COUNTY ADMINISTRATOR'S OFFICE
PIMA COUNTY GOVERNMENTAL CENTER
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C.H. HUCKELBERRY
County Administrator

June 6, 2017

Colonel D. Peter Helmlinger
Commander, South Pacific Division
U.S Army Corps of Engineers
1455 Market Street
San Francisco, California 94103-1398

Ms. Alexis Strauss
Acting Regional Administrator, Region 9
U.S Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Re: **Rosemont Copper Mine, Section 404 Clean Water Act**

Dear Colonel Helmlinger and Ms. Strauss:

I appreciate the South Pacific Division of the US Army Corps of Engineers (Corps) reaching out to my staff to discuss hydrology and water-resources impacts of the proposed Rosemont Copper Mine at a meeting in Phoenix on April 18, 2017. The meeting was to facilitate an independent review for your agency's pending decision to grant a Clean Water Act (CWA) Section 404 permit for the Rosemont Mine.

With this letter, Pima County and the Regional Flood Control District (collectively, Pima County) provide additional information regarding the impacts of the mine to Waters of the United States. The information attached to this letter highlights Pima County's continued concerns about the extensive impacts of this mine and the key uncertainties that need to be addressed.

Considerations of mine impacts

New information and analyses that were not part of the Corps' record provide a better understanding of recharge and runoff in the Davidson Canyon watershed in which the Rosemont mine is located (Figure 1, Attachments 1 through 5). The new information included for your review identifies errors and omissions in the Final Environmental Impact Statement (FEIS) analysis and provides new analyses of runoff and recharge that substantiate our concerns that effects on water quality and quantity will jeopardize downstream Outstanding Waters, if not also the proper functioning of the various mine features.

Attachment 1 reflects additional analysis by Flood Control District staff in response to the April meeting with your staff. Using the original regression model, we demonstrate there is a substantial impact on the Outstanding Waters in Davidson Canyon. Additional research shows that short-term gage records such as those described by HudBay at the meeting are a poor basis for understanding long-term peaks or averages.

Regardless of differences between the observed, recent flows and those that might be predicted by models, filling the headwaters with waste and tailings would forever alter watershed hydrology. None of the proposed 404 mitigation strategies does anything to compensate for the fundamentally impaired watershed functions.

At the April meeting, I understand Corps staff asked HudBay about flow augmentation, which could be used to compensate for changes in watershed hydrology. Flow augmentation has been used in several other mines in southern Arizona to mitigate reduced flows. Flow augmentation in the form of wet water provided before the impact would be a form of mitigation that is more certain and timely than the paper-model approach embodied in the Arizona Department of Environmental Quality's (ADEQ's) adopted Surface Water Mitigation Plan.

There are still other ways to reduce the impacts. I bring to your attention the Perimeter Containment Areas that unnecessarily diminish downstream runoff (Attachment 6). I believe the Corps may be unaware of these runoff retention features and their effects, and we ask they be eliminated if the mine is to proceed. These features and their effects were never formally identified or described in the FEIS. Regional Flood Control District staff proposed solutions to mitigate or eliminate the impacts they would cause, and it was agreed during the objection process that "legal and practical" feasibility would be discussed further with Rosemont. If the Corps had any discussions with the applicant about this, there is no available evidence of such in the Section 404(b)(1) documentation.

Considerations relating to enforcement

The State's water quality certification, which normally would prevent degradation of water quality of Outstanding Waters, rests on a flawed process. As part of that process, ADEQ adopted a definition of baseline water quality that excluded consideration of effects on water quantity or quality due to some of the most damaging construction activities (Attachment 7). We realize the Corps' 404 enforcement authority is independent of the State's; but in the event the Corps authorizes the activity, the State, Corps and Forest Service must all agree upon what should constitute the water quality baseline for the CWA. As it stands, the FEIS has a different definition than the State's 401 certification. The Corps should not allow lack of clarity to compromise future enforcement.

Considerations relating to timing of your decision

Pima County and the Regional Flood Control District jointly filed an appeal of ADEQ's administrative decision in Maricopa Superior Court on May 5, 2017. We ask that the CWA

Section 404 permit issuance be delayed until this matter is resolved. Further, it will be important to conduct a new analysis of baseline conditions of aquatic resources in the Biological Opinion related to the effects of the Sawmill Fire (Attachment 8).

We understand HudBay is preparing a revised Surface Water Mitigation Plan and two new surface water models for ADEQ. The Forest Service has also opened its administrative record to new information. Clearly, new information and changed circumstances call for further coordination among the agencies prior to any decision.

Our investments at risk

Pima County is home to many mines, which help sustain jobs in our community. However, mining in this particular location poses unacceptable costs to the community and risks to investments that local and federal taxpayers have made over the past several decades. Pima County and the Regional Flood Control District own land and water resources located downstream of the proposed Rosemont Copper Mine. In addition, the congressionally designated Las Cienegas National Conservation Area was created with full local support and a land trade involving the Bureau of Land Management. This particular Section 404 permit would fundamentally alter this treasured watershed and degrade the surface water resources currently enjoyed—and relied on—by our citizens. We ask that the Corps exercise its public trust responsibility under the CWA when considering this Section 404 permit.

In conclusion, Pima County appreciates the Corps' thorough analysis of Rosemont's impacts to the Waters of the United States. The attachments to this letter provide a host of much-needed data for your important decision; we know you will carefully weigh this information as you seek to carry out your trust responsibilities. Indeed, the stakes in the outcome of your decision have never been higher for the community and environment of Pima County. To that end, my staff is available to provide additional data and answer to any questions you may have.

Sincerely,

C.H. Huckelberry
County Administrator

CHH/mjk

c: Colonel Kirk Gibbs, Commander and District Engineer, Los Angeles District
US Army Corps of Engineers

FIGURE 1

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PROPOSED ROSEMONT MINE AND ENVIRONS

VAIL

COLOSSAL CAVE MOUNTAIN PARK

CIENEGA CREEK NATURAL PRESERVE

Cienega Creek

CITY OF TUCSON

Houghton Rd

Andrada Rd

Wentworth Rd

Wilmot Rd

Sahuarita Rd

CORONA DE TUCSON

BAR V RANCH

CORONADO N.F.

Santa Rita Rd

SANTA RITA EXPERIMENTAL RANGE

Davidson Canyon

Helvetia Rd

Whitehouse Canyon Rd

LAS CIENEGAS NCA

10

83

Mine to Vail Drainage Path

Other Stream or Wash

Outstanding Waters (per ADEQ)

Proposed Rosemont Mine Land Position

Fee Land

Patented Claim

Unpatented Claim

Extent of Mine Operations

Other Land Management

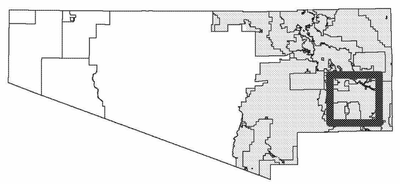
State Trust Land

Bureau of Land Management

Incorporated Area

Pima County Preserve Land

Pima County Index Map



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THE SEAL OF PIMA COUNTY ARIZONA

3/25/2015

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ATTACHMENT 1

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ATTACHMENT 1:

REGRESSION ANALYSIS FLAWED BY ERROR; EXISTING MODELS INDICATE MINE IMPACTS ARE UNDERESTIMATED; AND SHORT-TERM GAGE DATA ARE UNRELIABLE PREDICTORS OF LONG-TERM EFFECTS

Regression analysis was flawed by errors, which resulted in underestimated downstream flows in the FEIS. The omission of the precipitation and elevation terms resulted in substantially underestimating the runoff that comes from the mine site. Recalculation indicates there is a substantial impact on the Outstanding Waters in Davidson Canyon.

Existing recharge and runoff models show that the Rosemont mine's effects have been underestimated: Several spatially explicit, calibrated runoff models for the area exist, along with PRISM rainfall models. They show the importance of higher elevation areas on recharge and runoff as compared to the existing regression-based model used in the FEIS. All extant models indicate that the 4.3% reduction in average annual flows cited in the FEIS underestimate the impact on downstream hydrology.

Short-term gage data are unreliable as predictors of long-term effects of the mine. Short-term records can provide reliable estimates of the most frequent flows, but the likelihood of having observed data for large, infrequent floods is small. Because large floods have a disproportionate effect on the long-term averages, short-term gage data are unlikely to represent long-term averages or provide a "conservative" estimate of basin hydrology.

PIMA COUNTY
FLOOD CONTROL

MEMORANDUM

DATE: May 31, 2017

TO: Attendees Rosemont Hydrology/Water Quality
18 April, 2017 – USACE Phoenix

FROM: Evan Canfield, P.E HEC
Civil Engineering Manager

SUBJECT: **Follow Up On Downstream Flow Discussion April 18, 2017 Meeting in Phoenix USACE**

BACKGROUND

During the meeting, HudBay commented on Pima County's concerns about the hydrology at the Rosemont Mine site, and described their approach. We believe that several of the issues raised by HudBay deserve additional commentary, and significantly affect HudBay's conclusions. This memo addresses some of those.

SUMMARY

1.) **HudBay's regression model used incorrect precipitation (assumed 18 inches for entire watershed in Zeller, 2011) and mine area (appears to be 7.2 square miles in Zeller, 2011 but not specifically provided in SWCA 2012 which estimated a reduction of only 4.3%) which resulted in underestimated downstream flows in the FEIS.**

SWCA (08-28-2012) provided an estimate of 4.3% reduction of flow at the Davidson Canyon confluence, citing the method of Zeller, 2011. This original relationship by Zeller, 2011 is:

$$Q_{AA} = (8.44885x10^{-6})A^{0.9821}\,P^{2.1198}E^{1.2101}$$

Q_{AA} – Average annual runoff (acre-ft)
A – Area in (square miles)
P - Annual Precipitation (inches)
E – Mean Elevation (feet)

This was further simplified to assume the rainfall and elevation terms could be removed as described by Zeller, 2011, so that watershed area was the only relevant term. Since there is significant elevation difference, and precipitation difference, we believe this simplification is not warranted. In the April 18, 2017 meeting, Ronson Chee of Tetratech stated that precipitation is a variable in the original Zeller, 2011 relationship, and we believe that both the precipitation and elevation variables should be included, because these vary significantly across the watershed.

Based on the mine plan shown in 2012 (CDM-Smith), we estimated the area diverted by the mine, including mine, tailings, other operational features, and the upstream component of Barrel and Wasp Canyons, at 7.11 square miles (attachment A), which is nearly the same as the 7.2 square miles in Table 1 from Zeller, 2011.

Using this perimeter, observed elevation and precipitation from PRISM, the impact from the Zeller equation shows that 26% of runoff comes from the mine site (1,284 ac-ft from the mine site is 26% of the 4,975 ac-ft estimated from the entire watershed. This recalculation indicates a substantial impact on the Outstanding Waters in Davidson Canyon.

Q_{AA} (acre-ft)	Area (square miles)	Annual P (inches)	Mean Elevation (ft)
4,975	51.4	18.2	4,481
1,284	7.11	22.2	5,146
26%			

2.) **Pima County recommended using a model that provides spatial and temporal change.** Two such models already exist for this watershed but have not been evaluated for the FEIS. The first (Niraula, et al, 2012) was brought to HudBay's attention during the ADEQ certification process. The second, a U. S. Geological Survey basin characterization model, was actually published in 2007, but only recently came to my attention. We presented this during the meeting with the Corps of Engineers in April. We continue to believe that these two models are more representative of actual impacts because they includes spatial and temporal variability, which must be considered with an intermittent stream, such as the Outstanding Waters of Davidson Canyon, which contains dry reaches in part of the year.

A simplified available groundwater recharge and runoff estimate (e.g. Flint and Flint, 2007), and has been done for the larger Rillito Watershed on a 270m grid. Based on these areas, it is possible to estimate the relative impact of the mine site (CDM-Smith Mine Plan 07-09-12 Attachment A) to the larger Davidson Canyon Watershed.

		Acre-ft	Mean (inch)	
Flint & Flint	Total Watershed	22,495	8.2	Runoff
	Rosemont	2,649	6.9	Runoff
		12%		
Flint & Flint	Total Watershed	18,683	6.8	Recharge
	Rosemont	4,164	10.8	Recharge
		22%		
PRISM	Total Watershed	43,249	18.2	Precip
	Rosemont	7,148	22.2	Precip
		17%		

As the table shows, the mine site provides between 12 and 17% of the runoff and precipitation in the watershed, and 22% of the recharge. All models indicate that the 4.3% cited in the FEIS significantly underestimates the impacts on downstream hydrology.

3.) **Return period analysis of the limited data collected by HudBay is unlikely to provide estimates of average annual flows with acceptable confidence.** Pat Merrin from HudBay indicated that data collection would be the basis of future estimates of model calibration. HudBay stated that they believe the average annual discharges they provided are "conservative" relative to observed discharges so far. This conclusion is not supported by the available data.

We recently evaluated return-period data from the Walnut Gulch Experimental Watershed (concentration points 101 to 124) and the Santa Rita Experimental Watershed (SR4) as a basis of comparison of hydrologic models used in Pima County using method 17C in the HEC-SSP program. Results for the 10 watersheds with an average of 41 years of data are summarized below.

Concentration Point	Drainage Area (acres)	Years of Record (#)	Peak Observed Discharge (cfs)	100-Year Return Period Discharge: 50% Estimate (cfs)	5% Estimate (cfs)	95% Estimate (cfs)	Difference 5% to 95% (cfs)	Confidence Inverval/50 % Estimate	50% Observed in Record
101	3.05	25	15.1	***16.8***	33.9	10.0	23.9	1.42	No
102	4.29	53	18.4	***19.8***	27.3	14.6	12.7	0.64	No
103	8.97	54	30.5	***28.9***	47.1	20.7	26.4	0.91	Yes
104	10.82	53	43.5	***37.8***	56.5	28.7	27.8	0.74	Yes
105	0.58	46	2.9	***3.3***	5.7	2.3	3.4	1.03	No
106	1.11	51	7.1	***5.9***	9.1	4.4	4.7	0.80	Yes
112	4.81	49	22.3	***28.5***	55.2	19.1	36.1	1.27	No
122	2.22	14	5.7	***7.2***	17.6	5.4	12.2	1.69	No
124	5.36	25	20.4	***24.3***	58.2	15.0	43.2	1.78	No
SR4	4.88	42	23.9	***22.7***	35.7	17.8	17.9	0.79	Yes
	Average	41					Average	1.11	

Conclusions:

a.) Even with an average of 41 years of data, the range of the estimates is quite large, with the range exceeding the estimated 50% value on average. This indicates that even with a substantial data set our ability to estimate the 100-yr peak discharges with return period methods is quite poor.

b.) In only about 1/3 of the cases has a 100-year peak discharge (based on 50% estimate of peak 100-year discharge) been observed on the watershed. This indicates that even with a very large dataset, the likelihood of having observed data for a design discharge is very small. This means that one cannot rely on a short-term dataset to determine whether a model provides "conservative" estimates of basin hydrology.

To further evaluate the value of the last seven years of data, we performed return period analysis on the last seven years of data at the USGS Barrel Canyon gage (USGS # here):

Concentration Point	Drainage Area (acres)	Years of Record (#)	Peak Observed Discharge (cfs)	100-Year Return Period Discharge: 50% Estimate (cfs)	5% Estimate (cfs)	95% Estimate (cfs)	Difference 5% to 95% (cfs)	Confidence Inverval/50 % Estimate	50% Observed in Record
101	3.05	7	6.6	***10.2***	31.8	6.9	24.9	2.44	No
102	4.29	7	14.2	***24.8***	142.6	13.8	128.8	5.19	No
103	8.97	7	23.9	***38.2***	285.2	21.2	264.0	6.91	No
104	10.82	7	27.3	***43.7***	238.2	25.2	213.0	4.87	No
105	0.58	7	1.2	***3.0***	30.5	1.5	29.0	9.67	No
106	1.11	7	4.7	***7.0***	31.8	4.2	27.6	3.94	No
112	4.81	7	7.3	***19.0***	1259.1	7.4	1251.7	65.88	No
122	2.22	7	5.7	***10.1***	43.4	6.3	37.1	3.67	No
124	5.36	7	7.2	***10.8***	31.3	7.5	23.8	2.20	No
SR4	4.88	7	12.2	***15.8***	36.3	12.2	24.1	1.53	No
	Average	7					Average	11.64	

This evaluation indicated that the error on the estimate was over eleven times larger than the estimate itself, showing that return period analysis for short datasets are nearly useless in estimating 100-yr flood peaks.

REFERENCES

CDM Smith. 2012. *Preliminary Reclamation and Closure Plan for the Barrel Alternative, Rosemont Copper Company, July 2012, Rosemont Copper Project*. Prepared for Rosemont Copper Company. Tucson, AZ: CDM Smith. July 9

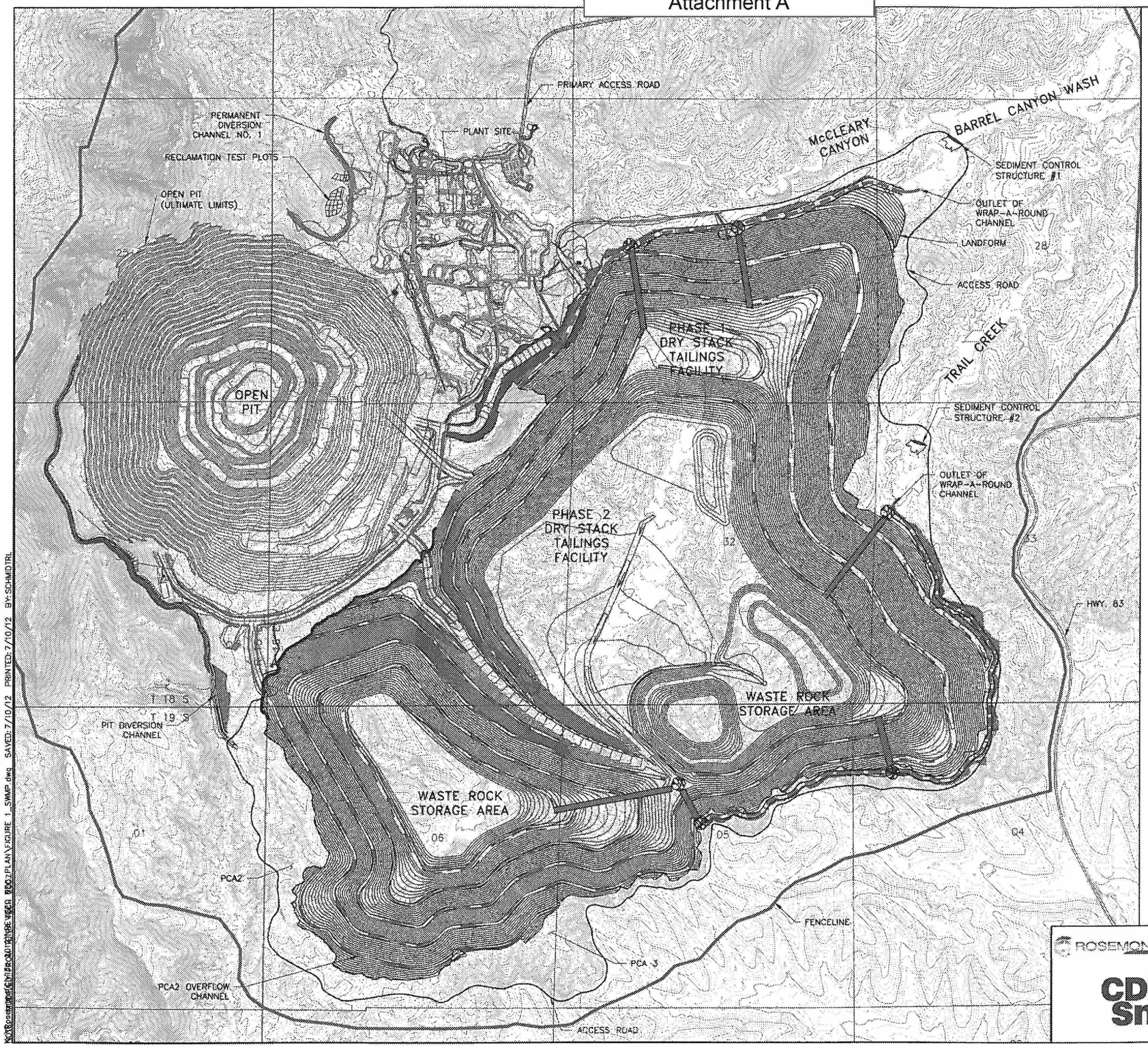
Flint L.E and Flint A.L. 2007. *Regional Analysis of Ground-Water Recharge*. USGS Professional Paper 1703—Ground-Water Recharge in the Arid and Semiarid Southwestern United States—Chapter B

Niraula, R., Meixner, T., and Norman, L.M. 2015. *Determining the importance of model calibration for forcasting absolute/relative changes in streamflow from LULC and climate changes*. Journal of Hydrology Vol. 522 p. 439-451

SWCA. 2012 Method for estimating flow in Davidson Canyon. Memorandum to file from DeAnne Rietz dated August 28, 2012.

Zeller, M. E. 2011. Predicted Regulatory (100-Yr) Hydrology and Average-Annual Runoff Downstream of the Rosemont Copper Project. Tucson, Arizona: Tetra Tech. July 11.

Attachment A



LEGEND

- EXISTING CONTOURS
- PROPOSED CONTOURS
- DRAINAGE CHANNEL
- STILLING BASIN
- DROP STRUCTURE
- WRAP-A-ROUND CHANNEL ROUTING
- DRAINAGE BENCH
- FENCELINE

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NOTE:
OPERATIONAL PLANT SITE SHOWN WITH RECLAMATION LANDFORM.

ROSEMONT COPPER

CDM Smith

PRELIMINARY RECLAMATION AND CLOSURE PLAN FOR THE BARREL ALTERNATIVE

BARREL ALTERNATIVE LANDFORM - POST MINING FACILITIES LAYOUT

LOCATION:	PIMA COUNTY, ARIZONA
DATE:	07.09.12
PROJECT NO.	91146
FILE NAME:	FIGURE 1.DWG
FIGURE NO.	1

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ATTACHMENT 2

ATTACHMENT 2:

SEEING THE WATER FOR THE MODELS: PIMA COUNTY'S MODELING OF ROSEMONT MINE IMPACTS ON WATER RESOURCES IN DAVIDSON CANYON REMAINS ROBUST DESPITE COMMENTS BY WESTLAND RESOURCES

Powell, B.F., J. Fonseca, E. Canfield, L. Orchard, and F. Postillion. 2016.

This report was in response to HudBay's criticism of the Powell et al. (2015) report (ATTACHMENT 3). In this report, Pima County maintained the need for the employment of a SWAT model to estimate runoff and the need to acknowledge the orographic effect suggested by the mine. (The lack of an observed orographic effect for the short period of record on the Rosemont site for the last few years [as reported in the recent Phoenix meeting] is irrelevant; for it to be absent on the Rosemont site and not other places in the region is counter to everything we know about the effect).

Another key criticism of the HudBay report is that the Powell et al. (2015) report relied on incorrect data related to the channel invert; this report clearly demonstrated this assertion to be mistaken.

Finally, HudBay suggested that the 2015 report was incorrect because of minor statistical issues. In the 2016, those issues were addressed, and the models rerun. Similar to the 2015 report, the new analysis showed that depth to water in a well along Davidson Canyon was very tightly correlated with streamflow length, meaning that the Rosemont mine—by cutting of stormflows to Davidson Canyon—will lead to a reduction in groundwater levels.

As noted in the 2015 and 2014 (ATTACHMENT 4) reports, this has important implications for effects on the aquatic resources of the Outstanding Waters.

Seeing the Water for the Models: Pima County's Modeling of Rosemont Mine Impacts on Water Resources in Davidson Canyon Remains Robust Despite Comments by Westland Resources et al. (2016)

May 24, 2016

Brian Powell, Pima County Office of Sustainability and Conservation
Julia Fonseca, Pima County Office of Sustainability and Conservation
Evan Canfield, Pima County Regional Flood Control District
Lynn Orchard, Pima County Regional Flood Control District
Frank Postillion, Pima County Regional Flood Control District

> "The EIS must identify all the indirect effects that are known, and make a good faith effort to explain the effects that are not known but are 'reasonably foreseeable'." *(Council on Environmental Quality 1981)*

Introduction

As the federal decision-making process around the proposed Rosemont Mine comes to a close, Pima County and Pima County Regional Flood Control District continue to gather data relating to the stewardship of lands downstream of the proposed mine and to understand potential impacts of the mine on key resources on these same downstream lands. The two principal areas of concern are the Cienega Creek Natural Preserve and the Bar V Ranch (Figure 1), which were purchased with public funds with the explicit purpose of preserving the ecosystem integrity of these landscapes. Linking the two areas is Davidson Canyon, which contains both riparian and aquatic habitats.

In 2015, Pima County provided the U. S. Environmental Protection Agency (EPA) and others a report (Powell et al. 2015) that contained additional information relevant to the inadequacies of the federal conclusions regarding the effects of the mine upon Davidson Canyon, particularly the riparian systems within and downstream of it. This was the latest in a series of County reports and memos (e.g., Pima County 2013; Huckelberry 2014; Powell et al. 2014; Canfield 2016) addressing various long-standing inadequacies in the Final Environmental Impact Statement (FEIS; U.S. Forest Service 2013), the federal mitigation measures regarding surface water and groundwater conditions, and the potential effects of the mine.

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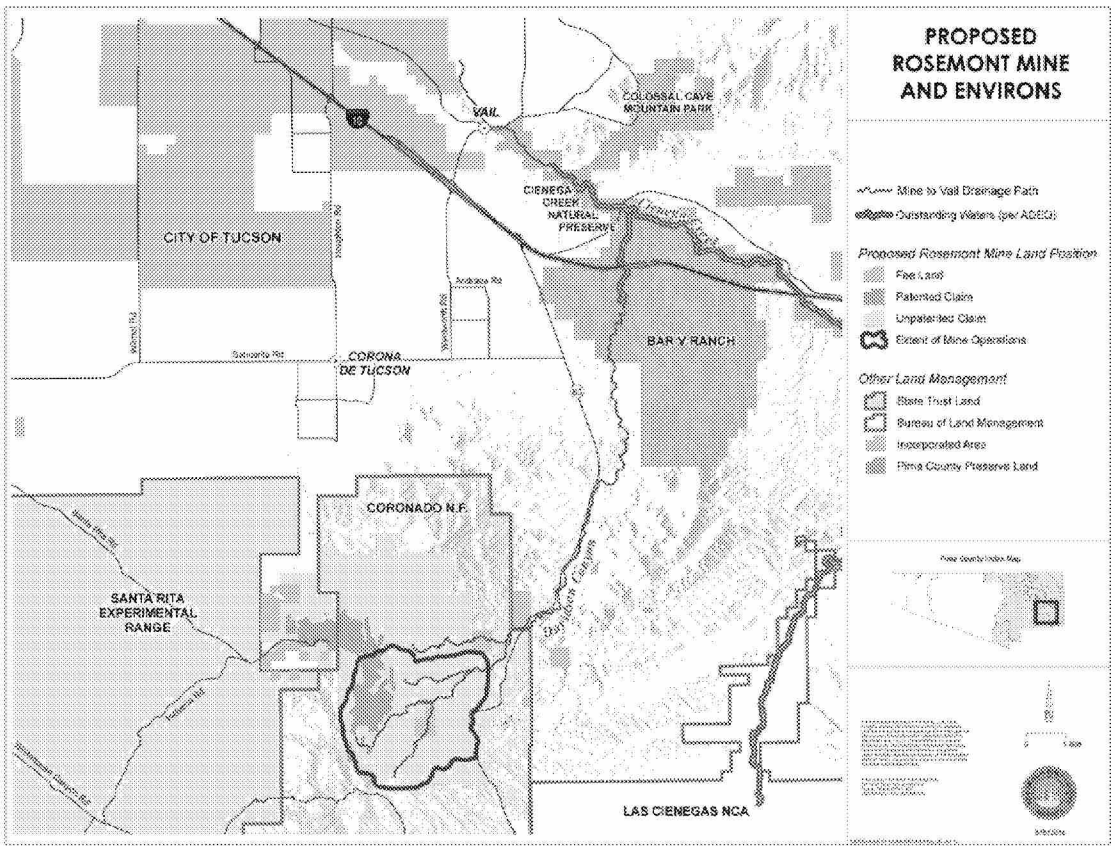

Figure 1. Location of the proposed Rosemont mine in relationship to Davidson Canyon, Cienega Creek, and key conservation lands.

Deficiencies of the FEIS and the proposed mitigations for waters regulated by the U.S. Army Corps of Engineers (Corps) have long concerned the EPA as well as other federal agencies involved in the Rosemont project. As a result, the Council on Environmental Quality (CEQ) has been periodically convening the federal agencies to discuss their differences, in hopes of resolving issues before the Corps and U.S. Forest Service issue their decisions.

Key uncertainties remain regarding the impacts of the mine, and Pima County has brought forward a robust dataset on key water resources in Davidson Canyon such as depth to shallow groundwater resources, stormwater flows, and length of surface water baseflows. At the request of the EPA, Pima County gathered together these data and presented the results (Powell et al. 2015).

Just prior to the CEQ's most recent field visit (April 2016), federal agencies involved in the Rosemont issue received comments prepared for Rosemont Copper Company[1] (WestLand et al. 2016) that sought to refute many of the key points addressed by Powell et al. (2015). The

[1] The report submitted to Rosemont had little in the way of referenced or assigned authorship, so barring additional information; it is referred to here as Westland et al. (2016).

purpose of this Pima County report is to respond to the criticisms outlined by Westland et al. (2016); our responses generally follow organization of that report.

2. Contribution of Barrel Canyon to Davidson Canyon

Westland et al. (2016) points out the difficulties of quantifying the distribution of runoff in Barrel and Davidson Canyons while adding nothing to the knowledge base of these watersheds. Pima County continues to maintain that the hydrologic analysis in the FEIS is deficient in identifying the stormwater impacts to Davidson Canyon and Cienega Creek, and Powell et al. (2014, 2015) have used the most complete available data and scientifically sound methodologies to advance our general understanding of these systems.

Westland et al. (2016) fail to present a scientifically supported alternative understanding of these systems, but instead simply point out perceived flaws and limitations found in the Powell et al. (2015) analysis. They identify limitations in using gage records from the Pima County Automated Local Evaluation in Real-Time (ALERT) system to conduct hydrological analyses. Westland et al. (2016) also discuss the lack of a comprehensive understanding of the spatial and temporal variability in rainfall across the local landscape, as well as the difficulty in using both USGS and ALERT gages to quantify streamflow volumes, but fail to present any robust alternative explanation to model the hydrological dynamics of these systems.

While we acknowledge there is much we do not currently understand, the onus is on Rosemont to demonstrate that their project will not adversely impact these resources. For example, Pima County has repeatedly suggested using the Soil Water Assessment Tool (SWAT) to evaluate the effects of the Rosemont mine on flows in Davidson Canyon. We understand that there is currently a modeling effort underway to help reduce some uncertainty around this issue, and we sincerely hope that that effort will be employing and adapting the recently published SWAT model (Niraula et al. 2015).

The following model parameterization suggestion has been made to the Arizona Department of Environmental Quality and HudBay previously (Canfield 2016), but we repeat it here:

1.) **Limits** – watershed of Davidson Canyon through the confluence with Cienega Creek.
2.) **Topography** –
    a. Existing Conditions - PAG LiDAR data at 10' resolution Grid.
    b. Maximum Diversion – Rosemont Mine Plan of Operations (modification of existing conditions topography at mine site only)
    c. Post Closure – Rosemont Mine Plan
3.) **Curve Number** – use PC Hydro tables (available on Web PCHydro, which are based on SSURGO soils data (10m) and reclassified Southwest ReGAP cover). Evaluation vs observed data runoff data (Stewart et al 2013) has indicated that the PC Hydro Curve Number values show less systematic bias than the USDA CN Tables.
4.) **Vegetated Cover -**
5.) **Observed Climate –** period of record coincident with observed runoff monitoring at Barrel Canyon (USGS 09484580 2009 to present)

6.) **Historical Climatic Data** - PRISM climatic data (800m) input
    a. 30 yr 'Normal' climate with the SWAT Weather Generator
    b. Daily Precipitation
    c. High and Low Temperature
    d. Reference ET
7.) **Simulations**
    a. Baseline (pre-site development)
    b. Maximum Diversion
    c. Post-closure
8.) **Evaluation Point**
    a. At Mine Compliance Point
    b. Upstream Edge of OAW
    c. At Confluence of Davidson Canyon and Cienega Creek

Evaluation Criteria

1.) **Model Comparison with Observed at Barrel Canyon Gage**
    a. Number of Days of flow
    b. Peak Daily Flow and Volume
    c. Seasonal volume of flow
    d. Annual volume of flow
2.) **Historical Climate Modeling of Annual Volume -** for Each 30 year simulation
    a. High Volume
    b. Low Volume
    c. Average
3.) **Historical Climate Modeling of Seasonal Volume -** for Each 30 year simulation
    a. High Volume
    b. Low Volume
    c. Average

Influence of Barrel Canyon and the Orographic Effect

If constructed, the Rosemont Mine would impact water inputs (e.g., stormwater and baseflow) to Davidson Canyon. An important element to understanding the extent and duration of those impacts is a more comprehensive description of the role that water movement through Barrel Canyon contributes to the hydrology of downstream regions in Davidson Canyon and Cienega Creek. Furthermore, a physical process known as the orographic effect must be considered to fully understand the dynamics of water movement through watersheds moving across significant topographical relief.

