

NEW MEXICO

Abandoned Mine Lands

Project Manual
Including Plans and Specifications
for Construction of

Carthage Mine Safeguard Maintenance Project

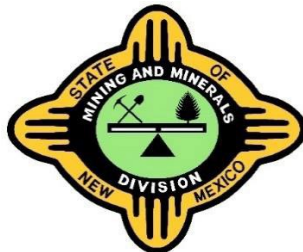
Socorro County, New Mexico

PROJECT NO.
EMNRD-MMD-2024-02

AUTHORIZED BY:

ABANDONED MINE LAND PROGRAM
MINING and MINERALS DIVISION
STATE OF NEW MEXICO, ENERGY, MINERALS AND NATURAL
RESOURCES DEPARTMENT*
(with reclamation fees paid by the New Mexico Coal Industry)

May 2024



00002 – CERTIFICATION PAGE

PROJECT NAME: CARTHAGE MINE SAFEGUARD MAINTENANCE PROJECT
LOCATION: SOCORRO COUNTY
PROJECT NUMBER: EMNRD-MMD-2024-02
AML PROJECT ENGINEER: MEGHAN J McDONALD, P.E.
Mining and Minerals Division
State of New Mexico, Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive Santa Fe, New Mexico 87505
Telephone 505.629.9872

The technical material and data contained in the specifications were prepared under the supervision and direction of the undersigned, whose seal as a Professional Engineer (P.E.), licensed to practice in the State of New Mexico, is affixed below.



DATE SIGNED: May 31, 2024

Michelle Lujan Grisham, Governor

All questions about the meaning or intent of these documents shall be submitted only to the General Services Department, State Purchasing Division Procurement Specialist, in writing.

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01	COVER SHEET
02	SITE ACCESS MAP OR PROJECT OVERVIEW MAP
03	AML R-10 EARTHEN BERM AND FENCING LOCATIONS
04	AML R-10 DECLINED CULVERT WITH BAT GATE
05	AML R-10 BAT GATE DETAILS
06	AML C-4 SHAFT BAT GATE
07	AML C-4 SHAFT BAT GATE DETAILS
08	REMOVABLE CROSSBAR LOCK DETAIL
09	AML C-6 PUFF PLUG CLOSURE
10	AML C-7 SWINGING BAT GATE

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DIVISION 1 – GENERAL REQUIREMENTS

The following sections describe the general requirements of this project. References to Sheet Numbers, refer to the design drawings, which are included in this Project Manual.

01010 – SUMMARY OF WORK

The Carthage Mine Safeguard Maintenance Project is located between the towns of San Antonio and Bingham in Socorro County, New Mexico. The project area (see Sheet No. 2) is on private surface ownership in Section 10, 15 and 21, Township 05 South, Range 02 East (USGS 7.5' Canon Agua Buena and Cerro De La Campana Quadrangle).

This project involves maintenance to existing mine safeguard structures and safeguarding of a subsidence feature. Four features will be addressed:

- Excavate to achieve access into mine workings at **Feature R-10**. Avoid disturbing historical timber cribbing. Keep any excavated soil as stockpile for later use. Backfill the mine feature with moisture conditioned compact fill. Backfill to construct a mound of compact fill where the opening of the feature originally began past location of where the skylight was once located. Construct a compact earthen berm next to the road adjacent to R-10. Contractor may use material from a previously constructed AML earthen berm. Seed and mulch.
- Remove existing timber AML safeguard method and replace with new steel bat gate at **Feature C-4**. Do not disturb historic timber cribbing. Excavate and moisture condition foundation for concrete collar. Construct concrete collar with rebar reinforcement. Install TS4 steel support and cross bars. Weld closures. Seed and Mulch.
- Excavate and backfill subsidence at **Feature C-6 adit**. Stockpile excavated soil. Construct polyurethane foam (PUF) fill and install salvaged feature marker. Backfill with stockpiled fill. Moisture condition and compact fill. Seed and Mulch.
- Remove existing AML Masterlock at **Feature C-7** to open existing swinging bat gate. Install new lock to ensure easier access to swing gate. Method shall be approved by AML Project Engineer prior to construction. Repair any damage to the gate structure caused during removal of the Masterlock.

Table I, below, lists the mine features where safeguard improvements will be made along with approximate size of openings needing filling, the estimated amount of material needed to make the improvement, and an indication of the type of work to be accomplished. Note the time restrictions for closure of some of the mine features.

Demobilization shall be conducted in such a manner to ensure that the Contractor leaves all project areas in as good or better condition than before disturbance.

**TABLE I
PROJECT SUMMARY INCLUDING APPROXIMATE MINE OPENING
DIMENSIONS AND CONSTRUCTION QUANTITY ESTIMATES**

The approximate mine opening dimensions and mine fill volume estimates are provided only for the information of the Potential Bidder. The Abandoned Mine Land Program makes absolutely no guarantee of their accuracy or precision. Volume estimates are of the material that may be required to fill the mine cavities and adjacent areas as indicated, including an allowance for shrinkage, irregularities and known underground mine voids. All mine features are irregular in shape. Estimates of mine fill volumes are generally not indicated at structural closures; excavation, fill and other earthmoving activities there are considered incidental to the work. Mine fill volume estimates are indicated at those structural closures with significant volumes of earthwork required.

To comply with wildlife restrictions, construction is limited to certain periods of the year. As the project area supports winter bat hibernation use and live Townsend’s big-eared bats (*Corynorhinus townsendii*) have been documented in the mine features, **construction shall only take place between April 1 - October 31** unless approved otherwise by Project Engineer in writing.

As construction activities will take place during the **migratory bird nesting season (February 15 - September 15)**, a pre-construction nesting bird survey will be completed by the AML Program or representatives of the AML Program to locate any active nest that would need to be avoided. This survey should be conducted no more than 10 days prior to the start of construction. If occupied nests are found, they must be avoided until the young have fledged to comply with the requirements of the MBTA

AML FEATURE NUMBER	TYPE OF MINE FEATURE	APPRX. DIMENSIONS (FEET)	QTY / VOLUME	WORK REQUIRED / COMMENTS
AML R-10	Adit Opening	19’ wide x 15’ long x 50+’ deep		
	Excavation of mine ceiling and rough sloughs	8’ wide x 26’ long x 6.75’ deep	52 cubic yards	
	Fill	126 cubic yards of moisture compacted fill	126 cubic yards	
	Compact Earthen Berm	120’ long x 4’ wide x 3’ high	53 cubic ft	

AML FEATURE NUMBER	TYPE OF MINE FEATURE	APPRX. DIMENSIONS (FEET)	QTY / VOLUME	WORK REQUIRED / COMMENTS
AML C-4	Existing Timber AML Safeguard Structure	10.2' wide x 14' long x 1' deep		
	Concrete	243 cubic ft of Concrete	9 cubic yards	
	Steel Grating	85 ft sq of Steel Grating	85 ft sq	
	TS 4x2x1/4 Steel	113 linear feet of TS 4x2x1/4 Steel	113 linear ft	
	1.5"x 1/4" angle iron bar	159 linear ft of 1.5"x 1/4" angle iron bar	159 linear ft	
	3/8" thick steel plate	1 square foot of 3/8" thick steel plate	1 square foot	
	1 1/2" pipe sleeve with 1/4" thickness	1 linear foot of 1 1/2" pipe sleeve with 1/4" thickness	1 linear foot	
AML FEATURE NUMBER	TYPE OF MINE FEATURE	APPRX. DIMENSIONS (FEET)	QTY / VOLUME	WORK REQUIRED / COMMENTS
AML C-6	Subsidence	11' wide x 12' long x 10' deep		
	PUF	264 cubic ft of PUF	264 cubic ft	
	Fill	10 cubic yards of fill	264	

AML FEATURE NUMBER	TYPE OF MINE FEATURE	APPRX. DIMENSIONS (FEET)	QTY / VOLUME	WORK REQUIRED / COMMENTS
AML C-7	Safeguarded Adit Steel Bar Replacement			Contractor must verify all dimensions prior to purchasing material. Replace current steel-bar with swing gate Contractor will have to cut lock with or without cutting steel gate to do replacement job, then replace damaged lock with new lock.

01011 – SUMMARY OF PROJECT AND CONSTRUCTION ACCESS

The project site consists of a historic underground coal mines with multiple mine openings that were secured by the AML Program during Phase I of the Safeguard Project in 2011. Mine features to be safeguarded in this project and the methods and time restrictions for safeguarding are summarized in Table I.

To the maximum extent practicable, construction access is limited to existing jeep trails and hiking trails, except as otherwise shown, specified, or allowed by the Project Manager. Feature access may require small off-road vehicles such as utility terrain vehicles.

The Contractor shall be responsible for thoroughly investigating site conditions and scheduling their equipment, equipment operations, personnel, and safety procedures to prevent accidents and injuries.

01012 – AVOIDANCE AREAS FOR PRESERVATION OF CULTURAL AND BIOLOGICAL RESOURCES

The Contractor shall avoid designated cultural and biological resources. The Contractor shall avoid any activities outside of the designated areas of disturbance. Additionally, existing mine features and interpretive displays shall not be removed or damaged as a result of the work. Access routes and methods to construction areas shall be coordinated with the Project Manager prior to mobilizing to targeted mine features. No construction disturbances (including excavation, fill and stockpiling of construction materials) or moving of artifacts shall take place unless directly specified in design documents. Avoidance zones within the designated disturbance area shall extend to five meters (16.4 feet) from the existing mine features structures, except where construction is indicated within this zone in which case the disturbance within the avoidance zone shall be minimized as practicable. The Project Manager or Project Engineer may designate special avoidance areas.

Wherever the Contractor is working with equipment near designated avoidance features and avoidance areas and wherever construction access routes pass next to these features, the Contractor shall place four-foot high, temporary, high-visibility barrier fencing (Hi-Vis, ADPI, or equivalent) around the features. The Contractor shall provide a submittal for the barrier fencing to be used prior to installation. Barrier fencing shall be removed upon completion of

work. An exception to this requirement may be during performing rock clearing from in front of mine entrances and clearing pedestrian approaches.

The Contractor shall bear all direct, indirect, and consequential costs of repairs due to unauthorized damage caused by the Contractor's operations to cultural and biological resources to be avoided. These costs shall include but are not limited to fees and charges of engineers, attorneys, and other professionals, made necessary thereby.

The Contractor shall cooperate fully to preserve archaeological and historic artifacts and any threatened or endangered species found within the project area. If the Contractor encounters a previously uninventoried archaeological site, historic site, or species listed as or proposed to be listed as threatened or endangered, the Contractor shall terminate all further operation in that immediate area until the archaeological or biological preservation agencies have had the opportunity to survey the site. This termination shall not preclude continuation of work in other areas nor shall it entitle the Contractor to additional payment in any form, other than an extension of time, unless the Contractor is substantially precluded from working on the entire project.

As the project area supports winter bat hibernation use and live Townsend's big-eared bats (*Corynorhinus townsendii*) have been documented in the mine features, construction shall only take place between April 1 - October 31 unless approved otherwise by Project Engineer in writing.

As construction activities will take place during the migratory bird nesting season (February 15 - September 15), a preconstruction migratory bird survey will be required by the AML Program or representatives of the AML Program and will take place within 10 days to the start of construction. The Contractor shall contact the AML Program Project Engineer at least one month prior to commencement of construction to coordinate this survey or three weeks prior to Notice to Proceed. Failure by the Contractor to timely coordinate a preconstruction migratory bird survey may impact the Contractor's schedule and no additional time or compensation will be granted. Following receipt of NTP, the Contractor shall be responsible for maintaining nest free conditions in construction-impacted areas. The Contractor shall comply with the requirements of the Migratory Bird Treaty Act (MBTA), the United States Fish and Wildlife Service (USFWS), and shall not cause harm or harassment to migratory birds.

If occupied nests are found, the AML Program will coordinate with the New Mexico Game and Fish Department and USFWS to determine the appropriate exclusion buffer. This exclusion buffer will remain until after the juvenile birds have fledged (flown from the nest).

01013 – Unmarked Human Burials

If unmarked human burials are discovered during ground disturbing activities on state or private land, work will stop. The remains will be protected from further disturbance and AMLP will notify the local law enforcement agency, the Office of the Medical Investigator (OMI), the state land managing agency, and State Historic Preservation Officer (SHPO). If the OMI determines that the remains are without medico-legal significance, the OMI will terminate jurisdiction and SHPO, in consultation with AMLP and the state land managing agency, will

determine the steps to be taken to protect or remove the remains in accordance with the Cultural Properties Act §18-6-11.2, NMSA 1978 and implementing rule 4.10.11 NMAC.

AMLPL will consult with Tribes that may attach religious and cultural significance to human remains, graves or associated funerary objects. This consultation will be coordinated with SHPO and may be conducted concurrently with SHPO notification to the tribes pursuant to 4.10.11 NMAC.

If unmarked human burials are discovered on federal land, work will stop, and the remains will be protected from further disturbance. AMLPL will contact the federal land managing agency(s) and SHPO. The federal land managing agency(s) will comply with 25 USC 3002 (d) of the Native American Graves Protection and Repatriation Act (NAGPRA) and implementing regulations at 43 CFR § 10.

01015 – CONTRACTOR'S USE OF THE PREMISES

The Contractor shall take reasonable measures to avoid traffic conflicts between vehicles of the Contractor's employees and private citizens and to avoid overloading of any driveways, roads and streets. The Contractor shall limit the access of equipment and trucks to the project site and provide protection for any improvements over which trucks and equipment must pass to reach the job site. If heavy equipment operated on wet or soft roads causes excessive rutting, the damage shall be repaired by grading the road upon completion of the work.

01025 – MEASUREMENT AND PAYMENT

The measurement for payment is as defined below. Payment shall be made based on the applicable unit price bid by the Contractor under the Statewide Price Agreement Invitation to Bid No. 40-52100-23-06111: Construction Services for Abandoned Mine Lands. The estimated quantities of materials and work required to complete the project are approximations only and are given as a basis for calculation upon which the contract award will be determined. All estimated quantities could vary considerably and will depend on the actual conditions encountered at the time the work is performed. AML reserves the right to decrease or increase any or all of the quantities of materials or work as may be deemed necessary during the project.

01027 – APPLICATIONS FOR PAYMENT

All Applications for Payment for work performed under this contract shall whenever practicable, first be reviewed by the Project Manager before being submitted to:

Daniela Chacon, Staff Engineer
Mining and Minerals Division
Energy, Minerals, and Natural Resources Department
State of New Mexico
1220 South St. Francis Drive

Santa Fe, New Mexico 87505
daniela.chacon@emnrd.nm.gov

Applications for Payment shall include a breakdown of project costs per day, including all labor, equipment usage, materials, mileage, and a description of the work completed for the day. All Applications for Payment shall include appropriate backup, including mileage logs, daily field reports showing work start/stop times, and materials receipts. Gross receipts tax shall be broken out separately on the Application for Payment.

01028 – PRICES

The following subsections describe the lump sum and unit prices to be paid under this contract. **No markup may be added to materials or equipment rentals per the conditions of the Statewide Price Agreement.**

I. Unit Prices

The basis of payment of lump sum prices as outlined in the Bid Form is as follows:

A. Mobilization

Payment for Mobilization will be made at the unit prices bid. Refer to Statewide Price Agreement.

In addition, payment for Mobilization will not be made until the Project Engineer's approval of an adequate performance. An "adequate performance" will be satisfied when the Contractor has shown the ability to successfully perform the required tasks of this project as outlined in these Specifications to the satisfaction of the Project Engineer. In case of any weather delays, compensation for additional Mobilization will not be made.

