



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
Gila County
Pinal County



MAY 2010

ENVIRONMENTAL ASSESSMENT

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

May 2010

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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
AIRFA	American Indian Religious Freedom Act
AMA	Active Management Area
APIF	Arizona Partners in Flight
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
IBAs	Important Bird Areas
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
MBTA	Migratory Bird Treaty Act
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
NHPA	National Historic Preservation 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
PSC	Priority Species of Concern
RCM	Resolution Copper Mining
RFRA	Religious Freedom Restoration Act
ROS	Recreation Opportunity Spectrum
ROW	Right-of-Way
SO ₂	Sulphur Dioxide
SPCC	Spill Prevention, Control and Countermeasure
S.R. 177	State Route 177
SRP	Salt River Project
State Trust 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). Included in this chapter is a review of the public participation efforts and the key issues carried forward for analysis in this Environmental Assessment (EA). Presented at the end of this chapter is a summary of the changes from the pre-decisional environmental assessment published in April 2009.

1.1. Organization of the Environmental Assessment

In response to Resolution Copper Mining's (RCM's) submittal of a plan of operations for pre-feasibility 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 three appendices.

- Chapter 1. Project Scope: Includes the history of the proposed project, the purpose and need for the project, a summary of the public participation process, issue development based on scoping comments and a summary of the changes made between the April 2009 pre-decisional EA (pre-decisional EA) and this EA.
- 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 environmental consequences of the no action, proposed action and other alternatives developed as part of the 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.
- Appendix B. Responses to Public Comments on the pre-decisional Environmental Assessment: Provides specific responses to comments received during the 30-day comment period on the pre-decisional EA.
- Appendix C. Special Status Species for Gila and Pinal Counties listed by the U.S. Fish and Wildlife Service (USFWS).

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 Forest 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.

The Pre-feasibility Plan of Operations activities include:

***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 were 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.

- 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 1.86 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 16.67 miles of existing roads on National Forest System Lands that would impact approximately 29.51 acres;
- 6) Construction of 0.33 mile of new roads that would impact 0.59 acre;
- 7) Road maintenance for access to previously authorized drill sites and new drill sites on public land administered by the Forest Service (National Forest System Lands), Arizona State Land Department (State Trust land) and private lands;

- 8) Completing road improvements on approximately 4.28 miles of existing roads that would impact approximately 5.75 acres on State Trust land and on approximately 1.05 miles of existing roads that would impact approximately 2.48 acres on privately owned land;
- 9) Constructing three new drill sites and monitoring wells on these sites that would impact approximately 0.39 acre of State Trust land and 0.18 acre of private land; and
- 10) Continuing exploratory and monitoring activities at previously authorized drill sites RES-13, HRES-05, HRES-07 and HRES-08 and utilization of existing well A-06 on State Trust land.

The total area of construction activity, including existing road surfaces, is approximately 80 acres.¹ Proposed new construction disturbance would occur on a total of 43.70 acres, of which 34.90 acres are on National Forest System Lands, 6.14 acres are on State Trust land, and 2.66 acres are on privately held lands. The proposed new construction activities and the Previously Authorized Activities as described in the Pre-feasibility Plan of Operations are referred to 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 locations of the proposed drill sites, previously authorized drill sites, existing

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, and 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.

¹ In the USFWS Biological Opinion for the project, they indicate that the total acreage of construction activity is 83 acres. The total acreage of construction activity in their analysis includes an estimate of the existing road surfaces within the PAA. The 83-acre value reported in their Biological Opinion is the total acreage of the construction area for the proposed action plus Alternative 3 and Alternative 5. The 80 acres of construction area reported here is the total acreage of the construction area for the proposed action only. If Alternative 3 and Alternative 5 are selected by the deciding officer and incorporated into the final plan of operations, the total acreage of the construction area would be 82.48 acres and reasonably rounded up to 83 acres.

roads that provide access to existing or proposed drill sites, and proposed new roads on National Forest System Lands, privately held lands and State Trust lands (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, State Trust lands and privately held lands in the following townships, ranges and sections of the Gila and Salt River Baseline and Meridian:

- Township 1 South, Range 13 East in portions of Sections 11, 13, 14, 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 3 through 8, 17, 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 its evaluation of developing 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 for compliance with the 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 is 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 its 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, as well as public comments provided on the pre-decisional EA. Appendix A provides responses to public scoping comments and Appendix B provides responses to comments received on the pre-decisional EA. This EA identifies mitigation and monitoring measures that were developed to minimize the potential adverse impacts of the Pre-feasibility Activities. This EA also considers three types of impacts: direct, indirect and cumulative in the evaluation of the issues identified during public and agency scoping for each of the alternatives considered in detail. Changes between the pre-decisional EA and this EA are summarized in Section 1.8.

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 actions,² should be discussed in the same environmental analysis if they would have cumulatively significant impacts.

² 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.

Similar actions are those reasonably foreseeable or proposed agency actions that 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 have been evaluated by the TNF to determine if they meet the CEQ definition of a connected action. 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 the 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 its development of a 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.
- 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 Trust lands) requiring improvements of Forest Service roads for access.
- 5) Construction of exploration and groundwater testing and monitoring well drill sites on National Forest System Lands that require improvements of roads on State Trust 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 its existing private holdings. In exchange it has 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) *Does 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 the 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 the 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 convey 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 MARRCO 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 the 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 the 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 Drill Sites on Private and State Trust Lands Requiring Improvements of Forest Service Roads for Access.** RCM has conducted and proposes to continue exploration and monitoring activities within State Trust and privately owned lands in the vicinity of the proposed Pre-feasibility Activities. These activities were identified and summarized in Appendix G of its Pre-feasibility Plan of Operations. A total of four existing drill sites (HRES-05, HRES-07, HRES-08 and RES-13) and two proposed drill sites (H-B and H-H) are located on State Trust land. An existing water source (well A-06) proposed as one of several sources of water for dust suppression along FR 2466 and FR 2469 is also located on State Trust land. HRES-05 and associated access road improvements were approved by the Arizona State Land Department (ASLD) in 2004. Access and construction of RES-13 was approved by the ASLD in 2006. HRES-07 and HRES-08 and associated access road improvements on State Trust land were approved by the ASLD in 2007. RCM will submit an application to the ASLD Minerals Section for approval to construct drill sites H-B and H-H and associated access roads prior to initiation of these proposed improvements on State Trust land. An exploration drill site is located on a private in-holding surrounded by National Forest System Lands located south of the East Plant Site and another in the Cross Canyon area south of the town of Superior.

There are several roads on National Forest System Lands that would be modified or maintained as part of the pre-feasibility studies to allow access to these drill sites on private and State Trust lands. HRES-05, HRES-07 and HRES-08 are each located off existing access roads on State Trust land that are currently accessed from the extension of FR 315 onto State Trust lands. RES-13 is an existing exploration drill site located on State Trust land south of the Oak Flat Withdrawal Area and currently is accessed through the Oak Flat Withdrawal Area via Forest Road (FR 2438), a user-created road, and FR 3153. Ongoing maintenance of FR 2438, the user-created road, and FR 3153 within the Oak Flat Withdrawal Area is proposed as part of the Pre-feasibility Activities. The exploration drill site on the private in-holding south of the East Plant Site is accessed by a user-created road that originates at Magma Mine Road and terminates at this private 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. The Cross Canyon Drill Site located on private land south of Superior would be accessed from FR 2440. Drill site H-H would be accessed from FR 2466 and the extension of FR 2466 south onto State Trust lands. Improvements to FR 2466 are included in the Pre-feasibility Activities. Drill site H-B is located along the extension of FR 315 onto State Trust land and improvements of FR 315 from S.R. 177 to access drill site H-C on National Forest System Lands will also be used for access to and construction of drill site H-B. Ongoing maintenance of FR 315 from Magma Mine Road south to the State Trust land boundary to provide access to these drill sites is proposed as part of the proposed Pre-feasibility Activities.

Analysis of drill sites on State Trust 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 Trust or private lands automatically trigger construction of road improvements on National Forest System Lands?* While the routes outlined in the Pre-feasibility Activities Plan of Operations to access drill sites on State Trust and private lands may be the most cost effective for mobilizing equipment and personnel to these sites, 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 Trust or private lands: should the Forest Service not authorize road improvements on National Forest System Lands that will be used to access drill sites on State Trust 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. However, air-lifting equipment to gain access to drill sites on State Trust or private lands has not been proposed and the Forest Service has determined that it is therefore not relevant to the analysis of the connectivity of these actions. For these reasons, the construction of drill sites on State Trust or private lands would trigger the construction of road improvements on National Forest System Lands.

- (ii) *Does the construction of drill sites on State Trust or private lands and road improvements on National Forest System 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 the construction of a drill site and subsequent drilling activities. There is a physical, temporal and logistical relationship between the road improvements on National Forest System Lands and the construction of drill sites on private or State Trust lands.
- (iii) *Do the drill sites on State Trust and private lands and required road improvements on National Forest System Lands depend on the construction of all the Pre-feasibility Activities for their justification?* The drill sites on State Trust or private lands and required road improvements do not depend on the construction of all the Pre-feasibility Activities for their justification. The construction of drill sites on State Trust and privately held lands for exploration and groundwater testing and monitoring are part of a larger suite of pre-feasibility studies and the data collected from all the drill sites will be considered as a whole. However, the data collected from the State Trust and private lands can contribute independently to the overall understanding of the physical resources of the region. The data collected from the drill sites on State Trust and private lands have value even if data were not available from the drill sites located on National Forest System Lands. The construction of drill sites on State Trust 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 the implementation of the other.

Considering that the operation and development of the drill sites on State Trust and private lands automatically trigger improvements to, and the maintenance of, roads on National Forest System Lands, we find that the construction and operation of the drill sites on State Trust and private lands are connected actions for purposes of analysis in 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 Trust or Private Lands.** There are four road segments on State Trust and private lands that would be modified to provide access for equipment and materials required to establish and operate drill sites on National Forest System Lands. Road improvements proposed on State Trust lands (FRs 315, 2469 and 2446) and privately owned lands (FRs 2440 and 898) were presented in Appendix D of RCM’s Pre-feasibility Activities Plan of Operations. Drill sites that would be constructed on National Forest System Lands but would be accessed by improved roads on State Trust or private lands are as follows:

- Drill site H-I is located on National Forest System Lands and will be accessed by vehicle from drill site H-H on the extension of FR 2469 on a State Trust 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 drill site 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 from S.R. 177 by FR 2440. Improvements to FR 2440 and the establishment of QC-04 and MB-03 are part of the proposed Pre-feasibility Activities. FR 2440 crosses private lands at Cross Canyon and improvements to the segment of FR 2440 that crosses private lands are proposed.
- Drill site H-E would be accessed from FR 315 and an existing user-created road on National Forest System Lands. After FR 315 enters State Trust land, a short segment of this user-created road on State Trust 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.
- PVT-7 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 Pinal Ranch or JI Ranch. A specific proposal for access across these private lands has not been provided by RCM.
- APV-8 will be accessed from FR 898. Access to FR 898 from U.S. Highway 60 crosses a relatively short segment of private land along an existing public easement. The road within this easement will not require improvement. The extension of FR 898 onto the JI Ranch property will require improvements to allow drilling equipment to access APV-8 via this road.
- West Access Routes 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, would cross a short segment of State Trust land west of RES-13.

Analysis of improvements and use of roads on State Trust 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 System Lands that use or will use access roads on State Trust or privately held land automatically trigger the required road improvements on State Trust or private lands?* RCM has 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. However, air-lifting equipment to gain access to drill sites on National Forest System Lands has only been indicated for PVT-7. Air-lifting has not been proposed to access drill sites H-E, APV-8, MB-03 or QC-04 by RCM and therefore the potential to air-lift equipment and materials to these four drill sites is not relevant to the

analysis of the connectivity of these actions. Therefore, the proposed construction of drill sites H-E, APV-8, MB-03 and QC-04 automatically triggers associated road improvements on State Trust and privately held lands. In contrast, the proposed development of PVT-7, because the air-lift option was indicated as an access option in the Pre-feasibility Plan of Operations, does not automatically trigger road improvements on adjacent private lands.

- (ii) *Does the construction of drill sites on National Forest System Lands that require road improvements on State Trust 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 the construction of a drill site and subsequent drilling activities. There is a physical, temporal and logistical relationship between the proposed road improvements on State Trust and private lands and the proposed construction of drill sites on National Forest System Lands. This practical relationship exists for the proposed road improvements on State Trust and privately held lands proposed to access drill sites H-E, APV-8, MB-03 or QC-04. This relationship does not exist for the construction of drill site PVT-7 because of the availability of other means of gaining access to this drill site for construction and drilling operations.
- (iii) *Does the construction of drill sites on National Forest System Lands that require road improvements on State Trust or private lands to access those drill sites depend on the construction of all the Pre-feasibility Activities for their justification?* The construction of drill sites on National Forest System Lands for exploration, groundwater testing and monitoring, and tunnel characterization work is part of a larger suite of pre-feasibility studies and the data collected from all 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 can contribute independently to the overall understanding of the physical resources of the region; these data have value, even if data were not available from the drill sites located on State Trust and private lands. 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 Trust or private lands do not create a “but for” situation where implementation of one action would not occur but for the implementation of the other.

The improvement and modification of roads on State Trust and private lands to gain access to drill sites H-E, APV-8, MB-03 and QC-04 on National Forest System Lands are connected actions.

- (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 a logical progression prior to the

initiation of mine development. Among them is the determination that mining the ore body is technically and economically feasible. Implementation of the proposed exploration and pre-feasibility studies is required to collect the 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, implementation of the Pre-feasibility Activities does not depend upon development of a 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 Operations 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 laws 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 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 the 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 Operations 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 an invitation to attend a public open house were published on June 11, 2008, in five area newspapers: *Scottsdale Tribune*, *East Valley Tribune*, *Arizona Silver Belt*, *Copper Basin News* and *Superior Sun*. The *East Valley Tribune* was the newspaper of record. 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 TNF 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. Responses to each comment/concern identified in the Comment Letters submitted during public scoping are provided in Appendix A.

The pre-decisional EA was published on April 1, 2009, and the legal notice announcing the 30-day public comment period was published in the *Arizona Capitol Times*, the newspaper of record, as well as in four other area newspapers: *East Valley Tribune*, *Arizona Silver Belt*, *Copper Basin News* and *Superior Sun*. All individuals and agencies included in the scoping mailing list, as well as those added after the scoping period, were specifically mailed a letter announcing the 30-day comment period. The pre-decisional EA was published on the TNF website and hard copies of the pre-decisional EA were provided to 11 local libraries: Apache Junction, Mesa, San Carlos, Superior, Florence, Kearny, Gila and Pinal County Library District Offices, Globe, Miami and Hayden. Additional hard copies were made available for public review at the TNF Supervisor's Office in Phoenix and the Globe District Office in Globe. Certified copies were sent to representatives of 10 Native American Tribes. Multiple means were provided to solicit comments (e.g., mail, email, phone) and direction for providing comments was included in the notice of availability and at locations where the EA could be reviewed. Twenty-one comments in the form of letters and/or emails were received during the 30-day comment period. The Forest Service ID Team identified individual comments within each of the comment letters, which were carefully evaluated according to defined criteria. If a comment was determined to identify an issue,³ then it was further examined to determine if the comment was substantive.⁴ If it was determined to be substantive, then it was further analyzed to determine if it was significant⁵ and required further analysis by Forest Service ID team specialists. Responses to all comments received are presented in Appendix B of this EA.

1.7. Issue Development

Using the scoping comments from the public, the Tribes, and other agencies and organizations, the ID Team developed a list of 10 issues to address in the environmental analysis following guidelines set forth in the Forest Service Handbook (FSH). In accordance with FSH guidelines, only significant or key issues need to be analyzed further in the NEPA document. 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.

³ The Forest Service defines an issue if the comment expressed a concern with the analysis presented in the EA that was either based on a belief or perception or that could include a negative cause-effect relative to the action or activity.

⁴ A comment was determined to be substantive if the comment was: 1) within the scope of the analysis, 2) relevant to the decision, 3) not already decided by law, regulation or policy, or 4) not speculative or is supported by scientific evidence.

⁵ A comment was determined to be potentially significant if it was substantive and warranted a change to the effects analysis. If determined to be potentially significant, the comment was further evaluated by the ID Team and appropriate specialist to determine if a significant impact could occur.

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

The 10 key issues identified during public and agency scoping and this analysis are provided below. This list of issues remained unchanged following our analysis of comments received on the pre-decisional EA:

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, and drilling, 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: Endangered Species and Arizona Hedgehog Cactus (AHC). Road widening, construction of new roads or construction of new drill sites may impact endangered species. Most concerns focused on potential impacts to AHC and/or its habitat in the PAA.⁶

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

Issue 6: Safety. 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 the Oak Flat Campground.

Issue 7: Conflicts with the 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 the Forest Service's travel management goals that may become established as part of the Forest Service's current planning efforts.

⁶ The Forest Service made the determination that the proposed action "may affect, likely to adversely affect AHC." Therefore, formal consultation in accordance with the requirements of Section 7 of the Endangered Species Act with the United States Fish and Wildlife Service was initiated and completed with issuance of a Biological Opinion.

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.

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.

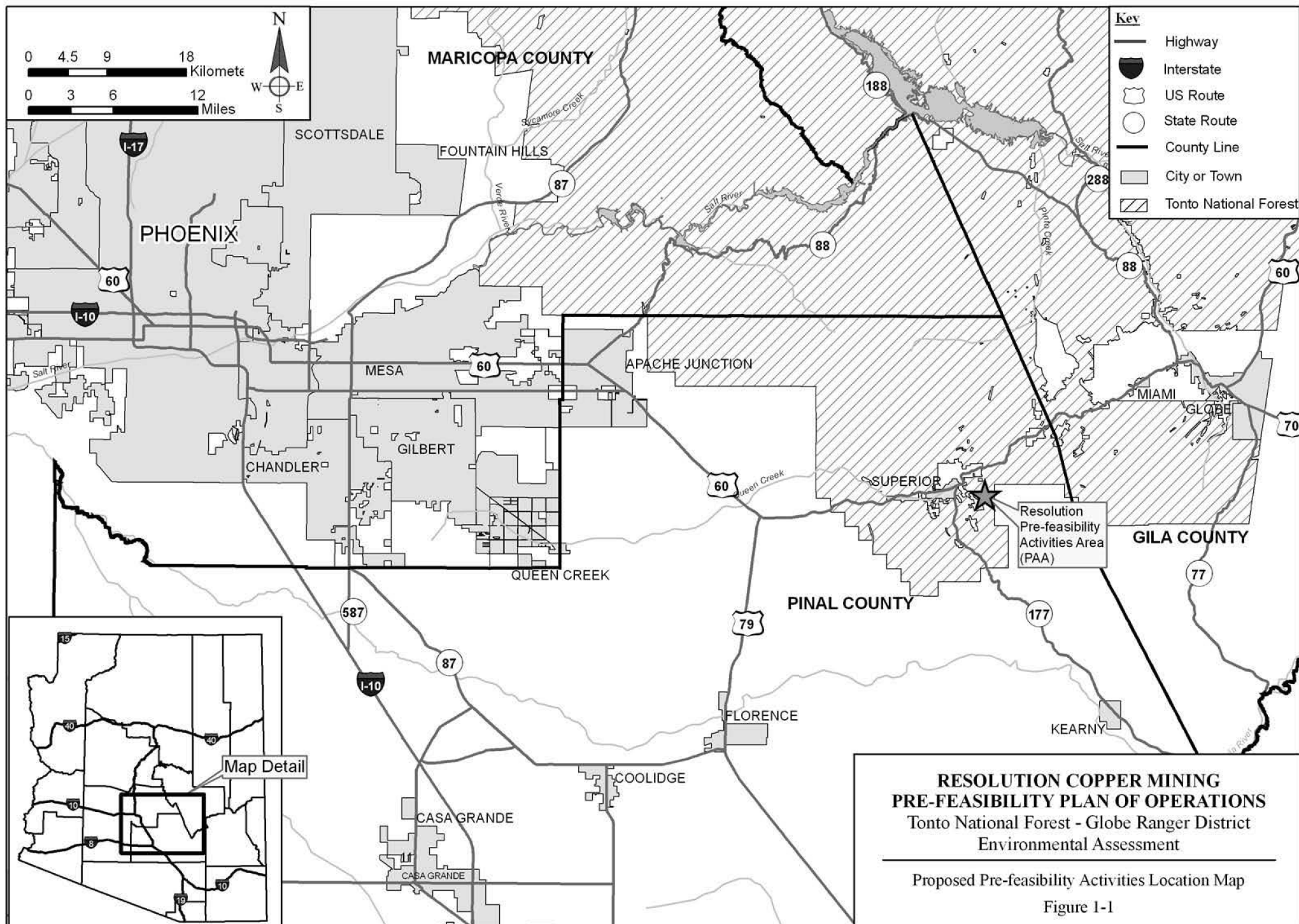
1.8. Changes Between the Pre-decisional EA and the Final EA

Notable changes between the pre-decisional EA and the final EA include:

- 1) The determination by the TNF that certain activities identified by RCM in Appendices D and G of its Pre-feasibility Activities Plan of Operations that RCM proposes to conduct on State Trust and privately owned lands are connected actions and therefore must be analyzed as part of the proposed action. Relevant sections of Chapters 1, 2 and 3 have been updated to reflect this determination, and graphics and acreage calculations have been updated throughout the document to include the connected actions.
- 2) Additional information developed during formal consultation with the U.S. Fish and Wildlife Service (USFWS) regarding the impacts of the Pre-feasibility Activities to the Arizona hedgehog cactus (AHC; *Echinocereus triglochidiatus* var. *arizonicus*) has been incorporated into this EA.
- 3) TNF-proposed conservation measures to avoid, minimize and mitigate potential impacts to AHC have been incorporated into the mitigation measures identified in this EA.
- 4) The wildlife section of Chapter 3 has been expanded to include analysis of project effects to Management Indicator Species (MIS) and migratory birds in accordance with recent Forest Service guidance.
- 5) Figures 2-5 and 2-6, which depict Alternative Access Routes 4a and 4b, respectively, have been revised to reflect minor modifications to these alignments based on additional field review by a TNF resource specialist. Acreages of disturbance associated with each of the alternatives have been updated accordingly in this EA.
- 6) Appendix B has been added to provide our responses to public comments on the pre-decisional EA. Where appropriate, information developed during the preparation of our responses to public comments has been incorporated into relevant sections of this EA.

- 7) Text throughout the document has been updated and refined to more clearly reflect our analysis and to clarify/respond to specific questions raised by some reviewers and commenters.
- 8) Appendix C has been added to provide specific information on Special Status Species for Gila and Pinal Counties listed by the USFWS.

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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 this 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 in detail 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 includes 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 its previously authorized exploration and monitoring activities.

RCM would continue with its pre-feasibility studies on private and State Trust 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 No. 9 Shaft and the sinking of the No. 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 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 the 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, as depicted in Figure 2-1, 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 1.86 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 16.67 miles of existing roads on National Forest System Lands that would impact approximately 29.51 acres;
- 6) Construction of 0.33 mile of new roads that would impact 0.59 acre;
- 7) Road maintenance for access to previously authorized drill sites and new drill sites on public land administered by the Forest Service (National Forest System Lands), State Trust land and private lands;

- 8) Completing road improvements on approximately 4.28 miles of existing roads that would impact approximately 5.75 acres on State Trust land and on approximately 1.05 miles of existing roads that would impact approximately 2.48 acres on privately owned land;
- 9) Constructing three new drill sites and monitoring wells on these sites that would impact approximately 0.39 acre of State Trust land and 0.18 acre of private land; and
- 10) Continuing exploratory and monitoring activities at previously authorized drill sites RES-13, HRES-05, HRES-07 and HRES-08 and utilization of existing well A-06 on State Trust land.

The total area of construction activity, including existing road surfaces, is approximately 80 acres.⁷ Proposed new construction disturbance would occur on a total of 43.70 acres, of which 34.90 acres are on National Forest System Lands, 6.14 acres are on State Trust land, and 2.66 acres are on privately held lands. The proposed new construction activities and the Previously Authorized Activities as described in the Pre-feasibility Plan of Operations are referred to as the Pre-feasibility Activities.

Each of the exploration and groundwater testing and monitoring drill sites would have an approximately 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 the 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 would 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 a 0.14-acre increase in disturbance footprint 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 New Disturbance Area for Pre-feasibility Activities on National Forest System Lands.

Pre-feasibility Activity Type	Disturbance Area (acres)
New Drill Site Disturbance	4.80
Existing Access Road Improvements	29.51
New Access Road Construction	0.59
Total Disturbance Area	34.90

⁷ In the USFWS Biological Opinion for the project, they indicate that the total acreage of construction activity is 83 acres. The total acreage of construction activity in their analysis includes an estimate of the existing road surfaces within the PAA. The 83-acre value reported in their Biological Opinion is the total acreage of the construction area for the proposed action plus Alternative 3 and Alternative 5. The 80 acres of construction area reported here is the total acreage of the construction area for the proposed action only. If Alternative 3 and Alternative 5 are selected by the deciding officer and incorporated into the final plan of operations, the total acreage of the construction area would be 82.48 acres and reasonably rounded up to 83 acres.

Table 2-2. Pre-feasibility Activities Proposed Duration and Authorization Period. Note that reclamation activities would commence at 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-B, H-C, H-E, H-F, H-H, 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 Boreholes	N/A	December 31, 2016
Road Maintenance for Groundwater Testing and Monitoring	N/A	December 31, 2025

Commonly 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 borehole. Directional core drilling can be completed from the bottom of the trunk hole.

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. The trunk hole would be drilled with a 6 ¾ to 7 ⅝ bit and cased with a 5 ½-inch casing. The deflection core holes range from 2.4 to 3.7 inches in diameter. 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.

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 follow.

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-04 ¹	0.26
MB-03 ¹	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. Acres of disturbance equal existing disturbed area plus new work at each of the 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 SE¼, NE¼, NE¼ 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 mile⁸ of existing road on National Forest System Lands and an approximately 0.4-mile portion on privately held lands. The existing user-created road from FR 2440 to QC-04 would require an additional 0.1 mile of improvements.

⁸ Note: Lengths of roadway improvements were originally calculated in AutoCAD in feet. They have been presented in text here rounded to the nearest 1/10th or 1/100th of a mile.

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 NW $\frac{1}{4}$, NW $\frac{1}{4}$, SW $\frac{1}{4}$ 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 (on National Forest System Lands and privately held lands as described for QC-04) and approximately 0.4 mile of additional improvements 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 NW $\frac{1}{4}$, SW $\frac{1}{4}$, SE $\frac{1}{4}$ 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 0.2 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 SE $\frac{1}{4}$, NW $\frac{1}{4}$, NE $\frac{1}{4}$ 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 Magma Mine Road. An access road from Magma Mine Road to the site already exists but would require approximately 75 feet of roadway improvements. Access road improvements are included in the acreage calculation for drill site disturbance.

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. OF-3 would be accessed from 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 the proposed testing and monitoring procedures are described in greater detail below.

Deep Groundwater Testing and Monitoring Wells. Four deep groundwater testing and monitoring wells are proposed. Well DHTW-01 would be located at drill site H-L, well DHTW-02 would be located at drill site H-K, and well DHTW-03 would be located at drill site H-N. The fourth well would be located at the Cross Canyon drill site on privately held land. 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.

Common Terms

- Air Drilling: Using compressed air or nitrogen to cool the drill bit and lift cuttings out of the borehole.
- 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 borehole.
- Reverse-circulation Drilling: A method to bring the sample to the surface inside the drill rods to reduce contamination.

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 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 the geophysical logging of this lower segment of the monitoring well, a 4-inch blank and slotted casing would be installed. The depths of the slotted casing would be based on the 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 air-lift 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 on National Forest System Lands 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 on National Forest System Lands. Two shallow groundwater testing and monitoring wells would be located on drill sites H-B and H-H on State Trust lands. 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 the slotted casing would be based on the 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 on National Forest System Lands 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 the information collected from the deep and shallow groundwater testing and monitoring wells.

Analysis of groundwater drawdown 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
National Forest System Lands	
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	0.35
Subtotal – National Forest System Lands	1.86
State Trust and Privately Held Lands	
H-B	0.22
H-H	0.17
Cross Canyon Drill Site	0.18
Subtotal – State Trust and Privately Held Lands	0.57
TOTAL	2.43

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

Drill Site H-B. H-B would be developed for groundwater monitoring and testing and would be located along FR 315 on State Trust lands in Township 2 South, Range 13 East, in the NW¼, NE¼ of Section 17. The purpose of this site is to explore groundwater in the Whitetail Conglomerate of underlying units where Apache Leap tuff is absent; provide additional control for direction and magnitude of water-level gradients south of Oak Flat; and define aquifer parameters for Whitetail Conglomerate of underlying units. The estimated surface disturbance for this site is 0.22 acre. H-B would be accessed from FR 315 on State Trust lands, which would be maintained to accommodate long-term groundwater testing and monitoring.

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 onto 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 Magma Mine Road by turning south on FR 315 and then turning to the southwest onto an existing user-created road shortly after crossing over on State Trust 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. 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-H. H-H would be developed for groundwater monitoring and testing and would be located along FR 2466 on State Trust lands in Township 2 South, Range 13 East, in the SW $\frac{1}{4}$ of Section 4. The purpose of this site is to provide additional control in the Apache Leap tuff for direction and magnitude of water-level gradients in the east part of the Devils Canyon drainage basin and to provide additional aquifer parameters for Apache Leap tuff. The estimated surface disturbance for this site is 0.17 acre. H-H would be accessed from FR 2466 on State Trust lands, which would be maintained to accommodate long-term groundwater testing and monitoring.

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 SW $\frac{1}{4}$, NW $\frac{1}{4}$, SE $\frac{1}{4}$ 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 portion 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, crossing onto State Trust land, going past drill site H-H and then turning north onto FR 2469.

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 SW $\frac{1}{4}$, NW $\frac{1}{4}$, SW $\frac{1}{4}$ 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 0.30 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 NE $\frac{1}{4}$, NE $\frac{1}{4}$, SE $\frac{1}{4}$ 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 SW $\frac{1}{4}$, SW $\frac{1}{4}$, SW $\frac{1}{4}$ 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 0.35 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 west and the

disturbances associated with these two access points are included in the drill site disturbance acreage calculation.

Cross Canyon Drill Site. The Cross Canyon Drill Site is located on privately held lands adjacent to FR 2440 east of Superior in Township 2 South, Range 12 East, a portion of Section 2. A deep groundwater testing and monitoring well would be drilled at the Cross Canyon drill site to establish deep aquifer parameters. The total estimated surface disturbance for the construction of this drill site would be approximately 0.18 acre. The Cross Canyon drill site would be accessed from S.R. 177 by turning east on FR 2440. Roadway improvements to FR 2440 would be required to access this drill site and exploration drill sites MB-03 and QC-04.

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 tunnel characterization 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	0.20
PVT-6	0.18
PVT-7	0.30
PVT-8	0.24
PVT-9	0.16
APV-6	0.14
APV-8	0.29
Total Drill Site Disturbance Area	1.80

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, the northern boundary of the Oak Flat Withdrawal Area in Township 1 South, Range 13 East, in the SE $\frac{1}{4}$, NE $\frac{1}{4}$, SE $\frac{1}{4}$ 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 via 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 then continuing 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 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 improvements 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 NW $\frac{1}{4}$, NE $\frac{1}{4}$, SE $\frac{1}{4}$ 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 0.59 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 NE $\frac{1}{4}$, NW $\frac{1}{4}$, NW $\frac{1}{4}$ 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 NE $\frac{1}{4}$, SW $\frac{1}{4}$, SE $\frac{1}{4}$ of Section 23. Geotechnical borehole APV-6A would be drilled at 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 SE $\frac{1}{4}$, NW $\frac{1}{4}$, SE $\frac{1}{4}$ 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, crossing a portion of privately held land 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 16.67 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 treatments. Level A roadway improvements are assumed to have an average of 6 feet of new disturbance along their entire length.

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. Level B roadway improvements are assumed to have an average of 10 feet of new disturbance along their length.

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 certain 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, an average of 6 feet of additional disturbance has been assumed for impact calculations in the Level C area. Similarly when a Level C road improvement is located on a road designated for Level B improvements, an average of 10 feet of additional disturbance has been assumed for the Level C area.

Level A, B and C road improvements would be made along portions of approximately 16.67 miles of existing access roads. Approximately 10.50 miles of existing access road would require Level A road improvements and approximately 6.17 miles of roadway 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 turn-outs 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 ²	Area of Disturbance ^{4, 5}	
			Linear Feet	Acres
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 their 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.	18,966	5.05
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.	3,244	0.45
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.	3,011	0.76
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.	548	0.08

Table 2-6. (Continued)

Road	Forest Service Road Maintenance Level ^{1,2}	Planned Road Condition During Pre-feasibility Plan of Operations Implementation ²	Area of Disturbance ^{4,5}	
			Linear Feet	Acres
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.	1,527	0.55
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.	6,515	4.36
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.	1,971	1.27
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.	2,562	0.59
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.	2,454	0.51
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.	22,234	8.17
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.	8,679	3.59
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.	2,543	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.	2,634	1.06
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.	2,229	0.76
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.	351	0.18

Table 2-6. (Continued)

Road	Forest Service Road Maintenance Level ^{1,2}	Planned Road Condition During Pre-feasibility Plan of Operations Implementation ²	Area of Disturbance ^{4,5}	
			Linear Feet	Acres
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.	3,733	0.65
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.	451	0.06
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.	3,440	0.73
Existing Road from U.S. Highway 60 to PVT-9	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.	345	0.13
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.	561	0.08
Total			87,998	29.51

¹ Data provided as a shape file by the 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 to 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 Levels A, B and C.

⁵ In addition to the proposed access improvements on the TNF, approximately 5.3 miles of existing roads would be improved on State Trust 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, 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 ²	Length ^{4, 5} (Miles)
Magma Mine Road	Level 5	Vegetation trimming and clearing to maintain visibility for heavy equipment transport.	2.05
Existing Road from Magma Mine Road, near Superior East Plant Site south to private in-holding	User-created ³	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.	0.11
Existing Road from Magma Mine Road to Site #1	User-created ³	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.	0.13
Existing User-created Road from Magma Mine Road north to Drill Site PVT-3	User-created ³	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.	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.	0.49
User-created bypass road from FR 2438 to FR 3153	User-created ³	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.	0.48
User-created road (old U.S. Highway 60) from FR 2438 to Drill Sites H-L and PVT-4	User-created ³	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.	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.	0.95
Total			5.13

^{1,2,3,4,5} For definition of terms and notes see Table 2-6.

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 Trust 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 0.59 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/Area of Disturbance	
			Feet	Square Feet
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	2,655
	No Classification	Improve road segments to generally achieve the High-clearance Vehicles management standard suitable for the equipment required to accomplish planned activities.	151	2,265
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	4,950
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	16,035
Total Length of New Access			1,727 (0.33 mile)	25,905 (0.59 acre)

Improvements to Roads on Privately Owned and State Trust Lands. RCM will require the use of four road segments not located on National Forest System Lands to access existing and proposed exploratory drill and well sites located on National Forest System, privately owned or State Trust lands. A segment of FR 2440 traverses privately owned lands to access QC-04 and MB-03 on National Forest System Lands. APV-8 is located on National Forest System Lands, but is accessed by FR 898, which crosses privately

owned lands located north of U.S. Highway 60. Access to drill site H-I requires improvement of the extension of FR 2466 and FR 2469 on State Trust land. Table 2-9 summarizes road improvements on State Trust and privately owned lands.

Table 2-9. Impacts Associated with Existing and Proposed Activities on State Trust and Privately Held Lands.

Activity Name	Disturbance					
	Level A		Level B		Level C Acres	Total Acres
	Linear Feet	Square Feet	Linear Feet	Square Feet		
FR 315	5,801	34,807	5,502	55,024	0.06	2.13
Extension of FR 898	3,359	20,156	0	0	1.05	1.51
Extension of FR 2440	2,179	13,072	0	0	0.67	0.97
Extension of FR 2466 and FR 2469	8,310	49,859	2,965	29,651	1.79	3.62
Total	19,649	117,894	8,467	85,675	3.57	8.23

Public Access and Traffic Management. The contractors hired to conduct the 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. Contractors responsible for the 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 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 2-10 provides a summary of the surface disturbance associated with the drill sites established as part of the Previously Authorized Activities.

Table 2-10. Estimated Disturbance Area for Drill Sites Established as Part of the Previously Authorized Activities on National Forest System Lands. 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 SE¼, NW¼, SE¼ 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 SE¼, SW¼, SE¼ of Section 32. RES-3 is an exploration drill hole developed at this drill site and consists of a single 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, labeled 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. Disturbance from the construction of this drill site would be approximately 0.15 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 are 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 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 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 #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 (ADWR #55-201851) and DOE well (#USWUZP-5). HRES-3 and the DOE well 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 Trust 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 waterline 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 waterline 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 the Arizona Department of Water Resources (ADWR) in accordance with their established reporting requirements.

Outside 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 the Phoenix AMA and water would be provided by the 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. At the beginning of each drilling cycle for shallow groundwater testing and monitoring wells, approximately 500 to 2,000 gallons per day of water will be required for drilling. After two to three days of drilling, water will be recycled and supplemental water will not be required. 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 at each active drill site. This water would be provided by water “made”⁹ 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. During peak periods of Pre-feasibility Activities, eight active drill rigs plus water for dust control will result in an estimated 0.42 acre-feet per day of water being used by the Pre-feasibility Activities.

Drill rigs use drilling mud to cool and lubricate the rods and diamond bit and to help carry cuttings to the surface. Drilling mud would be collected in large storage tanks (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 its 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 all times during the active drilling process; and 3) driving slowly when in-service vehicles are 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.

⁹ Minor amounts of water generated during drilling activities.

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 (BMPs).

RCM would obtain authorization under the Arizona Pollutant Discharge Elimination System (AZPDES) *de minimus* General Permit from the 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 the 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.

Fish and Wildlife. Proposed activity areas were surveyed for the endangered AHC and planviews of proposed activities that identify Arizona hedgehog cacti locations with respect to ground-clearing activities were submitted to the Forest Service. RCM proposed to avoid all AHC and to use clear-limit fencing and cactus guards when necessary to protect AHC. A biological monitor will be present at the time clearing takes place.

Potential Sonoran Desert Tortoise habitat (a Forest Service-sensitive species that has the potential to occur in the areas of proposed activities) will be examined during Pre-feasibility Activities. If encountered, the desert tortoise would be handled according to Arizona Game and Fish Department (AGFD) protocols. A copy of the tortoise protocol is on file at the drilling operations office located at the Resolution Core Facility.

Noxious weed surveys will be conducted within construction areas prior to ground disturbance and in accordance with Forest Service guidelines.

Open mud pits at unoccupied drill sites would be covered to prevent wildlife from becoming trapped. Drilling operations are anticipated to be continuous, however, and wildlife would not likely approach active rigs.

Cultural Resources. A Class III cultural resources survey was conducted within the PAA in 2003 and in 2007 and 2008. A Class III cultural resources survey report was completed and submitted to the Forest Service in May 2009. Detailed planviews of proposed activities that identify eligible cultural resource site locations with respect to ground-clearing activities were submitted to the Forest Service. An archaeological monitor would be present during vegetation clearing within or adjacent to any NRHP-eligible cultural resource site boundaries.

Hazardous Substances/Petroleum Products/Drilling Materials. RCM would use a Spill Prevention Control and Countermeasure (SPCC) plan to guide the 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 boreholes 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 2-11.

Table 2-11. 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.	Drill hole abandonment would be conducted in accordance with AAC R12-15, ARS Title 45, Chapter 2, Article 10, administered by the ADWR. In general, this procedure includes the following steps: After completion of each deflection, that portion of the hole would be filled with bentonite mud of sufficient density to prevent the movement of groundwater between any aquifers. 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.
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	Any drill site selected 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 are obtained.	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. 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.
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.

Roads. Table 2-12 identifies the Forest Service Road Maintenance Level for each segment of access roadway and describes the proposed reclamation and 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.

Table 2-12. 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.
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.
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.

Table 2-12. (Continued)

Road	Current Forest Service Road Maintenance Level	Post-Pre-feasibility Study Forest Service Road Maintenance Level and Reclamation 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 road's intersection with FR 2440 when the roadway is no longer required for access to pre-feasibility study activities.

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 described in the Pre-feasibility Plan of Operations to avoid impacts to the Boulder Campsite and Campground Boulder, a popular recreation and climbing area, located at the OF-2 drill site. The total acreage of impacts from construction of the North OF-2 exploration drill site alternative is 0.25 acre.

2.1.4. Alternative 4 – West Access Route 4a and Drill Site Locations 4E and 4W

West Access Route 4a 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 (Figure 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 Trust lands. The total length of new

road along West Access Route 4a would be approximately 4,511 feet of which 738 linear feet would occur on State Trust land. Construction of the road would impact 1.78 acres of National Forest System Lands and 0.35 acre of State Trust land. Total disturbed area from the construction of West Access Route 4a would be 2.13 acres. The turn-offs for this route at FR 315 and RES-13 would be gated to prevent public use.

RCM would construct two additional exploration drill sites that would be accessible from this road, 4E (0.35 acre) and 4W (0.29 acre). Both would be located on the south side of the West Access Route 4a alignment (Figure 2-5). The total acreage of West Access Route 4a and drill sites 4E and 4W would be 2.77 acres. The allowed occupancy period of drill sites 4E and 4W would be the same as allowed for the other exploration drill sites (see Table 2-2). 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 is allowed as part of this alternative.

2.1.5. Alternative 5 – West Access Route 4b and Drill Site Locations 4E and 4W

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 (Figure 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 (Alternative 5) follows a more southerly path than West Access Route 4a and then continues along an alignment similar to 4a northeast through State Trust lands to FR 3153. The total length of West Access Route 4b is approximately 5,495 linear feet of which 738 linear feet would occur on State Trust lands. The total acreage of impacts from West Access Route 4b would be approximately 2.45 acres of which 0.35 acre would occur on State Trust lands. While West Access Route 4b is longer, it crosses terrain that is much flatter. The turn-offs for this route at FR 315 and 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, 4E (0.31 acre) and 4W (0.29 acre). These drill sites would be placed on the north side of the West Access Route 4b alignment (Figure 2-6). Both sites are immediately adjacent to the West Access Route 4b

alignment. The allowed occupancy period of drill sites 4E and 4W would be the same as the other exploration drill sites (see Table 2-2). The total acreage of disturbance of West Access Route 4b and the two drill sites would be 3.05 acres. These features 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 Pre-feasibility 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 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 its Pre-feasibility Plan of Operations that it can access PVT-7 by helicopter if access through nearby private lands is not obtained. Based upon this assertion, consideration was given to whether or not access to a larger group of or all 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 is currently present 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 other than PVT-7 was not proposed by RCM and 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 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 the 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 Trust lands for approximately 1 mile. RCM expressed concerns about the logistics of using this route, including increased travel time to and from the sites, 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 AHC 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 to avoid potential impacts to 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 AHC.

2.3. Mitigation and Monitoring Measures

In response to public and agency comments on the Pre-feasibility Activities and Forest Service review and evaluation of project impacts, the following list of proposed mitigation and monitoring measures was developed to be incorporated into the proposed action. The issues referenced here refer to the issues identified in Section 1.7.

- 1) **Dust Emissions along Access Roads (Issue 1).** To minimize dust, unpaved roads will be watered as necessary during periods of regular use by RCM employees or contractors. If dust problems are noted, a watering schedule will be developed and implemented by RCM, or RCM will propose a dust palliative program for review and approval by the Forest Service; and upon approval will implement that program. In addition, as necessary, RCM will minimize land disturbance during site preparations, cover trucks when hauling any soil, minimize soil track-out by washing or cleaning truck wheels before leaving construction sites, create windbreaks, and revegetate disturbed land not used.
- 2) **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 emissions from Pre-feasibility Activities to peak estimated emission levels. Using readily available data, RCM will document its conformance with this requirement annually to the Forest Service.
- 3) **RCM Vehicle Traffic (Issues 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 the implementation of any ground-disturbing activities, a 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. Future compliance with Clean Water Act (CWA) regulations and permitting requirements will be required of RCM throughout the life of the project. Additionally RCM will be required to demonstrate compliance with State of Arizona Surface and Aquifer water quality standards for the four water sources identified for dust suppression on roads and drilling activities.
- 6) **Spill Prevention, Control and Countermeasure 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 activities.
- 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 Vehicle Safety Pull-out Size (Issues 2, 3 and 4).** RCM will coordinate with the Forest Service prior to the 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) **Rock Riprap and Aggregate Surfacing Material (Issues 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) **Water Quantity (Issue 3).** If RCM wishes to use water from existing well A-06 for dust control or drilling activities, RCM must first prove, through appropriate pump test and monitoring procedures, that the pumping of this well will not affect nearby groundwater-dependent ecosystems.
- 11) **Arizona Hedgehog Cactus (AHC) Conservation Measures (Issues 3 and 4).** A number of mitigation measures have been developed by the Forest Service to further avoid, minimize and mitigate for potential adverse impacts to AHC. Conservation measures incorporated into the Resolution Pre-feasibility Activities Plan of Operations Biological Assessment and Evaluation (August 2009) were refined during formal Section 7 consultation with the USFWS. These conservation measures are summarized below.

- **AHC Conservation Measure 1: Transplant.** Two AHC occur in close proximity to existing roads proposed for improvements as part of the Pre-feasibility Activities. The Forest Service has determined that these plants will need to be moved as a precautionary measure. A biological monitor, the Boyce Thompson Arboretum or other Forest Service-approved entity shall transplant these AHC and any other AHC identified during the resurvey required by AHC Conservation Measure 2 that cannot be avoided during construction of the Pre-feasibility Activities. The transplanted plants will be relocated to the Boyce Thompson Arboretum. RCM shall be responsible for preparing an initial transplant report that documents the origin and new location of each transplanted AHC. Location information provided by RCM to the Forest Service shall include U.S. Geological Survey (USGS) map(s) that depict the origin and transplant location of each transplanted AHC, UTM coordinates of the origin and transplant locations in NAD 83, and a sketch of the transplant location with a photograph of the plant. If an AHC is relocated to the Boyce Thompson Arboretum, the origin location data will be provided in the transplant report but detailed transplant location information, other than indicating its relocation to the Arboretum, will not be required. With the exception of the initial transplant data, RCM shall not be responsible for annual transplant monitoring or submittal of annual monitoring data for any AHC relocated to the Boyce Thompson Arboretum. If more than 20 AHC are impacted as a result of the proposed action (i.e., harmed, transplanted or relocated to the Boyce Thompson Arboretum), the Forest Service will reinitiate consultation with the USFWS.
- **AHC Conservation Measure 2: Resurvey Prior to Construction, Road Repair and Reclamation Activities.** The survey and monitoring protocols included in the EA (April 2009) shall be expanded to include all areas of the proposed Pre-feasibility Activities that contain AHC habitat or potential habitat for AHC. If the area of proposed construction has been surveyed within the past year as part of the required monitoring efforts (Conservation Measure 5), resurvey is not required prior to construction. Resurvey will be completed no later than one month prior to the planned implementation of road improvement activities authorized by the final Pre-feasibility Plan of Operations. In the event that the planned activities would result in potential unanticipated impacts to known AHC or may impact any newly identified AHC, the biological monitor in conjunction with the Forest Service and RCM will evaluate site-specific conditions and modify the proposed improvement activity to avoid impact. If avoidance is not possible, the AHC in question would be transplanted in accordance with AHC Conservation Measure 1 prior to the initiation of Pre-feasibility Activities in the vicinity of that AHC. Road repair refers to unplanned maintenance activities beyond routine maintenance and could include activities required to address natural erosion or other degradation that extends outside the road footprint.
- **AHC Conservation Measure 3: Measures to Protect Plants During Construction.** All AHC detected during resurvey will be clearly delineated with T-post and wire fencing to establish the limits of surface disturbance and protect the microhabitat associated with each

plant. Fencing will be placed as generally depicted in the Pre-feasibility Plan of Operations. In circumstances where additional screening is determined necessary by the biological monitor or the Forest Service, additional screening or protection measures will be implemented. When appropriate, and as determined by the biological monitor and/or Forest Service, concrete jersey barriers or a suitable equivalent will be used where plants are close to proposed road construction activities and additional protection from vehicle traffic is warranted. A jersey barrier shall be placed in a manner that protects the microhabitat of the AHC to the extent practical without causing significant impact to safe vehicle passage.