The orographic effect, which is the phenomenon of higher precipitation at greater elevation due in part to the reduced capacity for an air mass to retain moisture as the temperature decreases beyond its dew point, is a well-documented and accepted phenomenon (e.g., Daly et al. 1994) and is used in a wide variety of modeling approaches. Westland et al. (2016) incorrectly echoes Rosemont's continued assertions (citing the FEIS) that orographic effects have been accounted for in their assessment of mine impacts to the watershed.

The FEIS very clearly *does not include orographic effects* because the equation used to determine this did not contain an orographic effect parameter in the modeling of the predicted reductions in storm flow, making any estimates of the mine's impacts incomplete. Page 536 of the FEIS concludes the following:

> *Changes in surface flow and, therefore, to the recharge to shallow alluvid aquifers are possible as a result of disturbance by the mine and the removal of portions of the watershed upstream. The effect of the reduction in surface flow is estimated and could reduce storm flows by* ***4.3 [for the Preferred Alternative] to 11.5 percent,*** *depending on alternative, but this effect on recharge is likely to be overestimated, with the contribution being less owing to the distance downstream of the project area and substantial channel losses. Predictions of loss of recharge to the shallow alluvial aquifer have a high level of uncertainty because of the nature of the channels and the relatively great distance between the impacts from the proposed mine and lower Davidson Canyon. (USFS 2013)*

However, the values of 4.3 percent to 11.5 percent come from a numerical calculation (cited as SWCA Environmental Consultants 2012) that in turn cited Zeller (2011), which uses the calculation:

$$Q_{AAr} = \left(\frac{A_r}{A_n}\right)^{0.6636} Q_{AAn}$$

Where:

Q_{AAr} is the reduced average annual runoff (acre-ft)
Q_{AAn} is the average annual runoff under natural conditions (acre-ft)
A_r is the reduced watershed area assuming some diversion to mine (square miles)
A_n is the natural watershed area (square miles)

Importantly, because there is no parameter that models precipitation included in this equation, the equation clearly does not take into consideration any orographic effects, or differences in annual rainfall at higher elevations in the watershed. In fact, Zeller 2011 states: "assuming on a watershed-wide basis the average-annual precipitation, P, would not change meaningfully as a consequence of a small reduction in watershed size". Consequently, because the language in the FEIS clearly cites these calculations, it is clear that the modeled impacts did not take into consideration average annual precipitation (p. 428-429).

As such, Pima County continues to assert that orographic effects are not accounted for in the assessment of downstream runoff volumes in the FEIS, that the inclusion of these effects in the modeling of post-mine conditions may significantly alter the current analysis of impacts in the FEIS, and that the continued assertion that they are accounted for is factually in error.

Data Limitations

In section 2.2 of their report, Westland et al. (2016) point out that precipitation is variable across the landscape, a phenomenon that is well known in particular for southern Arizona. Westland et al. (2016) go on to cite data from two precipitation gauges in the Cienega Creek watershed (including the Empire Peak gage, the highest elevation in the watershed) and use the differences between the precipitation data collected at these two locations to seemingly suggest that the orographic effect does not, in fact, exist.

Pima County is aware that the Empire Peak precipitation gage consistently shows lower readings than other, lower elevation gages in the watershed (Powell 2013); we have been transparent about this observation. Though we do not know for sure why this is the case, we suspect that it is because the gage is placed at the highest point on Empire Peak and that consequently wind impacts the estimate. This is a well-known phenomenon that has been widely accepted by the scientific community and that is taken into consideration when interpreting precipitation data collected in such a scenario (Nešpor and Sevruk 1999). The Regional Flood Control District placed the gage at Empire Peak because other infrastructure is located on that site and not because it is representative of precipitation at that elevation. If, in fact, the orographic effect does not exist in the Barrel and Empire areas, then surely meteorologists would be interested in this anomaly.

In Section 2.1 of the April 19 Memo, Westland et al. (2016) attacks the use of ALERT streamflow data used in the Powell et al. (2015) report, and then in section 2.2 uses ALERT precipitation data to support their assertions, thereby highlighting the inconsistencies in their criticisms. The fact is that in both cases the limited spatial and temporal data available underscores the need for additional instrumentation and monitoring to accurately characterize the surface water hydrology of Barrel and Davidson Canyon, something that is lacking in the FEIS. They observe that the relative lack of directly measured hydrologic data, temporally abbreviated datasets and the coarse spatial distributions of data-collecting instruments makes using these data difficult to adequately describe watershed characteristics. In fact, the flaws pointed out (some valid and some not) actually corroborate the County's position that the FEIS has not adequately described the proposed Rosemont Mine's impact on the Davidson Canyon watershed. If, as they point out, the available data is insufficient to characterize the watershed's hydrologic characters, how is it possible to, at the same time, use the very same data to reach the conclusion that these resources will not be adversely impacted? Of course the available datasets have limitations, and additional data and analyses are warranted and needed. We continue to maintain that Hudbay has a responsibility to add to the knowledge base considering their potential to significantly impact these resources, but seemingly they have resisted doing so thus far.

Westland et al. (2016) asserts that ALERT data in Davidson Canyon does not account for low flows.

One of the primary criticisms by Westland et al. (2016) is that discharge values of zero are assigned to flow depths less than 1.4 feet at the Davidson Gauge (ALERT site 4313). This issue is not that low flow data was not collected or that ALERT streamflow sensors are not capable of—

or suitable for—capturing low and moderate flows. In fact, the flow sensor at ALERT station 4313 is located directly at the channel invert and is in a position specifically designed to measure low and moderate flows as well as flood flows (Figures 2 and 3).

The ratings used to display data on the ALERT website http://alert.rfcd.pima.gov/perl/pima.pl are sometimes intentionally truncated for a variety of reasons, and the truncated data set was used in the Powell et. al (2015) report. The complete data set, with discharge estimates for all stage values (including those below 1.4 feet for the period of July 15 – November 25 2015), is included in Figure 4.

Assigning discharge values to low flows increases the total flow volume calculation for the period of July 15 – November 25 of 2015 from 470 acre-feet—as reported in Powell et al. (2015)—to approximately 1600 acre-feet. The 470 acre-feet figure suggested that a disproportionately large percentage of total Davidson Canyon watershed volume is produced by Barrel Canyon. While the higher estimates of surface flow seems to counter our original argument, it is, as pointed out by Westland et al. (2016) a very short data set and the distance between the USGS gage at Barrel Canyon makes quantifying the overall flow contribution from these watersheds a difficult exercise for both Pima County and Rosemont. Neither Pima County nor Westland's analyses can correct the fact that the FEIS has done an inadequate job at describing the proposed Rosemont mine's impact on stormwater and baseflows in Barrel and Davidson canyons.

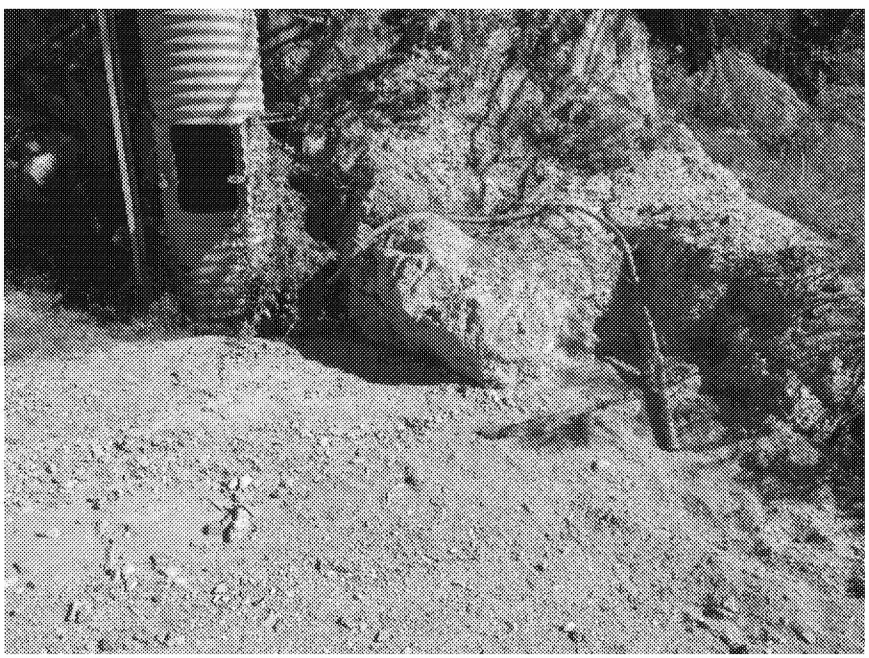

Figure 2. ALERT site 4313. Picture shows the location of the re-located pressure transducer outside of the stilling well. Photo taken on September 29, 2015.

Figure 3. ALERT site 4313. View is upstream and shows the location of the pressure transducer located at the channel invert. Photo taken on September 29, 2015.

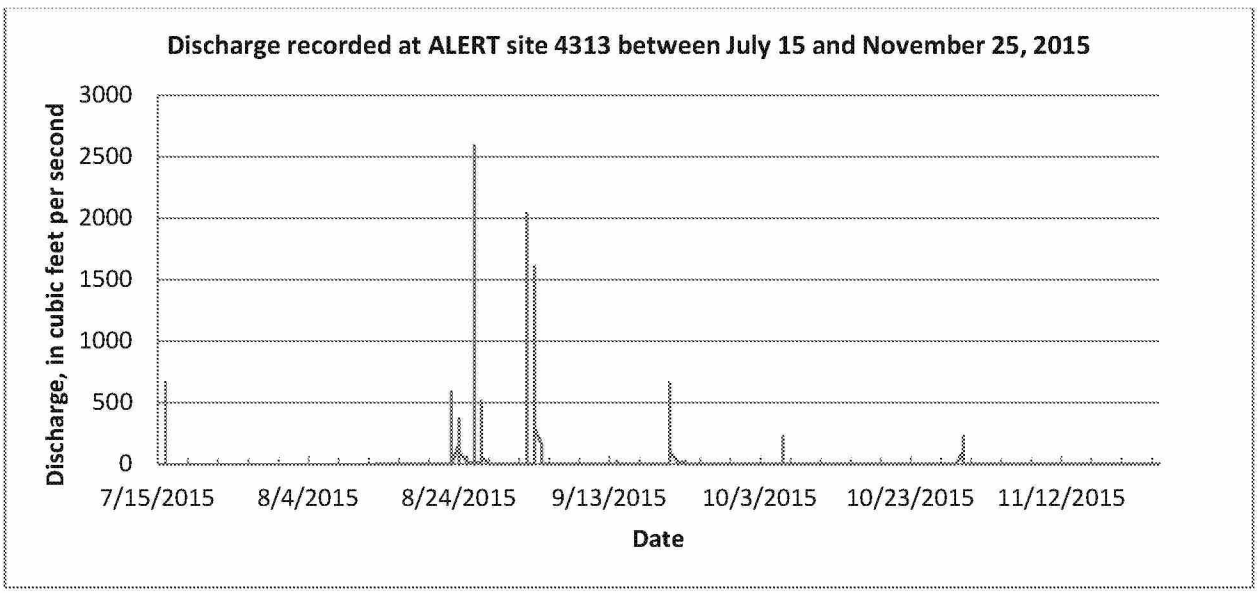

Figure 4. Non-truncated dataset of all storm water discharge, including flows of less than 1.4 feet, at ALERT site 4313 in Davidson Canyon for July 15 – November 25, 2015.

Additionally, Westland et al. (2016) also challenge the use of ALERT data recorded at ALERT site 4313 based on their presumption that scour and sedimentation have not been accounted for and that the stage/discharge relationship has not been maintained to account for changes in bed elevation. Westland et al. (2016) arrives at this conclusion erroneously. In fact, subtle shifts in the rating are made based on measured invert elevation after every field visit, which is typically twice per year. The mistake made by Westland et al. (2016) in this criticism is that the website they accessed (http://alert.rfcd.pima.gov/perl/pima.pl) is meant to display real-time data and not to disseminate historic information. The website disclaimer clearly states that the data are for "general information only". The database software used by this website to convert stage (depth) to discharge only allows one rating for the entire period of record so shifts or adjustments in the rating cannot be ascertained by an examination of data derived from this source alone. Internally, our primary ALERT database is operated with more sophisticated base station software that allows multiple ratings and invert elevation adjustments to be applied to multiple discrete time periods.

Furthermore, in the interest of transparency, these data are now available to be used to help reduce any uncertainty about the impacts of the Rosemont Mine and we welcome the use of these data.

2.3 Runoff Variability

Westland et al. (2016) presents a discussion of runoff variability between the USGS gauge 09484580 located at Barrel Canyon and the ALERT site 4313 streamflow gauge. It is unclear what exactly they are trying to establish but they show that runoff occurred at both locations on the same day on only three occasions during the July 15 – November 25, 2015 sampling period. As noted above, Westland et al. (2016) used an incomplete record of discharge for their analysis. In actuality, when using the complete dataset (Figure 5), it is clear that 70-percent of runoff events measured at the Davidson Canyon ALERT gage occurred on days where discharge was also recorded at Barrel Canyon. Barrel Canyon recorded more days of runoff than Davidson Canyon, but 50-percent of the runoff events recorded at Barrel Canyon also corresponded with days where runoff was measured at Davidson Canyon. As we have already acknowledged and pointed out, this temporally narrow data set is not sufficient to fully describe long-term watershed characteristics, but it does suggest that runoff events in the upper and lower watershed are not as temporally isolated as Westland et al. (2016) claim.

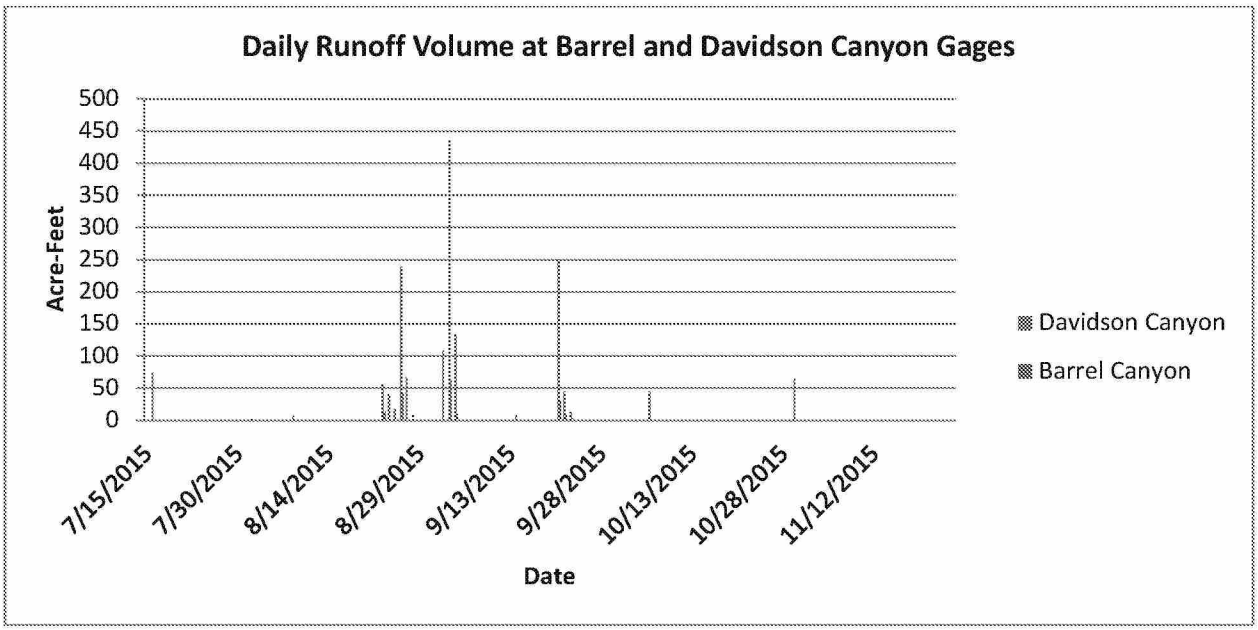

Figure 5. Runoff volume (acre feet) comparison between Davidson and Barrel canyon showing their close correlation.

3. Influence of Streamflow on aquifer recharge in Davidson Canyon

In section 3 of their report, Westland et al (2016) state that the correlation between stream flow and shallow groundwater levels is "axiomatic", well known to Arizona Department of Water Resources, and addressed in the Forest Service's Final Environmental Impact Statement (FEIS) for the Rosemont project. In fact, the FEIS does not adequately account for the fact that the project will starve Davidson Canyon of baseflow and stormflows, both of which are critical to both streamflow AND groundwater recharge. Pima County has long questioned the equation on which the widely cited loss of 4-11.5% of surface water contributions is predicated. In fact, that reported figure is based on work by Zeller (2011) and Krizek (2010) with follow-up work by SWCA Environmental Consultants (2012). None of these efforts looked at the baseflow conditions; Krizek (2010) for example, only looked at stormflows, and did not address baseflow, which means that these efforts present an incomplete scenario of the true complexity of the hydrologic system in the watershed.

By contrast, Pima County has brought forward a robust and long-term dataset on the relationship between flow, streamflow length, and depth to groundwater at lower Davidson Canyon. More recently, that dataset has been enhanced by an automatic datalogger in the Davidson 2 well, which allows for a greater insight into the responsiveness of the local aquifer to both stormflows and baseflows. These are critical and valid lines of evidence and can be used to model reductions in baseflow and stormflows to Davidson Canyon, similar to the work by Powell et al. (Figure 2; 2014). Unfortunately, Westland et al. (2016) did not take an opportunity to use the available Davidson Canyon data to model impacts on streamflow length, but instead simply criticized the model that Pima County used to do so.

4. Relationship between depth to water and length of streamflow in Davidson Canyon

Westland et al. (2016) was critical of the model produced by Powell et al. (2015) examining the relationship between streamflow length and depth to groundwater. Here we take a closer look at that critique, but it is important to note that here we will not address at length all of the minor quibbles perceived by Westland et al. (2016, section 4.3) with regards to "other statistical problems"; in a few cases they are correct (e.g., an axis was not labeled), but in most cases they are neither correct nor do their points refute the fundamental relationships that are so important to the issues at hand.

A primary concern to Westland et al. (2016) is that Powell et al. (2015) used a linear model with "censored response variables". We appreciate the authors pointing out this statistical minutiae to us and thus we have rerun the analysis without the zero values and with the two new values from late 2015. Figure 5 is the result of the re-run model using simple linear regression, which accounts for 71% of the variation in the data. Had Westland et al. (2016) done these analyses themselves, they would have seen that removing the zero values had no impact on the model outcome.

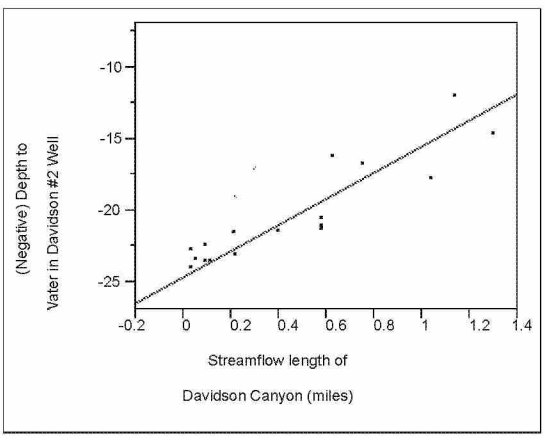

Figure 5. The relationship between streamflow length and depth to water in the Davidson #2 well. This is the same as Figure 6 in Powell et al. (2015) but with the zero values removed. Removing the zero values had no impact on the strong statistical relationship. The environmental connection between these two variables remained the same.

The second key issue raised by Westland et al. (2016) is that Powell et al. (2015) "fail to note or understand the effect of seasonal changes on the regression model." This is false from both the perspective of interpretation and modeling. From the modeling perspective, the variable *month* was used in the original analysis as an explanatory variable. As a response to the Westland et al. (2016) suggestion to exclude the zero values, we reran the analysis, which gave us 19 data points. The coefficient of determination (or the proportion of the variation in the dependent variable that is predictable from the independent variable) of the model that includes both

month and depth to water is 0.73, which is similar to the coefficient of determination of the re-run model (0.71). Because an advantage of multiple linear regression is its ability to inform us of the relative contribution of each variable to the model, we weighed the contribution of month and depth to water. We find that depth to water has considerably greater influence on the model than does month. Westland et al. (2016) failed to note this fact and instead suggested that a series of simple linear regression analyses with high coefficients of variation was the same as saying they all contributed about the same to the model outcome. Their attempt at a multivariate regression failed to highlight the relative contributions of month and depth to water.

From the perspective of interpretation, Westland et al. (2016) state that month in the final model is really a proxy for precipitation. Precipitation, not month, is clearly the driver and we see the expression most dramatically as stormflow in Davidson Canyon, but its influence on baseflow conditions (measured as length of streamflow) and depth to water are also evident.

Conclusion

By trying to discredit Powell et al. (2015), Westland et al. (2016) appear to be attempting to create a diversion from the real issue. Scrub away minor statistical issues and concerns about labeling axes and we in fact find some level of common agreement: precipitation is driving stormflows and baseflows and thus aquifer recharge, aquatic resources, and mesic and hydroriparian wildlife and their habitat. Altering the key outcomes of precipitation, stormflow and baseflow, will impact these key resources.

Natural variation in these systems is well known and documented, including Powell et al. (2015), but the key question that Pima County and others have unsuccessfully lobbied the Forest Service to thoroughly address for years remains: what additional impact will the Rosemont project have on these resources? As noted elsewhere in this report, the work by Krizek (2010) is woefully inadequate. It is unfortunate that instead of using robust statistical and technical methodologies to contribute to a better understanding of these resources, the companies behind the Westland et al. (2016) report simply disparage legitimate attempts to do so. The famous statistician John Tukey once said: "far better an approximate answer to the right question, which is often vague, than an exact answer to the wrong question, which can always be made precise". We think that Westland et al. (2016) and other analyses by Rosemont consultants continue to seek precise answers to the wrong questions.

In conclusion, neither our analysis nor theirs can completely address the deficiencies of the EIS. Modeling of changes in the Davidson watershed was identified as a need, and the FEIS was completed without adequate analyses. We once again call on the Forest Service to uphold the letter and spirit and NEPA by using models that account for variation in rainfall in addition to modeling the projected land-use impacts to storm flows and baseflows and the resulting diminishment of hydrological and biological resources of Davidson Canyon and lower Cienega Creek.

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ATTACHMENT 3

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ATTACHMENT 3:

NEW ANALYSIS OF STORMFLOW AND GROUNDWATER DATA FROM DAVIDSON CANYON: EVIDENCE FOR INFLUENCE OF STORMWATER RECHARGE OF GROUNDWATER.
Powell, B.F., J. Fonseca, and F. Postillion. 2015. Memorandum to Linda Mayro and Suzanne Shields.

This memorandum analyzed a new dataset for the Davidson #2 Well and depth to water as a function of stormflow at the Davidson Canyon ALERT gauge, stormflow events at the gauge, and surface water measured at the Barrel Canyon USGS Gauge. The analysis suggests that the Barrel watershed yields more water than its proportional area within the Davidson watershed.

The EIS discussion does not take into account the higher elevation difference of the Barrel watershed and the increased rainfall and runoff of the watershed, and thus underestimates the flow contribution of the Barrel watershed to Davidson Canyon.

Stormwater discharge and subsequent depth to water data showed a direct relationship between surface water flow and depth to water is evident for almost each period of time examined.

A new analysis of the relationship between depth to water and length of streamflow in Davidson Canyon, which used three new data points, reaffirms an earlier analysis by Powell et al. (2014, ATTACHMENT 4) for a strong statistical relationship between these two variables. That is, as groundwater levels rise and fall, so too does the length of flow in Davidson Canyon increase and contract.

PIMA COUNTY

SUSTAINABILITY & CONSERVATION

Memorandum

Date: December 13, 2015

To: Linda Mayro, Director, Office of Sustainability and Conservation;
Suzanne Shields, Director, Pima County Regional Flood Control District

From: Brian Powell, Program Coordinator, Office of Sustainability and Conservation;
Julia Fonseca, Environmental Planning Manager, Office of Sustainability and Conservation;
Frank Postillion, Pima County Regional Flood Control District

RE: New analysis of stormflow and groundwater data from Davidson Canyon: Evidence for influence of stormwater recharge of groundwater

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If constructed, the proposed Rosemont mine will have a host of negative environmental effects for which Pima County staff have focused numerous previous comments (e.g., Pima County 2012, 2013; Huckelberry 2014; Powell et al. 2014). Many issues raised by Pima County remain a concern, including the mine's impact on stormwater flows to Davidson Canyon and Cienega Creek and resulting impacts on surface water extent, groundwater recharge, vegetation, and the species that rely on these resources.

Past analysis by Pima County staff (Powell et al. 2014) focused on the groundwater declines on Cienega Creek and Davidson Canyon and connected observations of well depth to flow measurements made at Marsh Station and to length of streamflow in Cienega Creek and Davidson Canyon. This analysis showed an exceptionally strong relationship between length of surface water flow of Davidson Canyon and depth to groundwater. Modeling of this relationship showed that reduction in groundwater would have a concomitant impact on streamflow length; by one estimate as much as a 30% reduction in flow length (Powell et al. 2014).

The impacts of the proposed Rosemont mine on stormwater and baseflows to Davidson Canyon have been understated in both the final environmental impact statement (U.S. Forest Service 2013) and the draft water quality certification by the Arizona Department of Water Quality (Arizona Department of Environmental Quality 2014). The understated impacts were then carried through to the draft biological opinion (U. S. Fish and Wildlife Service 2013). In the County's comments to the Arizona Department of Environmental

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Quality (Huckelberry 2014), the County identified the need for more information on stormwater impacts to Davidson Canyon. The County's recent analysis (Powell et al. 2014) provided additional evidence that the runoff-recharge relationship in Davidson Canyon is strong, and cutting off upstream contributions to the watershed would be detrimental to the sustenance of surface and shallow groundwater which sustains hydroriparian habitat in the Creek, and is a large reason for its Arizona Outstanding Waters designation.

This current memorandum focuses on looking closely at a new dataset for the Davidson #2 Well (Arizona Department of Water Resources Well Registry #808500) and depth to water as a function of stormflow (cubic feet per second; CFS) at the Davidson Canyon ALERT gauge (#4313), stormflow events at the gauge, and surface water measured at the Barrel Canyon USGS Gauge (#94845680).

Davidson #2 Well is situated approximately 150 feet west of ALERT gauge #4313 and across Davidson Creek (Figure 1). Prior to a new pressure transducer installation it was measured for water levels on a monthly basis with an electrical well sounder. New data from the Davidson #2 Well, which is not pumped and is a monitoring well, comes from the installation of an automated water level depth sensor (pressure transducer) on July 17, 2015; the sensor records depth to water (DTW) four times each day. By contrast, the USGS and Pima County ALERT gauges record data every hour and ALERT gauge reporting is triggered by a stormwater event (see next paragraph). The period of record for most of the analysis in this memorandum is from July 16, 2015 to November 24, 2015.

We compared the DTW to four separate storm events recorded at the Davidson Canyon ALERT gauge. Unlike USGS streamflow discharge gauges, which record all surface flow, the ALERT gauges record only stormflow events that exceed a certain stage. Stage height at both gauges is in turn related to discharge using rating curves developed at each site. For both gauges we used the mean daily CFS as the explanatory variable in the statistical models.

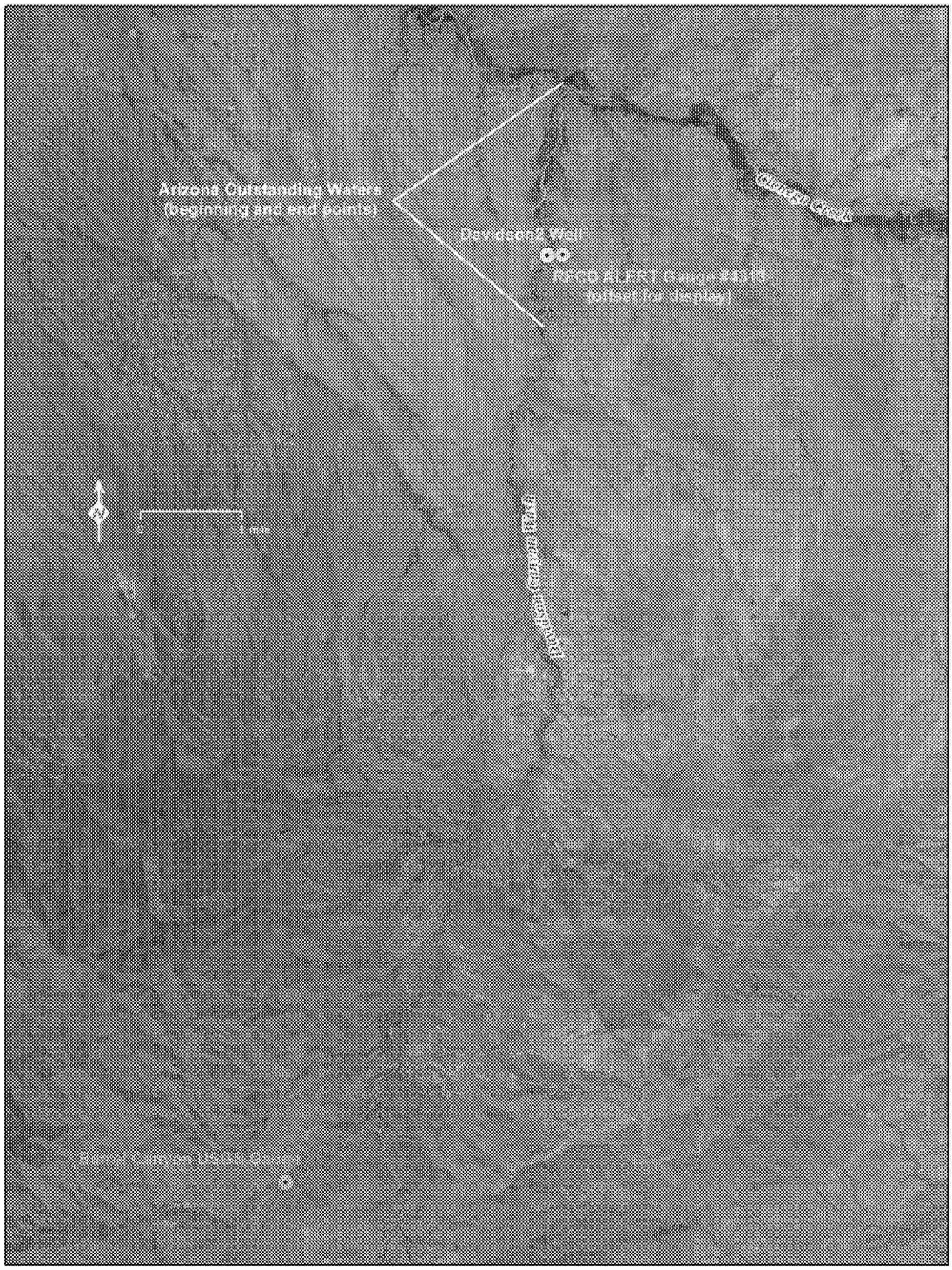

Figure 1. Location of key features related to the current analysis, Davidson Canyon, Pima County, Arizona.

