U.S. Department of the Interior
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Proposed Competitive Mineral Materials Sale (COC-078119) at Parkdale, Fremont County, CO.

Final Environmental Impact Statement

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DOI-BLM-CO-F020-2019-0013-EIS

Bureau of Land Management
Royal Gorge Field Office
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Proposed Competitive Mineral Materials Sale (COC-078119) at Parkdale, Fremont County, CO. (Parkdale Quarry Expansion Project) Final Environmental Impact Statement

( ) Draft	**(X) Final**
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Cooperating Agencies:	Colorado Parks and Wildlife Fremont County
Counties Directly Affected:	Fremont County, Colorado
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ABSTRACT

This Final Environmental Impact Statement (EIS) analyzes the potential direct, indirect, and cumulative impacts associated with the Parkdale Mineral Materials Sale (COC-078119) in Fremont County, Colorado. Martin Marietta proposes to expand the sale area to the north of the existing quarry on 1,460 acres of public land managed by the BLM Royal Gorge Field Office (RGFO). Approximately 700 acres are proposed for surface disturbing activities. In addition to the Proposed Action, two alternatives were analyzed in the EIS: the Alternative Sale Area Alternative and the No Action Alternative.

The Alternative Sale Area Alternative in response to stakeholder concerns regarding potential impacts under Alternative A to bighorn sheep and their habitat located within the Arkansas River Canyonlands ACEC to the west of the Sale Area. The Alternative Sale Area would occupy 893 acres of public lands administered by the BLM RGFO. Proposed activities within the Alternative Sale Area would essentially be the same as the Proposed Action. Under the No Action Alternative Martin Marietta would continue to mine the existing aggregate resource on private land.

Authorized Officer Responsible for the Final Environmental Impact Statement:	Keith Berger District Manager Winnemucca District Office Bureau of Land Management

EXECUTIVE SUMMARY

The Bureau of Land Management (BLM) Royal Gorge Field Office (RGFO) is preparing this Environmental Impact Statement (EIS) in response to an application for a 100-year contract for the sale of mineral materials submitted by Martin Marietta Materials, Inc. (Martin Marietta). The proposed 100-year materials sale contract would be subject to BLM review and renewal after each 10-year period during the life of the contract. The proposal would permit Martin Marietta to expand operations from its existing privately-owned Parkdale Quarry onto adjacent BLM-administered lands and provide access to 400-million net tons of aggregate.

The proposed expansion area includes the Mineral Materials Sale area (Sale Area), which encompasses approximately 1,400 acres of public land administered by the BLM RGFO. Proposed mineral material extraction within the 1,400-acre Sale Area would be limited to approximately 698 acres, and the remaining 702 acres would serve as a perimeter buffer for which no surface disturbance is proposed. The BLM prepared this EIS to analyze the impacts associated with the proposed mine expansion.

The purpose of this action is to respond to a request by Martin Marietta to obtain a renewable competitive contract for the sale of mineral materials located immediately adjacent to the existing Parkdale Quarry in Fremont County, Colorado. The need is based on BLM's multiple-use mission, set forth in the Federal Land Policy and Management Act of 1976 (FLPMA), which mandates that the public land resources be managed for a variety of uses, including mining. Per 30 U.S. Code (U.S.C.) 1602, the project would, "assist in the pursuit of measures that would assure the availability of materials critical to commerce, the economy, and national security" and "facilitate availability and development of domestic resources to meet critical materials needs."

Public Outreach and Issues

The BLM identified issues to be addressed in the EIS through public and internal scoping and through outreach to cooperating agencies and Tribal entities. The formal public scoping process began on July 31, 2019, with publication of the Notice of Intent (NOI) in the Federal Register. The NOI notified the public of the BLM's intent to prepare an EIS, provided information about the proposed action, described the purpose of the scoping process, and identified methods to provide comments. The public scoping period closed on August 30, 2019 for a total scoping period of 31 days. As part of the scoping process, the BLM hosted a scoping meeting in Canon City, Colorado on August 15, 2019 for the public and other interested parties to learn about and submit comments on the Parkdale Quarry Expansion. The comment parsing process resulted in approximately 39 individual comments, which were then coded according to planning issue categories. A total of 10 unique comment letters were submitted. The majority of comments received were unsupported position statements (18 percent), or related to fish and wildlife (15 percent), analysis methods and assumptions (13 percent), and wilderness and areas of critical environmental concern (13 percent). Substantive public comments, which are summarized in the Parkdale Quarry Expansion EIS Final Scoping Report, were considered in the preparation of this document.

Management Alternatives

The EIS considers three alternatives to address the sale of mineral materials application:

Alternative A (Proposed Action): Under the Proposed Action, most of the supporting operations for the mine, such as mineral processing, loadout, and transportation, would continue on Martin Marietta's private land. The Proposed Action includes the following activities within the mine expansion area over the estimated 100-year life of the quarry:

- Construction and operation of an access road;
- Excavation of mineral materials using safe, controlled blasting methods and heavy-duty excavation equipment;
- Loading of mineral materials onto haul trucks and/or an overland conveyor system for transport to the processing facilities on the adjacent private land;
- Reclamation of disturbed areas in accordance with Martin Marietta's reclamation plan.

Over 95 percent of the mineral materials to be processed at the quarry would continue to be transported by the existing Rock and Rail or Union Pacific railroads for delivery to customers and markets in southeastern Colorado and southwestern Kansas. Less than 5 percent of the mineral materials processed would be transported by truck to local markets within 50 miles of the quarry. Under Alternative A, Martin Marietta anticipates increasing annual production from 2,000,000 tons annually to approximately 4,000,000 tons annually.

Alternative B (No Action Alternative): Under the Alternative B (No Action Alternative), the BLM would deny Martin Marietta's mineral materials application. There would be no expansion of the existing Parkdale Quarry onto BLM-administered lands. Martin Marietta would continue to mine the granitic deposit on privately-owned lands at the existing Parkdale Quarry and conduct reclamation and closure of the mine according to their existing, authorized permits. Continued mining of the granitic deposit on private land would be visible from the Highway 50 corridor and adjacent areas. At the current rate of permitted production (2,000,000 tons annually), the existing quarry is anticipated to remain in operation for another 15 to 30 years.

Alternative C (Alternative Sale Area): In response to stakeholder concerns regarding potential impacts under Alternative A to bighorn sheep and their habitat located within the Arkansas River Canyonlands ACEC to the west of the Sale Area, Martin Marietta provided an Alternative Materials Sale area (Alternative Sale Area) boundary to the BLM for evaluation. Figure 2.5-1, Appendix C, presents the extent of the Alternative Sale Area. The Alternative Sale Area is shifted to the east approximately one half-mile, away from the ACEC, and includes the crest of Cactus Mountain.

Analysis of Impacts

Impacts can be beneficial or adverse, may result from an action directly or indirectly, or cumulatively with other actions, and can be long-term or short-term. The analysis in this document considers potential effects from the management of each individual resource on other resources. The discussion of environmental consequences focuses on the most critical impacts in order to streamline the analysis and address the most important issues of concern for the public, cooperating agencies, and the BLM. If a particular impact is not discussed, it is because no such impact is expected, or the impact is not within the scope of this EIS.

A detailed description of environmental consequences is included in Chapter 3.

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All figures will be presented in Appendix C of the Final EIS.

ACRONYMS AND ABBREVIATIONS

%	percent
ACEC	Area of Critical Environmental Concern
amsl	above mean sea level
BCR	Bird Conservation Region
BLM	Bureau of Land Management
btoc	below top of casing
CDPHE	Colorado Department of Public Health & Environment
CDRMS	Colorado Division of Reclamation, Mining and Safety
CEQ	Council on Environmental Quality
CESA	Cumulative Effects Study Area
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CPW	Colorado Parks and Wildlife
CRS	Colorado Revised Statutes
CUP	Conditional Use Permit
DAU	Data Analysis Unit
dv	deciviews
DWR	Colorado Division of Water Resources
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act of 1976
FR	Federal Register
ft.	feet
GHG	greenhouse gas
GIS	Geographic Information System
GMS	Growth Media Stockpiles
GMU	Game Management Units
gpm	gallons per minute
GRAPI	Gross Rent as a Percentage of Household Income

HAP	hazardous air pollutant
HUC	Hydrologic Unit Code
KOP	key observation point
MBTA	Migratory Bird Treaty Act
MM	Martin Marietta Materials, Inc. / Martin Marietta
MOU	Memorandum of Understanding
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NHD	National Hydrology Data
NLCD	National Land Cover Data
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PILT	payment in lieu of taxes
PLSS	Public Land Survey System
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PSD	Prevention of Significant Deterioration
RFFA	Reasonably Foreseeable Future Action
RGFO	Royal Gorge Field Office
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
Sale Area	Mineral Materials Sale Area
SMOCAPI	Selected Monthly Owner Costs as a Percentage of Household Income
SMP	Stormwater Management Plan
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures
U.S.	United States
U.S.C.	U.S. Code
USCB	U.S. Census Bureau

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRI	visual resource inventory
VRM	Visual Resource Management

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CHAPTER 1. INTRODUCTION

This Final Environmental Impact Statement includes revisions to the Draft EIS. New text is presented in grey highlight.

1.1. INTRODUCTION AND BACKGROUND

Martin Marietta Materials, Inc. (Martin Marietta) has submitted an application to the Bureau of Land Management (BLM) for a 100-year competitive contract, with option of renewal, for the sale of mineral materials. The proposal would permit Martin Marietta, as the successful bidder, to expand operations from its existing privately-owned Parkdale Quarry onto adjacent BLM-administered lands and provide access to 400 million net tons of aggregate. The existing Parkdale Quarry is located in Fremont County, Colorado, approximately 12 miles west of the Town of Cañon City, Colorado (Figure 1.1-1, Appendix C). It is situated on the north side of the Arkansas River and United States (U.S.) Highway 50 in portions of Township 18 South, Range 72 West, sections 1, 2, 11, 12, and Township 18 South, Range 71 West, sections 6 and 7 (6^{th} Prime Meridian). The proposed expansion area includes the Mineral Materials Sale area (Sale Area), which encompasses approximately 1,458 acres of public land administered by the BLM Royal Gorge Field Office (RGFO) (Figure 1.1-2, Appendix C). Proposed mineral material extraction within the 1,458-acre Sale Area would be limited to approximately 698 acres, and the remaining 760 acres would serve as a perimeter buffer for which no surface disturbance is proposed. The BLM prepared this Environmental Impact Statement (EIS) to analyze the impacts associated with the proposed mine expansion.

Under the Proposed Action, most of the supporting operations for the mine, such as mineral processing, loadout, and transportation, would continue on Martin Marietta's private land. The Proposed Action includes the following activities within the mine expansion area over the estimated 100-year life of the quarry:

- Construction of approximately 1.1 miles of access road;
- Excavation of mineral materials using safe, controlled blasting methods and heavy-duty excavation equipment;
- Loading of mineral materials onto haul trucks and/or an overland conveyor system for transport to the processing facilities on the adjacent private land;
- Reclamation of disturbed areas in accordance with Martin Marietta's reclamation plan.

Over 95 percent of the mineral materials to be processed at the quarry would continue to be transported by the existing Rock & Rail, Union Pacific, Burlington Northern Santa Fe, or other railroads for delivery to customers and markets in southeastern Colorado and southwestern Kansas. Less than 5 percent of the mineral materials processed would be transported by truck, with the majority of trips serving sites within 50 miles of the quarry.

1.2. BLM PURPOSE AND NEED

The purpose of this action is to respond to Martin Marietta's request for the sale of mineral materials located immediately adjacent to the existing Parkdale Quarry in Fremont County, Colorado.

The need is based on the BLM's multiple-use mission, set forth in the Federal Land Policy and Management Act of 1976 (FLPMA), which mandates that the public land resources be managed for a variety of uses, including mining. Per 30 U.S. Code (U.S.C.) 1602, the project would, "assist in the pursuit of measures that would assure the availability of materials critical to commerce, the economy, and national security" and "facilitate availability and development of domestic resources to meet critical materials needs."

1.3. DECISION TO BE MADE

The BLM will decide whether to approve the application and issue a renewable competitive contract for the sale of mineral materials in the mine expansion area, using the analysis contained in this EIS. Completion of this EIS does not constitute the final approval for the Proposed Action.

1.4. RELATIONSHIP TO BLM AND NON-BLM POLICIES, PLANS, AND PROGRAMS

1.4.1. National and BLM Policies

This EIS is consistent with the National Environmental Policy Act (NEPA) of 1969, as amended, and Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA. These are outlined in 40 Code of Federal Regulations (CFR) Parts 1500-1508 and Department of Interior NEPA regulations at 43 CFR 46. Proposed Mineral Materials Sales located on BLM-administered lands are regulated under 43 CFR Parts 3600-3604.

1.4.2. Land Use Plan Conformance

The proposed Mineral Materials Sale Area spans both the Arkansas River and Waugh Mountain/ Tallahassee subregions of the Royal Gorge Resource Area Resource Management Plan (RMP). The Proposed Action is subject to and has been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

Name of Plan: Royal Gorge Resource Management Plan, Arkansas River Sub-region

Date Approved: 05/13/1996

Decision Numbers: 1-40, 1-41, 1-42, 1-43, 1-66, 1-67

Decision Language:

1-40: "Areas will be . . . available for mineral materials development: administered under existing regulations; limited by closure if necessary; special mitigation will be developed to protect values on a case-by-case basis."

1-41: "Areas will be . . . available for mineral materials development under standard mineral operating practices."

1-42: "Areas will be . . . available for mineral materials development under a seasonal limitation through claimant/operator notification to protect: big game critical winter habitat; wild turkey winter habitat; raptor nesting/fledgling habitat; Mexican spotted owl habitat; bald eagle winter roosting habitat; peregrine falcon habitat; ferruginous hawk nesting/fledgling habitat."

1-67: "These designated Areas of Critical Environmental Concern (ACECs) will receive special management as follows: . . . mineral materials development will not occur."

Name of Plan: Royal Gorge Resource Management Plan, Waugh Mountain/Tallahassee Creek Subregion

Date Approved: 05/13/1996

Decision Numbers: 6-14, 6-20, 6-30, 6-35, 6-36, 6-37, 6-65,

Decision Language:

6-14: "Conflicts between wildlife habitat and other uses e.g., grazing, mineral development, etc., will be resolved in favor of achieving vegetation management goals."

6-20: "Mineral operations will be available with timing limitations for:

- big game critical winter habitat;
- raptor nesting and fledging habitat;
- wild turkey winter habitat."

6-35: "Areas will be open to mineral entry and available for mineral materials development:

- administered under existing regulations;
- limited by closure if necessary;
- special mitigation will be developed to protect values on a case-by-case basis."

6-36: "Areas will be open to mineral entry and available for mineral materials development under standard mineral operating practices."

6-37: "Areas will be open to mineral entry under timing limitations and available for mineral materials development under a seasonal limitation through claimant/operator notification to protect:

- big game critical winter habitat;
- wild turkey winter habitat;
- Mexican spotted owl habitat;
- ferruginous hawk & raptor nesting/fledging habitat."

6-65: "Visual Resource Management class criteria will be used as a guide for other resource management actions."

1.4.3. State and Local Land Use Plans and Policies

The Colorado Land Reclamation Act for the Extraction of Construction Materials (Colorado Revised Statutes [CRS] Title 34 Article 32.5-101 through 125) regulates the operations of all existing and new mining operations that extract construction materials, and the act recognizes that the extraction of construction materials and the reclamation of land affected by such extraction are necessary and proper (34-32.5-102). The Colorado Division of Reclamation, Mining and Safety (CDRMS) is tasked with carrying out these requirements. In the event the proposed material Sale Area or an actionable alternative on BLM-administered land is approved, CDRMS requirements would be implemented in conjunction with BLM requirements. The currently active Parkdale Quarry on private lands operates under CDRMS Permit # M1997054.

The Fremont County Master Plan, originally developed in 2002 and revised in 2015, encourages responsible mining operations that result in the least impacts possible (Fremont County 2015). The Proposed Action is consistent with the goals, objectives, and strategies related to mining and land use policy of the 2015 Fremont County Master Plan.

1.5. PERMITS AND APPROVALS

In addition to the EIS, implementing the BLM selected alternative would require authorizing actions from other federal, state, and local agencies with jurisdiction over certain aspects of the proposed project. Table 1.1 lists the major authorizations already in place that will need to be amended or new authorizations that will be required. Martin Marietta is responsible for amending existing permits and applying for and acquiring additional permits and approvals, as needed. All these authorizations would need to be current, prior to BLM issuing a contract for the requested mineral materials.

The maximum contract term allowed is 10 years at a time and before issuance of a renewed contract, BLM would perform additional review of on-site resource conditions and coordinate with resource specialists as required. The length of the competitive contract would be identified by the operator and is commonly measured in years and volume of material to be sold.

Competitive BLM material sale contracts will not be renewed by the BLM until either the contract period has lapsed or the volume of purchased material is extracted by the operator.

Table 1.1. Major Permits and Approvals

Permit/Approval	Granting Agency
Enforce the Federal Mine Safety and Health Act of 1977 Permit #504635	Mine Safety and Health Administration (MSHA)
Regular 112 Operation Reclamation Permit #M-1997-054	Colorado Division of Reclamation, Mining and Safety (CDRMS)
APENs -Air Quality Construction Permits	Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division
Sand & Gravel Mining Wastewater & Storm Water Combined Permit	CDPHE, Water Quality Control Division
General Permit for Sand and Gravel Mining and Processing #COG-500000	CDPHE, Water Quality Control Division
Conditional Use Permit	Fremont County
Construction Applications/Building Permits	Fremont County
Spill Prevention, Control, and Countermeasures Plan	U.S. Environmental Protection Agency (EPA)
Access Permit (County Road 157 to State Highway 50)	Colorado Department of Transportation (CDOT)

1.6. PUBLIC INVOLVEMENT

The BLM published a Notice of Intent (NOI) to prepare this EIS in the *Federal Register* on July 31, 2019. The NOI initiated a 30-day formal scoping period during which the BLM solicited input from the public on the issues and impacts to be addressed in this EIS. A public meeting was held at Abbey Events Center in Cañon City on August 15, 2019. Substantive public comments, which are summarized in the Parkdale Quarry Expansion EIS Final Scoping Report, were considered in the preparation of this document.

The BLM published a Notice of Availability (NOA) of the Draft EIS on February 7, 2020. The NOA announced the availability of the Draft EIS, summarized the alternatives and other key information presented in the Draft EIS, provided a link to the project website, provided the methods by which comments on the Draft EIS might be sent to the BLM, and noted a 45-day comment period in which comments must be received. A news release was also published, and provided information about the proposed quarry expansion, the date and venue information for the public meeting, and comment period timeframes. A summary of the Draft EIS public comment process, including substantive comments received, and responses to those comments, is provided in Appendix N.

1.7. KEY ISSUES

Key issues identified for detailed analysis in the EIS through the internal and external scoping processes are:

Air Quality

- What types and amounts of criteria air pollutants would be emitted as a result of the proposed Parkdale Quarry expansion, and what are the potential effects to ambient air quality in the region?
- What types and amounts of hazardous air pollutants would be released as a result of the proposed Parkdale Quarry expansion, and what are the potential health and environmental effects?
- What types and amounts of greenhouse gases that would contribute to global climate change would be emitted as a result of the proposed Parkdale Quarry expansion?

Lands with Wilderness Characteristics

- How would the proposed Parkdale Quarry expansion affect the currently inventoried area identified as having wilderness characteristics?

Social and Economic Conditions

- How would the proposed Parkdale Quarry expansion affect social and economic conditions in Fremont County?

Water Quality and Quantity (Surface and Ground Water)

- What are the water sources and water requirements for the Parkdale Quarry expansion?
- Is dewatering anticipated to be required in any of the pits?
- How would the Parkdale Quarry expansion affect water quality, quantity, and water rights?
- How would surface water and groundwater be monitored for the proposed mine expansion?

Wildlife (Terrestrial)

- How would the Parkdale Quarry expansion affect the availability and quality of habitat for bighorn sheep and other terrestrial wildlife species?

Wildlife (Migratory Birds)

- How would the Parkdale Quarry expansion affect the availability and quality of habitat for migratory birds?

Wildlife (Special Status Species)

- How would the Parkdale Quarry expansion affect the availability and quality of habitat for federal, state, and BLM RGFO designated special status wildlife and plant species?

Visual

- How would expansion of the Parkdale Quarry affect the area's scenic integrity and visual resources as seen from key observation points?

Impacts the BLM determined to be negligible or that would be subject to design features of the alternatives were not brought forward for detailed analysis. Section 3.1, *Introduction*, of this EIS presents information reviewed by the BLM during consideration of issues to be brought forward for detailed analysis.

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CHAPTER 2. DESCRIPTION OF ALTERNATIVES, INCLUDING THE PROPOSED ACTION

2.1. INTRODUCTION

This chapter summarizes the alternatives considered for this project, as well as alternatives considered but dismissed from detailed analysis. Alternative A, the Proposed Action, is considered under the Competitive Mineral Materials Sale (COC-078119) at Parkdale as described in the Mining and Reclamation Plan (Mine Plan) for the Parkdale Quarry expansion submitted to the BLM in June 2016 (Martin Marietta 2016). Appendix D of this EIS contains the current Mine and Reclamation Plan Summary, and the original Mining and Reclamation Plan, while the BLM RGFO reclamation standards and reclamation plan supplemental information are presented in Appendix E. All alternatives presented in this chapter, were developed based on internal and external scoping input and supporting technical information provided by Martin Marietta and reviewed by the BLM. This chapter also includes a summary of alternatives that were considered but not carried forward for detailed analysis.

2.2. EXISTING PARKDALE QUARRY OPERATIONS

The existing Parkdale Quarry is located on approximately 513 acres of private land owned by Martin Marietta (Figure 2.2-1, Appendix C). The existing Parkdale Quarry has been in operation at this location since 1997 under various ownership entities. The quarry was obtained by Martin Marietta in November 2015 from Front Range Aggregates, LLC. The quarry operates under CDRMS Regular 112 Reclamation and Operation Permit #M1997054 and a Conditional Use Permit (CUP) #07-003 from Fremont County. Current authorizations allow for mining and processing during daylight periods only and allow for 24-hour loading of material for transport by rail cars and trucks. The quarry is also permitted by the CDRMS to operate under Regular 112 Reclamation and Operation Permit #M1997054. The existing Parkdale Quarry directly employs approximately 45 full-time employees, in addition to various other sub-contractors and suppliers that support quarry operations. The current Parkdale Quarry Mine has approximately 37 million to 47 million tons of salable permitted reserves in the granite deposit on Martin Marietta's property. Martin Marietta is currently permitted by CDRMS to produce up to two million short tons per year from the site (one short ton equals 2,000 pounds). The permit with Fremont County allows Martin Marietta to conduct mining on 172.5 acres of its privately held lands at the Parkdale Quarry.

The quarry consists of two types of deposits located to the north of the Arkansas River: an alluvial deposit south of Tallahassee Creek and a granite deposit northeast of the creek within the private land (Figure 2.2-1, Appendix C). The alluvial reserves originally occupied approximately 100 acres and consisted of materials derived from granitic, gneissic, and amphibolite source rocks. These alluvial reserves have been substantially depleted as of 2019. Blasting is not

required for mining the alluvial reserves. The alluvial deposit is excavated using a tracked excavator and placed in haul trucks for transport to the materials processing plant. The material is fed by conveyors to a jaw crusher, followed by a cone crusher, and then screened to achieve the desired particle size including coarse concrete aggregate, ¾ inch, ½ inch, and $^{3}/_{8}$ inch crushed stone; sand; and crushed fines material.

The granite deposit is an approximate 65-acre permitted hard rock mining deposit located northeast and across Tallahassee Creek from the alluvial deposit. Mineral material recovery at the existing granite quarry uses a hillside excavation technique with benches of 30 to 40 feet in height depending on site characteristics. Topsoil at the site is stripped prior to excavation and is stored in growth media stockpiles (GMS) at various locations across the existing quarry for use in post-mining reclamation activities. Once topsoil is removed and the underlying rock material is exposed, the rock formations are fractured using explosives. All in-ground blasting work on the existing site is conducted by a licensed blaster and no explosive materials are currently stored onsite.

Once rock formations have been fractured, an excavator is used to load the material onto haul trucks for transport to the onsite processing facility. The processing of materials for the granite quarry is similar to the processing for the alluvial quarry. The processing facility consists of a series of mechanical rock crushers that pulverize the rock material into specific grain sizes used in road building and other construction industries. Once the rock material is processed, it is transported to local markets via either the existing railroad system or by truck. Approximately 95 percent of all material produced from the existing quarry is shipped via rail (Resource Economics 2019). Currently, the Parkdale Quarry's operations result in three to five trains per week with approximately 48 cars per train, as well as an average of two to three trips per day by standard over-the-road trucks. Aggregate produced is shipped for concrete and asphalt products.

Existing ancillary and operations support facilities located on the Martin Marietta owned private parcel include the quarry administration offices, employee facilities, equipment repair and maintenance shops, three water retention ponds, storage buildings, and a scale house. Electrical power is provided to the site via overhead distribution lines through the existing grid operated by Black Hills Energy Corporation.

Martin Marietta implements on-site water conservation measures to reduce water consumption during operations and a substantial portion of the current annual water use rate includes recycled water. Martin Marietta has existing water rights or supply agreements for augmentation water to obtain water for aggregate processing from tributary groundwater that collects in the alluvial pit and augmented as needed from Tallahassee Creek. Stormwater and excess groundwater are captured in settling ponds on site and are not discharged to Tallahassee Creek until water quality meets National Pollutant Discharge Elimination System (NPDES) permit limits. No chemicals are used in aggregate processing.

Reclamation of the site on private land will be completed in accordance with the existing Reclamation Plan and as required by the Parkdale Quarry Regular Operation 112 and

Reclamation Permit #M-97-054 approved by the State of Colorado Division of Reclamation, Mining and Safety. Reclamation of the currently authorized facilities is guaranteed by Martin Marietta's existing reclamation bond.

2.3. ALTERNATIVE A (PROPOSED ACTION)

The following sections summarize key components of Alternative A, which are detailed in Appendix D, *Mining and Reclamation Plan*.

2.3.1. Surface Ownership and Land Disturbance

The Sale Area includes approximately 1,458 acres of public land managed by the BLM RGFO (Figure 1.1-2, Appendix C). Martin Marietta estimates that approximately 400 million tons of aggregate material would be recoverable from the proposed Sale Area. Under Alternative A, mining and extraction of rock materials is anticipated to disturb approximately 698 acres of the project area. The remaining 760 acres of the project area would remain undisturbed serving as a perimeter buffer zone to minimize impacts to resources adjacent to the project area (Figure 2.2-2, Appendix C). Approximately 166 acres of the Arkansas River Canyonlands ACEC is located within the proposed buffer area of the Proposed Action. CDRMS regulations require that proposed aggregate mining operations include a minimum 200-foot buffer to be applied to active mining areas. During the alternatives development process for the proposed materials sale, the BLM considered reducing the proposed buffer area in order to reduce the overlap with lands designated as part of the Arkansas River Canyonlands ACEC. Reduction of the proposed buffer area to the CDRMS required minimum 200-foot buffer would result in approximately 107 acres of the Arkansas River Canyonlands ACEC remaining within the buffer area, therefore the BLM determined that reducing the proposed buffer would not provide any additional resource protection and the buffer area was left unchanged from the operator's Proposed Action. Only areas under active mining would be fenced.

2.3.2. Mining

Mining activity would progress under five phases over the approximate 100-year life-of-mine and would progress generally from the northwest edge of the Sale Area to the southeast edge. The mine plan area is expected to be fully operational in 2024, the first year of operation, under Alternative A. Expansion of mining activity at the site would provide long-term viability for the quarry, extending its useful life from the current forecast of 15 to 30 years under Alternative B, the No Action Alternative (depending on production) (Martin Marietta 2019d) to over 100 years into the future.

The five individual phases are referred to as the West Pit, West Central Pit, Central Pit, East Central Pit, and the East Pit as shown in Figure 2.2-1 (Appendix C). The West Pit mine area is anticipated to be fully operational in 2024, if the proposal is approved. The total anticipated

acreages of surface disturbance and mining periods for each of the five phases are presented in Table 2.1.

Surface disturbance from mining would be concurrently reclaimed in areas where mining and other activities are complete. During mining operations throughout the five proposed phases, surface disturbance would be limited to the area of active material extraction at any one time and areas undergoing concurrent reclamation. Due to the proposed phased approach to mining and implementation of concurrent reclamation, actual existing disturbance acreages at any one point in time are anticipated to be limited relative to the total acres of proposed disturbance. Although specific acreages of annual disturbance cannot be estimated due to shifts in production, Martin Marietta anticipates that active surface disturbance at any one point would be limited to 100 acres or less.

Under Alternative A, previously authorized mining of the granitic deposit located on Martin Marietta's private lands would cease upon BLM approval and any current disturbance would be reclaimed. However, Martin Marietta anticipates possibly mining some of these private reserves later in the 100-year life-of-mine. Under Alternative A, Martin Marietta would move the currently permitted southern mining boundary on private lands further to the north and away from the Arkansas River. This anticipated change in mining boundary would be included in an amendment to Martin Marietta's Fremont County CUP and CDRMS Mine and Reclamation Permit.

Alternative A includes a 100-year expected life-of-mine period if annual production rates were increased to approximately 2,000,000 to 4,000,000 short tons of rock material from the current production rate maximum of 2,000,000 short tons annually. Therefore, mining would proceed at 1,000,000 to 2,000,000 short tons per year during Phase 1 and would increase from 2,000,000 to 4,000,000 short tons per year during phases 2 to 5.

Table 2.1. Estimated Surface Disturbance and Active Mining Periods for Alternative A Phases

Phase Number	Phase Name	Surface Disturbance (acres)	Mining Period[1] (years)
1	West Pit	81	15-20
2	West – Central Pit	166	20-40
3	Central Pit	228	25-50
4	East – Central Pit	110	15-30
5	East Pit	113	15-25
	Total	**698**	-

Source: Martin Marietta 2016

[1] Based on current and future anticipated production rates

2.3.3. Materials Processing

Materials processing would continue as described in Section 2.2, *Existing Parkdale Quarry Operations*, and currently authorized at Martin Marietta's privately-owned processing area. The quarry would continue to produce aggregate commodities currently provided, and would expand production of railroad ballast. Under Alternative A, Martin Marietta would invest an additional $50 to $70 million from 2020 through 2023 to upgrade processing equipment that would allow for increased aggregate production, including increased production of railroad ballast.

2.3.4. Haul and Access Roads

Approximately 1.1 miles of new haul road designed to be consistent with BLM and industry standards would be constructed on BLM-administered lands along the southwestern border of the Sale Area leading from the proposed pit areas to the existing materials processing area (Figure 2.2-2, Appendix C). The haul road would include a running width of 60 feet to allow vehicles to safely pass. Engineered designs for the haul roads will be provided to BLM for review, prior to any contract issuance.

2.3.5. Ancillary and Support Facilities

Ancillary and support facilities would be similar to those described in Section 2.2, *Existing Parkdale Quarry Operations*, and currently authorized at Martin Marietta's privately-owned processing area, but would be upgraded to support the additional production. A dedicated rail loadout system would be added on the privately-owned land.

2.3.5.1. Site Security, Signs, and Fencing

To preclude public access for safety, active mining areas would be signed and/or fenced according to any requirements under the current Parkdale Quarry CDRMS operating permit, the current Fremont County CUP and BLM requirements based upon future site conditions. Areas where mining has yet to occur or where mining and reclamation activities are complete would not be fenced, unless it is determined to be necessary. Formal public access locations to the proposed Sale Area and adjacent BLM-administered lands are currently located on private land and are currently signed in accordance with regulatory requirements to alert the public of mining operations and quarry related traffic. The public may have direct, foot only, access into the BLM-administered lands from the west and north, so these areas would be signed, as needed, to alert the public of mining activity in the area. The BLM, in conjunction with the operator, would monitor public access and safety management throughout the life of the quarry and may require the implementation of other safety measures including increased signage, fencing, and site security personnel or equipment.

2.3.5.2. Rail Transport of Aggregate Materials

Under Alternative A, Martin Marietta estimates that rail transport of aggregate material would increase proportionally with overall production rates. In 2024, Martin Marietta estimates that production of 1,807,000 tons of aggregate material would require the addition of one to three trains per week to meet market demand. In addition, the length of loaded trains would be increased from 48 cars per train to approximately 90 cars per train.

2.3.6. Growth Media Stockpiles (GMS)

Topsoil and growth media management under Alternative A would remain consistent with the requirements under the current Parkdale Quarry CDRMS operating permit and Fremont County CUP. Topsoil would be stripped from mining areas prior to blasting and rock excavation and placed in various locations as GMS for use during reclamation. GMS that is not anticipated to be used within six months of excavation would be seeded to establish a vegetative cover for stabilization and protection from erosion.

2.3.7. Closure and Reclamation Plan

CDRMS and Fremont County Requirements and BLM Standards

Martin Marietta's current Fremont County CUP and CDRMS operating permits (Section 2.2, Existing Parkdale Quarry Operations) identify specific reclamation requirements to be implemented at the existing Parkdale Quarry concurrently during operations and upon final closure. These requirements are applicable to the private lands only and BLM authority does not apply to reclamation of privately owned lands. The BLM's authority with regards to reclamation is limited to ensuring all applicable BLM RGFO reclamation standards, as outlined in Appendix E, are successfully met during concurrent and final reclamation phases on BLM-administered lands. BLM RGFO reclamation standards and a summary of successful performance indicators are presented in Appendix E. BLM RGFO and CDRMS would conduct a bond review and assessment prior to authorizing an expanded mining area. This bond will based on the cost to reclaim the site.

