REMOVAL ACTION WORKPLAN & 90% DRAWINGS AND SPECIFICATIONS
Amity – Blue Ridge Mine Removal Action
Crook County, Oregon

June 2004

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Figure 1. Proposed Surface Water Stations

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1.0 INTRODUCTION

The United States Forest Service (USFS) has retained Cascade Earth Sciences (CES) to perform a Removal Action (RA) at the Amity – Blue Ridge Mines (Site). The purpose of the RA is to limit human and environmental exposure to the constituents of concern at the Site. The objectives of this project are to implement a practical and effective RA, which will meet or exceed the design objectives outlined in the preferred alternative of the Engineering Evaluation and Cost Analysis (EECA) and Action Memorandum.

This document comprises the Removal Action Workplan, and includes an Implementation Plan, and a site-specific Sampling and Analysis Plan (SAP). In addition, a stand-alone site-specific Health and Safety Plan (HASP) has also been prepared for planned field activities and is included in Appendix A.

1.1 SCOPE OF WORK

The Site is located in Crook County, Oregon, in Sections 14 and 5, Township 14 South, Range 20 East of the Willamette Meridian. The Site is accessed from Prineville by taking State Highway 26 east approximately 14 miles to junction with Forest Service Road (FR) 22, then taking FR 22 east approximately 8 miles to junction with FR 42, then following FR 42 along Canyon Creek approximately 10 miles. The Amity Mine is accessed using FR 4200-170 and FR 4200-152, which are located on the south side of FR 42. The Blue Ridge Mine is accessed using FR 4200-202, which is located on the north side of FR 42.

The work will consist of, but not be limited to, providing all labor, materials, earthwork, and incidentals necessary to excavate and transport waste rock piles at the Amity Mine to the Blue Ridge Mine. A repository will be constructed at the Blue Ridge Mine to contain the waste rock piles; the repository will consist of a geo-synthetic liner, cover material, and vegetation. Other work will consist of the asbestos abatement and removal, elemental mercury collection and disposal, demolition and offsite disposal of selected buildings and structures, mercury-impacted soil excavation and offsite disposal, shaft closure, and water well abandonment. Related mobilization, clearing and grubbing, road improvement and maintenance, erosion control, roadway obliteration, and revegetation will also be performed.

Logistical difficulties associated with the performance of this removal action project include the remoteness of the area and generally steep slopes located throughout the area, which will require special handling. The remote location may cause mobilization difficulties, and may also complicate delivery of the required materials.

2.0 REMOVAL DESIGN AND IMPLEMENTATION

2.1 SCHEDULE AND KEY PERSONNEL

Construction activities are planned to begin the week of June 21, 2004 and continue through the week of August 2, 2004. The field team scheduled to perform work during field operations include:

Dustin Wasley, PE - CES	Project Manager / Engineer of Record
Jay Williams, PE - CES	Engineering Discipline Manager
John Wells, PE - CES	Senior Engineer
MaryAnn Amann, RG - CES	Staff Geologist
Ryan Tobias - CES	Field Technician / Wildlife Biologist
Harley Meservey – Munitor Construction	Construction Manager

All personnel who will be performing invasive activities (i.e. sampling, construction work, etc.) during the construction activities are trained to work in hazardous environments as defined by the Occupational Safety and Health Act (OSHA) 1910.120. Other personnel who will periodically be on site may include:

Dennis Boles, Carrie Gordon, Terri Holtzapple, and Yvonne Sterud (USFS)

In addition to their presence on the site, key personnel will be kept informed regarding project activities, plans, schedules, budget/invoicing, and other issues through phone meetings and correspondence.

2.2 REMOVAL ACTION ACTIVITIES

As per the SOW and to maintain quality assurance of the implementation of the RA, CES will establish an Independent Quality Assurance Team (IQAT) consisting of John Martin, RG (Principal Geologist), Jay Williams, PE (Managing Engineer), and Mary Bates (Senior Administrative Coordinator).

The following items are the main components of the removal action and are listed in order of sequence. Some components may be completed at the same time at the approval of the Engineer. Complete Specifications (CSI Format) and Drawings are provided in Appendix B, which has been prepared as a stand-alone package for ease of review and implementation.

2.2.1 MOBILIZATION

This item is intended to compensate the Contractor for operations including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; for payment of premiums for bonds and insurance for the project; and for any other work and operations which must be performed or costs that must be incurred incident to the initiation of meaningful work at the site and for which payment is not otherwise provided for under the contract.

2.2.2 ROAD USE AND MAINTENANCE

Use Of Roads

(a) The Contractor is authorized to use roads that are a part of the construction project and those Forest Service roads designated below for performance of work under this contract.

Road No.	Termini	Authorizations, Restrictions & Requirements	Maintenance Required (Yes or No)
4200-170	42	None	Yes
4200-152	42	None	Yes
4200-200	42	None	Yes
4200-202	42	None	Yes

(b) If the Contractor requests use of a National Forest road or segment not designated for his use, the Forest Service may authorize such use if not in conflict with the current Road Rules document. Authorization to use such additional roads may include maintenance requirements and use limitations.

(c) The roads authorized for use will be subject to the following provisions.

1. The Road Rules in the current Ochoco National Forest Road Rules Document are applicable to all commercial road users. This document is available for inspection at the

office of the Forest Supervisor and shall be applicable except when modified by provisions of the contract.

2. State laws governing traffic rules and equipment requirements on State and County highways.

3. Federal regulations contained in 36 CFR 261.12. These regulations prohibit use of vehicles or equipment in excess of State legal highway loads or posted limits without valid State and Forest Service overload permits, damaging a road while using it, and blocking a road open to use by others, except as may be otherwise provided in the contract.

Load Limits

All vehicles and equipment shall not exceed State legal highway loads and widths or posted limits without valid State and Forest Service overload, overwidth permits. Forest Service overload permits for this project may be obtained from the District Ranger.

Federal Regulations contained in 36 CFR 261.54 as applied to the area by an order issued under 36 CFR 261.50. These regulations authorized the Forest Service, as a sovereign act, to issue additional restrictions and closures any time conditions warrant. Such closures will be in addition to those shown in the current Road Rules Document and will be posted on the road.

2.2.3 TRAFFIC CONTROL

The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs, and other traffic control devices, and shall take all necessary precautions for the protection of the work and safety of the public. Roads closed to traffic shall be protected by effective barricades, and obstructions shall be illuminated during the hours of darkness. Suitable warning signs shall be provided to properly control and direct traffic.

The Contractor shall erect warning signs in advance to any place on the project where operations may interfere with the use of the road or trail by traffic and at all intermediate points where the new work crosses or coincides with an existing road or trail. All road barricades, warning signs, lights, temporary signals, flagman and pilot car operators and equipment, and other protective devices, except for special devices, shall conform with Part VI of the Manual on Uniform Traffic Control Devices for Streets and Highways, published by the Federal Highway Administrations and applicable safety codes.

The Contractor shall furnish, erect, maintain, and remove when notified any project identification signs shown on the Drawings. Necessary warning signs and guards shall be posted during blasting operations to safeguard the public.

2.2.4 CLEARING AND GRUBBING

Clearing and grubbing will be performed in accordance with Section 02130 of the Technical Specifications at the direction of the Engineer.

2.2.5 EXCAVATION AND OFFSITE DISPOSAL OF BLUE RIDGE HOTSPOT

All waste material/soil that exceeds the hotspot concentration of 26,476 mg/kg at the Blue Ridge Mine (estimated to be <10 cubic yards) will be excavated, transported and disposed at the Arlington Subtitle C landfill. The only sample that exceeded the hotspot concentration was collected in an area adjacent to the

former rotary furnace foundation. Prior to the excavation of the hotspot, the area will be delineated using a Niton dual source XRF. Following excavation, the Niton will be used to see that the hotspot has been removed. Samples will also be collected as discussed in Section 3.2. The excavation area will be backfilled with non-impacted material scavenged from repository sub-grade or from around the Site and tamp compacted using the excavator bucket.

2.2.6 BLUE RIDGE MINE ONSITE WELL ABANDONMENT

The onsite water supply well at the Blue Ridge Mine will be abandoned per the State of Oregon Water Resource Department (OWRD) requirements. A licensed well driller will conduct the abandonment work. Specifically, the steel casing will be pulled from the ground using a large pump hoist if it is not cemented to the borehole. If cement is present between the steel casing and borehole, then the casing will be cut off approximately 1 to 2 feet BGS. The well will then be filled with a pressurized cement grout from the bottom of the well to the top of the cut casing using a tremie pipe. The remaining 1 to 2 feet BGS of the former well will be backfilled with native soil. CES will contract with Aiken Well Drilling in Bend, Oregon to perform this work. In addition, CES will submit all required paperwork with the OWRD to officially abandon the well.

2.2.7 HEATING OIL AND FUEL TANKS REMOVAL AND DISPOSAL

The underground fuel tank (located near the bunkhouse and well at the Blue Ridge Mine) will be decommissioned and disposed offsite in accordance with Oregon Department of Environmental Quality (ODEQ) requirements. During previous field visits, the top of tank was exposed and no liquid was observed in the tank, so removal of liquid is not included. Following excavation and removal of the tank, soil samples will be collected from the floor (2) and walls (4) of the excavation and submitted for analysis for the presence of total petroleum hydrocarbons (TPH). The “green” aboveground heating oil tank that was identified in the EECA near the process building was not present during the most recent site visit. What appeared to be backfill material (i.e. ¾ inch minus rock) was observed in the location of the tank. In order to assess that cleanup was completed, CES will excavate in the vicinity of the former tank and soil samples will be collected from the excavation (1 floor and 4 wall samples) for TPH analysis. CES estimates 10 CY of TPH-impacted material will be disposed, along with the tank, at the Deschutes County Landfill. The excavations will be backfilled with non-impacted material scavenged from repository sub-grade or from around the Site and tamp compacted using the excavator bucket.

2.2.8 BUILDING MATERIAL, EQUIPMENT, AND MISCELLANEOUS DEBRIS REMOVAL AND DISPOSAL

All buildings, process equipment, structures, and nuisance debris at the Site that pose a potential physical and chemical hazard to Site users will be removed. General debris and trash (i.e., bricks, wood, trash, etc.) will be transported and disposed at the Deschutes County Landfill in Bend. All metal equipment and debris will be transported and recycled at McCormick Swift in Redmond, Oregon. Based on the site reconnaissance and conversations with the USFS, the following will be completed:

Blue Ridge Mine

- The pantry/root cellar, located adjacent to the historic mill area, will be dismantled and only the concrete shell will remain. In addition, the pump house building, located adjacent to the bunkhouse, will be demolished and disposed offsite. The wood shell of the retort portion of the main process building will be demolished and disposed offsite. Designated miscellaneous debris and trash (e.g. metal siding, pipes, wood, garbage, drums, etc.) scattered throughout the Site and representing an “attractive nuisance” will be disposed or recycled offsite.
- The main portion of the process building, the bunkhouse, and the hopper at the secondary processing area will be left intact for historical significance. Concrete foundations at the Blue Ridge Mine will be left as historic features; the concrete slab beneath the retort will be inspected

for integrity as outlined in Section 2.2.8. In addition, dilapidated wood structures that have fallen over the years will be left intact and only trash and metal debris will be removed and disposed offsite.

Amity Mine

- The hopper is currently on the verge of collapsing and is considered a safety hazard. Based on this and the desire to leave the remains onsite, the hopper will be pulled down in the direction that it is naturally falling. To accomplish this, chains will be connected to the three lower structure members of the hopper and a dozer will be used to "fall"' the hopper. Other methods may be explored by CES and the USFS during construction to accomplish this task. The dilapidated wooden mill structure and all concrete structures will be left intact for historical significance.
- Designated miscellaneous debris and trash (e.g. metal siding, pipes, wood, garbage, drums, etc.) scattered throughout the Site and representing an "attractive nuisance" will be disposed or recycled offsite.

2.2.9 ASBESTOS ABATEMENT AND DISPOSAL

Following demolition of the retort building wood shell, asbestos containing material (ACM) within the retort building area will be removed and properly disposed. In addition, the remainder of the ACM scattered throughout the Site will be removed and properly disposed. The ACM will be removed by Paulson Environmental (Paulson), who is certified in accordance to the Asbestos Hazard Emergency Response Act (AHERA). Paulson will follow all applicable local, state and federal rules for asbestos abatement and disposal.

2.2.10 ELEMENTAL MERCURY AND RETORT DISPOSAL

Following the removal of the ACM, elemental mercury will be containerized from within the retort D-tubes and on the catch tray. CES proposes to collect the elemental mercury for transport to the Glenwood Receiving Station in Eugene, Oregon. Since the amount of mercury expected to be generated is less than 220 pounds during one month, the USFS can be considered a conditionally exempt generator (CEG) and thus not required to report on the waste they generate or to register with ODEQ. Using this approach, the product will not need to be handled as a hazardous waste under RCRA and can be transported to the disposal facility as a non-hazardous waste. Each container of mercury will be clearly labeled and numbered to correspond with the number on the required inventory sheet. The mercury will be collected using an EPA approved HEPA/activated carbon, mercury vacuum. Air monitoring will be performed during the mercury recovery using a Jerome Mercury Analyzer (Model 431x) to verify that the vacuum is properly filtering the mercury vapors.

Following the removal of the elemental mercury, the retort will be dismantled and the steel wiped clean and vacuumed to removal any remaining mercury. Following the cleaning, the steel will be transported to McCormick Swift in Redmond, Oregon for recycling and disposal. Other material encountered while dismantling the retort (i.e., bricks, concrete, etc.) will also be wiped clean and vacuumed to remove any remaining mercury. This material will be transported and disposed at the Deschutes County Landfill in Bend as construction debris. If it is not feasible to dismantle the retort, the entire retort may be disposed at the Deschutes County Landfill.

Following the removal of the retort, the floor of the retort building will be inspected for mercury that may have escaped and migrated under the retort. If mercury is discovered, it will be cleaned up using the mercury vacuum. CES will work with the USFS during and following removal of the retort as to the integrity of the concrete floor. It is the intent of the USFS to leave as much of the concrete floor intact as possible.

2.2.11 SURFACE WATER DIVERSION/CONTROL MEASURES

At the direction of the Engineer, storm water and snowmelt run-on would be controlled on the upgradient side by constructing run-on control ditches or berms that channel the water around the revegetated area and repository.

In addition, sediment control devices (i.e., straw bale barrier) will be installed on the downgradient side of the Amity Mine waste piles to control the migration of sediment into Johnson Creek, during and following construction activities. The sediment control devices will be installed in accordance with the details and specifications in the Drawings and at the direction of the Engineer.

2.2.12 REPOSITORY SUBGRADE PREPARATION

The repository subgrade will be excavated to the limits shown in the Drawing and in accordance with Section 02220 of the Technical Specifications. The excavated material will be stockpiled at the staging area to be used as cover material for the repository. Special care will be taken to segregate the top 6 to 12 inches from the remainder of the subgrade material.

2.2.13 AMITY WASTE PILE REMOVAL AND REPOSITORY CONSTRUCTION

The Amity waste piles (WP-A, WP-B, and WP-C) will be excavated to the limits shown in the Drawings and in accordance with Section 02220 of the Technical Specifications. Approximate lines and grades are shown on the Drawings, but the actual lateral extent and depth will be based on field observations and results of Niton analytical results. The estimated volume of material to be removed is 9,530 cubic yards. The Contractor shall provide access to the excavation areas, and shall sequence excavation and other activities to accommodate sampling and analysis work by the Engineer. Trucks will not be overfilled in order to minimize spillage of waste. If spillage occurs, the Engineer may require the trucks to be covered during transport. Loading areas and spur roads shall remain free of spilled material, to the extent practical, to avoid tracking of contaminated soil along the haul routes. Debris that is encountered in the excavation area (i.e., wood debris) shall be separated and disposed according to Section 02130 of the Technical Specifications. The excavated material will be transported and placed within the repository as shown on the Drawings and in accordance with Section 02220 of the Technical Specifications.

During the excavation of the waste pile and construction of the repository, the Contractor shall not discharge dust or any other air contaminants into the atmosphere in such quantity as will violate the regulations of any legally constituted authority. At the first sign of fugitive emissions, water will be applied using an atomized spray until visually damp. Special consideration will be given not to over water the tailings. No ponding or runoff from the tailings will be allowed. Excessively wet tailings can cause equipment safety issues and could potentially jeopardize the reclamation project. Water is available on FR 4215 near the confluence of the North Fork of the Crooked River and Jungle Creek (T.14S, R.21E, Section 32, SW¼); if sufficient water is not present, other water sources are available near Indian Creek.

2.2.14 REPOSITORY CAP CONSTRUCTION

The repository cap will be constructed in accordance with the Drawings and in accordance with Sections 02220 and 02402 of the Technical Specifications. The stockpile subgrade material will be used to construct a portion of the repository cap at a minimum of 18 inches as shown on the Drawings. In addition, because the subgrade material most likely contains rock and has minimal organic material, topsoil will be brought in to help the revegetation establish. The topsoil source will be determined by the Engineer and/or USFS representative. The subgrade material and topsoil shall be applied loose, not compacted in 6-inch lifts.

2.2.15 BLUE RIDGE WASTE PILE RECONTOURING

The various waste piles at the Blue Ridge Mine will be recontoured to better blend with the surrounding terrain. Work will be conducted in accordance with Section 02220 of the Technical Specifications, and at the direction of the Engineer and/or USFS representative.

2.2.16 BLUE RIDGE SHAFT #2 CLOSURE

The partially collapsed Shaft #2 at the Blue Ridge Mine will be backfilled and closed in such a manner to provide a permanent and complete blockage. The shaft will be closed in accordance with the details and specifications in the Drawings and in Section 04100 of the Technical Specifications. Riprap is recommended as backfill and special care will be taken not to use riprap too large that may cause premature plugging or bridging. Therefore, 6-inch minus riprap will be used. The riprap source is located approximately 7 miles north of the Blue Ridge Mine at the Indian Creek Pit on FR 22-255. The pit can be accessed by traveling north on FR 4210 until the intersection with FR 22, then northwest on FR 22 until intersections with FR 2200-250, then travel east on FR 22-250 until reaching FR 22-255.

2.2.17 REVEGETATION

All disturbed areas will be revegetated in accordance with Section 02880 of the Technical Specifications.

2.2.18 SOIL BIOENGINEERING AND JOHNSON CREEK RESTORATION

CES will utilize soil bioengineering techniques to stabilize the native material beneath WP-C and along Johnson Creek at the Amity Mine. WP-C is located adjacent to Johnson Creek and special care will be taken to choose a technique that is suitable for the conditions that are uncovered after excavation of the pile. CES has provided a preliminary design and layout of soil bioengineering options for this portion of Johnson Creek (See Drawing C-5). Following the excavation and removal of WP-C, the design and layout of the soil bioengineering will be finalized.

In addition, the portion of Johnson Creek near WP-C at the Amity Mine should be evaluated for minor stream restoration/modification. Because the final configuration of Johnson Creek will not be known until after the removal of WP-C, this portion of the removal action will be designed and constructed in the field based on field observations.

2.2.19 ROAD OBLITERATION

All temporary spur roads, FR 4200-170, FR4200-202, and FR 4200-152 (in the vicinity of the Amity Mine) will be obliterated following removal action activities in accordance with Section 02245 of the Technical Specifications, at the direction of the Engineer, and as summarized in the following bullets.

- 4200-152 Decommission. Leave road hydrologically stabilized, seeded and mulched. Road prism may be ripped, recontoured, as needed to control erosion. Snowmobilers will utilize the road; therefore, earth berms will be installed to control access.
- 4200-170 Close. Remove existing culverts and shape the drainage channel to match upgradient slope. Large boulders (3-4 feet diameter) will be placed near the intersection with FR 42 beyond the wide area at the direction of the Engineer. The roadbed will be ripped, seeded, fertilized and mulched; water bars may be installed to control erosion.
- 4200-202 Decommission. Beyond the parking area near the Bunkhouse, the road will be ripped, seeded, fertilized and mulched. Water bars may be installed through the steep area near the Process Building. In addition, large boulders (3-4 feet in diameter) will be placed above and

below the Process Building. The roadbed will be incorporated with the recontouring of the waste piles (Section 2.2.15) from the Process Building to intersection with FR 4200-200. The intersection with FR 4200-200 will be removed and earthen berms may be placed to detour vehicle traffic.

3.0 SAMPLING AND ANALYSIS PLAN

The following sections outline the Sampling and Analysis Plan (SAP) for the Removal Action and include three main sections: 1) Pre and Post Construction Water, Sediment and Benthic Macroinvertebrate Sampling, 2) Confirmation Soil and Waste Rock Sampling, and 3) Decontamination Procedures. CES will contract with Brooks Rand in Seattle, Washington to perform the laboratory analysis.

3.1 WATER, SEDIMENT AND BENTHIC MACROINVERTEBRATE SAMPLING AND MONITORING

CES will establish six stations in Winter and Johnson Creeks in order to establish baseline water and sediment quality, and benthic macroinvertebrate health and abundance, prior to construction activities. The approximate locations of the Stations are presented on Figure 1. The exact locations will be determined based on field conditions and will be located in depositional areas. The Stations will be surveyed and permanently marked with rebar and aluminum caps so they can be located by use of a GPS unit. Each Station number shall be clearly marked on the caps. At each Station, surface water, pore-water, sediment and benthic macroinvertebrate samples will be collected. Laboratory analyses and field parameters include the following for each of the media sampled:

- Surface Water Laboratory – Total recoverable mercury and arsenic.
- Pore Water Laboratory – Dissolved mercury and arsenic, and methyl mercury (low flow only).
- Surface Water and Pore Water Field Parameters - pH, temperature, conductivity, dissolved oxygen (DO), oxygen reduction potential (Eh), and flow rate.
- Sediment – Total mercury and arsenic, and methyl mercury (low flow only).
- Benthic Macroinvertebrate - Level III enumeration (species level in first and last event)

3.1.1 SURFACE WATER SAMPLING PROCEDURES

Surface water samples will be collected near depositional areas where water current is slower and there is greater retention time for the surface water to accumulate contaminants from sediment. If the stream is deep enough, the sample will be collected directly into the laboratory-supplied containers, otherwise samples will be collected using a decontaminated sampling beaker and the water will subsequently be decanted into the appropriate sample container supplied by the laboratory.

3.1.2 PORE-WATER SAMPLING PROCEDURES

Pore-water samples will be collected at each Station. CES field personnel will collect water from the pore space in stream gravels or sediment where the substrate is deep enough to insert the sampling device. A PP-27, manufactured by MHE, stainless steel sampler will be used to collect pore water samples. The PP-27 will be inserted in sediment to a depth at least 6-inches below the streambed, or at a depth determined appropriate in the field. Pore water will be extracted using either a syringe or peristaltic pump by attaching the device to the PP-27 sample-port and fed through a 0.45-micron filter. Water will be withdrawn at a low-flow sampling rate (50-100 milliliters per minute) in order to minimize entrapment of sediment and short-circuiting of surface water. Following filtration, the pore water will be placed into the appropriate sample containers supplied by the laboratory.

3.1.3 SEDIMENT SAMPLING

Sediment samples will be collected from 0-18 inches, unless bedrock is encountered. Transects will also be established in order to collect representative sediment samples across the entire reach. Sediment samples will be collected by scooping sediment from depositional areas with a decontaminated stainless steel trowel or Shelby core sampler. The sediment will then be placed in a stainless steel bowl and mixed thoroughly, which will separate large gravels and water from the sediment. Sediment will then be placed in laboratory-supplied clean 16-ounce glass jars with Teflon lids.

3.1.4 BENTHIC MACROINVERTEBRATE SAMPLING AND SURVEY

To collect the sample, a D-ring kick-net will be placed into the stream with the flat part of the hoop perpendicular to the stream flow and resting on the bottom. The invertebrates will be collected by disturbing a 30 by 60 centimeter (cm) area of stream bottom to a depth of approximately 10 cm, directly upstream of the net so that the current carries the macroinvertebrates and debris into the net. Depth permitting, all substrate larger than five centimeters will be rubbed by hand to dislodge any clinging macroinvertebrates. Each 30 x 60 cm area that is sampled will be considered a "jab". The contents of the jab will be placed into a sieve bucket and the sampling procedure repeated at additional locations within that habitat type until the appropriate number of jabs have been completed for a given sample. The contents of the sieve bucket will be cleared of large debris and placed into a labeled sample jar containing preservative. The sampling will proceed from downstream to upstream to minimize influences of disturbance to downstream sample reaches.

3.1.5 SAMPLING SCHEDULE

Approximately 2 to 3 weeks prior to commencement of construction activities, CES will conduct the Pre-Construction monitoring to establish the baseline water, sediment and benthic macroinvertebrate quality. Following construction activities, CES will perform three years of semiannual sampling and monitoring (high flow – Spring 2005, 2006, and 2007; and low flow – Fall 2004, 2005, 2006) at the seven newly established sampling stations in Johnson and Winter Creek in order to evaluate and monitor the success of the Removal Action. The analysis suite is outlined above; however, the high flow events will not be analyzed for methyl mercury and benthic macroinvertebrate enumeration will only be performed during the last monitoring event (Spring 2007). This will allow the USFS to evaluate the success of the RA with respect to the benthic community.

3.1.6 SAMPLING DESIGNATION AND LABELING

The following sample numbering system will be used to identify water, sediment, and benthic samples:

Water, Sediment, Pore-Water, and Benthic Sample Number Example: WC-SW-1 (S04)

Where:

WC	=	Winter Creek (JC = Johnson Creek)
SW	=	Surface Water
PW	=	Pore-Water
SS	=	Stream Sediment
B	=	Benthic Macroinvertebrate
1	=	Station Number
S04	=	Spring 2004 (F04 = Fall 2004)

3.2 CONFIRMATION SOIL AND WASTEROCK SAMPLING

This section presents the sampling plan that will be employed at the Site to confirm that soil impacted with mercury and/or hydrocarbons above specified concentrations is not left *in situ* during remedial actions. The criteria used in preparation of this plan are also included.

3.2.1 BLUE RIDGE MINE HOTSPOT

Following excavation and prior to backfilling, confirmation samples will be collected from the floor (1) and walls (4) of the excavation for field Niton analyses to determine that material greater than the hotspot concentration of 26,476 milligrams per kilogram (mg/kg) has been removed and the need for further excavation. In addition, the confirmation samples will also be sent to Brooks Rand for laboratory analysis for total mercury.

