

APPENDIX T

ECP Part 1

Sparrows Point Project Environmental Construction Plan

Based on:

*Federal Energy Regulatory Commission (FERC)
Upland Erosion Control, Revegetation and Maintenance Plan
and
FERC Wetland and Waterbody Construction
and Mitigation Procedures*

**Bold text indicates additions or modifications to the FERC's Plan
and Procedures based on:**

Commonwealth of Pennsylvania Department of Environmental Protection
Office of Water Management
Erosion and Sediment Pollution Control Program Manual, April 15, 2000
and
Maryland Department of the Environment
Water Management and Administration
Maryland Standards and Specifications for Soil Erosion and Sediment Control, 1994

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FERC UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN (1/17/2003 Version)

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Proposed additions or modifications presented within text in bold – based on Commonwealth of Pennsylvania Department of Environmental Protection, Office of Water Management, Erosion and Sediment Pollution Control Program Manual, April 15, 2000 and Maryland Department of the Environment, Water Management and Administration, Maryland Standards and Specifications for Soil Erosion and Sediment Control, 1994.

FERC's UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN (1/17/2003 Version)

I. APPLICABILITY

- A. The intent of this Plan is to assist applicants by identifying baseline mitigation measures for minimizing erosion and enhancing revegetation. The project sponsors should specify in their applications for a FERC Certificate (Certificate) any individual measures in this Plan they consider unnecessary, technically infeasible, or unsuitable due to local conditions and to fully describe any alternative measures they would use. Applicants should also explain how those alternative measures would achieve a comparable level of mitigation.

Once a project is certificated, further changes can be approved. Any such changes from the measures in this Plan (or the applicant's approved plan) will be approved by the Director of the Office of Energy Projects (Director), upon the applicant's written request, if the Director agrees that an alternative measure:

1. provides equal or better environmental protection;
2. is necessary because a portion of this Plan is infeasible or unworkable based on project-specific conditions; or
3. is specifically required in writing by another Federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Any requirements in this Plan to file material with the Secretary of the FERC (Secretary) do not apply to projects undertaken under the provisions of the blanket certificate program. This exemption does not apply to a request for alternative measures.

Project-related impacts on wetland and waterbody systems are addressed in the staff's Wetland and Waterbody Construction and Mitigation Procedures (Procedures).

II. SUPERVISION AND INSPECTION

A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector is required for each construction spread during construction and restoration (as defined by section V). 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.
2. Environmental Inspectors shall have peer status with all other activity inspectors.
3. Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the Certificate, state and Federal environmental permit conditions, or landowner requirements; and to order appropriate corrective action.

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B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS

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

1. Ensuring compliance with the requirements of this Plan, the Procedures, the environmental conditions of the Certificate authorization, the mitigation measures proposed by the applicant (as approved and/or modified by the Certificate), other environmental permits and approvals, and environmental requirements in landowner easement agreements.
2. Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance;
3. Verifying that the limits of authorized construction work areas and locations of access roads are properly marked before clearing;
4. 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;
5. Identifying erosion/sediment control and soil stabilization needs in all areas;
6. Ensuring that the location of dewatering structures and slope breakers will not direct water into known cultural resources sites or locations of sensitive species;

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7. Verifying that trench dewatering activities do not result in the deposition of sand, silt, and/or sediment near the point of discharge into a wetland or waterbody. If such deposition is occurring, the dewatering activity shall be stopped and the design of the discharge shall be changed to prevent reoccurrence;
8. Ensuring that subsoil and topsoil are tested in agricultural and residential areas to measure compaction and determine the need for corrective action;
9. Advising the Chief Construction Inspector when conditions (such as wet weather) make it advisable to restrict construction activities to avoid excessive rutting;
10. Ensuring restoration of contours and topsoil;
11. 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;
12. Determining the need for and ensuring that erosion controls are properly installed, as necessary to prevent sediment flow into wetlands, waterbodies, sensitive areas, and onto roads;
13. Inspecting and ensuring the maintenance of temporary erosion control measures at least:
 - a. on a daily basis in areas of active construction or equipment operation;
 - b. on a weekly basis in areas with no construction or equipment operation; and
 - c. within 24 hours of each 0.5 inch of rainfall;
14. Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification;
15. Keeping records of compliance with the environmental conditions of the FERC certificate, and the mitigation measures proposed by the project sponsor in the application submitted to the FERC, and other Federal or state environmental permits during active construction and restoration; and
16. Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase;

III. PRECONSTRUCTION PLANNING

The project sponsor shall do the following before construction:

A. CONSTRUCTION WORK AREAS

1. 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 have been conducted.
2. Project sponsors are encouraged to consider expanding any required cultural resources and endangered species surveys in anticipation of the need for activities outside of certificated work areas.

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B. DRAIN TILE AND IRRIGATION SYSTEMS

1. Attempt to locate existing drain tiles and irrigation systems.
2. Contact landowners and local soil conservation authorities to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.
3. Develop procedures for constructing through drain-tiled areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction.
4. 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.

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C. GRAZING DEFERMENT

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

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D. ROAD CROSSINGS AND ACCESS POINTS

Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration. **See Figures 13 and 14 for Typical Paved Road Crossing Control Measures (Open Cut and Bored).**

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E. DISPOSAL PLANNING

Determine methods and locations for the disposal of construction debris (e.g., timber, slash, mats, garbage, drilling fluids, excess rock, etc). Off-site disposal in other than commercially operated disposal locations is subject to compliance with all applicable survey, landowner permission, and mitigation requirements.

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F. AGENCY COORDINATION

The project sponsor must coordinate with the appropriate local, state, and Federal agencies as outlined in this Plan and in the Certificate.

1. Obtain written recommendations from the local soil conservation authorities or land management agencies regarding permanent erosion control and revegetation specifications.
2. Develop specific procedures in coordination with the appropriate agency to prevent the introduction or spread of noxious weeds and soil pests resulting from construction and restoration activities.

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G. STORMWATER POLLUTION PREVENTION PLAN

Make available on each construction spread the Stormwater Pollution Prevention Plan prepared for compliance with the U.S. Environmental Protection Agency's National Stormwater Program General Permit requirements.

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IV. INSTALLATION

A. APPROVED AREAS OF DISTURBANCE

1. Project-related ground disturbance shall be limited to the construction right-of-way, extra work space areas, pipe storage yards, borrow and disposal areas, access roads, and other areas approved in the Certificate. Any project-related ground disturbing activities outside these Certificated areas, except those needed to comply with the Plan and Procedures (e.g., slope breakers, energy-dissipating devices, dewatering structures, drain tile system repairs) will require prior Director approval. All construction or restoration activities outside of the Certificated areas are subject to all applicable survey and mitigation requirements.

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Construction of a natural gas pipeline consists of distinct phases: clearing, grading, ditching, lowering-in, backfilling, hydrostatic testing and restoration, as shown in Figure 1.

2. 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 Certificate condition. However, in limited, non-wetland areas, this construction right-of-way width may be expanded by up to 25 feet without Director approval to accommodate full construction right-of-way topsoil segregation and to ensure safe construction where topographic conditions (such as side-slopes) or soil limitations require it. Twenty-five feet of extra construction right-of-way width may also be used in limited, non-wetland or non-forested areas for truck turn-arounds where no reasonable alternative access exists.

Figures 2a, 2b, 2c, and 2d are typical ROW configurations showing how construction activities will be organized within the construction right-of-way.

Project use of these additional limited areas is subject to landowner approval and compliance with all applicable survey and mitigation requirements. When such 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:

- a. 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;
- b. identification of where the Commission's records contain evidence that the additional areas were previously surveyed; and
- c. a statement that landowner approval has been obtained and is available in project files.

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

B. TOPSOIL SEGREGATION

Figure 3 shows the typical construction right-of-way configuration during topsoil segregation.

1. 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:

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- a. actively cultivated or rotated croplands and pastures ;
 - b. residential areas;
 - c. hayfields; and
 - d. other areas at the landowner's or land managing agency's request.
2. In residential areas importation of topsoil is an acceptable alternative to topsoil segregation.
 3. In deep soils (more than 12 inches of topsoil), segregate at least 12 inches of topsoil. In soils with less than 12 inches of topsoil make every effort to segregate the entire topsoil layer.
 4. Where topsoil segregation is required, maintain separation of salvaged topsoil and subsoil throughout all construction activities.
 5. Segregated topsoil may not be used for padding the pipe.

C. DRAIN TILES

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

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D. IRRIGATION

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

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E. ROAD CROSSINGS AND ACCESS POINTS

Figures 4 and 5 show typical temporary entrance pads (rock pads and terra/tire mats) used where the right-of-way crosses roads to minimize the tracking of mud onto public roadways.

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

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F. TEMPORARY EROSION CONTROL

Figures 6 through 11 show typical erosion control devices used during clearing, grading, and ditching phases of construction (i.e., Diversion Ditches [Water Bars/Slope Breakers], Filter [Silt] Fence, Reinforced Silt Fence, Hay Bales, Rock Filter Outlet, and Runoff Ditch.

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

1. Temporary Slope Breakers/Diversion Ditches (see Figure 6)

- a. Temporary slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope breakers may be constructed of materials such as soil, silt fence, staked hay or straw bales, or sand bags.
- b. Install temporary slope breakers on all disturbed areas, as necessary to avoid excessive erosion. Temporary 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, and road crossings at the following spacing (closer spacing should be used if necessary):

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

- c. Direct the outfall of each temporary slope breaker to a stable, well vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.

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- d. Position the outfall of each temporary slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive resources.

2. Sediment Barriers (see Figures 7, 8, 9, and 10)

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- a. Sediment barriers are intended to stop the flow of sediments and to prevent the deposition of sediments into sensitive resources. They may be constructed of materials such as silt fence, staked hay or straw bales, compacted earth (e.g., driveable berms across travelways), sand bags, or other appropriate materials.
- b. 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.
- c. Where wetlands or waterbodies are adjacent to and downslope of construction work areas, install sediment barriers along the edge of these areas, as necessary to prevent sediment flow into the wetland or waterbody.
- d. **If any section of silt fence or straw bale barrier has been undermined or topped, install a rock filter outlet to replace the section (see Figure 10).**

3. Mulch

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- a. Apply mulch on all slopes (except in actively 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 or its equivalent, unless the local soil conservation authority, landowner, or land managing agency approves otherwise in writing.
- b. Mulch can consist of weed-free straw or hay, wood fiber hydromulch, erosion control fabric, or some functional equivalent.

- c. Mulch before seeding if:
 - (1) final grading and installation of permanent erosion control measures, will not be completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas), as required in section V.A.1; or
 - (2) construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.
- d. 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.
- e. 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).
- f. Ensure that mulch is adequately anchored to minimize loss due to wind and water.
- g. 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.
- h. Install erosion control fabric on waterbody banks at the time of final bank recontouring. Anchor the erosion control fabric with pegs, staples or other appropriate devices.

V. RESTORATION

A. CLEANUP

- 1. 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). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (temporary slope breakers and sediment barriers) until conditions allow completion of cleanup.

The project sponsor should file with the Secretary for the review and written approval of the Director, a winterization plan if construction will continue into the winter season when conditions could delay successful

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decompaction, topsoil replacement, or seeding until the following spring.

2. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed as specified in section IV.F. and inspected and maintained as specified in sections II.B.12 through 14. When access is no longer required the travel lane must be removed and the right-of-way restored.
3. Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Rock that is not returned to the trench should be considered construction debris, unless approved for use as mulch or for some other use on the construction work areas by the landowner or land managing agency.
4. Remove excess rock from at least the top 12 inches of soil in all actively cultivated or rotated cropland and 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 may approve other provisions in writing.
5. Grade the construction right-of-way to restore pre-construction contours and leave the soil in the proper condition for planting.
6. Remove construction debris from all construction work areas unless the landowner or land managing agency approves otherwise.
7. Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.

B. PERMANENT EROSION CONTROL DEVICES

1. Trench Breakers (see Figure 11)

- a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers.
- b. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and upslope of permanent slope breakers.
- c. In agricultural fields and residential areas where slope breakers are

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not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.

- d. 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.

2. Permanent Slope Breakers/**Diversion Ditches** (see Figure 6)

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- a. Permanent slope breakers are intended to reduce runoff velocity, divert water off the construction right-of-way, and prevent sediment deposition into sensitive resources. Permanent slope breakers may be constructed of materials such as soil, sand bags, or some functional equivalent.
- b. Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, using 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:

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

Note: Pennsylvania erosion control specifications call for closer spacing for permanent slope breakers, as indicated on Figure 6:

<u>Slope (%)</u>	<u>Spacing (feet)</u>
5 - 15	150
>15 - 30	100
>30	50

- c. 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.
- d. 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.

- e. **Runoff ditches also may be used to reduce the velocity of surface water runoff (see Figure 12).**

C. SOIL COMPACTION MITIGATION

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

Alternatively, make arrangements with the landowner to plant and plow under a "green manure" crop, such as alfalfa, to decrease soil bulk density and improve soil structure. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

3. Perform appropriate soil compaction mitigation in severely compacted residential areas.

D. REVEGETATION

1. General

- a. The project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities, except as noted in section V.D.1.b.
- b. Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowner's request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.

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2. Soil Additives

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

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3. Seeding Requirements

- a. Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. When hydroseeding, scarify the seedbed to facilitate lodging and germination of seed.
- b. Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or the request of the landowner or land management agency. Seeding is not required in actively cultivated croplands unless requested by the landowner.

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See Attachment A for proposed seed mixes.

- c. Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures discussed in section IV.F. and perform seeding of permanent vegetation at the beginning of the next recommended seeding season. Lawns may be seeded on a schedule established with the landowner.
- d. In the absence of written recommendations from the local soil conservation authorities, seed all disturbed soils within 6 working days of final grading, weather and soil conditions permitting, subject to the specifications in section V.D.3.a-c.
- e. Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.
- f. 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).
- g. 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 hydroseeding 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.

VI. 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:

- A. Signs;
- B. Fences with locking gates;
- C. Slash and timber barriers, pipe barriers, or a line of boulders across the right-of-way; and
- D. Conifers or other appropriate trees/or shrubs across the right-of-way.

VII. POST-CONSTRUCTION ACTIVITIES

A. MONITORING AND MAINTENANCE

- 1. Conduct follow-up inspections of all disturbed areas after the first and second growing seasons to determine the success of revegetation.
- 2. Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation shall be considered successful if crop yields are similar to adjacent undisturbed portions of the same field.

Continue revegetation efforts until revegetation is successful.

- 3. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in active agricultural areas until restoration is successful.
- 4. Restoration shall be considered successful if the right-of-way surface

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condition is similar to adjacent undisturbed lands, construction debris is removed (unless requested otherwise by the land owner or land managing agency), revegetation is successful, and proper drainage has been restored.

5. Routine vegetation maintenance clearing shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained annually in a herbaceous state. In no case shall routine vegetation maintenance clearing occur between April 15 and August 1 of any year.
6. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and vehicle trails as necessary.

B. REPORTING

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

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FERC’s WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES (1/17/2003 Version)

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Proposed additions or modifications presented within text in bold – based on Commonwealth of Pennsylvania Department of Environmental Protection, Office of Water Management, Erosion and Sediment Pollution Control Program Manual, April 15, 2000 and Maryland Department of the Environment, Water Management and Administration, Maryland Standards and Specifications for Soil Erosion and Sediment Control, 1994.

FERC's WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES (1/17/2003 Version)

I. APPLICABILITY

- A. The intent of these Procedures is to assist applicants by identifying baseline mitigation measures for minimizing the extent and duration of project-related disturbance on wetlands and waterbodies. The project sponsors should specify in their applications for a FERC Certificate (Certificate) any individual measures in these Procedures they consider unnecessary, technically infeasible, or unsuitable due to local conditions and to fully describe any alternative measures they would use. Applicants should also explain how those alternative measures would achieve a comparable level of mitigation.

Once a project is certificated, further changes can be approved. Any such changes from the measures in these Procedures (or the applicant's approved procedures) will be approved by the Director of the Office of Energy Projects (Director), upon the applicant's written request, if the Director agrees that an alternative measure:

1. provides equal or better environmental protection;
2. is necessary because a portion of these Procedures is infeasible or unworkable based on project-specific conditions; or
3. is specifically required in writing by another Federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Any requirements in these Procedures to file material with the Secretary of the FERC (Secretary) do not apply to projects undertaken under the provisions of the blanket certificate program. This exemption does not apply to a request for alternative measures.

Project-related impacts on non-wetland areas are addressed in the staff's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan).

B. DEFINITIONS

1. "Waterbody" includes any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes:

- a. "minor waterbody" includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of construction;
 - b. "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 construction; and
 - c. "major waterbody" includes all waterbodies greater than 100 feet wide at the water's edge at the time of construction.
2. "Wetland" includes any area that is not in actively cultivated or rotated cropland and that satisfies the requirements of the current Federal methodology for identifying and delineating wetlands.

II. PRECONSTRUCTION FILING

- A. The following information shall be filed with the Secretary prior to the beginning of construction:
 1. the hydrostatic testing information specified in section VII.B.3. and a wetland delineation report as described in section VI.A.1., if applicable; and
 2. a schedule identifying when trenching or blasting would occur within each waterbody greater than 10 feet wide, or within any designated coldwater fishery. The project sponsor shall revise the schedule as necessary to provide FERC staff at least 14 days advance notice. Changes within this last 14-day period must provide for at least 48 hours advance notice.
- B. The following site-specific construction plans required by these Procedures must be filed with the Secretary for the review and written approval by the Director:
 1. plans for extra work areas that would be closer than 50 feet from a waterbody or wetland;
 2. plans for major waterbody crossings;
 3. plans for the use of a construction right-of-way greater than 75 feet wide in wetlands; and
 4. plans for horizontal directional drill (HDD) "crossings" of wetlands or waterbodies.

III. ENVIRONMENTAL INSPECTORS

- A. At least one Environmental Inspector having knowledge of the wetland and waterbody conditions in the project area is required for each construction spread. 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.
- B. The Environmental Inspector's responsibilities are outlined in the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan).

IV. PRECONSTRUCTION PLANNING

- A. A copy of the Stormwater Pollution Prevention Plan (SWPPP) prepared for compliance with the U.S. Environmental Protection Agency's (EPA) National Stormwater Program General Permit requirements must be available in the field on each construction spread. The SWPPP shall contain Spill Prevention and Response Procedures that meet the requirements of state and Federal agencies.
 - 1. It shall be the responsibility of the project sponsor and its contractors to structure their operations in a manner that reduces the risk of spills or the accidental exposure of fuels or hazardous materials to waterbodies or wetlands. The project sponsor and its contractors must, at a minimum, ensure that:
 - a. all employees handling fuels and other hazardous materials are properly trained;
 - b. all equipment is in good operating order and inspected on a regular basis;
 - c. fuel trucks transporting fuel to on-site equipment travel only on approved access roads;
 - d. all equipment is parked overnight and/or fueled at least 100 feet from a waterbody or in an upland area at least 100 feet from a wetland boundary. These activities can occur closer only if the Environmental Inspector finds, in advance, no reasonable alternative and the project sponsor and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;

- e. hazardous materials, including chemicals, fuels, and lubricating oils, are not stored within 100 feet of a wetland, waterbody, or designated municipal watershed area, unless the location is designated for such use by an appropriate governmental authority. This applies to storage of these materials and does not apply to normal operation or use of equipment in these areas; and
 - f. concrete coating activities are not performed within 100 feet of a wetland or waterbody boundary, unless the location is an existing industrial site designated for such use.
2. The project sponsor and its contractors must structure their operations in a manner that provides for the prompt and effective cleanup of spills of fuel and other hazardous materials. At a minimum, the project sponsor and its contractors must:
- a. ensure that each construction crew (including cleanup crews) has on hand sufficient supplies of absorbent and barrier materials to allow the rapid containment and recovery of spilled materials and knows the procedure for reporting spills;
 - b. ensure that each construction crew has on hand sufficient tools and material to stop leaks;
 - c. know the contact names and telephone numbers for all local, state, and Federal agencies (including, if necessary, the U. S. Coast Guard and the National Response Center) that must be notified of a spill; and
 - d. follow the requirements of those agencies in cleaning up the spill, in excavating and disposing of soils or other materials contaminated by a spill, and in collecting and disposing of waste generated during spill cleanup.
- B. AGENCY COORDINATION

The project sponsor must coordinate with the appropriate local, state, and Federal agencies as outlined in these Procedures and in the Certificate.

V. WATERBODY CROSSINGS

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply to the U.S. Army Corps of Engineers (COE), or its delegated agency, for the appropriate wetland and waterbody crossing permits.
2. Provide written notification to authorities responsible for potable surface water supply intakes located within 3 miles downstream of the crossing at least 1 week before beginning work in the waterbody, or as otherwise specified by that authority.
3. Apply for state-issued waterbody crossing permits and obtain individual or generic section 401 water quality certification or waiver.
4. Notify appropriate state authorities at least 48 hours before beginning trenching or blasting within the waterbody, or as specified in state permits.

B. INSTALLATION

1. Time Window for Construction

Unless expressly permitted or further restricted by the appropriate 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:

- a. coldwater fisheries - June 1 through September 30; and
- b. coolwater and warmwater fisheries - June 1 through November 30.

2. Extra Work Areas

- a. 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 actively cultivated or rotated cropland or other disturbed land.
- b. The project sponsor shall file with the Secretary for review and written approval by the Director, a site-specific construction plan for each extra work area with a less than 50-foot setback from the water's edge, (except where the adjacent upland consists of

actively cultivated or rotated cropland or other disturbed land) and a site-specific explanation of the conditions that will not permit a 50-foot setback.

- c. Limit clearing of vegetation between extra work areas and the edge of the waterbody to the certificated construction right-of-way.
- d. Limit the size of extra work areas to the minimum needed to construct the waterbody crossing.

3. General Crossing Procedures

- a. Comply with the COE, or its delegated agency, permit terms and conditions.
- b. Construct crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.
- c. If the pipeline parallels a waterbody, attempt to maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the construction right-of-way.
- d. Where waterbodies meander or have multiple channels, route the pipeline to minimize the number of waterbody crossings.
- e. Maintain adequate flow rates to protect aquatic life, and prevent the interruption of existing downstream uses.
- f. Waterbody buffers (extra work area setbacks, refueling restrictions, etc.) must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

4. Spoil Pile Placement and Control

- a. All spoil from minor and intermediate waterbody crossings, 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 as described in section V.B.2.
- b. Use sediment barriers to prevent the flow of spoil or heavily silt-laden water into any waterbody.

