MEMORANDUM

Date: January 16, 2014

To: The Honorable Chair and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

Re: **Initial Review of Final Environmental Impact Statement and Draft Coronado National Forest Service Record of Decision for Proposed Rosemont Mine**

Background

In 2007, Pima County was invited by the Coronado National Forest (Forest Service) to participate as a cooperating agency in the National Environmental Policy Act (NEPA) process and related Environmental Impact Statement (EIS) for the proposed Rosemont Mine. This was a logical relationship considering the expertise of various County employees with regard to many of the resources that would be impacted by the proposed mine, as well as the County government's role in assuring the public's health, safety and welfare. Since then, the County has formally submitted comments to the Forest Service during the project scoping period in 2008, in response to the Draft EIS in 2012, and in response to the Preliminary Final EIS in August 2013. Outside of these formal comment periods, County staff has actively participated in meetings and other information-sharing opportunities with the Forest Service and other regulatory and cooperating agencies. In addition, the County hosted and participated in a congressional hearing on the mine proposal; and I and the Board have continued to work with our congressional delegation to ensure a fair process.

On December 13, 2013, the Forest Service issued their Final EIS (FEIS) and Draft Record of Decision (ROD), which highlights their preferred alternative for the project. To be clear, this FEIS is proposed as the basis for decisions by the Forest Service and the US Army Corps of Engineers (Corps). The principal federal responsibility in the EIS is to disclose what federal actions will be taken, as well as to describe effects of the proposed decisions on the "human environment," a term that includes not just natural or physical conditions, but also the relationships of local people to their environment. The Corps, however, has not yet issued their decision document; and the US Environmental Protection Agency (EPA) has been highly critical of the proposed mitigation for impacts regulated by the Corps under Section 404 of the Clean Water Act.

County staff reviewed the recently released FEIS and ROD, and the County Attorney's Office is currently reviewing staff comments. This memorandum provides an overview of

improvements found in the FEIS, a number of which can be attributed at least in part to Pima County's active participation in the process. These improvements have made the proposal less environmentally damaging than it would have been without our participation. This memorandum also identifies significant impacts that continue to be unaddressed and largely unmitigated and describes the next steps in the Forest Service's NEPA and permitting process. The FEIS still falls short of meeting federal requirements to disclose the full extent of damages that could reasonably be expected to result from this mine. In addition, the proposed mitigation and monitoring measures are woefully inadequate. Therefore I will likely be recommending that the County continue to pursue all administrative remedies to provide full disclosure of the mine's impacts, as well as meaningful mitigation.

Improvements in the Final Environmental Impact Statement

According to County staff's review, the FEIS is generally an improvement over previous drafts of the EIS (the Draft EIS and Preliminary Final EIS). Some of the omissions and errors noted in the previous drafts have been addressed, and a number of important improvements have been made to the mine proposal. Key improvements include:

- Minimizing filling of McCleary Canyon so it can continue to provide flow downstream into Barrel Canyon;
- Eliminating heap leach and oxide processes from the Barrel (i.e., the Preferred) Alternative;
- Eliminating underdrains in the Barrel Alternative that would have required perpetual maintenance;
- Diverting stormwater around the pit to reduce water quality impacts;
- Eliminating stormwater storage on the waste pile after closure to achieve increased runoff to downstream areas;
- Reduced impacts to dark skies and astronomy;
- Monitoring activities to reduce the potential for unanticipated failures on the mountain-face pit wall;
- Avoidance and minimization measures to reduce wildlife fatalities on the mine site; and
- Additional mitigation measures for the Chiricahua leopard frog, a threatened species that occurs on the Rosemont site.

The County's participation in the EIS review has also resulted in a number of clarifications that would make it possible for the Forest Service to verify that mine construction and operation conform to certain conditions and assumptions that the federal agencies made in the EIS. Because of the size and complexity of this project, however, many triggers,

thresholds and conditions remain missing. The significance of these thresholds and conditions is that, should the mine exceed them or propose to alter them, the federal agencies would be obligated to examine new impacts and potentially ask for new environmental reviews or measures to reduce those impacts. These thresholds and conditions include:

- Explicit constraints on the pit configuration;
- Up to five consecutive years of temporary closure before the Forest Service could authorize final reclamation and closure;
- A multi-agency monitoring group to review monitoring data submitted to the Forest Service (though this does not provide for adequate coordination);
- A new permit review process by the Forest Service to ensure permit conditions of other agencies do not conflict, with triggers for NEPA reanalysis;
- Excluding soil crushing, offsite borrow pits and other "mechanical manipulations of salvaged soil" from the action alternatives;
- Explicit thresholds for a wide variety of other impacts, which would trigger NEPA review and analysis; and
- Thresholds for impacts on groundwater on the San Xavier District of the Tohono O'odham Nation.

Impacts are Large and Enduring

The FEIS is also a more honest document. It finally acknowledges more of the impacts that the Cooperating Agencies and others have been pointing out for years. With all of the new disclosures, the list of impacts demonstrates that the project remains environmentally unsatisfactory, for reasons that include the following:

- Permanent destruction and alteration of over 5,400 acres of land in the headwaters of the Cienega Creek Watershed, which provides drinking water to Tucson;
- A mile-wide open pit that will draw in regional groundwater, negatively impact regional wells, and create a lake that will exceed surface water quality standards for numerous constituents including lead, cadmium, mercury, selenium and zinc. This toxic lake could poses a danger to wildlife and regional groundwater quality;
- Irrevocable alteration of the landscape of the Santa Rita Mountains, which are culturally significant to many residents, including tribal nations;
- Increase of 9 to 14 traffic accidents per year along the highway (though the FEIS eliminates the reference in the DEIS to projected increases in the number of fatalities;

- $2 million to $7 million per year in lost visitor spending; and
- Loss of thousands of oak trees, 200,000 to 300,000 agave plants, and habitat of animal and plant species, including endangered species.

Attachment 1 to this memorandum provides a review and critique of an expanded list of issues, impacts and mitigation identified by the federal agencies in the FEIS. This table is over 30 pages, but even this table does not summarize all of the impacts highlighted in the FEIS. **Despite its abbreviated nature, the table clearly shows that the impacts are large, the benefits accrue to a few, and the costs are spread to many.** Many of the mine's impacts are considered irreversible; meaning that society would forever lose future options or the flexibility to respond to new conditions. The EIS also discloses that the poorest among us, including Tohono O'odham, Pascua Yaqui, and Hispanic populations of Santa Cruz County, South Tucson and Rio Rico, may be disproportionately affected by this project. The EIS also acknowledges many uncertainties in the effects of the mine on groundwater, vegetation and the potential for successful reclamation; yet the document continues to rely on optimistic outcomes predicted in studies by the proponent, such as the belief there would be no irreversible loss of groundwater quality.

Significant Impacts Remain Undisclosed

Surprisingly, there are still significant impacts that remain unaddressed and impacts for which indirect or cumulative effects were ignored. There are also new impacts to be considered, **such as the Forest Service's extension of the mine life beyond what was assumed in the groundwater models and the creation of a management area that would facilitate expansion of mining to areas on the crest of the Santa Rita Mountains and north of the project area.** The Forest Service's decision would essentially cut off the 13,000 acres of the Santa Rita Mountains that lie north of the new mining management area (see Attachment 2). These and other issues are identified among the "Staff Concerns" in the last column of the table that is Attachment 1.

Also of concern is that the mine described in the EIS would not conform to Pima County's outdoor lighting code and the Regional Flood Control District's (RFCD's) floodplain and erosion management ordinance. The EIS relies on a lighting plan that would require substantial redesign to meet County Code. The EIS drew its floodplain-related impact conclusions based on hydrological studies that failed to meet requirements of the RFCD.

Mitigation and Monitoring are Totally Inadequate

The third column of the table in Attachment 1 identifies mitigation identified in the EIS for the mine, including mitigation that is not guaranteed and may never happen. Many of the impacts are under-mitigated or would not be mitigated at all:

- The FEIS discloses that toxicity of the pit lake water is simply not regulated by the Arizona Department of Environmental Quality (ADEQ) or any other agency.
- There is scant monitoring to detect seepage under waste or tailings, and no plan or funding to deal with it. ADEQ does not have authority to require financing for mitigating unforeseen impacts after closure.
- An additional 9 to 14 accidents per year on Highway 83 could lead to serious injuries or deaths of travelers. The mitigation response is to reduce potholes by repaving and to pave three existing school bus stops, including one located near the mine entrance. None of the impacts to County roads would be mitigated.
- Pit backfilling was rejected, and visual impacts would be addressed by constructing a giant berm along scenic Highway 83 and coloring the pit wall after closure.
- One of the principal public issues identified in scoping was the potential for further mine expansion. Nothing in the ROD constrains further mine expansion; and, the proposed amendment of the Forest Plan would, in essence, create a new mining zone, facilitating further mineral development within a new "Management Area 16" that extends northwest to areas Rosemont has identified for future mineral exploration and development. The proposed Management Area 16 ignores the scoping analysis and extensive public comments regarding the non-mineral values represented by these areas.
- No soil or vegetation success criteria are established in the FEIS for reclamation, and there is no plan for fixing areas damaged by erosion or fire after closure. By rushing the FEIS to completion without success criteria, the Forest Service has denied meaningful public involvement to a part of the country that has suffered the past effects of poor reclamation outcomes.
- Regional air quality would not be mitigated with the latest "Tier 4" technology for the haul trucks and the giant front-end loaders that do most of the mine work, and no guarantees that even the proposed air quality mitigation measures will be required.
- None of the 12 Arizona tribal nations that were consulted are willing to sign a mitigation agreement with the Forest Service under Section 106 of the National Historic Preservation Act.

When considering the balance of total impacts compared to the mitigation that is being required by the Forest Service, it is clear that impacts far outweigh the meager mitigation measures offered. The full effect of the Rosemont Mine project would remain largely unmitigated, and will remain so long after the jobs are gone. The County and others will be left with the environmental and social impacts in perpetuity, with little or no compensation.

The No-action Alternative is Preferable, and May Have Been Unduly Constrained

Both the ROD and the FEIS state that a federal decision rejecting the mine would be environmentally preferable. The Corps may yet reject approval, but the Forest Service has said all along that their "decision space" is constrained by the 1872 Mining Law. Staff believes the decision space may be broader than what has been acknowledged in the FEIS. First, the FEIS does not describe that the Forest Supervisors have rejected an examination of whether the claims to the nation's mineral estate are even valid. Second, the FEIS does not disclose a decision to allow a pipeline and wells on federal lands or discuss whether such a decision is discretionary.

Where the Process Goes From Here

Coronado National Forest Supervisor Jim Upchurch has not yet finalized a decision about the mine. A new federal administrative process for major projects such as the Rosemont Mine provides an opportunity for eligible individuals, non-governmental organizations, businesses, partnerships, state and local governments, and Indian Tribes to file an objection to a proposed project or activity before the final decision is signed. This process allows review of unresolved concerns by a higher-level Forest Service official, known as the Reviewing Officer, before a decision is made. As a local government that has commented previously during this process, Pima County can file an objection within a 45-day period, which started on January 1 and ends on February 14.

Following the objection filing period, the Forest Service will have a 45-day review period and the option for a 30-day extension. The total objection period has a statutory limit of 120 days following the legal notice commencing the objection process. At the end of this period, the Reviewing Officer will issue a written response to the objections, which may include instructions to Supervisor Upchurch to incorporate additional changes in the draft ROD or to move forward with the project.

Potential grounds for an objection are currently being deliberated by staff in consultation with the County Attorney's Office. I will likely present a recommendation in late January for formal consideration by the Board at an early February meeting. If the Board moves

forward with an objection, Pima County may have an opportunity to meet with the Reviewing Officer and Supervisor Upchurch with the objective of having a dialogue about the objection issues and exploring opportunities for resolving the concerns expressed in the objection. After the objection period is over, there will be no other opportunity to appeal the final decision, and no recourse other than litigation.

Summary

The fact remains that this mine is being proposed in an area that is clearly unsuitable for such an industrial use. The impacts to the health, safety and welfare of the public are significant and long-term. The short-term benefits pale in comparison and accrue to a few. The public deserves to know the full extent of the mine's impacts, as well the inclusion of realistic and meaningful mitigation measures. The public also deserves a decision-maker who has explored every reasonable option before approving a project that is so damaging to public lands. It is my opinion that the FEIS and draft ROD have failed on these critical points.