Streamflow Accounting: Barrel Canyon provides a disproportional amount of runoff to Davidson Canyon. The watershed area above the Davidson Canyon Gauge is 32,320 acres, while the area above the Barrel Canyon Gauge is 9,024 acres, 28% of the watershed area of the Davidson gauge. For the period of time that is the focus of this analysis (July 15-November 25), a total of 470 acre feet of stormwater were recorded at the Davidson Canyon gauge. At the Barrel Canyon Gauge 186 acre feet were recorded, 39% of the amount recorded at the Davidson Canyon Gauge. This suggests that the Barrel watershed yields more water than its proportional area within the Davidson watershed. The EIS discussion does not take into account the higher elevation difference of the Barrel watershed and the increased rainfall and runoff of the watershed, and thus underestimates the flow contribution of the Barrel watershed to Davidson Canyon.

Importance of Streamflow to Aquifer Recharge in Davidson Canyon. In this next analysis, we compare the daily change in well depth at Davidson #2 Well to stormwater flows in Davidson Canyon (Fig. 2), baseflow at Barrel Canyon (Fig. 3) and Barrel and Davidson canyon stormflow (Fig. 4).

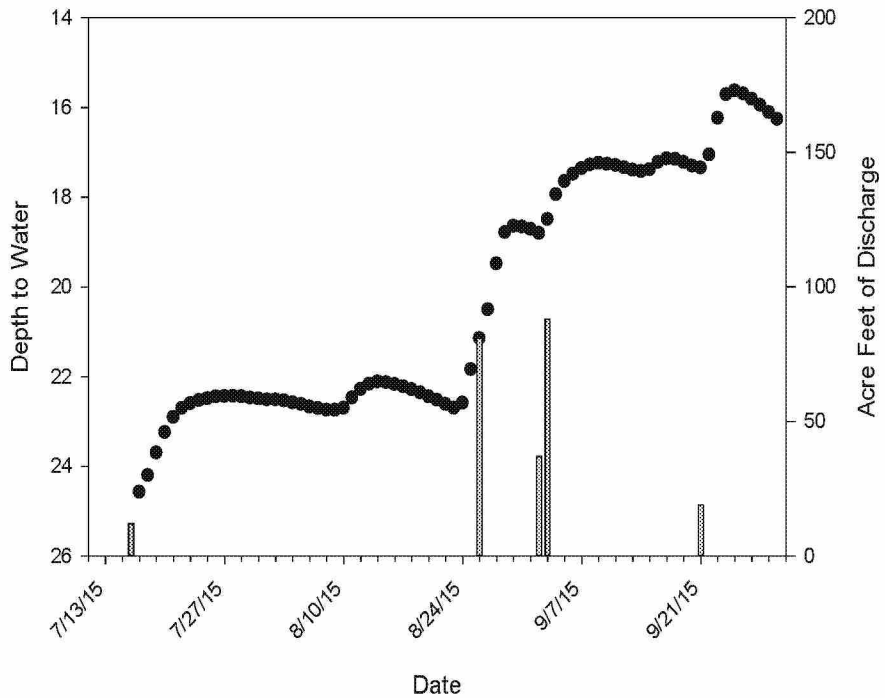

Figure 2. Change in depth to water (feet) at the Davidson #2 Well (black dots) in relationship to stormflow at the Davidson Canyon Gauge, 2015.

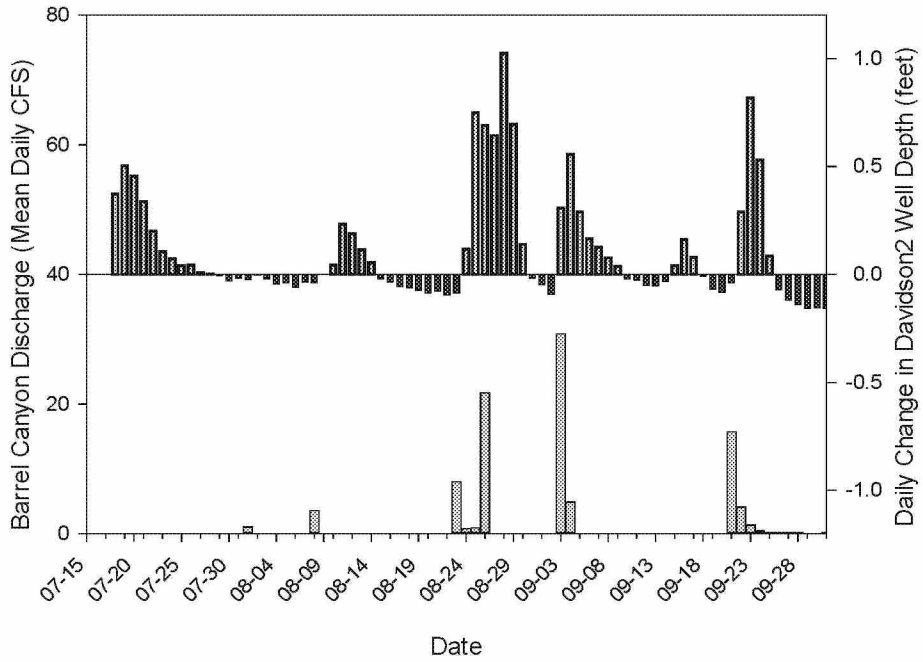

Figure 3. Daily change in depth to water (feet) at the Davidson #2 Well (colored bars) in relationship to flow measured at Barrel Canyon USGS gauge (grey bars), 2015. Daily change is calculated by subtracting average daily well depth (for a particular day) by the average depth for the previous day.

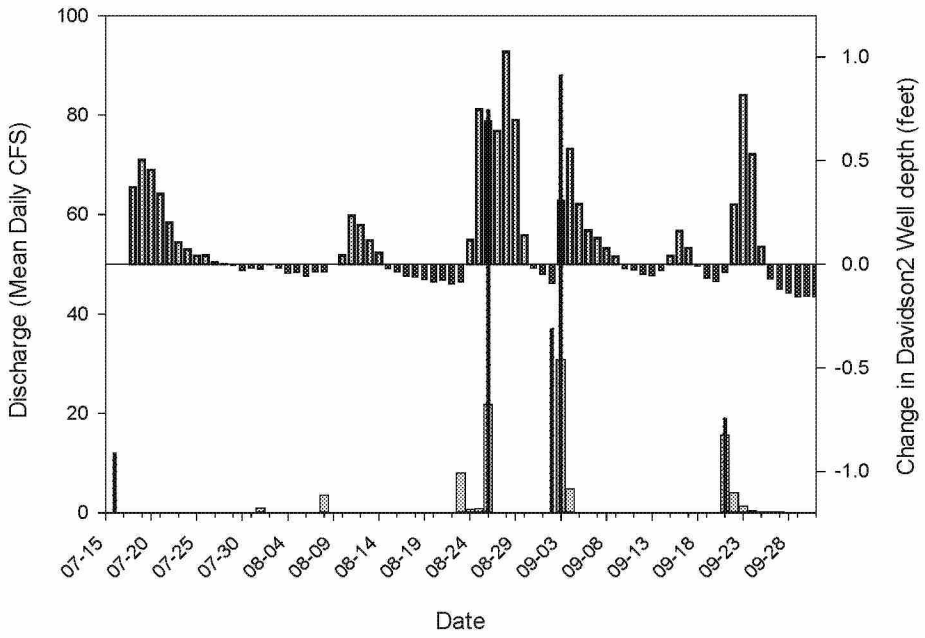

Figure 4. Same graph as Figure 2, but with the inclusion of discharge data from the Davidson Canyon ALERT gauge (solid black line).

A direct relationship between surface water flow and depth to water is evident for almost each period of time well depth increased. This phenomenon is preceded by stormflow in Davidson Canyon and/or measured flow in Barrel Canyon. An exception is an increase in recharge in the middle of September that is not associated with either of these measures, which also underscores the fact that there are many tributary inputs into Davidson Canyon below Barrel Canyon and not all of these may be recorded as stormflow at the Davidson Canyon Gauge.

We then took a more quantitative approach by looking at the daily change in well depth as a function of the relationship to stormflow, as measured at the Davidson Canyon Gauge. To do this we grouped change in well depth for each day into one of two categories in relationship to stormflow: 1) Yes(Y) = day was on or four days after a stormflow event or 2) No(N) = day was before or more than four days after a recorded stormflow event. The results show that there is strong statistical relationship between daily change in well depth and stormflow events (Fig. 5; 2-way t-test, $t_{128} = 12.6$, P =<0.0001, 95% confidence interval for "No" = -0.057 to -0.0014, "Yes" = 0.349 to 0.475). Thus, there is strong evidence for groundwater response at Davidson #2 well to storm water flow inputs recorded at the Davidson Canyon gauge.

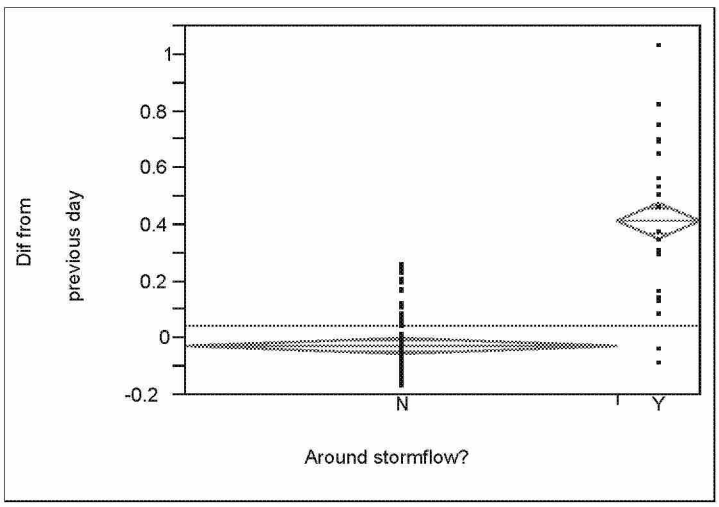

Figure 5. Daily difference in groundwater levels (as measured at the Davidson #2 Well) in relationship to stormwater events. (Y)es = on or four days after a stormflow event; (N)o before or more than four days after a recorded stormflow event.

Because of the limited availability of high-resolution DTW data, this analysis looks only at monsoon and fall flows, not winter flows, which are more likely to include flows from Barrel Canyon than monsoon flows due to the difference between the smaller aerial extent of monsoon storms than winter storms.

The relationship between streamflow length and depth to water in Davidson #2 Well remain strong. In this memorandum we also update the analysis of data from Davidson Canyon relating streamflow length in miles to depth of water in the Davidson #2 Well. These data were first reported in Powell et al. (2014; Figure 5) and used data from 2005-2013. Since that time, we have obtained three new data points: June 2014 and September and November 2015. Figure 6 shows the results, indicating the relationship reported in 2014 holds today, though two of the three most recent observations are further above the regression line, meaning that flow lengths are shorter than would be predicted based on the DTW. An interesting note is that most other observations above the regression line (and where there is flow in Davidson) occur during fall and winter months.

We furthered our analysis of these data by adding three additional variables into a multiple linear regression analysis (depth to water as the response variable): month, year and month*year interactive effect. The resulting model accounted for 88% of the variation in the data (Fig. 7; $R^2 = 0.88$, $F_{9,29} = 16.96$, $P =<0.001$). Of course, the relationship to depth to water explained most of the variation (as reported in Figure 6),

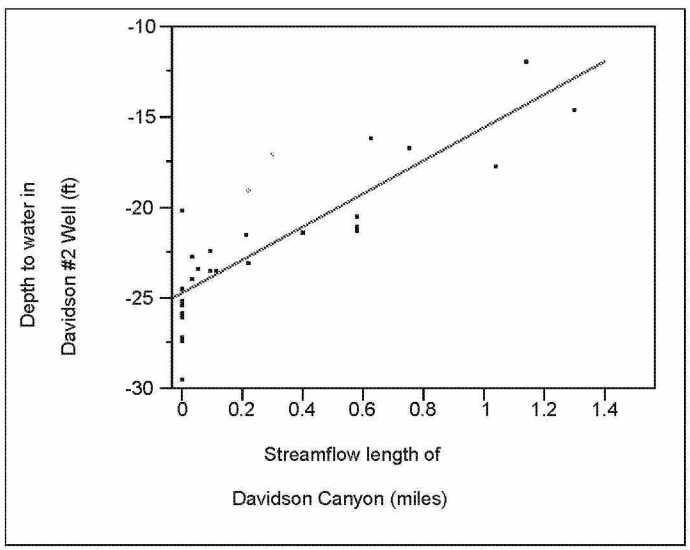

Figure 6. Relationship between length of flow in Davidson Canyon and depth to water at the Davidson #2 Well. The linear model (red line) explains 71% of the variation in the data. The most recent observations (green dots) are from September and November 2015.

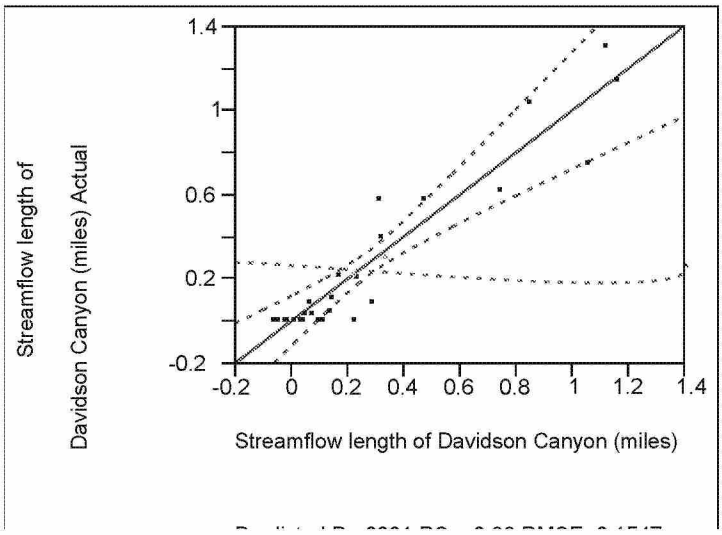

Figure 7. Relationship between length of flow in Davidson Canyon and other variables, from multiple linear regression model. The model (red line) explains 88% of the variation in the data. The most recent observations (green dots) are from September and November 2015.

but the September sampling period and September sampling * year were also statistically significant ($P < 0.01$). Year explained relatively little in the model, but during the period of analysis, presence of surface flow was relatively infrequent during the time period covered by the available data (i.e., 2005 and later). Especially before 2005, visits by Pima Association of Governments staff and others noted perennial water in Davidson Canyon in the winter and spring (Pima Association of Governments 2005), which highlights both the current drought conditions and the historical winter flow in Davidson Canyon.

In summary, our analysis found:

1) Barrel Canyon provides a disproportional amount of surface water within the Davidson Canyon watershed. This is not surprising that most of the high elevations areas of the watershed drain into Barrel Canyon and considering the orographic effect.
2) The shallow groundwater aquifer in Davidson Canyon, in which Davidson #2 Well is embedded, is highly responsive to pulses of surface water flow, whether it be baseflow or stormflow. This relationship was evident from the qualitative observations (Figs. 2-4) and quantitative analyses (Fig. 5). Yet, analysis of the impacts of the proposed Rosemont project on Davidson Canyon and Cienega Creek does not take into account this relationship. Further analysis of winter

precipitation in 2015-2016 using the new dataset at the Davidson #2 Well (intra-day well depths) will provide valuable insight into this important relationship.

3) The new analysis of the relationship between depth to water and length of streamflow in Davidson Canyon, which used three new data points, reaffirms an earlier analysis by Powell et al. (2014) for a strong statistical relationship between these two variables. That is, as groundwater levels rise and fall, so too does the length of flow in Davidson Canyon increase and contract (Fig. 6);
4) Failure to understand the connection between surface water in Davidson Canyon and to account for its loss because of surface water diversions by the Rosemont Mine could lead to irreparable harm to groundwater resources that are critical to the proper hydrological conditions and functions that sustain vegetation and surface water and to the wildlife that depend on these critical resources.

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ATTACHMENT 4

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ATTACHMENT 4:

IMPACTS OF THE ROSEMONT MINE ON HYDROLOGY AND THREATENED AND ENDANGERED SPECIES OF THE CIENEGA CREEK NATURAL PRESERVE. PIMA COUNTY, ARIZONA.
Powell, B., L. Orchard, J. Fonseca, and F. Postillion. 2014.

This report was the first attempt to use an extensive water resources dataset collected at the Cienega Creek Natural Preserve to understand the range of potential impacts that the mine might have on water resources and the threatened and endangered species that rely on this resource. The analysis show a strong statistical relationship between depth to water and baseflow and streamflow in the Outstanding Waters; these data provided strong support for a connection between surface water and groundwater resources in Davidson Canyon and Cienega Creek.

The report also showed that previous modeling efforts by WestLand Resources Inc. (2012) significant underestimated the loss of streamflow length that could result from the mine. The amount and percentage of baseflow that will be lost with a drawdown of the aquifer was estimated for the first time. These shallow aquifers support the aquatic and riparian resources of lower Cienega Creek and Davidson Canyon, thus losses would impact the extent of surface water and habitat for the Gila topminnow and Gila chub and other species. Looking more closely at the resulting fragmentation of aquatic habitat shows as flow extent declines, fragmentation will increase, thereby leading to additional take and threat to listed species that has not been previously considered.

Impacts of the Rosemont Mine on Hydrology and Threatened and Endangered Species of the Cienega Creek Natural Preserve

Brian Powell[1], Lynn Orchard[2], Julia Fonseca[1], and Frank Postillion[2]

July 14, 2014

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[2] Pima County Regional Flood Control District

Suggested Citation

Powell, B., L. Orchard, J. Fonseca, and F. Postillion. 2014. Impacts of the Rosemont Mine on hydrology and threatened and endangered species of the Cienega Creek Natural Preserve. Pima County, Arizona

Cover Photo: End of flow for one section of Cienega Creek at the Cienega Creek Natural Preserve. May 2014.

Introduction

If constructed, the Rosemont mine will reduce streamflow and groundwater inputs into Cienega Creek and Davidson Canyon. The uncertainty and discussions have been about the magnitude of that impact and how much, if any, projected changes will compromise populations of threatened and endangered (T&E) species and their habitats (e.g., Tetra Tech 2010a, b, WestLand Resources Inc. 2011, Pima County 2012, SWCA Enivironmental Consultants 2012, Pima County 2013). This is a critical question; lower Cienega Creek (herein, Cienega Creek unless otherwise noted) in the Cienega Creek Natural Preserve (CCNP) and in Davidson Canyon[1] provide both a critical water supply to the Tucson Basin and are a refugia for aquatic and riparian plants and animals found in few other places in Pima County.

This report provides the most comprehensive evaluation of the extensive water resource data that has been collected at CCNP as it relates to potential impacts from the Rosemont mine. We focus first on developing robust predictive models, apply those models to estimate a range of impacts to baseflow and length of streamflow, question some past analyses and assumptions about the lack of connection between surfacewater and groundwater, highlight key uncertainties that inhibit our ability to understand the full breadth of impacts from the mine, and finally, we combine the water resources data with our best understanding of the distribution of habitat for the aquatic and riparian T&E species that currently occur or recently occurred at the CCNP to estimate loss of habitat as a result of the mine.

A Note About Models and Their Use. Previously, estimated effects of the proposed mine on streamflow—particularly in reaches of perennial or intermittent flow—have been addressed primarily through groundwater modeling (e.g., Montgomery and Associates Inc. 2010, Tetra Tech 2010b, SWCA Enivironmental Consultants 2012). These models have then been used to estimate impacts on species in Cienega Creek and its major tributaries (U. S. Fish and Wildlife Service 2013). The final environmental impact statement (FEIS; U.S. Forest Service 2013) for the Rosemont project states that predicting sub-foot scale drawdowns at great distance and time scales is "beyond the ability of these groundwater models, or any groundwater model, to accurately predict." Nevertheless, sub-foot model results were presented as a basis to determine mine impacts on Outstanding Arizona Waters in Davidson Canyon and Cienega Creek (WestLand Resources Inc. 2011, 2012) and to draw conclusions about effects on T&E species. In this report, we also use subfoot groundwater model results as the best available information, but draw different conclusions than those of WestLand (2011, 2012).

[1] In this report, data collected in Davidson Canyon refer to areas in the CCNP and/or in Pima County's Bar-V Ranch.

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In striving to understand the potential impacts of water loss on these critical riparian areas and the T&E species they support, it is prudent to investigate a range of potential impacts in areas where the existing analysis is inadequate to provide the level of detail needed to understand the Rosemont projects' effects on the downstream environment. Analysis provided in this paper endeavors to aid in "informing the decision" by presenting a range of potential impacts based on empirical data systematically collected from wells and field excursions over several years (e.g., Pima Association of Governments 2009a, 2011). This analysis of well depth vs. baseflow and length of streamflow and other analyses in Cienega Creek and Davidson Canyon acknowledges the limitations of the groundwater models and presents a range of groundwater drawdown effects that are reasonable to consider given the uncertainties of groundwater models and natural variation experienced during the monitoring period at the CCNP.

Methods

Field Methods. To determine the loss of surface water, we first developed models using data from the depth of water in wells and baseflow and total length of streamflow at two sites: (1) Cienega Creek and (2) Davidson Canyon. Much of the data collection methods and location maps are summarized in Powell (2013). For this effort we used data collected as recently as 2014 (Cienega Creek) and 2013 (Davidson Canyon), the most up-to-date information that we could receive from the Pima Association of Governments, which collects the data. June data were used to determine the relationship between depth to groundwater and streamflow length from 2000-2014 for Cienega Creek, but for Davidson Canyon, all data were aggregated to model this relationship, in part because of the smaller sample size (sample collections were started in late 2005 at Davidson). June samples were selected for Cienega Creek for a number of reasons such as length of record and because streamflow length data represents a critical low-flow for the system. Depth to water was measured at the Cienega Well (Cienega Creek) and Davidson #2 Well (Davidson Canyon[2]). Depth to water in wells and mapping of streamflow length were always measured on the same day. We also developed models for the relationship between streamflow volume (cubic feet/second; herein referred to as baseflow), which is measured quarterly at the Marsh Station Bridge (again, see Powell 2013 for the more information) and depth to water at the Cienega Well. We used all quarterly sampling data from June 2001 to June 2014 for this analysis.

Data Analysis

[2] The Davidson #2 Well and streamflow reach are located in "Reach 2", as defined by Tetra Tech.

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Relationship between streamflow, depth to groundwater, and baseflow. We used linear regression to model the relationship between depth to water (in feet) and streamflow length (in miles) and baseflow (ft^3/sec). To model these changes, we interpolated the regression model to predict what changes in the response variables (i.e., baseflow and streamflow length) would result from a lowering of the water table by 0.1, 0.2, and 0.25 feet. This represents a look at the potential impacts to baseflow and streamflow length if the modeled results in Montgomery and Associates Inc. (2010) and Tetra Tech (2010b) occur as predicted (0-0.1 feet drawdown at Cienega Well, 0.10-0.98 feet at Davidson Well[3] for streamflow length). At Cienega Creek we looked at scenarios where drawdown will be slightly greater than predicted by the models to describe potential impacts if model results are not accurate (e.g., 0.2 - 0.25 feet drawdown at Cienega Well). For baseflow estimates we calculated total annual acre feet of baseflow lost, as well as seasonal estimates. Because baseflow was measured four times per year, we assumed these flow estimates represented seasonal averages. We used the annual and seasonal average baseflow to estimate the percentage of baseflow that would be reduced from groundwater drawdown. We log-transformed flow volume data to fit assumptions of the normal distribution for the regression analysis.

Fragmentation of Flow. One of the concerns about the loss of streamflow length is that the stream may also become more fragmented, which might isolate populations of fish, in particular. Fish caught in small, fragmented reaches would be more susceptible to extirpation due to a variety of factors, including predation and of course, loss of habitat. To model this for Cienega Creek, we first calculated the number and length of individual stream reaches (derived from individual start and stop points collected in the field). We then calculate intra-annual summaries, including the coefficient of variation in stream length[4] and total number of flow length segments over time. Finally, we used the results of the modeled changes in streamflow length as a function of depth to water in wells to understand how this might further fragment the system. Based on the modeled results for a drawdown of 0.25 feet, we calculated the number of streamflow lengths measured from 2001-2012 (the most complete set of information for which four seasonal measurements are each year) that were equal to or less than the predicted loss in streamflow length (1,085 feet), which we call the *threshold length*.

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[3] Davidson Well #2 is located approximately 1.8 miles north of the Montgomery and Associates 5-foot drawdown contour (in Montgomery and Associates Inc. 2010). That modeling effort showed a 0.31 foot drawdown at 150 years in Reach 2, and 0.98 feet at 1,000 years.

[4] Coefficient of variation (CV) is the standard deviation divided by the mean. For this study, CV provides a good method of comparison among years, because the mean flow length has changed considerably over time. Therefore, comparing standard deviations is not as informative.

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We then developed a multiple regression model to determine the relationship between the number of flow segments that met or exceeded this threshold and other factors thought to influence flow segments including length of flow, year, month, and month*year interaction[5].

Testing accuracy of groundwater-surface water relationship. We used 2008 and 2011 LiDAR to evaluate the accuracy of the groundwater-surface water relationship at the Davidson Well #2 and compared these data to figures and language in Tetra Tech (2010a) to determine if the Tetra Tech analysis was correct. A review of the LiDAR data collection can be found in Swetnam and Powell (2010).

Results and Discussion

Cienega Creek: Baseflow. From 2001-2014 average annual baseflow was 0.73 ft^3/sec but this varied considerably by month: March = 1.12 ft^3/sec, June = 0.32 ft^3/sec, September = 0.91 ft^3/sec, and December = 0.65 ft^3/sec. Baseflow declined as depth to groundwater increased, as explained by a linear function ($F_{1,56}$= 157.2, $P < 0.001$, $R^2 = 0.74$) (Figure 1). All four sampling

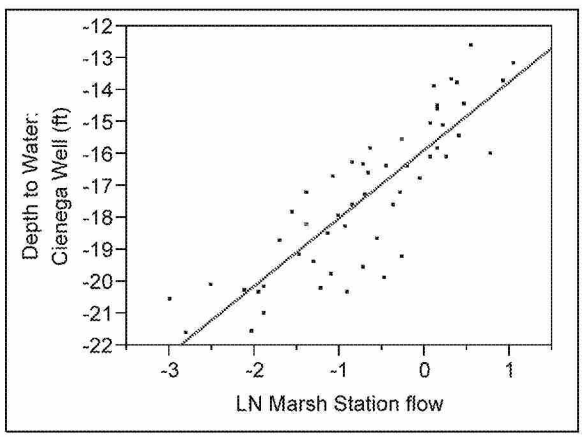

Figure 1. Relationship between flow (log [LN] of cubic feet/second) and depth to water at the Cienega Well. The linear model (red line) explains 74% of the variation in the data. Model used all data from June 2001-June 20014.

[5] In regression analysis (and for this situation), *interaction* occurs when a relation between two variables is modified by another variable. In other words, the strength or the sign (i.e., direction) of a relation between two variables is different depending on the value of some other variable.

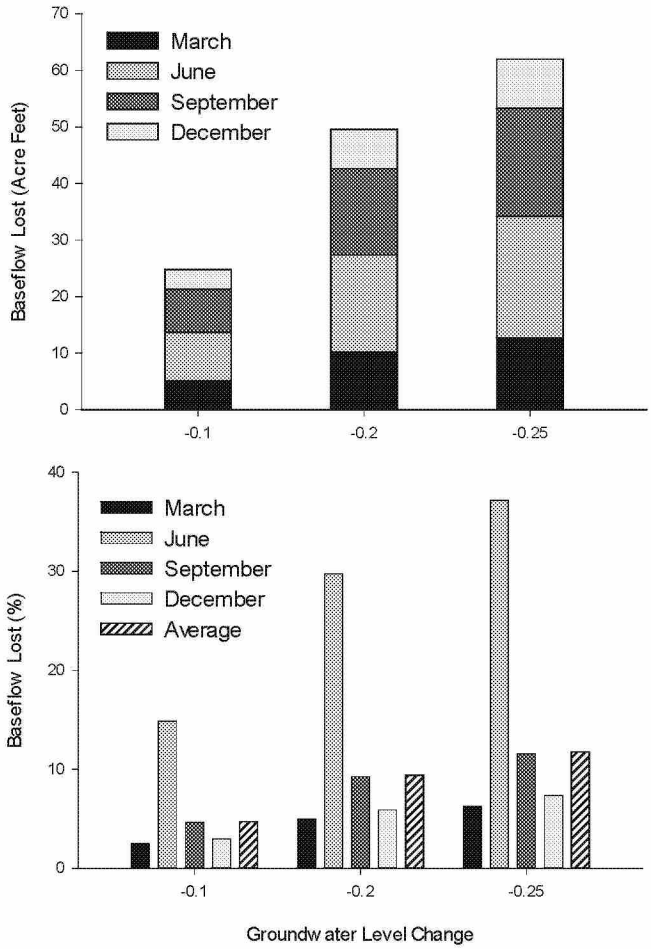

Figure 2. Modeled loss of streamflow volume (acre feet [top] and percent [bottom]) as a function of changes in groundwater level, by season. While total flow loss for the June period is similar to that of September, for example (top graph), this greater percentage of baseflow lost results from the lower baseflow volume during June.

periods (March, June, September, and December) showed a similar relationship ($P<0.004$), with the strength of the model fit (as expressed by R^2) ranging from 0.54 for December to 0.81 for March. Using the regression equations, we were able to calculate that with a 0.1 feet decline in groundwater elevation would lead to an average annual loss of 25 acre feet of water (Figure 2). Annual losses increase to 63 acre feet with 0.25 feet reduction in groundwater level at the Cienega Well.

Perhaps more important than total volume of water lost is the percentage of baseflow predicted to be lost. Average annual estimates of baseflow reduction range from 4.7% with a 0.1 feet reduction of groundwater level to 11.8% reduction with a 0.25 feet reduction (Figure 2)

As reported earlier, baseflow varied among months and this made inter-month percent loss in baseflow quite different than total loss. June is especially important to notice; it showed an estimated 14.9% loss of baseflow at Marsh Station with a 0.1 feet decline in the aquifer to as high as 37% with a 0.25 feet decline in the aquifer (Figure 2).

Cienega Creek: Streamflow length. Streamflow length and depth to water was explained by a linear function ($F_{1,12}$= 67.2, $P < 0.001$, $R^2 = 0.84$)[6] (Figure 3). Using this model, we would expect that a groundwater drawdown of 0.1 foot would result in a loss of 434 linear feet of Cienega Creek (Table 1). Because of uncertainty about the models and the high value of Cienega Creek, we also modeled drawdown of 0.25 feet, which results in a reduction of streamflow length of 1,085 feet. The mean extent of streamflow within the CCNP from 2000-2013 has been approximately 12,500 feet. A reduction of 434 feet would reduce surface water extent by 3.4% and 1,085 feet would be equal to approximately 8.6% reduction is flow extent.

It is important to note that the Cienega Well was used in the report by Westland (2012; page 5), but they claim that their model of depth to water and quarterly flow length showed an unusual statistical distribution and therefore use of that well was discounted in favor of data from the Jungle well. The June length of flow data in relation to the Cienega Well do not show this issue (Figure 4) and the Cienega Well is certainly useful for estimating loss of streamflow length.

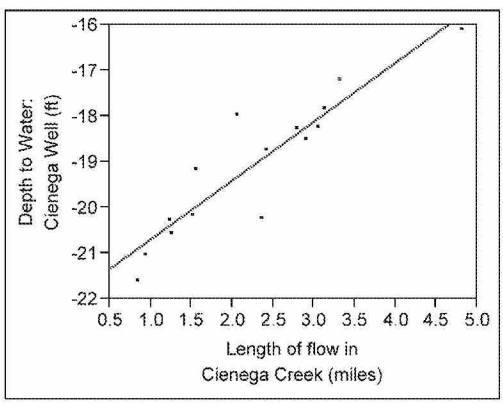

Figure 3. Relationship between length of flow of Cienega Creek at the Cienega Creek Natural Preserve and depth to water at the Cienega Well. The linear model (red line) explains 84% of the variation in the data.

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[6] It is important to note that we also modeled the relationship using a 2nd and 3rd order polynomial, which improved results somewhat, particularly for the 3rd order polynomial (R^2 = 0.87). However, for simplicity, we use the following formula to model the impact in groundwater drawdown on Cienega Creek within the CCNP: Length of flow (miles) = 14.662 + 0.650*depth of water at the Cienega Well (feet).

Table 1. Modeled reduction in streamflow length of Cienega Creek at the Cienega Creek Natural Preserve. Percent reduction is based on the mean June streamflow length of 2.38 miles (12,566 feet).

