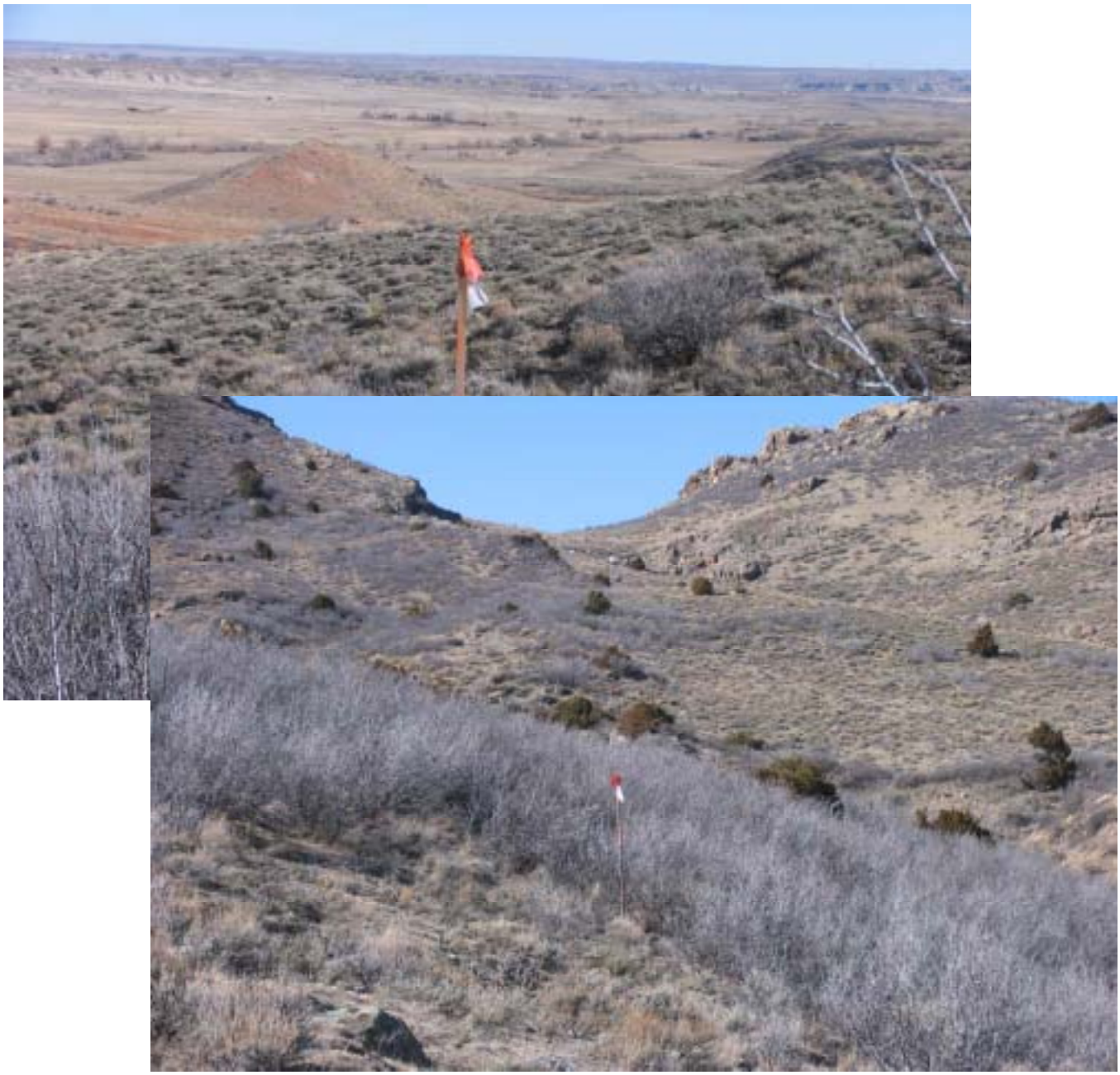
U.S. Department of the Interior
Bureau of Land Management

Casper Field Office

April 2005

ENVIRONMENTAL ASSESSMENT of the Proposed Huxtable Quarry Mineral Materials Project, Converse County, Wyoming



The Bureau of Land Management is responsible for the balanced management of the public lands and resources and their various values so that they are considered in a combination that will best serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield; a combination of uses that take into account the long term needs of future generations for renewable and nonrenewable resources. These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness and natural, scenic, scientific and cultural values.

WY-060-04-034

This Environmental Assessment was jointly prepared by Worthington, Lenhart and Carpenter, Inc. and Anderson Environmental Consulting, independent environmental consulting firms, with the guidance, participation, and independent evaluation of the Bureau of Land Management (BLM). The BLM, in accordance with Federal Regulation 40 CFR 1506.5 (a) & (b), is in agreement with the findings of the analysis and approves and takes responsibility for the scope and content of this document.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Casper Field Office
2987 Prospector Drive
Casper, Wyoming 82604-2968

1793/Huxtable Quarry
Mineral Materials Project

April 25, 2005

Dear Reader:

Enclosed for your review and comment is the Environmental Assessment (EA) of the Proposed Huxtable Quarry Mineral Materials Project. The project is located approximately 6 miles southwest of Douglas in south-central Converse County, Wyoming.

A copy of this EA has been sent to affected government agencies and those parties who indicated they wished to receive a copy. The EA is also available for review at the Bureau of Land Management (BLM) office listed below. It may also be viewed or downloaded from the BLM Casper website at *www.wy.blm.gov/cfo*.

Bureau of Land Management
Casper Field Office
2987 Prospector Drive
Casper, WY 82604

The 30-day comment period ends on May 25, 2005. You may submit written comments to Linda Slone, Project Manager at the above address. You may also submit electronic comments to casper_wymail@blm.gov. Please refer to the Huxtable Quarry Project in your comments.

This EA was prepared pursuant to the National Environmental Policy Act (NEPA) and other regulations to analyze potential impacts associated with the development of industrial nonmetallic minerals including construction aggregate rock (limestone and quartzite) and decorative fieldstone (moss rock).

Freedom of Information Act Considerations: Public comments submitted for this EA, including names and street addresses of respondents will be available for public review in their entirety at the above address during regular business hours (7:45 a.m. to 4:30 p.m.), Monday through Friday, except holidays. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

This EA is not the decision document. A decision record detailing the BLM's decision will be prepared and distributed following the end of the 30-day comment period. The decision on the proposed project will be based upon the analysis in this EA and on public comments. The decision is anticipated to be issued on June 7, 2005.

I appreciate the individuals, organizations, Federal, State, and local governments who participated in the NEPA analysis process for this project. I encourage you to review the document and submit your comments. Should you have any questions, please contact Linda Slone at the above address or at (307) 261-7520.

Sincerely,

Field Manager, Casper

ENVIRONMENTAL ASSESSMENT
of

JAMES N. HUXTABLE'S
PROPOSED HUXTABLE QUARRY MINERAL MATERIALS PROJECT

W½ OF SECTIONS 28 AND 33, T32N, R72W
CONVERSE COUNTY, WYOMING

Prepared For:

Casper Field Office
Bureau of Land Management
2987 Prospector Drive
Casper, Wyoming 82604

and

James N. Huxtable/Cadillac Ranch
720 Cold Springs Road
Douglas, Wyoming 82633

Prepared By:

WORTHINGTON, LENHART AND CARPENTER, INC.
200 Pronghorn Street
Casper, Wyoming 82601-1723

and

ANDERSON ENVIRONMENTAL CONSULTING
P.O. Box 3586
Casper, Wyoming 82602-3586

April 2005

TABLE OF CONTENTS

TABLE OF CONTENTS - Continued

Document Section **Page**

TABLE OF CONTENTS - Continued

Document Section **Page**

TABLE OF CONTENTS - Continued

Document Section **Page**

TABLE OF CONTENTS - Continued

Document Section **Page**

TABLE OF CONTENTS - Continued

Document Section **Page**

TABLE OF CONTENTS - Continued

Document Section **Page**

TABLE OF CONTENTS - Continued

LIST OF TABLES

LIST OF TABLES - Continued

LIST OF FIGURES

LIST OF FIGURES - Continued

1.0 INTRODUCTION

1.1 BACKGROUND

Mr. James Huxtable of Douglas, Wyoming has notified the Bureau of Land Management (BLM), Casper Field Office that he proposes to develop an industrial non-metallic mineral and decorative rock deposit located within the administrative boundary of the BLM's Casper Field Office. The proposed Huxtable quarry is located in the SW¼ of Section 33 in Township 32 North, Range 72 West, Converse County, Wyoming, as shown on Figure 1.1. Mr. Huxtable (project proponent) proposes to mine existing aggregate rock, limestone and quartzite resources for use in local construction-related activities and moss rock for decorative landscaping purposes within a 10-acre quarry site as described above. The mineral materials proposed for mining are owned by the United States of America while the surface estate at the proposed quarry site and along the 2.0 miles of proposed access (haul) road are owned by the project proponent. The *Materials Act of 1947*, as amended (30 USC 601 et seq.), and promulgating regulations found in Title 43 *Code of Federal Regulations* (CFR), Part 3600, govern federal mineral materials (such as sand, stone, gravel, rock, etc.) and authorize the BLM to sell federal mineral materials at fair market value.

While the surface estate within the Huxtable Quarry Project Area (HQPA) is owned by the project proponent, the mineral resources at the proposed quarry site are in federal ownership, thereby requiring the preparation of an environmental assessment (EA) to analyze and disclose the impacts of the proposed mineral materials sale. This EA is being prepared pursuant to the *National Environmental Policy Act* (NEPA), as amended (42 USC 4321 et seq.), and its implementing regulations found in Title 40 CFR Part 1500-1508, and BLM's *National Environmental Policy Act Handbook* (H-1790-1) (BLM 1988a). This EA assesses the environmental impacts of the Proposed Action and alternatives, including the No Action Alternative, and serves to guide the decision-making process.

The proposed Huxtable Quarry Mineral Materials Project would comply with all applicable local, state and federal rules and regulations. Table 1.1 lists the potential authorizing actions required for project compliance.

1.2 PURPOSE AND NEED

The Huxtable Quarry Mineral Materials Project would provide mineral materials for construction-related activities and decorative landscaping. The project proponent has indicated that a commercial need exists for this material in the Douglas area that cannot be met by existing quarry sites. As a consequence, the project proponent has submitted a request to the BLM for a sale of industrial non-metallic mineral and decorative rock resources located in the SW¼ of Section 33, Township 32 North, Range 72 West in order to meet the growing demand for mineral materials in this area of Converse County.

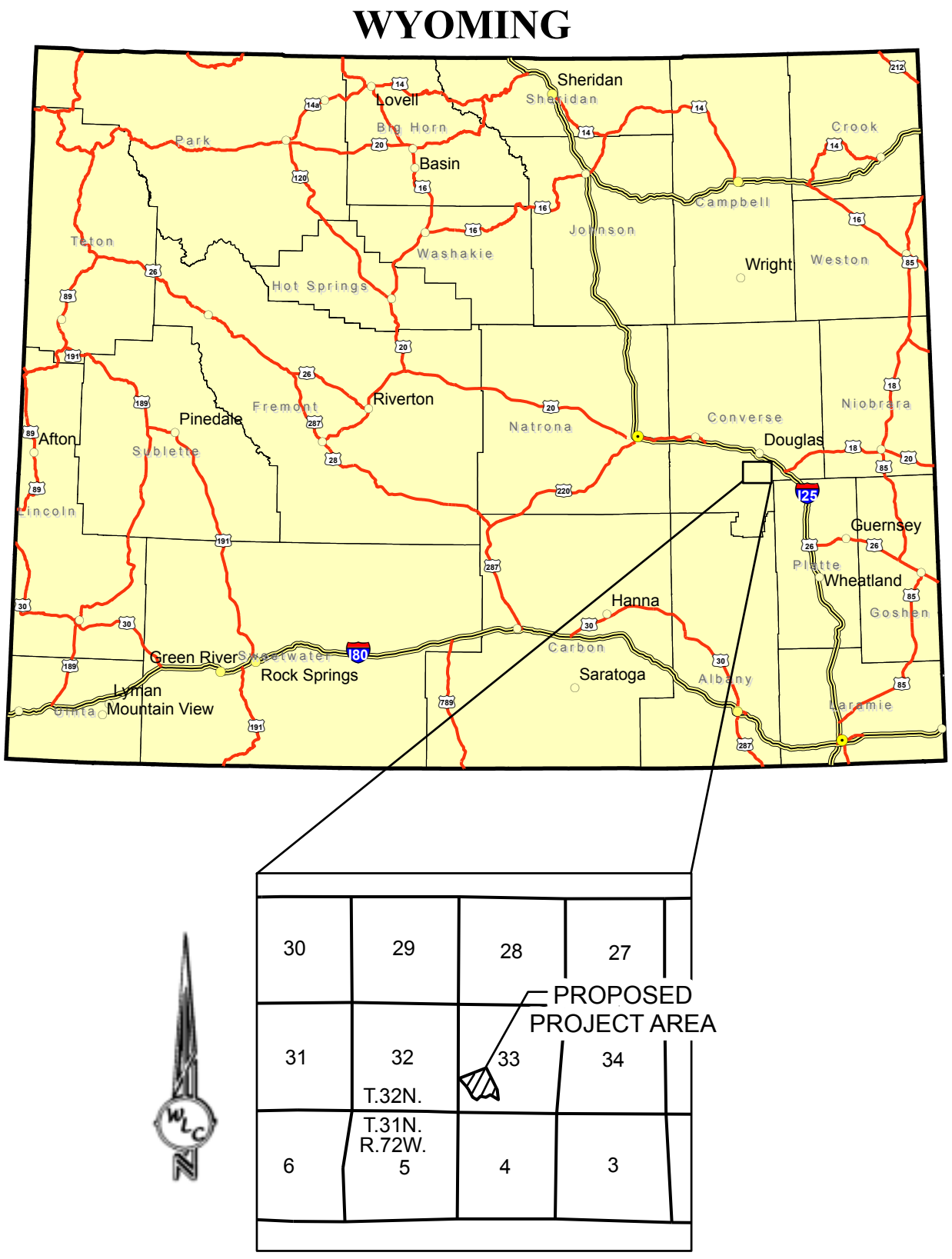


Figure 1.1 - General Location of the Proposed Project Area

Table 1.1 Potential Federal, State and Local Authorizing Actions; Huxtable Quarry Mineral Materials Project

Agency	Nature of Action
Bureau of Land Management	NEPA compliance Mineral sales contract
U.S. Army Corps of Engineers	Authorization to impact waters of the U.S.
U.S. Fish and Wildlife Service	Review of potential impacts on federally listed threatened, endangered, and candidate species
Department of Environmental Quality, Land Quality Division	Small mine permit
Department of Environmental Quality, Air Quality Division	Permit to construct Permit to operate
Department of Environmental Quality, Water Quality Division	Storm Water Pollution Prevention Permit
Wyoming State Engineer's Office	Surface water appropriation permit(s) Ground water appropriation permit(s)
Wyoming Game and Fish Department	Review of potential impacts on game and fish resources, including state-sensitive species
Wyoming State Historic Preservation Office	Consultation with BLM and review of potential impacts on cultural resources
Wyoming Department of Transportation	State road modification agreement
Converse County	County road use and modification agreements

1.3 CONFORMATION WITH LAND USE PLANS AND RELATIONSHIP TO STATUTES, REGULATIONS AND OTHER PLANS

1.3.1 Conformance with Land Use Plan

BLM planning for the project area is documented in the Platte River Resource Area (PRRA), Resource Management Plan (RMP) (BLM 1985b). The proposed action would take place in Resource Management Unit (RMU) 14: Remaining Platte River Resource Area. There is no primary management focus within this resource management unit. Rather, there are unit wide resource values with prescriptions addressing specific management needs where values exist. Specific management prescriptions applicable to the Proposed Action and alternatives include:

- M3: Salable Minerals. Mineral materials such as sand and gravel, moss rock, flagstone, and scoria will be available on demand for sale and for re-use, subject to conditions and stipulations developed case by case, so that efficient use can be made of the mineral resources. Materials in all low, moderate, and high potential areas are available except those in an area within 0.25 mile of the North Platte River for its entire length in the PRRA.

- Surface Disturbance Mitigation Guidelines. Surface disturbance will be prohibited in any of the following areas or conditions. Exceptions, waivers, or modification of this limitation may be approved in writing, including documented supporting analysis, by the Authorized Officer.

  a. Slopes in excess of 25%.

  b. Within important scenic areas identified in a land use plan (Class I and II Visual Resource Management Areas).

  c. Within 500 feet of surface water and (or) riparian areas.

  d. Within either 0.25 mile or the visual horizon (whichever is closer) of historic trails.

  e. Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur.

  f. Within 500 feet of Interstate highways and 200 feet of other existing rights-of-way (i.e. U.S. and State highways, roads, railroads, pipelines, and power lines).

  g. Within 0.25 mile of occupied dwellings.

  h. Material sites.

- R4: Visual Resource Management. The BLM's visual resource management (VRM) system will be applied in the PRRA where required to mitigate impacts from surface development.

- WL3 Deer Habitat Management. To protect important big game winter habitat, activities or surface use will not be allowed from November 15 to April 30. Exception, waiver, or modification of this limitation in any year may be approved in writing when supported by documented analysis.

- WL7: Raptors. To protect important raptor nesting habitat, activities or surface use will not be allowed from February 1 to July 31 within 0.25 to 0.50 mile of an active nest. Exception, waiver, or modification of this limitation in any year may be approved in writing when supported by documented analysis.

The Surface Disturbance Mitigation Guidelines referenced above would not apply as none of these resource concerns would be affected by the Proposed Action or alternatives. The proposal to develop mineral materials is in conformance with the 1985 Platte River Resource Management Plan (BLM 1985).

1.3.2 Wyoming Department of Environmental Quality

The Wyoming Department of Environmental Quality (WDEQ), Land Quality Division (LQD) administers and regulates mining and reclamation operations such as the proposed project, in conjunction with the BLM under a current Memorandum of Understanding (MOU). The WDEQ/LQD reviews and approves all proposed mining and reclamation plans under its jurisdiction. In addition, other WDEQ divisions including the Water Quality Division (WQD) and Air Quality Division (AQD) will review specific portions of the proposed quarry and reclamation plan, and, if the plans conform to and comply with applicable rules and regulations, specific environmental permits would be issued by the appropriate agency.

The project proponent has submitted applications to WDEQ's Air and Land Quality Divisions for approval of the 10-acre Huxtable quarry and these applications are currently pending review and approval.

1.3.3 Wyoming Department of Transportation

The Wyoming Department of Transportation (WDOT) regulates the construction of new access points (approaches) to/from existing highways within the State of Wyoming. The project proponent has received an approved access permit from the WDOT for the construction of an access approach to the Cold Springs Road (Wyoming State Highway 91) in the NW¼NW¼ of Section 28 in Township 32 North, Range 72 West.

1.3.4 Wyoming State Engineer's Office

The Wyoming State Engineer's Office (WSEO) regulates the appropriation of both surface and ground water within the State of Wyoming. The project proponent has proposed to use ground water produced from the Huxtable #2 water well (NW¼NW¼ of Section 33, T32N, R72W) for use in dust abatement on both the access (haul) road and in conjunction with crushing activities in the quarry. An enlargement (modification) of the existing ground water permit for the Huxtable #2 water well will be required authorizing the use of these waters for industrial purposes prior to the use of this water for dust abatement purposes.

1.3.5 Converse County

The proposed project conforms to the existing zoning for the subject area. In a letter dated January 31, 2005, Converse County Planning Director Paul Musselman indicated that Converse County does not have any zoning requirements regulating quarry operations.

1.4 SCOPING AND ISSUES IDENTIFIED

Public issues and comments regarding the proposed Huxtable Quarry Mineral Materials Project were solicited for incorporation into this analysis through the public scoping process. Scoping consisted of the publication of a public scoping notice and a formal public scoping meeting held in Douglas, Wyoming as summarized in Chapter 5.0 of this analysis document. Environmental and social issues of local importance associated with the project that were identified through the public scoping process are summarized as follows:

1. Potential impacts to air quality from fugitive dust emissions.

2. Potential impacts to surface and ground water resources.

3. Potential impacts to wildlife and wildlife habitat in the area, including:

    a) both game and non-game species (principally mule deer and the impacts to crucial mule deer winter range, raptor nesting habitat); and

    b) threatened, endangered and sensitive plant and animal species and their habitats.

4. Increased traffic on and associated potential impacts to existing state highways.

5. Potential impacts associated with noise during quarrying operations.

6. Potential damage to dwellings and structures from blasting operations.

7. Potential health and safety concerns from exposure to elevated radon levels.

8. Potential impacts to the scenic qualities of the area.

9. Potential impacts of the quarry on property values in the area

2.0 THE PROPOSED ACTION AND ALTENATIVES

2.1 PROPOSED ACTION

2.1.1 Introduction

The Huxtable rock quarry is proposed in the SW¼ of Section 33 in Township 32 North, Range 72 West on the northeastern flank of Sheep Mountain. Access to the quarry site would involve upgrading approximately 1.2 miles of existing, flat-bladed access road and the reconstruction of approximately 0.8 miles of existing two-track trail traversing the W½ of Sections 28 and 33 in Township 32 North, Range 72 West. Surface disturbance associated with the Proposed Action would include 10 acres associated with the actual quarry site and 11 acres associated with access road construction including 4.4 acres associated with the reconstruction of the 0.8 miles of two-track trail and 6.6 acres associated with the upgrading of the 1.2 miles of existing access road (refer to Figure 2.1). The proposed quarry is located on private surface overlying federal mineral estate administered by Casper Field Office (CFO), BLM.

The Huxtable Quarry Project Area (HQPA) is located approximately 6 miles southwest of Douglas in south-central Converse County, Wyoming. From the intersection of the old Yellowstone Highway (Wyoming State Highway 96) and the Cold Springs Road (Wyoming State Highway 91), legal access to the project area is south approximately 4.2 miles along the Cold Springs Road to the juncture with a privately owned ranch road, continuing generally south approximately 2 miles to the proposed project area.

Preliminary evaluations indicate that the proposed quarry site contains various types of industrial non-metallic minerals including construction aggregate rock (limestone and quartzite) and decorative fieldstone (moss rock). The construction aggregates would be used for road base construction, concrete, asphalt and rip-rap for drainage control structures. The decorative fieldstone is rock covered with moss, algae, fungi, or lichen and would be used for landscaping purposes. Total surface disturbance at the quarry site would be limited to 10 acres or less. Due to the varying demand for the mined products and the varying depths of mineral deposit, it is difficult to determine the annual quantity of rock that would be mined. However, based on current demand, it is anticipated that the annual quantity of rock quarried would typically range from 80,000 cubic yards (yd^3) to 200,000 yd^3 (approximately 112,000 to 280,000 tons) per year. Mining operations could last up to 15 years.

2.1.2 General Quarry Operations

An entrance identification sign would be posted and maintained at the main entrance into the proposed HQPA. The sign would contain the name, address, and telephone number of the operator, the name of the local authorized agent, and the WDEQ/LQD permit number of the operation. Mining operations would be conducted in a manner intended to prevent or minimize endangerment to the public safety and human and animal life.

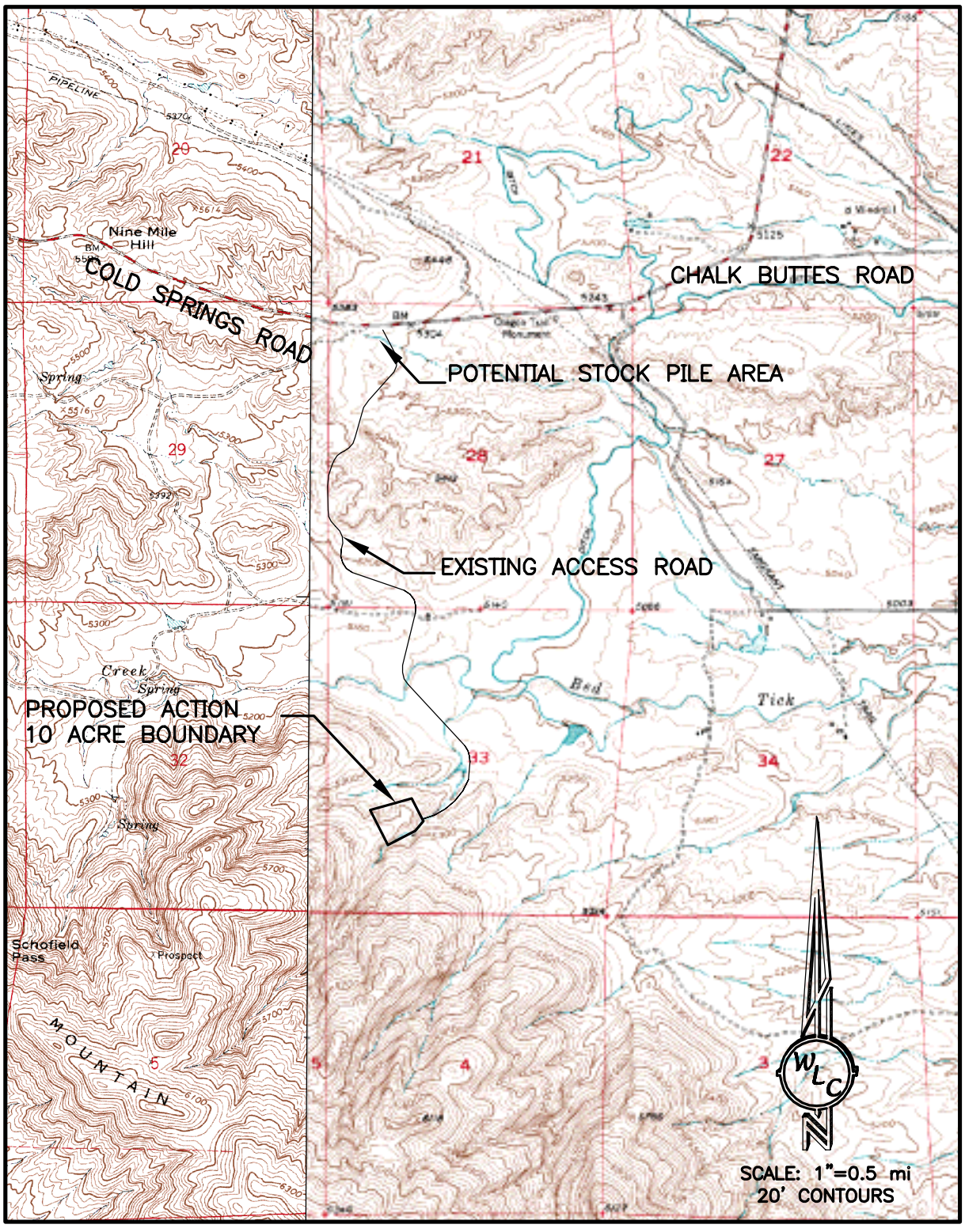


Figure 2.1 Map of the Proposed Project Area

Fencing would be installed in selected areas as needed to control or limit access to the quarry site to unauthorized personnel.

The typical hours of operation at the proposed Huxtable quarry would be Monday through Saturday from sunrise to sunset. Material demand may require operations in excess of these times for limited time periods.

Speed limits would be established in the quarry area and on the access road to promote safe conditions for the public and decrease potential encounters with grazing animals and wildlife. At the present time, it is anticipated that the maximum speed on the access road would be limited to 30 mi per hour due to the conditions in the area. All employees and contract haulers would be advised of the speed limit.

2.1.3 Access (Haul) Road Improvement

Prior to the commencement of mining operations, improvements to the privately owned access road would be initiated. The location of the access road is presented in Figure 2.2. These improvements would be required to facilitate equipment access to the proposed quarry area and to facilitate transportation of the quarried material off-site to market.

The access (haul) road would be designed and constructed to meet the standards of the anticipated traffic flow and all-weather requirements. Construction would include ditching, draining, graveling, crowning, and capping the roadbed as necessary to provide a well constructed and safe roadway. Prior to the commencement of construction, a *Road Construction Plan and Profile* would be prepared by a licensed professional engineer and submitted for BLM review and approval. Improvement/upgrading of the existing access road would reduce several sharp curves, minimize blind spots, widen narrow segments of the road, and provide a road suitable for its intended use. A total disturbed right-of-way (ROW) width of approximately 45 feet would be expected in conjunction with road construction/reconstruction activities.

The BLM would review *the Road Construction Plan and Profile* to ensure that the road conforms to appropriate engineering designs and specifications, including the placement of additional traffic control signs (e.g., speed, stop, truck traffic, and other signs). In addition, the WYDOT would ensure that road modifications at the intersection of the access road and Wyoming State Highway 91 conform to appropriate engineering designs and specifications. Improvements to the 1.2 miles of existing access road would result in approximately 6.6 acres of new (additional) surface disturbance. Reconstruction of the 0.8 miles of existing two-track trail would result in approximately 4.4 acres of new (additional) surface disturbance. Those areas not required for the active roadway (approximately 15 feet total) would be reclaimed and revegetated upon conclusion of road construction activities. Reclamation of these unneeded areas along either side of the active roadway would result in life of project (LOP) surface disturbance equal to approximately 7.4 acres attributable to the access (haul) road.

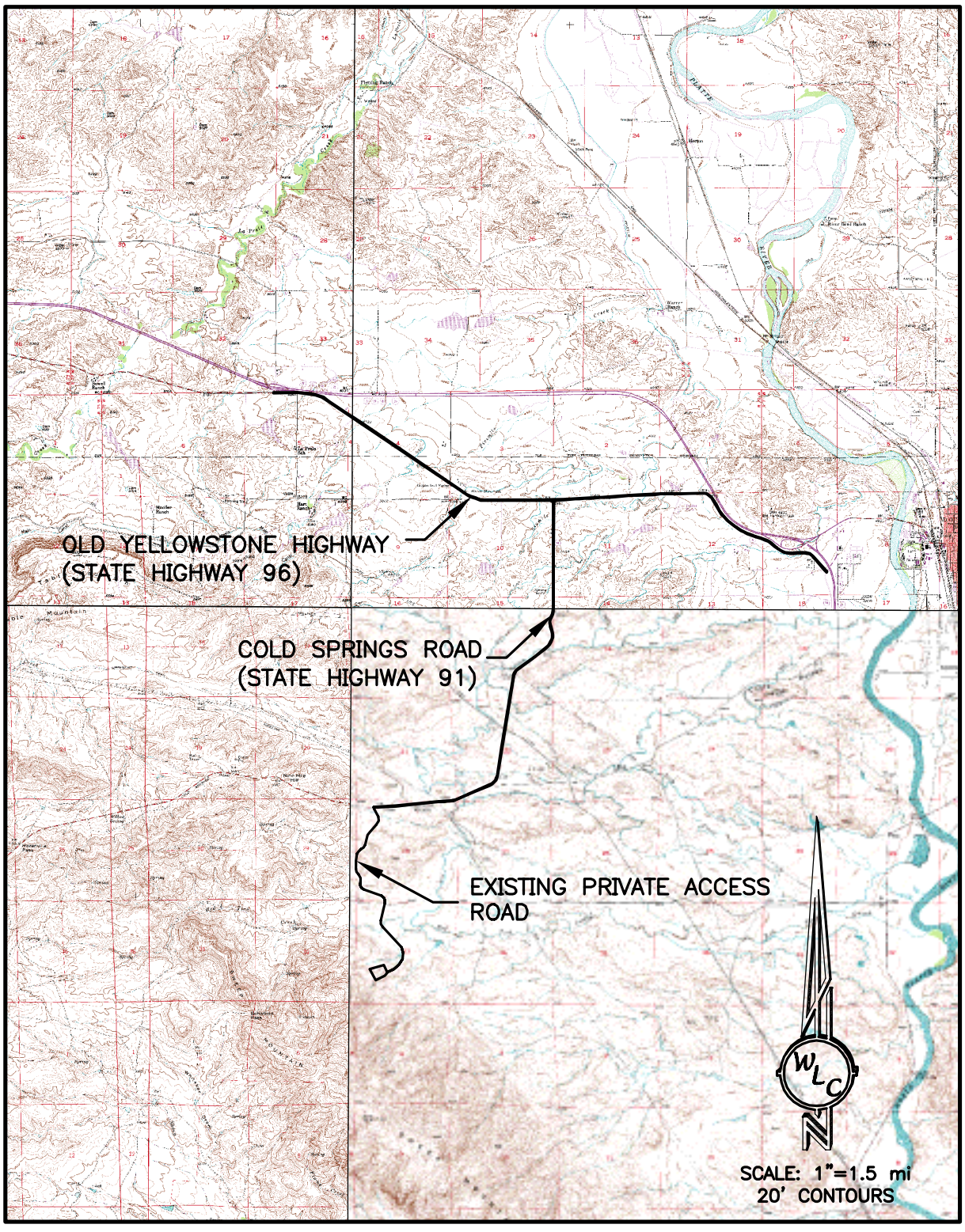


Figure 2.2 Location of Project Related Roads

2.1.4 Proposed Mining Operations

Mining activities would include the collection and removal of select surface rock for use in landscape applications, followed by topsoil salvage, drilling, blasting and excavation of mineral (rock) material. The mineral material would be processed on-site using portable crushers and screening units to segregate the product into its usable components. The final products would be loaded onto trucks and transported to various job locations or to off-site storage facilities. No permanent facilities (e.g., buildings, power lines, etc.) would be constructed at the quarry site. Temporary deployment of equipment, such as crushers and screening units, would be on an as-needed basis to facilitate rock processing prior to removal off-site.

Standard construction equipment would be used in the quarry operations. This equipment could include drill rigs, pickups, bulldozers, motor graders, crushers, screening units, water trucks, fuel trucks, front-end loaders, excavators and semi-trucks. The following standard mining practices and procedures would be employed at the proposed Huxtable quarry.

