MOTT MACDONALD

National Fuel

FM100 Project

ESCGP-3 Permit Application Package

October 2019 (Revised December 2020)

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Issue and revision record

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Contents

Tables

1 Introduction

This ESCGP-3 permit application package has been developed to address control of accelerated erosion and sedimentation resulting from earth disturbance associated with the proposed FM100 Project (Project). The permit application package consists of this written narrative and the attached appendices and plan drawings. It was developed to be in accordance with the requirements of 25 PA Administrative Code Chapters 78 and 102, as well as the Clean Streams Law (35 P. S. §§ 691.1001), as amended, utilizing guidelines and Best Management Practice (BMP) information provided in the Pennsylvania Department of Environmental Protection (PADEP) Erosion and Sediment Pollution Control Program Manual dated March 2012 (PADEP E&S Manual) and Pennsylvania Stormwater BMP Manual dated December 2006 (PADEP BMP Manual). The attached Erosion and Sediment Control and Agricultural Mitigation Plan (ESCAMP or Plan) has been developed by National Fuel Gas Supply Corporation (National Fuel) to address federal, state and local requirements. The ESCAMP complements the Site Restoration Plan (SR Plan) /Post Construction Stormwater Management Plan (PCSM Plan) prepared for this project and was planned and designed to be consistent with the SR/PCSM Plan under PA Code § 102.8. An up to date copy of the ESCAMP (Appendix G) (including this application package and all appendices, and any subsequently granted variances to the Plan) shall be maintained and available at the Project site during all stages of earth disturbance activity. This application package was prepared under the direct supervision of a Pennsylvania licensed Professional Engineer trained and experienced in erosion and sediment (E&S) control methods and techniques applicable to the size and scope of the proposed project.

1.1 Project Purpose and Description

The primary purpose of the Project, as initially designed and pre-filed with Federal Energy Regulatory Commission (FERC) Docket No. PF17-10-000), is to modernize a portion of National Fuel's existing pipeline system. The Project will allow for the removal from service and abandonment of approximately 44.9 miles of vintage steel pipe. National Fuel's risk analysis has prioritized the replacement of these aging facilities. In order to continue to provide the existing transportation and storage services provided by the facilities proposed to be abandoned, approximately 29.5 miles of new 20-inch-diameter coated steel pipeline, 0.4 miles of 12-inch-diameter coated steel pipeline to be used as a suction/discharge header, and 4,055 horsepower (hp) of compression and related facilities at the proposed Marvindale Compressor Station will be installed. The Project will enhance the reliability and safety of the National Fuel system for transportation services, local distribution market needs, storage management purposes and local production collection and transportation. Line FM100 is National Fuel's only connecting pipeline between its western and eastern operating systems.

In addition to modernizing its existing system, National Fuel also proposes to construct additional facilities designed to create 330,000 Dekatherm/day of incremental transportation capacity ("Transportation Capacity") from the Sergeant Township area to Transco at Leidy, PA. These additional facilities include 11,110 hp at the proposed Marvindale Compressor Station, 22,220 hp at the proposed Tamarack Compressor Station, an increase in the Line YM58 pipe diameter to 20-inch, and measurement upgrades at National's interconnection with Transco at Leidy.

The Transportation Capacity, which is fully subscribed to Transco under a proposed capacity lease, will provide upstream gas supply from shale producing areas in central PA to Transco's "Leidy South Project" (Docket No. PF19-1-000) on behalf of Transco's foundation shipper. The companion projects will allow abundant, reliable, and economic gas supply to access the

interstate pipeline system grid where it can reach key consuming market centers in the northeastern United States via the Transco pipeline system.

The Commission granted a certificate of convenience and necessity for the Project on August 6, 2020; should all other necessary permits be secured, it is anticipated that clearing and grading will commence in Q4 2020, with construction beginning in Q1 2021 and being complete by Q4 2021. Additional work will occur in 2022 supporting the abandonment of Line FM100. The proposed in-service date for the completed Project is December 2021. A detailed construction plan by Project segment will be submitted with the Implementation Plan. This plan will address timeframes for pre-construction activities (e.g., environmental clearance surveys, staking, clearing/grading, construction, restoration, and commissioning).

The Project includes:

- Installation of approximately 29.5 miles of 20-inch-diameter steel pipeline (Line YM58) from the proposed Marvindale Interconnect near the proposed Marvindale Compressor Station site in Sergeant Township, McKean County, PA and extending to the proposed Carpenter Hollow Over Pressure Protection (OPP) Station adjacent to existing Station HEP0 840T in Hebron Township, Potter County, PA. The proposed alignment generally parallels the existing Tennessee Gas Pipeline (TGP) 300 Lines.
- Installation of approximately 0.4 miles of 12-in-diameter steel pipeline (extension of existing Line KL).
- Installation of approximately 1.41 miles of 24-inch-diameter steel pipeline looping the existing National Fuel Line YM224 in Potter County, PA

Compressor Stations:

- Installation of the proposed 15,165 hp Marvindale Compressor Station in Sergeant Township, McKean County, PA
  - Install one natural gas fired Caterpillar G3516 (1,380 hp)
  - Install one natural gas fired Caterpillar G3608A4 (2,675 hp)
  - Install one natural gas fired Solar T-70 (11,110 hp)
- Installation of the proposed 22,220 hp Tamarack Compressor Station in Clinton County, PA
  - Install two natural gas fired Solar T-70 (11,110 hp each)

Interconnections/Stations:

- Proposed work at the existing Marvindale Interconnect/meter station near the new Marvindale Compressor Station (Sergeant Township, McKean County, PA);
- New OPP Station, Carpenter Hollow OPP Station, adjacent to existing Station HEP0 840T, between Line YM50 and Line YM224 (Hebron Township, Potter County, PA); and
- Modification of existing Leidy Interconnect LDC 2245 with Transco at the Leidy M&R Station (Clinton County, PA); evaluated under FERC Docket PF19-1-000.

Mainline Valves:

- KL Valve Set (Sergeant Township, McKean County, PA)
- MLV-1 (Norwich Township, McKean County, PA)
- MLV-2 (Liberty Township, McKean County, PA)

- MLV-3 (Hebron Township, Potter County, PA)
- MLV-4 (Allegany Township, Potter County, PA)

Abandonments:

- Abandonment and removal of Costello Compressor Station (Potter County, PA);
- Abandonment in place of approximately 44.9 miles of Line FM100 12-inch steel and appurtenances (Cameron, Clearfield, Elk and Potter Counties, PA); and
- Abandonment and removal of meter Station WHP-MS-4317X (Wharton Township, Potter County, PA).

Project Disturbance:

- McKean County: 333.5 acres
- Potter County: 167.9 acres
- Clinton County: 15.6 acres
- Clearfield County: 2.4 acres
- Cameron County: 17.4 acres
- Elk County: 1.3 acres

The following criteria were used to select the proposed route and aboveground facility locations:

- use of existing utility corridors;
- avoiding environmental resources (e.g., waterbodies, fisheries, wetlands, threatened and endangered species/significant habitats, etc.) and cultural resources, geologic/topographic hazards, and existing residential structures to the extent possible;
- the presence of existing access roads to accommodate construction along the proposed route;
- land uses (both existing and planned); potential impacts (both positive and negative) to local communities and landowners;
- engineering constraints, construction feasibility, topography and cost, including consideration of route length and opportunities to use existing corridors; and
- hydraulic design.

1.2 Purpose of this Plan

The ESCAMP has been prepared for use by National Fuel and its contractors as a guidance manual for minimizing erosion of disturbed soils and transportation of sediments off the right-of-way (ROW) and into sensitive resources (wetlands, streams, and residential areas) during natural gas pipeline construction. The procedures developed in the ESCAMP, which represent the National Fuel's BMPs, are designed to accommodate varying field conditions while maintaining rigid minimum standards for the protection of environmentally sensitive areas.

This application package is designed to provide specifications for the installation and implementation of soil erosion and sediment control measures while permitting adequate flexibility to use the most appropriate measures based on site-specific conditions. The intent of this application package is to provide general information on the pipeline construction process and to

describe specific measures that will be employed during and following construction to minimize impacts to the environment along the pipeline ROW.

The goal of these materials is to preserve the integrity of environmentally sensitive areas and to maintain existing water quality by implementing the following objectives:

- Minimize the extent and duration of disturbance;
- Protect exposed soil by diverting runoff to stabilized areas;
- Install temporary and permanent erosion control measures; and
- Establish an effective inspection and maintenance program.

1.3 Guidelines and Requirements

The ESCAMP incorporates the protocol and procedures contained within the Federal Energy Regulatory Commission's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan); and FERC's Wetland and Waterbody Construction and Mitigation Procedures (Procedures), collectively "FERC Plan and Procedures". The ESCAMP is also consistent with USACE guidelines, County Conservation Districts, and PADEP's published Erosion, Sediment and Pollution Control Manual. It is noted that the ESCAMP also contains decades worth of practical construction knowledge developed by National Fuel from previous pipeline construction projects in Pennsylvania. The ESCAMP is not intended to replace any of these published materials; only provide a singular location where all the information can be conveniently accessed. Care has been taken to prevent conflicting information between these documents and the ESCAMP; however, if there are any inadvertent conflicting standards the agency-published documents take precedence. In all cases National Fuel will implement the standard that provides the most stringent protection to property and the environment.

1.4 Surveys, Permits, and Notifications

National Fuel shall perform the required environmental field surveys, conduct appropriate agency coordination, and acquire the necessary environmental permits prior to start of construction of the Project. National Fuel shall notify the appropriate federal and state agencies prior to, during, and/or subsequent to the construction of the Project.

1.5 Inquiries

Inquiries regarding this application package should be addressed to:

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2 Existing Conditions

2.1 Existing Land Use and Land Cover

This section identifies land requirements for the Project and describes existing land use within the proposed Project areas. Land use data was calculated based on information obtained through field surveys, review of aerial photography and USDA National Agricultural Statistics Service (NASS) Cropland Data Layer (USDA-NASS, 2014). The land use characteristics are classified by primary vegetation cover type and/or predominant land use. For consistency, the land use and land cover classification system were derived from the FERC's *Guidance Manual for Environmental Report Preparation*, with the addition of a land use category for existing utility ROW. The Project will cross land use categories including agricultural pasture, cultivated cropland, forest and woodland areas, industrial/commercial land, open lands, open water, residential lands, and wetlands. Linear waterbodies less than 20-feet wide may have been classified within the adjacent land use categories. Land use types within the Project area classified into the following six categories:

- Agricultural Land - Pasture and/or hay fields, active cropland, orchards, and/or vineyards;
- Industrial/Commercial - Electric power or gas utility stations, manufacturing or industrial plants, landfills, mines, quarries, and commercial or retail facilities;
- Forest & Woodland - Tracts of upland or wetland forest or woodland that would be removed for the construction ROW or extra work or staging areas;
- Open Land - Non-forested lands, herbaceous and scrub-shrub wetlands, and maintained utility ROW;
- Open Water - Water crossings; and
- Residential Land - Residential yards and residential subdivisions.

National Fuel compared aerial photography from September 2013 available through Google Earth Pro and compared it to current aerial photography. There have been no significant changes to land use along the proposed pipeline alignment in the past five years.

Following construction, National Fuel will maintain a 50-foot-wide permanent ROW for operation and maintenance of the pipeline. Where the ROW crosses wetlands, National Fuel will maintain a 10-foot-wide permanent ROW for operation and maintenance. The construction footprint, excluding the above-ground facilities operational impacts and permanent access roads maintained for operations will be restored to pre-construction land use types.

Access to the Project will be achieved via maintained State and County roads, existing public and private access roads, and proposed new temporary and permanent access roads. National Fuel proposes to utilize 40 access roads for proposed construction activities and 18 existing access roads for abandonment activities (e.g., total of 58 project-wide). In general, only minor modifications are proposed at existing access roads which may include placement of gravel entry/exit pads at road junctures, and maintenance of the road throughout construction. On occasion, NFG may propose to widen discrete locations where necessary to allow for turning radius of equipment, passing lanes and pipe delivery. When widening is proposed, NFG will ensure that no sensitive environmental resources such as waterbodies, wetlands, cultural resources or sensitive species habitat will be impacted. It is not possible at this time to specifically identify all of these areas because the construction contractor has not been selected and the

identification of these sites is highly dependent upon the type of equipment available to the contractor. NFG has provided a typical drawing of how these areas would be handled if proposed for use within the Project LOD as presented on Drawing “DETAILS 001” (Figure 3B). Access roads that are non-public will require landowner agreements. Non-public access road impact calculations are based on a 30-foot-wide corridor. National Fuel surveyed a 50-foot-wide corridor based on the road centerline; ATWS required along access roads for turnouts, turnaround areas, parking, and general maneuverability of construction vehicles will be captured within LOD. Seventeen of the access roads will be maintained for operations and maintenance purpose.

Six contractor staging areas are proposed for use during construction.

There are no land uses fitting the following descriptions located within the Project area:

- Land for local historical or cultural significance (e.g., Native American religious sites, historic districts, etc.);
- Land used for landfills or hazardous waste sites; and
- National Scenic Rivers (i.e., designated or proposed candidate rivers on the Nationwide Rivers Inventory), state scenic rivers, and designated scenic areas or roads.

2.2 Receiving Waters

Field biologists conducted wetland and waterbody (e.g., streams, ponds, etc.) delineations were conducted from September and October 2017, as well as April and August 2018 along a 300-foot wide survey corridor centered on the pipeline and a 50-foot wide survey corridor centered on access roads. Additional surveys were conducted from July 28 through August 7, 2020 to address comments received by the Pennsylvania Department of Environmental Protection (PADEP) in their Technical Deficiency letter dated July 10, 2020. Revisions to this report include incorporating additional survey data collected in response to PADEP comments. In addition, PADEP and USACE representatives attended a field review of wetlands and waterbodies. All environmental resources identified during this investigation are shown in the ESCGP-3 drawings. A Wetland and Waterbody Delineation Report is included in the Section 404 / Chapter 105 General Permit submittal under separate cover for wetlands work completed in Pennsylvania.

Numerous waterbodies within various watersheds are crossed by the Project. Each watershed name and its associated PA Code, Title 25, Chapter 93 Designated or Existing Use crossed by the Project is shown in plan view on the application drawings.

Tables 2.2-1A thru 2.2-1D list waterbodies, wetlands, and floodways crossed by the Project, including information relevant to sensitive surface water resources, as shown in Appendix A. The table also identifies public wells and springs within 150 feet of the project work areas.

Pennsylvania Title 25 Chapter 93 sets forth water quality standards for surface waters. The provisions of Pennsylvania Title 25 Chapter 93 are issued under Sections 5 and 402 of the Clean Streams Law. Waterbodies in Pennsylvania are assigned one of the following aquatic life water quality classifications based upon Pennsylvania Title 25 Chapter 93: Cold Water Fishes (CWF), Warm Water Fishes (WWF), Migratory Fishes (MF), and Trout Stocked Fishery (TSF). Waterbodies in Pennsylvania may also be assigned one of the following special protection water quality classifications based upon Pennsylvania Title 25 Chapter 93: High Quality (HQ) or Exceptional Value (EV) waters. Waterbodies in Pennsylvania may also be assigned a water quality classification that combines aquatic life and special protection (i.e., HQ-WWF or HQ-CWF).

Pennsylvania Clean Streams Law (35 P.S. §691.1 et seq.) and regulations at Pennsylvania Code Title 25, including Chapters 91, 92, 93, 95, 96, 102, and 105 are also known as antidegradation

rules. The basic concept of antidegradation is to promote the maintenance and protection of existing water quality for HQ and EV waters, and protection of existing uses for surface waters because it recognizes that existing water quality and uses have inherent value worthy of protection and preservation. Existing uses are protected when PADEP makes a final decision on any permit or approval for an activity that may affect a protected use (PADEP, 2013b). Existing water quality is also protected for HQ and EV waters through the antidegradation rules and there are also additional requirements, such as antidegradation performance standards for erosion and sediment control. Sensitive surface waters with an existing use classification that is special protection (HQ or EV) can be found in Table 2.2-1A, in Appendix A.

All streams crossed by the Project are considered sensitive surface waters due to their being either listed by the PFBC as a stream section that supports the natural reproduction of trout (NRT) or are an UNT that contributes to the water quality of the naturally reproducing trout stream (PFBC 2019a). Pennsylvania Code Title 58, Chapters 57.4 and 57.11 defines Wild Trout Waters as: 1) Naturally Reproducing, 2) Class A, 3) Trout Stocked, or 4) Wilderness Trout waters. In-stream work restrictions for Wild Trout Waters follow:

- Naturally Reproducing Trout Waters: October 1 to December 31,
- Class A: October 1 to April 1, and
- Trout Stocked Waters (TSW): March 1 to June 15.

No streams crossed by the Project are listed on the PFBC website as being Class A wild trout streams or wilderness trout streams (PFBC, 2019c and 2019d). These listings can be found on Table 2.2-1A. National Fuel will abide by these in-stream work restrictions as well as FERC published instream restrictions for cold water fisheries, unless expressly permitted in writing by PAFBC. Specific PAFBC in-stream work restrictions or conditions places upon any stream crossed by the project will not be known until PADEP issues the ESCGP-3 and Chapter 105 permits. However, National Fuel will abide by any in-stream work time of year restrictions and anti-degradation performance standards for erosion and sediment control that are identified in those permits by the respective agencies.

The Project does not cross any scenic rivers (PADEP 2019f). Project waterbody crossings are not considered impaired (PADEP 2019f). No National Wild and Scenic Rivers have been identified within the USGS eight-digit HUC watershed where the Project facilities are located (USGS 2017).

National Fuel will follow the site-specific Erosion and Sedimentation Control Plans, Site Restoration Plans, PCSM Plans, ESCAMP; the Commission's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan), (2013a); and the Commission's Wetland and Waterbody Construction and Mitigation Procedures (Procedures), (2013b), to minimize impacts to streams during construction.

2.3 Waterbodies with Regulated Riparian Areas

The Project alignment will cross riparian buffers regulated under PA Chapter 102. Specifically, these regulated areas include 150 feet from the top of bank of perennial and intermittent waters located within Exceptional Value and High-Quality watersheds. Anticipated waterbodies which will be crossed are delineated on the E&SCP alignment sheets.

National Fuel intends to obtain and comply with the applicable Pennsylvania permits required to authorize these disturbances.

2.4 Soil Characteristics

Important attributes of the soils map units crossed by the pipeline are presented on Drawing "SOILS." The "SOILS" drawing includes the soil use limitations from the PADEP E&S Manual

Appendix E for all soils impacted by the Project in Pennsylvania. For all applicable soil use limitations, a resolution has been proposed. The locations of soil types crossed by the Project are shown on the E&SCP alignment sheets. These soil boundaries and associated information were obtained from the USDA SSURGO database.

The methods that will be utilized to minimize impacts on soils during construction include, but are not limited to:

- Minimize the area and duration of soil exposure;
- Protect critical areas by reducing the velocity of and controlling runoff;
- Install and maintain erosion and sediment control measures;
- Segregating and stockpiling topsoil on cultivated lands;
- Reestablish vegetation following final grading; and
- Inspect the ROW and maintain erosion and sediment controls, as necessary, until final stabilization is achieved.

2.5 Naturally Occurring Geologic Formations

This section provides a summary of the geological features present in the Project area, including physiography, topography, surficial and bedrock geology and mineral resources. The potential for geologic hazards to affect the Project is also discussed. In addition, National Fuel completed a geohazard review of the modernization portion of the project which specifically evaluated overall site conditions and potential risk levels posed by geotechnical conditions for construction and operation of the Project (see Appendix I). Where appropriate, mitigation measures intended to reduce the impact of the Project on geologic resources or reduce the impact of geologic hazards on the facilities are included.

2.5.1 Physiography

The Project and its associated facilities are within the Appalachian Plateaus physiographic province (PADCNR, 2016a). The Appalachian Plateaus province is a highland that has been eroded by streams which have created deep valleys and hilly topography (PADCNR, 2014). Further divided, the Project crosses the High Plateau Section, Pittsburgh Low Plateau Section and the Deep Valleys Section (PADCNR, 2016a).

The High Plateau section has a dominant topographic form characterized by broad, rounded to flat uplands having deep, angular valleys. The local relief is moderate to high (ranging from 300 to 1,000 feet) with approximate elevation ranges from 980 to 2,360 feet AMSL. This section is dominated by a dendritic drainage pattern (PADCNR, 2016b and 2016e).

The Pittsburgh Low Plateau section has a dominant topographic form characterized by a smooth to irregular, undulating surface with narrow, relatively shallow valleys and strip mines and reclaimed lands. The local relief is low to moderate (ranging from 100 to 600 feet) with approximate elevation ranges from 660 to 2,340 feet AMSL. The drainage pattern of this section is dendritic (PADCNR, 2016c and 2016e).

The Deep Valleys section has a dominant topographic form of very deep, angular valleys with some broad to narrow uplands. The local relief is moderate to very high (ranging from 300 to greater than 1,000 feet) with approximate elevation ranges from 560 to 2,560 feet AMSL. The drainage pattern of this section is angulate and rectangular (PADCNR, 2016d and 2016e).

2.5.2 Surficial Geology and Topography

The proposed pipelines are within a relatively simple geological location with generally near horizontally bedded sedimentary formations. The project intersects the following mapped geological formations (U.S. Geological Survey [USGS] descriptions quoted):

- Pottsville Formation – predominantly gray sandstone and conglomerate
- Catskill Formation – predominantly grayish-red sandstone, siltstone, shale and mudstone
- Senango and Oswayo Formation (Undivided) – predominantly greenish-gray, olive, and buff sandstone and siltstone, and gray shale in varying proportions
- Huntley Mountain Formation – predominantly greenish-gray and light-olive-gray, flaggy, fine-grained sandstone, siltstone and a few red shale interbeds
- Appendix E lists the geologic units crossed by the proposed pipeline routes (PADNCR, 2018d).
- Publicly available LiDAR data was processed to evaluate the site topography. The data set was obtained from Pennsylvania Spatial Data Access (PASDA) PAMAP Program – 3.2ft digital elevation model (Pennsylvania State University 2006-2008).

For the proposed Line YM58 pipeline alignment, 6.8 miles are between 15% and 30% gradient and 3.2 miles are >30% gradient. For the proposed Line YM224 pipeline alignment, 0.18 miles are between 15% and 30% gradient and 0.05 miles are >30% gradient.

2.5.3 Blasting

Based on surface appearance, lack of outcrops, and proximity to existing utility lines, National Fuel does not anticipate that the need for blasting will be widespread. In areas with potential shallow bedrock conditions which cannot be avoided, efforts will be taken to minimize potential impacts during construction. National Fuel will utilize other rock excavation techniques including rock trenchers, hydraulic hoe hammers and ripper teeth in areas of shallow bedrock. National Fuel will adhere to blasting permit requirements within the PAFBC's permit for in-stream blasting, if required. Table 6.2-2 in Appendix E lists the locations by milepost along the proposed pipeline routes where the depth to bedrock is predicted to be within 60 inches (5 feet) of the soil surface (USDA- Natural Resource Conservation Service (NRCS) 2018).

2.5.4 Mineral Resources

Three non-active and restored mines and one active mining operation was identified within 0.25-mile of the Project. Project cumulative impacts to geologic resources related to mining activities are anticipated to be minimal to non-existent due to the current status (non-operational) and spatial distance of the mines from the Project.

This area has had significant oil and gas activity in the past. There are 17 abandoned wells, 204 active wells, and 42 inactive wells within 0.25-mile of the Project. Other oil and gas related projects include the YM28 and FM120 Modernization Project, National Fuel Northern Access 2016 Project and Dominion Energy LN16 and LN20 Project. The Proposed project will not be in construction during the same time period as these projects; however, the YM28 and FM120 Modernization Project and Dominion Energy LN16 and LN20 Project will likely be in service at the time of construction. Care will be taken to avoid impacting these operational pipelines, particularly if blasting is required in the vicinity of these facilities. Blasting is not anticipated for the Project; however, if blasting does occur National Fuel has detailed preventative measures in this report as well as the attached Blasting Plan to prevent damage to nearby oil and

gas resources; refer to Appendix H. The same measures would apply to water wells. Further, protection and minimization of impacts to geologic resources are anticipated through implementation of best management practices (BMP) outlined in the ESCAMP.

2.5.5 Potential Geologic Hazards and Mitigation

The Project alignment does not cross, nor are the proposed facilities located near active quaternary faults, or near seismically active areas according to the USGS fault map (USGS 2016a). Since 1970, there have been no earthquakes with a magnitude (M) of 2.0 or higher on the Richter scale that has occurred within 100 miles of the proposed Project (USGS 2016b).

The seismic hazard for Cameron, Clinton, Clearfield, Elk, McKean, and Potter Counties is between four and eight and is, therefore, generally regarded as low. This is based on a two percent probability of exceedance in 50 years of peak ground acceleration. The hazard rating system ranges from zero through 80+, where zero indicates the lowest hazard and 80+ indicates the highest hazard (USGS 2014). In addition, no known Quaternary faults (i.e., faults that are found at the Earth's surface and younger than 1.6 million years) have been found near the Project area (USGS 2016a).

The Project is located within an area with a less than one percent chance of damage from natural and induced earthquakes. Additionally, there are no mapped earthquake epicenters within the Project area (PADCNR 2004). Therefore, earthquakes are not anticipated to be a geologic hazard to the Project activities.

Karst features such as sinkholes, caves, and caverns can form as a result of the long-term action of groundwater on soluble carbonate rocks (e.g., limestone and dolostone). The Project is not located in an area with karst formations such as sinkholes or surface depressions (Kochanov 2015, PADCNR 2019); consistent with this analysis, no surficial karst features were identified during field surveys (e.g., sink holes, caves, surface depressions, etc.).

As part of National Fuel's pipeline integrity program, the pipeline ROW will be routinely inspected, including for subsidence activity. If subsidence is found, National Fuel will take the appropriate corrective measures to maintain the integrity of the pipeline. These measures include determining the allowable stresses on unsupported pipe spans, importing fill for pipe support, and evaluating whether recurrence is likely. If it is determined that recurrence is likely, National Fuel would evaluate the potential of implementing additional stabilization measures or, if necessary, relocating the pipelines, and/or facilities.

Due to the low incidence and likelihood of land subsidence and the absence of karst terrain within the Project area, there is no anticipated subsidence concerns related to construction and operation of the Project.

The presence of the existing adjacent pipelines provides a precedent that the construction and operation of a natural gas pipeline is feasible in this terrain. The project does not intersect any of the high hazard documented landslides on the USGS mapping such as Active landslide or Soil and rock susceptible to landsliding. The only USGS mapped landslide category which was intersected by project components was Old Landslides (4 locations) which are described as "…relatively stable…" by the USGS. Field inspections were performed which did not observe any recent, or actively occurring major slope movements. National Fuel has committed to providing a Professional Engineer specializing in geotechnical engineering and slope stability, or a Professional Geologist with experience in engineering geology and slope stability, during construction to perform part-time project observations. The part-time observations will not absolve the construction contractor of the prime responsibility for construction safety and compliance with U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration regulations. The observations will be performed at key events including; post vegetation clearing, first breaking ground, trenching, and final grade restoration.

Fossils are not common in Pennsylvania and are only found in Mesozoic-age rocks in the southeastern part of Pennsylvania. The Project area is underlain by Paleozoic sedimentary rocks which have low potential to contain fossils. Although fossil specimens may be encountered during construction activities, no impacts on sensitive paleontological resources are anticipated. Further, National Fuel will provide training to environmental inspection staff and the construction contractor prior to mobilizing to recognize sensitive paleontological resources. In the unlikely event that unique or significant fossil specimens are discovered during excavation activities, National Fuel would cease construction at the site and notify the appropriate landowner or state agency.

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3 Proposed Conditions

The amount of earth disturbed is to be minimized as much as possible. Planning of the construction sequencing is required to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into environmental resource areas. Approximately 538.1 acres will be disturbed throughout the Project work limits in Pennsylvania. The disturbance along the pipeline ROW and within contractor staging yards is generally to be temporary; however, some permanent impacts will occur at aboveground facility locations, permanent access roads, and when some resources are converted from their existing condition to a maintained pipeline ROW. Disturbed areas are to be immediately seeded and mulched upon placement of the proposed pipeline and associated fill.

Earth disturbance is to be restricted to the Limit of Disturbance (LOD) delineated on the ESCGP-3 drawings. These drawings contain “Plan views” which depict proposed facilities and site features. This includes the limits of earth disturbance, the locations of existing roads, and the location of proposed BMPs.

3.1 Proposed Land Cover

During the initial construction stage of the project, much of the area will consist of exposed soils. Upon installation of the pipeline, the ROW is to be stabilized with vegetative cover as indicated on the E&SCP drawings. With the exception of long-term maintenance to trim woody vegetation and occasional mowing, no permanent topographic or land cover changes are proposed along the pipeline alignment aside from areas within the tree clearing limits.

Two compressor stations, one overpressure protection station, and five mainline valves will be constructed, described in Section 1.1, which will require minimal grading and cover change with the placement of stone. A post construction stormwater management (PCSM) design package is provided under separate cover.

3.2 Proposed Site Drainage Characteristics

An assessment of the Project site’s natural features was completed at the initial stage of Project planning. The proposed facilities have been sited to protect sensitive natural resources by avoiding these areas whenever possible. The site has also been planned and designed to maintain pre-development drainage patterns to the maximum extent practicable. A conscious effort has been made to maintain existing vegetation where possible and limit the extents of earth disturbance to the area necessary to construct the proposed facilities. Where possible, site drainage will be directed to previously established drainage features. No permanent changes to topography or drainage patterns are proposed for the pipeline aside from permanent waterbars to help prevent formation of rivulets and the PCSM control features designed where areas proposing new impervious surface are sited. The location of the proposed drainage features is referenced on the E&SCP alignment sheets. As mentioned above, the facility site has a separate PCSM report and drawing package, which includes proposed site drainage.

3.3 Proposed Riparian Buffer

The proposed Project is an oil and gas activity for which site reclamation or restoration is part of the permit authorization in PA Cod Chapters 78, 86-90 and 102. The proposed activities will leave existing riparian buffers undisturbed to the extent practicable. Riparian buffers within the Project

area will be protected and maintained according to Pennsylvania regulations discussed in Section 2.3.

A riparian buffer mix will be used to restore riparian buffers within 150 feet of HQ/EV waterbodies and within 100 feet of other waterbodies (non-HQ/EV waters). This seed mix will be used to revegetate the entire LOD in riparian areas where slopes are less than 10%. Tree and shrub plantings will also occur in forested riparian buffers, where workspace outside of the 10-foot maintained ROW will be planted.

Riparian buffers on Line FM100 (i.e., the Abandonment portion of the Project) will only be restored for workspaces within riparian buffers or as otherwise requested by the land management agency. The purpose for this is to avoid disturbing existing riparian vegetation that will recruit faster if left undisturbed after National Fuel no longer maintains the corridor. Riparian buffers within workspaces will be restored across the abandoned pipeline as needed, with no 10-foot maintained ROW.

As detailed in the Riparian Buffer Waiver Request (Section 8.1.5), National Fuel respectfully requests a riparian buffer waiver for impacts along the pipeline ROW in accordance with 25 PA Code §102.14(d)(2)(ii), for linear project impacts.

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4 Supervision and Inspection

To effectively mitigate Project-related impacts, the approved ESCAMP must be available on the site at all times and properly implemented in the field. Quick and appropriate decisions in the field regarding critical issues such as stream and wetland crossings, placement of erosion controls, trench dewatering, spoil containment, and other construction related items are essential.

The ESCAMP defines National Fuel's anticipated environmental inspection program (ESCAMP Section 2.1 & 2.2). The Environmental Inspector (EI) will have peer status with all other activity inspectors and will have the authority to stop activities that violate the environmental conditions of the FERC's Order (if applicable), other federal and state permits, or landowner requirements, and to order corrective action.

4.1 Responsibilities of the Environmental Inspectors

At a minimum, the EIs shall be responsible for the items addressed in Section 2.2 of the ESCAMP.

- Inspecting construction activities for compliance with the requirements of this E&SCP, the construction drawings, the environmental conditions of the FERC's Orders (if applicable), proposed mitigation measures, other federal or state environmental permits and approvals, and environmental requirements in landowner easement agreements;
- Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance;
- Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing, and maintained throughout construction;
- Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area;
- Identifying erosion/sediment control and stabilization needs in all areas;
- Verifying that the location design of waterbars will not cause erosion or direct water into sensitive environmental resource areas, including cultural resources sites, wetlands, waterbodies, and sensitive species habitat;
- Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into a sensitive environmental resource areas, including wetland or waterbody, cultural resource sites, and sensitive species habitats; stopping dewatering activities if such deposition is occurring and checking that the design of the discharge is changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities;
- Verifying that subsoil and topsoil are tested in agricultural areas to measure compaction and determine the need for corrective action;
- Advising the Chief Inspector when environmental conditions (such as wet weather or frozen soil) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction;
- Checking restoration of contours and topsoil;
- Verifying that the soils imported for agricultural or residential use have been certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner;

- Verifying that erosion controls are properly installed to prevent sediment flow into environmental resource (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species habitats) and onto roads and determining the need for additional erosion control devices;
- Inspecting temporary erosion control measures at least:
  - On a daily basis in areas of active construction or equipment operation;
  - On a weekly basis in areas with no construction or equipment operation; and
  - Within 24 hours of each 0.25 inch of rainfall.
  - NOTE: This responsibility may be transferred to field operations after construction is complete but before restoration is successful;
- Checking the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this timeframe would result in greater environmental impacts;
- Identifying areas that should be given special attention to verify stabilization and restoration after the construction phase;
- Keeping records of compliance with the environmental conditions of the FERC's Orders, proposed mitigation measures, and other Federal or state environmental permits during active construction and restoration; and
- Verifying that locations for any disposal of excess construction materials for beneficial reuse comply with Section 9.5.3.2 and 9.5.3.3 of this E&SCP.

4.2 Environmental Training for Construction

Environmental training will be given to both National Fuel personnel and contractor personnel whose activities will impact the environment during pipeline construction. The level of training will be commensurate with the type of duties of the personnel. All construction personnel from the chief inspectors, EIs, craft inspectors, contractor job superintendents to loggers, welders, equipment operators, and laborers will be given some form of environmental training. In addition to the EIs, all other construction personnel are expected to play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction. Training will be given prior to the start of construction and throughout the construction process, as needed, and will cover the following issues:

- The specifics of the ESCAMP and the Spill Prevention and Response Plan (SPRP);
- Job or activity specific permit requirements;
- Company policies and commitments;
- Cultural resource procedures and restrictions;
- Threatened and endangered species restrictions; and
- Any other pertinent information related to the job.

Inspectors should be knowledgeable in the principles and practice of erosion and sediment controls and possess the skills to access conditions at the construction site that could impact stormwater quality and assess the effectiveness of any sediment and control measures selected to control the quality of stormwater discharges from the construction site.

5 Description of Erosion and Sediment Control BMPs

The erosion and sediment control BMPs for this earth disturbance activity have been planned to minimize the extent and duration of the proposed earth disturbance, to protect existing drainage features and vegetation, minimize soil compaction, and employ measures and controls that minimize the generation of increased runoff. Specific BMPs have been selected for the Project to achieve these broad goals. The location of each proposed BMP is shown on the E&SCP alignment sheets.

Rock Construction Entrances

Rock construction entrances to control sediment tracking from the construction site at egress points are depicted on the E&SCP alignment sheets. In HQ/EV watersheds, rock construction entrances will be extended to a minimum 100-foot length, as shown on Drawing “DETAILS 001” (Figure 1).

Sediment Barriers

Compost filter socks are specified on the E&SCP alignment sheets as a perimeter control to prevent silt-laden runoff from exiting the LOD. The compost filter sock detail and specifications are presented on Drawing “DETAILS 002” and “003” (Figures 4A, 4B, & 4C). Sizing calculations for each compost filter sock proposed are presented on Standard E&S Worksheet #1 in Appendix B.

In locations where failure of a sediment barrier occurs due to concentrated flow, a rock filter outlet shall be installed in accordance with the detail presented on Drawing “DETAILS 002” (Figure 6).

Waterbars/Slope Breakers

Earthen waterbars are specified on the E&SCP alignment sheets in hillside locations where it will be necessary to divert both upslope and disturbed area runoff to vegetated areas to help minimize accelerated erosion and sedimentation. A construction detail is provided on Drawing “DETAILS 002” (Figures 7 & 8). They are to be aligned such that runoff will be directed towards the downslope side of the disturbed area and avoid flowing back into the ROW. The construction detail calls for a sump with a compost filter sock barrier at the waterbar point of discharge.

Permanent waterbars within the ROW shall be left in place after permanent stabilization has been achieved. Waterbars will be removed from agricultural and residential areas. Maintenance of waterbars shall be provided until ROW has achieved permanent stabilization.

Trench Plugs

Trench plugs are specified on the E&SCP alignment sheets to inhibit channelized flow which may occur in the trench when open during construction. Trench plugs shall remain in place during and after backfilling to prevent the trench from draining wetlands and/or changing the hydrology along the pipeline. The construction details are presented on Drawing “DETAILS 003” (Figures 10 & 11).

Erosion Control Blanket

In accordance with the notes listed on Drawing “DETAILS 003” (Figures 12A, 12B, & 13), erosion control blanket is to be placed on disturbed areas within 50 feet of streams and on slopes steeper than 3H:1V. In HQ/EV watersheds, erosion control blanket is to be placed on disturbed areas within 100 feet of streams. Areas to be blanketed are indicated on the E&SCP alignment sheets.

Temporary Equipment Bridges

Temporary equipment bridges are specified on the E&SCP alignment sheets in locations where construction equipment will be crossing an existing stream channel (waterbody with a defined bed and bank). Temporary bridges shall be installed in accordance with the construction details provided on Drawing “DETAILS 004” (Figure 9B).

Timber Mats

Timber mats are specified on the E&SCP alignment sheets in locations where construction equipment will be traveling through an existing wetland. Timber mats shall be installed in accordance with the construction details provided on Drawing “DETAILS 005” (Figures 23 & 24).

Hydrostatic Dewatering Structures

Straw bale dewatering structures will be utilized after hydrostatic testing to minimize erosion of the surrounding area and prevent pollution due to silt-laden runoff. Hydrostatic dewatering structure locations shall be installed in accordance with the construction details provided on Drawing “DETAILS 006” (Figures 26A & 26B).

Pumped Water Filter Bags

In locations where the work area must be dewatered, filter bags may be used to filter water pumped from disturbed areas prior to discharging to surface waters. Compost filter sock shall be installed below filter bags located in HQ/EV watersheds, within 50 feet of any receiving surface water, or where a well-vegetated area is not available. Filter bags shall be installed in accordance with the construction detail provided on Drawing “DETAILS 006” (Figure 27).

Cleanwater Diversions

Temporary diversion channels are proposed to divert runoff from undisturbed upslope areas and convey the runoff around areas of earth disturbance within the pipeline ROW corridor. All temporary diversion channels will utilize a Filtrexx Diversion Sock (or approved equal). From the diversion sock, the channelized flow will outlet to a temporary pipe(s) (clean water) crossing, which is installed across the right-of-way, and discharge to a perforated HDPE pipe level spreader covered in stone. In this scenario, clean water leaving the level spreader will return to sheet flow downslope of the disturbed ROW.

All level spreaders are expected to meet the proposed 200-foot maximum length. All level spreader and slope pipe sizing is presented as part of the Clean Water Diversion summary table on E&SCP Drawing “DETAILS 008”.

A downstream analysis of clean water diversion discharge point to the receiving water is not required for the following reasons. Velocities at the discharge of the level spreader are near zero since the stormwater will be discharged through the perforated pipe and minimum 4-inches of stone surrounding the perforated pipe. Once the discharge exits the orifices in the perforated pipe and trickles through the surrounding stone, it loses all its velocity and transforms into sheet flow. The discharge will be to a vegetated area and will ultimately follow the same drainage path as before the clean water diversion installation.

The clean water diversions collect clean stormwater above the disturbance, the slope pipe transports the clean water across the disturbance, and the level spreader connected to the slope pipe outlet discharges the clean water below the disturbance. The clean water diversions are being limited to 5 acres in accordance with the PADEP E&S Manual.

The clean water diversions are temporary in nature and will remain in place from disturbance to after vegetation is established and BMPs are removed. The clean water diversions collect and discharge stormwater in the same drainage area and do not take stormwater from one drainage area and discharge to a different drainage area. The clean water diversions do not change cover types, resulting in no change to the calculated runoff rates or volumes, and the clean water diversion discharge is returned to sheet flow at the level spreader, a flow condition similar to or better than the existing flow condition.

The discharge areas of the clean water diversions will be monitored in accordance with the ESCGP-3 permit required inspection.

Conditions downslope of the level spreader have been checked for percent slope and cover type in order to verify no offsite erosion would occur at these locations. This has been documented in Appendix C utilizing the Figure 5.1 “Nomograph to Determine Shallow Concentrated Flow Velocity” from the E&S Manual.

All hydrologic calculations utilized to size the temporary diversion channels, slope pipes, and level spreaders were calculated using Standard E&S Worksheets #9 and #10, for time of concentration and rational equations respectively. The temporary diversion channels were sized utilizing flow rates and allowable shear stress.

Temporary diversion channels are designed using material specifications for North American Green (NAG) products. Shear stresses are analyzed for the proposed temporary diversion channels, which are expected to be in place for a maximum of 12 months. All NAG lining products specified in the Clean Water Diversion summary table meet a construction period of 12 months. It should be noted that published design shear strengths are valid for the design life of the lining. As a result, no decrease in shear strength is expected over the life of the proposed swale linings. Published design shear strengths and design lives for individual linings are provided in Appendix D. An iterative approach was used in the design of all proposed temporary diversion channels and liners, which was a function of Manning’s ‘n,’ slope, and depth of water within the channel.

Drainage area mapping as well as Standard E&S Worksheets #9, #10, and #11 are provided for each clean water diversion in Appendix C (by county). Clean water diversion locations are specified on the E&SCP plan view drawings. Clean water diversions shall be installed in accordance with the construction details presented on Drawing “DETAILS 007” (Figures 31, 31A, 31B, & 31C).

5.1 Temporary and Permanent Revegetation

Revegetation requirements and procedures are presented in Section 9.6.2 of this application. As indicated on the drawings, disturbed areas are to be temporarily stabilized in accordance with regulatory agency requirements. Upon completion of construction activity, disturbed areas are to be permanently stabilized.

5.2 Protection of Sensitive and Special Value Features

During Project planning, the pipeline layout was field viewed to identify wetlands and streams. Where possible, the alignment was adjusted to minimize impacts. The opportunity to avoid impacts, however, is constrained by landowner preferences and construction requirements.

5.3 Minimize Earth Disturbance

Limiting the extents and duration of earth disturbance to that absolutely necessary to construct the proposed facility is a simple and the most effective BMP available. The LOD delineated on the E&SCP alignment sheets has been established to restrict construction activities to the minimum area needed to effectively and efficiently construct the proposed facilities. In addition to limiting the extents of the proposed earth disturbance, construction activities have been planned to limit the duration of earth disturbance.

Installation of the pipeline will typically proceed from one end of the construction spread to the other in an assembly line or "mainline" fashion. The spacing between the individual crews responsible for each interdependent activity is based on anticipated rate of progress. Construction is sequenced to limit, to the extent possible, the amount and duration of open trench sections, to prevent excessive erosion or sediment flow into environmental resource areas.

5.4 General Erosion and Sediment Control Plan Requirements

The BMPs listed in this application package shall be installed and maintained in accordance with FERC requirements and the PADEP E&S Manual. These BMPs shall be installed as shown prior to earth disturbance (including clearing and grubbing) within the drainage area of the BMP in question. In certain situations, minor grubbing may need to occur in order install erosion control devices; in these situations, grubbing and E&S controls will be installed concurrently. Appropriate BMPs shall be provided for each stage of activity. Each BMP shall be kept functional until all earth disturbances within the drainage area are completed and a minimum vegetative cover (uniform 70% coverage of perennial vegetation over the entire disturbed area) has been achieved or other suitable permanent erosion protection has been installed.

At least seven days prior to starting any earth disturbance activities (including clearing and grubbing), the owner and/or operator shall invite all contractors, the ESCGP-3 permit preparer, the SR/PCSM Plan preparer, and a representative from the applicable PADEP regional office to an on-site preconstruction meeting.

Prior to commencement of any earth disturbance activity including clearing and grubbing, the owner and/or operator shall clearly delineate sensitive areas, riparian forest buffer boundaries, areas proposed for infiltration practices, the limits of clearing, and trees that are to be conserved within the Project site. These parties shall also install appropriate barriers and/or signage where equipment may not be parked, staged, operated, or located for any purpose.

E&SC measures and facilities shall be installed and operational as indicated in the construction schedule prior to any earth moving activities (see the “Installing Temporary BMPs” in Section 9.5.2 of this application and on the E&SCP drawings). Control measures must be in place and operational at the end of each workday. Where it is possible, the disturbed area will be permanently stabilized immediately after the final earthmoving has been completed. For disturbed areas not able to be permanently stabilized, interim stabilization in the form of temporary seeding and mulching will be implemented. Until the site is permanently stabilized, all E&SC measures must be maintained properly by the Contractor.

After permanent stabilization is achieved, temporary E&SC measures will be removed. Areas disturbed during removal of the controls must be stabilized immediately. For vegetated areas, permanent stabilization is defined as a uniform 70% perennial vegetative cover.

Minor modification to the approved ESCAMP shall be noted on the version that is available on-site and initialed by the appropriate reviewing entity staff from PADEP and/or the County Conservation District. Minor changes to the ESCAMP may include adjustments to BMPs and locations within the permitted boundary to improve environmental performance, prevent potential pollution,

change in ownership or address, typographical errors and on-site field adjustments such as the addition or deletion of BMPs, or alteration of earth disturbance activities to address unforeseen circumstances.

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6 Project Site Runoff Prior to Site Restoration

A primary component of the ESCAMP was the design of erosion and sediment control BMPs to minimize and control accelerated erosion and minimize the generation of increased runoff. The proposed E&SC facility has been designed per design guidance provided in the PADEP E&S Manual.

This linear Project traverses multiple watersheds and landcover types. Post construction site conditions will generally be restored to their previous condition and cover type. However, any project components (i.e., aboveground facilities) submitted as part of the PCSM package may be changing cover type to be impervious. There is a negligible increase in runoff in locations where forest cover is removed and, in these locations, runoff will be adequately attenuated with the effective implementation of sediment barriers, trenches, and waterbars.

The only exception where preexisting land cover will not be restored is the proposed 10-foot wide permanent maintained ROW over the pipeline corridor. In locations where upland forest is removed during construction beyond the permanent maintained ROW, natural succession will occur for development of woody vegetation transitioning to forest cover. Site restoration measures are identified and described in the Site Restoration Plan Narrative and drawings (submitted concurrently as a separate attachment).

Runoff volume and peak discharge estimates have not been evaluated for the entire linear pipeline but since the majority of the Project traverses meadow and agriculture field, there are generally no changes to post construction runoff resulting from the project and very insignificant and minor increase in locations where forest cover is converted to meadow.

Proposed BMPs were sized based on the maximum tributary drainage area anticipated during construction. Runoff volumes and rates for specific BMPs were calculated utilizing the methods recommended in the PADEP E&S Manual for that type of facility.

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7 Recycling/Disposal of Materials

Building materials and other construction site wastes must be properly managed and disposed of to reduce potential for pollution to surface and ground waters as per 25 PA Code § 102.4(b)(5)(xi). All building materials and wastes shall be removed from the site and recycled or disposed of in accordance with PADEP's Solid Waste Management Regulations at 25 PA Code 260.1 et seq., 271.1 and 287.1 et. seq. No building materials, wastes, or unused building materials shall be burned, buried, dumped, or discharged at the site. No off-site disposal area has been identified as part of this application. Construction waste will be disposed of properly by the Contractor at a state-approved facility or recycled.

The Contractor will develop and implement procedures which will detail the proper measures for disposal and recycling of materials associated with or from the Project site in accordance with PADEP regulations. Construction wastes include, but are not limited to, excess soil materials, building materials, concrete wash water, and sanitary wastes that could adversely impact water quality. The Contractor will inspect the Project area weekly and properly dispose of all construction wastes. Measures will be planned and implemented for housekeeping materials management and litter control. Wherever possible, re-useable wastes will be segregated from other waste and stored separately for recycling.

The Contractor shall be responsible for implementing the ESCAMP for any borrow or waste areas required to complete the work. Disposal locations for excess soil/rock waste will have appropriate BMPs implemented at the waste site. The disposal locations must be verified with the applicable state department to show compliance with wetland and floodplain regulations. If an off-site location is used for borrow or disposal, the contractor is responsible for developing site-specific E&SC drawings, implementing the ESCAMP and submitting the E&SC drawings to PADEP or the applicable County Conservation District for review and approval. The Contractor must immediately stabilize the waste site upon completion of any stage or phase of earth disturbance activity at the waste site.

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8 Antidegradation Analysis

As identified in Section 2.2 of this narrative, the pipeline crosses HQ/EV waterbodies. The following antidegradation analysis has been prepared in accordance with 25 PA Code, §102.4(b)(6).

8.1 Non-discharge Alternatives

The proposed Project has been evaluated for nondischarge alternatives for compliance with state regulatory agency antidegradation requirements. Nondischarge alternatives are defined as environmentally sound and cost effective BMPs that individually or collectively eliminate the net change in stormwater volume, rate and quality for storm events up to and including the 2-year design storm when compared to the stormwater rate, volume and quality prior to the earth disturbance activities.

Various BMPs identified as nondischarge alternatives in the PADEP E&S Manual were considered and evaluated for implementation as part of the proposed activities. These alternatives were evaluated individually, and in various combinations, for their ability to minimize accelerated erosion and sedimentation during the earth disturbance activity to achieve no net change from pre-development to post-development volume, rate and concentration of pollutants in stormwater runoff. The following non-discharge alternatives are utilized or considered for implementation on this Project.

8.1.1 Alternative Routes

With respect to route alternatives or variations, the proposed pipeline route achieves the stated purpose and need of the Project while minimizing impacts to the environment, accommodating engineering/construction demands and optimizing the Project's economics. To accomplish this National Fuel examined aerial photography, USFWS NWI maps, USGS quadrangle maps, pipeline and oil and gas well data, and county parcel data. In addition, field surveys and public input were used during routing. The intent of this effort was to identify the most environmentally sound, technically efficient, and cost-effective route for the Project.

The routing criteria used in creating the various proposed routes included:

- Potential impact to sensitive resources
- Land use issues
- Potential impacts to landowners
- Proximity to residential areas
- Proximity to industrial development areas
- Engineering/construction issues
- Operation and maintenance considerations
- Supporting infrastructure
- Overall cost effectiveness
- Public input

The use of existing corridors was prioritized in the routing evaluation. Existing corridors generally provide the best opportunity to minimize environmental impacts and construction costs. Parallel construction reduces the need for establishing new corridors and thus the involvement of

additional landowners; minimizes clearing of new ROW; and lessens potential environmental impacts. Similarly, operation and maintenance costs incurred during the life of the pipeline can be reduced when corridors are shared.

Several alignment alternatives were incorporated into the final design that deviated from the existing ROW. These alternatives were driven primarily due to:

- lack of available workspace around residential areas,
- requests by landowners to avoid certain areas on their property,
- avoidance of existing utility infrastructure or minimizing crossing distance of roads, and
- avoidance of environmental or cultural resources.

Table 8.1-1 compares the Alternative Route Characteristics to the proposed Project alignment.

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Table 8.1-1: Alternative Route Characteristics

Factor	Proposed Project	System Alternative	Alternative Alignment	Loop Alternative 1 – Northern Alignment	Loop Alternative 2 – Southern Alignment	Loop Alternative 3 – Increase MAOP on Line 224[10]
Length of Route (to be constructed)	Line YM58 – 29.5 miles Line KL Ext. – 0.4-mile Line YM224 Loop – 1.4 miles **Total: 31.3 miles**	Line FM100 Replacement – 44.9 miles **Total: 44.9 miles**	Line FM120 Replacement – 5.8 miles Line FM100 Replacement – 3.7 miles Line LF3 – 24.0 miles **Total: 33.5 miles**	Parallel Dominion ROW – 5.4 miles Line YM58 – 29.5 miles **Total: 34.9 miles**	Parallel TGP ROW – 5.9 miles Line YM58 – 29.5 miles **Total: 35.4 miles**	0 miles
ROW Type						
New ROW (miles)[1]	7.3	--	24.0	6.9	5.5	--
Length of co-location (miles)[1]	24.0	44.9	9.5	28.0	29.9	--
ROW Land Requirements						
Pipeline operation requirements (acres)[2]	188.1	267.8	203.0	210.4	204.9	--
Pipeline construction requirements (acres)[3]	282.5	401.8	305.1	315.7	307.4	--
Wetlands						
Total wetlands crossed (feet)[4]	2,611.9	2,635.2	1,116.8	2,817.3	2,654.1	--
Total wetlands crossed (number)[4]	32	20	34	35	34	--
Total wetlands crossed (acres)[4]	4.7	4.6	2.1	5.0	4.8	--
PFO wetland area in operational and construction limits (acres)[4,5]	2.4	2.2	0.6	2.4	2.4	--
PEM wetland area in operational and construction limits (acres)[4,5]	1.0	--	0.2	1.0	1.0	--
PUB wetland area in operational and construction limits (acres)[4,5]	--	--	--	0.2	--	--
Riverine area in operational and construction limits (acres)[4,5] (includes R3, R4 and R5 NWI mapped subsystems)	1.3	2.4	1.3	1.4	1.4	--
Waterbodies						
Waterbodies Crossed (number)[6]	33	35	35	38	36	--
Land Use[7]						
Agricultural Land (miles/acres)	3.6/32.6	<0.1/0.1	0.1/0.6	4.2/38.5	4.8/41.5	--

Factor	Proposed Project	System Alternative	Alternative Alignment	Loop Alternative 1 – Northern Alignment	Loop Alternative 2 – Southern Alignment	Loop Alternative 3 – Increase MAOP on Line 224[10]
Industrial/Commercial Land (miles/acres)	0.5/5.1	1.0/9.2	2.1/16.5	0.4/5.8	0.8/7.3	--
Forest & Woodland (miles/acres)	9.8/100.3	40.7/268.7	24.9/235.4	12.9/130.6	10.7/107.3	--
Open Land (miles/acres)	17.1/142.0	3.6/119.7	6.3/51.4	17.1/138.3	18.7/148.3	--
Open Water (miles/acres)	0.2/1.7	<0.1/0.1	<0.1/0.3	0.2/1.7	0.2/1.7	--
Residential Land (miles/acres)	0.1/0.8	0.5/4.0	0.1/0.9	0.1/0.8	0.2/1.3	--
Residences and Structures						
Residences or structures located within 50 ft of the construction workspace (number)[8]	16	2	4	16	21	--
Cultural Resources[9]						
National Historic Landmarks within 0.50 mile (number)	--	--	--	--	--	--
NRHP eligible or potentially eligible cultural resources sites within 0.50 mile (number)	17	14	9	19	21	--
Other Environmental Factors						
Landfills, quarries (count within 0.50 mile)	2	4	--	2	2	--
Active oil and gas wells (count within 0.50 mile)	240	43	187	281	254	--
Foreign pipeline crossings (number)	49	12	14	53	54	--
Public roads crossed (number)	18	43	25	23	24	--
Miles exceeding 26% slope	7.1	9.3	5.8	11.1	10.6	--
Cold Water Fisheries Crossed	27	27	29	30	30	--
State Lands Crossed (acres)[5]	27.6	328.0	200.0	27.6	27.6	--

NOTES:

1. Co-location was based on the centerline of an alternative being within 100 feet of existing pipeline centerlines or powerline facilities.
2. Operational ROW for the Project is based on a 50-foot-wide permanent ROW; and includes proposed Line YM58, Line KL, and YM224 Loop. The operational ROW for alternatives considered is based on a 50-foot-wide permanent ROW.
3. Construction ROW for the proposed project is a 75-foot-wide typical ROW that includes a 50-foot-wide permanent easement and 25-foot-wide temporary workspace (TWS) abutting the permanent easement. For comparative purposes, it does not account for access roads or additional temporary workspace (ATWS). The typical construction ROW for alternatives considered is based on a 75-foot-wide typical construction ROW.

4. Based on centerline crossing of USFWS NWI data.
5. Based on a 50-foot-wide Permanent ROW and 25-foot-wide temporary workspace (does not account for construction crossing technique, such as conventional trench or HDD; therefore, area reported may not equal actual wetland impact).
6. Based on PADEP Chapter 93 Designated Use Streams data.
7. Land Use classes determined through 2017 aerial photography interpretation and USFWS NWI data; reported in miles crossed by pipeline and acres of construction ROW.
8. Based on a 75-foot-wide construction ROW.
9. Sources used for cultural assessment include (1) Pennsylvania Historical & Museum Commission Cultural Resources Geographic Information System [07/09/2019]; (2) National Register of Historic Places public database (accessed [07/09/2019]); and (3) National Parks Services National Historic Landmark database (accessed [07/09/2019]).
10. Although this alternative appears to have less impacts as presented in this table, when construction logistics such as access and dig-out staging are considered impacts may be considerable.

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8.1.2 Alternative Compressor Station Sites

With respect to aboveground facility site alternatives, an extensive alternatives siting analysis is covered in National Fuel's JPA Environmental Assessment. In summary the sites for the compressor stations were evaluated based on environmental comparisons, the primary difference between the proposed Marvindale Compressor Station site and three alternatives sites is the presence of existing natural gas facilities at the proposed site which maximizes the ability to collocate facilities and minimizes potential environmental impacts. The alternative sites have less direct access from existing roads and would require the construction of new permanent access road(s). The alternative sites would also require the acquisition of land from a private landowner, whereas National Fuel currently owns the proposed compressor station site. Additionally, these sites would require the construction of additional looping and would incur their respective impacts. For these reasons, the proposed site was selected over the alternate sites for the new Marvindale Compressor Station, and the alternative compressor station sites were dismissed from further consideration.

The proposed Tamarack Compressor Station site was selected over the alternative sites based on multiple factors including a landowner that was willing to sell their property, the lack of cultural and environmental concerns, the relative isolation of the site (e.g., limited nearby residences), and the close proximity to both existing power and Line YM53. Although the Tamarack Compressor Station will require the construction of a new permanent access road, the road will be co-located with existing pipeline ROW whereas new and/or improved permanent access roads to the alternative sites would generally require additional environmental impacts through greenfield areas. The alternative sites would also require the acquisition of land from private landowners, whereas National Fuel has an Option Agreement to purchase the proposed compressor station site. For these reasons, the proposed site was selected over the alternate sites for the new Tamarack compressor station, and the alternative compressor station sites were dismissed from further consideration.

Table 8.1-2 compares the Alternative Sites to the proposed Marvindale and Tamarack Compressor Station Sites.

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Table 8.11-2: Proposed and Alternative Compressor Station Site Characteristics

Factor	Proposed Project	Electric Driven	Alternatives Considered		
Marvindale Compressor Station			Site 1	Site 2	Site 3
Construction impacts (acres)	20.5	20.5	15.1	21.1	29.7
Permanent impacts[1] (acres)	6.8	6.8	9.6	9.7	9.1
Prime farmland[2] (acres)	2.6	2.6	11.7	11.8	7.5
NSAs within 1 mile (number)/closest NSA (miles)	3/0.4	3/0.4	0/0	0/0	3/<0.5
Attainment Status for All Criteria Pollutants[3] (Y/N)	Y	Y	Y	Y	Y
Land availability	Available	Available	Unknown	Unknown	Unknown
Land uses (acres)	Forest and Woodland – 12.7 Industrial/Commercial Land – 2.2 Open Land - 5.6 Wetlands <0.1 Open Water <0.1	Forest and Woodland – 12.7 Industrial/Commercial Land – 2.2 Open Land - 5.6 Wetlands <0.1 Open Water <0.1	Forest and Woodland – 3.8 Industrial/Commercial Land – 11.4	Forest and Woodland – 7.5 Industrial/Commercial Land – 3.9 Open Land -2.2	Forest and Woodland – 23.7 Industrial/Commercial Land – 6.1
Access (miles/use)	0.5/Existing Permanent	0.5/Existing Permanent	1.3/Existing Permanent	1.2/Existing Permanent	1.3/Existing Permanent
Tamarack Compressor Station			Site 1T	Site 2T	Site 3T
Construction impacts (acres)	15.6	15.6	10.1	7.2	9.6
Permanent impacts[1] (acres)	5.2	5.2	4.7	4.0	5.4
Prime farmland[2] (acres)	5.2	5.2	0.0	4.0	5.4
NSAs within 1 mile (number)/closest NSA (miles)	7/0.2	7/0.2	0/0	3/<0.5	1/<0.5
Attainment Status for All Criteria Pollutants[3] (Y/N)	Y	Y	Y	Y	Y
Land availability	8.75-acre parcel under Option Agreement	8.75-acre parcel under Option Agreement	Landowner Not receptive to Selling Property	Unknown	Unknown
Land uses (acres)	Forest and Woodland – 13.2 Open Land – 2.4	Forest and Woodland – 6.6 Open Land – 2.4	Open Land -10.1	Forest and Woodland – 7.2	Open Land -9.1 Forest and Woodland – 0.5
Access (miles/use)	0.3/New Private Road	0.3/New Private Road	0.2/ New Private Road	0.0/Existing Public Road	0.6/ New Private Road

NOTES:

[1] Includes operational footprint of compressor station and permanent access road.

[2] Determined using NRCS SSURGO soils data for the operational footprint of the compressor station.

[3] County attainment status data (USEPA 2019e).

8.1.3 Other Aboveground Facility Alternative Locations

With respect to the siting of other additional aboveground facilities proposed for the Project, which include:

- The Marvindale Interconnect to be installed near the new Marvindale Compressor Station site;
- The Carpenter Hollow OPP Station HEP0 4639 at the interconnect between the proposed pipeline and existing Line YM224; and
- Modification of the existing Leidy Interconnect LDC2245 with Transco at the Leidy M&R Station.

The location of these facilities is entirely dependent upon the location and configuration of the proposed new Line YM58 and the location of the receipt point with Transco at Leidy; therefore, no alternative sites were evaluated. In addition, pig launcher/receiver sites are fixed at the beginning and end of the proposed Line YM58 pipeline.

In addition to these facilities, three mainline valve facilities are proposed along the new pipeline at locations to be determined. The location of these facilities was selected based on an evaluation of the valve spacing per USDOT regulations (49 CFR 192), and the need to locate the valves near access roads for accessibility; therefore, no alternative sites were evaluated.

8.1.4 Limited Disturbed Area

As discussed in Section 5.2, the LOD delineated on the E&SCP alignment sheets has been established to restrict construction activities to the minimum area needed to effectively and efficiently construct the proposed facilities. This BMP is very effective at reducing the runoff volume rate, volume and concentration of pollutants in stormwater runoff. This BMP is "self-crediting" in that it automatically reduces the area to be treated and provides a corresponding reduction in stormwater impacts. However, it is not capable of addressing the impacts of the change in land cover associated with the proposed earth disturbance.

8.1.5 Limiting Extent and Duration of the Disturbance

This non-discharge alternative will be utilized to the extent possible on this project. The majority of the proposed earth disturbance will occur in the early activities of the construction sequence of the Project, including clearing and grading, with a much smaller earth disturbance occurring during site restoration. As described in Section 9.5 of this application, and throughout the ESCAMP, the duration and extent of earth disturbances will be limited to the current construction activity to be completed. Temporary or permanent stabilization is to occur as soon as possible upon completion of each activity. This BMP is very effective at reducing the concentration of pollutants in stormwater runoff and reducing the impact of bare earth on runoff volume and rate. However, it is not capable of addressing the impacts of the long-term change in land cover associated with the proposed earth disturbance.

8.1.6 Riparian Buffers and Riparian Forest Buffers

The feasibility of protecting, converting, or establishing a riparian forest buffer meeting the requirements of 25 PA Code §102.14 was analyzed for the proposed Project. The riparian area is defined as the land bordering a watercourse. Certain riparian forest buffers in Pennsylvania are protected under Chapter 102.14 of the Pennsylvania Code (PADEP 2010). The PADEP defines riparian forest buffers as a type of best management practice that consists of permanent vegetation that is predominantly native trees and shrubs.

Per Chapter 102.14 of the Pennsylvania Code, earth disturbance activities are not permitted within 150 feet of a perennial or intermittent river, stream, or creek; or lake, pond, or reservoir when the Project site is located in an EV or HQ watershed (PADEP 2010b). However linear pipeline projects (the Project) may request a waiver from the Chapter 102.14 requirements, provided the existing riparian buffer is undisturbed to the extent practicable, and the activity will otherwise meet the requirements of the chapter. Given the linear nature of the proposed Project, temporary impacts within riparian buffers is unavoidable.

The Project will impact the special protection riparian areas in various locations along the project as detailed in Table 2.2-1A, in Appendix A. The E&S drawings list the watershed classifications to further detail where special protection riparian buffers are impacted by the Project.

National Fuel evaluated all riparian areas using a 100-foot buffer from the top of bank of non-HQ/EV waters, and a 150-foot buffer from the top of bank for HQ/EV waters. Below is a list of total riparian disturbance / total forested riparian disturbance by County:

- McKean County = 48.3 acres / 9.0 acres
- Potter County = 19.4 acres / 4.1 acres
- Elk County = 0.2 acres / <0.1 acres
- Clinton County = 0.0 acres / 0.0 acres
- Clearfield County = 1.1 acres / 0.2 acres
- Cameron County = 3.1 acres / 1.0 acres

The total riparian area and total forested riparian area impacted by the Project is 72.1 acres and 14.4 acres, respectively.

Sensitive surface waters with an existing use classification of EV include Whitney Creek and South Branch Oswayo Creek.

Table 2.2-1A, in Appendix A, provides a list of waterbodies crossed by the Project and their associated watershed classification.

8.1.7 Riparian Buffer Waiver

National Fuel requests a Riparian Buffer Waiver in accordance with 25 PA Code §102.14(d)(2)(ii) for linear project impacts. This section describes the existing land cover of the riparian areas in the Project workspace; provides an assessment and quantifies riparian area impacts resulting from the construction and operation of the Project and provides proposed measures to minimize impacts and restore the riparian resources.

National Fuel will perform an assessment of the existing riparian buffer prior to construction to determine suitability for restoring by evaluating site's physical locations including soil characteristics, hydrology and topography.

To mitigate for temporary disturbances within riparian buffers, National Fuel has reduced workspace within riparian buffers to the extent practicable and will implement the BMPs detailed in this application package. National Fuel will employ multiple measures to reduce the extent and duration of Project impacts to riparian communities which include, but are not limited to the following:

- National Fuel will cut vegetation just above ground level in workspace locations, leaving existing root systems in place and preserve 150- foot riparian area where possible

- National Fuel will limit the removal of stumps and grading in wetlands and along waterbodies to the trench line and what is necessary to safely install the equipment crossings to promote natural revegetation and surface stabilization;
- National Fuel will utilize a riparian buffer mix within 150 feet of HQ/EV waterbodies and within 100 feet of other waterbodies. This seed mix will be used to revegetate the entire LOD in riparian areas where slopes are less than 10%.
- Tree and shrub plantings will also occur in forested riparian buffers, within workspace outside of the 10-foot maintained ROW will be planted.
- National Fuel will reduce workspace in certain locations when crossing wetlands.
- National Fuel will install erosion control measure including sediment barriers such as filter socks, erosion control blankets, temporary bridges and timber mats.
- National Fuel will utilize ATWS greater than 50 feet from stream banks.
- National Fuel will restore portions of the disturbed riparian forest buffer with replanting in the riparian areas outside of its permanent maintained right of way. National Fuel will reduce the potential for risk for invasion or spreading of invasive species by cleaning construction equipment (e.g. in locations where a riparian area or wetland is identified as having predominant invasive species vegetation, equipment can be cleaned prior to entering the next areas).
- National Fuel will implement BMPs to minimize riparian impacts and protect existing forested riparian buffers to the extent practicable. However, to manage the pipeline's integrity during Project operation, National Fuel must maintain a 10-foot wide tree free corridor over the pipeline; therefore, the entire forested riparian buffer cannot be replanted. Furthermore, because National Fuel does not own the property on which the proposed earth disturbance will occur, National Fuel cannot, without landowner permission, place deed restrictions or conservation easements to protect, convert, or establish a riparian buffer or riparian forest buffer to satisfy the antidegradation requirements of §102.4(b)(6) for the proposed earth disturbances.

In locations where a riparian buffer waiver is requested, where forest riparian areas are converted to herbaceous cover, National Fuel will develop a replanting plan for the riparian forest buffer locations. Replanting will occur in the construction workspace outside of the 10-foot-wide permanently maintained corridor over the pipeline. Preliminary details related to the replanted species and planting specifications are outlined below. National Fuel will replant and stabilize all riparian buffers affected by the Project once construction is completed. National Fuel will implement erosion and sediment BMPs as outlined in the ESCAMP and the erosion and sediment control plans. The riparian areas at stream crossings within the 50-foot-wide permanent ROW will be reestablished by applying a native approved riparian seed mix, developed in conjunction with the agencies. The seed mix will be applied at a rate and density as directed by nursery specifications and recommendations.

Replanting in the riparian areas within the ROW will include stabilizing with the approved seed mix and incorporating a mix of native shrubs listed in Table 8.1-4 below. The selected shrub species were identified in vegetation plot data obtained during the wetland and waterbody delineations. The selected plant materials have been selected for compatibility with the landscape characteristics and blend with the surrounding and adjacent riparian areas.

Outside of the permanent ROW, and to edge of the construction workspace and within a regulated floodplain, National Fuel will reestablish the riparian buffer by planting trees and shrubs. Replanting of the riparian buffers includes a combination of native tree and shrub species selected for different hydrologic regimes and different vegetative cover types throughout the Project area.

Trees and shrubs selected for replanting will be taken from the PADEP's Riparian Forest Buffer Guidance (Document Number 394-5600-001 PADEP 2010) and will also include species listed in field delineation plots and stream forms. The trees and shrubs selected for the Project are listed in Table 8.1-4. This is a short list of preferred plant species which will be modified upon final plan development. Plants will be either bare root, live stake, or containerized species.

Replanting methods will include monocultures consisting of three to six plants of the species in random clumps spaced approximately six to eight feet on center (o.c.) for shrubs, 10 feet o.c. for small tree species, and 12-14 feet o.c. for tree species. Planting spacing will follow industry specifications. Trees and shrubs will be planted at a density determined by evaluation of both aerial assessment and current data collected in the field. Typical planting details will be developed and provided in the final planting schedule.

Table 8.1-4: List of Preliminary Species for Replanting

Species	Soil PH	Height (feet)	Wildlife Value	Flood Tolerance	Shade Tolerance
Shrubs/Small Trees					
Gray dogwood (*C. racemosa*)	5.0-7.0	6-12	food source-fruits; cover	intermediate	tolerant
American Hornbeam (*Carpinus caroliniana*)	4.0-7.5	35-50	food source-catkins, buds, seeds, leaves and twigs	intolerant	very tolerant
Buttonbush (*Cephalanthus occidentalis*)	5.5-8.5	6-12	food source-fruit	very tolerant	very intolerant
Witchhazel (*Hamamelis virginiana)*	4.5-6.0	20-35	leaves toxic to some animals	intolerant	very tolerant
Winterberry (Ilex verticillata)	4.5-7.5	6-15	intermediate wildlife value	very tolerant	intermediate
Northern Arrowwood (*Viburnum recognitum)*	5.0-7.0	6-12	food source- fruit and nectar and pollen of the flowers	tolerant	tolerant
Common spicebush (*Lindera benzoin*)	4.5-6.0	6-12	high value as food source-fruits and leaves; host plant for spicebush swallowtail butterfly	intermediate	very tolerant
Staghorn sumac (*Rhus typhina*)	4.5-7.0	35-50	food source-fruit	intolerant	intermediate
Swamp rose** (*Rosa palustris*)	4.0-7.0	4-10	food source-fruit	very tolerant	intolerant
Trees					
American beech (*Fagus grandifolia*)	4.0-6.5	75-100	food source- nuts	very intolerant	very tolerant
Black (sweet) birch (*Betula lenta*)	5.0-7.0	50-75	food source- catkins, buds, seeds, leaves and twigs	intolerant	intermediate
Red Maple (Acer rubrum)	5.5-7.0	75-100	food source- fruits and young shoots	tolerant	tolerant
Northern red oak (*Quercus rubra*)	4.5-6.5	75-100	medium value for nesting and food source- acorns	intermediate	intermediate
Black willow* (*Salix nigra*)	5.0-8.0	35-50	food source-buds, fruit, twigs	very tolerant	very intolerant

Species	Soil PH	Height (feet)	Wildlife Value	Flood Tolerance	Shade Tolerance
Red (slippery) elm** (Ulmus spp.)	5.5-7.0	50-80	food source-seeds, twigs	tolerant	intermediate

Source: Riparian Forest Buffer Guidance, Document Number 3945600-001
Note: All shrubs/trees listed are in Region A: Allegheny Plateau Province
*Short lived: trees < 100 years; shrubs < 20 years
**May be hard to find in a nursery

Planting Methods

All seeding will be applied and plantings installed according to acceptable standards of the trade under the supervision of a landscape professional. All seed and plant materials will be nursery grown and will be guaranteed to be true to name and healthy upon delivery.

Wildlife Damage Control

After planting is completed, appropriate tree and shrub shelters (i.e. fencing, plastic collars) will be installed. If necessary additional or alternative methods of wildlife damage control including the application of a rodenticide or installing bait boxes.

Invasive Species Management

National Fuel's ESCAMP specifies that National Fuel will consult with the appropriate agencies regarding invasive species and develop specific procedures in coordination with the appropriate agencies to prevent the introduction or spread of invasive specifies. National Fuel's Environmental Construction Plan will be followed in the riparian buffer replanting areas.

8.1.8 Treatment Train Combination of BMPs

A combination of cost-effective and environmentally sound BMPs were considered for installation in a "treatment train" that collectively eliminate the net change in stormwater volume, rate and quality from pre-development to post-development conditions. The primary metric prohibiting the proposed Project from achieving non-discharge alternatives is the additional runoff volume generated by the earth disturbance necessary for the proposed activities. Permanent removal of runoff volume from the design storm hydrograph during earth disturbance phases was excluded from the available design alternatives due to the elevated sediment loadings expected during this stage of site construction. The "treatment train" approach was determined to be infeasible as a non-discharge alternative.

As demonstrated above, there is no combination of non-discharge alternative BMPs that enable the earth disturbance activities to achieve no net change from pre-development to post-development volume, rate and concentration of pollutants in stormwater runoff up to and including the 2-year/24-hour storm. In the absence of feasible non-discharge alternatives, Antidegradation Best Available Combination of Technologies (ABACT) BMPs will be utilized to address antidegradation requirements for the Pennsylvania portion of the Project.

8.2 Antidegradation Best Available Combination of Technologies

As demonstrated in the previous section, non-discharge alternatives do not exist for the proposed Project. Environmentally sound and cost-effective ABACT BMPs will be utilized to demonstrate that any change in PA stormwater runoff rate, volume, or quality will maintain and protect the existing quality and water uses of receiving surface waters and preserve existing baseflow. The

support drawings of this application package show the locations of all planned ABACT BMPs and details for construction of these facilities. The following is a summary of the combination of ABACT BMPs that have been incorporated into the site design and the features that make them ABACT:

8.2.1 Site Access

- 100-foot long Rock Construction Entrance(s)

8.2.2 Sediment Barriers

- Compost filter socks will be utilized for all perimeter control needs

8.2.3 Stabilization

- Disturbed areas immediately stabilized upon completion, or temporary cessation, of earth disturbance activity
- Disturbed areas stabilized with erosion control blanket within 100 feet of special protection surface waters, within 50 feet of all other receiving surface waters, and on slopes 3H:1V or steeper.

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9 Construction Techniques for Natural Gas Pipelines

9.1 Typical ROW Requirements

During Project review, conditions evaluated included topography, soils, bedrock, boulders, wetlands, and waterbodies, as well as proximity to existing roads, railroads, and residences. National Fuel has considered these noted conditions along with machinery requirements needed for safe pipeline and support facility installation. Minimum size and area requirements for worker safety involving construction activities established by the U.S. Department of Transportation (DOT) and Occupational Safety and Health Administration (OSHA) were also considered. Under certain conditions, additional workspace may be necessary to maintain safe practices in specific locations and would extend beyond the nominal 75-foot corridor.

The Project generally requires a 50-foot permanent ROW and an approximately 25-foot temporary construction workspace for a nominal 75-foot-wide construction corridor. This corridor width is based on construction conditions of similar projects within Pennsylvania. From the center of the pipe trench, the spoil side of the construction ROW is proposed to be 35 feet. This footprint will serve as the primary spoil storage area. Thus, the working side of the construction workspace will typically be 40 feet wide from the center of the pipe trench to the edge of the ROW and will serve to accommodate trench excavation, bank sloping, and safe equipment mobilization. Agricultural areas with full topsoil segregation will require an additional 25 feet, totaling a 100-foot-wide construction corridor.

9.2 Access Roads

To the extent practicable, existing roadways (public or private) will be used as the primary means to access the ROW. Access to the Project will be achieved via maintained State and County roads, existing public and private access roads, and proposed new temporary and permanent access roads. National Fuel proposes to utilize 40 access roads for proposed construction activities and 18 existing access roads for abandonment activities (e.g., total of 58 project-wide). In general, only minor modifications are proposed at existing non-public access roads which may include the placement of rock construction entrances at road junctures. in general, only minor improvements will occur at existing access roads beyond maintenance of the road throughout construction.

Maintenance activities during construction may include tree branch clearing, gravel placement, lengthening and/or widening. Moreover, ATWS will be located adjacent to several access roads for temporary vehicle parking, vehicle turn-out passing areas, and/or staging of minor supplies (e.g., hay bales for erosion control activities). Temporary access roads (TARs) for construction will be restored to original conditions following construction. Landowner permission and permanent rights will be obtained for the proposed permanent access roads (PARs).

9.3 Contractor Yards / Staging Areas

Contractor yards or staging areas are required for storing and staging equipment, pipe, fuel, oil, pipe fabrications, and other construction related materials. National Fuel has identified seven staging areas in Pennsylvania for use during construction of the Project. The total area of the Pennsylvania contractor yards/staging areas will be approximately 44.4 acres. A Highway

Occupancy Permit (HOP) will be acquired from the Pennsylvania Department of Transportation for access to the contractor yards if required.

The Contractor shall perform the following measures at contractor yards:

- Install erosion control structures as directed by the EI, outlined in this application, or identified on the construction drawings, and maintain them throughout construction and restoration activities;
- Implement and comply with the SPRP Plan; and
- Restore and revegetate all disturbed areas in accordance with the measures outlined in these application materials and as directed by the EI.

9.4 Off-ROW Disturbance

With certain exceptions, which are required in order to comply with FERC Plan and Procedures, all construction activities are restricted to within the limits identified on the construction drawings (exceptions include the installation of waterbars, installation of energy-dissipating devices, installation of dewatering structures, and drain tile repair which are subject to applicable survey requirements). However, as detailed in Section 4.1 of the ESCAMP, in the event that off-ROW disturbance occurs the following measures will be implemented:

- The EI will immediately report the occurrence to the Chief Inspector and ROW Agent;
- The conditions that caused the disturbance will be evaluated by the Chief Inspector and the EI, and they will determine whether work at the location can proceed under those conditions; and
- If deemed necessary by the Chief Inspector and EI, one or more of the following corrective actions will be taken: immediate restoration of the original contours, seeding and mulching of the disturbed area, and/or installation of erosion control devices. National Fuel's Environmental Compliance Coordinator will be notified as soon as practical.

9.5 Construction Sequence

Natural gas pipelines are installed using conventional overland buried pipeline construction techniques. These activities are necessary for the installation of a stable, safe, and reliable transmission facility consistent with DOT requirements and regulations. This section provides an overview of the equipment and operations necessary for the installation of a natural gas pipeline, describes potential impacts that may occur from each operation, and identifies the measures that will be implemented to control these potential impacts. This section also discusses in detail the erosion and sediment control techniques that apply to each construction activity including clearing, grading, trenching, lowering-in of pipe, backfilling, and hydrostatic testing. ROW restoration will be addressed in Section 9.6 of this application. The activities listed below are normally performed in the following sequence:

- Survey and flag the pipeline route, limits of disturbance, foreign line crossings, wetlands and other sensitive areas;
- Installing temporary erosion and sediment controls;
- Clearing the construction work area (CWA);
- Grading the CWA to establish safe workspace; installing additional erosion and sediment controls;
- Installing temporary waterbars/best management practices;

- Trenching/excavating the trench;
- Pipe stringing and bending;
- Welding, weld inspection and installing weld coating;
- Trench dewatering;
- Lowering the pipe into the trench; installing trench plugs;
- Backfilling the trench;
- Hydrostatic testing of pipe; and
- Permanent stabilization and restoration;
- Demobilization and site cleanup;
- Post-construction monitoring.

Obstacles to the mainline technique are often encountered and are not considered to be out of the ordinary. These obstacles, which include side hill crossings, rock, wetlands, streams, roads, and residential areas, do not normally interrupt the assembly line flow.

9.5.1 Clearing

Clearing operations will include the removal of vegetation within the CWA. Various clearing methods will be employed depending on tree size, contour of the land, and the ability of the ground to support clearing equipment. Vegetative clearing will either be accomplished by hand or by cutting equipment. The following procedures will be standard practice during clearing:

- Prior to beginning the removal of vegetation, the limits of clearing will be established and identified in accordance with the construction drawings;
- All construction activities and ground disturbance will be confined to within the limit of disturbance shown on the construction drawings;
- Clearly mark and protect trees to be saved as per landowner requests or as otherwise required;
- All brush and trees will be felled into the CWA to minimize damage to trees and structures adjacent to the CWA. Trees that inadvertently fall beyond the edge of the CWA will be immediately moved onto the CWA and disturbed areas will be immediately stabilized;
- Trees will be chipped or cut into lengths identified by the landowner and then stacked at the edge of the CWA or removed;
- Brush and limbs may be disposed of in one or more of the following ways depending on local restrictions, applicable permits, construction Line List stipulations, and landowner agreements:
  - Stockpiled along the edge of the CWA or in staging areas or;
  - Chipped, spread evenly across the CWA in upland areas; and plowed in; or
  - Hauled off site or;
  - Blown off-site with landowner approval.
- In no event will brush, ships, logs, or stumps be placed within stream or wetland areas.
- Existing surface drainage patterns will not be altered by the placement of timber or brush piles at the edge of the construction ROW.

9.5.1.1 Thermal Impacts

On this Project, the principal source of thermal impacts would be related to disturbance of vegetative cover. The following provisions are included in this application to avoid, minimize, or mitigate potential pollution from thermal impacts:

- Section 5 of the ESCAMP requires minimal disturbance within 50 feet of streams.
- Section 5 of the ESCAMP limits ROW width and vegetation removal through wetlands.
- Section 8 of the ESCAMP provides revegetation requirements.
- Section 9 of the ESAMP limits routine vegetation mowing or clearing.

The permanent pipeline ROW may be mowed periodically, and woody vegetation may be trimmed to allow safe pipeline operation. Some tree cover may be permanently removed in wooded areas. A 10-foot wide area will be maintained in an herbaceous state in wetland areas to comply with vegetative maintenance plan approved by FERC and the USDOT, Pipeline Hazardous Materials and Safety Administration (PHMSA) survey requirements.

9.5.2 Installing Temporary BMPs

BMPs, which are temporary erosion controls intended to minimize the flow of sediment and to prevent the deposition of sediments beyond approved workspaces or into sensitive resources, shall be installed following vegetative clearing operations. They may be constructed of materials such as compost filter socks, staked straw bales, compacted earth (e.g., drivable berms across travel lanes), riprap and stone, jute matting, timber mats, wood stakes, clay, bentonite, synthetic foam, concrete, or an equivalent material as identified by the EI. Where permitted by regulatory agencies, hay bales may be used in lieu of straw bales.

- Do not stake or trench in place straw bales used on equipment bridges or on mats across the travel lane.
- Inspect temporary BMPs daily in areas of active construction to verify proper functioning and maintenance. In other areas, BMPs will be inspected and maintained on a weekly basis throughout construction, and within 24 hours following storm events as detailed in Section 4.13 of the ESCAMP.
- Maintain all temporary BMPs in place until permanent revegetation measures are successful or the upland areas adjacent to wetlands, waterbodies, or roads are stabilized.
- Remove temporary BMPs from an area when replaced by permanent erosion control measures or when the area has been successfully restored.

9.5.3 Grading

The construction ROW 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.

9.5.3.1 Topsoil Segregation

Topsoil segregation methods will be used in all residential areas and in cultivated or rotated croplands, managed pastures, hayfields, and other areas at the landowner's or land managing agency's request. As detailed in ESCAMP section 4.3.1:

- Prevent the mixing of topsoil with subsoil by stripping topsoil from either the full work area or from the trench line and subsoil storage area (ditch plus spoil side method) as stipulated in the Construction Contract or Line List.
- 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.
- Where topsoil segregation is required, maintain separation of salvaged topsoil and subsoil throughout all construction activities.
- For wetlands, segregate the top 12 inches of topsoil within the ditchline, except in areas where standing water is present, or soils are saturated.
- Leave gaps in the topsoil piles for the installation of temporary waterbars to allow water to be diverted off CWA.
- Topsoil replacement (i.e., importation of topsoil) may be used as an alternative to topsoil segregation if approved by the landowner and National Fuel.
- Never use topsoil for padding the pipe, constructing temporary waterbars or trench plugs, improving or maintaining roads, or as a fill material.
- Stabilize topsoil piles and minimize loss due to wind and water erosion with use of BMPs, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary.

9.5.3.2 Tree Stump Removal and Disposal

- Remove tree stumps in upland areas along the entire width of the permanent ROW to allow adequate clearance for the safe operation of vehicles and equipment. Stumps within the CWA will be removed or ground to a suitable height that will allow the safe passage of equipment, as stipulated by the Chief Inspector or EI.
- Dispose of stumps by one of the following methods, pending approval by the Chief Inspector and the landowner, and in accordance with regulatory requirements:
  - Moved to National Fuel-approved off-site location (except in wetlands and agricultural areas);
  - Chipped on-site. Removed from ROW and hauled off site or blown off-site with landowner approval. Chipped material not removed from the site may be spread across the upland areas of the CWA in a manner that will not inhibit revegetation or broadcast into off-ROW and stable areas. Wood chips will not be left within agricultural lands, wetlands, or within 50 feet of wetlands. Wood chips will not be stockpiled in a manner that they may be transported into a wetland.
  - Ground to grade in wetlands, excess chips must be removed from wetlands for reuse on-site or properly disposed of off-site.

9.5.3.3 Rock Disposal

When rock is encountered it will be broken up either by drilling, pneumatic hammer or blasting. If blasting is required National Fuel will conduct pre-blast surveys with landowner permission to assess the condition of structures, wells, springs and utilities within 150 feet. Blasting will follow all procedures and safety measures according to National Fuel's Blasting Plan (Appendix H).

Rock (including blast rock) will be disposed of in one or more of the following ways:

- Buried on the ROW or in approved construction work areas as fill during grade cut restoration in accordance with the construction specifications. In cultivated/agricultural

lands, wetlands, and residential areas, rock may only be backfilled to the top of the existing bedrock profile;

- Windrowed per written landowner agreement with National Fuel. If windrowed, National Fuel will test for presence of pyritic rock. Should significant quantities of pyritic rock remain after trench backfill, National Fuel will attempt to treat the rock on-site according to the recommendations in PADEP's publication, *How to Avoid and Handle Acid-Producing Rock Formations Encountered During Well Site Development*. Alternatively, if the volumes of rock are too large to effective treat, National Fuel will arrange to dispose of the rock at an approved facility; and/or
- Removed and disposed of at a National Fuel approved site.

