing regulations at 36 C.F.R. Part 228, the scope of the NEPA analysis and the impacts of the proposed action were carefully considered and include analysis of the direct, indirect, and cumulative effects the no action, proposed action, and alternatives to the proposed action. A discussion of the Oak Flat Withdrawal Area, its history, and purpose are provided in response to 26-3. A land exchange is considered speculative and is considered to be outside the scope of analysis for this EA. (Please see further discussion in Section 1.4). Please see Section 1.5 for further information on the decision framework.

Comment Number: 6 The Plan of Operations is deficient in several areas, and we request that scoping remain open until the following documents can be provided to the public:
1. A cultural resources report;
2. Biological and ecological studies of the area;
3. Water resource and hydrological studies of the area; and
4. A better and fuller independent analysis of reclamation bonding costs and adequacy.

Response: The February 2008 draft of the Pre-feasibility Plan of Operations was sufficient to initiate review under the National Environmental Policy Act. Based upon public comments received during public scoping efforts, the results of the studies completed to support this EA, and our analysis of the project summarized in this EA, the Forest Supervisor will select a preferred alternative. Based upon that determination, RCM will be required to prepare a Pre-feasibility Plan of Operations that conforms to the findings of this EA and applicable Forest Service regulation. Public involvement in the NEPA process includes both scoping on the proposed action and commenting on the EA. The comments provided during public scoping have informed the scope of the studies completed for this EA. Analysis of reclamation bond estimations are conducted in accordance with the Forest Service's "Training Guide for Reclamation Bond Estimation and Administration" dated April 2004.

Comment Number: 7 Five exploration drill holes are proposed in the Plan of Operations, which raise significant concerns relative to recreational values of Oak Flat, in particular vehicular and pedestrian traffic related to the Oak Flat Campground and surrounding area. Hiking, climbing, bird watching, and camping among other recreational activities occur in Oak Flat, and drilling operations at OF-1 and OF-3 appear to have a significant impact on recreation. Concerns include safety of those recreating in the area, dust from heavy equipment and vehicles, noise from drilling rigs and other heavy equipment used in road widening.

Response: Public safety and the impacts of the proposed activities to recreational users of the Oak Flat Withdrawal Area have been considered in this EA. Specifically, noise and visual impact studies to assess the effects of the proposed drill sites on recreational users of the Oak Flat Campground have been conducted. A traffic

analysis was conducted which evaluated the potential impacts of RCM's use of roadways within Oak Flat Campground and evaluated two alternative access routes. The impacts of the proposed action on air quality have been evaluated and specifically consider fugitive dust emissions in the assessment. RCM will not be widening any roads within the Oak Flat Campground or within the Oak Flat Withdrawal Area as part of its Pre-feasibility Plan of Operations.

