U.S. Department of the Interior
Bureau of Land Management

Proposed Competitive Mineral Materials Sale (COC-078119) at Parkdale, Fremont County, CO.

Final Environmental Impact Statement

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

Volume II - Appendices A through D

Costs to date to develop analysis: $941,856

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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

Bureau of Land Management
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Appendix A

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Appendix B

Glossary and Index

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APPENDIX B. GLOSSARY AND INDEX

B.1 GLOSSARY

Acre: A unit of land measure equal to 43,560 square feet.

Affecting: Will or may have an effect on.

Allotment: A unit of land suitable and available for livestock grazing that is managed as one grazing unit.

Alluvium: A general term for clay, silt, sand, gravel, or similar unconsolidated detrital material, deposited during comparatively recent geologic time by a stream or other body of running water.

Animal Unit Month (AUM): The amount of forage required by one cow and calf, or their equivalent, for one month.

Aquifer: A zone, stratum, or group of strata acting as a hydraulic unit that stores or transmits water in sufficient quantities for beneficial use.

Bedrock: Solid rock exposed at the surface of the earth or overlain by unconsolidated material, weathered rock, or soil.

Best Management Practices (BMPs): Methods that have been determined to be the most effective and practical means of preventing or reducing impacts on a resource.

Borehole: A hole with a drill, auger, or other tools for exploring strata in search of minerals, for water supply, for blasting purposes, for proving the position of old workings and faults, and for releasing accumulations of gas or water.

Cooperating Agency: Any federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major federal action significantly affecting the quality of the human environment. The selection and responsibilities of a cooperating agency are described in Section 1501.6. A State or local agency of similar qualifications or, when the effects are on a reservation, an Indian Tribe, may by agreement with the lead agency become a cooperating agency.

Cultural Resources: Locations of human activity, occupation, or use. Cultural resources include aboriginal, historic, historic archaeological or architectural sites, structures, or places with important public and scientific uses, and locations of traditional cultural or religious importance to specified social and/or cultural groups.

Cumulative Impact: 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.

Deposit: A natural accumulation, such as precious metals, minerals, coal, gas, oil, etc., that may be pursued for its intrinsic value; gold deposit.

Dewatering: The lowering of the water level in a well as a result of withdrawal; the reduction in groundwater level at a point caused by the withdrawal of water from an aquifer.

Drawdown: Vertical distance that a water elevation is lowered or the pressure head is reduced due to the removal of water from the same system.

Effects include:

(a) Direct effects, which are caused by the action and occur at the same time and place.

(b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects also may include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.

Erosion: The wearing away of the land surface by running water, wind, ice or other geologic agents, including such processes as gravitation creep.

Exploration: The search for economic deposits of minerals, ore, gas, oil, or coal through the practices of geology, geochemistry, geophysics, drilling, shaft sinking and/or mapping.

Extraction: The process of mining and removal of coal or ore from a mine. Also used in relation to all process of obtaining metals from ores.

Feasible: Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.

Federal Agency: All agencies of the Federal Government. It does not mean the Congress, the Judiciary, or the President, including the performance of staff functions for the President in his Executive Office. For the purposes of regulation it includes States and units of general local government and Indian tribes assuming NEPA responsibilities under section 104(h) of the Housing and Community Development Act of 1974.

Forage: All browse and non-woody plants that are available to livestock or game animals for grazing or harvestable for feed.

Greenhouse Gas (GHG): An atmospheric gas such as water vapor, carbon dioxide, methane, and ozone that absorbs and emits radiation.

Groundwater: Water found beneath the land surface in the zone of saturation below the water table.

Growth Media: All materials, including topsoil, specified soil horizons, vegetative debris, and organic matter, which are classified as suitable for stockpiling and/or reclamation.

Haul Road: A road used by large (<50-ton capacity) trucks to haul ore and waste rock from an open pit mine to other locations.

Hydraulic Conductivity: The capacity of a rock to transmit water. It is expressed as the volume of water at the existing kinematic viscosity that will move in unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow.

Key Observation Point (KOP): A specific place on a travel route or within an existing or potential use area where the view of a management activity or project would be most revealing for purposes of the contrast rating.

Lead Agency: The agency or agencies preparing or having taken primary responsibility for preparing the environmental impact statement.

Mine Pit: Surface area from which ore and waste rock are removed.

Mining Claim: A portion of the Public Domain or related lands which a miner, for mining purposes, takes and holds in accordance with mining laws.

Mitigation includes:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

Monitor: To systematically and repeatably watch, observe, or measure environmental conditions in order to track changes.

National Ambient Air Quality Standards (NAAQS): The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to set NAAQS for pollutants that are considered harmful to the public and environment. These pollutants come from numerous and diverse sources. The EPA has set NAAQS for six principal pollutants, which are called "criteria" pollutants:

- Carbon monoxide
- Lead
- Nitrogen oxides
- Particulate matter
    - PM_{10} (any particulate matter with a diameter less than or equal to 10 microns)
    - $PM_{2.5}$ (any particulate matter with a diameter less than or equal to 2.5 microns. Also called "fine particulate matter")
- Ozone
- Sulfur dioxide

The Clean Air Act established two types of NAAQS:

1) **Primary standards:** set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly.
2) **Secondary standards:** set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings.

NEPA Process: All measures necessary for compliance with the requirements of section 2 and Title I of the National Environmental Policy Act (NEPA).

Notice of Intent: A notice that an environmental impact statement will be prepared and considered. The notice shall briefly:

(a) Describe the proposed action and possible alternatives.

(b) Describe the agency's proposed scoping process including whether, when, and where any scoping meeting will be held.

(c) State the name and address of a person within the agency who can answer questions about the proposed action and the environmental impact statement.

"Proposal" exists at that stage in the development of an action when an agency subject to the Act has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal and the effects can be meaningfully evaluated. Preparation of an environmental impact statement on a proposal should be timed (Section 1502.5) so that the final statement may be completed in time for the statement to be included in any recommendation or report on the proposal. A proposal may exist in fact as well as by agency declaration that one exists.

Permeability: see hydraulic conductivity.

pH: Symbol for the negative common logarithm of the hydrogen ion concentration (acidity) of a solution. The pH value of 7 is considered neutral. A pH value below 7 indicates acidity, and a pH value above 7 indicates alkalinity or a base.

Plan of Operations: A detailed description presenting the methods, timing, and contingencies to be used during the operation of the Project. A document required from any person proposing to conduct mineral related activities which utilize earth moving equipment and which will cause disturbance to surface resources.

Reclamation: Returning disturbed land to a form and productivity in conformity with a predetermined land management plan or a government approved plan or permit.

Record of Decision: A document separate from but associated with an Environmental Impact Statement which states the decision; identifies all alternatives, specifying which were environmentally preferable; and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not (40 CFR 1505.2).

Right-of-way: Strip of land or corridor over which a powerline, pipeline, access road, or maintenance road would pass.

Riparian: Pertaining to or situated on the bank of a body of water, especially of a watercourse such as a river.

Scope: Consists of the range of actions, alternatives, and impacts to be considered in an environmental impact statement. The scope of an individual statement may depend on its relationships to other statements (Sections1502.20 and 1508.28). To determine the scope of environmental impact statements, agencies shall consider three types of actions, three types of alternatives, and three types of impacts. They include:

(a) Actions (other than unconnected single actions) which may be:

Connected actions, which means that they are closely related and therefore should be discussed in the same impact statement. Actions are connected if they:

(i) Automatically trigger other actions which may require environmental impact statements.

(ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.

(iii) Are interdependent parts of a larger action and depend on the larger action for their Justification.

Cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.

Similar actions, which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. An agency may wish to

analyze these actions in the same impact statement. It should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement.

(b) Alternatives, which include: No Action Alternative.

- Other reasonable courses of actions.
- Mitigation measures (not in the Proposed Action).

(c) Impacts, which may be: 1) direct; 2) indirect; 3) cumulative.

Sensitive Species: Those species designated by a BLM State Director, in cooperation with a State agency responsible for managing the species, as sensitive. Sensitive species are those species (1) under status review by the U.S. Fish and Wildlife Service/National Marine Fisheries Service; (2) whose numbers are declining so rapidly that Federal listing may become necessary; (3) with typically small and widely dispersed populations; or (4) inhabiting ecological refugia or other specialized or unique habitats.

Stockpile: An accumulation of ore, stone, or other mined or quarried material.

Surface Water: Water found in ponds, lakes, inland seas, streams, and rivers or above the ground surface.

Watershed: The entire land area that contributes water to a particular drainage system or stream.

Wilderness Area: Wilderness areas are designated by Congress under the authority of the Wilderness Act of 1964 and comprise the National Wilderness Preservation System.

Winter Range: Important habitat and forage area for big game, as it provides valuable food and thermal cover that allow ungulate species (specifically mule deer for this analysis) to conserve energy during severe winter weather conditions.

B.2 INDEX

Final Environmental Impact Statement
Parkdale Quarry Expansion Project

Appendix C

Final EIS Figures

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APPENDIX C. FIGURES LIST

Chapter 1

Chapter 2

Chapter 3

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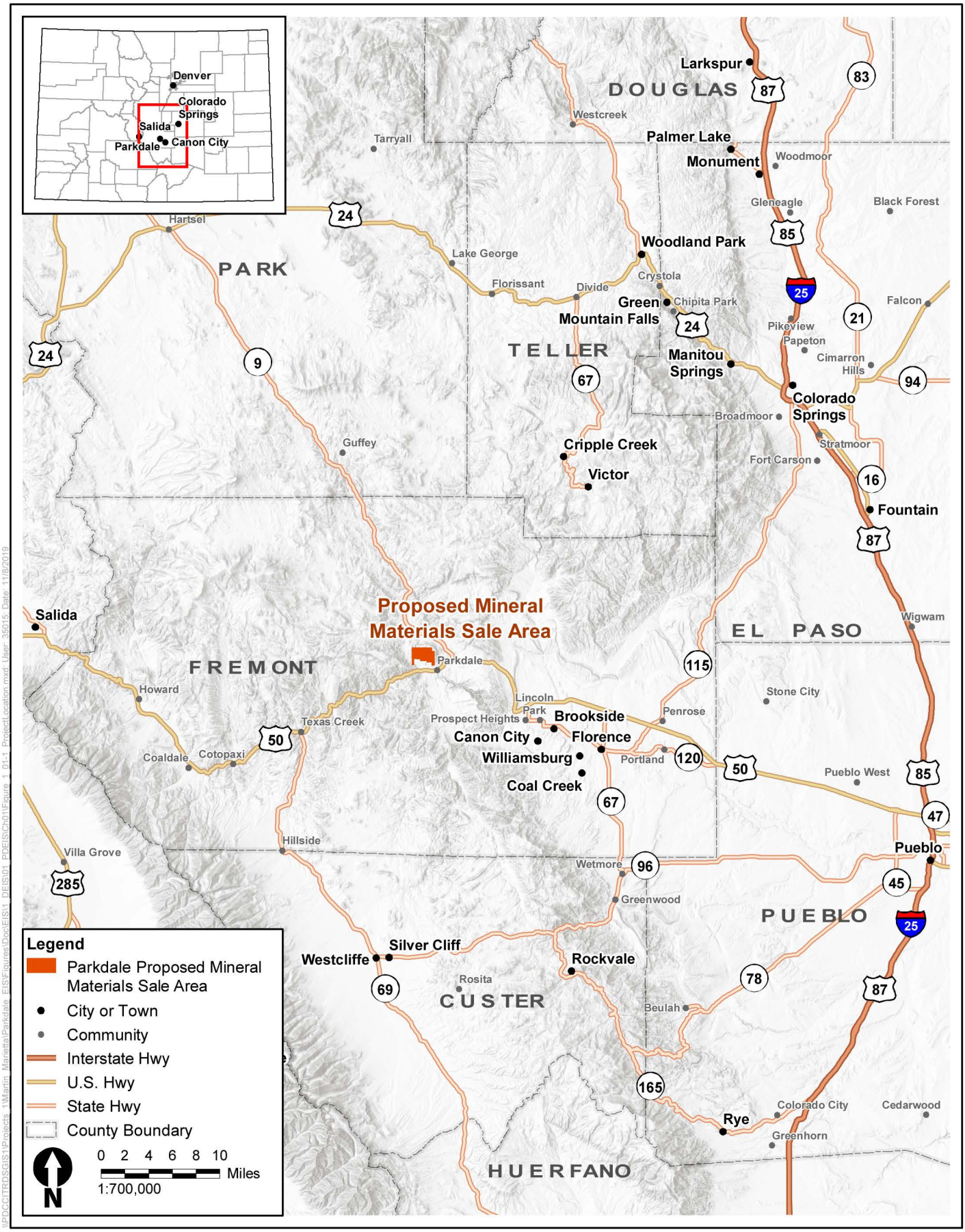


Figure 1.1-1
Proposed Quarry Location

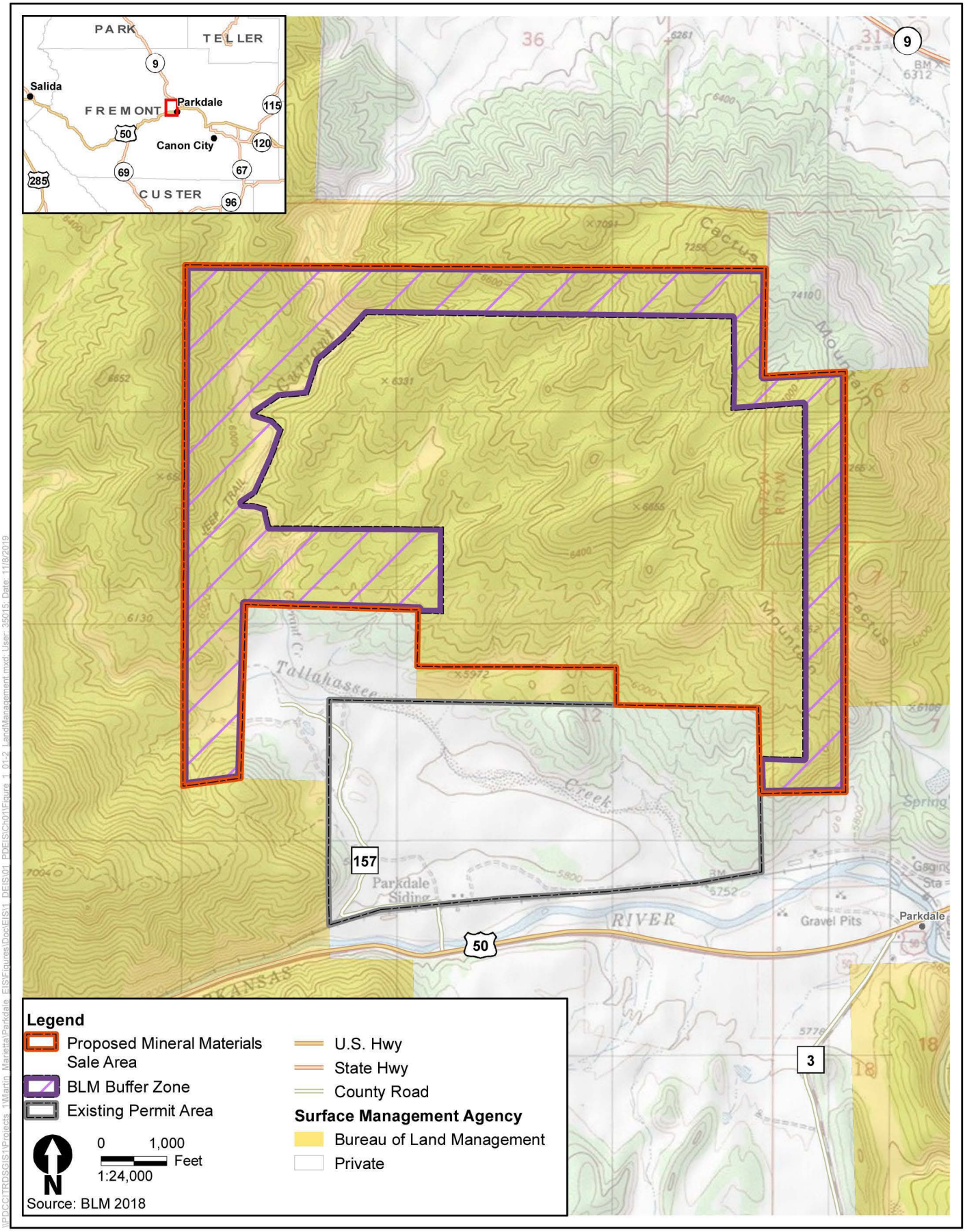


Figure 1.1-2
Land Management Status within the Existing Quarry and Proposed Mineral Materials Sale Area

Figure 2.2-1
Existing Operations

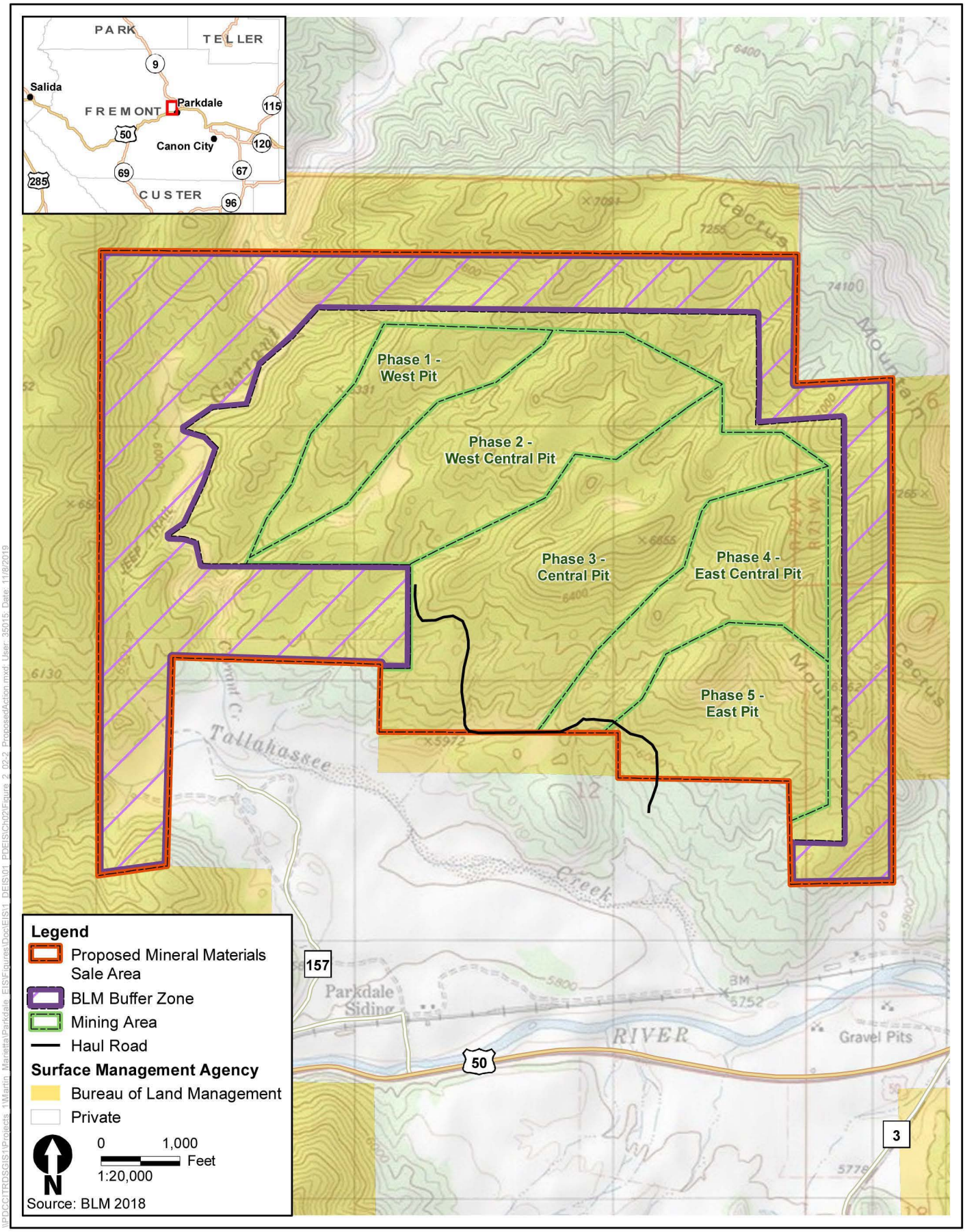


Figure 2.2-2
Proposed Mineral Materials Sale Area

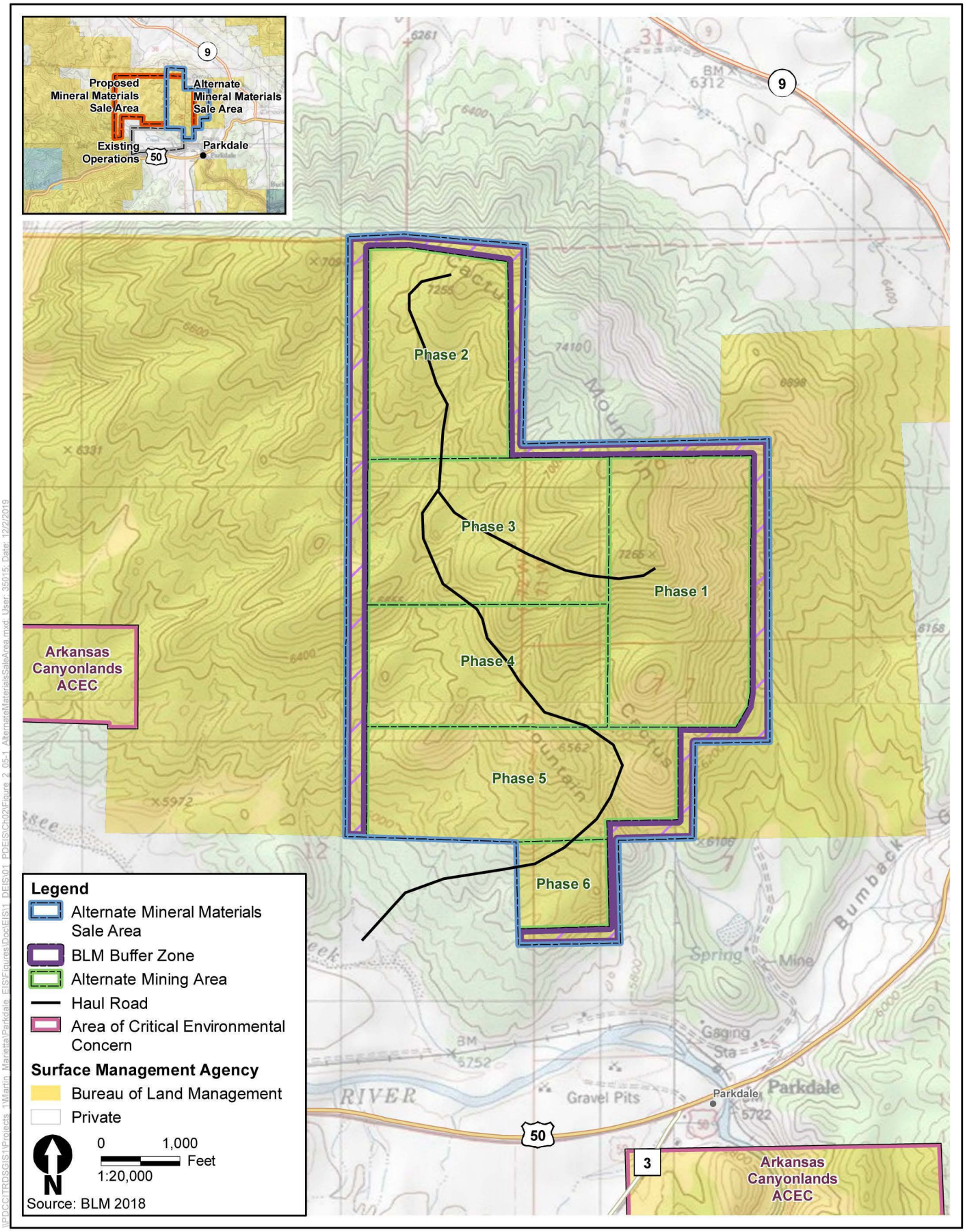
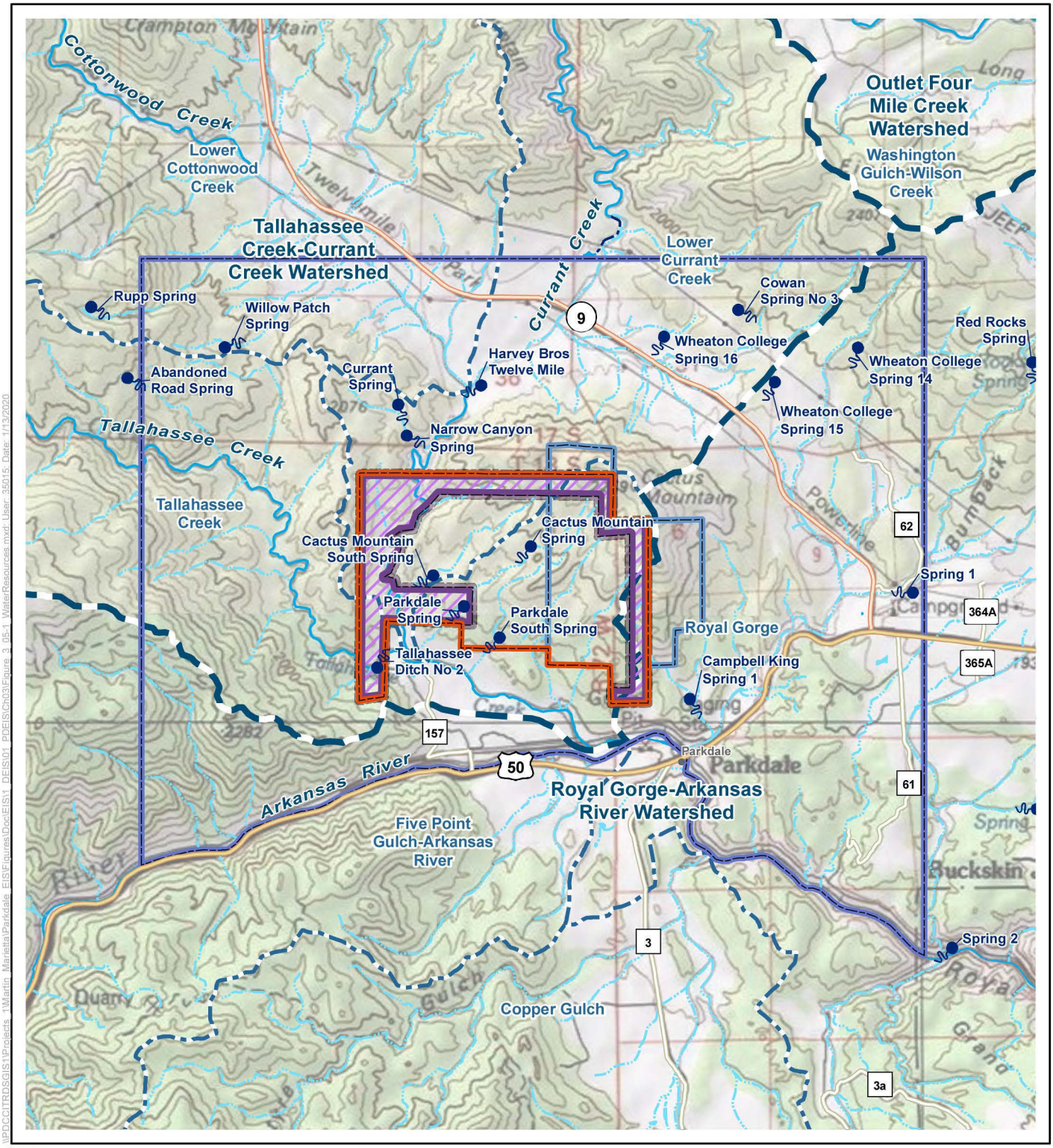
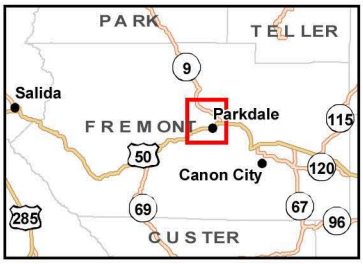


Figure 2.5-1
Alternate Mineral Materials Sale Area



Proposed Mineral Materials Sale Area
BLM Buffer Zone
Alternate Mineral Materials Sale Area
Water Resources Study Area
Watershed Boundary (HUC 10)
Subwatershed Boundary (HUC12)

Spring
Perennial Stream
Intermittent Stream
Canal/Ditch
Intermittent Lake/Pond
Perennial Lake/Pond



Source: NHD 2011, BLM 2019.