5. Equipment Bridges

- a. 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.
- b. Construct equipment bridges to maintain unrestricted flow and to prevent soil from entering the waterbody. Examples of such bridges include:
 - (1) equipment pads and culvert(s) (see **Figure 15**);
 - (2) equipment pads or railroad car bridges without culverts (see **Figure 15**);
 - (3) clean rock fill and culvert(s) (see **Figure 16**); and
 - (4) flexi-float or portable bridges.

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.

- c. 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.
- d. Design and maintain equipment bridges to prevent soil from entering the waterbody.
- e. Remove equipment bridges as soon as possible after permanent seeding unless the COE, or its delegated agency, authorizes it as a permanent bridge.
- f. 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 equipment bridges as soon as possible after final cleanup.

6. Dry-Ditch Crossing Methods

- a. Unless approved otherwise by the appropriate 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.
- b. **Dam and Pump (see Figure 17)**
 - (1) 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.
 - (2) Implementation of the dam-and-pump crossing method must meet the following performance criteria:
 - (i) use sufficient pumps, including on-site backup pumps, to maintain downstream flows;
 - (ii) construct dams with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);
 - (iii) screen pump intakes;
 - (iv) prevent streambed scour at pump discharge; and
 - (v) monitor the dam and pumps to ensure proper operation throughout the waterbody crossing.

c. **Flume Crossing (see Figure 18)**

The flume crossing method requires implementation of the following steps:

- (1) install flume pipe after blasting (if necessary), but before any trenching;
- (2) 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 in to achieve an effective seal);

- (3) properly align flume pipe(s) to prevent bank erosion and streambed scour;
 - (4) do not remove flume pipe during trenching, pipelaying, or backfilling activities, or initial streambed restoration efforts; and
 - (5) 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.
- d. **Horizontal Directional Drill (HDD) (see separate site specific drawings, as applicable)**

To the extent they were not provided as part of the pre-certification process, for each waterbody or wetland that would be crossed using the HDD method, provide a plan that includes:

- (1) site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction;
- (2) a description of how an inadvertent release of drilling mud would be contained and cleaned up; and
- (3) a contingency plan for crossing the waterbody or wetland in the event the directional drill is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

7. Crossings of Minor Waterbodies

Where a dry-ditch crossing is not required, minor waterbodies may be crossed using the open-cut crossing method (see **Figure 19**), with the following restrictions:

- a. 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;
- b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and

- c. equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification (e.g., agricultural or intermittent drainage ditches). However, if an equipment bridge is used it must be constructed as described in section V.B.5.

8. Crossings of Intermediate Waterbodies

Where a dry-ditch crossing is not required, intermediate waterbodies may be crossed using the open-cut crossing method (see **Figure 19**), with the following restrictions:

- a. 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;
- b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and
- c. all other construction equipment must cross on an equipment bridge as specified in section V.B.5.

9. Crossings 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 should be developed in consultation with the appropriate state and Federal agencies and should include extra work areas, spoil storage areas, sediment control structures, etc., as well as mitigation for navigational issues.

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

10. Temporary Erosion and Sediment Control

Install sediment barriers (as defined in section IV.F.2.a. of the Plan, **see Figures 6, 7, 8, 9, and 10**) 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:

- a. 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;
- b. where waterbodies are adjacent to the construction right-of-way, 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; and
- c. use 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.

11. 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 heavily silt-laden water flowing into any waterbody. Remove the dewatering structures as soon as possible after the completion of dewatering activities.

See Figure 20 for details on Filter Bag dewatering structures.

C. RESTORATION

See Figures 21 and 22 for streambank restoration/stabilization measures involving erosion control fabric and rip rap.

1. Use clean gravel or native cobbles for the upper 1 foot of trench backfill in all waterbodies that contain coldwater fisheries.

2. 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.
3. Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the Environmental Inspector.
4. Application of riprap for bank stabilization must comply with COE, or its delegated agency, permit terms and conditions.
5. Unless otherwise specified by state permit, limit the use of riprap to areas where flow conditions preclude effective vegetative stabilization techniques such as seeding and erosion control fabric.
6. Revegetate disturbed riparian areas with conservation grasses and legumes or native plant species, preferably woody species.
7. Install a permanent slope breaker 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. 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 waterbody.

8. Sections V.C.3. through V.C.6. above also apply to those perennial or intermittent streams not flowing at the time of construction.

D. POST-CONSTRUCTION MAINTENANCE

1. Limit vegetation maintenance 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 pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be maintained in a herbaceous state. In addition, trees that are located within 15 feet of the pipeline that are greater than 15 feet in height may be cut and removed from the permanent right-of-way.
2. 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.

VI. WETLAND CROSSINGS

A. GENERAL

1. The project sponsor shall conduct a wetland delineation using the current Federal methodology and file a wetland delineation report with the Secretary before construction. This report shall identify:
 - a. by milepost all wetlands that would be affected;
 - b. the National Wetlands Inventory (NWI) classification for each wetland;
 - c. the crossing length of each wetland in feet; and
 - d. 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 actively cultivated or rotated cropland. Standard upland protective measures, including workspace and topsoiling requirements, apply to these agricultural wetlands.

2. 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.
3. 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 existing soils lack adequate unconfined compressive strength that would result in excessively wide ditches and/or difficult to contain spoil piles.

4. 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.
5. Implement the measures of sections V. and VI. in the event a waterbody crossing is located within or adjacent to a wetland crossing. If all measures of sections V. and VI. 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:
 - a. spoil control;
 - b. equipment bridges;
 - c. restoration of waterbody banks and wetland hydrology;
 - d. timing of the waterbody crossing;
 - e. method of crossing; and
 - f. size and location of all extra work areas.
6. 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.

B. INSTALLATION

1. Extra Work Areas and Access Roads
 - a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land.
 - b. The project sponsor shall file with the Secretary for review and written approval by the Director, a site-specific construction plan for each extra work area with a less than 50-foot setback from wetland boundaries (except where adjacent upland consists of actively cultivated or rotated cropland or other disturbed land) and a site-specific explanation of the conditions that will not permit a 50-foot setback.

- c. Limit clearing of vegetation between extra work areas and the edge of the wetland to the certificated construction right-of-way.
- d. 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.

- e. The only access roads, other than the construction right-of-way, that can be used in wetlands without Director approval, are those existing roads that can be used with no modification and no impact on the wetland.

2. Crossing Procedures

Figures 23 and 24 show typical “conventional” and “push pull” wetland crossing procedures.

- a. Comply with COE, or its delegated agency, permit terms and conditions.
- b. Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe.
- c. Use "push-pull" or "float" techniques to place the pipe in the trench where water and other site conditions allow. **(See Figure 24.)**
- d. Minimize the length of time that topsoil is segregated and the trench is open.
- e. 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.

- f. Cut vegetation just aboveground level, leaving existing root systems in place, and remove it from the wetland for disposal.
- g. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction right-of-way in wetlands unless the Chief Inspector and Environmental Inspector determine that safety-related construction constraints require grading or the removal of tree stumps from under the working side of the construction right-of-way.
- h. Segregate the top 1 foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are saturated or frozen. Immediately after backfilling is complete, restore the segregated topsoil to its original location.
- i. Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to support equipment on the construction right-of-way.
- j. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or terra mats.
- k. Do not cut trees outside of the approved construction work area to obtain timber for riprap or equipment mats.
- l. Attempt to use no more than two layers of timber riprap to support equipment on the construction right-of-way.
- m. Remove all project-related material used to support equipment on the construction right-of-way upon completion of construction.

3. Temporary Sediment Control

Install sediment barriers (as defined in section IV.F.2.a. of the Plan, **see Figures 6, 7, 8, 9, and 10**) 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 in section VI.B.3.c., 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.

- a. 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.
- b. 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 prevent sediment flow into the wetland.
- c. 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.

4. 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 heavily silt-laden water flowing into any wetland. Remove the dewatering structures as soon as possible after the completion of dewatering activities.

See Figure 20 for details on Filter Bag dewatering structures.

C. RESTORATION

1. Where the pipeline trench may drain a wetland, construct trench breakers and/or seal the trench bottom as necessary to maintain the original wetland hydrology. **See Figure 11 for trench breaker typical details.**
2. 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 a slope(s) 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.
3. Do not use fertilizer, lime, or mulch unless required in writing by the

appropriate land management or state agency.

4. Consult with the appropriate land management or state agency to develop a project-specific wetland restoration plan. The restoration plan should include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of undesirable exotic species (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.
5. Until a project-specific wetland restoration plan is developed and/or implemented, temporarily revegetate the construction right-of-way with annual ryegrass at a rate of 40 pounds/acre (unless standing water is present).
6. Ensure that all disturbed areas successfully revegetate with wetland herbaceous and/or woody plant species.
7. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are judged to be successful as specified in section VII.A.5. of the Plan.

D. POST-CONSTRUCTION MAINTENANCE

1. 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 a herbaceous state. In addition, trees within 15 feet of the pipeline that are greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way.
2. 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.
3. Monitor and record the success of wetland revegetation annually for the first 3 years after construction or until wetland revegetation is successful. At the end of 3 years after construction, file a report with the Secretary identifying the status of the wetland revegetation efforts. Include the percent cover achieved and problem areas (weed invasion issues, poor revegetation, etc.). Continue to file a report annually until wetland revegetation is successful.

4. 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 revegetate the wetland. Continue revegetation efforts until wetland revegetation is successful.

VII. HYDROSTATIC TESTING

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply for state-issued water withdrawal permits, as required.
2. Apply for National Pollutant Discharge Elimination System (NPDES) or state-issued discharge permits, as required.
3. Notify appropriate state agencies of intent to use specific sources at least 48 hours before testing activities unless they waive this requirement in writing.

B. GENERAL

1. Perform 100 percent radiographic inspection of all pipeline section welds or hydrotest the pipeline sections, before installation under waterbodies or wetlands.
2. If pumps used for hydrostatic testing are within 100 feet of any waterbody or wetland, address the operation and refueling of these pumps in the project's Spill Prevention and Response Procedures.
3. 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 source or discharge location.

C. INTAKE SOURCE AND RATE

1. Screen the intake hose to prevent entrainment of fish.
2. 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.

3. Maintain adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.
4. Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.

D. DISCHARGE LOCATION, METHOD, AND RATE

1. Regulate discharge rate, use energy dissipation device(s), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow (**see Figure 25**).
2. 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.

ATTACHMENT A

SEED MIXES

(as recommended in:

Commonwealth of Pennsylvania Department of Environmental Protection, Office of Water Management, Erosion and Sediment Pollution Control Program Manual, April 15, 2000)

SEED MIXES

The following recommended seed mixes for utility rights-of-way were obtained from “Erosion Control & Conservation Plantings on Noncropland,” (1997, Penn State College of Agricultural Sciences).

Temporary Seed Mix (for temporary stabilization of areas where additional soil disturbance is anticipated):

Species	Rate
Annual ryegrass	40 pounds per acre
Hay or Straw Mulch	3 tons per acre

Permanent Seed Mixes:

Well Drained Areas:

Species	Rate (pounds per acre, based on pure live seed)
Annual ryegrass	10
Crownvetch	10
Tall fescue or perennial ryegrass	20
OR	
Annual ryegrass	10
Flatpea	20
Tall fescue or perennial ryegrass	20

Variable Drainage Areas (i.e., where well drained soils and poorly drained soils are intermingled):

Species	Rate (pounds per acre, based on pure live seed)
Annual ryegrass	10
Birdsfoot trefoil	6
Tall fescue	30
OR	
Annual ryegrass	10
Birdsfoot trefoil	6
Crownvetch	10
Tall fescue	20

Well Drained Areas for Grazing/Hay:

Species	Rate (pounds per acre, based on pure live seed)
Annual ryegrass	10
PLUS:	
a) Tall fescue or fine fescue	60 (tall fescue) or 25 (fine fescue)
OR	
b) Kentucky bluegrass and Redtop (3 lbs/ac)	25 3
OR	
c) Perennial ryegrass	15

Wetlands:

Species	Rate
Annual ryegrass	40 pounds per acre

Recommended seeding dates: Before August 15 for legumes (require 10-12 weeks to become hardy). For better success after this time, select legume seedlots with high content (30% to 35%) of hard seed.

Liming and Fertilization: Lime and fertilize in accordance with soil test recommendations. If soil test results are not available, apply at least 6 tons of agricultural grade limestone and 100-200-200 (100 lbs N, 200 lb P₂O₅, and 200 lbs K₂O) per acre. Do not apply lime or fertilizer in wetlands or waterbodies.

APPENDIX T

BMP Part 2

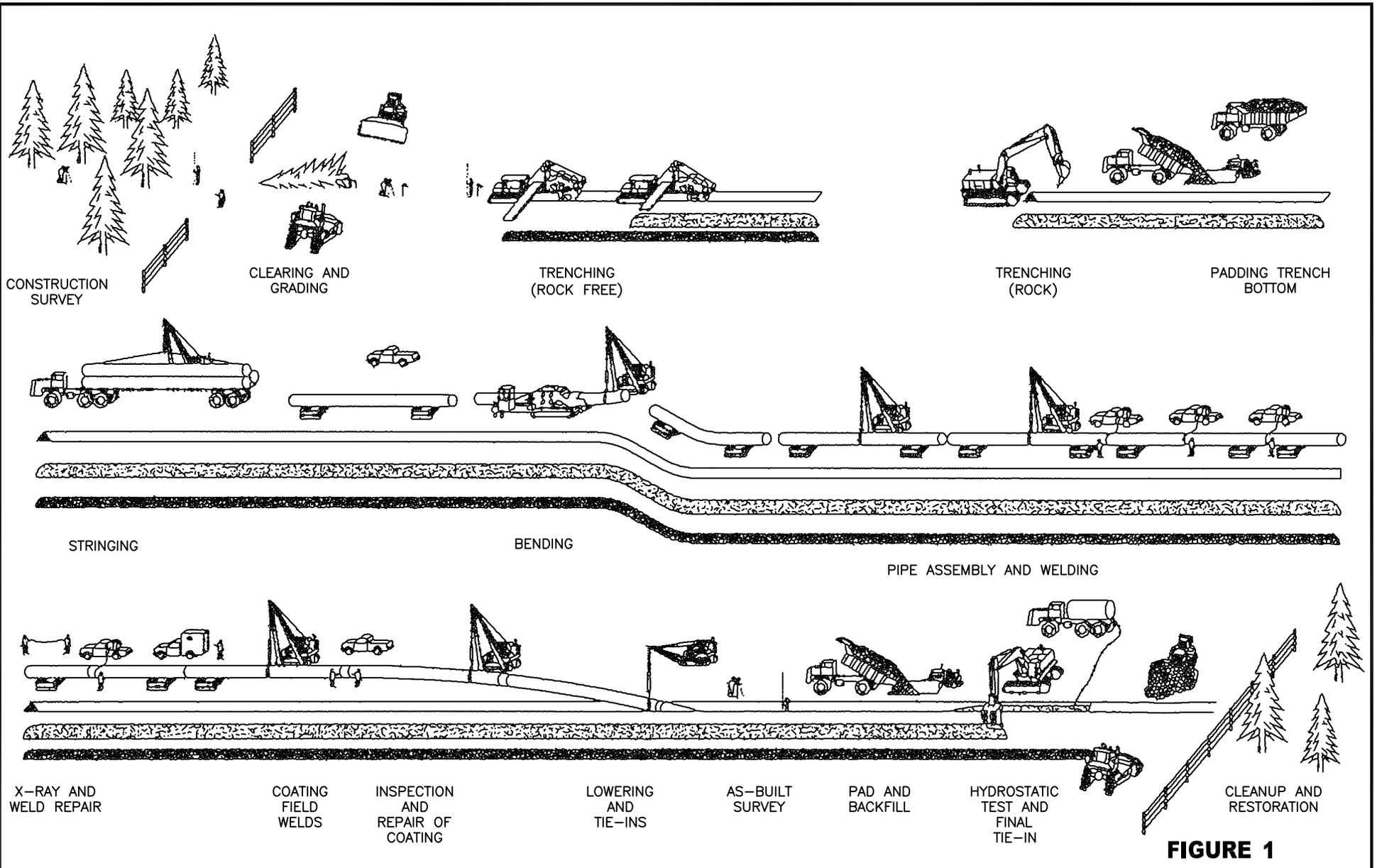
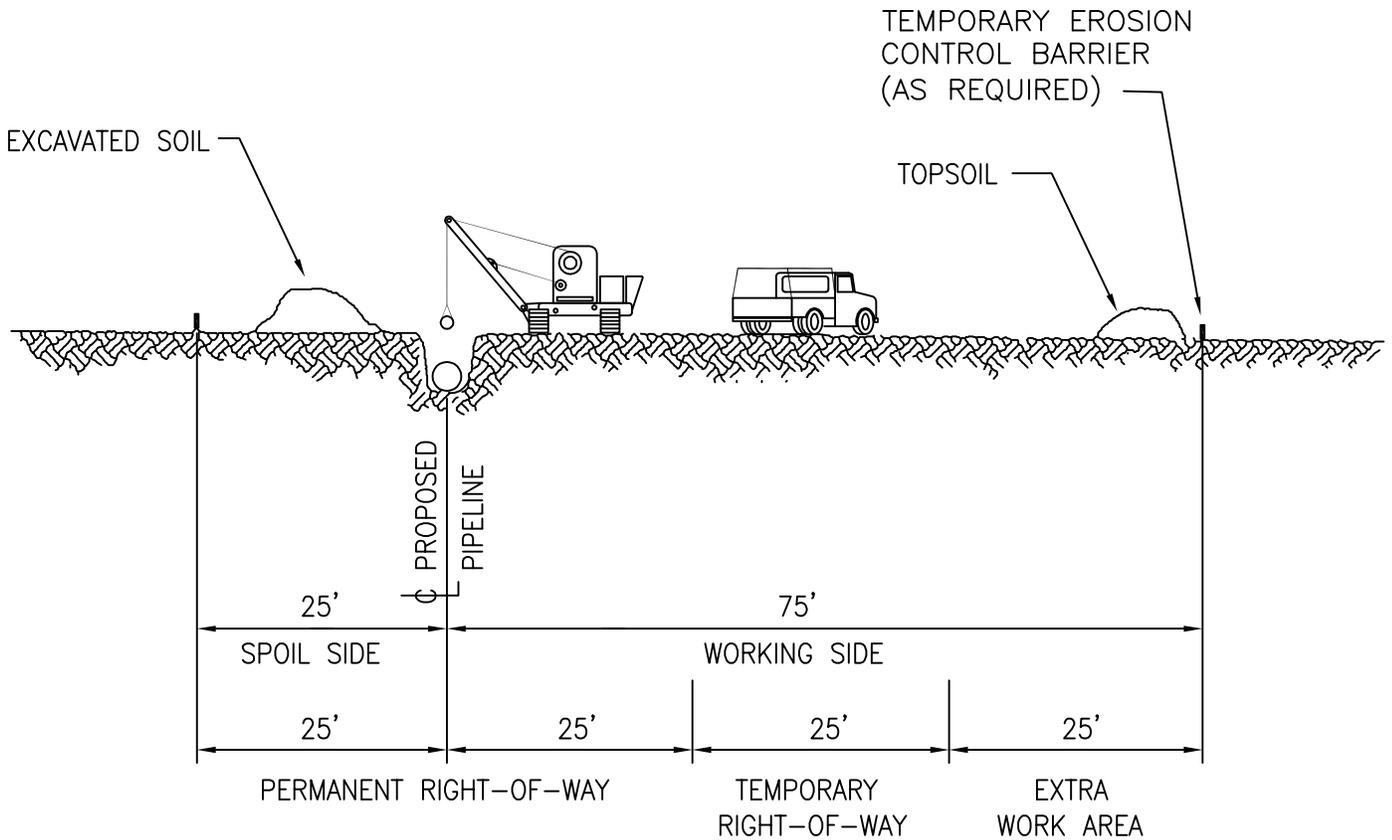


FIGURE 1



TYPICAL PIPELINE
CONSTRUCTION SEQUENCE

DRN BY EEI	CHK BY SS	APPRV DM	DATE 4/28/06	Scale NONE	Drawing No. TPC-01	Sht. 1 of 1	Rev 0
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NOTES:

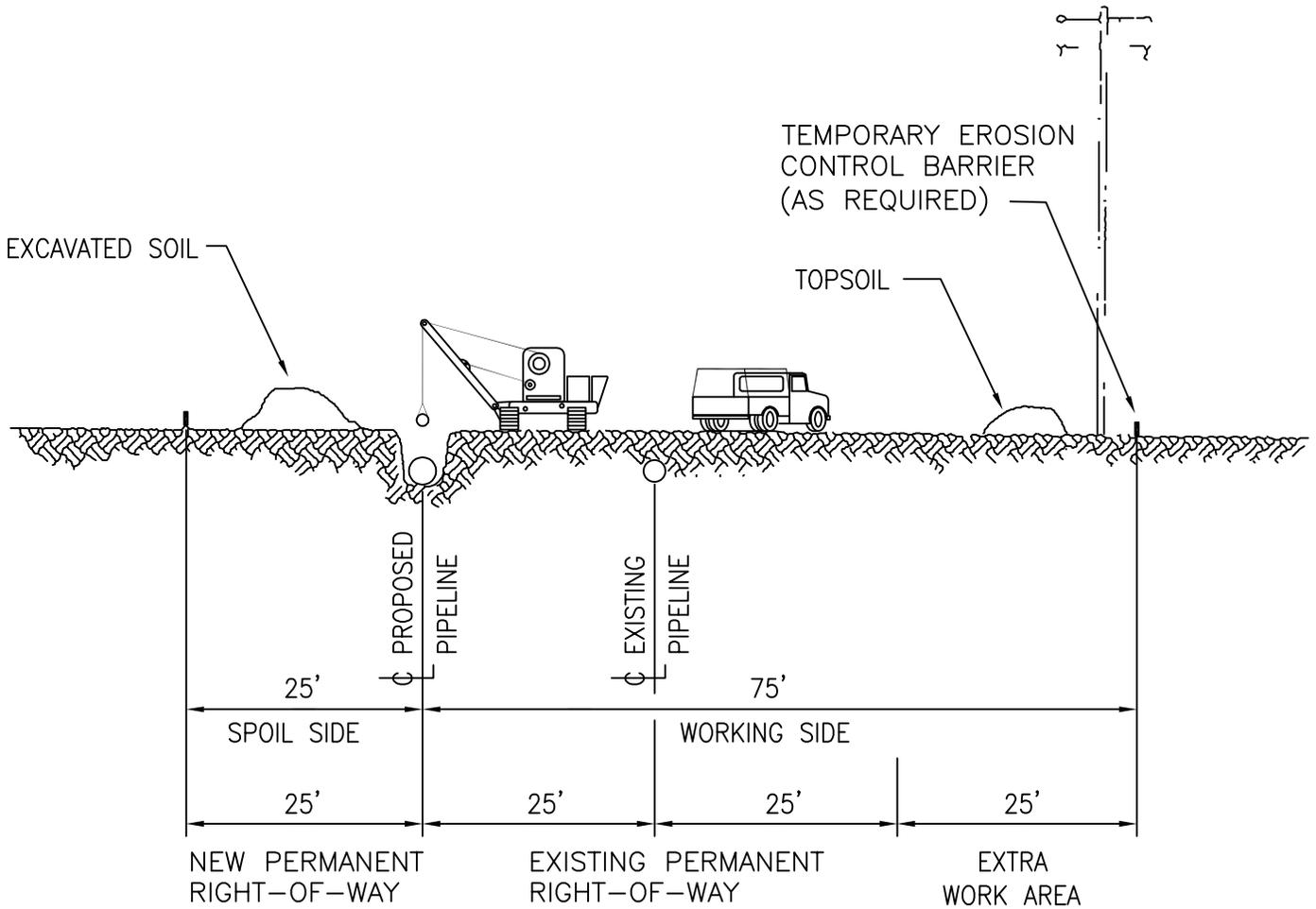
1. CONFIGURATION DOES NOT INCLUDE ADDITIONAL TEMPORARY WORKSPACE AT CROSSINGS.
2. PROPOSED PIPELINE TO MAINTAIN A MINIMUM OF ONE FOOT CLEARANCE BETWEEN SUBSURFACE UTILITY CROSSING.