- **AHC Conservation Measure 4: Coordination with Construction Crews.** Prior to the start of each phase of construction activities, the biological monitor shall inform construction crews of the presence and location of all known AHC proximate to the new, proposed construction activities and the procedures required to avoid adverse impact. The biological monitor shall have the authority to stop work in the event that the monitor believes that an AHC would be affected by the action. Work shall not proceed until one or more of the mitigation measures outlined in AHC Conservation Measures 1 and 3 have been implemented to minimize adverse impacts to AHC to the maximum extent practicable.
- **AHC Conservation Measure 5: Long-Term Monitoring of AHC.** AHC within the Action Area¹⁰ will be monitored every 2 years beginning in 2010 through the period authorized for the Pre-feasibility Activities. Biennial monitoring surveys shall occur in April and May to coincide with the flowering period of AHC. Biennial monitoring will occur along all roads proposed for improvement or used for the Pre-feasibility Activities that occur within AHC habitat or potential habitat. Biennial monitoring efforts will include resurveys of road corridors and drill site buffers within the Action Area following the procedures and protocols used for the original survey effort (WestLand 2009b). During surveys, special attention will be given to the condition of the road and the maintenance activities that are more than minimal that may require work outside the existing disturbance footprint such as erosion rills or larger erosional features that are forming. These areas shall be identified and the Forest Service and RCM shall develop specific actions to correct these conditions. The location of each AHC detected during biennial monitoring surveys shall be recorded on a USGS map or aerial photograph, UTM coordinates of each AHC or cluster of AHC will be recorded in NAD 83, and each AHC will be photographed and appropriately tagged in the field to facilitate long-term monitoring efforts. Data collected for each of the detected AHC during the biennial monitoring surveys will include photographs, measurements of growth activity (tubercles and secondary stem production), measurement of plant size, assessment of plant health, evidence of reproduction and an assessment of site integrity. One final monitoring survey will be required at the end of the authorization period for the proposed Pre-feasibility Activities or at the cessation of Pre-feasibility Activities by RCM, whichever occurs first.

¹⁰ Action Area as defined in the Biological Opinion issued by the USFWS (USFWS 2010).

The biennial monitoring report will be submitted to the Forest Service by RCM on or before December 1 of each monitoring year.

- **AHC Conservation Measure 6: Protection of Downgradient Plants.** Known AHC that occur downhill from the Pre-feasibility Activities will be protected by rock guards when deemed necessary by the biological monitor and the Forest Service. Rock guards will be painted white to minimize potential heat-loading effects. The guards shall be properly pinned to maximize their effectiveness. In the event a guard cannot be properly pinned and the AHC is transplantable,¹¹ the biological monitor would recommend transplant if, in the biological monitor's opinion, the potential risk to the plant from rock fall is greater than the risk of transplant. All transplant activities, data recording and monitoring of transplants will be done in accordance with AHC Conservation Measure 1.
- **AHC Conservation Measure 7: Use of Native Plants in Reclamation.** RCM would include native vegetation common to AHC habitat in reclamation and closure plans for the Pre-feasibility Activities. The Forest Service will develop this seed mix.
- **AHC Conservation Measure 8: Reintroduction of AHC Individuals via Seed/Seedlings.** Seeds and/or seedlings would be obtained from previously transplanted AHC housed at the Boyce Thompson Arboretum and/or the Carlota Copper Project AHC test plot. A propagation and monitoring technique plan could be cooperatively developed between the TNF, USFWS, Boyce Thompson Arboretum, RCM and any other agency and/or individual determined to be appropriate by the TNF and USFWS. Reintroduction areas could include, but may not be limited to, "safe areas" as identified in the Tonto National Forest Conservation Assessment and Plan for AHC. Introductions of seeds and/or seedlings would occur within two years after project initiation. Frequency and duration of propagation and monitoring, reintroduction areas and task responsibilities would be delineated in the propagation and monitoring technique plan developed. Propagations occurring outside the Action Area may require additional Section 7 consultation.
- **AHC Conservation Measure 9: Closure of User-created Roads.** User-created roads are defined as those roads on National Forest System Lands that were not created and are not maintained by the TNF. User-created roads within potential AHC habitat or AHC habitat would be proposed for closure. These user-created roads would then be surveyed by RCM to establish the presence/absence of AHC. Closure would be the responsibility of RCM and accomplished through the construction of a gate, berm or other adequate means as determined by the Forest Service. Road closures would serve to limit/reduce adverse impacts from various activities.

¹¹ Plants may not be transplantable because of poor health, rock or other physical constraint, or the size of the plant.

- 12) **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 shutdown to comply with red-flag conditions unless measures to minimize the risk of fire are employed and agreed to prior to fire seasons.
- 13) **Noxious Weeds (Issues 3 and 4).** All seed mixes to be used in reclamation are required to be certified weed free of seeds listed on the TNF 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.
- 14) **Well and Borehole Abandonment (Issues 3 and 6).** All wells and boreholes will be abandoned in accordance with State of Arizona well abandonment rules (Arizona Administrative Code Rule R12-15-816). Copies of Arizona Well Drill Reports, Well Log Forms and Well Abandonment Completion Reports will be provided to the Forest Service annually.
- 15) **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 the Boulder Campsite to minimize noise impacts to recreational users at that campsite.
- 16) **Visual Screening (Issue 5).** An assessment of the need for screening will be made by the Forest Service following drill setup. RCM will place camouflage netting materials on exploration drill sites OF-1 and OF-3 where they face the 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) **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 from the road and facilitate reclamation efforts upon completion of exploration drilling at this location.
- 18) **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 from the road and facilitate reclamation efforts.
- 19) **Rock Treatment (Issue 5).** Annually RCM will work with the Forest Service to 1) identify any disturbed areas associated with the construction of new roads, improvements to 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) **Nightlight Effects to Recreational Areas (Issue 5).** Lights used for night work and safety at drill sites will be directed or shielded to minimize nightlight effects to recreational areas.
- 21) **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) **Magma Mine Road (Issue 6).** RCM will be responsible for the maintenance and care of Magma Mine Road.
- 24) **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) **Oak Flat Withdrawal Boundary (Issue 7).** RCM will conduct a cadastral survey at proposed 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).** No roads are being proposed under this analysis for changes in designation. Travel management is expected to be complete before completion of the proposed actions of RCM. Those roads whose status is not changed through consideration under travel management will be returned to their original condition (or in the case of user-created roads, obliterated) when they are no longer in use for this project.
- 27) **Archaeological Monitor (Issue 9).** During construction of the road improvements for West Access Route 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) **Outfall Structure (Issue 9).** A cultural resources site is located adjacent to drill site 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) **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) **Early 1920s 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 2-13 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.

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Table 2-13. Comparison of Alternatives.

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a and Drill Sites 4E and 4W	Alternative 5 West Access Route 4b and Drill Sites 4E and 4W
Issue 1 Air Quality	The no action alternative would result in no development of new drill sites on National Forest System Lands and all drilling activities would be restricted to State Trust and private lands. In the short term, drilling activities may equal peak activity levels outlined in the 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 diminish, 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 = 43.35 PM _{2.5} = 4.46	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 1.41 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 and drill sites in tons are: Combustion Emissions: CO = 0.349 NO _x = 1.604 PM ₁₀ = 0.114 PM _{2.5} = 0.114 SO _x = 0.103 VOC = 0.129 Fugitive Emissions: PM ₁₀ = 0.674 PM _{2.5} = 0.067	Overall travel distance from the Superior East Plant Site to RES-13 would be 1.22 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 and drill sites in tons are: Combustion Emissions: CO = 0.349 NO _x = 1.604 PM ₁₀ = 0.114 PM _{2.5} = 0.114 SO _x = 0.103 VOC = 0.129 Fugitive Emissions: PM ₁₀ = 0.681 PM _{2.5} = 0.068
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.	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 43.70 acres. 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 watercourses in the vicinity of the PAA are not expected to be adversely impacted.	North OF-2 will impact 0.25 acre in the PAA. The net increase in disturbance after eliminating OF-2 would be 0.03 acre. Effects of mitigation would be the same as the proposed action.	A 2.77-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. 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. Effects of mitigation would be the same as the proposed action.	A 3.05-acre increase in overall surface disturbance in the PAA; 4b is longer but crosses terrain that is much flatter than 4a; gating this road to limit public access would reduce mechanical erosion from general recreational vehicle travel. This alternative would also reduce vehicle trips on roads within the Oak Flat Withdrawal Area, reducing the rate of mechanical erosion on those roads. Effects of mitigation would be the same as the proposed action.

Table 2-13. Comparison of Alternatives.

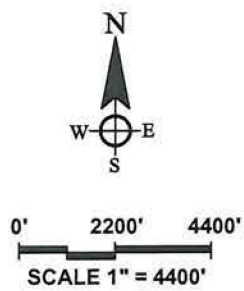
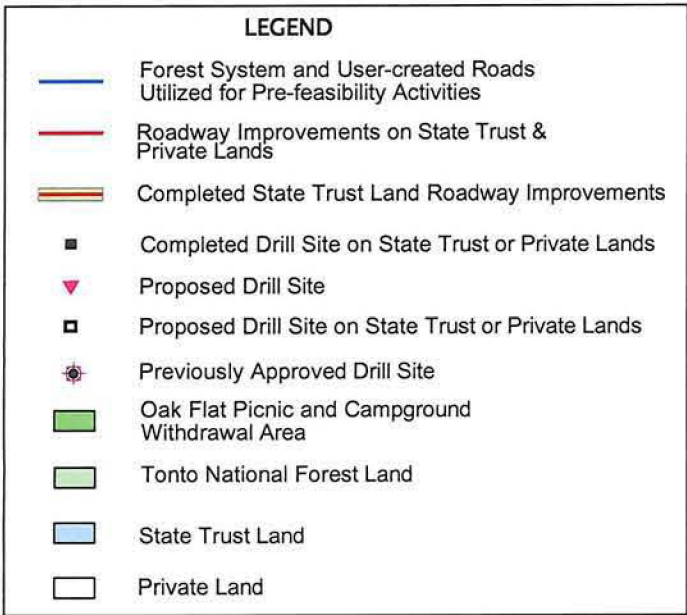
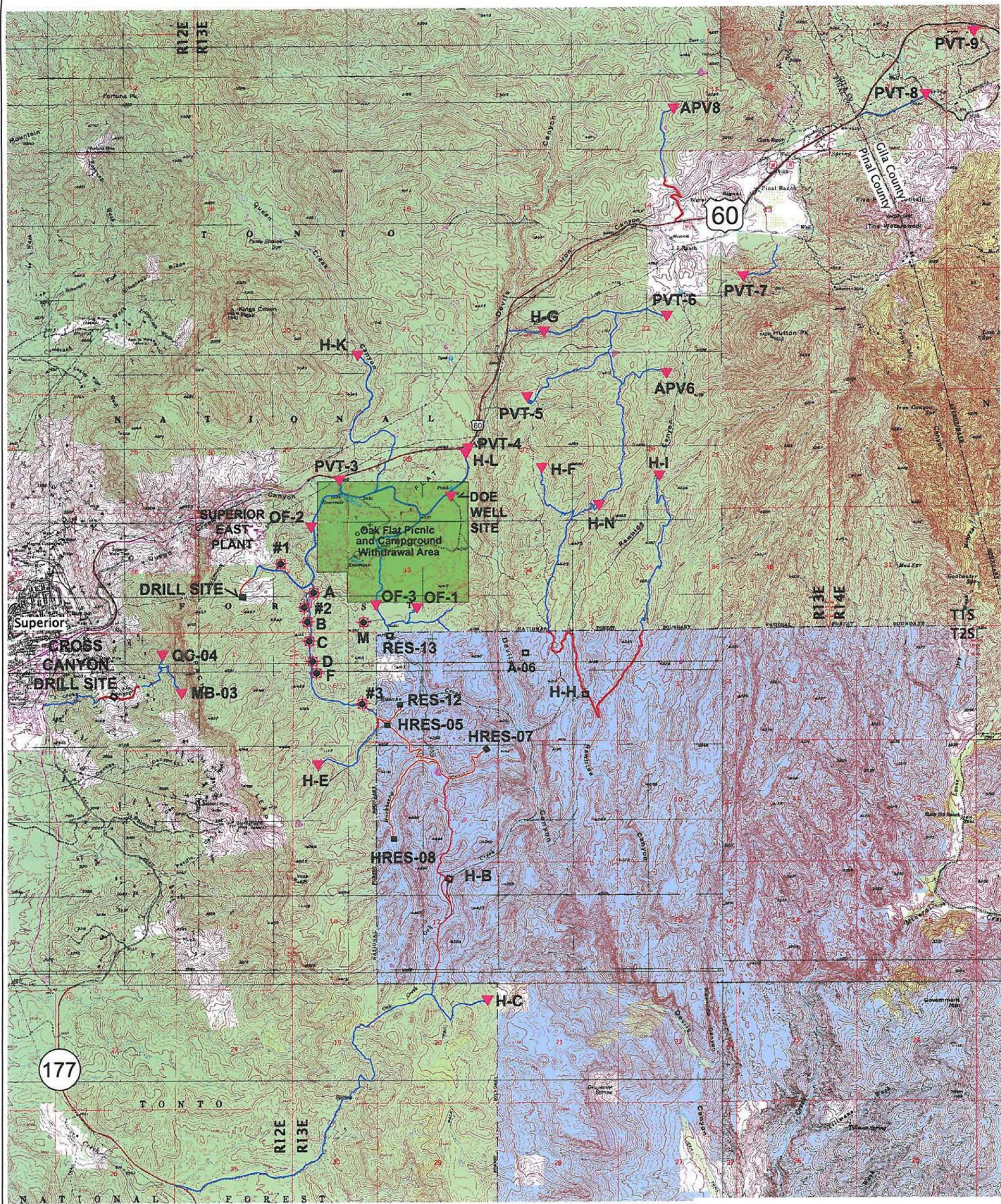
Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a and Drill Sites 4E and 4W	Alternative 5 West Access Route 4b and Drill Sites 4E and 4W
Issue 3 Wildlife	<p>There would be no new surface-disturbing activities. Closure and reclamation of existing previously authorized drill sites on National Forest System Lands would commence in accordance with the previously authorized Plan of 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 34.90 acres of previously undisturbed National Forest System Lands and 8.8 acres on State Trust and privately owned lands would be impacted, with the majority of the impact area immediately adjacent to previously disturbed areas.</p> <p>Approximately 33.32 acres of interior chaparral, 0.39 acre of Madrean evergreen woodland and 9.99 acres of Sonoran desertscrub habitat would be affected, primarily along 16.67 miles of existing roadways on National Forest System Lands and 5.33 miles of existing roads on State Trust (4.28 miles) and privately held lands (1.05 miles).</p> <p>Pre-feasibility Activities are not expected to result in detectable population level impacts to MIS or other existing forest-wide MIS trends.</p> <p>Any unintended take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.</p>	<p>This alternative component of the Pre-feasibility Activities would increase the acreage of interior chaparral habitat impacted by 0.03 acre over the proposed action. Impacts to MIS and Migratory Bird Treaty Act (MBTA) species will be similar to the proposed action.</p>	<p>This route and its associated drill sites would increase impacts to interior chaparral habitats in the vicinity of the PAA by 2.42 acres of National Forest System Lands and 0.35 acre of impact on State Trust land.</p> <p>It would create approximately 0.85 mile of new road between FR 315 and drill site RES-13; a total of 0.72 mile of new road would be constructed on National Forest System Lands.</p> <p>Impacts to MBTA and MIS species would be similar to the proposed action.</p>	<p>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 2.70 acres and 0.35 acre of impact on State Trust land.</p> <p>It would create approximately 1.04 miles of new road between FR 315 and drill site RES-13; a total of 0.90 mile of this new road would be constructed on National Forest System Lands.</p> <p>Impacts to MBTA and MIS species would be similar to the proposed action.</p>
Issue 4 Endangered Species and Arizona Hedgehog Cactus	<p>The no action alternative would not have any direct or indirect effect to AHC.</p>	<p>The Forest Service has determined that the proposed action, the implementation of the Pre-feasibility Activities, may affect, is likely to adversely affect the AHC and they have concluded Section 7 consultation with the USFWS.</p> <p>Approximately 30.27 acres of AHC or potential AHC habitat would be disturbed by Pre-feasibility Activities.</p> <p>Monitoring activities and other mitigation measures developed during consultation will avoid and minimize impacts to AHC.</p>	<p>Survey did not detect any AHC on or in the vicinity of North OF-2 and implementation of this alternative was considered during consultation with the USFWS and would result in 0.03 acre of additional impact to potential AHC habitat.</p>	<p>Survey did not detect any AHC 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 effect on AHC. This alternative was considered during Section 7 consultation with the USFWS and would result in 2.77 acres of additional impacts to potential AHC habitat.</p>	<p>Survey did not detect any AHC 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 effect on AHC. This alternative was considered during Section 7 consultation with the USFWS and would result in 3.05 acres of additional impacts to potential AHC habitat.</p>
Issue 5 Recreational Activities in and Around Oak Flat General Considerations	<p>No new drill sites would be developed on National Forest System Lands. All drill activities would be restricted to State Trust and private lands. Drill traffic would be limited to the use of Forest Roads to access private and State Trust 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 the Oak Flat Campground by routing drill site traffic outside the Oak Flat Withdrawal Area.</p>	<p>Would reduce impacts to recreational users of the Oak Flat Campground by routing drill site traffic outside the Oak Flat Withdrawal Area.</p>
Issue 5 Recreational Activities in and Around Oak Flat Noise Effects	<p>Under this alternative, noise levels in the Oak Flat Campground 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 30 dBA to 44 dBA at a background noise level of 40 dBA.</p>	<p>Impacts to recreational users of the 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 the 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 recreational users of the 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 the 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 2-13. Comparison of Alternatives.

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a and Drill Sites 4E and 4W	Alternative 5 West Access Route 4b and Drill Sites 4E and 4W
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 sites 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 the 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 Trust 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 Trust 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 Trust 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 the 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, M and RES-13 on State Trust land would be accessed via Forest Roads in the 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 the 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, M and RES-13. Short-term traffic impacts associated with the construction of tunnel characterization boreholes PVT-3 and PVT-4 and the deep groundwater testing and monitoring well at H-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.	Impacts would be the same as the West Access Route 4a alternative.
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 those associated with the maximum traffic generated within the Oak Flat Campground by the proposed action. The only traffic generated within the 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 Trust 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 Pre-feasibility Activities would be substantially less if West Access Route 4a were constructed. The only traffic use in the 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 the 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.
Issue 7 Conflicts with the Oak Flat Withdrawal Area	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.	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. 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.	Impacts would be the same as the proposed action.	Impacts would be the same as the proposed action.	Impacts would be the same as the proposed action.

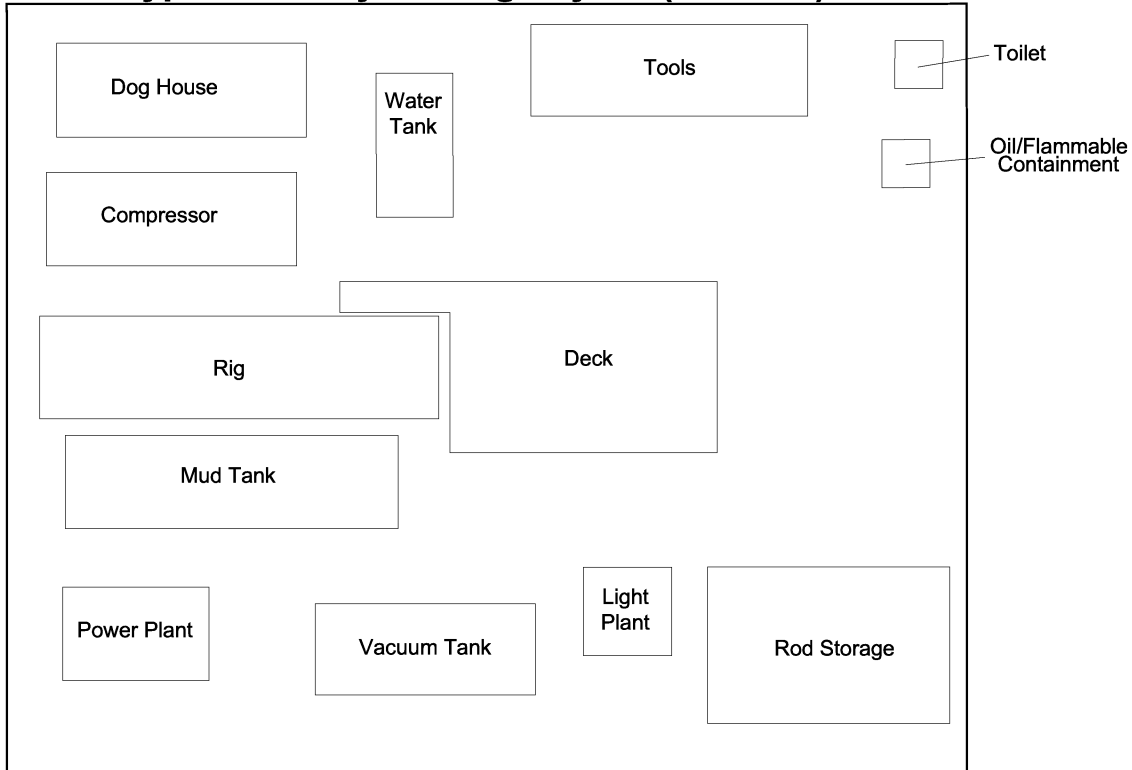
Table 2-13. Comparison of Alternatives.

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 North OF-2	Alternative 4 West Access Route 4a and Drill Sites 4E and 4W	Alternative 5 West Access Route 4b and Drill Sites 4E and 4W
Issue 8 Travel Management	There would be no change in current use patterns or designations for the existing roads within National Forest System Lands. If a future closure determination is made for any of the roads through the Forest Service’s travel management planning process, the Forest Service would be responsible.	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 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.	Impacts would be the same as the proposed action.	Impacts would be the same as the proposed action.	Impacts would be the same as the proposed action.
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. Although no traditional religious practitioners have indicated that plants of traditional importance are collected specifically from the PAA, it is understood that Apache regularly gather plant materials, notably acorns, from Oak Flat. The proposed action is not expected to adversely impact the ability of traditional peoples to harvest acorns or other resources from this area.	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.
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.	Based on a fairly long history of contact, consultation and archaeological survey in the area by Forest Service personnel and contracted consultants, it would seem apparent that there are sites significant to the Apache people for their traditional economic and religious use. The “discrete, narrowly delineated location[s]” (EO 13007 (1)(b)(iii)) of these sacred sites, however, have yet to be identified. Native American groups will not be precluded from using the Oak Flat Withdrawal Area and surrounding National Forest System Lands while the proposed Pre-feasibility Activities or any alternatives considered in this EA are underway.			
Cost Comparisons	RCM would be responsible for completion of closure and reclamation activities in accordance with existing authorizations.	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 5-year drilling period. Cost estimates for rock staining, boulder salvage and implementation of the other mitigation measures are not available at this time.	This alternative is not expected to substantially change the implementation costs from the proposed action.	This alternative would reduce the cost of implementation of mitigation measures by removing the requirement for a traffic monitor at the Oak Flat Campground. The estimated cost to construct West Access Route 4a is \$145,000. The cost for reclamation using standard Bureau of Land Management calculation factors is estimated to be \$11,000. Other costs for mitigation measures would be similar to the proposed action.	This alternative would reduce the cost of implementation of mitigation measures by removing the requirement for a traffic monitor at the Oak Flat Campground. 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. Other costs for mitigation measures would be similar to the proposed action.

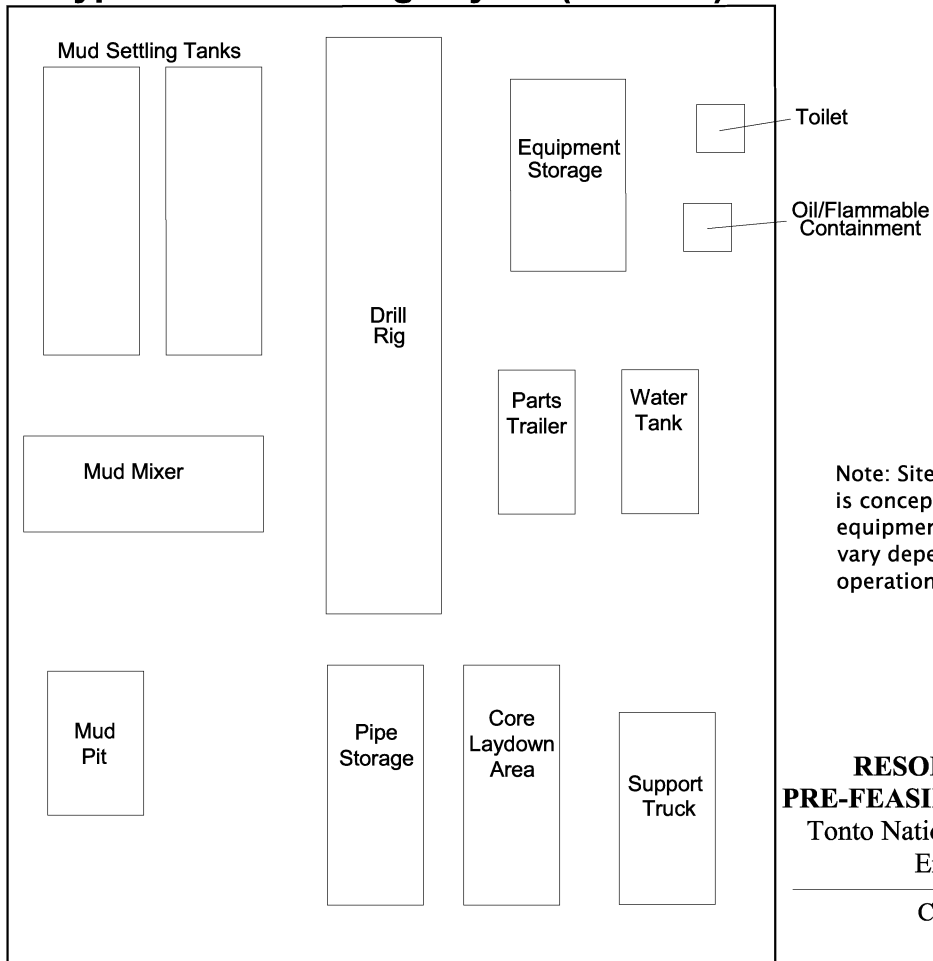


**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment
Proposed Pre-feasibility Activities Overview
Figure 2-1

Typical Rotary Drilling Layout (100'x80')



Typical Core Drilling Layout (80'x100')

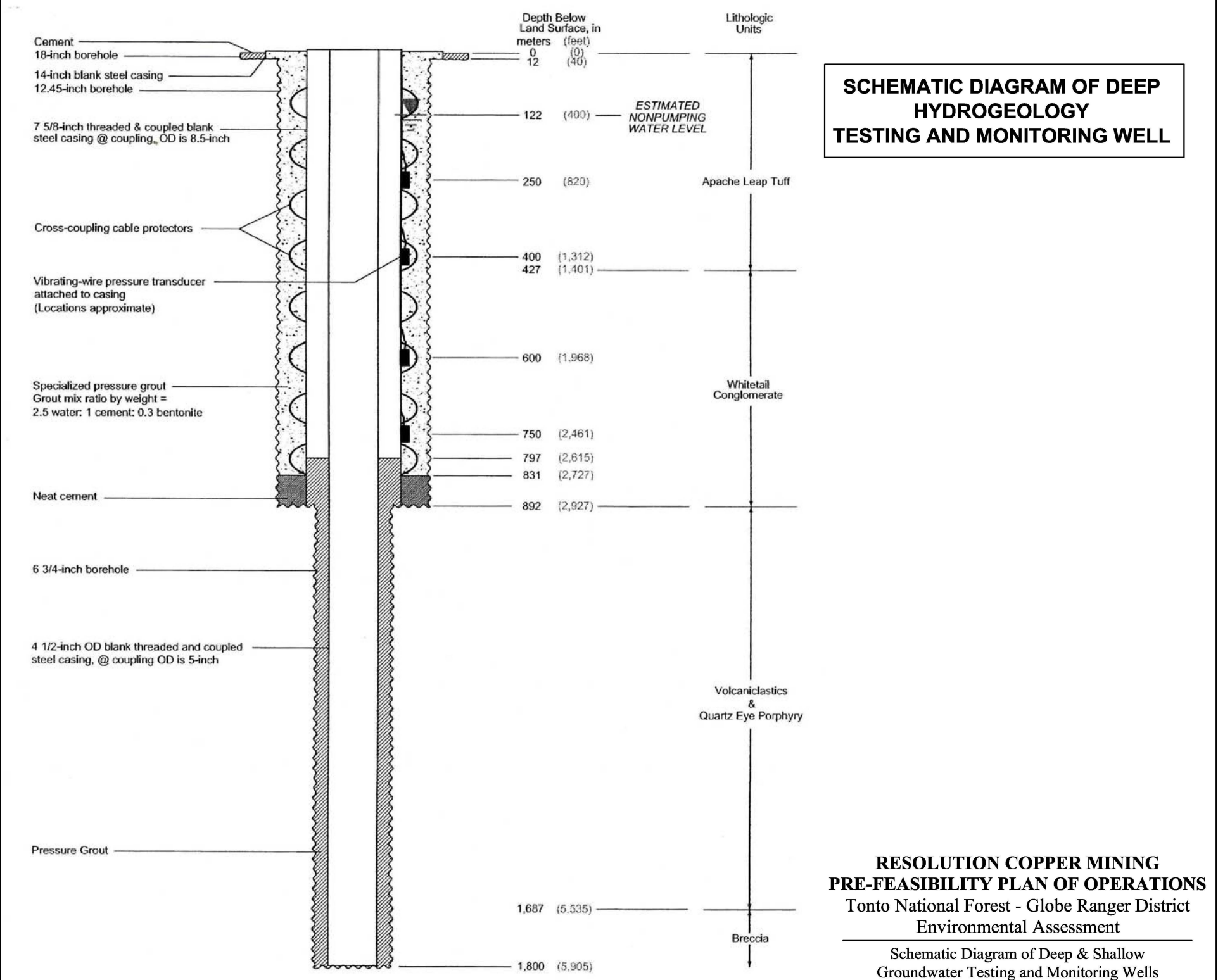
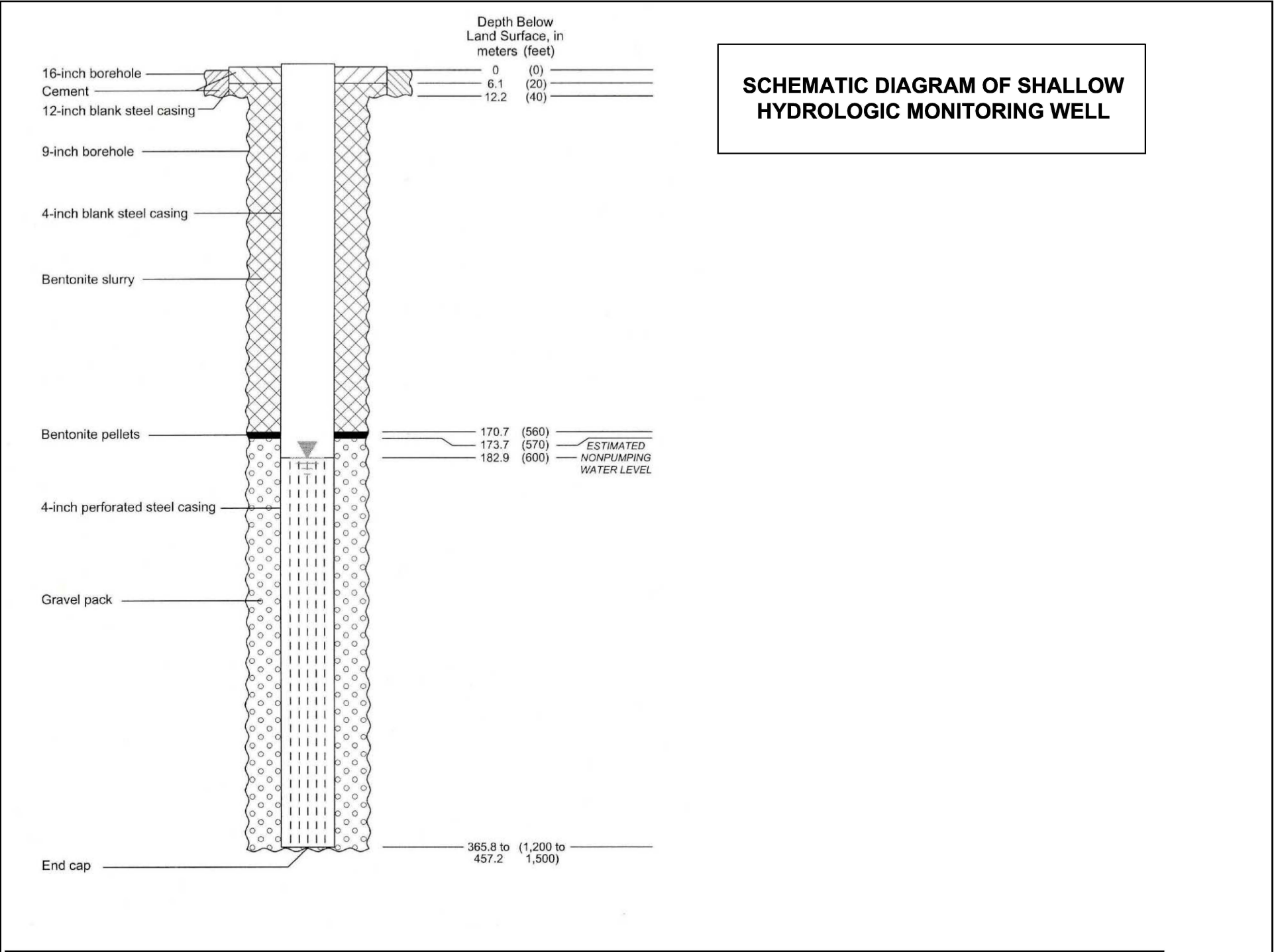


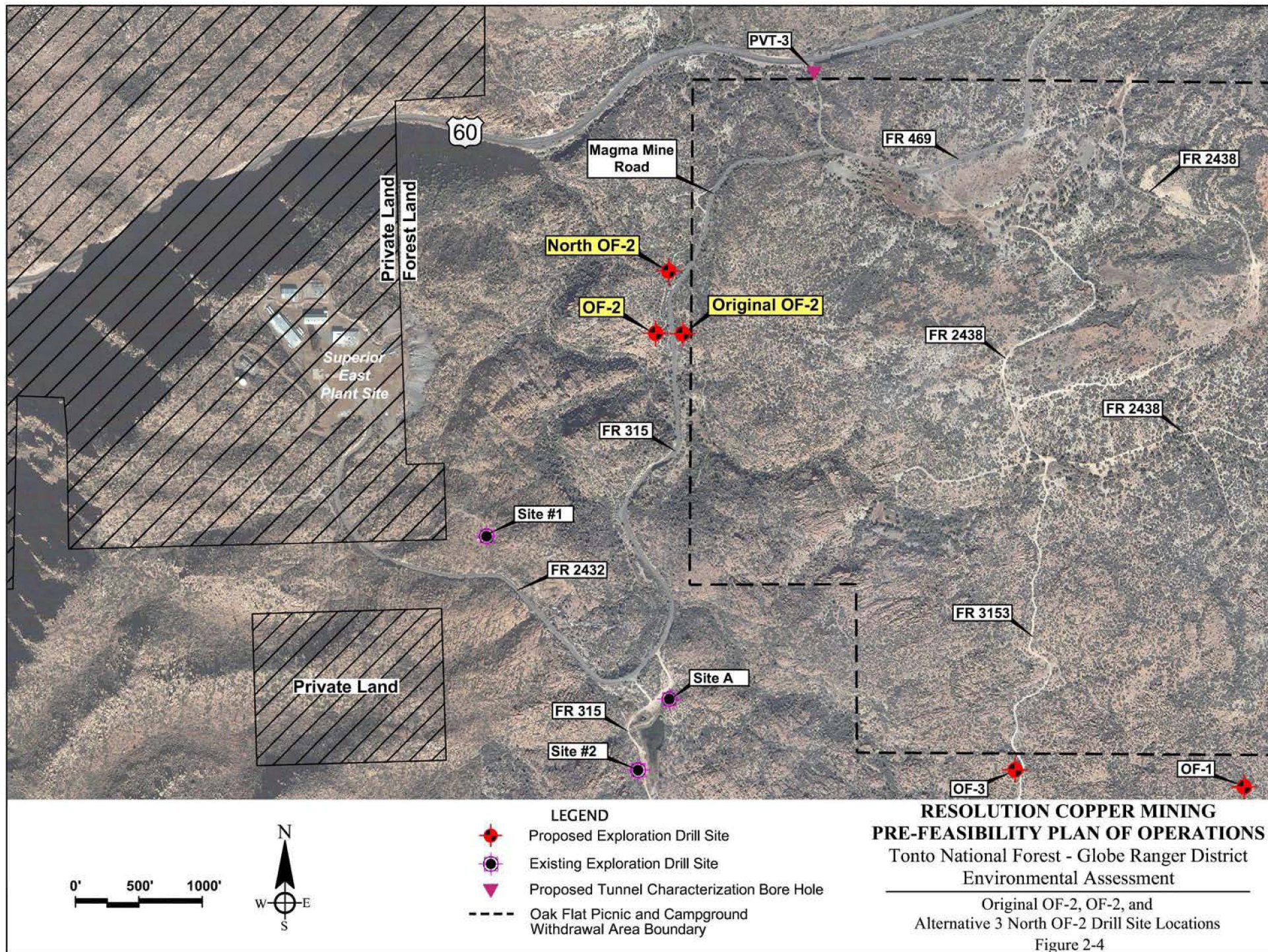
Note: Site configuration and equipment layout is conceptual. The actual site configuration and equipment layout used at each drill site will vary depending on site specific constraints and operational considerations.

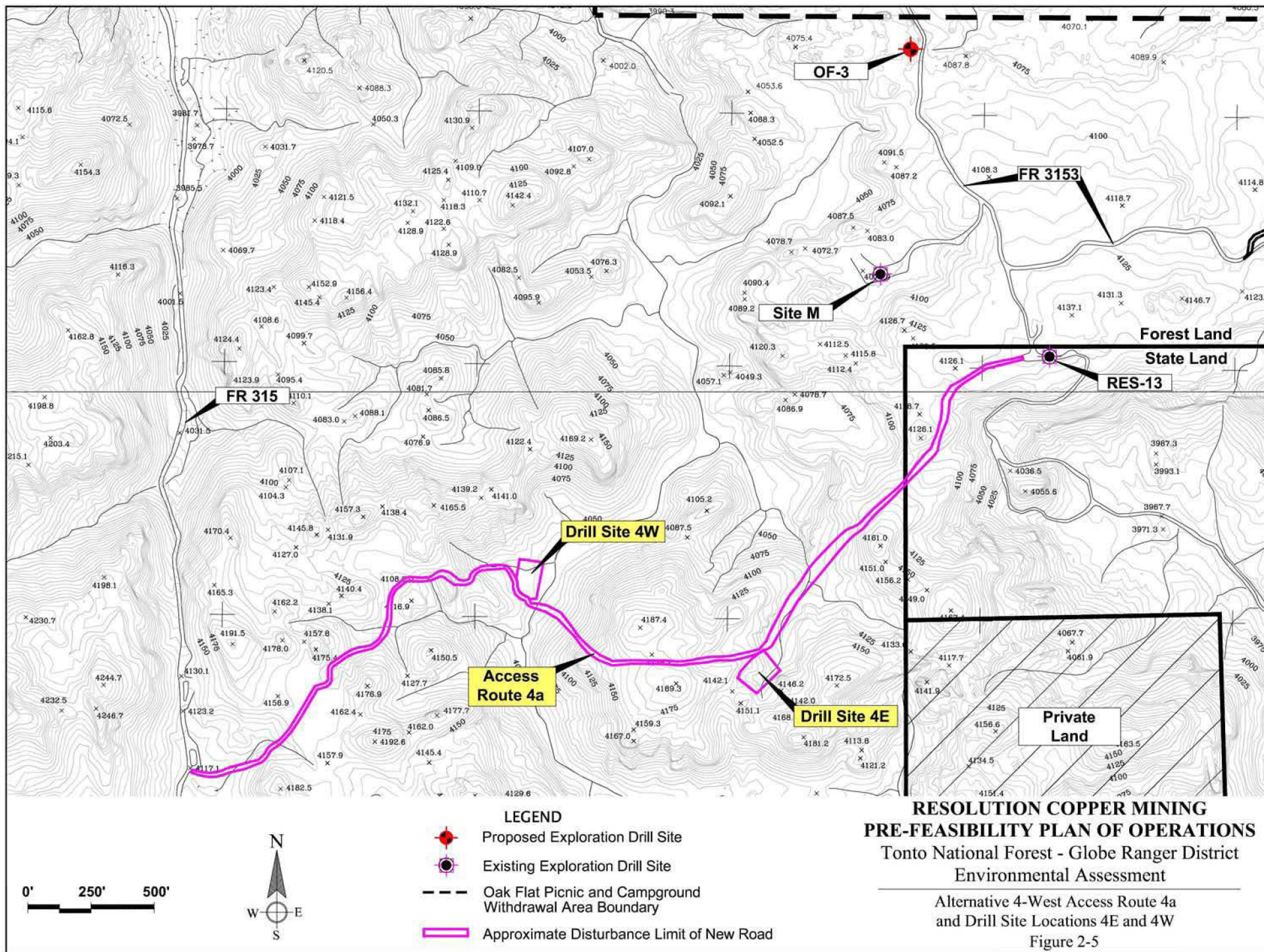
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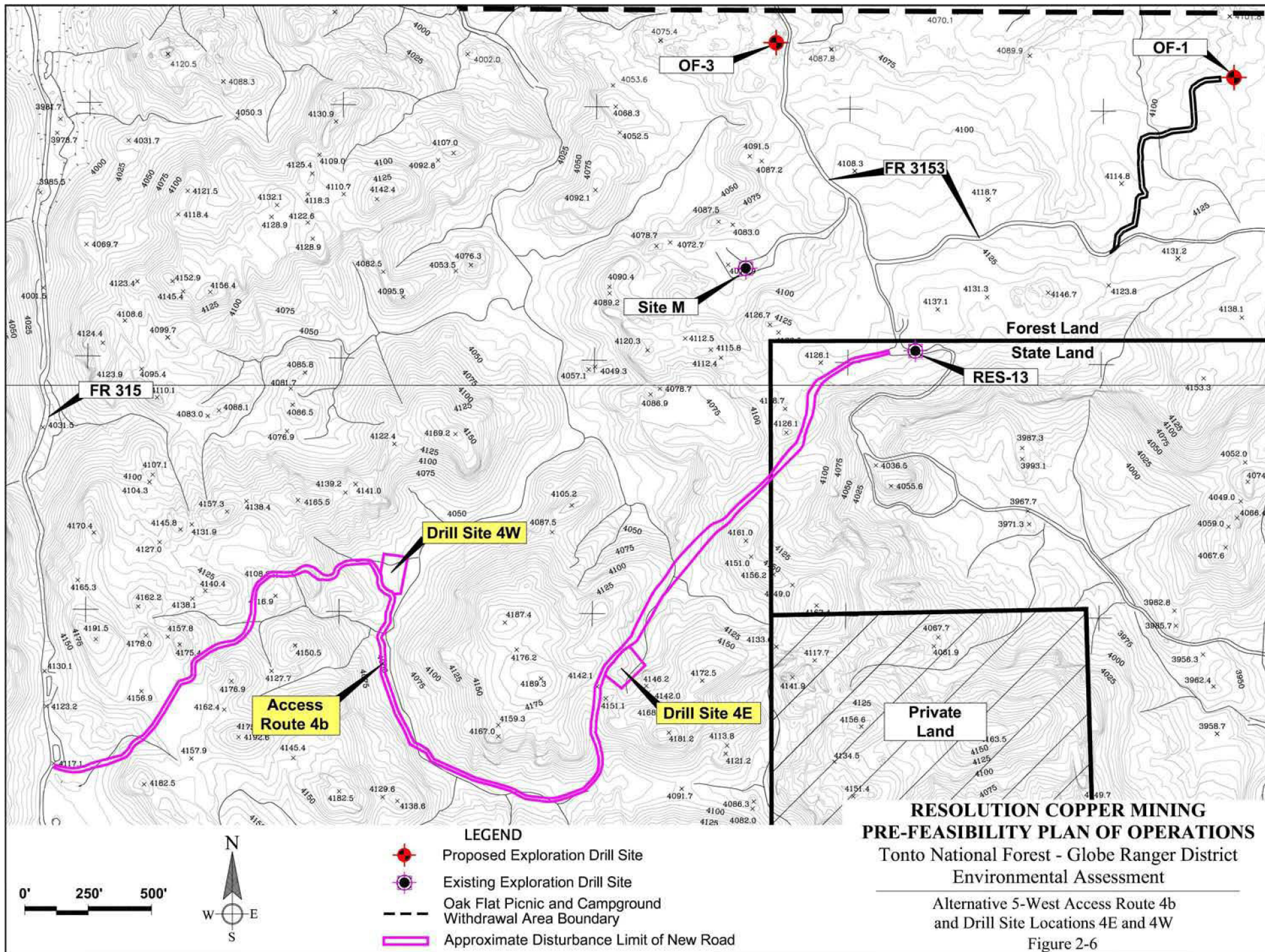
Conceptual Drill Site Layout

Figure 2-2









3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The first section of this chapter establishes baseline conditions 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 an analysis of the cumulative effects for each alternative is presented.

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 in 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 Tecle and Yitayew (1990).

The far eastern portions of the PAA occur within the Miami Planning Area, which was designated by the Environmental Protection Agency (EPA) as a Nonattainment Area for PM₁₀.¹² On March 28, 2007, the

¹² The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (NAAQS) for certain pollutants. To date, the 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), sulphur dioxide and lead. Airsheds with ambient concentrations of these pollutants below the standards set by the EPA are considered to be in "attainment" of the NAAQS. Areas with ambient concentrations above the standards are designated by the EPA as Nonattainment Areas.

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 the 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 the EPA approved the plan in January 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 the 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 Clean Air Act 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 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. The 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 are 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 are presented in Table 3-2. The average annual natural and annual average 2000–2004 baseline Standard Visual Ranges are 163 miles and 89 miles, respectively. These visibility data reflect 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 drilling activities would be restricted to State Trust 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 the maximum emissions scenario. As the need for new drilling targets on State Trust 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 Trust, 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	N/A
2004	1	N/A
2005	3	3
2006	5	4
2007	5	4
2008	6	5

Air Quality Effects of Mitigation Implemented Under the No Action Alternative

The 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 the 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 ongoing monitoring were considered. Air contaminants analyzed include carbon monoxide (CO), NO_x, SO₂, particulate matter in the form of PM₁₀ and 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 the following operational assumptions:

- Road and drill site improvements will occur for a maximum 5-month duration for the peak year emission estimate.
- 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 boreholes during the first year.

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

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

Activity Type	Days of Operation	Combustion Emissions in Tons for the Assumed 5-month Construction Period Each Year						Fugitive Emissions	
		CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	PM ₁₀	PM _{2.5}
		tons	tons	tons	tons	tons	tons	tons	tons
Exploration Boreholes	1,825	17.4	77.8	5.4	5.1	5.1	6.4	19.4	2.0
Deep Hydrogeologic 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	1.6	0.2
Deep Hydrogeologic 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	43.4	4.5

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 are 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 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 (Figures 3-1 and 3-2). Under the peak emissions scenario, detectable increases in haze within the nearest Class I airsheds are unlikely (Oliver and Fairbridge 1987). 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 the 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

The 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 the 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. Operation 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 0.85 mile (2.13 acres) of new drill road on National Forest System Lands and State Trust land and two drill sites totaling 0.64 acre on National

Forest System Lands. Construction of the road and drill sites is expected to take approximately 8 weeks to complete and would result in additional generation of combustion and fugitive emissions. The expected increase in combustion and fugitive emissions from Alternative 4 is summarized in Table 3-5.