3.2.2 HEATING OIL AND FUEL TANKS REMOVAL AND DISPOSAL

Following excavation and removal of the fuel tank and any visually obvious soil contamination, soil samples will be collected from the floor (2) and walls (4) of the excavation and submitted for total petroleum hydrocarbon (TPH) - hydrocarbon identification (HCID) analysis per the ODEQ Method NWTPH-HCID. Samples will be further quantitated, if either gasoline range (Gx) or diesel-heavy oil range (Dx) hydrocarbons are present, per ODEQ Method NWTPH-Gx or Dx.

Following excavation in the vicinity of former above ground heating oil tank, soil samples will be collected from the excavation (1 floor and 4 wall samples) for NWTPH-HCID analysis and subsequent NWTPH-Gx and Dx analysis, as appropriate.

3.2.3 MISCELLANEOUS MERCURY SCREENING AND ANALYSIS

On an as needed basis, CES will screen soil with suspected residual mercury concentrations in areas around the Site, specifically the Blue Ridge and Amity Mills because these areas will remain intact following the removal action. Screening will be performed using a Niton, and samples may be submitted for laboratory analysis for total mercury for additional verification.

3.2.4 SAMPLING PROTOCOL

All confirmation samples shall be collected as discrete samples from specific locations. Confirmation samples shall be collected from fresh, undisturbed soil from the walls and bottom of the excavation using a stainless steel or plastic spoon. Sample material will be placed in laboratory-supplied 4-ounce glass jars with Teflon-lined lids, and stored in a cooler on ice.

3.2.5 SAMPLING DESIGNATION AND LABELING

The following sample numbering system will be used to identify conformation samples:

Waste and Soil Sample Number Example: AMRA-WR1-1-5’

Where:

AMRA	=	Amity Mine Removal Action (BRMRA = Blue Ridge Mine RA)
WR1	=	Waste Rock Pile 1 (S = Soil, HS = Hotspot)
1	=	Sample Number
5’	=	Depth of sample from below ground surface

3.3 DECONTAMINATION METHODS

All sampling equipment (bowls, trowels, augers, etc.) will be stainless steel, and will be decontaminated before sampling. Equipment decontamination consists of a tap water rinse, a soap and tap water wash, a dilute HNO_3 rinse (10 parts DI water to 1 part concentrated HNO_3) and a DI water rinse followed by air drying. Decontamination water will be discharge directly to soils at the Site.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PLAN

The following standards will be maintained during sampling and analysis to ensure that the data generated for the assessment meets data quality objectives outlined in *Data Quality Objectives for Remedial Response Activities, Development Process*. All laboratory and field data will be subject to EPA Level II quality assurance/quality control (QA/QC) standards. All values between the method detection limit (MDL) and the practical quantitation limit (PQL) will be noted on the laboratory analytical reports.

4.1 FIELD QA/QC

According to USEPA Quality Assurance/Quality Control Guidelines, one duplicate and one equipment rinsate blank should be analyzed for each ten samples collected. The intent of these guidelines is to assess the precision of field sampling, and assure that contamination has not occurred in the field and that decontamination procedures were followed.

Equipment rinsate blank samples will be collected during sampling activities to test for cross-contamination between samples and will be collected by pouring distilled water over decontaminated sampling equipment into the sampling container. The rinsate and duplicate samples will be given unique labels. The samples will be analyzed for total mercury.

All samples will be collected in laboratory-supplied jars and bottles, labeled and transported according to the protocol described above. A chain-of-custody will be maintained from the time of sample collection until the time the samples are received by the analytical laboratory. The chain-of-custody will be signed by anyone who accepts responsibility for the samples, except the shipper. Shipping documents will represent custody of the samples by the shipper.

4.2 LABORATORY QA/QC

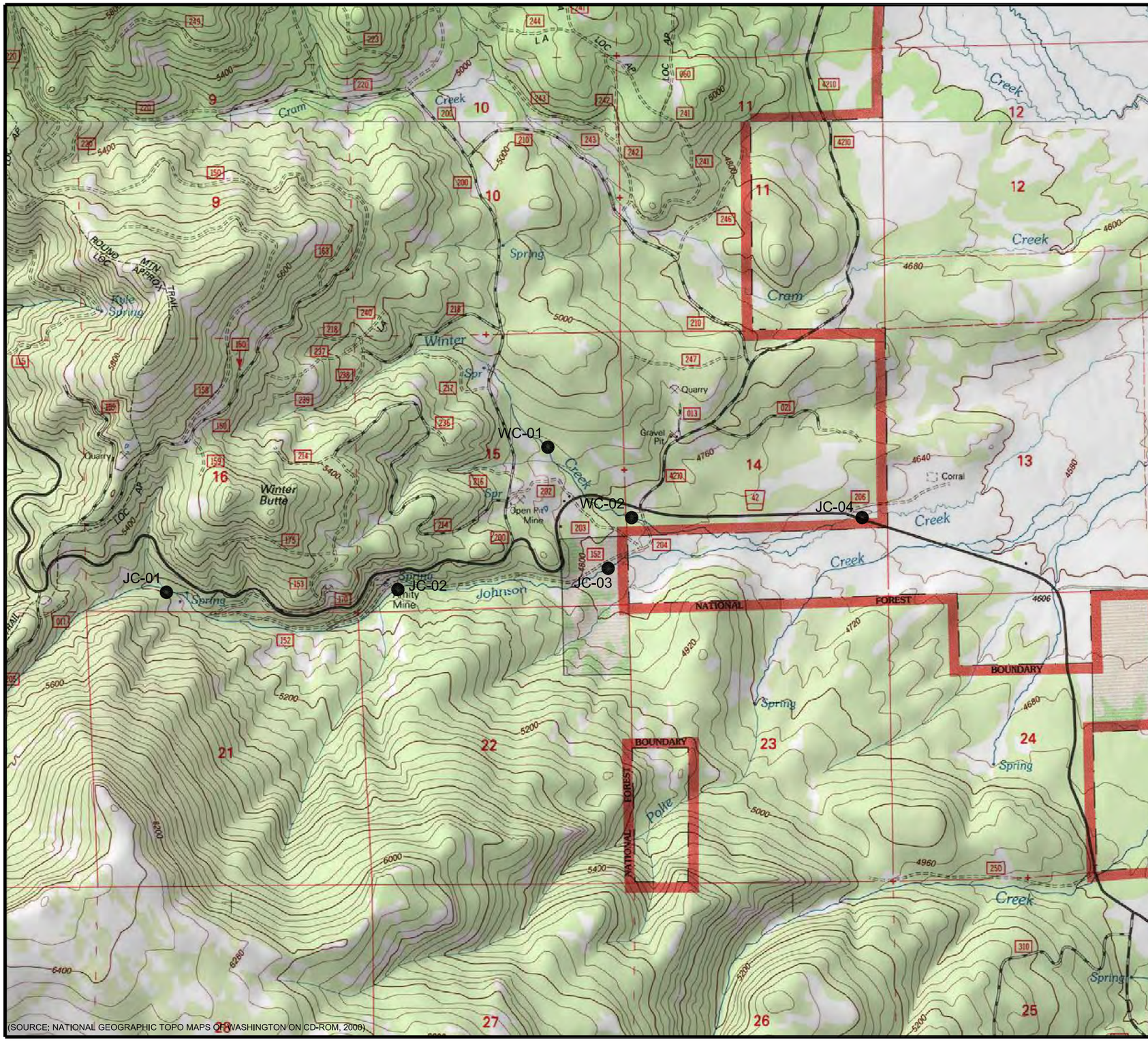
The laboratory will follow all requirements for analysis and reporting under the EPA Level II protocols, including, laboratory blanks, laboratory duplicates, matrix spikes and matrix spike duplicates. All samples will be analyzed within the holding times specified for the individual analytical procedure. All values between the MDL and the PQL will be noted on the laboratory analytical reports. Any sample analysis completed after the specified holding time will be noted in the laboratory analytical report. All analytical reports will be reviewed to see that all spikes, duplicates and lab blanks are within acceptable limits.

5.0 HEALTH AND SAFETY PLAN

The health and safety plan has been prepared as a separate document, and is included as Appendix A.

FIGURES

Figure 1. Surface Water Station Locations



EXPLANATION

● Surface Water Station

N

SCALE 1 INCH = 2,000 FEET

1 1/2 0 1 MILE

CONTOUR INTERVAL = 40 FEET

Figure 1. Proposed Surface Water Stations

PROJECT NUMBER: 2323026	AMITY - BLUE RIDGE REMOVAL ACTION
DATE: 03/12/04	
DWG BY: DGW / DWG NO: Fig 1.dwg	
PROJECT MANAGER: DGW	
REVISED:	CASCADE EARTH SCIENCES A Valmont Industries Company

APPENDICES

Appendix A. Health and Safety Plan
Appendix B. Drawings and Specifications

Appendix A.

Site Specific Health and Safety Plan

SITE-SPECIFIC HEALTH & SAFETY PLAN (HASP)

Prepared by:

CASCADE EARTH SCIENCES (CES)

I. GENERAL PROJECT INFORMATION

Name of Site ***Amity-Blue Ridge Site*** Project No. ***2323026***

Address of Site _____

Client Name ***Ochoco National Forest*** CES Project Manager: ***Dustin Wasley***

Client Address _____

Client Health & Safety Contact ***Dennis Boles (541) 219-1201***
(Name, Phone Number)

Site Contact Name and Phone Number ***Dennis Boles (541) 219-1201***

Plan Prepared By ***Dustin G. Wasley, Project Manager*** Date ***May 2004***

Reviewed By ***John Martin, CES Health and Safety Officer*** Date ***May 2004***

Overall Objective of Project: ***The work will consist of, but not be limited to, providing all labor, materials, earthwork, and incidentals necessary to excavate and transport waste rock piles at the Amity Mine to the Blue Ridge Mine. A repository will be constructed at the Blue Ridge Mine to contain the waste rock piles; the repository will consist of a geo-synthetic liner, cover material, and vegetation. Other work will consist of the asbestos abatement and removal, elemental mercury collected and disposal, demolition and offsite disposal of selected buildings and structures, mercury-impacted soil excavation and offsite disposal, shaft closure, and water well abandonment. Related mobilization, clearing and grubbing, road improvement and maintenance, erosion control, roadway obliteration, and revegetation will also be performed.***

The following site personnel have read this plan and are familiar with its provisions:

NAME	SIGNATURE	DATE
Client H&S Contact (USFS): Dennis Boles		
Project Team Leader (CES): Dustin Wasley		
Other Site Personnel:		
Engineering - Jay Williams, John Wells Construction Oversight – Robert Coffan		
Subcontractor (Munitor): Harley Meservey		

II. EMERGENCY INFORMATION

The SSO will coordinate the entry and exit of response personnel during an emergency.

NAME	PHONE NUMBERS
Local Police	911
Local Ambulance	911
Local Fire Department	911
Local Hospital = Pioneer Memorial Hospital	911 / (541) 447-6524
National Response Center (all spills)	(800) 424-8802
OR Emergency Response	(800) 452-0311 / _____ /
OR OSHA	(800) 922-2689 / _____ /
Oregon DEQ	(800) 452-4011

After immediate notifications are made, also notify:

NAME	PHONE NUMBERS
Project Manager (CES) – Dustin Wasley	(509) 921-0290
Project Manager (USFS) – Dennis Boles	(541) 219-1201
Subcontractor: Munitor Construction	(503) 702-6542

EMERGENCY PROCEDURES – IMMEDIATE

1. ***ASSESS SITUATION***: What is the Hazard? Can the Site be entered? Does the hazard still exist?

2. ***MAKE THE SITE SAFE***: Safe for others to enter?

3. ***ASSESS THE VICTIM***: 1) Breathing? 2) Heartbeat? 3) Other life threatening?

4. ***CALL 911***: Follow Oral Reporting Procedures below. If life threatening, request instructions from dispatcher; if not life threatening remove from contamination zone and consider the need for decontamination prior to transport.

   - Name, location, and phone number of person reporting;
   - Location of accident/incident, i.e., building number, facility name, etc.;
   - How many persons need help;
   - Description of injuries;
   - Details of any chemicals or other contamination involved;

- Summary of the accident including its suspected cause and the time it occurred;
- Summary of what is being done for the victim(s);
- Depending on severity of the accident you may want to suggest helicopter transport, or meeting the ambulance somewhere along the transport route;
- Do not hang up until the other party has done so.

5. ***APPLY EMERGENCY FIRST AID IF TRAINED:*** Remove injured party from contaminated or other unsafe zone, per OSHA HAZAWOPER guidelines. Ensure breathing, heartbeat, and reduce immediate threat to life.

EMERGENCY PROCEDURES - SECONDARY

1. Transport to hospital if possible, otherwise call ambulance (911).

2. Notify CES and USFS Project Manager and other key personnel.

3. Complete written accident/incident report using attached form. Send copies to CES Project Manager, Operations Manager (Health and Safety Advisor), and Human Resources.

HOSPITAL ROUTE: to Pioneer Memorial Hospital, 1201 N. Elm Street, Prinville, Oregon (refer to Attached Map):

Take Forest Service Road (FS) 42 (Canyon Creek Road) approximately 10 miles to where it converges with Ochoco Creek Road. Follow Ochoco Creek Road approximately 7 miles. Turn left onto Highway 26 (Ochoco Highway). Follow Highway 26 to Prineville, approximately 16 miles. Highway 26 is called E. 3rd Street in Prineville. Follow E. 3rd Street/Highway 26 to N. Elm Street. Turn right onto N. Elm Street and follow hospital signs.

Information will not be released under any circumstances to parties other than those listed above or bonafide emergency response facilities. The SSO MUST NOTIFY OR-OSHA by Phone WITHIN 8 HOURS in the Event of DEATH or CATASTROPHE (an accident in which five or more site workers seek or are sent to medical attention) at the Work Site. SSO MUST notify OR-OSHA by phone within 24 hours in the event of ANY accidents or injuries resulting in a hospital admission with medical treatment other than first aid. OR-OSHA Office: 1-800-922-2689.

III. PROJECT DESCRIPTION

	TYPE	DATE	X	TYPE	DATE
X	Soil Sampling	Summer 2004		Geophysical Survey	
	GW Sampling		X	Site Visit	Various
X	Sf. Water Sampling	Spring 2004 – on		Drum Sampling	
X	Sediment Sampling	Spring 2004 – on	X	Surveying	Fall 2004
X	Air Sampling	Summer 2004	X	Excavation	Summer 2004
	Drilling		X	Building Demolition	Summer 2004
	Compliance Audit				

Status of Site: Active _____ Inactive ___**X**_____ Prevailing Wind Direction ___**varies**_

A Site Description/History

Refer to Site Inspection and Engineering Evaluation / Cost Analysis (EECA) for history of the Site.

IV. HAZARDS

A. Potential Chemical Hazards

The following potential chemical hazards may exist in soils or building materials at the Site. Specific hazards include skin contact and inhalation with soil or tailings containing heavy metals, exposure to acid drainage, accidents with acid preservatives, and physical hazards from topography and structures. As outlined in the EECA, the primary compounds of concern at the Site include arsenic and mercury, and are further discussed in the following sections.

Arsenic: the OSHA PEL-TWA is 0.01 mg/m^3. Arsenic is a known carcinogen that has been shown to cause skin and lung cancer. It also may damage a developing fetus and should be handled as a teratogenic agent (causing developmental malformations). Oral exposure to inorganic arsenic can cause digestive tract pain, nausea, vomiting, diarrhea, decreased production of red and white blood cells, abnormal heart function, blood vessel damage, liver and/or kidney injury, and impaired nerve function, causing a "pins and needles" effect in the feet and hands. Skin contact with arsenic can cause burning, itching and a rash. Breathing arsenic can irritate the nose and throat; eye contact can cause red, watery eyes and irritation. Long-term exposure can cause an ulcer or hole in the "bone" dividing the inner nose, hoarseness, and sore eyes.

Mercury: TLV-TWA is 0.025 mg/m^3. Mercury, in both inorganic and organic forms, is toxic to humans and can cause death. The organic forms of mercury such as methylmercuric chloride and phenylmercuric acetate have been found to be more toxic than inorganic forms such as mercuric chloride. More severe effects on developing nervous systems are generally observed following exposure to organic mercury. Deaths have been reported following acute exposure to high

unspecified concentrations of metallic mercury vapor caused by a loss of respiratory function as a result of severe pulmonary tissue damage. Oral ingestion of single doses of mercuric chloride has led to poisoning and death caused by shock, cardiovascular collapse, acute renal failure, and severe gastrointestinal damage. Long-term exposure to either organic or inorganic mercury can irreversibly damage the brain, kidneys, or developing fetuses. The form of mercury and the way humans are exposed to it influence which of these health effects will be more severe.

The Amity-Blue Ridge Site has no airborne contaminant concentration data available to compare to TLV or OSHA-PEL TWAs. The information on TWA can be used to rank the relative toxicity of the compounds. The symptoms of exposure can be used as indicators to receive medical monitoring beyond the annual physical.

WASTE MATERIAL	LEVEL: Soil	OSHA PEL or TLV*	I.P.	RISK
Arsenic	<3,400 mg/kg	0.01 mg/m^3		Moderate
Mercury	<258,000 mg/kg	0.025 mg/m^3		Low

NOTES:

1. *The TLV (Threshold Limit Value) from the American Council of Governmental Industrial Hygienists is listed, unless the PEL (Permissible Exposure Limit) designated by OR-OSHA or the National Institute of Occupational Safety and Health (NIOSH) is lower.
2. Hazardous substance information sheets for these constituents are attached.

Other Hazard Information: Oxygen depletion (y / n)**: *N***
Explosion Hazard (y / n): ***N***
LEL (y / n): ***N***
Other Recognition Properties (odor, color, etc.)

B. Potential Physical and Biological Hazards

The remoteness of the Site presents a significant physical hazard. The nearest emergency facility is over 25 miles away. Minor incidents can become major accidents due to the lack of local facilities. Extra caution must be exercised by all personnel.

Physical hazards known or expected to be present on the site.

HAZARD	YES	NO	HAZARD	YES	NO
Overhead Power Lines		X	Heavy Equipment	X	
Buried Conduit		X	Pitch Points on Rig	X	
Uneven Ground	X		Insects/Snakes	X	
Steep Slopes	X		Ice		X
Slippery Conditions	X		High/Low Temperatures	X	
Rain	X		Rodent Nests/Droppings	X	
Confined Space Hazard		X	Potential adit collapse		X
Fall hazards	X		Ticks	X	

Hantavirus

It is remotely possible, though unlikely, that the Hantavirus may exist at the Site.

The Hantavirus is a deadly, airborne virus that is spread through the urine and feces of infected rodents. Thus far, the virus has only been associated with the following rodents: the deer mouse, cotton rat, rice rat, and the white-footed mouse. A person is infected with the virus by breathing in particles released into the air when infected rodents, or their nests or droppings, are disturbed. This can happen when a worker disturbs rodent nests or burrows, or when cleaning buildings where rodents have made a home. Rodent nests and droppings were noted in the old buildings planned for demolition at the Site. The virus will die quickly when exposed to sunlight.

The Hantavirus was first recognized as a unique health hazard in 1993, with 158 cases reported as of March 17, 1997. Outbreaks have been principally limited to the Four Corners region of Arizona, New Mexico, Utah, and Colorado. There have been no reported exposures to the Hantavirus in Oregon. The virus is most active when the temperature is between 45 and 72 degrees Fahrenheit.

Symptoms of Hantavirus Pulmonary Syndrome include: fever and muscle aches, chills, nausea, vomiting, diarrhea, abdominal pain, and/or dry, non-productive cough.

The principal exposure route of the Hantavirus is through inhalation of dried rodent urine and feces adhering to dust and soil particles.

The risk of exposure to the Hantavirus during excavation and demolition activities at the Site is low.

V. ORGANIZATION & RESPONSIBILITIES

A. Personnel

The following personnel are designated to carry out job functions on the site. Their responsibilities (i.e., field team leader, etc.) and the tasks they will be carrying out on the site are listed. All CES and subcontractor site workers performing invasive activities are required to meet the OR-OSHA training requirements outlined in Hazardous Waste Operations and Emergency Response (29 CFR 1910.120) and will be First Aid / CPR trained.

CES/USFS WORK PARTY	RESPONSIBILITY & TASKS
Dustin Wasley	Project Manager / Engineer of Record / Site Safety Officer (SSO)
Dennis Boles	Contracting Officers Representative / On-scene coordinator (OSC)
Subcontractor	Harley Meservey (Munitor Construction)
John Martin	Corporate Safety Officer
Robert Coffan	Construction Oversight
MaryAnn Amann, Ryan Tobias	Aquatic Sampling Team / SSO for aquatic sampling
Jay Williams, John Wells	Engineering Support

SUBCONTRACTOR WORK PARTY (NAME AND COMPANY)	RESPONSIBILITY	H/S INFO* ON FILE? (y/n)
Harley Meservey – Munitor Construction	Construction Manager	Yes
Munitor – laborers	Laborers	No
Munitor – laborers	Laborers	No

NOTES:
*****H/S Information includes Medical Monitoring; Health & Safety Training; and Respirator Qualified.

B. Work Zones

Excavation using heavy equipment will be conducted during this operation. These activities may require the establishment of specific work zones to avoid accidents and/or unauthorized entry. Two work zones are recommended for this operation: The Work Zone, or the Exclusion Zone (EZ); and the Support Zone (SZ). The EZ will be the area immediately within and downwind of the tailings impoundment. Signs and caution tape will be placed around the EZ and along Trail 1880 to inform the public not to enter the EZ. The SZ will be located upwind and outside of the tailings impoundment. Exact boundaries will be decided on by the SSO in the field. The boundaries may be adjusted by the SSO as work progresses depending on local conditions (such as prevailing wind, visibility, dust, etc.). Any persons not directly associated with the construction activities, will not be allowed to enter the EZ without the expressed permission of the SSO.

Exit from the EZ into the SZ should be upwind, and over flat terrain, whenever possible. General access to the EZ by the public or other unauthorized visitors will be restricted. Due to the remoteness of the Site, fences and barricade tape will not be employed to mark the EZ.

C. Command Post

The command post/staging area will be established downgradient from the work areas. This location shall, if possible, be upwind from the EZs. The command post shall include, at a minimum, a transport vehicle, cell phone, expedition style first aid kit, eye wash station, food, water, blanket, extra Level C PPE, and a posted copy of this plan.

VI. PERSONAL PROTECTIVE EQUIPMENT

This section lists the equipment that must be present on the site and used during the specified protection level.

Modified Level C PPE is required at the Site for some of the work performed in the EZs. In this report, “Modified Level C” shall refer to Level D PPE, which may include the use of full-face or half-face air purifying respirators, and possibly the use of other protective clothing. The actual modifications to be employed will be set on-site by the SSO, and will be based on the assessment of Site conditions as work progresses. All personnel at the Site will attend daily health and safety “tailgate” meetings to be held by the SSO.

A. Respirators

As discussed in the potential hazards section above (Section IV), the inhalation of particulates presents a significant migration pathway for potential hazards at the site. Specifically, workers may be exposed to arsenic and mercury-laden dust during excavation. Therefore, the proper use of air-purifying respirators is very important.

Each worker shall submit written proof that a medical evaluation was performed stating that the worker is capable of working with a respirator, and a qualitative or quantitative fit test showing passing results for the respirator the worker is using at the Site (OSHA 1910.134 Respiratory Protection Standard). N-Series, R-series, or P-series filter cartridges may be used with the respirator as long as the minimum efficiency of the cartridge is 99% or greater.

The following table is a checklist to be used when preparing for the field. Equipment that must be present on the site is marked with an **R; O** = Optional equipment. Optional items depend on site activities and existing/potential hazards. Subcontractors must have the same equipment listed here as a minimum.

DESCRIPTION	LEVEL OF PROTECTION							
	A		B		C		D	
	R/O	X	R/O	X	R/O	X	R/O	X
Respiratory								
Positive Pressure, full-face SCBA, or Positive Pressure Supplied Air Respirator with escape SCBA (NIOSH approved)	R		R					
Full-face or half-mask, air purifying respirator (NIOSH approved)					R	X		
Other (dust protection):						X		
Totally Encapsulating Chemical-Protective Suit	R							
Disposable protective suit, gloves, and boots (depending on suit construction, may be worn over totally-encapsulating suit)	R							
Coveralls	O		O		O	X	R	X
Long Underwear	O							
Hooded Chemical-Resistant Clothes:								
Overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls			R					
Overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls					R	X		
Other (types: tyvek; saranex; splash apron):								
Hands								
Gloves, outer, chemical-resistant	R		R		R	X	O	X
Gloves, inner, chemical-resistant	R		R		O	X		
Other (types: latex; nitrile rubber; natural rubber; etc.):								
Feet								
Boots, chemical-resistant, steel toe and shank	R		R		R	X	R	X
Boot covers, outer, chemical-resistant (disposable)	O		O		O	X	O	X
Other (rubber, chemical-resistant boots):								
Head								
Hard Hat (under suit for Level A)	R		R		R	X	R	X
Other (head warmer):								
Eyes & Face								
Safety Glasses or Chemical Splash Goggles					R	X	R	X
Face Shield					O		O	
Escape Mask					O		O	
Other:								
Ears								

DESCRIPTION	LEVEL OF PROTECTION							
	A		B		C		D	
	R/O	X	R/O	X	R/O	X	R/O	X
Ear Plugs	O		O		O	X	O	X
Ear Phones	O		O		O		O	
Other:								
Other Supplies								
First Aid Kit	R		R		R	X	R	X
Fire Extinguisher	R		R		R	X	R	X
Mobile Phone	R		R		R	X	R	X
Two-Way Radio	O		O		O			
Gator Aid / Water	O		O		R	X	R	X
Eye Wash Station	O		O		R	X	R	X
Wash & Dry Towelets	O		O		R	X	R	X
Other:								

NOTE:
Level A – To be selected when the greatest level of skin, respiratory, and eye protection is required.
Level B – The highest level of respiratory protection is necessary, but a lesser level of skin protection is needed.
Level C – The concentrations(s) and type(s) of airborne substance(s) is known and the criteria for using air-purifying respirators are met.
Level D – A work uniform affording minimal protection, used for nuisance contamination only.
Reassessment of Protection Program – The SSO may upgrade or downgrade the Level of Protection provided by PPE upon a change in site conditions or findings of subsurface investigations.

