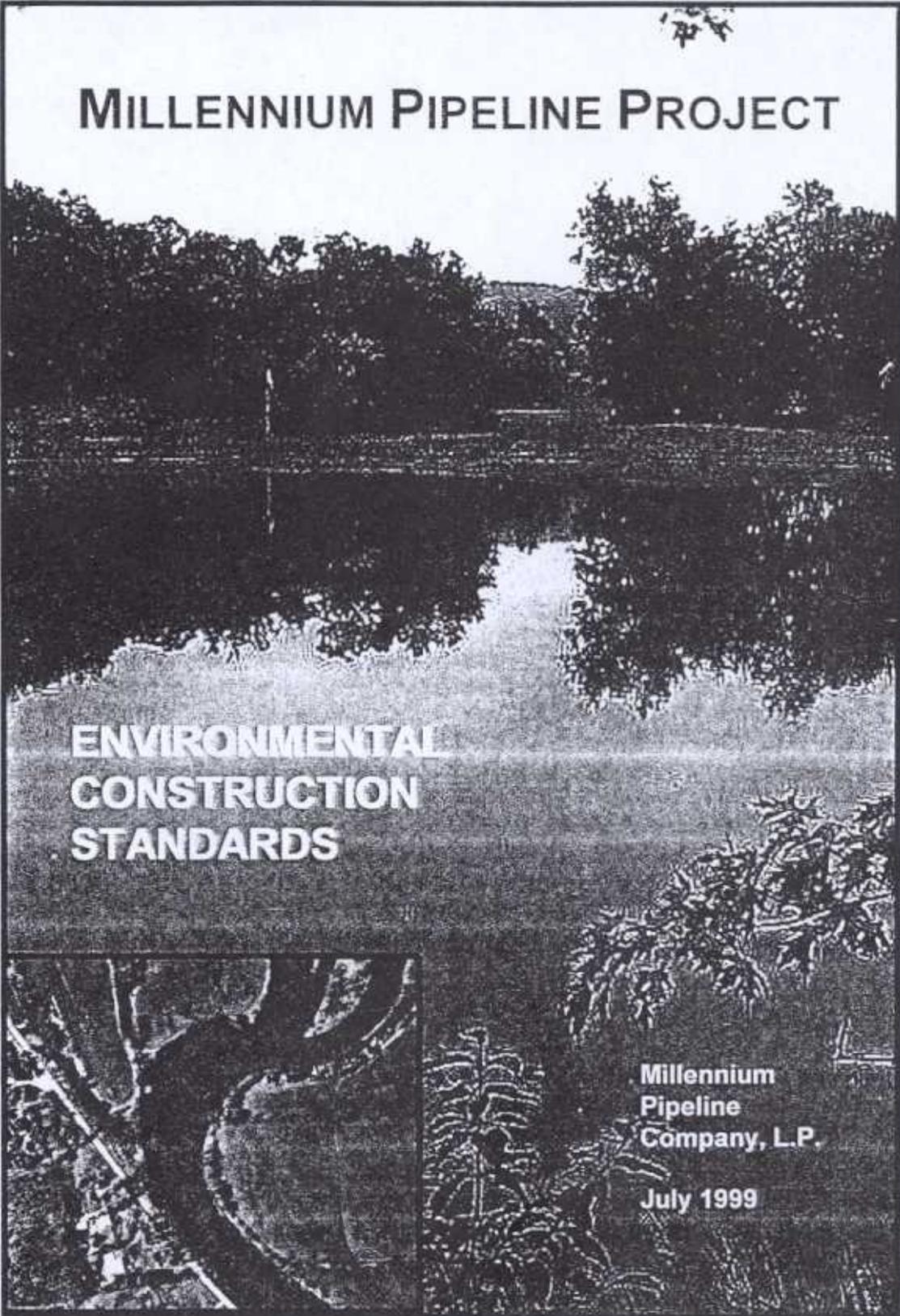


APPENDIX E1

MILLENNIUM'S ENVIRONMENTAL CONSTRUCTION STANDARDS



MILLENNIUM PIPELINE PROJECT

ENVIRONMENTAL CONSTRUCTION STANDARDS

Millennium
Pipeline
Company, L.P.

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I. INTRODUCTION

Millennium is committed to complying with the applicable environmental rules and regulations of federal, state, and local governments. Millennium's goal is to meet these requirements in the pursuit of a cleaner, safer environment for future operations.

Recognizing this goal, it is Millennium's policy that all construction, operation and maintenance activities be conducted in a safe manner that minimizes impacts on stream and wetland ecosystems, agricultural areas, wildlife habitat, cultural resources, and the human environment. To this end, Millennium has prepared these Environmental Construction Standards (**ECS**). The ECS is based upon FERC's Plan and Procedures and includes those requirements (by reference) as a minimum standard. The ECS also provides additional supplemental requirements that together with the FERC standards are the minimum requirements to be applied to all construction, operation, and maintenance activities for the Millennium Project.

The general objective of this ECS is to provide Millennium's personnel and contractors with instructional information, complete with a practical approach to environmental concerns that can arise before, during, and after facility construction. More specific objectives include:

- minimize impacts to environmentally sensitive areas; use the minimum land required for safe and efficient construction, operation, and maintenance of the facilities; adhere to applicable erosion and sedimentation policies during construction; and complete construction in a safe and timely manner.

Words and/or phrases which have special meaning (shown in **bold** at first occurrence in text) and acronyms have been defined in Table 1.

The intent of the ECS is to confine project-related disturbance to the identified construction work area (**CWA**) and to minimize erosion and enhance revegetation in those areas. Any project-related ground disturbance (including erosion) outside of these areas is subject to compliance with all applicable survey and mitigation requirements.

This ECS is the base document from which Millennium developed the construction alignment sheets (**CAS**). The CAS include written recommendations from the state and local soil conservation authorities or land management agencies for temporary and permanent erosion control, revegetation specifications, and mitigation.

II. UPLAND CONSTRUCTION

A. GENERAL

The **upland construction** spread operates as a moving assembly line performing specialized procedures in an efficient, planned sequence. Figure 1 presents this typical upland pipeline construction sequence. In addition, special construction crews install and alter fences, bore under major roads and railroads, install stream and **wetland** crossings that are not done by

conventional upland techniques, and construct valve settings and meter and regulator stations.

Specific standards for agricultural lands, streams, and wetlands are provided in Section III, Agricultural Construction and Section IV, Stream and Wetland Crossings, respectively.

While construction work is on-going, the CWA will be kept clean of all rubbish and debris resulting from the work. Non-hazardous materials and waste will be disposed of in an approved landfill. Hazardous materials and waste will be disposed of in accordance with all applicable Millennium policies and federal, state, and local regulations.

B. RIGHT-OF-WAY WIDTH

Millennium will obtain and use a 50-foot wide permanent right-of-way (*ROW*) and typically a 25-foot wide temporary construction *ROW* as illustrated in figure 2. In addition, where the pipeline is located adjacent to an existing *Columbia* pipeline, the existing cleared *ROW* may be used for excess spoil storage and travel by light-duty rubber tired vehicles. After the CWA is restored, the temporary work areas are allowed to revert to their previous uses and ownership. The permanent *ROW* is maintained as Millennium's permanent *ROW* for the facility. Figure 2 also illustrates the typical pipeline CWA when paralleling existing facilities.

In addition, there may be instances where extra work areas are needed for topsoil conservation, sidling construction, stream, river, and highway crossings, equipment staging, pipe and material storage, temporary and permanent access, and related construction activities. These areas are identified on the CAS.

C. CLEARING

The CWA is cleared to the width specified in the *ROW* agreements or CAS, whichever is less. During clearing operations, all brush and trees will be felled into the CWA to prevent off-CWA damage to trees and structures.

Large or valuable trees may be retained as specified in the *easement agreement*, provided they will not interfere with the safe construction, operation, or maintenance of the facility.

The clearing crew and related equipment will be permitted a single pass through streams prior to equipment crossing installations unless the stream is *high quality*.

1. Wood Products

Wood products (i.e. sawlogs, pulpwood, or cordwood) are the property of the landowner unless otherwise specified in the *easement agreement*. They will not be used for any purpose unless permission is first obtained from the landowner. When the landowner requests salvage of these materials, they will be stockpiled just off the CWA, but not within 50 feet of streams, floodplains, or wetlands. Equipment stacking the wood products will not leave the CWA. Usable timber that measures at least 10 inches in diameter at the

butt will be cut into pole lengths or as specified in the easement agreement.

2. Brush

All cleared brush will be disposed of by one of the following methods:

- Brush may be piled just off the CWA but not within 50 feet of streams, floodplains, or wetlands. Equipment stacking the brush will not leave the CWA. Brush piles will be constructed a maximum of 12 feet wide and compacted to approximately 4 feet high, with periodic breaks at a minimum of every 200 feet to permit wildlife travel. The landowner will be consulted to determine acceptable brush pile locations along the CWA. Brush may be burned where permitted by law provided necessary burning permits are obtained. Fires will be of reasonable size, not located in environmentally sensitive areas, and patrolled so that they will not spread off the CWA. The brush may be chipped. Chips will be given away, buried, or thinly spread (less than 2 inches thick) over the CWA or piled off the CWA per landowner request except in *agricultural lands* or within 50 feet of streams, floodplains, or wetlands. Chipping will be limited to those areas specified in the easement agreement. During *restoration*, soil will be augmented by the addition of 12 to 15 pounds of nitrogen (at least 50% slow release) per ton of chips to aid revegetation.

3. Fence Crossings

Where it is necessary to remove fences, adequate temporary fences or gates, as illustrated in figure 3, will be installed *immediately*. Such temporary fences or gates will be kept closed, except when necessary for construction purposes. Based on consultation with the landowner, temporary fencing will be installed along and/or across the CWA as necessary to protect livestock from active pipeline construction and open trenches. In addition, alternative pasturing/feeding arrangements may also be made.

Once construction is completed, permanent fence repairs will be completed. All fences that have been cut or removed will be permanently repaired or replaced during restoration to match the original type of the fence as much as possible. Where there is any doubt as to the usability of old fence material, new material will be used in making repairs. Fence posts will be installed to a depth that will prevent frost heave (normally 24- to 36-inches).

D. GRADING

Grading is necessary to provide a smooth and even surface for safe and efficient operation of construction equipment. Grading will be the minimum amount necessary and includes prompt installation of erosion control devices, such as interceptor diversions, *sediment filter devices*, and equipment crossings at streams to minimize soil loss and subsequent sedimentation.

1 Tree Stump and Rock Removal/Disposal

Tree stumps and large rocks will be cut, graded, or removed as necessary to permit construction and to provide adequate clearance for mechanical

equipment and other vehicles. Tree stumps that are adjacent to roads will be cut close to the ground or removed.

Stumps and large rocks will be disposed of in the following manner, pending landowner approval:

- buried within the CWA except in agricultural, residential, or wetland areas;
- cut flush with the ground using a stump grinder;
- windrowed just off the CWA with landowners' permission. Windrows will be a maximum of 12 feet wide with periodic breaks a minimum of 200 feet apart;
hauled from the site and disposed of in an approved landfill or other suitable area.

2. Topsoil Conservation in Non-agricultural Areas

Topsoil (up to 12 inches) will be stripped from the CWA in residential areas, and where the landowner requests. Figure 4 illustrates topsoil conservation techniques. The topsoil will be stockpiled separately from all subsoil and will be replaced last during *final grading*. Some erosion control devices are indicated on the CAS. The *Inspector* will determine if additional erosion control devices are needed in topsoil storage areas.

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

3. Erosion Control Devices Installed During Grading

Temporary erosion controls will be installed immediately after the initial disturbance of soil. The most effective and versatile erosion control devices are interceptor diversions and sediment filter devices as illustrated in figures 5, 6, and 7. Temporary diversions will be maintained during the construction phase until final diversions are installed. The CAS show the location of temporary interceptor diversions. Where required grading has significantly changed the slope, the Inspector may require more or fewer temporary diversions consistent with the table on figure 5.

All temporary erosion control devices, including roadside ditches, will be inspected near the end of each work day or after each storm event of 1/2 inch or greater, to ensure proper functioning. Any devices damaged beyond functioning will be repaired *promptly*.

4. Temporary Road Entrances

Temporary road entrances as illustrated in figures 8 and 9 will be installed during grading where the CWA crosses public roads when needed to maintain safe conditions and to prevent tracking soil and mud onto public roads. These installations are designed to remove mud from vehicle tires and tracks before accessing the road. In addition, public roads will be swept, shoveled, or scraped as necessary to keep the road surface safe. If the public road is gravel, the temporary entrance is not required to be graveled. Typical erosion control measures at road crossings are illustrated in figure 10.

E. ACCESS ROADS

Typically, Millennium requires access roads to the construction and staging areas. New access roads will be built only if existing access is inadequate. The access roads will be a maximum 25-foot wide with additional width in tight turns and at intersections with public roads. The roads will either be temporary (used for access during construction only) or permanent (used during and after construction for operation and maintenance of the facilities). All public roads are available for use as access roads without further approvals subject to posted weight restrictions. Safe and accessible conditions will be maintained at all roadway crossings and access points during construction and restoration.

Access road gradient will be as flat as local topography will practically allow. By breaking or changing grade frequently, fewer erosion problems will be encountered than on long, straight, continuous gradients. Interceptor diversions and/or other erosion and sediment control devices will be installed as needed.

At temporary road entrances, geotextile fabric and either rock or Terra Mats as illustrated in figures 8 and 9 or equipment pads will be used. The roadbed will be cleared of small stubs because these tend to puncture the fabric, thereby allowing fine particles to mix with the gravel.

Roads will cross streams and wetlands as close as possible to right angles. Road gradients approaching these crossings will be flattened to decrease runoff velocity. Runoff will be dispersed just prior to the crossing by means of an interceptor diversion with a sediment filter device at the outlet. Where conditions permit, new roads will be located at least 25 feet from any stream or wetland except at crossing locations. Culverts will be sized and placed to permit water flow under the access road.

After construction, temporary access roads (including any additional width used for construction) will be graded and left intact for the landowner's benefit, or removed and the area restored using the same specifications as applied to the CWA.

F. RESIDENTIAL AREAS

The following mitigation measures will be implemented for all residences within 50 feet of the CWA:

- mature trees and landscaping will not be removed from within the edge of the CWA unless necessary for safe operation of construction equipment;
- promptly after backfilling the trench, all lawn and landscaping restoration will commence, however an access lane may be temporarily retained if authorized by the Inspector;
- while the trench is open, the edge of the CWA adjacent to the residence will be safety fenced for a distance of 100 feet on either side of the residence to ensure that equipment, materials, and spoil remain within the CWA;
- a minimum of 25 feet will be maintained between the residence and CWA for a distance of 100 feet on either side of the residence. If the facility must be within 25 feet of a residence, it will be installed such that the

trench does not remain open overnight and in accordance with the appropriate detail in the CAS.

In those instances where construction has the potential to affect water quantity/quality from domestic or agricultural wells or springs in the proximity of the CWA, Millennium will offer to conduct pre- and post-construction (within two months of construction work restoration) testing of water wells within an appropriate distance (typically 150 feet) of the pipeline. Temporary construction fencing will be installed around any water supply well within the CWA prior to construction activities. These tests may include a pump inspection, flow rate, and bacteriological cultures. If a water well or spring used by the landowner is damaged as a result of Millennium's activities, Millennium will provide a temporary source of water and compensate the owner.

In those instances where the pipeline crosses private access roads, provisions will be made to ensure uninterrupted access along the road. These provisions will include promptly backfilling the trench and/or placing steel plates over the open trench or other similar measures as specified in the easement agreement.

G. TRAILS

For perpendicular trail crossings identified on the CAS Millennium will ensure safe and uninterrupted passage by:

- posting warning signs in each direction,
- erecting safety fencing,
- permitting hikers to safely cross the trench by leaving trench plugs or using other bridging devices,
- constructing and completing restoration through the area quickly, and
- coordinating with state and/or local park officials.

In addition, the trench will not be opened until the pipe is ready to be installed and the trench will be backfilled the same day. The trench will not be left open overnight within 100 feet of the trail crossing. These precautions will be taken regardless of the time of year. Figure 11 shows typical mitigation measures for trail crossings.

Site-specific plans for non-perpendicular trail crossings are provided on the CAS.

Millenium will notify the responsible agencies for any trail crossings at least one week in advance to commencing construction activities.

H. TRENCHING

1 Trenching Specifications

Typically, the trench will not remain open for more than 30 days in any area unless authorized by the Inspector (additional restrictions for stream and wetland areas are provided in Section IV).

As the trench is completed, trenchline breakers as illustrated in figure 12 will be installed promptly as shown on the CAS. Topsoil will not be used to construct the breakers. The breakers reduce water velocity and erosion of the trench bottom. All breakers will be maintained promptly.

- Sediment filter devices will be installed around spoil storage areas before digging bore pits.

If it is necessary to pump water from the trench or bore pits, the water will be pumped into a non-environmentally sensitive, heavily vegetated upland area, a sediment trap as illustrated in figure 13, or through a sediment filter device as illustrated in figures 6 and 7 at least 10 feet from any stream or wetland in order to minimize erosion and subsequent sedimentation of streams or wetlands. Water impounded in the trench will not be released directly or by overland flow into any *waterbody* or wetland.

When the trench must remain open for a greater length of time (i.e. hydrostatic test locations), appropriate erosion controls and safety measures will be employed as directed by the Inspector.

2. Blasting

All drilling and blasting will be done in a cautious manner, and suitable precautions will be taken to avoid injury or damage to persons, livestock, or other property. Landowners will be given timely notice (1 weeks' prior notice with at least 1 day confirming notice) prior to blasting.

If blasting is necessary within 150 feet of residential or commercial buildings/structures or other utilities, Millennium will hire an independent contractor to perform pre- and post-blast structural inspections and, if necessary, seismographic monitoring. Millennium will also contact all utility owners and request that an inspector from the company be present during construction across the utility line.

3. Temporary Construction Access Over the Trenchline

Where access across the trenchline is required, temporary facilities such as trench plugs or steel plates will be constructed or installed to permit safe crossing of livestock, vehicles, equipment, and persons from one side of the trench to the other. The access point will have #9 wire fence installed along both sides to prevent entry into the trench.

BACKFILLING SPECIFICATIONS

Backfilling will follow pipe lowering as closely as practical. Suitable material, but not topsoil, will be used to pad the pipe. Soil that has been excavated during construction and not used for backfill will be evenly spread over the cleared CWA or removed from the site and properly disposed. All waste materials such as barrels, cans, drums, stumps, coating and wrap, rubbish, waste, or other refuse will not be placed in the trench or left on the CWA.

Trenchline barriers as illustrated in figure 12 will be placed in the trench prior to backfilling as shown on the CAS to prevent water movement and subsequent erosion.