CHH/mjk

Attachments

c: The Honorable Raúl Grijalva, Arizona District 3 Member, US House of Representatives
The Honorable Ron Barber, Arizona District 2 Member, US House of Representatives

ATTACHMENT 1

Rosemont Mine
Final Environmental Impact Statement: Impacts, Mitigation, and Pima County Staff Concerns

Prepared by the Pima County
Office of Sustainability and Conservation

January 8, 2014

The following table provides an overview of the Rosemont Mine impacts and proposed mitigation under the Preferred (Barrel) Alternative, and Pima County staff concerns and recommendations regarding the Rosemont Mine Final Environmental Impact Statement (FEIS). Information in the "Issues/Category", "Impacts", and "Mitigation" columns is from the FEIS. Most of the issues within the category "Other Effects Considered," are additional staff concerns with the FEIS. Though an attempt was made to match mitigation measures and staff concerns to the most appropriate impact, some do no directly match. In this case, hyperlinks are used to link mitigation and concerns that may be applicable to more than one issue. Staff concerns are primarily related to unresolved issues with the FEIS and as such, do not reflect the full breadth of issues and concerns that staff have with regards to the proposed project. Further, it should be noted that most issues raised in this table come directly from Table 12 (summary table) of the FEIS, and as such does not cover all of the impacts that will result from the mine.

Quick reference to categories:

- General Statistics
- Geology, minerals, paleontology
- Soils and Revegetation
- Air Quality and Climate Change
- Groundwater Quantity
- Groundwater Quality and Geochemistry
- Surface Water Quantity
- Surface Water Quality
- Biological Resources
- Livestock Grazing
- Dark Skies
- Visual Resources
- Recreation and Wilderness
- Hazardous Materials
- Fuels and Fire Management
- Transportation/Access
- Noise
- Public Health and Safety
- Cultural Resources
- Socioeconomics and Environmental Justice
- Other Effects Considered/ Issues not resolved

Photos on the front cover by Brian Forbes Powell. All photos were taken at the site of the proposed mine on Federal Forest Service land.

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
General Statistics			
General		**FS-BR-20.** Funding of NEPA analysis required for implementation of mitigation measures or changes in the MPO that affect NFS surface resources	
Estimated production over the life of the mine	1.8 billion tons of ore and waste rock, 4.6 billion pounds of copper, 100 million pounds of Molybdenum, 70 million ounces of silver. This is an irreversible commitment.		
Estimated % of US production (copper)	11%		
Estimated % of world production (copper)	<1%		
Acres of impacts	5,888 (includes all disturbances within the perimeter fence, primary access road corridor, utility corridor, road construction and decommissioning, and rerouting of the Arizona Trail)	**FS-BR-07 –** Recordation of a restrictive covenant or conservation easement on the private Helvetia Ranch Annex North Parcel to mitigate for impacts to species listed as threatened or endangered. **FS-BR-08 –** Recordation of a restrictive easement on the private Sonoita Creek Ranch Parcel to mitigate for impacts to species listed as threatened or endangered. **RC-BR-01 (Voluntary, non-binding).** Recordation of a restrictive easement on private land referred to as the Fullerton Parcel to protect wildlife habitat. **FS-BR21 –** Recordation of a restrictive covenant or conservation easement on private land parcels in Davidson Canyon to mitigate for loss of habitat for listed species. **OA-SR-01** – Power line and water line locations. Final location is the shortest route of alternatives considered by the ACC and eliminates one water line pump station. **OA-GW-05** – Processing and placement of tailings to reduce water content and overall footprint. This mitigation requires the use of dry-stack tailings technology, which would eliminate the need for traditional tailings impoundments; would allow tailings to be placed and compacted in a manner that would reduce the overall footprint of tailings facilities; would minimize the amount of water entrained in the tailings (water from filtered tailings is reused); and would reduce the amount of fresh water needed for processing.	Project does not comply with Conservation Lands System (CLS) mitigation guidelines and, in general, mitigation offered is too little and Sonoita Creek Ranch occurs outside the CLS. Staff wants the EIS to disclose that the project is not consistent with SDCP CLS guidelines, and explain how much it would take to make it consistent, and why it is not consistent. Based on the mine's location within the CLS, mitigation should be more like 13,000 acres.
Pit Size: Diameter	6,000-6,500 feet (1.13-1.23 miles)		Pit stability depends on dewatering the aquifer before and during excavation.
Pit Size: Depth	1,900-3,250 feet (0.360-0.615 miles)		Parent company Augusta has indicated there are deeper resources below the pit that could be exploited, as well as three adjacent deposits: Peach-Elgin, Broadtop Butte and Copper World.
Pit bottom elevation	3,050 feet above mean sea level		1) Backfill of pit was considered but rejected. Staff recommend that a conveyer system be evaluated. The system would alleviate safety and truck transport issues. 2) Backfill analysis does not consider benefits to water resources such as groundwater quantity and quality.

Elevation in the project area	4,600-6,300 feet above mean sea level		The mine cuts off high elevation recharge and runoff functions in the Barrel Canyon watershed. FEIS does not properly account for these changes, and no mitigation is provided for damage to recharge functions.
Average energy use in processing facilities	108-112 mW		The transmission line has excess capacity, and the mine has proposed to own the line and substation, meaning that other processes or facilities could be added later.
CO_2 emissions: average during the active mining phase	182,000 tons		This estimate does not include the CO_2 equivalence of more potent emissions such as CH_4 and N_2O.
Emission equivalent based on the average use by humans	17,500 people		This estimate does not include the CO_2 equivalence of more potent emissions such as CH_4 and N_2O.
Mine Life	24.5-30 years		1. Staff recommends to develop a Supplemental EIS and consider additional avoidance, minimization and mitigation based on longer mine life. 2. Staff recommends to curtail water use or the FEIS should acknowledge that effects will be greater. (The groundwater models only provided for 20 to 22-years of pumping.)
		Geology, Minerals, and Paleontology	
General			1. Validity Exam. Text fails to disclose the decision of the Forest Supervisor to reject a discretionary validity exam, or impacts resulting from that decision. 2. The Forest Service (FS) acknowledges there are faults but don't consider how changes in flow caused by the mine might interact with the fault system. This explicit discussion will be important later when water levels are interpreted and recalibrated. Staff suggests to clearly identify all of the faults that are assumed to be barriers to movement in one place and use as a reference for NEPA reanalysis of model. 3. Amendment of Forest Plan would allow further mineral development in Area 16 (as stated in Ch. 3, p. 177). In appendix, Rosemont discloses interests and intent to develop Broadtop, Copper World and Peach Elgin. Also a Rosemont mitigation measure to buy the Forest's mineral fraction at Broadtop is disclosed. Therefore, cumulative effects of further mineral exploitation must be analyzed. The FEIS acknowledges that the federal action of amending the Forest Plan will allow further mineral development.
Potential loss of paleontological resources (moderate to high potential class/sensitive acres disturbed)	3,202	**FS-GMP-01**. Upon discovery of significant paleontological resources, Rosemont Copper would suspend work at that site and the site would be investigated by the appropriate personnel before work resumes. Significant fossils may be recovered.	There is some language in the FEIS about stopping work, but no assurance that this will be done. Independent monitor is the only way to ensure this. FS review of any discovered paleontological resource within 24 hours is not reasonable.
Qualitative assessment of	Failure is unlikely because of the	**FS-SR-04**. Rock slopes within the mine pit would be remotely	1. Forest should require monitoring and mitigation of referenced

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
geotechnical and seismic stability of pit	design criteria for expected seismic activity	monitored for movement.	pressures for stability of pit, with standards based on the pit configuration that is actually approved by the Forest in the approved Mine Plan of Operation (MPO). This requested monitoring and mitigation measure is different than and in addition to FS-SR-04. 2. FEIS discloses that induced seismicity is expected. Analysis of effects of induced seismicity was limited to direct impacts to the mine, not to surrounding land uses or forest resources, or indirect such as changes in aquifers. Staff suggest expanding analysis area.
Qualitative assessment of potential for disturbance of cave resources	No disturbance to known caves; geological formations have low potential for caves; therefore, it is unlikely that unknown resources would be impacted	**FS-GMP-02**. Upon indication or discovery of a cave or sinkhole, Rosemont Copper would suspend work at that site and contact the designated Forest Service representative to investigate the discovery before work is reinitiated.	There is some language in the FEIS about stopping work, but no assurance that this will be done. Independent monitor is the only way to ensure this. FS review of any discovered cave resource within 24 hours is not reasonable.
Soils and Revegetation			
Issue 1.1: Qualitative assessment of long-term stability of tailings and waste rock facilities, including expected results of reclamation	Modeling indicates that waste rock and tailings would be more stable than required by regulations	**FS-SR-01**. Soil would be salvaged in accordance with the final reclamation and closure plan. This plan would also specify where and how this growth media would be stored and where and how it would be applied on tailings and waste rock facilities and other disturbed areas in order to facilitate revegetation of mine related disturbance. Hill slopes would be monitored for erosion. Conservation measures and/or terms and conditions related to known lesser long-nosed bat roost protection measures would be followed. **FS-SR-03**. Constructing a buttress formed of waste rock surrounding and encapsulating the compacted tailings. **RC-LO-02 (non-binding)** – Elimination of future development of private lands located on top of waste rock and tailings facilities.	1. FEIS states that reclamation goals are supposed to be "consistent with forest land and resource management plans" but there is no indication of what plans the FS is referring to (The most current forest plan revision has only broad-brush generalities about such goals and objectives). 2. FS uses adaptive management as a process to guide reclamation efforts, but their approach (including lack of information) is contrary to the model of adaptive management that they proclaim to be guided by. The adaptive management manual cited by the FS says "An EIS incorporating adaptive management, whether as a "stand-alone" alternative or part of another alternative, needs to clearly describe how the approach would be implemented. This not only includes what types of actions are proposed initially, but also the results that are expected from monitoring and assessment, and future actions that may be implemented based on those results. Decision makers and the public must be able to see how the adaptive management approach would be implemented, including potential future actions and anticipated impacts on the environment." Staff believe that the FEIS fails in this respect because there has not been disclosure about what objectives will be used, what actions are proposed, and how the adaptive management feedback process will work.
Issue 1.2: Acres and quantitative level of disturbance leading to lost soil productivity	5,431	See OA-SR-01	
Issue 1.3: Qualitative assessment of the potential for revegetation	Onsite test plots and greenhouse studies indicate that revegetation can produce a vegetation volume that is	**FS-SR-02**. Includes efforts to establish native grasses, forbs, shrubs, and trees on areas disturbed by mining and mine related activities. Revegetation would be protected by detection and	1. Productivity may be estimated to be similar to climax community, but the species list is not similar. Staff suggest adding woody species to reclamation plan in riparian areas and north

of tailings and waste rock facilities	similar to historic climax conditions under proper management.	treatment of invasive weed species	aspect slopes. While trees have been added to Appendix B FS-SR-02, use of Pima County riparian standards is merited as best available science. 2. FEIS eliminated success criteria, making it impossible to understand if reclamation is feasible. Staff request that FS develop reclamation plan prior to the finalization of the EIS and provide cooperators and others sufficient time to review and change. This plan should include the number of plots and relevant statistical considerations that have been provided by Pima County staff to the FS. Note: An internal memo by FS staff highlights this point and refers to a document that has success standards related to vegetation. 3. FEIS has inadequate identification of impacts, mitigation, and bonding requirement 4. FEIS lacks a link between failure to meet success criteria and action to correct or mitigate. 5. FEIS fails to provide for reestablishment of vegetative cover and therefore mitigation of erosive forces and recreational value. 6. Trees are scarcely mentioned in the FEIS with regards to success criteria for reclamation; this does not "mimic natural vegetation patterns" as stated. Must wait for final reclamation plan, but that does not give much confidence that the loss of tens of thousands of oak trees will be mitigated.
Issue 1.4: Qualitative evaluation of alteration of soil productivity and soil development	Soil productivity would be reclaimed following placement of soil or soil/rock cover and revegetation, with the exception of 955 acres of mine pit		1. Soil calculations based on a nominal 12 inches of soil thickness for reclamation of the total waste rock and tailings mound results in a significant underestimation of the actual soil needed. Without the determination of realistic volumes of soil which will be needed for reclamation of the waste rock and tailings mounds, Rosemont Copper may run out of soil and be unable to satisfy the requirements of the final Reclamation and Closure Plan. As a result, revegetation of the upper landform sideslopes and upper surfaces may not be possible without the development of new off-site soil borrow areas and associated reclamation projects. Staff believe that the FS should require Rosemont to perform professional calculations of the volume of soil which will be needed to achieve a minimum 1 ft thickness for total mine reclamation operations on waste rock surfaces. 2. Two soil stockpile locations are planned on the surface of the Tailings and Waste Rock disposal mound at the end of Year 15. However, the volume capacity of these stockpiles is on the order of 2,000,000 cubic yards short of the soil material needed for final reclamation of the site, and for use during the post-closure period until revegetation is determined to be successful. The Forest Service should require Rosemont to clearly demonstrate how on-site soils will be managed throughout the mine life. 3. Characterize soils in the waste/tailings landform. FSM2250