FIGURE 2a



PROPOSED PIPELINE
TYPICAL CONSTRUCTION RIGHT-OF-WAY

DRN BY EEI	CHK BY SS	APPRV DM	DATE 04/27/06	Scale NONE	Drawing No. TCROW-01	Sht. 1 of 1	Rev 0
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- NOTES:
1. CONFIGURATION DOES NOT INCLUDE ADDITIONAL TEMPORARY WORKSPACE AT CROSSINGS.
 2. PROPOSED PIPELINE TO MAINTAIN A MINIMUM OF ONE FOOT CLEARANCE BETWEEN SUBSURFACE UTILITY CROSSING.

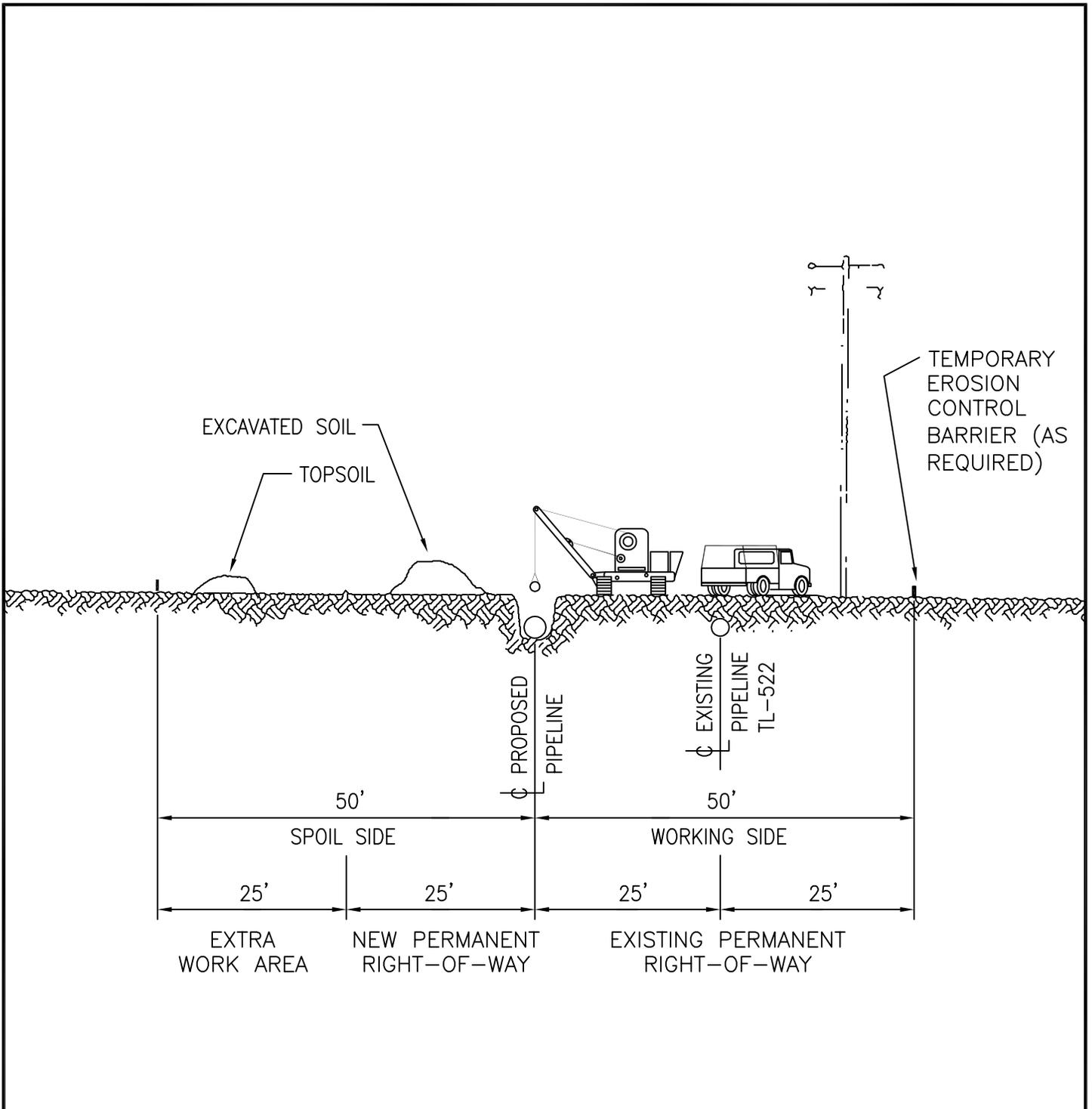
FIGURE 2b

ENGlobalSM Engineering, Inc.

Mid-Atlantic Express

PROPOSED PIPELINE
TYPICAL CONSTRUCTION RIGHT-OF-WAY

DRN BY EEI	CHK BY SS	APPRV DM	DATE 04/27/06	Scale NONE	Drawing No. TCROW-02	Sht. 1 of 1	Rev 0
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NOTES:

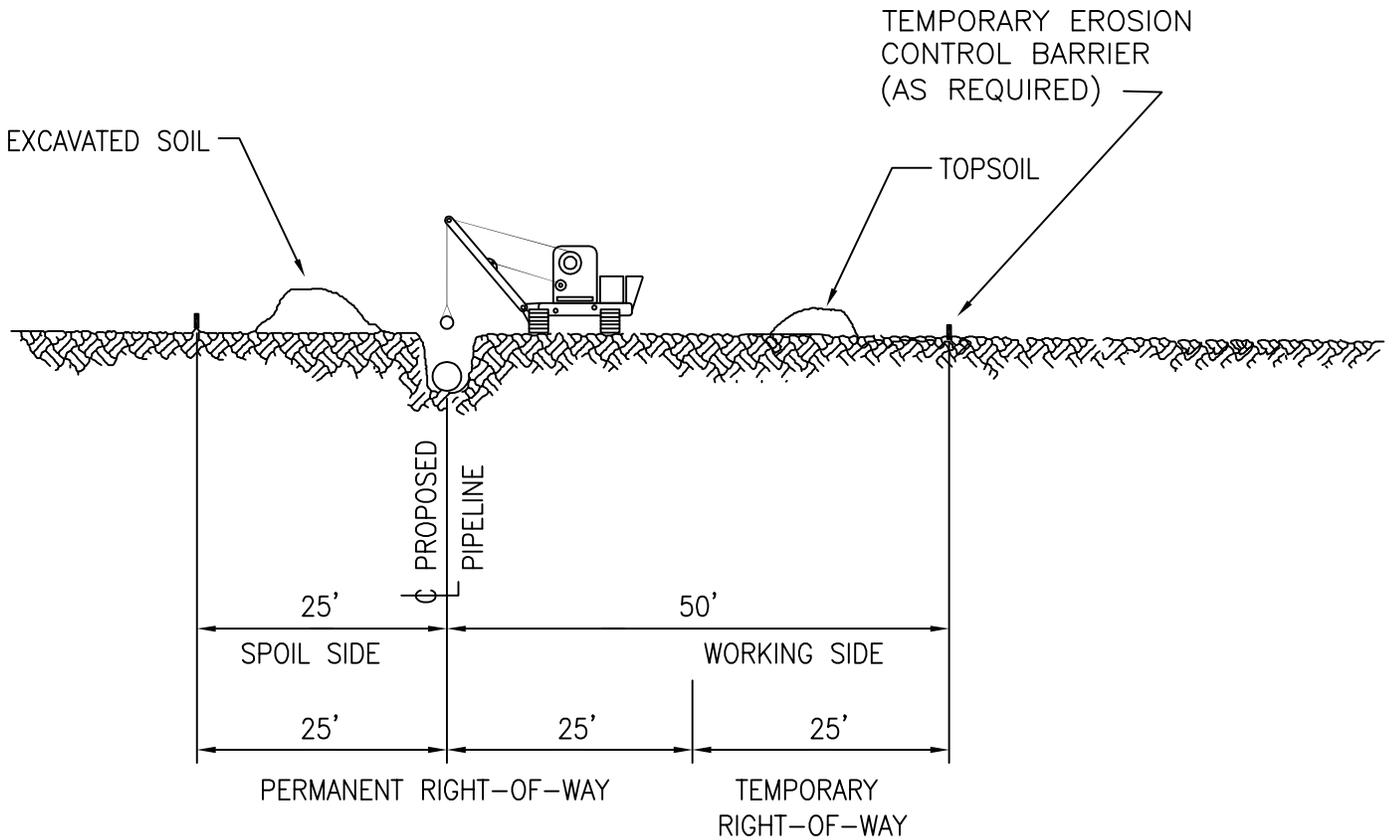
1. CONFIGURATION DOES NOT INCLUDE ADDITIONAL TEMPORARY WORKSPACE AT CROSSINGS.
2. PROPOSED PIPELINE TO MAINTAIN A MINIMUM OF ONE FOOT CLEARANCE BETWEEN SUBSURFACE UTILITY CROSSING.

FIGURE 2c



PROPOSED PIPELINE
TYPICAL CONSTRUCTION RIGHT-OF-WAY

DRN BY EEI	CHK BY SS	APPRV DM	DATE 04/28/06	Scale NONE	Drawing No. TCROW-03	Sht. 1 of 1	Rev 0
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NOTES:

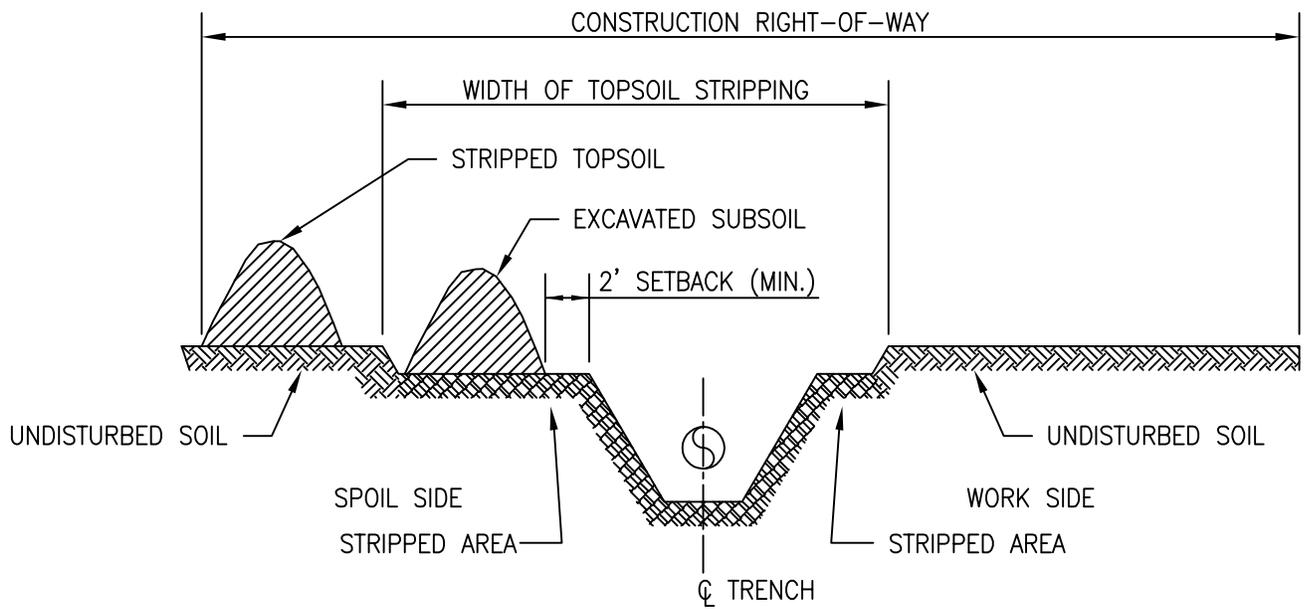
1. CONFIGURATION DOES NOT INCLUDE ADDITIONAL TEMPORARY WORKSPACE AT CROSSINGS.
2. PROPOSED PIPELINE TO MAINTAIN A MINIMUM OF ONE FOOT CLEARANCE BETWEEN SUBSURFACE UTILITY CROSSING.

FIGURE 2d

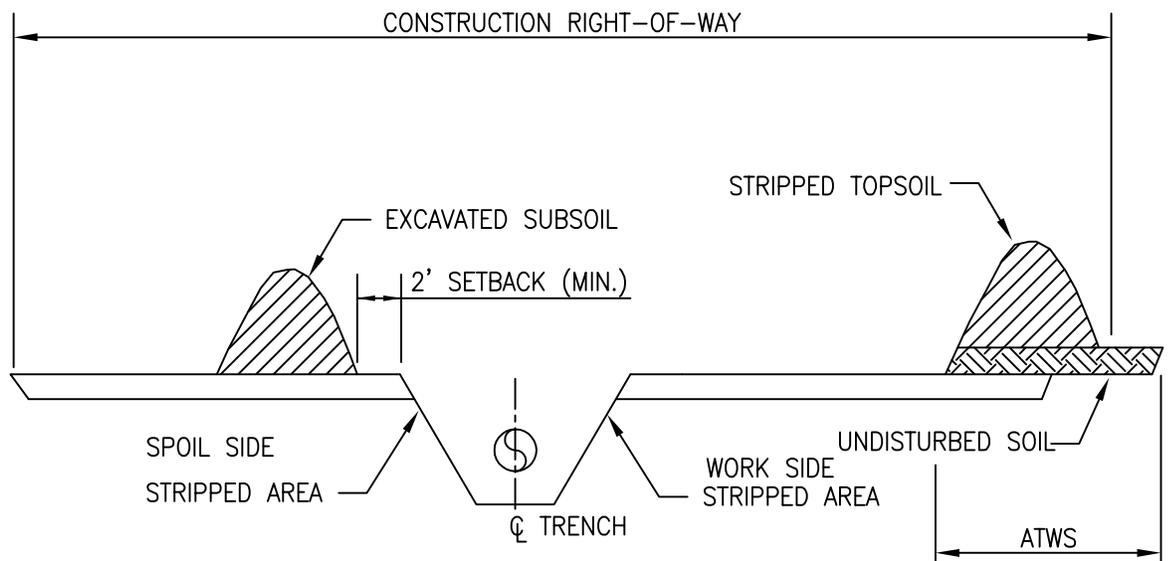


PROPOSED PIPELINE
TYPICAL CONSTRUCTION RIGHT-OF-WAY

DRN BY EEI	CHK BY SS	APPRV DM	DATE 04/27/06	Scale NONE	Drawing No. TCROW-01a	Sht. 1 of 1	Rev 0
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DITCH/SPOIL SIDE TOPSOIL SEGREGATION



FULL ROW TOPSOIL SEGREGATION

NOTES:

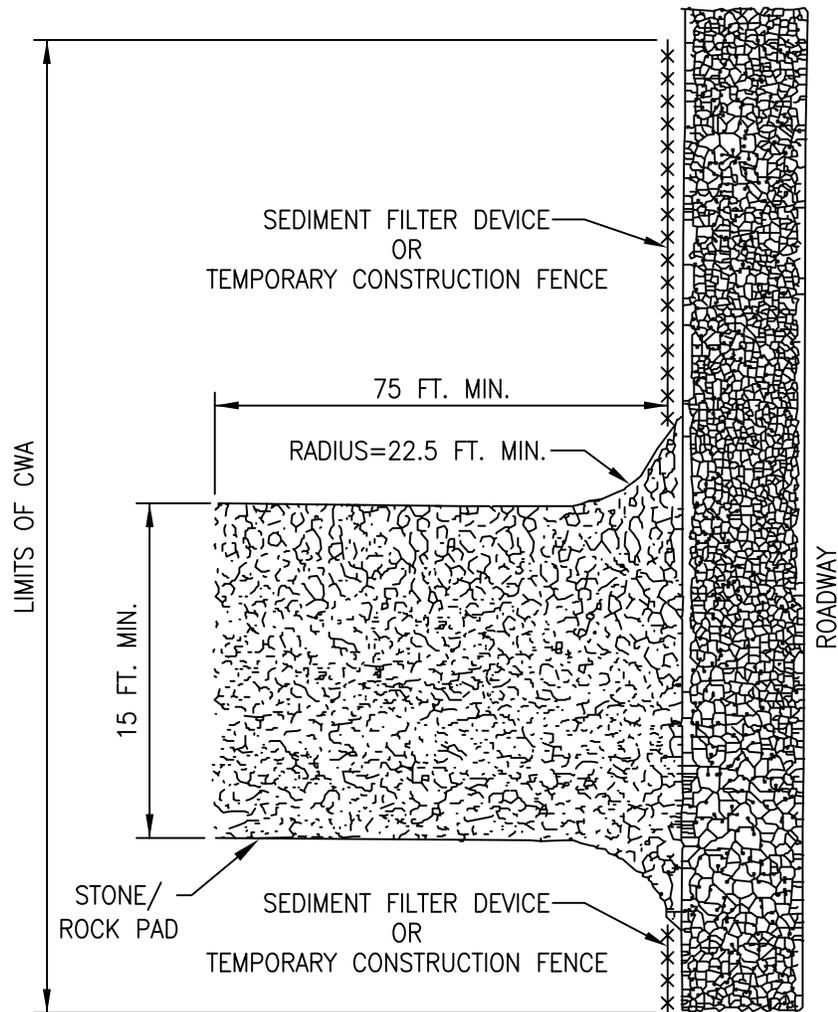
1. TOPSOIL STORED AS SHOWN ABOVE, OR AT OTHER COMPANY APPROVED LOCATIONS WITHIN THE CONSTRUCTION R.O.W. OTHER CONFIGURATIONS OF TOPSOIL AND SUBSOIL STORAGE ARE ACCEPTABLE PROVIDED SOILS ARE KEPT SEPARATE.
2. IN DEEP SOIL (MORE THAN 12 INCHES OF TOPSOIL), SEGREGATE AT LEAST 12 INCHES OF TOPSOIL. IN SOILS WITH LESS THAN 12 INCHES OF TOPSOIL, MAKE EVERY EFFORT TO SEGREGATE ENTIRE TOPSOIL LAYER.
3. SEGREGATE IN ACTIVELY CULTIVATED OR ROTATED CROPLANDS AND PASTURES, HAYFIELDS, RESIDENTIAL AREAS, WETLANDS, AND OTHER AREAS AT LANDOWNERS OR LAND MANAGEMENT AGENCY'S REQUEST.
4. TOPSOIL REPLACEMENT IS ACCEPTABLE ALTERNATIVE TO SEGREGATION IN RESIDENTIAL AREAS.

FIGURE 3



R.O.W. TOPSOIL SEGREGATION
TECHNIQUES

DRN BY EEI	CHK BY SS	APPRV DM	DATE 07/28/06	Scale NONE	Drawing No. TST-01	Sht. 1 of 1	Rev 0
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NOTES:

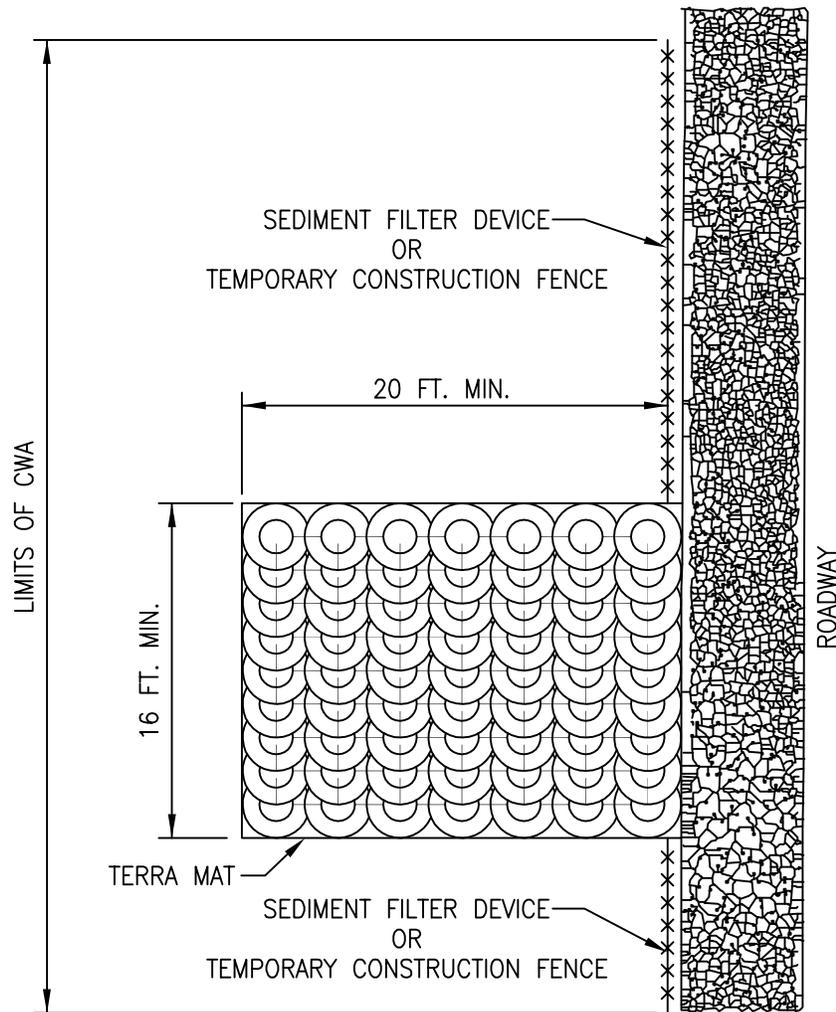
1. STONE SIZE WILL BE AASHTO NUMBER 1 COARSE AGGREGATE OR EQUIV. (4 INCH DIAMETER MINIMUM).
2. ROCK PAD WILL BE AT LEAST 6 INCHES THICK.
3. THE ROAD ENTRANCE WILL HAVE A GEOTEXTILE FABRIC BENEATH THE ROCK PAD.
4. CULVERTS/FLUME PIPES MUST BE INSTALLED UNDER ROCK PAD TO ALLOW WATER FLOW/DRAINAGE, IF NEEDED DUE TO ROADSIDE DITCHES OR TOPOGRAPHIC CONDITIONS.
5. IF ROCK PAD BECOMES COVERED WITH MUD SO AS TO BECOME INEFFECTIVE, ADDITIONAL STONE WILL BE ADDED.
6. ALL STONE AND FABRIC MUST BE REMOVED DURING ROW RESTORATION.
7. REMOVE TOPSOIL PRIOR TO INSTALLATION IN AGRICULTURAL LAND.