Draw-down (feet)	Arbitrary starting well depth (feet)	Streamflow length		Feet lost due to draw-down	Percent reduction in streamflow length
		Miles	Feet		
0	-18	3.10	16,347	0	0.0
-0.1	-18.1	3.01	15,913	-434	-3.4
-0.2	-18.2	2.93	15,479	-868	-6.9
-0.25	-18.25	2.90	15,262	-1085	-8.6

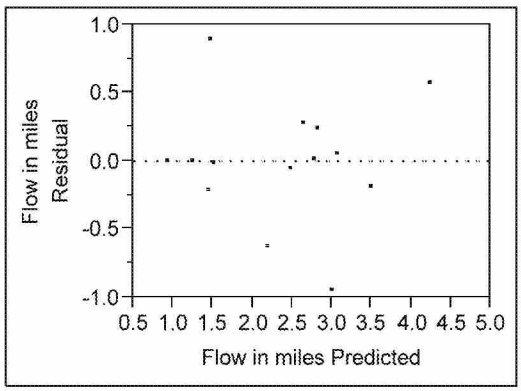

Figure 4. The dispersion of residuals from the model of streamflow length in Cienega Creek to depth to water in Cienega Well (June; Figure 1) shows that a linear model for this relationship is a valid statistical approach. Westland (2012), using data from all intra-annual streamflow lengths measurements, argued that this was not a statistically valid relationship. (Myers [2014] had similar issues with data from Empire Gulch). However, by using June data only, a linear model is appropriate.

It is critical to note that the results between the modeling results by Westland (2012) and those reported here are significantly different. Using data from the Jungle Well, Westland (2012) found that with a 0.1 foot decline in depth to water there would be 176 foot reduction in flow length; just 41% of our results. They also did not model a scenario that may result from a mine impact that is greater than other projections but may be within the realm of possibility (i.e., a 0.25 foot reduction in depth to water).

Davidson Canyon: Groundwater and Baseflow Extent. Streamflow length and depth to water was explained by a linear function ($F_{1,26}$= 89.9, $P < 0.001$, $R^2 = 0.78$) (Figure 5), which we used to model the impact in groundwater drawdown on Davidson Canyon: Length of flow (miles) = 2.180 + 0.085*depth of water at the Davidson #2 Well (feet) (Figure 5).

Using this model, we would expect that a groundwater drawdown of 0.1 foot would result in a loss of 45 linear feet of Davidson Canyon and a drawdown of 0.25 feet resulted in a reduction of

streamflow length of streamflow of over 112 feet (Table 2). Percent reductions are very similar to that of Cienega Creek and ranged from 3.0% to 7.6%. Using the 150 and 1,000 year estimates of impacts on groundwater (0.31 feet and 0.98 feet, respectively; Montgomery and Associates, 2010) would result in 9.4% and 30% loss of surface flow in Davidson Canyon, respectively. For comparison, the groundwater model by Montgomery and Associates (2010) equates the 0.98 feet of drawdown with a 0.29 miles (1,530 feet) reduction in stream length based on the drying of several of the 800 x 800 foot model grid cells where leakage to the aquifer exceeds streamflow into the reach.

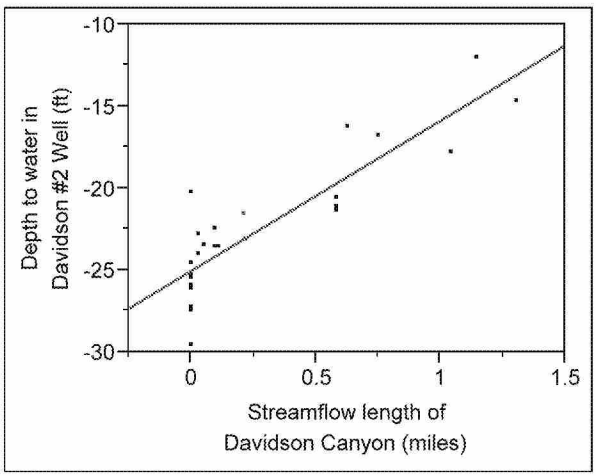

Figure 5. Relationship between length of flow of Davidson Canyon at the Cienega Creek Natural Preserve and depth to water at the Davidson #2 Well. The linear model (red line) explains 77% of the variation in the data. This model does not take into consideration changes in surface water runoff from the mine site.

Table 2. Modeled reduction in streamflow length for Davidson Canyon. Percent reduction is based on the mean June streamflow length of 0.28 miles (1,478 feet).

Draw-down	Arbitrary starting well depth in feet	Streamflow length		Feet of streamflow lost due to draw-down	Percent reduction in streamflow length
		Miles	Feet		
0	-20	0.4885	2,579	0	0.0
-0.1	-20.1	0.4800	2,534	-45	-3.0
-0.2	-20.2	0.4716	2,490	-89	-6.0
-0.25	-20.25	0.4673	2,467	-112	-7.6
-0.31	-20.31	0.4622	2,441	-138	-9.4
-0.98	-20.98	0.4071	2,141	-438	-30.0

Unlike in Cienega Creek, the groundwater model results used here to calculate drawdown are taken from locations within or very near the 5-foot drawdown contour and are assumed to be more reasonably certain than model results for Lower Cienega Creek. Accordingly, the stream length losses associated with nearly a foot of drawdown must be taken into consideration when evaluating the Rosemont mine's impact on lower Davidson Canyon. The stream length losses (0.29 miles; 1,530 feet) predicted by Montgomery and Associates (2010) are larger than those predicted in this study using the well depth to stream length regression analysis (Table 2). Taken together however, they provide a range of possible outcomes resulting from increased depths to groundwater due to the Rosemont mine.

Tetra Tech (2010a) suggests that this reach of Davidson Canyon is not connected to the regional groundwater system, and that streamflow impacts due to drawdown of the regional aquifer therefore are unlikely to occur. Yet the results of our analysis (Figure 5) provide very convincing evidence that contradicts this position.

We also take issue with Tetra Tech (2010a) data. Underpinning Tetra Tech's assertion is an illustration and a channel bed measurement at the Davidson Canyon stream gage (Figure 6). The accuracy of this figure relies on a "mid-channel bed" measurement taken by Tetra Tech (2010a). We examined Pima County LiDAR-generated elevation data at the same location and found that Tetra Tech's "mid-channel" bed elevation is five feet higher than the channel bed in 2008. We then examined 2011 LiDAR bed-elevations at the same location, which rule out the possibility that five feet of aggradation occurred, as would be required by Tetra Tech channel bed measurement. Instead, the actual bed elevations in 2008 and 2011 vary by less than 0.6 feet (Figure 7). Thus, the actual channel-bed is within a foot or two of the water table as measured in Davidson #2 Well.

The water-level measurements presented by Tetra Tech came from the Outstanding Waters nomination submitted by Pima Association of Governments (2005), which identified this reach as intermittent. Tetra Tech (2010a) uses the same data to infer than this portion of the channel is ephemeral. It is unreasonable to assume that groundwater never could discharge to the surface, or that it has been persistently below the bed between 1994 and 2004, as is indicated by Tetra Tech with the horizontal line connecting the last two groundwater measurements (Figure 6). It is even more unreasonable to extend that inference to the entire upstream reach, as is done by Tetra Tech (2010a).

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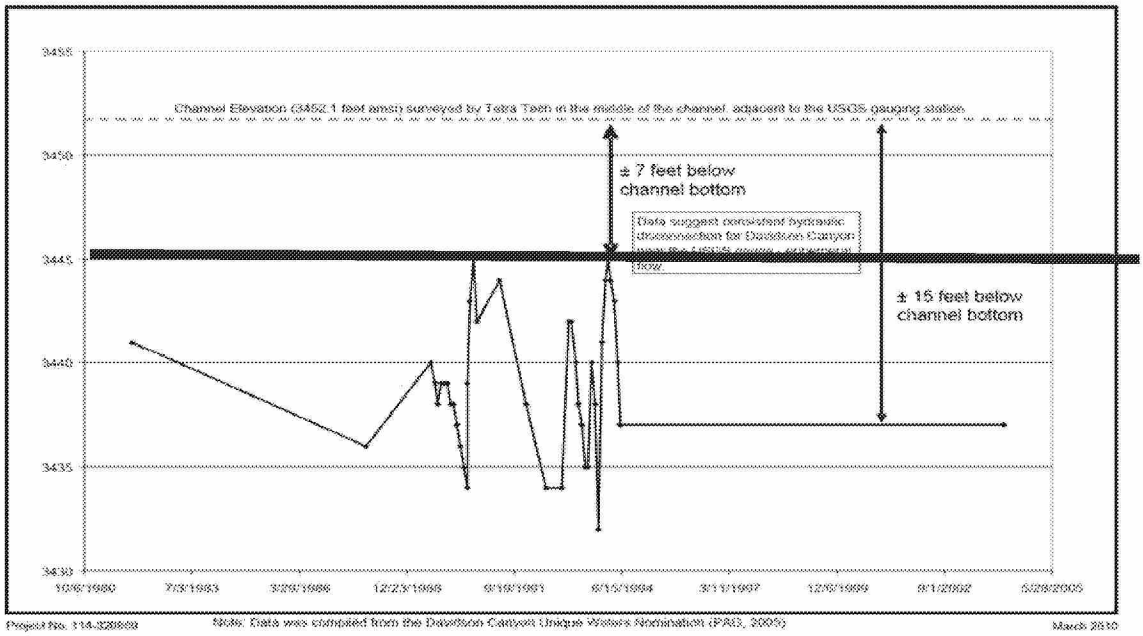

Figure 6. Tetra Tech's (2010a) Figure 5, amended to show actual channel bed elevation at the location. Red line shows position of the 2008 and 2011 channel bed based on LiDAR data.

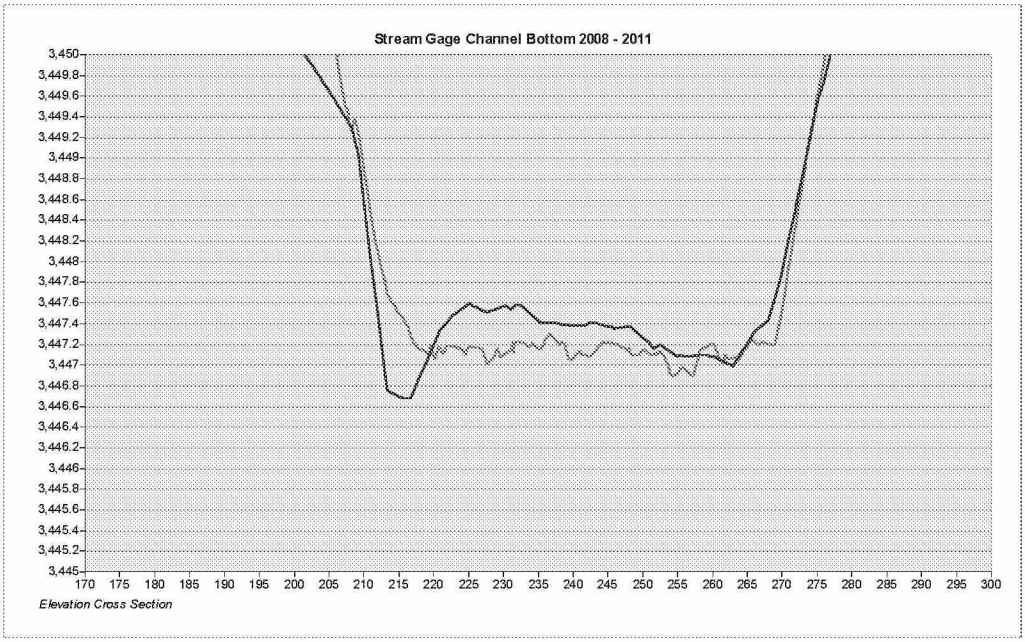

Figure 7. LiDAR channel cross-sections, 2008 in red, 2011 in green. Bed elevation varies by less than 0.6 feet.

Additionally, the work of Montgomery and Associates (2010) supports a connection to the regional aquifer in lower Davidson Canyon. The pre-mining steady state model simulated the interaction between the regional aquifer and the stream. The model produced results for both discharge and streamflow length that approximately matches past observations of flows and the extent of the Davidson perennial reach. If the regional aquifer was disconnected from the perennial reach, or so far below it that it does not impact surface flows, then one would expect that to be reflected in the model simulation showing a dry reach. It does not. Further evidence supporting a connection to the regional aquifer comes from interpretation of isotopic data by Dr. Chris Eastoe (Letter from County Administrator's Office to Robert Scalamera, Project Manager, Arizona Department of Environmental Quality (ADEQ); letter dated April 4, 2014).

These various lines of evidence, combined with errors and omissions by Tetra Tech, undermines Tetra Tech's argument that the intermittent baseflows in Davidson are unrelated to the regional aquifer. Combined, these analyses suggest that the impacts of Rosemont mine on Davidson Canyon and the Outstanding Arizona Waters have been understated in both the final environmental impact statement (U.S. Forest Service 2013), the draft water quality certification by ADEQ (Arizona Department of Environmental Quality 2014), and the biological opinion (U. S. Fish and Wildlife Service 2013). Based on this new information, the impact to the Davidson Canyon Outstanding Arizona Waters reach by the Rosemont project should be revaluated regarding the potential take of endangered species and the impact to riparian and water resources.

Davidson Canyon: Effect on Runoff. Key to understanding the mine's full impact on water resources requires a better understanding of the surface water runoff changes in the Barrel and Davidson canyons. Pima County has repeatedly objected to the methodology and the findings from Rosemont and their consultants as well as data that have been incorporated into the final environmental impact statement and biological opinion including that:

- Potential runoff reduction impacts on downstream riparian and water resources for all phases of the mine life are not fully disclosed.
- Cumulative runoff reduction impacts on downstream riparian and water resources, Davidson Canyon and Cienega Creek, are not fully disclosed.
- Deficiencies in the analysis of downstream water volume effects on Davidson Canyon, Cienega Creek and Outstanding Arizona Waters have resulted in the underestimation of reduction in surface water flows in FEIS.
- The hydrological analysis supporting the surface water evaluation is inadequate, as the modeling should have considered shorter duration, high-intensity rainfall events' and the FEIS misrepresents the methods followed as those prescribed by Pima County.
- Rosemont Copper still intends to capture and retain surface water from watersheds northeast of the tailings, west of the mine pit, and south of the waste rock disposal

area. Instead, this water should be released downstream to mitigate reductions in stream flows and impacts to riparian vegetation.

To inform the decision regarding the impact to riparian resources and potential take of endangered species, these runoff-related objections need to be addressed. In addition to the above mentioned objections, the Biological Opinion cites work by SWCA (2012) that has not been made available for Pima County's review, either as a Cooperator or as a participant in the Hydrology Work Group recently convened by the Federal agencies. The SWCA work apparently extrapolates runoff volume reductions in Barrel Canyon and Davidson Canyon above the Highway 83 bridge to the Outstanding Arizona Water reach downstream.

Acceptable methods for determining flood routing are described in Pima County Regional Flood Control District Technical Policy 18. In this document, the methods entitled *"Acceptable Model Parameterization for Determining Peak Discharges"* should be employed to determine the reduction in streamflow in Lower Davidson Canyon and Cienega Creek as a result of changes in the upper watershed due to the Rosemont project. Myers (2014) provides an additional critique of Westland's (2012) methodology to evaluate impacts of surface water impoundments on Davidson Canyon and highlights that the methods used are deficient to provide an understanding of the impacts.

Rosemont and their consultants have reported that reductions in the volume of channel infiltration in the headwaters, reductions in total annual runoff volume, and reductions in peak flood magnitude all will have minimal effects on the OAW reach (WestLand Resources Inc. 2011, Zeller 2011, SWCA Enivironmental Consultants 2012). Combined with previously discussed Tetra Tech (2012a, 2012b) interpretations, these arguments would suggest that:

- When groundwater is considered, surface water is the most important factor in supporting lower Davidson Canyon.
- When mine impacts that effect surface water are considered, lower Davidson is too distant from the headwaters to be impacted.
- When shallow groundwater and channel subflow from precipitation recharge in the headwaters are considered, the OAW reach is not connected to the upper watershed due to bedrock constrictions in the shallow aquifer.

These arguments, when summed up, suggest that the OAW reach of Davidson Canyon is isolated from its watershed entirely and apparently without a water source. In short, these studies reveal a disturbing pattern of minimizing impacts from the Rosemont mine on all aspects of the hydrologic cycle.

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Fragmentation of Flow in Cienega Creek. As has been reported elsewhere (WestLand Resources Inc. 2012, Powell 2013), streamflow length of Cienega Creek has declined precipitously since the 1980's and 1990's (Figure 8). In part because of this decline, streamflow length became highly variable as the streamflow responded to a shallow aquifer that was declining because drought and groundwater pumping. Looking more closely at the streamflow length data, not only was the streamflow length declining, but the streamflow segments were becoming more fragmented. This variability can be seen a number of ways, including the coefficient of variation (Figure 9) and number of segments per year (Figure 10).

From June 2001 to September 2012, there were a total of 341 recorded stream segments, 161 of which (47%) were at or below the threshold length established for this analysis (i.e., 1,085 feet). The number of stream segments below the threshold length was most influenced by length of flow in Cienega Creek (multiple regression, $F_{4,40} = 5.4$, $P = 0.0015$, $R^2 = 0.35$; Table 3) and not by any other factor (Table 3).

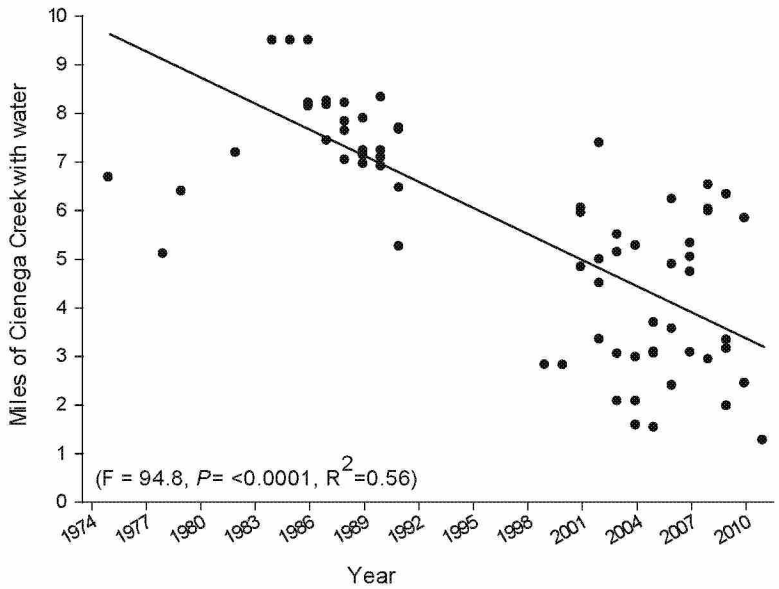

Figure 8. Extent of stream flow at Cienega Creek Natural Preserve (from Powell 2013) has both declined (solid line shows linear regression model) and shown more intra-annual variability. Maximum flow extent is 9.5 miles.

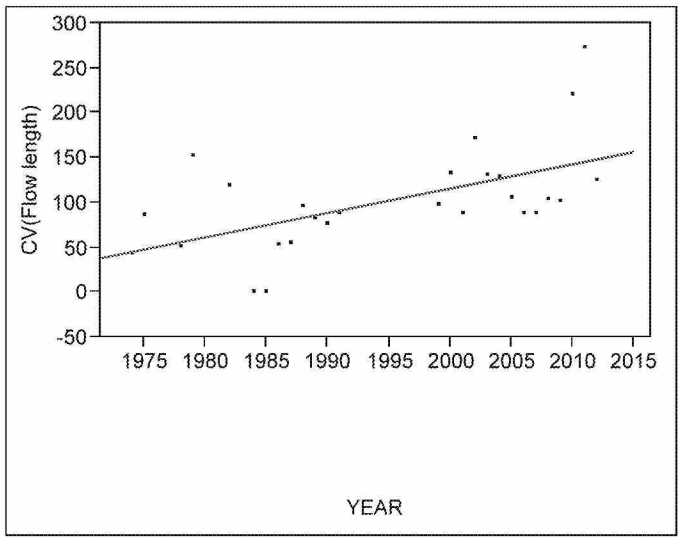

Figure 9. An increase in the coefficient of variation of streamflow length demonstrates that streamflow length is becoming increasingly variable over time. Increased variability can lead to instability of the system.

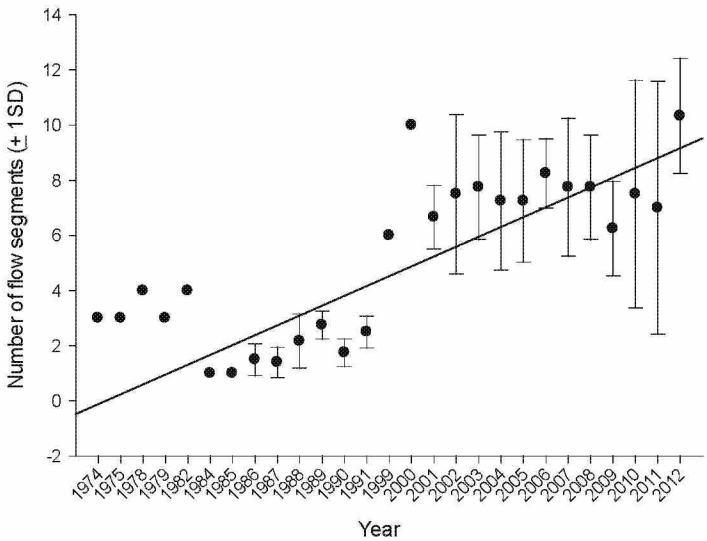

Figure 10. The number of streamflow segments has increased over time. As with flow length, increased variability can lead to isolation and loss of organisms that rely on open water, including Gila chub, Gila topminnow, and Huachuca water umbel. Analysis of variance test (solid line) shows this relationship to be significant ($F_{1,25}$= 11.8, P = 0.002, R^2 = 0.32).

Table 3. Results of multiple regression analysis on the relationship between number of flow segments that met the threshold (≤1,085 feet) and other variables thought to influence the number of segments.

Effect	Estimate	F	P
Length of flow in Cienega Creek	51.1	19.5	<0.0001
Year	0.2	0.1	0.804
Month	6.0	1.6	0.217
Year*Month interaction	0.3	0.1	0.781

Discussion: Impacts on Species

Habitats of aquatic and mesic-riparian species in Cienega Creek and Davidson Canyon are decreasing in size and quality as the result of the reduction in the amount of available groundwater and surfacewater. This section highlights the likely impact on individual species, but looking broadly at the impacts of loss, fragmentation, and isolation that could result from threats to shallow groundwater and stormwater is instructive.

Cienega Creek is currently under stress. Water, the lifeblood of the system, is declining by every measure. There is a large and growing body of literature on the causes and consequences of ecosystems under stress (e.g., Odum 1985, Rapport et al. 1998, Rapport and Whitford 1999, Scheffer et al. 2001, Folke et al. 2004) and key among these findings is that as threats increase, habitat extent and quality declines, variability increases, and a system is more susceptible to threats that would not otherwise have impacted the system, such as loss of native species, increase in invasive species, etc. In essence, the system becomes less resilient.

Of course, the current state of Cienega Creek has nothing to do with the Rosemont mine. Yet it should be clear from the data presented here that any future impacts to the surface and groundwater resources of the system could have a far greater impact than indicated by either Rosemont or the permitting agencies. Another way to look at the impacts of the Rosemont mine is to say that if it was already built and impacting groundwater during the current drought, then Cienega Creek could lose as much as 37% of the baseflow during the critical pre-monsoon season, potentially leading to severe population declines of T&E species.

Gila topminnow. The habitat of Gila topminnow can be a broad range of water types such as pools and riffles and seem to prefer stream margins. Preferred habitats contain dense mats of algae and debris, usually along stream margins or below riffles, with sandy substrates sometimes covered with organic mud and debris. The largest natural populations of Gila topminnow occur in Cienega Creek (Bodner et al. 2007). Gila topminnow have recently been

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monitored at the CCNP (Marsh et al. 2009, 2010)[7] and in some areas are found in stream reaches that often classify as intermittent based on PAG wet-dry data, as well as perennial reaches. The aquatic habitats in the CCNP are a patchwork of disconnected habitat patches that are only connected during high-volume stormflows.

The modeled decline of habitat highlighted in this report, which includes reduction in the amount of baseflow and surface water extent (Figures 1-3, Table 1) and increase fragmentation (Table 3) will impact this species, especially during this critical June period. For the topminnow, which can live in very shallow water, further fragmentation and loss of key refugia could have significant impacts. This is acknowledged by the U.S. Fish and Wildlife Service in the Biological Opinion (U. S. Fish and Wildlife Service 2013; page 287), but their analysis is qualitative in nature. The results presented here can help a more robust analysis.

Gila Chub. Gila chub have an affinity for deeper pools (as compared to Gila topminnow) in slow velocity water and are often associated with cover such as undercut banks, root wads, and instream debris piles. At the CCNP, their distribution is largely restricted to three pools, one of which is found in an intermittent reach (Figure 11). The drawdown of the aquifer that supports critical base flows for this species will likely reduce the size and volume of the pools in which the Gila chub live.

The data in this report (e.g., Figures 1-3, Table 1) should cause a reevaluation of the impacts of groundwater decline for this species. For the Gila chub, the U.S. Fish and Wildlife Service (2013, page 267) use the analysis by Westland Resources Inc. (2012) as a basis for determination of impact. As we have noted, that report underestimated impacts to stream reaches. Our report points to a need to recognize that if drawdowns eliminate the shorter, persistent reaches, then recolonization of intermittent aquatic habitats when joined by flooding will depend on fewer, more widely spaced perennial refugia. Also, as drawdown occurs, occupied Gila chub pools will reduce in surface water depth, thereby leading to a possibility of increased water temperatures. This could be a problem for this species (and not for Gila topminnow) because of their lower tolerance of high water temperatures (Carveth et al. 2006).

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[7] These studies have noted numbers of Gila chub caught at the CCNP but the survey methods were not designed to estimate populations or even catch-per-unit effort. The Biological Opinion (U. S. Fish and Wildlife Service 2013) does not take this into account (page 254; though it states later [page 273] that the methods were not meant to enumerate trends). Though restricted to a few pools at CCNP, there are many more individuals than are reported by these monitoring efforts.

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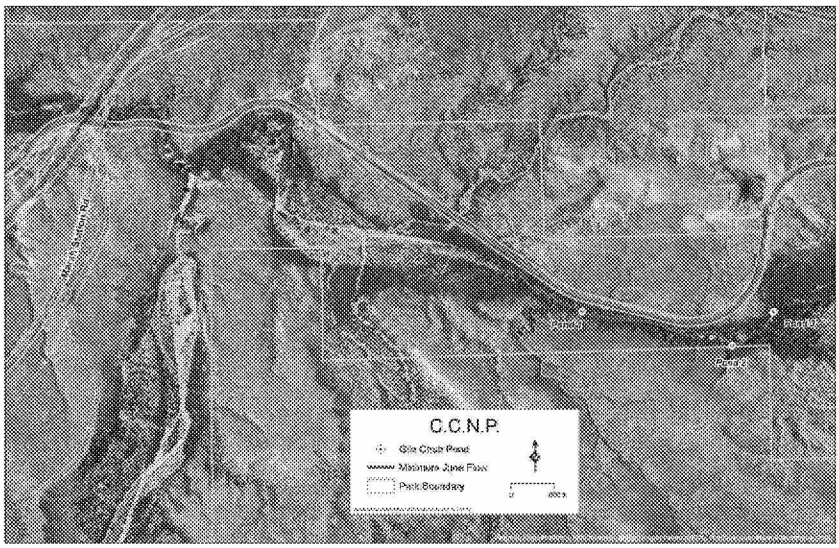

Figure 11. Location of pools with Chub in relation to areas that have a minimum June flow. Pool 3 is located in an intermittent stretch of the Creek, but that pool is very dynamic, as are the presence of chub. Pool 1 and Pool 2 contain chub more consistently. Figure by Mike List (Pima County IT).

Figure 12. This adult northern Mexican gartersnake was found feeding on lowland leopard frog tadpoles at the Cienega Creek Natural Preserve on June 13, 2014. Predicted surface water declines because of the mine would impact the extent of habitat and the species' primary food sources: fish and tadpoles. Photograph by Julia Fonseca.

Northern Mexican Gartersnake. This species is highly aquatic and only ventures a short distance away from water for hibernation and occasionally for foraging (U.S. Fish and Wildlife Service 2014). Its diet primarily consists of small fish and frogs, which are found on the CCNP. Though observations of this species at the Preserve are very rare, they have been found there (Rosen and Schwalbe 1988, Rosen and Caldwell 2004), including as recently as June 13, 2014 when one adult was confirmed (Figure 12). An additional juvenile may also have been found, but no positive identification was made. The historical decline in the amount and extent of

surface water (Figure 8) and the modeled decline in these resources as a result of the mine (Figures, 1-3, Tables 1, 2) will impact the extent of habitat and the aquatic prey base upon which these species depend. The northern Mexican gartersnake was not a part of the consultation for the biological opinion for the mine (U. S. Fish and Wildlife Service 2013), but will be part of the reinitiated consultation process (letter from USFWS Field Supervisor Steve Spangle to Forest Service Supervisor Jim Upchurch, dated May 16, 2014). The presence of the species and the modeled impacts should be considered as part of those deliberations.

Yellow-billed cuckoo. The yellow-billed cuckoo prefers large willow and cottonwood trees for nesting and foraging. The status of the population at the Cienega Creek NP is not entirely certain, but a single-pass survey by Powell (*unpublished data*) in 2013 revealed at least 11 individuals. Based on the work by Corman and Magill (2000), we know that the yellow-billed cuckoos populations at the CCNP and on the Las Cienegas NCA are some of the largest among small creeks in Arizona. Unfortunately, the slow desiccation of some areas of the CCNP in the last years has significantly impacted the gallery riparian forest on which the cuckoo depends for nesting, even as other forest patches continue to gain canopy volume and height (Figure 12, Swetnam et al 2013).

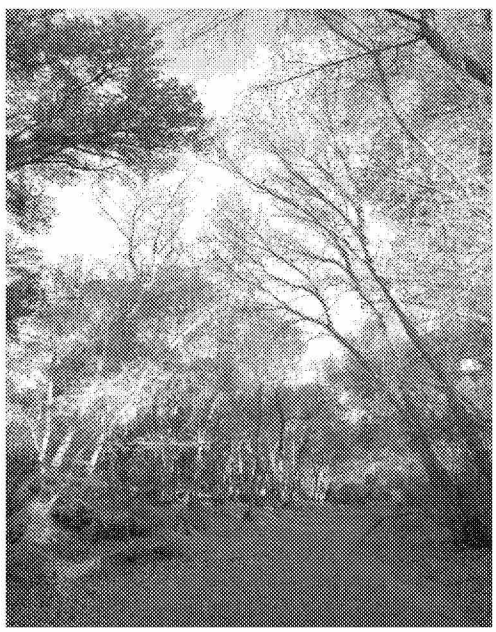

Figure 12. Photo from Cienega Creek NP showing impacts of the current drought on the thinning canopy of cottonwood trees, the primary tree used for nesting and foraging by the yellow-billed cuckoo. Loss of groundwater from the Rosemont mine will exacerbate this problem. Photo taken on May 30, 2014 very close to where yellow-billed cuckoos were detected in 2013. Cuckoos would be unlikely to nest in an area with such an open canopy.

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There has been a considerable amount of research on cottonwood and willow trees as it relates to depth to water and tree species composition in the desert southwest (e.g., Stromberg et al. 1996, Horton et al. 2001, Harner and Stanford 2003, Stromberg et al. 2007, Hidalgo et al. 2009, Merritt and Poff 2010). The work by Lite and Stromberg (2005) and Leenhouts et al. (2006) is particularly relevant to the situation at CCNP. Studying the threshold between groundwater depth and flow permanence on the presence and vigor of cottonwood trees, Lite and Stromberg (2005) found that flow permanence was the single greatest hydrologic predictor for the presence of cottonwood trees. Flow permanence of 76% was viewed as important, as was depth to water of approximately 3m, a result that that has been found by other studies (Horton et al. 2001). Lite and Stromberg (2005) believe that flow permanence is probably a surrogate for other (not studied) hydrological characteristics, but it provide a good starting place for thinking about how changes in groundwater drawdowns will impact the habitat of yellow-billed cuckoos. Flow permanence is a particularly helpful measure because it is easily observed, as opposed to depth to water, which can be measured at various wells but varies spatially. Pima County is currently pursuing an analysis of surface water extent and vegetation change over time. We hope to have results in the coming weeks.