- Comment Number:** 8 The proposed OF-2 drill site will negatively affect public recreation, as access will be restricted near a popular bouldering site and camping as well as limiting camping opportunities.
- Response:** An alternative site, North OF-2, was evaluated.
- Comment Number:** 9 How will Forest Service ensure that Resolution will not violate the withdrawn area with directional drilling at sites OF-1, OF-2, and OF-3? Will the directional drilling go under Oak Flat? How will the public be able to oversee the US Forest Service to make sure it is protecting the boundaries of the withdrawn areas?
- Response:** RCM has stated to the Forest Service that they would not drill under the Oak Flat Withdrawal Area. A mitigation and monitoring measure has been added that would require RCM to complete a Cadastral Survey of the boundary of the Oak Flat Withdrawal Area to ensure that adjacent drill sites be located outside the withdrawal boundaries. This mitigation measure would also require RCM to provide the Forest Service with exploration drill hole information of sufficient detail to document that directional drilling activities do not extend under the Oak Flat Withdrawal Area.
- Comment Number:** 10 It appears that monitoring well HRES-3 would occur within the withdrawn area. Any mining related activities within the withdrawn area is contrary to the PLO .
- Response:** HRES-3 is within the Oak Flat Withdrawal Area. Please refer to response to 7-1 for additional discussion.
- Comment Number:** 11 Six shallow groundwater monitoring wells would be drilled on Forest Service lands, which would require road alterations.
- Response:** All of the shallow groundwater monitoring wells are located along existing roads, and some minor improvements are proposed. Any required road improvements will be completed in accordance with the EA and the approved Pre-feasibility Plan of Operations. Chapter 2 of this EA provides additional detail regarding the proposed road improvements that would be implemented to facilitate access to the drill sites.
- Comment Number:** 12 PVT-3 is located right on the edge of Oak Flat. This tunnel borehole is located too close to the withdrawn area, negative impacts are too great, and the likelihood of violating the withdrawal area is also high.
- Response:** PVT-3 is located outside of the Oak Flat Withdrawal Area, between the withdrawal boundary and US 60. It is accessed via existing roads and does not require any new road construction. PVT-3 is one of nine geotechnical boreholes which would be drilled to determine subsurface rock conditions along two possible tunnel alignments. Drilling activities and geotechnical testing at this drill site is expected to take 4 to 5 weeks. The maximum period of occupancy at PVT-3 would be 6 months and drilling would be completed prior to December 2016.
- Comment Number:** 13 The proposed widening of access roads will accommodate access by larger vehicles unrelated to the mine, and open up an area for increased use that could harm the land and people who recreate in these areas, The widening should be evaluated, limits on the widening of roads considered, and provisions to modify and restore widened roads to pre-widened conditions so that they accommodate the same vehicles prior to construction should be developed. Impacts of road widening on wildlife and wildlife habitat should be evaluated, minimized, and mitigated.
- Response:** RCM will not be widening any roads within the Oak Flat Withdrawal Area as part of their proposed Pre-feasibility Plan of Operations. A Biological Assessment and Evaluation has been prepared for the proposed action and alternatives to the proposed action. Reclamation of roads will be conducted in accordance with policy established through the Travel Management Rule process (36 CFR Parts 212, 251, 261 and 295).
- Comment Number:** 14 Any use of, widening, or maintaining of roads within the withdrawn area must have a Special Use Permit and therefore also warrants an EIS.
- Response:** Road improvements within the Oak Flat Withdrawal Area are not proposed by RCM. Vehicle use within the Oak Flat Withdrawal Area would be minimized to the greatest extent practicable. Road use proposed by RCM would be authorized by the Forest Service through the mechanism of the Pre-feasibility Plan of Operations. Based on analyses summarized in this EA, the Forest Supervisor would determine if an EIS is required. Please see Section 1.5 for further details of the nature of the decision.
- Comment Number:** 15 The Plan of Operations does not adequately address impacts to cultural resources. A thorough analysis of the proposed exploration's impacts on the cultural values of the area is needed. The full extent of impact is not known because to date there has been little or no consultation with the tribes by the government or RCM. Full and thorough, good-faith, government-to-government discussions with the affected and interested tribes must be undertaken by the Forest Service.

Response: The Pre-feasibility Plan of Operations is not expected to provide the level of detail or information required to comply with the National Historic Preservation Act, EO 13007, or other applicable Federal or State regulations relating to cultural resources. Cultural resource sites were identified during the Class III Survey of the Pre-feasibility Activity Area. To protect these resources, maps in the Pre-feasibility Plan of Operations that were provided to the public purposefully excluded the locations of these sites. The Class III survey report was reviewed and approved by the Forest Service's archaeologist and was provided to interested Native American groups for their review and comment. Additionally, the Forest Service requested that the Tribes identify the presence of any sacred sites in accordance with EO 13007. Please refer to response to 21-3 for a more detailed discussion of the ongoing Government-to-Government consultation efforts and our actions to comply with the NHPA.

Comment Number: 16 Scoping should not continue until the Section 106 process has been completed.