Payment for Mobilization shall include all equipment, fees, fuel, insurance, labor, permits, personnel, supervision and transportation to assemble, drive, operate, place, position, provide security measures for, and transport equipment, field offices, fuel, implements, machinery, materials, temporary sanitary facilities, and support facilities to and at the job site in conformance with the Project Manager's directives and these Specifications. This amount shall include complete Mobilization no matter how often equipment is transported to individual sites within the project area.

Mobilization shall also include preparation of an Occupational Safety and Health Administration (OSHA) compliant Health and Safety Plan (HASP) detailing the site-specific hazards and safety precautions associated with site work. The HASP shall include a list of responsible persons, hazard identification, hazard controls and safe practices, emergency and accident response, employee training requirements, chemical safety data sheets (SDS), and communication information and procedures.

Mobilization shall also include providing materials for animal exclusion as defined in the beginning of Division 2 – Sitework.

Mobilization shall also include preparation of any other required pre-construction submittals as specified in this manual.

B. Safeguard of Specified Subsidence /Collapse Features

Payment for completing safeguard measures at specified mine features will be made at the lump sum price shown in the Bid Form. These prices shall include all work necessary to complete the safeguard measures in accordance with the drawings and specifications. This work shall include the tasks necessary to access the mine features, including clearing as necessary; removal of temporary fencing; temporary removal of existing barbed wire fence (one location); preparation of feature for backfilling; placement of corrugated steel pipe with bat gate for mine vent (one location); transportation, handling, and placement of toroid tire plugs (one location); handling, mixing, and application of polyurethane foam; placement and compaction of imported and salvaged backfill; grading/landforming of backfill; reinstalling existing barbed wire fence where temporarily removed (one location); and including all equipment, labor, material, and supervision costs necessary to complete safeguard construction.

C. Backfill Closure

Excavate approximately 52 cubic yards of fill to achieve access into mine workings. Avoid disturbing historical timber cribbing. Keep any excavated soil as stockpile for later use. Backfill the mine feature with approximately 126 cubic yards of moisture conditioned compact fill. Backfill to construct a mound of compact fill minimum 3 ft to maximum 5 ft high where the opening of the feature originally began past location of where the skylight was once located. Construct 64 cubic yards of compact earthen berm next to the road adjacent to R-10. Contractor may use material from a previously constructed AML earthen berm. Seed and mulch.

D. Shaft Bat Gate

Do not disturb previous AML safeguard structure or historic timber cribbing. Excavate and moisture condition foundation for cement collar. Construct 9 cubic yards for cement collar with rebar reinforcement. Install TS 4x2x1/4 support and cross bars, 1.5"x 1/4" angle iron bar, of steel grating . Weld closures. Mulch and seed.

E. PUF Plug Closure

Excavate and save loose soil. Construct 40 cubic yards of polyurethane foam (PUF) fill and install salvaged feature marker. Backfill 10 cubic yards with common stockpile fill from adjacent mine. Moisture condition and compact fill. Seed and Mulch.

F. Swinging Bate Gate

Remove existing AML Master lock at Feature C-7 to open existing swinging bat gate. Install new lock to ensure easier access to swing gate. Method shall be approved by AML Project Engineer

prior to construction. Repair any damage to the gate structure caused during removal of the Master lock.

G. Reseeding and Mulching of Disturbed Areas

Payment for Reseeding and Mulching of Disturbed Areas will be made at the unit prices bid. Refer to Statewide Price Agreement. The area shall be measured in the field, parallel to the seeded and mulched surface using methods acceptable to the Project Engineer. Payment for seeding and mulching will be made at the unit price of the Contractor's bid on the Bid Form multiplied by the number of units installed. This price shall include soil preparation including raking, topdressing, incorporating specified soil amendments, mulch, and seeding by broadcasting including all equipment, labor, material and supervision costs necessary to complete installation, of all areas disturbed by construction activities.

Any surface disturbance areas of the project must be seeded and mulched. Disturbed areas may include but are not limited to: filled areas, temporary access routes and obliterated roads, areas used for office (as necessary) and sanitation units, equipment parking, closed access trails, stockpile and storage areas, and service areas.

01030 – ALTERNATES

Whenever equipment or materials are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function, and quality required. Unless the name is followed by words indicating that no substitution is permitted, the Project Engineer may accept equipment or materials of other suppliers if the Contractor submits sufficient information to allow for adequate determination that the equipment or materials proposed are equivalent or equal to that named.

01035 – MODIFICATION PROCEDURES

The following section describes procedures for making modifications to the contract by change orders. Modifications may involve changes in contract sum, contract time, and scope.

01036 – CHANGE ORDER PROCEDURES

The Contractor shall submit a request for any changes in the work under this contract, in writing, to the Project Engineer. No changes in work or quantities shown shall be authorized until a properly executed Change Order has been issued by MMD. Any work performed outside the original quantities or scope of work, before the issuance of a properly executed Change Order, shall be at the Contractor's risk.

The Contract Time may only be changed by a Change Order. Any claim for an extension in the Contract Time shall be based on written notice delivered to the Project Engineer within

fifteen working days of the occurrence of the event causing the claim. The extent of the claim with supporting data shall be included unless the Project Engineer allows additional time to ascertain more accurate data. The Project Engineer shall determine all claims for adjustment in the Contract Time. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order. The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of the Contractor if a claim is made therefore as provided above. Such delays shall include, but may not be restricted to, acts or neglect beyond the Contractor's control, epidemics, fires, floods, labor disputes, abnormal weather conditions, or acts of nature. In the event delays in construction occur due to weather, the conditions as outlined above will be in effect. If the Contractor leaves the project area due to a weather delay, the Contractor shall be responsible for assuring that all areas are left in a clean and safe condition as approved and directed by the Project Manager. In case of any weather delays, compensation for additional Mobilization or Demobilization will not be made.

01040 – COORDINATION

The following sections define the parties responsible for coordination of the contract work at the project and job site levels.

01041 - PROJECT COORDINATION

The Project Engineer will send the Contractor Notices to Proceed, Change Orders, other contract documents, and approvals on Applications for Payment. The Project Manager or Project Engineer may issue a Suspension of Work Notice if there is reasonable basis to believe that the Contractor is violating any condition or term of the contract or specifications, or that violations of health and safety standards will occur unless such notice is issued. No work shall proceed until the Suspension of Work Notice has been vacated.

01042 – MECHANICAL AND ELECTRICAL COORDINATION

The Contractor shall be responsible for the coordination of all mechanical and electrical aspects of the contract work. This includes overseeing of the general operation and maintenance of that equipment.

01043 – JOB SITE ADMINISTRATION

The Contractor shall be responsible for the administration of the contract work at the job site. This includes assuring that all equipment and materials used for the contract work meet the required specifications set forth and that all work is performed in a timely and orderly manner. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs concerning the work. The Contractor shall designate a full time on-site superintendent or authorized representative who shall be present or can be contacted readily during project working hours. This person shall represent the Contractor in dealing with the Project Manager and shall insure adherence to these specifications and any other directives.

01050 – FIELD ENGINEERING

The Contractor shall be responsible for locating and avoiding all underground utilities at the contract work site. If damage to the utilities occurs during the contract work, the damage shall be repaired at the Contractor's expense.

The Contractor shall also be responsible for the proper setting of all construction staking. The Contractor shall provide engineering surveys for construction to establish reference points that are necessary to enable the Work to proceed. The Contractor shall be responsible for surveying and laying out the Work, shall protect and preserve any established reference points, and shall make no changes or relocations without the prior written approval of the Project Engineer. The Contractor shall report to the Project Engineer whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations. The Contractor shall replace and accurately relocate all reference points so destroyed, lost, or moved. When it becomes necessary in the construction of public works, to remove or obliterate any triangulation station, bench mark, corner monument, stake, witness mark, or other reference mark, it shall be the duty of the Contractor in charge of the work to cause to be established by a New Mexico registered land surveyor one or more permanent reference marks which shall be plainly marked as witness corners or reference marks, as near as practicable to the original mark, and to record a map, field notes, or both, with the county clerk and county surveyor of the county wherein located, showing clearly the position of the marks established with reference to the position of the original work. The surveys or measurements made to connect the reference marks with the original mark shall be of at least the same order of precision as the original survey. The developed data shall be certified by a licensed surveyor and submitted to the AML.

01060 – REGULATORY REQUIREMENTS

The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations, and all orders and decrees of bodies or tribunals having any jurisdiction or authority which in any manner affect those engaged or employed on the work or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees and shall protect and indemnify the State of New Mexico and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or any employees. The Contractor shall procure all permits and licenses, pay all charges, fees, royalties, and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the work.

01090 – REFERENCES

Reference to standard specifications, manuals, or codes of any technical association, organization, or society, or to laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, laws, or regulation in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual, or

code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the Contractor.

01092 - ABBREVIATIONS

The following is an explanation of the abbreviations that may be used in the contract documents:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AML	Abandoned Mine Land Program of MMD
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
ATSA	American Traffic Services Association
AWS	American Welding Society
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂	carbon dioxide
CPR	cardiopulmonary resuscitation
CRSI	Concrete Reinforcing Steel Institute
EMNRD	Energy, Minerals, and Natural Resources Department (state)
H ₂ S	hydrogen sulfide
HASP	Health and Safety Plan
MBTA	Migratory Bird Treaty Act
MMD	Mining and Minerals Division of EMNRD
NMAC	New Mexico Administrative Code
NMSA	New Mexico Statutes Annotated
NTP	notice to proceed
OSHA	Occupational Safety and Health Administration
OSMRE	Office of Surface Mining, Reclamation, and Enforcement (federal)
PLS	Pure Live Seed
PUF	polyurethane foam
SAE	Society of Automotive Engineers
SDS	safety data sheet
USFWS	United States Fish and Wildlife Service

01094 – DEFINITIONS

The following is a definition of the terms that may be used in the contract documents (source: A Dictionary of Mining, Mineral, and Related Terms, Paul W. Thrush, Bureau of Mines, Department of the Interior, Washington, D.C., 1968):

1. adit A horizontal or nearly horizontal passage driven from the surface for the working or dewatering of a mine.
2. back The roof or upper part in any underground mining cavity.

3. cribbing The close setting of timber supports when shaft sinking through loose ground.
4. collar Timbering or concrete around the mouth or top of a shaft; the junction of a mine shaft and the surface.
5. decline See "incline".
6. drift A horizontal passage underground.
7. entry A haulage road, gangway, or airway to the surface.
8. gob pile A pile of heap mine refuse on the surface.
9. incline A shaft not vertical; usually on the dip of a vein.
10. lagging Planks, slabs, or small timbers placed over the caps or behind the posts of the timbering, not to carry the main weight, but to form a ceiling or a wall, preventing fragments or rock from falling through.
11. lining The brick, concrete, cast iron, or steel casing placed around a tunnel or shaft as a support.
12. loading chute A three-sided tray for loading or for transfer of material from one transport unit to another.
13. portal Any entrance to a mine.
14. red dog Material of a reddish color resulting from the combustion of shale and other mine waste dumps on the surface.
15. shaft An excavation of limited area compared with its depth, made for finding or mining ore or coal, raising water, ore, rock, or coal, hoisting and lowering personnel and material, or ventilating underground workings.
16. spoil The overburden or on-ore material removed in gaining access to the ore or mineral material in surface mining.
17. stope An excavation in which ore has been excavated in a series of steps.
18. stull A timber prop set between the walls of a stope, or supporting the mine roof.
19. subsidence A sinking down of a part of the earth's crust.
20. talus A heap of coarse rock waste at the foot of a cliff.
21. tipple Originally the place where the mine cars were tipped and emptied of their ore, and still used in that sense, although now more generally applied to the surface structures of a mine, including the preparation plant and loading tracks.
22. winze Interior mine shaft.

01100 – SPECIAL PROJECT PROCEDURES

The following section describes special procedures for alteration, preservation, security, hazardous materials, and other types of projects demanding unique procedures. Safety procedures and methods for all underground work inside abandoned mine entries shall be in accordance with the "New Mexico Mine Safety Code for All Mines," published by the New Mexico Institute of Mining & Technology, State Inspector of Mines, Bureau of Mine Inspection, P.O. Box W105, Socorro, NM 87801, 1.505.835.5460.

01135 - HAZARDOUS AND CONFINED AREA PROCEDURES

This project requires construction work in, around, and over hazardous and unprotected highwalls, mine shafts, stopes, adits, and other openings which may be open to the surface or hidden from view by vegetation, trash, debris, or thin and unstable layers of surface materials or rock. The Contractor shall be responsible for thoroughly investigating the site conditions and scheduling the Contractor's equipment, equipment operations, personnel, and safety procedures to prevent accidents and injuries.

Before entry, the Contractor shall review safety procedures with all persons entering the mine. At least one standby person shall remain outside the mine during entry by others. The standby person(s), whenever possible someone who is trained in CPR and mine rescue procedures, shall have access to first aid, appropriate rescue equipment, and a vehicle and shall know where the nearest telephone / cell service for emergency calls is found. A communication system shall be established between the person(s) working inside the mine and the standby person(s) outside.

All persons entering the mine opening shall wear appropriate clothing and carry appropriate gear, including, as required for the conditions present, harnesses, head, hand and foot protection, life lines, respirators or self-contained breathing apparatuses, and other special equipment. Proper ventilation and adequate lighting at the workplace inside the mine entry shall be provided. The Contractor shall review with their workers and personnel the use of hazardous chemicals or materials, electrical power, or internal combustion engines inside mine entries for safety precautions and procedures.

The Contractor is fully responsible for construction safety and shall keep the Project Manager informed of his hazardous area safety procedures. Following is a discussion of some common abandoned mine hazards and appropriate procedures to be followed.

I. Bad Air

Miners use the term "bad air" to describe an atmosphere that will not support life. The poor air circulation in some mine openings can allow carbon dioxide (CO₂), carbon monoxide (CO), methane, hydrogen sulfide (H₂S), or radon gas to accumulate. These gases are treacherous inside mine openings and even experienced miners have been killed or harmed by entering areas containing them. CO (product of combustion) cannot be readily detected and is lethal in very small amounts. The Contractor shall follow the following and other appropriate hazardous bad air procedures.

An oxygen meter shall be used to test air before and while any personnel work inside a mine opening. The oxygen meter shall be a National Mine Service (NMS) OX231 oxygen meter or equivalent. The oxygen meter shall continuously monitor oxygen levels and have an audible warning signal. If the oxygen level falls below 19 percent, all personnel shall withdraw from the working area in the mine until the oxygen content increases to safe levels.

Any remedy for increasing oxygen content of the working area or providing ventilation from the surface shall be determined in consultation with the Project Manager.

II. Adit Cave-ins

Cave-ins are a danger in any abandoned mine. Disturbances such as vibrations caused by walking, speaking, blasting, hammering, percussion drilling, or construction equipment may cause a cave-in inside an inactive mine. The Contractor shall follow appropriate adit cave-in protection procedures, including scaling and barring of loose rock before beginning work in an area, shoring of decayed or weak timber framing, and shoring, jacking, or rock bolting of materials in the back (roof) and sides of the adits.

III. Collar Cave-ins

The collar or top of a shaft, stope, or subsidence often contains decomposed rock, decayed timbers, and other conditions that allow for rapid disintegration at the opening. With the additional weight and vibration of construction machinery, workers, and backfilling operations near the mine opening, the area around the collar can slide into the opening, along with nearby machinery and laborers. Backfilling operations can tear loose cribbing or lining in a shaft leading to collapse at the collar. The Contractor shall follow appropriate collar cave-in protection procedures.

IV. Falling

Because a shaft or stope has little light, the feeling of height and normal reaction to "pull back" is not evident to most persons. Many abandoned mine shafts, stopes, and winzes are deep enough to cause injury or death to persons entering these features. Rescue operations of a fallen person can also be extremely hazardous.

