RESPONSE TO COMMENT ON THE RESOLUTION PROJECT DEIS: CUMULATIVE IMPACT ANALYSIS FOR AMBIENT AIR QUALITY STANDARDS

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USDA – Forest Service, Tonto National Forest (TNF) received comments on the Resolution Copper Project (Project) Draft Environmental Impact Statement[1] (DEIS) pertaining to potential cumulative air quality impacts due to emissions from the proposed Project and increases in emissions from other nearby reasonably foreseeable sources. To address these comments, a Cumulative Impact Analysis (CIA) for air quality was performed for the proposed Project and nearby sources. The purpose of the CIA is to quantitatively evaluate cumulative air quality impacts due to emissions from the Project and reasonably foreseeable and known sources of emissions in the region near the Project. The identified nearby sources, modeling methods, and results of the CIA are presented in this technical memorandum. The cumulative air quality impacts were below the applicable Ambient Air Quality Standards (AAQS) for all pollutants and averaging times.

Introduction

Cumulative impact is the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future sources of emissions.[2] The results of the dispersion modeling analyses presented in the DEIS (DEIS, Section 3.6.4.2) address the potential air quality impacts associated with the Project (i.e., modeled emissions from the considered alternatives) and air quality impacts associated with other present sources of emissions that are nearby the project [i.e., representative background concentrations of pollutants for the Project area (DEIS Section 3.6.3 and DEIS Table 3.6.4-1)].

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[1] Resolution Copper Project and Land Exchange, DEIS, Pinal County, Arizona. USDA Forest Service et al. August 2019.

[2] 40 CFR 1508.7

The CIA adds estimated impacts to air quality due to emissions from reasonably foreseeable future sources to facility impacts in order to quantify the cumulative impacts to air quality.

Available information on existing emissions sources within the Cumulative Effect Study Area (CESA) was gathered and reviewed. In accordance with USDA – Forest Service National Environmental Policy Act (NEPA) guidance,[3] the CIA for the Project includes an air quality impact analysis of nearby emission sources and reasonably foreseeable future actions in the CESA with an emission increase greater than the minor New Source Review (NSR) permitting thresholds (see Table 1) between the time of the background monitoring period of the DEIS (2015-2016) and 2018. Emission sources with this level of emission increase would reasonably be expected to contribute to air quality impacts within the CESA and would not have been accounted for in the background monitoring for the Project.

Emission increases from the group of emission sources described above were modeled using AERMOD and the modeled impacts were added to the impacts due to emissions from the Project (as modeled for the DEIS) on a receptor-by-receptor basis. The cumulative air quality impacts (EIS impacts + nearby sources impacts) are compared to the AAQS.

Reasonably Foreseeable Actions & Nearby Sources

For the CIA, existing and potential future sources of emissions from reasonably foreseeable actions and nearby sources were considered. In Section 3.6.4.3 of the DEIS, TNF identified several reasonably foreseeable future actions as having the potential to affect air quality in the Project's vicinity:

- Pinto Valley Mine (PVM) Expansion
- Ripsey Wash Tailings Projects
- Ray Land Exchange and Proposed Plan Amendment
- Arizona Department of Transportation (ADOT) Vegetation Treatment
- TNF Travel Management Plan

Additionally, Pinal County Air Quality Control District (PCAQCD) provided emissions information for permitted industrial sources for both the background monitoring period (2015-2016) and for a more recent period (2018). The 2018 emissions information for each source was compared to the 2015 and 2016 inventories to determine which permitted facilities had emission increases during that period.

Each reasonably foreseeable future action and nearby source was evaluated to determine if increases in criteria air pollutant emissions were greater than the minor NSR permitting

[3] US Forest Service Handbook, Section 15.1, June 25, 2012, National Headquarters (WO), Washington DC.

thresholds used by the Arizona Department of Environmental Quality (AZDEQ)[4] and Pinal County Air Quality Control District (PCAQCD) to determine the applicability of minor source permitting and modeling requirements. The minor NSR permitting thresholds, in tons per year (tpy), are provided in Table 1. Reasonably foreseeable actions and nearby sources with emission increases greater than these thresholds are included in the CIA as these emission increases can reasonably be expected to contribute to air quality impacts in the CESA.

Table 1. Minor NSR Permitting Thresholds

Pollutant	Threshold (tpy)
CO	50
NO_X	20
PM_{10}	7.5
$PM_{2.5}$	5
SO_2	20

Brief descriptions of the reasonably foreseeable actions assessed for the CIA are presented below.