VII. MONITORING PROGRAM

Both *direct-reading instruments* and *passive air monitoring* may be employed during all phases of Site activities to estimate worker exposure at the Site.

> *Monitoring equipment will not be relied upon to assess suspended dust while working during excavation. Half-face or full-face respirators will always be employed by individuals working in the excavation zone at the Site. The respirators will be equipped with HEPA filters. Air monitoring may indicate the need for donning other PPE, however. The Onsite Safety Officer reserves the right to change the PPE following discussion with the Onsite Project manager.*

A. Air Monitoring

Sample pump air monitoring methods may be employed to monitor employee exposure to airborne contaminants, specifically airborne arsenic and mercury in dust, at the Site. Air monitoring can be achieved by collecting air samples using a sampling device attached to a worker for a specified amount of time (4 to 8 hours) during typical field activities that are *not* related to excavation. This will be performed prior to commencement of major field activities. The time-weighted average results will be used to assess the need for PPE or other actions in order to protect workers.

It will be assumed that permissible exposure limits may be reached during excavation. Therefore, workers will already be utilizing appropriate PPE. Air sampling may also be performed during excavation.

B. Action Levels

The following table specifies the monitoring equipment to be used on site and the action levels to upgrade to higher levels of personal protection.

MONITORING EQUIPMENT	MONITORING INTERVAL	ACTION LEVEL		
		D to C	C to B	Stop Work (IDLH*)
Air Sampling Device	4-8 hours	0.01 mg/m3 (As)	NA	5 mg/m3 (As)

*IDLH – Immediately Dangerous to Life and Health

C. Corrective Measures

At the first sign of fugitive emissions, water will be applied using an atomized spray until visually damp. Special consideration will be given not to overwater the tailings. No ponding or runoff from the tailings will be allowed. Excessively wet tailings can cause equipment safety issues and could potentially jeopardize the reclamation.

VIII. DECONTAMINATION / DISPOSAL PROCEDURES

Extensive decontamination procedures have been determined to be unnecessary for this project. However, should comprehensive decontamination become necessary due to Personal Protection Level upgrade, the SSO will devise a decontamination plan according to the table. Level C decontamination protocol shall be used with the following decontamination stations:

LEVEL C DECONTAMINATION STEPS		LEVEL D DECONTAMINATION STEPS	
1	Equipment Drop	1	Equipment Drop
2	Outer Garment, Boots, and Glove Wash and Rinse	2	Glove and Boot Wash and Rinse
3	Disposable Garment, Boots, and Glove Removal	3	Disposable Garment, Outer Boot and Glove Removal
4	Cartridge Change (if necessary)	4	Field Wash
5	Remove Respiratory Protection		
6	Field Wash		

The following decontamination equipment is required at the construction site.

DECONTAMINATION EQUIPMENT CHECKLIST			
X	Scrub Brushes	X	Garbage Bags
X	Waste Containers	X	Paper Towels
X	Soap		Isopropyl Alcohol
	Plastic Tubs		Pump Spray Bottles
X	Plastic Drop Cloths	X	Pump Spray Bottles (water)

Disposition of Decontamination Wastes

All equipment and liquids used for decontamination shall be decontaminated or disposed properly according to local, state and federal regulations. Commercial laundries or cleaning establishments that clean protective clothing or equipment shall be informed of the potentially harmful effects of exposures.

IX. COMMUNICATION PROCEDURES

Site workers will team with at least one other worker and operate on the buddy system at all times that work is being conducted anywhere on Site.

Three (3) horn blasts (siren, etc.) are the emergency signal to indicate that all personnel should leave the EZ.

The following standard hand signals will be used in case of failure of radio communications:

Hand gripping throat . . . . Out of air, can't breathe
Grip partner's wrist . . . . Leave area immediately
Both hands around waist . . . . . Leave area immediately
Hands on top of head . . . . . Need assistance
Thumbs up . . . . . OK, I am all right, I understand
Thumbs down . . . . . No, negative

X. EMERGENCY RESPONSE PLAN

For immediate emergency response, follow the steps outlined on page 3 of this plan.

It is not anticipated that the operations for this project will involve hazards that could necessitate instituting emergency response measures. However, should conditions change and an emergency response is warranted, the SSO will assume command unless and until superseded by police, fire or other emergency officials and follow OR-OSHA requirements. The priority of objectives in an emergency situation should be as follows: protection of personnel health and safety; protection of public safety; protection of environment; and protection of property.

Personnel Injury in the SZ. Upon notification of an injury in the SZ, the Project Team Leader and SSO will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with appropriate onsite first-aid and necessary follow-up as stated above. If the injury increases the risk to others, the designated emergency horn blasts or hand held siren signal shall be sounded and site personnel shall move to the decontamination line for further instruction. Activities onsite will stop until the added risk is removed or minimized.

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed.
3. The Site Safety Plan has been reviewed.
4. Site personnel have been briefed on any changes in the Site Safety Plan.

The SSO or specified alternate must complete the Accident Report Form, attached in Appendix B, in the event of any accident or incident on the site. Copies should be given to the Project Manager and the CES Operations Manager.

XI. MEDICAL SURVEILLANCE

All employees at this site are subject to the strict medical surveillance requirements for hazardous site workers as outlined in 29 CFR 1910.120. Copies of evidence of a current physical exam for personnel are maintained at the offices of CES and available on request.

XII. CONFINED SPACE ENTRY

Confined space entry is not anticipated to be a part of this project. Workers will not enter any confined space without notification and approval by the Project Manager and the CES Regional Manager. Any confined space entry must be performed in strict accordance with OR-OSHA Confined Space Entry requirements.

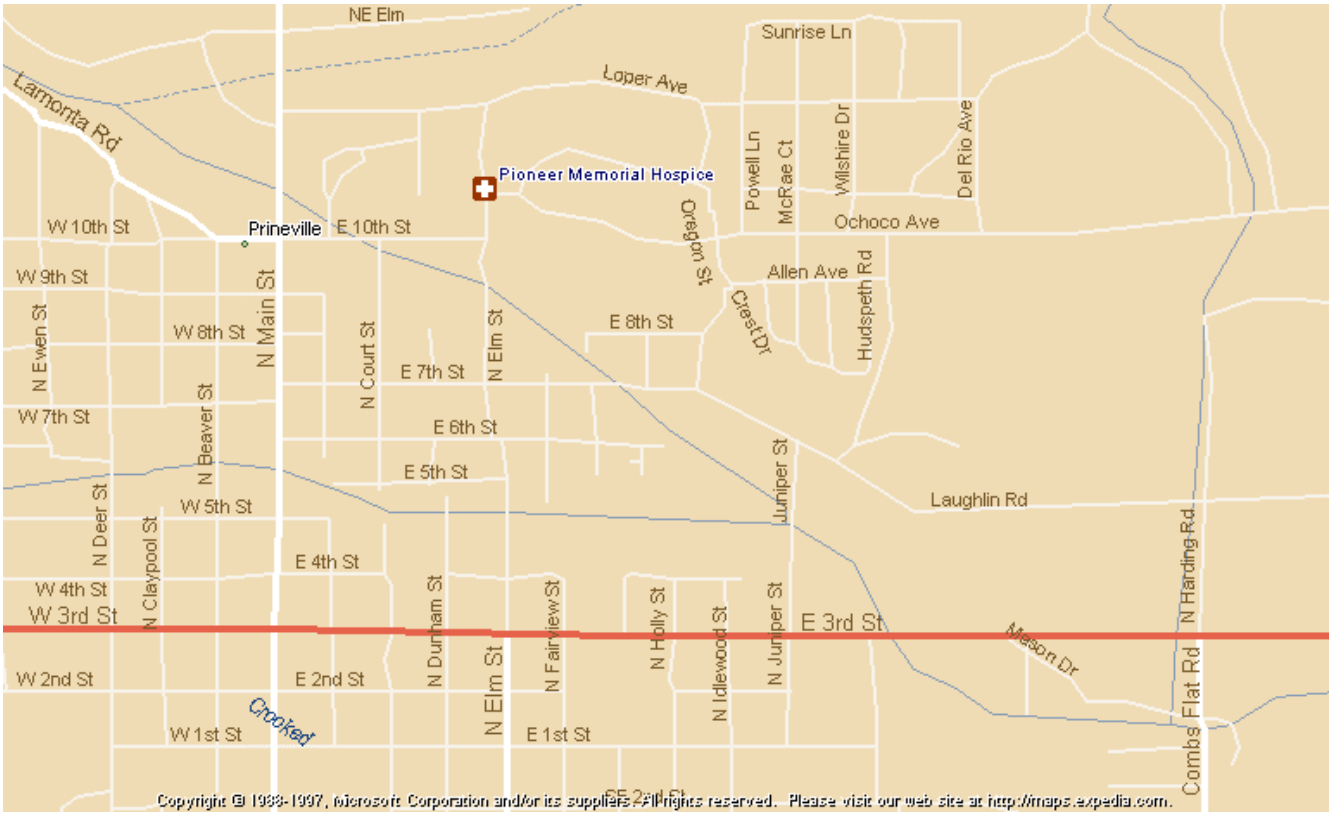
XIII. SPILL CONTAINMENT

Spills of hazardous materials are not anticipated to be a part of this project. If a spill occurs, workers are required to follow the OR-OSHA requirements for spill containment as outlined in 29 CFR 1910.120.

* * * * * * * * * *

A copy of the Site Safety Plan will be posted, or made available at the Command Post to onsite personnel and regulatory officers.

HOSPITAL ROUTE MAP



Hospital: Pioneer Memorial Hospital
1201 N. Elm Street
Prineville, OR 97754
Phone: (541) 447-6254
Emergencies: 911

Directions from Site:

Take Forest Service Road (FS) 42 (Canyon Creek Road) approximately 10 miles to where it converges with Ochoco Creek Road. Follow Ochoco Creek Road approximately 7 miles. Turn left onto Highway 26 (Ochoco Highway). Follow Highway 26 to Prineville, approximately 16 miles. Highway 26 is called E. 3rd Street in Prineville. Follow E. 3rd Street/Highway 26 to N. Elm Street. Turn right onto N. Elm Street and follow hospital signs.

ACCIDENT / INCIDENT REPORT FORM

ACCIDENT/INCIDENT REPORT FORM

(Use additional page if necessary)

Date: _____ Time: _____ Page _____ of _____

Name: _____ Employer: _____

Site Name and Location: _____

_____

Nature of Illness/Injury: _____

_____

_____

Symptoms: _____

_____

Action Taken: Air and Rest _____ First Aid _____ Medical _____

Transported by: _____

Witnessed by: _____

Facility Treating (Hospital's name): _____

Treatment: _____

_____

What was the person doing at the time of the accident/incident: _____

_____

_____

Personal Protection Equipment Worn: _____

_____

Suspected Cause of Accident/Incident: _____

_____

_____

What Immediate action was taken to prevent recurrence: _____

_____

Additional Comments: _____

_____

Employee's Signature: _____ Date: _____

Supervisor's Signature: _____ Date: _____

Appendix B.

Drawings and Specifications

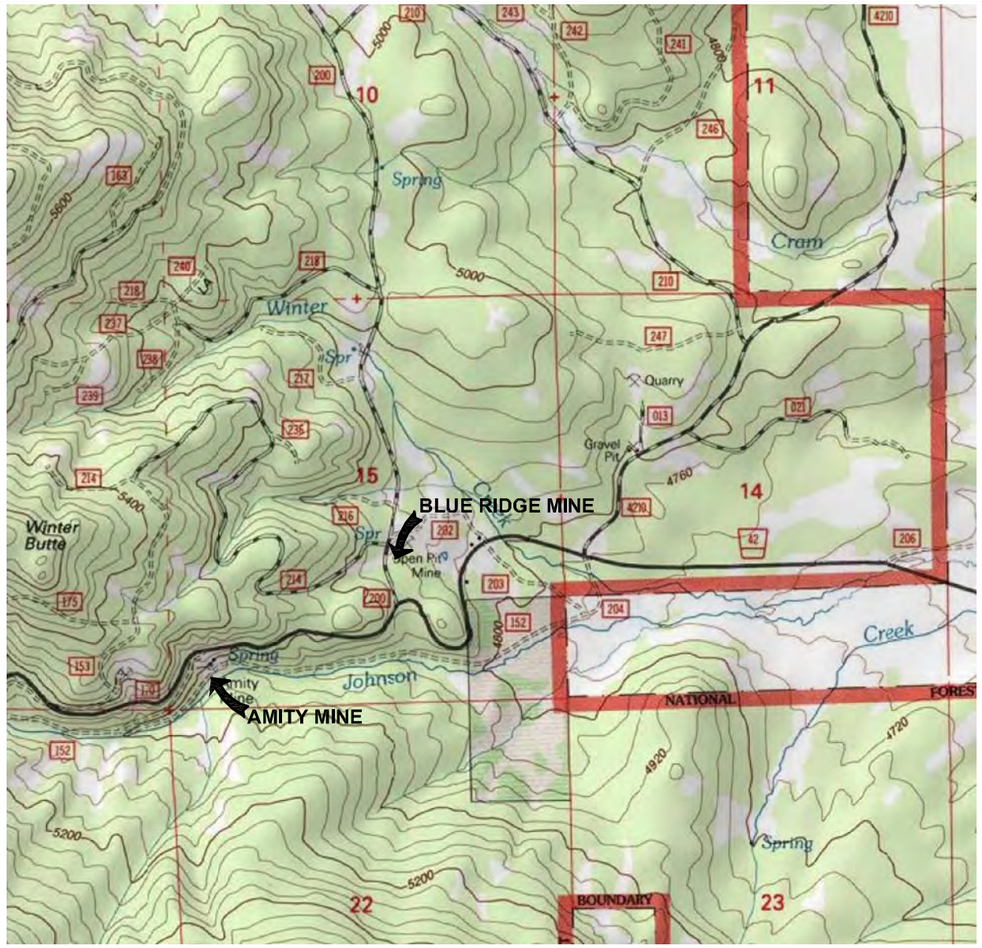
DRAWINGS

Sheet G1:	**Vicinity Map and Sheet Index**
Sheet C1:	**Amity Existing Grade Plan**
Sheet C2:	**Amity Finished Grade Plan**
Sheet C3:	**Amity Finished Grade and Existing Grade Cross Sections**
Sheet C4:	**Amity Drainage and Erosion Control Plan**
Sheet C5:	**Amity Mine and Johnson Creek Soil Bioengineering Sections**
Sheet C6:	**Blue Ridge Existing Grade Plan**
Sheet C7:	**Blue Ridge Repository Excavation and Finished Grade Plan**
Sheet C8:	**Blue Ridge Repository Profile and Cross Sections**
Sheet C9:	**Blue Ridge Final Grading Plan View**
Sheet C10:	**Blue Ridge Supplemental Details**
Sheet C11:	**Blue Ridge Rendered Repository**

AMITY - BLUE RIDGE REMOVAL ACTION

UNITED STATES FOREST SERVICE

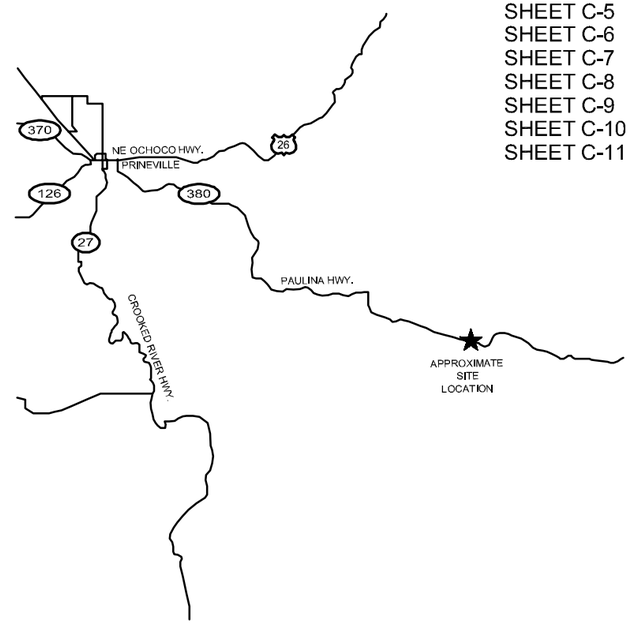
OCHOCO NATIONAL FOREST



SITE LOCATION

0 1000 FEET

SCALE



VICINITY MAP

0 10 MILES

SCALE

INDEX OF DRAWINGS

GENERAL

SHEET G-1 VICINITY MAP AND SHEET INDEX

CIVIL

SHEET C-1 AMITY EXISTING GRADE PLAN
SHEET C-2 AMITY FINISHED GRADE PLAN
SHEET C-3 AMITY FINISHED GRADE AND EXISTING GRADE CROSS SECTIONS
SHEET C-4 AMITY DRAINAGE AND EROSION CONTROL PLAN
SHEET C-5 AMITY MINE & JOHNSON CREEK SOIL BIOENGINEERING SECTIONS
SHEET C-6 BLUE RIDGE EXISTING GRADE PLAN
SHEET C-7 BLUE RIDGE REPOSITORY EXCAVATION AND FINISHED GRADE PLAN
SHEET C-8 BLUE RIDGE REPOSITORY PROFILE AND CROSS SECTIONS
SHEET C-9 BLUE RIDGE FINAL GRADING PLAN VIEW
SHEET C-10 SUPPLEMENTAL DETAILS
SHEET C-11 BLUE RIDGE RENDERED REPOSITORY

REGISTERED PROFESSIONAL ENGINEER 61208PE OREGON FEB 6 2001 DUSTIN G. WASLEY

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CHK. BY DGW
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VICINITY MAP AND SHEET INDEX

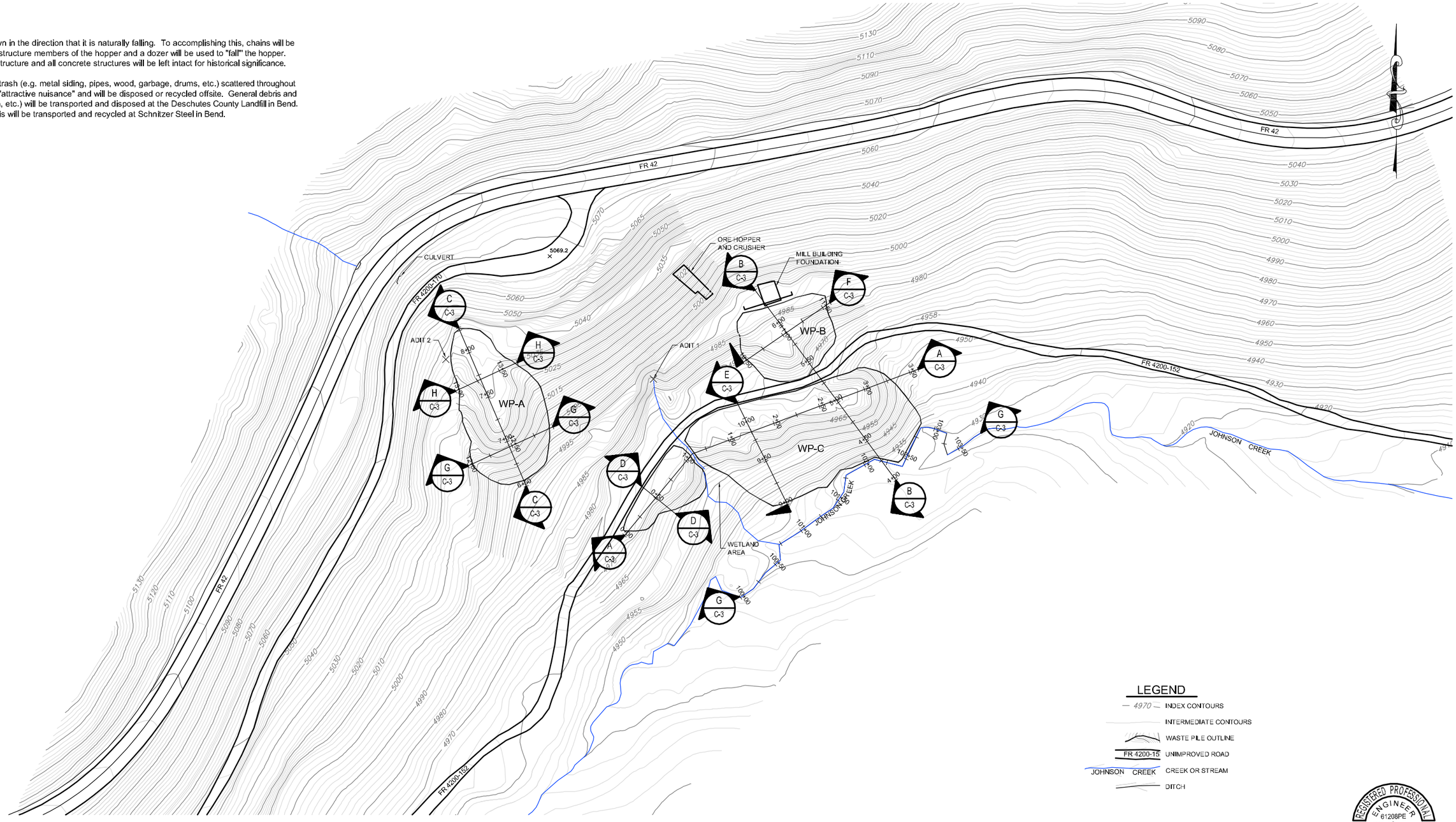
AMITY – BLUE RIDGE MINE REMOVAL ACTION / REMOVAL DESIGN

SHEET G-1

SPECIFICATIONS:

The Hopper will be pulled down in the direction that it is naturally falling. To accomplishing this, chains will be connected to the three lower structure members of the hopper and a dozer will be used to "fall" the hopper. The dilapidated wooden mill structure and all concrete structures will be left intact for historical significance.

All miscellaneous debris and trash (e.g. metal siding, pipes, wood, garbage, drums, etc.) scattered throughout the Site and representing an "attractive nuisance" and will be disposed or recycled offsite. General debris and trash (i.e., bricks, wood, trash, etc.) will be transported and disposed at the Deschutes County Landfill in Bend. All metal equipment and debris will be transported and recycled at Schnitzer Steel in Bend.



AMITY EXISTING SITE PLAN

0 50 100 FEET

SCALE

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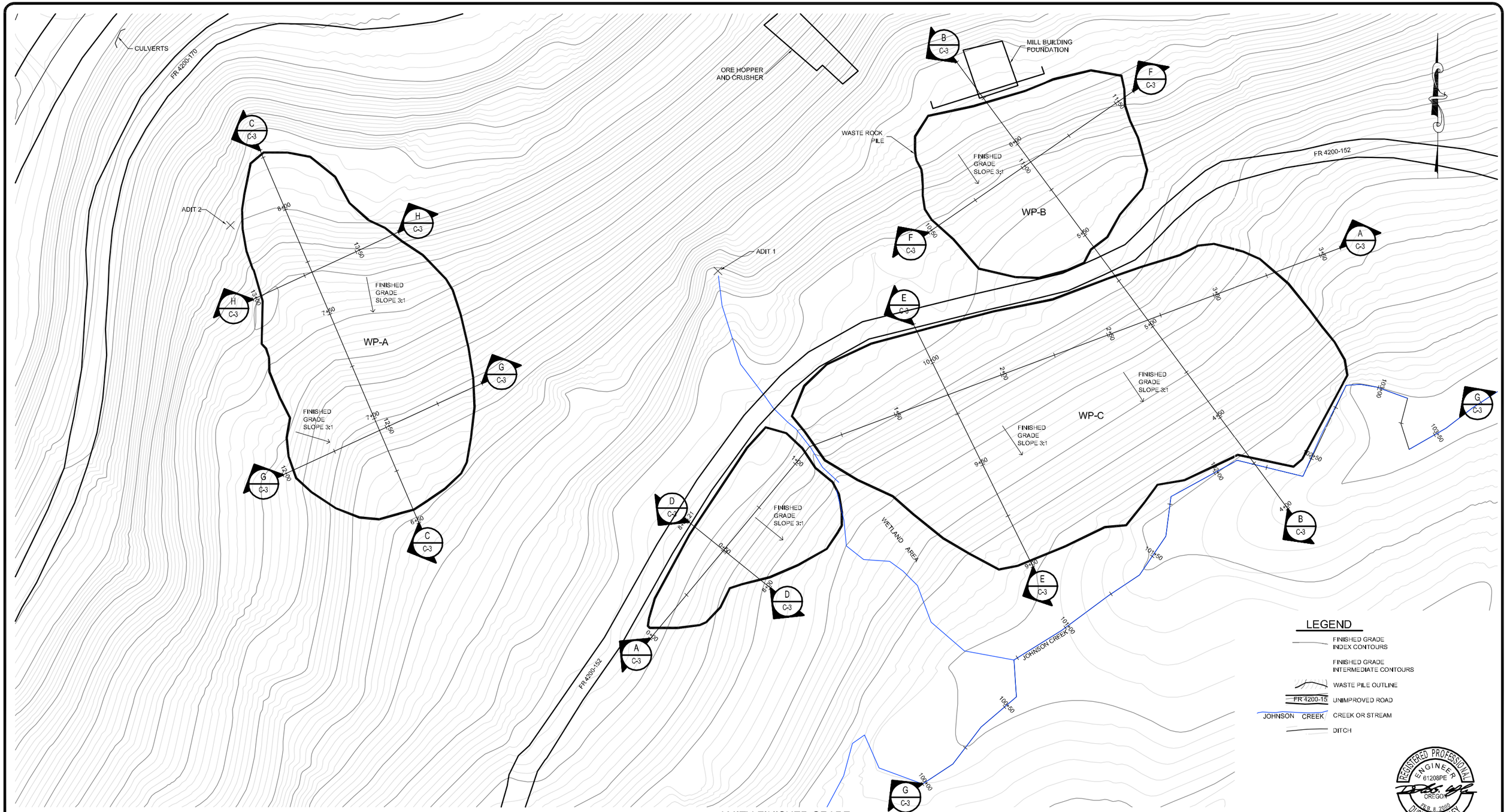
AMITY EXISTING GRADE PLAN

AMITY – BLUE RIDGE MINE REMOVAL ACTION / REMOVAL DESIGN

SHEET
C-1



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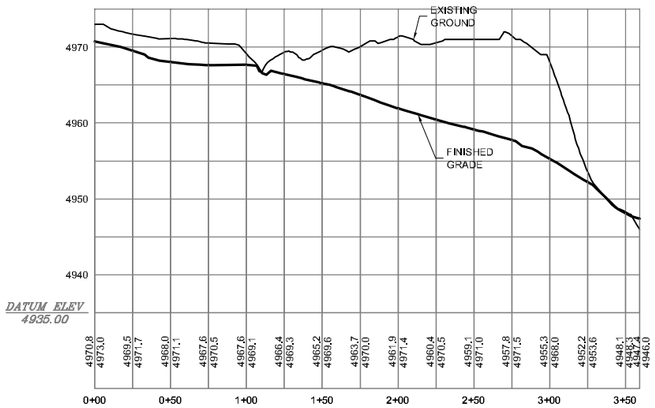
AMITY FINISHED GRADE PLAN

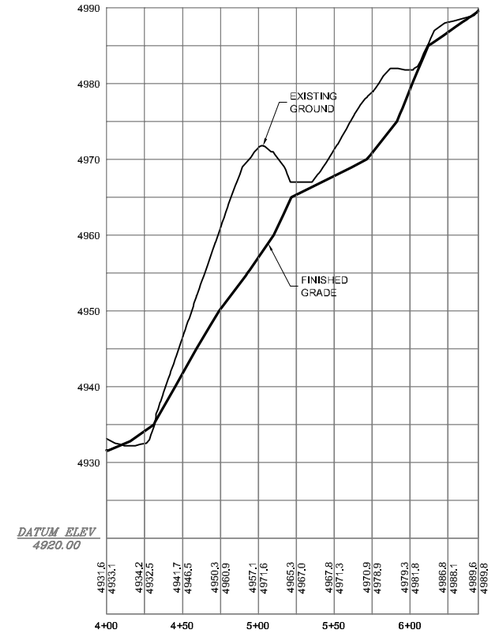
AMITY – BLUE RIDGE MINE REMOVAL ACTION / REMOVAL DESIGN

SHEET
C-2

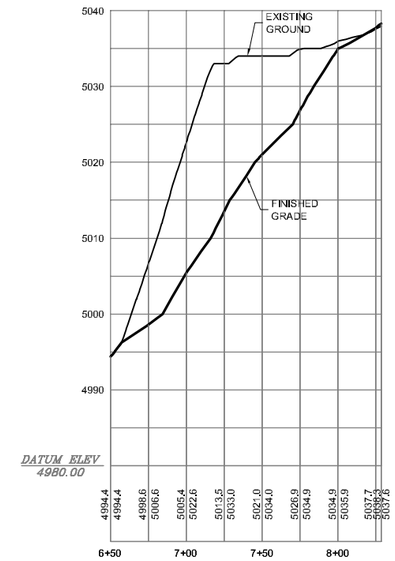
NOTE:
SECTIONS MAY NOT BE CUT PERPENDICULAR TO THE FINISHED GRADE SLOPE AND MAY NOT APPEAR TO BE 3:1 ON THIS SHEET. ALL FINISHED GRADES ARE TO BE SLOPED AT 3:1.