			states that the FS must use soil properties to assess condition and potential of effects on soil while planning. FSM 2840 reclamation is to reclaim consistent with Forest Plan, measurable performance standards required, but no measurable performance standards are included in this FEIS. And FS has not used "soil" properties of mining landform in analyzing effects. Staff suggests imposing specifications /standards for soil on waste-tailings pile in the FEIS. 4. Soil movement will be a huge concern, but may not be evident from the monitoring program, especially if such monitoring takes place only on "newly revegetated areas". This is not sufficient as it will take years for major erosion events to stop happening. 5. Without ties to thresholds and contingency plans, there is no confidence in the performance criteria process. In addition, for most of this appendix there is too little detail to be able to determine if the monitoring or mitigation efforts are sufficient. Instead, the analysis/process for developing is put off to beyond any comment period. Monitoring is good, but the document fails to identify what measures would be put in place if movement does happen. Aside from obvious human safety issues, there are also biological concerns, such as impacts to talus snail habitat. Bonding should be identified for potential slope movement. 6. Woody debris is suggested to "be used on the reclaimed growth medium surfaces to provide stability, organic matter, and microhabitats for seed germination, invertebrates, and small vertebrate species." This may not be realistic for more than a few years out from the initial vegetation clearance action because these woody elements will decompose. What, then, will be the plan for woody components at the time of mine closure?
Issue 1.5: Tons per year of sediment delivery to Davidson Canyon, Cienega Creek, or other streams and washes, compared with background sediment loading	22,170	**FS-SR-05**. monitor the movement of sediment within the channel of Barrel Canyon, including any aggradation or scour	The FEIS did not consider cumulative impacts of sediment delivery change over the active mine period and post-closure. Considering the proposed active mine life is over 20 years, the FEIS should assess long term impacts on sediment yield, delivery and channel geomorphology.
Air Quality and Climate Change			
General		**OA-AQ-01** – Paving of mine related roads to reduce dust emissions. **OA-AQ-03** – Dust control for open areas and storage piles. **OA-AQ-04** – Control of particulate emissions from lime slaking process. **OA-AQ-05** – Control of particulate emissions from major metallic mineral processing operations. **OA-AQ-08** – Reduction in air emissions from diesel engines associated with stationary equipment. **QA-AQ-9** – Reduction in air emissions from diesel engines associated with mobile sources (haulage equipment, etc.)	The state's air quality permit may not contain the proposed mitigation measures discussed in the EIS. Staffs recommends that the FS identify the circumstances under which tailings would be milled finer than what has been assumed. If milling is finer than projected, it could occur that would affect air quality, water quality and stability of the tailings. Explicit NEPA reanalysis threshold should be stated.

Issue 2.1: PM2.5 versus background and threshold	Premining: 0.7% increase in Pima County annual emissions. Active mining: 4× increase versus background levels; complies with NAAQS at perimeter fence		
Issue 2.1: PM10 versus background and threshold	Premining: 0.7% increase in Pima County annual emissions. Active mining: 3× increase versus background levels; complies with NAAQS at perimeter fence	**OA-AQ-02** – Dust control for unpaved roads. This mitigation contains a number of actions that are designed to control at least 90 percent of particulate matter 10 (PM10) emissions from the unpaved road network	1. The modeled emissions are perilously close to the standards. 2. Air quality impacts are under-estimated due to incorrect assumptions in the air quality modeling. 3. EIS does not specify what mitigation is required/voluntary/or when, if, each mitigation measure will occur.
Issue 2.2: Greenhouse gas emissions versus background	Premining: <0.1% increase in Pima County CO2 emissions. Active mining: ~1% increase in Pima County CO2 emissions	**RC-PU-01 (Voluntary, non-binding)** – Use of alternative methods of power generation such as solar and wind to augment power at the mine administration building	
Issue 2.3: VOC emissions	Premining: Emission rate of <1 ton per year. Active mining: Less than 1% increase in Pima County VOC emissions; emission rate of about 82 tons per year	**OA-AQ-06** – Use of covers on mix tanks and settlers to reduce emissions of volatile organic chemicals	Staff had requested a photochemical model to be used to determine if emissions would push the region over ozone standards. This was not done.
Issue 2.3: NOx emissions	Premining: <0.1% increase in Pima County NOx emissions Active mining: 3.4% increase in Pima County NOx emissions; emission rate of about 1,200 tons per year	**RC-AQ-01 (Voluntary, non-binding)**– Transporting employees in natural gas powered busses to reduce NOx emissions	Staff had requested a photochemical model to be used to determine if emissions would push the region over ozone standards. This was not done.
Issue 2.4: Meeting of air quality standards	Complies with all NAAQS at perimeter fence		Staff recommends that the FEIS recognize that not all of Rosemont's contributions to ozone can be abated, and Rosemont would "eat up" some of the region's capacity for maintaining the standards. Staff recommends the FEIS disclose that required actions might cause socioeconomic impacts if ozone standard is exceeded. Staff recommended replacement of all internal combustion engine involved in pumping water and tailings with electricity to reduce air pollution due to ozone.
Issue 2.5: Effects on air quality in Class I airsheds	Emissions do not exceed Class I increment thresholds; may contribute to degradation of air quality related values in the Saguaro National Park East, Saguaro National Park West, and Galiuro Wilderness Area Class I airsheds	OA-AQ-11 – Opacity monitoring. This monitoring describes emission limitations and establishes monitoring, reporting, and recordkeeping requirements regarding opacity. Locations specified in the air quality permit.	There is no guarantee that this mitigation measure will be required by the State of Arizona.
Groundwater Quantity			
General			1. Staff recommends that the FS deny Special Use authorizations for water developments on NFS lands. Forest can deny pipelines and groundwater development on Forest lands, even if it has no discretion over mine disposal. 2. Disclose how much water will be removed from pit and its

			disposition. According to US Forest Service groundwater management policy, annual reporting of withdrawals on Forest land in cubic feet of water is required. The Forest should require reporting of pumped water on Forest lands, and reporting of water in pipelines authorized for the transportation of water across Forest land. 3. More than 90,000 acre-feet of water will reside in a full pit lake, and 100s of af will evaporate each year. This is a loss to local aquifer system that the FEIS does not consider. The FS has failed to analyze partial or complete backfill which would save most of this water. The FEIS specifies creation of a pit lake is good for groundwater quality. This may be true, but the amount of water creates a huge deficit in the local groundwater system.
Davidson Canyon/Cienega Basin			
Issue 3A.1: Direction and feet of change in water table level Issue 3A.3: Geographic extent in which water resources may be impacted	More than 100-foot drawdown near mine pit within several years; springs in close proximity to pit (Fig Tree, Scholefield, Rosemont) experience over 10 feet of drawdown within the active mining phase; distant surface waters (Gardner Canyon, Davidson Canyon, Cienega Creek) unlikely to experience substantial drawdown over any time period, with the exception of Empire Gulch, which could experience several feet of drawdown beginning 50 years or more after closure of the mine; residences in Corona de Tucson unlikely to experience drawdown over 5 feet; residences along Singing Valley Road could experience over 10 feet of drawdown within 20 years of closure of the mine; residences along Hilton Ranch Road could see up to 10 feet of drawdown within 20 years of closure of the mine. Impacts will be in perpetuity.		1. Staff recommend that the proposed project should not move forward because of high level of uncertainty and lack of limits of proposed water use and general impacts to quality and quantity of surface water and groundwater table 2. Disclosure of immediate post closure effects are not stated in EIS. Equilibrium impacts stated, but that is over 1,000 years post mining. This discussion appears to be very down played. What really needs to be emphasized is the loss from years 0-20 (which is discussed) and 20-200 (not discussed). These impacts are far greater than at equilibrium and will affect the downstream well users and riparian vegetation. Tetra tech estimates at year 200 that 517 AF is evaporated and lost at the pit and that amount will rise as the pit lake grows. Over the 20-year mining period as much as 925 AF/year is lost due to pit dewatering. These are the amounts that need emphasis, not at equilibrium when the current generations are gone. In addition, little discussion regarding water availability for the downstream riparian community is mentioned. This needs elaboration and is an omission. 3. FEIS rejects arguments that 1-foot drawdown should be plotted and it fails to address points and literature raised by Pima County staff. The Haile Gold Mine in South Carolina recently published a groundwater model using 1-foot drawdown because of effect on streams. Staff suggests that FS publish a map showing springs and wells within 1-ft drawdown. 4. The groundwater model should have an impervious boundary on the west at or near the ridgeline, because of the topographic divide and, more importantly, the granodiorite rock. The FEIS provided lots of discussion, but failed to explain why a granitic intrusive rock is not impermeable.
Issue 3A.2: Relative impairment of mountain-	About 35 acre-feet, per year, in perpetuity		Staff had requested discharge of pumped pit dewatering well water to downstream reaches to mitigate this impact.

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
front groundwater recharge function			
Issue 3A.5: Comparison of mine pit water loss by evaporation with overall basin water balance	Total dewatering loss during active mining of 13,000 to 18,500 acre-feet; annual water loss in perpetuity of 170 to 370 acre-feet, which is equivalent to ~3% of basin recharge		Staff requested discharge of pumped pit dewatering well water to downstream reaches to mitigate this impact.
Issue 3A.6: Potential reduction in subsurface groundwater outflow from Davidson Canyon to Cienega Creek	Maximum reduction of 4.4% based on estimated surface flow reduction		Mitigation at Pantano Dam area and at ranches in other watersheds does not address the long-term loss of surface and subflow that will damage the riparian vegetation, loss of springs and loss of sub flow immediately downstream of the area of immediate impact at the mine. (See also surface water quantity).
Issue 3A.7: Approximate number of wells within geographic extent of impact	361 to 370	**RC-GW-01 (Voluntary, non-binding).** Providing protection for individual private residential well owners against the risk that mine-associated groundwater drawdown could impact their well.	1. FEIS claims that insufficient information was available to assess impacts to individual wells. Staff suggests that a well-by-well analysis be conducted so that well owners can know what to expect. 2. The FEIS is reliant on arguable modeling techniques and refuses to establish baseline based on pump data. It also fails to establish baseline or identify impacted wells for mitigation. Staff suggests expanding mitigation program and identify bond amount for well replacement.
Upper Santa Cruz Subbasin			
Issue 3B.1: Water needed for operations from Santa Cruz Valley and comparison with other water uses and basin water balance, measured in acre-feet	Total water use of 99,600 acre-feet, with permitted water use up to 120,000 acre-feet. Annual water use of 5,400 acre-feet during first 8 years represents an increase of 6.7% in area pumping	**OA-GW-04** – Control and recycling of process water. Overall reduction of fresh water use and avoidance of potentially contaminated discharges by containing all process water in lined facilities, to be recycled back into the process stream to offset fresh water use; and the installation of overflow alarms to alert operators to a potential overflow situation. **OA-GW-07** – Monitoring quantity of supply water removed from the Santa Cruz Basin. **RC-GW-02– (Voluntary, non-binding).** Recharging the aquifer in the Tucson Active Management Area to offset pumping of mine supply water. **RC-GW-03 (Voluntary, non-binding).** – Extension of Central Arizona Project pipeline to Green Valley. See also OA-GW-05.	1. See groundwater pumping and longer mine life. 2. Groundwater models inadequate: models are based on 20-year mine life, but PA/EIA says 24.5 to 30 years. ADWR mining extraction permit allows for withdrawal of 6,000 acre feet (af)/year but model is based on 5,400 af/year for first 8 years. Impacts to county-owned groundwater wells, and numerous other wells, have not been fully disclosed. Several wells may need to be replaced due to declining groundwater levels resulting from the mine's pumping. 3. Water supply loss not mitigated. Direct use of CAP or recharge would mitigate water-level declines in Green Valley area and leave higher quality water for potable use, and could be required to minimize impacts on Forest resources under FSM Handbook. 4. FEIS states CAP recharge is voluntary. It cites a ROW encroachment agreement with the Town of Sahuarita that stipulates CAP recharge within the area of drawdown, but CNF **won't enforce the license agreement if a different ROW is** selected. Recharge may not occur within the area of hydrologic impact. CNF should revise the EIS to provide complete analysis of future use of CAP and availability and guarantee for use in recharge.
Issue 3B.2: Direction and	Additional water-level declines from		