2.1.4.1 Topsoil Salvage and Storage

Topsoil in the HQPA is limited due to the very nature of the quarry site, which consists of exposed rock material. All available topsoil that can be accessed with standard surface mining equipment would be salvaged and stockpiled for permanent reclamation efforts. Equipment including (but not limited to) bulldozers, scrapers, and/or front-end loaders would be employed in topsoil salvage efforts. All available suitable plant growth material would also be salvaged and stockpiled separately for use in future reclamation.

Topsoil and subsoil salvage operations would comply with WDEQ/LQD rules regulations (WDEQ/LQD 2000).

All soil material that will be temporarily stockpiled for ten (10) months or longer would be signed and stabilized with vegetation. These soil stockpiles will be seeded with annual ryegrass (*Lolium multiflorum*) at a rate of ten pounds per acre.

2.1.4.2 Mineral Material Excavation

After all available topsoil has been salvaged from the mining area, the project proponent intends to excavate the rock with heavy equipment including (but not limited to) bulldozers, scrapers and/or front-end loaders. The excavated rock would be hauled by truck or front-end loader to on-site stockpiles or to a portable on-site crushing unit. Additional stockpiles of crushed mineral materials may be located at the intersection of Wyoming Highway 91 (Cold Springs Road) and the proposed quarry access (haul) road for winter use (NW¼NW¼ of Section 28, T32N, R72W). Prior to use of this area for stockpiling purposes, all available topsoil would be stripped from the stockpile area and the resulting topsoil stockpile would be reseeded as indicated above.

Blasting may be required in certain areas of the proposed quarry in order to fracture (break up) the rock for ease of handling. Small, portable drilling rigs would be used to drill holes into the rock in order to facilitate the placement of explosives. A typical mine drilling/blasting pattern is presented in Figure 2.3.

Upon completion of drilling operations, a procedure known as string blasting would be utilized to break the rock into manageable sizes for processing. String blasting is a mining technique which uses small, consecutive, time delayed blasts to fracture the rock and allow for the excavation of a desired amount of rock while minimizing the amount of fly rock. For a typical quarry with 15 foot hole spacing, the initial movement at the free face may occur in 10 to 12 milliseconds, but the burden only moves about 0.5 feet in 10 milliseconds. With one or two rows of holes the primary direction of rock movement is horizontal. As more rows are added the amount of possible fly rock is increased with every row added as shown in Figure 2.4 (duPont 1977). Many different types of explosive charges can be used for limestone quarries. The typical explosive charge range for limestone is 0.4 to 1.00 lb of explosive per yard of rock (Merritt et al. 2004).

Licensed personnel trained in the use of explosives would perform blasting operations within the quarry once or twice per year as needed. All blasters would be certified in the State of Wyoming, and all blasting operations would be performed in compliance with federal and state regulations. No explosives would be permanently stored within the quarry site. Any explosives temporarily stored in the area would comply with federal, state and local regulations. Blasting operations would be conducted in accordance with WDEQ/LQD and the use, handling and temporary storage of explosives would comply with the Bureau of Alcohol, Tobacco, and Firearms (BATF) rules and regulations pertaining thereto. The blasted rock would be hauled by truck or front-end loader to on-site stockpiles or to a portable on-site crushing unit.

In general, the following blasting procedures would be utilized in conjunction with the use of explosives in the proposed Huxtable quarry:

- The blaster in charge would ensure that personnel and equipment are a safe distance from the area prior to blasting. Guards would be posted at the entrance to the quarry area and north of the project area along the access road. These guards would prevent entry to the blast area. Immediately following all blasts, guards would be notified by radio that the blast area is clear and the quarry area is safe to re-enter.

- Audible warnings would be sounded prior to blasting.

- Blasting warning signs would be posted as required, with notices of 5 minutes, 1 minute, and all clear.

- Non-electric initiation systems would be used.

- Explosives would consist of primers and ammonium nitrate/fuel oil.

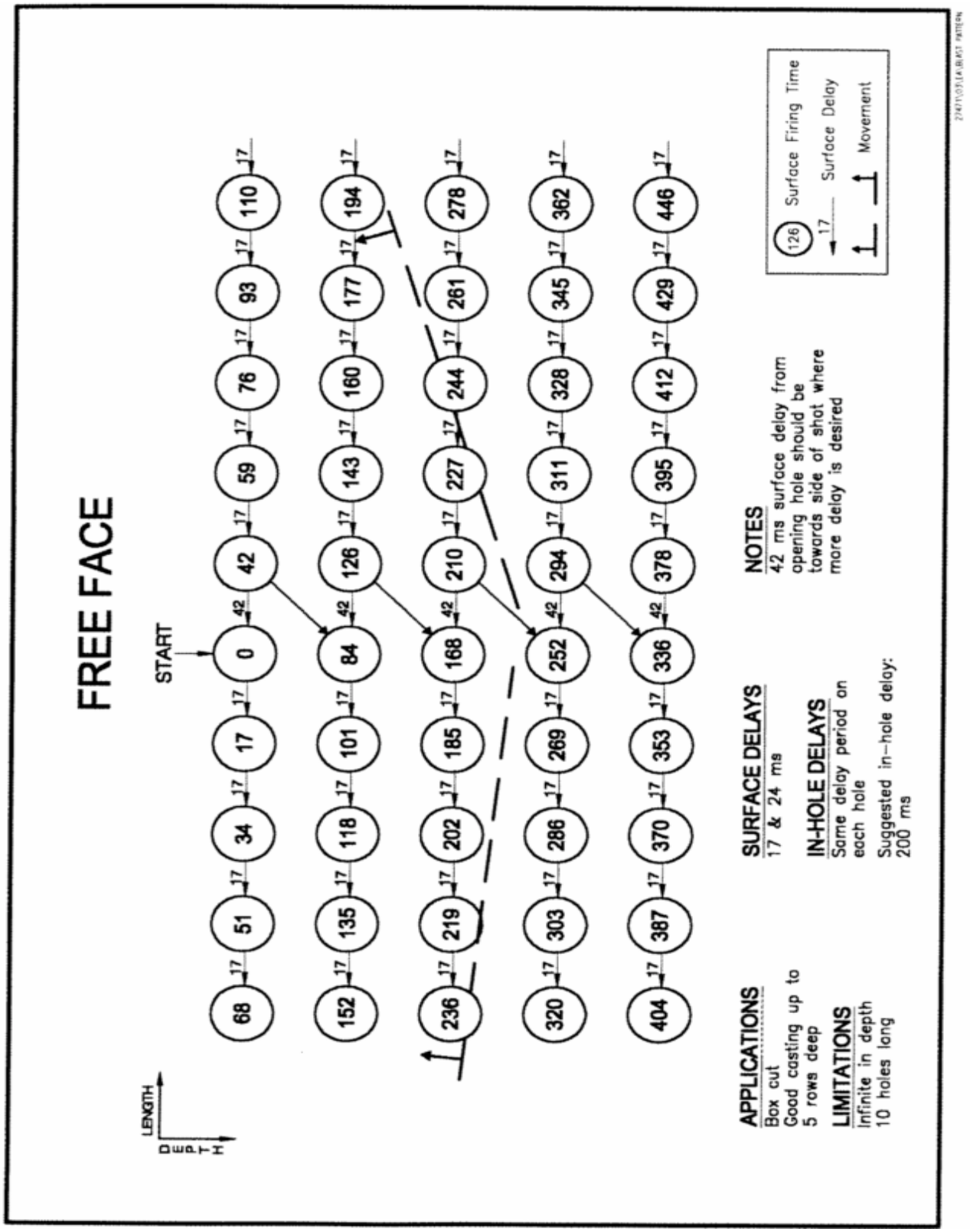


Figure 2.3 Typical Drilling/Blasting Pattern

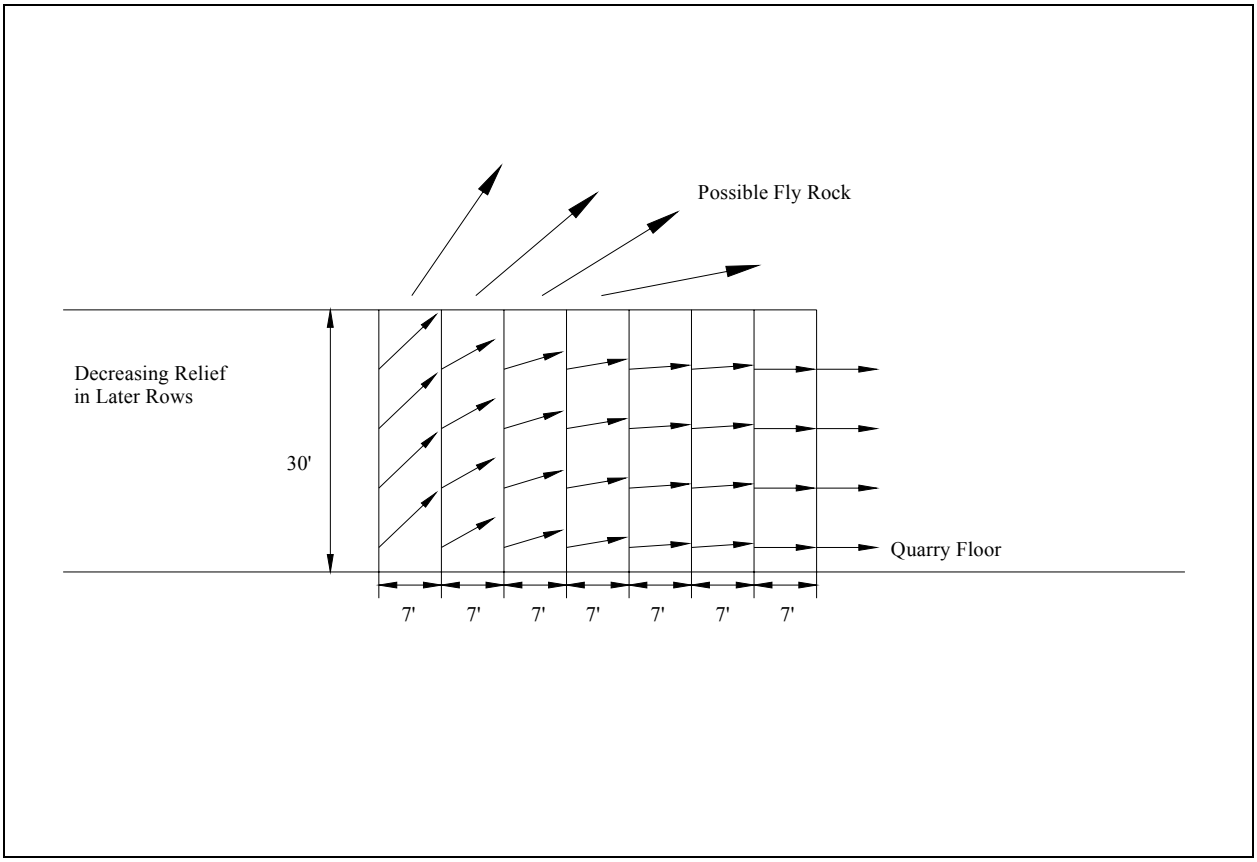


Figure 2.4 Effects of String Blasting

- All explosives and detonators would be handled in accordance with the manufacturer's instructions.

- Timing of blasts would be by non-electric delays.

- All blasts would be designed to minimize fly-rock. Hole direction and spacing, delay sequence, and explosive weight per delay would all be considered. When necessary, overburden or earth cover would be utilized as required to prevent unacceptable fly-rock.

- All blasts would be conducted only during daylight hours between sunrise and sunset except under emergency conditions.

- After a blast, the blaster would perform an inspection to determine whether all charges have detonated before any persons are allowed to return to the area. Misfires would be handled in accordance with the requirements of the applicable portions of federal, state, and local safety codes for blasting.

- A blasting notice would be published annually in the Douglas newspaper.

2.1.4.3 Mineral Material Processing and Loading

At the commencement of mining, a suitable area within the proposed project area (within or directly adjacent to the proposed quarry) would be stripped of topsoil so that the site can be used for processing and stockpiling the quarried product. As mining continues and additional area becomes available, the process area would be moved into previously mined areas within the actual quarry. These sites would be graded to provide a suitable working surface for processing-related activities. Leveling could include plating with reject material to maintain a level working surface and to minimize erosion. The locations of the proposed stockpiles and the location of the crusher can be seen in Figure 2.5.

After mining operations progress, the excavated rock would be hauled either by truck or front-end loader to a material stockpile or to a portable on-site crushing unit. Crushing would be conducted to process the rock to meet material size requirements. The crushed material would be processed through a screening unit to separate the various sizes of rock. Separate stockpiles would be established for each usable rock size. As process rock is needed, a front-end loader would be used to load trucks from the appropriate stockpiles for transport off-site.

Material washing during processing activities at the site is not anticipated. Approximately 4,200 gallons of water per day (GWPD) would be used to control fugitive dust from crushing equipment and the quarry access/haul roads. The proposed water source would be the Huxtable #2 water well located in the NW¼NW¼ of Section 33, Township 32 North, Range 72 West. The subject water well is owned and operated by the project proponent under an existing ground water appropriation for stock watering purposes issued by the office of the Wyoming State Engineer (permit number P80219W).

2.1.4.4 Reject Materials

Some unmarketable mineral material would be produced as the quarried rock is crushed and sorted. These reject materials typically would be composed of fine-grained to pebbly materials that would not meet contract specifications. These reject materials would be used to surface both the access (haul) road and work areas as needed to provide for all-weather accessibility while minimizing the potential for erosion. Reject materials not required for surfacing of the access (haul) road and work areas within the quarry would be stockpiled for future use in reclamation operations.

2.1.4.5 Projected Mineral Material Production

As indicated in Section 2.1.1, the estimated annual production of quarried mineral materials would be expected to range somewhere between 112,000 to 280,000 tons per year (TPY) based entirely upon demand and availability. Fluctuations in annual demand would dictate the actual amount of mineral materials to be mined and sold in any given year.

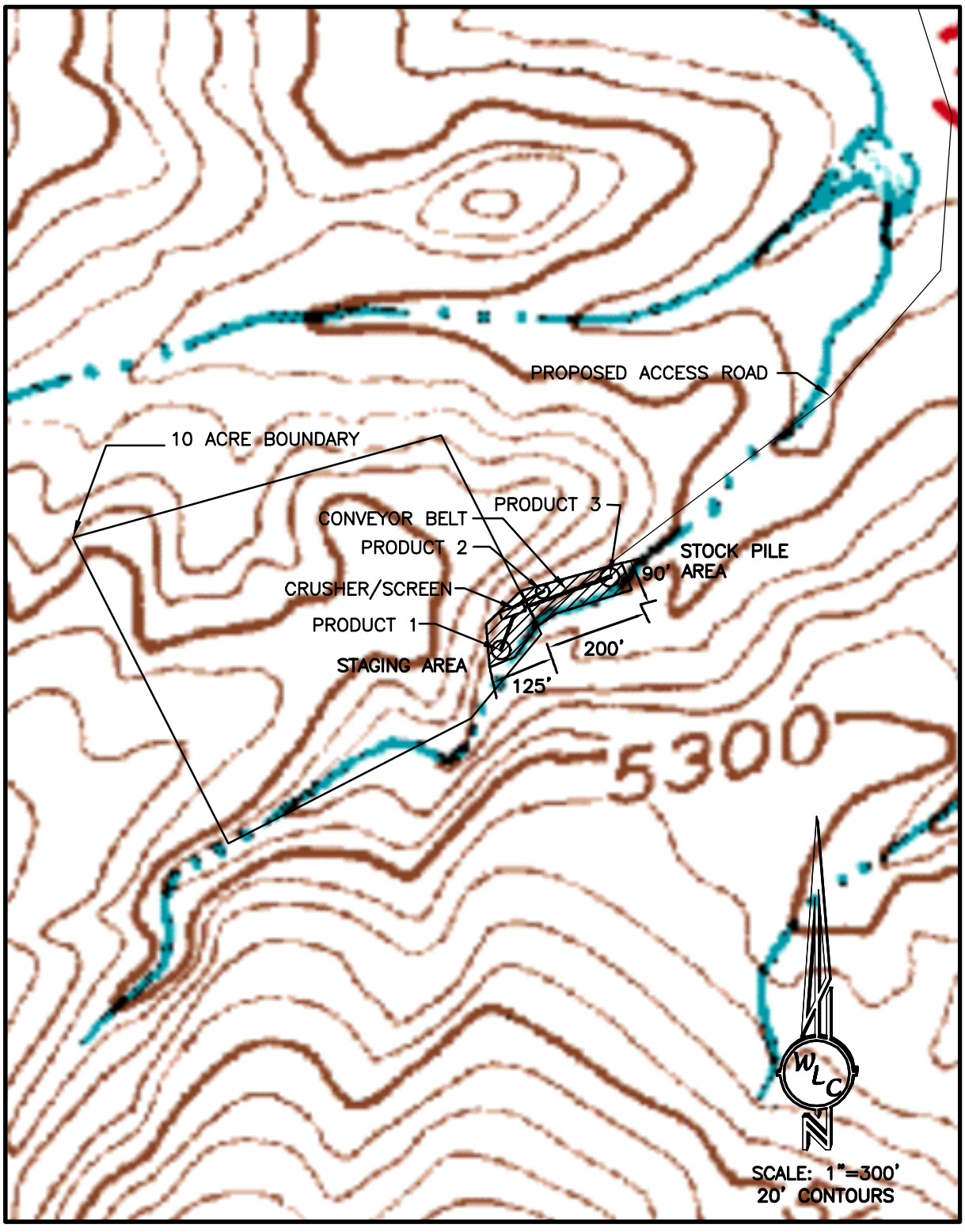


Figure 2.5 Material Stockpiles and Crusher Locations

As coring has not been conducted within the quarry area, estimates of mineral deposits are based solely upon a surface inspection of the proposed quarry area. In this regard, volumetric estimates of the quantity of mineral materials available in the 10-acre quarry site would suggest that approximately 1.2 million tons of rock could be quarried by the proposed mining operation from the 10-acre quarry site.

Mining operations conducted at a rate of approximately 80,000 yd^3 (112,000 tons) of mineral material per year would result in a quarry life of approximately 15 years. As the demand for mined mineral materials increases, mining activities would accelerate and the life of the quarry would be diminished incrementally. Mining operations conducted at the rate of 200,000 yd^3 (280,000 tons) per year would reduce the life of the quarry to approximately 52 months (4.28 years).

2.1.4.6 Transportation of Salable Mineral Materials

The crushed product would be loaded into highway haul (tractor-trailer) trucks and weighed for transportation off-site. Typically, each tractor-trailer would have a total capacity of approximately 35 tons and would be made up of a tractor unit, an articulated belly-dump trailer with an average load capacity of 20 tons, and a detachable rear-dump trailer (pup) with an average load capacity of 15 tons.

Product loading would be controlled to prevent overfilling and to ensure that material does not fall out of the trailers during transportation. Once the product has been loaded, each truck would exit the quarry area, turn north onto the access (haul) road and exit the project area onto Wyoming State Highway 91. All trucks would be properly licensed, permitted, and maintained, and all truck drivers would be properly trained and licensed by WDOT for the specific vehicle each driver would be operating.

Product transportation requirements would depend solely upon product sales. Table 2.1 provides information concerning the projected amount of truck traffic necessary to move varying annual quantities of the mined mineral material to market, with these estimates based upon a 12-hour work day, working six days a week (excluding holidays), and hauling 35 tons of mineral material per load. The trucking estimates provided in Table 2.1 reflect hauling activity during the 169 days per year of projected quarry operation, as well as year-round hauling operations from the proposed stockpile to be located directly adjacent to Wyoming Highway 91 (see Figure 2.1). Hauling from the off-site stockpile would allow product sales for an additional 138 days per year, depending upon product demand and weather conditions. As with the 169 day period of operations, the additional 138 days would not include Sundays or holidays.

The actual number of truck trips/day would depend upon a number of variable factors including product sales, number and type of trucks available, duration of the work season, project where the materials are required, and the distance to/from the final product destination. As indicated above, utilization of the off-site stockpile would facilitate material sales during the remaining 5.5 month period between November 15 and April 30 in any given year, thereby decreasing the required number of trips per day to move the total amount of mineral materials projected to be mined on an annual basis.

Table 2.1 Projected Transportation Needs for Product Sales [1]

Quarry Production in Tons per Year	Tons Moved per Day [2]		Number of Trucks [3]			
			169 Days/Year		307 Days/Year	
	169 Days	307 Days	Per Day	Per Hour	Per Day	Per Hour
112,000	662.72	364.82	19	1.58	11	0.92
154,000	911.24	501.63	27	2.25	15	1.25
196,000	1,159.76	638.44	34	2.83	19	1.58
238,000	1,408.28	775.24	41	3.42	23	1.92
280,000	1,656.81	912.05	48	4.00	27	2.25

1 Quarry production projected in 42,000 ton increments from the estimated minimum of 112,000 tons per year.

2 Calculated based upon an average load factor of 35 tons per truck.

3 The number of trucks per day has been rounded up to the next whole number.

2.1.4.7 Dust Abatement

As indicated in Section 2.1.4.3, approximately 4,200 GWPD would be used to control fugitive dust from crushing equipment and the quarry access/haul roads would be used daily.

Reject limestone materials used for surfacing of the access (haul) road would be combined with bentonite, a naturally occurring sodium montmorillonite clay, at a rate equal to approximately eight percent (by weight) of the reject (aggregate) surfacing material. Studies conducted at Iowa State University indicate that bentonite has several benefits over the most commonly used dust control products, calcium chloride and lignin sulfonate, which are only effective so long as they remain on the road surface. Blading of the road surface to correct potholes and/or wash boarding minimizes the effects of these two chemical products. The effectiveness of bentonite is not reduced by grading or other maintenance activities as the bentonite adheres to the pieces of aggregate material through an electrical bonding process. As a result, bentonite's bonding properties survive alternating wet and dry years, as well as the freeze-thaw cycle in northern climates. One application of bentonite reduces dust by 60 to 70 percent in the fist year, 50 to 60 percent in the second year, and 30 to 40 percent the third year. These results compare very favorably to the normal three-month total period of effectiveness for calcium chloride. Moreover, bentonite is an environmentally friendly dust control product in that it is a naturally occurring mineral containing no salt and poses no danger to the environment (U.S. Roads 2005). The application of bentonite to the limestone aggregate used for surfacing of the access road, combined with routine maintenance and watering as needed should reduce fugitive dust from the road for extended periods of time as indicated above.

2.1.4.8 Erosion Control

Storm water runoff from the quarry site would be controlled using best management practices (BMPs) and alternative sediment control measures as describe below. Common techniques that may be employed would include (but would not be limited to) the use of sediment fences or matting, the use of rip-rap or other erosion resistant material, and the use of existing sediment ponds (as described below) - as well as the prompt seeding of topsoil and subsoil stockpiles (WDEQ/LQD 1994). Surface disturbing activities within the proposed HQPA would comply with applicable provisions of the *Clean Water Act.* In this regard, the project proponent would prepare a Storm Water Pollution Prevention Plan (SWPPP) in accordance with WDEQ/WQD rules and regulations which outlines those measures to be used to control off-site erosion and sedimentation.

Erosion control measures established during the mining process would remain in place until the plant growth on reclaimed areas is adequate to provide stabilization in the area. Reclamation areas would be monitored, and erosion control measures would be supplemented if conditions warrant.

There are two existing stock-water ponds directly down stream (400 and 700 feet respectively) from the proposed quarry site that would be used for sediment containment. These two ponds would act as stilling basins for surface water runoff originating from the quarry site and would effectively trap any entrained sediments thereby preventing these sediments from reaching Bed Tick Creek.

2.1.4.9 HQPA Reclamation Practices and Procedures

The post-mine land use would continue to be livestock grazing and wildlife habitat to the extent possible. However, the landowner has plans to develop ranching structures and/or a homestead and the access (haul) road would remain for continued ranching operations.

Reclamation of the HQPA would comply with WDEQ/LQD reclamation standards (WDEQ/LQD 2000) for small mining operations and would include the following practices and procedures. Reclamation would commence as soon as practical after initial disturbance. However, some disturbed areas within the active quarry area may not be available for reclamation due to access needs and continued mining activities in the area. Once these areas are no longer needed for mine-related activities, they would be reclaimed as indicated below.
Newly reclaimed areas within the quarry may be fenced to exclude livestock and facilitate seedling establishment.

Access (Haul) Road Reclamation. As discussed above, the access (haul) road will remain post-mine for continued use by the project proponent. Reclamation activities will be performed subsequent to road construction/reconstruction and would consists of replacing stripped topsoil on the outslope areas of the access road and reseeding as indicated below. Approximately 15 feet of the total disturbed ROW would be reclaimed subsequent to road construction or reconstruction activities.

Quarry Backfilling and Recontouring. The objective of backfilling and recontouring would be to blend the disturbed area(s) within the HQPA with the surrounding undisturbed topography to the extent practicable. These reclamation activities would reduce the visual impact of the disturbed areas and promote the restoration of the overall project area to pre-mine uses. No ponds or impoundments would be constructed in the reclaimed landscape.

Due to the general lack of sufficient backfill material for use during reclamation, remnant high walls would be a component of the post-mine topography. Current projections indicate that these remnant high walls could be up to 100 ft high. Stabilization of the high walls and blending with the surrounding terrain would be accomplished using a variety of techniques:

- High walls less than 40 feet in height would typically be left in place, with rubble or reject material placed at the base of the high wall to promote stability and break-up the visual contrast.

- High walls exceeding 40 feet in height would be terraced or benched to ensure stability with blasting and/or grading employed as necessary to install these features in those high walls exceeding 40 feet in overall height. Installation of terraces or benches at regular intervals on high walls exceeding 40 feet in height would promote high wall stability, increase topographic diversity, enhance wildlife habitat, and assist in blending the remnant high walls with the surrounding terrain. Remnant high walls } 40 feet in height would comply with WDEQ/LQD rules and regulations pertaining thereto.

Reclamation of the quarried area will be accomplished as indicated above to the extent practical or possible. Revegetation of the rock quarry itself will be difficult and it is expected that the exposed rock in the quarry high walls would not be reclaimed to pre-disturbance levels of vegetative production and/or diversity.

Stockpiled unmarketable material would be spread on the more level areas within the disturbance area or at the base of the high walls. This material may also be selectively placed in mounds in the disturbed area to create a diverse topography. Clean fill material consisting of uncontaminated natural soil may also be imported from off-site sources to aid in the reclamation process. All backfilling and recontouring operations would comply with applicable WDEQ/LQD regulations.

Soil Placement and Seedbed Preparation. As previously stated, a shortage of suitable plant growth material may exist for reclamation of the mined areas. Salvaged topsoil and acceptable subsoil and/or overburden would be selectively placed in the area to encourage diversity of plant communities, to promote successful reclamation, and to blend with the surrounding topography. Areas where standard farming techniques may be safely employed would be prepared for seeding by scarifying as needed to break up any compacted surfaces. The soil would then be disked as needed to promote an adequate seedbed.

Reseeding. Upon conclusion of recontouring and subsequent seedbed preparation, all disturbed areas suitable for plant growth would be seeded using the seed mixture recommended in Table 2.1, below. Where feasible, seed would be drilled on the contour with a seed drill equipped with a depth regulator in order to ensure even depths of planting. Seed would be planted between

one-quarter (1/4) to one-half (1/2) inches deep except as noted in Table 2.2. For those areas too steep or rocky to permit drilling, seed would be broadcast (either by hand or mechanically) using double the recommended seeding rate contained in Table 2.2. Where the seed is broadcast, some method of seed incorporation would be used (i.e., raking, dragging with a chain, harrow or equivalent procedure) to ensure that the seed is worked into the soil material.

Hydro-seeding may be used as an alternative to drilling or broadcasting the seed.

Mulching. Mulch will be used to facilitate reclamation (reseeding) success and to control erosion on reclaimed (recontoured) areas within the HQPA. Two methods of mulching may be used during reclamation activities as follows:

- Certified weed-free straw may be blown onto the area at the rate of 3 tons per acre and crimped in place; or

- A standing stubble mulch consisting of oats, barley, wheat, millet, or similar nursery crop may also be used. Planting rates of the standing mulch would be 20 to 30 pounds per acre.

Soil Amendments. Livestock manure would be added to the topsoil to improve plant growth in areas designated as grazing land. Reclamation of high wall area would not involve the use of a manure soil amendment.

Control of Invasive Non-Native Species. Designated or prohibited weed species on lands within the HQPA would be controlled through implementation of the following procedures.

- Land disturbance would be kept to a minimum during the mining process.

- All disturbed surfaces including topsoil and subsoil stockpiles would be seeded as soon as possible following the initial disturbance as indicated above to limit the potential for invasion by non-native weed species.

- Chemical herbicides may be used to control invasive non-native species within the HQPA. The local weed and pest agency would be contacted, and the problem would be addressed in compliance with appropriate federal, state and local regulations pertaining to the application of chemical herbicides.

Monitoring and Maintenance. The reclaimed areas would be monitored on an annual basis by the project proponent, BLM and WDEQ/LQD to assess the adequacy of the continuing reclamation effort. Erosional features would be monitored and the appropriate corrective action instituted as warranted with additional erosion control features employed as needed. Measures to control infestations of invasive non-native species would remain in place during all phases of the mining and reclamation process.

Table 2.2 Proposed Seed Mixture

Common Name	Cultivars	Scientific Name	Pounds PLS/Acre [1]
Bluebunch wheatgrass	Goldar	*Pseudoroegneria spicata spicata*	3.0
Sandberg bluegrass	Common	*Poa sandbergii*	1.0
Needle-and-thread grass	Common	*Stipa comata*	1.0
Indian ricegrass	Nezpar	*Oryzopis hymenoides*	2.0
Sheep fescue	Durar	*Festuca ovina*	2.0
Alfalfa	Falcata	*Vicia villosa*	2.0
Winterfat [2]	Open Range	*Eurotia lanata*	1.0
Common serviceberry	Common	*Amelanchier alnifolia*	0.5
Common snowberry	Common	*Symphoricarpos albus*	0.5

1 Pounds of Pure Live Seed (PLS) per Acre

2 Winter fat should be hand broadcast or dribbled over the disturbed area – DO NOT DRILL

2.1.5 Fuel Storage, Waste Generation and Disposal

Fuel Storage. At this time, there are no plans for long-term fuel storage within overall project area. Mobile fuel trucks would be used to service and fuel the heavy equipment operating in the HQPA. Should fuel storage become necessary at some point in the future, the storage area would be constructed and operated in accordance with all applicable state and federal rules and regulations pertaining to the on-site storage thereof.

Fuel tanks would not be stored at the proposed quarry site. Any fuel storage tanks required for quarrying operations will be located at or near the proposed off-site stockpile area adjacent to Wyoming Highway 91 (see Figure 2.1). Fuel storage would be in full accordance with MSHA and OSHA standards and regulations including (but not limited to) the installation of impervious berms around all storage tanks and lining these bermed storage areas with an impervious liner to prevent the percolation of hydrocarbons into the ground water aquifer.

Waste Generation and Disposal. Portable, self-contained chemical toilets would be provided for human waste disposal. The toilet holding tanks will be pumped on an as-needed basis and the contents thereof disposed of in a WDEQ-approved sewage disposal facility. Solid wastes including garbage will be collected in a self contained, portable dumpster or trash cage on site. The accumulated trash will be hauled off-site to a WDEQ approved sanitary landfill as-needed. Solid wastes (trash, garbage, scrap, etc.) would not be imported to or disposed of in the HQPA.

Spills of petroleum products may occur during mining operations due to periodic equipment maintenance and/or accidents. Soils contaminated with petroleum products (e.g., oil, grease, fuel spills, etc.) would be cleaned up and disposed of in accordance with WDEQ rules and

regulations. Contaminated soils would be disposed of in an approved off-site facility capable of accepting such waste.

Acid-forming or toxic materials are not expected to be encountered during quarry operations and exposure of the underlying rock substrate would not facilitate the formation of potentially toxic or hazardous compounds or effluent.

2.2 ALTERNATIVE A: 40 ACRE QUARRY

2.2.1 Description of the Proposed Mining Area

The potential exists to enlarge the proposed Huxtable quarry from 10-acres to 40-acres overall. As with the Proposed Action, Alternative A would be located in portions of the SW¼ of Section 33, Township 32 North, Range 72 West, along the northeastern flank of Sheep Mountain and would expand the proposed quarry to approximately 40 acres in size (refer to Figure 2.6). Under Alternative A, the disturbance would be identical to the Proposed Action plus an additional 30 acres at the actual quarry site. The type of material to be mined and the estimated annual production would be identical to that presented under the Proposed Action.

Volumetric estimates of the quantity of mineral materials available in the 40-acre quarry site would suggest that approximately 5.7 million tons of rock could be quarried by the proposed mining operation from the 40-acre quarry site. As discussed in Section 2.1.4.5, mining operations conducted at a rate of approximately 80,000 yd^3 (112,000 tons) of mineral material per year would result in a quarry life of approximately 71 years. However, as the demand for mined mineral materials increases, mining activities would accelerate and the life of the quarry would be diminished incrementally. Mining operations conducted at the rate of 200,000 yd^3 (280,000 tons) per year would reduce the life of the quarry to approximately 20 years. For the purposes of this analysis, we will assume that the projected life of the quarry would be 30 years, which would allow for reasonable fluctuations in mining activity based upon demand, yet would still allow for the mineral resources therein to be exhausted by the end of the 30-yaer period.

2.2.2 Description of Mining Operations

Mining operations for Alternative A would be identical to those presented under the Proposed Action.