N

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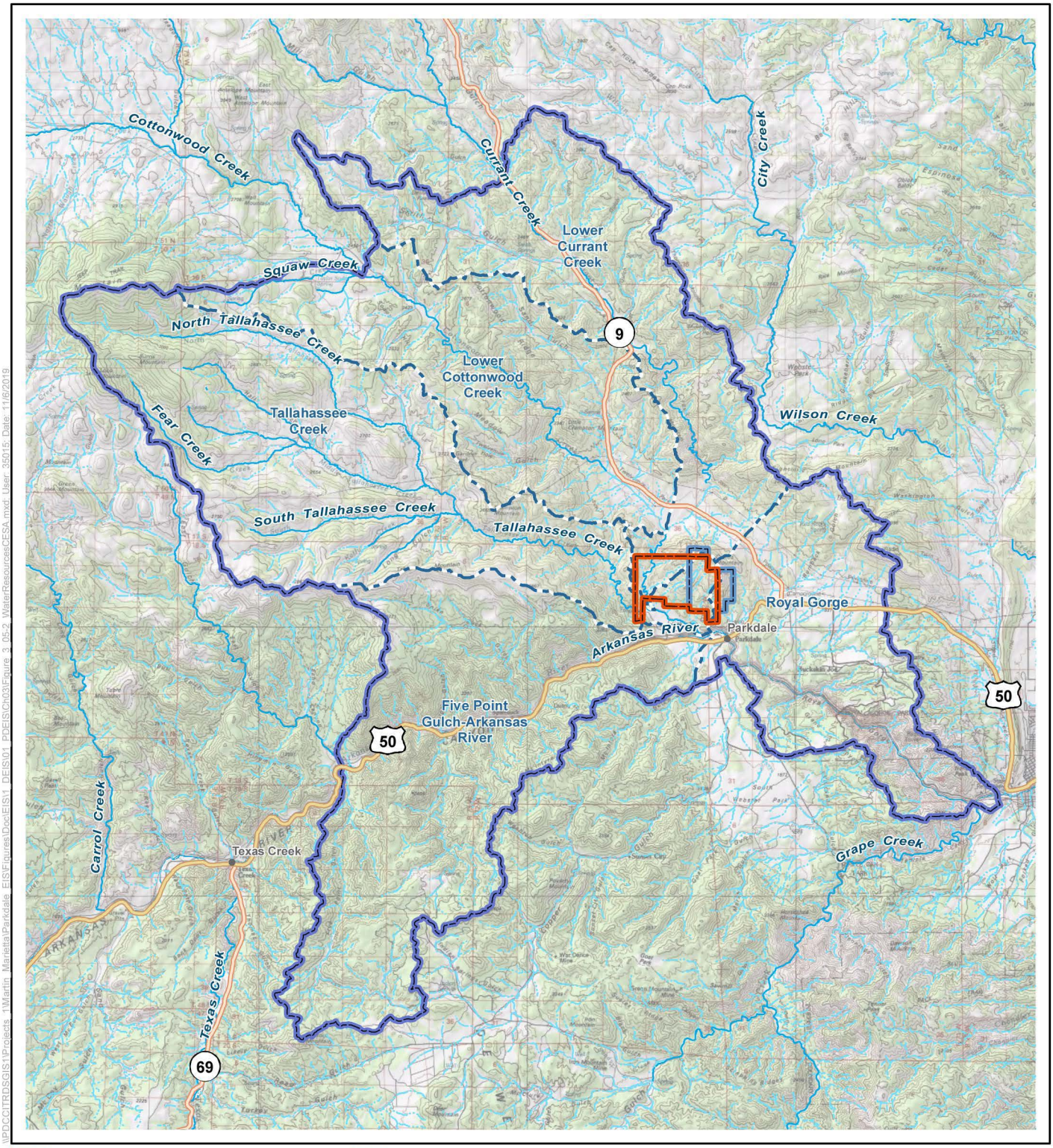
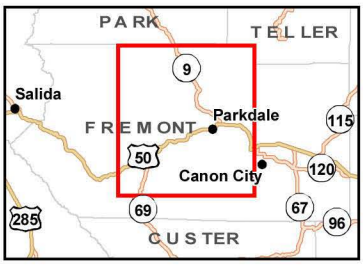
1:60,000

Figure 3.5-1
Water Resources Analysis Area for Direct and Indirect Effects



Proposed Mineral Materials Sale Area
Alternate Mineral Materials Sale Area
Water Resources Cumulative Effects Study Area Boundary
Subwatershed Boundary (HUC12)
Perennial Stream
Intermittent Stream



Source: NHD 2011

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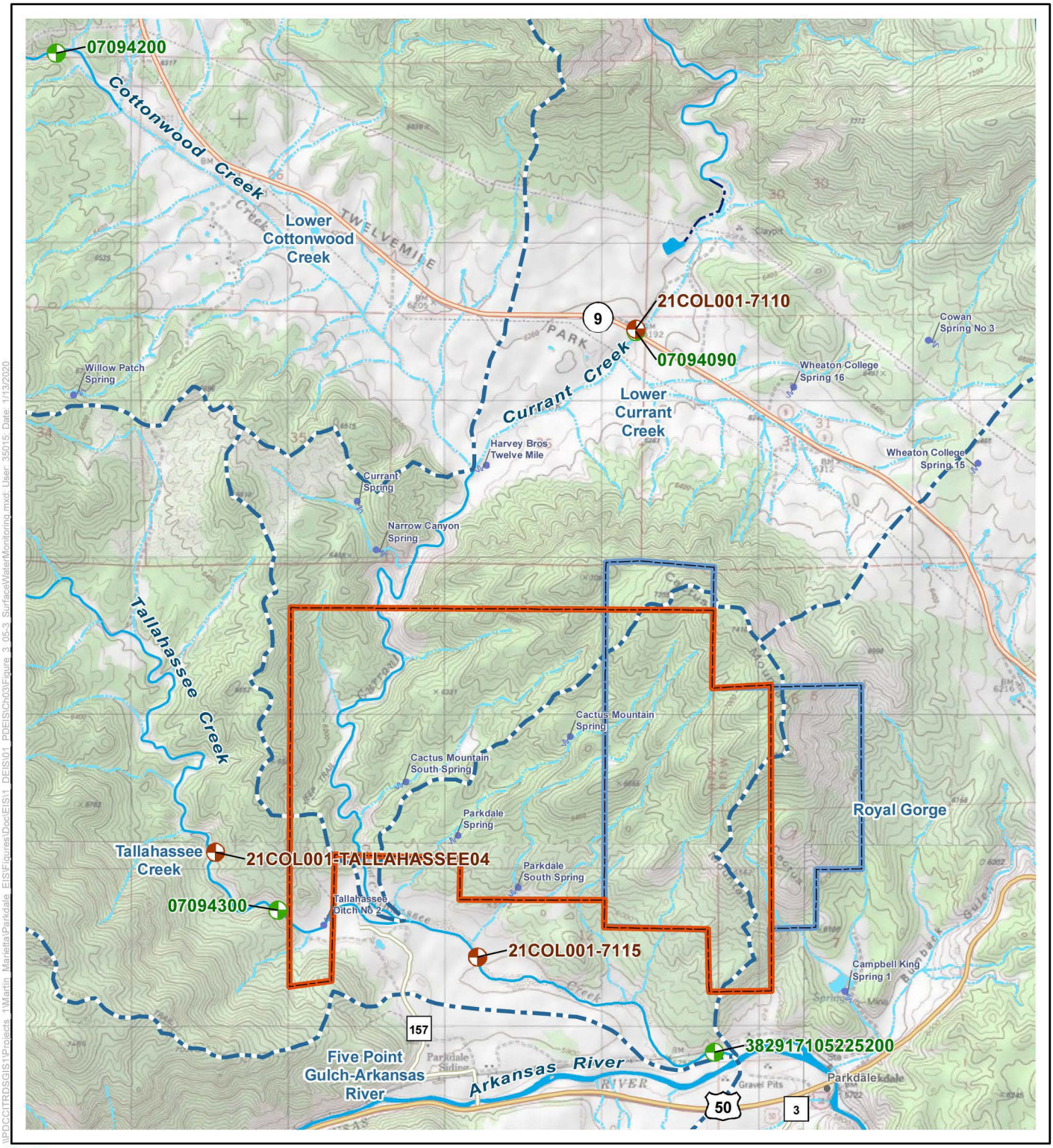
1:210,000

Figure 3.5-2
Water Resources
Cumulative Effects Study Area



Proposed Mineral Materials Sale Area

Alternate Mineral Materials Sale Area

Subwatershed Boundary (HUC12)

Spring

Surface Water Monitoring Site

CDPHE

USGS

Perennial Stream

Intermittent Stream

Canal/Ditch

Intermittent Lake/Pond

Perennial Lake/Pond

Source: NWQMC 2019

N

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1:36,000

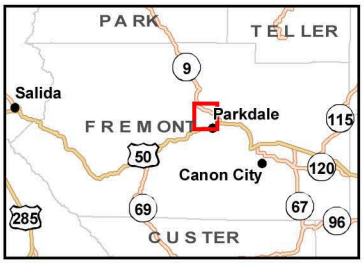
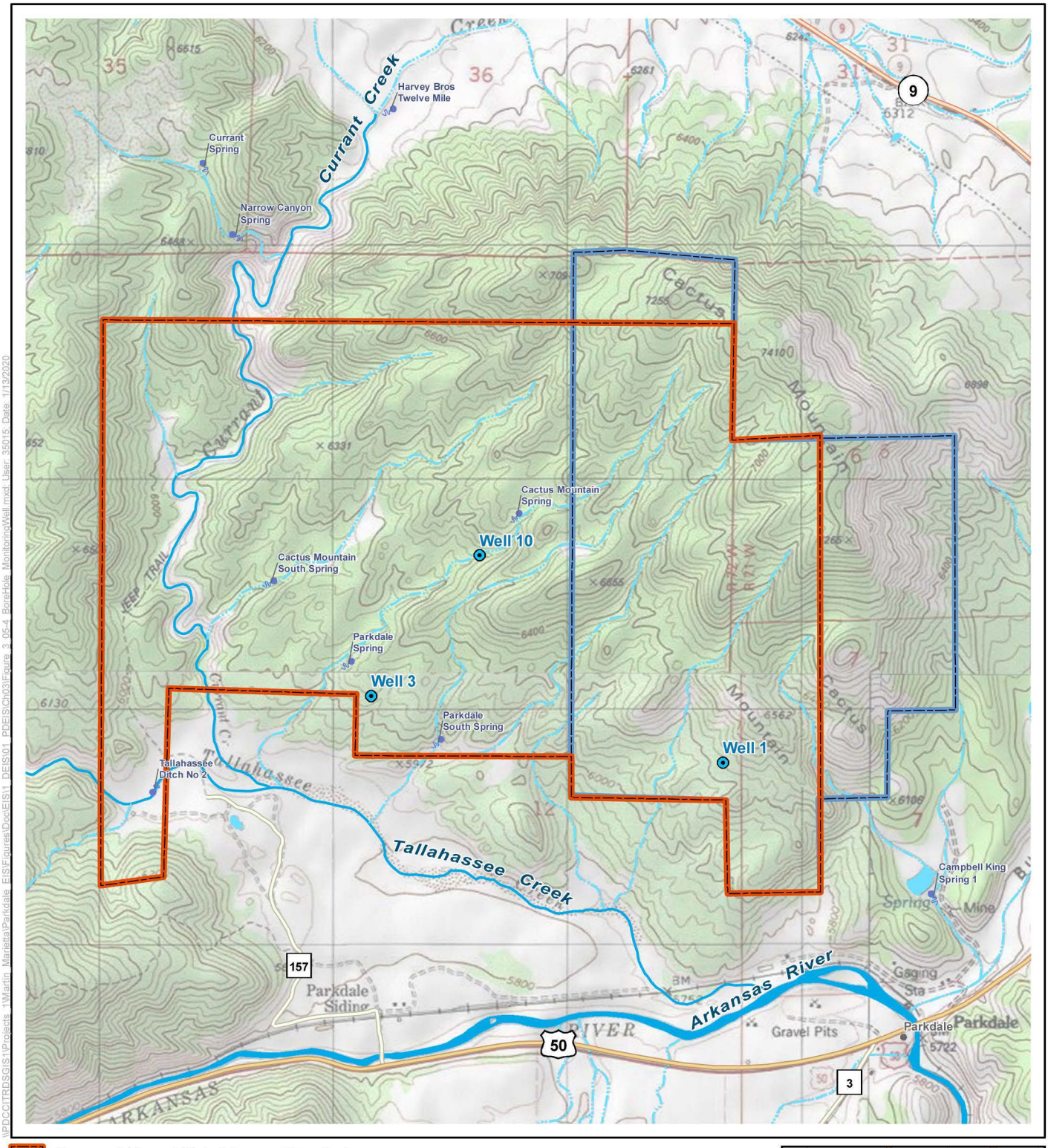


Figure 3.5-3
USGS and CDPHE Surface Water Monitoring Locations



Proposed Mineral Materials Sale Area

Alternate Mineral Materials Sale Area

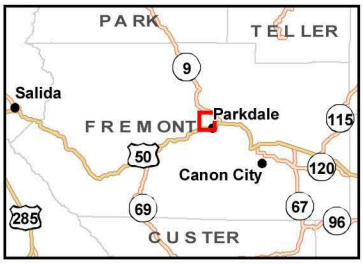
Monitoring Well

Spring

Perennial Stream

Intermittent Stream

Intermittent Lake/Pond



Source: BLM 2019

N

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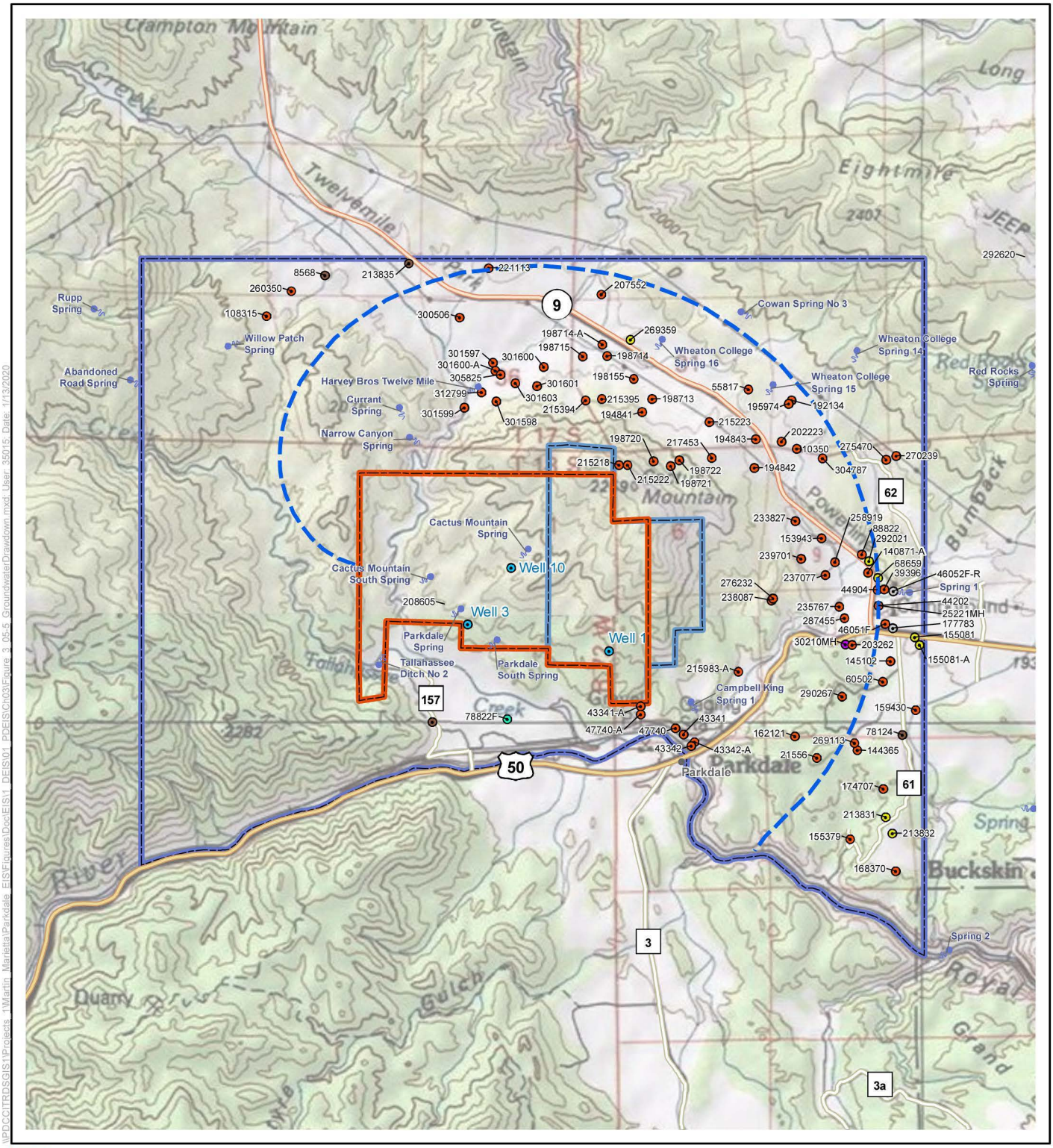
1:24,000

Figure 3.5-4
Monitoring Well Locations within the Mineral Sale Area



Proposed Mineral Materials Sale Area
Alternate Mineral Materials Sale Area
Water Resources Study Area
Estimated limit of potential drawdown impacts after 100 years of mining
Monitoring Well
Spring

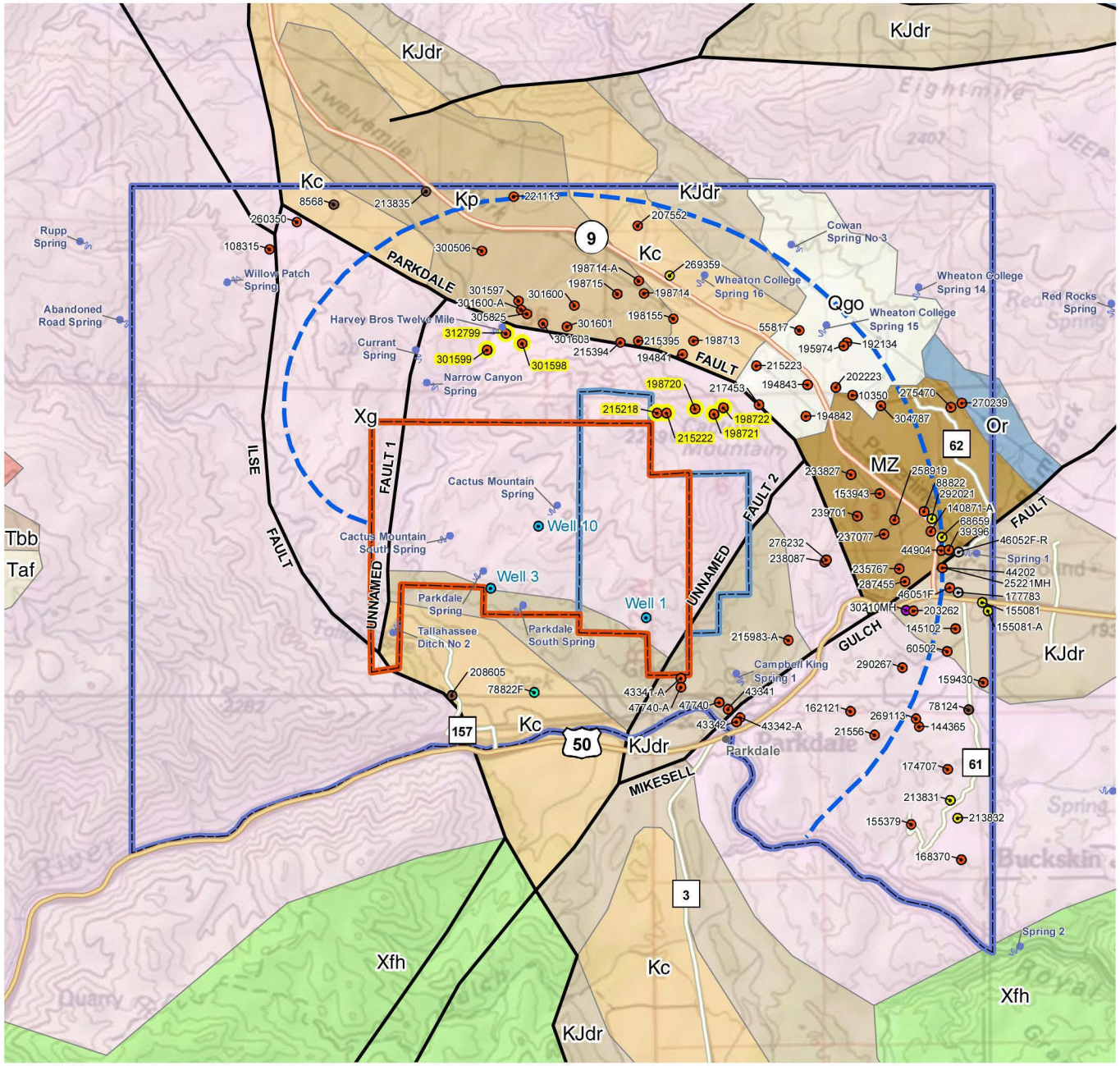
DWR Wells - Primary Use

Commercial
Domestic
Household use only
Monitoring/Sampling
Stock
Other

Source: DWR 2019

0 0.5 1 Miles
1:60,000
N

Figure 3.5-5
Groundwater Users and Well Locations within the Water Resources Study Area



Geologic Formation

- Taf - Ash-flow tuff of main volcanic sequence
- Tbb - Basalt flows and associated tuff, breccia, and conglomerate of late-volcanic bimodal suite
- Kc - Colorado Group
- Kjdr - Dakota, Purgatoire, Morrison, and Ralston Creek Formations
- Xfh - Felsic and hornblendic gneisses, either separate or interlayered
- Xg - Granitic rocks of 1700-m.y. age group
- MZ - Mesozoic rocks
- Older gravels and alluviums
- Or - One or more Ordovician formations
- Kp - Pierre Shale, undivided
- Tpl - Pre-ash-flow andesitic lavas, breccias, tuffs, and conglomerates
- Contact
- Fault

- Proposed Mineral Materials Sale Area
- Alternate Mineral Materials Sale Area
- Water Resources Study Area
- Estimated limit of potential drawdown impacts after 100 years of mining
- Monitoring Well
- Spring

DWR Wells - Primary Use

- Commercial
- Domestic
- Household use only
- Monitoring/Sampling
- Stock
- Other

Well locations are misreported in DWR database. The exact locations are unknown, but geologic logs for the wells indicate that they located are north of the Parkdale Fault in sedimentary rocks.

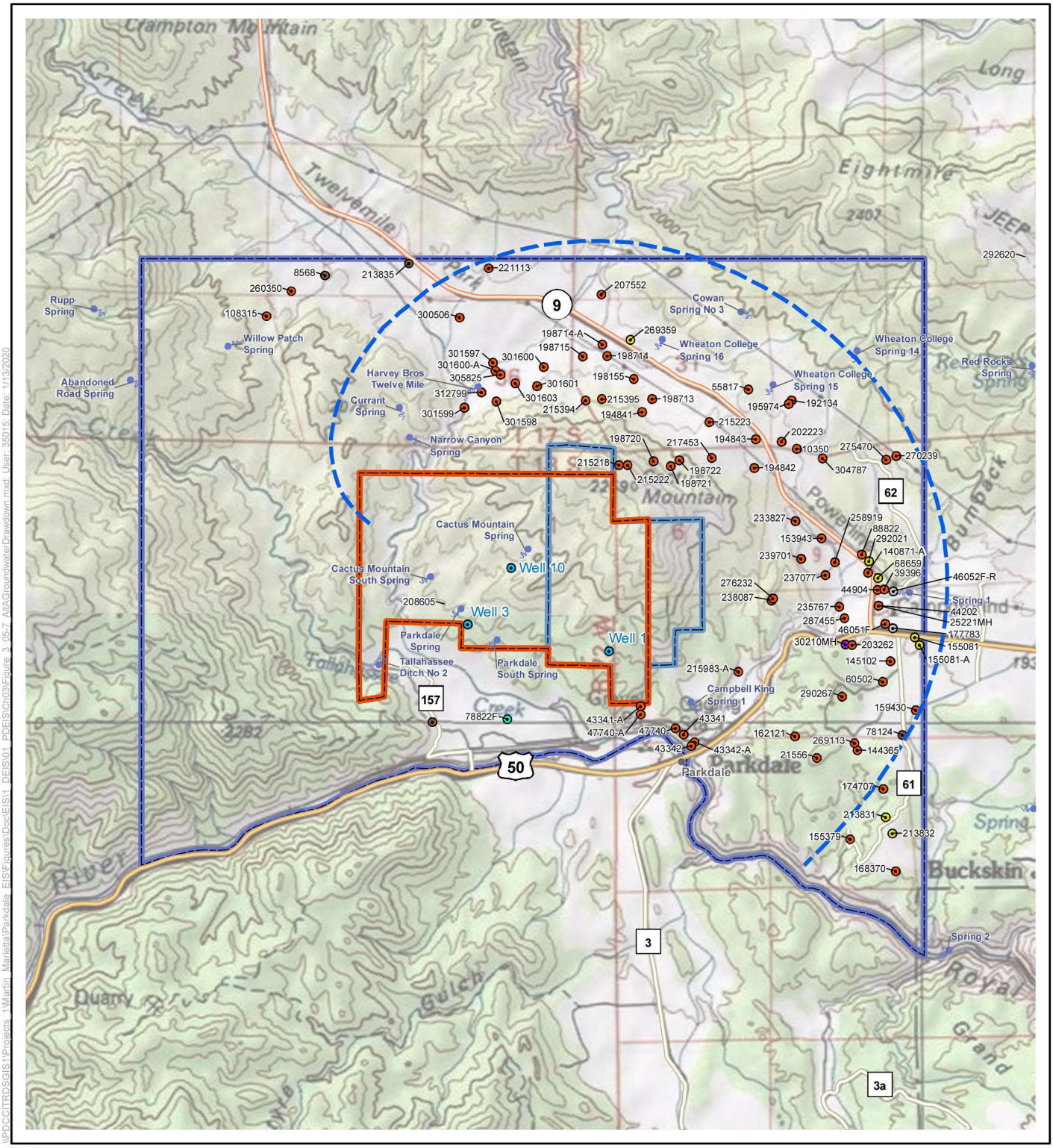
Source: DWR 2019, Green 1992.