Pinto Valley Mine (PVM) Expansion

Information on the planned PVM Expansion was provided by ICF International[5]. This information included detailed emissions calculations and modeling files. Future PVM emissions without the expansion (no-action) were subtracted from future PVM emissions including the expansion project (proposed action). Except for SO_2 emissions, the potential emission increases were above the minor NSR permitting thresholds. Therefore, emission increases due to the PVM Expansion were included in the CIA modeling.

Ripsey Wash Tailings Project

The Ripsey Wash Tailings Project received a final EIS and Record Of Decision (ROD) from the US Army Corps of Engineers in September and December 2018 with an associated ROD from BLM for infrastructure rights of way, mineral materials sales and AZ Trail Relocation in June 2019. The project is a new tailings storage facility (TSF) for ASARCO's Ray Mine once the existing TSF reaches capacity. The proposed Ripsey Wash Tailings Project would relocate mining-related activities and air emissions associated with the TSF from the existing TSF to the Ripsey Wash TSF. The activity rates for tailings storage (e.g., tons per day of tailings material

[4] Air Quality Modeling Guidelines for Arizona Air Quality Permits. AZDEQ. November 2019.

[5] "Carr, Edward shared the folder 'PVM_Proposed_Action Air Sciences' with you."
File: PVM_total_emissions_summary.Oct26_2018.add_details_Mar14_2019.add_ISR_May16_2019.updated_Dec4_2019.xlsx.
Email from E. Carr, ICF, to M. Hampson, Air Sciences, Inc. January 27, 2020.

stored) would continue to be limited by existing process equipment, which will not change as a result of the proposed action. Therefore, the Ripsey Wash Tailings Project is not included in the CIA modeling because no substantial increase in criteria pollutant emissions is expected and any influence on air quality due to emissions from the Ray Mine are already captured in the representative background concentrations for the Project area.

Ray Mine Land Exchange and Proposed Plan Amendment

ASARCO is also proposing to obtain land for exploration and mining operations near the Ray Mine. Most lands being considered in the plan amendment are adjacent to or inside the existing mine, and the land exchange would increase the footprint of the mine. The action's Final Supplemental Environmental Impact Statement (SEIS)[6], Section 4.4.1 states:

> *"Quantification of air quality impacts requires detailed descriptions of the proposed extent of mining operations, including, for example, a roster of equipment and ore production rates. Although ASARCO has provided general information about its future mining operations, it has not submitted any permit applications or provided sufficient details regarding exploration, mine development, operations, and closure/reclamation to provide a quantification of emissions resulting from the foreseeable mining operations at this time."*

The proposed land exchange does not include any change in activity rates. Only an expansion of the area in which current activities (and related emissions) can occur is planned. Because available information for this action does not indicate a substantial increase in criteria pollutant emissions, this project is not included in the CIA modeling and any influence on air quality due to emissions from the Ray Mine are already captured in the representative background concentrations for the Project area..

ADOT Vegetation Treatment

As stated in the Project's DEIS:

> *"ADOT plans to conduct annual treatments using EPA-approved herbicides to contain, control, or eradicate noxious, invasive, and native plant species that pose safety hazards or threaten native plant communities on road easements and NFS lands up to 200 feet beyond road easement on the Tonto National Forest. […] Activity and traffic could contribute marginally to fugitive dust in the area but would not result in any substantial change when considered with Resolution Copper Project air quality impacts."*

The vegetation treatment activity described above will have a minimal effect on air quality. Only a small amount of traffic will be required to conduct this treatment, and it will occur over short durations of time on an annual basis. Therefore, this action would not result in a

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[6] Ray Land Exchange. Final SEIS/Proposed Plan Amendments. US DOI BLM. July 2019.

substantial increase in emissions, and the ADOT Vegetation Treatment project is not included in the CIA modeling.

TNF Travel Management Plan

The TNF Travel Management Plan will limit motor vehicle travel within the TNF. The action is expected to reduce traffic and related emissions. Therefore, the TNF Travel Management Project is not included in the CIA modeling.

PCAQCD Emission Inventory Sources

In addition to the reasonably foreseeable actions identified by the TNF, existing known nearby emission sources included in PCAQCD emission inventories were evaluated to determine which facilities had reportable emission increases from 2015/2016 to 2018. The increases from the maximum of 2015/2016 to 2018 emissions for each facility were compared to the minor NSR permitting thresholds (see Table 1). The maximum emission from the 2015/2016 inventory is used in this method to calculate emission increases based on the assumption that maximum emissions from nearby sources in 2015/2016 were captured in the representative background concentrations disclosed in the DEIS. Facilities with increases of emissions which exceeded the thresholds were included in the CIA modeling.

Nearby Emissions Summary

For nearby facilities with emissions increases greater than the NSR permitting thresholds, the estimated emission increases modeled in the CIA are provided in Table 2.