9.5.4 Installing Temporary Waterbars

As discussed in Section 4.7 of the ESCAMP, temporary waterbars, which are temporary erosion control measures intended to reduce runoff velocity and divert water off the CWA, shall be installed following grading operations. The waterbars are to be installed on all disturbed areas as necessary to avoid excessive erosion. Temporary waterbars will be constructed of materials such as compacted soil and staked compost filter sock.

Waterbars must be installed on either side of waterbodies and wetlands and upslope of road crossings at the locations shown on the attached drawings or as determined by the EI (closer spacing should be used if necessary).

9.5.5 Trenching

The trench centerline will be staked after the CWA has been prepared. In general, a trench will be excavated to a depth that will permit burial of the pipe with a minimum of three feet of cover, four feet of cover in agricultural areas and five feet beneath waterbodies. Overland trenching may be accomplished using a conventional backhoe or a rotary wheel-ditching machine. In shale or rocky areas where the use of the wheel-ditching machine is limited, a tractor-drawn ripper will be employed to break and loosen hard substratum material. In areas where rock cannot be ripped, drilling and blasting may be required. A backhoe may then be used to remove rock and soil from the ditch.

The following procedures will be standard practice during ditching:

- Flag drainage tiles damaged during ditching activities for repair; and
- Place spoil at least 10 feet from the edge of waterbodies. Spoil will be contained with erosion and sediment control barriers (BMPs) to prevent spoil materials or heavily silt-laden water from transferring into waterbodies and wetlands or off the CWA.

9.5.6 Trench Dewatering

In accordance Section 4.10 of the ESCAMP, trench dewatering may be periodically required along portions of the proposed pipeline prior to and/or subsequent to installation of the pipeline to remove collected water from the trench.

- Trench dewatering will be conducted (on or off the CWA) in such a manner that does not cause erosion and does not result in silt-laden water flowing into any waterbody or wetland.
- The intakes of the hoses used to withdraw the water from the trench will be elevated and screened to minimize pumping of deposited sediments.

- Water may be discharged into areas where adequate vegetation is present adjacent to the CWA to function as a filter medium.
- Where vegetation is absent or in the vicinity of waterbody/ wetland areas, water will be pumped into a filter bag or through a structure composed of BMPs. When using filter bags, secure the discharge hose to the bag with a clamp.
- Remove dewatering structures as soon as practicable after the completion of dewatering activities.

9.5.7 Pipe Installation

The following sections describe how the pipe will be installed for the Project. In general, the pipeline installation process moves in an assembly line fashion and is limited to a week at any given location.

9.5.7.1 Stringing and Bending

Following trench excavation, pipe sections will be delivered to the construction site by truck or tracked vehicle and strung out along the trench. Individual pipe sections will be placed on temporary supports or wooden skids and staggered to allow room for work on the exposed ends. Certain pipe sections will be bent, as necessary, to conform to changes in slope and direction of the trench.

9.5.7.2 Welding and Weld Inspection

Once the bending operation is complete, the pipe sections will be welded together on supports using approved welding procedures that comply with Company welding specifications. After welding, the welds will be inspected radiographically or ultrasonically to check their structural integrity.

9.5.7.3 Lowering-in

Lowering-in consists of placing the completed pipeline sections into the trench where a tie-in weld will be made. Lowering-in is usually accomplished with two or more sideboom tractors acting in unison and spaced so as not to buckle or otherwise damage the pipe. The pipeline will be lifted from the supports, swung out over the trench, and lowered directly into the trench. The equipment uses a "leap frogging" technique requiring sufficient area to safely move around other tractors within the CWA to gain an advanced position on the pipe.

9.5.8 Backfilling

Backfilling consists of covering the pipe with the earth removed from the trench or with another 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 or screened spoil materials from trench excavation.

- Under no circumstances shall topsoil be used as padding material.
- Excess rock, including blast rock, may be used to backfill the trench to the top of the existing bedrock profile in accordance with Company specifications. Rock that is not used to backfill the trench will be treated as described in Section 9.5.3.3.
- Any excess material will be spread within the CWA in upland areas and land contours will be roughed-in to match adjacent topography.

- The trench may be backfilled with a crown over the pipe to compensate for compaction and settling. Openings will be left in the completed trench crown to restore pre-construction drainage patterns. Crowning shall not be used in wetland areas

9.5.8.1 Trench Plugs

As discussed in Section 7.2 of the ESCAMP, trench plugs are intended to slow subsurface water flow and erosion along the trench and around the pipe in sloping terrain. Trench plugs will be constructed with clay, bentonite, synthetic foam, or sand filled sacks. On severe slopes greater than 100 percent, bentonite used at the discretion of the Chief Inspector. Topsoil shall not be used to construct trench plugs. Trench plugs, which are used in conjunction with waterbars, shall be installed at the locations shown on the alignment sheet drawings or as determined by the EI. Trench plugs shall be installed at the base of slopes adjacent to waterbodies and wetlands, and where needed to avoid draining of a resource.

9.5.9 Hydrostatic Testing

Once the pipeline is completed and before it is placed into service, it will be hydrostatically tested for structural integrity in accordance with PHMSA regulations. Hydrostatic testing involves filling the pipeline with clean water and maintaining test pressure in excess of normal operating pressures. The testing procedure involves filling the pipeline with test water, performing the pressure test, and discharging the test water. Alternately the water may be hauled offsite. A Hydrostatic Discharge Permit will be obtained from the PADEP prior to hydrostatic testing. National Fuel anticipates withdrawing water for the hydrostatic testing from publicly and privately available water sources.

- The EI shall notify the agencies of the intent to use specific test water sources at least 48 hours before testing activities.
- Pumps used for hydrostatic testing within 100 feet of any waterbody or wetland shall be operated and refueled in accordance with the PPC Plan.
- Use only the approved water sources identified in the Clearance Package/Permit Book.
- Locate hydrostatic test manifolds outside wetlands and riparian areas to the greatest extent practical.
- For an overland discharge of test water, dewater into an energy dissipation device constructed of straw bales and absorbent booms.
- Dewater only at the locations shown on the construction drawings or locations identified in the Hydrostatic Test Package.
- Locate all dewatering structures in a well-vegetated and stabilized area, if practical, and attempt to maintain at least a 50-foot vegetated buffer from adjacent waterbody/wetland areas. If an adequate buffer is not available, BMPs or similar erosion control measure must be installed.
- Regulate discharge rate, use energy dissipation device(s), and install BMPs, as necessary, to prevent erosion, streambed scour to aquatic resources, suspension of sediments, flooding or excessive stream flow.
- The EI shall sample and test the source water and discharge water in accordance with the permit requirements

9.6 CWA Restoration and Final Cleanup

Restoration of the CWA 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 BMPs to minimize post-construction erosion.

In addition to the standard permanent restoration procedures set forth in Section 7.5 of the ESCAMP, residential areas will be restored in accordance with Section 10.3. Property shall be restored as close to its original condition as practical unless otherwise specified by the landowner.

- The Contractor shall make every reasonable effort to complete final cleanup of an area (including final grading 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 time frames, maintain temporary erosion controls (temporary waterbars, BMPs, and mulch) until conditions allow completion of cleanup.
- The disturbed CWA will be seeded within four working days of final grading, weather and soil conditions permitting.
- If final cleanup and seeding cannot be completed and is delayed until the next recommended growing season, the winter stabilization measures in Section 9.6.4 shall be followed.
- Grade the CWA to pre-construction contours.
- Spread segregated topsoil back across the graded CWA to its original profile.
- Remove excess rock from at least the top 12 inches of soil to the extent practical in all rotated and cultivated cropland, hayfields, managed pastures, residential areas, and other areas at the landowner's request. The size, density, and distribution of rock on the CWA should be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.
- A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed, regularly inspected and maintained. When access is no longer required, the travel lane must be removed and the CWA restored.
- Remove all construction debris from all construction work areas unless the landowner or land managing agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration.
- Remove temporary BMPs when replaced by permanent erosion control measures or when revegetation is successful per permit requirements.

9.6.1 Permanent Erosion Control

9.6.1.1 Permanent Waterbars

As detailed in Section 7.3 of the ESCAMP, permanent waterbars are intended to reduce runoff velocity, divert water off the CWA, and prevent sediment deposition into sensitive resources. Permanent waterbars will be constructed of compacted soil. A functional equivalent may be used when directed by the EI.

9.6.1.2 Erosion Control Blanket

- Install erosion control fabric at waterbar outlets and drainage swales as necessary or as directed by the EI.
- Install erosion control blanket or matting on slopes greater than 3H:1V, on disturbed areas within 50 feet of streams, and within 100 feet of streams in HQ and EV watersheds. Anchor the erosion control blanket or matting with staples or other appropriate devices in accordance with the manufacturers' recommendations.

- The EI will direct the installation of high-velocity erosion control blanket on the swale side of permanent waterbars
- Install erosion control blanket or matting in locations where temporary bridges were removed

9.6.2 Revegetation and Seeding

Successful revegetation of soils disturbed by Project-related activities is essential. Seeding will be conducted using the requirements as outlined in Section 8 of the ESCAMP.

9.6.3 Mulch

Mulch is intended to stabilize the soil surface and shall consist of weed-free straw or hay, wood fiber hydromulch, erosion control blanket, or some functional equivalent as approved by the EI and Chief Inspector. Mulch will be applied as directed in Section 4.9 of the ESCAMP.

9.6.4 Winter Stabilization

In the event that restoration occurs too late in the year for cleanup activities to adequately proceed, the following procedures will be implemented along the disturbed CWA at those locations until final restoration measures can be completed.

- Install permanent waterbars at specified intervals on all slopes, or as directed by the EI;
- Install temporary BMPs adjacent to stream and wetland crossings, as well as other critical areas;
- Seed and mulch the disturbed areas and seed segregated topsoil piles in accordance with these application materials; and
- Remove flumes from waterbody crossings to reestablish natural stream flow.

Refer to section 3.8 and Attachment 6 of the ESCAMP in Appendix G for additional information regarding winter stabilization.

9.7 Unauthorized Vehicle Access to ROW

National Fuel will offer to install and maintain measures to control unauthorized vehicle access to the ROW based on requests by the manager or owner of forested lands. National Fuel is currently working with individual state forests to determine specific needs. These measures may include:

- Signs;
- Highly visible construction fencing;
- Fences with locking gates;
- Slash and timber barriers, pipe barriers, or a line of boulders across the permanent ROW; or
- Conifers or other appropriate shrubs with a mature height of four feet or less across the permanent ROW.

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10 Special Construction Methods

National Fuel will utilize the following specialized construction procedures for agricultural areas, road crossings, and residential areas along the Project. The Project construction drawings, Line Lists, and Construction Contract will indicate the locations where specialized construction methods will be used.

10.1 Agricultural Areas

Section 4.3 of the ESCAMP, details National Fuels construction procedures in agricultural areas, including topsoil segregation, drain tiles, and maintaining irrigation during construction. Following construction National Fuel will test topsoil and subsoil for compaction at regular intervals in agricultural areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to identify approximate preconstruction conditions. Use penetrometers or other appropriate devices to conduct tests. If necessary, National Fuel will plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

10.2 Road Crossings

As detailed in Section 4.5 of the ESCAMP, unpaved private and public roads supporting minimal traffic volumes are usually crossed by boring or by means of an open cut, if this method is approved by the owner or appropriate road management agency. An open cut crossing may involve closing the road to all traffic and constructing an adequate detour around the crossing area or excavating one-half of the roadway at a time allowing through traffic to be maintained.

The trench for an open cut crossing is excavated with a backhoe or similar equipment, all backfill is compacted, and the road resurfaced. All state, national, and interstate highways as well as all railroads must be crossed by boring, unless the crossing permit allows an open cut crossing.

10.3 Residential Areas

Section 4.2 of the ESCAMP, details National Fuels construction procedures in residential areas.

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11 Waterbody and Wetland Crossings

Waterbody crossing procedures are addressed in Section 5 of the ESCAMP. Wetland crossing procedures are addressed in Section 6 of the ESCAMP. Specific restoration procedures for waterbodies and wetlands are addressed in Section 7.5 of the ESCAMP.

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12 Spill Prevention and Response Procedures

In addition to the requirements of the ESCAMP, the Contractor shall adhere to National Fuel's Spill Prevention and Response Procedures Plan at all times.

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13 Post Construction Activities

13.1 Post-Construction Monitoring

The Project shall adhere to the monitoring requirements set forth in this section and Section 9 of the ESCAMP. Company personnel shall perform the following:

13.1.1 Uplands

Routine maintenance of the ROW is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility during aerial patrols. In upland areas, maintenance of the ROW will involve clearing the entire ROW of woody vegetation.

- Routine vegetation mowing or clearing over a 50-foot wide corridor centered on the pipeline of the permanent ROW in uplands shall be conducted no more frequently than once every three years. However, to facilitate periodic corrosion and leak surveys, a 10-foot wide corridor centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot wide corridor in an herbaceous state.
- 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 USFWS.

13.1.2 Waterbodies and Wetlands

Refer to Sections 9.1.1 and 9.1.2 of the ESCAMP for waterbody and wetland post-construction maintenance activities. These restoration practices are consistent with PFBC comments to this the Project Joint Permit 105 Application submitted on August 8, 2020.

13.2 Reporting

Refer to Section 9.2 of the ESCAMP for post-construction reporting procedures.

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Appendices

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A. Tables 2.2-1 (A thru D)

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A.1 Table 2.2-1A – Waterbodies Crossed by the Project

A.2 Table 2.2-1B – Wetlands Located within Project Work Areas

A.3 Table 2.2-1C – Floodways Crossed by the Project

A.4 Table 2.2-1D – Water Supply Wells and Springs within 150-feet of Project Work Areas

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B. PADEP Standard E&S Worksheet 1 (Compost Filter Sock)

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C. Clean Water Diversions: Drainage Area Mapping & PADEP Standard E&S Worksheets 9, 10, & 11

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C.1 McKean County

C.2 Potter County

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D. North American Green Product Specifications

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E. Geologic Units Crossed by the Proposed Pipeline Routes

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F. PADEP Standard E&S Worksheet 22 (Plan Preparer Record of Training and Experience in Erosion and Sediment Pollution Control Methods and Techniques)

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G. ESCAMP

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H. Blasting Plan

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I. Geologic Hazard Mitigation Plan

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Table 2.2-1A (Rev 3): Waterbodies Crossed by the Project

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
Marvindale Compressor Station Access Roads										
McKean	Stream 001	PAR-1	N/A	Minor	UNT to Warner Brook	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 003	PAR-1	N/A	Minor	UNT to Warner Brook	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 005	PAR-1	N/A	Minor	UNT to Warner Brook	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Line YM58 Work Areas										
McKean	Stream 006	0.9	3.3	Minor	UNT to Wernwag Hollow	IT	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 007	1.2	4.3	Minor	UNT to Wernwag Hollow	P	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 008	1.4	12.4	Minor	Wernwag Hollow	P	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 011	1.5	3.3	Minor	UNT to Wernwag Hollow	IT	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 012	1.6	7.7	Minor	UNT to Wernwag Hollow	IT	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 014	1.6	1.0	Minor	UNT to Wernwag Hollow	IT	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 017	1.8	3.6	Minor	UNT to Red Mill Brook	IT	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 019	2.2	3.3	Minor	UNT to Browns Mill Hollow Run	IT	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 020	2.2	2.6	Minor	UNT to Browns Mill Hollow Run	IT	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 026	3.0	3.9	Minor	UNT to Robbins Brook	IT	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 027	3.3	3.0	Minor	UNT to Robbins Brook	P	HQ-CWF	Yes[5] /NRT	N/A - Workspace	10/01 – 12/31
McKean	Robbins Brook	3.4	13.4	Intermediate	Robbins Brook	P	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Donley Fork	3.6	6.6	Minor	Donley Fork	P	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 160	4.2	2.5	Minor	UNT to Robbins Brook	IT	HQ-CWF	Yes[5] /NRT	N/A - Workspace	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
McKean	Stream 030-1	4.9	3.3	Minor	UNT to Robbins Brook	E	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Ditch 02*	6.5	3.0	Minor	UNT to Boyer Brook	E	HQ-CWF	Yes[5] /NRT	Open Cut	10/01 – 12/31
McKean	Stream 037	6.6	24.9	Intermediate	UNT to Boyer Brook	P	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Potato Creek	6.8	246.5	Major	Potato Creek	P	TSF	No[5]/ST	HDD	3/1 – 6/15
McKean	Ditch 03*	6.9	3.0	Minor	UNT to Potato Creek	E	TSF	No[5] /ST	Open Cut	3/1 – 6/15
McKean	Ditch 05	6.9	5.7	Minor	UNT to Potato Creek	IT	TSF	No[5] /ST	Open Cut	3/1 – 6/15
McKean	Stream 038	7.1	4.8	Minor	UNT to Potato Creek	P	CWF	No[5]/ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Stream 039	7.1	4.4	Minor	UNT to Potato Creek	IT	CWF	No[5]/ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Stream 158	7.2	N/A	Minor	UNT to Potato Creek	E	CWF	No[5]/ST	N/A – Workspace	10/01 – 12/31 3/1 – 6/15
McKean	Stream 159	7.2	4.5	Intermediate	UNT to Potato Creek	E	CWF	No[5]/ST	N/A – Workspace	10/01 – 12/31 3/1 – 6/15
McKean	Stream 040	7.9	3.0	Minor	UNT to White Hollow	E	CWF	Yes[5] /NRT	N/A – Workspace	10/01 – 12/31
McKean	Stream 041	7.9	3.6	Minor	UNT to White Hollow	P	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 043	8.0	16.1	Intermediate	White Hollow	P	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 054	10.4	3.7	Minor	Coalbed Hollow	P	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 121	11.2	N/A	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	N/A – Workspace	10/01 – 12/31
McKean	Stream 122	11.2	5.0	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	N/A – Workspace	10/01 – 12/31
McKean	Stream 055	11.2	8.1	Intermediate	Bemis Hollow	P	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 056	11.3	3.8	Minor	UNT to Bemis Hollow	P	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 057	11.3	3.0	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	N/A – Workspace	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
McKean	Ditch 08*	13.3	3.0	Minor	UNT to Allegheny Portage Creek	E	TSF	Yes[5] /NRT/ST	Dry Crossing if No Flow/Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Ditch 09	13.3	8.3	Minor	UNT to Allegheny Portage Creek	IT	TSF	Yes[5] /NRT/ST	Dry Crossing if No Flow/Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Ditch 10	13.4	23.4	Minor	UNT to Allegheny Portage Creek	IT	TSF	Yes[5] /NRT/ST	Dry Crossing if No Flow/Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Stream 066	13.6	4.1	Minor	UNT to Allegheny Portage Creek	E	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Ditch 11	13.7	6.5	Minor	UNT to Allegheny Portage Creek	IT	TSF	Yes[5] /NRT/ST	HDD	10/01 – 12/31 3/1 – 6/15
McKean	Ditch 12	13.7	3.0	Minor	UNT to Allegheny Portage Creek	IT	TSF	Yes[5] /NRT/ST	N/A - Workspace	10/01 – 12/31 3/1 – 6/15
McKean	Ditch 13	13.7	5.8	Minor	UNT to Allegheny Portage Creek	IT	TSF	Yes[5] /NRT/ST	Dry Crossing if No Flow/Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Allegheny Portage Creek	14.1	128.4	Major	Allegheny Portage Creek	P	TSF	Yes[5] /NRT/ST	HDD	10/01 – 12/31 3/1 – 6/15
McKean	Stream 067	14.1	10.0	Intermediate	UNT to Allegheny Portage Creek	IT	CWF	Yes[5] /NRT	HDD	10/01 – 12/31
McKean	Stream 068	14.2	7.6	Minor	UNT to Allegheny River	E	CWF	No[5] /ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Stream 070	14.3	6.6	Minor	UNT to Allegheny River	IT	CWF	No[5] /ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Stream 071	14.5	3.4	Minor	UNT to Allegheny River	E	CWF	No[5] /ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Stream 073	14.6	3.3	Minor	UNT to Allegheny River	E	CWF	No[5] /ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Stream 074	14.7	3.3	Minor	UNT to Allegheny River	E	CWF	No[5] /ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Stream 075	14.7	2.3	Minor	UNT to Allegheny River	IT	CWF	No[5] /ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Allegheny River	14.8	168.2	Major	Allegheny River	P	CWF	No[5] /ST	HDD	10/01 – 12/31 3/1 – 6/15

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
McKean	Ditch 16	14.9	31.6	Minor	UNT to Allegheny River	IT	CWF	No[5] /ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Ditch 17	14.9	11.2	Minor	UNT to Allegheny River	IT	CWF	No[5] /ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Stream 077	15.0	4.0	Intermediate	UNT to Benson Hollow	P	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 078	15.4	3.5	Minor	UNT to Allegheny River	IT	CWF	No[5] /ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
McKean	Coleman Creek-1	15.7	28.1	Intermediate	Coleman Creek	IT	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Ditch 18-2	17.5	3.3	Minor	UNT to Jordan Hollow	IT	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 086	18.0	3.0	Minor	UNT to Jordan Hollow	E	CWF	Yes[5] /NRT	N/A - Workspace	10/01 – 12/31
McKean/Potter	Stream 089	18.1	3.4	Minor	UNT to Jordan Hollow	IT	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean/Potter	Stream 090	18.1	N/A	Intermediate	Jordan Hollow	P	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Stream 090	18.1	13.7	Intermediate	Jordan Hollow	P	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean/Potter	Stream 091	18.1	3.4	Minor	UNT to Jordan Hollow	IT	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
McKean	Stream 195	SA-7	7.0	Minor	UNT to Potato Creek	E	CWF	Yes[5] /NRT	Existing Road, install temporary bridge	10/01 – 12/31
Potter	Stream 092	18.1	1.0	Minor	UNT to Jordan Hollow	IT	CWF	Yes[5] /NRT	N/A - Workspace	10/01 – 12/31
Potter	Stream 093	18.9	36.5	Intermediate	Ernst Hollow	P	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Stream 094	19.1	22.3	Intermediate	UNT to Sartwell Creek	IT	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Sartwell Creek	19.2	25.9	Intermediate	Sartwell Creek	P	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Stream 096	19.6	33.1	Intermediate	UNT to Sartwell Creek	P	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Stream 098	19.7	7.5	Minor	UNT to Sartwell Creek	E	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Stream 197	19.9	N/A	Minor	UNT to Sartwell Creek	E	CWF	Yes[5] /NRT	N/A - Workspace	10/01 – 12/31
Potter	Stream 099	21.8	9.2	Intermediate	Baker Hollow	P	CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
Potter	Stream 156	23.0	36.7	Intermediate	Fishing Creek	P	CWF	Yes[5] /NRT/ST	Dam and Pump/Flume	10/01 – 12/31 3/1 – 6/15
Potter	Stream 152	23.2	N/A	Minor	UNT to Fishing Creek	IT	CWF	Yes[5] /NRT/ST	N/A - Workspace	10/01 – 12/31 3/1 – 6/15
Potter	Stream 151	25.0	8.8	Minor	UNT to East Branch Fishing Creek	IT	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Stream 117	26.0	N/A	Minor	UNT to White Chopin Hollow	E	HQ-CWF	Yes[5] /NRT	N/A - Workspace	10/01 – 12/31
Potter	Stream 116	26.7	3.9	Minor	East Branch Fishing Creek	P	HQ-CWF	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Whitney Creek	27.4	3.3	Minor	Whitney Creek	E	EV	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Stream 102	27.8	3.8	Minor	UNT to Whitney Creek	E	EV	Yes[5] /NRT	Dam and Pump/Flume	10/01 – 12/31
Potter	Stream 103	28.7	4.0	Minor	UNT to Whitney Creek	E	EV	Yes[5] /NRT	N/A – Workspace	10/01 – 12/31
Line YM58 Access Roads										
McKean	Stream 021	PAR-3	N/A	Minor	UNT to Red Mill Brook	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 022	PAR-3	N/A	Minor	UNT to Red Mill Brook	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 023	PAR-3	N/A	Minor	UNT to Red Mill Brook	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 025	PAR-3	3.0	Minor	UNT to Red Mill Brook	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 024	PAR-3/TAR-4	3.0	Minor	UNT to Red Mill Brook	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 109	PAR-5	3.0	Minor	UNT to Irons Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 110	PAR-5	N/A	Minor	UNT to Irons Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 111	PAR-5	3.0	Minor	UNT to Irons Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 112	PAR-5	N/A	Minor	UNT to Donley Fork	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
McKean	Stream 113	PAR-5	N/A	Minor	Donley Fork	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 114	PAR-5	N/A	Minor	UNT to Donley Fork	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 030-2	TAR-6	N/A	Minor	UNT to Robbins Brook	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 032	TAR-6	N/A	Minor	UNT to Robbins Brook	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 033	TAR-6	N/A	Minor	UNT to Robbins Brook	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 034	TAR-6	N/A	Minor	UNT to Robbins Brook	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 035	TAR-6	N/A	Minor	UNT to Robbins Brook	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 036	TAR-6	N/A	Minor	UNT to Robbins Brook	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Ditch 01*	TAR-6	3.0	Minor	UNT to Potato Creek	E	TSF	No[5] /ST	Existing Road, No Improvements Proposed	3/1 – 6/15
McKean	Ditch 05-2	TAR-8	5.0	Minor	UNT to Potato Creek	IT	TSF	No[5] /ST	Existing Road, No Improvements Proposed	3/1 – 6/15
McKean	Stream 044	TAR-10	3.0	Minor	UNT to White Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 198	TAR-10	N/A	Minor	UNT to White Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Ditch 59	TAR-11	3.0	Minor	UNT to White Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 045	PAR-12	N/A	Minor	UNT to White Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 046	PAR-12	N/A	Minor	UNT to White Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 047	PAR-12	N/A	Minor	UNT to White Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 048	PAR-12	1.00	Minor	UNT to White Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 049	PAR-12	N/A	Minor	UNT to White Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
McKean	Stream 050	PAR-12	N/A	Minor	UNT to White Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Ditch 06	PAR-12	3.0	Minor	UNT to White Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 051	TAR-13	N/A	Minor	UNT to Larson Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 052	TAR-13	N/A	Minor	UNT to Larson Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 053	TAR-13	N/A	Minor	UNT to Larson Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 057	TAR-14	3.0	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 058	TAR-14	N/A	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 118	TAR-14	6.5	Minor	UNT to Bemis Hollow	P	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 061	TAR-14	N/A	Minor	UNT to Bemis Hollow	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 062	TAR-14	N/A	Minor	Bemis Hollow	P	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 064	TAR-14	3.0	Minor	UNT to Bemis Hollow	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Ditch 58	TAR-14	3.0	Minor	UNT to Bemis Hollow	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 321	TAR-14	N/A	Minor	Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 344	TAR-14	10.0	Intermediate	Bemis Hollow	P	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 345	TAR-14	8.0	Minor	UNT to Bemis Hollow	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 347	TAR-14	3.0	Minor	UNT to Bemis Hollow	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 348	TAR-14	2.0	Minor	Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 349	TAR-14	N/A	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
McKean	Stream 350	TAR-14	2.0	Minor	UNT to Bemis Hollow	IT	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 351	TAR-14	N/A	Intermediate	Bemis Hollow	P	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 352	TAR-14	2.0	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 353	TAR-14/ TAR-17	2.0	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 354	TAR-14	2.0	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 320	TAR-17	N/A	Minor	UNT to Bemis Hollow	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Ditch 11-2	PAR-21	N/A	Minor	UNT to Allegheny Portage Creek	IT	TSF	No[5] /ST	Existing Road, No Improvements Proposed	3/1 – 6/15
McKean	Ditch 15*	TAR-22	N/A	Minor	UNT to Allegheny Portage Creek	E	TSF	No[5] /ST	Existing Road, No Improvements Proposed	3/1 – 6/15
McKean	Stream 080	PAR-25	N/A	Minor	UNT to Benson Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 081	PAR-25	10.0	Minor	UNT to Benson Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Coleman Creek-2	PAR-25	N/A	Intermediate	Coleman Creek	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 082	PAR-25	N/A	Minor	UNT to Coleman Creek	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 083	PAR-25	N/A	Minor	UNT to Coleman Creek	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 084	PAR-25	N/A	Minor	UNT to Coleman Creek	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 085	PAR-25	N/A	Minor	UNT to Coleman Creek	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 196	PAR-25	N/A	Minor	UNT to Jordan Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 086	TAR-28	3.0	Minor	UNT to Jordan Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Ditch 18-1	TAR-28	3.0	Minor	UNT to Jordan Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
McKean	Stream 085c	TAR-26	N/A	Minor	UNT to Jordan Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 085b	TAR-26	N/A	Minor	UNT to Jordan Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Stream 085a	TAR-26	N/A	Minor	UNT to Jordan Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
McKean	Ditch 18-3	TAR-26	3.0	Minor	UNT to Jordan Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Stream 312	PAR-30	N/A	Minor	UNT to Baker Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 67*	PAR-30	2.0	Minor	UNT to Baker Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 68*	PAR-30	2.0	Minor	UNT to Baker Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 69*	PAR-30	2.0	Minor	UNT to Bear Creek	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 70*	PAR-30	2.0	Minor	UNT to Bear Creek	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 72*	PAR-30	2.0	Minor	UNT to Wiemer Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 73*	PAR-30	2.0	Minor	UNT to Wiemer Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 74*	PAR-30	2.0	Minor	UNT to Wiemer Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 76*	PAR-30	2.0	Minor	UNT to Baker Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 77*	PAR-30	2.0	Minor	UNT to Baker Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Stream 155	PAR-31	N/A	Intermediate	White Chopin Hollow	P	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Stream 153	PAR-31	N/A	Minor	UNT to White Chopin Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Stream 154	PAR-31	1.0	Minor	UNT to White Chopin Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 29*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
Potter	Ditch 30*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 31*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 32*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 33*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 34*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 35*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 36*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 37*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 38*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 39*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 40*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 41*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 42*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 43*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 44*	PAR-31	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 28*	TAR-32	1.5	Minor	UNT to East Branch Fishing Creek	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Stream 150	PAR-33	3.0	Minor	UNT to White Chopin Hollow	IT	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 20	PAR-33	2.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
Potter	Ditch 21*	PAR-33	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 22*	PAR-33	1.0	Minor	UNT to White Chopin Hollow	E	CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 23*	PAR-33	1.0	Minor	UNT to East Branch Fishing Creek	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 24*	PAR-33	1.0	Minor	UNT to East Branch Fishing Creek	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 25*	PAR-33	1.0	Minor	UNT to East Branch Fishing Creek	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 26*	PAR-33	1.0	Minor	UNT to East Branch Fishing Creek	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Potter	Ditch 27*	PAR-33	1.0	Minor	UNT to East Branch Fishing Creek	E	HQ-CWF	Yes[5] /NRT	Existing Road, No Improvements Proposed	10/01 – 12/31
Line YM224 Loop Access Roads										
Potter	Ditch 53*	PAR-36	3.0	Minor	UNT to South Branch Oswayo Creek	E	EV	Yes[5] /CA	Existing Road, No Improvements Proposed	10/1 – 4/1 10/01 – 12/31
Potter	Ditch 21a*	PAR-36	3.0	Minor	UNT to South Branch Oswayo Creek	E	EV	Yes[5] /CA	Existing Road, No Improvements Proposed	10/1 – 4/1 10/01 – 12/31
Line FM100 Abandonment										
Clearfield	Stream 179	0.0	3.0	Minor	Lamb Hollow	IT	CWF	Yes[5] /NRT	N/A - Workspace	10/01 – 12/31
Clearfield	Ditch 47	0.1	1.0	Minor	UNT to Lamb Hollow	E	CWF	Yes[5] /NRT	Abandon in place / Access Road	10/01 – 12/31
Clearfield	Stream 180	0.2	62.9	Intermediate	Bennett Branch Sinnemahoning Creek	P	CWF	Yes[5] /NRT	Abandon in place / Access Road / Workspace	10/01 – 12/31
Clearfield	Stream 181	0.4	2.0	Minor	UNT to Bennett Branch Sinnemahoning Creek	E	CWF	Yes[5] /NRT	Abandon in place, Grout / Access Road / Workspace	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
Clearfield	Stream 182	1.4	3.3	Minor	UNT to Bennett Branch Sinnemahoning Creek	IT	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Clearfield	Stream 183	1.6	3.3	Minor	UNT to Bennett Branch Sinnemahoning Creek	P	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Clearfield	Stream 184	1.7	3.3	Minor	UNT to Bennett Branch Sinnemahoning Creek	IT	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Clearfield	Stream 185	1.7	3.3	Minor	UNT to Bennett Branch Sinnemahoning Creek	E	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Clearfield	Stream 186	2.1	22.6	Intermediate	UNT to Bennett Branch Sinnemahoning Creek	P	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Clearfield	Stream 187	2.2	5.1	Minor	UNT to Bennett Branch Sinnemahoning Creek	P	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Clearfield	Stream 188	2.2	12.5	Minor	UNT to Bennett Branch Sinnemahoning Creek	E	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Clearfield	Stream 190	2.1	8.5	Minor	UNT to Bennett Branch Sinnemahoning Creek	E	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Clearfield	Stream 145	4.8	21.0	Intermediate	Laurel Run	IT	HQ-CWF	Yes[5] /NRT	Abandon in place, Foam	10/01 – 12/31
Clearfield	Stream 146	4.8	6.0	Minor	UNT to Laurel Run	IT	HQ-CWF	Yes[5] /NRT	Abandon in place, Foam	10/01 – 12/31
Clearfield	Stream 147	4.8	26.4	Intermediate	Saunders Run	P	HQ-CWF	Yes[5] /CA	Abandon in place, Foam	10/1 – 4/1 10/01 – 12/31
Clearfield	Stream 372	7.0	2.0	Minor	UNT to Little Medix Run	E	HQ-CWF	Yes[5] /CA	Abandon in place	10/1 – 4/1 10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
Elk	Stream 144	7.9	N/A	Minor	UNT to Medix Run	IT	HQ-CWF	Yes[5] /NRT/ST	Abandon in place	10/01 – 12/31 3/1 – 6/15
Elk	Stream 143	7.9	57.1	Intermediate	Medix Run	P	HQ-CWF	Yes[5] /NRT/ST	Abandon in place	10/01 – 12/31 3/1 – 6/15
Elk	Stream 142	9.6	3.4	Minor	Jack Dent Branch	P	HQ-CWF	Yes[5] /CA	Abandon in place	10/1 – 4/1 10/01 – 12/31
Elk	Ditch 60	11.1	3.8	Minor	UNT to Sullivan Run	E	HQ-CWF	Yes[5] /CA	Abandon in place, Grout	10/1 – 4/1 10/01 – 12/31
Elk	Stream 140	12.3	9.1	Intermediate	UNT to Mix Run	P	EV	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Elk	Stream 141	12.3	5.3	Minor	Mix Run	P	EV	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Elk	Stream 139	19.4	N/A	Minor	UNT to Miller Run	IT	HQ-CWF	Yes[5] /CA	Abandon in place	10/1 – 4/1 10/01 – 12/31
Elk	Stream 138	19.5	5.5	Minor	UNT to Miller Run	IT	HQ-CWF	Yes[5] /CA	Abandon in place	10/1 – 4/1 10/01 – 12/31
Elk	Stream 137	19.6	2.0	Minor	UNT to Miller Run	E	HQ-CWF	Yes[5] /CA	Abandon in place	10/1 – 4/1 10/01 – 12/31
Cameron	Stream 134	19.7	N/A	Minor	UNT to Miller Run	IT	HQ-CWF	Yes[5] /CA	Abandon in place	10/1 – 4/1 10/01 – 12/31
Cameron	Stream 136	19.7	5.6	Minor	UNT to Miller Run	P	HQ-CWF	Yes[5] /CA	Abandon in place	10/1 – 4/1 10/01 – 12/31
Cameron	Stream 175	22.2	48.7	Intermediate	Mix Run	P	HQ-CWF	Yes[5] /NRT/ST	Abandon in place	10/01 – 12/31 3/1 – 6/15
Cameron	Stream 176	22.2	23.9	Intermediate	UNT to Mix Run	P	HQ-CWF	Yes[5] /NRT/ST	Abandon in place	10/01 – 12/31 3/1 – 6/15
Cameron	Stream 177	22.2	27.4	Intermediate	UNT to Mix Run	P	HQ-CWF	Yes[5] /NRT/ST	Abandon in place	10/01 – 12/31 3/1 – 6/15
Cameron	Stream 371	22.4	2.0	Minor	UNT to Mix Run	E	HQ-CWF	Yes[5] /NRT/MF	Existing Road, No Improvements Proposed	10/01 – 12/31
Cameron	Stream 174	23.2	186.3	Major	Bennett Branch Sinnemahoning Creek	P	WWF	No[5] /WWF	Abandon in place	12/1 – 5/31
Cameron	Stream 173	23.9	20.2	Intermediate	Little Dent Run	P	HQ-CWF	Yes[5] /CA	Abandon in place	10/1 – 4/1 10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
Cameron	Stream 172	24.9	N/A	Minor	UNT to Boyer Run	E	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Cameron	Stream 170	25.0	N/A	Minor	UNT to Boyer Run	E	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Cameron	Stream 171	25.0	15.9	Intermediate	Boyer Run	P	CWF	Yes[5] /NRT	Abandon in place	10/01 – 12/31
Cameron	Stream 132	25.7	12.5	Intermediate	UNT to Driftwood Branch Sinnemahoning Creek	P	EV	No[5] /ST/MF	Abandon in place	3/1 – 6/15
Cameron	Ditch 80	26.0	1.0	Minor	UNT to Driftwood Branch Sinnemahoning Creek	E	EV	No[5] /ST/MF	Existing Road, No Improvements Proposed	3/1 – 6/15
Cameron	Stream 365	26.0	178.0	Major	Driftwood Branch Sinnemahoning Creek	P	EV	No[5] /ST/MF	Existing Road, No Improvements Proposed	3/1 – 6/15
Cameron	Stream 366	26.0	6.0	Minor	UNT to Driftwood Branch Sinnemahoning Creek	E	EV	No[5] /ST/MF	Existing Road, No Improvements Proposed	3/1 – 6/15
Cameron	Stream 363	26.2	4.0	Minor	Driftwood Branch Sinnemahoning Creek	IT	EV	No[5] /ST/MF	Abandon in place	3/1 – 6/15
Cameron	Stream 169	26.8	279.7	Major	Driftwood Branch Sinnemahoning Creek	P	EV	No[5] /ST/MF	Abandon in place, Foam	3/1 – 6/15
Cameron	Stream 370	27.0	2.0	Minor	UNT to Driftwood Branch Sinnemahoning Creek	E	EV	No[5] /ST/MF	N/A - Workspace	3/1 – 6/15
Cameron	Stream 367	27.1	2.0	Minor	UNT to Johnson Run	IT	EV	Yes[5] /NRT/MF	Existing Road, No Improvements Proposed	10/01 – 12/31
Cameron	Stream 369	27.1	3.1	Minor	UNT to Johnson Run	E	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Cameron	Stream 166	27.4	3.3	Minor	UNT to Johnson Run	E	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Cameron	Stream 167	27.4	46.6	Intermediate	Johnson Run	P	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Cameron	Stream 168	27.4	2.0	Minor	UNT to Johnson Run	E	EV	Yes[5] /NRT/MF	N/A - Workspace	10/01 – 12/31

County	Waterbody Project ID	MP	Crossing Length[1] (ft.)	FERC Waterbody Classification	Waterbody Name	Flow Regime[2]	Chapter 93 Existing or Designated Use[3]	Wild Trout[4,5]	Crossing Method[6]	In-Stream Work Restrictions[7]
Cameron	Stream 368	27.4	8.0	Minor	UNT to Johnson Run	IT	EV	Yes[5] /NRT/MF	Existing Road, No Improvements Proposed	10/01 – 12/31
Cameron	Stream 362	29.4	3.4	Minor	UNT to Grove Run	E	HQ-CWF	Yes[5] /CA	Abandon in place	10/1 – 4/1 10/01 – 12/31
Cameron	Stream 361	30.4	N/A	Minor	UNT to Lick Island Run	E	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Cameron	Stream 360	30.8	3.0	Minor	UNT to Lick Island Run	E	EV	Yes[5] /NRT/MF	Dam and Pump/Flume	10/01 – 12/31
Cameron	Stream 130	38.1	1.6	Minor	UNT to Berge Run	E	EV	Yes[5] /CA/MF	Abandon in place	10/1 – 4/1 10/01 – 12/31
Cameron	Stream 131	38.1	4.0	Minor	UNT to Berge Run	P	EV	Yes[5] /CA/MF	Abandon in place	10/1 – 4/1 10/01 – 12/31
Cameron	Stream 127	38.6	4.1	Minor	Colbert Hollow	IT	EV	Yes[5] /CA/MF	Abandon in place	10/1 – 4/1 10/01 – 12/31
Potter	Stream 128	38.7	4.2	Minor	UNT to Colbert Hollow	IT	EV	Yes[5] /CA/MF	Abandon in place	10/1 – 4/1 10/01 – 12/31
Potter	Stream 129	38.7	3.9	Minor	UNT to Colbert Hollow	IT	EV	Yes[5] /CA/MF	Abandon in place	10/1 – 4/1 10/01 – 12/31
Potter	Stream 126	39.7	4.0	Minor	UNT to Little Bailey Run	P	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 125	40.1	8.0	Minor	Little Bailey Run	P	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 133	40.1	4.5	Minor	UNT to Little Bailey Run	P	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 165	40.7	1.7	Minor	Brainard Hollow	E	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 199	41.1	50.2	Intermediate	Bailey Run	P	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 163	41.2	4.7	Minor	UNT to Bailey Run	E	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 164	41.2	38.7	Intermediate	Bailey Run	P	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 357	41.8	2.4	Minor	UNT to Bailey Run	E	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 358	41.9	3.0	Minor	UNT to Bailey Run	E	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 161	42.5	23.8	Intermediate	West Darian Run	P	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31
Potter	Stream 162	42.5	2.1	Minor	UNT to West Darian Run	IT	EV	Yes[5] /NRT/MF	Abandon in place	10/01 – 12/31

Notes:

[1] Crossing length is recorded as either the length of pipeline or access road centerline crossing the stream from bank-to-bank; or the length of workspace crossing the stream if the pipeline or access road centerline does not cross the waterbody. Additionally, crossing lengths listed as N/A indicate that the pipeline, access road, or workspace does not cross the waterbody; however, the project crosses the associated floodway of this waterbody as indicated on the ARIT.

[2] Flow regime based on onsite field review. IT – Intermittent; E – Ephemeral; and P – Perennial. As classified by PA Code Title 25 Chapter 93.

[3] As classified by PA Code Title 25 Chapter 93.9 Existing or Designated Use shapefiles. WWF – Warm Water Fishes; CWF – Cold Water Fishes; MF – Migratory Fishes; TSF – Trout Stocked Fishery; HQ-CWF – High Quality Cold Water Fishery; and EV – Exceptional Value Fishery.

[4] As classified by PA Code Title 25 Chapter 93 Existing Use and Existing Use Migratory Fish shapefiles and the PA Fish and Boat Commission Trout Waters shapefiles. CA – Class A Trout Fishery, WWF – Warm Water Fishes; MF – Migratory Fishes; ST – Stocked Trout Fishery; and NRT – Naturally Reproducing Trout Water.

[5] Regional listings of Approved Trout Waters are provided by the PFBC website: http://pfbc.pa.gov/fishpubs/summaryad/troutwaters.html. Accessed May 2018. Waterbodies within 0.5-mile of a confluence with an Approved Trout Water and within the upper and lower section(s) are also considered Approved Trout Waters.

[6] If it is determined in the field during construction that either dam or pump or flume pipe methods are not possible; a wet trench method may be utilized. Open-cut methods will be evaluated at the time of construction to be used for streams if no flow is present.

[7] As classified under PA Code Title 58, Chapters 57.4 and 57.11 as a Class A Wild Trout Water, Wild Trout Water, or Wilderness Trout Water. In-stream work restrictions for Wild Trout Waters are in effect between October 1 and December 31. All streams classified as Wilderness Trout Waters qualify as EV resources; consultation with PFBC is required to obtain information regarding in-stream construction restriction periods.

* Ditches identified in the table with an asterisk have been determined by PADEP as ditches that do not contribute perennial or intermittent surface water flows to other jurisdictional Waters of the Commonwealth, as such, these ditches are not a regulated Waters of the Commonwealth and are not included on the ARIT Table. These non-jurisdictional ditches are included in the table for FERC reporting purposes, as such, if surface water flows are present at the time of construction crossing, these ditches will be considered Minor Waterbodies and crossed in accordance with the FERC Wetland and Waterbody Procedures.

Table 2.2-1B (Rev3): Wetlands Located within Project Work Areas

Wetland Name[1]	County	MP Begin	MP End	Wetland Type Classification[2]	EV Status[5]	Wetland Construction Impact Dimensions (ft.)	Total Wetland Impacts (acres)[3]	Permanent Wetland Impacts (acres)[4]
Line KL Extension Work Areas								
Wetland 004b*	McKean	0.2	0.2	PEM	EV	237.50 – 123.99 1.00 – 188.45	0.584*	0.004
Marvindale Compressor Station Access Roads								
Wetland 004	McKean	0.1	0.1	PFO	EV	0.59 - 8.07	<0.001	--
Wetland 285b	McKean	0.3	0.3	PEM	Other	2.21 - 23.62	0.001	--
Line YM58 Work Areas								
Wetland 004b*	McKean	0.2	0.2	PEM	EV	1.67 – 223.21	--*	0.009
Wetland 005	McKean	0.5	0.6	PEM	Other	291.52 - 85.02	0.381	0.011
Wetland 006	McKean	0.7	0.8	PEM	EV	99.12 – 72.51	0.169	0.004
Wetland 007	McKean	0.9	1.0	PEM	EV	6,161.17 - 57.97	0.822	0.023
Wetland 007a	McKean	0.9	1.0	PFO	EV	433.91 - 17.68	0.176	--
Wetland 007b	McKean	1.1	1.1	PFO	EV	56.26 - 15.15	0.020	--
Wetland 008	McKean	1.1	1.1	PEM	EV	65.23 - 68.11	0.104	0.003
Wetland 009	McKean	1.2	1.3	PEM	EV	799.23 – 57.55	1.087	0.031
Wetland 009a	McKean	1.2	1.2	PFO	EV	187.00 - 26.94	0.116	--
Pond 03	McKean	1.2	1.2	PUB	EV	37.52 - 23.74	0.020	--
Wetland 009b	McKean	1.3	1.3	PFO	EV	99.81 - 21.86	0.050	--
Wetland 010	McKean	1.4	1.5	PEM	EV	826.46 – 62.51	1.217	0.032
Wetland 010a	McKean	1.4	1.5	PFO	EV	408.50 - 18.76	0.176	--
Wetland 010b	McKean	1.5	1.5	PFO	EV	164.66 - 11.09	0.042	--
Wetland 011	McKean	1.6	1.6	PEM	EV	60.00 - 22.51	0.031	0.001
Wetland 145	McKean	1.6	1.6	PEM	EV	161.49 - 12.00	0.025	--
Wetland 012b	McKean	1.6	1.6	PEM	EV	41.65 - 12.00	0.012	--
Wetland 014	McKean	1.8	1.8	PEM	EV	33.25 - 23.57	0.018	--

Wetland Name[1]	County	MP Begin	MP End	Wetland Type Classification[2]	EV Status[5]	Wetland Construction Impact Dimensions (ft.)	Total Wetland Impacts (acres)[3]	Permanent Wetland Impacts (acres)[4]
Wetland 015	McKean	1.8	1.8	PEM	EV	20.39 - 11.05	0.006	--
Wetland 016	McKean	2.2	2.2	PFO	EV	31.45 - 13.46	0.010	--
Wetland 016a	McKean	2.2	2.2	PEM	EV	103.77 – 71.78	0.175	0.004
Wetland 016b	McKean	2.2	2.2	PEM	EV	192.47 – 50.47	0.231	0.007
Pond 06	McKean	2.8	2.8	PUB	Other	88.57 - 44.16	0.090	--
Wetland 018	McKean	3.0	3.0	PEM	EV	21.66 - 17.35	0.009	--
Wetland 020	McKean	3.3	3.4	PEM	EV	388.67 - 53.01	0.488	0.015
Wetland 020a	McKean	3.3	3.3	PFO	EV	107.42 - 92.05	0.227	0.021
Wetland 023	McKean	3.4	3.6	PEM	EV	727.41 - 47.79	0.815	0.028
Wetland 025	McKean	3.6	3.6	PEM	EV	81.17 – 57.96	0.111	0.003
Wetland 026	McKean	3.6	3.7	PSS	EV	215.83 - 67.55	0.335	0.050
Wetland 026a	McKean	3.6	3.7	PEM	EV	254.40 - 36.13	0.222	0.010
Wetland 027	McKean	3.7	3.7	PEM	EV	139.53 – 60.25	0.198	0.005
Wetland 028	McKean	4.1	4.1	PEM	Other	258.95 - 52.15	0.321	0.010
Wetland 029	McKean	4.3	4.3	PEM	EV	123.51 – 56.43	0.165	0.005
Wetland 031	McKean	4.9	5.0	PFO	EV	234.81 - 27.31	0.147	--
Wetland 031a	McKean	4.9	5.0	PEM	EV	182.80 – 41.94	0.183	0.007
Wetland 034	McKean	6.6	6.6	PSS	EV	72.56 - 24.08	0.040	--
Wetland 035-1	McKean	6.6	6.6	PSS	EV	80.00 - 15.50	0.027	--
Wetland 037b	McKean	6.8	6.8	PEM	EV	35.68 - 17.57	0.014	--
Wetland 037c	McKean	6.8	6.8	PSS	EV	104.83 - 65.99	0.159	0.015
Wetland 039	McKean	6.7	6.7	PEM	EV	87.69 - 52.05	0.105	--
Wetland 041	McKean	6.8	6.8	PEM	EV	8.85 - 6.02	0.001	--
Wetland 042	McKean	6.9	6.9	PEM	EV	27.75 - 13.27	0.008	--
Wetland 045	McKean	7.2	7.2	PEM	EV	107.08 - 20.63	0.050	--
Wetland 049	McKean	7.7	7.7	PEM	EV	21.13 - 2.00	0.001	--

Wetland Name[1]	County	MP Begin	MP End	Wetland Type Classification[2]	EV Status[5]	Wetland Construction Impact Dimensions (ft.)	Total Wetland Impacts (acres)[3]	Permanent Wetland Impacts (acres)[4]
Wetland 051	McKean	7.8	7.8	PEM	EV	247.36 - 50.01	0.293	0.009
Wetland 054	McKean	7.9	7.9	PEM	EV	55.12 - 36.35	0.047	0.001
Wetland 055	McKean	8.0	8.0	PEM	EV	170.07 - 37.65	0.148	0.001
Wetland 056	McKean	7.62	7.62	PEM	EV	9.79 - 3.00	0.001	--
Wetland 059a	McKean	9.3	9.3	PEM	EV	92.76 - 56.82	0.106	0.002
Wetland 061	McKean	9.7	9.7	PEM	Other	337.04 – 71.34	0.509	0.013
Wetland 066a	McKean	9.9	10.0	PEM	Other	404.04 - 47.86	0.453	0.015
Wetland 127	McKean	9.9	10.0	PFO	Other	265.54 - 23.47	0.143	--
Wetland 067	McKean	10.4	10.4	PEM	EV	59.45 - 15.89	0.022	--
Wetland 126c	McKean	11.2	11.2	PEM	EV	78.65 - 18.37	0.001	--
Wetland 126	McKean	11.2	11.2	PEM	EV	1.00 – 5.94	<0.001	--
Wetland 070	McKean	11.2	11.2	PEM	EV	33.07 - 25.06	0.019	--
Wetland 071	McKean	11.2	11.2	PEM	EV	28.51 - 28.68	0.018	--
Wetland 075	McKean	13.9	13.9	PEM	EV	25.88 - 13.50	0.008	--
Wetland 076	McKean	14.0	14.0	PEM	EV	118.18 - 10.47	0.028	<0.001
Wetland 077	McKean	14.0	14.0	PEM	EV	74.80 - 32.03	0.056	0.001
Wetland 078	McKean	14.1	14.1	PEM	EV	39.59 - 13.21	0.012	--
Wetland 080	McKean	14.1	14.1	PEM	EV	150.48 - 16.53	0.058	0.001
Pond 07	McKean	14.1	14.1	PUB	EV	25.77 - 16.20	0.010	--
Wetland 082	McKean	14.1	14.1	PEM	EV	2.56 - 7.00	<0.001	--
Wetland 083	McKean	14.3	14.3	PEM	EV	82.40 - 74.79	0.131	0.003
Wetland 086	McKean	14.5	14.5	PEM	EV	108.61 - 26.26	0.066	--
Wetland 088	McKean	14.5	14.6	PEM	EV	287.84 - 50.00	0.331	--
Wetland 091	McKean	15.1	15.2	PSS	EV	615.12 - 56.72	0.801	0.141
Wetland 091a	McKean	15.2	15.2	PEM	EV	233.71 - 71.20	0.385	0.003
Wetland 094	McKean	15.3	15.4	PEM	EV	123.50 - 15.31	0.043	--

Wetland Name[1]	County	MP Begin	MP End	Wetland Type Classification[2]	EV Status[5]	Wetland Construction Impact Dimensions (ft.)	Total Wetland Impacts (acres)[3]	Permanent Wetland Impacts (acres)[4]
Wetland 096	McKean	18.0	18.0	PEM	EV	22.50 – 8.46	0.004	--
Wetland 101	Potter	19.0	19.0	PEM	EV	61.96 - 68.19	0.099	0.002
Wetland 143	Potter	19.2	19.2	PEM	EV	52.75 -44.59	0.056	0.002
Wetland 142	Potter	23.0	23.1	PSS	EV	142.08-95.04	0.241	0.033
Wetland 141a	Potter	23.2	23.2	PEM	EV	195.52 -62.83	0.289	0.007
Wetland 141	Potter	23.2	23.3	PSS	EV	129.43 -32.31	0.095	0.007
Wetland 125	Potter	26.6	26.6	PEM	EV	66.24 -78.91	0.121	0.003
Wetland 124a	Potter	26.7	26.7	PEM	EV	94.43 -17.99	0.040	0.001
Wetland 124b	Potter	26.7	26.7	PEM	EV	47.13 -28.65	0.032	0.001
Line YM58 Access Roads								
Wetland 118	McKean	4.5	4.5	PEM	EV	83.64 – 1.26	0.002	--
Wetland 119a	McKean	4.5	4.5	PEM	Other	415.00 – 3.43	0.033	--
Wetland 120	McKean	4.5	4.5	PEM	Other	73.54 – 2.63	0.004	--
Wetland 121a	McKean	4.5	4.5	PEM	EV	23.41 - 4.85	0.003	--
Wetland 122	McKean	4.5	4.5	PEM	Other	265.39 – 3.47	0.021	--
Wetland 123a	McKean	4.5	4.5	PEM	Other	167.83 – 6.57	0.025	--
Wetland 035-2	McKean	6.5	6.6	PSS	EV	25.70 – 2.60	0.001	--
Wetland 035a	McKean	6.6	6.6	PEM	EV	43.44 – 0.98	0.001	--
Wetland 058	McKean	8.8	8.8	PEM	EV	173.10 – 2.78	0.011	--
Wetland 058a	McKean	8.8	8.8	PEM	EV	21.83 – 1.65	0.001	--
Wetland 060a	McKean	9.6	9.6	PEM	EV	165.45 – 1.59	0.006	--
Wetland 060	McKean	9.6	9.6	PEM	EV	66.83 – 0.97	0.001	--
Wetland 061b	McKean	9.8	9.8	PEM	Other	88.57 - 3.63	0.007	--
Wetland 062	McKean	10.0	10.0	PEM	EV	116.88 – 4.32	0.012	--
Wetland 063	McKean	10.0	10.0	PEM	EV	23.40 – 0.26	<0.001	--
Wetland 065	McKean	10.1	10.1	PEM	EV	4.39 – 90.59	0.009	--

Wetland Name[1]	County	MP Begin	MP End	Wetland Type Classification[2]	EV Status[5]	Wetland Construction Impact Dimensions (ft.)	Total Wetland Impacts (acres)[3]	Permanent Wetland Impacts (acres)[4]
Wetland 140	McKean	11.5	11.5	PEM	EV	18.44 – 2.49	0.001	--
Wetland 265	McKean	11.8	11.8	PFO	EV	1.66 - 101.53	0.004	--
Wetland 276	McKean	11.8	11.8	PSS	EV	3.23 - 7.36	0.001	--
Wetland 276a	McKean	12.1	12.1	PEM	EV	1.14 - 30.91	0.001	--
Wetland 264	McKean	12.6	12.6	PEM	EV	27.22 - 12.00	0.007	--
Wetland 089	McKean	14.4	14.4	PEM	EV	17.80 – 1.39	0.001	--
Wetland 258a	Potter	21.5	21.5	PEM	Other	38.00 -2.28	0.002	--
Wetland 261	Potter	21.5	21.5	PEM	Other	25.00 – 3.50	0.002	--
Line YM224 Loop Work Areas								
Wetland 112	Potter	1.1	1.1	PEM	EV	142.31 -12.00	0.039	<0.001
Wetland 114	Potter	1.1	1.1	PEM	EV	166.17 -12.00	0.046	--
Line FM100 Abandonment								
Wetland 149	Clearfield	0.0	0.1	PSS	EV	49.00 – 42.00	0.055	0.008
Wetland 149b	Clearfield	0.1	0.1	PEM	EV	34.00 – 0.30	<0.001	--
Wetland 149c	Clearfield	0.3	0.3	PEM	EV	49.00 – 93.00	0.106	0.002
Wetland 149d	Clearfield	0.3	0.3	PSS	EV	49.00 – 22.00	0.025	<0.001
Wetland 139a	Clearfield	4.7	4.7	PEM	EV	34.63 – 1.00	0.001	0.001
Wetland 139b	Clearfield	4.8	4.8	PEM	EV	200.50 – 1.00	0.005	0.005
Wetland 139	Clearfield	4.8	4.8	PEM	EV	50.00 – 17.00	0.020	--
Wetland 316a	Clearfield	6.3	6.3	PEM	Other	3.64 – 1.00	<0.001	<0.001
Wetland 318	Clearfield	6.6	6.7	PEM	Other	34.34 – 1.00	0.001	0.001
Wetland 320	Elk	7.4	7.4	PEM	Other	154.76 – 1.00	0.004	0.004
Wetland 137	Elk	7.9	7.9	PEM	EV	3.00 – 2.75	<0.001	--
Wetland 138	Elk	8.0	8.0	PEM	EV	49.00 – 13.00	0.015	<0.001
Wetland 136	Elk	9.6	9.6	PEM	EV	113.87 – 1.00	0.003	0.003
Wetland 136a	Elk	9.7	9.7	PEM	EV	71.95 – 1.00	0.002	0.002

Wetland Name[1]	County	MP Begin	MP End	Wetland Type Classification[2]	EV Status[5]	Wetland Construction Impact Dimensions (ft.)	Total Wetland Impacts (acres)[3]	Permanent Wetland Impacts (acres)[4]
Wetland 136b	Elk	9.8	9.8	PEM	Other	77.52 – 1.00	0.002	0.002
Wetland 135	Elk	11.0	11.1	PEM	Other	36.00 – 28.00	0.040	0.016
Wetland 311	Elk	11.2	11.3	PEM	Other	31.00 – 24.00	0.030	0.013
Wetland 313	Elk	11.5	11.5	PEM	EV	128.03 – 1.00	0.003	0.003
Wetland 134a	Elk	11.6	12.0	PEM	EV	54.00 -48.00	0.111	0.052
Wetland 134	Elk	12.0	12.1	PEM	EV	434.82 – 1.00	0.010	0.010
Wetland 133	Elk	12.3	12.3	PEM	EV	57.67 – 1.00	0.001	0.001
Wetland 325	Elk	13.2	13.2	PEM	Other	168.65 – 1.00	0.004	0.004
Wetland 327	Elk	13.7	13.7	PEM	Other	351.27 – 1.00	0.008	0.008
Wetland 329a	Elk	14.9	14.9	PEM	Other	19.78 – 1.00	<0.001	<0.001
Wetland 331	Elk	18.4	18.4	PEM	Other	194.66 – 1.00	0.004	0.004
Wetland 333	Elk	19.1	19.1	PEM	Other	44.44 – 1.00	0.001	0.001
Wetland 148	Cameron	22.1	22.1	PSS	EV	91.03 – 1.00	0.002	0.002
Wetland 303	Cameron	26.0	26.0	PSS	EV	200.00 -15.00	0.065	--
Wetland 303b	Cameron	26.0	26.0	PSS	EV	12.00 -15.00	0.005	--
Wetland 147a	Cameron	26.7	26.7	PEM	EV	102.97 – 1.00	0.002	0.002
Wetland 147	Cameron	26.8	26.8	PEM	EV	5.21 – 1.00	<0.001	<0.001
Wetland 305a	Cameron	26.9	26.9	PEM	EV	13.00 – 1.00	<0.001	--
Wetland 305	Cameron	27.0	27.0	PEM	EV	158.00 – 20.00	0.076	0.001
Wetland 297a	Cameron	28.9	28.9	PEM	Other	28.16 -1.00	0.001	0.001
Wetland 297	Cameron	28.9	29.1	PEM	Other	927.77 -1.00	0.021	0.021
Wetland 297b	Cameron	29.1	29.1	PEM	Other	47.73 -1.00	0.001	0.001
Wetland 299	Cameron	29.3	29.3	PEM	Other	144.79 – 1.00	0.003	0.003
Wetland 299a	Cameron	29.6	29.6	PEM	Other	226.11 – 1.00	0.005	0.005
Wetland 294	Cameron	30.4	30.4	PEM	EV	10.97 -1.00	<0.001	<0.001
Wetland 292	Cameron	30.8	30.8	PEM	EV	106.00 – 17.00	0.043	--

Wetland Name[1]	County	MP Begin	MP End	Wetland Type Classification[2]	EV Status[5]	Wetland Construction Impact Dimensions (ft.)	Total Wetland Impacts (acres)[3]	Permanent Wetland Impacts (acres)[4]
Wetland 131	Cameron	38.6	38.6	PEM	EV	34.07 – 1.00	0.001	0.001
Wetland 131	Potter	38.6	38.6	PEM	EV	299.52 – 1.00	0.007	0.007
Wetland 131a	Potter	38.7	38.7	PEM	EV	1.00 – 3.11	<0.001	<0.001
Wetland 130b	Potter	39.3	39.3	PEM	Other	1.00 – 22.48	0.001	0.001
Wetland 130	Potter	39.7	39.7	PEM	EV	1.00 – 27.20	0.001	0.001
Wetland 130a	Potter	39.7	39.7	PEM	EV	1.00 – 65.49	0.002	0.002
Wetland 129a	Potter	40.1	40.1	PEM	EV	1.00 – 77.57	0.002	0.002
Wetland 154	Potter	40.7	40.7	PEM	EV	1.00 – 29.81	0.001	0.001
Wetland 146	Potter	41.2	41.2	PEM	EV	1.00 – 3.91	<0.001	<0.001
Wetland 287	Potter	41.7	41.8	PEM	EV	1.00 – 347.82	0.008	0.008
Wetland 288a	Potter	41.8	41.8	PEM	EV	1.00 – 33.24	0.001	0.001
Wetland 288	Potter	41.8	41.9	PEM	EV	1.00 – 209.82	0.005	0.005
Wetland 290	Potter	42.5	42.5	PEM	EV	1.00 – 19.92	<0.001	<0.001
						PEM Subtotal[6]	**11.713**	**0.465**
						PSS Subtotal[6]	**1.852**	**0.257**
						PFO Subtotal[6]	**1.111**	**0.021**
						PUB Subtotal[6]	**0.120**	**0.000**
						Project Total[6]	**14.796**	**0.743**

[1] Field designations represent unique identifiers assigned to each wetland during field surveys.

[2] Wetland classifications are based on the Cowardin classification system whereby P = Palustrine, EM = Emergent, FO = Forested, SS = Scrub-Shrub, and UB = Unconsolidated Bottom.

[3] Total wetland impacts include all temporary and permanent impacts to wetlands.

[4] Permanent wetland impacts account for PFO and PSS wetlands that will be converted into PEM wetlands within a 10-foot-wide permanently maintained ROW. Permanent wetland impact acres reported also include the length and width of the pipeline within a wetland crossing.

[5] Exceptional Value (EV) wetlands include wetland areas that exhibit one or more of the following characteristics: (i) Wetlands which serve as habitat for fauna or flora listed as ‘‘threatened’’ or ‘‘endangered’’ under the Endangered Species Act of 1973 (7 U.S.C.A. § 136; 16 U.S.C.A. § § 4601-9, 460k-1, 668dd, 715i, 715a, 1362, 1371, 1372, 1402 and 1531—1543), the Wild Resource Conservation Act (32 P. S. § § 5301—5314), 30 Pa.C.S. (relating to the Fish and Boat Code) or 34 Pa.C.S. (relating to the Game and Wildlife Code).; (ii) Wetlands that are hydrologically connected to or located within 1/2-mile of wetlands identified under subparagraph (i) and that maintain the habitat of the threatened or endangered species within the wetland identified under subparagraph (i); (iii) Wetlands that are located in or along the floodplain of the reach of a wild trout stream or waters listed as exceptional value under Chapter 93 (relating to water quality standards) and the floodplain of streams tributary thereto, or wetlands within the corridor of a watercourse or body of water that has been designated as a National wild or scenic river in accordance with the Wild and Scenic Rivers Act of 1968 (16 U.S.C.A. § § 1271—1287) or designated as wild or

scenic under the Pennsylvania Scenic Rivers Act (32 P. S. § § 820.21—820.29); (iv) Wetlands located along an existing public or private drinking water supply, including both surface water and groundwater sources, that maintain the quality or quantity of the drinking water supply; or, (v) Wetlands located in areas designated by the Department as ''natural'' or ''wild'' areas within State forest or park lands, wetlands located in areas designated as Federal wilderness areas under the Wilderness Act (16 U.S.C.A. § § 1131—1136) or the Federal Eastern Wilderness Act of 1975 (16 U.S.C.A. § 1132) or wetlands located in areas designated as National natural landmarks by the Secretary of the Interior under the Historic Sites Act of 1935 (16 U.S.C.A. § § 461—467).

[6] Differences between the sum of the individual records and the subtotals and total acres reported are due to rounding to the nearest one-thousandth of an acre. The subtotals and total acres reported were derived from GIS analysis.

* Wetland 004b is crossed by both YM58 and KL Extension pipelines. The permanent impacts for each pipeline crossing are recorded individually for each pipeline with the total construction impacts to this wetland recorded under the Line KL Extension.

Table 2.2-1C (Rev 3): Floodways Crossed by the Project

County	MP/ Access Road Name	Latitude	Longitude	Waterbody Project ID	Waterbody Name	Chapter 93 Existing or Designated Use
Marvindale Compressor Station Access Roads						
McKean	PAR-1	41.70416085	-78.49996793	Stream 001	UNT to Warner Brook	HQ-CWF
McKean	PAR-1	41.70377389	-78.49992336	Stream 003	UNT to Warner Brook	HQ-CWF
McKean	PAR-1	41.70435834	-78.50000496	Stream 005	UNT to Warner Brook	HQ-CWF
Line YM58 Work Areas						
McKean	0.9	41.70952384	-78.4841501	Stream 006	UNT to Wernwag Hollow	HQ-CWF
McKean	1.2	41.71148123	-78.47999842	Stream 007	UNT to Wernwag Hollow	HQ-CWF
McKean	1.4	41.71328078	-78.47698812	Stream 008	Wernwag Hollow	HQ-CWF
McKean	1.5	41.71436376	-78.47474427	Stream 011	UNT to Wernwag Hollow	HQ-CWF
McKean	1.6	41.71464539	-78.47414846	Stream 012	UNT to Wernwag Hollow	HQ-CWF
McKean	1.6	41.71479147	-78.47411364	Stream 014	UNT to Wernwag Hollow	HQ-CWF
McKean	1.8	41.71685195	-78.47032115	Stream 017	UNT to Red Mill Brook	CWF
McKean	2.2	41.71984324	-78.46531115	Stream 019	UNT to Browns Mill Hollow Run	CWF
McKean	2.2	41.7200442	-78.46492246	Stream 020	UNT to Browns Mill Hollow Run	CWF
McKean	3.0	41.72633739	-78.45228861	Stream 026	UNT to Robbins Brook	HQ-CWF
McKean	3.3	41.72975562	-78.44757736	Stream 027	UNT to Robbins Brook	HQ-CWF
McKean	3.4	41.73038108	-78.44719633	Robbins Brook	Robbins Brook	HQ-CWF
McKean	3.6	41.73307059	-78.44369357	Donley Fork	Donley Fork	HQ-CWF
McKean	4.6	41.74251833	-78.43158935	Stream 160	UNT to Robbins Brook	HQ-CWF
McKean	4.9	41.74315861	-78.42554339	Stream 030 -1	UNT to Robbins Brook	HQ-CWF
McKean	6.6	41.75293467	-78.39749265	Stream 037	UNT to Boyer Brook	HQ-CWF
McKean	6.7	41.7544034	-78.39399173	Potato Creek	Potato Creek	TSF
McKean	7.1	41.7544615	-78.38972579	Stream 038	UNT to Potato Creek	CWF
McKean	7.1	41.75444543	-78.38935917	Stream 039	UNT to Potato Creek	CWF

County	MP/ Access Road Name	Latitude	Longitude	Waterbody Project ID	Waterbody Name	Chapter 93 Existing or Designated Use
McKean	7.2	41.75450282	-78.38716425	Stream 158	UNT to Potato Creek	CWF
McKean	7.2	41.75441042	-78.38743214	Stream 159	UNT to Potato Creek	CWF
McKean	7.9	41.75706657	-78.37493616	Stream 040	UNT to White Hollow	CWF
McKean	7.9	41.75697296	-78.37485919	Stream 041	UNT to White Hollow	CWF
McKean	8.0	41.75699609	-78.37249149	Stream 043	White Hollow	CWF
McKean	10.4	41.76355628	-78.32941825	Stream 054	Coalbed Hollow	HQ-CWF
McKean	11.2	41.76724807	-78.31686750	Stream 121	UNT to Bemis Hollow	HQ-CWF
McKean	11.2	41.76718262	-78.3146635	Stream 122	UNT to Bemis Hollow	HQ-CWF
McKean	11.3	41.76712779	-78.3145119	Stream 055	Bemis Hollow	HQ-CWF
McKean	11.3	41.76712281	-78.31426231	Stream 056	UNT to Bemis Hollow	HQ-CWF
McKean	11.3	41.76730245	-78.3139437	Stream 057	UNT to Bemis Hollow	HQ-CWF
McKean	13.6	41.78305035	-78.27729453	Stream 066	UNT to Allegheny Portage Creek	CWF
McKean	14.0	41.78829673	-78.27052216	Allegheny Portage Creek	Allegheny Portage Creek	TSF
McKean	14.1	41.7887135	-78.26995579	Stream 067	UNT to Allegheny Portage Creek (floodway accounted for with Allegheny Portage Creek)	CWF
McKean	14.2	41.78988336	-78.26787878	Stream 068	UNT to Allegheny River	CWF
McKean	14.3	41.79097787	-78.26622532	Stream 070	UNT to Allegheny River	CWF
McKean	14.5	41.7925588	-78.26424459	Stream 071	UNT to Allegheny River	CWF
McKean	14.6	41.79351298	-78.26314877	Stream 073	UNT to Allegheny River	CWF
McKean	14.7	41.79421314	-78.26217648	Stream 074	UNT to Allegheny River	CWF
McKean	14.7	41.79442351	-78.2619073	Stream 075	UNT to Allegheny River	CWF
McKean	14.9	41.79592939	-78.26034516	Allegheny River	Allegheny River	CWF
McKean	15.0	41.795592	-78.248992	Stream 077	UNT to Benson Hollow (floodway accounted for with Allegheny River)	CWF
McKean	15.4	41.795592	-78.248992	Stream 078	UNT to Allegheny River	CWF
McKean	15.7	41.80863178	-78.22251845	Coleman Creek-1	Coleman Creek	CWF

County	MP/ Access Road Name	Latitude	Longitude	Waterbody Project ID	Waterbody Name	Chapter 93 Existing or Designated Use
McKean	18.0	41.81016678	-78.20603292	Stream 086	UNT to Jordan Hollow	CWF
McKean/Potter	18.1	41.8110168	-78.20534566	Stream 089	UNT to Jordan Hollow	CWF
McKean/Potter	18.1	41.8110168	-78.20534566	Stream 090	Jordan Hollow	CWF
McKean/Potter	18.1	41.8110168	-78.20534566	Stream 091	UNT to Jordan Hollow	CWF
McKean	SA-7	41.80948877	-78.42597083	Stream 195	UNT to Potato Creek	CWF
Potter	18.1	41.8111918	-78.2050226	Stream 092	UNT to Jordan Hollow	CWF
Potter	18.9	41.8180475	-78.1947849	Stream 093	Ernst Hollow	CWF
Potter	19.1	41.8202685	-78.1930235	Stream 094	UNT to Sartwell Creek	CWF
Potter	19.2	41.8216804	-78.191606	Sartwell Creek	Sartwell Creek	CWF
Potter	19.6	41.8238897	-78.1841700	Stream 096	UNT to Sartwell Creek	CWF
Potter	19.7	41.8247684	-78.1828970	Stream 098	UNT to Sartwell Creek	CWF
Potter	19.9	41.82744521	-78.18129453	Stream 197	UNT to Sartwell Creek	CWF
Potter	21.8	41.8370533	-78.14919817	Stream 099	Baker Hollow	CWF
Potter	23.0	41.8359036	-78.1282262	Stream 156	Fishing Creek	CWF
Potter	23.2	41.83548861	-78.12540536	Stream 152	UNT to Fishing Creek	CWF
Potter	25.0	41.8391466	-78.0965789	Stream 151	UNT to East Branch Fishing Creek	HQ-CWF
Potter	26.0	41.8448506	-78.0796395	Stream 117	UNT to White Chopin Hollow	HQ-CWF
Potter	26.8	41.8452839	-78.0647304	Stream 116	East Branch Fishing Creek	HQ-CWF
Potter	27.4	41.8447063	-78.0527711	Whitney Creek	Whitney Creek	EV
Potter	27.8	41.84510165	-78.0444320	Stream 102	UNT to Whitney Creek	EV
Potter	28.7	41.85001485	-78.02968847	Stream 103	UNT to Whitney Creek	EV
Line YM58 Access Roads						
McKean	PAR-3	41.72249441	-78.45397676	Stream 021	UNT to Red Mill Brook	CWF
McKean	PAR-3	41.7178022	-78.45295649	Stream 022	UNT to Red Mill Brook	CWF
McKean	PAR-3	41.71663716	-78.45152507	Stream 023	UNT to Red Mill Brook	CWF

County	MP/ Access Road Name	Latitude	Longitude	Waterbody Project ID	Waterbody Name	Chapter 93 Existing or Designated Use
McKean	PAR-3	41.71277612	-78.44639801	Stream 025	UNT to Red Mill Brook	CWF
McKean	PAR-3/TAR-4	41.71380682	-78.44632243	Stream 024	UNT to Red Mill Brook	CWF
McKean	PAR-5	41.76275543	-78.47466734	Stream 109	UNT to Irons Hollow	CWF
McKean	PAR-5	41.76165361	-78.4739665	Stream 110	UNT to Irons Hollow	CWF
McKean	PAR-5	41.75557959	-78.47233415	Stream 111	UNT to Irons Hollow	CWF
McKean	PAR-5	41.75714654	-78.47049738	Stream 112	UNT to Donley Fork	HQ-CWF
McKean	PAR-5	41.75778345	-78.46514879	Stream 113	Donley Fork	HQ-CWF
McKean	PAR-5	41.74456085	-78.43976928	Stream 114	UNT to Donley Fork	HQ-CWF
McKean	TAR-6	41.74315861	-78.42554339	Stream 030-2	UNT to Robbins Brook	HQ-CWF
McKean	TAR-6	41.73616244	-78.40797283	Stream 032	UNT to Robbins Brook	HQ-CWF
McKean	TAR-6	41.73596673	-78.40637594	Stream 033	UNT to Robbins Brook	HQ-CWF
McKean	TAR-6	41.73650956	-78.40428649	Stream 034	UNT to Robbins Brook	HQ-CWF
McKean	TAR-6	41.73702569	-78.40279245	Stream 035	UNT to Robbins Brook	HQ-CWF
McKean	TAR-6	41.737596	-78.40079208	Stream 036	UNT to Robbins Brook	HQ-CWF
McKean	TAR-10	41.74903927	-78.37653927	Stream 044	UNT to White Hollow	CWF
McKean	TAR-10	41.75373402	-78.36461709	Stream 198	UNT to White Hollow	CWF
McKean	PAR-12	41.76034218	-78.36627787	Stream 045	UNT to White Hollow	CWF
McKean	PAR-12	41.76108322	-78.3644886	Stream 046	UNT to White Hollow	CWF
McKean	PAR-12	41.76105066	-78.35817164	Stream 047	UNT to White Hollow	CWF
McKean	PAR-12	41.76093737	-78.3579907	Stream 048	UNT to White Hollow	CWF
McKean	PAR-12	41.76041497	-78.35498313	Stream 049	UNT to White Hollow	CWF
McKean	PAR-12	41.76322064	-78.3500265	Stream 050	UNT to White Hollow	CWF
McKean	TAR-13	41.74881982	-78.32859692	Stream 051	UNT to Larson Hollow	CWF
McKean	TAR-13	41.74802283	-78.32751972	Stream 052	UNT to Larson Hollow	CWF
McKean	TAR-13	41.74798343	-78.32602203	Stream 053	UNT to Larson Hollow	CWF

County	MP/ Access Road Name	Latitude	Longitude	Waterbody Project ID	Waterbody Name	Chapter 93 Existing or Designated Use
McKean	TAR-14	41.76730245	-78.3139437	Stream 057	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.77139407	-78.31068016	Stream 058	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.76735896	-78.3083331	Stream 118	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.78092323	-78.30711247	Stream 061	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.78404182	-78.30766374	Stream 062	Bemis Hollow	HQ-CWF
McKean	TAR-14	41.78418368	-78.30799893	Stream 064	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.77970306	-78.30801112	Stream 321	Bemis Hollow	HQ-CWF
McKean	TAR-14	41.77999917	-78.30779369	Stream 344	Bemis Hollow	HQ-CWF
McKean	TAR-14	41.78097151	-78.30710417	Stream 345	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.77652863	-78.30990042	Stream 347	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.77984563	-78.30790509	Stream 348	Bemis Hollow	HQ-CWF
McKean	TAR-14	41.78041799	-78.30748762	Stream 349	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.78082273	-78.30717015	Stream 350	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.78165366	-78.30687864	Stream 351	Bemis Hollow	HQ-CWF
McKean	TAR-14	41.78248135	-78.30673406	Stream 352	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14/ TAR-17	41.78344186	-78.30704705	Stream 353	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-14	41.78392674	-78.30734922	Stream 354	UNT to Bemis Hollow	HQ-CWF
McKean	TAR-17	41.77632414	-78.29238775	Stream 320	UNT to Bemis Hollow	HQ-CWF
McKean	PAR-25	41.81054173	-78.2381618	Stream 080	UNT to Benson Hollow	CWF
McKean	PAR-25	41.81025457	-78.2337313	Stream 081	Benson Hollow	CWF
McKean	PAR-25	41.79599358	-78.24327073	Coleman Creek-2	Coleman Creek	CWF
McKean	PAR-25	41.80961941	-78.2212397	Stream 082	UNT to Coleman Creek	CWF
McKean	PAR-25	41.80998285	-78.22089958	Stream 083	UNT to Coleman Creek	CWF
McKean	PAR-25	41.81351769	-78.21890368	Stream 084	UNT to Coleman Creek	CWF
McKean	PAR-25	41.81661466	-78.2189201	Stream 085	UNT to Coleman Creek	CWF

County	MP/ Access Road Name	Latitude	Longitude	Waterbody Project ID	Waterbody Name	Chapter 93 Existing or Designated Use
McKean	PAR-25	41.75373402	-78.36461709	Stream 196	UNT to Jordan Hollow	CWF
McKean	TAR-28	41.81016678	-78.20603292	Stream 086	UNT to Jordan Hollow	CWF
McKean	TAR-26	41.81393544	-78.20897827	Stream 085c	UNT to Jordan Hollow	CWF
McKean	TAR-26	41.81581804	-78.20923341	Stream 085b	UNT to Jordan Hollow	CWF
McKean	TAR-26	41.81744083	-78.20848581	Stream 085a	UNT to Jordan Hollow	CWF
Potter	PAR-30	41.8374915	-78.1201519	Stream 312	UNT to Baker Hollow	CWF
Potter	PAR-31	41.8374915	-78.1201519	Stream 155	White Chopin Hollow	CWF
Potter	PAR-31	41.8393374	-78.1087150	Stream 153	UNT to White Chopin Hollow	CWF
Potter	PAR-31	41.8396724	-78.1078149	Stream 154	UNT to White Chopin Hollow	CWF
Potter	PAR-33	41.8462215	-78.0841382	Stream 150	UNT to White Chopin Hollow	CWF
FM100 Abandonment						
Clearfield	0.0	41.21983712	-78.5590388	Stream 179	Lamb Hollow	CWF
Clearfield	0.1	41.21946452	-78.55628583	Stream 180	Bennett Branch Sinnemahoning Creek	CWF
Clearfield	0.2	41.21912454	-78.55234646	Stream 181	UNT to Bennett Branch Sinnemahoning Creek	CWF
Clearfield	1.4	41.22173758	-78.53328573	Stream 182	UNT to Bennett Branch Sinnemahoning Creek	CWF
Clearfield	1.6	41.22174546	-78.52883081	Stream 183	UNT to Bennett Branch Sinnemahoning Creek	CWF
Clearfield	1.7	41.22174608	-78.52847668	Stream 184	UNT to Bennett Branch Sinnemahoning Creek	CWF
Clearfield	1.7	41.22174672	-78.52810906	Stream 185	UNT to Bennett Branch Sinnemahoning Creek	CWF
Clearfield	2.1	41.22176735	-78.52084423	Stream 186	UNT to Bennett Branch Sinnemahoning Creek	CWF
Clearfield	2.2	41.22177541	-78.51871262	Stream 187	UNT to Bennett Branch Sinnemahoning Creek	CWF
Clearfield	2.2	41.22177864	-78.51785314	Stream 188	UNT to Bennett Branch Sinnemahoning Creek	CWF
Clearfield	2.1	41.22177247	-78.519493	Stream 190	UNT to Bennett Branch Sinnemahoning Creek	CWF
Clearfield	4.8	41.23290313	-78.47530799	Stream 145	Laurel Run	HQ-CWF
Clearfield	4.8	41.2328101	-78.47494264	Stream 146	UNT to Laurel Run (floodway accounted for with Stream 145)	HQ-CWF
Clearfield	4.8	41.23277665	-78.47443993	Stream 147	Saunders Run	HQ-CWF

County	MP/ Access Road Name	Latitude	Longitude	Waterbody Project ID	Waterbody Name	Chapter 93 Existing or Designated Use
Clearfield	7.0	41.23932616	-78.43524847	Stream 372	UNT to Little Medix Run	HQ-CWF
Elk	7.9	41.24112555	-78.41853688	Stream 144	UNT to Medix Run	HQ-CWF
Elk	7.9	41.24118949	-78.41821967	Stream 143	Medix Run	HQ-CWF
Elk	9.6	41.24466248	-78.38586605	Stream 142	Jack Dent Branch	HQ-CWF
Elk	12.3	41.26481851	-78.34432451	Stream 140	UNT to Mix Run	EV
Elk	12.3	41.26463498	-78.34450821	Stream 141	Mix Run	EV
Elk	19.4	41.32317407	-78.25000128	Stream 139	UNT to Miller Run	HQ-CWF
Elk	19.5	41.32324776	-78.24953991	Stream 138	UNT to Miller Run	HQ-CWF
Elk	19.6	41.32348563	-78.24805042	Stream 137	UNT to Miller Run	HQ-CWF
Cameron	19.7	41.32385598	-78.24573111	Stream 134	UNT to Miller Run	HQ-CWF
Cameron	19.7	41.32380475	-78.24605197	Stream 136	UNT to Miller Run	HQ-CWF
Cameron	22.2	41.32919638	-78.2004463	Stream 175	Mix Run	HQ-CWF
Cameron	22.2	41.32891235	-78.20073939	Stream 176	UNT to Mix Run	HQ-CWF
Cameron	22.2	41.32864154	-78.20101884	Stream 177	UNT to Mix Run	HQ-CWF
Cameron	22.4 - MLV GIC0-5042 Access	41.33115784	-78.19948779	Stream 371	UNT to Mix Run	HQ-CWF
Cameron	23.2	41.33125816	-78.18382838	Stream 174	Bennett Branch Sinnemahoning Creek	WWF
Cameron	23.9	41.33232304	-78.17268958	Stream 173	Little Dent Run	HQ-CWF
Cameron	24.9	41.33956728	-78.15562219	Stream 172	UNT to Boyer Run	CWF
Cameron	25.0	41.34031579	-78.1543003	Stream 170	UNT to Boyer Run	CWF
Cameron	25.0	41.3403958	-78.15415735	Stream 171	Boyer Run	CWF
Cameron	25.7	41.34590607	-78.1433577	Stream 132	UNT to Driftwood Branch Sinnemahoning Creek	EV
Cameron	26.0 - RR Access	41.34559433	-78.13782607	Stream 365	Driftwood Branch Sinnemahoning Creek	EV
Cameron	26.0 - RR Access	41.34586622	-78.13796536	Stream 366	UNT to Driftwood Branch Sinnemahoning Creek	EV

County	MP/ Access Road Name	Latitude	Longitude	Waterbody Project ID	Waterbody Name	Chapter 93 Existing or Designated Use
Cameron	26.2	41.34961853	-78.13542578	Stream 363	Driftwood Branch Sinnemahoning Creek	EV
Cameron	26.8	41.35497482	-78.12688115	Stream 169	Driftwood Branch Sinnemahoning Creek	EV
Cameron	27.0	41.35753809	-78.12856463	Stream 370	UNT to Driftwood Branch Sinnemahoning Creek	EV
Cameron	27.1 - SR 120 North Access	41.35931752	-78.12852391	Stream 367	UNT to Johnson Run	EV
Cameron	27.1	41.35797232	-78.12829363	Stream 369	UNT to Johnson Run	EV
Cameron	27.4	41.36211159	-78.12424703	Stream 166	UNT to Johnson Run	EV
Cameron	27.4	41.36226577	-78.12412207	Stream 167	Johnson Run	EV
Cameron	27.4	41.36223789	-78.12406492	Stream 168	UNT to Johnson Run (floodway accounted for with Stream 167)	EV
Cameron	27.4 - SR 120 North Access	41.3629155	-78.12481532	Stream 368	UNT to Johnson Run	EV
Cameron	29.4	41.38741538	-78.11531008	Stream 362	UNT to Grove Run	HQ-CWF
Cameron	30.4	41.40179547	-78.1154495	Stream 361	UNT to Lick Island Run	EV
Cameron	30.8	41.40719538	-78.11400061	Stream 360	UNT to Lick Island Run	EV
Cameron	38.1	41.50905801	-78.09629892	Stream 130	UNT to Berge Run	EV
Cameron	38.1	41.50933212	-78.09626708	Stream 131	UNT to Berge Run	EV
Cameron	38.6	41.51697746	-78.09557138	Stream 127	Colbert Hollow	EV
Potter	38.7	41.51864096	-78.09550196	Stream 128	UNT to Colbert Hollow	EV
Potter	38.7	41.51800033	-78.09552869	Stream 129	UNT to Colbert Hollow	EV
Potter	39.7	41.53325786	-78.09486496	Stream 126	UNT to Little Bailey Run	EV
Potter	40.1	41.53878274	-78.09453778	Stream 125	Little Bailey Run	EV
Potter	40.1	41.5383674	-78.09455677	Stream 133	UNT to Little Bailey Run	EV
Potter	40.7	41.54603404	-78.08985339	Stream 165	Brainard Hollow	EV
Potter	41.1	41.55220421	-78.08558163	Stream 199	Bailey Run	EV
Potter	41.2	41.55280648	-78.08516977	Stream 163	UNT to Bailey Run	EV
Potter	41.2	41.55256454	-78.08533522	Stream 164	Bailey Run	EV

County	MP/ Access Road Name	Latitude	Longitude	Waterbody Project ID	Waterbody Name	Chapter 93 Existing or Designated Use
Potter	41.8	41.56054858	-78.07968963	Stream 357	UNT to Bailey Run	EV
Potter	41.9	41.56134213	-78.07913577	Stream 358	UNT to Bailey Run	EV
Potter	42.5	41.57005924	-78.07311992	Stream 161	West Darian Run	EV
Potter	42.5	41.56999738	-78.07316261	Stream 162	UNT to West Darian Run	EV

Table 2.2-1D-1 (Rev2): Water Supply Wells and Springs within 150-feet of Project Work Areas

Facility[1]/ County	MP	Latitude	Longitude	Well Type	Well ID	Workspace Type	Approx. Distance from Construction Workspace (feet)	Current Use
Line YM58								
McKean	19.1	41.820862	-78.193240	Spring	N/A	ATWS	91.0	Not utilized as a source of potable water
Potter	23.8	41.835457	-78.125261	Spring	N/A	ATWS	114.5	Not utilized as a source of potable water
Potter	23.2	41.83570	-78.12474	Spring	N/A	TWS	75.1	Not utilized as a source of potable water
Line KL Extension								
McKean	0.0	41.70135	-78.49992	Agricultural Irrigation	594683	ATWS	0	Withdrawal
McKean	0.0	41.70167	-78.49972	Domestic	131079	ATWS	0	Withdrawal
Line FM100 Abandonment								
Elk	8.0	41.24098	-78.417066	Spring	N/A	TWS	28.4	Not utilized as a source of potable water
Potter	44.0	41.59083	-78.05917	Domestic	N/A	Access Road	53.2	Withdrawal

[1] Project components not addressed in table do not have water supply wells/springs within 150 feet of Project workspaces.