Excess rock, including blast rock, may be used to backfill the trench to the top of the existing bedrock profile once the pipe is properly padded.

J. FINAL GRADING, RESTORATION AND STABILIZATION

After construction activities, all disturbed areas will be stabilized with either (1) final grading and restoration; or (2) **temporary stabilization measures** in order to prevent erosion and sedimentation until final grading and restoration can be completed.

1. Final Grading

Final grading will be completed within 10 calendar days of backfilling, weather and soil conditions permitting. When conditions require a delay, the 10 day time frame will not start until conditions are suitable for grading. Should unsuitable soil conditions persist, or be expected to persist, for more than 14 calendar days, the Inspector will record the conditions and require the installation of temporary stabilization measures, and final grading and restoration will be delayed. In no case will final grading be delayed beyond the end of the next recommended seeding season.

If final grade can be established, but conditions are not ideal for permanent seeding, the Inspector will specify application of temporary stabilization measures (including temporary seeding), and may also consider concurrent application of final seed mix and mulch as provided in Table 2a or per the local soil conservation authority.

During final grading and with landowner permission (except in agricultural land), soil over the trench will be mounded to allow for future settling. If the landowner does not agree to this process, backfill will be "walked-in" with tracked construction equipment to minimize future subsidence. Where fill in the trench or major depressions have settled below ground level, additional fill will be added as needed, and the area brought to final grade. The Inspector may approve a temporary travel lane in the CWA where needed to facilitate the remainder of construction and/or restoration. This travel lane will be restored when access through the area is no longer required.

During final grading the slope may be altered from the original grade if the resulting grade will be more stable or provide other benefits to the environment, Millennium, and/or the landowner. Such variances will be processed in accordance with Section VII.H.

Conserved topsoil will be returned during final grading

Final erosion control devices will be installed during final grading. Sediment filter devices needed to protect off-CWA resources will be installed or rebuilt promptly after final grading. Final interceptor diversions will not be installed in agricultural or pasture land without landowner's consent.

Appropriate soil compaction mitigation (disking) will be performed in severely compacted residential areas.

2. Restoration

Restoration will begin within 6 days of final grading, weather and soil conditions permitting. Fertilizer and lime will be disked into the soil (except rocky soils) to a depth of 3 to 4 inches to prepare a seedbed. In rocky soils, fertilizer and lime may be incorporated into the soil with tracked equipment. Seeding and mulching the CWA will promptly follow seedbed preparation. If a mulch blower is used, the strands of the mulching material will be long enough to allow for anchoring. Mulch will be anchored promptly after installation with a crimping disk or tracked equipment. Mulch tacifiers used in accordance with the manufacturer recommendations may be used as an alternative.

Hydroseeding will not be used without the specific written authorization of Millennium's Permit Manager.

The typical application rates for lime, fertilizer, seed, and mulch are listed in Table 2a. They will be used unless the easement agreement, permit, or local Natural Resource Conservation Service (*NRCS*) provides project-specific recommendations.

The seed will be uniformly applied and covered in accordance with the written recommendations of the local soil conservation authorities or land management agencies.

In the absence of recommendations from the local conservation authority, a seed drill equipped with a cultipacker is preferred for application, but broadcast can be used at double the recommended seeding rates. Where seed is broadcast, the seedbed will be firmed with a cultipacker or roller after seeding.

Permanent seeding, liming, and fertilizing may be performed by the landowner as specified in the easement agreement. The Inspector (or operating personnel) will ensure that the restoration is satisfactory and consistent with the landowner's planned land use.

The turf, ornamental shrubs, and specialized landscaping will be restored as specified in the easement agreement. Restoration work will be performed by personnel familiar with local horticultural and turf establishment practices.

Steep slopes will be restored immediately after final grading, weather permitting.

Jute netting as illustrated in figure 14 or equivalent approved by the Inspector may be used on steep slopes to help stabilize the CWA.

3. Temporary Stabilization Measures

When the Inspector determines that temporary stabilization measures are required, they will be completed as soon as possible. The seeding and mulching application rates are provided in Table 2b. Consideration will be given to the following when determining if temporary stabilization measures are to be implemented:

- anticipated weather conditions; and
- resources on and off the CWA to be protected

If temporary stabilization measures are utilized, final grading and/or restoration will commence once weather and soil conditions permit.

Mulch will be applied in accordance with the specifications outlined in this section except when mulching before seeding. The mulch application on all 8 percent or greater slopes within 100 feet of waterbodies and wetlands will be at a rate of 3 tons/acre.

4. Restoring Man-Made Structures

All existing man-made installations that are disturbed or damaged during construction will be repaired or replaced and left in equivalent or better condition than they were found prior to construction, unless otherwise specified in the easement agreement.

Existing diversion terraces or ditches will be repaired or replaced in accordance with the original design specification if available. In particular, attention will be paid to ensure that highly impermeable subsoil material is used as trench backfill to restore the diversion. This material will be recompacted below surface.

5. Off-Road Vehicle (ORV) Control

The need for *ORV* control will be discussed with each landowner and park manager along new ROW (not adjacent to existing ROW) in forest lands. If requested, one or more of the following *ORV* control measures will be installed during restoration:

- Plant conifers (pine trees) across the CWA. The spacing of trees and length of CWA planted should provide for adequate facility maintenance, but should be sufficient to limit access and to screen the ROW from view. Trees will not be planted directly over the pipeline.
- Install a slash and timber barrier, a pipe barrier, or a line of boulders across the CWA to restrict vehicle access.
- Install a locking gate with fencing extending a reasonable distance to prevent bypass.
- Install "No Trespass" signs.
- Limit ROW maintenance to that shown in figure 28 for 100-foot back from the road.

K. NOISE IMPACT MITIGATION

Construction equipment will be properly muffled and maintained to avoid producing excessive noise near *noise sensitive areas*.

L. HYDROSTATIC TESTING

Millennium will verify the facility's integrity by hydrostatic testing. Water will be drawn from local sources (streams, ponds, public water supplies) as indicated on the CAS in a manner that will minimize impacts to the environment and other existing users, while maintaining adequate stream flow and such that no perceptible change in water level or flow rate occurs. |

Test headers will not be located within 50 feet of streams or wetlands with standing water or saturated conditions unless topographic conditions dictate otherwise. If test headers must be installed within 50 feet of streams and wetlands, additional sediment filter devices will be installed to prevent sediments from entering into the stream or wetland. Water from state designated high quality streams or streams utilized as public water supplies will not be used unless other water sources are not readily available and the jurisdictional state or local agency permits its use. Intake hoses will be screened.

Jurisdictional agencies will be notified of the intent to withdraw water from streams at least 48 hours before testing activities, unless they waive this requirement in writing.

All welds will be radiographically inspected before pipe installation under waterbodies or wetlands.

Millennium will attempt to discharge hydrostatic test water in the same watershed from which it was taken. Should the hydrostatic testing plan require otherwise, Millennium will develop an appropriate plan to disinfect the water, if necessary, prior to its release into the environment.

The discharge of the hydrostatic test water will be performed in a manner that minimizes erosion. The energy of the released test water will be dissipated by discharging the water:

- into a well-vegetated upland, non-agricultural area;
- into a transport trailer tank;
- into a tank(s) or holding pond if public water supplies are used;
- into a body of water (with all required permits); or
- through sediment filter devices or a sediment trap to filter out various particulate matter.

If necessary, the water discharge rate will be regulated using energy dissipation device(s), and/or sediment barriers to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow. During the discharge, the Inspector will ensure that erosion and sedimentation are properly controlled.

Methanol may be injected, after discharging the water, to dry the pipe. Excess methanol will be collected from the facility and disposed of in accordance with applicable state and local regulations.

III. AGRICULTURAL CONSTRUCTION

A. GENERAL

Construction through agricultural lands will normally occur on a 100- to 125-foot wide CWA to protect topsoil from the impacts of trenching, traffic, and construction activity. Millennium will utilize a minimum 100-foot wide CWA to accommodate topsoil segregation and will bury the pipeline with a minimum 4-foot of cover in agricultural areas that are not shallow to bedrock and allow for an additional 1-foot of cover under drainage tile (figure 15). In agricultural

lands that are shallow to bedrock, the pipeline will be installed with sufficient cover to place it entirely within the bedrock.

General procedures to be used for clearing and disposal of wood products and brush are identified in Section II.C. However, any cherry (*Prunus* spp.) trees and shrubs cut within pastures, including wood and foliage, will be disposed of immediately into non-pasture locations to avoid contact with livestock.

To the greatest extent practical, Millennium will conduct all topsoil conservation and restoration activities in agricultural lands between the last week in May and the first week in October. The **Agricultural Inspector**, in consultation with the Chief Inspector, Millennium's Permitting Manager and the New York Department of Agriculture & Markets, will be responsible for determining if soil and weather conditions are suitable for topsoil removal/restoration activities outside these timeframes. The Agricultural Inspector is also responsible for informing the Chief Inspector when conditions (such as wet weather) make it necessary to restrict construction activities in agricultural lands regardless of the time of year.

Excess rock will be removed from at least the top 20-inches of soil to the extent practicable in all rotated and permanent agricultural lands, pastures, residential areas, and other areas as specified in the easement agreement. The size, density, and distribution of rock within the CWA should be similar to adjacent areas not disturbed by construction.

Organic soils such as the "black dirt" region in Warwick NY will require site-specific agricultural construction and mitigation procedures. These procedures will be shown on the CAS.

Access to hydrostatic test locations within agricultural lands will be via access roads other than the construction ROW, if available. If suitable alternative access is not available, restoration will not be completed for that entire field until hydrostatic tests are complete.

After construction, temporary access roads (including any additional width used for construction) through agricultural land will be removed and the area restored using the same specifications as applied to the CWA for topsoil conservation, subsoil decompaction and rock removal; etc.; unless the access is to be regraded and left intact for the landowner's specific benefit.

B. TOPSOIL CONSERVATION

Topsoil (up to 16 inches) will be stripped from the CWA in annually cultivated or rotated agricultural lands and in idle or fallow fields, and where the landowner requests. Figure 15 illustrates topsoil conservation techniques. The topsoil will be stockpiled separately from all subsoil, and will be replaced last during final grading. Topsoil will not be used to pad the pipeline, fill sacks for trenchline barriers or for any other purpose. Some erosion control devices for topsoil are indicated on the CAS. The Inspector will determine if additional erosion control devices based on field conditions are needed in topsoil storage areas.

C. SUBSOIL CONSERVATION

In agricultural lands where bedrock is less than 20-inches deep, at least 2/3 of the subsoil will be stripped from the CWA and stockpiled separately from the conserved topsoil and trench spoil. As an alternative, imported subsoil approved by the Agricultural Inspector can be used. The subsoil will be replaced over the bedrock as part of final grading. Imported subsoil, as needed, will be used as cover over rock backfill to deter its uplift by frost action.

D. BACKFILLING

The trench will be de-watered prior to backfilling. The specifications provided in Section II.H will be followed.

During backfilling, the subsoil will be crowned over the trench to allow for subsequent settling. This subsoil will be "walked in" or otherwise allowed to settle prior to topsoil replacement.

Excess rock, including blast rock, may be used to backfill the trench provided it is deeply buried (greater than 30-inches in mesic soils or 36-inches in frigid soils below the final grade) and the pipe is properly padded.

E. SOIL DECOMPACTION

Millennium will decompact subsoil twice to ensure proper aeration, drainage, and root penetration. Millennium will limit equipment travel in decompacted areas to the extent practical and will require additional decompaction for areas where construction access is still required. Once topsoil replacement has begun, all travel will be restricted to farmland restoration equipment. Prior to topsoil replacement, Millennium will rip and/or chisel the subsoil with a deep ripper or heavy duty subsoiler to at least 16-inches in depth, adjusted to meet site-specific conditions, and attempt to separate and remove rocks 4 inches or larger in size lifted to the subsoil surface, except where subsoil is excessively naturally stony. These rocks will be deeply buried (greater than 30-inches in mesic soils or 36-inches in frigid soils below the final grade) within the trench or collected and disposed of elsewhere in an appropriate upland location in consultation with the landowner or off-site. After topsoil replacement is complete, Millennium will shatter the subsoil again with a paraplow, remove any additional rocks uplifted during the decompaction process, and limit traffic on the CWA to prevent recompaction.

Soil compaction tests for both subsoil and topsoil within the CWA will be conducted and recorded in agricultural areas during final grading. Tests of subsoil must be performed before topsoil is restored to ensure complete depth of subsoil ripping throughout the CWA.

Hand-held US Army Corps of Engineers-style (*COE*) cone penetrometers or other similar devices (e.g. soil compaction tester) will be used to test for compaction. Tests will be performed at least once during subsoil decompaction and once after topsoil replacement on each agricultural property, though the Agricultural Inspector may conduct more testing as needed.

F. RESTORATION

Attempts will be made to coordinate restoration activities with the landowner's planting schedule where practicable. Should the Agricultural Inspector determine that soil conditions unsuitable for final restoration exist, he will record the conditions and require the installation of temporary stabilization measures (including temporary seeding), and final grading and restoration will be delayed. Among the methods used by the Agricultural Inspector is the Atterberg test for soil plasticity. In no case will final restoration be delayed beyond the end of the next growing season.

Permanent interceptor diversions will not be installed in agricultural lands unless otherwise specified in the easement agreements.

Active pasturelands will not be mulched unless grazing deferment plans have been developed with willing landowners, grazing permittees, and land management agencies, as appropriate, to minimize grazing disturbance of revegetation efforts.

G. DRAINAGE TILE AND IRRIGATION FACILITIES

Millennium has contacted landowners and/or the local NRCS to locate drainage tile facilities and irrigation systems. These facilities are located on the CAS. When advised by the landowner or NRCS that a landowner contemplates (within 3 years) the installation of drainage tile in areas crossed by the pipeline, the pipeline will be installed at a sufficient depth to accommodate the drainage tile and within US Department of Transportation (DOT) specifications.

All drainage tile crossed by construction activities will be marked and probed with a sewer rod or pipe snake to determine if damage has occurred. Drainage tile removed, cut, broken, or otherwise damaged during construction will be repaired or replaced as illustrated in figures 16 and 17. Qualified personnel will be used for all testing and repairs. Temporary measures approved by the Inspector will be taken to provide suitable drainage until permanent repairs are made.

Water flow will be maintained in crop irrigation systems unless shutoff is coordinated with the affected parties.

H. MONITORING

All agricultural portions of the CWA will be monitored for crop productivity, inordinate soil settling, excessive soil compaction, excessive rocks, and excessive wetness for 2 years following completion of restoration activities. Persons knowledgeable in these issues will undertake the monitoring. Final soil compaction tests of the soil profile's topsoil and subsoil horizons will be done under appropriate soil moisture conditions (moderately moist for most soils). Comparative tests will be done on soils of similar characteristics from undisturbed areas adjacent to the CWA. Compaction measurements of disturbed areas should be equal or less than that of adjacent undisturbed areas. Any portion of the CWA that is compacted greater than the adjacent agricultural lands will be decompacted again and re-tested. Should any of these conditions occur as a result of Millennium's construction and/or restoration activities, appropriate mitigative actions (i.e. importing additional

topsoil, performing additional decompaction, additional rock removal, and/or installing additional drain tile) will be undertaken by Millennium.

IV. STREAM AND WETLAND CROSSINGS

A. STREAM CROSSINGS

1. General

The main objective of any waterbody crossing is to construct the pipeline in a manner that minimizes erosion and subsequent sedimentation into the waterbody. Crossings will be constructed as close as possible to right angles with the waterbody channel. Adequate downstream flow rates will be maintained at all times to protect aquatic life and prevent the interruption of existing downstream uses. Each waterbody crossing will be treated as a separate construction entity, such that trenching, pipe installation, backfilling, and temporary stabilization measures or restoration are completed in the minimum number of consecutive calendar days possible. Whenever a time limit is imposed on a crossing procedure, that time limit is only applicable to trenching (except blasting), lowering in, and backfilling. Clearing, grading and equipment crossing installation and removal activities are not included as part of the "separate construction entity". Construction equipment will not be allowed in the water except as provided in this Section.

Unless expressly permitted or further restricted in the CAS, crossings must be constructed during the following time windows:

- Coldwater Fisheries - June 1 through September 15
- Coolwater and Warmwater Fisheries - June 1 through November 30

Millennium will notify authorities responsible for potable water supplies at least 1 week, or as required by state or local regulation, prior to any waterbody crossing.

When water levels are temporarily high, the Inspector will direct that starting any waterbody crossing be postponed until water levels subside.

The CWA will be as specified in the CAS. Pipe assembly for the waterbody crossing will usually be performed in the CWA prior to or concurrently with trenching.

Standards relating to spill prevention at waterbodies are contained in Section V., "Spill Prevention, Containment and Control".

If the facility parallels a waterbody, an attempt will be made to maintain at least 15 feet of undisturbed vegetation between the waterbody and the right-of-way except at the crossing location. Where waterbodies are adjacent to the CWA, sediment barriers will be installed along the edge of the CWA as necessary to contain spoil and sediment.

2. Crossing Techniques

Millennium will typically utilize either the dry-ditch (flume pipe or dam and pump) or wet-ditch techniques to install pipelines across waterbodies. Figures 18, 19 and 20 illustrate these methods. The site-specific methods to be used are shown on the CAS. Upland construction techniques may be used for **intermittent waterbody** crossings without perceptible flow at the time of the crossing, provided that a culvert is installed to carry stormwater flow across the trench area and the erosion and sediment control devices illustrated in figure 21 are installed.

3. Clearing

Tree and brush clearing will be performed as previously described in Section II, "Upland Construction". All cleared materials will be disposed of at least 50 feet from the water's edge.

4. Grading

Grading equipment will not enter the water to grade the banks. Waterbody banks will be graded only where, and as much as, necessary to permit safe and efficient operation of construction equipment. Initial grading within 25 feet of the water's edge will be limited to only the area needed to install the equipment bridge and any temporary work space. Any additional grading to the water's edge will be timed such that it immediately precedes trenching and pipe installation activities. During grading operations, sediment filter devices will be installed promptly as close to the water as practical. All disturbed areas within 50 feet of the water's edge will be promptly mulched. The mulch will be maintained until the waterbody crossing restoration is complete. Spoil from grading will be piled at least 10 feet from the water's edge and immediately protected with sediment filter devices so that it will not erode into the waterbody.

Construction equipment bridges consisting of culvert(s) with clean rock backfill or equipment pads as illustrated in figures 22 and 23 will be installed during grading operations at all waterbodies. For proper culvert installation, the Inspector may permit grading equipment to enter the water. Equipment bridges will not be required at **minor waterbodies** that do not have a state-designed fishery classification (for example, agricultural, or intermittent drainage ditches). However, if an equipment bridge is used, it will be constructed in accordance with the ECS.

5. Trenching

Notifications to jurisdictional agencies will be made at least 2 days prior to any trenching in waterbodies.