Table 2. Modeled Nearby Facilities

Facility	Increase (tpy) 2015/2016 to 2018				
	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2
PVM Expansion	158	345	238	45	-
Desert Basin Generating Station	-	32.8	25.0	24.7	1.1
Durham Regional Landfill	1.2	5.7	15.0	2.3	0.4
Saguaro Power Plant	30.2	96.5	4.0	4.0	0.4
Central AZ Correction Facility	14.3	62.0	1.8	-	1.0
Oracle Compressor Station	-	24.0	0.08	0.08	0.04

For these facilities, if an emission increase for any criteria pollutant exceeded the minor NSR threshold, then emissions increases for all criteria pollutants were included in the CIA modeling. Emissions decreases were not modeled.

Modeling Method

The CIA modeling analysis was conducted in a manner consistent with the methods described in the DEIS and the final, agency-approved air quality impacts modeling plans[7] for the Project. The same modeling receptors, meteorological data, background data sets, and versions of AERMET and AERMOD were used (versions 16216 and 18081, respectively). Impacts due to emission increases from the reasonably foreseeable actions and nearby sources were added to the DEIS impacts (representative background concentration plus impacts due to Project emissions) for the each of the Project's alternative scenarios: 2 (proposed action), 3, 4, 5, and 6 (preferred alternative).

Key and unique aspects of the CIA modeling methods are summarized below. Detailed descriptions of the DEIS modeling methods are documented in the air quality impacts modeling plans.

Coordinate System

The Universal Transverse Mercator (UTM) coordinate system projected in North American Datum of 1983 (NAD83), Zone 12, was used in this modeling analysis to define all locations in the modeling domain (sources and receptors).

Source Characterization and Model Input Parameters

The emissions from the Desert Basin Generating Station (DBGS), Saguaro Power Plant (SPP), and the Oracle Compressor Station (OCS) are associated with tall stacks. These emissions were modeled as AERMOD POINT sources. Coordinates and release parameters were based on available data and generalized estimates of release characteristics. Facility emissions for multiple stacks were divided between all stacks. Given the regional nature of this analysis, the effects of building downwash were not considered for the nearby sources.

Emissions from the Durham Regional Landfill (DRL), Central Arizona Correctional Facility (CAZCF), and Pinto Valley Mine Expansion (PVM Exp.) sources are associated with more dispersed, low-level emissions. These emissions were modeled as generalized VOLUME sources, with relatively low release-heights and broader horizontal dimensions representing the dispersed nature of the emissions for those facilities.

The source parameters for the modeled nearby emissions are provided in

Table 3 and Table 4 for POINT sources and VOLUME sources, respectively.

[7] Final Air Quality Impacts Analysis Modeling Plan, Resolution Copper Project (Air Sciences Inc., March 2018) and Resolution Copper project Air Quality Impacts Analysis Modeling Plan for NEPA (Air Sciences Inc., June 2018).

Table 3. Estimated POINT Source Parameters for Nearby Facilities

Facility	Stack	Model ID	Easting	Northing	Elev. (m)	Height (m)	Temp. (K)	Vel. (m/s)	Dia. (m)
DBGS	#1	N10584a	426,207	3,640,882	418	48.8	523	100	6.10
	#2	N10584b	426,207	3,640,921	418	48.8	523	100	6.10
SPP	#1	N10033a	472,106	3,601,884	589	30.5	773	100	1.83
	#2	N10033b	471,982	3,601,891	587	30.5	773	100	1.83
	#3	N10033c	471,937	3,601,891	587	30.5	773	100	1.83
OCS	#1	N10180	522,897	3,609,510	1,336	30.5	773	100	1.83

Table 4. Estimated VOLUME Source Parameters for Nearby Facilities

Facility	Model ID	Easting	Northing	Elev. (m)	Rel. Height (m)	SYINIT. (m)	SZINIT. (m)
PVM Exp.	PVM	502,616	3,697,922	1,294	4.57	1,209.3	4.25
DRL	N10842	472,970	3,616,126	612	2.29	58.1	2.13
CAZCF	N10727	469,533	3,655,350	493	4.57	558.1	4.25

Receptors

The receptor sets used for the CIA were the same as the respective receptor sets used for each of the Project's alternatives assessed in the DEIS.

Meteorological Data

Each nearby facility was modeled with two years of Resolution Copper Mine's site-specific AERMET data, the same sets used for the Project's sources modeled for the DEIS. Depending on the reasonably foreseeable actions' and nearby facilities' locations, emissions were modeled with either the East Plant Site or the West Plant Site meteorological data set. Specifically, the PVM Expansion and OCS facility were modeled with the East Plant Site meteorological data, and the DBGS, SPP, DRL, and CAZCF facilities were modeled with the West Plant Site meteorological data set.