FIGURE 4



TEMPORARY ROAD
ENTRANCE ROCK PADS

DRN BY EEI	CHK BY SS	APPRV DM	DATE 8/17/06	Scale NONE	Drawing No. TWC-03	Sht. 1 of 1	Rev 0
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NOTES:

1. TERRA MATS ARE CONSTRUCTED BY OVERLAPPING TIRES AND INTERCONNCTED CABLE.
2. TERRA MATS WILL BE UNDERLAIN WITH GEOTEXTILE FABRIC.
3. TERRA MATS WILL BE MAINTAINED SO AS NOT TO ALLOW EXCESS MUD TO ACCUMULATE.

FIGURE 5

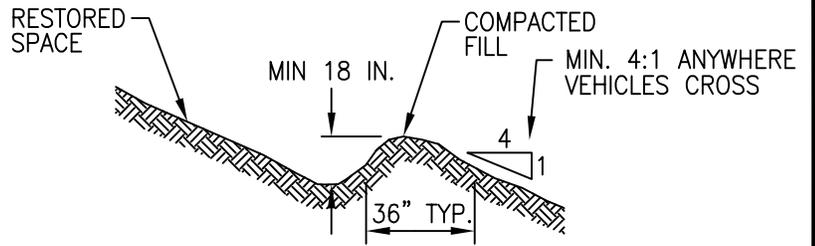


TEMPORARY ROAD
ENTRANCE TERRA MATS

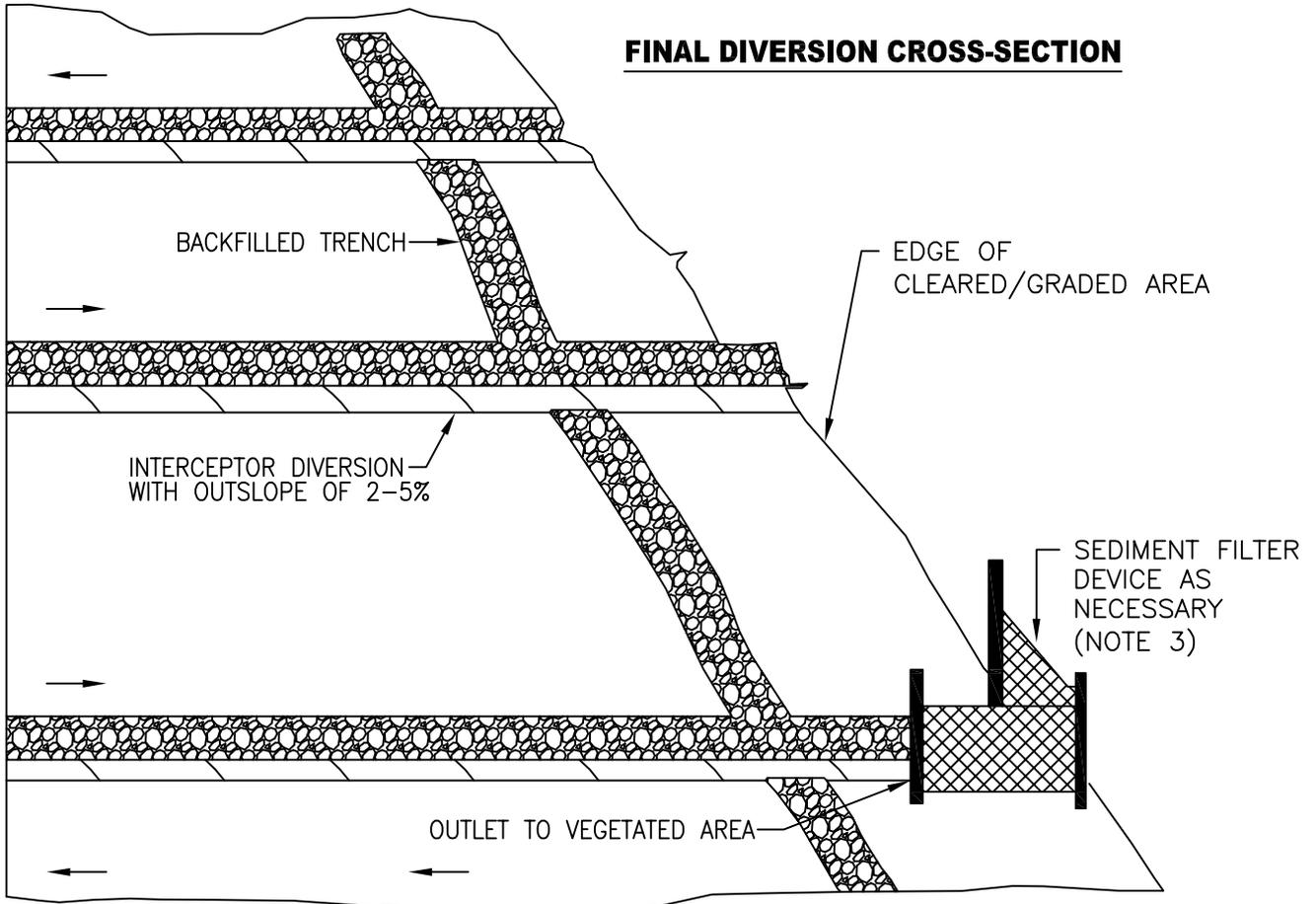
DRN BY EEI	CHK BY SS	APPRV DM	DATE 8/17/06	Scale NONE	Drawing No. TWC-04	Sht. 1 of 1	Rev 0
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NOTE 1

SLOPE	SPACING
< 5%	NONE
5-25%	150 FEET
15-30%	100 FEET
>30+%	50 FEET



FINAL DIVERSION CROSS-SECTION



NOTES:

1. SPACING USED FOR BOTH TEMPORARY AND FINAL INTERCEPTOR DIVERSIONS. SEED AND MULCH PERMANENT INTERCEPTOR DIVERSIONS.
2. TEMPORARY INTERCEPTOR DIVERSIONS WILL BE MAINTAINED DURING THE CONSTRUCTION PHASE UNTIL FINAL INTERCEPTOR DIVERSIONS ARE INSTALLED.
3. IF EXISTING GROUND COVER IS SPARSE, SECURE SEDIMENT FILTER DEVICE IN OUTLET.
4. THE DIVERSION MAY BE EXTENDED OFF THE CWA IF NECESSARY TO PROVIDE AN ADEQUATE OUTLET.
5. DIVERSION OUTLETS WILL ALTERNATE FROM SIDE TO SIDE WHENEVER POSSIBLE.
6. INSTALL DIVERSION TO TAKE ADVANTAGE OF NATURAL CROSS-SLOPE SWALES.
7. INSPECT DURING AND FOLLOWING CONSTRUCTION AND REPAIR AS NEEDED. KEEP CHANNEL FREE OF DEBRIS AND OBSTRUCTIONS.

FIGURE 6

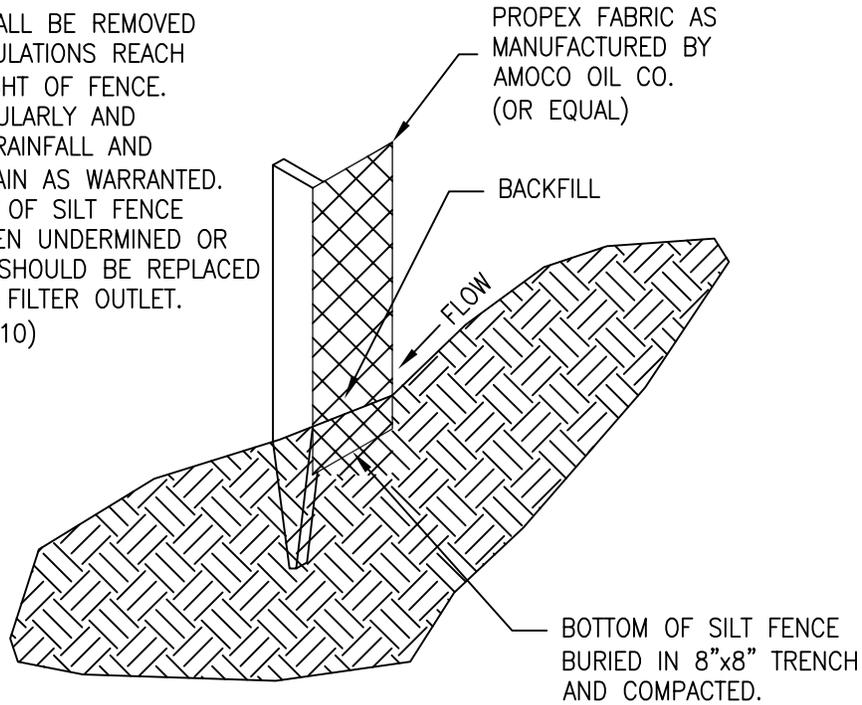


INTERCEPTOR DIVERSIONS
TYPICAL DETAILS

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/14/06	Scale NONE	Drawing No. DD-02	Sht. 1 of 3	Rev 0
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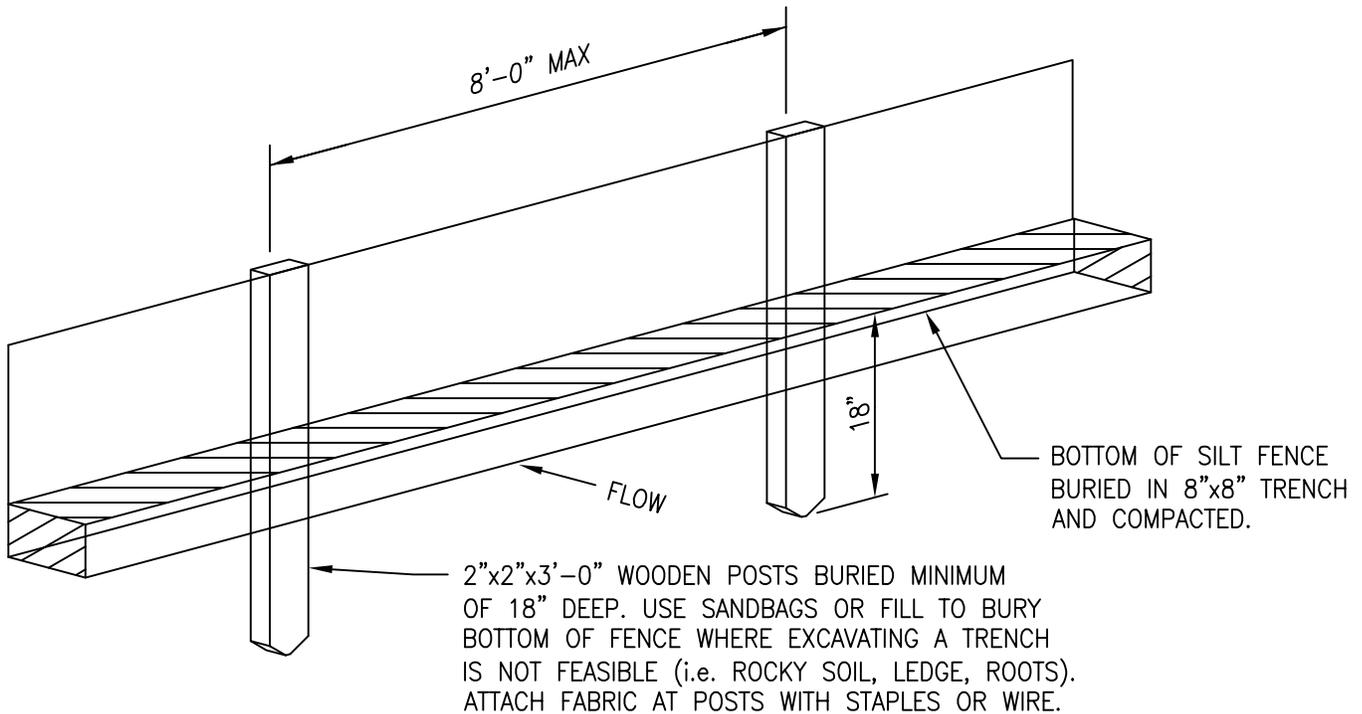
NOTES:

1. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF FENCE.
2. INSPECT REGULARLY AND AFTER EACH RAINFALL AND REPAIR/MAINTAIN AS WARRANTED.
3. ANY SECTION OF SILT FENCE THAT HAS BEEN UNDERMINED OR OVERTOPPED SHOULD BE REPLACED WITH A ROCK FILTER OUTLET. (SEE FIGURE 10)



SILT FENCE SUPPORT DETAIL

N.T.S.



TEMPORARY SILT FENCE DETAIL

N.T.S.

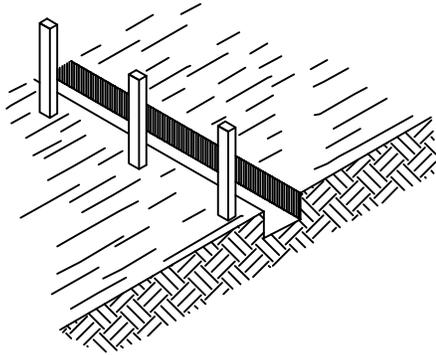
FIGURE 7



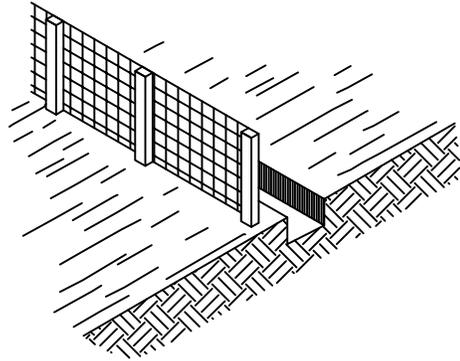
FILTER FENCE
TYPICAL DETAILS

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/09/06	Scale NONE	Drawing No. FF-01	Sht. 1 of 1	Rev 0
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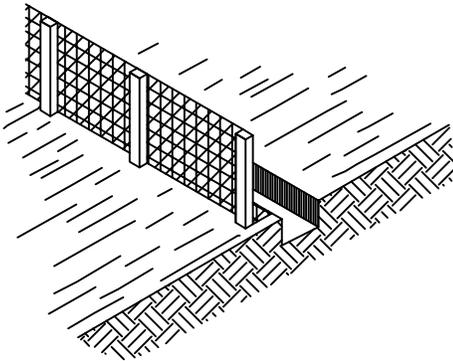
1. SET POSTS AND EXCAVATE A 8"x8" TRENCH UPSLOPE ALONG THE LINE OF POSTS.



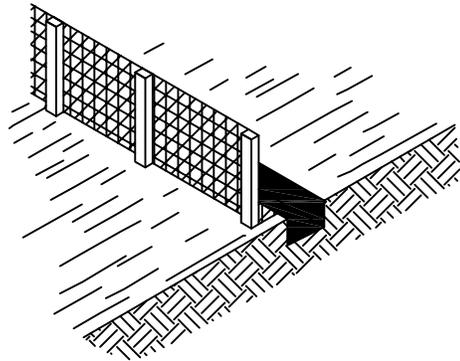
2. STAPLE WIRE FENCING TO THE POSTS.



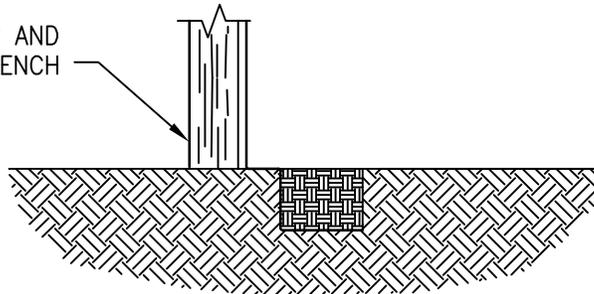
3. ATTACH THE FILTER FABRIC TO THE WIRE FENCE AND EXTEND IT INTO THE TRENCH.



4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



EXTENSION OF FABRIC AND WIRE INTO THE TRENCH



REINFORCED SILT FENCE CONSTRUCTION

N.T.S.

FIGURE 8

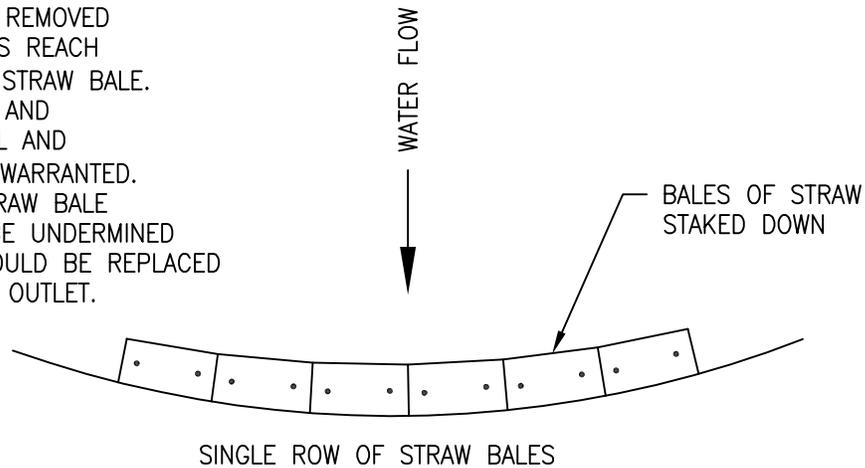


REINFORCED SILT FENCE

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/09/06	Scale NONE	Drawing No. FF-03	Sht. 1 of 1	Rev 0
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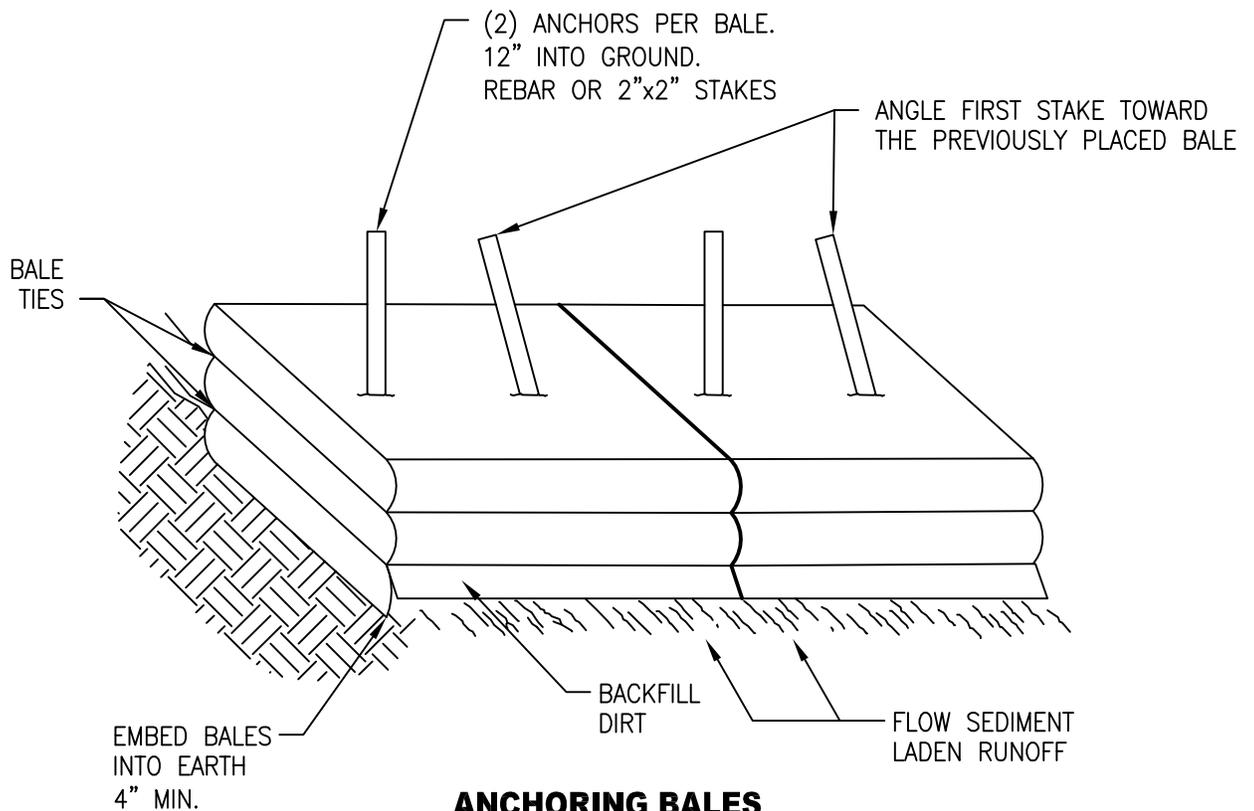
NOTES:

1. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF STRAW BALE.
2. INSPECT REGULARLY AND AFTER EACH RAINFALL AND REPAIR/MAINTAIN AS WARRANTED.
3. ANY SECTION OF STRAW BALE BARRIER THAT HAS BE UNDERMINED OR OVERTOPPED SHOULD BE REPLACED WITH A ROCK FILTER OUTLET. (SEE FIG. ___)