Response: Scoping is an integral and essential component of the NEPA process with regulation-established, discrete timeframes which allow for focused input. The scoping process required by NEPA is an integral component of NEPA review and should not be stopped while resource studies required to complete NEPA and consultations with interested parties required as a component of NEPA are ongoing. The potential for adverse impacts to cultural resources or sacred sites by implementation of the proposed action or another action alternative is an issue that has been identified for review during scoping efforts. Please refer to response to 21-3 for additional discussion of our ongoing consultation efforts.

Comment Number: 17 The Forest Service needs to engage in appropriate consultation pursuant to the NHPA with the Arizona State Historic Preservation Officer, the President's Advisory Council on Historic Preservation, the affected tribes and Tribal members, and interested parties regarding potential and actual impacts to cultural resources.

Response: Consultation pursuant to the NHPA has been initiated by the Forest Service, and will continue throughout our review of the proposed action. Please see response to 21-3 for additional discussion regarding Tribal consultations and project compliance with applicable laws, regulations, and executive orders relevant to cultural resources.

Comment Number: 18 The Forest Service must follow Executive Order 13007 ("Indian Sacred Sites"), dated May 24, 1996.

Response: Pursuant to EO 13007 and the NHPA, information from Native American groups regarding the presence of any sacred sites within the PAA has been requested. Please see response to 21-3 for additional discussion regarding tribal consultations and compliance with applicable laws, regulations, and executive orders relevant to cultural resources.

Letter: 27 **Commenter:** Campana, Kathryn 'Sam' **Executive Director:** Audubon Society of Arizona

Comment Number: 1 Audubon Arizona submitted letter testimony on S.3157, the Southeast Arizona Land Exchange and Conservation Act of 2008, to the Senate Energy and Natural Resources Committee expressing concerns about environmental impacts associated with the proposed mining operation on the areas surrounding Oak Flat.

Response: The Forest Service has not received any proposal from RCM to develop a mine. The land exchange is speculative and has no bearing on the review of the proposed Pre-feasibility Activities. Please see the discussion in Section 1.4 regarding the scope of analysis in this EA and Section 3.1.1 for more discussion on past, present, and reasonably foreseeable future activities.

Comment Number: 2 The mining operation will require significant discharge of water from the mine site, potentially impacting aquifers and the drainages of Queen Creek and Devils Canyon.

Response: Speculation about the potential effects from a mining operation is beyond the scope of analysis in this EA. Please see the discussion in Section 1.4 for more detail. Groundwater monitoring wells developed as part of the Pre-feasibility Plan of Operations will be used for aquifer testing, and relatively minor amounts of water will be pumped during these tests.

Comment Number: 3 Geotechnical faulting resulting from the mine may adversely affect water quality and quantity in Devils Canyon riparian area.

Response: Speculation about the potential effects from a mining operation is beyond the scope of analysis in the EA. Please see the discussion in Section 1.4 for more detail. Section 3.11 provides additional discussion on past, present, and reasonably foreseeable future activities.

Comment Number: 4 Different bird species of concern reside in the Oak Flat area, and include the wintering Lewis' Woodpecker.

Response: The Biological Assessment and Evaluation prepared for this project considered threatened and endangered bird species, birds protected by the Migratory Bird Treaty Act, and Forest Sensitive Species.

Comment Number: 5 Actions to protect the endangered hedgehog cactus population in the Oak Flat area and should be taken.

Response: Please see response to comment 21-8.

Letter: 28 Commenter Fibel, Herbert S.

Comment Number: 1 Existing 4 test drill sites already interfere with "quiet enjoyment of the area" and will "mar and distort the scenic view of this historically off limits to mining public resource."

Response: Analyses of potential noise and visual impacts to recreational users in Oak Flat area were conducted. These studies are summarized in Chapter 3 of the EA.

Comment Number: 2 Any activity by RCC [RCM] that "causes any physical disruption of the area has a sufficiently serious impact to justify the expansion of the Environmental Assessment into a full blown Environmental Impact Statement review."

Response: Our analysis of impacts is summarized in this EA. Please refer to Sections 1.4 and 1.5 for additional discussion regarding the scope of our NEPA analysis of the Pre-Feasibility Plan of Operations and the nature of the decision to be made by the Forest Supervisor.