Background Data

Modeling results disclosed in the DEIS include representative background concentrations determined by the methods described in the agency-approved air quality impacts modeling plans.

NO_2 Modeling

The default Ozone Limiting Method (OLM) was used to estimate NO_2 1-hour and annual concentrations from the nearby sources, similar to the approach used in the DEIS.

The use of the OLM requires the following additional input parameters:

- Background O_3 Concentrations – The use of the OLM option in AERMOD requires the input of O_3 background concentrations. The O_3 concentration values may be input as a single value, as hourly values to correspond with the meteorological data, or as temporally varying profiles. The CIA used the Project's onsite (East Plant Site) monitored hourly O_3 data.

- Ambient Equilibrium NO_2/NO_X Ratio – The AERMOD default NO_2/NO_X ambient equilibrium ratio of 0.9 was used for this analysis; this is the AERMOD default, as documented in EPA's Addendum to the AERMOD User's Guide.[8]

- In-Stack NO_2/NO_X Ratio – The regulatory default stack ratio of 0.5 was assumed for all nearby source emissions.

The use of the default NO_2/NO_X ratio is a conservative modeling approach. Facility-specific NO_2/NO_X ratios for the reasonably foreseeable actions and nearby sources would likely result in lower modeled NO_2 impacts than the results presented in the CIA.

PM_{10} and $PM_{2.5}$ Modeling

In the AERMOD modeling for the DEIS, particulate matter deposition was implemented for the Project's sources with emissions of PM_{10} and $PM_{2.5}$ using source-specific deposition parameters. For the nearby sources modeling for the CIA, the regulatory default AERMOD method without particulate deposition is used. Particulate deposition generally decreases air quality concentrations (by removal of particulates from the air as the emissions are transported away from the source). Modeling nearby sources without particulate deposition is a conservative modeling approach. Modeling with deposition parameters for the reasonably foreseeable actions and nearby sources would likely result in lower modeled PM_{10} and $PM_{2.5}$ impacts than the results presented in the CIA.

Combining Modeled DEIS and Nearby Source Impacts to Estimate Cumulative Impacts

For the DEIS, representative background concentrations plus modeled impacts due to the Project's potential emissions were estimated at each receptor for each alternative. To estimate cumulative air quality impacts, the modeled impacts from reasonably foreseeable actions and other nearby sources were added to the DEIS impacts for each receptor as shown in the equation below:

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[8] EPA. 2015. *Addendum: User's Guide for the AMS/EPA Regulatory Model – AERMOD (EPA-454/B-03-001, September 2004*. Office of Air Quality Planning and Standards, Air Quality Assessment Division. June 2015. Accessed October 6, 2016. http://www.epa.gov/ttn/scram/models/aermod/aermod_userguide.zip.

DEIS Impact (Background + Project) + Nearby Source Impacts (West Plant Met) + Nearby Source Impacts (East Plant Met) = ***Cumulative Air Quality Impact***

This method uses the modeled value that corresponds to the regulatory form of the health-based standard to pair modeled concentrations from the nearby sources with the results from the DEIS modeling at each receptor (i.e., modeled concentrations are paired spatially). The pairs of DEIS Impact + Nearby Source Impact are not paired temporally. This method results in conservative estimates of cumulative air quality impacts because the individual high values (i.e. the form of the standard) are summed even if each value was derived from different meteorological conditions. For reference, the AAQS and a description of the regulatory form of each standard are provided in Table 5.

Table 5. Applicable AAQS

Pollutant and Averaging Time	Regulatory Form of Standard	Standard ($\mu g/m^3$)
CO 1-hour	Not to be exceeded more than once per year	40,500
CO 8-hour	Not to be exceeded more than once per year	10,000
NO_2 1-hour	98th percentile over 2 years	188
NO_2 annual	Max. annual over 2 years	100
PM_{10} 24-hour	3rd high over 2 years	150
PM_{10} annual*	Max. annual over 2 years	50
$PM_{2.5}$ 24-hour	98th percentile over 2 years	35
$PM_{2.5}$ annual	Average annual over 2 years	12
SO_2 1-hour	99th percentile over 2 years	196
SO_2 3-hour	2nd high over 2 years	1,300
SO_2 24-hour*	2nd high over 2 years	365
SO_2 annual*	Max. annual over 2 years	80

