Erosion Control Plan

Original Document:
Appendix C
Second Draft of the Construction, Operations, and Maintenance Plan
January 27, 2017 Supplemental Filing
8.1 UPLAND EROSION CONTROL PLAN

8.2 PURPOSE

This ESCP has been prepared for use by Atlantic and its contractors as a guidance manual for minimizing erosion of disturbed soils and transportation of sediments off the construction right-of-way and into sensitive resource and residential areas during natural gas pipeline construction. The procedures developed in this plan, which represent Atlantic’s BMPs, are designed to accommodate varying field conditions while achieving compliance with regulatory requirements and protecting environmentally sensitive areas.

This ESCP is designed to provide guidelines, BMPs, and typical techniques for the installation and implementation of soil erosion and sediment control measures while permitting adequate flexibility to use the most appropriate BMP measures based on site-specific conditions. The intent of the ESCP is to provide general information on the pipeline construction process and sequence, and to describe specific measures that will be employed during and following construction to minimize impacts to the environment.

The goal of the ESCP is to preserve the integrity of the construction area and environmentally sensitive areas and to maintain existing water quality by:

- Minimizing the extent and duration of disturbance;
- Diverting runoff to stabilized areas;
- Installing temporary and permanent erosion control measures; and
- Establishing an effective inspection and maintenance program.

All land-disturbing activities will conform, at a minimum, to the FERC Plan and Procedures. Atlantic will also prepare and comply with SWPPPs that meet each state’s requirements. The SWPPPs are currently being prepared. Atlantic will also prepare Construction Alignment Sheets depicting the locations of erosion and sediment controls in construction work areas, consistent with the FERC Plan and Procedures, as well as the West Virginia Department of Environmental Protection, Division of Water and Waste Management, Erosion and Sediment Control Best Management Practice Manual\(^1\) (2006), the Virginia Department of Environmental Quality’s Virginia Erosion and Sediment Control Handbook (VESCH) \(^2\) (1992), Virginia’s Forestry Best Management Practices for Water Quality Technical Manual, DTI’s 2016 Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management for Construction and Maintenance of Linear Gas Transmission Pipeline (Standards and Specifications), and Dominion’s Slope Stability Policy and Procedure (Attachment C).

In addition, the MNF and GWNF are managed under LRMPs issued in 2011 and 2014, respectively. The LRMPs are comprehensive planning documents designed to guide land management decisions within the National Forest boundaries. The LRMPs describe desired conditions and outline Management Prescriptions to be pursued to achieve those conditions.

The Virginia Department of Forestry’s Virginia’s Forestry Best Management Practices for Water Quality, Technical Manual, 2011 was also consulted during selection of erosion and sediment control measures.

---

\(^1\) An online copy is available on the West Virginia Department of Environmental Protection website at: [https://apps.dep.wv.gov/dwwm/stormwater/BMP/index.html](https://apps.dep.wv.gov/dwwm/stormwater/BMP/index.html)

\(^2\) Hardcopy 1992 editions identify this as a Virginia Department of Conservation and Recreation document; the online version identifies this as a Virginia Department of Environmental Quality document.
Atlantic selected the more stringent or protective of the erosion and sediment control requirements set forth by FERC, West Virginia, Virginia, and the USFS to include in this ESCP. Consultation with USFS staff regarding specific control and restoration measures to be used in the MNF and GWNF is ongoing.

8.3 SOILS

An Order 1 Soil Survey (Survey) was performed between May 9 and June 22, 2016 along the available sections of the approximately 21.4-mile portion the route between MP 47 and MP 115. The Survey included approximately 5.2 miles of the route within the Marlinton Ranger District in the MNF, and 15 miles in the Warm Springs and North River Districts in the GWNF.

The Survey activities were conducted in a manner compliant with the requirements outlined in special use permit #GBR205003 for surveys in the MNF, and special use permit #GWP433201T for surveys in the GWNF.

8.2.1 Soil Survey

The Survey was conducted in four phases: (1) Desktop Study, (2) Preliminary Field Reconnaissance, (3) Team Training, and (4) Field Investigation. Background information was obtained during the desktop study to help identify the prevalent soil-landscape relationships across the proposed pipeline route within the Project area. The background information was also used by the soil scientist team to identify preliminary test pit locations and develop strategies for conducting the Survey. Preliminary GIS-generated maps were prepared for planning and field use. This section outlines the objectives and accomplishments of each phase. The Survey Report and results are found in Attachment G.

8.3 CONSTRUCTION WORK AREAS

Construction work areas include the construction right-of-way, additional temporary work space, access roads, temporary pipe storage and contractor yards, and aboveground facilities.

8.3.1 Pipeline Right-of-Way

For the AP-1 mainline, the construction corridor in non-agricultural uplands will measure 125 feet in width, with a 40-foot-wide spoil side and an 85-foot-wide working side. In areas where full width topsoil segregation is required (e.g., agricultural areas), an additional 25 feet of temporary construction workspace will be needed on the working side of the corridor to provide sufficient space to store topsoil. In wetlands, the width of the construction right-of-way will be reduced to 75 feet, with 25 feet on the spoil side and 50 feet on the working side. Over short distances and where topography allows, it may be possible to reduce the width of the corridor to a minimum of 75 feet in ecologically sensitive areas to minimize impacts. Atlantic will work with the USFS to determine where the width of the construction right-of-way can be reduced, and where the additional corresponding ATWS on each side of the narrowed section will be located. Following construction, a 53.5 foot-wide permanent easement will be maintained for operation of the pipeline.

During construction of the pipeline, the top width of the excavated pipe trench in most areas will typically range from 10 to 15 feet. This assumes that construction personnel will not be required to work in the trench, which is typical for most installations. In areas with steep terrain, construction personnel will be required to work in the trench to weld the pipeline. In these areas, the top of the trench will typically be 30 feet wide to provide sufficient space for construction personnel to work in the trench.
safely. The additional spoil from excavation of a wider trench will be stockpiled in the temporary construction right-of-way and ATWS.

Refer to Attachment A for typical construction right-of-way diagrams showing general land-disturbing boundaries and construction techniques.

### 8.3.2 Additional Temporary Workspace

In addition to the construction right-of-way, ATWS will be required to stage construction activities and store equipment, materials, spoil and topsoil where required at wetland, waterbody, and road crossings. ATWS will also be required in areas with steep side slopes or where special construction techniques are implemented as well as at tie-ins with existing pipeline facilities, utility crossings, truck turnaround areas, and spread mobilization/de-mobilization areas.

ATWS measuring 50 by 150 feet will typically be required on both sides of the corridor and both sides of the crossing at wetlands, waterbodies measuring greater than 10 feet in width, two lane roads, and railroads. ATWS measuring 25 by 100 feet will typically be required on both sides of the corridor and both sides of the crossing at waterbodies measuring less than 10 feet in width and single lane roads. Consistent with the LRMPs, ATWS will be set back 100 feet from in-stream waterbody crossings on USFS lands. Locations of ATWS are shown on the alignment sheets (Attachment B).

### 8.3.3 Access Roads

Atlantic has identified roads to be used to provide access to the right-of-way during construction and operation of the Project. Atlantic will mostly utilize existing roads, but eight new roads are proposed to be constructed on USFS lands (see Section 2.1.1.4). Some existing roads will require improvement (such as grading, gravelling, replacing or installing culverts, minor widening, and/or clearing of overhead vegetation) to safely accommodate construction equipment and vehicles.

### 8.4 CRITICAL AREAS

Atlantic developed and implemented the Slope Stability Policy And Procedure (updated in September, 2016) to avoid, minimize, and mitigate potential landslide issues in slip prone areas prior to, during, and after construction. The Slope Stability Policy And Procedure (Attachment C) applies to both Virginia and West Virginia. It includes considerations for slips associated with pipeline construction during routing, engineering design, preconstruction planning, construction, and post construction.

#### 8.4.1 Steep Terrain

Atlantic recognizes the increased risk in slips associated with pipeline construction particularly while traversing steep slopes. Special construction procedures and erosion and sediment control measures will be used in steep terrain areas, as described in Section 8.7.2. Additionally, Atlantic has developed and implemented a BIC Program to proactively manage construction and operation in steep slope areas, as described in Section 8.7.2.

Atlantic will:

- ensure that the erosion and sediment control measures in West Virginia are in compliance with an approved SWPPP or the *West Virginia Erosion and Sediment Control Best Management Practice Manual*;
• ensure that the erosion and sediment control measures in the Commonwealth of Virginia are in compliance with an approved SWPPP or the following regulations:

• Virginia Erosion and Sediment Control Regulations, (9 Virginia Code [VAC] VAC 25-840 et seq., as amended);
• Virginia Erosion and Sediment Control Certification Regulations (9 VAC 25-850 et seq. as amended);  
• Virginia Department of Environmental Quality (VDEQ), VESCH, Third Ed., 1992, as amended;
• VDEQ, Virginia Stormwater BMP Clearinghouse Stormwater Design Specifications, 2013, as amended;
• Virginia Stormwater Management Program Regulations (9 VAC 25-870 et seq., as amended);
• conduct monthly inspections to assess potential concerns and document and remediate identified slope failures;
• complete a geotechnical analysis to evaluate the causes of past slope failures along its pipeline right-of-way;
• identify procedures and measures to identify, prevent, contain, and remediate slope failures; and
• develop and implement policy and procedures to address slip prone areas.

8.4.2 Karst Geological Formations

A Karst Monitoring and Mitigation plan was developed for the proposed Project and is included as Attachment H.

8.4.3 Waterbodies and Wetlands

A Stream and Wetland Crossing Procedure Plan was developed for the proposed Project and is located in Section 9 of this COM Plan.

8.4.3.1 Virginia Requirements

The Environmental Protection Agency (EPA) issued the Chesapeake Bay Total Maximum Daily Load (TMDL) on December 29, 2010. The Chesapeake Bay TMDL addresses all segments of the Bay and its tidal tributaries and establishes wasteload allocation to reduce nitrogen, phosphorus and sediment discharges into the Bay. The portion of the ACP Project within the GWNF lies within the Chesapeake Bay TMDL Watershed and may be subject to additional Chesapeake Bay TMDL watershed measures during construction, in addition to ESC measures outlined in Sections 8.5 and 8.8.
8.5 EROSION AND SEDIMENT CONTROL MEASURES

Cross-country pipeline construction typically proceeds in assembly line fashion, with multiple stages of construction occurring simultaneously at different locations to minimize the time needed to complete the Project. The stages of construction include survey and flagging, clearing and mowing, grubbing and grading, trenching, pipe assembly (including stringing, bending, welding, testing, coating, and lowering-in), backfilling, hydrostatic testing, final grading, and restoration. The locations of the erosion and sediment control measures to be installed for each of these stages are described below. Detailed typical drawings of general erosion and sediment control measures are provided in Attachment I, and are also shown on the Construction Alignment Sheets in Attachment B.

8.5.1 Site Preparation

- Survey and flag the construction right-of-way and mark environmentally sensitive areas;
- Install rock access pads during grading;
- Conduct initial clearing, limited to that necessary to install temporary sediment barriers;
- Install all perimeter BMPs immediately after any bulk earth-moving activity;
- Conduct progressive clearing with installation of temporary sediment barriers and temporary equipment bridges keeping pace with clearing;
- Modify access roads by grading and installing stone where needed;
- Grade the right-of-way, and segregate topsoil where necessary; and
- Install temporary slope breakers, also referred to as interceptor dikes, also called temporary right-of-way diversions or water bars, as needed to reduce runoff velocity and divert water off the construction right-of-way.