2.2.3 Description of Reclamation Operations

Reclamation operations for Alternative A would be identical to those presented under the Proposed Action.

2.3 THE NO ACTION ALTERNATIVE

Under the No Action Alternative, mining operations within the project area would not be authorized or approved. No surface disturbance would occur, and no impacts to the existing physical or biological environment would take place. However, a continuing demand for industrial non-metallic minerals would eventually necessitate alternative quarry locations in the Douglas area.

The analysis of a No Action Alternative provides a benchmark, enabling decision-makers to compare the magnitude of environmental effects of each action alternative. Under the No Action Alternative, the BLM would deny the request to sell industrial non-metallic minerals located on federal mineral estate within the HQPA, while allowing existing land uses on the private surface estate to continue.

2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

2.4.1 40-Acre Quarry Located on Private Surface/Mineral Estate

As shown in Figure 2.7, the 10 acre quarry project was initially proposed in the NW¼ of Section 28, Township 32 North, Range 72 West on private surface and minerals. The rock quality at this location was deemed to be inadequate for most construction applications. This alternative quarry site would have been readily visible from Wyoming Highway 91 (Cold Springs Road) and would have dramatically altered the existing landscape, causing a potentially high impact to scenic values in the area. As a result, this alternative was not considered for further analysis.

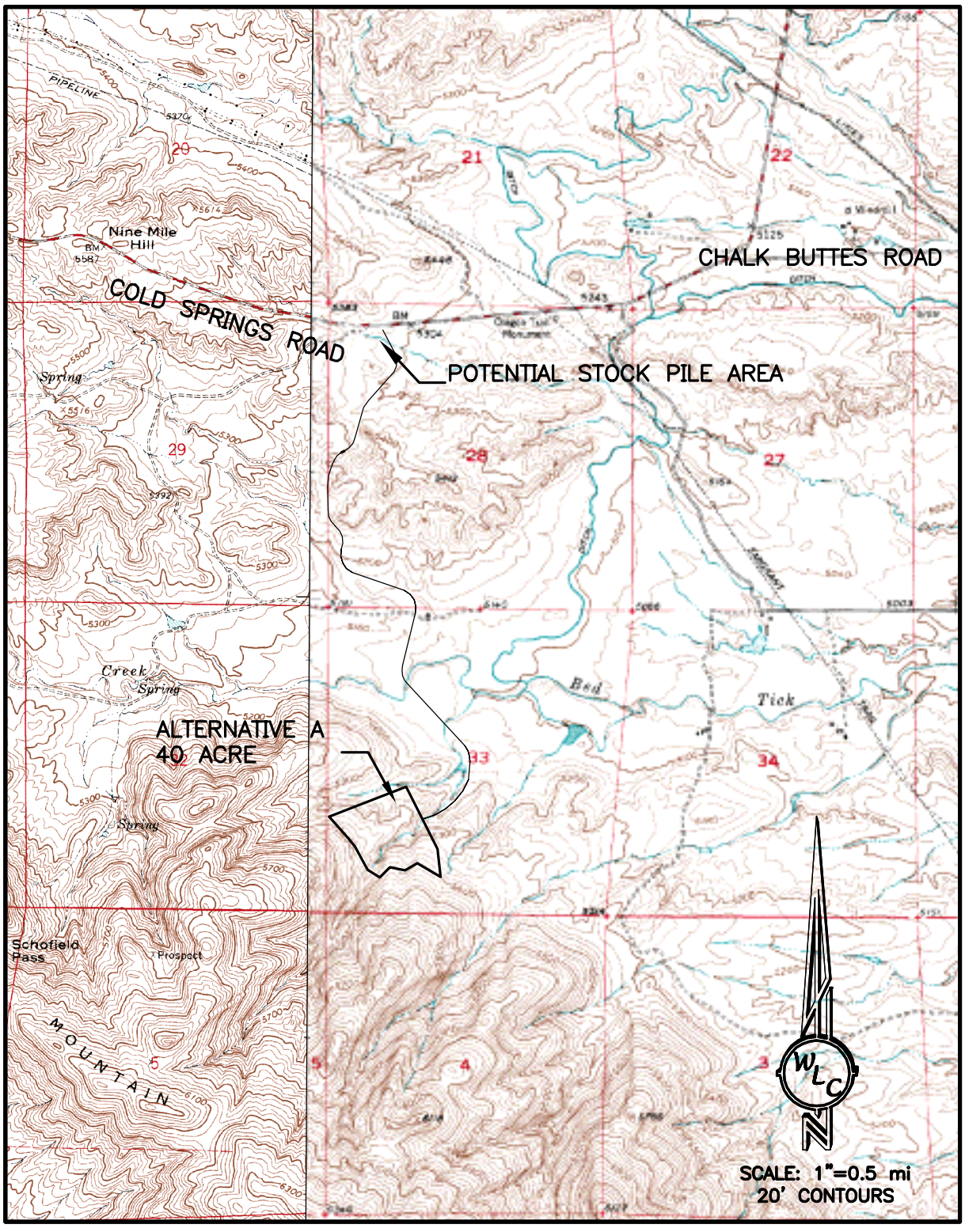


Figure 2.6 Alternative A: Proposed 40 Acre Quarry Site

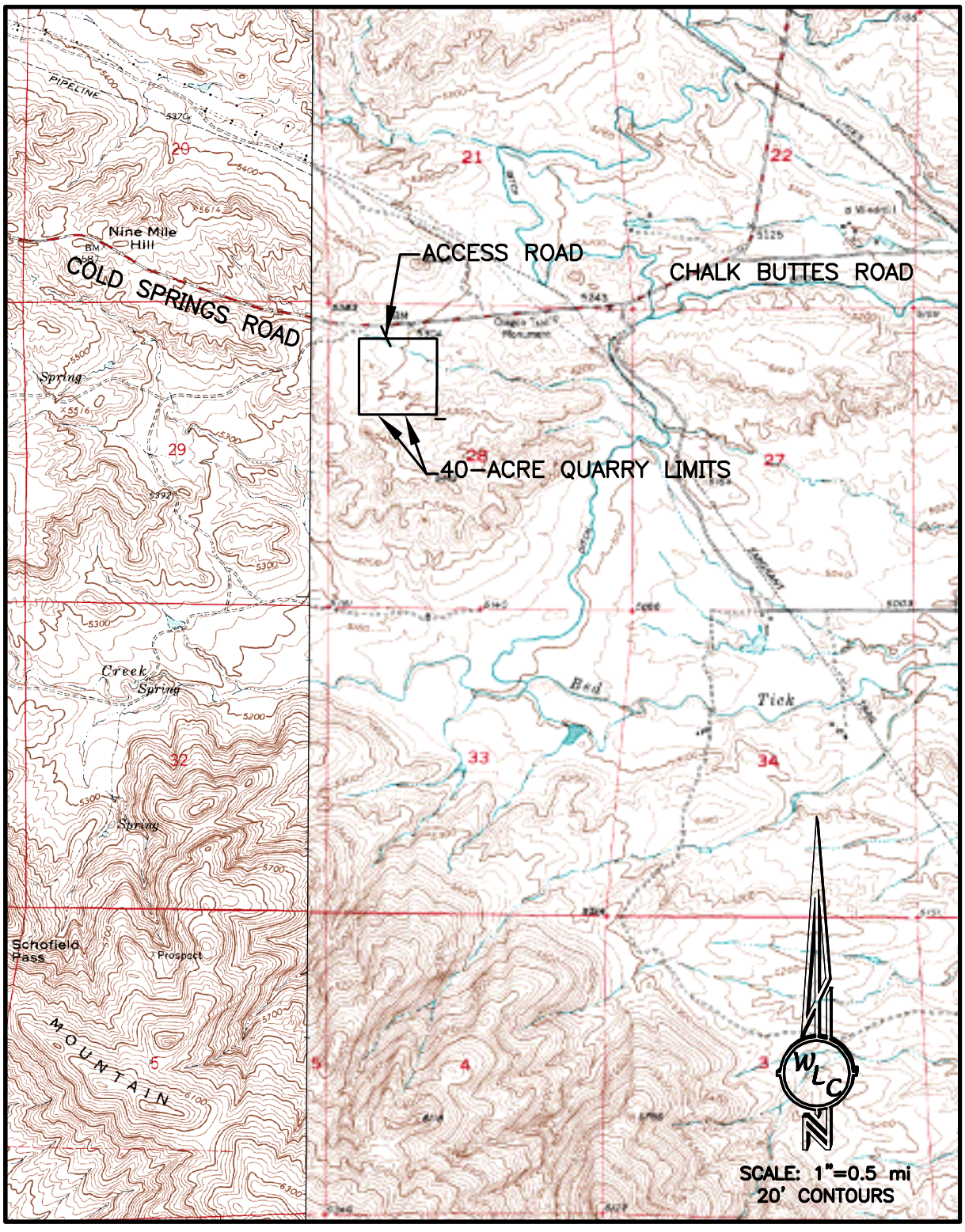


Figure 2.7 Alternative Quarry Site Not Analyzed in Detail

3.0 AFFECTED ENVIRONMENT

3.1 LOCATION, SETTING AND HISTORICAL USE

The Huxtable Quarry Project Area (HQPA) is located at the northeast end of Sheep Mountain, approximately 6 miles southwest of Douglas in south-central Converse County, Wyoming (refer to Figure 2.1). Topography ranges from steep rugged rock outcrops to relatively gentle slopes toward the northeast. Elevations within the proposed HQPA range from approximately 5,200 to 5,400 feet above mean sea level (AMSL). The proposed quarry would be located several hundred feet below the crest of Sheep Mountain and would not be visible from the west side of Sheep Mountain, which reaches an elevation of 6,230 feet (+/-) approximately 1.25 miles south of the proposed project area.

The HQPA lies within the foothills transition area in the Wyoming Basin physiographic province along the northern flank of the Laramie Mountain range (Knight 1994). The proposed project area is located within the Platte River drainage system (Blackstone 1988).

Record high and low temperatures are approximately 105∀F and -32∀F, respectively. Summer temperatures range widely, typically with warm sunny days and cool nights. In and around Douglas, the mid-day summer temperatures reach 90∀F about 27 days each year. During winter nights, temperatures fall to 0∀F about 20 times per year. On average, there are approximately 100 to 120 frost-free days per year in the central part of Converse County. At the higher elevations in the Laramie Range, these figures drop to approximately 60 to 100 frost-free days per year. The proposed project area receives approximately 12 to 15 inches of precipitation per year and the prevailing winds are from the southwest (Martner 1986, Curtis and Grimes 2004).

The HQPA has historically been utilized for livestock grazing, wildlife habitat and recreation. This area provides limited summer and fall grazing for cattle, sheep and horses. However, stocking rates are low due to the rugged terrain and relatively sparse vegetation (SCS 1988).

3.2 CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT

Critical elements of the human environment as defined by the BLM (1988a), their status in the proposed project area, and their potential to be affected by the Proposed Action or alternatives are presented in Table 3.1. A review of the Proposed Action and possible alternatives has determined that nine of the 13 critical elements of the human environment are not present in the HQPA, are not affected by the Proposed Action or alternatives, and therefore are not discussed further. Four critical elements (air quality, cultural resources, threatened and endangered species, and water quality) are present in the proposed project area, may be affected by the Proposed Action or alternatives, and are discussed in detail in this EA.

Table 3.1 Critical Elements of the Human Environment [1]

Element	Status	Analyzed in Detail in This EA
Air quality	Potentially affected	Yes
Areas of critical environmental concern	Not present	No
Cultural resources	Potentially affected	Yes
Environmental justice related issues	Not present	No
Farmlands (prime or unique)	Not present	No
Floodplains	Not present	No
Invasive, nonnative species (noxious weeds)	Potentially affected	Yes
Native American religious concerns	Not present	No
Threatened and endangered species	Potentially affected	Yes
Wastes (hazardous and solid)	Potentially affected	Yes
Water quality	Potentially affected	Yes
Wetlands/riparian areas	Not present	No
Wild and scenic rivers	Not present	No
Wilderness (wilderness study areas and wilderness areas)	Not present	No

[1] From the BLM NEPA Handbook H-1790-1 (BLM 1988a, 1999a).

Based on comments received from the public during a BLM-sponsored open house for the proposed Huxtable Mineral Materials Project held in Douglas, Wyoming on April 20, 2004, and additional comments received on the project proposal, this EA will also analyze potential impacts of the Proposed Action and alternatives on mineral resources, noise, recreation, socioeconomics, soil resources, transportation, vegetation, visual resources and wildlife. A determination has been made that other resource values (e.g., water rights, wild horses, land ownership patterns, land status, etc.) will not be affected by the Proposed Action or alternatives. As a consequence, these resources will not be analyzed in detail in this EA.

3.3 ENVIRONMENTAL ELEMENTS CONSIDERED WITH MINOR EFFECTS

The following resources would not be adversely affected by implementation of the Proposed Action or alternatives. Consequently, these resources will also not be addressed in this chapter or in Chapter 4.0 (Environmental Consequences) to follow.

- Fisheries - there are no perennial streams in or directly adjacent to the HQPA; consequently, there are no fisheries that could/would be affected by the Proposed Action.

- Range Resources - the proposed HQPA is situated entirely upon private surface estate owned by the proponent, Mr. James Huxtable. As there are no federal lands in the general vicinity

of the HQPA, it would be difficult to provide accurate calculations regarding existing Animal Unit Months (AUMs) available in the project area for livestock grazing purposes and/or the loss thereof attributable to the proposed action. Considering that Mr. Huxtable owns the surface to be impacted by the proposed rock quarry, it is reasonable to assume that he is fully aware of any potential conflicts with his own ranching operation, including the potential loss of grazing and/or impacts to existing agricultural improvements such as fences. The quarry site itself is situated on a rocky ridge with little value for livestock grazing purposes and the majority of the access road has already been constructed. As indicated above, the proposed project area provides limited summer and fall grazing for cattle, sheep and horses; however, stocking rates are low due to the rugged terrain and relatively sparse vegetation. Consequently impacts to range resources within the HQPA will not be addressed further in this analysis document.

3.3.1 Issues Raised During Public Scoping

Of the nine primary issues raised by the public concerning the proposed Huxtable Quarry Mineral Materials Project (see Section 1.4), three issues were determined to have minor or unquantifiable effects as follows.

3.3.1.1 Potential Damage to Dwellings and Structures from Blasting Operations

During string blasting the detonation of the explosives will generate stress waves in the surrounding rock. Considering that the proposed quarry is situated on the toe of a rather large ridge extending to the west/southwest, most of the seismic ground waves will propagate into the mountain and away from the public to the northeast (it should be noted that the closest public dwellings are located on the north side of Bed Tick Creek with an intervening alluvial/colluvial valley between the dwellings and the proposed quarry). The distance of propagation and intensity of the seismic wave is dependent on the type of rock and any fractures in the rock mass. Assuming that the seismic waves have a direct media transport to the residence to the northeast and that the maximum explosive charge is one pound/cy^3 of material removed, then the peak particle velocity (how fast the ground moves) can be calculated as follows:

$$V = 160 (R \div W^{1/2})^{-1.6}$$

Where: V = peak particle velocity in inches per second (ips);
R = distance between explosion and recording sites in feet; and
W = maximum pounds-per-delay-period of eight milliseconds or more.

The amount of rock removed per individual blast is required to determine effects of blasting. As previously discussed, string blasting utilizes a series of several smaller blasts, which are timed and delayed to gain the same net results as one large blast. Of course, the amount of rock removed per string blast will vary with product demand. However, in order to meet the estimated annual maximum tonnage of rock (280,000 tons or 200,000 yd^3) while using only two string blasts per year, then 100,000 yd^3 will need to be produced per blast (which assumes that there is no swell factor as some of the rock removed will be waste material). Using a string

blasting pattern as depicted in Figure 2.3, 50 bores holes 10 feet apart and 20 feet in depth would be required to free 100,000 yd^3 of material, with each bore hole freeing approximately 2,000 yd^3 of material. Assuming there are 4 timed blasts per hole, each blast would result in the removal of 500 yd^3 of rock. If we assume a maximum explosive factor of one pound/yd^3 would be used for the proposed quarry, then the maximum pounds of explosive per delay period would be 500 pounds (lbs). A conservative estimate of the nearest residence to the project area is approximately 5,000 feet. Therefore, with R = 5,000 feet and W = 500 lbs/delay period, then V = 0.03 ips. The intensity of seismic motion that can be tolerated by various kinds of structures is presented in Table 3.2. By comparison, the perceptible motion level to humans is approximately 0.02 ips.

Table 3.2 Damage Levels as a Function of Peak Particle Velocity [1]

Peak Particle Velocity [2]	Nature of Damage
12.0	Fall of rock in unlined tunnels.
7.6	50% probability of major plaster damage.
5.4	50% probability of minor plaster damage.
2.8 - 3.3	Threshold of damage from close-in blasting.
2.0	Safe blasting criterion for residential structures recommended by U.S. Bureau of Mines. [3]

1 From duPont Blaster's Handbook (duPont 1997).

2 Peak Particle Velocity expressed in inches per second.

3 Perceptible motion level to humans is approximately bout 0.02 inches per second.

So, by using the calculated peak particle velocity of 0.03 ips, there would not be any damage to residential structures in the area - the blast may be a perceptible motion to people if there was a continuous media to propagate the seismic waves. In most cases the residential structures would be toward the free face of the blast and wave propagation due to ground movement would not occur in that direction. As a consequence, the potential impacts to local dwellings/structures from blasting operations in the proposed quarry will not be discussed further in this analysis document.

3.3.1.2 Potential Health and Safety Concerns from Exposure to Elevated Radon Levels

Radon is a colorless, odorless, tasteless and chemically inert radioactive gas that is formed by the natural radioactive decay of uranium (radium) in rock, soil and water. Naturally existing, low levels of uranium occur widely in the Earth's crust and can be found in all 50 states (NSC 2005). All rocks contain some uranium, although most contain just a small amount - between 1 and 3

parts per million (ppm) of uranium. In general, the uranium content of soil will be about the same as the uranium content of the parent material (rock) from which the soil was derived. Some types of rocks have higher than average uranium content including light-colored volcanic rocks, granites, dark shales, sedimentary rocks that contain phosphate, and metamorphic rocks derived from these rocks. These rocks and their soils may contain as much as 100 ppm uranium. The higher the uranium level is in an area, the greater are the chances that houses in the area have high levels of indoor radon (USGS 2005, NSC 2005).

Because radon is a gas, it has much greater mobility than uranium and radium, which are fixed in the solid matter in rocks and soils. As a consequence, radon can more easily leave the rocks and soils by escaping into fractures and openings in rocks and into the pore spaces between grains of soil. The ease and efficiency with which radon moves in the pore space or fractures effects how much radon enters a house. If radon is able to move easily in the pore space, then it can travel a great distance before it decays, and is more likely to collect in high concentrations inside a building. The method and speed of radon's movement through soils is controlled by the amount of water present in the pore space (the moisture content), the percentage of pore space in the soil (the porosity), and the "interconnectedness" of the pore spaces that determines the soil's ability to transmit water and air (called soil permeability). Radon moves more easily through permeable soils, such as coarse sand and gravel, than through impermeable soils such as clays. Fractures in any soil or rock allow radon to move more quickly. Radon moves slower in water than in air. The distance that radon moves before most of it decays is less than one inch in water-saturated rocks or soils, but it can be more than six feet, and sometimes tens of feet, through dry rocks or soils. For these reasons, homes in areas with drier, highly permeable soils and bedrock, such as hill slopes, mouths and bottoms of canyons, coarse glacial deposits, and fractured or cavernous bedrock, may have higher levels of indoor radon. Even if the radon content of the air in the soil or fracture is in the "normal" range (200-2,000 pCi/L), the permeability of these areas permits radon-bearing air to move greater distances before it decays, and thus contributes to high indoor levels of radon (USGS 2005). Radon moving through pore spaces and rock fractures near the surface of the earth usually escapes into the atmosphere. Where a house is present, however, soil air often flows toward its foundation for three reasons:

1) differences in air pressure between the soil and the house (house pressures are typically lower than soil or ambient air pressures),

2) the presence of openings in the foundation of the house, and

3) increases in permeability around the basement (if one is present) due to construction practices.

Most houses draw less than one percent of their indoor air from the soil; the remainder comes from outdoor air, which is generally quite low in radon. Houses with low indoor air pressures, poorly sealed foundations, and several entry points for soil air, however, may draw as much as 20 percent of their air from the soil. Even if the soil air has only moderate levels of radon, levels inside of the house may be very high (USGS 2005, NSC 2005).

Radon can also enter homes through their water systems. Water in rivers and reservoirs usually contain very little radon because it escapes into the air, so homes that rely on surface water

supplies usually do not have a radon problem with their water. In big cities, water processing in large municipal systems aerates the water, which allows radon to escape, and also delays use of the water until most of the remaining radon has decayed. However, in many areas of the country, ground water is the main water supply for homes and communities. These small public water works and private domestic wells often have closed systems and short transit times that do not remove radon from the water or permit it sufficient time to decay. This radon escapes from the water to the indoor air as people take showers, wash clothes and dishes, or otherwise use water indoors. The areas most likely to have problems with radon in ground water are areas that have high levels of uranium in the underlying rocks. For example, granites in various parts of the United States are sources of high levels of radon in ground water that is supplied to private water supplies (USGS 2005).

The radon zone designation assigned to most of Wyoming (including Converse County) by the Environmental Protection Agency (EPA) is Zone 1. Zone 1 counties have a predicted average indoor radon screening level of greater than 4 pCi/L (pico curies per liter), which represents the highest priority zone and reflects the average short-term radon measurement that can be expected to be measured in a building without the implementation of radon control methods (EPA 2005). However, it should be noted that this designation applies to expected indoor levels of radon. As discussed above, radon is primarily transmitted into buildings through direct contact with radon-bearing soils, with the gas being concentrated in enclosed areas lacking ventilation such as basements. In rural areas, indoor radon concentrations can be exacerbated though the use of "contaminated" water from local wells which results in the release of radon gas into the indoor air atmosphere. While outdoor air that is drawn into a building may contribute to the indoor radon level, average outdoor air radon levels are about 0.4 pCi/L, but may be higher in some areas (NSC 2005).

In this regard, the Huxtable Quarry Mineral Materials Project proposes to mine limestone and quartzite, which are sedimentary and metamorphic rocks (respectively) which do not and are not expected to contain high levels of uranium. Moreover, any radon that might be potentially released from mining activities associated with the subject quarry would be immediately dispersed to the atmosphere and literally scattered to the winds. Considering both the horizontal and vertical distances from the proposed quarry to existing residences within the general area, it is unlikely that there would be any measurable increase in indoor (or outdoor) radon levels due to the proposed mining activity. As a consequence, potential health and safety concerns from exposure to elevated radon levels emanating from the proposed quarry will not be discussed further in this analysis document.

3.3.1.3 Potential Impacts on Property Values

The Pennsylvania Bureau of Mining and Reclamation performed a study entitled "Effects of Longwall Mining on Real Property Value and the Tax Base of Greene and Washington Counties, Pennsylvania" (PDEP 2002). The study was designed to determine if underground longwall mining had an effect on residential property values, and the real estate tax bases of Greene and Washington Counties over a period of 10 years between 1993 and 2002.

The findings of this study reported the following:

> *While undoubtedly the real estate truism: " value is derived from three factors- location, location, location" is based in fact, in general, proximity to a longwall mine does not appear to be the major factor in determining "county value" and therefore assessed value. Other factors such as access to utilities (public sewer and water), proximity to major roads, density of residences, and the desirability of surrounding land uses appear more likely to influence the general taxable value (county value) of residential properties.*

The findings of this study also stated that

> *There was no correlation between location with respect to longwall mining and the ratio of sales price to county value.*

The above study refers to the coal mining industry in Pennsylvania, which has a much greater impact upon the local area than does the quarry as proposed herein. Nonetheless, this study does illustrate that property values in Green and Washington Counties, Pennsylvania did not appear to decrease solely due the presence of a sub-surface mining operation in the area (PDEP 2002).

Local realtors, as well as the Converse County Assessor's office, were contacted in an effort to obtain any relevant information on the potential effects of the proposed quarry on local property values. None of the people contacted were able to make any predictions as to the possible effect that such a project would have on local property values due to the many variables used to determine land value.

As indicated above, location seems to be the key factor in assessing property value. While aesthetic values may play a role in property sales between willing sellers and willing buyers, this is typically not the sole factor in determining property value and/or the salability of said property. Considering that there are no subdivisions or planned housing developments within the affected area and the dominant land use in the area is agricultural, it is unlikely that the proposed project would have a detrimental effect upon local property values as the value of the land for agricultural purposes will not be diminished by the establishment of the Huxtable quarry.

Should area land owners propose a residential subdivision at some point in the future, the development would occur pursuant to current county zoning in the area and subsequent to the commencement of mining operations. Prospective buyers would be aware from the outset of the visual intrusion resulting from the quarry and would make personal decisions on property purchases accordingly. As a consequence, the potential impacts to local property values will not be discussed further in this analysis document.

3.4 AIR QUALITY

No site-specific air quality data are available from the proposed project area; however, air quality in the area is generally good and is in compliance with state and national ambient air quality standards. The principal air-borne pollutant within the proposed project area is particulate matter in the form of fugitive dust (uncontrolled wind-carried particulates) generated from natural and

human sources. Current national and state air quality standards are presented in Table 3.3. Visibility in the region is typically very good (> 70 miles) and fine particulates are generally considered to be the main source of visibility degradation (BLM 1985a).

Table 3.3 Selected National and Wyoming Ambient Air Quality Standards

Air Pollutant	Averaging Time Period	NAAQS (Fg/m^3) [2]	WAAQS (Fg/m^3) [3]	Incremental Increase Above Legal Baseline	
				PSD Class I	PSD Class II
Particulate matter <10 microns in diameter (PM_{10})	24-hour	150	150	8	30
	AAM [4]	50	50	4	17
Particulate matter <2.5 microns in diameter ($PM_{2.5}$)	24-hour	65	65	ns [6]	ns
	AAM	15	15	ns	ns
Ozone	1-hour	235	235	ns	ns
	8-hour	157	ns	ns	ns
Nitrogen dioxide (NO_2)	AAM	100	100	2.5	25
Sulfur dioxide (SO_2)	3-hour	1,300 [7]	1,300	25	512
	24-hour	365	260	5	91
	AAM	80	60	2	20
Carbon monoxide (CO)	1-hour	40,000	40,000	ns	ns
	8-hour	10,000	10,000	ns	ns

[2] NAAQS = National Ambient Air Quality Standards (adapted from 40 CFR 50.5-50.12). Primary standard unless otherwise noted. National Primary Standards establish the level of air quality necessary to protect public health from any known or anticipated effects of a pollutant, allowing a margin of safety to protect sensitive members of the population.

[3] WAAQS = Wyoming Ambient Air Quality Standard (adapted from WDEQ/AQD [2000a]).

[4] AAM = annual arithmetic mean.

[5] nd = no data.

[6] ns = no standard.

[7] Secondary standard. National Secondary Standards establish the level of air quality to protect the public welfare by preventing injury to agricultural crops and livestock deterioration of materials and property and adverse impacts to the environment.

3.5 NOISE

No site-specific noise level data are available for the proposed project area; however, noise in the area is probably in the range reported for "Grand Canyon (North Rim)" (wilderness) and "Farm in Valley" sites (Wyle Laboratories 1971).

The A-weighted sound pressure level, or A-scale, is used extensively in the U.S. to measure community and transportation noise and is a measure of noise in A-weighted decibels (dBA), which is directly correlated with some commonly heard sounds. Table 3.4 presents a list of commonly heard sounds with the corresponding noise level (Rau and Wooten 1980). Median noise levels for the proposed project area likely ranges from 20 to 40 dBA in the morning and

evening and from 50 to 60 dBA in the afternoon when wind speeds are typically greatest. These levels correspond to noise levels of a soft whisper (30 dBA), a library (40 dBA), a quiet office (50dBA), a small town 40-50 dBA), and normal conversation (60 dBA). Traffic along an interstate typically averages noise levels > 70 dBA (Wyle Laboratories 1971).

Table 3.4 Comparison of Measured Noise Levels with Commonly Heard Sounds, Wills Quarry Project, 2001 [1]

Source	dBA	Description
Normal breathing	10	Barely audible
Rustling leaves	20	
Soft whisper (at 16 feet)	30	Very quiet
Library	40	
Quiet office	50	Quiet
Normal conversation (at 3 feet)	60	
Busy traffic	70	Noisy
Noisy office with machines; factory	80	
Heavy truck traffic (at 49 feet)	90	Constant exposure endangers hearing

[1] Source: Rau and Wooten (1980).

Typical ambient noise levels at an operating surface quarry are in the 40 to 60 dBA range for a 24-hour period, and within 50 ft of the operation the maximum noise level could reach or exceed 85 to 95 dBA (BLM 1997a). Traffic along Bed Tick Road, Wyoming Highway 91 (Cold Springs Road), livestock grazing operations and wind are presently the primary sources of noise in the proposed project area. Examples of noise-sensitive areas in Wyoming include private residences, occupied raptor nests and greater sage-grouse leks during the breeding and nesting season(s).

There are no occupied dwellings, homes, public buildings (i.e., schools, churches or institutional buildings), parks, cemeteries or community centers within 0.75 miles of the proposed quarry area that would be affected by noise associated with the Proposed Action or alternatives.

3.6 CULTURAL RESOURCES

Cultural resources are the non-renewable physical remains of past human activity and are protected under Section 106 of the *National Historic Preservation Act of 1966* (as amended) and the *Archaeological Resources Protection Action of 1979* (as amended). Archaeological investigations in the North Platte River Valley basin indicate that human activity has occurred across the landscape over the past 10,000 years, beginning during he Paleo-Indian period and continuing up to the present (Frison 1991).

A Class III cultural resource investigation was conducted on August 27, 2003 by Archaeological Energy Consulting of Casper, Wyoming. The investigation covered the proposed 10-acre quarry area and access (haul) road route. No significant cultural resources were identified and cultural resource clearance was subsequently recommended for the Proposed Action. An additional investigation was conducted by Archaeological Energy Consulting on July 3, 2004 covering an additional 30 acres of potential surface disturbance associated with the expanded quarry as proposed in Alternative A. No prehistoric cultural resources were identified during the course of the second investigation. A historical homestead was recorded and subsequently evaluated by Rosenburg Historical Consultants in conjunction with these inventories. The homestead was recommended as not eligible for nomination to the National Register of Historical Places (NRHP). While BLM Class I and III cultural surveys were not conducted outside of those areas to be potentially disturbed by the Proposed Action and alternatives, there are undoubtedly other cultural resources in the Sheep Mountain area.

Public scoping conducted on the proposed Huxtable Quarry Mineral Materials Project identified a potential impact to the Emigrant Trail, which is located approximately 7,500 feet (1.42 miles) northeast of the proposed quarry area in Section 33 (at it's closest point) and approximately 2,700 feet (0.51 miles) east/northeast of the junction of the proposed access (haul) road with Wyoming Highway 91 (see Figure 2.1). However, the setting and visual integrity of the Emigrant Trail has been compromised by pre-existing development (e.g., power line and pipeline right-of-ways, roads and trails, residences and associated outbuildings) within the general area (Arthur 2005).

3.7 MINERAL RESOURCES

Bedrock, rock outcrops, regolith, cobbles, gravels and coarse soils characterize much of the western portion of the proposed project area. A light gray silty clay loam formed from a residuum of sandstone, siltstone, and limestone occurs on the finger ridges, with sandy loams, sands, and poorly sorted gravels formed from alluvium along eastern portions of the ephemeral drainages (Lageson and Spearing 1988; Love and Christiansen 1985).

Exploratory drilling has not been conducted within the proposed quarry area because of the rugged terrain, the associated costs, and the potential surface disturbance that would occur in conjunction with the exploratory drilling operations. However, preliminary surface investigations indicate that the proposed quarry area contains various types of industrial non-metallic minerals including construction aggregates (e.g., sand and gravel, limestone, and quartzite) and decorative fieldstone (e.g., moss rock). The construction aggregates are suitable for road base construction, concrete, asphalt, and rip-rap for drainage control structures. The decorative fieldstone is rock covered with moss, algae, fungi, or lichen and is suitable for landscaping purposes.

The project proponent estimates that approximately 1.2 million tons of construction aggregates could be mined from the 10-acre quarry site over the LOP. An additional 4.5 million tons of mineral material could be mined from the 40-acre alternative (Alternative A) over the LOP. These tonnage estimates do not account for unmarketable (i.e., waste) materials that would be produced during the processing (i.e., crushing) phase of the operation and which would not meet

contract or market specifications. During the mining operation, the unmarketable materials would be returned to the quarry for backfilling and/or used for surfacing of the access (haul) road and selected work areas within said quarry. Depending on the type of material that is being mined and its intended uses, the amount of unmarketable materials may account for as much as 25% of the total tonnage mined.

3.8 RECREATION

Recreational opportunities within the general project area (southern Converse County) include hunting, hiking, camping, off-road vehicle (ORV) travel, wildlife viewing and rock hounding (BLM 1984) and are all controlled by the landowner and require his permission. According to the project proponent deer hunting and rock hounding are the only recreational activities that occur within the HQPA (Huxtable 2005).

3.9 SOCIOECONOMICS

Converse County's population increased from 11,128 in 1990 to an estimated 12,560 in 2000 - a 12.9% increase resulting from people moving into the county seeking employment in mining, petroleum, and related industries (USDC 1990, WDOE 2001). Total full-time and part-time employment in Converse County was 5,887 in 1990, which was composed of 5,418 non-farm workers and 469 farm workers. Total full-time and part-time employment increased in Converse County to 6,953 in 1998 - an 18.1% increase over 1990 employment levels. In 1998, service employment represented the single largest employment sector in Converse County, with approximately 1,200 workers, followed closely by 1,199 workers employed in retail trade, 977 workers employed by local governments, and 868 workers employed in the mining industry (WDOE 2001).