Note: $\mu g/m^3$ = micrograms per cubic meter

* PCAQCD standard only - Not a Federal standard

CIA Results

The results of the CIA for all pollutants and each alternative are provided in Table 6 through Table 10. Figure 1. and Figure 2. display the PM_{10} 24-hour CIA results for Alternatives 2 (Proposed Action) and 6 (Preferred Action). Figure 3. and Figure 4. display the NO_2 1-hour CIA results for Alternatives 2 (Proposed Action) and 6 (Preferred Action). A complete suite of impact figures for all alternatives, pollutants, and averaging periods have been prepared and provided to the TNF under separate cover. The estimated total cumulative air quality impacts for all pollutants are below the applicable AAQS for each alternative. Overall, the increases in emissions from reasonably foreseeable actions and other nearby sources do not appreciably increase estimated air quality impacts from the air quality impact results disclosed in the DEIS.

Table 6. Cumulative Impacts for Alternative 2 (Proposed Action)

Pollutant and Averaging Time	EIS Impact (Project + Background) ($\mu g/m^3$)	Nearby Sources Impact ($\mu g/m^3$)	Cumulative Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Cumulative Impact Below AAQS (Yes/No)
CO 1-hour	8,080.8	3.2	8,084.0	40,500	Yes
CO 8-hour	3,558.8	0.7	3,559.5	10,000	Yes
NO_2 1-hour	146.4	2.7	149.1	188	Yes
NO_2 annual	3.0	4.8	7.8	100	Yes
PM_{10} 24-hour	96.8	0.3	97.0	150	Yes
PM_{10} annual	24.5	0.1	24.6	50	Yes
$PM_{2.5}$ 24-hour	17.7	0.0	17.8	35	Yes
$PM_{2.5}$ annual	5.9	0.0	5.9	12	Yes
SO_2 1-hour	116.6	0.0	116.6	196	Yes
SO_2 3-hour	86.4	0.0	86.4	1,300	Yes
SO_2 24-hour	20.4	0.0	20.4	365	Yes
SO_2 annual	2.9	0.0	2.9	80	Yes

Table 7. Cumulative Impacts for Alternative 3

Pollutant and Averaging Time	EIS Impact (Project + Background) ($\mu g/m^3$)	Nearby Sources Impact ($\mu g/m^3$)	Cumulative Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Cumulative Impact Below AAQS (Yes/No)
CO 1-hour	8,080.7	3.2	8,083.9	40,500	Yes
CO 8-hour	3,558.8	0.7	3,559.5	10,000	Yes
NO_2 1-hour	146.4	2.7	149.1	188	Yes
NO_2 annual	3.0	4.8	7.8	100	Yes
PM_{10} 24-hour	96.8	0.3	97.0	150	Yes
PM_{10} annual	24.4	0.1	24.4	50	Yes
$PM_{2.5}$ 24-hour	17.7	0.0	17.8	35	Yes
$PM_{2.5}$ annual	5.9	0.0	5.9	12	Yes
SO_2 1-hour	116.6	0.0	116.6	196	Yes
SO_2 3-hour	86.4	0.0	86.4	1,300	Yes
SO_2 24-hour	20.4	0.0	20.4	365	Yes
SO_2 annual	2.9	0.0	2.9	80	Yes

Table 8. Cumulative Impacts for Alternative 4

Pollutant and Averaging Time	EIS Impact (Project + Background) ($\mu g/m^3$)	Nearby Sources Impact ($\mu g/m^3$)	Cumulative Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Cumulative Impact Below AAQS (Yes/No)
CO 1-hour	8,099.8	3.2	8,103.0	40,500	Yes
CO 8-hour	3,559.7	0.7	3,560.4	10,000	Yes
NO_2 1-hour	149.8	2.7	152.5	188	Yes
NO_2 annual	3.0	4.8	7.8	100	Yes
PM_{10} 24-hour	97.1	0.3	97.4	150	Yes
PM_{10} annual	24.5	0.1	24.6	50	Yes
$PM_{2.5}$ 24-hour	17.8	0.0	17.8	35	Yes
$PM_{2.5}$ annual	6.0	0.0	6.1	12	Yes
SO_2 1-hour	117.1	0.0	117.1	196	Yes
SO_2 3-hour	86.4	0.0	86.4	1,300	Yes
SO_2 24-hour	20.4	0.0	20.4	365	Yes
SO_2 annual	2.9	0.0	2.9	80	Yes