		Mitigation	
feet of change in water table level	1.5 to 3.5 feet per year due to pumping; total drawdown of 90 feet in vicinity of wells due to pumping		
Issue 3B.3: Geographic extent in which water resources may be impacted	4 to 4 miles from pumping center		Staff recommends that the forest revise the EIS to address the direct and indirect impacts to tribal water resources
Issue 3B.4: Duration of effect (in years)	101 to 140 years		
Issue 3B.5: Potential for subsidence to occur as a result of groundwater withdrawal	The incremental withdrawal for the mine water supply would contribute to the overall groundwater withdrawal and land subsidence in the Sahuarita area		
Issue 3B.6: Approximate number of wells within geographic extent of impact	501 to 550		
Groundwater Quality and Geochemistry			
General			The Santa Rita Mountains may act as a geologic barrier for groundwater; not as modeled by the applicant. A sensitivity analysis was run and discussed Oct. 19, 2012, but the analysis is not responsive to previous staff concerns, which were about obtaining new data to constrain models. Staff asks that geophysical and other investigations be developed to define potential movement across the mountains prior to the ROD.
Issue 3C.1: Ability to meet Arizona Aquifer Water Quality Standards at points of compliance designated in the aquifer protection permit	Modeled water quality for potential seepage from tailings and waste rock meets standards; modeled water quality in mine pit lake exceeds the aquifer water quality standard for thallium and potentially ammonia, but the standard is not applicable to pit lakes. Irreversible and irretrievable commitments are not anticipated.	**FS-GW-01.** Monitoring equipment (such as collection pans or lysimeters) would be encapsulated within the waste rock in order to remotely assess the moisture content of the waste rock and allow for collection and analysis of seepage if any is generated. **FS-GW-02.** Groundwater quality sampling at locations other than required under the Arizona aquifer protection permit. **FS-GW-04.** Periodic updating of the pit lake geochemistry model to incorporate the most recent and pertinent geochemical results obtained through waste rock characterization efforts. **FS-BR-27** – Periodic validation and rerunning of groundwater model throughout life of mine. **OA-GW-02** – Reduction of the potential for acid generation and metal leaching from tailings and waste rock as required under the aquifer protection permit. **OA-GW-08** – Well abandonment or capping. This mitigation requires that Rosemont Copper properly abandon or cap all unused wells or open boreholes in accordance with State well abandonment regulations. **OA-GW-06** – Groundwater quality and aquifer-level monitoring required under the aquifer protection permit. This monitoring requires the construction and operation of point of compliance monitoring wells, groundwater quality monitoring and	1. Barrel Alternative conclusions and mitigation for groundwater quality continues to rely on an aquifer protection permit that was issued for a different mine than the preferred alternative. Staff suggests a supplemental EIS with Public Notice period; new analyses to understand consequences of ponded areas against the newly redesigned waste and tailings, along with other changes in stormwater runoff. 2. The FEIS reports results from modeling seepage through waste rock dumps that are unreasonably low. This is because the modeler used unrealistic unsaturated parameters and used climate data from the wrong location. FS indicates monitoring of potential seepage, but provides no plans for mitigation when it is discovered. Staff suggests using realistic cover parameters and climate input for modeling. 3. The monitoring plan calls for two points to be monitored for moisture content. Considering that any seeps would follow preferential flow paths, there is a very low probability that such monitoring would detect a seep. There should be frequent visual surveys for seeps on the dumps

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
		sampling protocols, and reporting as specified in the aquifer protection permit. See also OA-GW-05, OA-GW-04, OA-GW-07.	4. Staff recommends that the EIS set criteria for NEPA reanalysis that are more stringent than states. FS-GW-02 does not address these constituents. Even if it did, it allows Rosemont to set the criteria for thresholds and suspension of sampling. Forest Service should set the standards for As and U reanalysis. 5. Evaluation should not be limited to ore that is processed. Should also evaluate fate of milling process chemicals and their breakdown products. Of particular importance here are xanthates and carbon disulfide. Carbon disulfide is regulated under ARS 49-243(I) so that the applicant must limit discharge to the maximum extent practicable regardless of cost. At minimum, FS should disclose effects to Forest resources. 6. The monitoring plan calls for additional wells and springs to be sampled, but the wells are only existing wells. Staff recommends that the FS choose locations and require additional new wells to be constructed.
Issue 3C.2: Ability to demonstrate best available demonstrated control technology	Best available demonstrated control technology has been accepted through the aquifer protection permit process and has been determined to be adequate	See OA-GW-05	1. The pit lake will be terminal when flowing, but it is possible that during lake formation water could flow out of one or more sides of the pit. The FEIS has failed to consider this potential for degrading groundwater. 2. FEIS claims that seepage would not be concentrated but would rather be spread across the entire area of the facility. Staff recommends that FS acknowledge potential for preferential flow through the facilities and develop a plan to monitor for seeps and remedy problems. 3. FEIS does not identify the potential to concentrate naturally-occurring radioactive materials during processing, address concentrations, nor address mobility of radioactive materials in the tailings. Staff recommends setting thresholds/triggers for NEPA compliance and mitigation.
Impact to Sierrita sulfate plume	Minor changes in gradient or groundwater levels as a result of mine supply pumping would occur in the vicinity of the Sierrita sulfate plume. Overall direction of flow, location of plume, and effectiveness of control are not expected to be affected.		
Surface Water Quantity			
General			1. The naming scheme for referenced studies is inconsistent, arbitrary and capricious, so evaluating the claims in the FEIS leaves an unfair burden on people providing comment. 2. DEIS concluded County method was not peer reviewed. It was. Further, the County requested FS conduct its own peer review. Furthermore response misrepresents cooperator

[illegible]	[illegible]	Mitigation	[illegible]
			involvement by stating we "reviewed" their models. It should be noted that upon review we found them grossly inadequate and recommended using PC methods. 3. The recognition that fires occur in the project area, that the largest burn areas have occurred since 2005 and that fires can dramatically impact the hydrologic regime should include a plan to address these concerns. There is no acknowledgment of associated hazards which occur in post-fire conditions including gullying/erosion and debris flows which could impact drainage infrastructure both during operations and post closure. There are many examples of gullying and post fire debris flows, including the Schultz fire that occurred near Flagstaff in 2010.
Issue 3D.1: Quantitative assessment of water released and available for beneficial uses	Beneficial uses of ephemeral stream flows primarily related to stock tanks; after mitigation, negligible effect on beneficial uses		Rosemont still intends to capture and retain surface water from an approximately 1 square mile watershed to the west of the mine pit and along the southern perimeter of the waste rock disposal area. This water should be released downstream into Trail Creek as part of the site water management plan.
Issue 3D.4: Number of stock watering tanks that would be unavailable	15 stock tanks directly lost; 5 stock tanks possibly indirectly impacted downstream, but reduction in flow due to mine unlikely to affect tanks		
Issue 3D.5: Change in volume, frequency, and magnitude of runoff from the project area	Postclosure 17.2% reduction in average annual volume of stormwater flow; 22% reduction in 100-year, 24-hour peak stormwater flow; 4.3% reduction in stormwater flow in lower Davidson Canyon. Approximately 30 to 40% reduction during operations. Irreversible commitment of surface water flows would result from the permanent reduction in stormwater flows into downstream drainages.	**FS-SW-01**. design, location, and operation of stormwater diversion facilities in order to maintain flow downstream and avoid contact with processing facilities and ore stockpiles. **FS-SW-02**. This mitigation reflects the results of an effort to apply the concepts of geomorphic reclamation to the Barrel Alternative. The result is a design that would route more stormwater into downstream drainages postclosure than previous designs. **RC-SW-01 – (Voluntary, nonbinding)** Continued operation and data gathering of USGS flow gage that would provide data for surface water flows downstream of the mine site.	1. Staff stated in previous comments that the consultant should consider the results of a 3-hr storm, which was never done, and the FEIS implies that Pima County's concerns were addressed in the analysis they did, while they were not. In comments on 08-14-13, staff reiterated that the consultant erroneously stated that staff recommends the PC Hydro model for determining peak flows, and stated that Pima County has technical policies that describe which models should be used for which application. 2. The analysis of downstream water volume effects on Davidson Canyon and Cienega Creek is flawed, because Zeller (2011a) ignores the fact that greater rainfall occurs higher on the high elevations like the mine site, and will contribute more water to downstream areas than low elevation watersheds. By assuming that all areas contribute runoff equally, their model underestimates the impact the mine site will have on surface water and riparian vegetation in Davidson Canyon and Cienega Creek. 3. The FEIS acknowledges that the modification of stormwater peak flows and volume is important in multiple aspects. However, the FEIS does not include any plans to address possible issues resulting from the modification of storm flow. For example, what would happen if the reduction of runoff volume significantly affects Davidson Canyon and Cienega Creek? The FEIS lacks a "backup" plan. Staff would like the FS to explain what actions would be taken when problems are identified.

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
			4. It is important to monitor flow after the closure to assess post-closure and mitigation effects on downstream riparian vegetation and water resources. How long will the Rosemont Copper fund USGS to monitor the flow after the closure? The monitoring should continue after the closure to assess the mitigation effectiveness.
Issue 3D.6: Change in recharge to the aquifer by runoff	Reduction in recharge to shallow alluvial aquifers possible but cannot be quantified. Overall loss of mountain-front recharge to aquifer about 35 acre-feet per year, in perpetuity.		Staff requested discharge of pumped pit dewatering well water to downstream reaches to mitigate this impact.
Surface Water Quality			
Issue 3E.1: Ability to meet Arizona Surface Water Quality Standards	Runoff from waste rock is predicted to meet Arizona Surface Water Quality Standards for all constituents except dissolved silver; risk of exceedance is mitigated by waste rock segregation techniques and suggests that dissolved silver would likely be below standards as well	**FS-GW-03**. Waste rock characterization and segregation is required during operations under the aquifer protection permit [see OA-GW-02]. This supplementary monitoring measure involves additional waste rock and tailings characterization analysis during operations. **OA-GW-03** – Equipment and methods to keep potentially contaminated water from being released into the environment. This mitigation measure requires the use of appropriately sized lined ponds; retention of all contact stormwater for reuse as process water; and installation of overflow alarms to alert operators of a potential overflow situation. **OA-SW-01** – Detention and testing of stormwater. This mitigation measure requires detention and testing of stormwater quality from perimeter waste rock buttress areas for water quality testing prior to flowing downstream of the mine site. **OA-SW-02** – Implementation of stormwater pollution prevention plan. The stormwater pollution prevention plan identifies methods to reduce potential pollution of stormwater; this plan is site specific, flexible, and constantly updated as needed. See also OA-GW-04	1. Cooperating agencies have commented on the potential for unregulated discharge of stormwater that has been in contact with ore bodies and mine processing facilities in the event that the compliance point dam is overtopped and destroyed, which could happen with some frequency. This concern is based on a misunderstanding of the purpose of the compliance point dam. The stormwater reaching the compliance point dam is not halted or permanently retained by the dam in any way and will flow downstream in any case. The dam allows for some settling of sediment, detains stormwater temporarily, and allows for a convenient location to collect stormwater samples. The dam does not, however, prevent stormwater from flowing downstream. 2. The statement that waste and tails are not anticipated to exceed surface water quality standards does not take into account possibility for discharge to exceed numeric standard for suspended sediment concentration in AAC 18-11-109D or narrative standards at ACC R18-11-108.
Issue 3E.2: Change in geomorphology and characteristics of downstream channels	Sediment load would decrease, but sediment concentrations would remain the same, compared with baseline; analysis indicates that no changes in geomorphology (scour/aggradation) are expected in Barrel Canyon or Davidson Canyon owing to change in sediment load	See FS-BR-22	1. It is unclear whether the FS expects there to be any water bodies in the PCAs or elsewhere due to seepage or impoundment, other than the compliance dam. The expectations need to be clear, and if there are inadvertent water bodies created, the EIS should disclose the impacts on other resources, such as biology. 2. The method used to estimate erosion is not appropriate to evaluate the impact of mining alternatives and is far below industry standards. While Rosemont's consultant, Tetra Tech, has justified their use of the PSIAC method, the two studies cited by Tetra Tech, clearly state that the PSIAC method is inappropriate for site level assessment. 3. Rosemont Copper still intends to capture and retain surface water from an approximately 75 acre watershed area on the lower side slope of the northeastern portion of the tailings mound. This water should be released downstream into Barrel Canyon as part of the site water management plan.

