ATTACHMENT 2

Steep Slope Construction Narratives

MNF #1 / GWNF #2

Atlantic Coast Pipeline Project

May 10, 2017

MNF #1 site (MP 73.20 TO 73.50)

This construction narrative reference Revision D of the site specific plans and cut fill plans and provided 3/22/17 to the USFS. The following paragraphs are intended to supplement these plans.

Sequences of operations are:

1. Trees are felled with operations beginning at the bottom of the slope and working upward and along the ridge line.
2. Timber and slash removal will follow per one of two methods.
    a. Method 1 will utilize trackhoe(s) that will be controlled along slope to gather slash and timber for relocation to the top and bottom of steep slope area for processing.
    b. Method 2 will utilize yarder type equipment to relocate slash and timber to bottom of the slope for processing.
3. Following slash and timber removal, all stumps will be ground down to below grade level.
4. Grading operations follow right-of-way (ROW) clearing. The ROW is graded to create a safe and level working surface. The ROW is graded using a trackhoe.
    a. Operations along the lower slopes will first occur along the travel lane and be limited to this area until ditching operations begin. Excavated material will be side cast and stockpiled.
    b. Operation(s) along the upper slope will begin along the ditch side at the bottom of the slope. Excavated grade material will be sidecast to the temporary ROW along the working side of the ROW and a portion is relayed to the ATWS for temporary stockpiling.
5. Ditching operations will commence once grading and ROW preparation operations are complete.
    a. Spoil will be sidecast to the ditch side of the ROW as much as feasible, with the remaining spoil to be sidecast the working side of the ROW and leveled for traveling purposes

6. Following the establishment of the completed ditch, bending and stringing operations are performed. The required number of pipe joints will be first be brought to site and laid along the excavated ditch. Grade of ditch will be engineered and pipe will be bent accordingly.
7. Once bending and stringing operations are complete, pipe installation will commence. Pipe is welded and lowered into the excavated ditch. After initial pipe installation, final inspection will be performed and trench plugs installed.
8. Once the pipe has been installed backfilling operations begin.
9. Once backfilling has been completed, final grading and restoration begin. Work is performed in similar fashion as grading activities occurred through the use of winch line construction and excavator. Excavated spoils are replaced from the temporary ROW to original location and final grade, including permanent erosion controls, is re-established.
10. Immediately following final grade, final restoration commences and includes permanent seeding and erosion control fabric.

GWNF #2 site (MP 84.95 TO 85.05)

This construction narrative reference Revision D of the site specific plans and cut fill plans and provided 3/22/17 to the USFS. The following paragraphs are intended to supplement these plans.

Sequences of operations on the lower and upper slopes are:

1. Trees will first be felled with operations beginning at the bottom of the slope and working upward.
2. Timber and slash removal operations will follow per one of two methods. Through the use winch line construction. Winch line construction techniques involve the use of a bulldozer or series of bulldozers connected to each other with winch lines to control and stabilize the working piece of equipment (e.g. trackhoe, stump grinder) working along slope.
    a. Method 1 will utilize trackhoe(s) that will be controlled along slope to gather slash and timber for relocation to the top and bottom of steep slope area for processing.
    b. Method 2 will utilize yarder type equipment to relocate slash and timber to bottom of the slope for processing.
3. Once slash and timber has been removed from the slope, stump grinding equipment is controlled along the slope with the use of winch line and grinds all stumps to below ground level.
4. Soil nails and Tecco® Mesh are installed on the lower portion of the slope. Soil nails are installed by lowering small diameter drilling equipment down the slope and drilling holes

for the soil nails. TECCO® mesh is installed and connected to the soil nails stabilizing the steep slope.