A C-1 SECTION A-A
0 50 100 FEET
SCALE
5X VERT. EXAG.



B C-1 SECTION B-B
0 50 100 FEET
SCALE
5X VERT. EXAG.



C C-1 SECTION C-C
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SCALE
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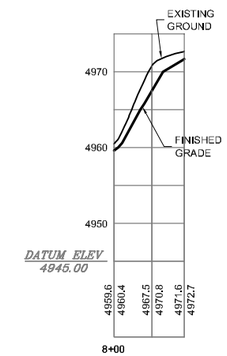

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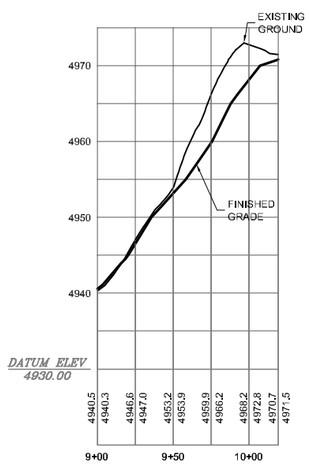

E C-1 SECTION E-E
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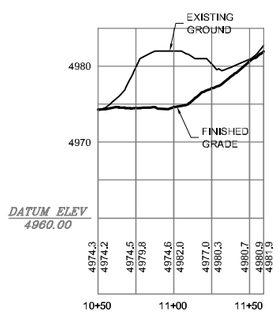
5X VERT. EXAG.



F C-1 SECTION F-F
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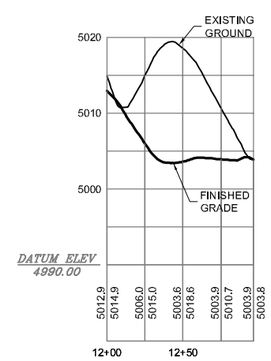
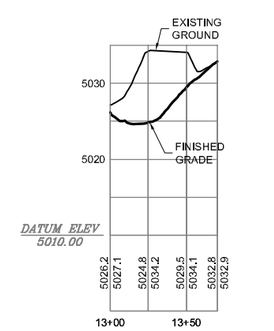
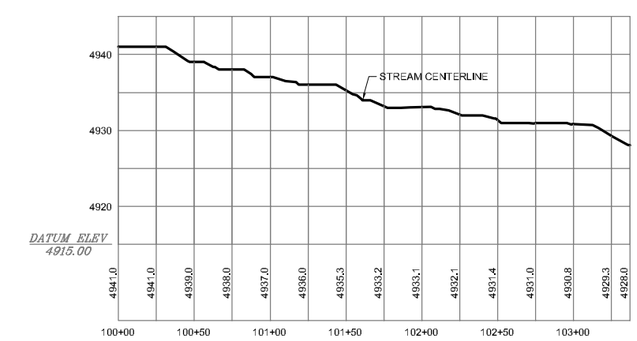
SCALE
5X VERT. EXAG.



G C-1 SECTION G-G
0 50 100 FEET
SCALE
5X VERT. EXAG.



H C-1 SECTION H-H
0 50 100 FEET
SCALE
5X VERT. EXAG.



G C-1 SECTION STREAM
0 50 100 FEET
SCALE
5X VERT. EXAG.

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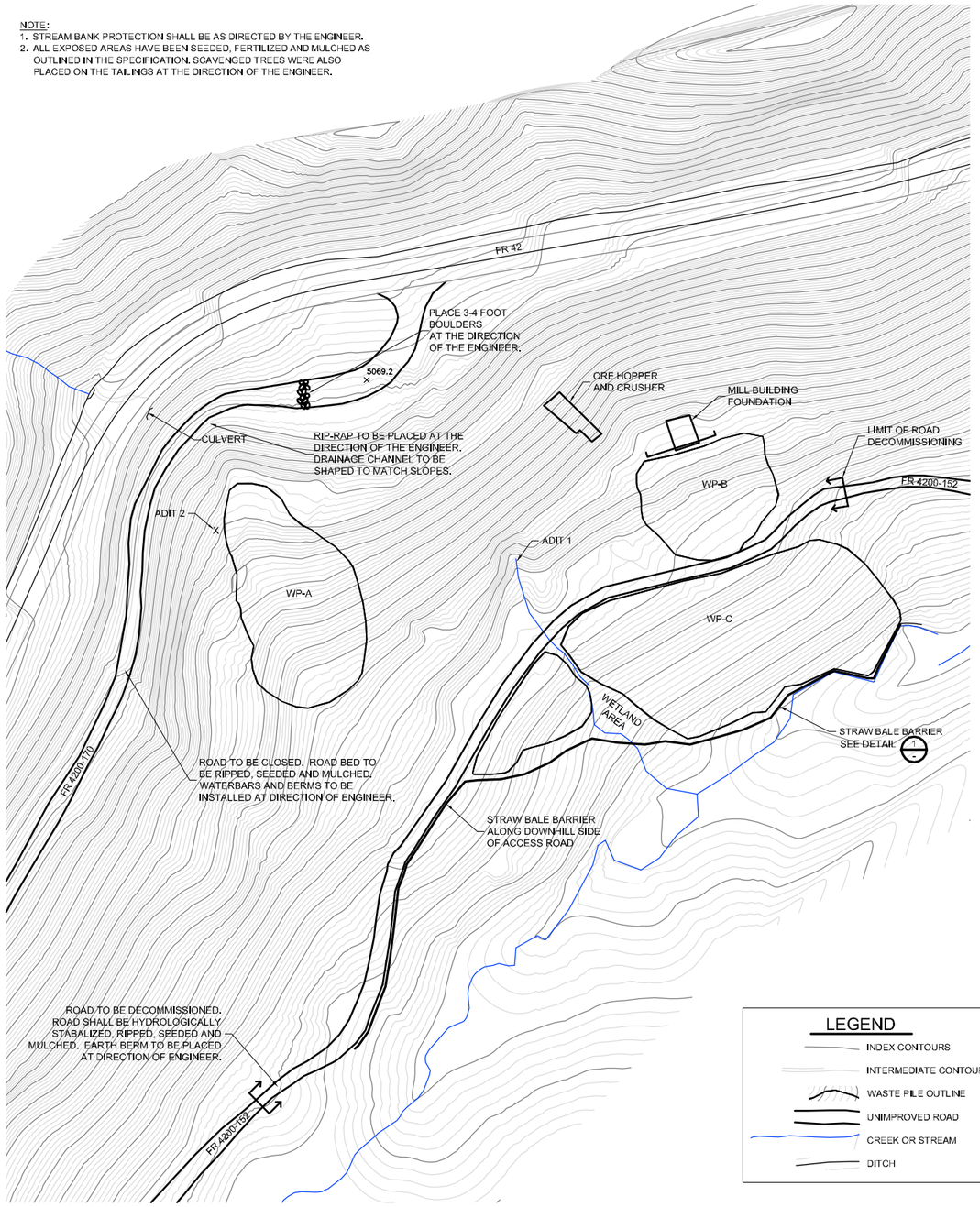
AMITY FINISHED GRADE AND EXISTING GRADE CROSS SECTIONS

AMITY – BLUE RIDGE MINE REMOVAL ACTION / REMOVAL DESIGN

SHEET
C-3

NOTE:
1. STREAM BANK PROTECTION SHALL BE AS DIRECTED BY THE ENGINEER.
2. ALL EXPOSED AREAS HAVE BEEN SEEDED, FERTILIZED AND MULCHED AS OUTLINED IN THE SPECIFICATION. SCAVENGED TREES WERE ALSO PLACED ON THE TAILINGS AT THE DIRECTION OF THE ENGINEER.

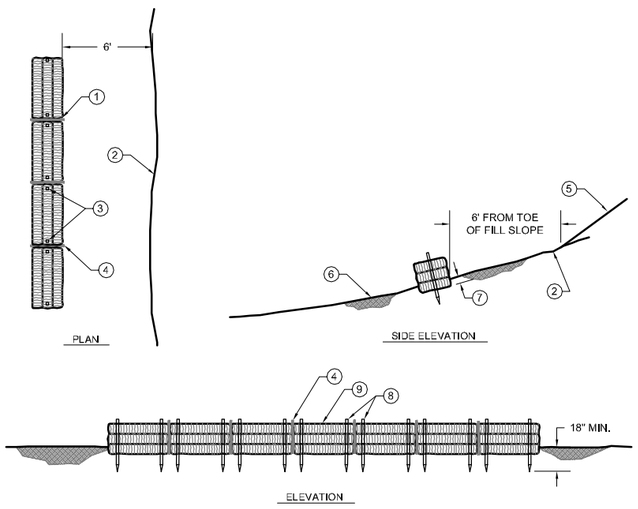


AMITY DRAINAGE PLAN

0 50 100 FEET
SCALE

KEYED NOTES:

1. PLACE BALES END TO END.
2. TOE OF SLOPE.
3. (2) STAKES PER BALE MIN. 2" x 2" x 3'.
4. TAMP LOOSE STRAW INTO JOINTS.
5. FILL SLOPE.
6. UNDISTURBED SLOPE.
7. PLACE BALES APPROXIMATELY 6" INTO THE GROUND.
8. DRIVE STAKE THROUGH EACH BALE AT BUTTED ENDS
9. STRAW BALES.



NOTES:
1. PLACE EROSION BARRIERS TO FOLLOW ALONG THE SLOPE CONTOUR. PLACE BALES WITH STRINGS ON SIDES TO PROLONG THE LIFE OF THE BARRIER. METAL POSTS MAY BE USED IN PLACE OF STAKES IN AREAS WHERE STAKES ARE UNSTABLE OR UNABLE TO BE DRIVEN.
2. MATERIAL COLLECTED BEHIND STRAW BALES TO BE REDEPOSITED IN REPOSITORY.

1 / - STRAW BALE BARRIER DETAILS
NOT TO SCALE

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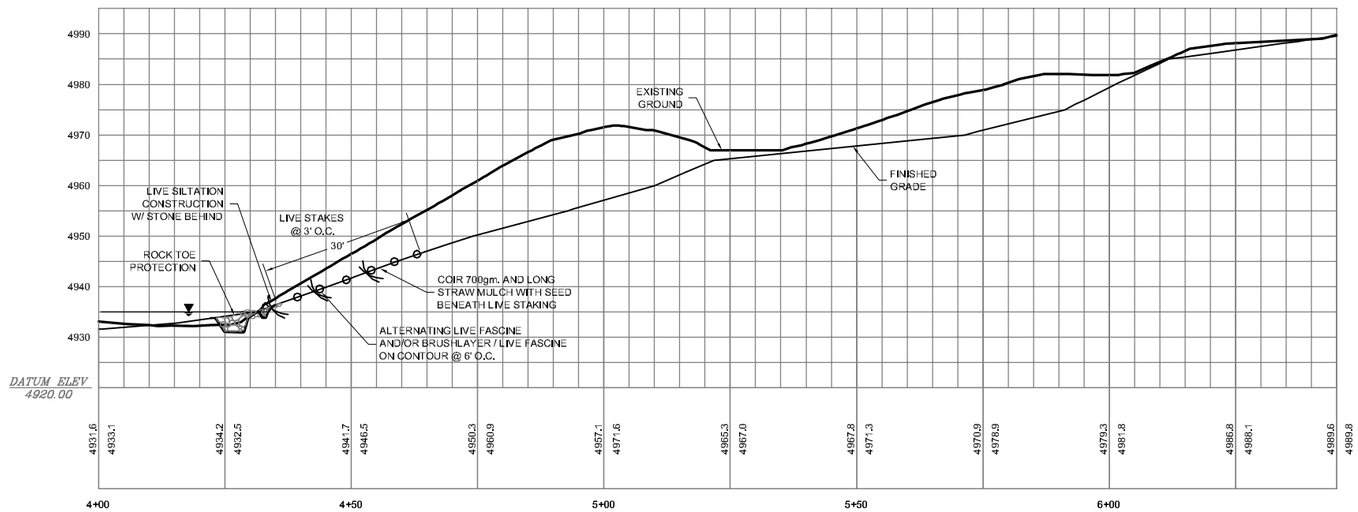
AMITY DRAINAGE & EROSION CONTROL PLAN

AMITY – BLUE RIDGE DESIGN/REMOVAL ACTION

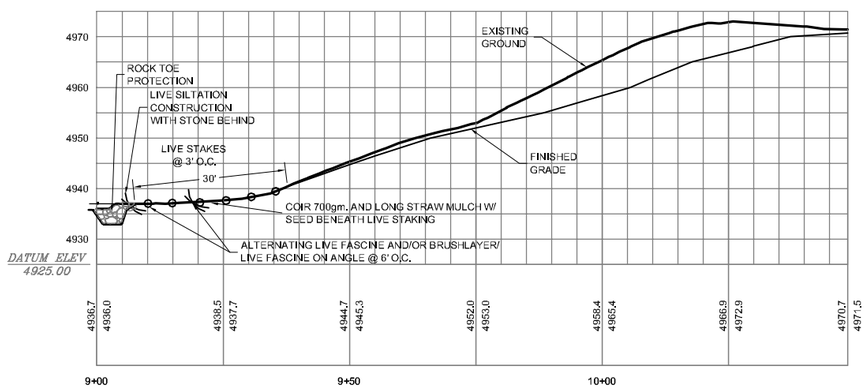
SHEET
C-4



B / C-1 SECTION B-B

0 — 30 FEET

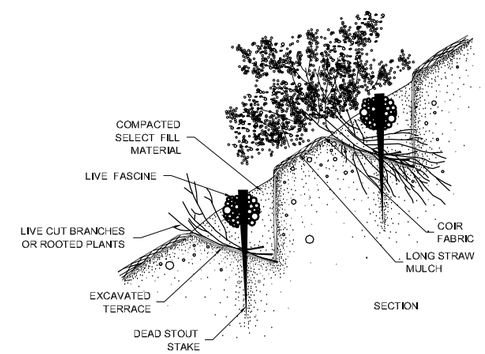
SCALE
1X VERT. EXAG.



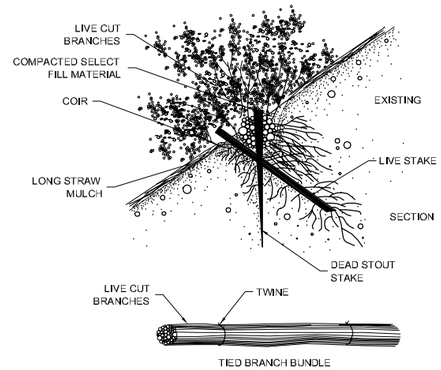
E / C-1 SECTION E-E

0 — 30 FEET

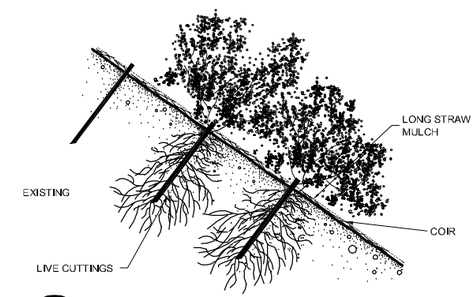
SCALE
1X VERT. EXAG.



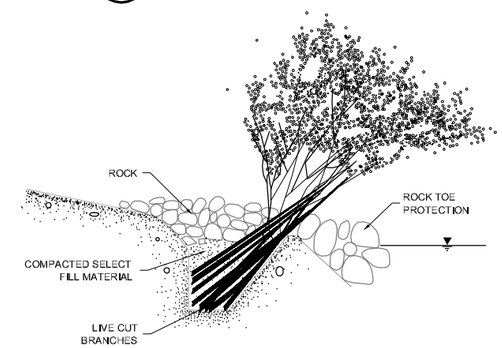
1 / - BRUSH LAYER / LIVE FASCINE W/ COIR & LONG STRAW MULCH
NOT TO SCALE



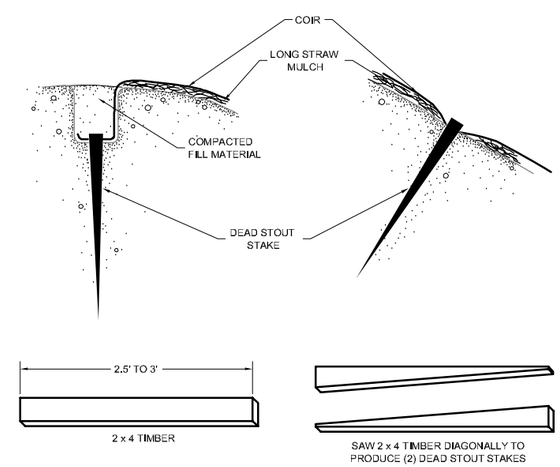
2 / - LIVE FASCINE W/ COIR & LONG STRAW MULCH
NOT TO SCALE



3 / - LIVE STAKE W/ LONG STRAW MULCH & COIR
NOT TO SCALE



4 / - LIVE SILTATION CONSTRUCTION W/ ROCK TOE
NOT TO SCALE



5 / - DEAD STOUT STAKE W/ COIR & LONG STRAW MULCH
NOT TO SCALE

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61208PE
OREGON
FEB. 8, 2000
DUSTIN G. WASLEY
Expires: 06/30/04

SOURCE:

SOIL BIOENGINEERING CONSULTANT

Robbin B. Sotir & Associates, Inc.
3602 Earnest W. Barrett Parkway, S.W.
Marietta, Georgia 30064

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AMITY MINE AND JOHNSON CREEK
SOIL BIOENGINEERING SECTIONS

AMITY – BLUE RIDGE MINE REMOVAL ACTION / REMOVAL DESIGN

SHEET
C-5

SPECIFICATIONS:

The Pantry/Root Cellar, Pump House Building, and the Retort portion of the Process Building will be dismantled and only the concrete shell will remain. All miscellaneous debris and trash (e.g. metal siding, pipes, wood, garbage, drums, etc.) scattered throughout the Site and representing an "attractive nuisance" and will be disposed or recycled offsite. General debris and trash (i.e., bricks, wood, trash, etc.) will be transported and disposed at the Deschutes County Landfill in Bend. All metal equipment and debris will be transported and recycled at Schnitzer Steel in Bend.

The main portion of the Process Building, the Bunkhouse, and the Hopper at the secondary processing area will be left intact for historical significance. All concrete foundations will be left as historic features. In addition, all dilapidated wood structures that have fallen over the years will be left intact and only trash and metal debris will be removed and disposed offsite.

The onsite water supply well will be abandoned per the OWRD requirements. A licensed well driller will conduct the abandonment work. The steel casing will be pulled from the ground using a large pump hoist if it is not cemented to the borehole. If cement is present between the steel casing and borehole, then the casing will be cut off approximately 1 to 2 feet below ground surface. The well will then be filled with a pressurized cement grout from the bottom of the well to the top of the cut casing using a tremie pipe. The remaining 1 to 2 feet of the former well will be backfilled with native soil from around the well.

The fuel tank will be excavated and disposed offsite in accordance with ODEQ requirements. Impacted soil will be will be disposed, along with the tank, at the Deschutes County Landfill. The excavations will be backfilled with non-impacted material scavenged from repository sub-grade or from around the Site and tamp compacted using the excavator bucket.

Following demolition of the Retort Building wood shell, asbestos containing material (ACM) within the Retort Building area will be removed and properly disposed. In addition, the remainder of the ACM scattered throughout the Site will be removed and properly disposed.