Issue 3E.3: Acres and locations that may be affected by surface water quality impacts and duration (in years) of those impacts	Runoff would affect 2.5 miles of Barrel Canyon (23 acres), and 14 miles of Davidson Canyon (234 acres); potential for effect is greatest during active mine life (20 to 25 years), gradually reducing as reclamation occurs		
Issue 3E.4: Acres of potentially jurisdictional WUS impacted	68.4		
Issue 3D.2: Number of stream miles changed from intermittent/perennial flow status to ephemeral flow status as a result of the project	**Empire Gulch, about 3 miles impacted** Low estimate: No or minor changes up to 150 years after closure; ephemeral by 1,000 years after closure. Best-fit models: Mixed results showing intermittent or ephemeral by 150 years after closure; all models indicate ephemeral by 1,000 years after closure. High estimate: Ephemeral by 50 years after closure **Cienega Creek, about 20 miles impacted.** Low estimate: No or minor changes predicted. Best-fit models: Mixed results, with one model showing no or minor changes through 1,000 years, one model showing intermittent conditions by 1,000 years, and one model showing intermittent conditions by 150 years and ephemeral conditions by 1,000 years. High estimate: Minor change predicted up to 50 years after closure; intermittent by 150 years after closure; ephemeral by 1,000 years after closure **Davidson Canyon:** No change predicted. **Gardner Canyon, about 1 mile impacted.** Low estimate: No change predicted. Best-fit models: No or minor changes predicted up to 150 years after closure. Mixed results at 1,000 years, ranging from no change to ephemeral. High estimate: Minor changes predicted up to 50 years		

		Mitigation	
	after closure; intermittent by 150 years after closure; ephemeral by 1,000 years after closure **Intermittent streams:** Some intermittent streams associated with springs in Sycamore Canyon (north), Sycamore Canyon (south), Box Canyon, and Mulberry Canyon may be impacted		
Issue 3D.3: Quantitative assessment of potential lowering of the water table/reduced groundwater flow to Davidson Canyon and Cienega Creek that results in permanent changes in flow patterns and that may affect their Outstanding Arizona Water designations and current designated uses	**Upper Cienega Creek:** Up to 50 years after closure of the mine, most modeling scenarios show no predicted effects. At 150 years after closure, some modeling scenarios show no or minor changes in flow, and some modeling scenarios show that there may be transition from perennial to intermittent flow, and increased duration of extremely low-flow conditions. At 1,000 years after closure, modeling scenarios are mixed, showing a range of outcomes, including minor changes in flow, transition from perennial to intermittent flow, and transition from perennial to ephemeral flow. All modeling scenarios show increased duration of extremely low-flow conditions. **Davidson Canyon and Lower Cienega Creek:** None predicted; reduction in surface runoff could change recharge to shallow alluvial aquifer; distance downstream makes impacts highly uncertain. Some water quality constituents potentially elevated in runoff, but potential is reduced by waste rock segregation procedures. Lowering of the groundwater table constitutes an irreversible commitment.	**FS-SSR-01**. Purchase of water rights, to be used for mitigating for impacts in the Cienega Creek watershed	1) Impacts on Outstanding Arizona Waters for all mining life phases (especially first 10 yrs) are not fully disclosed. The FEIS stated that "the only potential effect on the Outstanding Arizona Waters in Lower Davidson Canyon and Lower Cienega Creek would be the result of a decrease in runoff that would occur because portions of the Davidson Canyon watershed would be cut off in perpetuity by the mine site. This reduction in ephemeral flow is estimated to be 4.3 to 11.5 percent in lower Davidson Canyon". Again, FEIS only discusses about the "post-closure" conditions. As mentioned above, during the first 10 years of active mining phases, estimated runoff reduction from Barren Canyon is significant. FEIS should disclose the impacts on Outstanding Arizona Waters for different phases by using estimated runoff during that period. 2) Pima County staff agree about the necessity of monitoring the OAWs, and that Rosemont should fund the monitoring. This mitigation measure depends on access to the OAW located on County and District lands. This mitigation measure should recognize local authority. It should specify that the data for all aspects of the OAW will be collected by parties acceptable to Pima County who would report the data through Pima Association of Governments and Arizona Department of Environmental Quality. In addition, Pima County will need to approve all analytes and methods used in the OAW. Recently, Rosemont submitted to ASLD an application to site groundwater and surface water quality sampling devices on State Trust land; this sampling site is not located on the OAW. 3) The FEIS acknowledges that the modification of stormwater peak flows and volume is important in multiple aspects. However, the FEIS does not include any plans to address possible issues resulting from the modification of storm flow. For example, what would happen if the reduction of runoff volume significantly affects Davidson Canyon and Cienega Creek? The FEIS lacks a "backup" plan.
		Biological Resources	
			1. Document consistently downplays impacts to biological

			resources. The FS needs to be more honest in their assessment. For example, the FEIS consistently states that " The mine and ancillary facilities could result in a loss or alteration of habitat for numerous plant and animal species." By their own admission, they are losing thousands of oaks, hundreds of thousands of agave, so how could it be that they the mine "may," "could," "might" result in the loss of habitat? For vegetation they state: "have the potential to permanently change vegetation" The FS needs to provide more realistic assessment and state that some impacts simply will not be mitigated. 2. Inadequate species information; FEIS cited a host of species that will be covered under County MSCP, but they chose not disclose impacts. The FS did not analyze impacts on a host of Species of interest to Pima County, but more importantly, the SWCA 2013c report cites the need to analyze additional species (such as the Bell's vireo), but there is no current Management indicator species report available for review. 3. The FS made a determination that the loss of the population of Coleman's coralroot would not impact population viability. They cite "FS guidance" which gives a definition of PV that relates to the "distribution of the species on the Coronado and not other areas." FS needs to provide more information on this guidance. 4. FS uses language such as "Direct impacts (i.e., crushing, clearing, trampling, etc.) to this species are not anticipated because there are no documented occurrence records for this species within the project area or the footprints of the connected actions." However, no surveys have been conducted, so this conclusion cannot be drawn. 5. Impacts analysis are performed, but for almost all species analyzed (with the exception of a few T&E species), mitigation is not addressed
Issue 4.1: Acres of riparian areas disturbed, by vegetation classification	Pima County Mapped Riparian. Habitat directly disturbed =588 acres. Barrel Canyon = 162 acres of xeroriparian habitat expected to be indirectly impacted with high certainty. Empire Gulch = 407 acres of hydroriparian habitat could be indirectly impacted. Davidson Canyon (Reach 2) = 502 acres of xeroriparian habitat expected to be indirectly impacted with moderate certainty. An additional 14 riparian areas associated with springs would be directly or indirectly disturbed with high certainty; and an additional 35		

		Mitigation	
	riparian areas associated with springs may be indirectly disturbed but with lower certainty. Loos of riparian vegetation constitutes an irreversible commitment.		
Issue 4.2: Number of seeps and springs degraded or lost	Five springs directly lost due to surface disturbance; 11 springs highly likely to be indirectly impacted due to drawdown; 60 springs may be indirectly impacted due to drawdown, but water source is unknown; 19 springs unlikely to be impacted. Effect on seeps and springs as a result of lowering of the groundwater table constitutes an irreversible commitment.	**FS-SSR-02** – Spring, seep, and constructed/enhanced waters monitoring. A suite of 25 seeps and springs would continue to be monitored to identify any impacts that may occur due to dewatering of the regional aquifer in the vicinity of the mine pit.	
Issue 4.3: Change in the function of riparian areas	Hydroriparian habitat along Empire Gulch would transition to mesoriparian or xeroriparian Pockets of mesoriparian habitat along Davidson Canyon (Reach 2) could transition to mesoriparian or xeroriparian with moderate certainty. Xeroriparian habitat in lower Barrel Canyon highly certain to experience reduced vitality, extensiveness, and health and to transition to lesser quality habitat. Along Upper Cienega Creek, widespread transition from hydroriparian to xeroriparian habitat is unlikely, but contraction of hydroriparian habitat could occur with conversion at the transitional margins.	**FS-BR-22** – Monitoring to determine impacts from pit dewatering on downstream sites in Barrel and Davidson Canyons	The estimated reduction of annual runoff flow volume to downstream is 30-40% during pre-mining and active mining phases (SWCA, 2013). This substantial reduction of runoff to downstream could significantly affect downstream riparian and water resources. Although the potential impacts of the runoff reduction are briefly discussed in "Seeps, Springs and Riparian Areas", the FEIS only focused on the post-closure 17% reduction and did not fully analyzed the runoff reduction impacts on downstream vegetation and water resources for all phases of mine life. Especially, how the substantial reduction of stream flow volume during the first 10 years could affect downstream riparian vegetation.
Issue 4.4: Qualitative assessment of ability to meet legal and regulatory requirements for riparian areas	**Upper Cienega Creek:** Six criteria assessed for impacts to Outstanding Arizona Waters. Few changes predicted up to 50 years after closure, but some risk in changes of flow and frequency of low-flow conditions in the long-term (see Issue 3D.3). Low-flow conditions could affect biological characteristics under wadeable, perennial standards.		

	Davidson Canyon and Lower Cienega Creek: Seven criteria assessed for impacts to Outstanding Arizona Waters. Full analysis of ability to meet water quality requirements Davidson Canyon is not possible, but screening analysis suggests that some constituents may be elevated in stormwater. This potential is reduced by several safety factors, including waste rock segregation requirements. Otherwise, no predicted changes that would affect Outstanding Arizona Waters or biological characteristics protected under wadeable, perennial standards. Geomorphological changes unlikely to affect bottom deposit characteristics protected under wadeable, perennial standards.		
Issue 5A.1: Acres of terrestrial vegetation permanently lost or altered, by vegetation type	5,431 acres permanently lost or altered; see table 122 for breakdown by vegetation type. There will an irreversible commitment of vegetation resources	**FS-BR-01**. The entire plant site is sited and designed to reduce its size and overall footprint and to use gravity instead of pumping to move process water where possible. **FS-BR-04** – Salvage, growing, planting, and monitoring of Palmer's agave	FS-BR-04 does not call for staggering then planting of agave pants over time so that not all agaves will bloom at the same time after mine closure. Staff suggests developing a plan that would stagger agave planting so as to have flowing spread out. Also, promote grassland restoration actions elsewhere in the watershed that would promote agaves
Issue 5B.1: Acres by type of terrestrial and aquatic habitat lost, altered, or indirectly impacted.	Refer to table 108 (in "Seeps, Springs, and Riparian Areas" resource section) and table 123 for detailed information regarding these impacts. There will be an overall reduced presence of wildlife and...some species may never return to the area.	**FS-BR-03**. Specific ponds, basins, and other facilities would be enclosed, fenced, or otherwise managed to exclude wildlife, livestock, and the public. Includes construction of barriers to exclude Chiricahua leopard frogs. **FS-BR-05** – Construction, management, and maintenance of water features to reduce potential impacts to wildlife and livestock from reduced flow in seeps, springs, surface water, and groundwater. **FS-BR-06** – Location of the electrical power line that provides power to the pit area so that it avoids talus slopes to the extent practicable. **FS-BR-13** – Measures to ensure relocation of lesser long-nosed bat and other bat species in the immediate vicinity of the mine such as closing 20 abandoned mine features that may be impacted by mine activities, including the Chicago Mine. Rosemont Copper would also fence the R2 Mine and Helena Mine complex to exclude unauthorized human access. **FS-BR-16**. Rosemont Copper would establish an endowment, the Cienega Creek Watershed Conservation Fund, and provide $2,000,000 of funding. This fund would essentially be established as: (1) a resource to help restore the watershed to a functioning ecosystem; and (2) a mechanism to promote adaptive management	The impacts analysis for the Chiricahua leopard frog appears to be based on the listing decision in the BO, which is itself based on information that does not reflect the uncertainty of the groundwater models and effects on seeps and springs of the area. For example, the data that the U.S. Fish and Wildlife Service used dates to 2010; the impacts to Empire Gulch do not reflect the range of possible impacts.