Under Alternative A, Martin Marietta would be required to amend its current CDRMS and Fremont County permits and existing reclamation plan to include mining operations on BLM-administered lands. During this process, the BLM would coordinate with Martin Marietta, Fremont County, and CDRMS to ensure that modifications to the existing reclamation plan for current operations that are to be applied to the BLM-administered Sale Area are consistent with BLM reclamation standards.

Limitations of the Proposed Sale Area Reclamation Plan

Appendix D contains Martin Marietta's proposed mine closure and reclamation plan for the Sale Area. The goals, objectives, and proposed reclamation methods of this plan are similar to the

mine and reclamation plan for the existing Parkdale Quarry as permitted by Fremont County and CDRMS. The BLM has reviewed the proposed reclamation plan for BLM-administered lands for consistency with BLM reclamation standards and has identified details of the plan that would need to be further developed and approved through coordination with Fremont County and CDRMS during the permit amendment processes. The BLM RGFO Solid Minerals Final Reclamation Standards (Appendix E) presents those aspects for which detailed information or reclamation protocols would need to be developed and committed to by Martin Marietta prior to any BLM issued contract for mining activity on public lands in the proposed Sale Area.

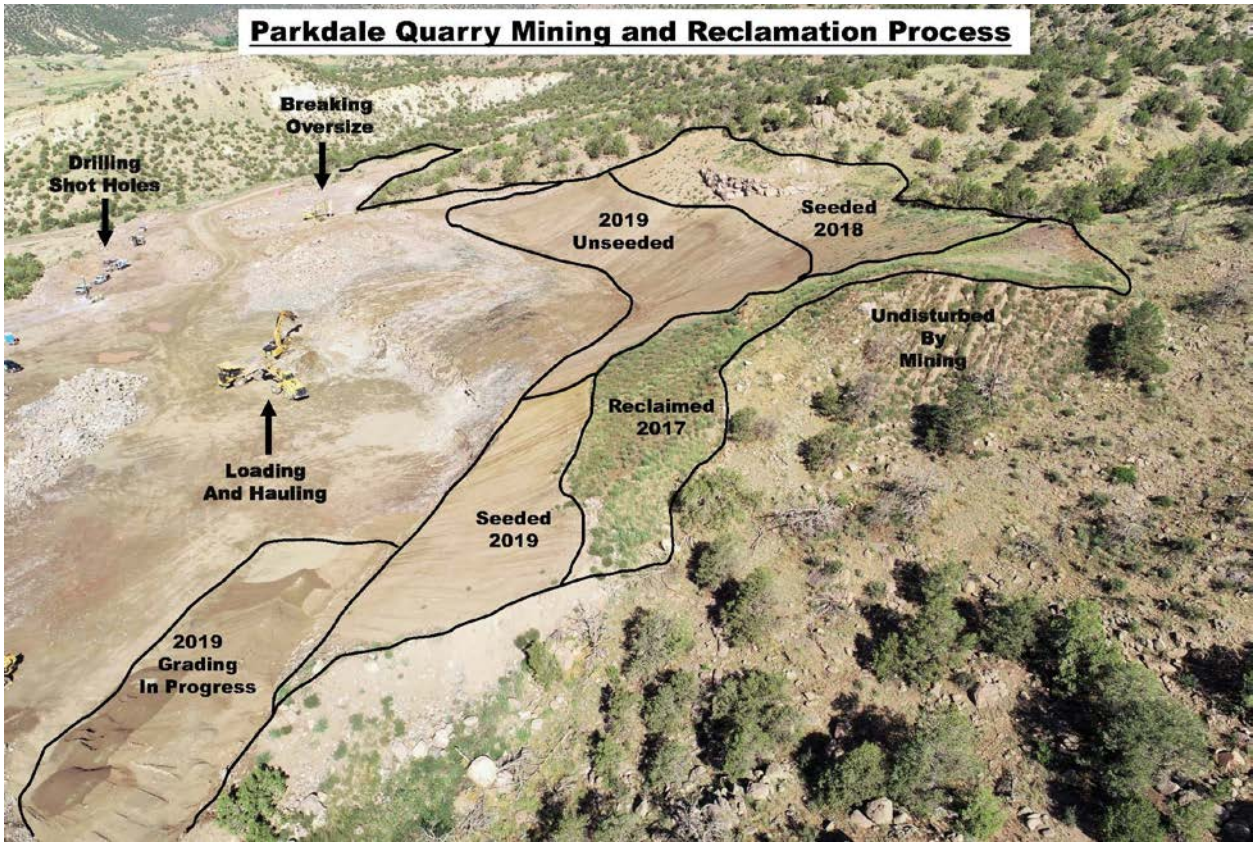
Reclamation Goals and Objectives

The overarching goal for final reclamation of the mining area would be to create a topographic and ecological setting that is similar to that of the lands located south of the existing Parkdale Quarry and the Arkansas River. These lands are characterized by grassland vegetation communities in the flat valley bottom and pinyon-juniper communities along the rugged hillsides surrounding the valley. Concurrent reclamation of mine areas for which mining has been completed would be implemented, resulting in a diversity of vegetation communities over the proposed 100-year mine life and include shortgrass prairie in the lowland areas, and mountain mahogany at the surrounding areas of higher elevation.

Final reclamation would be conducted in accordance with the finalized Mine and Reclamation Plan on file with the BLM (Appendix E), requirements of existing CDRMS and Fremont County permits, identified design features, and BLM reclamation standards (Appendix E) and other materials sale contract requirements. The process includes establishing final bench designs to ensure slope stability, grading and growth media placement, and soil stabilization through seeding and development of vegetative cover. Reclamation success would be measured on a phase by phase basis with the goal of achieving an approximate areal composition of 70 percent grassland and forb vegetation, 10 percent tree and shrub cover, and 20 percent rocky outcrops (on the slopes only). The specific percentages of reclamation cover types would be determined for each specific phase by the BLM and CDRMS as the Project progresses. Details of proposed cover types and percentages would be finalized in the material sale contract between the BLM and the operator. The locations of each mining phase are presented in Figure 2.2-2 and the completion of reclamation within each phase would follow the timing outlined in Table 2.1. Reclamation success of each phase would be reviewed by both the BLM and CDRMS and approval from both agencies would be required for the release of reclamation bond funding to Martin Marietta.

Exhibit A presents an infographic depiction of current mining and reclamation at the existing Parkdale Quarry. The areas noted in Exhibit A as reclaimed, seeded, unseeded, or where grading is in progress were generally mined in the 24-month period prior to the initiation of reclamation grading and seeding. Martin Marietta anticipates reclaimed areas within the Sale Area would be similar to those areas identified in Exhibit A as having completed reclamation.

Exhibit A. Mining and Reclamation at the Parkdale Quarry[1]



Source: Martin Marietta 2019a

[1] Areas in various stages of reclamation: Reclaimed 2017 was mined in 2016-2017; Seeded 2018 was mined in 2017-2018; Seeded 2019 was mined in 2018-2019; Unseeded 2019 was mined in 2019; 2019 Grading in Progress was mined in 2019.

Although the current proposed Mine Plan does not include any above ground structures, final closure and reclamation of disturbance within the Sale Area would include the removal of any above ground structures and facilities on BLM-managed lands. All quarry haul and access roads, associated culverts and other structures would be removed and reclaimed once mining is complete and the roads are determined to no longer be necessary to support reclamation activity and any post-reclamation monitoring requirements.

Once mining is completed, the resulting topography of the Mine Plan area would generally slope to the south and southwest, and drainage channels would be constructed to be stable with the new topography of the site. Mining benches would be backfilled and reclaimed once mining is completed using a bulldozer to place and compact fill material to grade. Reclaimed benches would be approximately 35-feet in height, 30-feet in width, and face-angles would be constructed at approximately 80 degrees, resulting in a 1:1 (horizontal to vertical) reclamation slope intended to blend with natural topography as shown in Figure 4 of the Parkdale Mine and Reclamation Plan (Appendix D). Figure 4 of the Mine and Reclamation Plan depicts a single reclamation bench for simplicity.

When final reclamation is completed at the end of the life-of-mine, the topography of the reclaimed areas would include a series of reclamation benches from the bottom of the slope to the upper edge of the area of previous disturbance. Tailored reclamation of each bench would allow for backfilling, some areas of revegetation and some areas of bare rock exposure, so that the highwall visually blends in with the surrounding landscape. Some reclamation benches may include steeper slopes and areas of bare exposed rock, intended to provide habitat for Rocky Mountain bighorn sheep (*Ovis canadensis*). These areas would be designed in coordination with the Colorado Department of Parks and Wildlife (CPW) and would be consistent with slope stability designs for the entire Sale Area.

Once reclamation benches are constructed, topsoil placement would occur with soil depths ranging from six to twelve inches, with the overall goal of an average soil depth of nine inches. Existing topsoil depths at the Parkdale Quarry and the proposed Sale Area range from 6 to 60 inches across various locations (Agile Stone 1997; NRCS 2020). Field investigation of salvageable topsoil volumes for stockpiling during operations and placement as cover during final reclamation are incomplete. Under Alternative A, the BLM would require Martin Marietta to complete an assessment of salvageable topsoil material across the five proposed mine phases and determine the potential need to identify additional soil amendment material to ensure adequate topsoil cover material (see Design Feature REC-003 in Table 2.2 below). Previous and ongoing reclamation activity at the Parkdale Quarry has been completed successfully by Martin Marietta through the use of existing topsoil resources for reclamation purposes.

Final grading of replaced topsoil would be conducted to minimize erosion potential and to maximize soil stability. Once topsoil placement is complete, soil samples would be collected and analyzed by a contract laboratory to identify any necessary fertilizer or amendment applications to support successful revegetation of the disturbed sites. Fertilizers, if necessary, would be applied using a broadcast or hydroseed method that ensures equal application rates across the site. Following application of fertilizers, reseeding would occur using broadcast or hydroseed methods with reclamation seed mixes approved by the BLM. Section 6.4 of the proposed Mine Plan (Appendix D) presents the proposed species and application rates for reseeding of interim GMS stockpiles and final reclamation of disturbed mine and haul road areas. Prior to the BLM's contract issuance and the initiation of mining activity on public lands, the final seed mix species and application rates would be developed in coordination with Martin Marietta, Fremont County, and CDRMS during their respective permitting processes.

Completion of final reclamation of disturbance on BLM-administered lands is anticipated to require between five and fifteen years at each mining area across the five proposed phases depending on the location and desired post-reclamation vegetation communities at each site. Monitoring of reclamation success would be conducted according to requirements set forth by the BLM and CDRMS (see Appendix E).

2.3.8. Schedule and Workforce

Alternative A includes a 100-year expected life-of-mine period if annual production rates were increased to approximately 2 to 4 million short tons of rock material. Mining activity would commence upon BLM and other required approvals. Daily operations under Alternative A would be similar to current operations with mining processing and transport by trucks typically limited to daylight periods. The loading times of material for transport by rail cars would be dependent on the ability to schedule trains. Phase 1 would include two 10-hour shifts (one material production shift and one equipment maintenance shift) and Phases 2-5 would include three overlapping 10-hour shifts (two material production shifts and one equipment maintenance shift).

2.3.9. Operator and BLM Proposed Design Features

During construction and operation of Alternative A, Martin Marietta would implement proposed design features by the BLM, as well as operator-proposed design features to avoid, reduce, and mitigate potential impacts to air, land, water, wildlife, and other resources. These design features and measures are summarized in Table 2.2.

Table 2.2. Operator and BLM Proposed Design Features for Alternative A

Measure Number	Resource Potentially Affected	Voluntary Design Feature[6] (Yes/No)	Required by BLM (Yes/No)	Required by Existing Permit[6] (Yes/No)	Operator and BLM Proposed Design Features
VIS-01[1]	Visual	Yes	No	No	Viewshed impacts will be minimized by using a technique called "mine from behind" wherein the existing topography acts as a view screen, and where mining of visible elevated areas is conducted from the side away from the viewpoint.
REC-01[1]	All	Yes	No	No	Reclamation activities will begin in a particular part of a pit area when mining is complete in that part of the pit area, and there is no longer a need to access it. Thus, reclamation will be occurring concurrently with mining, in order to minimize the total disturbed acreage.
REC-02[1]	Reclamation, Erosion Control	Yes	No	No	Overburden and topsoil would be placed in stockpiles for reuse during the reclamation process. Overburden and topsoil stockpiles that will not be used within six months of excavation will be seeded to establish a vegetative cover for stabilization and protection from erosion.
REC-03	Reclamation, Topsoil Storage and Amendment	No	Yes	No	Prior to initiation of mining activity on BLM-administered lands, an assessment of the existing topsoil resources within the area of proposed disturbance would be completed by Martin Marietta to determine the adequacy of existing topsoil volumes to provide an adequate cover in areas of final reclamation. If in the event the topsoil assessment indicates existing and recoverable soil volumes are insufficient for reclamation purposes, Martin Marietta would work with the BLM and CDRMS to identify appropriate sources of additional cover material and any necessary soil amendments to ensure sufficient topsoil cover appropriate for use in reclamation is available.
REC-04[1]	Reclamation, Erosion Control	Yes	No	No	Disturbed areas would be revegetated with the approved seed mix. Seeds will come from nursery plant stock grown on the Mineral Materials Sales Area or adjacent Martin Marietta-owned area, or would be obtained in standard containers with seed name; lot number; net weight; and percentages of purity, germination, hard seed, and maximum weed seed content clearly marked for each seed type. Seed supplies would not contain the seeds of any state recognized noxious weed species. A certificate stating that each seed lot has been tested by a laboratory with respect to the above requirements would be delivered with the seed.
REC-05	Reclamation	Yes	No	No	The Reclamation Plan will be updated to ensure the operator's adherence to CPW's recommendations for landscape feature designs benefitting bighorn sheep and other wildlife.

Measure Number	Resource Potentially Affected	Voluntary Design Feature[6] (Yes/No)	Required by BLM (Yes/No)	Required by Existing Permit[6] (Yes/No)	Operator and BLM Proposed Design Features
REC-06	Reclamation	No	Yes	Yes	The BLM would coordinate with Martin Marietta, Fremont County, and CDRMS to ensure that modifications to the existing reclamation plan for current operations that are to be applied to the BLM-administered Sale Area are consistent with BLM reclamation standards.
REC-07	Reclamation	No	Yes	No	The BLM RGFO Solid Minerals Final Reclamation Standards (Appendix E) presents aspects for which detailed information or reclamation protocols would need to be developed and committed to by Martin Marietta prior to any BLM issued contract for mining activity on public lands in the proposed Sale Area.
AQ-01[1]	Air Quality	Yes	No	No	Haul roads would be watered regularly to control dust and will also be treated with a chemical dust suppressant such as calcium or magnesium chloride.
AQ-02[3]	Air Quality	No	No	Yes	Adequate soil moisture would be maintained in topsoil and overburden to control dust emissions during removal. Watering would be implemented if necessary.
AQ-03[3]	Air Quality	No	No	Yes	Dust emissions from material handling (i.e., removal, loading, and hauling) would be controlled by watering at all times unless natural moisture is sufficient to control emissions.
AQ-04[3]	Air Quality	No	No	Yes	Emissions from blasting would be controlled by delay action detonators and sequential blasting practice to control emissions of Particulate Matter.
AQ-05[3]	Air Quality	No	No	Yes	Industry best practices would be used during all activities associated with blasting to minimize emissions of particulate matter.
AQ-06[3]	Air Quality	No	No	Yes	Material stockpiles would be watered as necessary to control fugitive particulate emissions. Aggregate materials would be sprayed with water during material loading into the storage bins or stockpiles, as needed, to control dust.
WR-01[2]	Water Quality	Yes	No	Yes	Storm water and excess ground water would be captured in settling ponds on site and not discharged until they meet the limits set by a Clean Water Act NPDES permit for discharge to Tallahassee Creek. The discharge water is sampled on a monthly basis to ensure that it meets required standards of the Clean Water Act and the State of Colorado.

Measure Number	Resource Potentially Affected	Voluntary Design Feature[6] (Yes/No)	Required by BLM (Yes/No)	Required by Existing Permit[6] (Yes/No)	Operator and BLM Proposed Design Features
WR-02[4]	Water Quantity	No	No	Yes	The wells on the private property are no longer present and monitoring of groundwater is no longer required. The observation borings on the BLM property are only permitted as temporary and will require re-permitting if they are to remain. A surface water and groundwater monitoring plan for the quarry expansion onto public lands will be developed in cooperation CDPHE as a requirement of the ROD.
WR-03[5]	Water Quality and Quantity	No	Yes	Yes	BMPs to be implemented to control sedimentation included in the Project Stormwater Management Plan include: • Installation of sedimentation ponds, silt fences, and wattles to control sediment transport in surface water runoff from disturbed areas • Site grading (i.e. diversion dikes and berms, vegetated swales and natural depressions) to stabilize exposed areas and contain runoff • Erosion controls (check dams, rip rap, drop structures, rock socks, and erosion blankets) to stabilize drainages and exposed areas • Concurrent reclamation and revegetation of disturbed areas with mining progress • Conservation and maintenance of riparian buffers adjacent to streams
HM-01[2]	Hazardous Materials	Yes	No	Yes	Diesel fuel for equipment is stored in a 10,000-gallon double-walled tank with an active leak detection system. The site has a spill containment plan in place and a spill containment receptacle for storage of the fuel nozzle. The tank is also surrounded by a fenced enclosure and bollards to minimize the chance that equipment could hit the tank.
HM-02	Hazardous Materials	No	Yes	No	In the event that the TENORM regulations are approved, the BLM will include measures to ensure mining operations are consistent with those regulations, as applicable.
CS-01	Cadastral Survey	No	Yes	No	The operator would identify and protect evidence of the Public Land Survey System (PLSS) and related Federal property boundaries prior to commencement of any ground-disturbing activity as directed in 43 CFR 3809.420 and CO Rev Stat §18-4-508 (2016). In the event of obliteration or disturbance of the Federal boundary marker, the operator would immediately report the incident, in writing, to the BLM Area Officer. The BLM Cadastral Survey would determine how the marker is to be restored. In rehabilitating or replacing the evidence, the responsible party would reimburse the BLM for costs or, if instructed to use the services of a Certified Federal Surveyor, procurement shall be per qualification-based selection. All surveying activities would

Measure Number	Resource Potentially Affected	Voluntary Design Feature[6] (Yes/No)	Required by BLM (Yes/No)	Required by Existing Permit[6] (Yes/No)	Operator and BLM Proposed Design Features
					conform to the Manual of Surveying Instructions and appropriate State laws and regulations. The BLM Cadastral Survey would review local surveys before being finalized or filed in the appropriate State or county office. The responsible party would pay for all survey, investigation, penalties, and administrative costs.
TW-01	Bighorn Sheep/Big Game	No	Yes	No	A timing limitation from November 1 to April 30 would be enacted to eliminate disturbance to bighorn sheep and mule deer during critical winter periods to avoid an adverse impact. This measure would be applied to the initial year of mine expansion activity only, as bighorn sheep are anticipated to acclimate to disturbance during subsequent years of active mining. The seasonal timing limitation would also be implemented on an annual basis for mine areas where reclamation groundwork (slopes and revegetation) has been completed. Human encroachment, including overflights, would also be minimized to the maximum extent possible from November 1 to April 30 to encourage winter use by bighorn sheep and other big game in reclaimed habitat.
TW-02	Migratory Birds/Raptors	No	Yes	No	Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern, no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 to July 15, the breeding and brood rearing season for most Colorado migratory birds. The provision would not apply to completion activities in disturbed areas that were initiated prior to May 15 and continue into the 60-day period. An exception to this timing limitation would be granted if nesting surveys conducted no more than one week prior to vegetation-disturbing activities indicate no nesting within 30 meters (100 feet) of the area to be disturbed. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions.

Measure Number	Resource Potentially Affected	Voluntary Design Feature[6] (Yes/No)	Required by BLM (Yes/No)	Required by Existing Permit[6] (Yes/No)	Operator and BLM Proposed Design Features
TW-03	Raptors	No	Yes	No	For compliance with the Migratory Bird Treaty Act and the Memorandum of Understanding between the BLM and the USFWS required by Executive Order 13186, the BLM must avoid actions, where possible, that result in a "take" of migratory birds. Martin Marietta would have a qualified biologist conduct raptor nest surveys prior to any new significant surface disturbance activities within suitable habitat. If active raptor nests are located, Martin Marietta would coordinate with the BLM to establish appropriate nest activity buffers in adherence with CPW's recommended raptor buffer distances. Any activity that could disturb the nesting raptors would be avoided in the established activity buffer until the nest is no longer in-use, or as directed by the BLM. Surface-disturbing activities would commence once the nest fledges.
TW-04	Special Status Plants	No	Yes	No	Pre-construction surveys would be conducted within the proposed area of disturbance for all special status plant species that have potential habitat, as determined by the BLM, in the Sale Area. While the BLM may direct Martin Marietta to avoid areas containing special status plant species populations, contract stipulations in the Sale Area do not prohibit development that could have a direct physical impact on these populations. Interim and final reclamation should aim to restore areas of potential habitat for sensitive plant species identified during pre-construction surveys.
NW-01	Noxious Weeds	No	Yes	No	Areas associated with the mining operation, including pits, roads, stockpiles, reclaimed areas and surrounding areas will be regularly monitored (at least once annually during the growing season) for the presence of weeds. If present, all Colorado list A and B noxious species (or any species required to be controlled per applicable federal, state, or local regulation) will be treated by an applicator licensed with the Colorado Department of Agriculture at least annually, using appropriate herbicides. Other species may be treated if it is necessary to meet reclamation or other management objectives. If annual treatments are not effective in controlling or eradicating the infestation, then multiple treatments per year may be required. Treatments shall be coordinated with the RGFO weed program lead to ensure compliance with BLM's pesticide application protocols, including use of RGFO approved chemicals, and proper application and monitoring record submission to RGFO, and to ensure effectiveness of treatment.
WT-01	Wetlands	No	Yes	Yes	BLM would require the operator to coordinate with the U.S. Army Corps of Engineers to receive a jurisdictional determination for potential aquatic features within the sale area. The U.S. Army Corps of Engineers' jurisdictional determination within the sale area will be documented in the BLM material sale contract.

Measure Number	Resource Potentially Affected	Voluntary Design Feature[6] (Yes/No)	Required by BLM (Yes/No)	Required by Existing Permit[6] (Yes/No)	Operator and BLM Proposed Design Features
AW-01	Aquatic Wildlife	No	Yes	No	In the event of a high-water event or failure, considerations for protections of aquatic wildlife and habitat would be covered in the Stormwater Management Plan (SMP) and Spill Prevention, Control, and Countermeasures (SPCC) Plan.
HR-01	Haul Road	No	Yes	No	Engineered designs for the haul roads will be provided to BLM for review, prior to any contract issuance.
GM-01	Growth Media Stockpiles	No	Yes	No	Growth Media Stockpiles that are not anticipated to be used within six months of excavation would be seeded to establish a vegetative cover for stabilization and protection from erosion.

Sources: [1] Mine and Reclamation Plan (Martin Marietta 2016); [2] Resource Economics 2019; [3] CDPHE Construction Permit #00FR0687F; [4] 1997 CDRMS 112 Permit M-97-054; [5] Martin Marietta Stormwater Management Plan; [6] Design features required under state and local permits are not considered voluntary.

2.4. ALTERNATIVE B (NO ACTION ALTERNATIVE)

Under the Alternative B (No Action Alternative), the BLM would deny Martin Marietta's mineral materials application. There would be no expansion of the existing Parkdale Quarry onto BLM-administered lands. Martin Marietta would continue to mine the granitic deposit on privately-owned lands at the existing Parkdale Quarry and conduct reclamation and closure of the mine according to their existing, authorized permits. Under Alternative B, Martin Marietta plans to upgrade existing facilities to support continued mining of the granitic deposit including expenditures of approximately $3 million for a new bridge, $4 million for rail upgrades, and $54 million for a new processing plant to be developed from 2020 to 2023. Continued mining of the granitic deposit on private land would be visible from the Highway 50 corridor and adjacent areas. At the current rate of production, the existing quarry is anticipated to remain in operation for another 15 to 30 years at current production rates.

Under the Alternative B, the existing Parkdale Quarry would continue to produce aggregate material used specifically for concrete and asphalt to address current and future market demand in the Colorado and surrounding markets, until the existing supply of aggregate material located within the currently permitted quarry area is exhausted. Martin Marietta anticipates that under Alternative B, an additional four to six non-railroad supported aggregate quarries would be required to address future demand for aggregate material in the Colorado and surrounding markets. The specific locations of these quarries are unknown but would likely be located within delivery truck proximity to current and future population centers in Colorado, where demand for aggregate materials is forecasted to increase relative to population growth in the state (Resource Economics 2019). Beyond the current proposal, the BLM is unaware of any future developments related to the existing Parkdale Quarry expansion, and detailed analysis of any other future quarry developments is considered speculative and beyond the scope of this analysis.

2.5. ALTERNATIVE C (ALTERNATIVE SALE AREA)

In response to stakeholder concerns regarding potential impacts under Alternative A to bighorn sheep and their habitat located within the Arkansas River Canyonlands ACEC to the west of the Sale Area, Martin Marietta provided an Alternative Materials Sale area (Alternative Sale Area) boundary to the BLM for evaluation. Figure 2.5-1 (Appendix C) presents the extent of the Alternative Sale Area. The Alternative Sale Area is shifted to the east approximately one half-mile, away from the ACEC, and includes the crest of Cactus Mountain.

2.5.1.1. Surface Ownership and Land Disturbance

The Alternative Sale Area includes 893 acres of public lands administered by the BLM RGFO, representing a reduction of 39 percent compared to Alternative A (Figure 2.5-1, Appendix C). Approximately 633 acres of the 893 total acres would be included in the area designated for

mining and reclamation (Figure 2.5-1, Appendix C). Although this area would be a reduction of 65 acres (9 percent) from the proposed mining area under Alternative A the amount of aggregate material estimated to be recoverable by Martin Marietta is similar to Alternative A (400 million tons) due to the increased elevation of the Alternative Sale Area. This volume of aggregate material proposed for sale and extraction is consistent with the purpose and need of the Proposed Action. The remaining 260 acres would serve as a perimeter buffer of undisturbed land.

2.5.1.2. Mining

Similar to the proposed Sale Area under Alternative A, the Alternative Sale Area under Alternative C contains an approximate resource amount of 400 million tons of mineral material. Development of the Alternative Sale Area would occur in six sequential phases over the 100-year life-of-mine as shown in Figure 2.5-1 (Appendix C). Phase 1 would be mined from west to east; Phase 2 would be mined from north to south; Phase 3 would be mined from east to west; Phases 4 and 5 would be mined from the northwest to the southwest; and Phase 6 would be mined from the north to south. The anticipated timeframes for each of the six phases and estimated surface disturbance acreages are presented in Table 2.3

Table 2.3. Estimated Surface Disturbance and Active Mining Periods for Alternative C Phases

Phase Number	Phase Name	Surface Disturbance (acres)	Mining Period[1] (years)
1	East Pit	138	25-30
2	North Pit	108	10-12
3	West 1 Pit	128	10-15
4	West 2 Pit	107	15-20
5	South Pit	125	15-20
6	South Extension Pit	27	2-3
Total		**633**	-

Source: Martin Marietta 2019a

[1] Based on current and future anticipated production rates

Mineral materials would be excavated in the same manner as described for the granite deposit in Section 2.6, *Existing Parkdale Quarry Operations*. Alternative C includes a 100-year expected life-of-mine period if annual production rates were increased to approximately 2,000,000 to 4,000,000 short tons of rock material from the current production rate maximum of 2,000,000 short tons annually. Therefore, mining would proceed at 1,000,000 to 2,000,000 short tons per year during Phase 1 and would increase from 2,000,000 to 4,000,000 short tons per year during phases 2 to 6.

2.5.1.3. Materials Processing

Materials processing would occur as described in Section 2.2, *Existing Parkdale Quarry Operations*, at processing facilities owned by Martin Marietta on private land. Product loadout onto rail cars and trucks would be the same as described for Section 2.2, *Existing Parkdale Quarry Operations.*

2.5.1.4. Haul and Access Roads

A new haul road of 2.9 miles would be constructed on BLM-administered lands leading from the proposed active mining areas to the existing materials processing area. The haul road under Alternative C would be approximately 1.8 miles longer that the haul road under Alternative A due to the rugged topography of the Alternative Sale Area and increased distance between the aggregate resource and processing area. The haul road would be designed to industry standards and include a running width of 60 feet to allow safe vehicle passage.

2.5.1.5. Ancillary and Support Facilities

Ancillary and support facilities would remain the same as described under Alternative A in Section 2.3.5, *Ancillary and Support Facilities*, at Martin Marietta's privately-owned processing area.

2.5.1.6. Site Security, Signs and Fencing

Implementation of site security including the installation of signage and fencing would be the same as described under the Proposed Action in Section 2.3.5.1, *Site Security, Signs, and Fencing*.

2.5.1.7. Growth Media Stockpiles (GMS)

Topsoil and growth media management under Alternative C would be the same as described under Alternative A in Section 2.3.6, *Growth Media Stockpiles,* and would remain consistent with the requirements under the current Parkdale Quarry CDRMS operating permit and Fremont County CUP.

2.5.1.8. Closure and Reclamation Plan

Reclamation and closure under Alternative C would proceed as described in Section 2.3.7, *Closure and Reclamation Plan*, for Alternative A. Appendix D contains the complete mine closure and reclamation plan that is applicable to Alternative C.

Existing topsoil depths at the Parkdale Quarry and the proposed Alternative Sale Area range from six to 60 inches across various locations (Agile Stone 1997;, NRCS 2020). Field investigation of salvageable topsoil volumes for stockpiling during operations and placement as cover during final reclamation are incomplete. Under Alternative C, the BLM would require

Martin Marietta to complete an assessment of salvageable topsoil material across six proposed mine phases and determine the potential need to identify additional soil amendment material to ensure adequate topsoil cover material (see Design Feature REC-003 in Table 2.2). Previous and ongoing reclamation activity at the Parkdale Quarry has been completed successfully by Martin Marietta through the use of existing topsoil resources for reclamation purposes.

2.5.1.9. Schedule and Workforce

Mining activity would commence upon BLM and other required approvals. Daily operations under Alternative C would be similar to current operations with mining processing and transport by trucks typically limited to daylight periods. Loading times of material for transport by rail cars would be dependent on the ability to schedule trains. Phase 1 would include two 10-hour shifts (one material production shift and one equipment maintenance shift) and Phases 2-5 would include three overlapping 10-hour shifts (two material production shifts and one equipment maintenance shift). Workforce estimates for Alternative C would include the creation of an additional 8-18 full-time staff positions located at the Parkdale Quarry.

2.5.1.10. Operator-committed Design Features

The operator-committed environmental protection measures or design features shown in Table 2.2 would be implemented for Alternative C. These measures and design features would avoid, reduce, or mitigate potential impacts to air, land, water, wildlife, and other resources.

2.6. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Previous conceptual Sale Area and mining area boundaries have been considered by Martin Marietta in coordination with the BLM and are discussed in the following section.

2.6.1. Original Proposed Sale Area Boundary Alternative

2.6.1.1. Avoidance of Resources of Concern

The original proposed Sale Area boundary was revised upon the completion of resource surveys that identified resources of concern in the vicinity of the proposed Sale Area boundary. The original Sale Area boundary has not been carried forward for analysis in this EIS as it would result in increased adverse impacts to resources of concern.

2.6.2. Reduced Life-of-Mine Alternative

During the development of this EIS, the BLM considered an alternative that included a reduction in the 100-year life-of-mine under Alternative A (Proposed Action) to a 50-year life-of-mine.

This reduction would be achieved through the reduction in the approved Sale Area to approximately 750 acres resulting in an active mining area of approximately 350 acres. This reduced life-of-mine alternative was considered for analysis but not carried forward as Martin Marietta determined that the alternative would not be economically feasible to implement due to the required economic investment costs to effectively process the granitic deposit requiring an approved mineral material sale of an amount equal to that proposed under Alternative A. This alternative does not meet the purpose and need of the proposed Mineral Materials Sale.

2.6.3. Mining Area Avoidance of Currant Creek

During pre-application discussions between Martin Marietta and the BLM, the originally proposed mining area boundary was located in closer proximity to sections of Currant Creek. The BLM provided Martin Marietta recommendations for avoiding and minimizing potential impacts to aquatic and other resources under the original proposed mining area. In response to BLM recommendations, Martin Marietta revised the proposed mining area boundary to be located further away from Currant Creek in order to avoid potential direct and indirect impacts to resources associated with Currant Creek. The originally proposed mining area boundary is not carried forward for analysis in this EIS as it would result in increased adverse impacts to aquatic and other resources associated with Currant Creek.

2.6.4. Production of Aggregate Only Alternative

Martin Marietta has considered an alternative proposal that would only include production of aggregate material for road and concrete construction uses. Under this alternative, railroad ballast material would not be produced from materials extracted from the proposed Sale Area. After completion of internal economic forecasting of future demand for both construction aggregate and railroad ballast material, Martin Marietta determined that production of railroad ballast material is required to meet the purpose and need of the Proposed Action through ensuring long-term economic feasibility of the operation.

2.7. COMPARISON OF ALTERNATIVES

Table 2.4 presents a summary comparison of keys aspects and design criteria of the Proposed Action and alternatives carried forward for detailed evaluation.