Table 3-5. Air Pollution Emissions Associated with West Access Route 4a and Drill Sites 4E and 4W. Calculated values assume 2 months of road improvement construction required to complete Route 4a in addition to the 5 months of road improvement construction associated with the proposed action. Calculations are performed in accordance with the methods described in the Air Emissions Inventory Development for Resolution Copper Mining Pre-feasibility Activities Plan of Operations.

Alternative Route	Increased Combustion Emissions in Tons for the Estimated 8-week Construction Period						Increased Fugitive Emissions (Tons for the 8-week Construction Period)	
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	PM ₁₀	PM _{2.5}
West Access Route 4a	0.349	1.604	0.114	0.114	0.103	0.129	0.674	0.067
West Access Route 4a (percent increase over proposed action)	0.82%	0.84%	0.85%	0.91%	0.83%	0.82%	1.56%	1.51%

Impacts during operation of the two drill sites that would be located along West Access Route 4a and the use of this route to access drill sites M, OF-1, OF-3 and the RES-13 drill site on State Trust lands are 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 1.41 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 the 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 2.37 miles of travel; 0.75 mile of paved road and 1.62 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 79.6 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 the 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	90.1	101.4
Total Miles	211.7	132.1	143.4

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 1.04 miles (2.45 acres) of new road on National Forest System Lands and State Trust lands and two new drill sites totaling 0.60 acre on National Forest System Lands. Construction of the new road and drill sites is expected to take approximately 8 weeks to complete and would result in additional generation of combustion and fugitive emissions. The expected increase in combustion and fugitive emissions from the implementation of Alternative 5 is summarized in Table 3-7.

Table 3-7. Air Pollution Emissions Associated with West Access Route 4b and Drill Sites 4E and 4W. Calculated values assume 2 months of road improvement construction required to complete Route 4b in addition to the 5 months of road improvement construction associated with the proposed action. Calculations are performed in accordance with the methods described in the Air Emissions Inventory Development for Resolution Copper Mining Pre-feasibility Activities Plan of Operations.

Alternative Route	Increased Combustion Emissions in Tons for the Estimated 8-week Construction Period						Increased Fugitive Emissions (Tons for the 8-week Construction Period)	
	CO	NO _x	PM ₁₀	PM _{2.5}	SO _x	VOC	PM ₁₀	PM _{2.5}
West Access Route 4b	0.349	1.604	0.114	0.114	0.103	0.129	0.681	0.068
West Access Route 4b (percent increase over proposed action)	0.82%	0.84%	0.85%	0.91%	0.83%	0.82%	1.57%	1.53%

Impacts to air quality during operation of the two drill sites that would be located along West Access Route 4b and the use of this route to access drill sites M, OF-1, OF-3 and the RES-13 drill site on State Trust lands are not expected to materially differ from the proposed action. Traveling from the Superior East Plant Site to RES-13 via West Access Route 4b would require 2.56 miles of travel, 1.22 miles shorter than the proposed action and 0.19 mile longer than West Access Route 4a. West Access Route 4b would utilize 0.75 mile of paved road and 1.81 miles of dirt road.

West Access Route 4b would result in approximately 68.3 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

Characteristics of the 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 depths 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, although 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 of the 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 (2008) has designated Queen Creek as an impaired stream for recorded exceedances of dissolved copper.¹³

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 separates 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 Trust 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 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.

¹³ 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 2008).

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

The 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

The total area of construction activity, including existing road surfaces, is approximately 80 acres. Proposed new construction disturbance would occur on a total of 43.70 acres, of which 34.90 acres are on National Forest System Lands, 6.14 acres are on State Trust land, and 2.66 acres are on privately held lands.

Much of the PAA is underlain by rock and would not be erodible; however, the overall footprint of erodible surface within the vicinity of the PAA would be increased. RCM has included BMPs in its proposal, which would localize and minimize impacts. Roads and drill sites would be reclaimed when no longer needed and required revegetation performance standards would conform with Forest Plan ground cover standards and guidelines. Ephemeral drainage systems and the few intermittent or perennial watercourses 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 the distance between the PAA and any potential receiving water body would eliminate the potential for sedimentation to reach those water bodies.

Erosion and Sedimentation Effects of Mitigation Implemented Under the Proposed Action

Ensuring implementation of the 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

The surface disturbance of North OF-2 is 0.25 acre and selection of this alternative would result in an approximately 0.03-acre increase in overall surface disturbance in the PAA over the proposed action. The existing surface disturbance from recreational use of 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 the West Access Route 4a Alternative

A 2.77-acre increase in overall surface disturbance in the PAA would occur from the construction of West Access Route 4a and new drill sites 4E and 4W. This access road would cross a small ephemeral drainage. Gating this road would limit its use and reduce mechanical erosion from general recreational vehicle travel. This alternative would also reduce 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 the 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 3.05-acre increase in overall surface disturbance in the PAA would occur from the construction of West Access Route 4b and new drill sites 4E and 4W. 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 crosses terrain that is much flatter. With the 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 1982). The majority of the PAA lies within areas classified as interior chaparral, with a 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.

Acreage of Desertscrub and Chaparral/Pinyon Juniper Woodland vegetation type and trends in 1985 and 2005 on the Tonto National Forest is provided in Table 3-8 (TNF 2005).

Table 3-8. Desertscrub and Chaparral/Pinyon-Juniper Woodland Vegetation Type Acreage and Trend on TNF. (TNF 2005)

Trend Direction	1985 Acres	Current Condition 2005 Acres	Trend
Desertscrub Trend Forest-wide			
Declining	no data	212,275	
Stable	909,418	463,336	
Upward	no data	221,160	
Desertscrub Total	909,418	896,771	-1.4% (Downward/Static)
Chaparral/Pinyon-Juniper Trend Forest-wide			
Declining	no data	102,030	
Stable	1,403,817	818,246	
Upward	no data	493,710	
Chaparral/Pinyon Juniper Total	1,403,817	1,413,986	+ 0.8% (Static)

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 hydriparian and mesoriparian communities are patchily distributed along the perennial and intermittent drainages such as Devils Canyon and Queen Creek (RCM 2008).¹⁴ Relatively isolated patches of xeriparian habitat are found along ephemeral drainages that traverse the PAA, and mesoriparian habitat associated with reservoirs constructed within ephemeral drainages is 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 livestock grazing. This is most evident along existing roadways, level areas adjacent to roadways and around livestock water 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 of 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 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 portion of the PAA is 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 fire-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*).

¹⁴ The principal aquifers in the vicinity of the Pre-feasibility Activities include: 1) a deep fractured-rock aquifer occurring in mineralized rocks hosting the ore body; 2) the Apache Leap tuff fractured-rock aquifer which extends across the Devils Canyon and upper Queen Creek drainage basins east of Apache Leap; 3) a basin-fill deposits aquifer which extends west from the Concentrator Fault in the Superior area; and 4) a shallow alluvial aquifer of limited extent that occurs in the Top of the World area. The hydrogeologic system that underlies much of the PAA consists of the deep aquifer overlain by the Apache Leap tuff aquifer—these two aquifers are separated from each other physically and hydraulically by an aquitard composed of low-permeability geologic units ranging in thickness from several hundred to more than 3,000 feet. Surface water features, such as seeps, springs and intermittent or flowing reaches, are all supported by surficial or the shallowest aquifers, including principally the Apache Leap tuff aquifer and localized alluvial aquifers (RCM 2008).

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 2004b). White-tailed deer (*Odocoileus virginianus couesi*) is the dominant ungulate species in the PAA. Other mammals known or expected to be in the area are ungulates, including 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 the 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).

Forest Plan direction for Management Indicator Species is to maintain or improve occupied habitat. Forest-wide trends of all MIS have been assessed and are reported in the Forest-wide Status Report for Management Indicator Species (TNF 2005). The background information and conclusions of this report are incorporated by reference. Ten MIS are known to occur in or near the PAA, as shown in Table 3-9, which lists the indicator group, reason for selection, 1985 and 2005 acres, percent change, and habitat trend for each of the 10 MIS identified for evaluation (WestLand 2010a).

Determination of the effects of the Pre-feasibility Activities to migratory birds was accomplished by considering: 1) effects to Priority Species of Concern (PSCs) listed by Arizona Partners in Flight (APIF), 2) effects to Important Bird Areas (IBAs), and 3) effects to important over-wintering areas. APIF identified PSCs by associated vegetation type. Eleven PSCs are listed for the vegetation types found in the vicinity of the PAA (Table 3-10). The potential impacts associated with the Pre-feasibility Activities were evaluated for each species based on published distribution and habitat preferences.

The closest designated Audubon Society IBA to the PAA is located at the Boyce Thompson Arboretum, approximately 3 miles west of Superior and almost 4 miles from Cross Canyon, the nearest part of the PAA. The Boyce Thompson Arboretum IBA includes low-elevation riparian habitat supported by Queen and Arnett creeks. The closest important overwintering site on the TNF is Roosevelt Lake (F. Wong pers. comm. to K. Harbour).

Table 3-9. Tonto National Forest Management Indicator Species for Interior Chaparral/Pinyon-juniper Woodland Vegetation Type. The Forest-wide Status Report for Management Indicator Species (TNF 2005) does not recognize Madrean Evergreen Woodland and considers the trend for Chaparral and Pinyon Juniper collectively; therefore, MIS for Chaparral and MIS for Pinyon-juniper vegetation type known to occur in the PAA were used for this analysis.

Species	Indicator Group	Reason for Selection	1985 Acres	2005 Acres	Trend
Ash-throated Flycatcher (<i>Myiarchus cinerascens</i>)	Pinyon-juniper, ground cover	Known to be present in PAA in habitat other than the Pinyon Juniper type	1,403,817	1,413,986	Static
Gray Vireo (<i>Vireo vicinior</i>)	Pinyon-juniper, tree density	Known to be present in PAA in habitat other than the Pinyon Juniper type	1,403,817	1,413,986	Static
Townsend's Solitaire (<i>Myadestes townsendi</i>)	Pinyon-juniper, juniper berry production	Known to be present in PAA in habitat other than the Pinyon Juniper type	1,403,817	1,413,986	Static
Juniper (Plain) Titmouse (<i>Baeolophus ridgwayi</i>)	Pinyon-juniper, general woodland conditions	Known to be present in PAA in habitat other than the Pinyon Juniper type	1,403,817	1,413,986	Static
Northern (Common) Flicker (<i>Colaptes auratus</i>)	Pinyon-juniper, snags	Known to be present in PAA in habitat other than the Pinyon Juniper type	1,403,817	1,413,986	Static
Spotted Towhee (<i>Pipilo maculatus</i>)	Pinyon-juniper, successional stages	Known to be present in PAA in habitat other than the Pinyon Juniper type	1,403,817	1,413,986	Static
Spotted Towhee (<i>Pipilo maculatus</i>)	Chaparral, shrub density	Known to be present in PAA in chaparral habitat	1,403,817	1,413,986	Static
Black-chinned Sparrow (<i>Spizella atrogularis</i>)	Chaparral, shrub diversity	Known to be present in PAA in chaparral habitat	1,403,817	1,413,986	Static
Black-throated Sparrow (<i>Amphispiza bilineata</i>)	Desertscrub, shrub diversity	Known to be present in PAA, desertscrub habitat in area west of Apache Leap	909,418	896,771	Downward/Static
Canyon Towhee (<i>Pipilo fuscus</i>)	Desertscrub, ground cover	Known to be present in PAA, desertscrub habitat in area west of Apache Leap	909,418	896,771	Downward/Static

Table 3-10. Priority Species of Concern and USFWS Conservation Species of Concern Considered in the MBTA Species Analysis. Habitat and components are based largely on Brown's (1994) biotic community types and the Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005).

Species	TNF Vegetation Type
Red-naped Sapsucker	Mixed conifer woodland. Present in Madrean evergreen woodland.
Golden Eagle	Pinyon pine – juniper woodland, Madrean evergreen woodland, Arizona Upland.
Gray Flycatcher	Pinyon pine – juniper woodland. Present in Madrean evergreen woodland.
Gray Vireo	Pinyon pine – juniper woodland. Present in interior chaparral and Madrean evergreen woodland.
Juniper Titmouse	Pinyon pine – juniper woodland. Present in Madrean evergreen woodland.
Peregrine Falcon*	Pinyon pine – juniper woodland. Present in Arizona Upland.
Black-throated Gray Warbler	Madrean evergreen woodland.
Black-chinned Sparrow	Interior chaparral.
Bendire's Thrasher	Arizona Upland, Sonoran desertscrub.
Canyon Towhee	Arizona Upland, Sonoran desertscrub.
Costa's Hummingbird*	Arizona Upland, Sonoran desertscrub.
Elf Owl	Arizona Upland, Sonoran desertscrub.
Gila Woodpecker	Arizona Upland, Sonoran desertscrub.
Gilded Flicker	Arizona Upland, Sonoran desertscrub.
Phainopepla*	Arizona Upland, Sonoran desertscrub.
Prairie Falcon	Arizona Upland, Sonoran desertscrub.
Purple Martin	Arizona Upland, Sonoran desertscrub.
Bell's Vireo	Sonoran riparian scrubland. Present in Madrean evergreen woodland.
Lucy's Warbler	Sonoran riparian scrubland. Present in Madrean evergreen woodland.

* Birds may also occur in other habitats.

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 the effects to wildlife for 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 System Lands would be implemented. The level of daily human activity, particularly along FR 315, could 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

The mitigation and monitoring measures described in Chapter 2 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Wildlife

Pre-feasibility Activities would take place in non-contiguous areas dispersed across 32 sections within four townships of National Forest System, State Trust and privately held lands. The construction activities of the proposed Pre-feasibility Activities encompass approximately 80 acres, of which approximately 43.70 acres of previously undisturbed lands would be impacted. Impacts from the proposed action will occur to interior chaparral (33.32 acres), approximately 0.39 acre of Madrean evergreen woodland and 9.99 acres of Sonoran desertscrub vegetation types; primarily along 16.67 miles of existing roads on National Forest System Lands and 5.33 miles of existing roads on State Trust and privately held lands.

Some impacts to MIS 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 habitat disturbances associated with the Pre-feasibility Activities would impact any MIS to a detectable degree. Table 3-11 summarizes acreage of impacts by MIS vegetation type for the no action, proposed action and the action alternatives. 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 or alter existing forest-wide trends (WestLand 2010a).

Table 3-12 summarizes the effects of the proposed Pre-feasibility Activities to Migratory Bird Treaty Act species. The majority of the area affected by the proposed action is immediately adjacent to previously disturbed areas. The use and maintenance of existing roads and the placement of the majority of the drill pads either on areas previously disturbed or adjacent to existing roads reduce the loss of migratory bird habitat. Any unintentional take reasonably attributable to the implementation of the proposed action is not likely to have any measurable negative effect on migratory bird populations (WestLand 2010b).

Wildlife Effects from Mitigation Implemented Under the Proposed Action

Five mitigation measures outlined in Chapter 2 would directly or indirectly 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.

Table 3-11. Summary of MIS Vegetation Types on Pre-feasibility Activities Area, with Forest Trends. Total acreage of each vegetation type and trend data from TNF (2005). Acres of impact are total acreage of new habitat impacts for proposed action. Action alternative acreages are just for the alternative element considered for each alternative.

Alternative	Land Ownership	Acres of Impact by Vegetation Type (Percent of Total Vegetation Type on TNF)		Total
		Interior Chaparral / Pinyon-Juniper (1,413,986 acres)* TNF Trend: Static	Upland Sonoran Desertscrub (896,771 acres) TNF Trend: Downward Static	
Alt. 1 No Action	Forest	0	0	0
	State Trust/Private	0	0	0
	Total	0	0	0
Alt. 2 Proposed Action	Forest	25.88 (0.002%)	9.02 (0.001%)	34.90
	State Trust/Private	7.83	0.97	8.8
	Total	33.71	9.99	43.7
Alt. 3 North OF-2	Forest	0.25 (0.00002%)	0	0.25
	State Trust/Private	0	0	0
	Total	0.25	0	0.25
Alt. 4 – Route 4a and Drill Sites 4E and 4W	Forest	2.42 (0.0002%)	0	2.42
	State Trust/Private	0.35	0	0.35
	Total	2.77	0	2.77
Alt. 5 – Route 4b and Drill Sites 4E and 4W	Forest	2.70 (0.0002%)	0	2.70
	State Trust/Private	0.35	0	0.35
	Total	3.05	0	3.05

* Madrean Oak woodland is included within the chaparral/pinyon-juniper vegetation type.

Table 3-12. MBTA Species Analysis Based on General Effects from Development of Drill or Road Sites to Habitat and Important Components of the Habitat.

Species	TNF Vegetation Type Designation	Habitat Preferences	Potential Habitat and Disturbance Impacts
Golden Eagle (<i>Aquila chrysaetos</i>)	Pinyon-juniper; Madrean evergreen woodland; Sonoran desertscrub	This raptor is usually found in open country, in prairies, in open wooded country and in barren areas, especially in hilly or mountainous regions. They nest on rock ledges, cliffs or in large trees.	This species has been observed in the Arizona Upland subdivision habitat in the vicinity of the project and it could be present in other vegetation types on the PAA. Direct or indirect impacts to this species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Red-naped Sapsucker (<i>Sphyrapicus nuchalis</i>)	Mixed conifer woodland	This woodpecker typically breeds in higher elevation mixed conifer forests and associated montane drainages. During the winter it may be found at lower elevations in riparian areas and adjacent vegetation, including Madrean evergreen woodlands.	No Great Basin conifer woodland has been observed or would be impacted by the Pre-feasibility Activities. This species has been observed in winter in Madrean evergreen woodland in the vicinity of the PAA, 0.39 acre of which could be impacted by the proposed action. Direct or indirect impacts to this species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Peregrine Falcon (<i>Falco peregrinus</i>)	Pinyon-juniper; Sonoran desertscrub	Optimum peregrine habitat is generally considered to be steep, sheer cliffs overlooking woodlands, riparian areas or other habitats supporting avian prey species in abundance.	No Great Basin conifer woodland has been observed or would be impacted by the Pre-feasibility Activities. This species has been observed in Arizona Upland desertscrub in the vicinity of the PAA, 9.99 acres of which could be impacted by the proposed action. Direct or indirect impacts to this species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Gray Flycatcher (<i>Empidonax wrightii</i>)	Pinyon-juniper	This flycatcher is most commonly associated with larger stands of pinyon-juniper with sagebrush understory and ponderosa overstory. Occasionally found in areas with Madrean evergreen species. Nest height is generally at 2 to 9 feet. This species may need some ground cover to support insect populations for foraging.	No Great Basin conifer woodland has been observed or would be impacted by the Pre-feasibility Activities. This species has been observed in Madrean evergreen woodland in the vicinity of the PAA, 0.39 acre of which could be impacted by the proposed action. Direct or indirect impacts to this species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.

Table 3-12. (Continued)

Species	TNF Vegetation Type Designation	Habitat Preferences	Potential Habitat and Disturbance Impacts
Gray Vireo (<i>Vireo vicinior</i>)	Pinyon-juniper	This vireo prefers relatively arid, open areas dominated by pinyon and juniper with a shrubby understory. Associated to a lesser extent with Madrean evergreen woodland and chaparral-covered slopes. The vireo commonly nests and forages at 2 to 8 feet.	No Great Basin conifer woodland has been observed or would be impacted by the Pre-feasibility Activities. This species has been observed in Madrean evergreen woodland in the vicinity of the PAA, 0.39 acre of which could be impacted by the proposed action. Direct or indirect impacts to this species are unlikely. This species is also included in the MIS analysis. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Black-throated Gray Warbler (<i>Dendroica nigrescens</i>)	Pinyon-juniper	This warbler is generally associated with open pinyon-juniper or oak woodlands. It is most closely associated with pinyon pine and is not usually found where juniper becomes dominant.	No Great Basin conifer woodland has been observed or would be impacted by the Pre-feasibility Activities. This species has not been observed in the project vicinity. Direct or indirect impacts to this species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Juniper Titmouse (<i>Baeolophus ridgwayi</i>)	Pinyon-juniper	This titmouse is primarily found in arid, juniper-dominated woodland communities; it infrequently forages and nests on the edges of other communities, including chaparral. Observed nest heights have ranged from approximately 4 to 14 feet.	No Great Basin conifer woodland has been observed or would be impacted by the Pre-feasibility Activities. This species has been observed in Madrean evergreen woodland in the vicinity of the PAA, 0.39 acre of which could be impacted by the proposed action. Direct or indirect impacts to this species are unlikely. This species is also included in the MIS analysis. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Costa's Hummingbird (<i>Calypte costae</i>)	Sonoran desertscrub	This hummingbird is generally associated with well-vegetated Sonoran and Mojave desertscrub uplands, particularly near desert washes. Nesting often occurs in a variety of trees, including palo verde, at heights of approximately 1 to 16 feet.	Approximately 9.99 acres of potentially suitable desertscrub habitat would be impacted by the Pre-feasibility Activities. This species has been observed in the Arizona Upland subdivision of Sonoran desertscrub in the vicinity of the PAA. Although individuals of this species could be impacted by the Pre-feasibility Activities, significant impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.

Table 3-12. (Continued)

Species	TNF Vegetation Type Designation	Habitat Preferences	Potential Habitat and Disturbance Impacts
Bendire's Thrasher (<i>Toxostoma bendirei</i>)	Sonoran desertscrub	This thrasher is most commonly found in Sonoran desertscrub, usually in areas with an abundance of trees, shrubs and cacti that are adjacent to more open areas. They are often found in xeroriparian conditions, and they may use rural agricultural areas. They will use grasslands if enough shrubs are present.	Approximately 9.99 acres of potentially suitable desertscrub habitat would be impacted by the Pre-feasibility Activities. This species could be present in the Arizona Upland subdivision of Sonoran desertscrub in the vicinity of the PAA. Although individuals of this species could be impacted by the Pre-feasibility Activities, significant impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Canyon Towhee (<i>Pipilo fuscus</i>)	Sonoran desertscrub	This towhee is generally found in arid and brushy conditions, and it is most common in Sonoran desertscrub, including more densely vegetated dry washes and rocky foothill slopes. It is occasionally found in chaparral, Madrean evergreen woodland and sparsely populated rural communities.	Approximately 9.99 acres of potentially suitable desertscrub habitat would be impacted by the Pre-feasibility Activities. This species has been observed in all vegetation types in the vicinity of the PAA. Although individuals of this species could be impacted by the Pre-feasibility Activities, impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Elf Owl (<i>Micrathene whitneyi</i>)	Sonoran desertscrub	This small owl is commonly found in Arizona Upland vegetation, but it is also common in other habitats with woody vegetation, including Madrean evergreen woodland. It requires cavities in saguaros or trees for nest sites.	Approximately 9.99 acres of potentially suitable desertscrub habitat would be impacted by the Pre-feasibility Activities. This species could be present in all vegetation types in the vicinity of the PAA. Although individuals of this species could be impacted by the Pre-feasibility Activities, impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Gila Woodpecker (<i>Melanerpes uropygialis</i>)	Sonoran desertscrub	This woodpecker is most commonly found in the Arizona Upland subdivision, although it will also use riparian areas with large cottonwoods, willows, sycamores and mesquites. It requires saguaros or large trees for excavation of its nest cavities.	Approximately 9.99 acres of potentially suitable desertscrub habitat would be impacted by the Pre-feasibility Activities. This species has been observed in the Arizona Upland subdivision in the vicinity of the PAA. Although individuals of this species could be impacted by the Pre-feasibility Activities, impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.

Table 3-12. (Continued)

Species	TNF Vegetation Type Designation	Habitat Preferences	Potential Habitat and Disturbance Impacts
Gilded Flicker (<i>Colaptes chrysoides</i>)	Sonoran desertscrub	This woodpecker is found primarily in Sonoran Desert uplands, particularly in areas containing saguaro cacti. It commonly nests in cavities in saguaros greater than 15 feet tall or riparian trees.	Approximately 9.99 acres of potentially suitable desertscrub habitat would be impacted by the Pre-feasibility Activities. This species could be present in the Arizona Upland subdivision of Sonoran desertscrub. Although individuals of this species could be impacted by the Pre-feasibility Activities, impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Phainopepla (<i>Phainopepla nitens</i>)	Sonoran desertscrub	Mistletoe is a key habitat requirement for this species, and it is able to use a variety of vegetation types if mistletoe is present. The phainopepla is most common in Sonoran desertscrub, but it may also be found in riparian woodlands. It is less common in pinyon-juniper woodlands and in Madrean evergreen woodlands.	Approximately 9.99 acres of potentially suitable desertscrub habitat would be impacted by the Pre-feasibility Activities. This species is known to be present in all vegetation types on the PAA. Although individuals of this species could be impacted by the Pre-feasibility Activities, impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Prairie Falcon (<i>Falco mexicanus</i>)	Sonoran desertscrub	This raptor is mainly found in deserts and grasslands, where it prefers more arid and more open conditions than the peregrine falcon. Nesting areas have been reported in pinyon-juniper areas and in Madrean evergreen woodlands.	Approximately 9.99 acres of potentially suitable desertscrub habitat would be impacted by the Pre-feasibility Activities. This species could be present in Arizona Upland vegetation on the PAA. Impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Purple Martin (<i>Progne subis</i>)	Sonoran desertscrub	Depending on subspecies, this large swallow is found in Sonoran desertscrub with numerous saguaro cavities or in higher elevation woodlands. It nests primarily in cavities above approximately 15 feet in saguaros and 30 feet in trees.	Approximately 9.99 acres of potentially suitable desertscrub habitat would be impacted by the Pre-feasibility Activities. This species is known to be present in Arizona Upland vegetation on the PAA. Although individuals of this species could be impacted by the Pre-feasibility Activities, impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.

Table 3-12. (Continued)

Species	TNF Vegetation Type Designation	Habitat Preferences	Potential Habitat and Disturbance Impacts
Black-chinned Sparrow (<i>Spizella atrogularis</i>)	Chaparral	This sparrow is closely associated with arid, brushy and generally sloping chaparral habitats. It generally nests in dense shrubs at a height of 1 to 7 feet.	Approximately 33.32 (discontinuous) acres of potentially suitable chaparral habitat would be impacted by the Pre-feasibility Activities, primarily adjacent to areas of existing disturbance. This species is known to be present in the interior chaparral on the PAA. Although individuals of this species could be impacted by the Pre-feasibility Activities, impacts to the species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Bell's Vireo (<i>Vireo bellii</i>)	Sonoran Riparian Scrubland	This vireo prefers dense, low, shrubby vegetation in lowland riparian areas, with willows, mesquite and seepwillows.	Small areas of Sonoran riparian scrubland may be present within the Arizona Upland vegetation, 9.99 acres of which could be impacted by the proposed action. This species has been observed in Madrean evergreen woodland in the vicinity of the PAA, 0.39 acre of which could be impacted by the proposed action. Direct or indirect impacts to this species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.
Lucy's Warbler (<i>Vermivora luciae</i>)	Sonoran Riparian Scrubland	Although this warbler will breed in dryer conditions than other North American warblers, it is most abundant along perennial or intermittent drainages with mesquite. They are primarily found in Sonoran desertscrub, but they may also use cottonwood-willow riparian areas.	Small areas of Sonoran riparian scrubland may be present within the Arizona Upland vegetation, 9.99 acres of which could be impacted by the proposed action. This species has been observed in Madrean evergreen woodland, 0.39 acre of which could be impacted by the proposed action. Direct or indirect impacts to this species are unlikely. Any unintentional take reasonably attributable to the Pre-feasibility Activities is not likely to have any measurable negative effect on migratory bird populations.

Sources:

- Latta, M.J., C.J. Beardmore, and T.E. Corman. 1999. Arizona Partners in Flight Bird Conservation Plan. Version 1.0. Nongame and Endangered Wildlife Program Technical Report 142. Arizona Game and Fish Department. Phoenix, Arizona.
- Corman, T.E. and C. Wise-Gervais. 2005. *Arizona Breeding Bird Atlas*. University of New Mexico Press. Albuquerque, New Mexico.
- NatureServe. October 2009. NatureServe Explorer at <http://www.natureserve.org/explorer>. Accessed April 26, 2010.

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 vegetation type impacted by approximately 0.25 acre, which is 0.03 acre more than the proposed OF-2 drill site. This increase of 0.03 acre is only 0.07 percent of the total new disturbance estimated for the proposed Pre-feasibility Activities and only 0.09 percent of the new disturbance from implementation of the Pre-feasibility Activities that occur within the interior chaparral vegetation type.

The incremental increase in impacts to chaparral/pinyon-juniper MIS vegetation type from implementation of this alternative is not expected to result in detectable population level impacts to MIS or alter the existing forest-wide trends.

The incremental increase in adverse impacts to chaparral habitat associated with the implementation of Alternative 3 and any unintentional take reasonably attributable to the implementation of this action alternative are not likely to have any measurable negative effect on migratory bird populations.

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 the interior chaparral vegetation type within the PAA by 2.77 acres (8.31 percent). It would create approximately 0.85 mile of new road on National Forest System Lands and State Trust lands between FR 315 and drill site RES-13.

The incremental increase in impacts to chaparral/pinyon-juniper MIS vegetation type from implementation of this alternative is not expected to result in detectable population level impacts to MIS or alter the existing forest-wide trends.

The incremental increase in adverse impacts to chaparral habitat associated with the implementation of Alternative 4 and any unintentional take reasonably attributable to the implementation of this action alternative are not likely to have any measurable negative effect on migratory bird populations.

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 3.05 acres (9.15 percent). It would create approximately 1.04 miles of new road on National Forest System Lands and State Trust lands between FR 315 and drill site RES-13.

The incremental increase in impacts to chaparral/pinyon-juniper MIS vegetation type from implementation of this alternative is not expected to result in detectable population level impacts to MIS or alter the existing forest-wide trends.

The incremental increase in adverse impacts to chaparral habitat associated with the implementation of Alternative 5 and any unintentional take reasonably attributable to the implementation of this action alternative are not likely to have any measurable negative effect on migratory bird populations.

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. Endangered Species and Arizona Hedgehog Cactus (Issue 4)

3.4.1. Affected Environment

Endangered Species

Lists of threatened and endangered species for Pinal and Gila Counties were obtained from the Arizona Ecological Field Office of the USFWS (USFWS 2008a and 2008b); information on individual listed species was obtained from the AGFD Heritage Database Management System (HDMS [AGFD 2008]). A screening analysis was conducted on the 14 endangered, 7 threatened, 1 proposed, 2 petitioned for listing and 3 candidate species listed by the USFWS for Pinal and Gila Counties. Analysis of these species included a review of available literature and documented observational data to determine species' preferred habitats and known geographic, elevation and seasonal ranges. In addition, field reconnaissance was conducted within the PAA to evaluate the vegetation and habitat characteristics for comparison with habitats known to support the species listed in Pinal and Gila Counties. Only two species, listed as endangered, were determined to have the potential to occur within the PAA: the Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*) and the lesser long-nosed bat (*Leptonycteris yerbabuena*). The lesser long-nosed bat has not been recorded in the vicinity of the PAA, but its potential to occur in or

near the PAA is considered in detail in the Biological Assessment and Evaluation (BA&E; WestLand 2009c). The Arizona hedgehog cactus occurs in the PAA and is considered in detail in the following sections. Appendix C provides a discussion of other species listed by the USFWS.

It was determined through development of the BA&E that AHC was the only species that had the potential to be affected by Pre-feasibility Activities.

Arizona Hedgehog Cactus

AHC is Federally listed as endangered without critical habitat throughout its entire range in Arizona. This species is one of 1,700 native plants that were proposed for listing as endangered by the USFWS on June 16, 1976 (USFWS 1976). On October 25, 1979, the USFWS published the final rule listing the AHC as an endangered species without critical habitat (USFWS 1979). AHC was listed because of its limited distribution. Potential threats to this species are summarized in the Conservation Assessment and Plan for the Arizona Hedgehog Cactus, Tonto National Forest (the AHC Conservation Assessment [TNF 1996]).

Taxonomy of the *Triglochidiatus* section of the *Echinocereus* has been in a state of flux for the past few decades (Baker 2006; Cedar Creek Associates 1994; Matthews 1994). NatureServe and a number of scientific publications on the species refer to this variety of AHC as *Echinocereus coccineus* var. *arizonicus* (Rose ex Orcutt) Ferguson. In this document we have followed the nomenclature utilized by the USFWS. There is also some confusion with regard to the identification of this taxon, as published descriptions vary significantly across the region (Cedar Creek Associates 1994). The AHC, as a taxonomic entity currently defined by the USFWS, 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 above 3,300 feet amsl (AGFD 2008; TNF 1996). AHC occur on open slopes and in cracks and crevices between boulders in Interior Chaparral and Madrean Evergreen Woodland habitats (Brown 1982).

A literature review was conducted to obtain the most recent information about the habitat, distribution and life history of the AHC. Species accounts from the AGFD (2008), Arizona Rare Plant Committee (2001), Cedar Creek Associates (1994) and SEINet (2008) were consulted. The distribution of AHC 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. Cedar Creek Associates' observations of more than 1,000 specimens located during field surveys for the nearby Carlota Project indicate that the AHC prefers stable rock formations such as 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 AHC to establish and grow. The remaining two rock types that are known to be associated with the AHC 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 AHC to the same extent as certain kinds of tuff or granite.

The PAA plus a buffer area was surveyed for AHC in July and September 2007 and in January, February, March and September 2008 (WestLand 2009b). Along proposed access roads, the width of the surveyed area was 100 feet, centered on the roadway centerline. The area surveyed at each proposed drill site was approximately 200 feet by 200 feet, which provided a survey buffer of at least 50 feet on all sides. Approximately 383.25 acres of National Forest System Lands, State Trust lands and private lands were surveyed for AHC in support of the Pre-feasibility Activities and other actions on private and State Trust lands (WestLand 2009b; Figure 6-1). Portions of the PAA near the Oak Flat Withdrawal Area were surveyed in 2004 as part of a larger block of 3,025 acres (WestLand 2004a; Figure 6-1). The Previously Authorized Activities were surveyed for AHC during 2001 (SWCA 2001; WestLand 2001a). In addition, a survey was completed for a series of drill sites and access roads in 2001 that were never authorized or constructed (WestLand 2001b). While much of the area surveyed is outside the scope of the Federal action being considered in this analysis, all these areas are included in the Resolution Pre-feasibility Activities Arizona Hedgehog Cactus Survey report (WestLand 2009a) to provide additional information regarding the distribution of AHC in the vicinity of the PAA. Collectively the lands covered by these surveys are referred to as the Compiled Survey Area. Table 3-13 summarizes the various surveys included in the Resolution Pre-feasibility Activities Arizona Hedgehog Cactus Survey report (WestLand 2009a).

Table 3-13. Summary of the Compiled Survey Area by Land Management Type and Year.

Land Management Status	Acres
2001 Drill Site and Road Surveys – National Forest System Lands	159.25
2004 Block Survey – National Forest System Lands	3,025
2007/2008 Drill Site and Road Surveys – National Forest System Lands	278.37
2007/2008 Drill Site and Road Surveys – State Trust lands	88.85
2007/2008 Drill Site and Road Surveys – Private Lands	16.03
Total Survey Area	3,567.50¹

¹ Approximately 195.47 acres of the drill site and road surveys on National Forest System Lands conducted in 2001, 2007 and 2008 were also surveyed during the 2004 block survey.

Within the 3,567.5-acre Compiled Survey Area, 140 AHC, including one dead individual, were located and mapped during AHC surveys on National Forest System, State Trust and private lands. One-hundred and five of these plants are located on National Forest System Lands and 35 were detected on private lands (WestLand 2009a). No AHC were detected on State Trust lands. Generally AHC 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).

Based on review of habitat and range requirements provided by the USFWS in the General Species Information maintained on their website, areas meeting habitat descriptions include those areas that 1) occur within the reported elevation range of this species; 2) occur in biotic communities similar to those known to be preferred by this species; and 3) contain bedrock geology that is known to support AHC. In accordance with the General Species Information, areas that contain all three habitat criteria are referred

to collectively in the BA&E (WestLand 2009c) and this EA as Potential AHC Habitat. Those areas that contain these habitat elements and have documented occurrences of AHC are referred to as AHC Habitat.

Areas of the PAA that do not contain AHC Habitat or Potential AHC Habitat include FR 315 from S.R. 177 north to the State Trust land boundary; FR 2440 and drill sites MB-03 and QC-04; FR 2261; and drill site H-C. These areas are generally west and south of Apache Leap.

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, might impact the AHC and its habitat in the PAA. The sections that follow provide our analysis of the effects of the alternatives considered in this EA to AHC.

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 effect to AHC.

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

The 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 Pre-feasibility Activities will impact AHC Habitat and Potential AHC Habitat; however, these impacts are not expected to occur at one time. They are expected to occur throughout the authorization period and more drill site construction and road improvement activities are expected to occur earlier in the authorization period than later. There is no specific schedule proposed by RCM for the construction and implementation of these activities. Roadway and drill site improvements and construction activities for the groundwater and exploration drill sites would be authorized through December 2014. Roadway improvements and drill site improvements for the geotechnical drilling activities would be authorized through 2016. Ongoing access to the deep and shallow groundwater monitoring wells and road maintenance activities required to provide that access would continue through 2025.

The total area of construction activity, including existing road surfaces, for the proposed action is approximately 80 acres. Of this area, the total area of construction disturbance to previously undisturbed

lands from the implementation of the Pre-feasibility Activities in the PAA would be a maximum of 43.70 acres¹⁵ and includes 1) 37.74 acres of Level A, B and C road improvements, 2) 0.59 acre of new road and 3) 5.37 acres of new drill sites. Fill material generated during the construction of the proposed road improvements will be used within the PAA for necessary road-base improvements or fill. Approximately 30.27 acres of previously undisturbed lands within the PAA, including the connected actions, that is AHC Habitat or Potential AHC Habitat will be directly affected by the Pre-feasibility Activities.¹⁶

The proposed configuration of the Pre-feasibility Activities avoids direct impacts to known AHC. Locations of individuals were provided to RCM during the planning of Pre-feasibility Activities so that the improvements could be designed to avoid direct effects to individual AHC. Although the design of the Pre-feasibility Activities expressly avoids impacts to individual AHC, two AHC that are located very close to the PAA would be transplanted and relocated to the Boyce Thompson Arboretum as a precautionary measure to prevent impacts from adjacent construction activities.

The Pre-feasibility Activities may occur at any time during the authorization period and over the course of the authorization period it is likely that new AHC may become established within some portions of the PAA prior to the implementation of all drill site and road improvement activities proposed as part of the Pre-feasibility Activities. Seedlings and immature plants can be difficult to detect during survey and undetected young plants within the PAA may be affected by the Pre-feasibility Activities, and could be adversely affected, despite efforts to avoid direct and indirect impacts during implementation of the mitigation and monitoring measures outlined in this EA. Further, detection of AHC that may become established in the PAA prior to resurvey and implementation of the road and drill site improvements in the Action Area could require RCM to modify its planned improvements or to transplant AHC in accordance with the conservation measures proposed in the BA&E and incorporated into the mitigation measures outlined in this EA.

Potential direct or indirect effects to AHC due to road watering for dust control, directional drilling or reclamation activities are not expected.¹⁷ Much of the PAA is underlain by rock and is not a highly erodible surface. Despite the relative stability of the landforms in the PAA, Pre-feasibility Activities may result in limited, localized erosion in the immediate vicinity of some construction areas. This erosion will be minimized using water bars, silt fences or other BMPs as described in the mitigation measures provided in Chapter 2 of this EA.¹⁸ Potential indirect effects on AHC include limited surface disturbance resulting from erosion. Although the potential adverse effects would be minor, they are not entirely discountable.

¹⁵ The estimate of new disturbance within the PAA is conservative, that is, it tends to overestimate the footprint of new disturbance. It is based on average widths of disturbance for each road improvement type (A or B) and includes the existing road surface within some C polygons. RCM has indicated that it believes that the actual footprint of new disturbance within the PAA will be less than the estimates provided here.

¹⁶ Approximately 13.43 acres directly affected by the planned road improvements, construction of new roads and construction of drill sites proposed as part of the Pre-feasibility Activities within the Action Area are not within AHC Habitat or Potential AHC Habitat.

¹⁷ For further discussion and detailed explanation of mitigation measures that would be implemented as part of the proposed Pre-feasibility Activities, see Chapter 2 of this EA.

¹⁸ For further discussion of erosion within the PAA, see p. 3-9 of this EA.

RCM will use approximately 5.13 miles of existing roads that do not require any improvement to meet the purpose and need for the project (Table 2-7). These roads are expected to require periodic surface maintenance to maintain them in a useable condition. The proposed improvements of existing roads, construction of new roads and drill site construction will increase the overall footprint of disturbed land in the portion of the range of the AHC that contains the Action Area. There is the possibility that erosion associated with these activities could cause erosion beyond the levels anticipated, resulting in additional loss of AHC Habitat or Potential AHC Habitat. However, due to the rocky nature of the PAA and vicinity and the erosion-control measures that will be implemented as part of the Pre-feasibility Activities, erosion due to Pre-feasibility Activities is not expected to extend beyond the PAA and Action Area considered in the USFWS Biological Opinion.

AHC could be affected by recreational users of the roads within National Forest System Lands. AHC could be impacted by recreational users if, for example, they take their ORV off existing roads or conduct a multi-point turn on existing roads and damage adjacent vegetation, including AHC, during the turn. Similarly it is conceivable that pedestrian users could impact AHC while hiking off trail. Both these effects are somewhat speculative and no evidence was found during field investigations to indicate that any of these potential impacts had actually occurred. The increased accessibility that would result from the road improvements associated with the Pre-feasibility Activities is not expected to increase this problem and may make vehicles less likely to leave the road.

Illegal collection of AHC was identified as a potential risk factor in the AHC Conservation Assessment (TNF 1996). The TNF concluded that "...this concern is primarily manifested along the main travel corridors and for those few specimens which exist in a soil matrix as opposed to a rock matrix." The proposed road improvements, construction and maintenance will increase the accessibility of some areas. This improved access could conceivably increase the possibility of AHC theft. Given the current proximity of very visible AHC to existing roads that are easily accessible, it does not appear that theft will be a significant issue or consequence resulting from implementation of the Pre-feasibility Activities. Long-term AHC monitoring efforts have been underway on other parts of the TNF for many years. Many of the areas being monitored are readily accessible by the public and to date there has been no AHC loss attributable to theft (Mark Taylor, TNF, pers. comm.). It is unlikely that any increase in road use attributable to the improvements proposed for the Pre-feasibility Activities would result in a significant increase in AHC theft.

While Potential AHC Habitat in the Action Area has been fragmented by existing roads and other disturbances, there is no evidence available at this time to suggest that this fragmentation has direct or indirect effects to AHC. Pollination and seed dispersal for AHC appear to be accomplished by animals that are relatively mobile (TNF 1996). The principal pollinator for claret cup cacti are hummingbirds (Scobell and Scott 2002). The fruits of AHC are fleshy and red, they are low to the ground and the seeds are relatively small. Expected dispersal agents include ground-foraging birds such as quail and other species and other animals that would be attracted to the fruits and seeds, including lagomorphs, rodents and ants (TNF 1996; Mark Taylor, TNF, pers. comm.). Dispersal is also likely to occur from stormwater runoff generated by summer monsoons (Mark Taylor, TNF, pers. comm.). The minor increase in habitat

fragmentation that would result from the proposed road improvements and road and drill site construction in the PAA is not expected to cause or lead to significant interference with AHC pollen or seed dispersal.

Windblown dust and the dust generated by new, proposed construction activities or from disturbed sites have the potential to affect the physiological performance of plants (see Rasoul et al. 1997; Walker and Everett 1987; and Mandre and Ots 2004). At this point in time there are no studies specific to AHC regarding the effects of naturally occurring or fugitive dust emissions on plant health and vigor; however, dust accumulation on desert plants has been demonstrated to affect photosynthesis, water use efficiency and leaf temperature. Rasoul et al. (1997) reported that ecophysiological effects from heavy dust accumulation on shrubs in the Mohave Desert may cause lower primary productivity. Much of the PAA is underlain by rock and is not a highly erodible surface; therefore, vehicle traffic is not expected to generate the kinds of dust typical of alluvial fill common in lower desert habitats. During field survey for AHC, there was no indication that the AHC found closest to the existing unpaved roads had been directly or indirectly affected by fugitive emissions. Dust emissions would increase in the PAA during construction activities. The potential increase in dust emissions would be minimized by periodic roadway watering to minimize dust generation. Any potential increase in fugitive dust emissions during construction that could affect physiological function of AHC would occur for a relatively short period of any plant's expected life and any accumulation of dust on AHC stems would be washed off by precipitation events. Potential physiological impacts and reduction in primary productivity from fugitive dust emissions from construction and use of Forest System and user-created roads for the Pre-feasibility Activities are expected to be temporary and transitory in nature and are not expected to result in measurable changes in long-term AHC productivity.

Construction activities would require the use of rock hammers and other heavy equipment in close proximity to AHC. Vibration from construction equipment has the potential to disrupt substrate for those AHC in close proximity to the construction activity, potentially directly injuring plant roots. This potential adverse impact seems more likely to occur if the vibration caused by the construction activity initiates soil movement close to the plant. The use of T-post and wire fencing for marking AHC locations and the placement of concrete jersey barriers or suitable equivalent to protect the microhabitat adjacent to known AHC minimize the potential for this adverse impact. Along the Omya Road north of U.S. Highway 60, construction activities for road improvements occurred in very close proximity to AHC. There were no detectable adverse impacts from vibration associated with that construction activity to any AHC during the construction period or subsequent monitoring activities (Mark Taylor, TNF, pers. comm.). If soil movement caused by vibrations associated with construction activities is going to have more than undetectable/minor effects to AHC, the biological monitor will be present to address this potential adverse impact in accordance with the mitigation and monitoring measures outlined in this EA.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the Proposed Action

Specific mitigation and monitoring activities that will be implemented to avoid and minimize direct adverse impacts to AHC include the requirement to have a biological monitor in all areas of suitable

habitat for this species (Mitigation and Monitoring Measure 11). The biological monitor will resurvey areas to confirm the location and number of hedgehog cactus in the vicinity of planned road improvement activities, confirm the presence and location of clear-limit fencing, and, as appropriate, place rock guards over any AHC located downgradient of planned activities that the monitor determines may be at risk of damage from inadvertent rock fall (Mitigation and Monitoring Measure 11). A depiction of these guards is provided in Photographs 1 and 2.



Photograph 1. Representative AHC guard (front view).



Photograph 2. Representative AHC guard (rear view).

Welded steel guards will be used to protect AHC from rolling or sliding debris that may be dislodged as a result of Pre-feasibility Activities. The potential for this type of impact exists only for those AHC located downgradient of the Pre-feasibility Activities. Of the AHC detected during survey, approximately 18 are located downhill of the PAA. As part of the described mitigation and monitoring measures, a qualified biologist will resurvey areas where road improvements and pad construction are scheduled prior to implementation of road and pad construction, noting all AHC that may be susceptible to rolling or sliding debris if the area has not been surveyed within the past year. Any known or newly identified AHC in susceptible areas will be covered by the secured steel guards.

The AHC-specific mitigation measures described in Chapter 2 are designed to avoid impacts to AHC and would minimize potential adverse impacts to its potential habitat. The TNF has required RCM to transplant two AHC as a precautionary measure; resurvey for AHC at least 1 year prior to any construction, road repair or reclamation activity; provide for the protection of plants during construction; coordinate with construction crews; implement long-term monitoring of AHC within the Action Area described by the USFWS in their Biological Opinion; provide specific measures for the protection of downgradient plants; and use native plants in reclamation. A biological monitor would resurvey all areas of suitable habitat for AHC to confirm the location and number of AHC in the vicinity of the planned road improvement activities. The monitor would also confirm the presence and location of clear-limit fencing and, as appropriate, place rock guards over any AHC located downgradient of the planned activities that the monitor determines may be at risk of damage from inadvertent rock fall. Implementation of the prescribed biological monitoring activities during road and drill pad construction, including the placement of rock guards over cactus on the downhill side of proposed road and drill site construction areas, dust control measures, the requirements of a fire plan, management actions required by the noxious weed management program, and reduction in the size of safety pull-outs to avoid impacts will minimize possible adverse impacts to Arizona hedgehog cactus and 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

No AHC were detected in the immediate vicinity of the North OF-2 drill site. Implementation of this alternative would not impact any known AHC. Detection of AHC that may become established at North OF-2 prior to the development of this site could require RCM to modify its planned improvements at North OF-2 or to transplant AHC if they are unable to avoid direct impacts.