Prior to trenching within the waterbody, water impounded in the upland trench will be pumped into a sediment filter device, sediment trap, or heavily vegetated area.

Sediment filter devices for trench spoil will be installed prior to commencing trenching activities. Sediment filter devices will be temporarily removed from the trench line to allow trenching activities to proceed.

Trench spoil from the waterbody will be piled at least 10 feet from the water's edge (topography permitting) and protected by sediment filter devices. All spoil will be placed in the CWA at least 10 feet from the water's edge.

The minimum depth of cover for all waterbody crossings will be 4 feet in normal soils and 2 feet in consolidated rock.

Trench plugs will be used at all non-flumed waterbody crossings to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody. Trench plugs will be of sufficient size to withstand upslope water pressure.

6. Blasting

During the pre-planning of waterbody crossings, an evaluation (usually with a backhoe) will be made concerning the need for blasting. If the evaluation is inconclusive, the waterbody bed will be tested for consolidated rock prior to trenching.

Blasting will not be done within waterbody channels without prior approval from government authorities having jurisdiction and at least 2 days prior notice to the authority must be provided.

If the waterbody bottom is consolidated rock, it can be drilled and shot at any time prior to commencing the crossing. However, removal of shot rock, and any additional drilling, shooting, and material removal, will be completed within the minimum number of consecutive calendar days practical. The time frame for completing the crossing will immediately commence once a trench of appropriate dimensions is established.

7. Backfilling

Waterbody bottoms will be returned as near as practical to their original contours. Spoil from the trench will be used as backfill. Clean gravel or native cobbles will be used for the final 1-foot of fill in the backfilled trench in all coldwater fisheries.

The sediment filter devices at the water line will be promptly reinstalled after backfilling.

8. Restoration

The preferred method is to achieve final grade and restore the waterbody, its banks, and 50 foot buffers within 24 hours of backfilling. In the absence of site-specific seeding recommendations, the specifications listed in Table 2a will be used. If conditions do not permit the preferred method, the CWA not in use for access will be promptly rough graded and stabilized in accordance with Table 2b.

Waterbody banks will be stabilized and temporary sediment barriers installed within 24 hours of completing the crossing. For dry-ditch crossings, bank stabilization will be completed before returning flow to the waterbody channel.

Asphaltic emulsions will not be used to stabilize mulch within 100 feet of waterbodies. Liquid mulch binders will not be used within 100 feet of waterbodies.

All equipment bridges will be removed once access in the area is no longer required.

Replacement of waterbody banks will be at the approximate original contour. If the waterbody banks are such that an unstable final soil grade could result and vegetative stabilization would be inadequate, the Inspector will require mechanical stabilization of the waterbody banks. Mechanical stabilization includes riprap, gabions, jute netting, etc.

Disturbed riparian areas will be revegetated with conservation grasses and legumes or native plant species, preferably woody species.

Riprap will be of field or quarry run stone, which is hard and durable. The riprap will be large enough to prevent normal waterbody current from moving it, typically 6-inch rock for slow moving waterbodies and 12-inch or larger rock for others. The riprap will be placed at least 18-inches thick and generally thicker at the base. The riprap slope will be no steeper than 50% and should conform to the remainder of the waterbody bank slopes where they are flatter than 50%. Proper installation may require extending the riprap beyond the CWA. These installations will be coordinated with the *Environmental Inspector* and Millennium's Permitting Manager.

Erosion control fabric, such as jute thatching or bonded fiber blankets will be installed at a minimum, on waterbody banks at the time of final bank recontouring. Erosion control fabric will be anchored with wooden stakes.

Sediment filter devices will be removed once permanent revegetation is successful.

B. WETLAND CROSSINGS

1. General

The main objective of any wetland crossing is to minimize construction-related disturbance and restore the original contour of the wetland. Wetlands will be marked in the field with the provided signage by a knowledgeable person prior to the start of construction. The Inspector will maintain these field markings during construction.

Aboveground facilities will not be located in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with US Department of Transportation regulations.

When water levels are temporarily high, the Inspector will direct that construction in the wetland will be postponed until after the water levels subside.

Water impounded by beaver dams will be siphoned off as opposed to breaching the dam. Siphons will typically consist of 4-inch flexible, plastic

pipe. Water will be discharged in a manner that will not increase sedimentation or scour into adjacent wetlands or waterbodies.

Staging areas for wetland crossings will be located as indicated on the CAS.

The only access roads, other than the CWA, that will be used in wetlands are those existing roads that can be used with no modification and no impact on the wetland. Additional clearing in wetlands along access roads will not be permitted. Within the wetland area, silt fence will be installed along both sides of the road and mats will be placed in the road prior to any further use.

Construction equipment operating in wetland areas will be limited to that needed to clear the CWA, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the CWA. All other construction equipment will use access roads located in upland areas to the maximum extent practicable. Where access roads in upland areas do not provide reasonable access, all other construction equipment will be limited to one pass through the wetland using the CWA.

A typical wetland crossing is illustrated in figure 24

Mulch will not be used as a temporary erosion control measure in wetlands.

Standards relating to spill prevention at wetlands are contained in Section V, "Spill Prevention, Containment and Control".

2. Crossing Techniques

For wetland crossings without standing water or saturated soils, upland construction techniques will be used provided the top 12 inches of soil is conserved from graded areas, the trench and areas designated for temporary storage of non-wetland spoil. As an alternative, sub-soils can be placed on 6 inches of mulch and retrieved during subsequent backfilling operations. The duration of construction related disturbance will be minimized to the extent practical.

Wetland crossings with standing water or saturated soils will be constructed as separate construction entities, such that trenching, pipe installation, backfilling, and restoration are completed in the minimum number of consecutive calendar days necessary. Clearing, grading, and equipment crossing installations are not included as part of the separate construction entity. The "push-pull" or "float" technique of pipe installation will be utilized whenever water and other site conditions permit.

3. Clearing

Tree and brush clearing will be performed as previously described in Section II, "Upland Construction", except that vegetation will be cut off at ground level leaving the existing root systems in place. All cut vegetation will be removed from the wetland for disposal.

4. Grading

Grading in wetlands will consist of the minimum necessary for safe and efficient equipment operation. No grading or removal of stumps or root systems from the rest of the CWA in wetlands will occur unless the Chief Inspector and Environmental Inspector determine that safety-related construction constraints require removal of tree stumps from under the working side of the CWA. The Inspector will note areas where stumps are removed so they can be replanted with woody vegetation as described in "Wetland Restoration".

Equipment pads, board roads, corduroy (no more than 2 layers), and/or construction equipment with wide tracks will be used in wetlands with standing water or saturated soils. Tree stumps, rock, soil imported from outside the wetland or brush will not be used to stabilize the CWA or as equipment pads in wetlands. All equipment pads, board roads, and corduroy will be removed during restoration of the wetland.

Where wetlands are adjacent to the CWA, sediment barriers will be installed along the edge of the CWA as necessary to prevent sediment flow into the wetland. Sediment barriers will be removed only after successful CWA restoration.

Sediment filter devices will be installed promptly across the CWA during grading at any wetland edge and maintained until CWA revegetation is complete. Temporary interceptor diversions will be installed adjacent to wetlands. Relative locations of these devices are illustrated in figure 24.

5. Trenching

Sediment filter devices can be temporarily removed from the trenchline to allow trenching activities to proceed. Spoil piles will be protected with sediment filter devices as shown on the CAS or if determined necessary by the Inspector to prevent the flow of spoil off the CWA.

6. Blasting

During the pre-planning of crossing wetlands with standing water or saturated soils, an evaluation will be made concerning the need for blasting. If the evaluation is inconclusive, the wetland will be tested for consolidated rock prior to trenching. If the wetland has consolidated rock, it will be drilled and shot as part of the single construction entity. Topsoil will be removed from the trench area prior to blasting in wetlands without saturated soils.

Blasting mats will be used in wetland areas (except those with standing water) during blasting operations.

7 Backfilling

If trench dewatering is required, the water will be discharged through a sediment trap, or into a heavily vegetated area outside the wetland, so that no silt-laden water enters directly into the wetland. Spoil from the trench will be used as backfill. The surface will be recontoured as closely as practical to the original so that drainage patterns will not be changed. In wetlands

without standing water or saturated soils, the conserved soil layer will be returned to the surface during backfilling.

Sediment filter devices will be promptly installed after backfilling.

Where the pipeline trench may drain a wetland, trenchline barriers will be constructed to seal the trench bottom as necessary to maintain the original wetland hydrology.

Concrete coating activities will not take place within 100 feet of any wetland.

8. Restoration

Upon completion of construction in wetland areas with standing water or saturated soils, all access improvements will be promptly removed. In the absence of specific recommendations from conservation authorities, the seed mix and rate specified in Table 2c will be used. Fertilizer or lime will not be used, unless required in writing by a jurisdictional agency.

Asphaltic emulsions will not be used to stabilize mulch within 100 feet of wetlands. Liquid mulch binders will not be used within 100 feet of wetlands.

Where stumps have been removed, woody vegetation adapted to wetlands will be replanted, except within 5 feet of the pipeline centerline or appurtenances (figure 25).

For all forested wetlands affected Millennium will:

- plant native trees to ultimately restore the CWA except for the maintained portion of the permanent ROW to its preconstruction state;
- plant native shrub and herbaceous species to revegetate the 30-foot wide portion of the permanent ROW selectively maintained as described in Section VI.C.; and,
- consult with the US Fish and Wildlife Service (*FWS*), the Environmental Protection Agency (*EPA*), the COE, and the appropriate state agency to determine the density for planting the native trees and shrubs.

V. SPILL PREVENTION, CONTAINMENT AND CONTROL

A. GENERAL

All efforts will be made to prevent spills of any amount of petroleum products or polluting materials. The following will be followed to help avoid spills and minimize the impact of spills that accidentally occur:

Bulk quantities up to 5,000 gallons of diesel fuel and 5,000 gallons of gasoline will be stored in up to 3 locations (the fuel depots) for each spread. Adequate spill containment measures, such as containment dikes with a capacity for at least 100% of the maximum storage volume combined with impervious lining will be installed before fuel storage tanks are filled, and will be maintained throughout the Project. Bulk quantities of hazardous liquids (e.g., solvents and lubricants) will be stored at the fuel

depot locations. The Chief Inspector will have available a Material Safety Data Sheet (*MSDS*) sheet for each hazardous material on site.

- Generally, fuel will be stored at the equipment staging areas and as much equipment as practical will be refueled there. Any equipment that must be refueled in the field will be fueled from tanks carried to the work site. Fuel carriers (greater than 110 gallons capacity) will not be permitted to cross wetlands or ford waterbodies. Equipment refueling will not be performed within 100 feet of any waterbody or wetland, except by hand-carried cans (5 gallon maximum capacity), when necessary. If construction equipment must be refueled within 100 feet of a waterbody, the procedures outlined in the site-specific drawing for that waterbody will be followed. Care will be taken during refueling not to overfill or spill fuel onto the housing of equipment.

Refueling are will be located hydraulically down gradient and outside aquifer protection areas, whenever possible, and if located within an aquifer protection area, the refueling area will be lined.

Lesser quantities of fuel (up to 500 gallons) and solvents and lubricants (e.g., motor oils, hydraulic fluid) may be stored along the CWA as necessary to service equipment used on the Project (quantities vary depending on the size of the construction spread being used), provided that this storage does not conflict with other parts of this plan. Sorbent booms and clean-up kits will be kept at all storage locations.

All fuel storage areas will be located at least 100 feet from streams, ponds, or wetlands; at least 200 feet from active private water wells, and at least 400 feet from municipal water wells, unless using an operational fuel storage area established on Millennium property. Equipment servicing, lubricating, and refueling will also be in accordance with these requirements whenever possible. Where these conditions can not be met, the Environmental Inspector will prepare a supplemental Spill Prevention, Control, and Countermeasure (*SPCC*) plan, based on field conditions, to protect these resources.

Use of hazardous materials for vehicle maintenance will follow the same requirements mentioned above for equipment refueling. Impervious or sorbent materials will be placed under the work area before the work begins. Additional sorbent materials will also be readily available. Waste materials created during maintenance (e.g., used oil) will be collected for proper disposal. An Inspector will inspect the work site and the vehicle after the maintenance work is complete to ensure that all hazardous materials are properly contained. All waste material, including partially used or empty containers, discarded parts, clean up rags, and used sorbent materials, as well as discarded hazardous materials containers (e.g., oil cans, grease tubes), will be collected and placed in open-top drums for proper disposal.

- All motor fuel, lube oil, chemicals, and other polluting substances will be tightly sealed and clearly labeled during transportation and storage.
- Fuel trucks, pumps, mechanics' vehicles, the contractor's foremen's vehicles, Inspectors' vehicles, and all vehicles working within aquifer protection areas and public water supply watersheds will be equipped with spill kits containing absorbent materials approved for petroleum products. Construction equipment will not be washed in any waterbody or wetland, nor will runoff resulting from washing operations be permitted to directly enter any waterbody or wetland area.

Construction equipment, vehicles, materials, hazardous materials, chemicals, fuels, lubricating oils, and petroleum products will not be

parked, stored, or serviced within 100 feet of all waterbodies and wetlands.

All equipment will be inspected daily for leaks prior to beginning work in aquifer protection areas, waterbodies or in wetlands. Steps will be taken to repair leaks or remove the equipment from service, if necessary.

B. Spill Cleanup

- Spills occurring during construction, operation, and maintenance will be reported immediately to the Inspectors, and Millennium's Permitting Manager at 607-773-9116. Millennium's Permitting Manager will contact the appropriate agencies if the spills are of a reportable quantity.

If a spill should occur, Millennium will take immediate action to ensure that the impact of the spill is minimized, and to see that appropriate cleanup action is immediately undertaken.

In the event of a spill into or in the vicinity of bodies of water or wetlands, the following will occur immediately:

- the source will be immediately stopped;
- the spill will be contained by placing sorbent booms or constructing dikes;
- the spill will be collected with sorbent materials, skimmed off water surfaces with booms, and/or the contaminated soil will be excavated; and the waste materials will be properly disposed in accordance with Millennium policy.

The affected areas will be restored as closely as possible to their previous condition.

If the spill is such that Millennium or the on-site contractor cannot immediately and effectively respond, Millennium's contractor who specializes in spill cleanup will be employed.

VI. MAINTENANCE

A. GENERAL

Maintenance of Millennium's ROWs will be an ongoing process that will be governed by Millennium policy, certificate, and permit conditions, and easement agreements. Full width vegetation maintenance clearing will 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 will full width vegetation maintenance clearing occur between April 15 and August 1 of any year.

Maintenance activities will be performed with emphasis on preservation and enhancement of the environment. All applicable certificate and permit conditions will be incorporated into the future maintenance plan for the facility.

Specific procedures will be developed in coordination with the appropriate agency to prevent the introduction or spread of noxious weeds and soil pests resulting from construction and restoration activities.

B. UPLAND AREAS

Agricultural lands will be monitored as discussed in Section III. Agricultural Construction.

The ROW will be maintained by mowing or other mechanical means. Herbicides will not be used.

Plant growth on the ROW and in the erosion control devices will be inspected regularly and maintained for the life of the facility. Follow-up inspections will occur after the first and second growing seasons. Revegetation will be considered successful if perennial non-nuisance vegetation is similar in density to adjacent undisturbed land. If revegetation is not successful, the area will be restored as soon as practical. If vegetative cover and density are not similar or there are excessive noxious weeds after 2 full growing seasons, a professional agronomist will determine the need for additional restoration measures (such as fertilizing or reseeding). The agronomist's recommendations will be implemented as soon as possible.

Problems with drainage and irrigation systems resulting from construction activities will be reported to the local operations supervisor. Corrective measures will be performed as needed.

Erosion, landslide, subsidence and/or sinkhole problems on the facility ROW and access roads will be reported to the local operations supervisor. Corrective measures will be performed as needed provided the problem resulted from construction or operation of the facility. Erosion control devices that are no longer required may be removed at the discretion of the local operations supervisor. Similarly, additional erosion control devices will be installed as required.

All temporary sediment barriers will be maintained in place until permanent revegetation measures are successful or the upland areas adjacent to wetlands, waterbodies, or roads are stabilized. Temporary sediment barriers will be removed from an area once that area is successfully restored.

Efforts to control unauthorized ORV use, in cooperation with the landowner, will continue throughout the life of the project. Signs, gates, and vehicle trails will be maintained as necessary.

C. WATERBODIES, WETLANDS, AND ENVIRONMENTALLY SENSITIVE AREAS.

Millennium will work cooperatively with appropriate government agencies in an effort to minimize the impacts of ROW maintenance in waterbodies, wetlands, and other environmentally sensitive areas.

Vegetation maintenance will be limited adjacent to waterbodies to allow the growth of a riparian strip at least 25 feet wide, as measured from the waterbody's mean high water mark. Figures 26 and 27 illustrate ROW

maintenance standards near waterbodies. Figure 28 illustrates ROW maintenance standards near other environmentally sensitive areas.

In wetland areas a corridor up to 10 feet wide centered on the pipeline will be maintained in an herbaceous state. In addition, trees that are located within 15 feet of the pipeline and are greater than 15 feet tall may be selectively cut. Stumps will be left in-place. All felled trees will be removed from the wetland.

Attempts will be made to prevent the invasion or spread of undesirable exotic vegetation (i.e., purple loosestrife and phragmites) within wetland areas disturbed during construction. Typically, these efforts are limited to Millennium's wetland construction techniques.

The success of wetland revegetation will be monitored annually for the first 3 years after construction. Revegetation will be considered successful if the cover of native herbaceous and/or woody species is at least 80 percent of the total area, and the diversity of native species is at least 50 percent of the diversity originally found in the wetland. If revegetation is not successful at the end of 3 years, Millennium will develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively revegetate the wetland with native wetland herbaceous and woody plant species. Revegetation efforts will be continued until wetland revegetation is successful.

At certain locations on Millennium's system, listed threatened, endangered, or special concern species and their habitats have been identified. In addition, eligible cultural resources, wetlands, and other environmentally sensitive areas may also have been identified. In these instances, the CAS include maintenance provisions that will be adhered to for the life of the facility.

VII. ENVIRONMENTAL CONSTRUCTION MANAGEMENT AND INSPECTION

A. GENERAL

Millennium is the responsible party for compliance with the environmental conditions contained in the CAS, which includes all permits and other approvals. One or more Environmental and Agricultural Inspectors will be assigned to each spread and will report to the Chief Inspector. Agricultural and Environmental Inspectors will have peer status with all other activity inspectors.

B. ENVIRONMENTAL INSPECTOR

The Environmental Inspector will be an individual who, by training and experience, is qualified to deal with all aspects of environmental management during construction. The Environmental Inspector is responsible for assuring that the construction activity is performed in accordance with the environmental conditions of the CAS and the ECS.

