

**Appendix D**

**FERC Upland Erosion Control,  
Revegetation and Maintenance Plan**



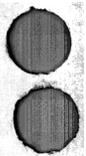
**UPLAND EROSION CONTROL, REVEGETATION, AND  
MAINTENANCE PLAN**

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## UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN (PLAN)

### I. APPLICABILITY

- A. This Plan applies to all natural gas construction projects where it is imposed by the Commission or agreed to by project sponsors and shall be used for all nonwetland areas of a project. However, the staff encourages using this Plan for all construction and abandonment activities. Wetland and waterbody systems are addressed in the Wetland and Waterbody Construction and Mitigation Procedures (**Procedures**).

Deviations that involve measures different from those contained in this Plan will only be permitted as certificated by the Commission or by written approval of the Director of the Office of Pipeline Regulation (OPR), or his/her designee, unless specifically required in writing by another Federal, state, or Native American land management agency for the portion of the project on its land. The project sponsor shall file other agency requirements with the Secretary of the Commission (Secretary) before construction.

- B. The intent of this Plan is to confine project-related disturbance to certificated areas (such as construction right-of-way, extra work areas, pipe storage yards, and access roads), and to minimize erosion and enhance revegetation in those areas. Any project-related ground disturbance (including erosion) outside of these areas is subject to compliance with all applicable survey and mitigation requirements.
- C. The project sponsor shall file with the Secretary the locations and dimensions of all areas that will be disturbed by project-related activities, including pipe storage yards, contractor yards, disposal areas, and access roads as part of its application.

### II PRECONSTRUCTION FILING

- A. Before construction begins on a project that will disturb more than 5 acres of land, the project sponsor must file with the Secretary a copy of its Stormwater

Pollution Prevention Plan prepared for compliance with the U.S. Environmental Protection Agency's National Stormwater Program General Permit requirements. This plan must be available in the field on each construction spread and shall include a Spill Prevention, Containment, and Countermeasure Plan (see section IV.A. of the Procedures).

- B. The project sponsor shall file with the Secretary all written requirements from Federal, state, or Native American land management agencies regarding erosion control, revegetation, or maintenance for the project that deviate from this Plan.

### III. SUPERVISION AND INSPECTION

#### A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector is required for each construction spread during active construction or restoration.
2. Environmental Inspectors shall have peer status with all other activity inspectors.
3. Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the FERC certificate or other authorizations and order corrective action.

#### B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS

At a minimum, the Environmental Inspector(s) shall be responsible for:

1. Ensuring compliance with the requirements of this Plan, the Procedures, the environmental conditions of the FERC certificate authorization, the mitigation measures proposed by the applicant in the application submitted to FERC, and other environmental permits and approvals;

2. Verifying that the limits of authorized construction work areas and locations of access roads are properly marked before clearing;
3. Verifying the location of drainage and irrigation systems;
4. Identifying stabilization needs in all areas;
5. Locating dewatering structures and slope breakers to ensure they will not direct water into known cultural resources sites or locations of sensitive species;
6. Verifying that trench dewatering activities do not result in the deposition of sand, silt, and/or sediment near the point of discharge into a wetland or waterbody. If such deposition is occurring, the dewatering activity shall be stopped and the design of the discharge shall be changed to prevent reoccurrence;
7. Testing subsoil and topsoil in agricultural and residential areas to measure compaction and determine the need for corrective action;
8. Advising the Chief Inspector when conditions (such as wet weather) make it advisable to restrict construction activities in agricultural areas;
9. Ensuring restoration of contours and topsoil;
10. Approving imported soils for use in agricultural and residential areas;
11. Ensuring that temporary erosion controls are properly installed and maintained, daily if necessary;

12. Inspecting temporary erosion control measures at least:
  - on a daily basis in areas of active construction or equipment operation;
  - on a weekly basis in areas with no construction or equipment operation; and
  - within 24 hours of each 0.5 inch of rainfall;
13. Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification;
14. Keeping records of compliance with the environmental conditions of the FERC certificate, and the mitigation measures proposed by the project sponsor in the application submitted to the FERC, and other Federal or state environmental permits during active construction and restoration; and
15. Establishing a program to monitor the success of restoration. See section VIII.A. Implementation of this program may be transferred to the company's operating section upon completion of construction and restoration activities.