SINGLE ROW OF STRAW BALES

PLAN VIEW



ANCHORING BALES

BALED STRAW FILTER DETAIL

SECURELY BOUND BALES REQUIRED FOR DURABILITY

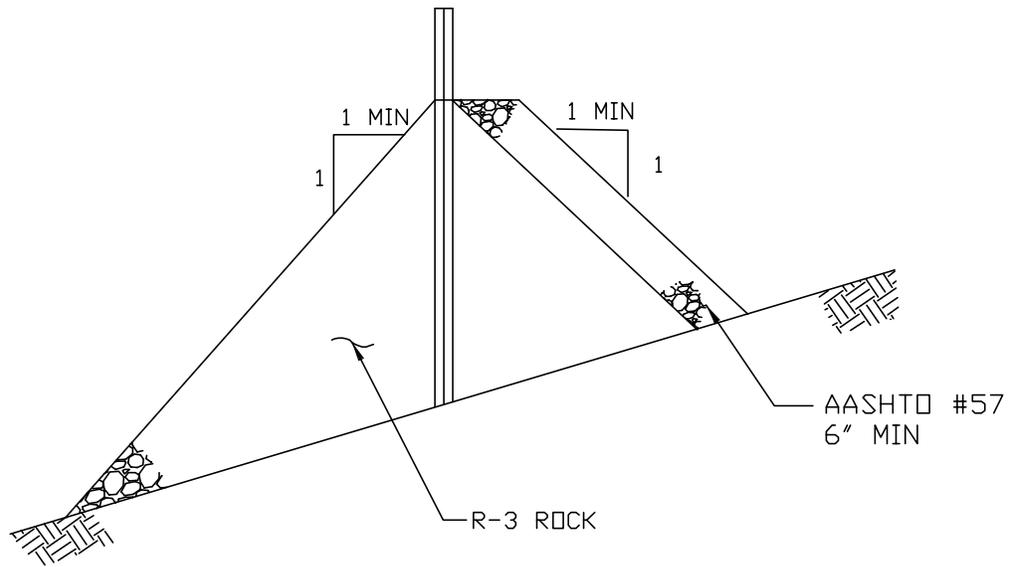
FIGURE 9



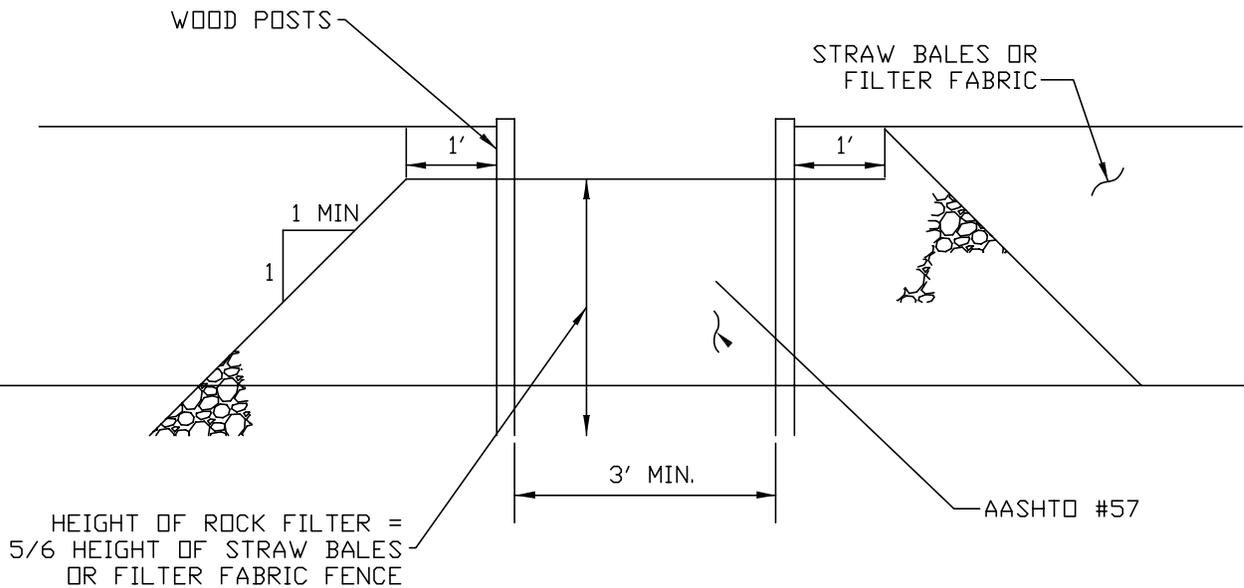
BALED STRAW FILTER DETAIL

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/09/06	Scale NONE	Drawing No. SBI-01	Sht. 1 of 1	Rev 0
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**STANDARD CONSTRUCTION DETAIL #18
Rock Filter Outlets**



OUTLET CROSS-SECTION



UP-SLOPE FACE

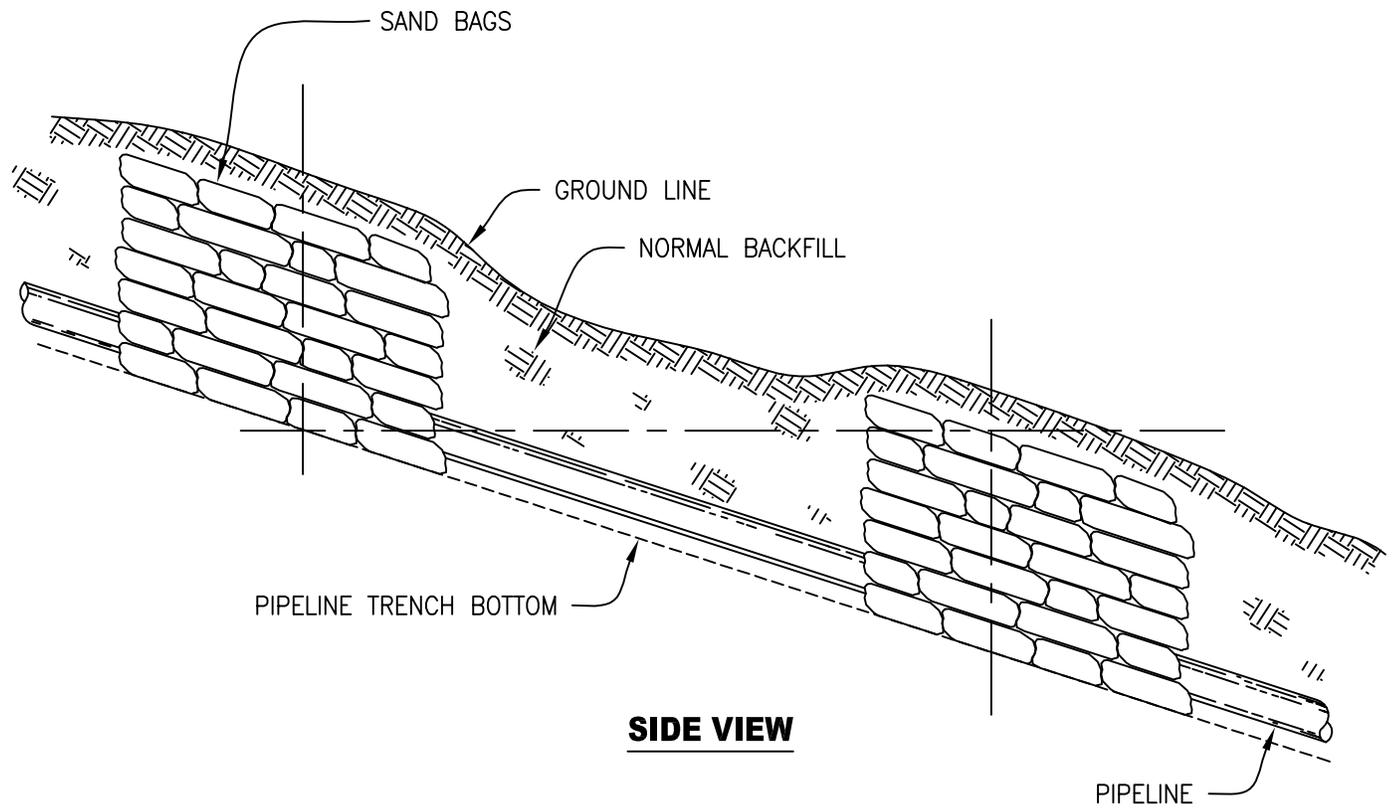
Sediment must be removed when accumulations reach 1/3 the height of the outlet.

FIGURE 10

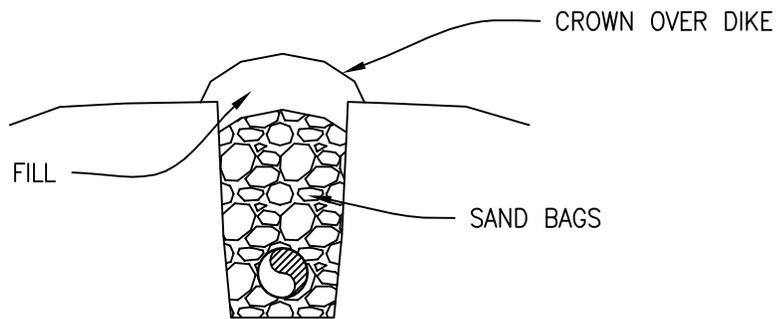


STANDARD CONSTRUCTION
ROCK FILTER OUTLETS

DRN BY EEL	CHK BY SS	APPRV DM	DATE 8/31/06	Scale NONE	Drawing No. RFO-01	Sht. 1 of 1	Rev 0
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SIDE VIEW



END VIEW

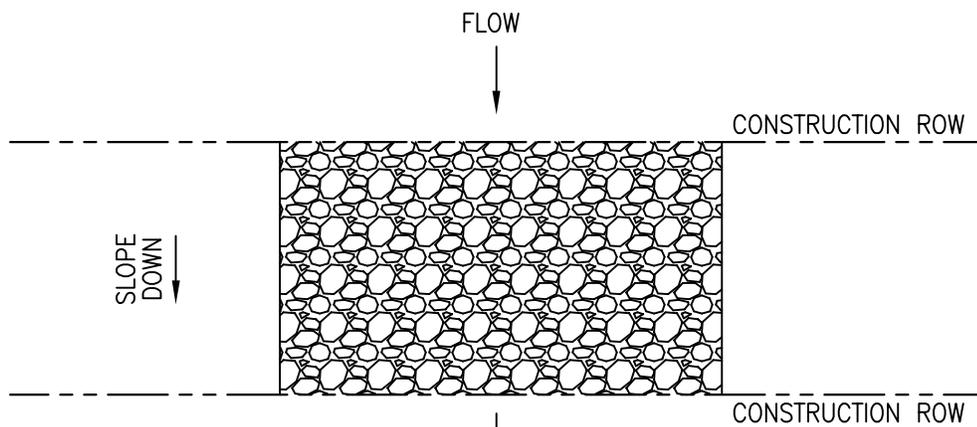
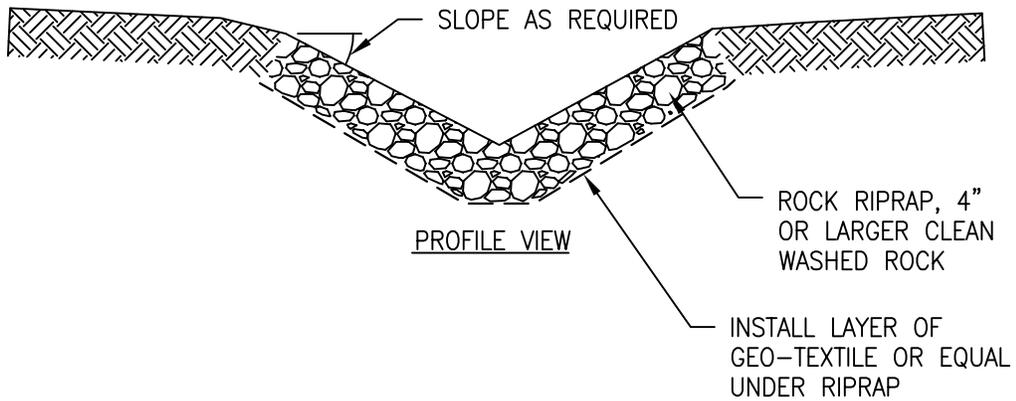
**TRENCH BREAKER
INSTALLATION**

FIGURE 11



TRENCH BREAKER
TYPICAL DETAILS

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/14/06	Scale NONE	Drawing No. DEB-01	Sht. 1 of 3	Rev 0
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SLOPE TO MAINTAIN VELOCITY < 10 FPS

TO UNDISTURBED AREA

PLAN VIEW

NOTE:
INSTALL EROSION CONTROLS
AT OUTLET AS WARRANTED

RUNOFF DITCH

FIGURE 12



RUNOFF DITCH

DRN BY EEI	CHK BY SS	APPRV DM	DATE 07/27/06	Scale NONE	Drawing No. ROD-01	Sht. 1 of 1	Rev 0
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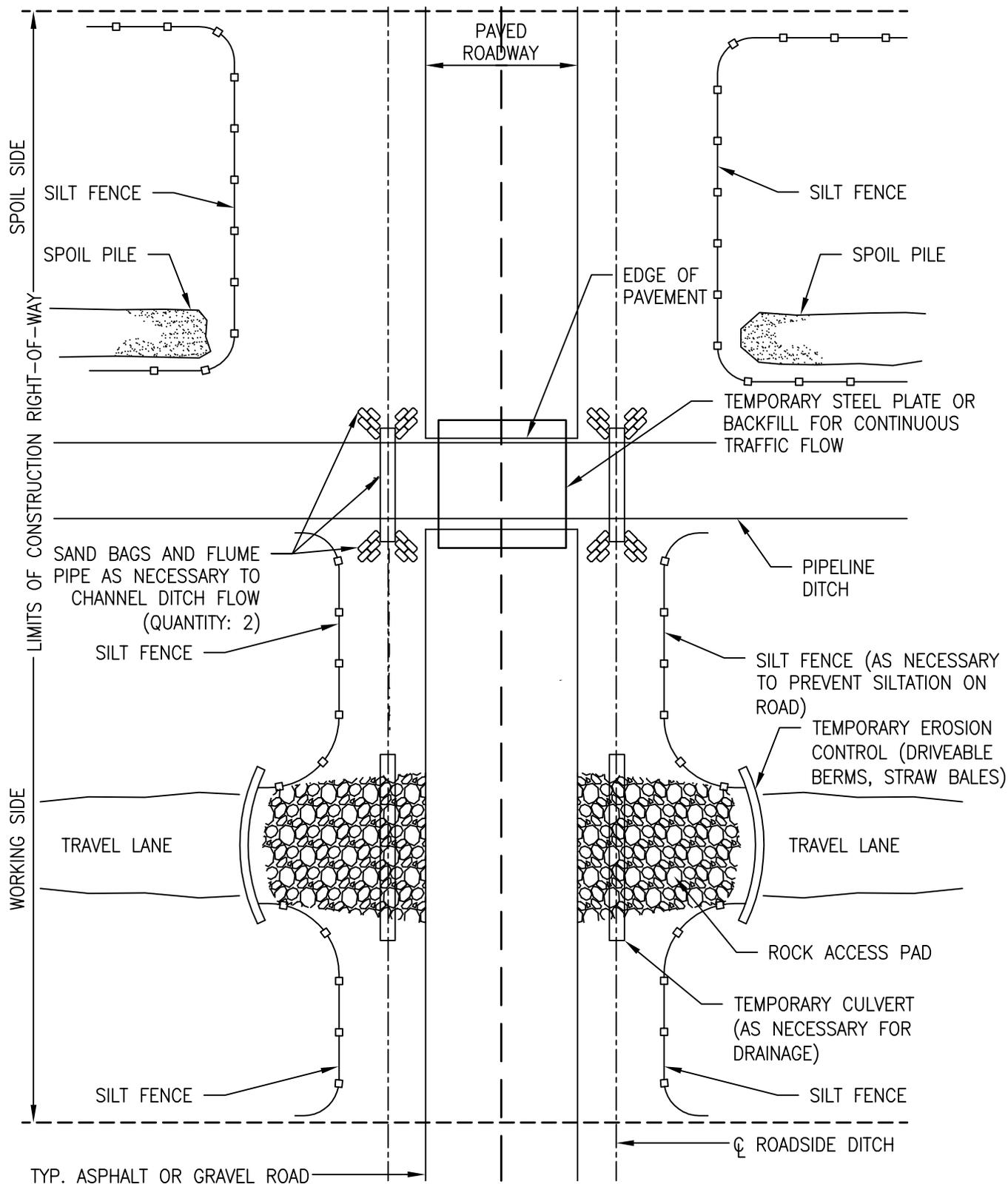


FIGURE 13



TYPICAL PAVED ROAD CROSSING CONTROL MEASURES (OPEN CUT)

DRN BY EEI	CHK BY SS	APPRV DM	DATE 07/27/06	Scale NONE	Drawing No. TPRC-01	Sht. 1 of 1	Rev 0
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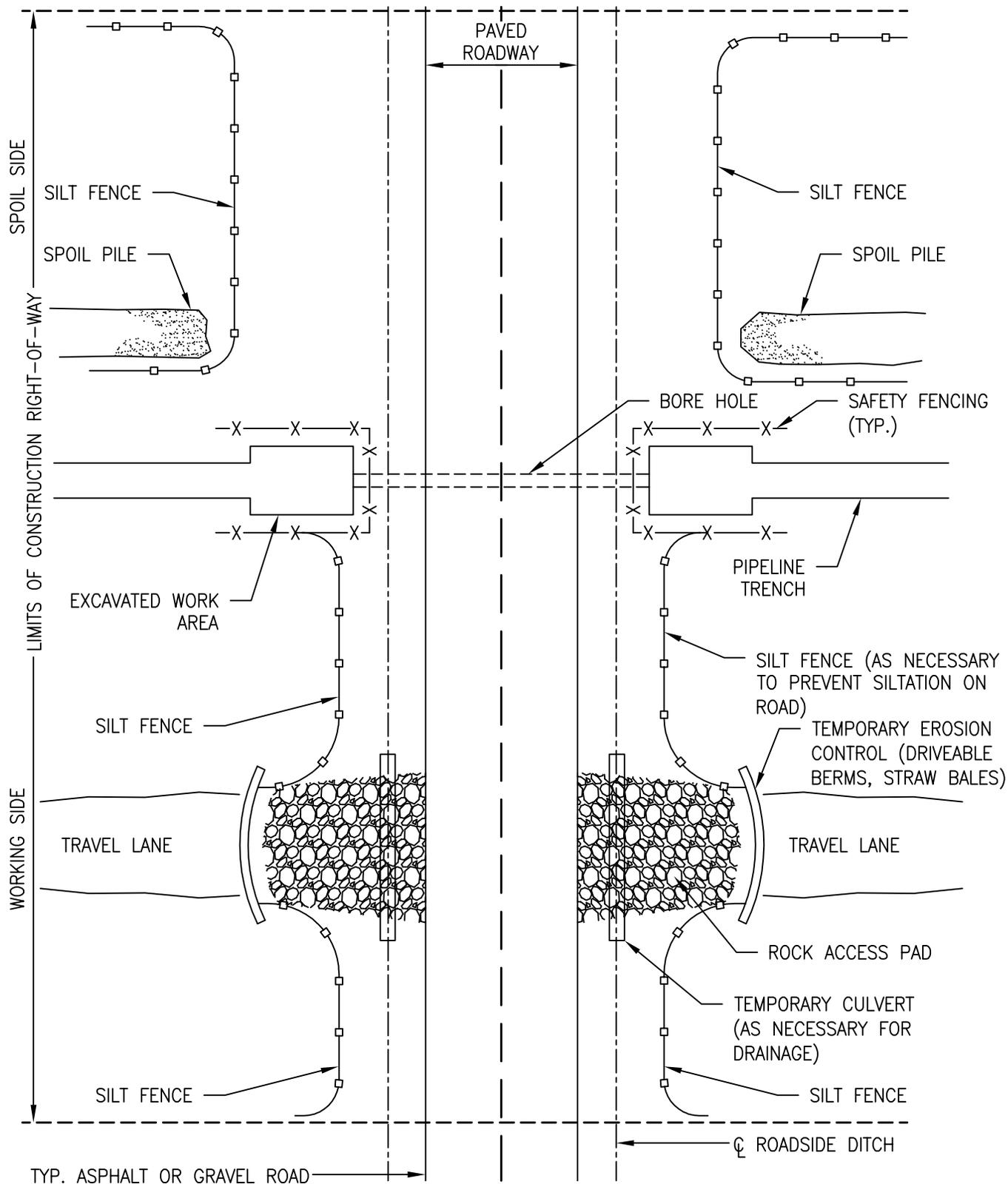
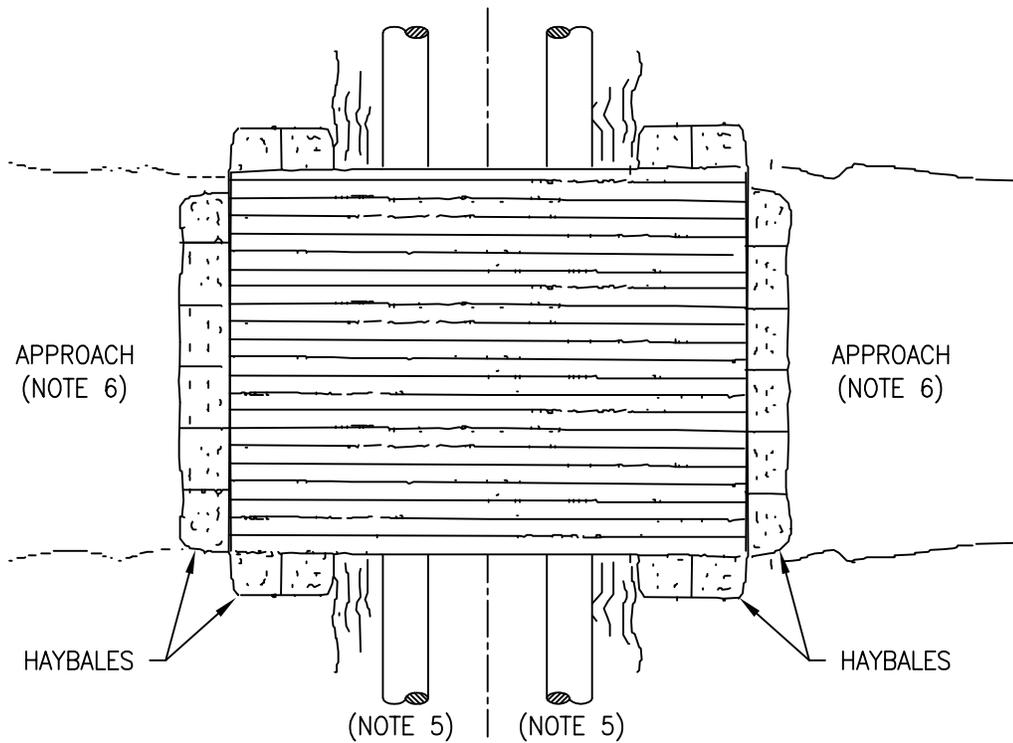