8.5.2 Pipe Installation

- Excavate new trench to accommodate new/replacement pipeline segment;
- String pipe, bend the pipe joints;
- Weld the pipe, inspect welds;
- Lower the pipe into the trench;
- Install permanent trench plugs;
- Backfill the trench;
- Install hydrostatic test dewatering structures;
- Hydrostatically test the pipe and dewater;
- Bring the pipeline to gas service;
• Final grade right-of-way and temporary workspaces to original contours to the extent practicable;

• Install permanent interceptor dikes; and

• Replace segregated topsoil.

8.5.3 Restoration

• Conduct right-of-way finish grading and cleanup. As soon as slopes, channels, ditches, and other disturbed areas reach final grade, they must be stabilized;

• Apply soil amendments, permanent seed, mulch and/or erosion control fabric;

• Restore temporary access roads or any paved surfaces to original condition; and

• Remove temporary sediment barriers from an area when replaced by permanent erosion control measures or when the area has been successfully restored to uniform 70 percent perennial vegetation. Temporary erosion control BMPs will not be removed until inspection by the EI to confirm site stabilization.

• Reseed/replant work areas with native and pollinator species as provided in the Restoration and Rehabilitation Plan (Section 10) and the Visual Resources Plan (Section 20).

8.5.4 Survey and Flagging

• The limits of the approved work areas, boundaries of environmentally sensitive areas, and the location of the facilities must be marked in the field prior to the start of mechanized activities. Environmentally sensitive areas are those that are more susceptible to serious erosion problems and thus may require enhanced erosion and sediment control measures. Examples of such areas may include steep slopes and sinkholes down-gradient of Project activities. Examples of specialized controls that may be used in these areas include specialized pipeline construction methods that combine several construction stages, thereby reducing earth disturbance.

• The limits of approved work areas (i.e. the construction right-of-way, including ATWS and staging areas) will be established and visibly marked before clearing. The locations of approved access roads will be flagged and marked with signs.

• Signs and highly visible flagging will also be used to mark the boundaries of sensitive resource areas, including waterbodies and wetlands, and/or areas with special requirements along the construction work area, in accordance with the Construction Alignment Sheets. Orange plastic fencing may be more useful than flagging to assure that equipment operators stay out of critical areas. Only unavoidable work should take place within critical areas and their buffers.

• Safety fencing will be installed as needed during grading at public access points or around open unattended excavations to warn pedestrians of possible hazards. In addition, lights, signs and other warnings are required at road entrances and road crossings (see West Virginia or VDOT permits and regulations).
- Safety fencing may also be used to identify sensitive areas to be protected during construction or to highlight hazards along the right-of-way (e.g., a single-strand electric fence). Safety fencing may not be substituted for wire fencing in active pastures.

- Flagging or marking shall be maintained throughout construction.

- Other large diameter trees on the edge of the construction right-of-way and ATWS areas will be flagged by EIs to save/protect as green recruitment or habitat/shade trees, where feasible.

**Virginia Requirements**

Refer to Virginia Erosion and Sediment Control (E&S) Handbook for further details on the following requirement:

- Per Virginia Standard & Spec 3.38 (Tree Preservation and Protection), at a minimum the limits of clearing shall be located outside the drip line of any tree to be retained. In addition, heavy equipment, vehicular traffic, or stockpiles shall not be permitted within the drip line of any tree to be retained.

**8.5.5 Construction Entrance**

A construction entrance will be constructed at any point where construction equipment leaves the right-of-way and enters a paved public road or other paved surface. Typically, a construction entrance consists of filter fabric overlain by 6 inches of coarse aggregate extending a minimum of 70 feet from the edge of the pavement. It must extend the full width of the vehicular ingress and egress area and have a minimum 12-foot width. Conveyance of surface water through culverts under the entrance shall be provided, as necessary.

The construction entrance must function to remove mud from vehicles and equipment leaving the right-of-way. As mud accumulates on the entrance, clean stone must be added or the tire mats lifted and shaken to remove mud. Any mud that is carried onto the pavement must be thoroughly removed by the end of the day by shoveling or sweeping. The mud will be returned to the right-of-way. The use of water to remove sediment tracked onto roadways is not permitted.

If the majority of the mud is not removed by the vehicles traveling over the stone, then tires of the vehicle must be washed before entering the public road.

Maintenance of the construction entrance may require periodic top dressing with additional stone and cleanout of any structures used to trap sediment. If any inadvertent sediment tracking occurs on the public roadway, the road shall be cleaned thoroughly by the end of each day.

**Virginia Requirements**

Refer to Virginia E&S Handbook for further details on the following requirement:

- In accordance with VESCH Std. & Spec 3.02 (Stone Construction Entrance), a construction entrance will be constructed at any point where construction equipment leaves the right-of-way and enters a paved public road or other paved surface. Typically, a construction entrance is comprised of filter fabric overlain by 6 inches of coarse aggregate (VDOT #1) extending a minimum of 70 feet from the edge of the pavement.
The area of the entrance must be excavated 3 inches prior to laying the filter fabric underliner. The entrance must extend the full width of the vehicular ingress and egress area and have a minimum 12-foot width. Conveyance of surface water through culverts under the entrance will be provided, as necessary. If such conveyance is impossible, the construction of a “mountable” berm with 5:1 slopes will be permitted.

8.5.6 Clearing

Clearing operations include the removal of vegetation within the construction right-of-way. The Timber Removal Plan (Section 4) provides additional information regarding timber removal.

- Clearing will be confined to within the construction right-of-way shown on the Construction Alignment Sheets;
- Trees will be felled into the construction right-of-way to minimize damage to trees and structures adjacent to the right-of-way. Trees that inadvertently fall beyond the edge of the right-of-way will be immediately moved onto the right-of-way and disturbed areas will be immediately stabilized, per landowner approval;
- Slash will be ground up and used as mulch, hauled to an approved disposal site, or burned.
- Stumps excavated from the trench line that are not ground to mulch onsite will be placed along the edge of the construction right-of-way or in temporary extra workspaces. Stumps will be hauled from the extra workspaces to an approved disposal site, used on the right-of-way for restoration purposes, burned, or disposed of according to USFS requirements.
- Felled merchantable timber will be moved to a landing for trucking to nearby mills. Non-merchantable timber will be chipped, hauled off-site, or salvaged for use during restoration activities, or by burning, if permitted. After it is cut, non-merchantable timber that will be retained for restoration purposes will be placed along the edge of the construction right-of-way or temporary work area.
- Existing surface drainage patterns shall not be altered by the placement of timber or brush piles at the edge of the construction right-of-way.
- Where ground skidding is used, the following measures will be implemented to minimize soil disturbance:
  - Low ground weight (pressure) vehicles will be used, where feasible.
  - The removal of soil duff layers will be avoided to maintain a cushion between the soil, logs, and logging equipment.
  - Designed skid trails will be used to restrict detrimental soil disturbance (e.g., compaction and displacement) to a smaller area of the right-of-way over the pipeline trenching area.
- Erosion and sediment control measures shall be installed immediately following mechanized clearing of trees, brush and vegetation.
Virginia Requirements

- According to VESCH Std. & Spec. 3.38, fires will not be permitted within 100 feet from the drip line of any trees to be retained. Fires will be limited in size to prevent adverse effects on trees, and kept under surveillance.

8.5.7 Install Temporary Sediment Barriers and Diversions

Sediment barriers, which are temporary sediment controls intended to minimize the flow and deposition of sediment beyond approved workspaces or into sensitive resource areas, shall be installed following vegetative clearing operations. The primary sediment barrier methods to be used on the ACP Project will include silt fencing, temporary diversion dikes, and sediment traps. Sediment traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place. General requirements are as follows:

- Install temporary sediment barriers at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a road crossing, waterbody and/or wetland until revegetation is complete. Leave adequate room between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition. For silt fencing, an effort should be made to locate the fencing at least 5 feet to 10 feet beyond the toe of the slope.

- Where wetlands or waterbodies are adjacent to and downslope of construction work areas, install sediment barriers along the edge of these areas, as shown on the construction alignment sheets.

- Inspect temporary sediment barriers daily in areas of active construction to ensure proper functioning and maintenance. In other areas with no construction or equipment operation, sediment barriers will be inspected and maintained on a weekly basis throughout construction and within 24 hours of each 0.5 inch of rainfall event.

- Sediment removed from erosion controls will be disposed by adding to existing onsite soil stockpiles and stabilizing, or will be reused onsite within the construction right-of-way and outside of any wetlands, streams or riparian areas.

- 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.

- Remove temporary sediment barriers from an area when replaced by permanent erosion or sediment control measures or when the area has been successfully restored to perennial vegetation.

- Erosion barriers should be constructed of synthetic materials, clean straw bales, or other Forest Service-approved material free of seeds or viable parts of invasive plants.

8.5.7.1 West Virginia Requirement

Refer to West Virginia BMP Manual for further details for the following requirement:
• Remove temporary sediment barriers from an area when replaced by permanent erosion or sediment control measures or when the area has been successfully restored to uniform 70 percent perennial vegetation.

8.5.7.2 Virginia Requirement

Refer to Virginia E&S Handbook for further details for the following requirement:

• Per Virginia Minimum Standard 2, during construction of the project, soil stock piles and borrow areas will be stabilized or protected with sediment trapping measures. Atlantic is responsible for the temporary protection and permanent stabilization of soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.

• Per Virginia Minimum Standard 3, permanent vegetation will not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion. Remove temporary sediment barriers from an area when replaced by permanent erosion or sediment control measures or when the area has been successfully restored to perennial vegetation. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.

8.5.8 Silt Fencing

• The following specifications can be found in the DEQ Virginia Erosion & Sediment Control Field Manual and are consistent with the FERC Plan and Procedures. Silt Fencing constructed of synthetic filter fabric stretched across and attached to supporting posts, and in some cases a wire support fence, will be placed across or at the toe of a slope or in a minor drainage way to intercept and detain sediment and decrease flow velocities from drainage areas of limited size. Silt fencing is applicable where sheet and rill erosion or small concentrated flows may be a problem.

• Silt fencing will be used where the size of the drainage area is not more than one quarter acre per 100 feet of silt fence length; the maximum slope length behind the barrier is 100 feet; and the maximum gradient behind the barrier is 50 percent (2:1).

• Silt fencing can be used in minor swales or ditches where the maximum contributing drainage area is no greater than 1 acre and flow is no greater than 1 cubic feet per second. In ditches or swales where higher velocity flow is expected, rock check dams should be used in place of silt fence.

• Silt fencing will not be used in areas where rock or some other hard surface prevents the full and uniform depth anchoring of the barrier.

• If steel posts are utilized, they must have a minimum weight of 1.33 pounds per linear foot and have a minimum length of 5 feet. Posts will be placed a maximum of 6 feet apart.

• The height of the fence shall be a minimum of 16 inches above grade and shall not exceed 34 inches above ground elevation.
Filter cloth shall be spliced together only at support posts with a minimum 6-inch overlap.