Table 2.4. Comparison of Proposed Action and Alternatives

Impact	Alternative A[1] (Proposed Action)	Alternative B[2] (No Action Alternative)	Alternative C[1] (Alternate Sale Area)
Life of Mine (years)	100	15-30	100
Number of Phases	5	3	6
Phase 1 Surface Disturbance (acres)	81	40	138
Phase 2 Surface Disturbance (acres)	166	40	108
Phase 3 Surface Disturbance (acres)	228	40	128
Phase 4 Surface Disturbance (acres)	110	NA	107
Phase 5 Surface Disturbance (acres)	113	NA	125
Phase 6 Surface Disturbance (acres)	NA	NA	27
Total Surface Disturbance on BLM-administered Land (acres)	698	0	633
Length of New Haul Road (miles)	1.1	-	2.9
Direction of Mining	Northwest to Southeast	Varies by phase, generally south to north	Varies by phase, generally south to north
Aggregate Reserves (short tons)	400,000,000	37,000,000-47,000,000	400,000,000
Annual Aggregate Production (short tons)	2,000,000-4,000,000	800,000-2,000,000	2,000,00-4,000,000
Products	Aggregate for concrete, asphalt, and railroad ballast	Aggregate for concrete and asphalt and limited railroad ballast	Aggregate for concrete, asphalt, and railroad ballast
Number of Daily Production Shifts	1-2	1	1-2
Total Direct Employment (full time staff)[3]	53-63	45	53-63
Proximity to Arkansas River Canyonlands ACEC	Southwest border of proposed mining area borders the ACEC	Current western boundary borders the ACEC	Proposed Alternative Sale Area is located 0.4 miles to the east of the ACEC border
Lands with Wilderness Characteristics	1,996 acres (6%) would be eliminated from the Echo Canyon unit	0 acres would be eliminated from the Echo Canyon unit	1,233 acres (4%) would be eliminated from the Echo Canyon unit
Air Quality	Emissions increases would be within existing thresholds. Amendment to the existing CDPHE permit	Current emissions are less than regulated thresholds. CDPHE emissions permit is in place.	Same as Alternative A

Impact	Alternative A[1] (Proposed Action)	Alternative B[2] (No Action Alternative)	Alternative C[1] (Alternate Sale Area)
	would be required.		
Overall Water Use Rate	Similar use rate to Alternative B. Minimal groundwater and surface water effects.	1,500 gpm is the current use rate	Similar use rate to Alternative B. Minimal groundwater and surface water effects.
Daily Water Consumption[4]	Approximately 11 gpm	10 gpm	Approximately 11 gpm
Wildlife	81-705 acres of bighorn sheep and mule deer habitat would be incrementally disturbed and then reclaimed over the life-of-mine	No habitat disturbance on BLM-administered lands	138-633 acres of bighorn sheep and mule deer habitat would be incrementally disturbed and then reclaimed over the life-of-mine
Visual	Mining activity would be minimally visible from Highway 50, but not visible from Highway 9. The haul road would be minimally visible.	All phases and the haul road would remain visible from Highway 50	Most phases and the haul road would be visible from Highway 50 and Highway 9

[1] Proposed surface disturbance would be located solely on BLM-administered lands.
[2] Surface disturbance would occur entirely on Martin Marietta's privately-owned lands. Approximately 120 acres of private land would be disturbed over the three phases (approximately 40 acres per phase).
[3] Includes current and future staff positions for the Parkdale Quarry and Rock & Rail Railroad.
[4] The majority of current water use is from recycled water. Consumptive uses include the existing wash plant and haul road dust control.

2.8. BLM-PREFERRED ALTERNATIVE

Chapter V, Section B.2.b of the BLM's National Environmental Policy Act Handbook directs that "the Manager responsible for preparing the EIS should select the BLM's preferred alternative. …For externally initiated proposals, … the BLM selects its preferred alternative unless another law prohibits such an expression. … The selection of the preferred alternative should be based on the environmental analysis as well as consideration of other factors that influence the decision or are required under another statutory authority."

The BLM has selected a preferred alternative based on the analysis in this EIS. This preferred alternative is the alternative that best fulfills the agency's statutory mission and responsibilities, considering economic, environmental, technical and other factors. The BLM has determined that the preferred alternative is Alternative A (Proposed Action) with the mitigation outlined in Chapter 4 of this EIS. Selection of the preferred alternative primarily was based on potential effects associated with visual and water resources. Under Alternative A, the majority of visual effects to the public along the Highway 50 corridor would be screened from view by intervening topography and the existing quarry. Potential effects to private water rights and wells in the vicinity of the Project area may be slightly reduced under Alternative A in comparison to Alternative C.

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CHAPTER 3. ISSUES ANALYSIS

3.1. INTRODUCTION

This chapter summarizes the evaluation of resource-related issues generated by the proposed Parkdale Quarry Expansion and alternatives analyzed in this EIS. It also includes a description of the past, present, and reasonably foreseeable future actions (RFFAs) that may result in cumulative impacts with the proposed project or alternatives.

The issues analyzed in this chapter are analyzed relative to Alternative A (Proposed Action), Alternative B (No Action Alternative), and Alternative C (Alternative Sale Area). Alternative options considered but eliminated from detailed analysis are described in Section 2.4.3.

Baseline information summarized and presented in this chapter was obtained from published and unpublished materials; discussions with local, state, and federal agency staff; field and laboratory studies conducted in the project area; and on-site experience with mining and reclamation. The affected environment for individual resources was delineated based on the area of potential direct and indirect environmental impacts for the proposed project.

This chapter also describes the anticipated direct and indirect impacts of the proposed project and the alternatives, as well as potential cumulative impacts. The analysis of potential impacts from the proposed project assumes the implementation of regulatory requirements and the Operator Committed Design Features presented in Section 2.3.9 that would be implemented in association with the proposed project. Potential mitigation and monitoring developed in response to anticipated impacts for individual resources are presented and analyzed by the BLM at the end of each resource section. This chapter also identifies residual impacts, which are impacts that would remain after mitigation measures have been implemented.

The proposed project may result in cumulative effects associated with other past, present, and RFFAs in the area. For resources where project-specific impacts are identified, the cumulative effects associated with the proposed project were evaluated together with other past, present, and RFFAs. The period of potential cumulative impact is defined as the approximately 100-year mine life of the project followed by 5 to 15 years of final reclamation. The cumulative effects analysis for each resource addressed the potential cumulative effects within the resource-specific cumulative effects study area (CESA). Cumulative effects, including descriptions of and rationale used to develop CESAs, are discussed on a resource-by-resource basis in Chapter 3.

3.1.1. General Setting

The Parkdale Quarry is located in Fremont County, Colorado, approximately 12 miles west of the Town of Cañon City, Colorado (Figure 1.1-1, Appendix C). The surrounding terrain consists of rugged pinyon-juniper dominated hillsides surrounding open grassland dominated valleys, with the proposed project site situated in the southern Rocky Mountains physiographic province.

Elevations within the proposed Sale Area boundary range from approximately 5,800 feet to 7,200 feet amsl.

3.1.2. Supplemental Authorities

To comply with the NEPA, and in accordance with the BLM NEPA Handbook (H-1790-1) (BLM 2008a) the BLM considered the following supplemental authorities and resources in determining what resources are present within the proposed Sale Area and could be potentially affected under the Proposed Action: Air Quality, ACECs, Cultural Resources, Environmental Justice, Farmlands (Prime or Unique), Floodplains, Forests and Rangelands, Grazing Management, Land Use Authorization, Lands with Wilderness Characteristics, Migratory Birds, Minerals, Noxious Weeds and Invasive Non-native Plant Species, Native American Religious Concerns, Paleontological Resources, Recreation, Riparian/Wetlands, Social and Economic Values, Soils, Special Status Species, Vegetation, Visual Resources, Waste (Hazardous and Solid), Water Quality and Quantity, Wild and Scenic Rivers, Wilderness, Wild Horses and Burros, and Wildlife. Section 3.3, *Issues Evaluation*, presents rationale for the authorities and resources carried forward for detailed analysis.

3.2. CUMULATIVE EFFECTS

This section summarizes cumulative effects from past, present, and RFFAs for the Proposed Action and forms the basis for the discussion of cumulative impacts. Cumulative impacts under NEPA are defined by the CEQ as:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time"
>
> (40 Code of Federal Regulations 1508.7).

Cumulative effects are discussed on a resource-by-resource basis in Chapter 3 sections, including the description of and rationale used to develop individual resource CESAs. Table 3.1 presents information regarding resource CESAs.

Table 3.1. Cumulative Effect Study Areas by Resource

Resource	CESA Description	CESA Name	Size of CESA (acres)
Air Quality	Proposed Sale Area and a 31-mile radius	Air CESA	2,588,000
Water Resources	6th-level USGS hydrologic unit code 12 sub-watersheds that contain the Sale Area or parts of the analysis area	Water CESA	122,688
Wildlife Resources	Varies by species. See Section 3.6.3 for CESA descriptions.		
Lands with Wilderness Characteristics	Echo Canyon Area	LWC CESA	31,600
Visual Resources	Proposed Sale Area and a 15-mile radius	Visual CESA	451,840
Socioeconomic Resources	Fremont County	Socioeconomics CESA	918,760

Relevant projects and actions are defined for the EIS as those past, present, and RFFAs that could interact with the Proposed Action or alternatives in a manner that would result in cumulative impacts, resulting primarily from mining, commercial activities, and public uses.

3.2.1. Past and Present Actions

Past and present development projects and other actions within Fremont County include historic and ongoing activities including mining, grazing, recreation, other commercial activities, and wildfire occurrence. Past and present projects and actions are identified for those specific actions for which impacts upon the natural environment would contribute incrementally to impacts from the Proposed Action or action alternatives and are considered in the cumulative effects analysis are described in Table 3.2.

Table 3.2. Surface Disturbance Associated with Past and Present Actions and RFFAs within the Resource CESAs

Action	Past and Present Disturbance (acres)	Projected RFFA Disturbance (acres)	Total Disturbance (acres)
Mines and Quarries (Product Type)[1]			
AZCO Construction/AZCO Pit (sand, gravel)	<10	-	<10
Maars Memorial (aggregate)	<10	-	<10
High Plains/South 40 Quarry (stone)	<10	-	<10
Iron Mountain (gravel)	<10	-	<10
Seifert Construction/Tallahassee Pit (sand and gravel)	<10	-	<10
Vallie Gravel (sand, gravel)	<10	-	<10
Byzantine Quarry (limestone, granite, sandstone)	18	-	175
Continental Materials/Canon Dolomite Quarry (dolomite)	30	157	481
Continental Materials/Grisenti Farms (sand, gravel)	102	451	115
Fremont Paving & Redi-Mix/McKenzie Pit (sand, gravel)	2	13	33
Fremont Paving & Redi-Mix/Penrose Pit (sand, gravel)	90	31	821
Fremont Paving & Redi-Mix/Florence South Pit (sand, gravel)	14	731	23
Front Range Aggregates/Parkdale (sandstone, gravel, granite)	127	9	513
Holcim/Portland Limestone Quarry (limestone)	760	386	1600
Krauth Co/J&J Stone Pit (sandstone)	4	840	115
Langston Concrete/Florence Sand & Gravel Pit (sand, gravel)	38	111	77
Pioneer Sand Company/Philips Ranch Property (sand, gravel)	44	39	175
Pioneer Sand Company/Hardscrabble Pit (sand, gravel)	10	131	146
Ranch Land LLC/Ranch Land Rock Pit (gravel)	44	136	920
Rockbottom LLC/Spotted Burro Pit (sand, gravel)	16	876	54
Rockbottom LLC/Oak Creek Gravel Pit (gravel)	8	38	26
Rocky Mountain Materials/Red Canyon (aggregate, sand, gravel)	59	18	675
Rocky Mountain Materials/Penrose Ranch's (sand, gravel)	192	616	2496

Action	Past and Present Disturbance (acres)	Projected RFFA Disturbance (acres)	Total Disturbance (acres)
Rocky Mountain Materials/Coyote Ridge (sand, gravel)	8	2304	193
Tezak Heavy Equipment/T.H.E. Aggregate Source (granite, sand, gravel)	96	185	231
Tezak Stone & Aggregate/Tezak No 2 (sand, gravel)	20	135	20
Yevoli Cobblestone Pit (sand, gravel)	5	0	84
Parkdale Quarry Exploration Activity	<5	0	<5
Utilities and Infrastructure			
Roads	12,856	-	12,856
Railroads	3,472	-	3,472
Communication sites	239	-	239
Transmission Lines	7,645	-	7,645
Other			
Wildfires (2002-2013)	4,000	-	4,000
Totals	**25,899**	**7,207**	**33,185**

[1] Applies to mines and quarries only.

Recreational activities occur mainly on the Arkansas River and at the Royal Gorge Park. Multiple white-water rafting companies offer rafting tours through the area and fishing is also popular in the area. The Royal Gorge Park is open year-round and visitors come to enjoy the view from the bridge, the gondola ride, and the zip line, among other activities. The Arkansas River is designated as a Gold Medal fishery upstream of, and in the area adjacent to the existing Parkdale Quarry.

3.2.2. Reasonably Foreseeable Future Actions

RFFAs for the Parkdale Quarry Expansion EIS cumulative effects analysis include other projects or actions that potentially impact those resources that would be impacted by the Proposed Action during the same period of time (including final reclamation). RFFAs for which disturbance acreages can be quantified are presented in Table 3.2 and RFFAs for which disturbance acreages are unknown are described below. RFFAs identified in this section must also have been determined by the BLM as having a reasonable likelihood of moving forward towards development and to be located within the boundaries of the various CESAs for the Proposed Action.

The Fremont County Master Plan predicts a moderate population growth trend and the future sprawl of mixed development along the Arkansas Valley and scattered residential settlement farther west that would threaten to undermine the scenic, rural qualities of those mountain and plains areas that are necessary to attract quality growth (Fremont County Planning

Commission 2015). Future residential growth would also result in additional requests for rights-of-way associated with new roads and other community infrastructure. Additionally, increased motorized and non-motorized recreational use of BLM lands, particularly along the Arkansas River, is anticipated.

Mining in Fremont County typically provides construction materials for out-of-county development along the Colorado Front Range. Due to the relatively high predicted population increase along the Front Range (36 percent between 2018 and 2040 [Colorado Department of Local Affairs 2017]), demand for aggregates is expected to continue at the same or greater rate. Future demand for both freight and passenger rail service in Colorado and adjacent states is projected to increase in the coming decades due to population growth statewide (CDOT 2018). This increase in demand is likely to result in an increased demand for rail ballast material for maintenance and construction of rail lines.

Other development predicted in the Draft Eastern Colorado Resource Management Plan that could contribute to cumulative impacts includes renewable energy facilities, utility and road rights of way, vegetation treatments and hazardous fuels reduction, spread and invasion of noxious weeds, continued changes and possible intensification to Colorado's climate in association with global climate change, and increasing wildfire occurrence and intensity.

3.3. ISSUES EVALUATION

The CEQ regulations state that NEPA documents "must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail" (40 CFR 1500.1[b]). Although many issues may arise during scoping, not all of them warrant analysis in an EIS. An issue is analyzed if (1) an analysis is necessary to make a reasoned choice between alternatives, or (2) the issue is associated with significant direct, indirect, or cumulative effects, or analysis is necessary to determine the significance of the effects. Minor issues not requiring detailed analysis are those where the effects are negligible or are mitigated through the design features of the alternatives. Table 3.3 summarizes issues identified by resource that are carried forward for detailed analysis in this EIS. Table 3.4 presents resources for which no issues were identified or for which issues were identified but not carried forward for detailed analysis.

Table 3.3. Issues Carried Forward for Analysis

Program Area	Issue Statement	Resource Present? (Yes/No)	Brought Forward for Analysis? (Yes/No)	Rationale	Addressed in Section
Air Resources and Climate	1) What types and amounts of hazardous air pollutants would be released as a result of the proposed Parkdale Quarry expansion, and what are the potential health and environmental effects? 2) What types and amounts of criteria air pollutants would be emitted as a result of the proposed Parkdale Quarry expansion, and what are the potential effects to ambient air quality in the region? 3) What types and amounts of greenhouse gases that would contribute to global climate change would be emitted as a result of the proposed Parkdale Quarry expansion?	Yes	Yes	Parkdale Quarry expansion effects on air quality were identified as a key issue during scoping.	3.4
Social and Economic Conditions	How would the proposed Parkdale Quarry expansion affect social and economic conditions in Fremont County, including tourism?	Yes	Yes	Parkdale Quarry expansion effects on social and economic conditions in Fremont County were identified as a key issue during scoping.	3.9
Visual Resources	What is the extent of impact on sensitive visual receptors resulting from the change in landforms during operations and post-mining?	Yes	Yes	Public scoping identified potential visual impacts as a key issue.	3.8
Water Quality, Surface and Ground	1) What are the water sources and water requirements for the Parkdale Quarry expansion? 2) Is dewatering anticipated to be required in any of the pits? 3) How would the proposed Parkdale Quarry expansion affect water quality, quantity, and water rights? 4) How would surface water and groundwater be monitored for the proposed mine expansion?	Yes	Yes	Parkdale Quarry expansion effects on water resources in the study area were identified as a key issue during scoping.	3.5

Program Area	Issue Statement	Resource Present? (Yes/No)	Brought Forward for Analysis? (Yes/No)	Rationale	Addressed in Section
Lands with Wilderness Characteristics	How would the proposed Parkdale Quarry Expansion affect the currently inventoried area identified as having wilderness characteristics?	Yes	Yes	The proposed mine expansion area contains lands determined through inventory to possess wilderness characteristics, but these lands are not specifically managed to protect or maintain wilderness characteristics under the Royal Gorge Resource Area RMP. Lands within the proposed mine expansion area would no longer qualify as lands with wilderness characteristics once mining activities commence.	3.7
Wildlife: Migratory Birds	How would the proposed Parkdale Quarry expansion affect the availability and quality of habitat and nesting sites for migratory bird species?	Yes	Yes	No raptor nests were identified within the proposed Sale Area during surveys. Migratory birds do utilize the area and the Proposed Action would affect available habitat.	3.6
Wildlife: T&E, Sensitive Species	How would the proposed Parkdale Quarry expansion affect the availability and quality of habitat for special status wildlife species?	Yes	Yes	The proposed Sale Area does provide habitat for some BLM sensitive species and the Proposed Action would affect available habitat. No habitat for federal T&E species is located within the proposed Sale Area.	3.6
Wildlife: Terrestrial	How would the proposed Parkdale Quarry expansion affect the availability and quality of habitat for bighorn sheep and other big game species?	Yes	Yes	The Proposed Action would remove suitable habitat for big game species.	3.6

NA = Not Applicable

Table 3.4. Resource Area or Supplemental Authority for Which No Issues Were Identified or Not Carried Forward for Detailed Evaluation

Program Area	Issue Statement	Resource Present? (Yes/No)	Brought Forward for Analysis? (Yes/No)	Rationale
Cadastral Survey	No issues identified.	Yes	No	Due to resurveys in the subject area, the location of the Public Land Survey System (PLSS) bounding the Mineral Material Sale project is known to a high degree of certainty (10 feet) and therefore, the proposed buffer is considered adequate. There are 12 PLSS monuments that would be identified and protected prior to ground--disturbing activities as directed in 43 CFR 3809.420 and CO Rev Stat §18-4-508.
Cultural Resources	Will the undertaking directly, indirectly, or cumulatively, and adversely, affect any historic properties present in the area of potential effects?	No	No	A historic property (a site eligible for the National Register of Historic Places [NRHP]) was found in the area of potential effects (see report CR-RG-17-101 P). However, the historic property will not be affected by the proposed undertaking, as project redesign eliminated the site from the area of potential effects.
Environmental Justice	Will the proposed Parkdale Quarry expansion disproportionally impact environmental justice populations?	No	No	Review of 2017 U.S. Census data indicates that Fremont County does not have environmental justice populations (Table 3.15) that meet the criteria of having five percentage points greater than the State of Colorado.
Farmlands, Prime and Unique	No issues identified.	No	No	The U.S. Department of Agriculture, Natural Resources Conservation Service soil survey for Fremont County Area, Colorado classifies several soil map units as “prime farmland if irrigated” along Tallahassee Creek, County Road 157, and U.S. Highway 50. These soils are confined to floodplains along Tallahassee Creek and the Arkansas River and do not extend into the proposed mine expansion area, which is predominantly confined to adjacent upland areas. No direct or indirect effects to these soils are anticipated from the Parkdale Quarry expansion, and there is no current or anticipated use of these lands for agriculture.
Wildland Fire and Fuel Management	No issues identified.	No	No	The BLM would continue to manage wildland fire and fuels on BLM-administered lands outside of the mineral material Sale Area in accordance with current policies and practices. Martin Marietta would implement best practices for wildfire prevention and response, minimizing the potential for mining activities to ignite a wildfire within or adjacent to the proposed mine expansion area.

Program Area	Issue Statement	Resource Present? (Yes/No)	Brought Forward for Analysis? (Yes/No)	Rationale
				The BLM would require a contract to purchase forest products to be in place prior to new disturbances. Forest product removal would reduce fuel loading and risk of wildland fire. All forest products and other vegetative material would be harvested, stored, and removed or disposed of in accordance with BLM specifications, and in a manner that minimizes the potential for wildfire ignition.
Forest Management	No issues identified.	Yes	No	The BLM would require a contract to purchase forest products to be in place prior to new disturbances. All forest products and other vegetative material would be harvested, stored, and removed or disposed of in accordance with BLM specifications, and in a manner that minimizes the potential for wildfire ignition.
Geology and Minerals	No issues identified.	Yes	No	There are no known coal resources within the vicinity of the proposed mine expansion area. Various metals and nonmetallic minerals have the potential to occur in areas of Fremont County in proximity to the Parkdale Quarry; however, all active mining claims within the proposed mine expansion area are held by Martin Marietta. There is no potential for oil and gas development or active leases in the vicinity of the proposed mine expansion boundary.
Invasive Plants	How would the proposed Parkdale Quarry expansion affect the potential for invasive plants to colonize and spread during and after the operational life of the mine?	Yes	No	Although there are known noxious weed infestations, including leafy spurge, within the general area, on both BLM and on private land owned by Marin Marietta, weed control design features and stipulations are expected to keep existing infestations from spreading, and establishing.
Lands and Realty	No issues identified.	Yes	No	The proposed Parkdale Quarry expansion would not alter existing land ownership and administration.
Noise	How would noise impact recreation activity within the Arkansas Headwaters Recreation Area?	Yes	No	Recreation activity is currently affected by existing mining and processing operations. The proposed action and alternatives would not substantially alter the level of noise resulting from mining and processing activity and therefore user experience within the Arkansas Headwaters Recreation Area would be similar to Alternative B.

Program Area	Issue Statement	Resource Present? (Yes/No)	Brought Forward for Analysis? (Yes/No)	Rationale
Paleontology	No issues identified.	No	No	The BLM conducted a paleontological survey for the exploration work that was conducted within the proposed mine expansion area during preparation of the Parkdale Area Mineral Materials Sampling Environmental Assessment. The only area with potential fossil yield was located in the vicinity of the sandstone outcrop on the southern edge of the proposed mine expansion area. The proposed mine expansion area was modified to exclude this area and therefore would eliminate the potential for direct effects to the paleontological resources.
Range Management	No issues identified.	Yes	No	The proposed mine expansion area overlaps the Parkdale grazing allotment, which is permitted to Stone & Long for 128 authorized animal unit months (AUMs). Although the proposed mining area occurs in an area that is currently not accessible to livestock due to steep rocky slopes and limited forage production, the mine will be responsible for fencing livestock out of these areas if needed. Therefore, the proposed mine expansion area does not account for any loss of allocated AUMs.
Recreation	How would public access for recreational activities and recreational opportunities and settings on lands within and surrounding the proposed mine expansion area be affected?	Yes	No	Public access to the area is difficult but if a recreationist gained access to the area, the recreational opportunities and settings would be changed from its current state with the proposed expansion. The mine expansion would increase the amount of noise, light with night activity, and increased human activity in the area. This might deter recreationists seeking solitude and quiet. Considering mining activity is already occurring in the area, the change would be expected to be minor. The Proposed Action is not anticipated to impact the ability for the public to access the Arkansas Headwaters Recreation Area or substantially change the visitors experience. Impacts to the Arkansas Headwaters Recreation Area would be similar in nature to those currently experienced due to current mining at Parkdale.
Soils	No issues identified.	Yes	No	Martin Marietta proposes to separate, store, and reclaim topsoil in accordance with best management practices and procedures specified in the mining and reclamation plan. Implementation of these practices and procedures would minimize soil losses as a result of the quarry expansion.

Program Area	Issue Statement	Resource Present? (Yes/No)	Brought Forward for Analysis? (Yes/No)	Rationale
Tribal Concerns	Will the undertaking affect historic properties with traditional and religious significance to tribes?	Yes	No	The BLM consulted with 16 tribes regarding this undertaking (Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Sioux Tribe, Comanche Nation of Oklahoma, Crow Creek Sioux, Eastern Shoshone, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, Northern Ute Tribe, Oglala Sioux Tribe, Rosebud Sioux Tribe, Southern Ute Tribe, Standing Rock Lakota Tribe, and the Ute Mountain Ute Tribe). Several tribes requested additional consultation, including the opportunity to visit the area of potential effects. The tribes that requested additional consultation were extremely concerned about the highly sensitive site that had been eliminated from the area of potential effects. They requested that the area in which the site is located never be developed or added back into the project. The operator assured them that it would not ever be included in the area of potential effects.
Vegetation	How would the proposed Parkdale Quarry expansion affect the abundance and composition of plant communities during operations and post-mining?	Yes	No	No unique vegetation communities were documented within the proposed Sale Area during surveys. Existing vegetation would be removed from the site and reclaimed upon mining completion.
Wastes, Hazardous or Solid	No issues identified.	N/A	No	Hazardous or solid wastes would be managed in accordance with all applicable laws and regulations. Martin Marietta anticipates limited to no use of hazardous wastes at the mine.
Wetlands and Riparian	Would the proposed Parkdale Quarry expansion affect any waters of the United States, as determined by the U.S. Army Corps of Engineers?	Yes	No	No wetland areas determined to be jurisdictional waters of the United States have been identified within the proposed materials mining area. Some limited areas of riparian vegetation associated with isolated spring locations would be removed under the Proposed Action. The applicant is currently coordinating with the U.S. Army Corps of Engineers regarding these isolated springs. The U.S. Army Corps of Engineers will have to complete a jurisdictional determination for each potentially impacted wetland, spring, or other aquatic resource prior to issuance of the contract.
Wildlife: Aquatic	No issues identified.	No	No	No aquatic wildlife resources have been identified within the proposed mine expansion area and no indirect effects are anticipated to aquatic wildlife resources downstream of the mine pending the

Program Area	Issue Statement	Resource Present? (Yes/No)	Brought Forward for Analysis? (Yes/No)	Rationale
				results of the water resources analysis prepared for the EIS.
Special Designations – Areas of Critical Environmental Concern	No issues identified.	Yes	No	The proposed mine expansion area was modified to avoid the Arkansas Canyonlands ACEC, resulting in no effect from the proposed quarry expansion.
Special Designations – Wild and Scenic Rivers	No issues identified.	Yes	No	The BLM assigned a tentative classification as suitable (recreational) for inclusion in the Wild and Scenic River System to the segment of the Arkansas River that flows from Salida to Parkdale and passes directly south of the Parkdale Quarry, known as Arkansas River Segment 3. The Outstanding Remarkable Values (ORVs) for this segment are recreation, scenery, wildlife, botany, fish and cultural The proposed project would not impact recreation, wildlife, botany, fish, and cultural ORVs because those ORVs are confined to the footprint of the suitable stream segment, which is limited to ¼ mile on each side of the river from the ordinary high-water mark. The scenery ORV would not be impacted because visitors using the river would not be able to see the mining activities from the river, and because overall, the project is designed to minimize visual impacts.
Special Designations – Wilderness, Wilderness Study Areas, or Natural Areas	How would the proposed Parkdale Quarry Expansion affect the proposed Table Mountain Wilderness Area?	No	No	The nearest existing wilderness or wilderness study area or Natural Area is the High Mesa Grassland Natural Area, is located more than 2.5 miles from the proposed mine expansion area. The proposed Parkdale Quarry expansion would not directly affect wilderness or wilderness study areas. The proposed Sale Area includes a limited portion of the proposed but not currently designated Table Mountain Wilderness Area.

3.4. AIR RESOURCES AND GREENHOUSE GASES

Issue 1: What types and amounts of criteria air pollutants would be emitted as a result of the proposed Parkdale Quarry expansion, and what are the potential effects to ambient air quality in the region?

Issue 2: What types and amounts of hazardous air pollutants would be released as a result of the proposed Parkdale Quarry expansion, and what are the potential health and environmental effects?

Issue 3: What types and amounts of greenhouse gases that would contribute to global climate change would be emitted as a result of the proposed Parkdale Quarry expansion?

3.4.1. Affected Environment

Air pollution and greenhouse gases (GHGs) within the planning area originate from such sources as industry, agricultural activities, energy production, transportation, residential activities, and consumer product use. The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for criteria pollutants, which include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone, particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead. The State of Colorado also has its own ambient air quality standards that are similar to the NAAQS. EPA designates areas as attainment (having pollutant levels that are within the NAAQS), nonattainment (having pollutant levels that exceed the NAAQS), or maintenance (having pollutant levels that formerly exceeded the NAAQS but that have been reduced to attainment levels). EPA has designated Fremont County as attainment for all criteria pollutants.

Hazardous air pollutants (HAPs) are pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. Health concerns due to hazardous air pollutants generally are considered too localized to be included under the scope of NAAQS. EPA regulates HAPs through emission standards, including National Emission Standards for Hazardous Air Pollutants, which limit emission rates and apply to affected sources that are, or are located at, major sources of HAP emissions. A major source is defined in 40 CFR 63.2 as any stationary source that emits or has the potential to emit 10 tons per year or more of any single HAP or 25 tons per year or more of any combination of HAPs. Based on the provisions of its Colorado Department of Public Health and Environment (CDPHE) air quality permit, the Parkdale Quarry is not a major HAP source.

The CDPHE measures air quality at sites throughout the state. The nearest CDPHE monitoring site to the project is located in Cañon City and measures PM_{10} (EPA site ID 08-043-0003). The NAAQS for PM_{10} is 150 micrograms per cubic meter ($\mu g/m^3$) averaged over 24 hours. In the most recent three years with complete data available (2016-2018), maximum 24-hour PM_{10}

concentrations measured at this site were 54 µg/m^3, 48 µg/m^3, and 39 µg/m^3, respectively, which at this site did not exceed the NAAQS.

The CDPHE assigns all geographical regions a priority class depending on how much air quality is allowed to degrade under the Prevention of Significant Deterioration (PSD) permitting rules. Class I areas are those of special national or regional natural, scenic, recreational, or historic value, and this category allows for very little degradation in air quality. Class II areas allow for reasonable industrial/economic expansion. Major stationary sources of air pollution authorized on BLM-administered lands can contribute to the consumption of PSD increments. The Parkdale Quarry is limited under its CDPHE air quality permit to emissions levels that are less than the EPA thresholds for PSD review. Therefore, the PSD requirements do not apply to Parkdale Quarry.

Visibility impairment or haze is caused when sunlight encounters tiny pollution particles in the atmosphere and is either absorbed or scattered, which reduces the clarity and color of what can be seen. Federal land management agencies including the BLM express visibility in terms of deciviews (dv). A change of one dv is approximately a 10-percent change in the light extinction coefficient (i.e., light that is scattered or absorbed and does not reach the observer), which is a small but usually perceptible scenic change. To assess the visibility impact of a project, the agencies use a threshold of 0.5 dv for projects that could contribute to a visibility problem and 1.0 dv for projects that by themselves could cause visibility issues. Measurements from the visibility monitors nearest the planning area (located at Rocky Mountain National Park and Great Sand Dunes National Park) show that existing visibility is less than under natural conditions, but shows an improving trend over time.

Deposition of air pollutants such as sulfur and nitrogen may cause acidification of soils and surface waters, affecting water chemistry, aquatic vegetation, invertebrate communities, amphibians, fish, soil microorganisms, and plants. Federal land management agencies use a threshold of 0.005 kilograms per hectare per year to assess deposition impacts of a project. The deposition monitors nearest the planning area are located at Rocky Mountain National Park and Great Sand Dunes National Park. Measurements at Rocky Mountain National Park show that existing deposition rates are greater than under natural conditions, but show a slightly improving trend over time. Measurements at Great Sand Dunes National Park show no clear trend in deposition rates.

Greenhouse gases (GHGs) are so named because of their heat-trapping capacity and contribution to global warming. These gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several fluorinated species of gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. CO_2 is emitted from the combustion of fossil fuels (oil, natural gas, and coal), solid waste, trees, and wood products, and as a result of other chemical reactions (e.g., cement manufacturing). The production, transport, and combustion of coal, natural gas, and oil emit methane. Methane also results from livestock and other agricultural practices and from the decay of organic waste in municipal solid waste landfills. Agricultural and industrial activities as well

the combustion of fossil fuels and solid waste emit N_2O. Fluorinated gases are powerful greenhouse gases that are emitted from a variety of industrial processes and are often used as substitutes for ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). GHG emissions commonly are expressed as CO_2 equivalent (CO_2e), which is an average of the individual gas emissions weighted according to their respective global warming potentials.

The Intergovernmental Panel on Climate Change (IPCC 2013) indicates that an increase in atmospheric GHG concentration results in an increase in the earth's average surface temperature, primarily by trapping and thus decreasing the amount of heat energy radiated by the Earth back into space. The phenomenon is commonly referred to as global warming. The Intergovernmental Panel on Climate Change expects global warming to affect weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, all of which is collectively referred to as climate change.

3.4.2. Environmental Effects

3.4.2.1. Direct and Indirect Effects from Alternative A

Issue 1: What types and amounts of criteria air pollutants would be emitted as a result of the proposed Parkdale Quarry expansion, and what are the potential effects to ambient air quality in the region?