#### IV. PRECONSTRUCTION PLANNING

The project sponsor shall do the following before construction:

##### A. DRAIN TILE AND IRRIGATION SYSTEMS

1. Contact landowners to locate fields containing drainage tiles and irrigation systems.
2. Contact landowners and local soil conservation authorities to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.

##### B. GRAZING DEFERMENT

Develop grazing deferment plans with willing landowners, grazing permittees, and land management agencies to minimize grazing disturbance of revegetation efforts.

C. ROAD CROSSINGS AND ACCESS POINTS

Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration.

D. DISPOSAL PLANNING

Determine methods and locations for the disposal of timber, slash, chips, and excess rock. Off-site disposal is subject to compliance with all applicable survey and mitigation requirements.

E. AGENCY COORDINATION

1. Coordinate with the appropriate agencies as specified in sections IV.A.2., IV.B., IV.E.2., IV.E.3., V.F.1.b., V.F.3.d., VI.B.2.b., VI.D.2 VI.D.3.b., and VI.D.3.h.
2. Obtain written recommendations from the local soil conservation authorities or land management agencies regarding erosion control and revegetation specifications, both temporary and permanent. Have available all written recommendations from these or other agencies for erosion control and revegetation specifications at the project location.
3. Develop specific procedures in coordination with the appropriate agency to prevent the introduction or spread of noxious weeds and soil pests resulting from construction and restoration activities.

V. INSTALLATION

A APPROVED AREAS OF DISTURBANCE

1. Confine construction activity and ground disturbance to certificated areas.
2. The construction right-of-way width shall not exceed that described in the project sponsor's FERC application unless otherwise modified by a certificate condition. However, additional construction right-of-way may be used (subject to compliance with all applicable survey and mitigation requirements) in limited areas for full right-of-way width topsoil segregation or where topographic conditions, such as side-slopes, require it to ensure safe construction. In no case shall the construction right-of-way width exceed 100 feet without the prior written approval of the Director of OPR.

B. TOPSOIL SEGREGATION

1. Use topsoil segregation methods in all residential areas and when the construction right-of-way is wider than 30 feet in:
  - annually cultivated or rotated agricultural lands (except pasture);
  - hayfields; and
  - other areas at the landowner's request.
2. Prevent the mixing of topsoil with subsoil by stripping topsoil from either the full work area or from the trench and subsoil storage area (ditch plus spoilside method).
3. In residential areas topsoil replacement (i.e., importation of topsoil) is an acceptable alternative to topsoil segregation.
4. In deep soils (more than 12 inches of topsoil), segregate at least 12 inches of topsoil. In soils with less than 12 inches of topsoil make every effort to segregate the entire topsoil layer.

C. DRAIN TILES

1. Mark drain tile locations identified during construction.
2. Probe all drainage tile systems within the area of disturbance to check for damage.
3. Repair damaged drain tiles to their original or better condition. Do not use filter-covered drain tiles unless the local soil conservation authorities and the landowner agree. Use qualified specialists for testing and repairs.
4. For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems. For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).

D. IRRIGATION

Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.

E. ROAD CROSSINGS AND ACCESS POINTS

1. Maintain safe conditions at all road crossings in accordance with the road crossing plans referenced in section IV.C.
2. If crushed stone access pads are used in residential or active agricultural areas, place the stone on synthetic fabric to facilitate removal.

F. TEMPORARY EROSION CONTROL

Install temporary erosion controls immediately after initial disturbance of the soil. Temporary erosion controls must be properly maintained throughout construction (on a daily basis) and reinstalled as

necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is complete.