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

- ensuring compliance with the requirements of the CAS, ECS, and any permits or certificates obtained for the Project;

- verifying that the limits of authorized CWA and locations of access roads are properly marked before clearing;
 - identifying stabilization needs in all areas;
 - locating dewatering structures and interceptor diversions to ensure they will not direct water into known cultural resource sites or locations of sensitive species;
- 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 will be stopped and the design of the discharge will be changed to prevent reoccurrence;
- ensuring restoration of contours and topsoil;
- approving imported soils for use in residential areas;
- ensuring that temporary erosion controls are properly installed and maintained, daily if necessary;
- inspecting temporary erosion control measures at least on a daily basis in areas of active construction or equipment operation, on a weekly basis in areas with no construction or equipment operation, and within 24 hours of each storm event with greater than 1/2 inch of rainfall;
- ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification;
- keeping records of compliance with the environmental conditions of the CAS and other federal or state environmental permits during active construction and restoration;
- establishing a program to monitor the success of restoration. Implementation of this program may be transferred to operating personnel upon completion of construction and restoration activities;
- looking for evidence of contamination and, if found, ceasing activities in that area and notifying the Chief Inspector and Millennium's Permitting Manager and waiting for further instruction. If the contamination is determined to be hazardous, an experienced hazardous waste contractor will be mobilized to handle the waste; the hazardous waste contractor will follow a site-specific health and safety plan and standard operating procedures for working in hazardous environments.

C. AGRICULTURAL INSPECTOR

The Agricultural Inspector will be an individual who, by training and experience, is qualified to deal with all aspects of agricultural management during construction. The Agricultural Inspector is responsible for assuring that the construction activity is performed in accordance with the agricultural conditions of the CAS and the ECS.

At a minimum, the Agricultural Inspector(s) will be responsible for the following in agricultural lands:

- ensuring compliance with the requirements of the CAS, ECS, and any permits or certificates obtained for the Project;
 - verifying that the limits of authorized CWA and locations of access roads are properly marked before clearing;
- determining the depth of topsoil;
- verifying the location of drainage and irrigation systems;
- identifying stabilization needs in all areas;

testing subsoil and topsoil to measure compaction and determine the need for corrective action;

confirming that rock removal efforts are satisfactory;

- informing the Chief Inspector when conditions (such as wet weather) make it necessary to restrict construction activities in agricultural lands;
 - determining where delayed restoration in agricultural lands is required;
 - ensuring restoration of contours and topsoil;
 - approving imported soils for use in agricultural lands;
 - keeping records of compliance with the agricultural conditions of the CAS and other federal or state agricultural permits during active construction and restoration;
- establishing a program to monitor the success of restoration. Implementation of this program may be transferred to operating personnel upon completion of construction and restoration activities;

D. LEAD ENVIRONMENTAL SPECIALIST

A Lead Environmental Specialist will be assigned to each spread. The Lead Environmental Specialist will report to Millennium's Permitting Manager and will be an individual who, by training and experience, is qualified to deal with all aspects of environmental management during construction. The Lead Environmental Specialist will be responsible to work in an advisory capacity to the Chief, Agricultural, and Environmental Inspectors. The individual will also be responsible for preparing weekly reports, attending and reporting at morning Inspectors' meetings and monitoring all activities during construction. The Lead Environmental Specialist will have peer status with all other activity inspectors.

E. ENVIRONMENTAL TRAINING

Millennium's Permitting Manager will be responsible for assuring that the Agricultural and Environmental Inspector(s) and other Inspectors have been trained in all environmental aspects of the activity, and fully understand the environmental conditions contained in the CAS. In addition, Millennium's Permitting Manager will ensure that all contract personnel have environmental awareness training prior to commencing work on the Project.

F. CONTRACTOR'S ENVIRONMENTAL COMPLIANCE SPECIALIST

All contractors will be required to provide at least 1 Environmental Compliance Specialist per spread. This specialist will become thoroughly familiar with the CAS. The specialist will be responsible for the contractor's efforts to install and maintain environmental control devices and for construction in environmentally sensitive areas. Contractor's specialist will work in cooperation with Millennium's employees responsible for environmental compliance.

G. ENVIRONMENTAL CONSTRUCTION MANAGEMENT

The Agricultural Inspector, Environmental Inspector, and Lead Environmental Specialist will have the authority to stop work on a particular construction function if it deviates from the environmental conditions of the CAS. The deviation will be reported immediately to the Chief Inspector, Environmental or Agricultural Inspector, and Lead Environmental Specialist. Further, each

functional inspector will report any environmental deviation immediately to the Inspector and the contractor's foreman. The Chief Inspector will be responsible for the resolution of the deviation after consultation with the Lead Environmental Specialist.

Stop work authority for the entire spread's construction activity rests with the Chief Inspector or Millennium's Construction Manager.

H. ENVIRONMENTAL VARIANCES

Unapproved variances from the CAS and ECS will not be permitted. Any proposed variance will require written approval from Millennium's Permitting Manager prior to commencing the activity. The approval for a variance will be issued only after appropriate agencies (those having jurisdiction over the affected resources, e.g. COE for "waters of the United States", DEC for issues relating to the water quality certification and/or state jurisdictional wetlands, and FERC for all issues) have been contacted. Such contact will typically consist of a telephone call from Millennium's Permitting Manager followed by written documentation if determined necessary by the regulatory agency. In instances where written approval is not practical (i.e., emergencies and weekends), verbal approval may be given provided that written confirmation is provided as soon as possible. .

VIII. EMERGENCY CONSTRUCTION

In the event of an emergency, the Chief Inspector will take such action as is necessary to contain the emergency giving due regard to minimizing environmental impact. In conjunction with other Millennium policies, the requirements contained in the ECS will be followed as closely as possible. Emergencies will be reported to the appropriate agencies when time allows.

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- Figure 6 - Sediment Filter Device - Silt Fencing**
- Figure 7 - Sediment Filter Device - Staked Bales**
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- Figure 9 - Temporary Road Entrance - Terra-Mats**
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- Figure 26 - Right-of-Way Maintenance - Wetlands**
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TABLE 1
DEFINITION OF TERMS

AGRICULTURAL INSPECTOR:

The Inspector responsible for agricultural compliance

AGRICULTURAL LANDS:

Permanent or rotated croplands, improved pasturelands and hayfields
Typically, a rotated field can be identified by the lack of woody vegetation.

Construction Alignment Sheets are the drawings used to portray the Project routing, environmental details, and other information needed to construct the Project. These drawings are included in the bid documents and subsequent construction contract(s).

CHIEF INSPECTOR:

The Chief Inspector reports directly to the Zone Construction Manager and is the individual responsible for managing all inspection activities during construction. The Chief Inspector supervises a team of inspectors including clearing, grading, welding, backfilling, restoration, and environmental.

U.S. Army Corps of Engineers

COLUMBIA:

Columbia Gas Transmission Corporation

CWA:

The construction work area includes but is not limited to permanent and temporary ROW, contractor's yards, pipe and materials storage yards, and access roads.

EASEMENT AGREEMENT:

Legal document used to secure Company rights for construction, operation and maintenance of the facilities. The easement agreement normally includes the specific special conditions negotiated between the Company and the landowner that will be adhered to during construction, operation and maintenance of the facilities.

ECS:

Environmental Construction Standards

ENVIRONMENTAL INSPECTOR:

The Inspector responsible for environmental compliance

EPA:

Environmental Protection Agency

FINAL GRADING:

Includes returning the CWA as closely as practical to its original contour, redistributing conserved topsoil, soil compaction testing in agricultural lands, and installing final interceptor diversions.

FWS:
U.S. Fish and Wildlife Service

TABLE 1 (continued)
DEFINITION OF TERMS

HIGH QUALITY STREAM:

A cold water fishery or significant warm water fishery classified as C(t) or higher by the New York State Department of Environmental Conservation.

IMMEDIATELY:

Without interval of time; "right now".

INSPECTOR:

Any of the Chief Inspector, Agricultural Inspector, Environmental Inspector, Lead Environmental Specialist, or any other inspector assigned to do an environmental task.

INTERMEDIATE WATERBODY:

A waterbody greater than 10 and less than 100 feet at the water's edge at the time of construction.

INTERMITTENT WATERBODY:

A waterbody channel which generally carries water in the Spring or immediately after a rain event; designated on topographic maps with a broken line and indicated in the CAS stream crossing table.

MILLENNIUM:

Millennium Pipeline Company, L.P.

MILLENNIUM'S PERMITTING MANAGER:

The Permitting Manager reports directly to the Facility Development Project Manager and is the individual responsible for managing activities needed to acquire all environmental and archaeological permits and approvals for the Project. These activities include:

- preparation of the environmental and cultural resource reports, and/or permit applications;
- answering data requests from FERC and other agencies;
- preparing, obtaining approvals and providing training on the environmental construction plans;
- coordinating permitting activities with other disciplines to ensure consistency for the Project.

The Permitting Manager is also responsible for compliance with environmental requirements during construction and restoration activities.

MINOR WATERBODY:

A waterbody less than or equal to 10 feet wide at the water's edge at the time of construction.

MSDS:

Material Safety Data Sheet

NOISE SENSITIVE AREA:

Includes residences, schools, churches, cemeteries, hospitals, and outdoor amphitheaters.

NRCS:

Natural Resource Conservation Service

ORV:

Off-road vehicle.

PERENNIAL WATERBODY:

A waterbody which generally flows all year in years of normal rainfall; waterbody level is generally lowest in the Fall, highest in the Spring; designated with a solid line on topographic maps and indicated in the CAS stream crossing table.

PROMPTLY:

By the end of the work day.

TABLE 1 (continued)
DEFINITION OF TERMS

RESTORATION:

Includes fertilizing, liming, disking, seeding and mulching, and crimping mulch.

ROW:

Right-of-way.

SEDIMENT FILTER DEVICE:

Properly embedded silt fence or staked bales (figures 6 and 7).

SPCC:

Spill Prevention Control and Countermeasure Plan

STEEP SLOPE:

Slope of 33% or greater.

TEMPORARY STABILIZATION MEASURES:

Includes installing temporary interceptor diversions and sediment filter devices, mulching critical areas, and seeding if necessary to hold soil in place until final grading and restoration can be accomplished.

UPLAND CONSTRUCTION:

All areas which are not waterbodies, rivers, or wetlands.

WATERBODY:

Includes any natural or artificial waterbody, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes.

WETLAND:

An area of special concern with soils prone to holding water for long periods of time, generally also characterized by distinctive plants such as rushes, sedges, cattails, or certain shrubs/trees. Includes any area that satisfies the requirements of the current Federal methodology for identifying and delineating wetlands.

Includes all grammatical variations of each term

TABLE 2a

SEED MIX REQUIREMENTS FOR CWA AND WATERBODY CROSSINGS

Type		Rate (lbs/acre) ¹
Seed	Orchard Grass and/or Switch Grass	20
	Birdsfoot-Trefoil (Empire) ²	7
	Annual Rye	10
Fertilizer	10-10-10 (or equivalent)	600 ³
Crushed Limestone		4000
Mulch	Hay or Straw	4000
<p>1 Pure Live seed within 12 months of testing. 2 Legumes to be inoculated at 4 times recommended rate. 3 Where wood chips are spread, additional slow release nitrogen will be spread (12 to 15 lbs per ton of chips.)</p>		

TABLE 2b

SEED MIX FOR TEMPORARY STABILIZATION

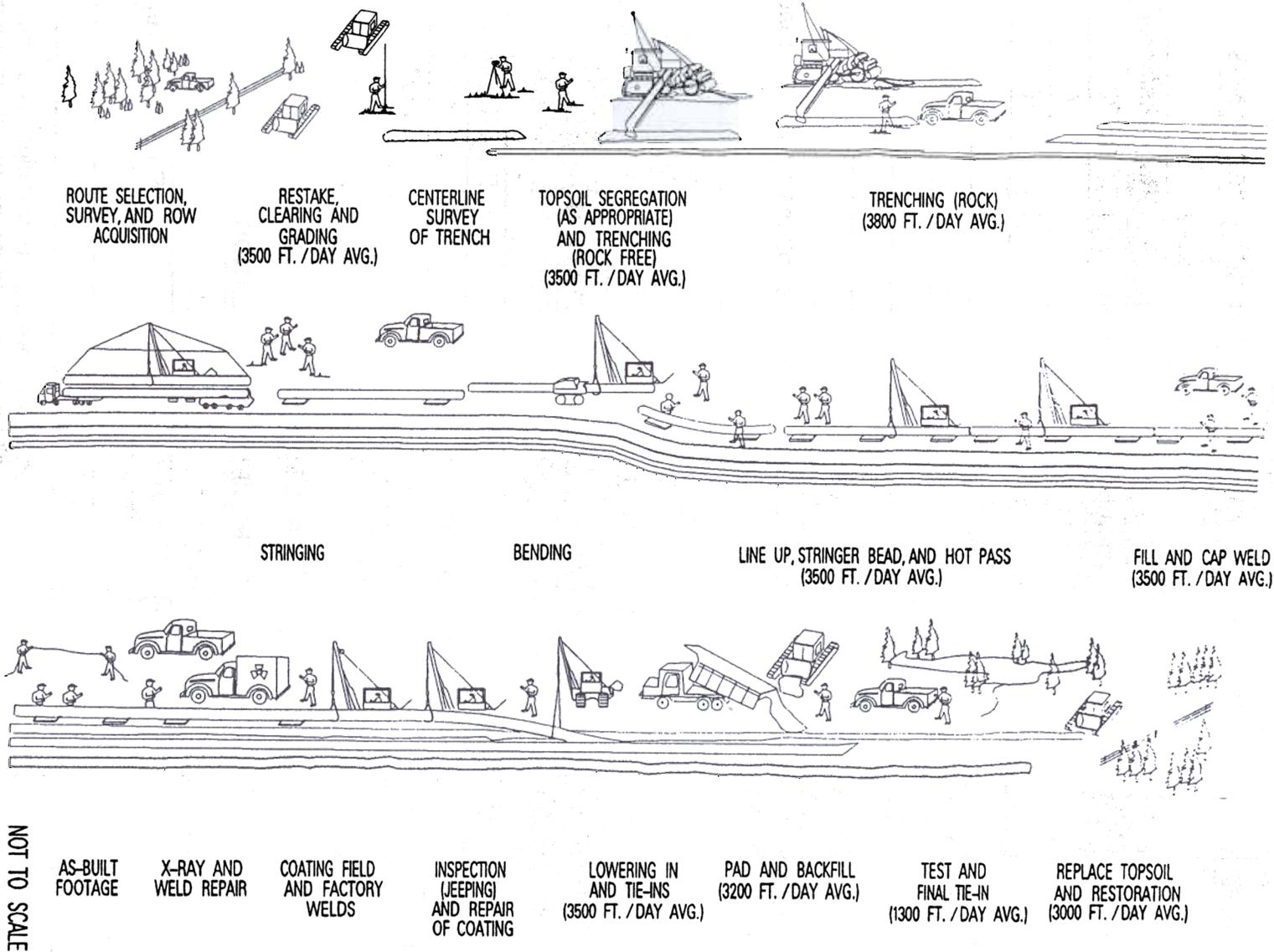
Type		Rate (lbs/acre)
Seed	Annual Rye	40
Mulch	Hay or Straw	6000

TABLE 2c

SEED MIX REQUIREMENTS IN WETLANDS

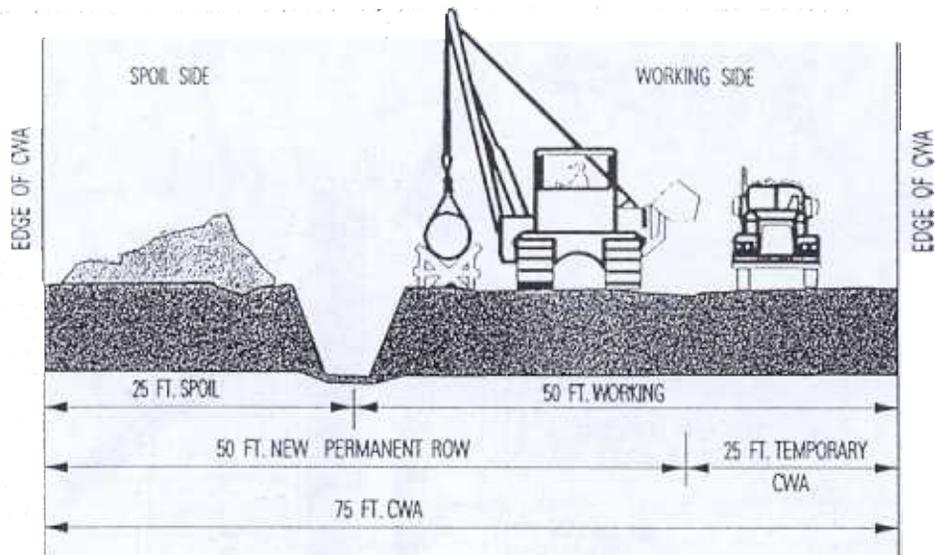
Type		Rate (lbs/acre)
Seed	Annual Rye	40
<p>* Annual Rye is used as a temporary re-vegetative measure until indigenous plants re-establish cover. A monitoring program will be in effect to insure adequate cover is established.</p>		

MILLENNIUM PIPELINE

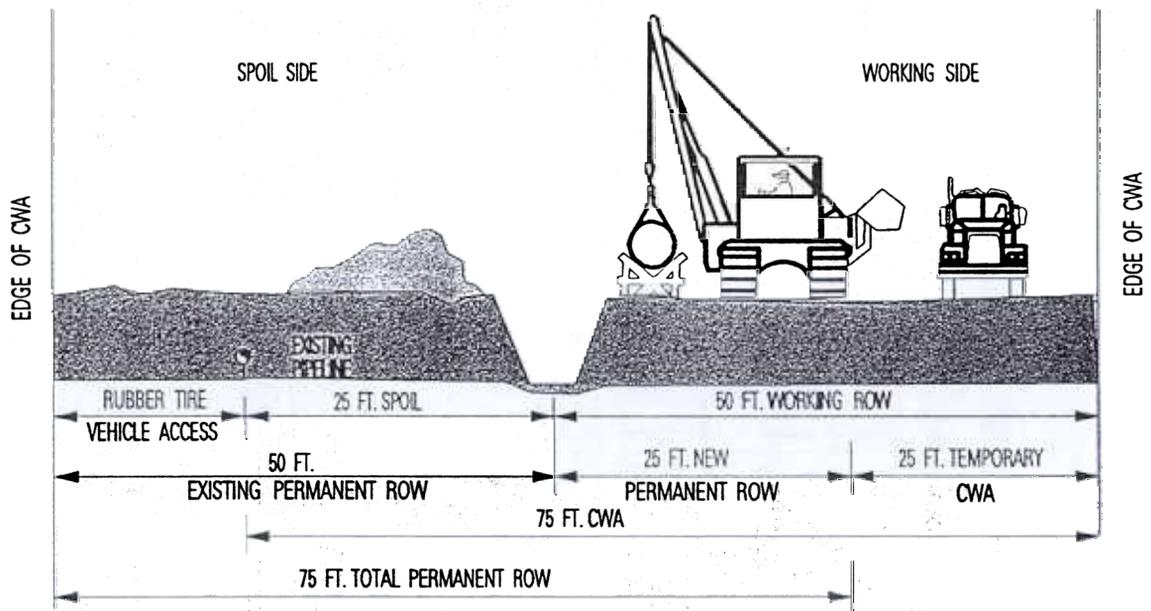


TYPICAL UPLAND PIPELINE CONSTRUCTION SEQUENCE

FIGURE 1



NEW ROW & LIFT AND LAY



PARALLEL TO EXISTING ROW

NOTES: 1. THE DIMENSIONS SHOWN ON THIS FIGURE ARE TYPICAL, REFER TO CONSTRUCTION ALIGNMENT SHEETS FOR SPECIFIC CWA DIMENSIONS.

