FINAL ENVIRONMENTAL ASSESSMENT

MADRID STORMWATER AND EROSION CONTROL PROJECT

Santa Fe County, New Mexico

Coal Problem Area: Madrid Coal Breaker - NM935060

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FOR:

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Reviewed by: _____, AML Program Manager

Date: 11/1/2024

Mining and Minerals Division
Energy, Minerals, and Natural Resources Department
1220 South St. Francis Drive
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LIST OF ACRONYMS

AIRFA	American Indian Religious Freedom Act
AML	Abandoned Mine Land
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
BA/BE	Biological Assessment/Biological Evaluation
BISON-M	Biota Information System of New Mexico
BMP	Best Management Practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
EA	Environmental Assessment
EMNRD	Energy, Minerals, and Natural Resources Department
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EO	Executive Order
FONSI	Finding of No Significant Impact
IPaC	Information for Planning and Consultation
MBTA	Migratory Bird Treaty Act
MHD	Madrid Historic District
MOA	Memorandum of Agreement
NAGPRA	Native American Graves Protection and Repatriation Act
NAA	No Action Alternative
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMAC	New Mexico Administrative Code
NMDA	New Mexico Department of Agriculture
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMPIF	New Mexico Partners in Flight
NMPM	New Mexico Principal Meridian
NMRPTC	New Mexico Rare Plant Technical Council
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OHWM	Ordinary High Water Mark
OSMRE	Office of Surface Mining Reclamation and Enforcement
PA	Proposed Action
SHPO	State Historic Preservation Office
SWQB	Surface Water Quality Bureau
USACE	United States Army Corps of Engineers
DOI	United States Department of the Interior
UNM	University of New Mexico
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WOTUS	Waters of the United States
WRCC	Western Regional Climate Center

1. INTRODUCTION

The New Mexico Energy, Minerals, and Natural Resources Department (EMNRD) Abandoned Mine Land (AML) Program, in partnership with the United States Department of Interior (DOI) Office of Surface Mining Reclamation and Enforcement (OSMRE), are proposing to establish stormwater conveyances, erosion control measures, and fire prevention improvements within the town of Madrid, New Mexico, located in Santa Fe County, approximately 22 miles southwest of Santa Fe (Figure 1). These measures are proposed on 125 acres comprised of private, state and county owned land (hereafter referred to as the Proposed Action [PA]).

The PA is designed to help address on-going coal mining legacy hazards including stormwater flooding in and around Madrid, erosion on existing gob piles and roadways, improving the town's fire suppression capabilities, and closing a re-opened adit feature. Madrid's identity is rooted in its coal mining history and its economy relies heavily on tourism. It is important for the New Mexico AML Program to preserve the historical integrity of the town while safeguarding against environmental hazards.

1.1 Project Location

The Area of Potential Effect (APE), containing the town of Madrid, is approximately 22 miles southwest of Santa Fe in Santa Fe County, NM. The APE is located within section 35 of Township 14 North, Range 7 East (T14N-R7E), as depicted in United States Geological Survey (USGS) New Mexico Principal Meridian (NMPM), and on unplatted land in the Mesita de Juana Lopez and Ortiz Mine Grants, as depicted in United States Geological Survey (USGS) New Mexico Principal Meridian (NMPM) Madrid 7.5' topographic quadrangles (Figure 2).

The APE is a combination of private, state and county-owned land that makes up approximately 125 acres (Figure 2). The percentage of surface ownership within the APE includes 84 acres (67%) private, 27 acres (22%) Santa Fe County, 7 acres (6%) New Mexico Department of Transportation (NMDOT), 4 acres (3%) Madrid Landowners Association, 3 acres (2%) Madrid Water Cooperative.

1.2 Purpose and Need for Proposed Action

The need for the PA is to address human health and safety concerns from hazards associated with the remnants of mining activities, including excessive erosion, flooding, and open mine features, as well as address fire suppression insufficiencies in Madrid. The purpose of the PA is to safeguard the public from these hazards while preserving the historical mining landscape.

1.3 Project History/Background

The town of Madrid was developed as a mining community in the 1890s. As a company town, the area grew to include housing, churches, a school, and local businesses which continued to expand through the 1930s to support miners and their families. Mining activities slowed after World War II with the last active mine in Madrid closing in 1962. During the 1960s and early 1970s, the town was mostly empty and efforts to sell it as a whole unit failed. In the late 1970s, the town was sold

as individual properties and purchased in large by eclectic individuals seeking personal freedoms. This sentiment continues, and today, Madrid is a tourist destination known for its artists who wish to preserve and embrace the rich mining history of the town (WCRM 2021).

The AML Program's work in Madrid began in the 1980s and has included adit closures, asbestos removal, water tank abatement, drainage repairs and reclamation, structure demolition, and various maintenance activities. These projects have been met with varying levels of success and public approval. Recent water quality monitoring results indicate past reclamation efforts performed by the AML Program have made a positive impact on stormwater quality (Appendix C). A detailed description of past projects and results can be found in the Madrid Compendium (NM AML 2009).

In 2011, Madrid Mining Landscape community outreach identified two main reclamation projects in the town of Madrid: The East Slope Catchment project and the Arroyo Restoration project (Dekker/Perich/Sabatini 2011). Since abandonment of the mines, existing coal waste piles, known as gob piles, have remained relatively unstable and poorly vegetated. This, combined with modified natural drainages and deteriorated manmade drainage structures, has resulted in the movement of large quantities of sediment downslope and downstream flooding, especially during high precipitation events. The sediment movement has had significant negative impacts on the town of Madrid, located immediately downslope and adjacent to multiple coal gob piles. Over time, sediment has accumulated within the area, clogging drainage paths, and leading to episodic flooding throughout the town (WCRM 2021). Recently, fugitive stormwater and resulting erosion has exposed and reopened a mine adit feature that was previously backfilled by AML in 2011.

In recent years, the AML Program has increased public involvement throughout the planning process. The AML Program met numerous times with the local community and landowners. One of the main issues repeated during these communications was to determine a way to address these severe stormwater concerns without complete reclamation of the gob piles that celebrate the historical mining of the town. In addition, community members expressed concerns to update the town's fire suppression system as the current water storage tank is outdated, undersized, and has severely eroded (NM AML 2009). The AML Program strongly considered these public concerns during development of the PA. For a collection of documents regarding the history and development of this project, please see the NM AML Program's website: <https://www.emnrd.nm.gov/mmd/abandoned-mine-land-program/projects/award-winning-work/madrid-stormwater-erosion-control-project/madrid-stormwater-erosion-control-project-documents/>.

1.4 Project Decision

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA; 42 USC 4321, et seq.) and Council on Environmental Quality (CEQ) guidelines (40 Code of Federal Regulations [CFR] 1500-1508), which require a systematic, interdisciplinary approach to project planning and implementation, and emphasize serious consideration of environmental impacts to federally funded projects.

This EA was prepared on behalf of the AML Program and discloses the environmental consequences of implementing Alternatives A, B, and C. The OSMRE is the lead agency for the

PA. This EA will be reviewed by land management agencies with jurisdiction and made available to the public for review, comment, and consideration. A Finding of No Significant Impact (FONSI) document would then be prepared by the OSMRE describing the findings of the analysis in this EA. The OSMRE Denver Field Branch Manager would be the "Deciding Official" for the PA as the signatory of the FONSI document, if applicable.

1.5 Relevant Statutes and Regulations

The PA does not conflict with any known state or local planning or zoning ordinances. All alternatives are required to conform and comply with the following applicable and relevant regulations and statutes:

- American Indian Religious Freedom Act (AIRFA) of 1978 (42 USC 1996)
- Archaeological Resources Protection Act (ARPA) of 1979 (16 USC 470)
- Clean Air Act (CAA) of 1970, as amended (42 USC 7401 et seq.)
- Clean Water Act (CWA) of 1972, as amended (33 USC 1251 et seq.)
- Endangered Species Act (ESA) of 1973, as amended (16 USC 1531 et seq.)
- Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations (Executive Order [EO] 12898
- Floodplain Management (EO 11988)
- Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC 703–712)
- NEPA of 1969, as amended (42 USC 4321 et seq.)
- National Historic Preservation Act (NHPA) of 1966 as amended, (54 USC 300101 et seq.; formerly 16 USC 470 et seq.)
- National Pollutant Discharge Elimination System (NPDES), as amended (33 USC 1251 et seq.)
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 USC 3001 et seq.)
- Protection and Enhancement of the Cultural Environment (EO 11593)
- Protection of Wetlands (EO 11990)
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 et seq.)
- Secretarial Order 3206: American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act
- Tackling the Climate Crisis at Home and Abroad (EO 14008)

Relevant agency correspondence can be found in Appendix A. A Memorandum of Agreement (MOA) between OSMRE, EMNRD, and NM SHPO regarding the PA was entered into April 3, 2023 (Appendix B). The County of Santa Fe, Madrid Landowners Association, U.S. Army Corps of Engineers, and the Madrid Water Cooperative signed as concurring parties. This MOA describes previous agreements, anticipated effects of the PA, and stipulations to mitigate adverse effects to historic properties.

During original surveys of the arroyo, it was categorized as a Waters of the U.S. However, due to the most recent Supreme Court Sackett v. EPA decision and subsequent revision of the definition of Waters of the U.S., ephemeral waterways are excluded. Therefore, the USACE determined this

project does not require a Section 404 CWA permit (Appendix C). A Pre-Construction Notice (PCN) for the PA has been submitted and deemed consistent with CWA Section 401 Water Quality Certification for the 41 Nationwide Permits, pursuant to WQC Condition 1 (Appendix C). In addition, the AML Program would also apply for a Section 402 (NPDES) permit from the EPA prior to construction.

1.6 Public Involvement

In order to meet the NEPA goal of early and meaningful public participation in the decision process, the CEQ requires agencies to make diligent effort to involve the public at multiple stages of the NEPA process (CEQ 1997).

A public meeting was held on December 13, 2017, at the Madrid Fire Station, 5 Firehouse Lane, Madrid, New Mexico. The purpose of the public meeting was to provide an overview of the PA and to accept comments and answer questions from the public. Public meeting notices were published in the *Santa Fe New Mexican* on November 29, and December 12, 2017. Public notices were also published in the *Mountain View Telegraph* on November 30, and December 7, 2017. The meeting notice was also mailed to 120 local addresses on November 27, 2017. Seventeen (17) community members and several AML Program representatives attended the public meeting. Due to the number of claimants and public response to the first public meeting, a second public meeting was held on June 20, 2018, at the Madrid Fire Station. Notice was published in the *Mountain View Telegraph* and the *Santa Fe New Mexican* on May 31, and June 14, 2018. Notices were also mailed to 137 addresses. Ten (10) community members attended the public meeting, as well as AML Program representatives. A third public meeting was held on September 24, 2018, at the Mine Shaft Indoor Theater in Madrid. Public notice was published in the *Santa Fe New Mexican* on September 17, 2018. A notice was also mailed to 161 addresses. Seventeen (17) people attended the meeting, as well as AML Program representatives.

The following is a summary of the community's initial concerns as discussed in meetings and public comment period:

- Retaining gob piles
- Safeguarding the fire department's water storage tank
- Stabilizing the arroyo through town
- Reduce sedimentation in roads and buildings during flood events
- Maintaining gravel roads throughout town

A fourth public meeting was held January 25, 2024, to present the Draft EA and receive public comment. The Draft EA was released for a 30-day comment period between January 8 and February 7, 2024. Notice of the meeting and comment period was provided via *Santa Fe New Mexican* and *Albuquerque Journal* legal notices, 340 local residential and business address mailings, KMRD public service announcements, MLA Facebook group postings, and public information board postings. Substantial feedback and concerns were brought forward during this comment period, primarily regarding:

- Impacts to Madrid Arroyo

- Downstream impacts
- Updates to the PA that weren't originally covered in the Draft EA

In response to these comments, a Revegetation Plan was created and made public, updates were made to engineering designs, and additional information was incorporated into the Final EA. A final public meeting was held August 15, 2024. The purpose of this meeting was to present the Revegetation Plan (new) and Engineering Designs (updated). This meeting was not associated with an additional open comment period. Notice of the meeting and comment period was provided via *Santa Fe New Mexican* and *Albuquerque Journal* legal notices, 340 local residential and business address mailings, KMRD public service announcements, MLA Facebook group postings, and public information board postings.

Further details on public meetings, including notices, presentations, and public comments can be found in Appendix D. Public Involvement Compendium.

The Final EA will be published for viewing on the AML Program's website and sent to OSMRE for agency review. OSMRE will be providing a 30-day comment period via the Federal Register.

2. DESCRIPTION OF ALTERNATIVES

Provided below is a description of the three alternatives developed by the AML Program. Included is Alternative A, the Proposed Action (PA) and the AML Program's preferred alternative, as well as Alternative B and Alternative C, and the No Action Alternative (NAA).

2.1 Alternative A, Proposed Action

The PA as described below was designed to address issues related to legacy mining operations, including stormwater control, erosion, and open mine features, as well as improve fire suppression capabilities, while being visually unobtrusive in the historical setting of Madrid. The PA has been designed to provide the maximum level of service within the limitations of landowner permission and feedback from public involvement.