Table 9. Cumulative Impacts for Alternative 5

Pollutant and Averaging Time	EIS Impact (Project + Background) ($\mu g/m^3$)	Nearby Sources Impact ($\mu g/m^3$)	Cumulative Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Cumulative Impact Below AAQS (Yes/No)
CO 1-hour	8,079.6	3.2	8,082.8	40,500	Yes
CO 8-hour	3,558.1	0.7	3,558.8	10,000	Yes
NO_2 1-hour	146.4	2.7	149.1	188	Yes
NO_2 annual	3.0	4.8	7.8	100	Yes
PM_{10} 24-hour	96.7	0.3	97.0	150	Yes
PM_{10} annual	22.4	0.0	22.4	50	Yes
$PM_{2.5}$ 24-hour	17.7	0.0	17.8	35	Yes
$PM_{2.5}$ annual	5.9	0.0	5.9	12	Yes
SO_2 1-hour	116.6	0.0	116.6	196	Yes
SO_2 3-hour	86.4	0.0	86.4	1,300	Yes
SO_2 24-hour	20.4	0.0	20.4	365	Yes
SO_2 annual	2.9	0.0	2.9	80	Yes

Table 10. Cumulative Impacts for Alternative 6 (Preferred Alternative)

Pollutant and Averaging Time	EIS Impact (Project + Background) ($\mu g/m^3$)	Nearby Sources Impact ($\mu g/m^3$)	Cumulative Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Cumulative Impact Below AAQS (Yes/No)
CO 1-hour	8,089.8	3.2	8,092.9	40,500	Yes
CO 8-hour	3,559.2	0.7	3,559.9	10,000	Yes
NO_2 1-hour	147.6	2.7	150.3	188	Yes
NO_2 annual	3.0	4.8	7.8	100	Yes
PM_{10} 24-hour	97.0	0.3	97.3	150	Yes
PM_{10} annual	20.8	0.1	20.9	50	Yes
$PM_{2.5}$ 24-hour	17.8	0.0	17.9	35	Yes
$PM_{2.5}$ annual	5.9	0.0	5.9	12	Yes
SO_2 1-hour	116.6	0.0	116.6	196	Yes
SO_2 3-hour	86.4	0.0	86.4	1,300	Yes
SO_2 24-hour	20.4	0.0	20.4	365	Yes
SO_2 annual	2.9	0.0	2.9	80	Yes