NOT TO SCALE

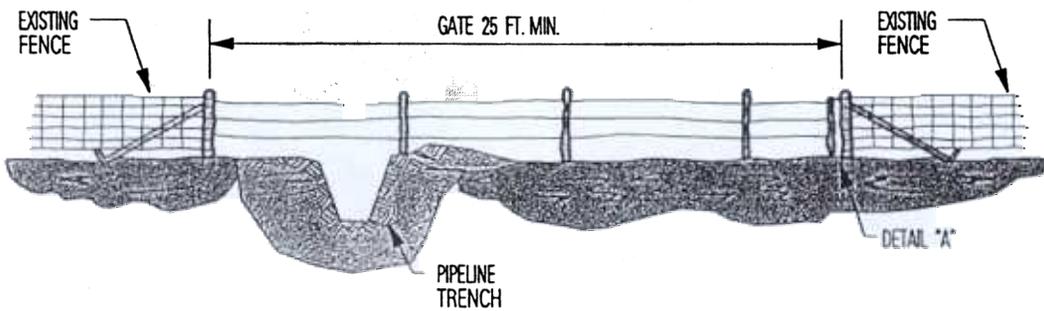
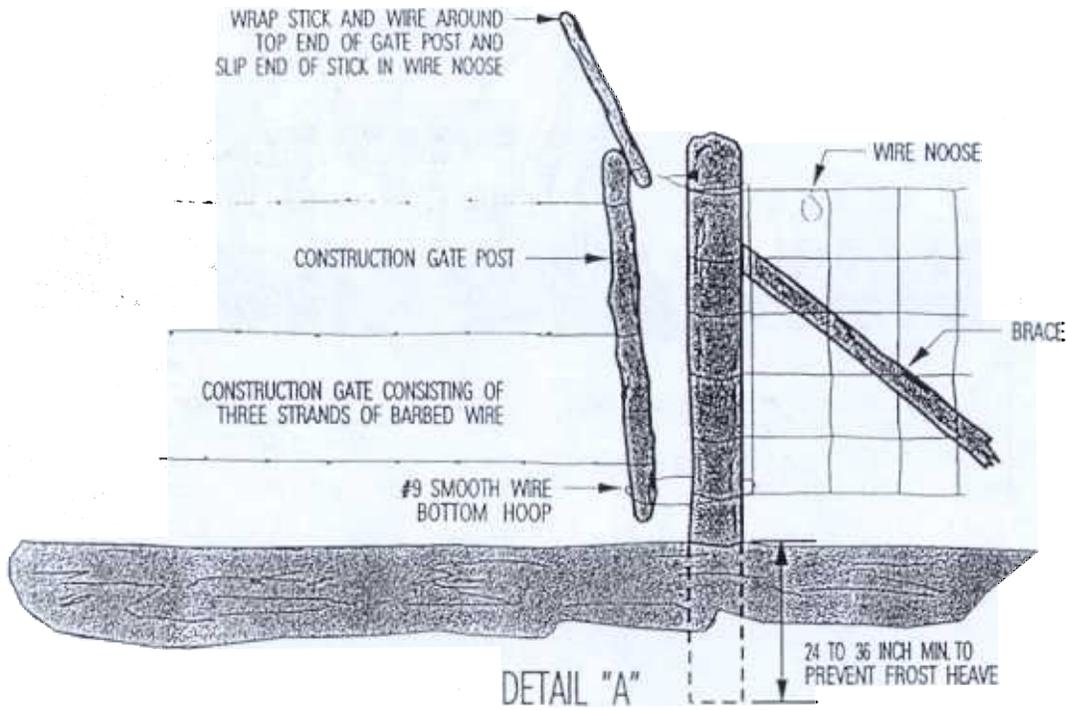


**MILLENNIUM
PIPELINE™**

ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL UPLAND
CONSTRUCTION
WORK AREA

FIGURE 2



- NOTES:
1. IF EXISTING FENCE POSTS ARE STEEL "T" BAR TYPE, THEN REMOVE THE STEEL "T" BAR POST ON BOTH SIDES OF THE GATE OPENING AND REPLACE WITH TEMPORARY WOODEN POSTS, BRACED AS SHOWN.
 2. SUITABLE SUBSTITUTES FOR THE STICK AND WIRE GATE FASTENER ARE PERMISSIBLE.

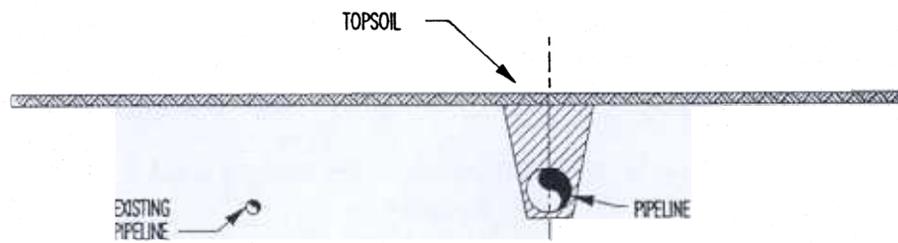
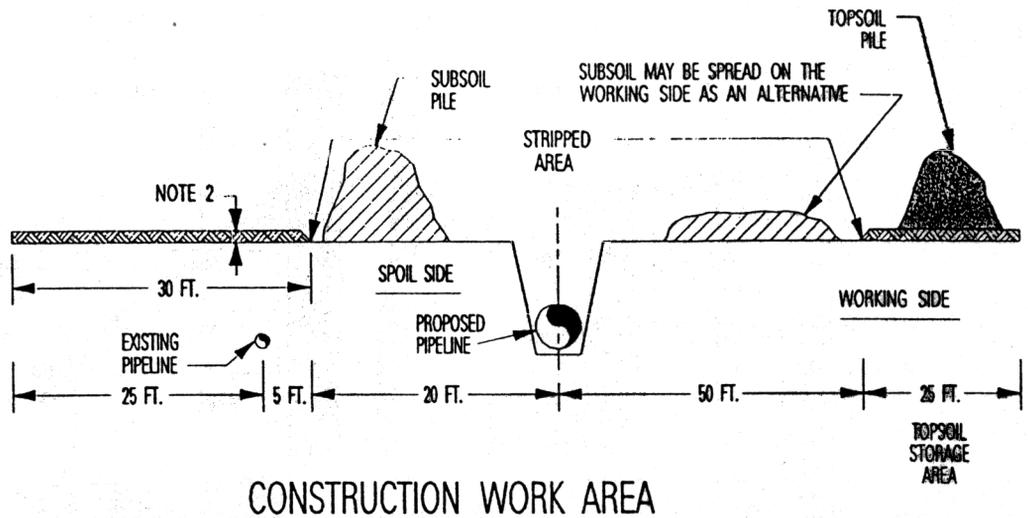
NOT TO SCALE



ENVIRONMENTAL CONSTRUCTION STANDARDS

TEMPORARY
CONSTRUCTION
GATE

FIGURE 3



- NOTES:
1. OTHER CONFIGURATIONS OF TOPSOIL AND SUBSOIL ARE ACCEPTABLE PROVIDED SOILS ARE KEPT SEPARATE.
 2. UP TO 12 INCHES OF TOPSOIL WILL BE REMOVED.
 3. TOPSOIL AND SUBSOIL PILES WILL BE ADEQUATELY PROTECTED FROM EROSION AND SEDIMENTATION BY USE OF SEDIMENT FILTER DEVICES OR MULCH.
 4. TOPSOIL REPLACEMENT IS ACCEPTABLE ALTERNATIVE TO TOPSOIL SEGREGATION IN RESIDENTIAL AREAS.

NOT TO SCALE



ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL TOPSOIL
CONSERVATION IN
RESIDENTIAL AREAS

FIGURE 4

INTERCEPTOR DIVERSIONS

Interceptor diversions are the most common and effective device used for erosion control on the CWA. During construction, temporary diversions are installed to control water on the graded CWA. During restoration final diversions are installed to protect the CWA from erosion until the vegetation reestablishes on the disturbed areas.

Temporary diversions are generally made by building a curb 8 to 14 inches high across the CWA. The curbs are shaped to allow passage of construction equipment and inspector vehicles. The diversion should not have a gradient of more than 5% (preferably 2%), and must drain either into the trench or off the CWA. Where water is directed off the CWA, the outlet will be protected by a sediment filter device or heavy vegetation. Temporary diversions may be broken down by construction equipment during the workday, but will be restored by the end of each day. Temporary diversions will be spaced along the CWA in accordance with Figure 5. The actual number of temporary diversions may vary from that of final diversions because the construction CWA's artificial grade may reduce the slope.

Final diversions typically consist of a curb 16 to 20 inches high below a shallow swale. The curb is constructed of compacted earth fill with side slopes of 2:1 or flatter to allow passage of maintenance equipment. The diversions should extend across the entire CWA and drain water with no more than a 2% to 5% gradient. The outlets of final diversions are stabilized with sediment filter devices, rock, brush, or heavy vegetation. Final diversions will be spaced along the CWA in accordance with Figure 5 (or as shown on the Construction Alignment Sheets), and will tie into existing diversions where present. In places where final grade creates side slopes or slopes which break in more than one direction, diversion installation may need to vary to create an outslope of 2% which will carry water off the CWA.

Alternative diversion construction may be used in areas where an earthen diversion is impractical. In these instances, temporary diversions may be constructed with sediment filter devices.



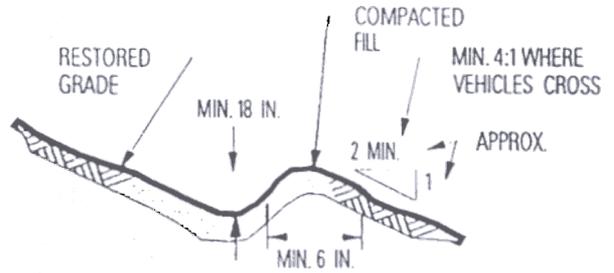
ENVIRONMENTAL CONSTRUCTION STANDARDS

INTERCEPTOR
DIVERSIONS

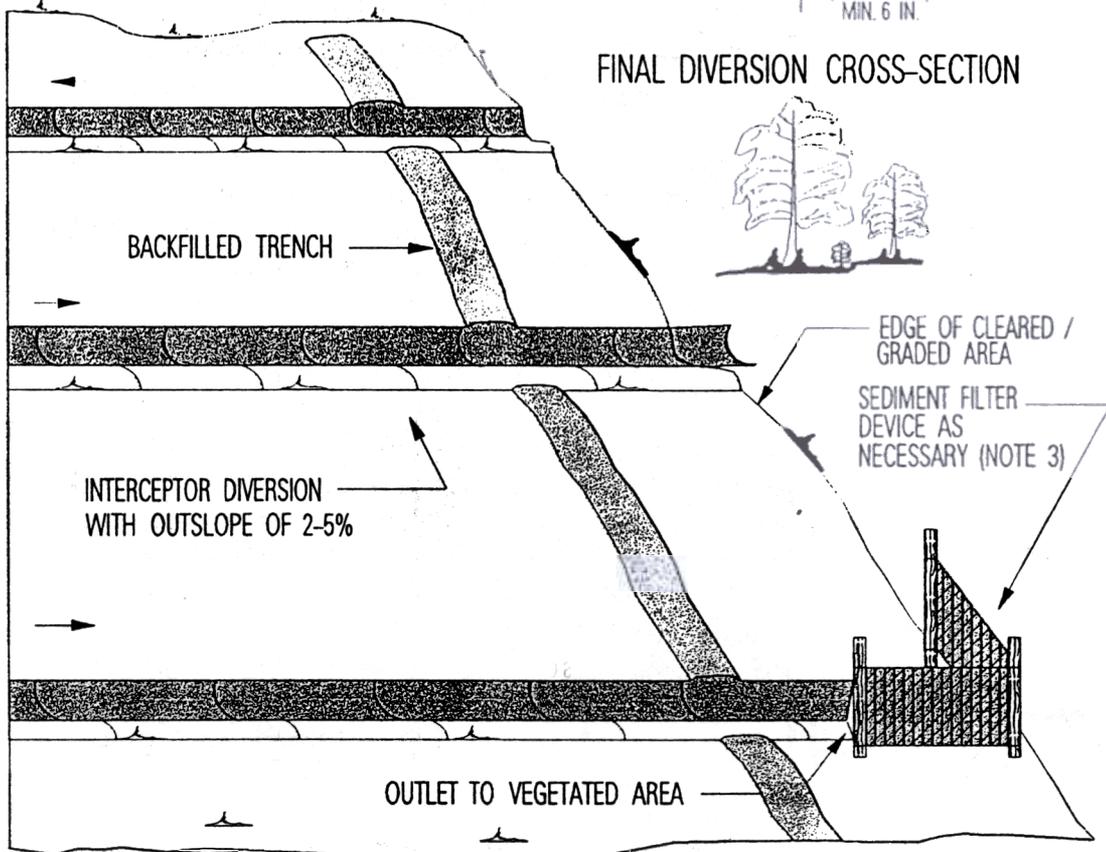
FIGURE 5
(PAGE 1 OF 2)

SLOPE	NOTE 1	SPACING
< 5%		NONE
5-15%		300 FEET
15-30%		200 FEET
>30+%		100 FEET

INTERCEPTOR SPACING



FINAL DIVERSION CROSS-SECTION



- NOTES:**
1. SPACING USED FOR BOTH TEMPORARY AND FINAL 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 DIVERSIONS TO TAKE ADVANTAGE OF NATURAL CROSS-SLOPE SWALES.

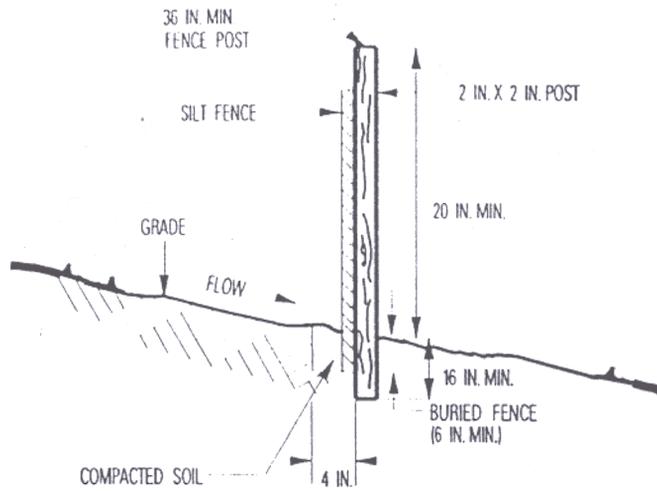
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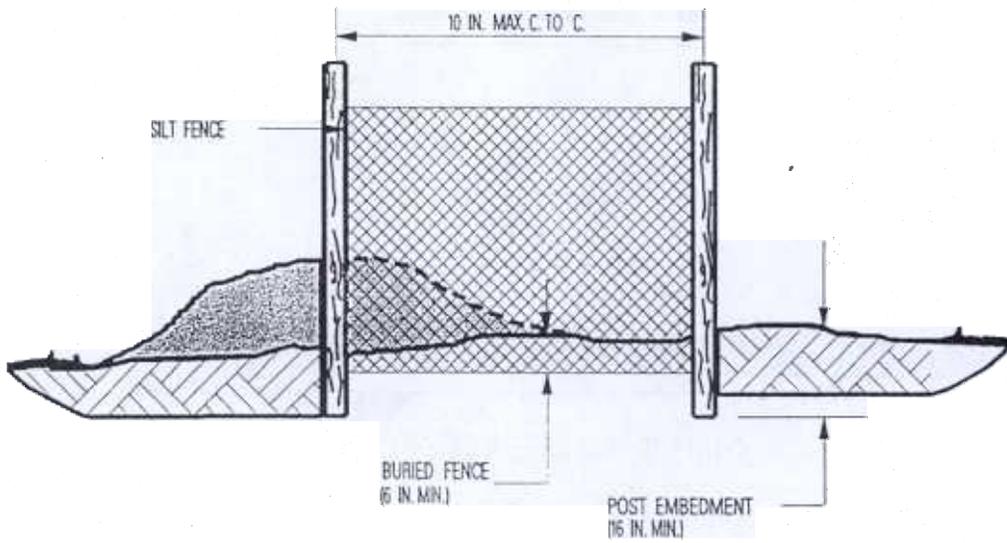
ENVIRONMENTAL CONSTRUCTION STANDARDS

INTERCEPTOR
DIVERSIONS

FIGURE 5
(PAGE 2 OF 2)



SIDE VIEW



FRONT VIEW

NOTE: SILT FENCE CAN ALSO BE INSTALLED (USING THE SAME SPECIFICATIONS AS PRESENTED ABOVE) IN OTHER SITUATIONS FOR EROSION AND SEDIMENTATION CONTROL.