5. Timber mats are placed within the soil nail area to protect these from damage by the equipments. Fill is then placed over the mats (as depicted in the site specific plans) to develop the travel lane.
6. Grading operations commence once clearing operations has been completed. The ROW is graded to create a safe and level working surface. Grading method will utilize a trackhoe that is controlled along the slope with through the use of winch lines.
    a. Operations along the lower slope will first occur along the travel lane and are limited to this area until ditching and stream installation operations commence. Only grading necessary to construct a bridge and allow for transitioning onto steep slope area is performed. Excavated material is relayed and placed into the bottom area for temporary stockpile.
    b. Operation(s) along the upper slope begin along the ditch side at the bottom of the slope. Excavated grade material is sidecast to the temporary ROW along the working side of the ROW.
7. Ditching operations commence once grading and ROW prep operations have been completed.
    a. Operations along the lower slope occur first. Stream installation and lower slope is ditched and pipe (a pre-fabricated section) is installed. During this operation, excavated material is placed outside the 10-ft buffer from the edge of the waterbody. Once the prefabricated pipe section has been installed the area is backfilled and restored with exception of travel lane.
    b. Ditching operations along the upper slope follow the construction of the lower slope. Operations begin at the base of the slope and work upward to the top of slope and spoil placed to the side is used as support for the additional spoil working upslope. Spoil is sidecast to the ditch side of the ROW as much as feasible, with the remaining spoil sidecast the working side of the ROW and leveled for traveling purposes
8. Following the establishment of the completed ditch, bending and stringing operations is performed. The required number of pipe joints are first brought to site and stockpiled at the bottom and top of slope. Grade of ditch is engineered and pipe bent accordingly.
9. Once bending and stringing operations are complete, pipe installation (i.e. ‘lowering in’ begins. Each pipe joint is placed within the ditch and welded. This process is referred to as the stovepipe method. After initial pipe installation, final inspection is performed and trench plugs installed.
10. Once the pipe has been installed along the identified steep slope area, backfilling operations begin. Backfilling starts at the base of the upper slope where the lower slope had been previously backfilled, and moves upslope.

11. Once backfilling has been completed, final grading and restoration commences. Operations begin at the base of the upper slope working upslope. Work is performed in similar fashion as grading activities using winch lines. Excavated spoils are re-sidecast from the temporary ROW to original location and final grade, including permanent erosion controls, is re-established. Immediately following final grading, final restoration and slope stabilization is accomplished. This includes permanent seeding efforts and erosion control fabric installation.

Part II: General Considerations and Minimum Requirements for Ensuring Slope Stability and Soil Productivity

Responses to the questions as they pertain to the site specific designs are provided below. The COM plan is under review and comments will be addressed separately.

1. Topsoil segregation. Describe locations and techniques for topsoil segregation. At a minimum, the FS will require segregation over the trench area for the top 6 inches of material, or all actual topsoil as identified by the FS, whichever is deeper, throughout all areas of National Forest land.

RESPONSE: Topsoil segregation is addressed under a separate letter.

2. Blasting. Disclose locations where blasting is required. Unanticipated blasting will require Forest Service approval.

RESPONSE: Atlantic anticipates excavation by blasting to fracture the rock along the ROW is required. Per the general blasting plan provided in the COM Plan, site specific blast plans will be prepared in accordance with the appropriate regulations by certified blasting specialist.

3. Protection for stockpiled excavated materials.
    a. Describe methods for preventing erosion of stockpiled material. The FS will require temporary seeding or other FS-approved technique for any material left exposed for more than seven days.

RESPONSE: Protection of stockpiled material can be accomplished through the use of temporary seeding and mulch if the material is exposed for more than seven days.

    b. Describe methods for preventing saturation of stockpiled material, which could lead to slippage of backfilled material. Techniques may include temporary seeding and mulching, use of tarps, implementing an accelerated backfilling schedule, or other methods proposed by ACP and approved by the FS.

RESPONSE: Seeding and mulching of the temporary stockpiled material may be used to minimize saturation. Tarpaulins or other similar materials will not be used. As noted in the narratives above backfilling follows immediately after inspection of the welds and coating to minimize potential for saturation.

4. Trench breakers/plugs.
    a. Describe trench breaker/plug materials and construction. Foam will not be permitted on National Forest land. Bags of concrete mix may be used no more frequently than every other plug; sand bags or other semi-permeable, FS-approved material shall be used for all other trench plugs.

RESPONSE: Refer to the updated site plans and Best-in-class (BIC) details. Atlantic proposes foam trench breakers for steep slopes as part of the adaptive management strategy. However, we understand that the use of these is currently uder review by the USFS.

b. Describe trench breaker/plug spacing. FERC spacing specifications are acceptable to the FS, although closer spacing may be employed where ACP determines a need due to slope steepness.

RESPONSE: Refer to the revised site plans for proposed trench breaker spacing.

5. Bleeder drains. Describe the spacing and construction of bleeder drains.
   a. On slopes greater than 30 percent, bleeder drains shall be spaced no farther apart than every other trench plug. Closer spacing may be used where ACP determines a need due slope steepness, discharge volume, or other factors.

RESPONSE: Atlantic's erosion and sediment control (ESC) drawings as well as the BIC details detail the bleeder drain locations. Bleeder drains are installed at every other trench plug.

b. Bleeder drains may be needed on slopes less than 30 percent if subsurface flow or seeps are encountered during trench excavation. The Forest Service representative and ACP's environmental inspector will consult to determine the need for bleeder drains on slopes less than 30 percent.