Work above the highwall also presents fall hazards including unstable edges, poor footing, and/or trip hazards.

The Contractor shall follow appropriate hazardous fall protection procedures. This includes proper lighting, barricades, fences, personal fall arrest systems, guardrails, covers, safety net systems, safety monitoring systems, and other protection as suitable for the conditions. Fall protection shall be in accordance with OSHA regulations regarding construction fall protection (OSHA 29 CFR Subpart M). These regulations establish a six-foot threshold for the height at which fall protection is required, require employers to provide training for each employee who might be exposed to a fall hazard, and prohibit the use of body belts for fall protection and the use of non-locking snap hooks.

V. Loose Rock

The highwall is a dominant feature at the site and consists of vertical to near-vertical faces of weathered amphibolite and granite. The height of the highwall is variable, and the size of rock that could fall is expected to vary from small to many cubic feet in size. Any falling rock has the potential to injure or kill, and there is no way to predict when a rock fall will occur. Certain construction activities may promote rock fall including those that require vibration, shock, or removing material that may be supporting loose rocks. The Contractor shall require head protection and implement measures to protect workers (e.g. shields, scaling loose rocks, etc.)

A mineshaft or open stope will weather in much the same way as a cliff. Loose rocks are always found on timbers or on the walls. A small rock that falls a sufficient distance can penetrate a person's skull. The Contractor shall follow appropriate hazardous loose rock protection procedures, including scaling of loose rock, construction of shields, and wearing of head protection.

01170 - INDUSTRIAL WASTES AND TOXIC SUBSTANCES

The Contractor shall comply with all applicable laws and regulations existing or hereafter enacted or promulgated regarding industrial wastes and toxic substances. In any event, the Contractor shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) regarding any toxic substances that are used, generated by or stored at the project site. See 40 CFR, Part 702799. Additionally, any release of toxic substances (leaks, spills, etc.) greater than the reportable quantity established by 40 CFR, Part 117, shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b. A copy of any report required or requested by any federal agency or state government because of a reportable release or spill of any toxic substances shall be furnished to the Project Engineer concurrent with the filing of the reports to the involved federal agency or state government.

01200 – PROJECT MEETINGS

The following sections describe the required project meetings that the Contractor is expected to attend.

01210 - PRECONSTRUCTION CONFERENCES

Before starting work at the site, a conference will be held to review the construction schedules; to establish procedures for handling documents, drawings, other submissions, and for processing Applications for Payment; and to establish a working understanding between the parties as to the nature of the project. Present at the conference will be the Project Manager, the Project Engineer, the Contractor, the Contractor's superintendent, and other persons as appropriate. The Contractor shall present a progress schedule at the preconstruction conference as specified in Section 01310 below and a fire prevention and awareness plan as specified in Section 01565 below.

01220 - PROGRESS MEETINGS

Progress meetings may be held during construction for purposes of scheduling and coordination of work. Throughout the life of the project, the Contractor shall keep the Project Manager and Project Engineer well informed of the schedule of work.

01300 – SUBMITTALS

The following sections describe the required documents and reports to be submitted by the Contractor during the contract work.

01310 - PROGRESS SCHEDULES

The Contractor shall provide a detailed progress schedule to be followed in completing the work. This schedule shall be submitted in writing at the preconstruction conference and shall show the anticipated time required by the Contractor to complete each item of work in the Bid Form. Schedules may be prepared as a horizontal bar chart with a separate bar for each major portion of work or operation, identifying the first workday of each week.

01320 - PROGRESS REPORTS

The Contractor shall submit written accurate daily progress reports to the Project Manager. The reports shall include but are not limited to work accomplished, quantities of unit price bid items installed, including load tickets as appropriate, records of any complaints including corrective actions taken, records of visitors to the site, and records of any personal injury or property damage incidents. The Contractor's authorized representative shall meet the Project Manager a minimum of once each week to verify and sign-off on all payable units of work performed during that week. The authorized representatives from both parties shall be designated at the start of the project during the preconstruction conference.

01330 – HEALTH AND SAFETY PLAN

The Contractor shall prepare a Health and Safety Plan (HASP) detailing the site-specific hazards and safety precautions associated with site work. The HASP shall comply with OSHA standards and shall include a list of responsible persons, hazard identification, hazard controls and safe practices, emergency and accident response, employee training requirements, required personal protective equipment (PPE), SDS, and communication information and procedures.

The HASP shall also describe hazards related to the COVID-19 Pandemic. The HASP shall include the Contractor's Infections Disease Preparedness and Response Plan, which shall include:

- Where, how, and to what sources of Covid-19 site personnel might be exposed.
- Non-occupational risk factors at home and in community settings.

- Workers' individual risk factors (e.g., older age; presence of chronic medical conditions, including immunocompromising conditions; pregnancy).
- Controls necessary to address these risks.
- Basic infection prevention measures.
- Policies and procedures for prompt identification and isolation of sick people.
- Workplace controls for reducing the risk of Covid-19 spread in the workplace.

Additional information and safety resources related to COVID-19 can be found on OSHA's website: <https://www.osha.gov/SLTC/covid-19/>

Contractor shall follow New Mexico Department of Health Public Health Orders, Executive Orders, and COVID safe practices for construction. Additional information may be found on the New Mexico Department of Health Coronavirus Disease 2019 webpage at <https://cv.nmhealth.org/>.

The Contractor shall submit a draft of the HASP to the Project Engineer for review and comment a minimum of one month before mobilization to the site. The Contractor shall finalize the HASP and submit a final copy to the Project Engineer prior to beginning work on the project site.

01340 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

The Contractor shall submit shop drawings, product data, and samples as required in the specifications. Submittals shall be organized such that each submittal covers items in no more than one specification section. The Contractor shall allow a minimum of 14 calendar days for the Project Engineer's review; shorter periods for Project Engineer's review will not be acceptable. The Contractor shall allow acceptable time for the entire review process including transmittal, initial Project Engineer's review, correction and resubmission, final review, and distribution.

Engineering data and shop drawings covering all equipment and fabricated materials shall be submitted to the Project Engineer for review and comments. These data shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and operation of component materials and devices; the external connections, anchorages, and supports required; and performance characteristics and dimensions needed for installation and correlation with other materials and equipment. Data submitted shall include drawings showing essential details of any changes proposed by the Contractor.

It shall be the duty of the Contractor to check all data and shop drawings for completeness before submittal for Project Engineer's review. Each drawing or data sheet shall have indicated there on the proposed use of the item as it pertains to the Work. Catalog cuts, pages, or copies submitted for review shall have items proposed for use in the Work clearly marked and identified. The current catalog number, date, and revision and drawing number (if applicable) shall be included.

Deviations from the drawings or specifications shall be identified on each submittal and shall be referenced in the Contractor's transmittal letter. The submittal for such deviations shall also include details of changes proposed and modifications required for all affected portions of the Work.

Shop drawings and other review data shall be submitted to the Project Engineer only from the Contractor.

The Contractor's submittal of shop drawings and other review material shall represent that the Contractor has reviewed the details and requirements of the Contract Documents, has coordinated the subject of the submittal with other portions of the Work, and has verified dimensions, quantities, construction details, materials, and installation criteria, as applicable for the Work. The Contractor shall accept full responsibility for the completeness of each submittal and, for re-submittals, verify that exceptions noted on the previous submittal have been accounted for.

Any requirement for more than one resubmission or delay in obtaining Project Engineer's review of submittals will not entitle the Contractor to an extension of Contract Time unless authorized by Change Order.

The Project Engineer's review of drawings and data submitted by the Contractor will cover only general conformity to the drawings and specifications, external connections, and dimensions that affect the plans and layout. The Project Engineer's disposition of submittals will not constitute a blanket approval of all dimensions, quantities, and details of the material, equipment, or item shown. Regardless of the corrections made in, or disposition given to, such drawings and data by the Project Engineer, the Contractor shall be responsible for the accuracy of such drawings and data and for their conformity and compliance with the contract documents.

No work shall be performed in connection with the fabrication or manufacture of materials and equipment, nor shall any material, accessory, or appurtenance be purchased until the drawings and data therefor have been reviewed.

Four copies of each drawing and necessary data shall be submitted to the Project Engineer. Each drawing or data sheet shall be clearly marked as instructed above. Submittals will be accepted only from the Contractor.

When the drawings and data are returned NOT APPROVED or RETURNED FOR CORRECTION, corrections shall be made as noted by the Project Engineer and four corrected copies resubmitted as instructed above.

When drawings and data are returned marked NO EXCEPTIONS NOTED, EXCEPTIONS NOTED, or RECORD COPY, no additional copies need be submitted.

The Project Engineer will return two copies with comments to the Contractor. The Contractor shall send additional copies with the original submittal if the Contractor requires more than two copies.

All drawings and data, after final processing by the Project Engineer, shall become a part of the contract documents and the work shown or described thereby shall be performed in conformity therewith unless otherwise required by the Project Engineer.

01380 - CONSTRUCTION PHOTOGRAPHS

At the request of the AML Program, the Contractor shall provide routine periodic construction photographs to support Applications for Payment and to supplement Project Record Documents.

01400 – QUALITY CONTROL

The following sections outline the duties, responsibilities, and qualifications of inspectors, testing laboratories, and the Contractor's quality control requirements required to perform the contract work.

01405 - CONTRACT QUALITY CONTROL

The Contractor shall be responsible for the maintenance of quality control throughout the period of the contract work. This includes making periodic spot checks to assure that equipment, materials, and construction quality, meet the contract specifications.

01410 - TESTING LABORATORY SERVICES

Independent commercial testing laboratories shall perform all tests required by the contract documents to determine compliance with the specifications. The testing laboratories shall be acceptable to the Project Engineer. The laboratories shall be in the regular business of testing services in accordance with the specifications for which tests are required, and shall be staffed with trained and experienced technicians, equipped properly, and fully qualified to perform the specified tests in accordance with reference standards.

All testing services for tests of materials required by the contract documents shall be the responsibility of the Contractor. The Project Engineer shall review all sources of materials before delivery of the materials to the job site. Before the performance of any testing, the Contractor shall obtain the concurrence of the Project Engineer for the laboratory or laboratories selected by the Contractor.

The Contractor shall require the producer or manufacturer of materials, for which the specifications require inspection or testing services during the production or manufacturing process, to arrange for and pay an independent organization to perform the specified services.

The Project Manager will determine the exact time and location of field sampling and testing. The Project Manager or Project Engineer may require additional sampling and testing as necessary to assure that materials conform to the contract documents. The Contractor shall pay the costs of any retesting or re-sampling required when initial tests or samples fail to meet the specified requirements.

Written reports of tests furnished by the Contractor for the Project Engineer's review shall be submitted in conformance to the procedures set forth in Section 01340.

01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

The following sections specify the types of construction facilities and temporary controls the Contractor shall provide for completion of the contract work.

01505 - MOBILIZATION

The Contractor shall furnish and mobilize all specified construction facilities, temporary controls, equipment, labor, materials, power, supervision, and supplies to the site and commence work within 30 working days after receipt via certified mail of the Notice to Proceed. Mobilization includes everything necessary to complete the required contract work. The Contractor shall inform the Project Manager of plans and schedules to move all equipment, machinery, and supplies to the job site. The Contractor shall locate and position the staging area including field offices, parking, storage, and support facilities as directed and approved by the Project Manager. All equipment and machinery shall be moved onto the job site in conformance with previously approved plans and schedules. It is the Contractor's responsibility to arrange for storage facilities for equipment and materials. City, state, federal, or other public or private property shall not be used as temporary storage or parking areas for any equipment or materials unless written clearance is obtained by the Contractor from the appropriate public officials or private individuals. The Contractor must be prepared to move all necessary equipment to each construction site within the project area.

01510 - TEMPORARY UTILITIES

The following sections describe temporary utilities, controls, facilities, and construction aids required during construction. They include requirements for installation, maintenance, and removal.

01516 - TEMPORARY SANITARY FACILITIES

The Contractor shall provide temporary sanitation facilities during the contract work, and made available to MMD personnel. The facility shall be installed on the project site in a location removed from the immediate contract work area. Sanitation facilities (portable toilet units) shall include a handwash station. Sanitation unit(s) shall be staked down to prevent tipping from high winds. The facility shall be locked to prevent unauthorized access during the times work is not conducted.

Sanitation facilities shall be maintained and serviced at least twice a month, unless more frequent service is necessary. The Contractor shall remove the facility upon completion of the contract work and restore the area.

01530 – BARRIERS AND ENCLOSURES

The Contractor shall provide barricades with blinking markers for all equipment on roadways and pedestrian walkways. The barricades shall be no less than twenty feet from the front and rear of any equipment in the described rights-of-way. Traffic control devices shall be in substantial conformance with the American Traffic Services Association (ATSA) Guide for Work Area Traffic Control. The Contractor shall remove the barricades upon completion of the contract work.

01533 - TREE, PLANT AND WILDLIFE PROTECTION**I. Tree and Plant Protection**

Environmental disturbance shall be kept to a practical minimum.

In steep areas and around vegetation, the Contractor shall, before beginning work, discuss the planned extent and nature of disturbance with the Project Manager. Existing plants and trees shall be protected from damage or injury resulting from the Contractor's operations. Damaged trees and shrubs shall be trimmed to remove broken limbs where minor damage has occurred. Where directed by the Project Manager, cut or scarred surfaces of trees or shrubs shall be treated with a heavy coat of a tree sealant approved by the Project Manager.

II. Wildlife Protection

All area wildlife, including bats and owls, that may use the mine features are protected, and this safeguard project shall not adversely affect them. Refer to Table I for designated periods of the year where work restrictions shall be implemented to protect wildlife. Shooting at and chasing wildlife is prohibited.

At or before the preconstruction conference, the Contractor shall submit a construction schedule, which includes anticipated dates of closure of specified mine features, in accordance with Section 01310. Based on this schedule the AML biological staff will give authorization to proceed on closure of the mine features that require netting or tarping to exclude animals before closure. It is solely the Contractor's responsibility to obtain this authorization. Normally a minimum of one week written notice of the dates of closure is needed from the Contractor to the AML biological staff. After approval of the schedule, any need for changes shall be coordinated with the AML biological staff a minimum of 48 hours before closure of the features. The Contractor's failure to follow this procedure may result in stoppage of the construction activity at the Contractor's expense until the biological staff can reschedule netting and tarping of the specified features.

The Contractor shall aid AML staff to expel remaining bats or other animals before backfilling or closing a mine feature, in covering the entrances of designated mine features with tarps or other barricades after the animals have exited and in removing the barricades following closure. The Contractor shall provide sufficient numbers and sizes of tarps, polyethylene sheets or other satisfactory covers for this purpose.

All mine openings, except those whose workings can be fully visually checked by the Project Manager and those which are safeguarded by the construction of bat closures, airflow closures or high-strength steel mesh, shall be tarped or netted before closure and require agreement on the dates of closure

During construction of bat closures, the Contractor shall schedule activities so the bats can readily pass through the partially completed closures from one hour before sunset until sunrise. In addition, during construction of bat closures at shafts, the Contractor shall take positive measures to reduce the rock and other material that drop into those mine features.

Internal combustion engines, including those used on air compressors, shall be placed such that exhaust from the engine is not drawn into the mine openings.

01535 - PROTECTION OF INSTALLED WORK

The Contractor shall protect installed work and control traffic in the immediate area to prevent damage from subsequent operations. Installed work includes existing safeguard measures (gates, adit closures, vents, etc.) and interpretive signs/infrastructure.