An emissions inventory was developed to characterize the emissions from the Parkdale Quarry and the proposed expansion. Information on emissions from stationary sources was taken from the facility's air quality permit. Emissions from mobile sources (construction, excavation, and materials handling equipment; trucks; worker vehicles; and locomotives) were calculated based on emission factors taken from EPA models and databases, and the proposed activity levels for these sources.

Assumptions for the analysis were selected to be conservative (tending to overestimate emissions). For example, where projections indicated a range of values, the high end of the range was selected for the emissions estimate. Alternative A would increase the quarry's production rate and with it the activity levels of equipment and vehicles, which would lead to increased emissions. On the other hand, mobile source emissions on a per-unit basis are expected to decrease over time because of increasingly stringent regulation by the EPA, as older, higher-emitting trucks and equipment are retired and replaced by newer, lower-emitting ones. Because of these two opposing trends, the scenario of maximum emissions can occur in years other than those in which maximum production occurs. Accordingly, emissions were evaluated for Phase 1 in 2020 with a production rate of 2,000,000 tons per year, and for Phase 2 in 2033 with a production rate of 4,000,000 tons per year. Emissions in Phases 3 through 5 would occur after

2033 and are expected to be less than in Phase 2 for the same production level. Table 3.5 presents the estimated emissions inventory.

Table 3.5. Estimated Emissions Inventory

Alternative and Source Type (Year)	Emissions (criteria pollutants in U.S. tons per year, GHGs in metric tons per year of CO_2 equivalent)						
	CO	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOC**	**GHGs**
Alternative B (2020)							
Stationary Permitted[1]	3	18	50	7	1	1	715
Mobile (except rail)[2]	15	19	17	5	0	1	1,498
Rail[3]	32	120	3	3	NA	5	11,277
Blasting[2]	26	7	1	0	1	NA	201
Purchased Electricity (offsite power plants)	NA	3	NA	NA	2	NA	3,829
Total	**76**	**167**	**70**	**15**	**4**	**7**	**17,520**
Alternative A – Phase 1 (2020)							
Stationary Permitted[1]	3	18	50	7	1	1	715
Mobile (except rail)[2]	17	22	17	5	0	1	1,498
Rail[3]	84	314	7	7	NA	12	29,492
Blasting[2]	52	13	1	0	2	NA	402
Purchased Electricity (offsite power plants)	NA	8	NA	NA	5	NA	9,300
Total	**157**	**374**	**75**	**20**	**7**	**15**	**41,407**
Alternative B (2033)							
Stationary Permitted[1]	3	18	50	7	1	1	715
Mobile (except rail)[2]	39	39	17	18	0	2	1,484
Rail[3]	14	16	16	4	0	1	11,277
Blasting[2]	26	7	1	0	1	NA	201
Purchased Electricity (offsite power plants)	NA	3	NA	NA	2	NA	3,829
Total	**76**	**96**	**67**	**12**	**4**	**4**	**17,506**
Alternative A – Phase 2 (2033)							
Stationary Permitted[1]	6	32	88	13	2	2	1,430
Mobile (except rail)[2]	25	28	28	12	0	2	2,520
Rail[3]	169	273	5	5	NA	10	58,985
Blasting[2]	105	27	3	0	3	NA	804
Purchased Electricity (offsite power plants)	NA	8	NA	NA	5	NA	9,300
Total	**316**	**378**	**125**	**26**	**10**	**16**	**73,038**

Alternative and Source Type (Year)	Emissions (criteria pollutants in U.S. tons per year, GHGs in metric tons per year of CO_2 equivalent)						
	CO	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOC**	**GHGs**
Emissions Change with Alternative A Compared to Alternative B							
Phase 1 (2020)	81	208	5	5	4	8	23,887
Phase 2 (2033)	240	282	58	14	6	12	55,532

Source: Martin Marietta 2019b

Emissions have been rounded to the nearest ton.
Values less than 0.5 have been rounded to zero.
Sum of individual values may not equal total due to rounding.

[1] Includes point sources and fugitive emissions. Emissions for 2020 are permitted limits. Existing permitted sources include:
Quarry pit #1. Permitted activities: rock drilling, blasting, material extraction, handling, stockpiling, hauling and the associated onsite conveyors and transfer points.
Quarry pit #2. Permitted activities: sand and gravel material extraction, handling, stockpiling, hauling and the associated onsite conveyors and transfer points.
Vibrating screens (2)
Cone crushers (2)
Dewatering pump diesel engine (108 hp) (1)

[2] Includes combustion and fugitive emissions.
[3] Estimated rail trip distances (one-way): 130 miles under Alternative B, 170 miles under Alternatives A and C.

NA = Not available

Emissions from stationary sources are limited by the terms of the quarry's air quality permit to correspond to a production limit of 2,250,000 tons per year and were assumed not to change for Phase 1. However, if production rates with Alternative A were to increase above these limits, as in Phase 2, Martin Marietta would be required to apply to CDPHE for an amendment to its permit to allow the increased production and emissions. In Table 3.5**,** emissions from stationary permitted sources under Phase 2 are assumed to reflect an amended permit and have been scaled up according to production rates.

Martin Marietta plans to transition from the use of conventional diesel fuel in Phase 1 to 50 percent diesel and 50 percent electric or alternative fuels in Phase 2, and to 100 percent electric or alternative fuels in Phases 3 through 5. As a result, emissions of exhaust pollutants (primarily from mobile sources) in Phase 2 are expected to be less than shown in Table 3.5, and would be still less in Phases 3 through 5. The future emissions from power plants that would generate the electricity to charge electrified equipment and vehicles are not known because commercialization of electric technology for the applicable equipment has barely begun, and electric technology is not yet feasible for the heavier equipment. The future emission rates from alternatively-fueled equipment would depend on the selection of alternative fuels. Therefore, emission reductions that could occur from the transition to electric and alternative fuels were not quantified. This contributes to the conservatism of the analysis.

Railroad ballast would be a primary product of the Parkdale Quarry. Currently, ballast used in Colorado must be shipped by rail from quarries in Oklahoma and Wyoming. Martin Marietta projects that the Parkdale Quarry would provide a local source of ballast, which would displace

ballast shipments from the larger multi-state region. As a result, under Alternative A, rail traffic and the associated emissions would increase at the Parkdale site but would decrease regionally as longer rail trips are displaced by shorter rail trips. Moreover, Martin Marietta projects that local demand for ballast under Alternative B would result in development of four additional quarries in Colorado that would ship their production by truck. Under Alternative A, the Parkdale Quarry would meet the regional demand for ballast, and to the extent that it would do so with rail shipment, truck volumes from other quarries would be decreased. This displacement of truck trips by rail would lead to additional emissions reductions. Information is not available to quantify regional emissions reductions and they are not included in Table 3.5. However, such reductions are expected to reduce the potential regional impacts of Alternative A on air quality, visibility, and acid deposition.

Based on the estimated emissions and the distances from the project to areas of likely exposure of the public to the emissions (approximately 3,000 feet or more), criteria pollutant concentrations under Alternative A are not expected to exceed the NAAQS. Alternative A is not expected to result in substantial effects on visibility or acidic deposition in Class I areas.

General Conformity Evaluation

States and local authorities have the responsibility for bringing their regions into compliance with the NAAQS. State Implementation Plans are EPA-approved plans that set forth the applicable air pollution control requirements for each State. Section 176(c) of the Clean Air Act prohibits Federal entities from taking actions in nonattainment or maintenance areas that do not "conform" to the State Implementation Plan. The purpose of this conformity requirement is to ensure that Federal activities: (1) do not interfere with the emissions budgets in the State Implementation Plans; (2) do not cause or contribute to new violations of the NAAQS; and (3) do not impede the ability to attain or maintain the NAAQS. To implement Clean Air Act section 176(c), EPA issued the General Conformity Rule (40 CFR 93, subpart B).

The General Conformity Rule established emissions thresholds (40 CFR 93.153) for use in evaluating the conformity of a project. To evaluate conformity, all changes in direct and indirect emissions (as defined in the rule) are summed. If the net emissions increases due to the project are less than the thresholds, the project is presumed to conform and no further conformity evaluation is required. If the emission increases exceed any of the thresholds, a conformity determination is required. The BLM, as the Federal entity with jurisdiction for the proposed action, must demonstrate that the proposed action meets the requirements of the General Conformity Rule.

The Conformity Rule applies only to those pollutants for which the project area is designated nonattainment or maintenance. The Parkdale Quarry is not located within a nonattainment or maintenance area, so the General Conformity Rule does not apply to emissions at the Parkdale Quarry site. However, trucks and trains associated with the quarry travel through two maintenance areas: the Cañon City PM_{10} maintenance area and the Colorado Springs CO maintenance area. Therefore, the changes in PM_{10} and CO emissions, respectively, associated

with Alternative A that would occur in these maintenance areas were compared to the General Conformity thresholds, which are 100 tons per year of each pollutant. Emissions were calculated for the portion of truck and train travel associated with Alternative A that would occur within the Cañon City PM_{10} maintenance area and the Colorado Springs CO maintenance area. In both areas, the emissions increases that would occur under Alternative A would be less than the conformity thresholds. Accordingly, a General Conformity determination is not required for Alternative A.

Protective/Mitigation Measures

Because criteria pollutant concentrations under Alternative A are not expected to exceed the NAAQS, and regional emissions reductions are expected, no protective/mitigation measures for criteria pollutants are proposed.

Issue 2: What types and amounts of hazardous air pollutants would be emitted as a result of the proposed Parkdale Quarry expansion, and what are the potential effects to ambient air quality in the region?

Based on the provisions of its CDPHE air quality permit, the Parkdale Quarry is not a major HAP source and the project would not cause the Parkdale Quarry to become a major HAP source. Based on the Parkdale Quarry's non-major source status and the distances from the project to areas of likely public exposure (approximately 3,000 feet or more), no adverse health effects are expected from HAP emissions associated with the project.

Protective/Mitigation Measures

The provisions of the Parkdale Quarry's air quality permit that limit criteria pollutant emissions also serve to limit HAP emissions. Because no adverse health effects are expected from HAP emissions associated with the project, no protective/mitigation measures for HAPs are proposed.

Issue 3: What types of greenhouse gases would be emitted as a result of the proposed Parkdale Quarry expansion?

The primary source of GHG emissions at the Parkdale Quarry is exhaust from equipment and vehicles, and to a lesser extent from permitted stationary sources. These GHG emissions consist mostly of CO_2, and smaller amounts of CH_4 and N_2O. There are no NAAQS for GHGs. Potential climate impacts of Alternative A are evaluated based on GHG emissions levels. As shown in Table 3.5, GHG emissions would increase under Alternative A. These increases would contribute incrementally to current climate change trends. However, the planned transition to electric and alternatively-fueled equipment is likely to reduce GHG emissions. Also, regional GHG emissions would decrease due to displacement of longer rail trips by shorter rail trips, and displacement of trucks by rail, as discussed above for Issue #1.

Protective/Mitigation Measures

The planned decrease in diesel fuel usage at the Parkdale Quarry over time is likely to decrease GHG emissions at the site. Also, Alternative A would decrease emissions regionally as discussed above for Issue #1.

3.4.2.2. Direct and Indirect Effects from Alternative B

Under Alternative B, the proposed expansion would not occur and there would be no impact from the project. Emissions from stationary sources at the Parkdale Quarry would continue to be limited by the provisions of its existing air quality permit. Emissions from construction equipment, trucks, and trains associated with the Parkdale Quarry would be expected to decrease slowly over time as older, higher-emitting equipment, vehicles, and locomotives are retired and replaced with newer, lower-emitting ones.

3.4.2.3. Direct and Indirect Effects from Alternative C

The emissions inventory under Alternative C would be similar to the emissions summarized in Table 3.2 for Alternative A. Stationary source emissions would be the same as identified in Table 3.2. Alternative C would have minor differences in on-site mobile source emissions compared to Alternative A due to slight differences in haul road routes and travel distances to the processing area on private land. Criteria pollutant concentrations under Alternative C are not expected to exceed the NAAQS based on the estimated emissions and the distances from the alternate Sale Area to areas of likely public exposure (approximately 3,000 feet or more). Alternative C is not expected to result in substantial effects on visibility or acidic deposition in Class I areas.

A General Conformity determination is not required for Alternative C because the emissions increases that would occur under Alternative C would be similar to Alternative A and therefore, would be less than the conformity thresholds.

Parkdale Quarry is not a major HAP source based on the CDPHE air quality permit, and the proposed expansion would not become a major HAP source. No adverse health effects are anticipated from HAP emissions associated with Alternative C.

Greenhouse gas emissions would increase under Alternative C at similar levels to Alternative A, and contribute to climate change. Reduction in greenhouse gas emissions would occur with the planned transition to electric and alternatively-fueled equipment in the future. In addition, greenhouse gas emissions would be reduced with displacement of trucks by rail transport and displacement of longer rail trips by shorter rail trips as a result of Alternative C.

3.4.3. Cumulative Effects Analysis

The CESA for air resources is defined as the proposed Sale Area and a 50-kilometer (31-mile) radius around the project. Past, present, and reasonably foreseeable future actions that could contribute to cumulative impacts to air quality include an increase in industrial, commercial, and residential development and motorized vehicle use. The population in the planning area is projected to increase by 35 percent between 2018 and 2040 (Colorado Department of Local Affairs 2017), and therefore it can be assumed that there will be a proportional increase in development and motor vehicle use and the associated emissions at the regional scale. Regional increases in emissions would be lessened by current and future EPA and CDPHE requirements for emission controls.

Emissions from past, present, and reasonably foreseeable future actions would disperse in the atmosphere and become part of the regional background pollutant levels. Because of the rural nature of the area, ambient background concentrations of air pollutants are expected to be relatively low, and air quality in the region is expected to remain in attainment for criteria pollutants. Cumulative air quality impacts from Alternatives A and C would not be substantial because the sum of the background levels and project-generated concentrations is expected to be less than the NAAQS for each pollutant.

Climate change is by nature a cumulative impact, and all GHG emissions play a role in contributing to global GHG concentrations and climate change. The following summary is adapted from the BLM Colorado Annual Air Resources Report 2.0 (BLM 2018), which is incorporated herein by reference. The future climate will reflect the warming caused by past anthropogenic emissions, future anthropogenic emissions, and natural variability. In the coming decades, the magnitude of climate change will be significantly affected by the overall trend in global GHG emissions. As global mean surface temperature increases, it is virtually certain that there will be more frequent hot and fewer cold temperature extremes over most land areas. Extremes in temperatures, precipitation and drought, and storm intensity will become more common, but these changes will not be uniform geographically. Oceans will continue to warm and acidify, levels of Arctic sea ice will continue to decrease, and sea level will continue to rise. In Colorado, projections indicate future warming. Precipitation trends are less clear, but most projections indicate an increase in winter precipitation. Trends in runoff and streamflow also are uncertain though projections generally indicate decreases in annual streamflow. Increased warming, drought, and insect outbreaks, all associated with climate change, will continue to increase wildfire risks and impacts to people and ecosystems.

GHG emissions associated with Alternatives A and C could contribute to cumulative global climate impacts. However, given the relatively low GHG emissions associated with Alternatives A and C, their contribution to global GHG concentrations and any resulting climate change would be low.

3.5. SURFACE, GROUND WATER, AND WATER QUALITY

Issue 1: What are the water sources and water requirements for the Parkdale Quarry expansion?

Issue 2: Is dewatering anticipated to be required in any of the pits?

Issue 3: How would the Parkdale Quarry expansion affect water quality, quantity, and water rights?

Issue 4: How would surface water and groundwater be monitored for the proposed mine expansion

3.5.1. Affected Environment

The analysis area for direct and indirect effects to surface water and groundwater resources is shown in Figure 3.5-1 (Appendix C) and includes the area north of the Arkansas River within about 1.5 miles of the Sale Area. The area south of the Arkansas River is excluded from the analysis because the river forms a hydrologic boundary that is below the elevation of the pit floor and the potential level of groundwater drawdown effects that could be caused by the proposed mining operation.

The cumulative effects study area for water resource is shown on (Figure 3.5-2, Appendix C) and includes the sixth-level U.S. Geological Survey (USGS) hydrologic unit code (HUC) 12 sub-watersheds that contain the Sale Area or parts of the analysis area (Table 3.6).

Table 3.6. USGS 6th Level Sub-Watersheds within the Water Resources Cumulative Effects Study Area

4th Level Sub-Basin (HUC 8)	5th Level Watershed (HUC 10)	6th Level Sub-Watershed (HUC 12)	Sq. Mile
Arkansas Headwaters (11020001)	Tallahassee Creek – Currant Creek (1102000111)	Lower Cottonwood Creek (110200011108)	(32.8)
		Lower Currant Creek (110200011109)	(35.3)
		Tallahassee Creek (11020001110)	(50.2)
	Royal Gorge – Arkansas River (1102000114)	Five Point Gulch – Arkansas River (110200011407)	(47.4)
		Royal Gorge (110200011409)	(26.0)

3.5.1.1. Surface Water Resources

The Sale Area is located on the flank of Cactus Mountain and drains southwest toward Currant and Tallahassee Creeks. All drainages within the proposed pit disturbance are intermittent or ephemeral and flow for limited periods during most years in response to direct precipitation and snowmelt. Three named streams and fifteen springs are located within the analysis area. In downstream order, the streams include Cottonwood Creek, Currant Creek, and Tallahassee Creek. The springs include Cactus Mountain Spring, Cactus Mountain South Spring, Parkdale Spring, Parkdale South Spring, and Tallahassee Ditch No. 2 Spring within the Sale Area, and Willow Patch Spring, Currant Spring, Narrow Canyon Spring, Campbell King Spring No. 1, Harvey Brothers Twelve Mile Spring, Cowan Spring No. 3, Wheaton College Springs Nos. 14, 15, and 16, and spring No. 1 within the analysis area, but outside of the Sale Area.

Cottonwood Creek

Cottonwood Creek is an intermittent stream that flows southeast from its headwaters in Park County to its confluence with Currant Creek about one mile north of the Sale Area. Its designated beneficial uses include Class 1 Coldwater Aquatic Life, Existing Recreation, Agriculture, and Water Supply. Streamflow and water quality data for Cottonwood Creek are available from USGS monitoring station 07094200. The station is located about 2.3 miles above the confluence with Currant Creek (Figure 3.5-3, Appendix C) and was monitored on 13 dates extending from January 1981 to September 1982. Reported instantaneous streamflows for the period of record ranged from 0.03 to 23 cubic feet per second (cfs). Monitored water quality parameters including field measurements of pH, specific conductance (SC), dissolved oxygen (DO), and temperature, and laboratory analyses for selected major ions, metals, and radionuclides generally met applicable standards and are presented in Appendix F. The mainstem of Cottonwood Creek from F6 Road to the confluence with Currant Creek is not 303(d) listed in the 2018 Colorado Integrated Report (CDPHE 2018) but it has not been assessed as meeting its designated beneficial uses because of a lack of supporting data.

Currant Creek

Currant Creek is a perennial stream that flows south through the western portion of the Sale Area to its confluence with Tallahassee Creek about 1,700 feet south of the Sale Area boundary. The stream channel is within the planned buffer zone under Alternative A and would not be disturbed by the proposed mining operation. The total length of Currant Creek within the Sale Area is 1.5 miles. Designated beneficial uses of the stream include Class 1 Coldwater Aquatic Life, Existing Recreation, Agriculture, and Water Supply. Streamflow and water quality data for Currant Creek are available from three stations located above its confluence with Cottonwood Creek (Figure 3.5-3, Appendix C). Stations 07094090 and 383150105225500 were monitored by the USGS. Station 21COL001-7110 was monitored by CDPHE. Available data from the stations are presented in Appendix F and summarized in Table 3.7. The monitored parameters generally met

applicable water quality standards. The mainstem of Currant Creek from its source in Park County to the confluence of Tallahassee Creek is not 303 (d) listed in the 2018 Colorado Integrated Report (CDPHE 2018) and with the exception of Existing Recreational Use, it is currently assessed as meeting its designated beneficial uses. Existing Recreational Use for Currant Creek was not assessed in the 2018 Colorado Integrated Report (CDPHE 2018).

Table 3.7. Summary of Available Streamflow and Water Quality Data for Currant Creek

Station	Period of Record	Number of Samples	Range of Measured Streamflows	Water Quality Analyses
USGS 07094090	01/13/1981 – 09/21/1982	12	0.30 – 31 cfs	Field parameters, selected ions, metals, and radionuclides
USGS 383150105225500	4/22/72	1	--	Field parameters, major ions, nutrients, iron and manganese
CDPHE 21COL001-7110	08/17/2010	1	--	Field parameters, alkalinity, hardness, nutrients, selected ions and metals

cfs = cubic feet per second

Tallahassee Creek

Tallahassee Creek is a perennial stream that flows southeast through the southwestern portion of the Sale Area, and then through the existing Parkdale Quarry to its confluence with the Arkansas River. The stream channel within the buffer zone under Alternative A would not be disturbed by the proposed mine expansion, however, the current disturbance of the creek on private land south of the Sale Area would continue with continued mining. The total length of Tallahassee Creek within the Sale Area is 0.2 miles. Designated beneficial uses of the stream include Class 1 Coldwater Aquatic Life, Existing Recreation, Agriculture, and Water Supply. Streamflow and water quality data for Tallahassee Creek are available from four stations (Figure 3.5-3, Appendix C). Stations 07094300 and 382917105225200 were monitored by the USGS and are located above the confluences with Currant Creek and the Arkansas River, respectively. Stations 21COL001-Tallahassee04 and 21COL001-7115 are located above and below the confluence with Currant Creek, respectively and were monitored by CDPHE. Available data from the stations are presented in Appendix F and summarized in Table 3.8. The monitored parameters generally met applicable water quality standards. The mainstem of Tallahassee Creek from the confluence with South Tallahassee Creek to the confluence with the Arkansas River is not 303 (d) listed in the 2018 Colorado Integrated Report (CDPHE 2018) and is currently assessed as meeting its designated beneficial uses.

Table 3.8. Summary of Available Streamflow and Water Quality Data for Tallahassee Creek

Station	Period of Record	Number of Samples	Range of Measured Streamflows	Water Quality Analyses
USGS 07094300	01/13/1981 – 09/21/1982	11	0.01 – 31 cfs	Field parameters, selected ions, metals, and radionuclides
USGS 382917105225200	06/03/1987 – 10/21/1992	14	0.14 – 44 cfs	Field parameters, alkalinity, TDS, nutrients, and metals
CDPHE 21COL001-Tallahassee04	0/14/1980	1	--	Field parameters, alkalinity, hardness TDS, TSS, nutrients, selected ions and metals
CDPHE 21COL001-7115	09/12/2005 – 06/21/2011	3	--	Field parameters, E. Coli, alkalinity, hardness, nutrients, major ions and metals

cfs = cubic feet per second; TDS = total dissolved solids; TSS = total suspended solids.

Springs

Fifteen springs are located within the analysis area (Figure 3.5-1, Appendix C). Cactus Mountain Spring, Cactus Mountain South Spring, Parkdale Spring, and Parkdale South Spring are located within the Sale Area. The other springs are located within the analysis area, but occur outside of the Sale Area. Locations, elevations, and discharge information for the springs are summarized in Table 3.9**.**

Springs within the Sale Area were surveyed by the BLM on November 19, 2019. Cactus Mountain, Cactus Mountain South, and Parkdale springs were all flowing at about 0.25 gpm at the time of observation. Parkdale South Spring was dry. The springs are recharged by the infiltration of precipitation on their local watersheds, and they discharge from granitic bedrock in intermittent drainages on the southwest side of Cactus Mountain. The BLM holds federal reserved water rights on Parkdale Spring (# 1202149) and Cactus Mountain Spring (# 1202067) with decreed amounts of 0.22 cfs each.

Willow Patch, Currant, and Narrow Canyon springs are located on BLM land north and northwest of the Sale Area (Figure 3.5-1, Appendix C). Willow Patch and Narrow Canyon springs were surveyed by the BLM near the end of June in 2016. Both springs were flowing at the time of observation, but at very low rates (Table 3.9). Willow Patch Spring issues from a stream terrace adjacent to an intermittent tributary to Lower Cottonwood Creek. Narrow Canyon Spring is located in the channel of an intermittent tributary to Currant Creek. Current Spring was surveyed at the end of August in 2012 at which time it was dry.

Campbell King Spring 1, Tallahassee Ditch No. 2 Spring, Harvey Brothers Twelve Mile Spring, Wheaton College Springs 14, 15 and 16, and unnamed spring No. 1 are located on private land and only limited information including the spring locations and elevations are available. All of the springs have privately held water rights with the exception of unnamed spring 1 (Table 3.10).

Table 3.9. Summary of Springs within the Analysis Area

Spring	Latitude	Longitude	Elevation (ft.)	Discharge (gpm)	Date Surveyed
Cactus Mountain Spring[1]	38.50599	-105.39281	6,480	0.25	11/19/2019
Cactus Mountain South Spring[1]	38.50336	-105.40489	6,040	0.25	11/19/2019
Parkdale Spring[1]	38.5002	-105.40104	6,140	0.25	11/19/2019
Parkdale South Spring[1]	38.49727	-105.39662	5,920	No Flow	11/19/2019
Willow Patch Spring[1]	38.52571	-105.42888	6,600	0.016	06/27/2016
Currant Spring[1]	38.51939	-105.40823	6,200	No Flow	08/24/2012
Narrow Canyon Spring[1]	38.51673	-105.40668	6,300	Very Low	06/27/2016
Campbell King Spring 1[2]	38.49140	-105.37232	5,840	Unknown	Not Surveyed
Tallahassee Ditch No. 2 Spring[3]	38.49544	-105.41055	5,920	Unknown	Not Surveyed
Harvey Brothers Twelve Mile Spring[3]	38.52156	-105.39913	6,120	Unknown	Not Surveyed
Wheaton College Spring 14[3]	38.52503	-105.35265	6,500	Unknown	Not Surveyed
Wheaton College Spring 15[3]	38.52173	-105.36301	6,380	Unknown	Not Surveyed
Wheaton College Spring 16[3]	38.52605	-105.37654	6,250	Unknown	Not Surveyed
Cowan Spring No. 3[3]	38.52891	-105.36630	6,560	Unknown	Not Surveyed
Unnamed Spring No. 1[2]	38.50220	-105.34645	6,200	Unknown	Not Surveyed

Sources: [1] BLM Royal Gorge Field Office (BLM 2019)
[2] National Hydrography Dataset (USGS 2005)
[3] Colorado Division of Water Resources (DWR) Water Rights Database (DWR 2020)

Surface Water Rights

Surface water rights for the analysis area were compiled from a search of the Colorado Division of Water Resources (DWR) water rights database. A total of 19 surface water rights were identified within the analysis area. The water rights are summarized in Table 3.10. The downloaded records are presented in Appendix G.

Table 3.10. Summary of Surface Water Rights within the Analysis Area

Water Right ID	Structure Name	Structure Type	Water Source	Decreed Amount (cfs)	Latitude	Longitude
1200854	Tallahassee Ditch No 1	Ditch	Tallahassee Creek	3.5	38.49612	-105.414
1200570	Pioneer Ditch Current Creek	Ditch	Currant Creek	3.75	38.49867	-105.408
1200573	Third Ditch	Ditch	Currant Creek	4	38.48973	-105.389
1200928	Cc Royal Gorge Intake	Ditch	Arkansas River	19	38.47221	-105.354
1200928	Cc Royal Gorge Intake	Ditch	Arkansas River	3.5	38.47221	-105.354
1203021	Currant Creek Minimum Flow	Min. Flow	Currant Creek	1.9	38.49546	-105.405
1203020	Currant Creek Minimum Flow	Min. Flow	Currant Creek	2	38.52139	-105.4
1203011	Tallahassee Creek Minimum Flow	Min. Flow	Tallahassee Creek	1	38.48778	-105.38
1202834	Hasp Currant Creek Exchange	Reach	Currant Creek	0	38.49545	-105.405
1202835	Hasp Tallahassee Creek Exchange	Reach	Tallahassee Creek	0	38.48765	-105.381
1200857	Tallahassee Ditch No 2	Spring	Tallahassee Creek	14	38.49544	-105.41055
1202149	Parkdale Spring	Spring	Arkansas River	0.0022	38.50029	-105.40104
1202400	Harvey Brothers Twelve Mile	Spring	Arkansas River	3.2	38.52156	-105.39913
1202067	Cactus Mountain Spring	Spring	Arkansas River	0.0022	38.50599	-105.39281
1202549	Wheaton College Spring 16	Spring	Arkansas River	0.022	38.52605	-105.37654
1202247	Campbell King Spring 1	Spring	Arkansas River	0.01	38.49140	-105.37232
1202281	Cowan Spring No 3	Spring	Arkansas River	0.013	38.52891	-105.36630
1202548	Wheaton College Spring 15	Spring	Arkansas River	0.0044	38.52173	-105.36301
1202547	Wheaton College Spring 14	Spring	Arkansas River	0.0088	38.52503	-105.35265

Source: Colorado Division of Water Resources (DWR) Water Rights Database (CDWR 2020)

3.5.1.2. Groundwater Resources

Groundwater at the site is recharged by the infiltration of precipitation on upland areas and flows laterally away from high points following topography to discharge at streams and springs at lower elevations. The average precipitation at the site is about 17 inches annually (BLM 2017a) with recharge to groundwater being estimated to be about 0.16 inches per year (ERM 2019).

Four hydrostratigraphic units are noted in the analysis area. They include alluvium in stream channels and drainages, sedimentary rocks located north and south of the Sale Area, and granitic rocks that are divided into weathered granite near the surface and competent but fractured granite below a depth of about 20 feet (ERM 2019). Alluvium occurs as a thin veneer over granitic bedrock in intermittent drainages within the Sale Area and as thicker deposits adjacent to perennial streams including Currant Creek, Tallahassee Creek, and the Arkansas River. The sedimentary rocks rest unconformably on granite near the southern boundary of the Sale Area and are in fault contact with granite along the Parkdale Fault north of the Sale Area and unnamed faults near the southeast and southwest portions of the Sale Area (Figure 3.5-6, Appendix C).

The faults are believed to cause some compartmentalization of groundwater flow across the structures by the disruption of stratigraphy and juxtaposition of rock types with different hydraulic characteristics.

Groundwater levels within the Sale Area have been evaluated by three monitoring wells installed by the Proponent (Figure 3.5-4, Appendix C). The wells were installed in cored boreholes that were drilled to depths of about 250 feet below ground surface (Table 3.11**)**. The observed depths to groundwater ranged from about 10 to 128 feet, and water levels in the wells fluctuated by up to 24 feet during four monitoring events completed between December 2018 and August 2019 (Table 3.12**)**. Water level elevations in the monitoring wells ranged from about 6,027 to 6,262 feet and indicate a southeast flow direction away from Cactus Mountain toward Tallahassee Creek and the Arkansas River. The observed groundwater elevations ranged from about 87 to 322 feet higher than the planned minimum pit floor elevation of 5,940 amsl for Alternative A. The need and method for dewatering the proposed quarry is discussed in Section 3.5.2.1, *Direct and Indirect Effects from Alternative A.*

Table 3.11. Completion Details for Monitoring Wells and Exploration Boreholes

Well ID	Latitude	Longitude	Casing Elevation (ft. amsl)	Total Depth (ft. btoc)	Well Casing	Screened Interval (ft. btoc)
PD-1	38.496541°	-105.382685°	6,252.7	239	2-inch PVC	20-239
PD-3	38.499052°	-105.399946°	6,075.8	249	2-inch PVC	20-249
PD-10	38.504486°	-105.394678°	6,271.6	251	2-inch PVC	20-251

Note: Coordinate locations GCS- NAD 83

amsl = above mean sea level; btoc = below top of casing; ft. = feet

Table 3.12. Summary of Measured Groundwater Levels in Monitoring Wells

Monitored Date	PD-1		PD-3		PD-10	
	Depth to Water (ft. btoc)	*Water Level Elevation (ft. amsl)*	*Depth to Water (ft. btoc)*	*Water Level Elevation (ft. amsl)*	*Depth to Water (ft. btoc)*	*Water Level Elevation (ft. amsl)*
12/7/2018	103.63	6149.11	47.52	6028.23	11.19	6260.37
12/11/2018	104.13	6148.61	47.55	6028.2	9.76	6261.8
5/14/2019	123.99	6128.75	38.38	6037.37	10.17	6261.39
8/29/2019	127.71	6125.03	49.19	6026.56	18.69	6252.87

amsl = above mean sea level; btoc = below top of casing; ft. = feet

Information about the permeability (hydraulic conductivity) and transmissivity of the granitic rocks within the Sale Area are available from single well tests performed in the monitoring wells listed in Table 3.11. The results of the tests are summarized in Table 3.13 and indicated hydraulic

conductivity values ranging from 0.0019 to 0.0065 ft./day (ERM 2019). The average hydraulic conductivity from the three tests was calculated to be 0.0039 ft./d, which is assumed to be the best estimate of the average hydraulic conductivity of the fractured granitic rocks below a depth of about 20 feet (ERM 2019). The granite body within the Sale Area is not considered to be an aquifer under the generally accepted definition because the average hydraulic conductivity of the rock mass is too low to consistently transmit economic quantities of water to wells. Bedrock with this range of observed hydraulic conductivity is generally considered to be an aquitard if it is located between two units with higher hydraulic conductivity.

Site-specific hydraulic conductivity data are not available for weathered granite, sedimentary rocks or alluvium near the proposed quarry expansion, but typical values for weathered granite range from about 0.9 to 15 ft./day (Domenico and Schwartz 1990). Typical hydraulic conductivity values for fractured sandstone range from about 0.003 to 3 ft./day, and typical values for alluvium range from about 3 to 300 ft./day (Spitz and Moreno 1996).