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
		and allow flexibility in mitigation to achieve desired outcomes in light of future uncertainties. **RC-BR-02 (Voluntary, non-binding)**– Agreement in principle between Rosemont Copper and Arizona Game and Fish Department to conduct various actions. See also measures on Issue 5E.1; many apply here as well.	
Issue 5B.2: Qualitative assessment of impacts on aquatic habitats and surface water that supports wildlife and plants such as stock tanks, seeps, and springs.	Hydroriparian habitat in Empire Gulch could be impacted, including transition from perennial to intermittent or ephemeral stream flow, mortality of individual species, reduced vegetation volume, and possibly transition to mesoriparian or xeroriparian habitat. Impacts to hydroriparian habitat along Cienega Creek and Davidson Canyon are possible but not the most likely scenario. Aquatic and riparian habitat associated with 5 springs would be lost due to direct surface disturbance; 11 springs are highly likely to be indirectly impacted due to groundwater drawdown and would likely cease functioning as viable habitat; and 60 springs may be indirectly impacted due to drawdown, but their water source is unknown. Direct loss of habitat associated with 15 stock tanks.	**FS-BR-28** – Monitoring of water quality in potential Chiricahua leopard frog habitat	
Issue 5B.3: Qualitative assessment of how changes in the function of riparian areas could impact wildlife habitat	Changes in cover, foraging efficiency and success, reproductive success, growth rates of young, and predator-prey relationships	**FS-BR-14** – Measures to reduce impacts to western yellow-billed cuckoo such as limitation on vegetation clearing during western yellow-billed cuckoo nesting season.	
Issue 5C.1: Acres of disturbance that could create conditions conducive for invasive species	5,431 acres disturbed in the project area; an additional 162 acres of xeroriparian habitat in Barrel Canyon, 502 acres of xeroriparian habitat in Davidson Canyon, and 407 acres of hydroriparian habitat in Empire Gulch could be indirectly impacted by reduced surface water flows and groundwater drawdown resulting conditions conducive to invasive species	**FS-BR-11** – Monitoring and control of actions to reduce or prevent impacts to Chiricahua leopard frog from invasive aquatic species (including American bullfrogs, northern crayfish, tiger salamanders, and warm-water, spiny-rayed fish species).	Executive order 13112 requires that the Forest Service consider invasive species in its actions. It is stated that an invasive species plan will be developed with "specific measures", but the Rosemont Invasive Species Management Plan (2012; cited) lacks any details or have any firm commitments. The EIS only cites this document once and there is no section in the EIS that give any "specific measures" with regards to invasive species. Therefore, specifics about targets, actions plans, and planning processes for the development and implementation of the invasive species plan must be included in the EIS. Simply leaving those decisions to post-acceptance of the MPO will likely result in a plan that is long on promises and vague on specifics. Consideration of adjacent

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
			and downstream lands that will be affected by the mine's operations must be included in this plan. Finally, a plan and assured and sufficient funding for post-mining monitoring and treatment actions must be part of any invasive species plans.
Issue 5D.1: Qualitative assessment of the change in movement corridors and connectivity between wildlife habitats	Increase movement habitat fragmentation and disrupt dispersal and migration patterns of species using six animal movement corridors; restore small amount of three movement corridors due to decommissioning of roads	**FS-BR-09** – Funding to support camera studies for large predators, including jaguar and ocelot. **FS-BR-23** – Monitoring to determine the extent of road-kill near the project area.	Use of camera traps and/or dung-sniffing dogs to monitor jaguars cannot reasonably be considered mitigation for effects.
Issue 5D.2: Qualitative assessment of mortality of various animal species resulting from increased volume of traffic related to mine operations	Animal mortality would likely increase for some species types but could decrease for other species types (depending on local wildlife populations and natural histories of species encountering roads) during mine construction and active mine operations	**FS-BR-19**: Measures to reduce impacts to jaguars. Includes wildlife crossing signs and reducing speed limits on site.	
Issue 5E.1: Acres of habitat disturbed for each special status species, including impacts to designated and proposed critical habitat	5,431 acres lost or converted; refer to table 123 for detailed information regarding these impacts; refer to species' narratives in "Environmental Consequences" section for discussions of impacts to designated or proposed critical habitat	**FS-BR-02.** Facility redesign involves enclosure of the stockpile by a domed structure and reorientation of the crusher/ball loading facility conveyers to avoid a population of Coleman's coral-root, which is a Forest Service sensitive species. A complete inventory of the NFS land disturbance footprint for Coleman's coral-root and beardless chinch-weed would be completed prior to ground disturbance. **FS-BR-12** – Relocation of Chiricahua leopard frogs from areas in the immediate vicinity of the project area. **FS-BR-15** – Measures to protect two occurrences of Coleman's coral-root during road decommissioning. **FS-BR-26** – Annual monitoring for Chiricahua leopard frog. **FS-BR -10** – Measures to reduce and rectify impacts to Pima pineapple cactus by minimizing surface disturbance in the utility corridor; surveying and monitoring; and transplanting those cacti that cannot be avoided. **FS-BR-18**. Pre-disturbance surveys for Forest Service sensitive species. See also measures on Issue 5B.1; many apply here as well.	1) Barrel Alternative was chosen, in part, to avoid a population of Coleman's coralroot, but they are proposing to put a fence around most of this large population of plants and call such an action avoidance, but it is so close of the process facility and a major diversion channel that fire, desiccation, invasive species, etc. are sure to impact the species. 2) As part of the avoidance of Coleman's coralroot plants, it is imperative that the host trees be monitored for vigor and condition; if they die, so too will the orchids. Specify what contingencies would be put in place if the host plants are impacted.
Issue 5E.2: Potential to affect the population viability of any species	Individuals may be impacted, but loss of population viability is not likely	**FS-BR-25**– Surveying for bats in the vicinity of the project area	
Issue 5F.1: Acres of habitat impacted from noise, vibration, and light	Up to 146,163 acres impacted		
Issue 5F.2: Qualitative assessment of effects on wildlife behavior from noise, vibration, and light	Changes in habitat use, timing of activity patterns, inter- and intra-specific communication, foraging efficiency and success, reproductive		

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
	success, and predator-prey relationships		
		Livestock Grazing	
Impacts to allotments: Acres of change from fully to partially capable within the Rosemont, Thurber, Greaterville, DeBaud, Helvetia, Stone Spring, and Rosemont allotments	5,182 . 955-acre open pit represents an **irreversible loss of grazing land**	**FS-BR-17**. Rosemont Copper would prepare and submit to the Coronado a request to modify the allotment management plans for the Thurber, DeBaud, Greaterville, and Rosemont Forest Service grazing allotments within 1 year of issuance of the ROD. See also FS-BR-03, FS-BR-05	The effects of grazing on revegetation success criteria has not been analyzed
Stock ponds lost	15	See FS-BR-05	
Springs impacted	76		
Potential reduction in AUMs each year over 25-year mine life	862 to 919		
		Dark Skies	
Issue 8.1: Fractional increase in sky brightness from mine facility and vehicle lighting at Whipple Observatory	**83% increase in sky brightness at** horizon; 8% increase at 10 degrees above horizon; 3.3% increase at 20 degrees above horizon; 0.4% increase at 90 degrees above horizon	**FS-DS-01** – Implementation of an outdoor lighting plan that would reduce potential impacts from artificial night lighting. **FS-DS-02** – Funding of additional ground-based sky brightness monitoring	ROD does not cite a County Outdoor Lighting Permit as one of the mitigation measures. County has authority to regulate outdoor lighting on mine sites under §11-251(35). Compliance with the outdoor lighting code would require substantial redesign of proposed lighting because lighting is proposed to use color rendering which is not compliant with the Outdoor Lighting Code of maximum temperature of 3500K and proposed lumen output likely exceeds code limitations.
Issue 8.1: Fractional increase in sky brightness from mine facility and vehicle lighting at Jarnac Observatory	Undetermined increase at horizon due to overlap with light from city of Nogales; 21% increase at 10 degrees above horizon; 8% increase at 20 degrees above horizon; 0.7% increase at 90 degrees above horizon		
Issue 8.1: Fractional increase in sky brightness from mine facility and vehicle lighting at Sonoita	76% increase in sky brightness at horizon; 10% increase at 10 degrees above horizon; 4% increase at 20 degrees above horizon; 0.1% increase at 90 degrees above horizon		
Issue 8.1: Fractional increase in sky brightness from mine facility and vehicle lighting at Corona de Tucson	28% increase at 10 degrees above horizon; 11% increase at 20 degrees above horizon; 0.1% increase at 90 degrees above horizon (project area is blocked by terrain and is therefore provided for closest degree visible above horizon)		
Issue 8.1: Fractional	4,000% increase in sky brightness at		

[illegible]	[illegible]	Mitigation	[illegible]
increase in sky brightness from mine facility and vehicle lighting at SR 83	horizon; 117% increase at 10 degrees above horizon; 39% increase at 20 degrees above horizon; 9% increase at 90 degrees above horizon		
Issue 8.1: Fractional increase in sky brightness from mine facility and vehicle lighting at Empire Ranch	1,200% increase in sky brightness at horizon; 24% increase at 10 degrees above horizon; 10% increase at 20 degrees above horizon; 1% increase at 90 degrees above horizon		
Visual Resources			
Issue 7.1: Acres that would no longer meet current forest plan scenic integrity objectives designations	4,228. Existing views of the Santa Rita Mountains would be irreversibly lost behind the waste rock and tailings facilities.	FS-VR-04 – Measures to reduce the visual impact of the mine pit	
Issue 7.2: Qualitative assessment/degree of change in landscape character from analysis viewpoints over time: open- pit impacts	Pit face and diversion channel permanently visible		1. By accepting applicant's claim that landforming will block views of the pit, the analysis downplays that the contoured tailings will be highly visible and this design increases visibility of the tailing pile from State Route 83 significantly. 2. FS response suggests visual analysis and ADOT criteria indicate no impact of preferred alternative, but this is not correct. The visual blight created by miles of rill eroded tailing piles blocking the view of what was once a ridgeline is whitewash and indicates the lack of reasonableness of the analysis and conclusions.
Issue 7.2: Qualitative assessment/degree of change in landscape character from analysis viewpoints over time: waste rock and tailings impacts	Permanent, major, adverse impacts from highly visible piles		
Issue 7.2: Qualitative assessment/degree of change in landscape character from analysis viewpoints over time: processing facility impacts	Facility visible for approximately 10 years, then partially screened by waste rock and tailings	**FS-VR-01** – Color of mine related buildings blends into the natural landscape. **FS-VR-02** – Removal of unneeded facilities during closure. **FS-VR-03** – Measures to reduce color contrasts from cuts, fills, and concrete structures associated with the mine.	
Issue 7.2: Qualitative assessment/degree of change in landscape character from analysis viewpoints over time: power transmission line	Adversely visible on the west side of Santa Rita Mountains and over the ridgeline for life of the project	**RC-VR-01 (Voluntary, non-binding)** – Architectural designs for buildings associated with the water supply line pump stations. Rosemont Copper has stated that they would follow University of Arizona College of Architecture and Planning and Landscape Architecture design guidance for buildings associated with four pump stations to ensure that they maintain the tenor of the Santa Rita	

[illegible]	[illegible]	Mitigation	[illegible]
impacts and water supply mitigation		Experimental Range.	
Issue 7.3: Miles of SR 83 with direct line-of-sight views of the project area	3.9		
Issue 7.4: Miles of project area visibility along concern level 1 and 2 roads and trails	42.5		
Acres of project area regional visibility	264,795		
Miles of realigned Arizona National Scenic Trail (east side of SR 83) with direct line-of-sight views of the project area	8.7		
Recreation and Wilderness			
General			FEIS fails to identify users and resources
Issue 9.1: Acres that would no longer meet current forest plan Recreation Opportunity Spectrum designations	6,990. There would be irretrievable and irreversible impacts as a result of displaced recreation users and adverse effects on recreation experiences and activities		
Issue 9.1: Acres of semiprimitive nonmotorized	0		
Issue 9.1: Acres of semiprimitive motorized	6,177	**FS-RW-03** – Mitigate loss of off-highway-vehicle use opportunities. Rosemont Copper would provide funding for efforts to produce a plan for developing facilities and managing off-highway-vehicle use that would be displaced from the project area. Rosemont Copper would enter into a voluntary collection agreement to provide funding up to $800,000 for uses that include the NEPA analysis and decision process to determine where additional facilities are warranted and appropriate in addition to implementation of the off-highway-vehicle mitigation	The Rosemont site is a very popular place for off-highway vehicles (OHVs), which are likely to be displaced to other lands nearby. The EIS calls for money to go to the FS for managing OHVs on their land, but in reality, OHVs will be displaced to other, non-FS lands such as Las Cienegas National Conservation Area and the County's Bar-V ranch. This should be acknowledged and funding should be available for other land owners/managers to receive compensation
Issue 9.1: Acres of roaded modified	169		
Issue 9.1: Acres of roaded natural	644		
Issue 9.2: Acres of Coronado National Forest unavailable for recreational use	6,990	**RC-TA-02 (Voluntary, non-binding)** – Providing public access to Rosemont Copper private lands not affected by mine operations through appropriate state agencies and programs	
Issue 9.2: Miles of NFS roads lost	18.5		