Table 2.2-1D-2 (Rev2): Water Supply Wells within 400-feet of Project HDDs

Facility/ County	MP	Latitude	Longitude	Well Type	Parcel ID	Workspace Type	Approx. Distance from Construction Workspace (feet)	Current Use
Line YM58								
McKean	~6.9	41.75516	-78.39358	Domestic	27-002-101.24	ATWS	262	Withdrawal
McKean	~6.9	41.75308	-78.39197	Domestic	27-002-101	ATWS	199	Withdrawal
McKean	~14.9	41.79504	-78.25973	Domestic	26-006-157	TWS	277	Withdrawal
McKean	~15.0	41.79709	-78.25756	Domestic	26-006-171a	ATWS	276	Withdrawal
McKean	~15.0	41.79678	-78.25708	Domestic	26-006-171b	ATWS	189	Withdrawal
McKean	~15.0	41.79589	-78.25685	Domestic	26-006-171.3	TWS	29	Withdrawal

Source: PAGWIS 2018, landowner coordination and Project environmental survey.

NATIONAL FUEL GAS COMPANY

Erosion and Sediment Control
&
Agricultural Mitigation Plan
(ESCAMP)

18 November 2013

Revised: October 3, 2019

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TABLE OF CONTENTS Page

1 INTRODUCTION

1.1 Plan Objectives

The primary objective of this Erosion and Sedimentation Control & Agricultural Mitigation Plan (ESCAMP or "Plan") is to reduce potential impacts from construction and maintenance of the project and outline mitigation, monitoring and maintenance procedures.

This Plan describes basic environmental construction and agricultural mitigation techniques that National (or its contractors) will use to construct and maintain pipelines. Best Management Practices (BMPs) will be implemented throughout construction to protect the environment and to minimize potential effects to the pipeline project. This document references BMPs that may be National Fuel Gas's (National) BMPs, Pennsylvania Department of Environmental Protection's (PADEP) BMPs, ~~New York State Department of Environmental Conservation (NYSDEC) BMPs~~ or varying combinations of listed references.

This ESCAMP has been modified and may be subject to further revision, as needed prior to construction, to include any additional requirements recommended by Federal, State, or Local agencies during the process of issuing permits. This document will be included as part of the Contractor's construction specifications.

1.2 Format

The content of this Plan is derived from the Federal Energy Regulatory Commission's (FERC) Wetland and Waterbody Construction and Mitigation Procedure; Upland Erosion Control, Revegetation, and Maintenance Plan; and Agricultural Mitigation Through the Stages of Pipeline Planning, Construction/Restoration and Follow Up Monitoring. Additional project specific input has been integrated from consultation with the United State Army Corps of Engineering, the Pennsylvania Department of Environmental Protection~~, the New York State Department of Environmental Conservation,~~ the United States Fish & Wildlife Service, the United States Department of Agriculture, ~~New York State Department of Agriculture & Markets~~, and the County Soil & Water Conservation Districts.

This ESCAMP provides information regarding the project construction and restoration, including the following:

- Agricultural Mitigation, as described herein and provided in the attached Soil Protection and Subsoil Decompaction Plan (Attachment 1);
- Wetland/Waterbody Construction, Erosion and Sedimentation Controls as described herein and as detailed in attached Best Management Practices (BMP) drawings (Attachment 2);
- Stormwater Pollution Prevention project information; and
- Revegetation and Maintenance details.
- Reference information used to develop this Plan is identified in the Section 11. Supplemental information is provided in the project Spill Prevention and Response Procedures (SPRP) document, Hydrostatic Test Plan, and Site Specific Residential Mitigation Plans (not included in this document).

2 SUPERVISION AND INSPECTION

2.1 Environmental Inspection

- At least one Environmental Inspector having knowledge of the wetland and waterbody conditions in the project area is required for each construction spread during construction and restoration. The number and experience of Environmental Inspectors assigned to each construction spread should be appropriate for the length of the construction spread and the number/significance of resources affected.
- Environmental Inspectors shall have peer status with all other activity inspectors.
- Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the FERC's Orders, stipulations of other environmental permits or approvals, or landowner easement agreements; and to order appropriate corrective action. Corrective actions (and their status) will be documented in daily forms and, at a minimum, maintained in project files for the duration of construction activities.

The Project's Environmental Manager will be the primary liaison between the Project and agency representatives. Environmental Inspectors may be directed by the Environmental Manager to coordinate with agency field staff during project inspection activities. Agencies will be notified of project activities in accordance with permit and FERC's Orders requirements or as required by law (e.g., spill of hazardous material to a water source). Additional notifications will be made on a case-by-case situation (e.g., requests for agency guidance or existing requirement variances).

2.2 Responsibilities of Environmental Inspectors

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

- Inspecting construction activities for compliance with the requirements of this Plan, FERC Procedures, the environmental conditions of the FERC's orders, the mitigation measures proposed by the project sponsor (as approved and/or modified by the order), other environmental permits and approvals, and environmental requirements in landowner easement agreements.
- Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance.
- Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing, and maintained throughout construction.
- Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area.
- Identifying erosion/sediment control and soil stabilization needs in all areas.
- Coordinate activities with agricultural inspectors and drainage specialists in farmland areas (see Section 2.4 – Responsibilities/Qualifications of Agriculture Inspectors).
- Ensuring that the design of slope breakers will not cause erosion or direct water into sensitive environmental resource areas including known cultural resources sites, wetlands, waterbodies and sensitive species habitats.
- Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into sensitive environmental resource areas, including wetlands, waterbodies, cultural resource sites, and sensitive species habitats; stopping dewatering activities if such deposition is occurring and ensuring

the design of the discharge shall be changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities. (See Trench Dewatering section of this Plan).

- Ensuring that subsoil and topsoil are tested in residential areas to measure compaction and determine the need for corrective action.
- Advising the Chief Inspector when environmental conditions (such as wet weather or frozen soils) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction. .
- Ensuring restoration of contours and topsoil.
- Verifying that the soils imported for agricultural or residential use have been certified (if available) as free of noxious weeds and soil pests, unless otherwise approved by the landowner.
- Ensuring that erosion control devices are properly installed, to prevent sediment flow into sensitive environmental resource areas (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species habitats) beyond approved workspace limits and onto roads, and determining the need for additional erosion control devices.
- ~~When working in New York State (NY), ensuring compliance with New York State Department of Environmental Conservation (DEC) State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from construction activities where applicable (NY DEC SPDES permit required for NY Projects resulting in 1 acre disturbance or greater). See Stormwater Pollution Prevention section of this plan.~~
- When working in Pennsylvania (PA), ensuring compliance with either the PA Department of Environmental Protection's (DEP's) Erosion and Sediment Control General Permit (ESCGP-3) or their National Pollution Discharge Elimination System (NPDES) Permit for Stormwater Discharges Associated with Construction Activities where applicable (PA DEP ESCGP-3 permit required for PA Oil & Gas Related (non-distribution) Projects resulting in 5 acres disturbance or greater; PA DEP NPDES permit required for PA Distribution Projects resulting in 1 acre disturbance or greater). See Stormwater Pollution Prevention section of this plan.
- Inspecting and ensuring the maintenance of temporary erosion control measures at least:
    - On a daily basis in areas of active construction or equipment operation.
    - On a weekly basis in areas with no construction or equipment operation.
    - Within 24 hours of ~~0.5~~ 0.25 inch of rainfall.
- Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts.
- Keeping records of compliance with the environmental conditions of the FERC's orders, and the mitigation measures proposed by the project sponsor in the application submitted to the FERC, and other Federal or state environmental permits during active construction and restoration.
- Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase.
- Verifying that locations for any disposal of excess construction materials for beneficial reuse comply with all applicable local, state, and federal regulations/permits and do not result in adverse environmental impacts or violate applicable landowner/land management agency agreements. These locations must also comply with Section 3.3.

2.3 Agricultural Inspection

The Agricultural Inspection for the project will include a combination of agricultural and drainage specialists to ensure aspects of the project that affect farmland meet or exceed: the project-specific conditions or orders of certification, relevant to agricultural resources, which are incorporated by the lead/certifying agency.

National's level of agriculture-related staffing will be dependent on the workload requirements including but not limited to: technical, pre-construction planning; construction/restoration inspection and; monitoring and follow-up remediation including drainage mitigation activities (e.g.: less staff during the pre-construction planning phase and the monitoring and the follow-up remediation phase), but will include the project's commitment to agricultural inspectors and agricultural drainage specialists on a full-time basis through pipeline construction/restoration, which make up the peak work load phase of pipeline right-of-way activity.

Based on the project's anticipated number of construction work spreads, there may be one agricultural drainage specialist and two agricultural inspectors assigned full-time, per spread. However, a practical degree of flexibility will be available: should agricultural construction/restoration activity within one work spread be temporarily light enough for the agricultural inspector to fully and effectively supervise, at a time when the activities are heavy in the other work spread, then the agricultural inspector in the former spread may temporarily assist the staff in the latter spread. For periods of peak construction/restoration activities in agricultural lands that exceed the effective capability of the full-time staff, the project will provide additional temporary agricultural inspectors.

During phases of less intensive project activity (e.g., pre-construction planning, or dormant right-of-way winterization without construction, follow-up crop monitoring, etc.), fewer staff may be employed, as appropriate, relative to the level of activity. Regardless, the project sponsor will provide an adequate number of qualified personnel (per the responsibilities/qualifications herein) to meet the level of effort required by this plan or conditions of FERC's Orders.

To the extent practicably feasible, the project will strive to utilize the same agricultural and drainage specialist staff during the planning, construction restoration and monitoring phases of work to allow for maximum technical continuity.

2.4 Responsibilities/Qualifications of Agriculture Inspectors

Agricultural Inspector

The work of a qualified Agricultural Inspector, with the ability and the authority required to perform independently, assumes the pipeline right-of-way project aspects listed below:

- Training and education of other project sponsor staff (e.g.: land agents, craft inspectors, assistant agricultural compliance inspectors, environmental inspectors, etc.), and construction personnel, in the proper use and application of the agricultural right-of-way standards and case-specific orders of certification.
- Technical field supervision over all aspects of the project that affects agricultural resources, through each stage of on-site work: right-of-way clearing, construction stages (including compliance with trench dewatering procedures), clean-up stage and initial restoration stages.
- Technical field supervision (after the satisfactory completion of initial restoration), over the on-site monitoring of, and the follow-up restoration in, agricultural lands.

- Communication in conjunction with other project staff with affected farmland owners and operators over the project's duration: planning through construction/initial restoration, to completion of monitoring and follow-up restoration.

The key mission of each Agricultural Inspector is ensuring the project's full compliance in meeting (or exceeding) standards and case-specific conditions or orders pertaining to the affected agricultural resources.
The following are recommended qualifications for Agricultural Inspectors:

- Earned a bachelor degree or associate in applied science diploma in: agronomy or environmental sciences, with concentration in: agriculture, soils, horticulture, forestry, or closely allied science, and been employed in the respective field, regionally, not less than five years (i.e.: not directly out of college); or-
- Advanced steadily in a career through on-the-job training and performance, regionally, for a minimum of ten years as a soil and water conservation field technician with a practical working knowledge of soil conservation, farming, surveying, land excavation and drainage, or similar types of work: from the land review, field planning and design/layout phase through construction inspection and site completion; or-
- Advanced steadily in a career through on-the-job training and field performance for a minimum of five years in pipeline construction/restoration right-of-way work, with at least two full years serving as an assistant to either a qualified agricultural or environmental compliance inspector, and have earned, and currently hold certification as, either a Professional in Erosion and Sediment Control (CPESC) or Professional in Storm Water Quality (CPSWQ); or-
- Combination of the above qualifications.

Drainage Specialist (where appropriate)

The Agricultural Drainage Specialist is responsible for the detailed, on-site data consolidation of all surface and subsurface drainage characteristics and facilities for affected farmlands; and planning and technically supervising all drainage-related mitigation, through the planning and construction, initial restoration, post-construction monitoring and follow up restoration stages. The drainage specialist provides the specialized technical direction that enables the project to fully restore all disturbed land and all facility components of surface and subsurface drainage on affected farmland; including the effective mitigation of new or exacerbated conditions of water boils or field saturation

The drainage specialist serves as a specialized arm of the Agricultural Inspectors working in close technical coordination with them over a project's full duration, as required. The drainage specialist will provide primary technical direction of on-site drainage mitigation and follow up for all affected agricultural lands. In addition the drainage specialist may provide both technical field direction and oversight of the subcontractors specializing in agricultural drainage.

The work of a qualified drainage specialist, with the ability and technical authority to work both jointly and independently, assumes the pipeline right-of-way project aspects listed below:

- On-site inventory of all surface and subsurface drainage-related characteristics of affected farmlands, in the pre-construction planning phase. This includes location referencing for drainage such as:
    - existing features of surface runoff such as small but defined swales, up to large and broad swales;
    - existing farm features of water control such as diversion terraces, field ditches, main outlet ditches;
    - existing buried water lines (farmstead consumptive use);

  - existing water source (developed springs, etc.) or unnamed water flow areas;
  - subsurface drain line systems ranging from clay tile to modern perforated polyethylene tubing; or, approximated locations of earlier stone drain systems; key drainage features which are outside of the directly affected farm field[s], but may serve to receive the respective surface or subsurface drainage, e.g.: ditches and culverts of active or abandoned railroads, road ditches, etc.
- Estimating portions of farms, based on soil, terrain, and drainage/water table characteristics, where new or exacerbated conditions of water boils or field saturation should be anticipated for follow up mitigation.
- In farm lands, assisting other Agricultural and Environmental Inspectors in the advance selection of acceptable trench de- watering measures and respective locations of water discharge to avoid agricultural impacts and estimating the pumping/associated hose length requirements necessary to ensure such avoidance of impacts.
- Ensuring the project's prompt marking/staking of all disturbed drainage facilities. Assisting the Agricultural Inspectors, as needed, in ensuring compliance with trench de-watering standards and dry backfilling (as defined in Section 4.10) of the trenches in affected farmland.
- Planning and laying out interceptor drain line systems including their safe, gravity-flow discharge to predetermined outlet locations.
- Providing on-site design, general material estimates and technical field supervision over:
  - Drain line repairs and system replacements;
  - The effective engineering re-construction of un-avoided surface drainage facilities such as diversion terraces or farm waterways;
  - The installation and outlet of interceptor drain line systems.

3 PRECONSTRUCTION PLANNING

This Section presents the pre-construction planning efforts, further details regarding the construction activities are presented in Section 4 – Construction Activities and general sequencing of planning, installation, cleanup and restoration is presented in Section 10 – General Pipeline Construction Sequencing.

3.1 Construction Work Areas

Construction activities shall be confined to the approved work areas.

- Identify all construction work areas (e.g., construction right-of-way, extra work space areas, pipe storage and contractor yards, borrow and disposal areas, access roads, etc.) that would be needed for safe construction. The project sponsor must ensure that appropriate cultural resources and biological surveys are conducted, as determined necessary by the appropriate federal and state agencies.
- Project sponsors are encouraged to consider expanding any cultural resources and endangered species surveys in anticipation of the need for activities outside of authorized work areas.
- Plan construction sequencing to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into sensitive environmental resource areas.

3.1.1 ROW & Staging Areas

Before construction begins, the right-of-way (ROW) will be surveyed and staked. Other utility lines will be located and marked to prevent accidental damage during pipeline construction.

Staging areas will be set up when the contractor starts work. Proper BMP controls will be erected prior to any sustained heavy traffic. If vehicles enter or exit the staging area onto a paved road, an entrance pad will be installed as per *BMP Drawing No. 1.*

3.1.2 Access Roads

The project will make use of the ROW for access along the pipeline. Where additional access is necessary for pick-up trucks and other vehicles, existing access roads may be used upon agreement with the landowner. Appropriate BMP controls will be installed and maintained on these roads, and they will be reclaimed to a condition at least equal to their pre-construction condition.

In agricultural lands topsoil will be stripped and segregated for expansion (widening or lengthening) or installation access roads (if necessary). National will work with landowners, and if requested by the landowner, access roads will remain in place for landowner use following construction. Alternatively, if access roads are restored to original use (e.g., tillable land) they will be fully restored using the same scope of agricultural mitigation and restoration measures that apply to pipeline construction right-of-way.

3.1.3 Pipe yards

During project planning efforts have been made to site pipe yards in previously disturbed non-agricultural areas. If agricultural lands are utilized for yards, the Contractor shall strip and segregate topsoil in agricultural lands used as pipe yards. However, if any such area is used as a pipeyard it will be fully restored using the same scope of agricultural mitigation and restoration measures that apply to pipeline construction right-of-way.

3.1.4 Wetland/Waterbody Crossings

The pre-construction activities include survey of topographic surface elevations, in addition to the identification of wetlands and waterbodies. This survey will include elevations at the top and bottom of banks, location of the greatest stream depth, and edge water edge of the crossing for both pre- and post-construction. This topographic survey of conditions will be used, in conjunction with pre-construction photograph of the crossing locations from downstream and parallel to the pipeline centerline to document the pre-existing conditions of the crossing and to confirm that existing topography and profiles are re-established during restoration. All construction plans will be prepared in accordance with the FERC guidance, National standards, and the BMPs.

Stream crossings will be inspected daily during active construction and weekly during inactive construction. Following the restoration of the stream crossing, the crossings will be inspected after major rain events. This inspection program will continue through several high water events to ensure that the stream channel is stable.

The following should be filed with the Secretary of the FERC (Secretary) prior to the beginning of construction, for the review and written approval by the Director:

- Site-specific justifications for extra workspace areas that would be closer than 50 feet from a waterbody or wetland
- Site-specific justifications for the use of a construction right-of-way greater than 75- feet-wide in wetlands.

The following information must be filed with the Secretary prior to the beginning of construction. These filing requirements do not apply to projects constructed under the automatic authorization previsions in the FERC's regulations:

- Spill Prevention and Response Procedures specified in section 3.5
- A schedule identifying when trenching or blasting will occur within each waterbody greater than 10 feet wide, within any designated coldwater fishery, and within any waterbody identified as habitat for federally-listed threatened or endangered species. The project sponsor will revise the schedule as necessary to provide FERC staff at least 14 days advanced notice. Changes within this last 14-day period must provide for at least 48 hours advanced notice.
- Plans for horizontal directional drilling (HDD) under wetlands or waterbodies
- A wetland delineation report if applicable
- The hydrostatic testing information

3.2 Agricultural Area Planning

3.2.1 Drain Tile and Irrigation Systems

Supplementing the details of pre-construction activities, in agricultural areas, as identified in the responsibilities of the Drainage Specialist (Section 2.4), planning will include the following:

- Attempt to locate existing drain tiles and irrigation systems.
- Contact landowners and County Conservation Districts to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.
- If working in New York State, develop procedures (with NYS DA&M and/or the Soil and Water Conservation District) for constructing through drain tile areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction.
- Engage qualified drain tile specialists, as needed to conduct or monitor repairs to drain tile systems affected by construction. Use drain tile specialists from the project area, if available.
- Assist in identification of the dewatering outlets and favorable locations, including off ROW, for the protected day lighting of gravity flow drain outlets for new interceptors or replaced drain lines.
- For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems.

3.2.2 Grazing Deferment

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

3.3 Disposal Planning

Determine methods and locations for the regular collection, containment, and disposal of excess construction materials and debris (e.g., timber, slash, mats, garbage, drilling cuttings and fluids, excess rock, etc.) throughout the construction process. Disposal of materials for beneficial reuse must not result in adverse environmental impact and is subject to compliance with all applicable survey, landowner or land management agency approval, and permit requirements.

3.4 Agency Coordination

During the planning the project sponsor must coordinate with the appropriate local, state, and federal agencies as outlined in this Plan and /or required by the FERC's Orders.:

- Obtain written recommendations from the local soil conservation authorities or land management agencies regarding permanent erosion control and revegetation specifications.
- National will consult with the appropriate technical and/or regulatory agencies regarding invasive species, noxious weeds and soil-borne pathogens. National agrees to consult with the appropriate agencies regarding agricultural bio security (noxious weeds and soil-borne pathogens). If necessary, based on this consultation, National will develop specific practical cost-effective procedures to mitigate significant agricultural bio security risks, if they are determined to exist in the project area.
- Develop specific procedures in coordination with the appropriate agencies to prevent the introduction or spread of invasive species, noxious weeds, and soil pests resulting from construction and restoration activities.
- Develop specific procedures in coordination with the appropriate agencies and landowners, as necessary, to allow for livestock and wildlife movement and protection during construction.
- Develop specific blasting procedures in coordination with the appropriate agencies that address pre- and post-blast inspections; advanced public notification; and mitigation measures for building foundations, groundwater wells, and springs. Use appropriate methods (e.g., blasting mats) to prevent damage to nearby structures and to prevent debris from entering sensitive environmental resource areas.

3.5 Spill Prevention and Response Procedures

The project sponsor shall develop project-specific Spill Prevention and Response Procedures, as specified in section IV of the staff's procedures. A copy must be files with the Secretary of the FERC (Secretary) prior to construction and made available in the field on each construction spread. The filing requirement does not apply to projects under the automatic authorization provisions in the FERC's regulations.

3.6 Stormwater Pollution Prevention Plan

Make available on each construction spread in Pennsylvania, the Stormwater Pollution Prevention Plan prepared for compliance with the National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Construction Activities or the Pennsylvania Department of Environmental Protection's Erosion & Sedimentation Control General Permit (ESCGP-3).

~~Make available on each construction spread in New York, the Stormwater Pollution Prevention Plan prepared for compliance with the New York State Department of Environmental Conservation, State Pollution Discharge~~

Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities (GP-0-15-002).

3.7 Residential Construction

For all properties with residences located within 50 feet of construction work areas, project sponsors shall; avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified on landowner agreements; fence the edge of the construction work area for a distance of 100 feet on either side of the residence; and restore all lawn areas and landscaping immediately following clean-up operations, or as specified in landowner agreements. If season or weather conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (sediment barriers and mulch) until conditions allow completion of restoration.

3.8 Winter Construction Plans

If construction is planned to occur during winter weather conditions, project sponsors shall develop and file a project-specific winter construction plan with the FERC application. This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations. (See Attachment 6 of this manual).

The plan shall address:

- 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, inspecting and reporting, stormwater control during spring thaw conditions); and
- Final restoration procedures (e.g., subsidence and compaction repair, topsoil replacement, seeding).

4 CONSTRUCTION ACTIVITIES

This Section presents the details regarding specific construction activities while additional general sequencing of planning; installation, cleanup and restoration are presented in Section 10 – General Pipeline Construction Sequencing.

4.1 Approved Areas of Disturbance

Project-related ground disturbance shall be limited to the construction right-of-way, extra workspace areas, pipe storage yards, borrow and disposal areas, access roads, and other areas approved in the FERC's Orders. Any project-related ground disturbing activities outside these areas will require Director approval. This requirement does not apply to activities needed to comply with the Plan and Procedures (i.e., slope breakers, energy-dissipating devices, dewatering structures, drain tile system repairs) or minor field realignments and workspace shifts per landowner needs and requirements that do not affect other landowners or sensitive environmental resource areas. All construction or restoration activities outside of the authorized areas are subject to all applicable survey, permit requirements, and landowner easement agreements.

The construction right-of-way width for a project shall not exceed 75 feet or that described in the FERC application unless otherwise modified by a FERC Order.

Project use of any additional areas is subject to landowner or land management agency approval and compliance with all applicable survey and permit requirements. When additional areas are used, each one should be identified and the need explained in the weekly or biweekly construction reports to the FERC, if required. The following material should be included in the reports:

- The location of each additional area by station number and reference to a previously filed alignment sheet, or updated alignment sheets showing the additional areas;
- Identification of the filing at FERC containing evidence that the additional areas were previously surveyed; and
- A statement that landowner approval has been obtained and is available in project files.

Prior written approval of the Director is required when the authorized construction right-of-way width would be expanded by more than 25 feet.

4.2 Residential Area Construction

The care exercised by construction crews and the qualities of cleanup following construction are paramount concerns of homeowners. National will make every effort to ensure that all construction activities minimize adverse impacts to residences and that cleanup is quick and thorough.
Throughout construction, traffic lanes and access to homes will be maintained except for the brief periods essential for laying the new pipeline. The Contractor will erect temporary safety fences in the vicinity of streets and homes to keep the public away from the construction zone. National may use techniques such as stovepipe and drag section construction in order to minimize the impacts of construction in residential areas on a site-specific basis. Site-specific residential mitigation plans will be utilized in areas with residences within 25 feet from the edge of construction right-of-way.

Homeowners will be notified in advance of any scheduled disruption of household utilities and the duration of the interruption will be kept as brief as possible. Representatives of the local utility companies will be on-site during construction when necessary. In addition, National will strive to accommodate any special concerns regarding ornamental shrubs, trees, or structures by avoiding them as long as such avoidance will not unduly interfere with construction and operation of the pipeline.

National will take measures to ensure that construction activities will not prevent access to residential areas by fire and emergency vehicles. At least one lane of traffic will be kept open for emergency vehicles when constructing on or across residential streets. During the brief period of road closure, steel plates will be available on site to cover the open area to permit travel by emergency vehicles.

In residential areas, topsoil replacement (i.e., importation of topsoil) is an acceptable alternative to topsoil segregation. Where topsoil segregation is conducted, maintain separation of salvaged topsoil and subsoil throughout all construction activities. Segregated topsoil may not be used for padding the pipe or filling sandbags.

Immediately after backfilling, residential areas will be cleaned up, and all construction debris will be removed. Lawns will be raked, topsoil added as necessary, and lawns restored per agreements with landowners. Ornamental shrubs will be replaced where possible. Contractors will restore fences, mailboxes, and other structures removed during construction. Sidewalks, driveways, and roads will be restored as soon as practical.

4.3 Agricultural Area Construction

In predominantly agricultural areas, National will have Agricultural Inspectors/Specialists on site during construction in accordance with the Agricultural Inspection section of this Plan. In addition, prior to construction, National's Drainage Specialists (in coordination with National land agents) will contact farm landowners and operators and the local agencies for planning purposes described in previous section.

4.3.1 Topsoil Segregation

Unless the landowner or land management agency specifically approves otherwise, 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) in:

- Cultivated or rotated croplands, and managed pastures;
- Residential areas;
- Hayfields; and
- Other areas at the landowner's or land managing agency's request.

In residential areas, importation of topsoil is an acceptable alternative to topsoil segregation.
Where topsoil segregation is required, the project sponsor must:

- Segregate at least 12 inches of topsoil in deep soils (more than 12 inches of topsoil); and
- Make every effort to segregate the entire topsoil layer in soils with less than 12 inches of topsoil. Remove subsoil to a depth of 12 inches or to the top of the bedrock, whichever is shallower
- For specialty soils, topsoil removal up to 16 inches will be required.

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

Segregated topsoil may not be used for padding the pipe, constructing temporary slope breakers or trench plugs, improving or maintaining roads, or as a fill material.

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

4.3.2 Drain Tiles

All drainage tiles encountered shall be marked, maintained during construction, and restored to as good or better condition upon completion of construction. *BMP Drawing Nos. 30, 30A and 42* provide typical information for drain tiles where encountered. Specific details on drain tile monitoring activities are provided in Section 7.6.1.

- Mark locations of drain tiles damaged during construction. Encountered drain tiles shall be referenced and flagged with stakes located adjacent to the ditch, and the right-of-way edge (outer perimeters).
- When it is necessary to maintain flow in the drainage system during construction, a temporary pipe bridge shall be installed across the trench. Smaller feeder drains shall be capped so that flows are diverted to the primary drain on which the Pipe Bridge has been installed.
- Open ends of tile shall be covered to prevent ingress of dirt, rock, or wildlife.

- All drainage systems shall be probed to determine if damage has occurred. All tiles damaged during construction shall be flagged by the trenching inspector.
- Repair or replace all damaged drain tiles to their original or better condition under the supervision of the Drainage Specialist. Do not use filter-covered drain tiles unless the local soil conservation authorities or land management agencies and landowner agree. Use Qualified Drainage specialists for testing and repairs to ensure proper repairs and adequate probing/testing of the repaired or replaced drainage systems.
- For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems. For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).
- Other drainage-related impacts such as water boils and right-of-way saturation that are created or exacerbated by the pipeline project will be mitigated during monitoring and follow-up remediation (see Section 9.1 - Monitoring and Maintenance).
- Detailed records of drainage system repairs shall be maintained and upon request given to the landowner and the local soil conservation authority or land management agency offices for future reference.

4.3.3 Irrigation

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

4.4 Equipment Crossings

Construction of equipment crossings will occur during the clearing or grading process. Protective measures will include the use of timber mats laid adjacent to and across streambeds if banks are high enough, flume pipe covered by fill material (clean gravel or crushed stone) or portable bridges approved by the Environmental Inspector. The size and number of flume pipes will be sufficient for maximum anticipated flows. Typical crossing method information is presented on *BMP Drawing Nos. 2, 9, 12, 13 and 21.*

Flume pipes will conform to waterbody crossing dimensions and alignments. Stream channels will not be permanently straightened or realigned to conform with flume pipe dimensions or for any other reasons, unless a permit has been acquired to do so.

4.5 Road Crossings and Access Points

An entrance pad *(BMP Drawing No. 1)* is a temporary entrance/exit located where construction traffic enters or leaves the right-of-way onto or from a roadway or other paved surface. This access pad is typically constructed of stone or gravel. Strip topsoil and segregate for access areas and roads in agricultural and residential lands.A stabilized entrance pad is intended to reduce off-site sedimentation by eliminating the tracking of excess soil onto paved public roadways. The entrance pad serves as the designated point at which all construction traffic can access and exit the right-of-way. If crushed stone access pads are used in residential or active agricultural areas, place the stone on durable synthetic fabric to facilitate removal.

The Grading Crew will install rock entrances at public roads. If the job kicks off at a point where an entrance pad is required, the entrance pad will be installed as soon as the immediate area required for the pad is stumped and

rock can be brought in. This shall be within forty-eight (48) hours from the time the Grading Crew move onto the location.

For other locations along the pipeline where entrance pads are required, the pads will be installed as the Grading Crew progresses to these locations, but no later than forty-eight (48) hours from the time they reach these locations. Also;

- Maintain safe and accessible conditions at all road crossings and access points during construction.
- If crushed stone access pads are used in residential or agricultural areas, place the stone on synthetic fabric to facilitate removal.
- 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.

4.6 Interim Stabilization*

~~Where activity ceases for 20 or more days or~~ jobs not cleaned up by October 15 will be final graded and seeded with Aroostook (if available) winter rye at a rate of 170 pounds per acre. One hundred percent (100%) mulch will be spread on non-stabilized slopes of 10% or steeper. Only weed-free straw mulch, not hay mulch, will be used where mulch is needed on agricultural land. Before permanent seeding is planted in spring, the right-of-way will be inspected and any grade or water control structures that have been damaged over the winter will be repaired.

4.7 Slope Breakers

Install erosion controls immediately after initial disturbance of the soil. Erosion controls must be properly maintained throughout construction (on a daily basis) and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is compete.

- Slope breakers (waterbars) are intended to reduce runoff velocity and divert water off the construction ROW. Slope breakers may be constructed of materials such as soil, silt fence; staked hay or straw bales (straw only in agricultural lands), sand bags, or filter socks.

- Install slope breakers on all disturbed areas, as necessary to avoid excessive erosion. Slope breakers must be installed on slopes greater than 5 percent where the base of the slope is less than 50 feet from waterbody, wetland, road crossings and the following spacing (closer spacing if necessary): (See *BMP Drawing No.* 8A)

Table 1: Slope Breaker Installation: Slope and Distance

PENNSYLVANIA Installation		~~NEW YORK Installation~~	
Slope	Distance	~~Slope~~	~~Distance~~
<5%	250 Feet	~~<5%~~	~~125 Feet~~
5 - 15%	150 Feet	~~5 - 10%~~	~~100 Feet~~
>15 - 30%	100 Feet	~~>10 – 20%~~	~~75 Feet~~
>30%	50 Feet	~~>20 – 35%~~	~~50 Feet~~
		~~>35%~~	~~25 Feet~~

*Upon temporary cessation of an earth disturbance activity or any stage or phase of an activity where a cessation of earth disturbance activities will exceed 4 days, the site shall be immediately seeded, mulched, or otherwise protected from accelerated erosion and sedimentation pending future earth disturbance activities. Upon final completion of an earth disturbance activity or any stage or phase of an activity, the site shall immediately have topsoil restored, replaced, or amended, seeded, mulched or otherwise permanently stabilized and protected from accelerated erosion and sedimentation.

- Direct the outfall of each slope breaker to a stable, well-vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction ROW (*See BMP Drawing No. 31*).
- Position the outfall of each slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive environmental resource areas.
- Inspect and maintain slope breakers throughout the construction project.

4.8 Sediment Barriers

Sediment barriers are intended to stop the flow of sediments and prevent the deposition of sediments beyond approved workspaces or into sensitive resources. They may be constructed of materials such as silt fence, staked hay or straw bales (straw only in agricultural lands), compacted earth (e.g., drivable berms across travel ways), sand bags, filter socks, or other appropriate materials. Typical sediment barrier information is presented on *BMP Drawing Nos. 5 and 22*.

- At a minimum, install and maintain temporary sediment barriers across the entire construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody, wetland, or road crossing until revegetation is successful as defined in this Plan. Leave adequate room between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.
- Where wetlands or waterbodies are adjacent to and down slope of construction work areas, install sediment barriers along the edge of these areas, as necessary to prevent sediment flow into the wetland or waterbody.
- Install temporary sediment barriers at the base of slopes adjacent to road crossings until disturbed vegetation has been reestablished.
- Inspect and maintain all temporary sediment barriers throughout the construction project and after ~~.5~~ 0.25 inches of rainfall within a 24-hour period.
- 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.
- Contractor shall incorporate appropriate erosion/sediment control measures in pipe yards.
- Remove temporary sediment barriers from areas that are successfully revegetated. In agricultural lands, if access to restored farmlands is required to remove sediment barriers, access will be limited to light-weight wide tired vehicles.

4.9 Mulch

- Apply mulch on all slopes (except in cultivated cropland) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw unless the local soil conservation authorities, landowner, or land managing agency approves otherwise in writing. In agricultural lands, straw mulch application will be conducted at the discretion of the Agricultural inspector.
- Mulch can consist of weed-free straw, hay, wood fiber hydro-mulch, erosion control fabric, or some functional equivalent. Hay will not be utilized in agricultural lands.
- If mulching <u>before</u> seeding: increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.

- Mulch all disturbed upland areas (except cultivated croplands) before seeding if: Final cleanup, including final grading and installation of permanent erosion control measures, is not completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas); or, Construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.
- If mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.
- If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).
- On all dry, sandy sites and slopes greater than 8%, spread mulch uniformly over the area to cover at least 75% of the ground surface at a rate of 3 tons/acre of straw or hay or its equivalent, unless the local soil conservation authority or land management agency makes other recommendations in writing. Hay will not be utilized in agricultural lands.
- If a mulch blower is used, the strands of the mulching material shall be at least 8 inches long to allow anchoring.
- Ensure that mulch is adequately anchored to minimize loss due to wind and water.
- When anchoring by mechanical means, use a mulch-anchoring tool to properly crimp the mulch to a depth of 2 to 3 inches. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or waterbodies, except where the product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization.
- Do not use synthetic monofilament mesh/ netted erosion control materials in areas designated as sensitive wildlife habitat, unless the product is specifically designed to minimize harm to wildlife. Anchor the erosion control fabric with staples or other appropriate devices.

4.10 Trench Dewatering

Trench dewatering is the removal of excess runoff and groundwater (that has accumulated and is occupying the ditch line) to allow for the installation of the pipe or the completion of a pipeline tie-in, and the dry backfilling (as defined below) of the ditch. The removal of any excess water within the ditch line prior to backfilling is critical in agricultural lands; and permits ditch inspection and allows for a drier ditch to backfill the spoil material. This enables the right-of-way to be effectively restored sooner, by the relatively faster return of workable conditions, as opposed to extended waiting until spoil material backfilled in a wet ditchline dries enough to be able to have the heavy equipment work over. Typically, the trench is dewatered, and is maintained in a dewatered state not higher in water level than six inches above the top of the trench bottom sand bagpipe supports, during the backfilling activity ("dry backfilling").

Trench dewatering management will be accomplished by using a combination of efforts or BMPs (See *BMP Drawing Nos. 5, 22, 28, 31, 35 and 39*) dependent upon the specific site conditions and may include the following:

- Sediment filtering bags *(BMP Drawing No. 28)* and/or other equivalent sediment control structures for pumped water should be used whenever water is pumped from the pipeline trench. Sediment filter bags (use only Non-woven Geotextile filter bags), when implemented and maintained properly, prevent the discharge of heavily silt-laden water - effectively trapping particles larger than approximately 150 microns. Filter bags shall be used in well-vegetated areas, providing additional filtration upon discharge. Discharge to agricultural lands will not

be conducted in active crop areas unless dry conditions are present and with landowner permission. The pumping rate should not exceed the maximum recommended by the Manufacturer (for example: Pumping rate through the filter bags shall be no greater than 750 gpm or ½ the maximum specified by the manufacturer, whichever is less). The filter bags will be changed when they become half full. Their silt contents will not be deposited on agricultural lands.

- Discharge into approved upland vegetated (grassy) areas onto stable erosion resistant areas, located such that it does not allow the water to return to the right-of-way ditch line.
- Based on previous experience, filter bags have provided successful means in controlling the discharge of turbid waters If the water being discharged from the filter bag appears "milky" or excessively cloudy, then sediment corrals can be utilized to augment filter bag use, positioned at least 25 feet from any waterbody and closely monitored to ensure proper function to prevent turbid water from entering a waterbody.
- Trench dewatering using floating pump or supporting pump intakes to reduce sediments suspended in water.
- Use a splashboard or dissipation device at the point of discharge to prevent scouring of the ground.
- Filtration bags, a straw bale basin, filter cloth basins or a combination of these devices are acceptable methods of filtration for discharge of water in an insufficiently vegetated or wetland area.
- Pumping water to temporary holding areas (e.g., other sections of pipeline trench, nearby or crossed ditches, external portable tanks).
- Planning dewatering into construction sequencing to minimize amount of dewatering required. For example, during the lowering-in phase, dewatering should be accomplished before requisite construction activity occurs (such as in the morning) and backfill activity should be initiated as soon as possible following pipe installation to prevent the ditch from refilling with water when a high ground water table is present. In agricultural lands, dewatering level will be maintained, throughout backfilling operations, to no more than six inches above the top of the trench-bottom pipe support sand bags to ensure dry backfilling.
- In agricultural lands trench-dewatering activities will be coordinated with the Environmental Inspector by the Agricultural Inspector/Drainage Specialists.

4.11 Temporary Trench Breakers

- Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as bentonite, clay, sand bags or polyurethane foam, subsoil earth filled bags or equivalent (refer to permit or permitting agency for acceptable materials). Topsoil shall not be used for filling trench breaker bags. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the spacing in the following table. (See BMP Drawing Nos. 6Aand 8A).
- At a minimum, install a trench breaker 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. Install trench breakers at wetland boundaries, as specified (See BMP Drawing No. 6A).
- Trench breakers will be installed at intervals according to the table below and at additional locations, if necessary, in agricultural lands as recommended by the Agricultural Inspector. The base level of each breaker is established on the trench floor, prior to pipe laying, to ensure the completed breaker's control against significant water-piping and internal erosion. The bulk remainder of each trench breaker will be installed after the pipe is laid in the ditch and prior to backfill. *(See BMP Drawing No. 6A*)

- An Engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at intervals as per the following table and upslope of slope breakers and/or the site specific SWPPP or E&S Plan (See BMP Drawing Nos. 6A and 8A).

Table 2: Temporary Trench Breakers: Hard / Soft Plug Spacing

Slope	Hard Plug Spacing	or	Soft Plug Spacing
<5%	N/A		1000 Feet
5 - 15%	900 Feet		600 Feet
>15 - 30%	600 Feet		400 Feet
>30%	300 Feet		200 Feet

In agricultural lands, at the direction of the Environmental/Agricultural Inspector trench breaker heights may be adjusted to full, one-half, two-thirds, or alternating heights based on field conditions.

4.13 Maintenance of Erosion Control Devices

Inspecting and ensuring the maintenance of temporary erosion control measures will be conducted at least:

- On a daily basis in areas of active construction or equipment operation.
- On a weekly basis in areas with no construction or equipment operation.
- Within 24 hours of ~~0.5~~ 0.25 inch of rainfall.

Slope breakers will be checked and repaired at the end of each day where construction traffic has disturbed them.

5 WATERBODY CROSSINGS

A summary of the waterbody crossings and locations are included in the waterbody tables.

5.1 Construction Restrictions

No construction may take place in or affecting banks of any streams:

Unless expressly permitted or further restricted by the appropriate federal or state agency in writing on a site-specific basis, instream work, except that required to install or remove equipment bridges, must occur during the following time windows:

Coldwater fisheries - June 1 through September 30

Coolwater and warmwater fisheries - June 1 through November 30.

5.2 Stream Buffer Area

Stream buffer areas must be maintained at all times. The buffer area is that area 50 feet from the top of banks on both sides of stream. Activities such as stacking cut logs, burning cleared brush, discharging water from trenches, welding pipe sections, refueling and maintaining equipment should be done outside of buffer areas. These areas

should also be seeded and mulched immediately after pipeline installation. Stream crossings will be treated as a special construction crossing in order to minimize the amount of time required to complete construction. Construction equipment will not be parked or stored in the buffer area. No fuel storage, fuel transfer, oil change or hydraulic fluid additions shall occur within 100 feet of any waterway. Please see Table 3 below with guidelines.

PA Stream	A, B, C, D, E, J, K
PA Stream (HQ/EV)	A, B, C, D, E, J, L, M, N
PA Wetland	A, B, C, F, G, H, I
~~NY Stream~~	~~A, B, C, D, E, O~~
~~NY Wetland~~	~~A, B, C, F, G, H, I, P~~

Table 3: Stream & Wetland Crossing Guidelines

Note: Table above assumes ALL scenarios involve FERC jurisdiction

A. No hydrocarbon refueling, hazardous material storage, overnight equipment parking, or concrete coating activities within 100' of streams/wetlands (FERC).
B. Pumps & fuel vessels operating within 100' of streams/wetlands require secondary containment (FERC).
C. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50' away from wetland/stream (FERC, PADEP).
D. All spoil must be placed in the ROW at least 10 feet from the water's edge (FERC).
E. Maintain 15' Undisturbed Riparian area when pipeline parallels a stream (FERC).
F. Limit ROW width to no more than 75' through wetland areas (FERC).
G. Cut vegetation just above ground level and leave root systems in wetlands (FERC).
H. Limit pulling of stumps and grading activities in wetlands to directly over the trenchline unless these activities are required on the ROW for safety purposes (FERC).

I. Segregate the top 1' of topsoil from the area disturbed by trenching in wetlands unless standing water is present or soils are saturated (FERC).
J. No Grubbing within 50' of top of bank of stream until all materials required to complete the crossing are on site and pipe is ready for installation (PADEP).
K. Immediately stabilize area 50' from top of stream bank with erosion control blanket (PADEP).
L. Immediately stabilize area 100' from top of HQ/EV stream bank with erosion control blanket (PADEP).
M. Preserve 150' riparian area of HQ/EV stream wherever possible (PADEP).
N. No hydrocarbon refueling, hazardous material storage, overnight equipment parking, or concrete coating activities within 150' of HQ/EV stream (PADEP).
~~O. Minimize disturbance to 50' riparian area. Use 100' for cold water lakes (NYSDEC).~~
~~P. Pay close attention to DEC 100' wetland buffer requirements in NY permits (NYSDEC).~~

Note: The above is not an exhaustive list of requirements but a guideline. All project specific permits and plans must be reviewed prior to construction activities through stream and wetland areas. Any contradictions or inconsistencies between this table and relevant permit documents or regulatory guidance should be addressed by deferring to the most stringent procedures, unless directed by National Fuel or Empire Pipeline.

5.3 Maintenance of Stream Crossing Control Devices

Construction erosion control devices will be installed prior to earth disturbance of the area. They will be maintained at all times. Inspecting and ensuring the maintenance of temporary erosion control measures will be conducted at least:

- On a daily basis in areas of active construction or equipment operation.
- On a weekly basis in areas with no construction or equipment operation.
- Within 24 hours of ~~0.5~~ 0.25 inch of rainfall.

5.4 Additional Work Space Areas

Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.

The project sponsor shall file with the Secretary for review and written approval by the Director, a site-specific justification for each extra work area with a less than 50-foot setback from the water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. The justification must specify the conditions that will not permit a 50-foot setback and measures to ensure the waterbody is adequately protected.

Limit the size of extra work areas to the minimum needed to construct the waterbody crossing.

5.5 Spoil Pile Placement/Control

All spoil from minor and intermediate waterbody crossing, and upland spoil from major waterbody crossings, must be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas.

Use sediment barriers to prevent the flow of spoil or silt-laden water into any waterbody.

5.6 Waterbody Crossing Procedures

Comply with all FERC, Army Corps of Engineers state, or other applicable regulatory agency's permit terms and conditions.

Construct crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.

Leave at least 25 feet of ground on either side of the waterbody (top of bank) as a natural, vegetative strip (except for the trench and equipment crossing). All woody species will be cut flush to grade and only the stumps in the trench line will be removed. When necessary, stumps at the bridge crossing area may be removed to accommodate the safe installation of the construction bridge.
Where pipelines parallel a waterbody, maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the construction right of way, except where maintaining this offset will result in greater environmental impact.
Where waterbodies meander or have multiple channels, route the pipeline to minimize the number of waterbody crossings.

Maintain adequate waterbody flow rates to protect aquatic life, and prevent the interruption of existing downstream uses

Waterbody buffers (e.g., extra work area setbacks, refueling restrictions) must be clearly marked in the field with signs and/or highly visible flagging until construction-regulated ground disturbing activities are complete.

Crossing of waterbodies when they are dry or frozen and not flowing may proceed using standard upland construction techniques in accordance with the Plan, provided that the Environmental Inspector verifies that water is unlikely to flow between initial disturbance and final stabilization of the feature. In the event of perceptible flow, the project sponsor must comply with all applicable Procedure requirements for "waterbodies", as defined in 5.11 Waterbody Size Classification.

5.7 Pipeline Construction at Streams

- Install filter fence across the right-of-way prior to construction. (See *BMP Drawing No.* 5 for proper fence installation) Make any repairs to fence as necessary after each working day. Replace filter fence across the travel area with straw bales during construction. (See *BMP Drawing No.* 22 for proper installation of straw bales)
- The stream is not to be diverted or the flow restricted. No filter fence or straw bales are to be placed directly into stream flow.
- The pipe is to be readied outside the stream buffer area prior to trenching and then installed immediately.

- Install trench breakers at the edge of stream during construction as per *BMP Drawing No. 6A*. Ditching is to be performed from stream banks where possible.

5.8 Equipment Bridges

Only clearing equipment and equipment necessary for installation of equipment bridges may cross waterbodies prior to bridge installation. Limit the number of such crossings of each waterbody to one per piece of clearing equipment.

Construct and maintain equipment bridges to allow unrestricted flow and to prevent soil from entering the waterbody. Examples of such bridges include:

- Timber mat bridges as per *BMP Drawing No. 9*
- equipment pads and culvert(s)
- equipment pads or railroad car bridges without culverts
- clean rock fill and culvert(s)
- flexi-float or portable bridges as per *BMP Drawing No. 52, 53, & 54.*

Additional options for equipment bridges may be utilized that achieve the performance objectives noted above. Do not use soil to construct or stabilize equipment bridges.
Design and maintain each equipment bridge to withstand and pass the highest flow expected to occur while the bridge is in place. Align culverts to prevent bank erosion or streambed scour. If necessary, install energy dissipating devices downstream of the culverts.

Design and maintain equipment bridges to prevent soil from entering the waterbody.

Remove temporary equipment bridges as soon as practicable after permanent seeding.

If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, remove temporary equipment bridges as soon as practicable after final cleanup.

All bridges must be removed after use unless necessary approvals from the Army Corps or the appropriate state agency for permanent use has been obtained.

5.9 Dry-Ditch Crossing Methods

Unless approved otherwise by the appropriate federal or state agency, install the pipeline using one of the dry-ditch methods outlined below for crossings of waterbodies up to 30 feet wide (at the water's edge at the time of construction) that are state-designated as either coldwater or significant coolwater or warmwater fisheries, or federally-designated as critical habitat.

5.9.1 Dam and Pump

The dam-and-pump method may be used without prior approval for crossings of waterbodies where pumps can adequately transfer streamflow volumes around the work area, and there are no concerns about sensitive species passage.

Implementation of the dam-and-pump crossing method must meet the following performance criteria:

- use sufficient pumps, including on-site backup pumps, to maintain downstream flows
- construct dams with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner)
- screen pump intakes to minimize entrainment of fish
- prevent streambed scour at pump discharge
- continuously monitor the dam and pumps to ensure proper operation throughout the waterbody crossing.

5.9.2 Flume Crossing

The flume crossing method requires implementation of the following steps:

- install flume pipe after blasting (if necessary), but before any trenching
- use sand bag or sand bag and plastic sheeting diversion structure or equivalent to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required to achieve an effective seal
- properly align flume pipe(s) to prevent bank erosion and streambed scour
- do not remove flume pipe during trenching, pipelaying, or backfilling activities, or initial streambed restoration efforts
- remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

5.9.3 Section Intentionally Left Blank

5.10 Section Intentionally Left Blank

5.11 Waterbody Size Classification

- “Minor waterbody” includes all waterbodies less than or equal to 10 feet wide at the water’s edge at the time of crossing.
- “Intermediate waterbody” includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water’s edge at the time of crossing.
- “Major waterbody” includes all waterbodies greater than 100 feet wide at the water’s edge at the time of crossing.

5.12 Crossing of Minor Waterbodies

Where a dry-ditch crossing is not required, minor waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

- Except for blasting and other rock breaking measures, complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours. Streambanks and unconsolidated streambeds may require additional restoration after this period.
- Limit use of equipment operating in the waterbody to that needed to construct the crossing.
- Equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification or protected status (e.g., agricultural or intermittent drainage ditches). However, if an equipment bridge is used it must be constructed as described in section 5.8.

5.13 Crossing of Intermediate Waterbodies

Where a dry-ditch crossing is not required, intermediate waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

- Complete instream construction activities (not including blasting and other rock breaking measures) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible.
- Limit use of equipment in the waterbody to that needed to construct the crossing.
- All other construction equipment must cross on an equipment must cross on an equipment bridge as specified in section 5.8.

5.14 Crossing of Major Waterbodies

Before construction, the project sponsor shall file with the Secretary for the review and written approval by the Director a detailed, site-specific construction plan and scaled drawings identifying all areas to be disturbed by construction for each major waterbody crossing (the scaled drawings are not required for any offshore portions of pipeline projects). This plan must be developed in consultation with the appropriate state and federal agencies and shall include extra work areas, spoil storage areas, sediment control structures, etc., as well as mitigation for navigational issues. The requirement to file major waterbody crossing plans does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

The Environmental Inspector may adjust the final placement of the erosion and sediment control structures in the field to maximize effectiveness.

5.15 Temporary Erosion and Sediment Control

Install sediment barriers (as defined in section IV.F.3.a of the Plan) immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan; however, the following specific measures must be implemented at stream crossings:

- Install sediment barriers across the entire construction right-of-way at all waterbody crossings, where necessary to prevent the flow of sediments into the waterbody. Removable sediment barriers (or driveable berms) must be installed across the travel lane. These removable sediment barriers can be removed during

the construction day, but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent;

- Where waterbodies are adjacent to the construction right-of-way and the right-of-way slopes toward the waterbody, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil within the construction right-of-way and prevent sediment flow into the waterbody; and
- Use temporary trench plugs at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody.

5.16 Trench Dewatering

Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in silt-laden water flowing into any waterbody. Remove the dewatering structures as soon as practicable after the completion of dewatering activities.

6. WETLAND CROSSINGS

A summary of the wetland crossings and locations are included in the wetland tables. Refer to Table 3 for wetland crossing guidelines.

6.1 General Guidelines

National will insure that all construction personnel are informed that impacts on all vegetation will be kept to a minimum. Wide tracked equipment will be used and standing water will be maintained at normal levels to insure that water level and flow are kept at pre-construction levels. Where water levels are temporarily high, as a result of a recent heavy rainfall, the Company Representative may direct that the construction be postponed until after the water levels subside.

Comply with the Army Corps of Engineers , or it's delegated agency, permit terms and conditions.

Vehicular traffic in wetlands and wet areas will be restricted to a minimum and access avoided to the extent possible. Wetland crossings will be treated as a special construction crossing in order to minimize the amount of time required to complete construction. Construction equipment will not be parked or stored in the wetland. No fuel storage, fuel transfer, oil change or hydraulic fluid additions shall occur within 100 feet of any wetland. The project sponsor shall conduct a wetland delineation using the current federal methodology and file a wetland delineation report with the Secretary before construction. The requirement to file a wetlands delineation report does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

This report shall identify:

- By milepost all wetlands that would be affected
- The National Wetlands Inventory (NWI) classification for each wetland
- The cross length of each wetland in feet

- The area of permanent and temporary disturbance that would occur in each wetland by NWI classification type

The requirements outlined in this section do not apply to wetlands in cultivated or rotated cropland. Standard upland protective measures, including workspace and topsoiling requirements, apply to these agricultural wetlands.

Route the pipeline to avoid wetland areas to the maximum extent possible. If a wetland cannot be avoided or crossed by following an existing right-of-way, route the new pipeline in a manner that minimizes disturbance to wetlands. Where looping an existing pipeline, overlap the existing pipeline right-of-way with the new construction right-of-way. In addition, locate the loop line no more than 25 feet away from the existing pipeline unless site-specific constraints would adversely affect the stability of the existing pipeline.

Limit the width of the construction right-of-way to 75 feet or less. Prior written approval of the Director is required where topographic conditions or soil limitations require that the construction right-of-way width within the boundaries of a federally delineated wetland be expanded beyond 75 feet. Early in the planning process the project sponsor is encouraged to identify site-specific areas where excessively wide trenches could occur and/or where spoil piles could be difficult to maintain because existing soils lack adequate unconfined compressive strength.

Wetland boundaries and buffers must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

Implement the measures of sections 5 and 6 in the event a waterbody crossing is located within or adjacent to a wetland crossing. If all measures of sections 5 and 6 cannot be met, the project sponsor must file with the Secretary a site-specific crossing plan for review and written approval by the Director before construction. This crossing plan shall address at a minimum:

- Spoil control
- Equipment bridges
- Restoration of waterbody banks and wetland hydrology
- Timing of the waterbody crossing
- Method of crossing
- Size and location of all extra work areas

Do not locate aboveground facilities in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with U.S. Department of Transportation regulations. The following describes the proposed wetland crossing techniques to reduce construction-related impacts. Typical wetland crossing information is shown in *BMP Drawing Nos. 4 and 4A*. Modification to this plan may be made as dictated by soil moisture conditions at the time of construction.

6.1.1 Construction in Dry Wetlands

Dry Wetland: No standing water or saturated soil at time of construction.

- Standard pipeline construction methods can be used in wetlands where soils are dry enough at the time of construction to support equipment.
- In dry wetlands topsoil segregation must be used (as long as there is sufficient topsoil present to allow for mechanical separation by equipment).

- Install filter fence across ROW at edge of wetland.
- If spoil and silt cannot be contained within the ROW (i.e., approved working limits), install filter fence at the edge of the construction ROW; remove during cleanup.
- Minimize vegetation clearing and stump removal within the wetland, only remove cut vegetation and stumps in trench line.
- Segregate topsoil over trench-line.
- Install trench breakers at each wetland boundary (on upland side).
- Restore topsoil and seed with Annual Ryegrass (see Revegetation section of this Plan).

6.1.2 Construction in Saturated Wetlands

Saturated Wetland: Standing water or highly saturated soil at time of construction.

- Wetlands topsoil segregation is not required.
- Minimize vegetation clearing and stump removal, only remove cut vegetation and stumps in trench line.
- Permanent slope breakers will be installed at the base of all slopes adjacent to wetlands.
- Clean rock with Geo-textile or timber mats can be used for the temporary road.
- Timber mats can only be two (2) layers deep.
- Remove any timber mats used during construction in wetlands.
- Weld pipe outside the wetlands and carry in or use the push pull method.
- Install trench breaker at each wetland boundary (on upland side).
- Do not use brush mats.
- Do not use upland soils for temporary roads.

6.2 Standard Pipeline Construction

Standard pipeline construction can be used in wetlands where soils are dry enough at the time of construction to support equipment. This crossing method requires the segregation of topsoil from subsoil (as long as there is sufficient topsoil present to allow for mechanical separation by equipment).

The construction procedures that will be used to cross small wetlands will be similar to those used on dry land areas. However, if the trench contains water, trench breakers will be left in the trench prior to entering the wetland. This procedure will minimize silt discharges into the wetland. If construction activities breach a permeable layer, the bottom of the trench will be sealed.

In addition, the point at which the trench enters and exits a wetland will be sealed with impervious trench breakers (clay or bentonite) to insure the wetlands hydrologic integrity. Concrete bags/sakrete shall not be used as impervious trench breakers at wetland limits. Backfill will be well compacted, especially at the edges of the wetland. Original topographic conditions will be restored after the completion of construction.

Construction in larger wetland areas may use the "push technique". Board mats will be used to provide a working surface for the movement of equipment, personnel, and materials. The trench may be excavated using a dragline or clamshell dredge. The excavated material will be stored adjacent to the trench.

The pipe will be stored and joined at staging areas located outside the wetland. As necessary, the pipe will be weighted to provide negative buoyancy and temporary floats may be attached to the pipe to provide short-term positive buoyancy. After floating the pipe into place, these floats will be cut and the pipe will settle to the bottom of the trench. This operation will be repeated, with pipe sections fabricated, pushed into place, and subsequent sections welded together until the wetland crossing is complete. The excavated material will then be placed over the pipe to backfill the trench. To maintain flow patterns within the wetland, excess soil will be removed or redistributed within the right-of-way in such a manner that the flow patterns are not impacted.

Wetland revegetation shall be considered successful if the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction. If revegetation is not successful at the end of 3 years, develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively re-vegetate the wetland. Continue revegetation efforts until wetland revegetation is successful.

Do not conduct vegetation maintenance over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be maintained in an herbaceous state. In addition, trees within 15 feet of the pipeline that is greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way.

Do not use herbicides or pesticides in or within 100 feet of a wetland, except as allowed by the appropriate land management agency or state agency.

Do not use rock, soil imported from outside the wetland, tree stumps, or brush to support equipment on the construction right-of-way.

If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of topsoil and subsoil in wetlands, use low-ground–weight construction equipment, or operate normal equipment on timber rip rap, prefabricated equipment mats, or terra mats.

6.3 Extra Work Areas and Access Roads

Locate all extra work areas and access roads (such as staging areas and additional spoil storage areas) at least 50 feet away from all wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land

The project sponsor shall file with the Secretary for review and written approval by the Director, site-specific justification for each extra work area with a less than 50 foot setback from the wetland boundaries, except where adjacent upland consists of cultivated or rotated cropland or other disturbed land. The justification must specify the site-specific conditions that will not permit a 50-foot setback and measures to ensure the wetland is adequately protected.

The construction right-of-way may be used for access 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., with timber riprap, prefabricated equipment mats, or terra mats).

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.

The only access roads, other than the construction right-of-way, that can be used in wetlands are those existing roads that can be used with no modifications or improvements, other than routine repair, and no impact on the wetland.

6.4 Equipment Pads / Timber Mats

In wetlands with standing water the National representatives may direct that equipment pads be used to prevent unnecessary damage to the soil structure. Generally several equipment pads will be laid side by side in the construction travel area.

6.5 Clearing

- Limit construction equipment operating in wetland areas to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.
- Rubber tired equipment will be allowed to work in wetlands unless the equipment will not damage existing root systems and is approved by the Chief Environmental Inspector (CEI). Bulldozers will not be used to remove timber, trees, or brush. Trees and brush will be cut at ground level by tree shears, grinders, or chain saws.
- Tree stumps will be left in place, except within the trench line or unless their removal is necessary to ensure the safety of workers. Tree stumps may only be removed from outside the trench line if specifically authorized by the Chief Inspector. Leaving stumps in place will facilitate rapid vegetation of the wetland by indigenous tree species following construction. Stumps may be ground to a suitable height for safety reasons.
- All timber, brush, and grindings will be removed from the wetland.
- Debris and stumps will not be buried within wetlands but may be buried in the ROW outside of wetlands (in non-agricultural lands), where permitted.
- Trees located outside of the ROW will not be cut.
- The Environmental Inspector will photo document areas before and after clearing for use in later revegetation/restoration.
- The project sponsor can burn woody debris in wetlands, if approved by the Army Corps of Engineers and in accordance with state and local regulations, ensuring that all remaining woody debris is removed for disposal.

6.6 Grading

Extensive grading will normally be unnecessary because the topography of most wetlands is level. Grading will be limited to the areas directly over the trench line, except where topography, such as side slopes, requires additional grading for safety reasons. Where grading is required, topsoil will be segregated and returned as an even layer to all graded areas.

6.7 Trenching

- The topsoil in wetlands will be stripped from the ditch line and segregated if: it is not saturated and of sufficient depth to allow mechanical separation. Topsoil stripping (in non-saturated conditions) will be performed up to a depth of 12 inches. The segregated topsoil will be stockpiled separately from subsoil for later restoration of the ROW. Immediately after backfilling is complete, restore the segregated topsoil to it's original location.
- Spoil will be contained with straw bales, filter socks, or silt fences to prevent the spoil from flowing off of the ROW or into waterbodies.
- Minimize the length of time that topsoil is segregated and the trench is open. Do not trench the wetland until the pipeline is assembled and ready for lowering in.

6.8 Temporary Sediment Control

Install sediment barriers immediately after initial disturbance of the wetland or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench). Except as noted below, maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan.

Install sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary at all wetland crossings where necessary to prevent sediment flow into the wetland.

Where wetlands are adjacent to the construction right-of-way and the right-of-way slopes toward the wetland, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil within the construction right-of-way and prevent sediment flow into the wetland.

Install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way through wetlands. Remove these sediment barriers during right-of-way cleanup.

6.9 Trench Dewatering

Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in silt-laden water flowing into any wetland. Remove the dewatering structures as soon as practicable after the completion of dewatering activities.

6.10 Backfilling

- The trench will be backfilled with subsoil first. After the subsoil has been rough graded, topsoil will be replaced in an even layer. The topsoil contains seeds, rhizomes, and other plant propagules, which will aid rapid re-colonization by indigenous wetland species.
- Where rock (boulders, etc.) was part of the surface features prior to construction of the pipeline, rock will be placed back in the wetland in approximately the same configuration, as had been the pre-construction situation. Photos will be taken of the ROW in these situations, both before and after, in order to document the nature of the situation.

7 RESTORATION

7.1 Cleanup

- Commence cleanup operations immediately following backfill operations.* Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). In agricultural lands, deep ripping of the exposed right-of-way, rock cleanup, and disposal prior to topsoil replacement and deep sub-soiling are part of the restoration process prior to grading (for details on agricultural land decompaction refer to Attachment 1). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup. If construction or restoration unexpectedly continues into the winter season when conditions could delay successful decompaction, topsoil replacement, or permanent seeding until the following spring, file with the Secretary for the review and written approval of the Director, a winter construction plan (as specified in section 3.7). this filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.
- A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed and inspected and maintained. When access is no longer required the travel lane must be removed and the right-of-way restored.
- Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Generally, in agricultural lands, rock will not be returned to the trench any higher than 24 inches below the exposed (topsoil-stripped) construction surface. However, if extensive areas of shallow bedrock (within 24 to 30 inches from native surface) are encountered, National will limit backfill of rock to a depth of not less than 30" below pre-existing grade. Rock that is not returned to the trench should be considered construction debris, unless approved for use as cover/surface stabilization or for some other use on the construction work areas by the landowner or land managing agency.
- Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.
- Grade the construction right-of-way to restore pre-construction contours and leave the soil in the proper condition for planting.
- Remove construction debris from all construction work areas unless the landowner or land management agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration.
- Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.
- Contractor shall restore and re-vegetate all disturbed pipe yard areas, including lime, fertilizer, seed and mulch or restore equivalent to pre-construction conditions.

PERMANENT EROSION CONTROL DEVICES

7.2 Permanent Trench Breakers

*The time period between trench excavation and the start of site stabilization shall not exceed 30 calendar days. Restoration will be completed as soon as possible after grading. Cessation of activity for 4 days or longer requires temporary stabilization.

- An Engineer or similarly qualified professional shall determine the need for and spacing of trench breakers, including agricultural fields. Otherwise, trench breakers shall be installed at intervals as per the following table and upslope of slope breakers and/or the site specific SWPPP or E&S Plan (See BMP Drawing Nos. 6A and 8A).
- Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as bentonite, clay, sand bags or polyurethane foam (refer to permit or permitting agency for acceptable materials). Do not use topsoil in trench breakers.
- At a minimum, install a trench breaker 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. Install trench breakers at wetland boundaries, as specified in the procedures.

Table 4: Permanent Trench Breaker Spacing

Slope	Spacing
<5%	1000 Feet
5 - 15%	500 Feet
>15 - 25%	300 Feet
>25-35%	200 Feet
>35-100%	100 Feet
>100%	50 Feet

7.3 Permanent Slope Breakers

- Permanent slope breakers are intended to reduce runoff velocity, divert water off the construction ROW, 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 the spacing recommendations obtained from the local soil conservation authority or land managing agency.
- In the absence of written recommendations, use the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-of-way: (See *BMP Drawing No.* 8A)
- Construct slope breakers to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices 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 slope breakers extend beyond the edge of the construction right-of-way, they are subject to compliance with all applicable survey requirements.
- Please see Table 1 for correct slope breaker installation methods using percent slope and distance.

7.4 Soil Compaction Mitigation

- Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to approximate preconstruction conditions. Use penetrometers or other appropriate devices to conduct tests.
- Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil.
- If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.
- Perform appropriate soil compaction mitigation in severely compacted residential areas.

7.5 Permanent Restoration Measures

Permanent restoration and revegetation measures serve to control erosion and sedimentation by establishing a vegetative cover, which protects the soil, and by using structures which can divert or slow runoff and trap sediment. The Contractor shall restore all disturbed portions of the construction ROW and supplemental work areas, as approved by Company.

- Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas).*
- All construction debris shall be removed from the ROW and the ROW shall be graded so that the soil is left in the proper condition for planting.
- Where trench compaction has not been done, the ROW shall be graded to pre-construction contours, as practical, with a small crown of soil left over the ditch to compensate for settling, but not to interfere with natural drainage. Openings shall be left in the trench-line crown to allow for lateral surface drainage, as approved by National inspectors.
- Where topsoil has been segregated, the topsoil shall be spread back along the ROW in an even layer (as further described in Attachment 1 - Soil Protection and Subsoil Decompaction Plan).
- The Environmental Inspector may direct construction of permanent slope breakers to replace temporary erosion control barriers at road, waterbody and wetland crossings, as specified/approved. In addition, in agricultural lands, construction of permanent slope breakers at these areas will be reviewed and coordinated with the Agricultural Inspector.

Wetland and Waterbody Crossing Restoration

7.6.1 Wetlands Crossings

- All project related material used to support equipment on the right-of-way, including, but not limited to: work mats, timber temporary riprap, and other construction debris shall be removed during the final grading of the right-of-way.
- Where the pipeline trench may drain a wetland, construct trench breakers at the wetland boundaries and/or seal the trench bottom as necessary to maintain the original wetland hydrology.

*The time period between trench excavation and the start of site stabilization shall not exceed 30 calendar days. Restoration will be completed as soon as possible after grading.

- Once backfilling is complete, affected areas original contours and flow regimes will be restored to maintain original wetland hydrology.
- For each wetland crossed, install a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from the wetland, or as needed to prevent sediment transport into the wetland. In addition, install sediment barriers as outlined in the Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.
- Ensure that all disturbed areas successfully revegetate with wetland herbaceous and/or woody plant species.
- During final grading, wetlands (including areas within the 100-foot buffer) will be restored to original contours and the buffer areas seeded and mulched as soon after backfilling as practicable (preferably within 48 hours but not longer than one week) with the exception of the travel portion of the ROW, which will also be restored using these procedures after the travel way is no longer need.
- If necessary or required; to reduce the potential for risk for invasion or spreading of invasive species (such as purple loosestrife, phragmites, or Japanese knotweed), an elevated wash rack station will be used for equipment – see *BMP Drawing No. 44*. This wash rack equipment will be used in cases where:
    - the construction equipment exits a wetland having predominant invasive species vegetation, and
    - it enters another wetland without the invasive species within the next 1000 feet along the alignment
- The ROW will be seeded with annual rye grass or native perennial seed mix (see Revegetation section of this Plan) at a rate of 40 pounds/acre (unless standing water is present) to stabilize the area until indigenous wetland species can re-establish themselves. If the affected wetland is within an active agricultural parcel, reseeding will be performed according to landowner agreements.
- If bad weather limits the effectiveness of reseeding efforts, at the discretion of the Environmental Inspector and as allowed by all applicable permits, the ROW should be mulched (with straw only) to minimize erosion until conditions are suitable for reseeding. This temporary mulch cover should be monitored and maintained until conditions are suitable for completing restoration.
- No fertilizer, mulch, or lime shall be used in wetlands unless required in writing by the appropriate federal or state agency.
- Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after revegetation and stabilization of adjacent upland areas are judged to be successful.
- Consult with the appropriate federal or state agencies to develop a project-specific wetland restoration plan. The restoration plan shall include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of invasive species and noxious weeds (e.g., purple loosestrife and phragmites), and monitoring the success of the revegetation and weed control efforts. Provide this plan to the FERC staff upon request.
- During forested wetland restoration, the following measures will be undertaken to maximize or monitor success of revegetation:
    - Minimizing removal of stumps – to the extent practicable (while still allowing for safe working conditions) stumps will be left in place within the construction ROW to re-sprout following construction and restoration;

- As indicated in the Clearing section of the plan, tree stumps may only be removed from the trench line unless specifically authorized by the Chief Inspector (stumps may be removed or ground to a suitable height for safety reasons);
- If practicable, any stumps or root wads removed from the trench line, may be maintained within the ROW (e.g., staged and mulched during construction) to improve viability and replaced during restoration;
- As necessary, or to supplement revegetation of forested wetlands (if stumps have been too damaged to survive), locally native tree species will be planted during the restoration or monitoring phases;
- Locally native tree species stock or cuttings will be planted in a random pattern to promote natural distribution, although minimum species-appropriate average planting densities will be observed;
- Following construction, ROW maintenance in wetlands will be limited to clearing of 10 feet, centered on the pipeline. In addition, trees within 15 feet of the pipeline that is greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way.

7.6.2 Waterbody Crossings

- Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the Environmental Inspector. Native rock from the construction right-of-way will be used to stabilize the banks where available. Do not use stream material for stabilization.
- Use clean gravel or native cobbles for the upper 1 foot of trench backfill in all waterbodies that contain coldwater fisheries.
- For open cut crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing instream construction activities. For dry-ditch crossings, complete streambed and bank stabilization before returning flow to the waterbody channel.
- Install erosion control fabric or a functional equivalent on waterbody banks at the time of final bank re-contouring. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.
- Application of riprap for bank stabilization must comply with COE, or its delegated agency, permit terms and conditions.
- Unless otherwise specified by state permit, limit the use of riprap to areas where flow conditions preclude effective vegetation stabilization techniques such as seeding and erosion control fabric.
- Install permanent slope breakers across the construction right-of-way at the base of slopes greater than 5 percent that are less than 50 feet from the waterbody, or as needed to prevent sediment transport into the waterbody, install sediment barriers as outlined in the Plan as per *BMP Drawing No.* 8 prior to seeding and mulching (as described above in Section 7.3). in some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the waterbody.
- Seed and mulch the area immediately after pipeline installation. Revegetate disturbed riparian areas with native species of conservation grasses, legumes, and woody species, similar in density to adjacent undisturbed lands. At locations with existing (pre-construction) wooded conditions along stream banks and riparian areas, the following measures will be followed to minimize the potential for erosion and to provide for overhanging vegetation:

- During clearing, existing stream bank vegetation will be maintained, except within the trench line– a setback of 50 feet from the stream bank will be utilized for additional temporary work space.
- To the extent practicable (while still allowing for safe working conditions) stumps may be left in place along these riparian areas to re-sprout following construction and restoration.
- If practicable, any stumps or root wads removed from the trench line, may be maintained within the ROW (e.g., staged and mulched during construction) to improve viability and replaced during restoration

7.6 Residential Areas Restoration

Cleanup and restoration measures in residential areas will commence upon completion of the pipeline lowering in and backfilling. The restoration and mitigation efforts in residential areas will be completed in accordance with FERC requirements and include site-specific residential mitigation plans for residences located within 25 feet from the edge of construction right-of-way.

In residential areas topsoil replacement (i.e., importation of topsoil) is an acceptable alternative to topsoil segregation.

7.7 Agricultural Mitigation

The subsoil shall be de-compacted prior to replacement of the segregated topsoil. Decompaction activities shall be conducted only during periods of relatively low soil moisture to ensure the desired mitigation and prevent additional subsurface compaction. Specific additional details are included in Attachment 1 to this Plan - Soil Protection and Subsoil Decompaction Plan.

The project sponsor will file with the Secretary for the review and written approval of the Director, a winterization plan if construction will continue into the late autumn or winter season, or if restoration will not have been completed on agricultural lands by October when moisture or temperature conditions could delay successful restoration until the following year in agricultural lands – including subsoil decompaction, topsoil replacement, or permanent seeding.

7.8.1 Subsurface Drainage Systems

Subsurface drainage systems may include a collection of subsurface pipes, such as perforated tubing or tile, that intercepts, collects and transports excess groundwater, within the soil, from a section of land. Systems may also include older emplacements of “stone drains” installed in the late 1800s and early 1900s. Subsurface drainage systems have a number of functions depending on the location and the conditions under which the tile has been installed. Drain tile can have the following impacts:

- Improvement of the seasonal soil condition in an area by regulating the seasonal water table and ground water flow serving to maintain the parcel or area for farming or similar use;
- Providing the ability to control the amount of surface water and groundwater in an existing wet area that is used for agriculture production;

- Intercepting and removing surface runoff through the ground as opposed to allowing the flow across the surface (which would increase the potential for erosion and loss of valuable topsoil):
- Serves as an outlet for an existing system or an area that may have an increase in ground saturation related to pipeline excavation activity;
- Collects groundwater for other uses such as: spring fed, shallow wells for domestic supply; irrigation; watering ponds for livestock or similar activity.

During the pre-construction planning (see Pre-Construction Planning section of this Plan) verification should be obtained from the land department files, the landowner and/or the County Conservation or USDA-NRCS office, as to the existing or future tile system that will be crossed. A detailed drainage line repair procedure for the repair of clay tile and plastic drain line will be developed by the Ag Specialist in consultation with the local Soil and Water Conservation District (where appropriate). It is important to verify that all tiles have been distinctly marked on both sides of the excavated area and right-of-way edges (outer perimeter), for later reference. If necessary, make provisions to be able to maintain the system in working order, so as to limit impacts to existing crops from the excess groundwater for the duration of the construction activities.

During construction, drain tiles shall be identified, marked and information recorded by the drainage specialist (see Agricultural Inspection section of this Plan). If damaged during construction, a qualified drain tile repair specialist will conduct repair or replacement to equivalent or better condition. Typical repairs are shown on *BMP Drawing Nos. 30, 30A, and 42*, and generally include the following:

- Tile repairs should be designed with substantial support placed beneath the replaced section of tile to prevent the sagging of the tile line when the backfill material placed back in the trench settles, as shown on the attached repair detail.
- It is important to adequately size the repairs to match the existing tile system. Inadequately sized tile can negatively affect the entire system and render it non-functional.
- Should additional tile be necessary due to evident soil saturation, verify that the existing tile system can accommodate the additional amount of flow prior to connecting into that system. If necessary, a new system should be installed to facilitate the new lines or the existing system should be increased in size to accommodate the increase in flow amounts.
- At the time a tile is cut, the exposed ends of the drainpipe should be plugged or covered to prevent the tile from becoming clogged with dirt or rocks.
- The trenching crew or inspector shall carefully and immediately mark the location of cut or damaged tile in a prominent manner with lath, staking or flagging securely placed in the backfill or at the edge of the right-of-way.
- General tile replacement or repairs shall be performed in accordance with the requirements identified in this document including the material engineering details noted in BMP Drawing No. 30, and/or local ordinances or standards which may be higher, but not lower, in their level of requirements.
- The Drainage Specialist must approve any tile that may be proposed for reuse.
- The original gradient of the tile line shall be re-established with the replacement tile. As an alternative, the tile line can be re-routed and/or replaced, but must function as well as the original line.

8 REVEGETATION

8.1 General

- The project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities, except as noted as follows:
- Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowners request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.
- Restore agricultural lands based on site-specific soil data.

8.2 Revegetation Operations

In general, rough grading will occur 0-3 days after backfilling. The right-of-way will then be limed and fertilized (no fertilizer or lime shall be used in wetlands). The lime and fertilizer will then be disked or blended into the worked soil. If necessary, a rock rake will then be run or stones will be hand-picked by laborers. The right-of-way will then be finished with a final grade. Then seed and mulch will be applied at specified rates.

In agricultural areas, additional procedures for restoration and revegetation will be performed in accordance with those outlined in the Soil Protection and Subsoil Decompaction Plan (Attachment 1)

8.3 Soil Additives

The respective project representative within the appropriate time frame will interview each affected farmland operator, during planning prior to construction, for data on the most recent preconstruction application of soil additives per field. If necessary within the appropriate time frame, site-referenced soil testing of all affected agricultural land along the project at appropriate intervals to determine the respective soil's pH, percent of organic material, cation exchange capacity, and NPK (nitrogen, phosphorus, potassium) will be implemented. This information will be used to help establish the specific rate of lime and nutrients to be applied per field for: temporary seed cover applications; permanent seed mixtures; and (depending on time of restoration and other seasonal factors), row crop production the same season as restoration. Additional written data concerning soil modifiers will be obtained from the County Conservation District, or land management agencies. Based on the results of the site testing and other information, the site-specific fertilizer and soil pH modifiers will be incorporated into the top two inches of soil during or as soon as practicable after application.

8.4 Seeding Requirements

- Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. When hydro seeding, scarify the seedbed to facilitate lodging and germination of seed.
- Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or the request of the landowner or land management agency. Seeding is not required in cultivated croplands unless requested by the landowner
- Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures and perform seeding of permanent

vegetation at the appropriate time within the next recommended seeding season based on ROW soil workability (further described in Attachment 4 – Seeding, Fertilizing, and Lime Recommendation for Gas Pipeline Right-of-Way Restoration in Farmlands).Dormant seeding or temporary seeding of annual species may also be used, if necessary, to establish cover, as approved by the Environmental Inspector. Lawns may be seeded on a schedule established with the landowner.

- In the absence of written recommendations from the local soil conservation authorities, seed all disturbed soils within 4 working days of final grading in Pennsylvania ~~and 7 days in New York~~, weather and soil conditions permitting, subject to specifications in the first three (3) bullets of this section (8.4 Seeding Requirements). Upon completion or temporary cessation of the earth disturbance activity in a special protection watershed, immediate stabilization should occur.
- Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.
- Treat legume seed with an inoculant specific to the species using the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydro).
- In the absence of written recommendations from the local soil conservation authorities, landowner, or land managing agency to the contrary, a seed drill equipped with a cultipacker is preferred for seed application.
- Broadcast or hydro seeding can be used in lieu of drilling at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding. In rocky soils or where site conditions may limit the effectiveness of this equipment, other alternatives may be appropriate (e.g., use of a chain drag) to lightly cover seed after application, as approved by the Environmental Inspector.
- Seed slopes steeper than 33% immediately after final grading, weather permitting.
- For two-year project timelines, the topsoil berm will be seeded when the soil in the pile is loose and fresh. The top of the berm will be flattened to allow for lightweight broadcast seeding over the entire berm.

8.5 Temporary Mixtures - October 15 through March 31

General site preparation, lime and fertilizer application rates and temporary seed mixtures are detailed in Attachment 4 – Seeding, Fertilizing, and Lime Recommendation for Gas Pipeline Right-of-Way Restoration in Farmlands.

8.6 Permanent Mixtures - April 1 through October 14

General site preparation, lime and fertilizer application rates and permanent seed mixtures are detailed in Attachment 4 – Seeding, Fertilizing, and Lime Recommendation for Gas Pipeline Right-of-Way Restoration in Farmlands.

In agricultural lands soils will be tested prior to construction by the Agricultural Inspector to determine appropriate site-specific lime and fertilizer application rates (modifying the general rates in Attachment 4 up or down accordingly).

9 POST CONSTRUCTION ACTIVITIES AND REPORTING

9.1 Monitoring and Maintenance

- Conduct follow-up inspections of all disturbed areas, as necessary, to determine the success of revegetation and address landowners concerns. At a minimum, conduct inspections after the first and second growing seasons.
- Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation (or crops in cultivated cropland) is similar in density and cover to adjacent undisturbed lands.
- In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise. Monitoring will be performed by the Agricultural Inspector as necessary during the growing season for a period of no less than two years immediately following full-length activation of pipeline or completion of successful yield, whichever occurs first. The monitoring shall include an assessment of plant populations, general appearance, and yields appropriate to the crops being monitored – as outlined in the Special Crop Productivity Monitoring Procedures Paper (February 1993), included as Attachment 3 to this document.
- In wetland areas, revegetation and restoration progress will be recorded annually for three years post construction or until restoration is deemed successful.
- Continue revegetation efforts until revegetation is successful.
- Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in agricultural areas until restoration is successful.
- Restoration shall be considered successful if the ROW surface condition, including the topsoil and the horizon of the upper subsoil is similar to adjacent undisturbed lands, construction debris is removed (unless otherwise approved by the landowner or land managing agency), revegetation is successful, and proper drainage for agriculture, including the mitigation of right-of-way water boils and saturation, has been restored.
- Routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in a herbaceous state. In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15th and August 1st of any year unless specifically approved in writing by the responsible land management agency or the U.S. Fish and Wildlife Service.
- Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and permanent access roads as necessary.

9.1.1 Waterbody Post-Construction Maintenance

Limit routine vegetation mowing or clearing adjacent to waterbodies to allow a riparian strip at least 25 feet wide, as measured from the waterbody's mean high water mark, to permanently revegetate with native plant species across the entire construction right-of-way. 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 that are located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be removed from the permanent right-of-way. Do not conduct any routine vegetation mowing or clearing in riparian areas that are between HDD entry and exit points.

Do not use herbicides or pesticides in or within 100 feet of a waterbody except as allowed by the appropriate land management or state agency.

Time of year restrictions specified in the Plan (April 15 – August 1 of any year) apply to routine mowing and clearing of riparian areas.

9.1.2 Wetland Post-Construction Maintenance

Do 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 a 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. Do not conduct any routine vegetation mowing or clearing in wetlands that are between HDD entry and exit points.

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

Time of the year restrictions specified in the Plan (April 15 – August 1 of any year) apply to routine mowing and clearing of wetland areas.
Monitor and record the success of wetland revegetation annually until wetland revegetation is successful.

Wetland revegetation shall be considered successful if all of the following criteria are satisfied:

- The affected wetland satisfies the current federal definition for a wetland (i.e., soils, hydrology, and vegetation).
- Vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction.
- If natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion.
- Invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.

9.2 Reporting

The project sponsor shall 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

The project sponsor shall file with the Secretary quarterly activity reports documenting the results of follow-up inspections required by section 9.1; any problem areas, including those identified by the landowner; and corrective actions taken for at least 2 years following construction.

The requirement to file quarterly activity reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or advanced notice provisions in the FERC's regulations.

9.2.1 Wetland Reporting

Within 3 years after construction, file a report with the Secretary identifying the status of the wetland revegetation efforts and documenting success as defined in 9.1.2 above. The requirements to file wetland restoration reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or advanced notice provisions in the FERC's regulations.

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

9.3 Off Road Vehicle Control

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

- Signs
- Fences with locking gates
- Slash and timber barriers, pipe barriers, or a line of boulders across the ROW
- Conifers or other appropriate trees or shrubs across the ROW

10 GENERAL PIPELINE CONSTRUCTION SEQUENCING

10.1 Pre-Construction

Prior to mobilization, the Drainage Specialist/Agricultural Inspector will review drain tile systems, potential dewatering outlets, and potential outlets for interceptor systems to mitigate subsequent ROW water boils and saturation (see Pre-Construction Planning section of this Plan). In conjunction with the Environmental Inspector and the Project's construction management, the Drainage Specialist/Agricultural Inspector will review nearby or crossed ditches (see Section 4.10), for their adequacy as temporary holding areas for trench dewatering, at a minimum covering those segments of the Project's ROW through agricultural lands that are identified with high water table (HWT) soil. The staff will review the construction ROW plan, concerning agricultural lands for: a) the topsoil stockpiling locations being consistent with the upslope side of the ROW; b) the "extra work space areas" for their sufficiency of size to accommodate effective soil segregation and protection, for various special construction related activities (e.g., bore set ups and corresponding spoil areas; staging sites for waterway or road crossings, etc.); and c) location of all natural drainage swales on affected farms, where adequate surface drainage gaps (through soil berms) are to be left as openings during topsoil stripping and spoil excavation management.