Table 3.13. Summary of Pumping Test Results

Well ID	Average Pumping Rate (gpm)	Pumping Duration (min)	Maximum Drawdown (ft.)	Saturated Thickness (ft.)	Transmissivity ($ft.^2/d$)	Hydraulic Conductivity (ft./d)
PD-1	0.136	110	10.5	134.9	0.26	0.0019
PD-2	0.716	74	99.8	201.4	0.63	0.0031
PD-3	0.960	102	≈128	241.2	1.57	0.0065

ft. = feet; $ft.^2/d$ = foot squared per day; gpm = gallons per minute; min = minutes

Groundwater quality data for the Sale Area are available from six samples that were collected from the monitoring wells listed in Table 3.11. The wells were monitored for field parameters, major ions, dissolved metals, and radionuclides during two sampling events completed in December 2018 and May 2019. Monitoring results indicate that groundwater at the site has near neutral pH (6.64-7.71) low to moderate concentrations of total dissolved solids (318-437 mg/l) and generally meets water quality standards for drinking water with the exception of gross alpha radiation and uranium (ERM 2019). Groundwater quality data for the site are presented in Appendix F.

In addition to site-specific groundwater data that were developed for the Sale Area, well records from the Colorado Division of Water Resources (DWR) were reviewed to identify other wells and groundwater users within the analysis area. The database search found 97 wells that were listed as either being constructed or replaced within the area of interest (Figure 3.5-5, Appendix C). The majority of wells are reported as being located east and northeast of the Sale Area in areas that are underlain by cretaceous-age sedimentary rocks **(**Figure 3.5-6, Appendix C). Eight of the wells are reported to be located within the granitic rocks on the north side of Cactus Mountain, but review of aerial photographs and well construction reports indicates that the locations are misreported and that the wells are actually completed in sedimentary rocks north of the Parkdale Fault **(**Figure 3.5-6,

Appendix C). The exact locations of the wells are unknown, but with the exception of the three monitoring wells installed by the Proponent, no wells are located in the granite within the fault block defined by the Parkdale Fault and unnamed faults 1 and 2 **(**Figure 3.5-6, Appendix C). A summary of primary water uses for wells in the analysis area is presented in Table 3.14. DWR well records are presented in Appendix G.

An analysis of the completion water levels for wells reported in the DWR database indicates that groundwater elevations in the analysis area vary widely, ranging from 5,657 to 7,041 feet elevation. The variation occurs over relatively short distances and often exceeds 100 to 200 feet between wells that are located within 1,000 to 2,000 feet of each other. The accuracy of the water level analysis is affected by a number of factors including the accuracy of the reported well locations and surface elevations, completion details for individual wells, and the range of time over which the groundwater levels were measured, but the reported variability is consistent with groundwater systems in low-permeable rocks that are poorly inter connected over short distances.

Table 3.14. Summary of Primary Water Uses for Wells within the Analysis Area

Primary Water Use	Count
Commercial	3
Domestic	56
Domestic, Industrial	1
Domestic, Irrigation	1
Domestic, Stock	21
Domestic, Storage	1
Household Use Only	7
Stock	4
Monitoring	2
Other	1
Total	**97**

3.5.2. Environmental Effects

3.5.2.1. Direct and Indirect Effects from Alternative A

Four issues for surface water and groundwater resources were determined during the scoping process for the proposed Parkdale Quarry Expansion. The issues are related to: (1) the water usage requirements and sources of water for the proposed mine expansion; (2) the need for active dewatering of the pits to facilitate mining in the expansion area; (3) the potential effects of mining in the Sale Area on surface water and groundwater quality, quantity, and current water users; and,

(4) how the existing water monitoring plan would be modified to incorporate mining in the expansion area.

Issue 1: Water Usage Requirements and Sources.

The current quarry operation uses about 1,500 gallons of water per minute (gpm), most of which is recycled water that is used at the wash plant or is applied to roads for dust control. It is expected that water usage under Alternative A would be similar to current usage by the quarry. Water for the quarry is obtained from tributary groundwater that collects in the completed alluvial pit and is augmented as needed by water from Tallahassee Creek under a state reviewed and approved withdrawal permit. Water shares are leased from the Board of Water Works of Pueblo, the Twin Lakes Reservoir and Canal Company, and the Cañon City Water Department to allow the use of groundwater and surface water by the mine. Alternative A would continue to use these sources of water for mining operations in the Sale Area and the potential effects of water usage under Alternative A would be the same as the effects of the currently permitted usage.

Issue 2: Need for Active Dewatering of the Pits.

The need for active dewatering of the pits to facilitate mining in the Sale Area was evaluated based on observations on groundwater inflow to the current quarry operation and scoping-level calculations of inflow performed by ERM (2019) and Whetstone (2020a). The analysis by ERM used two types of analytical calculations: one for southwest linear flow towards the quarry highwall and one for radial flow to a semicircle representing the northeast portion of the quarry. Both calculations assumed the following conditions:

- The hydraulic conductivity of the granitic rocks is equal to the average of the testing data in Table 3.13 (i.e., 0.0039 ft./day).
- Specific yield of the granitic rocks is equal to 0.01.
- The quarry is instantaneously excavated to full depth at time zero.
- Groundwater drawdown at the quarry wall would be 300 feet.
- The thickness of the permeable fractured bedrock is 500 feet.
- Groundwater flow is horizontal.
- The potentially affected area has homogeneous characteristics, is unbounded, and has infinite aerial extent.

The analysis by Whetstone used the groundwater modeling software MODFLOW-SURFACT V.4.0- (Hydrogeologic 2011) and a similar set of assumptions with the following exceptions:

- The potentially affected area is bound (no flow) to the south by the Arkansas River. The river elevation is below the planned elevation of the pit floor and therefore the cone of depression caused by groundwater drawdown cannot expand past this boundary.
- The potentially affected area is also bound (no flow) by Currant and Tallahassee Creeks where the elevations of the drainages are below the minimum level of the planned pit floor.

The analyses by ERM and Whetstone generally provide similar estimates of groundwater inflow to the quarry. ERM estimated that inflows during mining were likely to range from 15 to 25 gpm (ERM 2019). These values are consistent with observed flows from the existing quarry face, which is about 270 feet high and typically has little or no seepage except after precipitation events and during spring snowmelt. Whetstone estimated an inflow rate of 27 gpm to the quarry at its full extent after 100 years of mining (Whetstone 2020a). This estimate is considered to be conservatively high because groundwater systems in fractured granite bodies with low hydraulic conductivity tend to be poorly connected over broad areas and the Parkdale and unnamed fault 2 are likely to act as boundaries to the north and east (Whetstone 2020a). Under any circumstance, the predicted inflows are low enough to not be of operational consequence, and advanced dewatering of the quarry by pumping from groundwater wells would not be required to facilitate mining. Free flowing groundwater that enters the quarry during mining would be routed to settling ponds for re-infiltration to groundwater or discharge to Currant or Tallahassee Creek. Water in settling ponds would be monitored for suspended sediment and turbidity to ensure that it meets applicable standards prior to any surface release.

Issue 3: Potential Effects of Mining in the Sale Area on Surface Water and Groundwater Quality, Quantity, and Current Water Users.

The potential effects of Alternative A on surface water and groundwater quality, quantity, and current water users in the analysis area were evaluated using the following methods: stormwater runoff modeling by Whetstone (2020b, Appendix F), the previously discussed scoping-level calculations and modeling by ERM and Whetstone (ERM 2019 [Appendix K], Whetstone 2020a [Appendix F]), evaluation of the hydrogeologic setting of wells and springs relative to the proposed mine expansion area, comparison of groundwater quality data from monitoring wells in the Sale Area to water quality data for Currant and Tallahassee Creeks, and comparison of the estimated area of potential groundwater drawdown related to mining to the locations of wells and groundwater users identified in the DWR database.

Development of Alternative A could affect groundwater levels and availability in the Analysis Area. The quarry would be developed in a structurally isolated block that is bound to the north by the Parkdale Fault and to the east and west by unnamed faults 1 and 2. The drainages for Currant Creek, Tallahassee Creek, and the Arkansas River also form hydrologic boundaries west and

south of the Sale Area because their elevations are below the level of the planned pit floor and the cone of depression associated with mine dewatering would not be able to expand into areas that are below the lowest elevation that would be dewatered. The streams would also act as sources of groundwater recharge that would maintain groundwater elevations at constant levels adjacent to the waterbodies.

The potential for impacts to existing groundwater users was evaluated using scoping-level calculations and modeling by ERM (2019, Appendix K) and Whetstone (2020a, Appendix F). The analyses were used to define the area in which groundwater levels could be theoretically reduced by 5 feet or more after 100 years of mining (Figure 3.5-5, Appendix C) and incorporates numerous simplifying but conservative assumptions. The most important assumptions that affect the results of the evaluation are that groundwater near the proposed quarry expansion is well connected over a broad area that has consistent hydrogeologic properties, and that groundwater levels are drawn-down to the lowest level of the final pit floor at the start of mining. In reality, available water level data from DWR well records suggest that groundwater is poorly connected over relatively short distances, and drawdown associated with pit dewatering would occur gradually over the expected 100-year life of the mine. Other factors that result in overprediction of drawdown in areas distal to the proposed quarry include hydrologic boundaries that are not considered such as the Parkdale Fault, unnamed fault 2, and the Mikesell Gulch Fault (Figure 3.5-6, Appendix C). Unnamed fault 1 has less effect on the analysis because the drainage for Currant Creek is simulated as a no-flow boundary in the Whetstone model (Whetstone 2020a, Appendix F) and is located in the same general area as unnamed fault 1. Sedimentary rocks that are in fault contact with the granite north and south of the Sale Area are expected to have higher hydraulic conductivity than the granite and are also recharged by water from perennial sections of Currant and Cottonwood creeks that lose flow to groundwater and become intermittent near State Highway 9. A number of smaller intermittent drainages located northeast of the highway also contribute runoff that infiltrates into to the sedimentary rocks. The higher hydraulic conductivity of the sedimentary rocks and additional recharge from surface water are not considered in the analyses by ERM and Whetstone, which tends to increase the conservatism of the predicted drawdowns along the State Highway 9 corridor.

The results of the analytical calculations (Appendix K) and numerical model (Appendix F) for Alternative A predict groundwater drawdowns of between 5 and 30 feet for wells located in sedimentary rocks north of the Parkdale Fault **(**Figure 3.5-6, Appendix C). This prediction is considered to be a conservative overestimation based on the previously discussed rational. With the exceptions of wells 276232, 238087, 30210MH, and 203262, wells that are located within the zone of potential impacts east of the Sale Area in the fault block between unnamed fault 2 and the Mikesell Gulch Fault and southeast of the Mikesell Gulch Fault have water level elevation that are below the lowest elevation of the proposed pit or they are located on the opposite side of Bumback Gulch, which has surface elevations below the level of the proposed pit. These wells have negligible potential to be impacted by drawdown related to mine dewatering. Wells 276232 and 238087 have reported water level elevations of 6,164 feet and predicted drawdown at the well

locations is about 25 feet. Wells 30210MH and 203262 have reported water level elevations between 6,194 and 6238 feet and drawdown in this area is predicted to be about 8 feet. Potential drawdown impacts to wells would be permanent to the extent that they would actually occur.

Alternative A would lower groundwater levels in the quarry area by up to about 300 feet and would result in the elimination of flows from Parkdale South, Cactus Mountain, and Cactus Mountain South Springs, which would be in, or immediately adjacent to the pit. The BLM-held federal reserved water rights on Cactus Mountain Spring and Parkdale Spring would be affected because the springs would cease to flow. This impact would be permanent and major, but could be mitigated by development of surface water impoundment(s) or the installation of groundwater wells for wildlife and livestock watering within the Sale Area as the impacts are observed to occur. Drawdown of groundwater levels outside of Sale Area under Alternative A also has the potential to reduce or interrupt flows from springs located within the zone of potential impacts shown on Figure 3.5-6 (Appendix C). This would affect the associated water rights. The impacts would be permanent and major but could be mitigated by the installation of wells or construction of surface water impoundments should they occur. The pre-mining groundwater flow direction in the Sale Area is south to southeast toward Tallahassee Creek and the Arkansas River under a gradient of 0.89 ft./ft. (Whetstone 2020c, Appendix F). After mining and reclamation of the site, the gradient will be in the same direction but will be lower. The post-mining groundwater gradient in the quarry is estimated to be 0.024 ft./ft. based on the slope of the reclaimed pit floor.

Groundwater quality under Alternative A could be affected in the area of the planned quarry. The potential impacts include increases in total dissolved solids (TDS) and nitrogen species (nitrate and nitrite) from mining and controlled subsurface blasting. These impacts would be localized and temporary during active mining and may be mitigated by monitoring and modification of mining practices if impacts are observed. Alternative A is not expected to affect the quality of groundwater accessed by existing users at wells or springs outside of the Sale Area.

The Sale Area currently drains south to southwest with the majority of surface water runoff flowing to Currant Creek and Tallahassee Creek through three main drainage areas (Figure 3.5-1, Appendix C). Once mining is complete, the topography of the quarry would generally slope in the same direction as the pre-mining surface and drainage channels would be excavated into the quarry floor to maintain the current general patterns of runoff. The drainage channels would be constructed with profiles and sinuosity similar to natural drainages in Webster Park that feed into the south side of the Arkansas River. Under Alternative A, streamflow and water quality could be affected in Currant and Tallahassee creeks. Development of the quarry would modify the topography of areas tributary to the creeks and affect the timing and volume of runoff reporting to the creeks. The removal of mountainous terrain by the proposed quarry and restoration of the land to a broad, gently sloping valley may affect the temperature of runoff reporting to Currant and Tallahassee Creek. This effect would be permanent, but is expected to be insignificant to minor because the disturbed area of the quarry would represent less than 1.4 percent of the total watershed area for the Tallahassee Creek-Currant Creek Watershed (Whetstone 2020b).

Potential impacts to surface water flow rates in Currant Creek and Tallahassee Creek were evaluated using HydroCAD modeling software and the NRCS TR-55 method. The models estimated the surface water runoff from the Sale Area under existing conditions, which were then compared to the potential runoff after mining disturbance and reclamation. The stormwater runoff modeling (Whetstone 2020b, Appendix F) indicates that the reduction of slopes in the quarry area and change in vegetation after reclamation could increase the volume of runoff reporting to the creeks by 160 percent for the 100-year precipitation event and by 220 percent for the 10-year precipitation event. This would consequently decrease infiltration of precipitation and snowmelt to groundwater. Decreased infiltration to groundwater and the reduced groundwater gradient in the quarry would result in decreased baseflows to the creeks that would be offset by increased streamflows during major storm events. The calculated reductions in baseflows to Currant Creek and Tallahassee Creek under Alternative A are 0.00012 cfs (0.053 gpm) and 0.00028 cfs (0.124 gpm) respectively (Whetstone 2020c, Appendix F). Under assumed low-flow conditions of 0.1 cfs for Currant Creek and 0.5 cfs for Tallahassee Creek, the reductions in baseflows would be 0.12 percent and 0.06 percent of the total streamflows, respectively (Whetstone 2020c, Appendix F).

Runoff from the site during mining could have increased turbidity, sediment, and elevated concentrations of nitrate and nitrite, but it would be routed to settling ponds and monitored to ensure that it meets applicable water quality standards prior to being discharged to either Currant or Tallahassee Creek. Runoff from the reclaimed quarry is expected to be similar in quality to the pre-mining condition and would not require settling before being allowed to flow into Current and Tallahassee creeks. Potential impacts to streamflows in Currant and Tallahassee creeks could decrease over time as vegetation returns to native pinyon-juniper canopy. The increase in runoff predicted by the stormwater modeling is small relative to the total runoff from the Currant and Tallahassee Creek watershed (Whetstone 2020b, Appendix F) because the modeled area (1.6 mi^2) represents less than 1.4 percent of the total watershed area for the Tallahassee Creek-Currant Creek Watershed (118.3 mi^2). The annualized increase in runoff in Tallahassee Creek below the Sale Area, calculated from the probability-weighted changes in runoff for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year storms, is 0.067 cfs (Whetstone 2020b, Appendix F). The Intergovernmental Panel on Climate Change fifth assessment report (IPCC 2014) projects that Colorado will warm by +2°F to +6.5°F by mid-century, but indicates that there is a lack of consensus about potential changes in precipitation with models projecting between -5 percent to +8 percent change in annual precipitation. Climate change has the potential to increase or decrease the frequency and intensity of precipitation events, which may increase or decrease the percentage of water that runs off from the site under Alternative A. Potential impacts to water quality from storm water runoff would be mitigated by the use of BMPs to control turbidity, sediment, and nitrogen in runoff and by monitoring to ensure that runoff collected in sediment ponds meets applicable water quality standards prior to release to the surrounding drainages.

Issue 4: How would surface water and groundwater be monitored for the proposed mine expansion?

Mining in the Sale Area under Alternative A has the potential to reduce groundwater levels within the area shown on Figure 3.5-5 (Appendix C) and reduce water availability to nearby wells and springs. Potential impacts to groundwater quality may include increased TDS, nitrate, and nitrite concentrations within the mining area. Potential impacts to Currant and Tallahassee Creeks under Alternative A include increased runoff during storm events and the alteration of patterns of streamflow. Water quality impacts to Currant and Tallahassee creeks may include increased levels of turbidity, temperature, TDS, suspended solids, and nitrogen species (nitrate and nitrite) in runoff and baseflow from the mining area. A monitoring plan would be developed that requires operational and post reclamation monitoring in areas adjacent to the mine to detect changes in groundwater levels that could affect groundwater availability to springs and wells and allow for the timely mitigation of impacts if any. Monitoring would also be implemented between the proposed quarry and Currant and Tallahassee creeks to detect changes in shallow groundwater chemistry that could affect baseflow reporting to the creeks. Potential impacts to surface water would be evaluated by establishing streamflow and water quality monitoring stations on Currant and Tallahassee creeks. The monitoring plan would also require monitoring of spring flows and water quality for springs located within the area of potential impacts south of the Parkdale Fault (Figure 3.5-6, Appendix C).

Protective/Mitigation Measures

Potential impacts to water resources under Alternative A include:

- Alteration of groundwater levels and reduction of groundwater availability to users and springs located within the area shown on Figure 3.5-5 (Appendix C).
- Elimination of spring flows within the proposed quarry footprint and elimination of the water source for the Federal Reserved Water Right on Parkdale and Cactus Mountain Springs.
- Alteration of groundwater quality near the proposed quarry including increased concentrations of TDS, nitrate and nitrite.
- Increased runoff to Currant and Tallahassee creeks during storm events and alteration of patterns of streamflow caused by changes in runoff and baseflow from the proposed quarry area.
- Alteration of water quality in Currant and Tallahassee Creeks including increased turbidity and concentrations of TDS, suspended solids, nitrate and nitrite.

Mitigation Measure W1: Develop Water Monitoring Plan

Mitigation to minimize impacts of groundwater availability to users near Alternative A would include monitoring to detect changes in groundwater levels in and around the Sale Area. If

lowered levels are observed in monitoring areas anticipated to directly be affected by the mining activities, then the following protocol will be followed:

1. Initiate a focused analysis, at the expense of the operator and in coordination with applicable regulatory agencies, to better determine if the lowered water levels can be attributed to the mining activity.
2. If the lowered water levels can be directly attributed to the mining activity, then the operator will need to initiate actions for timely replacement of affected water supplies by the drilling new wells, deepening existing wells or other comparable action.

Mitigation of potential impacts to streamflow and surface water and groundwater quality would include monitoring to detect changes to allow for adaptive management of mining practices if adverse impacts are observed.

If monitoring indicates that reductions in spring flows or streamflows are occurring and that these reductions are probably caused by mine induced drawdown, the following measures would be implemented:

1. The BLM would evaluate the available information and determine if mitigation is required;
2. If mitigation is required, Proponent would be responsible for preparing a detailed, site-specific plan to enhance or replace the impacted water resources. The mitigation plan would be submitted to the BLM identifying drawdown impacts to surface water resources. Mitigation would depend on the actual impacts and site-specific conditions and could include a variety of measures including flow augmentation, and on-site or off-site improvements). Methods for providing a new water source or improving an existing water source may include, but are not limited to:
    a. Installation of a water supply pump in an existing well (e.g., monitoring well) – this could provide replacement water for directly impacted Cactus Mountain Spring and Parkdale Spring
    b. Installation of a new water production well
    c. Piping water from a new or existing source
    d. Installation of a guzzler
    e. Enhanced development of an existing seep to promote additional flow
    f. Fencing or other protection measures for an existing seep to maintain flow

An approved site-specific mitigation plan would be implemented followed by monitoring and reporting to measure the effectiveness of the implemented measures. If initial implementation were unsuccessful, the BLM may require implementation of additional measures.

Effectiveness

Feasibility and success of mitigation would depend on site-specific conditions and details of the monitoring and mitigation plan.

Mitigation Measure W2: Loss of Springs and Federal Reserved Water Right

Mitigation of the springs and Federal Reserved Water Right that would be eliminated by Alternative A would include the development of alternative perennial sources of water within the reclaimed quarry footprint including the creation of small surface water impoundments that could be used by wildlife. Alternatively, the BLM may require the proponent to provide alternative water supply for wildlife though the pumping and delivery of water from existing or new groundwater production wells to surface water impoundments or wildlife guzzler installations.

Two of the springs that may be impacted by the proposed action are federally reserved water rights that are considered "Public Water Reserves". Although they are not shown on the plats, the springs are "withdrawn". So, in order to have a potential impact, the withdrawals have to be revoked, which could be a 6-9 month process.

Effectiveness

Feasibility and success of mitigation would depend on site-specific conditions and details of the mitigation plan.

Residual Effects

The area of residual mine-related groundwater drawdown is predicted to persist for the foreseeable future around the mine as shown in Figure 3.5-5 (Appendix C). Successful implementation of mitigation measures would minimize or eliminate most residual adverse effects to water resources. However, a permanent reduction of groundwater levels potentially could occur and would comprise a residual adverse effect to individual surface water locations, but would have little effect on the overall water balance of the hydrologic basins.

3.5.2.2. Direct and Indirect Effects from Alternative B

Under Alternative B, the proposed mineral Sale Area would not be developed, and direct and indirect effects to groundwater and surface water resources would not occur beyond those effects resulting from previously authorized disturbance. Under this alternative, the natural watershed in Sale Area would not be disturbed and mining related changes to the patterns of surface water and groundwater flow would not occur.

3.5.2.3. Direct and Indirect Effects from Alternative C

Issue 1: Water Usage Requirements and Sources.

Under Alternative C, the water usage requirements and the sources of water would be the same as for Alternative A. It is expected that the quarry operation would require approximately 1,500 gpm of water for dust suppression and aggregate processing. The water would be obtained from the pit lake in the previously mined alluvium quarry and would be augmented as needed by water from Tallahassee Creek under a state reviewed and approved withdrawal permit.

Issue 2: Need for Active Dewatering of the Pits.

Under Alternative C, the need for dewatering of the mine pits would be the same as for Alternative A. The average groundwater seepage from the working pit face is expected to range from about 15 to 30 gpm (ERM 2019; and Whetstone 2020a), similar to what is observed in the current quarrying operation, and the pits would not require active dewatering to facilitate mining.

Issue 3: Potential Effects of Mining in the Sale Area on Surface Water and Groundwater Quality, Quantity, and Current Water Users.

Alternative C could affect groundwater levels and availability near the Sale Area. The area of potential impacts would be similar in size to Alternative A, but offset to the east (Figure 3.5-7, Appendix C). The results of the numerical model for Alternative C predict groundwater drawdowns of between 5 and 75 feet for wells located in sedimentary rocks north of the Parkdale Fault **(**Figure 3.5-6, Appendix C). This prediction is considered to be a conservative overestimation based on the previously discussed rational. With the exceptions of wells 276232, 238087, 30210MH, and 203262, wells that are located within the zone of potential impacts east of the Sale Area in the fault block between unnamed fault 2 and the Mikesell Gulch Fault and southeast of the Mikesell Gulch Fault have water level elevation that are below the lowest elevation of the proposed pit or they are located on the opposite side of Bumback Gulch, which has surface elevations that would be below the level of the pit floor. These wells have negligible potential to be impacted by drawdown related to mine dewatering. Wells 276232 and 238087 have reported water level elevations of 6,164 feet and predicted drawdown at the well locations is about 65 feet. Wells 30210MH and 203262 have reported water level elevations between 6,194 and 6238 feet and drawdown in this area is predicted to be about 22 feet. Potential drawdown impacts to wells under Alternative C would be permanent to the extent that they would actually occur.

Alternative C would lower groundwater levels in the quarry by up to 300 feet and could decrease or eliminate flows from Parkdale, Parkdale South, Cactus Mountain, and Cactus Mountain South springs. The BLM's federal reserved water rights on Cactus Mountain Spring and Parkdale Spring may be adversely affected. This impact has the potential to be permanent and major if it occurs, but could be mitigated by the development of surface water impoundment(s) or the

installation of groundwater wells for wildlife and livestock watering. Drawdown of groundwater levels outside of Sale Area under Alternative C also has the potential to reduce or interrupt flows from springs located within the zone of potential impacts shown on Figure 3.5-7 (Appendix C), which would affect the associated water rights. The impacts would be permanent and major, but could be mitigated by the installation of wells or construction of surface water impoundments should they occur.

Similar to Alternative A, groundwater quality near the quarry could be affected by mining under Alternative C. The potential impacts include increases in total dissolved solids (TDS) and nitrogen species (nitrate and nitrite) from mining and controlled subsurface blasting. These impacts would be localized and temporary during active mining and may be mitigated by monitoring and modification of mining practices if impacts are observed. Alternative C is not expected to affect the quality of groundwater accessed by existing wells outside of the Sale Area but could affect the quality of water discharged from Campbell King Spring 1.

Under Alternative C, streamflow and water quality could be affected in Tallahassee and Currant creeks. Development of the quarry under Alternative C would modify the topography of areas tributary to the streams and affect the timing and volume of runoff in the intersected drainages. Increased runoff from the site during mining may have elevated levels of turbidity, sediment, nitrate, and nitrite, but it would be routed to settling ponds and would be monitored to ensure that it meets applicable water quality standards prior to any discharge to the Tallahassee Creek drainage or the intermittent drainage above Campbell King Spring 1. Potential impacts to streamflow in Tallahassee Creek would include increased runoff during storm events, which would be permanent but negligible to minor because the disturbed mining area would represent less than 1.4 percent of the total watershed. A small portion of a drainage tributary to Currant Creek would be permanently captured by the quarry under Alternative C. The potential reduction in runoff to Currant Creek by capture of the drainage area would be negligible because the captured area would represent less than 0.1 percent of the total watershed for Currant Creek. Potential decreases in baseflow to Tallahassee and Currant creeks would be similar to Alternative A because dewatering of the quarry would draw down the water table in the area of the streams.

Potential impacts to the water quality of the streams would be mitigated by the use of BMPs to control turbidity, sediment, and nitrogen in runoff and by monitoring to ensure that runoff collected in sediment ponds meets applicable water quality standards prior to any surface release. The removal of mountainous terrain by Alternative C and restoration of the land to a broad, gently sloping valley may have long-term effects to the temperature of runoff reporting to Tallahassee Creek. This effect would be permanent, but is expected to be negligible to minor because the disturbed area of the quarry would represent less than 1.4 percent of the total watershed area for the Tallahassee Creek-Currant Creek Watershed (Whetstone 2020b).

Issue 4: How Would the Existing Water Monitoring Plan be Modified to Incorporate Mining in the Expansion Area?

Under Alternative C, a monitoring plan would be developed that would be similar to the one for Alternative A. The monitoring plan would require operational and post reclamation monitoring in areas adjacent to the mine to detect changes in groundwater levels that could affect groundwater availability to springs and wells and allow for the timely mitigation of impacts if any. Monitoring would also be implemented between the proposed quarry and Tallahassee Creek to detect changes in shallow groundwater chemistry that could affect baseflow reporting to the creeks. Potential impacts to surface water would be evaluated by establishing streamflow and water quality monitoring stations on Tallahassee and Currant creeks. The monitoring plan would also require monitoring of spring flows and water quality for springs located within the area of potential impacts south of the Parkdale Fault (Figure 3.5-6, Appendix C).

Protective/Mitigation Measures

Mitigation of direct and indirect impacts to water resources under Alternative C would be the same as for Alternative A and would include:

- Monitoring to detect changes in groundwater levels outside of the Sale Area and allow for timely replacement of affected water supplies by the Proponent by drilling new wells or deepening existing wells.
- The development of alternative sources of water including surface impoundments within or near the Sale Area to replace or augment spring flows that could be reduced by mining.
- Monitoring of streamflow and surface water and groundwater quality to detect changes and allow for adaptive management of mining practices if adverse impacts are observed. Spring flow and water quality monitoring at the Campbell King Spring 1 would be required under Alternative C.

Residual Effects

Residual effects are anticipated to be similar to those discussed under Alternative A.

3.5.3. Cumulative Effects Analysis

The CESA for water resources is the Lower Currant Creek, Royal Gorge, Five Point Gulch-Arkansas River, Tallahassee Creek, and Lower Cottonwood Creek HUC 12 subwatersheds. Reasonably foreseeable future conditions that could cumulatively impact water resources include the projected population increase (36 percent over the next 20 years [Colorado Department of Local Affairs 2017]) combined with the current trend in climate change, which may combine to create an overall decrease in water quantity.

3.6. TERRESTRIAL WILDLIFE

Issue 1: How would the Parkdale Quarry expansion affect the availability and quality of habitat and nesting sites for migratory bird species?

Issue 2: How would the Parkdale Quarry expansion affect the availability and quality of habitat for special status wildlife species?

Issue 3: How would the Parkdale Quarry expansion affect the availability and quality of habitat for bighorn sheep?

3.6.1. Affected Environment

The analysis area for direct and indirect effects on wildlife and aquatic resources is the Mine Plan boundary. The CESAs for wildlife resources are described in Section 3.6.3, *Cumulative Effects Analysis,* and vary depending on the species. CESAs were determined based on wildlife use within the mineral sale regional location and important seasonal habitats for species such as Rocky Mountain bighorn sheep.

Information regarding wildlife species and habitat within the study area and CESAs was obtained from a review of existing published sources, site-specific wildlife and habitat surveys, BLM, CPW, and U.S. Fish and Wildlife Service (USFWS) file information.

3.6.1.1. Existing Habitat

The proposed mineral Sale Area is located near Parkdale, Colorado, adjacent to the existing Parkdale Quarry, and encompasses the southwest side of Cactus Mountain. Elevations in the mineral material Sale Area range from approximately 5,790 ft. to 6,960 ft. Existing wildlife species and habitats are typical of the Front Range foothills of southeastern Colorado (Cedar Creek 1997).

As indicated in Table 3.15, National Land Cover Data (NLCD) indicates that the majority of wildlife habitat in the study area consists primarily of evergreen forest (53 percent) and shrub/scrub (47 percent) (Figure 3.6-1, Appendix C). Field surveys confirmed that the study area is dominated by pinyon-juniper evergreen forest and shrub/scrub consisting predominantly of pinyon pine (*Pinus edulis*), Rocky Mountain juniper (*Juniperus scopulorum),* one-seed juniper *(Juniperus monosporum),* Gambel oak (*Quercus gambelii*) and mountain mahogany (*Cercocarpus montanus*) (ICF 2019). Piñon-juniper habitat in the study area may provide an important supply of pine nuts and juniper berries as a winter food source for wildlife. Wildlife commonly found in the piñon-juniper habitat include western scrub-jay, juniper titmouse, gray flycatcher, blacktail jackrabbit, cliff chipmunk, mule deer and elk. Predators common in this habitat include gray foxes and raptors such as red-tailed hawks (Marcus et. al. 2011).

Mountain scrub/shrubland habitat provides valuable food and cover for many wildlife species. Many shrub species produce edible fruits, and they provide a large selection of forage types. Gambel oak acorns are an important mast crop in many areas. Birds such as band-tailed pigeon, wild turkey, Lewis's woodpecker, Steller's jay, western scrub-jay, and green-tailed towhee feed on the acorns. Other birds such as the Virginia's warbler utilize mountain shrub habitat for resting, feeding, and nesting. Dusky flycatcher, Virginia's warbler, and green-tailed towhee are associated with Gambel oak and other shrub habitat (BLM 2017a).

Table 3.15. National Land Cover Data (NLCD) Designations within the Study Area

Mineral Sale Area	Evergreen Forest (acres)	Shrub/Scrub (acres)	Total[1] (acres)
Phase 1 – West Pit	29.5	51.2	80.7
Phase 2 – West Central Pit	106.5	61.1	167.6
Phase 3 – Central Pit	112.1	124.5	236.6
Phase 4 – East Central Pit	73.4	38.9	112.3
Phase 5 – East Pit	48.7	58.6	107.3
Total	**370.2**	**334.3**	**704.5**

Source: USGS 2016

[1] Totals may vary due to rounding.

The study area consists of very steep rugged terrain. Rock outcrops and cliffs existing in the mineral Sale Area are numerous and may serve as important habitat for yellow-bellied marmot, rock squirrel, bush-tailed woodrat, and swallows. Ledges and cavities in cliff areas could provide suitable nesting habitat for cliff-nesting raptors such as red-tailed hawk, prairie falcon, golden eagle, and great horned owl.

The study area is situated within the fifth level (Hydrologic Unit Code, HUC: 1102000111) Tallahassee Creek-Currant Creek watershed of the Arkansas Headwaters sub-basin (11020001). Perennial streams located within the watershed are Currant Creek, Cottonwood Creek, North Tallahassee Creek, Tallahassee Creek, Thirtyone Mile Creek, Fear Creek, South Tallahassee Creek, Dicks Creek, North Waugh Creek, Paris Creek, Squaw Creek, Middle Tallahassee Creek, Kelly Creek, Freshwater Creek, Salt Creek, and West Waugh Creek. All Perennial/intermittent streams originating from this watershed drain into Tallahassee Creek. Tallahassee Creek is a tributary of Arkansas River (BLM 2017a).