If the North OF-2 drill site alternative is selected, approximately 0.25 acre of Potential AHC Habitat would be impacted. The OF-2 drill site (0.22 acre) would not be disturbed by Pre-feasibility Activities; however, this site is currently impacted by existing recreational uses. The selection of this alternative results in a net increase in adverse impacts to Potential AHC Habitat of 0.03 acre. Indirect effects would be as described for the proposed action alternative.

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

Previous surveys have not detected any AHC in the vicinity of West Access Route 4a and the associated drill sites 4E and 4W (WestLand 2004a and 2009b). This alternative would not impact any known AHC. West Access Route 4a occurs in a portion of the Action Area that contains potential AHC habitat. Construction of Access Route 4a and drill sites 4E and 4W would impact approximately 2.77 acres of Potential AHC Habitat on National Forest System Lands (2.42 acres) and State Trust land (0.35 acre). Detection of AHC that may become established within the footprint of West Access Route 4a and associated drill sites could require RCM to modify its planned improvements or to transplant AHC if it is unable to avoid direct impacts.

Indirect effects would be as described for the proposed action alternative.

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

Previous surveys have not detected any AHC in the vicinity of West Access Route 4b and the associated drill sites 4E and 4W (WestLand 2004a and 2009b). This alternative would not impact any known AHC. West Access Route 4b occurs in a portion of the Action Area that contains potential AHC habitat. Construction of Access Route 4b along with drill sites 4E and 4W would impact 3.05 acres of Potential AHC Habitat on National Forest System Lands (2.70 acres) and State Trust land (0.35 acre). Detection of AHC that may become established within the footprint of West Access Route 4b and associated drill sites subsequent to the last survey of this site could require RCM to modify its planned improvements or to transplant AHC if it is unable to avoid direct impacts.

Indirect effects would be as described for the proposed action alternative.

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 in 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). The majority of this competition occurs west of the Oak Flat Campground in Queen Creek Canyon and the 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 the PAA is the 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 recreational 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 3-14 summarizes Recreation Opportunity Spectrum classes.

Table 3-14. Recreation Opportunity Spectrum, Tonto National Forest. (Source: USFS 2005)

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 the 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.

In the vicinity of the PAA, three ROS classes are delineated. The majority of the Pre-feasibility Activities are located within areas designated as either Semi-primitive Motorized or Roaded Natural. The PAA locations immediately adjacent to U.S. Highway 60 or S.R. 177 are primarily classified as Roaded Natural while the 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 Roaded 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 2009d). 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.

Visual Resources. All lands in the TNF have been characterized with respect to scenic quality, which, in turn, has 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 alteration 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 3-15.

Table 3-15. 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 TNF 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 Area and the other running through the Oak Flat Withdrawal Area along its eastern boundary) and the Superior East Plant Site, where the existing head frame is a prominent element of the views from the Oak Flat Withdrawal Area 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 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 a high-quality visual experience.

The segment of U.S. Highway 60 that 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 2009g). 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.¹⁹ 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. The 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 the 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

¹⁹ By convention, the road used to access the Oak Flat Campground and the Superior East Plant Site is referred to as Magma Mine Road from its intersection with U.S. Highway 60 to the entrance of the Superior East Plant Site. 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 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 Magma Mine Road.

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 Trust lands are located south of the Oak Flat Withdrawal Area and 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 the 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 using current well construction technologies that 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 locations 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 the road was first constructed. Peak use of the road occurred during the 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 include providing access to the six drill sites located along FR 315 and the pre-feasibility study activities at the Superior East Plant Site.

A draft traffic impact analysis was done by Aztec Engineering (Aztec) 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) is attributed to 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 might 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 2009d). 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 of 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 the 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 2009e).

The potential visual impacts of the Pre-feasibility Activities to motorists traveling on U.S. Highway 60 were evaluated using helium-filled weather balloons that were 4 feet in diameter and 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 2009g).

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 Trust 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 Trust lands. One drill site, RES-13, located on State Trust 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 the 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 Trust lands south of the Oak Flat Withdrawal Area diminishes, the total number of vehicle trips to access these sites will be reduced.

Recreation Effects of Mitigation Implementation Under the No Action Alternative

The 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) boundaries of the Oak Flat Withdrawal Area. Access to site OF-1 and site OF-3 would be through the Oak Flat Campground. When these drill sites are occupied, workers accessing the drill sites would add to the existing traffic by access requirements for site M on National Forest System Lands and site RES-13 on State Trust lands. This access is achieved by using FR 2438 to the user-created 2438 bypass,²⁰ 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 Magma Mine Road. This is not an officially designated campsite within the TNF, 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 the DOE first constructed the 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 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 2009d). The model

²⁰ This user-created road has existed and is clearly evident on 1948 USGS topographic maps and earlier maps and photographs.

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 level 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 (Table 3-16).

Table 3-16. Predicted Sound Levels at Oak Flat and Dispersed Designated Campsites based on OF-1, North OF-2 and 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

Figure 3-3 shows sound level contours representing the results of computer modeling at a 40-dBA background. According to the model, there would be no increase in sound levels at the designated campsites in the Oak Flat Campground from drilling activities under the proposed action. The model predicted that sound levels at all 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).

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 and would not be distinguishable from vehicle noise generated by other recreationists.

Visual Effects. The proposed Pre-feasibility Activities would be consistent with the current level of manmade alterations to the existing landscape and would meet the VQO management goals set by the Forest Plan 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 are

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 2009f). This study determined that recreationists at all 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 recreational 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 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 FR 2438 (Points 39, 40, 12, 13 and 14). Both balloons were visible from a spur road heading west from FR 2438 to several dispersed campsites (Points 31, 32, 41 and 42). No balloons were visible at the end of the road where camping was noted (Points 43 and 44).
- Driving east on FR 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 FR 2438 turns north and then west, OF-1 was no longer visible.
- From FR 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 Magma Mine Road or from FR 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 FR 469, only the high balloon was visible.
- From FR 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 the Oak Flat Campground, on 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 39, 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 OF-3 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 the Resolution Plan of Operations Pre-feasibility Activities: Visual Management System Analysis (WestLand 2009g). 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 the 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 that traverse the Oak Flat Campground. The traffic increase on Forest Roads that traverse the Oak Flat Campground is outlined in the Resolution Plan of Operations Pre-feasibility Activities Oak Flat Campground Traffic Analysis (WestLand 2009e).

There are several scenarios for drill rig deployment on drill sites during implementation of the proposed action. Only a portion of the proposed drill sites would impact campground traffic. To estimate traffic increases, 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 increases for these five scenarios are shown on Figure 3-7. Analysis of the scenario that includes simultaneous drilling at all sites adjacent to the Oak Flat Campground (long-term exploration sites south of the Oak Flat Campground [sites OF-1, OF-3, M and RES-13]; the 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 2009e). 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. If necessary, RCM would place camouflage netting materials on these exploration drill sites where they face the Oak Flat Campground if screening from existing boulders or vegetation is not sufficient to block views. 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 into the landscape during drill site and road reclamation activities. RCM would also minimize nightlighting effects by directing or shielding lights to minimize nightlight effects to recreational areas. Where appropriate, RCM would identify any disturbed areas associated with the construction of new roads, improvement of existing roads and construction of drill sites suitable for rock staining and stain those surfaces with simulated desert varnish to minimize visual impacts. In addition, riprap and aggregate used for road preparation will be angular and the color shall match the native soil color. Aggregate surfacing placed on drill sites will be removed or buried at closure. All these measures would collectively minimize the effects 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 30 dBA 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 the 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 the Oak Flat Campground or alter general patterns of traffic use or intensity on 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 2009d), 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 2009d). A supplemental study using 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 3-17.

Table 3-17. 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 quiet 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 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 the campground.

Noise Effects. Noise impacts to the recreational users of the 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 action (Figure 3-3). While noise effects from fixed sources would be unchanged, the overall noise impacts to recreational users of the 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 who travel south through the Oak Flat Withdrawal Area to State Trust land may be able to see a small portion of this road on State Trust 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 around 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 the 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 the Oak Flat Campground would be for groundwater monitoring at the DOE Well Site, H-L and PVT-4, if PVT-4 is selected for groundwater monitoring and testing. Figure 3-10 depicts the anticipated traffic patterns for the West Access Route 4a alternative. Notably, implementation of the seasonal restriction for well and

borehole drilling at PVT-3, PVT-4 and H-L would further reduce traffic impacts to recreational users by limiting drilling activities at these three 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 on Recreation

Generally this alternative would reduce Pre-feasibility Activity impacts to visitors of the Oak Flat Campground by routing exploration drill site traffic outside 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 of the 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 from 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 are also accessed from Magma Mine Road. Shortly after turning off U.S. Highway 60, individuals wishing to access the designated campsites at the Oak Flat Campground, dispersed camping and picnicking sites within the Oak Flat Withdrawal Area, or to travel through the Withdrawal Area 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 Trust 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 that traverse the Oak Flat Campground were evaluated in the Oak Flat Picnic and Campground Withdrawal Area Traffic Analysis (WestLand 2009e). 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. The 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 that 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 Trust 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 that 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 Magma Mine Road would not be expected to change from the existing conditions measured in November 2008 (Aztec 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 employees' 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 Magma Mine Road. Vehicles supporting geotechnical and groundwater drill sites PVT-4 and H-L would veer off Old U.S. Highway 60 in the northeast corner of FR 2438. Vehicles supporting exploration drill sites OF-1, OF-3, M and RES-13 would turn on an existing user-created road that 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 that includes simultaneous drilling at all sites adjacent to the Oak Flat Campground (long-term exploration sites south of the Oak Flat Campground [sites OF-1, OF-3, M and RES-13]; the 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 2009e). 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 of up to 5 years.

Within the Oak Flat Campground, the increased volumes of traffic associated with the proposed action are 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 Magma Mine Road is expected to remain within the general limits reported by Aztec (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 a 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 the North OF-2 Drill Site Alternative to Safety

The 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

West Access Route 4a would reroute 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 were constructed. RCM's only traffic use in the Oak Flat Campground would be for a relatively short period required for the construction of a groundwater testing and monitoring well at H-L and a geotechnical borehole at PVT-4, which would be restricted to the off-season use of the Oak Flat Campground. Once these are constructed, traffic associated with the Pre-feasibility Activities through the Oak Flat Campground would be for groundwater monitoring at the DOE Well Site, H-L and PVT-4 if PVT-4 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 the West Access Route 4a alternative.

3.7. Conflicts with the 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 1952, President Truman issued Executive Order 10355 delegating authority to the Secretary of the Interior to withdraw or reserve lands of the United States for public purposes. As part of this order, in October 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 were revoked. He went on to inform the District Rangers that they “have received instructions to formally withdraw 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 the 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 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 campgrounds, 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 the 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 that 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 might 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 the 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 National Forest System 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 the 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 the 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 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 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 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 TNF, in coordination with the public and interested groups and 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 that 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 the 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 be no change in current use patterns or designations for the existing roads within National Forest System Lands. Forest Roads that would have been improved to a Level 2 maintenance standard 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 Service's travel management planning process, the Forest Service would be responsible for implementing closure as its budget allows. Similarly if existing roads 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 the desired road condition.

Travel Management, Effects of Mitigation for the No Action Alternative

The 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 the implementation of the Pre-feasibility Activities might 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. No roads are being proposed under this analysis for changes in designation.

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 the implementation of the Pre-feasibility Activities. This mitigation measure specifically states that travel management is expected to be complete before completion of the proposed action by RCM. Those roads whose status is not changed through consideration under travel management

will be returned to their original condition (or in the case of user-created roads, obliterated) when they are no longer in use for this project.

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 recreational users of the Oak Flat Withdrawal Area. This would be a user-created road and would not be open 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 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 the West Access Route 4a alternative.

3.9. Cultural Resources (Issue 9)

3.9.1. Affected Environment

The United States government has a trust responsibility brought about by treaties and laws related to American Indians. This responsibility is unambiguous in that the welfare of American Indians and their land and its resources is entrusted to the United States. For the Forest Service, trust responsibilities are defined by executive orders, laws and treaties that are directly related to National Forest System Lands. While there are no treaties tied to the Oak Flat Withdrawal Area or the adjacent landscapes upon which

the Pre-feasibility Activities are proposed, the Forest Service responds to trust responsibilities by following the laws that protect Tribal rights and by making a strong concerted effort to manage National Forest System Lands in a way that accommodates the needs and concerns of Native American groups, while still maintaining a responsibility to all citizens of the United States.

In addition to NEPA, the Forest Service has followed pertinent laws, regulations and policies in conducting the cultural analysis presented in this EA. These include:

- National Historic Preservation Act (NHPA),
- Executive Order 13007,
- Executive Order 12898,
- Executive Order 13175,
- Forest Service Manual 1500,
- American Indian Religious Freedom Act (AIRFA) of 1978, and
- National Register Bulletin 38 regarding traditional cultural properties.

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.

Government-to-government and tribal consultation in accordance with the requirements of the NHPA were initiated shortly after the Pre-feasibility Plan of Operations was determined to be administratively complete. Prior to the public scoping meeting, the Forest Service sent letters inviting Tribal representatives from 10 Tribes having historic and cultural associations with the project area to comment on the proposed action and informing them of the scheduled public meeting. Following this mailing and prior to the public open house, Forest Service ID team members were invited to a meeting with the Western Apache Coalition to present information and answer questions about the proposed action. The Tribes 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 the Tribes seeking their comments on the report and specifically requesting their input regarding traditional cultural places and practices. The pre-decisional EA (April 2009) was provided to the Tribes for review and comment. As a result of review comments, the Forest Service determined that activities occurring on State Trust and private lands were connected actions to those activities proposed on the TNF. Therefore, Class III cultural resources survey reports for those activities were provided to the Tribes for review and comment on March 16, 2010. Tribal consultation is ongoing and will formally conclude for this action when a final decision regarding the Pre-feasibility Plan of Operations is reached, 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. Prehistoric subsistence patterns relied on the region’s natural resources and 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 Apache 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 the Oak Flat Campground, the Pinal Mountain area and nearby National Forest System Lands along U.S. Highway 60.

Around A.D. 1500 or earlier, bands of Athabaskan-speaking groups with a linguistic affinity to native peoples in Alaska, Canada and northern California began arriving in the region of the southern Colorado Plateau and the mountainous region below the Mogollon Rim (Stein 1994:10, 11; Whittlesey 2003:243). The exact route and timing of the Athabaskan migration into the Southwest has not been fully resolved, but most scholars agree that it occurred late in prehistory (Whittlesey 2003). Soon after their arrival in the Southwest, the Navajo and the Apache separated as distinct cultural groups (Whittlesey 2003:243). The Apache settled in the mountainous regions of the greater Southwest while the Navajo settled around the Four Corners area. The Apache moved into upland areas that contained no large populations of other native peoples and that had apparently been unpopulated since the exit of the Mogollon, Salado and Hohokam cultures from the Mountain Transition Zone late in prehistory (Whittlesey 2003:242). The Apaches are composed of six major tribal groups: the Jicarilla, Lipan, Mescalero, Chiricahua, Kiowa-Apache and Western Apache (Goodwin and Basso 1971:12). Goodwin (1935:55) described the Western Apache as “those Apachean peoples who have lived within the present boundaries of the State of Arizona during historic times, with the exception of the Chiricahua Apaches and a small band of Apaches known as the Apache Mansos, who lived in the vicinity of Tucson.” By the mid-1800s, the territory of the highly mobile Western Apache covered 90,000 square miles (Getty 1964:27) and the population has been estimated at 4,000 (Goodwin and Basso 1971:12).

The Western Apache territory was ecologically varied, with high mountain peaks, desert areas and lush river valleys. Each Western Apache band practiced a hunting-and-gathering subsistence strategy supplemented by horticulture. Wild plant foods collected by Apachean groups in upland areas included acorns from the Emory oak, juniper berries and the hearts of agaves (Goodwin 1942). Large game, wild fowl and rodents also were hunted (Goodwin 1942). According to Goodwin (1937:61), agricultural products made up only 25 percent of the yearly diet, the remainder being a combination of undomesticated plants, game animals and livestock.

Western Apache social organization was based on small mobile groups exempt from an overall political authority (Goodwin 1942). These local groups, connected by kinship and social and economic ties, would generally include four to five households or gowas (Apachean brush structures also known as wikiups) (Goodwin 1942). These local groups were part of a larger clan that regulated social relationships and obligations (Goodwin 1942). The clans, as with the rest of Apache society, were matrilineal.

The Western Apache material culture, as would be expected from a highly mobile people, was based on expedient, easily transported containers and tools made of basketry, wood and fibers (Whittlesey 2003:247). The Western Apache also produced pottery and scavenged and reused tools from prehistoric sites (Whittlesey 2003:247).

The Pinal Mountains have been historically documented as the territory of the Western Apache, specifically the Pinal Band of the San Carlos group (Goodwin 1942:2). In the beginning of sustained European contact in the 1700s, the Pinal Band was known to the Spanish as the “Pinaleños” (Spicer 1962:244). The territory of the Pinal Band included the mountainous areas around the modern town of Globe in the aptly named Pinal Mountains. The Salt River to the north marked the northern extent of the Pinal Band; the Dripping Springs Valley was the southern limit (Goodwin 1942:25). The spring, summer and fall months were spent in the highest portions of the Pinal Mountains, hunting large game and collecting wild foods such as acorns from the Emory oak and the hearts of various agave species. Agriculture played a significant role in the diet of the Western Apache. Domesticated crops are known to have been cultivated around Wheatfields on Pinal Creek and near the confluence of Pinal Creek and the Salt River (Goodwin 1942:24). During the cold months, lower-elevation camps were established on the south and southwestern faces of the Pinal Mountains (Goodwin 1942:25). The Apache people would sometimes rely on the acquisition of livestock and foodstuffs from Anglo and Hispanic settlers or other Tribes by raiding or trading during the late winter and early spring months for subsistence (Goodwin and Basso 1971).

As Euroamerican populations increased in Arizona during the 1860s, conflicts with Western Apache groups for resources and land escalated to levels best expressed as open warfare. Soon after he was appointed commander of the U.S. military in the Arizona Territory, General George Crook issued an ultimatum to all Apaches that they must report to their assigned reservations by February 1872. Toward the end of 1872, Crook began a campaign to consolidate those groups that had not submitted to his demand (Thrapp 1967). By 1875, the Pinal Band had been sent to live on the San Carlos Apache

Reservation near the confluence of the San Carlos and Gila rivers, where many of their descendants live to this day.

The PAA is located near 16 archaeological sites documented during surveys conducted in the Oak Flat area and the PAA that have components attributed to the Apache people (Buckles 2009; Buckles and Granger 2009; Lindeman and Whitney 2005). These include 12 sites documented during the Oak Flat survey (Lindeman and Whitney 2005: Table 4.2). Four additional sites with Apache components were documented during the PAA surveys of National Forest System Lands and State Trust lands (Buckles 2009; Buckles and Granger 2009). Several of these sites include archaeological loci attributed to prehistoric Native American and historic Euroamerican peoples as well as the Apache peoples. The proposed action in the PAA or any alternatives considered in this EA will avoid impacts to all 16 sites with components attributed to the Apache peoples.

Apache sites, particularly those from the post-Reservation confinement period, are often difficult to recognize without direct Tribal assistance. The TNF in general, and Oak Flat specifically, continue to be used by Apache and Yavapai Tribes, including the San Carlos Apache Tribe, for resource gathering and the TNF is known by virtue of previous Forest Service contacts and consultations to contain sites of traditional and religious significance to them. Specific locations and boundaries for these sites, however, are not available and it is not known which, if any, of the identified archaeological sites might correspond to these locations having traditional and/or religious significance. Nor is it known whether there are Apache heritage sites in the area that are not represented by traditional archaeological signatures of artifact assemblages and structural features.

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 dot 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.

3.9.2. Environmental Consequences: Direct and Indirect Effects

Several commenters expressed concern that the proposed action would have undue impacts on cultural 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

The 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 any of the historic or prehistoric resources identified during Class III survey of the PAA. All the archaeological 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. Access improvement and increased visitation also facilitates monitoring and law enforcement, frequently resulting in better protection and preservation. However, the ultimate balance between these effects on cultural resources is difficult to predict or quantify as it depends on a multitude of factors.

Although no traditional religious practitioners have indicated that plants of traditional importance are collected specifically from the PAA, it is understood that Apache regularly gather plant materials, notably acorns, from Oak Flat. Since it will not restrict access to the area and will minimize impacts to vegetation, the proposed action is not expected to adversely impact the ability of traditional peoples to harvest acorns or other resources from this area.

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 1920s 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 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 and drill sites 4E and 4W alternative would not have any direct or indirect adverse impact to identified cultural resources. The routing of traffic away from the Oak Flat Withdrawal Area via West Access Route 4a may result in beneficial effects for traditional people harvesting acorns from within the Oak Flat Withdrawal Area by reducing the volume of traffic associated with operations at drill sites OF-1, M, OF-3 and RES-13.

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 any identified cultural resources. The routing of traffic away from the Oak Flat Withdrawal Area via West Access Route 4b may result in beneficial effects for traditional people harvesting acorns from within the Oak Flat Withdrawal Area by reducing the volume of traffic associated with operations at drill sites OF-1, M, OF-3 and RES-13.

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."

The TNF has been informed that the Oak Flat area holds a special traditional and religious significance for the Apache people as a whole, and specifically for the Tonto, Pinal and San Carlos Apache. No specific sacred sites have been identified in Tribal consultations, nor were there concerns expressed about any project activities affecting such sites, at least in the short-term lifespan of the project. Nevertheless, based on a fairly long history of contact, consultation and archaeological survey in the area by Forest Service personnel and contracted consultants, it would seem apparent that there are sites significant to the Apache people for their traditional economic and religious use. The "discrete, narrowly delineated location[s]" (EO 13007 (1)(b)(iii)) of these sacred sites, however, have yet to be identified.

3.10.2. Environmental Consequences: Direct and Indirect Effects

Concern was expressed during the scoping period that the Pre-feasibility Activities might 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

The 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

Concern was expressed during the EA scoping period that the Pre-feasibility Activities might have an undue impact on Native Americans' free exercise of religion at sites identified as sacred within or in the vicinity of the PAA. A number of commenters stated that the Oak Flat area is sacred to Native Americans affiliated with Apache cultural traditions. No specific sacred sites as defined in EO 13007 have been identified in the PAA during ongoing Tribal consultation efforts by TNF staff, although evidence from consultation suggests that sacred sites in the vicinity of the PAA do exist. It is not known if any of these sites correspond to the known archaeological sites in the area, but it remains a possibility. In any case, none of the archaeological sites identified during survey of the PAA will be impacted by the proposed action.

Information has not been provided that would suggest that the proposed action would affect access to a sacred site under the terms of the AIRFA and EO 13007, or in any other way substantially burden a Native American Tribe's expression of religious freedom under the Religious Freedom Restoration Act (RFRA). 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 public lands within Oak Flat and the 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; however, it is not anticipated that this experience would be substantially burdened. In the context of the RFRA, 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 action in the PAA.

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 Tribe's 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 Tribe's 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 Tribe's 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, the 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 affected environment section for each key issue provide 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 3-18. Within Table 3-18, 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 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.

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 3-18). 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.

Table 3-18. 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 1 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 than or equal to 10 miles from the PAA.
Zone D is greater than 10 miles from the PAA.

Resource Categories based on Key Issues identified during public scoping:

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

Activity and Effects (Number References Activity ID on Figure 3-11)	Cumulative Effects Context Summary
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 wildlife by impacting wildlife habitat. AHC surveys at the mine have been negative. Future operations that could expand the mine footprint may impact cultural resources and require mitigation.	Spatial Context: Zone B Temporal Context: Past, Present and Future Potential Cumulative Effects: AQ, W, CR
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 1,400 acres. Located on private and National Forest System Lands. A plan of operations was reviewed in accordance with the requirements of 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 prehistoric archaeological resources has been completed.	Spatial Context: Zone B Temporal Context: Past, Present and Future Potential Cumulative Effects: AQ, W, AHC, CR
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. Wildlife effects from direct loss of habitat. Not known if development adversely affected cultural resources.	Spatial Context: Zone B Temporal Context: Past, Present and Future Potential Cumulative Effects: AQ, W, CR

Table 3-18. (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 has 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. Wildlife effects through the loss of habitat. Mining activities over the past 100 years may have impacted AHC and cultural resources.</p>	<p>Spatial Context: Zone C Temporal Context: Past, Present and Future Potential Cumulative Effects: 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 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: AQ, 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 benefited 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 C Temporal Context: Past Potential Cumulative Effects: W, AQ, ES</p>

Table 3-18. (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 the BLM (currently in litigation) and Clean Water Act 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 stockpiles 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, ES</p>
<p>8. RCM Exploration and Well Development on State Trust and Private Lands – Development of RCM exploration drill sites and well sites on State Trust and private lands to support ongoing exploration and groundwater studies. These activities would temporarily and locally affect air quality through dust emissions and increases 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, AHC, cultural resources, recreational uses in 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. No. 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 the Oak Flat Withdrawal Area. Conducted within existing disturbed areas.</p>	<p>Spatial Context: Zone A Temporal Context: Past, 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/AQ, W/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 waterline 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 3-18. (Continued)

Activity (Number References Activity ID on Figure 3-11)	Cumulative Effects Context Summary
12. MARRCO Railroad – Past, present and potential future use of the MARRCO railroad for mining or other commercial purpose. Railroad built between 1914 and 1915. Approximately 9.5 miles on the TNF. Past steam operations and present diesel operations affect air quality. The railroad may also act as a barrier to some small wildlife species.	Spatial Context: Zones B, C and D Temporal Context: Past, Present and Future Potential Cumulative Effects: AQ, W, CR
13. OMYA Superior Limestone Quarry – Ongoing limestone quarry located about 0.5 mile northwest of the PAA. Indirect effects to the AHC from clearance of potential habitat. Approximately 90 acres of surface disturbance. Activities contribute to emissions affecting air quality and wildlife habitat. Air emissions from fugitive and combustion sources. Access road crossings of Queen Creek stabilized to reduce sedimentation.	Spatial Context: Zone B Temporal Context: Past, Present and Future Potential Cumulative Effects: AQ, W, AHC, ES/ES
14. RCM Previously Authorized Exploration Activities – On private, State Trust and National Forest System 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 emissions 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 AHC, cultural resources and Native American religious practices determined no adverse effect.	Spatial Context: Zone A Temporal Context: Past, Present and Future Potential Cumulative Effects: AQ, ES, W, OFR, S
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 AHC and wildlife.	Spatial Context: Zone A Temporal Context: Past, Present and Future Potential Cumulative Effects: W, AHC
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.	Spatial Context: Zone A Temporal Context: Future Potential Cumulative Effects: Unknown
17. Future Pre-feasibility Drilling Activities – Future activities for exploration purposes could be pursued on private, State Trust and/or National Forest System 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, AHC, cultural resources, recreational uses in Oak Flat, traffic safety and Native American religious practices. Until a specific proposal is submitted, the location and nature of those effects would be speculative.	Spatial Context: Zone A Temporal Context: Future Potential Cumulative Effects: AQ, ES, W, AHC, OFR, S, CR, NARP

Table 3-18. (Continued)

Activity (Number References Activity ID on Figure 3-11)	Cumulative Effects Context Summary
18. Turn Lane off U.S. Highway 60 at Magma Mine Road – Turn lane constructed for safety reasons along eastbound U.S. Highway 60 at Magma Mine Road.	Spatial Context: Zone A Temporal Context: Past Potential Cumulative Effects: ES, OFR, S
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 AHC are probable. Surface disturbance could potentially affect cultural resources and recreational uses in the Oak Flat area.	Spatial Context: Zones A, B and C Temporal Context: Future Potential Cumulative Effects: AQ, W, AHC, CR, OFR, S, NARP, AR
20. U.S. Highway 60 Improvements at Pinto Valley Turn-off – Four-mile passing lane under construction between the Pinto Valley Mine turn-off 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 the Forest Service and ADOT.	Spatial Context: Zone B Temporal Context: Present and Future Potential Cumulative Effects: AQ, ES, W, S
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.	Spatial Context: Zones A, B, C and D Temporal Context: Present and Future Potential Cumulative Effects: ES, W, AHC, S
22. Salt River Project (SRP) and Arizona Public Service (APS) Power Lines and SRP Substation – Several aboveground power lines occur in the vicinity of the PAA. An 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 (which has not yet been obtained) immediately to the west of this corridor to add a 230-kV line to service the Kearny/Ray Mine area. The SRP Silver King substation is located in Zones A and B. An 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 affects visual aesthetics, which in turn affects recreational uses.	Spatial Context: Zones A and B Temporal Context: Past, Present and Future Potential Cumulative Effects: AQ, W, AHC, CR, OFR, NARP
23. Grazing on Federal and State Trust Land – Most Federal and State Trust lands currently used for livestock grazing purposes. Livestock grazing has historically occurred in the PAA and continues today. Surface disturbance and habitat modification associated with grazing have potential to affect wildlife, vegetation (including the AHC), erosion and sedimentation, and cultural resources located on the surface.	Spatial Context: Zones A, B, C and D Temporal Context: Past, Present and Future Potential Cumulative Effects: W, AHC, ES, CR

Table 3-18. (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, AHC, erosion and sedimentation potential, and recreational uses. The 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 Trust Lands – State Trust lands are periodically auctioned for development to fund public schools. Lands west of the PAA and east of the Phoenix metropolitan area are largely State Trust 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 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, and 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 eliminate cross-country travel and limit travel to 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 recreational 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 Roads – Off-highway vehicle driving is a popular recreational use on National Forest System Lands in the vicinity of the PAA and throughout the 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 areas. 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 3-18. (Continued)

Activity (Number References Activity ID on Figure 3-11)	Cumulative Effects Context Summary
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 the Sonoran Desert in the TNF. Provides accessible interpretive trail, reclamation of prospecting pits and open mines near proposed system trails, and installation of fencing and signage to deter motorized vehicle use.	Spatial Context: Zone D Temporal Context: Present and Future Potential Cumulative Effects: W/W, ES, RA, CR/CR
31. Tonto National Forest Recreational Facility Analysis – Process to assist the TNF in creating a sustainable program that aligns recreation sites and facilities with visitor needs.	Spatial Context: Zones A, B, C and D Temporal Context: Present and Future Potential Cumulative Effects: OFR, RA
32. Apache Leap Recreational Uses – Small user-created hiking trails have been placed from FR 315 northeast to the top of Apache Leap. Effects to native wildlife and vegetation in the area.	Spatial Context: Zone A Temporal Context: Past, Present and Future Potential Cumulative Effects: W, CR, OFR
33. Devils Canyon Recreational Uses – Recreational uses include hiking, bird watching and canyoneering. These uses contribute to air emissions associated with mobile sources and affect native wildlife and vegetation in the area.	Spatial Context: Zone A Temporal Context: Past, Present and Future Potential Cumulative Effects: AQ, W, AHC, CR, OFR
34. Arizona Trail – Continuous 800+ mile trail across Arizona from Mexico to Utah. Traverses the TNF Globe Ranger District approximately 3 miles west of Superior and approximately 7 miles west of the PAA. The trail could potentially put humans in areas where interaction with wildlife becomes more likely.	Spatial Context: Zones B, C and D Temporal Context: Past, Present and Future Potential Cumulative Effects: W, RA
35. Phoenix North Abandoned Mine Lands Remediation Project – Project to remediate physical safety hazards associated with abandoned mine features located in the Globe and Mesa Ranger districts of the TNF.	Spatial Context: Zone D Temporal Context: Past, Present and Future Potential Cumulative Effects: CR/CR, W/W
36. Superior West Project – Freeport McMoRan proposes to conduct a magnetotelluric geophysical investigation west of Superior, Arizona. Sites along the survey grid would be accessed from existing roads and foot travel.	Spatial Context: Zones B and C Temporal Context: Present and Future Potential Cumulative Effects: None
37. Pinaladera Fuels Management Project – Fuels reduction of approximately 83,558 acres south of Globe. Area includes the Pinal Mountain Recreation Area, located in the Pinal Mountains south of Globe and east of Devils Canyon.	Spatial Context: Zone D Temporal Context: Future Potential Cumulative Effects: AQ, CR, RA, W/W, ES

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 the EPA as a Nonattainment Area 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 1-hour ozone maximum concentrations in Pinal County have generally decreased from 1993 to 2007 (Figures 3-1 and 3-2). 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 the 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's 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 has 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 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 Trust and private lands are complete.

The cumulative effects associated with the no action alternative and the activities outlined in Table 3-18 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 cumulative effects similar to 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 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. 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 the construction of this alternative, compared to the proposed action, would be minimal. The total miles traveled to access Pre-feasibility Activity 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 Activity 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 the vegetation cover and the extent of the 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 the 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 is 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 they 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 Trust lands included as well. While State Trust lands, particularly toward Florence and Florence Junction, may be developed at some point in the future, the vast majority of lands in the analysis area are protected and will not be adversely impacted by the present and reasonably foreseeable future actions. The relatively small area of impact from the Pre-feasibility Activities is spread over a large area of National Forest System Lands and is 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 0.07 percent increase in new surface disturbance when compared to the proposed action and the likelihood of animal-vehicle collisions 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 6.3 percent increase in new surface disturbance when compared to the proposed action and the likelihood of animal-vehicle collisions 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 a 7.0 percent increase in new surface disturbance over the proposed action and the likelihood of animal-vehicle collisions 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 effects to AHC 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 occurs within portions of Zones A, B, C and D identified in Table 3-18.

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 AHC 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 the withdrawal of certain National Forest System Lands from mineral entry for AHC 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 AHC; therefore, it would not contribute to any cumulative effects.

Cumulative Arizona Hedgehog Cactus 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 and reasonably foreseeable future actions to determine whether significant cumulative impacts may occur.

Cumulative Arizona Hedgehog Cactus Effects of 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 the construction of the West Access Route 4a alternative and drill sites 4E and 4W 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 the construction of the West Access Route 4b alternative and drill sites 4E and 4W 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 the cumulative effects associated with recreational uses in and around Oak Flat are represented by Zone A (Table 3-18 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 the Oak Flat Campground.

Cumulative Recreation Effects of the Proposed Action

Cumulative effects analysis Zone A is largely comprised of public land that provides a variety of recreational opportunities (Table 3-18). Activities within this zone that influence the baseline/trend for determining cumulative recreation effects are provided in Table 3-18 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, the 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 the 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 the Withdrawal Area. It should be noted that at these same times, the commercial truck traffic climbing the grade up 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 Trust land as well.

There will be impacts from the implementation of the proposed action to 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 the 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 the West Access Route 4a alternative.

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 would accommodate forecasted increases in traffic in the 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 related 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 Route 4a alternative.

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

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

No impacts would occur under the no action alternative; 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 the Forest Service's ongoing 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, prehistoric and other cultural resources within, and in the vicinity of, the PAA and we have evaluated the potential cumulative effects within cumulative impact analysis Zones A, B and C (Table 3-18). Prehistoric cultures that are known from this area include the 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 NHPA, many of these unavoidable impacts have been mitigated by the avoidance of impacts or the implementation of specific data recovery efforts. Collectively this has helped to preserve the 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 sites. The mitigation measures outlined in this EA require active monitoring during the 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 sites and would not result in any significant adverse impacts to cultural resources.

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

The 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

The 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

The 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.

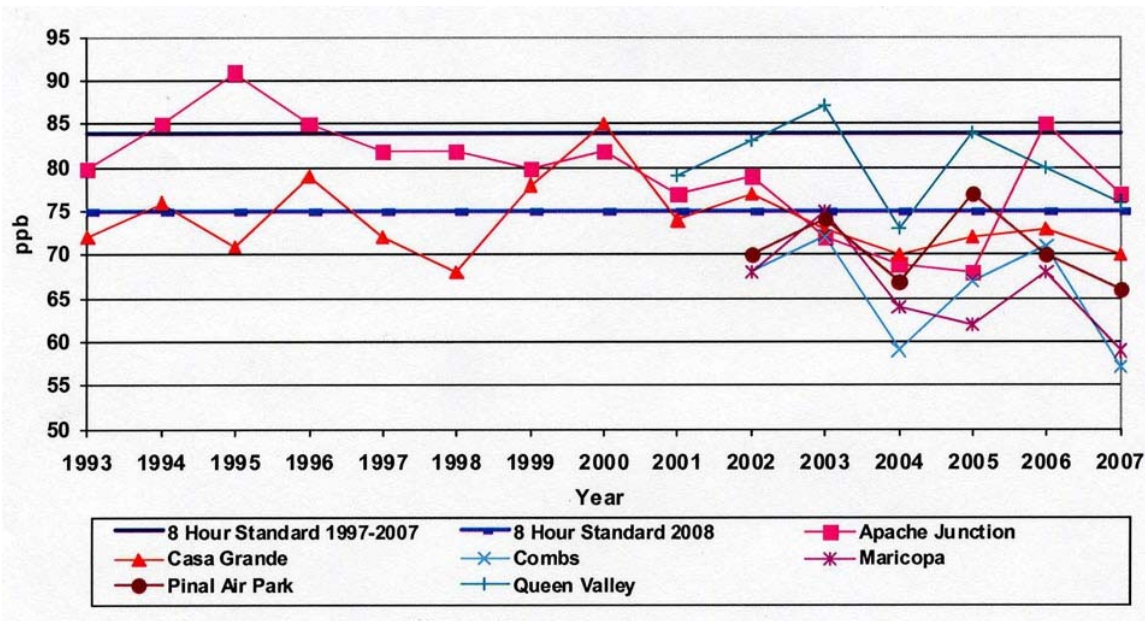


Figure 3-1. Eight-Hour Ozone Trends – Fourth Highest Concentration. [Source: Pinal County Air Quality Control District 2007 Ambient Monitoring Network Plan and Data Summary (final document dated June 16, 2008)]

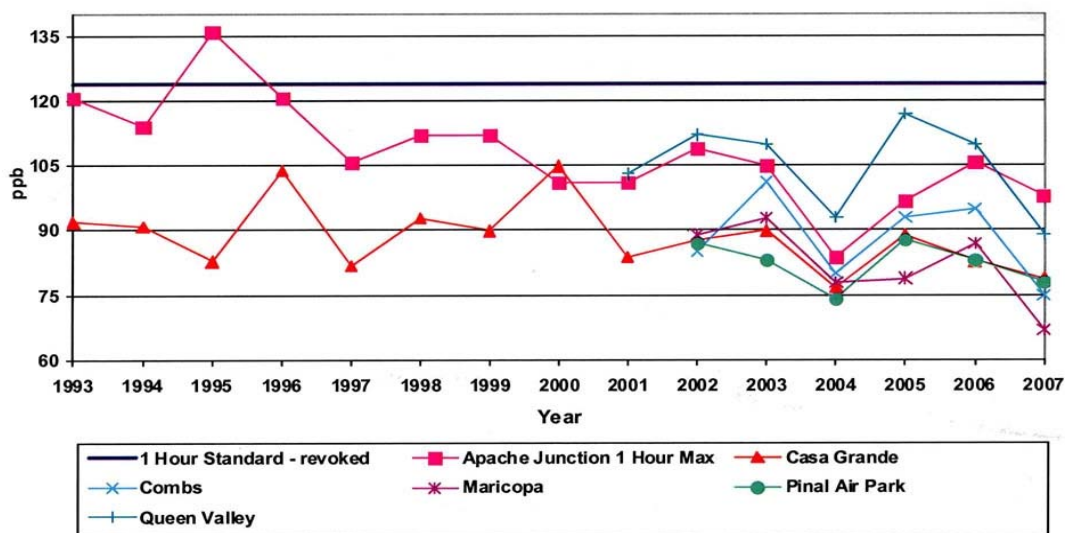


Figure 3-2. One-Hour Ozone Trends – Maximum Concentration. [Source: Pinal County Air Quality Control District 2007 Ambient Monitoring Network Plan and Data Summary (final document dated June 16, 2008)]

Sound Level Contours¹ A-weighted decibels (dBA)

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

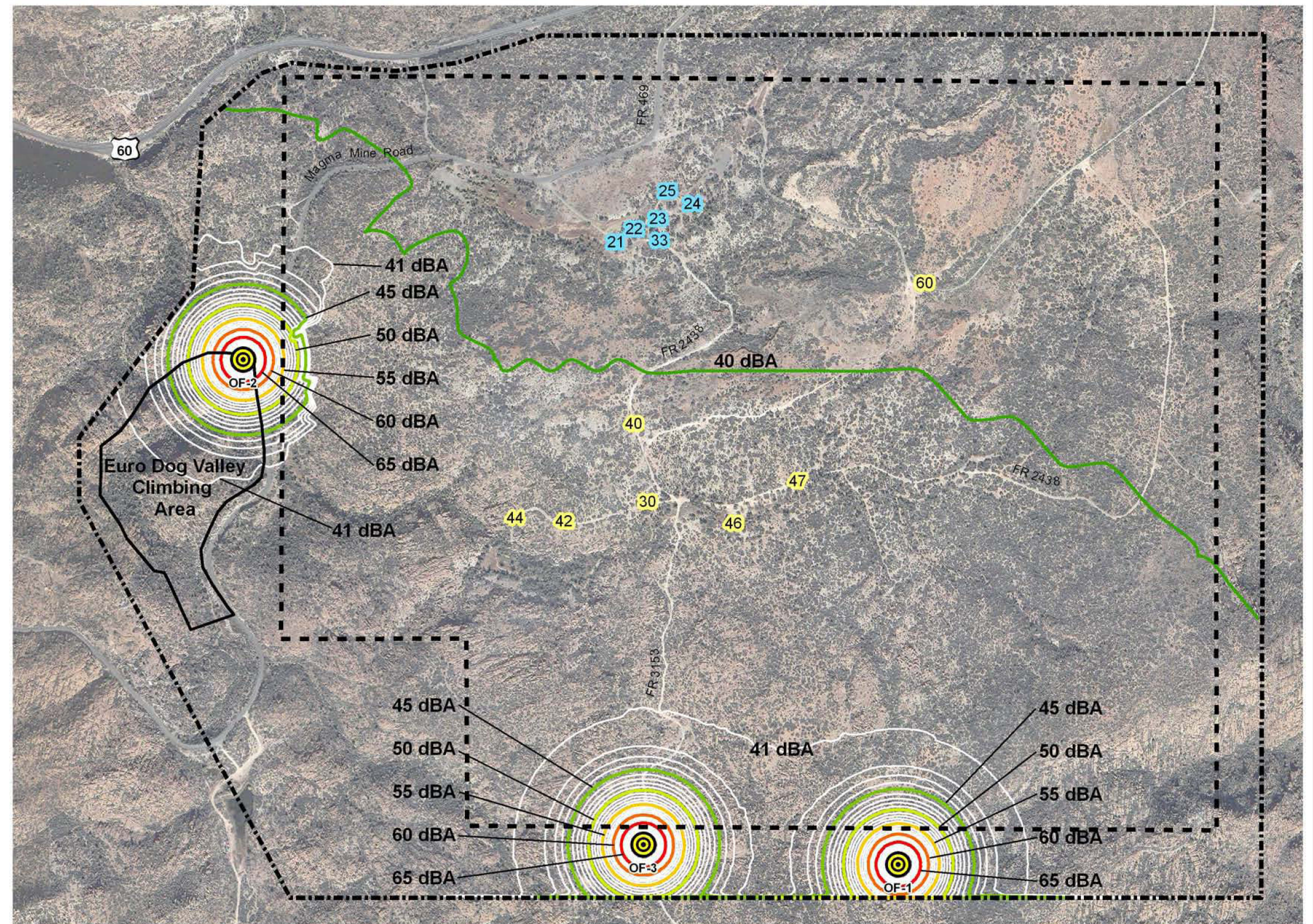
- Oak Flat Picnic and Campground Withdrawal Area Boundary
- Study Area Boundary
- ⊙ Proposed Exploration Drill Rigs

Campgrounds

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

Notes:

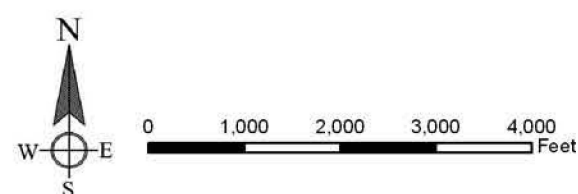
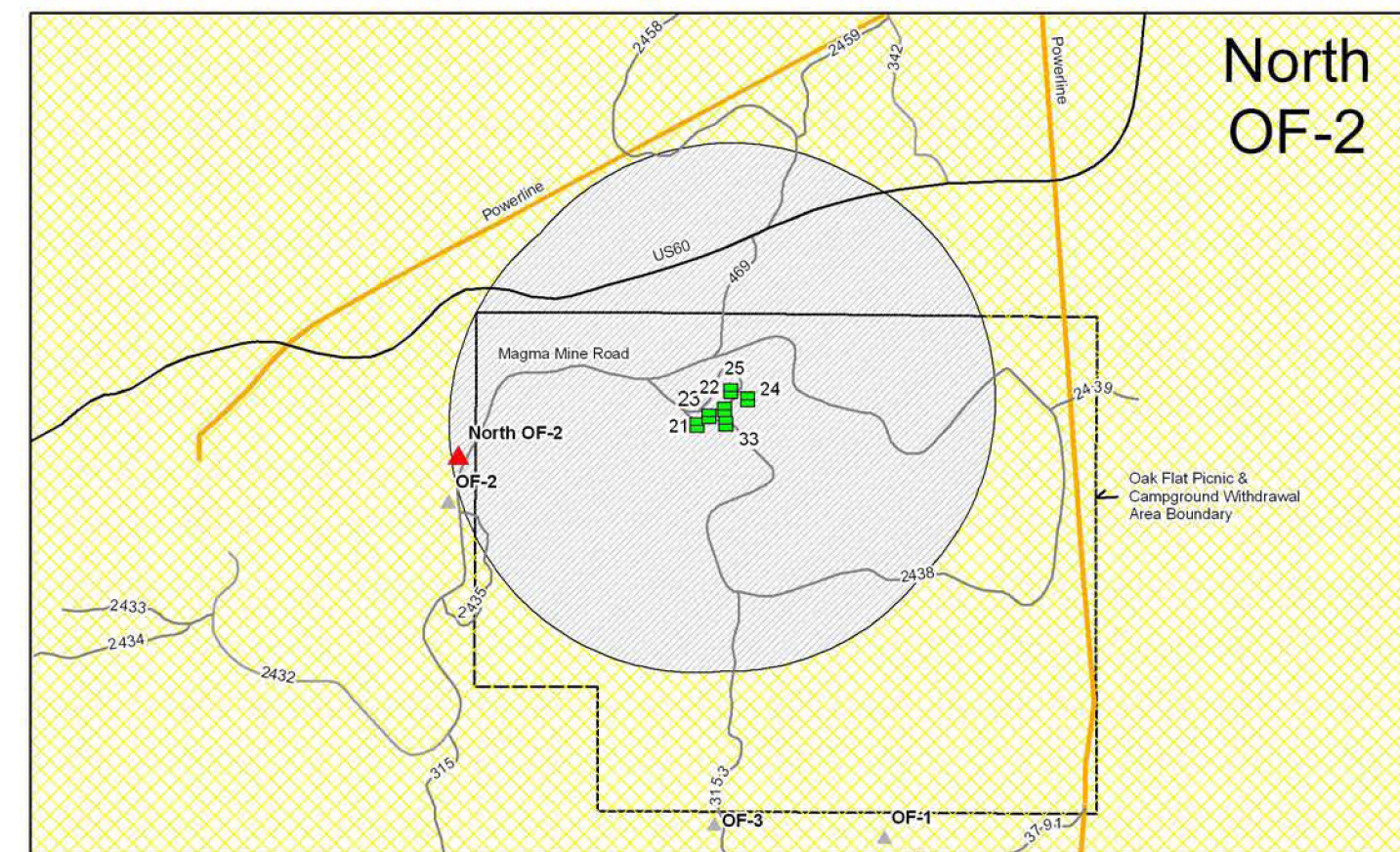
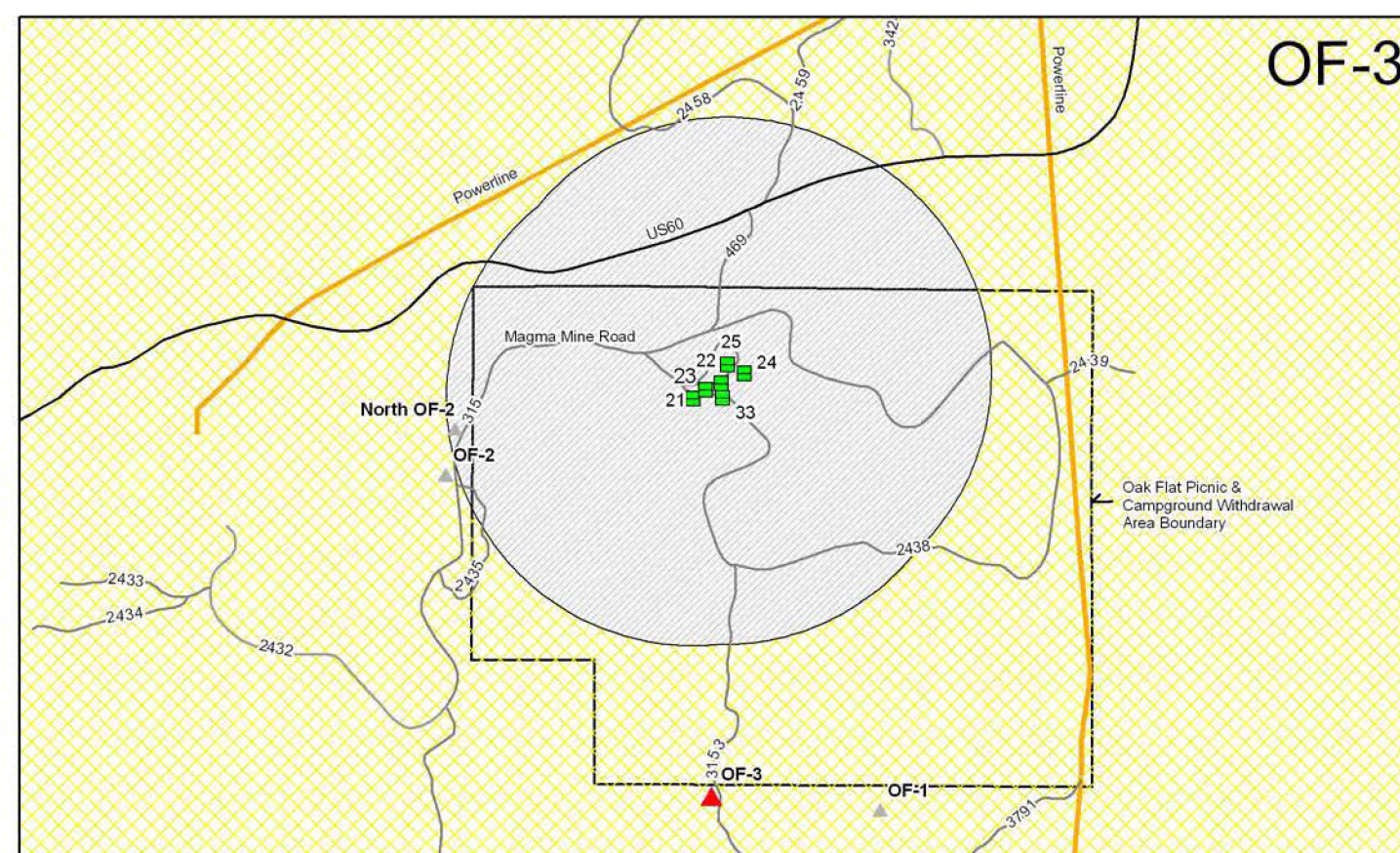
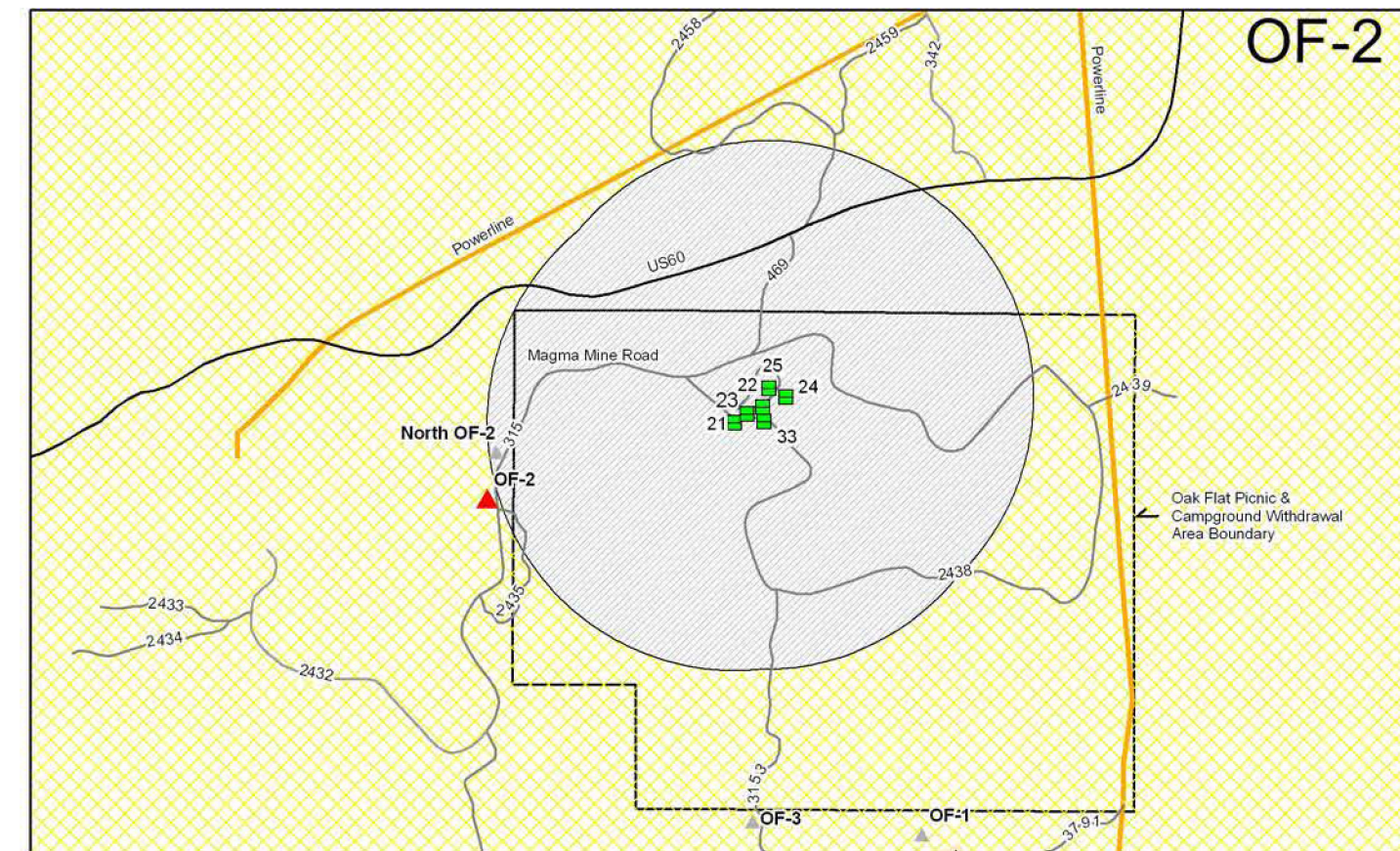
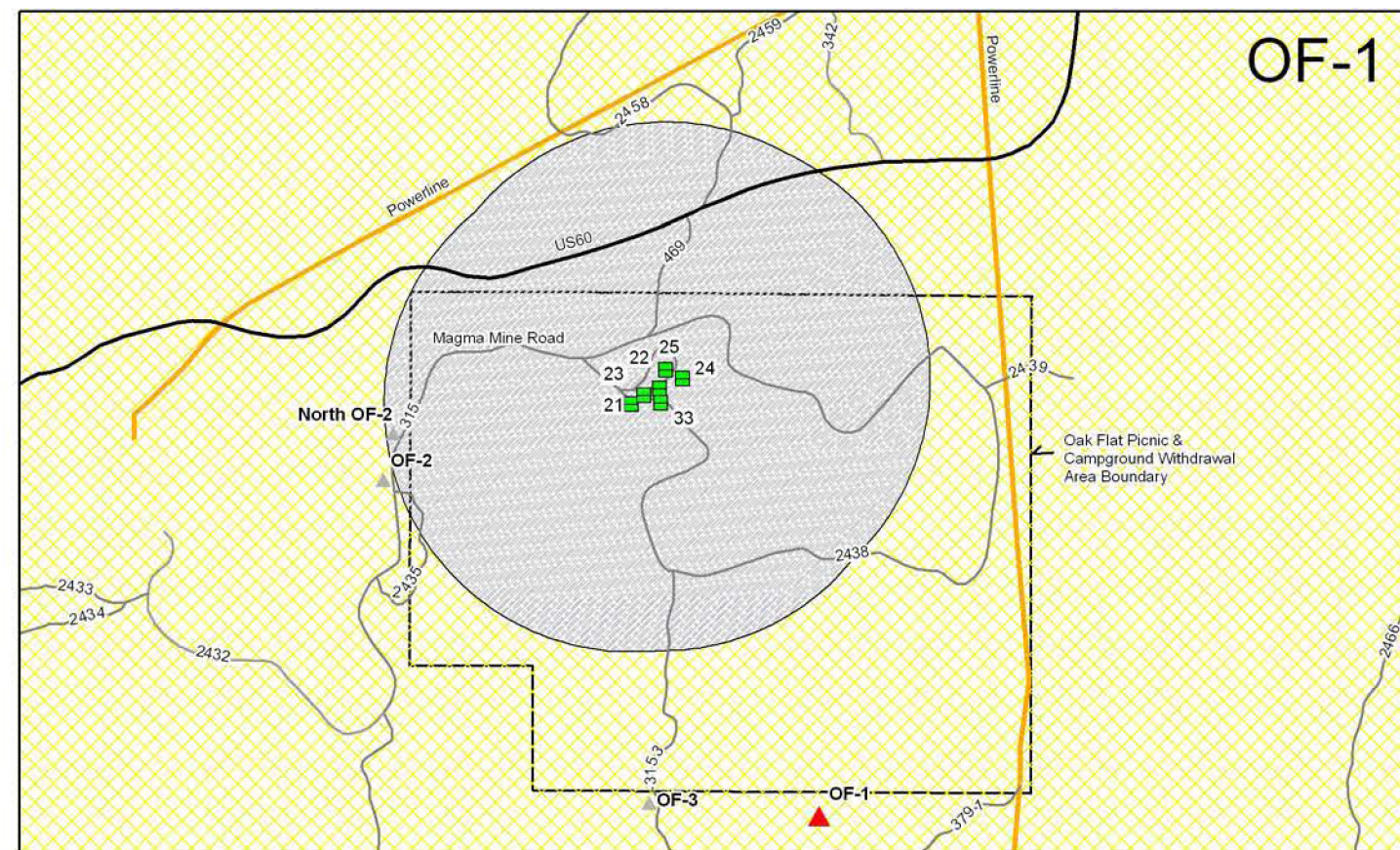
1. Results of computer model of Alternative 2: the simultaneous operation of drill rigs at sites OF-1, OF-2, and OF-3 plus a background sound level of 40 dBA.



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

Sound Level Contours Resulting from
Noise Model of Alternative 2, the Proposed Action

Figure 3-3



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 - 0.5 Mile to 3-5 Miles From Observer



Proposed Drill Site

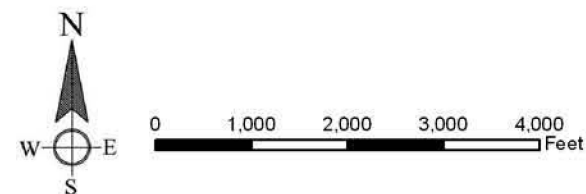
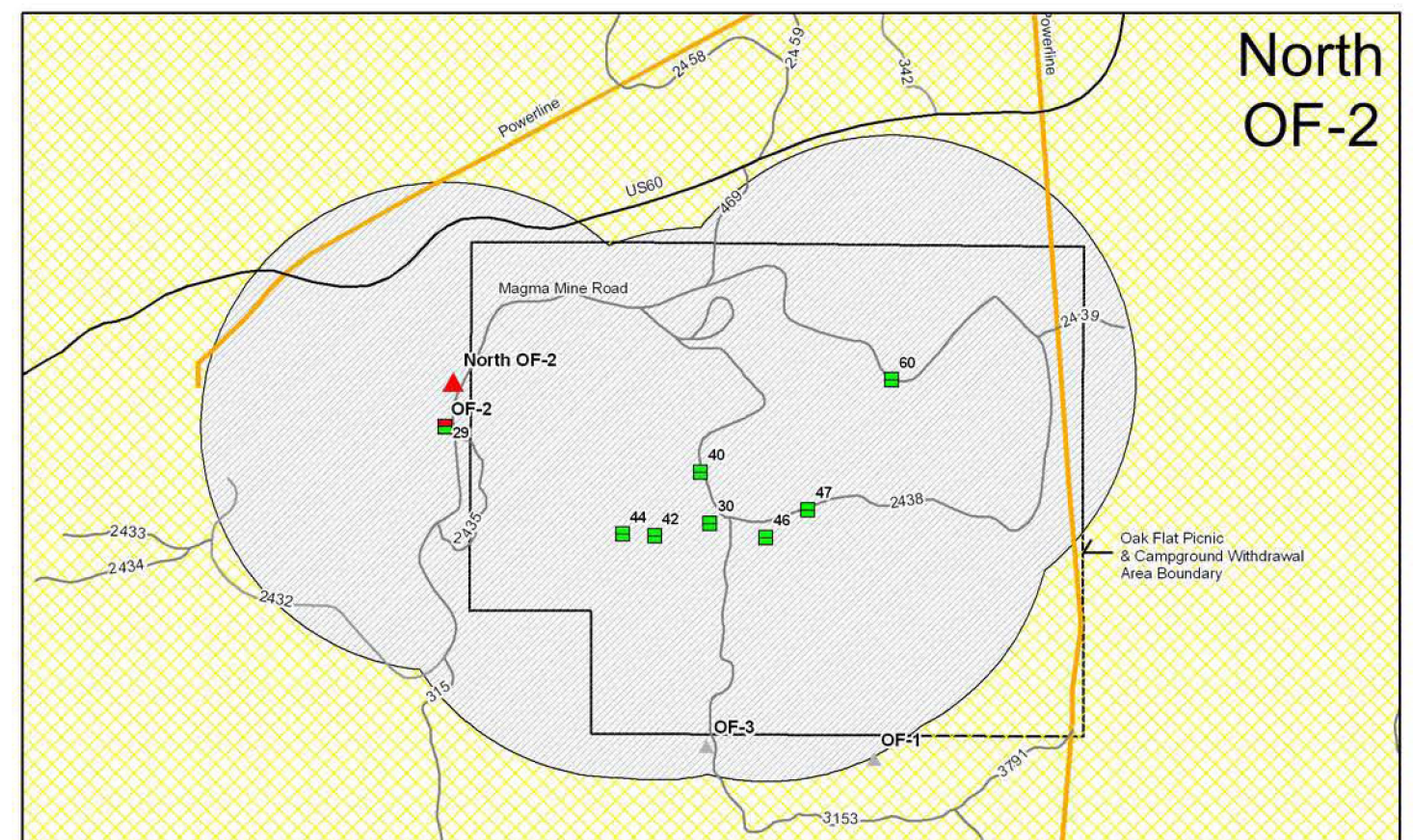
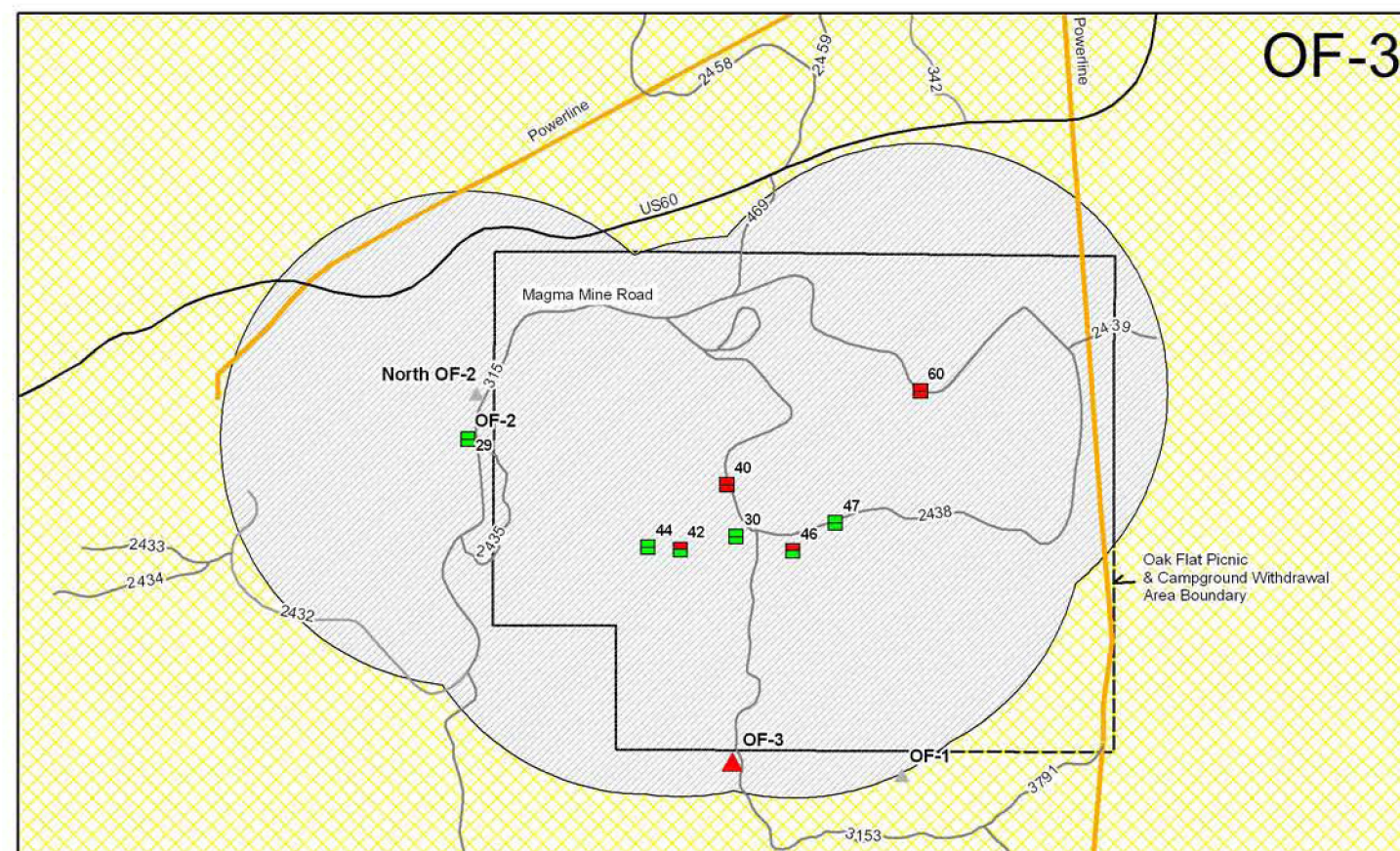
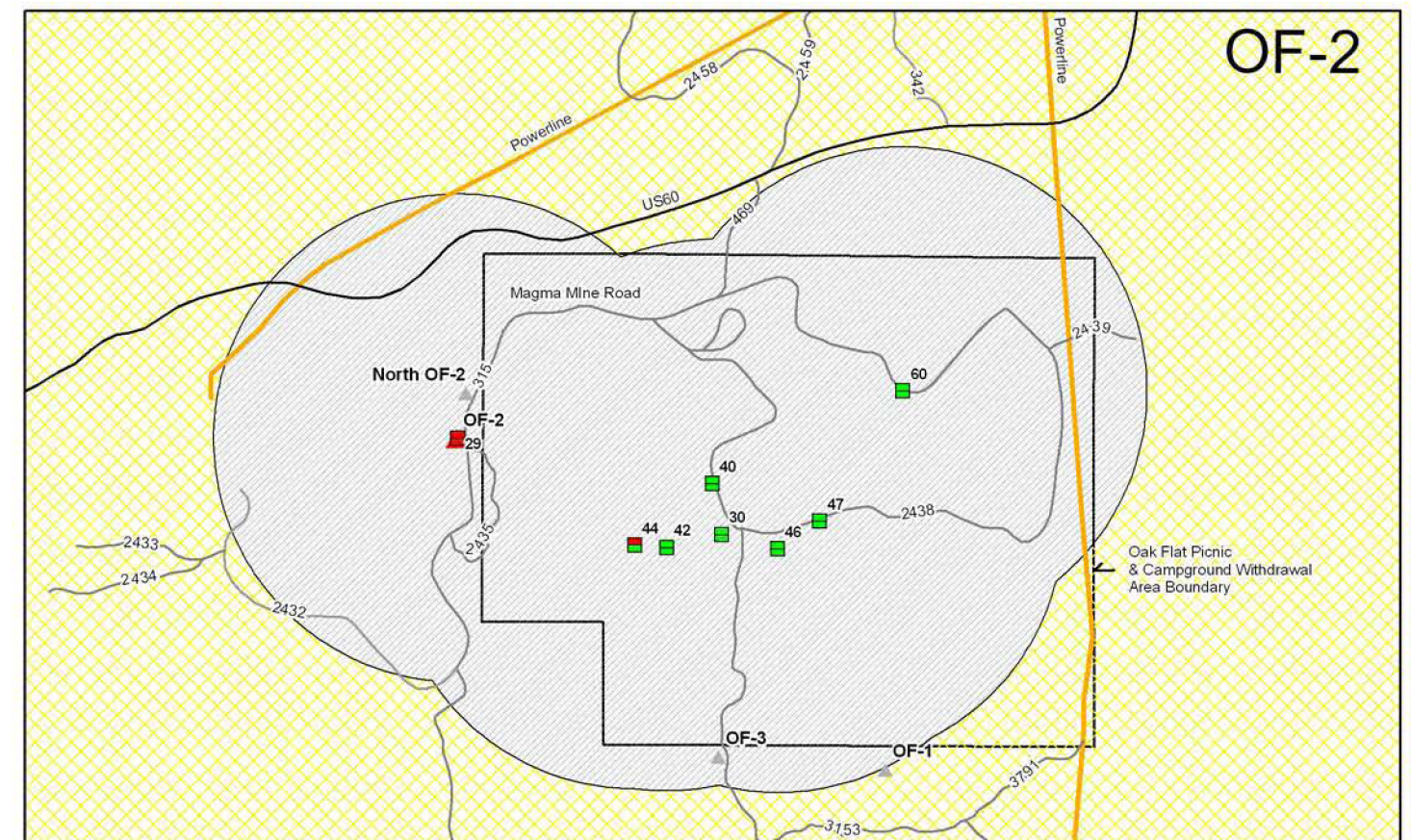
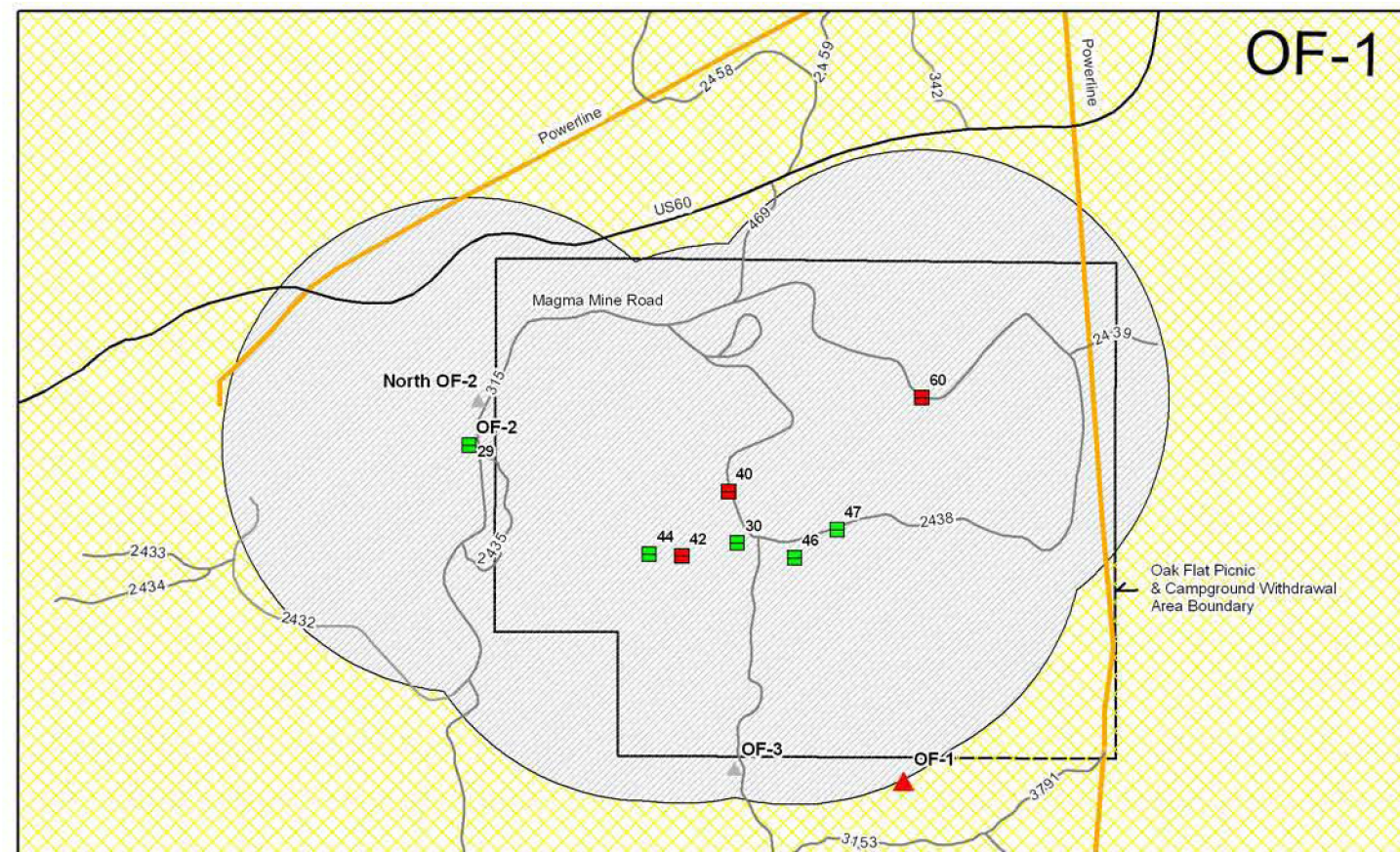


Forest Road

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 Designated Campsites at the Oak Flat Campground

Figure 3-4




Legend


Key Observation Points

☐ No Balloons Sighted

80' Balloon Sighted

12' Balloon Sighted

 12 Balloons Sighted

 Both Balloons Sighted

 Foreground = 0 to 0.25 - 0.5 Miles From Observer

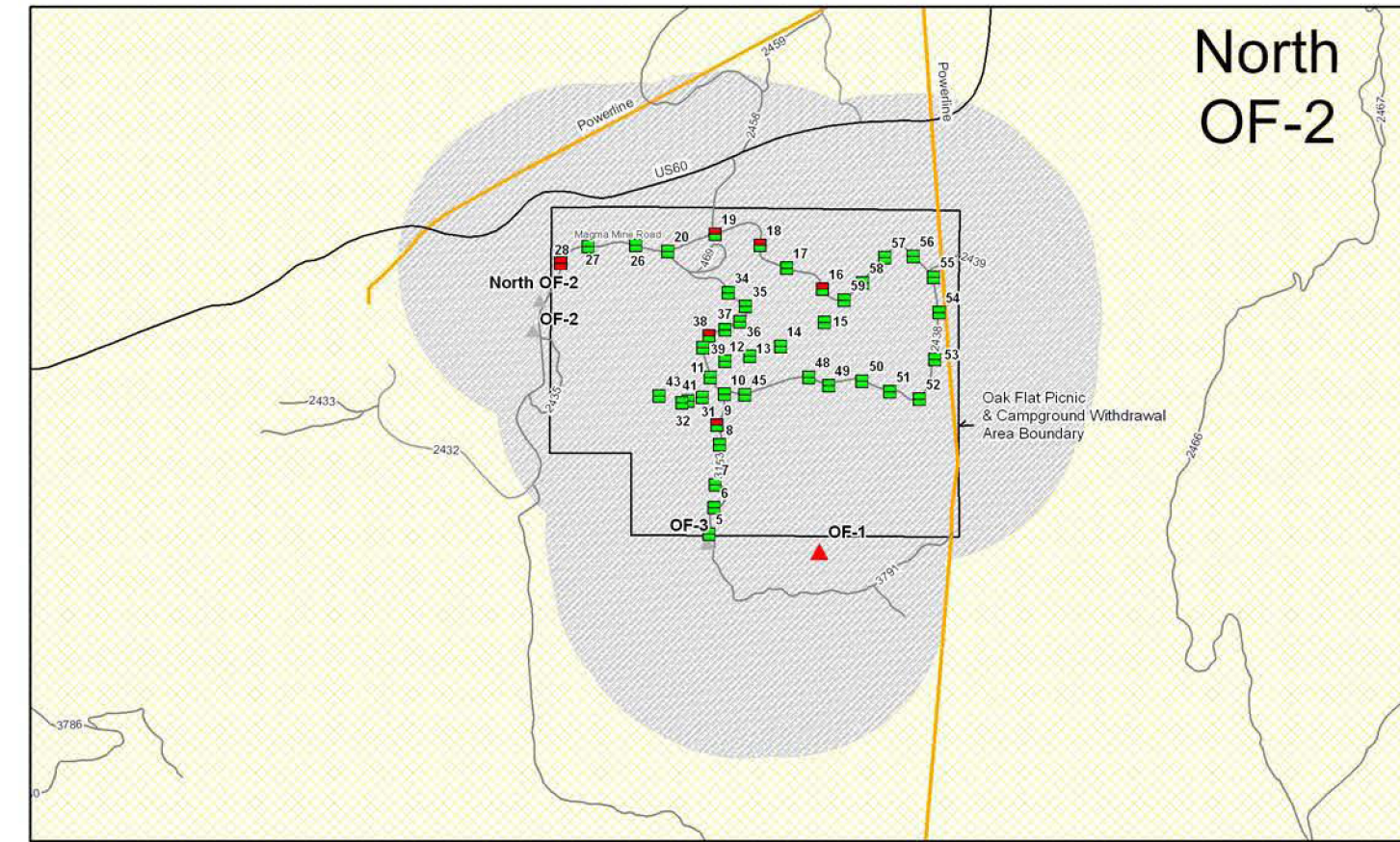
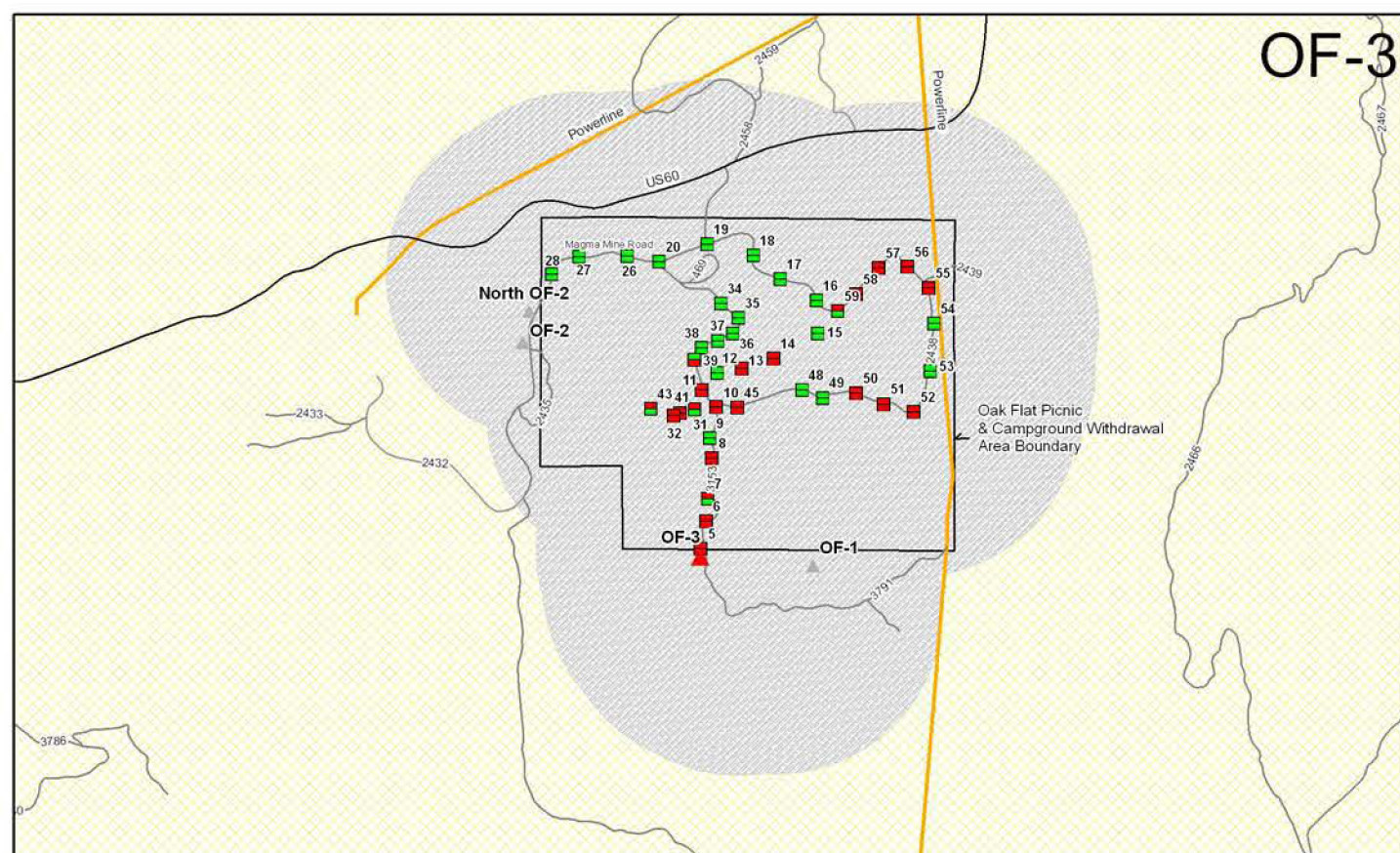
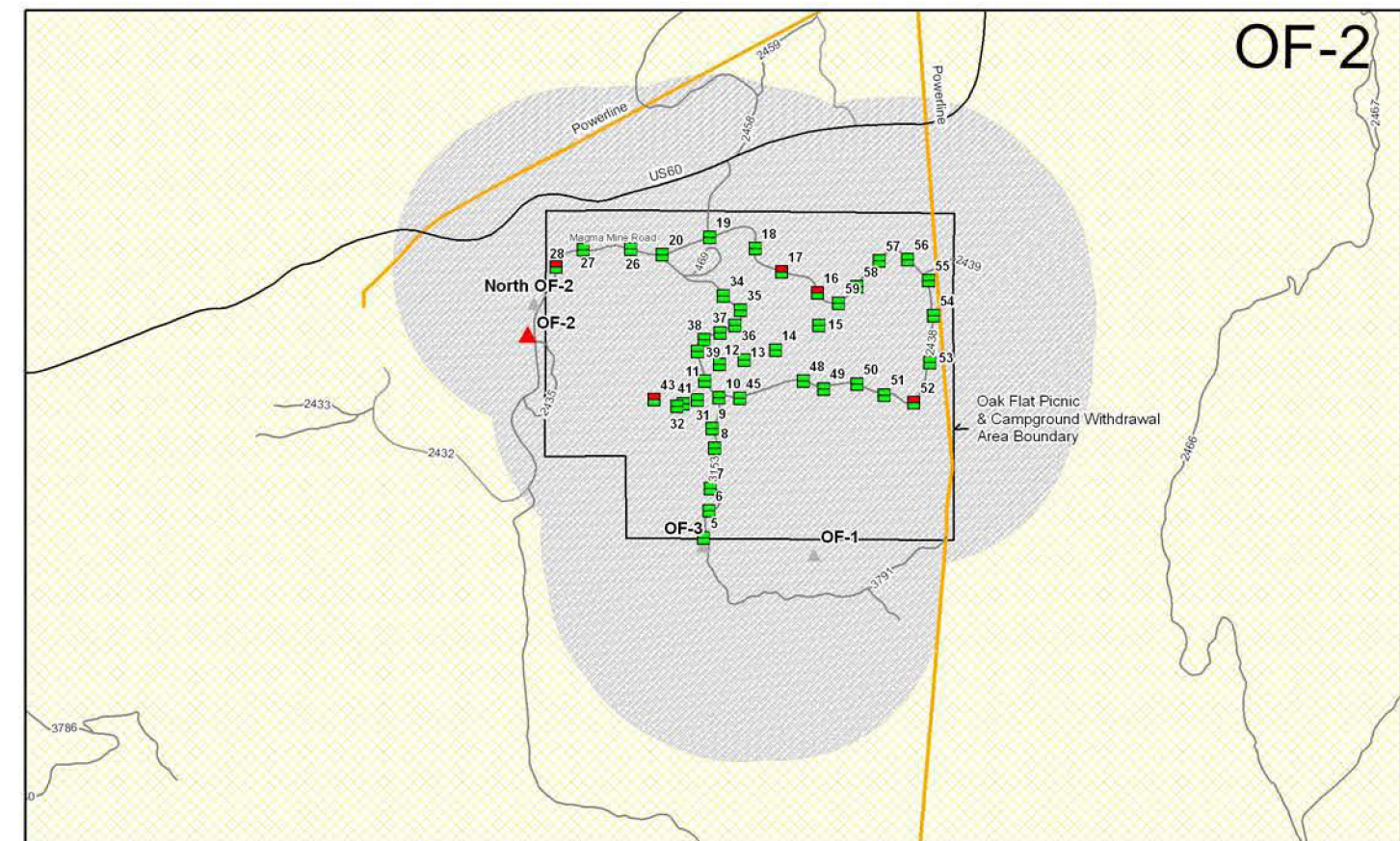
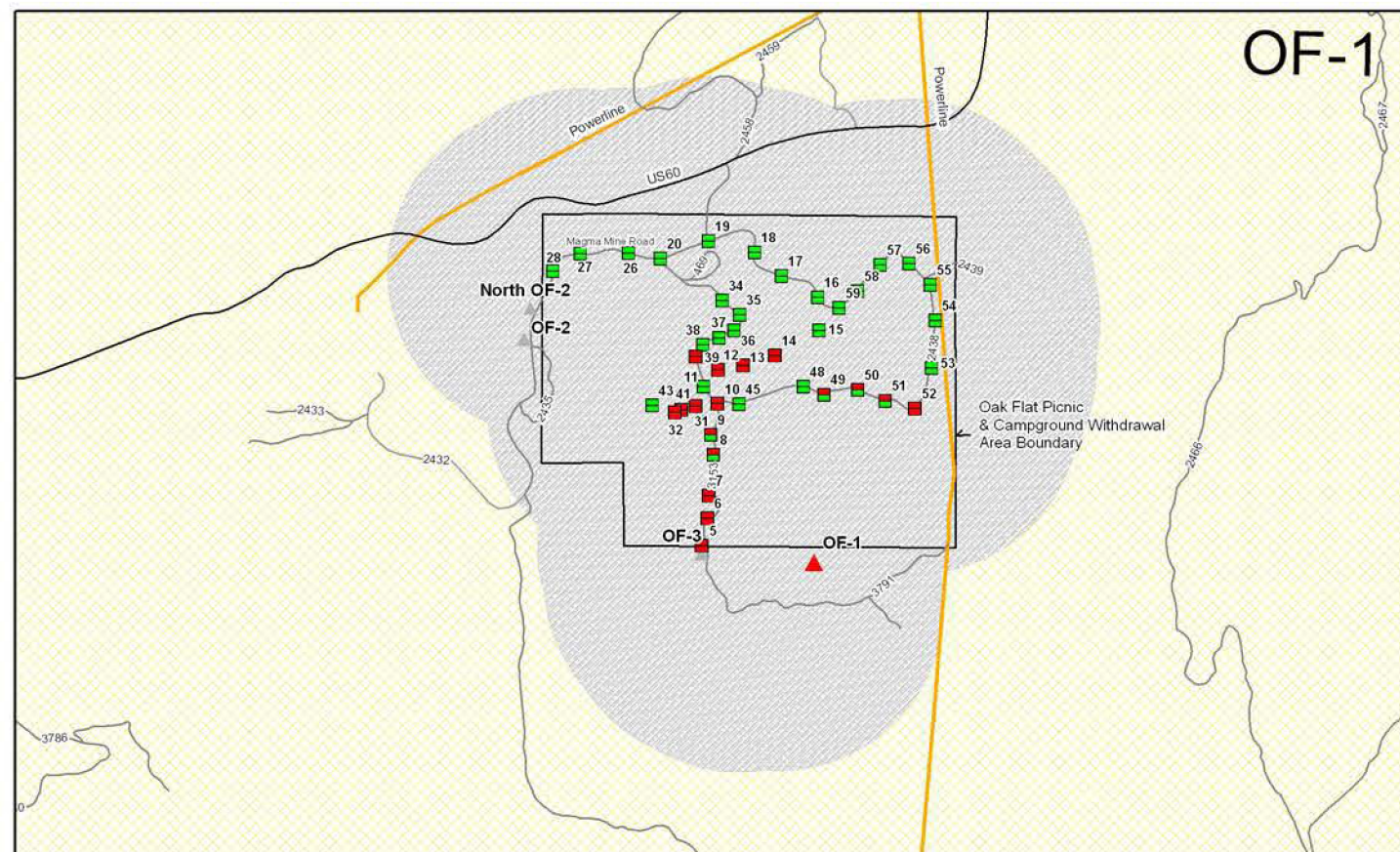
 Foreground = 0 to 0.25 - 0.5 Miles From Observer

 **Proposed Drill Site**

2958 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 Picnic & Campground Withdrawal Area and the Boulder Campsite
Figure 3-5



0 1,500 3,000 4,500 6,000 Feet

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



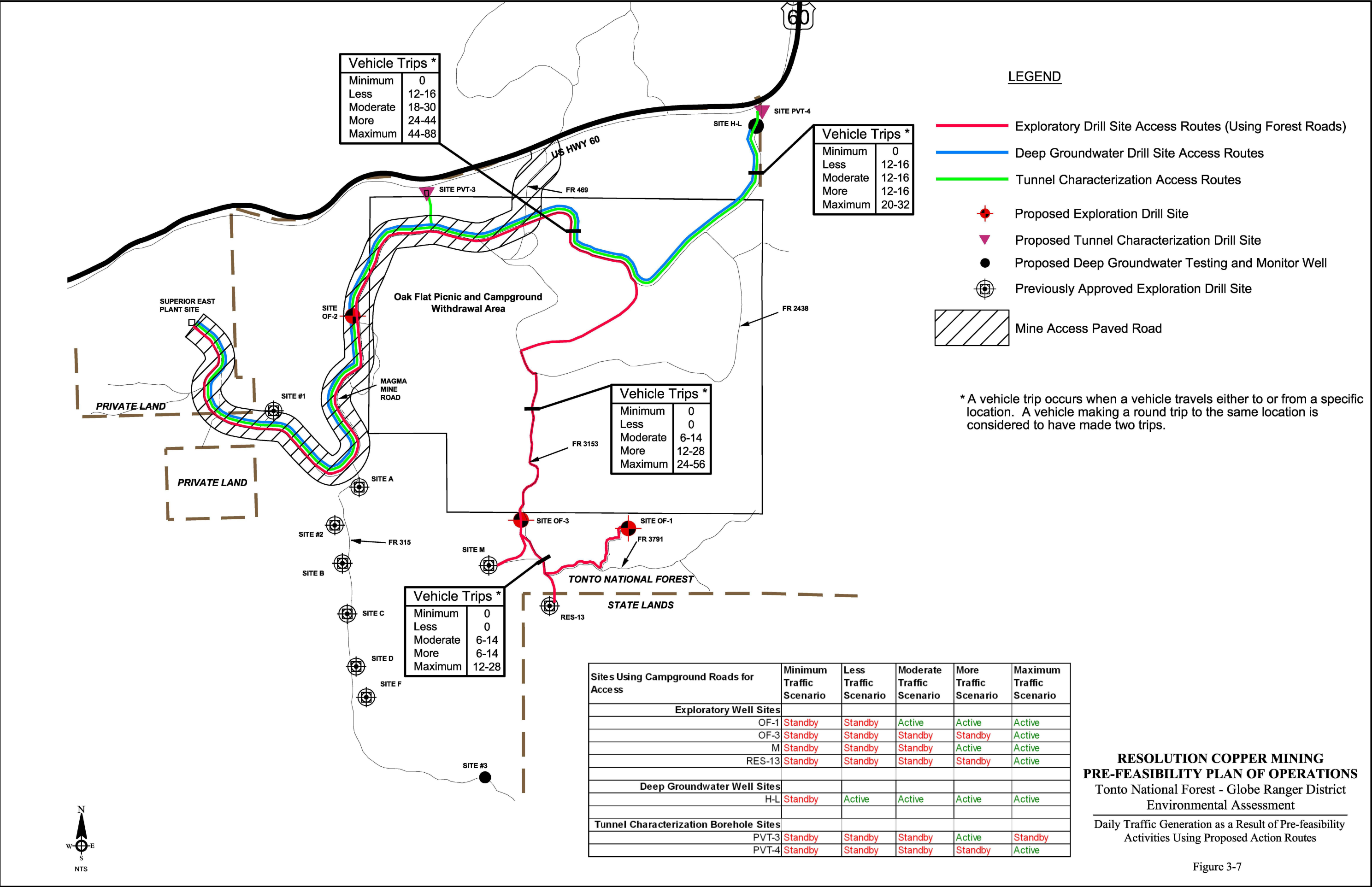
Proposed Drill Site



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 Key
Observation Points Along Roads in the Oak Flat
Picnic & Campground Withdrawal Area
Figure 3-6



**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

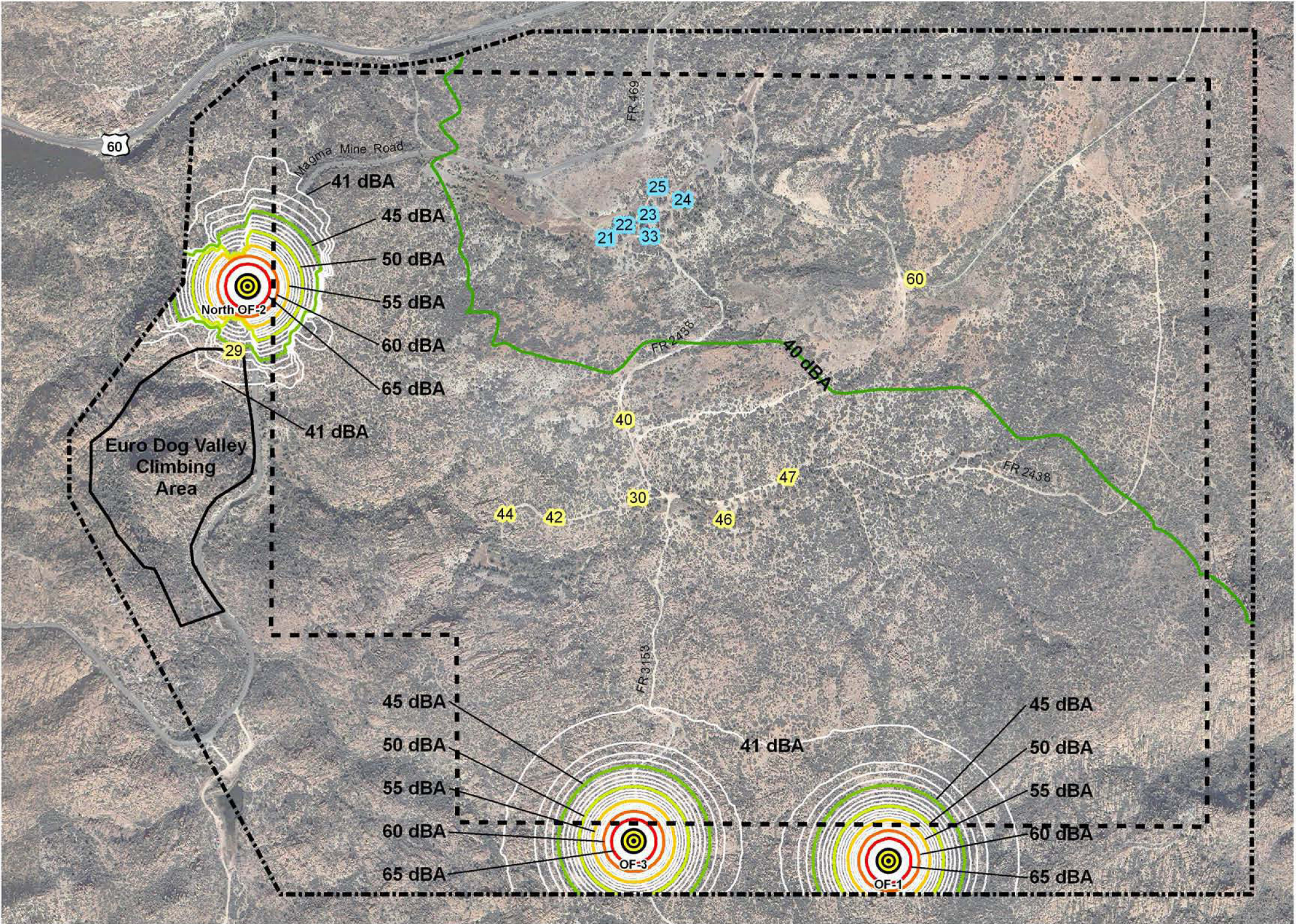
Sound Level Contours¹
A-weighted decibels (dBA)

- 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

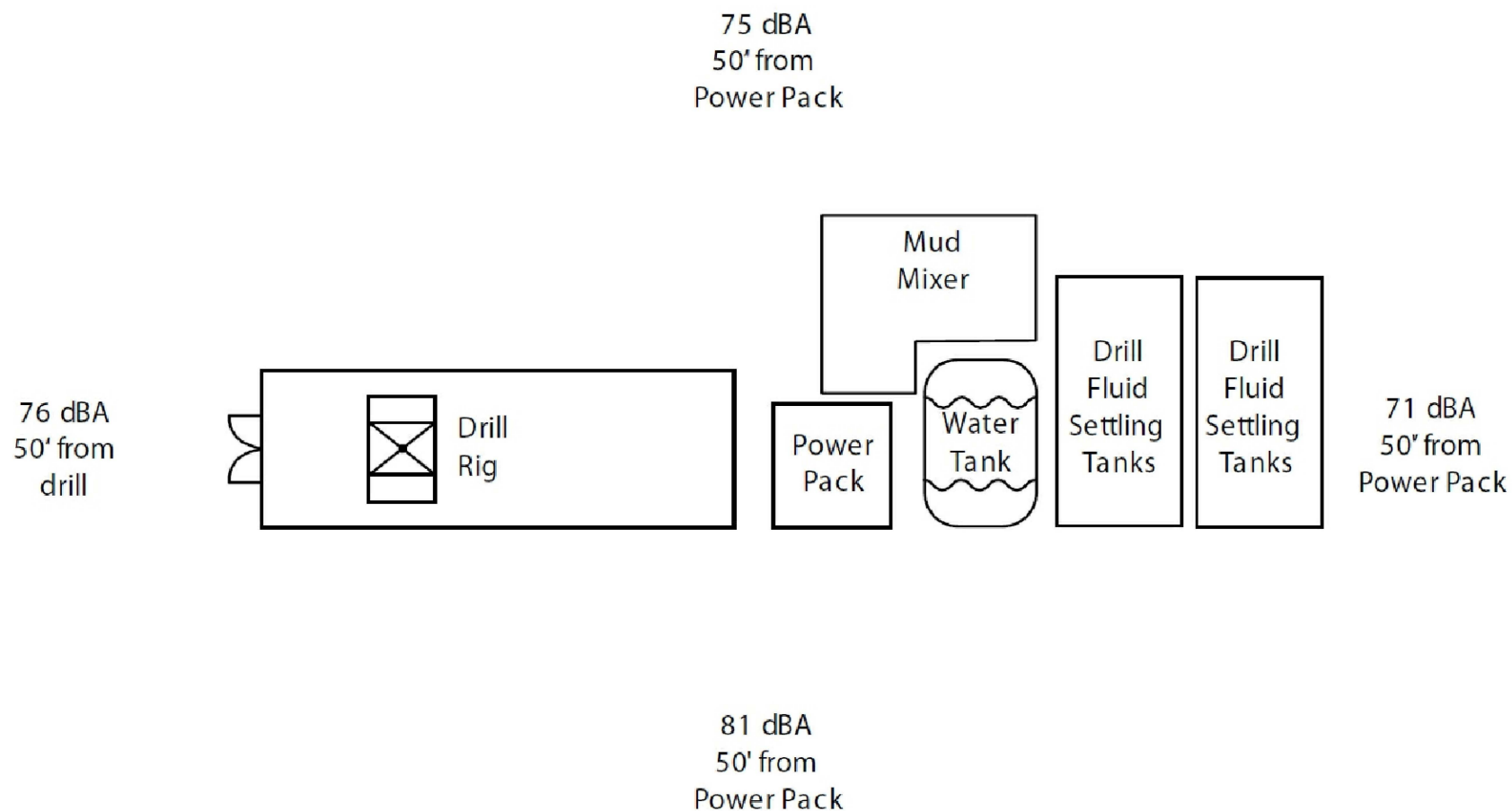
Notes:
1. Results of computer model of Alternative 3: the simultaneous operation of drill rigs at sites OF-1, North OF-2, and OF-3 plus a background sound level of 40 dBA.