Letter: 29 Commenter Barrett, Sylvia

Comment Number: 1 Questions the need for more drilling sites; understands that RCC [RCM] should have enough information from the more than 85 wells and drill sites in the area; no need to "further ruin the terrain."

Response: Please refer to responses to comments 25-8 and 25-9.

Comment Number: 2 "This land" is part of Public Land Order 1229 which deems this land inviolate to mining.

Response: Please see response to 7-1 for a full discussion of PLO 1229 as amended by PLO 5132.

Comment Number: 3 "Pre-feasibility studies have already been done.... Shouldn't the course of action be "No Action Alternative" until NEPA studies are undertaken? Once NEPA studies are complete and if the land swap goes through, then you can drill to your hearts' content and do it anywhere you like."

Response: The Forest Service has not received any proposal from RCM to develop a mine. Please refer to the discussion in Section 1.4 for a more detailed description of the scope of analysis. Section 3.11 provides a discussion of past, present, and reasonably foreseeable future activities.

Comment Number: 4 "Who previously approved exploration operations? The answer...USDA Forest Service. Was the public ever asked about this? Should they have been? Not really knowing procedures I am very curious as to how this works."

Response: Kennecott Exploration Company, RCM's predecessor in interest, first filed a plan of operations to pursue various pre-feasibility study activities on National Forest System Lands in February 2001. Public involvement in this original authorization was described in the original Forest Service decision document authorizing this activity as follows: "Consultation and public involvement was sought for the Resolution Project drilling program during February and March 2001. A letter was mailed to interested parties and agencies on March 2, 2001. Six letters were received in response. Two were supportive of the project and two did not express concern related to the proposed exploration plan. One letter, from the Arizona Game and Fish Department, contained suggestions, which were addressed in the mitigation requirements and modifications to the original Plan of Operations. The remaining letter, from Tribal government, expressed general opposition to mining. Forest Service personnel met with the interested Tribal representative at the project site to address any concerns. In addition, Kennecott representatives have periodically met with local organizations and governments to discuss the company's plan. The Forest Service did not receive any additional inquiries as a result of those meetings."

Comment Number: 5 QC-04 and MB-03 - on previously disturbed land; didn't RCC get enough information so that further disturbance of these areas is not necessary? "What important structure is QC-04 and MB-03 intersecting and 1100 and 1300 meters?"

Response: RCM has indicated that these two drill sites are required to provide information on subsurface structural geology, specifically what is known on the West Boundary Fault. RCM has indicated that this information is necessary to further its evaluation of the feasibility of developing the target ore body.

Comment Number: 7 Concern regarding the tunnel alignment: "What types of contaminants or material will the conveyor or tunnel be carrying? Isn't this putting the horse before the cart? The land is not theirs ... the land swap is not for sure. So there is no need for ruining the landscape just yet!"

Response: RCM has indicated that the purpose of the geotechnical evaluations is to determine if construction of a tunnel conveyor system is technically and economically feasible. Please see Section 1.4 for additional discussion regarding the scope of our NEPA analysis of the Pre-feasibility Plan of Operations.

Comment Number: 8 Should be no road closures keeping the public off public lands: "What is to stop RCC [RCM] from keeping