The stormwater improvements proposed would provide a medium level of service and would require periodic maintenance on gravel roads, channels, and rolling dips, and to remove sediment and debris, especially after large precipitation events. The NM AML Program and the MLA entered into a Cooperative Agreement in 2019 (EMNRD 2019). The MLA agreed to accept the responsibility for permanent post-construction monitoring and maintenance on properties not owned and managed by local or state agencies. As a result of this Cooperative Agreement, the AML Program will provide the MLA with a specifications and maintenance manual for any new infrastructure to be maintained and monitored by the MLA upon completion of construction (including maintenance intervals). As the MLA also maintains roadway easements through the Santa Fe County Greenbelt parcel, the MLA would be responsible for any maintenance. The AML Program would conduct major repairs of stormwater features on private property if a design were not functioning effectively and any major repairs that may be needed to the arroyo project. On

private property, maintenance would be the responsibility of the landowner, who may also receive assistance from the MLA. At the request of multiple landowners and the community, the types of designs used in this project are as low maintenance as possible while balancing the critical needs to convey stormwater away from residences and buildings.

Engineering designs and revegetation plan information can be found online at www.emnrd.nm.gov/mmd/public-notices/ under the Madrid Stormwater and Erosion Control Project section. The following activity descriptions are depicted in Online Design- *Stormwater Designs*, unless otherwise noted. For pictures of example features from past projects, please see the *Public Design Review Meeting Powerpoint (August 15, 2024)* available online.

The PA has been split into the following subsections based on location and activity type. For a general overview of the locations referenced, please refer to Online Design- *Stormwater Designs*.

2.1.1 Ice House Road, Proposed Action
The PA in the Ice House Road area would include improvements to Bethlehem Hill Road, Bethlehem Hill Arroyo, and Ice House Road. Improvements to Bethlehem Hill Road would consist of earthen rolling dips, cobble rock rundowns, and cobble swales to slow and direct stormwater off Bethlehem Hill Road and into a stormwater conveyance channel. The treatment proposed at Bethlehem Hill Arroyo would construct plunge pools (also known as Zuni bowls) and one-rock dams to alleviate erosion during storm events. Rock- and riprap-lined intercept channels would be installed upslope (east) from the village routed to a plunge pool and sediment pond; any uphill concrete structures would be hidden from view from the village.

A sediment pond near the intersection of Bethlehem Hill Road and Ice House Road would be constructed to accept stormwater from the lower intercept and from Bethlehem Hill Arroyo. The pond would discharge through a culvert crossing under Ice House Road to the west and a stormwater conveyance channel with drop structures would be added west from Ice House Road to Cave Road. This structure would pass under NM-14 through a piped storm drain system and return to a rectangular drainage channel. NM-14 would have one-lane closures during installation completed during warmer summer months when possible. Ice House Road would be re-graded to a crowned gravel roadway cross section with concrete dips, curb and gutters installed along the route.

2.1.2 Madrid Arroyo and Cave Road, Proposed Action
Bridge Street would be regraded with an addition of base course material. A center valley gutter, drainage inlet catch basin, and storm drain would be installed to funnel to Madrid Arroyo. Back Road would be minorly regraded and surfaced with gravel when the project is completed.

A contractor staging area would be placed south of Cave Road. Cave Road would be regraded with a rock lined swale and two drainage channels to convey. A pedestrian bridge would be constructed along the pedestrian trail over the proposed drainage channel. Two channels with concrete box culverts would be constructed at Cave Road crossing to direct small stormwater flows to the original Madrid Arroyo alignment and, secondarily, to direct higher flows into the west channel. Rock walls, riprap, and other erosion controls measures would be installed in and around the

channels near the culverts. Reinforced concrete road surfacing or aggregate base course surfacing would be installed above the culverts.

The main channel of Madrid Arroyo would be re-graded, and rock and soil deflectors, grade control structures, and other features would be installed in the channel. Some excess fill from the arroyo would be added to the old railroad grade between Cave Road and Madrid Arroyo to minimize Madrid Arroyo flooding homes along Cave Road. Fill would be stabilized with gravel surfacing on top. A temporary access road would be constructed north of Cave Road to access the northeast portion of Madrid Arroyo. A shallow channel would be excavated and grade control features added. Some tree removal would occur; trees and shrubs to be retained and other grading exclusion zones would be protected with temporary safety fencing as needed. All clearing, grubbing, trash, and metal waste uncovered during grading operations would be removed from site.

Following reconstruction of the arroyo, the area would be revegetated with hydroseeding and live plantings suited to Madrid's climate and soil types. Separate seed mixes have been designated based on the soil moisture content of the reclamation areas: dry, upland species mix; higher soil moisture species mix for channel edges and deflectors; and higher soil moisture, shade-adapted species mix. Plants designated to be reseeded or planted in upland areas were chosen for their ability to survive a harsh, arid environment. Upland species would most likely be seeded or planted in late spring/early summer, subject to weather. The full plant species list with additional information regarding water needs, timing recommendations, seed mix designation, etc. can be found in Online Design- *Arroyo Revegetation Plan*; Attachment 1. See Figures 1, 2, and 3 in the Online Design- *Arroyo Revegetation Plan* for detailed locations of proposed seed mixes and tree plantings. Full seeding specifications, including seed bed preparations, timing restrictions, seed and plug quantities, and mulching information are provided in Online Design- *Arroyo Revegetation Plan*; Attachment 4. A drip irrigation system with 3,000-gallon irrigation tank would be installed and operated for up to two years for vegetation that would benefit from additional water during early establishment, primarily tree and shrub plantings (Online Design- *Arroyo Revegetation Plan*; Figure 1). After two years, responsibility over the water tank would be turned over to the MLA to use as desired. A water truck with spray hose would also be used for the plant plugs and seeded areas as needed. AML personnel would visit approximately every 1-3 weeks, depending on climatic conditions, to check if the water truck is needed. A monitoring plan would be created and would be implemented likely up to two years following revegetation.

AML plans to dispose approximately 12,000 cubic yards of excess soil and sediment from regrading Madrid Arroyo on the vacant property north of the ballfield. The existing gob piles within the disposal site would be regraded and contoured prior to placing the excavated material. The material would be deposited over the disposal area and used to regrade the gob piles with haul trucks, graded to varying depths between one to eight feet depending on terrain, then seeded and mulched with a Santa Fe County-approved native seed mix. This soil and sediment disposal area may also be used for a period of up to one year by AML and its contractor(s) as a construction materials and equipment staging area during construction. The existing parking area would be regraded and surfaced with six inches of compacted base course material for use as a staging area. The road through this area would be graded and a riprap low water crossing installed for use.

2.1.3 Firehouse Lane, Proposed Action

A summary of actions proposed for the Firehouse Lane area is shown on Online Design- *Stormwater Designs*. A rectangular concrete ditch would be installed along the upslope side of Dominguez Road to direct runoff into a storm drain inlet. Flow from the opposite direction would be directed past an existing rock drop structure and plunge pool, past a proposed boulder retaining wall, and into a trapezoid channel leading to the same storm drain inlet.

A stormwater conveyance route (rock-lined ditch) and boulder retaining wall would be added along the hillside above the Red Dog Road to channel stormwater south to the existing culvert located under Firehouse Lane. The east gob piles in the Firehouse Lane area would have plunge pools, one rock dams, and rock rundowns placed in the higher elevations of the drainages with trapezoidal channels constructed at the toes of the gob piles to capture and convey stormwater and sediment. Midway along Firehouse Lane, stormwater would pass under the road via two buried concrete culverts and feed into Madrid Arroyo. Red Dog Road would be regraded with an addition of base course material.

Concrete valley gutters would be installed along Firehouse Lane and at the intersection of Firehouse Lane and Red Dog Road. The southern stretch of Firehouse Lane would be updated to a 12-foot-wide crowned gravel roadway with v-ditch able to convey stormwater into Madrid Arroyo and along the west segment into the existing drop inlet adjacent to NM-14. The middle portion of Firehouse Lane would be updated to a 12-foot-wide cross-slope gravel road with v-ditch. The northern portion of Firehouse Lane would be regraded to a 24-foot-wide cross-sloped gravel roadway.

2.1.4 Water Tank and Fire Suppression System, Proposed Action

The PA for the water tank and fire suppression system would include the installation of a new 125,000-gallon tank, new hydrants, and a transmission pipeline crossing NM-14 and Madrid Arroyo south of Madrid and across from the existing potable water tank (Online Design- *Fire Suppression Tank;* Online Design- *Stormwater Designs*). A concrete pad would be installed for the new tank location and the existing access road would be stabilized with 4-inch gravel surfacing. The proposed pipeline would be routed to a connection with the existing fire suppression pipeline near the fire house. The waterline would be installed by trenching along the majority of the route. However, where the pipeline would cross under NM-14, it would be placed in a casing installed via boring. Trenching work in the arroyo bottom would take place during dry forecast to minimize soil and hydrological impacts. New pipeline would be placed in Madrid Water and NMDOT land except for one private landowner. This southern location was chosen as it is less disruptive to residents and visitors and has less potential for underground utility interference.

2.1.5 Mine Adit Closure, Proposed Action

Recently, fugitive stormwater and resulting erosion have exposed and reopened a mine adit feature that was previously backfilled by AML in 2011. This feature is on private property near the intersection of Icehouse Road and Bethlehem Road in Madrid. To address human health and safety concerns, this feature would be closed and safeguarded, potentially utilizing the following methods: manually or mechanically filling mine openings using imported or surrounding soil and

rock, waste material or using polyurethane foam, and/or building structural barriers to restrict human access, such as rock bulkheads.

2.1.6 Design Features

The following are design features incorporated into the PA to avoid or mitigate impacts to the human environment. These would be used as needed throughout the previously described actions.

- The contractor shall prepare a Stormwater Pollution Prevention Plan (SWPPP) and obtain required National Pollutant Discharge Elimination System (NPDES) permit coverage for construction activity from the USEPA as required under the Clean Water Act. Best management practices (BMPs) shall be used to minimize erosion and transport of sediment (see NMDOT standard drawings 603-01-1/7 through 7/7). The SWPPP shall include the proposed construction staging area and temporary sanitary facilities and show location of all BMPS including check dams, silt fences, inlet protection, straw sock, or other BMPs that are required in the approved SWPPP per the NMDOT NPDES manual at the following internet location: https://www.dot.nm.gov/wp-content/uploads/2024/01/nmdot-npdes-manual-rev-4-2023.pdf.
- Should a screen be required for onsite screening of construction materials, a General Construction Permit for Quarrying, Crushing, and Screening Facilities (GCP-2) would be secured prior to operation. The BMPs and controls under this GCP would be followed to ensure air emissions do not cause significant impacts to air quality.
- Upon completion of construction, temporary erosion and sediment controls would be removed once the project area is stabilized as determined by the AML Program Manager.
- At the completion of construction, revegetation and restoration of disturbed areas would be conducted. Revegetation shall include mulching and seeding of exposed areas with specified seed mix provided in the Revegetation Plan.
- In the event of an unexpected release of hazardous materials during construction, the contractor would be responsible for reporting, cleanup, and disposal of any contaminated soils. Contractor shall be required to report spills of gasoline, solvents, and other chemicals of reportable quantities to the AML Program Manager.
- Exposed and disturbed soil surfaces shall be watered at a frequency sufficient to avoid fugitive dust. Earthmoving and other dust-producing activities would be suspended during periods of high winds when dust control efforts are unable to prevent fugitive dust. Stockpiles of debris, soil, sand, or other materials would be watered or covered. Any materials transported on-site by truck shall be covered. Soil disturbance would be minimized, and native vegetation and topsoil would be retained where possible.
- Soil accumulated from excavation activities and not used in the work shall be transported and disposed at the soil stockpile located north of the Madrid Ball Park..
- Construction contractors shall ensure that construction equipment and vehicles use approved emission control devices and limit unnecessary idling.
- Contractor laydown area and vehicle parking areas would be identified during pre-construction meeting.

- Construction contractors would be required to limit construction equipment and vehicle use to daytime hours. Construction contractors shall be required to ensure that construction equipment and other equipment have working mufflers and other noise control devices.
- Trenching activities would utilize applicable conservation measures as outlined by NMDGF (2022) to avoid trapping small animals.
- If cultural materials or human burials are encountered during construction activities, work in the area shall stop, the contractor shall immediately contact the NM EMNRD Project Manager.
- The contractor shall prepare and implement traffic control plans for NM-14 and local roads. Divert traffic around construction zones utilizing lane closures. Do not divert traffic on local roads.
- The contractor shall dispose of all unsuitable earthen materials in an environmentally acceptable manner at a location approved by the NM EMNRD. Solid waste and construction demolition debris shall be transported and disposed at a New Mexico permitted landfill facility.
- The contractor shall promptly clean up any material excavated within the public right-of-way or private roadway easements to minimize excavated material being washed down the street or into any public drainage facility.
- All trash within the project limits would be collected and removed.

2.2 Alternative B

Alternative B is a selection of actions similar to the PA with alterations for each project area as described below. In general, Alternative B includes more intensive stormwater management actions that would also be more visually obtrusive in Madrid's historical setting. The stormwater improvements proposed would provide a high level of service and would require less maintenance than the PA. Alternative B would include the same mine adit closure as discussed in the PA.

2.2.1 Ice House Road, Alternative

The Ice House Road alternative includes proposed stormwater and erosion control features characterized by paved standard and inverted crown road improvements to all roads, storm drain pipes, large detention pond, and rock-lined stormwater diversions. NM-14 would have one-lane closures during installation completed during warmer summer months.