BLUE RIDGE PLAN

0 100 200 FEET

SCALE

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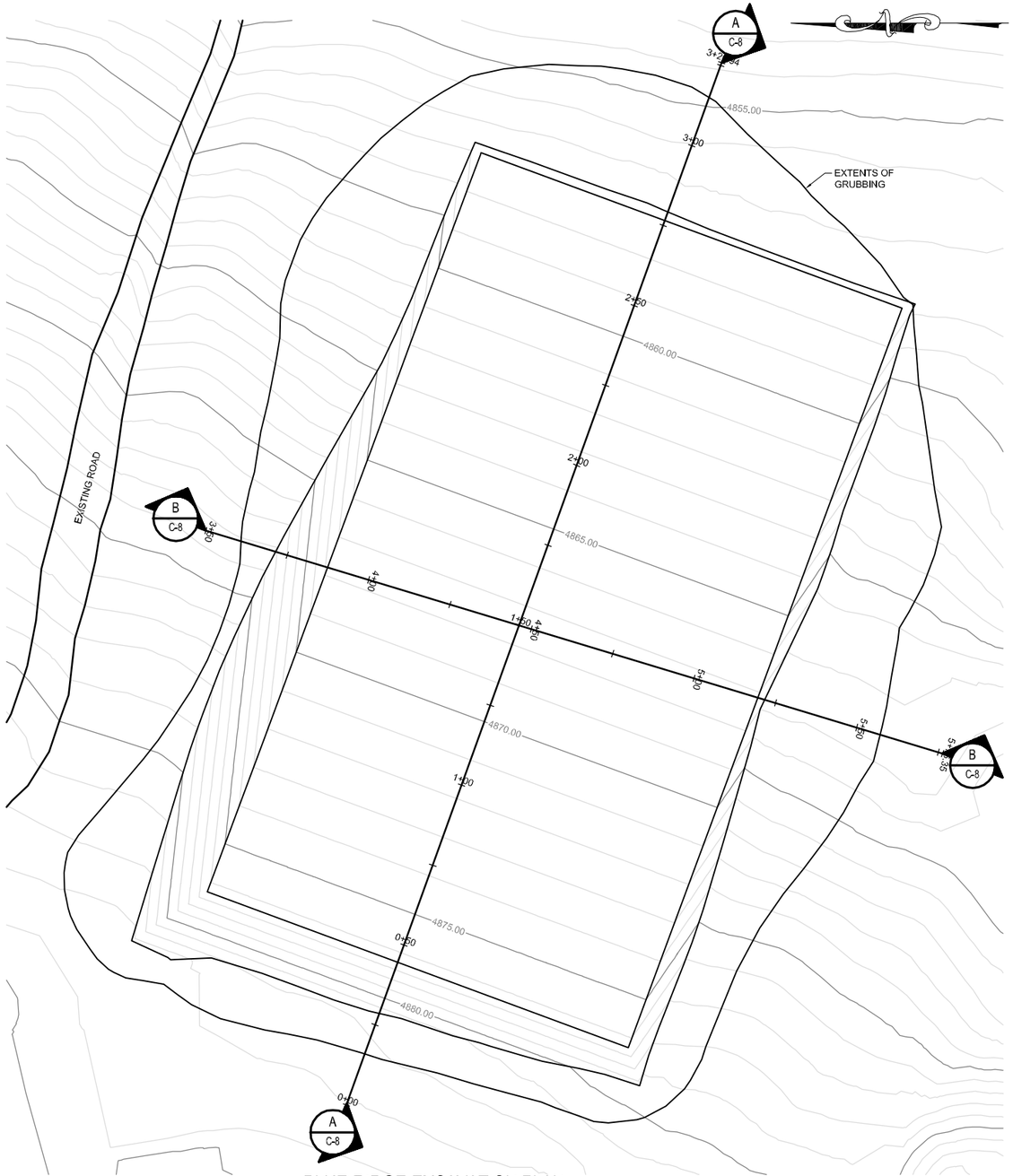
BLUE RIDGE EXISTING GRADE PLAN

AMITY – BLUE RIDGE MINE REMOVAL ACTION / REMOVAL DESIGN

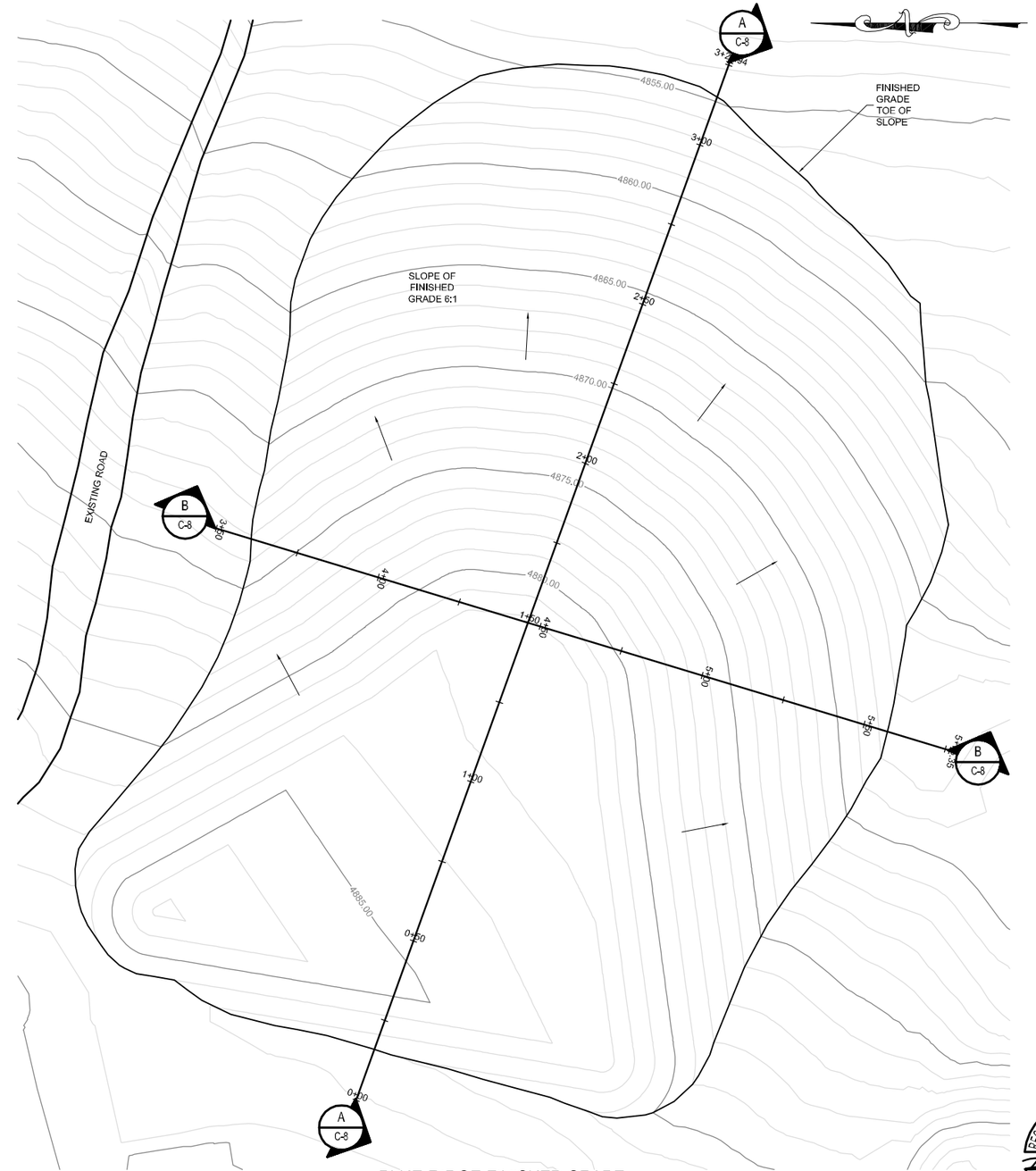
SHEET
C-6



BLUE RIDGE EXCAVATION PLAN

0 20 40 FEET

SCALE



BLUE RIDGE FINISHED GRADE

0 20 40 FEET

SCALE

REGISTERED PROFESSIONAL ENGINEER
61208PE
OREGON
FEB 8 2000
DUSTIN C. WASLEY
Expires: 06/30/04

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2323026C6,7,8.dwg DEO 5/17/04

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OCHOCO NATIONAL FOREST

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3	–	–	MO/DAY/YR
4	–	–	MO/DAY/YR
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DES. BY JHW
DRG. BY DEO
CHK. BY DGW
DATE CREATED 12/30/03
JOB No. 2323026

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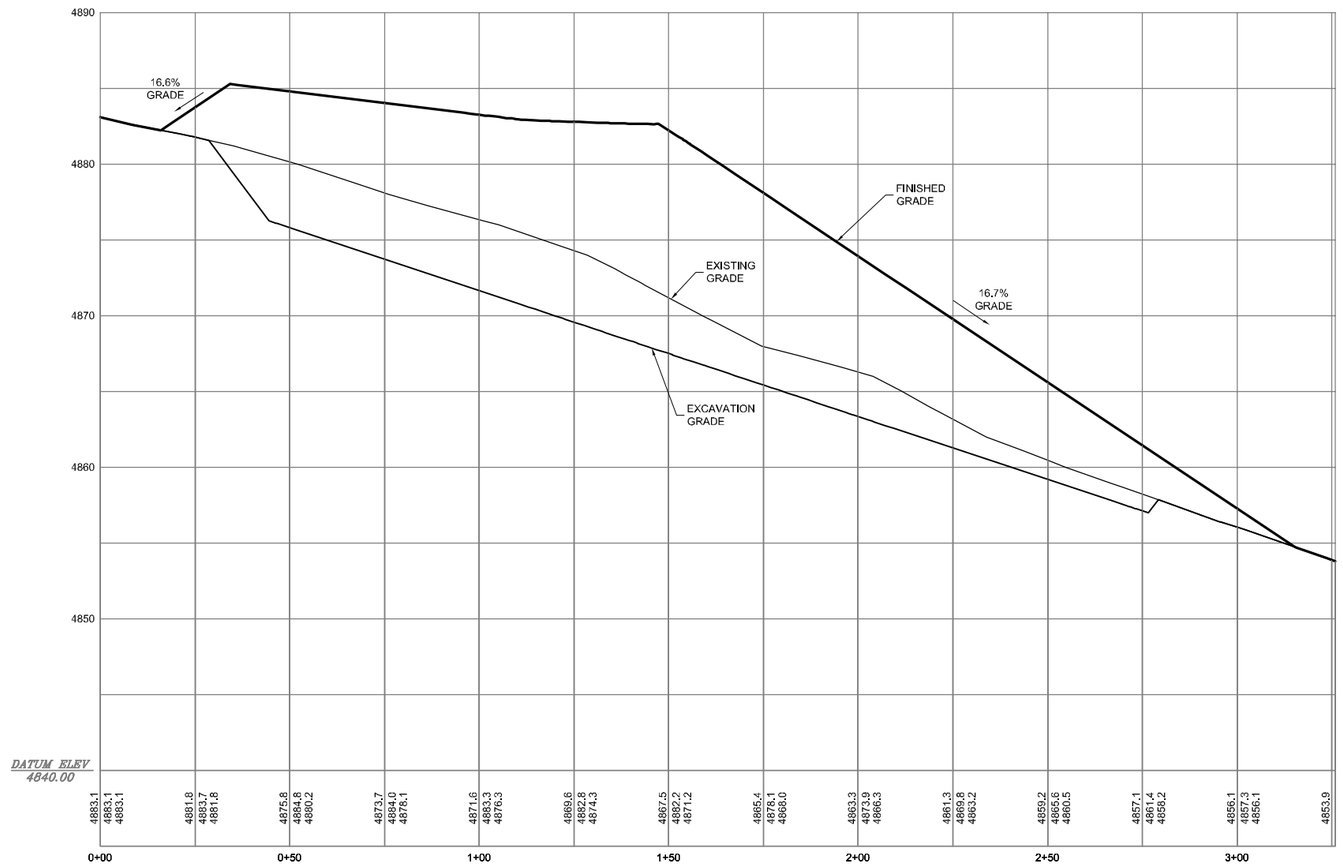
BLUE RIDGE REPOSITORY EXCAVATION AND FINISHED GRADE PLAN

AMITY – BLUE RIDGE MINE REMOVAL ACTION / REMOVAL DESIGN

SHEET
C-7



A C-7 SECTION A-A

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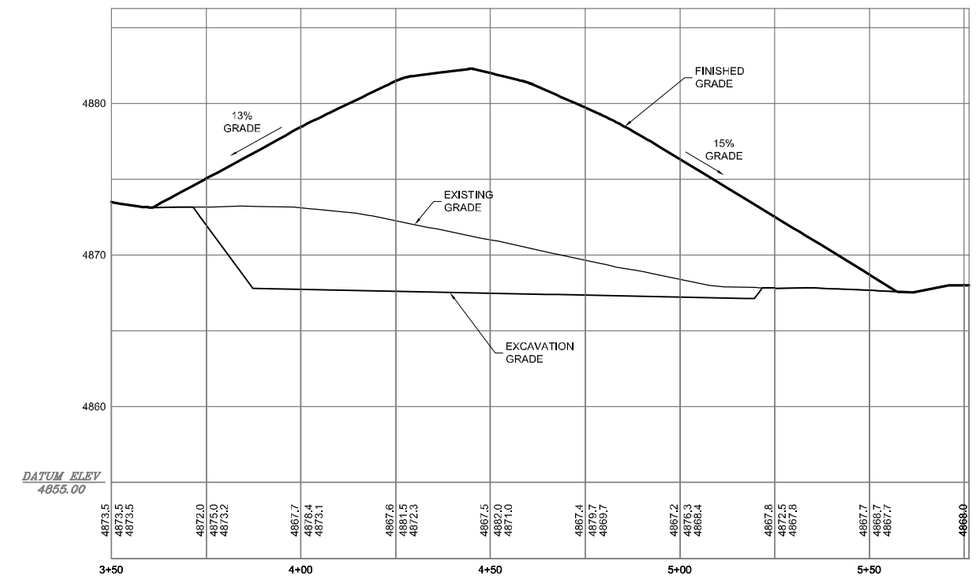
SCALE
4X VERTICAL EXAGERATION



B C-7 SECTION B-B

0 20 40 FEET

SCALE
4X VERTICAL EXAGERATION

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4	–	–	MO/DAY/YR
5	–	–	MO/DAY/YR

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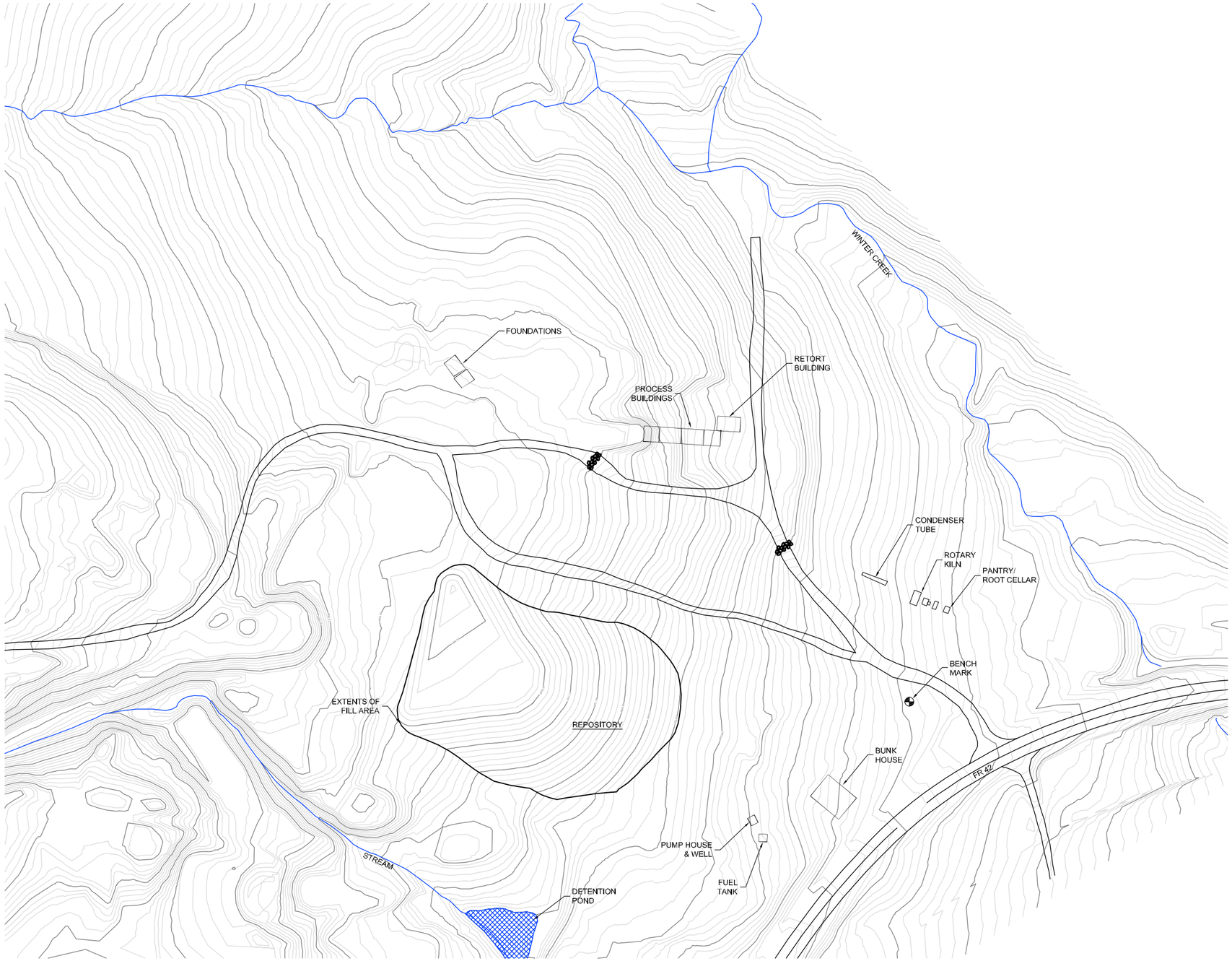
BLUE RIDGE REPOSITORY PROFILE AND CROSS SECTIONS

AMITY – BLUE RIDGE MINE REMOVAL ACTION / REMOVAL DESIGN

SHEET
C-8



BLUE RIDGE FINAL GRADING - PLAN VIEW

0 60 120 FEET

SCALE

REGISTERED PROFESSIONAL ENGINEER 61208PE OREGON FEB 8 2000 DUSTIN C. WASLEY

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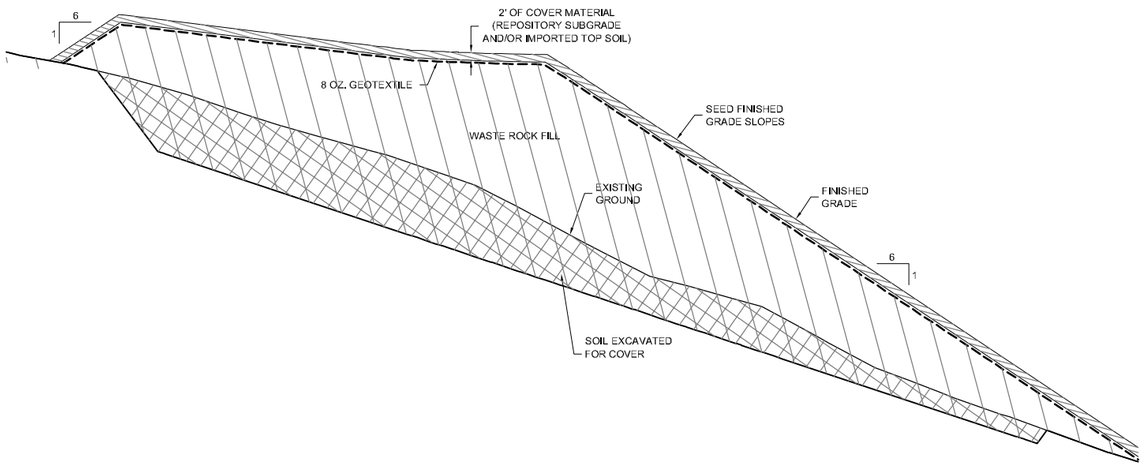
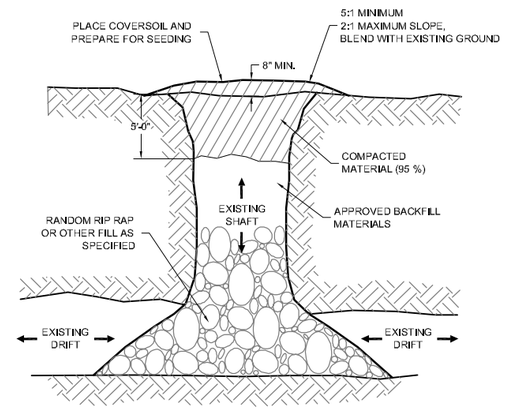
BLUE RIDGE FINAL GRADING
PLAN VIEW

AMITY – BLUE RIDGE DESIGN/REMOVAL ACTION

SHEET
C-9



1 / - REPOSITORY / WASTE ROCK FILL PLACEMENT DETAIL
NOT TO SCALE



NOTES:
1. DIMENSIONS AND QUANTITIES VARY DUE TO UNDERGROUND CONDITIONS.
2. CAUTION SHALL BE EXERCISED WHENEVER WORKING NEAR MINE OPENINGS.
3. RIP RAP IS TO BE PLACED IN THE SHAFT BOTTOM TO DEPTHS DETERMINED BY THE ENGINEER.
4. RIP RAP SHALL CONFORM TO THE REQUIREMENTS DESCRIBED IN SPECIFICATIONS.

2 / - SHAFT CLOSURE DETAIL
NOT TO SCALE

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OREGON
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4	–	–	MO/DAY/YR
5	–	–	MO/DAY/YR

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CHK. BY DGW
DATE CREATED 1/30/04
JOB No. 2323026

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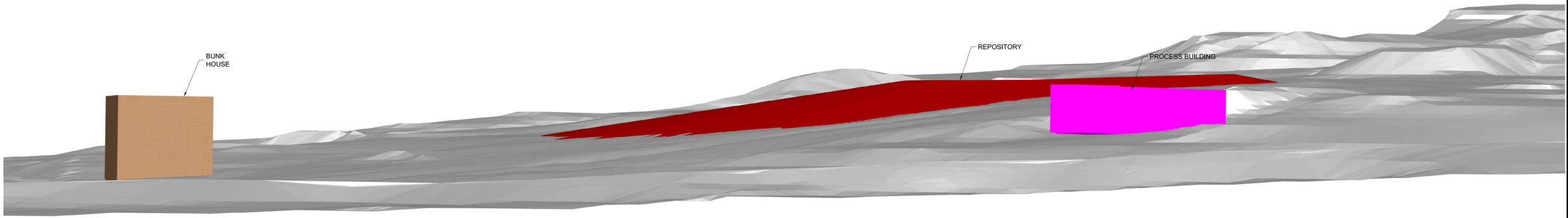
BLUE RIDGE SUPPLEMENTAL DETAILS

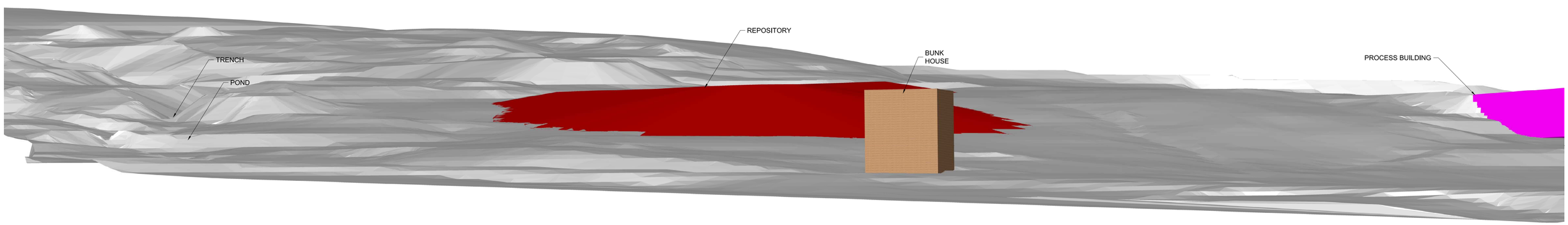
AMITY – BLUE RIDGE DESIGN/REMOVAL ACTION

SHEET
C-10



BLUE RIDGE RENDERING- FACING SOUTH

NOT TO SCALE



BLUE RIDGE RENDERING- FACING WEST

NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER
61208PE
OREGON
FEB. 8, 2000
DUSTIN G. WASLEY

Expires: 06/30/04

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2323026C11.dwg JHW 4/05/04

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OCHOCO NATIONAL FOREST

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3	–	–	MO/DAY/YR
4	–	–	MO/DAY/YR
5	–	–	MO/DAY/YR

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BLUE RIDGE REPOSITORY RENDERING

AMITY – BLUE RIDGE MINE REMOVAL ACTION / REMOVAL DESIGN

SHEET
C-11

TECHNICAL SPECIFICATIONS

Section 00190: Mobilization
Section 02130: Clearing and Grubbing
Section 02136: Landfill Material Disposal (Landfill)
Section 02205: Loose Small Stone Riprap
Section 02220: Excavation and Embankment
Section 02245: Obliteration of Roadways
Section 02251: Sediment Control
Section 02402: Geo-synthetic Fabric
Section 02801: Seeding
Section 02935: Soil Bioengineering Streambank And Cut Slope Protection
Section 04100: Close Mine Openings
USFS Region 6 - Fire Protection And Suppression Procedures

DIVISION 00

SECTION 00190
MOBILIZATAION

PART 1 - GENERAL

This item is intended to compensate the Contractor for operations including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; for payment of premiums for bonds and insurance for the project; and for any other work and operations which must be performed or costs that must be incurred incident to the initiation of meaningful work at the site and for which payment is not otherwise provided for under the contract.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

DIVISION 02

SECTION 02130
CLEARING AND GRUBBING

PART 1 - GENERAL

3.2 Description

This item shall consist of clearing, grubbing, removing and disposing of all vegetation, dead woody material, and debris within the clearing limits except objects designated to remain. Specifications for other items may refer to these specifications.

3.3 Areas to be Cleared and Grubbed

The limits of clearing and grubbing will be established by this Section, by other Section items, or on the Drawings. The clearing and grubbing limits will normally coincide with the designated working limits, however, the Engineer may also designate individual trees and snags outside the clearing limits for selective removal and disposal, or he may designate areas within the working limits where clearing and grubbing is not required or allowed within the provisions of this specification.

Grading Limits: Area that is to be excavated or covered with additional materials during construction.
Working Limits: Area consisting of the grading limits plus room for equipment to maneuver to perform the necessary clearing and grubbing. These limits, to be held to a minimum, will be designated for each project.
Clearing Limits: Area consisting of the working limits plus any additional area for a boom or other above ground clearance requirement.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 General

Clearing and grubbing shall be confined to designated areas. The Engineer will designate the trees, shrubs, and other plants and objects to remain. The Contractor is to keep the clearing to a minimum and to exercise care to not damage trees and shrubbery within clearing limits when there is no reason for grubbing.

3.2 Felling

Trees shall be felled within the clearing limits, usually towards the center, so as to prevent damage to the trees that are to be left standing. When necessary to prevent damage to structures, other trees or property, or to minimize danger to traffic, trees shall be cut in sections from the top downward.

3.3 Clearing Area Within Grading Limits

Clearing shall consist of the removal of all biodegradable material (trees, snags, shrubs, brush, dead woody debris, or plants). Branches of trees extending over the grading limits shall be trimmed.

3.4 Grubbing Area Within Grading Limits

A. Embankment Areas - In embankment sections where the total depth of fill will be less than 3 feet above undisturbed earth, grubbing shall consist of the removal of all biodegradable material (stumps, roots larger than 2 inches in diameter, matted roots, duff, and other protruding or surface objects). The resulting depressions shall be filled and compacted with material specified for the embankment.

In embankment sections where the total depth of fill will be 3 feet or greater above undisturbed earth, all loose biodegradable material shall be removed. Undisturbed stumps, roots, and nonperishable solid objects which will be a minimum of 3 feet below the finished surface of embankments, except those in embankments designed to impound water, need not be removed. The stumps that remain shall be cut off not more than 6 inches above the original ground line.

B. Areas to be Excavated - In cut sections, the removal of stumps and roots shall be done to such depth that in no case will any portion remaining extend closer than 18 inches to any subgrade or slope surface.

3.5 Area Outside Grading Limits but within Clearing Limits

On areas designated for clearing and grubbing outside of the grading limits, stumps may be cut within 4 inches of the ground and left, in lieu of being removed. All trees, shrubs, and other protruding or surface objects shall be cleared, except the vegetation and objects designated to remain.

3.6 Trimming of Trees

All required trimming shall be done in accordance with approved horticultural practices.

3.7 Timber Used by the Contractor

Timber cut from within the clearing limits, meeting specification requirements, may be utilized by the Contractor for constructing temporary structures, false-work, etc., as required in the project and also for camp purposes, provided written authorization for such use is obtained from the Engineer.

3.8 Timber to be Saved

All sound, green logs or poles, not used by the Contractor in the project, having a top diameter of 2 inches or more and a length of 4 feet or more, as determined by the Engineer, shall be saved. Material to be saved shall be trimmed of limbs and tops, sawed into such lengths designated below, and stacked in an area readily accessible for loading and hauling equipment, and where they will not interfere with the grading. Skidding timber outside staked working limits will not be approved.

All timber designated to be saved will be cut as follows:

- Logs over 15 inches in diameter are to be cut in 8-foot lengths.
- Logs with diameters between 8 inches and 15 inches will be cut in 12-foot lengths.
- Limbs, treetops, etc., from 2 inches to 8 inches in diameter will be cut in maximum 4-foot lengths (2-foot lengths within campground areas).