01540 – SECURITY

The Contractor shall act to assure the protection of the contract work and equipment at the contract work site. The Contractor shall furnish, install, and maintain safety fences around any hazardous or high-voltage equipment at the site for the duration of the project. Where appropriate, the Contractor shall restrict access to the project site by barricading access roads during off-hours and by posting "No Admittance" and "Hard Hat Area" signs.

The Contractor shall be responsible for the safety and security of equipment and materials. The Contractor may not claim damages or hold the State of New Mexico, the property owner, the property custodian, or the design engineer responsible for stolen, damaged, or vandalized materials and/or equipment. The work site will be accessible to the public during the construction period and fencing the entire site for security purposes is not practical.

Temporary fencing shall be placed around active work areas during off-hours.

01550 – ACCESS ROADS AND PARKING AREAS

Unless otherwise indicated, all Contractor personnel and equipment shall enter and leave the project site via existing roads and trails. Upon the regrading, recontouring, or reclamation of any part of the site, further vehicular use shall be limited to that necessary to complete operations. Any access routes that are determined by the Project Manager to be maintained throughout the project duration shall be left in as good or better condition than the condition before the start of the project. Existing roads and trails shall be used whenever possible.

Equipment shall be "walked" or operated cross-country to travel to work sites where roads do not exist. The Contractor shall advise the Project Manager and obtain prior approval every time any road blading, clearing, or dozing is required for access. Topdressing shall be stripped and stockpiled before blading as directed by the Project Manager. All unspecified roads, trails, or travel routes shall be regraded to approximate original contours, reclaimed, and revegetated, as necessary, in conformance with the specifications at no additional cost to EMNRD. Where directed by the Project Manager, the Contractor shall build earthen berms to discourage vehicular traffic and to control erosion on closed temporary construction access roads.

01560 – TEMPORARY CONTROLS

The Contractor shall take all reasonable steps to reduce any inconvenience and disruption to the public because of this project. The Contractor shall provide the following temporary controls for the duration of the contract work.

01561 - CONSTRUCTION CLEANING

The Contractor shall keep the contract work area, equipment, and adjacent areas free from spillages of construction and maintenance materials during the contract work. The Contractor shall also provide for the containment of solid debris created by unpackaging construction materials and waste from meals consumed at the contract work site. The Contractor shall assure the cleanup and removal of all spillages and solid debris to an approved disposal site at the end of each contract workday.

01562 - DUST CONTROL

The Contractor shall take all necessary measures to control dust emanations from the construction equipment. The Contractor shall assure that the equipment used in the contract work is fitted with all standard dust control devices. To maintain the health and safety of project personnel, dust control measures at this site shall comply with all local, state, and federal health and safety regulations. The Contractor shall be prepared to begin dust control measures anytime at the request of the Project Manager. Water for dust control shall be distributed in sufficient quantity and at proper times by water truck(s) equipped with spray bars, cannons, and hoses (of sufficient lengths) approved by the Project Manager. The quantity of water required and the frequency of watering shall be dependent upon the weather and the site's surface conditions and may vary throughout the project duration.

There is no source of water on site for dust suppression. The contractor shall be responsible for identifying a source for water and providing dust suppression at no additional cost to the project.

01564 - NOISE CONTROL

The Contractor shall assure that all equipment used in the contract work is fitted with standard noise suppression devices.

01565 - FIRE PREVENTION AND SAFETY AWARENESS

The Contractor shall develop an emergency plan that will outline precautionary measures and identify initial attack resources and procedures in case of a fire incident. This plan will be submitted to the Project Manager at the Pre-Construction meeting. The Project Manager will then provide feedback about the plan. The Contractor shall provide the fire emergency plan to all individuals working on this project.

Examples of precautionary measures might be:

1. Inspect all motorized and mechanized equipment to insure mufflers and spark arresters are operating properly.
2. Insure personnel are properly trained on the safe use of welding torches, arc welders, generators, saws, power grinders, chainsaws, and other tools and are also familiar with the potential of this equipment to create hot sparks and ignite fires.
3. Avoid welding or cutting in areas next to and above flammable materials or during windy conditions. This would pertain to materials inside the mine as well as outside the mine. Welding shall not take place within 25 feet of polyurethane foam during application. After its application, welding shall not take place above it without first covering the surface with at least 6" of fill material.

Examples of resources and procedures might be:

1. Implement a Hot Work Permit process to be issued for each hot work event.
2. Maintain adequate fire extinguishers, water tanks, sprayers, and other equipment at the work site that would enable personnel to immediately extinguish any accidental ignition.
3. Have personnel observe the work area while welders are operating (welders cannot see where the sparks are falling when the welder is under the welding hood).
4. Assign an individual to be responsible for the area being "safe" (no hot sparks, iron is cold) before leaving the work site.
5. Develop an emergency notification procedure in case the fire incident is or appears to be reaching an out-of-control status.

The Contractor shall obey all fire restrictions declared by the landowner(s) or adjoining property management agencies (i.e. University of New Mexico, U.S. Forest Service, and/or Bureau of Land Management).

01566 – PUBLIC SAFETY

Efforts to protect visitors from injury due to execution of the work shall be taken wherever practical. Examples of procedures that shall be followed include:

1. Use of caution signage.
2. Maintaining cleared unimpeded access to upper parking area.
3. Maintaining at least one cleared pedestrian access route to primary mine features at all times.
4. Securing of unused materials and equipment.
5. Cordon off active work areas using flagging (12-inch by 9-inch orange triangles, minimum) and/or construction fencing.

01570 – TRAFFIC REGULATION

The Contractor shall take the following measures for regulation of traffic at the contract work site.

01572 – FLAGGERS

The Contractor shall post flaggers during the off-loading and on-loading of equipment or materials in roadways at the contract work site access road entrance and/or during cleaning of the highway surface. The flaggers shall halt traffic during the off-loading or on-loading process or direct traffic to an alternate route.

01574 - HAUL ROUTES

The Contractor shall consult with the authority having jurisdiction in establishing public thoroughfares to be used for haul routes and site access. Any damage to the site access road from driving on wet/muddy surface shall be repaired at the end of the project, or as directed to maintain public access to the site.

01580 – PROJECT IDENTIFICATION AND SIGNS

At least one temporary project sign shall be furnished and erected by the Contractor at the most convenient point of public access to the project site. The proposed sign location, message content, and font size shall be preapproved by contractor submittal, including sign mockup, prior to installation. The project identification sign shall be installed within ten working days after the receipt via certified mail of the Notice to Proceed or within five days after the Contractor initially mobilizes to the project site, whichever comes first. The sign is to be a minimum of four feet by eight feet by three quarter inch (4' x 8' x 3/4") exterior grade plywood and is to give the project title, project number, and other data within the box on the Title Page of this document. Exterior quality paint in contrasting colors shall be used. The Contractor shall remove sign, framing, supports, and foundations at completion of Project and restore the area. The costs connected to the construction, painting, erection, and later removal of the sign should be covered under Bid Item No. 1, Mobilization, on the Bid Form.

Sample of Sign:

<p>[PROJECT TITLE]</p> <p>[Nearest Municipality], [County], New Mexico</p> <p>PROJECT NO. EMNRD-MMD-####-##</p> <p>PLEASE PARDON THE INCONVENIENCE WE ARE PERFORMING MINE RECLAMATION SERVICES PLEASE AVOID AREAS IMPACTED BY WORK ACTIVITIES</p> <p>WORK AUTHORIZED BY: ABANDONED MINE LAND PROGRAM, MINING AND MINERALS DIVISION ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT STATE OF NEW MEXICO</p> <p>EMNRD PROJECT MANAGER: ##### CONTRACTOR: ##### CONTACT NUMBER: (505) ###-#### CONTACT NUMBER: (###) ###-####</p>
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01590 – FIELD OFFICES AND SHEDS

Portable or mobile buildings, or buildings constructed with floors raised above ground, may be provided by the Contractor in locations approved by the Project Manager and the landowner. At completion of work, the Contractor shall remove all buildings, foundations, utility services, and debris and restore areas.

01600 – MATERIALS AND EQUIPMENT

All materials and equipment required to complete the work shall be as specified. Any substitution to the specified products requires prior approval by the Project Engineer.

01700 – CONTRACT CLOSEOUT

The following sections specify the duties and responsibilities of the Contractor to close out the contract.

01701 - CONTRACT CLOSEOUT PROCEDURES

When work is completed, the Contractor shall submit project record documents to the Project Manager.

01702 - FINAL INSPECTION

Upon written notice from the Contractor that the entire Work or an agreed portion thereof is complete, the Project Engineer will make a final inspection with the Project Manager and Contractor and will notify the Contractor in writing of all particulars in which this inspection

reveals that the Work is incomplete or defective. The Contractor shall immediately take such measures as are necessary to remedy such deficiencies.

01710 - FINAL CLEANING

After completion of all work, the Contractor shall demobilize and remove all equipment, materials, spills, supplies, and trash from the project site and shall reclaim all areas disturbed by the Contractor's activities. Unless otherwise specified, developed, maintained roads that existed before commencement of the Contractor's activities need not be reclaimed, but must be left in a condition equal to or better than what existed before the Contractor's activities began. Fences, gates, plants, sod, and other surface materials disrupted by these operations shall be replaced or restored to original or better conditions immediately upon completion of work at the site. This shall include sweeping or cleaning the asphalt pavement on the highway if mud or soil is tracked onto the asphalt from the site access road. Other damage to private or public property shall be immediately repaired. All such cleanup, repair, or replacement work shall be done at the Contractor's expense and to the satisfaction of the Project Manager pending approval of the appropriate public officials and property owners. Payment for Demobilization should be covered under Bid Item No. 1, Mobilization, on the Bid Form.

01720 – PROJECT RECORD DOCUMENTS

The Contractor shall prepare final Project Record Documents providing information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination. At Contract closeout, the Contractor shall deliver Project Record Documents and samples under provisions of Section 01701.

END OF DIVISION 1

DIVISION 2 – SITEWORK

The following sections describe the sitework to be performed under this contract.

Before any disturbance of the mine features, the Contractor shall provide tarps and one inch mesh material (chicken wire, polypropylene, or similar material) and assist AML staff or consultants in excluding animals from the features to be closed. Refer to the requirements in Section 01533.

02050 – DEMOLITION

The following section describes selective demolition to be performed under this contract.

02070 - SELECTIVE DEMOLITION

The mine features may require the removal of debris such as boards, signs, timbers, wire, temporary fencing, etcetera. Salvageable materials (e.g. T-posts and temporary chain link fencing) shall be neatly stacked on the site, while trash shall be properly disposed of at the Contractor's expense at an appropriate licensed landfill. All fasteners shall be removed from lumber and timbers. All specified or established avoidance areas shall be avoided and the recommendations of the archaeological report and the State Historic Preservation Office (SHPO) will be followed.

Other debris that may cause bridging of backfill material or otherwise interfere with construction shall be removed as directed by the Project Manager.

02100 – SITE PREPARATION

02110 - SITE CLEARING

This work shall consist of trimming, removing, and disposing of vegetation and debris in accordance with these specifications, except those items designated to remain. This work shall also include the preservation from damage or defacement of all vegetation and items designated to remain.

Trimming shall consist of pruning low-hanging branches from trees and shrubs designated to remain to provide enough clearance for construction activities. Removal shall consist of cutting vegetation flush with the ground surface and the satisfactory disposal of trees, brush, and any other vegetation. The Contractor shall perform selective tree and shrub removal and trimming only in designated work areas as shown on the drawings.

The Contractor shall remove vegetation outside of the migratory bird nesting season (February 15-September 15). If any vegetation is to be removed during the migratory bird nest

season, the Contractor shall contact the Project Manager four weeks prior to the removal to allow for completion of a migratory bird survey.

Within construction limits for borrowing backfill material, all surface debris, roots, stumps, trees, and other objectionable protruding obstructions shall be cleared with the Project Manager's concurrence.

All vegetation from trimming and removal operations shall be spread along and adjacent to the disturbed area as practicable and as designated by the Project Manager.

02200 – EARTHWORK

The following sections describe the earthwork to be performed under this contract.

02210 - GRADING

The following sections describe the grading to be performed under this contract.

02211 - ROUGH GRADING

Unless otherwise specified or indicated, all cut and fill slopes shall be rough graded so that slopes are not steeper than three horizontals to one vertical (3h:1v) in earth, two horizontals to one vertical (2h:1v) in incompetent rock and very rocky soils, and one half horizontal to one vertical (0.5h:1v) in competent rock. Where specified and as directed by the Project Manager, the Contractor shall grade sites and construct drainage ditches around safeguarded mine features to divert storm water away from those features.

Where cut slopes in competent rock are steeper than one and a half horizontal to one vertical (1.5h:1v), the maximum uninterrupted vertical height of the slopes shall be no more than ten feet. A series of slopes, each at between one half horizontal to one vertical (0.5h:1v) and one and a half horizontal to one vertical (1.5h:1v), may be constructed in competent rock if horizontal benches or terraces a minimum of six feet wide, within slopes of at least 4 percent, are built at a vertical spacing of no more than ten feet.

02212 - DECOMPACTION

Before construction demobilization and following the need for any construction access to each mine feature, the Contractor shall decompact areas compacted by construction activity, including temporary work areas and access trails, and staging, storage and parking areas. Areas where more than four feet of overburden material has been removed shall also be decompact. Decompaction shall be performed to the satisfaction of the Project Manager.

Where bedrock is exposed at the surface, such decompaction will not be required. Decompaction methods shall be effective at reducing soil density to a minimum depth of twelve inches (except where bedrock is closer to the surface) and shall be accomplished without

inverting the soil layers. Where practicable, ripping shall be done along the contour. Alternatives to ripping or auguring for decompaction shall be acceptable to the Project Engineer.

02216 - ACCESS ROAD/ROUTE CLOSURES

Before construction demobilization and following the need for any construction access, the Contractor shall close temporary construction access roads/routes as specified and as directed by the Project Manager. The Contractor shall out slope the road surface and remove all berms along the outer edge of the road. By grading material toward the cut bank, the Contractor shall take care not to spill graded material over the fill slope. The out slope shall be enough to divert water over the bank at approximately four to eight percent.

The Contractor shall construct berms and cross-ditches as directed by the Project Manager, to restrict vehicular access and control erosion.

In addition, cross-drains shall be located to divert water where the road traverses a ridge, above and below road junctions, above steep incurves to prevent bank cutting and to keep road surface water from entering a draw, below sharp incurves to prevent water from a draw from coursing down the road, and below seeps and springs.

Construction access routes with minimal disturbance shall be raked out to the satisfaction of the Project Manager and seeded as specified in Section 02900 – Landscaping.

02220 - EXCAVATING, BACKFILLING, AND COMPACTING

The Contractor shall construct berms as directed by the Project Manager to control erosion and divert water away from R-10 mine openings. Berms will be constructed of compacted soil with a riprap rock cover. Berms constructed will be 6 feet wide, 3 feet high with the length given in the project plan set.

02222 - EXCAVATION

The Contractor shall reopen, as necessary, the collapse features and decline adit that may be partially closed, by mucking out the debris, earth, and rock plugging or partially plugging them. Before removing any backfill, the Contractor shall discuss with the Project Manager where material shall be excavated, and shall obtain the Project Manager's approval of the excavation plan.

I. Feature R-10 Declined Adit

The roof of the mine collapsed into the mine workings resulting in the Feature R-10 subsidence. The material in the subsidence feature includes the topsoil that dropped into the hole when it collapsed. The Contractor shall excavate to achieve access into mine workings and salvage as much of the topsoil as feasible for use as backfill. The underlying rock is assumed to have broken up during the collapse resulting in rock rubble beneath the soil inside of the hole. Separation of soil from rock may be difficult due to the relative thinness of the topsoil in the area

above the highwall. The Contractor shall limit the excavation of rock with the topsoil, and hand screen large rocks and place them back in the subsidence feature after soil excavation efforts are completed.