Annual per capita personal income in Converse County was $14,487 in 1990 compared to $19,977 in 1998 - 37.9% increase (WDOE 2001). The annual average unemployment rate in Converse County in 1999 was 5.2%, compared to 4.9% for Wyoming for the same time period (WDOE 2001). The cost of living index for Converse County was 93 during the fourth quarter of 1999 in Douglas, compared to a statewide average for Wyoming of 100 (WDOE 2001). According to the 1990 census, the percent of all persons living below the poverty level in Converse County was 11.9%, which was identical to the statewide average for Wyoming for the same period. There were 1,188 vacant housing units or a rate of 8.9% in Converse County in 1990, compared to the statewide average vacant housing rate of 3.9% during the same time period (USDC 1990).

3.10 SOIL RESOURCES

Soils in the project area are highly variable depending on landscape position and parent material. Preliminary Natural Resources Conservation Service (NRCS) soils mapping (Soil Survey of Converse County - South Half) and soil descriptions for the project area are included in Appendix A. Soil maps and descriptions are available at the NRCS office in Douglas. Soils

along the proposed access route are typically well drained loams and sandy loams on relatively gentle slopes with a moderate erosion hazard. Near the proposed quarry site slopes increase and the erosion hazard is moderate to severe. NRCS mapping identifies the soils at the proposed quarry site as Tyzak-Rock Outcrop Complex (Tyzak). The Tyzak soil covers approximately 50% of the mapping unit and is typically shallow to bedrock (less than 11 inches) with a high content of coarse fragments. Erosion hazard on the Tyzak soil is severe due to steep slopes and shallow, poorly developed soils. Reclamation potential is poor due to shallow, poorly developed soils and the large amount of coarse fragments present (NRCS 2003)

3.11 TRANSPORTATION

The primary safety risks for people living, working and traveling to/from the general project area are related to vehiclular traffic. These risks also include safety issues related to public school bus traffic along Wyoming State Highways 91 and 96. Surface transportation into and out of the proposed project area would be provided by a privately-owned access (haul) road, while access to the general project area from Douglas would be provided by two public highways including Wyoming State Highway 91 (Cold Springs Road) and Wyoming State Highway 96 (Chalk Buttes Road) - which represent the only readily accessible public roads into the proposed project area (see Figures 2.1 and 2.3). These public roads provide the principal roadway linking the proposed project area with the rest of central Wyoming and the national highway system. According to 1998 data from the Wyoming Department of Transportation (WDOT), average daily traffic (ADT) for Wyoming State Highway 91, on Mile Post 2.99 west of Douglas near the proposed project area, was recorded at 292 vehicles over a 24-hour period (WDOT 1999).

According to information provided by Converse County School District #1, two public school buses make morning and afternoon stops along the Cold Springs and Chalk Buttes Roads. When combined, there are two school buses scheduled to travel between Douglas and the Cold Springs Road on school days, with these buses traveling area roadways between the hours of 7:03 and 7:37 n the morning and between 3:05 and 4:30 n the afternoon.

Bus #22's route begins on Cold Springs Road and continues onto Chalk Buttes Road. According to the published school bus schedule for Bus #22, the stops occur between 7:03 and 7:35 in the morning and between 3:25 and 4:30 in the afternoon. Bus #6's route begins on the Easterbrook Road and continues to the Chalk Buttes Road. According to the published school bus schedule for Bus #6, stops occur between 7:08 and 7:37 in the morning and between 3:05 and 4:20 in the afternoon.

The proposed access (haul) road within the HQPA would be approximately 2 miles in length (including 1.2 miles of existing, flat-bladed road and 0.8 miles of existing two-track trail) and is currently being used by the project proponent for routine agricultural activities associated with his ranching operation. As previously indicated, the access (haul) road is located solely on private surface estate owned by the project proponent and access to these private lands (the project area) is strictly controlled. It is estimated that the existing road is currently being used by the project proponent as little as once per day and as much as four times per day.

3.12 VEGETATION

The Wyoming Gap Analysis project (Merrill et al. 1996) mapped landcover types in polygons throughout the state of Wyoming with each polygon assigned a primary cover type. Most polygons were also assigned a secondary cover type, both of which were generated from landsat imagery. The Wyoming Natural Diversity Database (WYNDD) was asked to provide the GAP landcover data for the HQPA. According to GAP, the primary cover-type within the W½ of Section 28 and the N½NW¼ of Section 33 is Basin Rock and Soil, with a Xeric Upland Shrub cover type identified within the S½NW¼ and much of the SW¼ of Section 33. The secondary cover type includes Wyoming Big Sagebrush and Black Sage Steppe respectively (WYNDD 2005). No riparian or wetland plant communities/habitat was observed in the HQPA in conjunction with the biological inventory conducted on February 24, 2005 (AEC 2005).

The proposed quarry area supports a mountain foothills shrub/juniper woodland habitat type (see Table 3.5) consisting of true mountain mahogany (*Cerocarpus montanus*), Antelope bitterbrush (*Purshia tridentate*), Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), silver sagebrush (*Artemisia filifolia*), skunkbush (*Rhus trilobata*), sumac (*Rhus coriaria*), common snowberry (*Symphoricarpos albus*), common serviceberry (*Amelanchier ainifolia*), rubber rabbitbrush (*Chrysothamnus nauseosus*) with interspersed juniper (*Juniperus chinensis*). The understory consists mostly of bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), needle-and-thread grass (*Stipa comata*), prairie junegrass (*Koeleria macrantha*), cheatgrass (*Bromus tectorum*) and numerous forb species.

The proposed access road route supports a predominately shrub steppe prairie habitat type with a small area of shortgrass prairie (see Table 3.5) along a short segment of the road route directly south of Bed Tick Creek. Dominant shrubs in the shrub-steppe habitat include Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), silver sagebrush (*Artemisia cana*), antelope bitterbrush (*Purshia tridentata*) and rubber rabbitbrush (*Chrysothamnus nauseosus*). Each of these species can be the only shrub or appear in complex seral conditions with other shrubs with a common shrub complex consisting of antelope bitterbrush and Wyoming big sagebrush. When this habitat is in good or better ecological condition a bunchgrass steppe layer is characteristic. Diagnostic native bunchgrasses that often dominate different shrub-steppe habitats include bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), bottlebrush squirreltail (*Elymus elymoides*), needle-and-thread grass (*Stipa comata*), threadleaf sedge (*Carex filifolia*) and Sandberg bluegrass (*Poa sandbergii*). Depending on site potential and disturbance history, the shrub-steppe habitat type can be rich in forbs or have little forb cover.

No site specific surveys have been conducted to determine the presence of invasive non-native species. However, it is possible that Canadian thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), cheatgrass (*Bromus tectorum*), Russian knapweed (*Acroptilon repens*), and halogeton (*Halogeton glomeratus*) occur on or adjacent to previously disturbed areas within the overall project area.

3.13 VISUAL RESOURCES

The project location lies within a Visual Resource Management (VRM) Class III area. Management objectives for this location are to partially retain the existing character of the landscape. Moderate levels of contrast are acceptable and new visual intrusions may draw the viewers' attention. However, new projects should not dominate the landscape. Best management practices for visual resources dictates that the basic elements which make up the existing landscape (i.e., line, form, color and texture) should be repeated whenever possible.

A key observation point (KOP) was selected from which to assess the existing visual environment within and adjacent to the HQPA. KOPs are chosen with the following criteria in mind: angle of observation, number of viewers, length of time project is in view, relative project size, season of use and lighting conditions. For this project a single KOP (located on County Road 8 and approximately midway between the base of the divide between Bed Tick and Little Bed Tick Creeks) was chosen as this was representative of the most significant view of the proposed quarry operation (see Figure #1 in Appendix B). The proposed Huxtable quarry is located roughly 1.3 miles southwest of the KOP. Two classes of viewers would be affected by changes in the project area. Transient viewers traveling on the county road will be able to see the proposed quarry for several minutes as they traverse the valley bottom. Moreover, entering the valley from the north would provide a direct, head-on view of the HQPA for a short time, at a distance of about 1.4 miles. Since these viewers are likely driving and focusing on the road ahead, their perception of the proposed quarry activity area would be limited. The second set of viewers are occupants of four of the five residences adjacent to and north of Bed Tick Creek. These individuals can view the proposed project area at distances varying from 0.8 miles and 1.75 miles, generally southwest of the dwellings. Indivisibility here is a larger issue in that the viewers have an opportunity to observe the project area on a daily basis and potentially for much longer periods of time.

Based on computer-generated viewshed analysis, the HQPA could also be seen from a distance along portions of Interstate 25 (I-25) south of Douglas, and possibly from upland locations within the Douglas environ (see Figure #'s 2 and 3 in Appendix B). These were not considered viable KOPs due to distance, length of time the project would be in view (particularly from I-25) and the screening effect of intervening landforms, vegetation and other developments.

In order to describe the characteristic landscape, visual resource management (VRM) techniques are used to portray the project area in objective terms of line, form, color, and texture. Another important factor in typifying a landscape is that of distance zones and the landscape components existing within them. Distance zones consist of the foreground, midground and background and are generally addressed as measured distances (foreground would be from KOP to three miles, midground from three to five miles, and background five miles and beyond). In constrained areas such as the Proposed Action, the foreground, midground and background are more readily defined by the landscape itself. In this case, the foreground extends from the KOP on the county road across the meadow/pasture area to the base of Sheep Mountain and surrounding foothills, a distance of about 1.4 miles. The midground, which contains the proposed quarry consists of the foothill zone itself, and the background the rising slopes of Sheep Mountain proper up to the skyline.

The foreground consists of flat to gently rolling hay meadows, ditches and several lines and clusters of trees. Gently rounded horizontal shapes dominate the view, echoed by the rounded shapes of the cottonwood groves. In contrast, the near foreground also contains several residential and agricultural structures, driveways, and fences. The midground, which contains the project area, is characterized by higher flat-topped benches rising a hundred feet or more above the foreground plain. These benches are dissected by drainages heading in the higher country to the west, forming a series of V-shaped valleys opening onto the lower flat and introducing a series of horizontal and diagonal lines. Darker vegetation serves to accentuate the difference in character between the lowlands and foothill benches. Rising behind these benches, Sheep Mountain forms a rounded backdrop with generally smooth curvilinear shapes against the skyline. Vegetation cover varies throughout this background exposing rock and mineral soil in some areas, and covering the surface in others.

Overall, the general project area is a typical valley floor/uplands interface with benches and steeper slopes climbing to the skyline. Essentially rural, there is only moderate development within the overall viewshed. Five residences line the county road with perhaps a quarter to half mile between them. Outbuildings and other structures are confined to the immediate vicinity of the dwellings, limiting the cultural component of the landscape to a narrow, discontinuous band along the road. There is a cylindrical water tank and a rectangular structure located at distance to the southwest on the bench in the midground, but they are quite small seen from any relevant point on the county road and are thus subordinate to the larger natural features. There is a two-track road visible leading generally into the project area, and another ascending the eastern slope of Sheep Mountain a short distance north of the proposed quarry. Both are visible only in the distance and are somewhat subdued. At the same time, however, they do introduce artificial linear shapes into an otherwise rounded natural view.

3.14 WATER RESOURCES

3.14.1 Surface Water Resources

The proposed project area lies entirely within the North Platte River drainage basin and is drained by an unnamed, well-defined, second-order ephemeral drainage that drains into Bed Tick Creek and eventually into the North Platte River approximately 5.5 miles east of the HQPA. Bed Tick Creek is the only intermittent stream within 2 miles of the proposed project area and is located approximately 0.5 miles north of the proposed quarry site.

Two small stock ponds are located approximately 400 feet and 700 feet, respectively, down stream of the proposed quarry site within the second-order ephemeral drainage referenced above. These stock ponds are currently dry but do retain water during heavy precipitation events. These ponds are fed by precipitation runoff from the general project area. There are no other reservoirs, ponds or pits within the HQPA.

There is no site-specific surface water quality data from the proposed project area; however, a comparison of water quality data from the general area with WDEQ/WQD Chapter 8 water class standards (WDEQ/WQD 2000) indicates that surface water quality would typically meet

livestock class of use (Class III) criteria (BLM 1998). Bed Tick Creek is an ephemeral stream that is classified by WDEQ (2001 stream classification list) as a Class 3B drainage, which indicates that it does not support fish habitat but does support other aquatic life. As a consequence, it is unlikely that Bed Tick Creek is able to support game fish populations due to a lack of nursery areas and/or food sources (WDEQ/WQD 1990). The project proponent confirms that the upper reaches of Bed Tick Creek within the HQPA does not flow except during periods of heavy spring runoff or intense local precipitation events (Huxtable 2005).

Neither Bed Tick Creek nor the segment of the North Platte River located immediately below the confluence of Bed Tick Creek and the North Platte River are included on the WDEQ/WQD 2000 305(b) list of water bodies with water quality impairments (WDEQ/WQD 2000). This list includes rivers, streams, creeks, or any bodies of water for which effluent limitations required by the federal *Clean Water Act*, as amended, are not stringent enough to implement any water quality standards applicable to such waters.

3.14.2 Ground Water Resources

No exploratory drilling has been conducted within the proposed project area, and there are no existing water wells within the actual project area. However, records maintained by the Wyoming State Engineer's Office indicate that there are a total of 157 ground water rights within a 3-miles radius of the proposed project area. There are 9 water wells within a one-mile radius of the quarry site (refer to Figure 3.1). Their static water depths and total well depths are tabulated in Table 3.5.

Table 3.5 Water Wells within a One Mile Radius of the Proposed Huxtable Quarry

Permit Number	Priority Date	Legal Description				Facility Name	Applicant	Well Depth	Static Depth
		Township	Range	Section	Qtr-Qtr				
P86479W	10/28/91	32N	72W	34	SWSW	Fritz #2	Lawrence Fritz	N/A	N/A
P97415W	04/17/90	32N	72W	33	NESE	Sheep Mtn. #1	City of Douglas	1165'	365'
P82387W	04/17/90	32N	72W	34	SWNW	Ridge Water-WWDC #1	WY Water Dev-elopment Comm.	N/A	N/A
P70305W	05/28/85	32N	72W	34	SWNW	ENL Gedney #3	Henry Gedney	120'	30'
P12073W	03/31/10	32N	72W	34	SWNW	Gedney #3	Henry Gedney	120'	30'
P80219W	07/14/89	32N	72W	33	NWNW	Huxtable #2	James Huxtable	160'	42'
P83411W	08/06/90	32N	72W	34	NENW	Bedtick I	Mary J. Smith	125'	25'
P83412W	08/06/90	32N	72W	34	NENW	Bedtick II (deepened)	Mary J. Smith	165'	25'
P11413P	09/30/06	31N	72W	05	NWNW	Whitaker	Wm. H. Cross & Sons	100'	40'

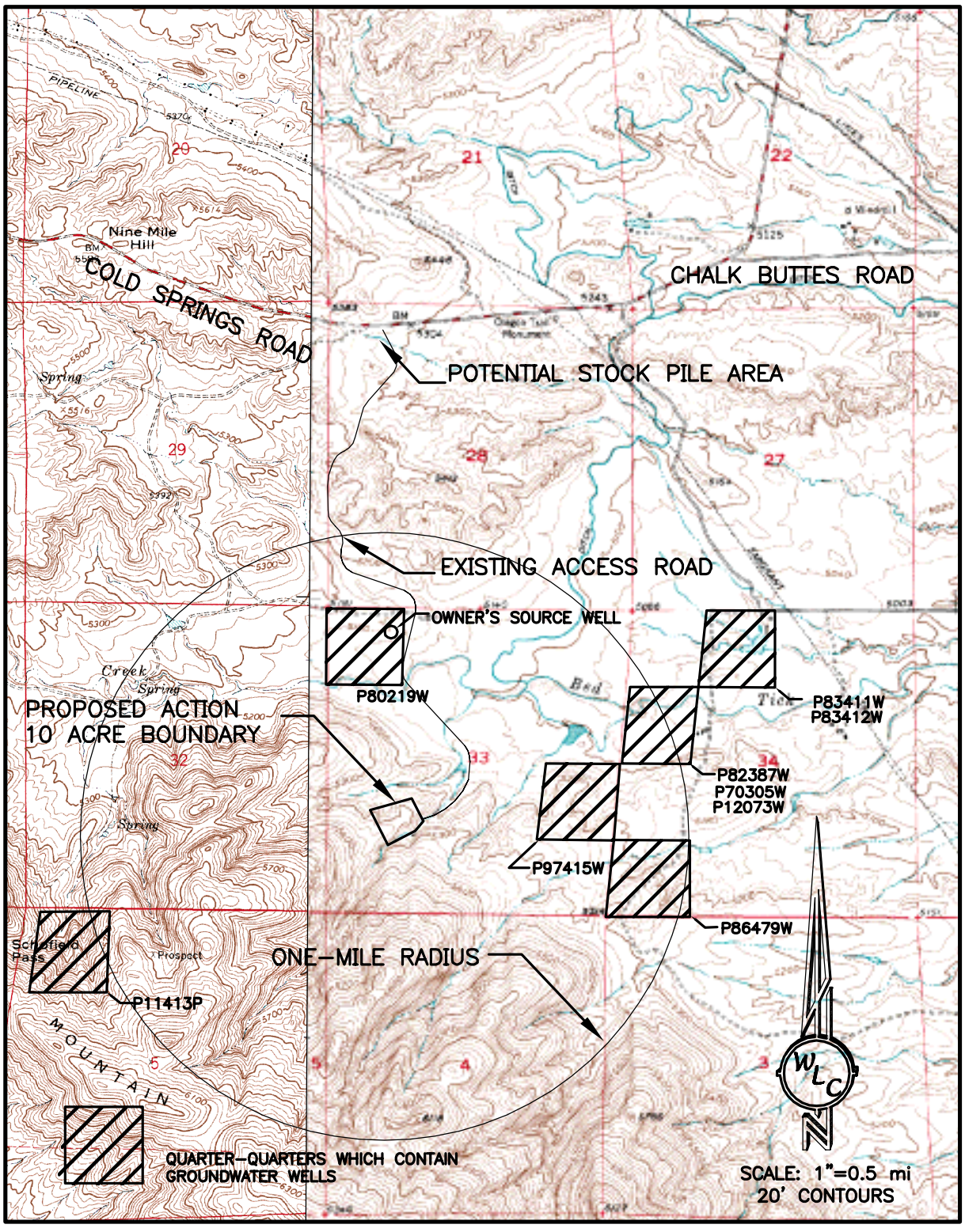


Figure 3.1 Water Wells within a One Mile Radius of the Project Area

Depths were not available for the Ridge Water-WWDC #1 and Fritz #2 wells. The City of Douglas owns the Sheep Mountain Well #1 located approximately 3,000 feet (+/-) east/northeast of the proposed quarry site.

There is no site-specific ground water quality data from the proposed project area; however, a comparison of water quality data from the general area to WDEQ/WQD water class standards (WDEQ/WQD 1993) indicates that ground water quality would typically meet livestock class of use (Class III) criteria (BLM 1998). Most likely the water quality in these wells is better than Class III, since some of the wells listed in Table 3.5 have been permitted as domestic wells.

3.15 WILDLIFE RESOURCES

Information concerning wildlife resources within the HQPA is presented below.

3.15.1 Big Game

Mule deer (*Odocoileus hemionus*) are the primary big game species found within the proposed HQPA with deer populations in this area classified within the South Converse Herd Unit (hunt area 65). The South Converse Herd Unit has a post-season population objective of 16,000 animals with a 2003 post-season estimate of 10,081 deer, 37% below population objectives. Drought continues to be one of the primary factors depressing mule deer populations in this herd unit. The proposed quarry is located within crucial winter/yearlong range for mule deer (WGFD 2003a).

Other big game species which may inhabit portions of the proposed HQPA include elk (*Cervus elaphus*), pronghorn antelope *(Antilocapra americana)*, Rocky Mountain bighorn sheep (*Ovis canadensis*), and white-tailed deer (*Odocoileus virginianus*). No crucial habitats for any of these species exist within the proposed project area.

3.15.2 Other Mammals

Other mammal species known to occur or to potentially occur in the HQPA include badger (*Taxidea taxus*), bobcat (*Lynx rufus*), black-tailed jackrabbit *(Lepus californicus*), coyote (*Canis latrans*), deer mouse (*Peromyscus maniculatus*), desert cottontail (*Sylvilagus auduboni*), least chipmunk (*Tamias minimus*), long-legged myotis (*Myotis volans*), mountain lion (*Felis concolor*), northern pocket gopher (*Thomomys talpoides*), striped skunk (*Mephitis mephitis*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), white-tailed jackrabbit (*Lepus townsendii*), and Wyoming ground squirrel (*Spermophilus elegans*) (WGFD 1999).

3.15.3 Raptors

The HQPA contains potential nesting habitat for a variety of raptor species including, but not limited to golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), Swainson's hawk

(*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), and prairie falcon (*Falco mexicanus*) (WGFD 1999).

An inventory of historic raptor nesting activity within the HQPA was conducted by Robert M. Anderson/Anderson Environmental Consulting (AEC) on February 24, 2005. No historic raptor nests were observed within the inventory area (AEC 2005).

3.15.4 Migratory and Non-Migratory Birds

Bird species distribution as reported in *The Atlas of Birds, Mammals, Reptiles and Amphibians in Wyoming* (WGFD 1999) includes a compilation of observations mapped by latitude and longitude, with the State of Wyoming divided into 28 regions. These regions are based upon a one degree separation of both latitude and longitude. The HQPA falls with Wyoming Distribution Area (latilongs) 20 as defined by the WGFD (1999). Avian distribution data for the Partners in Flight (PIF) priority species potentially occurring within the HQPA is included in Table 3.6. Only those birds that have been classified by WGFD (1999) as confirmed breeders (nest and/or young observed), with circumstantial evidence of breeding (nest and/or young not located), or that have been observed at any time (season) within the general area (but without any evidence of breeding) are included in the list. PIF priority species that have not been observed within Wyoming Distribution Area 20 are not included in Table 3.6.

Most of the birds listed in Table 3.6 typically nest either on the ground, in shrubs or in rock habitat (cliffs, ledges, crevices, etc.); therefore, activities associated with the Proposed Action have the potential to destroy individual nests, eggs, and/or young of some of these species. Projected losses are indeterminate as there are no Breeding Bird Survey (BBS) routes located within the immediate vicinity of the HQPA to provide information on breeding bird densities.

Concerns regarding the decline of both migratory and non-migratory bird populations both locally and on a continental scale have resulted in a nationwide bird conservation planning effort. Management goals and objectives for bird conservation are found in the Land Bird Strategic Plan, Presidential Executive Order (EO) 13186 dated January 17, 2001, and the Proposed Memorandum of Understanding associated with the above Presidential EO. Bird Conservation Plans prepared at the state and regional levels also include objectives for bird conservation. As evidenced by EO 13186, there has been national direction to implement actions that incorporate these goals.

3.15.5 Amphibians, Reptiles and Fish

Based on range and habitat preference, few if any amphibians or reptiles (herptiles) occur in the HQPA. Herptiles that may occur in the overall project area include Northern leopard frog (*Rana pipiens*), Northern many-lined skink (*Eumeces multivirgatus multivirgatus*), red-lipped prairie lizard (*Sceloporus undulatus erythrocheilus*), Northern prairie lizard (*Sceloporus undulatus garmani*), Western smooth green snake (*Liochlorophis vernalis blanchardi*) and milk snake (*Lampropeltis triangulatum*) (WYNDD 2005).

Table 3.6 List of Partners In Flight (PIF) Priority Bird Species Potentially Found within the Huxtable Quarry Project Area (Nicholoff 2003)

Common Name	Scientific Name	Habitat Type [1]	Distribution Area 20 [2]
Level I Species (Conservation Action)			
Ferruginous Hawk	*Buteo regalis*	SS/SGP	B
Greater Sage Grouse	*Centrocercus urophasianus*	SS	B
Mountain Plover	*Charadrius montanus*	SS/SGP	B
Upland Sandpiper	*Bartramia longicauda*	SGP	O
Long-billed Curlew	*Numenius americana*	SGP	O
Burrowing Owl	*Athene cunnicularia*	SGP	B
Short-eared Owl	*Asio flammeus*	SGP	O
Brewer's Sparrow	*Spizella breweri*	SS, MFS	B
McCown's Longspur	*Calcarius mccownii*	SS/SGP	B
Level II Species (Monitoring)			
White-throated swift	*Aeronautes saxatalis*	Spec.	O
Gray flycatcher	*Empidonax wrightii*	MFS	O
Dusky flycatcher	*Empidonax oberholseri*	MFS	B
Cassin's Kingbird	*Tyrannus vociferans*	JW	O
Loggerhead Shrike	*Lanius ludovicianus*	SS	B
Juniper Titmouse	*Baeolophus griseus*	JW	O
Western Bluebird	*Sialia mexicana*	JW	O
Townsend's Solitare	*Myadestes townsendii*	JW	B
Sage Thrasher	*Oreoscoptes montanus*	SS	B
Vesper Sparrow	*Pooecetes gramineus*	SS	B
Lark Sparrow	*Chondestes grammacus*	SS	B
Lark Bunting	*Calamospiza melanocorys*	SGP	B
Grasshopper Sparrow	*Ammodramus savannarum*	SGP	B
Chestnut-collared Longspur	*Calcarius omatusi*	SGP	O
Dickcissel	*Spiza Americana*	SGP	O
Bobolink	*Dolichonyx oryzivorus*	SGP	O
Level III Species (Local Interest)			
Golden eagle	*Aquila chrysaetos*	Spec.	B
Prairie Falcon	*Falco mexicanus*	Spec.	B
Common Poorwill	*Phalaenoptilus nuttallii*	SS	B
Say's Phoebe	*Sayornis saya*	SS	B
Rock Wren	*Salpinctes obsoletus*	Spec.	B
Bewick's Wren	*Thryomanes bewickii*	JW	O
Virginia's Warbler	*Vermivora virginiae*	JW	O

[1] Habitat Types: SS = Shrub-steppe
SGP = Shortgrass Prairie
JW = Juniper Woodland
MFS = Mountain-foothills Shrub
Spec. = Specialized (cliffs and canyons)

[2] B = Nest or young dependent upon parent birds observed.
b = Circumstantial evidence of breeding.
O = Species has been observed, but there was no evidence of nesting.

Due to the lack of permanent water bodies or perennial streams, the HQPA is not likely to support any fish populations (AEC 2005).

3.16 THREATENED, ENDANGERED AND BLM SENSITIVE SPECIES

The *Endangered Species Act* (ESA) (16 USC 1531-1543) protects listed threatened and endangered (T/E) plant and animal species and their critical habitats. A list of T/E species that potentially occur within the HQPA was provided by the Wyoming State Office of the USFWS. Endangered species are those species which are in danger of extinction throughout all or a significant portion of their range while threatened species are those species likely to become endangered in the foreseeable future throughout all or a significant portion of their range. Proposed species are those species for which the USFWS has published proposed rules in the *Federal Register* for listing of the species, but for which a final rule has not been adopted.

3.16.1 Federally Listed Animal and Plant Species

Federally listed species identified by the USFWS in their response to project scoping that may occur in the vicinity of the HQPA include the threatened bald eagle, the endangered black-footed ferret, the threatened Preble's meadow jumping mouse, the threatened Ute ladies'-tresses as well as five species found downstream in the North Platte River drainage that could be affected by water depletions as shown in Table 3.7. In 2003, the USFWS issued a decision that the mountain plover did not warrant protection under the ESA. Likewise, the USFWS recently issued a similar decision on greater sage grouse and elected not to list the species at this time. Therefore, neither of these species currently warrant protection under the ESA.

A discussion of those T/E species identified by the USFWS as potentially occurring within the HQPA follows.

Bald Eagle *(Haliaeetus leucocephalus)*. The bald eagle is a threatened species (down-listed from endangered and now proposed for removal from federal listing) that requires cliffs, large trees, or sheltered canyons associated with a concentrated food source (e.g., fish or waterfowl concentration areas) for nesting and/or roosting areas. Bald eagles forage over wide areas during the non-nesting season (i.e., fall and winter) and scavenge on animal carcasses such as pronghorn, deer, elk, sheep, and cattle (Edwards 1969; Snow 1973; Call 1978; Steenhof 1978; Peterson 1986).

Survey flights during the early 1980's suggested that more bald eagles were foraging in rangelands than along the rivers and other large water bodies. In this regard, open rangelands throughout east-central Wyoming are probably being used opportunistically by bald eagles for foraging (BLM 2005); however, the Wyoming Natural Diversity Database (WYNDD) contains no records of bald eagles within or adjacent to the proposed project area (WYNDD 2005) and BLM's GIS database also indicates that there are no documented bald eagle roost or nest locations within a one-mile radius of the HQPA.

Table 3.7 Federally Listed Threatened and Endangered Species and Their Potential Occurrence within the Huxtable Quarry Project Area

Common Name	Scientific Name	Federal Status [1]	Potential Occurrence Within the HQPA [2]
Mammals			
Black-footed ferret	*Mustela nigripes*	E	X
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	T	R
Birds			
Bald eagle[3]	*Haliaeetus leucocephalus*	T	O
Interior least tern [4]	*Sterna antillarum*	E	X
Piping plover [4]	*Charadrium melodus*	T	X
Eskimo curlew [4]	*Numenius borealis*	E	X
Fish			
Pallid sturgeon [4]	*Scaphirhynchus albus*	E	X
Plants			
Ute ladies'-tresses	*Spiranthes diluvialis*	T	X
Western prairie fringed orchid [4]	*Plantanthera praeclara*	T	X

[1] Federal status: E = listed as federally endangered.
T = listed as federally threatened.

[2] Species occurrence:

O = occasional; this species may occur in the HQPA during specific times of the year and may be locally common when suitable food is available; generally not present for extended periods.
R = rare; species may occur in the HQPA for just a few days or hours (e.g., stopping over during migration), or the species has only occasionally or rarely been sighted in the HQPA. Encounters during the proposed action are very unlikely.
X = unlikely; there has been no recent historical record of the species' occurrence in the HQPA; probability of encountering the species during project-related activity is very unlikely.

[3] Proposed for removal from federal listing.

[4] North Platte River species.

Black-footed Ferret (*Mustela nigripes)*. The black-footed ferret, an endangered species, was once distributed throughout the high plains of the Rocky Mountain and western Great Plains regions (Clark and Stromberg 1987; Forrest et al. 1985). Prairie dogs *(Cynomys sp.)* are the primary food source for black-footed ferrets (Sheets et al. 1972), although historically a few black-footed ferrets have been collected away from prairie dog towns (Forrest et al. 1985).

As there are no prairie dog towns within the HQPA, impacts to black-footed ferrets will not occur; consequently, this species will not be addressed further in this analysis document (AEC 2005).

Preble's meadow jumping mouse *(Zapus hudsonius preblei)*. Preble's meadow jumping mouse, a threatened species, is a potential resident in riparian habitats east of the Laramie Mountains and south of the North Platte River drainages. All subspecies of *Zapus* in Wyoming are strongly associated with riparian areas, and are seldom found outside of heavy vegetation immediately adjacent to flowing streams. Preble's meadow jumping mouse is strongly associated with foothills and plains riparian areas. Heavy herbaceous cover is vital, and the highest densities of *Z. h. preblei* have been recorded in areas with some woody (e.g., cottonwood, willow) overstory. (Beauvais 2001; Keinath 2001; Keinath et al. 2003).

A single male *Z. h. preblei* was captured on Bed Tick Creek in June of 1999 approximately 1.5 miles east (downstream) of the proposed rock quarry access road crossing. The mouse was captured in conjunction with an inventory conducted for Wyoming Interstate Company's Medicine Bow Lateral natural gas pipeline. There are no other known occurrences of *Z .h. prebeli* recorded within or directly adjacent to the proposed project area (WYNDD 2005).

Ute ladies'-tresses *(Spiranthes diluvialis)*. Ute ladies'-tresses, a threatened species, is a perennial orchid that occurs primarily on moist, sub-irrigated or seasonally flooded soils in valley bottoms, gravel bars, old oxbows, or floodplains bordering springs, lakes, rivers, or perennial streams at elevations between 1,800 and 6,800 feet (Fertig 2000; Keinath et al. 2003; Spackman et al. 1997). Where Ute ladies'-tresses occur in ephemeral drainages, ground water is typically shallow (i.e., within approximately 18 inches of the ground surface) (BLM 2004, 2005). The plant has been found locally in the North Platte River drainage below Alcova Reservoir and in the drainages of the Cheyenne and Niobrara Rivers in southeastern Wyoming.

Four occurrences of the species have been recorded in Wyoming, with all discoveries made between 1993 and 1997. The closest recorded occurrence of Ute ladies'-tresses to the HQPA is in northwestern Converse County approximately 50 miles to the north/northwest, and there have been no occurrences recorded within the project area or elsewhere in southern Converse County (Fertig 2000; Keinath et al. 2003; WYNDD 2005). There are no perennial streams with associated riparian habitats as discussed above within the HQPA (AEC 2005) and there have been no occurrences of *S. diluvialis* recorded within the project area (WYNDD 2005). Consequently, this species is not discussed further in this EA.

North Platte River Species. In addition to the species listed above, the USFWS also identified five T/E species that may occur in the downstream riverine habitats of the North Platte River in Nebraska. These species include the endangered interior least tern *(Sterna antillarum)*, the threatened piping plover *(Charadrium melodus)*, the endangered pallid sturgeon *(Scaphirhynchus albus),* the endangered Eskimo curlew *(Numenius borealis)*, and the threatened Western prairie fringed orchid *(Platanthera praeclara)*. These species could be adversely affected by surface water depletions in the North Platte River system resulting from project-related activities.