RESPONSE: Bleeder drains will be installed per the ESC plans and details.

c. Protect bleeder drain outlets using rip-rap or other FS-approved material. The FS may specify alternate materials in certain locations if necessary for protection of resources.

RESPONSE: Bleeder drain outlets will be installed per the ESC plans and details.

d. The FS will require post-construction water quality testing at selected bleeder drain outlets. Locations will be selected by the FS based on nearby sensitive resources, and the FS will provide the chemical parameters to be included in the testing.

RESPONSE: Post construction water quality testing is not required by federal, state or local stormwater permits.

6. Temporary erosion control. Describe temporary erosion control and sediment transport barriers.
   a. Silt fence shall not be used at locations of concentrated overland flow, whether the flow is natural or constructed. Compost filter socks or other controls designed

to filter or chemically remove sediment from water shall be used in those locations, subject to FS approval.

RESPONSE: Refer to the updated site specific plans and ESC drawings.

b. Silt fence may be used as perimeter control where concentrated flow does not exist, as well as where prescribed as a barrier to keep threatened, endangered, and sensitive (TES) species out of the work area, or spoil materials or sediments out of TES habitat.

RESPONSE: Refer to the updated site specific plans and ESC drawings.

c. Where temporary slope breakers are deemed necessary during construction, as determined by consultation between ACP's environmental inspector and the FS representative, install berms or other appropriate diversion structures on the ROW to intercept and divert water from the ROW. Install 12-inch diameter or larger compost filter socks at the outlet of the berms to control sediment transport.

RESPONSE: Refer to the updated site specific plans and ESC drawings.

d. In areas where excessive run-on (i.e., onto the ROW or access roads) is expected or occurs, diversion channels or berms may be installed on the upslope side of the ROW. Run-on diversions or berms shall disperse the water into a well vegetated area, such that it does not result in concentrated discharge or rill erosion at or downslope of the outlet. One or more 12-inch or larger diameter compost filter socks shall be installed at each outlet to aid in reducing energy and removing sediment suspended in the discharged water.

RESPONSE: Refer to the updated site specific plans and ESC drawings.

7. Compaction. Address the prevention of compaction during construction, and remediation of compaction after construction.

RESPONSE: As final grading is performed, existing ground is scarified through earth moving operations as soils are placed back to existing grade and a seed bed is prepared through the use of a disk, track cleats, backhoe bucket teeth, or other approved method. The following measures proposed by the USFS will be coordinated during the development of the COM plan.

a. Employ timber mats or trench spoil to protect underlying soil where possible.
b. Limit the use of heavy equipment on steep slopes to the minimum amount necessary.
c. Use a cone penetrometer to measure compaction on the construction ROW prior to and following completion of construction activities. Post-construction

compaction that exceeds pre-construction compaction indicates the need for compaction remediation.

d. On ROW slopes <20% where compaction remediation is needed, use de-compaction techniques such as a ripper, harrow disk, backhoe bucket teeth, chisel plow, or other FS-approved techniques to de-compact travel lanes and any other compacted areas.
e. On ≥20% slopes where compaction remediation is needed and can be accomplished safely and effectively without causing further resource damage, use backhoe bucket teeth, or another safe, FS-approved method, to break up compacted soils.

8. Trench backfilling. Describe techniques for ensuring moisture levels in backfilled material do not present an elevated risk of slippage.

RESPONSE: Atlantic proposes to estimate soil moisture by feel and appearance use the methodology based on the NRCS technique for estimating soil moisture for irrigation schedule. This procedure will be implemented on slopes greater than 30 percent where a 2-inch rainfall event has occurred within a 24-hour period, or as determined by the environmental inspector.

a. Topsoil and spoil material shall be replaced only when moisture levels in those reserved materials are at appropriate levels. Appropriate levels shall be determined using Time Domain Reflectometry (TDR) measurements taken at 5 or more locations in each pile between 1 and 2 ft below the pile surface. This requirement applies to all spoil piles on National Forest land, except as noted otherwise below.
    i. In jurisdictional wetland areas, ACP is not required to conduct soil moisture testing. The flat topography of the wetlands being crossed by the project is not likely to lead to slope failures.
    ii. In areas that (1) are not jurisdictional wetlands, and (2) were identified by the Order 1 soil survey as having wet or poorly drained soil, testing is required regardless of the timing of excavation and backfill, and regardless of any precipitation that may or may not have occurred between initial excavation and completion of backfilling. In all other areas, testing is not required if (1) excavation and backfilling occur on the same day, or (2) no precipitation occurs between initial excavation and completion of backfilling.
b. All individual moisture values from each pile (not the average of all measurements) must be less than 25 percent volumetric water content for replacement of material into the trench (spoil material) or onto the surface of the trench (topsoil). Twenty-five percent volumetric water content is approximately

field capacity (field capacity is the approximate soil moisture resulting from 2 to 3 days of drainage following saturation).