A trench shall be excavated approximately 4-inches wide and 4-inches deep on the upslope side of the proposed location of the measure.

When wire support is not used, extra-strength filter fabric shall be fastened to the upslope side of the posts using one inch long (minimum) heavy-duty wire staples or tie wires and the fabric shall be extended into the trench. The posts shall be placed a maximum of 6 feet apart.

When wire support is used, the wire mesh fence must be fastened securely to the upslope side of the posts using heavy duty wire staples at least one inch long, tire wires or hog rings. The wire will extend into the trench a minimum of two inches and will not extend more than 34 inches above the ground surface. The standard-strength fabric will be stapled or wired to the wire fence, and 8 inches of the fabric will be extended into the trench. The posts will be placed a maximum of 10 feet apart.

If silt fence is to be constructed across a ditch line or swale, the measure must be of sufficient length to eliminate end flow and the configuration shall resemble an arc with the ends oriented upslope. Extra-strength filter fabric must be used for ditch lines or swales with a maximum 3-foot spacing of posts.

The 4-inch by 4-inch trench shall be backfilled and the soil compacted over the filter fabric.

Remove accumulated sediments when sediment reaches ½ the above-ground height of the fence.

On USFS lands, all silt fences will be removed and discarded properly after project completion. Soils will be stabilized and seeded as per the Restoration and Rehabilitation Plan (Section 10). Permanent erosion control protective measures will be utilized if seeding alone will not stabilize the site and provide soil stability.

8.5.8.1 Belted Silt Retention Fence (BSRF)

The primary silt fence product planned for use on the ACP Project is a patented Belted Silt Retention Fence (BSRF) product which is available in two designs used to address different site conditions, as follows:

- BSRF Priority 1 (green band) is a heavy-duty silt fence constructed with a 36-inch, non-woven, spun-bond fabric with an internal scrim incorporated into the fabric for additional strength and durability. The system utilizes wood stakes spaced at 4-feet and a specific method of attachment. The system is functionally equivalent to wire back and metal steel post silt fence and is designed for the protection of high priority areas, including wetlands and waterbodies.

- BSRF Priority 2 (black band) is a medium-duty silt fence constructed with a 36-inch, non-woven, spun-bond fabric that is calendared on one side. The system utilizes wood stakes spaced at 6-feet and a specific method of attachment.
An estimated 125,000 feet of silt fence is anticipated to be needed on USFS lands.

8.5.9 Temporary Diversion Dike

A temporary ridge of compacted soil constructed at the top of a sloping disturbed area will be used to divert stormwater runoff from upslope drainage areas away from the unprotected slope. Temporary diversion dikes can also be constructed at the base of a slope to protect adjacent and downstream areas by diverting sediment-laden runoff from a disturbed area to a sediment-trapping control measure. A temporary diversion dike is a good choice when the control limits of a silt fence are exceeded. The temporary diversion dike must be installed as a first step in the land-disturbing activity at locations shown on the Construction Alignment Sheets and must be functional prior to upslope land disturbance.

- The maximum allowable drainage area is 5 acres.
- The minimum height measured on the upslope side of the dike is 18 inches.
- The dike should be compacted to prevent failure and have side slopes 1.5:1 or flatter with a minimum base width of 4.5 feet.
- The channel behind the dike shall have a parabolic or trapezoidal cross-section shape to avoid high velocity flow which could arise in a v-shaped ditch. The channel will have a positive grade to a stabilized outlet.
- The diversion dike and channel will be stabilized immediately following installation with temporary or permanent vegetation. Where channel slope is greater than 2 percent, Rolled Erosion Control Product (RECP) will be used to stabilize soil until vegetation is established.
- The temporary diversion dike will be inspected and repairs made to the dike, flow channel, outlet or sediment trapping area, as necessary. Once every day in active construction areas, whether a storm event has occurred or not, the measure shall be inspected and repairs made if needed. Damages caused by construction traffic or other activity must be repaired before the end of each working day.

8.5.9.1 West Virginia Requirements

Refer to West Virginia BMP Manual for detailed specifics on the following requirements.

- Temporary (less than 6 months) diversions must be designed to handle peak discharge from a 2-year/24-hour storm.
- The side slopes shall be no steeper than 2:1
- The design shall include a 10 percent settlement factor.

8.5.9.2 Virginia Requirements

In accordance with VESCH Std. & Spec 3.09 (Temporary Diversion Dike), refer to Virginia E&S Handbook for detailed specifics on the following requirements.
• The minimum height measured on the upslope side of the dike is 18 inches.

• The dike should be compacted to prevent failure and have side slopes 1.5:1 or flatter with a minimum base width of 4.5 feet.

8.5.10 Temporary Sediment Trap

A temporary ponding area formed by constructing an earthen embankment with a stone outlet may be used to detain sediment-laden runoff from small disturbed areas (where total drainage area is less than three acres) to allow sediment to settle out prior to discharge. The sediment trap may be constructed either independently or in conjunction with a temporary diversion dike as a suitable option for outlet control. The temporary sediment trap must be installed as a first step in the land-disturbing activity at locations shown on the Construction Alignment Sheets and must be functional prior to upslope land disturbance.

• The maximum useful life of a temporary sediment trap is 18 months. Traps will be replaced should the construction period exceed 18-months. Sediment traps may need to be replaced sooner than 18 months (on an as-needed basis) if at any time they cease to be effective. This will be determined based on the regularly scheduled inspections of these traps. Erosional control inspection and maintenance will continue on all parts of the project until the landscape is deemed stable. Permanent features will replace temporary features if the erosional feature does not become stable in the short term (less than 18 months).

• Topsoil will not be used for constructing sediment barriers of any kind.

• The total contributing drainage area to a sediment trap is less than 3 acres

• The sediment trap must be designed to have an initial storage volume of 134 cubic yards per acre of drainage area with a minimum 2:1 length to width ratio, if possible.

• Side slopes of the excavated area should be no steeper than 1:1 and the maximum depth of excavation within the wet storage area should be 4 feet.

• Outlet requirements include a combined coarse aggregate/riprap stone section of the embankment. Filter cloth shall be placed at the stone-soil interface. The length of the stone outlet will be detailed on the Construction Alignment Sheets (Attachment A) and will be designed at 6 feet times the total drainage area in acres. The crest of the stone outlet must be at least 1.0 foot below the top of the embankment.

• The maximum height of the embankment shall be 5 feet measured to the base of the stone outlet. Side slopes of the embankment shall be 2:1 or flatter.

• Fill material shall be selected from material that is are free of roots or other woody vegetation, large stones, or organic matter and compacted in 6-inch lifts.

• The temporary sediment trap will be stabilized immediately following installation with temporary or permanent vegetation.
8.5.10.1 West Virginia Requirements

Refer to West Virginia BMP Manual for further details for the following requirement:

- The sediment trap should have a storage volume of 3600 cubic feet per acre of drainage area. (WV BMP 3.29).

8.5.10.2 Virginia Requirements

Refer to Virginia E&S Handbook for further details for the following requirement:

- Per VESCH Std. & Spec 3.13 (Temporary Sediment Trap), outlet requirements include a combined coarse aggregate/riprap stone section of the embankment (VDOT #3, #357 or #5 Coarse Aggregate and Class I riprap). The length of the stone outlet will be detailed on the Construction Alignment Sheets (Attachment B).

8.5.11 Grubbing and Grading

The construction right-of-way will be graded as needed to provide a level workspace for safe operation of heavy equipment used in pipeline construction. The following procedures will be standard practice during grading.

8.5.12 Topsoil Segregation

During construction, topsoil and subsoil will be disturbed by grading of the right-of-way, trench excavation, and by heavy equipment moving along the right-of-way. Atlantic will conduct topsoil segregation in accordance with the FERC Upland Erosion Control, Revegetation and Maintenance Plan.

In areas where full width topsoil segregation is required, an additional 25 feet of temporary construction workspace would be needed on the working side of the corridor to provide sufficient space to store topsoil. Because of the increased need for additional right-of-way width and loss of additional forestland, and need to remove stumps, which would increase topsoil mixing with the subsoil and the increase the potential for erosion, topsoil segregation is generally not conducted in forested areas.

Either the “ditch plus spoil side” or the “full right-of-way” segregation method would be used where topsoil segregation is necessary.

In areas where topsoil segregation is performed on the MNF and GWNF, the O and A horizons will be segregated from the transition soil horizons AB/BA. O horizon soils are defined as a soil layer containing a high percentage of organic matter. A horizon soils are defined as the dark subsoil below the O horizon. AB/BA horizon soils are defined as light colored subsoils located below the O and A horizons.
• 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 spoil side” method).

• Segregate at least 12 inches of topsoil in deep soils with more than 12 inches of topsoil. In soils with less than 12 inches of topsoil, make every effort to segregate the entire topsoil layer.

• Within wetlands, segregate the top 12 inches of topsoil within the trenchline, except in areas where standing water is present or soils are saturated.

• Maintain separation of salvaged topsoil and subsoil throughout all construction activities.

• Leave gaps in the topsoil piles and spoil piles for the installation of temporary slope breakers to allow water to be diverted off the construction right-of-way.

• Topsoil will not be used for constructing sediment barriers of any kind. In addition, topsoil will never be used for padding the pipe, improving or maintaining roads, or as fill material.

• Stabilize topsoil piles and minimize loss due to wind and water erosion with use of sediment barriers, mulch, temporary seeding, or functional equivalents.

• Topsoil operations (stripping and replacement) should not be performed when the soil is excessively wet or frozen.

• All perimeter dikes, berms, sediment basins, and other sediment controls shall be in place prior to stripping. These practices must be maintained during topsoiling.

• Side slopes of the stockpile shall not exceed 2:1.

• Perimeter controls must be placed around the stockpile immediately.

• Prior to dumping and spreading topsoil, the subgrade shall be loosened by discing or scarifying to a depth of at least 4 inches to ensure bonding of the topsoil and subsoil.

• Topsoil shall be uniformly distributed to a minimum compacted depth of 2 inches on 3:1 slopes or steeper slopes and 4 inches on flatter slopes.

• Topsoil containing Non-Native Invasive Species (NNIS) will be left undisturbed to the degree possible. Cleared vegetation and segregated topsoil from areas of invasive plant infestations will be maintained adjacent to the areas from which they were removed to eliminate the transport of soil-borne propagules to other areas along the right-of-way. The stockpiles will be identified as invasive plant species stockpiles with signs. During reclamation, the materials will be returned to the areas from which they were obtained.

8.5.12.1 West Virginia Requirements

Refer to West Virginia BMP’s Handbook for detailed information for the following requirements:
• Seeding of stockpile shall be completed within 7 days of the formation of the stockpile if it is to remain dormant for longer than 21 days in accordance with West Virginia Std & spec 3.10 (Temporary Seeding). Stabilization of stockpiles with a temporary cover (i.e. mulch) in accordance with West Virginia Std & spec 3.12 (Mulching) is also acceptable.

• In areas which are not going to be mowed, the surface should be left rough by not fine grading in accordance with West Virginia Std & Spec 3.08 (Surface Roughening).