Title to all such timber cut from National Forest land shall remain with the United States, subject to disposal by the Forest Service, U.S. Department of Agriculture, in accordance with its regular procedures, unless otherwise specified.

3.9 Clearing or Clearing and Grubbing Requirements for Various Items:

A. Buildings - Construction work shall disturb a minimum of the existing terrain and plant life adjacent to the building site. Only trees, shrubs, stumps, and major roots, which interfere, may be removed. When excavation reveals the major roots of a live and significant tree nearby, the Contractor shall not remove the tree unless it interferes with the construction and removal is authorized by the Engineer.

3.10 Disposal of Refuse

Debris and refuse shall be disposed of in accordance with Section 02136, or stockpiled onsite to be used as part of the reclamation activities

- END OF SECTION -

DIVISION 02

SECTION 02136
WASTE MATERIAL DISPOSAL (LANDFILL)

PART 1 - GENERAL

1.1 Description

This item shall consist of loading, handling, hauling, and disposal of unsuitable excavated material, oversize boulders, stumps, brush, slash, roots, and other vegetable refuse resulting from the clearing and grubbing operation; and trash resulting from construction activities, or rubbish dumped by others. The waste disposal site shall be off National Forest lands at the county landfill. The Contractor shall be responsible for all costs, royalties, arrangements, procurement, cleanup, and work associated with a waste disposal area.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

All unsuitable excavated material, oversize boulders, stumps, brush, slash, roots, and other vegetable refuse resulting from the clearing and grubbing operation along with other construction refuse shall be hauled to a disposal area. All requirements of disposal and disposal site finish work are the responsibility of the Contractor. The Government is not responsible for material to be disposed of upon its departure from the project area.

- END OF SECTION -

DIVISION 02

SECTION 02205
LOOSE SMALL STONE RIPRAP

PART 1 - GENERAL

1.1 Description

This item shall consist of furnishing and placing a protective covering of stone on slopes or around or below pipe outlets, culverts, etc. and will serve as backfill material for the Blue Ridge Shaft#2 in accordance with these specifications, in conformity with the Drawings and to the lines and grades established.

On the drawing showing typical culvert installations, this item is shown as "Loose Rock Riprap."

PART 2 - PRODUCTS (NOT APPLICABLE)

3.1 Riprap

Riprap size and gradation shall be as follows. The desire is to try to use riprap with 50% in the 6-8 inch range.

Size Fraction	Size*
Maximum size	8 inches
D50	6 inches
D20	4 inches
D10	1-1/2 inches

*Equivalent spherical diameter

Riprap to be placed as channel lining and energy dissipater aprons may be obtained from the borrow area designated by the USFS or other suitable source as approved by the Engineer. Contractor is to use a grizzly screen or other method to remove oversize material, as necessary. The riprap shall be sound, hard, and free from laminations, fractures, or other structural defects, it shall be of such quality that they will not disintegrate on exposure to water or weathering. The USFS borrow pit shall be shaped and left in a condition comparable to how it was at the start of the project and as directed by the Engineer. Any excess material shall be pushed against the edge of the pit and consolidated. Excavated slopes shall be a minimum of 1.5:1 side slope. Pit shall be sloped to drain.

PART 3 - EXECUTION

Riprap shall not be dropped onto the geotextile fabric (Section 02402) from a height exceeding 2 feet. The riprap size shall correspond to those shown on the Drawings and in this specification. Filter fabric (Section 02402) shall be placed under all riprap channel lining. Nominal thickness as indicated in the Drawings or by the Engineer shall refer to the minimum thickness of the riprap layer, measured perpendicular to the slope. Riprap placement shall begin on the lowest portion of the slope.

- END OF SECTION -

DIVISION 02

SECTION 02220
EXCAVATION AND EMBANKMENT

PART 1 - GENERAL

1.1 Description

This item shall consist of excavation and shaping of borrow excavation, drainage excavation, shaping of stream channels, removal of slide material, excavation of unsuitable material, embankment construction, and disposal of all excavated material necessary for the completion of construction including channel changes, furrows, slope rounding, benches, berms, dips, approaches, and subsidiary work.

1.2 Excavation

Excavation shall consist of the excavation and disposal of all excavated material at designated locations, regardless of its nature.

1.3 Borrow Excavation

Borrow excavation shall consist of the excavation and utilization of material from sources shown on the Drawings or from commercial sources. Additional sources of borrow excavation shall be approved in advance by the Engineer.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 Clearing and Grubbing

Clearing and grubbing shall be accomplished in accordance with Section 02130 before work under Section 02220 begins, except the grubbing of stumps, which may proceed concurrently with excavation, and the burning of slash, which may be delayed until weather permits. Excavation and placement operations shall be conducted so material to be treated under Section 02130 will not be incorporated in the work.

3.2 Pioneering

Pioneering operations for the top of excavation slopes, toe of embankments, or pioneer road construction shall prevent undercutting of the final excavation slope, depositing of materials outside of the construction limits, and any restriction of drainage.

3.3 Utilization of Excavated Materials

All suitable, excavated material shall be used in the construction of embankments, sub-grades, shoulders, slopes, bedding, and backfill for subsidence's and for other purposes as shown on the Drawings.

1. Excess Excavation - Designed excess excavation shall be disposed of as shown on the Drawings.

2. Rock for Slope Protection - Excavated rock suitable for protection of embankments or backfill of subsidences may be conserved and used in lieu of a designated materials source.

4. Conserving Material - Material encountered in the excavation, suitable for cushion, finishing, topsoil, or other purposes, may be conserved and utilized instead of materials from designated sources. Excessively wet material that is otherwise suitable for embankment or fill shall be field drained and dried before placement.

5. Excavation of Unsuitable Material - Unsuitable material (consisting of organic material, wet, clay, etc.) shall be excavated. Disposal will be as shown on the Drawings. Excavated areas shall be backfilled with suitable material when necessary to complete the work. Frozen material shall not be placed in embankments. Rocks that are too large to be incorporated into the embankment shall be broken for incorporation, maneuvered to the face of the embankment, and embedded so that they will not roll or obstruct the use and maintenance of the roadbed, or moved to approved locations.

6. Conservation of Topsoil - When shown on the Drawings, suitable topsoil shall be removed, transported, and deposited in the designated stockpile areas.

3.4 Drainage Excavation

Drainage excavation shall include construction of side ditches, minor channel changes, inlet and outlet ditches, furrow ditches, ditches constructed along roads but beyond the roadway limits, subsidence areas, and other minor earth drainage structures as shown on the Drawings. Excavated material shall be utilized in accordance with section 3.3.

3.5 Finishing Slopes

Finished slopes shall conform reasonably to the lines staked on the ground or shown on the Drawings. The finished slope shall be left in a roughened condition to facilitate the establishment of vegetative growth. The finish associated with template and string line or hand-raking methods will not be permitted. Loose rock, debris, and other material larger than 6 inches in diameter shall be removed from the slope.

The tops of excavations, excluding areas of solid rock, shall be blended with the adjacent terrain by rounding where shown on the Drawings. Decomposed rock that may be cut without blasting or ripping shall be rounded. Earth overlying rock shall be rounded above the rock.

All rock excavations that require blasting shall be formed with controlled blasting techniques unless otherwise shown on the drawings. Controlled blasting is defined as the controlled usage of explosives and blasting accessories in appropriately aligned and spaced drill holes for the purpose of producing a free surface or shear plane in the rock excavation slopes and of minimizing landscape damage, adjacent ground vibration and overbreak. Presplitting is not intended unless shown on the drawings.

The Contractor shall drill, blast, and excavate short test sections (not to yield in excess of 1,000 cubic yards) to determine the controlled blasting method, hole spacing, and charge best suited to the material encountered.

3.6 Overbuilding and Landscape and Stream Protection

Excavated or embankment material shall be confined within the construction limits to avoid overbuilding and to protect the landscape and streams.

3.7 Sub-grade Treatments

Sub-grade treatment shall consist of soil modification by admixing aggregates, placing filter cloth, fiber mat, wood corduroy, rock blanket, or other similar materials over areas of unsuitable embankment material that are shown on the Drawings. The construction and material requirements for the type of sub-grade treatment will be specified or shown on the Drawings.

3.8 Stream Channel Construction

This work entails the excavation and/or shaping of stream channels as shown on the Drawings. All construction of the channel will conform to all grades, bank slopes, etc., as specified on the Drawings or in other Sections of this Contract. Under no circumstances are toxic substances to be included in this work. Should toxic substances be encountered during excavation, the Contractor will notify the Engineer immediately. If toxic substances are encountered, the Contractor will over excavate the channel by three feet, place protective liners as directed by the Engineer, and haul in suitable fill material to bring the centerline of the channel back up to the desired grade.

3.9 Water

The Contractor shall be responsible for obtaining the right to use water for the work including any royalty costs.

Mobile watering equipment shall have reasonable watertight tanks of known capacity. Equipment used for dust control and finishing operations of sub-grade and surfaces shall provide uniform and controlled application of water without ponding or washing. Positive control of water from the driver's position is required at all times.

3.10 Earth Berms

Permanent earth berms shall be constructed along the shoulder of roads or streams at locations shown on the drawings. Material used in the construction of berms shall be well graded with no rocks having a diameter greater than one-fourth of the height of the berm.

Acceptable material for the berm may be windrowed as the roadbed is constructed or stockpiled at a designated area as specified by the Engineer for later use. When the local material is not acceptable, material shall be imported from approved locations or from commercial sources. Material used for berm construction shall contain no frozen material, roots, sod, or other deleterious material. Material shall not be wasted over the embankment slope.

Compaction density of the berm shall be 90% of the maximum density as determined by AASHTO T-99, Method C or D. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The compaction units may be of any type, provided they are capable of compacting each lift of material as specified. Maximum lift will be 12 inches.

3.11 Embankment and Backfill Placing Methods

A. All Methods - When an embankment or backfill is to be placed across swampy ground or a swampy subsidence and removal of unsuitable material or sub-grade treatment is not required, the lower part of the embankment or backfill shall be constructed in a single layer to the minimum depth necessary to support construction equipment or subsequent backfill material. Rocks larger than six (6) inch diameter shall not be concentrated in any areas of the embankment or backfill.

B. Specific Methods - All embankments or backfill shall be placed by one or more of the following methods as shown on the Drawings:

1. Method 1 - Side Casting and End Dumping. Embankment or backfill may be placed by side casting and end dumping. Where material containing a large amount of rock is used to construct embankments or backfill, a solid embankment or base for additional backfill material shall be provided by working smaller rocks and fines in with the larger rocks and fines to fill the voids.

2. Method 2 - Layer Placement. Surfaces steeper than a ratio of 3 to 1, upon which embankment is to be placed shall be roughened or stepped when shown on the Drawings to provide permanent bonding of new and old materials.

   Embankment or backfill shall be layer placed, except over rock surfaces, in which case material may be placed by end dumping to the minimum depth needed for operation of spreading equipment. Each embankment or backfill layer shall be leveled and smoothed before placement of subsequent layers. Hauling and spreading equipment shall be operated uniformly over the full width of each layer.

   Suitable material shall be placed in layers no more than 12 inches thick, except when the material contains rock more than 9 inches in diameter, in which case layers may be of sufficient thickness to accommodate the material involved. No layer shall exceed 24 inches before compaction.

   Placing individual rocks or boulders greater than 24 inches will be permitted provided the embankment or backfill will accommodate them. Such rocks and boulders shall be at least 6 inches below sub-grade. They shall be carefully distributed and the voids filled with finer material to form a dense and compacted mass.

   Where material containing large amounts of rock is used to construct embankments or backfills, the layers may be of sufficient thickness to accommodate the material involved. A solid embankment or backfill with adequate compaction shall be constructed by working smaller rock and fines in with the larger rocks to fill the voids and by operating hauling and spreading equipment uniformly over the full width of each layer as the embankment or backfill is constructed.

3. Method 3 - Controlled Compaction. Embankments or backfills shall be placed as specified in Method 2, except earth embankment or backfill shall be placed in horizontal layers not exceeding 8 inches (loose measure) and compacted with a sheepsfoot roller. Material shall be at moisture content suitable for attaining the required compaction.

3.12 Construction Tolerances

The tolerance class shall be as shown on the Drawings. Roadway ditches shall be constructed to flow in the direction of design with the gradient no flatter than one-half of 1 percent.

Tolerance Class[a]

	Tolerance Class[a]					
Item	A	B	C	D	E	F
Sub-grade Elevation (Feet)	+/- 0.1	+/- 0.2	+/- 0.5	+/- 1	+/- 2	+/- 3
Centerline Alignment (Feet)	0.2	0 .5	1	1	2	3
Slopes, Excavation, Embankment, Backfill (Percent)	+/- 3	+/- 5	+/- 5	+/- 5	+/- 10	+/- 10

[a]Maximum allowable deviation from construction stakes and Drawings.

Deviations shall be uniform in the direction of change for a distance of 200 feet or more along the project centerline.

3.13 Grading Plans

Cross sections and grading plans are provided on the Drawings. The Contractor shall be held to fixed elevations, as determined by a registered surveyor. Proposed channels shall be construction staked by a registered surveyor and subsequent re-staking shall be included based on field adjustment made by the Engineer. A verification survey by a registered surveyor shall be completed and submitted to the Engineer for approval at the end of the project. All costs shall be included in a separate line item if survey work is required for the completion of the project. A smooth and finish-graded surface shall be required on all areas before placing topsoil and revegetation.

3.14 Positive Drainage

The Contractor shall provide positive drainage for all areas during and after construction. No water should be impounded during or after construction.

All areas, which settle below, plan elevation or impounded water before completion of the Contract shall be filled in, re-graded, and reseeded.

3.15 Erosion Control

The Contractor shall be responsible for the repair of slope erosion up to the final acceptance of the project. In areas not designated for sheet runoff, the Contractor shall make an attempt to grade the embankment to drain into existing or proposed swale areas. This shall include the use of diversion swales and other measures to direct runoff to rock dams, rock channels, etc.

All drainage swales and ditches must be approved by the Engineer prior to placing topsoil and reseeding. The cost of the swales and ditches, if not already in a separate line item, shall be included with the line item for placing of embankments or fill.

- END OF SECTION -

DIVISION 02

SECTION 02245
OBLITERATION OF ROADWAYS, PARKING SPURS AND STAGING AREAS

PART 1 - GENERAL

1.1 Description

This item shall consist of obliteration and work to prevent erosion and encourage revegetation, in accordance with these specifications, of such roadways or work areas as are indicated on the Drawings or designated on the ground for obliteration.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 General

The obliteration of roadways, parking spurs, staging areas, etc., shall consist of rough grading when needed, ripping or scarifying, cross ditching, opening drainages, and final contouring of backfilled areas. The work shall not commence until after the designated sections are no longer needed to serve traffic.

3.2 Rough Grading

Rough grading shall consist of filling the existing ditch and rough out sloping of the roadway. The road shoulder shall be roughly broken down to present a more natural appearance.

3.3 Ripping

After the rough grading has been completed, the area of the roadway shall then be ripped, scarified or plowed to a minimum 6 inch depth at maximum 16 inch intervals and left in a condition suitable for reseeding or to encourage natural revegetation.

3.4 Cross Ditching

After the rough grading and ripping have been completed, the roadway shall be cross-ditched at approximately 100-foot intervals. These cross ditches shall be sloped with the grade and be cut to a minimum 8-inch depth below the roadbed, placing the excavated materials on the downhill side. They shall extend from outside the shoulder line continuous into the back slope to form a positive intercepting ditch.

3.5 Drainages

Live streams and other drainages shall be opened by removing the old structures and grading the approach fills so that they will in no way impair the flow in the channel. Materials with salvage value shall be carefully removed as directed by the Engineer.

3.6 Placement of Boulders

Large boulders (3-4 feet in diameter) will be placed to detour vehicle traffic near the intersection of FR 42 and FR 4200-170, and above and below the Blue Ridge Processing Building on FR 4200-202. Earthen berms will be placed on the east and west side of the Amity Mine on FR 4200-152. Boulders and earthen berms will be placed at the direction of the Engineer and as shown on the Drawings.

- END OF SECTION –

DIVISION 02

SECTION 02251
SEDIMENT CONTROL

PART 1 - GENERAL

1.1 General

Short-term sediment collection for construction activities.

1.2 Submittals

A. Submit manufacturer's certification that sediment collection systems meet or exceed specified requirements.

B. Submit manufacturer's installation instructions and maintain copy at the jobsite.

1.3 Delivery, Storage and Handling

A. Unload, store and load sediment collection materials in a manner which prevents damage or excessive exposure to sunlight and weather.

PART 2 - PRODUCTS

2.1 Erosion and Sediment Control Systems

A. Comply with type of sediment collection systems indicated in the Contract Documents.

B. If sediment collection systems are not specified, use any of the alternate materials meeting the minimum requirements of this section and the approved Erosion Control Plan.

C. Notify the Engineer if installation conditions do not match those in the Drawings.

D. Provide sediment collection materials and use in accordance with the governing agency.

2.2 Inlet Protection

A. Provide a filtering system around an inlet or drain to trap sediment and prevent the sediment from entering the storm drain system in accordance with the Standard Drawings.

B. Filter Fabric Inlet Protection:

1. Filter Fabric: Refer to specifications for Silt Fence.
2. Wooden Stakes: 2 inches x 2 inches or 2 inches x 4 inches with a minimum length of 3.0 feet.
3. Staples: Heavy-duty wire at least 3/8 inches long.
4. Washed Gravel: ¾ inches to 1-1/4 inches in diameter, with less than 5% fines.

C. Gravel Inlet Protection:

1. Mesh: hardware cloth or wire mesh with 3/8 inch to ½ inch openings.
2. Filter Fabric: Refer to specifications for Silt Fence.
3. Washed Gravel: ¾ inch to 4 inches is diameter.

E. Block and Gravel Inlet Protection:

1. Mesh: Hardware cloth or wire mesh with 3/8 to ½ inch openings.
2. Filter Fabric: Refer to specifications for Silt Fence.
3. Washed Gravel: ¾ inch to 4 inches in diameter.

2.3 Straw Bale Barrier

A. Provide a temporary sediment barrier consisting of a row of entrenched and anchored straw bales in accordance with the Drawings.

B. Bales to be made of densely packed cut straw securely bundled by bailing twine or wire. The material must be certified as weed-free.

2.4 Temporary Berm

A. Provide a temporary berm or ridge of compacted soil or sandbags, which will intercept and divert runoff from the construction areas.

B. Construct soil berm from embankment materials.

C. Construct sandbag berms with high quality sandbags. Each bag to have the following dimensions: length - 24 inches to 30 inches; width – 16 inches to 20 inches; depth or thickness – 6 inches to 8 inches; and weight – 90 pounds to 130 pounds.

2.5 Sediment Basin

A. Provide a temporary basin to collect, trap, and store sediment produced by construction activities in accordance with the size requirements outlined in Section 3.5.

B. Construct sediment basins using excavation and embankment materials by either excavating the basin or by placing an earthen embankment across a low area or drainage swale. Provide a riser and pipe outlet with a gravel outlet or spillway to slow the release of runoff.

C. Fill material should be taken from approved designated borrow areas, and should be of the type and quality conforming to that specified for the adjoining fill material. It should be free of roots, woody vegetation, oversize stones, rocks exceeding 6-inch diameter, or other objectionable materials. Do not use frozen material.

2.6 Silt Fence

A. Provide temporary sediment barrier consisting of a filter fabric stretched and attached to supporting posts, with wire fence backing as required by the type of fabric employed as indicated on the Drawings.

B. Silt fences may be made of burlap or various synthetic materials. Acceptable synthetic materials are pervious polypropylene, nylon, and polyester or polyethylene yarn conforming to the performance specifications listed in Table 1.

Table 1 – Silt Fence Performance Specifications

Physical Property	Requirement
Filtering efficiency	75% to 85% (minimum)
Tensile strength at 20% (maximum) elongation	Standard strength – 360 lbs./ft. (minimum)
	Extra strength – 600 lbs./ft. (minimum)
Slurry flow rate	0.3 gpm/ft.^{2} (minimum)

C. Design Life: 6 months for synthetic fences, 2 months for burlap.

D. Wire Reinforced Backing (if used): 14 gage minimum, with mesh spacing and a width of 2-4 feet.

E. Post Specifications:

1. Length: 4 feet minimum.
2. Material: 2 inches x 2 inches or 2 inches x 4 inches pine (or equivalent) or 1.0 pound/foot to 1.3 pound/foot steel.

2.7 Culvert Riser

A. Provide a perforated metal pipe attached to a culvert inlet and extending upward to allowing the inlet area to serve as a temporary sediment trap for the construction area.

B. Provide materials for the culvert riser that are consistent with the culvert upon which they are attached.

PART 3 - EXECUTION

3.1 Examinations

A. Verify that slope contours are to required alignment and grade. Place sediment collection system on all drainage ways downstream of disturbed areas of construction and as directed by the Engineer and as indicated in the Contract Documents.

B. Examine sediment collection material and equipment for defect or damage.

C. Verify sediment collection material and equipment delivered to site meet the requirements of the Contract Documents.

D. Provide sediment collection facilities in accordance with governing agency.

E. Install sediment collection systems in accordance with the Drawings.

3.2 Inlet Protection

A. Height of Filter Fabric: Limit height of the filter fabric to 15 inches above the crest of the drop inlet.

B. Sump: Where possible, provide a filter fabric or block-and-gravel protection device with a sediment-trapping sump 12 inches to 18 inches deep as measured from the crest of the inlet. Side slopes should be 2:1. Provide 30 cubic yards of excavation for each acre of ground disturbed.

C. Orientation: Place the longest dimension of the basin toward the area of greatest flow.

D. Filter fabric:

1. Stakes: Place a stake at each corner of the inlet and around the edges at no more that 3 feet apart. Drive the stakes into the ground, if possible, or a minimum of 8 inches.

2. Frame: For stability, install a framework of wood strips around the stakes at the crest of the overflow area, 18 inches above the crest of the drop inlet.

3. Excavate: Excavate a trench 8 inches to 12 inches deep around the outside perimeter of the stakes. If a sediment-trapping sump is being provided, then the excavation may be as deep as 24 inches.

4. Staple: Staple the filter fabric to the wooden stakes with heavy-duty staples, overlapping the joints to the next stake. Ensure that 12 inches to 30 inches of filter fabric extends at the bottom so it can be formed into the trench.

5. Completion: Place the bottom of the fabric in the trench and backfill the trench all the way around, using washed gravel to minimum depth of 4 inches. Use enough gravel to ensure contact between the filter fabric and the underlying surface.

E. Gravel and Mesh:

1. Preparation: Remove any obstructions to excavating and grading. Excavate sump area, grade slopes, and properly dispose of soil.

2. Secure Inlet: Prevent seepage of sediment-laden-water.

3. Wire Mesh: Place wire mesh over the drop inlet so the wire extends a minimum of 12 inches beyond each side of the inlet structure. Overlap the strips of mesh if more than one is necessary.

4. Fabric: Place filter fabric over the mesh, extending it at least 18 inches beyond the inlet opening on all sides. Ensure that weep holes in the inlet structure are protected by filter fabric and gravel.

5. Stone: Place stone or gravel over the fabric/wire mesh to a depth of at least 12 inches.

F. Block and Gravel

1. Preparation: Secure the inlet grate to prevent seepage of sediment-laden water.

2. Wire Mesh: Place wire mesh over the drop inlet so the wire extends a minimum of 12 to 18 inches. Overlap the strips of mesh if more than one is necessary.

3. Fabric: Place filter fabric (optional) over the mesh and extend it at lease 18 inches beyond the inlet structure.

4. Blocks: Place concrete blocks over the filter fabric in a single row lengthwise on their sides along the sides on the inlet. Excavate the foundation a minimum of 2 inches below the crest of the inlet. The bottom row of blocks should be against the edge of the structure for lateral support.

5. Orientation: The open ends of the block should face outward, not upward, and the ends of adjacent blocks should abut. Lay one block on each side o the structure on its side to allow for dewatering of the pool.

6. Dimensions: The block barrier should be at least 12 inches high and may be up to a maximum of 24 inches high. It may be from 4 inches to 12 inches deep, depending on the size of block used.

7. Finishing: Prior to backfilling, place wire mesh over the outside vertical end of the blocks so that stone does not wash down the inlet.

8. Gravel: Place gravel against the wire mesh to the top of the blocks.

G. Inspect regularly and after every storm. Make any repairs necessary to ensure the sediment control device is in good working order.

H. Remove accumulated sediment and restore the trap to its original dimensions when sediment has accumulated to half the design depth of the trap. Sediment should be disposed at an approved site in a manner that will not contribute to additional siltation.

1. Gravel-and-Mesh Devices: Clean (or remove and replace) the stone filter or filter fabric if it becomes clogged.

2. Filter Fabric Devices: Replace the fabric immediately if it becomes clogged. Make sure the stakes are firmly in the ground and that the filter fabric continues to be securely anchored.

I. Inlet protection should remain in place and operational until the drainage area is completely stabilized or up to 30 days after the permanent site stabilization is achieved.

3.3 Straw Bale Barriers

A. Do not use straw bale barriers where flow rate exceed 1 cubic foot/second or the drainage area is greater than 1.25 acres.

B. Provide an undisturbed buffer zone of 3 to 6 feet is necessary between the barriers and surface waters to allow safe removal of the barrier and of accumulated sediments.

C. Embed bales to a minimum depth of 6 inches and backfill for the entire length of the barrier. Each bale should be securely anchored with 2 stakes 2 inches x 2 inches x 36 inches or steel drift pins driven at least 18 inches into the ground.

D. Install straw bale barriers at the toe of slopes prior to disturbing the slopes. Install the bales a short distance away from the toe of the slope and outside of any ditch channel.

E. Place the bales in a single row lengthwise on the contour for sheet flow applications, or perpendicular to the contour in concentrated flow applications. When flows are expected to be high enough to surpass the infiltration capacity of the bales, the center (low point) bales shall be wrapped in filter fabric with a 3 foot tail stapled securely and extending from the down gradient side of the barrier to prevent scouring. The ends of the adjacent bales must tightly abut one another.

F. Fill all gaps between bales with tightly wedged straw. For concentrated flow applications, extend the end of the barrier so that the bottom of the end bales are at a higher elevation than the top of the lowest middle bale to assure that sediment laden water flows through or over the barrier instead of around the ends of the barrier.