Figure 1. PM_{10} 24-hour Cumulative Impacts for Alternative 2

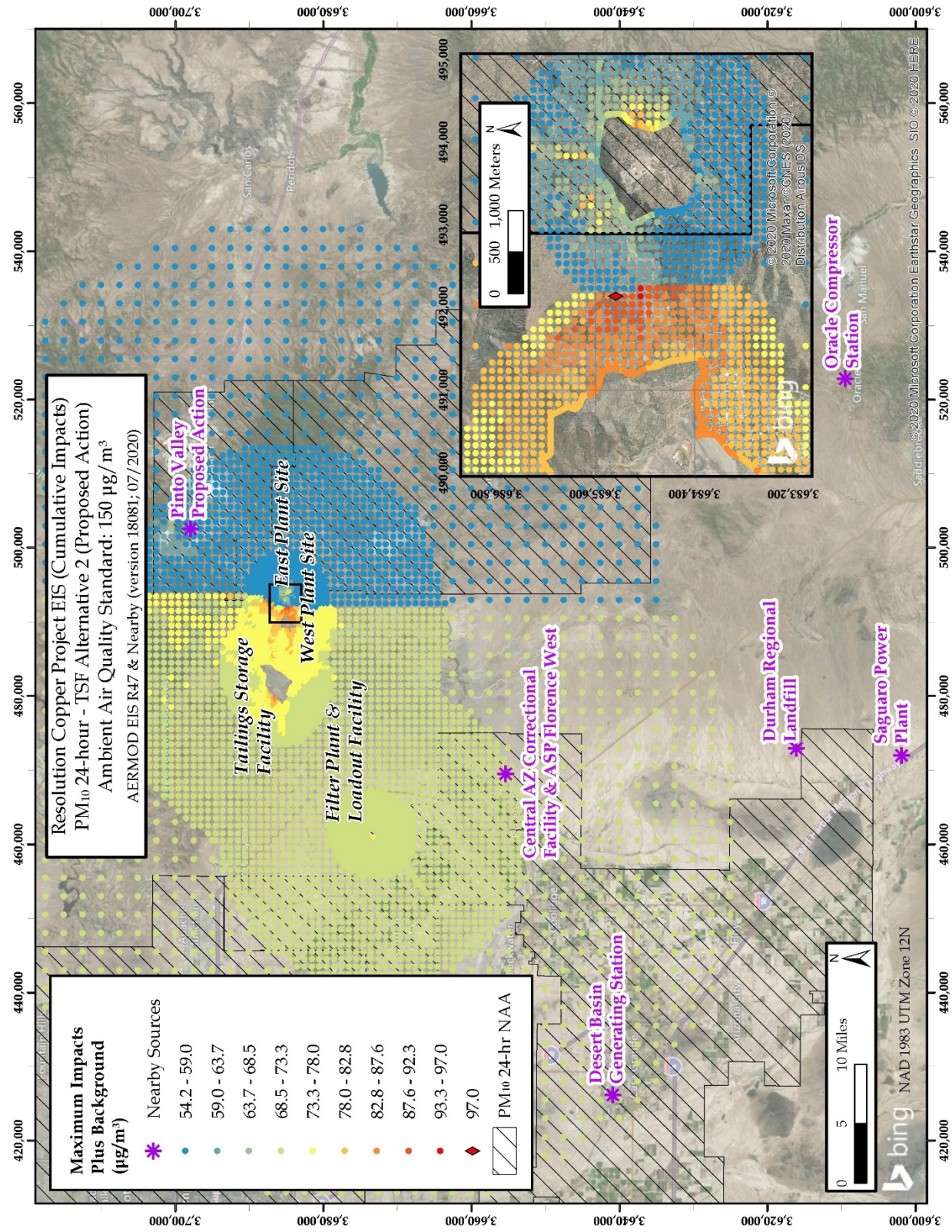

Figure 2. PM_{10} 24-hour Cumulative Impacts for Alternative 6

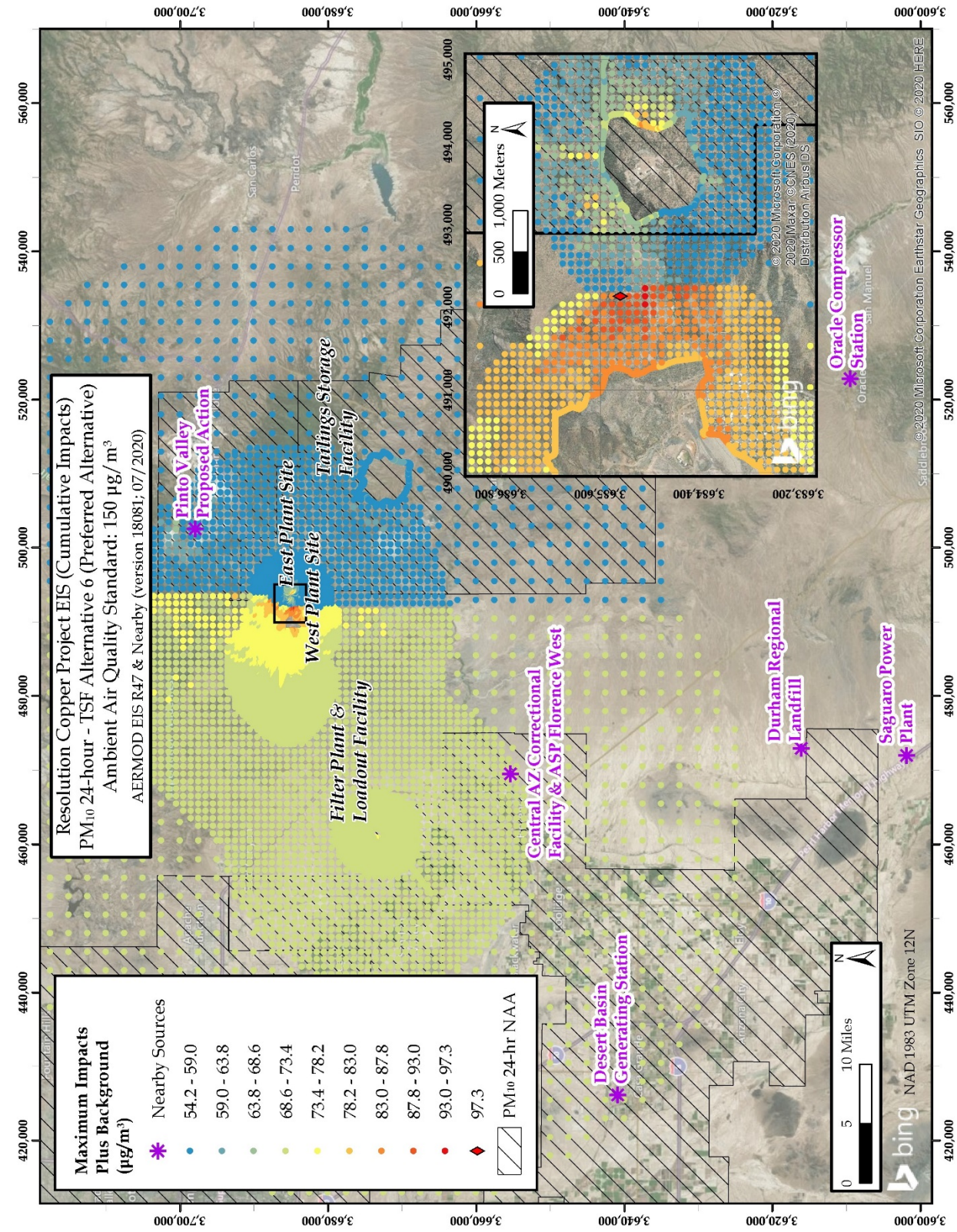

Figure 3. NO_2 1-hour Cumulative Impacts for Alternative 2 (Proposed Alternative)