An analysis of National Hydrology Data (NHD) and field surveys confirm that sources of available water for wildlife consumption are limited within the study area (USGS 2019; ICF 2019). Surface water features include a few intermittent streams, Currant Creek, and Tallahassee Creek (Table 3.16**)**. Tallahassee Creek supports narrow strips of mesic meadows and forest/shrub wetland vegetation along its banks. Riparian-specific features include willow and herbaceous riparian habitats (ICF 2019). The majority of the runoff in the study area flows to Currant Creek and

Tallahassee Creek through three main intermittent drainage areas. The Arkansas River is located to the south of the Sale Area and the existing Parkdale Quarry.

Table 3.16. Surface Water and Wetland Resources within the Study Area

Mineral Sale Area	Intermittent Stream (miles)	Riverine Wetlands (acres)
Phase 1 – West Pit	0.28	0.7
Phase 2 – West Central Pit	1.36	3.2
Phase 3 – Central Pit	2.54	6.1
Phase 4 – East Central Pit	0.64	1.5
Phase 5 – East Pit	0.47	1.1
Total	**5.29**	**12.6**

Sources: USGS 2019; USFWS 2019

3.6.1.2. Big Game Species

Big game species are managed by CPW, with range designations and migration corridors for each species delineated across the entire state. CPWs strategic plan defines that game populations are to be managed in accordance with a Data Analysis Unit (DAU) plan. A DAU is the geographic area that represents the year-round range of a big game herd and includes all of the seasonal ranges for a specific herd. Each DAU is typically composed of several Game Management Units (GMU). Mule deer (*Odocoileus hemionus*), bighorn sheep (*O. canadensis canadensis*), black bear (*Ursus americanus*) and mountain lion (*Puma concolor*) are the only big game animals likely to be found in the study area (Cedar Creek 1997). The study area occurs entirely within CPW's Management Area 13, specifically big game hunting unit 58 (CPW 2019a).

Rocky Mountain bighorn sheep and mule deer are the primary big game species within the study area. Mule deer and big horn sheep population numbers fluctuate from year-to-year based on habitat conditions. Limiting factors within the study area include water availability, and amount of suitable quality habitat. Seasonal use and movement patterns in the vicinity of the study area depends on weather and forage availability and quality.

Mule Deer

Mule deer are distributed statewide in all ecosystems in Colorado. They are most abundant in shrublands in rough, broken terrain where abundant food and cover are provided (Cedar Creek 1997). The study area is located within mule deer overall range and severe winter range (Figure 3.6-2 and Figure 3.6-3, Appendix C) (CPW 2019d). Mule deer use of the study area is variable with populations exhibiting seasonal movement as a result of elevational migration in response to snow cover. The majority of the study area is used by mule deer as early spring and winter range, although some may occur in the study area on a year-round basis (BLM 2017a).

The study area is located within CPW's Cripple Creek DAU D-16 and GMU 58 for mule deer (Figure 3.6-2, Appendix C). Herd management of mule deer in D-16 is conducted like most herds in Colorado (CPW 2007). Post-hunt population estimates for 2018 indicate that the mule deer population in D-16 was approximately 13,400 individuals (CPW 2019b). CPWs current population objective for D-16 is to target a post-season population of 16,000 to 20,000 deer with a post-season composition of 30 to 35 bucks/100 does (CPW 2007).

Bighorn Sheep

Bighorn sheep utilize the areas in and around the study area on a year-round basis including Bighorn Sheep Canyon, Cactus Mountain, and the Royal Gorge (BLM 2017a). The study area is geographically located within bighorn sheep overall range and severe winter range, which support seasonal migration of bighorn sheep (Figure 3.6-4 and Figure 3.6-5, Appendix C). Herds in Colorado typically migrate between higher elevation summer ranges and lower elevation winter ranges. Severe winter range is defined as part of the winter range where 90 percent of the individual animals are located when the annual snowpack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten (BLM 2017a). CPW has been collecting GPS collaring data on 15 individual bighorn sheep in the study area for several years. The collaring data collected through the study supports CPW's Species Activity Map (SAM) data, which indicates that the local population tends to use habitat in the study area predominantly during winter and early spring (CPW 2019d). Bighorn sheep in the study area generally migrate to higher elevations along the Arkansas River or to the Royal Gorge in March and April.

Bighorns are adapted to a wide variety of habitats. Preferred habitat is provided in areas dominated by rock cover, grass, and shrubs with very steep rugged escape terrain in areas with good visibility (George et al. 2009). In general, bighorn sheep populations in Colorado are not evidently limited by availability of suitable habitat. Winter habitat is more likely to be limiting for bighorn sheep in Colorado. During winters, bighorns often are forced to concentrate on windswept ridges or move to lower elevations where human impacts on habitat are more prominent. CPW considers bighorn sheep susceptibility to domestic livestock diseases the primary factor limiting Rocky Mountain bighorn sheep populations in Colorado (George et al. 2009).

The mineral Sale Area is located within the bighorn sheep Arkansas River GMU S07 and DAU 09 (Figure 3.6-4, Appendix C). Two ram hunting licenses are issued per year in this game management unit, with hunter success being close to 100 percent in most years (CPW 2019c) Levels of hunting activity within the study area are unknown, but are likely to be minimal due to the limited public access and difficult terrain. Rams have been harvested several miles upriver, but none have been confirmed within the Sale Area (CPW 2019c).

Post-hunt population estimates over the past several years for GMU S07 show that the population has remained close to 80 individuals (CPW 2019c). No herd management plan has been completed for DAU 09; however, CPW's bighorn sheep management plans and goals include maintaining or increasing the size of existing herds and populations, with emphasis given to the

larger herd complexes (DAUs), or core populations, that represent groups of interconnected herds within a mountain range. Forays (long-distance periodic movements among populations) by bighorn sheep maintain connectivity between populations (or between herds).

Rocky Mountain bighorn sheep are a BLM Colorado-designated sensitive species (BLM 2015) and BLM management of Federal lands to maintain and enhance bighorn sheep habitat is guided by directives outlined in BLM Manual 6840 – Special Status Species (BLM 2008b).

3.6.1.3. Migratory Birds/Raptors

Nongame birds encompass a variety of passerine and raptor species including migratory bird species that are protected under the Migratory Bird Treaty Act (MBTA) (16 C. 703-711) and Executive Order 13186 (66 FR 3853). Migratory bird species protected by the MBTA are listed in 50 CFR 10.13, and the list of protected species is reviewed and updated regularly. Pursuant to Executive Order 13186, a Memorandum of Understanding (MOU) between the BLM and USFWS outlines a collaborative approach to promote the conservation of migratory bird populations. Additionally, bald and golden eagles are also protected under the Bald and Golden Eagle Protection Act (16 U.S.C.) 668 *et seq.*), which prohibits take and disturbance of individuals and nests. Any actions affecting bald and golden eagle may require development of an eagle conservation plan.

Pinyon-juniper woodlands support the largest number of nesting bird species found in any upland vegetation type in the West (Marcus et al. 2011). In addition to nesting birds, it is likely that birds such as passerines and raptors may migrate through the study area. Although limited in extent, wetland, grassland, and wooded areas throughout the study area may provide important stopover habitat for migrants or individuals during pre- and post-breeding movements.

The study area is located in the Southern Rockies/Colorado Plateau Bird Conservation Region (BCR 16) (Figure 3.6-7 Appendix C). An inventory of migratory and resident bird species potentially occurring within the mineral Sale Area was assembled from several sources including U.S. Fish and Wildlife Service Birds of Conservation Concern – 2008 List for BCR 16-Southern Rockies/Colorado Plateau. These species are associated with pinon-juniper and mountain shrub habitats, and are species that have declining populations and should be protected from habitat alterations. Table J.1 in Appendix J identifies the eight migratory bird species identified.

Raptor use of the study area is limited primarily to species associated with shrubland and pinon/juniper habitats in the foothills and lower mountain elevations. No raptors were observed during field surveys of the study area. Raptor species that potentially occur as residents or migrants within the study area include eagles (golden eagles), hawks (e.g., red-tailed hawk) falcons (e.g., prairie falcon, American kestrel), northern harrier, and turkey vulture (Cedar Creek 1997). Suitable nesting habitat is present on or near the study area for most of these species, but no nest sites or evidence of nesting activity of any raptor species were located during field surveys (ICF 2019). Cliff sites are numerous within the study area, but there was no evidence of

raptor nesting activity on any cliff face within the study area (ICF 2019). Mature cottonwoods exist outside the study area along Tallahassee Creek, and could provide suitable nest sites for red-tailed hawk, golden eagle, and great horned owl. Sensitive bird species are discussed further in Section 3.6.1.4, *Special Status Species.*

3.6.1.4. Special Status Species

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed species that are protected under the Endangered Species Act (ESA), and species designated as sensitive by the BLM. In addition, there is a Colorado State protected species list (Colorado Revised Statues, Title 33 Article 1-101) that the BLM has incorporated, in part, into its sensitive species list.

In accordance with the ESA, as amended, the lead agency (BLM) in coordination with the USFWS must ensure that any action that they authorize, fund, or carry out would not adversely affect a federally listed threatened or endangered species. In addition, as stated in Special Status Species Management Policy 6840 (6840 Policy) (Rel. 6-125), it also is BLM policy "to conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA provisions are no longer needed for these species, and to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing of these species under the ESA."

Federally Listed Species

A species consultation list identifying federally listed species potentially occurring in the Sale Area was provided by USFWS through their *Information for Planning and Consultation* (IPaC) online tool. No identified critical habitat and no known occurrences of ESA plant or wildlife species have been observed or have the potential to occur in the study area (USFWS 2019b). In addition, no federal proposed or candidate species are likely to be present within the study area (Table J.2, Appendix J). However, the study area is located within the range of the Mexican spotted owl, a federally listed threatened species.

BLM Special Status Species

A total of 38 special status wildlife species were identified as potentially occurring within the study area (BLM 2019a). These species, their associated habitats, and their potential for occurrence within the study area are summarized in Table J.3. Occurrence potential for each species within the study area and CESA was evaluated for each species based on their habitat requirements and/or known distribution. Fifteen (15) special status wildlife species were identified as having potential to occur within the study area based on habitat requirements and known range distributions.

3.6.1.5. Aquatic Communities

Riparian habitat is minimal within the study area and is limited primarily to areas adjacent to Currant Creek. Some limited areas of riparian vegetation are also associated with isolated spring locations within the study area, and would be removed during mining. Riparian areas in the study area are dominated by plains cottonwoods (*Populus deltoides*), narrowleaf cottonwood (*Populus angustifolia*), thinleaf alder (*Alnus tenuifolia*), and peachleaf willow (*Salix amygdaloides*) (ICF 2019). Currant Creek is located outside the proposed surface disturbance area, therefore no direct effects to riparian communities along Currant Creek are anticipated. Due to insufficient water flow in ephemeral waterbodies within the study area, it is unlikely that wetlands or riparian habitats within the study area support fish species. These areas may support amphibian species. Impacts to aquatic species within the study area would be unlikely. Potential impacts to downstream aquatic communities from decreased water quality from storm water runoff would be mitigated by the use of BMPs to control turbidity, sediment, and nitrogen in runoff and by monitoring to ensure that runoff collected in sediment ponds meets applicable water quality standards prior to release to the surrounding drainages. A Stormwater Management Plan (SMP) and Spill Prevention, Control, and Countermeasures (SPCC) Plan also would be required for compliance under additional permitting authorities as described in Section 1.5, *Permits and Approvals*, therefore, impacts to downstream aquatic biological resources are not anticipated.

3.6.2. Environmental Effects

Terrestrial resource related issues were determined through consultation with CPW (CPW 2019g) and USFWS (USFWS 2019b). No direct or indirect effects to aquatic biological resources are anticipated. The primary issues related to terrestrial wildlife include loss or alteration of native habitats; increased habitat fragmentation; individual and population displacement; and direct mortality or injury of wildlife.

The potential effects of the proposed mineral sale on terrestrial wildlife resources can be classified as short-term (temporary) and long-term in duration. Short-term effects result from habitat disturbance and removal due to construction and from activities associated with quarry operation and occur during the active life of the quarry and until *reclamation* is successfully completed. Short term effects would cease upon quarry closure and completion of successful reclamation. Long-term effects include permanent changes to habitats and the wildlife and aquatic populations that depend on those habitats, regardless of reclamation success.

3.6.2.1. Direct and Indirect Effects from Alternative A

Issue 1: How would the proposed Parkdale Quarry expansion affect the availability and quality of habitat for bighorn sheep and other big game species?

Under Alternative A, mining would be performed in five phases progressing from west and northwest to southeast (Figure 2.2-2, Appendix C). Habitat losses associated with Alternative A

include a total disturbance of 674 acres of bighorn sheep severe winter range and 705 acres of mule deer severe winter range over the life of the quarry (approximately 100 years). Habitat losses would occur in phases, as each phase of mining is implemented, and would be sustained over an approximately 20 to 30-year period as bare bedrock would remain until a mining pit is no longer needed and reclamation is initiated (Table 3.17**)**. Disturbance associated with Alternative A would be reclaimed, as presented in Section 2.3.7. Proposed reclamation activities would aim to replace pinyon-jumpier habitat with plant communities that provide greater winter forage for bighorn sheep and mule deer.

Bighorn sheep and mule deer would avoid a much larger footprint during implementation of Alternative A. Noise and human presence associated with rock and gravel extraction would likely result in additional habitat losses due to displacement of big game species away from operation activities. All processing activities would continue to occur at the existing Parkdale Quarry, so no additional disturbance is anticipated in association with processing facilities.

Project related fencing installed around active mining and reclamation areas would exclude big game species from accessing areas of suitable habitat immediately adjacent to mine operations, although big game are likely to avoid these areas due to human presence and noise. All fencing located within the proposed Sale Area would be wildlife friendly and consist of three-strand fencing with smooth wire and steel posts. Big game could be adversely affected by colliding with or becoming entangled in project fencing, although individuals are anticipated to avoid fenced areas where mining operations are occurring.

Big game may experience higher levels of mortality due to the construction of a new haul road under Alternative A and associated increased vehicular traffic during construction, expansion, and development. Vehicular traffic collisions may injure or kill individual big game species, and local populations may experience higher levels of mortality due to increased number of roads and use of existing roads in the immediate vicinity of the study area.

Adverse effects to the local mule deer and bighorn sheep populations would be expected to be relatively minor since habitat disturbance would occur in phases, suitable habitat is available in the areas surrounding the study area, and no parturition (lambing) areas would be affected. As described in Section 2.3.7, and the Reclamation Plan in Appendix D, Martin Marietta would use a concurrent reclamation technique to minimize the amount of habitat disturbance during active mining. Habitat losses resulting from displacement may be minimized over time as mule deer and bighorn sheep become acclimated to increased operational activities. Mule deer and bighorn sheep have demonstrated the ability to adapt to mining operations as long as they do not associate harassment or hunting with the activity (Jansen et al 2007; MacCallum 1988; MacCallum 1991).

Table 3.17. Disturbance to Bighorn Sheep and Mule Deer Severe Winter Range Associated with Alternative A

Mineral Sale Area	Total Bighorn Sheep Range Disturbance (acres)	Total Mule Deer Range Disturbance (acres)
Phase 1 – West Pit	81	81
Phase 2 – West Central Pit	168	168
Phase 3 – Central Pit	206	237
Phase 4 – East Central Pit	112	112
Phase 5 – East Pit	107	107
Total	**674**	**705**

Mitigation Measure TW-01: Seasonal Timing Limitations

The Alternative A is proposed in bighorn sheep and mule deer severe winter range. The 1996 Royal Gorge Resource Area Resource Management Plan states that within the Arkansas River Ecoregion, big game critical winter habitat within the Sale Area would be seasonally limited to mineral operations from December 1 to April 30. Colorado Parks and Wildlife's statewide recommended stipulations for land use were updated in December 2019 and include seasonal restriction dates for bighorn sheep winter range from November 1 to April 30 and for mule deer winter range from December 1 to April 30. Alternative A does not serve the purpose of improving the site for wintering big game; therefore, a timing limitation from November 1 to April 30 would be enacted to eliminate disturbance to bighorn sheep and mule deer during this critical period to avoid an adverse impact. This measure would be applied to the initial year of mine expansion activity only, as bighorn sheep are anticipated to acclimate to disturbance during subsequent years of active mining, as interpreted by CPW in consultation with the BLM biologist.

The seasonal timing limitation would also be implemented for mine areas where reclamation groundwork (slopes and revegetation) has been completed. Human encroachment, including overflights, would also be minimized to the maximum extent possible from November to April to encourage winter use by bighorn sheep and other big game in reclaimed habitat.

Effectiveness:

Implementation of this measure would avoid and minimize adverse effects to bighorn sheep during periods of severe winter conditions when snow depths restrict access to forage and other habitat components. Limitation of mining activity during this period would result in a reduction of potential disturbance and displacement of bighorn sheep during this sensitive period.

Issue 2: How would the proposed Parkdale Quarry expansion affect the availability and quality of habitat and nesting sites for migratory bird species?

As described in Section 3.6.1.3, a variety of migratory bird species (e.g., raptors and songbirds) have been identified as potentially occurring within the study area. Potential direct effects to bird

species would include the short-term reduction of 705 acres of potentially suitable breeding, roosting, and foraging habitat, including 370 acres of pinyon-juniper habitat, and 334 acres of shrub/scrub habitat. Raptor mortalities could increase under Alternative A due to vehicular collisions similar to big game species. Alternative A would result in decreased quality of habitat for raptor prey species due to changes in vegetation community composition and/or an increase in invasive species during mine development, which would result in reduced prey availability.

Effects to other migratory bird species would be similar to those described for raptors, excluding the effects on prey availability and predation, which are not applicable to other birds that do not prey on small mammals. Overall effects to migratory birds and raptors are expected to have minimal effect on local bird populations based on the amount of suitable breeding and foraging habitat in the area surrounding the study area, which would not be affected by Alternative A.

Mitigation Measure TW-02: Migratory Bird Timing Restriction

Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern, no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 to July 15, the breeding and brood rearing season for most Colorado migratory birds. The provision would not apply to completion activities in disturbed areas that were initiated prior to May 15 and continue into the 60-day period. An exception to this timing limitation would be granted if nesting surveys conducted no more than one week prior to vegetation-disturbing activities indicate no nesting within 30 meters (100 feet) of the area to be disturbed. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions.

Mitigation Measure TW-03: Pre-construction Raptor Surveys

Additionally, Martin Marietta would have a qualified biologist conduct raptor nest surveys prior to any new significant surface disturbance activities within suitable habitat. If active nests are located, Martin Marietta would coordinate with the BLM to establish appropriate nest activity buffers in adherence with CPW's recommended raptor buffer distances. Any activity that could disturb the nesting raptors would be avoided in the established activity buffer until the nest is no longer in-use, or as directed by the BLM. Surface-disturbing activities would commence once the nest fledges. The definition of "active nest" varies by species, based upon life history traits and other specific circumstances involved. For the proposed sale area, which is in a pinyon woodland landscape, raptors in this landscape typically do not exhibit high site fidelity to a specific nest site. Therefore, an active nest is defined as "actively being used for brood rearing in the moment" in this situation.

Issue 3: How would the proposed Parkdale Quarry expansion affect the availability and quality of habitat for special status wildlife species?

Special status species are identified in Table J.3 (Appendix J). Effects to special status wildlife species would be similar to those described above for big game and migratory bird species. Direct

effects to special status species would include the short-term reduction of 370 acres of pinyon-juniper habitat, and 334 acres of shrub/scrub habitat. Effects would include displacement from the disturbed areas and increased habitat fragmentation until vegetation is re-established. In most instances, suitable habitat adjacent to disturbed areas would be available for use by these species; however, displacement would increase competition and could result in some local reductions in special status wildlife populations if adjacent habitats have a higher density of species.

Direct mortality and injury due to vehicle collisions would be similar for special status species as for other wildlife species. Indirect effects on special status mammal species would also be similar to those described for big game, with the exception of effects to seasonal habitats and migratory corridors, which are not delineated for special status species in the study area. Habitat fragmentation would have a greater impact on special status species where roads and other disturbed areas lacking vegetation would present a barrier to movement due to lack of cover and vulnerability to predation. Potential effects to special status species from quarry development are expected to be low, due to the low probability of their occurrence in the proposed Sale Area.

Bats

Two bat species (Townsend's big-eared bat and fringed myotis) have the potential to occur in the Sale Area. Implementation of Alternative A could result in direct and indirect impacts to these local bat species and their habitat, especially when disturbance occurs in riparian, shrubland, woodland, grassland and meadow foraging habitats. Direct impacts would include loss of foraging, nursery, and hibernacula habitat during the life of the quarry, and mortalities due to vehicular traffic collisions.

Indirect impacts associated with Alternative A include increased noise related to mining activities, human presence and artificial lighting used for nighttime operations in the existing processing area only. Some bat species, like Townsend's big-eared bats, are especially susceptible to disturbance, and may abandon nursery and hibernaculum, leading to increased mortality (CNHP 2013). Arousal in winter could deplete vital energy stores and prevent arousal in spring. Project-related noise from construction, vehicle traffic, and increased human activity could adversely affect these species. The use of artificial lighting during night-time operations could adversely impact foraging bats.

Potential roost sites for these bat species include crevices on cliff faces, mines, caves, trees, and buildings. Existing crevices on cliff faces, rock outcrops and small cavities are numerous in the Sale Area and may provide roosting habitat, and would be impacted under Alternative A. The increase disturbance and noise near these roosting habitats may also cause displacement of aversion to use of the habitats. Overall population-level effects to sensitive bat species are expected to be minimal based on the amount of suitable roosting and foraging habitat in the area surrounding the study area, which would not be affected by Alternative A.

Protective/Mitigation Measures

None are identified.

Birds

Golden Eagle

Although no golden eagles or nest sites were identified within the study area during baseline surveys, individuals could occur while opportunistically foraging for roadkill or passing through the study area. Direct impacts would include the short-term reduction of 705 acres of potential foraging and breeding habitat and direct mortality due to vehicular collisions. Indirect impacts are associated with increased mine-related noise and human presence that would increase under Alternative A.

Additional indirect impacts to golden eagles would be similar to those discussed for migratory birds above. Potential impacts to this species as a result of Alternative A are considered low due to the lack of active nest sites or individuals within the study area, and low potential for impacts to the prey base in the study area.

Burrowing Owl

Although no burrowing owl nest locations or preferred foraging areas containing prairie dog colonies were observed during baseline studies, this species may occur within the study area. Direct impacts to western burrowing owl would include short-term reduction of 705 acres of potential breeding and foraging habitat. In addition, burrowing owls could be particularly affected by roads development, as this species only nests in burrows on the ground; consequently, roads could result in destruction of burrowing habitat, and burrowing owls may be more susceptible to collisions with vehicles.

Indirect impacts associated with mine-related noise and human presence currently occur at the site and would increase under Alternative A. Burrowing owls maybe also be indirectly affected by any adverse impacts on prairie dog towns because burrowing owls often use abandoned prairie dog burrows as nest sites. However, reclamation of disturbed areas, which would provide more open ground and herbaceous cover preferred by prairie dogs, could result in expansion of prairie dog burrows and subsequently increase the abundance of nesting sites for burrowing owls. Burrowing owls also prefer open ground for hunting and for nesting sites. Increased prairie dogs in the Project Area would also increase prey abundance for larger raptor species such as golden eagles, bald eagles, and ferruginous hawks. Potential impacts to this species as a result of the Alternative A are considered low due the overall availability of suitable habitat in the study area, and the lack of nesting owls or individuals observed during surveys.

Ferruginous Hawk

Although no ferruginous hawk nests were identified within the Sale Area and this species was not observed during surveys, individuals could occur while foraging or passing through the Sale Area. Direct impacts would include the short-term reduction of 370 acres of pinyon-juniper and 334 acres of shrub/scrub foraging habitat until final reclamation is completed and vegetation re-established and a long-term reduction of 194 acres. Indirect impacts associated with Alternative A include increased mine-related noise and human presence.

Additional indirect impacts to ferruginous hawks associated with Alternative A would be similar to those discussed for migratory birds above. Potential impacts to this species as a result of the proposed mineral sale are considered low due to the lack of active nest sites within the study area, the current level of activity at the mine site, and low potential for impacts to the prey base in the study area.

These direct adverse impacts to sensitive raptors and migratory bird species associated with the construction and operation of the proposed project would be minimized due to the implementation of Operator Committed Environmental Protection Measures presented in Table 2.2.

Protective/Mitigation Measures

See Mitigation Measures TW-02 and TW-03 above.

Amphibians

Plain's Leopard Frog

Plain's leopard frog has not been documented within the study area, but suitable habitat exists. Implementation of Alternative A could result in direct and indirect impacts to the Plain's leopard frogs and their habitat, especially when disturbance occurs in wetland and riparian habitats. Direct impacts would include loss of foraging, breeding, and over-wintering habitat during the life of the quarry, and mortalities due to vehicular traffic collisions.

Indirect effects resulting from implementation of Alternative A include increased habitat fragmentation where roads and other disturbed areas lacking vegetation would present a barrier to movement due to lack of cover and vulnerability to predation and increased erosion and sedimentation due to surface disturbance. Potential effects to the Plain's leopard frog from quarry development are expected to be low, due to the low probability of their occurrence in the proposed Sale Area, and the lack of suitable aquatic features.

Protective/Mitigation Measures

None are identified.

Plants

There are six sensitive plant species (Rydberg's golden columbine, Brandegee's buckwheat, gold blazingstar, Royal Gorge blazingstar, rock-loving noeparrva, and Degener's beardstonque) that have the potential to occur in the study area based on the availability of suitable habitat. Most of these species prefer open areas in pinyon-juniper and shrubland communities, or barren soils on rock outcrops or hillsides. Under Alternative A, the majority of surface disturbance would occur in shrubland and pinyon juniper habitat, and in upland areas that were previously undisturbed. Impacts to BLM sensitive plant species could include direct mortality as a result of surface disturbance, habitat fragmentation associated with habitat loss, and the partial or complete destruction of an individual plant or cluster of plants' seed banks where surface-disturbing activities occur. Indirect impacts include a change in vegetation composition and diversity, expansion of invasive species and noxious weeds, and potential for increased soil erosion. Soil erosion could result in less soil to support special status plant communities.

Reclamation activities would aim to revegetate the study area predominantly with grassland species, resulting in a loss of shrubland vegetation communities with which most of these plant species are associated. This could result in long term habitat loss from the conversion of pinyon juniper and shrub-dominated cover types to predominantly grass and forb cover types. Activities associated with Alternative A could have a direct adverse impact on special status plant species populations if mining activities could not avoid established plant communities. Proposed mitigation measures could reduce potential impacts on special status plant species.

Mitigation Measure TW-04: Pre-construction Special Status Plant Species Surveys

Pre-construction surveys would be conducted within the proposed area of disturbance for all special status plant species that have potential habitat, as determined by the BLM, in the Sale Area. While the BLM may direct the operator to avoid areas containing special status plant species populations, lease stipulations in the Sale Area do not prohibit development (i.e., No Surface Occupancy [NSO] stipulation) that could have a direct physical impact on these populations.

Interim and final reclamation should aim to restore areas of potential habitat for sensitive plant species identified during pre-construction surveys.

3.6.2.2. Direct and Indirect Effects from Alternative B

Under Alternative B, the proposed mineral Sale Area would not be developed, and direct and indirect effects to wildlife resources would not occur beyond those effects resulting from previously authorized disturbance. Under this alternative, 705 acres of potential wildlife habitat would not be disturbed or lost, as described under Alternative A. Additional habitat fragmentation and animal displacement would not occur, limiting the effects to wildlife resources to existing conditions.

3.6.2.3. Direct and Indirect Effects from Alternative C

In response to stakeholder concerns regarding potential impacts under Alternative A to bighorn sheep and their habitat located within the proposed Arkansas River Canyonlands ACEC to the west of the Sale Area, Martin Marietta provided an Alternative Materials Sale Area (Alternative C) boundary to the BLM for evaluation (Martin Marietta 2019a). Alternative C would include approximately 633 acres of surface disturbance, and potential effects to game, migratory birds, and special status species under Alternative C would be similar in extent to Alternative A, but would include approximately 65 fewer acres of surface disturbance and would be shifted to the east approximately one half-mile away from the ACEC.

Protective/Mitigation Measures

None are identified.

Residual Effects

Assuming successful reclamation of all project components, residual impacts to wildlife habitat would include the temporary loss of approximately 698 acres and 633 acres of wildlife habitat under Alternative A and Alternative C, respectively. This loss off wildlife habitat would be incremental over the 100-year life of mine and would persist until final reclamation is complete and successful.

3.6.3. Cumulative Effects Analysis

The CESA for special status species encompasses the Tallahassee Creek-Currant Creek watershed and Royal Gorge-Arkansas River watershed (Hydrologic Unit Code, HUC 10: 1102000111), the CESA for migratory birds is the Arkansas Headwaters Sub-basin (HUC 8: 11020001) (Figure 3.6-7, Appendix C), the CESA for bighorn sheep comprises the Arkansas Valley DAU S09 (GMUs S47, S68, S07, S49, and S79) and the Shelf Road DAU (GMU S60) (Figure 3.6-6, Appendix C) and the CESA for mule deer comprises the Cripple Creek DAU D-16 (GMUs 49, 57, 58, and 581) and the Wet Mountain DAU D-34 (GMUs 86, 69, 84, 861, 691) (Figure 3.6-2, Appendix C). The CESAs include contiguous areas that provide important seasonal habitat for general wildlife species.

The past, present, and RFFAs are discussed in Section 3.2.1, *Past and Present Actions*, and Section 3.2.2, *Reasonably Foreseeable Future Actions.*

Past, present, and RFFAs in the wildlife CESAs have resulted, or would result in the direct disturbance of habitat primarily related to urbanization and population growth infill, roads and highways, mineral development, transmission lines, and grazing and agriculture activities. Development of reasonably foreseeable mining and infrastructure projects needed for urban development is anticipated across the CESAs, especially in and around existing population centers such as Salida, Cañon City, Brookside, and Florence. Wildfire has also impacted wildlife habitat near the Sale Area. In the last two decades wildfires have burned approximately

8,000 acres. The regional area is an arid climate and if the current trend in climate change continues wildfire frequency may increase and have an increasing impact on wildlife habitat.

3.6.3.1. Alternative A

Cumulative effects to wildlife resources would be predominantly related to habitat loss, habitat fragmentation and wildlife displacement associated with Alternative A as described in Section 3.6.2, *Environmental Effects*. These effects would be present throughout the life of the mine until final reclamation is complete. Other direct effects to big game species include mortalities or injury resulting from vehicle collisions as well as indirect effects such as avoidance, restriction of movement (due to new facilities or roads), displacement of animals from the RFFAs during all seasons, and increased potential for poaching/hunting.

The type and nature of cumulative effects to migratory bird species would be primarily related to the direct and indirect effects of Alternative A described in Section 3.6.2, *Environmental Effects*, and would include direct mortality through vehicular traffic collisions due to increased access and activity in the area. Indirect effects include habitat loss, degradation, and habitat fragmentation, as well as disturbance and displacement from areas with human activities.

Potential cumulative effects to special-status species also would be similar to those described in Section 3.6.2, *Environmental Effects*, and primarily related to Alternative A. Special status species including small mammals, migratory birds, reptiles, and amphibians that occur in the CESA would continue to occupy their respective ranges and breed successfully; however, population numbers may decrease relative to the amount of cumulative habitat loss and disturbance from incremental development. Effects would most likely occur where the RFFAs and Alternative A overland the special status species CESA.

3.6.3.2. Alternative B

Cumulative effects resulting from past, present, and RFFAs to wildlife resources for Alternative B would generally be the same as those described for Alternative A. However, there would be 705 acres less of surface disturbance and associated habitat fragmentation within the CESA under Alternative B. Effects to the existing bighorn sheep and mule deer severe winter ranges, migratory birds, and special status species would be limited to those resulting from previously authorized actions for the existing Parkdale Quarry.

3.6.3.3. Alternative C

Cumulative effects resulting from past, present, and RFFAs to wildlife resources for Alternative C would generally be the same as those described for Alternative A. However, there would be 65 acres less of surface disturbance and associated habitat fragmentation within the CESA under Alternative C. These effects would be present throughout the life of the mine until final reclamation is complete.

3.7. LANDS WITH WILDERNESS CHARACTERISTICS

Issue 1: How would the proposed Parkdale Quarry Expansion affect the currently inventoried area identified as having wilderness characteristics?

3.7.1. Affected Environment

BLM policy in Section 201 of FLPMA requires the BLM to maintain, on a continuing basis, an inventory of all public lands and their resources and other values, including wilderness characteristics. The RGFO conducted an inventory of lands with wilderness characteristics in 2015 in accordance with BLM Manual 6310, *Conducting Wilderness Characteristics Inventory on BLM Lands*, which is the policy that provides guidance on how to conduct an inventory. The RGFO 2015 inventory identified over 190,000 acres of lands having wilderness characteristics and included the Echo Canyon lands with wilderness characteristics unit consisting of approximately 31,600 acres. The Echo Canyon unit is located within Bighorn Sheep Canyon, approximately 11 miles west of Cañon City. The unit contains the proposed Sale Area, which lies on the eastern edge of the unit (Figure 3.7-1, Appendix C). The rugged terrain of the area, overall size, lack of public access, and opportunities for solitude and primitive and unconfined recreation all contribute to the area's wilderness characteristics. Echo Canyon in general has many mechanically constructed and maintained routes within the area. Evidence of past human activity such as mining tailing piles and prospecting pits, a water catchment, mechanical vegetation treatments, and wildlife exclosures are located within the unit. Motorized access into the area is for administrative access only, limiting use and contributing to the wilderness characteristics of the area. The existing quarry is located to the south of the proposed expansion area on 513 acres of private land owned by Martin Marietta.