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

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

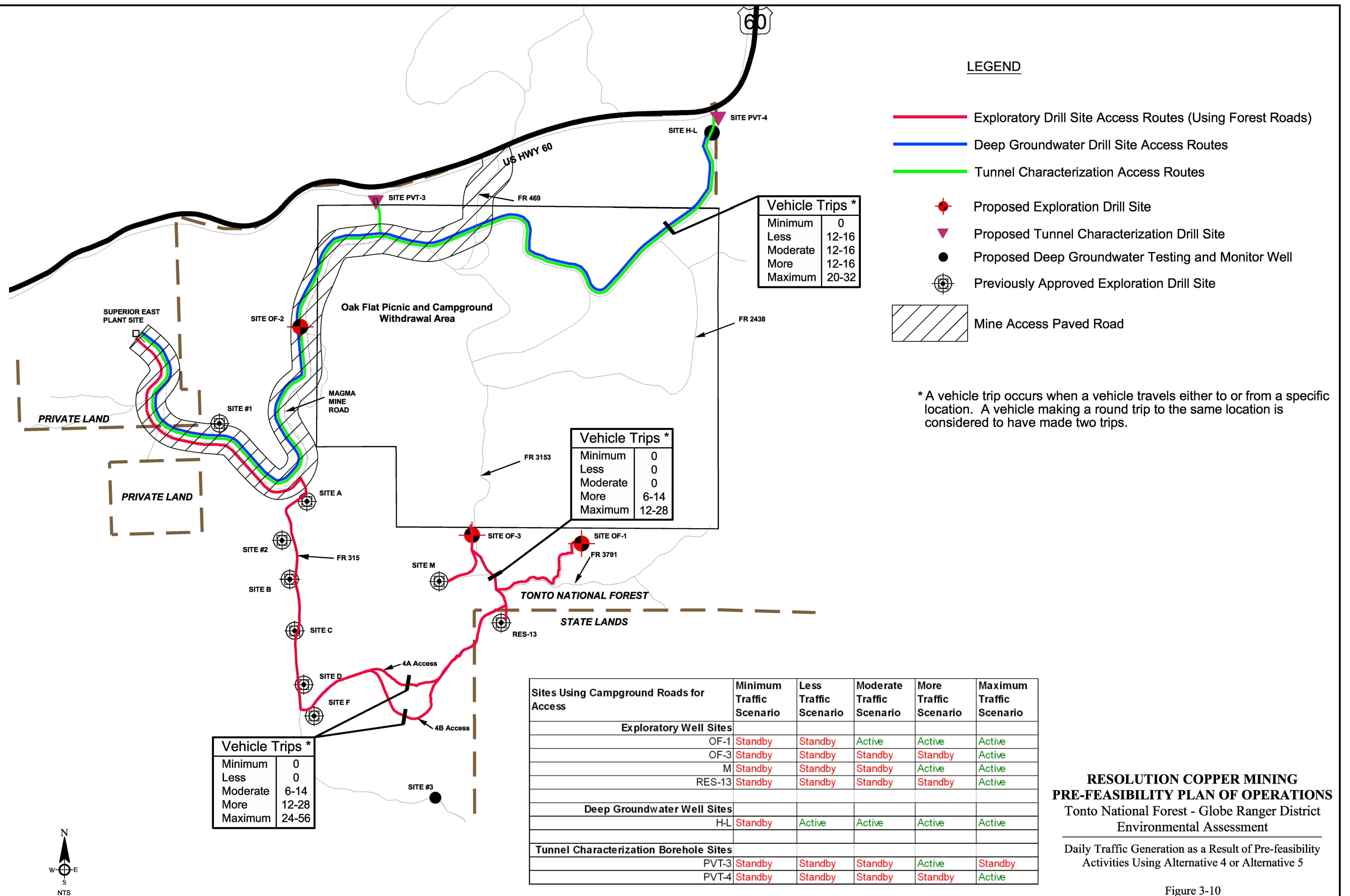
Figure 3-8

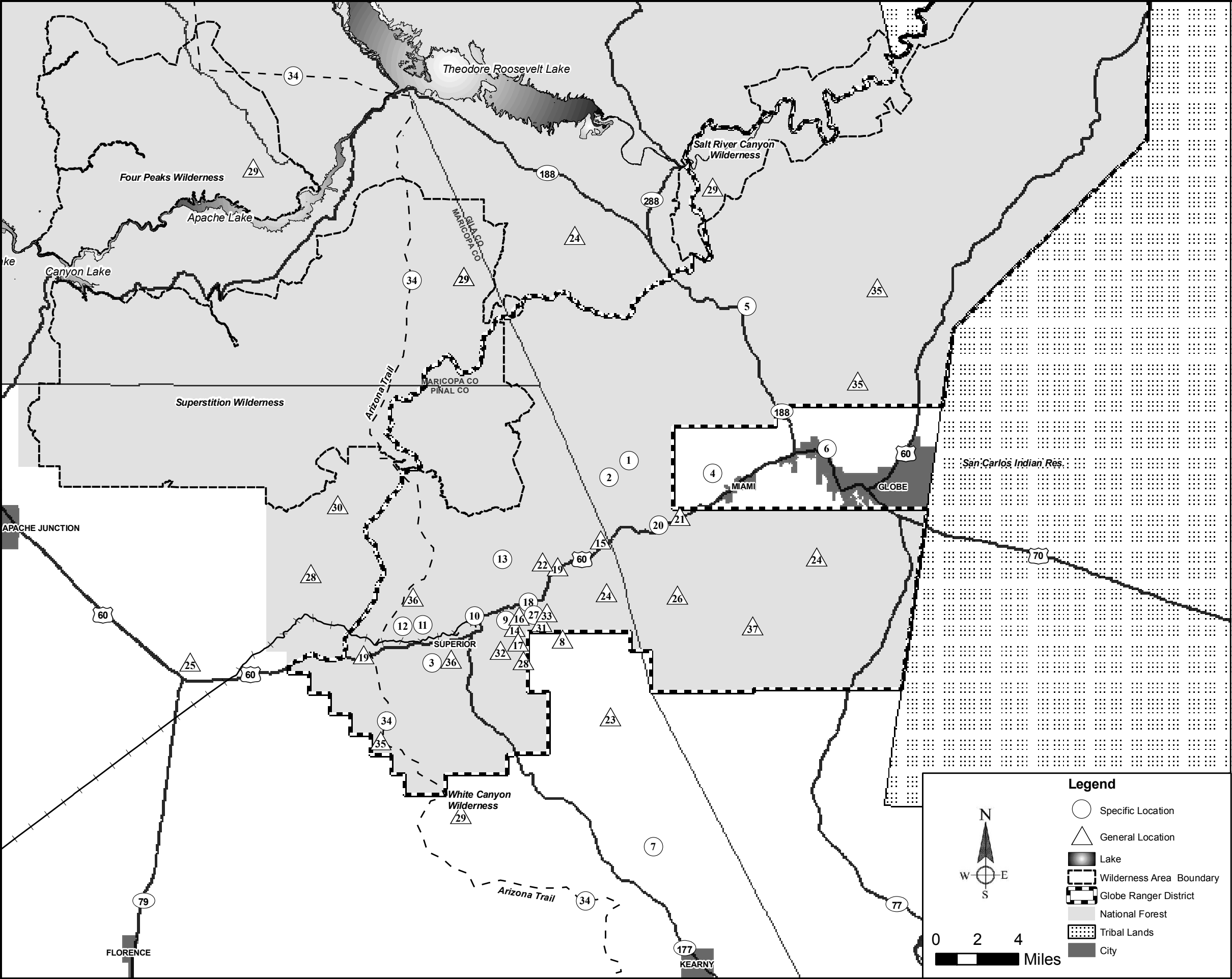


**RESOLUTION COPPER MINING
PRE-FEASIBILITY PLAN OF OPERATIONS**
Tonto National Forest - Globe Ranger District
Environmental Assessment

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

Figure 3-9





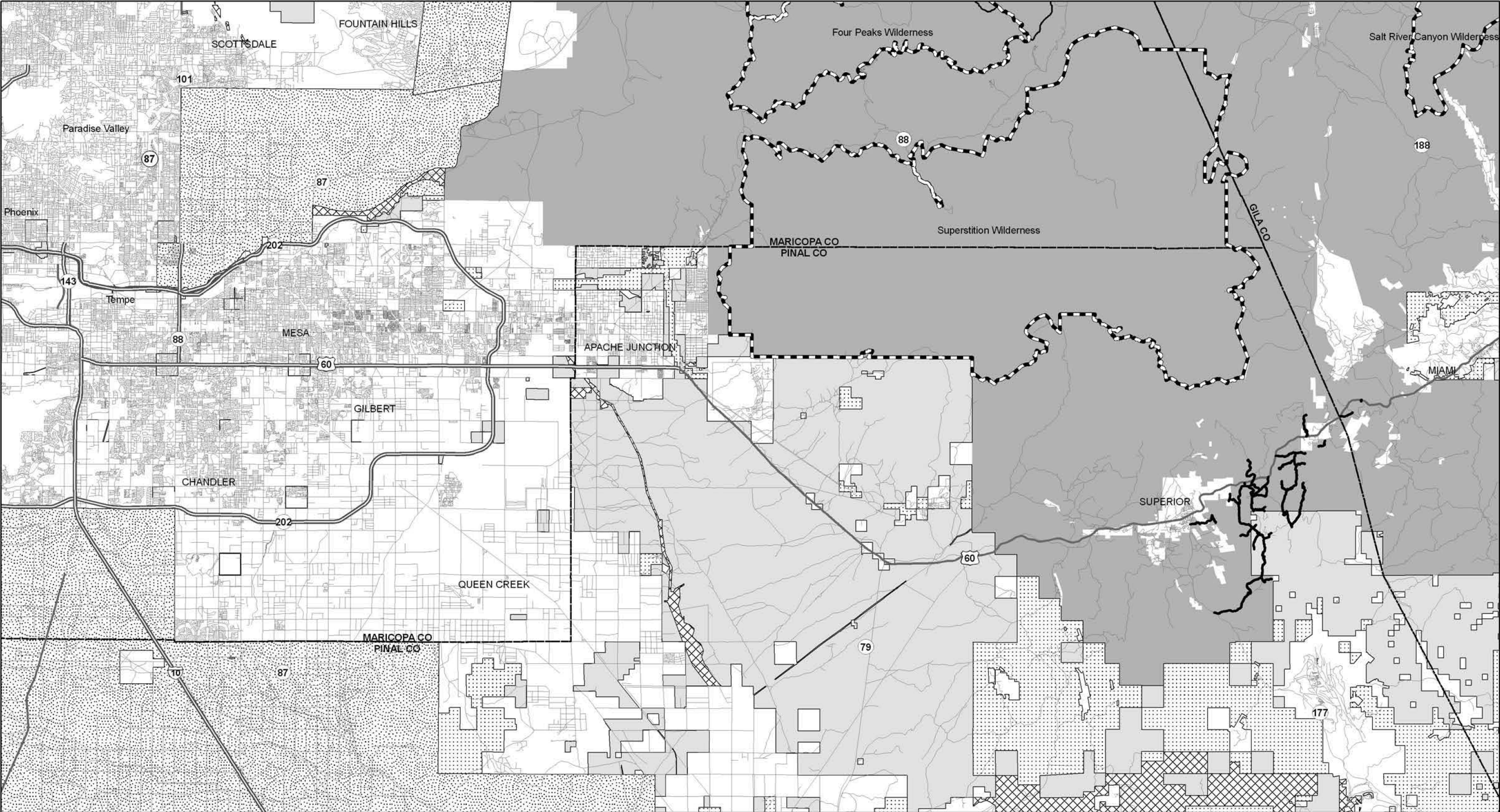
- 1 Pinto Valley Mine
- 2 Carlota Mine
- 3 Harborlite Perlite Mining Operations
- 4 Mine Properties near Miami, Arizona
- 5 Pinal Creek Remediation WQARF Project
- 6 Old Dominion Mine Closure
- 7 ASARCO Ray Mine Operations and BLM Land Exchange
- 8 RCM Exploration and Well Development on State and Private 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
- 35 Phoenix North Abandoned Mine Land Remediation Project
- 36 Superior West Project
- 37 Pinaladera Fuels Management

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

**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

- Proposed Pre-feasibility Activities
- 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

Geographic Context for Cumulative
Effects, Particularly for Air Resources

Figure 3-12

4. CONSULTATION AND COORDINATION

List of Preparers

Forest Service Interdisciplinary Team Members

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Fred Wong	Forest Biologist
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Lee Ann Atkinson	Globe District, Geologist
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Kim Vander Hoek	Forest Landscape Architect
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Gabrielle Kenton	Assistant Forest Planner/NEPA Specialist
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Michelle Mraz	Environmental Planner
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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 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

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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.

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 a 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 responses to the public comments received during the public scoping process. These comments were used by the Forest Service to identify issues of concern and help the ID Team formulate alternatives 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 parties, including private citizens, non-government organizations and agencies including 18 Tribal officials representing 10 Indian Tribes. Chapter 1 provides a more detailed account of the scoping efforts undertaken during this NEPA process. The scoping comment period closed on July 18, 2008; no comments were received after that date.

Within the scoping comment period, 31 letters, emails, faxes or comment forms (collectively referred to as comment letters) were submitted to the Tonto National Forest. All the 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 the commenters, the organization they represent and the letter number assigned to their comment. Following this table, responses to the comments are provided to 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

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 a 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.

APPENDIX B — RESPONSES TO COMMENTS ON THE PRE-DECISIONAL EA

This appendix provides responses to the public comments received during the comment period on the pre-decisional EA published on April 1, 2009. The pre-decisional EA was published on the Tonto National Forest (TNF) website and hard copies of the pre-decisional EA were provided to 11 local libraries: Apache Junction, Mesa, San Carlos, Superior, Florence, Kearny, Gila and Pinal County Library District Offices, Globe, Miami and Hayden. Additional hard copies were made available for public review at the TNF Supervisor's Office in Phoenix and the Globe District Office in Globe. Certified copies were sent to representatives of 10 Native American Tribes. Multiple means were provided to solicit comments (e.g., mail, email, phone) and direction for providing comments was included in the notice of availability and at locations where the EA could be reviewed. Twenty-one comments in the form of letters and/or emails were received during the 30-day comment period. The Forest Service ID Team identified individual comments within each of the comment letters, which were carefully evaluated according to defined criteria. If a comment was determined to identify an issue,¹ then it was further examined to determine if the comment was substantive.² If it was determined to be substantive, then it was further analyzed to determine if it was significant³ and required further analysis by Forest Service ID team specialists. Responses to all comments received are presented herein.

The 30-day public comment period started with the publication of the pre-decisional EA on April 1, 2009. Concurrent with the publication of the notice in area newspapers, the notice was mailed or emailed to all those interested parties, including private citizens, non-government organizations and agencies including 18 Tribal officials representing 10 Indian Tribes. Chapter 1 provides a more detailed account of the public involvement process undertaken during this NEPA process.

Within the comment period, 21 letters, emails, faxes or comment forms (collectively referred to as comment letters) were submitted to the TNF. All the comment letters were reviewed and individual comments within each letter were identified and categorized for analysis. Table B-1 provides an alphabetical list of all the commenters, the organization they represent and the letter number assigned to their comment. Following this table, responses to the comments are provided to each of these comment letters. When appropriate, information was incorporated in the EA document.

¹ The Forest Service defines an issue if the comment expressed a concern with the analysis presented in the EA that was either based on a belief or perception or that could include a negative cause-effect relative to the action or activity.

² A comment was determined to be substantive if the comment was: 1) within the scope of the analysis, 2) relevant to the decision, 3) not already decided by law, regulation or policy, or 4) not speculative or is supported by scientific evidence.

³ A comment was determined to be potentially significant if it was substantive and warranted a change to the effects analysis. If determined to be potentially significant, the comment was further evaluated by the ID Team and appropriate specialist to determine if a significant impact could occur.

Table B-1. Alpha List of Commenters, the organization they represent, and their Letter Number

Name	Organization	Date	Letter Number
Arnst, Diane L.	Arizona Department of Environmental Quality	4/10/09	21
Bennett, Garrett James	CenterFocus Climbing	4/29/09	10
Blaine, Marjorie	Army Corps of Engineers	4/20/09	12
Bronson, Sharon	County Supervisors Association of Arizona	4/7/09	2
Cook, David	DC Cattle Co, LLC	4/28/09	5
		4/29/09	20
Dalton-Rabago, Pamela		4/3/09	19
Dawson, Shirley	Gila County Board of Supervisors	4/7/09	1
Dooley, Betsey		4/27/09	18
Featherstone, Roger	Arizona Mining Reform Coalition	4/30/09	9
Fetterman, Russ	Globe-Miami Regional Chamber of Commerce and Economic Development	4/23/09	4
Freeman, Nancy	Groundwater Awareness League	4/30/09	8
Grainger, Wayne		4/30/09	16
Heig, Rich A.	Resolution Copper Mining	4/28/09	15
Marshall, Bill	Southern Gila County Economic Development Corporation	4/27/09	3
Nosie, Wendsler, Sr	San Carlos Apache Tribe	4/29/09	17
Sparks, Joe P.	Sparks Law Firm, P.C.	4/30/09	14
Taunt, Linda	Arizona Department of Environmental Quality	4/28/09	13
Taylor, Kent	Pinal County Parks, Open Space, and Trails	4/24/09	6
Williams, Deborah		4/25/09	11
Witzeman, Robert A., M.D.	Maricopa Audubon Society	4/29/09	7

Letter: 1 Commenter Shirley Dawson Chairman Gila County Board of Supervisors

Comment Number: 1 County Resolution No. 09-02-02: A Resolution of The Board of Supervisors of Gila County, Arizona, expressing support for the Southeast Arizona Land Exchange and Conservation Act and urging the United States Senate and House of Representatives to promptly enact this legislation and to recognize Resolution Copper Company for its investment and efforts to develop a new copper mine and enhance the local, state, and national economies.

Response: Thank you for your participation and comment. As discussed in the EA, Section 1.4, the Legislative Land Exchange was not considered a connected action to the proposed Pre-feasibility actions, and therefore was not evaluated in the EA.

Letter: 2 Commenter Sharon Bronson President County Supervisors Association of Arizona

Comment Number: 1 Resolution Number 2-09 - A Resolution of the County Supervisors Association of Arizona expressing support for the Southeast Arizona Land Exchange and Conservation Act and urging the United States Senate and House of Representatives to promptly enact this legislation and to recognize Resolution Copper Company for its significant investments and effort to develop a new copper mine and enhance local, state, and national economies.

Response: Thank you for your participation and comment. As discussed in the EA, Section 1.4, the Legislative Land Exchange was not considered a connected action to the proposed Pre-feasibility actions, and therefore was not evaluated in the EA.

Letter: 3 Commenter Bill Marshall President Southern Gila County Economic Development Corporation

Comment Number: 1 The Southern Gila County Economic Development Corporation known as (SGCEDC) is located in Globe AZ with a focus on economic opportunities on a regional basis which encompasses Eastern Pinal County as well as all of Gila County. President Obama has committed to putting America back to work, this project would create hundreds of jobs not only in this region but statewide.

Response: Thank you for your participation and comment.

Comment Number: 2 The EA is a very comprehensive document. It thoroughly defines the proposed action's purpose as well as a detailed presentation of pre-feasibility alternatives, while identifying potential environmental impacts and the consequences that may arise from them.

Response: Thank you for your participation and comment.

Comment Number: 3 Approval of the plan of operations would be consistent and compatible with the Tonto National forest plan and would require no amendment.

Response: Thank you for your participation and comment.

Comment Number: 4 A finding of no significant impact is appropriate and should be made without qualifications because the EA clearly demonstrates that none of the alternatives considered would significantly affect the environment.

Response: Thank you for your participation and response to the EA. From the analysis presented in this EA the Forest Supervisor will determine if an Environmental Impact Statement (EIS) would be necessary. If an EIS is not necessary, the Forest Supervisor will document that determination in a Finding of No Significant Impact (FONSI) and issue a Decision Notice.

Comment Number: 5 Alternative 4, West access route 4A, should be the selected alternative as it minimizes potential impacts while addressing traffic safety concerns.

Response: In response to public scoping comments, two alternatives were developed to address safety concerns as well as potential conflicts with recreational users at the Oak Flat Campground. Both West Access Route 4a and 4b provide alternative routes designed to avoid traffic concerns in the Oak Flat Withdrawal Area. Both routes would start at FR 315 and would be used to gain access to OF-1, OF-3, M, and RES-13. The Forest Supervisor will consider public comments, analysis disclosed in the EA, information contained in the public record, and management direction and policy, collectively, to determine the selected alternative.

Comment Number: 6 Sustainability in the Copper mining industry is vital to the security of our nation through the development of green technologies. The SGCEDC urges the U.S. Forest Service to approve the EA as submitted and select Alternative 4A for immediate implementation.

Response: Thank you for your participation and comment.

Letter: 4 **Commenter** Russ Fetterman **President** **Globe-Miami Regional Chamber of Commerce and Economic Development**

Comment Number: 1 The EA is a very comprehensive document. It thoroughly defines the proposed action's purpose, need and scope while providing a detailed presentation of pre-feasibility alternatives, potential environmental impacts and the consequences that may arise from them. The EA also identifies specific mitigation measures to minimize or eliminate those potential impacts. The EA appears to comply fully with the National Environmental Policy Act and with EO 13007.

Response: Thank you for your participation and comment.

Comment Number: 2 Approval of the Plan of Operations would be entirely consistent and compatible with the Tonto National Forest Plan, which should not require any form of amendment.

Response: Thank you for your participation and comment.

Comment Number: 3 A Finding of No Significant Impact (FONSI) is appropriate and should be made without qualification because the EA clearly demonstrates that none of the alternatives considered would "significantly" affect the environment.

Response: Thank you for your participation and response to the EA. From the analysis presented in this EA the Forest Supervisor will determine if an Environmental Impact Statement (EIS) would be necessary. If an EIS is not necessary, the Forest Supervisor will document that determination in a Finding of No Significant Impact (FONSI) and issue a Decision Notice.

Comment Number: 4 Alternative 4, West Access Route 4A, should be the selected alternative because it minimizes potential impacts while providing for safer traffic patterns and less traffic in the area of the Oak Flat Campground than other alternatives.

Response: In response to public scoping comments, two alternatives were developed to address safety concerns as well as potential conflicts with recreational users at the Oak Flat Campground. Both West Access Route 4a and 4b provide alternative routes designed to avoid traffic concerns in the Oak Flat Withdrawal Area. Both routes would start at FR 315 and would be used to gain access to OF-1, OF-3, M, and RES-13. The Forest Supervisor will consider public comments, analysis disclosed in the EA, information contained in the public record, and management direction and policy, collectively, to determine the selected alternative.

Comment Number: 5 Resolution Copper's project is one of the greatest economic development opportunities in the history of Arizona. In view of the current economic climate, it is imperative that the Forest Service move forward with all deliberate speed and ensure that we are able to take full advantage of the jobs and tax monies that this project offers. The chamber believes that Resolution Copper has gone the extra mile to ensure the project is environmentally responsible, and the company has been sensitive to local concerns. Sustainable copper production is vital to our national security and to our nation's effort to develop green technologies--especially to the development and mass production of electric cars.

Copper mining is a critical part of our community's cultural heritage and its future, and the Chamber urges the U.S. Forest Service to approve the EA and to select Alternative 4A for immediate implementation.

Response: Thank you for your participation and comment.

Letter: 5 **Commenter** David Cook **Managing Member** **DC Cattle Co. LLC**

Comment Number: 1 The United States Forest Service (USFS) has a mandated role by congress to work with and assist the use of resources on federal lands. Multiple Use is the mission of the FS.

This project falls in those guidelines and mission of the FS. Items 1-7 are in compliance with that mission as well.

Response: Thank you for your participation and comment.

Comment Number: 2 I support alternative two (2) and offer that the only way information may be obtained concerning the project as a whole is to gather needed data.

Response: Thank you for your participation and comment.

Comment Number: 3 I support the decision in choosing alternative two and believe that an EIS is not necessary and that the Forest Supervisor may issue a "Finding of No Significant Impact" (FONSI) in regards to this proposed action. (4 CFR 1508.27).

Response: Thank you for your participation and response to the EA. From the analysis presented in this EA the Forest Supervisor will determine if an Environmental Impact Statement (EIS) would be necessary. If an EIS is not necessary, the Forest Supervisor will document that determination in a Finding of No Significant Impact (FONSI) and issue a Decision Notice.

Comment Number: 4 In regards to reclamation costs assurances (page two) costs should be at a minimum as it is only impacting 38.66 Acres.

Response: The determination of the final bond amount for project reclamation will be determined by the Forest Supervisor in coordination with RCM.

Letter: 6 **Commenter** Kent Taylor **Senior Planner** **Pinal County Parks, Open Space, and Trails**

Comment Number: 1 Site Disturbance - It appears that each site will be mass graded as part of the site preparation. Best practices would recommend that each site be evaluated individually based on the physical setting and graded only where necessary for equipment and personnel. This site by site analysis will allow for minimal environmental disturbance while potentially making reclamation easier and less costly.

Response: Thank you for your comment and recommendations. Section 2.1.2 of the EA describes the extent of surface disturbance proposed at each drill site. Required as a mitigation and monitoring measure (EA, Section 2.3), RCM will prepare and submit a SWPPP for the Forest Supervisor's approval prior to any ground disturbing activity (Mitigation Measure #4). This SWPPP will require details of site clearing activities and methods to be implemented to reduce erosion. In addition, Mitigation Measures #17, 18, and 21 will require retention of native boulders at drill sites for screening and reclamation purposes.

Comment Number: 2 Dust Control - From the information provided, it appears that vehicle traffic increases to levels which would make dust a constant issue. For example, the report states that FR 2438 would have a potential increase of 88 cars per day. Although the Proposed Alternative outlines mitigation measures (watering of roads etc.), there are no specific guidelines outlined for that mitigation. Suggestions to assist in more effectively mitigating the dust issues would include: 1) outline the specific number of water mitigations per day based on the expected vehicle counts. The

vehicle counts could be monitored on a semi annual/annual basis to verify if the beginning counts, and thus the watering schedule, are still applicable, 2) require shuttle transportation to sites wherever possible, especially if there are several sites served by one access road.

Response: Thank you for your suggestions. As you indicated, mitigation and monitoring measures presented in the EA (Section 2.3) include watering roads as necessary during periods of regular use by RCM employees or contractors and reduction of vehicle traffic. These measures will be strengthened by adding "If dust problems are noted a watering schedule will be developed and implemented by RCM, or RCM will propose a dust palliative program for review and approval by the TNF; and upon approval will implement that program." In addition, measures to specifically reduce disturbance of particular matter pursuant to recommendations received from the Arizona Department of Environmental Quality will also be added. Please refer to Letter 21, Comment Number 1 of this Appendix for further details.

Comment Number: 3 Reclamation - The Proposed Alternative is not clear about what specific reclamation measures must be taken by the applicant. It should be made clear that reclamation must bring all disturbances back to their original state, or a reasonably similar state. Reclamation plans should be specific at this juncture for two critical reasons. First, it will assist in alleviating future misunderstandings or disagreements about expectations and second, it will assist in setting up the proper monetary assurances needed from the applicant for future reclamation activities.

Response: Reclamation and closure obligations are presented in the EA as part of the action proposed by RCM (Section 2.1.2, Proposed Action: Reclamation and Closure) and under the Mitigation and Monitoring Measures (Section 2.3, Item 7).

Under the Proposed Action, 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, 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 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.

Table 2-11 in the EA 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.

The EA further describes monitoring and mitigation measures that must be implemented to meet the Forest Service standards for reclamation. Temporary and Interim Reclamation (Mitigation Measure 7) in the EA requires that RCM 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.

Comment Number: 4 Non monitoring sites - Sites not selected for monitoring should not be mass graded as part of reclamation efforts.

Response: Section 2.1 describes the extent of surface disturbance at each drill site. Best management practices (BMPs) implemented will consider the sites' topographic and site-specific constraints (see Figure 2-1). One of the BMPs to be implemented is clearing the minimum area required for well construction.

Letter: 7 **Commenter** Robert Witzman, M.D. **Conservation Chair** **Maricopa Audubon Society**

Comment Number: 1 The impact of RCC's drilling activities in both the Oak Flat area and the surrounding USFS land upon the water tables of Devil's Canyon and the adjacent riparian areas is of great concern to the Maricopa Audubon Society and those citizens of this state who wish to protect Arizona's unique riparian habitats.

The tragic disappearance and death of alder trees in the nearby Haunted Canyon/Carlota Mine watershed illustrates how tenuous and fragile such arboreal and vegetative habitats are here in the Sonoran Desert. Sometimes it takes just a few days, weeks or months at vulnerable times of the year to destroy or dry up a riparian habitat or wetland which may have taken years or decades, if not centuries, to create. Mature or old-growth trees that required years to bring to maturity can be destroyed by a mine in a few days, or weeks. Witness the nearby Haunted Canyon Tonto National Forest tragedy. Hot or briefly dry aquifer impacts can be devastating and tragic. The Devil's Canyon riparian area has a year-round source of water at present. Will its water source continue to survive without interruption after the RCC interventions occur?

Not only are pre-feasibility RCC aquifer impacts a concern, but little is denoted or described or anticipated of what may have transpired in the past and what may take place in the future regarding survival of such precious, vulnerable ribbons of life in our Sonoran Desert. Devil's Canyon and other surrounding watersheds and aquifers are prime candidates for needless disasters.

Devil's Canyon is one of the most lush and remarkable riparian zones in central Arizona. It equals and in many ways exceeds the ecological attributes of southern Arizona's San Pedro and Gila riparian habitats in many respects. There is in Devil's Canyon a truly exceptional and unique diversity and density of broad leafed Sonoran Desert riparian tree, shrubs and plant life species found in few areas elsewhere in the state including: Arizona White Oak, Emory Oak, Mexican Blue Oak, Arizona Black Walnut, Velvet Ash, Arizona Sycamore, Fremont Cottonwood, Bonpland Willow, Goodding Willow, Nettleleaf Hackberry, and lastly, Mexican Blue Oak. Very seldom is such diversity found in our arid Southwest.

This riparian treasure adjacent to the RCC drilling and mining activity now underway has a remarkable and exceptional diversity regarding its plantlife and animal and birdlife. We have identified two Zone-tailed Hawk and one Black Hawk and one Turkey Vulture nesting areas along just the first 1 1/2 and two miles of the riparian corridor adjacent to Oak Flat. This lush, dense Sonoran Desert riparian treasure continues many more miles downstream. It is difficult to inventory and access on foot due to its rugged nature. Here are a captivating succession of glorious cascades and waterfalls and limpid pools. They are dependent upon the aquifer which is under threat from the now underway and proposed future RCC mining and drilling impacts.

What the status is of other plant and animal species which have federal protection in this marvelous Sonoran Desert riparian treasure is unknown. We know of no published biological studies of this unique and precious Sonoran Desert riparian treasure. For example, what might be the future of the following federally protected species which might be found here: including Mexican Spotted Owl, Cactus Ferruginous Pygmy Owl, Southwestern Willow Flycatcher, Western Yellow-billed Cuckoo, Lesser Long-nosed Bat, Gila Chub, Loach Minnow, Gila Topminnow? These impacts must be clarified now, not after this mining disaster goes forward.

Response:

Four sources of water are proposed for dust suppression and drilling processes. These include the No. 9 shaft, the Superior West Plant Site, Well A-06 (ADWR#55-214967) on State Trust lands, and water purchased from the Arizona Water Company (which obtains water from wells located near Florence Junction). The potential hydrologic impacts of dewatering the No. 9 shaft were evaluated for the special use permit issued for the Magma Arizona Railroad Company (MARRCO) water pipeline. Results of that evaluation indicated that the site is characterized by two aquifer systems, the shallow Apache Leap Tuff aquifer and a deep aquifer consisting of Whitetail conglomerate and underlying Tertiary, Mesozoic, Paleozoic, and Precambrian rocks that are separated by an aquitard composed of low-permeability geologic units ranging in thickness from several hundred to more than 3000 feet. Mining operations at this site have required groundwater dewatering since the early 1900's. Dewatering pumps were turned off in 1998 and aquifer conditions were recovering until dewatering resumed in 2008. The Apache Leap Tuff Aquifer is penetrated by the Number 9 shaft and discharges to the shaft and to underground mine workings. Water level elevations in the shaft did not recover to the bottom of the Apache Leap tuff before dewatering operations resumed in 2008. Impacts to ground water dependent ecosystems on the Tonto NF or nearby wells that may have occurred from any dewatering of the Apache Leap Tuff by the No. 9 shaft or underground mine workings would have occurred decades past. Because water table elevations in the No. 9 shaft did not recover to the bottom of the Apache Leap Tuff aquifer prior to resumption of dewatering operations, impacts of the No. 9 Shaft on water table conditions in the Apache Leap Tuff would not have changed from the period when dewatering was occurring. Consequently continued dewatering of the No. 9 shaft would not affect ground water dependent ecosystems.

In order to eliminate any possible effects to groundwater dependent resources from the pumping of the existing Well A-06 a mitigation measure has been added (EA, Section 2.3) which requires that, prior to pumping, RCM first prove, through appropriate pump test and monitoring procedures, that the use of water from that well would not affect nearby groundwater dependent ecosystems. RCM has stated in the proposed action that water purchased from the Arizona Water Company could also be used instead of pumping Well A-06.

Direct, indirect, and cumulative effects to wildlife were evaluated in the EA (Sections 3.3, 3.11.4). Species evaluated were designated as "threatened," "endangered," or "proposed/candidate" by the U.S. Fish and Wildlife Service (FWS). Additionally, direct, indirect, and cumulative effects were evaluated on Forest Service sensitive species as listed by the Tonto National Forest. Species lists for the Pre-feasibility Activities Area (PAA) were obtained from the Arizona Ecological Field Office of the FWS for Pinal and Gila Counties, the Arizona Game and Fish Department

Heritage Database Management System, and from Tonto National Forest (TNF) Sensitive Species lists. A composite list was created which included species listed as threatened, endangered, proposed for listing as threatened and/or endangered, or candidate by the FWS, or listed as sensitive by the TNF, and having potential to be present in either Pinal or Gila Counties, or within TNF boundaries. A screening analysis was conducted as a part of the Biological Assessment and Evaluation written for this project to determine which of these species had the potential to be present within the PAA. This analysis concluded that suitable habitat was lacking, or the PAA was outside the species' range for the following species: Mexican spotted owl, cactus ferruginous pygmy owl, southwestern willow flycatcher, western yellow-billed cuckoo, Gila chub, loach minnow, and Gila topminnow.

Comment Number: 2 The Oak Flat area is unique as a nesting, wintering-over or migratory habitat for many birds considered unique, important or significant in North America. The adjacent lush and diverse Devil's Canyon habitat undoubtedly provides habitat for even more species but due to its difficulty of access has not been even partially inventoried. The National Audubon Society/American Bird Conservancy "Watchlisted" birds whose nesting or wintering habitat would be impacted or destroyed would be: RED LISTED; Black-chinned Sparrow (nesting), Bell's Vireo (nesting), Lewis's Woodpecker (wintering). YELLOW LISTED; Lucy's Warbler (nesting), Abert's Towhee (nesting), Lawrence's Goldfinch (wintering), Gray Vireo (nesting), Varied Thrush (wintering), Harris's Sparrow (wintering).

Response: An evaluation of potential impacts to Watchlisted bird species as a result of Pre-feasibility activities was conducted. Identified potential impacts in the evaluation were vegetation removal, noise, human presence, and traffic. As a result of the evaluation, it was determined that Pre-feasibility activities will affect potentially suitable wintering and/or nesting habitats through vegetation removal, but this impact would not be of a magnitude great enough to affect individuals or have an impact on entire species.

Letter: 8 **Commenter Nancy Freeman** **Executive Director** **Groundwater Awareness League**

Comment Number: 1 Mining destroys landscape and habitat and dreams. There are some places too special to destroy for the sake of dollars. Because of the rise in copper prices in 2002 to 2007, existing mines have exploded their operations—throughout the world, including Arizona. Therefore, the need for new mining operations does not exist. The actual supply and demand ratio for copper is never calculated. As the copper price rises and falls, the "hire today, lay-off tomorrow" cycle creates and destroys dreams of mining laborers.

Response: Thank you for your participation and comment. RCM is conducting Pre-feasibility studies to determine if it is economically and logistically feasible to construct and operate a mine at this location. RCM will base this decision on many factors including the anticipated demand for copper. Any future mine construction and/or operation is considered outside the scope of analysis of this EA (Section 1.4).

Comment Number: 2 The Environmental Assessment for Resolution Copper Mining pre-feasibility activities at Superior, Arizona does not adequately address the Apache Leap Tuff hydrology. There is reason for concern for the effects of dewatering the Apache Leap Tuff in the regions proposed for mining by the Resolution Copper Mining Company of England and Australia. The Environmental Assessment only mentions a couple of wells in Apache Leap Tuff, but does not delineate the importance of the assessment of the potential consequences of dewatering of the Apache Leap Tuff, which would include, but not be limited to, the loss of water supply to trees in Oak Flat and dewatering of Devil's Canyon and its unique vegetation that grows in cracks and riffs along the canyon's cliffs.

Response: This comment is outside the scope of analysis of this Environmental Assessment (EA, Section 1.4). One of the purposes of the Prefeasibility Plan of Operations is to gather geologic and hydrologic data needed to support studies being conducted for the planned development of the deep copper ore deposit being investigated by RCM.

Comment Number: 3 If there is to be pre-feasibility activities on Forest Service lands, particularly protected Forest Lands, the reason for these activities should be reasonable and should be made clear. When the mining company wrote their Environmental Assessment, they gave no such [gave no] logic or justification at all for disturbing the land. The prolonged drought in Arizona has already put some of the trees in Oak Flat in jeopardy. Further disturbance, for no reason other than "we want to assess" is not an option.

Response: The reason RCM has proposed to conduct Pre-feasibility activities on National Forest System Lands is to gather and evaluate geologic, geotechnical, and hydrologic data to support studies being conducted by RCM for their planned development of a deep copper ore deposit (EA, Section 1.3, Purpose and Need). The 1872 Mining Act confers a statutory right to enter upon public lands open to location in pursuit of locatable minerals, and to conduct mining

activities, locate necessary facilities, conduct associated incidental activities, and all uses reasonably incidental thereto.

Comment Number: 4 The key issue remains why does the mining company want to obtain current Forest Service land that contains Oak Flat and Devil's Canyon? They have stated that they cannot mine on their presently owned private land without obtaining this additional Forest Service land. Further, they state that they do not intend to disturb this land. So why is obtaining and assessing the land necessary to their planned mining operations?

Response: The Legislative Land Exchange and any future mine construction and/or operation is not a Forest Service action subject to review and decision by the Forest Service, and is outside the scope of this EA (Section 1.4).

Comment Number: 5 The important issue of the dewatering of the Apache [Tuft] was not listed as a concern in the Environmental Assessment. At present, water, which sustains Oak Flat, the surrounding oak forests, and the unique Devil's Canyon flora, is protected by Federal Law. The Doctrine of the Federal right to water in public lands was established in 1908 by *Winters v. United States*. www.blm.gov/nstc/WaterLaws/pdf/FedResWaterRights.pdf

A case in 1999 in Arizona Supreme Court reasserted the Federal right to water in public lands is still [in tact]. The presiding judge wrote, "The [Winters'] doctrine applies not only to Indian reservations, but to other federal enclaves, such as national parks, forests, monuments, military bases, and wildlife preserves." www.g-a-l.info/AZAdjudication.htm

Response: Federal Reserved Rights belonging to the Forest Service are limited to those necessary to meet the primary purposes for creating the Forest Reserves. These include providing a continuous supply of timber and favorable conditions of water flow. The only reserved rights asserted by the Tonto National Forest are claims for fire management, road management, and administrative uses. The Forest Service on a national basis has not been able to successfully quantify reserved rights under the "favorable conditions of water flow" purpose.

Comment Number: 6 An understanding of the groundwater hydrology in the entire region is fundamental to comprehending the effects that dewatering the tuff by mining operations will have in the region. The tuff overlays the entire area proposed to be mined and extends up to Top of the World. The tuff is actually a steep escarpment of volcanic ash flow. The ash flow tuff, named after the Apache Leap cliffs, at one time covered approximately 1000 km² in the Superior region. Today the tuff has been reduced by extensive faulting [in italics] and erosion to approximately 250 km² and reaches a maximum thickness of some 600 meters.

The proof of the porosity of the tuff, therefore its ability to contain liquids/rain that sustain the oak trees and the other plant material, including the flora on the walls of Devil's Canyon, is the fact that the Department of Energy contracted with the University of Arizona to test its porosity as a model for the feasibility of storing radioactive waste in volcanic tuffs, particularly the extensive Yucca Mountain Tuff. Obviously, if the tuffs were not porous, they would not be targeted as a storage facility. Excerpt from the report (1):

[Commenter provides results of studies on the geohydrology and porosity of Apache Leap tuff; provides study citations as well.]

The report states that additional research should be able to identify more recent discussions of the regional hydrogeology and more fully document the impact of past dewatering from the shaft and other boreholes on groundwater, springs and surface water in the area of concern. The report further states that the Magma shaft dewatering and the other boreholes in the area appear to have radically changed the groundwater system in the Apache Leap Tuff.

In other words, the current reports on the region are plentiful. There is no justification for any further disturbance, which is sure to create more rifts and fractures in the tuff.

Response: Much of this comment is beyond the scope of this EA. The purpose of the EA is to assess the impacts of the disturbance necessary to conduct pre-feasibility studies. These include deep and shallow groundwater testing and monitoring wells that will obtain geologic and groundwater data in geologic units well below the Apache Leap Tuff as well as within this unit.

Comment Number: 7 In fact, there is no mention of the environmental hazards of heavy drilling equipment on the tuff. The University of Arizona has also conducted a study (4) to determine the strength criterion that would best represent the failure of the tuff.

[Table 2.21 Results of Triaxial Compressive Strength Tests on Apache Leap Tuff Specimens]

Response: The development of a deep ore body and associated activities is considered outside the scope of this EA (Section 1.4).

Letter: 9 **Commenter** Roger Featherstone **Director** **Arizona Mining Reform Coalition**

Comment Number: 1 We urge to Forest Service to choose the No-Action Alternative and deny this POO.