Huachuca water umbel. The Huachuca water umbel requires permanent water and grows on the margins of streams. First detected in 2001 within patches of cattail and bulrush (Engineering and Environmental Consultants Inc. 2001), the umbel appeared to have colonized a location in the CCNP from larger populations upstream. The cattail-bulrush wetland in which umbel colonized was considered a perennial reach in 2000-2001, but subsequently desiccated because of the headcut, which was studied intensively by the Pima Association of Governments (PAG; 2009b). The PAG study included piezometers which documented the loss of near-surface waters and dewatering of sediment during pre-monsoonal droughts that precede headcutting during subsequent floods. The dewatering of sediment during pre-monsoonal months likely rendered umbel habitat unsuitable, even if no headcutting occurred.

The umbel has not been seen in the CCNP for a number of years, in spite of casual searches during quarterly walk-throughs, and a dedicated search during 2013. Colonization events may be infrequent, and with reductions in areas of permanent water from the impacts of the Rosemont mine, there will be less available habitat for natural establishment and persistence.

Conclusions

To our knowledge, this is the first attempt to use water resource data collected at the CCNP and Davidson Canyon to better understand the range of potential impacts that the mine might have on water resources and the T&E species that rely on this resource. Our analysis show:

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- The statistical relationship between depth to water and baseflow and streamflow extent is outstanding for the paired relationships of Cienega Creek and Cienega Well (Figure 1) and Davidson Canyon and Davidson Canyon #2 well (Figure 3);

- These data, along with a critique of Rosemont-sponsored data collection efforts that relied on faulty data and assumptions, provide the strongest support to date for the connection between surface water and groundwater resources in Davidson Canyon and Cienega Creek.

- Using models that express this relationship, we show that previous modeling efforts (WestLand Resources Inc. 2012) significant underestimated the loss of streamflow length that could result from the mine. We also estimate, for the first time, the amount and percentage of baseflow that will be lost with a drawdown of the aquifer the supports the aquatic and riparian resources of lower Cienega Creek and Davidson Canyon.

- Groundwater drawdowns of the magnitude predicted and within possibility show that there will be significant and measurable impacts on the extent of surface water and habitat for the Gila topminnow and Gila chub (Table 1) and other species (Tables 1 and 2). This is particularly critical during June when the creek is at its lowest baseflow and extent;

- Fragmentation of aquatic habitat shows and inverse relationship to flow extent (Table 3); that is, as extent declines, fragmentation will increase. This will lead to additional take and threat to T&E species that has not been previously considered;

- There is still considerable uncertainty about the impacts of surface water diversions into Cienega Creek and Davidson Canyon. Developing a better understanding of these impacts will allow a more refined accounting of impact on the aquatic system of Cienega Creek and Davidson Canyon and the species that call these places home.

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ATTACHMENT 5

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ATTACHMENT 5:

SOURCES OF RECHARGE TO GROUNDWATER IN DAVIDSON CANYON, SOUTHEAST ARIZONA—An Isotopic Tracer Study by Rachel Tucci and Jennifer McIntosh, 2015.

Isotopic values for local rainfall differ from Tucson- Researchers at University of Arizona (UA) have analyzed isotopic values for summer and winter precipitation data from the Rosemont Project area. The average summer precipitation values from the Rosemont area, collected in the last few years, differ from the long-term average of Tucson precipitation, whereas average $\delta^{18}O$‰ values for winter precipitation are similar. Also, unlike the long-term record for the Tucson Basin and Santa Catalina Mountains, there is no discernible pattern in $\delta^{18}O$‰ values of precipitation with elevation in the local precipitation data so far collected by Rosemont or UA researchers.

Isotopic values for discharge in Outstanding Arizona Waters (OAW) reach are consistent with a mixture of winter and summer recharge- Based on all available rainfall isotopic data including those collected by Rosemont as well as Pima County, groundwater and surface water discharges in the Davidson watershed appear to be a mixture of winter and summer recharge. The recent UA data includes a new 9/30/14 value of -9.9‰ $\delta^{18}O$ and -72.0‰ δD for streamflow in the OAW at 31.985306 degrees latitude and -110.647 degrees longitude at elevation 3519 feet (data from UA Environmental Isotope Laboratory), consistent with winter precipitation average values (-10.3‰ $\delta^{18}O$). The values for monsoonal streamflow are at odds with TetraTech's interpretation that Davidson Canyon base flows in the Outstanding Arizona Waters (OAW) are the product of local runoff events only.

Upper Davidson Canyon baseflow is a mix of young and old water- Researchers at University of Arizona have analyzed for tritium in the base flow of Davidson Canyon on March 26, 2016 at location 31.86569, -110.68597, elevation 4291 feet (data from UA Environmental Isotope Laboratory). Tritium values were detectable but lower than ambient rainfall values, suggesting a mix of old and young water. The tritium value would be consistent with an interpretation that recent recharge is a source of water contributing to base flow, along with older groundwaters which support intermittent baseflows. This location is just downstream of the Barrel Canyon stream gage.

Sources of recharge to groundwater in Davidson Canyon, SE Arizona: an isotopic tracer study

Rachel Tucci and Jennifer McIntosh
The University of Arizona, Department of Hydrology & Water Resources

INTRODUCTION

Davidson Canyon is the largest channel that drains the proposed controversial Rosemont Copper Mine, and is a tributary to Cienega Creek. Davidson Canyon is classified as Outstanding Arizona Waters (OAWs), which indicates it's superior water quality. Questions have been raised about the potential impacts of future mining activities on surface water and groundwater resources in the area. Background studies of hydrogeochemical conditions are needed in order to evaluate, any future sources of contamination, were it to occur. This preliminary study utilizes natural isotopic tracers (^{18}O, ^{2}H, ^{3}H) to investigate the source of recharge, relative ages of groundwater at different locations, and groundwater-surface water interactions in the Davidson Canyon watershed.

SITE DESCRIPTION

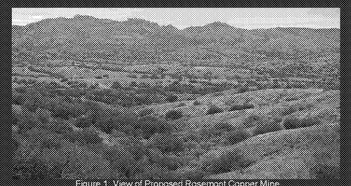


Figure 1: View of Proposed Rosemont Copper Mine
Photo Credit: Mamta Popat / Arizona Daily Star

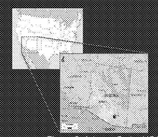


Figure 2: Arizona State, USA

Davidson Canyon is located in the southeast corner of Pima County in southern Arizona (figure 2). It is in the Sonoran Desert of the American southwest. Davidson Canyon is the closest waterway from the proposed Rosemont Copper Mine. The Canyon empties into the Cienega Creek north of the Interstate 10. Davidson Canyon used to be perennial, but due to long term drought and population growth in recent years the stream in the canyon is now ephemeral.

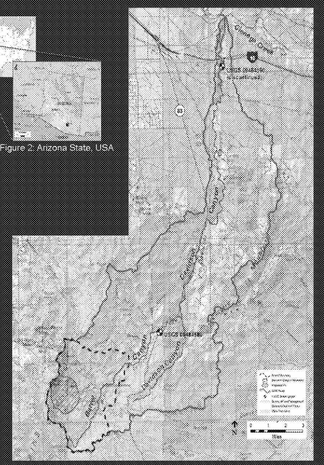
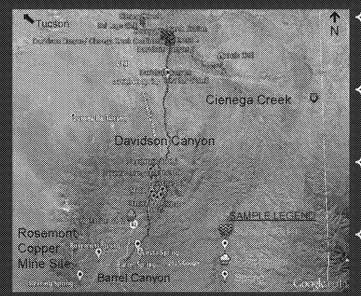


Figure 3: Davidson Canyon Watershed is 22,000 acres
(Rosemont Copper Davidson Canyon Conceptual Surface Water Monitoring Plan, Water and Earth Technologies INC.)

METHODS

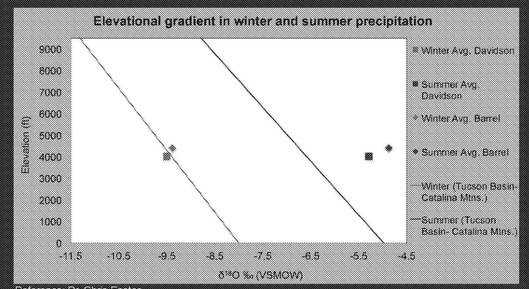


- Water samples were collected from 15 domestic wells and 4 surface water sites, following USGS protocol for water quality sampling.
- Samples were analyzed at the University of Arizona Environmental Isotope Lab in Geosciences for $\delta^{18}O$ and δD. Select samples were analyzed for ^{3}H.
- Additional data provided by Pima County Flood Control (RFCD) and Pima Association of Governments (PAG) included 3 groundwater wells and 5 surface water sites.
- Additional data provided by Hudbay Minerals Inc. included 4 surface water sites and 2 precipitation collector stations.

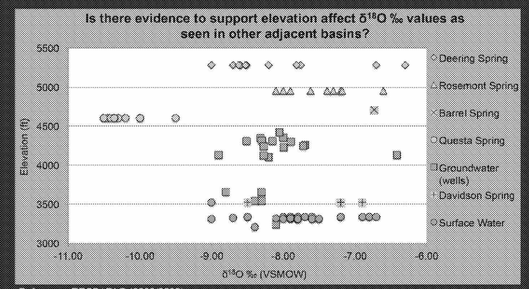
✧ ACKNOWLEDGMENTS

- The Residence along Highway 83 that allowed me to sample from their domestic wells.
- Pima County Flood Control (RFCD) and Pima Associates of Governments (PAG) for sharing data.
- Mrs. Karen Herther, Senior Hydrologist at Rosemont Copper Mine for sharing data.
- Dr. Chris Eastoe, Senior Research Scientist, Geosciences University of Arizona for tritium analysis contribution.
- Dr. Martha Whitaker, Senior thesis advisor at the University of Arizona for advice and guidance.

DOES SEASONALITY AND/OR ALTITUDE INFLUENCE THE STABLE ISOTOPES IN PRECIPITATION?

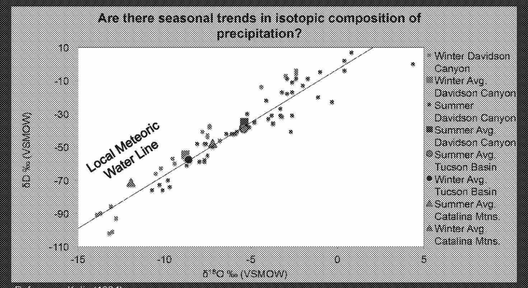


Reference: Dr. Chris Eastoe
Hudbay Minerals INC.



Reference: RFCD/ PAG (2000/2003)
Hudbay Minerals INC.

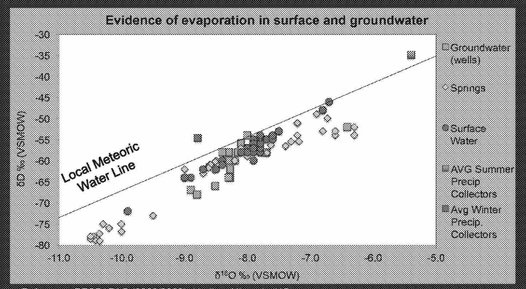
- Average $\delta^{18}O$ values for winter precipitation in the study area are similar to values for the Tucson Basin at the same elevation. This is likely a result of the widespread frontal winter storms in the region.
- The summer averages of the precipitation sites measured are not representative of the Tucson Basin average. This maybe a result of convective monsoon season storms, which are more localized.
- The Tucson Basin precipitation is normalized to the amount of rainfall whereas the precipitation data for this study did not include amount of rainfall . Having volume weighted $\delta^{18}O$ and δD values may alter our results.
- The large range and overlap of $\delta^{18}O$ and δD values for winter and summer precipitation points to no clear seasonal trends for the study period. However, average values for winter and summer precipitation in the study area fit expected relationships (with winter $\delta^{18}O$ values lower than summer), and match Tucson Basin values.



Reference: Kalin (1994)
Hudbay Minerals INC.

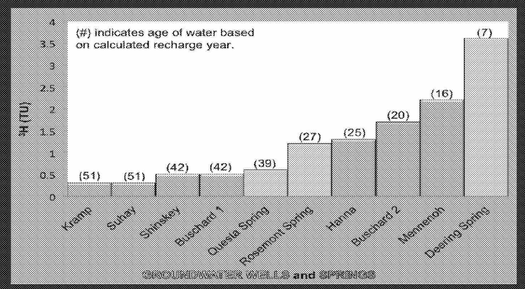
- The limited range in elevation of the precipitation collectors do not vary enough to evaluate an altitude affect.
- An expected relationship would display a trend with more negative $\delta^{18}O$ values at higher elevation and less negative $\delta^{18}O$ values closer to the basin floor.

- Groundwater, surface water and springs have $\delta^{18}O$ and δD values closest to winter precipitation averages suggesting a dominance of winter recharge.
- There is also evidence for slight evaporation during recharge.



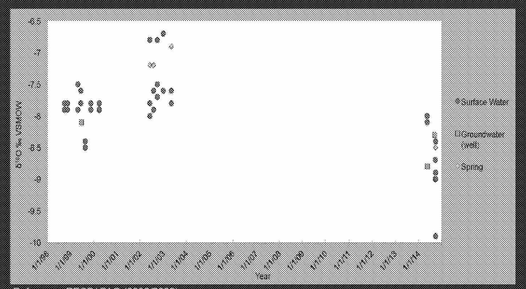
Reference: RFCD/ PAG (2000/2003); Hudbay Minerals INC.

WHAT IS THE APPARENT AGE OF GROUNDWATER?



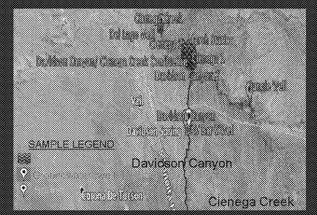
- Recharge dates based on the radioactive decay equation $^{3}H_t = {}^{3}H_o * \exp(-\lambda t)$; $^{3}H_o$=5.3 TU (Tucson Basin average precipitation) and $T_{1/2}$=12.43yrs
- The ^{3}H concentrations for seven domestic wells and two springs are low and close to detection limit (0.6 TU), which indicates groundwater was likely recharged from a mix of modern recharge (<10 years old) and older pre-bomb pulse recharge (>~60 years old).
- Deering spring has a higher value closer to the average, current value of local precipitation (mean of 5.3 TU), which indicates modern recharge (7 years old).
- Further analysis, not shown here, revealed no apparent relationship with ^{3}H and a seasonality or altitude affect.
- In order to date the "older water component" in the groundwater more precisely additional analysis of ^{14}C would need to be conducted.

IS THERE EVIDENCE OF GROUNDWATER AND SURFACE WATER INTERACTION?



Reference: RFCD/ PAG (2000/2003)

- The $\delta^{18}O$ values of the surface water, groundwater wells and springs are within the same range, which is evidence of a connection between source waters.
- Further analysis of water levels and local hydrogeology would help to distinguish where the surface water is recharging to the groundwater or the groundwater is discharging to the surface water.



ATTACHMENT 6

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ATTACHMENT 6:
PERIMETER CONTAINMENT AREAS SHOULD BE DRAINED

Perimeter Containment Areas (PCAs) are environmentally damaging to downstream Waters and should be eliminated: The large runoff retention areas known as Perimeter Containment Areas (PCAs) were not identified or analyzed in the Clean Water Act 404(b)(1) alternatives analysis or elsewhere in the FEIS. These areas are not constructed features; they are passively created by discharging fill, which has the effect of impounding flow from several watersheds. The PCAs should be drained to reduce impacts on downstream Waters during operation of the mine. This is considered a best management practice.

The Corps has not considered this effect. We objected to the effects of retaining runoff in the PCAs during the Forest Service's EIS objection period and proposed drainage channels to reduce impacts to downstream Waters (see figure in the attachment). The 404(b)(1) analysis said that "minimization efforts include stormwater control designs that route as much unimpacted water as feasible into downstream flow systems", but there is no evidence in the 404(b)(1) documentation available to us that the Corps' considered the PCAs, or the potential to route the runoff water downstream.

During the objection meeting, Rosemont representatives acknowledged that perimeter channels were likely feasible, as noted in the meeting summary discussing our objections (see excerpt in the attachment). The Forest Supervisor was directed to conduct further evaluation and discussion with the applicant, but there is no evidence that this was ever done, and we doubt the Forest Service brought the issue up with the Corps.

Two Draft Objections to FEIS and ROD

February 11, 2014 mk

OBJECTION 1

Significant surface waters from the western and southern portions of the mine site should be released in perpetuity for downstream discharge

Rosemont Copper 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 in perpetuity as part of the site water management plan.

Prior Written Comments and Relation to Objection

Prior written comments can be found at: *Pima County Comments - Rosemont Copper Mine Preliminary Administrative Final Environmental Impact Statement*, August 14, 2013, pp. 161-162, figure p.163

This objection and the prior written comment address the same subject matter.

Description of Aspects of the Proposed Project Addressed by the Objection

As shown in the PA DEIS (Chapter 2, p57, Figure 19 – Barrel Alternative Stormwater Concept) and on Figure 13 (Barrel Alternative Landform) of the CDM Smith *Preliminary Reclamation and Closure Plan* (July 2012), two Perimeter Containment Areas (PCA2 and PCA3) are to be located along the southern boundary of the Waste Rock disposal mound. The PCAs are stormwater retention basins, intended to capture and hold all incoming surface water, with no release to downstream drainages.

Objection Figure 1 (February 2014) is based on Figure 13 (Barrel Alternative Landform) of the CDM Smith *Preliminary Reclamation and Closure Plan* (July 2012). As shown on Objection Figure 1, stormwater which is intended to be collected and retained in PCA2 and PCA3 includes contributions from: the lower slopes of the Waste Rock mound and adjacent upper slopes of the Barrel Canyon watershed (Area 1), and the entire upgradient watershed area associated with the Pit Diversion Channel (Area 2). Area 1, comprising the area which is not planned for downstream drainage between the Waste Rock mound and the upper Barrel Canyon watershed divide, has a surface area of about 335 acres. Area 2, consisting of a mountainous watershed which sheds surface water to the Pit Diversion Channel for transfer into Area 1, has a surface area of about 240 acres with an approximate 100-yr discharge of 1800 cubic feet per second. Combined, Areas 1 and 2 have a watershed surface area approaching 1 square mile in size.

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As noted in the FEIS Volume 2, Chapter 3 of the DEIS under *Barrel Alternative-Stormwater Management after Closure*, p. 425 "The diversion channel west of the pit would collect precipitation in stormwater retention ponds along the southern toe of the waste rock facility and would be allowed to infiltrate as aquifer recharge, but it would not be able to flow downstream as surface water due to topography".

The "topography" referenced here is simply the geometric result of construction of the waste rock pile onto the existing slopes of upper Barrel Canyon (the resultant surface of the large graded pile superimposed on hilly topography nearby the upper watershed boundary). As a result of construction, stormwater collecting in Area 1becomes trapped between the lower slopes of the Waste Rock mound and the existing, undulating upper slopes of the head of Barrel Canyon. As noted above, in addition to the capture of all waters from the Area 1 watershed, all water collected from the Area 2 watershed and transmitted by the Pit Diversion Channel is also captured and held without release in these two large surface water trapping areas.

Stormwater retained in PCA2 and PCA3 is problematic both during mining operations and throughout the post-closure period. Retained stormwater will reduce the quantity of surface water which is released downstream of the mine site. This represents a significant, permanent reduction of a valuable downstream surface water resource, with associated adverse impacts to habitat and riparian resources, and downstream recharge.

In addition, stormwater ponded against mounded waste rock to depths of up to about 50 ft may cause leaching of contaminants as the ponded water moves laterally into and through the waste rock mound. The infiltration of ponded water from PCA 2 and PCA 3 through the waste rock materials may also infiltrate tailings materials deposited downstream within the Barrel Canyon channel, with the potential to cause additional contamination of surface water and shallow groundwater downstream of the mine site.

Suggested Remedies to Resolve the Objection

Surface waters collected in Areas 1 and 2 certainly do not have to be captured and held in PCA2 and PCA3. These waters can, and should, be collected and transferred via a continuous perimeter drainage channel, and released downstream into the Trail Creek - Barrel Canyon drainage system as a fundamental stormwater management component of the facility operational and postclosure condition.

The Forest Service should require Rosemont Copper to professionally design and construct a stormwater management channel along the southern perimeter of the Waste Rock mound to collect and transmit surface waters from the Pit Diversion Channel (Area 2 on Objection Figure 1), and the lower side slopes of the Waste Rock mound and adjacent upper Barrel Canyon watershed (Area 1 on Objection Figure 1). The stormwater management channel would transfer these surface waters into the FEIS Wrap-A-Round channel alignment located at the east end of Area 1 (Objection Figure 1). From this point, the collected surface waters

could then be transferred around the eastern side of the Waste Rock mound for release downstream in perpetuity into Trail Creek at location SW-2, the outlet of the Wrap-a-Round channel.

There is sufficient grade for a continuous perimeter stormwater channel from PCA2 all the way around to the Trail Creek outlet at location SW-2. As shown on Objection Figure 1, the Waste Rock mound perimeter distance from Point SW-1 (elev ~ 5220 msl) to Point SW-2 (elev ~ 4820 msl) is about 20,000 ft, with a corresponding elevation drop of about 400ft. This corresponds to an average slope of approximately 2% for the perimeter system.

Construction of a stormwater management channel through the Area 1 zone could be accomplished by integrating and implementing the following operations:

A. Design the stormwater channel per standard engineering state of the practice, including minor modifications to the geometry of the southern Waste Rock mound side slopes to facilitate passage of perimeter stormwater.

B. Per the final design, perform the necessary excavations and fills through the hilly topographic slopes of upper Barrel Canyon adjacent to the Waste Rock mound, in order to obtain the required width and channel grade of the perimeter stormwater managment system.

C. Utilize abundant waste rock materials for construction of the perimeter stormwater management channel, including placement of waste rock materials within the channel area between the Waste Rock slope and the upper Barrel Canyon slopes. Utilization of waste rock as a construction fill material will reduce the volume of excavation required into the existing side slopes.

Design and construction of a continuous perimeter stormwater system is doable, has real benefits to the community and environment, and factually constitutes a minor part of these primary planned mining operations:

- Excavation and disposal of 1.9 billion tons of waste rock and tailings
- Creation of a permanent 4.5 square mile waste disposal landform on Federal and State lands

OBJECTION 2

Significant surface waters from the northeast portions of the tailings mound should be released in perpetuity for downstream discharge

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.

Prior Written Comments and Relation to Objection

Prior written comments can be found at: *Pima County Comments - Rosemont Copper Mine Preliminary Administrative Final Environmental Impact Statement*, August 14, 2013, p. 163 and figure on same page

This objection and the prior written comment address the same subject matter.

Description of Aspects of the Proposed Project Addressed by the Objection

As shown on Objection Figure 1, there is no collection channel planned to transfer water collected at the base of the Area 3 sideslope interval. An additional wraparound or perimeter channel should be constructed at this location along the northeastern side of the Tailings mound. Instead, stormwater collecting from this approximate 75 acre watershed side slope simply ponds along the base of the sideslope, within three main tributary areas below the adjacent north-trending ridgeline. This situation is similar in nature to the trapped water in PCA 2 and PCA 3 as described above in Objection 1.

Stormwater retained in pools against the waste rock buttress at this location is problematic, both during mining operations and throughout the post-closure period. Retained stormwater will reduce the quantity of surface water which is released downstream of the mine site, both from the approximate 75-acre mound side slope area and also the adjacent hilly sideslope to the crestline. This represents a significant and permanent reduction of a valuable downstream surface water resource, with associated adverse impacts to habitat and riparian resources, and downstream recharge.

In addition, stormwater ponded against the mounded waste rock may cause leaching of contaminants as the ponded water moves laterally into and through the waste rock buttress. The percolating water may also may also reach and infiltrate tailings materials deposited downgradient within the Barrel Canyon channel. Fluid contact with waste rock and/or tailings materials includes the potential to cause contamination of surface water and shallow groundwater downstream of the mine site.

Suggested Remedies to Resolve the Objection

The Forest Service should require Rosemont Copper to professionally design, and construct, an approximate 5000 ft long stormwater management channel along the northeastern perimeter of the Tailings mound to collect surface waters from the lower eastern side slope (Area 3 on Objection Figure 1). Surface waters collected along the base of this slope should be routed to the tailings mound side slope stormwater channel shown at location SW-3, for transfer into the northern Wrap-A-Round channel and release in perpetuity at the channel outlet into downstream Barrel Canyon.

The Forest Service should require Rosemont Copper to professionally design and construct the stormwater management channel at the base of the 75-acre tailings mound side slope. Construction of the stormwater channel could be accomplished by integrating and implementing the following operations:

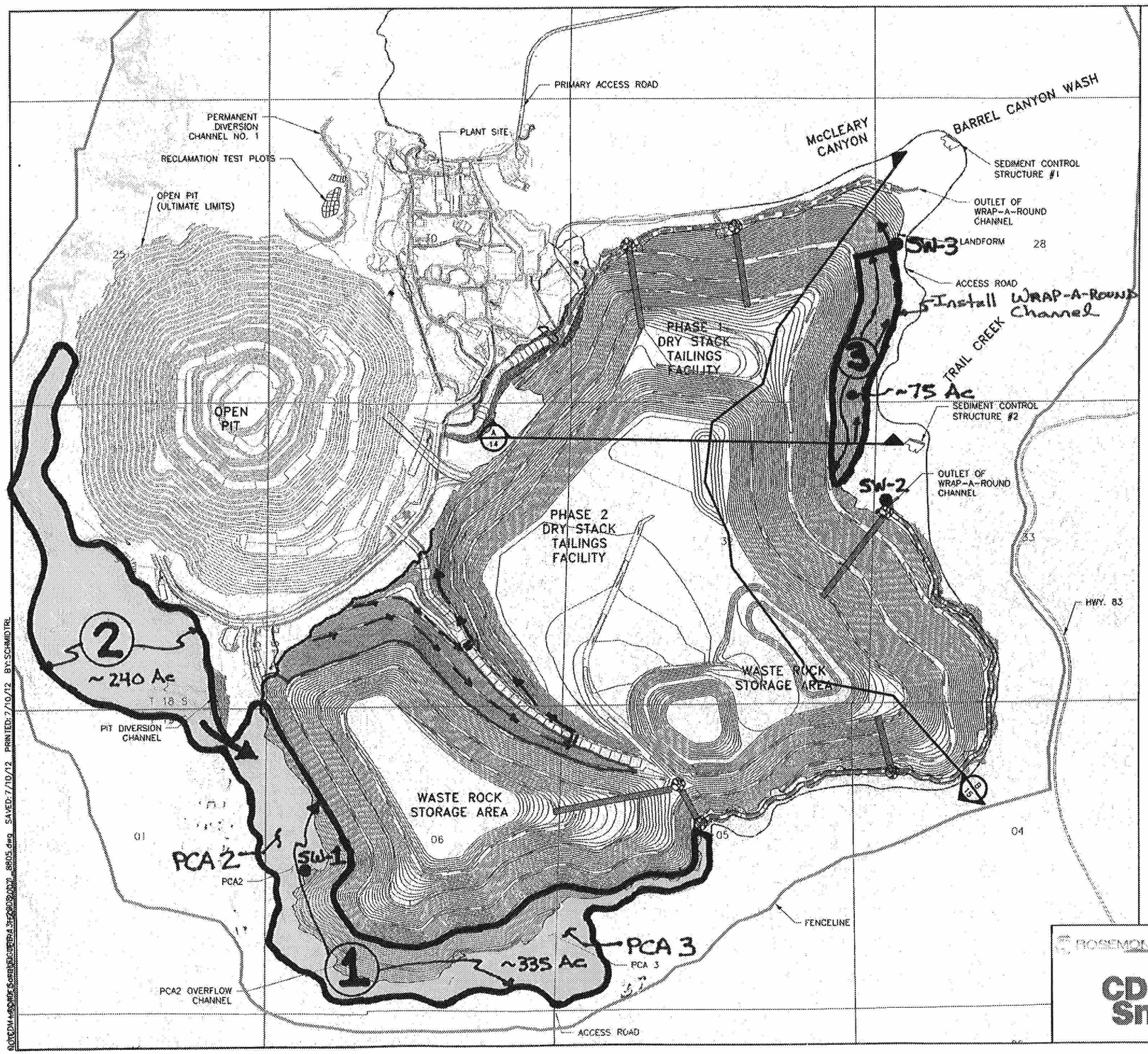
A. Design the stormwater channel to transfer collected water per standard engineering state of the practice.

B. Per final design plans, perform the necessary excavations through the hilly topographic slopes of upper Barrel Canyon adjacent to the base of the waste rock buttress on the perimeter of the Tailings mound, in order to obtain the required width and channel grade of the perimeter stormwater managment system.

C. Utilize abundant waste rock materials for construction of the perimeter stormwater management channel where advantageous, including placement of waste rock materials within the channel area between the waste rock slope and the eastern upper Barrel Canyon watershed slopes. Utilization of waste rock as a construction fill material will reduce the volume of excavation required into the existing side slopes.

Design and construction of a stormwater management channel at this location is doable, has real benefits to the community and environment, and factually constitutes a minor part of these primary planned mining operations:

- Excavation and disposal of 1.9 billion tons of waste rock and tailings
- Creation of a permanent 4.5 square mile waste disposal landform on Federal and State lands



LEGEND

- EXISTING CONTOURS
- PROPOSED CONTOURS
- DRAINAGE CHANNEL
- STILLING BASIN
- DROP STRUCTURE
- WRAP-A-ROUND CHANNEL ROUTING
- DRAINAGE BENCH
- FENCELINE

Objection Figure 1
February, 2014

N

450 0 900 1800

NOTE:
OPERATIONAL PLANT SITE SHOWN WITH RECLAMATION LANDFORM.

ROSEMONT COPPER

CDM Smith

PRELIMINARY RECLAMATION AND CLOSURE PLAN FOR THE BARREL ALTERNATIVE

BARREL ALTERNATIVE LANDFORM - POST MINING FACILITIES LAYOUT

LOCATION:	PIMA COUNTY, ARIZONA
DATE:	07.09.12
PROJECT NO.	91146
FILE NAME:	FIGURE 13.DWG
FIGURE NO.	13

Surface Water Resources – Mitigation (SWR-4)

- At the Pima County resolution meeting, the County suggested that storm water (run-on) from outside the pit area, rather than be diverted to an infiltration pond, could be run (via a "perimeter channel"), downstream to the watershed. They acknowledged this would be costly but believed it was feasible. The Forest Supervisor should discuss the legal and practical feasibility of some method of routing this clean storm water to the watershed below to see if Rosemont wishes to propose such a change to its plans.

SUMMARY

In conclusion, I have reviewed all of the issues raised in the objections filed on the Rosemont Copper Mine Project and the assertions that the project violates various environmental laws, regulations, policies, and the Coronado Forest Plan. I find that the project is in compliance with these laws, regulations, policies, and the Forest Plan. However, by copy of this letter, I am instructing the Forest Supervisor to complete consultation with USFWS and address the clarifications and corrections I identified above prior to signing the Final ROD.

There will be no further review of this response by any other Forest Service or U.S. Department of Agriculture official as per 36 CFR 218.11(b)(2).

Sincerely,

CALVIN N. JOYNER
Regional Forester

cc: Jim Upchurch

ATTACHMENT 7

ED_002020B_00036430-00080

ATTACHMENT 7: NOTICE OF APPEAL FILED IN MARICOPA SUPERIOR COURT

ADEQ's definition of the water quality baseline is illegal, unwise, and cause conflicts with the federal definition in the Environmental Impact Statement. ADEQ's definition of the water quality baseline conflicts with the U.S. Forest Service's FEIS, which states that "baseline conditions would be established prior to mine construction (before pre-mining phase)" (see FEIS Appendix B at B016). Instead, as part of its 401 certification, the state of Arizona accepted Rosemont's definitions of the baseline as described in a "Surface Water Mitigation Plan" that was never subject to public review or comment.

Under the Plan's definition, water quality impacts prior to when "larger-scale stormwater impoundments" are constructed would be deemed natural variations and exceedances of surface water quality standards would not trigger any mitigation of water quality impacts. The baseline is defined in a way that permit 404-regulated activities to occur, and these may influence the water quality observed during the earliest phases of opening the mine.

Baseline water quality data should exclude data collected during and after clearing and grubbing of the land surface, the construction of pit diversion channels and impoundments other than the vaguely worded "larger-scale impoundments" in the current definition, and the construction of haul and access roads. Including 404-regulated impacts as part of baseline and pre-judging any resulting changes as "natural variation" is arbitrary and capricious. Including clearing and grubbing in the baseline does not make sense, given that the natural soil in the area is observed to have elevated levels of soluble metals, and may have contributed to dissolved metals in recent stormwater samples.