Excavated material shall be stockpiled near the feature for reuse in backfill.

Safety Note: The Contractor shall inspect the Feature R-10 prior to mobilizing equipment to the edge of the collapse feature. Underground mine workings extend away from the subsidence feature. The mine workings are voids that extend away from the hole and present risks of further collapse under the weight and vibration of equipment operation. The Contractor shall avoid placing equipment, personnel, or other resources over mine openings. The Contractor shall inspect the presence of powerlines and shall place safety procedures in place to avoid equipment and personnel interfering with dangers of powerlines.

II. Feature C-4 Safeguarded Shaft

Extreme caution to preserve historic timber cribbing. Excavate subgrade before construction of concrete collar. Foundation preparation will be done by hand.

III. Feature C-6

Excavate and save loose soil around outer rim of feature. Do not remove slough soils at the bottom of the feature.

Safety Note: The Contractor shall inspect the Feature C-6 prior to mobilizing equipment to the edge of the collapse feature. Underground mine workings extend away from the subsidence feature. The mine workings are voids that extend away from the hole and present risks of further collapse under the weight and vibration of equipment operation. The Contractor shall avoid placing equipment, personnel, or other resources over mine openings.

02223 - BACKFILLING OF MINE OPENINGS

This work shall consist of backfilling the mine features with specified engineered fill material or salvaged topsoil or excavated materials as designated in the specifications or as directed by the Project Manager. Two of the four features requiring fill material will include placement of PUF to reduce the amount of soil fill and enhance the filling of voids. Specifications for PUF material and placement are provided in Section 13050.

I. General

All backfill material shall be free of snow, ice, frozen lumps, logs, timbers, significant amounts of woody or vegetative debris, other deleterious materials and materials of such size and shape that they may bridge the opening being filled.

Hand backfilling is an option if the site is difficult for equipment access or too steep to operate equipment safely.

II. Materials

Contractor shall provide a submittal for all imported fill materials before delivery to the site. The Project Manager may request a sample of the material in addition to product data.

1. Imported Granular Fill: naturally occurring granular material free from wood vegetation, or other deleterious matter. Fill shall contain sufficient sand or filler to permit compaction. Unallowed material includes well sorted sands and gravels, very fine sand, shale, clayey soil, contaminated soil, or soil that will not support plant growth.
2. Riprap: Angular rock or stone free of seams, fractures, and coatings; and of such characteristics that will not disintegrate when subject to the action of flowing water. The minimum specific gravity of the stone shall be 2.65 as determined in accordance with ASTM C127, latest edition. The maximum resistance to abrasion shall be fifty (50) percent determined in accordance with the requirements of ASTM C535, latest edition. The riprap shall have a maximum to minimum dimension ratio not more than 3:1. Allowable gradations shall be:

Maximum dimension (inches)	% Smaller
12	100
9	50-70
6	35-55
3	10

3. Water: Soil conditioning shall be performed using uncontaminated water provided by the Contractor. There is no source of water available on site or in the immediate vicinity of the site. Sourcing and transportation of water shall be the responsibility of the Contractor at no additional cost to the unit price provided for executing safeguard construction.

III. Final Layer of Fill

Wherever practicable, the final eight- to twelve-inch layer of the fill at mine openings shall be soil of comparable quality to the undisturbed soil surrounding the backfilled feature. Note the topdressing requirements of section 02921.

02224 - BORROW

Except as otherwise noted or allowed by the Project Manager, the Contractor shall not use any material from within the mine area for borrow.

02229 - COMPACTION

Fill shall be constructed in compacted layers of uniform thickness. Soil shall be conditioned with water to improve compaction. Fill material which contains excessive moisture shall not be compacted until the material is dry enough to obtain relative compaction.

The loose thickness of each layer of fill material before compacting shall not exceed 8 inches, except as approved by the Project Manager. Any rock greater than 4 inches in any dimension shall be removed from the fill material prior to compaction. No large rocks shall be left in contact with the vent pipe, natural rock surfaces (e.g., highwall or adit surfaces), or other new or relic infrastructure.

Material used for fill shall be compacted whenever possible using multiple passes with a rammer/jumping jack compactor. Hand tampers may be used to achieve compaction where mechanical equipment will not fit (e.g., inside the decline adit). The fill shall obtain a compaction density not less than what the equipment can reasonably obtain to the satisfaction of the Project Manager. Wheel rolling to achieve compaction is prohibited to prevent damage to nearby structures or collapse of underground mine voids.

02230 – EMBANKMENTS

Berm to be constructed at Feature R-10 using unclassified fill from excavation stock pile. Native onsite soils excavated for this project may be used for earthwork. If on-site soil quantities are insufficient for backfill, imported non-organic general fill may be used after approval by the Project Engineer. The fill source shall be identified and imported by the Contractor. Excess soil remaining after earthwork is completed shall be spread uniformly at areas designated by the Project Manager. The fill shall obtain a compaction density not less than what the equipment can reasonably obtain to the satisfaction of the Project Manager. Wheel rolling to achieve compaction is prohibited to prevent damage to nearby structures or collapse of underground mine voids.

02600 – PIPED UTILITY MATERIALS

The following sections describe piped utility materials to be installed under this Contract.

02613 - CORRUGATED METAL PIPE

Corrugated metal pipe and connectors shall be made from galvanized steel in conformance with the applicable requirements of AASHTO M218 or ASTM A929. The pipe shall be manufactured and inspected in conformance with the requirements of AASHTO M36 and as hereinafter specified. The size of the pipe shall be nominal 18-inch diameter. Nominal diameter or dimensions as referred to in AASHTO M36 shall be defined as the minimum inside dimension of the pipe.

Materials for corrugated metal pipe and appurtenances shall be as specified in AASHTO M36. Pipe in which the seams indicate slippage or unraveling will be rejected. Sawed ends and

vent notches on pipes will be permitted provided all burrs are removed. Spelter coating damaged by welding or fabrication shall be repaired and recoated in accordance with AASHTO M36.

Unless otherwise indicated, corrugated steel pipe shall be Type I and consist of 14- or 16-gauge galvanized steel pipe with helical corrugations. The pipe shall be new, free of rust, gaps in seams, holes in the wall, and deformations that reduce the inside diameter by more than two inches.

Bands for connecting helically corrugated pipe shall conform to the requirements of AASHTO M36. Coupling bands shall be a minimum of 18 gauge and made of the same base metal and coating as the pipe. Coupling bands shall lap equally on each of the pipes being connected to form a tightly closed joint after installation. Flange bands will not be permitted.

Submittal approval for corrugated metal pipe and appurtenances is required before delivery.

02800 - SITE IMPROVEMENTS

Cattle guards, fences, gates, and other road or street improvements destroyed, removed, or damaged during construction shall be replaced with the same type and dimensions of units removed and shall be equal to and consistent with the undisturbed portions of the improvements existing before the project.

02830 - FENCES

Fencing Specifications shall conform to the requirements set forth in AASHTO M181, the New Mexico Standard for Public Works Construction, Section 410 and NMSA 1978, Sections 77-16-1 through 77-16-18, as modified below.

I. General

The Contractor shall submit one test certificate each to the Project Engineer certifying that the fencing materials conform to the requirements herein provided. When the locations of manufacturing plants allow, the plants may be inspected for compliance with specified manufacturing methods and material samples will be obtained for laboratory testing for compliance with material quality requirements. This can be the basis for acceptance of manufacturing lots as to quality. All materials will be subject to inspection for acceptance as to condition to check for compliance before or during incorporation of materials in the work. All fences shall be installed in the locations specified and as directed by the Project Manager.

II. Wire Fence

This work shall consist of the construction of fence in substantial compliance with the specifications, lines and grades shown on the plans or established by the Project Engineer.

A. Wire

All fences shall consist of six wires spaced as indicated.

Barbed wire shall conform to ASTM A121 Class 1 or 3 coating and shall consist of two strands of nominal 12 gauge (0.099-inch) coated diameter wire with either 2-point, fourteen gauge (0.080-inch) diameter barbs spaced approximately four inches apart or 4-point, 14 gauge (0.080-inch) barbs spaced approximately five inches apart. The shape of barbs may be flat, half-round, or round. Instead of galvanizing, the wire may be coated with aluminum alloy at the rate of not less than 0.30 ounces per square foot of wire surface and the barbs at the rate of not less than 0.25 ounces per square foot of wire surface.

Tie wires for fastening barbed wire to steel posts shall be not less than thirteen gauge (0.109-inch) coated diameter and galvanized conforming to ASTM A1 12. Eleven gauge (0.120-inch) coated diameter or heavier wire fasteners or metal clamps may be used instead of tie wires when approved in advance by the Project Engineer.

Stays for wire fences shall be not less than 9 gauge (0.142-inch) coated diameter galvanized wire conforming with ASTM A1 16 and of length and spacing shown on the plans.

B. Brace Panels and Posts

Intermediate brace, gate brace and corner panels shall be prefabricated assemblies, "Easy Fence" by D-C Industries (Blackfoot, ID, 208.782.1177) or approved equivalent, which require no concrete footings. They shall be installed following the manufacturer's recommendations.

Line posts shall be metal. All posts shall be of the type, size and length shown on the plans and as herein provided.

Metal posts shall be fabricated from rail, billet, or commercial grade steel conforming to ASTM A702 and shall be galvanized or painted green as required. All metal posts throughout the project shall be either galvanized or painted the same color green. Galvanizing shall conform to ASTM A123. When painted green, the posts shall be cleaned of all loose scale before finishing and painted with one or more coats of weather resistant, air baking or drying, green paint or enamel.

Metal line posts shall consist of heavy-duty steel spaced sixteen and one half feet apart. Metal line posts shall have a minimum weight of 1.33 pounds per foot exclusive of anchor plates. A minus tolerance not to exceed 5 percent of the minimum weight of each post will be permitted. A plus tolerance of two inches and a minus tolerance of one inch in the length of each post will be permitted. Metal line posts may be I-beam, T-beam, U-beam, Y-beam, or H-column section.

Line posts shall be provided with corrugations, lugs, ribs, or notches spaced approximately one inch on centers to engage the required fence wire in designated spaces. Posts with punched tabs to be crimped around the wire will not be accepted. Anchor plates shall be an area of not less than eighteen square inches, shall weigh not less than 0.67 pound each and shall

be securely welded, bradded, swaged, or riveted to each line post in a way that prevents displacement when the posts are driven.

C. Fittings

All fittings, hardware and appurtenances for fences shall be commercial quality steel, malleable iron, or wrought iron and shall be galvanized in accordance with the requirements of ASTM A153. Fittings shall be black PVC-coated with ultraviolet-resistant coating.

III. Construction

The Contractor shall perform such clearing and grubbing as may be necessary to construct the fence to the required grade and alignment. At locations where fence runs are completed, appropriate adjustment in post spacing shall be made to conform to the requirements for the type of closure indicated.

The tops of all posts shall be set to the required depth and alignment. Cutting off the tops of posts shall be allowed only with the approval of the Project Manager and under the conditions specified. Wire or fencing of the size and type required shall be firmly attached to the posts and braced in the manner indicated. All wire shall be stretched tautly and shall be installed to the required elevations.

Wire fences shall be constructed in conformity with the details and at locations shown on the plans or staked by the Project Manager. All posts shall be set plumb and to the depth and spacing shown on the plans. Excavations for footings and anchors shall be to dimensions shown on plans or established by the Project Engineer. Metal line posts may be driven. Posthole backfill shall be placed in thin layers and each layer solidly compacted. Posts set in rock shall be placed as directed by the Project Manager.

Mechanical stretcher or other device designated for such use shall stretch fence wire and welded wire fabric. Stretching by motor vehicle will not be permitted. The length between pull posts shall not exceed nine hundred ninety feet for barbed wire fence.

Intermediate braces shall be placed at intervals not to exceed nine hundred ninety feet and shall be spaced evenly between corner posts.

Corner posts and braces shall be placed at appropriate fence angles or bends.

Fence materials of the same manufacturer, type, or process, conforming to the specifications and details shown on the plans, shall be used throughout the work unless otherwise authorized in writing by the Project Engineer.

Contractor personnel shall follow site safety requirements and use of personal protective equipment. Installation of fencing within 10 feet of the top edge of highwalls or near vertical slopes shall be executed while wearing and maintaining fall protection equipment.

02840 - SIGNAGE

To alert visitors to the site of the rockfall hazard, signs shall be posted as directed by the Project Manager. The Contractor shall provide labor, equipment, and materials necessary to place posts and secure the hazard signs.

I. General

The Contractor shall install hazard signs and signposts at locations specified by the AML Program Project Manager. The locations shall be selected at the most visited mine features at the base of the highwall or other prominent site features. Provided signs shall have a 10-year durability warranty and shall not fade, peel, delaminate, or rust during that time. Two styles of signs shall be provided by the contractor:

A. Hazard Signs

Hazard signs shall be yellow diamonds complying with the Manual on Uniform Traffic Control Devices (2004 Edition inclusive of subsequent supplements). Signs shall be 24.2 inches tall and 18 inches on each of the four sides. Corners shall be rounded at a radius of 1.5 inches. Signs shall be provided with two 3/8-inch holes located in the center of the sign and spaced 18-inches apart and equally spaced from the top and bottom corners of the diamond. A total of 5 signs shall be supplied, all with the same rockfall hazard warning pictorial (no text). The pictorial design provided shall directly match the following image:



B. Directive Sign

At the direction of the Project Manager, signs shall be provided and installed that provide a directive to not undermine the highwall by removal of rock. Signs shall be a square with 18-inch sides and rounded corners with radii of 1.5 inches. Two 3/8-inch holes shall be provided in the horizontal center of the sign and 1.5 inches from the top and bottom of the sign. The pictorial design provided shall be centered on the sign and match the following image:



II. Materials

A. Signs

Signs shall be fabricated in accordance with U.S. Department of Transportation *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-14* using heavy-duty 80-mil rustproof aluminum (ASTM B 209, alloy 6061-T6) with a reflective finish (ASTM D4956).

Printed graphics shall be printed with 3M screen printing or 3M outdoor digital inks designed for outdoor traffic (equivalent manufacture printing and inks meeting warranty requirements are acceptable). Signs shall be laminated for enhanced UV resistance, durability, and graffiti resistance.

B. Signposts

U-Channel posts (open) shall be provided and fabricated from standard “T” rails weighing 91 pounds per yard or more according to ASTM A499, Grade 60. Signposts shall be 2.00 pounds per foot before punching and shall be punched with 0.375-inch diameter holes spaced 1 inch on centers across the entire length. Signpost width shall be greater than 3 inches and length shall be 8 feet with a tolerance of 2 inches plus or minus.

Signposts shall be finished with baked enamel green paint or galvanized per ASTM A123. The posts shall be punched and cleaned of all loose scale, burrs, and sharp edges before finishing and coating.

C. Sign Fasteners

Fastener hardware shall be zinc-plated steel bolts with matching nuts and lock washers. Steel hardware shall be 2.5 inches in length and 5/16-inch diameter.

Washers shall be used to separate dissimilar materials (between the post and the sign and between the sign and the bolt head).

III. Construction

Submittals shall include a shop drawing of each sign type including the pictorial to be used and dimensions of the sign and material submittals for sign, signposts, and fasteners.

The locations for the signs shall be identified and marked as directed and approved by the AML Project Manager prior to placement of signpost. Locations shall not damage existing infrastructure or cultural resources and shall not block or impede pedestrian access routes or future maintenance activities. Consideration shall be given to possible future safeguarding measures to protect visitors from rockfall. Compliance with New Mexico Call Before You Dig 811 regulations shall be maintained.