Before construction begins, the R.O.W. will be surveyed and staked. Other utility lines will be located and marked to prevent accidental damage during pipeline construction. Additionally, mark stream buffers and wetland

boundaries. Post environmental signs as it relates to No Fueling areas, Access Roads, Not an Access Road, Streams and Wetlands.

10.2 Staging Area; Typical BMP's 1, 5, 17, 23A, 45ABC

Staging areas will be set up when the contractor moves in to begin work. Install proper BMPs as required. Examples of BMP's are rock construction entrances, silt fence or sock, rock channel filters, topsoil segregation. Proper access BMPs will be implemented prior to any sustained heavy traffic. If vehicles enter or exit the staging area onto a paved road, an entrance pad will be installed as per *BMP Drawing No.1.* Strip topsoil and segregate for staging areas (if any) residential or agricultural lands.

10.3 Handling of Hazardous Materials

All fuels, oils, chemicals, or other hazardous materials will be maintained in tightly sealed containers during transportation and storage. Fuels will be stored in equipment staging areas in stationary tanks. The tanks will be diked at the time of their placement in the staging area. Refueling will be performed in accordance with Section IV.A.1 of the FERC's Wetland and Waterbody Construction and Mitigation Procedures (Procedures); this includes storage of hazardous materials and the application of concrete coating. The FERC procedure is to store fuels and perform refueling at distances no less than 100 feet from a stream or wetland. In addition to the FERC's procedures, the project will not allow the maintenance of equipment within 100 feet of streams and wetlands unless not doing so may create a greater hazard if not corrected before moving equipment (e.g., patching an oil leak from a stranded backhoe). This is also shown on *BMP Drawing Nos. 4 and 4A*, note 2.

In the event of a spill or leakage, the contents will be transferred to another tank. The empty tank will be removed as well as all standing liquids caught by the dike. All obviously contaminated soils will be removed and photo-ionization meters will be used to identify any further contaminated soils. The excavated area will be backfilled with clean soil.

10.4 Access Roads

The project will make use of the existing ROW for access along the pipeline. ~~Where additional access is necessary, existing access roads may be used upon agreement with the landowner.~~ Expansion of existing access roads or creation of new access roads is subject to routine construction requirements (e.g., topsoil stripping in residential or agricultural areas). BMPs will be installed and maintained on these roads, and they will be reclaimed to a condition at least equal to their pre-construction condition unless otherwise agreed to with a landowner.

10.5 Rock Entrances; BMP 1

The Grading Crew will install rock entrances at public roads in accordance with BMP Drawing No. 1, Entrance Pad. If the job kicks off at a point where an entrance pad is required, the entrance pad will be installed as soon as the immediate area required for the pad is stumped and rock can be brought in. This shall be within forty-eight (48) hours from the time the Grading Crew move onto the location.

For other locations along the pipeline where entrance pads are required, the pads will be installed as the Grading Crew progresses to these locations, but no later than forty-eight (48) hours from the time they reach these locations.

Rock construction entrances should be installed wherever it is anticipated that construction traffic will exit the project site onto any roadway, public or private. Access to the site should be limited to the stabilized construction entrance(s). Rock construction entrances should be maintained to the specified dimensions and the capacity to remove sediment from tires by adding rock when necessary. A stockpile of rock material should be maintained on site. Sediment deposited on public roadways should be removed and returned to the construction site immediately. Note: Washing roadway or sweeping the deposits into roadway ditches, sewers, culverts, or other drainage courses is not acceptable.

10.6 Clearing; Typical BMP's 1, 5, 37, 45ABC

Clear and grub vegetation as needed within the clearing limits as shown on the plans. Minimize vegetation clearing at stream crossings to maintain existing riparian buffers. Temporary stream and wetland crossings must be provided by the Clearing Crew wherever equipment crosses an existing stream channel and/or wetland. Mats are to be placed within designated travel area. Wherever such crossings are installed, an appropriate permit must be obtained from DEP, DEC, and/or Army Corps of Engineers.

This consists of the removal of trees and other obstructions from the ROW Clearing will be restricted to only that portion of the ROW necessary for actual construction. Trees, brush, and other obstructions will be cleared to permit safe and efficient use of machinery and other construction equipment. Permission will be obtained from landowners for use of access roads across their property to the ROW, for cutting trees and erecting temporary gates where necessary.

Various clearing methods will be employed, depending on tree size, contours of the land, and the ability of the ground to support clearing equipment. Marketable timber will be cut to specified lengths and stacked. All brush may be disposed of in one of several ways, depending on local restrictions and the terms of applicable permits and/or easement agreements: piled on the edge of the R.O.W. to provide cover for wildlife, burned, or chipped. Chipped wood may be removed from or scattered along the edge of the ROW. After the removal of ROW vegetation temporary ECDs will be installed as necessary to prevent erosion.

10.7 Grading; Typical BMP's 1, 4A, 5, 8A, 9, 17, 19, 22, 23A, 37, 45ABC, 51

Rock outcrops, ridges, boulders, and tree stumps will be removed from the working area, and sharp topographical irregularities will be graded to ensure rapid and safe passage of the work crews. Backhoes and bulldozers will be employed for removal of tree stumps, rocks, and boulders. Burying them or setting them outside the construction area will serve to dispose of tree stumps in an approved manner, typically. No tree stumps will be buried or placed in agricultural lands. In agricultural lands as identified in Section 4.3.1 Topsoil Segregation, topsoil will be carefully stripped from the full work area (spoil stockpiling zone, trench area, pipe stringing/welding, and traffic areas) segregated from the subsoil, and preserved for later restoration of the ROW. Leveling the ROW may entail rock blasting in certain areas. Qualified, experienced personnel will conduct blasting operations. Licensed blasting experts will be employed, and blasting permits will be obtained when required by government authorities. Disposal of excess rock will be in accordance with the terms of any applicable permit and/or easement agreements.

Install waterbars at each location specified on the plans. Strip topsoil within designated areas (Ag land, pasture, etc.) as needed and stockpile within the LOD. Apply seed (rye grass) and mulch to topsoil stockpile. Install compost filter sock or filter fence at all locations specified in the plans. In areas with concentrated flow, install limestone rock filters (do not use silt sock) as indicated on the plans. Grading Crew will typically make improvements to clearing crew's temporary stream and wetland crossings.

10.8 Temporary Diversions; Typical BMP's 11, 14, 17, 25

Diversion ditches will be installed by the Grading Crew each time the crew progresses to a location where an additional diversion ditch is required according to this Plan. Example information on diversion ditches and controls are included on *BMP Drawing Nos. 11, 14, 17 and 25*. The Rough Grading Crew (at the leading edge of the grading process) will install rough diversions each day for that section of the ROW, which has been rough graded. The Finish Grade Crew (at the trailing edge of the grading process) will finalize the construction of the temporary diversion ditches. After that, each succeeding crew will be responsible for maintaining the diversion ditches on a daily basis.

10.9 Ditching; Typical BMP's 4, 6A, 10A, 12, 13, 18, 21, 28, 30, 38, 47

Begin pipeline construction. Minimize earth disturbance to the maximum extent possible to install pipeline and windrow spoil within the LOD. Apply seed (rye grass) and mulch to all areas of the spoil pile (4 day for PA ~~and 7 day in NY requirement~~). The proposed steel pipeline with welded joints will require a relatively long time frame for open trench. Wherever water is pumped from the trench, it must be treated for sediment removal prior to discharging. Sediment bags should be distributed at low lying areas along the pipeline corridor. The excavated trench will remain open for the minimum time necessary to efficiently excavate the trench, install pipeline, backfill the trench, install trench plugs at locations indicated on the plan and begin stabilization of the disturbed areas. For most installations, this time period should not exceed 30 calendar days. Re-establishment of water bars, silt fence or sock must be completed by the end of each day.

The ditch centerline will be staked following completion of grading. The ditch will be excavated by mechanical backhoe to a depth that provides at least three (3) feet of cover on top of the pipe, except in bedrock areas, where a minimum cover of two (2) feet will be provided. In areas where the depth of soil over bedrock is less than (4) feet, the pipe should be buried below the top of the bedrock at the depth required for the land use, whichever is less. In agricultural lands a minimum of (4) feet of cover will be maintained, except where the new pipeline is located parallel and adjacent to an older existing pipeline that was buried with less than 40 inches of cover. In this situation, a minimum depth of 40 inches is required. In areas where temporary filling has been utilized, the depth will be measured from the original ground surface. During construction, excavated material is typically stored along one side of the trench while the other side is used as a work area.

The method of excavation used will depend on the specific soil conditions encountered, however, it is expected that track excavators will be required. Ditch-line breakers, usually composed of sandbags or staked straw bales, will be installed on steep slopes. Where bedrock is encountered, attempt to rip the ditch with a backhoe. Only if this technique proves unsuccessful will blasting be used.

Landowners will be contacted sufficiently in advance of construction, regarding access ways across the trench. The owner, as well as the operator (if different from the owner), of affected agricultural land will be met with by one of the respective project representative to designate farming related access ways across the trench. Where requested by either by landowners or farmland operators, access ways across the trench will be spaced at convenient intervals to allow landowners and land operators, all sizes of farming equipment requiring access, domestic livestock, and wildlife to cross the construction area.

Drainage Specialists in coordination with National land agents will contact landowners to locate drainage systems installed along the pipeline. If drainage tile is present, excavation of the trench will be to a depth sufficient to meet drainage tile clearance requirements. Damaged drain tiles will be promptly repaired or replaced (see Restoration section of this Plan).

10.10 Lowering In

Prior to lowering in, the ditch will be cleaned of all debris; the bottom smoothed and sand bags placed at a spacing of 15 feet or less, along the ditch bottom. The pipe string will be lifted from the skid supports and lowered directly into the ditch by using a sufficient number of side-boom tractors equipped with rubber-tired cradles and/or slings and belts to prevent damage to the pipe and pipe coating.
In areas where the ditch bottom is irregularly shaped due to consolidated rock and/or where the excavated spoil materials are unacceptable for backfilling around the pipe, padding materials may be required. Sand or screened subsoil material from the ditch excavation, or a combination of each, will be used for padding. This padding material will be placed on the bottom of the ditch, at a depth of six (6) inches, just prior to lowering in the pipe.

10.11 Backfilling; Typical BMP's 4, 6A, 10A, 12, 13, 18, 21, 28, 30, 38, 47

Before backfilling begins, a final inspection will be made to assure that all debris has been removed from the ditch and that the pipe and pipe coating are undamaged.

Where rock, gravel, or other materials are encountered of a size and shape that could cause damage to the pipe or pipe coating, select padding material will be placed around the pipe to a thickness of six (6) inches, or rock shield will be applied.

While the ditch is open the Drainage Specialist will supervise the repair or replacement of drain lines. During backfilling, the Drainage Specialist or Agricultural Inspector (in conjunction with backfill inspector) will supervise the application of the necessary measures to ensure protection from damage and permanent drain line support for gravity flow. Prior to backfilling the trench, any drain tiles across the working side of the ROW will be inspected to ensure its integrity. Tiles crushed or otherwise damaged by construction activity will be repaired or replaced to pre-construction or better condition.

In the event dewatering is required for pipe installation and backfilling additional efforts described in Section 4.10 will be employed.

On steep slopes, trench breakers consisting of sandbags, gravel, cement, or cement-filled sacks will be installed in the trench over and around the pipe to provide full protection against wash-away in areas that are vulnerable. Compacted earth or other suitable low-permeability material will be used on gentler slopes and wet areas to minimize channeling of groundwater along the ditch line.

The ditch will be backfilled using either subsoil excavated from the pipeline ditch or fill from a remote source. Multiple passes of heavy equipment will be used to compact the fill material.

Restoration and cleanup activities will occur following the pipe installation and backfill as described in Section 7.

10.12 Stream Crossing; Typical BMP's 2, 5, 6A, 13, 21, 24, 28, 31, 37, 45ABC, 47, 51

As pipeline construction progresses to stream crossings, install temporary dam and pump bypass system or flumed crossing as shown on the plans and dewater excavations as needed. Once crossing is complete, remove pump and bypass system and restore normal stream flow. Place erosion control blankets on banks. Replace all temporary sediment controls (silt fence or sock). Apply soil additives, seed and mulch all disturbed areas within 50-feet of stream on both sides of stream (within 24-hrs of completion). Temporary equipment crossings will be removed when no longer needed.

10.13 Hydrostatic Testing

Before any segment of new pipeline is placed in-service, it will be hydrostatically tested to ensure it conforms to ESP SC and D.O.T. specifications. Test water will be withdrawn from nearby hydrants, ponds, streams, or trucked in from an off-site location. This water will be pumped into the pipeline behind a fill pig. A high-pressure pump will be used to pressurize the pipeline to designed test pressure. The test pressure will be maintained for eight (8) hours. After test, the pipe section is depressurized and test water is discharged to an approved location where it is released back into the environment (in accordance with the project Hydrostatic Test Plan). (Reference *BMP Drawing No. 3*.)

10.13.1 Notification Procedures and Permits

Apply for state-issued water withdrawal permits, as required.

Apply for National Pollutant Discharge Elimination System (NPDES) or state-issued discharge permits, as required.

Notify appropriate state agencies of intent to use specific sources at least 48 hours before testing activities unless they waive this requirement in writing.

10.13.2 General

Perform 100 percent radiographic inspection of all pipeline section welds or hydrotest the pipeline sections, before installation under waterbodies or wetlands.

If pumps used for hydrostatic testing are within 100 feet of any waterbody or wetland, address secondary containment and refueling of these pumps in the project's Spill Prevention and Response Procedures.

The project sponsor shall file with the Secretary before construction a list identifying the location of all waterbodies proposed for use as a hydrostatic test water or discharge location. This filing requirement does not apply to projects constructed under the automatic authorization provisions of FERC's regulations.

10.13.3 Intake source and Rate

Screen the intake hose to minimize the potential for entrainment of fish.

Do not use state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and/or local permitting agencies grant written permission.
Maintain adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users

Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable

10.13.4 Discharge Location, Method, and Rate

Regulate discharge rate, use energy dissipation device(s), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive stream flow.

Do not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.

10.14 Restoration and Re-vegetation; Typical BMP's 5, 8A, 24, 45ABC

As pipeline construction is completed, re-grade the site to pre-project contours. Apply soil additives according to plan requirements. Seed and mulch disturbed areas immediately upon final grading operations. Place erosion control blankets within 100-feet from any stream, drainage, wetland, or other body of water in Special Protected Watersheds and non-agricultural areas. Place hydraulically applied blanket or erosion control blanket on all slopes equal to or greater than 3:1.

The time period between trench excavation and the start of site stabilization shall not exceed 30 calendar days. Restoration will be completed as soon as possible after grading. Cessation of activity for 4 days or longer requires temporary stabilization.

Final grading, topsoil replacement, and installation of permanent erosion control structures will be completed within 20 days after backfilling the trench (10 days in residential areas). If soil moisture, seasonal or other weather conditions prevent compliance with these time frames, temporary erosion controls (temporary slope breakers and sediment barriers) will be maintained until conditions allow completion of cleanup.

The pipeline ROW will be carefully cleaned up and restored following construction. When the backfilling is completed, excess rock and similar materials will be removed from the ROW along with accumulated construction debris, and the ROW will be re-graded.

Topsoil will be re-spread over the ROW in areas where it had been segregated prior to ditching. Drainage ditches, terraces, roads, and fences will be restored to their former condition. Permanent slope breakers will be installed to divert runoff away from disturbed areas. Agricultural lands will be restored to equal or better condition (see the Restoration section and attached Soil Protection and Subsoil De-compaction Plan).

Construction equipment, surplus materials, and debris will be removed from the ROW. Pipeline markers and warning signs will be erected at roads and interspersed at points along the ROW. The ROW will be re-seeded, fertilized, and mulched unless the landowner stipulates otherwise. Re-vegetation will be monitored periodically. If excessive erosion occurs, these areas will be stabilized and re-vegetated.

10.15 Maintenance /Reporting

All BMPs must remain in place and FUNCTIONAL until all areas within the limit of disturbance are completed and permanently stabilized. Maintenance must include inspection of all erosion and sediment controls after each runoff event and also on a weekly basis.

10.16 ECD Removal and Close Out

Upon achieving permanent stabilization (a minimum uniform, perennial 70% vegetative cover) remove compost filter sock/filter fence and any other temporary erosion and sediment pollution control BMP. Seed, mulch, and permanently stabilize any disturbed areas caused by the removal of the temporary BMPs.

REFERENCES

- Federal Energy Regulatory Commission. Upland Erosion Control, Revegetation, and Maintenance Plan, May 2013.
- Federal Energy Regulatory Commission. Wetland and Waterbody Construction and Mitigation Procedures, May 2013.
- New York State Department of Agriculture & Markets. Pipeline Construction Projects- Agricultural Mitigation through Stages of Project Planning, Construction/Restoration and Follow-Up Monitoring, November 1997.
- New York State Department of Agriculture & Markets – Special Crop Productivity Monitoring Procedures, February 1993.
- New York State Department of Agriculture & Markets – New York State Farmlands Seeding, Fertilizer, and Lime Recommendations for Gas Pipeline Right-of-Way Restoration in Farmlands, undated.
- Pennsylvania Department of Environmental Protection. ESCGP-2 permit for Stormwater Discharges from Construction Activity.
- Pennsylvania Department of Environmental Protection. Erosion and Sediment Pollution Control Manual. Technical Guidance Number 363-2134-008; March 2012
- New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activities (GP-0-15-002).

Attachment 1

Soil Protection and Subsoil Decompaction Plan

SOIL PROTECTION
and
SUBSOIL DECOMPACTION MITIGATION PLAN

May 2006
Revised January 2019

OVERVIEW OF PROCEDURES

Successful soil protection and subsoil decompaction includes procedures generally associated with the following steps, with the detailed technical process outlined in the following Detailed Procedures Section:

Agency Coordination

During project planning, construction, restoration and monitoring, agency coordination will be conducted at levels appropriate to meet the objectives in this Plan, including:

1. Coordinate with the appropriate agencies regarding:
    - Drain Tile and Irrigation Systems
    - Grazing Deferment
    - Soils
    - Agricultural Biological Security
2. Obtain written recommendations from the County Conservation District regarding erosion control and revegetation specifications, both temporary and permanent. Have available all written recommendations from these or other agencies for erosion control and revegetation specifications at the project location.
3. The project sponsor agrees to consult with the appropriate agencies regarding agricultural bio-security (noxious weeds and soil-borne pathogens). If necessary, based on this consultation, Empire will develop specific practical cost-effective procedures to mitigate significant agricultural bio-security risks, if they are determined to exist in the project area.

Topsoil Segregation

1. Use topsoil segregation (or topsoil replacement) methods in all of the following areas:
    - Annually cultivated or rotated agricultural lands
    - Hayfields, improved pastures[1], and rotation hay land/pastures
    - Other areas at the landowners' request
    - Residential areas
2. Prevent the mixing of topsoil with subsoil in agricultural lands by stripping all topsoil from the full work area.
3. In deep agricultural soils strip topsoil in accordance with detailed procedures outlined in the following section.
4. At stream crossings, segregate topsoil from pipe trench on stream banks to facilitate re-stabilization.

[1] Improved pastures: land of generally tillable quality, used predominantly for grazing but largely open (free of trees, brush, and boulders)

Drain Tiles

All drainage tiles encountered shall be marked, maintained during construction, and restored or replaced to as good or better condition upon completion of construction. Tiles shall be referenced and flagged with stakes located adjacent to the ditch and the temporary construction right-of-way edges (outer perimeter).

Additional details regarding drain tile maintenance, repair and/or replacement are provided in Section 4.3.2 and along with the associated BMP drawings.

Soil Compaction Mitigation

Subsoil compaction of all agricultural lands shall be relieved in two phases. First the subsoil shall be deep ripped (at times of appropriately low soil moisture) with uplifted stone removal (using standard rock-picking equipment) occurring prior or replacement of the segregated topsoil. Following topsoil replacement a second phase of decompaction will occur, that includes Paratill® deep sub-soiling, and supplemental excess stone removal, of the right-of-way (including the topsoil storage area). Subsoil and topsoil replacement activities shall not be performed after October 1st, unless this act is approved by a qualified environmental inspector and/or a certifying agency along with Ag and Markets.

DETAILED PROCEDURES

Topsoil Segregation

1.0 Use topsoil segregation methods in all the following areas:
- Annually cultivated or rotated agricultural lands.
- Hayfields, improved pastures[2], and rotation hay land/pastures.
- Other areas at the landowners' request

2.0 Prevent the mixing of topsoil with subsoil by stripping topsoil from the full work area and limit all excavating, spoil stockpiling, and traffic/equipment to the area cleared of topsoil.
- Note: Less than full available width of construction right-of-way may be used, provided that the topsoil and subsoil are segregated and all traffic/equipment and subsoil storage are limited to the area cleared of topsoil.

3.0 Stockpile both the spoil and topsoil in a manner that prevents pooling of water behind the soil piles (prevents excessive saturation of the soil), e.g.: cut a surface drainage gap through the segregated soil piles (lineal berms), and across the right-of-way, at swale crossings, and protect outlet points.

4.0 In deep agricultural soils (more than 12 inches of topsoil), segregate the topsoil to a minimum depth of at least 12-incheIn shallow soils, the entire topsoil will be stripped. The subsoil will be segregated to a depth of 12 inches or to the top of bedrock, whichever is shallower In soils with less than 12 inches of topsoil the entire topsoil layer and 1-2 inches of friable subsoil (as approved by the Agricultural Inspector) will be segregated. Topsoil removal up to a depth of 16 inches will be required in specially designated soils.

5.0 At stream crossings, only segregate topsoil from pipe trench on stream banks to facilitate re-stabilization. Don't disturb the remainder of the actual bank. Agricultural topsoil stripping shall proceed out to the field's fringe, near, but not beyond the edge of the stream's riparian strip.

[2] Improved pastures: land of generally tillable quality, used predominantly for grazing but largely open (free of trees, brush, and boulders).

Soil Compaction Mitigation: Two Phases

1.0 First phase, deep-ripping the exposed subsoil. In all agricultural sections of the right-of-way where topsoil is stripped, the Contractor shall deep rip the exposed, construction surface subsoil with deep tillage devices such as a heavy duty ripping chisel or ripping chisel-plow, e.g.: V-frame or straight-frame ripper; or a heavy duty Paratill®.

The subsoil shall be thoroughly deep-ripped and rock picked prior to the replacement of segregated topsoil. The subsoil shall be deep-ripped to a depth of 18 to 22 inches as determined by the Agricultural Inspector. At least 40 hp of pull should be available per leg of implement, e.g.: 4 legs / 160 hp tractor.

Note: Due to the spacing between ripping legs (about 24 to 30 inches) a series of staggered, overlapping, "parallel rips" is employed to help ensure thorough breakup of the compacted mass of subsoil material. "Kittering" or a broad "S" series of cross rips will immediately follow for sites where the former "parallel" technique is inadequate for breakup of larger chunks into smaller clods.

1.1. All rocks, which are brought to the surface during the de-compaction process, shall be removed, as necessary, so that the size, density and distribution is similar to adjacent areas not disturbed by construction, during alternating passes of the deep ripper, rock rake, wind rower, and mechanical rock picker.

1.2. Upon approval by the Agricultural Inspector of the subsoil deep ripping and the stone removal, the topsoil that has been temporarily removed for the period of construction shall then be uniformly replaced, preferably using a light to moderate weight, LGP (low ground pressure), wide-track bulldozer.

1.3. All of the first phase deep-ripping and rock picking activities, as well as topsoil replacement and second phase de-compaction activities shall be conducted only during periods of relatively low soil moisture (i.e., not in a state of plastic consistency), as verified by the Atterberg field test, to ensure the desired mitigation and prevent additional soil profile compaction. Further technical details are provided in the Soil Moisture (Workability) section below.

1.4. Once the deep-ripping phase begins, further use of the right-of-way for any traffic is prohibited.

2.0 Second phase: Following topsoil replacement - Paratill® the right-of-way preferably with a deep angled-leg sub-soiler so the soil profile will be loosened to a depth of 20 to 22 inches achieving the necessary shattering of the subsoil and remove any large size uplifted rocks.

2.1. Deep soil profile shattering (by Paratill® or other approved deep tillage implement) includes the entire width of the temporary construction right-of-way: all areas that where the topsoil was stripped and replaced plus the area where the topsoil berm had been stored.

2.2. Deep soil profile shattering tools with angled legs include the 3 to 5 leg Paratill ®.

2.3. Alternative deep sub-soiling tools include such implements as but not limited to the straight leg Unverferth Zone Builder ® with 5 legs and (for narrower right-of-ways or limited hp tractors) 3 leg parabolic shanks, heavy duty sub-soiler (either straight frame or V-frame). Manufacturers' such as but not limited to John Deere ® and Brillion ®.

2.4. As noted for deep ripping (above) at least 40 hp of pull should be available per leg of implement for full depth effectiveness in right-of-way conditions.

2.5. If subsequent construction and cleanup activities result in further compaction, conduct additional deep sub-soiling of the agricultural soil profile, as needed.

3.0 After the completion of deep, soil profile shattering the right-of-way is lightly to moderately disked and then limed, fertilized and seeded during friable (workable) soil moisture conditions to minimize re-compaction.

Trench Crowning and Mitigation of Trench Settling

Prior to trench crowning and during the trench backfilling, ripped or blasted bedrock or concentrated volumes of excavated stone or rock material (excavated from the trench) may be used to backfill the trench only to the top of the existing bedrock profile. Generally, in agricultural lands, rock will not be returned to the trench any higher than 24 inches below the exposed (topsoil-stripped) construction surface in mesic soils nor 30 inches in frigid soils from the exposed working construction surface right-of-way

All excess rock not utilized, as trench backfill, will be hauled away. The remaining backfill materials will consist of suitable subsoil over the rock fill material.

1.0 Rough trench crowning will occur during the backfill operation of the construction phase, using subsoil materials over the trench to allow, and compensate, for trench settling to the extent possible prior to restoration. Right-of-way crowning is the placement of a small berm or crown using two distinct layers of soil materials over the trench line in agricultural areas. Installing a berm or crown along the trench line compensates for the settling of backfilled soils following pipeline restoration. Typically, when backfilling, air pockets or voids will remain below grade. Eventually, the below grade soils will move into the voids and creates depressions at the surface. The crown material will compensate for this settling and can be used to fill in the area that would have otherwise been a depression. *BMP No. Drawing No. 38* shows typifies the procedure.

   Note: If construction backfilling occurs between early autumn through winter Agricultural restoration will not be initiated until relatively drier soil conditions in late spring or early summer. Nearly all the trench settling will have occurred by mid-spring, giving the opportunity to compensate for trench settling using surplus, on site subsoil material immediately before restoration

   Note: The stockpiled topsoil (with the proper low moisture content) will be uniformly spread over the stripped portion of the affected right-of-way, after the initial deep ripping of the exposed subsoil and the rock cleanup has been completed, in late spring or early summer.

2.0 In areas where trench settling occurs after topsoil spreading, imported topsoil will be used to fill each depression. Attempts will be made to identify sources of topsoil free of weeds, including soliciting input from landowners of potential sources.

3.0 Topsoil from the right-of-way or from adjacent agricultural land will not be used to backfill depressions.

Soil Moisture (Workability) during Restoration, Compaction Testing during Monitoring and Remedial Action

1.0 Soil Moisture – During restoration activities check the soils for not exceeding friable (workable) moisture content using the following procedures (Atterberg field test for plastic soil consistency):

   1.1 Exposed construction surface subsoil

      1.1.1 Take a sample with a soil auger at a depth of 16 inches.

1.1.2 Roll the soil in your hand (Worm Method), to the diameter of an earthworm (1/8" diameter), and if the soil remains intact, in increments beyond 3/8" long, the soil is too wet (or "plastic"). If it breaks (crumbles) apart into 3/8" or shorter sections, the moisture content is correct (workable for deep ripping).

1.2 Topsoil stockpile (berm)

1.2.1 Take samples from vicinity of the berms' lower outside and inside slopes, 9 inches deep, and from the berms' inner core (at least 24 inches inside of the berm).

1.2.2 Administer the same test for each individual sample of topsoil material, as above in 1.1.2 (worm method). If all samples test friable (workable) topsoil replacement may proceed as long as favorable soil conditions remain.

1.2.3 If the topsoil is too wet, break open the topsoil stockpile (berm) and rough spread the soil partially across the right-of-way, allow it to air dry, and then conduct re-tests, until friable (usually about 2 days minimum of clear, dry weather) and then complete the topsoil replacement.

2.0 Compaction Testing during the Post Restoration Monitoring and Maintenance - Once the moisture of the restored, full soil profile on the affected right-of-way is at or near equilibrium with the adjacent off right-of-way land, soil profile compaction testing will be conducted by the Agricultural Inspector using an appropriate soil penetrometer or other soil compaction-measuring device (in the early spring following the year of initial restoration).

2.1 Cone-type soil penetrometer, using the 3/4 inch diameter cone, or similar cone-type soil compaction measuring tool, capable of withstanding applications of at least 400 pounds-per-square-inch (psi). When the readings inside the right-of-way are less than, equal with, or no more than twenty percent greater than the subsoil density readings outside the right-of-way, the subsoil de-compaction/shattering restoration is satisfactory.

2.2 Test for soil compaction, obtaining readings at every 3-inch vertical interval from surface to 21 inches, or to the point of resistance (300 psi), through the topsoil and subsoil, across the project right-of-way in agricultural areas. These cross section tests shall be conducted at right-of-way inter-spacing (not to exceed 200 feet) sufficient to determine the need for remedial measures.

2.3 Tests shall be done on the same soil type under the similar moisture conditions and should include the following areas

2.3.1 Temporary stockpile areas

2.3.2 The trenched zone

2.3.3 Soil from undisturbed areas

2.3.4 The work area

2.3.5 Any traffic areas related to the project

2.4 It is standard to test each sampling site of a multi-site cross section at five to eight separate points of measurement of the soil profile's density, all taken in roughly the area of a thirty-inch diameter circle. The single highest and single lowest mechanical samples of the complete soil profile, per test site, are "thrown out". The remainder of the complete test samples recorded in 3-inch increments is used to calculate the soil profile's average density per 3-inch increment.

2.5 The soil profile compaction test results within the right-of-way will be compared with those of the adjacent off right-of-way portion of the affected farm field/soil unit.

2.6 If the “higher-than-threshold” measurements occur (for instance) in one out of six representative cross-sections of one long field and no similar excesses are measured in its neighboring croplands along the right-of-way, this should be viewed as an “isolated anomaly” and the soil restoration work on the subject field is generally considered adequate.

3.0 Where representative subsoil density on the right-of-way, or a repetitive zone within the right-of-way, exceeds the representative subsoil density outside the right-of-way, follow-up shattering of the soil profile will be performed using a deep, angled-leg subsoil tool in the respective areas of the right-of-way.

4.0 Follow-up deep shattering will be applied during periods of relatively low soil moisture to ensure the desired mitigation and to prevent additional subsoil compaction. (Refer to Soil Moisture section 1.0, above)

5.0 Oversized stone/rock material, which is uplifted to the surface as a result of the deep shattering, will be removed.

General Monitoring and Remediation

1.0 General right-of-way conditions to be monitored include topsoil thickness, relative soil density (compaction), relative content of rock and large stones, trench settling, crop development, drainage and repair of severed fences, etc, for not less than two years following the full-length activation of the pipeline or completion of initial ROW restoration, whichever occurs last.

Topsoil deficiency and trench settling shall be mitigated with imported topsoil that is of "equal or greater quality" than topsoil on the affected site. Crop development/production problems maybe the result of right-of-way trench saturation or residual compaction, in which case appropriate interceptor drainage and/or de-compaction mitigation will be implemented. Results will be compared to portions of the same field located outside of the right-of-way.

Attachment 2

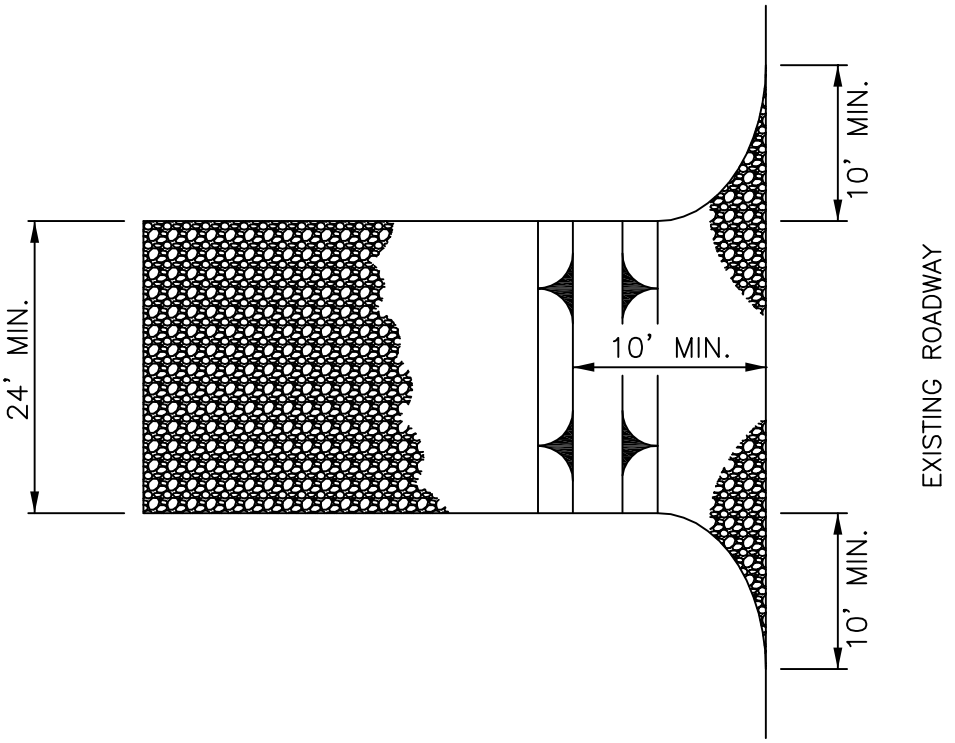
Best Management Practices (BMP) Drawings

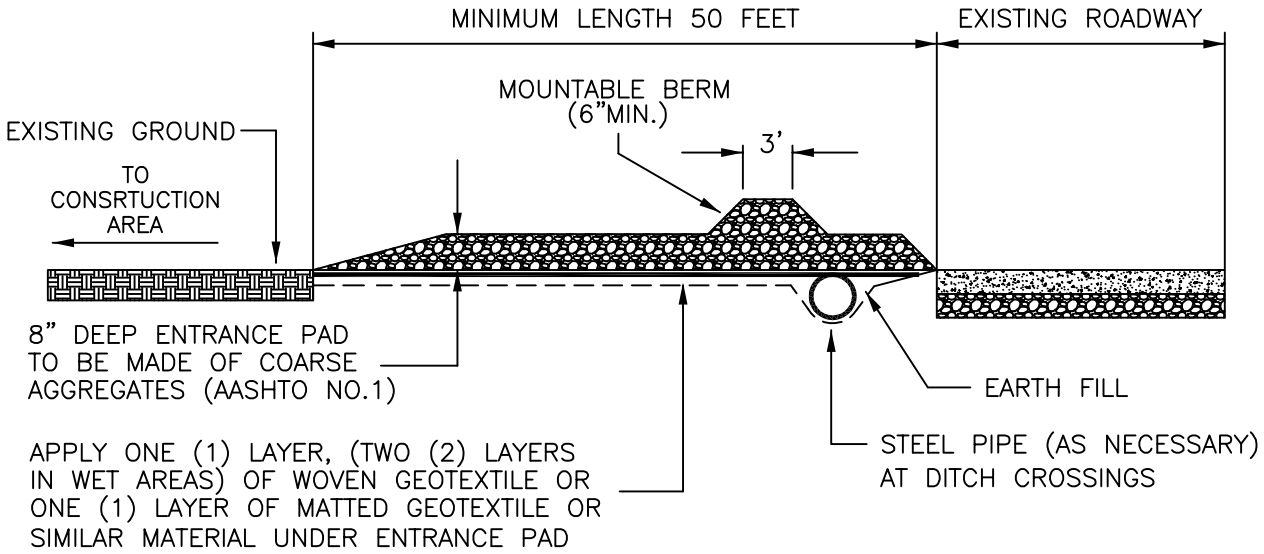
BMP Drawing Index

BMP Description	Drawing Number	Drawing Date
Entrance Pad	1	1/17/2014
Stream Crossing – Dam & Pump Energy Dissipater	2	5/16/2002
Pipe Test Energy Dissipater	3	12/9/2013
Wetland Crossing	4	1/17/2014
Wetland Travel Area	4A	1/17/2014
Filter Fence	5	6/2/2010
Trench Breaker	6A	1/17/2014
Stream Bank Stabilization	7	1/7/1997
Slope Breakers	8A	1/17/2014
Stream Mat	9	1/17/2014
Stream Mat at Undefined Channel	9A	1/17/2014
Temporary Equipment Timber Mat Stream Crossing	9B	8/24/2016
Road Crossing (Open Cut)	10	1/17/2014
Diversion Ditch	11	1/8/1997
Road Crossing (Bore)	12	1/17/2014
Stream Crossing (Bore)	12A	3/22/2019
Flume (Dry Ditch) Stream	13	1/17/2014
Run Off Ditch	14	6/27/2007
Erosion Blankets Channel Installation	15	1/9/1997
Specifications Erosion Blankets Channel Installation	15A	1/9/1997
Block and Gravel Drop Inlet Sediment Barrier Rock	16	3/27/2017
Channel Filter	17	1/10/1997
Road Culvert Extension Across Pipeline Trench	18	9/9/2003
Temporary Culvert With Clean Rock Fill Temporary	19	1/17/2014
Culvert Across Open Trench	20	1/10/1997
Dam And Pump Stream Crossing	21	1/17/2014
Straw Bale Installation	22	3/10/2000
Topsoil Segregation	23	1/17/2014
Topsoil Segregation	23A	1/17/2014
Topsoil Segregation	23B	1/17/2014
Erosion Blankets Slope Installation	24	1/13/1997
Specifications Erosion Blankets Slope Installation	24A	1/13/1997
Catch Basin Sediment Sack	25	3/5/2008
Cathodic Protection Anode Installation	26	1/17/2014
Storm Water Channel	27	6/27/2007
Dewatering Filter Bag	28	1/17/2014
Road Culvert	29	9/14/2001
Typical Drain Tile Repair Across Trench	30	6/24/2005

BMP Drawing Index

BMP Description	Drawing Number	Drawing Date
Typical Drain Tile Repair Across Trench	30A	6/29/2005
Energy Dissipater	31	6/27/2007
Wooden Mat Bridge Pipeline Crossing	32	1/17/2014
Stone Bridge Pipeline Crossing (Without Mats)	32A	1/17/2014
Bell Hole Next To Waterbody	33	1/17/2014
Bell Hole Next To Wetland	34	1/17/2014
Bell Hole Agricultural Field	35	1/17/2014
Bell Hole Adjacent To Paved Road	36	1/17/2014
Extra Work Spaces	37	1/17/2014
Right-Of-Way Crowning	38	4/4/2005
Discharge Method For Trench Dewatering	39	1/17/2014
Parallel/New Submain Tile Installation	40	5/11/2006
Lateral Intercept Drain	41	4/8/2005
Typical Drain Tile Outlet	42	6/24/2005
Stone Pipeline Crossing with Timber Matting	43	1/17/2014
Elevated Washrack	44	5/3/2007
Compost Filter Sock	45A	12/9/2013
Compost Filter Sock	45B	3/11/2010
Compost Filter Sock	45C	3/11/2010
(No BMP Drawing)	46	-----
Trench Dewatering Sediment Corral	47	9/13/2010
Hydrotest Water Discharge Device	48	1/17/2014
Large Volume Hydrotest Water Discharge Device	48A	1/17/2014
Concrete Slab Pipe Protection Detail	49	1/17/2014
Diversion Terrace Protection and Mat	50	1/17/2014
Sediment Filter Sock (New York)	51	1/23/2014
30’-0” Portable Bridge	52	2/9/2017
35’-0” Portable Bridge	53	2/9/2017
40’-0” Portable Bridge	54	2/9/2017





MOUNTABLE BERMS SHOULD BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED. PIPE TO BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.

MAINTENANCE:

ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON THE SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPSOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION BY 50 FEET INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWER, CULVERTS, OR OTHER DRAINSGEWAYS IS NOT ACCEPTABLE.

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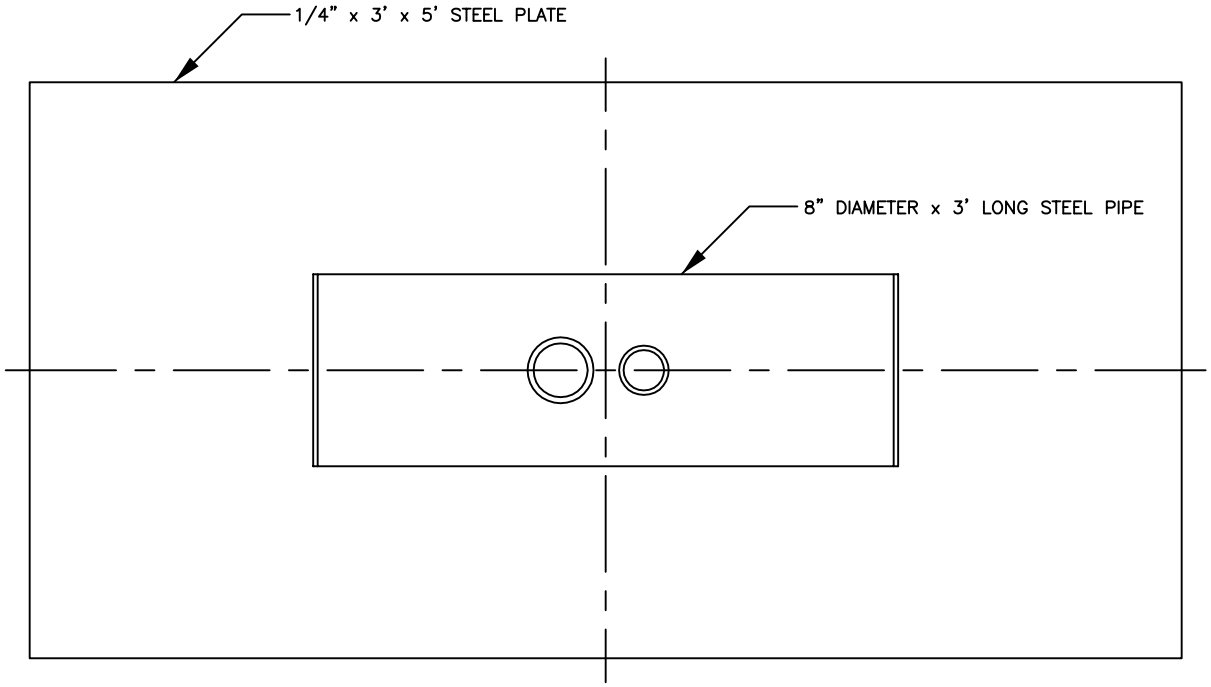
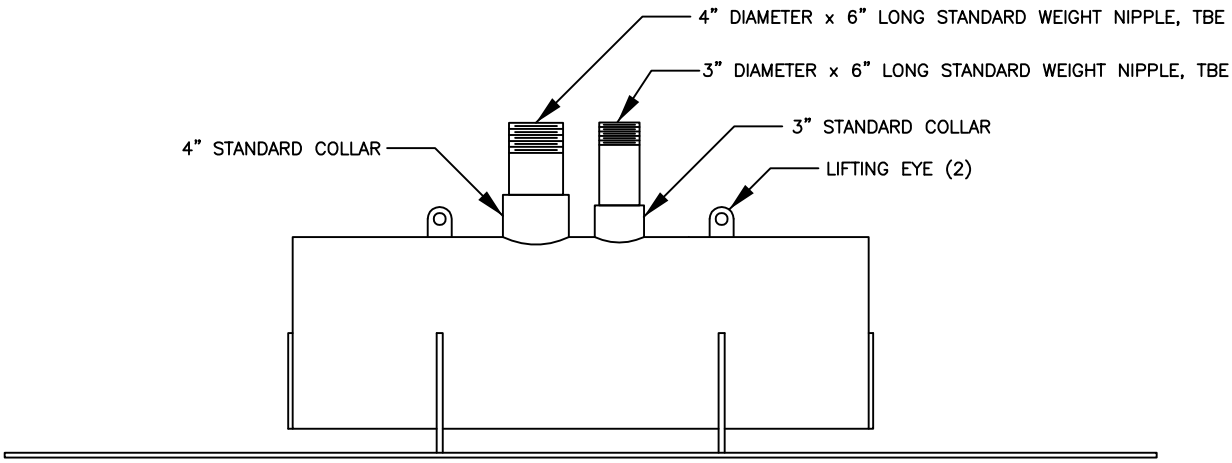
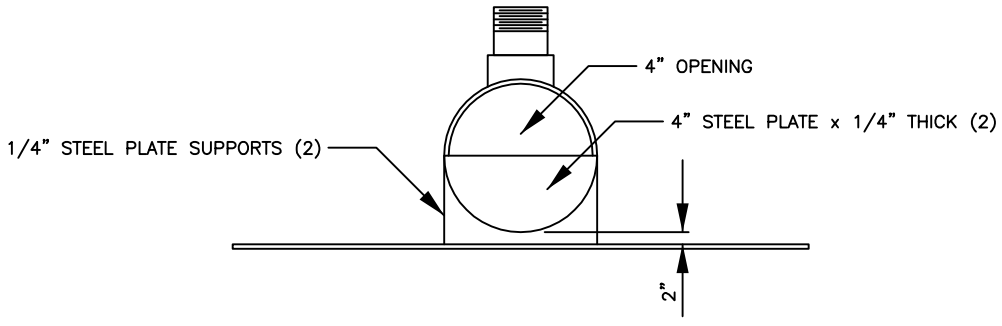
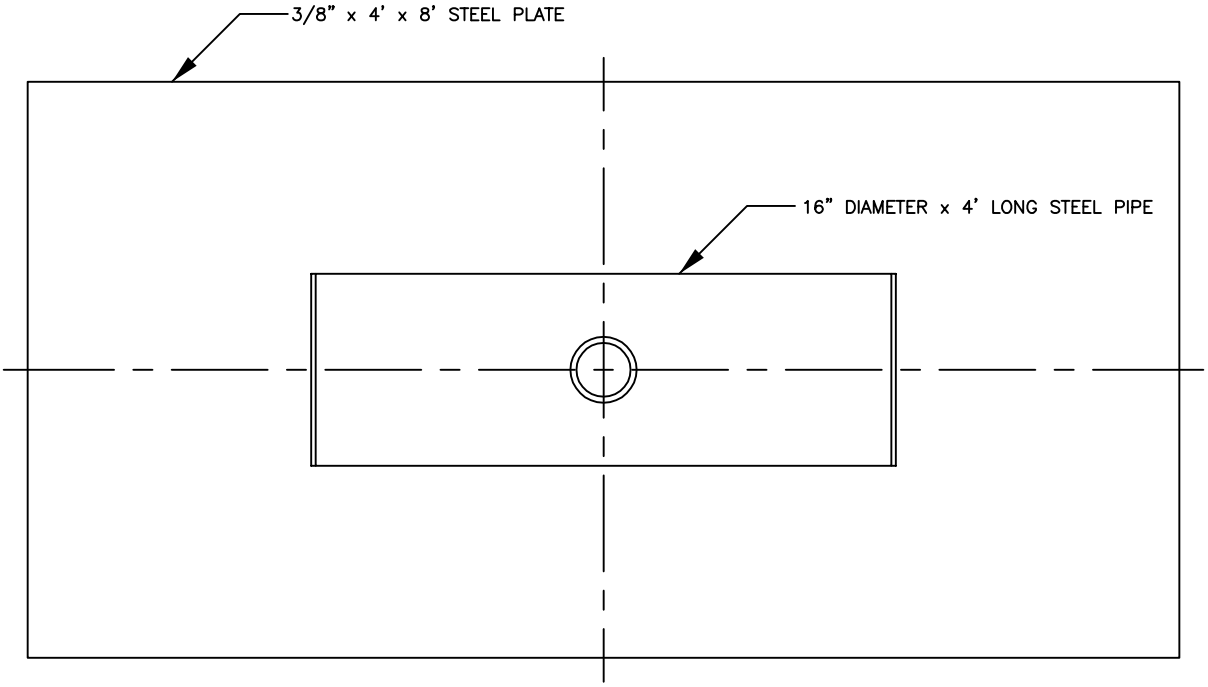
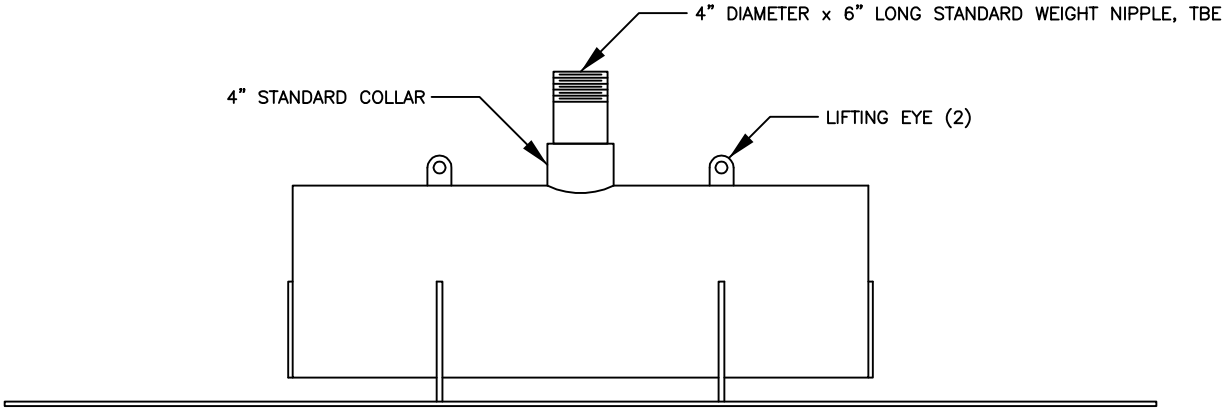


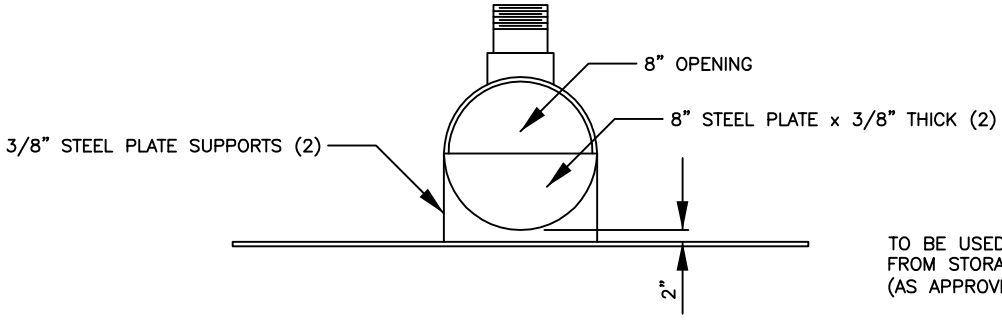




National Fuel Supply Corporation	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: L.A.P./P.A.B. FILENAME: NFGSC\BMP02.dwg DATE: 05/16/2002	STREAM CROSSING - DAM & PUMP ENERGY DISSIPATER	DRAWING NUMBER: 2







TO BE USED FOR DISCHARGING FROM STORAGE TANK TO STREAM (AS APPROVED BY PERMITTING)

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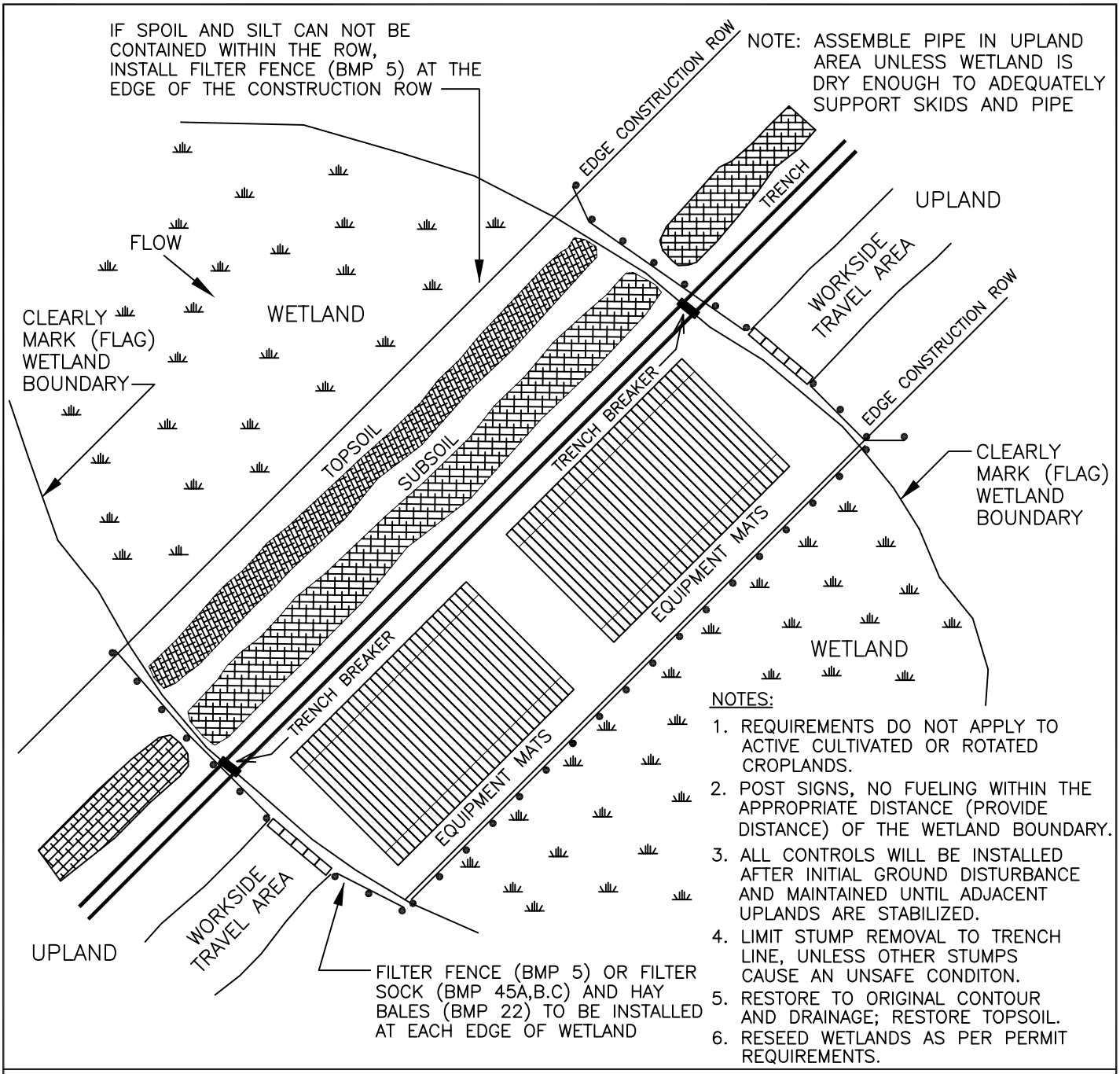
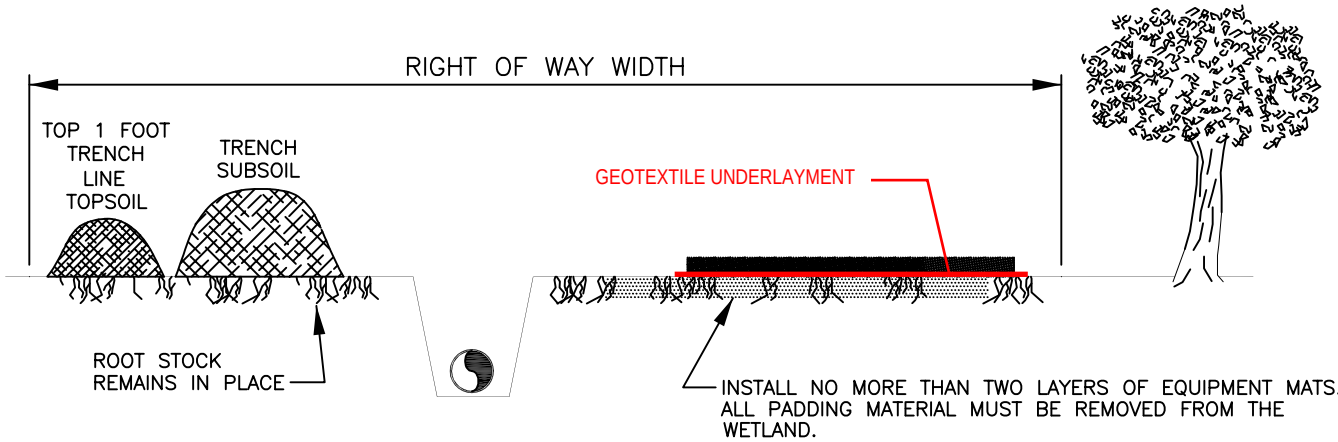


NOTES:

1. REQUIREMENTS DO NOT APPLY TO ACTIVE CULTIVATED OR ROTATED CROPLANDS.
2. POST SIGNS, NO FUELING WITHIN THE APPROPRIATE DISTANCE (PROVIDE DISTANCE) OF THE WETLAND BOUNDARY.
3. ALL CONTROLS WILL BE INSTALLED AFTER INITIAL GROUND DISTURBANCE AND MAINTAINED UNTIL ADJACENT UPLANDS ARE STABILIZED.
4. LIMIT STUMP REMOVAL TO TRENCH LINE, UNLESS OTHER STUMPS CAUSE AN UNSAFE CONDITON.
5. RESTORE TO ORIGINAL CONTOUR AND DRAINAGE; RESTORE TOPSOIL.
6. RESEED WETLANDS AS PER PERMIT REQUIREMENTS.



RESTORE TO ORIGINAL CONTOUR AND DRAINAGE; RESTORE TOPSOIL

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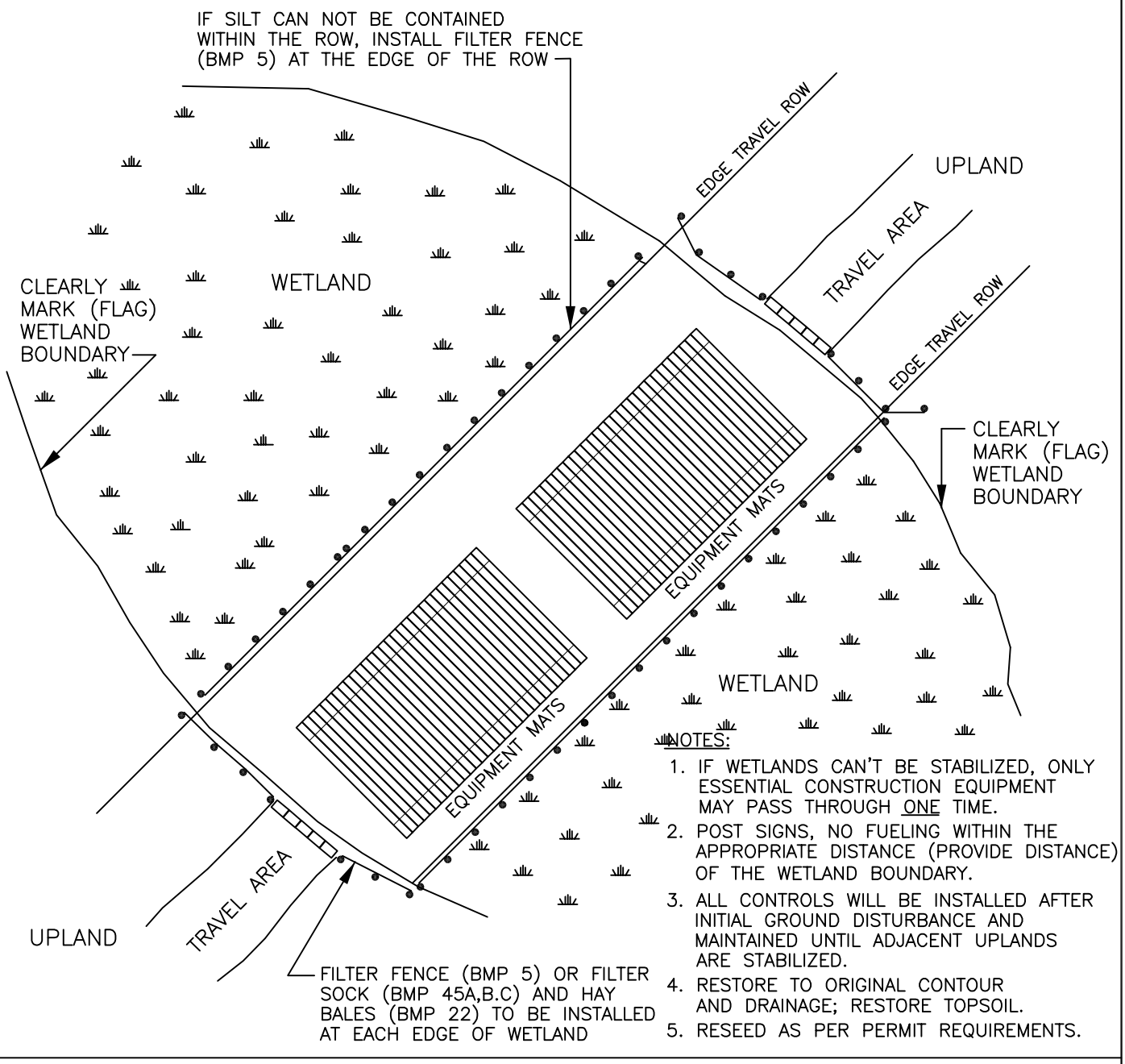
FILENAME: EPC\BMP04.dwg
LAST REVISION DATE: 01/17/2014

WETLAND CROSSING

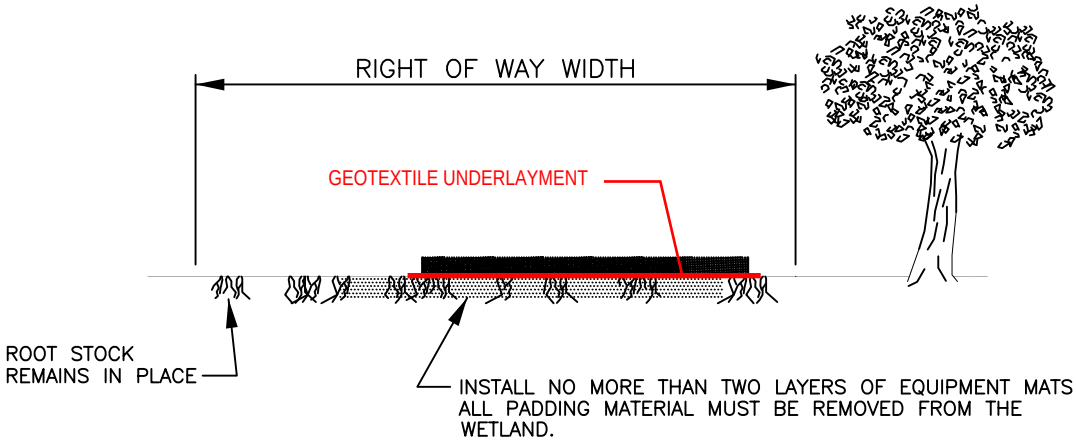
DRAWING NUMBER: 4

REVIEWED: 01/2014



NOTES:

1. IF WETLANDS CAN'T BE STABILIZED, ONLY ESSENTIAL CONSTRUCTION EQUIPMENT MAY PASS THROUGH ONE TIME.
2. POST SIGNS, NO FUELING WITHIN THE APPROPRIATE DISTANCE (PROVIDE DISTANCE) OF THE WETLAND BOUNDARY.
3. ALL CONTROLS WILL BE INSTALLED AFTER INITIAL GROUND DISTURBANCE AND MAINTAINED UNTIL ADJACENT UPLANDS ARE STABILIZED.
4. RESTORE TO ORIGINAL CONTOUR AND DRAINAGE; RESTORE TOPSOIL.
5. RESEED AS PER PERMIT REQUIREMENTS.



RESTORE TO ORIGINAL CONTOUR AND DRAINAGE; RESTORE TOPSOIL

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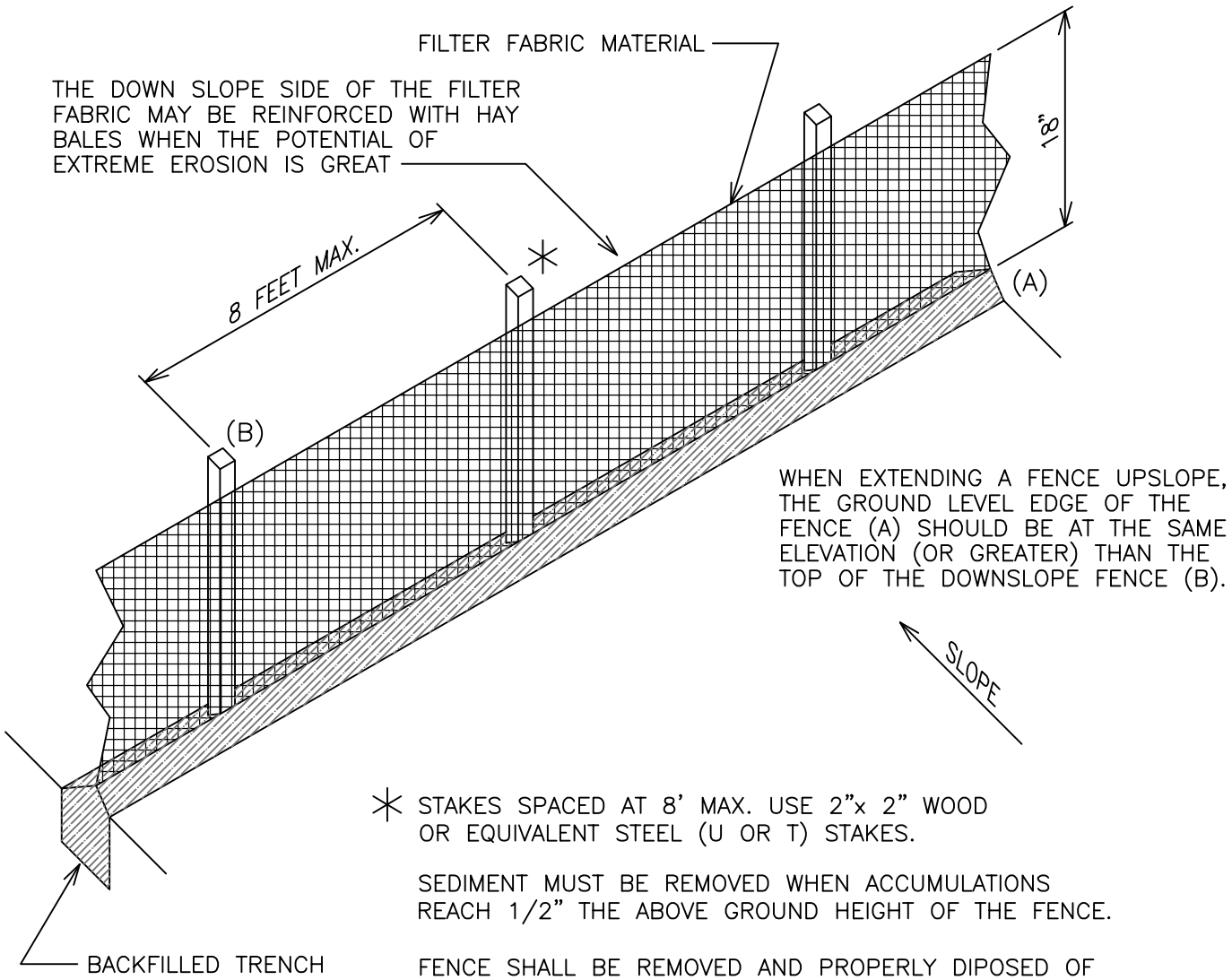
FILENAME: EPC\BMP04A.dwg
LAST REVISION DATE: 01/17/2014

WETLAND TRAVEL AREA

DRAWING NUMBER: 4A

REVIEWED: 01/2014

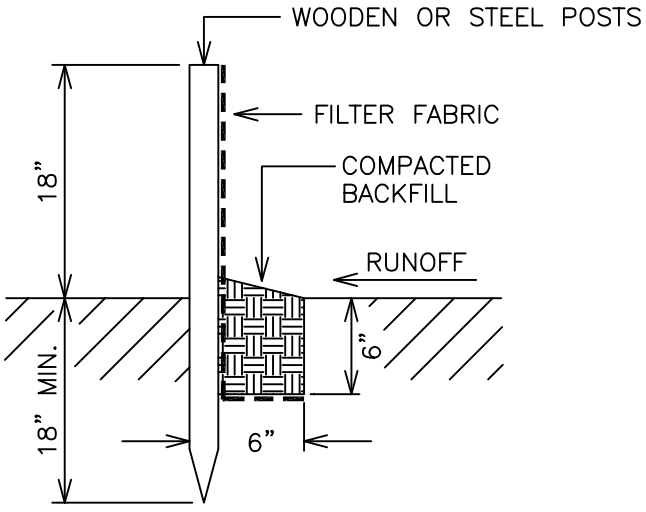


✳ STAKES SPACED AT 8' MAX. USE 2"x 2" WOOD OR EQUIVALENT STEEL (U OR T) STAKES.

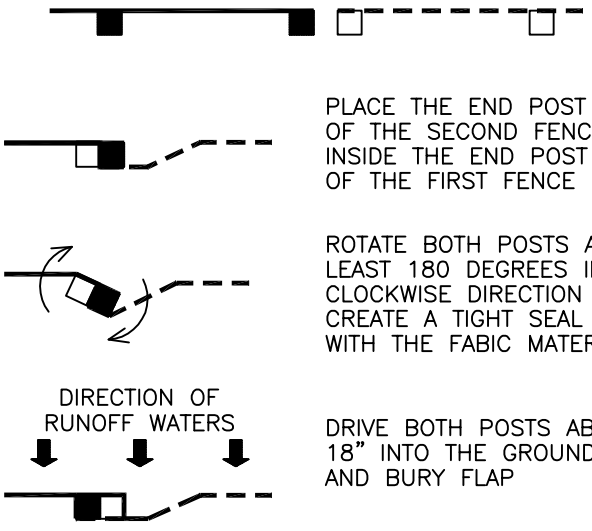
SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2" THE ABOVE GROUND HEIGHT OF THE FENCE.

FENCE SHALL BE REMOVED AND PROPERLY DIPOSED OF WHEN DISTURBED AREA IS PERMANENTLY STABILIZED.

FENCE DETAIL



ATTACHING TWO SILT FENCES



PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE

ROTATE BOTH POSTS AT LEAST 180 DEGREES IN A CLOCKWISE DIRECTION TO CREATE A TIGHT SEAL WITH THE FABIC MATERIAL

DRIVE BOTH POSTS ABOUT 18" INTO THE GROUND AND BURY FLAP

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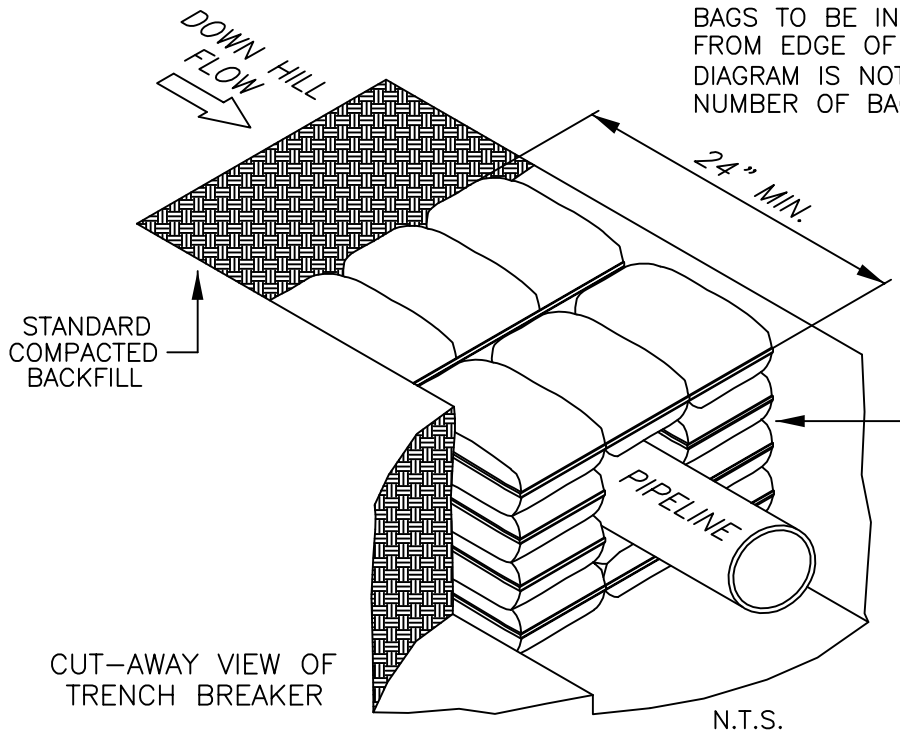
REVIEWED: 01/2014



CUT–AWAY VIEW OF TRENCH BREAKER

N.T.S.

BAGS TO BE INSTALLED TO FILL ENTIRE VOID FROM EDGE OF DITCH TO EDGE OF DITCH. THE DIAGRAM IS NOT A REPRESENTATION OF THE TOTAL NUMBER OF BAGS REQUIRED.

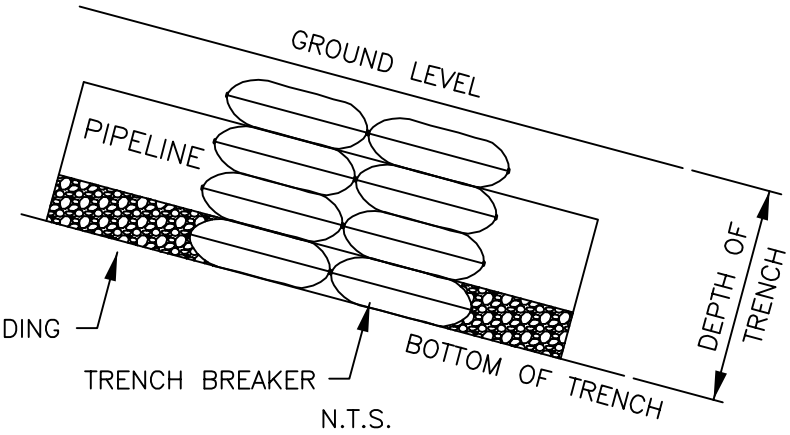
STACKED CLAY, BENTONITE, SYNTHETIC FOAM, OR SAND FILLED SACKS

IMPERVIOUS TRENCH BREAKERS (CLAY OR BENTONITE) ARE REQUIRED FOR ALL STREAM, RIVER, WETLAND OR OTHER WATER BODY CROSSINGS.

TEMPORARY TRENCH BREAKERS:

HARD/SOFT PLUG SPACING			
SLOPE	HARD PLUG	(OR)	SOFT PLUG
< 5%	N/A	(OR)	1000'
5–15%	900'		600'
15–30%	600'		400'
>30%	300'		200'

* SEE BMP #8A FOR ADDITIONAL DETAILS



N.T.S.

TRENCH BREAKER SLOPE SPACING

- AT THE SPACING LISTED IN THE CHART SHOWN BELOW ON THIS DRAWING.

ADDITIONAL LOCATIONS

AS A MINIMUM, INSTALL A TRENCH BREAKER AT THE BASE OF SLOPES GREATER THAN 5% WHERE THE BASE OF SLOPE IS LESS THAN 50' FROM A WATERBODY OR WETLAND AND WHERE NEEDED TO AVOID DRAINING A WATERBODY OR WETLAND.

* SYNTHETIC FOAM,

PERMANENT TRENCH BREAKERS		
TRENCH SLOPE (%)	SPACING (FT)	PLUG MATERIAL
<5	1,000	* CLAY, BENTONITE,* ~~SOIL~~ OR SAND FILLED SACKS
5–15	500	* CLAY, BENTONITE,* ~~SOIL~~ OR SAND FILLED SACKS
15–25	300	* CLAY, BENTONITE,* ~~SOIL~~ OR SAND FILLED SACKS
25–35	200	* CLAY, BENTONITE,* ~~SOIL~~ OR SAND FILLED SACKS
35–100	100	* CLAY, BENTONITE,* ~~SOIL~~ OR SAND FILLED SACKS
>100	50	CEMENT FILLED BAGS (WETTED) OF MORTARED STONE

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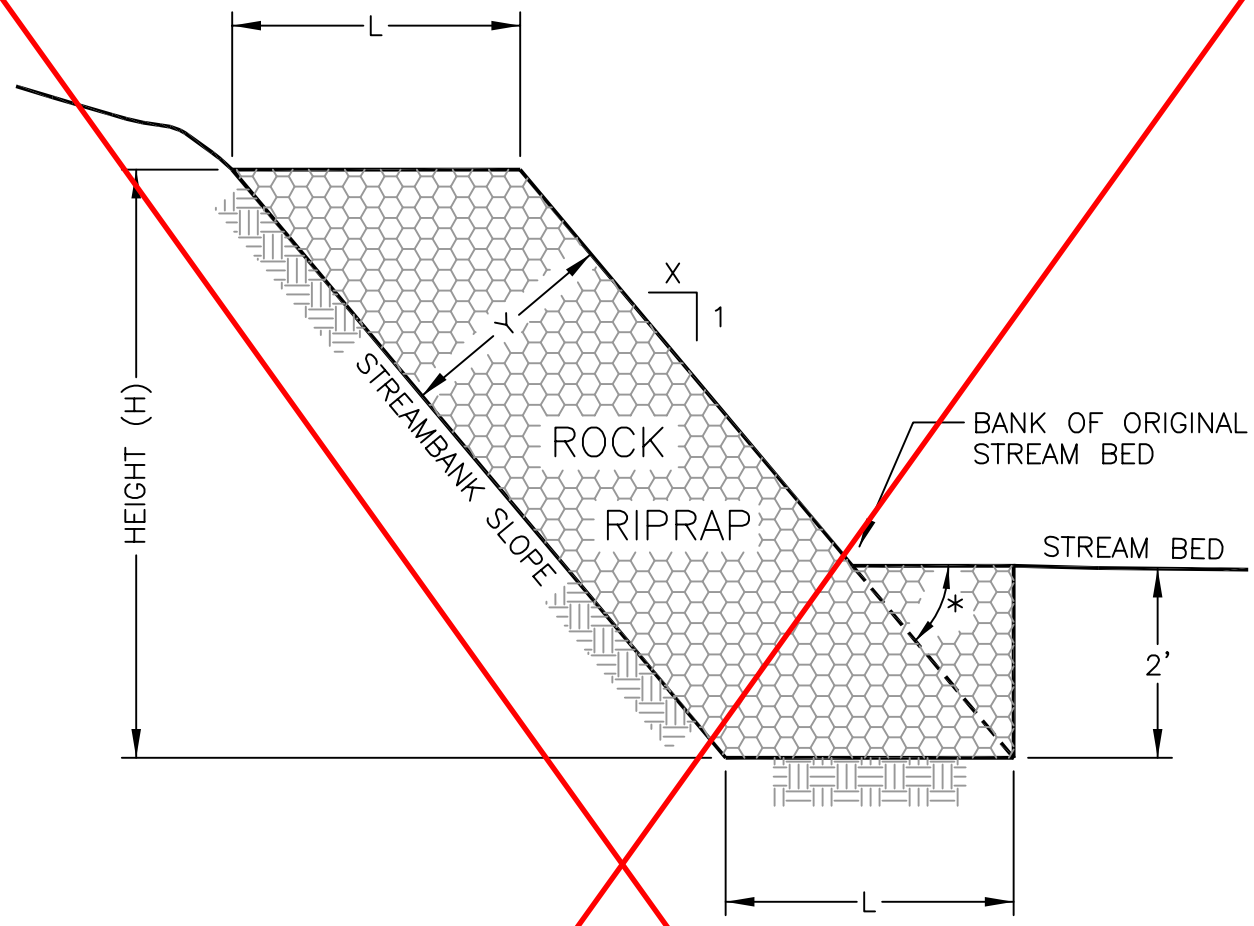
FILENAME: NFGSC\BMP06A.dwg
LAST REVISION DATE: 01/17/2014

TRENCH BREAKER

DRAWING NUMBER: 6A

REVIEWED: 01/2014

REFER TO E&S DETAILS,
FIGURE 18



(Y) ROCK THICKNESS	TABLE OF L VALUES SIDE SLOPES			
	1.5:1	2:1	2.5:1	3:1
12"	1.8'	2.2'	2.7'	3.2'
18"	2.7'	3.4'	4.0'	4.7'
24"	3.6'	4.5'	5.4'	6.3'
30"	4.5'	5.6'	6.7'	7.9'
36"	5.4'	6.7'	8.1'	9.5'
42"	6.3'	7.8'	9.4'	11.1'
48"	7.2'	8.9'	10.8'	12.7'
*	33.69°	26.57°	21.80°	18.43°

FORMULAS TO CALCULATE LENGTH OF RIPRAP (L)

$$L = \frac{Y}{\sin *} \qquad \text{OR} \qquad L = Y\sqrt{X^2 + 1}$$

(ENTER "Y" IN FEET)

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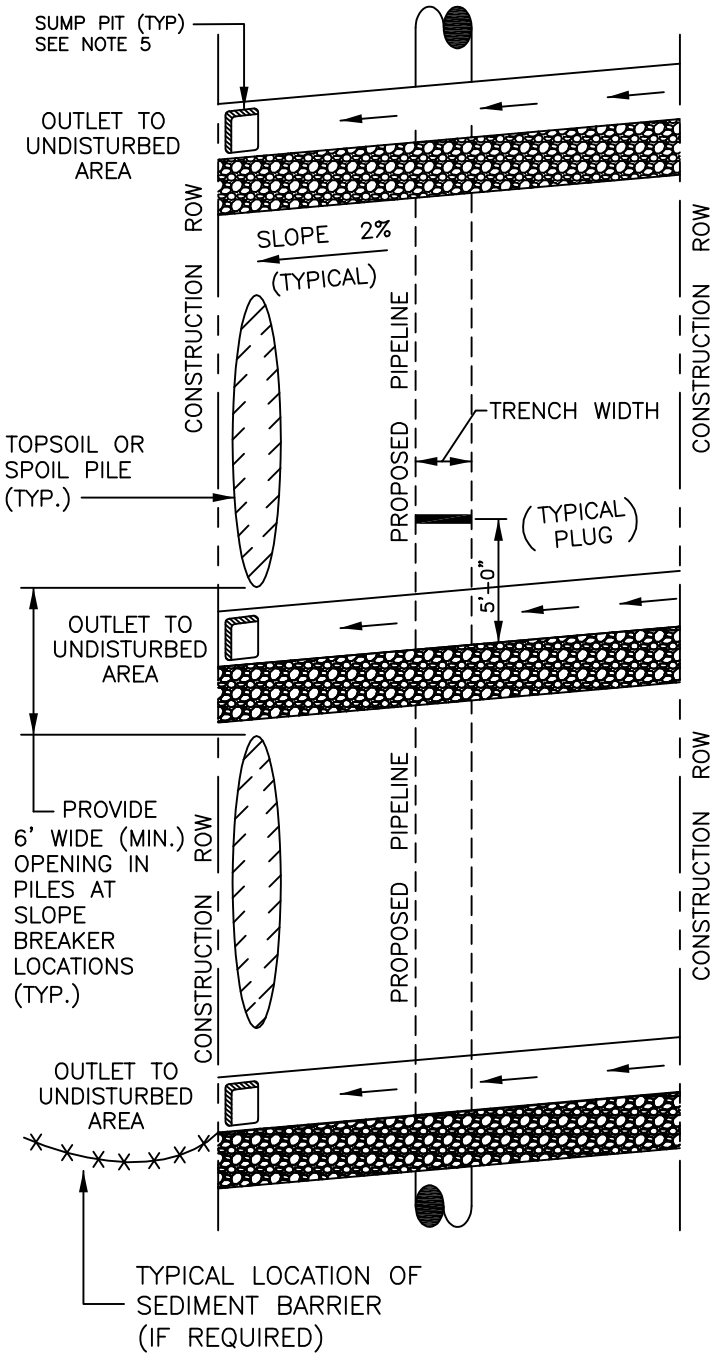
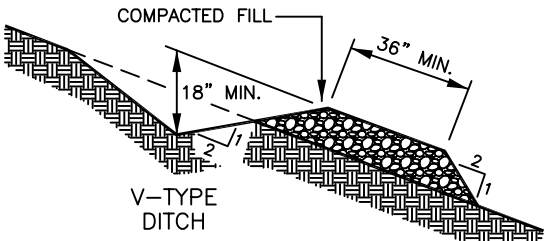
DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP07.dwg
DATE: 01/07/1997

STREAM BANK STABILIZATION

DRAWING NUMBER: 7

REVIEWED: 01/2014





V-TYPE DITCH TO BE 24" (MIN.) WHEN PLACED ON SLOPES GREATER THAN 33% (3H:1V).

TEMPORARY TRENCH BREAKER

HARD/SOFT PLUG SPACING			
SLOPE	HARD PLUG	(OR)	SOFT PLUG
< 5%	N/A		1000'
5–15%	900'	(OR)	600'
15–30%	600'		400'
>30%	300'		200'

~~NEW YORK PROJECTS SLOPE BREAKER SPACING~~

SLOPE	DISTANCE
<5%	125 FEET
5–10%	100 FEET
10–20%	75 FEET
20–35%	50 FEET
>35%	25 FEET

PENNSYLVANIA PROJECTS SLOPE BREAKER SPACING

SLOPE	DISTANCE
<5%	250 FEET
5–15%	150 FEET
15–30%	100 FEET
>30%	50 FEET

NOTES:

1. DO NOT INSTALL SLOPE BREAKERS TO OUTLET IN THE DIRECTION OF HOUSES OR BUILDINGS.
2. ANY BREAKERS THAT OUTLET ONTO A GRASS YARD WILL BE FILTERED BY A FILTER FENCE.
3. INSTALL AT THE BASE OF SLOPES ADJACENT TO WATERBODIES AND WETLANDS.
4. BREAKERS MAY EXTEND UP TO 4' BEYOND THE EDGE OF CONSTRUCTION IF THE AREA IS ENVIRONMENTALLY CLEARED.
5. OBSTRUCTIONS, (E.G. STRAW BALES, SILT FENCE, ROCK FILTERS, COMPOST SOCKS ETC.)SHOULD NOT BE PLACED IN ANY WATERBARS. WHERE NEEDED, THEY MAY BE LOCATED BELOW THE DISCHARGE END OF THE WATERBAR.
6. HARD PLUGS ARE UN-EXCAVATED PLUGS OF NATIVE SOIL LEFT IN THE PIPELINE TRENCH.
7. SOFT PLUGS ARE COMPACTED SOIL PLUGS THAT ARE PRE-EXCAVATED AND INSTALLED IN THE PIPELINE TRENCH.
8. COMPANY INSPECTOR SHALL DETERMINE THE TYPE OF PLUG TO BE USED.