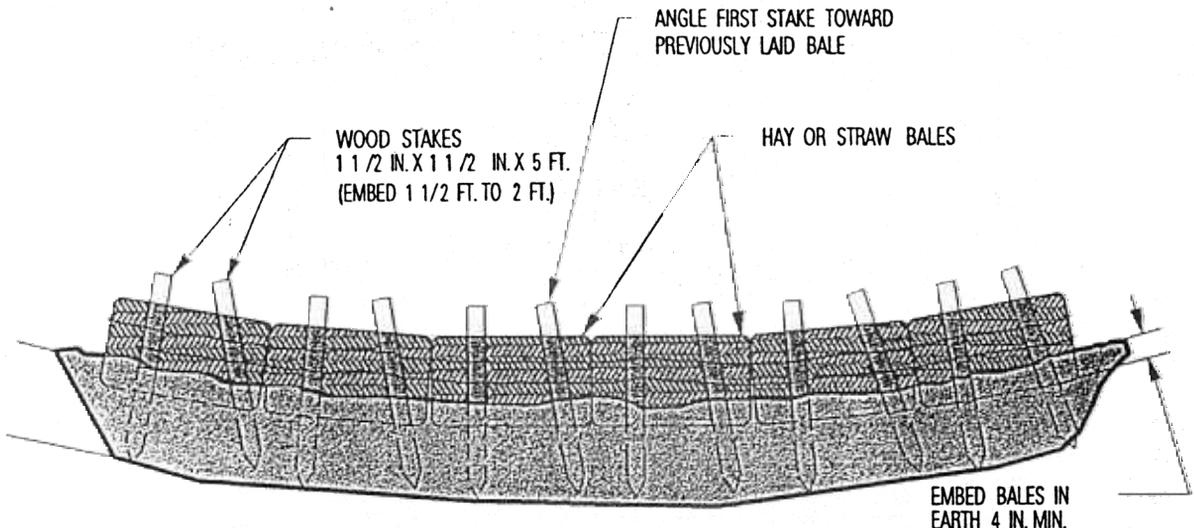
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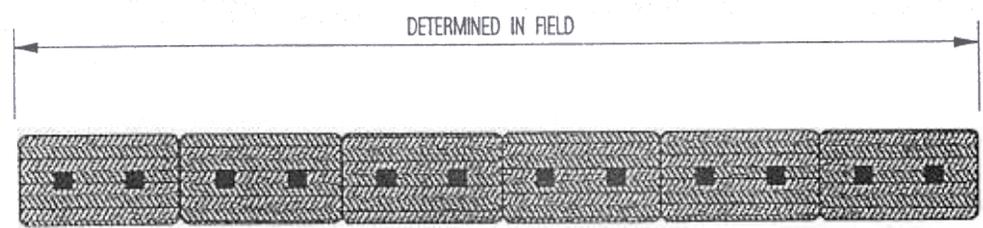
ENVIRONMENTAL CONSTRUCTION STANDARDS

SEDIMENT FILTER
DEVICE
SILT FENCING

FIGURE 6



SIDE VIEW



TOP VIEW

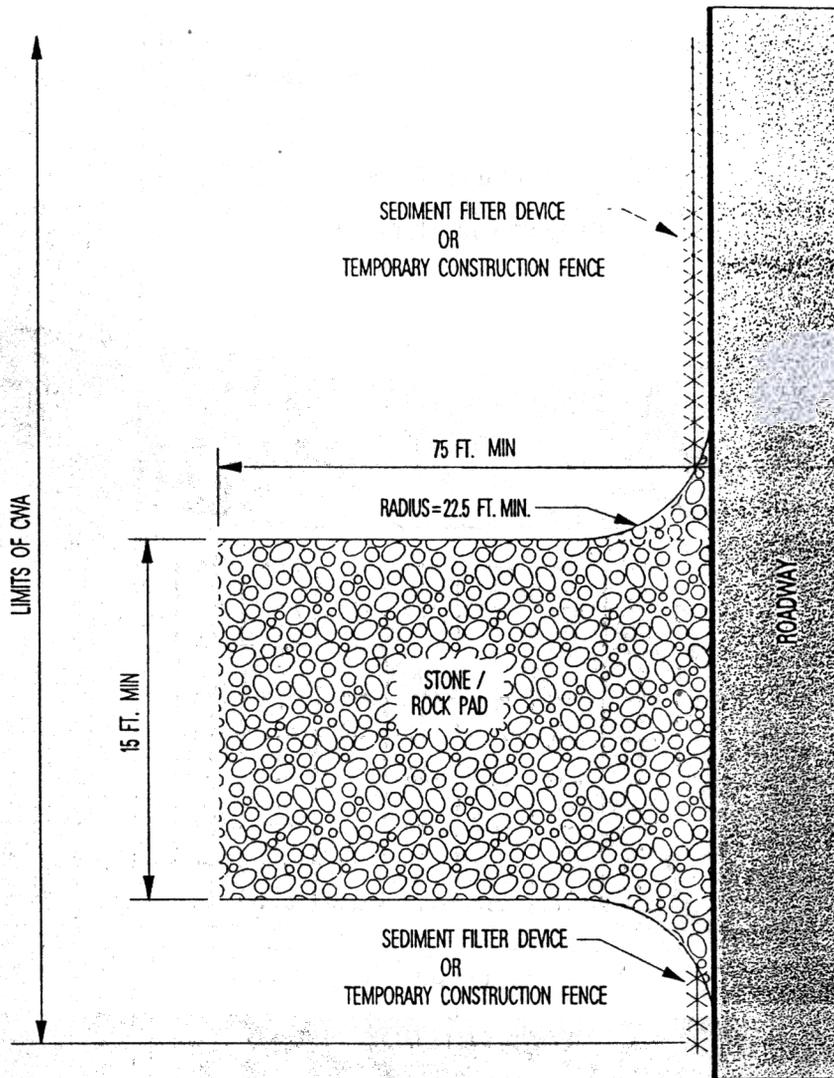
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ENVIRONMENTAL CONSTRUCTION STANDARDS

SEDIMENT FILTER
DEVICE
STAKED BALES

FIGURE 7



- 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. IF ROCK PAD BECOMES COVERED WITH MUD SO AS TO BECOME INEFFECTIVE, ADDITIONAL STONE WILL BE ADDED.
 5. ALL STONE AND FABRIC MUST BE REMOVED DURING ROW RESTORATION.
 6. REMOVE TOPSOIL PRIOR TO INSTALLATION IN AGRICULTURAL LAND.

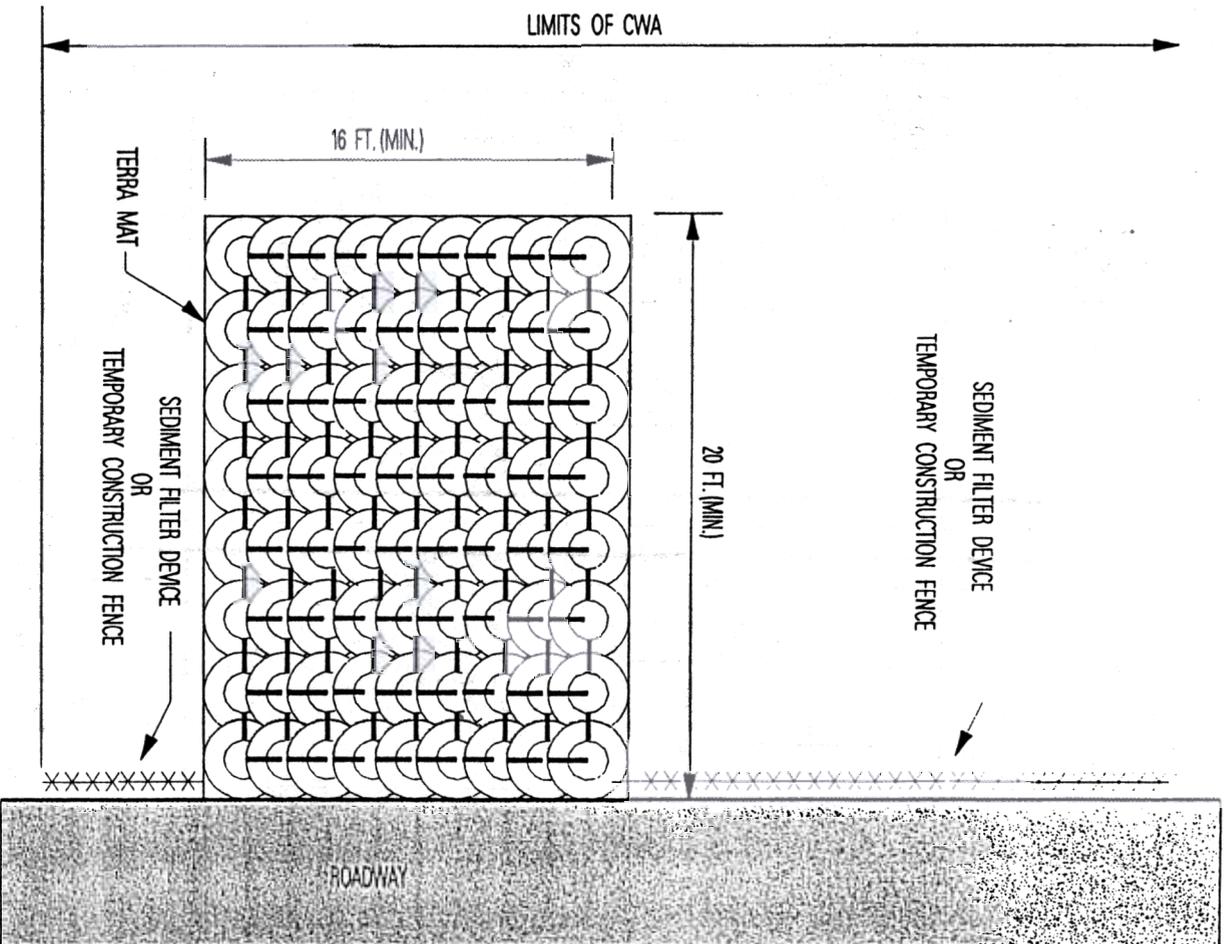
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TEMPORARY ROAD
ENTRANCE
ROCK PADS

FIGURE 8



- NOTES:
1. TERRA MATS ARE CONSTRUCTED BY OVERLAPPING TIRES AND INTERCONNECTED 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.

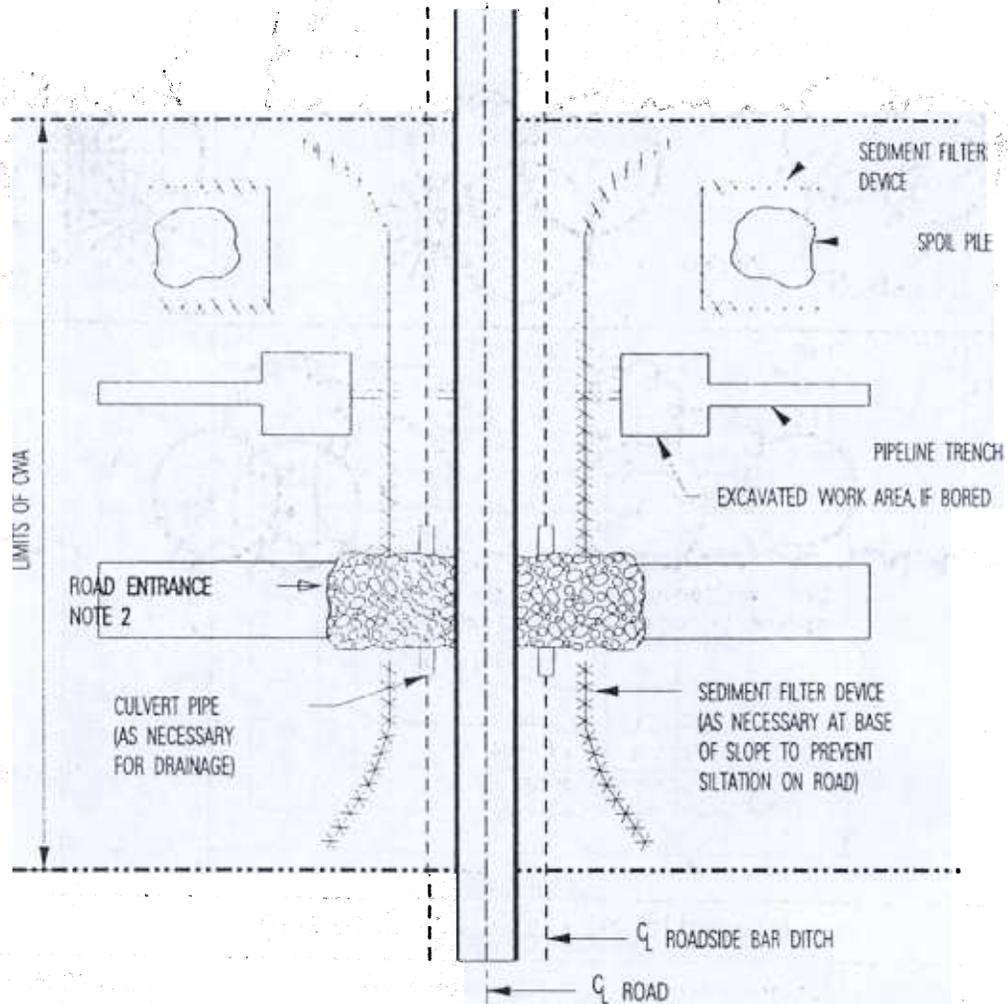
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TEMPORARY ROAD
ENTRANCE
TERRA MATS

FIGURE 9



- NOTES:
1. SIMILAR PROCEDURES WILL BE USED AT RAILROAD CROSSINGS.
 2. REFER TO FIGURES 8 AND 9 FOR TYPES OF ROAD ENTRANCES.

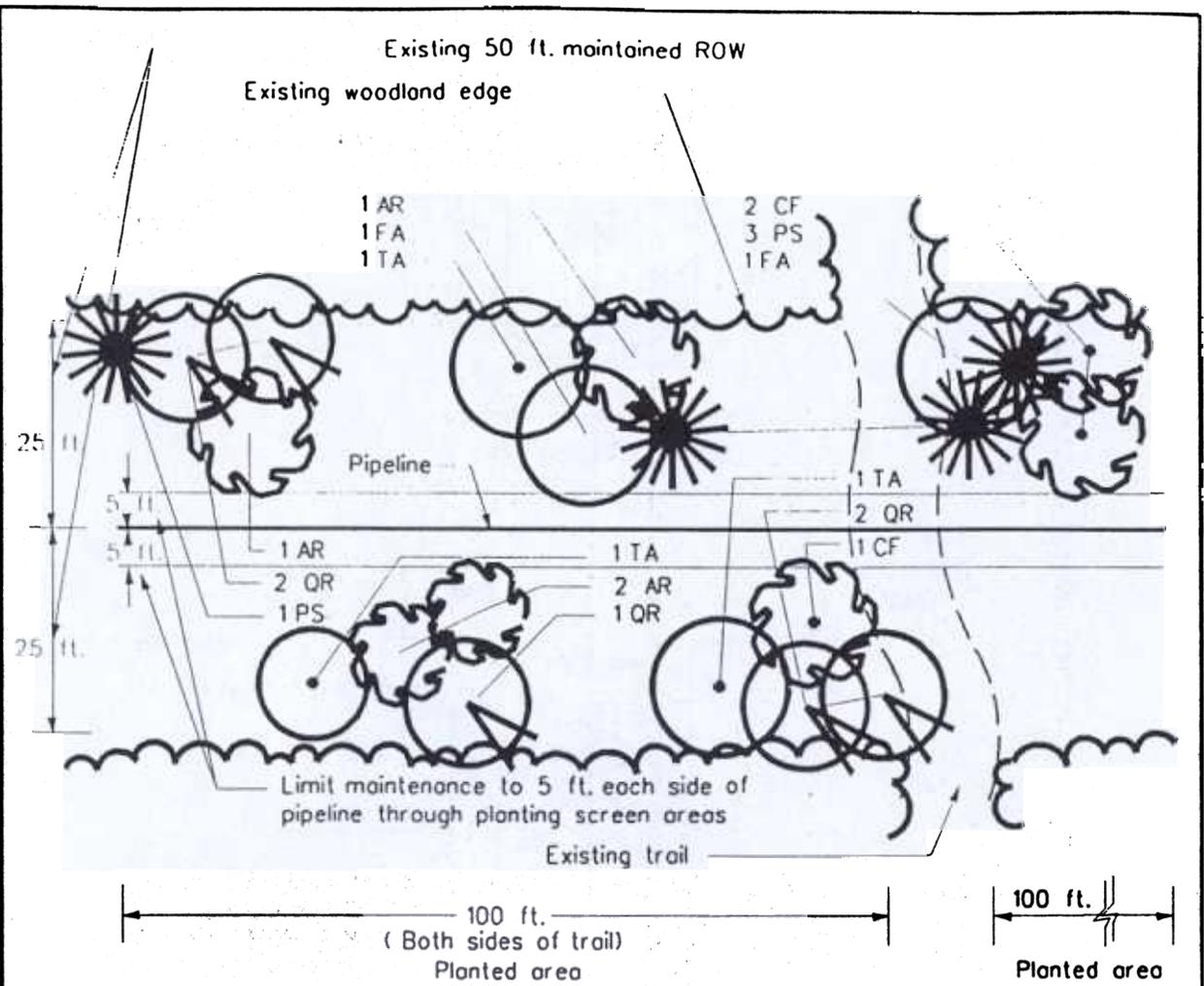
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL EROSION
CONTROL MEASURES
AT ROAD CROSSINGS

FIGURE 10



Typical Plant List-Trail Crossing

Symbol	Botanical Name	Common Name	Size/Comments
TA	<i>Tilia americana</i>	American linden (Basswood)	1 1/2 in. cal. B&B
AR	<i>Acer rubrum</i>	Red maple	1 1/2 in. cal. B&B
QR	<i>Quercus rubrum</i>	Red oak	1 1/2 in. cal. B&B
FA	<i>Fraxinus americana</i>	White ash	1 1/2 in. cal. B&B
PS	<i>Pinus strobus</i>	White pine	4 ft. ht. B&B
CF	<i>Cornus florida</i>	Flowering dogwood	4 ft. ht. B&B

B&B • balled and burlapped
cal. • caliper

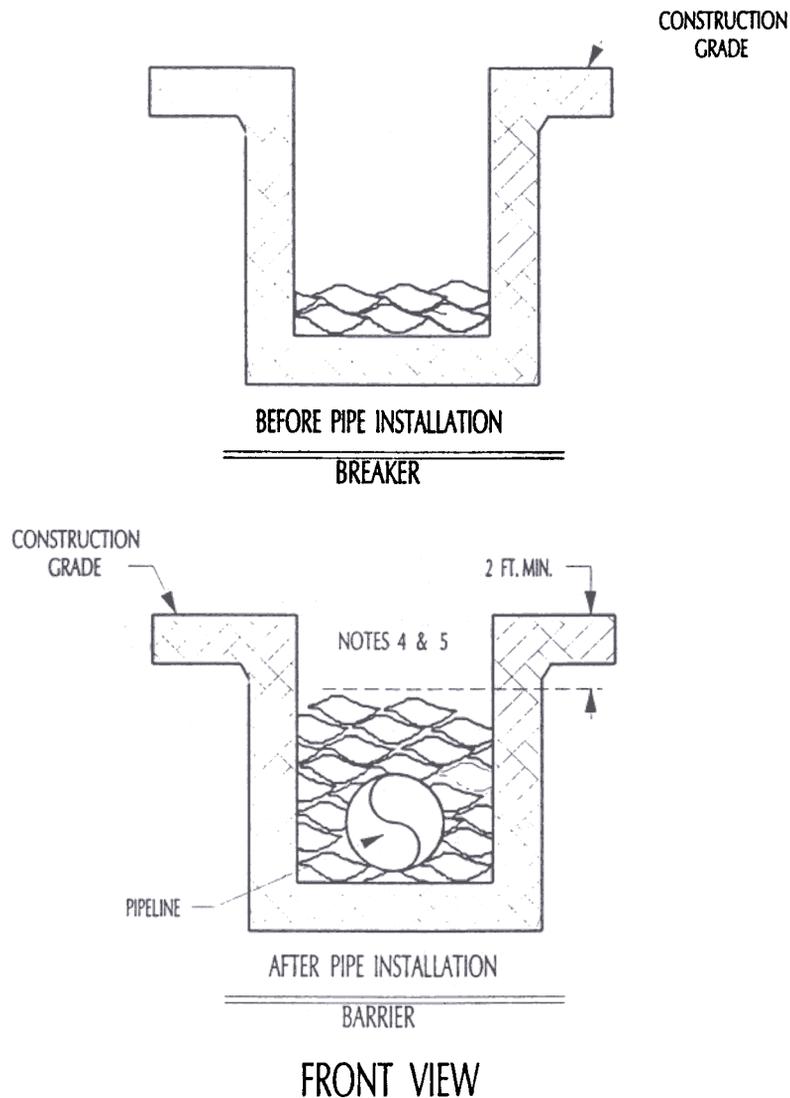
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL TRAIL
PLANTING