G. Perform one inspection during the first runoff-producing event after the installation of the barriers to assure proper functioning. Immediately repair damaged bales, undercutting, or end runs. Replace bales as needed due to disintegrations or rotting.

H. Remove accumulated sediment and disposed at an approved site in a manner that will not contribute to additional siltation.

3.4 Temporary Berms

A. Provide berms to prevent minor runoff onto newly constructed slopes until vegetation is established or until permanent measure are in place. Provide berms to intercept flow from the construction area and direct it to sediment removal facilities prior to discharge.

B. Dimensions:

1. Soil Berm: A berm of soil with an approximate height of 12 to 18 inches with a minimum top width of 24 to 28 inches and side slopes of 2:1 or flatter. Berms should be high enough to prevent flow from overtopping. Berms are normally constructed from embankment materials.

2. Sandbag Berm: Height = 1.5 feet minimum, top width = 1.5 minimum, bottom width = approximately 4 to 5 feet.

3. Sandbag Size: Length = 24 to 30 inches, depth or thickness = 6 to 8 inches, and weight = 90 to 130 pounds.

C. Construction:

1. Soil Berm: Grade to drain to a slope drain inlet. Construct embankments with a gradual slope to one side of the embankment to permit the placement of all temporary berms and slope drains on one side of the embankment. When fills are constructed on side hill slopes, slope the top surface toward the inside so that surface runoff will be away from the fill slope. Compact the entire width of the berm.

2. Sandbag Berm: Install so that flow under or between bags is prevented. Stack the sandbags in an interlocking fashion to provide additional strength for resisting the force of the flowing water. However, do not stack them more than three high without broadening the foundation using additional sandbags, or providing additional stability.

D. Inspect and repair temporary berms periodically as well as after each significance rainfall. For sandbag berms, reshaped or replaced sandbags as needed during inspection. When sediment reaches 6 inches, remove the accumulated sediment and disposed at an approved site in a manner that will not contribute to additional siltation. Leave berms in place until all upstream areas are stabilized and accumulated sediment has been removed. Remove sandbags by hand.

3.5 Sedimentation Basins

A. Provide sediment basins where physical site conditions or land ownership restrictions preclude the effective use of barrier-type erosion control measures. Provide sediment basins for disturbed areas of more than 10 acres within the same drainage basin or where operations expose critical areas to soil erosion.

B. Volume and Configuration of Basin:

1. Small Areas: Provide at least 65 cubic yards/acre of total drainage area.

2. Larger Areas: For areas greater that 10 acres within the same drainage basin provide at least 130 cubic yards/acre of total drainage area.

4. Baffles and Spillway: Install baffles or other deflectors to spread the flow throughout the basin. Install an emergency spillway and riser pipe(s).

5. Depth and Surface Area: Determine the surface area based on the Standard Drawing with a minimum of 3 feet of sediment storage and 3:1 side slopes

6. Approval: Submit design of the sediment basin and obtain Engineer's approval prior to construction.

C. Construction Requirements:

1. Placement: Install the temporary sediment basin before clearing and grading is undertaken. Locate the dam to provide maximum volume capacity for sediment behind the structure. It should not be built within an active stream channel. Install fencing around the basin, as necessary to endure public safety.

2. Preparation: Prepare the dam site by clearing vegetation and removing topsoil before beginning dam construction. For areas under the embankment and any structural works, lea, grub, strip topsoil to remove all trees, vegetation, roots and other objectionable material. To facilitate clean out and restoration, clear the pool area of all brush, tress or other debris.

3. Spillway Bed: Level the bed for the pipe spillway to provide uniform support through its entire length under the dam.

4. Spillway: Construct an emergency spillway on undisturbed soil and not on fill. Line the spillway with 4 inches of concrete, reinforced with 6 inch x 6 inch, 6 inch x 6 inch diameter W1.4 each way wire mesh extending to a minimum of 36 inches down each face of the embankment. The spillway should be at lease 18 inches deep with 1:1:5 side slopes.

5. Piping: Secure all pipe joints and fasten watertight. Fasten the riser rigidly and securely to the barrel and seal watertight. Place the barrel on a firm foundation according to the lines and grades shown on the approved Contract Documents.

6. Backfill: Place at least 24 inches of hand-compacted backfill (maximum 6 inch lifts) over the pipe spillway before crossing it with construction equipment. Control the movement of the hauling and spreading equipment over the fill so that the entire surface of each lift will be traversed by not less than one tread tract of the equipment.

7. Discharge: The pipe spillway should discharge at ground elevation below the dam, and not more than 12 inches above any streambed.

8. Placement of Fill: Scarify areas on which fill is to be placed prior to placement of fill. Place fill materials in 6-inch maximum lifts, compacted by construction equipment. Provide continuous horizontal lifts over the entire length of the fill.

9. Stabilization: Stabilize the embankment and emergency spillway with vegetation or other stabilization measures.

D. Sediment basins should be readily accessible for maintenance and sediment removal. Inspect after each rainfall and clean out when half the available sediment storage volume has been filled with sediment. Dispose of removed sediment and stabilize in an approved location such that sediment does not re-enter waters. Sediment may not be dumped into any water of the U.S without appropriate permitting.

E. Operate and maintain the sediment basin until the drainage area is permanently stabilized by vegetation or other permanent controls.

3.6 Silt Fence Barriers

A. Provide silt fences near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through.

B. Provide silt fences along the toe of fills, on the downhill side of large through-cut areas, along streams, at natural drainage areas and above interceptor dikes and as indicated in the Contract Documents.

C. Construct the silt fence after cutting and slashing of trees and before excavating haul roads, fill benches, or any soil disturbing construction activity in the drainage areas.

D. The silt fences must remain in place until the disturbed areas are permanently stabilized.

E. Configuration:

1. Maximum Drainage Area: 0.25 acres/100 feet of fence length.

1. Maximum Fence Length: 300 feet for 100-foot slope length.

2. Maximum Slope Length (Upstream Drainage Distance) to Fence:
   a. 100 feet for slopes flatter than 5:1.
   b. 15 feet for slopes steeper than 2:1.

3. Maximum Slope Steepness Above Fence: 1:1 grade.

4. Minimum Toe-in Depth: 6 inches.

5. Post Spacing:
   a. With wire support fence – 10 feet maximum.
   b. Without wire fence – 6 feet maximum.

6. Post Depth (Below Ground Surface): 18 inches minimum.

7. Undisturbed Buffer Zone: 3 feet minimum between fence and surface waters.

F. Construction Requirements:

1. Maximum Height of the Filter Fence: Between 1.5 feet and 3 feet above the ground surface (depending on the amount of upslope ponding expected).

2. Post Spacing: 10 feet apart when a wire mesh support fence is used and no more than 6 feet apart when using extra-strength filter fabric (without a wire fence). The posts should extend at least 18 inches into the ground.

3. Trench: Excavate a trench about 6 inches wide and 4 to 12 inches deep along the upslope side of the line of posts.

4. Fastening: If standard strength filter fabric is to be used, fasten the optional wire mesh support fence to the upslope side of the posts using heavy duty wire staples, tie wires, or hog rings. Extend the wire mesh support to the bottom of the trench.

5. Extra Strength Filter Fabric: Does not require a wire mesh support fence. Staple or wire the filter fabric directly to the posts and extend 8 to 18 inches of the fabric into the trench.

6. Trees: Do not attach filter fabric to trees.

7. Joints: Splice fabric together only at a support post, with a minimum 6 inches overlap, and securely seal the joint.

8. Backfill: Backfill the trench with compacted soil or ¾ inch minimum diameter gravel placed over the filter fabric.

G. Inspect silt fences periodically for damage (such as tearing by wind, animals, or equipment) and for the amount of sediment, which has accumulated. Remove the sediment when it reaches one-half the height of the silt fence. In situations where access is available, machinery can be used. Otherwise, the silt must be removed manually.

H. Remove sediment deposits when heavy rain or high water is anticipated. Place the sediment deposits in an area where there is little danger of erosion.

3.7 Culvert Risers

A. Provide risers at culvert inlet that receive runoff from upstream construction sites or from other erodible areas at indicated on the Drawings. Do not use for drainage areas larger than a 1.25 acres.

B. Determine the volume of the water storage for the culvert riser based on the total drainage area upstream in accordance with the specifications for Sediment Basins. Ensure water impoundment will not extend to private property unless authorized in writing by the property owner.

C. Install the culvert riser according to the Contract Documents. Fasten the riser pipe rigidly and securely to the culvert barrel. Seal the joint so that it is watertight.

D. Inspect the rise periodically and following runoff-producing storms. Remove accumulated sediments to restore the design capacity of the sediment deposit area. Dispose of sediment where they are not likely to reenter stream flow or surface runoff.

E. Remove culvert risers after permanent erosion control measure are in place.

- END OF SECTION -

DIVISION 02

SECTION 02402
GEO-SYNTHETIC FABRIC

PART 1 - GENERAL

1.1 Description

This item shall consist of furnishing and installation of a geo-synthetic filter fabric. The fabric will be used in the construction as shown on the Drawings.

PART 2 - PRODUCTS

2.1 Materials

The material shall be an 8-ounce per square yard geo-textile consisting of nonwoven, polypropylene, needle punched geo-textile fabric that is resistant to ultraviolet degradation and to biological and chemical environments found in normal soils. The material shall be free from defects or tears. The geo-textile shall also be free of any treatment or coating which might adversely alter its hydraulic or physical properties after installation. The geo-textile filter fabric shall be PermeaTex 4080 or approved equal.

PART 3 - EXECUTION

3.1 Installation

Installation of the filter fabric shall be in accordance with manufacturer's instructions and specifications. Cover material shall be installed in accordance to the manufacturer’s instructions and as shown on the Drawings.

The lined areas shall be maintained until all work has been completed and accepted. Maintenance shall consist of the repair of areas damaged by erosion, wind, fires, or other causes.

- END OF SECTION -

DIVISION 02

SECTION 02801
SEEDING

PART 1 - GENERAL

1.1 Description

This item shall consist of broadcast seeding designated areas using specified seed mixtures with fertilizer.

The areas to be seeded shall be all cut slopes, fill slopes and other disturbed areas.

PART 2 - PRODUCTS

2.1 Seed

The seed mix shall be as follows:

Common Name	Scientific Name	% Live Seed	#LS/acre
Red fescue	Festuca rubra	85	3
Sheep fescue	Festuca ovina	85	3
Sandberg bluegrass	Poa secunda	85	3
Blue wildrye	Elymus glaucus	85	5
Birdsfoot trefoil	Lotus corniculatus	85	1

All seed shall conform to the requirements of State Laws; and U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act; in effect on the date of invitation of bids. Seed which has become wet, moldy or otherwise damaged in transit or storage will not be accepted.

Seed shall be furnished separately or in mixture in standard containers clearly marked or labeled with (1) Seed name, (2) Lot number, (3) Net weight, (4) Percentage of purity and of germination and hard seed, (5) Percentage of weed seed content, and (6) all seed shall be certified as noxious weed-free seed. The Contractor shall furnish the Engineer duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of date of delivery. This statement shall include: (1) Name and address of laboratory, (2) Date of test, (3) Lot number of each kind of seed, and (4) Results of tests as to name percentages of purity and of germination, and percentage of weed content, for each kind of seed furnished, and in case of a mixture, the proportions of each kind of seed.

2.2 Fertilizer

The fertilizer shall be 16% total nitrogen, 16% available phosphoric acid, 16% total water soluble potash, and 20% sulphur applied at the rate of 200 pounds per acre.

Fertilizer shall be dry, free-flowing type suitable for application with broadcast seeding. It shall be a standard commercial fertilizer supplied separately or in mixtures in standard containers with name, weight, and guaranteed analysis of contents clearly marked. Fertilizer which has become wet or otherwise damaged in transit or storage will not be accepted.

2.3 Mulch

Mulch shall consist of 100% agricultural straw certified as weed free.

PART 3 - EXECUTION

3.1 General

The specified seed mixture, with fertilizer, shall be uniformly spread on the designated areas to the density in pounds of live seed per acre as specified.

Each area or suitable section of the area to be seeded shall be seeded as soon as the grading and finishing work have been completed and the area prepared and approved for seeding. Seeding shall follow the finishing work as closely as feasible and if possible before the ground has become packed or hardened. No regard shall be given to the season of the year except that no seeding shall be done during windy weather or when the ground is excessively wet or deeply frozen.

3.2 Preparation of Seeding Area

Cut slopes, fill slopes, embankments or other areas to be seeded shall be shaped and finished as specified under the Sections involved. The area, where necessary, shall be worked such that the surface is loose to a depth of at least one inch. Each area shall be approved for seeding by the Engineer before seed is applied.

3.3 Seeding and Mulching

The seed or seed mixtures, with or without fertilizer, shall be accurately proportioned as stipulated and thoroughly mixed. They shall be remixed as necessary so that a uniform mixture will result as each loading of the seeder is made. Seed, with fertilizer, shall be applied with a rotary hand seeder or other approved type commercial seeder or by an agreed upon method. All portions of the area shall be uniformly covered to the required density.

Mulch straw be applied at a depth of 2 to 4 inches using certified weed-free straw, except for areas located in shady areas, in which case mulching is not required. The Contractor shall install mulch on the embankment slopes and other exposed areas when they are finished and after seeding. All mulched areas will be thoroughly wetted following application. For slopes steeper than 2:1, mulch will be disked or spiked into the soil.

3.4 Maintenance of Seeded Area

The Contractor will not be required to maintain an area which has been satisfactorily seeded except that he shall protect the area against traffic by warning signs or barricades or other methods approved by the Engineer.

When a seeded area has become damaged by storm or otherwise prior to final acceptance of the project, the Engineer may order the area reworked. The damage shall then be repaired as directed and the area reseeded.

- END OF SECTION -

DIVISION 02

SECTION 02935
SOIL BIOENGINEERING STREAMBANK AND CUT SLOPE PROTECTION

PART 1 - GENERAL

1.1 Description

Furnish all labor, materials, equipment, and incidentals required to construct the soil bioengineering, live stake, live fascine, brushlayer/live fascine and live siltation construction structures for the streambank and cut slope protection after the removal action has been completed as indicated on the drawings. Work includes furnishing, installing and maintaining: a) live cut plant material branch harvesting, loading, hauling, preparing, storing and fabricating; b) erosion control woven coir fabric; c) seed and long straw mulch material; and d) select fill material.

The types of soil bioengineering method installations are specified; i.e. live cut branch material methods (live stake, live fascine, live siltation construction and brushlayer/live fascine), installed after the slope has been reconstructed. The following installation timing for the soil bioengineering live cut branch material work shall be performed in the dormant season as defined. Additional methods may be used to protect the slope during the non-dormant season; these methods may include placement of large boulders and filter fabric at the direction of the Engineer. Contractor shall coordinate construction activity to work within these installation constraints.

1.2 Definitions

Amelioration: The addition of soil conditioners, fertilizer, lime or other soil additives to the insitu material to produce select fill material, intended to ensure a healthy growing medium for the live cut branches and seed.

Bank: Refers to sections of land immediately adjacent to Johnson Creek.

Basal cut ends: The basal ends of the live cut branches that are intended to develop roots.

Branches or live cut plant material: Material that has been cut from live native growing plants. This live, rootable plant material will be used in the fabrication of living soil bioengineering structures, i.e., live stake, live fascine brushlayer/live, fascine and live siltation construction.

Brushlayer: Refers to living cut brush that is placed shallowly and approximately perpendicular into the slope face with the growing tips directed towards the outside of the slope.

Brushlayer/live fascine: Refers to the combination of the soil bioengineering methods, brushlayer and live fascine. These methods combined are intended to function mechanically, immediately and long to control erosion, grow and reinforce the slope face.

Cold storage: Refers to a method of keeping the harvested live cut plant material branches in a dormant state.

Dead stout stake: Nonliving, untreated, sawed lumber, made from new (2-in x 4-in) timbers.

Deep watering: Water required to promote healthy plant growth. The amount and frequency will be based upon site conditions including precipitation, moisture content, time of year, time of installation, condition, size and species of the plant, top growth and root size and type. Typically in terms of depth, deep watering refers to two feet (2-ft) in vertical elevation measured from the ground elevation of the installed plant. Irrigation methods may include sprinkler, drip or hand watering.

Dormant season: The time of year when plant materials are not actively growing, after the first "killing" frost and before the first buds of spring.

Growing tips: The top ends of the live cut branches that are intended to produce leaf development.

Harvesting site: Source areas of the native live cut plant material branches.

Inspection: The Client shall inspect all work performed under this Section for conformance with the plans and specifications at the completion of installation, upon the written request of the Contractor received at least 10 days before the anticipated date of inspection. Any and all corrective work identified during the inspection shall be immediately completed by the Contractor at no additional cost.

Landowner: Owner of the live cut plant harvesting site.

Live fascine: A collection of live cut branches grouped together into a sausage-like structure, with the growing tips all placed in the same direction. This structure is intended to function mechanically to control erosion, grow and reinforce the shallow surface soil.

Live siltation construction: Refers to live cut brush that is placed in the ground along the edge of Johnson Creek, above the constructed rock toe protection, with the growing tips oriented towards the creek.

Live stake: Branches or stems that have been cut and pruned from living plant material from willow, Salix species. All side branches are trimmed. It is intended to produce roots, leaves and grow.

Living installations: Refers to all live cut branch plant material methods i.e., live stakes, live fascine, brushlayer/live fascine and live siltation construction.

Long straw mulch: Refers to long straw or hay that is used as mulching material under the coir erosion control fabric.

Select fill material: Insitu material that has been tested and treated with nutrients as required to promote healthy plant growth.

Qualified Individual: Refers to a person who will be retained by the Contractor and be responsible for supervising all aspects of the work, with the qualifications specified.

Seeding: Refers to the seed mixture that will be installed under the woven coir fabric, in between the soil bioengineering live cut method installations.

Slope: The outer finished face of the cut.

Soil bioengineering: A method that uses specific live plant materials as a structural, environmental and aesthetic component. Live stake, live siltation construction, live

fascine and brushlayer/live fascine, coir, seeding, and long straw mulch are part of the soil bioengineering installation methods.

System excavation: Earthwork that is performed prior to such activities as placing the actual live installation into the ground, and that is directly associated with the soil bioengineering work.

Toe protection: Refers to the use of riprap rock in and along the toe and bank of Johnson Creek, to protect the bed and banks from scour and erosion.

Woven coir: A continuously woven mat, without seams, used to cover the finished surface of the cut slope for erosion control.

3.3 Delivery, Storage and Handling

A. Time of Year - Harvest in the dormant season. When temperatures exceed sixty degrees (60°) during the day at the harvesting site, harvesting operations must stop.

B. Inspection - Prior to leaving the harvesting site, or immediately upon arrival at the job site, inspect all live branch cuttings. They are to be healthy, freshly cut living branch material. No invasive vines or plant materials may be mixed in with the cuttings. Leave such material at the harvesting site. The live branch cuttings shall be free from insect infestation and disease.

C. Transportation - Transport live branch cuttings in an enclosed trailer or completely covered with a tarpaulin during transportation from the harvesting site to the job site. During transportation, place the live cut branch bundles on the transport vehicles, with the growing tips toward the cab of the vehicle to prevent damage and to facilitate handling.

D. Arrival Time - All cut plant material shall be delivered to the job site within 24 hours of cutting. Schedule cutting and delivery of the live cuttings or branches to the site so that the materials can be installed the day they arrive or as specified.

E. Fabrication - All live branch method system fabrication and preparation shall be done on the project site and shall not be done at the harvesting site or other sites. Fabrication and preparation shall include making live fascines, cutting live stakes, and trimming branches or other activities required in construction.

F. Storage - Live cuttings or branches not installed on the day of arrival at the job site shall be stored and protected. They may be stored for a maximum of 7 days. Storage sites shall be continually shaded locations to protect the live cut branches from the wind. The live cuttings or branches shall be heeled-in moist soils or kept in water. Protect live cut materials from drying at all times. When the temperature reaches 50°F or above on the day the material is harvested, the live cut branches can not be stored but must be installed on the day of harvesting. When the live cut branches have been fabricated into building units for live stake, live fascine, or similar methods, they must be used on that day.

G. Cold Storage - Harvested live cut branch material may be stored in free standing, insulated, refrigerated vans under the following criteria: Humidity in the storage space shall be 95 percent or higher. Maintain temperature in the storage above freezing (33 ° F or 1° C) but below 38 ° F or 4° C. Maintain and provide a temperature recording system which produces hard copies of the temperature range inside the storage space 24 hours/day with temperature logs for the Client

at the beginning of each week. Implement a sprinkler/wetting process, such as the use of perforated hoses suspended from above the storage area. Water live cut branches daily. Live cut branches may be stored in this manner for a maximum of sixty (60) days. .

PART 2 - PRODUCTS

2.1 Materials

A. Baling Twine - Material used for the purpose of tying the live fascine and harvested branch bundles together is to be natural and undyed.

B. Coir

1. Woven coir fabrics shall have the following minimum average roll properties:

Coir 400gm

Property	Test Method	Criteria
Thickness	ASTM D177	0.28-in
Weight	ASTM D3776C	11.8 oz/sq yd (400 gms/m)
Open Area	Measured	65 percent
Roll Width	Measured	4 meters (13.1-ft)

Coir 700gm

Property	Test Method	Criteria
Thickness	ASTM D177	0.28-in
Weight	ASTM D3776C	20.6 oz/sq yd (700 gms/m)
Open Area	Measured	50 percent
Roll Width	Measured	4 meters (13.1-ft)

2. Fabric must be without seams.

3. Fabric shall be obtained from: KoirMat, DeKoWe, Belton Industries, RoLanka Intl., Inc., or equal.

C. Dead Stout Stakes - Dead stout stakes are cut from new, sound, untreated two inch by four inch lumber. Each stake is 2.5 feet long and fabricated by cutting each section diagonally across the four inch face to make two stakes from each section. The diagonal cut begins and ends to provide a 1/8 to 1/4-in wide tip on the finished stake. Where rocky or hard soil conditions exist, two foot long, 1/2-in diameter hooked rebar may be substituted for dead stout stakes.

D. Long Straw Mulch - Long straw mulch consists of dry straw or hay, which is certified weed free. Material which is musty, moldy, caked, decayed, or dusty will be rejected.

E. Select fill material shall be as specified - Investigate the select fill material for presence of noxious weed seeds. Species that compete with the selected installed plant species shall be eradicated. Should noxious weeds become evident during the first growing season, remove and dispose of them at no additional cost.

F. Fertilizer and amelioration application rates shall meet the following requirements:

1. Fertilizer shall be slow release (25 to 30 percent release) a 16-16-16, mixed into select fill material at the rate of 200 pounds per acre.

2. Dolomitic lime shall be agricultural grade ground limestone graded so that a minimum of 90 percent passes the No. 10 mesh screen and at least 40 percent passes the No. 100 mesh screen. Dolomitic lime shall have a calcium and magnesium carbonate content of not less than 85 percent and shall be mixed at a rate of 3,000 lbs per 800 cubic yards of select fill material.

3. All fertilizer, lime and amelioration materials shall be uniform in composition and free flowing and delivered to the site in bags, each fully labeled, including the same trademark, or trade name and warranty of the producer.

G. Water - Water shall contain no toxic elements that could be harmful to plant growth. Water, hose and watering equipment shall be provided by the Contractor.

H. Live Cut Branch Materials

1. Harvest live cut branch plant materials from sites located within seventy-five miles from the Worksite. The Contractor shall acquire all applicable permits prior to harvesting activities. Only healthy, well-branched, and disease-free stock from the species list is acceptable. Leave harvesting sites clean and tidy. Cut larger log material into sixteen inch (16-in) firewood lengths and neatly stacked where directed by the landowner or cut and dispose as otherwise agreed to with the landowner.

2. Provide a copy of the signed written agreement between the Landowner and prior to the start of harvesting activities, if applicable. All conditions for site access, use, clean up and any special conditions shall be included. The Contractor shall be solely responsible for activities on the harvesting site. Obtain all permits required by Federal, State or local regulations.

3. Locate harvesting sites with the following species: (Species need to be determined during field activities, but will likely be) willow (Salix sp.), shrub dogwood (Cornus sp.), Viburnum sp. and Alnus sp.

4. Cutting equipment such as chain saws, bush axes, loppers, and pruners may be used for harvesting, provided that they are used in such a manner that they leave clean cuts. Handle live growing plant material at the harvesting site to avoid bark stripping and splitting of stems. Make cuts six to twelve inches (6-in to 12-in) from the ground or as required by the Landowner. Make cuts flat or at a slight or blunt angle.

5. Use twine or hoisting belts to bind the live branch cuttings securely into bundles at the harvesting site for easy handling and for protection during

transport. Group live branch cuttings in such a manner that they stay together when handled. Keep side branches and brushy limbs intact and place all growing tips in the same direction. Using the same number of branches in each bundle, e.g., 15, 30 or 45 for consistent on-site counts.

6. Prior to leaving the harvesting site, label all live branch cuttings. Secure labels to each bundle of live branch cuttings and indicate the date harvested and collection location.

I. Seed mixture and spread rate shall be as specified in Section 02801.

2.2 Sampling, Testing, and Acceptance

A. Vegetation

1. Only living methods alive and healthy at the time of final inspection will be accepted. This includes the live stakes, live fascines, live cut branches**,** brushlayer/live fascine and live siltation construction methods. Replace any non-living methods immediately after inspection and during the maintenance period. Live fascine, live siltation construction and brushlayer/live fascine methods with 2-ft of continuous length void of vegetation shall be replaced.

2. Living method acceptance is as follows for live cut branch material, container plant material in percent and seeded areas:

Method	Percent Living
Live Stakes	90%
Live Fascine	60%
Brushlayer/Live Fascine	70%
Live Siltation Construction	80%

PART 3 - EXECUTION

3.1 General

A. Conform final grades and slopes to Contract Documents. Maintain site drainage during construction to control surface drainage away from cut slopes, so that runoff water is collected and drained. Protect and preserve existing vegetation, trees, and wetland areas.

B. Determine exact quantities of all items including coir, seed mix, long straw mulch, select fill material, and quantity of live cut branch installations and associated and ancillary construction items required by this Section. Provide layout, elevation, length, quantity and quality of each work item required by this Section. Obtain approval of underlying materials before proceeding with construction of succeeding activities.