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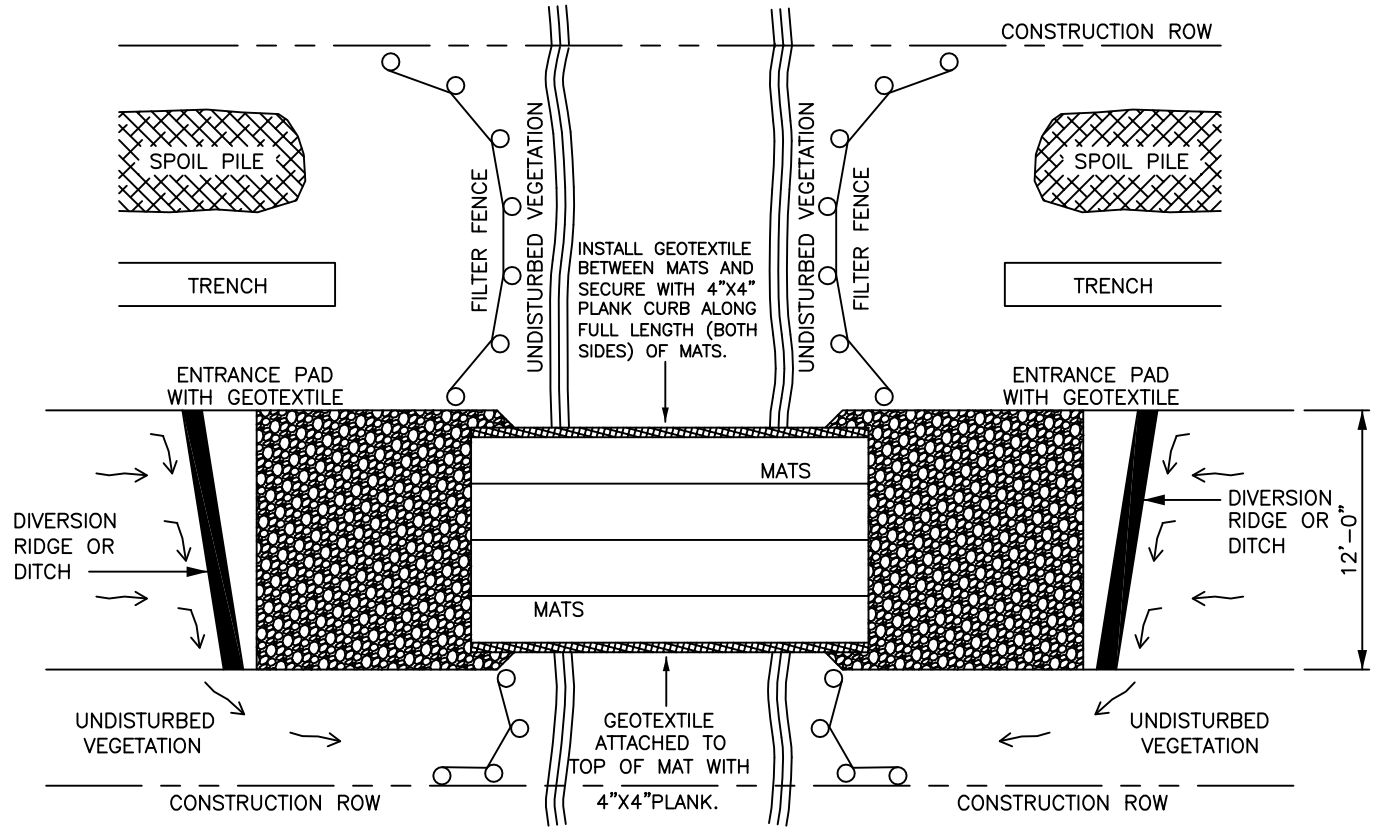
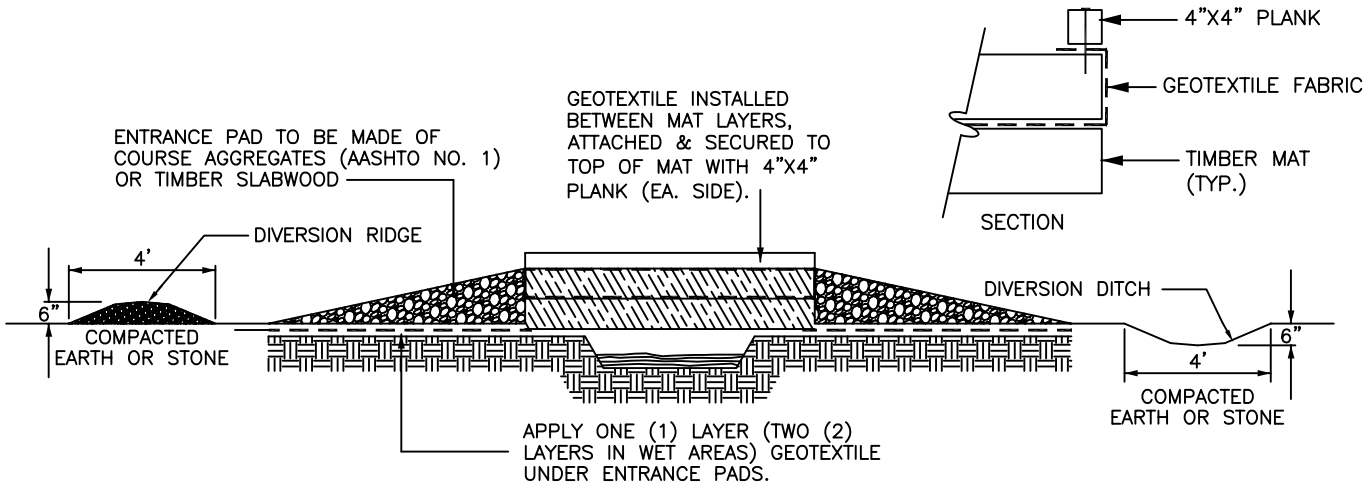
FILENAME: EPC\BMP08A.dwg
LAST REVISION DATE: 01/17/2014

SLOPE BREAKERS HARD PLUGS AND SOFT PLUGS

DRAWING NUMBER: 8A

REVIEWED: 01/2014





1. ONLY CLEARING EQUIPMENT AND EQUIPMENT NECESSARY FOR INSTALLATION OF EQUIPMENT BRIDGES MAY CROSS WATERBODIES PRIOR TO BRIDGE INSTALLATION. LIMIT THE CROSSING OF EACH WATERBODY TO ONE PER PIECE OF CLEARING EQUIPMENT.
2. INSTALL FILTER FENCE ACROSS THE DISTURBED AREA OF THE R.O.W.
3. APPLY GEOTEXTILE UNDER ENTRANCE PADS. INSTALL GEOTEXTILE BETWEEN MATS AND ATTACH TO TOP MAT.
4. EXCESS MUD IS TO BE REMOVED FROM THE ENTRANCE PADS AND MATS DURING CONSTRUCTION.
5. DURING FINAL CLEAN UP WHEN MATS, CULVERT, CLEAN ROCK FILL, ETC. ARE REMOVED, INSTALL FILTER FENCE ACROSS THE ENTIRE R.O.W. ON BOTH SIDES OF STREAM.
6. LOCATE ALL SPOIL A MINIMUM OF 10 FEET FROM THE WATERS EDGE.

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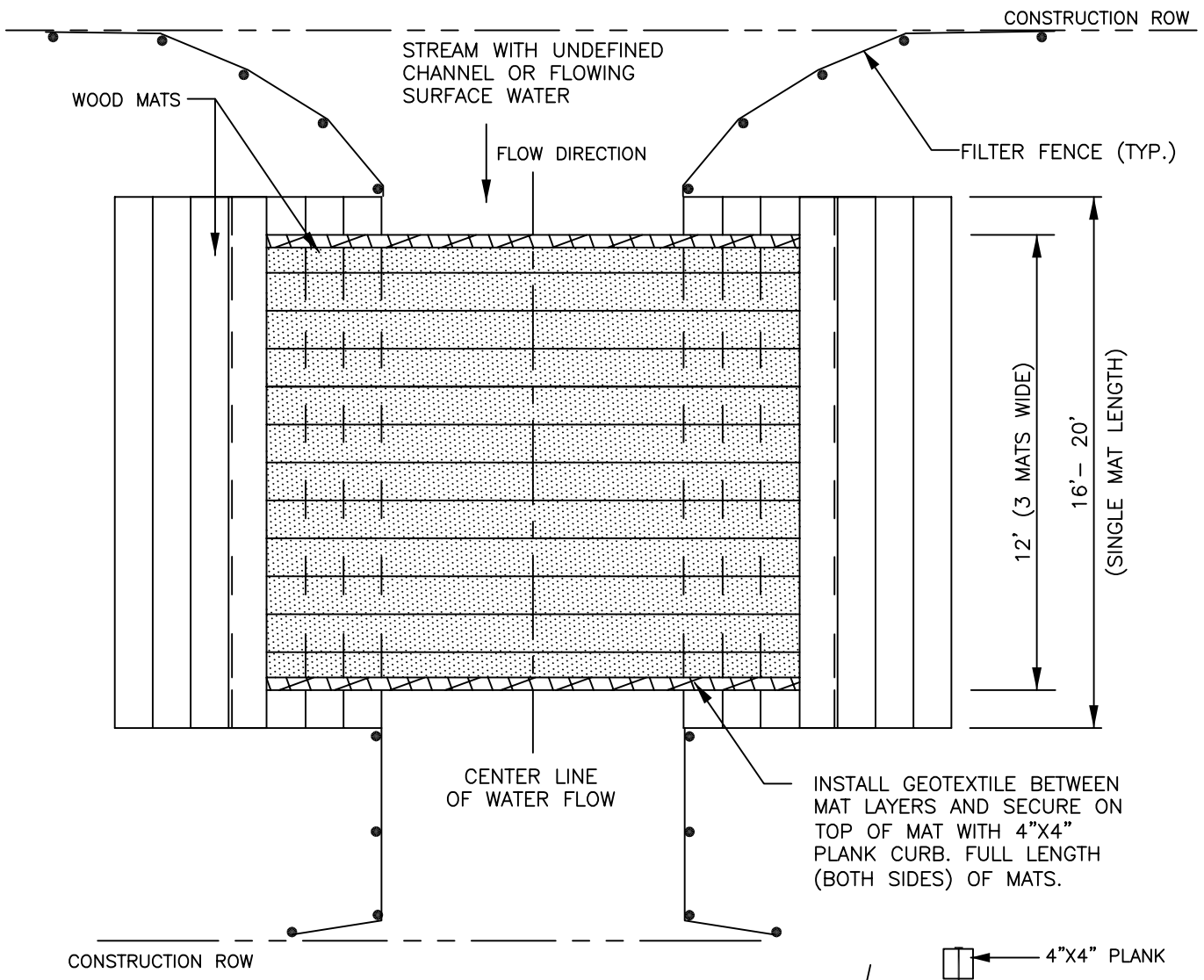
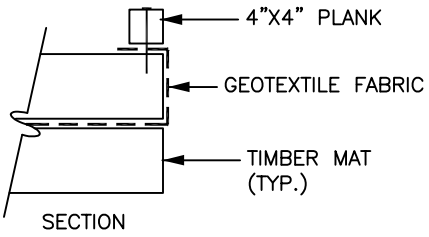
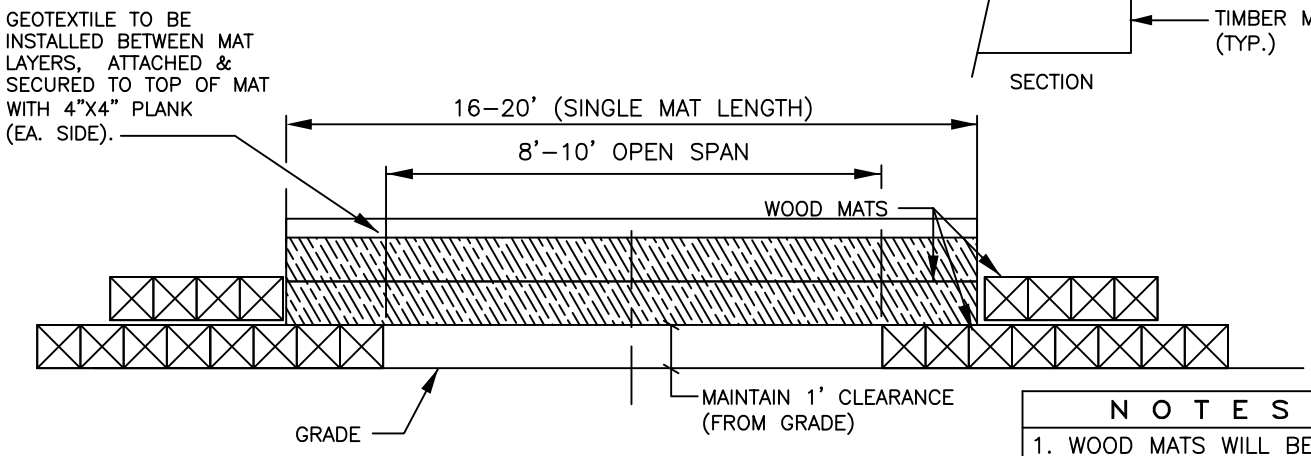
REVIEWED: 01/2014



PLAN VIEW



SECTION

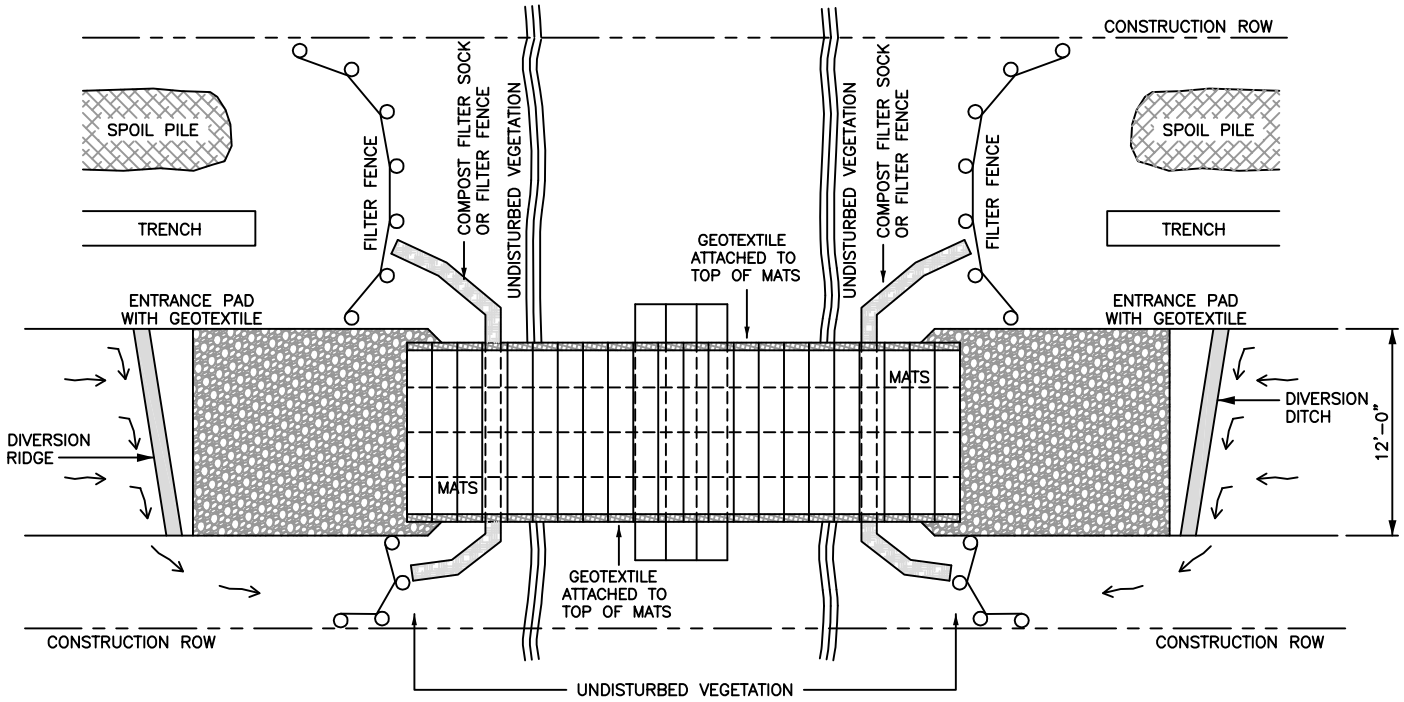


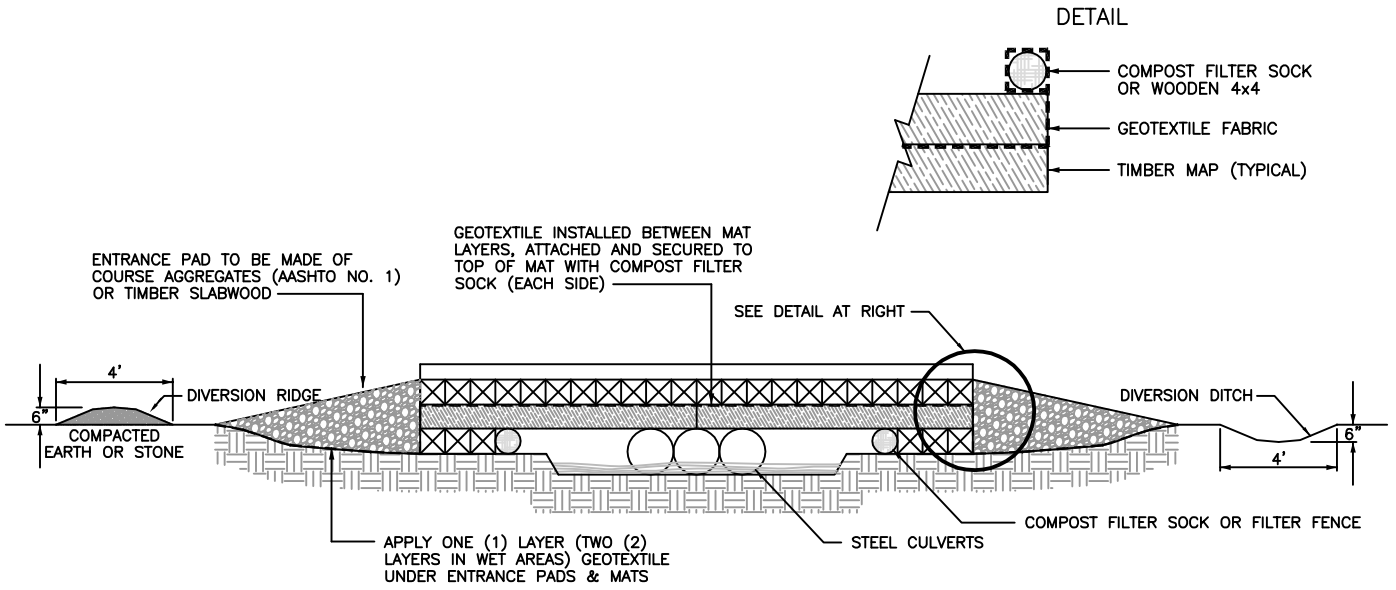
SIDE VIEW

N O T E S

1. WOOD MATS WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
2. ADDITIONAL MATS, IF NEEDED, WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.

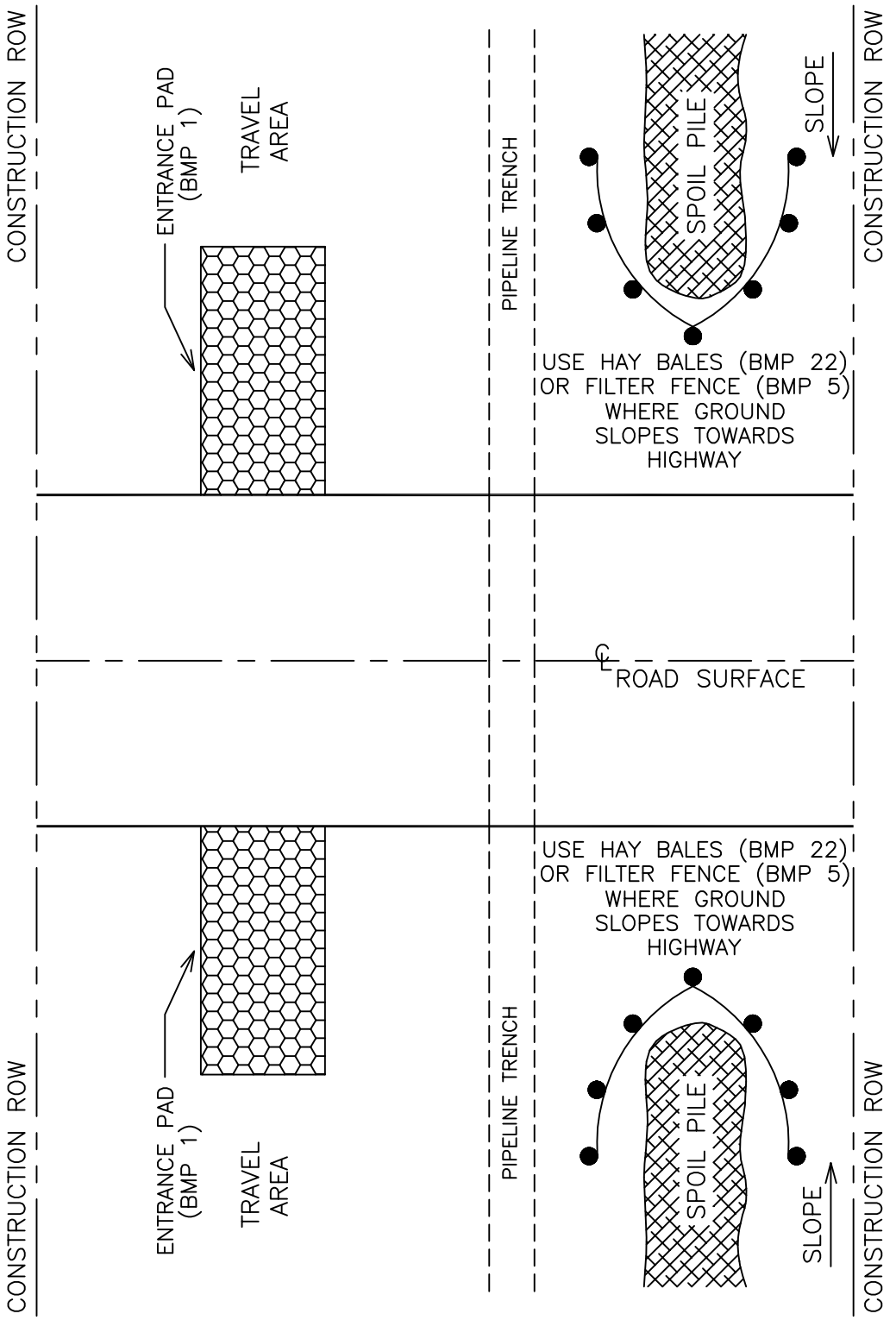
National Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871–8676	DRAWN BY: K. HURLEY FILENAME: EPC\BMP9A.dwg DATE: 01/17/2014	STREAM MAT @ UNDEFINED CHANNEL	DRAWING NUMBER: 9A





1. ONLY CLEARING EQUIPMENT AND EQUIPMENT NECESSARY FOR INSTALLATION OF EQUIPMENT BRIDGES MAY CROSS WATERBODIES PRIOR TO BRIDGE INSTALLATION. LIMIT THE CROSSING OF EACH WATERBODY TO ONE PER PIECE OF CLEARING EQUIPMENT.
2. INSTALL FILTER FENCE ACROSS THE DISTURBED AREA OF THE R.O.W.
3. APPLY GEOTEXTILE UNDER ENTRANCE PADS AND MATS. ATTACH GEOTEXTILE TO MATS.
4. EXCESS MUD IS TO BE REMOVED FROM THE ENTRANCE PADS AND MATS DURING CONSTRUCTION.
5. DURING FINAL CLEAN UP WHEN MATS, CULVERT, CLEAN ROCK FILL, ETC. ARE REMOVED, INSTALL FILTER FENCE ACROSS THE ENTIRE R.O.W. ON BOTH SIDES OF STREAM.
6. LOCATE ALL SPOIL A MINIMUM OF 10 FEET FROM THE WATERS EDGE.
7. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS PRIOR TO EARTH DISTURBANCE.
8. WOODEN SIDE BOARDS WILL BE USED TO KEEP SEDIMENT FROM FALLING INTO STREAM.
9. GEOTEXTILE FABRIC WILL BE PLACED ABOVE FIRST LAYER OF MATS TO PREVENT SEDIMENT FROM FALLING INTO THE STREAM.

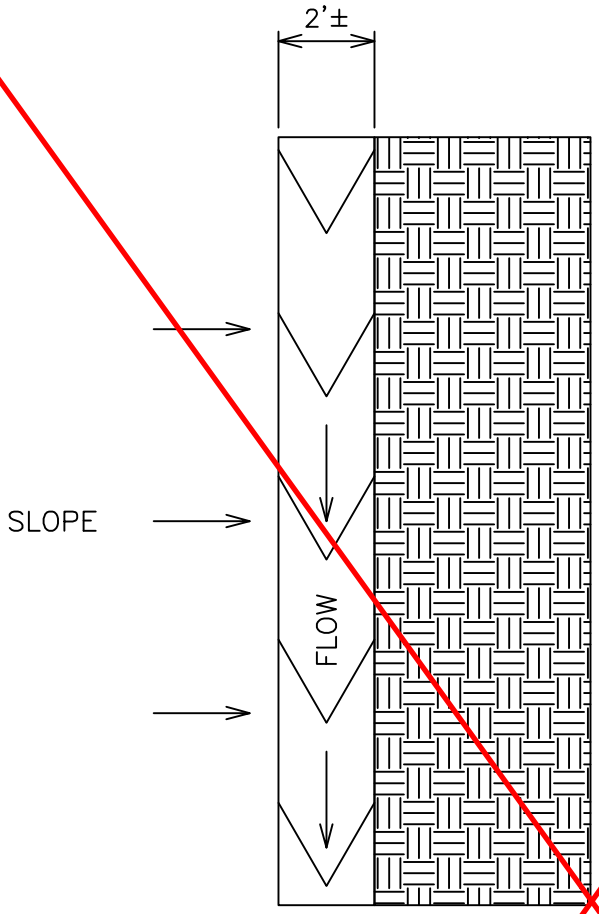
national Fuel	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP09B.dwg DATE: 08/24/2016	TEMPORARY EQUIPMENT TIMBER MAT STREAM CROSSING	DRAWING NUMBER: 9B



National Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: L. A. PHILLIPS FILENAME: EPC\BMP10.dwg LAST REVISION DATE: 01/17/2014	ROAD CROSSING (OPEN CUT)	DRAWING NUMBER: 10

REVIEWED: 01/2014

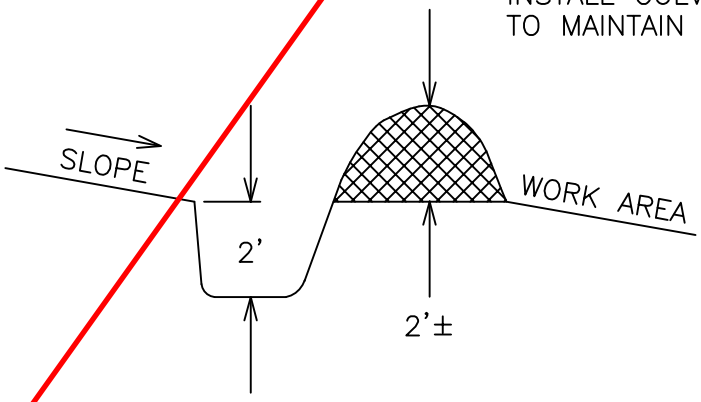
REFER TO E&S DETAILS,
FIGURE 31A



DIVERSION DITCHES ARE INTENDED TO COLLECT AND CONVEY CLEAN SURFACE WATER, SPRINGS, ETC. AWAY FROM THE PROJECT AREA.

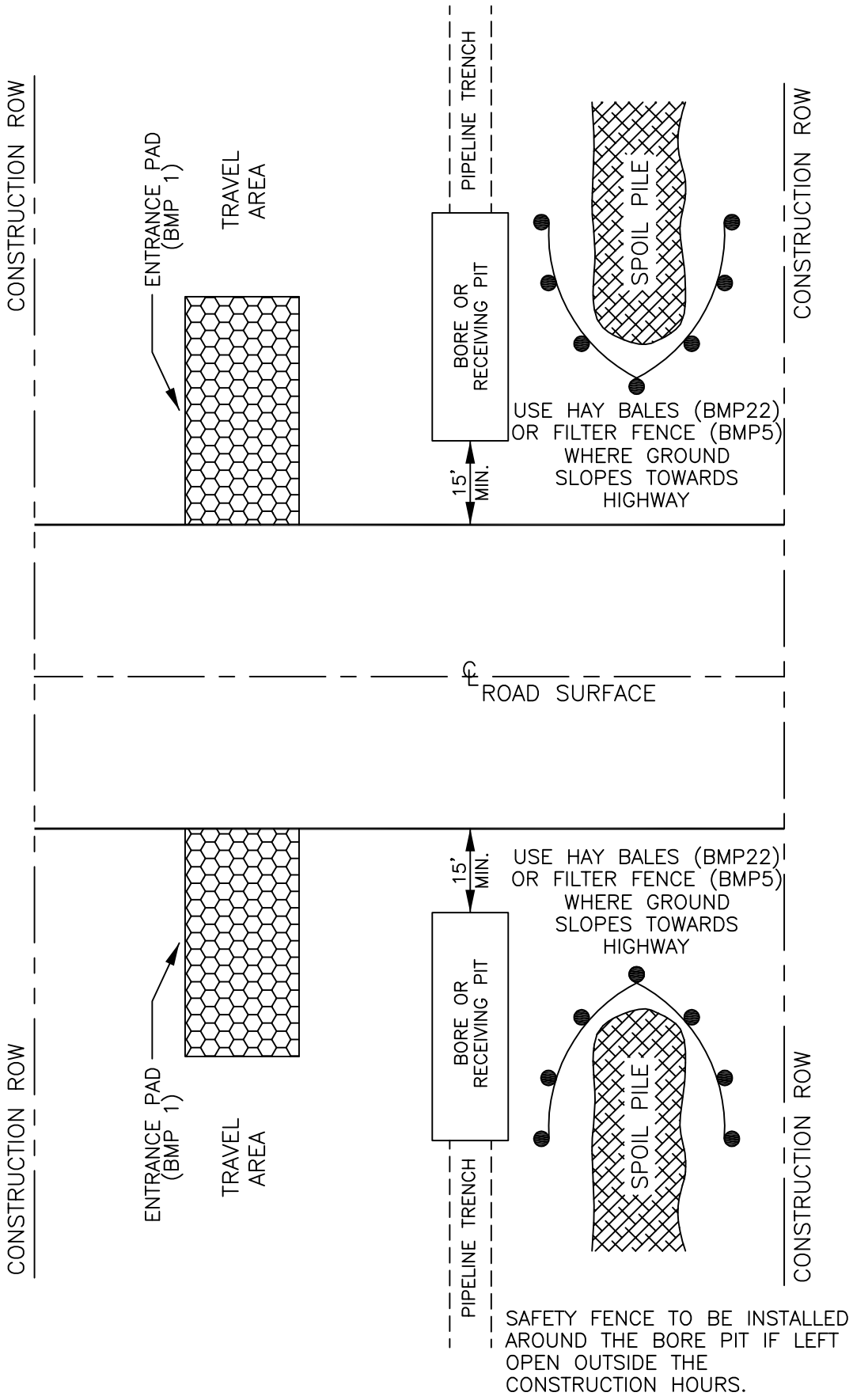
WORK AREA

OUTLET TO UNDISTURBED AREAS OR INSTALL CULVERT ACROSS THE R.O.W. TO MAINTAIN CLEAN WATER.



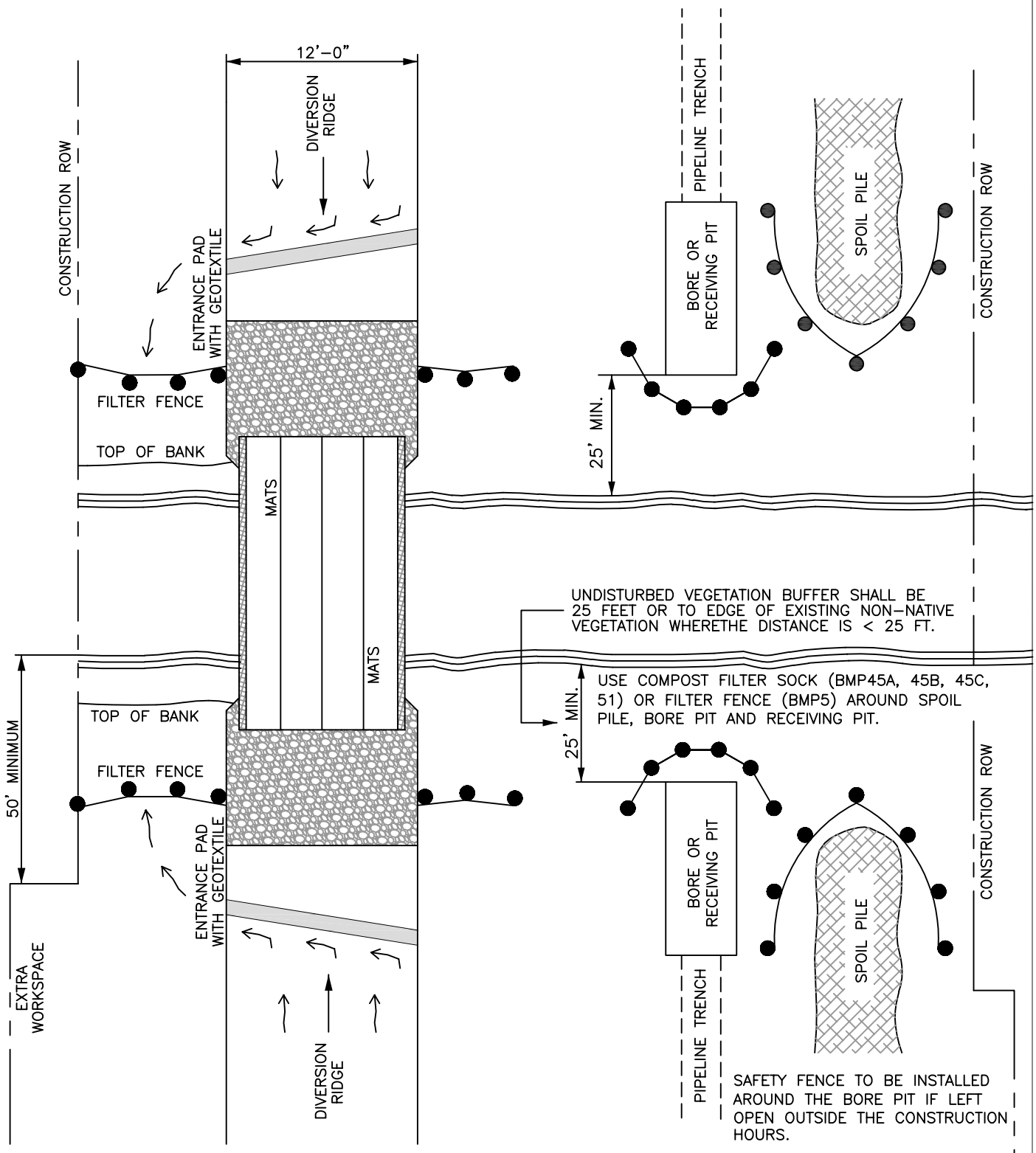
National Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP11.dwg DATE: 01/08/1997	DIVERSION DITCH	DRAWING NUMBER: 11

REVIEWED: 01/2014



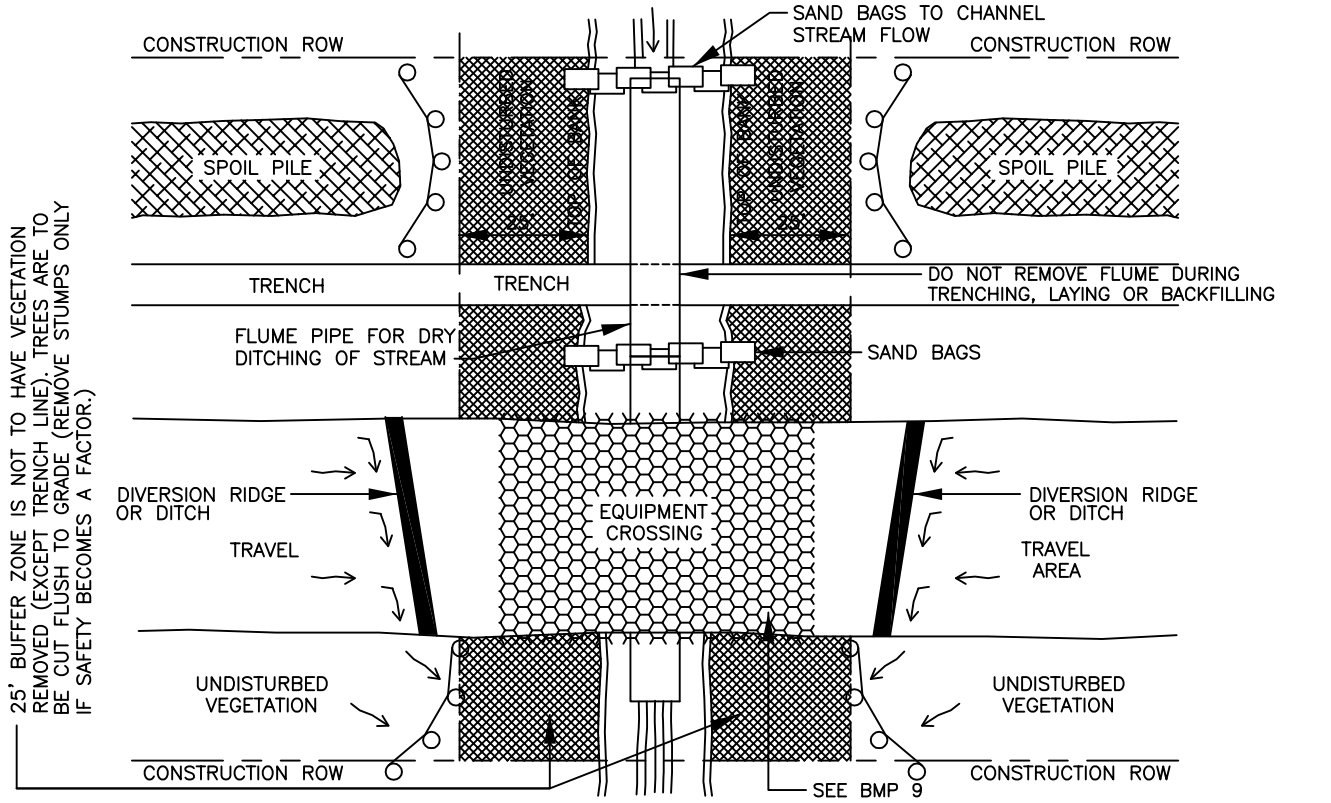
national fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: L. A. PHILLIPS FILENAME: EPC\BMP12.dwg LAST REVISION DATE: 01/17/2014	ROAD CROSSING (BORE)	DRAWING NUMBER: 12

REVIEWED: 01/2014



1. UTILIZE DEWATERING FILTER BAG (BMP28) WHEN PUMPING WATER FROM TRENCH.
2. DISPOSE OF DRILLING MUD AT AN APPROVED DISPOSAL FACILITY.

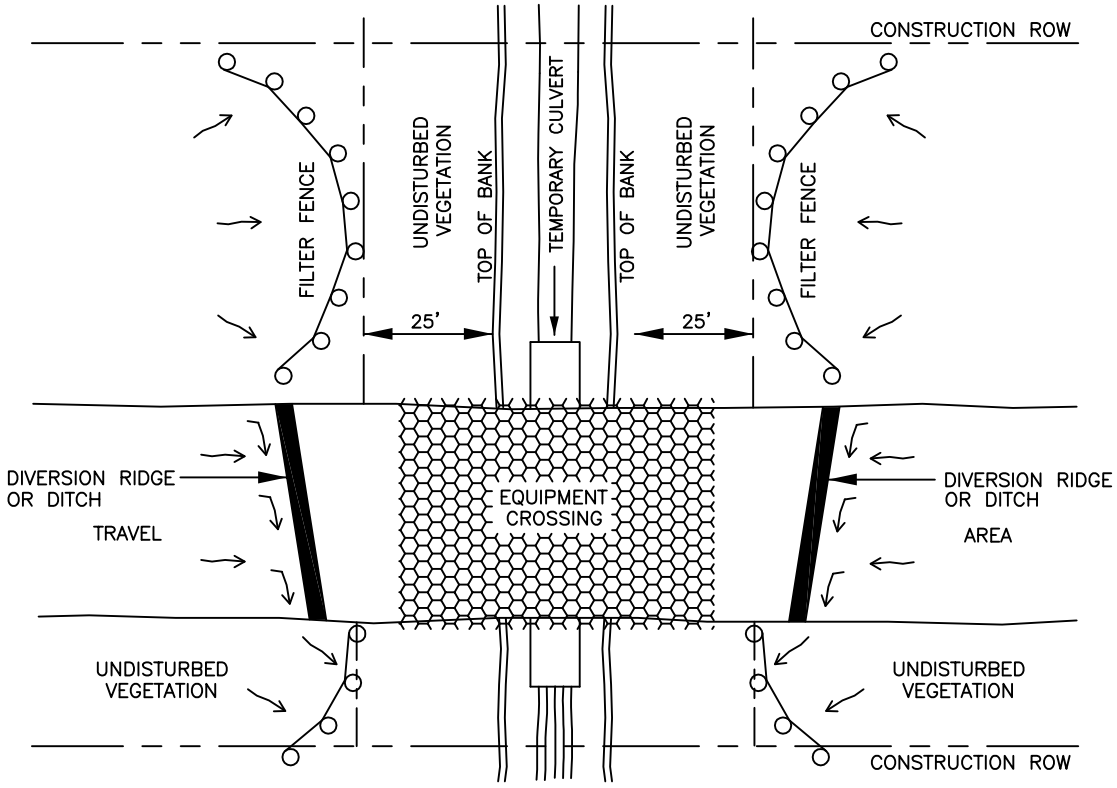
National Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871–8676	DRAWN BY: R. J. PFISTER FILENAME: EPC\BMP12.dwg LAST REVISION DATE: 03/22/3019	STREAM CROSSING (BORE)	DRAWING NUMBER: 12A



SPOIL REMOVED DURING TRENCH CONSTRUCTION OF CROSSING MAY BE PLACED 10 FT BACK FROM ORDINARY HIGH WATER MARK PROVIDED E&S CONTROLS INSTALLED.

UNDISTURBED VEGETATION BUFFER SHALL BE 25 FT OR TO EDGE OF EXISTING NON-NATIVE VEGETATION WHERE THAT DISTANCE IS <25 FT.

DURING CONSTRUCTION

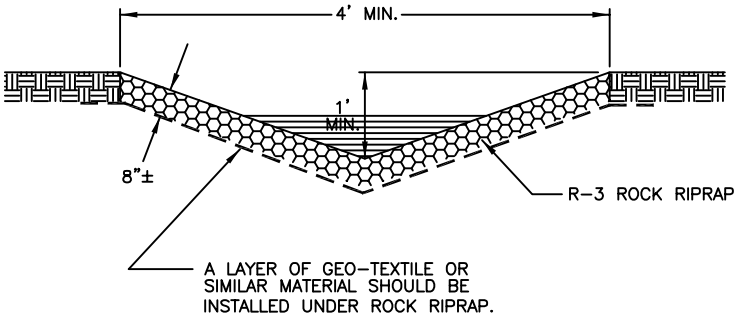


AFTER CONSTRUCTION

NOTE:
DRY-DITCH CROSSING METHODS CAN BE USED FOR WATERBODIES UP TO 30'.

national Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: DRISCOLL/PHILLIPS FILENAME: EPC\BMP13.dwg LAST REVISION DATE: 01/17/2014	FLUME (DRY DITCH) STREAM	DRAWING NUMBER: 13

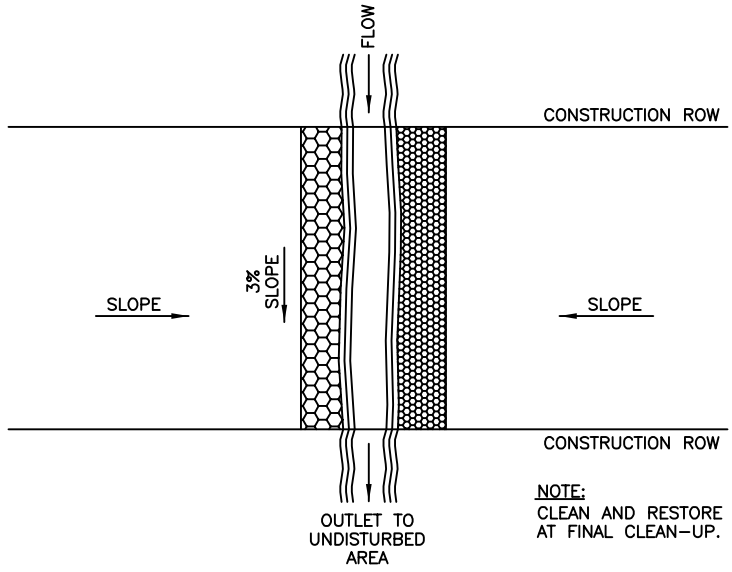
REVIEWED: 01/2014



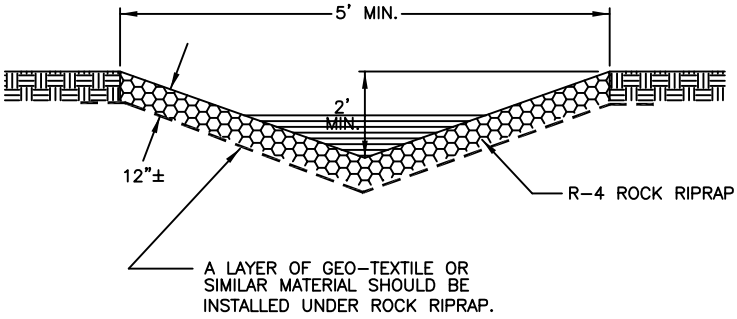
ROCK SIZE (INCHES)

MAX. 6"
AVG. 3"
MIN. 2"

VELOCITY = 6.5'/SEC.
Q = 13 CFS



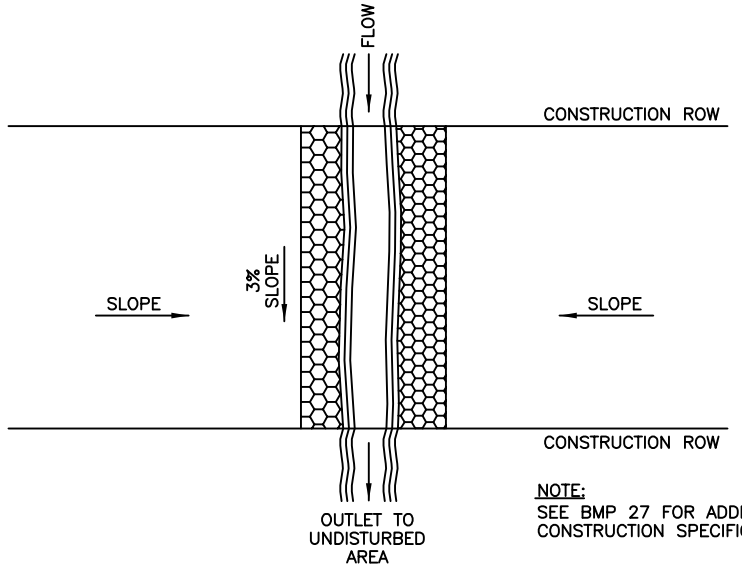
NOTE:
CLEAN AND RESTORE DITCH AT FINAL CLEAN-UP.



ROCK SIZE (INCHES)

MAX. 12"
AVG. 6"
MIN. 3"

VELOCITY = 8.7'/SEC.
Q = 43 CFS



NOTE:
SEE BMP 27 FOR ADDITIONAL DETAILS, CONSTRUCTION SPECIFICATIONS AND MAINTENANCE.

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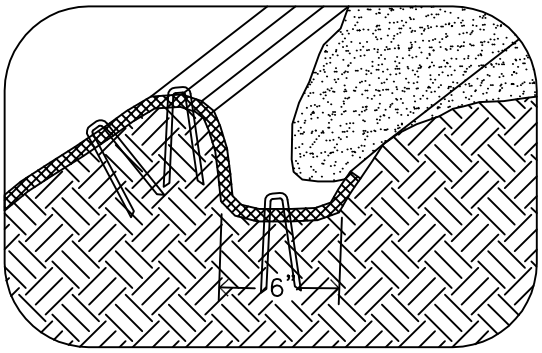
DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP14.dwg
LAST REVISION DATE: 06/27/2007

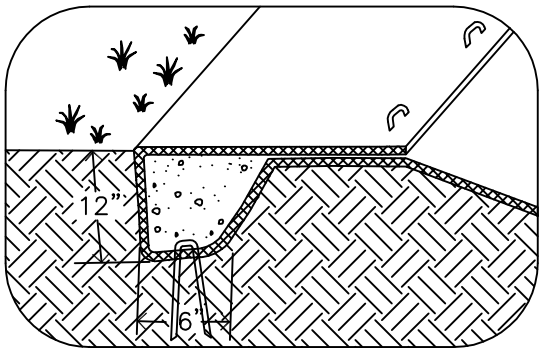
RUN OFF DITCH

DRAWING NUMBER: 14

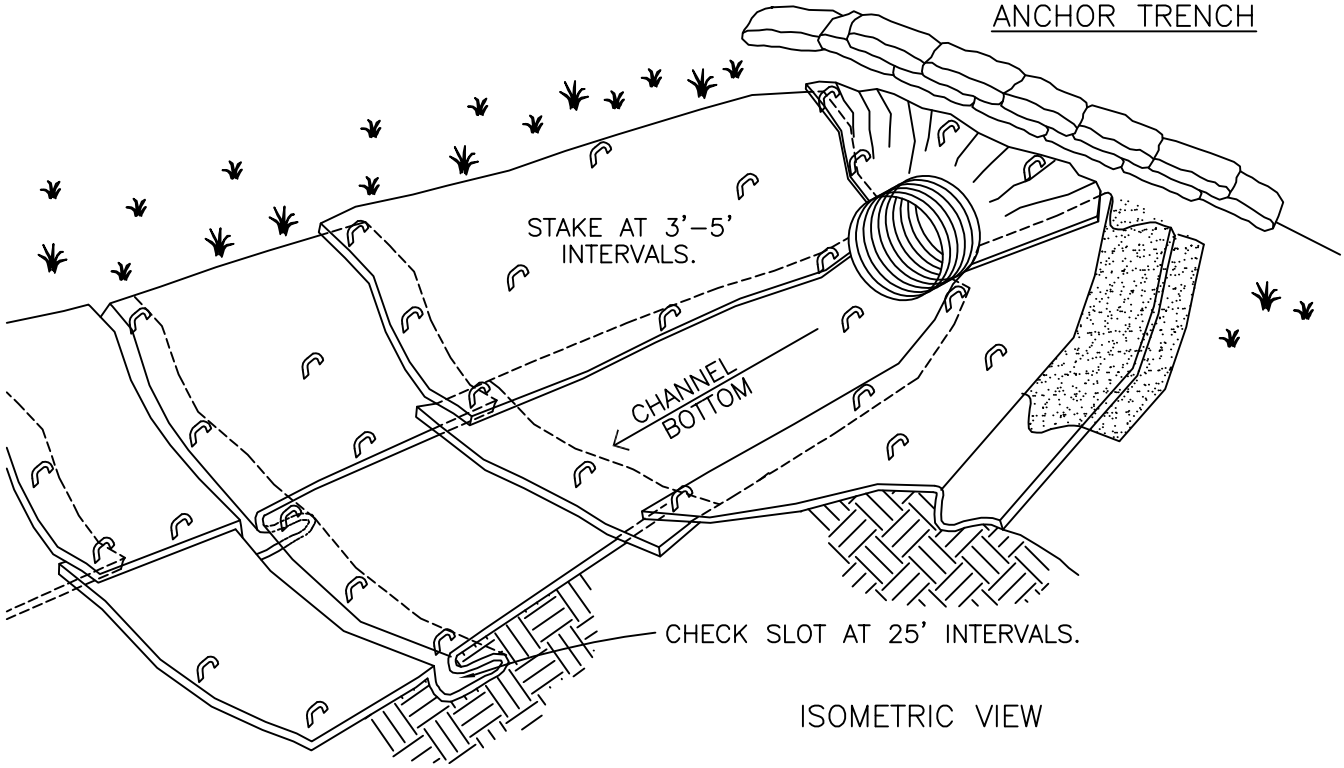
REVIEWED: 01/2014



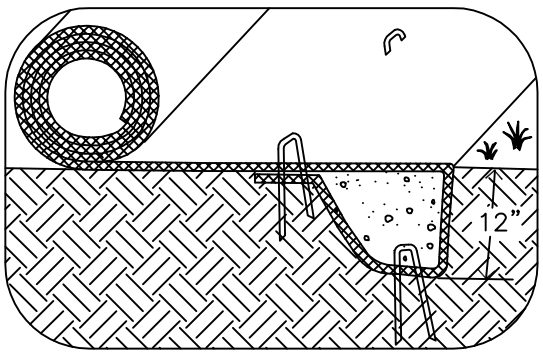
LONGITUDINAL ANCHOR TRENCH



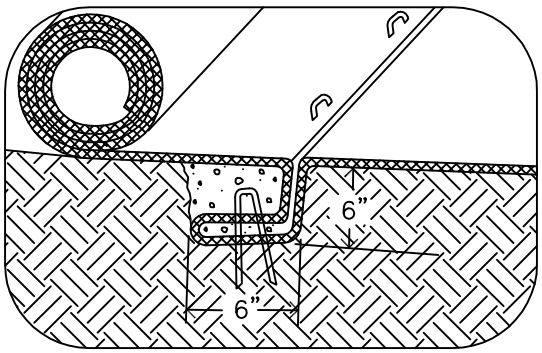
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH



ISOMETRIC VIEW



INITIAL CHANNEL ANCHOR TRENCH



INTERMITTENT CHECK SLOT

NOTES:

1. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURERS SPECIFICATIONS.
2. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.
3. SEE DRAWING NO. 15A FOR INSTALLATION SPECIFICATIONS.

national Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871–8676	MODIFIED BY: L. A. PHILLIPS FILENAME: NFGSC\BMP15.dwg DATE: 01/09/1997	EROSION BLANKETS CHANNEL INSTALLATION	DRAWING NUMBER: 15

REVIEWED - 01/2014

CONSTRUCTION SPECIFICATIONS:

SITE PREPARATION

1. PROPER SITE PREPARATION IS ESSENTIAL TO ENSURE COMPLETE CONTACT OF THE PROTECTION MATTING WITH THE SOIL.
2. GRADE AND SHAPE AREA OF INSTALLATION.
3. REMOVE ALL ROCKS, CLODS, VEGETATIVE OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED BLANKETS, OR MATS WILL HAVE DIRECT CONTACT WITH THE SOIL.
4. PREPARE SEEDBED BY LOOSENING 2"–3" OF TOPSOIL ABOVE FINAL GRADE.
5. INCORPORATE AMENDMENTS, SUCH AS LIME AND FERTILIZER, INTO SOIL ACCORDING TO SOIL TEST AND THE SEEDING PLAN.

SEEDING

SEED AREA BEFORE BLANKET INSTALLATION FOR EROSION CONTROL AND RE–VEGETATION OR SEED AFTER MAT INSTALLATION FOR TURF REINFORCEMENT. WHEN SEEDING PRIOR TO BLANKET INSTALLATION, ALL CHECK SLOTS AND OTHER AREAS DISTURBED DURING INSTALLATION MUST BE RESEEDED. WHERE SOIL FILLING IS SPECIFIED, SEED THE MATTING AND THE ENTIRE DISTURBED AREA AFTER INSTALLATION AND PRIOR TO FILLING THE MAT WITH SOIL.

ANCHORING

U–SHAPED WIRE STAPLES, METAL GEOTEXTILE STAKE PINS OR TRIANGULAR WOODEN STAKES CAN BE USED TO ANCHOR MATS TO THE GROUND SURFACE. WIRE STAPLES SHOULD BE A MINIMUM OF 8 GAUGE. METAL STAKE PINS SHOULD BE 3/16" DIAMETER STEEL WITH A 1 1/2" STEEL WASHER AT THE HEAD OF THE PIN. WIRE STAPLES AND METAL STAKE SHOULD BE DRIVEN FLUSH TO THE SOIL SURFACE. WOODEN STAKES SHOULD BE 3" X 1 1/2" TRIANGULAR WOODEN SURVEY STAKES. TWO INCHES OF WOOD STAKING SHOULD REMAIN ABOVE THE SOIL SURFACE. ALL ANCHORS SHOULD BE 8"–18" LONG AND HAVE SUFFICIENT GROUND PENETRATION TO RESIST PULLOUT. LONGER ANCHORS MAY BE REQUIRED FOR LOOSE SOILS.

INSTALLATION IN CHANNELS

1. DIG INITIAL ANCHOR TRENCH 12" DEEP AND 6" WIDE ACROSS THE CHANNEL AT THE LOWER END OF THE PROJECT AREA.
2. EXCAVATE INTERMITTENT CHECK SLOTS, 6" DEEP AND 6" WIDE ACROSS THE CHANNEL AT 25' TO 30' INTERVALS ALONG THE CHANNEL.
3. CUT LONGITUDINAL CHANNEL ANCHOR SLOTS 4" DEEP AND 4" WIDE ALONG EACH SIDE OF THE INSTALLATION TO BURY EDGES OF MATTING, WHENEVER POSSIBLE EXTEND MATTING 2 – 3 ABOVE THE CREST OF CHANNEL SIDE SLOPES.
4. BEGINNING AT THE DOWNSTREAM END AND IN THE CENTER OF THE CHANNEL, PLACE THE INITIAL END OF THE FIRST ROLL IN THE ANCHOR TRENCH AND SECURE WITH FASTENING DEVICES AT 1' INTERVALS. NOTE: MATTING WILL INITIALLY BE UPSIDE DOWN IN ANCHOR TRENCH.
5. IN SAME MANNER, POSITION ADJACENT ROLLS IN ANCHOR TRENCH, OVERLAPPING THE PRECEDING ROLL A MINIMUM OF 3".
6. SECURE THESE INITIAL ENDS OF MATS WITH ANCHORS AT 1' INTERVALS, BACKFILL AND COMPACT SOIL.
7. UNROLL CENTER STRIP OF MATTING UPSTREAM. STOP AT NEXT CHECK SLOT OR TERMINAL ANCHOR TRENCH.
8. UNROLL ADJACENT MATS UPSTREAM IN SIMILAR FASHION, MAINTAINING 3" OVERLAP.
9. FOLD AND SECURE ALL ROLLS OF MATTING SNUGLY INTO ALL TRANSVERSE CHECK SLOTS. LAY MAT IN THE BOTTOM OF THE SLOT THEN FOLD BACK AGAINST ITSELF. ANCHOR THROUGH BOTH LAYERS OF MAT AT 1 INTERVALS THEN BACKFILL AND COMPACT SOIL. CONTINUE ROLLING ALL MAT WIDTHS UPSTREAM TO THE NEXT CHECK SLOT OR TERMINAL ANCHOR TRENCH.
10. ALTERNATE METHOD FOR NONCRITICAL INSTALLATIONS: PLACE TWO ROWS OF ANCHORS ON 6 CENTERS AT 25' TO 30' INTERVALS IN LIEU OF EXCAVATED CHECK SLOTS.
11. SHINGLE–LAP SPLICED ENDS BY A MINIMUM OF 1' WITH UPSTREAM MAT ON TOP TO PREVENT UPLIFTING BY WATER OR BEGIN NEW ROLLS IN A CHECK SLOT. ANCHOR OVERLAPPED AREA BY PLACING TWO ROWS OF ANCHORS, 1' APART ON 1' INTERVALS.
12. PLACE EDGES OF OUTSIDE MATS IN PREVIOUSLY EXCAVATED LONGITUDINAL SLOTS, ANCHOR USING PRESCRIBED STAPLE PATTERN, BACKFILL AND COMPACT SOIL.
13. ANCHOR, FILL AND COMPACT UPSTREAM END OF MAT IN A 12" X 6" TERMINAL TRENCH.
14. SECURE MAT TO GROUND SURFACE USING U–SHAPED WIRE STAPLES GEOTEXTILE PINS OR WOODEN STAKES.
15. SEED AND FILL TURF REINFORCEMENT MATTING WITH SOIL, IF SPECIFIED.

SOIL FILLING IF SPECIFIED FOR TURF REINFORCEMENT.

1. AFTER SEEDING, SPREAD AND LIGHTLY RAKE 1/2" – 3/4" OF FINE TOPSOIL INTO THE MAT APERTURES TO COMPLETELY FILL MAT THICKNESS.
2. USE BACKSIDE OF RAKE OR OTHER FLAT IMPLEMENT.
3. SPREAD TOPSOIL USING LIGHTWEIGHT LOADER, BACKHOE, OR OTHER POWER EQUIPMENT. AVOID SHARP TURNS WITH EQUIPMENT.
4. DO NOT DRIVE TRACKED OR HEAVY EQUIPMENT OVER MAT.
5. AVOID ANY TRAFFIC OVER MATTING IF LOOSE OR WET SOIL CONDITIONS EXIST.
6. USE SHOVELS, RAKES OR BROOMS FOR FINE GRADING AND TOUCH UP.
7. SMOOTH OUT SOIL FILLING JUST EXPOSING TOP NETTING OF MATRIX.

INSPECTION AND MAINTENANCE

1. ALL BLANKET AND MATS SHOULD BE INSPECTED PERIODICALLY FOLLOWING INSTALLATION.
2. INSPECT INSTALLATION AFTER SIGNIFICANT RAINSTORMS TO CHECK FOR EROSION AND UNDERMINING. ANY FAILURE SHOULD BE REPAIRED IMMEDIATELY.
3. IF WASHOUT OR BREAKAGE OCCURS, RE–INSTALL THE MATERIAL AFTER REPAIRING THE DAMAGE TO THE SLOPE OR DRAINAGEWAY.

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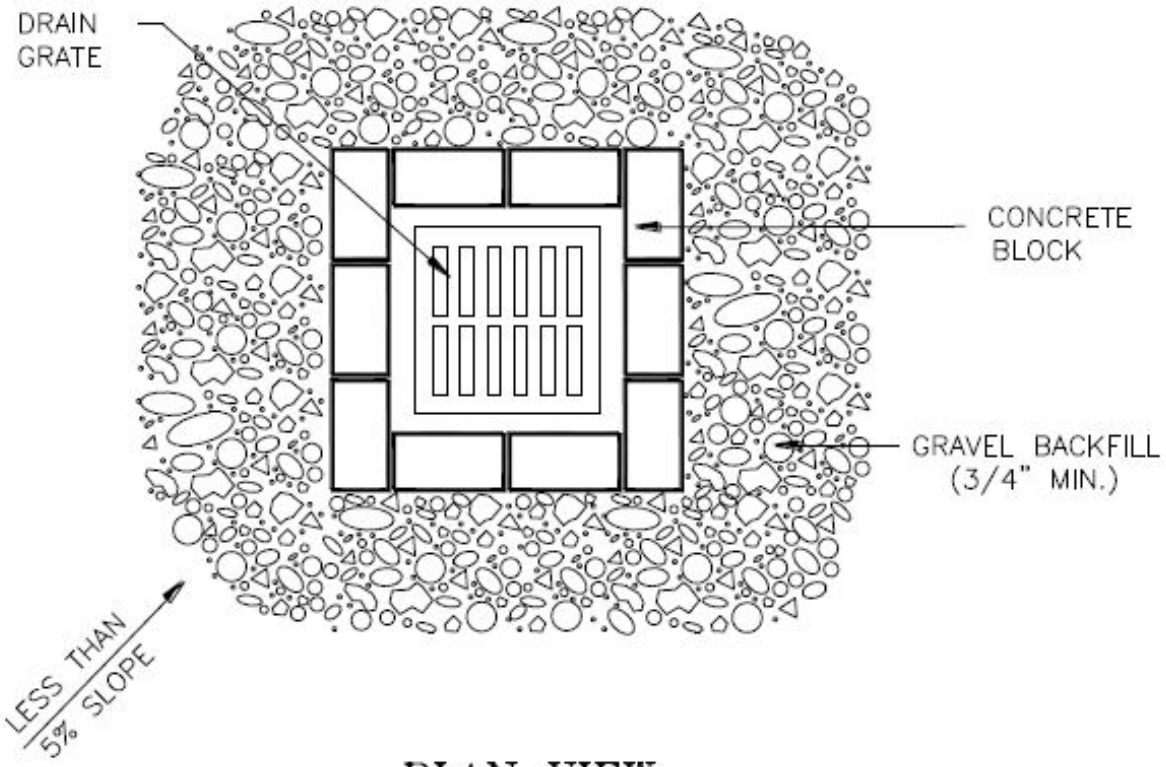
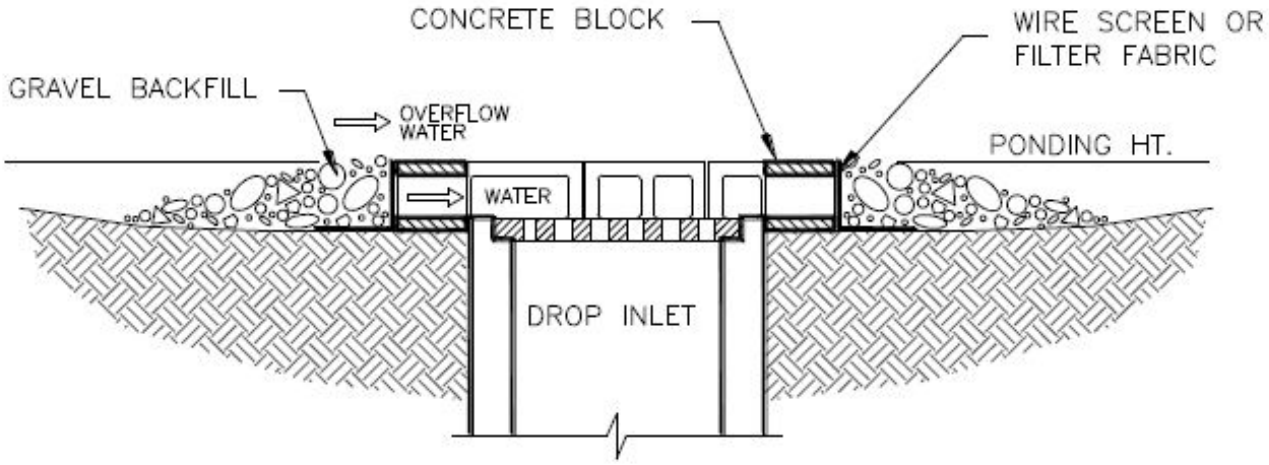
MODIFIED BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP15A.dwg
DATE: 01/09/1997

SPECIFICATIONS EROSION BLANKETS CHANNEL INSTALLATION

DRAWING NUMBER: 15A



PLAN VIEW



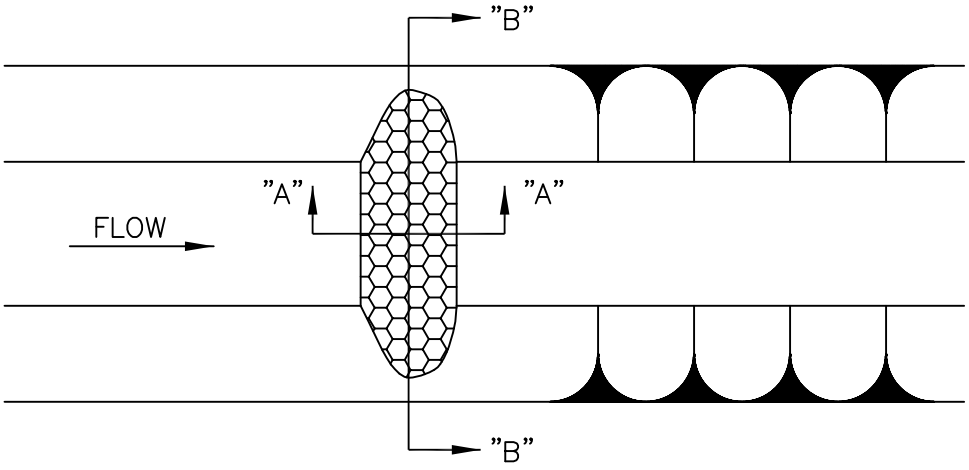
ELEVATION VIEW

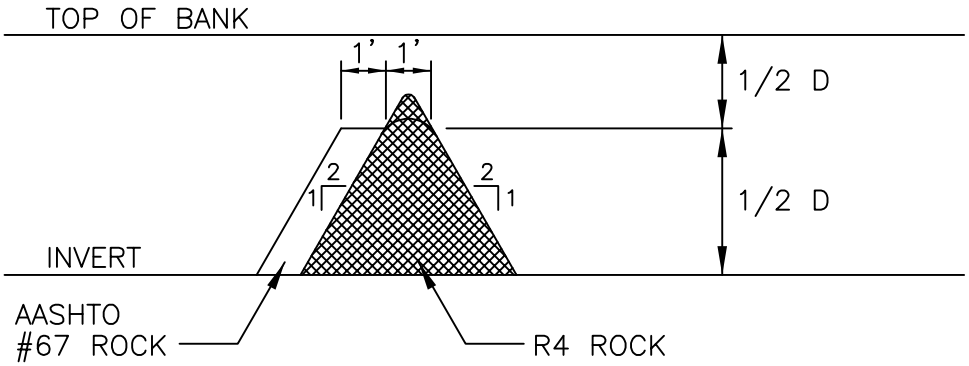
NOTES:

1. DROP INLET SEDIMANT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BY-PASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.

national fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: L. A. PHILLIPS FILENAME: DATE: 03/27/2017	BLOCK AND GRAVEL DROP INLET SEDIMENT BARRIER	DRAWING NUMBER: 16

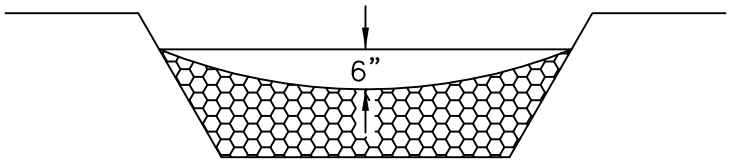
REVIEWED: 03/2017





D=DEPTH OF WATER
AT CHANNEL CAPACITY

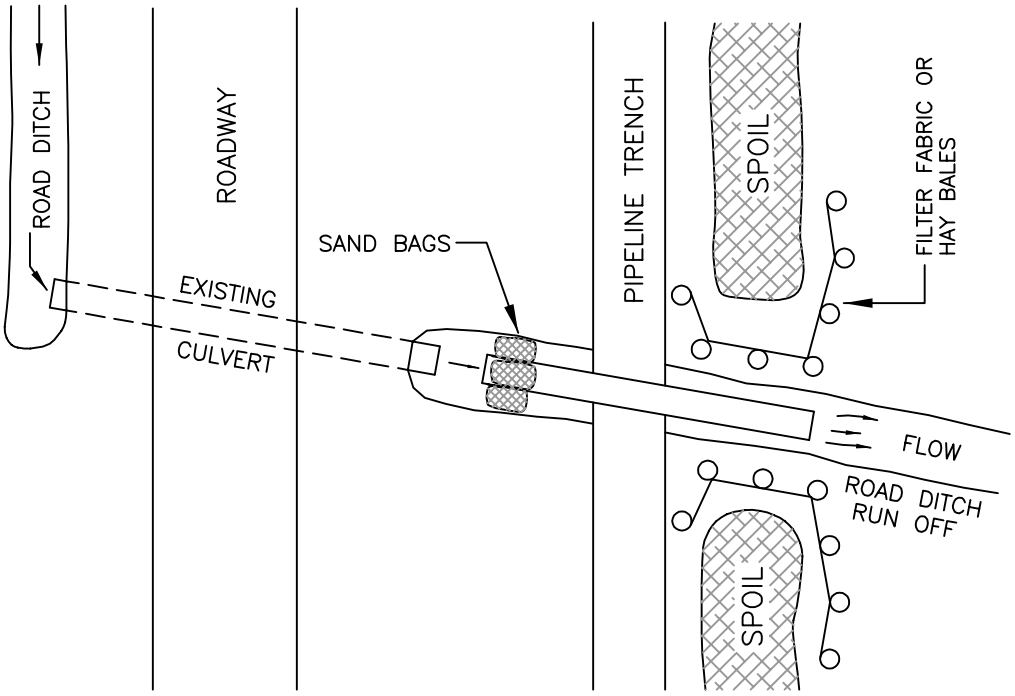
SECTION "A–A"

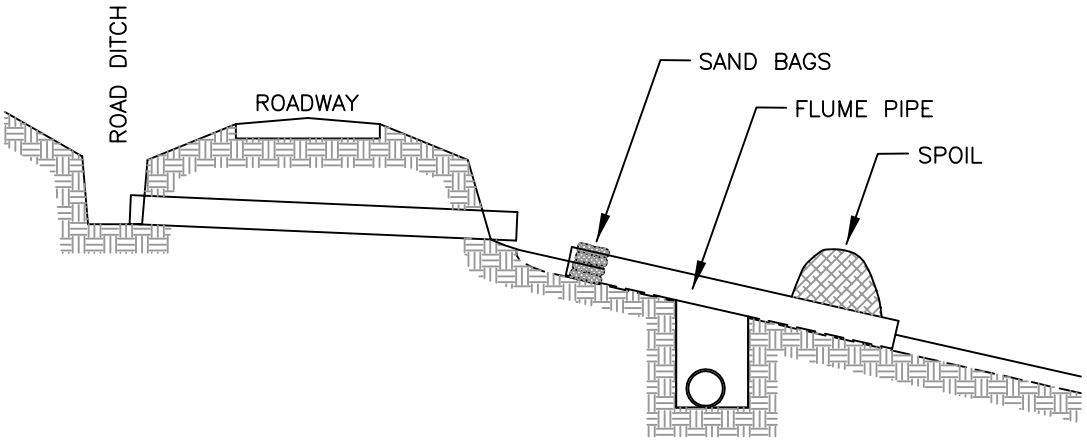


SECTION "B–B"

1. ROCK FILTERS WILL BE CONSTRUCTED WITH AASHTO NUMBER 67 AND R–4 ROCK AS SPECIFIED IN SECTIONS 703.2 AND 850.2 OF PENNDOT'S PUBLICATION 408.
2. FREE STANDING ROCK CHANNEL FILTERS WILL BE CONSTRUCTED TO THE DIMENSIONS SHOWN ABOVE.
3. MAINTENANCE: ROCK FILTERS WILL BE REMOVED WHEN CLOGGED WITH SEDIMENTS. MATERIALS MUST BE WASHED COMPLETELY FREE OF ALL FOREIGN MATERIALS OR NEW ROCK USED TO REBUILD THE FILTER.

national Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871–8676	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP17.dwg DATE: 01/10/1997	ROCK CHANNEL FILTER	DRAWING NUMBER: 17





NOTES:

1. INSTALL TEMPORARY CULVERT ACROSS PIPELINE TRENCH AT ROAD CULVERT LOCATIONS WHERE PIPELINE TRENCH IS LOCATED BELOW ROAD SURFACE. AN 8" MINIMUM DIAMETER CULVERT IS TO BE INSTALLED.

2. REMOVE CULVERT WHEN BACK FILLING AND RESTORE ROAD DITCH RUN OFF TO ORIGINAL CONDITION.

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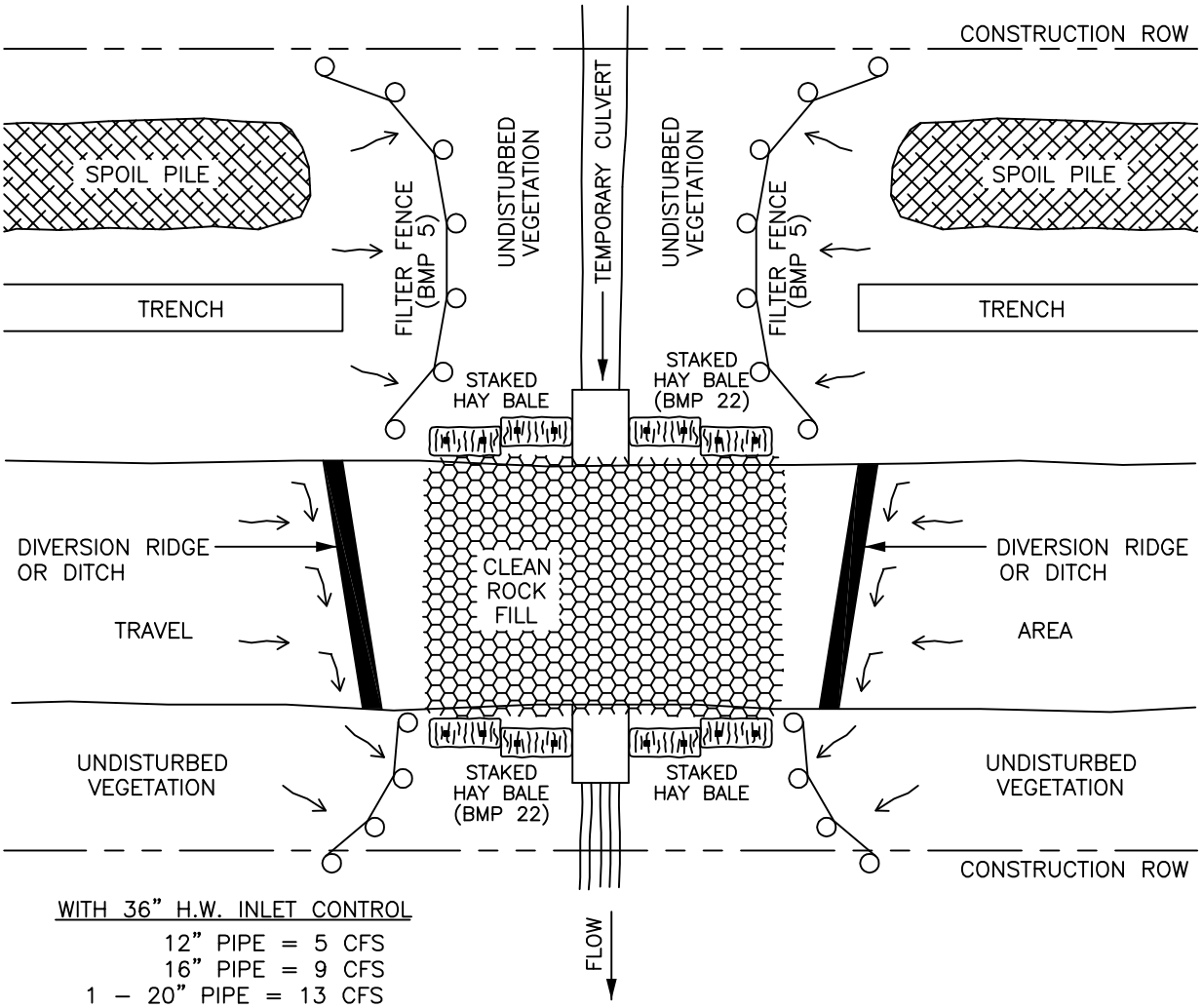
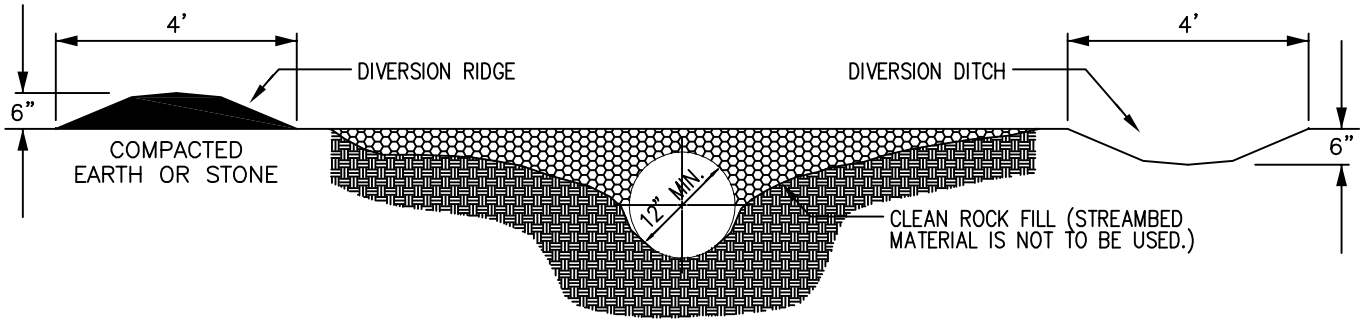
REVIEWED: 01/2014



WITH 36" H.W. INLET CONTROL

12" PIPE = 5 CFS
16" PIPE = 9 CFS
1 – 20" PIPE = 13 CFS
2 – 20" PIPE = 26 CFS
3 – 20" PIPE = 39 CFS



1. TEMPORARY CULVERT SHOULD EXTEND BEYOND TOE OF ROAD.
2. ROADWAY SHOULD BE DEPRESSED OVER CULVERT TO ALLOW FOR OVERFLOW.
3. CLEAN ROCK FILL SHALL BE USED TO GUARD AGAINST EROSION AND SEDIMENTATION. STREAMBED MATERIAL IS NOT TO BE USED.
4. INSTALL FILTER FENCE (BMP 5) ACROSS THE DISTURBED AREAS OF THE R.O.W.
5. INSTALL STAKED HAY BALES (BMP 22) ALONG TRAVEL AREA ON EACH SIDE OF CULVERT OPENING, TO CONTROL MUD FROM CONSTRUCTION TRAFFIC. THESE AREAS ARE TO BE CLEANED PERIODICALLY DURING CONSTRUCTION. **DO NOT INSTALL HAY BALES IN WATERWAY.**
6. DURING FINAL CLEAN UP WHEN CULVERT, CLEAN ROCK FILL, ETC. ARE REMOVED, INSTALL FILTER FENCE ACROSS THE ENTIRE R.O.W. ON BOTH SIDES OF STREAM.
7. LOCATE ALL SPOIL A MINIMUM OF 10 FEET FROM THE WATERS EDGE.

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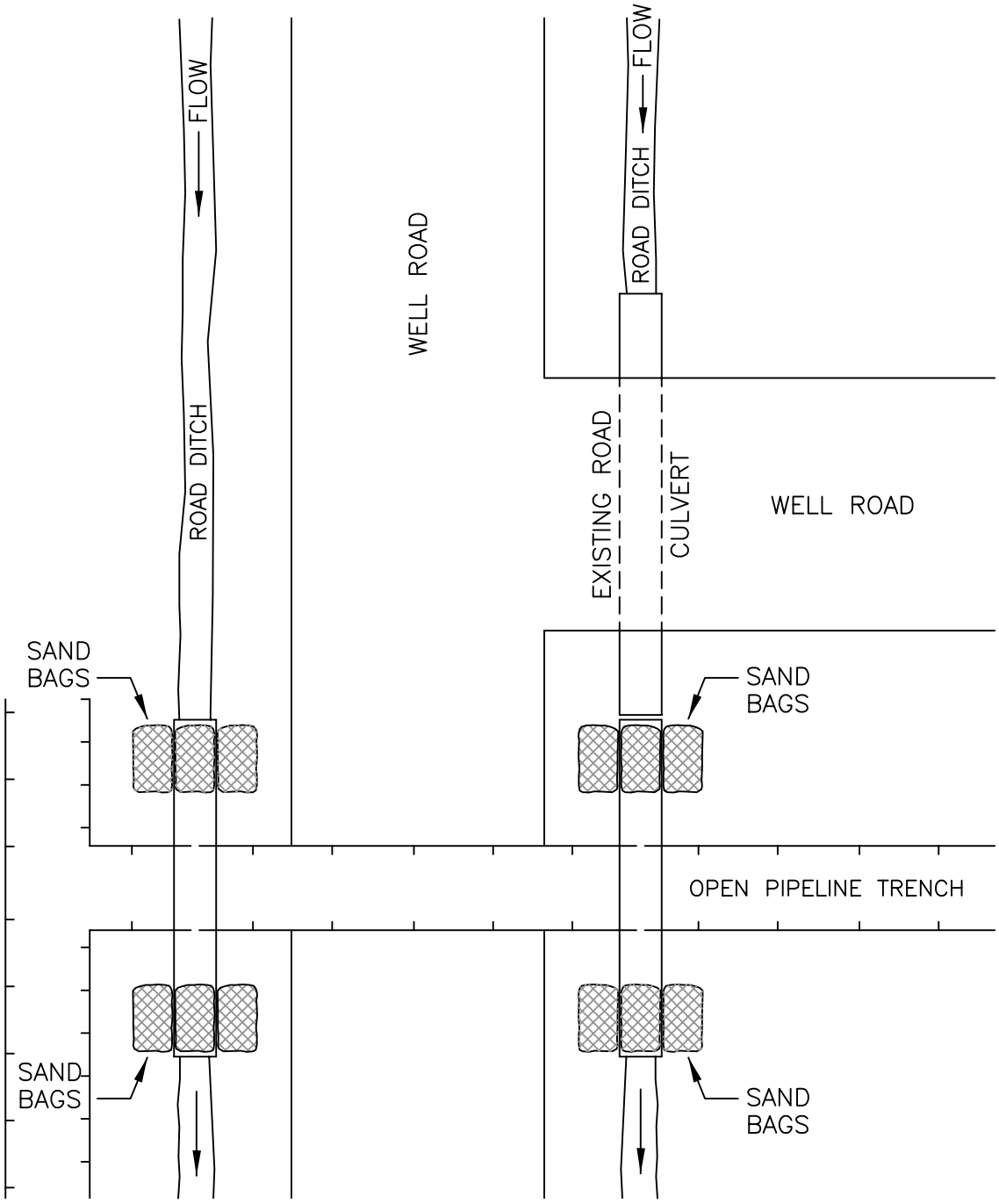
REVIEWED: 01/2014



NOTES:

1. INSTALL TEMPORARY CULVERT IN ROAD DITCH, ACROSS OPEN PIPELINE TRENCH. AN 8" MINIMUM DIAMETER CULVERT IS TO BE INSTALLED.