N

0 0.5 1 Miles

1:60,000

Figure 3.5-6
Geologic Setting of Groundwater Wells within the Water Resources Study Area



Proposed Mineral Materials Sale Area
Alternate Mineral Materials Sale Area
Water Resources Study Area
Estimated limit of potential drawdown impacts after 100 years of mining for Alternative A
Monitoring Well
Spring

DWR Wells - Primary Use

Commercial
Domestic
Household use only
Monitoring/Sampling
Stock
Other

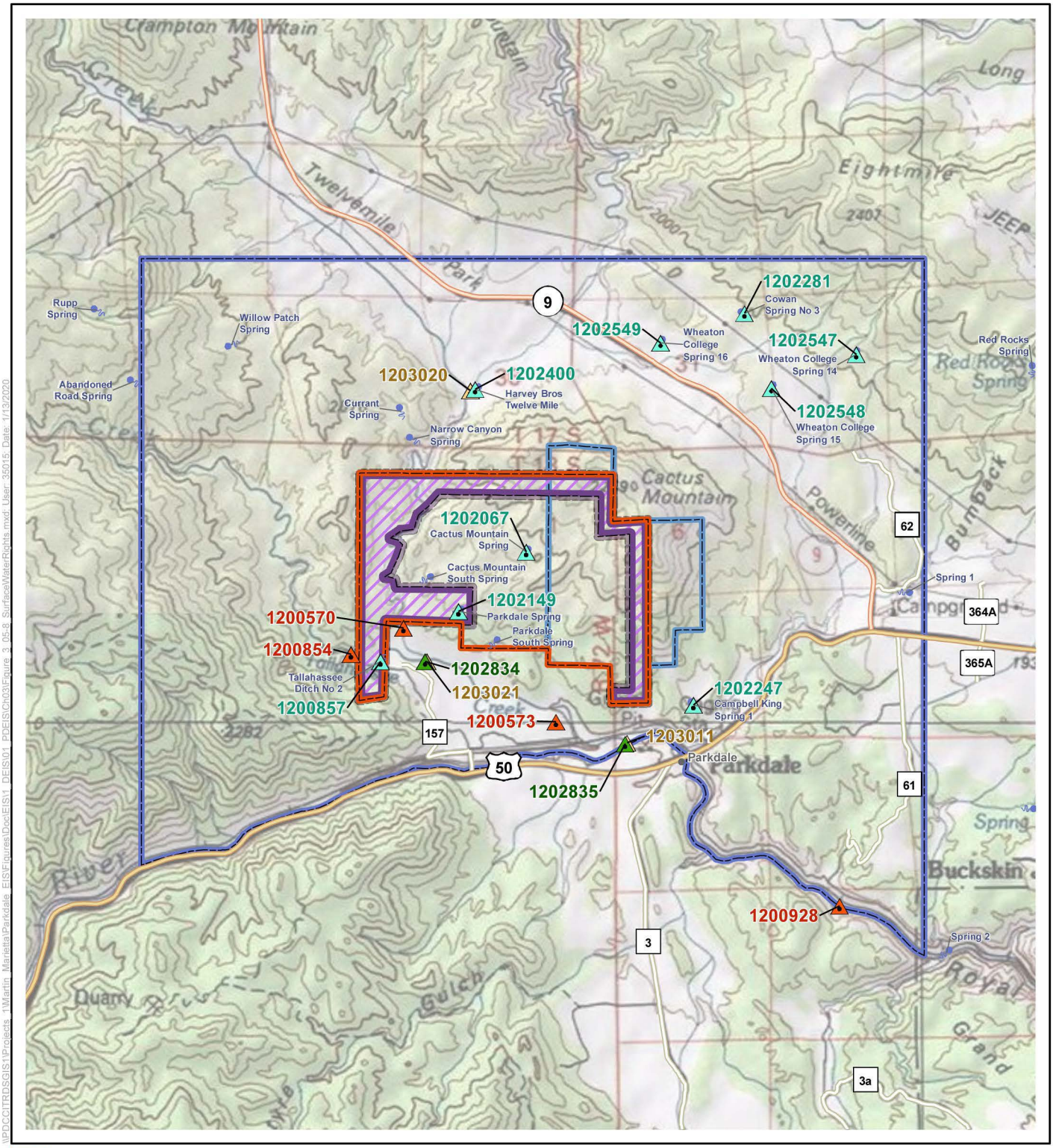
Source: DWR 2019

N

0 0.5 1 Miles

1:60,000

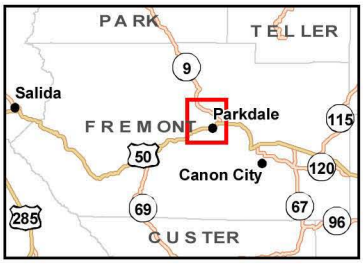
Figure 3.5-7
Area of Potential Groundwater Drawdown Impacts for Alternative A



Proposed Mineral Materials Sale Area
BLM Buffer Zone
Alternate Mineral Materials Sale Area
Water Resources Study Area
Spring

Water Rights Structure Type

Ditch
Minimum Flow
Pump
Reach
Reservoir
Spring



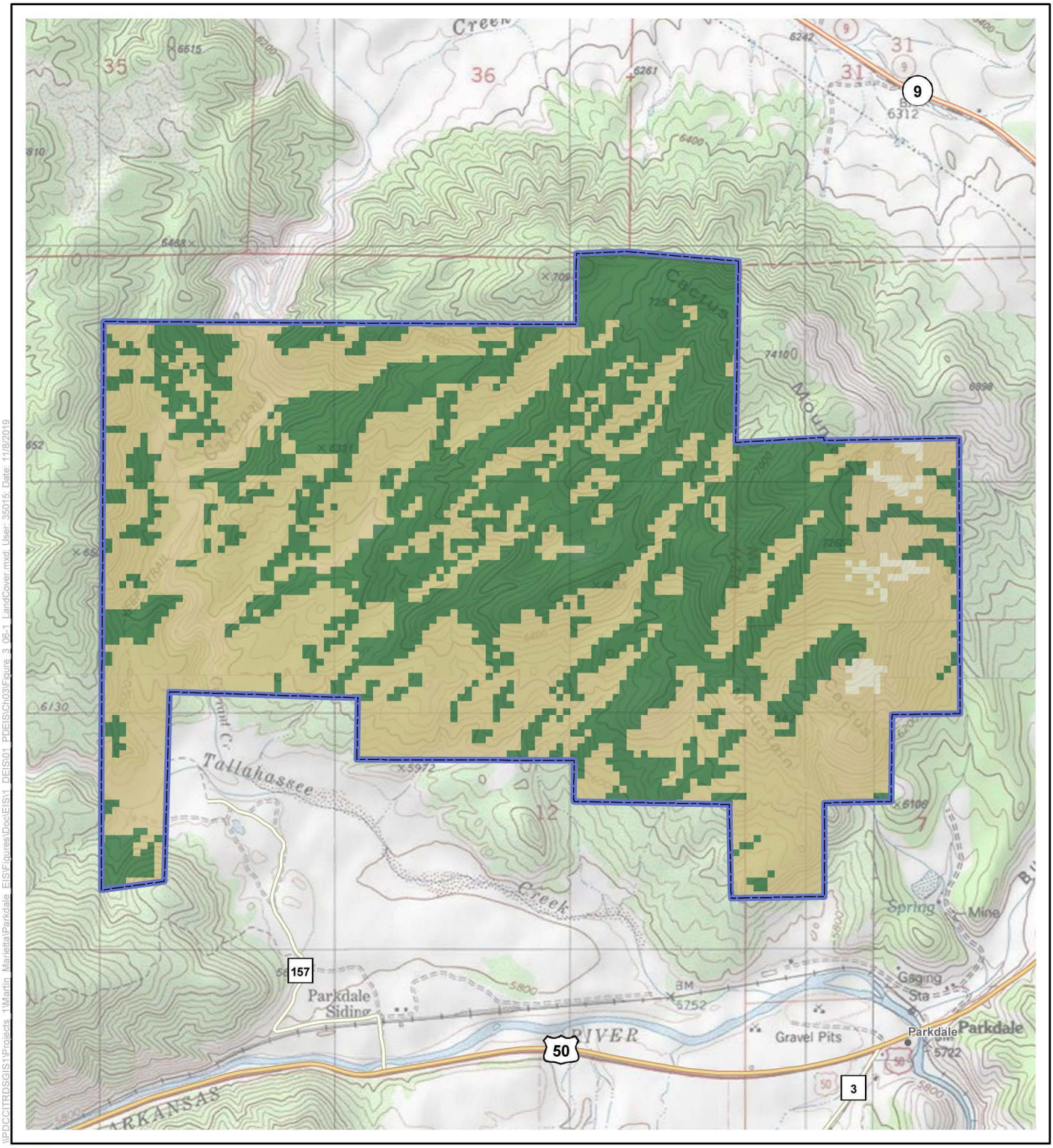
Source:

N

0 0.5 1 Miles

1:60,000

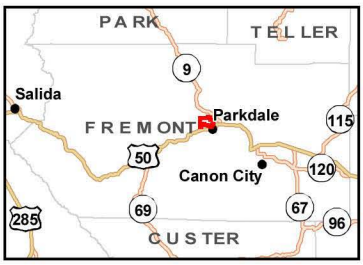
Figure 3.5-8
Surface Water Rights in the Water Resources Study Area



Landcover Study Area

Land Cover Class

- Evergreen Forest
- Herbaceuous
- Shrub/Scrub



Source: NLCD 2016.

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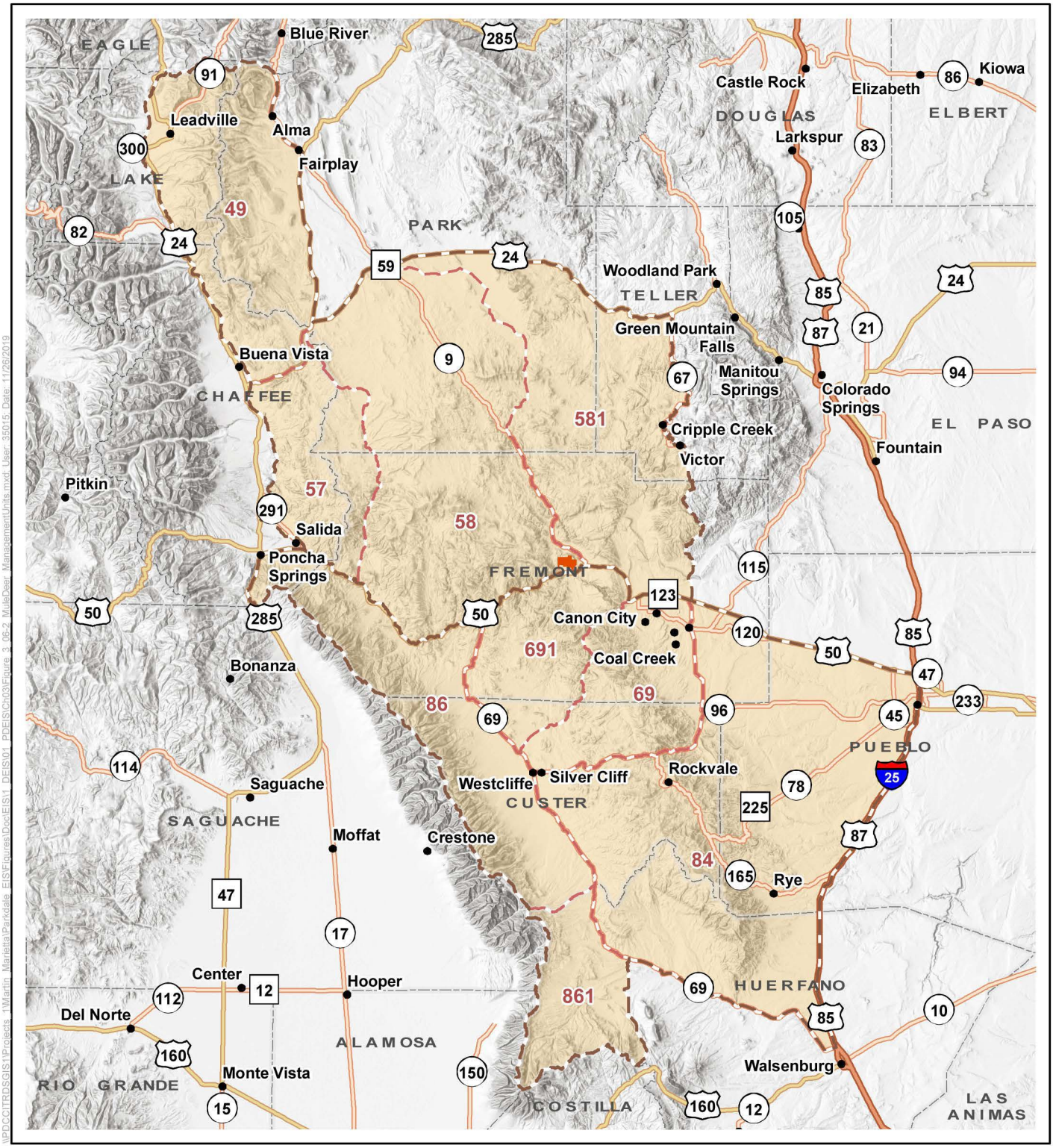
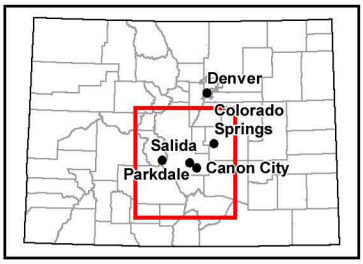
1:24,000

Figure 3.6-1
Landcover in the Study Area



Study Area
Cumulative Effects Study Area
Data Analysis Unit
Game Management Unit

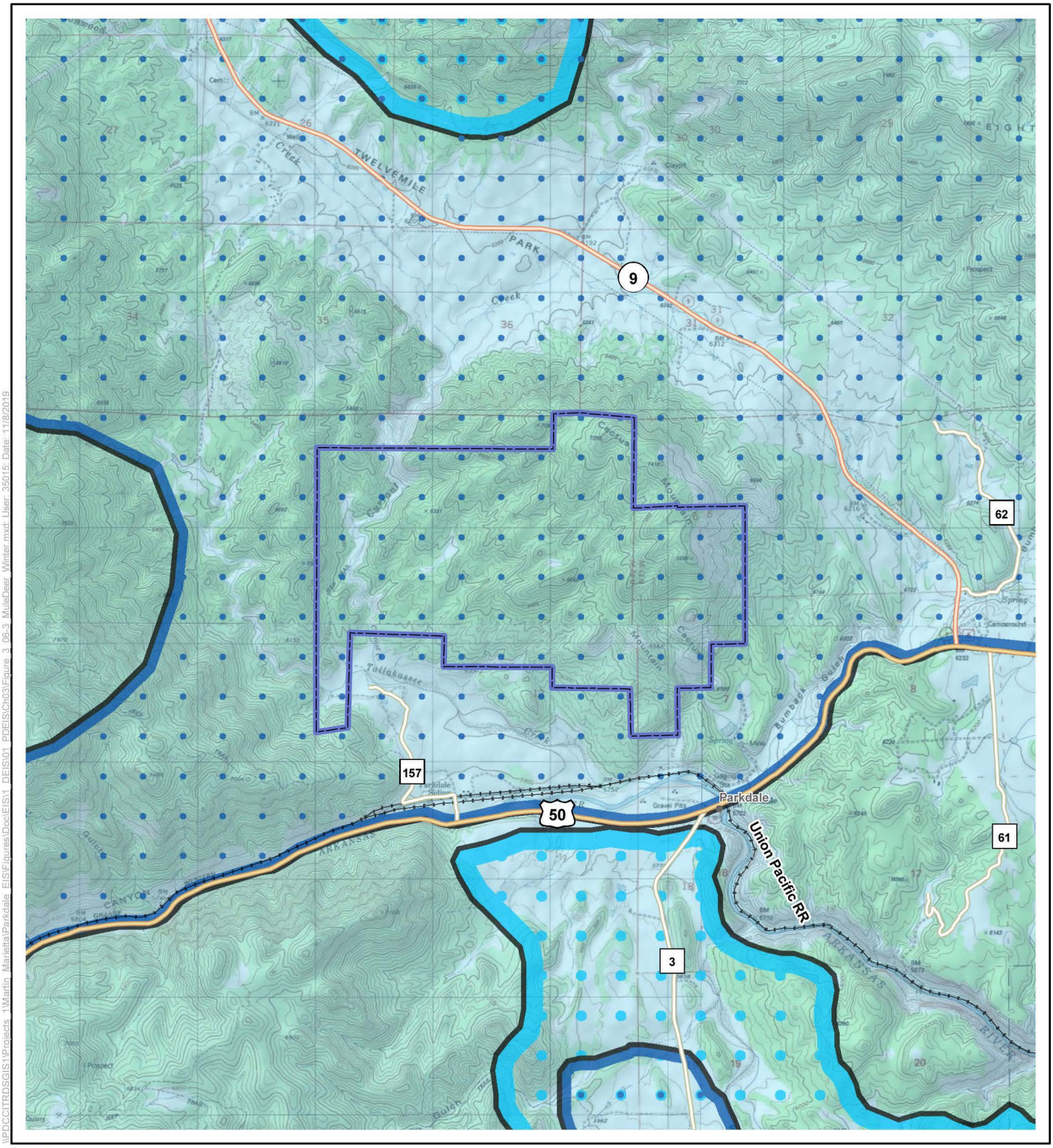
City or Town
Interstate Hwy
U.S. Hwy
State Hwy
County Road



Source: CPW 2018

0 5 10 Miles
1:1,100,000

Figure 3.6-2
Mule Deer Cumulative Effects Study Area



Source: CPW 2018.

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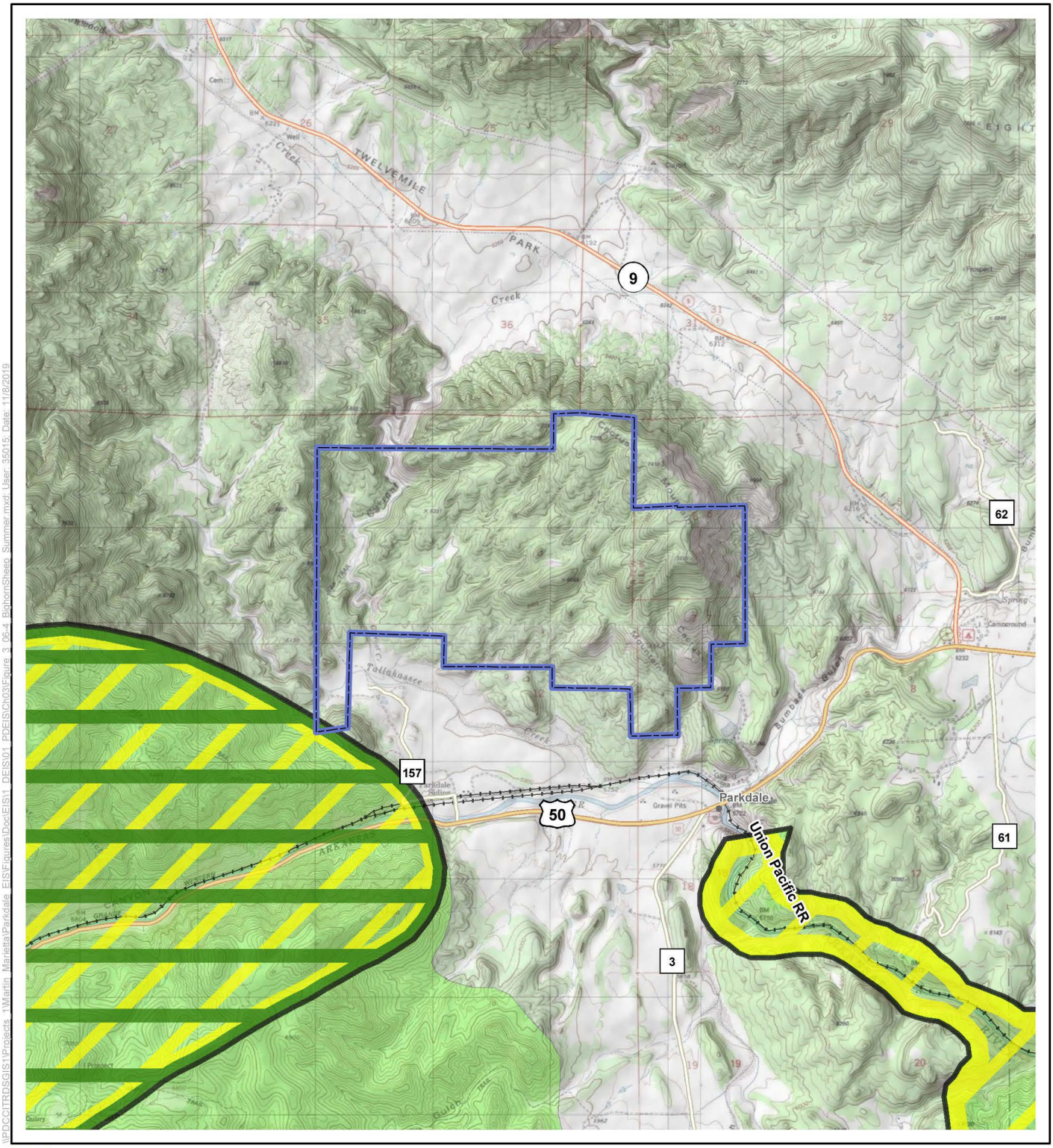
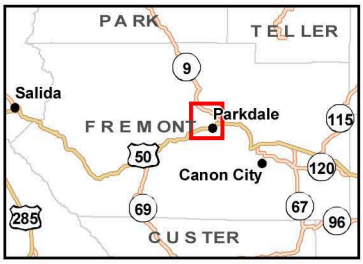
1:48,000

Figure 3.6-3
Mule Deer Winter Ranges in the Study Area



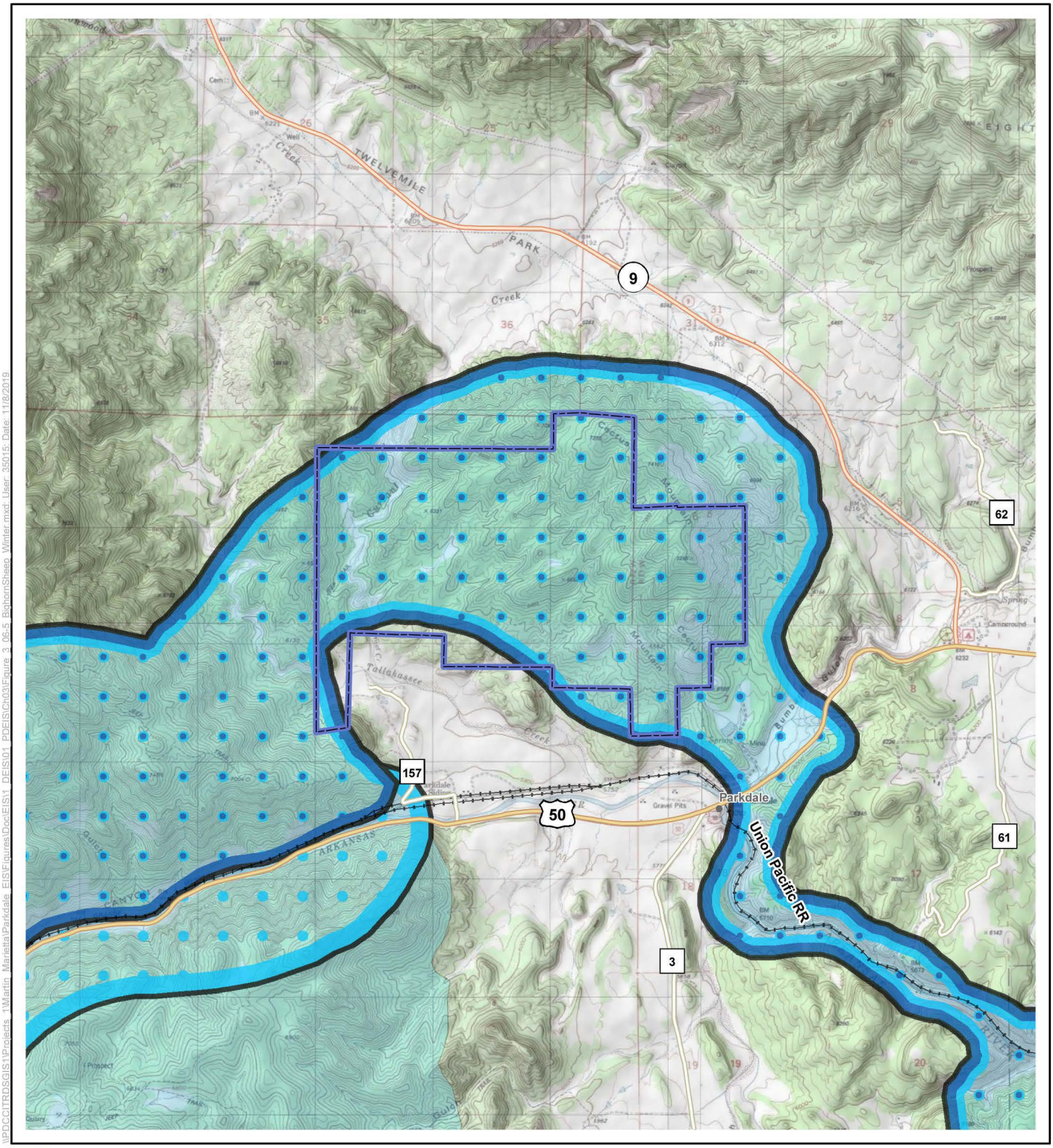
Study Area
Summer Concentration Area
Production Area
Summer Range



Source: CPW 2018.

0 0.25 0.5 Miles
1:48,000

Figure 3.6-4
Bighorn Sheep Summer Ranges in the Study Area



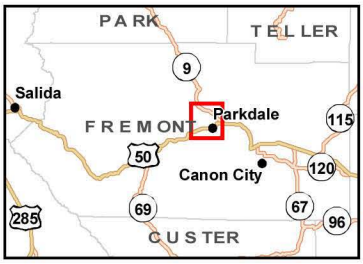
Study Area

Bighorn Sheep Range

Severe Winter Range

Winter Concentration Area

Winter Range

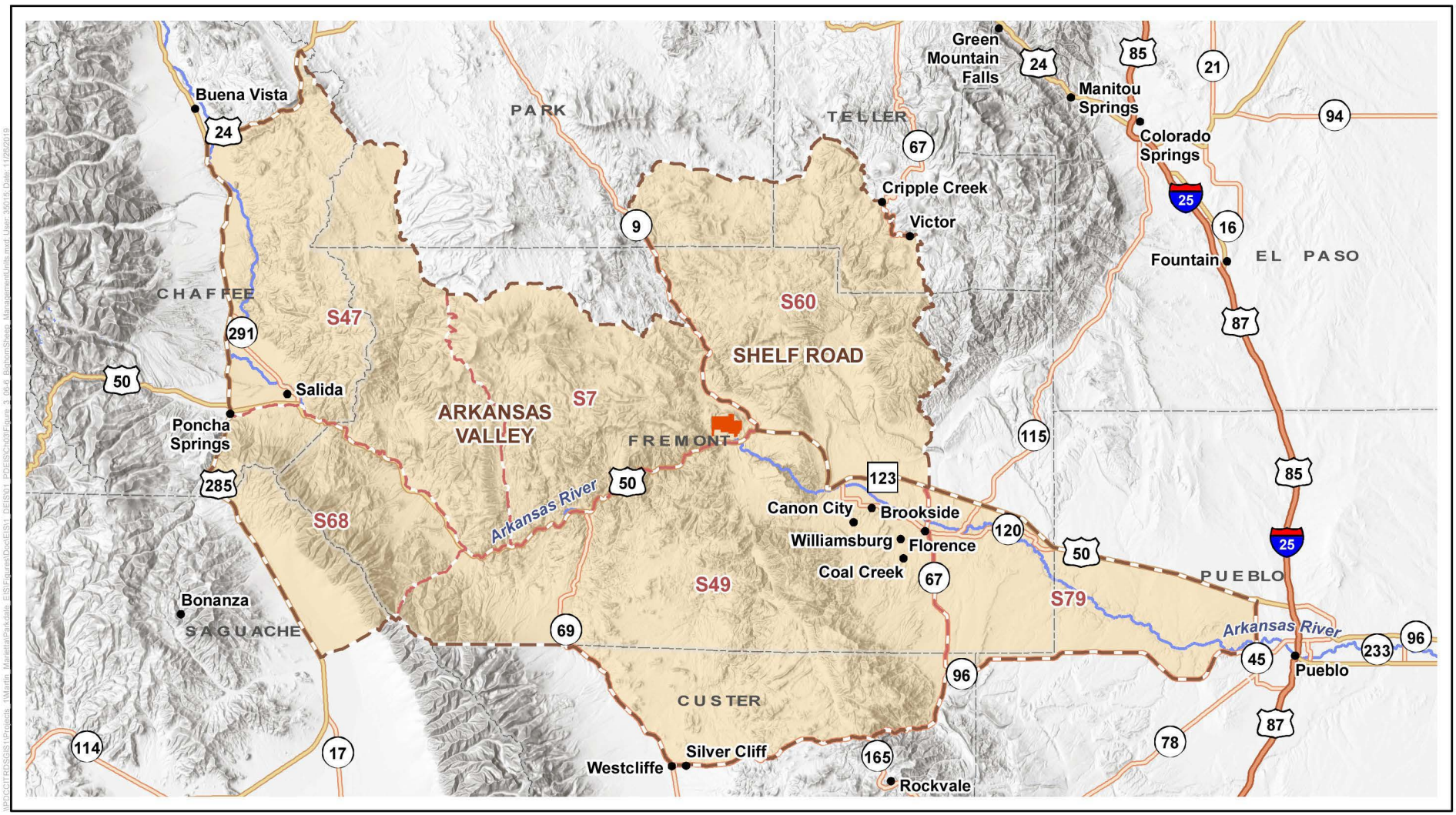


Source: CPW 2018.