[illegible]	[illegible]	Mitigation	[illegible]
Issue 9.3: Qualitative assessment of potential for noise to reach recreation areas	Generally 40 dB or less; industrial noise would be noticed near the perimeter fence		
Issue 9.4: Qualitative assessment of impacts to solitude in designated wilderness and other backcountry areas	Little or no change to solitude because the majority of lands designated as semi-primitive motorized, designated wilderness, and primitive areas are beyond 4 miles and would likely not be affected		
Issue 9.5: Annual hunter days lost (per year)	775		
Issue 9.5: Percent of hunt unit 34A on forest lands affected	4%		
Issue 9.6: Miles of Arizona National Scenic Trail relocated	12.8	**FS-RW-01** – Relocation of a segment of the Arizona National Scenic Trail and construction of trailheads. **FS-RW-02** – Arizona National Scenic Trail: easement to allow the trail to be constructed across Rosemont Copper's private land	Staff support the re-location of the trail.
Issue 9.7: Qualitative assessment of increased pressure on other areas	Moderate increase in use expected to nearby areas such as Happy Valley, Gardner Canyon, Louisiana Gulch, Ophir Gulch, and Carouleau Gap		
Hazardous Materials			
General			FEIS fails to identify impacts. Staff recommends a Suplemental EIS with plan for release control prior to development of hydrologic sink.
Potential for release of ammonium nitrate and fuel oil during use	Materials consumed during detonation; negligible risk to environment	**FS-HM-01** – Hazardous materials containment and management. This mitigation involves handling, storage, use, and communication information about hazardous materials, in accordance with laws and regulations. **FS-HM-02** – Maintaining material safety data sheets in accordance with 30 CFR 47.	
Potential for release of laboratory reagents during storage or use	Materials used in small quantities in controlled setting; negligible risk to environment		
Potential for release of cleaning fluids during storage or use	Materials used in small quantities in controlled setting; negligible risk to environment		
Potential for release of reagents during solvent extraction and electrowinning	None		
Potential for release of ammonium nitrate from risk of explosion during	In dry form presents little risk for release or migration; by itself and properly stored does not present an		

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
storage	unusual risk of fire or explosion; negligible risk to environment		
Potential for release of hazardous waste	Reduced risk, compared with proposed action, because of removal of the heap leach and oxide facilities		
Potential for catastrophic release of sulfuric acid or petroleum product during transportation	Reduced potential risk, compared with proposed action, because of removal of the heap leach and oxide facility		
Potential for catastrophic or major release of sulfuric acid or petroleum product within the mine	None for sulfuric acid, less than proposed action for petroleum products because of the removal of the oxide facilities		
Potential release of contaminants from failure of leach pad	None		
Fuels and Fire Management			
			1. No fire management plan has been proposed. There are many ignition sources possible and many fire-prone resources, such as nearby oak trees that could ignited from these ignition sources. 2. See also fire impacts and surface waters
Risk of Activities Increasing Ignition			
Blasting	Low		
Increased vehicle traffic	Increased risk of accidental ignition along transportation routes		
Storage and transportation of flammable materials	Increased risk of accidental ignition along transportation routes		
Construction	Low		
Effects of Activities on Fuel Loading		**RC-FF-01 –(Voluntary, non-binding)** Allowing access to a new water source for firefighting efforts.	
Clearing of vegetation	Low		
Noxious weeds	Minor additional fuel loading after mitigation		
Decrease in groundwater level	Minor		
Transportation/Access			
Issue 12.1: Change in type and pattern of traffic by road and vehicle type	Increase in truck and passenger car traffic from mine related traffic on analyzed highway routes	**FS-TA-01** – Development of a comprehensive transportation plan. The transportation plan would address maintenance standards; levels of appropriate use; methods to maintain the roadways sufficiently to prevent washboard, rutting, and drainage problems; commitment to replace surfacing lost to drainage; commitment to repair roads damaged by use; commitment to restore temporary roads to natural preoperation conditions during reclamation/closure;	1. FS summarily dismisses need to improve 83 by stating ADOT **does not intend to widen it to four lanes. Obviously there are other** measures which could be considered; an SEIS should be required. 2. Increased fatality and accident rates. FEIS fails to identify impacts and issues; use of population instead of traffic for fatality rates is unacceptable.

[illegible]	[illegible]	Mitigation	[illegible]
		and installation and maintenance of wildlife crossing structures. **RC-TA-01 (Voluntary, non-binding)**– Scheduling deliveries to the mine to take place during nonpeak traffic hours to avoid adding to traffic congestion. **RC-TA-03 (Voluntary, non-binding)**– Limiting travel on utility maintenance road. Rosemont Copper would limit travel on the utility maintenance road to only what is necessary for pipeline or power line operation and maintenance and would only perform road maintenance when necessary.	3. Adverse transportation impacts are anticipated on county roads but are not disclosed and mitigated. County roadways include, but are not limited to, Sahuarita Road and Santa Rita Road. Traffic study is needed. 4. Corrugated culverts are not an acceptable design feature for wildlife.
Issue 12.2: Quantitative assessment of the change in level of service on potential highway routes	Decrease in level of service for some intersections and roadway segments but would not decrease to an unacceptable level of service. Mitigation measures would reduce the impacts of mine related traffic.		
Issue 12.3: Quantitative assessment of roads decommissioned by the mine and roads lost to motorized access	35.0 miles of existing NFSRs decommissioned; 18.5 miles of NFSRs restricted by mine operations		The argument by the proponent that there is no legal access across their fee lands is incorrect. Historic roads—whether or not county maintained—are legal by adverse possession and historic use. As a "fence out" state, Arizona landowners including Augusta must provide an alternate route for historic roads it closes.
Noise			
Issue 9.3: Qualitative assessment of potential for noise to reach recreation areas and expected noise level	Impacts to recreational users from intermittent blasting noise (construction and mining operation phases) and equipment operational noise (mining operation phase), resulting in a likely decrease in recreational value in the area immediately surrounding the project area (premining and active mining phases)	**FS-N-01** – Management techniques to reduce potential noise impacts from blasting. This mitigation is focused on noise management techniques, including generally limiting blasting to once per day, during daylight hours; and sequenced blasting using time-delay technology. Explosive usage is limited to 52 tons per day, as consistent with the limits contained in the air quality permit. **FS-N-02** – Actions to reduce potential noise impacts from vehicles	
Issue 11B.1: Ability of alternatives to meet rural landscape expectations	For all action alternatives: no impacts to residents from construction, blasting, equipment operation, or traffic noise during any phase of mine life		
Public Health and Safety			
Issue 10.1: Qualitative assessment of public health risk from mine operations and facilities	None; public is excluded from mine operations and facilities by perimeter fence	**FS-PHS-01** – Construction of a perimeter fence that would exclude the public. **FS-PHS-02** – Preparation of emergency response and contingency plans, including a fire plan	
Issue 10.2: Qualitative assessment of public health risk from geological hazards	Geological hazards are unlikely, with the exception of land subsidence in the Santa Cruz valley, which could be marginally increased by mine supply		Staff recommends that the FS revise the EIS to include additional information on the potential for subsidence. FEIS says incremental withdrawal for mine water supply would contribute to the overall groundwater withdrawal and land subsidence in the

Category/Issue	Impacts (Barrel Alternative)	Mitigation	Pima County Staff Concerns and Recommendations
	pumping		Sahuarita area. Land subsidence is likely to continue.
Issue 10.3: Qualitative assessment of public health risk from noise and vibration	Acute noise hazards from construction, traffic, equipment, or blasting are unlikely		
Issue 10.4: Quantitative assessment of ability to meet air quality standards for human health	NAAQS are met at the perimeter fenceline		
Issue 10.5: Quantitative assessment of the potential change in traffic accidents	A potential increase of 9 to 14 additional traffic accidents per year on SR 83 during the year with the highest projected traffic volume: active mining phase year 1	**OA-TA-01** – ADOT activities to mitigate impacts of increased traffic on SR 83. This mitigation consists of Rosemont Copper's providing funding to the Arizona Department of Transportation (ADOT) to implement activities to reduce impacts resulting from increased traffic on SR 83. ADOT has indicated that the activities it plans to implement include 3-inch pavement overlay from Interstate (I-) 10 to the intersection of the primary access road; striping; raising guardrails and signs to match new pavement height; and paving three existing bus pullouts for school bus use. See also FS-TA-01 and RC-TA-01	
Issue 10.6: Trip count per day for all hazardous materials and qualitative assessment of potential effects	94 weekly trips for all hazardous materials shipments		
Issue 10.7: Qualitative assessment of impacts on local emergency response to accidents or spills on public roadways	Less than other action alternatives due to reduced hazardous materials shipments		
Cultural Resources			
General	Construction of the mine and associated facilities constitute an irreversible commitment of resources. Archaeological sites cannot be reconstructed once disturbed, nor can they be fully mitigated		
Issue 6A.1: Number of historic properties buried, destroyed, or damaged	82	**FS-CR-01** – Archaeological data recovery on sites that would be adversely affected. **FS-CR-02** – Respectful and appropriate treatment of human remains that would be disturbed by the project. **FS-CR-03** – Curation of archaeological collections in accordance with 36 CFR 79 and the HPTP. **FS-CR-04** – Monitoring and treatment of inadvertent discoveries. **FS-CR-05** – Limiting ground-disturbing activity between the perimeter fence and security fence. **FS-CR-06** – Cultural resources protection training. **FS-CR-07** – Project proponent would allow tribal members access, upon 5 days'	

[illegible]	[illegible]	[illegible]	[illegible]
		advance request, to the project area for cultural practices. **FS-CR-10** – Interpretation of the results of the cultural resources investigations for tribal members, the Hispanic community, and the public	
Issue 6A.2: Potential for vibrations to damage historic properties	Very unlikely		
Issue 6A.3: Qualitative assessment of impacts on historic properties	Notable impact		
Issue 6B.1: Number of impacted prehistoric sites known/likely to have human remains	30		
Issue 6B.2: Number of historic sites likely to have human remains	3		
Issue 6C.1: Number of sacred springs impacted	**16**		
Issue 6C.2: Qualitative assessment of impact on Native Americans of desecration of land, springs, burials, and sacred sites	Notable impact	**FS-CR-08** – Project proponent would organize tribal members' field visits to potentially affected springs. **RC-CR-01 (Voluntary, non-binding)**– Conservation lands used for tribal practices. This involves using the conservation lands required through the Section 7 and 404 (b)(1) permitting processes to offset losses to the tribal members.	
Issue 6D.1: Acres of traditional resource collection areas impacted	6,990	**FS-CR-09** – Transplanting of critical plant resources and inclusion of species within revegetation mixture	
Issue 6D.2: Qualitative assessment of the impacts on other non-tribal communities in the region in terms of impacts on resources, such as historical townsites, cemeteries, mines, ranches, and homesteads	Notable impact	**FS-CR-11** – Stabilization of previously excavated historic properties between the security and perimeter fences	
Socioeconomics and Environmental Justice			
General	The [mine] would potentially cause irreversible impacts to the affected area with regards to changes in the local landscape, community values, and quality of life. Disturbance to cultural resources that would disproportionately adversely impact the Tohono O'odham Nation, as an		

	environmental justice community, would be irreversible		
Issue 11A.1: Change in employment over time	Regional increase in employment: **Premining phase:** Pima County – 594 direct jobs and 443 indirect jobs per year; Three-county analysis area – 768 direct and 453 indirect jobs per year. **Active mining and reclamation/closure:** Pima County – 434 direct jobs and 1,260 indirect jobs per year; Three-county analysis area – 434 direct jobs and 512 indirect jobs per year.		Inconsistent standards applied to job losses vs job creation and methods used to calculate spending for lost jobs is different than that used for jobs created
Issue 11A.2: Change in property values over time	Potential decrease in area property values between 4 and 11% within 5 miles of the project area. Potential impacts include more than $6.4 million in losses to property values.		
Issue 11A.3: Change in tax base per year over time	Regional increase in tax base. $11 million in construction sales tax during construction. Total direct local and State revenues over the life of the mine are estimated at $136.7 million.		The FEIS states "there would be minimal demands on the local housing supply during the operational phase of the mine", and it states Indirect Revenue Impacts would be "approximately $107.6 million for State and local governments over the life of the mine". The $107.6 million Indirect Revenue Impacts cited are based on the study by Applied Economics, which included $58.2 million of NEW city and county property tax revenues in the $107.6 million. The Applied Economics study derives the $58.2 million for property taxes because it assumes newly constructed housing to satisfy all of the indirect-related impact of the mine. If the EIS assumes minimal demands on local housing, then the amount of city and county property tax revenues must then be reduced accordingly.
Issue 11A.4: Change in demand and cost for State road maintenance over time	Increase in funding needs during operation phase of mine. Partially offset by increased tax dollars from more fuel consumption by heavy trucks.		
Issue 11A.5: Change in demand and cost for emergency services over time	Potential change in population is not expected to result in dramatic demands on public services and emergency services costs. However, the increase in overall traffic could lead to more accidents and an increase in demand for emergency services over time.		
Issue 11A.6: Quantitative	Direct effects: $1.4 to $4.7 million		The FS repeatedly responds that while there are impacts they