2.2.2 Madrid Arroyo and Cave Road, Alternative

The Cave Road and Madrid Arroyo alternative would include re-grading Cave Road and constructing a rock-lined swale gravel roadway to convey stormwater. Excess fill from the arroyo would be added to the existing railroad grade between Madrid Arroyo and Cave Road to minimize Madrid Arroyo from leaving its banks and flooding homes along Cave Road. The arroyo crossing would be constructed with two concrete box culverts designed to county standards for public safety and emergency access. The arroyo would then be reseeded with a native seed mix approved by the County to stabilize areas disturbed by grading. Bridge Street would be paved and a center valley gutter and drainage inlet drop structure reporting to Madrid Arroyo installed. Improvements to Madrid Arroyo would include re-grading the floodplain and installing rock and soil deflectors to minimize lateral erosion and direct stormwater into the west channel.

The revegetation plan for Madrid Arroyo would be similar to that described in the PA, with the exception of minor modifications to adjust around the concrete structures. In addition, the staging area and spoil pile at the ballfield would be the same as described in the PA.

2.2.3 Firehouse Lane, Alternative

The Firehouse Lane alternative would consist of installing stormwater and erosion control features such as paved standard roads, storm-drain pipes, rock-lined stormwater diversions, and sediment basins. Red Dog Road would be paved and a stormwater conveyance route (rock-lined ditch) would be added along the hillside of Red Dog Road to channel stormwater south to the existing culvert located under Firehouse Lane.

2.2.4 Water Tank and Fire Suppression System, Alternative

The water tank and fire suppression alternative would still install a new 125,000-gallon water tank and use horizontal directional drilling for the pipeline under the highway. However, the proposed new pipeline would be routed along the west side of NM-14 and cross under the highway at the bend. The new pipeline would be placed entirely in the NM-14 right-of-way.

2.2.5 Design Features

Design features for Alternative B would be similar to those described in the PA and adjusted as needed to fit the actions in Alternative B.

2.3 Alternative C, No Action Alternative

The NAA would take no measures to reduce hazards associated with past mining activity. This alternative provides the lowest level of service, as no stormwater or erosion structures would be constructed in the discussed project areas and fire suppression capabilities would remain at the current level. The NAA does not satisfy the purpose and need of the PA based on AML Program reclamation priorities (PL 95-87, 30 USC 1240[a] 2006).

2.3.1 Icehouse Road, No Action Alternative

Under the NAA, none of the proposed improvements for stormwater and erosion control, including road improvements, storm drain pipes, detention ponds, rock-lined stormwater diversions, or sediment basins, would be constructed in the Ice House Road area.

2.3.2 Madrid Arroyo and Cave Road, No Action Alternative

Under the NAA, none of the proposed improvements for stormwater and erosion control, including road improvements, channel regrading, culverts, drain pipes, seeding, rock and soil deflectors, or weirs and debris catchment, would be constructed in the Arroyo and Cave Road areas.

2.3.3 Firehouse Lane, No Action Alternative

Under the NAA, none of the proposed improvements for stormwater and erosion control, including road improvements, storm drain pipes, detention pond, rock lined stormwater diversions, or sediment basins, would be constructed in the Firehouse Lane area.

2.3.4 Water Tank, No Action Alternative

Under the NAA, no updates would be made to the current fire suppression system. The water tank used to supply fire hydrants throughout Madrid would remain at 100,000 gallons and be below

requirements to meet National Fire Protection Association (NFPA) standards (Weston Inc. 2019). The tank would also continue to be susceptible to damage from erosion and flooding as it would continue to leak and remain within the flood path.

2.3.5 Mine Adit Closure, No Action Alternative
Under the NAA, the recently opened mine adit feature would not be closed and no actions to safeguard the public would occur.

2.4 Alternatives Considered but Not Analyzed

Additional alternatives were considered during public scoping and the development of the PA that will not be analyzed. Initially, the AML Program proposed fully reclaiming the gob piles in effort to significantly, and more permanently, reduce sedimentation and address stormwater and erosion control needs. However, public scoping indicated Madrid residents strongly opposed the reclamation of these prominent visual representations of mining history. Rehabilitating the existing water storage tank was also considered; however, this was eliminated from consideration due to the age, condition, and operational requirements of the outdated system.

3. AFFECTED ENVIRONMENT

This section describes the existing environmental resources and their present conditions within the APE. Resource issues unlikely to be affected by the PA and therefore not discussed in detail below include air quality and visibility, energy, farmlands, floodplains, forestry, geology, greenhouse gases and climate change, groundwater, historic trails, leasable and locatable minerals, livestock grazing and rangeland, and noise.

3.1 General Project Setting

The PA is within the town of Madrid, NM. The population of Madrid is 247, with 169 associated buildings, 145 of which are occupied (U.S. Census Bureau 2020). Madrid is located in the foothills of the Ortiz Mountains. The Ortiz Mountains are a small range within the San Pedro-Ortiz porphyry belt. Elevation within the APE ranges from approximately 5,930 to 6,350 feet above sea level. The topography ranges from nearly level in the valley floor to steeply sloping mountain sides. The APE includes steep slopes and drainages, narrow ridgelines, talus deposits, gob piles, and several ephemeral arroyos. Average temperatures in the general area range from a minimum of 17.6°F in January to a maximum of 90.1°F in July; annual precipitation averages 12.77 inches (WRCC 2016).

The APE is located within Arizona/New Mexico Mountains Level III ecoregion (Griffith et al 2006); higher elevation portions are within the Rocky Mountain Conifer Forests sub-region, and lower elevation areas are within the Conifer Woodlands and Savannahs sub-region (Level IV). The Conifer Woodlands and Savannahs reflect the transitional zone between grassland and scrubland vegetative communities and conifer woodlands and typically contain pinyon-juniper woodlands intermingled with grasslands and shrublands. The Rocky Mountain Conifer Woodlands

reflect higher moisture levels, with ponderosa pine, Gamble oak, mountain mahogany, and dense understory (Appendix E).

3.2 Air Quality

The Air Quality Bureau (AQB) within the New Mexico Environment Department (NMED) has authority over air quality, except in Bernalillo County and on Tribal Lands.

Criteria Air Pollutants

EPA established primary and secondary National Ambient Air Quality Standards (NAAQS) under 40 CFR 50 that specify acceptable concentration levels of six criteria pollutants. These include Particulate Matter less than 10 microns (PM_{10}), Particulate Matter less than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NOx), ozone (O_3), and lead (Pb). Short-term NAAQS, defined as periods of 1-, 8-, and 24-hour terms, have been established for pollutants contributing to acute health effects. Long term NAAQS are defined in annual averages, have been established for pollutants contributing to chronic health effects. NMED AQB has adopted the federal standards. Table 1 provides the specific levels per each criterial pollutant.

Table 1. *NAAQS Criteria Pollutant Limits*

Pollutant		Primary/Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m3 (1)	Not to be exceeded
Nitrogen Dioxide (NO2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	**PM2.5**	primary	1 year	9.0 µg/m3	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m3	98th percentile, averaged over 3 years
	PM10	primary and secondary	24 hours	150 µg/m3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Federal regulations designate air quality control regions (AQCRs) in violation of the NAAQS as nonattainment areas and AQCRs with levels below the NAAQS as attainment areas. Maintenance areas are AQCRs that have previously been designated as nonattainment and have been redesignated to attainment for a probationary period through implementation of maintenance plans. The PA is within Santa Fe County, NM, which is in attainment for all CAA criteria pollutants.

Class I Areas

A Class I Areas are federal lands that include national parks, national wilderness areas, and national monuments. These areas are granted special air quality protections under Section 162(a) of the CAA. The nearest Class I area is the Bandelier Wilderness, approximately 21.6 miles to the northwest of the PA.

Greenhouse Gasses & Climate Change

Greenhouse gases (GHGs) are components of the atmosphere that trap heat relatively near the surface of the earth and therefore contribute to the greenhouse effect and climate change. Most GHGs occur naturally in the atmosphere, but increases in their concentration result from human activities, such as the burning of fossil fuels. Global temperatures are expected to continue to rise as human activities continue to add carbon dioxide (CO2), methane, nitrous oxide, and other greenhouse (or heat-trapping) gases to the atmosphere. Whether rainfall will increase or decrease remains difficult to project for specific regions (EPA 2016).

The NMED Climate Change Bureau (CCB) identifies, implements, and monitors New Mexico's efforts to reduce greenhouse gas emissions by at least 45% by 2030 as compared to 2005 levels. NMED is working to meet their climate goals by:

- Leading state climate policy development and implementation within the interagency Climate Change Task Force;
- Implementing actions identified in Governor Michelle Lujan Grisham's 2019-003 Executive Order Addressing Climate Change and Energy Waste Prevention;
- Tracking and evaluating the State's greenhouse gas emissions data: 2018 inventory and 2020 oil and gas only inventory;
- Forecasting greenhouse gas emissions reductions from climate actions: 2018 forecast, 2021 forecast, and 2021 climate policy simulator (an open-source modeling tool).
- Implementing the Clean Car Rule and other policies that reduce the greenhouse gas footprint from transportation;
- Initiating the development of clean hydrogen (see the public version of a concept paper submitted to the US Department of Energy's (DOE's) Regional Clean Hydrogen Hubs program); and
- Supporting climate work within the Environment Department, state agencies, and all other public and private entities throughout the state.

3.3 Cultural Resources

The PA is subject to Section 106 (54 USC 306108) of the National Historic Preservation Act (NHPA) (54 USC 300101 et seq. and its implementing regulations 36 CFR Part 800: Protection of Historic Properties, as revised August 2004). To comply with Section 106 of the NHPA, a Class III cultural resource inventory, including archival research, records review, preliminary listing recommendations for National Register of Historic Places (NRHP) eligibility, and a 100 percent pedestrian survey of the entire APE was completed to identify any historic properties that would be potentially impacted by the PA. During the field inventory, cultural resource contractors evaluated and provided preliminary listing recommendations for NRHP eligibility; through the consultation process with the State Historic Preservation Office (SHPO), final NRHP eligibility determinations were made in accordance with Section 106. Class III archaeological survey methods were conducted in accordance with *Standards for Survey and Inventory* (NMAC 2006) and in compliance with Sections 18-6-5, 18-6-9, and 18-6-9.1 through 18-6-9.3 of the Cultural Properties Act; New Mexico Statutes Annotated 1978 (NMSA 1978) of the Cultural Properties Act and in observance of the requirements of New Mexico Administrative Code (NMAC) Title 4, Chapter 10, Part 8, Subsection 17 (4.10.8.17 NMAC) and Title 4, Chapter 10, Part 15 (4.10.15 NMAC) for protection of archaeological resources in New Mexico (WCRM 2021).

A large portion of the APE overlaps with the Madrid Historic District (MHD). The MHD encompasses approximately 200 acres and covers the downtown area, areas of the town that hold historic resources such as the ballpark, mining museum, and historic railroad segments. The MHD was listed in the New Mexico State Register of Cultural Properties (SR 356) in 1974 and the NRHP (NRHP No. 77000928) in 1977. In the NRHP nomination form, the MHD is stated as being representative of one of the oldest company-owned mining towns in the Western United States (Baxter and Cook 1976), with a period of significance from 1828 to 1926.

The APE for cultural resources includes 125 acres of primarily private lands, with small parcels administered by the County of Santa Fe, the Madrid Water Users Cooperative and Madrid Landowners Associations in Santa Fe County, and the NMDOT. The cultural inventory completed in 2020 (WCRM 2021) determined there are 109 historic buildings, two (2) historic structures, fifteen (15) archaeological sites, and one (1) historic isolated occurrence within the APE. Surveys of the updated APE area in 2024 documented three (3) additional archaeological sites and one (1) additional historic building (HCPI 54668; Sachse and Kurota 2024; Rodriguez and Kurota 2023). All identified historic resources are associated with the mining history of Madrid. The nature of the historic buildings, structures, and archaeological sites within Madrid can be split between the following group type descriptions and summarized in Table 2:

1. Residential Buildings and Features and subtype
    1.a. Community Refuse Disposal,
2. Commercial Buildings and Features and subtype
    2.a. Community Pride Resources,
3. Transportation and Infrastructure System Features, and
4. Mine-Related Buildings, Structures, Features, and Objects

Table 2. *Summary of historic properties and sites by property type*[1,2]

	Property Type 1	Property Type 1a	Property Type 2	Property Type 2a	Property Type 3	Property Type 4
Buildings	80		33	13		2
Structures					2	
Archaeological Sites	8	3		3	3	6

[1]Data from WCRM 2021, Sachse and Kurota 2024, and Rodriguez and Kurota 2023.
[2]Some buildings and sites were assigned to multiple property types. The historic isolate could not be assigned a property type.

Of the 110 historic buildings, fifty (50) are recommended as eligible for inclusion in the NRHP and the other sixty (60) buildings and two (2) structures are recommended not eligible. Of the eighteen (18) historic archaeological sites, thirteen (13) sites are recommended as eligible for inclusion in the NRHP, and four (4) sites are recommended as not eligible. In addition, one (1) historical archaeological site was determined unevaluated for listing in the NRHP (HPD Log No. 47255). The one (1) documented isolated occurrence represents a nonsignificant resource with no NRHP eligibility. The historical significance of the eligible resources within the APE is summarized in Table 3 (WCRM 2021; Sachse and Kurota 2024; Rodriguez and Kurota 2023). Two of the archaeological sites (LA 117776 and LA 117779) recommended eligible by WCRM were subsequently determined not eligible by the SHPO, and one site (LA 195464 recommended not eligible was assigned an undetermined eligibility status by the SHPO (HPD Log No. 114885).