3.16.2 BLM Sensitive Species

BLM sensitive species are those species that may warrant future designation as proposed T/E species, but available data are not currently sufficient for USFWS to make such a decision. Table 3.8 provides a listing of those BLM sensitive species that could potentially within the State of Wyoming.

BLM sensitive animal and plant species potentially occurring in the general vicinity of the HQPA include ferruginous hawk, American peregrine falcon, greater sage-grouse, mountain plover, burrowing owl, loggerhead shrike, sage thrasher, Brewer's sparrow, fringed myotis, Townsend's big-eared bat, swift fox, and northern leopard frog (WYNDD 2005). There may be some overlap of avian species between Table 3.6 and Table 3.8.

Of the BLM sensitive species identified in Table 3.7 that could potentially occur within the overall project area, three species are more likely to occur within the HQPA based upon a review of habitat types within the project area conducted by AEC on February 24, 2005 and include ferruginous hawk, greater sage-grouse and mountain plover.

Ferruginous hawk (*Buteo regalis*). No ferruginous hawk nests were identified within the HQPA in conjunction with a biological inventory conducted on February 24, 2005 (AEC 2005).

Greater sage-grouse (*Centrocercus urophasianus*). There are two (2) historic greater sage-grouse leks known to exist within this general area of southern Converse County including:

- Poison Lake Road lek: SW¼SW¼NE¼ of Section 36, T31N, R72W; and

- Faulkenberg lek: SW¼NE¼SW¼ of Section 25, T31N, R73W.

The Poison Lake Road lek was active in 1995 and inactive between 1997 and 2000. Strutting activity at the Poison Lake Road lek is not known for the years 1994, 1996 and 2001 through 2003. Strutting activity at the Faulkenberg lek is not known for the ten year period from 1994 through 2003 (WGFD 2003b). None of the above leks are within 5 miles of the HQPA and there are no other known greater sage-grouse leks within a 5 mile radius of the proposed project area. Potential sage grouse nesting and early brood-rearing habitat (based upon observations of shrub height and densities) is not known to exist within the HQPA with the exception of the potential stockpile location directly south of the Cold Springs Road (NE¼NW¼NW¼ of Section 28, T32N, R72W) (AEC 2005).

Mountain plover (*Charadrius montanus*). Mountain plover inhabit the high, dry short-grass plains east of the Rocky Mountains (Dinsmore 1983) as well as the sagebrush grasslands throughout Wyoming (WGFD 1999), and are documented to breed throughout Wyoming, especially in prairie dog colonies (WGFD 1999). Potential mountain plover habitat is not known to exist within the HQPA (AEC 2005).

Table 3.8 Wyoming BLM Sensitive Species and Their Habitat Preferences

Species		Habitat	Likely to Occur [1]
Common Name	**Scientific Name**		
Mammals			
Long-eared Myotis	*Myotis evotis*	Conifer and deciduous forests, caves and mines	N
Fringed Myotis	*Myotis thysanodes*	Conifer forests, woodland-chaparral, caves and mines	N
Spotted Bat	*Euderma maculatum*	Cliffs over perennial water, basin-prairie shrub	N
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Forests, basin-prairie shrub, caves and mines	N
Pygmy Rabbit	*Brachylagus idahoensis*	Basin-prairie and riparian shrub	N
White-tailed Prairie Dog	*Cynomys leucurus*	Basin-prairie shrub, grasslands	N
Wyoming Pocket Gopher	*Thomomys clusius*	Meadows with loose soil	N
Idaho Pocket Gopher	*Thomomys idahoensis*	Shallow stony soils	N
Swift Fox	*Vulpes velox*	Grasslands	N
Birds			
White-faced Ibis	*Plegadis chihi*	Marshes, wet meadows	N
Trumpeter Swan	*Cygnus buccinator*	Lakes, ponds, rivers	N
Northern Goshawk	*Accipter gentilis*	Conifer and deciduous forests	N
Ferruginous Hawk	*Buteo regalis*	Basin-prairie shrub, grassland, rock outcrops	Y
Greater Sage-grouse	*Centrocercus urophasianus*	Basin-prairie shrub, mountain-foothill shrub	Y
Long-billed Curlew	*Numenius americanus*	Grasslands, plains, foothills, wet meadows	N
Yellow-billed Cuckoo	*Coccyzus americanus*	Open woodlands, streamside willow and alder groves	N
Burrowing Owl	*Athene cunicularia*	Grasslands, basin-prairie shrub	N
Sage Thrasher	*Oreoscoptes montanus*	Basin-prairie shrub, mountain-foothill shrub	Y
Loggerhead Shrike	*Lanius ludovicianus*	Basin-prairie shrub, mountain-foothill shrub	Y
Brewer’s Sparrow	*Spizella breweri*	Basin-prairie shrub	N
Mountain Plover	*Charadrius montanus*	Shortgrass, great basin-foothills grassland, and sagebrush-grasslands	N
Fish			
Roundtail Chub	*Gila robusta*	Colorado River drainage, mostly large rivers, also streams and lakes	N
Leatherside Chub	*Gila copei*	Bear, Snake and Green drainages, clear, cool streams and pools	N
Bluehead Sucker	*Catostomus discobolus*	Bear, Snake and Green drainages, all waters	N
Flannelmouth Sucker	*Catostomus latipinnis*	Colorado River drainage, large rivers, streams and lakes	N
Colorado River Cutthroat Trout	*Oncorhynchus clarki pleuriticus*	Colorado River drainage, clear mountain streams	N
Reptiles			
Midget Faded Rattlesnake	*Crotalus viridis concolor*	Mountain foothills shrub, rock outcrop	N

Table 3.8 Continued

Species		Habitat	Likely to Occur [1]
Common Name	**Scientific Name**		
Amphibians			
Boreal (Northern Rocky Mountain population) Toad	*Bufo boreas boreas*	Pond margins, wet meadows, riparian areas	N
Spotted Frog	*Ranus pretiosa (lutieventris)*	Ponds, sloughs, small streams	N
Plants			
Meadow Pussytoes	*Antennaria arcuata*	Moist, hummocky meadows, seeps or springs surrounded by sage/grasslands 4,950-7,900 ft	N
Small Rock Cress	*Arabis pusilla*	Cracks/crevices in sparsely vegetated granite and pegmatite outcrops within sage/grasslands 8,000-8,100 ft	N
Mystery Wormwood	*Artemisia biennis* var. *diffusa*	Clay flats and playas 6,500 ft	N
Nelson's Milkvetch	*Astragalus nelsonianus* or *Astragalus pectinatus* var. *platyphyllus*	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely vegetated sagebrush, juniper and cushion plant communities at 5,200-7,600 ft	N
Precocious Milkvetch	*Astragalus proimanthus*	Cushion plant communities on rocky, clay soils mixed with shale on summits and slopes of white shale hills 6,800-7,200 ft	N
Cedar Rim Thistle	*Cirsium aridum*	Barren, chalky hills, gravelly slopes, and fine textured, sandy-shaley draws 6,700-7,200 ft	N
Ownbey's Thistle	*Cirsium ownbeyi*	Sparsely vegetated shaley slopes in sage and juniper communities 6,440-8,400 ft	N
Wyoming Tansymustard	*Descurainia torulosa*	Sparsely vegetated sandy slopes at base of cliffs of volcanic breccia or sandstone 8,300-10,000 ft	N
Large-fruited Bladderpod	*Lesquerella macrocarpa*	Gypsum-clay hills and benches, clay flats, and barren hills 7,200-7,700 ft	N
Stemless Beardtongue	*Penstemon acaulis* var. *acaulis*	Cushion plant or Black sage grassland communities on semi-barren rocky ridges, knolls, and slopes at 5,900-8,200 ft	N
Beaver Rim Phlox	*Phlox pungens*	Sparsely vegetated slopes on sandstone, siltstone, or limestone substrates 6,000-7,400 ft	N
Tufted Twinpod	*Physaria condensata*	Sparsely vegetated shale slopes and ridges 6,500-7,000 ft	N
Green River Greenthread	*Thelesperma caespitosum*	White shale slopes and ridges of Green River Formation 6,300 ft	N
Uinta Greenthread	*Thelesperma pubescens*	Sparsely vegetated benches and ridges on coarse, cobbly soils of Bishop Conglomerate 8,200-8,900 ft	N
Cedar Mountain Easter Daisy	*Townsendia microcephala*	Rocky slopes of Bishop Conglomerate 8,500 ft	N

[1] Y = Likely to occur in or in the vicinity of the HQPA based on habitat and WYNDD data (2005).

N = Not likely to occur in or in the vicinity of the HQPA based on habitat and WYNDD data (2005).

4.0 ENVIRONMENTAL CONSEQUESNCES

In accordance with 40 CFR 1502.16, this chapter of this EA includes a discussion of the potential environmental consequences of the Proposed Action, Project Alternatives and the No Action Alternative for each of the affected resources. An environmental impact is defined as a change in the quality or quantity of a given resource due to a modification in the existing environment resulting from project-related activities. Impacts may be beneficial or adverse, may be a primary (direct) or secondary (indirect) result of an action, and may be permanent and long-term or temporary and of short duration. Impacts may vary in degree from a slight discernible change to a total change in the environment. This impact assessment assumes that all construction and reclamation measures described in the Proposed Action would be successfully implemented. If such measures are not implemented, additional adverse impacts may occur.

Generally speaking, the residual and cumulative impacts associated with both the Proposed Action and Alternative A are virtually identical, with Alternative A increasing the initial (overall) disturbance by 30 acres and extending the LOP for an additional 15 years. LOP disturbance would increase from 18 acres for the Proposed Action to 48 acres for Alternative A. As a consequence, discussions of both residual and cumulative impacts for the Proposed Action and Alternative A will be combined for each resource, rather than broken down into a separate discussion by alternative. In those cases where additional impacts may result from Alternative A, these impacts will be disclosed and discussed accordingly for each affected resource.

4.1 GENERAL DISCUSSION OF CUMULATIVE IMPACTS

Cumulative impacts result from the incremental impacts of an action added to other past, present and reasonably foreseeable future actions, irregardless of the party or parties responsible for such actions. Cumulative impacts may result from individually minor, but collectively significant, actions occurring over a period of time (40 CFR 1509.7).

The general project area has been utilized continuously for agricultural purposes (livestock grazing) since the early twentieth century and the natural environment of the general project area remains largely unaffected by human-related activities (BLM 2001). Prior surface disturbing activities within the general HQPA have been primarily limited to agricultural and rural modifications to the existing landscape including the conversion of native vegetation to crops and cropland for the production of domestic livestock forage such as alfalfa, construction of rural highways to serve outlying ranches and residences, and minor surface disturbing activities associated with the installation of an infrastructure (e.g., fences, power lines, telephone lines, etc.) commensurate with the current rural/agricultural land uses in the area. Commercial development in the area to date has been somewhat limited and includes the two facilities discussed below.

- Medicine Bow Lateral natural gas pipeline owned and operated by Wyoming Interstate Gas Company. The pipeline ROW is approximately 1.5 miles to the east of the HQPA. The pipeline was installed ca 2000 and the pipeline ROW has since been reclaimed and revegetated.

- Wills Quarry owned and operated by 71 Construction. The Wills quarry was approved in 2001 to develop an industrial non-metallic mineral and decorative rock deposit on private surface estate in Sections 10, 11, 13, 14, 15 and 23 in Township 31 North, Range 72 West. The Wills quarry is located approximately 13,000 feet (2.46 miles) southeast of the proposed HQPA (at its closest point) and is projected to disturb approximately 10 acres per year. Total surface disturbance associated with the Wills quarry is estimated to be 500 acres over the LOP, which is estimated to be 75 years (BLM 2001).

Other than the Wills quarry referenced above, there are currently no other large-scale industrial or commercial developments such as oil and gas exploration and development, quarrying operations, logging activities, or other industrial developments within the general project area. Moreover, BLM is unaware of any reasonably foreseeable future actions proposed within the general project area that would contribute to any cumulative impacts.

The Proposed Action would result in 22 acres of total (initial) surface disturbance and 18 acres of long-term (LOP) surface disturbance due to mining activities. This surface disturbance would be in addition to the 500 acres of surface disturbance previously authorized for the Wills Quarry Project (BLM 2001).

Cumulative impacts associated with Alternative A would be virtually identical to those discussed for the Proposed Action (above) with the exception that quarry site would be increased from 10 acres to 40 acres with a concomitant increase in surface disturbance. The estimated LOP for Alternative A would also be increased from 15 years to 30 years.

All environmental resources have been evaluated for cumulative impacts in accordance with BLM directives (BLM 2004) and a determination has been made that cumulative impacts would be negligible because there are no past, present, or reasonable foreseeable future actions that, when combined with the Proposed Action or Alternative A, would result in impacts beyond those that already exist.

4.2 AIR QUALITY

4.2.1 Introduction

Air quality impacts are limited by regulations, standards, and implementation plans established under the *Clean Air Act* and State of Wyoming law, as administered by WDEQ/AQD. Under the Federal Land Policy Management Act (FLPMA) and the *Clean Air Act*, the BLM can not conduct or authorize any activity which does not conform to all applicable local, state, tribal or Federal air quality laws, statutes, regulations, standards or implementation plans.

4.2.2 Significance Criteria

The significance criteria for air quality include both state and federally enforced legal requirements to ensure that ambient air pollutant concentrations remain below specified levels.

These include both National Ambient Air Quality Standards (NAAQS) and Wyoming Ambient Air Quality Standards (WAAQS), and the Prevention of Significant Deterioration (PSD) Class I and Class II increments (which limit specific air pollutant concentration increases above a baseline value in specific areas), as listed in Table 4.1.

Table 4.1 Background Air Quality Concentrations, Ambient Standards and PSD Increments in Micrograms per Cubic Meter ($\sigma g/m^3$)

Airborne Pollutant	Averaging Time[1]	Background Concentration	Air Quality Standards		PSD Increments	
			WAAQS	NAAQS	Class I	Class II
Carbon Monoxide (CO)	1-hour	3,336	40,000	40,000	None	None
	8-hour	1,381	10,000	10,000	None	None
Nitrogen Dioxide (NO_2)	Annual	5.0	100	100	2.5	25
Ozone (O_3)	1-hour	162	235	235	None	None
	8-hour	150	157	157	None	None
Sulfur Dioxide (SO_2)	3-hour	93	1,300	1,300	25.0	512
	24-hour	32	260	365	5.0	91
	Annual	4	60	80	2.0	20
PM_{10}	24-hour	47	150	150	8.0	30
	Annual	16	50	50	4.0	17
$PM_{2.5}$	24-hour	15	65	65	None	None
	Annual	5	15	15	None	None

4.2.3 Direct and Indirect Impacts

4.2.3.1 Proposed Action

Pollutants of concern associated with the Proposed Action are regulated by the WDEQ/AQD and primarily include total suspended particulates (TSP) and particulates less than 10 microns in diameter (PM_{10}). The Proposed Action would not have any permanent facilities that would emit nitrogen oxide (NO_x), sulfur oxide (SO_x), carbon monoxide (CO), volatile organic compounds (VOC), or any hazardous air pollutant. Blasting may generate minor emissions of NO_x. Fugitive dust emissions would primarily occur while the quarry is operating and would be limited to the active quarry work area and access (haul) road. Depending on climatic conditions, some fugitive dust emissions would occur until reclamation operations have been completed. As described in

the Proposed Action, the project proponent would be responsible for treating and maintaining the private access (haul) road in a manner that would control fugitive dust and protect the structural integrity of the road.

Prior to the initiation of quarrying operations, the Proposed Action would be evaluated by WDEQ/AQD for compliance with state air quality standards and permitting requirements. If WDEQ/AQD determines a permit is required for the Proposed Action, the project proponent would prepare any required permit application information and comply with all applicable air quality standards and permit stipulations. Typically, an operation of the scale envisioned under the Proposed Action would not meet the emission threshold specified under Chapter 6, Section 2(k)(viii) of the Wyoming Air Quality Standards and Regulations (WDEQ/AQD 2000b), and a formal permit for the quarry site would be waived by WDEQ/AQD.

On the other hand, portable quarrying or processing equipment such as the crusher, screens, and/or conveyor belts utilized at the proposed project area are permitted separately by WDEQ/AQD as a portable air emission source under Wyoming Air Quality Standards and Regulations (WDEQ/AQD 2000b). All portable quarrying or processing equipment utilized under the Proposed Action would be properly permitted by the WDEQ/AQD.

A site-specific air quality permit will be required or issued by the WDEQ/AQD for the quarry site and the project proponent would comply with Chapter 3, Section 2(f) of the Wyoming Air Quality Standards and Regulations. This regulation requires all fugitive dust emissions to be limited to prevent unnecessary amounts of particulate matter from becoming airborne and requires the use of water and/or chemical dust suppressant on all unpaved haul roads, access roads and work areas utilized during the operation of the Proposed Action.

4.2.3.2 Alternative A

Annual air quality emissions under Alternative A would be essentially identical to those described under the Proposed Action, except a 40 acre project area would be disturbed and fugitive dust emissions would occur for twice the amount of time projected under the Proposed Action. All other permitting and regulatory requirements discussed under the Proposed Action would apply to Alternative A.

4.2.4 No Action Alternative

Under the No Action Alternative, no mineral sale would occur, no quarrying would be conducted, there would be no additional development in the proposed project area, and impacts to air quality resources would remain at existing levels.

4.2.5 Mitigation and Monitoring

The following mitigation measure is recommended to minimize impacts to air quality resulting from the proposed Huxtable Mineral Materials Project.

- Dust abatement measures will be implemented to reduce fugitive dust emitted from activities associated with the proposed mining operations. The access road will be sprayed with water 2 to 5 times daily, as needed, during hauling activities. Water will also be used on the portable crusher and on any conveyance belts to minimize dust emissions.

4.2.6 Residual Impacts

There would be some temporary deterioration to air quality in the vicinity of the Proposed Action or Alternative A. However, these impacts would be within state-permitted air quality levels, and they would be localized and temporary.

4.2.7 Cumulative Impacts

Negligible cumulative impacts to air quality would be anticipated from the implementation of either the Proposed Action or Alternative A as discussed in Section 4.1.

4.3 NOISE

4.3.1 Introduction

Noise impacts are limited by regulations, standards, and implementation plans under the administration of by the Mine Safety and Health Administration (MSHA) and the Occupational Safety and Health Administration (OSHA). The BLM can not conduct or authorize any activity which does not conform to all applicable local, state, tribal or Federal laws, statutes, regulations, standards or implementation plans.

4.3.2 Significance Criteria

Impacts from noise may be considered as significant if long-term project activities exceed the 55-dBA standard for noise at residences and/or other noise-sensitive locations such as greater sage grouse leks during breeding season, raptor nests during breeding and nesting seasons, and big game crucial winter ranges during critical winter periods. The significance criteria for noise pollution include both state and federally enforced legal requirements to ensure that noise levels remain below specified levels.

4.3.3 Direct and Indirect Impacts

4.3.3.1 Proposed Action

Noise levels under the Proposed Action would increase during quarrying activities such as topsoil removal, drilling and blasting, material hauling and processing, and product loading and

transporting. Depending upon atmospheric conditions, the highest levels would probably be associated with the limited blasting activity that would occur approximately once or twice per year. The nearest residence is a ranch house located approximately 3,960 feet (0.75 miles) east of the proposed access (haul) road. Typical ambient noise levels at an operating large surface mine are in the 40 to 60 dBA range for a 24-hour period and within 50 feet of the operation the maximum noise level could reach or exceed 85 to 95 dBA (BLM 1992).

The primary noise-related impact from the Proposed Action would be the extended period of time noise would occur during quarrying and reclamation operations. However, since quarrying operations would be limited to typical business hours (Monday-Saturday, sunrise to sunset) there would be no noise-related impacts during non-operating hours or on Sundays and holidays. The increased noise level would have little additional off-site effect because of the remoteness of the proposed project area. Any increased noise would be reduced to pre-disturbance levels during non-operating periods and after quarrying and reclamation operations have been completed.

Wildlife in the immediate vicinity of the quarry may be adversely affected during periods of active quarrying operations; however, observations at other surface mining operations in Wyoming indicate that most wildlife species adapt to increased noise associated with quarrying operations (BLM 1999b). Nonetheless, quarrying operations would not be allowed during the period from November 15 through April 30 in any given year in order to minimize impacts to mule deer wintering in the area (see Section 4.11). Likewise, there are no known greater sage grouse leks within a five mile radius of the proposed HQPA, so noise generated in association with quarrying activities would not have an adverse effect on grouse breeding activities. Impacts to potential raptor breeding and nesting activity in the area are unlikely as there are no known historic raptor nests within the project area (AEC 2005).

4.3.3.2 Alternative A

Noise levels under Alternative A would be essentially identical to those described under the Proposed Action, except noise from quarrying operations would occur for twice the amount of time projected under the Proposed Action.

4.3.4 No Action Alternative

Under the No Action Alternative, no mineral sale would occur, no quarrying would be conducted, no additional noise would be generated form the proposed project area, and noise levels would remain at existing levels.

4.3.5 Mitigation and Monitoring

The following mitigation and monitoring measure is recommended in order to minimize the impacts of noise emanating from the proposed Huxtable Quarry Mineral Materials Project.

- Noise due to quarrying operations will be monitored during operation hours, and will be within the regulated limits provided by MSHA and OSHA. In addition to the above controls, stockpiles will be constructed at the opening of the canyon to muffle the noise generated by quarrying operations.

4.3.6 Residual Impacts

There would be an increase in noise levels under both the Proposed Action and/or Alternative A within the proposed project area. The highest noise levels would generally be limited to the active quarrying area and roads and would be limited to operating hours (Monday-Saturday, sunrise to sunset) and would be quickly dispersed by the wind.

4.3.7 Cumulative Impacts

Considering the pastoral nature of the overall project area and the general lack of substantial pre-existing noise emitters within the general HQPA, negligible cumulative impacts to noise would be anticipated from the implementation of either the Proposed Action or Alternative A.

4.4 CULTURAL RESOURCES

4.4.1 Introduction

Cultural resources, including archaeological and historic sites, on lands subject to federal authority are protected by various laws and regulations commencing with the *American Antiquities Act of 1906*. Specific directives concerning Cultural Resource Management can be found in *Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* (Federal Register 1983) and BLM Manual Section 8100. Prior to the initiation of any federal action, cultural resources must be inventoried and evaluated to determine their eligibility for inclusion in the NRHP. This evaluation is comprehensive screening process to determine significance and is designed to protect only the most significant sites. NRHP criteria (36 CFR 60.4) for determining eligibility define four (4) criteria of significance based upon "…the quality of significance in American history, architecture, archaeology, and culture present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association; and that:

- are associated with events that have made a significant contribution to the broad patterns of our society; or

- are associated with the lives of persons significant in our past; or

- embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

- have yielded, or may be likely to yield, information important in prehistory or history".

Cultural properties are generally not eligible for inclusion in the NRHP if they lack diagnostic artifacts, subsurface remains, or structural features. Furthermore, sites that cannot be placed in a temporal context or shown to be related to other sites are usually not eligible and therefore are not officially protected.

4.4.2 Significance Criteria

Guidelines for determining adverse impacts to any site currently on, or eligible for, the NRHP have been developed by the Advisory Council on Historic Preservation [36 CFR 800.9 (b)(1),(2),(3)]. These guidelines indicate that significant impacts to cultural resources would include the following:

- destruction or alteration of all or part of an eligible property;

- isolation of a cultural resource from, or alteration of, its surrounding environment;

- introduction of visual, audible, or atmospheric elements that are either out of character with the property or alter its setting; and/or

- neglect and subsequent deterioration thereof.

These adverse impacts could be in the form of either direct, indirect, or cumulative impacts to cultural resources, which are defined below.

1. Direct impacts would result from physical disturbance of the cultural resource, resulting in an adverse effect to the site and its setting. Construction activities would be the primary direct impact affecting identified sites or structures.

2. Indirect effects resulting from implementation of the Proposed Action would not immediately result in the physical alteration of the site or its setting. Construction of an access road into an area containing significant sites or structures would allow public access and the potential for subsequent artifact collection.

3. Indirect activities, such as collection, could ultimately alter the overall composition and contextual integrity of the site, resulting in a cumulative impact over time.

Determining the potential effect(s) of any impact depends upon the level of information available. Should the occasion arise where an unavoidable impact to cultural resources either on, or eligible for nomination to the NRHP was identified, the proponent would be required to develop a mitigation plan designed to minimize disturbance to the site. This mitigation plan would be developed in consultation with both the State Historic Preservation Officer (SHPO) and the appropriate Surface Management Agency (SMA). Commencement of construction

activities would not proceed until the mitigation plan had been approved by both the SHPO and SMA and subsequently implemented.

4.4.3 Direct and Indirect Impacts

4.4.3.1 Proposed Action

As described in Chapter 3, cultural resource surveys of the proposed project area were conducted in 2003 and again in 2004. Results of these surveys indicate that none of the sites within the survey area are eligible for listing on the NRHP. These sites include a previously recorded historic site that lies approximately 200 feet east of the proposed access (haul) road, which would not be directly affected (i.e., disturbed) by the proposed project. The examined homestead is not eligible for listing on the NRHP.

As indicated in Section 3.6, several comments received in conjunction with public scoping expressed concern regarding the potential impacts of the Proposed Action (and alternatives) on the Emigrant Trail. The trail itself would not be directly affected (i.e., there will be no direct surface impact or disturbance) by project-related activities. Moreover, the setting and visual integrity of the trail in this area has already been compromised by previous activities thereby rendering those segments of the trail that would be indirectly affected by the Proposed Action (and alternatives) as a non-contributing segment not requiring protection and/or mitigation.

4.4.3.2 Alternative A

Potential impacts to cultural resources under Alternative A would be essentially identical to those described under the Proposed Action, except impacts would occur on four times the area that would be disturbed under the Proposed Action. A Class III Cultural Resource Inventory was conducted on the alternate 40-acre quarry site and cultural clearance was subsequently recommended for said quarry site. Consequently, Alternative A would have a negligible impact on cultural resources in the affected area.

4.4.4 No Action Alternative

Under the No Action Alternative, no mineral sale would occur, no quarrying would be conducted, and no impacts to cultural resources would occur.

4.4.5 Mitigation and Monitoring

The following mitigation measure is recommended to minimize impacts to cultural resources resulting from the proposed Huxtable Quarry Mineral Materials Project.

- The operator would be responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any archaeological, historical, or vertebrate fossil objects on-site. If archaeological, historical, or vertebrate fossil materials are discovered, the operator would suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Operations would not resume until written authorization to proceed is issued by the Authorized Officer.

  Within five (5) working days, the Authorized Officer would evaluate the discovery and inform the operator of actions that would be necessary to prevent loss of significant cultural or scientific values.

  The operator would be responsible for the cost of any mitigation required by the Authorized Officer. The Authorized Officer would provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required mitigation has been completed, the operator would be allowed to resume operations.

4.4.6 Residual Impacts

The Proposed Action and/or Alternative A would not result in any unavoidable adverse (residual) impacts to identified cultural resources; however, some loss of unidentified cultural resources may occur. If unidentified cultural resources are located during quarrying operations, activity in the area would be halted, the proper regulatory authority would be contacted, and appropriate action undertaken to avoid impacts as recommended in Section 4.4.5, above.

4.4.7 Cumulative Impacts

All identified cultural/historical resources within the HQPA would either be avoided or potential impacts thereto mitigated in accordance with BLM/SHPO recommendations; consequently, no adverse cumulative impacts would occur to the cultural resources of the area.

4.5 MINERAL RESOURCES

4.5.1 Introduction

Existing mineral materials would be removed from the quarry area in conjunction with the proposed mining operation. The quantities of mineral material removed would be dependent upon the selected project alternative as discussed below.

4.5.2 Significance Criteria

The following criteria were used to determine the significance of impacts to the mineral resource:

- conflicts which could interfere with the recovery of other minerals;
- an unmanageable change to the existing geology; and
- geological changes that would impact the health and safety of the environment.

4.5.3 Direct and Indirect Impacts

4.5.3.1 Proposed Action

Under the Proposed Action, approximately 1.2 million tons of limestone, quartzite and moss rock would be excavated from the proposed project area over the LOP. At least 75% of these materials would be utilized in construction-related activities, with the remaining unmarketable materials returned to the quarry. The moss rock collected from the surface would be used for decorative landscaping purposes.

At this time there are no other known deposits of commercial mineral materials (resources) within the proposed HQPA.

4.5.3.2 Alternative A

Potential impacts to mineral resources under Alternative A would be essentially identical to those described under the Proposed Action except that an additional 5.7 million tons (+/-) of mineral material would be excavated from the 40-acre quarry.

4.5.4 No Action Alternative

Under the No Action Alternative, no mineral sale would occur, no quarrying would be conducted, and no impacts to mineral resources would occur.

4.5.5 Mitigation and Monitoring

No mitigation or monitoring is recommended.

4.5.6 Residual Impacts

The removal of sand and gravel, limestone, quartzite, and moss rock resources from the HQPA, as described for the Proposed Action and Alternative A would constitute an unavoidable adverse (residual) impact upon the mineral resource.

4.5.7 Cumulative Impacts

The 1.2 million tons of mineral material removed from the proposed quarry under the Proposed Action (5.7 million tons estimated under Alternative A) would be in addition to the 28 million tons of mineral material (limestone, quartzite and moss rock) expected to be mined from the Wills quarry over the estimated LOP. The Proposed Action would increase mineral material production from this general area of southern Converse County by approximately four percent with a twenty percent increase in mineral material production for Alternative A. As a consequence, negligible cumulative impacts to the mineral resources of the overall area would be anticipated from the implementation of either the Proposed Action or Alternative A.

4.6 RECREATION

4.6.1 Introduction

The proposed HQPA exists entirely on privately-owned surface estate and access to the area is strictly controlled by the project proponent. The area sees limited use for recreational activities in the early fall (primarily the months of September and October) in conjunction with hunting season by permission only. The area is also used for horseback riding and hiking. There are very limited public lands in the area that are accessible and thereby available for public recreational purposes. As a consequence, the value of the area for general recreational purposes is limited at best.

4.6.2 Significance Criteria

Impacts to recreation would be considered significant if project development changes the recreational use of the area or would result in a violation of the PRRA RMP or other land use planning recreational objectives.

4.6.3 Direct and Indirect Impacts

4.6.3.1 Proposed Action

Under the Proposed Action, a maximum of 22 acres would be disturbed over the LOP. Recreational opportunities would be temporarily limited within the overall project area, which is comprised entirely of all private surface estate. Once mining operations have been completed and the disturbed areas successfully reclaimed, big game species would likely re-occupy the HQPA and hunting opportunities would be restored to pre-disturbance levels. Likewise, the other recreational activities mentioned above would be available within the project area.

Considering the limited recreational opportunities currently available on the private surface estate encompassed within the HQPA, the Proposed Action would have a negligible impact on public recreational opportunities within the overall area.

4.6.3.2 Alternative A

Direct impacts to public recreational opportunities within the HQPA would be similar to those described under the Proposed Action; however, the impacts would occur over a larger area for an additional 15 years. Nonetheless, Alternative A would have a negligible impact on public recreational opportunities within the overall area due to existing land ownership patterns therein which restrict public access and concomitant recreation opportunity.

4.6.4 No Action Alternative

Under the No Action Alternative, no mineral sale would occur, no quarrying would occur, and recreational opportunities within the proposed project area would continue at current rates.

4.6.5 Mitigation and Monitoring

No mitigation or monitoring is recommended.

4.6.6 Residual Impacts

There would be a temporary, but avoidable, decrease in recreational opportunities within the disturbed portion of the proposed project area due to implementation of either the Proposed Action or Alternative A. However, the surface rights of the proposed project area are privately owned, and the public does not currently have free access to the proposed project area. Access to the proposed project area is only allowed by permission from the project proponent. As a consequence, recreational opportunities for the general public would not be affected by selection of either the Proposed Action or Alternative A.

4.6.7 Cumulative Impacts

The general area is predominately private surface estate with limited access; consequently, recreational opportunities for the general public within the area are extremely limited. Implementation of the Proposed Action or Alternative A would not change these surface ownership patterns or result in a cumulative reduction in (loss of) public recreational opportunities in the affected area(s).

4.7 SOCIOECONOMICS

4.7.1 Introduction

As previously mentioned, the HQPA is currently being used for agricultural and very limited recreational purposes and therefore is not contributing significantly to the economic development

of the local community. Access to the proposed quarry area would cross lands currently being used for ranching operations by the project proponent. Economic development in the surrounding community has been primarily limited to rural expansion and agricultural operations similar to current surface use patterns employed by the project proponent and his neighbors in the general area.

4.7.2 Significance Criteria

The Records of Decision (RODs) for both the Green River and Pinedale Resource Area RMPs (BLM 1988b, BLM 1997b), as well as land use plans prepared for the State of Wyoming by the Wyoming State Land Use Commission (1979) identify the following management goals/objectives associated with socioeconomics:

- to coordinate land use decisions with economic factors and needs;
- to mitigate economic, social, and environmental impacts on communities caused by rapid or large-scale growth and development;
- to plan for the provision of public facilities and services, including safe and efficient transportation and utility systems, in coordination with local land use policies, goals, and objectives; and
- to provide adequate, suitable land(s) to meet the housing needs of all residents.

BLM (2004b) criteria stipulate that impacts to socioeconomic resources would be considered potentially significant if any of the following were to occur:

- changes in total employment exceed an increase of 1% of the trend, or
- changes in local tax revenues exceed an increase or decrease of 15% of the trend.

