

NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA CONSERVATION PRACTICE STANDARD

LAND RECLAMATION, ABANDONED MINED LAND

(Ac.)

CODE 543

DEFINITION

Reclamation of land and water areas adversely affected by past mining activities

PURPOSE

- Stabilize abandoned mined areas to decrease erosion and sedimentation, support desirable vegetation and improve offsite water quality and/or quantity
- Protect public health, safety and general welfare
- Maintain or improve landscape visual and functional quality

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to abandoned mined land that degrades the quality of the environment and prevents or interferes with the beneficial uses of soil, water, air, plant or animal resources, or endangers human health and safety.

CRITERIA

General Criteria Applicable to All Purposes

Develop a reclamation plan that is consistent with the site capability, the planned land use and the landowner's conservation objectives. Include practices necessary to reclaim and stabilize the mined areas to prevent further degradation of soil, water, air, plant and animal resources.

Dust Control. Control the generation of particulate matter and fugitive dust during removal and replacement of soil and other materials. Detail the practices and activities

necessary for dust control in the plans and specifications.

Site Preparation. Properly identify areas for preservation including those containing desirable trees, shrubs, grasses, stream corridors, natural springs, historic structures or other important features.

Remove trees, logs, brush, rubbish and other debris from construction areas that can interfere with reclamation operations. Dispose of these materials so they will not create a resource problem or interfere with reclamation activities and the planned land use.

Remove or bury soil materials that will adversely affect water quality or plant growth. Bury materials containing heavy metals and/or acid forming materials below the root zone, or add suitable soil amendments to minimize the negative effect of this material. Materials that would adversely affect ground water if buried shall be removed from the site.

Slope overhanging rocks walls to ½ horizontal to one vertical slope or flatter before placing backfill against the wall. In the plans and specifications, identify the thickness and density of lifts for fill material to limit the deep infiltration of precipitation and to limit settlement of the completed fill to acceptable levels, based on the planned land use.

Removal and Placement of Material for Final Cover. Salvage, stockpile and protect soil materials from the site that are suitable for use as final cover material. Control prohibited noxious and/or invasive plant species in the stockpile area. Use Virginia Conservation Practice Standard *Pest Management (Code 595)* for guidance to control noxious and invasive plants.

Reconstructed soils must meet the requirements for the specified land use on at least 80 percent of the area. Soils in the remaining areas must be suitable for stabilization and revegetation.

Spread the final cover material over the graded areas to the depth specified in the reclamation plan. The final slope must permit application of needed conservation and management practices to keep soil losses within planned levels. Some settlement of the final cover material is likely to occur. Plan for expected settlement if it is likely to interfere with the intended land use, surface drainage, or water disposal.

Erosion and Sediment Control during Construction. Plan and implement conservation practices that will decrease erosion and trap sediment onsite during construction to limit offsite damages from sedimentation to acceptable levels.

Runoff Control. Plan and implement runoff control practices to control erosion for final stabilization of the site. The practices selected must be compatible with the final planned land use of the site.

Establishment of Vegetation. Do site preparation, planting and seeding at a time and in a manner to ensure survival and growth of the selected species. In the plans and specifications, identify the criteria for successful establishment of vegetation such as minimum percent ground/canopy cover, percent survival or stand density.

Apply soil amendments and/or plant nutrients as appropriate, according to the requirements of Virginia Conservation Practice Standard *Nutrient Management (Code 590)*. If the recommended fertilizer rate exceeds the criteria in Virginia Conservation Practice Standard *Nutrient Management (Code 590)*, use appropriate mitigating practices to reduce the risk of nutrient losses from the site.

Select plant materials suitable for the specified end land use according to local climate potential, site conditions and the Plant Establishment Guide for Virginia. Identify in the plans and specifications the species, rates of seeding or planting, minimum quality of planting stock, such as PLS or stem caliper,

and method of establishment. Use only viable, high quality seed or planting stock.

Use the Plant Establishment Guide for Virginia for seedbed preparation, seeding rates, planting dates, depths and methods. The slope of the land shall be considered in the selection of seedbed preparation methods.

Restoration of Borrow Area. If fill material is removed from a borrow area, the topsoil from the borrow area must be stockpiled separately and replaced after the borrow area is restored for its intended purpose.

If topsoil is removed from a borrow area, grade and shape the borrow area for proper drainage and revegetate to control erosion.

If the borrow area is prime farmland, remove and stockpile the A and B soil horizons separately by horizon (or the B and C soil horizons if applicable). Replace the soil horizons on the borrow area in the natural sequence to a thickness that will restore the original soil productivity. Treat the borrow area to meet the requirements of the Virginia Conservation Practice Standard *Land Reclamation* 313 Waste Storage Facility

359 Waste Treatment Lagoon

378 Pond

436 Irrigation Storage Reservoir

552 Irrigation Regulating Reservoir, *Currently Mined Land (Code 544)*.

Additional Criteria to Maintain or Improve Landscape Visual and Functional Quality

Reclaim the site to maintain or improve visual quality based on the scenic quality of the reclaimed site as well as the function of the site for the end land use. Plan the reclamation to be compatible with the topography and land cover of the adjacent landscape. Focus on areas of high public visibility and those offering direct or indirect human and wildlife benefits.