Indeed, at the Corps' meeting that we attended in April, the Arizona Department of Environmental Quality (ADEQ) Director seemed unaware that the as-defined water quality baseline includes mine construction activities that are regulated by ADEQ. Rosemont representatives at that meeting seemed to agree that a revision of this definition is warranted, but this flawed definition currently stands as the basis for this 401 certification. The Corps need not rely on state for enforcement, but should the Corps wish to pursue enforcement independent of the state's authority, there would be an inherent conflict between the water quality baseline as defined in the FEIS and in the 401 Certification, unless this discrepancy is resolved prior to the Corps' decision.

The above issues were never properly considered during ADEQ's 401 Certification process. The Rosemont Surface Water Mitigation Plan was added to the record after the close of the public comment period and was used as the basis for conditions inserted into the final Certification. ADEQ's failure to comply with Arizona notice and comment law was the basis for an administrative challenge of the Certification.

Having recently exhausted administrative remedies to the ADEQ's decision, on May 5, 2017, Pima County and the Regional Flood Control District filed an appeal in Maricopa Superior Court.

MICHAEL K. JEANES
Clerk of the Superior Court
By Lizethe Rivas , Deputy
Date 05/05/2017 Time 16:48:28
Description Amount
---------- CASE# LC2017-000144-001 -----
SP ACT PET RV/ST ADM 319.00 W
TOTAL AMOUNT 0.00
Receipt# 25918262

BARBARA LAWALL
PIMA COUNTY ATTORNEY
CIVIL DIVISION
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Andrew.Flagg@pcao.pima.gov
Attorney for Appellants

IN THE SUPERIOR COURT FOR MARICOPA COUNTY

IN AND FOR THE STATE OF ARIZONA

PIMA COUNTY, PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT Appellants, vs. MISAEL CABRERA, DIRECTOR OF THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY, Appellee.	Case No. LC2017-000144 **NOTICE OF APPEAL FOR JUDICIAL REVIEW OF FINAL ADMINISTRATIVE DECISION**

Pima County ("County") and the Pima County Regional Flood Control District ("District") file this Notice of Appeal pursuant to A.R.S. § 12-904(A).

PARTIES, JURISDICTION, AND VENUE

1. Pima County is a body politic and corporate, and a political subdivision of the State of Arizona.
2. The Pima County Regional Flood Control District is a special taxing district

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organized pursuant to Title 48, Chapter 21, Article 1 of the Arizona Revised Statutes.

3. Misael Cabrera ("Cabrera") is the Director of the Arizona Department of Environmental Quality ("ADEQ") and is sued in his official capacity. The principal offices of ADEQ are located in Maricopa County.
4. ADEQ issued a Section 401 water quality certification ("§ 401 Certification") to Rosemont Copper Company on February 3, 2015.
5. On March 5, 2015, County and District jointly filed an administrative appeal of ADEQ's decision to issue the Certification. A copy of that document (without attachments) is attached hereto as Exhibit A.
6. ADEQ, through a March 23, 2015 letter (attached hereto as Exhibit B), denied Appellants' appeal based on ADEQ's assertion that it lacks jurisdiction to consider the appeal.
7. Relying on its interpretation of A.R.S. § 49-202, ADEQ argued that it lacked jurisdiction to hear Appellants' § 401 Certification challenge because, for Certifications related to individual § 404 permits, only the permit applicant may appeal the Certification.
8. Conversely, Appellants assert that administrative appeal rights provided at A.R.S. § 41-1092.03(B) govern Appellants' challenge of the § 401 Certification.
9. A.R.S. § 41-1092.03(B) allows any party adversely affected by an appealable agency action to challenge the action through an administrative appeal.
10. Appellants, on April 1, 2015, filed a Request for Reconsideration with ADEQ addressing the jurisdictional issue. A copy of the Request for Reconsideration is attached hereto as Exhibit C.
11. ADEQ, in a letter dated May 1, 2015 (attached hereto as Exhibit D), again asserted lack of jurisdiction for its denial of Appellants' appeal.

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12. Pursuant to A.R.S. § 12-902(A)(1), Appellants asked this Court (Maricopa Superior Court Case No. LC2015-000243) for relief from ADEQ's refusal to consider Appellants' administrative appeal of the § 401 Certification.
13. In that action, Appellees argued ADEQ's decision denying the appeal was not a "final agency action" but merely advisory, thereby precluding appeal to this Court due to, again, lack of jurisdiction.
14. Judge McClennen was troubled by ADEQ's attempt to insulate itself from challenges to its administrative decisions by labeling them advisory and, in an order dated July 14, 2016 (attached hereto as Exhibit E), remanded the matter to ADEQ requiring that it issue a final administrative decision regarding Appellants' appeal.
15. On remand, the underlying jurisdictional issue regarding the interplay between A.R.S. § 49-202 and A.R.S. § 41-1092.03(B) was briefed and a hearing held before the Office of Administrative Hearings (OAH).
16. The Administrative Law Judge issued a decision finding that the § 401 Certification was an appealable agency action, but concluding that A.R.S. § 49-202 does preclude Certification challenges from anyone but the applicant. A copy of that decision is attached hereto as Exhibit F.
17. As permitted by A.R.S. § 41-1092.08(B), the Director of ADEQ reviewed the OAH decision and issued a Final Administrative Decision accepting the OAH decision. A copy of the Director's decision is attached hereto at Exhibit G.
18. This action seeks judicial review of ADEQ's decision made by Cabrera, as Director of ADEQ.
19. Jurisdiction in Superior Court to review ADEQ's administrative decision is proper pursuant to A.R.S. § 12-905(A).

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20. Venue in Maricopa County Superior Court is proper pursuant to A.R.S. §§ 12-401(16) and 12-905(B).

BACKGROUND

21. Section 404 of the Federal Water Pollution Discharges Prevention and Control Act (also known as the Clean Water Act or "CWA") (33 U.S.C. §§ 1251 to 1387) authorizes the Secretary of the Army, through the Corps of Engineers (or "COE"), to issue permits for the discharge of dredged or fill material into navigable waters. 33 U.S.C. § 1344(a).

22. As a pre-condition for obtaining a "Section 404 permit", an applicant must provide to the COE a so-called Section 401 water quality certification that the proposed discharge will comply with "applicable provisions of sections 1311, 1312, 1313, 1316, and 1317" of the CWA. 33 U.S.C. § 1341(a).

23. Section 401 certifications are issued by the state in which the discharge originates. 33 U.S.C. § 1341(a).

24. ADEQ is authorized, pursuant to A.R.S. § 49-202, to issue the Section 401 certifications on behalf of the State.

25. Rosemont Copper Company ("Rosemont") applied to ADEQ for a Section 401 certification on January 12, 2012.

26. ADEQ issued a draft certification in March of 2014.

27. County and District jointly filed three sets of comments (March 21, 2014; April 4, 2014; and July 16, 2014) in response to ADEQ's request for comments on the draft certification.

28. ADEQ issued a final Section 401 certification (the "§ 401 Certification") to Rosemont on February 3, 2015.

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29. Appellants timely appeal the § 401 Certification's issuance on March 5, 2015, citing, among other things, ADEQ's failure to comply with Arizona notice and comment law when considering and issuing the Certification.

30. ADEQ refused to accept Appellants' appeal alleging that A.R.S. § 49-202(H) precludes appeal of water quality certifications if the underlying permit is an individual, rather than a nationwide or general Clean Water Act § 404 (33 U.S.C. § 1344) permit.

31. Regulations promulgated pursuant to § 404 of the Clean Water Act define an "individual permit" as:

> a Department of the Army authorization that is issued following a case-by-case evaluation of a specific project involving the proposed discharge(s) in accordance with the procedures of this part and 33 CFR part 325 and a determination that the proposed discharge is in the public interest pursuant to 33 CFR part 320.

33 CFR § 323.2(g).

32. Those same regulations define a "general permit" as:

> a Department of the Army authorization that is issued on a nationwide or regional basis for a category or categories of activities when:
>
> (1) Those activities are substantially similar in nature and cause only minimal individual and cumulative environmental impacts; or
>
> (2) The general permit would result in avoiding unnecessary duplication of regulatory control exercised by another Federal, State, or local agency provided it has been determined that the environmental consequences of the action are individually and cumulatively minimal.

33 CFR § 323.2(h).

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33. Finally, a "nationwide permit" is defined by the regulations as "a type of general permit which authorizes activities on a nationwide basis unless specifically limited." 33 CFR § 330.2(b).

34. The Certification issued by ADEQ to Rosemont supports Rosemont's underlying "individual" § 404 permit application which is currently pending before the U.S. Corps of Engineers.

35. While Appellants cited A.R.S. § 49-202(H) as a basis for appeal in their Notice of Appeal, they also cited A.R.S. Title 41, Chapter 6, Article 10 and provided a showing that both Appellants qualified under that statute to appeal the Certification.

36. A.R.S. Title 41, Chapter 6, Article 10 allows appeal:

> by a party who will be adversely affected by the appealable agency action or contested case and who exercised any right provided by law to comment on the action being appealed or contested, provided that the grounds for the notice of appeal or request for a hearing are limited to issues raised in that party's comments.

A.R.S. § 41-1092.03(B).

37. A.R.S. § 41-1092.03(B) is part of the larger Arizona Administrative Procedure Act ("APA"): A.R.S. Title 41, Chapter 6.

38. The APA specifically addresses its relationship to other statutes:

> This chapter [chapter 6] creates only procedural rights and imposes only procedural duties. They are in addition to those created and imposed by other statutes. To the extent that any other statute would diminish a right created or duty imposed by this chapter, the other statute is superseded by this chapter, unless the other statute expressly provides otherwise.

A.R.S. § 41-1002(B).

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COUNT ONE

Judicial Review of Administrative Decision

39. Appellants incorporate by reference all of the preceding paragraphs and allegations of this Notice of Appeal, as if set forth herein.

40. ADEQ acted arbitrarily and capriciously, abused its discretion, and acted contrary to law when it refused to accept Appellants' appeal in this matter.

41. ADEQ's decision to reject Appellants' appeal was in error, arbitrary and capricious, contrary to law, and an abuse of discretion because ADEQ's misinterpretation of A.R.S. § 49-202(H) improperly divests Appellants of their right to appeal granted under A.R.S. Title 41, Chapter 6, Article 10.

RELIEF

42. Appellants Pima County and Pima County Flood Control District seek the following relief:

    a. Reverse ADEQ's decision denying Appellants' Notice of Appeal in this matter and remand the matter to ADEQ for consideration of the substantive arguments made in Appellants' Notice of Appeal.

    b. Award Appellants attorneys' fees pursuant to A.R.S. § 12-348.01 and costs pursuant to A.R.S. § 12-341, incurred and expended herein.

    c. Grant Appellants such other and further relief as the Court may deem just and proper.

RESPECTFULLY SUBMITTED May 5, 2017.

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PIMA COUNTY ATTORNEY

By _____
Charles W. Wesselhoft
Deputy County Attorney

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Copies hand delivered on May 5, 2017
to the Clerk of the Court.

Copies mailed:
May 5, 2017, to:

Misael Cabrera, Director
Arizona Department of Environmental Quality
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Phoenix AZ 85007

Curtis Cox
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Exhibit A

Notice of Appeal

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ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

PIMA COUNTY, a body politic; and PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT, Appellants, vs. THE STATE OF ARIZONA, and THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY, Respondents.	**NOTICE OF APPEAL**

I. INTRODUCTION

This is a challenge by Pima County and the Pima County Regional Flood Control District (the "Appellants") to the Arizona Department of Environmental Quality's ("ADEQ") issuance of a Clean Water Act Section 401 Water Quality Certification ("Certification") to Rosemont Copper Company ("Rosemont") for its Rosemont Copper Project (the "Mine"). A copy of the issued Certification is attached hereto as Exhibit A.

II. JURISDICTION AND STANDING

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a. This Petition is Proper in this Forum

Issuance of Clean Water Act Section 401 Certification in Arizona is authorized under pertinent portions of A.R.S. § 49-202. Specifically, ADEQ is authorized to process § 401 certification requests in accordance with subsections C through H of A.R.S. § 49-202. A.R.S. § 49-202(B). A.R.S. § 49-202(H) provides the pathway for appealing an ADEQ § 401 certification decision. Pursuant to that subsection, "[a]ny person who is or may be adversely affected by the denial of or imposition of conditions on the certification of a nationwide or general permit may appeal that decision pursuant to title 41, chapter 6, article 10" entitled "Administrative Hearing Procedures." Article 10 further provides: "A party may obtain a hearing on an appealable agency action or contested case by filing a notice of appeal or request for a hearing with the agency within thirty days after receiving the notice prescribed in subsection A of this section." The article 10 procedures allow appeal by "a party who will be adversely affected by the appealable agency action or contested case and who exercised any right provided by law to comment on the action being appealed or contested, provided that the grounds for the notice of appeal or request for a hearing are limited to issues raised in that party's comments." A.R.S. § 41-1092.03(B). While ARS § 49-202(B) does not require Appellants to have commented on the appealed action, as noted below, Appellants did submit comments.

b. Appellants are Entitled to Bring this Action

i. Appellants are Adversely Affected by the Agency's Action

Both Pima County ("County") and the Pima County Regional Flood Control District ("District") will be adversely affected by the ADEQ action. Appellants own the land and

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water rights in the Outstanding Waters reach of Davidson Canyon and the Outstanding Waters reach downstream of Davidson Canyon. Both of these Outstanding Waters reaches are downstream of surface water and ground water impacts resulting from the construction and operation of the Mine. In addition, Appellants manage the Bar V ranch and Cienega Creek Natural Preserve for wildlife and recreational purposes plus oversee ranching at the Bar V Ranch. These facilities are also located downstream of the surface water and ground water impacts resulting from the construction and operation of the Mine. Allowing Rosemont to proceed with the proposed construction and operation of the Mine will result in degradation of the quality of the surface water in Outstanding Waters located on Appellant's properties and in adverse impacts to surface waters and uses thereof on the Bar V Ranch.

ii. Appellants Commented on the Action being Appealed

Appellants submitted three sets of comments for ADEQ consideration in this matter:

1. The first County/District comment, attached hereto as Exhibit B, was submitted to ADEQ on March 21, 2014;

2. The second County/District comment, attached hereto as Exhibit C, was submitted to ADEQ on April 4, 2014; and

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3. The third County/District comment, attached hereto as Exhibit D, was submitted to ADEQ on July 16, 2014. This comment provided supplemental information.[1]

County/District comments contained in Exhibits B and C were timely submitted.[2] As those Exhibits show, Appellants commented on the draft Certification. However, portions of the final Certification and of documents used in the ADEQ decision-making process were never available for public review and comment in the action below. Further, there is no public record concerning ADEQ response to public comments or of what criteria ADEQ used to modify the draft Certification. Those issues will be addressed below.

c. This Petition is Timely

The appeal procedure, A.R.S. title 41, chapter 6, article 10, sets forth a thirty day limitation for filing a notice of appeal on an appealable agency action. A.R.S. § 41-1092.03(B). To date, neither Appellant has received official notice of ADEQ's Certification issuance. To ensure the timeliness of this appeal, Appellants are filing this action within thirty days of the ADEQ signature date.

d. Scope of Review and Basis for Reversal

Review of ADEQ's action is limited by statute:

[1] The information was also provided to the involved federal agencies for ESA consultation on the § 404 permit decision.
[2] The initial comment period closed on March 24, 2014 but was extended by ADEQ until April 7, 2014.

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> The court shall affirm the agency action unless after reviewing the administrative record and supplementing evidence presented at the evidentiary hearing the court concludes that the action is not supported by substantial evidence, is contrary to law, is arbitrary and capricious or is an abuse of discretion.

A.R.S. § 12-910(E).

III. BASIS OF APPEAL

In issuing the Certification, ADEQ acted arbitrarily and capriciously and abused its discretion. ADEQ has produced no explanation of the basis for its decision to issue, despite extensive comments by Appellants (and others), a final Certification that is nearly identical to the draft version issued [date]. Further, ADEQ included documents in its decision record that were not in the available for public review and comment. Specifically, ADEQ considered Rosemont's December 2014 "Surface Water Mitigation Plan." That plan is flawed and the flaws raise serious questions about Rosemont's ability to meet the Arizona surface water quality standards ("SWQS") and maintain existing uses, including recreation, wildlife and livestock.

a. Facts

i. Pima County and Pima County Regional Flood Control District have Invested Millions of Taxpayer Dollars to Protect Lands in the Cienega Creek Groundwater Basin.

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Pima County has worked to protect and conserve natural resources in the Cienega basin since 1986, with the creation of the Cienega Creek Natural Preserve. According to the County Administrator's Office, total acquisition costs for lands in the Cienega Creek basin total nearly $64 million. Most notably, these include portions of lower Cienega Creek and Davidson Canyon, downstream of the proposed mine. The Cienega Creek Natural Preserve is a 4000-acre protected area owned by Pima County Regional Flood Control District containing intermittent and perennial flow reaches, and springs supported by a shallow water table. Acquisition costs total $8.6 million for the Preserve. Acquisition began in 1986 and was largely completed in the early 1990s.

The Bar V Ranch, located along Davidson Canyon south of Interstate Highway 10 was acquired for $8.1 million in 2005. The State Transportation Board unanimously approved a contribution of $500,000 to acquire 600 acres of the ranch along Davidson Canyon to preserve viewsheds along state-designated scenic roads and highways. Bar V Ranch includes a vital wildlife linkage recognized by Arizona Game Fish Department along Davidson Canyon.

In addition, the county also acquired 58 acres near the Empire Mountains at a cost of $190,000 called the Amadon and Nunez properties. These lands are located five to six miles east of the mine, and were purchased in conjunction consistent with the U. S. Bureau of Land Management's plan for Las Cienegas National Conservation Area.

ii. Pima County and Pima County Regional Flood Control District have Acted to Protect Water and Water Quality along Cienega Creek and Davidson Canyon.

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The presence of water combined with riparian vegetation creates wildlife habitat of very high value supporting diverse populations of mammals, birds, fish, reptiles, and amphibians. Several special status species are present within the Preserve including the endangered Gila Topminnow, the threatened Gila Chub Mexican garter snake, and the yellow-billed cuckoo. These same water conditions create an area with very high values for recreation, educational opportunities and scenic quality, as well as wildlife.

The ecological and recreational significance of the Preserve is amplified because it is one of a very few remaining examples of a desert riparian environment. Environments of this type once paralleled many of the water courses and drainages in southern Arizona such as the Santa Cruz River near Tucson. During the past century, the extent of these riparian areas has been greatly reduced.

When the Preserve was established in 1986, the Pima County Board of Supervisors, sitting as the Board of Directors of the Pima County Flood Control District, adopted a Declaration of Restrictions, Covenants, and Conditions that applies to areas along Cienega Creek and Davidson Canyon. This document states that the Preserve was established ...for the purposes of the preservation and protection of the natural and scenic resources of the property,...

At the same time, the Board stated that Pima County's management goals, simply stated, are to maintain the present natural characteristics of the Cienega Creek Natural Preserve, and if possible, to allow natural restoration of the climax vegetation...The following management policies support Pima County's desire to maintain our last remaining low-elevation perennial stream in as natural a condition as possible"

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The restrictions that run with the land also state that … Pima County shall not conduct, nor permit any other person to conduct mining, quarrying, sand hauling, fill hauling, or timbering of any kind on the Preserve. Hunting or trapping of birds or animals, grazing of cattle, or the destruction or removal of plants, shrubs, trees, except with written permission of Pima County, is expressly prohibited. In the interest of resources protection, no discharge of waste or by-products or materials on land or into water channels that might result in harm to wildlife or human water supplies will be permitted.

As acquisitions proceeded over the next decade, the District obtained historic water rights and transferred their uses to recreation and wildlife purposes to protect streamflow occurring within the Natural Preserve. As authorized by the Board of Supervisors in 1986, the District also filed for in-stream flow rights, receiving an instream flow certificate in 1993. The County holds water rights for stock-watering purposes along Davidson Canyon.

At the request of Pima County Regional Flood Control District, Pima Association of Governments began monitoring groundwater levels at three sites within the Preserve in 1989. This program was expanded to include groundwater monitoring along Davidson Canyon and base flow discharges along Cienega Creek in the early 1990s. PAG continues to monitor groundwater levels and surface water discharges today.

Pima County Regional Flood Control District and Pima County have also taken steps to protect water quality of Cienega Creek and Davidson Canyon, beginning in1987 with water quality sampling. An interagency proposal was submitted in 1990 to protect Cienega Creek within the Natural Preserve under the State of Arizona's Unique Waters program, which imposes anti-degradation standards under state water quality rules. This

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designation was received in 1992 for the lower Cienega Creek. The designation was amend in 2002 in include portions of upper Cienega Creek located on U.S. Bureau of Land Management land.

In recognition of Davidson Canyon's outstanding ecological and recreational values, Pima County purchased the Bar V Ranch, consisting of 1763 acres of private lands and 12,674 acres of State Trust Land grazing leases. Bar V Ranch includes four channel miles of Davidson Canyon and a working ranch. A riparian enclosure fence has been constructed along part of the wash. The Cienega Creek Natural Preserve downstream has an additional two miles of Davidson Canyon's flow and has also been excluded from livestock grazing.

In 2005, Pima County Administrator C. H. Huckelberry requested to classify Davidson Canyon as an Outstanding Water, pursuant to R18-11-112 of the Arizona Administrative Code. The purpose was to protect the high quality water that Davidson provides to Cienega Creek via springs and groundwater underflows.

Davidson Canyon is a rare, spring-fed, low-elevation desert stream that supports leopard frogs, and at times, the native fish known as the long-fin dace. The Arizona Game and Fish Department has recognized this as one of the most important wildlife migration corridors in this part of Arizona, linking the Rincon, Empire and Santa Rita Mountains (see Arizona Wildlife Linkage Assessment, 2006). Sky Island Alliance has monitored wildlife use of Davidson Canyon below the Rosemont Mine in several places periodically since 2001. Their data show that Davidson Canyon is used by black bear, mountain lion, bobcat, coatimundi, white-tailed deer and at least three species of skunks.

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Water chemistry data indicated that the water in the bottom of Davidson Canyon is excellent, lower in total dissolved solids than the base flows in the main channel of Cienega Creek where the Unique Waters designation had already been received from the State. In addition, an isotope study by Pima Association of Governments showed that groundwater underflows from Davidson Canyon contribute a significant portion of the base flow in Cienega Creek, which is already designated as a Unique Water.

b. Legal Framework

i. The Section 401 Process and Required Consideration under Federal and Arizona Law

This matter arises under §401 (33 U.S.C. § 1341) of the Federal Water Pollution Control Act (33 U.S.C. §§ 1251 to 1387; otherwise known as the Clean Water Act) and A.R.S. § 49-202. Rosemont applied for a § 404 (33 U.S.C. §1344) permit from the U.S. Corps of Engineers for activities Rosemont plans related to the development of the Mine. As a precondition to the issuance of a § 404 permit for the Mine, the State of Arizona must issue a § 401 water quality certification. In that document, the State must certify that Rosemont's § 404 activities will comply with applicable Arizona water quality standards (WQS) and allow for maintenance of existing uses. Section 401(a)(1) provides:

> Any applicant for a Federal license or permit to conduct any activity . . . which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate . . . that any such discharge will comply with the applicable provisions of [the Clean Water Act].

33 U.S.C. 1341(a)(1).

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Both federal and Arizona law require the State to ensure compliance with all applicable WQS before issuing a § 401 water quality certification. If the Mine will violate water quality standards and cannot be reasonably expected to meet those standards through remedial measures, ADEQ must deny certification. *See* 33 U.S.C. § 1341(a)(1) and (a)(3). The Clean Water Act also authorizes the State to impose conditions on the Certification necessary to ensure compliance with WQS. 33 U.S.C. 1341(d).

ADEQ is statutorily designated as the State's agency responsible for issuing § 401 Certifications. A.R.S. § 49-202(A). ADEQ is required to issue rules governing how it will evaluate §401 applications but has done so only in a limited sense. The rules pertaining to antidegradation provide that

> [t]he Director shall conduct the antidegradation review of any discharge authorized under a nationwide or regional § 404 permit as part of the § 401 water quality certification prior to issuance of the nationwide or regional permit. The Director shall conduct the antidegradation review of an individual § 404 permit if the discharge may degrade existing water quality in an OAW or a water listed on the 303(d) List of impaired waters. For regulated discharges that may degrade water quality in an OAW or a water that is on the 303(d) List of impaired waters, the Director shall conduct the antidegradation review as part of the § 401 water quality certification process.

AAC R18-11-107.01(D).

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Further, ADEQ is to evaluate "whether the effect of the discharge will comply with the water quality standards for navigable water established by department rules adopted pursuant to § 49-221, subsection A, and § 49-222." A.R.S. § 49-202(C).

ADEQ, by rulemaking, established "Outstanding Arizona Water" ("OAW") designations for pertinent reaches of Cienega Creek and in Davidson Canyon. AAC R18-11-112(G)(8) and (G)(21). Both of these waters are downstream of Mine activities. As OAW's, both streams warrant additional protection under Arizona law. Specifically, they are subject to Tier 3 antidegradation protection pursuant to AAC R18-11-107(D). Tier 3 antidegradation protection requires that "existing water quality shall be maintained and protected in a surface water that is classified as an OAW under R18-11-112. Degradation of an OAW under subsection (C) is prohibited." AAC R18-11-107, *emphasis added.*

Additional regulatory Tier 3 protections include:

- A new or expanded point-source discharge directly to an OAW is prohibited.
- A person seeking authorization for a regulated discharge to a tributary to, or upstream of, an OAW shall demonstrate in a permit application or in other documentation submitted to the Department that the regulated discharge will not degrade existing water quality in the downstream OAW.
- A discharge regulated under a § 404 permit that may affect existing water quality of an OAW requires an individual § 401 water quality certification to ensure that existing water quality is maintained and protected and any water quality impacts are temporary. Temporary water quality impacts are those impacts that occur for a period of six months or less.

AAC R18-11-107.01(C)(2) through (4).

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ii. Public Notice Requirements Under Federal and Arizona Law

Nowhere does Arizona law specifically address the Clean Water Act requirement that the state "establish procedures for public notice in the case of all certifications by it and, to the extent it deems appropriate, procedures for public hearings in connection with specific applications." 33 U.S.C. § 1341(a)(1). Arizona statutes include a general provision for public participation in ADEQ processes. That provision requires ADEQ to, by rule, "prescribe procedures to assure adequate public participation in proceedings of the department under this chapter." A.R.S. § 49-208(A). Further, the public participation procedures, at a minimum, must "prescribe public notice requirements including the content and publication of the notice, provide an opportunity for public hearings and specify the procedures governing the hearings and <u>require the public availability of relevant documents</u>." *Id., emphasis added.*

Arizona rules promulgated pursuant to A.R.S. § 49-208 require ADEQ to:

1. Publish the notice as a legal notice at least once, in one or more newspapers of general circulation in the county or counties concerned;
2. Include in the notice the following information:
3. The major issue under consideration or a description of the reason for the action;
4. The Department's proposed action and effective date for that action;
5. The location where relevant, nonconfidential documents may be obtained and reviewed during normal business hours;
6. The name, address and telephone number of a person within the Department who may be contacted for further information;

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7. The location where public comments may be addressed, and the date and time by which comments shall be received.

AAC R18-1-401(A).

c. <u>ADEQ Based a Portion of Its Decision on a Relevant Document that was not Subject to Public Review and Comment</u>

The Certification identifies, in section 3 (Information Reviewed), a document entitled "Surface Water Mitigation Plan" (the "Plan", a copy of the narrative portion of which is attached hereto as Exhibit E), which was prepared by Rosemont in December, 2014. This submittal by Rosemont to ADEQ came long after the close of the public comment period[3] and approximately only a month prior to ADEQ's decision to issue the Certification. At no point during this period did either Rosemont or ADEQ make an attempt to inform the public of the Plan's existence or to solicit input on the Plan's content. That it is included in the "Information Reviewed" list signifies that it is a relevant document and, indeed, represents a critical piece of information in ADEQ's decision-making process.

The Clean Water Act requires Arizona to provide public notice of the § 401 process consistent with Arizona public participation procedures. U.S.C. § 1341(A). Those Arizona procedures require relevant documents to be publicly available (A.R.S. § 49-208(A)) and the public to be notified where they can be viewed. AAC R18-1-401(A). A relevant document, made part of the record at the last possible minute and with no notice to the public until the decision has been made, does not comply with either the Clean Water Act or Arizona statutes. The resulting Certification is, therefore, void.

[3] Extended comment period ended April 7, 2014

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d. Rosemont's Surface Water Mitigation Plan is Fatally Flawed

i. The Plan, and therefore, the Certification, Improperly Relies on an As-Yet-to-be-Developed Surface Water Model

Section 4.0 of the Plan advises that a Surface Water Model (the "Model") "is planned." Plan, Sec. 4.0. This Model is to "quantify potential changes surface water runoff" and to "quantify potential flow reductions." *Id.* The apparent intent is to identify whether Mine construction changes "affect, or have the potential to affect, downstream water quality." *Id.* Rosemont's schedule shows implementation of the Model in January, 2017, after nearly two years of development. Plan, Sec. 6.0

Since the downstream OAWs are covered by Tier 3 of the Arizona antidegradation standard, they cannot be degraded. AAC R18-11-107(D). There is no room for maybes and unknowns; this is an absolute prohibition. Despite the lack of a surface water model and, consequently, no idea of the Mine's impacts on downstream OAWs, ADEQ issued the Certification based solely on Rosemont's promise that it will develop the Model and implement it two years from now. Furthermore, without the model, there is no demonstration that the proposed mitigation measures can be effective. While ADEQ has some discretion in this matter, it must make a serious effort to determine whether the Mine will impact the OAWs and, if so, whether the mitigation measures will be effective. The lack of a surface water model leaves ADEQ with nothing but Rosemont's promises. Until the model is developed, there is no comfort level that Mine activities will be protective of the OAWs. Further, without a model, there can be no demonstration that

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Rosemont's mitigation can be effective in offsetting the anticipated declines identified in the FEIS and other documents.

An arbitrary and capricious decision is one where there has been "an unreasoning action, without consideration and in disregard for facts and circumstances." *Maricopa County Sheriff's Office v. Maricopa County Employee Merit Commission, et al.*, 211 Ariz. 219, 223 (2005). Issuance of the Certification without the model is arbitrary and capricious.

ii. ADEQ has Improperly Approved Definitions Requiring any Impacts Resulting from Regulated Construction Activities to be Include in the "Baseline" and would Require these Impacts to be Deemed "Natural Variation"

ADEQ approved a definition of baseline water quality conditions that includes water quality changes resulting from Phase 1 construction of impoundments. Including those impacts as part of baseline and pre-judging any resulting changes as "natural variation" is arbitrary and capricious and is contrary to law. These definitions were never provided to the public until now, so there is no previous record of our commenting on this issue. These definitions go far beyond the intent of describing how reductions in surface water volumes will be mitigated.

The surface water mitigation plan's definition of baseline also conflicts with the USFS FEIS which states, "baseline conditions would be established prior to mine construction (before pre-mining phase)" (see FEIS appendix B at B-16).

The Certification provides in Section 1:

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> Subject to the conditions in Section 5, ADEQ certifies that based on the information in Section 3 and in consideration of comments received in response to public notice of the draft Certification decision issued February 21, 2014, the activities proposed for **Rosemont Copper Project** will not violate applicable surface water quality standards (SWQS) in the subject water bodies including McCleary, Wasp, Trail, Barrel and Davidson Canyons and Cienega Creek in the Santa Cruz Watershed, near Greaterville, Pima County.

Certification, Sec. 1.

In reaching this decision, ADEQ cites both the draft memorandum entitled "Revised Analysis of Surface Water" and the "Surface Water Mitigation Plan." Certification, Sec. 3, Items 16 and 26, respectively. In the Certificate, ADEQ also approves the Surface Water Mitigation Plan, whose purpose is stated below in the Certificate's Specific Conditions:

> The applicant has prepared, and ADEQ has approved, a Surface Water Mitigation Plan, December, 2014, to maintain aquatic and riparian resources at pre-project levels in the Outstanding Waters portions of Davidson Canyon Wash and Lower Cienega Creek. The purpose of the plan is to detail the measures that will be taken to offset predicted reductions in surface water flows and sediment, resulting from the construction and operation of the Rosemont Copper Project, and a schedule for implementation of such measures.
>
> Upon issuance of this Certification, the applicant shall begin implementing the Surface Water Mitigation Plan. Any proposed changes to this plan by the applicant shall be submitted in writing to ADEQ. ADEQ shall coordinate with the USDA

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Forest Service and CoE to determine if the changes are warranted and they should be approved.