4.7.3 Direct and Indirect Impacts

4.7.3.1 Proposed Action

Assuming a typical annual production rate of 280,000 tons of mineral material per year, approval and implementation of the Proposed Action would probably not require any new employees. Employees currently working at other mining/construction/quarrying operations within the general area would conduct operation s in the proposed Huxtable quarry. The Proposed Action would generate approximately $80,000 per year in direct employee wages ($6,000,000 over the LOP). These figures do not include wages generated from secondary employment opportunities associated with the Proposed Action or Alternative A.

The Proposed Action would result in income from mineral sales to the federal government of approximately $140,000 per year ($600,000 over the LOP). State and county governments would receive about $45,400 per year in sales tax revenue ($194,312 over the LOP), and total federal and state payroll taxes (employee and employer contributions) would also generate approximately $44,000 per year ($188,320 over the LOP). The Proposed Action would generate a total tax revenue income for federal and state governments of approximately $229,400 per year ($981,832 over the LOP) based upon a mineral materials production rate of 280,000 tons per year. These figures do not include indirect revenue generated for federal and state governments from secondary employment taxes and other applicable taxes such as sales and fuel taxes.

The Proposed Action would generate a total of approximately $389,400 per year ($1,666,632 over the LOP) in employee wages and total federal and state tax revenue. The wages and tax revenue projections presented above are only estimates based on the typical annual mineral material production rates described above. Actual wages and tax revenues generated from the Proposed Action would be based on the actual tonnage of mineral materials sold in any given year and cannot be accurately estimated.

Since there would be no change in estimated employment associated with the Proposed Action, there would be no adverse (negative) impacts to area socioeconomics. Likewise, there would be no impacts to the existing infrastructure (e.g., housing, utilities, schools, hospitals, etc.) in either the city of Douglas or Converse County.

4.7.3.2 Alternative A

Approval and implementation of Alternative A would result in approximately the same annual wages and tax revenues generated as described for the Proposed Action, with these wages and tax revenues extended for approximately 15 additional years. Royalty estimates for the LOP would be increased by an approximate factor of 3.75 as the quarry would remove an additional 4.5 million tons of mineral materials from the quarry in addition to the 1.2 million tons of material expected to be removed in conjunction with the Proposed Action. Otherwise, the potential socioeconomic impacts anticipated in conjunction with Alternative A would be similar to those described for the Proposed Action.

4.7.4 No Action Alternative

Under the No Action Alternative, no mineral materials sale would occur and quarrying would not be conducted in the HQPA. As a consequence, the socioeconomics of Converse County would remain as before and would be unchanged by the prospect of mining activities in conjunction with either the Proposed Action or Alternative A.

4.7.5 Mitigation and Monitoring

No mitigation is recommended.

The quantities of mineral materials removed from the quarry will be closely monitored to determine taxable quantities and federal revenues. A scale will be placed in the HQPA to weigh each load prior to leaving the project area.

4.7.6 Residual Impacts

The Proposed Action would provide continuing employment for residents of Converse County and would generate millions of dollars in wages for these employees as well as tax revenues for federal and state government over the LOP. These figures would increase proportionately for Alternative A. There would be no negative impacts to the local infrastructure in the city of Douglas or in the Converse County area. As a result, no unavoidable adverse (residual) impacts are expected to occur to the local economy resulting from implementation of either the Proposed Action or Alternative A.

4.7.7 Cumulative Impacts

No negative cumulative impacts would occur to the socioeconomics of the city of Douglas or to Converse County resulting from implementation of either the Proposed Action or Alternative A. Positive cumulative impacts would include the generation of additional local, state and federal revenues associated with the production of mineral materials from the proposed Huxtable quarry. The quarry would also provide a source of employment for local residents thereby augmenting the local tax base and providing an additional source of income to the local community.

4.8 SOIL RESOURCES

4.8.1 Introduction

Impacts that could result from quarry operations within the HQPA would include the removal of vegetation, subsequent exposure and disturbance of the soil, mixing of soil horizons, an increase in the susceptibility of the soil to wind/water erosion, loss of the soil resource, and an overall alteration in the topography of the affected areas(s). The initial disturbance of the soil, in association with the potential loss of soil through erosion, could ultimately reduce both the quantity and productivity of topsoil available for reclamation operations. However, all available topsoil would be salvaged during initial construction and stockpiled for later reclamation of mined areas in order to assure that the natural fertility and reclamation potential of the topsoil resource is not reduced.

Increased surface runoff and water erosion would primarily occur in the short-term and would decline over time due to natural stabilization and surface crusting. Soil and climatic factors in the overall area, combined with utilization of technological and/or mechanical applications designed to enhance revegetation would generally ensure stabilization of each disturbed area within one (1) to two (2) years after initial disturbance.

4.8.2 Significance Criteria

Impacts to soils resulting from quarrying operations associated with the Proposed Action would be considered as significant if:

- mining activity resulted in increased erosion that could not be reduced by 50% one year after initial soil disturbance and by 75% five years after initial soil disturbance; and/or
- reclamation of disturbed areas would not result in the establishment of vegetative cover adequate to stabilize the site within 5 years.

4.8.3 Direct and Indirect Impacts

4.8.3.1 Proposed Action

The Proposed Action would result in approximately 22 acres of disturbance over the LOP as shown in Table 4.2. Direct impacts to soils would include the removal of vegetation, exposure of the soil, mixing of soil horizons, loss of topsoil productivity, soil compaction, and increased susceptibility to wind and water erosion. These impacts may, in turn, result in increased runoff, erosion, and the potential introduction of sediments into the North Platte River system.

Table 4.2 Land Disturbance Summary for the Proposed Action and Alternative A in Acres

Project Disturbance	Initial Disturbance		LOP Disturbance	
	Proposed Action	Alternative A	Proposed Action	Alternative A
Quarry Area	10.0	40.0	10.0	40.0
Access Road	10.9	10.9	7.3	7.3
Material Stockpiles	1.0	1.0	1.0	1.0
Total Acres	**21.9**	**51.9**	**18.3**	**48.3**

4.8.3.2 Alternative A

Alternative A would result in approximately 52 acres of initial (short-term) and 48 acres of long-term (LOP) surface disturbance as shown in Table 4.2. With disturbance limited to a maximum of 10 acres per year, direct impacts to soils would be similar to those described under the Proposed Action. Although the surface disturbance associated with Alternative A would be limited to 10 acres at any one time, the overall disturbed area would increase by 30 acres and impacts associated with mining activities would be extended for an additional 15 years.

4.8.4 No Action Alternative

Under the No Action Alternative, no mineral sale would occur, no quarrying would be conducted, and existing impacts to soil resources in the HQPA would continue to occur at current rates.

4.8.5 Mitigation and Monitoring

No mitigation or monitoring is recommended.

4.8.6 Residual Impacts

Implementation of either the Proposed Action or Alternative A would result in some increased and unavoidable soil loss through wind and water erosion. Productivity of some disturbed soils would be reduced due to the removal of vegetation, exposure of the soil, mixing of soil horizons, and increased susceptibility to wind and water erosion. High walls created in conjunction with mechanical rock mining activities would likely remain unreclaimed forever. Salvaged topsoil removed from these high wall areas prior to mining would likely be utilized in other (more level) areas of the quarry to achieve some degree of long-term reclamation.

4.8.7 Cumulative Impacts

Mining activities associated with either the Proposed Action or Alternative A would result in an additional 22 and 52 acres of total (initial) surface disturbance respectively. LOP surface disturbance would equal 18 and 48 acres respectively. This disturbance would be in addition to the 500 acres of total (initial) surface disturbance proposed in conjunction with the proposed Wills quarry and would represent a four percent increase in total soil disturbance in the general area attributable to the Proposed Action and a ten percent increase in total soil disturbance attributable to Alternative A. LOP disturbance in the general area would increase by three and nine percent respectively and would be considered as a negligible cumulative impact to the soil resource.

4.9 TRANSPORTATION

4.9.1 Introduction

The HQPA is located within a relatively rural environment approximately 6 miles southwest of the downtown area of Douglas, Wyoming. As indicated in Sections 2.1.1 and 3.11, access to the proposed HQPA would be via existing Wyoming State Highways 91 and 96. Considering that this is a rural area, occupied residences are somewhat limited in the area with approximately three residences within a one-mile (+/-) radius of the proposed quarry and access (haul) road

route. Maintaining existing levels for transportation safety is important to the community and a necessity for the proposed project.

4.9.2 Significance Criteria

The following criterion was used to determine the significance of impacts to area transportation:

- conflicts with local traffic.

4.9.3 Direct and Indirect Impacts

4.9.3.1 Proposed Action

Under the Proposed Action, vehicle traffic on Wyoming State Highway 91 and Wyoming State Highway 96 would increase. According to 1998 data from the WYDOT, average daily traffic (ADT) for Wyoming State Highway 91, on Mile Post 2.99 west of Douglas near the proposed project area, was recorded at 292 vehicles over a 24-hour period (WDOT 1999).

As described in the Proposed Action, product transportation would depend on product sales. However, assuming that maximum annual production is 280,000 tons (200,000 cubic yards) of marketable product produced and sold each year, assuming 169 working days per year (based on 6.5 working months a year and 26 work days per month), and assuming an average truck capacity of 35 tons per trip, there would be approximately 48 loaded trucks leaving the project area per work day to move approximately 1,657 tons per day (TPD) of mined mineral materials. These estimates assume that trucking activities would only be conducted in conjunction with actual mining and crushing activities based upon timing restrictions in the actual quarry area designed to protect wintering wildlife in crucial habitat. In point of fact, trucking activities could occur year-round by hauling from the stockpile area to be located adjacent to Wyoming Highway 91 (see Figure 2.1), which is outside of the big game winter range and would therefore not be subject to the operational restrictions to be imposed on the quarry itself (see Section 4.13). As a consequence, daily truck traffic would most likely be dictated by demand on a seasonal basis with actual trips determined by the amount of materials under contract at any particular time, the actual number of trucks available in the area with which to haul these materials, and the round-trip distance between the source and the destination. Please refer to Table 2.1 for a comparison of expected ADT associated with product sales for a variety of mineral material production scenarios and for hauling periods encompassing both 169 and 307 days per year.

By comparison, quarrying activities currently being conducted by McMurry Redi-Mix at 3 separate limestone quarries southwest of Casper, Wyoming in the Alcova area typically requires 5 to 18 trucks to move between 500 and 2,500 TPD with 4 to 5 round trips required per truck each day to move the limestone to Casper (Crane 2005). Assuming each truck was capable of hauling 35 tons of material per trip (as estimated for the proposed Huxtable quarry), 15 to 72 trips per day would be required to move this volume of material from the Alcova quarries via Wyoming Highway 220 to McMurry's batch plant in Casper.

Utilizing 1998 Average Daily Traffic (ADT) values provided by WDOT (WDOT 1999), the average number of vehicles traveling along Wyoming State Highway 91 under the Proposed Action would increase from 292 vehicles to approximately 388 vehicles over a 24-hour period for maximum mineral material production. Increases in traffic volume attributable to the Proposed Action would occur during regular business hours (Monday through Saturday, sunrise to sunset). There would be no increase in traffic volumes under the Proposed Action (or Alternative A) on Sundays or holidays. Along with the increased traffic volume, there would also be an increased, albeit slight, risk of traffic accidents on Wyoming State Highway 91 and Wyoming State Highway 96.

Traffic volumes are relatively low on Wyoming State Highway 96 compared with the traffic volumes on other state highways. For example, during 1999 WDOT recorded ADT on Wyoming Highway 59 near Mile Post 1 north of Douglas at 2,900 vehicles over a 24-hour period which included 370 trucks (WDOT 1999).

Under the Proposed Action (and Alterative A), there would be an increase in truck traffic on Wyoming State Highway 91 during the morning when public school buses are picking up children for school and again in the afternoon when the buses are returning children home. Based upon the assumption that the school buses would be enroute for approximately 45 minutes morning and afternoon, the bus drivers could expect to encounter a maximum of 3 haul trucks during each run on a daily basis.

4.9.3.2 Alternative A

Potential impacts to area transportation under Alternative A would be essentially identical to those described under the Proposed Action except that the increased volume of truck traffic and increased risk of traffic accidents would occur for twice the length of time anticipated under the Proposed Action.

4.9.4 No Action Alternative

Under the No Action Alternative, no mineral sale would occur, no quarrying would be conducted, and there would be no change in the existing health and safety (transportation) conditions within the overall area.

4.9.5 Mitigation and Monitoring

The following mitigation measures are recommended in order to minimize the impacts of increased traffic on local and area highways resulting from mining activities associated with the proposed Huxtable Rock Quarry.

- All equipment and equipment operators will be to be properly licensed by the WDOT. Equipment operators will be trained in the operation of the specific piece of equipment they would be operating and will be instructed in the existing regulations governing school bus

traffic and the proper techniques for complying with state law regarding bus stops in rural areas.

4.9.6 Residual Impacts

There would be an increased volume of traffic and an increased risk of traffic accidents on Wyoming State Highway 91 and Wyoming State Highway 96 due to increased traffic resulting from implementation of either the Proposed Action or Alternative A. Selection of Alternative A would increase these risks for an additional 15 years beyond the projected LOP for the Proposed Action. However, traffic volume on these roads is currently low and proper licensing and safety awareness training for equipment operators by the project proponent would mitigate and minimize the increased risk to the public.

4.9.7 Cumulative Impacts

Increases in local traffic would result from implementation of either the Proposed Action or Alternative A resulting from mining activities within the proposed Huxtable quarry. Average Daily Traffic (ADT) on Wyoming Highways 91 and 96 would increase from 292 vehicles/day to an estimated 388 vehicle per day - with this increase attributable primarily to truck traffic associated with said quarry, thereby adding to the overall ADT for the affected roadways. However, truck traffic emanating from the proposed Huxtable quarry would occur on area roadways that are not being used for hauling operations associated with the Wills quarry and would not represent a cumulative increase in the average daily truck traffic on Wyoming Highways 91 and 96 resulting from/in conjunction with mining operations in the general project area. A cumulative increase in truck traffic could occur at the junction of Wyoming Highway 96 with Wyoming Highway 94, and from said junction either into Douglas or to the I-25 on-ramp - assuming that the product mined from both quarries is transported into Douglas. Nonetheless, the additional truck traffic associated with the Proposed Action or Alternative A would not appreciably increase the ADT currently being experienced on area roadways - particularly when compared to the ADT on Wyoming Highway 59 at Mile Post 1 directly north of Douglas.

4.10 VEGETATION

4.10.1 Introduction

As indicated in Section 3.11, vegetation within the HQPA is included in two primary cover types including Basin Rock and Soil and Xeric Upland Shrub. Secondary cover types include Wyoming Big Sagebrush and Black Sage Steppe (WYNDD 2005).

Potential impacts to vegetation within the HQPA would primarily involve the clearing and subsequent disturbance of existing, native vegetation as a result of mining activities. The duration of the resultant impact is dependant upon the time required for natural succession to return reclaimed areas to a pre-disturbance condition of cover and stability.

4.10.2 Significance Criteria

Impacts to native vegetation within the project area would be considered as significant if any of the following were to occur:

- project activities resulted in range degradation through the introduction of invasive non-native species (noxious weeds) to the degree that such establishment resulted in listed weedy species occupying more than 20% of a specific vegetation type or hampering successful revegetation of desirable species in disturbed areas; or

- a "may effect" determination was reached by the cooperating agencies for any plant species currently listed as either "threatened or endangered" under the ESA.

4.10.3 Direct and Indirect Impacts

4.10.3.1 Proposed Action

The primary impact to existing vegetation resulting from exploration activities within the proposed HQPA would be the loss of vegetative production during and immediately following initial disturbance. As indicated in Section 4.11.3.1, mining activities would result in the short-term loss of native forage production on 22 acres, with the long term (LOP) loss estimated at 18 acres. While reclamation activities will result in the re-establishment of forage production on approximately 3.6 acres of disturbed surface within the HQPA (outslope areas of the access road route), the remaining 18 acres will see limited reclamation and subsequent forage production. We expect that the 10 acre quarry site will never be reclaimed to pre-disturbance levels of plant species diversity. As the HQPA does not contain unique plant communities, or populations of either T/E or BLM sensitive species (see Sections 3.15 and 4.12) the loss of plant species diversity within the 22-acre affected area is considered as a negligible impact to the vegetative resource. No riparian or wetland pant communities would be affected by surface disturbing activities associated with either the Proposed Action or Alternative A (AEC 2005).

The invasion of newly-disturbed areas by invasive non-native plant species would be a potential impact resulting from surface disturbing activities within the HQPA. Several species of invasive non-native plant species have become established on disturbed sites throughout Wyoming. As indicated in Section 3.11, some of the more common weed species which could be expected to invade disturbed surfaces within the HQPA include Canada thistle, musk thistle, cheatgrass, Russian knapweed and halogeton. If allowed to become established, infestations of these invasive non-native species could provide seed sources for invasion of neighboring lands and could impact forage production on these affected lands. However, considering the somewhat limited amount of surface disturbance which would be associated with mining activities within the HQPA and the mitigation measures recommended below, potential infestations of invasive non-native species would be controlled thereby preventing the establishment of these species within or adjacent to the HQPA as a result of project-related surface disturbance.

4.10.3.2 Alternative A

Impacts associated with Alternative A would be identical to those discussed above, only on a somewhat larger scale as the rock quarry would be expanded from 10 acres to 40 acres. The additional 30 acres of surface disturbance associated with the expanded quarry site would all occur within the mountain-foothills shrub habitat type (see Section 4.11.3.2). As indicated above, plant species diversity would be lost within the 40 acre quarry site. The increased surface disturbance associated with the expanded quarry site would increase the potential for infestations of invasive non-native plant species. Implementation of the mitigation recommended below would control these potential infestations.

4.10.4 No Action Alternative

Under the No Action Alternative, the BLM would deny the Proposed Action and no surface disturbing activities would occur in conjunction with the proposed rock quarry. Plant communities within the HQPA would continue undisturbed at present levels, with fluctuations in species diversity due primarily to weather, wildlife and domestic livestock grazing patterns and other natural causes.

4.10.5 Mitigation and Monitoring

The following mitigation measure is recommended to minimize impacts to vegetation resulting from the proposed Huxtable Quarry Mineral Materials Project.

- The project proponent would be required to control invasive non-native species on all disturbed areas associated with the proposed mining operation. Monitoring would occur on an annual basis for those invasive non-native species identified by the State of Wyoming, including any additional species as specified by the appropriate Converse County Weed Control District. Should invasive non-native species be identified within the HQPA in conjunction with this annual monitoring, control and eradication measures would be implemented in accordance with existing federal, state and local laws, rules and regulations applicable thereto.

4.10.6 Residual Impacts

The Proposed Action would result in the initial disturbance of approximately 22 acres of surface and the subsequent removal of vegetative from these lands. LOP surface disturbance would equal 18 acres and it could take 20-30 years after reclamation has been initiated for those reclaimed areas to achieve vegetation production and species diversity comparable to pre-disturbance conditions. Vegetation would likely be lost from the actual 10 acre quarry site forever.

As indicated in Section 4.1, residual impacts attributable to Alternative A would be identical to those for the Proposed Action, but on a larger scale - being increased by 30 acres. As above, mining activities would result in 52 acres of initial surface disturbance and 48 acres of LOP disturbance. Vegetation would likely be lost from the 40 acre quarry site forever.

4.10.7 Cumulative Impacts

Vegetation in the overall area would continue to be impacted primarily by on-going livestock grazing practices. There are no other appreciable surface disturbing activities occurring or expected to occur within the overall project area (see Section 4.11.6). The Proposed Action would result in 22 acres of initial and 18 acres of long-term (LOP) removal of vegetation. On-going mining activities associated with the Wills Quarry Project Area (WQPA) would result in the removal of vegetation from an additional 500 acres within the general area.

As indicated in Section 4.12.6, initial (short-term) disturbance (generally associated with access road construction/reconstruction activities) would be reclaimed shortly after disturbance, but could take up to 20 years to reach pre-disturbance levels of plant species diversity (shrub composition). The actual quarry areas (for both the HQPA and the WQPA) would likely never return to pre-disturbance levels of vegetative diversity and composition.

Cumulative impacts associated with Alternative A would be virtually identical to those discussed for the Proposed Action (above) with the exception that quarry site would be increased from 10 acres to 40 acres with a concomitant increase in surface disturbance and vegetative loss. There is no current evidence that there are or have been any significant cumulative impacts to vegetation resources within the general project area. No special habitats would be disturbed, no T/E or special status plants are known to exist within the overall project area and invasive non-native species would be controlled as necessary by the project proponent.

4.11 VISUAL RESOURCES

4.11.1 Introduction

Impacts to visual resources are evaluated by comparing the basic design elements of the Proposed Action and Alternative A with similar elements characteristic of the existing landscape. The degree to which the Proposed Action and Alternative A contrast with these elements is a measure of impact. Other factors used to determine overall impacts to visual resources include the project's relative location from key observation points and the duration and relative scale of the Proposed Action or Alternative A. Residual impacts are directly related to topography and quality of reclamation efforts.

4.11.2 Significance Criteria

The acceptable degree of contrast for given landscapes within the Casper Field Office is dictated by the VRM Classes set forth in the Platte River Resource Area Management Plan of 1985. The

project location lies within a VRM Class III area. Management objectives for this location are to partially retain the existing character of the landscape. Moderate levels of contrast are acceptable and new visual intrusions may draw the viewers' attention. However, new projects should not dominate the landscape. Best management practices (BMPs) for visual resources dictate that the basic elements which make up the existing landscape (i.e., line, form, color and texture) should be repeated whenever possible.

4.11.3 Direct and Indirect Impacts

4.11.3.1 Proposed Action

A visual simulation of the Proposed Action was derived from the same photo used to depict the characteristic landscape from the KOP (see Figure #4 in Appendix B). Other materials used to create the simulation include digital elevation models provided by the project proponent and available information on the color and texture of the rock material to be exposed. The visual simulation illustrates the Proposed Action midway through development. Throughout the life of the project it is reasonable to assume the entire ten acres would be subjected to some measure of disturbance. While not all ancillary facilities are represented, the simulation portrays a reasonable estimate of the Proposed Action.

The degree to which the basic elements of the Proposed Action contrast with elements dominant in the existing environment were rated as being moderate to high. Sheep Mountain which makes up the backdrop contains forms that are somewhat triangular but softened by rounded edges and mirroring vegetation. The angular forms created by the Proposed Action would produce a moderate contrast with the rounded forms that dominate the foreground and midground of project area. Similar degrees of contrast are found when comparing the introduction of horizontal and vertical lines. The introduced lines would be emphasized by disruption of converging lines of the existing drainages and the sinuous lines of vegetation which tend to follow natural contours. The most striking contrast is created by removal of vegetation and top soil that would expose the gray-white and crimson colors of the bedrock which would stand out against the gray-greens and juniper colors of the slopes and the lighter greens of fields in the foreground.

New structures and equipment would include earth moving machinery and an upgraded access road. Activities associated with the mining operation that would be expected to occur include drilling, blasting, excavation and heavy truck traffic, all of which contrast with the pastoral setting and existing structures. The upgrades to the access road in conjunction with noise, movement and heavy truck traffic would draw and hold the viewer's attention.

Reclamation efforts described for the Proposed Action would reduce the overall contrast within the project area. The remaining high walls would be visible long term and continue to impact the visual resource. Improved mitigation efforts such as staining would reduce these impacts.

Viewshed analysis was used to determine locations from which the Proposed Action can be seen (see Figure #2 in Appendix B). The 10-acre quarry site would be seen from four of the five

residences and from locations with high elevation as far away as Douglas and along I-25. The greatest impacts to visual resources would occur for those residents within two miles of the proposed site and would continue long after final reclamation is complete. Impacts from visual intrusions, increased activity at the site and along the access (haul) road, and the relative scale of the project would result in a moderate to high degree of visual contrast. This is consistent with VRM Class III objectives allowing for moderate contrasts that do not dominate the view. Provided the reclamation guidelines described in the Proposed Action are followed, the action would meet VRM Class III objectives.

4.11.3.2 Alternative A

Contrasting elements created by the 40-acre alternative would be similar to those described under the Proposed Action, except in terms of scale. This proposal allows for ten acres to be actively mined at any given time. After the completion of the first phase of development additional areas would be opened. Reclamation efforts would begin prior to new excavation. As a result the mine site would be divided with areas being in different phases of excavation and reclamation. While this would limit the size of the active quarry and mitigate some of the visual contrast, the totality of the impacts would still be substantially greater and require a longer period of activity than seen under the Proposed Action. A visual simulation (see Figure #5 in Appendix B) has been provided showing the 40-acre proposal during the final stages of development. Reclamation efforts would be occurring during this stage of development and have been included in the simulation.

Viewshed analysis was used to determine locations from which the proposed 40-acre quarry could be seen (see Figure #2 in Appendix B). The overall distance and number of locations by which the 40-acre quarry site would be seen would be substantially greater than for the 10-acre proposal. The greatest impacts to visual resources would occur for those residents within two miles of the proposed site and would continue long after final reclamation is complete. Impacts from visual intrusions, increased activity at the site and along the access road, and the relative scale of the project would result in a high degree of visual contrast. The project would not be consistent with VRM Class III objectives as it would dominate the view from a foreground and midground viewer perspective and would result in significant impacts to the visual resource.

4.11.4 No Action Alternative

Under the No Action Alternative, no mineral sale would occur, no quarrying would be conducted, there would be no additional development in the proposed project area, and no unavoidable adverse impacts.

4.11.5 Mitigation and Monitoring

The following mitigation measures are recommended to minimize impacts to visual resources resulting from the proposed Huxtable Quarry Mineral Materials Project.

- Retention of the northern-most slope to be used for screening purposes as depicted in the photo-simulation (see Figure #4 in Appendix B).

- Native shrub species found within the existing landscape should be used in the seed mixture for reclamation purposes.

- High walls should not be allowed to exceed WDEQ requirements.

Monitoring of quarry activities should occur at a minimum of twice a year for either the Proposed Action or Alternative A. Throughout the life of the project and after reclamation the foremost bench should remain in place and be used as visual screening. Reclamation efforts should strive for natural contouring including the reduction of remnant high walls whenever feasible. Seed mixtures should include woody species and native species which are currently located within the project area. Environmental stain used on the high walls would improve the overall reclamation and reduce residual impacts of the Proposed Action.

4.11.6 Residual Impacts

Implementation of either the Proposed Action or Alternative A would result in impacts to the existing landscape that are unavoidable and reclamation efforts would never fully restore the quarry site to its pre-existing condition. Quarry activities would introduce permanent changes in color and line due to the exposure of underlying rock and disruption of the natural contours that would likely be cost-prohibitive to fully remediate. The remnant high wall would produce straight and angular lines and shapes that would contrast with the naturally occurring forms and colors found in the existing landscape. The scale of these impacts would be greater for Alternative A due to the larger size of the quarried area, as the western edge would extend higher up the slope above the screening ridgeline in front of the quarried area.

4.11.7 Cumulative Impacts

The proposed project area has been utilized continuously for agricultural purposes (livestock grazing) since the early twentieth century. The natural environment of the general project area remains largely unaffected by human-related activities such as ranching, grazing, and recreational activities. There is one rock quarry approximately three miles southeast of the project area but can not be seen from the KOP, as it is located in a canyon and screened from view.

In the proposed project area existing developments (e.g., houses, fences, county roads, etc.) can be considered to be visual intrusions but are generally consistent with the rural/pastoral setting. The addition of the Proposed Action or Alternative A represents a change to an industrial use which contrasts with the current rural setting. With development increasing in the Douglas area there will be an increased demand for mineral materials. It is therefore reasonable to assume that the demand for these mineral materials will continue and additional quarries may be developed in the future which would add to the cumulative impact. Visual quality of the area would be further diminished as the area becomes increasingly developed.

4.12 WATER RESOURCES

4.12.1 Introduction

Hydrologic impacts resulting from surface disturbances associated with the proposed project would include the removal of vegetation, exposure of the underlying soil surface, and compaction of the soil. These impacts would result in an increased overland flow of surface runoff with subsequent erosion and off-site sedimentation. Consequently, these changes in the local environment could create the potential for increased stream flow, increased sediment loading, and the subsequent degradation of both surface and subsurface water quality below acceptable standards, if they are not properly controlled or occur in close proximity to a perennial stream or aquifer recharge point. Both the magnitude and duration of these impacts depend upon several factors, including:

- slope aspect and gradient,
- degree and extent of soil disturbance(s),
- susceptibility of the soil to erosion,
- proximity of the disturbance to existing stream channels, and
- mitigation measures implemented.

Additional factors would include the duration of construction (surface disturbing) activities coupled with the timely implementation and subsequent success (or failure) of applicable reclamation measures. These potential impacts would be greatest after commencement of construction activities, but would begin to decrease shortly after completion of surface disturbing activities due to a combination of passive stabilization and implementation of erosion and sediment control measures as necessary to control runoff.

The leakage or spillage of liquid hydrocarbons and/or other fluids/chemicals utilized in quarry operations could also degrade both surface and ground water resources. The impact of such an occurrence would depend primarily upon the quantity and chemical composition of the fluid(s) released, the relative proximity of the spill to the water body potentially impacted, and mitigation measures implemented to control the event.

4.12.2 Significance Criteria

The following criteria were used to determine the significance of impacts to other surface and subsurface hydrologic (water) resources within the project area:

- degradation of existing surface water quality such that state and/or federal standards are not met;

- modification of the quantity or quality of stream flows that affect established users such as humans, livestock, fish or wildlife;
- impacts to water yield(s) from existing wells or springs resulting from project-related activities;
- degradation of existing subsurface water quality in aquifers important for agricultural and/or domestic purposes; and
- total disturbance in any watershed is greater than (exceeds) 10 percent.

4.12.3 Surface Water Resources

Surface water flow in the area only occurs in response to heavy precipitation events. The office of the Wyoming State Engineer (WSEO) has no historical stream flow data for Bed Tick Creek. Mr. Dave Andrews, a former employee of the WSEO who oversaw the watershed for 21 years, was also unaware of any historical flow measurements along Bed Tick Creek (Andrews 2004). Observations by Mr. Andrews would suggest that a 6-hour precipitation event is required to produce surface water flow in Bed Tick Creek, with these events occurring approximately at 25-year intervals.

4.12.3.1 Direct and Indirect Impacts

4.12.3.1.1 Proposed Action

The Proposed Action would result in the initial disturbance of 22 acres with approximately 18 acres of surface disturbance remaining for the LOP. Surface disturbing activities associated with the mining operation would temporarily slow surface water flow out of the active quarry area and the area located immediately up-gradient from the active quarry area until such time as quarrying operations have progressed to the point where permanent reclamation operations can re-establish the drainage channel and facilitate the unobstructed flow of runoff through the quarried area.

Under the Proposed Action, quarrying operations would not be conducted below the bottom of the stream channel that flows into the two existing stock ponds located in the second-order ephemeral tributary below the quarry site. The project proponent would implement BMPs and alternative sediment control measures to temporarily slow down, but not divert, the flow of runoff into the closest of the two dry stock ponds (approximately 400 feet downstream from the quarry site), which would be utilized as a sediment containment structure (stilling basin) for water flowing through the quarry site. The first dry stock pond should collect most of the sediments that are not contained upstream by sediment control structures installed within or directly downstream of the active quarry. Water that escapes the first stock pond would continue to flow downstream for approximately 300 feet where it would be captured in the second dry stock pond. The second dry stock pond would be utilized as a secondary sediment control

structure (stilling basin) to capture any remaining sediments that passed from the quarry site through the initial stock pond sediment control structure.

Implementation of BMPs and the alternative sediment control measures specified in the Proposed Action would be implemented to prevent storm water runoff from any disturbed portion of the active quarry area from degrading the quality of any receiving waters including Bed Tick Creek or the North Platte River. Alternative sediment control measures would be required by WDEQ/LQD and WDEQ/WQD permits and would minimize and mitigate impacts to surface water quality. The alternative sediment control measures would remain in place until reclamation standards have been met and their removal is approved by WDEQ/LQD.

With the implementation of BMPs and alternative sediment control measures (including the use of the two dry stock ponds as sediment containment structures), water quality would be expected to be similar to pre-mining conditions. Therefore, the Proposed Action would have negligible impacts on surface water quality in the HQPA.

4.12.3.1.2 Alternative A

Alternative A would result in approximately 48 acres of disturbance over the LOP. Disturbance would be limited to a maximum of 10 acres per year. Alternative A would also require the implementation of the same alternative sediment control measures and the same reclamation procedures and standards as described for the Proposed Action. Direct impacts to surface water resources would be essentially identical to those described under the Proposed Action; however, the impacts would occur on an incrementally larger area and for twice the length of time anticipated under the Proposed Action.

4.12.4 Ground Water Resources

4.12.4.1 Direct and Indirect Impacts

4.12.4.1.1 Proposed Action

Based on the description of existing ground water resources, it is probable that water-bearing aquifers exist beneath the area proposed for mining. Based upon the following considerations, it is unlikely that the Proposed Action would intercept any important, near-surface ground water aquifers or impact any existing water rights within the general project area:

- the elevation and geology at the proposed quarry site;
- the absence of any existing springs or seeps within the immediate quarry area;
- the depth to water-bearing zones in area water wells (see Table 3.4); and

∉ the limited depth of the proposed mining operation.