C. Soil Bioengineering cut slope protection shall be installed as indicated and specified.

3.2 Live Fascine

A. Fabrication - Live fascines shall be fabricated using one to two-year old branched material with the side branches attached. The finished live fascine bundles shall be seven to eight inches in diameter and a minimum of fifteen feet long. They shall be tied together securely with baling twine or other natural, biodegradable undyed material every twelve inches.

B. Handling - When fabricated finished fascine bundles are moved, a minimum of one person per five feet of length is required during handling to prevent damage.

C. Size Ranges - Each branch used in live fascine construction shall be a minimum of six feet long and shall have a trunk diameter between one half and one inch. The live stakes used to secure the bundle shall conform to the specifications for live stakes.

D. Excavation - The trenches for the single live fascine bundles shall be excavated nine to ten inches (9-in to 10-in) deep and wide.

E. Installation

1. Prior to the placement of live fascines, the coir erosion woven control fabric shall be first placed horizontally on the slope and "tucked" into each live fascine trench so that the entire trench is covered with fabric. A one to two inch layer of select fill material shall be placed on top of the coir fabric in the bottom and sides of the trench prior to the live fascine bundle installation.

   Step 1 The trench shall be prepared by placing a layer of select fill material in the coir lined trench. The live fascine bundle shall be placed directly upon the select fill material and coir erosion control fabric.

   Step 2 The live fascine bundle shall be secured every three feet with a dead stout stake installed flush with the bundle.

   Step 3 Select fill material shall be placed and compacted in and around the live fascine bundle, branches, and dead stout stakes. The branches shall have good contact and be completely surrounded with the select fill material.

   Step 4 Live stakes shall be tamped in at an approximate forty-five degree (45°) angle to the slope on the downslope side of the live fascine bundle installations midway between the previously installed dead stout stakes. The live stakes shall be installed on three foot centers and protrude three inches above the finished ground elevation.

2. The select fill material shall be filled in and around the branches, the bundle, and at each dead stout stake. The backfill around the live fascine bundle shall be compacted by foot. Select fill material shall be previously mixed with the required fertilizer, lime and soil amendments. Water compaction shall not be acceptable. When backfill operations are completed for the live fascine, it should be a neatly installed row, on contour with the branches slightly visible.

3. The live fascine shall form a small bench in the cut slope. Locations and quantities shall be generally as indicated with modifications made to suit field conditions at no additional cost.

F. Spacing - The live fascines shall be spaced in two configurations 1. six feet apart horizontally and installed at a sixty degree (60°) angle next to Johnson Creek and parallel to each other; and 2. twenty feet apart horizontally (face measurement), in between the brushlayer/live fascines, placed on contour and parallel to each other. All final locations and configurations shall be determined in the field by the Qualified Individual. Lay out these configurations on site for approval prior to excavation or installation.

G. Species Percent - Live fascine methods shall be composed of (Species need to be determined in the field, but will likely be) fifty percent (50%) Willow salix sp. and fifty percent (50%) mix of the other species specified.

3.3 Brushlayer / Live Fascine

A. Fabrication - Brushlayer/live fascines shall be fabricated using a combination of branches. Use branched brushy material. Materials used in the brushlayer shall be varied by branch diameter, attached branches, age of plant and species as determined by the Qualified Individual.

B. Size Ranges - The brushlayer/live fascines shall be fabricated from three and one half to five foot long branches with all side branches intact. The brushlayer/live fascines branches shall range in size from one half inch to two inches at the basal ends.

C. Excavation - The terraces for the combined brushlayer/live fascine shall be cut two and one half to three feet deep into the slope. The terraces shall slope back from the front outside edge to the back of the terrace at a 20 degree to 25 degree angle.

D. Installation

1. Prior to the placement of the brushlayer/live fascines branches, the coir erosion control fabric shall first be placed horizontally and "tucked" into and laid on each brushlayer/live fascine sloped terrace so that the entire terrace sloped and back excavation is covered with coir fabric. A one to two inch layer of select fill material shall be placed on top of the coir fabric on the sloped terrace bottom prior to the brushlayer/live fascine installation.

Step 1 The sloped terrace shall be prepared by placing a layer of select fill material on the coir lined terrace. The brushlayer branches shall be placed directly upon the Select fill material and woven coir erosion control fabric as follows:

Step 2 The live cut branch materials for the brushlayer shall be placed in three (3) different directions (angled right, left and perpendicular to the slope) with select fill material of approximately two inches in between and on the branches at each layer. Select fill material shall be placed and compacted in and around the live fascine bundle, branches, and dead stout stakes. The branches shall be completely surrounded with the Select fill material. A total of forty-five branches shall be used per linear yard.

Step 3 When the last perpendicular layer of branches are installed and two inches of select fill material is placed on them the live fascine bundle shall be placed on top and secured every three feet (3') with a dead stout

stake. The dead stout stakes shall be installed flush with the top of the live fascine bundle.

Step 4 Select fill material shall then be placed and compacted until the existing cut slope face elevation is reached.

2. Select fill material shall be filled in and around the branches, the bundle, and at each dead stout stake. The backfill around the live fascine bundle shall be compacted by foot. The select fill material shall be previously mixed with the required fertilizer, lime and soil amendments as specified herein. Water compaction shall not be acceptable. When backfill operations are completed for the brushlayer/live fascine, it shall be a continuous dense row of brush with a distinctive upward angle. The branches shall be slightly visible in the live fascine.

3. The brushlayer/live fascine shall form a bench in the cut slope. Live stakes are not required in the live fascine when it is combined with a brushlayer.

E. Spacing - The brushlayer/live fascine rows shall be spaced twenty feet apart (face measurements), in between the live fascines and parallel to each other as indicated. All final locations and configurations shall be determined in the field. Lay out these configurations on site for approval prior to excavation or installation.

F. Species Percent - Brushlayer/ live fascine methods shall be composed of (Species need to be determined in the field, but will likely be) fifty percent (50%) Willow salix sp. and fifty percent (50%) mix of the other species specified. In the brushlayer/live fascine, both the live fascine and the brushlayer units shall be mixed fifty percent (50%).

3.4 Live Siltation Construction

A. Fabrication - live siltation construction shall be fabricated using a combination of branches. Use branched brushy material. Materials used in the live siltation construction shall be varied by branch diameter, attached branches, age of plant and species as determined by the Qualified Individual.

B. Size Ranges - The live siltation construction shall be fabricated from five to seven foot long branches with all side branches intact. The live siltation construction branches shall range in size from one half inch to three inches at the basal ends.

C. Excavation - The trench for the combined live siltation construction shall be cut in a trapezoidal shape. The side closest to the creek shall be cut down and back into the bank at a forty-five degree (45°) angle. The bottom of the trench shall be eighteen inches wide with the back (furthest away from the creek) cut vertically. The trench is located immediately behind and above the previously installed rock toe protection.

D. Installation

1. Prior to the placement of the live siltation construction branches, the woven coir erosion control fabric shall first be placed horizontally and "tucked" into and laid in the live siltation construction trench so that the entire trench including the front sloped side, the bottom and the back excavation is covered with coir fabric. A one to two inch layer of select fill material shall

be placed on top of the coir fabric on the sloped side and bottom prior to the live siltation construction installation.

Step 1 The trench shall be prepared by placing a layer of select fill material on the coir lined trench, as previously described. The live siltation construction branches shall be placed in the trench directly upon the select fill material and woven coir erosion control fabric as follows:

Step 2 The live cut branch materials for the live siltation construction shall be placed in three (3) different directions (angled right, left and perpendicular to the creek) with select fill material of approximately two to four inches in between and on the branches at each layer. Select fill material shall be placed and compacted in and around the live siltation construction, branches. The branches shall be completely surrounded with the select fill material. A total of forty-five branches shall be used per linear yard.

Step 3 Place the last perpendicular layer of branches are installed and the final select fill material on them.

Step 4 Place a six to eight inch layer of stone on top of the live siltation construction along the bank side of the installation.

2. The branches shall be very visible and protrude approximately two feet from the trench. Only one row in installed along the creek.

E. Species Percent - Live siltation construction methods shall be composed of (Species need to be determined in the field, but will likely be) seventy percent (70%) Willow salix sp. and thirty percent (30%) mix of the other species specified.

3.5 Live Stake

A. General - Live staking is required in between the live fascine and brushlayer/live fascine methods. Install live stakes on prepared slopes as specified. Use live stakes alone or in combination with live fascine bundles with woven coir, seed and long straw mulched areas. When the live stakes are used as part of the brushlayer/live fascine or live fascine method, the live stake shall be considered part of the live fascine method. Install live stakes as specified.

B. Size Ranges - Stakes shall have a minimum diameter of one half inch and a maximum diameter of one and one-half inches. Cut live stakes from willow, Salix sp.

C. Fabrication - Trim all side branches and cut into two and one-half foot lengths. Cut flat on top, and at an approximately forty-five degree angle on the bottom end for tamping into the ground. Avoid bark stripping during fabrication. Damaged live stakes will not be acceptable.

D. Installation - Install live stakes into the ground. They shall protrude approximately three inches from the finished ground elevation. Place live stakes approximately at a forty-five degree angle to the slope face. In cases where the ground is hard, a pilot hole shall be made using a one-half inch metal rod to assist in inserting the live stake. This rod may not be larger than one-half inch outside diameter. The rod shall be carefully removed so as not to enlarge the hole. Alternatively the Contractor may elect to drill the holes using a two to three inch

diameter drill bit. Compact well around the live stake stem as it is being installed, to ensure that the live stake is in contact with the soil for its full installation length. Open woven coir prior to drilling (do not cut).

E. Density - Place stakes three and five feet on center as indicated.

3.6 Coir with Long Straw Mulch and Seed

A. General - This work consists of placing long straw mulch, seed and woven coir on the finished and prepared six inch deep select fill material on the slope face, in between the live installations, in and around live fascines, live siltation construction and brushlayer/live fascines as indicated.

B. Installation

1. In all areas where coir is used, the area shall be prepared with select fill material**,** six inches in depth, fertilized, seeded and lightly raked in one-quarter inch deep and covered with one and one half to two inches of long straw mulch. Spread the long straw mulch by hand. Do not chop up or blow it on. As specified, install woven coir over the top of the graded and prepared select fill material slope and in the trenches for live fascines and on the terraces of the brushlayers/live fascines and in the live siltation construction trench, or over these method installations. Secure the woven coir material with dead stout stakes three feet on center overall and every three feet on the overlapped seams. Overlap coir seams eight inches. Woven coir shall be dry when placed.

2. The covered slopes shall be smooth and neatly finished. The coir fabric shall not be in tension, but should be neatly and snuggly placed against the surface.

3.7 Seeding

A. Seed over the prepared select fill material slope and under the coir and long straw mulch. The seed mixture and spread rate shall be as specified in Section 02801. Prepare the seed, fertilizer mixture and spread rates and submit for approval. Do not sow seed on top of the installed live fascine, live siltation construction and brushlayer/live fascine soil bioengineering methods or in the trenches or on the terraces. Broadcast seed by hand in between the installed rows, one foot above and six inches below each soil bioengineering live cut branch installation. All seeded areas shall be fertilized, straw mulched and covered with woven coir erosion control fabric. Lightly rake one quarter inch deep the fertilizer and seed into the select fill material covered cut soil slope.

3.8 Compaction

A. Select fill material on the slope face shall be prepared by scarification and the amelioration of the insitu material to the depth of six inches. Select fill material is placed over and around live cut branches through the use of hand tools, foot tramping and machine as designated in the specifications.

B. Select fill material around the soil bioengineering methods shall be compacted to 80 to 85 percent Standard Proctor Density (ASTM D698).

- END OF SECTION -

DIVISION 04

SECTION 04100
CLOSE MINE OPENINGS

PART 1 - GENERAL

1.1 Description

This work shall consist of permanently closing all mine openings, a shaft is a vertical opening, and any opening basically in a horizontal plane will be considered as an adit.

1.2 Conditions

The site conditions vary at each mine opening and the Contractor shall carefully evaluate the amount to work necessary to close each opening.

1.3 Submittals

The Contractor shall provide information on the material to be used for shaft closures per the submittal requirements for those material subsections of this Section.

PART 2 – MATERIAL

2.1 Riprap

Riprap used to close or seal mine openings shall be placed with an excavator or hand-laid and random riprap.

2.2 Other Backfill Materials

All other suitable materials adjacent to the mine openings shall be used as backfill material, but this material shall not interfere with the placement of the riprap closure. Materials below adits shall be pushed up into the openings insofar as possible.

The Contractor may be required to provide additional backfill materials to close the openings. Additional materials shall be obtained from borrow sources approved by the Engineer or from the areas designated on the Drawings.

PART 3 – EXECUTION

3.1 Site Preparation

All exposed timbers, ties, brush, trees, trash, and other combustible materials found in the mine opening work area shall be disposed of as specifies in Section 02130, Clearing and Grubbing. In no case will such material be placed within the mine opening or in the mine.

Metal, steel pipe, rails, concrete, and other like structural materials found in the mine opening shall be broken down and disposed in accordance with Section 02136.

Any portion of an entrance structure that would be exposed after the closure and reclamation of the opening shall be removed to a minimum of 1 foot below the finished ground surface. The limits of the closure work shall be determined by the Engineer prior to commencing with the closure work.

3.2 Topsoil Savage

All topsoil and other suitable surface soil shall be salvaged from any area to be disturbed by the closure work and stockpiled.

3.3 Drainage

Any mine opening discharging water will require construction of a drainage facility. Details of such facilities are shown on the Drawings.

3.4 Shaft Closure

Shafts shall be backfilled with approved materials in such a way as to provide a permanent and complete blockage of the shaft as shown in the Drawings. Complete blockage of the shaft is achieved by filling the entire area across the shaft and the drift below the shaft, which is necessary to support the backfill. Riprap (8-inch minus) will be placed to prevent future sloughing from the shaft into the drift. Material will be carefully and methodically placed to prevent bridging.

Mounding of backfill materials above the surrounding ground will be required as detailed in the Drawings. Materials used to construct the mound shall be compacted by operating construction equipment uniformly over the shaft. Final grading shall result in positive drainage of all areas.

3.5 Topsoil Replacement

After all other operations are completed and accepted by the Engineer, all available topsoil previously salvaged shall be spread uniformly over the disturbed areas and left with a rough surface texture without depressions where water will collect. The entire area shall be cleaned of all surface debris and left with a neat appearance.

- END OF SECTION -

USDA FOREST SERVICE
PACIFIC NORTHWEST REGION

FIRE PROTECTION AND SUPPRESSION

1. Fire Period and Closed Season

   Specific fire prevention measures are listed below and shall be effective for the period April 1 to October 31 of each year. The Forest Service may change the dates of said period by advance written notice if justified by unusual weather or other conditions. Required tools and equipment shall be kept currently in serviceable condition and immediately available for initial attack on fires.

2. Fire Plan

   Before starting any operations on the project, the Contractor, Permittee, Licensee, or Purchaser, hereinafter referred to as the "Contractor," shall prepare a fire plan in cooperation with the Engineer providing for the prevention and control of fires in the project area.

   The Contractor shall certify compliance with fire protection and suppression requirements before beginning operations during the fire period and closed season, and shall update such certification when operations change.

3. Substitute Measures

   The Engineer may by written notice authorize substitute measures or equipment or may waive specific requirements during periods of low fire danger.

4. Emergency Measures

   The Forest Service may require emergency measures, including the necessary shutting down of equipment or portions of operations in the project area during periods of fire emergency created by hazardous climatic conditions.

5. Fire Control

   The Contractor shall, independently and in cooperation with the Forest Service, take all reasonable action to prevent and suppress fires in the project area. Independent initial action shall be prompt and shall include the use of all personnel and equipment available in the project area.

   For the purpose of fighting forest fires on or in the vicinity of the project which are not caused by the Contractor's operations, the Contractor shall place employees and equipment temporarily at the disposal of the Forest Service. Any individual hired by the Forest Service will be employed in accordance with the Interagency Pay Plan for Emergency Firefighters. The Forest Service will compensate the Contractor for equipment rented at fire fighting equipment rates common in the area, or at prior agreed to rates.

6. Compliance with State Forest Laws

Listing of specific fire precautionary measures herein is not intended to relieve the Contractor in any way from compliance with the State Fire Laws covering fire prevention and suppression equipment, applicable to operations under this contract, permit or license.

7. Fire Precautions

Specific fire precautionary measures are as follows:

a. Smoking and Open Fires

Smoking and fires shall be permitted only at the option of the Contractor. The Contractor shall not allow open fires on the project area without advance permission in writing from Forest Service.

Unless restricted by State Law or Federal Regulation, smoking shall be permitted only in such portions of the project area that are free of flammable material. Smokers shall sit down to smoke in such a position that any burning material will fall within a cleared area, and shall extinguish and press out in mineral soil all burning material before leaving the cleared area.

b. Fire Extinguishers and Equipment on Trucks, Tractors, etc.

All power-driven equipment operated by the Contractor on National Forest land, except portable fire pumps, shall be equipped with one fire extinguisher having a UL rating of at least 5 BC, and one "D" handled or long handled round point shovel, size "0" or larger. In addition, each motor patrol, truck and passenger-carrying vehicle shall be equipped with a double-bit axe or Pulaski, 3-1/2 pounds or larger.

Equipment shall be kept in a serviceable condition and shall be readily available.

c. Power Saws

Each gasoline power saw operator shall be equipped with a pressurized chemical fire extinguisher of not less than 8-ounce capacity by weight, and one long-handled round point shovel, size "0" or larger. The extinguisher shall be kept in possession of the saw operator at all times. The shovel shall be accessible to the operator within 1 minute.

d. Extinguishers

One refill for each type or one extra extinguisher sufficient to replace each size extinguisher required on equipment shall be safely stored in the fire tool box or other agreed upon place on the project area that is protected and readily available.

e. Spark Arresters and Mufflers

Each internal combustion engine shall be equipped with a spark arrester meeting either (1) USDA Forest Service Standard 5100-1a, or (2) appropriate Society of Automotive Engineers (SAE) recommended practice J335(b) and J350(a) as now or hereafter amended unless it is:

(1)Equipped with a turbine-driven exhaust supercharger such as the turbocharger. There shall be no exhaust bypass.

(2)A passenger-carrying vehicle or light truck, or medium truck up to 40,000 GVW, used on roads and equipped with a factory-designed muffler complete with baffles and an exhaust system in good working condition.

(3)A heavy duty truck, such as a dump or log truck, or other vehicle used for commercial hauling, used only on roads and equipped with a factory designed muffler and with a vertical stack exhaust system extending above the cab.

Exhaust equipment described in this subsection, including spark arresters and mufflers, shall be properly installed and constantly maintained in serviceable condition.

f. Emergency Fire Precautions

The Contractor shall restrict operations in accordance with the Industrial Fire Precaution Levels listed below. The Forest Service may change the Industrial Fire Precaution Levels to other values upon revision of the National Fire Danger Rating System and may change the specific Industrial Fire Precaution Levels when such changes are necessary for the protection of the National Forest. When sent to the Contractor, the revised Industrial Fire Precaution Levels will supersede the attached levels.

INDUSTRIAL FIRE PRECAUTIONS SCHEDULE

LEVEL	INDUSTRIAL FIRE PRECAUTION (IFPL)

I. Closed season - Fire precaution requirements are in effect. A fire watch/security is required at this and all higher levels unless otherwise waived.

II. Partial hootowl - The following may operate only between the hours of 8 p.m. and 1 p.m., local time:

a. power saws, except at loading sites;
b. cable yarding;
c. blasting;
d. welding or cutting of metal.

III. Partial shutdown - The following shall be prohibited except as indicated:

Cable yarding - except that gravity operated logging systems employing non-motorized carriages may be operated between the hours of 8 p.m. and 1 p.m., local time, when all block and moving lines, except the line between the carriage and the chokers, are suspended 10 feet above the ground;

Power saws - except power saws may be used at loading sites and on tractor/skidder operations between the hours of 8 p.m. and 1 p.m., local time.

In addition, the following are permitted between the hours of 8 p.m. and 1 p.m., local time:

a. tractor/skidder operations;
b. mechanized loading and hauling of any product or material;
c. blasting;
d. welding or cutting of metal;
e. any other spark-emitting operation not specifically mentioned.

IV. General shutdown - All operations are prohibited.

The following definitions shall apply to these Industrial Fire Precaution Levels:

Cable yarding systems: A yarding system employing cables and winches in a fixed position.

Closed season (Fire Precautionary Period): That season of the year when a fire hazard exists as declared by the responsible agency official.

Engineer: The person executing the contract, permit or license on behalf of the Government and includes that person's designated representative, acting within the limits of their authority or the duly appointed successor to the individuals.

Loading sites/woods site/project area: A place where any product or material (including but not limited to logs, firewood, slash, soil, rock, poles, posts, etc.) is placed in or upon a truck or other vehicle.

Low hazard area: Means any area where the responsible agency representative (WDNR, ORF, BIA, BLM) determines the combination of elements reduces the probability of fire starting and/or spreading.

Tractor/skidder operations: include a harvesting operation, or portion of a harvesting operation, where tractors, skidders, or other harvesting equipment capable of constructing fireline, are actively yarding forest products and can quickly reach and effectively attack a fire start.

Waivers, written in advance, may be used for any and all activities. Activities for which waivers may be issued include, but are not limited to:

a. mechanized loading and hauling;
b. road maintenance such as sprinkling, graveling, grading and paving;
c. cable yarding using gravity systems or suspended lines and blocks, or other yarding systems where extra prevention measures will significantly reduce the risk of fire;
d. powers saws at loading sites or in felling and bucking where extra prevention measures will significantly reduce the risk of fire;
e. maintenance of equipment (other than metal cutting and welding) or improvements such as structures, fences and powerlines.

Such waiver, or substitute precautions will prescribe measures to be taken by the Contractor to reduce the risk of ignition, and/or the spread of fire. The Engineer shall consider site specific weather factors, fuel conditions, and specific operations that result in less risk of fire ignition and/or spread than contemplated when precaution level was predicted. Consideration shall also be given to measures that reduce the precaution levels above. The Contractor shall assure that all conditions of such waivers or substitute precautions are met.

The Contractor shall obtain the predicted Industrial Fire Precaution Level daily, prior to the start of work, from the appropriate Ranger District headquarters. If predictions made after 6:00 p.m., local time, are significantly different than the original prediction, the Forest Service will inform the Contractor when changes in restrictions or industrial precautions are made.

NOTE:The IFPL system does not apply on lands protected by ODF east of the summit of the Cascades.

Where hauling involves transit through more than one shutdown/regulated use area, the precaution level at the woods loading site shall govern the level of haul restriction, unless otherwise prohibited by other than industrial precaution level system.

8. Fire Tools

The Contractor shall furnish serviceable fire fighting tools in a readily accessible fire tool box or compartment of sound construction with a hinged lid and hasp so arranged that the box can be secured or sealed. The box shall be red and marked "Fire Tools" in letters one inch high. It shall contain a minimum of:

a. 2 axes or Pulaskis with a 32-inch handle;

b. 3 adze eye hoes. One Pulaski may be substituted for 1 adze eye hoe;

c. 3 long-handled, round point shovels, size "0" or larger.

9. Fire Security

When the Industrial Fire Precautions Level is "I" or higher, unless a waiver is granted, the Contractor shall designate a person who shall perform fire security services listed below on the project area and vicinity. The designated person shall be capable of operating the Contractor's communications and fire fighting equipment specified in the contract, excluding helicopters, and of directing the activities of the Contractor's personnel on forest fires. In lieu of having the designated person perform the required supervisory duties, the Contractor may provide another person meeting the qualifications stated above to direct the activities of Contractor's personnel and equipment during all fire fighting activities.

Services described shall be for at least 1 hour from the time the Contractor's operations are shut down. For the purposes of this provision, personnel servicing equipment, and their vehicles, who are not engaged in cutting or welding metal are excluded.

Fire security services shall consist of moving throughout the operation area or areas constantly looking, reporting, and taking suppression action on any fires detected. Where possible, the designated person shall observe inaccessible portions of helicopter operating areas from vantage points within or adjacent to project area.

10. Blasting

Whenever the Industrial Fire Precaution Level is "II" or greater, a fire security person equipped with a long-handled, round point, No. "0" or larger, shovel, and a five-gallon backpack pump can filled with water will stay at location of blast for 1 hour after blasting is done. Blasting may be suspended by Forest Service in writing, in an area of high rate of spread and resistance to control.

Fuses shall not be used for blasting. Explosive cords shall not be used without written permission of Forest Service, which may specify conditions under which such explosives may be used and precautions to be taken.

Additional Fire Precautionary Measure 1 - Tank Truck

The Contractor shall provide a tank truck or trailer containing not less than 300 gallons of water during yarding, loading, land clearing, right of way clearing, and mechanical treatment of slash. A tank truck or trailer will not be required if power saw falling and bucking is the only operation. Such tank truck or trailer shall be maintained in a serviceable condition and located within 10 minutes, round trip, from each project area during fire period and closed season.

The tank truck or trailer shall be equipped with a pump capable of discharging 20 gallons of water per minute, using a ¼ inch nozzle tip, through a 50-foot length of rubber lined hose. In addition, 500 feet of serviceable fabric jacket rubber lined hose of not less than 1 inch outside diameter, fitted with a nozzle capable of discharging a straight stream of ¼ inch diameter and a spray pattern shall be immediately available for use. The tank, pump, and at least 250 feet of hose and nozzle shall be connected and ready for use at all times.

If a trailer is used, it shall be equipped with a hitch to facilitate prompt movement. A serviceable tow vehicle shall be immediately available for attachment to the trailer and must meet the time requirements stated above. Such truck or trailer shall be equipped to operate for a minimum of 8 hours. Tank truck or trailer shall be available from the start of work to the end of the Fire Watch/Fire Security service.

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Additional Fire Precautionary Measure 2 - Communications

The Contractor shall provide adequate two-way communication facilities to report a fire to the Forest Service within 15 minutes of detection. FCC regulations prohibit commercial use of Citizen Band (CB) radios. CB's are not considered adequate two-way communications.

Such communications shall be operable during periods of operation of power driven equipment, including the time fire security is required.

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