Signposts installed in soil shall be driven in accordance with manufacturer's recommendations. At least 2.5 feet of the posts shall be embedded below the original surface grade. Posts shall be set plumb.

Should solid rock be encountered during signpost installations, the locations may be adjusted, but only with prior approval from the AML Project Manager; otherwise, rock coring or other appropriate equipment shall be used to excavate to the minimum embedment depth. Signposts installed in rock shall be secured using concrete in the annular fill space within the core hole. The top of the concrete shall be crowned to shed water. For posts in concrete, install temporary guys or bracing to hold the posts in position until the concrete sets. Do not install materials on posts and do not strain posts set in concrete until seven (7) days after concrete placement, or until the concrete has reached a compressive strength of 2,500 psi, whichever occurs first. Any concrete testing costs shall be borne by the Contractor. Results of the test(s) shall be provided by an independent material testing company.

Signposts and signs shall be rotated to face away from the highwall or as directed by the AML Project Manager and mounted at the top of the posts. Bolts shall be tightened to the torque recommended by the sign manufacturer. Anti-theft measures shall be taken to protect the signs (e.g., tack weld bolt to nut, scar threads on bolt, and/or bend thread end of bolt).

02890 - FEATURE IDENTIFICATION MARKERS

The Contractor shall install identification markers at features. The identification markers shall be installed in at locations shown on the plans or as specified by the Project Manager.

I. Materials

A. Marker Caps

The caps will be bronze or other alloy typical of markers typically used by professional surveyors. The markers will be provided by the Project Manager with feature information already engraved on the surface.

B. Steel Pipe

The pipe shall be 3 ½-inch (4-inch outer diameter) schedule 40 galvanized steel pipe. Pipe shall be manufactured using steel conforming to the requirements of ASTM A1008/A1008M and A1011/A1011M.

C. Fill Sand

Clean sand shall be used to fill voids in the pipe. The sand shall be clean, well sorted, sand that can be poured into the pipe and fill the pipe without bridging or forming voids. Suitable material shall be Quikrete® Premium Play Sand or equivalent.

D. Cement Grout

Cement grout shall be high strength, non-metallic, and non-shrink, compliant with ASTM C1107. Grout shall be premixed, so only water is added at the job site. Acceptable material shall be Quikrete® non-shrink precision grout, or equivalent. Water shall be provided by the Contractor.

II. Construction

The locations of the markers are shown in the plans; however, locations may be changed in the field by the Project Manager.

Steel pipe shall be placed vertically and plumb in granular fill material. The pipe lengths shall be a minimum of 4 feet. The pipe shall have a minimum of 6 inches and a maximum of 12 inches exposed above grade. Once placed, the interior void of the pipe may be filled with sand to within 6 inches of the top of the pipe. A minimum of 6 inches from the top of the pipe shall be filled with hydrated non-shrink grout. The grout shall be hydrated such that it has just reached flowable characteristics, but not excessively. Ensure that there are no cavities or voids in the pipe during grouting. The provided marker cap shall be embedded in the grout. The marker shall be covered during curing if inclement weather is forecasted.

If site conditions prevent installation of the marker caps in the steel pipe, the Contractor shall obtain alternate installation instructions from the Project Manager. Alternate considerations may include drilling and grouting the caps in undisturbed, competent rock or concrete at or immediately adjacent to the feature.

02900 - LANDSCAPING

The following sections describe revegetation to be performed under this contract. Revegetation shall be required at areas disturbed during construction and as specified by the AML Project Manager.

2920 – SOIL PREPARATION / SURFACE ROUGHENING

Prior to seedbed preparation, the Contractor shall grade all disturbed areas as described, decompact those areas specified above, and roughen the surface as specified below.

On slopes up to 1.5h:1v, the soil surface in areas to be seeded shall be prepared to be continuously rough and hummocky. This shall be accomplished by using an excavator bucket, or other acceptable methods that produce similar results, to create small pockets and furrows to trap water and create favorable microclimates for plant growth.

After roughening, seed shall be broadcast or hydroseeded as specified below. In areas with extremely dry and loose soil, the Project Manager may require the Contractor to wait until the soil has settled before seeding.

Large and small boulders may be left exposed on site prior to seeding, either singly or in groupings that blend with the natural surroundings, as directed by the Project Manager. The Project Manager may require that additional boulders be placed on site to enhance visual variation and provide wildlife habitat.

Unless the soil is severely compacted or as otherwise noted, soil preparation will not be required for discontinuous, isolated areas of disturbance less than 0.05 acres (approximately 2,500 square feet or 50 feet by 50 feet).

The extent of seedbed preparation shall not exceed the area on which the entire seeding operation can be applied. Seed shall be applied before soil surface crusting occurs. Loss of seed and fertilizer due to erosion shall be prevented from occurring. If crusting or erosion occurs, the entire area affected shall be reworked beginning with seedbed preparation.

02921 - TOPDRESSING

As specified, on construction sites, mined areas, and other critical areas where the existing surface material is either chemically or physically unsuited to support adequate vegetation, the best available soil material as determined by the Project Manager shall be evenly spread on the surface in sufficient depths to maintain plant growth. Available topdressing in all areas to be disturbed shall be set aside prior to deeper soil disturbance for excavation, mine feature backfilling and access road blading.

Topdressing shall be applied generally along the contour, but if hazardous conditions arise, the application may be in another direction. In all cases, placement shall be such that erosion is kept to a minimum. All top-dressed slopes shall be prepared by surface roughening before planting to reduce erosion.

02930 - GRASSES

The following section describes the seeding to be conducted under this contract.

02933 - SEEDING

Following completion of seedbed preparation, the Contractor shall seed areas according to the Specifications and as follows:

I. Seeding Time

Seeding shall be accomplished between June 15 and August 31 of each year, unless specific permission in writing is issued by the Project Engineer to allow seeding before or after these dates. Seeding shall not be done when the soil is too wet, too dry, or otherwise untillable as determined by the Project Manager.

II. Seed Species and Mixtures

To assure AML that the seed purchased shall exhibit the characteristics associated with the given variety, and that it is genetically pure, the Contractor shall provide certified seed of named varieties. For the unnamed varieties, the seed shall be obtained by the contractor from the closest available source adapted to the climate and soil. The percentage of each species comprising seed mixtures for application is outlined below. The mixture is to be used for revegetation of areas defined above in Section 02920. Seed species and varieties, which are well adapted to the soil, climate, and topography of the disturbed areas, shall be used in revegetation and are discussed below.

III. Seeding Methods

A. Broadcasting/Hydroseeding

The seed shall be broadcast or hydroseeded. When broadcast seeding, passes shall be made over the site to be seeded such that an even distribution of seed is obtained. Broadcast seeding shall take place immediately following the completion of final soil preparation.

Broadcast seeding shall not be conducted when wind velocities would prohibit an even seed distribution as determined by the Project Manager. Broadcast seeding shall be followed by hand raking, manual use of a drag chain, or sweeping with sturdy tree or shrub branches to cover seed.

This shall be done over the entire seeded area but shall not be so extreme as to reduce the extent of soil relief.

Broadcast seeding of large areas shall be done using hand-operated “cyclone-type” mechanical seeders. All seeding equipment used shall be equipped with a metering device and set to the appropriate seeding rate.

Broadcast seeding of small areas of disturbance, less than 0.05 acres (approximately 2500 square feet or 50 feet by 50 feet) may be done by hand scattering and raking to ensure seeds are not exposed on the soil surface.

After completion of the broadcast seeding and seed covering, organic debris such as logs, tree stumps and grubbed vegetation shall be randomly redistributed across the sites. This shall be done at the Project Manager’s direction for the purpose of creating visual variation, ground shading, and production of wildlife habitat. Care shall be taken to avoid leveling the soil surface.

B. Completion

If the Contractor is scheduled to close the project outside the specified seeding time when seeding is the only incomplete item, the Contractor shall complete only seed bed preparation and 75 percent of the lump sum bid price for seeding will be retained. Then the job shall be held open for seeding during the next seeding season with the remainder of the bid price being paid upon completion and acceptance of seeding.

If all of the work required by the contract, except seeding, is completed before seeding is accomplished because of seasonal limitations, partial acceptance of the work will be made with final acceptance delayed until seeding has been accomplished in accordance with these specifications. Liquidated damages will not be assessed against the Contractor during the interim period between the dates of partial acceptance and final acceptance if such delay is the result of seasonal limitations.

C. Seeding Rates

Seeding rates are given in Table II. Pure Live Seed (PLS) expresses seed quality. PLS is a percentage of pure, viable seed in a particular lot of seed. PLS is calculated by multiplying the percent total germination by the percent purity and dividing by one hundred (100):

$$\text{Percent PLS} = \frac{\text{Purity} \times \text{Germination}}{100}$$

TABLE II

Class	Plant Species (Common Name/Scientific Name)	Pure Live Seed (pounds per acre)
Graminoids	Indian Ricegrass (<i>Achnatherum hymenoides</i>)	2.50
	Tobosagrass (<i>Pleuraphis mutica</i>)	2.50
	Sideoats Grama (<i>Bouteloua curtipendula</i>)	2.00
	Blue Grama (<i>Bouteloua gracilis</i>)	2.00
	Sand Dropseed (<i>Sporobolus cryptandrus</i>)	2.50
	Galleta (<i>Pleuraphis jamesii</i>)	2.00
Forbs	Evening Primrose (<i>Oenothera Caespitosa</i>)	1.00
	Mexican Hat (<i>Ratibida columnifera</i>)	1.00
	Buffalo gourd (<i>Cucurbita foetidissima</i>)	1.00
	Scarlet Globemallow (<i>Sphaeralcea coccinea</i>)	1.50

All seed shall comply with NMSA 1978, Sections 76-10-11 through -22 and 21.18.4 NMAC, Seed Standards and Classifications. Invoices or bag labels showing purity and germination for all seed shall be provided to the Project Manager before seeding.

The Contractor shall protect and care for seeded areas until final acceptance of the work and shall repair all damage to seeded areas caused by pedestrian or vehicular traffic at no additional cost to EMNRD.

02940 – MULCHING

The Contractor shall apply mulch to all seedbed areas. Mulching will not be permitted when the wind velocity exceeds fifteen miles per hour. The mulch type shall be coarse bark and/or wood chips or chunks, pecan shells, or approved equivalent. Materials shall be wind resistant. No more than 15 percent, by loose volume, shall pass through a 0.25-inch sieve. The mulch shall not contain resin, tannin, or other compounds in quantities that would be detrimental to plant life. Sawdust or materials with noxious seed or plants will not be acceptable. Chipped, but uncomposted, yard waste will not be acceptable unless the material is certified to be free of weed seed. Plant trimmings generated from onsite activities may be shredded and used for mulch; however, deliberately trimming vegetation for the sole purpose of making mulch is not allowed.

The mulch shall be spread uniformly over the prepared area either by hand or with a mechanical mulch spreader. Mulch shall be applied by the Contractor to all seeded areas immediately after seeds are planted to provide suitable surface litter for improvement of moisture conditions and to reduce the potential for damaging erosion or soil blowing which might occur before or during plant establishment.

The rate of application of woody mulch shall be 70 to 80 cubic yards per acre (approximately 0.5-inch thick after spreading).

02955 – SALVAGE OF NATIVE PLANTS

Before any area is disturbed for access, borrow, fill or other construction activities, the Contractor, accompanied by the AML Project Manager, shall thoroughly scout the area for native plant species. All significant plants shall be marked by the Project Manager and avoided by the Contractor wherever practicable. Of those that need to be disturbed, the Contractor shall salvage those that can be replanted, as the Project Manager directs and as specified below. Species that shall be salvaged include prickly pears (*Opuntia spp.*) and other cactus species, including pincushion types.

Plants to be salvaged shall be dug from the soil before earthmoving operations, preserving as many roots and as much of the soil around the roots as practicable. The south side of the plant and the soil line shall be marked with paint or marking crayons. When transplanted the plant shall be placed in the same orientation it was exposed to before harvesting.

Cactus and other salvaged plants shall be planted as soon as possible but no more than one week after harvest.

Salvaged plants shall be placed into nearby uncompacted native soil, preferably in areas that have been disturbed by construction activities and along closed access roads.

Any transplanted plants shall be watered in at the time of planting; no further watering is required. Larger specimens shall be staked as necessary as determined by the Project Manager.

02990 - SUBMITTALS

Complete data and specifications for the following items shall be submitted in accordance with the procedure set forth in Section 01340:

- Materials:
 - General Fill materials
 - Rip Rap Fill Material
 - Polyurethane Foam (PUF) Signs
 - TS 4x2x1/4 Steel - ASTM A588, A242, A606-4, A847 and A709-50W
 - 8"x3/8" Steel Plate - ASTM A588, A242, A606-4, A847 and A709-50W
 - 4"x3/8" Steel Plate - ASTM A588, A242, A606-4, A847 and A709-50W
 - 3/4" x 6" bolts w/ double nuts and washers
 - 1 1/2" x 1/4" pipesleeve A588, A242, A606-4, A847 and A709-50W
 - Concrete

- Grout
- Steel Grating - ASTM A1011, A588, A242, A606-4, A847 and A709-50W
- 1.5"x ¼" angle iron bar - ASTM A588, A242, A606-4, A847 and A709-50W
- 1" Opening Diameter Chicken Wire
- Identification Markers
- Seed mix
- Mulch
- Excavation Plan (Section 02222)

END OF DIVISION 2



DIVISION 3 – CONCRETE AND GROUT

This work shall consist of column foundation supports for metal grate adit and stope closures; foundations for metal barrier fence; waste rock and mortar surrounds for egress closures;

and concrete and grouted anchor supports for horizontal and vertical metal grate closure, as indicated on the drawings. Unless otherwise specified all grouting shall be done with non-shrink grout. This work includes any excavation for base of bulkheads and furnishing and installation of forms.

03001 – GENERAL REQUIREMENTS

All cast-in-place grout shall be accurately and properly placed and finished as indicated on the drawings and as specified in this section.

At least thirty-six (36) hours in advance, the Contractor shall inform the Project Engineer and Project Manager of the times and places at which the Contractor intends to place grout. No grout shall be placed without prior examination by the Project Engineer or Project Manager of the bedrock or anchor conditions.

All grout work shall conform to appropriate requirements of ACI 301, Specifications for Structural Concrete for Buildings, except as modified by the requirements below.

03010 - CONCRETE MATERIALS

I. Materials

A. Cement

All cement used in concrete shall be Portland cement conforming to all requirements of ASTM C150, Type II, low alkali. High-early-strength Type III Portland cement may be used in concrete at the Contractor's option. When Portland cement is delivered in packages, the name and brand of the manufacturer and the type shall be plainly identified thereon. When cement is delivered in bulk, the same information shall be contained in the shipping invoices accompanying the shipment. A bag shall contain 94 pounds net weight and will be considered equal to one cubic foot. A barrel shall consist of 376 pounds net weight and will be considered equal to four cubic feet. The Contractor shall obtain from the manufacturer and furnish a certificate of compliance stating that the cement delivered to the work complies with the requirements herein provided. To prevent deterioration after delivery, cement and aggregates shall be stored as to prevent intrusion of foreign matter. Any material that has deteriorated or has been contaminated shall not be used for concrete.

B. Admixtures

Admixtures shall conform to ASTM C494. Sugar, calcium chloride, or admixtures containing

chloride from other than impurities from admixture ingredients will not be permitted. Air entraining admixtures shall be required and shall conform to ASTM C260. Water reducing admixtures may be used and shall conform to ASTM C494 or ASTM C1017.

C. Curing Compounds

Liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C309.