FIGURE 14

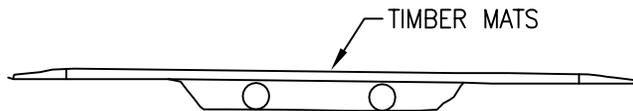


TYPICAL PAVED ROAD CROSSING CONTROL MEASURES (BORED)

DRN BY EEI	CHK BY SS	APPRV DM	DATE 07/27/06	Scale NONE	Drawing No. RCB-01B	Sht. 1 of 1	Rev 0
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PLAN



ELEVATION

NOTES:

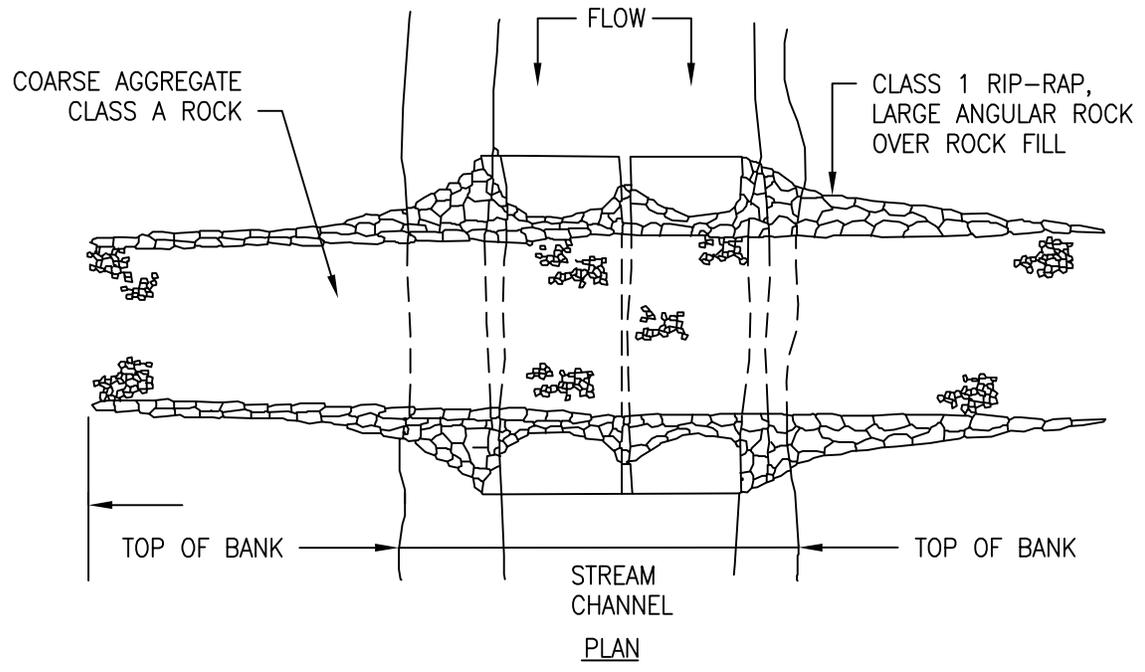
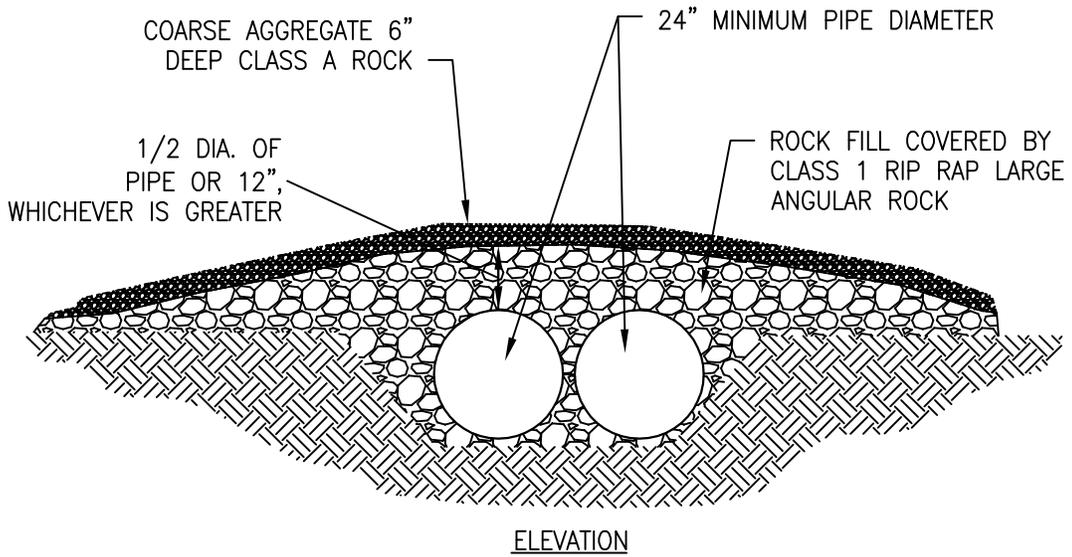
1. THIS TYPE OF BRIDGE IS GENERALLY USED FOR SMALL STREAM CROSSINGS LESS THAT 20 FEET IN WIDTH IN COMBINATION WITH A PROPER STREAM BANK CONFIGURATION.
2. BRIDGE WILL BE TEMPORARILY REMOVED IF HIGH WATER RENDERS IT UNSAFE FOR CROSSING.
3. BRIDGE TO REMAIN IN PLACE UNTIL THE COMPLETION OF FINAL RESTORATION.
4. SILT FENCE, HAYBALES OR SANDBAGS MAY BE USED INTERCHANGEABLY. REMOVE DURING USE; REPLACE AT NIGHT AND WHEN CROSSING IS NOT BEING USED.
5. CULVERT PIPES MAY BE UTILIZED IF ADDITIONAL SUPPORT IS REQUIRED.
6. RAMP APPROACHES CCAN BE EITHER GRADED OR DUG INTO GROUND IF NECESSARY, STONE MAY BE USED ON APPROACHES.
7. MAINTAIN PADS TO PREVENT SOIL FROM ENTERING STREAM.

FIGURE 15



TYPICAL EQUIPMENT CROSSING
(TIMBER MAT BRIDGE)

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/09/06	Scale NONE	Drawing No. SM-02	Sht. 1 of 1	Rev 0
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- GENERAL NOTES:
1. NOT TO SCALE
 2. THIS TYPE OF CROSSING CAN BE INSTALLED IN BOTH WET OR DRY WEATHER STREAM CONDITIONS WHERE THE DRAINAGE AREA EXCEEDS 10 ACRES.

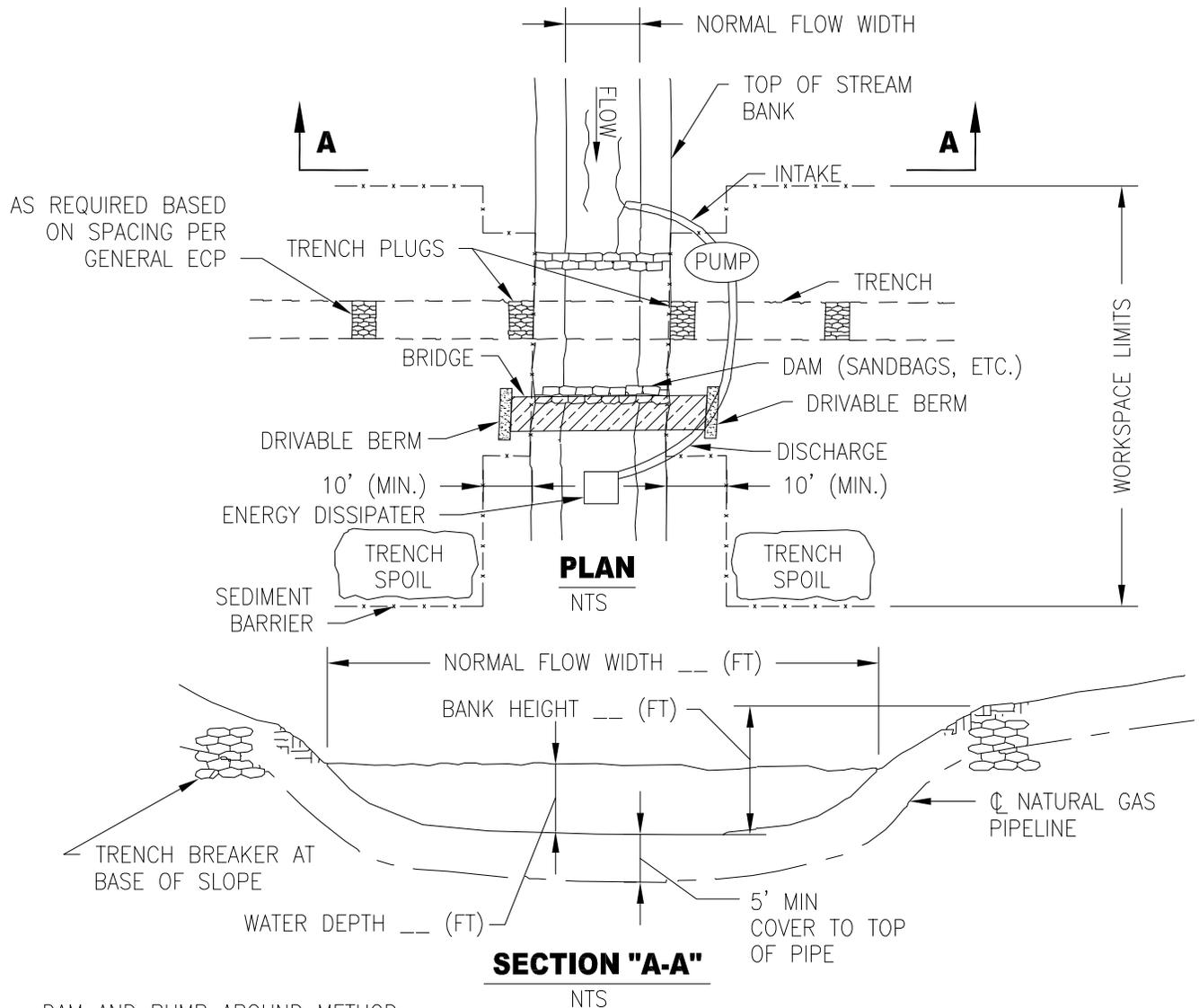
FLUMED EQUIPMENT CROSSING

FIGURE 16



TYPICAL EQUIPMENT CROSSING
(ROCK/FLUME)

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/09/06	Scale NONE	Drawing No. FS-01	Sht. 1 of 1	Rev 0
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DAM AND PUMP AROUND METHOD;

GENERAL CONSTRUCTION SEQUENCE NOTES: (REFER TO GENERAL ECP FOR DETAILS).

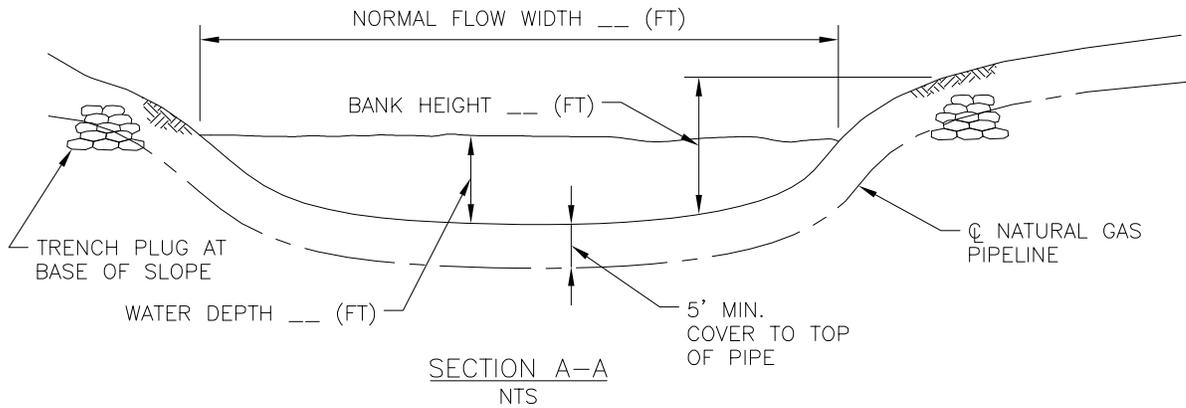
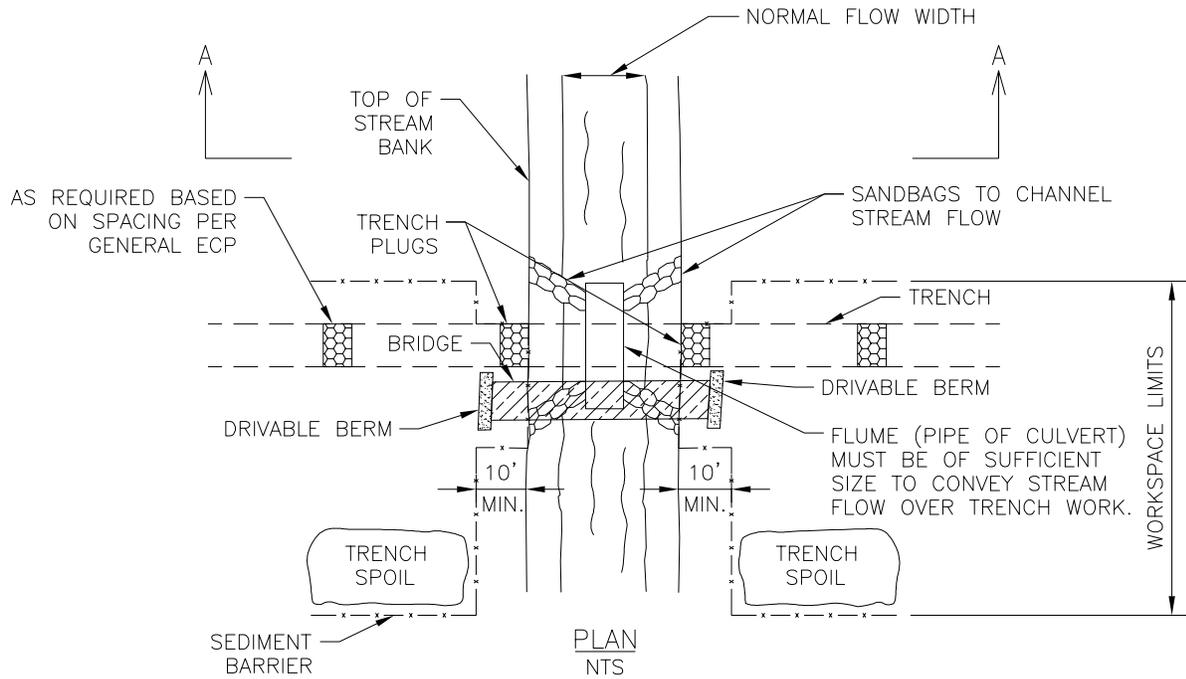
1. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS, PRIOR TO EARTH DISTURBANCE.
2. SET UP PUMP(S) AND HOSE AS SHOWN, OR USE OTHER PRACTICAL ALTERNATIVES AS APPROVED BY THE COMPANY CHIEF AND ENVIRONMENTAL INSPECTOR. PUMP(S) SHOULD HAVE TWICE THE PUMPING CAPACITY OF ANTICIPATED FLOW.
3. CONTRACTOR TO ENSURE A SUFFICIENT NUMBER OF ACTIVE BACKUP PUMP(S) TO MAINTAIN THE CAPACITY OF THE STREAM FLOW AT ALL TIMES DURING INSTALLATION ARE READILY AVAILABLE ON-SITE PRIOR TO BEGINNING THE CROSSING.
4. ALL INTAKE HOSES WILL BE SCREENED TO PREVENT THE ENTRAINMENT OF FISH.
5. EXCAVATE TRENCH.
6. INSTALL PIPE IN TRENCH, THEN INSTALL TRENCH PLUGS.
7. BACKFILL TRENCH TO PRE-EXISTING CONTOURS AND COMPLETE FINAL CLEANUP OF THE STREAMBED AND BANKS.
8. DISMANTLE DOWNSTREAM DAM, THEN UPSTREAM DAM. KEEP PUMP(S) RUNNING TO MAINTAIN STREAM FLOW.
9. REMOVE TEMPORARY ACCESS ROAD (IF NECESSARY).
10. SEED AND MULCH DISTURBED AREAS. STABILIZE STREAM BANKS.

FIGURE 17



TYPICAL DAM AND PUMP CROSSING

DRN BY EEL	CHK BY SS	APPRV DM	DATE 11/07/06	Scale NONE	Drawing No. D&PSC-03	Sht. 1 of 1	Rev 0
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FLUME PIPE METHOD:

GENERAL CONSTRUCTION SEQUENCE NOTES: (REFER TO GENERAL ECP FOR DETAILS).

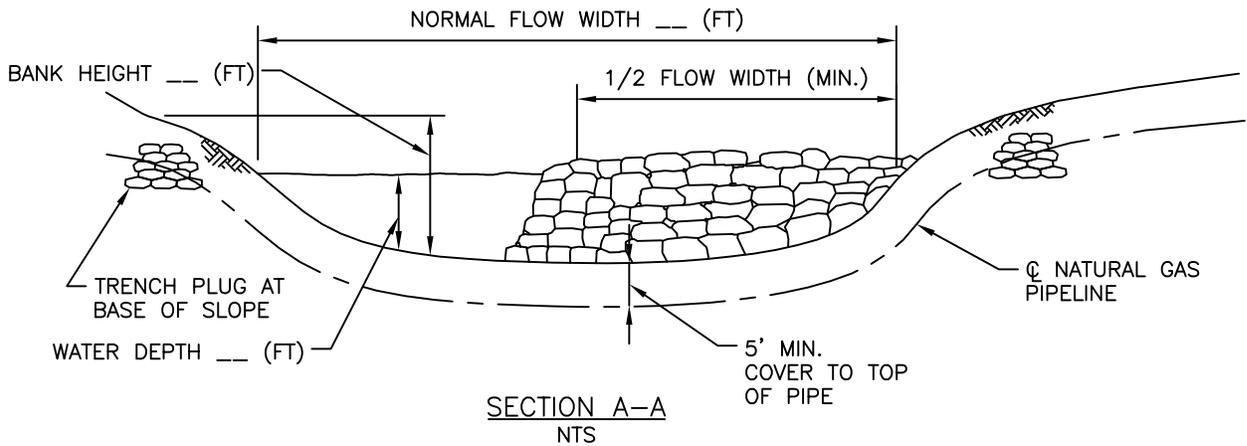
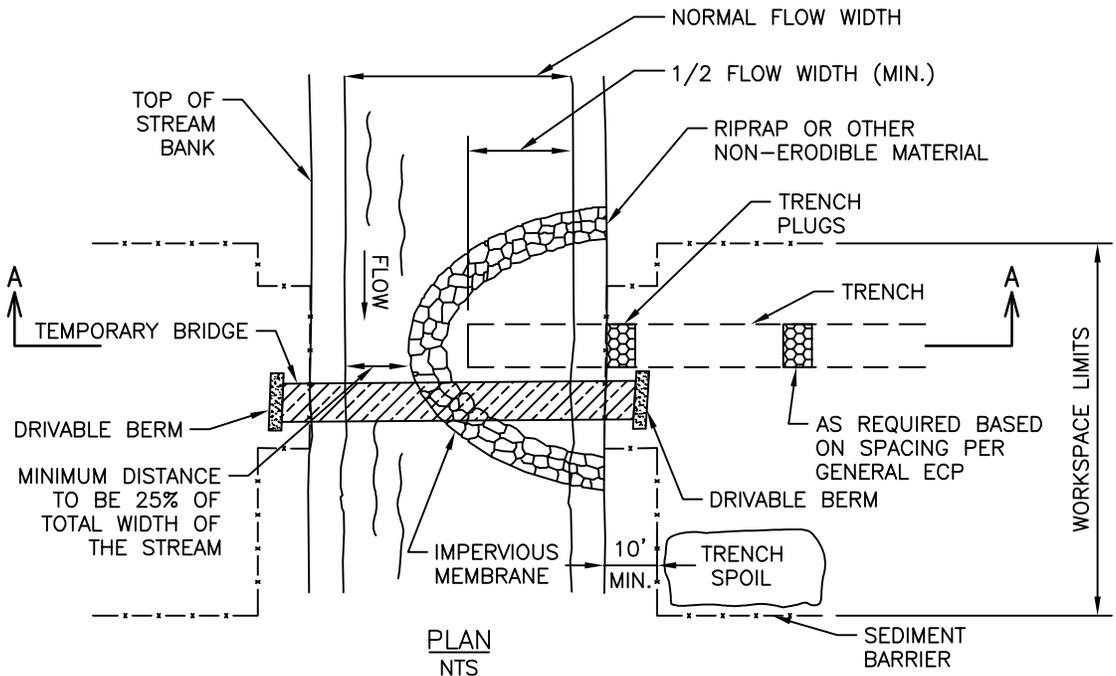
1. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS, PRIOR TO EARTH DISTURBANCE.
2. INSTALL FLUME PIPE(S) BEFORE TRENCHING.
3. CONSTRUCT DAMS TO DIVERT WATER INTO FLUME PIPE(S). PROPERLY ALIGN FLUME PIPE(S) TO PERMIT WATER FLOW THROUGH THE PIPE(S) AND TO PREVENT BANK EROSION AND STREAMBED SCOUR.
4. FLUME PIPE(S) WILL REMAIN IN PLACE DURING TRENCHING, PIPELAYING AND BACKFILLING ACTIVITIES.
5. EXCAVATE TRENCH.
6. INSTALL PIPE IN TRENCH, THEN INSTALL TRENCH PLUGS.
7. BACKFILL TRENCH TO PRE-EXISTING CONTOURS AND COMPLETE FINAL CLEANUP OF THE STREAMBED AND BANKS.
8. DISMANTLE DOWNSTREAM DAM, THEN UPSTREAM DAM, AND THEN REMOVE THE FLUME PIPE(S).
9. REMOVE TEMPORARY ACCESS ROAD (IF NECESSARY).
10. SEED AND MULCH DISTURBED AREAS. STABILIZE STREAM BANKS.