8.5.12.2 Virginia Requirements

Refer to Virginia E&S Handbook for detailed information for the following requirements:

• Per VESCH Std & Spec 3.31 (Temporary Seeding) and Virginia Minimum Standard #1 and #2, seeding of stockpile shall be completed within 7 days of the formation of the stockpile if it is to remain dormant for longer than 14 days in accordance with Virginia Std & Spec 3.31 (Temporary Seeding) and Minimum Standard #1 and #2. Stabilization of stockpiles with a temporary cover (i.e. mulch) in accordance with Virginia Std & Spec 3.35 (Mulching) is also acceptable.

• In areas which are not going to be mowed, the surface should be left rough by not fine grading in accordance with Virginia Std & Spec 3.29 (Surface Roughening).

8.5.13 Tree Stump Removal and Disposal

• Remove tree stumps in upland areas along the entire width of the permanent right-of-way to allow adequate clearance for the safe operation of vehicles and equipment. Stumps within the temporary right-of-way will be removed or ground below the surface in accordance with Atlantic construction specifications to allow the safe passage of equipment, as determined by the Construction Site Supervisor or EI.

• In wetlands, limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction right-of-way in wetlands unless the Construction Site Supervisor and/or EI determine that safety-related construction constraints require grading or the removal of tree stumps from under the working side of the construction right-of-way.

• Dispose of stumps by one of the following methods with the approval of the AO:
  • Burned on construction right-of-way, if permitted;
  • Chipped, spread across the construction right-of-way in upland areas, and plowed in;
  • Used as erosion control or OHV blocking material;
  • Hauled off-site for disposal at an appropriately-licensed disposal facility.

8.5.14 Rock Management

Rock, including blast rock, will be used, removed or disposed of in one of the following ways:
• Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. (Rock that is not returned to the trench shall be considered construction material or waste, unless approved for use as mulch or for some other use on the construction work areas by the land owner or land managing agency);

• Windrowed on the edge of the right-of-way per AO approval;

• Used to create wildlife habitat as directed by the AO;

• Burying of large rock within the construction right-of-way;

• Removed and disposed of at an authorized disposal site;

• Used as riprap for streambank stabilization if permitted by USFS and other regulatory agency(ies) such as the U.S. Army Corps of Engineers (USACE), and provided the rock is uncontaminated and free of soil and other debris. Atlantic has not proposed, and does not currently anticipate the use of riprap for streambank stabilization on USFS lands.

Virginia Requirements:

• Per VESCH Std. & Spec. 3.19 (Riprap), stone for riprap will consist of field stone or rough unhewn quarry stone of approximately rectangular shape. The stone will be hard and angular and of such quality that it will not disintegrate on exposure to water or weathering and it will be suitable in all respects for the purpose intended. The specific gravity of the individual stones will be at least 2.5. Rubble concrete may be used provided it has a density of at least 150 lbs. per cubic foot, and otherwise meets the requirement of the VESCH standard and specification.

8.5.15 Temporary Slope Breakers

Temporary slope breakers, also called temporary right-of-way diversions and water bars, are temporary erosion control measures intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope breakers may be constructed of materials such as compacted soil, silt fence, or sand bags. Segregated topsoil may not be used for constructing temporary slope breakers.

• Install temporary slope breakers on all disturbed areas as necessary following topsoil removal and grading operations to avoid excessive erosion. Unless otherwise specified by permit conditions, temporary slope breakers must be installed on slopes at the recommended spacing interval indicated below.

• The temporary diversion should be constructed across the disturbed portion of the right-of-way;

• Positive grade with less than 2 percent slope should be provided to a stabilized outlet; steeper grading may be utilized as necessary to promote positive drainage.

• Direct the outfall of each slope breaker to a stable, well vegetated area or construct an energy-dissipating device (silt fence, staked weed-free straw bales, erosion control fabric) at the end of the slope breaker.
• Position the outfall of each temporary slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive resource areas.

• Each diversion should exit onto stabilized ground. It should never exit onto the right-of-way where it can run down to the next diversion. These stabilized areas will be reinforced if necessary, and routinely inspected and maintained to prevent erosion off the right-of-way.

• Install temporary slope breakers on slopes greater than 5 percent where the base of the slope is less than 50 feet from waterbody, wetland, and road crossings.

• Minimum allowable height of the diversion is 18 inches, installed by machine or hand-compact ed in 8-inch lifts.

• Side slopes should be 2:1 or flatter to allow the passage of construction traffic, along with a minimum base width of 6 feet.

• Inspect temporary slope breakers daily in areas of active construction to insure proper functioning and maintenance. In other areas, the slope breakers will be inspected and maintained on a weekly basis throughout construction, and following every rainfall.

• Slope breakers which will not be subject to construction traffic should be stabilized with temporary seeding.

8.5.15.1 West Virginia Requirements

Refer to West Virginia BMP Manual for detailed specifics on the following requirements.

• Closer spacing may be used if determined necessary by the EI. The WV BMP Manual spacing requirements are recommended since they are more stringent than FERC Plan requirements (see Table 8.5.5-1):

<table>
<thead>
<tr>
<th>Trench Slope</th>
<th>Distance (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5%</td>
<td>300</td>
</tr>
<tr>
<td>10%</td>
<td>175</td>
</tr>
<tr>
<td>15%</td>
<td>125</td>
</tr>
<tr>
<td>20%</td>
<td>100</td>
</tr>
<tr>
<td>Greater than 25%</td>
<td>75</td>
</tr>
</tbody>
</table>

* Slope breaker spacing in areas of steep terrain may be decreased as a result of the steep slopes BIC Program described in Section 2.1.9.5. Accordingly, this table may be revised to reflect more stringent spacing requirements.
8.5.15.2 Virginia Requirements

Refer to Virginia E&S Handbook for detailed information for the following requirements:

- Closer spacing may be used if determined necessary by the EI. The VESCH spacing requirements are recommended since they are more stringent than FERC Plan requirements (see Table 8.5.5-2):

<table>
<thead>
<tr>
<th>Trench Slope</th>
<th>Distance (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 7%</td>
<td>100</td>
</tr>
<tr>
<td>7–25%</td>
<td>75</td>
</tr>
<tr>
<td>25–40%</td>
<td>50</td>
</tr>
<tr>
<td>Over 40%</td>
<td>25</td>
</tr>
</tbody>
</table>

* Slope breaker spacing in areas of steep terrain may be decreased as a result of the steep slopes BIC Program described in Section 2.5.6. Accordingly, this table may be revised to reflect more stringent spacing requirements.

8.5.16 Timber Mat Stabilization

Atlantic utilizes construction timber mats to provide access through areas such as wetlands and waterbodies, some agricultural fields, and other areas as determined by the Construction Supervisor. This practice reduces soil compaction and provides a stable travel lane for contractors along the Project right-of-way, thus minimizing land disturbance. This practice may be incorporated in addition to the WV BMP and VESCH practices and requirements.

The use of construction timber mats generally does not constitute soil disturbance or a change in hydrology. Therefore, the installation of timber mat access roads and work pads is not considered a regulated land-disturbing activity and these areas are generally not included in land disturbance area calculations.

8.5.17 Temporary Stabilization

West Virginia Requirements

When acceptable final grade cannot be achieved (e.g. during winter or early spring construction), when permanent seeding cannot be applied due to adverse soil and weather conditions, or any time an area will remain idle for more than 21 days, temporary stabilization (temporary seed, mulch, additional sediment barriers as directed by the EI) must be applied within seven (7) days to that area. E&S measures will be monitored and maintained until conditions improve and final restoration can be completed.

Virginia Requirements

When acceptable final grade cannot be achieved (e.g. during winter or early spring construction), when permanent seeding cannot be applied due to adverse soil and weather conditions, or any time an area will remain idle for more than 14 days, temporary stabilization (temporary seed, mulch, additional sediment barriers as directed by the EI) must be applied within seven (7) days to that area. Erosion and sediment control measures will be monitored and maintained until conditions improve and final restoration can be completed.
The seed mixtures and application rates, seeding dates, soil amendment recommendations, and planting recommendations are currently pending additional consultation with the USFS staff.

8.5.17.1 Trenching

The trench centerline will be staked after the construction right-of-way has been prepared. In general, a trench will be excavated to a depth that will permit burial of the pipe with a minimum of 3 feet of cover.

The following procedures will be standard practice during ditching:

- Flag drainage tiles damaged during ditching activities for repair;
- Place spoil in additional extra work areas or at least 10 feet away from the waterbody’s edge in the construction right-of-way. Spoil will be contained with erosion and sediment control devices to prevent spoil materials or sediment-laden water from transferring into waterbodies and wetlands or off of the right-of-way;
- If temporary erosion or sediment controls are damaged or removed during trenching, they shall be repaired and/or replaced before the end of the work day;
- Excavated material shall be placed on the uphill side of trenches.

8.5.17.2 Trench Breakers

Permanent sacks of sand, polyurethane foam, bentonite clay, or possibly cement bags (in areas of steep terrain) installed around the pipe will remain in the trench to prevent subsurface channeling of water along the trench. Topsoil will not be used in trench breakers. Trench breakers are not employed in trenchless pipeline construction such as HDD or for non-linear facilities (e.g. compressor stations, metering and regulating stations).

The need for and spacing of trench breakers will be indicated on the Construction Alignment Sheets (Attachment B). Trench breakers will be installed at the same spacing as and upslope of permanent slope breakers unless determined otherwise by the certifying Professional Engineer.

Permanent trench breakers will be installed at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland.

Trench breakers must be installed at wetland boundaries or the trench bottom must be sealed, as specified in the Procedures. Trench breakers will not be installed within a wetland.

8.5.17.3 Trench & Site Dewatering

Dewatering may be periodically conducted to remove accumulated groundwater or precipitation from the construction right-of-way, including from within the trenchline. The need for erosion controls as well as the type of control used will vary depending on the type and amount of sediment within the water, and volume and rate of discharge. Section 8.5.20 sets forth criteria for discharge to a well-vegetated area of sufficient length. The Karst Plan (Attachment H) outlines the requirements of site dewatering within karst areas. Karst features will not be utilized for the disposal of water.
8.5.17.4 Dewatering Filter Bag

No discharge of hydrostatic test water is planned on USFS lands. However, trench dewatering on USFS lands may be necessary at locations along the pipeline, for example, if a high water table is encountered. Atlantic utilizes filter bags for dewatering and velocity reduction on a majority of pipeline construction Project in accordance with the dewatering practices illustrated in the WV BMP Manual (Std. & Spec. 3.22 Dewatering) and VESCH (Std. & Spec. 3.26 Dewatering Structure). Design criteria and specifications vary by dewatering bag manufacturer. A variety of filtering dewatering bag products are available on the market. All manufacturers’ guidance on the use, design, sizing, maintenance and application of the geotextile dewatering bag shall be followed.

- Conduct dewatering (on or off the construction right-of-way) in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any waterbody, wetland, or off-site property.
- Elevate and screen the intake of each hose used to withdraw the water from the trench to minimize pumping of deposited sediments.
- Remove dewatering structures as soon as practicable after the completion of dewatering activities. If sediment build-up prevents the bag from functioning properly, or the bag becomes half full of sediment, the bag will be discarded and replaced.

8.5.17.5 Virginia Requirements

Refer to Virginia E&S Handbook for detailed information for the following requirements:

- If discharging to a well-vegetated area, then per VESCH Std. & Spec 3.26, a minimum filtering length of 75 feet must be available in order for such a method to be feasible. A de-watering bag may not be needed if there is a well-stabilized, vegetated area on-site to which water can be discharged. The area must be stabilized so that it can filter sediment and at the same time withstand the velocity of the discharged water without eroding.