D. Water

Water for concrete shall be clean and free from harmful amounts of acids, alkalis, oils, organic materials, salts, sand, sewage, or other deleterious substances and shall be furnished by the Contractor. Water shall be potable and shall have a pH value of not less than 4.5 nor more than 8.5 as determined by AASHTO T26 before its use. The sulfate content as SO_4 shall not exceed one thousand parts per million (1,000 ppm).

E. Fine Aggregate

1. General Characteristics. Fine aggregate shall consist of natural sand, manufactured sand, or a combination thereof, or other accepted inert materials composed of clean, durable, hard, uncoated, well-rounded grains.

2. Grading. Fine aggregate shall be well graded and, when tested by standard laboratory sieves, shall conform to the following:

Sieve (ASTM E11) Percent Passing by Weight	
3/8-in.	100
No. 4	95 to 100

The fine aggregate shall have not more than 45 percent passing any sieve and retained on the next consecutive sieve of those shown above, and its fineness modulus shall be not less than 2.3 nor more than 3.1.

3. Deleterious Substances. The maximum percentage of deleterious substances shall not exceed the following limits:

Clay lumps 3.0% by weight
 Material finer than No. 200 sieve 3.0% by weight
 Coal and lignite 1.0% by weight
 Other deleterious substances 1.0% by weight

All fine aggregate shall be free from harmful amounts of alkali and organic

impurities.

4. Soundness. Fine aggregate shall conform to the requirements of magnesium sulfate soundness of ASTM C33. The maximum loss in five (5) cycles shall not exceed 12 percent by weight.

F. Coarse Aggregate

1. General Characteristics. Coarse aggregate shall consist of natural gravel, crushed gravel, crushed stone, or crushed hydraulic-cement concrete, or a combination thereof, or other accepted inert materials having clean durable, hard, strong pieces; free from adherent coatings; and conforming to the requirements of these Specifications. Fifty percent by weight of the minus ¾ inch sieve size particles shall have a minimum of two fractured faces.

2. Grading. Coarse aggregate shall be well graded between the limits specified and shall conform to the following requirements:

Sieve	Percent Passing by Weight
1-in.	100
¾-in.	95 to 100

3. Deleterious Substances. The maximum allowable percentage of deleterious substances and physical properties shall not exceed the following limits:

- Soft fragments 2.0% by weight
- Clay lumps 0.25% by weight
- Material finer than No. 200 sieve 1.0% by weight
- Coal and lignite 0.25% by weight

4. Sampling and Testing. Methods of sampling and testing the coarse and fine aggregate shall be in accordance with ASTM C33.

II. Concrete Mix Design

Structural concrete for concrete footings and collars for steel bat cupolas and for other shaft bat compatible and airflow closures shall be made with aggregates and cement conforming to a minimum compressive strength of 3,500 pounds per square inch (psi) after 28 days. The concrete shall contain a minimum of 611 pounds of cement (6.5 bags) per cubic yard and a maximum water/cement ratio of 0.49. Fine aggregate shall be not less than 38 percent or more than 42 percent by weight of the mix.

All other concrete, including concrete for unreinforced cast-in-place plugs and hollow core plugs, shall conform to a minimum of 3,000 psi after 28 days.

All concrete shall have an entrained air content between 4 percent and 8 percent by volume when determined with the requirements of ASTM C231.

III. Mixing Concrete

If the concrete is mixed on the site, equipment and mixing procedures shall conform to ACI 301. All concrete shall be thoroughly mixed in a batch mixer of an accepted type and capacity for not less than two minutes after all the materials including water have been placed in the drum. During mixing, the drum shall be operated at the speed specified by the manufacturer of the equipment. The entire contents of the mixer shall be discharged before being recharged, and the mixer shall be cleaned frequently. The concrete shall be mixed only in such quantities as are required for immediate use. No retempering of concrete will be permitted. Hand mixed concrete will not be permitted except by special acceptance of the Project Engineer.

IV. Ready-Mix Concrete

At the option of the Contractor, ready-mixed concrete may be used instead of concrete mixed at the job site. Ready-mixed concrete shall conform to all requirements of ASTM C94 and these Specifications as to grading of aggregates, strengths, consistency, and so on. The Project Manager shall have free access to the mixing plant at all times. Ready-mixed concrete shall be continuously mixed from the time the water is added until the time of use. Concrete shall be delivered to the site of the work and discharged from the truck mixer or truck agitator shall be completed within one hour after the cement contacts the mixing water or with aggregates that are surface wet. The organization supplying ready-mixed concrete shall have sufficient plant and transportation facilities to assure continuous delivery of concrete at the required rate.

V. Proportioning

The proper proportioning of aggregates and cement will be determined by an acceptable independent testing laboratory at the expense of the Contractor. The proportioning of aggregates will be the most suitable combination of aggregates that will give the necessary workability and desired consistency when mixed with water and cement as specified. The ratio of cement to dry, fine aggregate shall be that necessary to provide the maximum amount of density of the mixture when used with the minimum amount of water required to produce the specified slump in the resulting concrete. This determination of the proper ratio shall be made by testing laboratory, at the expense of the Contractor, using representative samples of the aggregates which will be used, and before use shall be reviewed by the Project Engineer. The batch proportions used shall be such that full bags of cement are used in each batch.

VI. Consistency

The consistency for concrete shall be kept uniform for each class of work and shall be checked by means of slump tests. The slump for concrete shall be not less than two (2) inches

and not more than (4) four inches. The consistency of the concrete shall be varied as directed by the Project Engineer or Project Manager. If through accident, intention, or error in mixing, any concrete is too wet, such concrete shall not be incorporated in the work, but shall be discarded as waste material at an accepted disposal area.

VII. Placing Concrete

Where indicated, mine openings to be closed with a cast-in-place footings and steel structures and cast-in-place concrete caps shall be excavated to competent bedrock or founded on clean, durable existing concrete. The Contractor is responsible for site inspections, testing or exploration necessary to ensure that the bid adequately reflects excavation conditions including hand trimming and leveling required.

The surface of hardened concrete upon which fresh concrete is to be placed shall be rough, clean, sound, and damp. The hardened surface shall be cleaned of all laitance, foreign substances (including curing compound), washed with clean water, and wetted thoroughly preceding placement of fresh concrete.

Concrete shall be handled from the mixer to the place of final deposit as rapidly as possible by methods that prevent separation or loss of ingredients. It shall be deposited as nearly as practicable in its final position to avoid rehandling. It shall be deposited in continuous layers, the thickness of which generally shall not exceed 12 inches.

The rate of depositing concrete in forms shall be controlled to prevent deflection of the form panels. The concrete shall be thoroughly compacted by means of a suitable mechanical vibrator. Vibrating shall be supplemented with hand spading the concrete around the reinforcing steel.

The Contractor is cautioned that cold weather protection for concrete may be required should concrete be placed in the winter months. If cold weather concreting is done, it shall conform to the requirements of ACI 306R. No concrete shall be placed or be allowed to cure without protection in any weather where the temperature falls below forty degrees Fahrenheit (40° F) at any time during the daily 24-hour period. The period of time such protection shall be maintained shall be not less than seven days.

The Contractor is also cautioned that hot weather protection for concrete shall be required should concrete be placed in the summer months or during any time of hot weather (defined in ACI 305R as high ambient temperature, high concrete temperature, low relative humidity, and high wind speed). If hot weather concreting is done, it shall conform to the requirements of ACI 305R.

Concrete shall have a temperature of at least 50°F and not more than 80°F at the time of placing. At no time during placement or curing shall the concrete surface temperature be allowed to fall below 40°F. Concrete shall not be placed on frozen ground. Frozen aggregate shall not be used in concrete.

Finishes of concrete work shall be as specified in ACI 301.

VIII. Concrete Equipment

All concrete equipment used shall be of a type, capacity, and mechanical condition suitable for accomplishing all requirements of this work and all applicable local, state, and federal codes and regulations, both safety and otherwise. Equipment shall be maintained in first class operating condition at all times. Concrete equipment may include a mixer equipped with a mechanically operated paddle type agitator or equivalent. This may be accomplished by using a single or multiple batch bin system. A water meter shall be installed by the Contractor on water lines to permit accurate measurement of the quantity of water used in making the various mixes. The Contractor shall supply certificates of calibration for all gauges and meters used on this work. Water supply lines for mixing shall be routed for maximum protection and minimum traffic interruption. Facilities shall be provided by the Contractor to measure the proportion of aggregate, cement, sand, water and admixtures required in the design mix. In addition, the Contractor shall devise a system to accurately measure the volume of concrete delivered from the mixing plant or transportation vehicle per unit of time

03100 - CONCRETE FORMWORK

Concrete structures shall be cast in place with proper formwork. The Contractor shall be fully responsible for reinstallation of concrete structures should forming materials and methods fail to adequately support the concrete. All cast-in-place concrete structures shall meet the tolerances for formed surfaces specified in ACI 301.

03200 - CONCRETE REINFORCEMENT

03210 - REINFORCING STEEL

I. Bars

Reinforcing steel bars shall be new billet steel conforming to ASTM A615, Grade 60.

II. Placing Reinforcing Steel

Reinforcing steel, before being placed, shall be thoroughly cleaned of heavy rust, scale or other coatings that will destroy or reduce the bond. A slight coating of rust will not be considered objectionable. Reinforcement shall be carefully formed to the dimensions indicated. It shall not be bent or straightened in a manner that will injure the material, including heating by a torch. Bars with kinks or bends not shown shall not be used. Reinforcing steel shall be accurately placed and secured against displacement by using annealed iron wire of not less than No. 18 gauge or suitable clips. The reinforcing steel shall be supported using bar supports to support the steel the proper distance above the bottom of the footings.

03250 - CONCRETE ACCESSORIES

Bar supports shall meet the requirements of CRSI Class C, plastic protected, or Class E, stainless steel protected.

A survey marker supplied by the Project Manager shall be set in each exposed structure or in the rock adjacent to the structure as approved by the Project Manager. At the location indicated by the Project Manager, the survey marker shall be cast in the structure or grouted by drilling a hole and grouting the cap in place using a non-shrink grout such as Quikrete Non-Shrink General Purpose Grout, or approved equivalent. Alternately the survey marker may be fixed in the concrete structure using epoxy grout. For backfilled features, a pipe monument as specified in Section 02890 and as shown on the drawings shall be installed on those features directed in Table I.

03300 - CAST-IN-PLACE CONCRETE

03370 - CONCRETE CURING

All concrete, regardless of temperature, weather, or season, shall be allowed to cure (kept moist) for a period of not less than seven days after the concrete is poured. Alternatives to 7 days of wet curing shall be submitted to the Project Engineer for review. Curing will not be required longer than 72 hours only if high-early-strength concrete (Type III) is used.

The concrete in structures shall reach a minimum compressive strength of 3,000 psi before attachment of the steel structures or backfilling can occur, except for backfilling shallow edges of concrete caps. Backfill material shall be placed in maximum 12 inch lifts (loose thickness) and shall be placed in a manner which will prevent damage to the structures and which will allow these structures to assume the load from the fill gradually and uniformly. The material shall be compacted to a density of no less than what the backfill equipment is reasonably capable of obtaining to the satisfaction of the Project Manager.

Note that uneven curing of integrally colored concrete will lead to uneven color. Requirements for curing compounds used at colored concrete are specified above. Discolored concrete cured with plastic membrane sheets or non-approved compounds will be rejected. Concrete temperatures for colored concrete shall be maintained between 65 and 85°F for the first three days after placing.

03600 - GROUT

This section specifies grouting as indicated on the drawings.

03610 - GROUT MATERIALS

Non-shrink grout

Quikrete "Non-Shrink General Purpose

Grout", L&M Construction Chemicals "Crystex" or "Premier" or "Duragrout", Master Builders "Masterflow 713 Plus" or "Masterflow 928" or "Set Grout", Euclid "Hi-Flow Grout" or "N-S Grout", "Five Star Grout", or approved equivalent¹, meeting the requirements of ASTM C1107, Grade C

Water

Clean and free from deleterious substances

03620 – NON-SHRINK GROUT

Non-shrink grout shall be furnished factory premixed so only water is added at the job site. Grout shall be mixed in a mechanical mixer. No more water shall be used than is necessary to produce a flowable grout. The grout shall meet strength requirements of $f'_c = 5,000$ psi.

Concrete foundations to receive non-shrink grout shall be saturated with water for 24 hours prior to grouting.

Grout shall be placed in strict accordance with the manufacturer's directions so all spaces and cavities are filled without voids. Forms shall be provided where structural components will not confine the grout. The grout shall be finished smooth in all locations where the edge of the grout will be exposed to view after it has reached its initial set.

Non-shrink grout shall be protected against rapid loss of moisture by covering with wet rags or polyethylene sheets. After edge finishing is completed, the grout shall be wet cured for at least seven days. Alternatives to 7 days of wet curing shall be submitted to the Project Engineer for review.

03990 - SUBMITTALS

The Contractor shall submit manufacturer's data or catalog information, including placing and finishing recommendations, wet-curing method, and weather protection method for the grout materials and any curing compounds.

Submittals shall be made in accordance with the procedure set forth in Section 01340.

END OF DIVISION 3

DIVISION 5 – METALS

The following section specifies all items fabricated from metal shapes and all wrought or cast metal items. Fabricated metal items that are detailed in the contract documents but not mentioned specifically herein shall be fabricated in accordance with the applicable requirements of this section. This section excludes signs and signposts (see Section 02840).

05010 – METAL MATERIALS

All materials shall be new and undamaged and shall conform to pertinent ASTM or other industry standard specifications including the following

I. Steel

Shapes, Plates, and Bars	ASTM A588
Structural Tubing	ASTM A500 or ASTM A1085, (cold-formed carbon steel)
Grating	ASTM A588, A242, A606-4, A847 and A709-50W
Bolts and Nuts	ASTM F593 and F594, (stainless steel grade 18.8 or 316) or ASTM A325, ASTM A307 (carbon steel, Grade A)
Flat Washers	ANSI B27.2, of the same material as bolts and nuts

The mine vent grate shall be fabricated from mild steel ($F_y=30,000$ psi), as specified above.

05030 – METAL FINISHES

Specified hereunder are shop-applied coatings. This section specifies the required shop coatings for metal services where it is not practicable to use a corrosion resistant material.

05031 – SHOP COATING

I. Materials

Unless otherwise authorized, shop applied prime coatings shall be:

Zinc-rich Urethane Primer Tnemec "90-97 Tneme-Zinc" or DuPont "Imron 62 ZF", or approved equivalent.

For repair of hot-dip galvanized surfaces and to rustproof welds, field applied coatings shall be:

Cold Galvanizing Compound Z.R.C. Cold Galvanizing Compound, or approved equivalent.

II. Cleaning

Surfaces shall be dry and of a proper temperature when coated, and free of grease, oil, dirt, dust, grit, rust, loose mill scale, weld flux, slag, weld spatter, or other objectionable substances. Articles to be galvanized shall be pickled before galvanizing. All other ferrous metal surfaces shall be cleaned by high power wire brushing or blasting. Welds shall be scraped, chipped, and brushed as necessary to remove all weld spatter.

III. Galvanizing

All galvanizing shall be done after fabrication by the hot-dip process in conformity with requirements of ASTM A123, A153 and A385.

IV. Steel

Unless otherwise specified and if such an occasion shall occur, all ungalvanized structural and miscellaneous steel shall be given an anticorrosion prime coat in the shop after fabrication. Steel surfaces shall be prime coated as soon as practicable after cleaning. All painting shall be done in a heated structure if the outside air temperature is below 50 degrees Fahrenheit. Steel shall not be moved or handled until the shop coat is dry and hard.