FIGURE 11



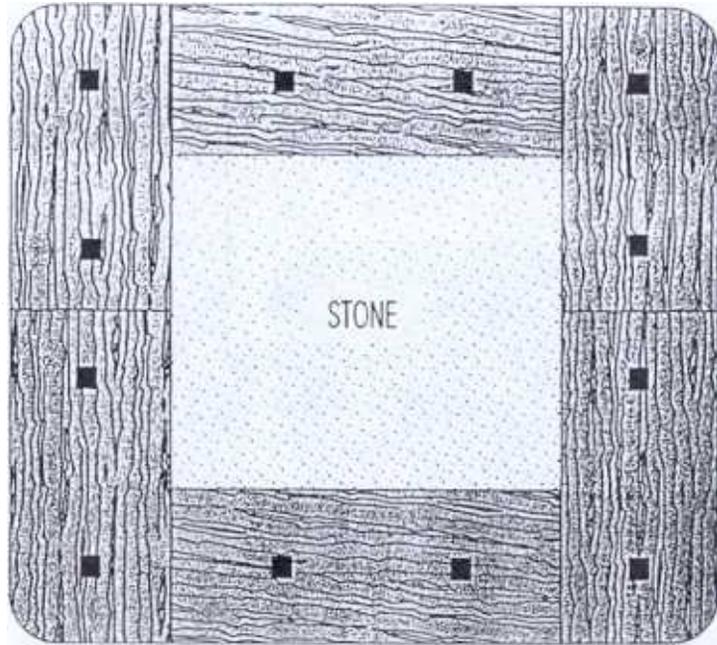
- NOTES:
1. INSTALL BREAKERS EVERY 15 FT. PROMPTLY AS THE TRENCH IS COMPLETED.
 2. INSTALL BARRIER JUST UPHILL OF EVERY INTERCEPTOR DIVERSION PROMPTLY AS THE PIPE IS INSTALLED IN THE TRENCH. IF INTERCEPTOR DIVERSIONS ARE NOT INSTALLED (ie AGRICULTURAL LANDS), INSTALL BARRIERS ACCORDING TO SPACING IN FIGURE 5.
 3. PRIOR TO LOWERING IN, REMOVE THE ROCKS.
 4. INSTALL SACKS FOR BARRIERS TO TOP OF TRENCH ON STEEP GRADES THAT ARE NOT USED FOR FARMING.
 5. TOP OF TRENCHLINE BARRIER WILL BE BELOW PLOW DEPTH IN AGRICULTURAL LAND.
 6. TOPSOIL WILL NOT BE USED TO CONSTRUCT THE BREAKERS OR BARRIERS.
 7. FOAM OR OTHER SUBSTITUTES ARE NOT PERMISSIBLE.
 8. ENSURE SANDBAGS ARE SNUG AGAINST EACH OTHER, THE PIPE, THE TRENCH WALL AND TRENCH FLOOR.

NOT TO SCALE

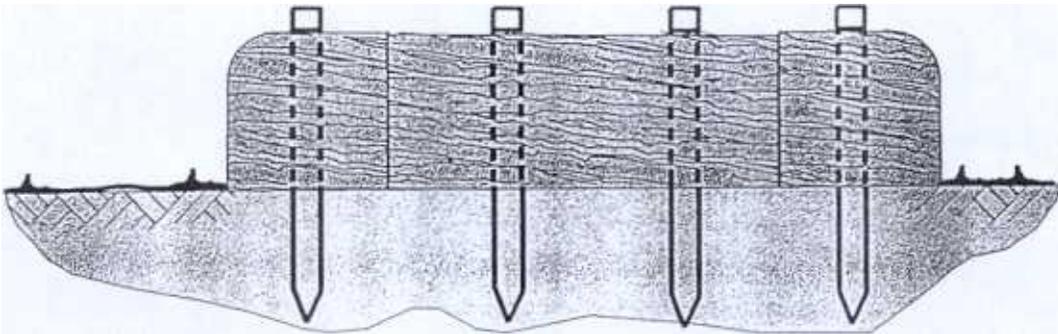


TRENCHLINE
BARRIERS
AND BREAKERS

FIGURE 12



PLAN VIEW



SIDE VIEW

- NOTES:
1. INSTALL BALES AS SHOWN. IF ADDITIONAL STORAGE VOLUME IS NECESSARY, SECURE ADDITIONAL BALES ON TOP OF INITIAL BOTTOM LAYER AND/OR BY INCREASING THE NUMBER OF BALES IN BOTTOM LAYER.
 2. SECURE EACH BALE & EACH LAYER OF BALES USING EITHER TWO REBARS OR TWO WOODEN STAKES PER BALE.
 3. PLACE A 5 TO 6 INCH DEEP LAYER OF 3/4 TO 1 INCH CLEAN STONE ON GROUND COVER INSIDE BALES OR INSTALL GEOTEXTILE FABRIC IN THE BOTTOM AND PLACE DISCHARGE HOSE IN A SEDIMENT FILTER BAG.
 4. THE SEDIMENT TRAP WILL NOT BE GREATER THAN TWO BALES IN HEIGHT FOR SIX-BALE BOTTOM CONSTRUCTION UNLESS THE TRAP WALLS ARE REINFORCED.

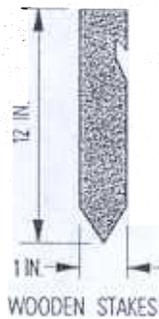
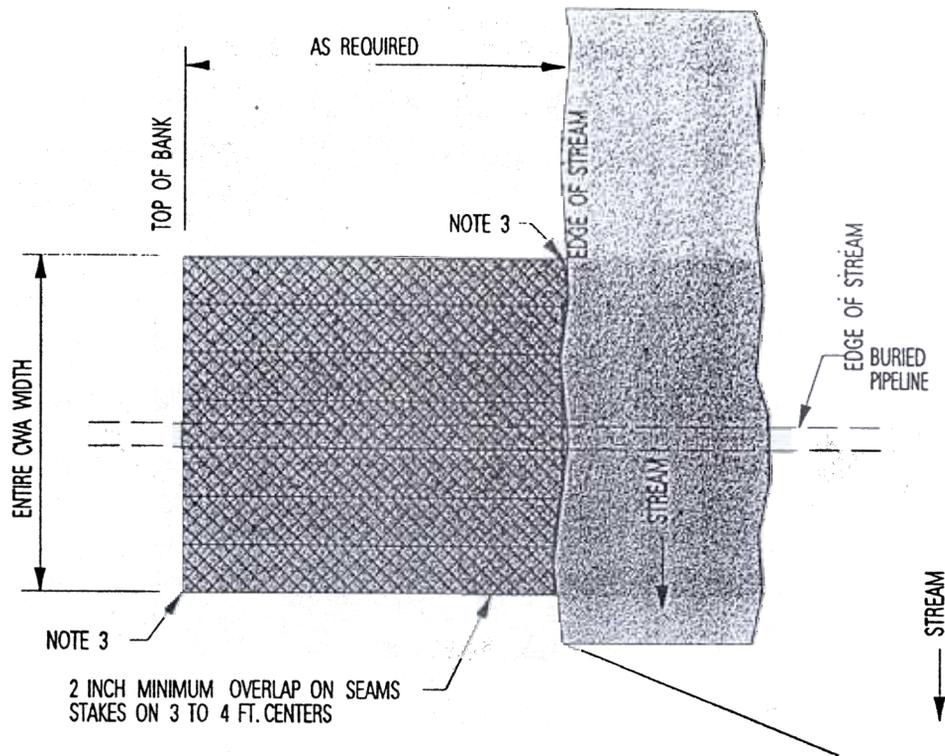
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ENVIRONMENTAL CONSTRUCTION STANDARDS

SEDIMENT TRAP

FIGURE 13



- NOTES:
1. INSTALL JUTE NETTING DURING RESTORATION.
 2. LIME, FERTILIZE, SEED AND MULCH AREA TO BE JUTE NETTED.
 3. BURY UPHILL AND UPSTREAM EDGE OF JUTE NETTING.
 4. DIVERSIONS WILL BE INSTALLED ABOVE JUTE NETTING ON SLOPED BANKS.
 5. ON SHORT BANKS (LESS THAN 10 FT.), JUTE NETTING CAN BE PERPENDICULAR TO BANK SLOPE.
 6. INSTALL ON STEEP SLOPES OR ON THE BANKS OF FLOWING STREAMS, OR IN UPLAND AREAS.
 7. DO NOT USE METAL STAPLES OR STAKES IN PASTURE OR AGRICULTURAL AREAS.

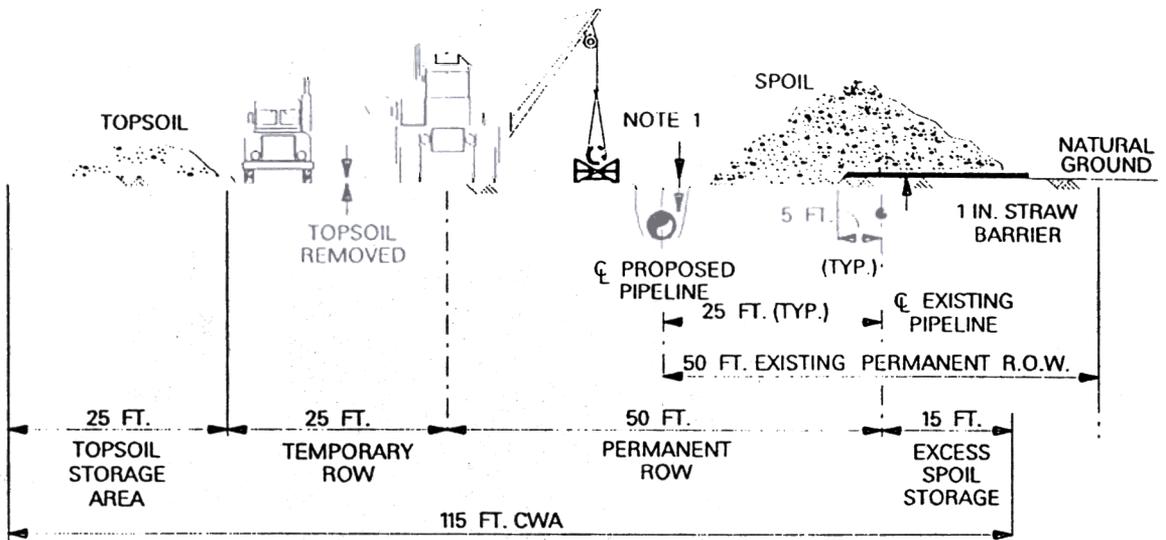
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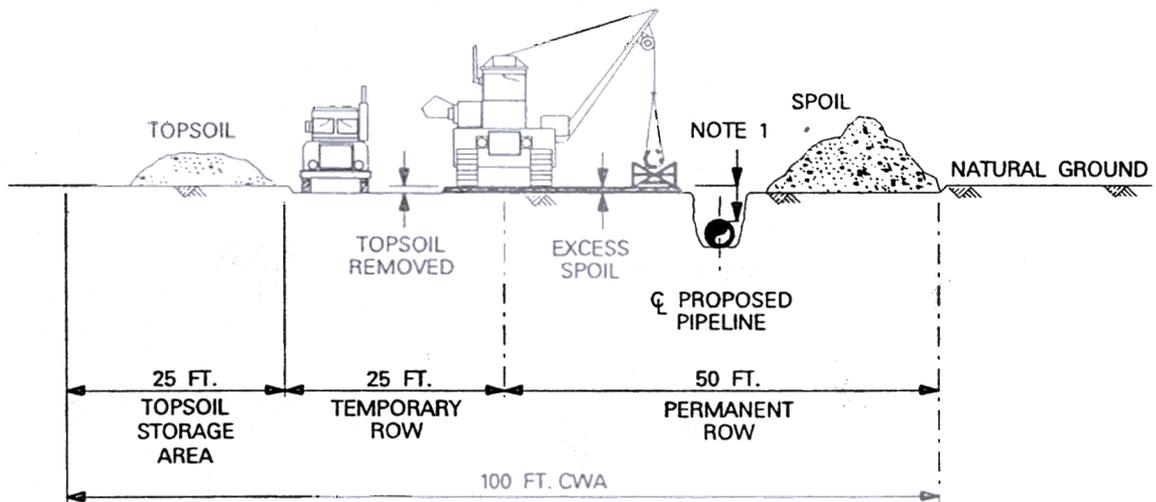
ENVIRONMENTAL CONSTRUCTION STANDARDS

EROSION
CONTROL
BLANKET

FIGURE 14



ADJACENT TO EXISTING PIPELINE WITH GRASS GROUND COVER



LIFT & LAY NEW PIPELINE OR PLOWED FIELD

NOTE:

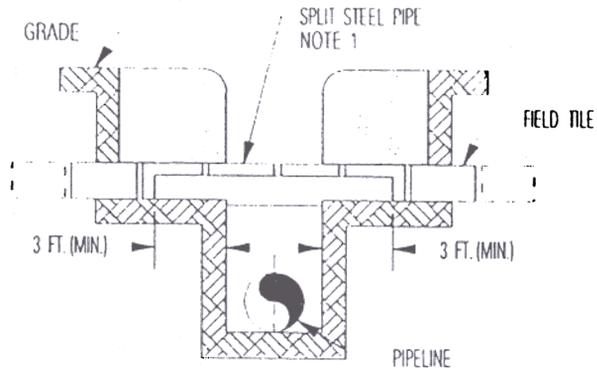
1. DEPTH OF COVER IN CROPLAND TO BE 4 FT. OR 1 FT. BELOW EXISTING FIELD TILE, WHICH EVER IS GREATER. (FIGURE 17)
2. OTHER CONFIGURATIONS OF TOPSOIL AND SUBSOIL ARE ACCEPTABLE PROVIDED THEY ARE KEPT SEPARATE.
3. UP TO 16 INCHES OF TOPSOIL REMOVED.
4. TOPSOIL AND SUBSOIL PILES WILL BE ADEQUATELY PROTECTED FROM EROSION AND SEDIMENTATION BY USE OF SEDIMENT FILTER DEVICES OR STRAW MULCH.
5. A 1 IN. THICK STRAW VISUAL BARRIER MUST BE INSTALLED PRIOR TO SUBSOIL SPOILING OVER TOPSOIL.

NOT TO SCALE

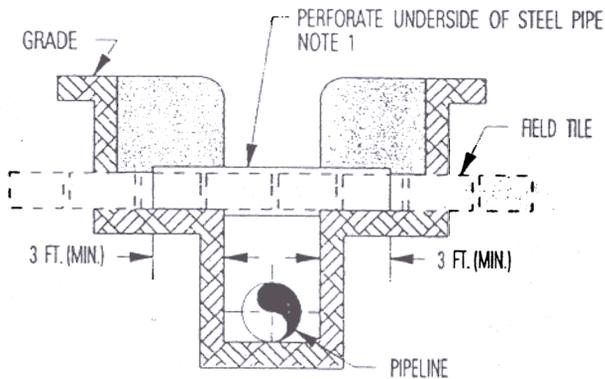
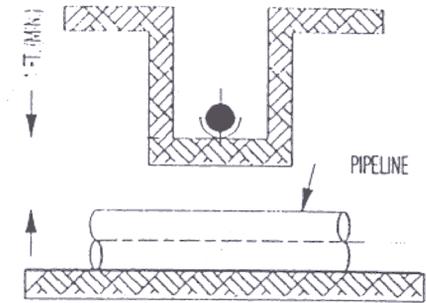


TYPICAL
TOPSOIL
CONSERVATION
IN AGRICULTURAL LAND

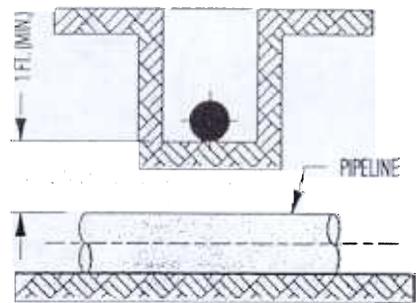
FIGURE 15



METHOD 1



METHOD 2



- NOTES:
1. STEEL CARRIER PIPE TO HAVE INSIDE DIAMETER AS NEAR AS POSSIBLE TO THE OUTSIDE DIAMETER OF THE FIELD TILE.
 2. MAINTAIN ORIGINAL FLOW LINE OF FIELD TILE IN BOTH METHODS.
 3. REPLACEMENT FIELD TILE WILL NOT BE FILTER COVERED UNLESS NATURAL RESOURCES CONSERVATION SERVICE AND LANDOWNER SPECIFY.