Table 3. *Historic significance of eligible features within the APE as defined by 36 CFR 60.4*[1]

	Buildings	Structures	Archaeological Sites (WCRM Recommendation)	Isolated Occurrence	Archaeological Sites (SHPO Determination)
Criterion A, B, and C[2]	1				
Criterion A and B			2		2
Criterion A and C	21		1		1
Criterion A and D					7
Criterion A	28		2		
Criterion C	1				
Criterion D			7		
Not Eligible	60	2	3	1	6
Unevaluated					1

[1] Data from WCRM 2021, Sachse and Kurota 2024, and Rodriguez and Kurota 2023.
[2] Criterion A- associated with events that have made a significant contribution to the broad patterns of our history
Criterion B- associated with the lives of persons significant to our past
Criterion C- embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess highly artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
Criterion D- that have yielded, or may be likely to yield, information important in prehistory or history

3.4 Visual Resources

Visual resources consist of landforms, vegetation, rock and water features, and cultural modifications that create the visual character and sensitivity of landscapes. Two factors were considered when evaluating the existing condition of visual resources within the APE: visual

quality and visual sensitivity. Visual quality is the overall impression or attractiveness of an area, considering the variety, vividness, coherence, harmony, or pattern of landscape features. Visual sensitivity is a measure of an area's potential sensitivity to visual change considering types of viewers, viewer exposure, volumes, as well as viewing distance.

Evidence of the historical mining activities is visually apparent throughout the APE. There are 112 historic buildings and structures throughout the APE that help visually tell the history of Madrid mining. Black-colored gob piles left by past mining activities contrast sharply with the natural setting, supporting little vegetation other than sparse weedy cover and have highly eroded side-slopes with gob waste sloughing off into the canyon bottoms and drainage courses (Dekker/Perich/Sabatini 2010). While the gob piles detract from the natural visual quality, they do provide a distinctive visual context of the historical land use in the area. Visual sensitivity is high given the tourist destination and direct access through the center of the APE on NM-14.

The Turquoise Trail National Scenic Byway (NM-14) bisects the APE. The byway was recognized as a National Scenic Byway for the area's intrinsic scenic quality. Scenic quality is derived from a distinct, memorable visual experience that incorporates a harmony between the natural landscape and manmade elements (FHWA 2019).

3.5 Water Resources

The Clean Water Act (CWA) of 1972 regulates activities that have the potential to impact Waters of the United States (WOTUS) as defined by the United States Army Corps of Engineers (USACE). Section 404 of the CWA regulates discharge of dredged and fill materials within the ordinary high water mark (OHWM) of WOTUS and is administered by the USACE. Section 401 of the CWA regulates water quality and, for the purposes of the PA, is administered by the NMED Surface Water Quality Bureau (SWQB).

3.5.1 Wetlands

No National Wetlands Inventory (NWI) wetlands are located within the APE and no wetlands were located during any field surveys (Appendix E). Therefore, there would be No Effect to wetlands, and they will not be discussed further.

3.5.2 Waterways

The natural waterflow pathways throughout Madrid were greatly altered during previous mining. In addition, remnant unvegetated gob piles on the landscape cause high velocity runoff and excessive sedimentation. Current stormwater controls through town are insufficient to handle these loads. Sediment has accumulated and clogged some existing features. During large precipitation events, roadways and private properties are flooded, often with large amounts of sediment load. The current NMDOT culvert crossing under NM-14 is not located in the correct spot to best capture and transmit stormwater under the highway, causing greater flooding over the highway during precipitation events.

Madrid Arroyo, the largest arroyo going through town, has been considerably altered over time. There is a large amount of excess sediment, debris, and trash deposited throughout which decreases its stormwater capacity. Erosion along banks and small and large headcuts are present. Some

homes on the east side of Cave Road are lower than arroyo grade, and thus are flooded when the arroyo floods.

Based on hydrological data obtained from the Resource Geographic Information System (UNM 2017), four (4) ephemeral waterways occur within the APE. Two ephemeral drainages are located on the west side of the APE and enter Madrid Arroyo via outlets located on the west streambank. Only the outlets are located within the APE, and no infrastructure associated with the PA would occur within these drainages. One of these drainages is a stormwater conveyance outlet with no OHWM indicators present and likely does not provide a significant hydrologic connection with associated drainages or Galisteo Creek further downstream. A third drainage documented on the eastern edge of the APE was identified as an "isolated" erosional feature with no apparent hydrologic connectivity to associated drainages or Galisteo Creek further downstream and does not meet the USACE definition of WOTUS. These drainages lack characteristics consistent with jurisdictional waterways and CWA permits for activities within these waterways would not be required from the USACE (Appendix E).

The fourth ephemeral drainage is Madrid Arroyo, the large drainage running through the middle of Madrid. Madrid Arroyo was identified as having a distinct OHWM with indicators including bed and bank, gravel sheets, presence of litter and debris, exposed root hairs below intact soil layers, and change in particle distribution. It also appears to have a significant nexus with Galisteo Creek roughly 2.5 miles north of Madrid and, subsequently, the Rio Grande another 15 miles to the west (Appendix E). During original surveys of the arroyo, it was categorized as a Waters of the U.S. However, due to the most recent Supreme Court Sackett v. EPA decision and subsequent revision of the definition of Waters of the U.S., ephemeral waterways are excluded.

3.5.3 Water Quality

To identify conditions of existing surface water quality in Madrid, the AML Program conducted a water quality monitoring study in which existing stormwater runoff contaminants were analyzed and test levels were compared to state and federal regulations (Appendix C). As design plans for the PA would divert stormwater into Madrid Arroyo, the AML Program wanted to identify existing stormwater runoff quality on a reference site, coal waste gob piles (one of which was previously reclaimed), and discharge points (sites representing cumulative stormwater runoff within the APE). Monitoring constituents were determined by consultation with the NMED. Based on laboratory analysis, analytes from samples taken at the reference site and the reclaimed gob pile were either at the non-detection reporting limit or below the established Environmental Protection Agency (EPA) or NMED standards. Total dissolved solids (TDS) and dissolved manganese exceeded the NMED and/or EPA standards at discharge points, and dissolved aluminum exceeded standards at discharge points and at the unreclaimed gob pile. These monitoring results indicate past reclamation efforts performed by the AML Program have made a positive impact on stormwater quality (Appendix C).

3.6 Wildlife

During biological surveys (conducted on May 22-23, 30-31 of 2019), forty-two (42) vertebrate species were recorded: thirty-seven (37) species of birds, two (2) species of mammals, and three (3) species of reptiles. Thirty-four (34) of the bird species documented during the surveys are

federally protected under the Migratory Bird Treaty Act (MBTA) and more likely breed within the area. The three (3) non-native species documented, Eurasian collared-dove (*Streptopelia decaocto),* European starling (*Sturnus vulgaris),* and house sparrow (*Passer domesitcus*), have no federal or state protection. One (1) active Cooper's hawk (*Accipiter cooperii*) nest was located along the arroyo in the northern portion of the APE (Appendix E). Federally listed species and special status species are addressed in the following section. The exposed mine adit was only recently opened and unlikely to provide suitable bat habitat; it is a possible entrapment and injury/mortality hazard for wildlife species.

3.7 Special Status Species

The U.S. Fish and Wildlife Service (USFWS), New Mexico Department of Game and Fish (NMDGF), and New Mexico Rare Plant Technical Council (NMRPTC) databases were reviewed to determine potential occurrence of state or federal proposed, candidate, threatened, and endangered species (i.e., Special Status Species) in the APE. The USFWS Ecological Service's Information for Planning and Consultation (IPaC) website was used to determine the federally-listed species with potential to occur within the APE. The Biota Information System of New Mexico (BISON-M 2019) database was searched for state-listed fauna species, and the NMRPTC website was searched for information on potential state threatened or endangered flora species within Santa Fe County. A review of Special Status Species likely to occur and/or with potential habitat in the APE was analyzed in detail within a separate Biological Assessment and Biological Evaluation (BA/BE) and the results are summarized below (Appendix E). Special Status Species considered unlikely to occur and without suitable habitat in the APE were removed from further consideration.

3.7.1 Federally endangered, threatened, candidate, or proposed species

Due to the lack of federal critical habitat, general habitat, or occurrence, the following species analyzed in the BA/BE do not occur within the APE: Mexican spotted owl (*Strix occidentalis lucida*), New Mexico meadow jumping mouse (*Zapus hudsonius luteus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*). No federally listed species were documented during the surveys (Appendix E). Therefore, there would be No Effect to these species, and they will not be analyzed in further detail.

3.7.2 State endangered, threatened, or Species of Greatest Conservation Concern

Due to the lack of general habitat or occurrence, the following species analyzed in the BA/BE do not occur within the APE: spotted bat (*Euderma maculatum),* Pacific marten (*Martes caurina*), meadow jumping mouse, white-tailed ptarmigan (*Lagopus leucura*), bald eagle (*Haliaeetus leucocephalus),* prairie falcon *(Falco peregrinus*), least tern (*Sternula antillarum*), yellow-billed cuckoo, boreal owl (*Aegolius funereus*), Mexican spotted owl, violet chinned hummingbird (*Amazilia violiceps*), southwestern willow flycatcher, Baird's sparrow (*Centronyx bairdii*), Lilljeborg's peaclam (*Pisidium lilljeborgi*), and Santa Fe cholla (*Cylindropuntia viridiflora;* Appendix E). Therefore, there would be No Effect to these species, and they will not be analyzed in further detail.

One Special Status Species, the gray vireo (*Vireo vicinior*), has the potential to occur within the APE and will therefore be analyzed in further detail. The gray vireo is a state-threatened species, most often found in open pinyon-juniper woodland or juniper savannah with a shrub component of 35 – 45 percent. It also occurs in middle elevation montane shrub habitats with rocky slopes and scattered conifers (NMPIF 2007). Pinyon-juniper woodland is the dominant habitat type across the upper elevations of the APE and would constitute suitable vireo habitat. During biological surveys, no gray vireos or gray vireo nests were observed (Appendix E).

3.8 Vegetation

Much of the APE has been developed, therefore lacking vegetation, with dispersed disturbed ditches acting as poor stormwater channels. Remaining native portions of the APE are dominated by two vegetative communities, Pinyon Juniper Woodland and Arroyo Riparian Habitat along the drainage, with interspersed coal gob piles (Dick-Peddie 1993). Dominant vegetation within the APE includes: one-seed juniper (*Juniperus monosperma*), winterfat (*Krascheninnikovia lanata*), two-needle pinyon (*Pinus edulis*), James' galleta (*Pleuraphis jamesii*), and Siberian elm (*Ulmus pumila*). The arroyo riparian habitat located along the Madrid Arroyo consists of a mixture of Siberian elm and upland vegetation (Appendix E).

Four noxious weed species, as defined by the New Mexico Department of Agriculture (NMDA), were located during the biological surveys. Siberian elm and cheat grass (*Bromus tectorum*), both class C species, were frequently located throughout the APE along the drainages. Two small populations of bull thistle (*Cirsium vulgare*), a class B species, were documented in the southeast and northern section of the APE. Tamarisk (*Tamarix ramosissima*), a class C noxious weed was found sporadically along the arroyo banks in the northern section of the PA (Appendix E).

3.9 Soils

The PA is located within the north central New Mexico valleys/mesas and conifer woodlands and savanna. The northern half of the APE lies within the north central New Mexico valleys and mesas, characterized as mostly pinyon pine and juniper savanna with slightly cooler temperatures and greater precipitation than the lower valleys and mesas. The south half of the APE is within the conifer woodlands and savannas, exhibiting a cooler and wetter climate than the north central New Mexico valleys and mesas and is seen as a transition community supporting both pinyon-juniper and ponderosa pine (Griffith et al. 2006).

The APE is dominated by four major soil types: Oelop-Charalito complex, 1 to 3 percent slopes; Kech-Cerropelon-Rock outcrop complex, 5 to 50 percent slopes; Puertecito-Paraje complex, 15 to 50 percent slopes; and Devargas-Riovista-Riverwash complex, 0 to 5 percent slopes; with dispersed other minor components (NRCS 2019; Figure 3). There is also a large coal component to soils throughout.

> The Oelop-Charalito complex occurs throughout town and within the primary Madrid arroyo and typically occurs in stream terraces and flood-plain steps. They are well-drained soils and have none to rare frequency of flooding or ponding. Runoff classification ranges from very low to low. Depth to water table is typically greater than 80 inches. This soil type is rated

slight for hazard of soil loss from unsurfaced roads and trails. It is rated as low water erosion potential and high wind erosion potential.

Kech-Cerropelon-Rock complex occurs on the lower half of eastern hillside of Madrid and typically occurs on the hillsides ranging from the summit to backslope. They are well drained soils and have no frequency of flooding or ponding. Unlike the Oelop-Charalito complex, these soils have a medium to high runoff classification. Depth to water table is typically greater than 80 inches. This soil type is rated moderate for hazard of soil loss from unsurfaced roads and trails. It is rated as moderate water erosion potential and very high wind erosion potential.