0 0.25 0.5 Miles

1:48,000

Figure 3.6-5
Bighorn Sheep Winter Ranges in the Study Area



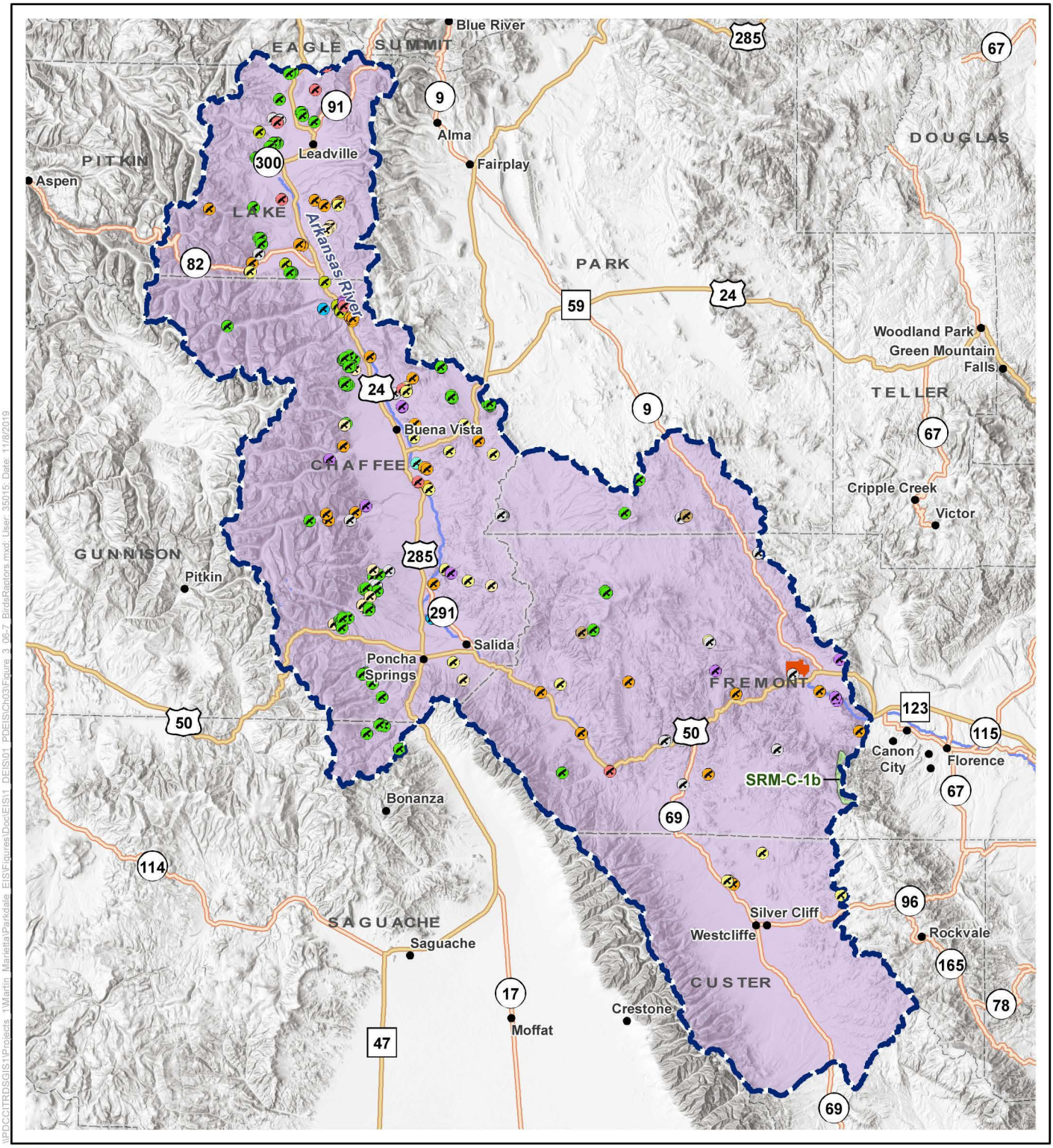
Study Area
Cumulative Effects Study Area
BighornSheep Management Units
Data Analysis Unit
Game Management Unit

City or Town
Interstate Hwy
U.S. Hwy
State Hwy
County Road

Source: BLM 2018

0 5 10 Miles
1:700,000

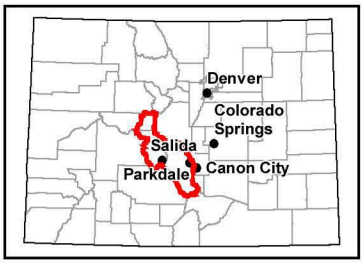
Figure 3.6-6
Bighorn Sheep Cumulative Effects Study Area



Study Area
Arkansas Headwaters Sub-basin
Mexican Spotted Owl Critical Habitat
Southern Rockies/Colorado Plateau Bird Conservation Region

Raptor Nests

- Bald Eagle
- Cooper's Hawk
- Golden Eagle
- Long-eared Owl
- Northern Goshawk
- Osprey
- Peregrine Falcon
- Prairie Falcon
- Red-tailed Hawk
- Swianson's Hawk
- Unknown Raptor



Source: NABCI 2015, USFWS 2019, BLM 2019.

ICF

N

0 5 10 Miles
1:900,000

Figure 3.6-7
Migratory Birds/Raptors
Cumulative Effects Study Area

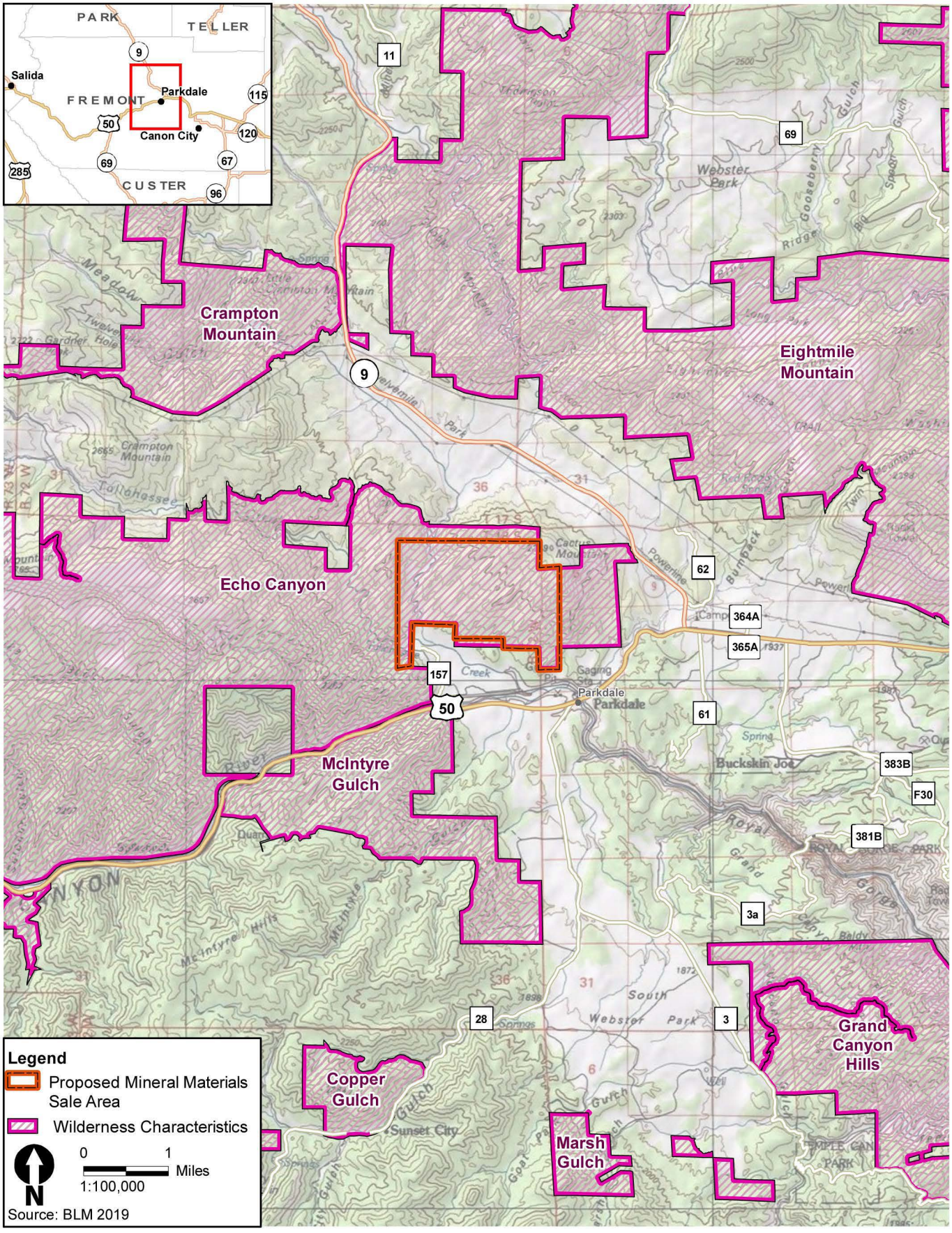


Figure 3.7-1
Proposed Mineral Materials Sale Area and Lands with Wilderness Characteristics

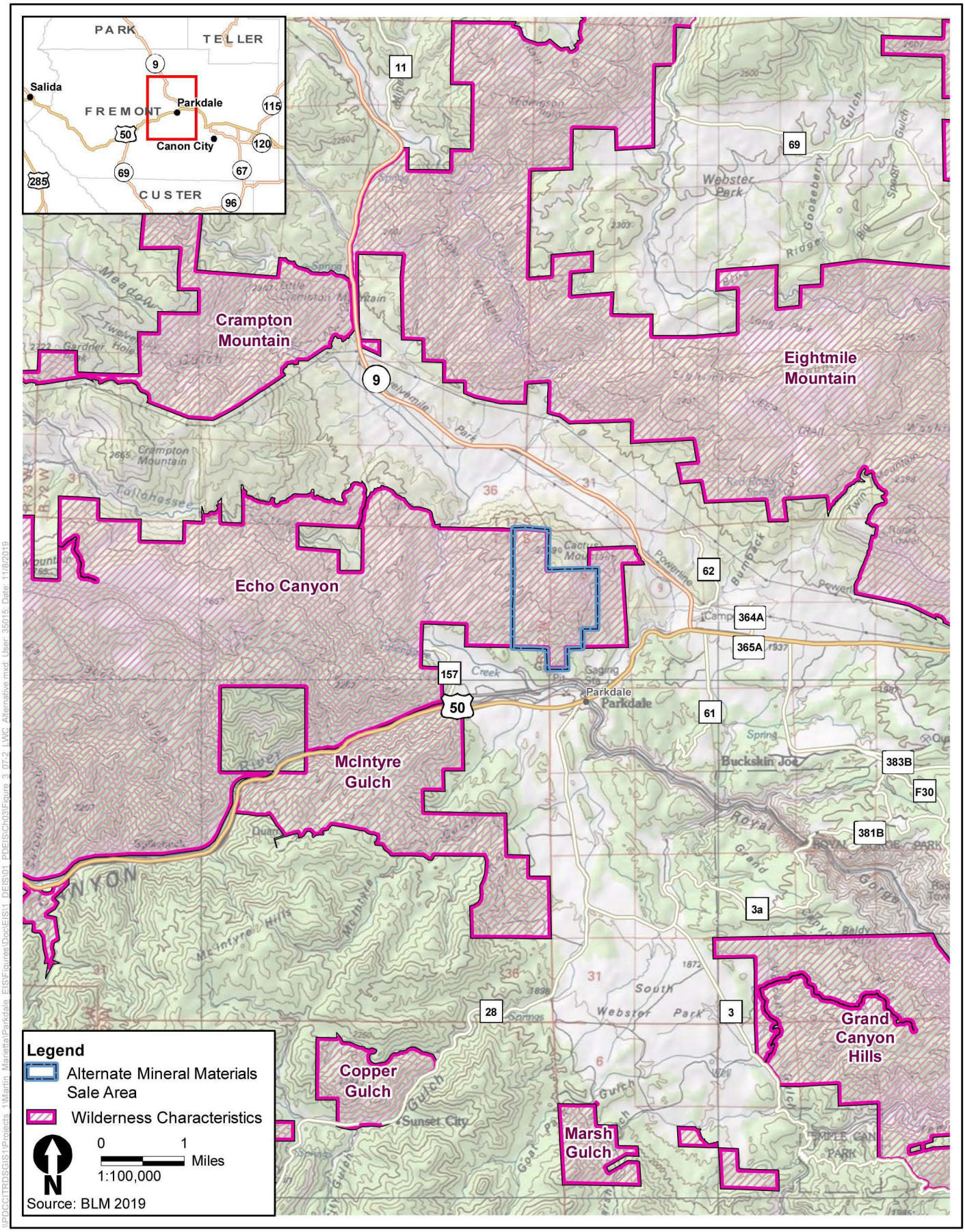
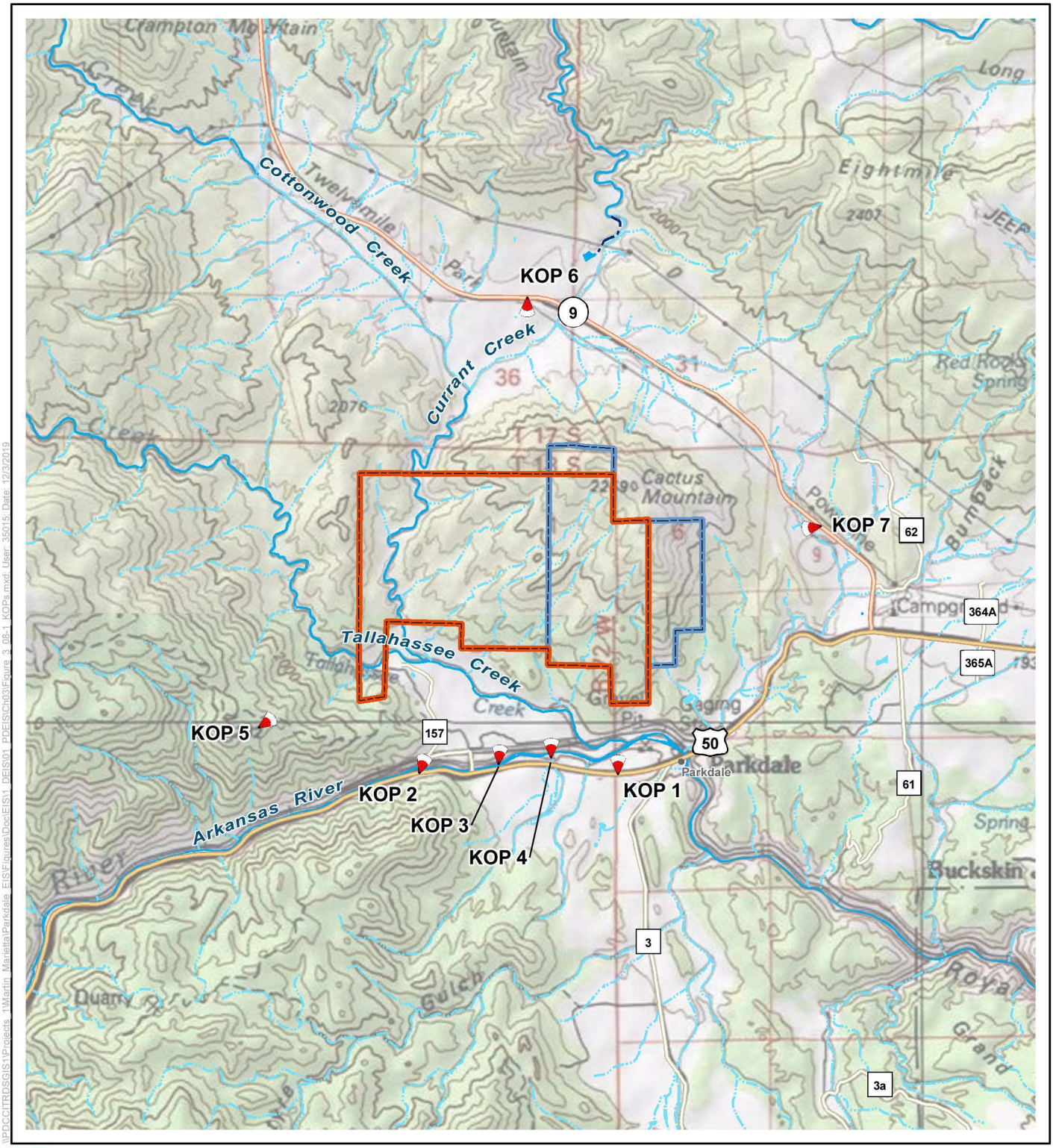


Figure 3.7-2
Alternate Mineral Materials Sale Area and Lands with Wilderness Characteristics



Proposed Mineral Materials Sale Area

Alternate Mineral Materials Sale Area

Key Observation Point

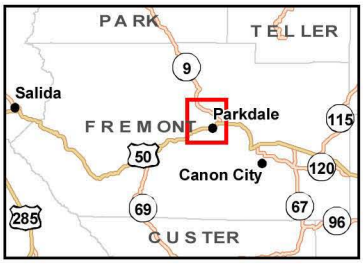
Perennial Stream

Intermittent Stream

Canal/Ditch

Intermittent Lake/Pond

Perennial Lake/Pond

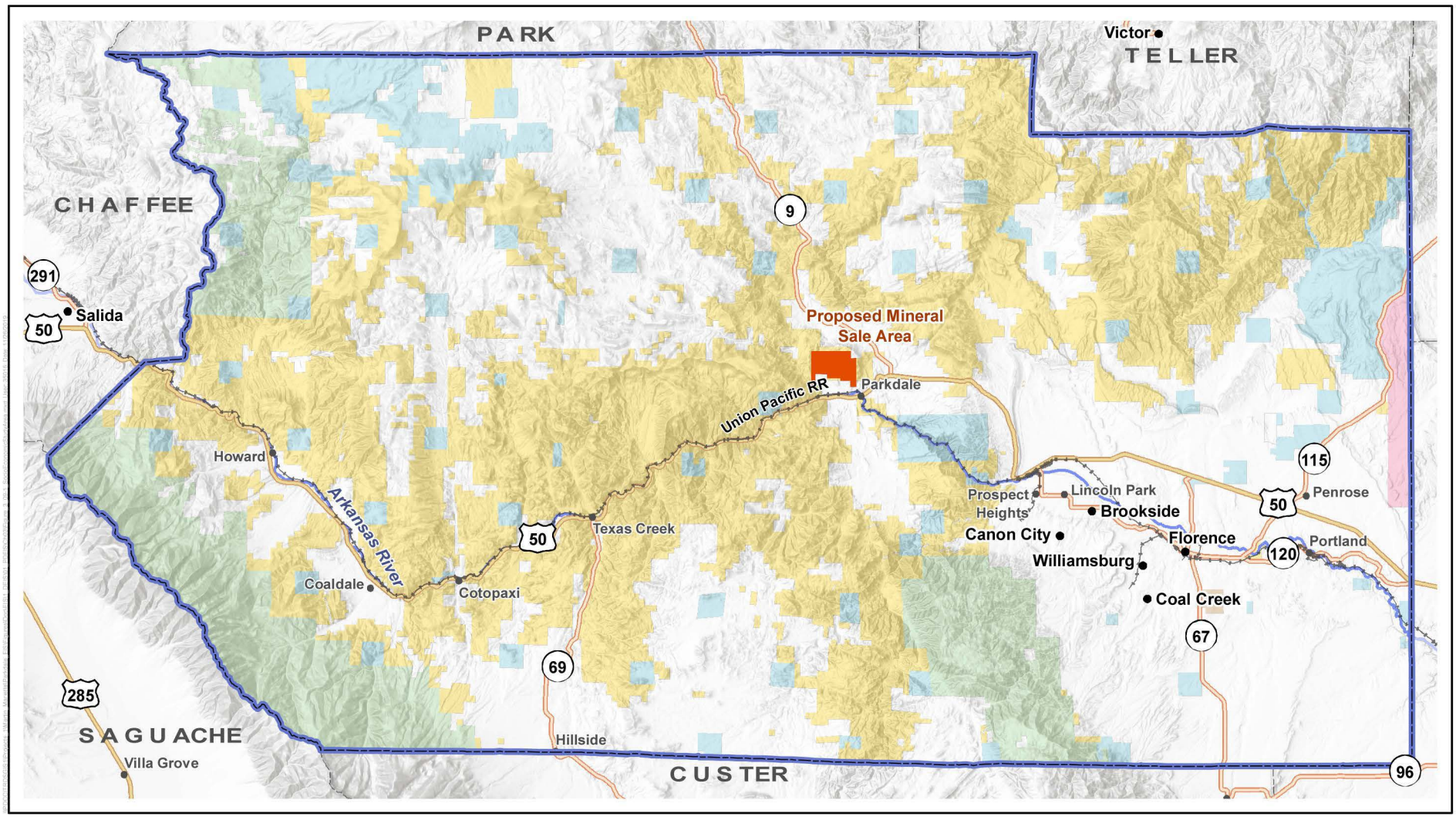


N

0 0.5 1 Miles

1:60,000

Figure 3.8-1
Key Observation Points



Proposed Mineral Materials Sale Area
Socioeconomic Study Area
City or Town
Community
U.S. Hwy
State Hwy
Union Pacific Railroad

Source: BLM 2018

Surface Management Agency
Bureau of Land Management
Military Reservation
Private
State
U.S. Forest Service
Other Federal

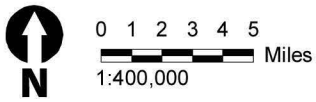
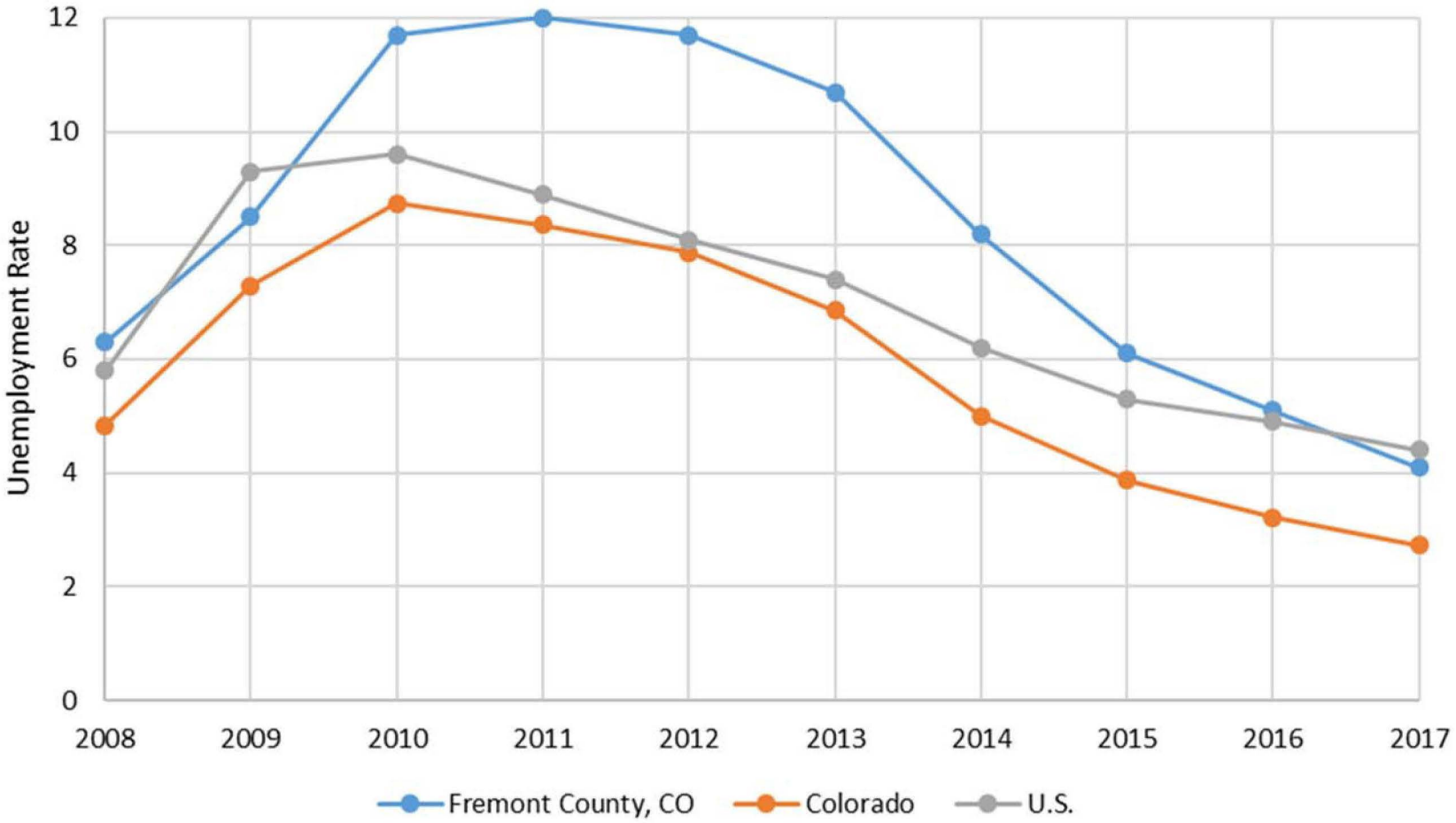
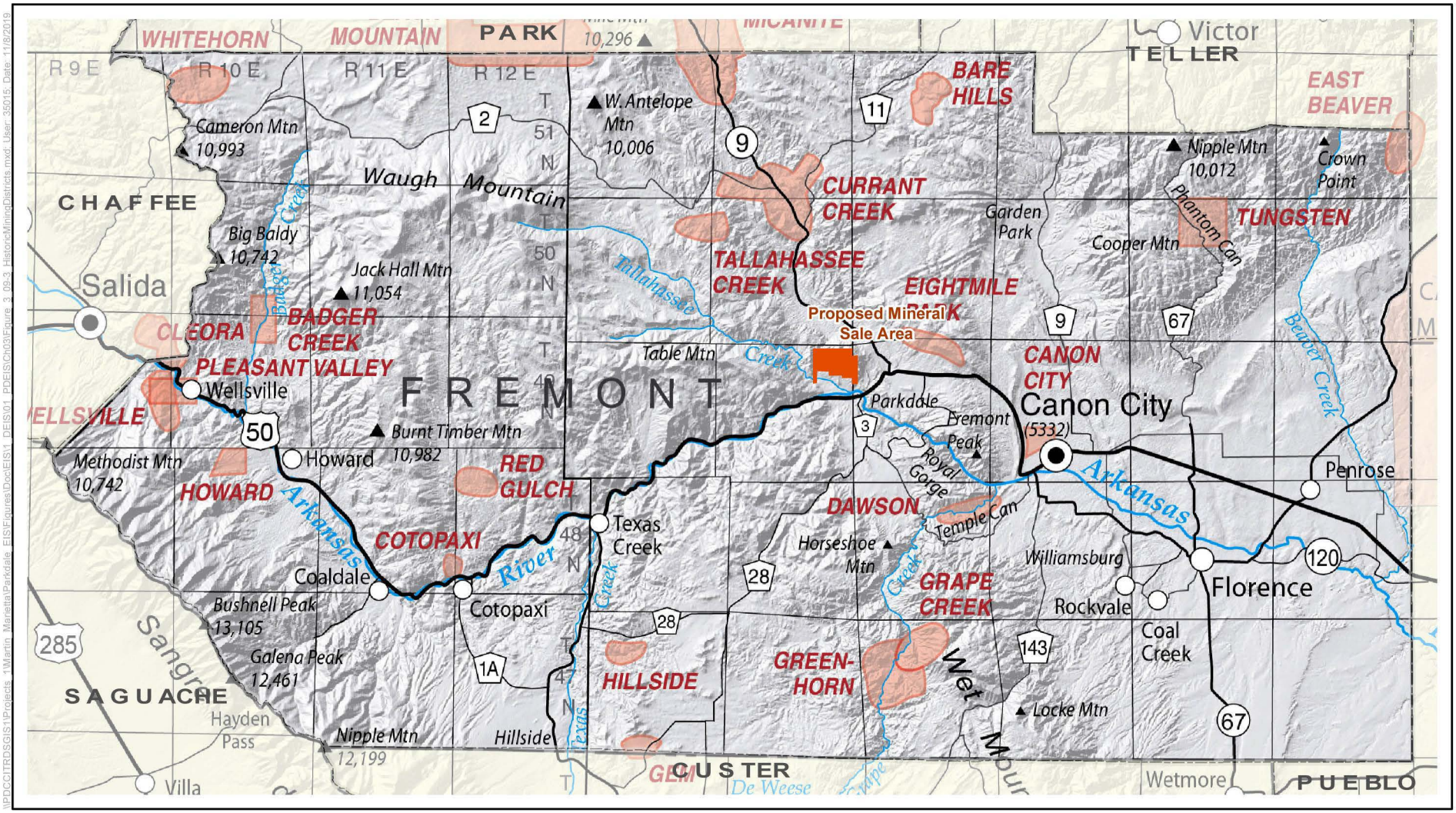