05500 – METAL FABRICATIONS

Structural steel and miscellaneous metals shall be erected in accordance with drawings that are a part of the contract documents. Structural steel and miscellaneous metal shall be stored on blocking so that no metal touches the ground and water cannot collect thereon. The material shall be protected against bending under its own weight or superimposed loads. Care shall be taken in handling steel and miscellaneous metals to avoid unsightly gouges and scrapes.

The Contractor shall make adequate provisions for all erection loads and for sufficient temporary bracing to maintain the structure safe, plumb and in true alignment until completion of erection and installation of necessary permanent bracing.

Before assembly, surfaces to be in contact with each other shall be thoroughly cleaned. All parts shall be assembled accurately as shown on the drawings. Light drifting will be permitted to draw parts together, but drifting to match unfair holes will not be permitted. Any enlargement of holes necessary to make connections in the field shall be done by reaming with twist drills. Enlarging holes by burning is absolutely prohibited.

After erection, all welds, abrasions, and surfaces not shop-primed, except surfaces to be in contact with concrete, shall be primed, unless the steel is weathering steel. The primer shall be consistent with the shop prime coat.

Welders certified in accordance with American Welding Society (AWS) specifications for the intended work shall do all welding. A copy of certifications shall be furnished to the Project Engineer. All welding shall be consistent with the requirements of AWS D1.1, "Structural Welding Code," including adequate edge preparation and preheating and the selection of proper flux (when applicable).

Where feasible, welding and fabrication shall be executed off site and finished product mobilized to the site for installation.

The Contractor shall use caution when installing or fabricating metal works in mine openings so that no foreign materials or equipment are dropped into the mine (salvage may not be possible). Also, "bad air" is not anticipated hazard at the Harding Mine Site, but it is the Contractor's responsibility to execute the work in accordance with their Site-Specific Health and Safety Plan. Air monitoring should be performed as needed.

05990 – SUBMITTALS

- Complete data, detailed drawings, and setting or erection drawings covering all structural and miscellaneous metal items, including bolts and nuts, shall be submitted in accordance with the procedure set forth in Section 01340
- A detailed description of welding processes to be utilized (including electrode classification)
- AWS welding certifications

END OF DIVISION 5

DIVISION 13 – SPECIAL CONSTRUCTION

The following sections describe the special construction to be performed under this contract.

13050 - POLYURETHANE FOAM CLOSURES

The following section describes the polyurethane foam (PUF) closures to be installed in the specified mine features. The work consists of installing a bottom form (as needed), installing PUF to specifications, backfilling over the PUF to the specified level, and, where required, installing corrugated steel riser pipes with steel grates.

The Contractor shall inform the Project Engineer and Project Manager of the times and places at which PUF is to be placed at least three working days in advance.

13051 - MATERIALS AND EQUIPMENT

Unless otherwise specified, polyurethane foam (PUF) shall have a minimum installed density of 1.85 pounds per cubic foot (pcf). Machine-applied or poured-in-place PUF shall be equivalent to SWD Urethane Co. "SWD 425," North Carolina Foam Inc. "NCFI-811," Foam Concepts LLC, "EFS Equipment-less Foam Sealant", Mine Seal, LLC, "PUF-Seal" or Urethane Contractors Supply and Consulting "SES III 2.0 Pour." Bagged PUF shall be equivalent to Foam Concepts Inc. "EFS Equipment-less Foam Sealant" or Mine Seal, LLC "PUF-Seal," or approved equal.

PUF characteristics shall conform to the following standards:

PUF CHARACTERISTIC	STANDARD	SPECIFICATION
Density	As specified	ASTM D1622
Closed Cell Content	>85%	ASTM D6226
Compressive Strength	25 psi minimum	ASTM D1621
Water Absorption	0.2 lbs./sq. ft. maximum	ASTM D2842
Exothermic Reaction Rate	Low	-
Fire Resistance	High	-

PUF used in mine closures shall not contain chlorinated fluorocarbons (CFC's) or hydrochlorofluorocarbons (HCFC's).

The proportioning unit shall be capable of attaining a minimum temperature of 125°F and shall be a Gusmer Model H-11 or equivalent. For remote project locations, or with the approval of the Project Manager, smaller capacity proportioners will be acceptable. In this event the proportioner shall be the Gusmer FF or equivalent.

Minimum heated hose length from proportioner to gun shall be 80 feet. The hose shall maintain or increase component temperature from the proportioner. Longer heated hose lengths may be required depending upon the distance from the proportioning unit to the reclamation site. Approval of the Project Manager is required for the use of any length of unheated hose on a PUF closure.

If the Contractor specifies the use of an application gun, it shall be capable of mixing plural components in the proper ratio at the minimum acceptable output of four pounds per minute. The gun shall be a Gusmer AR mechanically self-cleaning design or equivalent. Application guns constructed by individuals or manufacturers not typically used in the PUF industry may be used if warranted by the PUF supplier or manufacturer.

For poured foam, separate component measuring and mixing containers shall be used. Each component shall be assigned a specific measuring container, each marked with a predetermined volume level corresponding to the required mix ratio. The components shall always be measured in the same quantities, the components added in a separate container, and thoroughly mixed using an appropriate mixing device. In all cases, measuring and mixing of poured PUF shall be done in strict accordance with manufacturer's recommendations, including maintenance of recommended temperatures of the components for mixing and placement. The Contractor shall supply a proper thermometer and use it to check each mixed batch.

The manufacturer shall package bagged foam with pre-measured amounts of each component. Foam shall be used prior to the end of the manufacturer's designated shelf life.

13052 - MATERIAL SAFETY, HANDLING AND TRANSPORT

Materials shall be stored in accordance with the manufacturer's recommendations. All safety precautions outlined by the Polyurethane Division of the Society of Plastics Industries, NFPA, OSHA, EPA, and the manufacturer's Safety Data Sheets (SDS) shall be observed. SDS and technical data sheets shall be on-site and available at all times.

There shall be no welding, smoking, or open flames within 25 feet of PUF application. A minimum 15-pound, class ABC, fire extinguisher shall be on site during foam application.

Workers wearing organic respirator masks and safety glasses or goggles shall apply PUF. State or federal regulations requiring additional safety equipment shall supersede these requirements. Workers wearing respirator masks shall follow the training, fit testing, medical surveillance, and other relevant requirements specified in 29 CFR 1910.134.

The Contractor shall follow all applicable state and local regulations for the transport and use of PUF and chemicals required for cleanup. The Contractor shall obtain any required permits for transportation. In the event of a component leak or spill, the Contractor shall notify the appropriate agencies and jurisdictions.

An oxygen meter shall be used to test air before and during installation of the bottom forms or any other work more than 10 feet inside a mine opening. The oxygen meter shall be a National Mine Service (NMS) OX231 oxygen meter or equivalent. The oxygen meter shall continuously monitor

oxygen levels and have an audible warning. If the oxygen level falls below 19 percent, all personnel shall withdraw from the working area in the mine until the oxygen content increases to safe levels.

Any remedy for increasing oxygen content of the working area or providing ventilation from the surface shall be determined in consultation with the Project Manager.

13055 - EXECUTION

Debris, soil, and loose rock in each of the subsidence features shall be cleared wherever PUF will be installed. A reasonable effort shall be made to excavate any soils down to bedrock or based upon the limitation of the equipment used and safe equipment travel. Due to the shape of the subsided features (wider at the top than the bottom), subsidence feature(s) shall be over excavated to accommodate the appropriate thickness/depth of PUF material to support the overburden load and allow for maximum adhesion along the walls of the subsidence feature(s). Soils shall be separated for use as cover.

I. Formwork

The bottom form and cross members may consist of any commonly available building materials capable of sustaining an initial lift of two to four feet of PUF. Acceptable cross member materials include, but are not limited to, reinforcing steel, 2x4's, dowels, cardboard tubes, and fabric air-inflated plugs. Acceptable bottom form materials include, but are not limited to, foam that has been poured and allowed to cure, wire sheeting (e.g., hog wire) affixed to geonet material, plywood, cardboard, paneling, and carpeting. Any combination of the above materials will be acceptable. Alternate bottom forms shall be reviewed with the Project Engineer prior to use.

The formwork shall be installed at that level specified in the closure drawings or as directed by the Project Engineer following uncovering by the Contractor of the existing conditions within the mine opening. Unless otherwise indicated, cross members may be placed at an angle no greater than 20 degrees from the horizontal as long as both ends are seated in competent rock. The bottom form shall be set over the cross members.

All bottom forms shall be completed prior to the application of any polyurethane foam. The Contractor shall provide the Project Manager with a list of installed depth to bottom forms for polyurethane foam closures. Any breach in the bottom form caused by rock fall or other reason shall be repaired prior to the arrival of PUF applicators at that site. The Contractor shall be responsible for the integrity of the bottom form and the loss of any polyurethane should it fail.

II. Polyurethane Foam (PUF)

The depth of polyurethane foam installed to plug a feature opening shall be as specified or indicated in the project drawings.

In large pours, PUF can get hot enough to actually melt and even burn. This may leave a hollowed out plug or “eggshell” that has very little strength. The remaining foam will be cracked and discolored, very similar to severe UV damage.

Polyurethane foam shall be installed in lifts with a maximum rise of 18 inches. The lifts shall be installed no sooner than 20 minutes apart (and no sooner than 30 minutes apart for ambient air temperatures above 84°F) and have a maximum lift height of three vertical feet per hour. Installed PUF lifts shall pass through the tack free stage before applying the next lift. At no time shall sprayed or poured PUF cut into the rising foam. The PUF shall be applied in such a manner that the entire void is filled, that shadow zones or voids are not created during PUF application, and that temperatures are not raised to unsafe levels.

The Project Manager may use an infrared non-contact thermometer to monitor exothermic generation. If the ambient air temperature is below 60F, extra time will be required to allow the PUF to fully expand and may prevent each lift from reaching a full height of 18 inches. Every degree of ambient air temperature over 65°F adds at least two degrees to the temperature of the rising foam. Ambient air temperatures above 90°F can cause problems with PUF formation. PUF application shall cease if heating or off-ratio foam is observed. The Contractor shall remedy off-ratio foam and demonstrate proper quality PUF to the Project Manager before application resumes. The surface temperature should reach a plateau and start to drop before resuming foam installation. If using bulk foam, reduce the quantity per bucket as the day heats up.

Bagged or poured-in-place polyurethane foam shall be placed in strict accordance with the manufacturer's recommendations, including the need for thorough mixing of components. If required by the Project Engineer, the manufacturer of bagged or poured-in-place polyurethane foam shall provide a certified representative experienced in the placement of their product for a minimum of one eight-hour day. This representative will direct field operations and instruct the Contractor in the proper mixing, placement, and safety procedures for bagged or poured-in-place PUF.

The surfaces of the void to be filled shall be as free as possible of grease and standing water. PUF shall not be applied to surfaces with running water. Remedial action for such situations shall be reviewed with the Project Manager. Polyurethane foam shall not be applied directly to a debris plug, but shall be applied to a bottom form of known physical and chemical properties. PUF shall not be applied during rain unless the foam is fully protected from interaction with water by a physical barrier.

If off-ratio PUF is observed, the applicator must stop, correct the imbalance, and continue application with the proper ratio PUF. Correction and determination of the foam ratio shall be done on a plastic sheet away from the work area. Any lift of off-ratio PUF comprising over two percent of the intended PUF column heights shall be removed. An amount of off-ratio PUF less than two percent of the specified volume may remain if allowed to cool and if the outer perimeter of off-ratio PUF is removed. If off-ratio foam comprises more than 10 % of the specified PUF volume, five percent of the price bid for the site will be deducted as a penalty.

The Contractor shall be responsible for lost or damaged equipment. Damages or claims arising from PUF overspray shall be the responsibility of the Contractor. Under no circumstances shall foreign material be placed in the PUF material unless specifically specified or authorized by the Project

Manager. Non-PUF materials shall be non-toxic and non-hazardous and shall not compromise the strength or water saturation characteristics of the PUF.

Upon reaching the specified grade level for application of PUF, the Contractor shall undertake cleanup of PUF operations.

III. Field Quality Control

The Project Manager will make periodic checks of the quality of PUF applied. The principal check on quality will be visual. Acceptable PUF shall be tan-white to buff in color with no vesicles and a smooth to coarse orange peel surface. Any one of the following conditions shall cause PUF application to cease and efforts to correct the off-ratio condition begun.

<u>Condition</u>	<u>Possible Cause</u>
Dark PUF color Smooth and Glassy Friable or Brittle PUF Improper Density	Excess A Component
Light in Color to White Bad Cell Structure Mottled Appearance Blowholes or Pinholes	Excess B Component
Slow Rise Poor Cell Structure Frequent Equipment Clogging Slow Curing Poor Physical Properties	Bad Material
Air Bubbles on Surface Tension Cracks on Surface Excessive Air Bubbles	Pouring Too Fast Between Lifts

At any time during PUF application the Project Manager may call for a density test. The Contractor shall provide and fill a container for this purpose and the sample will be tested for density. The density of the sample shall be within the range of 1.85 to 3.00 pounds per cubic foot. Density tests indicating that PUF installed is not within the minimum specified range shall cause corrective action resulting in PUF within the acceptable nominal range, less deviation due to barometric pressure changes from Standard Temperature and Pressure.

The Contractor shall conduct density tests of PUF at no additional expense to EMNRD. At the discretion of the Project Manager, density tests showing PUF in the acceptable range will be taken in the

center of the cavity to which PUF is being applied. A sampling box constructed of sheet aluminum and lined with polyethylene shall be lowered into the cavity to take a representative sample of PUF just above the level of installed polyurethane.

At the option of the Project Manager, up to three one-cubic-foot samples of PUF may be taken from the job site for density analysis at the Contractor's expense. In addition, at the option of the Project Manager, up to three samples of up to 100 cubic inches in volume may be taken for on-site tensile strength testing at the Contractor's expense. PUF shall be provided for the samples at no additional cost to EMNRD.

IV. Backfilling

To protect the PUF from vandalism if the site is to be left unattended, two to six inches of fill shall be uniformly shoveled over the foam as soon as possible after the last layer of PUF has solidified. No sooner than 96 hours after PUF application, the remaining void above the PUF plug shall be backfilled. The first two-foot lift of fill shall be placed by hand, bucket, or chute to lower the velocity of impact against the PUF. With approval of the Project Manager, this fill may be placed by streaming from heavy equipment such as a loader bucket. The depths and types of fill over the PUF shall be as indicated or specified in the contract documents or as directed by the Project Manager. Unless otherwise indicated, the minimum cover shall be 18 inches of common fill.

Unless otherwise specified or directed by the Project Manager, common fill above polyurethane foam closures shall be nearby cohesionless material with no pieces larger than six inches in diameter, free of debris or trash, and containing no materials classified as toxic or hazardous. The unit weight of the fill material shall be less than 130 lb/cu. Ft.

Fill above the polyurethane foam closures shall be placed in a manner that will prevent damage to the polyurethane foam plug and riser pipes and will allow these structures to assume the load from the fill gradually and uniformly.

The use of riding vibratory compaction equipment shall be prohibited above polyurethane foam closures and vibrations due to other construction equipment operations shall be kept to a minimum in these areas. With care and for the minimum acceptable period of time, small walk-behind compaction equipment, such as rammer tampers, may be used in these areas.

V. Cleanup

The Contractor shall clean the site of all PUF fragments and overspray. PUF overspray greater than 1/8-inch thick on timbers or historic materials shall be scraped or ablated to 1/8 inch minus to permit ultraviolet degradation of over sprayed polyurethane. Tools and equipment shall be cleaned in such a manner as to avoid injury to vegetation or wildlife. Handling of chemicals used in cleanup shall comply with all applicable local, State and Federal regulations.

END OF DIVISION 13