- As warranted by site conditions, a standard dewatering structure may be used per the construction and maintenance specifications in VESCH Std. & Spec 3.26 (Dewatering Structure), including the use of a portable sediment tank, filter box, or straw bale/silt fence pit. The dewatering structure must be sized (and operated) to allow pumped water to flow through the filtering device without overtopping the structure. The filtering devices must be inspected frequently and repaired or replaced once the sediment build-up prevents the structure from functioning as designed. The accumulated sediment removed from a dewatering device must be spread on-site and stabilized or disposed of at an approved disposal site.

8.5.17.6 Pipe Installation

During all phases of the pipe installation process, ensure that all roadway crossings and access points are safe and accessible conditions. Repair damaged temporary erosion controls by the end of the work day. If portions of slope breakers are removed from the travel lane to facilitate safe work conditions, they shall be restored prior to the end of the work day. Pipe installation will commence according to Atlantic construction and implementation plans and generally consists of stages such as stringing and bending, welding, and lowering-in and tie-ins.
8.5.17.7 Backfilling

Backfilling consists of covering the pipe with the earth removed from the trench or with other fill material hauled to the site when the existing trench spoil is not adequate for backfill. Backfilling will follow lowering-in of the pipeline as close as is practical.

In areas where the trench bottom is irregularly shaped due to consolidated rock or where the excavated spoil materials are unacceptable for backfilling around the pipe, padding material may be required to prevent damage to the pipe. This padding material will generally consist of sand, crushed limestone, or screened spoil materials from trench excavation. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.

8.5.17.8 Hydrostatic Testing

While hydrostatic testing will occur on all pipeline sections of the Project, including those of USFS lands, there will be no hydrostatic test water appropriations or test water discharges on USFS lands.

8.5.24 Restoration and Final Cleanup

Restoration of the right-of-way will begin after pipeline construction activities have been completed. Restoration measures include the re-establishment of final grades and drainage patterns as well as the installation of permanent erosion and sediment control devices to minimize post-construction erosion. Property shall be restored as close to its preconstruction condition as practical unless otherwise specified by the landowner. All temporary ESC measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed. Trapped sediment will be removed or stabilized onsite. Disturbed soil resulting from removal of the BMPs or vegetation will be permanently stabilized. Per Virginia Minimum Standard 3, permanent stabilization is achieved when vegetation is established that is uniform, mature enough to survive, and will inhibit erosion.

- The Contractor shall make every reasonable effort to complete final cleanup of an area (including final grading, topsoil replacement and installation of permanent erosion control structures) within 20 days after backfilling the trench in that area (within 10 days in residential areas). If seasonal or other weather conditions prevent compliance with these timeframes, continue to inspect and maintain temporary erosion and sediment controls (i.e. temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup.

- As soon as slopes, channels, ditches, and other disturbed areas reach final grade, they must be stabilized. The disturbed right-of-way will be seeded as soon as possible and within no more than 7 days of final grading, weather and soil conditions permitting.

- Grade the right-of-way to pre-construction contours, with the exception of the installation of any permanent measures required herein.

- Grading practices such as stair-stepping or grooving slopes or leaving slopes in a roughened condition by not fine-grading will be used on all slopes steeper than 3:1 in accordance with West Virginia Standard & Specification 3.08 (Surface roughening) and Virginia Standard and Specification 3.29 (Surface roughening) on all slopes steeper than 3:1 or that have received final grading but will not be stabilized immediately.

- Spread segregated topsoil back across the graded right-of-way to its original profile.
• The size, density, and distribution of rock on the construction right-of-way shall be similar to adjacent areas not disturbed by construction, or as approved by the AO.

• A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion and sediment control structures are installed, regularly inspected and maintained. When access is no longer required, the travel lane must be removed and the right-of-way restored.

• Remove all construction debris (used filter bags, skids, trash, etc.) from all construction work areas unless the landowner or land managing agency approves leaving material onsite for beneficial reuse, stabilization, or habitat restoration. Grade or till the right-of-way to leave the soil in the proper condition for planting.

• For construction activities occurring in winter, conditions such as frozen soils or snow cover could delay successful soil compaction mitigation or seeding activities. In these conditions, Atlantic will follow its Winter Construction Plan (Attachment D) and resume clean-up and restoration efforts the following spring. Atlantic will monitor and maintain temporary erosion controls (e.g., temporary slope breakers, sediment barriers, or mulch) until conditions allow for completion of cleanup and installation of permanent erosion control structures.

• NNIS measures, as described in Section 11.

8.5.17.9 West Virginia Requirements

Refer to West Virginia BMP Manual for detailed information for the following requirements:

Final site stabilization means that all soil-disturbing activities are completed, and that either a permanent vegetative cover with a density of 70 percent or greater has been established or that the surface has been stabilized by hard cover such as pavement or buildings. It should be noted that the 70 percent requirement refers to the total area vegetated and not just a percent of the site.

8.5.17.10 Virginia Requirements

Refer to Virginia E&S Handbook for detailed information for the following requirement.

Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.

8.5.17.11 Permanent Slope Breakers

Permanent slope breakers will be installed during final grading, where required, to slow runoff velocity and direct water off the right-of-way and prevent sediment deposition into sensitive resources. Permanent slope breakers may be constructed of materials such as soil, stone, or some functional equivalent.

• Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, unless requested by the landowner, using spacing shown on the Construction Alignment Sheets.
Spacing for permanent slope breakers will be the same as temporary slope breakers described in Section 8.5.15.

Construct permanent slope breakers with a minimum of a 2 to 8 percent outslope to divert surface flow to a stable vegetative area without causing water to pool or erode behind the slope breaker; steeper grading may be utilized as necessary to promote positive drainage. In the absence of a stable vegetative area, install an energy-dissipating device at the end of the breaker.

Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction right-of-way to effectively drain water off the disturbed area. Where permanent breakers extend beyond the edge of the construction right-of-way, they are subject to compliance with all applicable survey and permit requirements.

Where drainage is insufficient in upland areas, install a rock-lined drainage swale as approved by the EI. The drainage swale is generally 8 feet wide and a maximum of 18-24 inches deep.

8.5.17.12 Soil Stabilization Blankets and Matting

Erosion control fabric or blankets are used during restoration, including as mulch, to slow down stormwater and stabilize soil until vegetation becomes established. Care will be taken to avoid areas of steep slopes as much as practical; however, areas which could not be avoided will be addressed with slope breakers and RECP. RECPs must be consistent with WV BMP Manual Standard and Specification 3.13 for RECPs and VESCH Standard and Specification 3.36 for Soil Stabilization Blankets and Matting. RECPs are also suitable as an effective vegetation stabilization technique on waterbody banks, vegetated channels, and the swale side of permanent slope breakers where moving water is likely to wash out new plantings.

As shown on the detail drawings, soil stabilization blankets must be installed vertically downslope on steep slopes and on shallow slopes the mats can be installed across the slope.

Slope surface must be smooth with minimum rocks, lumps, grass and sticks such that the blanket can be placed flat on the surface for uniform soil contact.

Seed is applied to the graded slope prior to installation of the blanket. Seed should be lightly raked into the soil;

The blanket will be rolled from the top of the slope or top of the channel downgradient toward the toe of the slope or channel outlet and keyed into a minimum 6 inch deep trench at the top of the slope.

Upslope ends will be buried in an anchor slot not less than 6-inches deep and tamped to firmly embed the material.

The blankets will be anchored with staples or other appropriate devices in accordance with the manufacturers' recommendations.

On highly erodible soils and on slopes steeper than 4:1, erosion check slots may be made by inserting a fold of a separate piece of material into a 6-inch trench and tamping firmly.
Staple the fold to the main blanket at minimum 12-inch intervals across the up-gradient and down-gradient portion of the blanket. The need for and spacing of check slots will based on manufacturers’ recommendations.

- The terminal end of the material is folded with 4 inches of material underneath and stapled every 12 inches at minimum.

**8.5.17.13 Seeding will be done in accordance with Section 10, the Restoration and Rehabilitation Plan. West Virginia Requirements**

Refer to West Virginia BMP Manual for detailed information on the following requirements:

- Adjacent blankets will be overlapped, or by abutting product as defined by the manufacturer, and stapled together.

- Join a new roll of material by creating an anchor slot as with the upslope ends and overlapping the end of the up-gradient roll and stapling across the end of the previous roll just below the anchor slot.

**8.5.17.14 Virginia Requirements**

Refer to Virginia E&S Handbook for detailed information on the following requirements:

- Soil stabilization blankets will be mechanically fastened and used on slopes of 3:1 or greater and in stormwater conveyance channels.

- Adjacent blankets will be overlapped and stapled together.

- Join a new roll of material by creating an anchor slot as with the upslope ends and overlapping the end of the upgradient roll and stapling across the end of the previous roll just below the anchor slot.

**8.5.17.15 Soil Compaction**

A Restoration and Rehabilitation Plan has been prepared for the ACP to address post-construction restoration rehabilitation activities on USFS lands. Soil Compaction is addressed in Section 10.3.1.3 of the COM Plan.

**8.5.17.16 Revegetation**

A Restoration and Rehabilitation Plan has been prepared for the ACP to address post-construction restoration and rehabilitation activities on USFS lands. Revegetation is addressed in Section 10.3.1.2 of the COM Plan.

**8.5.17.17 Mulching**

A Restoration and Rehabilitation Plan has been prepared for the ACP to address post-construction restoration and rehabilitation activities on USFS lands. Mulching is addressed in Section 10.3.1.9 of the COM Plan.
8.5.18 Vegetative Streambank Stabilization

Streambanks are always vulnerable to new damage and repairs are periodically required. During construction, banks shall be checked after every high-water event. Gaps in the vegetative cover should be fixed at once, and mulched if necessary. Fresh cuttings from other plants on the bank may be used to fill gaps, or they may be taken from mother-stock plantings if available.

Virginia Requirement:

Vegetative streambank stabilization will be used to protect streambanks from the erosive forces of flowing waters. Vegetative streambank stabilization will be implemented along banks in creeks, streams and rivers subject to erosion from excess runoff. This practice is generally applicable where bankfull flow velocity does not exceed 5 feet per second (ft./sec.) and soils are erosion resistant. Above 5 ft./sec., structural measures are generally required. In accordance with VESCH Std. & Spec 3.22 (Vegetative Streambank Stabilization), Atlantic will adhere to the following design criteria:

- Ensure that channel bottoms are stable before stabilizing channel banks.
- Keep velocities at bankfull flow non-erosive for the site conditions.
- Provide mechanical protection such as rip-rap on the outside of channel bends if bankfull stream velocities approach the maximum allowable for site conditions.
- Be sure that requirements of other Commonwealth or federal agencies are met in the design in the case that other approvals or permits are necessary.

8.5.19 Structural Streambank Stabilization

Structural streambank stabilization is applicable to streambank sections which are subject to excessive erosion due to increased flows or disturbance during construction. This practice is generally applicable where flow velocities exceed 5 ft./sec. or where vegetative streambank protection is inappropriate. Any non-biodegradable fabric used for bank stabilization will be removed when vegetation is re-established. Although structural streambank stabilization is not anticipated to be necessary to stabilize streambanks; in the event that it is deemed appropriate, Atlantic will consult with the USFS and seek the AO’s approval and other permits as necessary.