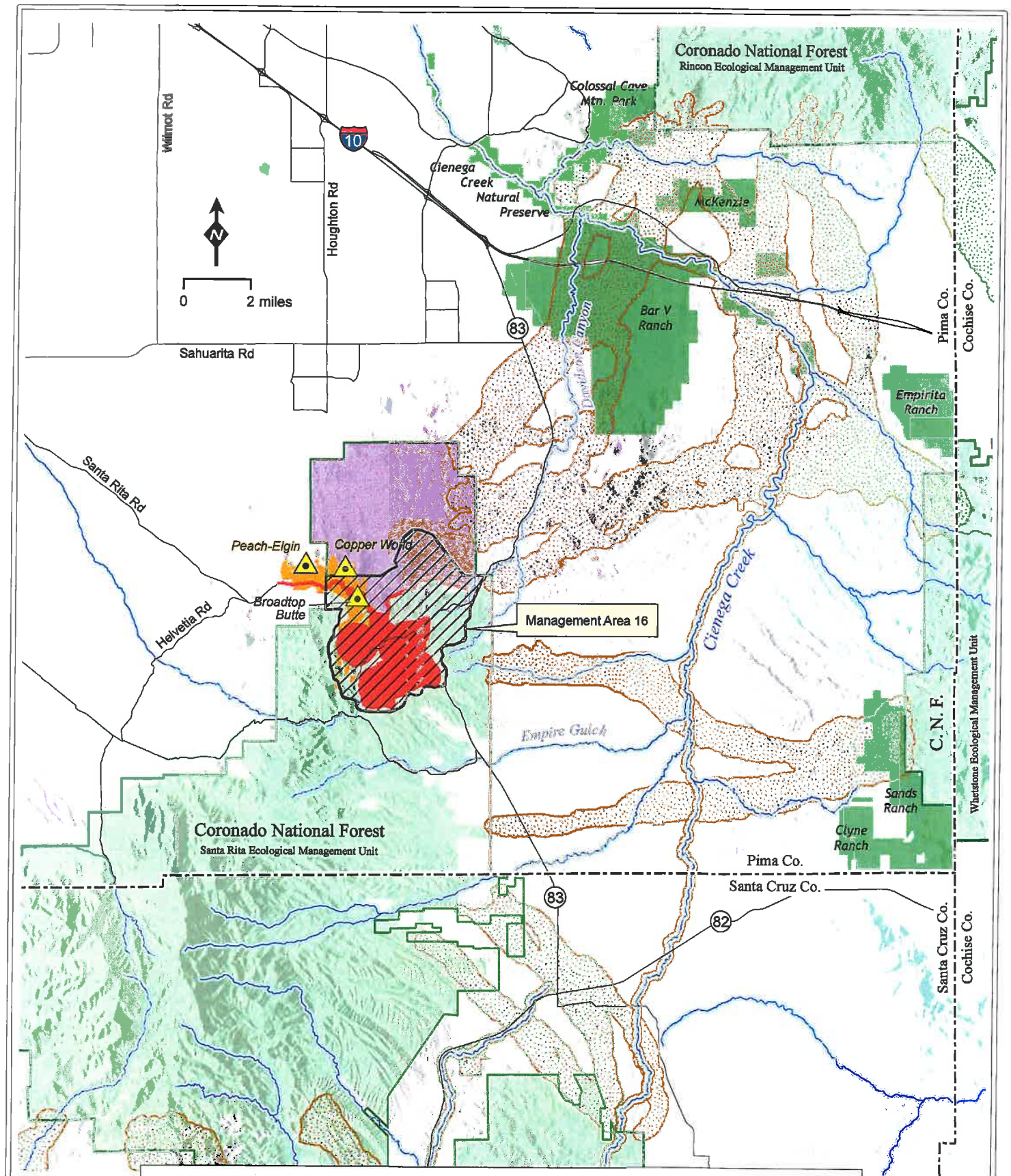
assessment of change in tourism and recreation revenue over time	reduction in visitor spending per year. Indirect effects: $621,900 to $2.1 million reduction in output per year. 15 to 50% decrease in nature- based tourism from 0 to 10 miles from proposed mine per year.		cannot deny the mine. Even so, they can identify an alternative that is not so visible from 83 and which does not create loss and reduced quality of so many trails (Arizona Trail, Barrel Canyon, Lopez, Gunsight pass and Sycamore)
Issue 11A.7: Qualitative assessment of economic effect on the astronomy industry	Increased night sky brightness could result in an impairment of observatories near the project area, which could result in a decrease in State revenues generated from astronomy, space, and planetary research and tourism. The negative public perception of having a copper mine next to an observatory may impact observatory revenues.		
Issue 11B.1: Qualitative assessment of the ability of alternatives to meet rural landscape expectations as expressed by Federal, State, and local plans	Potential impact to area quality of life resulting from altered landscapes		Pima County has exceptional open space values not typical levels of service. Inclusion of tribal trust land as public open space is incorrect.
Issue 11B.2: Quantitative assessment of economic effects on amenity-based relocation	0.09% decrease in net migration to Santa Cruz County as a percentage of county population. 6 to 37% decrease in the rate of population growth in the Patagonia Census County Division (CCD). However, the decrease in amenity-based migration may be offset by the increase in mine staff relocation. Impacts on amenity migration in Pima County and the greater Tucson area are expected to be negligible owing to the more dynamic nature of the metropolitan economy.		
Other Effects Considered/ Issues not resolved			
Environmental Justice: Impacts to populations protected by Title VI of the Civil Rights Act	Possible disproportionate effects on the Tohono O'odham Nation, as well as on the other consulting tribes, with regard to disturbance to cultural resources		
Community		**RC-CP-01 (Voluntary, non-binding)** – Establishment of the Santa Rita Mountains Community Endowment Trust for the purposes of	

[illegible]	[illegible]	[illegible]	[illegible]
		funding priority community projects. The endowment would consist of assets, commitments, and funding from Rosemont Copper, including conservation easements and restrictive covenants donated in the first year of production ($6 million), $500,000 contributed from Rosemont Copper each year for 25 years ($12.5 million), and up to $25 million in variable contributions from Rosemont Copper, based on the price of copper (Rosemont Copper Company 2010).	
Forest Plan amendment significance			The ROD says that a forest plan amendment is not significant; they consider only the area, and not scoping of public issues and the 25,000 DEIS comment letters about this project in relation to the Forest.
NEPA process and authority to grant project			1. Authority to grant project is questioned. Rationale for ROD relies on unexplained reference to the Multiple Use Mining Act to justify "placement" of tailings and waste rock on public land. 2. ROD does not address public concerns about potential for further mine expansion. Nothing in the ROD constrains further mine expansion, and in fact the proposed amendment of the Forest Plan would in essence create a new mining zone, facilitating further mineral development within a new "management area 16" and lower the expectations for reclamation, since additional mining land uses would be expected in the new management area. To remedy this, staff suggests adding deed restrictions or protective covenants that would make avoidance effective over the long-term. 3. Floodplains: The lack of differences between the impacts of the alternatives demonstrates that true alternatives have not been fully considered. ROD Decision Space suggests that the no action alternative is environmentally preferable. An environmentally preferable alternative that also meets the purpose and need should have been developed. 4. The analysis required by the National Environmental Policy Act was bifurcated by the Bureau of Reclamation's decision to treat Rosemont's Green Valley pipeline and recharge proposal as a separate action. The two should be regarded as connected actions by this later EIS because the recharge is mitigation for the impacts of the mine and would not be undertaken if Rosemont did not intend to operate mineral extraction wells. 5. Impacts are understated and mitigation success overly optimistic, for example the executive summary says "may", text says "could" and "will". By concluding that an impact is relatively small and therefore is insignificant belies the intent of NEPA which is to identify impacts and alternatives in order to avoid or mitigate those impacts.
Floodplain use permit			FEIS failed to recognize the permit requirement (floodplain use permit) and the role of the Pima County Regional Flood Control

			District. Floodplain Use Permit is Required for activities that might obstruct, retard, or divert the flow of water in a watercourse. Required for private lands in unincorporated areas of Pima County.
Bonding			Bond amount determination will occur later after the final Plan of Operation is in place, but the FEIS fails to identify impacts and mitigation for those identified as inadequate. Adequate bond is impossible to determine without adequate EIS. Furthermore, the response implies bond is only for on-site mitigation. While this may be true, on-site mitigation should prevent off-site impacts.
Temporary closure			No effects on the human environment have been disclosed. This is particularly concerning because if pit dewatering continues, then the groundwater impacts have not been disclosed. Only 22 years of groundwater extraction was simulated; this is not the full mine life as currently defined in the FEIS.
Effects to air travel			FEIS failed to analyze or disclose whether there are effects of any changes in air travel due to mine. Staff recommend disclosure of impacts; mitigate; Establish threshold for NEPA re-analysis if impacts occur
Effects on bandwidth			FEIS does not disclose bandwidth impacts especially in relation to military (Buffalo Soldiers electronic testing area).
No compliance with the Migratory Bird Treaty Act			The Migratory Bird Treaty Act is mentioned on page 587, but no other mention of compliance. This requires further analysis and discussion.
Missing Reports			Numerous reports that are cited in the document are not on the FS website. This includes 6 reports (by SWCA and SWCA and the FS) that are cited on page 576 alone. No management indicator species report. These reports have not been provided to cooperators; therefore it is not possible to evaluate the information contained therein. Staff assert that thee FS needs to provide cooperators access to citations that are missing and provide ample time to review.
Did not adequately analyze cumulative effects			Cumulative effects did not consider other regional plans and permits. Past impacts disclosed in 2012 EIS for Pima County MSCP should be considered.
Land ownership			Effects of selling mineral fractions to Rosemont Copper. The FS clarified that no exchanges would occur, but they proposed in the PAFEIS selling the mineral fractions to RCC, and identified RCC as willing to acquire them. They say this would avoid the impact of increased difficulty in managing these parcels after they become integrated in the mining facilities. But some of the mineral fractions are part of another deposit that is not proposed for mining at this time: Broadtop Butte. The FS examined only the advantages of selling mineral fractions from an administrative standpoint, but not whether there are any disadvantages from

			relinquishing administration. They also failed to analyze the effect of amending the Forest Plan to allow for land acquisition or other land protection measures, even as they talk about the difficulty of obtaining a restrictive covenant on the private lands.
Mitigation			Bonding has not been determined for the project yet, but the level of uncertainty about the mine's impacts to Davidson and Cienega Creek warrant a mitigation fund for Pima County that can be used for future mitigation actions

ATTACHMENT 2



EFFECT OF ROSEMONT MINE ON LANDSCAPE CONNECTIVITY

Pima County GIS

- Barrel Alt. (Pit, Landform, Plant Site, Access Roads)
- Rosemont Patented Claims
- Additional Resource Deposits
- Coronado National Forest (White = Private Inholding)
- Portion of Forest Isolated (13,095 acres)
- Pima County Preserve Lands
- Wildlife Linkages (AZ Game & Fish, 2006)