c. ACP shall employ qualified and trained inspectors who will be responsible for taking TDR measurements and evaluating whether the results meet allowable soil moisture requirements for backfilling. The number of inspectors will be adjusted (increased or decreased) based on the schedule of activities and the needs of the project. The TDR unit (brand and model) must be agreed to as suitable by the Forest Service.
d. ACP's inspector shall keep records of the measured moisture levels for each topsoil and spoil pile at or just before the time of replacement into or onto the trench. The location (i.e., GPS locations along with the nearest milepost) of each topsoil or spoil pile shall be noted along with those moisture levels.
e. TDR measurements shall be taken during the construction phase of the Project during trench backfilling (both subsoil and topsoil) on National Forest lands. Measurement results shall be provided to the Forest Service weekly, except for weeks when no backfilling occurs on National Forest land. The Forest Service will be notified that no backfilling occurred via ACP's weekly status report, which is filed on the FERC docket.
f. If moisture levels are found to be unsuitable for replacement (i.e., they exceed allowable moisture requirements), topsoil or spoil material may be mechanically mixed, or Forest Service-approved materials (e.g. lime, etc.) may be physically mixed in, to allow evaporation to achieve allowable moisture levels.

9. Permanent Slope Breakers. Describe specifications for permanent slope breakers.

RESPONSE: Specifications for permanent slope breakers are provided in the ESC plans. Installation of these will be per the approved plans and specifications or as determined by the BIC steep slope specialists. The following measures proposed bythe USFS will be coordinated during the development of the COM plan.

a. On slopes <5 percent gradient, slope breakers often do not function properly; therefore, slope breakers are not required on slopes less than 5 percent unless field conditions are such that a slope breaker would enhance the temporary or permanent water control. The ACP environmental inspector and the Forest Service representative will coordinate to determine where this is desirable in the field.
b. On slopes between 5 and 30 percent gradient, spacing between slope breakers shall not exceed 100 ft.
c. On slopes having 30 to 40 percent gradient that ACP has identified as moderate to high risk areas for slope failures (based on the Phase 1 and 2 Geohazard Analysis Reports), spacing between slope breakers shall not exceed 50 ft.

d. On all slopes >40 percent gradient, spacing between slope breakers shall not exceed 50 ft.
e. Spacing wider than the requirements stated for any of the above situations requires prior approval from the Forest Service. Conversely, closer spacing of slope breakers is permitted without Forest Service approval where ACP believes additional drainage control is needed.
f. Twelve-inch diameter (or larger) compost filter socks shall be installed at the outlet of slope breakers to control sediment transport until vegetation becomes established. If the Forest Service representative deems the amount of discharge at a drainage outlet to be of a volume requiring additional control, larger diameter compost filter socks or multiple compost filter socks shall be installed.

10. Erosion and Sediment Control Maintenance. Consistent with ACP's Environmental Construction Standards, environmental inspections will be conducted by the third party environmental monitor to maintain the effectiveness of implemented erosion and sediment controls. If the third party environmental monitor identifies the need for additional measures or maintenance/repair of installed practices, ACP will implement them to achieve the objectives outlined in the erosion and sediment control plan and comply with the Forest Plan.

RESPONSE: ESC maintenance is discussed in the COM Plan.

11. Long-Term Monitoring. ACP will monitor the ROW erosion control revegetation effectiveness for the life of the permit within the MNF and GWNF.

RESPONSE: Atlantic will incorporate the following measures in the development of the COM plan in coordination with the USFS.

a. If the appropriate state agency ground cover requirements are not met because the seed was sowed outside a normal seeding season, additional seeding and soil amendments shall be applied to the cover deficient areas. Reseeding and soil amendment application shall be assessed at the start of the spring and fall normal seeding seasons.
b. The timing for reseeding and other amendments shall be in accordance with the Forest Service for both the seed mix and the application. ACP shall follow the manufacturer's recommendations for application procedures of other soil amendments such as soil conditioners, hydroseeding, etc.
c. ACP will coordinate with the Forest Service each year during which construction is active or the year immediately following construction to determine if reseeding or other amendments are necessary in areas that were seeded during late spring, summer, fall or winter and are on the schedule for the next normal seeding season.