Figure 3.9-1
Socioeconomic Study Area

Figure 3.9-2. Unemployment Rates, 2008-2017



Sources: (BLS 2018a)



Proposed Mineral Materials Sale Area
Historic Mining District

Source: Colorado School of Mines 2019

N

0 1 2 3 4 5
Miles
1:400,000

Figure 3.9-3
Fremont Historic Mining Districts

Final Environmental Impact Statement

Parkdale Quarry Expansion Project

Appendix D

Part 1: Current Mining and Reclamation Plan
Part 2: Original Mining and Reclamation Plan

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COC-078119
1/15/2020

BLM Required Information	Martin Marietta Materials, Inc. Information	MAP/Figure Provided	Enough Info for Analysis	Additional Info Needed Prior to Contract Authorization
1. General Information				
a. Operator information	Martin Marietta Materials, Inc., Rocky Mountain Division, 1627 Cole Blvd., Suite 200, Lakewood, CO 80401	-	X	-
b. Location	The Parkdale Quarry is located in Fremont County, Colorado, approximately 12 miles west of the Town of Canon City, Colorado (Figure 1.1-1 in the EIS). The Parkdale Quarry is situated on the north side of the Arkansas River, and north of U.S. Highway (US) 50 in portions of Sections 11, 12, 13, and 14, Township 18 South, Range 72 West, Sixth Prime Meridian. Martin Marietta proposes to expand operations generally north onto BLM property in portions of Sections 1, 2, 11, and 12, Township 18 South, Range 72 West, Sixth Prime Meridian (the Mineral Materials Sale Area) (Figure 1.2-2 in the EIS).	X	X	-
c. Surface and mineral rights ownership	BLM managed surface and minerals.	-	X	-
d. Easements, Right-of-Ways, existing structures, etc.	There will be no structures within 200 feet of the proposed mineral materials sales area.	-	X	-
e. Schedule - Seasonal and daily hours of operation and shifts	100-year mine life. Mining and processing limited to daylight periods only. 24-hour loading of material for transport by rail cars and trucks. Phase 1 would have Two 10-hour shifts (one material production shift and one equipment maintenance shift) and Phases 2-5 would have Three overlapping 10-hour shifts (two material production shifts and one equipment maintenance shift).	-	X	-
2. Mine Site				
a. Mine method and direction	Surface hardrock mining using benched working face. Mining direction, generally northwest to southeast.	X	X	-
b. Facilities (buildings, scales, wash areas, hazardous materials storage, tank farms, restrooms, smoking area, etc.)	There will be no structures within the proposed mineral materials sales area. All structures will remain within the privately owned area and are covered under the current permits for the site. (Map included as SWMP Fig. 2, 1/22/19)	X	X	-
c. Man-made structures (culverts, bridges, portals, etc.)	There will be no structures within the proposed mineral materials sales area, other than possibly culverts and detention ponds. All structures will remain within the privately owned area and are covered under the current permits for the site. (Map included as SWMP Fig. 2, 1/22/19)	X	X	Location of culverts for road construction, and stormwater detention ponds, as applicable.
d. Geology and deposit thickness and consistency	The deposit consists of Precambrian granite. Some veins of gabbro were observed during the exploratory drilling, and are expected to comprise less than 5% of the deposit. The deposit is within a plutonic rock body and the deposit thickness is in excess of 300 feet.	-	X	-
e. Geotechnical stability	Slope stability is addressed in the CDRMS permit (*Slope Stability Report Sand and Gravel Mining Operation for Parkdale Quarry*; Applegate Group, Inc. January 2008; *Parkdale Quarry Slope Stability Summary*, Lyman Henn Inc. January 2008). The BLM proposed mineral materials sale is contiguous with, is part of the same rock body as, and extends mining of the currently permitted deposit. Geotechnical stability for pit design is already addressed in the slope stability report submitted as part of the existing permit.	-	X	Clarification from certified professional that no additional information needed.
f. Communications system	The existing radio communication system will continue to be used for the proposed mineral materials sales area.	-	X	-
g. Utilities (include installation and upgrades, as applicable)	Black Hills is currently upgrading the power to the area, including the mine. Martin Marietta Materials is paying a portion of the costs for that upgrade whether the proposed action is approved, or not. The upgrade is independent of the proposed action, though a material processing plant sized to accommodate the anticipated additional production associated with the proposed action would require significantly more power than a plant designed only to process resources on Martin Marietta-owned lands.	-	X	-

BLM Required Information	Martin Marietta Materials, Inc. Information	MAP/Figure Provided	Enough Info for Analysis	Additional Info Needed Prior to Contract Authorization
h. Proximity to waterways	Current Creek is located within the western buffer area of the proposed sale area. Tallahassee Creek runs through the existing mine footprint on private. The southern portion of the proposed sale area is approximately 0.7 miles north of the Arkansas River (Figure 3.5-1 in Appendix C of the EIS).	-	X	-
i. Approximate depth of water table, if known	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). 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.	-	X	-
j. Surface water controls	The current operation is covered under Colorado Permit No. COG500325 for stormwater. This permit will be updated as needed, if the proposal moves forward.	X	X	Need modified SWMP and maps
k. Documented outfalls (point source discharge to surface waters)	Five outfalls located along the perimeters of the existing permit boundary on private are currently monitored and sampled in accordance with State of Colorado requirements. (Map included as SWMP Fig. 2, 1/22/19)	X	X	The location of the outfalls need to be identified, and the NPDES permit will need to be updated. Applicant needs to confirm no additional outfalls are needed, and if they would be on BLM lands. The Monitoring and Sampling Plan needs to be completed through coordination between operator and CDPHE.
l. Safety controls	The current mine plan incorporates multiple safety controls and demonstrates compliance with MSHA requirements. Some general practices include controlled public access and routine safety meetings. Martin Marietta also follows a Guardian Angel Safety Program.	X	X	-
m. Signage	The mine site has signage for traffic rules, public information and safety warnings that all demonstrates compliance with MSHA requirements. A sign is also posted at the entrance of the mine site that includes the operator name and CDRMS permit number.	X	X	-
3. Access				

BLM Required Information	Martin Marietta Materials, Inc. Information	MAP/Figure Provided	Enough Info for Analysis	Additional Info Needed Prior to Contract Authorization
a. Road construction	The haul road running along the southern and southwestern boundary of the Mineral Materials Sale Area will be constructed prior to the commencement of mining as the main haul road serving the area (Figure 2.2-2 in Appendix C of the EIS). The main haul road will lead from the material processing facilities on the Martin Marietta owned portion of the quarry. The main haul road will remain in place throughout the life of the mine. Semi-permanent and temporary haul roads will be constructed to bring material from the pit areas to the main haul road. Haul roads will be constructed in a manner that allows for safe movement and sound performance of vehicles, as warranted by the conditions encountered in a particular location. In general, haul roads will have an approximate six-inch thick fine gravel surfaced wearing course over approximately nine inches of coarse crushed rock, which will in turn sit on approximately 18 inches of compacted aggregate base over the native subgrade unless conditions dictate that an alternate road section will meet safety and performance objectives. Haul roads will generally be at least 60 feet in width to provide ample room for vehicles to safely pass each other. Maximum grades on the haul roads will generally be 10-percent or less, and roads will be designed with a 2-percent cross fall to facilitate drainage. Horizontal curves will generally be designed with a radius of at least 150 feet and will be designed with approximately 10-percent super elevation to safely accommodate anticipated travel speeds. Vertical curves will be flat enough to allow for safe braking distances by loaded haul trucks to avoid obstruction in the travel way.	X	X	Mine Site Design Plan to be completed, and to include design and location of haul roads, with special attention to storm water management
b. Berm construction	Haul roads will be bordered by berms, the height of which will be at least as high as the axle on the largest piece of equipment expected to use the road. These will be constructed in accordance with MSHA requirements.	-	X	-
c. Security - Fencing, gates, signage, guard	Site access and security will remain the same as the current mine. The access road is directly off of Hwy 50 on the north side. The access includes a bridge across the Arkansas River and a cross over the railroad tracks. The entrance to the mine site has a gate that can be closed as needed. There is also an office for checking into and a scale house. Signage and fencing may be installed, if needed, in areas involved with the proposed sale area.	-	X	-
d. Surface water controls	The current operation is covered under Colorado Permit No. COG500325 for stormwater. This permit will be updated as needed, if the proposal moves forward. (Map provided in the SWMP for existing operation).	X	X	Need modified SWMP and maps
4. Mining Operation				
a. General overview of process	Mining activity would progress under five phases over approximately 100 years, from west and northwest to southeast (Figure 2.2-2 in Appendix C of the EIS).	X	X	-
b. Operations, production rates and mining methods	Excavation of mineral materials using explosives and/or 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. Anticipated production rate is approximately 4-million tons/year.	-	X	-
c. Blasting Program	All blasting conducted shall be done in accordance with appropriate industry standards and as prescribed by the Mine Safety and Health Administration. All blasting shall be conducted between the hours of 10:00 a.m. to 5:00 p.m.. The blasting shall not occur more than five times per week. All explosive work on the site will be performed by a licensed third party blaster. The explosives needed for each blast will be transported to the site immediately before blast holes are loaded and excess explosives will be removed from the site after the blast holes are loaded. No explosives will be stored on site BLM property.	-	X	-

BLM Required Information	Martin Marietta Materials, Inc. Information	MAP/Figure Provided	Enough Info for Analysis	Additional Info Needed Prior to Contract Authorization
d. Mine geometry, design and composition - Bottom elevation, working slopes, benches (production and interim reclamation), soil and rock type	The deposit consists of precambrain granite. Some veins of gabbro were observed during the exploratory drilling, and are expected to comprise less than 5% of the deposit. The deposit is within a plutonic rock body and the deposit thickness is in excess of 300 feet. It is expected that the excavated pit sides and bottom will be comprised of the granite. Two types of mining benches will be created during the mining process, production benches and reclamation benches (Figure 4 in Appendix D of the EIS). The production benches are those created during the active mining process, the face of which is the source of the mined materials. Reclamation benches are those which remain when mining is completed, and are generally located at the mining disturbance boundary. Production benches will not exceed 70 feet in height, have a face angle anticipated to be approximately 80 degrees, and a width of not less than 40 feet. Temporary safety berms will be constructed parallel to and at the top edge, and ten feet from the base of production benches that are not actively being mined.	X	X	-
e. Stationary, mobile and processing equipment. Provide the following - 1) Year, make, model; 2) Function in the mining operation; 3) Special accommodations (white noise backup alarm, lighting, scrubber, etc.)	All equipment information provided as part of the air quality data submission process.	-	X	-
f. Development activities	The haul road used to transport mined materials to Martin Marietta's property for processing will be constructed prior to the commencement of Phase 1 mining (Figure 2.2-2 in Appendix C of the EIS). We anticipate that Phase 1 of the mining process will disturb approximately 81 acres over a period of 15 to 20 years in the area designated as the West Pit. Phase 2 mining will disturb approximately 166 acres over an estimated period of 20 to 40 years in the area designated as the West Central Pit. We estimate that Phase 3 will disturb approximately 228 acres over a period of 25 to 50 years in the area designated as the Central Pit. The Phase 4 will disturb approximately 110 acres over an estimated 15 to 30 year period in the area designated as the East Central Pit. Phase 5 mining will disturb approximately 113 acres in the area designated as the East Pit, and will take an estimated 15 to 25 years.	X	X	-
g. Topsoil stripping, stockpiling and stabilizing	Overburden and topsoil will be stripped from areas to be mined by the use of conventional heavy earthmoving equipment. Overburden and topsoil will 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 from stabilization and protection from erosion. The applicant has committed to test an admixture of plant fines and topsoil. The results from such tests will be reviewed jointly by the applicant and the Division of Wildlife [this will also include CDRMS and BLM]. If appropriate and suitable, the applicant will then augment the available topsoil with such fines but only if it will be successful as a growth media.	-	X	Need modified SWMP and maps; modified APEN for fugitive dust.

BLM Required Information	Martin Marietta Materials, Inc. Information	MAP/Figure Provided	Enough Info for Analysis	Additional Info Needed Prior to Contract Authorization
h. Overburden stripping, stockpiling and stabilizing	Aggregate materials will be excavated from the Mineral Materials Sale Area by using explosives to free the rock from the matrix. Once the aggregate material is blasted free of the rock matrix, a loader or excavator will be used to handle and load it into off-road dump trucks and/or onto a conveyor for transport to the material. processing area on the adjacent Martin Marietta-owned property. Blocks of rock that are too large to process (oversize material) or that will not be used as riprap will be temporarily set aside adjacent to the excavation site for mechanical size reduction. An excavator equipped with a mechanical breaker or other mechanical means will be used to reduce oversized material to an appropriate size for transport and processing.	-	X	Need modified SWMP and maps; the SWMP should have a goal and method(s) to monitor and control erosion. Need dust control plan to be modified and provide a revised APEN for new operations. Need to evaluate wind loss from bare stockpiles.
i. Development rock processing and stockpiling	Aggregate materials will be excavated from the Mineral Materials Sale Area by using explosives to free the rock from the matrix. Once the aggregate material is blasted free of the rock matrix, a loader or excavator will be used to handle and load it into off-road dump trucks and/or onto a conveyor for transport to the material. processing area on the adjacent Martin Marietta-owned property. Blocks of rock that are too large to process (oversize material) or that will not be used as riprap will be temporarily set aside adjacent to the excavation site for mechanical size reduction. An excavator equipped with a mechanical breaker or other mechanical means will be used to reduce oversized material to an appropriate size for transport and processing.	-	X	-
j. Approximate percent of process and overburden waste rock generation		-	X	Need waste % for PV.
k. Grading plan	General information is provided in the mine plan.		X	Finalized grading map, incorporating drainages, after coordination with CDRMS.
l. Excavation, stockpiling and earthwork balance for surface structures	Surface structures are already in place on private land for existing mine.	X	X	-
m. Geochemistry of Ore, Waste Rock and Peripheral Rock, if potential concern	This is an aggregate quarry mining a relatively homogenous granite deposit, not a metals mine or coal mine. Sulfide minerals have not been identified in the deposit in the mining area. Acid rock discharge does not apply.	-	X	-
n. Mine backfill, as applicable	N/A	-	-	-
o. Treatment and Containment Plan for Mine Related Material (i.e. tailings pond, as applicable)	Treatment is not proposed, other than physical processing.	-	X	-
p. Development rock conveyance and transport, both onsite and off	Loading of mineral materials onto haul trucks and/or an overland conveyor system, possibly in the future, for transport to the processing facilities on the adjacent private land. If a conveyor system is used in the future, it would resemble the current one used at a nearby Martin Marietta Materials quarry.	-	X	-
q. Processing operations (primary crusher, secondary crusher, etc.)	Loading of mineral materials onto haul trucks and/or an overland conveyor system for transport to the processing facilities on the adjacent private land.	X	X	-

BLM Required Information	Martin Marietta Materials, Inc. Information	MAP/Figure Provided	Enough Info for Analysis	Additional Info Needed Prior to Contract Authorization
r. Additional processes onsite (batch plant, washplant, etc.)	All processing will continue to take place on private land.	X	X	-
s. Interim reclamation	Interim reclamation will consist of ongoing reclamation in this proposal. Those details are located in Section 8 below.	-	X	-
5. Management Practices				
a. Containers and tanks	Containers, tanks and other materials and waste storage structures will continue to only be used on private land.	X	X	Provide any updated practices, as applicable.
b. Fuel handling and chemical usage (Spill Response Plan)	Currently there is an Oil Spill Contingency Plan and SPCC in place. These will apply to the proposed sale area, as applicable.	X	X	Provide any updated plans, reporting processes and practices, as applicable.
c. Blasting materials handling and storage	All blasting will be conducted by a 3rd party.	-	X	-
d. Spill prevention, control and countermeasures plan, if applicable	Currently there is an Oil Spill Contingency Plan and SPCC in place. These will apply to the proposed sale area, as applicable.		X	-
e. Solid &/or hazardous waste	There will be no solid or hazardous waste generated or stored in the proposed mineral material sales area.	-	X	-
f. Hazardous substances	There will be no hazardous substances stored in the proposed mineral material sales area.	-	X	-
g. Weeds	Martin Marietta will continue to administer the management plan for the control of undesirable or noxious plants or weeds, as per recommendation of the Fremont County Weed Control Officer and the Natural Resources Conservation Service. The Fremont County weed control specialist comes in and sprays at least once a year, typically in the spring. We also try to make sure that vehicles entering the site are clean so as not to transport weed seeds onto the site. There is a leafy spurge and weed control plan currently in place for the active mine. These measures will be applied to the proposed sale area.	-	X	Provide updated plans and practices, as applicable.
h. Sanitary system	No permanent change to the current sanitation system is proposed for BLM land or as a result of the proposal. The active mine on private land utilizes portalets (pumped 1-2 times per week), which at some point may be upgraded to a septic system in the future, in accordance with applicable regulations. If needed, portalets may be utilized in the BLM sale area on a temporary basis.	X	X	-
i. Stockpiles - topsoil, product, overburden/waste material, process waste rock	Approach to stockpiling is provided in the mine plan. Locations of piles are not provided but likely not needed for the EIS. No waste rock anticipated.		X	
j. Additional material used for blending	No blending material is currently needed to be used or stored at Parkdale. If in the future material is brought in, it would most likely be stored on the private land in the processing area.	-	X	-
k. Roads & berms	A drainage ditch will run along the downhill side of the haul road. Temporary safety berms will be constructed parallel to and at the top edge, and ten feet from the base of production benches that are not actively being mined, in accordance with MSHA requirements. Haul roads will be watered regularly to control dust, and will also be treated with a chemical dust suppressant such as calcium or magnesium chloride.	X	X	In the Mine Plan Design, identify how water from the drainage ditch will be handled. Need to address the stability of the drainage ditch.

BLM Required Information	Martin Marietta Materials, Inc. Information	MAP/Figure Provided	Enough Info for Analysis	Additional Info Needed Prior to Contract Authorization
l. Water usage, treatment and discharge	No substantial difference in water usage will occur with proposed sale area. Water will continue to be pumped locally in accordance with an existing substitute water supply plan. It is estimated that 1500 gpm will be used daily, with 11 gpm of that be consumptive use. Discharge is described in Substitute Water Supply Plan (SWSP).	X	X	Need to consult with CDWR for clarification on permits needed; Need modified SWSP and maps.
m. Wastewater sources, treatment and discharge	Not applicable.	-	X	-
n. General housekeeping	All practices will be the same as what is done now.	-	X	-
o. Interim management plan during shutdown periods	Management and monitoring during temporary shutdowns would adhere to all permits and authorizations currently in place.	-	X	BLM would require continued conncurent reclamation of disturbed areas during temporary shutdown periods.
p. Administrative policies affecting mine site and regional resources (training, onsite fire & EMT response, shift work, etc.)		-	X	Applicable policies for training, etc. may be needed.
6. Compliance (Provide all Federal, State and local regulatory permits that will be required)				
Reclamation Permit (CDRMS)	In place, would require amendment.			
MSHA	In place, amended as needed.			
Air (CDPHE)	In place, would require amendment.			
Water quality (CDPHE)	In place, would require amendment.			
Water quantity, surface and groundwater (State of Colorado)	In place, would require amendment.			
Oil spills prevention and preparedness (CDPHE/EPA)	In place, amended as needed.			
404 Clean Water Act (USACE)	No dredging or filling of Waters of the US are proposed.			
Blasting/explosives (CDOPS/ATF)	In place, amended as needed.			
Any other regulatory requirement applicable to the operation				
7. Quality Assurance/Quality Control			X	
a. Active mining monitoring plans - 1) Air quality, water quality, water quantity, noise, weeds, interim reclamation, and others as applicable; 2) Tanks, facilities, equipment, security structures, and others as applicable	Typically part of existing permit/authorities.	-	X	Provide BLM with a current monitoring protocol that reflects all amendments.

BLM Required Information	Martin Marietta Materials, Inc. Information	MAP/Figure Provided	Enough Info for Analysis	Additional Info Needed Prior to Contract Authorization
b. Interim (temporary cessation and/or seasonal shutdown) monitoring plans	Management and monitoring during temporary shutdowns would adhere to all permits and authorizations currently in place.	-	X	Additional criteria may be required by BLM on public lands.
c. Post-closure monitoring	Monitoring will be adequate to ensure final reclamation is established in accordance with BLM (Appendix E and requirements resulting from this analysis), CDRMS and Fremont County requirements.	-	X	Additional criteria will be provided to BLM after coordination with CDRMS and Fremont County.
8. Interim & Final Reclamation				
a. Sequence and timing	The generalized post-mining topography and a three dimensional rendering of general landscape at the end of mining each phase is shown on the mine plans for each phase. The three dimensional renderings also help to demonstrate how visual impacts are minimized by using topographic features. Each mine phase will be substantially completed before the next is started. 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 (Exhibit A in the EIS). Thus, reclamation will be occurring concurrently with mining, in order to minimize the total disturbed acreage.	X	X	-
b. Final land use & composition; Overall Approach	The Mine Plan provides an overview of reclamation processes. The private land is currently identified as an end land use of water storage. The BLM land would have an end use of natural open land and range land.	-	X	-
c. Removal of structures	All major structures would remain on private land. Other things such as fencing and signs would be removed and disposed of appropriately.	-	X	-
d. Access roads/trails	All new access roads on BLM would be reclaimed.	-	X	-
e. Benches & slopes	Reclamation benches will be approximately 35 feet high, have a bench width of approximately 30 feet, and a face angle of approximately 80 degrees, resulting in an overall approximate 1:1 (horizontal to vertical) reclamation slope. Reclamation of individual benches will be accomplished by regrading and/or backfilling benches to an approximate 1:1 (horizontal to vertical) reclamation slope to generally blend with the surrounding topography. The actual bench geometry selected will be that which provides a minimum static factor of safety of 1.3, based on rock slope stability analysis. Some areas of bare rock will remain as bare rock and reclamation of areas of bare rock will be limited to that practical for minimizing obvious disturbance. Based on conversations with the Colorado Department of Parks and Wildlife staff, we anticipate leaving some parts of some mining benches with near vertical slopes, as they mimic topography that serves as escape habitat for bighorn sheep to avoid predators. Benches will be backfilled as final mining is completed, and fill will be placed using a bulldozer to grade and compact slope fill material. A generalized cross-section showing the reclaimed bench geometry is presented in Appendix D, Figure 4.	X	X	-

BLM Required Information	Martin Marietta Materials, Inc. Information	MAP/Figure Provided	Enough Info for Analysis	Additional Info Needed Prior to Contract Authorization
f. Grading	Valley Floor: The Mineral Materials Sale Area currently drains to the south and southwest, with the majority of the runoff from the area flowing to Current Creek and Tallahassee Creek through three main drainage areas, as shown in Appendix D, Figure 7, the Parkdale Expansion Topographic Map. Once mining is completed, the topography of the valley floor created in the mining process will generally slope to the southwest and south, as shown in Appendix D, Figure 8, the Parkdale Expansion Proposed Mine Plan. Drainage channels will be excavated into the valley floor that connect to the three existing main drainages outside the Mineral Materials Sales Area. The drainage channels will be laid out so as to continue to generally direct water from the areas currently draining to the main drainage areas. A conceptual layout for the drainage channels is presented in Appendix D, Figure 9. The drainage channels will be constructed for the new hydrology and topography of the site, and will need to be sized for a design storm (typically the 24 hour, 100 year storm). Some side drainages will be constructed to better capture and direct runoff within the Mineral Materials Sale Area.	X	X	Finalized grading and reclamation maps, incorporating drainages, after coordination with CDRMS.
g. Soil stabilization and revegetation	* Heavily compacted soil surfaces will be ripped to depths varying from 6 to 12 inches, depending upon the degree of compaction prior to the replacement of topsoil. Based on the adjacent Parkdale Quarry, the existing topsoil depth in the Mineral Materials Sale Area generally ranges from 0 inches to 18 inches. Replacement topsoil depths comparable to those prior to mining, or an average of 9 inches evenly placed, will be used. Prior to reseeding of disturbed areas, topsoil will be placed to achieve a generally uniform thickness; minimize compaction and erosion; and preserve biological, physical, and chemical properties. Where practical, soil will be applied so as to minimize grading requirements and compaction from multiple equipment passes over the area being reclaimed. Final grading will generally be completed parallel to the topographic contour of the area, where safety conditions permit, to minimize erosion and maximize site stability. Ideally, soil will be applied on areas to be seeded less than 30 days prior to seeding. * Within five days after the application of fertilizer, but prior to seeding, the topsoil will be prepared for seeding by utilizing a disk, harrow or chisel plow to roughen the surface, depending upon site conditions and availability. The topsoil surface will then be left in a roughened condition to inhibit erosion and provide a receptive surface for subsequent reclamation procedures. * Prior to reseeding of disturbed areas, samples will be collected to ascertain fertilizer application concentration. * Seed mixtures provided (with details on application rates and seed supply sources) specific to stockpiles, roads and quarry floors, and benches. Broadcast method. * Mulching will be conducted immediately following seeding operations, where deemed necessary at the time of application to meet reclamation objectives.	-	X	X
h. Cost estimate (for locatable operations only)	N/A - The reclamation cost estimate will be jointly calculated by CDRMS and BLM.	-	X	-

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PARKDALE QUARRY EXPANSION
MINERAL MATERIALS COMPETITIVE SALE COC-078119
MINING AND RECLAMATION PLAN

1. Introduction

Martin Marietta Materials has requested the Parkdale Mineral Materials Competitive Sale COC-078119 in order to expand operations at its privately owned Parkdale Quarry onto adjacent BLM-administered lands. The Parkdale Quarry is located in Fremont County, Colorado, approximately 12 miles west of the Town of Canon City, Colorado. The Parkdale Quarry is situated on the north side of the Arkansas River, and north of U.S. Highway (US) 50 in portions of Sections 11, 12, 13, and 14, Township 18 South, Range 72 West, Sixth Prime Meridian. Martin Marietta proposes to expand operations generally north onto BLM property in portions of Sections 1, 2, 11, and 12, Township 18 South, Range 72 West, Sixth Prime Meridian (the Mineral Materials Sale Area). The general location of the Parkdale Quarry and the proposed Mineral Materials Sale Area is shown on the Vicinity Map, Figure 1. The Parkdale Quarry and the proposed Mineral Materials Sale Area are shown in additional detail on the Site Map, Figure 2. The elevation of the Mineral Materials Sale Area ranges from approximately 5,790 feet to 6,960 feet, and consists of mountainous topography.