Virginia Requirement:

In accordance with VESCH Std. & Spec 3.23 (Structural Streambank Stabilization), Atlantic will adhere to the following general construction and maintenance specifications, where appropriate:

Streambank Protection Measures:

- Riprap - heavy angular stone placed or dumped onto the streambank to provide armor protection against erosion. Installation should be in accordance with Std. & Spec. 3.19 (Riprap)
- Gabions - Rectangular, rock-filled wire baskets are pervious, semi-flexible building blocks which can be used to armor the bed and/or banks of channels or to divert flow away from eroding channel sections. At a minimum, they should be constructed of a
hexagonal triple twist mesh of heavily galvanized steel wire. The design water velocity for channels utilizing gabions should not exceed that given below in Table 8.5.19-1:

<table>
<thead>
<tr>
<th>Gabion Thickness (feet)</th>
<th>Maximum Velocity (feet per second)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>6</td>
</tr>
<tr>
<td>3/4</td>
<td>11</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
</tr>
</tbody>
</table>

- Deflectors (groins or jetties) - Structural barriers which project into the stream to divert flow away from eroding streambank sections.
- Reinforced Concrete - may be used to armor eroding sections of the streambank by constructing retaining walls or bulk heads. Positive drainage behind these structures must be provided.
- Log Cribbing - a retaining structure built of logs to protect streambanks from erosion. Log cribbing is normally built on the outside of stream bends to protect the streambank from the impinging flow of the stream.
- Grid Pavers - modular concrete units with interspersed void areas which can be used to armor the streambank while maintaining porosity and allowing the establishment of vegetation. These structures may be obtained in pre-cast blocks or mats, or they may be formed and poured in place.

All structures should be maintained in an "as built" condition. Structural damage caused by storm events should be repaired as soon as possible to prevent further damage to the structure or erosion of the streambank.

8.6 ACCESS ROAD CONSTRUCTION

Atlantic has identified roads which will be used to provide access to the proposed ACP pipeline right-of-way and other facilities during construction and operation of the Project. Atlantic will primarily utilize existing roads. Section 2.1.1.4 provides information regarding new access roads proposed to be constructed on USFS lands.

The following conditions apply to the use of all access roads:

- During construction and restoration activities, access to the right-of-way is limited to the use of new or existing access roads identified on the construction drawings.
- The only access roads that can be used in wetlands, other than the construction right-of-way, are those existing roads requiring no modification or improvements, other than routine repair, and posing no impact on the wetland.
- The construction right-of-way may be used for access across wetlands when the wetland soil is firm enough to avoid rutting or the construction right-of-way has been appropriately stabilized to avoid rutting (e.g., timber matting). However, access is not allowed through wetlands that would not otherwise be impacted by the Project.
In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing shall use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction right-of-way.

Maintain safe and accessible conditions at all road crossings and access points during construction and restoration. Access road maintenance through the construction sequence may include grading and the addition of gravel or stone when necessary.

Maintain access roads in a stable manner to prevent off-right-of-way impacts, including impacts to adjacent and/or nearby sensitive resource areas, and implement all appropriate erosion and sediment control measures for construction/improvement of access roads.

Minimize the use of tracked equipment on public roadways.

Remove any soil or gravel spilled or tracked onto roadways daily or more frequent as necessary to maintain safe road conditions.

Repair any damages to roadway surfaces, shoulders, and bar ditches.

All access roads across a waterbody must use an equipment bridge.

For access through environmentally sensitive areas such as saturated wetland or waterbodies, use timber mats or an equivalent, unless otherwise authorized by agency permits.

Limit construction equipment operating in wetland areas to that needed to clear the right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way. All other construction equipment shall use access roads located in upland areas to the maximum extent practical.

In some cases, existing roads will require improvement (such as grading, gravelling, replacing or installing culverts, minor widening, and/or clearing of overhead vegetation) to safely accommodate construction equipment and vehicles.

Traffic will be restricted on access roads during unfavorable conditions, such as saturated soil. Gravel, wooden mats or a combination of geotextile and gravel may be used to help facilitate operations during wet periods.

Roads will be surfaced with gravel or another suitable material to provide a non-erodible running surface.

Cut-banks and fill-slopes will be stabilized as soon as feasible to a non-erodible condition using vegetation, rock, geotextile material or other suitable material.

Silt fence or rip rap outlet protection will be constructed at outlets of drainage structures.

Do not side-cast fill material if there is a chance that it will enter a stream, or if side slope exceeds 60 percent. Full bench construction with end hauling material to a suitable location is recommended when side slopes exceed 60 percent.
• When access roads intersect public highways, the contractor will use a combination of
greatextile and gravel (temporary stone construction entrance) to help keep mud off
highway entrances.

• Will maintain road so that water can flow freely from the road surface.

**Virginia Requirements:**

• In accordance with VESCH Std. & Spec 3.03 (Road Stabilization),

• Temporary access roads should be at least 14 feet wide for one-way traffic and 20 feet
wide for two-way traffic.

• All cuts and fills will be 2:1 or flatter to the extent possible. A 6-inch course of VDOT
#1 Course Aggregate will be applied immediately after grading.

• Temporary access roads will follow the contour as much as possible with grades between
2-10 percent. Steep gradients that exceed these grades may be necessary when boundary
lines or buffer areas require such a deviation. In these instances of steep terrain,
additional BMPs will be necessary to mitigate the disturbance. Road grades will vary
frequently to help reduce road surface erosion.

• In accordance with VESCH Std. & Spec 3.20 (Rock Check Dam), Atlantic will adhere to
the following construction and maintenance specifications:

• Use VDOT #1 coarse aggregate alone when the drainage area of the ditch or swale is less
than 2 acres. Use a combination of Class I riprap and VDOT #1 coarse aggregate when
the drainage area is between 2 and 10 acres.

• Maximum height of the check dam will be 3 feet.

• The center of the check dam must be at least 6 inches lower than the outer edges to create
a weir effect.

• Key the check dam into the soil approximately 6 inches for added stability

• Filter cloth may be used under the stone to provide a stable foundation and to facility the
removal of the stone.

• The maximum spacing between the dams should be such that the toe of the upstream dam
is at the same elevation as the top of the downstream dam.

• Sediment should be removed from behind the check dams when it has accumulated ½ of
the original height of the dam. Erosion caused by high flows around the edges of the dam
should be corrected immediately.

• Unless incorporated into a permanent stormwater management control, check dams are to
be removed when their useful life has been completed. In temporary ditches and swales,
check dams should be removed and the ditch filled in when they are no longer needed. In
permanent ditches and swales, check dams should be removed when the grass has
matured sufficiently to protect the ditch or swale. The area beneath the check dam should be seeded and mulched immediately after removal.

- Per VESCH Std & Spec 3.17 (Stormwater Conveyance Channel), Atlantic will apply the following general specifications to the construction and maintenance of roadside ditches:
  - Trees, stumps, roots and obstructions will be removed and disposed properly;
  - The channel will be excavated and graded to the proper grade and cross section;
  - Fill will be well compacted;
  - Excess soil will be removed and disposed of properly;
  - The method used to establish grass in the ditch or channel will depend upon the severity of the conditions encountered. Methods available for grass establishment are set forth in VESCH Std & Spec 3.32 (Permanent Seeding);
  - During the initial establishment, grass-lined channels should be repaired immediately and grass re-established if necessary. After grass has become established, the channel should be checked periodically to determine if the grass is withstanding flow velocities without damage. If the channel is to be mowed, it should be done in a manner that will not damage the grass; and
  - For riprap-lined channels: riprap will be installed in accordance with VESCH Std. & Spec. 3.19 (Riprap). Riprap-lined channels should be inspected periodically to ensure that scour is not occurring beneath the fabric underlining of the riprap layer. The channel should also be checked to determine that the stones are not dislodged by large flows.

8.7 SPECIAL CONSTRUCTION PROCEDURES

Sensitive areas (e.g. wetland/water body crossings or residential developments) or areas requiring specialized construction measures (e.g. boring or directional drilling) will be treated as separate construction entities. Sensitive areas require additional erosion and sediment control procedures. Specialized construction often combines several construction stages into one and reduces earth disturbance, reducing the amount of erosion and sediment control measures.

8.7.1 Winter Construction

Atlantic has developed and filed a Project-specific winter construction plan with the FERC application; it is included as Attachment D.

The plan addresses:

- Winter construction procedures (e.g., snow handling and removal, access road construction and maintenance, soil handling under saturated or frozen conditions, topsoil stripping);

- Stabilization and monitoring procedures if ground conditions will delay restoration until the following spring (e.g., mulching and erosion controls, inspection and reporting, stormwater control during spring thaw conditions); and
Final restoration procedures (e.g., subsidence and compaction repair, topsoil replacement, seeding).

8.7.2 Steep Terrain and Best in Class (BIC) Program

8.7.2.1 Steep Terrain

Atlantic recognizes the increased risk of instability associated with pipeline construction particularly while traversing steep slopes. As a baseline, Atlantic developed a program for use on projects within steep terrain. The program outlines the following engineering design methods which will apply to slip prevention and correction during construction:

- drainage improvement that may include providing subsurface drainage at seep locations through granular fill and outlet pipes, incorporating drainage into trench breakers using granular fill, and/or intercepting groundwater seeps and diverting them from the right-of-way;
- buttressing slopes with bagged concrete mix trench breakers;
- changing slope geometry;
- benching and re-grading with controlled backfill;
- using alternative backfill;
- chemical stabilization of backfill;
- Geogrid reinforced slope that consists of benching existing slope, installing subsurface drains, and incorporating Geogrid reinforcement into compacted backfill; and/or
- retaining structures.

Selection of the most appropriate engineered prevention measure or combination is dependent on the individual site conditions and constraints during the time of construction.

For the ACP Project, Atlantic is also committed to identifying mitigation measures beyond standard practices through the BIC Program. The focus of the BIC Program is to proactively address steep slopes (defined as slopes with an inclination greater than 30 percent and greater than 100 feet in length) and landslide hazards related to pipeline construction, compressor station, and metering and regulation facilities that could potentially impact environmental resources, in particular streams, wetlands, and waterbodies. The BIC program is intended to incorporate the permit requirements from West Virginia and Virginia, and then exceed these regulatory standards, in order to mitigate for potential erosion and sediment discharges related to steep slope and landslide hazards.

The ultimate goal of the BIC Program is to develop project-specific engineering mitigation recommendations and thereby support preparation of steep slope control measures and site-specific ESCP for the ACP Project. The BIC Program has achieved this by assembling a team of internal Dominion stakeholders along with supporting external subject matter experts to develop project- specific mitigation recommendations and in the field determinations, by using a process-based approach that includes: hazard identification and assessment (i.e. find and then understand the hazard), engineering mitigation design (i.e. targeted design measures that mitigate the hazard), monitoring (i.e. track performance to understand
if additional mitigation is needed), and operational measures (i.e. monitor and maintain and operate the
system, as needed).