3.7.2. Environmental Effects

3.7.2.1. Direct and Indirect Effects from Alternative A

Issue 1: The Parkdale Quarry Expansion Alternative A would affect the currently inventoried Echo Canyon area identified as having wilderness characteristics.

If Alternative A were to be selected by the BLM, development of the Sale Area in the eastern portion of proposed Echo Canyon unit would incrementally eliminate 1,458 acres of public lands from possessing wilderness characteristics and likely an additional isolated 536 acres to the east of the Sales Area for a total of 1,996 acres. This represents approximately six percent of the Echo Canyon unit identified as lands with wilderness characteristics. The remaining acreage of the Echo Canyon area would not be affected by Alternative A and the inventoried wilderness characteristics would still apply. The Sale Area likely would not meet LWC criteria even after

reclamation. The BLM would re-inventory the Sale Area after reclamation to determine if it meets the criteria for lands with wilderness characteristics.

Protective/Mitigation Measures

No protective or mitigation measures would avoid or minimize the reduced acreage of wilderness characteristics that apply to the Echo Canyon area.

3.7.2.2. Direct and Indirect Effects from Alternative B

Issue 1: None.

Under Alternative B, the BLM would deny Martin Marietta's mineral materials application. There would be no expansion of the Parkdale Quarry onto BLM-administered lands and the Echo Canyon lands with wilderness characteristics unit. Martin Marietta would continue to mine privately owned lands at the Parkdale Quarry for the next 15 to 30 years and conduct reclamation and closure of the mine according to their existing, authorized permits.

Protective/Mitigation Measures

No protective or mitigation measures would be required because there would be no impacts to the Echo Canyon lands with wilderness characteristics unit.

3.7.2.3. Direct and Indirect Effects from Alternative C

Issue 1: The Parkdale Quarry Expansion Alternative C would affect the currently inventoried Echo Canyon area identified as having wilderness characteristics.

Alternative C proposes to shift the Sale Area to the east approximately one half-mile. The Alternative C Sale Area boundary includes a total of approximately 893 acres. If Alternative C were to be selected by the BLM, development in the eastern portion of the proposed Echo Canyon lands with wilderness characteristics unit would eliminate 893 acres from possessing wilderness characteristic and likely an additional isolated 340 acres to the east of the Sales Area for a total of 1,233 acres. This represents approximately four percent of the total Echo Canyon acreage. The remaining acreage of the Echo Canyon unit would not be affected, and the inventoried wilderness characteristics would still apply. Once the area has been successfully reclaimed it is likely that the Sale Area would not meet LWC criteria but the area would be re-inventoried by the BLM at that time to determine if it meets the criteria for lands with wilderness characteristic

Protective/Mitigation Measures

No protective or mitigation measures would avoid or minimize the reduced acreage of wilderness characteristics that apply to the Echo Canyon area.

3.7.3. Cumulative Effects Analysis

Issue 1: The Parkdale Quarry Expansion would affect the currently inventoried Echo Canyon area identified as having wilderness characteristics.

The CESA for lands with wilderness characteristics is the Echo Canyon area in its entirety, as shown in Appendix C, Figures 3.7-1 and 3.7-2. Past and present activities in the CESA have resulted in impacts to the naturalness of the Echo Canyon area. Little disturbance has occurred within the CESA, however, mechanically constructed and maintained routes within the area, mining tailing piles and prospecting pits, water development improvements, mechanical vegetation treatments, and wildlife exclosures are located within the Echo Canyon area and have an impact on the overall naturalness of the area. RFFAs in and adjacent to the CESA would include an overall increase in human presence proportional to the anticipated population growth, new mining operations to support infrastructure construction necessary to accommodate the anticipated population increase, and potential changes to frequency and intensity of wildland fire due to current climate change trends.

3.7.3.1. Alternative A

Alternative A would contribute to cumulative impacts to the wilderness characteristics of the Echo Canyon area by creating 698 acres of surface disturbance that would likely result in the elimination of 1,298 acres that would otherwise be included in the potential designation as lands with wilderness characteristics.

3.7.3.2. Alternative B

Under Alternative B, the existing quarry would not be expanded and would not contribute to cumulative impacts to the wilderness characteristics of the Echo Canyon area.

3.7.3.3. Alternative C

Alternative C would contribute to cumulative impacts to the wilderness characteristics of the Echo Canyon area by creating 633 acres of surface disturbance that would likely result in the elimination of 1,233 acres from the inventory of lands with wilderness characteristics.

3.8. VISUAL RESOURCES

Issue 1: What is the extent of impact upon sensitive visual receptors resulting from the change in landforms during operations and post-mining?

3.8.1. Affected Environment

The study area for visual resources encompasses the viewshed specific to Alternative A and Alternative C and the CESA includes an area within 15 miles of the Sale Area. This geographic region was selected as the CESA because beyond 15 miles from the proposed Sale Area, the proposed project facilities and excavation site would either not be visible or would be considered as a minor element in the visual landscape.

Scenic quality is the measure of the visual appeal of a unit of land. Section 102(a) of the FLPMA (1976), states that "…the public lands are to be managed in a manner that would protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values." Section 103(c) identifies "scenic values" as one of the resources for which public land should be managed. Section 201(a) states that "the Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including scenic values)…". Furthermore, Section 101(b) of the National Environmental Policy Act requires that measures be taken to ensure that aesthetically pleasing surroundings be retained for all Americans.

A visual resource inventory (VRI) was conducted for the Sale Area in 2015. The inventory revealed that visual resources along the Arkansas River corridor in Bighorn Sheep Canyon are dominated by the river as well as rocky outcrops and steep valley walls, with a variety of vegetation and colors. The river canyon has high recreation visitation that is dependent upon intact landscapes and natural scenery. The public land in the canyon is highly visible from Highway 50, a major travel corridor for residents and visitors. The inventory found that scenic quality is important for rural residents' quality of life. Sensitivity to change among the local residents is considered high. The inventory also identified the presence of contrasts with the natural environment such as ranches, homes, recreation facilities, power lines, and active mines. Despite the non-natural features the overall landscape was still found to have a VRI Class II.

The VRI was done at a coarse office wide scale, and described below. When looking at the specific Sale Area, the existing quarry beyond the railroad line is evident with its conical shaped stockpiles, earthen berm, and horizontal quarry bench cuts. Rail cars are frequently parked on the tracks. The vegetation changes from sparse in the foreground to uniform pinyon and juniper woodlands in the background. Structures in the mine are visible from the road. Besides the river corridor, which is immediately adjacent to the Highway, these elements tend to dominate the view in this area.

Visual Resource Management (VRM) classes along with the corresponding VRM Objectives were established in the Royal Gorge Field Office (RGFO) in 1996 with the approval of the Royal Gorge Resource Area Resource Management Plan (RMP). Visual Resource Management objectives corresponding to the various management classes provide standards for analyzing and evaluating proposed projects. Projects are evaluated using the Contrast Rating System to determine if it meets VRM objectives established by the RMP.

The VRM class established in the 1996 Royal Gorge Resource Area RMP (BLM 1996) for the proposed Sale Area is Class II. The objective for Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer.

Five key observation points (KOPs) have been identified in the visual resources study area. Factors considered in selecting the KOPs include angle of observation, number of viewers, length of time the proposed Sale Area is in view, relative Sale Area size, season of use, and light conditions. These KOPs were used for conducting the characteristic landscape, impacts, and VRM compliance analysis. KOP locations are shown in Figure 3.8-1 (Appendix C), and described below:

- KOP 1 was chosen as a vantage point for vehicles traveling west on Highway 50, while being far enough away from KOP 4 to provide a different viewpoint.
- KOP 2 was chosen for vehicles traveling east on Highway 50. Its location on the curve of Highway 50 would provide a vantage point to the Sale Area for those traveling east.
- KOP 3 was chosen as an in-river vantage point for recreationists traveling down the Arkansas River, a very popular recreational activity in the area.
- KOP 4 was chosen as a vantage point for recreationists gathering at the Arkansas Headwaters Recreation Area, Parkdale site. Visitors here would likely be in that parking area putting kayaks/rafts into the river, pulling kayaks/rafts out of the river, getting gear organized, etc. (CPW 2019f). It is expected that recreationists would be at KOP 4 for a longer time period than the other KOPs, and it provides a clear vantage point of the Sale Area.
- KOP 5 was chosen as the Arkansas Canyonlands ACEC location because it sits high on the hillside, it looks down on the Sale Area so it has an unobstructed view, and it is still within two miles of the Sale Area. However, access to KOP 5 is poor and therefore has few visitors.

Two additional KOPs were selected to analyze visual impacts related to the alternative Sale Area (Alternative C). Because Alternative C would shift the Sale Area to the east, including portions of the eastern slope of Cactus Mountain, travelers along Highway 9 would likely have a vantage point of the mining and reclamation activities that they would not have under Alternative A. Therefore, these two additional KOPs represent vantage points for travelers along Highway 9, and are analyzed under Alternative A (Figure 3.8-1, Appendix C):

- KOP 6 was chosen for vehicles traveling south on Highway 9. The location of this KOP would likely provide commuters a vantage point of the alternate Sale Area, primarily on the western slope of Cactus Mountain.
- KOP 7 was chosen for vehicles traveling north on Highway 9. The location of this KOP would likely provide commuters a vantage point of the alternate Sale Area, primarily on the western slope of Cactus Mountain.

3.8.2. Environmental Effects

This section discusses project related impacts to visual resources resulting from Alternative A, Alternative B, and Alternative C. Primary issues related to visual resources include direct and indirect impacts associated with the change in landforms and degradation of views from KOPs in the vicinity of the project. All visual simulations used for the analysis for impacts to visual resources are provided in Appendix H.

Each of the alternatives considered in this EIS were analyzed for its potential to result in impacts on visual resources. Visual impacts were analyzed using the methodology outlined in the BLM Handbook H8431-1, Visual Resource Contrast Rating (BLM 1986b), which analyze the levels of visual contrast created between a project and the existing, characteristic landscape. As noted previously, the management standards and allowable contrasts for the visual rehabilitation area are those of the management Class II objective. The following indicators were considered when analyzing the potential impacts that each alternative would have on visual resources:

- Degree of consistency or conflicts with established BLM VRM class objectives; and
- Change in the scenic quality of the existing characteristic landscape from KOPs due to visibility of components of Alternative A other alternatives to Alternative A.

3.8.2.1. Direct and Indirect Effects from Alternative A

Issue 1: What is the extent of impacts on sensitive visual receptors resulting from the change in landforms during operations and post-mining?

The visual impacts would be greatest from KOP 5 because the proposed Sale Area would be in the immediate foreground. The strong form and sharp line of the proposed Sale Area would create a contrast compared to the existing landforms. All five mining phases would be visible from KOP 5; however, concurrent reclamation would be implemented as mining progresses, reducing

the overall visual impact. The proposed haul road would appear at the base of the proposed Sale Area but would be weakly visible. Once the proposed Sale Area has been reclaimed and the vegetation has established, the shape, contour, and contrast of the area compared to the surrounding natural landforms would be visible from KOP 5, but would unlikely attract attention.

Visual impacts from KOP 2 would also be high. The proposed Sale Area would be in the immediate foreground from KOP 2 for those traveling east on Highway 50. However, impacts would not be visible until approximately Phase 3, because the hillside immediately to the north of KOP 2 would obstruct views to Phases 1 and 2. Visual impacts from KOP 2 would be reduced due to the implementation of concurrent reclamation. It is unlikely that the proposed haul road would be visible from KOP 2. Once the proposed Sale Area has been reclaimed and the vegetation has established, the shape, contour, and contrast of the Sale Area compared to the surrounding natural landforms would be visible from KOP 2, but would unlikely attract attention.

Due to the "mine from behind" approach to the proposed Sale Area, the predominate hillsides between KOP 1 and the proposed Sale Area would block a majority of the views of the proposed Sale Area for those traveling west on Highway 50. Mining Phases 1 and 2 would not be visible for passing motorists, while Mining Phases 3 through 5 would only be slightly noticeable, due to the alterations of the ridgeline from this vantage point. It is unlikely that the proposed haul road would be visible from KOP 1. The changes in the ridgeline of the proposed Sale Area would be noticeable to those familiar with the area; motorists passing through would not be aware of the mining operation taking place on the backside of the ridge.

Visual impacts from KOP 4 would be similar to those of KOP 1. The proposed Sale Area would be in the immediate foreground from KOP 4 for recreationists gathering at the Arkansas Headwaters Recreation Area, Parkdale site. Visitors here are likely to spend some time at this location, whether they are organizing gear and preparing to put their rafts or kayaks into the river, using the restroom facilities, or taking their rafts/kayaks out of the river. Similar to the vantage point from KOP 1, the mining impacts from KOP 4 would not be visible until approximately Phase 3. The hillsides immediately north of KOP 4 would obstruct views to Phases 1 and 2. It is unlikely that the proposed haul road would be visible from KOP 4. Once the proposed Sale Area has been reclaimed and vegetation has established, the shape, contour, and contrast of the Sale Area compared to the surrounding natural landforms would be visible from KOP 4, but would unlikely attract attention.

Visual impacts from KOP 3 would be similar as those from KOP 1 and KOP 4. For those recreating in the Arkansas River, mining and reclamation activities would not be noticeable until Mining Phases 3 through 5. The ridgelines on Cactus Mountain would be altered during Mining Phases 3 through 5, resulting in minor to moderate impacts to visual resources. While the shape, contour, and topography of Cactus Mountain would be altered during the mining and reclamation phases, it is unlikely that these changes would attract attention from recreationists in the Arkansas River at KOP 3.

The proposed Sale Area would be seeded, and vegetation cover would establish during the ongoing reclamation efforts at the Sale Area. Vegetation cover would consist of native species that closely resemble existing undisturbed vegetation that substantially mimics the topographic and ecological setting present in the surrounding hillsides and to the south of Parkdale Quarry. The landscape to the south of Parkdale Quarry is shortgrass prairie on the lowland areas, bordered by hillside/montane areas on mountain scrubland dominated by mountain mahogany. The reclamation of the proposed Sale Area would result in the replacement of the existing pinion-juniper plant community with grassland and shrub plant communities. Although the restored vegetation is expected to enhance wildlife habitat, it would likely create a visual contrast with the vegetation immediately adjacent to the proposed Sale Area. Accordingly, visual contrast related to the restored vegetation would be permanent and moderate following operation and reclamation, but is unlikely to attract attention.

During and post-reclamation, the topographic transformation of the proposed Sale Area would result in highly noticeable visual impacts due to the topographical transformation of the western slope of Cactus Mountain. Although the reclamation benches, which would be approximately 35 feet high with a width of approximately 30 feet, would be backfilled to an approximate reclamation slope of 1:1 (horizontal to vertical), the shape, form, and contour of the proposed Sale Area would be substantially different than pre-mining conditions.

Overall, visual impacts at the proposed Sale Area during mining operations, post-closure, and reclamation would be noticeable from the KOPs. There would be a change in the shape, contour, contrast, and vegetation cover through all mining phases and reclamation. However, because the mining operations and reclamation activities would be completed in five phases spanning 100 years, and the areas disturbed would be concurrently reclaimed as mining progresses, the overall impacts would be mitigated and decreased. Therefore, the VRM Class II status of the proposed Sale Area would be maintained. Mining and reclamation activities would be visible, but they would not attract the attention of the casual observer.

Protective/Mitigation Measures

As described above, concurrent reclamation of mine areas for which mining has been completed would be implemented. This would allow for vegetation to establish where mining has been completed, while mining activities are in progress elsewhere within the proposed Sale Area. Concurrent reclamation would result in reduced impacts to visual resources and visual contrast.

3.8.2.2. Direct and Indirect Effects from Alternative B

Issue 1: What is the extent of impacts on sensitive visual receptors resulting from the change in landforms during operations and post-mining?

Under Alternative B, the mining expansion and associated activities would not occur. Therefore, new visual contrasts would not be introduced, and visual resources would not change from their current condition.

Protective/Mitigation Measures

No protective or mitigation measures would be implemented under Alternative B, other than what is mandated in the existing permits for operating the Parkdale Quarry.

3.8.2.3. Direct and Indirect Effects from Alternative C

Issue 1: What is the extent of impacts on sensitive visual receptors resulting from the change in landforms during operations and post-mining?

Unlike under Alternative A, the "mine from behind" approach for the alternative Sale Area would only partially conceal mining activities for those traveling west on Highway 50 at KOP 1. Mining activities and reclamation would be readily visible from KOP 1, primarily from the alteration of the ridgeline. Mining Phase 1 would be particularly noticeable from this KOP, as this mining phase would remove a portion of the ridgeline to the west. Mining Phases 5 and 6 would also be noticeable for motorists traveling west on Highway 50. The form and line of the ridges would be altered enough to be noticeable, but may not attract attention from this KOP. Additionally, concurrent reclamation would be implemented as mining progresses, reducing the overall visual impact. The haul road under Alternative C would be slightly noticeable from KOP 1, but would not likely attract attention. Once reclamation is complete, the changes to the ridgeline of the alternative Sale Area would only be noticeable to those familiar with the area; travelers passing through would not be aware of the mining operations that occurred within the alternative Sale Area.

Visual impacts would be high from KOP 5. The alternative Sale Area would be in the immediate foreground for those in the ACEC at this KOP. The strong form and sharp line of the alternative Sale Area would create a contrast compared to the existing landforms, and portions of the ridgeline of Cactus Mountain would be removed. All six mining phases would be visible from KOP 5, however, concurrent reclamation would be implemented as mining progresses, reducing the overall visual impact. The haul road under Alternative C would appear at towards the higher elevations of Cactus Mountain from KOP 5, but would be weakly visible and would not attract attention. Once the alternative Sale Area has been reclaimed, the shape, contour, and contrast of the area compared to the surrounding natural landforms would be noticeable from KOP 5, but would not attract attention.

Similar to the proposed action, visual impacts from KOP 2 would be high. The alternative Sale Area would be in the immediate foreground from KOP 2 for those traveling east on Highway 50. Mining and reclamation activities would be visible for all mining phases, because the alternative configuration of the mining phases would not be hidden by hillsides and would be within view for those traveling east on Highway 50. A portion of the haul road would be slightly visible from KOP 2 and is not expected to attract attention. Concurrent reclamation would be implemented as mining progresses, reducing the overall visual impact. Once the alternative Sale Area has been reclaimed, the shape, contour, and contrast of the Sale Area compared to the surrounding natural landforms would be visible from KOP 2. However, because a majority of those viewing the alternative Sale Area from KOP 2 would be traveling east on Highway 50, the altered topography is not likely to attract attention.

Visual impacts from KOP 4 would be high. The alternative Sale Area would be in the immediate foreground from KOP 4 for recreationists gathering at the Arkansas Headwaters Recreation Area, Parkdale site. Just as under Alternative A, visitors here are likely to spend more time at this location than the other KOPs. The mining impacts from KOP 4 would be visible for all of the mining phases. Portions of the haul road would be visible from KOP 4, and may attract attention from recreationists gathering in this area. Once the alternative Sale Area has been reclaimed, the shape, contour, and contrast of the alternate Sale Area compared to the surrounding natural landforms would be visible from KOP 4.

Visual impacts from KOP 7 would be moderate for those traveling north on Highway 9. Travelers would be able to see mining and reclamation activities on the crest and backside of Cactus Mountain. Mining Phase 1 would create the most noticeable contrast from existing conditions, resulting in highly visible impacts. The remaining mining phases would result in minor impacts to visual resources, as most of the mining activities and impacts would not be visible to motorists traveling north on Highway 9. The haul road under Alternative C would not be visible from KOP 7. Once the alternative Sale Area has been reclaimed, the shape, contour, and contrast of the Sale Area compared to the surrounding natural landforms would be visible from KOP 7, but would not attract attention.

Visual impacts from KOP 3 would be minor to moderate for those recreating on the Arkansas River. Recreationists would be able to see mining and reclamation activities during all mining phases, but visual impacts would be particularly noticeable during Mining Phases 1 and 5. The remaining mining phases would result in minor impacts to visual resources, as most of the mining activities and impacts would be weakly visible to recreationists on the Arkansas River. A portion of the haul road would be slightly visible from KOP 3, but would not likely attract attention from recreationists in the Arkansas River. Once the alternative Sale Area has been reclaimed, the shape, contour, and contrast of the Sale Area compared to the surrounding natural landforms would be visible from KOP 3, but would not attract attention.

The impacts to visual resources would be negligible from KOP 6 because all mining and reclamation activities would be conducted on the southside (opposite side) of the primary

ridgeline from this KOP. The only mining phase that would be visible from KOP 6 would be Mining Phase 2, and the impacts from this Mining Phase would not be noticeable to anyone traveling south on Highway 9. The haul road under Alternative C would not be visible from KOP 6. Once the alternative Sale Area has been reclaimed, the shape, contour, and contrast of the area compared to the surrounding natural landforms would not be visible from KOP 6.

Just as under Alternative A, the alternative Sale Area would be seeded, and vegetation cover would establish during the ongoing reclamation efforts at the Sale Area. Vegetation cover would use native species and closely resemble existing undisturbed vegetation that substantially mimics the topographic and ecological setting present in the surrounding hillsides and to the south of Parkdale Quarry. The landscape to the south of Parkdale Quarry is shortgrass prairie on the lowland areas, bordered by hillside/montane areas on mountain scrubland dominated by mountain mahogany. The reclamation of the alternative Sale Area would result in the replacement of the current pinion-juniper plant community with grassland and shrub plant communities. Although the restored vegetation is expected to enhance wildlife habitat, it would likely create a visual contrast with the vegetation immediately adjacent to the alternate Sale Area. Accordingly, visual contrast related to the restored vegetation would be permanent and moderate following operation and reclamation.

During and post-reclamation, the topographic transformation of the alternative Sale Area would result in more noticeable visual impacts compared to the restored vegetation cover described above. Although the reclamation benches, which would be approximately 35 feet high with a width of approximately 30 feet, would be backfilled to an approximate reclamation slope of 1:1 (horizontal to vertical), the shape, form, and contour of the alternative Sale Area would be substantially different than pre-mining conditions.

Overall, visual impacts at the alternative Sale Area during mining operations, post-closure, and reclamation would be noticeable from the KOPs. There would be a change in the shape, contour, contrast, and vegetation cover through all mining phases and reclamation. Although the mining operations and reclamation activities would be completed in six phases spanning 100 years, the overall impacts would be not be mitigated and decreased enough to meet VRM Class II standards. Therefore, the VRM Class II status of the alternative Sale Area would not be maintained. Mining and reclamation activities would be visible, and the existing character of the landscape would not be retained.

Protective/Mitigation Measures

As described above, concurrent reclamation of mine areas for which mining has been completed would be implemented. This would allow for vegetation to establish where mining has been completed, while mining activities are in progress elsewhere within the alternative Sale Area. Concurrent reclamation would result in reduced impacts to visual resources and visual contrast.

3.8.3. Cumulative Effects Analysis

Issue 1: What is the extent of impacts on sensitive visual receptors resulting from the change in landforms during operations and post-mining?

The CESA for visual resources encompasses an area within 15 miles of the Sale Area. Beyond 15 miles, the Sale Area and associated mining and reclamation activities would either not be visible or would be considered as a minor element in the visual landscape. Prominent existing features within the CESA include the existing Parkdale Quarry and associated quarry facilities, Cañon City and the Fremont County Airport, and the Arkansas River.

Past, present, and RFFAs in the visual resources CESA have resulted, or would result in the direct disturbance of the natural and rural aesthetic quality of the area. Impacts to the natural and rural aesthetic quality have resulted from urbanization and population growth, roads and highways, mineral development, transmission lines, and grazing and agriculture activities. Development of reasonably foreseeable mining and infrastructure projects needed for additional urban development is anticipated across the CESA, especially in and around Cañon City. Wildfire has also impacted visual resources near the Sale Area. In the last two decades wildfires have burned approximately 8,000 acres. The regional area is an arid climate and if the current trend in climate change continues wildfire frequency may increase and have an increasing impact on visual resources. However, reclaimed and remaining features from the proposed sale in combination with the other past, present, and RFFAs within the CESA would continue to have long-term cumulative impacts to visual resources in the CESA but would be minor to moderate and blend into the existing landscape.

3.9. SOCIOECONOMIC CONDITIONS

Issue 1: How would the proposed Parkdale Quarry expansion affect social and economic conditions in Fremont County?

3.9.1. Affected Environment

The study area for assessing direct and indirect effects of the proposed quarry expansion on socioeconomic conditions is Fremont County as the Parkdale Quarry is centrally located within the county (Figure 3.9-1, Appendix C) and over 90 percent of current mine employees reside in Fremont County (Martin Marietta 2019c). The socioeconomic study area, depicting Fremont County, communities, the current and proposed mine site, and land status, can be seen in Figure 3.9-1 (Appendix C), *Socioeconomic Study Area*. The existing mine and the proposed mine areas can be seen in Figures 2.2-1 and 2.2-2 (Appendix C).

3.9.1.1. Population and Demographics

The population of Fremont County is 46,601 residents, the sixteenth most populous county in the state of Colorado during the 2013-2017 time period. The eastern third of Fremont is more densely populated and includes the largest communities in Fremont County, Cañon City and Florence. Cañon City is home to 16,298 residents, and the community of Florence, located approximately 8.5 miles southeast of Cañon City, has population of 3,845 residents during the 2013-2017 time period. Together, the communities of Cañon City, Florence, and the unincorporated town of Penrose (3,176) are home to almost 50 percent of the total population in Fremont County (USCB 2017a). The western two-thirds of the county is more mountainous and less developed. A small number of residents live in several unincorporated towns in the Arkansas River Valley (Fremont County Planning Commission 2015).

Over the period from 2010-2017, the Colorado state population expanded by over eight percent while the population of Fremont County declined 0.5 percent (USCB 2019). The population of Colorado is projected to increase by approximately 15 percent from 2020-2035, while Fremont County is projected to grow just 6 percent over that same period. The projected growth rate is more similar over the period from 2035 to 2050, with the state population increasing by approximately nine percent and the Fremont County population increasing by seven percent. The population of Fremont County is forecasted to reach 49,354 by 2030, 52,848 by 2040, and 56,406 by 2050 (DOLA 2018). From a recreation and tourism perspective, the BLM anticipates the Royal Gorge Extensive area to have a baseline visitation increase of six to nine percent due to general population growth and increased interest in recreation (BLM 2019d).

Fremont County is less ethnically diverse than Colorado as a whole, with fewer Hispanic residents. For the purposes of this analysis, a community is considered an environmental justice community if the total number of individuals living below the poverty level or total minority population, as defined by the U.S. Census Bureau (USCB), is 50 percent or more of the community or is “meaningfully greater” than the reference community (the State of Colorado). The BLM Colorado State Office applies a standard of five percentage points higher than in the comparison area to determine “meaningfully greater”. By applying this analysis criteria to the population estimates, none of Fremont County’s communities were identified as potential environmental justice low-income or minority communities (Table 3.18).

Table 3.18. Number and Percent of People in Minority or Low-income Residents, 2013-2017

Geography	Total Population	White Alone	Black or African American Alone	American Indian or Alaskan Native Alone	Asian or Pacific Islander Alone	Other and Two or More Races	Hispanic or Latino[1]	Total Minority Population	Income Below Poverty Level[2]
Colorado	5,436,519	4,576,201 (84.2%)	221,155 (4.1%)	51,406 (0.95%)	173,351 (3.2%)	414,406 (7.6%)	1,157,200 (21.3%)	1,704,543 (31.4%)	11.5%
Fremont County	46,601	42,068 (90.3%)	2,145 (4.6%)	575 (1.2%)	366 (0.79%)	1,447 (3.1%)	6,058 (13.0%)	9,565 (20.5%)	15.8%

Sources: USCB 2017b; USCB 2017a

[1] People who identify as Hispanic or Latino may be of any race.
[2] The USCB threshold for poverty in 2017 was $12,752 for an individual under the age of 65, $11,756 for an individual over the age of 65, and $25,094 for a family of four (USCB 2017b). Percent represents all below the poverty line.

3.9.1.2. Employment and Income

Table 3.19 shows the labor force statistics in Fremont County and Colorado. In 2017, the unemployment rate in Fremont was 4.1 percent, while the unemployment rate statewide was 2.7 percent. Historically, the unemployment rate in Fremont has been higher than the state and national unemployment rate. The unemployment rate across geographies has been declining since its peak in 2010-11. Figure 3.9-2, *Unemployment Rates, 2008-2017*, (Appendix C) shows the unemployment rate across geographies from 2008 to 2017.

Table 3.19. Labor Force and Employment

Geography	Labor Force		Employed		Unemployed		Unemployment Rate (percent)	
	2010	***2017***	***2010***	***2017***	***2010***	***2017***	***2010***	***2017***
Fremont County	15,825	14,972	13,973	14,355	1,852	617	11.7%	4.1%
Colorado	2,724,420	2,992,418	2,486,405	2,911,081	238,015	81,337	8.7%	2.7%
United States*	153,889	162,075	139,064	155,761	14,825	6,982	9.6%	4.4%

Sources: BLS 2018a; BLS 2019

*Thousands

Per capita income in the study area is historically much lower than average per capita incomes for the state of Colorado and the United States. In 2017, per capita income in Fremont County was 38.8 percent lower than the average per capita income in Colorado. Additionally, per capita incomes in Fremont County have grown at a slower annual rate compared to the state and country as a whole (Table 3.20).

Table 3.20. Per Capita Income, 2015-2017

Geography	2015	2016	2017	Percent Change, 2015-2017
Fremont County	$32,185	$32,780	$33,422	3.8%
Colorado	$52,228	$52,372	$54,646	4.6%
United States	$48,940	$49,831	$51,640	5.5%

Source: BEA 2019

Notes: Per capita personal income was computed using Census Bureau midyear population estimates. Estimates for 2010-2017 reflect county population estimates available as of March 2018.

In 2017, the largest employment industry in Fremont County is health care and social assistance, employing 2,224 people or 22 percent. The next largest employment sector is the combined Federal and local governments, employing 17 percent of the County, or 1,735 people, as the County hosts a number of prisons. Mining, quarrying, and oil and gas extraction is the highest paying private sector in the study area, with employees making more than $70,000 annually, but employs only an average of 79 people annually. Other important sectors include accommodation and food services, construction, manufacturing, arts, entertainment and recreation, and transportation and warehousing, depicted in Table 3.21.

Comparing 2017 to 2001, the County has seen job losses in the construction, manufacturing and information industries. The largest increase in jobs was in health care and the real estate/rental sectors (SCEDD 2017). A goal of the County is to improve the diversification of the local economy (SCEDD 2017).

Table 3.21. Fremont County Establishments, Employment, and Wages by Sector and Industry, 2017

North American Industry Classification System Sector		Annual Establishments	Annual Average Employment	Total Annual Wages	Annual Wages per Employee
Private Sector		**890**	**8,386**	**$269,362,373**	**$36,430**
62	Health Care and Social Assistance	127	2,224	$76,343,990	$34,327
44-45	Retail Trade	117	1,687	$43,155,763	$25,589
72	Accommodation and Food Services	76	1,105	$16,813,094	$15,210
23	Construction	122	655	$27,474,186	$41,961
31-33	Manufacturing	37	547	$30,820,441	$56,362
71	Arts, Entertainment, and Recreation	24	348	$6,372,509	$18,329
48-49	Transportation and Warehousing	26	297	$9,433,286	$31,780
56	Administrative and Support and Waste Management and Remediation Services	40	267	$6,959,159	$26,072
81	Other Services (except Public Administration)	59	245	$5,708,024	$23,322
54	Professional, Scientific, and Technical Services	80	234	$10,158,068	$43,395
52	Finance and Insurance	47	197	$11,312,718	$57,352
53	Real Estate and Rental and Leasing	51	157	$4,705,622	$29,909
42	Wholesale Trade	35	146	$5,111,714	$34,972
51	Information	15	89	$4,152,500	$46,833
21	Mining, Quarrying, and Oil and Gas Extraction	8	79	$5,589,842	$70,609
22	Utilities	8	49	$3,342,970	$67,763
11	Agriculture, Forestry, Fishing and Hunting	8	38	$906,576	$23,701
61	Educational Services	5	14	$526,413	$38,054
55	Management of Companies and Enterprises	4	7	$472,377	$69,982
Federal Government		**16**	**1,085**	**$75,666,483**	**$69,739**
92	Public Administration	8	1,030	$73,044,822	$70,917
48-49	Transportation and Warehousing	8	55	$2,621,661	$47,667
State Government		**18**	**650**	**$26,978,472**	**$41,505**
92	Public Administration	14	606	$24,602,376	$40,598
22	Utilities	4	44	$2,376,096	$54,002
	Total	**924**	**10,121**	**$372,007,328**	**$36,756**

Source: BLS 2018b

3.9.1.3. Housing

During the 2013- 2017 time period, Fremont County had 19,630 total housing units, of which 2,868 were vacant. Of these vacant housing units approximately 12 percent were for rent, 8 percent were for sale, and 39 percent were for seasonal, recreational, or occasional use. Fremont

County has a higher percentage of vacant housing units compared to the state, however a smaller percentage of these units are available for rent (USCB 2017b).

Table 3.22 below shows the housing unit estimates for the larger communities in proximity to the quarry. As of 2017, Cañon City is the municipality with the largest number of vacant housing units (646). There are approximately 1,814 vacant housing units in all other unincorporated areas of Fremont County.