Grade and shape spoil piles and borrow areas to blend with the adjacent landscape topography to the extent practicable.

Develop a planting plan that mimics the species, arrangement, spacing and density of

plants growing on adjacent landscapes. Choose native species of erosion control vegetation and other plant materials where practical. Arrange plantings to screen views, delineate open space, act as windbreaks, serve as parkland, provide wildlife habitat or protect stream corridors.

Additional Criteria to Protect Public Health, Safety and General Welfare

Reclamation plans must eliminate the safety hazards to the public from erosion and water pollution, high walls, pools of water with steep side slopes that are difficult to escape from, landslide potential, and exposed mine openings.

Based upon the site hazards, design treatment alternatives that meet the requirements of the Virginia Conservation Practice Standards *Land Reclamation, Landslide Treatment, (Code 453)*, *Land Reclamation, Toxic Discharge Control (Code 455)* and/or *Mine Shaft and Adit Closing (Code 457)*.

Abandoned mine sites may contain buildings or other structures either on or eligible for the National Register of Historic Places (NRHP). Include a cultural resources (Section 106) review of the site during planning to determine what actions need to take place. Structures that are on or eligible for the NRHP should be considered and recorded. Under NRHP regulations (36 CFR part 800), structures that present a hazard may be removed or destroyed after proper recording and consultation with the State Historic Preservation Officer (SHPO) and appropriate tribes.

CONSIDERATIONS

The reclamation of abandoned mine lands provides an opportunity to increase carbon sequestration. Choose species such as deep rooted perennial grasses and trees to increase the carbon sequestration potential of the reclaimed site.

The key to a successful restoration is often dependent upon the proper placement of soils that will best support vegetation. One means to do this is to develop a detailed soil survey for the project and proposed borrow areas. Use the soil survey to identify the types and

extent of soil materials and those that will best support vegetation.

Soil permeability is often a problem on reclaimed soils. Improve soil permeability after placing backfill material by using tillage or deep ripping to decrease compaction and promote infiltration and root development. Do not plan practices that promote infiltration if seepage through cover materials has the potential to increase acid mine drainage from underlying acid forming materials.

Maintenance activities will need to occur on a regular basis after initial reclamation to ensure success. The construction of stabilized access roads will allow access to the site for maintenance without causing erosion problems. Gravel roads should be surfaced with a well-graded gravel in order to allow all-weather access to the site.

Reclaimed mine areas can provide important wildlife habitat. Improve the potential for wildlife habitat by establishing diverse vegetation types, including water in the reclaimed landscape, increasing edge effect and diverse landforms. Avoid monocultures of vegetation when possible.

Reclaimed soils are often low in organic matter. The use of appropriate rates of organic soil amendments such as manure, compost, mulch or biosolids can contribute to the success of vegetative establishment by increasing soil organic matter. Use of biosolids will require additional permits.

Every effort should be made to utilize native, non-invasive vegetative species.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for each treatment unit according to the Criteria, and Operation and Maintenance sections of this standard.

Record all required information in an engineer field book, on a plan sheet or design computation sheet, or in another appropriate location.

DESIGN DATA

1. Completed Environmental Evaluation (Form VA-EE-1) and subsequent requirements.
2. Soils and geologic investigation.
3. Survey and plot data: profile, cross-sections, topography, as needed.
4. Design computations, including purpose of practice and references used.
 - a. Detailed information on the soil amendments to be applied to the site.
 - b. Needed water control structures.
 - c. Plan for control of AMD, as needed.
 - d. Plan for addressing safety hazards.
5. Plan view of site with existing and planned features, including dimensions, distances, location of topsoil stockpiles, final grading plan, etc.
6. Standard Cover Sheet (VA-SO-100A).
7. Materials and quantities needed. Identify borrow material and/or spoil area, as needed. Plans for restoration of the borrow area(s) shall be shown.
8. Detailed information on the species and arrangement of plant materials to be planted on the site.
9. Detailed information for the installation of erosion and sediment control practices.
10. Supplemental practices required.
11. Virginia Conservation Practice Specifications (700 Series) or NEH, Part 642, Specifications for Construction Contracts.
12. Operation and Maintenance Plan.

CHECK DATA

1. As-built survey.
2. As-built plans including dimensions, types and quantities of materials installed, and variations from design. Include justification for variations.
3. Locations of appurtenant practices.
4. Adequacy of vegetation and/or ground cover.
5. Complete as-built section of Cover Sheet.

OPERATION AND MAINTENANCE

Prepare an Operation and Maintenance plan that provides specific details concerning

conservation practices identified in the reclamation plan. As a minimum, include the following items in the operation and maintenance plan.

- Annually check the site for areas where settlement may adversely affect drainage and land use. Repair when needed.
- Annually check the site for bare spots, eroded areas, areas of excessive settlement and other areas where initial attempts to establish vegetation were not successful. Use annual soil test results to determine if additional soil amendments are needed prior to revegetation.
- Maintenance of access roads.
- Maintenance of drainage structures and channels.
- Annually check the site for noxious weeds and invasive species. Remove unwanted plants, as needed.
- Control of vehicular traffic to minimize disturbance to reclaimed areas.

REFERENCES

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