Response: 40 CFR part 1502.14(d) requires that the alternative of no action be included in an Environmental Impact Statement. Forest Service Handbook 1909.15 Chapter 14.1 clarifies: "The no-action alternative provides a baseline for estimating the effects of other alternatives; therefore, consider the no-action alternative in detail in each environmental analysis." Under current statutes, selection of a "no-action" alternative is outside the authority of the Responsible Official and could involve a probable "taking" of private property rights under the Fifth Amendment of the Constitution. The Forest Service does not have the authority or discretion to prohibit well-planned and legitimate mineral operations complying with all applicable laws and located in areas open to mineral entry. We use the NEPA process to develop reasonable alternatives and mitigation that minimizes adverse environmental impacts while allowing the operations to take place. The 1872 Mining Act confers a statutory right to enter upon public lands open to location in pursuit of locatable minerals, and to conduct mining activities, locate necessary facilities, associated incidental activities, and all uses reasonable incidental thereto. The Forest Service's responsibility is to facilitate the exercise of that right while protecting and requiring the operator to restore surface resources and minimize adverse environmental impacts.

Comment Number: 2 Alternatively, the Forest Service should prepare an EIS to examine in greater detail the problems with this proposal.

Response: Thank you for your participation and response to the EA. From the analysis presented in this EA the Forest Service Supervisor will determine if an Environmental Impact Statement (EIS) is necessary. If it is determined that an EIS will not be required, the Forest Supervisor will document that determination in a finding of no significant impact (FONSI) and issue a Decision Notice.

Comment Number: 3 Background

This proposal was prepared by Resolution Copper Company, a wholly-owned subsidiary of foreign mining giants Rio Tinto and BHP (Henceforth referred to as Rio Tinto/BHP) to move beyond exploration into actual assessment of a major mine proposal. The project would take place in an area that includes portions removed from mineral entry, heavily relied on by other forest service users, and in an area critically important to the cultural and spiritual wellbeing of Native American Tribes.

Response: Thank you for your comment. The EA addresses the withdrawal area, other uses of National Forest System lands, including recreation, and Native American concerns. More detailed information relating to your comments are provided in the following responses.

Comment Number: 4 An EIS Must Be Prepared

Based on the sensitive nature of the ecosystem involved, the presence of the Oak Flat Campground as a 760 acres parcel that was withdrawn from mineral entry and mining activities by Executive Order in 1955, the clear indication by the Forest Service that a mine proposal is a likely outcome of this action, and the clear indication that the entire Oak Flat / Apache Leap Landscape is of critical importance to the religious and cultural survival of Native American Tribes, an Environmental Assessment is not adequate. Instead, the Tonto National Forest must find that an Environmental Impact Statement should be prepared for these activities.

[COMMENTER QUOTES CASE LAW REGARDING LEVEL OF NEPA ANALYSIS]

In this case, based on the unique environmental and recreational resources that will be impacted by the project, as well as the significant cultural and religious resources at risk from the project, the issuance of a FONSI violates NEPA.

Response: From the analysis presented in this EA the Forest Supervisor will determine if an Environmental Impact Statement (EIS) is necessary. If it is determined that an EIS will not be required, the Forest Supervisor will document that determination in a finding of no significant impact (FONSI) and issue a Decision Notice.

Comment Number: 5 An EIS Must Be Prepared

These impacts are in addition to the EA's failure to fully review the cumulative, direct, and indirect impacts from this and other connected, related, and reasonably foreseeable future actions.

Response: The EA documents the analysis of effects for specific resources issues identified through the public scoping process. Ten issues were identified. Indirect, direct, and cumulative effects for each of the ten issues are discussed in Chapter 3 of the EA.

Section 1.4 of the EA provides a thorough discussion of the scope of the federal action evaluated in this analysis. 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 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 the 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." The CEQ also requires that cumulative actions, when viewed with other proposed actions, should be discussed in the same environmental analysis if they would have cumulatively significant impacts. The cumulative effects analysis looks at whether the proposed activities may have a significant cumulative effects on identified resources when added to the effects on those same resources from other activities. 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 six actions considered are: 1) RCM's pursuit of a legislative land exchange to acquire the Oak Flat Withdrawal Area and National Forest System Lands; 2) RCM's dewatering of the No. 9 Shaft and RCM's development of a 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; 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 Trust lands) requiring improvements to Forest Service roads for access; 5) construction of exploration and groundwater testing and monitoring well drill sites on National Forest System Lands that require improvements to roads on State Trust or private lands; and, 6) development of RCM's deep copper ore body. Application of the criteria set forth in CEQ guidelines indicated that actions defined under Items 1, 2, 3 and 6 are not connected to the Proposed Activity and effects are not are not evaluated in this EA. Upon reconsideration, it has been determined that activities on state trust and privately-owned lands, as defined under Items 4 and 5 above, are connected actions and have now been included in the analysis of impacts.

Comment Number: 6 An EIS Must Be Prepared

The Oak Flat Withdrawal Area (OFWA) was created by Public Land Order (PLO) 1229 in 1955 and amended by PLO 5132 in 1971 to withdraw the campground from mining. This proposal would allow the withdrawn area be impacted by noise, light and other pollution from drilling locations directly adjacent to the withdrawn area. Truck traffic would occur within the withdrawn area to reach drilling sites adjacent to the OFWA which would require the "improvement" of roads within OFWA that would not be required if this proposal was not allowed. We are not convinced that mitigation measures proposed in the EA to avoid Rio Tinto/BHP's intrusion into the OFWA by directional drilling would be successful. Further, this proposal would allow mining related activity within the OFWA. This is in clear violation of the PLO 1229 and 3152. These impacts must either not be allowed and an EIS must be prepared to look at these impacts in greater detail.

Response: No mining-related activity is proposed within the Oak Flat Withdrawal Area as part of the Pre-feasibility Activities. There are three proposed exploration drill sites (OF-1, OF-2, and OF-3), two tunnel characterization boreholes (PVT-3 and PVT-4), and one groundwater testing and monitoring well site (H-L) located adjacent to the Oak Flat Withdrawal Area on previously disturbed lands. In response to concerns raised during the public scoping period,

two issues were associated with activity near the Oak Flat Withdrawal Area: Recreational Activities In and Round Oak Flat (Section 3.5, Issue 5 in the EA) and Conflicts with the Withdrawal Area (Section 3.7, Issue 7, in the EA). Studies were conducted to address these concerns and determine the impacts of work proposed at these sites on recreational users of the Oak Flat Campground. Separate technical reports were completed for noise, visual, and traffic effects and mitigation measures have been developed in the EA to reduce impacts. Alternative routes that avoid service-vehicle traffic through the Oak Flat Withdrawal Area have been considered (Alternatives 4 and 5). Mitigation measures have been developed to reduce visual impacts (Mitigation Measures 16, 17, 18, and 19), night light effects (Mitigation Measure 20), and noise (Mitigation Measure 15).

As described in Section 3.7, the Forest Service has determined that any directional drilling under the Oak Flat Withdrawal Area would be in violation of the withdrawal and developed Mitigation Measure 25 (Section 2.3 of the EA) requiring RCM to conduct a cadastral survey of the boundary and provide annual drilling information to the Forest Service with sufficient detail to document that directional drilling activities do not extend under the Oak Flat Withdrawal Area.

Within the Oak Flat Withdrawal Area, RCM would continue to maintain the existing roads to the Forest Service Maintenance Level designated for those routes (EA Table 2-6) in order to access drill sites 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. Forest Service further restricts travel to certain roads within the Oak Flat Withdrawal Area (Mitigation Measure 24) and requires that all roads utilized are in conformance with the Forest Service Travel Management goals during use and at reclamation and closure (Mitigation Measure 26).

Comment Number: 7 An EIS Must Be Prepared

There is a body of documentation about the sensitive nature of the Oak Flat / Apache Leap environs that would be impacted by this proposal that was not cited in this EA that the Tonto National Forest should have known about and included. For example, the Maricopa Audubon Society commissioned a study (attached) called Vegetation and Wildlife Survey of Devil's Canyon, Tonto National Forest prepared by: Sky Jacobs and Aaron Fleisch that studies the wildlife and vegetation in and around Devil's Canyon. There needs to be more extensive investigation of the environment that would occur if an EIS was prepared.

Response: The EA provides a general discussion of the vegetation and wildlife for the PAA. As a result of input during the public scoping process, key issues were identified for more detailed evaluation. Those dealing with the biodiversity of the area are Issue 3 (Wildlife) and Issue 4 (Arizona Hedgehog Cactus). A technical memorandum discussing watch-listed bird species in the area was also prepared in response to public comments. An in-depth Biological Assessment and Evaluation (BAE) was prepared which evaluates impacts to all special status species listed by the US Fish and Wildlife Service and the TNF for this area. Habitat descriptions are provided in detail. The focus of the BAE is the endangered Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*; AHC). We believe that the investigations and impact evaluations completed for the EA and subsequent documents is commensurate with the level of impacts associated with RCM's proposed Pre-feasibility Activities. Additionally, mitigation measures have been developed to minimize impacts to the extent practicable at each site and along the roadways, and to revegetate areas following the completion of work at each site.

Comment Number: 8 An EIS Must Be Prepared

Comments prepared during the scoping phase of this EA and other documents known to exist by the Forest Service show the critical spiritual and cultural importance of this area to Native American Tribes. The Tonto National Forest has [There needs to be more extensive investigation of the environment that would occur if an EIS was prepared] a trust responsibility to exhaustively protect human rights and religious freedom of Indian Tribes that behooves the preparation of more extensive analysis than afforded by this EA.

Response: The analysis in the EA and accompanying technical reports support the findings of no adverse impact to cultural resources resulting from implementation of the Pre-feasibility Activities. Section 3.10 of the EA discusses Native American religious practices and considers potential effects to these from the Pre-feasibility Activities. The Forest Service consulted with Native American Tribes (see Chapter 4, Coordination and Consultation) through the scoping and comment periods.

Comment Number: 9 An EIS Must Be Prepared

The Forest Service states in section 1.3 of the EA that, "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." (Emphasis added.) Again in Section 1.4 the Forest Service states, "The activities considered, all of which are associated with RCM's ultimate goal of developing a new underground copper mine..." (Emphasis added.) Yet, the Forest Service concludes that any analysis of this planned development itself is not warranted as part of the EA. This is clearly not consistent and an EIS should be prepared that includes an analysis of this planned development, along with all other past, present, and reasonably foreseeable future activities in the area.

Response: Section 1.4 of the EA defines the scope of the federal action and evaluates other actions in the context of CEQ guidelines for determining connected actions. Mine development is not automatically triggered by the Pre-feasibility Activities. In fact, RCM could determine that mine development is not technically or economically feasible. Implementation of the Pre-feasibility Activities does not depend on development of the mine.

Comment Number: 10 An EIS Must Be Prepared

At the very least, a public comment period of at least 30 days must be provided before the decision becomes final.

Response: Public comment periods have been provided as required under NEPA and Forest Service policy.

Comment Number: 11 The Forest Service Misapplies Federal Mining and Public Land Law

The Forest Service states in Section 1.3, 1.4, and 1.5 that it must approve this Plan of Operations (P00) according to the 1872 Mining Law. This is not correct. While the 1872 Mining Law makes it very difficult to deny a proper Plan for exploration, when a mine company moves from exploration to mine planning, which by definition Pre-feasibility is the first stage, the Forest Service has an obligation to fully review the impacts from mine development and assure itself and the public that the operation complies with applicable laws and regulations. For example, for mine development, operations proposed on lands that are not covered by valid mining/millsite claims are not covered by the Mining Law. See *Mineral Policy Center v. Norton*, 292 F.Supp.2d 30, 46-48 (D.D.C. 2003).

In the converse, if the Forest Service believes that pre-feasibility is still exploration, then it is clear that the company is prohibited from entering the withdrawn area for activities related to mineral exploration or development. This is because no activities related to mineral exploration are allowed in the withdrawn area, due to the fact that there are no claims within the withdrawn area that were valid on the date(s) of withdrawal. "In order for the claimant to show that he has a legal right to mine the claim, the evidence must show that a discovery existed within the boundaries of the claims at the time of withdrawal. *United States v. Boucher*, 147 IBLA 236, 242-43 (IBLA 1999)." *Ernest K. Lehmann v. Salazar*, 2009 WL 659673 at *1 (D.D.C. 2009). See also *United States v. Gunsight Mining Co.*, 5 IBLA 62 (1972).

Response: As described in Section 1.4 of the EA, development of the mine does not meet the CEQ's definition of a connected action and the effects are not analyzed in this EA. RCM has not submitted a mining plan of operations which would initiate NEPA for the that activity. Based on the results of the Pre-feasibility and other factors, RCM may choose to not proceed with mine development. The actions outlined in the proposed Pre-feasibility Activities 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 US 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: 12 The Forest Service Misapplies Federal Mining and Public Land Law

Further, based on the current applicability of the withdrawal, approval of any activities that rely on the removal of the withdrawal (e.g., via the land exchange, etc.) for their eventual justification is not allowed. For example, it appears that the Tunnel Characterization Boreholes are related to future tunnels underneath the OFWA. Since any activities on or under the OFWA are not permissible, these boreholes, and any other project activities that would require the removal of the withdrawal, are not logical at this time. The agency cannot permit activities under the guise of the Mining Law, or any other law, whose utility/usefulness is based on the occurrence of speculative future events.

It appears that the alignment of the two tunnel routes that Rio Tinto/BHP is investigating would place either or both of the tunnels under the withdrawn area. If this is the case, the boreholes cannot be allowed. There is no legal purpose for investigating the location for a tunnel under an area where it would be illegal to place a tunnel. Rio Tinto/BHP must show conclusively that any tunnel testing would not involve a route under the withdrawn area.

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 are 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: 13 The Forest Service Improperly Dismisses/Fails to Review Connected Actions and Fails to Review the Direct, Indirect, and Cumulative Impacts of All Past, Present, and Reasonably Foreseeable Future Actions.

Connected action number 2, No. 9 Shaft Dewatering and Development of a New Shaft, is clearly a connected action. Rio Tinto/BHP has state[d] numerous times that the purpose of dewatering the No. 9 shaft is to use the shaft to conduct further drilling to delineate the ore body and technical details. If the No. 9 shaft were to exist on public land, de-watering and used of the shaft for testing would clearly be part of this POO. Just because the No. 9 shaft is on land expropriated from the public by patenting under the 1872 Mining Law does not preclude the necessity of the Forest Service taking a closer look at the de-watering for what it is – part of the general pre-feasibility testing plan by Rio Tinto/BHP. Segmenting out part of the pre-feasibility testing plan regarding to land ownership is not acceptable. The Forest Service has the clear duty to look at activities off the public lands that would impact public resources.

NEPA regulations specifically require an analysis of the impact on the environment "which 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." 40 CFR § 1508.7. Thus, the fact that some of the activities will occur on private lands does not eliminate NEPA's requirement that the Forest Service analyze the environmental impacts of those private land activities. Indeed, the 9th Circuit Court of Appeals (which includes Arizona) recently decided this issue and squarely held that a federal agency is required to analyze the cumulative and connected impacts occurring on private land, even if that activity does not require federal agency approval. *Natural Resources Defense Council v. U.S. Forest Service*, 421 F.3d 757, 815-815 (9th Cir. 2005). There, the Court specifically held that federal agencies must consider the cumulative impacts associated with off-site and private land activities.

Similarly, item number 3, MARRCO Pipeline is a connected action. The only reason that the pipeline exists is for the purpose of disposal of water from the de-watering of the No. 9 shaft. The main reason for the de-watering of the No. 9 shaft is for testing and development of a mine. The only way to de-water the shaft is to dispose of the water. There is a clear cause and effect of all of these actions and a clear need and sequence of events that connect all of these actions to the proposed plan. As we discuss later in these comments, water taken from the No. 9 shaft would be used at several drilling locations proposed in the POO. It defies logic to conclude that taking water from the NO. 9 shaft for drilling and dust control as proposed in the plan does not make the de-watering a connected action.

Response: 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 six actions considered are: 1) RCM's pursuit of a legislative land exchange to acquire the Oak Flat Withdrawal Area and National Forest System Lands; 2) RCM's dewatering of the No. 9 Shaft and RCM's development of a 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; 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 Trust lands) requiring improvements to Forest Service roads for access; 5) construction of exploration and groundwater testing and monitoring well drill sites on National Forest System Lands that require improvements to roads on State Trust or private lands; and, 6) development of RCM's deep copper ore body. Application of the criteria set forth in CEQ guidelines indicated that actions defined under Items 1, 2, 3 and 6 are not connected to the Proposed Activity and effects are not evaluated in this EA. Upon reconsideration, it has been determined that activities on state trust and privately-owned lands, as defined under Items 4 and 5 above, are connected actions and have been included in the analysis of impacts.

Comment Number: 14 The Forest Service Improperly Dismisses/Fails to Review Connected Actions and Fails to Review the Direct, Indirect, and Cumulative Impacts of All Past, Present, and Reasonably Foreseeable Future Actions.

Items 4 and 5 regarding pre-feasibility and exploration activities on state and private land are also connected actions. Several of these locations are accessed by traveling through public lands (indeed even through the OFWA in some cases) and there will be impacts from accessing these sites during this proposed action. To segment out these plans is improper as there is no question that it would add to the cumulative impact of this proposed POO.

Response: Subsequent to publication of the EA (April 2009), it was determined that Pre-feasibility Activities occurring on State and private lands are connected actions and, therefore, are within the scope of analysis for this EA. The CEQ also requires that cumulative actions, when viewed with other proposed actions, should be discussed in the same environmental analysis if they would have cumulatively significant impacts. The cumulative effects analysis looks at whether the proposed activities may have a significant cumulative effects on identified resources when added to the effects on those same resources from other activities. This analysis determined that the proposed activities do not add significantly to those of any past, present, or reasonably foreseeable future activities (EA Section 3.11).

Comment Number: 15 The Forest Service Improperly Dismisses/Fails to Review Connected Actions and Fails to Review the Direct, Indirect, and Cumulative Impacts of All Past, Present, and Reasonably Foreseeable Future Actions.

Item 6, Development of the Deep Copper Ore Body is also a connected action. As stated by the Forest Service, and noted above, the ultimate goal of this POO is the development of a mine. To deny any connection between these actions is a highly artificial construction that serves no purpose. Indeed it is a violation of the Forest Service's goal of protecting the environment and serving people to deny any connection between this proposed action and a mine. The Forest Service has an obligation to begin to discuss the impacts a mine would have on the Tonto National Forest whether or not Rio Tinto/BHP is forthcoming with details of their mine plan.

Response: As described in Section 1.4 of the EA (Scope of the Federal Action), the CEQ's definition for connected actions was used to determine if other activities in the area should be considered in this EA. Connected actions are defined by the 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." Mine development is not automatically triggered by the Pre-feasibility Activities and RCM may determine that mine development is not technically or economically feasible. The Forest Service has made the determination that development of the mine is not a connected action and is not within the scope of analysis for this EA.

Comment Number: 16 The Forest Service Improperly Dismisses/Fails to Review Connected Actions and Fails to Review the Direct, Indirect, and Cumulative Impacts of All Past, Present, and Reasonably Foreseeable Future Actions.

In addition and in the alternative, to comply with NEPA, the Forest Service must consider all direct, indirect, and cumulative environmental impacts of the proposed action. 40 CFR § 1502.16; 40 CFR § 1508.8; 40 CFR § 1508.25(c). Direct effects are caused by the action and occur at the same time and place as the proposed project. 40 CFR § 1508.8(a). Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. 40 CFR § 1508.8(b). Both types of impacts include "effects on natural resources and on the components, structures, and functioning of affected ecosystems," as well as "aesthetic, historic, cultural, economic, social or health [effects]." Id. Cumulative effects are defined as the impacts resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. 40 CFR § 1508.7. Cumulative impacts result from individually minor but collectively significant actions taking place over a period of time. Id.

Here, the cumulative impacts from these activities must be fully analyzed. See *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 971-974 (9th Cir. 2006)(requiring agency to provide "objective quantification of the impacts" from all "reasonably foreseeable" mining projects in the area.). In this case, since the EA acknowledges that future mine development (and the other projects discussed above) are at least "reasonably foreseeable," the agency must analyze the quantitative impacts from all of these projects in one NEPA document. Thus, even if the agency believes these activities are not "connected actions," or related actions, the agency must review all of the impacts from these activities under its NEPA duties to review all "cumulative impacts".

Response: The CEQ requires that cumulative actions, when viewed with other proposed actions, should be discussed in the same environmental analysis if they would have cumulatively significant impacts. 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. 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 (EA Section 3.11).

Comment Number: 17 The Forest Service Improperly Allows Mining Activities Within the Oak Flat Withdrawn Area.

Section 2.1.2 outlines the Forest Service's Proposed Action. The EA outlines numerous intrusions, both direct and indirect, into the Oak Flat Withdrawn Area. As noted above, this violates PLO 1229 and 5132, as well as federal mining and public land law.

For example, on page 37 of the EA, the Forest Service states that Rio Tinto/BHP would continue to maintain the existing roads to access drill site M and an existing drill site on State lands south of the withdrawn boundaries. Maintenance of roads within the withdrawn area for mining activities by a mining company must immediately be halted. In addition, road maintenance cannot be allowed by this Plan. We wonder how a user-created road created by a mining company could possibly exist within an area clearly withdrawn from mining!

Response: The actions outlined in the proposed Pre-feasibility Activities 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 US 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. The user-created road which exists within the withdrawal area was most likely created by recreational users of the Oak Flat Campground and predates any RCM activity in the area.

Comment Number: 18 The Forest Service Improperly Allows Mining Activities Within the Oak Flat Withdrawn Area. The Forest Service must explain how it allowed the illegal drilling of a test well by Rio Tinto/BHP within the withdrawn area. Approval for this illegal activity must be immediately ended and the well completely reclaimed. The drilling and continued use of this well by Rio Tinto/BHP is clearly a violation of PLO 1229 and 5132.

Response: The DOE well site was originally 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. 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.

Construction of the new well, 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 allows for more detailed and technologically advanced investigations of groundwater. This well was located directly adjacent to the DOE well to build on the groundwater information provided by past studies at the site. The groundwater data retrieved from 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 Activities Plan of Operations.

The operation of the DOE groundwater monitoring well has been ongoing since it was first constructed in 1990. It has been used and monitored for various hydrologic studies and continued to be monitored by RCM today. The HRES-3 well has also been strictly used for ground water investigations since it was constructed in 2004. The data collected from these wells will ultimately allow scientists to more effectively understand and evaluate potential hydrologic impacts of future proposed mining activities in the region.

Comment Number: 19 Water Management

The EA would allow Rio Tinto/BHP to use water taken during the dewatering of the No. 9 shaft for dust suppression and drilling. As we discussed earlier in our comments, this clearly makes the dewatering a connected action that should be studied in a comprehensive EIS. Further however, this EA does not examine the polluted character of this water and the potential for contamination of the ecosystem and groundwater by using this source. In addition, the EA should further study the impact of using at least 6,000 gallons per day from the area's water table. There needs to be much more discussion of both water quality and water quantity from the preferred alternative.

Rio Tinto/BHP should remove all cuttings and mud from the Forest as dispose of them in an environmentally responsible manner.

Response: A mitigation measure, to be incorporated into the proposed action (EA, Section 2.3) states that 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. Future compliance with CWA regulations and permitting requirements will be required of RCM throughout the life of the project. Additionally, RCM will be required to demonstrate compliance with State of Arizona Surface and Aquifer water quality standards for the four water sources identified for dust suppression on roads and drilling activities.

Four sources of water are proposed for dust suppression and drilling processes. These include the No. 9 shaft, the Superior West Plant Site, Well A-06 (ADWR#55-214967) on State Trust lands, and water purchased from the Arizona Water Company (which obtains water from wells located near Florence Junction). The potential hydrologic impacts of dewatering the No. 9 shaft were evaluated for the special use permit issued for the Magma Arizona Railroad Company (MARRCO) water pipeline. Results of that evaluation indicated that the site is characterized by two aquifer systems, the shallow Apache Leap Tuff aquifer and a deep aquifer consisting of Whitetail conglomerate and underlying Tertiary, Mesozoic, Paleozoic, and Precambrian rocks that are separated by an aquitard composed of low-permeability geologic units ranging in thickness from several hundred to more than 3000 feet. Mining operations at this site have required groundwater dewatering since the early 1900's. Dewatering pumps were turned off in 1998 and aquifer conditions were recovering until dewatering resumed in 2008. The Apache Leap Tuff Aquifer is penetrated by the Number 9 shaft and discharges to the shaft and to underground mine workings. Water level elevations in the shaft did not recover to the bottom of the Apache Leap tuff before dewatering operations resumed in 2008. Impacts to ground water dependent ecosystems on the Tonto NF or nearby wells that may have occurred from any dewatering of the Apache Leap Tuff by the No. 9 shaft or underground mine workings would have occurred decades past. Because water table elevations in the No. 9 shaft did not recover to the bottom of the Apache Leap Tuff aquifer prior to resumption of dewatering operations, impacts of the No. 9 Shaft on water table conditions in the Apache Leap Tuff would not have changed from the period when dewatering was occurring. Consequently continued dewatering of the No. 9 shaft would not affect ground water dependent ecosystems.

In order to eliminate any possible effects to groundwater dependent resources from the pumping of the existing Well A-06 a mitigation measure has been added (EA, Section 2.3) which requires that, prior to pumping, RCM first prove, through appropriate pump test and monitoring procedures, that the use of water from that well would not affect nearby groundwater dependent ecosystems. RCM has stated in the proposed action that water purchased from the Arizona Water Company could also be used instead of pumping Well A-06.

Comment Number: 20 All New Road should be completely Obliterated during Reclamation

The EA calls for new user created roads to be closed simply by constructing an earthen berm at the start of these roads. This is not acceptable. User created roads should be completely obliterated using accepted best practices during reclamation. Care should be taken during the scope of this Plan to make sure that the public does not use these roads and create a pattern of use that will be hard to break.

Response: Mitigation Measure number 26 (EA Section 2.3) states that "No roads are being proposed under this analysis for changes in designation. Travel management is expected to be complete before completion of the proposed actions of RCM. Those roads whose status is not changed through consideration under travel management will be returned to their original condition (or in the case of user created roads, obliterated) when they are no longer in use for this project."

Comment Number: 21 All New Road should be completely Obliterated during Reclamation

Access to [Dill] site PVT-7 would turn a trail into a 4-wheel drive road. The closure procedures outlined for reclamation of this new road is not sufficient to prevent public access to this road. Either the road must not be constructed, or the road needs to be completely obliterated upon reclamation. Further, Rio Tinto/BHP must assure that the public, other than non-motorized traffic, have no access to this road.

Response: Mitigation Measure number 26 (EA Section 2.3) states that "No roads are being proposed under this analysis for changes in designation. Travel management is expected to be complete before completion of the proposed actions of RCM. Those roads whose status is not changed through consideration under travel management will be returned to their original condition (or in the case of user created roads, obliterated) when they are no longer in use for this project."

Comment Number: 22 Noxious Weed Management

Rio Tinto/BHP need to document at least quarterly the cleaning and inspecting of equipment to make sure they do not transport noxious weeds. Once a year is not enough. The cleaning and inspecting of equipment to avoid the spread of noxious weeds and the resulting documentation should apply to all vehicles used for drilling and testing.

Response: The Proposed Action includes the environmental protection measure that noxious weed surveys will be conducted within construction areas prior to ground disturbance and in accordance with Forest Service guidelines and that additional mitigation may be required depending on the results of those surveys. In addition, Mitigation Measure 13 includes the requirement that all equipment be cleaned off site prior to use on the project. The Forest Service believes that with implementation of these measures the requirement for annual reporting of these activities is appropriate.

Comment Number: 23 Night Light Effects

Drilling should take place only during daylight hours in areas where night light would be visible to the public from the Oak Flat Withdrawal Area and existing hiking trails and other camping areas. At a minimum, the Plan should specify that dark sky standards be the minimum standard for night operating conditions.

Response: The EA considers effects to visual resources (see Section 3.5), including the scenic quality of the landscape. Mitigation to reduce effects to night skies has been developed (see Mitigation Measure number 20). This mitigation measures states that "Lights used for night work and safety at drill sites will be directed or shielded to minimize night light effects to recreational areas."

Comment Number: 24 Travel Within the Withdrawn Area

The only travel when conducting mining activities as part of this plan should be on the paved Magma Mine Road. Use of the withdrawn area for mining activities violates PLO 1229 and 5139.

Response: The actions outlined in the proposed Pre-feasibility Activities 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 US 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: 25 Additional Drill Monitoring Needs to Be Done to Prevent Drill Incursion into the Oak Flat Withdrawn Area

An Annual inspection of Rio Tinto/BHP records is not sufficient to prevent incursion into the OFWA by directional drilling. An independent third party should inspect drilling records weekly at every location near the OFWA and should have the authority to immediately suspend operations if any suspicious activity is found. Rio Tinto/BHP has a pattern of violating the withdrawn area and simply cannot be trusted to provide only annual documentation with no independent on the ground verification.

Response: As included in Section 2.3 of the EA under Mitigation Measure number 25, RCM will be required to conduct a cadastral survey of the Oak Flat Withdrawal Area boundary in the areas adjacent to proposed drills sites to ensure that activities at these sites do not encroach on withdrawn lands. In addition, this mitigation measure states that 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. The Forest Service feels that this requirement is sufficient to prevent incursion.

Comment Number: 26 Helicopter Access to drilling sites improperly Rejected

One of the alternatives rejected in the EA is to access drilling locations that either are proposed on state or private lands or would require road access through the Forest or for drilling locations that would require the building of additional roads. There is no real rationale given for this decision other than it was "impractical." The use of helicopter should be given more credence as it would prevent long term disturbance of the area by the creation of additional new roads that may or may not be adequately reclaimed.

Response: The use of helicopters was evaluated as an option to access sites on State Trust and private lands that would require road access through National Forest System Lands. It was determined that, based on the extent of existing road infrastructure in the PAA and the frequency that drill sites need to be accessed while drilling operations are ongoing, the use of helicopters would not be reasonable. The majority of the access required for the proposed action is along existing roadways, only 0.33 miles (or 0.59 acres) of new road access would be constructed as part of the proposal (EA Table 2-8).

Comment Number: 27 Lack of Consultation with Native American Tribes and Individuals

The Forest Service seems to recognize in Section 3.9 that it has a duty to Consult on a Government to Government to basis under NHPA as part of this process. However, the Forest Service erroneously believes that simply sending letters to Tribal Governments constitutes consultation under NHPA. Such a truncated consultation process violates the NHPA and its implementing regulations.

NHPA § 106 ("Section 106") requires federal agencies, prior to approving any "undertaking," such as approval of this project, to "take into account the effect of the undertaking on any district, site, building, structure or object that is included in or eligible for inclusion in the National Register." 16 U.S.C. § 470(f). Section 106 applies to properties already listed in the National Register, as well as those properties that may be eligible for listing. See *Pueblo of Sandia v. United States*, 50 F.3d 856, 859 (10th Cir. 1995). Section 106 provides a mechanism by which governmental agencies may play an important role in "preserving, restoring, and maintaining the historic and cultural foundations of the nation." 16 U.S.C. § 470.

If an undertaking is the type that "may affect" an eligible site, the agency must make a reasonable and good faith effort to seek information from consulting parties, other members of the public, and Native American tribes to identify historic properties in the area of potential effect. See 36 CFR § 800.4(d)(2). See also *Pueblo of Sandia*, 50 F.3d at 859-863 (agency failed to make reasonable and good faith effort to identify historic properties).

Here, the agency failed to properly ascertain the historical, cultural, and religious properties and values of the lands that will be affected by the project and related activities, as well as failing to properly ascertain the impacts (including cumulative impacts) of the project on these resources. The agency also failed to properly consult with the potentially affected Tribes.

Response: The analysis in the EA and accompanying technical reports support the findings of no significant impact resulting from implementation of the Pre-feasibility Activities. Section 3.10 of the EA discusses Native American religious practices and considers potential effects to these from the Pre-feasibility Activities. The Forest Service consulted with Native American Tribes (see Chapter 4, Coordination and Consultation) through the scoping and comment periods.

Comment Number: 28 Native American Religious Practices

While the Forest Service acknowledges its duty to apply Executive Order 13007 to this action, it rejects out of hand any duties under this order despite comments from the San Carlos Apache Tribe stating that "Oak Flat, Apache Leap, Devil's Canyon and the related canyons, geological formations, and springs in the area of proposed activity are holy, sacred, and consecrated lands." Instead of summarily rejecting this information, the Forest Service should have taken its duty to fully consult seriously and work with effected Tribes to understand more fully the nature of the objections and consequences of this proposal on their religious practices. There is a great deal of work here to be done by the Forest and again points to why further study is needed before approving this POO.

Response: The analysis in the EA and accompanying technical reports support the findings of no adverse impact to cultural resources resulting from implementation of the Pre-feasibility Activities. Section 3.10 of the EA discusses Native American religious practices and considers potential effects to these from the Pre-feasibility Activities. The Forest Service consulted with Native American Tribes (see Chapter 4, Coordination and Consultation) throughout the environmental analysis process.

Comment Number: 29 Failure to Comply with Forest Service Regulations and the Organic Act

In addition to the above-noted failures, the EA and proposed action violates the Forest Service's duties to minimize adverse impact to public land resources under the Organic Act of 1897 and its implementing regulations at 36 CFR Part 228. For example, by rejecting alternatives that would reduce the environmental impact (such as alternatives that would not approve/include individual aspects of the project such as activities within the OFWA, the tunnel boreholes, etc.) (see above and previous comments by the groups), the agency has not minimized the project's impacts. Of course, this also violated NEPA's duties to fully analyze all reasonable alternatives.

Even if some subset of activities may be approved under the Mining Law (a much smaller set of activities than argued by the agency and the company), approval of all of the activities violates these mandates.

Response: The Forest Service operates within a complex legal framework that governs land and resource management the National Forests and directs forest planning efforts. While the Organic Act of 1897 set forth basic guidance for creating forest reserves from public lands, subsequent laws such as the Multiple-Use Sustained-Yield Act of 1960 and the National Forest Management Act of 1976 further defined the regulatory and management authority of the Forest Service. The Forest Service is charged with a multiple-use mandate that must balance protection with sustained use of natural resources. NEPA obligates Federal agencies to consider the environmental impacts of their actions and requires full public participation in the planning process. NEPA is a procedural rather than a substantive act and requires full public disclosure of the proposed action. The Forest Service has completed a full EA in response to RCM's submittal of the Pre-feasibility Activities Plan of Operations. Public involvement has been conducted pursuant to NEPA and Forest Service guidelines and alternatives to the proposed action have been considered. Five alternatives were considered in detail in the EA and 10 alternatives were considered but eliminated. We feel that the EA documents a full analysis of all reasonable alternatives.

Letter: 10 Commenter Garrett James Bennett

Owner

CenterFocus Climbing

Comment Number: 1 As I am aware that fighting capitalism and greed is nearly impossible in this day and age, I can only hope that the United States Forest Service will have the vision to look beyond economics and place value in American spirit. I understand that the role of the Forest Service is to manage resources for the greatest good. I also understand that Resolution Copper provides many jobs and will help to greatly stimulate the economy given the approval of this proposed action, and that Resolution has mining rights established by the General Mining Law of 1872. Due to these mining regulations I am aware that no action cannot be selected by the US Forest Service. However, any closure of the Oak Flat Withdrawal Area would violate the public land order that removed this area from appropriation under U.S. mining laws.

Response: The Proposed Action (i.e., Alternative 2, EA Section 2.1.2) and the alternatives identified during EA development (i.e., Alternatives 3 through 5, EA Sections 2.1.3, 2.1.4, 2.1.5) do not propose closure of the Oak Flat Withdrawal area. Therefore, Public Land Order (PLO) 1229, modified by PLO 5132 which specifically allows "...all forms of appropriation under the public land laws applicable to national forest lands, except under the U.S. mining laws" will not be violated.

Comment Number: 2 When our past leaders recognized an invaluable spiritual quality in the American wild, and helped preserve and protect these lands with federal designations of National Forests and lands, this proposed action was not in my opinion what they had in mind. This country has abused the ambiguity of concrete laws and provisions, utilizing unintended loopholes in the support of greed for much too long. We are selling away the spirit of America and its citizens by twisting and manipulating what we already know is not morally right. It takes only common sense to know that when these lands were preserved, they were not meant to be chess pieces traded and swapped and moved and re-arranged. Any legislative authority whom would have passed laws to protect our American heritage and landscape would never approve of this, as it would be overly evident that this type of mentality would be step one in a series of steps that will eventually lead to the prostitution of the American landscape. We all need money to survive, but America will eventually face a total collapse if we do not start thinking of long-term self-sustainability.

Response: Thank you for your participation and comment.

Comment Number: 3 Having climbed and traveled in over twenty countries across five different continents, I can honestly say that the Queen Creek area is one of the most unique and beautiful landscapes that I have ever seen. In addition to numerous archeological resources, the bio-diversity of the area is spectacular. Queen Creek is a cross-section of the American landscape which is un-paralleled and deserves protection based on its unique geological, biological and archeological significance. Geologically, the aesthetic of the area is unique and unmatched anywhere else. It has already been noted by the Forest Service that parts of the proposed area "pass through a complex assemblage of geologic units that represent a wide span of geologic time." Biologically the bloom of the Arizona Hedgehog cactus, the hummingbirds, javelina and other desert life bring incredible diversity to the area. Archeologically, pottery, metatlas and other artifacts are scattered across the Oak Flat landscape. The emotional and recreational benefits bring a sense of calmness and well-being into all those that frequent this area. For over fifteen years I have seen countless people recreating with a joyful bliss that is rare.

Response: Thank you for your participation and comment. This EA evaluates the affected environment within the Pre-feasibility Activities Area (PAA), to include geology, biology, and cultural resources (EA Sections 3.2.1, 3.3, 3.4, 3.9, 3.10). Mitigation measures to minimize and/or eliminate impacts of Pre-feasibility activities to geologic, biological, and cultural resources were developed (EA Section 2.3). Specifically, Mitigation Measures 4, 7, 8, 10, 11, 12, 14, 17, 18, 19, 21, 27, 28, and 29 directly address impacts to biological, cultural, and geologic resources.

Comment Number: 4 I am sure that mine workers want jobs, I am sure that they need jobs. In these difficult times this is a common case across the country. Unfortunately, it is not our nation's landscape that should continue to bear the burden of supporting an income for a fraction of its population at a price that involves stripping the rights of every other American citizen and their children and their childrens' children on an eternal and infinite level. I do not believe that the owners of Resolution are concerned with providing employment to its workers, they are concerned with profit at all cost. Of course they will say they are concerned with providing jobs as it is required, fashionable and necessary on a public relations level to get what they want, but maybe if they are so concerned about the financial well-being of the surrounding areas their corporate officers are willing to impose substantial pay cuts on themselves so that they may be able to increase the salaries of their employees. Maybe some of these reduced corporate profits could be used to apply mining tactics with a higher level of concern for conservation, instead of economical mining that could result in the destruction of this ecosystem.

Response: Thank you for your participation and comment.

Comment Number: 5 We can keep selling the American spirit, but what will happen to our grandchildren when there is nothing left to pillage. In conclusion, the Queen Creek area has truly provided me with a sense of sanity and well-being that goes unmatched anywhere else in the world. I have seen this in the tens of thousands of recreationists that use the area as well. The area is unique biologically, archeologically, environmentally and a suited replacement simply does not exist. If a line is never drawn in regards to these sorts of proposals the parameters of acceptable use will continue to expand until nothing is safe or truly protected any longer. Eventually, we will all be long gone, and our future generations will have lost a definitive element to what America once was. We will end up having traded everything away until nothing is the way it was ever intended to be. Loopholes will have been aggressively pursued and abused for decades, and one day we will realize that we have sold out our own blood, our heritage and our pride.

Response: Thank you for your participation and comment.

Comment Number: 6 As a result I strongly feel that NO ACTION should be allowed in regards to this proposal. I sincerely thank the Tonto National Forest for keeping me informed regarding this proposal, and for the civil opportunity to express what I think. The Tonto National Forest has always functioned in a well organized and professional manner, and I thank you for your time in considering my comments.

Response: Thank you for your comment and continued interest in the Tonto National Forest. 40 CFR part 1502.14(d) requires that the alternative of no action be included in an Environmental Impact Statement. Forest Service Handbook 1909.15 Chapter 14.1 clarifies: "The no-action alternative provides a baseline for estimating the effects of other alternatives; therefore, consider the no-action alternative in detail in each environmental analysis." Under current statutes, selection of a "no-action" alternative is outside the authority of the Responsible Official and could involve a probable "taking" of private property rights under the Fifth Amendment of the Constitution. The Forest Service does not have the authority or discretion to prohibit well-planned and legitimate mineral operations complying with all applicable laws and located in areas open to mineral entry. We use the NEPA process to develop reasonable alternatives and mitigation that minimizes adverse environmental impacts while allowing the operations to take place. The 1872 Mining Act confers a statutory right to enter upon public lands open to location in pursuit of locatable minerals, and to conduct mining activities, locate necessary facilities, associated incidental activities, and all uses reasonable incidental thereto. The Forest Service's responsibility is to facilitate the exercise of that right while protecting and requiring the operator to restore surface resources and minimize adverse environmental impacts.

Letter: 11 **Commenter Deborah Williams**

Comment Number: 1 I would like to comment upon the proposed Plan of Operations by RCM in the Tonto National Forest. I am extremely concerned about the environmental and cultural impacts the proposed action would incur. Specifically, I am concerned with invasive procedures upon land which is held as culturally significant to Native American groups

(Yavapai and Apache). These groups have public stated their objections to mining activities in the area. There is also a documented history of use by these groups. There is a known origin site, a place for acorn gathering, holds Apache gowa sites, and burial places.

Response: Thank you for your participation and comment. The Forest Service has consulted with Native American Tribes through the scoping and comment periods (EA, Chapter 4, "Coordination and Consultation"). Sections 3.9, 3.10, 3.11.10, and 3.11.11 of the EA discuss cultural resources and consider potential effects to these relative to the Pre-feasibility Activities.

Comment Number: 2 Any action should undergo an EIS as well as consultation with the Yavapai and Apache tribes prior to initiation of mining activity, even if only prefeasibility.

Response: Thank you for your participation and comment. From the analysis presented in this EA the Forest Supervisor will determine if an Environmental Impact Statement (EIS) would be necessary. If it is determined that an EIS is not required, the Forest Supervisor will document that determination in a Finding of No Significant Impact (FONSI) and issue a Decision Notice. The Forest Service has consulted with Native American Tribes through the scoping and comment periods (EA, Chapter 4, "Coordination and Consultation").

Comment Number: 3 The other concern is the impact this activity will have on the Oak Flats campground which still in use. This area is extremely important to recreationists as well as local groups who frequent the site. Increased activity will be disruptive and increase risk to those using the area. This area is already impacted and no substitute area is currently available. The same is true of the area used by boulderers and rock climbers.

Response: In response to comments received during the public scoping period, the EA included analyses which address specific concerns regarding recreational activities in and around the Oak Flat Campground (Issues 5 and 6 in the EA). Specific impact studies conducted evaluated traffic patterns, noise levels, visual impacts, and safety risks associated with the proposed Pre-feasibility Activities. Results of the studies are summarized in Sections 3.5, 3.6, 3.11.6, and 3.11.7 of the EA. Mitigation measures (Section 2.3 of the EA) were developed to minimize impacts identified and include reducing vehicle traffic, locating specific drill equipment in certain configurations to direct noise away from recreational vehicles, and implementing screening techniques to reduce visual impacts (Section 2.3 of the EA). In addition, three alternatives were developed to mitigate impacts to recreational use in the area (Alternatives 3, 4, and 5; Sections 2.1.3, 2.1.4, and 2.1.5 of the EA).

Comment Number: 4 In addition, RCM has not received official permission to access and impact the Oak Flat area. While I understand RCM's interest and need for prefeasibility studies, to proceed with drilling, even on a limited scale, appears to circumvent the protections which were ordered.

Response: The proposed Pre-feasibility activities do not include drill sites within the Oak Flat Withdrawal Area and RCM has stated that they would not drill under the Oak Flat Withdrawal Area from drill sites in the vicinity. A mitigation and monitoring measure has been developed that would require RCM to complete a Cadastral Survey of the boundary of the Oak Flat Withdrawal Area to ensure that nearby drill sites be located outside the withdrawal boundaries (Mitigation measure #25, Section 2.3 of the EA). This mitigation measure would also require RCM to provide the Forest Service with exploration drilling information of sufficient detail to document that directional drill activities do not extend under the Oak Flat Withdrawal Area. There is no proposal to enter the Oak Flat Withdrawal Area for purposes of locating a 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: 5 Traffic concerns and the building and widening of roads are also issues, not only to humans but to flora and fauna in the area.

Response: Impacts to wildlife were analyzed in the EA (Sections 3.3, 3.4, 3.11.4, 3.11.5). Mitigation measures were developed which address reduction of vehicle traffic, protection of Arizona hedgehog cacti, and management of noxious weeds (EA, Section 2.3).

Comment Number: 6 The area is known for its particular geologic, scenic and wildlife features which will be inevitably impacted to some degree. Further study should be initiated before any action is taken.

Response: The EA analyzed impacts from the proposed Pre-feasibility activities to key resources in the area (EA, Sections 3, "Affected Environment and Environmental Consequences"). The findings of these investigations have driven the development of mitigation measures which minimize and/or avoid these resources (EA, Section 2.3).

Comment Number: 7 At this point in time, I would recommend that the project be substantially modified to minimize these impacts or be rejected.

Response: Thank you for your participation and comment. In response to public comments and evaluation of project impacts during this EA process, alternatives were developed as well as mitigation measures to minimize and/or avoid impacts (EA, Sections 2.1, 2.3).

Letter: 12 **Commenter Marjorie Blaine** **Senior Project Mngr** **Department of the Army,
Los Angeles District, Corps of Engineers**

Comment Number: 1 The Environmental Assessment (EA) referred to drainages within the proposed project area; however, there was not enough detailed information in order for us to determine whether the proposed pre-feasibility studies (and associated infrastructure such as roads) will impact those drainages and/or require a Section 404 permit. Resolution Copper Mining should submit a preliminary jurisdictional delineation (PJD) to the Corps at the above address at the very earliest possible time in order for us to make our determination of jurisdiction and permit requirements. The EA should also reference the possibility that a Section 404 permit may be required prior to onset of the pre-feasibility studies or construction of any roads or other infrastructure.

Response: Pre-feasibility activities associated with roadway maintenance of existing roads and/or construction of new roads are proposed to occur within the PAA, some of which cross ephemeral drainages. Pursuant to 33 CFR Part 323.4(6), construction or maintenance of temporary roads for moving mining equipment is not subject to regulation under Section 404 of the Clean Water Act (i.e., these activities are exempt). The exemption directs that roads are constructed and maintained in accordance with best management practices to assure that flow and circulation patterns and chemical and biological characteristics of waters of the United States are not impaired, that the reach of the waters is not reduced, and that any adverse effect on the aquatic environment will be otherwise minimized. Mitigation measures, to include implementation of BMPs have been developed to minimize and/or avoid impacts to ephemeral drainages within the PAA (EA, Section 2.3).

Letter: 13 **Commenter Linda Taunt** **Deputy Director** **Arizona Department of Environmental Quality**

Comment Number: 1 The Arizona Department of Environmental Quality, Water Quality Division's (ADEQ) iterates our comments from the July 18, 2008 letter in response to RCM's Pre-Feasibility Proposal. The EA addresses our concerns relating to groundwater, and acknowledges the need for a Stormwater Pollution Prevention Plan (SWPPP) for construction activities and for coverage under the Arizona Pollutant Discharge Elimination System's (AZPDES) De Minimis General Permit. We have some additional points related to future water quality permits that likely will be necessary at the implementation of this project.

[The letter then discusses the various permits required]

Response: Included as a mitigation measure #5 (EA, Section 2.3): "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. Future compliance with Clean Water Act (CWA) regulations and permitting requirements will be required of RCM throughout the life of the project. Additionally, RCM will be required to demonstrate compliance with State of Arizona Surface and Aquifer water quality standards for the four water sources identified for dust suppression on roads and drilling activities".

Comment Number: 2 Because the proposed activities will occur up until 2025, RCM will need to be cognizant of the most current permit in existence at the time it seeks coverage for an activity. We appreciate the opportunity to review and provide comments.

Response: RCM will be required to obtain water quality permits in the future as required by ADEQ in order to remain in compliance with state water quality regulations (EA, Mitigation Measure #5).