It should be noted that the city of Douglas has expressed concern regarding potential impacts to their Sheep Mountain #1 water supply well located in the NE¼SE¼ of Section 33 in Township 32 North, Range 72 West. The proposed well is located approximately 3,000 feet (+/-) east/northeast of the proposed quarry and is approximately on the same elevational plane as the proposed quarry floor. As indicated in Table 3.4, the Sheep Mountain #1 water supply well was drilled to 1,165 feet and produces approximately 910 gallons of water per minute (GWPM) for both miscellaneous and municipal uses (WSEO 2005).

Using the formula presented in Section 3.3.1.1, peak particle velocity at the Sheep Mountain #1 water well from blasting activities at the proposed Huxtable quarry would be approximately 0.06 inches per second (ips), which is well below the U.S. Bureau of Mines (USBM) threshold limits for safe blasting (see Table 3.2) and is slightly higher than the 0.02 ips level of perceptible motion to humans. Considering that the water well is slightly over one-half (0.5) mile from the proposed Huxtable quarry and the static water levels is approximately 365 feet below the floor of the quarry, it is unlikely that mining operations (including blasting) would have an impact thereon. Nonetheless concerns regarding the potential impacts to both the quality and quantity water produced from the Sheep Mountain #1 water supply well resulting from mining operations will be addressed through the application of those mitigation measures to be recommended in Section 4.12.6. These mitigation measures should ensure that any impacts to the subject well are identified through a monitoring program to be implemented by the project proponent.

In the unlikely event of an impact to any existing water rights, Wyoming State law (Wyoming Statute § 41-3-907) states that pre-existing water rights are protected from human interference or other affects such as changes in water quantity or quality. Therefore, should mining activities associated with the Proposed Action (or Alternative A) impacted existing water rights located immediately down gradient of the proposed Huxtable quarry, the project proponent would be responsible for mitigating the identified impacts. The WDEQ/LQD and the WSEO would also ensure that any necessary mitigation measures are fair and reasonable. Mitigation measures might include well replacement, redrilling the existing well, replacement or resetting of the pump, or providing an alternative source of water that meets the quantity and quality of the existing water well.

The project proponent is proposing to use a privately-owned water well (Huxtable #2) for dust abatement purposes. Approximately 4,200 GWPD would be used for dust abatement on the access (haul) road and to mitigate dust emissions from the crushers and belts. These dust abatement measures would consume approximately 709,800 gallons of water per year (2.2 acre-feet), with LOP water usage estimated at 10.65 million gallons of water (32.7 acre-feet). In this regard, a pump test was performed on the Huxtable #2 water supply well on February 18, 2005 by Hydro-Engineering. The well was pumped at 14.7 gpm for 71 minutes creating a total of 12.8 feet of draw down. The results of the pump test indicated that the transmissivity used for calculations of the estimated draw down is 1,690 gal/day/foot. The storage coefficient for the aquifer based upon the 60-foot thick aquifer can be estimated to be $6X10^{-05}$. Based upon the projected water usage of 4,200 gal/day for 169 days/year, an average use of 3 GWPM can be used to estimate the draw down for the aquifer. The nearest well (producing from a similar depth and aquifer) is roughly 4,700 feet from the source well. Using the Theis equation, the estimated

drawdown would be 0.85 feet at the end of the 169 days of continuous pumping using the average pumping rate of 3 GWPM. This minimal amount of drawdown should not affect the amount of yield from any of the adjacent wells in the vicinity of the proposed project area.

The quality and level of the ground water is not anticipated to be effected by the proposed quarry, and will be monitored to identify any impacts to the aquifer during quarry operations (see Section 4.12.6). Based on the above discussion, and considering the mitigation measures proposed in Section 4.12.6, the Proposed Action would not be expected to have an adverse impact upon ground water resources within or directly adjacent to the HQPA.

4.12.4.1.2 Alternative A

Impacts to ground water resources under Alternative A would be essentially identical to those described under the Proposed Action; however, the impacts would occur on an incrementally larger area and for twice the length of time anticipated under the Proposed Action.

Expansion of the quarry area from 10 acres to 40 acres would double the projected LOP water usage from the Huxtable #2 water well for use in dust abatement activities. Water usage would increase from 32.7 acre-feet to 65.4 acre-feet of water for the LOP.

4.12.5 No Action Alternative

Under the No Action Alternative, no mineral sale would occur, no quarrying would be conducted, and impacts to surface and ground water resources would continue at current rates without the added impacts resulting from quarrying activities associated with either the Proposed Action or Alternative A.

4.12.6 Mitigation and Monitoring

The following mitigation and/or monitoring measures are recommended in order to minimize the impacts of the proposed Huxtable Quarry Mineral Materials Project upon surface and ground water resources within the overall area.

- The access (haul) road would cross ephemeral drainages at grade. Access across Bed Tick Creek would involve the installation of a new culvert designed to pass a 10-year 24 hour event and to convey heavy truck traffic and mining equipment over Bed Tick Creek. Silt fences and straw bale sediment traps would be utilized in accordance with an approved Storm Water Pollution Prevention Plan permit, to prevent introduction of sediment to runoff water. Since the quarry plan requires quarrying horizontally into the canyon walls rather than downward, no ground water is likely to be encountered.

- The project proponent would notify the Douglas Public Works Director (or his designee) at least 48 hours in advance of blasting to enable the City to monitor turbidity levels in the Sheep Mountain #1 water supply well immediately before and after blasting operations.

Should the turbidity in the Sheep Mountain #1 well increase dramatically (} 0.5 National Turbidity Units) following the blasting operation, blasting operations would cease.

∉ Secondary lined containment ponds would be installed around all liquid chemical storage facilities.

∉ A minimum of two monitoring wells would be installed down gradient of the proposed quarry. These monitoring wells would be monitored annually for draw down and for the presence of contaminants from chemical storage in the area and other possible contaminants from the explosives used in conjunction with blasting operations in said quarry.

4.12.7 Residual Impacts

There would be an unavoidable increase in surface disturbance within the affected watersheds under the Proposed Action. There would also be temporary loss of surface water due to the presence of the open quarry and the implementation of the alternative sediment control measures required by WDEQ/WQD and WDEQ/LQD. Following the successful completion of permanent reclamation operations, surface water flow and quality would eventually mimic pre-disturbance conditions.

Unavoidable adverse (residual) impacts for surface water resources under Alternative A would be essentially identical to those described under the Proposed Action except that the effects would occur for twice the length of time anticipated under the Proposed Action.

4.12.8 Cumulative Impacts

4.12.8.1 Surface Water Resources

The proposed Huxtable Mineral Materials Project represents the only known commercial development within the drainage of Bed Tick Creek, a dry ephemeral tributary of the North Platte River in and directly downstream of the HQPA. While the Wills quarry is located approximately 2.5 miles to the south/southeast of the HQPA, surface disturbances and potential impacts to surface water quality resulting from activities within the WQPA would occur in a drainage basin separate and apart from the drainage basin of Bed Tick Creek. Surface drainage from the WQPA flows into the North Platte River via a series of second and third-order ephemeral drainages that either flow directly to the North Platte River (in the northern two-thirds of the WQPA) or into Wagon Hound (southern one-third of the WQPA) and thence into the river (BLM 2001). Should sediments from both quarries reach the North Platte River, this would represent a cumulative impact to the surface water quality. However, implementation of the appropriate sediment control measures and SWPPPs as discussed for both projects would virtually eliminate any potential of sediments from reaching the North Platte River. As a consequence, the proposed Huxtable Quarry Mineral Materials Project is not expected to result in an adverse and cumulative impact upon surface water quality in the Bed Tick or North Platte River drainage basins.

4.12.8.2 Ground Water Resources

As indicated in Table 3.5, there are nine existing water wells within a one-mile radius of the proposed Huxtable quarry with seven of the nine wells permitted for domestic and stock watering purposes only (WSEO 2005). The Sheep Mountain #1 well is permitted for municipal and miscellaneous purposes while the Ridge Water-WWDC #1 well was permitted as a monitoring well. While the project proponent has no plans to drill additional water wells within the HQPA, the Huxtable #2 will be utilized as a water source well for use in dust abatement measures within the HQPA. A pump test was conducted on the Huxtable #2 water well in February of 2005 which indicated the draw down on the aquifer would be minimal in conjunction with water usage from said well for dust abatement purposes. Based upon this draw down information, it is unlikely that use of water in conjunction with the proposed project would result in a cumulative draw down within the aquifer thereby affecting shallow area water wells. Similarly, as the Sheep Mountain #1 water well is considerably deeper than the Huxtable #2, it is also unlikely that water use in conjunction with the proposed quarry would result in a commensurate draw down in the Sheep Mountain well.

As there are no other commercial developments within the general project area, the potential for cumulative impacts (including both draw down and possible contamination) to ground water resources in the area is considered to be negligible.

4.13 WILDLIFE RESOURCES

4.13.1 Introduction

The HQPA provides habitat for many species of both game and non-game vertebrates, including mule deer, raptors, upland game and migratory birds, predators and furbearers. The principal impacts likely to be associated with the proposed mining activity would include potential displacement of wildlife species from preferred habitat and the potential loss of wildlife habitat as a result of project activities.

4.13.2 Significance Criteria

Impacts to wildlife species within the project area would be considered as significant if any of the following were to occur:

- Project-related activities impacted an officially-designated crucial habitat during an important use period; and

- a permanent reduction in the rate of population recruitment for economically important or statutorily protected species occurred as a result of project activities.

4.13.3 Direct and Indirect Impacts

4.13.3.1 Proposed Action

The initial (short-term) loss of 22 acres of big game habitat due to vegetation removal would be mitigated with measures included in the Proposed Action in order minimize surface disturbance and to ensure timely reclamation and revegetation of all disturbed areas to the extent practicable.

Big Game. As indicated in Section 3.15.1, the HQPA includes crucial big game winter range for mule deer (*Odocoileus hemionus*). As defined above, any mining activities which occurred during the period from November 15 through April 30 in any given year would be considered as a potentially significant impact upon mule deer wintering HQPA. In this regard, mitigation has been recommended which would preclude any mining activity within the designated crucial big game winter range from November 15 through April 30, thereby eliminating the potential impact to wintering mule deer during the important use period.

Mining activities associated with the actual quarry site would result in the permanent loss of 10 acres of mountain-foothills shrub habitat in crucial winter range. Reclamation efforts undertaken once mining operations have ceased will probably not return the mined area to pre-disturbance levels of vegetative diversity, particularly for the mountain shrub component of the affected crucial habitat. As a consequence, the suitability of the mined area for crucial habitat will be permanently lost. However, this loss is considered as minor when compared to the overall abundance and distribution of the mountain foothills shrub community that comprises crucial mule deer winter range along the front of the Laramie Range. Rather than direct habitat loss, the greatest impact on wildlife populations would be from displacement of big game species from preferred habitats as a result of increased level(s) of human activity (including vehicular traffic) and associated noise. The extent of this displacement is difficult to predict when one considers that response to noise and human presence varies from species to species as well as among individuals of the same species. In some cases, wildlife species may habituate to noise and human presence after initial exposure, and begin to utilize areas that were formerly avoided. It is commonly assumed that these effects are detrimental to individual species and numerous studies have examined the effects of human presence on big game species (Klein 1974; Irwin and Peek 1979; Ward and Cupal 1979; MacArthur et al. 1982; Brekke 1985).

In addition to the avoidance response, an increased human presence intensifies the potential for wildlife-human interactions ranging from the harassment of wildlife to poaching and increased legal harvest. Likewise, increased traffic levels on existing access roads could increase the potential for wildlife-vehicle collisions. These collisions are most frequent where roads traverse areas commonly frequented by game species.

Generally speaking, mining activities would temporarily displace big game animals in the immediate vicinity (up to 0.5 miles) of such activities. However, once such activities are completed, most big game animals would become acclimated to the reduction in traffic and human activity and would continue to utilize suitable habitat in closer proximity to the quarry site, haul road, and stockpile area(s). However, such habitat may not be utilized to the same extent as it was prior to disturbance. It could take 20 + years for some reclaimed areas to attain

pre-disturbance shrub conditions and vegetation diversity and, as indicated above, the quarry itself is not expected to attain pre-disturbance shrub conditions and diversity. However, once mining operations have been completed, revegetation operations are completed and suitable vegetation habitat re-established, big game would likely re-occupy all previously disturbed areas within the HQPA with the exception of the quarry itself. Considering that mining activities will not be allowed during the critical use period, the potential for the displacement of wintering mule deer resulting from human activities associated with the Proposed Action is negligible.

Small Mammals. Impacts to small mammals resulting from implementation of the Proposed Action would include direct mortality during project-related activities, especially associated with construction activities and increased traffic. Generally, the dispersed and relatively small amount of habitat physically impacted by the haul road and rock stockpiles outside of the actual quarry area would limit impacts to small mammal species. Most small mammal populations are relatively tolerant of human activity and would likely experience population reductions in direct proportion to the amount of habitat removed. This would most likely be true for species with relatively small home ranges (e.g., rodents and lagomorphs) and less applicable to more wide-ranging species such as coyotes and badgers. Project-related impacts to small mammals would likely be masked by natural variations in weather, disease, and other natural factors. Impacts to rare habitats (e.g., wetlands areas) would not occur in conjunction with the Proposed Action. The loss of habitat for other mammals due to vegetation removal would be mitigated with measures included in the Proposed Action to minimize surface disturbance and to ensure timely reclamation and revegetation of all disturbed areas with the exception of the actual quarry area.

Impacts to small mammal populations in the quarry area of the HQPA would be greater due to the intensive nature of activities proposed therein in conjunction with the mining activity. As indicated above, these population reductions would be directly proportional to the amount of habitat initially removed in conjunction with mining activities. Reclamation and revegetation of those areas mined in conjunction with the HQPA will return selected portions of the HQPA area to some degree of vegetative diversity which may restore some habitat for smaller mammals, particularly rodents; however, we do not expect the actual mined area to return to pre-disturbance levels of habitat diversity and/or effectiveness. Again, considering the limited areal extent of the Proposed Action and the habitat loss associated therewith, the subsequent effect of this loss upon small mammal populations would be considered as negligible.

Raptors. Suitable nesting habitat for a variety of species does occur within the overall project area as indicated in Section 3.13.3; however, an inventory of historic raptor nesting activity within the HQPA on February 24, 2005 failed to locate any historic raptor nests within the inventory area (AEC 2005). It is possible that mining activities and associated traffic could displace raptor species attempting to nest within the project area should these activities occur during the breeding/nesting period. However considering the lack of historic nests within the overall HQPA, the potential for future displacement is considered to be minimal.

Migratory and Non-Migratory Birds. Surface disturbing activities associated with the Proposed Action would result in the short-term disturbance of 22 acres of shrub-steppe and mountain-foothills shrub habitat which provide a source of food, security cover and nesting habitat for many of the species listed in Table 3.5. Only 25% of this disturbance would be reclaimed within 5 years of initial disturbance, resulting in a long-term (LOP) loss of 18 acres

of habitat. Reclamation of the 3.6 acres associated with access road construction/reconstruction would introduce some degree of vegetative (e.g., habitat) diversity into the area which would benefit those species dependant upon the shrub-steppe habitat type, but the mountain-foothills shrub habitat that would be eliminated within the 10 acre quarry site would not be restored to pre-disturbance levels of species diversity and/or habitat effectiveness. Depending upon the quarrying methods utilized and the ultimate configuration of the sidewalls remaining upon conclusion of quarrying activities, some habitat may be created for those avian species preferring rock ledges, cracks and crevices.

Considering the relatively small percentage of total surface disturbance proposed within the overall project area, the actual magnitude of direct habitat loss and subsequent displacement would be minimal. The primary impacts would occur in direct proportion to the amount of habitat actually disturbed for any particular species in conjunction with the time of year the disturbance occurred. Some increased mortality would be likely from bird/vehicle collisions as a result of increased vehicle traffic. Depending upon the time of year, birds could move to adjacent habitats undisturbed by project-related activities. However, project-related activities during the nesting season could result in nest failure or destruction. Such impacts, however, would be of such scale that they would be unlikely to affect area populations or species viability. Three of the species identified in Table 3.5, including ferruginous hawk, greater sage-grouse, and mountain plover (BLM sensitive species) will be discussed in greater detail in Section 4.13.

Amphibians, Reptiles, and Fish. As indicated in Section 3.13.5, few if any amphibians or reptiles (herptiles), and no fish, are found within the HQPA. Potential adverse impacts to herptiles would include direct mortality during surface-disturbing activities, loss of suitable habitat, and displacement of individuals. Such impacts would occur in direct proportion to the amount of suitable habitat disturbed. Considering the extremely limited amount of suitable herptile habitat within the HQPA, the potential impact to herptile populations resulting from the short-term disturbance of 22 acres of habitat and the long-term disturbance of 18 acres of habitat would be minimal. As discussed above, the mining operation could ultimately create some suitable habitat for selected herptiles (particularly snakes and lizards) that prefer rock ledges, cracks and crevices for foraging, sunning and denning purposes.

4.13.3.2 Alternative A

Impacts associated with Alternative A would be identical to those discussed above, only on a somewhat larger scale as the rock quarry would be expanded from 10 acres to 40 acres. The additional 30 acres of surface disturbance associated with the expanded quarry site would all occur within the mountain-foothills shrub habitat type, which has been identified as crucial mule deer winter range. As above, mining activities within an officially designated crucial habitat during an important use period would be viewed as a potentially significant impact; however, implementation of the recommended mitigation would eliminate the direct impact to wintering big game animals. Indirect impacts would continue through the loss of important seasonal habitat; however, this loss is considered to be minor within the overall herd unit.

As above, impacts to other wildlife species would involve the permanent loss of an additional 30 acres of mountain-foothills shrub habitat. As stated above, it will be virtually impossible to return the quarried area to a level of vegetative diversity and productivity equal to pre-disturbance levels – resulting in the permanent loss of those habitat types for most species. Depending upon the quarrying methods employed, some habitat may be created for those smaller mammal, avian and herptile species that prefer rocky habitats including ledges, cracks and crevices.

4.13.4 No Action Alternative

Under the No Action Alternative, the BLM would deny the Proposed Action and no surface disturbing activities would occur in conjunction with the proposed rock quarry. Wildlife populations would continue at present levels, with fluctuations due primarily to weather, disease, and other natural causes.

4.13.5 Mitigation and Monitoring

The following mitigation measures are recommended to minimize impacts to wildlife resulting from mining activities associated with the proposed Huxtable Quarry Mineral Materials Project.

- To protect mule deer wintering on crucial big game winter range, no surface disturbing and/or mining activities (including, but not limited to blasting, quarrying, crushing, screening, hauling, etc.) will not be allowed during the period from November 15 to April 30.

- Should the project proponent wish to conduct blasting operations within the proposed quarry between May 1 and July 31, a raptor nesting inventory would be required prior to blasting to ensure that raptor nesting activities within a one-half (0.5) mile radius of the quarry would not be disrupted. Should the inventory determine that raptor nesting activity is not occurring within the inventory area, blasting operations would be allowed to proceed.

  Raptor nesting inventories would be conducted by a qualified wildlife biologist approved by the Caper Field Office, Bureau of Land Management and a written report would be submitted to the Authorized Officer, CFO documenting the results of all inventories.

4.13.6 Residual Impacts

The Proposed Action would result in the temporary loss of approximately 22 acres of wildlife habitat. Some species such as big game, large mammals, upland game birds, and raptors would be temporarily displaced and some wildlife species, especially small mammals, small birds, amphibians, and reptiles would be killed during construction activities. There would also be an indeterminate increase in wildlife mortality from vehicle/animal collisions.

4.13.7 Cumulative Impacts

As indicated in Section 4.1, there are currently no large-scale industrial or commercial developments within the general project area and BLM is unaware of any reasonably foreseeable future actions proposed within the general project area that would contribute to cumulative impacts to wildlife populations. The general area has been utilized continuously for agricultural purposes (primarily livestock grazing) since the early twentieth century and the natural environment remains largely unaffected by human-related activities (BLM 2001).

Cumulative impacts to wildlife resources would likely occur in direct proportion to the amount of habitat loss that occurs for each species. Wildlife resources in the affected area would continue to be impacted primarily by on-going agricultural (grazing) activities. The Proposed Action would result in 22 acres of total surface disturbance and 18 acres of long-term (LOP) habitat loss due to mining activities. This habitat loss would be in addition to the 500 acres of surface disturbance previously authorized for the Wills Quarry Project (BLM 2001). However, it should be noted that the Wills Quarry Project Area (WQPA) is located outside of designated mule deer crucial winter range and thus would not contribute to a cumulative loss of crucial mule deer habitat.

Short-term (initial) disturbance (generally associated with access roads) would be reclaimed shortly after disturbance, but could take up to 20 years to reach pre-disturbance levels of species diversity (shrub composition). The actual quarry areas (for both the HQPA and the WQPA) would likely never return to pre-disturbance levels of vegetative diversity and composition. Based upon the actual, authorized, and proposed disturbance associated with rock quarry operations within the general area, total surface disturbance would amount to less than 1% of the South Converse Mule Deer Herd Unit. There is no current evidence that there are or have been any significant cumulative impacts to any wildlife species within the general project area.

4.14 THREATENED, ENDANGERED AND BLM SENSITIVE SPECIES

4.14.1 Introduction

The USFWS identified four T/E species that could potentially occur within the HQPA including the threatened bald eagle, the endangered black-footed ferret, the threatened Preble's meadow jumping mouse and the threatened Ute ladies'-tresses. Based upon an inventory of the overall project area conducted by AEC on February 24,2005, suitable habitat for these species was not identified within the project area. As indicated in Section 3.16.1 (Table 3.7), three of the four species including black-footed ferret, Preble's meadow jumping mouse and Ute ladies'-tresses are not expected to occur within the project area. Bald eagles may occur within the area on an occasional basis. Water depletions in the North Platte River in conjunction with mining operations will impact those downstream species listed in Section 3.16.1.

BLM sensitive species that may occur within the HQPA are discussed in Section 3.16.2.

4.14.2 Significance Criteria

Impacts to threatened, endangered and BLM sensitive species within the project area would be considered as potentially significant if any of the following were to occur:

- project activities impacted an officially-designated crucial habitat during an important use period;
- a permanent reduction in the rate of population recruitment for economically important or statutorily protected species occurred as a result of project activities; and
- a "may effect" determination was reached by the cooperating agencies for any wildlife species currently listed as either "threatened or endangered" under the ESA.

4.14.3 Direct and Indirect Impacts

4.14.3.1 Proposed Action

As discussed in Section 3.16.1, suitable habitat for black-footed ferret, Preble's meadow jumping mouse and Ute ladies'-tresses does not occur within the HQPA based upon an evaluation of the area conducted by AEC in February 2005 (AEC 2005). Potential impacts to bald eagles, the North Platte River Species and BLM sensitive species are discussed below.

Bald Eagle. The HQPA does not contain suitable roosting/perching habitat, concentrated feeding areas (perennial streams), or other special (nesting) habitats which might result in increased eagle activity therein. Migrating or forging bald eagles and those nesting or wintering along the North Platte River may occasionally forage or fly through the HQPA; however, such use is likely intermittent and for relatively short periods of time. Moreover, the level of human activity expected to occur within the project area during mining operations would likely discourage eagle use, assuming that eagles were present in the general area during the period between May 1 and November 14 - no mining activities would occur during the winter months when bald eagles are most likely to occur in the area.

Given the proposed period of mining activity coupled with the intermittent use and the lack of nesting and roosting habitat in the HQPA, it is anticipated that the Proposed Action would not affect bald eagles.

North Platte River Species. The proposed mining operation would consume approximately 4,200 gallons of water per day (GWPD) for use in dust abatement on the access road and in conjunction with crushing operations or 709,800 gallons of water per year (approximately 2.2 acre-feet of water per year). As indicated in Section 2.1.2.3, water used in conjunction with the proposed mining operations would be obtained from an existing water well (Huxtable #2) owned and operated by the project proponent. Total water usage for the LOP would be approximately 10.65 million gallons of water (32.7 acre-feet). Considering the depth of the well and the fact that no isotopic analyses have been conducted on this water, we must assume that the water-

bearing aquifer in the Huxtable #2 water well is connected to the North Platte River system. As a consequence, water diverted from the well for use in mining operations would result in a 2.2 acre-foot depletion to the central and lower reaches of the North Platte River on an annual basis for the life of the project and may affect the North Platte River species identified in Table 3.7.

BLM Sensitive Species. Impacts to most BLM sensitive species as a result of the Proposed Action likely would occur in direct proportion to the amount of their habitat that would be disturbed. The Proposed Action would result in approximately 22 acres of initial disturbance and 18 acres of long term or LOP disturbance). Most animal species are sufficiently mobile that, if present, they would not be affected by the Proposed Action. However, it is possible that some individuals would be killed by vehicles or equipment, or temporarily or permanently displaced from their preferred habitats. Such impacts would be limited to a relatively few individuals and would not have an adverse affect on populations as a whole.

Table 3.8 provides a listing of BLM sensitive species in Wyoming and their habitat preferences, along with the expected occurrence of these species within the HQPA. In this regard, an inventory conducted by AEC on February 24, 2005 failed to identify suitable mountain plover habitat within the HQPA. Suitable ferruginous hawk habitat does exist within the northern portions of the project area primarily along/in proximity to the proposed access road route; however, no nests were identified in conjunction with said inventory. Likewise, the majority of the area does not contain suitable greater sage grouse nesting and early brood-rearing habitat with the possible exception of the proposed material stockpile site directly south of Wyoming Highway 91. While suitable sage grouse nesting and early brood-rearing habit does exist in this particular area, the closest known lek is well over five miles away. Moreover, the proposed stockpile site is directly adjacent not only to an existing Wyoming state highway, but the primary access into the property as well - with an existing livestock handling facility (including corrals, sheds, equipment storage areas, etc.) directly to the east of the stockpile site. Consequently, it is unlikely that the proposed stockpile site is being utilized for greater sage grouse nesting/brood-rearing purposes due to the pre-existing levels of human activity in the area.
The smaller species listed in Table 3.7 would likely be affected to a minor degree by the Proposed Action.

4.14.3.2 Alternative A

Impacts to threatened, endangered and BLM sensitive species associated with Alternative A would be identical to those discussed above, only on a somewhat larger scale as the rock quarry would be expanded from 10 acres to 40 acres. The additional 30 acres of surface disturbance associated with the expanded quarry site would all occur within the mountain-foothills shrub habitat type, which would have a greater effect on those BLM sensitive species that utilize this habitat type for breeding/nesting purposes. Expansion of the quarry area from 10 acres to 40 acres would double the projected LOP water usage from 32.7 acre-feet of water to 65.4 acre-feet and would result in continued depletions in the North Platte River for an additional 15 years.

4.14.4 No Action Alternative

Under the No Action Alternative, the BLM would not approve the Proposed Action and no disturbance/development would occur in conjunction with the mining of the federal mineral estate. Impacts to T/E species and BLM sensitive species would continue at current levels, with fluctuations due primarily to weather, disease, and other natural causes.

4.14.5 Mitigation and Monitoring

The following mitigation and/or monitoring measures are recommended in order to protect threatened, endangered and BLM sensitive species that may be either directly or indirectly impacted by mining activities associated with the proposed Huxtable Rock Quarry.

- Water depletions to the North Platte River System are likely to jeopardize the continued existence of one or more federally listed species or critical habitats. In accordance with a 1996 USFWS Biological Opinion (revised in 2002), minor water depletions to the Platte River System of 25 acre feet or less per year may be offset by implementing conservation measures identified therein. These conservation measures include authorizing the use of National Fish and Wildlife Foundation account funds to offset and restore the project related impacts to Platte River fish and wildlife resources.

4.14.6 Residual Impacts

Under either the Proposed Action or Alternative A, there could be some displacement of BLM sensitive species.

4.14.7 Cumulative Impacts

Cumulative impacts to T/E species would be limited to the effects of additional water depletions in the North Platte River on those downstream species listed in Table 3.7 and their habitat.

Cumulative impacts to BLM sensitive species would likely occur in direct proportion to the amount of disturbance to habitats of the specific species and would be limited to those areas where suitable habitat would be removed or the larger area from which individuals may be displaced by project-related activities.

There is no evidence that there are or have been any significant cumulative impacts to any T/E or BLM sensitive species within the area.

4.15 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The term "Irreversible Commitment of Resources" refers to the loss of future options which would result from mining operations associated with the proposed Huxtable Quarry Mineral Materials Project and primarily applies to the resultant impacts upon:

- non-renewable resources such as minerals or cultural resources; or to
- processes or factors that are renewable only over long periods of time (e.g., soil productivity).

Likewise, the term "Irretrievable Commitment of Resources" refers to the loss of production, harvest, or use of natural resources. For example, some or all of the forage production from an area is irretrievably lost while the area serves as an access road or rock quarry site. Although this forage production loss is irretrievable, the action is not irreversible and, if the land use changes through subsequent abandonment and reclamation of these facilities, forage production would resume to some degree.

The primary irreversible and irretrievable commitment of resources resulting from the implementation of either the Proposed Action or Alternative A would be the removal and use of industrial, non-metallic minerals such as limestone, quartzite and moss rock in conjunction with mining activities. Other irreversible and irretrievable commitments of resources would include:

- soil lost through wind and water erosion;
- loss of productivity (i.e., forage and wildlife habitat) from those lands disturbed in conjunction with mining activities;
- the inadvertent or accidental destruction of cultural resources;
- direct mortality of wildlife resulting from construction and associated mining activities;
- the labor, materials and energy expended during mining and subsequent reclamation activities associated with the proposed project; and
- effects upon the area viewshed resulting from mining activities.

5.0 CONSULTATION AND COORDINATION

5.1 BACKGROUND

The Huxtable Quarry Mineral Materials Environmental Assessment was prepared by independent engineering and environmental consulting firms, with the guidance, participation, and independent evaluation of the Bureau of Land Management. A list of the personnel responsible for document preparation, and their individual responsibilities are provided in Section 5.4.

5.2 PUBLIC PARTICIPATION

As indicated in Section 1.4, an open process has been employed for the determination and scope of the issues addressed in this environmental document. Public scoping was conducted in compliance with the procedural requirements of the Council on Environmental Quality (CEQ) rules and regulations for the implementation of NEPA (40 CFR 15001.7). Activities associated with the implementation of the public scoping process are summarized below.

1. A scoping notice was released by the CFO on April 4, 2004 in order to identify the issues related to the proposed Huxtable Quarry Mineral Materials Project. The scoping notice was sent to those agencies, companies, individuals and organizations identified as having a potential interest in the proposed project (see Section 5.3).

2. BLM issued a press release concurrently with the mailing of the referenced scoping notice and said notice was also posted electronically on BLM's website for public review. The scoping notice was published in Wyoming newspapers as follows:

   a) the Rock Springs Daily Rocket on April 8, 2004;

   b) the Douglas Budget on April 14, 2004; and

   c) the Glenrock Independent on April 15, 2004.

3. An open house was held at the Best Western Douglas Inn on Tuesday, April 20, 2004 from 6:30 p.m. to 8:00 p.m. which included a brief presentation followed by questions from the public regarding the proposed project. The open house was attended by approximately 36 individuals, not including representatives of the BLM or the project proponent.

The scoping notice referenced above solicited public comment on the proposed Huxtable Quarry Mineral Materials Project for a period of thirty days commencing on April 4, 2004 and ending on May 4, 2004. In response to several requests received from the public, the comment period was subsequently extended for two weeks until May 18, 2004. Comments received in conjunction with public scoping included 25 emails, 9 letters, 2 faxes and 7 written comments received during the public meeting in Douglas. There was some overlap in these comments in that several

comments were both faxed or emailed to BLM with the original letter subsequently mailed to the CFO as well.

5.3 AGENCIES, COMPANIES, INDIVIDUALS AND ORGANIZATIONS CONTACTED

As indicated above, numerous contacts have been made during the course of this environmental analysis. The following agencies, companies, individuals and organizations received copies of the scoping notice for the proposed Huxtable Quarry Mineral materials Project. Separate consultations were conducted with some of the state agencies identified below in order to obtain specific information concerning potential impacts to individual resources within their jurisdictional purview.

5.3.1 State of Wyoming

1. Department of Agriculture; Cheyenne, Wyoming
2. Department of Environmental Quality; Cheyenne, Wyoming
    a. Air Quality Division
    b. Land Quality Division
    c. Water Quality Division
3. Game and Fish Department; Casper and Cheyenne, Wyoming
4. Office of State Lands and Investments; Cheyenne, Wyoming
    a. Division of Forestry
5 State Engineer's Office; Cheyenne, Wyoming
6. State Geological Survey; Laramie, Wyoming
7. State Historic Preservation Office; Cheyenne, Wyoming
8. State Planning Office; Cheyenne, Wyoming

5.3.2 Local Governments/Organizations

1. City of Douglas; Douglas, Wyoming
    a. Sherri Mullinix, Mayor
    b. Bobbe Fitzhugh, City Administrator

2. Converse County Commissioners; Douglas, Wyoming
3. Converse County Library; Douglas, Wyoming
4. Converse County Planning Commission; Douglas, Wyoming
5. Converse County Road and Bridge Department; Douglas, Wyoming
6. Douglas Chamber of Commerce; Douglas, Wyoming
7. Douglas Planning Commission; Douglas, Wyoming

5.3.3 Individuals, Citizens Groups and Regional Societies

1. Mr. & Mrs. Ed Baker; Douglas, Wyoming
2. Mr. & Mrs. Rick Baker; Douglas, Wyoming
3. Mr. & Mrs. Darren Fink; Douglas, Wyoming
4. Mr. & Mrs. Mike Gibson; Douglas, Wyoming
5. Mr. & Mrs. Art Hageman; Douglas, Wyoming
6. Mr. & Mrs. Chuck Headly; Douglas, Wyoming
7. Mr. Jim Huxtable; Douglas, Wyoming
8. Mr. & Mrs. Mike Sanford; Douglas, Wyoming
9. Mrs. Julie Smith; Douglas, Wyoming

5.3.4 Industry/Business

1. Worthington, Lenhart and Carpenter, Inc.; Casper, Wyoming

5.4 LIST OF PREPARERS

Table 5.1 identifies the BLM personnel associated with the review of this EA. Table 5.2 identifies those companies and associated personnel responsible for its preparation.