Mining is expected to disturb approximately 700 acres in the Mineral Materials Sale Area over the life of the mine. The Mineral Materials Sale Area is surrounded by an approximate 760-acre buffer that will be included in the mining permit boundaries, but will be left undisturbed. The purpose of the buffer is to provide a separation between the area where mining will occur and surrounding areas open to the public. Activities that create a ground disturbance will be restricted to the Mineral Materials Sale Area. Mineral processing, loadout, transportation, and associated activities will continue to be performed on Martin Marietta Materials' owned property south of the Mineral Materials Sale Area. Activities that will be conducted on the Mineral Materials Sale Area include:

- Construction and operation of access/haul roads onto and within the Mineral Materials Sale Area;
- Excavation of mineral materials using explosives and/or 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 our reclamation plan, to be approved by BLM and the Colorado Department of Reclamation, Mining, and Safety.

Final reclamation of the Mineral Materials Sale Area, as envisioned, will create a landscape that substantially mimics the landscape currently present in Webster Park, south of and bordering the Mineral Materials Sale Area.

2. Mine Phasing

Mining of the Mineral Materials Sale Area will be performed in five phases progressing generally from west and northwest to southeast. The areas expected to be disturbed by the five mining phases are shown on the Parkdale Expansion Mine Plan, Map 1. The haul road used to transport mined materials to Martin Marietta's property for processing will be constructed prior to the commencement of Phase 1 mining. The mine plan and mining phases are designed to minimize the area of disturbed unreclaimed ground within the Mineral Materials Sale Area, and to minimize the length of time that a piece of ground within the Mineral Materials Sale Area remains disturbed and unreclaimed. The mine plan and phasing is also designed to minimize viewshed impacts along the Arkansas River/U.S. Highway 50 corridor from the mining operation in the Mineral Materials Sales Area. 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. Additionally, the sandstone outcroppings along the southern edge of the Mineral Materials Sales Area will remain undisturbed to further screen mining from being visible along the Arkansas River/U.S. Highway 50 corridor.

We anticipate that Phase 1 of the mining process will disturb approximately 81 acres over a period of 15 to 20 years in the area designated as the West Pit. Phase 2 mining will disturb approximately 166 acres over an estimated period of 20 to 40 years in the area designated as the West Central Pit. We estimate that Phase 3 will disturb approximately 228 acres over a period of 25 to 50 years in the area designated as the Central Pit. The Phase 4 will disturb approximately 110 acres over an estimated 15 to 30 year period in the area designated as the East Central Pit. Phase 5 mining will disturb approximately 113 acres in the area designated as the East Pit, and will take an estimated 15 to 25 years. The generalized post-mining topography and a three dimensional rendering of general landscape at the end of mining each phase is shown on the mine plans for each phase, Maps 2A and B through 6A and B. The three dimensional renderings also help to demonstrate how visual impacts are minimized by using topographic features. Each mine phase will be substantially completed before the next is started. 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.

3. Haul Road Construction

The haul road running along the southern and southwestern boundary of the Mineral Materials Sale Area, shown on Map 1, will be constructed prior to the commencement of mining as the main haul road serving the area. The main haul road will lead from the material processing facilities on the Martin Marietta owned portion of the quarry. The main haul road will remain in place throughout the life of the mine. Semi-permanent and temporary haul roads will be constructed to bring material from the pit areas to the main haul road. Haul roads will be constructed in a manner that allows for safe movement and sound performance of vehicles, as warranted by the conditions encountered in a particular location. In general, haul roads will have an approximate six-inch thick fine gravel surfaced wearing course over approximately nine inches of coarse crushed rock, which will in turn sit on approximately 18 inches of compacted aggregate base over the native subgrade unless conditions dictate that an alternate road section will meet safety and performance objectives.

Haul roads will generally be at least 60 feet in width to provide ample room for vehicles to safely pass each other. Maximum grades on the haul roads will generally be 10-percent or less, and roads will be designed with a 2-percent cross fall to facilitate drainage. Horizontal curves will generally be designed with a radius of at least 150 feet and will be designed with approximately 10-percent superelevation to safely accommodate anticipated travel speeds. Vertical curves will be flat enough to allow for safe braking distances by loaded haul trucks to avoid obstruction in the travel way. A drainage ditch will run along the downhill side of the haul road, and haul roads will be bordered by berms, the height of which will be at least as high as the axle on the largest piece of equipment expected to use the road. Haul roads will be watered regularly to control dust, and will also be treated with a chemical dust suppressant such as calcium or magnesium chloride. A typical haul road cross section is shown on Figure 3. If a conveyor is installed to transport material from the Mineral Materials Sale Area to the processing area on Martin Marietta-owned property, it will follow and be directly adjacent to the main hail road.

4. Bench Design

Two types of mining benches will be created during the mining process, production benches and reclamation benches. The production benches are those created during the active mining process, the face of which is the source of the mined materials. Reclamation benches are those which remain when mining is completed, and are generally located at the mining disturbance boundary. Production benches will not exceed 70 feet in height, have a face angle anticipated to be approximately 80 degrees, and a width of not less than 40 feet. Temporary safety berms will be constructed parallel to and at the top edge, and ten feet from the base of production benches that are not actively being mined. Reclamation benches will be approximately 35 feet high, have a bench width of approximately 30 feet, and a face angle of approximately 80 degrees, resulting in an overall approximate 1:1 (horizontal to vertical) reclamation slope. The actual bench geometry selected will be that which provides a minimum static factor of safety of 1.3, based on rock slope stability analysis. Cross-sections of typical production and reclamation benches are shown in Figure 4.

5. Materials Handling

Overburden and topsoil will be stripped from areas to be mined by the use of conventional heavy earthmoving equipment. Overburden and topsoil will 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 from stabilization and protection from erosion.

Aggregate materials will be excavated from the Mineral Materials Sale Area by using explosives to free the rock from the matrix. All explosive work on the site will be performed by a licensed blaster. The explosives needed for each blast will be transported to the site immediately before blast holes are loaded and excess explosives will be removed from the site after the blast holes are loaded. Explosives will not be stored on BLM property.

Once the aggregate material is blasted free of the rock matrix, a loader or excavator will be used to handle and load it into off-road dump trucks and/or onto a conveyor for transport to the material

processing area on the adjacent Martin Marietta-owned property. Blocks of rock that are too large to process (oversize material) or that will not be used as riprap will be temporarily set aside adjacent to the excavation site for mechanical size reduction. An excavator equipped with a mechanical breaker or other mechanical means will be used to reduce oversized material to an appropriate size for transport and processing.

6. Reclamation

The primary goal for reclamation of the mining area will be to create a topographic and ecological setting that is similar to that of Webster Park and the hillsides surrounding Webster Park, south of the Parkdale Quarry. The landscape of Webster Park is shortgrass prairie on the lowland areas, bordered by hillside/montane areas of mountain scrubland dominated by sagebrush, and mountain mahogany. Reclamation activities proposed for the Mineral Materials Sale Area will result in the replacement of the current pinion-juniper plant community which has encroached on the area with plant communities that more closely resemble predevelopment conditions in the area and that enhance wildlife habitat and habitat diversity, and provide winter forage for bighorn sheep and mule deer. Since the reclamation activities will be ongoing over the anticipated 100+ year life of the quarry, the restoration will also yield habitat with diverse age-class plant communities. Conceptual 3-Dimensional views from the northwest and northeast respectively are shown in Figures 5 and 6, and provide a generalized overview of what the topography of the area will look like after reclamation.

6.1. Grading

6.1.1. Valley Floor

The Mineral Materials Sale Area currently drains to the south and southwest, with the majority of the runoff from the area flowing to Current Creek and Tallahassee Creek through three main drainage areas, as shown on Figure 7, the Parkdale Expansion Topographic Map. Once mining is completed, the topography of the valley floor created in the mining process will generally slope to the southwest and south, as shown on Figure 8, the Parkdale Expansion Proposed Mine Plan. Drainage channels will be excavated into the valley floor that connect to the three existing main drainages outside the Mineral Materials Sales Area. The drainage channels will be laid out so as to continue to generally direct water from the areas currently draining to the main drainage areas. A conceptual layout for the drainage channels is presented on Figure 9. The drainage channels will be constructed with a depth, cross-section, and sinuosity similar to that of the natural drainages in Webster Park that feed into the south side of the Arkansas River. Some side drainages will be constructed to better capture and direct runoff within the Mineral Materials Sale Area.

6.1.2. Benches

Reclamation benches will be approximately 35 feet high, have a bench width of approximately 30 feet, and a face angle of approximately 80 degrees, resulting in an overall approximate 1:1 (horizontal to vertical) reclamation slope. Reclamation of individual benches will be accomplished by regrading and/or backfilling benches to an approximate 1:1 (horizontal to vertical) reclamation slope to generally blend with the surrounding topography. Some areas of bare rock will remain as

bare rock and reclamation of areas of bare rock will be limited to that practical for minimizing obvious disturbance. Based on conversations with the Colorado Department of Parks and Wildlife staff, we anticipate leaving some parts of some mining benches with near vertical slopes, as they mimic topography that serves as escape habitat for bighorn sheep to avoid predators. Benches will be backfilled as final mining is completed, and fill will be placed using a bulldozer to grade and compact slope fill material. A generalized cross-section showing the reclaimed bench geometry is presented on Figure 4.

6.2. Topsoil Replacement

Heavily compacted soil surfaces will be ripped to depths varying from 6 to 12 inches, depending upon the degree of compaction prior to the replacement of topsoil. Based on the adjacent Parkdale Quarry, the existing topsoil depth in the Mineral Materials Sale Area generally ranges from 0 inches to 18 inches. Replacement topsoil depths comparable to those prior to mining, or an average of 9 inches evenly placed, will be used.

Prior to reseeding of disturbed areas, topsoil will be placed to achieve a generally uniform thickness; minimize compaction and erosion; and preserve biological, physical, and chemical properties. Where practical, soil will be applied so as to minimize grading requirements and compaction from multiple equipment passes over the area being reclaimed. Final grading will generally be completed parallel to the topographic contour of the area, where safety conditions permit, to minimize erosion and maximize site stability. Ideally, soil will be applied on areas to be seeded less than 30 days prior to seeding.

6.3. Fertilizer Application

Prior to reseeding of disturbed areas, we will contract with a laboratory proficient in the analysis of soils for agricultural purposes. Two composite samples will be collected from the reclamation topsoil at a depth from 0 to 6 inches, and per 1,000 linear feet of bench or 10 acres of valley floor. Samples will be taken with either a tile spade or soil auger free of foreign substances or rust. No galvanized tools will be used. About one quart of material will be collected for each composite sample. The laboratory will be briefed on the following items for each sample or appropriate set of samples:

- Plant species to be established;
- Type of seedbed preparation technique;
- Type of mulching practices;
- Approximate slope;
- Problems or conditions; and
- Future land use.

All samples will be placed in clean polyethylene bags at the time of collection, sealed and delivered to the laboratory as soon as possible. When samples cannot be delivered within 24 hours of

collection, they will be air-dried in a "dust free" environment for about 48 hours or as recommended by the laboratory. Samples will be analyzed for:

- pH;
- Potassium (parts per million);
- Texture;
- Electrical conductivity (millimhos per centimeter);
- Percent organic matter;
- Lime estimate;
- NH4-N and N03-N (parts per million);
- Sodium adsorption ratio; and if necessary;
- Phosphorus (parts per million).

The fertilizer application concentration will be based on recommendations from the laboratory sample analyses. Fertilizer will be broadcast over the seedbed using hand- operated "cyclone-type" seeders, rotary broadcast equipment attached to construction or revegetation machinery, or using aerial broadcast seeding equipment. Fertilizer broadcast equipment will be equipped with metering devices. Fertilizer application will take place prior to final seedbed preparation treatment to ensure the incorporation of fertilizer into the seedbed. Fertilizer broadcasting operations will not be conducted when wind velocities would interfere with even fertilizer distribution.

6.4. Reclamation Seed Mixtures

The following reclamation seed mixtures are proposed for use in the Mineral Materials Sale Area.

SOIL STOCKPILE STABILIZATION (26 POUNDS PER ACRE)

Species Preferred		**Variety**	**Lbs/Acre**	**PLS/Acre**
Desert wheatgrass	Agropyron desertorum	Arriba, Nordan	5.0	875,000
Thickspike wheatgrass	Agropyron dasystachyum	Critana	10.0	1,860,000
Western wheatgrass	Agropyron smithii	Arriba, Barton	6.0	756,000
Yellow Sweetclover	Melilotus officinalis		5.0	1,050,000

ROADS AND QUARRY FLOORS (20 POUNDS PER ACRE)

SPECIES		Weight-Percent	Seeds - Percent	Seeds per Pound	Seeds per Pound Mix
Blue Grama Grass	Bouteloua gracilis	11.00%	26.96%	825,000	90,750
Sideoats Grama Grass	Bouteloua curlipendula	18.00%	10.15%	190,000	34,200
SpikeMuhly	Muhlenbergia wrighti	2.00%	9.50%	1,600,000	32,000
Indian Ricegrass	Oryzopsis hymenoides	21.00%	8.79%	141,000	29,810
Sheep's Fescue	Festuca ovina	4.00%	8.08%	680,000	27,200
Sand Dropseed	Sporobolus cryptandrus	0.50%	7.72%	5,200,000	26,000
Thickspike Wheatgrass	Agropyron dasystachyum	16.00%	7.32%	154,000	24,640
Western Wheatgrass	Agropyron smithii	20.00%	7.13%	120,000	24,000
Canby's Bluegrass	Poa canbyi	2.00%	5.50%	925,500	18,510
Purple Three-Awn	Aristida purpurea	1.00%	0.77%	260,000	2,600
Fringed Sage	Artimesia frigida	0.25%	3.34%	4,500,000	11,250
Priare Sage	Artemisia ludoviciana	0.25%	3.34%	4,500,000	11,250
Alfalfa	Medicago sativa	2.00%	1.25%	210,000	4,200
Fourwing Saltbush	Atriplex canescens	1.00%	0.15%	52,000	520
Skunkbush Sumac	Rhus aromatica	1.00%	0.03%	10,600	106

QUARRY BENCHES (20 POUNDS PER ACRE)

SPECIES		Weight-Percent	Seeds-Percent	Seeds per Pound	Seeds per Pound Mix
Blue Grama Grass	Bouteloua gracilis	17.00%	30.73%	825,000	140,250
Sandberg Bluegrass	Poa sandbergii	6.00%	12.17%	925,500	55,530
Sand Dropseed	Sporobolus cryptandrus	1.00%	11.39%	5,200,000	52,000
Sideoats Grama Grass	Bouteloua curlipendula	25.00%	10.41%	190,000	47,500
Sheep's Fescue	Festuca ovina	6.00%	8.94%	680,000	40,800
Indian Ricegrass	Oryzopsis hymenoides	25.00%	7.72%	141,000	35,250
Little Bluestem	Andropogon scoparius	6.00%	3.42%	260,000	15,600
Canadian Wild Rye	Elymus canadensis	3.00%	0.76%	115,000	3,450
Purple Three-Awn	Aristida purpurea	1.00%	0.57%	260,000	2,600
Needle & Thread	Stipa comata	2.00%	0.50%	115,000	2,300
Blanketflower	Gaillardia aristata	2.00%	1.28%	293,000	5,860
Wild Bergamot	Monarda fistulosa	2.00%	0.92%	210,000	4,200
Four-wing Saltbush	Atriplex canescens	1.00%	10.96%	5,000,000	50,000
Mountain Mahogany	Cercocarpus montanus	1.00%	0.13%	59,000	590
Wood's Rose	Rosa woodsi	1.00%	0.08%	35,000	350
Skunkbush Sumac	Rhus aromatica	1.00%	0.02%	10,600	106

6.5. Seeding

Within five days after the application of fertilizer, but prior to seeding, the topsoil will be prepared for seeding by utilizing a disk, harrow or chisel plow to roughen the surface, depending upon site conditions and availability. The topsoil surface will then be left in a roughened condition to inhibit erosion and provide a receptive surface for subsequent reclamation procedures.

Disturbed areas will 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 will 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 will 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 will be delivered with the seed. Only certified seed of named varieties will be used where varieties are specified and can be obtained. Sources for "common" seed will be selected with comparable climatic and elevation characteristics similar to the project's climate and elevation. Legume seed will be inoculated with the correct rhizobium prior to shipping. All legume seed will be planted prior to the expiration date on the inoculum tag or reinoculated within 24 hours prior to planting. Seeds will be applied to benches and the valley floor area at a seeding rate of approximately 20 pounds of pure live seed (PLS) per acre which equates to approximately 210 seeds per square foot. Seeds will be applied to stockpiles at a seeding rate of approximately 26 PLS per acre which equates to approximately 104 seeds per square foot. Seed will be broadcast over the seedbed using hand- operated "cyclone-type" seeders, rotary broadcast equipment attached to construction or revegetation machinery, or aerial broadcast (hydroseeding) methods.

6.6. Mulching

Mulching will be conducted immediately following seeding operations, where deemed necessary at the time of application to meet reclamation objectives. Straw mulch will be spread evenly by hand or mechanical blower in those areas where it is deemed necessary. When mulching slopes, application will be initiated at the top of the slope, working down slope, where possible. Mulch will not be spread when wind velocities would prohibit even material distribution. Straw Mulch will not be musty, moldy, caked, or decayed and will be free of noxious weeds or noxious weed seeds. It will be delivered in an air-dry condition. The majority of stems will be 10 to 12 inches long or longer prior to application if the mulch is to be anchored by crimping. Approximately two tons of mulch per acre will be applied to all areas to be mulched.

FIGURES AND MAPS

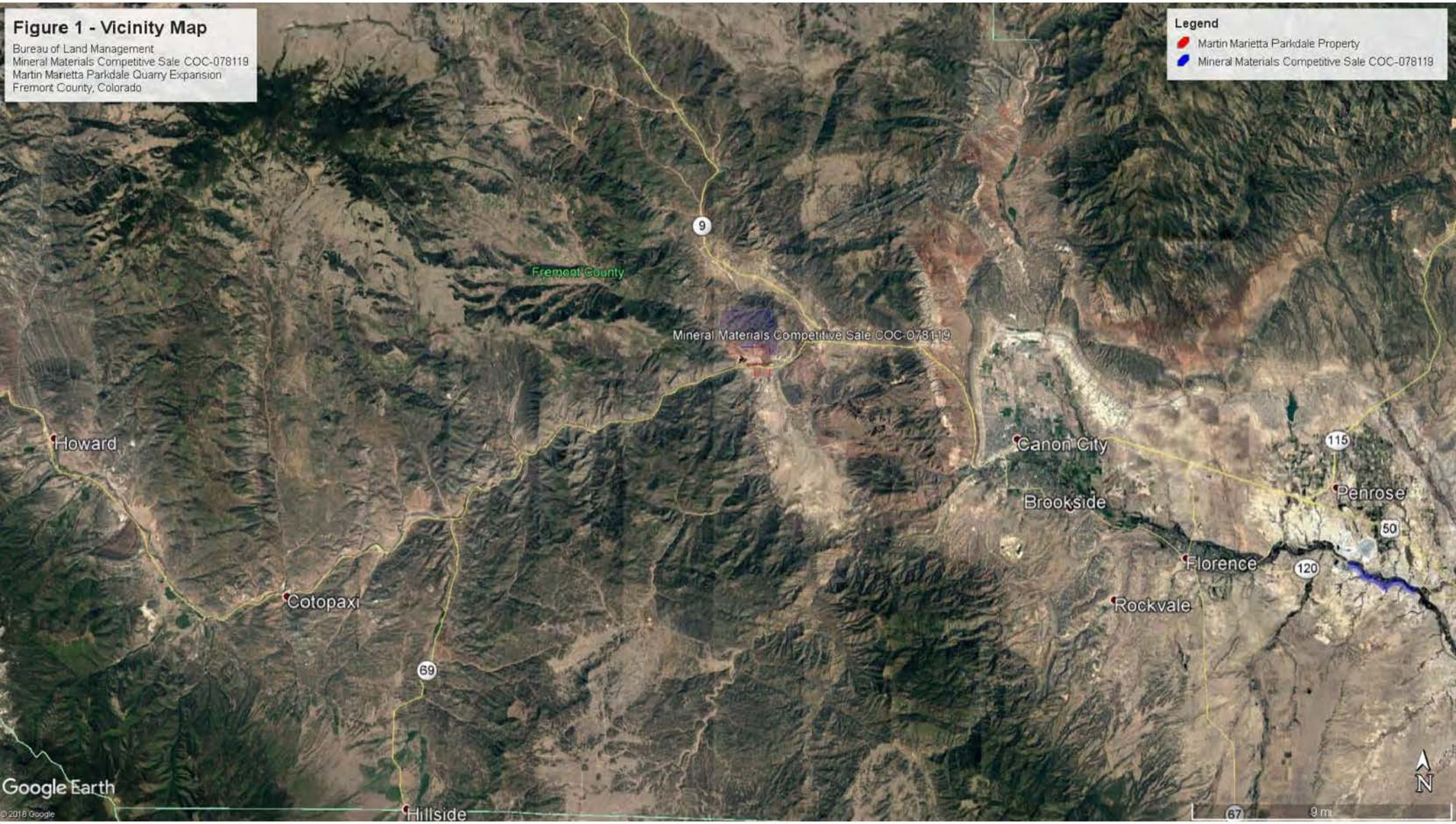
Figure 1 - Vicinity Map
Bureau of Land Management
Mineral Materials Competitive Sale COC-078119
Martin Marietta Parkdale Quarry Expansion
Fremont County, Colorado
Legend
Martin Marietta Parkdale Property
Mineral Materials Competitive Sale COC-078119
Fremont County
Mineral Materials Competitive Sale COC-078119
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Cotopaxi
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Brookside
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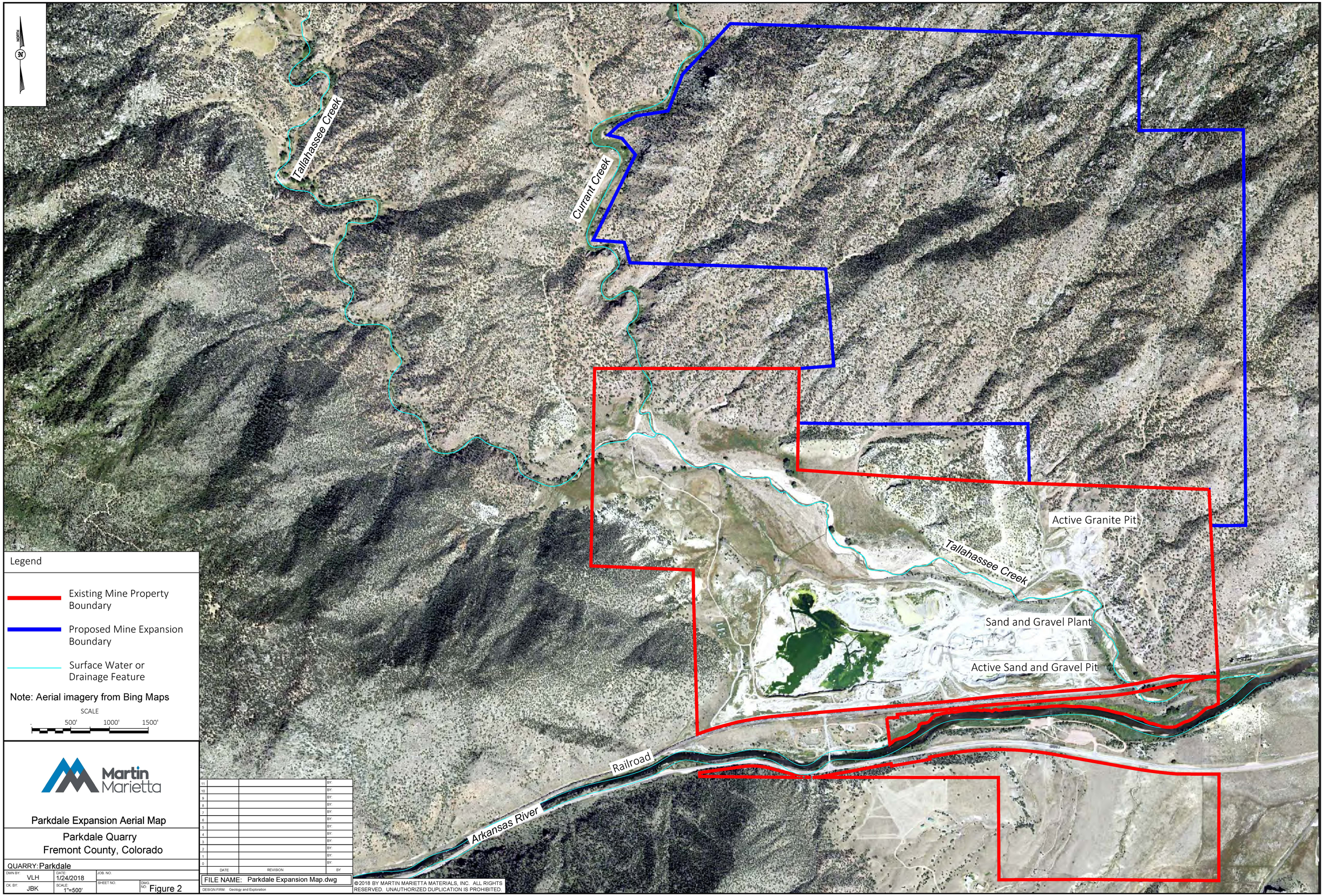

Legend

- Existing Mine Property Boundary
- Proposed Mine Expansion Boundary
- Surface Water or Drainage Feature

Note: Aerial imagery from Bing Maps

SCALE

500' 1000' 1500'