1. Temporary Slope Breakers

- a. Temporary slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope breakers may be constructed of materials such as soil, silt fence, staked hay or straw bales, or sand bags.
- b. Construct temporary slope breakers using the written recommendations of the local soil conservation authorities. In the absence of these recommendations, install temporary slope breakers at the following spacing:

<u>Slope (%)</u>	<u>Spacing (feet)</u>
5 - 15	300
>15 - 30	200
>30	100

- c. Direct the outfall of each temporary slope breaker to a stable, well vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.
- d. Inspect and maintain temporary slope breakers as specified in sections III.B.11. through 13.

2. Sediment Barriers

- a. Sediment barriers are intended to stop the flow of sediment. They may be constructed of materials such as silt fence, staked hay or straw bales, or sand bags.
- b. Install temporary sediment barriers at the base of slopes adjacent to road crossings

until disturbed vegetation has been reestablished.

- c. Install temporary sediment barriers at appropriate locations to prevent siltation into waterbodies or wetlands crossed by or near the construction work area (as required in the Procedures).
- d. Inspect and maintain all temporary sediment barriers as specified in sections III.B.11 through 13.
- e. Maintain all temporary sediment barriers in place until permanent revegetation measures are successful or the upland areas adjacent to wetlands, waterbodies, or roads are stabilized.
- f. Remove temporary sediment barriers from an area when that area is successfully restored as specified in section VIII.A.6.

### 3. Mulch

- a. Mulch is intended to stabilize the soil surface. Mulch can consist of straw, hay, erosion control fabric, or some functional equivalent.
- b. Apply mulch in accordance with the specifications outlined in this section except, if mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre.
- c. Mulch before seeding if:
  - (1) final cleanup, including final grading and installation of permanent erosion control measures, is not completed in an area within 10 days after the trench in that area is backfilled; or

(2) construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions;

- d. On all dry, sandy sites and slopes greater than 8 percent, spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw or hay or its equivalent, unless the local soil conservation authority makes other recommendations in writing. If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).
- e. If a mulch blower is used, the strands of the mulching material shall be at least 8 inches long to allow anchoring.
- f. Ensure that mulch is anchored to minimize loss by wind and water.
- g. When anchoring by mechanical means, use a mulch anchoring tool to properly crimp the mulch to a depth of 2 to 3 inches.
- h. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or waterbodies.
- i. Install erosion control fabric, such as jute thatching or bonded fiber blankets, at a minimum, on waterbody banks at the time of final bank recontouring. Anchor the erosion control fabric with staples or other appropriate devices.

## VI. RESTORATION

### A CLEANUP

1. Make every effort to complete final cleanup of an area (including final grading and installation of permanent erosion control structures) within 10 days after backfilling the trench in that area. If this schedule cannot be met, final cleanup must be completed as soon as possible. In no case shall final cleanup be delayed beyond the end of the next recommended seeding season.
2. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed as specified in section V.F. and inspected and maintained as specified in sections III.B.11 through 13. When access is no longer required the travel lane must be removed and the right-of-way restored.
3. Excess rock, including blast rock may be used to backfill the trench to the top of the existing bedrock profile.
4. Remove excess rock from at least the top 12 inches of soil to the extent practicable in all rotated and permanent cropland, hayfields, pastures, residential areas, and other areas at the landowner's request. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. Make diligent efforts to remove stones greater than 4 inches if the off right-of-way areas do not contain stones greater than 4 inches. The landowner may approve other rock size provisions in writing.
5. Remove construction debris from the right-of-way and grade the right-of-way to leave the soil in the proper condition for planting.

B. PERMANENT EROSION CONTROL DEVICES

1. Trench Breakers

- a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers.
- b. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and upslope of permanent slope breakers.
- c. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.
- d. Install trench breakers at the base of slopes adjacent to waterbodies and wetlands and where needed to avoid draining of a wetland.

2. Permanent Slope Breakers

- a. Permanent slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Permanent slope breakers may be constructed of materials such as soil and sand bags.
- b. Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, using the spacing recommendations obtained from the local soil conservation authority. In the absence of written recommendations, use the spacing for temporary slope breakers provided in section V.F.1.b.