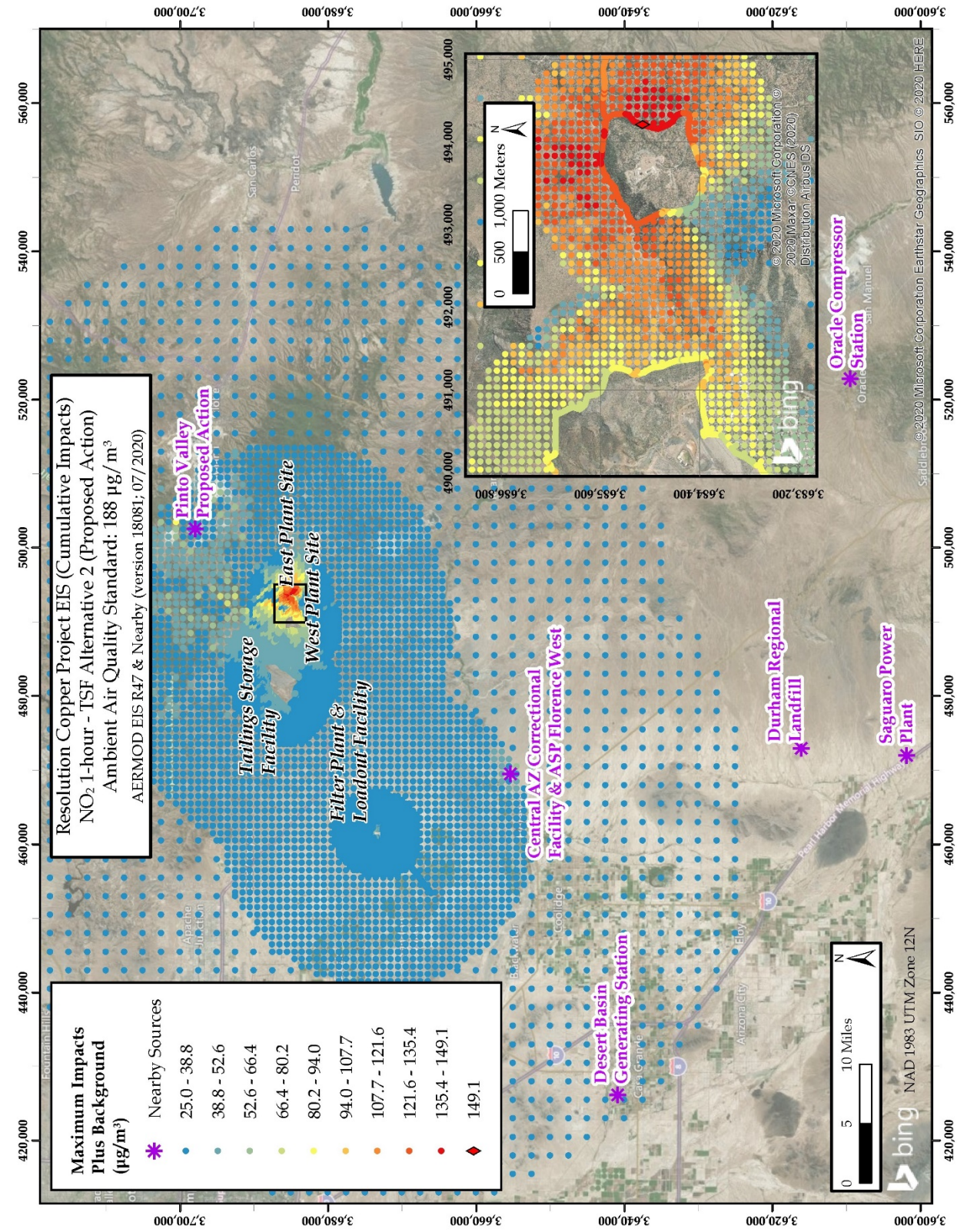

Figure 4. NO_2 1-hour Cumulative Impacts for Alternative 6 (Preferred Alternative)