Martin Marietta

Parkdale Expansion Aerial Map

Parkdale Quarry
Fremont County, Colorado

QUARRY: Parkdale

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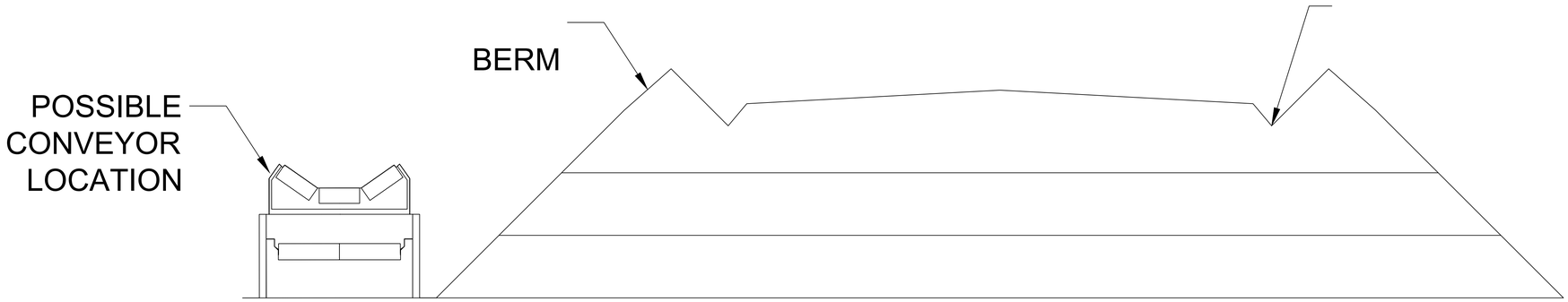

*NOT TO SCALE

*The actual road section used for a location will be that which allows for safe movement and sound performance of vehicles, as warranted by the conditions encountered

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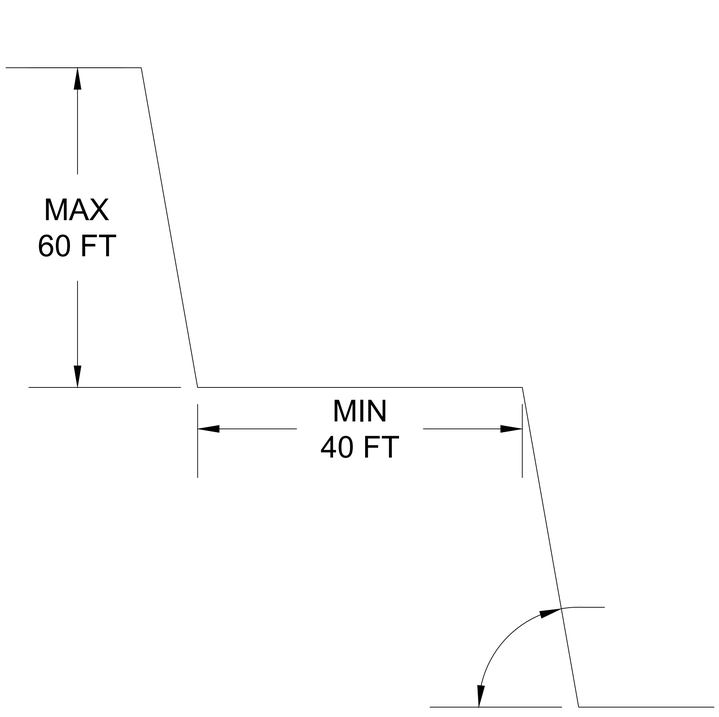

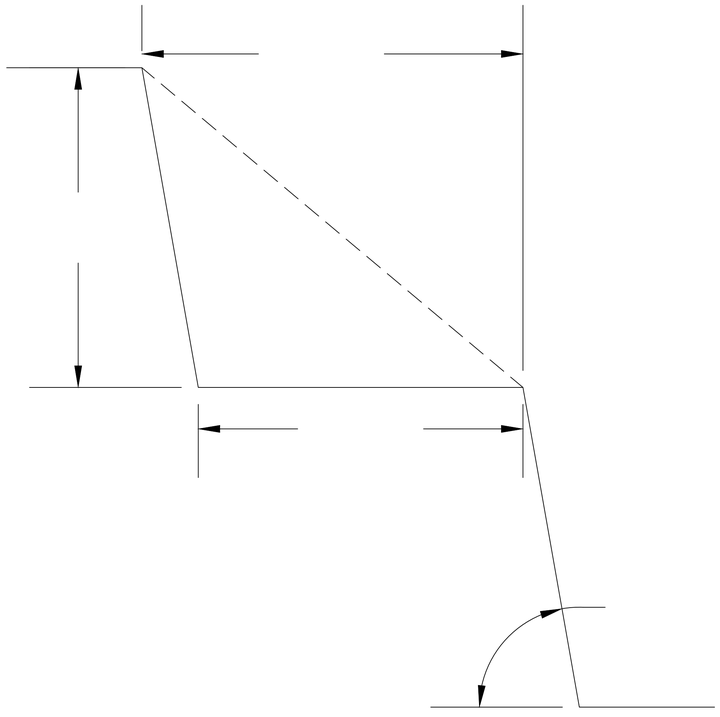

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LEGEND

Exisiting Mine Property Boundary

Proposed Mine Expansion Boundary

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Parkdale Conceptual Plan Northwest View

Parkdale Quarry
Fremont County, Colorado

QUARRY: Parkdale

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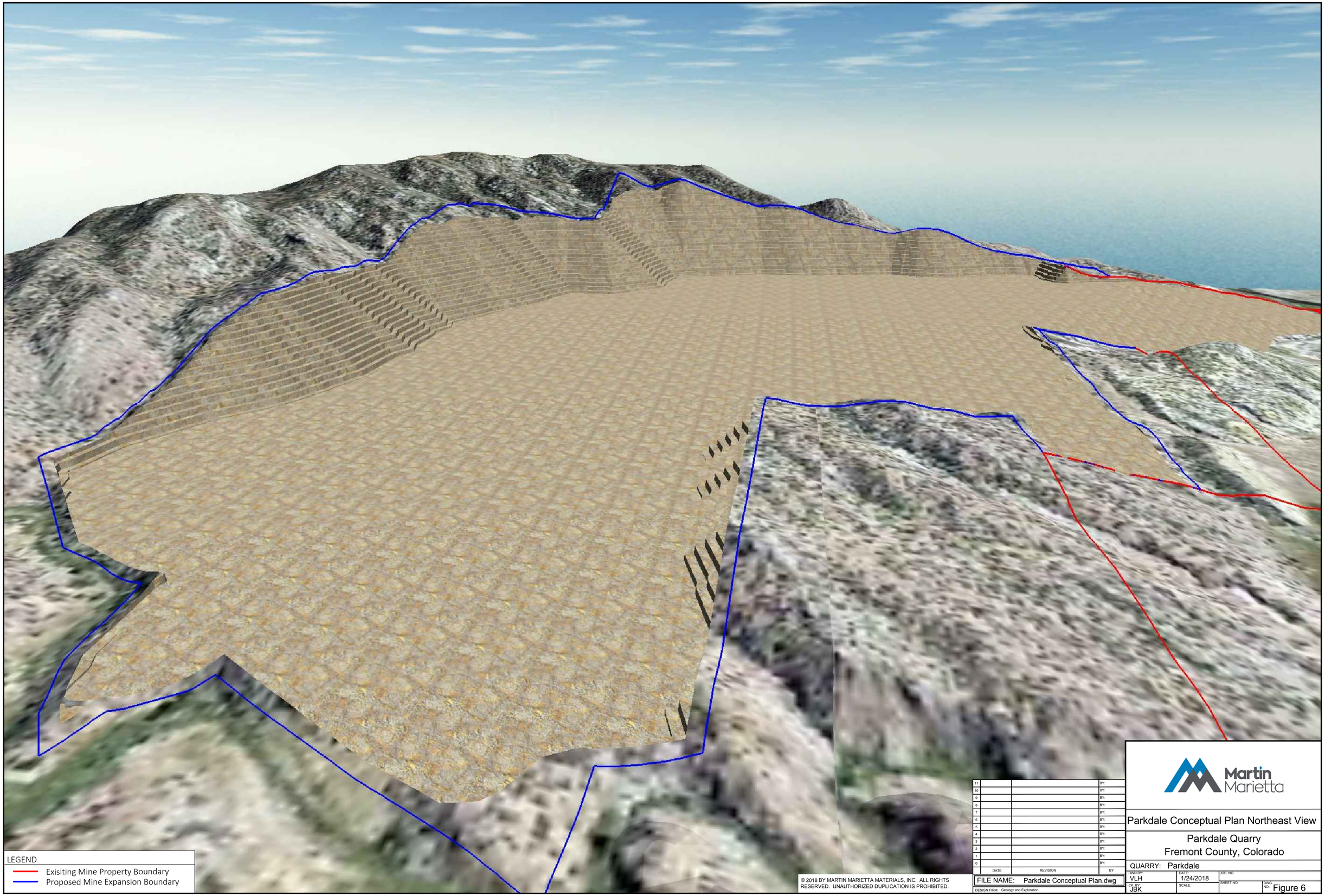

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Parkdale Conceptual Plan Northeast View

Parkdale Quarry
Fremont County, Colorado

QUARRY: Parkdale

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NORTH

Currant Creek

Tallahassee Creek

Tallahassee Creek

Arkansas River

Arkansas River

Legend

- Existing Mine Property Boundary
- Proposed Mine Expansion Boundary
- Surface Water or Drainage Feature
- Topographic Contour (USGS, 20 foot interval)

SCALE

0 500' 1000' 1500'

Martin Marietta

Parkdale Topograpic Map

Parkdale Quarry
Fremont County, Colorado

QUARRY: Parkdale

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DESIGN FIRM: Geology and Exploration

Limit of disturbance offset 50' from expansion boundary

Tallahassee Creek

Currant Creek

Tallahassee Creek

Arkansas River

NORTH

Legend

- Resource Area
- Limit of Disturbance
- Bench Contour (35'-tall benches, 1:1 slope)
- Pit Floor Contour (20' interval)
- Surface Water or Drainage Feature
- Proposed Mine Expansion Boundary
- Existing Mine Permit Boundary
- Topographic Contour (USGS, 20' interval)

SCALE

0 500' 1000' 1500'

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Parkdale Expansion Mine Plan

Parkdale Quarry
Fremont County, Colorado

QUARRY: Parkdale

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DESIGN FIRM: Geology and Exploration

NORTH

Legend

40' Contours

Proposed Drainage Channel

SCALE

0 300' 600' 900'

Martin Marietta

Conceptual Drainage Channel Layout

Parkdale Quarry
Fremont County, Colorado

QUARRY: Parkdale

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DWB	1"=300'		Figure 9

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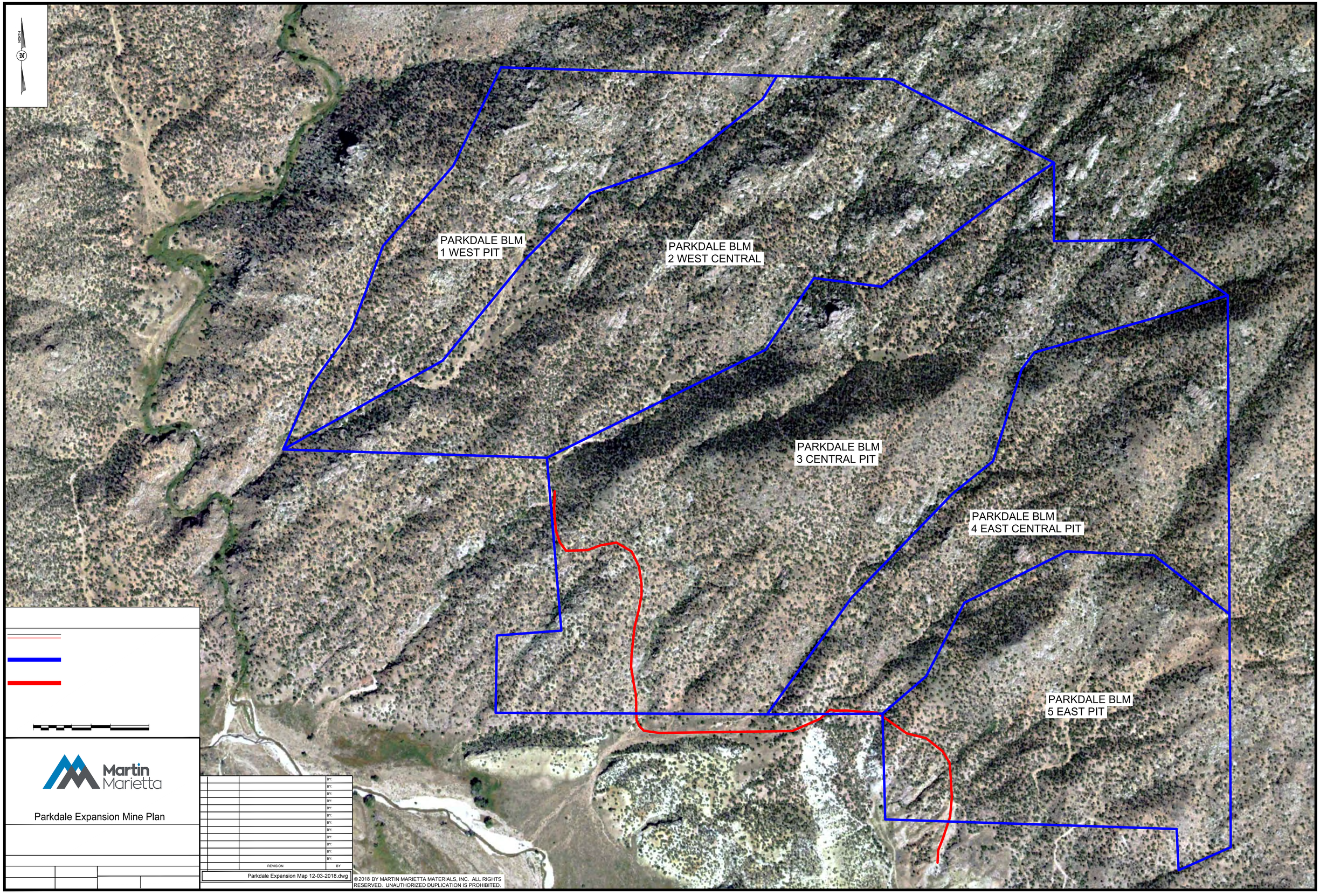
Note: Drainage Locations are Approximate,
Final Location will be Determined as Areas are Reclaimed.



Martin Marietta

Parkdale Expansion Mine Plan

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Parkdale Expansion Map 12-03-2018.dwg

NORTH

Martin Marietta

Parkdale Expansion - West Pit

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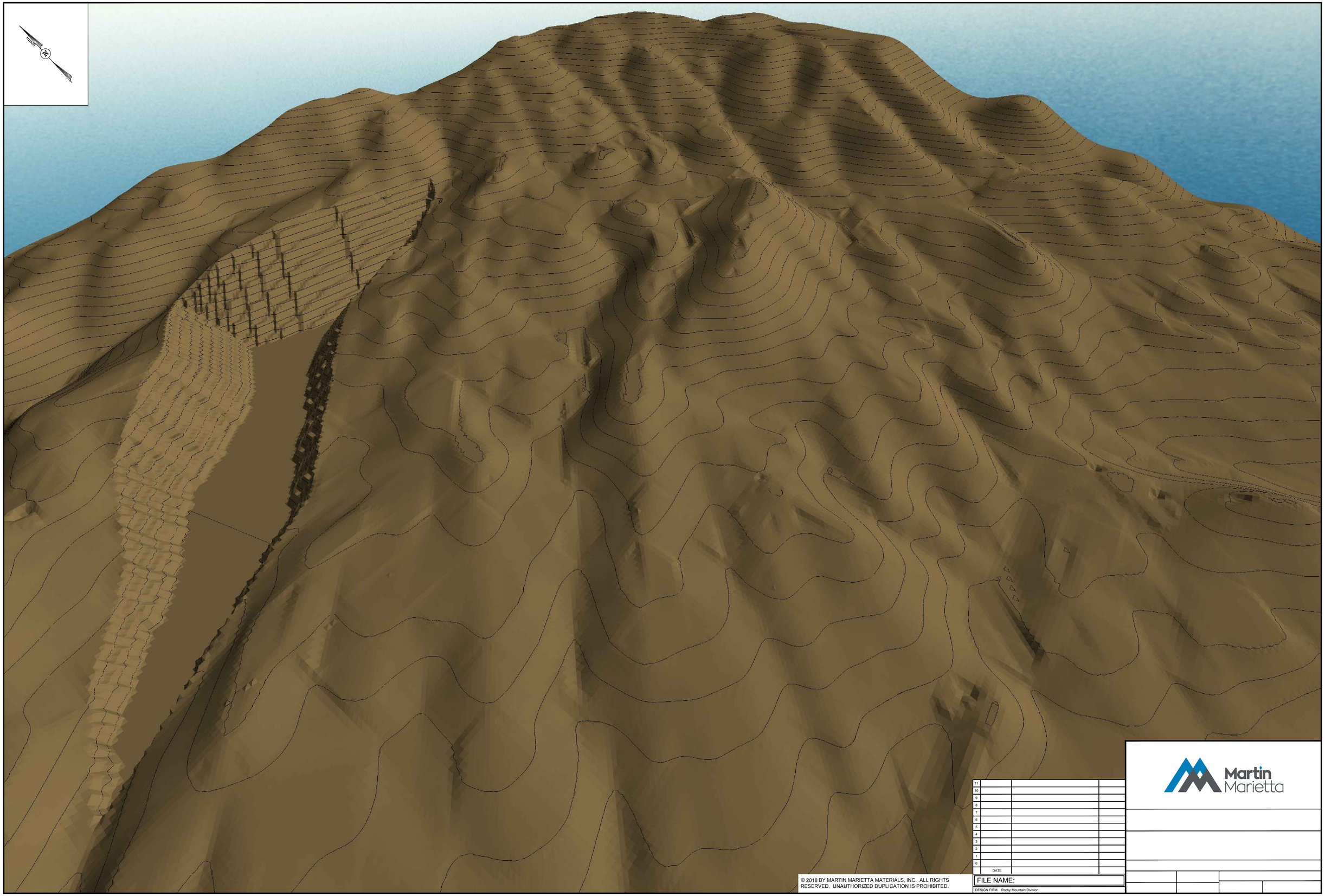

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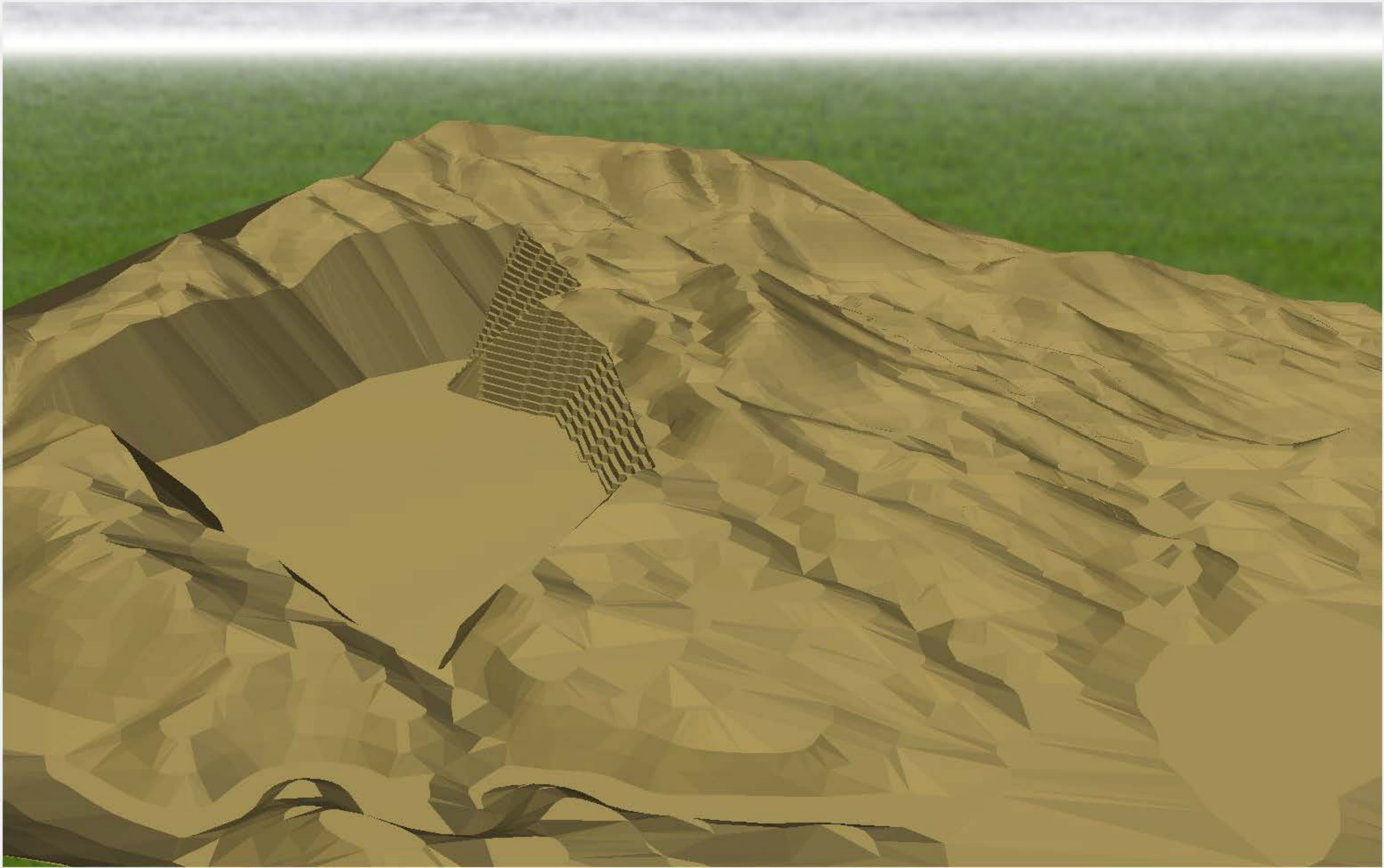

NORTH

Martin Marietta

Parkdale Expansion - West Central Pit

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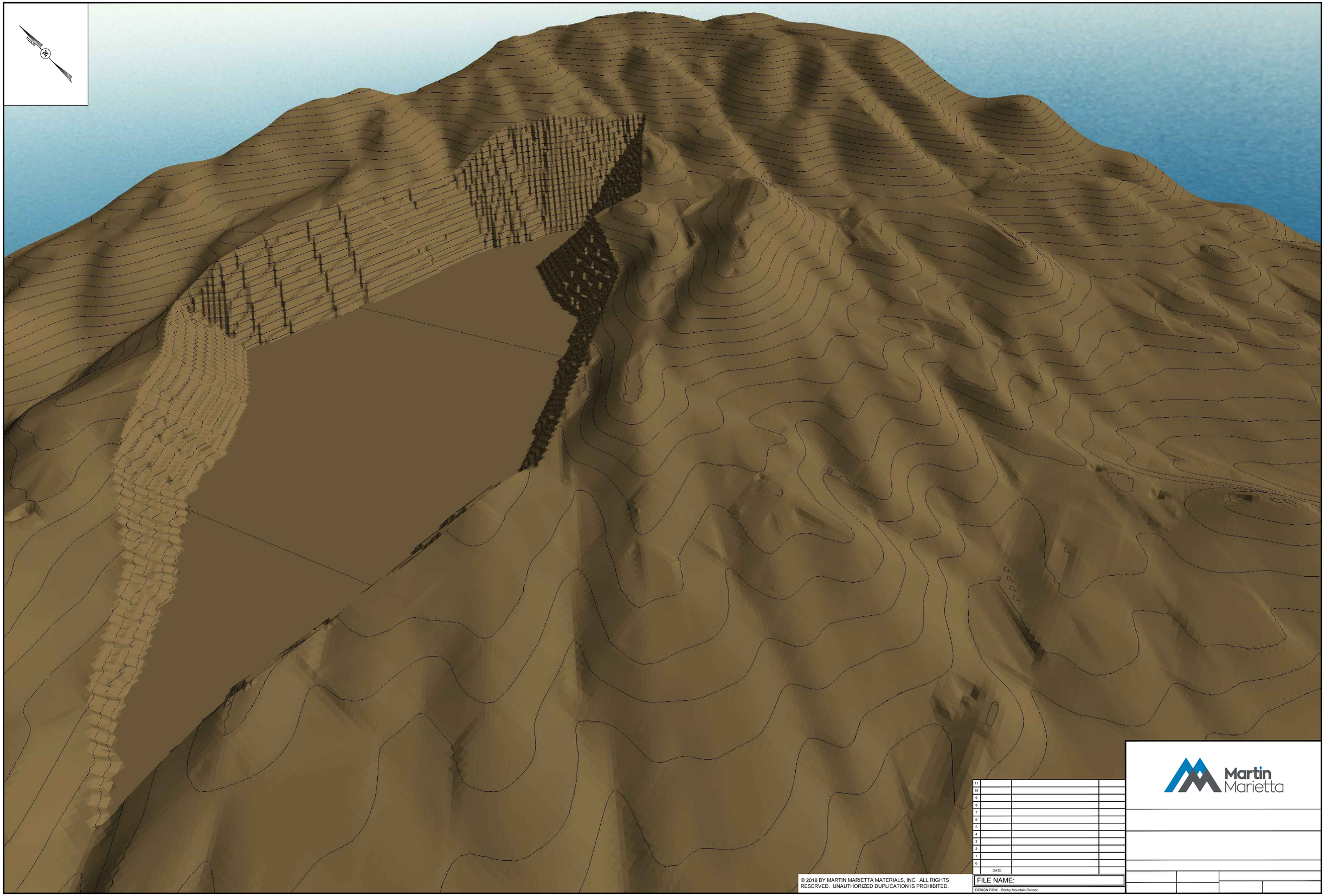

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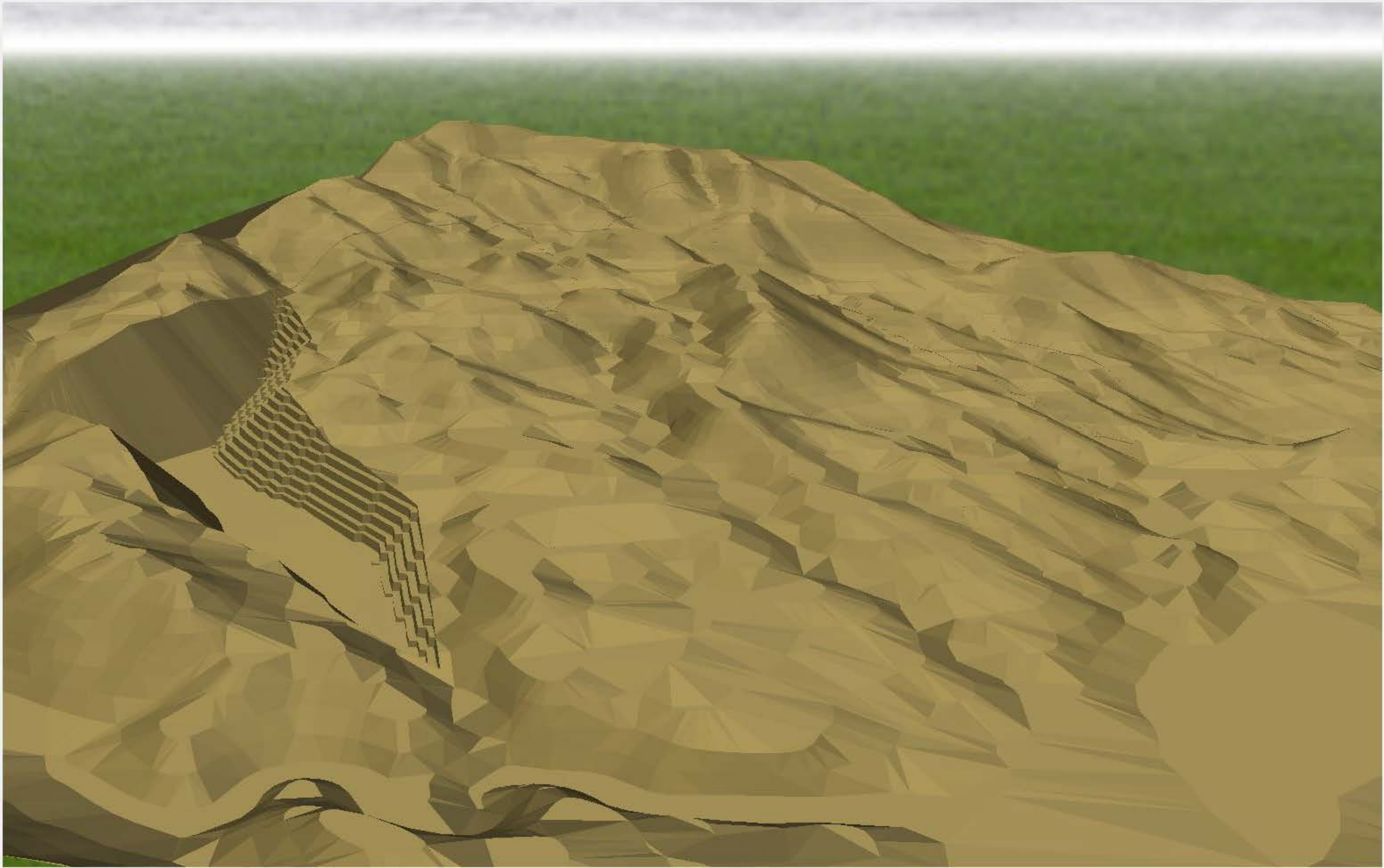