Table 5.1 Interdisciplinary Team for the BLM

Name	Area of Expertise
Casper Field Office	
Chris Arthur	Cultural/Historic Resources
Eve Bennett	Outdoor Recreation Planner/Visual Resources
Mike Brogan	Hydrologist
Charlie Fifield	Range Management Specialist
Joe Meyer	Soils Specialist
Patrick Moore	Assistant Field Manager – Minerals
Linda Slone	Planning and Environmental Coordinator
Bob Specht	Geologist/Project Manager
Jim Wright	Wildlife Biologist
Wyoming State Office	
Tom Lahti	Landscape Architect/Visual Resources

Table 5.2 List of EA Preparers

Name	Area of Expertise
Worthington, Lenhart & Carpenter	
Ryan Woodruff	Project Manager, EA Preparation
Anderson Environmental Consulting	
Robert M. Anderson	Vegetation , Wildlife, EA Preparation
Archaeological Energy Consulting	
Richard D. Enders	Cultural Resources
Hydro-Engineering LLC	
George Hoffman	Hydrology
Rosenberg Historical Consultants	
Robert G. Rosenberg	Historical Resources
WWC Engineering, Inc.	
Mike Steen	Geologist

6.0 REFERENCES

Anderson Environmental Consulting (AEC). 2005. Biological Evaluation and Raptor Nesting Inventory of the Proposed Huxtable Rock Quarry Project Area, Converse County, Wyoming. Unpublished report. 15 pp. + appendix.

Andrews, D. 2004. Personal communication between Dave Andrews and Ryan Woodruff on Thursday, May 6, 2004.

Arthur, C. 2005. Personal communication between Chris Arthur, Archaeologist with the Casper Field Office, Bureau of Land Management and Robert M, Anderson on Friday, April 8, 2005.

Beauvais, G.P. 2001. Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*) in Wyoming: Status report, July 2001. Wyoming Natural Diversity Database, University of Wyoming. Laramie, Wyoming. 10 pp.

Blackstone, Jr., D.L. 1988. Traveler's Guide to the Geology of Wyoming. Geological Survey of Wyoming, Bulletin 67. Laramie, Wyoming. 130 pp.

Brekke, E.B. 1985. Effects of CO_2 development on elk calving in south-central Colorado. Unpublished report. Bureau of Land Management. Canon City, Colorado.

Bureau of Land Management. 1984. Platte River Resource Area Resource Management Plan, Draft Environmental Impact Statement. U.S. Department of the Interior, Bureau of Land Management, Wyoming State Office. Cheyenne, Wyoming. 366 pp. + appendices.

_____. 1985a. Platte River Resource Area Resource Management Plan, Final Environmental Impact Statement. U.S. Department of the Interior, Bureau of Land Management, Wyoming State Office. Cheyenne, Wyoming. 247 pp. + appendices.

_____. 1985b. Platte River Resource Area Resource Management Plan Environmental Impact Statement and Record of Decision. U.S. Department of the Interior, Bureau of Land Management, Wyoming State Office. Cheyenne, Wyoming. BLM-WY-ES-84-020-4410. 93 pp. + appendices.

_____. 1988a. National Environmental Policy Act Handbook, H-1790-1. U.S. Department of the Interior, Bureau of Land Management, Washington, D.C. 126 pp. + appendices.

_____. 1988b. Pinedale Resource Area Resource Management Plan Environmental Impact Statement and Record of Decision. U.S. Department of the Interior, Bureau of Land Management, Pinedale Resource Area, Rock Springs District Office. Rock Springs, Wyoming. 118 pp.

_____. 1994. Guidelines for Assessing and Documenting Cumulative Impacts. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C. 70 pp.

_____. 1997a. Final Environmental Impact Statement for the North Rochelle Coal Lease Application (Federal Coal Lease Application WYW127221), U.S. Department of the Interior, Bureau of Land Management, Casper District Office, Wyoming. 123 pp. + appendices.

_____. 1997b. Green River Resource Management Plan Environmental Impact Statement and Record of Decision. U.S. Department of the Interior, Bureau of Land Management, Green River Resource Area, Rock Springs District Office. Rock Springs, Wyoming. 106 pp. + appendices.

_____. 1998. Final Environmental Impact Statement for the Powder River Coal Lease Application and Thundercloud Coal Lease Application. U.S. Department of the Interior, Bureau of Land Management, Wyoming State Office. Cheyenne, Wyoming. 179 pp. + appendices.

_____. 1999a. Interim guidance. Changes to the list of critical elements of the human environment in the Bureau of Land Management's National Environmental Policy Act (NEPA) Handbook. Distribution Memorandum No. 99-178. U.S. Department of the Interior, Bureau of Land Management, Washington, D.C. 3 pp.

_____. 1999b. Final Environmental Assessment for the Proposed Enron (Belco) BLM Coal Lease Exchange WYW-322794. U.S. Department of the Interior, Bureau of Land Management, Casper Field Office. Casper, Wyoming. WY-070-EA-9-191. 187 pp.

_____. 2001. Environmental Assessment for the Proposed Wills Quarry Project, Converse County, Wyoming. U.S. Department of the Interior, Bureau of Land Management, Casper Field Office. Casper, Wyoming. WY-060-01-038. 96 pp. + appendices.

_____. 2004. Environmental Assessment of Bill Barrett Corporation's Modified Cooper Reservoir Natural gas Development Project, Natrona County, Wyoming. U.S. Department of the Interior, Bureau of Land Management, Casper Field Office. Casper, Wyoming. WY-060-04-34. 111 pp.

_____. 2005. Environmental Assessment for the Cave Gulch Infill Development Project, Natrona County, Wyoming. U.S. Department of the Interior, Bureau of Land management, Casper Field Office. Casper, Wyoming. WY-060-EA05-17. 143 pp. + appendices.

Call, M.W. 1978. Nesting habitats and surveying techniques for common western raptors. U.S. Department of the Interior, Bureau of Land Management. Technical Note No. 316. 115 pp.

Clark, T.W. and M.R. Stromberg. 1987. Mammals in Wyoming. University of Kansas, Museum of Natural History, Public Education Series Number 10. 313 pp.

Crane, S. 2005. Personal communication between Susan Crane, Assistant Safety Director, McMurry Redi-Mix and Ryan Woodruff on Wednesday, April 6, 2005.

Curtis, Jan and K. Grimes. 2004. Wyoming Climate Atlas. Prepared in cooperation with the Wyoming Water Research Program, University of Wyoming; the U.S. Geological Survey; and the Wyoming Water Development Commission. 328 pp.

Dinsmore, J.J. 1983. Mountain plover (*Charadrius montanus*). Pages 185-196 *In* J.S. Armbruster (editor) Impacts of coal surface mining on 25 migratory bird species of high federal interest. Department of the Interior, U.S. Fish and Wildlife Service. FWS/OBS-83/85. 348 pp.

duPont. 1977. Blaster's Handbook, 16th (175th Anniversary) Edition. Explosives Products Division, E.I. du Pont de Nemours & Company. Wilmington, Delaware. 494 pp.

Edwards, C.C. 1969. Winter behavior and population dynamics of American Eagles in Utah. Ph.D. dissertation, Brigham Young University. Provo, Utah. 156 pp.

Environmental Protection Agency (EPA). 2005. EPA Map of Radon Zones. Information acquired via the Internet at website: http://www.epa.gov/iaq/radon/zonemap.html.

Fertig, W. 2000. Status Review of the Ute Ladies' Tresses (*Spiranthes diluvalis*). Wyoming Natural Diversity Database, University of Wyoming. Laramie, Wyoming. 17 pp.

Forrest, S.C., T.W. Clark, L. Richardson and T.M. Campbell III. 1985. Black-footed ferret habitat: Some management and reintroduction considerations. Wyoming Bureau of Land Management Wildlife Technical Bulletin Number 2. Cheyenne, Wyoming. 49 pp.

Federal Register. 1983. 48 FR 44716.

Frison, G.C. 1991. Prehistoric hunters of the high plains. Academic Press, Inc. New York, New York. 532 pp.

Huxtable, J. 2005. Personal communication between Jim Huxtable and Ryan Woodruff on Friday, January 28, 2005.

Irwin, L.L. and J.M. Peek. 1979. Relationship between road closures and elk behavior in northern Idaho. Pages 199-204. In: North American Elk: Ecology, Behavior and Management edited by M.S. Boyce and L.D. Hayden-Wing. University of Wyoming. Laramie, Wyoming.

Keinath, D. 2001. Habitat associations of Preble's Meadow Jumping Mice in Wyoming: A GIS model and descriptive analysis. Prepared for the U.S. Fish and Wildlife Service by the Wyoming Natural Diversity Database, University of Wyoming. Laramie, Wyoming 17 pp.

Keinath, D., B. Heidel and G.P Beauvais. 2003. Wyoming plant and animal species of concern. Prepared by the Wyoming Natural Diversity Database, University of Wyoming. Laramie, Wyoming.

Klein, D.R. 1974. The reaction of some northern mammals to aircraft disturbance. Pages 377-383. In: Eleventh International Congress of Game Biologists; September 3-7, 1973. Stockholm, Sweden. Swedish Environmental Protection Board. Stockholm, Sweden.

Knight, D.H. 1994. Mountains and plains: The ecology of Wyoming landscapes. Yale University Press, New Haven, Connecticut. 338 pp.

Lageson, D.R., and D.R. Spearing. 1988. Roadside geology of Wyoming. Mountain Press Publishing Company, Missoula, Montana. 271 pp.

Love, J.D., and A.C. Christianson. 1985. Geologic map of Wyoming. U.S. Geological Survey, Washington, D.C.

MacArthur, R.A., V. Geist and R.H. Johnson. 1982. Cardiac and behavioral responses of mountain sheep to human disturbance. Journal of Wildlife Management 46:351-358.

Martner, B. 1986. Wyoming Climate Atlas. Prepared in cooperation with the Wyoming Water Research Center, University of Wyoming. University of Nebraska Press. Lincoln, Nebraska.

Merrill, E.H., T.W. Kohley, M.E. Herdendorf, W.A. Reiners, K.L. Driese, R.W. Marrs and S.H. Anderson. 1996. The Wyoming gap analysis project final report. University of Wyoming. Laramie, Wyoming. 109 pp. + appendices.

Merritt, F.S., M.K. Loftin, and J.T. Ricketts. 2004. Standard Handbook for Civil Engineers, 5th Edition. McGraw-Hill Publishing Company, Inc. New York, New York. 1600 pp.

National Wildlife Federation. 1987. Raptor management techniques manual. National Wildlife Federation Scientific and Technical Series No. 10. Port City Press, Inc. Baltimore, Maryland. 420 pp.

National Safety Council (NSC). 2005. Radon Fact Sheets. Information acquired via the Internet at website: http://www.nsc.org/library/facts/radon.htm.

Nicholoff, S.H., compiler. 2003. Wyoming Bird Conservation Plan, Version 2.0. Wyoming Partners in Flight. Wyoming game and Fish Department. Lander, Wyoming. 668 pp

Natural Resources Conservation Service (NRCS). 2003. Non-Technical Soil Description, Soil Survey Area WY609, Converse County Area, Wyoming, Southern Part. Unpublished report. United States Department of Agriculture, Natural Resources Conservation Service. Douglas, Wyoming.

Parrish, T.L., S.H. Anderson, and W.F. Oelklaus. 1993. Mountain plover habitat selection in the Powder River Basin, Wyoming. Prairie Naturalist 25(3);219-226.

Pennsylvania Department of Environmental Protection (PDEP). 2002. Effects of Longwall Mining on Real Property Value and the Tax Base of Greene and Washington Counties, Pennsylvania. Final Report. Prepared by Jeffrey R. Kern, David Falkenstern, and Ronald W. Stingelin. 70 pp. Information acquired via the Internet at website: http://www.dep.state.pa.us/dep/deputate/minres/Longwall/report02/fimnalreport.htm.

Peterson, A. 1986. Habitat suitability index models: Bald eagle (breeding season). U.S. Fish and Wildlife Service Biological Report 82(10.126). 25 pp.

Rau, J.G., and D.C. Wooten. 1980. Environmental Impact Analysis Handbook. McGraw Hill, Inc. New York, New York. 656 pp.

Sheets, R.G., R.L. Linder and R.B. Dahlgren. 1972. Food habits of two liters of black-footed ferrets in South Dakota. American Midland Naturalist 87:249-251.

Snow, C. 1973. Habitat management series for endangered species. Report No. 5: Southern bald eagle (*Haliaeetus leucocephalus leucocephalus*) and northern bald eagle (*H. l. alascanus*). U.S. Department of the Interior, Bureau of Land Management. Technical Note No. 171. 58 pp.

Soil Conservation Service (SCS). 1988. Foothills and Mountains Southeast, Wyoming Range Descriptions, Field Office Technical Guide. U.S. Department of Agriculture, Natural Resource and Conservation Service. Washington, D.C. 33 pp.

Spackman, S., B. Jennings, J. Cole, C. Dawson, M. Monton, A. Krantz and C. Spurrier. 1997. Colorado rare plant field guide. Prepared for the Bureau of Land Management, U.S. Forest Service and U.S. Fish and Wildlife Service by the Colorado Natural Heritage Program. Fort Collins, Colorado.

Steenhoff, K. 1978. Management of wintering bald eagles. U.S. Fish and Wildlife Service FWS/OBS-78/79. 59 pp.

U.S. Department of Commerce (USDC). 1990. 1990 Census of Population. U.S. Department of Commerce, Economics, and Statistics, Bureau of the Census. U.S. Government Printing Office. Washington, D.C.

U.S. Geological Survey (USGS). 2005. The Geology of Radon by James K. Otton, Linda C.S. Gunderson, and R. Randall Schumann. Information acquired via the Internet at website: http://energy.cr.usgs.gov/radon/georadon.html.

U.S. Roads. 2005. New Dust Control Material Proves Itself. In: Road Management & Engineering Journal. March 1998. USroads.com, the website of TranSafety, Inc. Sequim, Washington. 5 pp. Information acquired via the Internet at website: http://www.usroads.com/journas/rmej/9803/rm980303.htm.

United States Department of the Interior (USDI). 1980. Department Manual 516: Environmental Quality. Washington, D.C.

Ward, A.L. and J.J. Cupal. 1979. Telemetered heart rate of three elk as affected by activity and human disturbance. Pages 47-56. In: Proceedings of the Dispersed Recreation and Natural Resource Management Symposium. Utah State University. Logan, Utah.

Wyle Laboratories. 1971. Community noise. Prepared for the U.S. Environmental Protection Agency, Report No. NTID300.3. Washington, D.C. 203 pp.

Wyoming Cooperative Fishery and Wildlife Research Unit. 1994. Raptor Mitigation Handbook. Wyoming Cooperative Fishery and Wildlife Research Unit. Laramie, Wyoming. 62 pp. + appendices.

Wyoming Department of Employment, Research and Planning (WDOE). 2001. Patterns of Population Change in Wyoming, 1990-2000. Information acquired via the Internet at website: http://wydoe.state.wy.us/1mi/0901/12.htm.

Wyoming Department of Environmental Quality, Air Quality Division (WDEQ/AQD). 2000a. Wyoming Air Quality Standards and Regulations, Chapter 2, Ambient Standards. Cheyenne, Wyoming. 5pp.

_____. 2000b. Wyoming Air Quality Rules and Regulations, Chapter 6, Permitting Requirements. Cheyenne, Wyoming. 93 pp.

Wyoming Department of Environmental Quality, Land Quality Division (WDEQ/LQD). 1994. Alternative Sediment Control Measures, Guideline No. 15. Cheyenne, Wyoming. 13 pp.

_____. 2000. Non-Coal Rules and Regulations. Cheyenne, Wyoming. 80 pp.

Wyoming Department of Environmental Quality, Water Quality Division (WDEQ/WQD). 1990. Water Quality Rules and Regulations, Chapter 1, Quality Standards for Wyoming Surface Waters. Cheyenne, Wyoming. 87 pp.

_____. 1993. Water Quality Rules and Regulations, Chapter 8, Quality Standards for Wyoming Ground Water. Cheyenne, Wyoming. 13 pp.

_____. 2000. Wyoming's 2000 305(b) State Water Quality Assessment Report. Cheyenne, Wyoming. 8 pp. + appendices.

Wyoming Department of Transportation (WDOT). 1999. Vehicle Miles Book. Cheyenne, Wyoming. 120 pp.

Wyoming Game and Fish Department (WGFD). 1999. Atlas of Birds, Mammals, Reptiles, and Amphibians in Wyoming. Wyoming Game and Fish Department, Wildlife Division. Cheyenne, Wyoming. 190 pp. + appendices.

_____. 2003a. 2002 Annual Big Game Herd Unit Job Completion Reports. Casper Region Annual Big Game Herd Unit Reports 2002. Cheyenne, Wyoming. 325 pp.

_____. 2003b. 2002 Sage Grouse Job Completion Report. 2002 Sage Grouse and Pheasant Job Completion Report, Casper Region. Cheyenne, Wyoming. 59 pp.

Wyoming Natural Diversity Database (WYNDDB). 2005. Data Compilation for Robert M. Anderson/Anderson Environmental Consulting. Completed on February 18, 2005. Unpublished Report. Wyoming Natural Diversity Database, University of Wyoming. Laramie, Wyoming.

Wyoming State Land Use Commission (WSLUC). 1979. State of Wyoming Land Use Plan.

Wyoming State Weed Team (WSWT). 2003. Wyoming Weed Management Strategic Plan prepared by the Wyoming State Weed Team. June 2003. 12pp. Information acquired via the Internet at website: http://www.wyoweed.org.

7.0 ABBREVIATIONS AND ACRONYMS

ADT	Average Daily Traffic
AEC	Anderson Environmental Consulting
AMSL	Above Mean Sea Level
AUM	Animal Unit Month
BATF	Bureau of Alcohol, Tobacco and Firearms
BBS	Breeding Bird Survey
BLM	Bureau of Land Management
BMP	Best Management Practices
BWPD	Barrels of Water per Day
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFO	Casper Field Office
CO	Carbon monoxide
dBA	Decibel
DR	Decision Record
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FLPMA	Federal Land Policy Management Act
GWPM	Gallons of Water per Minute
GWPD	Gallons of Water per Day
HQPA	Huxtable Quarry Project Area
ips	Inches per Second
lbs	Pounds
KOP	Key Observation Point
LOP	Life of Project
MOU	Memorandum of Understanding
MSHA	Mine Health and Safety Administration
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides (oxides of nitrogen)
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSC	National Safety Council
O_3	Ozone
ORV	Off-Road Vehicle
OSHA	Occupational Safety and Health Administration
pCi/L	Pico Curies per Liter
PDEP	Pennsylvania Department of Environmental Protection
PIF	Partners in Flight

PM_{10}	Particulate matter with an effective diameter less than 10 microns
$PM_{2.5}$	Particulate matter with an effective diameter less than 2.5 microns
ppm	Parts per Million
PRRA	Platte River Resource Area
PSD	Prevention of Significant Deterioration
RMP	Resource Management Plan
ROD	Record of Decision
SCS	Soil Conservation Service
SEO	State Engineer's Office
SHPO	State Historic Preservation Officer
SMA	Surface Management Agency
SMU	Soil Mapping Unit
SO_2	Sulfur dioxide
SO_x	Sulfur oxides (oxides of sulfur)
SWPPP	Storm Water Pollution Prevention Plan
T/E	Threatened and Endangered Species
TPD	Tons per Day
TPY	Tons per Year
TSP	Total Suspended Particulates
USBM	U.S. Bureau of Mines
USC	United States Code
USDC	U.S. Department of Commerce
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound
VRM	Visual Resource Management
WAAQS	Wyoming Ambient Air Quality Standards
WDEQ	Wyoming Department of Environmental Quality
…..**AQD**	…..Air Quality Division
…..**LQD**	…..Land Quality Division
…..**WQD**	…..Water Quality Division
WDOE	Wyoming Division of Employment
WDOT	Wyoming Department of Transportation
WGFD	Wyoming Game and Fish Department
WQPA	Wills Quarry Project Area
WSEO	Wyoming State Engineer's Office
WSLUC	Wyoming State Land Use Commission
WYNDD	Wyoming Natural Diversity Database

APPENDIX A

Soil Descriptions for the Proposed Project Area

Summary of the Physical Characteristics of Individual Soil Mapping Units Encountered in the HQPA [1]

Soil Map Unit #	Soil Map Unit Name	Slope Phase	Road Length	Soil Series	Land Capability [5] Non-Irrigated	Land Capability [5] Irrigated [6]	Soil Depth	Available Water Capacity	Permeability	Erosion Factor T [7]	Wind Erodibility [8] Group	Wind Erodibility [8] Index
95	Forkwood-Cambria Loams	0 to 6%	1,523'	45% Forkwood loam	3*e*	NR	very deep	high	moderate	5	5	56
				35% Cambria loam	4*e*	NR	very deep	high	moderate	5	5	56
110	Hiland-Bowbac Fine Sandy Loams	6 to 15%	609'	45% Hiland fine sandy loam	4*e*	NR	very deep	moderate	moderate	5	3	86
				35% Bowbac fine sandy loam	4*e*	NR	moderately deep	low	moderately slow	3	3	86
123	Kishona-Cambria Loams	0 to 6%	2,335'	45% Kishona clay loam	4*e*	NR	very deep	high	moderate	5	4L	86
				40% Cambria loam	4*e*	NR	very deep	high	moderate	5	5	56
168	Shingle-Taluce Badland Complex	10 to 40%	2,031'	30% Shingle clay loam	6*e*	NR	shallow	very low	very slow	2	4L	86
				25% Taluce fine sandy loam	6*e*	NR	shallow	very low	moderately slow	2	3	86
				20% Badland [3]	8	NR	shallow	high	very slow	---	---	---
182	Theedle-Kishona-Shingle Loams	3 to 20%	2,742'	35% Theedle loam	4*e*	NR	moderately deep	low	moderately slow	3	4L	86
				25% Kishona clay loam	4*e*	NR	very deep	high	moderate	5	4L	86
				20% Shingle clay loam	6*e*	NR	shallow	very low	very slow	2	4L	86
222	Theedle-Kishona Loams	6 to 15%	200'	45% Theedle loam	4*e*	NR	moderately deep	low	moderately slow	3	4L	86
				35% Kishona clay loam	4*e*	NR	very deep	high	moderate	5	4L	86
224	Tyzak-Rock Outcrop Complex [2]	6 to 70%	1,170'	50% Tyzak channery loam	7*e*	NR	shallow	very low	very slow	1	8	0
				50% Rock Outcrop [4]	NR	NR	---	---	---	---	---	---

[1] Information obtained from *Non-Technical Soil Description, Soil Survey WY609, Converse County Area, Wyoming, Southern Part.* Unpublished Report. United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (2003).

[2] Both the ten acre (Proposed Action) and forty acre (Alternative A) quarry sites are located within Soil Map Unit 224: Tyzak-Rock Outcrop Complex.

[3] Badland - Weathered bedrock at the surface to a depth of 60 inches or more.

[4] Rock Outcrop - Unweathered bedrock at the surface to a depth of 60 inches or more.

[5] Refer to the definitions of Land Capability on the following pages.

[6] NR = Not Rated.

[7] Refer to the definitions for Erosion Factor T on the following pages.

[8] Refer to the definitions for Wind Erodibility on the following pages.

CAPABILITY CLASSES are Designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, with Class I soils having few limitations and Class VIII soils having multiple limitations that prevent commercial crop production.

The capability classes are defined as follows:

- Class I soils have few limitations that restrict their use.

- Class II soils have some limitations that reduce the choice of plants or that require moderate conservation practices.

- Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices or both.

- Class IV soils have very severe limitations that restrict the choice of plants, require very careful management, or both.

- Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

- Class VI soils have severe limitations that make them generally unsuitable for cultivation.

- Class VII soils have very severe limitations that make them unsuitable for cultivation.

- Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example II*e*. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

EROSION FACTOR T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year. Soil loss (Erosion Factor) T is assigned according to properties of root limiting subsurface sol layers. The designation of a limiting layer implies that the material above the layer has more favorable plant growth properties. As limiting or less favorable soil layers become closer to the surface, the relative ability of a soil to maintain its productivity through natural and managed processes decreases. Criteria for assigning "T" are estimated from:

1. The severity of physical or chemical properties of subsurface layers.
2. The climatically influenced properties of soil moisture and temperature.
3. The economic feasibility of utilizing management practices to overcome limiting layers or conditions.

Erosion Factor "T" is expressed as soil loss tolerance in tons/acre based upon the depth to the limiting layer in inches as follows:

0 - 10 inches = 1 ton/acre	40 - 60 inches = 4 tons/acre
10 - 20 inches = 2 tons/acre	} 60 inches = 5 tons/acre
20 - 40 inches = 3 tons/acre	

WIND ERODIBILITY GROUPS are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

The WIND ERODIBILITY INDEX is used in the wind erosion equation (WEQ). The index number indicates the amount of soil lost in tons per acre per year. The range of wind erodibility index numbers is 0 to 300.

APPENDIX B

Figures to Support VRM Analysis

Figure 1.

Proposed Huxtable Quarry Site

Pre-development
Photo-Simulation

Figure 2

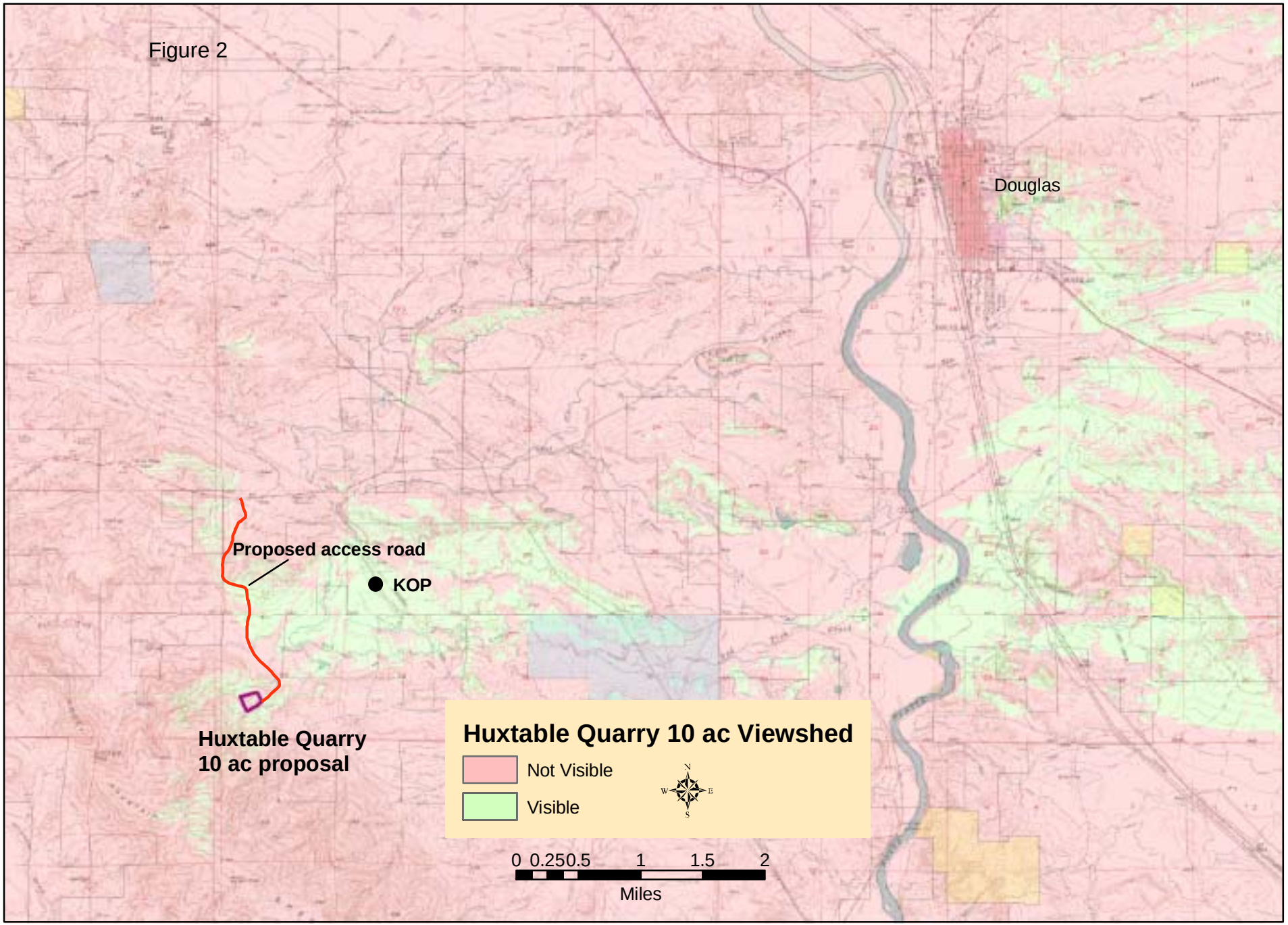

Douglas
Proposed access road
KOP
Huxtable Quarry
10 ac proposal
Huxtable Quarry 10 ac Viewshed
Not Visible
Visible
N
W
E
S
0 0.250.5 1 1.5 2
Miles

Figure 3

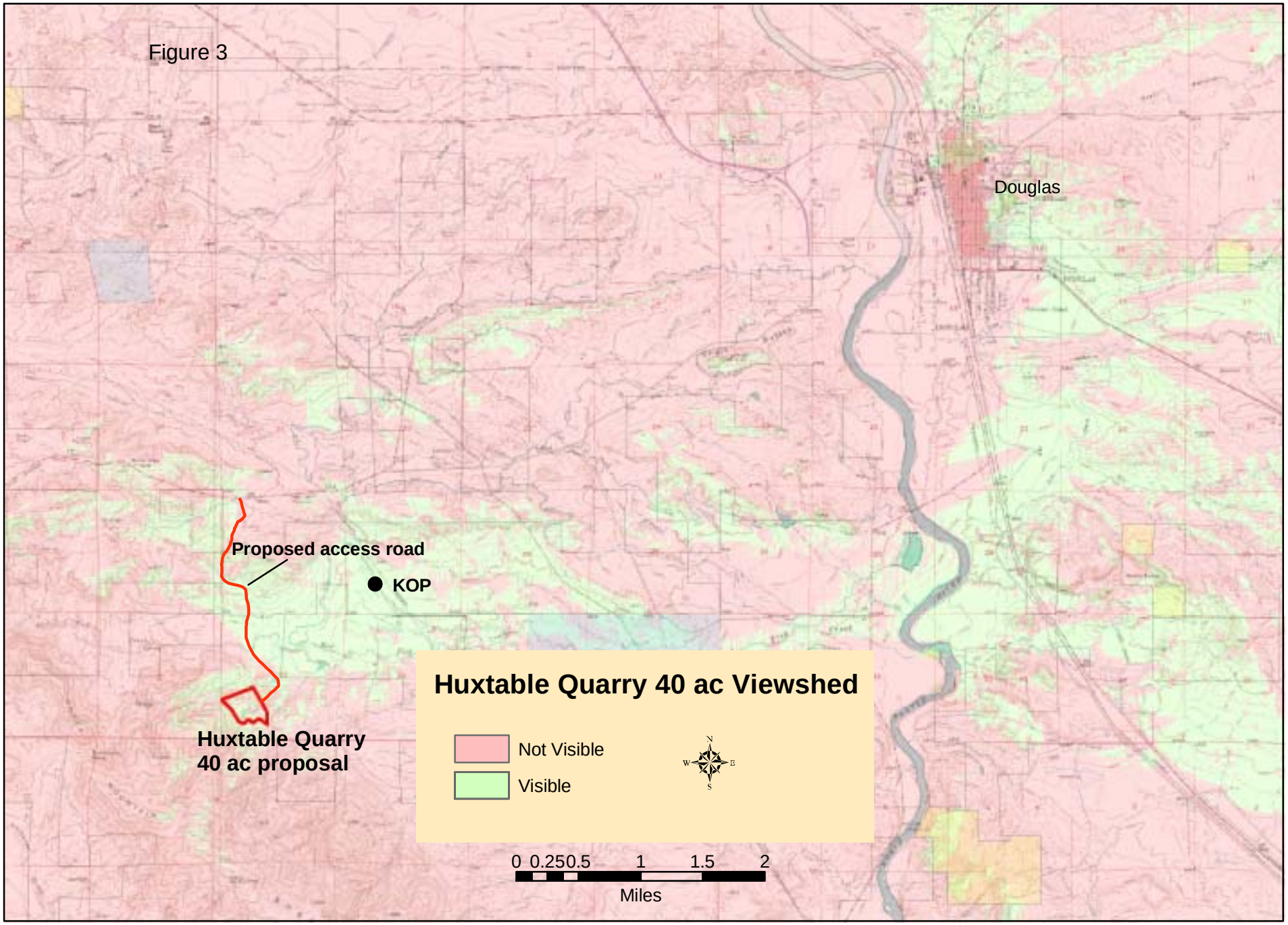

Douglas
Proposed access road
KOP
Huxtable Quarry
40 ac proposal
Huxtable Quarry 40 ac Viewshed
Not Visible
Visible
N
W
E
S
0 0.250.5 1 1.5 2
Miles

Figure 4.

Proposed Action - Ten Acre Quarry Site

Photo-Simulation

Figure 5.

40 Acre proposal

Photo-Simulation