The Puertecito-Paraje complex occurs on the upper half of the eastern hillside of Madrid and typically occurs on the shoulder and backslope of low hills. They are well drained soils and have no frequency to flooding or ponding. Similar to the Kech-Cerropelon-Rock complex, they have a medium to high runoff classification, and a depth to groundwater greater than 80 inches. This soil type is rated severe for hazard of soil loss from unsurfaced roads and trails. It is rated as low water erosion potential and moderate wind erosion potential.

The Devargas-Riovista-Riverwash complex occurs primarily within the Madrid arroyo and along stream terraces and floodplains. They are well-drained to excessively drained soils and generally have rare frequency of flooding or ponding. Runoff classifications range from none to very low. Depth to the water table is typically greater than 80 inches. This soil type is rated moderate for hazard of soil loss from unsurfaced roads and trails. It is rated as low water erosion potential and high wind erosion potential.

The gob piles present in Madrid are comprised of waste material left over from coal mining operations. Because they are comprised of shale, low-grade coal, and other impurities, the piles are non-economical to process. They have become part of the historical mining landscape and are regarded as valuable to the ambience of Madrid. However, they are unvegetated and are significant sources of flooding and erosion throughout the APE. An additional source of soil erosion within the APE is the current water tank for the fire suppression system which is leaking and causing bank erosion.

3.10 Human Health and Safety

Stormwater conveyances and the existing fire suppression system are currently inadequate within Madrid. Flooding and erosion are exacerbated from the historically highly modified topography and highly erodible soils in the valley. Flooding has caused roads to become de facto stormwater channels and subsequently caused severe erosion and deposition in roadways and ditches. During large precipitation events, lower levels of houses and businesses have become filled with sediment. The current fire suppression system is leaking and has an undersized gravity pipeline which limits its ability and future ability to provide sufficient fire safety. The current stormwater and fire system inadequacies pose threats to human health and safety. The recently opened mine adit feature is a potential fall hazard.

3.11 Socioeconomic Conditions and Environmental Justice

Per the National Environmental Policy Act Implementing Regulations Revisions Phase 2 Final Rule (2024), environmental justice must be addressed in the development of alternative in a NEPA analysis. To be transparent regarding environmental justice, it is included in the affected environment and environmental impacts chapters even though adverse impacts are not anticipated.

This information on socioeconomic conditions was derived from the EPA's Environmental Justice Screening tool (EPA 2022) and verified through the Justice40 Initiative screening tool (CEQ 2022). The EJ screening tool uses American Community Survey (ACS) and US Census data to provide environmental and demographic characteristics of a designated area. The Justice40 Climate and Economic Justice Screening Tool (CEJST) identifies census blocks that meet qualifications to be classified as disadvantaged. Both tools use the most recent available US Census Bureau data at the block-group level to identify demographic characteristics of a study area defined by the user. For this project area the most recent ACS data from the EJ Screening tool and CEJST was from 2015-2019 (Census 2015-2019).

3.11.1 Demographic Trends

The population of Madrid has ranged from 204 residents in 2010 to 247 in 2020 (Census 2010 and 2020). Unlike other mining reclamation projects, population fluctuations in Madrid are not caused by mining activity but rather influences from Santa Fe and Albuquerque.

While demographic data of Santa Fe County shows 5 of every 10 people in the county as Hispanic (CDC 2019), the majority of Madrid's population is of Caucasian ethnicity. A total of 86 percent of the population are White, 4 percent are Black or African American, 2 percent identify as American Indian, and 8 percent are reported as two or more races (Census 2020).

3.11.2 Employment and Income

Between 2016-2020, the population of the area that was 16 or older was estimated at approximately 89.7% percent of the total population. A total of 29 percent of this population was in the labor force and 2 percent were considered to be unemployed. The additional 70 percent of the population were not in the labor force. A total of 71 percent of households had an annual income of less than $15,000, 9 percent had an income between $15,000 and $50,000, and 20 percent had an income over $50,000. Therefore, 69 percent of the population had income below poverty level (Census 2016-2020).

With over forty shops and art galleries, tourism is Madrid's most important economic contributor and is likely to remain the most important economic sector due to the distance from significant employment opportunities (Madrid Merchants Association 2022). Madrid's economy is increasingly dependent upon the richness of its historic and natural resources, and the historic mining features continue to be a major draw for tourists. Another economic consideration is Madrid's appeal as a filming location. Numerous movies such as Easy Rider (1969), Sam Cade (1972), The Man Who Fell to Earth (1976), and more recently Wild Hogs (2007), Engine House (2013) and the Storms of Sons (2016) were attracted to Madrid's old mining scenery and historic buildings for filming purposes. Keeping historic aspects intact is important to ensure tourists and

film production crews continue to find Madrid appealing as a destination and remain economic contributors to the town.

3.11.3 Environmental Justice and Disadvantaged Communities

The CEJST identifies areas as disadvantaged if they are above the threshold for one or more environmental/climate indicators and above both socioeconomic indicator thresholds. Environmental/climate categories considered include climate change, clean energy and energy efficiency, clean transit, affordable and sustainable housing, reduction and remediation of legacy pollution, critical clean water and wastewater infrastructure, health burdens, and training and workforce development. Socioeconomic indicators include low income, higher education non-enrollment, and high school degree non-attainment. The CEJST does not identify the Madrid area as disadvantaged in any of the above stated categories. The only environmental indicator above threshold is expected agriculture loss rate; the socioeconomic indicator of higher education non-enrollment is also above threshold. Data is currently not available for the wastewater discharge indicator.

Of the 12 Environmental Justice indices listed on the EPA Environmental Justice Screening and Mapping Tool (EPA 2022), Madrid is at or above the 50th percentile compared to the rest of the country for 7 of the 10 indices for which there is data (for two indices, there is no data); however, compared to the rest of NM, Madrid is in relatively low percentiles for all indices for which there is data available, except Underground Storage Tanks (Table 4).

Table 4. *EPA EJScreen Report*[1] *for Madrid*

Environmental Justice Indexes	State Percentile	EPA Region Percentile	USA Percentile
EJ Index for Particulate Matter 2.5	11	35	50
EJ Index for Ozone	8	22	34
EJ Index for 2017 Diesel Particulate Matter	17	37	54
EJ Index for 2017 Air Toxics Cancer Risk	14	37	52
EJ Index for 2017 Air Toxics Respiratory HI	15	38	53
EJ Index for Traffic Proximity	N/A	N/A	N/A
EJ Index for Lead Paint	3	10	31
EJ Index for Superfund Proximity	15	32	49
EJ Index for RMP Facility Proximity	18	40	56
EJ Index for Hazardous Waste Proximity	18	36	53
EJ Index for Underground Storage Tanks	40	47	63
EJ Index for Wastewater Discharge	N/A	N/A	N/A

[1](EPA 2022) EJScreen is a screening tool for pre-decisional use. Please see online EJScreen discussions for data limitations.

In order to meet the NEPA goal of early and meaningful public participation in the decision process, the CEQ requires agencies to make diligent effort to involve the public at multiple stages

of the NEPA process (CEQ 1997). Efforts to include the public, specifically the residents of Madrid, throughout the development of this project are outlined in Appendix D.

3.12 Noise

Some traffic noise is present in Madrid from NM-14, which runs through the middle of town and connects the town to Albuquerque and Santa Fe. Other existing sources of noise sources in town are associated with businesses and private residences.

3.13 Transportation

The main access into and through Madrid is NM-14. NM-14 runs approximately 54 miles from Albuquerque to Santa Fe and is the primary route used by tourists to visit the town as well as the quickest route for residents seeking services from larger cities in the area. Many Madrid businesses and attractions are accessible from NM-14 as it runs through downtown. NM-14 is recognized as the Turquoise Trail National Scenic Byway (ISTEA 1991). The Turquoise Trail is considered a national scenic byway for its intrinsic scenic quality (FHWA 2022), derived from both the natural and manmade elements of the area (FHWA 2019). As the PA, Alternative B, and NAA would all cause no major changes to the scenic quality along the Turquoise Trail National Scenic Byway and would not conflict with the goals of the Turquoise Trail Corridor Management Plan, NM-14 as a National Scenic Byway will not be discussed in further detail (Turquoise Trail Association 2006).

There is a low point that occurs on Highway 14 near Madrid that experiences frequent flooding, and heavy rain events can lead to sediment runoff from mining areas, particularly gob piles, causing road blockage and clogging stormwater infrastructure. The current culvert is not located in the lowest spot to capture stormwater. In September of 2013, a major flooding event caused a gob pile to blowout and led to a clogged culvert and drop inlet. Emergency construction took place to install protective barriers below the blown-out gob pile and above the Museum, grade and install base course at impacted driveways, and rock line roadside ditches to protect driveways (NM AML 2017).

Except for the NM-14, which is paved, all other roads in town are unpaved with either crusher fines or dirt surfacing. Ice House Road, Cave Road, Bridge Street, and Firehouse Lane Road all connect to NM-14 and provide access for many private drives and residential streets. Current stormwater prevention on these roads is insufficient and stormwater is often diverted onto private driveways, leading to flooding on private land. Red Dog Road comes off Firehouse Lane and both roads lie within an area of uncontrolled stormwater runoff and sediment deposits from eroding gob piles. Sediment transport along these roads has washed into basements of local homes and blocked driveways.

3.14 Recreation

The APE contains private, state, and county owned lands which provide various recreational opportunities to residents and visitors. An informal trail system spans from the Coal Mining Museum south of town to the historic Oscar Huber Memorial Ball Park north of town. The Madrid Open Space, within the APE, contains 57 acres of open land including dirt trails that can be used for a multitude of passive recreation including hiking, walking, bird watching/wildlife viewing,

dog-walking, horse-back riding, and running. The Madrid Arroyo area as described in the PA and "Greenbelt" portion of the Madrid Open Space are the same. The Madrid Open Space Management Plan describes this area as the community's "backyard", due to close proximity to homes, daily recreational use by residents, and location for community events (Santa Fe County Open Space & Trails 2017).

4. ENVIRONMENTAL IMPACTS

This chapter describes the effects, or impacts, to the affected environment that could potentially result from the PA, Alternative B, and the NAA as described in Chapter 2. Baseline condition of the existing environment, as described in Chapter 3, was used to identify potential impacts resulting from the Alternatives.

An impact, or effect, is a modification to the environment brought about by an outside action. Impacts can vary in degree from no change, slightly discernable change, a noticeable change, to a significant change in the environmental condition. Impacts can be beneficial (positive) or adverse (negative), and short-term (typically less than 5 years), long-term, (greater than 5 years), or permanent.

An action can have direct or indirect effects and can contribute to cumulative effects. Direct effects occur at the same time and place that an action is being performed. Indirect effects occur later in time or farther form the initial action but are still reasonably foreseeable. Cumulative effects are discussed in Chapter 5.

4.1 Air Quality

4.1.1 Alternative A

The PA would have short-term adverse impacts on air quality in Madrid. Activities implemented under the PA would take place primarily on or around the main road or within the drainages and arroyos. The PA would expose land in stages before implementing the repairs and controls and reclaiming the disturbed land. A staging area would be used to temporarily stockpile incoming material to be used for the PA. Dust control methods discussed in Section 2.1.6 would reduce these short-term adverse impacts.

NMED AQB considers de minimis emissions to be those less than 10 tons per year of any regulated air contaminants, less than 10 pounds per hour of any regulated air pollutant with a national or state level ambient ai quality standard, or less than 1 ton per year of lead. The PA is not expected to exceed these thresholds requiring an air permit for the earth disturbing activities.

Though not anticipated, should a screen be required for onsite screening of construction materials, a General Construction Permit for Quarrying, Crushing, and Screening Facilities (GCP-2) would be secured prior to operation. The BMPs and controls under this GCP would be followed to ensure air emissions do not cause significant impacts to air quality.

4.1.2 Alternative B

Alternative B includes more rigorous road and stormwater improvements such as paved roads and concrete culverts, which would provide a higher level of service and require less maintenance (Dekker/Perich/Sabatini 2021). Multiple roads would be improved to a higher and more permanent degree than the PA. Construction would occur in the same areas as the PA, but be more intensive than under the PA. With features requiring less frequent maintenance, there would be fewer instances of maintenance activity creating additional air impacts. Short-term adverse impacts and long-term beneficial impacts to air would be similar but greater under Alternative B than the PA due to the additional equipment, fuel, and transportation required to complete the more intensive repairs.

4.1.3 Alternative C

Under the NAA, no stormwater, erosion control, or re-contouring waterways would occur. The Madrid Arroyo and adjacent areas would continue to erode with increased exposure to disturbed lands. Therefore, the NAA would have long-term, adverse effects on ambient air quality for PM_{10} and overall dust particulate.

4.2 Cultural Resources

4.2.1 Alternative A

Construction would take place within the MHD. Most project activities are proposed along existing areas of disturbance. Implementing improvements outlined in the PA would direct stormwater and associated sediment away from areas in the APE containing historic resources. Proposed road upgrades and stormwater conveyances were designed to blend into the natural or historical environment. Certain construction actions or elements may be seen by the casual observer; however, project designs have incorporated natural and historical designs to ensure no more than a weak visual contrast is maintained. Minimal, temporary effects to the mining landscape and resources eligible for NRHP inclusion may occur. Overall, the PA would reduce the risk of future damage to historic resources during precipitation events. Under the PA, fire suppression capabilities would be improved and the threat of fire to historic resources would be decreased, further reducing potential damage to historically significant resources. During construction of the proposed improvements, mitigation measures would be used to ensure avoidance and/or minimal disturbance to resources of concern (Section 6.2).