FIGURE 18



**TYPICAL DETAILS
FLUME PIPE METHOD**

DRN BY EEL	CHK BY SS	APPRV DM	DATE 11/07/06	Scale NONE	Drawing No. FPM-01	Sht. 1 of 1	Rev 0
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COFFER DAM CROSSING:

GENERAL CONSTRUCTION SEQUENCE NOTES: (REFER TO GENERAL ECP FOR DETAILS).

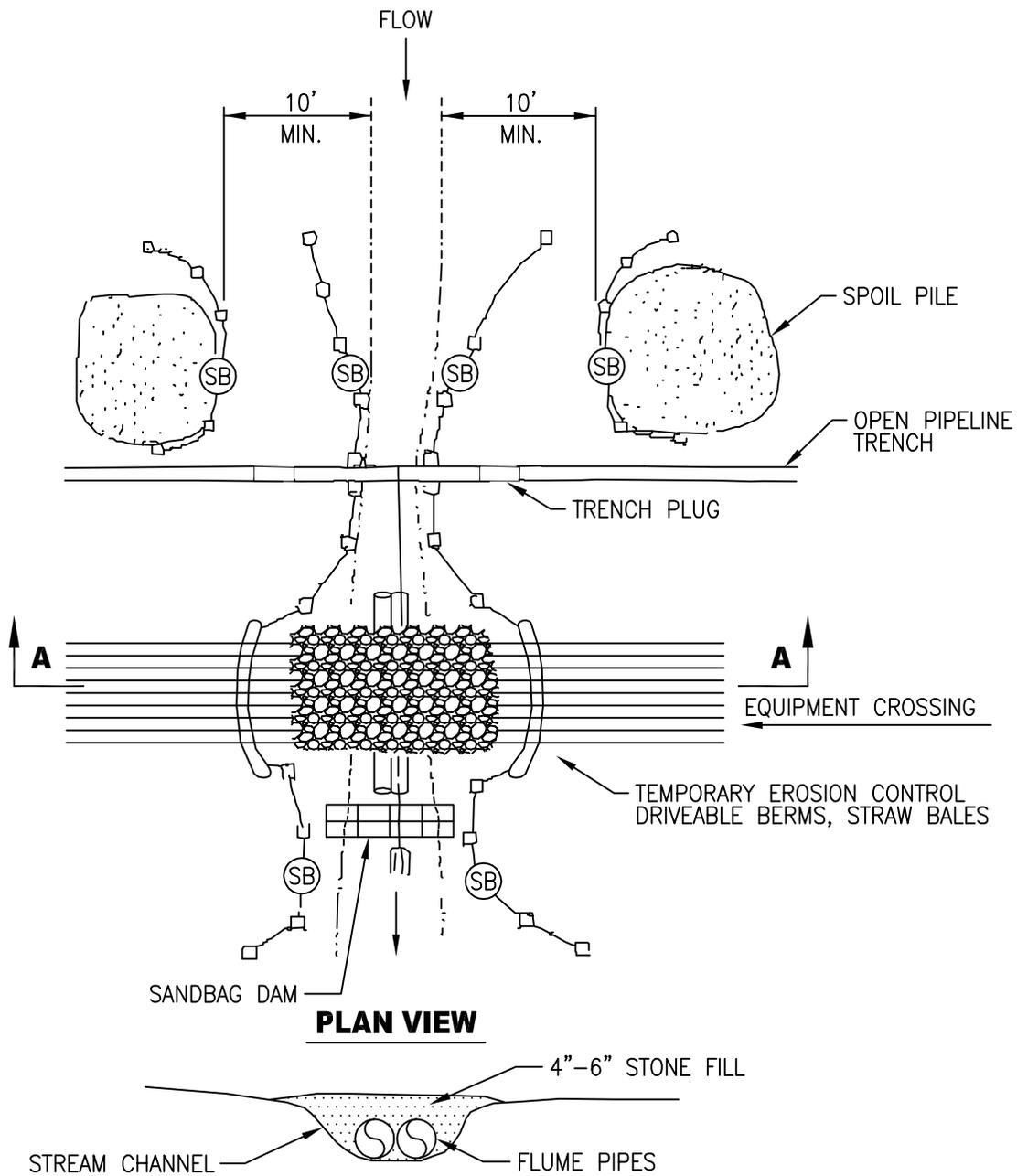
1. CONSTRUCTION IS TO BE PERFORMED IN LOW FLOW PERIODS AND WILL NOT PROHIBIT THE FLOW OF THE STREAM.
2. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS, PRIOR TO EARTH DISTURBANCE.
3. PREPARE THE PIPE FOR BURIAL (WELDS, BEND, COATING, ETC.).
4. FORM COFFERDAM BY PLACING MATERIAL IN SEMICIRCLE ON SIDE OF STREAM WHERE PIPELINE INSTALLATION IS TO BEGIN. SURROUND STRUCTURE WITH IMPERVIOUS MATERIAL TO BLOCK FLOW FROM ENTERING WORK AREA.
5. WHEN FLOW IS DIVERTED, DEWATER WORK AREA TO AN APPROVED DEWATERING LOCATION.
6. EXCAVATE TRENCH.
7. INSTALL PIPE IN TRENCH, THEN INSTALL TRENCH PLUGS. BACKFILL TRENCH TO PRE-EXISTING CONTOURS AND COMPLETE FINAL CLEANUP OF THE STREAMBED AND BANKS.
8. REMOVE COFFERDAM MATERIALS.
9. SEED AND MULCH DISTURBED AREAS. STABILIZE STREAM BANKS WITHIN 72 HOURS.
10. FOLLOWING THE ABOVE PROCEDURES, THE COFFERDAM IS THEN SET UP FROM THE OPPOSITE BANK AND EXTENDS FAR ENOUGH TO INCLUDE THE TIE-IN POINT IN MID-STREAM. REMOVE TEMPORARY ACCESS ROAD (IF NECESSARY).

FIGURE 18A



TYPICAL DETAILS
COFFERDAM CROSSING

DRN BY EEI	CHK BY SS	APPRV DM	DATE 11/17/06	Scale NONE	Drawing No. CD-01	Sht. 1 of 1	Rev 0
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NOTES:

SECTION "A-A"

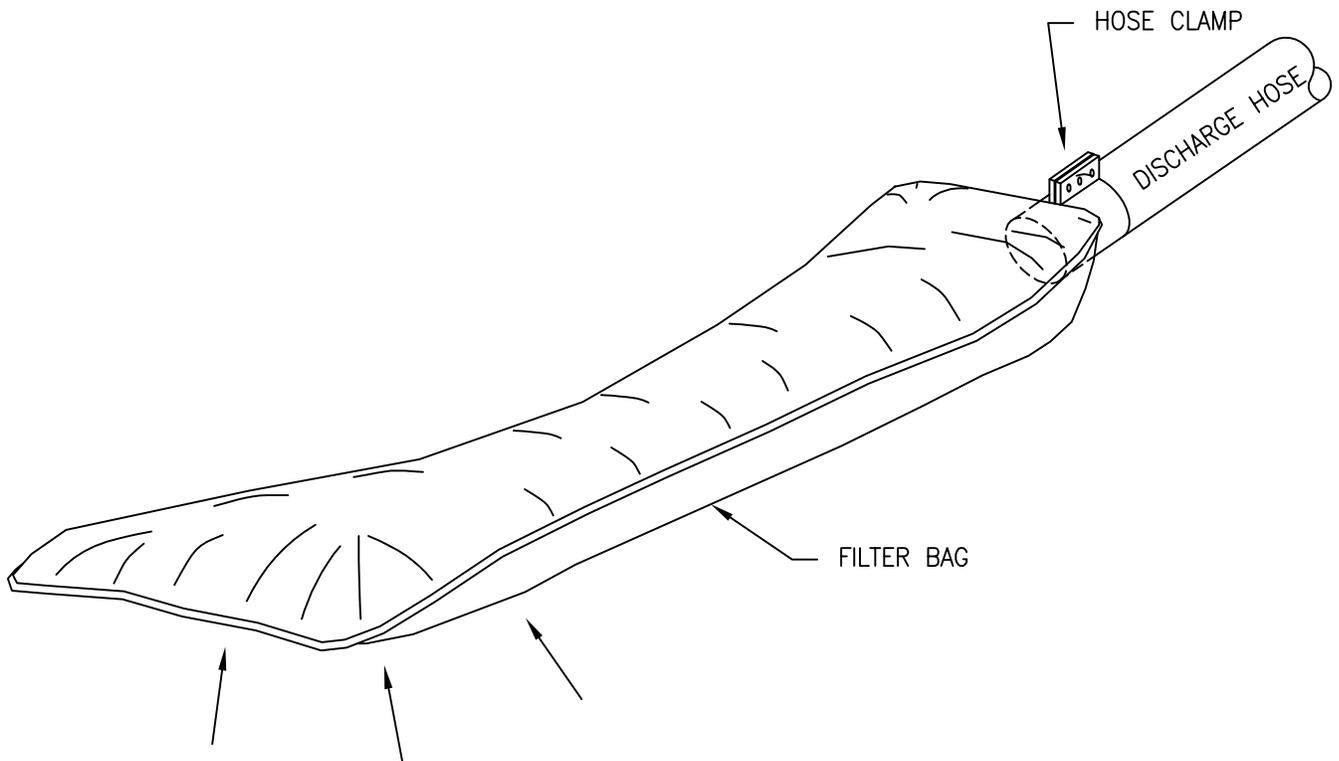
1. (SB) TEMPORARY SEDIMENT BARRIER OF SILT FENCE AND OR STRAW BALES, OR OTHER APPROPRIATE MATERIALS.
2. EXCAVATE ACROSS STREAM CHANNEL.
3. DO NOT REFUEL OR STORE FUEL WITHIN 200 FEET OF THE WATERBODY, WHERE FEASIBLE.
4. NUMBER OF FLUME PIPES FOR EQUIPMENT BRIDGE WILL VARY DEPENDING ON ON-SITE CONDITIONS.
5. COMPLETE OPEN CUT CROSSING AS PER FERC TIMING RESTRICTIONS REFERENCED IN PROCEDURES.

FIGURE 19



TYPICAL OPEN CUT
STREAM CROSSING

DRN BY EEI	CHK BY SS	APPRV DM	DATE 8/17/06	Scale NONE	Drawing No. D&PSC-02	Sht. 1 of 1	Rev 0
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SET BAG IN WELL VEGETATED AREA. IF VEGETATED AREA IS NOT AVAILIABLE, SET BAG ON FILTER FABRIC ON GROUND.

ATTACH TO END OF DISCHARGE HOSE TO PUMP OUT BELL HOLE OR DITCH
 LIMIT: 80 GPM/SF
 AVAILABLE DIFFERENT SIZES BASED ON SILT VOLUME

GEOTEXTILE DEWATERING FILTER BAG

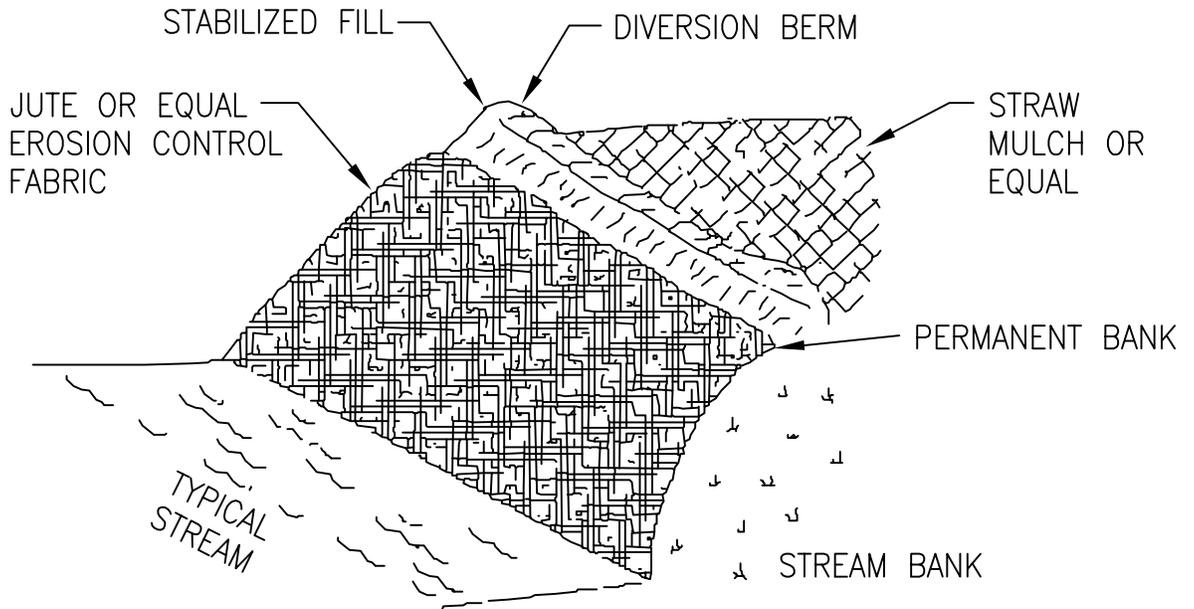
FIGURE 20



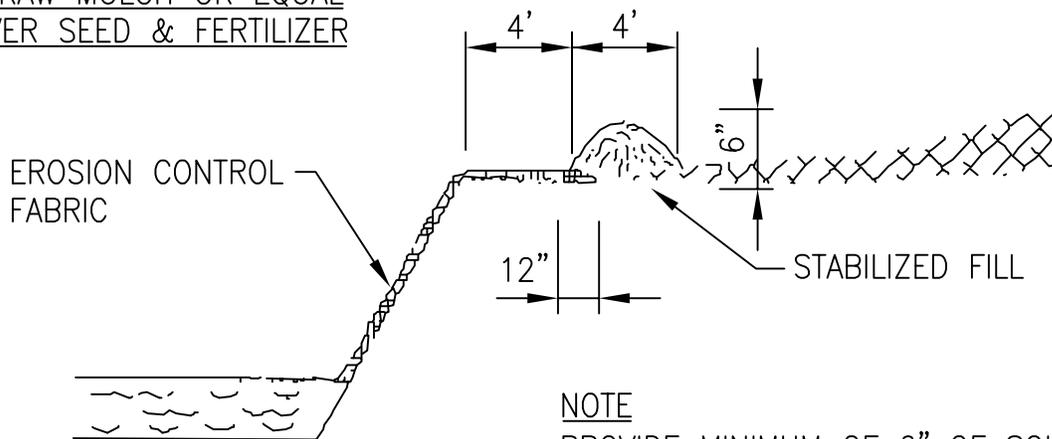
DEWATERING FILTER BAG
 TYPICAL DETAILS

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/14/06	Scale NONE	Drawing No. DFB-01	Sht. 1 of 1	Rev 0
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STAKE TO THE SLOPE WITH WOOD PEGS OR STAPLE
PER MANUFACTURERS SPECIFICATION



STRAW MULCH OR EQUAL
OVER SEED & FERTILIZER



NOTE

PROVIDE MINIMUM OF 6" OF SOIL COVER OVER
FIRST 12" OF EROSION CONTROL FABRIC AS
SHOWN

CROSS SECTION

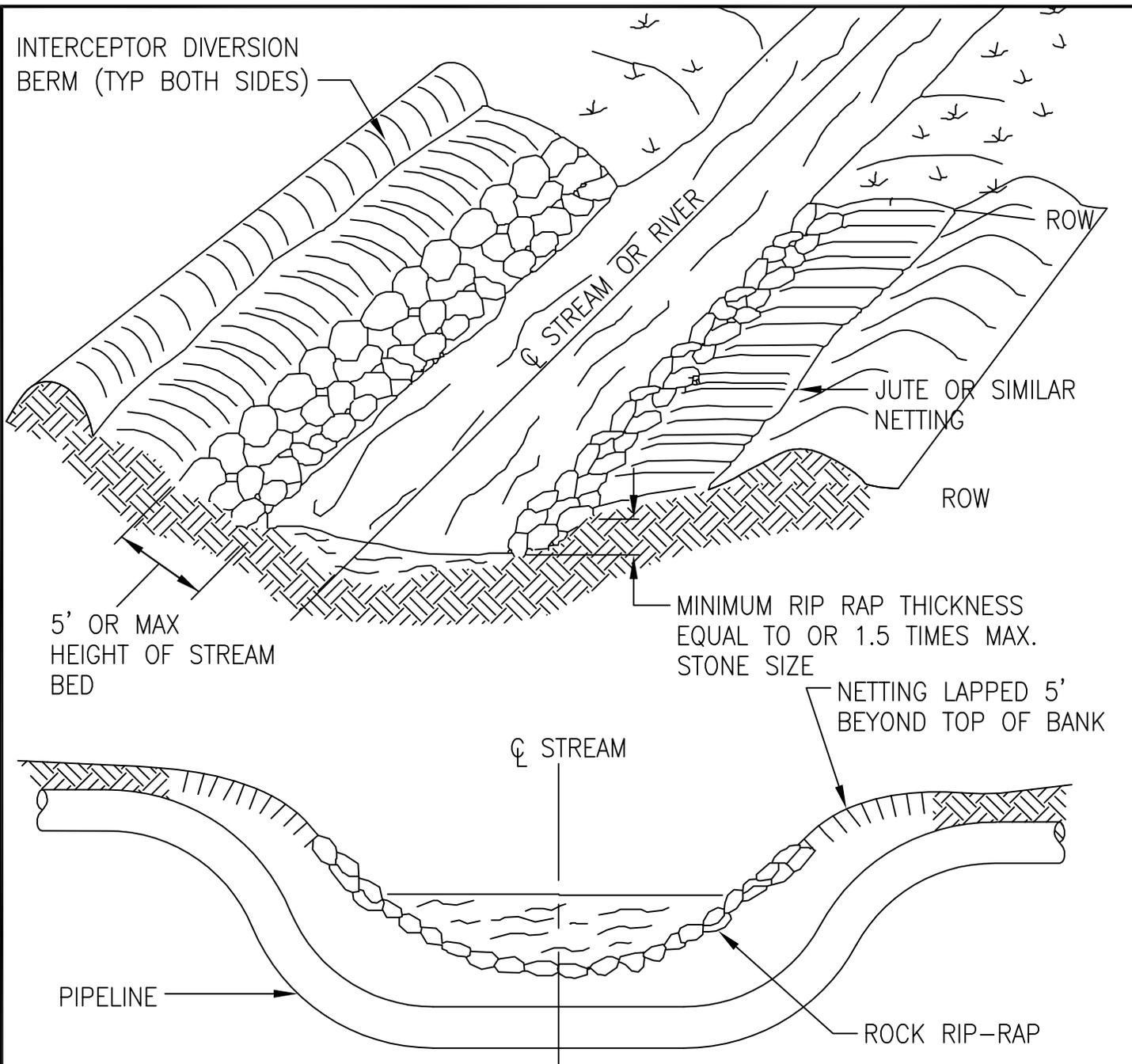
N.T.S.

FIGURE 21



STREAMBANK STABILIZATION
(EROSION CONTROL FABRIC) TYPICAL DETAILS

DRN BY EEI	CHK BY SS	APPRV DM	DATE 08/17/06	Scale NONE	Drawing No. SBS-02	Sht. 1 of 1	Rev 0
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NOTE:
 RIP-RAP SHOULD BE USED IF REQUIRED TO CONTROL EROSION. (I.E., STEEP STREAM GRADIENT, HIGH ENERGY FLOW, HIGHLY EROSION SOILS, HIGH RESOURCE VALUE). FOR ALTERNATIVE SEE STREAM BANK EROSION CONTROL FABRIC. FIGURE SBS-02

1. PLACE RIP-RAP COMPLETELY ACROSS ROW.
2. LIME, FERTILIZE AND SEED TOP OF BANK PRIOR TO THATCHING INSTALLATION.
3. CLASS 1 OR 2 SHALL BE USED FOR RIP-RAP (SEE SECTION B.5.)
4. RIP-RAP IS GENERALLY NOT AUTHORIZED FOR UTILITY CROSSING INVERT IN NATURAL STREAMS.

TYPICAL RIP-RAP BANK PROTECTION / STABILIZATION

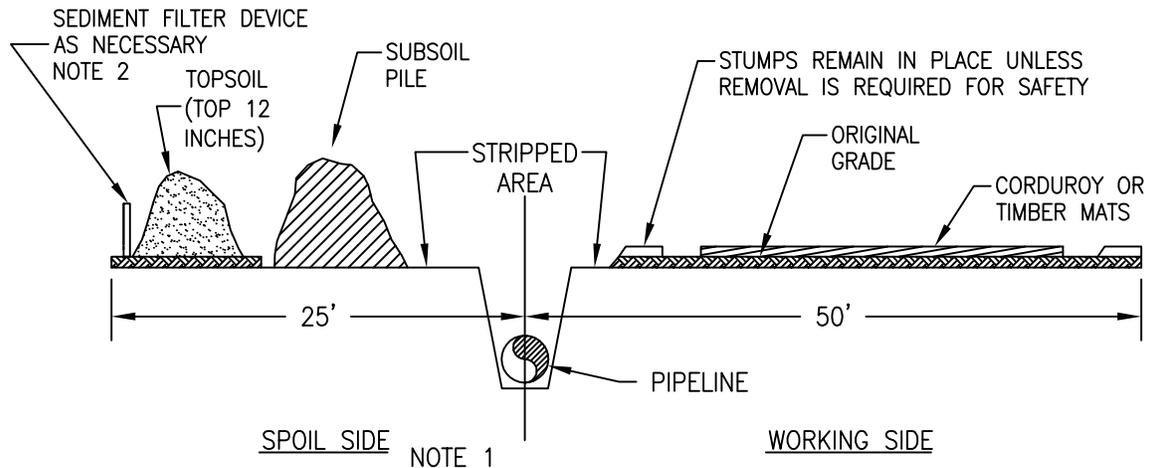
N.T.S.