2. REMOVE CULVERT WHEN BACK FILLING AND RESTORE ROAD DITCH TO ORIGINAL CONDITION.

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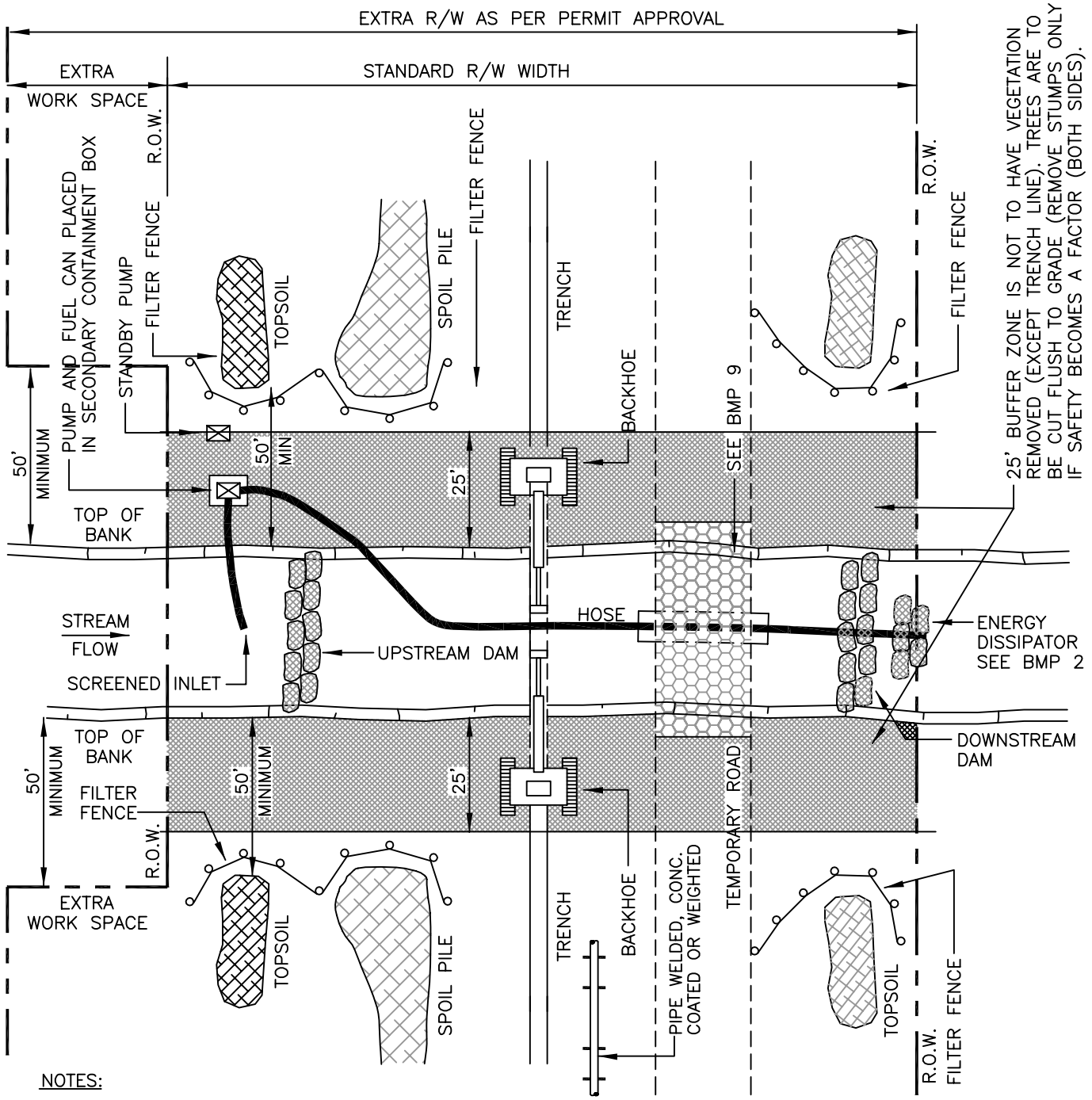
REVIEWED: 01/2014



NOTES:

1. USE DAM AND PUMP METHOD ON NARROW WATERCOURSES WITH LIMITED STREAM FLOW TO PREVENT SEDIMENTATION AND INTERRUPTION OF STREAM FLOW DURING CROSSING CONSTRUCTION. IF FISH PASSAGE IS A CONCERN, THIS METHOD IS NOT APPROPRIATE.
2. SCHEDULE CONSTRUCTION DURING LOW FLOW PERIOD.
3. SET UP PUMP AND HOSE AS SHOWN, OR USE OTHER PRACTICAL ALTERNATIVES. PUMP SHOULD HAVE TWICE THE PUMPING CAPACITY OF ANTICIPATED FLOW. HAVE STANDBY PUMP ON SITE.
4. INSTALL DAMS COMPOSED OF SANDBAGS OR CLEAN GRAVEL WITH PLASTIC LINER TO KEEP STREAM BED DRY.
5. EXCAVATE TRENCH AND LOWER IN PIPE UNDER HOSE. MOVE HOSE AS REQUIRED OR DISCONNECT IF TEMPORARY FLOW BLOCKAGE IS ACCEPTABLE. BACKFILL TRENCH.
6. DISMANTLE DOWNSTREAM DAM, THEN UPSTREAM DAM. KEEP PUMP RUNNING TO MAINTAIN FLOW.
7. MONITOR DAM AND PUMP FOR PROPER OPERATION THROUGHOUT THE CROSSING INSTALLATION.
8. SPOIL REMOVED DURING TRENCH CONSTRUCTION OF CROSSING MAY BE PLACED 10 FT BACK FROM ORDINARY HIGH WATER MARK PROVIDED E&S CONTROLS ARE INSTALLED.
9. UNDISTURBED VEGETATION BUFFER SHALL BE 25 FT OR TO EDGE OF EXISTING NON–NATIVE VEGETATION WHERE THAT DISTANCE IS <25 FT.

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REVIEWED: 01/2014

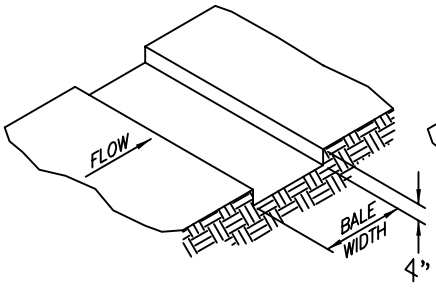
DESIGN RESTRICTIONS:

1. THE FORMATION OF CONCENTRATED FLOWS ON THE UPSLOPE DRAINAGE AREA IS NOT PERMITTED. IF CONCENTRATED FLOWS DO DEVELOP, DIRECT STABILIZATION MEASURES MUST BE EMPLOYED TO PREVENT SUCH CONDITIONS.
2. STRAW BALE BARRIERS MAY NOT BE PLACED IN ANY AREA OF CONCENTRATED FLOWS SUCH AS STREAMS, CHANNELS, DITCHES, SWALES, ETC.
3. STRAW BALE BARRIERS WILL NOT BE USED IN AREAS WHERE ROCK PREVENTS THE FULL AND UNIFORM DEPTH ANCHORING OF THE BARRIER.
4. STRAW BALE BARRIERS WILL BE REPLACED EVERY THREE (3) MONTHS OR MORE OFTEN IF THE BALES DETERIORATE AND BECOME INEFFECTIVE.

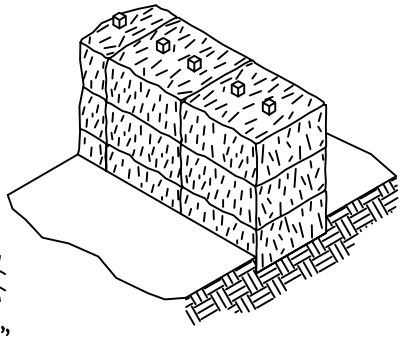
INSTALLATION:

1. THE ANCHORING TRENCH WILL BE CONSTRUCTED TO THE REQUIRED GRADE AND DEPTH AS SHOWN.
2. SUPPORT STAKES WILL BE DRIVEN TO THE REQUIRED DEPTH AS SHOWN.
3. THE ANCHORING TRENCH WILL BE BACKFILLED AND COMPACTED TO A DENSITY EQUAL TO UNDISTURBED SITE SOILS.

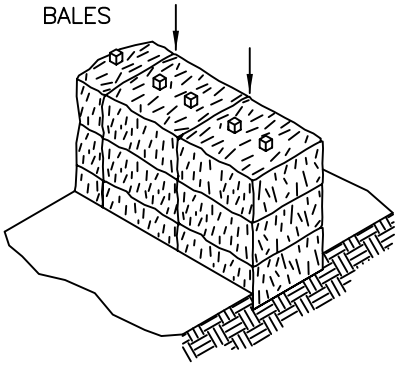
1. EXCAVATE ANCHORING TRENCH



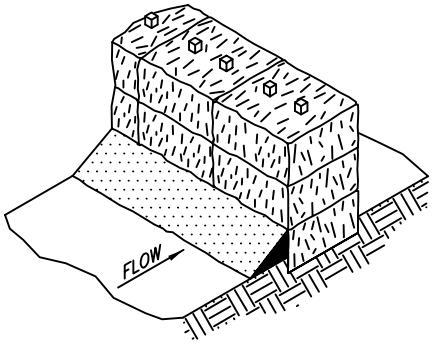
2. PLACE AND STAKE STRAW BALES



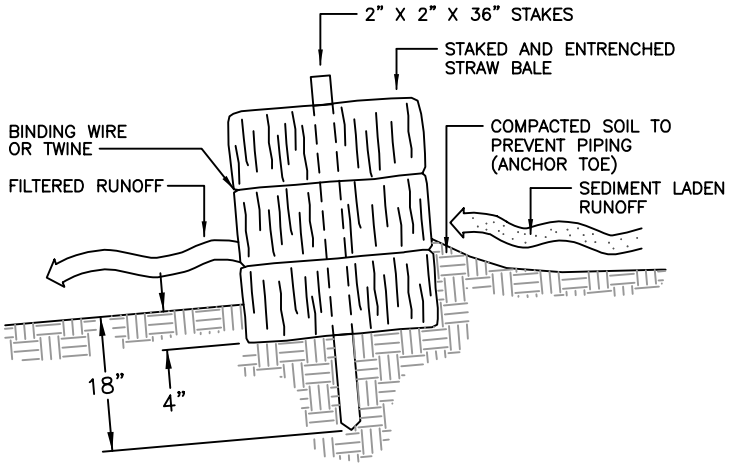
3. WEDGE LOOSE STRAW BETWEEN BALES



4. BACKFILL AND COMPACT THE EXCAVATED SOIL (ANCHOR TOE)



CROSS–SECTION OF STRAW BALE BARRIER



MAINTENANCE:

1. THE BARRIER WILL BE INSPECTED AFTER EVERY RUNOFF EVENT. DISLODGED BALES SHOULD BE RESET, STAKED AND BACKFILLED TO THE REQUIREMENTS LISTED UNDER "INSTALLATION". ALL CLOGGED OR INOPERATIVE BALES WILL BE REPLACED.
2. ACCUMULATED SEDIMENTS WILL BE REMOVED AS REQUIRED AND IN ALL CASES WHERE UNIFORM ACCUMULATIONS REACH 1/3 THE ABOVE GROUND HEIGHT OF THE BARRIER.
3. ALL UNDERCUTTING OR EROSION OF THE ANCHOR TOE WILL BE REPAIRED IMMEDIATELY WITH COMPACTED BACKFILL MATERIALS.

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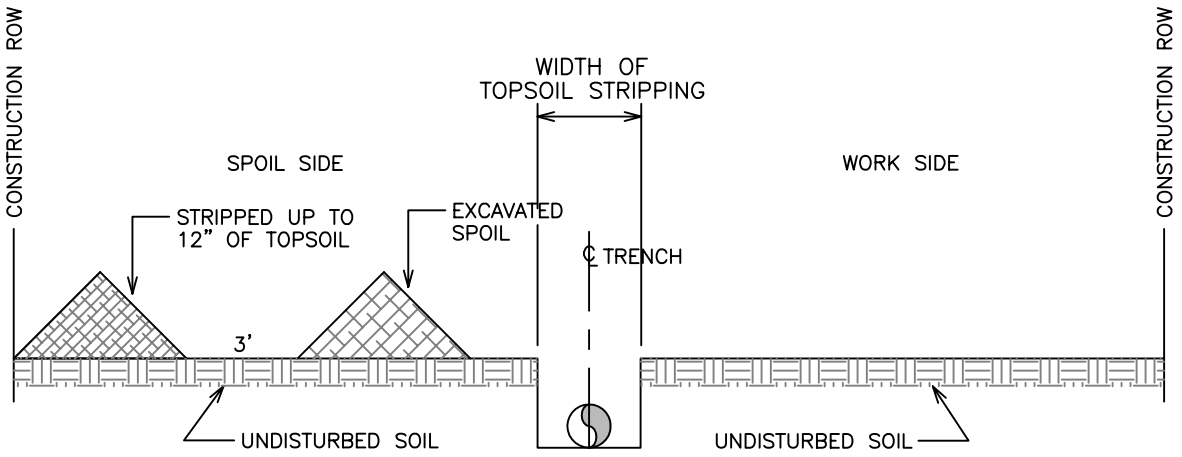
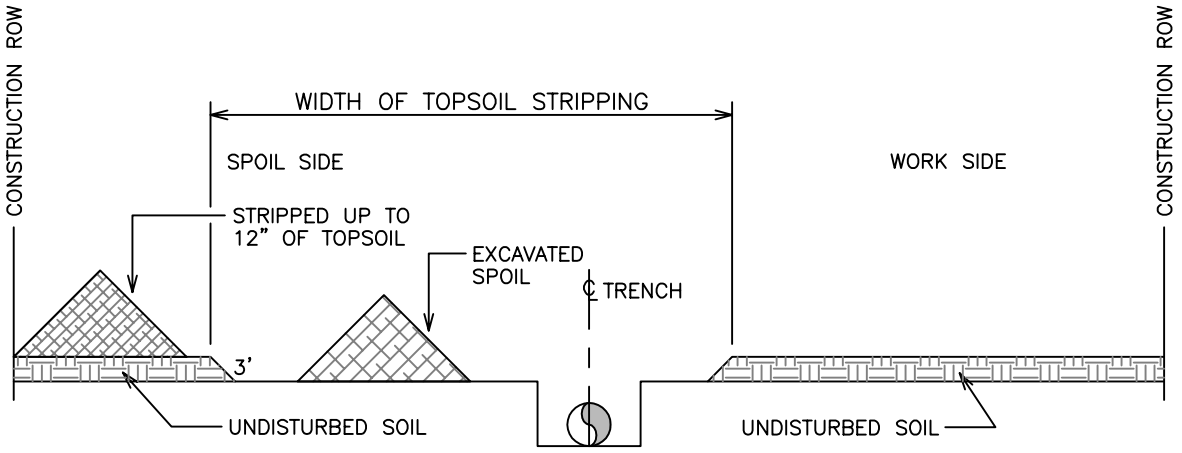


DITCH LINE TOPSOIL STRIPPING

ALSO USED IN NON-SATURATED WETLANDS



DITCH PLUS SPOIL SIDE SEGREGATION

NOTES:

1. ALLOW FOR A 3' SEPARATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT-OF-WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.

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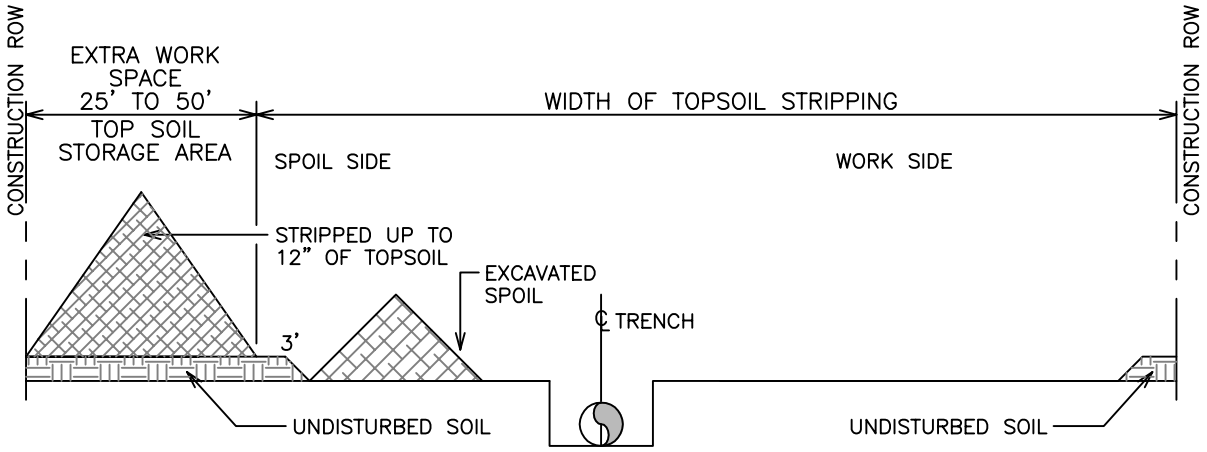
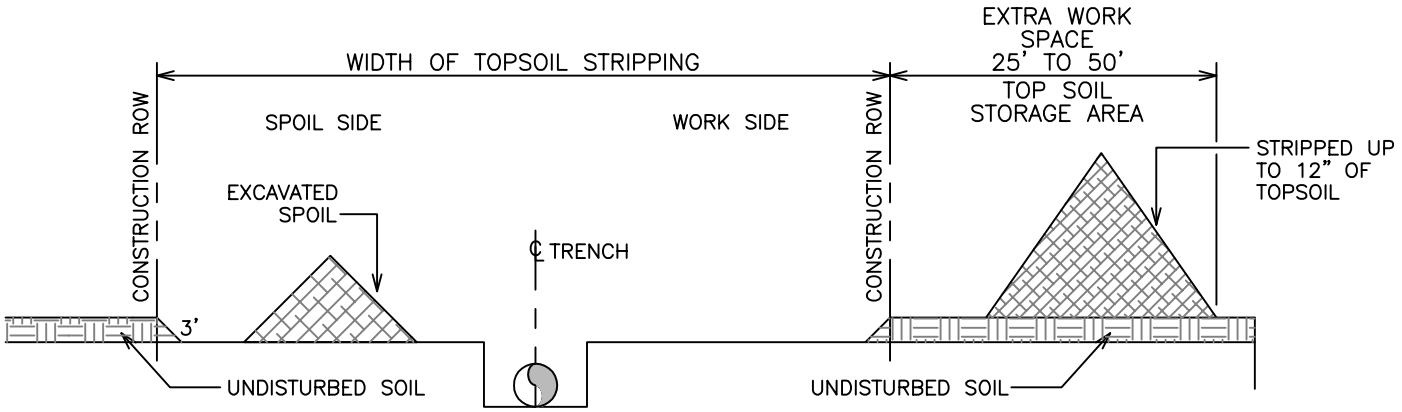
REVIEWED: 01/2014



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - A



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - B

NOTES:

1. ALLOW FOR A 3' SEPARATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT-OF-WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.

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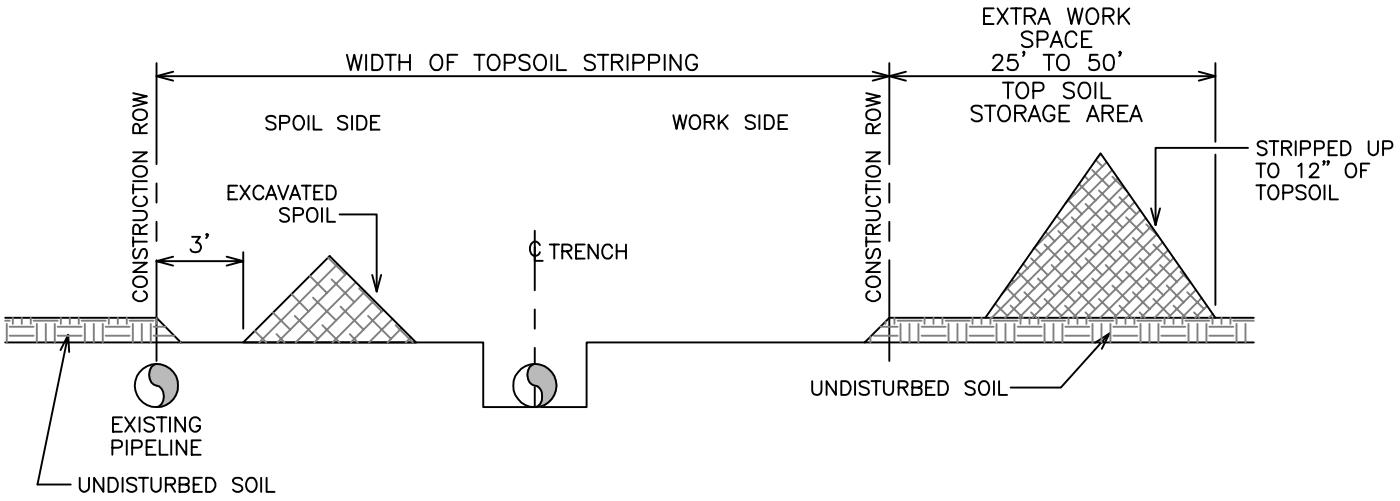
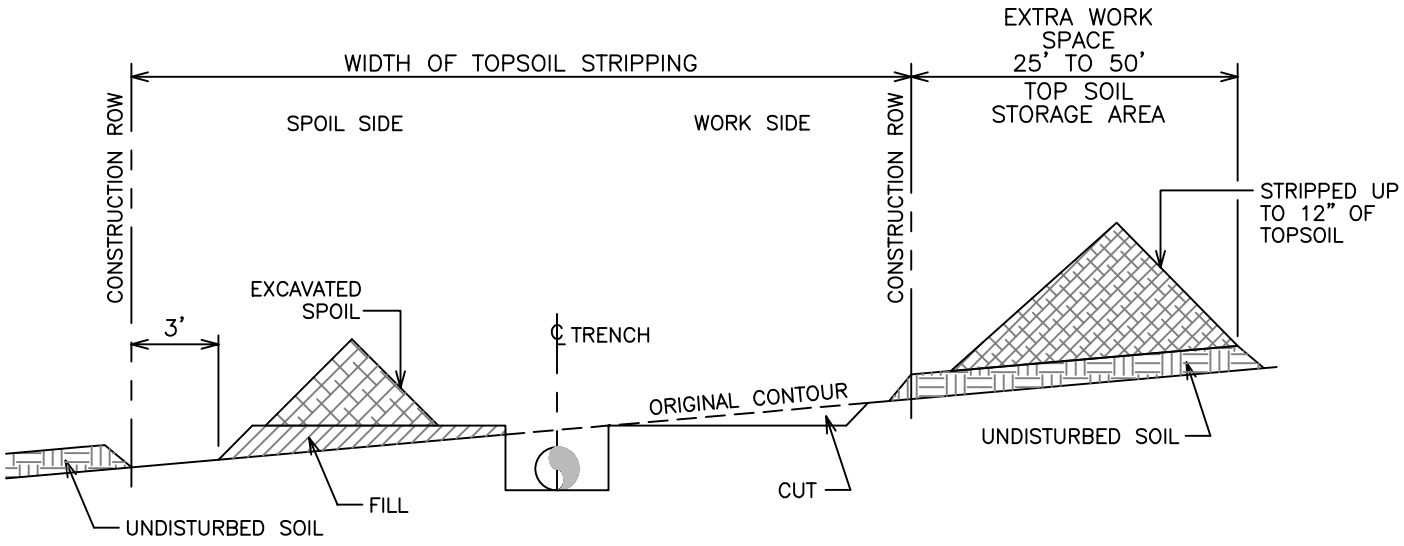
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP23a.dwg
LAST REVISION DATE: 01/17/2014

TOPSOIL SEGREGATION

DRAWING NUMBER: 23A



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - PARALLELING PIPELINES



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - SIDE SLOPES

NOTES:

1. ALLOW FOR A 3' SEPARATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT-OF-WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.

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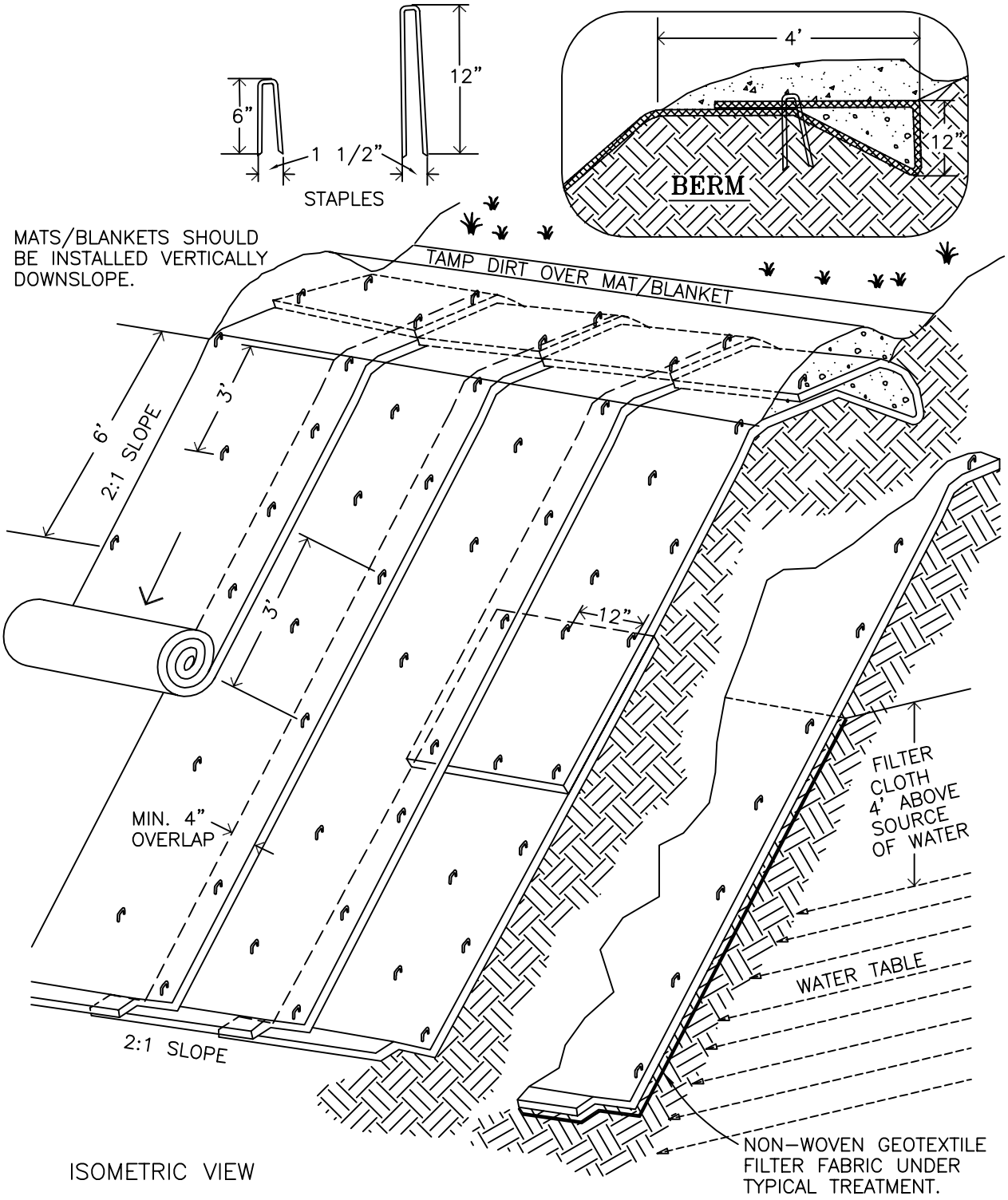
REVIEWED: 01/2014



ISOMETRIC VIEW

TYPICAL SLOPE SOIL STABLIZATION

NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.

2. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

3. SEE DRAWING NO. 24A FOR INSTALLATION SPECIFICATIONS.

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MODIFIED BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP24.dwg
DATE: 01/13/1997

EROSION BLANKETS SLOPE INSTALLATION

DRAWING NUMBER: 24

CONSTRUCTION SPECIFICATIONS:

SITE PREPARATION

1. PROPER SITE PREPARATION IS ESSENTIAL TO ENSURE COMPLETE CONTACT OF THE PROTECTION MATTING WITH THE SOIL.
2. GRADE AND SHAPE AREA OF INSTALLATION.
3. REMOVE ALL ROCKS, CLODS, VEGETATIVE OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED BLANKETS, OR MATS WILL HAVE DIRECT CONTACT WITH THE SOIL.
4. PREPARE SEEDBED BY LOOSENING 2"–3" OF TOPSOIL ABOVE FINAL GRADE.
5. INCORPORATE AMENDMENTS, SUCH AS LIME AND FERTILIZER, INTO SOIL ACCORDING TO SOIL TEST AND THE SEEDING PLAN.

SEEDING

SEED AREA BEFORE BLANKET INSTALLATION FOR EROSION CONTROL AND RE–VEGETATION OR SEED AFTER MAT INSTALLATION FOR TURF REINFORCEMENT. WHEN SEEDING PRIOR TO BLANKET INSTALLATION, ALL CHECK SLOTS AND OTHER AREAS DISTURBED DURING INSTALLATION MUST BE RESEEDED. WHERE SOIL FILLING IS SPECIFIED, SEED THE MATTING AND THE ENTIRE DISTURBED AREA AFTER INSTALLATION AND PRIOR TO FILLING THE MAT WITH SOIL.

ANCHORING

U–SHAPED WIRE STAPLES, METAL GEOTEXTILE STAKE PINS OR TRIANGULAR WOODEN STAKES CAN BE USED TO ANCHOR MATS TO THE GROUND SURFACE. WIRE STAPLES SHOULD BE A MINIMUM OF 8 GAUGE. METAL STAKE PINS SHOULD BE 3/16" DIAMETER STEEL WITH A 1 1/2" STEEL WASHER AT THE HEAD OF THE PIN. WIRE STAPLES AND METAL STAKE SHOULD BE DRIVEN FLUSH TO THE SOIL SURFACE. WOODEN STAKES SHOULD BE 3" X 1 1/2" TRIANGULAR WOODEN SURVEY STAKES. TWO INCHES OF WOOD STAKING SHOULD REMAIN ABOVE THE SOIL SURFACE. ALL ANCHORS SHOULD BE 8"–18" LONG AND HAVE SUFFICIENT GROUND PENETRATION TO RESIST PULLOUT. LONGER ANCHORS MAY BE REQUIRED FOR LOOSE SOILS.

INSTALLATION ON SLOPES

1. BEGIN AT THE TOP OF THE SLOPE AND ANCHOR ITS BLANKET IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL TRENCH AND TAMP EARTH FIRMLY.
2. UNROLL BLANKET DOWNSLOPE IN THE DIRECTION OF THE WATER FLOW.
3. THE EDGES OF ADJACENT PARALLEL ROLLS MUST BE OVERLAPPED 2" TO 3" AND BE STAPLED EVERY 3 FEET.
4. WHEN BLANKETS MUST BE SPLICED, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH 6" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.
5. BLANKETS SHALL BE STAPLED SUFFICIENTLY TO ANCHOR BLANKET AND MAINTAIN CONTACT WITH THE SOIL. STAPLES SHALL BE PLACED DOWN THE CENTER AND STAGGERED WITH THE STAPLES PLACED ALONG THE EDGES STEEP SLOPES, 1:1 TO 2:1, REQUIRE 2 STAPLES PER SQUARE YARD. MODERATE SLOPES, 2:1 TO 3:1, REQUIRE 1 1/2 STAPLES PER SQUARE YARD (1 STAPLE 3' O.C.). GENTLE SLOPES REQUIRE 1 STAPLE PERSQUARE YARD.

SOIL FILLING IF SPECIFIED FOR TURF REINFORCEMENT.

1. AFTER SEEDING, SPREAD AND LIGHTLY RAKE 1/2" – 3/4" OF FINE TOPSOIL INTO THE MAT APERTURES TO COMPLETELY FILL MAT THICKNESS.
2. USE BACKSIDE OF RAKE OR OTHER FLAT IMPLEMENT.
3. SPREAD TOPSOIL USING LIGHTWEIGHT LOADER, BACKHOE, OR OTHER POWER EQUIPMENT. AVOID SHARP TURNS WITH EQUIPMENT.
4. DO NOT DRIVE TRACKED OR HEAVY EQUIPMENT OVER MAT.
5. AVOID ANY TRAFFIC OVER MATTING IF LOOSE OR WET SOIL CONDITIONS EXIST.
6. USE SHOVELS, RAKES OR BROOMS FOR FINE GRADING AND TOUCH UP.
7. SMOOTH OUT SOIL FILLING JUST EXPOSING TOP NETTING OF MATRIX.

INSPECTION AND MAINTENANCE

1. ALL BLANKET AND MATS SHOULD BE INSPECTEDPERIODICALLY FOLLOWING INSTALLATION.
2. INSPECT INSTALLATION AFTER SIGNIFICANT RAINSTORMS TO CHECK FOR EROSION AND UNDERMINING. ANY FAILURE SHOULD BE REPAIRED IMMEDIATELY.
3. IF WASHOUT OR BREAKAGE OCCURS, RE–INSTALL THE MATERIAL AFTER REPAIRING THE DAMAGE TO THE SLOPE OR DRAINAGEWAY.

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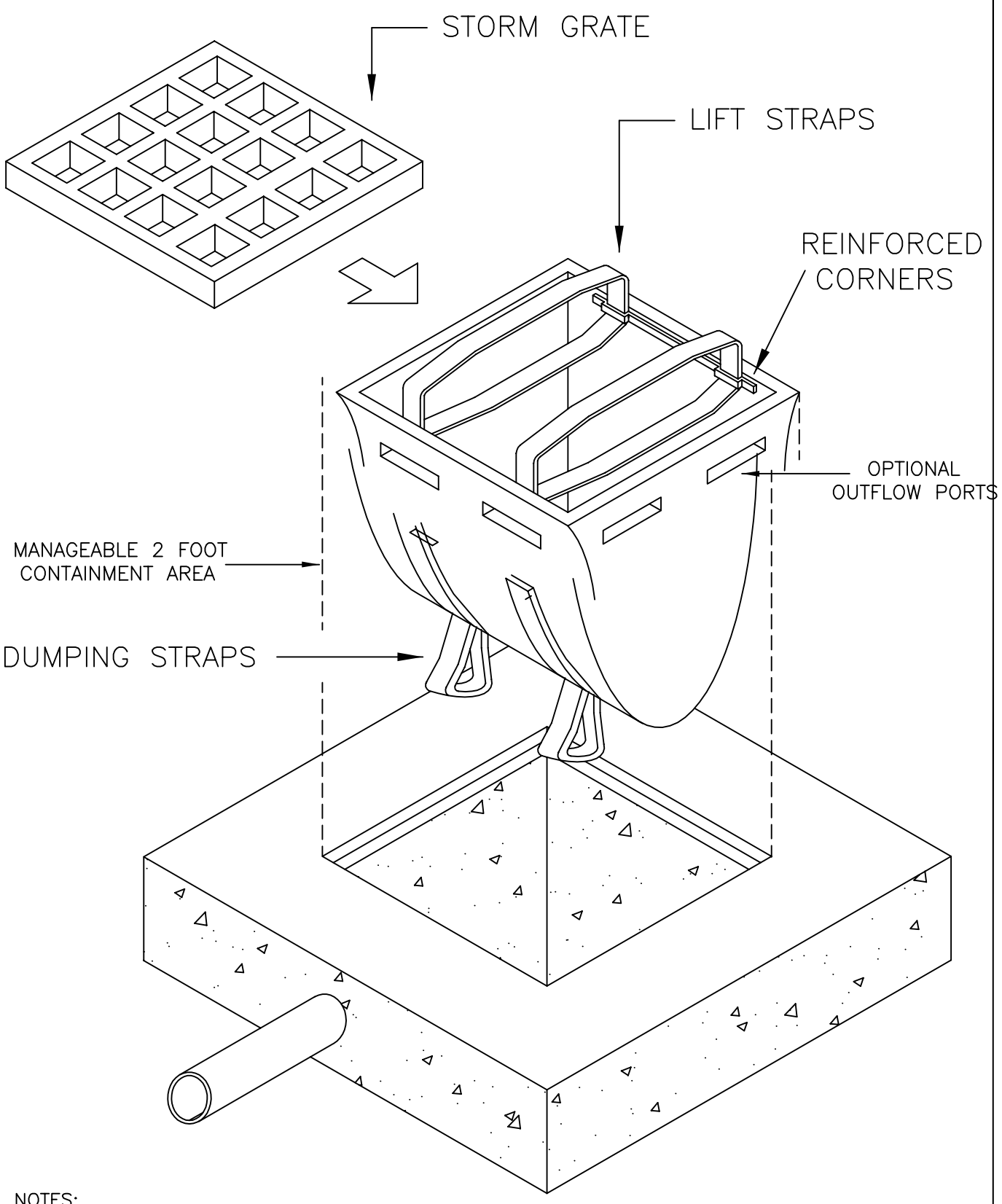
MODIFIED BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP24A.dwg
DATE: 01/13/1997

SPECIFICATIONS EROSION BLANKETS SLOPE INSTALLATION

DRAWING NUMBER: 24A



NOTES:

1. CATCH BASIN SEDIMANT SACK IS TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)

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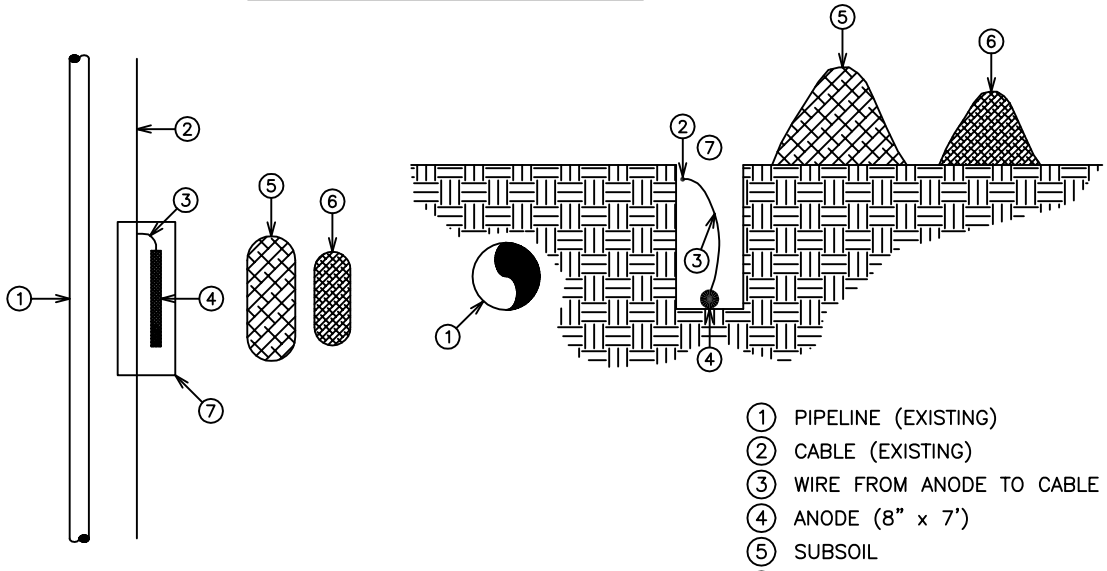
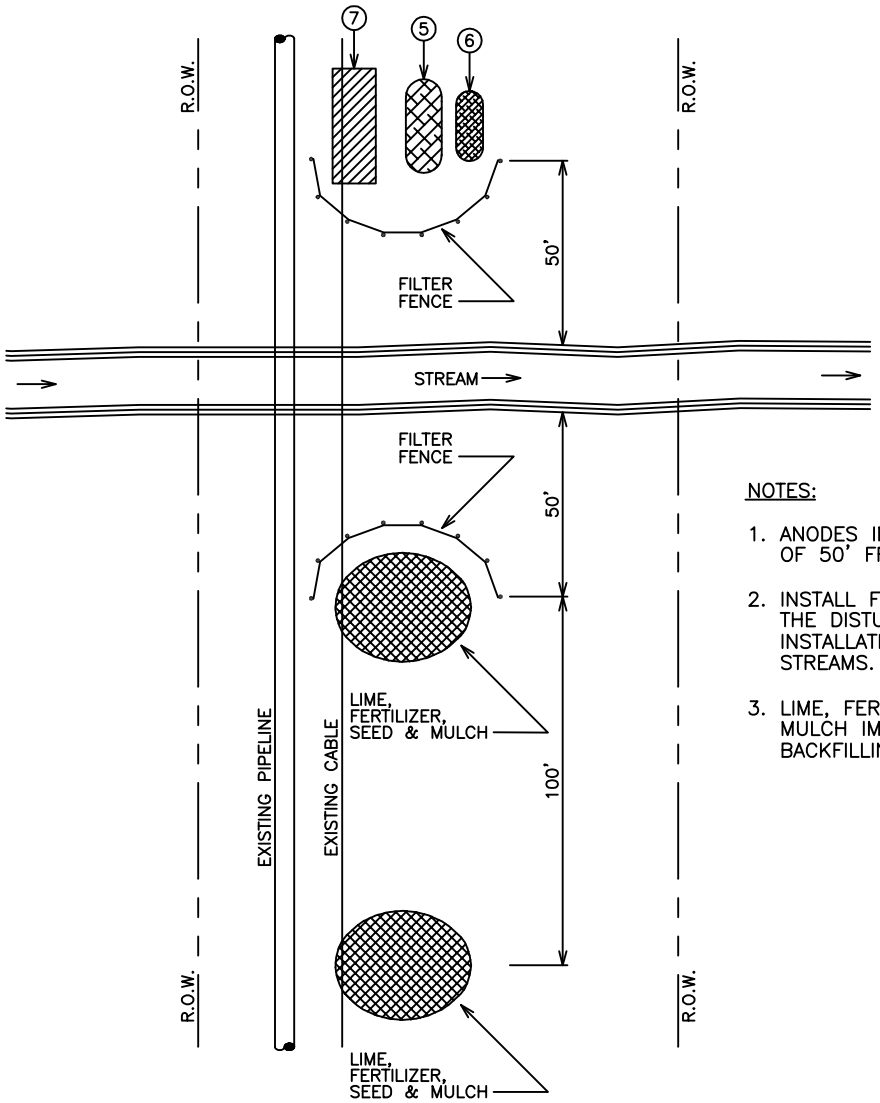
TYPICAL ANODE INSTALLATION



1. PIPELINE (EXISTING)
2. CABLE (EXISTING)
3. WIRE FROM ANODE TO CABLE
4. ANODE (8" x 7')
5. SUBSOIL
6. TOPSOIL
7. OPENING (4'W x 10'L x 5'D)



NOTES:

1. ANODES INSTALLED A MINIMUM OF 50' FROM EDGE OF WATER.
2. INSTALL FILTER FENCE ACROSS THE DISTURBED AREAS AT ANODE INSTALLATIONS ADJACENT TO STREAMS.
3. LIME, FERTILIZE, SEED AND MULCH IMMEDIATELY AFTER BACKFILLING.

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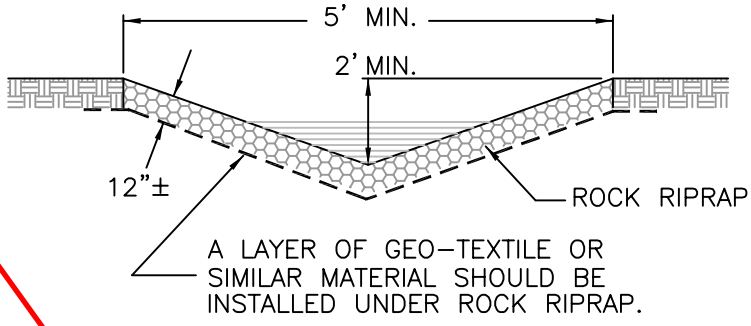
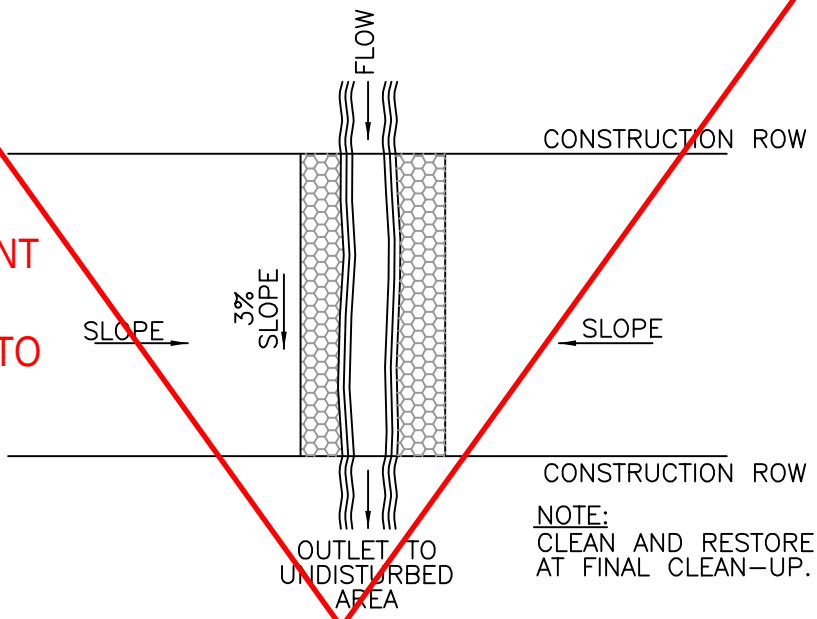


VELOCITY = 8.7'/SEC.
Q = 43 CFS



NOTE:
CLEAN AND RESTORE DITCH AT FINAL CLEAN-UP.

SEE BMP 14 FOR OPTIONAL DIMENSIONS

FOR ANY PERMANENT STORM WATER CHANNELS, REFER TO FACILITY PCSM PACKAGES.

NO TEMPORARY STORM WATER EARTHEN CHANNELS ARE PROPOSED.

CONSTRUCTION SPECIFICATIONS

1. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO A DENSITY APPROXIMATING THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
2. OVERFILL DEPRESSIONS WITH RIPRAP.
3. REMOVE BRUSH, TREES, STUMPS, AND OTHER OBJECTIONABLE MATERIAL.
4. CUT THE SUBGRADE SUFFICIENTLY DEEP SO THAT THE FINISHED GRADE OF THE RIPRAP WILL BE AT THE ELEVATION OF THE SURROUNDING AREA. CHANNELS SHOULD BE EXCAVATED SUFFICIENTLY TO ALLOW PLACEMENT OF THE RIPRAP IN A MANNER SUCH THAT THE FINISHED INSIDE DIMENSIONS AND GRADE OF THE RIPRAP MEET DESIGN SPECIFICATIONS.
5. PLACE THE SAND AND GRAVEL FILTER BLANKET IMMEDIATELY AFTER THE GROUND FOUNDATION IS PREPARED FOR GRAVEL, SPREAD FILTER STONE IN A UNIFORM LAYER TO THE SPECIFIED DEPTH. WHERE MORE THAN ONE LAYER OF FILTER MATERIAL IS USED, SPREAD THE LAYERS WITH MINIMAL MIXING.
6. PLACE THE FILTER FABRIC DIRECTLY ON THE PREPARED FOUNDATION. OVERLAP THE EDGES BY AT LEAST 12 INCHES, AND SPACE ANCHOR PINS EVERY 3 FEET ALONG THE OVERLAP. BURY THE UPPER AND LOWER ENDS OF THE CLOTH A MINIMUM OF 12 INCHES BELOW GROUND. TAKE CARE NOT TO DAMAGE THE CLOTH WHEN PLACING RIPRAP.
7. WHERE LARGE STONES ARE USED OR MACHINE PLACEMENT IS DIFFICULT, A 4-INCH LAYER OF FINE GRAVEL OR SAND MAY BE NEEDED TO PROTECT THE FILTER FABRIC.
8. PLACEMENT OF RIPRAP SHOULD FOLLOW IMMEDIATELY AFTER PLACEMENT OF THE FILTER.
9. PLACE RIPRAP SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF STONE WITH A MINIMUM OF VOIDS.
10. PLACE RIPRAP TO ITS FULL THICKNESS IN ONE OPERATION.
11. DO NOT PLACE RIPRAP BY DUMPING THROUGH CHUTES OR OTHER METHODS THAT CAUSE SEGREGATION OF STONE SIZES.
12. TAKE CARE NOT TO DISLODGE THE UNDERLYING BASE OR FILTER WHEN PLACING THE STONES.
13. THE FINISHED SLOPE SHOULD BE FREE OF POCKETS OF SMALL STONE OR CLUSTERS OF LARGE STONES.

MAINTENANCE

RIPRAP SHOULD BE INSPECTED PERIODICALLY FOR SCOUR OR DISLODGED STONES. CONTROL OF WEED AND BRUSH GROWTH MAY BE NEEDED IN SOME LOCATIONS.

National Fuel SUPPLY CORPORATION

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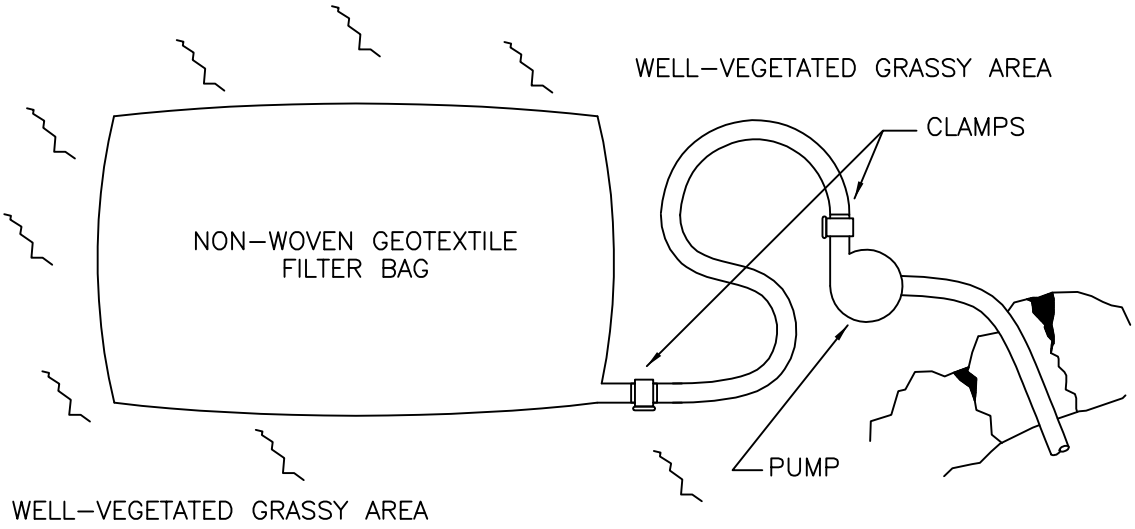
DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP27.dwg
LAST REVISION DATE: 06/27/2007

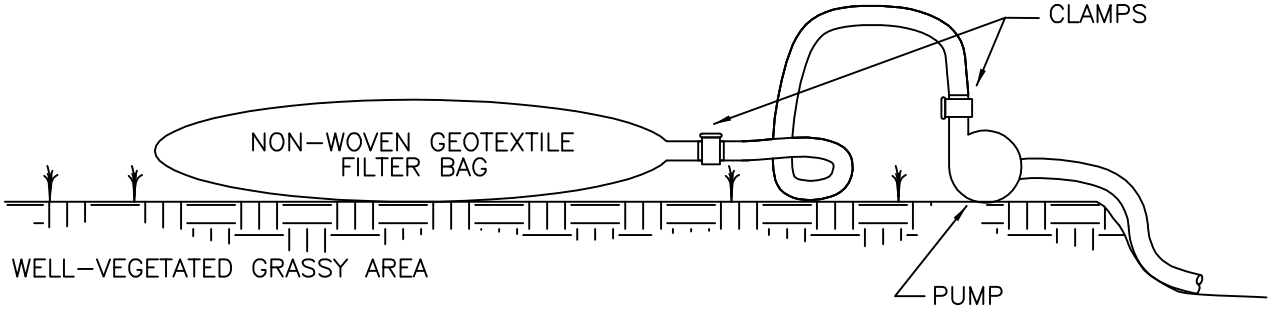
STORM WATER CHANNEL

DRAWING NUMBER: 27

FILTER BAGS FOR REMOVING SEDIMENT FROM PUMPED WATER



PLAN VIEW



ELEVATION VIEW

1. FILTER BAGS SHALL BE MADE FROM NON–WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS.
2. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE 1/2 FILLED WITH SEDIMENT.
3. BAGS SHALL BE LOCATED IN WELL–VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
5. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.
6. ALL FILTER BAGS AND TRAPPED SEDIMENT SHALL BE REMOVED TO A SUITABLE WASTE AREA WHEN ACCUMULATED SEDIMENTS REACH 1/2 TOTAL BAG CAPACITY.

IF SEDIMENT IS OBSERVED LEAVING THE FILTER BAG, UTILIZE STRAW BALE CONTAINMENT SIMILAR TO BMPs 47–48.

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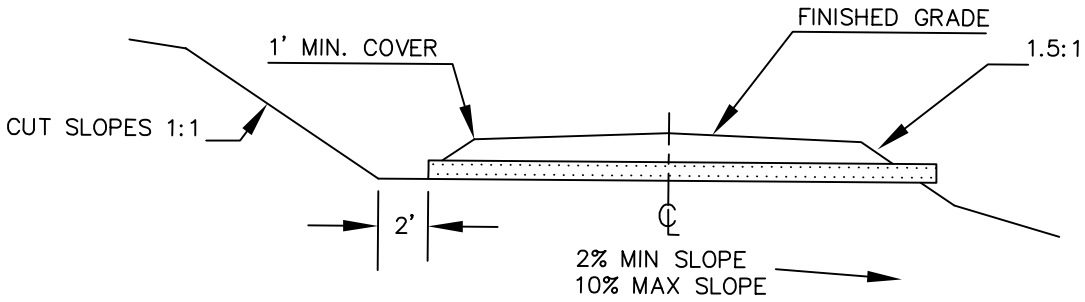
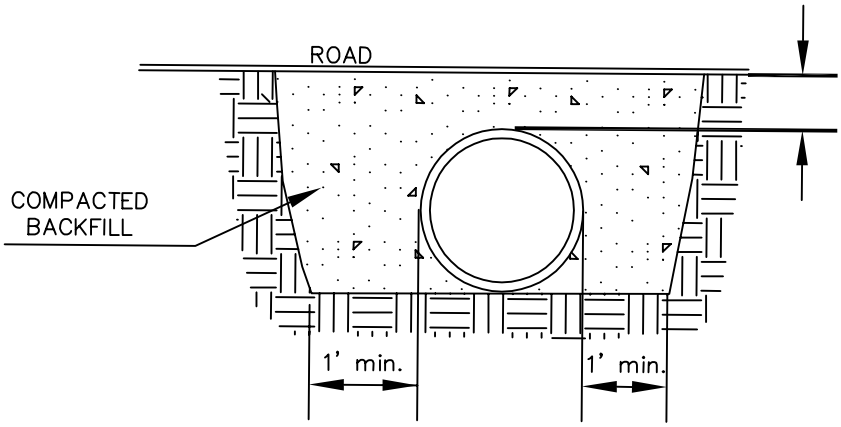
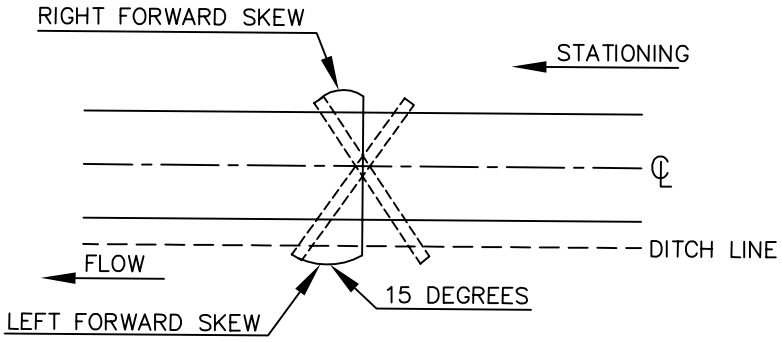


CULVERT SECTION

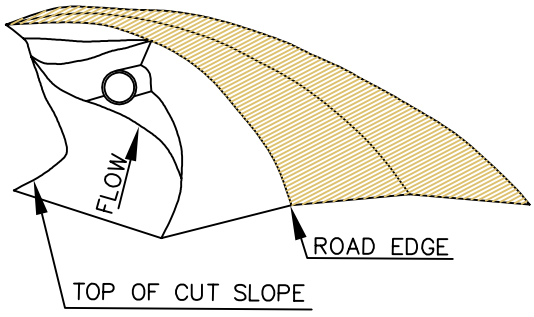


CULVERT – END VIEW

PROFILE VIEW

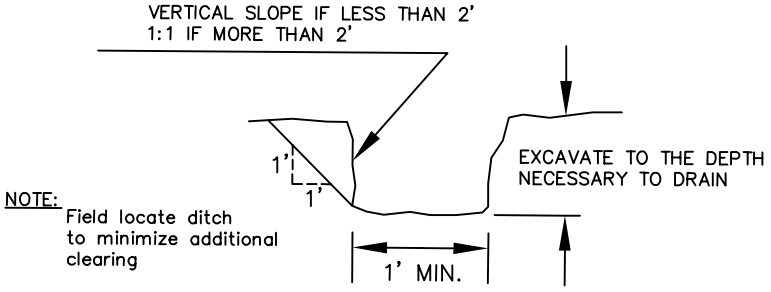


SKEW DETAIL



DITCH BLOCK

PERSPECTIVE VIEW



NOTE: Field locate ditch to minimize additional clearing

OUTLET DITCH SECTION

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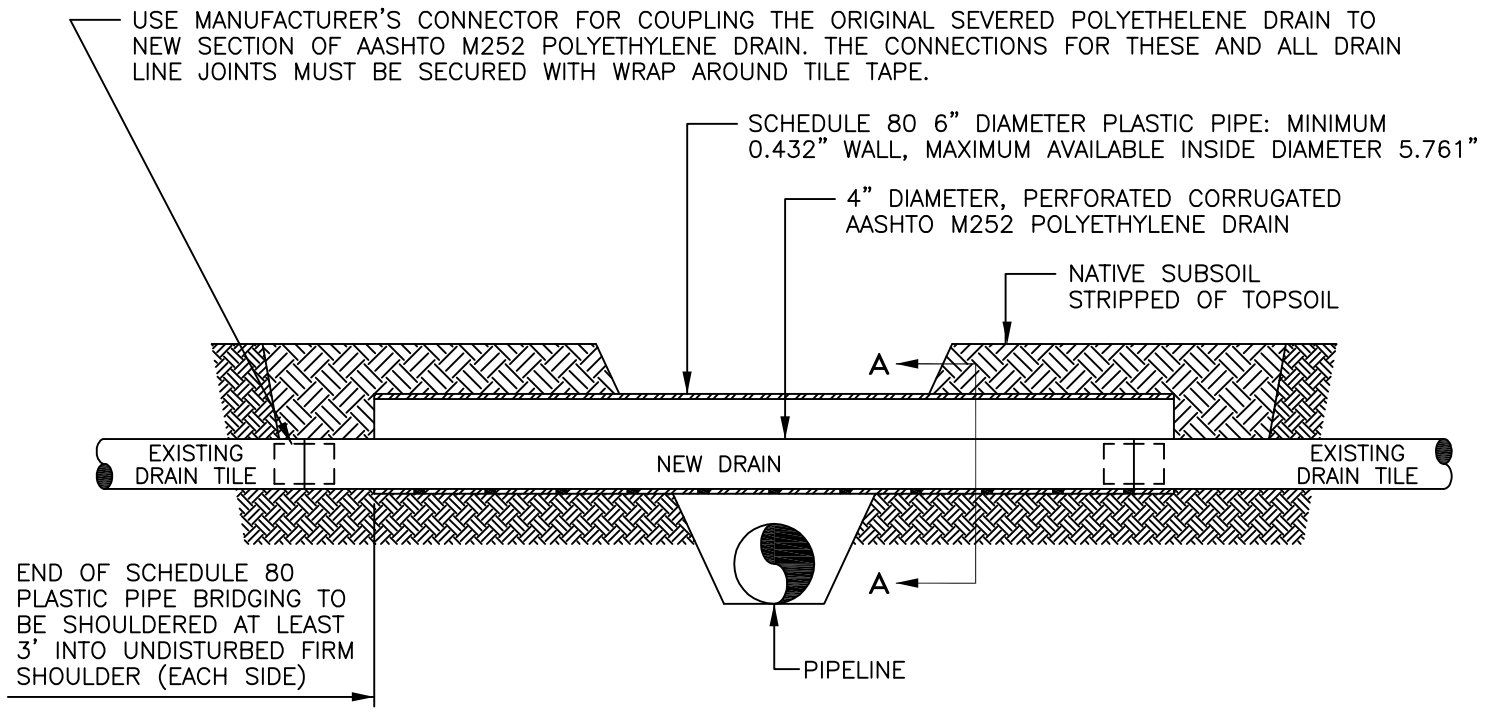


DRAINAGE TILE	SUPPORT SIZE
3" TO 5"	6" PIPE
6"	8" PIPE
7" TO 8"	10" PIPE
9" TO 10"	12" PIPE
12"	W12 x 14
15" TO 18"	W16 x 26
OVER 18"	W18 x 46

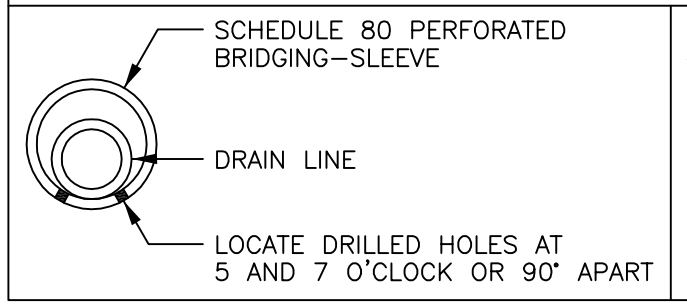
PVC SCHEDULE 80 PIPE (FOR BRIDGING–SLEEVES)

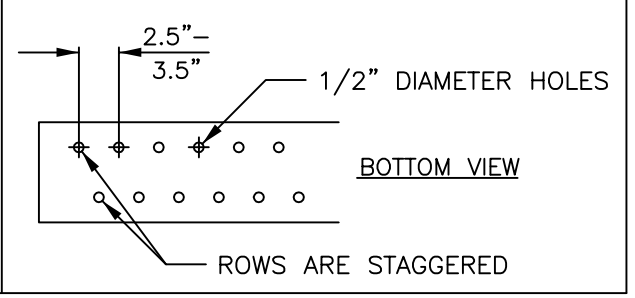
NOMINAL SIZE (INCHES)	AVERAGE O.D. (INCHES)	MAXIMUM WALL THICKNESS (INCHES)	MAXIMUM AVAILABLE I.D. (INCHES)
4	4.500	0.337	3.826
6	6.625	0.432	5.761
8	8.625	0.500	7.625
10	10.750	0.593	9.564
12	12.750	0.687	11.376

AASHTO M252
SINGLE WALL, CORRUGATED, PERFORATED (SLOTTED) POLYETHYLENE DRAIN LINE

NOMINAL SIZE (INCHES)	OUTSIDE DIAMETER (INCHES)
4	4.71
6	7.00
8	9.90
10	11.90
12	14.41
15	17.70

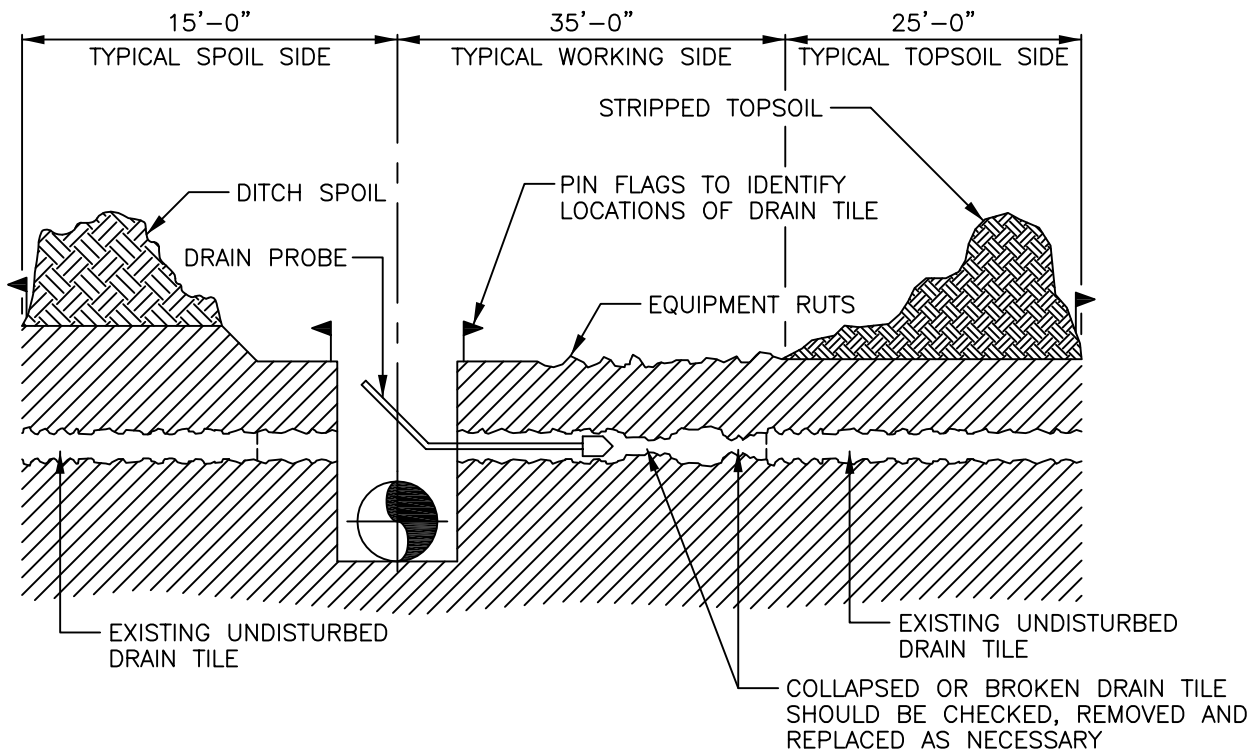
SECTION A–A VIEW OF DRAIN LINE PROTECTED BY PERFORATED, DURABLE SLEEVE





NOTES:

1. THE BRIDGING–SLEEVE REPAIR IS VERTICALLY POSITIONED ACROSS THE TRENCH SO IT MAINTAINS THE GRAVITY–FLOW GRADIENT OF THE ORIGINAL DRAIN TILE.
2. BOTH OF THE RECONNECTIONES MAY BE LOCATED PHYSICALLY OUTSIDE OF THE BRIDGING–SLEEVE (LEFT) OR INSIDE THE SLEEVE (RIGHT) AFTER SLIDING IT OVER THE REPAIR.



NOTE:

WITHIN ALL AREAS OF CONSTRUCTION ACTIVITIES;

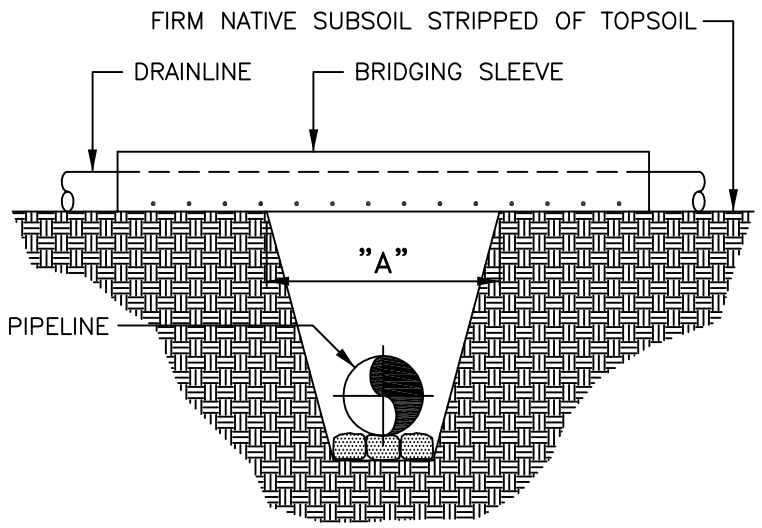
1. PROBE AND CLEAN OUT ALL DRAIN TILES.
2. REPLACE ANY DAMAGED TILES.
3. REPAIR ANY DAMAGED JOINTS.

national fuel SUPPLY CORPORATION

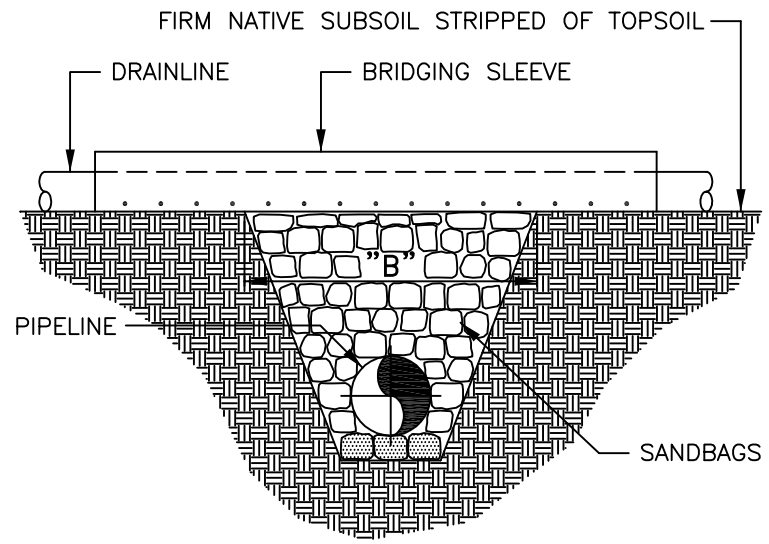
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP30.dwg
DATE: 06/24/2005

TYPICAL DRAIN TILE REPAIR ACROSS TRENCH

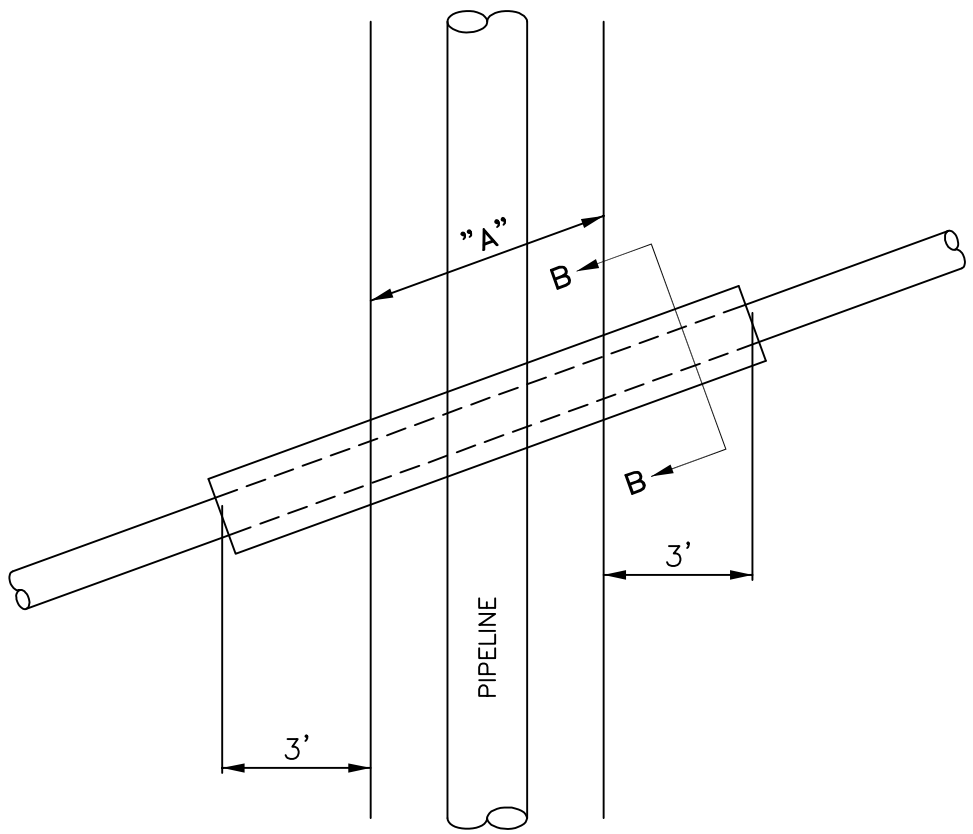
DRAWING NUMBER: 30

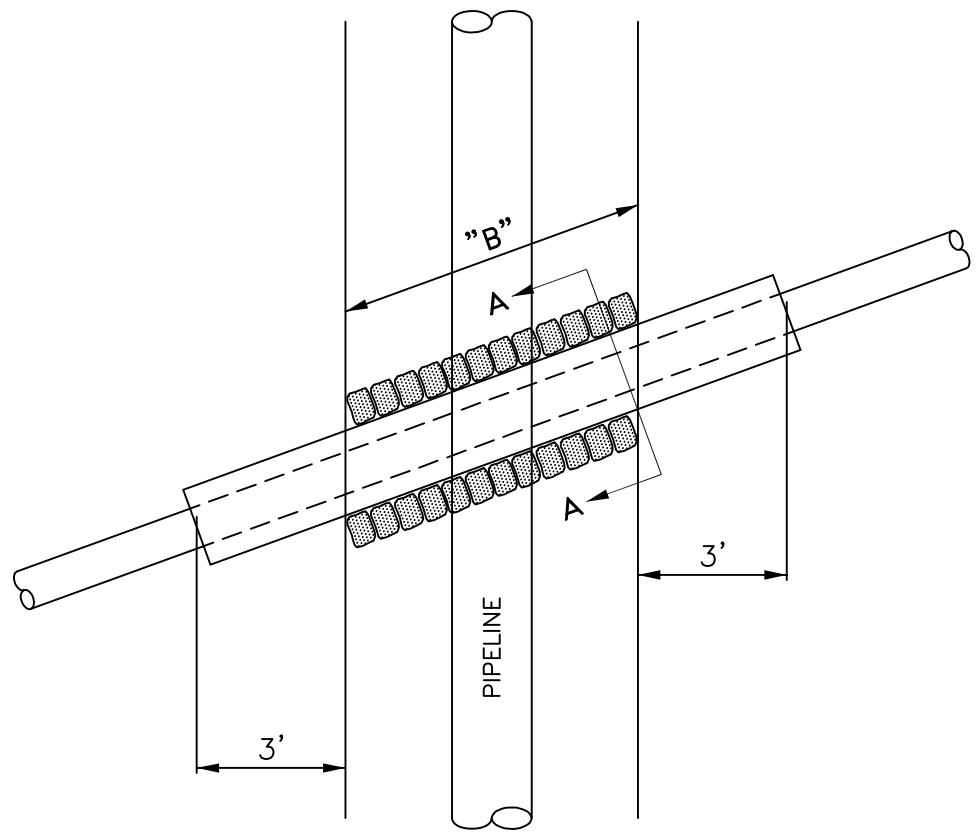


IF DISTANCE "A" DOES NOT EXCEED 10 FEET, THE SCHEDULE 80 PERFORATED BRIDGING–SLEEVE DOES NOT REQUIRE SUPPORT UNDER THE BRIDGING–SLEEVE.

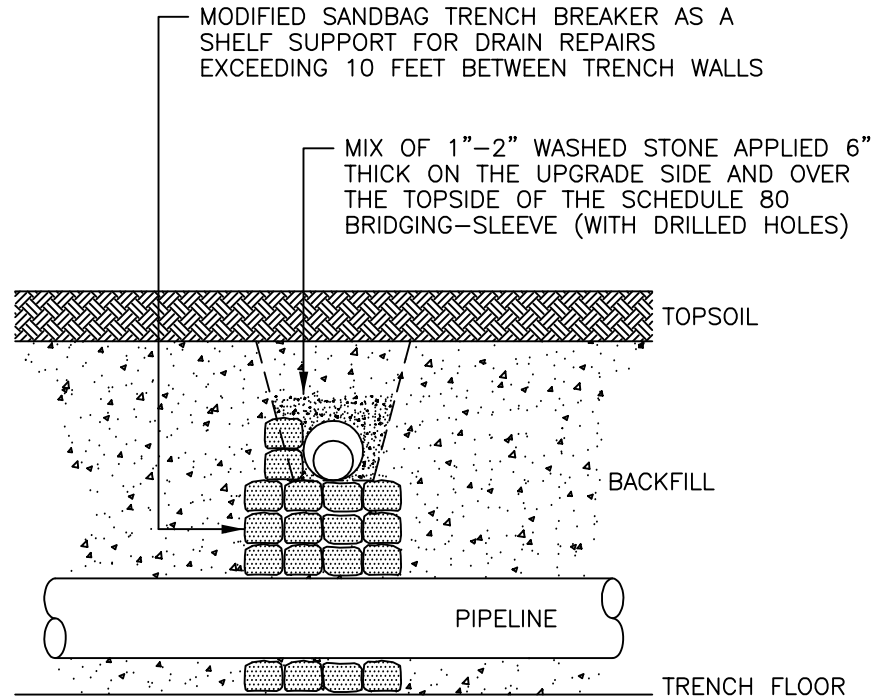


IF DISTANCE "B" EXCEEDS 10 FEET, THE SCHEDULE 80 PERFORATED BRIDGING SLEEVE REQUIRES A MODIFIED SANDBAG TRENCH BREAKER UNDER THE BRIDGING SLEEVE





CROSS SECTION "B–B" IS THE SAME AS CROSS SECTION "A–A", MINUS THE SAND BAG TRENCH BREAKER. MINIMUM OF 1"–2" WASHED STONE 4"–6" THICK UNDERNEATH, AROUND SIDES AND OVER TOP OF THE BRIDGING SLEEVE.



THE BRIDGING–SLEEVE DRAIN REPAIR RESTS ON THE UPGRADIENT SIDE OF THE MODIFIED SANDBAG TRENCH BREAKER. THE HIGHER PORTION OF THE TRENCH BREAKER IS ON THE DOWN GRADIENT SIDE OF THE REPAIR.

NOTE: IF THE REPAIR OF THE SEVERED DRAINLINE CROSSES THE PIPELINE TRENCH AT AN ANGLE REQUIRING MORE THAN 20' OF BRIDGING–SLEEVE BETWEEN THE FARTHEST ENDS OF THE FIRM SHELVES, MODIFY THE CROSSING ANGLE TO SHORTEN THE TOTAL LENGTH OF THE CROSSING AND THEN TIE TO THE EXISTING DRAIN TILE.

SECTION A-A

National Fuel SUPPLY CORPORATION

DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP30A.dwg
DATE: 06/29/2005

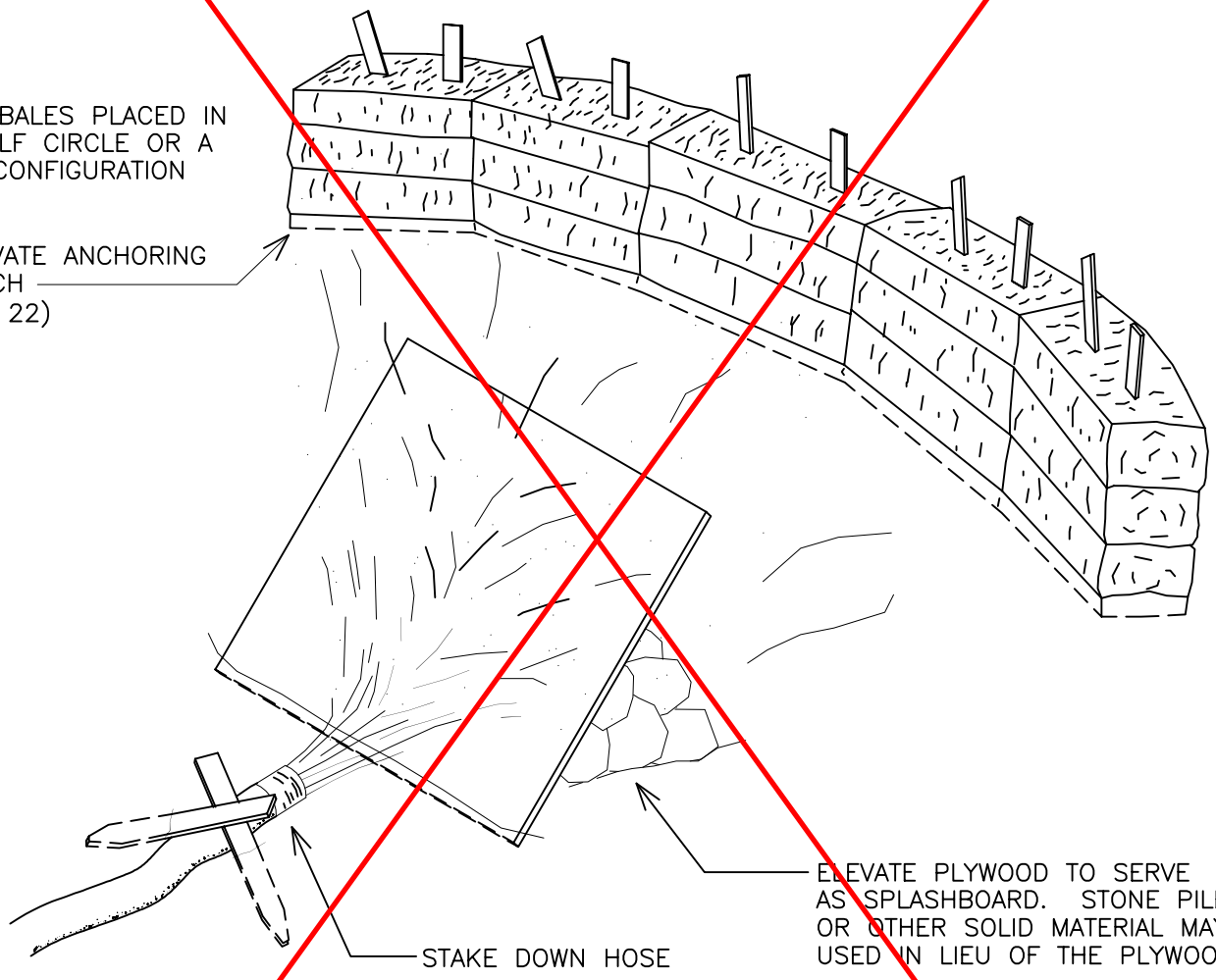
TYPICAL DRAIN TILE REPAIR ACROSS TRENCH

DRAWING NUMBER: 30A

PREFER BARRIER LOCATION
IS IN A VEGETATED AREA

HAY BALES PLACED IN
A HALF CIRCLE OR A
"U" CONFIGURATION

EXCAVATE ANCHORING
TRENCH
(BMP 22)



ELEVATE PLYWOOD TO SERVE
AS SPLASHBOARD. STONE PILE
OR OTHER SOLID MATERIAL MAYBE
USED IN LIEU OF THE PLYWOOD

STAKE DOWN HOSE

**ALTERNATIVE CONTROLS USED FOR TRENCH (BMP 28)
HYDROSTATIC DE-WATERING (BMP 3)**

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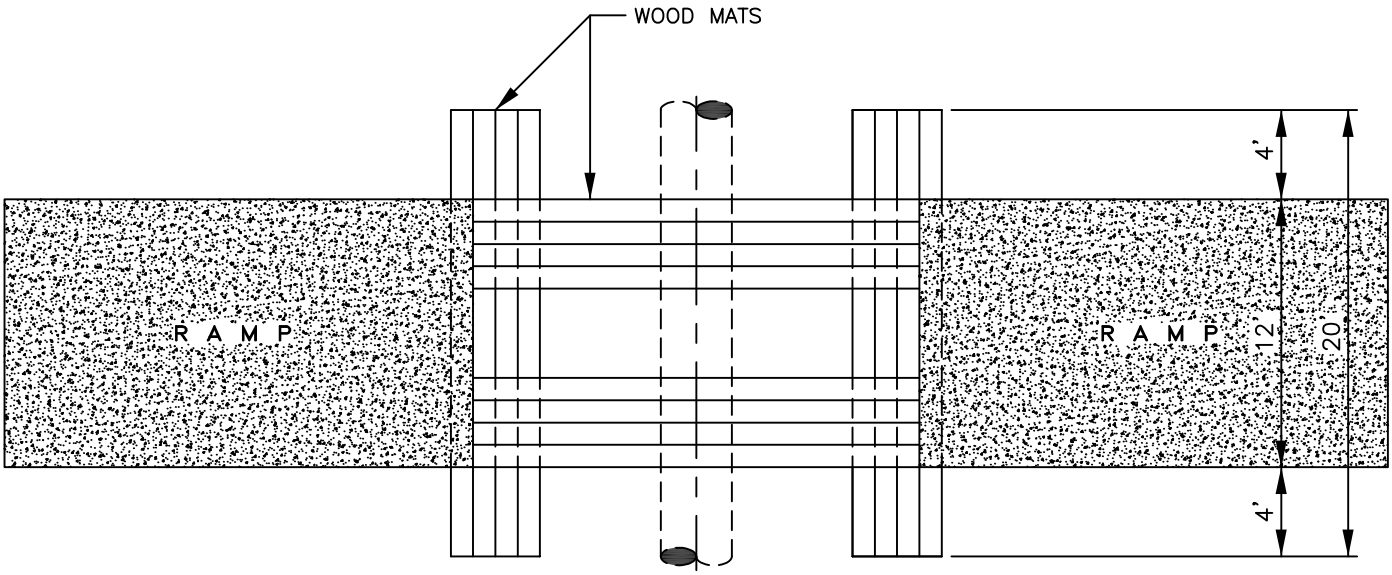
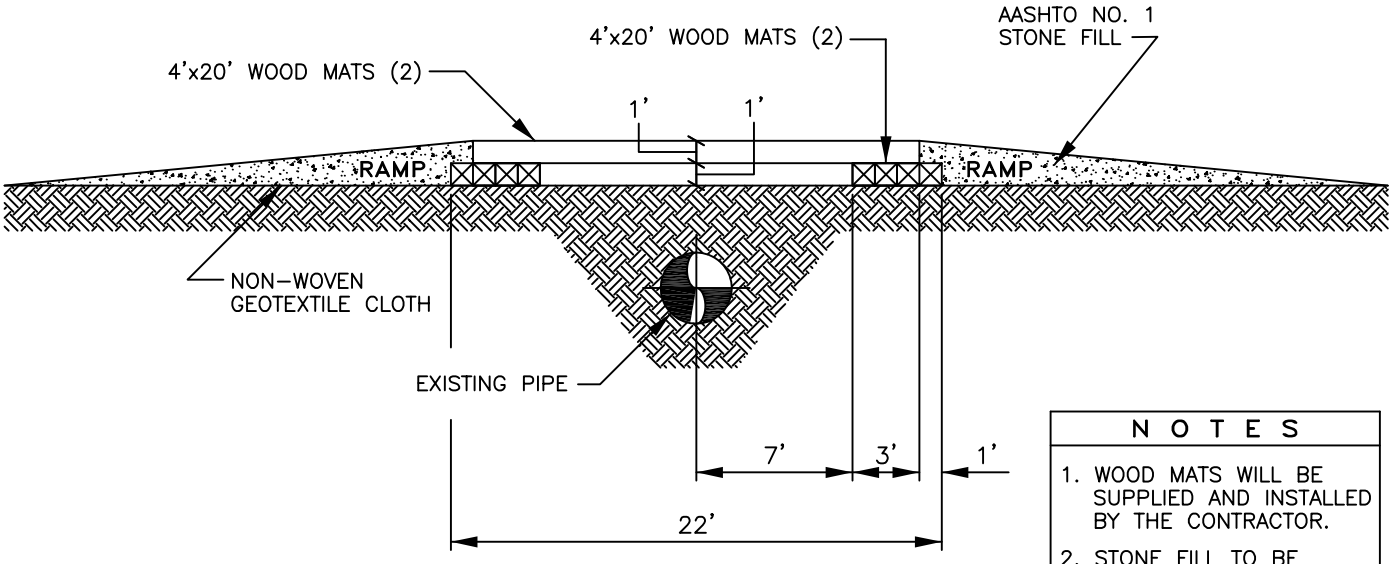
REVIEWED: 01/2014

PLAN VIEW



SIDE VIEW



N O T E S
1. WOOD MATS WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
2. STONE FILL TO BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
3. ADDITIONAL MATS, IF NEEDED, WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.