The OSMRE, AML Program, and the SHPO have determined that the PA may adversely affect the Madrid Historic District (SR 356; NRHP No. 77000928) and twelve archaeological sites (LA108551, LA 115534, LA 117777, LA 170805, LA 195467, LA 197066, LA 197068, LA 197067, LA 130124, LA 195468, LA 203027, and LA 204048) within the APE. In addition to the inter-agency consultations, the AML Program initiated consultation with potentially concerned tribes pursuant to 36 C.F.R. Part 800, the regulations implementing Section 106 of the NHRP (54 U.S.C. § 100101); none of the tribes have identified properties having religious and cultural significance within the APE.

No further archaeological investigations, testing, or other documentation is required within the APE for resources determined not eligible for listing in the NRHP, or for noncontributing elements to the MHD. Moving, altering, collecting, or unauthorized removal of archaeological or historic

resources within the APE is prohibited by contractors, subcontractors, or oversight personnel. Collections by a qualified archaeologist are strongly discouraged except in cases where an artifact is likely to be lost through illegal collection (NMR 2005).

The PA is anticipated to have adverse effects to the MHD and NRHP eligible properties during project implementation. The AML Program has executed a MOA and proposed a mitigation plan to address adverse effects to historic properties. Adverse effects would be mitigated through adherence to the MOA and SHPO consultations. A description of the site, specific activities causing effects, and mitigation treatments are discussed in Table 5 (Section 6.2). With periodic maintenance, the PA is expected to have long-term, beneficial effects to historic resources. Long-term beneficial effects to historic structures are expected to preserve, maintain, and protect historic resources from structural decay, fire hazards, destruction, catastrophic precipitation events, and natural weathering processes.

4.2.2 Alternative B

Under Alternative B, more intensive stormwater prevention and erosion control measures would occur. These measures would provide the highest level of flood protection to historic resources. Similar effects and mitigation measures discussed in the MOA and displayed in Table 5 (Section 6.2) would occur. However, the construction design of Alternative B features would be more visually intrusive with a higher level of visual contrast for the casual observer and detract from the historic setting of the MHD. Effects from installation of a new fire suppression system on historic resources would be similar to those described in Alternative A. Therefore, Alternative B would have long-term, beneficial effects to some historic resources in the form of structural protection, but have long-term, adverse effects to the historic setting of the MHD.

4.2.3 Alternative C

Under Alternative C, NAA, no new stormwater prevention, or erosion control measures would occur. Periodic flooding during large precipitation events would continue to cause damage and potential collapse of historic resources. Fire suppression capabilities would remain inadequate. Therefore, the NAA would have long-term, adverse effects to historic resources as they would continue to deteriorate at the present rate, and flooding and fire would continue to be a threat to historically significant resources.

4.3 Visual Resources

4.3.1 Alternative A

Short-term, adverse impacts would occur to visual resources during construction activities with the presence of heavy machinery, traffic cones, and storage of materials for proposed structures that would not be easily disguised or blend in well with Madrid's current setting. Large swaths of vegetation within Madrid Arroyo would be removed during construction, but large trees and shrubs would be saved where possible. Hydroseeding and planting native vegetation would reestablish the natural setting of the arroyo over time.

In designing stormwater prevention and control features, visual impact of these structures on Madrid's mining landscape was taken into consideration. Stormwater prevention structures installed under the PA would minimally detract from the mining aesthetic of Madrid while

reducing flooding and improving soil infiltration. Upgrades to Ice House Road, Cave Road, and Firehouse Lane under the PA would leave the roads as gravel and include regrading and shaping of the road to better drain stormwater. Using cobble/rock for structures such as channel storm drains, swales, and rundowns, though visibly noticeable, would look more natural than alternatives such as concrete and would not negatively impact visual resources. In areas where concrete would be utilized, such as the three intercept channels at Ice House Road and concrete box culverts used in the Cave Road crossing of the arroyo, the features would be placed in a way to be hidden from view as much as possible (Dekker/Perich/Sabatini 2021). The gob pile near the ballfield would be regraded and revegetated with native species; other gob piles would remain unchanged. Therefore, there would be minimal to no long-term effect on visual resources.

Given the proposed blending of stormwater and erosion control features to the natural and historical aesthetic of the town, the PA would have no long-term effect on the scenic quality of the Turquoise Trail National Scenic Byway. Short-term, adverse effects may occur during construction.

4.3.2 Alternative B

Under Alternative B, improvements such as paving or asphalting the roads and building channel storms drains, swales, and rundowns out of concrete would alter and detract from the historical character of the town, resulting in long-term adverse impacts to visual resources and potential minor effects to the National Scenic Byway. As construction would take longer under this alternative, the short-term adverse impacts from the presence of construction material and equipment would be greater than the PA. Using more intense stormwater improvements would result in the need for less frequent maintenance of the structures, so there would be fewer instances of machinery presence needed for upkeep of installed structures (Dekker/Perich/Sabatini 2021).

4.3.3 Alternative C

The NAA would allow the current visual resources of Madrid to remain and there would be no visible alterations to the mining landscape. Continual flooding and sediment movement under the NAA may negatively impact Madrid's visual resources as damage to historic features and businesses occur (WRCM 2021). No effect to the National Scenic Byway is expected.

4.4 Water Resources

4.4.1 Alternative A

Stormwater features proposed throughout town are generally designed to capture stormwater and sediment away from roads and private property and convey the stormwater eventually into the arroyo. Some features, such as rolling dips, rundowns, swales, plunge pools, and sediment pond, would also slow stormwater as it comes downhill. The new culvert crossing under NM-14 would be relocated to a lower spot to better capture and move stormwater under the road, which would reduce flooding over this main road. Decreased sedimentation would result in long-term beneficial impacts to water quality. Slowing the stormwater as it comes down into the arroyo would also lead to reduced flooding, increased infiltration, and decreased erosion. Adverse impacts may occur during construction as soil and existing stormwater features are disturbed. However, adverse impacts would cease directly following installation, and the beneficial impacts listed above would

last long-term. Past reclamation efforts performed by the AML Program have made a positive impact on stormwater quality, and the PA is expected to have similar effects (Appendix E).

The PA has been designed to handle a 100-year flood event under Cave Road where possible. Some other drainage channels proposed for construction throughout the project area are not designed to handle a 100-year flood event. These channels were designed for handling the maximum amount of stormwater capacity while taking into account landowners' requests for minimal maintenance and impact, resulting in less than 100-year capacity. The PA would remove excess sediment within Madrid Arroyo to increase stormwater capacity and regrade the channel closer to the shape of a natural meandering channel. Lowering the grade of the arroyo would reduce flooding into the homes on the east side of Cave Road. A diversion channel would be incorporated to handle additional handle additional flow during large events. Grade control structures would be installed in areas of elevational changes to minimize headcutting and encourage saturation upstream. These updates added throughout the arroyo would cause long-term beneficial impacts in the form of decreased erosion, slowed stormwater, increased saturation, and reduced sediment moving downstream. As the waterway would be returning to a more natural channel, the hydrologic regime would be expected to return to a more normal condition with greater natural overbanking and less flooding to the residences near the arroyo. The PA would slow stormwater and capture some sediment but is not designed at the level to capture all sediment. Some sediment would still be transported downstream, but it would be less than current loads. Slowed stormwater and less erosion in the project area would likely lead to less sediment and headcutting immediately downstream.

Large trees and shrubs would be retained within the arroyo where possible. In areas where vegetation is removed, the area would be reseeded and/or planted with native plants and mulched. These vegetation and revegetation actions would help to hold the soil in place, slow stormwater and increase infiltration, decrease erosion, and improve water quality. The potential for short-term adverse impacts would be greater in the arroyo given the amount of disturbance. If precipitation events occur during construction, disturbed soils in a waterway lacking the stormwater features are more likely to be eroded. The beneficial impacts from stormwater features would be applied directly after installation, but short-term adverse effects on water from vegetation removal would continue for a few years until vegetation is reestablished. Mitigation measures and BMPs as described in Section 2.1.6, such as temporary erosion and sediment controls and mulching, would reduce these impacts until the system reaches the long-term beneficial impacts described.

4.4.2 Alternative B

Stormwater features proposed throughout town as part of Alternative B would capture stormwater and divert sediment away from roads and private property. More hardscapes and higher functioning stormwater features would be used than those of the PA, resulting in better sedimentation capture. Additional hardscapes could cause increased stormwater runoff velocity; however, features are also proposed to slow stormwater runoff. Activities within Madrid Arroyo would be the same as the PA. Overall, this would result in better protection from flooding and greater sediment capture. Downstream impacts are expected to be similar to PA but with potential for less sediment reaching downstream.

4.4.3 Alternative C

Under the NAA, no stormwater, erosion control, or re-contouring waterways would occur. The Madrid Arroyo and adjacent areas would continue to erode. Flooding and erosion within the APE would occur at the same rate and continue to damage properties. Water quality would remain at substandard quality (I.e. total dissolved solids (TDS), dissolved manganese, and dissolved aluminum exceeding NMED and/or EPA standards). Therefore, the NAA would have short- and long-term adverse impacts to water resources.

4.5 Wildlife

4.5.1 Alternative A

Throughout town, direct impacts to wildlife habitat, including habitat removal or degradation, would be limited to areas designated for stormwater, erosion, and fire suppression tasks of the PA implementation. Impacts would largely occur in areas currently disturbed by development or stormwater and erosional issues. Therefore, short-term, adverse impacts to habitat may occur during project implementation but would be very limited. Long-term, adverse impacts to wildlife habitat are not anticipated; reducing habitat degradation caused by stormwater and erosional issues within the APE may provide long-term, beneficial impacts to wildlife habitat. Closing the mine adit feature would have long-term, beneficial impacts by removing the entrapment and injury/mortality hazard for wildlife.

Within Madrid Arroyo, large swaths of habitat would be removed in order to complete regrading, contouring, and stormwater feature installation. Large trees and shrubs would be saved where possible, but some would be removed (see Online Design- *Stormwater Designs*). Following reconstruction in the arroyo, the arroyo would be revegetated following the methods outlined in Section 2.1.2. Plantings of native trees, shrubs, and grass plugs along with mulching and hydroseeding vegetation would revegetate the arroyo over time. For up to two years post-reclamation, the vegetation would receive supplemental water as needed. The length of time to achieve full revegetation would greatly depend on the local weather during the years following reclamation, but overall, it would likely take several years for ground cover to reestablish and many years for the trees and shrubs to grow to a large size. Wildlife habitat improvement with native vegetation would be a long-term beneficial impact. Within the arroyo, the PA would slow stormwater velocity, increase infiltration, and allow better access to floodplains which would provide more water to remaining and future vegetation in the arroyo.

Short-term adverse impacts to wildlife would occur. Small mammals and reptiles could be accidently crushed or trapped in trenches left during construction, but Design Features (Section 2.1.6) following NMDGF trenching guidelines would reduce these impacts. The majority of habitat would be removed within Madrid Arroyo, except for large tree/shrub users. Wildlife would be temporarily displaced during project implementation. Displaced wildlife could temporarily relocate to suitable, undisturbed habitat in the surrounding area. The PA would not cause long-term avoidance of the APE. After construction, wildlife species would be expected to return to Madrid Arroyo successively over time as habitat develops. One active Cooper’s hawk nest was documented during the wildlife surveys and additional migratory birds likely breed within the APE (Appendix E). Construction during the avian breeding season (March 31 to August 15) could result in avoidance, nest abandonment, decreased productivity, and/or mortalities. If construction

activities occur outside the breeding season, no impact to avian breeding success would occur. If the PA adheres to mitigation measures described in Section 6.3, migratory bird impacts would be avoided.

4.5.2 Alternative B
Alternative B would have similar impacts on wildlife as the PA given the same disturbance footprint. Short-term impacts may be greater given the longer and more intensive construction activity. If Alternative B adheres to mitigation measures described in Section 6.3), migratory bird impacts would be avoided.

4.5.3 Alternative C
Under the NAA, wildlife habitat would remain in its current state within the APE. No short- or long-term adverse or beneficial impacts to wildlife would result from stormwater, erosion, and fire suppression tasks of the PA. The mine adit would remain an entrapment and injury/mortality hazard for wildlife and potential long-term adverse impact.

4.6 Special Status Species

4.6.1 Alternative A
Federally endangered, threatened, candidate or proposed species:
The PA would have no effect on any federally listed species (Appendix E).

State endangered or threatened:
The gray vireo, state threatened, is the only state listed species with potential to occur within the APE. Direct impacts to gray vireo habitat, including habitat removal or degradation, would primarily occur in Madrid Arroyo. Within Madrid Arroyo, large swaths of habitat would be removed in order to complete regrading, contouring, and stormwater feature installation. Large trees and shrubs would be saved where possible, but some would be removed (see Online Design-*Stormwater Designs*). Short-term, adverse impacts to habitat would occur during project implementation. Plantings of native trees, shrubs, and grass plugs along with mulching and hydroseeding vegetation would revegetate the arroyo over time. The length of time to achieve full revegetation would greatly depend on the local weather during the years following reclamation, but overall, it would likely take several years for ground cover to reestablish and many years for the trees and shrubs to grow to a large size. Wildlife habitat improvement with native vegetation would be a long-term beneficial impact.