- their signage up on a more permanent basis to prevent the public from entering? Who is going to monitor [RCM] every day?" Modifications will scar the land; destruction left behind if land swap does not go through.
- Response:** No permanent road closures are anticipated. Short-term, temporary road restrictions that limit the use of some roads will be likely during road improvements or movement of drilling equipment during the course of operations as outlined in the Pre-feasibility Plan of Operations.
- Comment Number:** 9 "Where is the permitted landfill for the 'excess mud' going to be? How deep are 'mud pits'? If drilling mud is allowed to dry, will it stay on site until reclamation activities take place? If not ... at what point will it be removed?"
- Response:** RCM would collect excess cuttings and drilling muds generated during drilling activities and remove them from National Forest System Lands. These materials would be disposed of in accordance with applicable Arizona law.
- Comment Number:** 10 Define "silt fencing" and "water bar."
- Response:** Silt fencing and water bars are elements of best management activities implemented to control erosion and soil loss during and after construction activities. Silt fence consists of geotextile materials and wood or metal posts. The posts hold the silt fence vertically and a portion of the fence is normally buried to prevent undercutting. Water flows through the geotextile material while the soil is captured on the uphill side. A water bar is a shallow ditch with a berm on the down hill side that is constructed across a sloping road, trail, or utility row. The water bar diverts water flow from the disturbed area to prevent excessive erosion.
- Comment Number:** 11 "If a fire, caused by drilling or the drill operator, gets out of control...who puts it out and who pays to have it put out?"
- Response:** If a fire gets out of control, the Forest Service would respond in accordance with their standard practices and procedures. If the fire is human caused the responsible party would be required to pay the cost of extinguishing the fire. A mitigation measure regarding conformance with the Forest Service Fire Plan has been added.
- Comment Number:** 12 39.2 acres of disturbance is conservative..."Who would RCC contact and how would they get more land? Would it again be a public process? Or would someone in your department just give the "go ahead" since they already had started to drill?"
- Response:** Activities identified by the Forest Service in its decision notice would constitute the full range of Pre-feasibility Activities RCM is authorized to conduct on National Forest System Lands. If a previously unforeseen activity is requested by RCM they would have to modify the approved Pre-feasibility Plan of Operations or submit a new plan for review and approval by the Forest Service in accordance with applicable regulations and the National Environmental Policy Act.
- Comment Number:** 13 Service vehicles adjust speed to avoid creating a dust trail. Define "service vehicle" classification. "Can I as a concerned citizen stop the vehicle if the law is being broken" Or do I just get the license plate # and turn them into to someone? Who would that someone be? What is the punishment for breaking the law?"
- Response:** Service vehicles include standard size pick-up trucks, larger trucks transporting fuel oil for drill rigs and generators, trucks to service the portable toilets, etc. Whether or not concerned citizens can stop a vehicle if they perceive that a law is being violated is a legal question and beyond the scope of this EA or the Forest Service's authority to respond. However, a mitigation measure was developed to address reported safety concerns. RCM will be required to prepare an administrative access control plan. Specific items that would be addressed in the plan include, but may not be limited to: 1) signage, 2) training programs and documentation, 3) performance standards and specific policies to identify problems and terminate offenders, 4) plans for limiting traffic during periods of high-use public events, 5) plans to incorporate traffic safety issues into regular "lunch box" safety meetings on site, 6) provide traffic monitor when and where appropriate, and 7) provide a collection agreement to fund Forest Service oversight of the traffic monitor.
- Comment Number:** 14 Regarding scenic values: "What is considered timely reclamation?"
- Response:** Reclamation is considered timely when initiated at the earliest possible date once activity at any site is complete. Factors taken into consideration include optimal weather conditions for earthwork and seasonal conditions for achieving the most successful revegetation efforts.
- Comment Number:** 15 "How would unoccupied drill sites be covered to prevent wildlife from being trapped?"
- Response:** If a drill site is unoccupied but not yet ready for closure and abandonment, RCM will be required, in accordance with ADWR regulations, to temporarily cap the drill hole to prevent access by wildlife.
- Comment Number:** 16 "There is yet NO LAND SWAP and there is the possibility that they may not get the land swap so shouldn't this project be put on hold until more is known about what is going to happen with this land?"

Response: As a matter of law and regulation, the Forest Service must consider the proposed Pre-feasibility Plan of Operations. Please refer to Section 1.4 for further discussion about the Legislative Land Exchange and its relationship to the proposed activities. Section 3.11 provides additional discussion on past, present, and reasonably foreseeable future activities.

Letter: 30 **Commenter** Cecala, Rick

Queen Creek Coalition

Comment Number: 1 Regarding drill site OF-2: the location is popular for climbing and camping; location of the "Campground Boulder"; recommend selecting another location to minimize disruption to rock climbing in this area.