- c. Construct slope breakers with a 2 to 8 percent outslope to divert surface flow to a stable area. In the absence of a stable area, construct appropriate energy-dissipating devices off the construction right-of-way. Where slope breakers extend beyond the edge of the construction right-of-way to direct runoff into stabilized areas, they are subject to compliance with all applicable survey requirements.

#### C. SOIL COMPACTION MITIGATION

1. Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to identify approximate preconstruction conditions. Use U.S. Army Corps of Engineers-style cone penetrometers or other appropriate devices to conduct tests.
2. Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil. Alternatively, make arrangements with the landowner to plant and plow under a "green manure" crop, such as alfalfa, to decrease soil bulk density and improve soil structure. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.
3. Perform appropriate soil compaction mitigation in severely compacted residential areas.

#### D. REVEGETATION

1. General
  - a. The project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities, except as noted in section VI.D.1.b.

- b. Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowner's request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.

## 2. Soil Additives

Fertilize and add soil pH modifiers in accordance with written recommendations obtained from the local soil conservation authority or land management agencies. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as possible after application.

## 3. Seeding Requirements

- a. Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. When hydroseeding, scarify the seedbed to facilitate lodging and germination of seed.
- b. Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or land management agencies, except in upland areas where landowners request alternative seed mixes. Seeding and mulching in cultivated cropland shall conform with the adjacent off right-of-way area unless otherwise requested by the landowner in writing.
- c. Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures discussed in section V.F. and perform seeding of permanent vegetation at the beginning of the next recommended seeding

season. Lawns may be seeded on a schedule established with the landowner.

- d. Seed slopes steeper than 33 percent immediately after final grading, weather permitting, subject to the specifications in section VI.D.3.a-c.
- e. Seed all disturbed soils within 6 working days of final grading, weather and soil conditions permitting, subject to the specifications in section VI.D.3.a-c.
- f. Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.
- g. Treat legume seed with an inoculant specific to the species. For conventional seeding, use 4 times the manufacturer's recommended rate of inoculant. For hydroseeding, use 10 times the recommended rate of inoculant.
- h. Uniformly apply and cover seed in accordance with the written recommendations of the local soil conservation authorities or land management agencies.

In the absence of recommendations referred to in section VI.D.3.h. above, a seed drill equipped with a cultipacker is preferred for application, but broadcast or hydroseeding can be used at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding.

## VII. OFF-ROAD VEHICLE CONTROL

To each owner or manager of forested lands offer to install and maintain measures to control unauthorized vehicle access to the right-of-way. These measures may include:

- signs;
- fences with locking gates;

- slash and timber barriers, pipe barriers, or a line of boulders across the right-of-way; and
- conifers or other appropriate trees or shrubs across the right-of-way.

VIII. POST-CONSTRUCTION ACTIVITIES

A. MONITORING AND MAINTENANCE

1. Conduct follow-up inspections of all disturbed areas after the first and second growing seasons to determine the success of revegetation.
2. Monitor crops for at least 2 years to determine the need for additional restoration.
3. Revegetation shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation (or crops in cultivated cropland) are similar in density and cover to adjacent undisturbed lands. If vegetative cover and density are not similar or there are excessive noxious weeds after two full growing seasons, a professional agronomist shall determine the need for additional restoration measures (such as fertilizing or reseeding). Implement the measures recommended by the agronomist.
4. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in active agricultural areas.
5. Routine vegetation maintenance clearing shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained annually in a herbaceous state. In no case shall routine vegetation maintenance clearing occur between April 15 and August 1 of any year.
6. Restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, revegetation is

successful, and all temporary erosion control devices are removed.

7. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and vehicle trails as necessary.

#### B. REPORTING

1. The project sponsor shall maintain records that identify by milepost:
  - a. method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;
  - b. acreage treated;
  - c. dates of backfilling and seeding; and
  - d. names of landowners requesting special seeding treatment and a description of the follow-up actions.
2. The project sponsor shall file with the Secretary quarterly activity reports documenting problems, including those identified by the landowner, and corrective actions taken for at least 2 years following construction.