Table 3.22. Housing Unit Estimates by Municipality, 2017

Geography	Total Housing Units	Occupied Housing Units	Vacant Housing Units	Vacancy Rate
Cañon City	7,362	6,716	646	8.8
Florence	1,765	1,598	167	9.5
Unincorporated Area	9,779	7,965	1,814	18.6
Total	**18,906**	**16,279**	**2,627**	**12.3**

Source: DOLA 2017b

Additional indicators addressing the relative cost of housing in the study area are shown in Table 3.23. The median value of an owner-occupied unit in the study area is $160,000, less than the state average of over $285,000. The values for Selected Monthly Owner Costs as a Percentage of Household Income (SMOCAPI), and Gross Rent as a Percentage of Household Income (GRAPI) provide an indicator of the affordability of housing in the study area compared to the state average; specifically, the cost of owning or renting a home relative to income. The percentage of units where SMOCAPI and GRAPI is 35 percent or more is slightly higher in Fremont County compared to the state average, however this difference is not significant.

Table 3.23. Selected Housing Cost Indicators, 2013-2017

Geography	Median Value of Owner-Occupied Units	Owner Occupied Units with a Mortgage			Occupied Units Paying Rent	
		Percent[1]	*Median SMOC*	*SMOCAPI 35% or More*	*Median Gross Rent*[2]	*GRAPI 35% or More*
Fremont County	$160,000	56.7%	$1,132	22.5%	$786	41.5%
Colorado	$286,100	72.2%	$1,623	20.7%	$1,125	41.3%

Source: USCB 2017f

[1] Percentage of owner-occupied housing units.
[2] For occupied units paying rent (does not include rent on vacant units).

SMOC: Selected Monthly Owner Costs (includes mortgage payments, real estate taxes, insurance, utilities, fuels, and condominium fees).
SMOCAPI: Selected Monthly Owner Costs as a Percentage of Household Income.
Median Gross Rent: Contract rent plus estimated cost of utilities and fuels if paid by the renter.
GRAPI: Gross Rent as a Percentage of Household Income.

3.9.1.4. Community Facilities and Services

Water Supply and Treatment

The Parkdale Quarry mine uses approximately 1,500 gallons of water per minute, mainly for dust control. On-site water is obtained from tributary groundwater and is supplemented when needed by water taken from the Tallahassee Creek located adjacent to the mine. Taking water from Tallahassee Creek is approved under a State permit. Process water is not discharged from the mining site. Water that is discharged from the site is sampled on a monthly basis to ensure it meets Clean Water Act and State of Colorado standards (Resource Economics LLC 2019).

3.9.1.5. Public Finance

County and city governments in the study area are funded mostly by property taxes and intergovernmental transfers from federal and state sources. Combined property, sales, and use tax revenue are projected to be over $12 million in 2017 for Fremont County general fund revenue. Those tax revenue streams supported 71 percent of total Fremont County general fund revenue. Approximately 7 percent of Fremont County revenue was anticipated to come from State and Federal intergovernmental revenues, such as grants, licenses, permit, and other miscellaneous revenues (Fremont County Finance Office 2017). The Fremont County General fund accounts for 49 percent of estimated revenue and 50 percent of estimated expenditures. Additional financing to cover the excess of expenditures beyond revenue stems from intergovernmental transfers.

Payment in lieu of taxes (PILT) are payments from the Federal Government to local governments to help compensate for lost property taxes resulting from tax-exempt Federal lands located within the local jurisdiction. More than half of the land in Fremont County is federal or state public land, managed by the U.S. Forest Service, the BLM, or the Colorado Parks and Wildlife. Local governments use PILTs to pay for various government services such as law enforcement and infrastructure. The payments are calculated based on acreage of eligible lands within the county, population, and other Federal transfers such as mineral royalties (U.S. Department of the Interior 2019). Table 3.24 provides the total PILTs made to the counties in from 2015 to 2019.

Table 3.24. Fremont County PILT Payments, 2015-2019

Year	Payment	Total Acres
2015	$1,076,954	455,215
2016	$1,111,743	455,253
2017	$1,138,110	455,253
2018	$1,176,069	455,254
2019	$1,177,027	455,254
2019 Average Payment per Acre	$2.59	

Source: U.S. Department of the Interior, n.d.

Table 3.25 depicts the assessed value, tax rate, and property taxes from 2016 to 2018. For the existing Parkdale Quarry located on its private property, Martin Marietta paid an average of over $23,000 annually in property taxes to Fremont County.

Table 3.25. Parkdale Quarry Property Tax Assessed Valuations and Rates in Fremont County, 2016-2018

Year	Assessed Value	Tax Rate	Property Tax
2016	$508,088	0.048048	$24,413
2017	$434,002	0.054132	$23,493
2018	$370,858	0.059241	$21,970
Average*	**$437,649**	**0.053807**	**$23,292**

Source: Fremont County Treasurer's Office 2019

*Not discounted

Table 3.26 presents Fremont County's permitted mining operations. Total permitted acreage in Fremont County is over 220,000 acres. Fremont County earns an annual fee of over $51,000 from permitted mine operations.

Table 3.26. 2018 Fremont County Permitted Mining Operations, Acreage, and Fee by Mine Type

Mine Type	Acreage	Fee
Other	21.50	$1,114
Surface	219,439	$49,790
Underground	1,159	$75
Total	**220,620**	**$50,979**

Source: Colorado Division of Reclamation, Mining, and Safety 2019b

The Parkdale Quarry currently does not pay revenue to the BLM based on its operations, as they are conducted on lands where Martin Marietta owns the mineral interests (Resource Economics LLC 2019).

3.9.1.6. Social Values

There are large areas of state-owned land that are essential features of recreational opportunity and scenic quality of the County (State of Colorado 2019d). Active land use in the county includes mining and mineral processing, commercial trade, agriculture and livestock grazing, manufacturing, and recreation and tourism. The largest river on Colorado's eastern slope, the Arkansas River, bisects the county and acts as a key source of recreation and water supply (State of Colorado 2019d).

Mining

Beginning in the 1800s, the "Colorado Mineral Belt" was the source of much of the State's wealth for decades. Colorado has a variety of metals and minerals such as silver, gold, industrial mineral, and coal (Colorado School of Mines 2019). The Fremont County historic mine district is composed of 19 districts and is pictured in Figure 3.9-3 (Appendix C), *Fremont Historic Mining Districts*.

The mining industry and associated economic activity has historically played a large part of the Fremont County local economy. As described in Section 3.9.1.2, mining employment and secondary services related to mining operations continue to contribute to the Fremont County economy. While only 79 people are employed in the Mining, Quarrying, and Oil and Gas Extraction sector in 2017 in Fremont County, these workers are the second highest paid workers in the county, on average.

Tourism and Recreation

With Royal Gorge located in Fremont County, the County also desires to continue development of its outdoor recreation sector (SCEDD 2017) and to provide adequate parks, recreational facilities and open space while maintaining the rural character of the county (Fremont County 2015). The region offers hiking, biking, natural landscapes, and geologically important sites. The Arkansas River, which abuts the existing Martin Marietta processing plant site, is one of the most popular whitewater rafting locations in the nation, and is also a popular site of camping, biking, horseback riding, and sightseeing. In 2018, approximately 20 percent of the jobs in the County are in travel and tourism related industries with an average annual income of $17,449. Many of these jobs are less 40 hours per week (Headwaters Economics 2019).

The BLM anticipates the Royal Gorge Extensive Recreation area to have a baseline visitation increase of six to nine percent due to general population growth and increased interest in recreation (BLM 2019d). The proposed quarry area is in a rugged landscape, which is difficult to

access for recreation and there is not a route currently available for the public to easily access the site. Given its limited use and lack of formal trails, the BLM does not maintain any trail counts in the proposed area. The BLM does not anticipate a substantive change from the baseline in visitation under Alternative A in the Mine Plan Area.

Rail

The Rock & Rail Railroad is owned by Rock & Rail LLC, a subsidiary of Martin Marietta. Currently the Rock & Rail Railroad employs 24 people annually, however, with increased production under Alternative A, direct employment associated with the rail operations could increase by 6 to 10 annual jobs. The Royal Gorge Route Railroad tourist train is also a joint owner of the track through Royal Gorge. The train transports approximately 100,000 passengers per year (Royal Gorge Route Railroad 2017). Currently, the Parkdale Quarry's operations result in three to five trains per week with approximately 48 cars per train as well as an average of two to three trips per day by standard over-the-road trucks (Martin Marietta 2019b).

Non-market Values

Non-market values include quality of life factors, ecosystem services, and non-use values such as existence, option, and bequest values. There is considerable complexity involved in understanding the values people have. As part of the Eastern Colorado Resource Management Plan process (BLM 2017b), the BLM heard some relevant insights for non-market values that may be affected by the proposed action. Residents of Fremont County responded that a rural quality of life, which is afforded by the existence of large undeveloped lands, is a primary factor in choosing to live there. Wildlife and resource conservation stakeholders, which may live outside of Freemont County, identified that lands with wilderness characteristics are important to them, especially for their value in providing wildlife habitat. Mineral utilization stakeholders believe mineral extraction is socially important because it has been part of the area's history, and because it supports the health of the local economy through support of private sector jobs.

3.9.2. Environmental Effects

Potential direct economic impacts of the Sale Area include changes in employment, income, business costs, and tax revenue to local, State, and Federal government entities. Changes in employment and income can result in indirect socioeconomic impacts, such as changes in population, which can lead to community impacts on housing, infrastructure, and other government services. Table 3.27 presents a summary overview of anticipated investment, employment, and production under the various alternatives.

Table 3.27. Alternatives Overview

	Alternative A (Proposed Action)	Alternative B (No Action)	Alternative C (Alternate Sale Area)
Construction	$91 million	$22.5 million	$91 million
Operations (2024-2050)	37-47 quarry employees 30-34 rail employees 67-81 total employees	27 quarry employees 24 rail employees 51 total employees	37-47 quarry employees 30-34 rail employees 67-81 total employees
Operations (2051-2120)	37-47 quarry employees 30-34 rail employees 67-81 total employees	0 employees	37-47 quarry employees 30-34 rail employees 67-81 total employees
Annual Production	4.0-million tons per year	0.8-million tons per year	4.0-million tons per year

Sources: Resource Economics LLC 2019; Martin Marietta 2019d; Martin Marietta 2019e

3.9.2.1. Direct and Indirect Effects from Alternative A

Issue 1: How would the proposed Parkdale Quarry expansion affect social and economic conditions in Fremont County?

As described in Chapter 2, the mine plan area is expected to be fully operational in 2024, under the Alternative A. Expansion of mining activity at the site would provide long-term viability for the quarry, extending its useful life from the currently forecast 15 to 30 years under Alternative B, the No Action Alternative (depending on production) (Martin Marietta 2019d) to over 100 years into the future. Martin Marietta estimates that the proposed approximate 698-acre expansion of the granite deposit pit footprint to the north onto the BLM lands would add an estimated 400 million to 500 million additional net tons of minable reserves to Martin Marietta's currently permitted reserves. Alternative A would sustain production of up to 4-million net tons of deposit per year, extending the mine life to 100 or more years at the increased production rate. Martin Marietta's contractor estimates, given the forecasted increase in aggregate prices, that the value of sales from the quarry over the first five and fifteen years will be $120 million and $629 million, respectively (Resource Economics LLC 2019).

There are two main drivers of socioeconomic impacts associated with Alternative A. The first is the increased economic activity that would result from the construction, operations, and reclamation phases of the proposed expansion, which include employment, local expenditures, and production. The second is the reduced availability of public lands for other uses such as recreation and livestock grazing. These two drivers have the potential to affect earnings by the workforce in the study area, the population of the study area, the demand for housing and public services, local fiscal revenues and social values.

Employment and Income

Under Alternative A, an additional $50 to $70 million beyond the capital expenditures for Alternative B would be purchased from 2020 through 2023. As the capital equipment is anticipated to be purchased outside of Fremont County, there is no anticipated direct, indirect, or induced spending or employment in Fremont County (Martin Marietta 2019e).

Expansion of mining services under Alternative A would create 10 to 20 additional annual direct jobs. According to the BLS and depicted in Section 3.9.1.2, mining jobs are the second highest paying jobs in Fremont County, with employees earning more than $70,000 per year on average. The current direct annual employment and estimated direct employment under Alternative A is shown in Table 3.28.

In addition to the direct employment associated with the expansion of mining activity at the quarry itself, Alternative A has broader implications for the employment associated with the Rock & Rail Railroad servicing the site. The Rock & Rail Railroad is owned by Rock & Rail LLC, a subsidiary of Martin Marietta. Currently the Rock & Rail Railroad employs 24 people annually, however, under Alternative A, direct employment associated with the rail operations could increase by 6 to 10 annual jobs. The Royal Gorge Route Railroad tourist train is also a joint owner of the track through Royal Gorge. The train transports approximately 100,000 passengers per year (Royal Gorge Route Railroad 2017), however the proposed expansion is not anticipated to have a substantial adverse impact on tourist train operations (Martin Marietta 2019d).

Table 3.28. Alternative A Associated Annual Employment

Labor Category	Number of Employees at Existing Quarry	Increase in Direct Employees Under Alternatives A and C
Parkdale Quarry		
Plant Manager	1	0
Mining Manager	1	0
Quality Control Technician	1	0
Supervisor (Lead Man)	3	1
Equipment Operator	10	1-4
Truck Driver (Onsite Haul Trucks)	2	2-4
Scale Operator / Office Manager	1	1
Plant Operator	1	0-1
Rail Loader	0	1-2
Customer Service Representative	1	0-1
Maintenance	3	2
Laborer	3	2-4
Total	**27**	**10-20**
Rock & Rail Railroad		
General Manager	1	0
Distribution Supervisor	1	0
Supervisor (Lead Man)	3	1
Rail Engineer	5	1-2
Rail Engineer (Training)	4	1-2
Office Manager	1	0
Plant Operator	2	1
Equipment Operator	3	1
Rail Distribution Manager	1	0
Maintenance	1	0-1
Laborer	2	1-2
Total	**24**	**6-10**

Source: Martin Marietta 2019d

Under Alternative A, an additional 10 to 20 employees would be expected to be working at the site, whether directly employed by the operator, or employed by mining, transportation or construction contractors. Another 6 to 10 employees would be likely be employed by the railroad line serving the quarry. The actual direct employment totals would vary depending on market demand for aggregate materials, but total direct employment is expected to be no less than the current 51 employees shown in Table 3.29. Martin Marietta expects that under Alternative A, production necessary to meet market demand will increase from 0.8 million tons in 2019 to

4.0 million tons in 2039 (Resource Economics LLC 2019). Because the Parkdale Quarry already has existing infrastructure for the processing and transportation of materials in place, the economic impacts associated with the initial construction of the proposed expansion would be limited. Table 3.29 depicts the number of employees under the baseline and Alternatives A and C.

Table 3.29. Summary of Employment for Baseline and Alternatives A and C

Segment	Current Number of Employees	Employees Under Alternative A and C	Additional Employees
Parkdale Quarry	27	37-47	10-20
Rock & Rail Railroad	24	30-34	6-10
Total	**51**	**67-81**	**16-30**

Source: Resource Economics LLC 2019

Economic Modeling Results

A discussion of the economic impact analysis and the results are presented in the Socioeconomics Appendix I. Under the "low estimate" for direct additional employment (10 direct additional quarry employees and 6 direct additional railroad employees), Alternative A would support over 26 total jobs, $1.9 million of labor income, and $6.2 million of regional output, annually. Under the "high estimate" for direct additional employment (20 direct additional quarry employees and 10 direct additional railroad employees), Alternative A would support over 49 total jobs, $3.45 million of labor income, and $11.5 million of regional output, annually.

Population

Alternative A would generate employment. Martin Marietta estimates that total direct employment associated Alternative A could range from 16 to 30 direct new employees and 26 to 49 total jobs. As stated in Section 3.9.1.2, Fremont County has over 600 unemployed residents, as of 2017. Because the jobs associated with or dependent on construction aggregate mineral resource extraction are typically some of the highest paying jobs in the community and generally do not require a college degree (Martin Marietta 2017), it is expected that the additional employees needed would be hired locally. Therefore, impacts on the local population from Alternative A would be negligible.

In 2017, the largest employment industry in Fremont County is health care and social assistance, employing 2,224 people or 22 percent. The next largest employment sector is the combined Federal and local governments, employing 17 percent of the County, or 1,735 people, as the County hosts a number of prisons. Mining, quarrying, and oil and gas extraction is the highest paying private sector in the study area, with employees making more than $70,000 annually, but employs only an average of 79 people annually. Other important sectors include accommodation and food services, construction, manufacturing, arts, entertainment and recreation, and transportation and warehousing, depicted in Table 3.18. Comparing 2017 to 2001, the County has

seen job losses in the construction, manufacturing and information industries. The largest increase in jobs was in health care and the real estate/rental sectors (SCEDD 2017). A goal of the County is to improve the diversification of the local economy (SCEDD 2017).

Housing & Public Services

Alternative A is expected to yield a negligible change in population, thus no changes in demand for housing and public services are expected.

Local Fiscal Revenues

As discussed in Section 3.9.1.5, *Public Finance*, the main source of tax revenues are property taxes. On an annual average, Martin Marietta paid $23.3 thousand in property taxes to Fremont County from 2015 to 2017. This value corresponds to approximately 0.1 percent of Fremont County property tax revenue in FY17. Although Martin Marietta's property ownership is not anticipated to change under Alternative A, Fremont County property tax revenue is anticipated to increase due the investment in new processing equipment and additional mobile equipment. PILT payments from the Department of the Interior, as discussed in Section 3.9.1.5, would remain unchanged under Alternative A.

Due to the anticipated increased production of aggregates under Alternative A, an increase in revenue associated with the mine plan and severance taxes to Fremont County can be expected. Martin Marietta pays a severance tax to Fremont County, which is 5.974 percent, and is specific to aggregate extraction. This tax is in addition to other local taxes paid for property, etc. Martin Marietta is required to pay the BLM fair market value for any aggregate materials removed. Currently, the fair market value for crushed stone aggregate is $0.79 per short ton. This revenue paid to the BLM goes into the U.S. Federal Treasury. Together with other property-related costs, expenditures are estimated to be $1.3 million in 2024 (Resource Economics LLC 2019) when the quarry is fully operational. Property-related costs include such items specific to activities occurring on the BLM land like weed control, dust control, and the maintenance of infrastructure placed on the BLM property (Martin Marietta 2019d).

In addition, local expenditures associated with Alternative A would pay sales taxes. A portion of sales tax collection is distributed to the counties, cities and school districts where they are collected. The modeling results also produces tax estimates. Total additional taxes to localities, the State of Colorado, and the Federal Government could range from over $600,000 to over $1.1 million. The results are presented in the Socioeconomics Appendix I.

Social Values

Alternative A would extend mining activity in the study area. This would contribute to the continuation of mining as a main form of livelihood to the local population and would tend to reinforce existing social values rather than alter them.

Rail and Truck Traffic

Alternative A is anticipated to add one to three additional trains per week. The trains would likely increase in length from the current 48 cars to approximately 90 cars. The proposed expansion is not anticipated to have a substantial adverse impact on tourist train operations. Regarding rail traffic through Cañon City and Florence, during Phase 1, the number of trains is expected to remain the same, but the number of cars per train is expected to double from the current level of rail activity. During Phase 2, the number of trains is expected to increase, roughly double the current number of weekly trains and the number of cars per train is expected to double, similar to Phase 1. Thus Phase 2 could result in a quadrupling in rail activity from the current level. In-town wait times for the railroad could similarly double in Phase 1 and quadruple in Phase 2. This could result in increased wait times for vehicles at impacted railroad crossings in Cañon City and Florence.

Current truck traffic is estimated as an average of two to three round trips per day. Martin Marietta estimates that truck traffic would remain the same under Alternative A (Martin Marietta 2019b). Due to no anticipated change in truck traffic, the proposed expansion is not anticipated to have an adverse impact on traffic in the area. Table 3.30 presents a summary of anticipated rail and truck traffic.

Table 3.30. Summary of Rail and Truck Traffic for Baseline and Alternatives

Haul Type	Current Level of Rail and Truck Activity	Anticipated Rail and Truck Activity Under Alternative A and Alternative C
Rail	3 to 5 48-car trains/week	Phase 1: 3 to 5 100-car trains/week Phase 2: 5 to 10 100-car trains/week
Truck	2-3 trips/day by standard over-the-road trucks, 240 days/year	2-3 trips/day by standard over-the-road trucks, 240 days/year

Source: Martin Marietta 2019b

Noise

While a noise study has not been conducted for the operation, Alternative A would utilize the processing equipment for current operations on private land and would move mining and some processing activities further from the Highway 50 corridor, thus potentially reducing noise impacts from those operations. Regarding the blast schedule, the hours of operation are unlikely to substantially change from those currently permitted. Blasting hours would be expected to remain from 10:00 AM to 5:00 PM, Monday through Friday, as set forth in the CUP currently in effect for the Parkdale Quarry (Martin Marietta 2019d).

Non-market Values

Alternative A would reduce lands with wilderness characteristics by 6 percent. As discussed in Section 3.2.6.1, relatively minor impacts are expected on big horn sheep and big game animals

given the availability of other suitable habitat. Quality of life impacts are often associated with changes in noise, traffic, and visual impacts. Noise and truck traffic are expected to remain consistent with existing operations. However, residents and visitors may experience longer delays from trains if production increases. Section 3.8.2 discusses visual impacts.

3.9.2.2. Direct and Indirect Effects from Alternative B

Issue 1: How would the proposed Parkdale Quarry expansion affect social and economic conditions in Fremont County?

Alternative B assumes that the proposed Mineral Materials Sale for the Parkdale Quarry Mine expansion is not approved by the BLM. Expected mining capital expenditures under Alternative B would include approximate expenditures of $2 million for a new bridge, $500,000 for rail upgrades, and $20 million for a new processing plant over 2020 to 2023 As for mining operations, Martin Marietta anticipates that, based on the current customer demand of aggregates for concrete, the quarry can expect a remaining life of 15 to 30 years after which the quarry would cease operations. However, if operations were expanded to meet demand for additional products (railroad ballast, rip rap and erosion control materials, structural fill) within other markets, operations could be expected to cease in 10 to 20 years (Martin Marietta 2019d).

Under Alternative B, there would be no change in the social and economic conditions in the local economy and Fremont County because the mine would continue to operate as currently permitted. Employment is expected to be consistent with current levels, depicted in Table 3.29 for the rest of the remaining mine life, 15 to 30 years, as described above. Thus, local employment and labor earnings are not expected to change, nor demand in housing, public services, or local fiscal revenues, or quality of life, for the rest of the remaining mine life.

Under Alternative B, upon final closure of the quarry Martin Marietta would no longer require the use of the Rock & Rail Railroad and therefore ongoing contribution to maintenance costs associated with the railroad would cease. This reduction in maintenance funding would adversely impact the ability of the Royal Gorge Route Railroad to maintain operation of the tourist train through the Royal Gorge.

This alternative provides the greatest non-use values for stakeholders that want to protect lands with wilderness characteristics.

3.9.2.3. Direct and Indirect Effects from Alternative C

Issue 1: How would the proposed Parkdale Quarry expansion affect social and economic conditions in Fremont County?

Although the acreage of disturbance is reduced under Alternative C in comparison to Alternative A, the amount of aggregate material that would be produced is essentially the same under both alternatives, therefore the environmental effects of Alternative C on socioeconomic conditions at

the local, regional, and Fremont County scale would be the same as described for Alternative A in Section 3.9.2.1. As a result, the socioeconomic impacts of Alternative C would be the same as described for Alternative A.

3.9.3. Cumulative Impacts

The CESA for socioeconomic effects encompasses Fremont County, the same area as the study area. The socioeconomic effects of past and present actions for the Parkdale Quarry Mine are reflected in the affected environment. Any cumulative effects with the alternatives are reflected in the discussion of the direct and indirect environmental effects. The discussion below focuses on RFFAs.

As previously discussed, key drivers of socioeconomic impacts associated with Alternatives A and C include increased employment, local expenditures, revenues, and production. There would be reduced availability of public lands for other uses. RFFAs that would have a cumulative effect on local employment, expenditures and production include mining operations, exploration activities, grazing and agriculture, and utility and infrastructure development. These activities are expected to continue at levels similar to present levels and what occurred in the recent past. Three aggregate mining operations in Fremont County are undergoing reclamation and closure: the Vallie Gravel mine located on the south side of the Arkansas River; the Hardscrabble mine, about a mile west of the Portland plant on Highway 120; and the Grisenti Farms mine located near Highway 115 on the north side of the Arkansas River. It is unknown whether other aggregate mines may develop or expand operations in the future in Fremont County. Alternatives A and C would contribute to the socioeconomic effects and cumulative impacts for an additional 60-80 years beyond Alternative B, the No Action Alternative.

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CHAPTER 4. CONSULTATION AND COORDINATION

This chapter summarizes agency and public consultation and coordination conducted by the BLM, prior to and during the preparation of this EIS.

4.1. PUBLIC PARTICIPATION AND SCOPING

This EIS was prepared in consultation and coordination with various federal, state, and local agencies, organizations, and individuals. Agency consultation and public participation have been accomplished through a variety of formal and informal methods, including scoping meetings, responses to e-mails, meetings with individual public agencies and interest groups. This section summarizes these activities.

In order to identify agency requirements and public concerns related to the proposed project the BLM has conducted a public involvement process that is intended to: (1) broaden the base of available information to support decision making; (2) inform the public about proposed actions and the potential impacts resulting from those actions; and (3) ensure that public concerns and needs are understood and addressed by agency decision makers.

The CEQ, through NEPA, requires the BLM to provide opportunities for the public to participate at four specific points in the EIS process: the initial project scoping period, the review and comment period of the Draft EIS, the review of the Final EIS, and the receipt of the Record of Decision (ROD). These opportunities are defined as follows:

- Scoping: The public is provided a 30-day scoping period to disclose potential concerns and issues associated with the Proposed Action. Information obtained by the BLM and other agencies during the public scoping period is combined with issues identified by lead and cooperating agencies. The summarization of these issues form the scope of the alternatives and analysis in the EIS.
- Draft EIS Comment Period: A minimum 45-day Draft EIS comment period is initiated by the publication of a Notice of Availability (NOA) for the Draft EIS in the Federal Register (FR). Members of the public are encouraged to provide comments on the Draft EIS via email or hardcopy to the address listed in the NOA. These public comments are combined with comments from the lead and cooperating agencies to form the basis for revising the Draft EIS into the Final EIS.
- Final EIS Review: A 30-day Final EIS availability period is initiated by the publication of the NOA for the Final EIS in the FR.
- ROD: Subsequent to the 30-day availability period for the Final EIS, the ROD would be prepared.

4.1.1. Scoping

The formal public scoping process began with publication of a NOI in the FR on July 31, 2019 (FR Volume 84, Number 147). The BLM invited the public to submit comments during the 30-day scoping period from July 31, 2019, through August 30, 2019. The NOI notified the public of the BLM's intent to prepare an EIS, provided information about the Proposed Action, described the purpose of the scoping process, and identified methods to provide comments.

The BLM hosted a scoping meeting on August 9, 2019, for the public and other interested parties to learn about and submit comments on the Parkdale Quarry Expansion. The BLM used an open house meeting format to encourage open and informal dialog between the public and agency representatives and allowed attendees to learn about the proposed Parkdale Quarry Expansion at their own pace. Representatives from the BLM included the BLM project manager and members of the BLM interdisciplinary team and management from the RGFO and the Colorado State Office. MM was also in attendance to answer technical questions from the public, as needed.

The BLM received a total of 10 comment submittals (e.g., letter, comment form, or email) during the scoping period, resulting in a total of 39 comments. Most of the comments the BLM received were from federal and state agencies. Scoping comments were used to help determine the scope of issues to be addressed and help identify the significant issues related to the Proposed Action. The Public Scoping Summary Report for this EIS (BLM 2019e) provides a detailed table listing each individual comment, its source, and where the comment would be addressed in the EIS. Table 4.1 details the distribution of scoping comment documents by organization type.

Table 4.1. Number of Comment Documents by Organization Type

Affiliation Category	Number of Comment Documents
No Affiliation Included or Withheld	6
Interest Group	2
Business	0
State/Local Government	1
State Agency	1
Tribal	0
Total	**10**

Table 4.2 presents the number of comments by issue category.

Table 4.2. Number of Individual Comments by Issue Category

Issue Category	Number of Comments Per Issue Category
Air Quality and Climate Change	3
Alternatives	2
Analysis Methods and Assumptions	5
Cultural Resources	0
Fish and Wildlife	6
Hazardous or Solid Wastes	0
Lands and Realty	0
Laws, Regulations, Guidance	1
Mineral Resources	0
NEPA Process	0
Noise	2
Other or General Issues	0
Proposed Action	0
Purpose and Need	0
Reasonably Foreseeable Actions	0
Recreation	1
Socioeconomics and Environmental Justice	2
Tribal Treaty Rights and Trust Responsibilities	0
Unsupported Position Statement	7
Visual Resources	3
Water Quality	2
Wilderness, and ACECs	5
Total	**39**

4.1.2. Public Review of the Draft EIS

The 45-day public comment period on the Draft EIS began upon publication of the NOA of the Draft EIS in the FR, which occurred on Friday, February 7, 2020. An open-house public meeting on the Draft EIS was held at the Abbey Events Center in Cañon City, Colorado, on February 26, 2020 from 4:30 p.m. to 6:30 p.m.

An EIS mailing list of interested persons was initially assembled from the scoping mailing list with the addition of persons who expressed interest in being added to the mailing list during and subsequent to scoping. The mailing list was revised to add those persons requested to be on the mailing list.

The BLM also announced the availability of the Draft EIS through BLM press release, and by publishing notices of availability in local newspapers, on the website, and through mailing. The Draft EIS was distributed to interested parties identified in the updated mailing list, as described above, and also made available via the internet. Public comments were submitted digitally through the BLM ePlanning site https://go.usa.gov/xy6tn, or by mail to the BLM RGFO. Responses to substantive comments are contained as Appendix N.

4.2. CONSULTATION AND COORDINATION WITH FEDERAL, STATE, AND LOCAL AGENCIES, AND TRIBES

Issues related to agency consultation and review included mining regulation and reclamation, biological resources, cultural resources, socioeconomics, air quality, and land and water management. Consultations regarding historic properties were conducted pursuant to the National Historic Preservation Act and implementing regulations at 36 CFR 800. The USFWS provided an official list of Threatened and Endangered Species that could potentially occur within the Project area. As the state agency with jurisdiction and expertise related to wildlife, CPW participated as a cooperating agency in discussions regarding bighorn sheep habitat, reclamation strategy, and other wildlife issues. Fremont County participated as a cooperating agency during discussions regarding economic, social, and environmental conditions within the county.

Executive Order 13084 directs the BLM to establish regular and meaningful consultation and collaboration with Native American Tribal governments on the development of regulatory policies and permit approvals for proposed projects that could substantially or uniquely affect tribal communities. The BLM sent letters to the tribal representatives listed in Section 4.3.5, *Tribal Organizations.*

4.3. LIST OF CONTACTS

The following agencies, businesses, organizations, and individuals were contacted during the preparation of the Draft EIS.

4.3.1. Federal Agencies

- Bureau of Land Management – Colorado State Office, Lakewood
- Bureau of Land Management – Washington D.C.

4.3.2. State Agencies

- Colorado Department of Natural Resources
- Colorado Parks and Wildlife

- Colorado Division of Reclamation, Mining and Safety
- Colorado Division of Public Health and Environment
- Colorado State Historic Preservation Office

4.3.3. Elected Officials

- Michael Bennet – U.S. Senator
- Cory Gardner – U.S. Senator
- Diana DeGette – U.S. Representative

4.3.4. Local Agencies

- Fremont County Commissioners

4.3.5. Tribal Organizations

The BLM consulted with the following 16 tribes regarding the proposed mineral material sale:

- Apache Tribe of Oklahoma
- Cheyenne and Arapaho Tribes of Oklahoma
- Cheyenne River Sioux Tribe
- Comanche Nation of Oklahoma
- Crow Creek Sioux
- Eastern Shoshone
- Jicarilla Apache Nation
- Kiowa Tribe of Oklahoma
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- Northern Ute Tribe
- Oglala Sioux Tribe
- Rosebud Sioux Tribe
- Southern Ute Tribe
- Standing Rock Lakota Tribe
- Ute Mountain Ute Tribe

4.3.6. Newspapers and Libraries

- Cañon City Daily Record
- KKTV
- KUNC
- Chaffee County Times
- Arkansas Valley Voice
- Prairie Mountain Media

4.3.7. Private Organizations and Companies

- Trout Unlimited
- Rocky Mountain Bighorn Society
- Rocky Mountain Elk Foundation
- Wild Sheep Foundation
- Ducks Unlimited
- Nature Conservancy
- Mule Deer Foundation
- Audubon Society
- The Sierra Club
- Conservation Colorado
- The Wilderness Society
- Wild Connections
- Cañonland Walkers and Hikers
- Theodore Roosevelt Conservation Partnership
- Western Resource Advocates
- Colorado Wildlife Federation
- Central Colorado Wilderness Coalition
- Colorado Stone Sand & Gravel Association
- American Exploration & Mining Association
- Echo Canyon River Expeditions
- Arkansas River Outfitters Association

4.3.8. Individuals

- Grazing Permittee

CHAPTER 5. LIST OF PREPARERS

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NEPA Coordinator	Martin Weimer
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Air Resources	Chad Meister
Wildlife Resources and Special Status Species	Matt Rustand
Soils and Water Resources	John Smeins
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NEPA/Editor	Marie E. Lawrence
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Cultural Resources and Tribal Consultation	Monica Weimer
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Economics, Environmental Justice	Amy Stillings
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Recreation, Visual Resources, WSAs/ACECs/Other, Wilderness Characteristics	Linda Skinner
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[1] Whetstone Associates

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