Response: In response to this concern raised by a number of commenters, a North OF-2 alternative was identified by the Forest Service for consideration as an alternative to the proposed action in this EA.

Comment Number: 2 Regarding access to OF-3 and OF-1 through Oak Flat parcel: concerns about volume of traffic and resulting impact on camping and other recreational uses of the Oak Flat parcel; recommend selection of an access route that would be less disruptive of the campground area.

Response: The impacts of increased traffic and safety concerns has been considered in this EA. In addition, six alternative access routes for OF-1 and OF-3 were considered and two have been carried forward for detailed analysis in this EA.

Comment Number: 3 QCC requests clarification of RCM's legal right to maintain its current and proposed use of HRES-3, the hydrologic monitoring station, located within the withdrawn Oak Flat parcel. From the Plan of Operations it appears that RCM has been, or will be, doing new drilling at this site. This new drilling activity is appurtenant to mining activities and may be inconsistent with Public Land (Law) Orders 1229 and 5132.

Response: For more detailed discussion regard the construction and use of HRES-3 within the Oak Flat Withdrawal Area and proposals for ongoing groundwater monitoring at this drill site please refer to the response to comment 7-1.

Comment Number: 4 PVT-3 et al: Request clarification on Resolution's legal right to build its proposed 11-mile conveyor tunnel through NF land.

Response: The analysis of RCM's legal right to construct a conveyor tunnel under National Forest System Lands is beyond the scope of this EA. The activities considered in this EA is the construction of drill sites and associated road improvements and drilling of geotechnical boreholes to collect data that will be used for engineering and planning studies to determine if a conveyor tunnel is technically and economically feasible. Evaluation of mine development i.e., accessing, mining, and processing the deep copper ore deposit, is beyond the scope of this EA. Please refer to Section 1.4 of this EA for additional discussion regarding our scope of analysis and Section 3.11 for a discussion on past, present, and reasonably foreseeable future activities.

Comment Number: 5 PVT 1 et al: Certain numbers have been omitted from the numbering system for proposed drilling sites. The existence and location of additional drilling sites on private land could bear on the necessity for sites proposed on National Forest land. Information should be made available about the nature and existence of PVT1 and 2; H-A, H-D, MB-01 and 02; QC-01, -02, and -03.

Response: While we understand that there are additional drill sites on private and State lands that support ongoing pre-feasibility studies by RCM, this does not preclude them from proposing further activities on National Forest System Lands.

Comment Number: 6 QC-04 and MB-03 - These geotechnical drill holes are proposed to be located west of and directly below Apache Leap. What information does RCM anticipate collecting from these sites? Are they essential to the pre-feasibility study?

Response: Please refer to response to 29-5.

Letter: 31 **Commenter** Sparks, Joe P.

Sparks Law Firm, P.C.

Comment Number: 1 "On behalf of the Tribes, this Firm objects to this determination (that an EA is sufficient), and insists that a full Environmental Impact Statement (EIS), which evaluates the synergistic effects of the entire proposed mining operation, is required under these circumstances." Further discussion on NEPA and definition of "connected actions"; pre-feasibility and future actions are "interdependent parts of a larger action."

Response: The determination of the appropriateness of an EA vs. an EIS to satisfy NEPA's substantive requirements has not been made. A preliminary determination was made by the Forest Supervisor in our public notice dated June 11, 2008. The final decision with regard to whether or not an EA is sufficient will be made based upon the analysis provided in this EA and the significance criteria provided CEQ regulations. As described in Section 1.5 of this EA, our final determination will be published in our decision notice that will be prepared by the Forest Supervisor following the public comment period for this EA.