The BIC Program Team convened in a series of design workshops to examine the identified
hazards and supporting information along the pipeline alignment. The hazards were initially identified by
studies such as the Geohazards Assessment or the karst study, and/or from other targeted studies such as
the order 1 soil survey. These studies identify and assess or support the review of the hazard, and provide
a basis to select the most applicable and robust BIC mitigation response to minimize or eliminate the
hazard, and then monitor the hazard through ongoing operations.

The conceptual work-flow process of the BIC Program (see FiguresA-1/2 through A-4) is
organized around four general steps, briefly described as follows:

- **Hazard Identification** - Geologic hazards are systematically identified during the
Geohazards Analysis Program through desktop analysis and field reconnaissance as well
as by supporting evaluations (e.g. karst studies and soil surveys).

- **Hazard Characterization, Assessment, and Threat Classification** - As part of the
Geohazards Analysis Program, the nature of the geohazards and their potential impacts
on the pipeline and environmental resources are assessed. A semi-quantitative ranking of
hazard threat level to the proposed pipeline from various geohazards is used to identify
areas for further investigation to determine where appropriate mitigation and monitoring
measures may need to be designed and implemented during construction.

- **Hazard Mitigation** - Areas for mitigation are selected based upon potential risk to the
pipeline, environment, and operations and maintenance. Overall hazard reduction
techniques may include BIC construction practices and/or best management practices.

- **Site and hazard specific plans have been developed based on the recommendations of the
Geohazards Analysis Program and mitigation techniques selected by a BIC team of
experts. The site and hazard specific plans will address the specific geologic hazard (e.g.,
slip, stream scour, ground displacement) with detailed mitigation measures, as applicable,
for construction and/or operation of the Project. Atlantic will incorporate these measures
into ESCP and corresponding SWPPPs.

- **Hazard Monitoring** - Atlantic will monitor mitigation techniques to assess their
effectiveness and the need for further mitigation, if appropriate.

The ultimate goal of the BIC Program is to develop project-specific engineering mitigation
recommendations targeting un-authorized discharges to water bodies resulting from steep slope, landslide
and erosion hazards. The locations where the BIC Program will be implemented are identified on the
construction alignment sheets (Attachment A) and on plans developed for a select group of the most
challenging and unique steep slopes requiring site-specific designs (Attachment G).
A-1/2: Hazard Identification and Assessment

A-3: Hazard Mitigation

Hazard Identification

Geohazard Characterization and Assessment

Further Characterization and Assessment

Mitigation

Monitoring

Risk Assessment

Risk (Qualitative)

Risk (Quantitative)

A-3: Hazard Mitigation

No Action

Monitoring and/or Emergency Response only as needed

Mitigate in Place

Increase Pipeline Capacity to Resist Ground Displacement

Pipe and Trench Configuration Design on Unstable Slopes

Surface Drainage

Subsurface Drainage

Leachline Stabilization

Active Operational Measures

Passive Operational Measures

- Replace Sharp Bends
- Reduce Exposed Length
- Maximum Unanchored Length
- Stabilize Trench
- Geomorphologic Lignting
- Select Backfill
- Control/Restruct Material
- Replace Slope Breakers
- Corr Lugs
- Brow Ditch
- Dewater Ditch
- Stram, Hay, or Wood Matting
- Drainage Control Matting
- Hystone
- Grout
- Silt Fence
- Outstanding Protection
- Tracking Slopes
- Re-vegetation slopes
- Rock Filter in Trench
- Armored Channel Banks
- Trench Breaker
- Trench Plug/Drum
- Seepage Collector
- French Drain
- Enhanced Drain
- Trench Rotary Drain
- Rock Backfill and Drain
- Vertical Wedge
- Ditch Drains
- Subdrain Trenches
- Horizontal Ditch
- Drainage Walls
- External Resistance
- Restone Existing Slope
- Regrade Slope
- Replace Slope Material with Light-Weight Material
- Remove Unstable Materials
- Re-direct watercourse flow or install bank armor
- Reduce groundwater level and/or surface water inflitration
- Pressure Relief
- Pipe Cutting
- Pressure Reduction
- Pipe Isolation
- Rock Guard
- Rockfall Control
- Sheet Trench
- Relocation
- Increasing Stand-Off Distance
- Constructing Protective Barriers
- Installation of Line Break Valve
- Pre-positioning of Materials and Equipment
Atlantic will provide specific employee training which will be developed from the BIC program. Atlantic personnel with responsibility for pipeline routing, construction, or operation must be trained in this procedure on an annual basis. The training may be completed by an online learning management system module or may be conducted by Energy Infrastructure Environmental Services personnel, or Atlantic Engineering Management. At a minimum, the following personnel will be trained:

- Engineering Directors and Managers;
- Design and construction engineers;
- Operations Directors, Managers and Supervisors;
- Construction supervisors; and
- Construction and operations ECC.

The training must include the following:

- Types and causes of slope failures;
- Routing avoidance and desktop methods;
- Field reconnaissance;
- Risk prioritization;
- Pipeline design and engineering to prevent slope failures;
- Addressing slope failures during construction;
- Addressing slope failures post construction; and
- Reporting requirements.
8.7.3 Seeps

In the event that subsurface flow is encountered, an under drain will be utilized, as necessary, to divert water away from the right-of-way. If encountered, seeps can be mitigated by using seep collectors placed down-slope of areas showing seepage. Armored fill placed at the toe of the slope may be used in areas of steep slopes in addition to a perforated drain pipe to divert subsurface water away from the cut slope. These structures may be kept in place or re-installed after construction in a manner that avoids seepage concentrations from the right-of-way while minimizing overall changes to subsurface flow. On steep slopes these seeps, as identified during construction, would go through an incremental layer of field review, per the BIC Program, to determine if additional erosion controls would be required.

8.8 INSPECTION FREQUENCY

Inspection of temporary erosion and sediment control measures with occur at least:

- On a daily basis in areas of active construction or equipment operation;
- On a twice-weekly basis in areas with no construction or equipment operation; and
- Within 24 hours of each stormwater event (runoff from precipitation, snowmelt, surface runoff and drainage, including rainfall events resulting in 0.5 inches or more).

8.8.1 Virginia Requirements

In accordance with CGP condition Part I.B.4, the following will be implemented for construction activities within the Chesapeake Bay TMDL Watershed:

1. Permanent or temporary soil stabilization will be applied to denuded areas within 7 days after final grade is reached on any portion of the site;

2. Nutrients will be applied in accordance with manufacture’s recommendations or an approved nutrient management plan and will not be applied during rainfall events; and

3. Inspection requirements are as follows:

   a. Inspections will be conducted at a frequency of (i) at least once every four business days or (ii) at least once every five business days and no later than 48 hours following a measurable storm event (a measurable storm event is defined as a rainfall event producing 0.25 inches of rain or greater over 24 hours). In the event a measurable storm event occurs when there are more than 48 hours between business days, the inspection will be conducted on the next business day; Note that Atlantic will follow a more stringent or protective inspection frequency stipulated by FERC (see above), and

   b. Representative inspections used by linear construction projects will include all outfalls discharging to surface waters identified as impaired or for which a TMDL wasteload allocation has been established and approved prior to the term of the CGP. Representative inspections occur once temporary or permanent soil stabilization has been installed and vehicle access may compromise the temporary or permanent soil stabilization and potentially cause additional land disturbance increasing the potential for erosion. Runoff from the temporary or permanently stabilized pipeline right-of-way will generally occur as sheet flow and will not be discharged through discrete outfalls. In the event that an outfall is
present along the pipeline right-of-way, representative inspections within the Chesapeake Bay Watershed will include those discrete outfalls. The proposed access roads located within the TMDL watershed will be covered under the general inspections, outlined in Section 8.1, due to accessibility to the roadway.

8.9 CORRECTIVE ACTION

DIT and/or their contractors will take corrective action to any of the inspected areas that have reported deficiencies to the control measures in place. Repairs will be made within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts.

8.10 REPORTING

Section 3.8 of the COM Plan discusses general inspection reporting requirements. Additional reporting requirements specific to the ESCP are as follows:

- Atlantic will maintain records that identify by milepost:
  - method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;
  - acreage treated;
  - dates of backfilling and seeding;
  - names of landowners requesting special seeding treatment and a description of the follow-up actions;
  - the location of any subsurface drainage repairs or improvements made during restoration; and
  - any problem areas and how they were addressed.

- Atlantic will submit quarterly reports to the USFS documenting the results of follow-up inspections; any problem areas; and corrective actions taken for at least 2 years following construction.

8.11 POST-CONSTRUCTION ACTIVITIES AND MAINTENANCE

8.11.1 Monitoring Program

Atlantic and/or their contractors will follow the following post-construction monitoring and maintenance guidelines.

- Restoration will be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed, revegetation is successful, and proper drainage has been restored.

- Once final stabilization is conducted, Atlantic and/or their contractors will conduct follow-up inspections of all disturbed areas, as necessary, to determine the success of
revegetation and address landowner concerns. At a minimum, Atlantic will conduct inspections after the first and second growing seasons.

- NNIS monitoring/treatment will be done in accordance with Section 11, the Non-Native Invasive Plant Species Management Plan.

- Revegetation efforts will continue until revegetation is successful (see Section 10.4).

- Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.

8.11.2 Monitor and record the success of wetland revegetation annually until wetland revegetation is successful, as described in Section 9.5.3. Maintenance

- The permanent pipeline right-of-way will be maintained in an herbaceous state. Woody vegetation within the permanent right-of-way will be cleared periodically, in order to maintain accessibility of the right-of-way for maintenance and to accommodate pipeline integrity surveys. In uplands, trees and brush will be cleared over the entire width of the permanent right-of-way on an as-needed basis not to exceed once every 3 years. In wetlands and riparian areas, a 10-foot-wide corridor centered over the pipeline will be cleared at a frequency necessary for the corridor to be permanently maintained in an herbaceous state, as allowed by the Procedures. In addition, trees within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating maybe selectively cut and removed from the permanent right-of-way. In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15 and August 1 of any year unless specifically approved in writing by the responsible land management agency or the FWS.

- Atlantic will not conduct routine vegetation mowing or clearing over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees within 15 feet of the pipeline with roots that could compromise the integrity of pipeline coating may be selectively cut and removed from the permanent right-of-way. Atlantic will not conduct routine vegetation mowing or clearing in wetlands that are between HDD entry and exit points.

- Atlantic will not use herbicides or pesticides in or within 100 feet of a stream or wetland, except as allowed by the appropriate federal or state agency.

- Within 3 years after construction, Atlantic will file a report with the FERC identifying the status of the wetland revegetation efforts and documenting success. For any wetland where revegetation is not successful at the end of 3 years after construction, Atlantic will develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively revegetate wetlands. Atlantic will continue revegetation efforts and file a report annually documenting progress in these wetlands until wetland revegetation is successful.

- Atlantic will make efforts to control unauthorized off-road vehicle use, as described in Section 18, the Off-Highway Vehicle Blocking Plan (Blocking Plan).
8.12 STORMWATER MANAGEMENT

Where pre-development land cover conditions are changed significantly triggering requirements for post-construction stormwater quality and quantity requirements, post-construction BMPs may be required to comply with water quality and water quantity criteria and MS-19 of the Erosion and Sediment Control Regulations.