SPECIAL NOTE:

PROPOSED VEHICLE & EQUIPMENT WHEEL / TRACK LOAD WEIGHTS SHALL BE PROVIDED TO NFG ENGINEERING SERVICES TO DETERMINE IF ADDITIONAL MEASURES ARE NECESSARY BASE ON THE SPECIFIC PIPELINE TO BE CROSSED.

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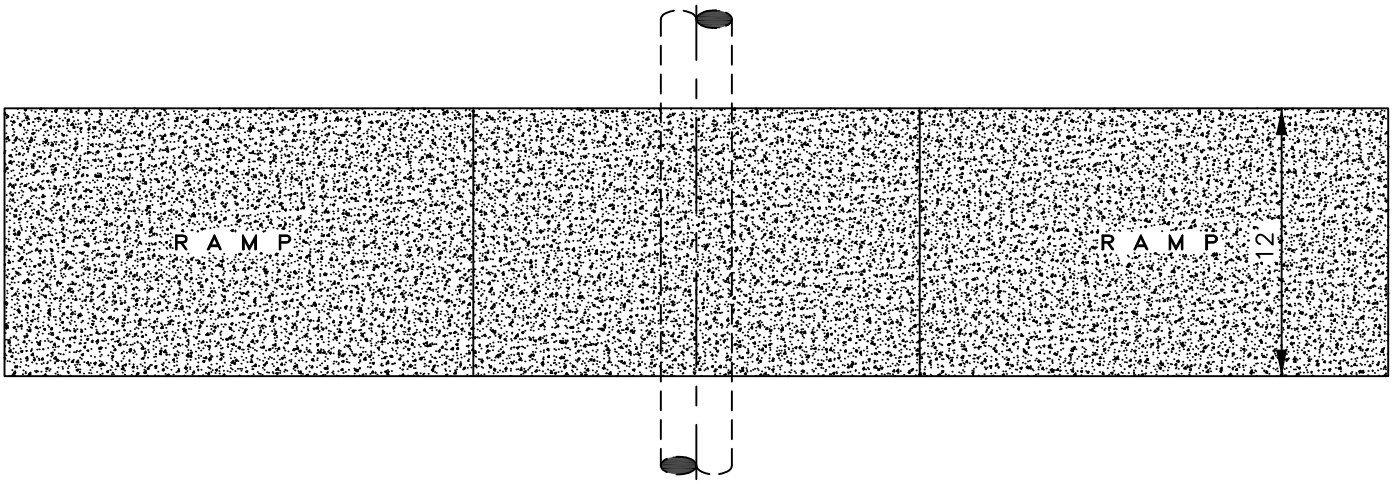
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP32.dwg
REVISED DATE: 01/17/2014

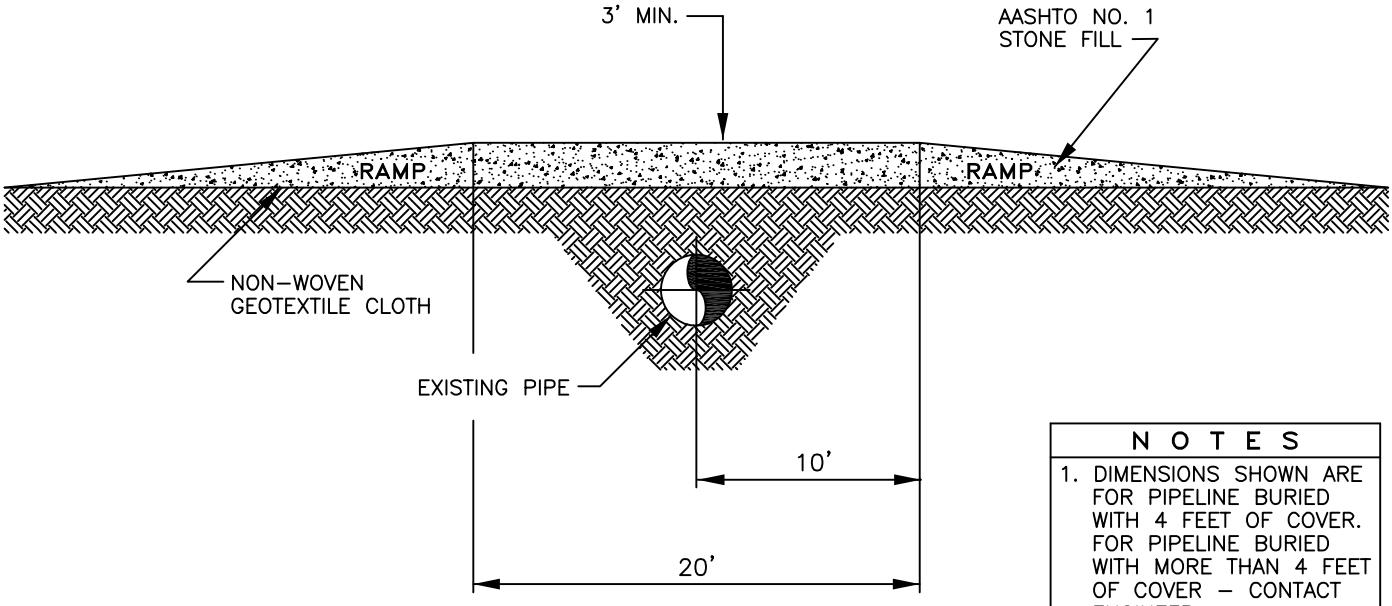
WOODEN MAT BRIDGE PIPELINE CROSSING

DRAWING NUMBER: 32

PLAN VIEW



SIDE VIEW



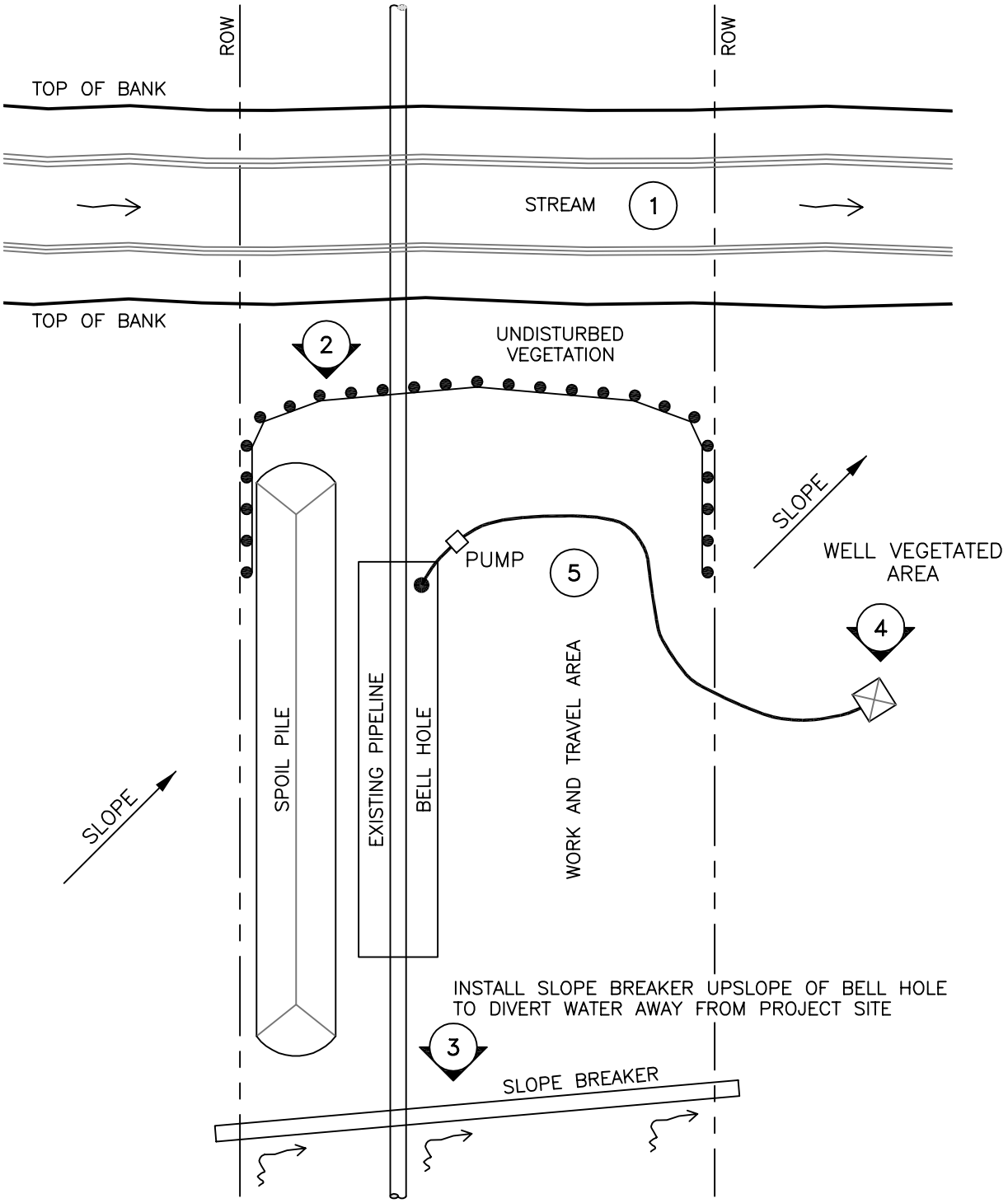
SPECIAL NOTE:

PROPOSED VEHICLE & EQUIPMENT WHEEL / TRACK LOAD WEIGHTS SHALL BE PROVIDED TO NFG ENGINEERING SERVICES TO DETERMINE IF ADDITIONAL MEASURES ARE NECESSARY BASED ON THE SPECIFIC PIPELINE TO BE CROSSED.

NOTES

1. DIMENSIONS SHOWN ARE FOR PIPELINE BURIED WITH 4 FEET OF COVER. FOR PIPELINE BURIED WITH MORE THAN 4 FEET OF COVER – CONTACT ENGINEER.
2. STONE FILL TO BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.

national Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP32.dwg REVISED DATE: 01/17/2014	STONE BRIDGE PIPELINE CROSSING	DRAWING NUMBER: 32A



1. REFER TO BMP NO. 9 FOR STREAM CROSSING REQUIREMENTS AND PROCEDURE.
2. REFER TO BMP NO. 5 FOR FILTER FENCE INSTALLATION AND BMP NO. 45A,B,C FOR COMPOST FILTER SOCK INSTALLATION AS PERMITTED AND AS PER PERMIT APPROVAL.
3. REFER TO BMP NO. 8A FOR SLOPE BREAKER INSTALLATION.
4. REFER TO BMP NO. 28 AND 31 FOR DEWATERING FILTER BAG AND ENERGY DISSIPATION.
5. ALL DISTURBED AREAS TO BE RESTORED AND STABILIZED IMMEDIATELY AFTER BACKFILLING.

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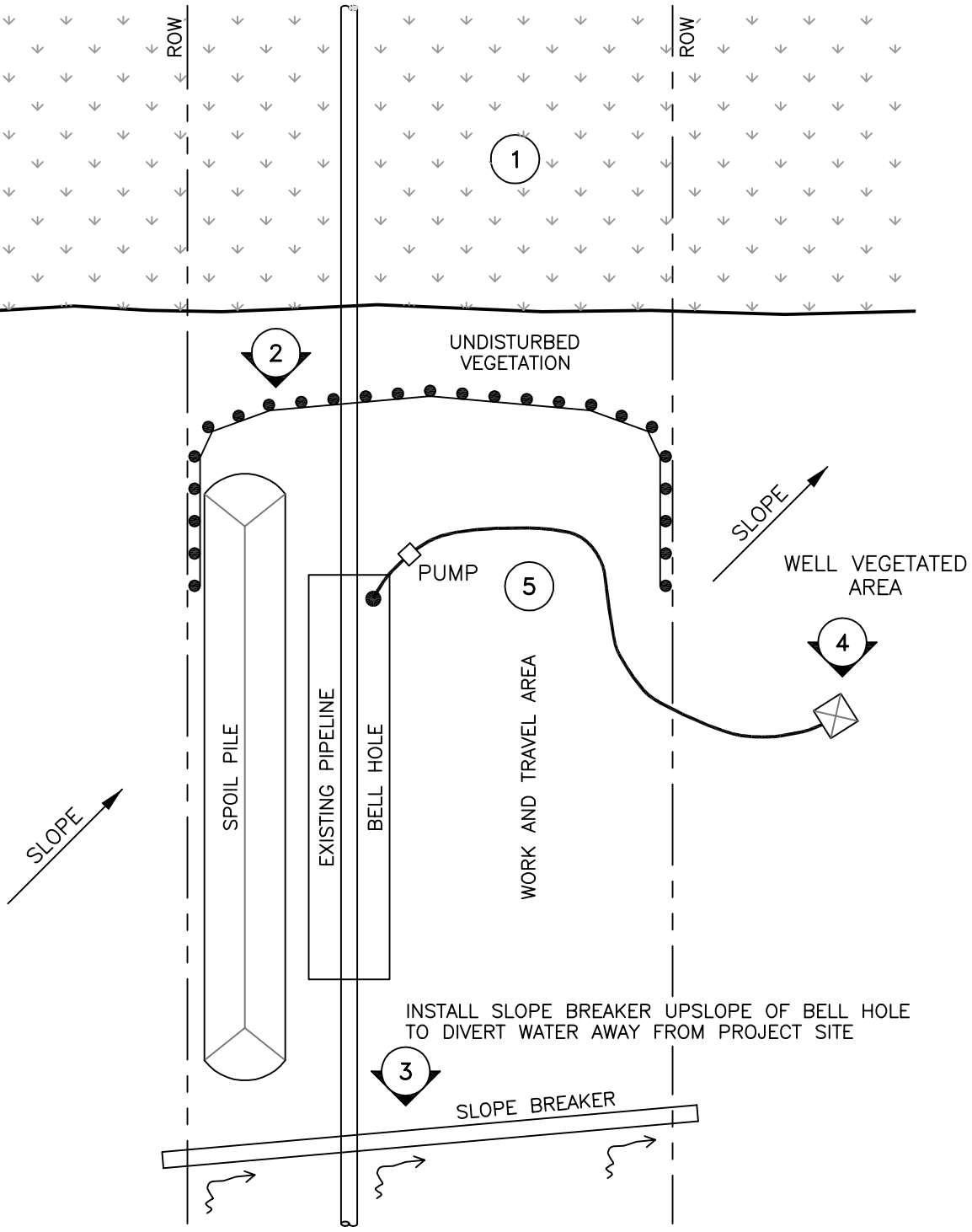
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP33.dwg
LAST REVISION DATE: 01/17/2014

BELL HOLE NEXT TO WATERBODY

DRAWING NUMBER: 33

REVIEWED: 01/2014



1. REFER TO BMP NO. 4/4A FOR WETLAND CROSSING/TRAVEL REQUIREMENTS AND PROCEDURES.
2. REFER TO BMP NO. 5 FOR FILTER FENCE INSTALLATION AND BMP NO. 45A,B,C FOR COMPOST FILTER SOCK INSTALLATION AS PERMITTED AND AS PER PERMIT APPROVAL.
3. REFER TO BMP NO. 8A FOR SLOPE BREAKER INSTALLATION.
4. REFER TO BMP NO. 28 AND 31 FOR DEWATERING FILTER BAG AND ENERGY DISSIPATION.
5. ALL DISTURBED AREAS TO BE RESTORED AND STABILIZED IMMEDIATELY AFTER BACKFILLING.

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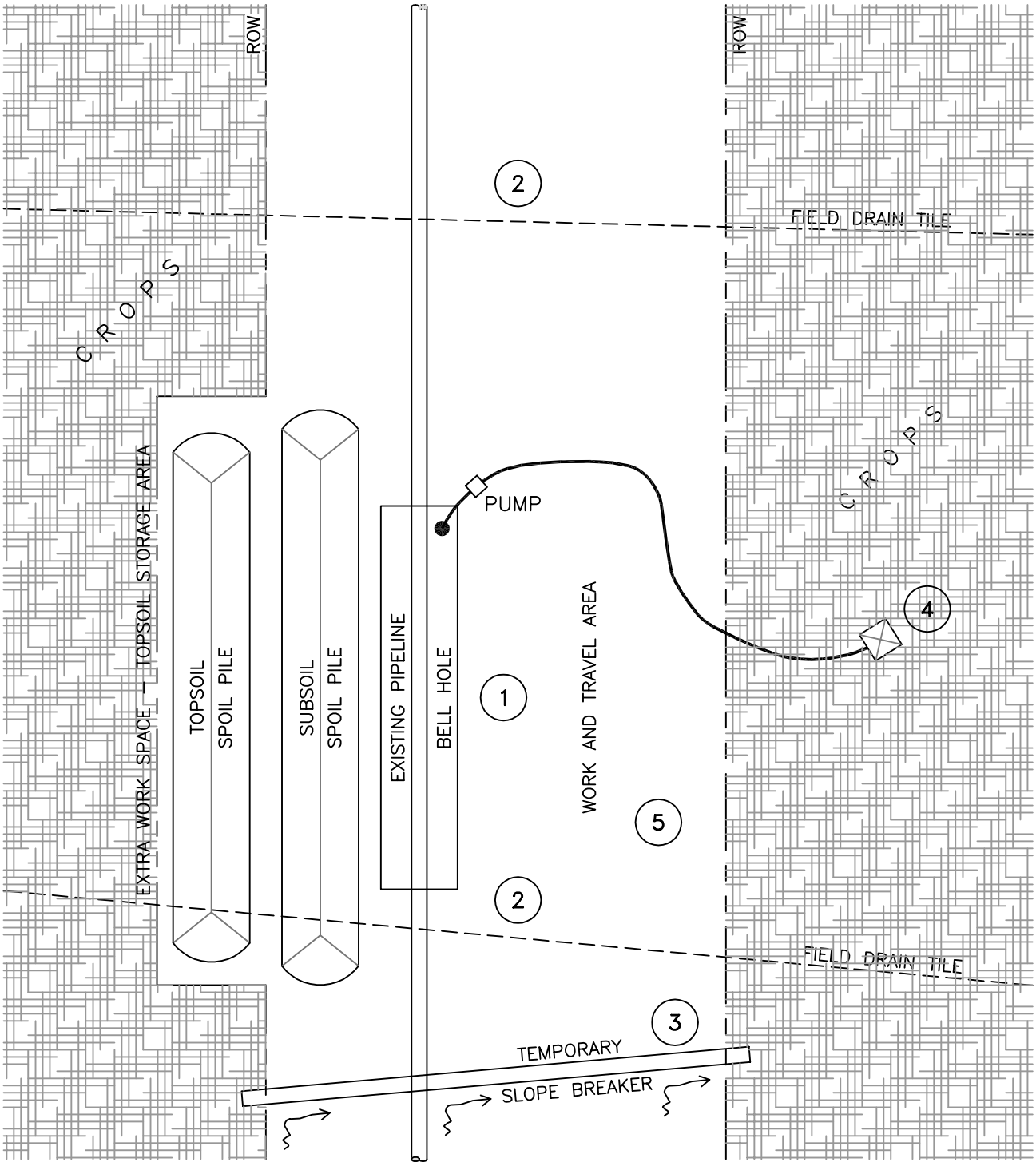
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP34.dwg
LAST REVISION DATE: 01/17/2014

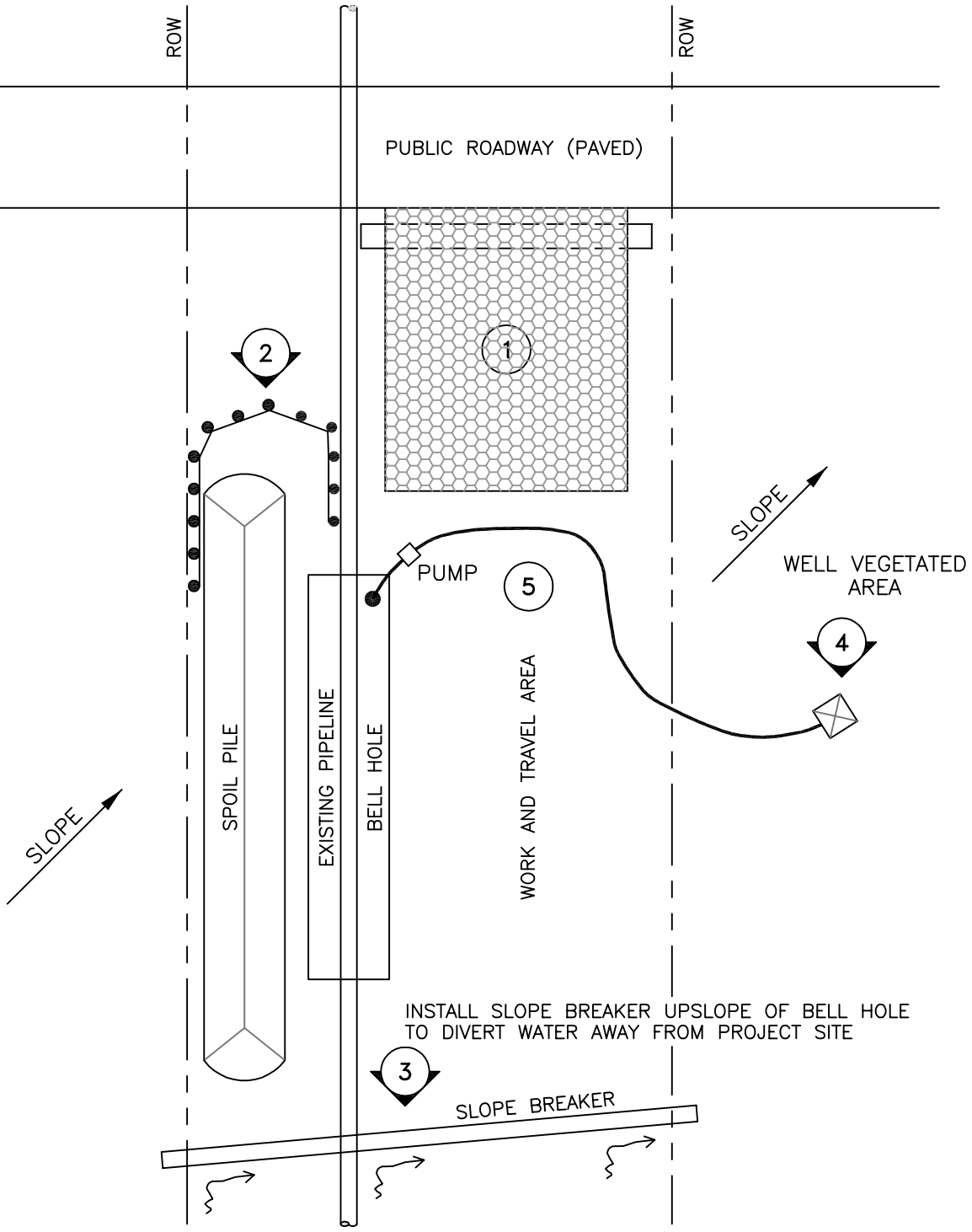
BELL HOLE NEXT TO WETLAND

DRAWING NUMBER: 34



1. REFER TO BMP NO. 23A AND 23B FOR FULL ROW TOPSOIL SEGREGATION REQUIREMENTS AND PROCEDURES.
2. REFER TO BMP NO. 30 AND 30A FOR DRAIN TILE REPAIR ACROSS TRENCH REQUIREMENTS AND PROCEDURES.
3. REFER TO BMP NO. 8A FOR SLOPE BREAKER INSTALLATION.
4. REFER TO BMP NO. 28 AND 31 FOR DEWATERING FILTER BAG AND ENERGY DISSIPATION.
5. ALL DISTURBED AREAS TO BE RESTORED AND STABILIZED IMMEDIATELY AFTER BACKFILLING.

national fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP35.dwg LAST REVISION DATE: 01/17/2014	BELL HOLE AGRICULTURAL FIELD	DRAWING NUMBER: 35



1. REFER TO BMP NO. 1 FOR ENTRANCE PAD INSTALLATION.
2. REFER TO BMP NO. 5 FOR FILTER FENCE INSTALLATION AND BMP NO. 45A,B,C FOR COMPOST FILTER SOCK INSTALLATION AS PERMITTED AND AS PER PERMIT APPROVAL.
3. REFER TO BMP NO. 8A FOR SLOPE BREAKER INSTALLATION.
4. REFER TO BMP NO. 28 AND 31 FOR DEWATERING FILTER BAG AND ENERGY DISSIPATION.
5. ALL DISTURBED AREAS TO BE RESTORED AND STABILIZED IMMEDIATELY AFTER BACKFILLING.

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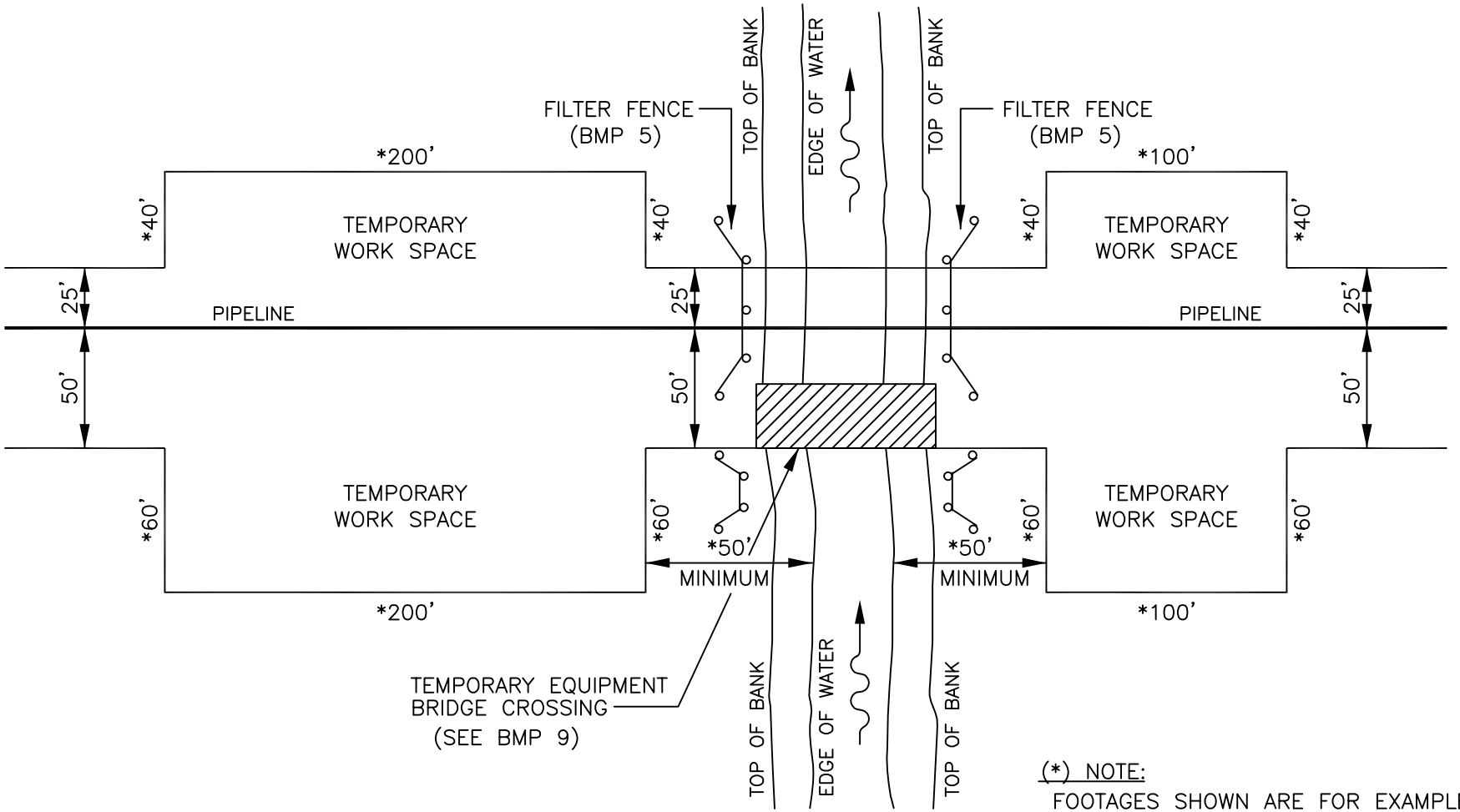
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP36.dwg
LAST REVISION DATE: 01/17/2014

BELL HOLE ADJACENT TO PAVED ROAD

DRAWING NUMBER: 36



(*) NOTE:

FOOTAGES SHOWN ARE FOR EXAMPLE PURPOSES ONLY. ACTUAL EXTRA WORK SPACE AREAS WILL VARY DEPENDING ON INDIVIDUAL PROJECTS.

1. SPOIL REMOVED DURING TRENCH CONSTRUCTION OF CROSSING MAY BE PLACED 10 FT BACK FROM ORDINARY HIGH WATER MARK PROVIDED E&S CONTROLS INSTALLED.

2. UNDISTURBED VEGETATION BUFFER SHALL BE 25 FT OR TO EDGE OF EXISTING NON-NATIVE VEGETATION WHERE THAT DISTANCE IS <25 FT.

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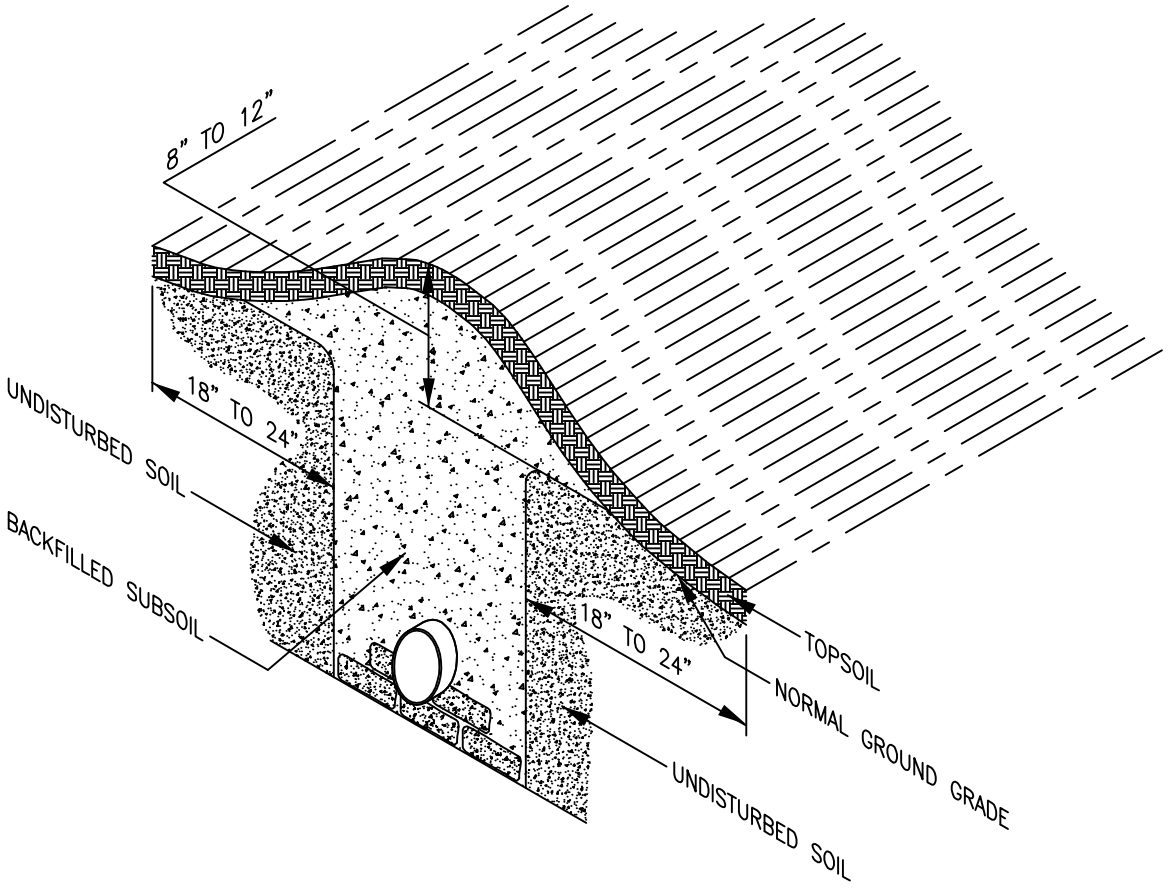
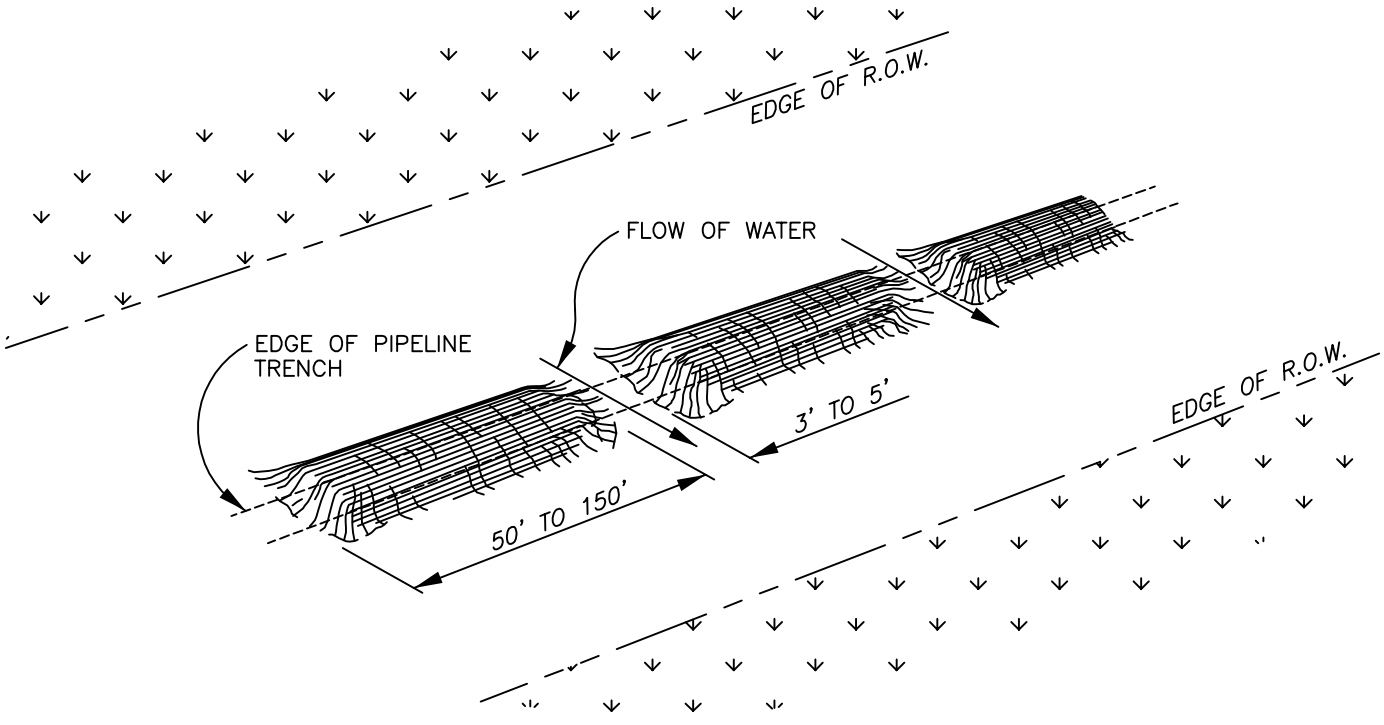
DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP37.dwg
LAST REVISION DATE: 01/17/2014

EXTRA WORK SPACES

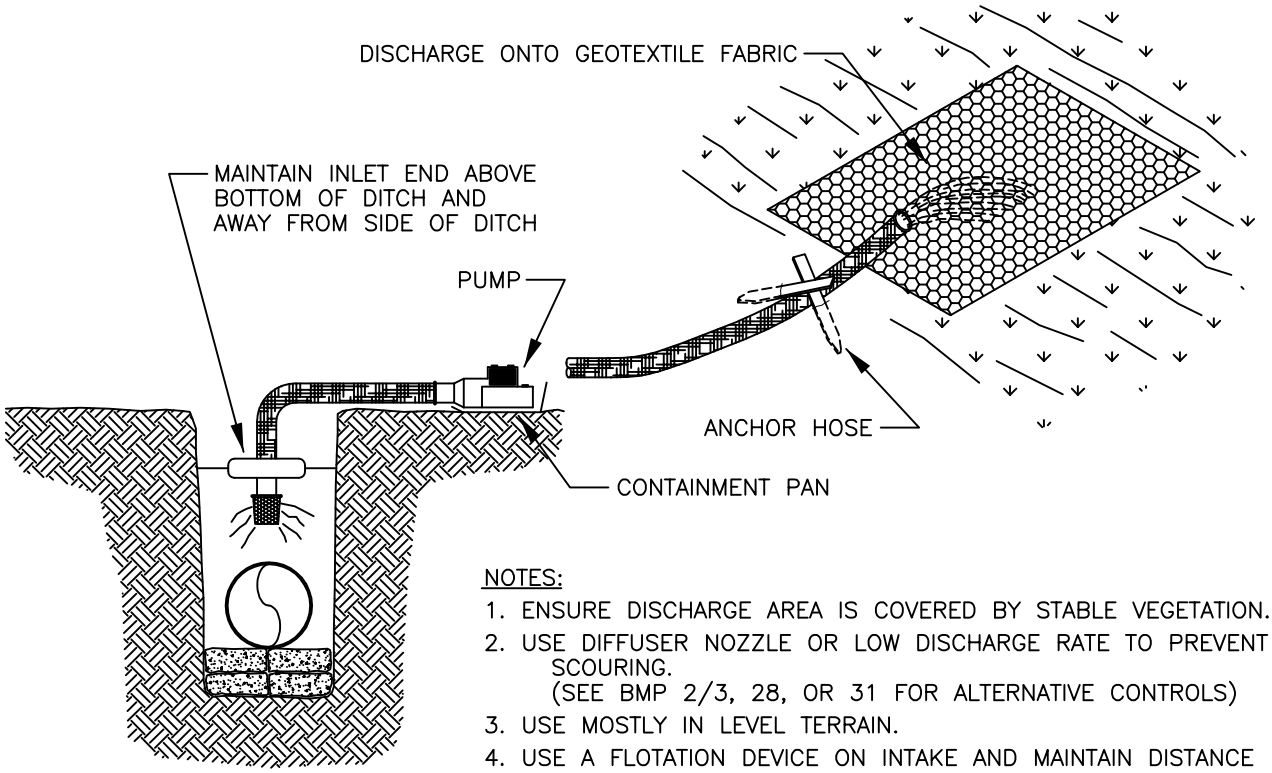
DRAWING NUMBER: 37

CREST OF BACKFILL TO BE 8" TO 12" HIGH OVER CENTER LINE OF TRENCH AND FEATHERED OUT TO ZERO 18" TO 24" FROM TRENCH WALL



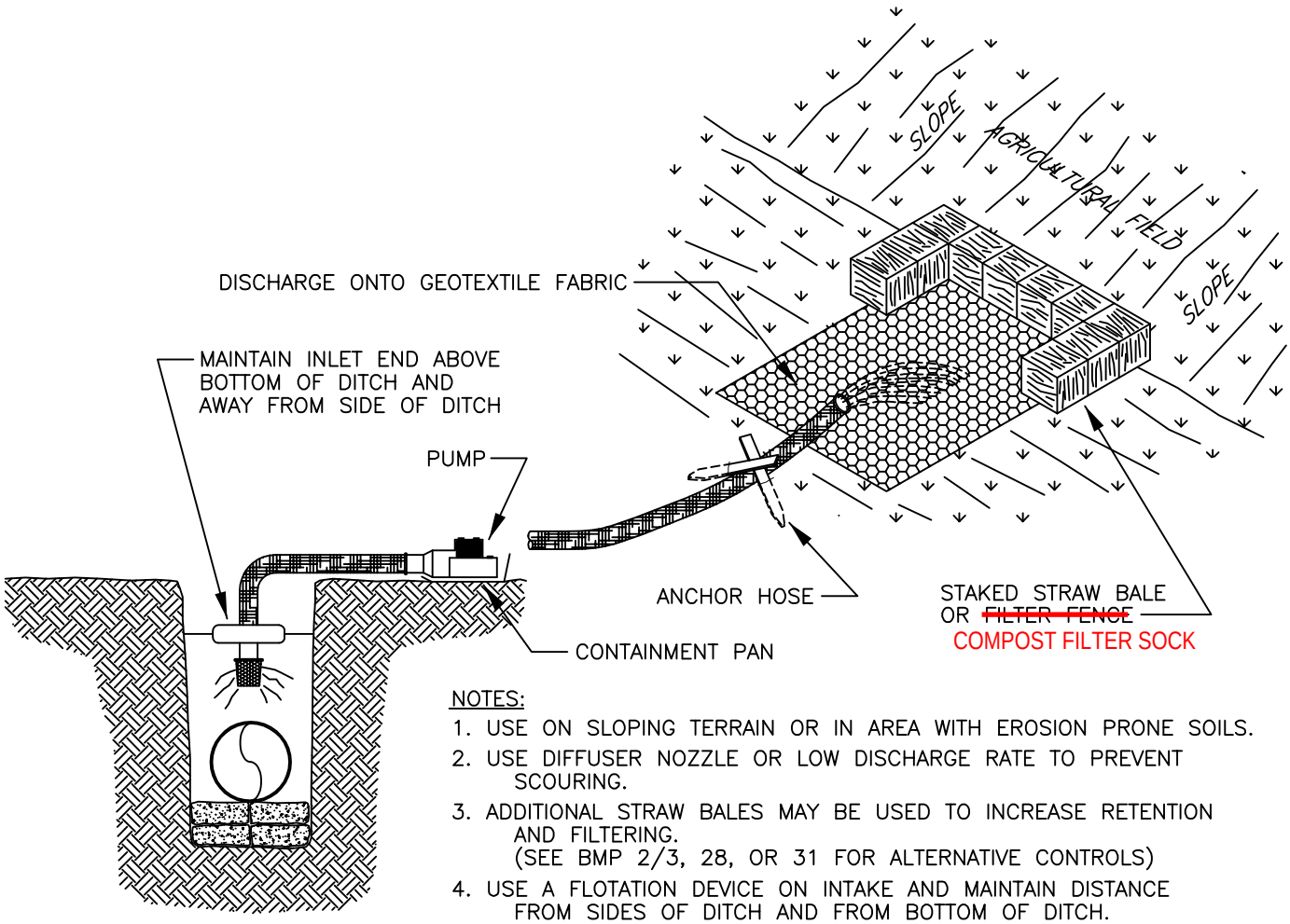


national fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP38.dwg DATE: 04/04/2005	RIGHT-OF-WAY CROWNING	DRAWING NUMBER: 38



NOTES:

1. ENSURE DISCHARGE AREA IS COVERED BY STABLE VEGETATION.
2. USE DIFFUSER NOZZLE OR LOW DISCHARGE RATE TO PREVENT SCOURING.
   (SEE BMP 2/3, 28, OR 31 FOR ALTERNATIVE CONTROLS)
3. USE MOSTLY IN LEVEL TERRAIN.
4. USE A FLOTATION DEVICE ON INTAKE AND MAINTAIN DISTANCE FROM SIDES OF DITCH AND FROM BOTTOM OF DITCH.



NOTES:

1. USE ON SLOPING TERRAIN OR IN AREA WITH EROSION PRONE SOILS.
2. USE DIFFUSER NOZZLE OR LOW DISCHARGE RATE TO PREVENT SCOURING.
3. ADDITIONAL STRAW BALES MAY BE USED TO INCREASE RETENTION AND FILTERING.
   (SEE BMP 2/3, 28, OR 31 FOR ALTERNATIVE CONTROLS)
4. USE A FLOTATION DEVICE ON INTAKE AND MAINTAIN DISTANCE FROM SIDES OF DITCH AND FROM BOTTOM OF DITCH.

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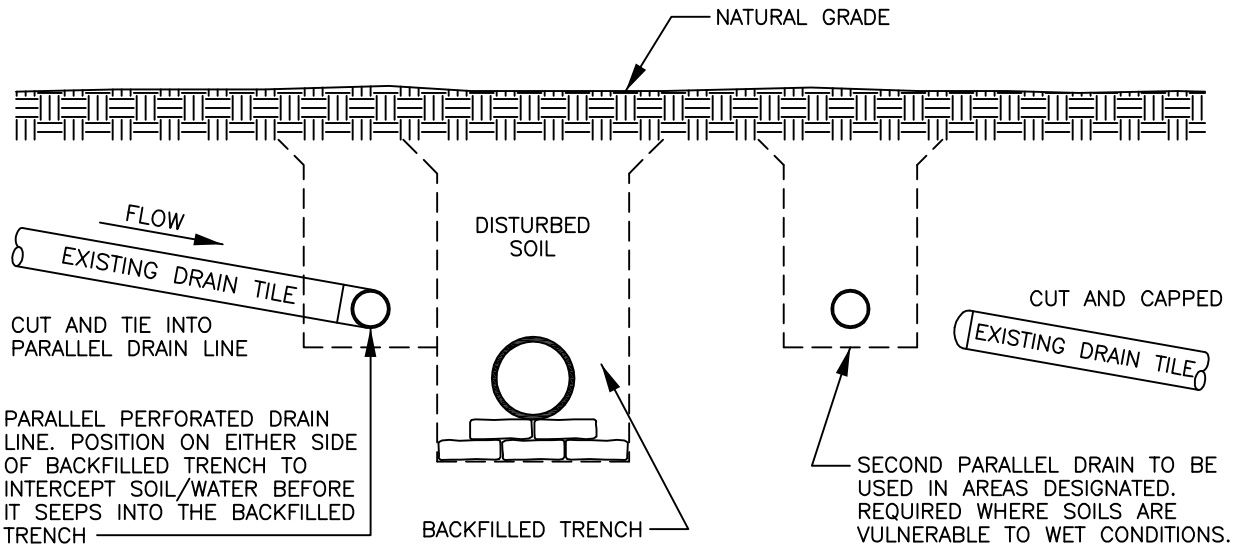
DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP39.dwg
LAST REVISION DATE: 01/17/2014

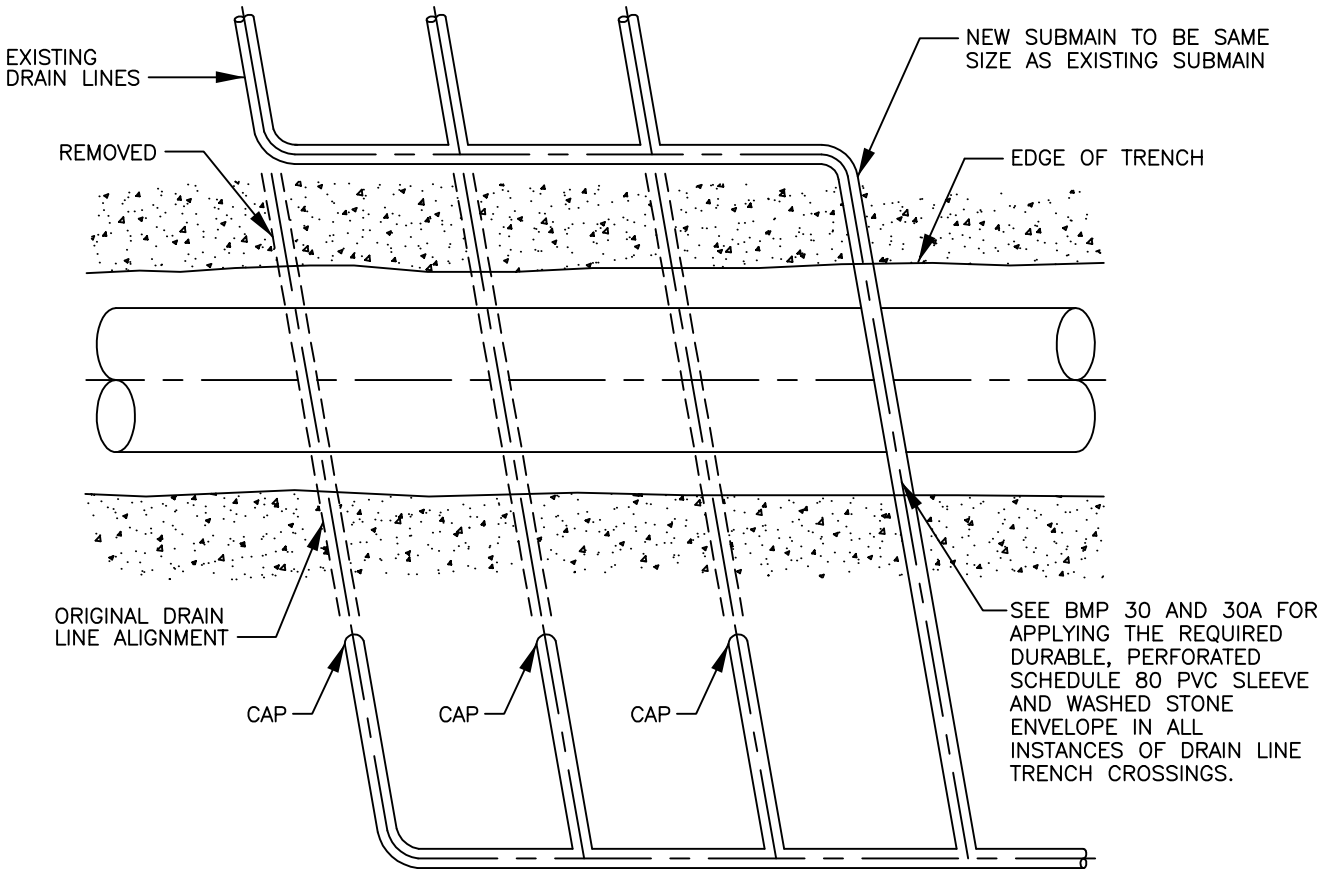
DISCHARGE METHOD FOR TRENCH DEWATERING

DRAWING NUMBER: 39



NOTE:

1. PARALLEL DRAINAGE TILE INSTALLATION TO BE APPROVED FOR SITE SPECIFIC AGRICULTURAL SOILS WHERE REPAIR OF EXISTING CROSS TILES WOULD BE LESS EFFECTIVE FOR EXAMPLE:
   A. SHALLOW BEDROCK.
   B. INTERFERENCE BY OTHER UTILITY LINES.
   C. TO HEADER CLOSELY SPACED SHALLOW TILES AND FRENCH DRAINS.
2. PARALLEL/NEW SUBMAIN TILE INSTALLATION MUST ACCOUNT FOR THE ISSUE OF LONG–TERM ROW SATURATION; AND MUST BE APPROVED BY THE AGRICULTURAL DRAINAGE SPECIALIST.



PLAN VIEW TILE SYSTEM WITH NEW SUBMAIN

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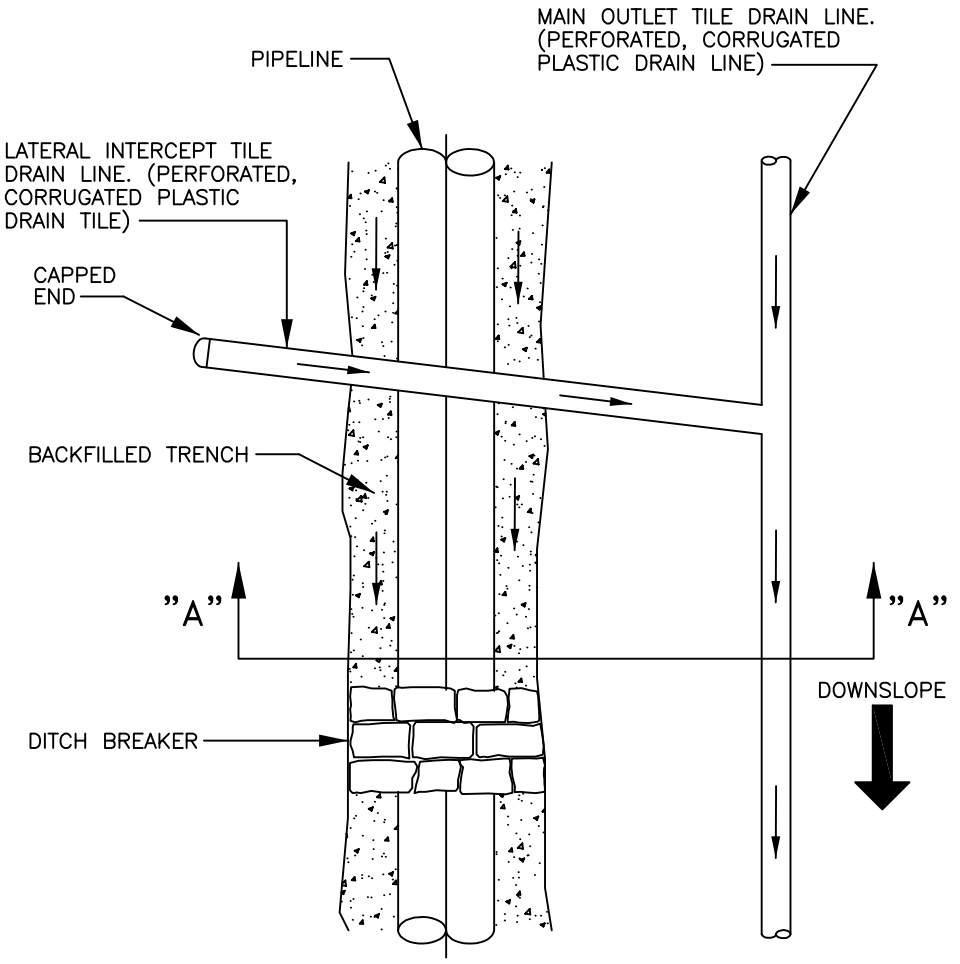
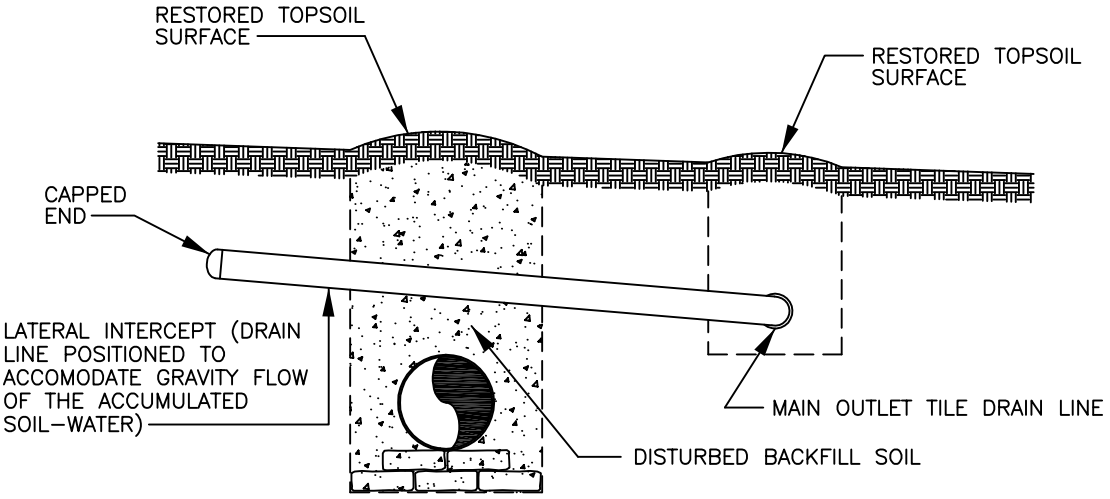


PLAN



PROFILE – SECTION "A"–"A"

NOTES:

1. DITCH BREAKERS PREVENT GULLY EROSION WHILE TRENCH IS OPEN AND HELP INHIBIT WATER PIPING AND WATER BLOWOUTS DOWN THE COURSE OF THE PIELINE AFTER BACKFILLING.
2. INTERCEPT DRAIN LINES ABSORB THE SOIL AND WATER WHICH DRAIN NATURALLY FROM THE UNDISTURBED SOIL PROFILE INTO THE DISTURBED BACKFILL SOIL MATERIAL OF THE TRENCH. THE INTERCEPT DRAIN LINES HELP PREVENT SATURATED SOIL CONDITIONS.
3. AGRICULTURAL CROPLAND MAY REQUIRE CROSS TRENCH DRAINAGE OR PARALLEL DRAINAGE.

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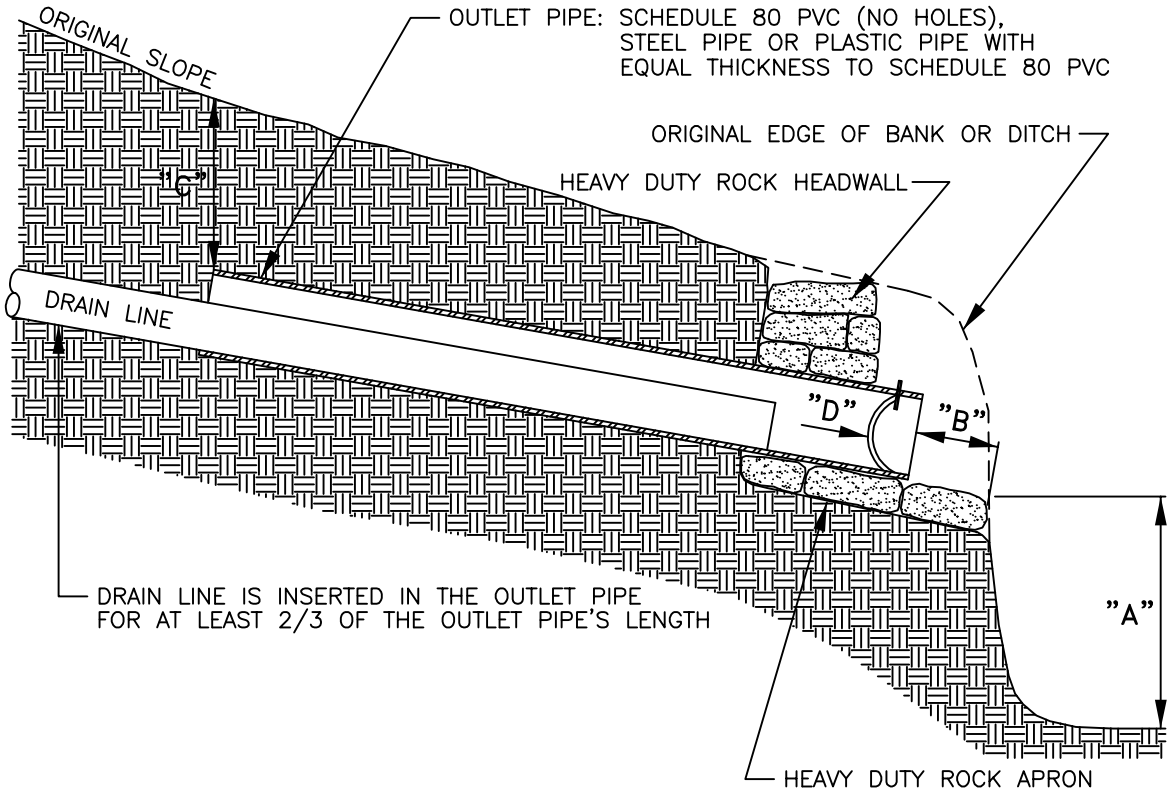

"A" – THE FREE DROP OR OUTFALL DISTANCE OF THE DRAINAGE WATER TO ITS UNRESTRICTED (FREE) DAYLIGHT OUTLET. GUIDELINE IS 2 FEET BUT NOT LESS THAN 1 FOOT WITHOUT SPECIAL DESIGN APPROVAL.

"B" – THE RECESS BACK FROM THE EDGE OF THE BANK OR DITCH OR OTHER POINT OF DAYLIGHT. GUIDLINE IS 2 FEET RECESSED BACK TO AVOID FUTURE DAMAGE.

"C" – THE MINIMUM DEPTH OF COVER OVER THE DRAIN LINE AT WHICH THE OUTLET PIPE MUST BEGIN. THE MINIMUM IS 2 FEET.

"D" – AN INTERNALLY HINGED ANIMAL (RODENT) GUARD, BOLTED FROM THE OUTSIDE. MOUNT THE GUARD 4"–6" BACK INSIDE THE OUTLET PIPE.

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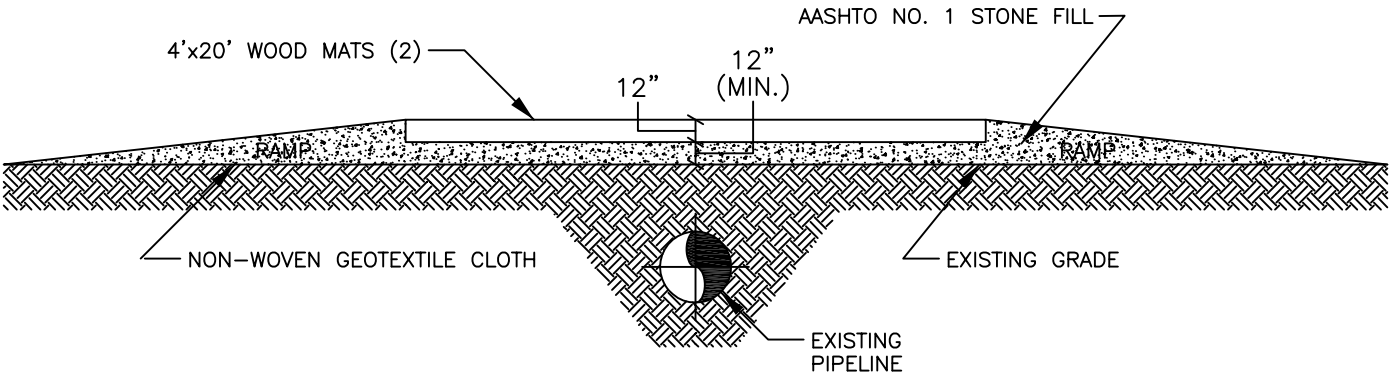

N O T E S
1. ADDITIONAL STONE DEPTH MAY BE REQUIRED – CONTACT ENGINEERING.
2. WOOD MATS WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
3. STONE FILL TO BE SUPPLIED AND INSTALLED BY THE CONTRACTOR. INSTALL 1 (ONE) LAYER OF NON–WOVEN GEOTEXTILE CLOTH PRIOR TO INSTALLING THE STONE.
4. ADDITIONAL MATS, IF NEEDED, WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.

SPECIAL NOTE:

PROPOSED VEHICLE & EQUIPMENT WHEEL / TRACK LOAD WEIGHTS SHALL BE PROVIDED TO NFG ENGINEERING SERVICES TO DETERMINE IF ADDITIONAL MEASURES ARE NECESSARY BASED ON THE SPECIFIC PIPELINE TO BE CROSSED.

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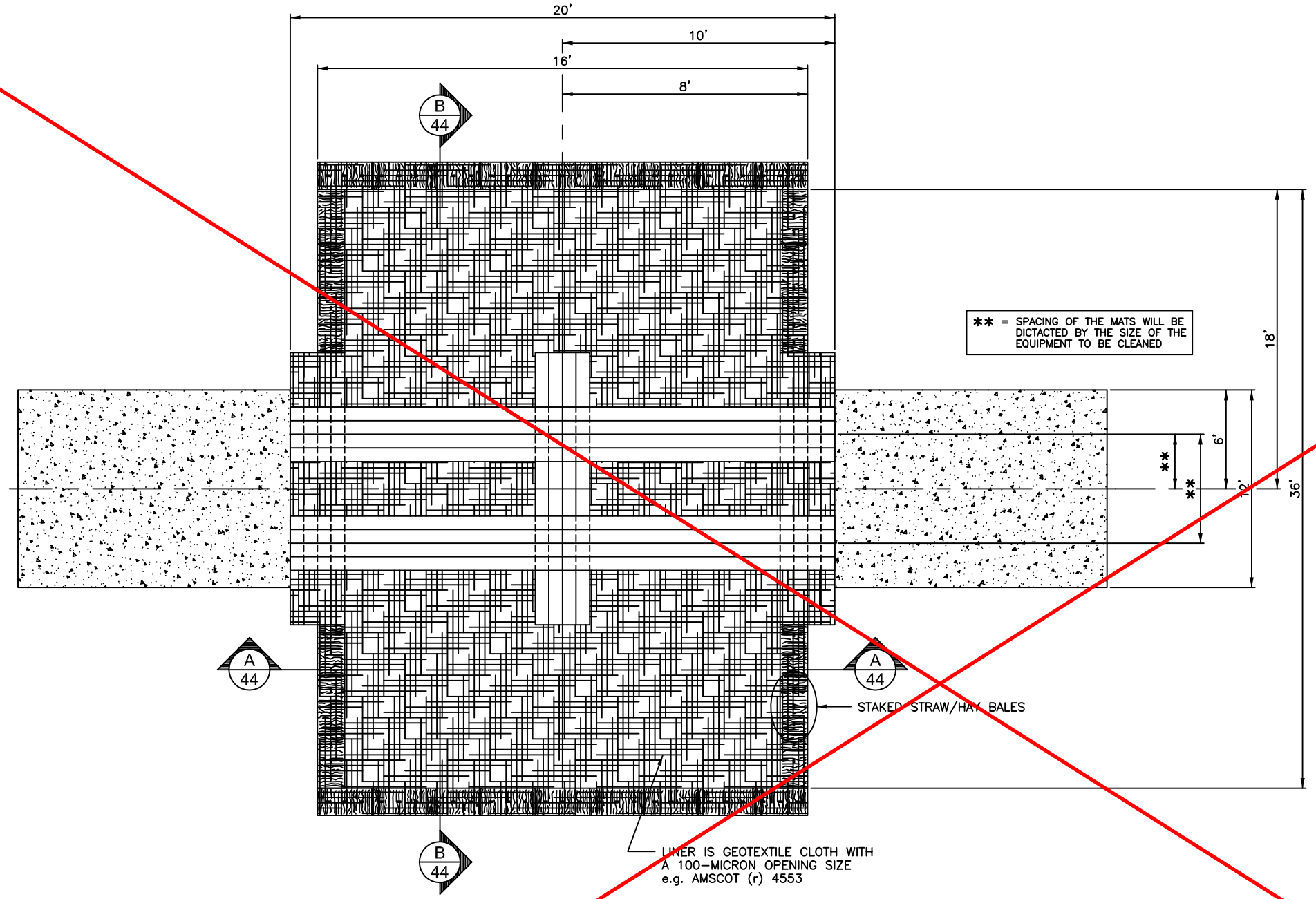
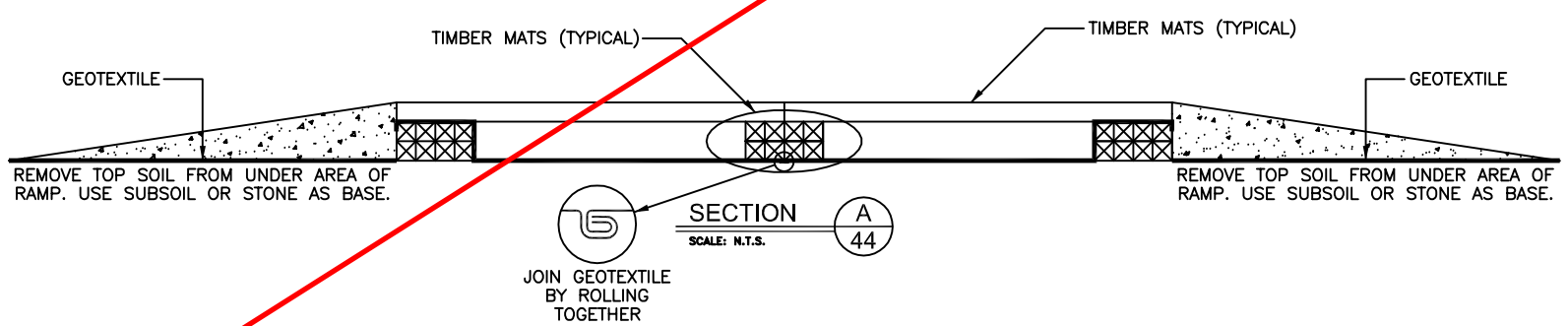
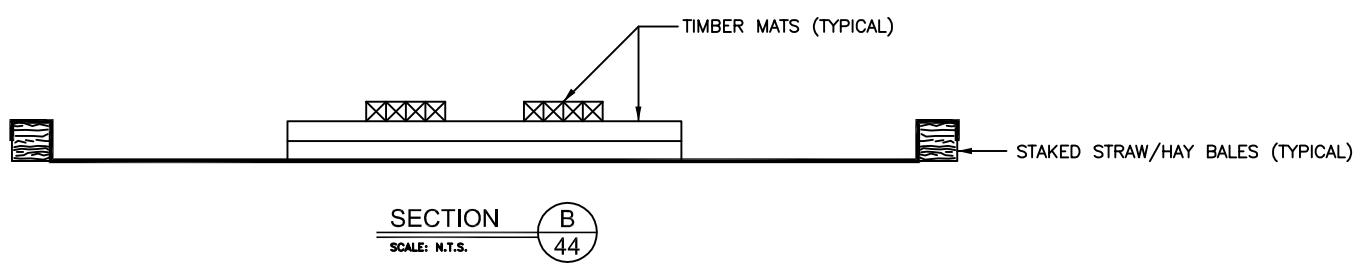
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP43.dwg
REVISED DATE: 01/17/2014

TEMPORARY WOODEN MAT PIPELINE CROSSING

DRAWING NUMBER: 43







NOTES:

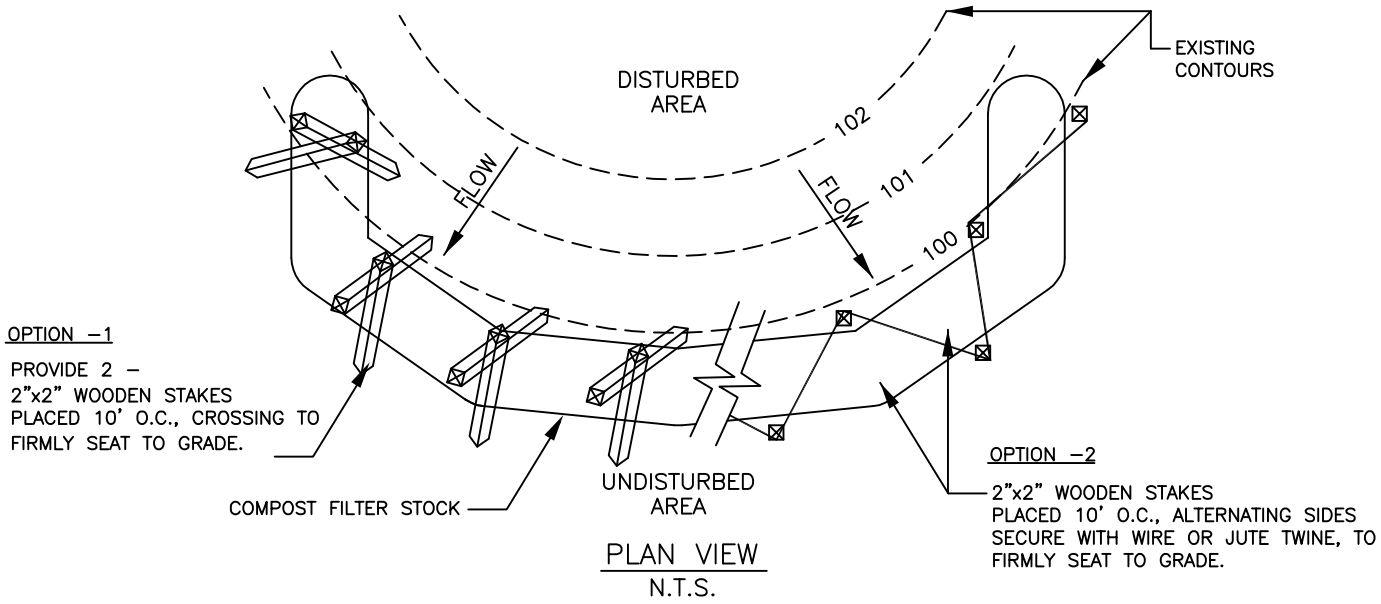
1. WASH STATION MUST BE WITHIN THE ENVIRONMENTALLY CLEARED RIGHT-OF-WAY AND OUTSIDE THE 100' WETLAND BUFFER ZONE.
2. IF WASH STATION IS IN AGRICULTURAL LANDS, REMOVE THE TOPSOIL AND STOCKPILE. BEFORE THE TOPSOIL IS REPLACED, THE SUBSOIL MUST BE DECOMPACTED AND ROCKS REMOVED. THE TOPSOIL MOISTURE MUST PASS THE ATTERBERG TEST PRIOR TO SPREADING THE TOPSOIL.
3. THE LOCATION OF THE PUMPING EQUIPMENT, WATER SUPPLY AND SPRAY EQUIPMENT WILL BE DICTATED BY THE LOCATION OF THE WASH STATION.
4. AFTER THE EQUIPMENT WASHING IS COMPLETE, FOLD OR ROLL THE GEOTEXTILE (CAUTION WILL BE EXERCISED NOT TO SPILL ANY OF THE CONTAINED MATERIAL) AND REMOVE TO AN APPROPRIATE DISPOSAL SITE. REMOVE THE CLEANING EQUIPMENT, RAMPS AND STRAW/HAY BALES AND COMPLETE THE CLEANUP.

National Fuel SUPPLY CORPORATION

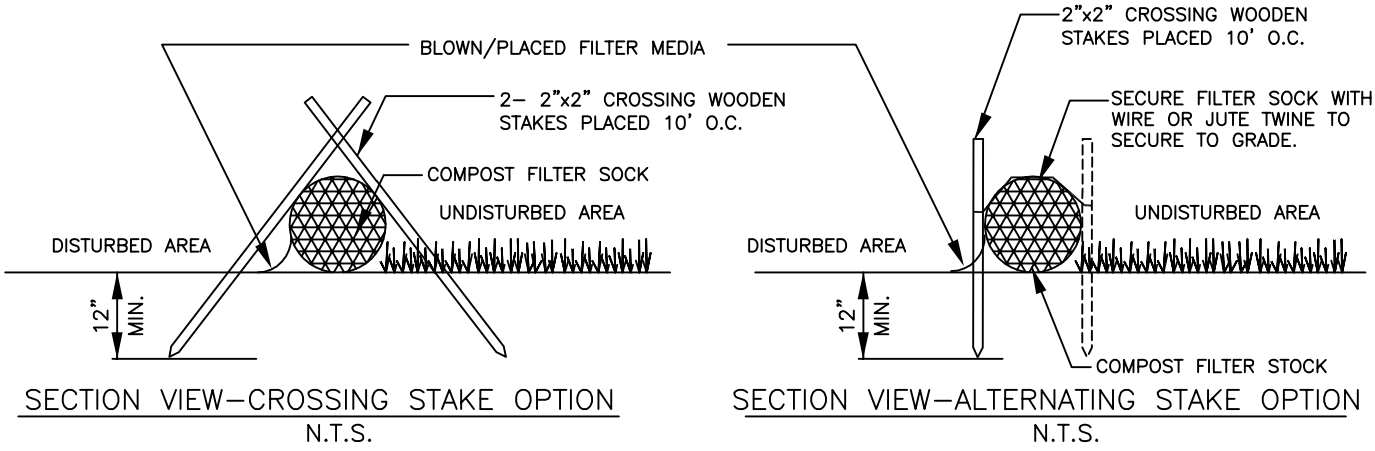
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP44.dwg
DATE: 05/03/2007

ELEVATED WASHRACK

DRAWING NUMBER: 44



PLAN VIEW
N.T.S.



SECTION VIEW–CROSSING STAKE OPTION
N.T.S.

SECTION VIEW–ALTERNATING STAKE OPTION
N.T.S.

Adapted from Filtrexx

Sock fabric shall meet standards of Table 4.1.
Compost shall meet the following standards:

Oganic Matter Content	80% – 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5 – 8.0
Moisture Content	35% – 55%
Particle Size	98% pass through 1" screen
Soluable Salt Concentration	5.0 dS Maximum

Compost Filter Sock shall be placed at existing level grade. Both ends of the sock shall be extended at least 8 feet up slope at 45 degrees to the main sock alignment (see Figure 4.1). Maximum slope length above any sock shall not exceed that shown on Figure 4.2.

Traffic shall not be permitted to cross filter socks.

Accumulated Sediment shall be removed when it reaches 1/2 the above ground height of the sock and disposed in the manner described elsewhere in the plan.

Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.

Biodegradable filter sock shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be placed according to manufacturer's recommendations.

Upon stabilization of the disturbed area to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil pupplement, dispose of mesh.

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DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP45a.dwg
DATE: 12/09/2013

COMPOST FILTER SOCK
(FOR PENNSYLVANIA USE)

DRAWING NUMBER: 45A
SHEET 1 OF 3

Compost Filter Sock

Sediment Removal Efficiency: HIGH. This devise is an ABACT (Antidegradation Best Available Combination of Technologies) for HQ and EV watersheds.

Compost filter socks are a type of contained compost filter berm. They consist of a biodegradable or photodegradable mesh tube filled (typically using a pneumatic blower) with a coarse compost filter media that meets certain performance criteria (e.g. hydraulic flow through rate, total solids removal efficiency, total suspended solids removal efficiency, turbidity reduction, nutrient removal efficiency, metals removal efficiency, and motor oil removal efficiency).

Filter socks are flexible and can be filled in place or filled and moved into position. They are especially useful on steep slopes. Heavy vegetation should be removed prior to installing the sock. Filter socks can also be used on rocky slopes if sufficient preparation is made to ensure good contact of the sock with the underlying soil along its entire length. They may also be used on pavement as a perimeter control. Socks used in this manner range in diameter from 8" to 32". **Note:** Some settlement of the tube typically occurs after installation. The diameter of the sock tube is the dimension to be used for slope design purposes (Figure 4.2). Socks with diameters less than 12" should only be used for residential housing lots of ½ acre or less that are a branch to a sediment basin or sediment trap.

As with other sediment barriers, filter socks must be placed parallel to contour with both ends of the sock extended upslope at a 45-degree angle to the rest of the sock to prevent end-arounds (See Figure 4.1). Socks placed on earthen slopes should be anchored with stakes driven through the center of the sock (see Standard Construction Detail 4-1) at intervals recommended by the manufacturer. Where socks are placed on paved surfaces, concrete blocks should be used immediately down-slope of the socks to help hold the sock in place.

The maximum slope length above a filter sock should not exceed those shown in Figure 4.2.

The anticipated functional life of a biodegradable filter sock should be 6 months; for photodegradable socks 1 year. Projects with anticipated disturbances lasting longer than the functional life of a sock should plan to replace the socks periodically or use another type of BMP.

Upon stabilization of the disturbed area, the filter sock may be left in place and vegetated or removed. In the latter case, the mesh is typically cut open and the compost/mulch spread as a soil supplement, the mesh is removed from the site and disposed of.

Filter socks using other fillers may be approved on a case-by-case basis if sufficient supporting information (including manufacturer's specs and independent test data) is provided.

TABLE 4.1 Compost Sock Fabric Minimum Specifications		
Material Type	**5 mil HDPE**	**5 mil HDPE**
Material Characteristics	Bio-degradable	Photo-degradable
Sock Diameters	12-inch 18-inch 24-inch 32-inch	12-inch 18-inch 24-inch 32-inch
Mesh Opening	3/8"	3/8"
Tensile Strength	26 psi	26 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	-----	23% at 1000 hr.
Minimum Functional Longevity	6 months	9 months
Two-ply Systems		
Inner Containment Netting	HDPE biaxial net	
	Continuously wound	
	Fusion-welded junctures	
	3/4" x 3/4" Max. aperture size	
Outer Filtration Mesh	Composite Polypropylene Fabric (Woven layer & non-woven fleece Mechanically fused via needle punch)	
	3/16" Max. aperture size	
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.		

FIGURE 4.2

Maximim Permissible Slope Lengths Above Compost Filter Socks

12-inch Sock Diameter		18-inch Sock Diameter	
Maximum Slope Length (ft)	**Percent Slope**	**Maximum Slope Length (ft)**	**Percent Slope**
520	2	700	2
210	5	340	5
170	10	240	10
120	15	200	15
90	20	140	20
60	25	100	25
45	30	80	30
40	35	60	35
35	40	50	40
30	45	30	45
25	50	20	50

National Fuel Supply Corporation

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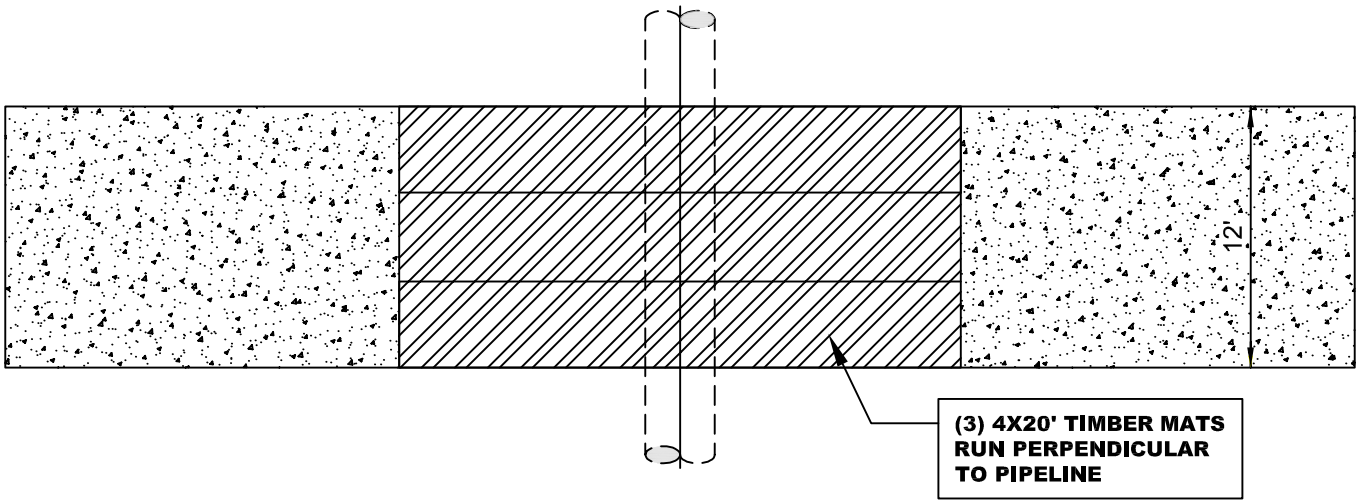
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP45c.dwg
DATE: 03/11/2010

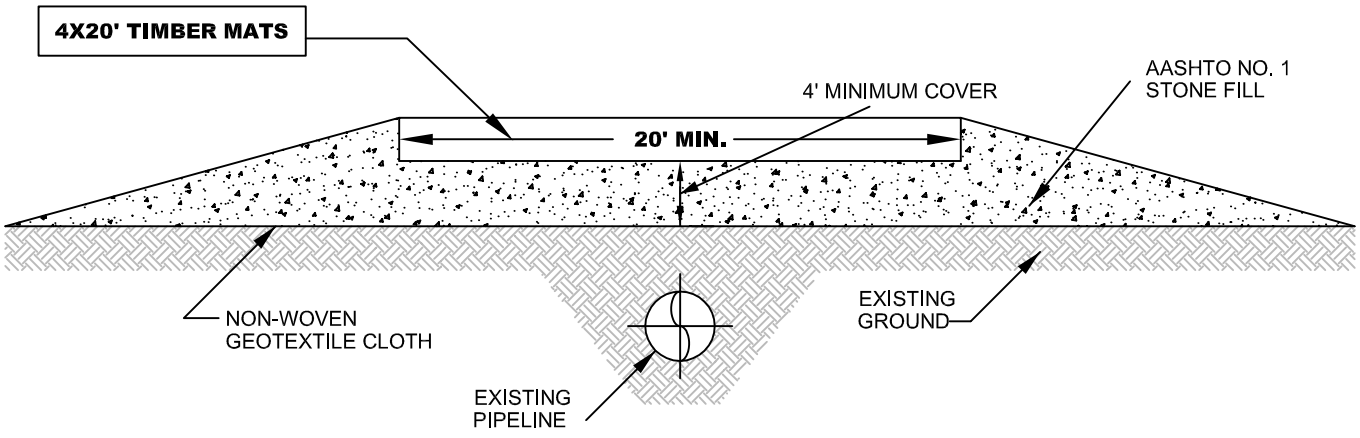
COMPOST FILTER SOCK

DRAWING NUMBER: 45C
SHEET 3 OF 3

PLAN VIEW



SIDE VIEW



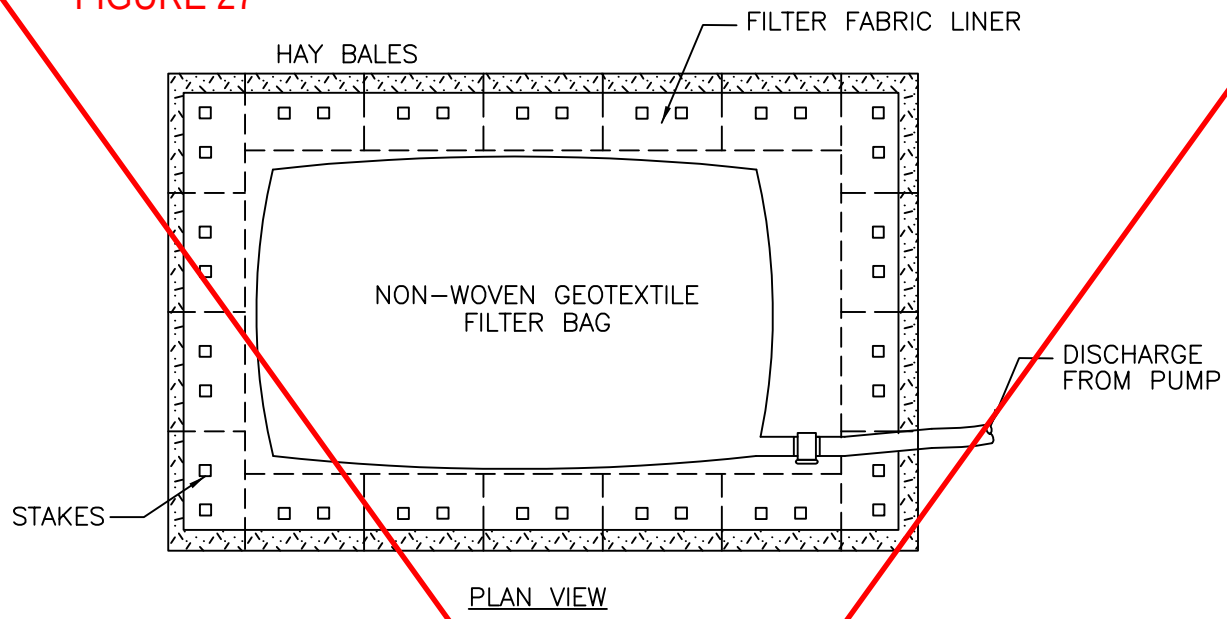
National Fuel
SUPPLY CORPORATION

STONE PIPELINE CROSSING WITH TIMBER MATTING BMP 46

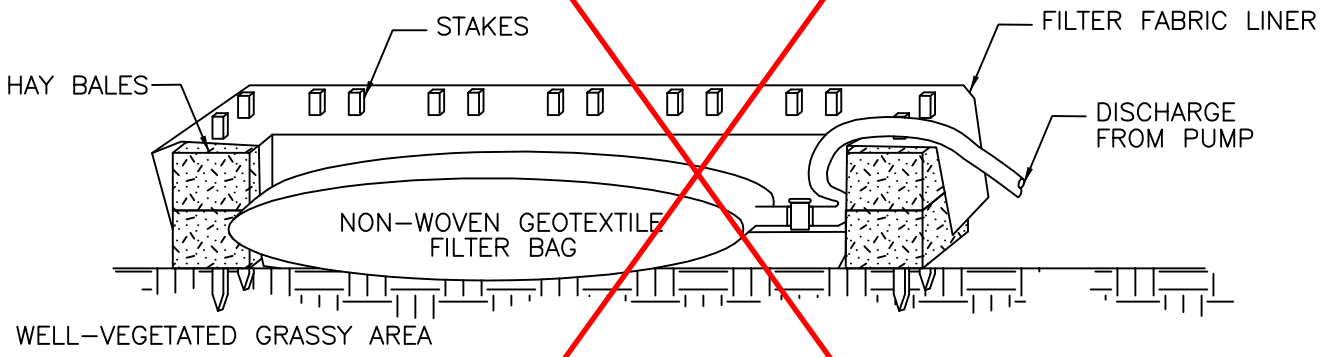
ENGINEERING DEPARTMENT
GEOMATICS SECTION
1100 STATE STREET
ERIE, PENNSYLVANIA 16501

DATE:	DRAWN BY:	APPROVED BY:
01/17/2014	Gary Hoffacker	M. P. WALLACE
SCALE: N.T.S.	FILENAME: BMP46.DWG	

REFER TO E&S DETAILS,
FIGURE 27



PLAN VIEW



ELEVATION VIEW

NOTES:

1. RECTANGULAR DETWATERING DISCHARGE AREA CONSTRUCTED OUT OF HAY BALES STACKED ONE OR TWO ROWS HIGH AND SECURED WITH WOODEN STAKES (SEE BMP 22 FOR HAY BALE INSTALLATION).
2. FILTER FABRIC LINER INSTALLED COVERING ENTIRE INTERIOR OF STRUCTURE AND SECURED ATOP THE HAY BALES WITH WOODEN STAKES.
3. DEWATERING DEVICE SHALL BE LOCATED IN WELL–VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. DISCHARGE DEVICE SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. SEE BMP 28 FOR DEWATERING FILTER BAG DETAILS.
5. FOR LESS TURBID WATER DISCHARGE GEOTEXTILE FILTER BAG IS OPTIONAL AND STRUCTURE MAY UTILIZE JUST FILTER FABRIC LINER.