Gray vireos may be temporarily displaced during project implementation. Displaced gray vireos could temporarily relocate to suitable, undisturbed habitat in the surrounding area. The PA would not cause long-term avoidance of the APE. Construction during the gray vireo breeding season (March 31 to August 15) could result in avoidance, nest abandonment, decreased productivity, and/or mortalities. If construction activities occur outside the breeding season, no impact to breeding success would occur. If the PA adheres to mitigation measures described in Section 6.3, impacts to gray vireo breeding would be avoided.

Therefore, the PA has potential to cause short-term, adverse impacts to special status species (gray vireo) but is not expected to have long-term adverse impacts. Implementation of measures described in Section 6.3 would mitigate effects to gray vireo within the APE.

4.6.2 Alternative B
Alternative B would have similar impacts to special status species (gray vireo) as the PA and utilize the same mitigation measures (Section 6.3). Short-term impacts may be greater given the longer and more intensive construction activity.

4.6.2 Alternative C
Under the NAA, special status species (gray vireo) habitat would remain in its current state within the APE. No short- or long-term adverse or beneficial impacts would occur.

4.7 Vegetation

4.7.1 Alternative A
Activities associated with the PA throughout town would primarily take place in existing disturbed or developed areas, such as edges of gob piles and roadways. The staging areas and soil disposal site are located on previously disturbed areas. If vegetation is present, it would be removed where stormwater features and associated actions are proposed. Existing roads would be utilized to the extent possible to access these sites. Disturbed areas would be mulched and seeded with native vegetation. Minimal impacts to vegetation would occur around town.

Within Madrid Arroyo, large swaths of vegetation would be removed in order to complete regrading, contouring, and stormwater feature installation. Large trees and shrubs would be saved where possible, but some would be removed (see Online Design- *Stormwater Designs*). Following reconstruction in the arroyo, the arroyo would be revegetated following the methods outlined in Section 2.1.2. Short-term adverse impacts to vegetation would occur. These impacts include removal of vegetation, potential soil compaction, and accidental root damage to saved trees or shrubs. Plantings of native trees, shrubs, and grass plugs along with mulching and hydroseeding vegetation would revegetate the arroyo over time. For two years post-reclamation, the vegetation would receive supplemental water as needed. The length of time to achieve full revegetation would greatly depend on the local weather during the years following reclamation, but overall, it would likely take several years for ground cover to reestablish and many years for the trees and shrubs to grow to a large size. Long-term beneficial impacts to vegetation include removal of excess sediment, decreased sedimentation, and reclamation with native vegetation. Within the arroyo, the PA would slow stormwater, increase infiltration, and allow better access to floodplains which would provide more water to remaining and future vegetation in the arroyo.

Some weeds would be removed during arroyo work along with vegetation removal described above, including some Siberian elm. Existing weed infestations within or near the APE could spread and establish on disturbed soils, potentially exacerbated by construction equipment. Mitigation strategies could reduce this spread potential a limited amount (Section 6.4). It is likely weed species which already exist in the general area and seedbank would reestablish some populations in the arroyo. Establishing the arroyo with native vegetation suited for this environment would decrease opportunities for weed establishment.

4.7.2 Alternative B
Mitigation strategies and impacts on vegetation under Alternative B would be similar to the PA.

4.7.3 Alternative C
Under the NAA, stormwater control within the APE would remain inadequate. Disturbance to soils within flood-prone areas would continue at the present rate, which would result in long-term, adverse impacts to vegetation. No beneficial impacts to vegetation would occur.

4.8 Soils
4.8.1 Alternative A
Stormwater features proposed throughout town are generally designed to capture stormwater and divert sediment away from roads and private property and convey the stormwater and sediment into the arroyo. Some features, such as rolling dips, rundowns, swales, plunge pools, and sediment pond, would also slow stormwater as it comes downhill. This would result in increased infiltration and decreased erosion. Soil types within the APE range from slight to severe for soil loss from unsurfaced roads and trails. The addition of gravel surfacing on many of the roads in the APE and staging areas would help to stabilize the soil loss along roads. Soils in the APE are rated as low to moderate potential for water erosion and are well drained with low frequency of flooding/ponding. Therefore, once the PA is completed, issues of stormwater erosion and flooding for areas with native soils should be greatly reduced. Features installed at the base of some gob piles would slow stormwater and capture some sediment. However, coal gob piles will remain as a source of runoff and sedimentation. The one gob pile near the ballfield would be regraded with additional sediment and stabilized with mulch and vegetation. The leaking water tank would be replaced to stop the current bank erosion.

Adverse impacts may occur during construction as soil and existing stormwater features are disturbed. Soils in the APE are rated from very high to moderate wind erosion potential. They would be highly susceptible to soil loss and causing fugitive dust, especially during disturbance. The design feature in Section 2.1.6 discusses the measures which would be taken to reduce this issue, including watering exposed soils, suspended operations during high winds, and covering or watering stockpiles as needed. Wind erosion of these soils would continue to occur as it does naturally, but the additional impacts of construction would be reduced by these actions. Adverse impacts from construction would cease following installation, and the beneficial impacts listed above would last long-term.

The PA would remove excess sediment within Madrid Arroyo to increase stormwater capacity and regrade the channel to more closely resemble the shape of a natural meandering channel. A stormwater diversion channel would be incorporated to accommodate increased flow during large stormwater events. Grade control structures would be installed in areas of elevational changes to minimize headcutting and encourage saturation upstream. These updates added throughout the arroyo would cause long-term beneficial impacts in the form of decreased erosion and stormwater velocity, increased infiltration, and reduced sediment moving downstream. The erosion and stormwater control features proposed for implementation throughout the PA would slow stormwater and capture some sediment but are not designed at the level to capture all sediment. Some sediment would still be transported downstream, but it would be substantially less than

current loads. Reduced stormwater velocity and less erosion in the project area would likely lead to less sedimentation and headcutting immediately downstream.

Large trees and shrubs would be retained within the arroyo where possible. In areas where vegetation is removed, the area would be reseeded and/or planted with native plants and mulched. These vegetation and revegetation actions would help to hold the soil in place, slow stormwater and increase infiltration, and decrease erosion. The potential for short-term adverse impacts would be greater in the arroyo given the amount of disturbance. If precipitation events occur during construction, disturbed soils in a waterway lacking stormwater features are more likely to be eroded. The beneficial impacts from stormwater features would be applied directly after installation, but short-term adverse effects on soil from vegetation removal would continue for a few years until vegetation is reestablished. Design features as described in Section 2.1.6, such as temporary erosion and sediment controls and mulching, would reduce these impacts until the system reaches the long-term beneficial improvements as described.

4.8.2 Alternative B

Impacts on soils under Alternative B would be similar to the PA. Paved roads would reduce potential for road erosion greater than graveled surfaces. Greater disturbance would occur during construction, so the potential for short-term adverse impacts would increase. Design features would be similar to those described in the PA but likely used to greater degree. More intensive stormwater controls requiring less maintenance would occur, resulting in greater, long-term beneficial impacts on soils.

4.8.3 Alternative C

Under the NAA, stormwater control within the APE would remain inadequate. Disturbance to soils within flooding areas would continue at the present rate. This would result in long-term, adverse impacts to soils. No beneficial impacts to soils would occur.

4.9 Human Health and Safety

4.9.1 Alternative A

The PA would reduce hazardous flooding conditions that arise from monsoon rains and flash flooding throughout the streets and waterways of Madrid. The PA would improve traffic safety and safety to homes and businesses by reducing erosion/deposition and flooding damages. Stormwater and erosion controls features of the PA would have long-term, beneficial impacts on human health and safety. With regular maintenance of PA features, no adverse effects are anticipated.

Fire suppression capabilities would be enhanced with greater capacity and consistency due to expanded waterlines and increased storage in the 125,000-gallon water tank. Fire suppression improvements would have long-term, beneficial impacts on the health and safety of the entire community by providing more stable and dependable services. No adverse effects are anticipated.

The PA would safeguard the public from a hazardous abandoned mine feature, which would have long-term beneficial impacts to human safety.

4.9.2 Alternative B

Under Alternative B, more intensive stormwater and erosion control features would be installed, requiring less maintenance. Beneficial impacts to human health and safety would be greater than the PA as they would more adequately address the erosion and flooding issues. Effects from the fire suppression system and mine adit closure would be the same as the PA.

4.9.3 Alternative C

Under the NAA, flooding and erosion within the APE would continue its current trend causing threats to human health and safety. The existing fire suppression system would remain inadequate, and the abandoned mine feature would present a continued risk to public safety. The NAA would have long-term, adverse effects to human health and safety.

4.10 Socioeconomic Conditions and Environmental Justice

4.10.1 Alternative A

As Madrid's population experiences detrimental impacts from past mining activity to their surrounding environment, improvements proposed under the PA, including upgraded stormwater conveyances, fire suppression system, and erosion control measures, would address current human health and safety concerns. Construction throughout town may cause temporary, adverse impacts to socioeconomics related to tourism as there would be increased noise from equipment and possible restricted access to visitors in some areas under construction. There would be no effect or a positive impact long-term, as Madrid would be able to promote the historical value of the town and count on the safety of visitors to the area with improved fire suppression facilities and stormwater control.

Long-term socioeconomic benefits to residents also include decreased insurance rates for Madrid property owners as a result of a fire suppression system that would meet NFPA standards and Insurance Service Offices flow rate requirements (Weston Inc. 2019). An improved fire suppression system would also reduce potential cost of property and structure loss from structural damage or wildfire. Madrid property owners would also have long-term socioeconomic benefits from erosion and stormwater improvements by reducing or eliminating the risk of roads and structures being adversely impacted from uncontrolled sediment transport and/or flooding that can damage residences and businesses.

The PA would also be the most appropriate alternative considering environmental justice as this alternative was designed based on input from the Madrid community. By offering various public opportunities for comment and discussion during the project development (Appendix D), the PA meets requirements outlined in the CEQ Environmental Justice Guidance under NEPA (CEQ 1997).

4.10.2 Alternative B

The socioeconomic impacts of Alternative B would be similar to those of the PA. Addressing flooding and erosion issues and improving the fire suppression system under Alternative B would also provide benefits such as reduced insurance rates from reduced risk of fire hazard and potential for less cost from property/structure damage or loss.

There is some possibility that Alternative B would have negative socioeconomic impacts. Since the historical, mining characteristics bring economic benefits of tourism and movie production, proposed upgraded improvements could detract from these characteristics and cause a negative socioeconomic impact.

Alternative B would have similar impacts to environmental justice as the PA. However, the community indicated during public scoping they were less in favor of the more intense erosion and flooding control measures which could negatively impact the visual resources of Madrid and detract from the mining nature of the town.

4.10.3 Alternative C

The NAA would allow erosion, flooding, and insufficient fire suppression abilities to affect the community of Madrid. The current, historical character would remain as a draw to tourism and movie industries. However, threats to human health and safety and negative impacts to other environmental resources that contribute to quality of life for Madrid's population would remain. Therefore, the NAA would likely give rise to adverse impacts to the low-income or disadvantaged population of the town**.**

4.11 Noise

4.11.1 Alternative A

The PA is expected to have minor adverse impacts on noise. Adverse impacts would be short-term, lasting only the duration of the construction phase of the PA and cease upon completion. Much of the activities would take place along main roads, where road noise is anticipated, and within the arroyos where topography would provide some sound abatement. Construction would adhere to Design Features listed in Section 2.1.6, which would minimize noise impacts to the community.

4.11.2 Alternative B

Alternative B includes more rigorous road and stormwater improvements such as paved roads and concrete culverts, which would provide a higher level of service and require less maintenance (Dekker/Perich/Sabatini 2021). Multiple roads would be improved to a higher and more permanent degree than the PA. Construction would occur in the same areas as the PA, but be more intensive than under the PA. With features requiring less frequent maintenance, there would be fewer instances of maintenance activity creating additional noise impacts. Short-term adverse impacts and long-term beneficial impacts to noise would be similar but greater under Alternative B than the PA due to the additional equipment required to complete the more intensive repairs.

4.11.3 Alternative C

Under the NAA, no stormwater, erosion control, or re-contouring waterways would occur. Therefore, no noise impacts would be expected.

4.12 Transportation

4.12.1 Alternative A

The PA would have short- and long-term impacts on transportation in Madrid. Activities implemented under the PA would take place primarily on or around main roads, temporarily limiting access and causing closures of certain roads. The AML contractor would prepare a

NMDOT approved-traffic control plan for the project (Online Design- *Fire Suppression Tank*). NM-14 would have one-lane closures during installation, completed during warmer summer months. NM-14 traffic would not be diverted onto local roads. Barricades and signage would be used as needed for safety and to direct traffic.

A representation of the traffic control plan for the Madrid Arroyo area can be found on Online Design- *Stormwater Designs*. Construction activities requiring road closures or limited access would be coordinated by NMDOT and private landowners to ensure residences would still be accessible (Dekker/Perich/Sabatini 2021). Road signage would be used to maintain the area for local traffic only. Interruptions for local traffic would be limited to "day of" construction and notifications provided prior. This disruption to current traffic flow would have an adverse impact; however, it would be short-term and mitigated as much as possible to allow continued access to businesses and homes.