FIGURE 22

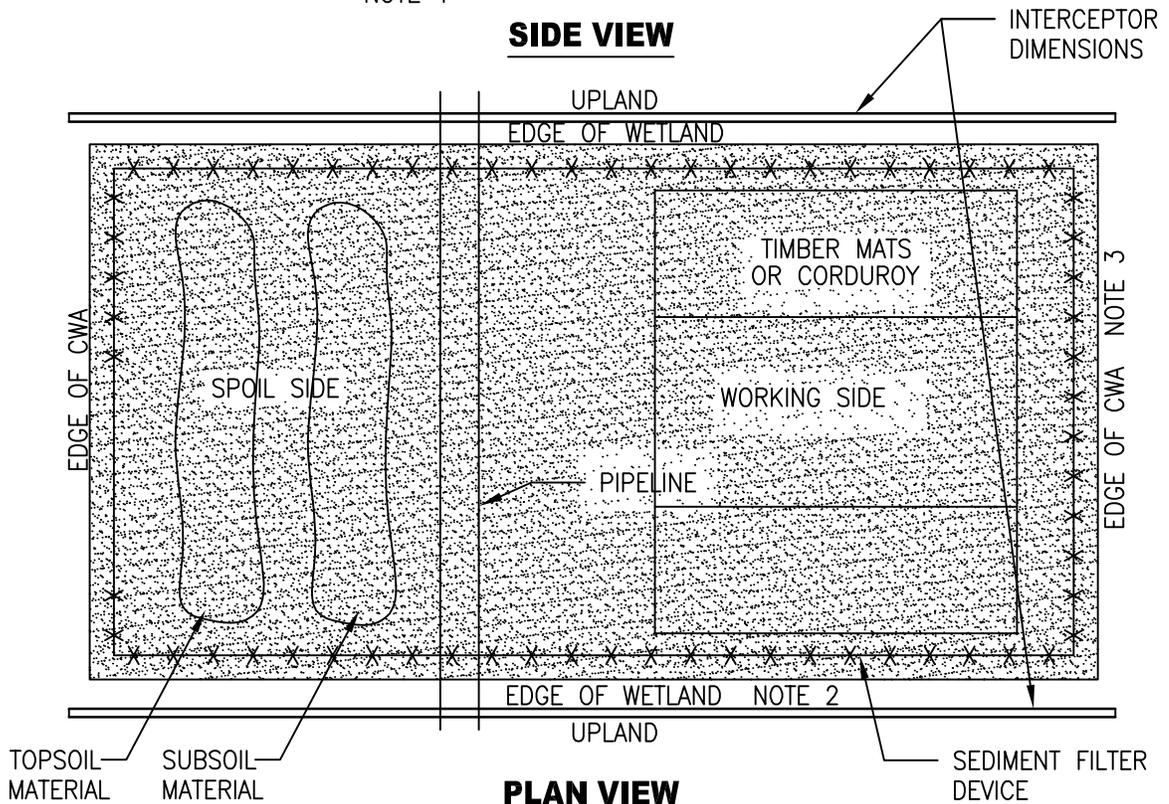


STREAM BANK STABILIZATION (RIP-RAP) TYPICAL DETAILS

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/09/06	Scale NONE	Drawing No. SBS-01	Sht. 1 of 1	Rev 0
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SIDE VIEW



PLAN VIEW

NOTES:

1. IN WETLAND AREAS WHICH CONTAIN NO STANDING WATER OR SATURATED SOILS, TOPSOIL (TOPSOIL 12 INCHES) AND SUBSOIL WILL BE STOCKPILED SEPARATELY WITHIN THE WETLAND CWA.
2. A SEDIMENT FILTER DEVICE WILL BE PLACED ACROSS THE CWA AT THE WETLAND'S EDGE.
3. A SEDIMENT FILTER DEVICE WILL BE PLACED AT THE EDGE OF THE CWA AND AROUND SOIL AND SUBSOIL PILES AS NECESSARY.

FIGURE 23



TYPICAL
WETLAND
CROSSING (CONVENTIONAL)

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/14/06	Scale NONE	Drawing No. TWC-01	Sht. 1 of 1	Rev 0
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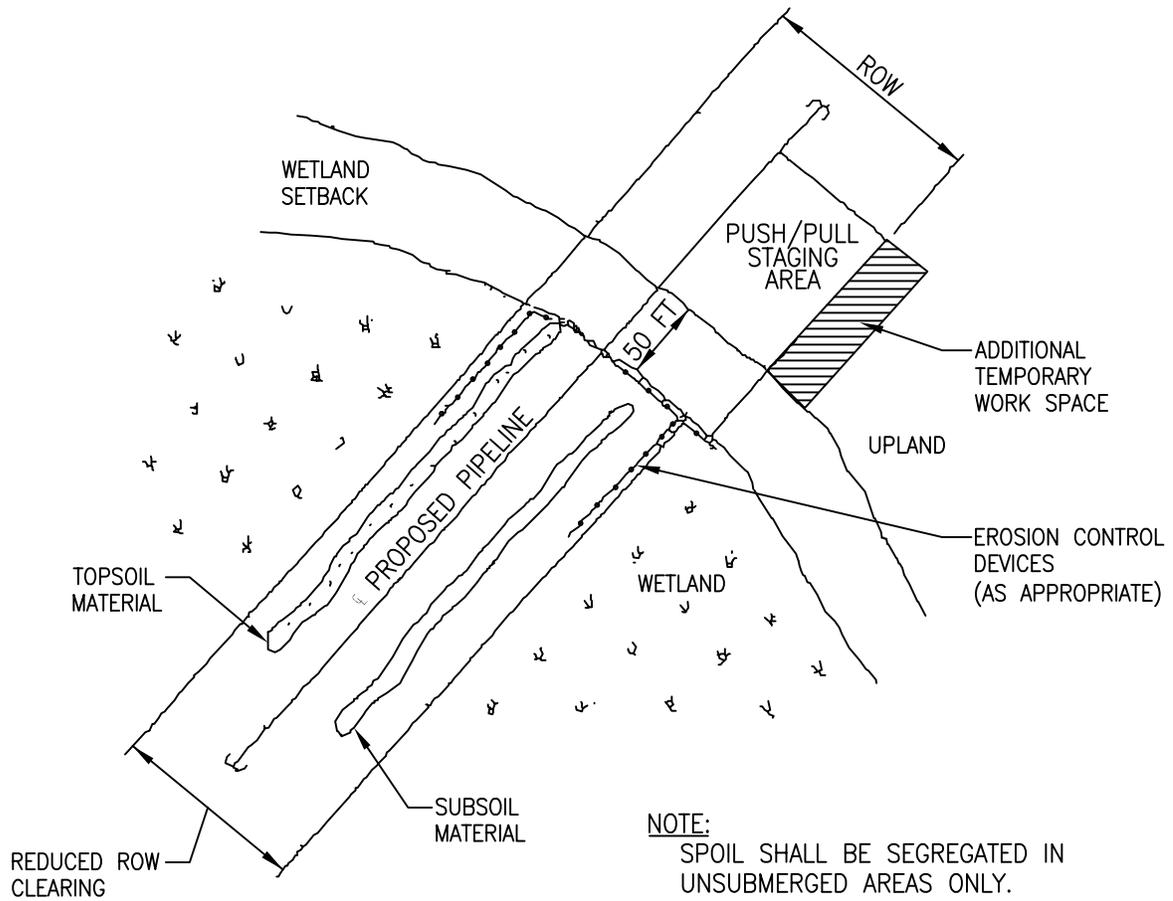
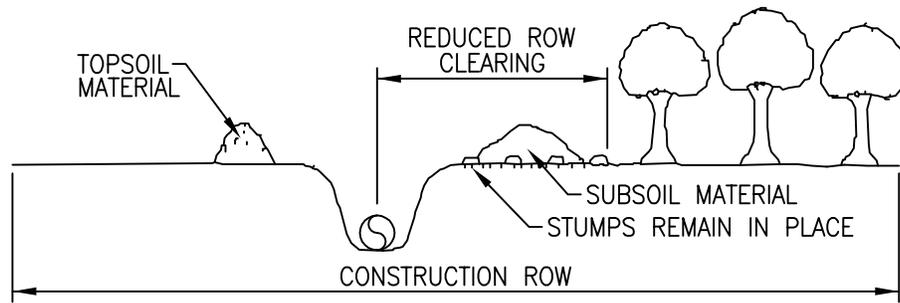
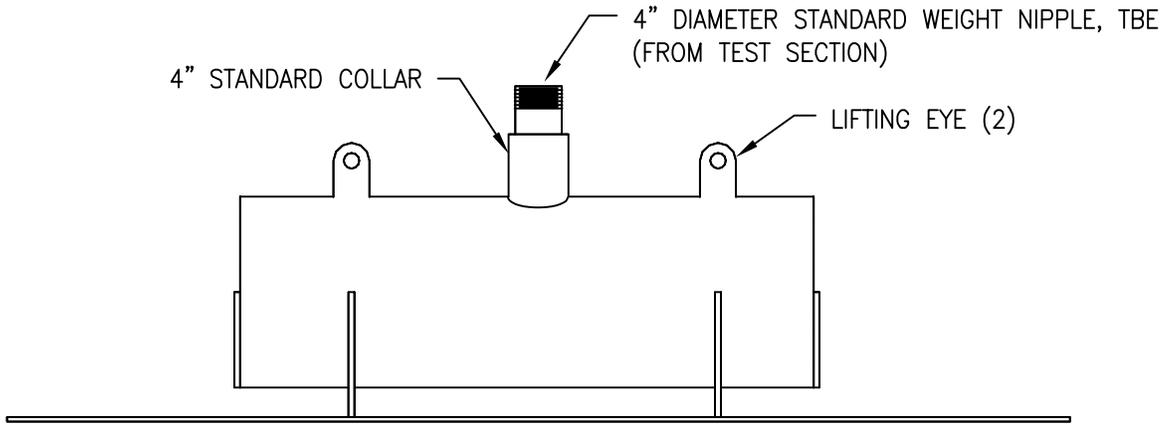
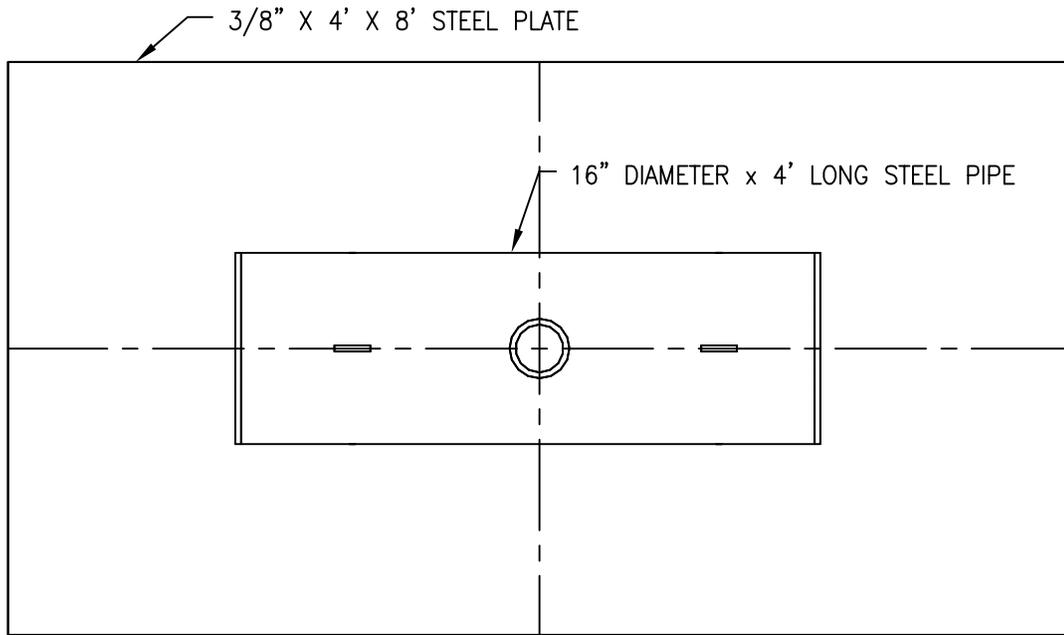


FIGURE 24



TYPICAL
WETLAND CROSSING
(PUSH PULL)

DRN BY EEI	CHK BY SS	APPRV DM	DATE 7/17/06	Scale NONE	Drawing No. TWC-02	Sht. 1 of 1	Rev 0
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NOTES:

1. ENERGY DISSIPATER TO BE ANCHORED.
2. ENERGY DISSIPATER MUST BE USED WITH FILTER BASIN AS APPROPRIATE (EG. STACKED, REINFORCED, DOUBLE OR TRIPLE HEIGHT SHOW BALES OR GEOTEXTILE FILTER FABRIC BLANKET).
3. LOCATE ON AN UPLAND AREA.
4. DO NOT DISCHARGE INTO WETLANDS OR WATERBODIES UNLESS PERMITTED BY APPROPRIATE AGENCIES.

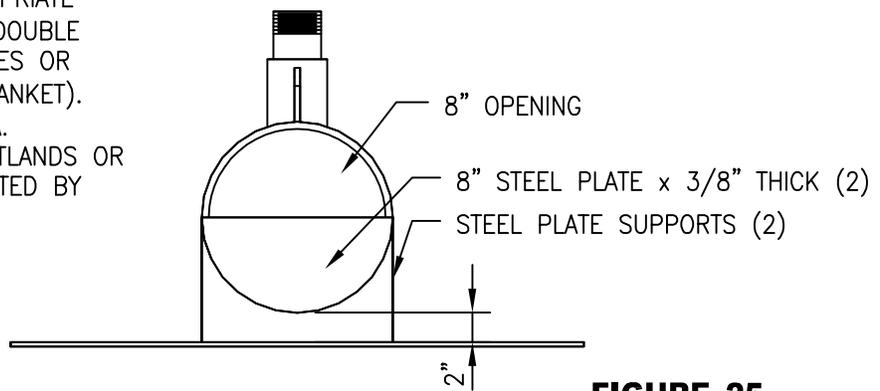
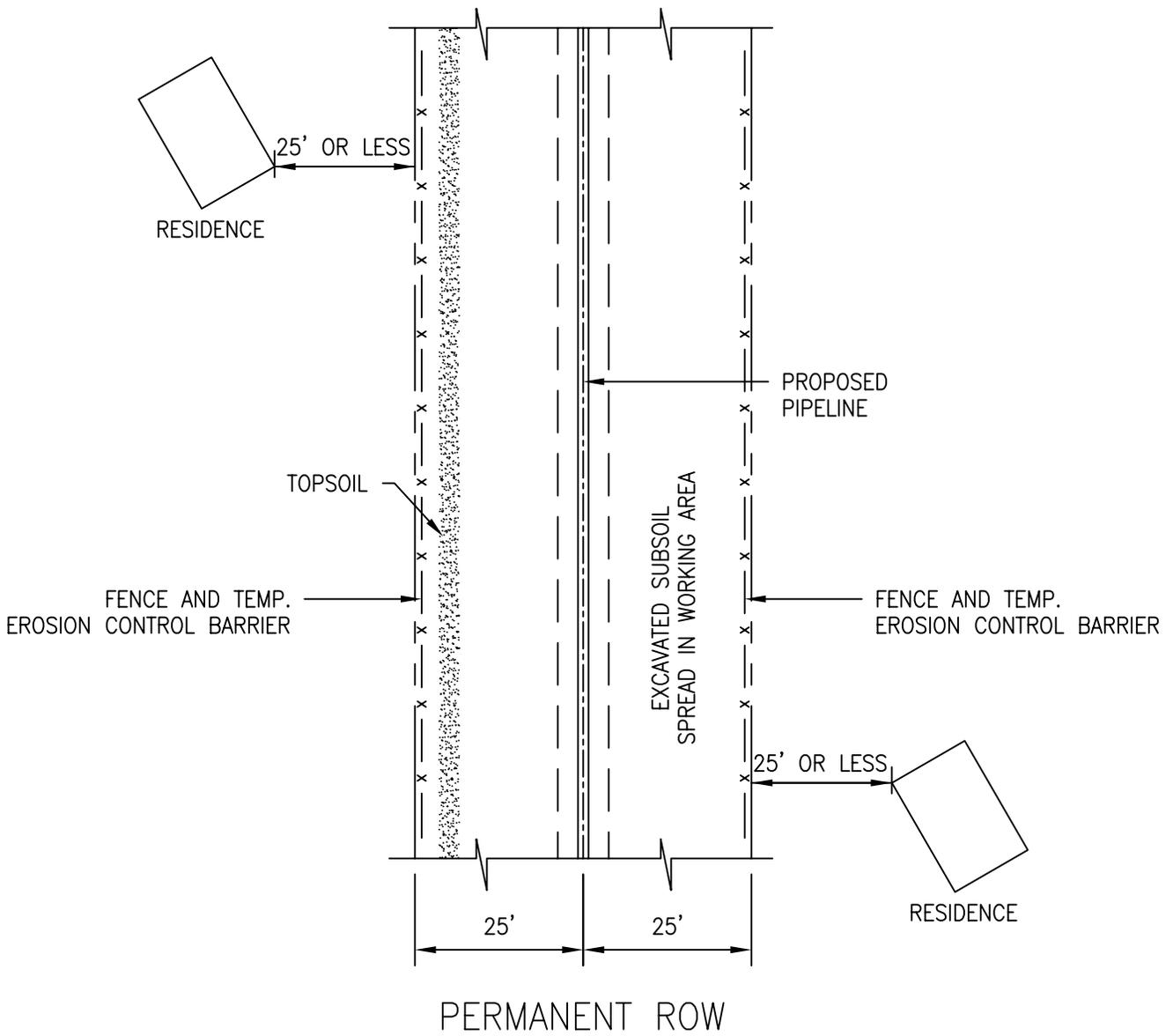


FIGURE 25



PIPE TEST ENERGY DISSIPATER

DRN BY EEI	CHK BY SS	APPRV DM	DATE 06/09/06	Scale NONE	Drawing No. PTED-01	Sht. 1 of 1	Rev 0
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- NOTES:
1. PIPE TO BE STOCKPILED OFF SITE
 2. REMOVE AND STORE TOPSOIL; PROTECT TOPSOIL FROM EROSION AND SEDIMENTATION BY USE OF SEDIMENT FILTER AND/OR MULCH.
 3. EXCAVATE DITCH ACCORDING TO OSHA SHORING PROCEDURES.
 4. SPREAD EXCAVATED SUBSOIL OVER WORKING AREA.
 5. FABRICATE PIPE IN DITCH OR TRAM IN 2-3 JOINTS OF PIPE WELDED AND COATED THEN MAKE TIE-IN WELDS IN DITCH.
 6. REPLACE EXCAVATED SUBSOIL AND TOPSOIL AND PLANT SEED IN ACCORDANCE WITH REGULATORY CONDITIONS.

FIGURE 26



TYPICAL CONSTRUCTION TECHNIQUES
IN RESTRICTED
RESIDENTIAL AREAS

DRN BY EEI	CHK BY SS	APPRV DM	DATE 12/20/06	Scale NONE	Drawing No. TCTRR-01	Sht. 1 of 1	Rev 0
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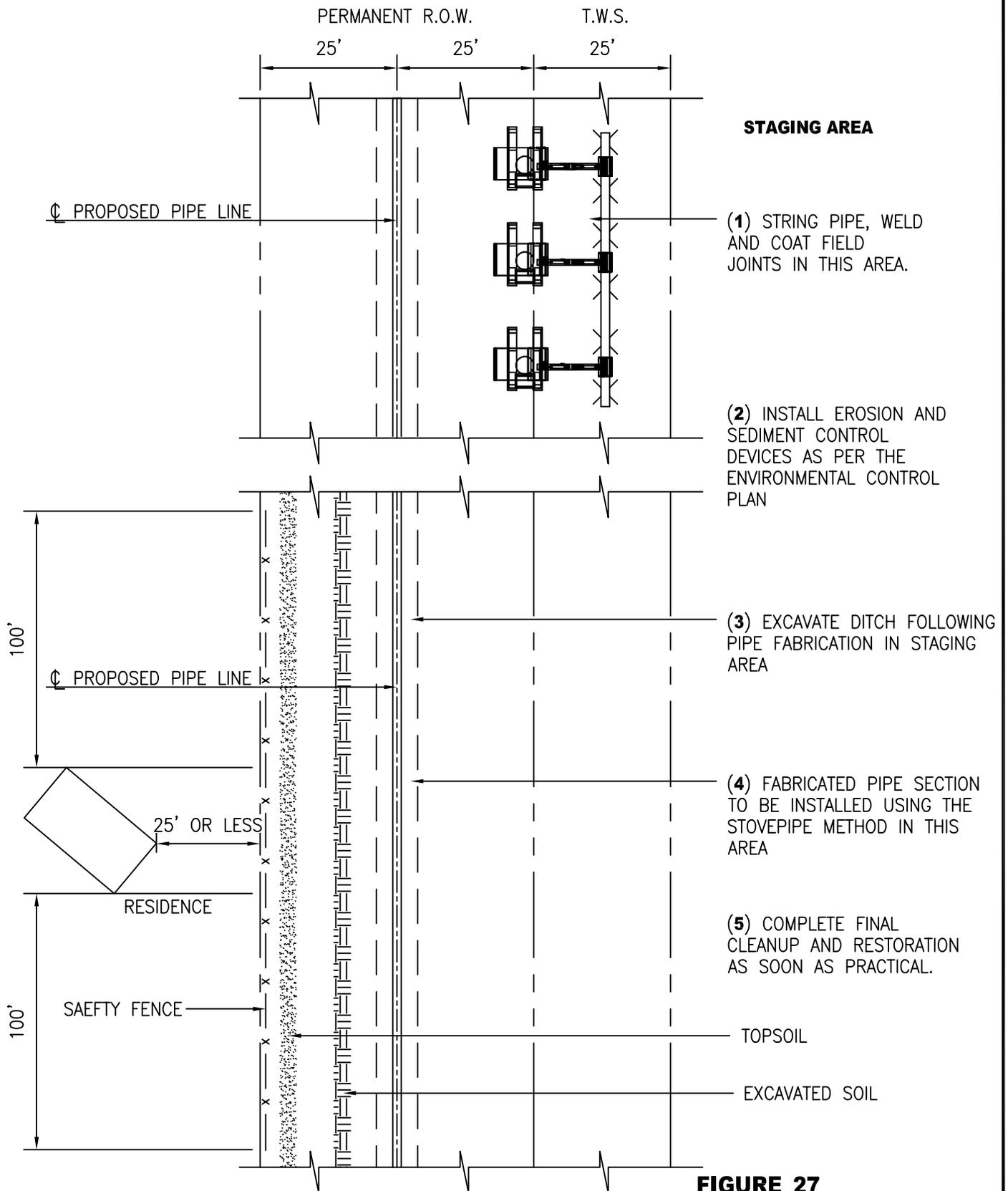


FIGURE 27



TYPICAL CONSTRUCTION
TECHNIQUES IN
RESIDENTIAL AREAS

DRN BY EEI	CHK BY SS	APPRV DM	DATE 12/12/06	Scale NONE	Drawing No. TCTRA-01	Sht. 1 of 1	Rev 0
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