Letter: 14 Commenter Joe P. Sparks

The Sparks Law Firm, P.C.

Comment Number: 1 This letter will confirm my earlier verbal request for a 180 day extension of time in which to comment on the Environmental Assessment regarding the Resolution Copper Mining Pre-feasibility Activities Plan of Operations ("Environmental Assessment"). As I discussed with you over the telephone on April 9, 2009, and with Assistant Forest Supervisor Tom Klabunde on April 8, 2009, the Environmental Assessment involves a matter which is far too complex to be studied and addressed in the 30 day period which has been set for public comment by the Notice dated April 1, 2009.

This Firm represents the San Carlos Apache Tribe and Tonto Apache Tribe (collectively "Tribes") as Special Counsel on certain environmental and natural resource matters. The Firm also represents the Inter Tribal Council of Arizona ("ITCA"), the membership of which is comprised of 20 Arizona Indian Tribes, as general counsel. It is on behalf of the Tribes and the ITCA that this Firm requests additional time to comment.

The Tribes and the VEVA each oppose Resolution Copper Mining's Plan of Operations. On July 18, 2008, our Firm submitted comments to the Forest Service Team Leader regarding Resolution Copper Mining LLC's Plan of Operation for Pre-feasibility Mining Studies on behalf of the Tribes and the Yavapai-Apache Nation. A copy of these comments is attached here for your review.

On initial review, the Environmental Assessment and the response to this Firm's comments on behalf of the Tribes contained on pages A-19 and A-20 of Appendix A are superficial, at best. The Tribes and the ITCA strongly wish to file timely comments regarding the Environmental Assessment, but a thorough study of the documents cannot be completed in the brief period allowed, and appropriate comments cannot be drafted in this time. For these reasons, on behalf of the Tribes and the ITCA, I repeat my request for an extension of time in which to comment on the Environmental Assessment.

Response: In our letter to you dated May 18, 2009, your request for a 180 day extension of the comment period was respectfully denied. In accordance with 36 CFR Part 215.6, the time period for opportunity to comment cannot be extended.

Comment Number: 2 In addition, there has been no government to government consultation between the Forest Service and the Tribes and ITCA. The additional time requested here would be the minimum period during which the Forest Service may reasonably expect to initiate and participate in any meaningful and substantive government to government consultation.

Response: Government to government consultation in accordance with the National Historic Preservation Act was initiated shortly after the Plan of Operations was submitted to the TNF and was determined to be administratively complete (i.e., approximately June 2008). Tribal consultation is ongoing and will conclude for this action when a final decision regarding RCM's Pre-feasibility Plan of Operations is reached, although Tribal comments may be considered at any time over the life of Pre-feasibility activities (EA, Section 3.9.1, and Chapter 4).

Comment Number: 3 This Firm serves as Special Counsel to the San Carlos Apache Tribe, the Tonto Apache Tribe, and The Yavapai-Apache Nation ("Tribes") on environmental, natural resource, and other matters. On behalf of the Tribes, we submit the following comments to the Forest Service regarding Resolution Copper Mining, LLC's Plan of Operations for pre-feasibility mining studies.

I. An Environmental Assessment is Insufficient under NEPA

In his letters dated June 6, 2008, to certain Tribal leaders, Forest Supervisor Gene Blankenbaker indicated that "[b]ased on initial review of the proposal, [the Forest Service has] determined that a Environmental Assessment (EA) would be the appropriate level of NEPA analysis for the Plan of Operations". On behalf of the Tribes, this Firm objects to this determination, 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.

In this case, the pre-feasibility action proposed by Resolution Copper Mining, LLC ("Resolution Copper"), is a part of a greater plan to carry out a large-scale copper mining operation in southeastern Arizona. Without connection to future mining plans in the area, the pre-feasibility activities proposed by Resolution Copper at this time would be wholly without purpose. The pre-feasibility action and any future actions required for mining are clearly connected actions under 40 C.F.R. § 1508.25(a)(1) - the pre-feasibility activities plainly "depend on the larger action for their justification," and the pre-feasibility and future actions are "interdependent parts of a larger action." Because a mining operation on the site would require an EIS, a simple Environmental Assessment for the pre-feasibility activity is insufficient under NEPA. Proposed pre-feasibility activities and actual mining operations should be addressed in one comprehensive EIS which studies the impacts of the full proposed mining project as a whole, together with the cumulative impact of all past, existing, and proposed mining activities in the area.

Courts reject attempts by agencies to use "piecemealing" or "segmentation" to divide a major federal action into smaller components in order to avoid preparing a comprehensive EIS. If such piecemealing were allowed, an agency could "avoid the NEPA requirement that an EIS be prepared for all major federal actions with significant environmental impacts by segmenting an overall plan into smaller parts involving action with less significant environmental effects."¹ "When the segmentation project has no independent justification, no life of its own, or is simply illogical when viewed in isolation, the segmentation will be held invalid."² For example, in *Town of Huntington v Marsh*,³ the Second Circuit Court of Appeals recognized that the U.S Army Corps of Engineers' distinction between designating a site and issuing permits to use that site was unacceptable piecemealing in order to avoid preparing a comprehensive EIS. The Court found that designating sites and issuing permits were connected activities, stating that "[t]he proper test to determine relatedness under 40 C.F.R. § 1508.25(a)(1)(iii) is whether the project has independent utility." *Id* at 1142.

Here, Resolution Copper's preliminary feasibility activities are connected to the proposed mining project itself, have no independent utility, and should be evaluated in an EIS which considers the environmental impact of the mining project as a whole.

Under the National Environmental Policy Act (NEPA), agencies must address connected actions in one comprehensive EIS. According to 40 C.F.R. § 1 508_25(a)(1), "Actions are connected if they: (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 requirements has not been made. A preliminary determination was made by the Forest justification."

Response: Thank you for your participation and response to the EA. From the analysis presented in this EA the Forest Service Supervisor will determine if an Environmental Impact Statement (EIS) is necessary. If it is determined that an EIS will not be required, the Forest Supervisor will document that determination in a finding of no significant impact (FONSI) and issue a Decision Notice.

No proposal has been submitted to the TNF for development of the ore body RCM is proposing to explore in their Plan of Operations (EA, Section 1.4). The Pre-feasibility activities proposed by RCM are exploratory in nature, proposed in order to estimate the extent, location, and value of the ore body (EA, Section 1.2), and do not automatically trigger development of a mine. Pre-feasibility studies would allow RCM to determine the preliminary economics of the ore body, identify potential risks, and establish where further work and studies are required. Subsequently, the Pre-feasibility activities proposed by RCM do not depend upon development of a mine, and in fact may negate future mine development (EA, Section 1.5).

Comment Number: 4 Oak Flat Picnic and Camp Ground is Protected Under Federal Law

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. The proposed pre-feasibility activities are mining related activities, and therefore are not permitted.

Response: The proposed Pre-feasibility activities do not include drill sites within the Oak Flat Withdrawal Area and RCM has stated that they would not drill under the Oak Flat Withdrawal Area from drill sites in the vicinity. A mitigation and monitoring measure has been developed that would require RCM to complete a Cadastral Survey of the boundary of the Oak Flat Withdrawal Area to ensure that nearby drill sites be located outside the withdrawal boundaries (Mitigation measure #25, Section 2.3 of the EA). This mitigation measure would also require RCM to provide the Forest Service with exploration drilling information of sufficient detail to document that directional drill activities do not extend under the Oak Flat Withdrawal Area. There is no proposal to enter the Oak Flat Withdrawal Area for purposes of locating a 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: 5 Pre-Feasibility Activities Would Affect Tribes' Free Exercise of Religion

Oak Flat, Apache Leap, Devil's Canyon, and the related canyons, geologic formations and springs located in the area of proposed activity are holy, sacred, and consecrated lands. The Apaches and other Tribes conduct religious activities, prepare shrines, and approach and pray at the shrines created by their Elders in this area. Religious objects, shrines, paintings, and religious symbols necessary to the practice of the Tribes' religion are kept, protected, and tended to in numerous locations, making the land sacred to the Tribes. The bodies and funerary objects of many of the most powerful of their spiritual leaders are placed in these locations to remain forever undisturbed, and thus consecrate this area.

Tribal members actively practice their religion at various locations within this area making this area holy to the Tribes. The area includes locations from which the spiritual leaders summon, by prayers and songs, the four Spirits of the Mountains and the Spirit of the Earth's breath - the wind. In Apache, these spirits are called Gahn or Ga'ahn. In these canyons are springs, intimately known to the Tribes. At these springs they place offerings and pray and express their gratitude for the waters of the Earth (the Earth's blood), which run also in their hearts and veins, and is essential to life for all beings, including plants, objects, and formations considered by some non-Indians to be inanimate.

Specific aspects of the religions of the Tribes can not be practiced at any other location on the Earth. Only there can they conduct, initiate, and complete activities necessary to essential aspects of their religion.

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: TNF responsibility under law, regulation and Executive Order 13007 is to ensure that Tribes are not restricted or prevented in their practice of traditional activities or religious pursuits on National Forest System Lands, including access to and use of shrines and other sacred locations. Consultation to identify sacred sites that might be affected by Pre-feasibility Activities has been conducted with Tribes claiming cultural affiliation in the PAA, and no specific sacred sites were identified. As a part of consultation, Apache legal counsel informed the TNF that Oak Flat, Apache Leap, Devils Canyon and related canyons, geologic formations, and springs in the area of the proposed activity are holy sacred, and consecrated lands. The information provided by Tribes with cultural affiliation in the PAA indicate that the proposed action and alternatives do not restrict access, future ceremonial use, or adversely affect the physical integrity of any known sacred site identified during consultation (EA, Section 3.10).

Comment Number: 6 IV. Government to Government Consultation is Required

Finally, there has been no government to government consultation with these Tribes, or any other American Indian Tribes in Arizona as required by both federal law and policy. In addition, although some Tribal leaders were made aware of the comment period by the Forest Service, the Tribes have not been afforded sufficient time to fully address the proposed action and Environmental Assessment. For example, although this Firm was sent a copy of Mr. Blankenbaker's letter dated June 6, 2008, it was not received by our office until July 1, 2008.

Response: Government to government consultation in accordance with the National Historic Preservation Act was initiated shortly after the Plan of Operations was submitted to the TNF and was determined to be administratively complete (i.e., approximately June 2008). Tribal consultation is ongoing and will conclude for this action when a final decision regarding RCM's Pre-feasibility Plan of Operations is reached, although Tribal comments may be considered at any time over the life of Pre-feasibility activities (EA, Section 3.9.1, and Chapter 4). It is not known why the consultation letters sent by the TNF on June 6, 2008 were not received in a more timely fashion.

Comment Number: 7 LETTER FROM THE SPARKS LAW FIRM TO USFWS RE: Arizona Hedgehog Cactus 5-Year Status Review by San Carlos Apache Tribe (June 18, 2008)

This Firm serves as Special Counsel to the San Carlos Apache Tribe ("Tribe") on environmental, natural resources, and other projects. On behalf of the Tribe, this Firm submits the following comments regarding the Arizona Hedgehog Cactus ("Hedgehog Cactus") for use during the U.S. Fish and Wildlife Service's ("USFWS") five-year status review under the Endangered Species Act.

The Tribe urges the USFWS to maintain the Hedgehog Cactus as an endangered species protected by the Endangered Species Act.

In the last five years, the Tribe has become increasingly aware of threats to the Hedgehog Cactus by the mining industry. The ecological range of the Hedgehog Cactus is substantially identical to the footprint of the proposed Resolution Copper Mine between Superior, Arizona and Miami, Arizona. In the last five years, a loss of species has resulted from road construction and exploratory drilling associated with this proposed mining operation.

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, to include the endangered Arizona hedgehog cactus, designated critical habitat, Forest Service sensitive species and birds protected by the Migratory Bird Treaty Act. In consultation with the U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act, it was determined that the project would not likely jeopardize the continued existence of Arizona hedgehog cactus.

Comment Number: 8 LETTER FROM THE SPARKS LAW FIRM TO USFWS RE: Arizona Hedgehog Cactus 5-Year Status Review by San Carlos Apache Tribe (June 18, 2008)

At the current time, in connection with its proposed operation, Resolution Copper Mining, LLC, is attempting through a federal land exchange (introduced to the United States Congress as the Southeast Arizona Land Exchange and Conservation Act of 2007 (HR. 3301)) to obtain private ownership of the Oak Flat Campground, which is located in the heart of the range of the Hedgehog Cactus and is presently protected from all mining activities. If this land exchange is approved, and Resolution Copper's plans go forward, there will be substantial alterations to the terrain in the area, and a further loss to species is likely to result.

Response: The proposed Southeast Arizona Land Exchange and Conservation Act of 2009 is not a Forest Service action subject to review and decision by the Forest Service (EA, Section 1.4). The proposed Pre-feasibility Activities 1) do not trigger the legislative land exchange, 2) do not have to proceed in a specific order or simultaneously with each other, and 3) are not dependent on each other to occur.

Comment Number: 9 LETTER FROM THE SPARKS LAW FIRM TO USFWS RE: Arizona Hedgehog Cactus 5-Year Status Review by San Carlos Apache Tribe (June 18, 2008)

Through the block-caving mining process, Resolution Copper would develop a series of tunnels deep below the Hedgehog Cactus habitat. Using blasting and other techniques over an operating period of more than 40 years, Resolution Copper will break up and remove the ore body from the ground for further processing, creating an enormous void in the Earth that will eventually collapse in on itself, causing significant surface subsidence throughout the project area and a vertical collapse of a substantial portion of elevated terrain by as much as 2,000 vertical feet. This disturbance would not only alter and destroy the habitat of the Hedgehog Cactus, but would alter weather patterns and temperature ranges necessary for its survival.

The protection and recovery of the Arizona Hedgehog Cactus is of high importance to the San Carlos Apache Tribe. Please contact this Firm with any questions, concerns, or requests for more information.

Response: No proposal has been submitted to the TNF for development of the ore body RCM is proposing to explore in their Plan of Operations (EA, Section 1.4). The Pre-feasibility activities proposed by RCM are exploratory in nature, proposed in order to estimate the extent, location, and value of the ore body (EA, Section 1.2), and do not automatically trigger development of a mine. Pre-feasibility studies would allow RCM to determine the preliminary economics of the ore body, identify potential risks, and establish where further work and studies are required.

Letter:	15	Commenter Rich A. Heig	Vice President	Resolution Copper Mining
Comment Number:	1	It is our assessment that the EA has analyzed and disclosed impacts associated with the Plan in sufficient detail such that the public and interested agencies can thoroughly understand the proposed activities. Resolution Copper Mining (RCML) has made every attempt to minimize the environmental effects of the Plan. Further, RCML believes that the Forest Service has identified appropriate project alternatives which address the specific concerns of Forest users who have participated in the NEPA process.		
Response:		Thank you for your participation and comment.		
Comment Number:	2	Specifically, RCML now believes that the selection of Alternative 4a or 4b would best serve the public by reducing traffic associated with drilling activities in the Oak Flat campground area. The selection of Alternative 4a or 4b would result in less disruption to recreational users, as will the relocation of the proposed Drill Site OF-2 to the north.		
Response:		In response to public scoping comments, two alternatives were developed to address safety concerns as well as potential conflicts with recreational users at the Oak Flat Campground. Both West Access Route 4a and 4b provide alternative routes designed to avoid traffic concerns in the Oak Flat Withdrawal Area (EA, Section 2.1.4, 2.1.5). Both routes would start at FR 315 and would be used to gain access to OF-1, OF-3, M, and RES-13. The Forest Supervisor will consider public comments, analysis disclosed in the EA, information contained in the public record, and management direction and policy, collectively, to determine the selected alternative.		
Comment Number:	3	RCML agrees with the discussion in the EA which states that the development of a mine does not necessarily automatically follow the pre-feasibility work, and that the pre-feasibility work, and all of the exploration and		

development work, is designed to determine whether the copper deposit can be technologically and economically developed.

Response: Thank you for your participation comment.

Letter: 16 **Commenter Wayne Grainger** **Not Affiliated**

Comment Number: 1 The entire process is a time consuming, delicate, frustrating, and yet very worth while for all. Many factors should be considered before the final decision is made; short and long term goals need to be addressed, big picture impact throughout the entire site should be considered at all times. Governmental agencies must fulfill numerous methods, alternatives, and options prior to acceptance. Privately owned organizations are subject to the same guidelines as governmental agencies during projects of this size.

This individual is in favor of the Environmental Impact Statement (EIS). This will provide satisfaction among all concerned parties, providing a better life for future generations. Much of the AZ landscape is scared because of mining operations. Through proper planning, mining of copper can be achieved, while keeping all involved areas clean and green.

Response: Thank you for your participation and response to the EA. From the analysis presented in this EA the Forest Supervisor will determine if an Environmental Impact Statement (EIS) would be necessary. If an EIS is not necessary, the Forest Supervisor will document that determination in a Finding of No Significant Impact (FONSI) and issue a Decision Notice.

Letter: 17 **Commenter Wendsler Nosie, Sr.** **Chairman** **San Carlos Apache Tribe**

Comment Number: 1 The San Carlos Apache Tribe opposes the 5.409- Southeast Arizona Land Exchange and Conservation Act of 2009 and the proposed Resolution Copper mine at Chich'il Bi[dagoteel].

Response: The proposed Southeast Arizona Land Exchange and Conservation Act of 2009 is not a Forest Service action subject to review and decision by the Forest Service (EA, Section 1.4). The proposed Pre-feasibility Activities 1) do not trigger the legislative land exchange, 2) do not have to proceed in a specific order or simultaneously with each other, and 3) are not dependent on each other to occur.

Comment Number: 2 We believe that the proposed Pre-feasibility Plan of Operations EA and any previous attempts to collect traditional Apache perspectives regarding mining activities in the area of Oak Flat and Apache Leap did not involve meaningful government-to-government consultation. Therefore we are providing information on how these proposed activities will seriously harm Apaches, and what steps the Tribe believes should be taken to resolve this matter.

Apaches have traditionally opposed large-scale mining, and the Tribe opposes large-scale mining to this day. Since 1996 the Tribe's Elder's Cultural Advisory Council has written several formal letters to Federal and local government agencies strongly opposing large-scale mining. Long before that countless Apaches fought, killed, and died protecting our homelands from large-scale mining.

Mining is inconsistent with our conservative, traditional Apache values. We have been taught to respect the natural world, and to keep it clean and natural. Our traditional relationship with the land is deep and personal. We depend on the natural world for our survival, and our survival depends on maintaining our personal relationships with all living things. Our word for this earth is Nigosdzan, "Earth is Woman". We were taught never to desecrate her by digging deep into her veins.

Response: Thank you for your participation and comment. Government to government consultation in accordance with the National Historic Preservation Act was initiated shortly after the Plan of Operations was submitted to the TNF and was determined to be administratively complete (i.e., approximately June 2008). Tribal consultation is ongoing and will conclude for this action when a final decision regarding RCM's Pre-feasibility Plan of Operations is reached, although Tribal comments may be considered at any time over the life of Pre-feasibility activities (EA, Section 3.9.1, and Chapter 4).

Comment Number: 3 Everything in the natural world is alive and has a power. We have a name for everything: the plants, the animals, the birds, the atmosphere, the minerals, the winds, the stars, the bodies of waters, the places, and everything else.

We recognize the power that each element of the natural world has, and that each individual power is directly related to particular Holy Beings.

We recognize that each of these elements works in concert with the other elements that make up an ecosystem. The power of each of these species is influenced by the other species in the ecosystem, and these combinations of power contribute to the power of the entire ecosystem. All of these powers are in turn influenced by the particular power of the place they are found, so that the power of each ecosystem cannot be duplicated or replaced.

Apaches often need to access these particular species and ecosystems, in person or remotely, by physical access, prayer, song, vision, or ceremony. Our traditional specialists use song cycles and ceremonies - just like modern scientists use formulas and technology - for the community's healing, protection, and physical and spiritual well-being and happiness.

Damage to these ecosystems, and to the species found within them, weakens their power and shows great disrespect to the Holy Beings with whom they are associated, who have the ability to deny the benefits of this power, or the spiritual or physical access to these ecosystems. Losing access to these ecosystems - either by their closure or their destruction - profoundly weakens the strength of Apache prayer and ceremony, and severely limits the ability of Apaches to effectively practice their religion, ultimately resulting in physical and spiritual harm to Apaches.

Over the past 150 years our traditional Apache lands have been destroyed, place-by-place, ecosystem- by-ecosystem. We see parking lots covering our traditional food and medicine gathering areas, our sacred springs run dry by development, and trailer parks in our traditional corn and pumpkin fields. Now you are proposing more destruction.

The proposed mine at Chich'il Bi[dagoteel will destroy many particular ecosystems and the living things within them. These ecosystems and living things are associated with particular Holy Beings that we depend on, in particular a certain kind of Gaan - all-powerful Mountain Spirits - with whom Chich'il Bi[dagoted is associated. Destroying this area will greatly hurt our ability to conduct public and private ceremonies involving these Gaan and other Holy Beings.

The area impacted by the mine includes cherished traditional food and medicine gathering areas, which would be forever lost if the mine were to open. We believe that the proposed mine will seriously affect the waters both above and below the ground that we depend on for physical and spiritual sustenance. We believe that there is no way to mitigate this loss or the serious impacts to Apaches. We believe that destroying these ecosystems will violate our civil and religious rights.

Response: The cultural and religious values of the San Carlos Apache Tribe are known to the TNF, recognized and addressed in the EA (Sections 3.9, 3.10 and 3.11). No proposal has been submitted to the TNF for development of the ore body RCM is proposing to explore in their Plan of Operations (EA, Section 1.4). The Pre-feasibility activities proposed by RCM are exploratory in nature, proposed in order to estimate the extent, location, and value of the ore body (EA, Section 1.2), and do not automatically trigger development of a mine.

Comment Number: 4 We, like you, believe in economic development for our people. We need jobs desperately. But we can't accept an economy that is inconsistent with our most deeply held values. Just as you don't want jobs for your young people that are based on drugs or prostitution, we don't want jobs that are based on destroying Nigosdzan. We believe that an economy based on extractive industries is short-term, and physically and spiritually harmful. We believe, like so many international reports indicate, that extractive industries rarely benefit indigenous communities.

Response: Thank you for your participation and comment.

Comment Number: 5 We want the Federal Government to proceed with a full administrative review through an Environmental Impact Statement so that we can more fully analyze the serious impacts that this proposed mine will have on our people. At that time, we will be happy to discuss in detail these impacts, and the ways in which they may or may not be mitigated.

We would also like to work with our local, state, and Federal governments in identifying long-term, responsible economic development strategies for all of us, that are consistent with both traditional Apache values and scientifically-informed, environmentally sustainable practices.

Response: Thank you for your participation and response to the EA. From the analysis presented in this EA the Forest Supervisor will determine if an Environmental Impact Statement (EIS) would be necessary. If an EIS is not necessary, the Forest Supervisor will document that determination in a Finding of No Significant Impact (FONSI) and issue a Decision Notice.

Letter: 18 Commenter Betsey Dooley Not Affiliated

Comment Number: 1 PHONE CALL

Expressed concern with block cave mining, and potential water contamination, landslides, and water quality as a result of this mining type.

Response: No proposal has been submitted to the TNF for development of the ore body RCM is proposing to explore in their Plan of Operations (EA, Section 1.4). The Pre-feasibility activities proposed by RCM are exploratory in nature, proposed in order to estimate the extent, location, and value of the ore body (EA, Section 1.2), and do not automatically trigger development of a mine.

Comment Number: 2 PHONE CALL

PLO 5132, and concerned that Resolution will mine below the Oak Flat Withdrawal area.

Response: RCM has committed to the TNF that no directional drilling will occur under the Oak Flat Withdrawal Area (EA, Section 3.7.2). In order to ensure RCM does not conduct directional drilling under the withdrawal, mitigation measure #25 has been developed which will require RCM to conduct a cadastral survey of the Oak Flat Withdrawal boundary, and to provide annual drilling information from those drill sites located adjacent to the withdrawal boundary to document that directional drilling activities are not violating the withdrawal (EA, Section 2.3).

Comment Number: 3 PHONE CALL

Concerned about the potential land exchange, and does not want it to happen.

Response: The proposed Southeast Arizona Land Exchange and Conservation Act of 2009 is not a Forest Service action subject to review and decision by the Forest Service (EA, Section 1.4).

Letter: 19 Commenter Pamela Dalton-Rabago Not Affiliated

Comment Number: 1 I do not have any problem with Resolution drilling or building roads. The only thing I would ask is that any road that is built to remain. Every time we turn around another road is closed or so bad you can not get down them which means the 4-wheelers are going to go off the roads.

You used to maintain roads but not any more. We are surrounded by the Forest Service and we need access to the forest. We also do not want to see more trails because the roads are not maintained. It is not us who go off the roads but others coming from the Valley please make it accessible so that the forest will not be destroyed.

Response: Table 2-11 in the EA 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. No roads are proposed to be closed as a part of the proposed action or any of the proposed alternatives (EA, Sections 2.1.2, 2.1.3, 2.1.4, 2.1.5).

Letter: 20 Commenter David Cook (comment #2) Managing Member DC Cattle Co. LLC

Comment Number: 1 The confusion is that in the April 1 letter there are only three alternatives listed. In the EA "on line" there are more. I only commented on what was sent out for scoping. Good job DC.

Response: The Forest Service apologizes for the confusion. The notice sent out dated April 1, 2009, listed three alternative actions to the Proposed Action (the proposed action was not numbered on the notice). There are two alternative access routes to drill sites that were listed together under number 3 on the notice. The EA lists five alternatives, including the proposed action and the two access routes as separate alternatives (EA, Sections 2.1.2, 2.1.3, 2.1.4, 2.1.5).

Letter: 21 Commenter Diane L. Arnst Manager, Air Arizona Department of Environmental Quality

- Comment Number:** 1 Constructing the 0.33 miles road and road maintenance to maintain access to drilling sites has the potential to negatively impact the area's environment, particularly with 10-micron size particulate matter (PM 10). Equipment and vehicles disturbing the soil and tailpipe emissions could generate PM10 (dust) and other pollutants. Exceedances of the PM 10 standard have been recorded in Pinal County, and that is why it is so important to consider the adverse impacts of particulates.
- The proposed plan of operations may temporarily increase ambient PM10 levels that can penetrate the lungs of human beings and animals. PM-10 is subject to a National Ambient Air Quality Standard (NAAQS) to protect public health and welfare. Fine particulate matter, 2.5 microns in size and smaller (PM2.5), which could be generated during construction and road maintenance, also is subject to a NAAQS. A table containing NAAQS for the six criteria pollutants regulated under the Clean Air Act also is included with this response.
- Because it is difficult for our lungs to expel PM2.5, inhaling it has been linked to a variety of negative health impacts: premature mortality; heart attacks by disturbing heart rhythms and increasing plaque and clotting; respiratory infections; asthma attacks; and cardiopulmonary obstructive disease aggravation.
- Therefore, to comply with applicable air pollution control requirements and minimize adverse impacts on public health and welfare, the specific measures listed below are recommended to reduce the generation of PM 10.
- REDUCE DISTURBANCE of PARTICULATE MATTER during CONSTRUCTION
- I. Site Preparation and Construction
- A. Minimize land disturbance;
- B. Suppress dust on traveled paths which are not paved through wetting, use of watering trucks, chemical dust suppressants, or other reasonable precautions to prevent dust entering ambient air
- C. Cover trucks when hauling soil;
- D. Minimize soil track-out by washing or cleaning truck Wheels before leaving construction site;
- E. Stabilize the surface of soil piles; and
- F. Create windbreaks
- II. Site Restoration
- A. Revegetate any disturbed land not used;
- B. Remove unused material; and
- C. Remove soil piles via covered trucks.
- Applicable rules to reduce dust during construction, demolition, and earth moving activities are enclosed:
- Arizona Administrative Code R18-2-604 through -607
- Arizona Administrative Code R18-2-804
- Response:** Thank you for your recommendations. The mitigation and monitoring measure #1 presented in the EA (Section 2.3) have been strengthened by adding the specific measures outlined here in your comment. In addition, suggestions regarding dust control received from Pinal County are also being added (please see Letter 6, Comment Number 2 for further details).

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APPENDIX C — SPECIAL STATUS SPECIES FOR GILA AND PINAL COUNTIES LISTED BY THE U.S. FISH AND WILDLIFE SERVICE

Lists of threatened and endangered species for Pinal and Gila Counties were obtained from the Arizona Ecological Field Office of the U.S. Fish and Wildlife Service (USFWS) (USFWS 2008a and 2008b); information on individual listed species was obtained from the Arizona Game and Fish Department (AGFD) Heritage Database Management System (HDMS [AGFD 2008a]). A screening analysis was conducted on the 14 endangered, 7 threatened, 1 proposed for delisting, 2 petitioned for listing, and 3 candidate species listed by the USFWS. Analysis of these species included a review of available literature and documented observational data to determine species' preferred habitats and known geographic, elevation and seasonal ranges. In addition, field reconnaissance was conducted within the PAA to evaluate the vegetation and habitat characteristics for comparison with habitats known to support the species listed in Pinal and Gila Counties.

- **USFWS Endangered Species**

ARIZONA CLIFFROSE (*Purshia subintegra*)

Status: Federally listed as endangered under the Endangered Species Act (ESA), listed for Pinal and/or Gila Counties (endangered); Tonto National Forest (TNF) endangered species (TNF-endangered [under the ESA; TNF Species List 10/2007])

Known Distribution and Habitat Needs: This species is known to occur within the TNF. It is endemic to central Arizona and can be found in Maricopa, Yavapai, Mohave and Graham Counties. Arizona cliffrose is found on rolling limestone hills in Sonoran desertscrub, usually on white Tertiary (Miocene and Pliocene) lacustrine deposits high in lithium, nitrates and magnesium. Elevation ranges from 2,500 to 4,000 feet (AGFD 2008c).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. The PAA lacks the white Tertiary lacustrine deposits favored by this plant and is outside this species' known range. HDMS reports no records for this species in the PAA vicinity (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the Arizona cliffrose or its habitat. This species is not considered further in this EA.

ARIZONA HEDGEHOG CACTUS (*Echinocereus triglochidiatus* var. *arizonicus*)

Status: Endangered, TNF-endangered, Arizona highly safeguarded plant species (highly safeguarded [Arizona Department of Agriculture])

Known Distribution and Habitat Needs: This species is known to occur within the TNF. Its range is restricted to the highlands of Pinal and Gila Counties. AHC are 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 above 3,300 feet amsl (AGFD 2008c, TNF 1996). Known habitat requirements include open slopes and cracks and crevices between boulders in Interior Chaparral and Madrean Evergreen Woodland habitats (Brown 1994). Elevation range is 3,300 to 5,700 feet (TNF 1996).

The distribution of the AHC 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. Cedar Creek Associates' observations of more than 1,000 specimens located during field surveys for the nearby Carlota Project indicate that the AHC prefers stable rock formations such as 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 AHC to establish and grow. The remaining two rock types that are known to be associated with the AHC 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 AHC to the same extent as certain kinds of tuff or granite.

Likelihood of Occurrence in the PAA Vicinity: This species occurs within the PAA. WestLand Resources, Inc., conducted comprehensive surveys for this plant throughout the PAA and documented the locations of all individuals. This species is considered in greater detail in this EA.

BONYTAIL CHUB (*Gila elegans*)

Status: Endangered; TNF-endangered; historically known from the TNF (historically known); wildlife of special concern in Arizona (wildlife of special concern [AGFD HDMS (6/3/2008)])

Known Distribution and Habitat Needs: This species is historically known to occur within the TNF. In Arizona, this species is currently limited to a small population in Lake Mohave along the Colorado River, possibly extending to Parker Dam. It is primarily found in backwaters and eddies away from strong currents, preferring waters with high levels of total dissolved solids. It also survives in lakes and ponds, including lakes Mohave and Havasu (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat and is outside this species' known range. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the bonytail chub or its habitat. This species is not considered further in this EA.

COLORADO PIKEMINNOW (*Ptychocheilus lucius*)

Status: Endangered, TNF-endangered, wildlife of special concern in Arizona (wildlife species of concern [AZ Game and Fish Department Heritage Data Management System (6/3/2008)]), reintroduction populations designated as experimental-nonessential under the ESA (experimental-nonessential)

Known Distribution and Habitat Needs: This species is known to occur within the TNF. Considered extirpated in Arizona, this species has been experimentally reintroduced in the Salt and Verde River drainages. Habitat includes turbid, deep and strongly flowing water. Small individuals occupy shallow backwater areas with little or no current and sand/silt substrates. During flood events, this species may occupy flooded bottomlands adjacent to rivers (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat and is outside this species' known range. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the Colorado pikeminnow or its habitat. This species is not considered further in this EA.

DESERT PUPFISH (*Cyprinodon macularius*)

Status: Endangered, TNF-endangered, wildlife species of concern

Known Distribution and Habitat Needs: This species is known to occur within the TNF. Restricted to three natural populations in California and the non-natural irrigation drains around the Salton Sea. Also found in restricted locations in Sonora and Baja California, Mexico. One natural population still occurs in Quitobaquito Spring and Pond in Pima County and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai Counties, Arizona (Mark Taylor, TNF, pers. comm.).

Natural habitat for this small fish includes desert springs, small streams and marshes. It can also tolerate warm saline water (USFWS 2008a and 2008b).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat and is outside this species' known range. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the desert pupfish or its habitat. This species is not considered further in this EA.

GILA CHUB (*Gila intermedia*)

Status: Endangered, TNF-endangered, wildlife species of concern

Known Distribution and Habitat Needs: This species typically occupies pools in small streams, marshes, cienegas and other quiet waters, although it may have occurred in larger, more complex habitats. It occurs in Fish and Mineral Creeks within the TNF (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat and is outside this species' known range. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the Gila chub or its habitat. This species is not considered further in this EA.

GILA TOPMINNOW (*Poeciliopsis occidentalis occidentalis*)

Status: Endangered, TNF-endangered, wildlife species of concern

Known Distribution and Habitat Needs: This species is known to occur within the TNF. It is known to occupy several localities in the Gila River drainage and one locality in the Bill Williams River drainage (AGFD 2008c). The topminnow requires small streams or cienegas with vegetated shallows at elevations below 4,500 feet (USFWS 2008a). It prefers shallow, warm and fairly quiet waters, but will adjust to a wide range, living in quiet to moderate currents, depths to 3 feet, and water temperatures from constant 26.7°C (80°F) springs to streams fluctuating from 6.1 to 37.2°C (43 to 99°F) (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat and is outside this species' known range. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the Gila topminnow or its habitat. This species is not considered further in this EA.

LESSER LONG-NOSED BAT (*Leptonycteris yerbabuenae*)

Status: Endangered, TNF-endangered¹, wildlife species of concern

Known Distribution and Habitat Needs: We found no confirmed records of this species within the TNF. This species is migratory and present in southern Arizona from April to September and south of the border the remainder of the year. Two records of immature bats exist from the Phoenix area, but most records are south of Pinal County. The lesser long-nosed bat is associated with areas of desertscrub containing agave and columnar cacti; it roosts in caves and abandoned mines. Elevation range is below 6,000 feet (USFWS 2008b).

Likelihood of Occurrence in the PAA Vicinity: Very low potential for this species to occur. The PAA is approximately 67 miles away from the closest known maternity site and/or post-maternity dispersal roost site. The PAA is outside the geographic ranges mapped by Hoffmeister (1986) and Cockrum (1991) for this species, and AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). This species is not considered further in this EA.

¹ Not known to occur on the TNF, but currently included in the TNF list of threatened and endangered species.

MEXICAN GRAY WOLF (*Canis lupis baileyi*)

Status: Endangered, TNF-endangered², wildlife species of concern

Known Distribution and Habitat Needs: We found no confirmed records of this species within the TNF. The most common habitat for this species is chaparral, woodland and forested areas, as well as upper Sonoran grasslands. Its elevation range is from 3,000 to 12,000 feet. This species was reintroduced in the Blue Range Primitive Area of Greenlee and Apache Counties, consisting of rugged topography bisected by the Mogollon Rim. The wolf typically avoids desert areas, but may use these areas as a travel corridor (AGFD 2008c).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. The PAA is located well outside this species' current range in the Blue Range Primitive Area of Greenlee and Apache Counties. AGFD HDMS reports no records for this species near the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the Mexican gray wolf or its habitat. This species is not considered further in this EA.

NICHOL TURK'S HEAD CACTUS (*Echinocactus horizonthalonius* var. *nicholii*)

Status: Endangered, highly safeguarded

Known Distribution and Habitat Needs: We found no confirmed records of this species within the TNF. This species is found in Sonoran desertscrub, either within unshaded sites on dissected alluvial fans at the foot of limestone mountains or on inclined terraces and saddles on limestone mountainsides. It is found in the Waterman Mountains in north central Pima County and the Vekol Mountains in southwestern Pinal County. Elevation range is 2,400 to 4,100 feet (USFWS 2008b).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. The PAA is outside this plant's range. AGFD HDMS reports no records for this species near the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the Nichol Turk's head cactus or its habitat. This species is not considered further in this EA.

SOUTHWESTERN WILLOW FLYCATCHER (*Empidonax traillii extimus*)

Status: Endangered, TNF-endangered, wildlife species of concern

Known Distribution and Habitat Needs: This species is known to occur within the TNF. The southwestern willow flycatcher is found in dense stands of cottonwood, willow and tamarisk vegetation communities along rivers and streams. It is locally distributed in these communities throughout much of Arizona. Elevation range is below 8,500 feet (USFWS 2008a and 2008b).

² Not known to occur on the TNF, but currently included in the TNF list of threatened and endangered species; may be dropped from list following further review.

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. Although it is possible that it may fly over during migratory periods, there is no suitable riparian habitat within the PAA to support breeding and nesting of this species. AGFD HDMS reports no records for this species within 2 miles of the PAA, and the PAA is outside designated critical habitat for this species. It is our opinion that the Pre-feasibility Activities would not affect the southwestern willow flycatcher or its habitat. This species is not considered further in this EA.

RAZORBACK SUCKER (*Xyrauchen texanus*)

Status: Endangered, TNF-endangered, wildlife species of concern

Known Distribution and Habitat Needs: This species is known to occur within the TNF. It is endemic to the Colorado River basin and the only remaining natural populations are in and near lakes Mohave, Mead and Havasu. The species is found in river and lacustrine areas, not in fast-moving water (USFWS 2008a and 2008b). It tends to occupy strong, uniform currents over sandy bottoms, eddies and backwaters lateral to river channels and sometimes concentrating in deep places near cut banks and fallen trees (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat to support this species. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the razorback sucker or its habitat. This species is not considered further in this EA.

WOUNDFIN (*Plagopterus argentissimus*)

Status: Endangered, TNF-endangered, historically known, wildlife species of concern, experimental-nonessential

Known Distribution and Habitat Needs: The woundfin is historically known to occur within the TNF. At present, it is restricted to approximately 50 miles of perennial reaches of the Virgin River in Utah, Arizona and Nevada. This riverine species is often found adjacent to riffles in runs and quiet waters over sand or sand/gravel substrates (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat and is outside this species' known range. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the woundfin or its habitat. This species is not considered further in this EA.

YUMA CLAPPER RAIL (*Rallus longirostris yumanensis*)

Status: Endangered, TNF-endangered, historically known, wildlife species of concern

Known Distribution and Habitat Needs: This species is historically known to occur within the TNF. It is found in fresh water and brackish marshes and is associated with dense emergent riparian vegetation. This

species requires wet substrate (e.g., mudflats and sandbars) with dense herbaceous or woody vegetation for nesting and foraging. Elevation range is below 4,500 feet (USFWS 2008a and 2008b).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. The PAA lacks suitable marshland habitat necessary to support this species. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the Yuma clapper rail or its habitat. This species is not considered further in this EA.

- **USFWS Threatened Species**

APACHE (ARIZONA) TROUT (*Oncorhynchus apache*)

Status: Federally listed threatened under the ESA, listed for Pinal and/or Gila Counties (threatened) wildlife species of concern

Known Distribution and Habitat Needs: We found no confirmed records of this species within the TNF. This native trout is endemic to the White Mountains of Arizona in the headwater reaches of the Little Colorado, Black, and White Rivers. This fish is restricted to elevations above 5,780 feet (AGFD 2008c).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat and is below this species' elevation range. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the Apache trout or its habitat. This species is not considered further in this EA.

BALD EAGLE (*Haliaeetus leucocephalus*), Sonoran Desert nesting population

Status: Threatened; TNF-threatened species (TNF-threatened [under the ESA; TNF Species List 10/2007]); wildlife species of concern

Known Distribution and Habitat Needs: This species is known to occur within the TNF. The USFWS and the AGFD have recorded breeding territories within the region of the PAA. The closest documented breeding area is located approximately 20 miles north of the site near the Salt River (Jacobson et al. 2007). Bald eagles nest in tall trees, snags or cliffs near reservoirs, rivers and streams with abundant prey (USFWS 2008a and 2008b). In Arizona, eagles are found along the larger river systems and near reservoirs that offer suitable nesting and foraging opportunities (AGFD 2008c). Wide elevation range.

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. The species may fly over the PAA, but the PAA does not contain suitable roosting or foraging habitat (large trees or cliffs near water with abundant prey). It is our opinion that the Pre-feasibility Activities would not affect the bald eagle desert nesting population or its habitat. This species is not considered further in this EA.

CHIRICAHUA LEOPARD FROG (*Rana chiricahuensis*)

Status: Threatened, TNF-threatened, wildlife species of concern

Known Distribution and Habitat Needs: This species is known to occur within the TNF. It inhabits streams with deep rock-bound pools, but may also occur in springs and stock tanks that support aquatic or herbaceous vegetation. The only documented occurrences within the TNF are from the Payson and Pleasant Valley Ranger Districts. Generally at elevations above 3,500 feet within the TNF (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. The PAA is outside this species' known range. AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the Chiricahua leopard frog or its habitat. This species is not considered further in this EA.

GILA TROUT (*Oncorhynchus gilae*)

Status: Threatened, TNF-threatened, wildlife species of concern

Known Distribution and Habitat Needs: This species is known to occur within the TNF. It was historically found in the Verde and Agua Fria drainages in Arizona, but was considered extirpated in the State by 1993. Reintroductions of this species have taken place since. It occurs in small headwater streams within the TNF where water temperatures seldom exceed 21°C (70°F) (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat to support this species. It is our opinion that the Pre-feasibility Activities would not affect the Gila trout or its habitat. This species is not considered further in this EA.

LOACH MINNOW (*Tiaroga cobitis*)

Status: Threatened, TNF-threatened, historically known, wildlife species of concern

Known Distribution and Habitat Needs: This species is historically known to occur within the TNF. It inhabits turbulent, rocky riffles or mainstream rivers and tributaries up to about a 7,200-foot elevation. It typically occupies interstices of cobble-size substrate occasionally with dense growths of filamentous algae (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat to support this species. The PAA is not within designated critical habitat for this species. It is our opinion that the Pre-feasibility Activities would not affect the loach minnow or its habitat. This species is not considered further in this EA.

MEXICAN SPOTTED OWL (*Strix occidentalis lucida*)

Status: Threatened, TNF-threatened, wildlife species of concern

Known Distribution and Habitat Needs: This species is known to occur within the TNF. The Mexican spotted owl nests in canyons and dense forests with multilayered foliage structure, generally older forests of mixed conifer or ponderosa pine/Gambel oak. Elevation range is 4,100 to 9,000 feet. (USFWS 2008a and 2008b).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. The PAA is below the elevation range for this species and is outside designated critical habitat boundaries. The PAA does not contain suitable woodland habitat to support this species. It is our opinion that the Pre-feasibility Activities would not affect the Mexican spotted owl or its habitat. This species is not considered further in this EA.

SPIKEDACE (*Meda fulgida*)

Status: Threatened, TNF-threatened, historically known, wildlife species of concern

Known Distribution and Habitat Needs: This species is historically known to occur within the TNF. It occupies midwater habitats of runs, pools and swirling eddies, typically less than 1 foot deep (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat to support this species. The PAA is not within designated critical habitat for this species. It is our opinion that the Pre-feasibility Activities would not affect the spikedace or its habitat. This species is not considered further in this EA.

- **USFWS Proposed Species**

CALIFORNIA BROWN PELICAN (*Pelecanus occidentalis californicus*)

Status: Proposed delisted, under the ESA, listed for Pinal and/or Gila Counties

Known Distribution and Habitat Needs: Pelicans are coastal birds that inhabit near-shore habitats such as beaches, estuaries and near-shore islands in Mexico and the U. S. This species is sometimes dislocated by storms and transiently found on lakes and rivers in Arizona (USFWS 2008a and 2008b).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. This species feeds exclusively on fish, and the PAA lacks suitable perennial aquatic habitat. No critical habitat has been proposed or designated for this species. It is our opinion that the Pre-feasibility Activities would not affect the California brown pelican or its habitat. This species is not considered further in this EA.

- **Species Petitioned for USFWS Listing**

CACTUS FERRUGINOUS PYGMY OWL (*Glaucidium brasilianum cactorum*)

Status: Petitioned for listing under the ESA in Arizona (petitioned for listing)

Known Distribution and Habitat Needs: The cactus ferruginous pygmy owl nests in cavities in trees or large columnar cacti. This bird has historically been associated with riparian cottonwood forests and Sonoran desertscrub in central and southern Arizona, but most recent records are located south and west of Tucson (AGFD 2008c, Corman and Wise-Gervais 2005).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. The PAA is outside this species' current range (Corman and Wise-Gervais 2005). AGFD HDMS reports no records for this species in the vicinity of the PAA (AGFD 2008b). It is our opinion that the Pre-feasibility Activities would not affect the cactus ferruginous pygmy owl or its habitat. This species is not considered further in this EA.

TUCSON SHOVEL-NOSED SNAKE (*Chionactis occipitalis klauberi*)

Status: Petitioned for listing

Known Distribution and Habitat Needs: This species is endemic to south central Arizona, in Pima and Pinal Counties. It is associated with arid locations with sandy washes, dunes and rocky hillsides. The elevation range for the species *C. occipitalis* is up to 4,700 feet (AGFD 2008c).

Likelihood of Occurrence in the PAA Vicinity: Potential for this species to occur. The PAA is within this species' known range, and AGFD HDMS records indicate reports of this species within 2 miles of the PAA. This species is not considered further in this EA.

- **USFWS Candidate Species**

ACUÑA CACTUS (*Echinomastus erectocentrus* var. *acunensis*)

Status: Federal candidate species for listing under the ESA, listed for Pinal and/or Gila Counties (candidate), highly safeguarded

Known Distribution and Habitat Needs: This species is found on well-drained knolls and gravel ridges in Sonoran desertscrub. Elevation range is 1,300 to 2,000 feet (USFWS 2008a and 2008b).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. The elevation of the PAA is well above the upper elevation limit for this species. It is our opinion that the Pre-feasibility Activities would not affect the acuña cactus or its habitat. This species is not considered further in this EA.

YELLOW-BILLED CUCKOO (*Coccyzus americanus*)

Status: Candidate, TNF-sensitive Species List 10/2007 (TNF-sensitive), wildlife species of concern

Known Distribution and Habitat Needs: This species is known to occur within the TNF. Records indicate that the species is found in association with perennial riparian woodland habitats (cottonwood, willow or tamarisk galleries) (USFWS 2008a and 2008b). Elevation range is below 6,710 feet in Arizona (AGFD 2008c).

Likelihood of Occurrence in the PAA Vicinity: No reasonable potential for this species to occur. Although it is possible that the bird may fly over the PAA, the site lacks suitable riparian woodland habitat to support this species. It is our opinion that the Pre-feasibility Activities would not affect the yellow-billed cuckoo or its habitat. This species is not considered further in this EA.

HEADWATER CHUB (*Gila nigra*)

Status: Candidate, TNF-sensitive

Known Distribution and Habitat Needs: This species is known to occur within the TNF. It is restricted to the Gila River basin in middle to headwater reaches of mid-sized streams. It prefers pools associated with cover such as deep places near obstructions, large pools or undercut banks (TNF 2000).

Likelihood of Occurrence in the PAA Vicinity: No potential for occurrence. The PAA lacks suitable perennial aquatic habitat to support this species. It is our opinion that the Pre-feasibility Activities would not affect the headwater chub or its habitat. This species is not considered further in this EA.

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