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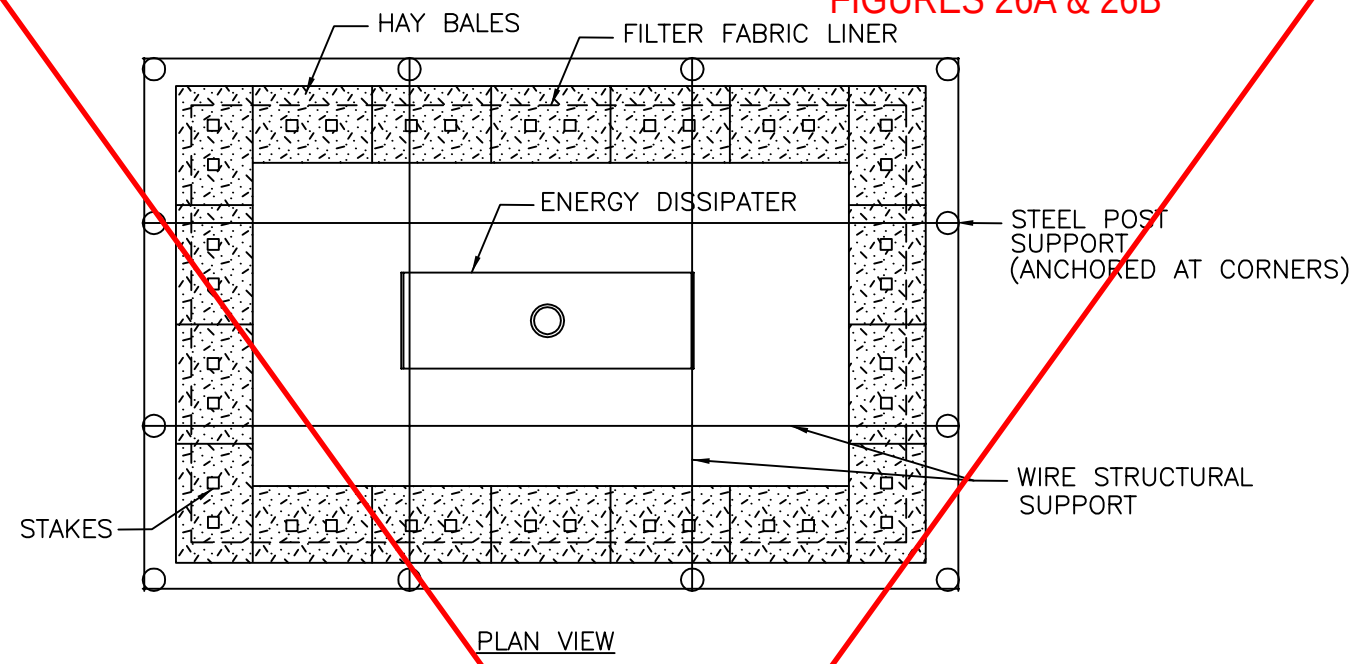
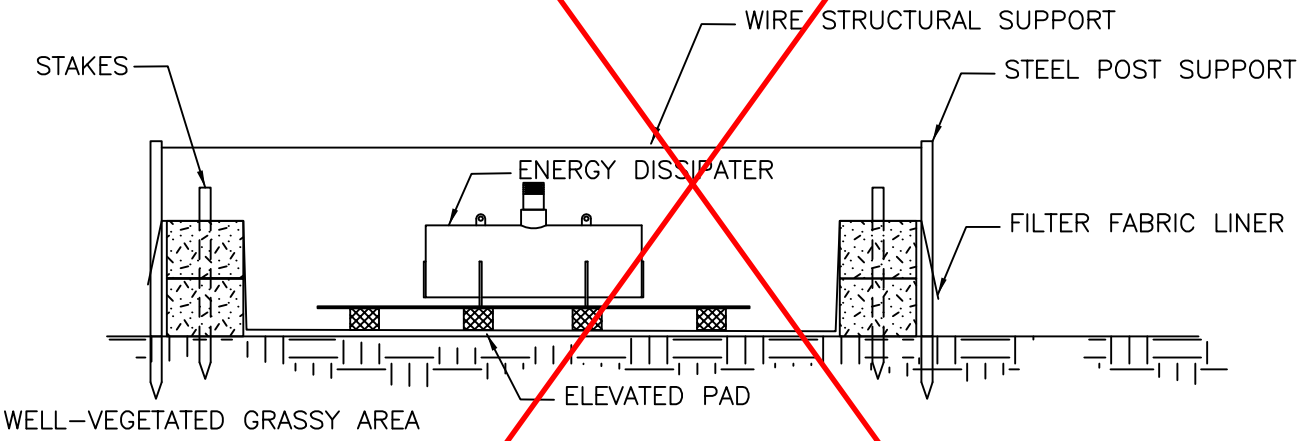
REFER TO E&S DETAILS,
FIGURES 26A & 26B



PLAN VIEW



ELEVATION VIEW

NOTES:

1. RECTANGULAR DETWATERING DISCHARGE AREA CONSTRUCTED OUT OF HAY BALES STACKED TWO HIGH SECURED WITH WOODEN STAKES (SEE BMP 22 FOR HAY BALE INSTALLATION) AND WIRED (STEEL) POSTS.
2. FILTER FABRIC LINER INSTALLED COVERING ENTIRE INTERIOR OF STRUCTURE AND SECURED BETWEEN THE HAY BALES WITH WOODEN STAKES.
3. DEWATERING DEVICE SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. DISCHARGE DEVICE SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. SEE BMP 3 FOR ENERGY DISSIPATER DETAILS.

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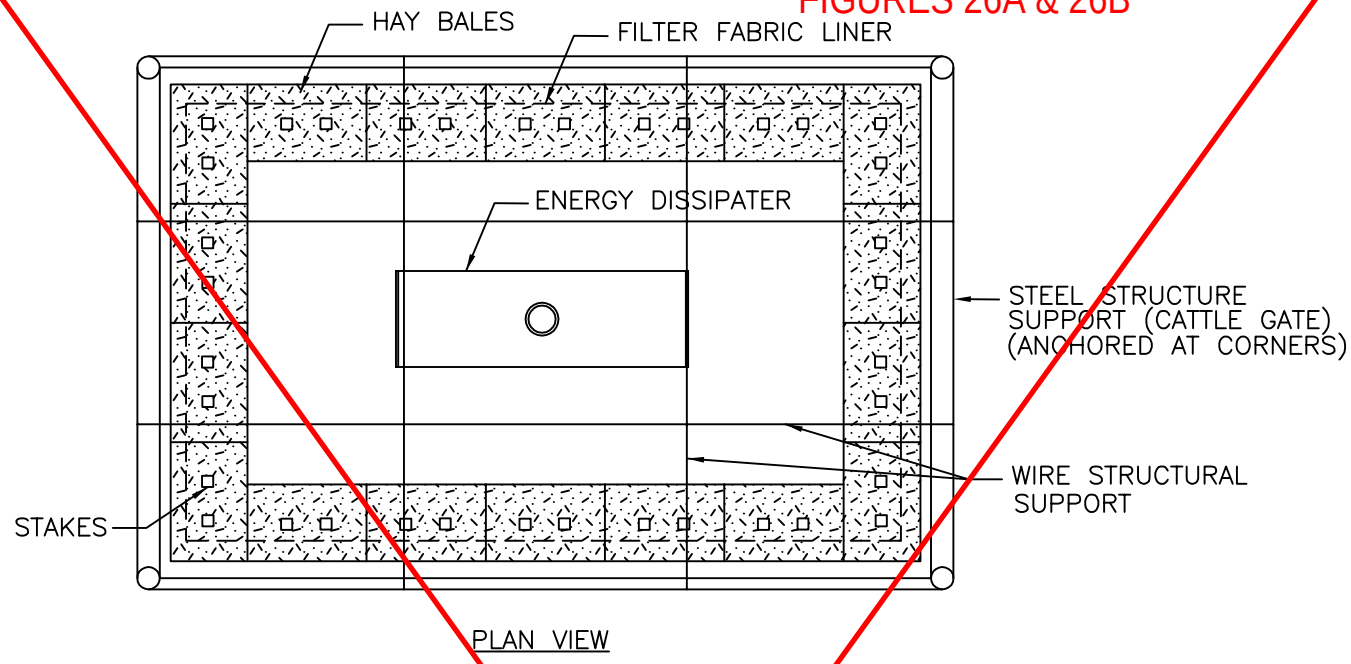
DRAWN BY: L. M. TELESCA
FILENAME: BMPs\BMP48.dwg
DATE: 01/17/2014

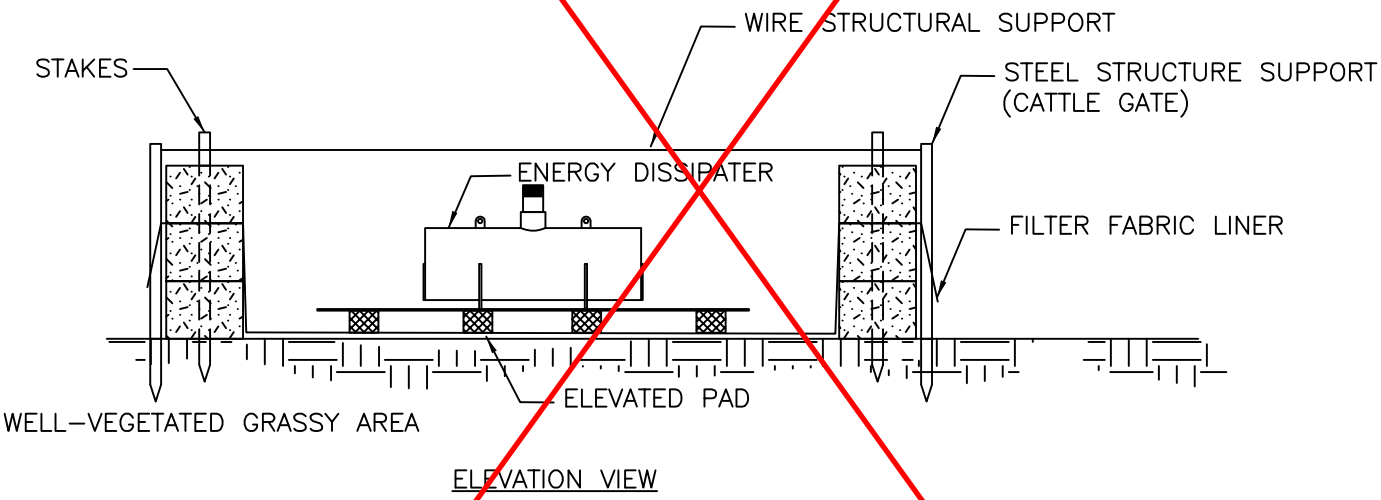
HYDROTEST WATER DISCHARGE DEVICE

DRAWING NUMBER: 48

REFER TO E&S DETAILS,
FIGURES 26A & 26B



PLAN VIEW



ELEVATION VIEW

NOTES:

1. RECTANGULAR DETWATERING DISCHARGE AREA CONSTRUCTED OUT OF HAY BALES STACKED THREE HIGH SECURED WITH WOODEN STAKES (SEE BMP 22 FOR HAY BALE INSTALLATION) AND WIRED (STEEL) CATTLE GATES.
2. FILTER FABRIC LINER INSTALLED COVERING ENTIRE INTERIOR OF STRUCTURE AND SECURED BETWEEN THE HAY BALES WITH WOODEN STAKES.
3. DEWATERING DEVICE SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. DISCHARGE DEVICE SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. SEE BMP 3 FOR ENERGY DISSIPATER DETAILS.

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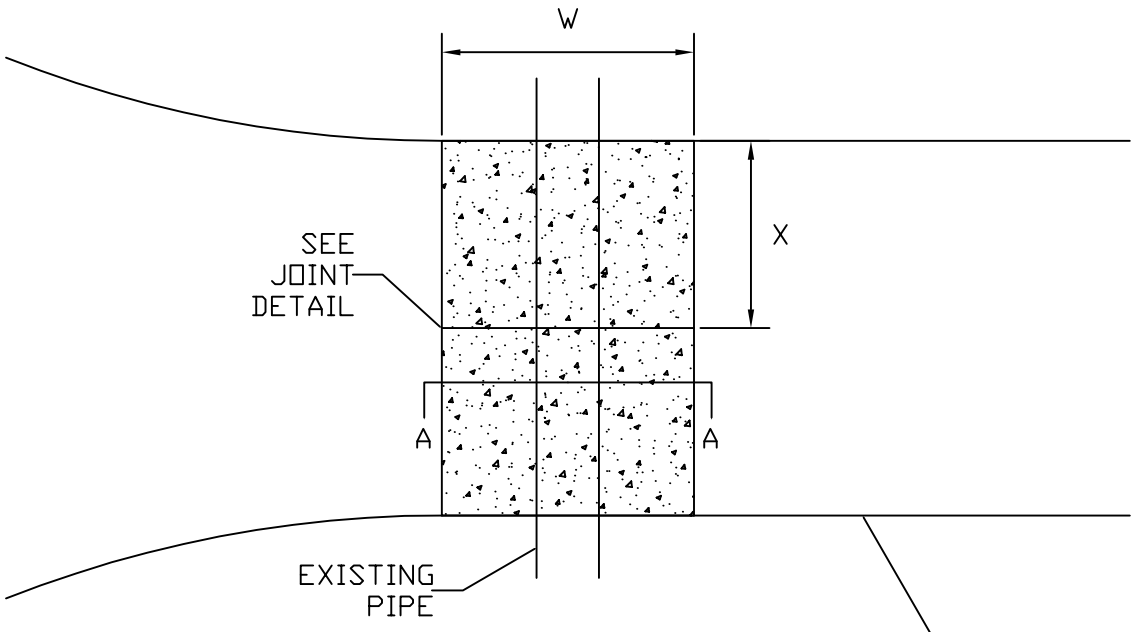
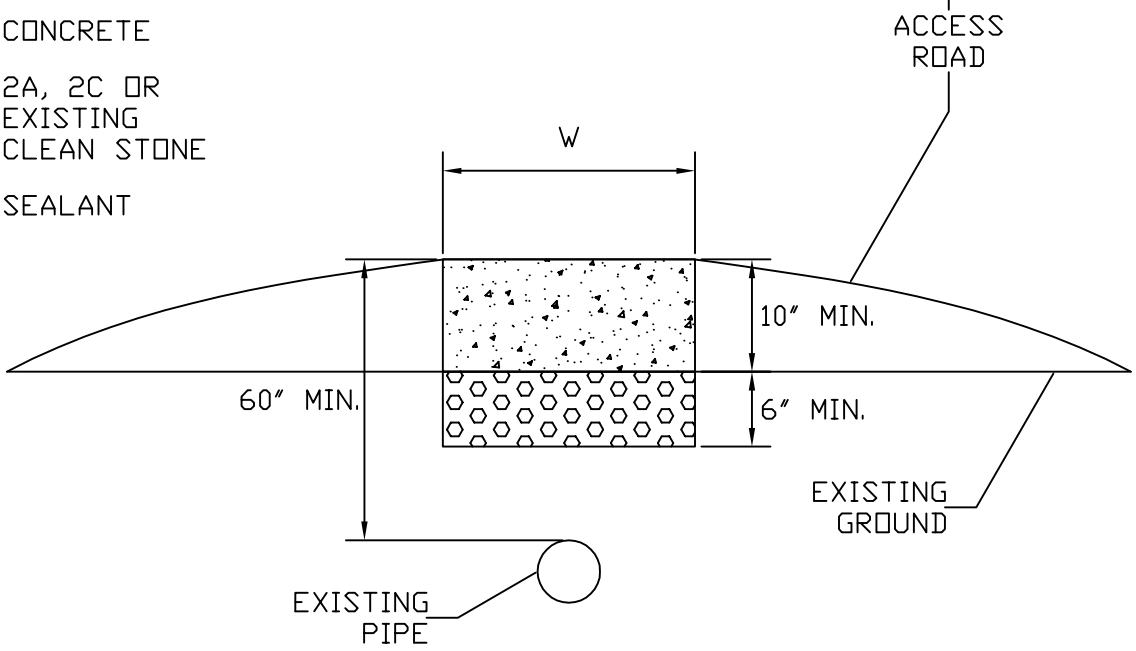


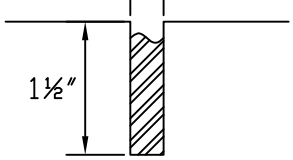
CONCRETE

2A, 2C OR
EXISTING
CLEAN STONE

SEALANT



CONTRACTION
JOINT
DETAIL
3/8"



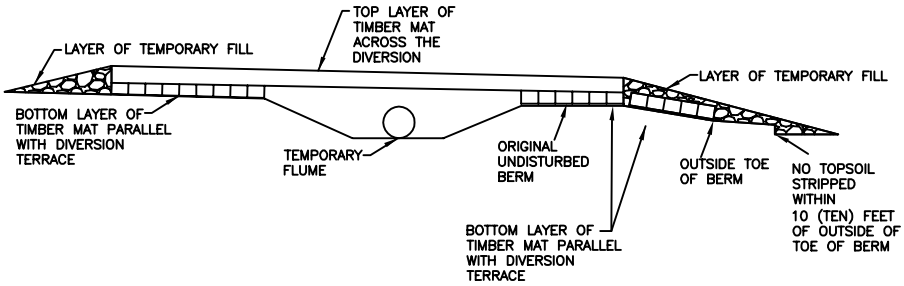
GENERAL NOTES

W=6'+OD+6' (15' MIN)
X=PUT JOINT ON ℄ OR
EVERY W×1.5

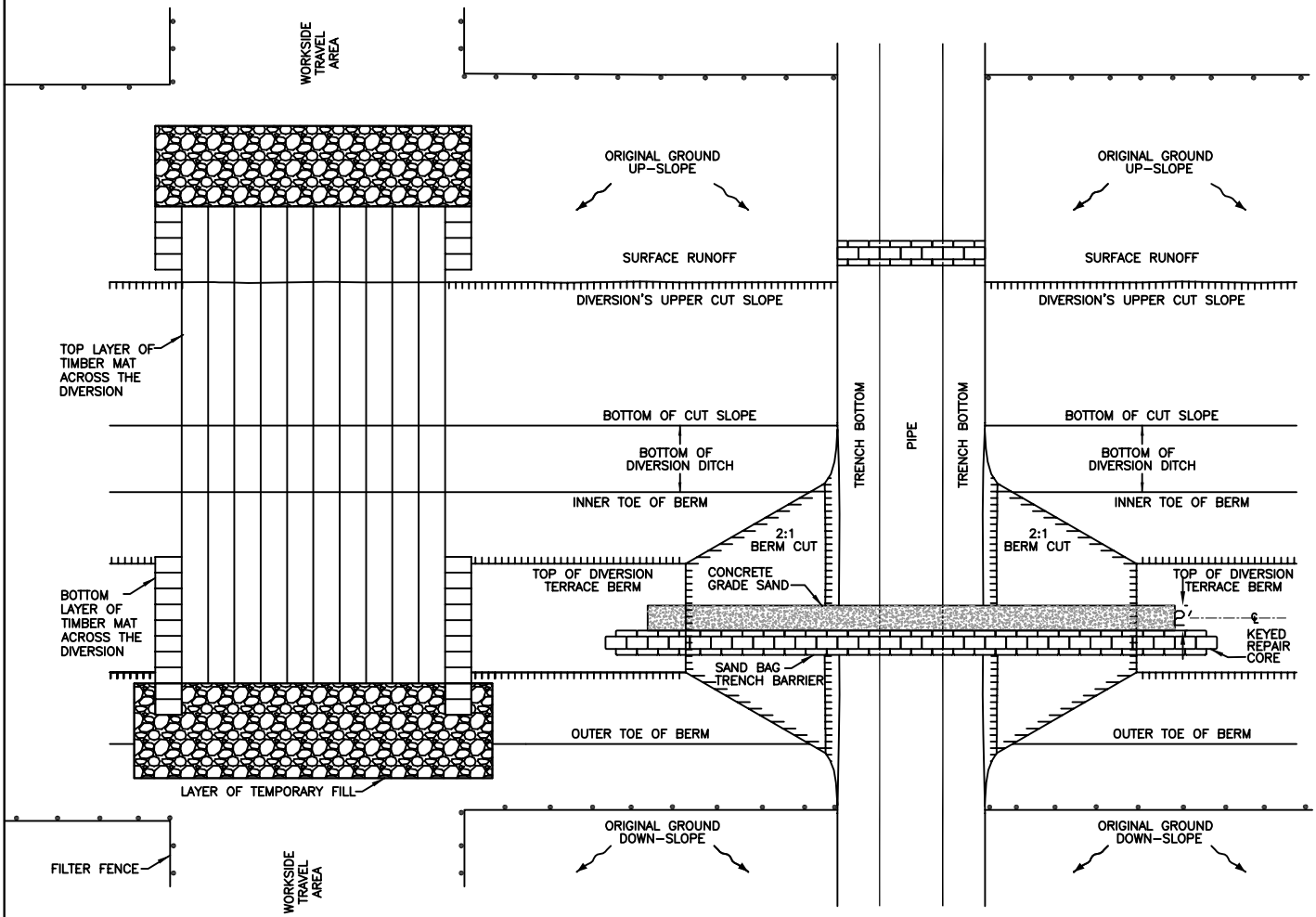
REFER TO C,S&P MANUAL
SECTION 16 FOR
CONCRETE PLACEMENT
AND CURING
INFORMATION

National Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: B. MCSHANE FILENAME: BMP49.dwg LAST REVISION DATE: 01/17/2014	CONCRETE SLAB PIPE PROTECTION DETAIL	DRAWING NUMBER: 49

DIVERSION TERRACE TIMBER MAT BRIDGE SIDE VIEW



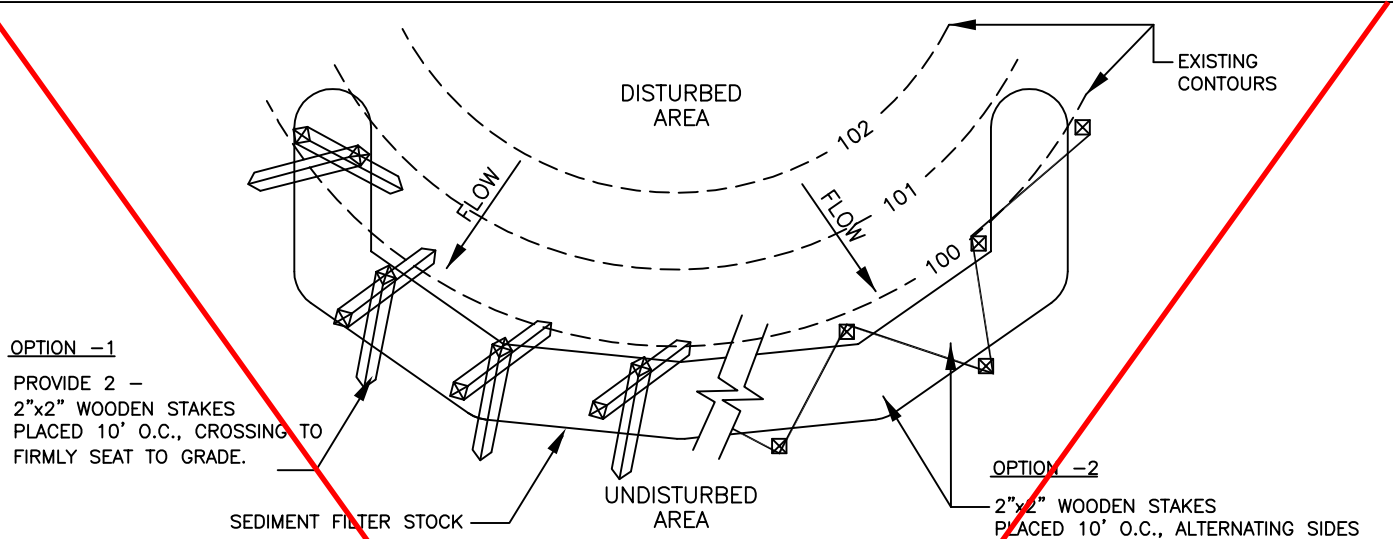
TOP VIEW OF DIVERSION BERM REPAIR AND TIMBER MAT BRIDGE



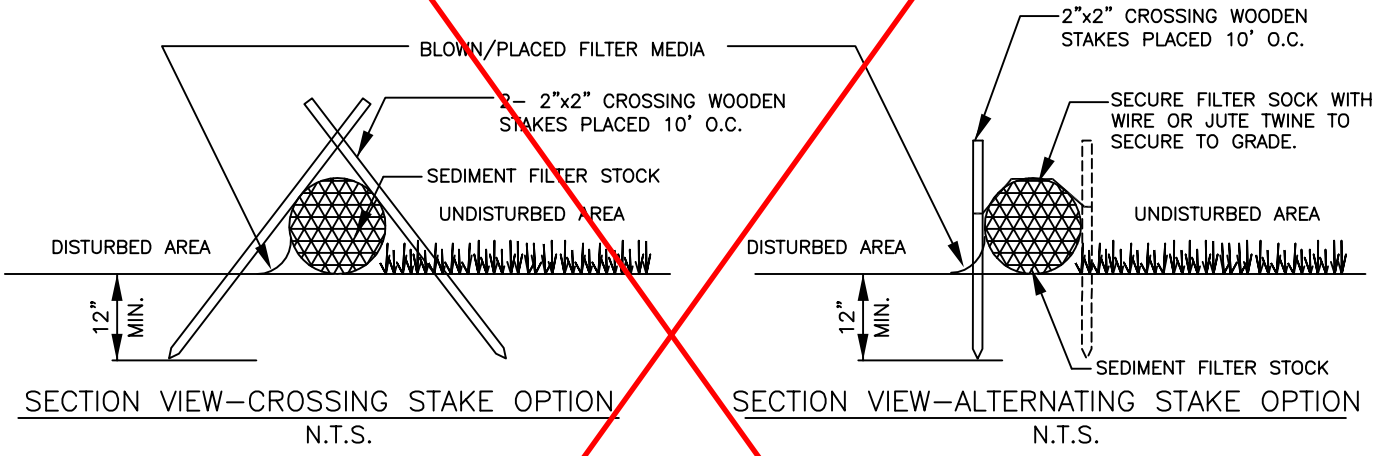
NOTES:

1. THE ONLY PORTION OF DIVERSION TO BE DISTURBED IS THE PIPELINE TRENCH AND THE 2:1 BERM CUT, DURING CONSTRUCTION; AND THE BERM'S KEYED-IN REPAIR CORE DURING THE RECONSTRUCTION OF THE DIVERSION TERRACE.
2. ALL OTHER ORIGINAL FEATURES OF THE DIVERSION TERRACE ARE PROTECTED THROUGHOUT THE RIGHT OF WAYS CONSTRUCTION AND RESTORATION STAGES OF WORK AND ACCESS BT TEMPORARY FILL LAYERS AND TIMBER BRIDGING.
3. A TEMPORARY FLUME WILL BE MAINTAINED UNTIL THE DIVERSION TERRACE IS FULLY RECONSTRUCTED.
4. FILTER FENCE WILL BE INSTALLED AT THE UPSLOPE AND DOWNSLOPE SIDES OF THE DIVERSION BERM (AT THE LIMITS OF THE TOPSOIL STRIPPING) TO LIMIT ACCESS AND DISTURBANCE.

National Fuel SUPPLY CORPORATION		DRAWN BY: T. HARRIS (H&A) FILENAME: Plan.dwg LAST REVISION DATE: 01/17/2014	DIVERSION TERRACE PROTECTION AND MAT	DRAWING NUMBER: 50



PLAN VIEW
N.T.S.



SECTION VIEW–CROSSING STAKE OPTION
N.T.S.

SECTION VIEW–ALTERNATING STAKE OPTION
N.T.S.

Adapted from Filtrexx

SEDIMENT FILTER SOCKS MAY BE FILLED WITH THE FOLLOWING MEDIA:
WOOD FIBER/CHIPS, SHREDDED ASPEN, COCONUT FIBERS, STRAW.

COMPOST FILLED LOGS ARE NOT ACCEPTABLE FOR USE IN NEW YORK STATE

SPREADING OF SEDIMENT SOCK MEDIA ON SITE AFTER UPGRADE STABILIZATION HAS BEEN ACHIEVED SHALL BE ACCEPTABLE ONLY AFTER APPROVAL IS GRANTED BY OWNER. HEAVY SEDIMENT SATURATION IN SOCK OR POOR SPREADING MEDIA MAY REQUIRE THE REMOVAL OF THE ENTIRE SOCK FROM THE PROJECT SITE UPON STABILIZATION.

REFER TO CHECK DAM BMP (17) FOR DESIGN STANDARDS WHEN UTILIZING SOCK FOR THAT PURPOSE.

Traffic shall not be permitted to cross filter socks.

Accumulated Sediment shall be removed when it reaches 1/2 the above ground height of the sock and disposed in the manner described elsewhere in the plan.

Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.

Biodegradable filter sock shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be placed according to manufacturer's recommendations.

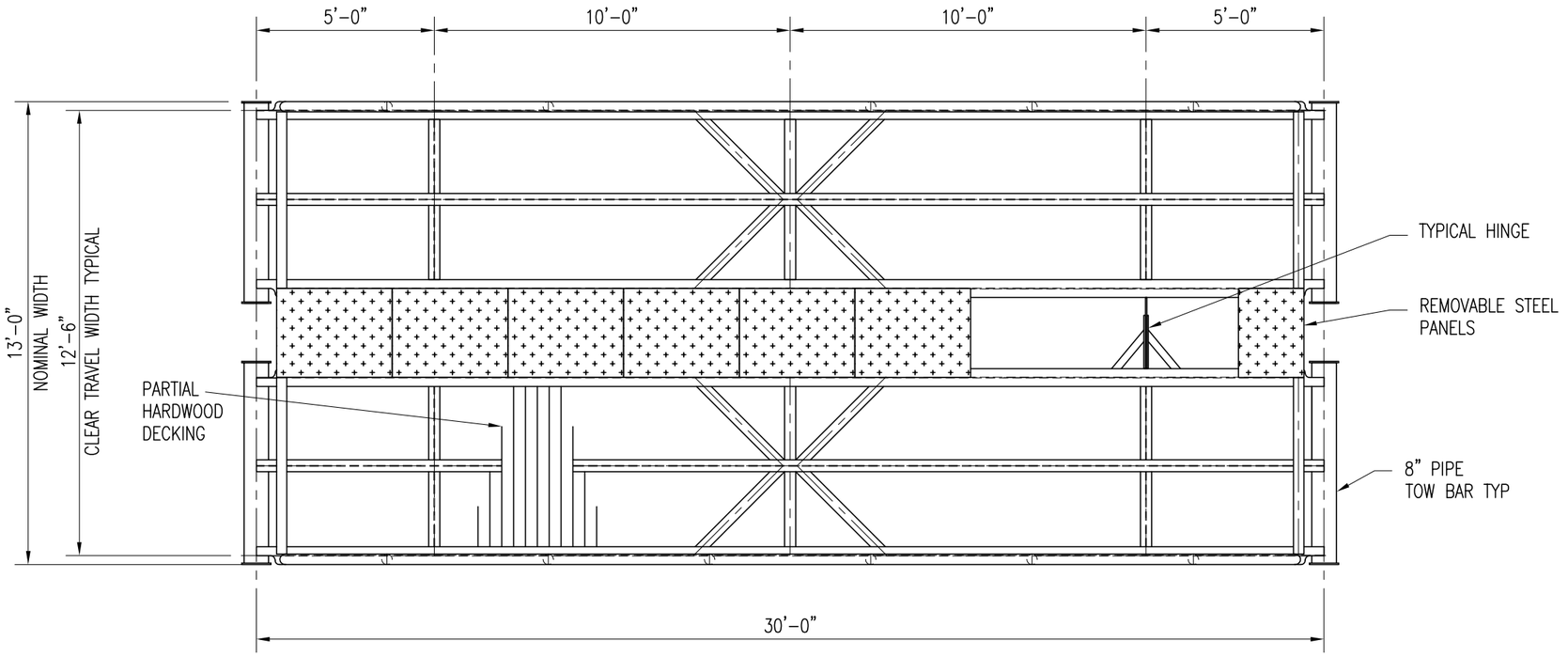
Upon Owner approval and stabilization of the disturbed area to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement, dispose of mesh.

National Fuel SUPPLY CORPORATION
ENGINEERING DEPT.
1100 STATE STREET
P.O. BOX 2081
ERIE, PA. 16512
(814) 871–8676

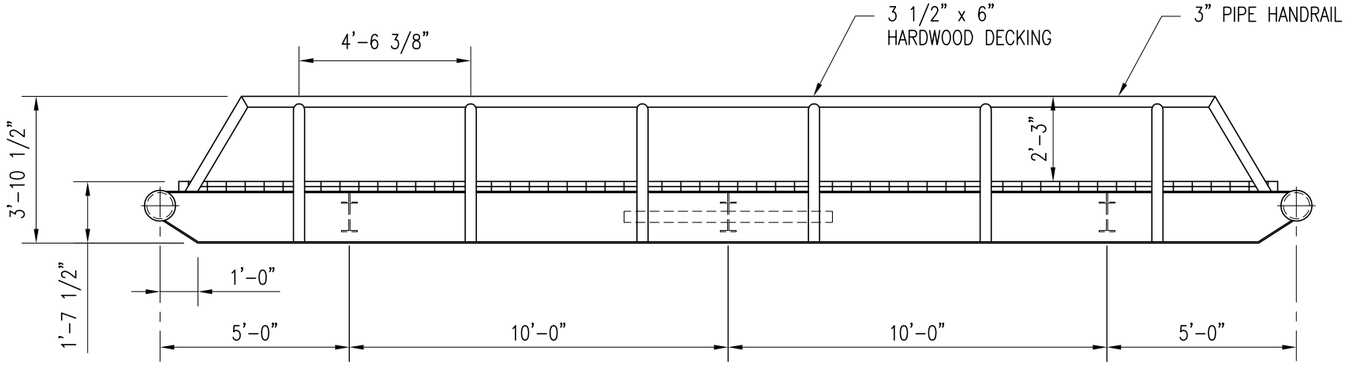
DRAWN BY: L. A. PHILLIPS
FILENAME:
DATE: 01/23/2014

SEDIMENT FILTER SOCK
(FOR NEW YORK USE)

DRAWING NUMBER: 51



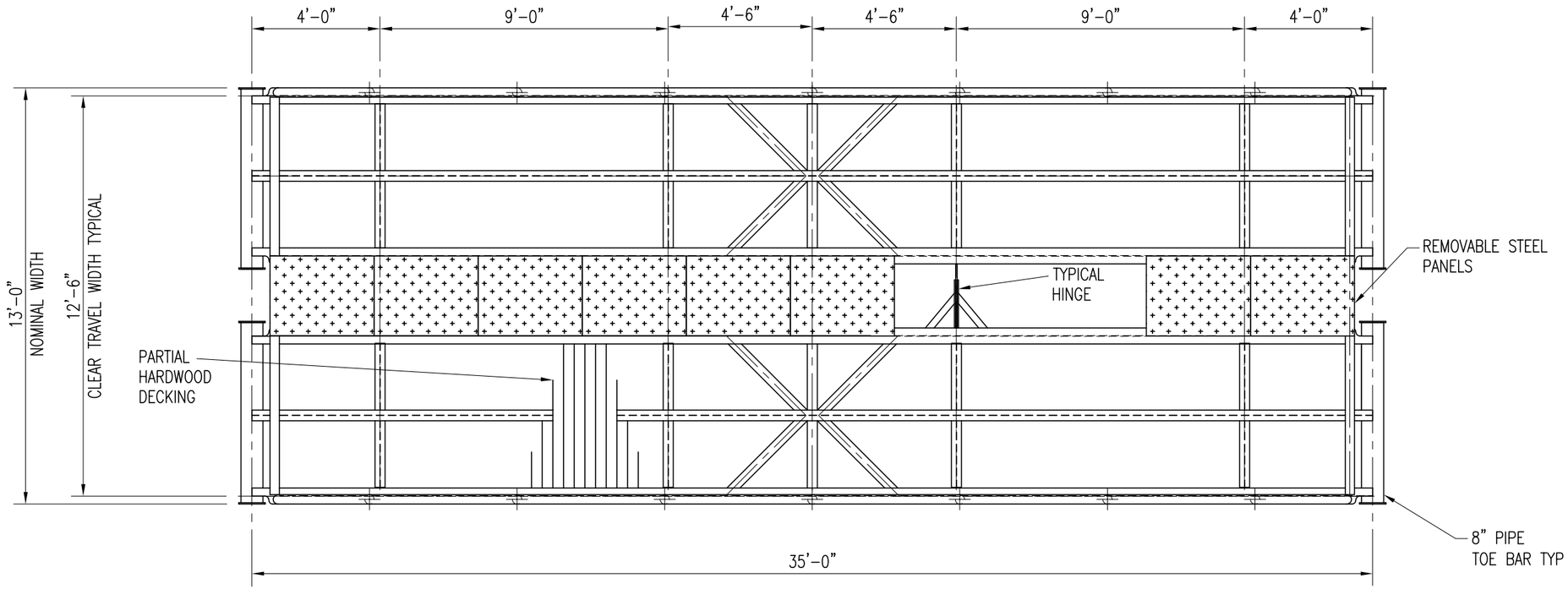
PLAN VIEW



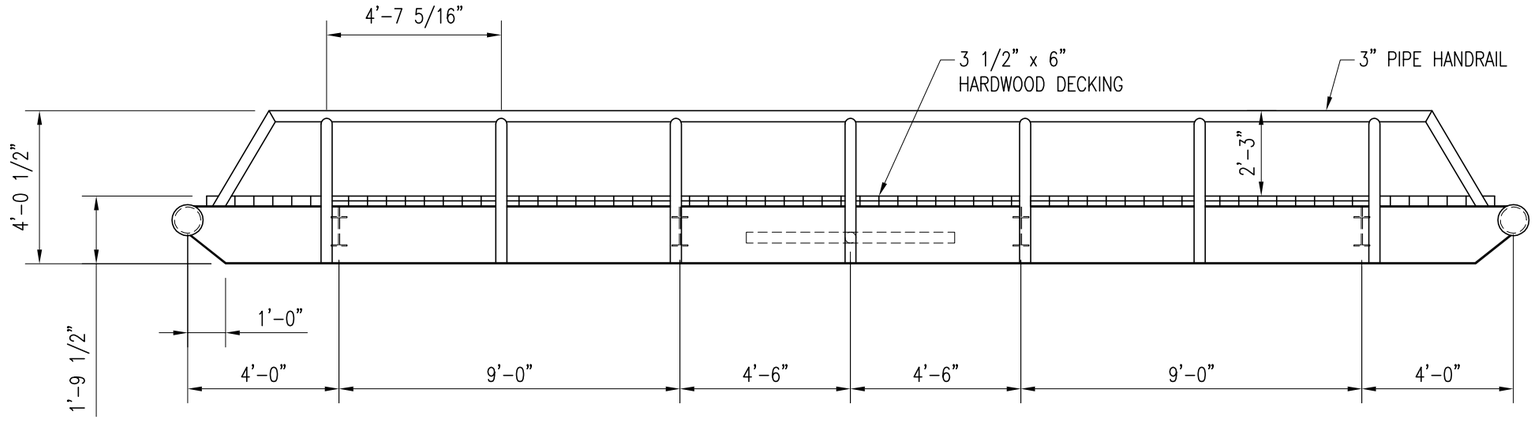
SIDE VIEW

SCALE: 3/8"=1'-0"

THIS BRIDGE – PRODUCT OF: ADM WELDING AND FABRICATION, LLC 37 BROADHEAD STREET WARREN, PA 16365 FILE No. HS25-30A PHONE: 814-723-7227 FAX: 814-723-7326 WWW.ADMWELDING.COM EMAIL: ADMWELDING@VERIZON.NET	national fuel	DRAWN BY: TD (ATSI) FILENAME: BMP 52.DWG DATE: 02/09/17	30'-0" PORTABLE BRIDGE	DRAWING NUMBER: 52



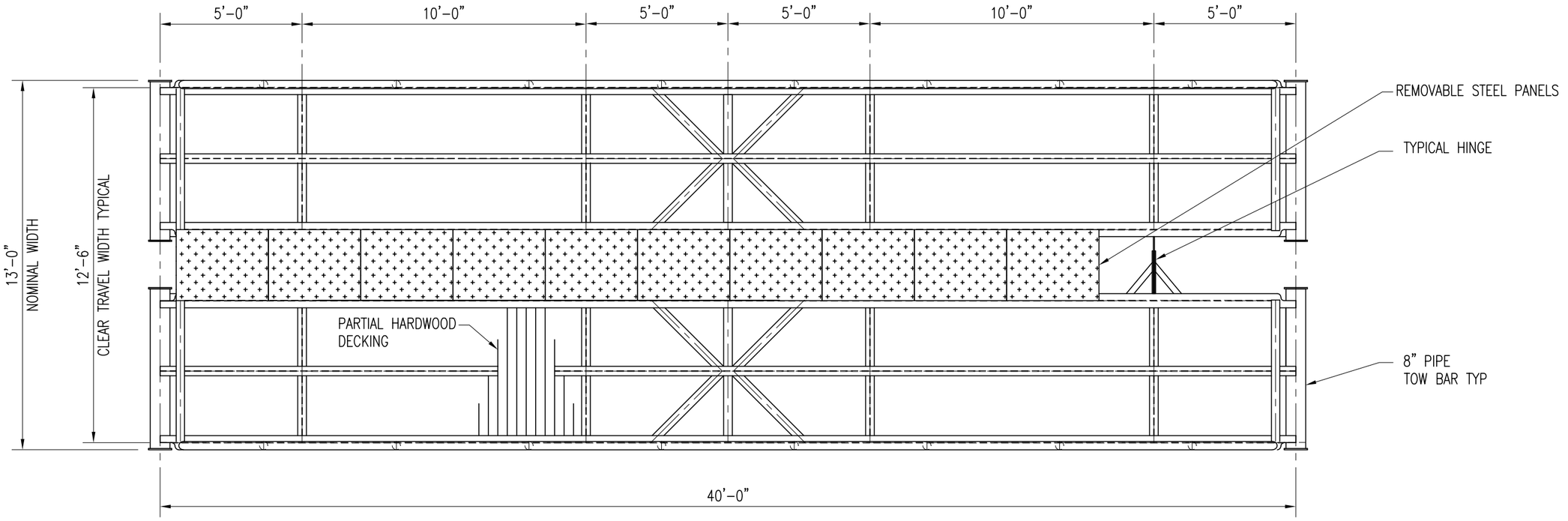
PLAN VIEW



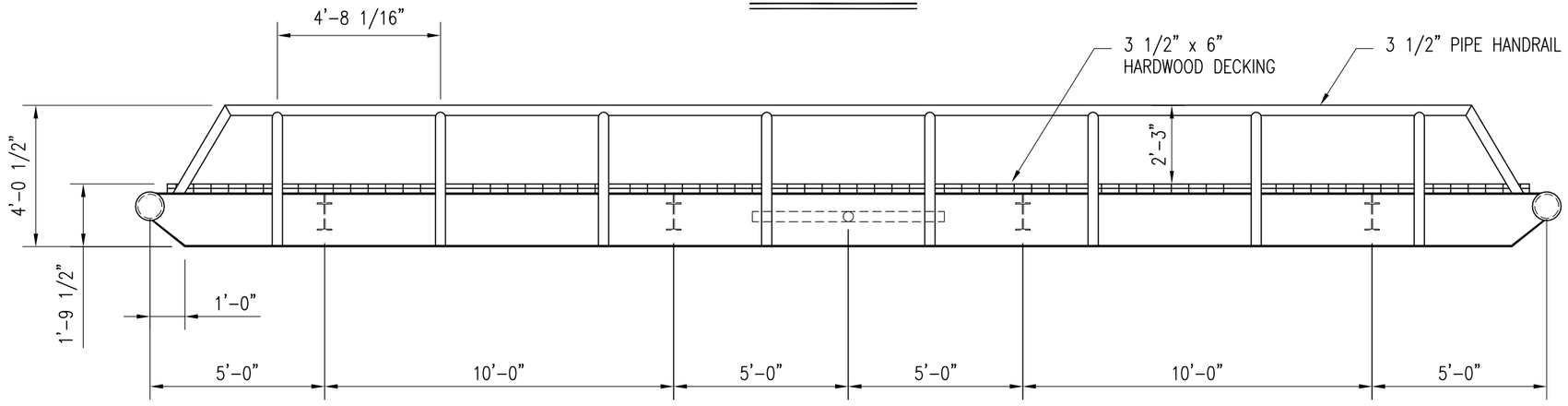
SIDE VIEW

SCALE: 3/8"=1'–0"

THIS BRIDGE – PRODUCT OF: ADM WELDING AND FABRICATION, LLC 37 BROADHEAD STREET WARREN, PA 16365 FILE No. HS25–35A PHONE: 814–723–7227 FAX: 814–723–7326 WWW.ADMWELDING.COM EMAIL: ADMWELDING@VERIZON.NET	national fuel	DRAWN BY: TD (ATSI) FILENAME: BMP 52.DWG DATE: 02/09/17	35'-0" PORTABLE BRIDGE	DRAWING NUMBER: 53



PLAN VIEW



SIDE VIEW

SCALE: 3/8"=1'-0"

THIS BRIDGE – PRODUCT OF:
ADM WELDING AND FABRICATION, LLC
37 BROADHEAD STREET
WARREN, PA 16365
PHONE: 814-723-7227
FAX: 814-723-7326
WWW.ADMWELDING.COM
EMAIL: ADMWELDING@VERIZON.NET

national fuel

DRAWN BY: TD (ATSI)
FILENAME: BMP 52.DWG
DATE: 02/09/17

40'-0" PORTABLE BRIDGE

13'W x40'L x 45-TON, 5 AXLE COMBINATION VEHICLE LOAD CAPACITY.
SUBJECT TO A 10 MPH MAXIMUM SPEED RESTRICTION

DRAWING NUMBER: 54

Attachment 3

Special Crop Productivity Monitoring Procedures

SPECIAL CROP
PRODUCTIVITY MONITORING PROCEDURES

February 1993

Provided by:
NYS Dept. of Agriculture & Markets
10-13 Airline Drive
Albany NY 12235-0001

The following outline explains the method the agriculture specialists should use to compare crop yields on and off the right-of-way. It is important that the specialist use sound judgment when selecting areas to sample. These areas should be representative of the field and should have similar soil types, drainage characteristics, and topography.

Evaluating Corn Crops

Plant Population

1.0 Check the plant population in the corn fields in late May or early June.

2.0 Count the number of plants in an area equal to 1/1000 of an acre (see table below). A population count should be done for the spoil area, the trench area, and the traffic area of the right-of-way. Do the same for the unaffected field.

Row Length to Sample 1/1000 Acre

Row Width Inches	Length of Row
42	12' 5"
40	13' 1"
38	13' 9"
36	14' 6"
34	15' 5"
32	16' 4"
30	17' 5"

3.0 Repeat the population counts for two other locations along the right-of-way in the same field.

4.0 Average the population counts from on the right-of-way and convert to plants per acre. Do the same for counts from off the right-of-way.

General Appearance

1.0 Observe the fields in late July/early August and note any visual differences in population, color, and size on and off the right-of-way.

Yield

1.0 Record differences in general appearance on and off the right-of-way during early September (silage) or early October (grain corn).

2.0 Select sample plots using the same method as in lb, above. Count the number of ears in each sample area. Count the number of rows of kernels and the number of kernels per row on at least three of the ears in the sample area. Kernels at the tip of the ear that are less than 1/2 normal size should not be counted.

3.0 Multiply the number of ears x the number of rows of kernels x the number of kernels per row x 0.01116 = bushels per acre.'

[1]Corn yields are calculated at 15.5% moisture

4.0 Average the results from the three ears from one sample plot. Average the results from the nine sample plots on the right-of-way, do the same for the three sample plots off right-of-way (see example below). Examples of corn yield estimates:

Row width = 30" Length of Row = 17' 5" #of ears in row = 21

	Ear #1	Ear #2	Ear #3
Rows of Kernels	12	10	10
Kernels/Row	40	38	44

21 x 40 x 12 x .0116 = 116.9 bu/ac
21 x 38 x 10 x .0116 = 92.6 buiac
21 x 44 x 10 x .0116 = 107.2 bu/ac

Avg. yield for plot #1 = 105.5 bu/ac

Evaluating Small Grains

1.0 Plant Population

1.1. Check populations in October (winter grains) or mid/late May (spring grains). Population counts should be done for the spoil area, trench area, the traffic area, and the unaffected field. Count the number of plants in 1/10,000 of an acre (2.09' x 2.09'). Repeat the population counts at the other two locations in the same field.

2.0 General Appearance

2.1. Observe the fields in June or early July and record any visual differences in color, size, and plant population on and off the right-of-way.

3.0 Yield

3.1. Harvest the crop for yield checks in mid-July/early August (earlier for winter grains).

3.2. Select sample plots using the same method that was used for the population checks.

3.3. Cut the crop from the sample plot by hand approximately three inches above the ground.

3.4. Separate the grain, weigh, test for moisture level, and average the results from on the right-of-way. Convert the results to bushels per acre and compare (see example below).

Yield estimate for small grains:

Plot size = 1/10,000 of an acre

crop — wheat Avg. weight = 60 lbs./bu

Sample weight = .25 lbs.
Moisture level = 22%
Ideal harvest moisture = 12%
22% - 12% = 8%
.25 lbs. x 8% = .02 lbs,
.25 lbs. - .02 lbs. = .2.3 lbs

[1]Corn yields are calculated at 15.5% moisture

.23 lbs. x 10,000 = 2300 lbs./ac
2300 lbs/ac : 60 lbs/bu = 38.3 bu/ac

Evaluating Soybeans

1) Plant Population
   a) Check the plant populations in late June/early July. if the soybeans are planted in rows use the same method that is used for corn. If the beans are planted with closer spacing use the method for small grains (2.09' x 2.09')

2) General Appearance
   a) Check the general appearance in early August, note any visual differences in population, color, and size on and off the right-of-way.
   b)
3) Yield
   a) Harvest the plants in late September and early October. If the soybeans are planted in rows use the same method that is used for corn. If they are planted with closer spacing use the method for small grains.
   b) Separate the beans, weigh them, and test for moisture. Average the results for the sample areas on the right-of-way using the same method that was used for small grains. Do the same for the areas off the right-of-way.
   c) Convert to bushels per acre.

Evaluating Hay Crops

1) Plant Population
   a) It is not necessary to do population counts for hay crops, however, the agricultural specialist will need to note the percentage of alfalfa in mixed stands on and Off the right-of-way.
   b) Any visible difference in populations of pure alfalfa stands should also be noted.

2) General Appearance
   a) The general appearance of hay stands should be recorded in late spring, mid summer, and late summer. Any differences in color, height, and stand quality should be noted.

3) Yield
   a) Complete yield checks for hay crops just before the second cutting is done.
   b) Cut vegetation from sample plot (1/10,000 of an acre) two to three inches above the ground. Test the moisture level and weigh the sample, adjust the weights using the example below. Average the results from on the right-of-way, do the same for the off right-of-way samples.

      Ideal moisture level = 18% Sample weight = .6 lbs.
      Moisture level of sample = 25%

      25% - 18% = 7%
      .6 lbs. x .07 = .042 lbs.
      .6 lbs. -.042 lbs. = .56 lbs.
      .56 lbs x 10,000 = 5,600 lbs./ac = 2.8 tons/ac.

[1]Corn yields are calculated at 15.5% moisture

Attachment 4

Seeding, Fertilizing, and Lime Recommendations
for
Gas Pipeline Right-of-Way Restoration in Farmlands

NEW YORK STATE FARMLANDS
SEEDING, FERTILIZING, AND LIME RECOMMENDATIONS
FOR GAS PIPELINE RIGHT-OF-WAY RESTORATION
IN FARMLANDS

Rev, 6-15-2005
Provided by
NYS Dept. of Agriculture and Markets
Division of Agricultural Protection and Development Services
10-B Airline Drive
Albany NY 12235-0001

NEW YORK STATE FARMLANDS

1.0 SEEDING, FERTILIZER, AND LIME RECOMMENDATIONS FOR GAS PIPELINE RIGHT-OF-WAY RESTORATION IN FARMLANDS

This paper supplements the Department of Agriculture and Markets' publication, "Pipeline Right-of-Way Construction Projects: Agricultural Mitigation Through Stages of Project Planning, Construction/ Restoration and Follow.. Up Monitoring (Rev. 1 I-97)." It is intended to familiarize the reader with varieties of seed mixes that are proven highly effective, in New York State farmlands affected by pipeline right-of-way construction, with full agricultural mitigation.

The paper lists several different seed mixes, for permanent cover, and provides other pertinent information including: temporary cover; the need for and use of soil nutrients; as well as follow-up monitoring and other useful notes. This paper is NOT intended as a guide to the sequential steps of disking and surface tillage for seedbed preparation and the sequence of liming, fertilizing, seeding, and mulching.

******* ALL SEEDING RATES BELOW ARE FOR DRILL SEEDER APPLICATION *[PREFERRED METHOD1.*

*** IF BROADCAST SEEDING IS USED, ALL SEEDING RATES *[BELOW]* MUST BE DOUBLED.

1.1 Permanent Seeding Mixtures.

1.1.1 Common for hayland planting:

a.) Alfalfa 20# if seeded alone, or with one of the following cold season grasses: Timothy, or Orchard grass, or Bromegrass should be added if one of these grasses is desired by the farm operator, at the rate of 8# per *acre. [See "3) Quick Erosion Control" below.]*

b.) Pardee Birdsfoot Trefoil 16# per acre, plus either:
Timothy, or Orchard grass, or Bromegrass should be added [per farm operator's choice] at 6# per acre rate. *[See "3) Quick Erosion Control" below.]*

c.) Medium Red Clover or Mammoth Red Clover 15# per acre, plus either: Timothy, or Orchard grass, or Bromegrass should be added [per farm operator's choice] at the rate of 6# per acre. *[See "3) Quick Erosion Control" below.]*

1.1.2 Common for pasture planting:

d.) Dutch White Clover 6# per acre; plus Pardee Birdsfoot Trefoil 6# per acre; plus Orchard grass 6# per acre

e.) Note: Reed Canary Grass at the rate of 18# per acre is excellent hay or pasture grass for wetter soils. For hay, cut early. Do not use Reed Canary Grass in wetlands *[See "3) Quick Erosion Control" below.]*

1.1.3 *Quick Erosion Control.-*

f.) For quick control of erosion when seeding the right-of-way: mix Annual Ryegrass as an additive into each of the Permanent Seeding Mixtures [see above]. Annual Ryegrass provides the quickest temporary cover against erosion [while the other plants are still in their slower/longer period of development]. Use approximately 6# or 7# per acre of the Annual Ryegrass when drill seeding the mix. Double the amount to 12# to 14# of Annual Ryegrass if broadcast.

g.) THE DRILL SEEDING RATES [LISTED ABOVE] FOR DISTURBED PIPELINE RIGHT-OF-WAY ARE SLIGHTLY INCREASED OVER THE STANDARD RATES IN ORDER TO HELP COMPENSATE FOR THE LOWER THAN NORMAL GERMINATION RATES DUE TO:

- THE LOWERING OF NUTRIENTS AVAILABLE TO THE PLANTS AFTER PIPELINE CONSTRUCI ION HAS DISTURBED TOPSOIL AND SUBSOIL.
- TIMING OF SEED MIX APPLICATION MAY BE IDEAL FOR SOME OF THE VARIETIES IN A MIX BUT ONLY MARGINAL FOR ONE OR MORE OTHERS.

h.) Special situation seeding, at project's risk for pastureland only: If the right-of-way's soil is restored by late September, a "risk" seeding can be applied between late September and the third week in October: Aroostook Winter Rye at 2 bu. or 112# per acre, mixed with: Pardee Birdsfoot Trefoil 16# per acre, Tall Fescue 20# per acre and Orchard Grass 8# per acre. The Aroostook Rye provides winter cover, and portions of the high rate of Trefoil, Fescue, and Orchard Grass seed may stay dormant until the following spring season. If successful in coverage, the permanent seeding of respective pastures is complete. If not, the site must be reseeded.

1.2 Temporary Cover.

1.2.1 For large-size pipeline right-of-way projects with a two-year plan, to construct one year and restore the following year.

i.) Topsoil berm

Topsoil stripping and stockpiling performed in late spring to mid-summer - broadcast seed the entire topsoil berm with either Oats at 2 bu. [80#] per acre, or Aroostook Winter Rye at 2 bu. [112#] per acre in July-August. A light to moderate rate [about 1500 -2000 #/acre] of weed-free straw mulch cover may be needed for retaining adequate summer soil moisture. *[For larger size topsoil berms, the temporary cover seeding may be more uniformly applied by `flattening- the top of the berm and using small, light equipment to drop and broadcast seed from the top, covering all surfaces of the berm.]*

j.) Exposed construction zone/subsoil
After backfilling, by or before late October, plant the exposed right-of-way subsoil to Aroostook Winter Rye at the rate of 3 bu. [168#] per acre with broadcast seeder; or 2 bu. [112#] if drill seeded. In preparation, the surface of the exposed subsoil is first scarified generally parallel with the slope's contours and fertilized with 200# of 10-20-20 (N,P,K) per acre, for temporary winter cover to succeed, due to the subsoil compaction and its low fertility. Apply a light to moderate [not heavy] rate [about 1000 #/acre] of weed-free straw mulch over the temporary seeding,

Note that other temporary cover seedings, in addition to those noted above, may be used, pending on seasonal conditions and the mutual approval of the farmland operator and agricultural inspector.

1.2.2 For any pipeline right-of-way project, large or small where a "winterized" right-of-way is necessary and a seeding with Aroostook Winter Rye can be applied before the end of October:

Topsoil berm and exposed, backfilled construction zone
Apply 3 bu. [168#] per acre, broadcast, Refer to Exposed construction zone above regarding scarification of surface and rate of straw mulch.

1.2.3 For unavoidable, off-season construction ['mud and freeze-thaw" season construction], when topsoil is stripped after October, and effective, temporary cover seeding is impossible due to inherent climate factors: use a moderate rate of weed-free straw mulch cover over the topsoil berm. Establish and maintain all temporary erosion controls along the construction right-of-way corridor - throughout the off season construction - including but not limited to: outside perimeter runoff ditching; silt fencing; water bars and runoff drainage gaps through the topsoil berm and across right-of-way to prevent water ponding, berm saturation, and erosion.

1.3 Use Seed Inacculant.

1.3.1 Remember to apply the appropriate variety of fresh inocculant to all legume seed before use [e.g.: alfalfa, birdsfoot trefoil, etc.]. *Even if the seed label says it is pre-inocculated, the viable seed in the batch could easily be two or more years old while the pre-inocculant is past its life.* The certified seed itself may still be good, but non-responsive without the proper fresh inocculant applied at the time of seeding.

1.4 Fertilizer For Right-of-Way Reseeding:

Soil Testing, The fertilizer rates listed below are approximations. Prior to construction, before the topsoil is stripped, representative sampling is conducted: agronomic soil samples are obtained about 400 feet apart along the right-of-way, and submitted and laboratory tested for: pH; % organic material; cation exchange capacity, and N,P,K [Nitrogen, Phosphorus/Phosphate, and Potassium/Potash). The results are applied to determine the lime and fertilizer rate to apply for the respective soils and farms.

1.4.1 "10-20-20" This means 10# of nitrogen, 20# of phosphorus, 20# of potash per 100# of fertilizer. Pending on test results, use 300# per acre, [This totals out to 30# of nitrogen, 60# of phosphorous, 60# of potash per acre.]

1.4.2 "5-10-10" This means 5# of nitrogen, 10# of phosphorus, 10# of potash per 100# of fertilizer. Pending on test results, use 600# per acre. [This totals out to 30# of nitrogen, 60# of phosphorous, 60# of potash per acre.]

1.5 Fertilizer for temporary cover seeding of exposed right-of-way construction work surface.

Refer to "Temporary Cover" B. 1. b. exposed construction zone/subsoil on page 2.
(Fertilizer is not recommended for temporary seed cover on the topsoil berm, but is strongly advised on the exposed subsoil surface.)

1.6 Fertilizer as a topdressing [follow-up additive] in haylands and pastures:

"16-8-8" This means 16# of nitrogen, 8# of phosphorous, 8# of potash per 100# of fertilizer. Use 200-300# per acre, depending on field conditions. This totals out to either:
32# of nitrogen, 16# of phosphorus, 16# of potash; or
48# of nitrogen, 24# of phosphorus, 24# of potash per acre,

1.7 Agricultural Lime.

See reference to Soil testing, for pH, in D. Fertilizing For Right-of-Way Reseeding, above.

- A minimum rate of 3 tons agricultural lime per acre for most permanent seedings in naturally low-lime soils [e,g.: Southern Tier/northern Allegheny Plateau]. A heavier amount will be applied if so indicated from pH test results. Use lower lime rate on naturally high-lime soils based on site specific soil pH test and farm record of recent lime application [e.g.: Central Plains/northern half of Finger Lakes Region].

- Pelletized and agriculture lime are rated the same in tons to be applied.
  Except pelletized is easier to handle and reacts to the soil quicker but it cannot be reduced in its amount. [Do not use "liquid lime" on agricultural land.]

1.8 Monitoring and Follow-Up.
Restored right-of-way is monitored for not less than two years after initial restoration seeding is completed. The seeding is satisfactory if it produces equal to or better than the adjacent undisturbed planting. Seasonal surface soil moisture conditions will vary from year to year, and may be ideal to poor [excessively dry] for germination when pipeline project applies the seed. Seedings that are unsatisfactory due to lower plant population/poor plant health or overpopulation of weeds will be replanted.

Far monitoring of crop productivity, refer to: "Special Crop Productivity Monitoring Procedures," a February 1993 paper, provided by the NYS Department of Agriculture and Markets.

1.9 Final Notes on Seedings.

- Always use certified seed for each variety used alone or in a mix.
-
- Always use a Brilion drill seeder with rear cultipacker, or similar implement, for hayland and improved pasture seedings.

- Do not try to seed when the ground is wet.

- While Empire birdsfoot trefoil has been a traditional variety applied throughout the region, the more recently developed "Pardee" birdsfoot trefoil is widely applied with proven performance in soils with drainage limitations and even better in well-drained soils. The Pardee variety has improved winter survival over other varieties when properly planted.

- Remember to double the permanent seeding rates when using broadcast seeding due to the mortality rate,

- Perennial Ryegrass is not a favorite grass with farmers and is not recommended in seed mixes on agricultural right-of-way.

- Incorporate fertilizer and lime into the soil; and apply fine surface tillage/seedbed preparation practices

- Creeping Fescue is shade tolerant.

Attachment 5

NFG General Seed Mixtures

Temporary Mixtures ~~October 15th through March 31st. New York requires the mixtures to be used between November 15th and April 1st.~~

Site preparation: Apply 1 ton of agricultural-grade limestone per acre, plus fertilizer at the rate of 10-10-10 per acre, and work in where possible. After seeding, mulch with hay or straw at a rate of 3 tons per acre.

Lime	Fertilizer	Mulch
One (1) ton per acre	150 lbs. per acre 10-10-10	Hay or Straw 3 tons per acre in PA ~~4 tons per acre in NY~~

Temporary Seed Mixture
Winter Rye
170lbs. per acre

Permanent Mixtures - April 1 through October 14
For disturbed areas that achieve finished grade during non-germinating seasons, use temporary mixtures until germinating season begins.
For non-agricultural lands use the following guidelines:

Lime	Fertilizer	Mulch
Six (6) ton per acre	1,000 lbs. per acre 10-10-20	Hay or Straw 3 tons per acre

☐NFG Seed Mixture No. 1
General R.O.W. Mixture
Application Rate 40 lbs. per acre
30% Fawn Tall Fescue
25% Annual Ryegrass
15% Timothy
10% Birdsfoot Trefoil
10% Alsike Clover
5% Yellow Blossom Clover
5% Red Top

☐NFG Seed Mixture No. 3 Wet Upland Areas
Application Rate 50 lbs. per acre
70% Perennial Ryegrass
24% Birdsfoot Trefoil
6% Red Top

☐NFG Seed Mixture No. 4
Residential Lawns
Application Rate 120 lbs. per acre
ERNST # ERNMX-114
"Penn State Mix"
50% Kentucky Bluegrass
30% Creeping Red Fescue
10% Perennial Ryegrass
10% Annual Ryegrass

☐NFG Seed Mixture No. 5
Agricultural Lands
Application Rate 30 lbs. per acre
50% Alfalfa
50% Timothy

☐NFG Seed Mixture No. 6
Wetlands
Application Rate 40 lbs. per acre
100% Annual Ryegrass

☐NFG Seed Mixture No. 9
Steep Slopes >20%
Application Rate 50 lbs. per acre
40% Perennial Ryegrass
40% Lathco Flatpea (2 x inoculm)
20% Birdsfoot Trefoil

☐Ernst Seed Mixture
Cattle Grazing Mix
Application rate 30 lbs. per acre
ERNST # ERNMX-118
30% Festuloliom
30% Orchardgrass
30% Perennial Ryegrass
5% Red Clover
5% White Clover

☐Ernst Seed Mixture
Cattle Hay mix
Application Rate 20 lbs. per acre
ERNST # ERNMX-108
40% Red Clover
30% Tall Fescue
20% Alfalfa
10% Timothy

☐Ernst Seed Mixture
Horse Pasture and Hay Mix
Application rate 25 lbs. per acre
ERNST # ERNMX-107
40% Orchardgrass
28% perennial Ryegrass
20% Tall Fescue
5% Timothy
5% Kentucky Bluegrass
2% Meadow Brome

☐Strip Mine Seed Mixture
Application Rate 43 lbs. per acre
20 lbs. Annual Ryegrass
8 lbs. Switchgrass
6 lbs. Alsike Clover
5 lbs. Creeping Red Fescue
4 lbs. Red Top

Attachment 6

Winter Construction Plan

Table of Contents

WINTER CONSTRUCTION PLAN

Revised: January 2019

NOTE: All elements of this Plan are subject to applicable permit requirements and conditions, as well as general or specific applicable regulatory requirements imposed by Federal, State or Local agencies (Regulatory Authorities). Any contradictions between regulations or activities imposed by Regulatory Authorities and those outlined in this Plan, shall default to the measures prescribed by the Regulatory Authorities.

It will be required by The Contractor to correct any trenchline subsidence that occurs during spring thaw prior to final restoration

1. PRECONSTRUCTION PLANNING

The Company has developed and suggests the implementation of this winter construction plan when any of the following conditions could occur:

- ☐ Sustained cold temperatures occur that result in the freezing to a depth of 2 inches or more;
- ☐ Backfill material could freeze to the extent that adequate compaction becomes difficult;
- ☐ Topsoil stockpiles could freeze and cannot be uniformly redistributed across disturbed areas or separated from the sub-grade material;
- ☐ Snow accumulations are great enough to prevent visual observation of the construction work area; or
- ☐ Historical conditions in the region indicate that significant runoff from spring snow melt may require additional protective measures.

This plan addresses and identifies the chain of decision making that will occur on a day-to-day basis for determining the construction practices that can occur in any one area. The right-of-way conditions will be evaluated in morning meetings with the Contractor

and Company and re-evaluated during the day if weather changes may affect construction practices.

2. SAFETY RECOMMENDATION

2.1 Tips to Protect Workers

Prolonged exposure to freezing or cold temperatures may cause serious health problems such as trench foot, frostbite, and hypothermia. In extreme cases, including cold water immersion, exposure can lead to death. Danger signs include uncontrolled shivering, slurred speech, clumsy movements, fatigue, and confused behavior. If these signs are observed, call for emergency help.

OSHA's Cold Stress Card (attached) provides a reference guide and recommendations to combat and prevent many illnesses and injuries. Other tips include the following:

2.2 Recommendations for Employers

Employers should take the following steps to protect workers from cold stress:

- ☐ Schedule cold projects for the warmer part of the day, if possible.
- ☐ Reduce the physical demands of workers.
- ☐ Use relief workers or assign extra workers for long, demanding tasks.
- ☐ Provide warm liquids to workers.
- ☐ Provide warm areas for use during break periods.
- ☐ Monitor workers who are a risk of cold stress.
- ☐ Provide cold stress training that includes information about:
    - o Worker risk
    - o Prevention
    - o Symptoms
    - o The importance of monitoring yourself and coworkers for symptoms
    - o Treatment Personal protective equipment

2.3 Recommendations for Workers

Workers should avoid exposure to extremely cold temperatures when possible. When cold environments or temperatures cannot be avoided, workers should follow these recommendations to protect themselves from cold stress:

- ☐ Wear appropriate clothing.
  - o Wear several layers of loose clothing. Layering provides better insulation.
  - o Tight clothing reduces blood circulation. Warm blood needs to be circulated to the extremities.
  - o When choosing clothing, be aware that some clothing may restrict movement resulting in a hazardous situation.
- ☐ Make sure to protect the ears, face, hands, and feet in extremely cold weather.
  - o Boots should be waterproof and insulated.
  - o Wear a warm hat; it will keep your whole body warmer. (Hats reduce the amount of body heat that escapes from your head.)
- ☐ Move into warm locations during work breaks; limit the amount of time outside on extremely cold days.
- ☐ Carry cold weather gear, such as extra socks, gloves, hats, jackets, a change of clothes, and a thermos of hot liquid.
- ☐ Include a thermometer and chemical hot packs in your first aid kit.
- ☐ Avoid touching cold metal surfaces with bare skins.

Monitor your physical condition and that of your coworkers.

3. SNOW USES, REMOVAL, AND STORAGE

3.1 Uses

Snow can be used for insulation over the trench line prior to excavation to reduce frost penetration along the line until the ditching process begins.

3.2 Removal

Snow should be removed from the construction workspace to provide safe and efficient working conditions and to expose soils for grading/excavation when snow impedes safe working conditions. Removal of snow along the access roads is necessary to ensure safe access to the right-of-way. Snow should be removed from all storage locations to allow the subsurface to freeze. Snow removal shall be accomplished using equipment designed for that purpose and care should be taken so that underlying soil and/or vegetation is not scraped off or blown away during snow removal. Snow removal equipment is limited to approved workspaces, however, snow may be lifted or blown off and deposited into areas beyond the approved workspaces provided the equipment stays entirely within the approved workspace. Snow shall be removed in a manner so as not to cause damage to woody vegetation, environmentally sensitive areas, or other resources.

3.3 Storage

Snow storage within the right of way should clearly separate snow from spoil storage to avoid mixing.

Snow removal and storage shall be placed in an area to avoid any potential erosion problems due to sudden melting.

3.4 Landowner Requirements

Prior to construction, if winter construction is anticipated, the Company will identify appropriate snow removal and storage areas, and secure approval from affected landowners, addressing landowner access, fences and gates.

3.5 Acceptable Snow Removal and Storage Methods

Snow removal on the right-of-way and access roads should be accomplished by minimizing spoil being removed along with the snow. The snow should be stockpiled in designated areas, as allowed by landowner agreements and permit conditions.

The placement and protection of the stockpiles should ensure that snow melt will not cause erosion and sedimentation issues.

3.6 Sensitive Areas

No stockpiled snow shall be placed in designated avoidance areas, such as cultural resource sites, residential mitigation areas, sensitive species or habitat areas, or within wetlands/waterbodies including buffer areas. ~~In New York, edges of disturbed areas that drain within 100 feet of a waterbody will have two rows of silt fence, five feet apart, installed on the contour.~~ The Company will identify these areas and provide signage and/or safety fence as applicable, to ensure compliance with this condition.

4. CROSSING WETLANDS AND WATERBODIES

4.1 Topsoil Segregation

Prior to trench excavation, snow can be piled over the trench line to form an insulating barrier and prevent deep frost penetration. The stockpiled snow is then removed just prior excavation to prevent mixing of the snow and the topsoil material. Where the excavated materials are exposed to freezing ambient air temperatures for extended periods of time the backfill will tend to be larger, angular blocks. The blocks should be broken into smaller pieces to reduce trench subsidence during spring thaw.

The Contractor should not use frozen backfill. To avoid frozen backfill, strip off the outer frozen layer of the spoil pile to expose the inner unfrozen subsoil. The frozen soil should then be broken up into smaller pieces to avoid voids which cause subsidence. In winter conditions a slight crown should be created over the trench line, this will allow for backfill subsidence. During final grading and clean-up, restore the trench line back to surrounding contours.

To minimize high water content wetland spoil freezing to ground surface, minimize the amount of open trench during frozen conditions. Fill should not be placed on saturated or frozen surfaces. To avoid this, the Contractor should place timber mats and/or geotextile matting on the ground prior to excavation and fill placed on top. ~~In New York, a barrier must be installed at least fifteen feet from the toe of the stockpile to prevent migration.~~

Pipeline excavation activities should limit the length of open ditch to allow for excavation, lowering in, and backfilling to a range of 24 to 72 hours. Frozen or soft, mucky, or highly

compressible materials should not be incorporated into fills. Frozen material should be set aside and placed on top of the backfilled trench or the trench backfilled with a crown. The crown should only be constructed directly over the backfilled trench with native material and should not extend out beyond the trench line.

Subsoil that is used to crown the trench line should not extend above the natural surface grade. The crown will be capped with native topsoil to ensure elevations will be restored with topsoil at the surface. If the topsoil has been removed as a frozen material, the topsoil should be placed on top of the trench line as the cap of the crown. Small gaps can be left in the crown to allow for natural surface drainage before the material is completely settled during thaw conditions.

All backfilled material should be monitored for subsidence and excessive crowning conditions.

Final restoration of wetlands should be completed to the maximum extent practicable during winter conditions. Complete remediation may be required during non-frozen conditions as necessary.

4.2 Temporary Bridges

During construction temporary bridges will be installed across wetlands and waterbodies. In the event that the wetland is frozen and traveling across with equipment will not cause rutting, temporary bridges are not required. If construction activities cease during winter periods, all bridges will be removed that will be impacted by high flow during spring runoff.

5. UPLAND AREAS

5.1 Topsoil Segregation

Unless the landowner or land management agency specifically approves otherwise, 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) in:

- ☐ Cultivated or rotated croplands, and managed pastures;
- ☐ Residential areas;

- ☐ Hayfields; and

- ☐ Other areas that are defined by the restriction list.

The average duration and intensity of winter conditions in the project region should be considered early in project planning and scheduling. Regions that have extended periods of freezing temperatures and deeper frost depths will require more deliberate planning for topsoil segregation. Long-term topsoil stockpiling to manage the topsoil may be required to ensure a more effective seeding and restoration after the spring thaw.

5.2 Residential Area Construction

In residential areas, importation of topsoil is an acceptable alternative to topsoil segregation.

Where topsoil segregation is required, the Company will:

- ☐ Segregate at least 12 inches of topsoil in deep soils (more than 12 inches of topsoil); and
- ☐ Make every effort to segregate the entire topsoil layer in soils with less than 12 inches of topsoil. Maintain separation of snow, salvaged topsoil, and subsoil throughout all construction activities.

Segregated topsoil may not be used for padding the pipe, constructing temporary slope breakers or trench plugs, improving or maintaining roads, or as a fill material.

Stabilize topsoil piles and minimize loss due to wind and erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary. Topsoil segregation should be accomplished, where practicable, prior to frozen conditions. Specialized equipment may be used to break up the topsoil prior to stripping.

Restoration of the topsoil should ideally occur after both the topsoil and the exposed subsoil have thawed, the ground has dried after the spring melt, and the soils are more easily worked. If an extended wet period occurs after the spring thaw, proper erosion and sediment controls should be set into place to avoid topsoil loss and discharges into wetlands or waterbodies. Right-of-way stabilization needs to be implemented regardless

of whether topsoil restoration has taken place. Temporary stabilization of the right-of-way and topsoil pile can take place by re-mulching and dormant seeding if necessary.

For all properties with residences located within 50 feet of construction work areas, the Company will:

- ☐ Avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified on landowner agreements;
- ☐ Fence the edge of the construction work area for a distance of 100 feet on either side of the residence; and
- ☐ Restore all lawn areas and landscaping, if possible, immediately following cleanup operations, or as specified in landowner agreements.

If frozen conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (sediment barriers and mulch) until conditions allow completion of restoration.

Throughout construction, traffic lanes and access to homes will be maintained except for the brief periods essential for laying the new pipeline. The Contractor will erect temporary safety fences in the vicinity of streets and homes to keep the public away from the construction zone. The Company may use techniques such as stovepipe and drag section construction in order to minimize the impacts of construction in residential areas on a site-specific basis. Site-specific residential mitigation plans will be utilized in areas with residences within 25 feet from the edge of construction right-of-way.

Homeowners will be notified in advance of any scheduled disruption of household utilities and the duration of the interruption will be kept as brief as possible. Representatives of the local utility companies will be on- site during construction when necessary. In addition, the Company and Contractor will strive to accommodate any special concerns regarding ornamental shrubs, trees, or structures by avoiding them as long as such avoidance will not unduly interfere with construction and operation of the pipeline.

The Company and Contractor will take measures to ensure that construction activities will not prevent access to residential areas by fire and emergency vehicles. At least one lane

of traffic will be kept open for emergency vehicles when constructing on or across residential streets. During the brief period of road closure, steel plates will be available on site to cover the open area to permit travel by emergency vehicles.

6. WATER HANDLING

The Contractor will maintain, at all times during winter construction, sufficient means to promptly remove and dispose of water entering the trench or other parts of the right-of-way or construction area.

Fill should not be placed on saturated or frozen surfaces. Any and all ice should be removed from the open trench prior to backfill. If not removed significant subsidence following spring melt can occur.

Dewatering activities performed during frozen conditions will be continuously monitored and adjusted as necessary. Discharge locations should be carefully evaluated and selected based on the site conditions including vegetation cover, soil type, and topography. When dewatering pumps are not in use, pumps and hoses should be properly drained to prevent damage.

6.1 Structure Installation/Removal

Planning for dewatering structure locations that include filter bags and straw bale structures should be completed early in the construction process and, if possible, when ground conditions are favorable (before freezing).

Removal of dewatering structures should take place promptly after final use. If conditions do not allow for a prompt removal, clearly mark structures until proper removal can take place.

6.2 Hydrostatic Testing

In areas where test water discharges are occurring on top of frozen ground, the discharge water will not absorb into the ground, resulting in increased surface water runoff and ponding in low lying areas. The increased runoff can melt and erode the upper layer of frozen soil, especially in areas where the water may become channelized. Discharged

water can also flow underneath snow, causing unobserved erosion and potential deposition in sensitive resource areas.

Similar to dewatering activities during standard non-frozen construction conditions, dewatering activities performed during frozen conditions should be continuously monitored and adjusted as necessary. Discharge locations should be carefully evaluated and selected based on site conditions including vegetation cover, soil type, and topography. Dewatering activities will only take place during daylight hours.

Where testing will occur during low-flow periods, the Company will discuss any appropriation volume or rate restrictions with the appropriate regulatory agencies.

6.3 Equipment Care

Freezing conditions make operating equipment outdoors more difficult Lubricants and other liquids in pumps can freeze up and not operate. Plans should consider measures to ensure equipment is protected from the elements and operational prior to use. When dewatering during freezing conditions, pumps may have to be installed in small, heated shelters to prevent the pumps from freezing and becoming non-operational or causing damage to the pumps that could result in a spill or leak of lubricants or fuel. The use of anti-freeze liquids in the pump housing is not recommended due to the difficulty of removing the potentially hazardous liquids prior to the re-use of the pumps. When not in use, dewatering pumps and hoses should be properly drained during freezing conditions to prevent damage.

7. TEMPORARY EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures installed prior to or during frozen conditions may not remain functional under these conditions. The Company and Contractor will review the construction right- of-way in advance of frozen ground conditions and install the necessary temporary erosion and sediment control devices in advance of changing weather.

Advance placement will allow for the “keying” in of bales to the ground that will enable the devices to be more effective throughout construction. Sediment barriers (silt fence, straw

bales, earthen berms, filter sock) will be installed across the right-of-way at waterbodies, wetlands, and road crossings as determined necessary by the Environmental Inspector. ~~New York requires a minimum twenty five foot buffer to be maintained from all perimeter controls. In New York, silt fence should be marked with stakes that are visible above the snow.~~

The Company and/or Contractor will keep an Environmental Inspector (EI) and environmental labor crew on site or on call through the periods of thaw to monitor erosion control structures and stabilization efforts and make adjustments or repairs as necessary and as right-of-way conditions allow. Crews should have proper equipment available to allow access to the right-of-way under soft soil conditions.

If final cleanup and restoration activities have not occurred prior to the spring melt, monitoring of the right-of-way should be implemented during the delay between construction and restoration or temporary shutdown of construction activities. The monitoring program should include:

- ☐ Erosion control structures requiring repair;
- ☐ Areas of slope instability; and
- ☐ Areas where significant levels of erosion are occurring.

The Environmental Inspector should determine the most effective means of dealing with identified problems, taking into consideration the suitability of the right-of-way for access by equipment, potential damages that could occur by equipment accessing the right-of-way, and the urgency/significance of the problem.

8. WINTER STABILIZATION PLANNING

When construction is complete or has been postponed, and final restoration (i.e. decompaction, final grading, topsoil replacement, and lime/fertilization/seeding) is delayed until the spring or summer, the development of a site specific winter stabilization plan should be implemented. The purpose of this plan is to avoid excess site disturbance resulting from freeze/thaw periods and precipitation events in the winter months and into the spring.

The plan should be drafted using any applicable information including, but not limited to: guidelines provided by appropriate agencies, specifications found within the ESCAMP, and guidance from the Company or third-party environmental inspector personnel. The plan should identify key areas of concern, additional erosion control measures to be implemented, timeframes for site inspections over winter shutdown, timeframes for restoration activities, and any site-specific factors that may affect proper restoration of the project area (i.e. landowner restrictions).

8.1 General Guidelines

As construction approaches winter months, weather conditions must be closely monitored and the Contractor must take measures to stabilize areas that will not be restored before winter freeze. These areas should be properly stabilized ahead of time, during favorable weather conditions when soils are more easily worked, if possible. ~~In areas in New York where soil disturbance has temporarily or permanently ceased, soil stabilization measures should be initiated by the end of the next business day and completed within three days. In advance of a melt event, New York requires that disturbed soil should be stabilized at the end of each work day unless work will resume within 24 hours in the same area and no precipitation is in the forecast or the work is in disturbed areas that collect and retain runoff (i.e. open utility trenches).~~

When construction timeframes and/or seasonality do not allow for, or are not likely to allow for, proper restoration of the ROW after backfilling, all non-active areas should be stabilized once facilities are installed.

When construction in an area ceases, open excavations will be backfilled as necessary, or safety fencing will be installed for protection. Because restoration will be delayed, any compacted subsoil must be roughened to reduce the potential for erosion during snowmelt or significant rain events.

Slope breakers, berms, and other erosion and sediment control measures will be installed to minimize erosion along the ROW and deposition of sediments off the ROW. If not already completed, gaps will be cut into topsoil and subsoil piles and through the crown

over the trench to allow drainage across the ROW. Environmental Inspectors may determine the need for additional erosion and sediment controls, where necessary.

Equipment bridges will be removed from water courses where potential for high spring flows could compromise the integrity of bridges. Stream banks and adjacent areas on either side of stream or wetland crossings will be stabilized, where needed. Wetland areas where mats are removed will be cleaned up to the extent possible and disturbed soils adjacent to streams and wetlands will be stabilized, if necessary.

All disturbed areas will require temporary mulch before a winter shutdown. Temporary mulch will be applied to all disturbed areas at a rate of 3 tons per acre in Pennsylvania ~~and 4 tons per acre in New York~~. The temporary mulch will be crimped in where possible, or will be track-walked into the right-of-way where ground conditions or slopes make the use of the crimping tool impractical. One hundred percent (100%) mulch will be spread on non-stabilized slopes of 10% or steeper. Only weed-free straw mulch, not hay mulch, will be used where mulch is needed on agricultural land. If significant snow cover or frozen conditions exist on the right-of-way, the decision to apply mulch to disturbed areas will be determined by the Environmental Inspector. If the situation permits, consultation with local erosion control professionals and applicable agencies may be necessary to determine the best methods for anchoring the mulch (i.e. soil tackifiers).

All temporary erosion and sediment controls and stabilization measures should be inspected prior to winter shutdown and periodically throughout the shutdown period to ensure they are functioning properly. If deficient erosion and sediment control measures are discovered during winter shutdown, The Contractor must mobilize personnel to the site to remedy the problem upon notification.

8.2 Seeding

For instances where weather conditions allow proper decompaction of soils, final grading, and topsoil replacement, the following temporary mixtures may be used to stabilize the right-of way between the dates **October 15th** and **March 31st in Pennsylvania** ~~**and between the dates November 15th and April 1st in New York**~~

Lime	Fertilizer	Mulch
One (1) ton per acre	150 lbs. per acre 10-10-10	Hay or Straw 3 tons per acre in PA ~~4 tons per acre in NY~~

8.3 Temporary Seed Mixture

Winter Rye

170 lbs. per acre

If winter rye is unavailable, an alternative such as winter oats or winter wheat may be substituted. For other seed mixes, to ensure adequate vegetation growth when seeding outside of the recommended seeding windows, seed at a higher rate to account for lower germination success. Before permanent seeding is planted in spring, the right-of-way will be inspected and any grade or water control structures that have been damaged over the winter will be repaired.