Should the results of monitoring by ADEQ, the applicant or others and/or revised hydrologic modeling (ROD Mitigation Measures FS-BR-22, FS-BR-27, FS-GW-02, FS SR-05) demonstrate that, as a result of the certified activities, water quality upstream of or in the OAW segments in Davidson Canyon Wash and/or Lower Cienega Creek has been degraded, ADEQ will request that the CoE suspend the CWA 404 Permit in order for ADEQ to evaluate the issues and require additional mitigation measures should the impacts be more than temporary degradation.

Any unauthorized material changes in, or failure to implement the Surface Water Mitigation Plan, as it is currently approved or as amended in the future by the applicant and approved by ADEQ, may be grounds for ADEQ requesting the CoE modify, suspend or revoke the CWA 404 permit pursuant to 33 CFR 325.4(a)(2). Certification, Spec. Cond. 1.

While the purpose of the Plan is to detail the measures that will be taken to offset predicted reductions in surface water flows and sediment, Section 1 of the Plan, on page 3, goes far beyond this intent. "Baseline" water quality is defined to include impacts that could occur during construction activities:

Monitoring discussed in this Plan is separated into two phases: Phase 1 and Phase 2. Phase 1 monitoring includes the time period from 2006 to the present and to the point when Project construction activities begin to affect stormwater flow and drainage. The installation of additional monitoring stations/locations (see Section 2.2.2 of this Plan) is assumed phased in during this period and is based on Rights

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> of Way from the Arizona State Land Department (ASLD). This time period covers the baseline monitoring that was initiated in 2006. As a note, any trends, water quality changes, or other anomalies observed in the Phase 1 data are understood to be due to natural variations or other activities not associated with the Project; and
>
> Phase 2 monitoring will begin when major construction activities occur at the Project site, i.e., when larger-scale stormwater impoundments are constructed at the Project site and used to contain stormwater.

Plan, Sec. 1.2.1.

Note that Phase 1 includes "to the point when Project construction activities begin to affect stormwater flow and drainage", but Phase 2 does not begin until "larger-scale stormwater impoundments are constructed and used to contain stormwater". This is vague and confusing, especially because there are so many impoundments of different sizes and none are specifically referenced in the Plan or description of activities being certified. Clearly, though, Rosemont intends to perform substantial amounts of construction during baseline development.

Activities being certified are described in the Certification, Section 2, in a way that is also vague and confusing:

> NOTE: During the development of the Final Environmental Impact statement (FEIS), changes were made to the project design that modified certain activities proposed in the CoE Public Notice/Application No. SPL-2008-00816-MB (Public Notice). This Certification is based on activities described in the Public Notice, with the exception of activities modified by the selected action in the USDA Forest Service's Record of Decision and FEIS. These modifications to the planned

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activities include the removal of the heap leach facility and process, elimination of fill in McCleary Canyon and the removal of the flow-through drain systems under the waste rock storage areas and dry stack tailings facilities.

Certification, Sec. 2.

However, the resubmitted § 404 application (the "404 Application") describes Surface Water Management on page 3. In that description, Rosemont advises:

> For the purposes of stormwater management, the open pit, the heap leach facility, and the plant site are closed systems, with all direct rainfall contained on site. Currently designed stormwater diversions include the flow-through drain system, process water temporary storage (PWTS), and open pit diversions. In addition to the primary diversions, a storage and recovery system sump will be developed in the waste rock storage area. Project water management facilities are intended to have sufficient capacity to handle runoff generated from 100-year, 24-hour storm events. Sediment control facilities are designed to reduce the total suspended solid loads to the minimum practical level in the 10-year, 24-hour storm event, defined as total suspended sold [*sic*] concentrations equal to existing conditions.
>
> Stormwater flows from the plant site will be collected in the lined PWTS pond, located immediately downgradient of the plant site. The PWTS pond functions as a closed system with all water that is directed to the pond from the plant, in addition to collected stormwater runoff, incorporated into the process water flows.
>
> The buttresses of the dry stack tailings facility will advance ahead of the tailings surface to provide containment while concurrent reclamation and best management practices, such as settling ponds, will be used to limit soil erosion in

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> the outer slopes. The top of the tailings area is impervious and will be sloped inward so precipitation falling on top of the active tailings area will remain on top and evaporate. Ponded water may be pumped to the PWTS pond as needed to limit infiltration into tailings mass. Stormwater management at the waste rock facilities will be similar to that for the dry tailings facility.

404 Application, page 3.

As noted in the Certification, the project description and activities were modified in the draft ROD and FEIS. The FEIS identifies an 18- to 24-month preconstruction period that includes pit construction and diversion of the intercepted runoff to Barrel Canyon, not impoundment. Specifically: see p. xvi of the FEIS executive summary:

> The project would be located primarily within the Barrel Canyon drainage and its tributaries. Diversion channels would be constructed to intercept runoff from precipitation and route it around the mine facilities for discharge to lower Barrel Canyon, downstream of the project. Over time, the northern tailing facility would expand south and east and would cover a portion of the Barrel Canyon.

FEIS, p. xvi.

The FEIS further provides:

> Preproduction stripping of overlying rock would require 18 to 24 months (premining stage) to prepare for full-scale mining operations, train work crews, construct access and haul roads, and clear and grub the pit and tailings and waste rock facilities that would be disturbed during the initial years of operation.

FEIS, p. xvii.

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Page 14 of the July 2013 Stormwater Pollution Prevention Plan (SWPPP), which was not listed as a relevant document for the Certification and, therefore, apparently not reviewed by ADEQ, provides much more explicit information regarding sequencing of stormwater controls on the figures 4-13 submitted with the SWPPP. At the minimum, based on these, there could be clearing, grubbing, construction of the crushing, milling and flotation facilities, and at least partial construction of the pit diversion and the haul and access roads during baseline.

In conclusion, it is clear the baseline is defined in a way that permits 404-regulated activities to occur during baseline water quality data collection. This is illogical in addition to arbitrary and capricious. While it is true under Arizona law that there can be no discharges from the mine workings during active mining and that this prohibition does not apply before mining commences, it is not logical to assume that construction activities at the mine cannot cause any trends, water quality changes or other anomalies, particularly when wholesale diversions of watersheds will occur during the earliest phases of construction.

The monitoring plan goes further to define any trends, water quality changes or other anomalies as "due to natural variations or other activities not related to the Project" (Section 1 of the Plan at page 3). Approving an applicant's statement requiring official to interpret water quality data in the applicant's favor is arbitrary and capricious, if not contrary to law.

iii. Rosemont Will Use Improper Adaptive Management Techniques to Modify the Plan

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The Surface Water Mitigation Plan, dated December 2014, is a new document that is part of the basis for Certification. This new document advises that a surface water model will be used to identify runoff replacement as a means of mitigating reduction of surface water discharges. At page 18, Rosemont states:

> In addition to serving as a tool to quantify potential flow reductions due to Project activities, the Model will be used to estimate runoff replacement quantities from off-site mitigation locations. Project effects will be based on existing and new monitoring points located throughout the watershed up-gradient of the USGS Gaging Station. The USGS station is located at the intersection of SR 83 and the Lower Barrel Canyon Drainage.

Plan, Sec. 4.0.

In the Plan, Rosemont proposes the use of an adaptive management process "to ensure the initial intent of the Plan is being met, and that pertinent data is being collected and reported and that site conditions are accurately represented." Plan, Sec. 8.0. It identifies three key components of adaptive management:

- Testing assumptions - collecting and using monitoring data to determine if current assumptions are valid;
- Adaptation - making changes to assumptions and monitoring program to respond to new or different information obtained through the monitoring data and project experience: and
- Learning - documenting the planning and implementation processes and its successes and failures for internal learning as well as the scientific community.

Plan, Sec. 8. Rosemont further provides a partial list of elements that may be modified as part of the adaptive management process:

> Monitoring locations;

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Monitoring parameters;

Monitoring frequencies;

Assumptions associated with pollutant loading, runoff volume, and/or assimilative capacity;

Modeling approach;

Mitigation opportunities or requirements;

Implementation process for mitigation; and

Information provided and included in the quarterly data summaries and in the Annual Summary Report.

Approximately 30% of the surface water entering the OAW at Davidson Canyon will be impounded as a result of the Mine, yet there is no plan proposed by Rosemont to make up for that reduction in flow. Further, there is <u>no connection</u> between the host of data proposed to be collected and a decision to engage in a management action that can reverse or mitigate for damages caused. Instead, the Certification allows Rosemont to invoke an "adaptive management" process whose outcome is not avoiding, minimizing, or mitigation harm to the resource (quantity and/or quality of surface water), but instead to refine models. Characterizing such an approach as adaptive management is contrary to logic, because adaptive management is inherently focused on management actions that foster outcomes related the goal of the project, which is:

. . . no degradation to downstream water quality (compared to current water quality) due to Project construction, operation, and/or closure activities. Additionally, no degradation is anticipated to the water quality in the Outstanding Arizona Water (OAW) segment of Davidson Canyon Wash.

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Plan, Sec. 1.0.

The certification ignores a large body of literature and practice of adaptive management in environmental decision processes in general (e.g., Walters 1986; Gregory and Keeney 2002; Williams et. al. 2007) and water management in particular (Richter et. al. 2003; Zedler 2003; Richter and Thomas 2007; Medema et. al. 2008). Citations to this literature with brief excerpts is attached hereto as Appendix 1. To our knowledge, no credible application of adaptive management principles and practices are restricted to model validation and refinement, as was certified for Rosemont. In short, while model validation is a key step in adaptive management, such models only serve to improve the outcome of management actions. Rosemont's reliance solely on model refinement is an improper use of the adaptive management method and, consequently, ADEQ's acceptance and approval of this approach as a key component of the Plan is arbitrary and capricious.

In the case of surface water in the Davidson watershed, adaptive management—even as practiced according to industry standards—is not an appropriate tool for surface water in Davidson Canyon. Instead, the focus of the mitigation plan should be on avoidance, minimization, and mitigation of impacts that are already modeled to occur, particularly during construction. In light of the absolute antidegradation requirement of AAC R18-11-107(D) for the OAWs involved, failure to require such a focus is arbitrary, capricious and contrary to law.

iv. Rosemont's Surface Water Mitigation Plan Does not Include a Stormwater Mitigation Plan nor any Immediate Contingency to Address Stormwater Impacts

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Rosemont opines that it "does not anticipate any adverse changes to water quality or the stability of Davidson Canyon Wash or the OAW segment as the result of Project activities." Plan, Sec. 5.0. For that reason, it offers only "general concepts" of what it will do should stormwater impacts occur. *Id.* ADEQ's acceptance of Rosemont's opinion and the resulting approval of the Plan without stormwater response contingencies is arbitrary and capricious and is contrary to law.

Both Davidson Canyon and Cienega Creek are OAWs (AAC R18-11-112(G)) and are protected by the Tier 3 antidegradation standard. AAC R18-11-107. Tier 3 protections in Arizona law are:

1. Tier 3 antidegradation protection applies only to an OAW listed in R18-11-112(G).
2. A new or expanded point-source discharge directly to an OAW is prohibited.
3. A person seeking authorization for a regulated discharge to a tributary to, or upstream of, an OAW shall demonstrate in a permit application or in other documentation submitted to the Department that the regulated discharge will not degrade existing water quality in the downstream OAW.
4. A discharge regulated under a § 404 permit that may affect existing water quality of an OAW requires an individual § 401 water quality certification to ensure that existing water quality is maintained and protected and any water quality impacts are temporary. Temporary water quality impacts are those impacts that occur for a period of six months or less.

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AAC R18-11-107.01(C). Two of these protections, (3) and (4) are particularly relevant to the instant discussion.

Protection (3) requires Rosemont to demonstrate that Mine-related discharges "will not degrade existing water quality." AAC R18-11-107.01(C)(3). Rosemont has not done so with respect to stormwater discharges. It merely offers its belief that there will be no impacts and advises that it will develop a mitigation plan "[w]hen it is determined that mitigation is required." Plan, Sec. 5.0.

Rosemont's intent to delay development of a mitigation plan leaves open the likelihood that impacts to the OAWs will last more than the "temporary" six-month duration specified in Protection (4). Only after an impact is detected, will Rosemont develop the mitigation plan and implementation of the plan's response actions will be even further postponed. This is particularly problematic given the inherent delay in reporting impacts to the U.S. Forest Service (only on a quarterly basis) followed in delays in convening meetings of the response committee.

Rosemont's failure to make the demonstration necessary to meet the requirement of Protection (3) is contrary to law. ADEQ's approval of the Plan with the non-compliant demonstration and the lack of an immediate mitigation plan is arbitrary and capricious.

e. <u>ADEQ Relied Upon Faulty Technical Data in its Decision-Making Process</u>

As noted above, Appellants submitted three letters during ADEQ's review of the Rosemont application. ADEQ has made no attempt to address any of these comments in a written explanation of its decision-making process. It issued a final Certification that is

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essentially identical to the draft version and merely makes passing reference, in the "Information Reviewed" section of the Certification, to the many comments received. This lack of a reasoned response to the comments coupled with the lack of significant revisions between the draft and final Certification suggests the comments were, for the most part, ignored.

ADEQ's apparent refusal to consider comments filed is particularly troubling in light of information contained in Appellants' July 16, 2014 submittal (Exhibit D, hereto). While this document was submitted outside the official comment period, it is not a comment, *per se*, but represents supplemental technical information regarding streamflow and groundwater in Cienega Creek and Davidson Canyon. Attached to the July 16, 2014 letter was a document entitled "Impacts of the Rosemont Mine on Hydrology and Threatened and Endangered Species of the Cienega Creek Natural Preserve"[4] (hereinafter, "Powell (2014)") which points out a statistically significant link between surface water flow extent and groundwater resources in lower Cienega Creek and Davidson Canyon. In particular, Powell (2014) identifies and discusses faulty topographical data relied upon by Rosemont. This new technical data makes invalid Rosemont's assertion that the Davidson Canyon surface-water system is disconnected from the groundwater system. However, despite the obvious importance of this information in the protection of OAW water quality and the resulting potential for Mine impacts, ADEQ apparently chose to ignore Appellants' submittal. ADEQ's failure to consider the data supplied in Appellants' July 16, 2014 submittal and to factor that data into the Certification is arbitrary and capricious.

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[4] Powell, Orchard, Fonseca, and Postillion (2014). Impacts of the Rosemont Mine on hydrology and Threatened and Endangered Species of the Cienega Creek Natural Preserve. The Powell document resulted from a federal workshop held on June 10 and 11, 2014 to identify new data and analyses pertaining to surface waters. The data therein was not available during the official comment period in this matter.

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Powell (2104) shows: 1) the corrected channel bed elevations are clearly within elevations that intersect the shallow groundwater table; and 2) groundwater supports intermittent surface flows in the OAW reach. There is, however, no recognition of this information in ADEQ's final Certification nor is there any explanation as to why the information was ignored.

Figure 1 of Appendix 2 hereto is a graph[5] produced by Rosemont purporting to show groundwater elevations significantly below stream bed levels. Figure 2 in Appendix 2 hereto is the same graph[6] but with corrected stream bed elevations. The corrected cross-sectional data demonstrate that the following conclusions from Rosemont's Davidson Canyon Conceptual Groundwater Monitoring Plan[7] are incorrect:

- "DTW [depth to water] has been persistently 7 to 15 feet below the stream channel in the OAW Reach;"
- "Persistent DTW below the stream channel bottom, combined with ephemeral, short duration, low discharge, and limited surface-length expression of spring flow, indicates that the groundwater system is usually disconnected from the surface-water system;"
- "Groundwater is disconnected from the alluvial stream channel"; and
- "Potential impacts to the OAW Reach will be limited

(Groundwater Plan, page 12) and that ADEQ's reliance[8] on those conclusions was improper.

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[5] Figure 5 in Tetra Tech (2010a), Davidson Canyon hydrological conceptual model as assessment of spring impacts. Tetra Tech project 114-320869. Prepared for Rosemont Copper, Tucson, Arizona.
[6] Figure 6 in Powell (2014).
[7] Davidson Canyon Conceptual Groundwater Monitoring Plan, prepared by Engineering Analytics, Inc., March 2012.
[8] Cited as document 13 in Certification, Section 3.0.

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Appellants, in their April 4, 2014 comments (Exhibit C) discuss ADEQ's decision to ignore isotope work done by Montgomery and Associates in 2010[9] that clearly supports a hydraulic connection between the OAW reach of Davidson Canyon and the regional aquifer. The statement in the Mitigation Plan that "no degradation is anticipated to the water quality in the Outstanding Arizona Water (OAW) segment of Davidson Canyon Wash" (Plan, Sec. 1.0), in part, presumes that the OAW reach is not connected to the regional aquifer as reported in Tetra Tech (2010a). This overlooks documentation suggesting otherwise, and therefore, contradicts the Certification's assertion that mining activities will not cause degradation to water quality in the OAW.

Further, as also discussed in Appellants' July 16, 2014 report (attached to Exhibit D), ADEQ failed to consider and comment on an analysis showing drawdown of the regional aquifer in amounts reported in (Montgomery 2010) can potentially reduce wetted stream length in Lower Davidson Canyon by 30%. This analysis is crucial to illustrate the potential damage to the OAW that will result from drawdowns in the regional aquifer. It undermines Rosemont's argument that the streamflows in Davidson Canyon are unrelated to the regional aquifer and that groundwater is disconnected from the alluvial stream channel. When additional evidence is considered, it is apparent there is a much higher probability of Mine impacts on Lower Davidson Canyon and the Outstanding Arizona Waters. The data concerning these increased risks were apparently not considered by ADEQ in its decision to issue the Certification. That failure produced an arbitrary and capricious decision.

[9] Montgomery and Associates, Inc. 2010. Revised report: Groundwater flow modeling conducted for simulation of proposed Rosemont pit dewatering and post-closure, Vol. 1: Text and tables. Prepared for Rosemont Copper. Tucson, Arizona.

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IV. CONCLUSIONS

For the reasons provided above, ADEQ's Certification that the activities proposed by Rosemont for the Rosemont Copper Project will not violate applicable surface water quality standards in Davidson Canyon and Cienega Creek is not supported by substantial evidence, is contrary to law, is arbitrary and capricious and is an abuse of discretion. For that reason, ADEQ's decision to issue the Certification must be reversed. Further, approval of the Rosemont Surface Water Mitigation Plan must be rescinded and amended to address the inadequacies discussed herein. Revision of the Plan should be followed by public review and comment. Finally, Rosemont must quantify the extent and duration of "temporary" impacts from Mine operations to the downstream OAWs.

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RESPECTFULLY SUBMITTED March 5, 2015.

BARBARA LAWALL
PIMA COUNTY ATTORNEY

By _____
Charles Wesselhoft
Deputy County Attorney

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CERTIFICATE OF SERVICE

I hereby certify that on March 5, 2015, a copy of the above Notice of Appeal, was served on the persons listed below by depositing said document into the U.S. Mail, postage prepaid (certified mail, return receipt requested) prior to 11:59 p.m.

Director
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007

and

Hearing Administrator
ADEQ Office of Administrative Counsel
1110 West Washington Street
Phoenix, Arizona 85007

With a copy to:

Office of the Attorney General
Environmental Enforcement Section Administrative Appeals Desk
1275 West Washington Street
Phoenix, Arizona 85007

***

By: Stacey Berman

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Exhibit B

March 23, 2015 letter from ADEQ

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Henry R. Darwin
Director

March 23, 2015

Mr. Charles Wesselhoft
Deputy County Attorney
32 North Stone Avenue, Suite 2100
Tucson, Arizona 85701

RE: Notice of Appeal (Water Quality Certification to Rosemont Copper Company)

Dear Mr. Wesselhoft:

Arizona Revised Statute (A.R.S.) § 49-202(H) limits administrative appeals of water quality certifications under Title 41, Chapter 6, Article 10. As you noted, A.R.S. § 49-202(H) authorizes an adversely affected person to appeal a certification of a nationwide or general permit. In this case, the requirements of A.R.S. § 49-202(H) have not been met because the State's 401 Water Quality Certification applies to the individual Clean Water Act 404 permit for the Rosemont Copper Project. Since the requirements have not been met, your appeal request is denied.

If you have any questions, feel free to contact me at (602) 771- 224.

Sincerely,

Sherri L. Zendri
Administrative Counsel
Arizona Department of Environmental Quality

cc: Curtis Cox, Arizona Attorney General's Office

Exhibit C

Request for Reconsideration

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ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

PIMA COUNTY, a body politic; and PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT, Appellants, vs. THE STATE OF ARIZONA, and THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY, Respondents.	**REQUEST FOR RECONSIDERATION**

INTRODUCTION

In a letter from the Arizona Department of Environmental Quality (ADEQ) dated March 23, 2015 (copy attached hereto as Exhibit A) ADEQ denied Appellants Pima County's and Pima County Flood Control District's appeal of ADEQ's issuance of a Section 401 water quality certification (Certification) to Rosemont Copper Company. ADEQ cites, as a basis for denial, an alleged standing limitation in A.R.S. § 49-202(H). Specifically, ADEQ denied the appeal because the appeal challenged issuance of a

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certification for an individual, rather than a nationwide or general, permit. For the reasons discussed below, Appellants respectfully request that ADEQ's decision to deny the appeal be reversed.

DISCUSSION

I. Appellants Pled Applicability of Both A.R.S. § 49-202(H) and A.R.S. § 41-1092.03(B) in Their Assertion of Standing

While Appellants, in their Notice of Appeal ("Notice"), offered A.R.S. § 49-202(H) as a basis for standing, Appellants also relied on the standing provisions of A.R.S. § 41-1092.03(B) and, in particular, explained Appellants' participation in the Certification process and, therefore, their right to appeal the Certification under that statute. State law specifically allows appeal by a "party who will be adversely affected by the appealable agency action or contested case and who exercised any right provided by law to comment on the action being appealed or contested . . . ." A.R.S. § 41-1092.03(B). Appellants meet the requirements of A.R.S. § 41-1092.03(B) and have a right to appeal the Certification independent of A.R.S. § 49-202(H).

II. Appellants are Parties for Purposes of A.R.S. § 41-1092.03(B)

"Party," for purposes of Title 41, Chapter 6, "means each person or agency named or admitted as a party or properly seeking and entitled as of right to be admitted as a party." ARS 41-1001(12). Nothing in Title 41, Chapter 6 is particularly instructive regarding who is entitled to be admitted as a party. However, there is case law touching on the subject.

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City of Phoenix v ADEQ, et al., 205 Ariz. 576 (Div. 1, 2003) involved a challenge by the City of Phoenix (City) of a permit issued by ADEQ to a waste management company allowing the company to own and operate a hazardous waste treatment and storage facility. The City's challenge was based, in part, on whether the Resource Conservation and Recovery Act[1] (RCRA) and regulations promulgated thereunder preempted A.R.S. Title 41, Chapter 6, Article 10 (Article 10).

As part of the court's analysis of this question, it looked to regulations promulgated pursuant to RCRA and, in particular at 40 CFR § 124.19(a). The court pointed out that, under the cited RCRA regulation, "only persons or entities who first filed comments on the initial draft permit may petition the Board for administrative review." *Phoenix* at 582. It then went on to say, when comparing the challenge provisions under RCRA with those in Article 10:

> Moreover, whereas federal regulation requires that only parties who filed comments on, or participated in, the initial draft permit are allowed to petition for administrative review and thus ultimately obtain judicial review, no such qualifying preliminary objection is required under Article 10.

Id. Thus, for purposes of RCRA permit challenges and Article 10, the Division 1 court equated "persons" with "parties." There is no reason to believe a different interpretation applies when a water quality certification is the underlying decision.

The broader interpretation of "party" is also supported when A.R.S. § 41-1092.03(B) is read in conjunction with A.R.S. § 49-202(H). As discussed below, these two statutes, when combined, provide appeal rights for all persons adversely impacted by ADEQ's issuance of § 401 water quality certifications. It is unreasonable to ascribe a

[1] RCRA is the 1976 amendment to the federal Solid Waste Disposal Act, 42 U.S.C. §§ 6901 to 6992k.

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PIMA COUNTY ATTORNEY
CIVIL DIVISION

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lesser standing standard to those appealing nationwide and general permit-related certifications but a higher standard to those appealing individual permit certifications.

Given the lack of any guidance to the contrary in statute or case law, Appellants must be considered Article 10 parties.

III. A.R.S. § 41-1092.03(B) Allows Appeals of § 401 Individual Permit Certifications

The Arizona Administrative Procedure Act ("APA"), A.R.S. Title 41, Chapter 6, grants persons the right of appeal "an appealable agency action." A.R.S. § 41-1092.03(B). An "appealable agency action" is defined under the APA as "an action that determines the legal rights, duties or privileges of a party and that is not a contested case." ARS 41-1092(3). Appellants, in the Notice of Appeal, provided multiple claims concerning ADEQ's improper issuance of the Certification and the resulting impact on Appellants' legal rights as downstream property owners. Protection of those rights is the very purpose of the APA.

IV. A.R.S. § 49-202(H) Does Not Preclude A.R.S. § 41-1092.03(B)-based Appeals of § 401 Individual Permit Certifications

While A.R.S. § 49-202(H) allows both an "applicant" and "any person who is or may be adversely affected by the denial or imposition of conditions on the certification of a nationwide or general permit" to appeal the certification, there is nothing in that statute precluding challenges to individual permit certifications under another statute. Indeed, interpreting A.R.S. § 49-202(H) as a limitation would be in direct conflict with the general right to appeal agency actions provided under A.R.S. § 41-1092.03(B).

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CIVIL DIVISION

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Given this conflict, interpreting A.R.S. § 49-202(H) as a limitation on Appellants' right to appeal the Certification is inconsistent with the state's Administrative Procedure Act (the "APA"). A.R.S. Title 41, Chapter 6. The APA, which includes A.R.S. § 41-1092.03(B), provides the following explanation of statutory hierarchy: "[t]o the extent that any other statute would diminish a right created or duty imposed by this chapter, the other statute is superseded by this chapter, unless the other statute expressly provides otherwise." A.R.S. § 41-1002(B). Therefore, A.R.S. § 49-202(H) must be interpreted as something other than a limitation on the APA-granted right to appeal.

Interpreting A.R.S. § 49-202(H) to preclude appeal of individual permit certifications is also illogical in that the statute allows appeal of nationwide and general permits but, for individual permits which often result in substantial impacts to waters of the U.S., no appeal is allowed.

The logical, conflict free interpretation of the two provisions allows appeals of individual permit certifications to proceed under A.R.S. § 49-1092.03(B), subject to the requirement that the persons appealing participated in the certification process. A.R.S. § 49-202(H) provides a separate appeal pathway for persons challenging nationwide and general permit certifications. Certifications for those types of permits are issued generally and with little or no opportunity for review and input regarding specific conditions imposed on permittees or those adversely impacted by the certifications. This appears to be the gap the Legislature intended to close in enacting ARS 49-202(H).

V. CONCLUSION

As discussed above, Appellants properly pled their right to appeal pursuant to ARS 41-1092.03(B). They were parties to the Certification process and therefore qualify for standing to appeal under ARS 41-1092.03(B). Appeals of individual § 401 permit

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certifications are properly brought under ARS 41-1092.03(B). Finally, ARS 49-202(H) does not preclude appellants from an appeal pursuant to ARS 41-1092.03(B).

For the above reasons, Appellants respectfully request reconsideration of ADEQ's decision to deny Appellants' appeal in this matter.

RESPECTFULLY SUBMITTED April 1, 2015.

BARBARA LAWALL
PIMA COUNTY ATTORNEY

By _____
Charles Wesselhoft
Deputy County Attorney

BARBARA LAWALL
PIMA COUNTY ATTORNEY
CIVIL DIVISION

ED_002020B_00036430-00132

BARBARA LAWALL
PIMA COUNTY ATTORNEY
CIVIL DIVISION

CERTIFICATE OF SERVICE

I hereby certify that on April 1, 2015, a copy of the above Request for Reconsideration, was served on the persons listed below by depositing said document into the U.S. Mail, postage prepaid (certified mail, return receipt requested) prior to 11:59 p.m.

Director
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007

and

Hearing Administrator
ADEQ Office of Administrative Counsel
1110 West Washington Street
Phoenix, Arizona 85007

With a copy to:

Office of the Attorney General
Environmental Enforcement Section Administrative Appeals Desk
1275 West Washington Street
Phoenix, Arizona 85007

***

By: Stacey Bowman

ED_002020B_00036430-00133

Exhibit D

May 1, 2015 Letter from ADEQ

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Henry R. Darwin
Director

May 1, 2015

Mr. Charles Wesselhoft
Deputy County Attorney
32 North Stone Avenue, Suite 2100
Tucson, Arizona 85701

RE: Request for Reconsideration (Water Quality Certification to Rosemont Copper Company)

Dear Mr. Wesselhoft:

The Arizona Department of Environmental Quality (ADEQ) has received and considered your April 1, 2015 request to reconsider its position regarding Pima County's appeal of the Section 401 Water Quality Certification to Rosemont Copper Company. ADEQ does not have the legal authority to expand the statutory jurisdiction authorizing administrative appeals in the State's administrative appeals process. Therefore, as previously stated in ADEQ's March 22, 2015 letter, ADEQ is unable to accept an appeal and agree to your request. ADEQ, however, does not take a position on the right to administratively appeal, through the federal administrative appeals process, the Army Corp of Engineers' Section 404 permit.

If you have any questions, feel free to contact me at (602) 771- 2242.

Sincerely,

Sherri L. Zendri
Administrative Counsel
Arizona Department of Environmental Quality

cc: Curtis Cox, Arizona Attorney General's Office

Exhibit E

Order dated July 14, 2016

Michael K. Jeanes, Clerk of Court
*** Filed ***
07/18/2016 8:00 AM

SUPERIOR COURT OF ARIZONA
MARICOPA COUNTY

LC2015-000243-001 DT 07/14/2016

CLERK OF THE COURT
J. Eaton
Deputy

THE HON. CRANE MCCLENNEN

PIMA COUNTY
PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT

CHARLES WESSELHOFT

v.

HENRY DARWIN (001)

CURTIS A COX

OFFICE OF ADMINISTRATIVE HEARINGS
REMAND DESK-LCA-CCC

HIGHER COURT RULING / REMAND

Appellants Pima County and Pima County Regional Flood Control District ask this Court to review actions taken by Appellee the Arizona Department of Environmental Quality (AzDEQ) refusing to allow Appellants to proceed with the appellate review process. For the following reasons, this Court orders AzDEQ to take some official action in this matter.

I. FACTUAL BACKGROUND.

On October 11, 2011, Rosemont Copper Company (Rosemont) applied to the Army Corps of Engineers for a discharge permit (known as a § 404 permit), and on January 12, 2012, applied to Appellee the Arizona Department of Environmental Quality (AzDEQ) for a § 401 certification, which it needed in order to obtain the § 404 permit. AzDEQ issued a notice stating any comments were due by March 24, 2014. In response, Appellants filed an initial set of comments on March 21, 2014. AzDEQ extended the comment period to April 7, 2014, and Appellants filed a second set of comments on April 4, 2014.

On February 3, 2015, AzDEQ issued the final Certification. On March 5, 2015, Appellants filed an administrative appeal pursuant to the Arizona Administrative Procedure Act seeking to have this issue reviewed at an administrative hearing, such as one before the Office of Administrative Hearings. Mr. Charles Wesselhoft (Wesselhoft), Deputy (Pima) County Attorney, received a letter dated March 23, 2015, on Arizona Department of Environmental Quality letterhead, from Ms. Sherri L. Zendri (Zendri), who listed herself as Administrative Counsel, Arizona Department of Environmental Quality. In that letter, Zendri stated that Appellants did not qualify as entities that were permitted to file an administrative appeal, and thus "your appeal request is denied." (Zendri Letter, dated Mar. 23, 2015, at 1.)

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In response to Zendri's letter, Appellants filed a Request for Reconsideration giving their reasons why they believed they did have the right to appeal AzDEQ's issuance of the final Certification. (Request for Reconsideration, dated Apr. 1, 2015.) In response, Wesselhoft received another letter, again on Arizona Department of Environmental Quality letterhead from Zendri, who again listed herself as Administrative Counsel, Arizona Department of Environmental Quality. In that letter, Zendri stated "ADEQ is unable to accept an appeal and agree to your request." It further stated "ADEQ, however, does not take a position on the right to administratively appeal, through the federal administrative appeals process, the Army Corp of Engineers' Section 404 permit." (Zendri Letter, dated May 1, 2015, at 1.)