The ballpark parking area may be used for a period of up to one year by AML and its contractor(s) as a construction materials and equipment staging area during construction. The parking area would be regraded and surfaced with six inches of compacted base course material for use as a staging area. The road through this area would be graded and a riprap low water crossing installed for use (Online Design- *Stormwater Designs*). The AML Program and contractors would coordinate with the town of Madrid to ensure parking is still available during certain festivals and events requiring additional parking.

With regular maintenance, long-term impacts under the PA would be beneficial. Multiple roads would be improved for use from their current state with regrading and the addition of base course materials. Improved stormwater management would improve transportation conditions, especially during heavy precipitation events that previously flooded low areas in town (NM AML 2017). Erosion control would help keep sediment off NM-14, which can be dangerous and potentially require large machinery and road closures to clean up after rain events. Erosion control features would also help minimize sediment from being deposited on private drives and blocking access to residential homes (Dekker/Perich/Sabatini 2021).

4.12.2 Alternative B

Alternative B includes more rigorous road and stormwater improvements such as paved roads and concrete culverts, which would provide a higher level of service and require less maintenance (Dekker/Perich/Sabatini 2021). Multiple roads would be improved to a higher and more permanent degree than the PA. Construction would occur in the same areas as the PA, but be more intensive than under the PA. With features requiring less frequent maintenance, there would be fewer instances of maintenance activity disrupting traffic. Short-term adverse impacts and long-term beneficial impacts to transportation would be similar but greater under Alternative B than the PA.

4.12.3 Alternative C

Under the NAA, flooding and erosion would continue to have negative impacts on transportation, and road conditions would remain in their current state, continuing to deteriorate over time. Traffic would not be impacted by construction activities related to installing new stormwater structures or

road upgrades but would continue to be disrupted by flooding and closures from presently inadequate stormwater features.

4.13 Recreation

4.13.1 Alternative A

During project implementation, there would be temporary closures or blocked access to areas containing recreational trails, which would have an adverse impact on recreation in Madrid. In addition, substantial reclamation within Madrid Arroyo, or the "greenbelt", would alter the recreation environment in the long-term.

Within Madrid Arroyo, large swaths of vegetation would be removed in order to complete regrading, contouring, and stormwater feature installation. Large trees and shrubs would be saved where possible, but some would be removed (see Online Design- *Stormwater Designs*). Following reconstruction in the arroyo, the arroyo would be revegetated following the methods outlined in Section 2.1.2. Plantings of native trees, shrubs, and grass plugs along with mulching and hydroseeding vegetation would revegetate the arroyo over time. The length of time to achieve full revegetation would greatly depend on the local weather during the years following reclamation, but overall, it would likely take several years for ground cover to reestablish and many years for the trees and shrubs to grow to a large size. Therefore, there would be short-term adverse impacts on recreation due to lack of vegetation in the setting. Over time, native vegetation would be reestablished, leading to long-term beneficial impacts of a more resilient natural setting.

By reducing hazards to public health and safety caused by flooding and erosion issues, the PA would provide residents and visitors with a long-term, beneficial impact of improved conditions to enjoy recreational opportunities.

4.13.2 Alternative B

Impacts to recreation under Alternative B would be similar to the PA.

4.13.3 Alternative C

Under the NAA, hazards to public health and safety caused by flooding and erosion issues would continue to pose health and safety risks to the public. Continual erosion under the NAA would impact trails used for recreational activities. However, use of Madrid Arroyo, or the "greenbelt" would be able to continue uninterrupted by construction and reclamation activities.

5. CUMULATIVE IMPACTS

Under NEPA, cumulative impacts are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. The OSM requires potential cumulative impacts from each alternative be identified for each of the resource values to not overlook any impact resulting from the "fragmentation" of actions. Past actions within the APE include its mining history and previous actions involving AML projects within Madrid. Beyond the PA, no other major present or future actions are anticipated at this time. The APE and surrounding areas are largely privately owned which makes determining future activities difficult.

Therefore, cumulative impacts to resources will consider the mining history, previous AML actions, and the alternatives presented.

There are no outstanding short-term effects from past actions. Short-term, cumulative effects to all resources under each alternative would be the same as previously addressed in Chapter 4. As no long-term adverse impacts to wildlife or special status species resources would occur as a result of the PA or Alternative B, no cumulative effects would occur.

Past mining in Madrid has left long-term, negative impacts to water, vegetation, soils, human health and safety, transportation, and recreation resources. Past AML actions to address these issues have had varying success, but overall have had positive impacts. Implementation of the PA and Alternative B would add to the beneficial impacts to these resources, with a greater impact expected from Alternative B.

The historical mining in Madrid has had a long-term, positive impact on the cultural, visual, and socio-economic resources of the area as it gave the features their historical significance, the distinctive visual and historical setting, and provided a basis for the tourist destination. Past AML actions have had adverse, positive, and/or no impacts to these resources. Some historic mining features have been altered or removed to address substantial human health and safety concerns resulting in adverse impacts to these resources. Other AML actions similar to the PA either did not affect or helped to protect these resources from hazardous conditions. The PA would add to the cumulative beneficial impacts to these resources, while Alternative B would likely result in both adverse and beneficial cumulative impacts.

Madrid residents experience both positive and negative impacts from Madrid's past mining activity. Previous AML actions did not undergo the level of public involvement that occurred under the development of the PA. Therefore, there would be a beneficial impact to environmental justice under the PA and Alternative B, with a greater impact expected from the PA as that was the more desired alternative from the community. There may be an adverse cumulative effect from the NAA as Madrid's population would remain affected by the current hazardous environmental conditions.

The NAA would result in no cumulative impacts to all other resources besides environmental justice.

6. MITIGATION/AVOIDANCE

This section recommends measures to mitigate or avoid potential adverse impacts of the PA (Section 2.1) and Alternative B (Section 2.2). This section does not include Design Features (Sections 2.1.6 and 2.1.5) or other actions which are already incorporated as part of the PA and Alternative B. Only those resources which have additional recommended mitigation measures are included below. No mitigation measures are proposed for Alternative C (Section 2.3), as that is the No Action Alternative.

6.1 Cultural Resources

Avoidance is recommended as a BMP for cultural properties determined eligible for listing in the NRHP or listed on the State or National Registers. If avoidance cannot be accomplished, it is recommended to implement measures to mitigate potential adverse effects to historic properties. The OSMRE, AML Program, and the SHPO have agreed that the PA would be implemented in accordance with stipulations provided in the MOA. These stipulations were developed to consider the effects of the PA on historic properties and to mitigate any potential adverse effects. Adverse effects and mitigation treatment measures are summarized below in Table for properties the OSMRE, AML Program, and the SHPO have determined the PA may adversely affect. These treatments include further documentation, testing and data recovery excavations, monitoring, reducing the construction footprint and height of retaining walls, and matching color palettes to blend with existing materials. The construction contractor and AML Program Project Manager should adhere to avoidance practices to prevent any unauthorized collection or removal of known or undocumented cultural resources.

Table 5. *Madrid Stormwater and Erosion Control Project Archaeological Site NRHP Eligibility Determinations, Potential Effects, and Proposed Mitigation Treatments*

Resource No.	HPD Eligibility Determination	Potential Project Effects	Proposed Mitigation Treatment
SR 365^ (Madrid Historic District)	SR and NRHP Listed Property	Adverse; trenching along the Santa Fe County fire hydrant waterline system and stormwater conveyance from SR 14 may result in inadvertent discoveries of cultural resources	Monitor construction and document discoveries
LA 108851^	Eligible, A & D	Adverse; slope limits of drainage structure	Document historic drainage structure and conduct Testing and Data Recovery within the new channel footprint
LA 115534^	Eligible, A & D	Adverse; Cave Road realignment, widening, and trenching may result in inadvertent discovery of buried cultural resources	Monitor construction and document cultural discoveries
LA 117777^	Eligible, A & D	Adverse; drainage channels, potential retaining walls, Bethlehem Pool, Cave Road Realignment, culvert	Monitor construction and document discoveries; reduce height of retaining walls to four feet or less and use color palette to blend into gob; contain plunge pool activities to channel; reduce slope limits and use low vibration equipment
LA 117779^ / HCPI 47458	LA = Not Eligible HCPI = Eligible, A	Adverse; Ice House Road Grading	Monitor construction with attention towards effects of vibrations to the structure (Chrysler-Plymouth Garage).
LA 130124*	Eligible, D	Adverse	Monitor construction and document cultural discoveries

Resource No.	HPD Eligibility Determination	Potential Project Effects	Proposed Mitigation Treatment
LA 170805^	Eligible, A & D	Adverse; may require excavation into Arroyo Channel bank; Firehouse Channel may require excavation; capping railroad grade may alter the character of the feature	Design not to affect Arroyo Channel bank slope; design to confine Firehouse Channel disturbance to channel bottom; design match capping materials to existing railroad grade material
LA 195467^	Eligible D	Adverse; water tower pad construction would impact site	Data recovery within construction footprint
LA 195468^	Eligible D	Adverse: Madrid Arroyo Construction	Data Recovery in portion of site along the bank of Madrid Arroyo
LA 197066^	Eligible A & B	Adverse; Bethlehem Road construction	Reduce slope limits and monitor vibration
LA 190767^	Eligible A & C	Adverse; Icehouse Road construction	Monitor construction and document discoveries
LA 203027#	Eligible D	Adverse: Madrid Arroyo Construction	Data Recovery in portion of site along the bank of Madrid Arroyo
LA 204048*	Eligible D	Adverse: Demolition of existing historic water conveyance features for Icehouse Channel Construction	Data Recovery within construction easement

^ HPD Log 114885; #HPD Log 120884; *HPD Log 122290

Designated avoidance buffers should be established and extend a minimum 50 feet from all site boundaries for eligible, contributing segments, or listed properties. This may include installing a four (4) feet tall temporary, high-visibility barrier fencing (or other approved barrier) to help prevent inadvertent site entry or damage when ground disturbing activities occur near cultural resources.

In the unlikely event that actual or suspected human remains are encountered, all construction within 100-ft of the discovery should immediately cease. The remains would be protected from further disturbance and the AML Program would notify the local law enforcement agency, the Office of the Medical Investigator (OMI), the state land managing agency, and the SHPO. If OMI determines that the remains are without medico-legal significance, OMI would terminate jurisdiction and the SHPO, in consultation with AML Program and the state land managing agency, would determine the steps to be taken to protect or remove the remains in accordance with the Cultural Properties Act, NMSA 1978, Section 18-6-11.2 and implementing 4.10.11 NMAC. If the human remains cannot be left in place, recovery of the individual(s) and associated funerary objects would be conducted in conformance with Rule 4.10.11 NMAC. Human remains or funerary objects with lineal descendants to Native American groups would be subject to the Native American Graves Protection and Repatriation Act (NAGPRA) regulations.

The PA would have the potential to cause adverse effects to the MHD and NRHP eligible properties within the APE. Adverse effects would be mitigated through adherence to the MOA and SHPO consultations. Alternative B would use similar mitigation measures discussed above; these would be less effective due to the more visually obtrusive actions of Alternative B.

6.2 Wildlife and Special Status Species

The following are potential mitigation measures which would be applied as applicable to the PA or Alternative B:

- Implement proposed construction outside the migratory bird breeding season (March - August).
- If project activities would take place during the migratory bird breeding season (March – August), pre-construction nest surveys may be completed to avoid direct impacts to avian species. If active nests are located, consultation with the USFWS and NMDGF would occur. To avoid disturbance, construction activities near nest sites would be delayed until fledging occurs, or a nest removal permit would be obtained from the USFWS.
- For the identified Cooper's hawk nest, USFWS recommends a 0.25-mile spatial buffer around any active nests during breeding season (March – August).

6.3 Vegetation

The following are potential mitigation measures which could be applied as applicable to the PA or Alternative B for vegetative resources:

- Vehicles and construction equipment would be inspected and cleaned before and after use to limit potential spread of weeds.
- During the project construction phase, disturbed areas would be monitored for invasive/noxious weeds. If weeds are identified, AML would notify landowners and provide BMP or treatment recommendations, if requested. Landowners would be responsible for any invasive species control per individual preferences.

6.4 Human Health and Safety

Due to past mining operations and processing, hazardous waste or contaminated soil may be encountered during the construction phase. If encountered, appropriate agencies would be notified, and the waste would be disposed of in the manner specified by local, state, and federal regulations and requirements.

7. AGENCY CONSULTATION

The following public agencies and tribal entities were contacted or consulted with during the development of this EA (in alphabetical order):

- Cochiti Pueblo
- Comanche Indian Tribe
- Environmental Protection Agency
- Hopi Tribe
- Isleta Pueblo
- Jicarilla Apache Nation
- Kiowa Tribe

- Madrid Landowners Association
- Madrid Merchants Association
- Madrid Water Coop
- Madrid Volunteer Fire Department
- Nambe Pueblo
- Navajo Nation
- New Mexico Department of Game and Fish
- New Mexico Department of Transportation
- New Mexico Rare Plant Technical Council
- New Mexico State Historic Preservation Office
- Office of Surface Mining Reclamation and Enforcement
- Ohkay Owingeh (San Juan) Pueblo
- Pojoaque Pueblo
- San Ildefonso Pueblo
- Sandia Pueblo
- Santa Clara Pueblo
- Santo Domingo Pueblo
- Santa Fe County
- Tesuque Pueblo
- U.S. Army Corps of Engineers, Albuquerque District, Regulatory Division
- U.S. Fish and Wildlife Service, Ecological Services Field Office

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