NORTH

Martin Marietta

Parkdale Expansion - Central Pit

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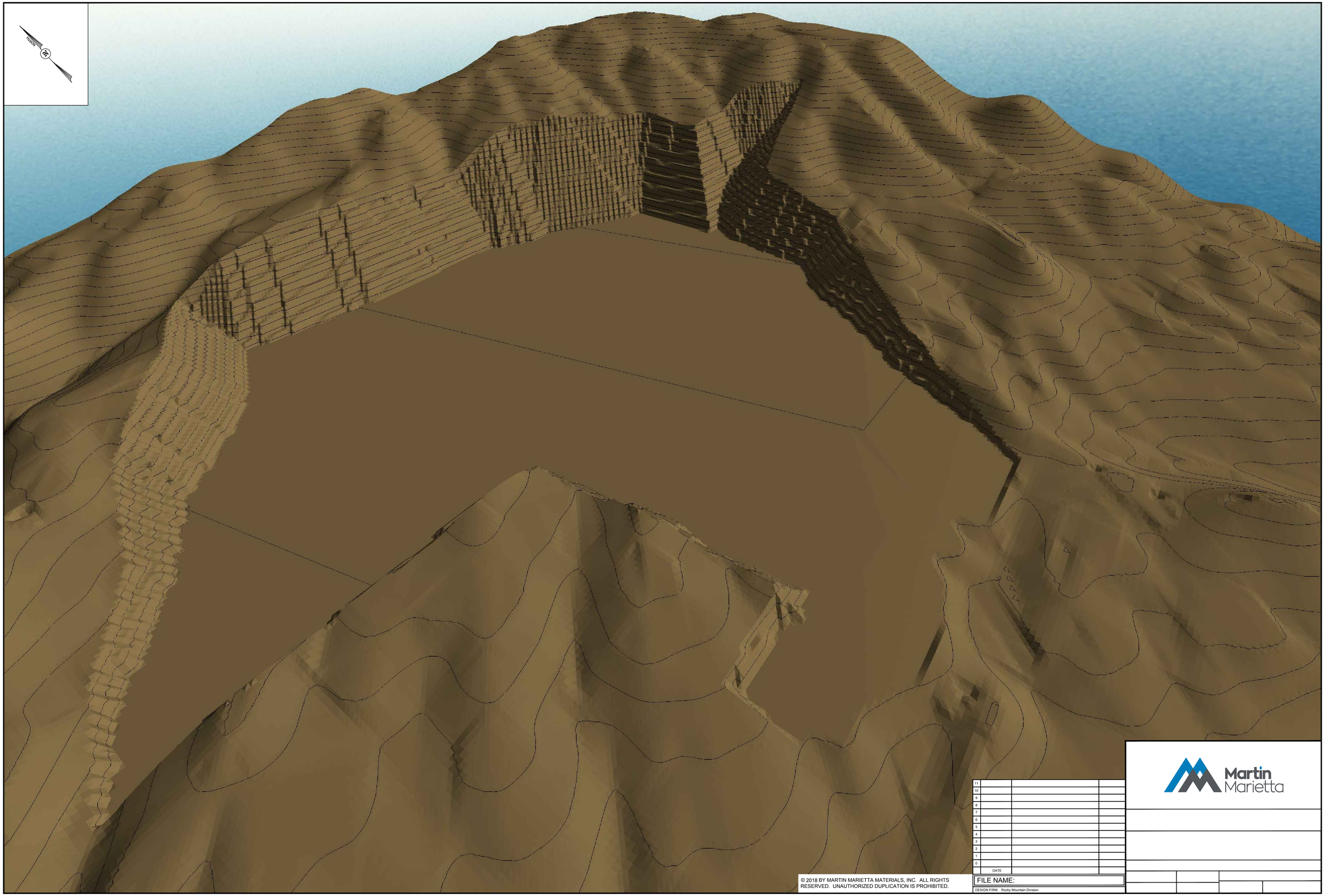
Parkdale Expansion Map 12-03-2018.dwg



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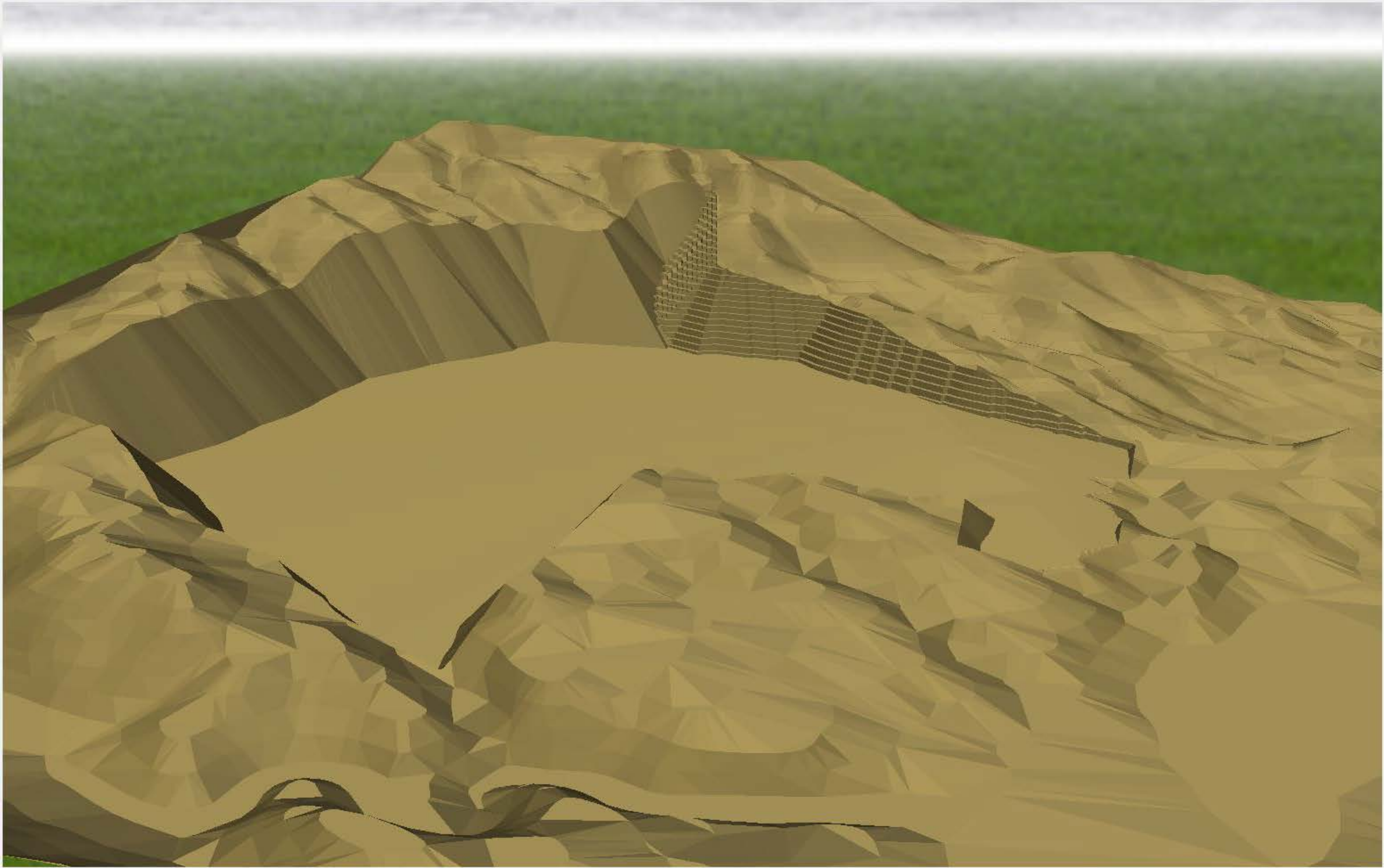
DESIGN FIRM: Rocky Mountain Division

Martin Marietta



NORTH

Martin Marietta

Parkdale Expansion - East Central Pit

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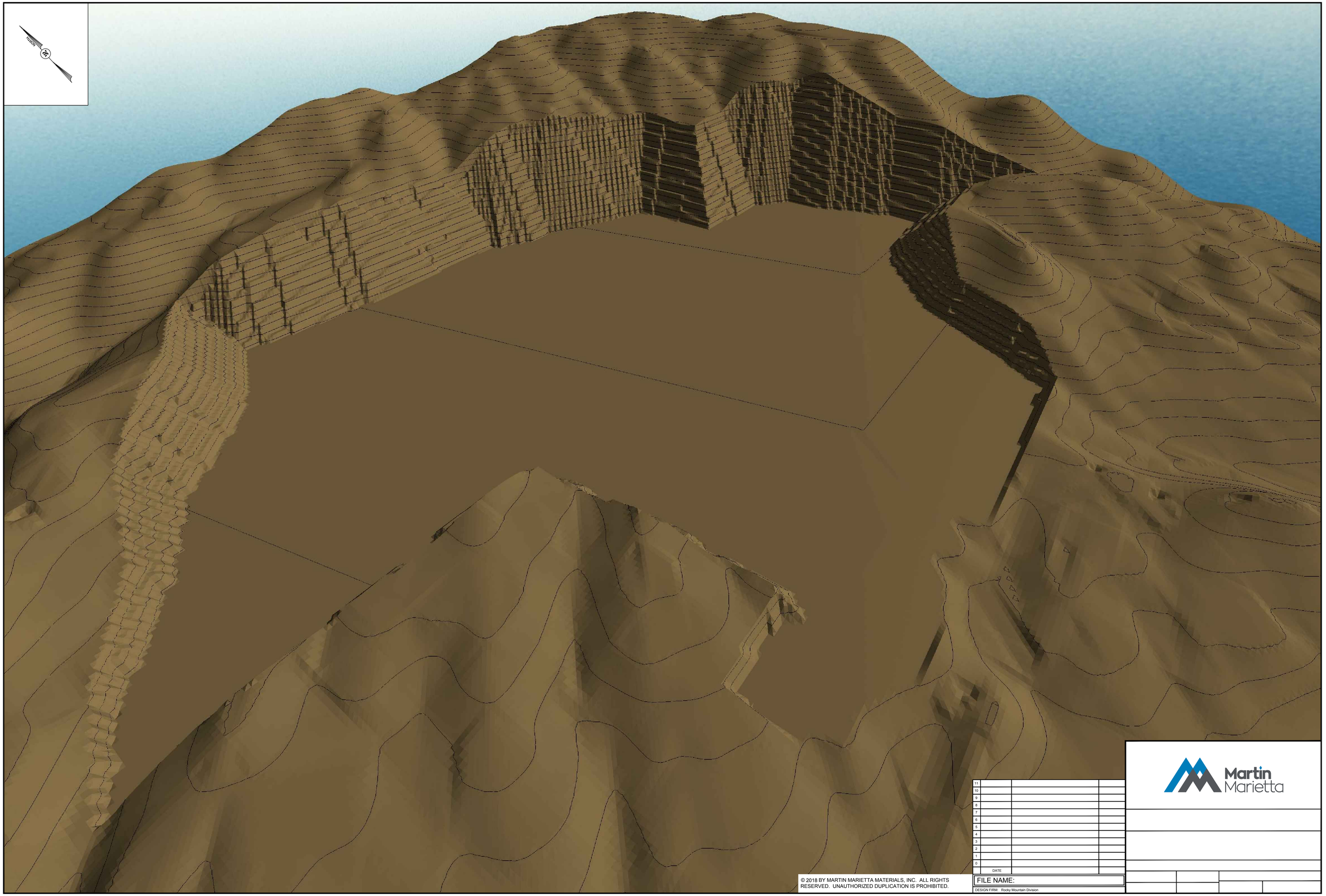
Parkdale Expansion Map 12-03-2018.dwg



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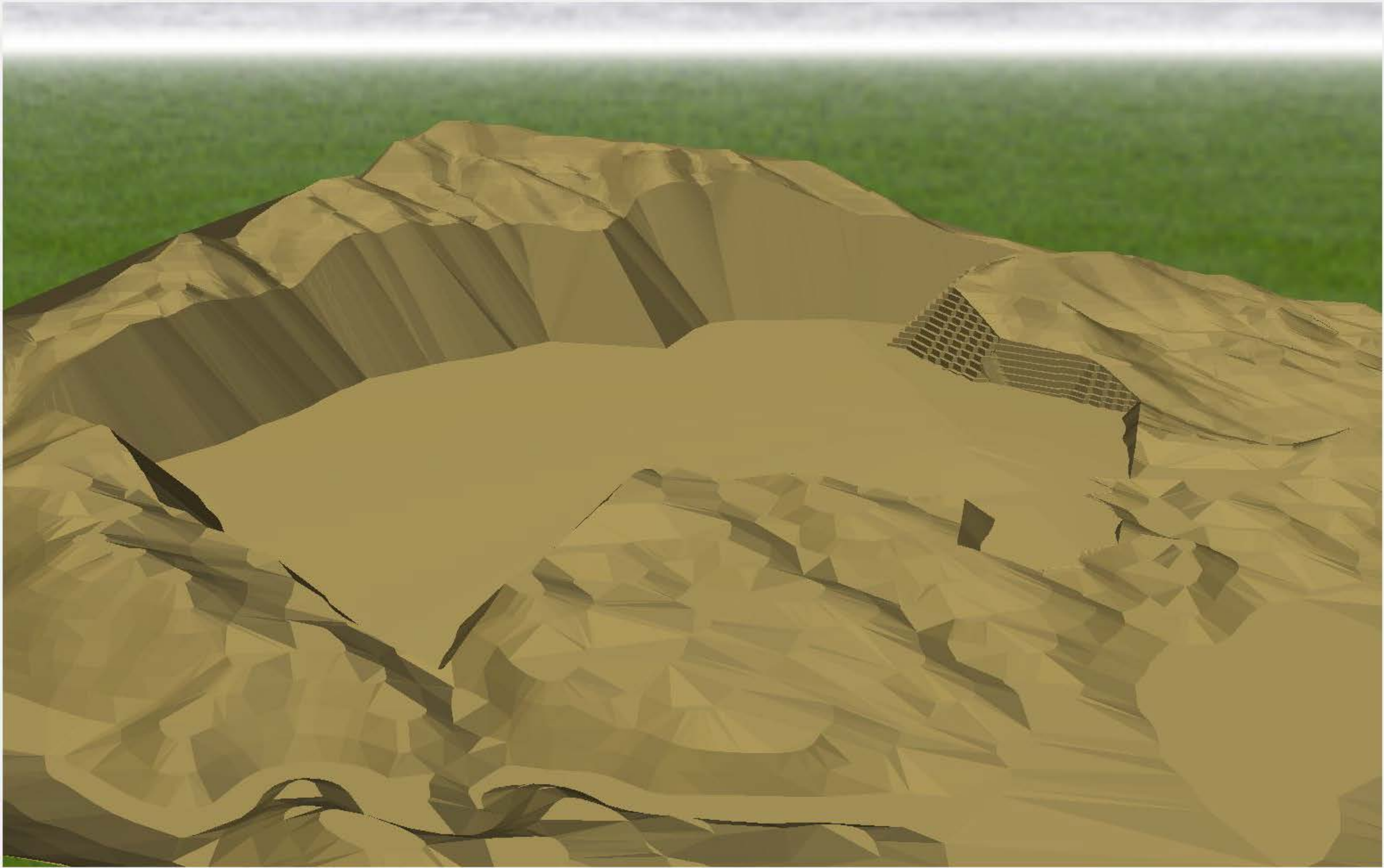
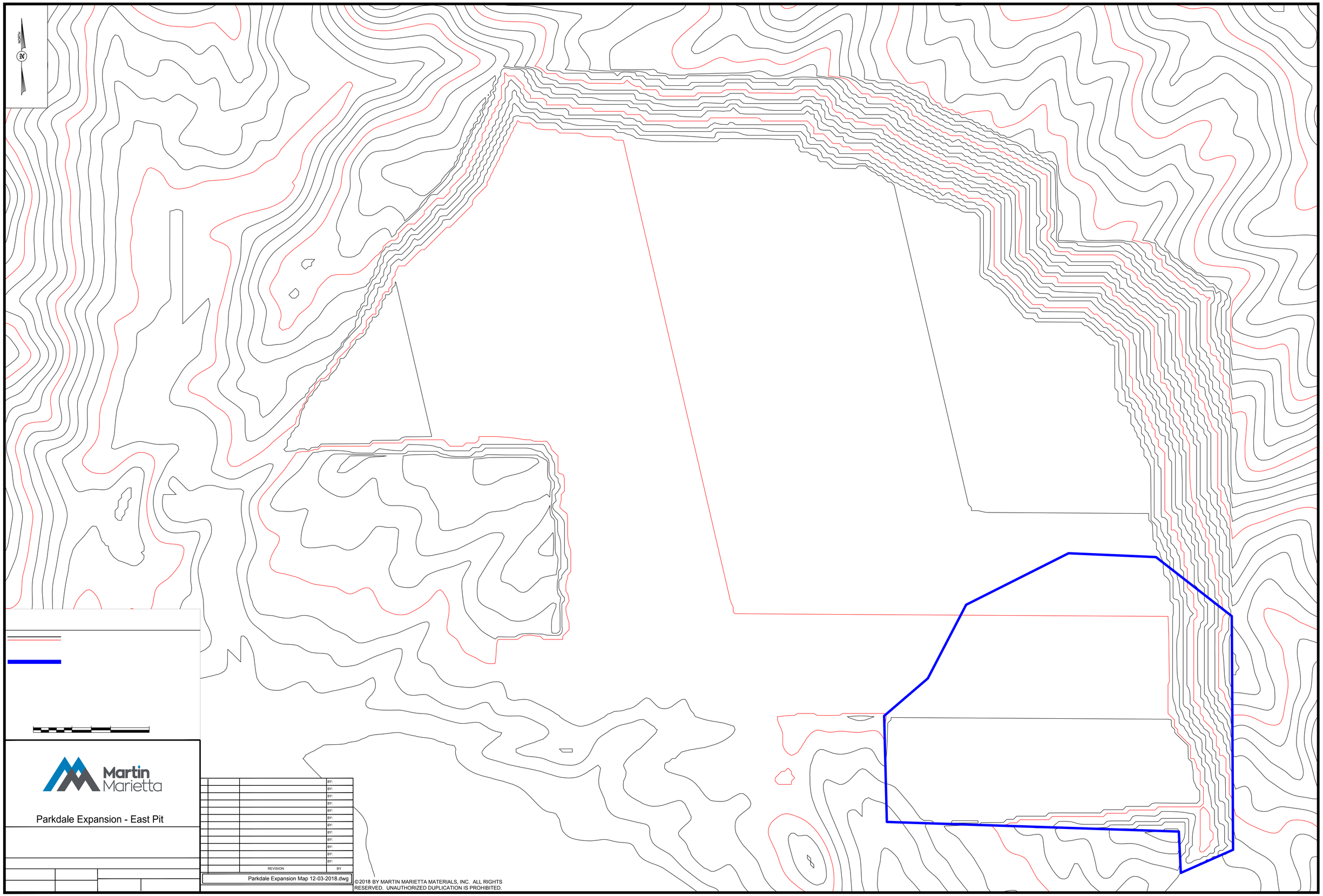
DESIGN FIRM: Rocky Mountain Division

Martin Marietta





Martin Marietta

Parkdale Expansion - East Pit

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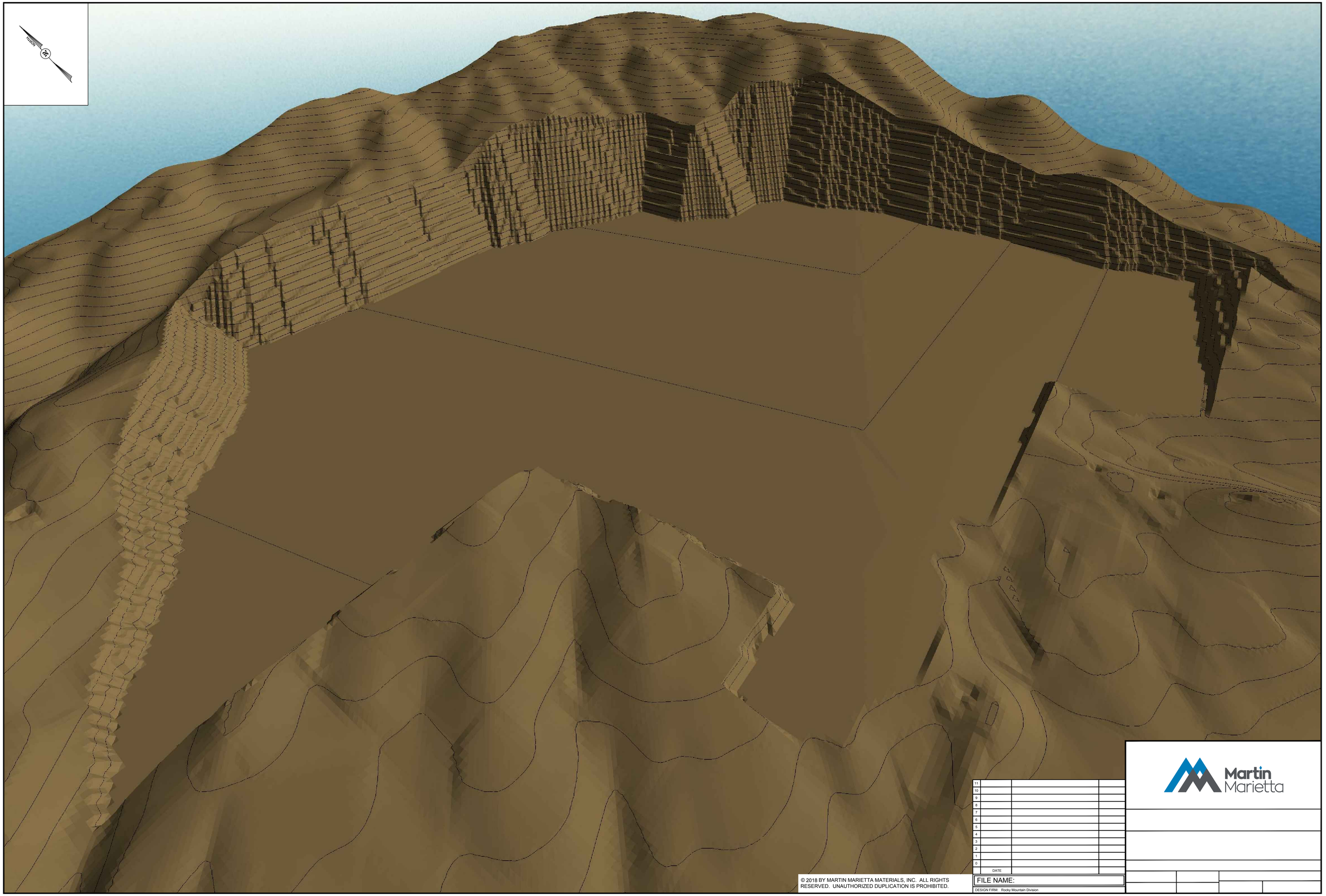
Parkdale Expansion Map 12-03-2018.dwg



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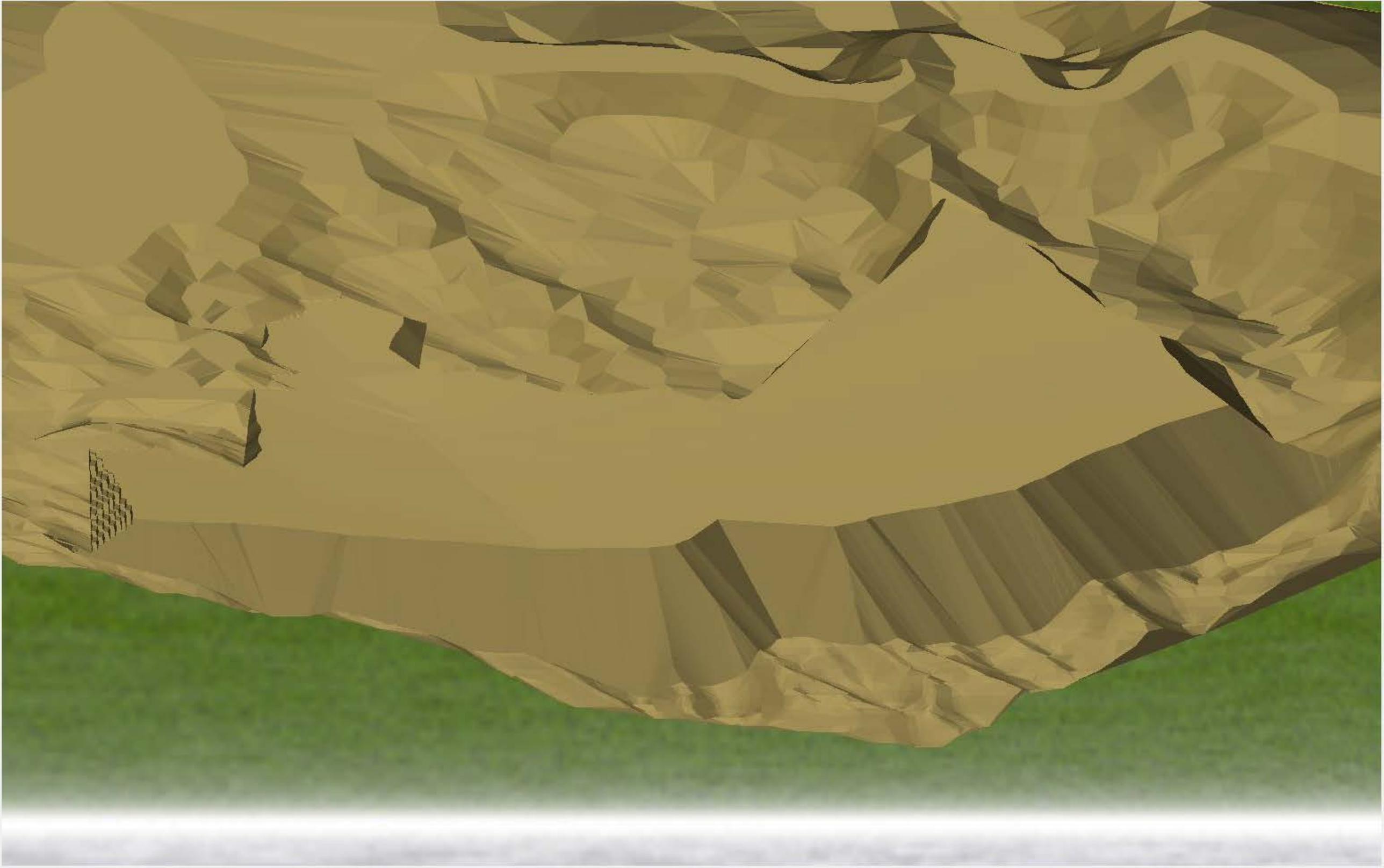
DESIGN FIRM: Rocky Mountain Division

Martin Marietta



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