Comment Number: 2 Objects to "piecemealing" or "segmentation" to divide major Federal action into smaller components to

- avoid preparing a comprehensive EIS.
- Response:** We have carefully considered segmentation in our analysis of the scope of this EA and do not believe that our analysis of the Pre-feasibility Plan of Operations is piecemealing or segmentation of our NEPA responsibilities. Sections 1.4 and 3.11 provide more detailed discussions of our analysis of past, present, and reasonably foreseeable future activities with regard to the proposed pre-feasibility activities.
- Comment Number:** 3 Oak Flat Picnic and Camp Ground is protected under Public Land Order 1229 and its 1971 modification from appropriations under the U.S. Mining Laws. "This logically includes protection from the creation or widening of roads, and the use of such roads to access mining-related activities, including inter alia, the proposed pre-feasibility activities."
- Response:** The actions outlined in the proposed Pre-feasibility Plan of Operations and the alternatives identified during the NEPA process do not consider construction of new roads or widening of existing roads within the Oak Flat Withdrawal Area. The Oak Flat Withdrawal Area was withdrawn from appropriation by PLO 1229 as modified by 5132, except under the U.S. Mining Laws. There is no proposal to enter the Oak Flat Withdrawal Area for purposes of locating a mining claim or any other mineral entry or appropriation. Vehicle traffic within the Oak Flat Withdrawal Area related to mineral exploration on other National Forest System Lands does not constitute a mineral entry or appropriation in violation of the withdrawal.
- Comment Number:** 4 Pre-feasibility activities would affect tribes' free exercise of religion - Oak Flat, Apache Leap, Devils Canyon and related canyons, geologic formations and springs located in the are of proposed activity "are holy, sacred, and consecrated lands.... This area, and nothing within it, should be disturbed. No holes should be drilled. No roads should be built. No surveys, samples, or photographs should be taken. No seismic explosions should be detonated nor testing conducted."
- Response:** A Class III survey of the Pre-feasibility Activities has been completed in conformance with the NHPA. Pursuant to EO 13007 and NHPA, information from Native American groups regarding the presence of any sacred sites within the Pre-feasibility Activity Area has been requested. In the context of EO 13007, a sacred site "means any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." During ongoing consultation, Native American Tribes have not provided information on any specific sacred sites within or near the PAA or any of the alternative sites considered in this EA. The proposed action and alternatives do not restrict access, future ceremonial use, or adversely affect the physical integrity of any sacred site identified during consultation. Please see response to 21-3 for additional discussion regarding Tribal consultation and compliance with applicable laws, regulations, and executive orders relevant to cultural resources.
- Comment Number:** 5 Government to Government consultation is required by Federal law and policy. Tribes have not been afforded sufficient time to respond; scoping letter dated June 6 was not received until July 1, 2008.
- Response:** As discussed at the meeting of the Apache Coalition in Payson on June 23, 2008, we do not understand why the letters sent by the Forest Service to some of the Tribes on June 6, 2008 were not forwarded to your office in a more timely fashion. To help facilitate your receipt of those letters, we forwarded copies of the original June 6 letter to you on June 30, 2008. You will also be directly receiving our letter announcing the opportunity to comment on the Pre-feasibility Plan of Operations.
- Comment Number:** 6 Regarding attachment to the letter: a fax sent to USFWS in response to the AZ hedgehog cactus 5-year status review by the Tribe; raised concerns about the land exchange and block-cave mining process impacting hedgehog habitat within the footprint of the proposed mine.
- Response:** A Biological Assessment and Evaluation was completed for the Pre-feasibility Activities to evaluate the potential effects of the project on Federally-listed species, designated critical habitat, Forest Service sensitive species and birds protected by the Migratory Bird Treaty Act. The Arizona hedgehog cactus was included in this evaluation. A full pedestrian survey of the Pre-feasibility Activities and possible alternatives has been completed. Arizona hedgehog cacti are known to occur in the vicinity of some of the Pre-feasibility Activities, but they do not occur uniformly, nor do they occur within any of the sites proposed for disturbance. We determined that the Pre-feasibility Activities may affect but are not likely to adversely affect Arizona hedgehog cactus. Pursuant to this determination, informal consultation with the USFWS was initiated. The potential adverse effects that may be associated with a Legislative Land Exchange or development of the deep copper ore deposit using block cave mining techniques is beyond the scope of this analysis. Section 1.4 provides a discussion on the scope of analysis of this EA and Section 3.11 provides a discussion on past, present, and reasonably foreseeable future activities.