8.12.1 West Virginia Requirements

The West Virginia Department of Environmental Protection recognizes that construction of aboveground and underground linear utilities may not result in changes to the post-development runoff characteristics of the land surface after the completion of the construction and final stabilization. The installation of the ACP pipeline is an example of such a Project where the areas disturbed will be returned to their pre-development condition. Therefore, the preparation and implementation of post-construction stormwater management measures for the pipeline portion of the Project is not warranted.

Within the MNF, forest/open space or managed turf will be returned to a vegetative state and characteristics of stormwater runoff should remain unchanged. Therefore, post-construction stormwater management will not be required for the portion of the Project within the MNF.

8.12.2 Virginia Requirements

The VDEQ recognizes that construction of aboveground and underground linear utilities may not result in changes to the post-development runoff characteristics of the land surface after the completion of the construction and final stabilization. The installation of the ACP pipeline is an example of such a Project where the areas disturbed will be returned to their pre-development condition. Therefore, the preparation and implementation of post-construction stormwater management measures for the pipeline portion of the Project is not warranted.

Within the GWNF, forest/open space or managed turf will be returned to a vegetative state and characteristics of stormwater runoff should remain unchanged. Therefore, post-construction stormwater management will not be required for the portion of the Project within the GWNF.

8.13 VARIANCE TO OPEN TRENCH LENGTH

The Virginia Erosion and Sediment Control Law Minimum Standard 16a requires that no more than 500 feet of trench remain open at one time. However, this requirement would significantly slow construction and increase the amount of time the work area remains disturbed. In accordance with 9 VAC 25-870-50, Atlantic will request that VDEQ approve open trench work greater than 500 feet where necessary to facilitate efficient and effective construction in compliance with Virginia Erosion and Sediment Control Law.

Any other variances to this plan or the State Minimum Standards must be approved prior to implementation. The EI will monitor any variance-related activities.

8.14 ADDITIONAL MITIGATION MEASURES FOR U.S. FOREST SERVICE LANDS

On USFS lands, additional measures will be implemented in conformance with the applicable standards and guidelines identified in the MNF and GWNF LRMPs. If a general mitigation measure as described above is more stringent than an applicable standard or guideline, the more stringent measure will be applied.
8.14.1 Monongahela National Forest

- Maintain, restore, or improve soil quality, productivity, and function. Manage soil disturbances from management activities such that they do not result in long-term loss of inherent soil quality and function. (MNF LRMP SW01).

- Disturbed soils dedicated to growing vegetation shall be rehabilitated by fertilizing, liming, seeding, mulching, or constructing structural measures as soon as possible, but generally within 2 weeks after Project completion, or prior to periods of inactivity, or as specified in contracts. Rip compacted sites when needed for vegetative re-establishment and recovery of soil productivity and hydrologic function. The intent is to minimize the time that soil is exposed on disturbed sites or retained in an impaired condition. (MNF LRMP SW03).

- Erosion prevention and control measures shall be used in program and Project plans for activities that may reduce soil productivity or cause erosion. (MNF LRMP SW04).

- Severe rutting resulting from management activities shall be confined to less than 5 percent of an activity area. (MNF LRMP SW06). Note: MNF is considering a project-specific LRMP amendment to this standard.

- Use of wheeled and/or tracked motorized equipment may be limited on soil types that include the following soil/site area conditions:
  - Steep Slopes (40 to 50 percent) – Operation on these slopes shall be analyzed on a case-by-case basis to determine the best method of operation while maintaining soil stability and productivity.
  - Very Steep Slopes (more than 50 percent) – Use is prohibited without recommendations from interdisciplinary team review and line officer approval.
  - Susceptible to Landslides – Use on slopes greater than 15 percent with soils susceptible to downslope movement when loaded, excavated, or wet is allowed only with mitigation measures during periods of freeze-thaw and for one to multiple days following significant rainfall events. If the risk of landslides during these periods cannot be mitigated, then use is prohibited.

- Soils Commonly Wet At Or Near The Surface During A Considerable Part Of The Year, Or Soils Highly Susceptible To Compaction. Equipment use shall normally be prohibited or mitigated when soils are saturated or when freeze-thaw cycles occur. (MNF LRMP SW07). Note: MNF is considering a project-specific LRMP amendment to this standard.
  - Management actions that have the potential to contribute to soil nutrient depletion shall be evaluated for the potential effects of depletion in relation to on-site acid deposition conditions. (MNF LRMP SW08).

- Inventory the soil resource to the appropriate intensity level as needed for Project planning and/or design considerations. (MNF LRMP SW10).
• Soil stabilization procedures should take place as soon as practical after earth-disturbing activities are completed or prior to extended periods of inactivity. Special revegetation measures may be required. (MNF LRMP SW11).

• Use Forest-wide soils map(s) and county soil survey report interpretations to help determine soil characteristics and protection needs. (MNF LRMP SW12).

• Topsoil should be retained to improve the soil medium for plant growth on areas to be disturbed by construction. Topsoil should be salvaged from an area during construction and stockpiled for use during subsequent reclamation, or obtained from an alternate site. On some areas, soil material may have to be added to obtain vigorous plant growth. Soil to be used for this purpose should have chemical tests made to determine its desirability for use. (SW15).

• Where the removal of vegetative material, topsoil, or other materials may result in erosion, the size of the area may be limited from which these materials are removed at any one time. (MNF LRMP SW16).

• Management activities that may result in accelerated erosion and loss of organic matter should have one or more of the following practices applied to mitigate potential effects:
  o Limiting mineral soil exposure,
  o Appropriately dispersing excess water,
  o Ensuring sufficient effective groundcover,
  o Stabilizing disturbed soils through revegetation, mulching, or other appropriate means,
  o Preventing or minimizing excessive compaction, displacement, puddling, erosion, or burning of soils, and
  o Preventing or minimizing the initiation or acceleration of mass soil movement (e.g., slumps, debris flows, or landslides). (MNF LRMP SW19)

• Where new roads and skid roads cross stream channels, channel and bank stability shall be maintained. (MNF LRMP SW35).

• When stream crossing structures are removed, stream channels shall be restored to their near natural morphology (width, depth, and gradient associations for streambeds, streambanks, floodplains, and terraces). Disturbed soil shall be stabilized. (MNF LRMP SW36).

• New structures (culverts, bridges, etc.) shall be designed to accommodate storm flows expected to occur while the structures are in place. Use scientifically accepted methods for calculating expected storm flows. (MNF LRMP SW46).

• Ground disturbance should be avoided within seeps, vernal pools, bogs, fens, and other wetlands during Project implementation. These areas should be managed to protect wet soils and rare plants and provide wildlife watering sources using the following protection:
No new system roads or skid roads should be located within these areas except at essential crossings. Such crossings should be designed to minimize disturbance to the extent practical.

Logs should not be skidded through these areas. Keep slash and logs out of them.

- For protection of cold water fisheries, apply the following to the channel buffers of perennial trout streams (stocked and native) during the period of October 1 to June 1:
  - Potential sediment-producing ground disturbance exceeding two consecutive days shall only be initiated after consultation with a Forest fisheries biologist.
  - Sediment-producing ground disturbance during this period shall use additional erosion control measures and seeding or mulching, applied concurrently with the activity. (MNF LRMP WF14).
- Work with USDA state and private forestry and county extension agents to identify or develop sources for weed-free straw and mulch. (MNF LRMP VE20).

### 8.14.2 George Washington National Forest

- On all soils dedicated to growing vegetation, the organic layers, topsoil and root mat will be left in place over at least 85 percent of the activity area and revegetation is accomplished within 5 years. (The activity area is the area of potential soil disturbance expected to produce vegetation in the future, for example: timber harvest units, prescribed burn area, grazing allotment, etc.). (GWNF LRMP FW-5). Note: GWNF is considering a project-specific LRMP amendment to this standard,

- Locate and design management activities to avoid, minimize, or mitigate potential erosion. (GWNF LRMP FW-6)

- Use ditchlines and culverts when new permanent road construction grades are more than 6 percent and the road will be managed as open for public use. (GWNF LRMP FW-7)

- Where soils are disturbed by management activities, appropriate revegetation measures should be implemented. When outside the normal seeding seasons, initial treatments may be of a temporary nature, until permanent seeding can be applied. Revegetation should be accomplished within 5 years. For erosion control, annual plants should make up >50 percent of seed mix when seeding outside the normal seeding season and the area should be reseeded with perennials within 1½ years. (GWNF LRMP FW-9)

- Clearcutting is not allowed where high risk soils (as described in Chapter 3-Management Approach for Soils and in the Glossary) are identified. (GWNF LRMP FW-12)

- Motorized vehicles are restricted in the channeled ephemeral zone to designated crossings. Motorized vehicles may only be allowed on a case-by-case basis, after site-specific analysis, in the channeled ephemeral zone outside of designated crossings. (GWNF LRMP FW-15) Note: GWNF is considering a project-specific LRMP amendment to this standard,
Management activities expose no more than 10 percent mineral soil in the channeled ephemeral zone. (GWNF LRMP FW-16) Note: GWNF is considering a project-specific LRMP amendment to this standard,

Favor use of native grasses and wildflowers beneficial as wildlife foods when seeding temporary roads, skid roads, log landings and other temporary openings when slopes are less than 5 percent. On slopes greater than 5 percent, favor use of vegetation that best controls erosion. (GWNF LRMP FW-93)

A contractor’s sources of fill, soil, shale, and related materials will be pre-approved. Contractors will submit a description of the source. The Project inspector or a qualified designee will inspect the supply source. Use of the source will be prohibited if contaminated by transferable agents of invasive species. (GWNF LRMP FW-95)

The soils of riparian corridors have an organic layer (including litter, duff, and/or humus) of sufficient depth and composition to maintain the natural infiltration capacity, moisture regime, and productivity of the soil (recognizing that floods may periodically sweep some areas within the floodplain of soil and vegetation). (GWNF LRMP DC 11-03)

Exposed mineral soil and soil compaction from human activity may be present but are dispersed and do not impair the productivity and fertility of the soil. Any human-caused disturbances or modifications that cause environmental degradation through concentrated runoff, soil erosion, or sediment transport to the channel or waterbody are promptly rehabilitated or mitigated to reduce or eliminate impacts. (GWNF LRMP DC 11-04)

Management activities expose no more than 10 percent mineral soil within the Project area riparian corridor. (GWNF LRMP DC 11-003)

To minimize the length of streamside disturbance, ensure that approach sections are aligned with the stream channel at as near a right angle as possible. Locate riparian corridor crossings to minimize the amount of fill material needed and minimize channel impacts. Generally, permanent structures or temporary bridges on permanent abutments are provided when developing new crossings on perennial streams. Permanent structures, temporary bridges or hardened fords are used when crossing intermittent streams. (GWNF LRMP DC 11-050)

If culverts are removed, stream banks and channels must be restored to a natural size and shape. All disturbed soil must be stabilized. (GWNF LRMP DC 11-054)

For activities not already covered in the above standards, ground disturbing activities are allowed within the corridor if the activity will cause more resource damage if it were located outside the corridor, on a case-by-case basis following site-specific analysis. Any activity allowed under these conditions is minimized and effective sediment trapping structures such as silt fences, brush barriers, straw bale barriers, gravelling, etc., are required. Sediment control, prior to, or simultaneous with, the ground disturbing activities, is provided. (GWNF LRMP DC 11-058)