On June 3, 2015, Appellants filed a Notice of Appeal for Judicial Review of Administrative Decision stating, "This action seeks judicial review of ADEQ's decision made by [Henry R.] Darwin, as Director of ADEQ." (Notice of Appeal at ¶ 9.) In its Answering Brief filed October 26, 2015, Appellees (which now included both AzDEQ and Rosemont) presented three arguments.

First, Appellees contended this Court did not have jurisdiction in this appeal because (1) the two letters from Zendri were not the actions of AzDEQ, (2) thus those letters did not constitute an administrative decision under A.R.S. § 12–901(2), and (3) thus those letters did not constitute a final administrative decision under A.R.S. § 12–902(A)(1) that would be subject to administrative review under A.R.S. § 12–904(A). Appellees stated "Zendri's letters are more properly viewed as advisory communications from agency counsel to counsel for the Appellants." (Appellees' Joint Answering Brief at 7, ll. 14–15.) They further stated "Zendri was not the Director of ADEQ and was not authorized to render decisions for the agency." (*Id.* at 7, ll. 25–26.)

Second, Appellee contended this Court did not have jurisdiction in this appeal because Appellants failed to seek a hearing of the agency decision in accordance with the Administrative Procedure Act. Appellees contend that, because Appellants had taken the position that the Zendri letters constituted an appealable agency action within the meaning of A.R.S. § 41–1092(3), "they had an obligation to request a hearing on that action pursuant to A.R.S. § 41–1092.03(B) and to complete the administrative appeal process *before* seeking judicial review under the Administrative Review Act." (Appellees' Joint Answering Brief at 9–10; emphasis original.)

Third, Appellees contended that "even if Ms. Zendri's advisory letters constitute a final administrative decision and Appellants' failure to exhaust administrative remedies is ignored, Appellants, as a matter of law, had no right to appeal the Certification." (Appellees' Joint Answering Brief at 10, ll. 15–17.)

At the oral argument held January 27, 2016, Appellees again took the position that the Zendri letters were not the action of the administrative agency (AzDEQ), thus this Court did not have jurisdiction to review what had happened below. This Court raised the question whether this Court could treat the current action as a special action in the nature of mandamus and order the Director of AzDEQ to take some action as Director of, and on behalf of, AzDEQ. This Court ordered the parties to file supplemental briefs on that issue. The parties have now done so.

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II. DISCUSSION.

In their Joint Supplemental Brief, filed June 1, 2016, Appellees state the following:

> Appellees acknowledge that Ms. Zendri was authorized to act on behalf of ADEQ (but as the agency's Administrative Counsel, and not as its Director) and that her correspondence is consistent with ADEQ's position in this case. But that does not mean Ms. Zendri is authorized to issue final administrative decisions on behalf of ADEQ or that her communications are appealable under the ARA.
>
> As a result, there are two serious jurisdictional problems which affect the Court's interlocutory powers, including its authority to issue the contemplated order. First, as stated, the ARA provides for judicial review in the superior court of "a final decision of an administrative agency." A.R.S. § 12–902(A)(1). Ms. Zendri is not the ADEQ Director, and her letters do not constitute the final administrative decision of ADEQ. See Appellees' Ans. Br. At 6–8.
>
> Second, Appellants failed to exhaust their administrative remedies. Under the Administrative Procedure Act ("APA"), A.R.S. §§ 41–1092 to 41–1092.12, a party who is adversely affected by an "appealable agency action" is required to request a hearing and complete the administrative appeal process. At the end of that process, a final administrative decision is issued by the agency head or board. *See* A.R.S. § 41–1092.08. Even if Ms. Zendri's letters were an appealable agency action—as Appellants must contend—they did not seek a hearing and obtain a final administrative decision. Consequently, their appeal is barred by A.R.S. § 41–1092.08(H) and by the doctrine of exhaustion of administrative remedies. See Appellees' Ans. Br. At 8–10.

(Joint Supp. Brief, filed Jun. 1, 2016, at 3–4.) This Court accepts Appellees' position that "Ms. Zendri is [not] authorized to issue final administrative decisions on behalf of ADEQ" even though "her correspondence is consistent with ADEQ's position in this case." (Joint Supp. Brief, filed Jun. 1, 2016, at 3, ll. 15–17.) Zendri's letters indicated that AzDEQ had adopted a position on Appellants' right to appeal that was contrary to Appellants' position, but AzDEQ chose to express that position, not by the issuance of an administrative decision by the Director of AzDEQ, but by means of "advisory communications from agency counsel to counsel for the Appellants." (Appellees' Joint Answering Brief at 7, ll. 14–15.) AzDEQ's position is that, because Ms. Zendri's letters are only "advisory communications" and not final administrative decisions by the agency, Appellants have no right to appeal to this Court. That would also mean Appellants had no right to seek review by means of a hearing by the Office of Administrative Hearings, which is what Appellants tried to do. Although AzDEQ is entitled to take any position it wishes on Appellants' contention that they have the right to appeal AzDEQ's issuance of the final Certification to Rosemont, this Court is of the opinion that AzDEQ is not entitled to insulate itself from judicial review by having its Administrative Counsel issue "advisory communications," rather than having its Director issue an administrative decision.

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On the issue of jurisdiction, this Court is of the opinion that, if it does not have jurisdiction because AzDEQ has not issued a final administrative decision, this Court has the jurisdiction to treat these proceedings as a special action in the nature of mandamus. This Court will therefore order the Director of AzDEQ to issue an administrative decision on Appellants' request to appeal AzDEQ's issuance of the final Certification to Rosemont. In making this order, this Court is aware that it has no authority to order the Director of AzDEQ to decide this matter in any particular way. Thus, AzDEQ and its Director have complete discretion to decide in any way they deem appropriate on Appellants' request to appeal AzDEQ's issuance of the final Certification to Rosemont. Under this Court's order, the only thing AzDEQ and its Director must do is reduce that decision to writing in such a manner that it becomes an administrative decision, so that Appellants may pursue further administrative remedies if they choose to do so.

III. CONCLUSION.

Based on the foregoing, this Court concludes AzDEQ does not have the authority to reject a permissible request (for further review) by Appellants, and then insulate itself from judicial review by having its Administrative Counsel issue "advisory communications," rather than having its Director issue an administrative decision. This Court further determines there is no just reason to delay entry of judgment and no further matters remain pending, and thus this judgment is entered pursuant to Rule 54(c).

IT IS THEREFORE ORDERED treating these proceedings as a Special Action in the nature of mandamus.

IT IS FURTHER ORDERED that the Director of AzDEQ to issue an administrative decision on Appellants' request to appeal AzDEQ's issuance of the final Certification to Rosemont.

IT IS FURTHER ORDERED entering this judgment pursuant to Rule 54(c).

IT IS FURTHER ORDERED signing this minute entry as a formal Order of the Court.

/s/ Crane McClennen
THE HON. CRANE MCCLENNEN
JUDGE OF THE SUPERIOR COURT

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NOTICE: LC cases are not under the e-file system. As a result, when a party files a document, the system does not generate a courtesy copy for the Judge. Therefore, you will have to deliver to the Judge a conformed courtesy copy of any filings.

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Exhibit F

Administrative Law Judge Decision

IN THE OFFICE OF ADMINISTRATIVE HEARINGS

In The Matter Of:	No. 16A-P33-DEQ
ROSEMONT COPPER 401 CERTIFICATION	**ADMINISTRATIVE LAW JUDGE DECISION**
Appellants: Pima County and Pima County Flood Control District	

HEARING: Oral argument held on February 7, 2017

APPEARANCES: Andrew Flagg, Esq. and Charles Wesselhoft, Esq. for Appellants; Norman James, Esq. for Rosemont Copper Company; Curtis Cox, Esq. and Bradley Pollock, Esq. for the Arizona Department of Environmental Quality

ADMINISTRATIVE LAW JUDGE: Thomas Shedden

FINDINGS OF FACT

1. On November 1, 2016, the Arizona Department of Environmental Quality ("ADEQ") issued a Notice of Hearing setting the above-captioned matter for hearing on December 20, 2016, at the Office of Administrative Hearings in Phoenix, Arizona.

2. The Appellants are Pima County and Pima County Flood Control District (referred to collectively as "Pima County" or the "County"). Rosemont Copper Company was also a party in the matter.

3. The basic issue is whether Pima County meets the statutory requirements to file an administrative appeal of ADEQ's issuance to Rosemont of a Clean Water Act section 401 certification.

4. The parties agreed that the issue could be resolved as a matter of law, but ADEQ's administrative record, consisting of twelve exhibits, was taken into evidence.

5. Rosemont plans to build and operate an open pit copper mine in Pima County and it has applied to the Army Corp of Engineers for a section 404 (dredge and fill) permit under the Clean Water Act.

6. There are two types of section 404 permits, individual and general permits. Rosemont has applied for an individual permit.

Office of Administrative Hearings
1400 West Washington, Suite 101
Phoenix, Arizona 85007
(602) 542-9826

7. A section 404 permit cannot be issued to Rosemont unless ADEQ first issues a section 401 certification.

8. On February 3, 2015, ADEQ issued to Rosemont the required section 401 certification. The section 401 certification provides that ADEQ has determined that Rosemont's proposed activities will not violate the applicable surface water quality standards. The certification is exhibit 6 in the Administrative Record ("A.R." 6).

9. Pima County filed with ADEQ a Notice of Appeal arguing that ADEQ's decision to issue the certification should be reversed. A.R.7.

10. Through a letter dated March 23, 2015, ADEQ informed Pima County that its appeal was being rejected because Pima County was not authorized under ARIZ. REV. STAT. section 49-202(H) to bring such an appeal.[1] A.R. 8.

11. Pima County filed with ADEQ a request for reconsideration, in which it asserted that its appeal was also proper under ARIZ. REV. STAT. section 41-1092.03(B), and that it had properly raised that point in its appeal. A.R. 9.

12. Through a letter dated May 1, 2015, ADEQ affirmed its position that it was unable to accept an appeal from Pima County. A.R. 10.

13. Pima County filed an action in Maricopa County Superior Court requesting the Court to review the Decision of ADEQ's Director, by which it meant ADEQ's March 23 and May 1, 2015 letters.[2] *See* A.R. 11 (Minute Entry July 14, 2016).

14. At the Superior Court, ADEQ took the position that ADEQ's Director had not taken any action, and that the letters were advisory communications. In the alternative, ADEQ asserted that if its letters were a Director's Decision, Pima County had failed to exhaust its administrative remedies. ADEQ argued that the Court had no jurisdiction in either scenario. Id.

15. The Superior Court did not accept ADEQ's position, finding that ADEQ had impermissibly "insulate[d] itself from judicial review." The Court ordered that the matter should be treated as a special action (mandamus) and it ordered ADEQ to issue an administrative decision on Pima County's request to appeal ADEQ's issuance of the section 401 certification. A.R. 11.

---

[1] Prior to an amendment in 1998, the applicable provision was found in subsection 49-202(G).
[2] Rosemont was also a party in that matter.

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16. Through a letter dated September 26, 2016, ADEQ provided that: "Pursuant to [the Superior Court's order] ADEQ is granting appeal rights to Pima County for ADEQ's March 23, 2015 letter." In its letter, ADEQ reiterated its position that Pima County did not meet the requirements of ARIZ. REV. STAT. section 49-202(H) and consequently, that ADEQ was unable to accept the appeal. A.R. 12.

17. On November 1, 2016, ADEQ issued the Notice of Hearing. The scope of this matter is limited to whether Pima County has a right to appeal ADEQ's decision.

18. On December 13, 2016, Pima County filed an Opening Brief; ADEQ and Rosemont file a Joint Response on January 13, 2017; Pima County a Reply on January 25, 2017; and oral argument was held on February 7, 2017.

19. ADEQ and Rosemont argue that the right to appeal a 401 certification is governed exclusively by ARIZ. REV. STAT. section 49-202(H) and that because Pima County does not meet those requirements, ADEQ properly rejected the County's appeal.

20. ADEQ and Rosemont also argue that the issuance of a section 401 certification is not an appealable agency action and that ARIZ. REV. STAT. section 41-1092.03 does not apply.

21. Pima County argues to the effect that ADEQ's issuance of a section 401 certification is an appealable agency action subject to appeals under ARIZ. REV. STAT. section 41-1092.03 and that subsection 49-202(H) added to, rather than limited, those who can appeal by allowing appeals of certifications of general permits.

22. Pima County argues that ADEQ's interpretation of the statutes is not logical because under ADEQ's interpretation, a person who is adversely affected by the certification of a general or nationwide 404 permit can appeal, but the same is not true for persons adversely affected by the certification of individual permits and individual 404 permits will have a more substantial impact.

23. Pima County acknowledges that the first sentence of subsection 49-202(H) is redundant to subsection 41-1092.03(B), but, citing ARIZ. REV. STAT. section 41-1002(B), it argues that the legislature did not expressly eliminate appeals under 41-1092.03 when it modified ARIZ. REV. STAT. section 49-202.

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24. Pima County argues it meets the requirements of 41-1092.03(B) because it will be adversely affected by the certification and it exercised its right to comment.

25. Through Laws 1996, Chapter 2, Article 1, the legislature clarified ADEQ's authority to issue section 401 certifications by modifying and expanding ARIZ. REV. STAT. section 49-202, which statute was modified again in 1998. Pima County's Opening Brief at Appendix A provides a copy Laws 1996, Ch. 2, Art. 1 and its legislative history.

26. Pima County argues that nothing in the legislative history indicates an intent to preclude a non-applicant from appealing the certification of an individual section 404 permit because there is no discussion of appeal rights in that history other than a summary of the bill's language. ADEQ and Rosemont argue to the effect that the legislative history does show an intent to limit appeals because the history shows that the legislation was intended to create "a specific procedure" using "specific criteria."

CONCLUSIONS OF LAW

1. The burden of proof at an administrative hearing falls to the party asserting a claim, right or entitlement, and the standard of proof on all issues in this matter is that of a preponderance of the evidence. ARIZ. ADMIN. CODE § R2-19-119.

2. A preponderance of the evidence is:

> The greater weight of the evidence, not necessarily established by the greater number of witnesses testifying to a fact but by evidence that has the most convincing force; superior evidentiary weight that, though not sufficient to free the mind wholly from all reasonable doubt, is still sufficient to incline a fair and impartial mind to one side of the issue rather than the other.

BLACK'S LAW DICTIONARY 1373 (10th ed. 2014).

3. Because Rosemont cannot be issued a section 404 permit unless ADEQ issues the section 401 certification, the certification determines Rosemont's legal rights or privileges within the meaning of ARIZ. REV. STAT. section 41-1092(3). As such ADEQ's issuance of the certification meets the definition of an appealable agency action. ARIZ. REV. STAT. § 41-1092(3) ("'Appealable agency action' means an action that determines the legal rights, duties or privileges of a party and that is not a contested case.")

4. A statute is to be construed to "avoid ... render[ing] any of its language mere surplusage, and instead give meaning to each word, phrase, clause, and sentence so that no part of the statute will be void, inert, redundant, or trivial." *City of Phoenix v. Phoenix Emp't Relations Bd.*, 207 Ariz. 337, 340-41 ¶ 11, 86 P.3d 917, 920-21 (App. 2004)

5. ADEQ's interpretation of the applicable statutes should be given considerable weight unless there is clear statutory guidance contrary to ADEQ's interpretation. *Arizona Water Co. v. Arizona Department of Water Resources*, 208 Ariz. 147, 91 P.3d 990 (2004).

6. As pertinent to this matter, ARIZ. REV. STAT. section 49-202(A) provides that ADEQ "is designated as the agency for this state for all purposes of the clean water act .... [and] may take all actions necessary to administer and enforce [the act] as provided in this section...."

7. As pertinent to this matter, ARIZ. REV. STAT. section 49-202(B) provides that ADEQ "shall process requests under section 401 of the clean water act for certification of permits required by section 404 of the clean water act in accordance with subsections C through H of this section."

8. ARIZ. REV. STAT. section 49-202(H) provides:

> Pursuant to title 41, chapter 6, article 10 an applicant for certification may appeal a denial of certification or any conditions imposed on certification. Any person who is or may be adversely affected by the denial of or imposition of conditions on the certification of a nationwide or general permit may appeal that decision pursuant to title 41, chapter 6, article 10.

9. Because Pima County is not the applicant for certification in this matter, it has no authority under ARIZ. REV. STAT. section 49-202(H) to appeal ADEQ's decision to issue the 401 certification.

10. Pima County argues that the appeal rights found in ARIZ. REV. STAT. section 41-1092.03(B) also apply to section 401 certifications. As pertinent to this matter, ARIZ. REV. STAT. section 41-1092.03(B) provides:

> A notice of appeal or request for a hearing also may be filed by a party who will be adversely affected by the appealable agency action or contested case and who exercised any right provided by law to comment on the action being appealed or contested, provided that the grounds for the notice of appeal or request for a hearing are limited to issues raised in that party's comments.

11. Pima County's position is not consistent with the principals set out in *City of Phoenix* because the first sentence of ARIZ. REV. STAT. section 49-202(H) is redundant to appeal rights that applicants for individual permits would already have had under section 41-1092.03(B). Pima County acknowledges as much, but argues to the effect that *City of Phoenix* does not apply based on ARIZ. REV. STAT. section 41-1002(B), which provides:

> This chapter creates only procedural rights and imposes only procedural duties. They are in addition to those created and imposed by other statutes. To the extent that any other statute would diminish a right created or duty imposed by this chapter, the other statute is superseded by this chapter, unless the other statute expressly provides otherwise.

12. Pima County's argument is not persuasive because when the legislature amended ARIZ. REV. STAT. section 49-202, it limited ADEQ's authority by including the phrase "as provided in this section" and by directing ADEQ to process certifications "in accordance with subsections C through H of this section." ARIZ. REV. STAT. §§ 49-202(A) and (B).

13. In addition, as ADEQ interprets the applicable statutes, these limitations mean that ARIZ. REV. STAT. section 41-1092.03(B) does not apply. ADEQ's positon is supported by the legislative history showing that the legislation was intended to create "a specific procedure" using "specific criteria," Ariz. State Sen., Final Revised Fact Sheet for S.B. 1290, and there is no clear statutory guidance contrary to ADEQ's interpretation of the statutes.

14. As such, Pima County has not shown that ADEQ's decision to reject the County's appeal should be reversed.

ORDER

IT IS ORDERED that Pima County's and Pima County Flood Control District's appeals are dismissed.

In the event of certification of the Administrative Law Judge Decision by the Director of the Office of Administrative Hearings, the effective date of the Order is five days after the date of that certification.

Done this day, March 2, 2017.

/s/ Thomas Shedden
Thomas Shedden
Administrative Law Judge

Transmitted electronically to:

Misael Cabrera, PE, Director
Department of Environmental Quality

Exhibit G

Final Administrative Decision

BEFORE THE DIRECTOR OF THE
DEPARTMENT OF ENVIRONMENTAL QUALITY

In the matter of:	
ROSEMONT COPPER 401 CERTIFICATION Appellants: Pima County and Pima County Flood Control District	No. 16A-P33-DEQ **FINAL DECISION AND ORDER**

Disposition of the Recommended Decision of the Administrative Law Judge

The Director has reviewed the Administrative Law Judge (ALJ) Decision and Order, as well as the record in this matter. The ALJ has recommended dismissal of the appeal upon appellant's failure to show by a preponderance of the evidence that ADEQ's decision to reject the County's appeal should be reversed. The basic issue is whether Pima County meets the statutory requirements to file an administrative appeal of ADEQ's issuance to Rosemont of a Clean Water Act ("CWA") section 401 certification.

ADEQ SUMMARY OF FINDINGS OF FACTS

A. On February 3, 2015, ADEQ issued to Rosemont.Copper ("Rosemont") the required CWA section 401 certification. The section 401 certification provides that ADEQ has determined that Rosemont's proposed activities will not violate the applicable surface water quality standards.

B. Pima County filed with ADEQ a Notice of Appeal arguing that ADEQ's decision to issue the certification should be reversed.

C. ADEQ responded on March 23 and May 1, 2015 with letters stating pursuant to Arizona Revised Statute (A.R.S.) § 49-202(H), Pima County did not meet the requirements of a party with standing to appeal.

D. Pima County filed an action in Maricopa County Superior Court requesting the Court to review the March 23 and May 1, 2015 letters.

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E. The Court determined the March 23 and May 1, 2015 letter were final agency actions and ordered ADEQ to reissue the determination including administrative appeal language as required by A.R.S. §41-1092.03.

ADEQ SUMMARY OF CONCLUSIONS OF LAW

A. The ALJ found Pima County is not the applicant for certification in this matter, therefore it has no authority under A.R.S. §49-202(H) to appeal ADEQ's decision to issue the section 401 certification.

B. The ALJ found how ADEQ interprets A.R.S. §49-202(H) is appropriate; therefore, A.R.S. §41-1092.03(B) does not apply to Pima County.

C. Pima County has not shown ADEQ's decision to reject the County's appeal should be reversed.

Pursuant to Arizona Revised Statute (ARS) §41-1092.08(B), for the rationale above, the Director of ADEQ accepts the ALJ Decision and Order based upon the finding that the appellant's failed to show by a preponderance of the evidence that ADEQ's decision to reject the County's appeal should be reversed. The matter is therefore dismissed accordingly.

ORDER

IT IS ORDERED that Pima County's and Pima's County Flood Control District appeal in Docket No. 16A-P33-DEQ is dismissed. This is the Final Decision of the Director of ADEQ.

Notice of Right to Request a Rehearing or Review

A party to this matter may file a Motion for Rehearing or Review within thirty (30) days after service of this Final Decision and Order pursuant to A.R.S. § 41-1092.09. A party

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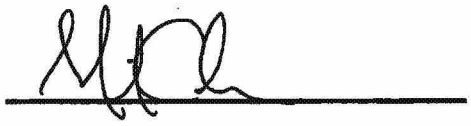
is not required to file a Motion for Rehearing or Review to seek judicial review of this Final Decision and Order. A.R.S. § 41-1092.09(A)(3).

DATED this 31st day of March, 2017.



Misael Cabrera, Director
Arizona Department of Environmental Quality

ORIGINAL filed this 31st day of March, 2017, with:

Anakaren Lemus, Hearing Administrator
Office of Administrative Counsel
Arizona Department of Environmental Quality
1110 W. Washington Street, #6135C
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Copy of the forgoing sent certified mail this 31st day of March, 2017, to:

Pima County
130 W. Congress, 10th Floor
Tucson, AZ 85701

Pima County Flood Control District
201 N. Stone 9th Floor
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Copy of the foregoing sent via email this 31st day of March, 2017, to:

Thomas Shedden
Administrative Law Judge
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ATTACHMENT 8

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ATTACHMENT 8:

THE SAWMILL FIRE BURNED CRITICAL AQUATIC RESOURCES IDENTIFIED IN THE BIOLOGICAL OPINION

The Sawmill Fire is much larger than previous fires evaluated in the Rosemont EIS process. The fire has directly altered habitat conditions in four of the Biological Opinion's Key Reaches. Indirect impacts are expected on all five of the remaining wetlands and the Threatened and Endangered species they support, especially Cienega Creek 7, 13, and 15, all of which are downstream of the fire, via ash and sediment mobilized during subsequent flows. Impacts to listed species and aquatic resources should be evaluated prior to a decision.

Fire Size and Estimated Impact

At over 43,000 acres, the Sawmill Fire is almost twice the size of the largest fire identified in the FEIS analysis (Table 78, below). As such, the Sawmill Fire likely significantly changed baseline conditions in the Cienega Valley, in particular for the aquatic and riparian species that were the basis for the U.S. Fish and Wildlife Service's (USFWS) Biological Opinion (BO).

Table 78. Summary of past wildfires larger than 10 acres

Fire	Date Started	Acres	Affected Area Relative to Analysis Area (percent)
Gardner Fire	07/18/89	75	0.5
Fagan Fire	08/08/95	134	0.8
Florida Fire	07/07/05	23,186	142.5
Fagan Fire	04/30/07	533	3.3
Hilton Fire	2/11/12	432	2.7
Mulberry Fire	06/02/08	61	0.4
Melendrez Fire	05/29/09	5,791	35.6
Fish Fire	04/21/09	2,026	12.5
Greaterville Fire	05/02/11	2,331	14.3

Biological and Ecological Elements

The BO segmented Cienega Creek based on discrete hydrological and geographic units (Key Reaches) and reviewed impacts to Threatened and Endangered species at these reaches. Of the nine Key Reaches with significance to the BO, four were areas were directly impacted by the Sawmill Fire (Figure 1):

- Cienega Creek Reach 4. Approximately 0.8 mile long, located on Upper Cienega within the Las Cienegas NCA, immediately upstream of Mattie Canyon;
- Cienega Creek Reach 5. Approximately 0.8 mile long, located on Upper Cienega Creek, within the Las Cienegas NCA, downstream of Mattie Canyon and containing the USGS Sonoita stream gage.
- Empire Gulch Reach 1. Approximately 0.3 mile long, located within the Las Cienegas NCA immediately downstream from the Upper Empire Gulch Springs, near the Empire Ranch Headquarters.
- Empire Gulch Reach 2. Approximately 1 mile long, located within the Las Cienegas NCA immediately upstream of the Cienega Creek confluence.

Indirect impacts are expected to occur on all five of the remaining wetlands and the Threatened and Endangered species they support, especially Cienega Creek 7, 13, and 15, all of which are downstream of the fire.

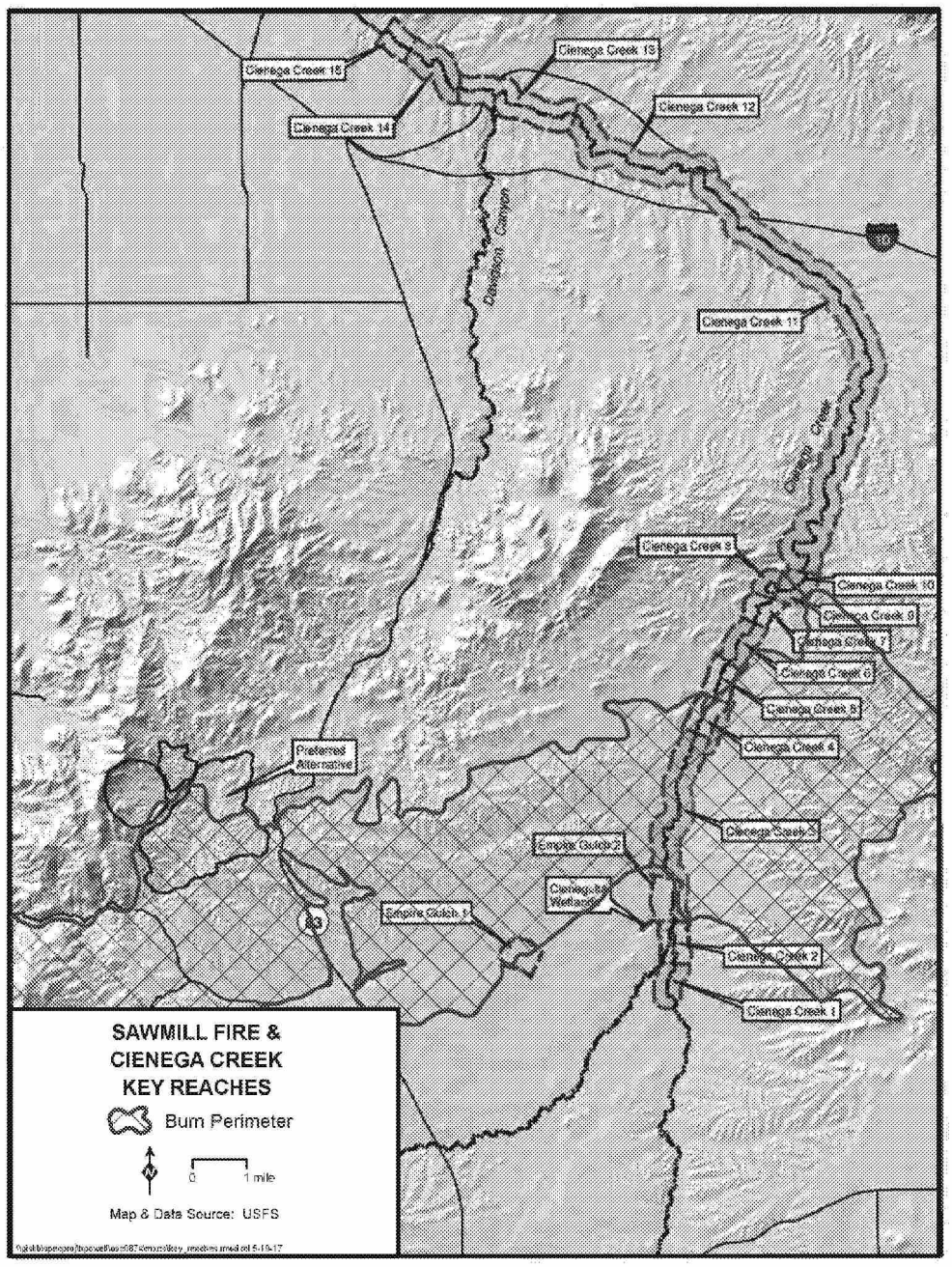

Figure 1. Key Reaches identified in the U.S. Fish and Wildlife Service's Biological Opinion (page 37) with the extent of the Sawmill Fire superimposed.

Fire Effects on Aquatic Habitat: Gila Chub, Gila topminnow, and Chiricahua leopard frog

The Sawmill Fire was primarily a low-intensity fire, but burned key riparian areas and upland areas that will contribute ash and sediment to the Cienega Creek system. With regard to Gila

chub, Gila topminnow, and Chiricahua leopard frogs, the BO considers "the present-day state of the hydrology to represent the baseline condition". All effects, whether the result of anticipated climate change alone, mine drawdown alone, and/or climate change and mine drawdown combined, are described in terms of their divergence from present, pre-project conditions". The Sawmill Fire fundamentally changed this baseline.

It is too early to know the fire's impacts on these species, but studies in other areas after large fires have noted the impacts on water quality and habitat. Studies have found that ash and debris flows following large fires can radically alter sediment loads and stream channel characteristics (Dunham et al. 2007; Cawson et al. 2013; Nyman et al. 2015; Tuckett and Koetsier 2016). We are concerned, in particular for the deeper pool for the both the chub and topminnow. There will likely be a change in baseline physical habitat for these species.

The BO places great emphasis on dissolved oxygen as key and limiting feature of the Cienega Creek environment. Bodner et al. (2007) noted "Fishless pools that were likely caused by low levels of dissolved oxygen have already been observed in Cienega Creek." While the fire cleared the canopy ash trees that may have been contributing to lower oxygen levels, the silt and ash from the fire may significantly impact dissolved oxygen levels. Low dissolved oxygen levels has been found to impact fish populations post fire (Earl and Blinn 2003; Hitt 2003; Lyon and O'Connor 2008; Reale et al. 2015). We encourage data collection through the summer and fall of 2017 to determine new baseline conditions for these species and their habitat.

Fire Effects on Southwestern Willow Flycatcher and Yellow-billed Cuckoo Habitat
The Sawmill Fire also impacted the large riparian trees and streamside undergrowth upon which the yellow-billed cuckoos and southwestern willow flycatcher rely, respectively. Early assessment of the fire's extent and damage have not been done, but we know that areas around the Empire Gulch were severely damaged. While understanding the impacts of the fire on fish and frog populaitons may be difficult to understand, the link between structural and floristic elements of bird habitat have a long and well documented body of literature (e.g., Karr and Freemark 1983; Hall and Mannan 1999; Powell and Steidl 2002; Hatten and Paradzick 2003). As with the fishes and frogs, we encourage studies in the spring and summer of 2017 to understand the changes in vegetation and bird populations so that baseline conditions can be reevaluated.

Additional Resources that Changed as a result of the Sawmill Fire

- **Jaguar**: The critical habitat pinchpoint over the saddle of the Santa Rita Mountains was entirely burned over. Listing document for the species and its recovery plan make no mention of whether jaguars avoid or favor burned over areas.
- **Soils:** Baseline soil quantities from reclamation may be impacted by the fire; this has not been taken into account.
- **Springs**: Approximately 6 springs are located within the burn area and which were analyzed as part of the EIS.
- **Stock tanks**: Not evaluated for ash flows. It is likely that Chiricahua leopard from habitat has been impacted along Box Canyon: Box Canyon Tank, Sycamore Canyon tank.

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