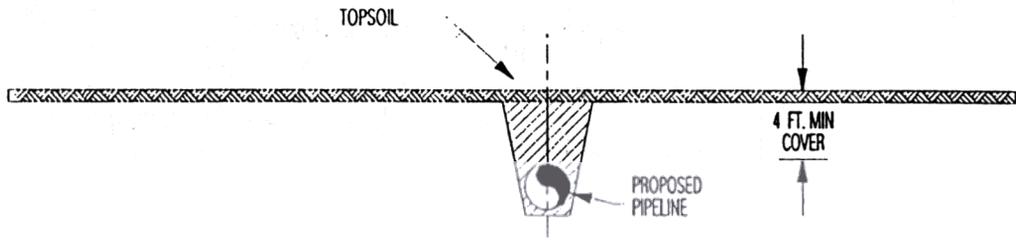
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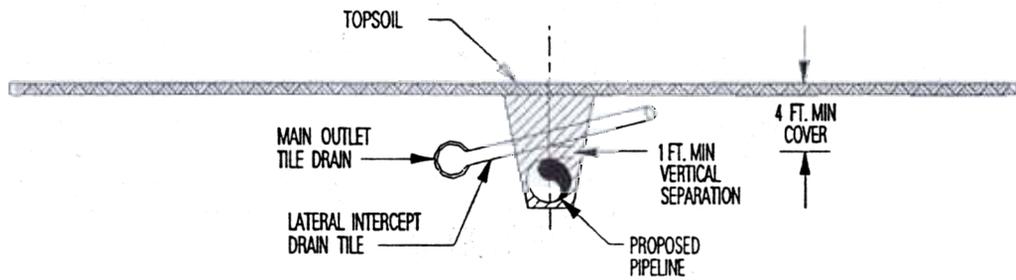
ENVIRONMENTAL CONSTRUCTION STANDARDS

FIELD TILE
REPLACEMENT
METHODS

FIGURE 16



WITHOUT DRAIN TILE



WITH DRAIN TILE

NOTES: 1. DISTURBED FIELD TILE TO BE REPAIRED IN ACCORDANCE WITH FIGURE 16

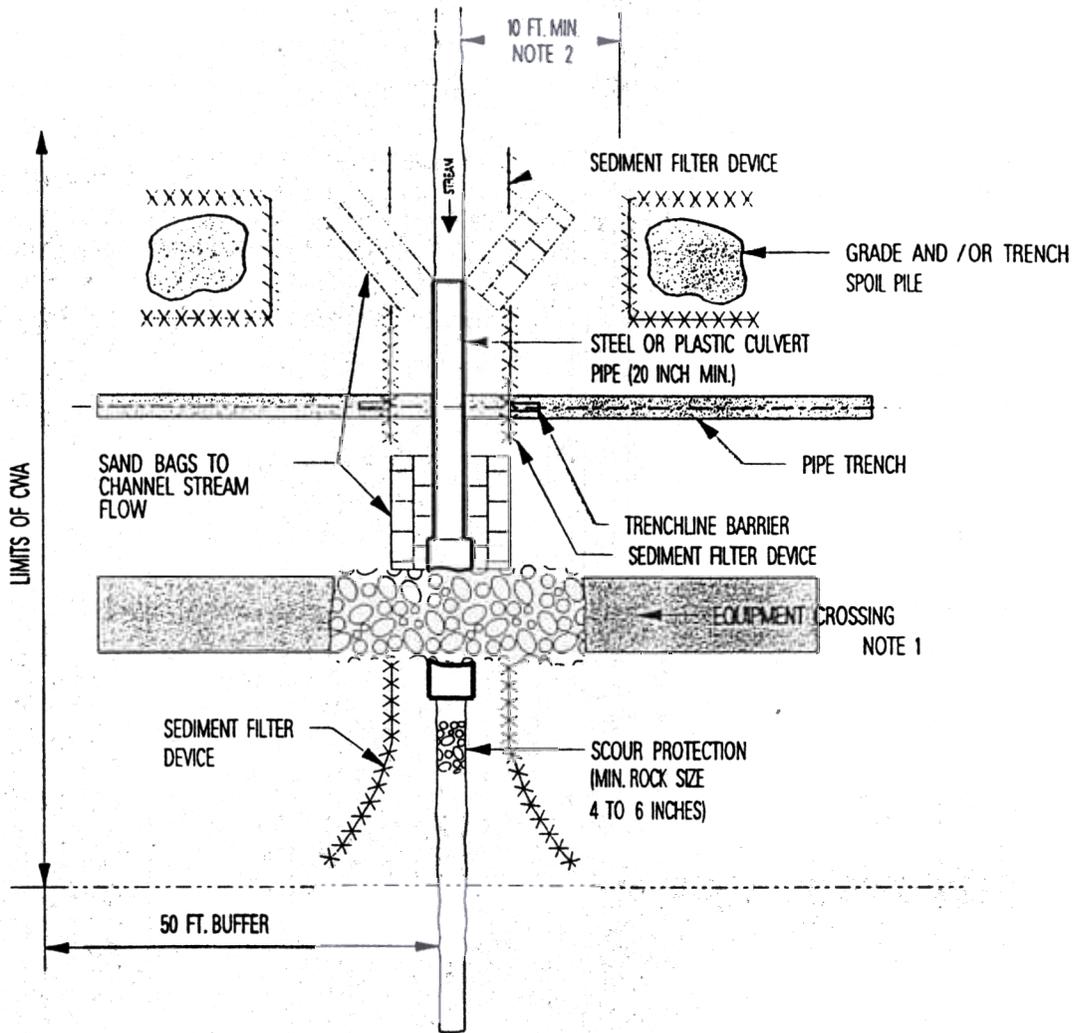
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL
AGRICULTURAL
LAND
CROSS - SECTION

FIGURE 17



- NOTES:
1. EQUIPMENT CROSSINGS ARE TO BE PREPARED AS ILLUSTRATED IN FIGURES 22 & 23.
 2. GRADE AND TRENCH SPOIL WILL BE STOCKPILED AT LEAST 10 FEET FROM THE WATER'S EDGE, TOPOGRAPHY PERMITTING.
 3. INSTALL FLUME PIPE AFTER BLASTING, BUT BEFORE TRENCHING.
 4. USE SAND BAG OR SAND BAG AND PLASTIC SHEETING DIVERSION STRUCTURE, OR EQUIVALENT.
 5. PROPERLY ALIGN FLUME PIPE.
 6. DO NOT REMOVE FLUME PIPE DURING TRENCHING, PIPELAYING, OR BACKFILLING ACTIVITIES.
 7. REMOVE ALL FLUME PIPES AND DAMS THAT ARE NOT ALSO PART OF THE EQUIPMENT BRIDGE AFTER FINAL CLEANUP BUT BEFORE PERMANENT SEEDING.

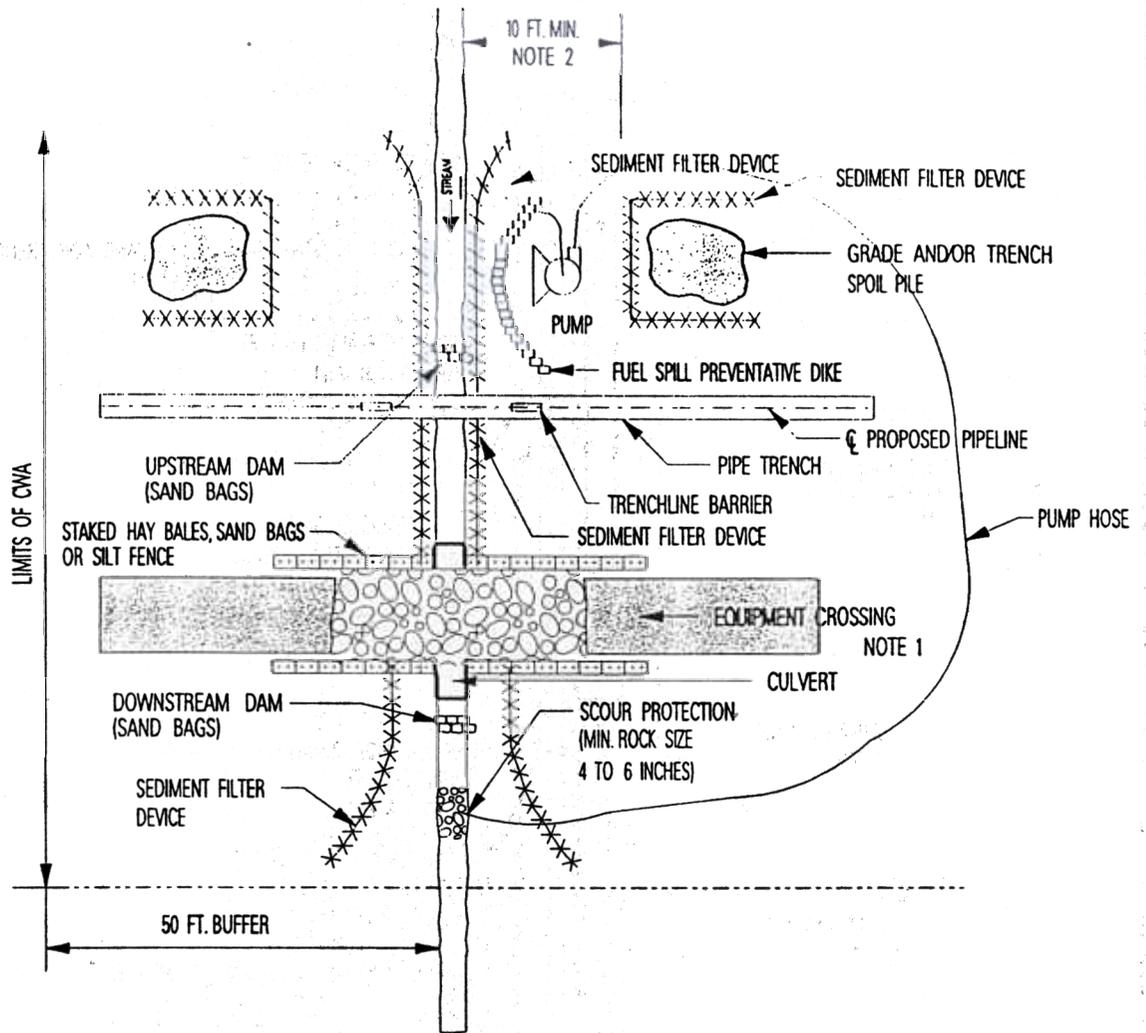
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL
STREAM CROSSING
DRY-DITCH
(FLUME)

FIGURE 18



- NOTES:
1. EQUIPMENT CROSSINGS ARE TO BE PREPARED AS ILLUSTRATED IN FIGURES 22 & 23.
 2. GRADE AND TRENCH SPOIL WILL BE STOCKPILED AT LEAST 10 FEET FROM THE WATER'S EDGE, TOPOGRAPHY PERMITTING.
 3. SET UP PUMP AND HOSE AS SHOWN, OR USE OTHER PRACTICAL ALTERNATIVES. PUMP SHOULD HAVE TWICE THE PUMPING CAPACITY OF ANTICIPATED FLOW.
 4. CONTRACTOR TO ENSURE A SUFFICIENT NUMBER OF ACTIVE AND BACKUP PUMPS TO MAINTAIN THE CAPACITY OF THE STREAMFLOW AT ALL TIMES DURING INSTALLATION.
 5. ALL INTAKE HOSES WILL BE SCREENED.
 6. DISMANTLE DOWNSTREAM DAM, THEN UPSTREAM DAM. KEEP PUMP RUNNING TO MAINTAIN STREAM FLOW.

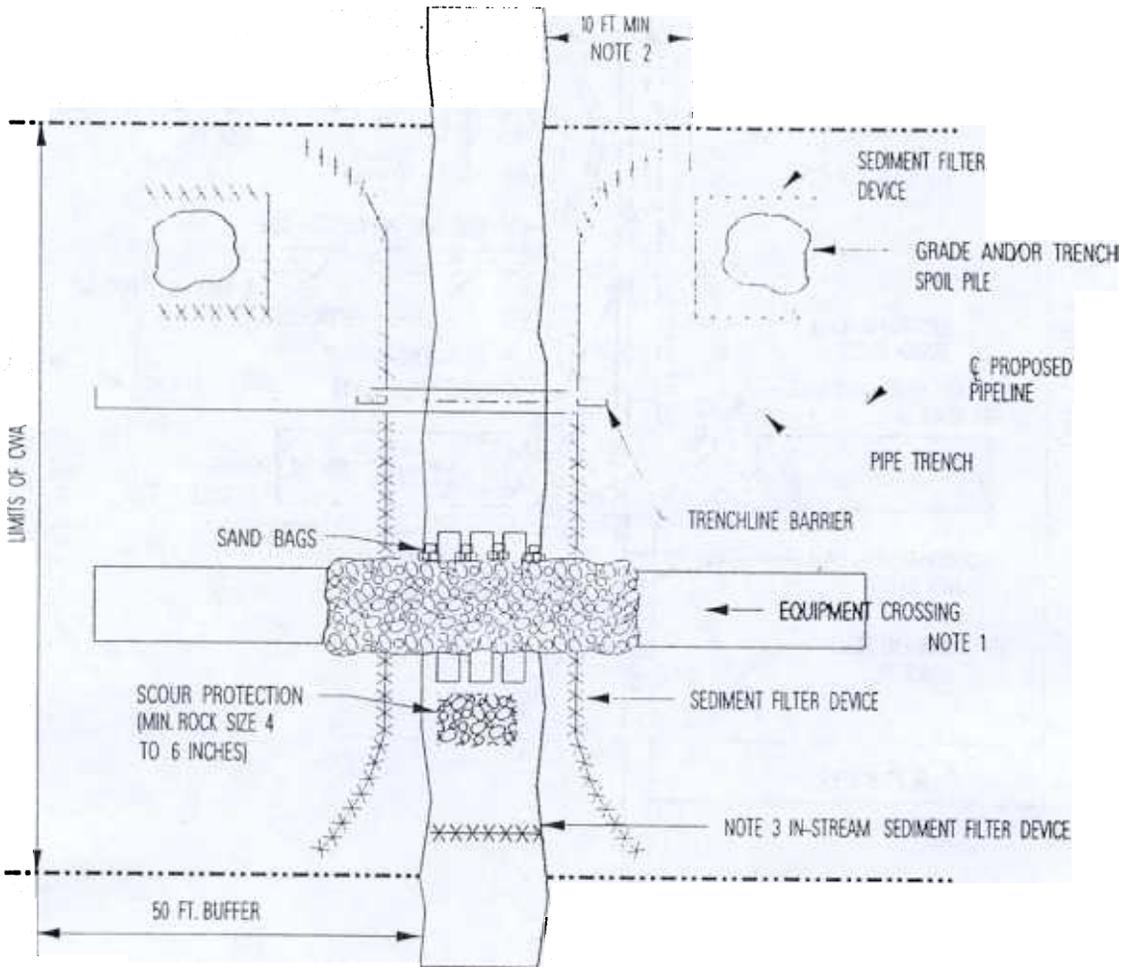
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL
STREAM CROSSING
DRY-DITCH
(DAM AND PUMP)

FIGURE 19



- NOTES:
1. EQUIPMENT CROSSINGS ARE TO BE PREPARED AS ILLUSTRATED IN FIGURES 22 & 23.
 2. GRADE AND TRENCH SPOIL WILL BE STOCKPILED AT LEAST 10 FEET FROM THE WATERS' EDGE, TOPOGRAPHY PERMITTING.
 3. IN HIGH QUALITY STREAMS, INSTALL IN-STREAM SEDIMENT FILTER DEVICE 40 FT. AND 60 FT. DOWNSTREAM IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

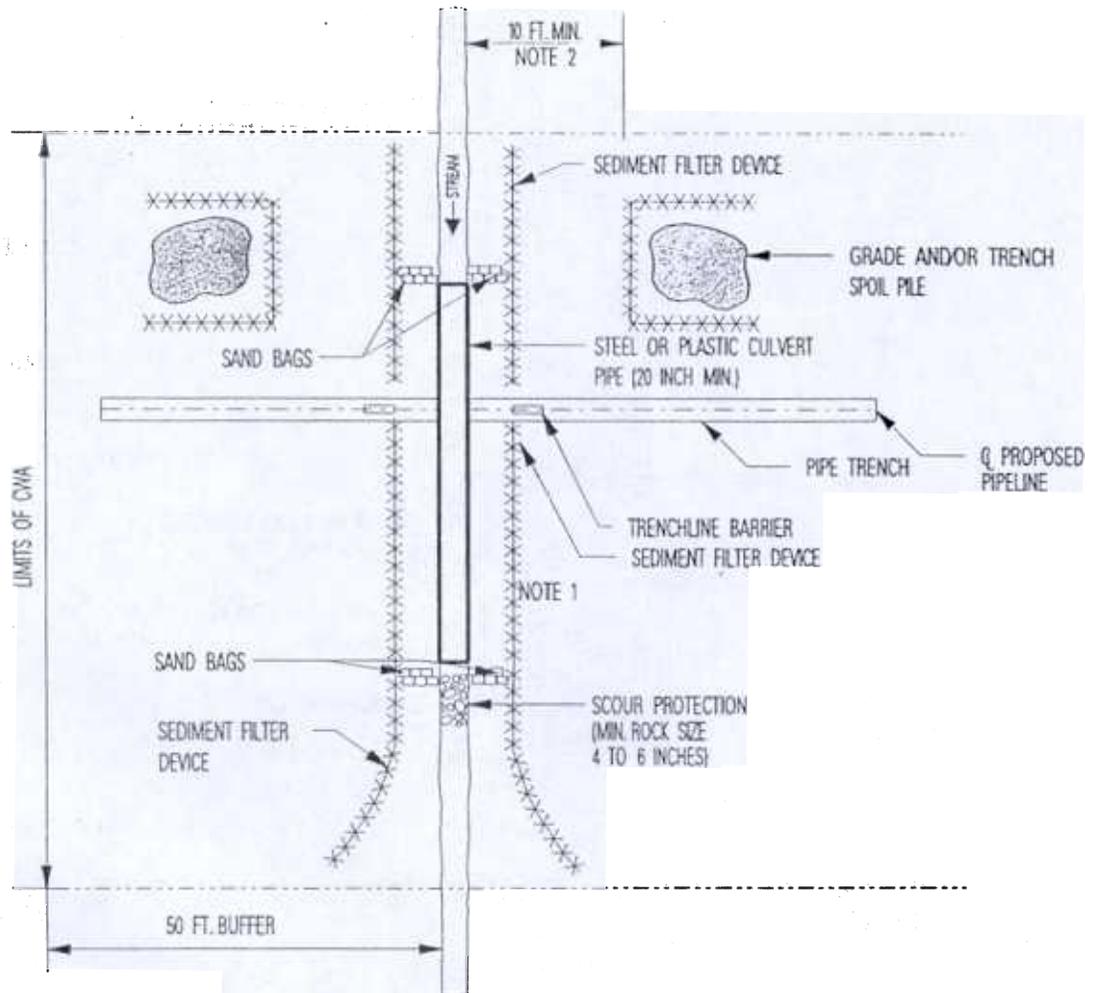
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL
STREAM CROSSING
WET-DITCH

FIGURE 20



- NOTES:
1. EQUIPMENT CROSSINGS, IF INSTALLED, ARE TO BE PREPARED AS ILLUSTRATED IN FIGURES 22 & 23.
 2. GRADE AND TRENCH SPOIL WILL BE STOCKPILED AT LEAST 10 FEET FROM THE WATER'S EDGE, TOPOGRAPHY PERMITTING.
 3. INSTALL CULVERT IF STREAM CROSSING IS NOT PROMPTLY INSTALLED.

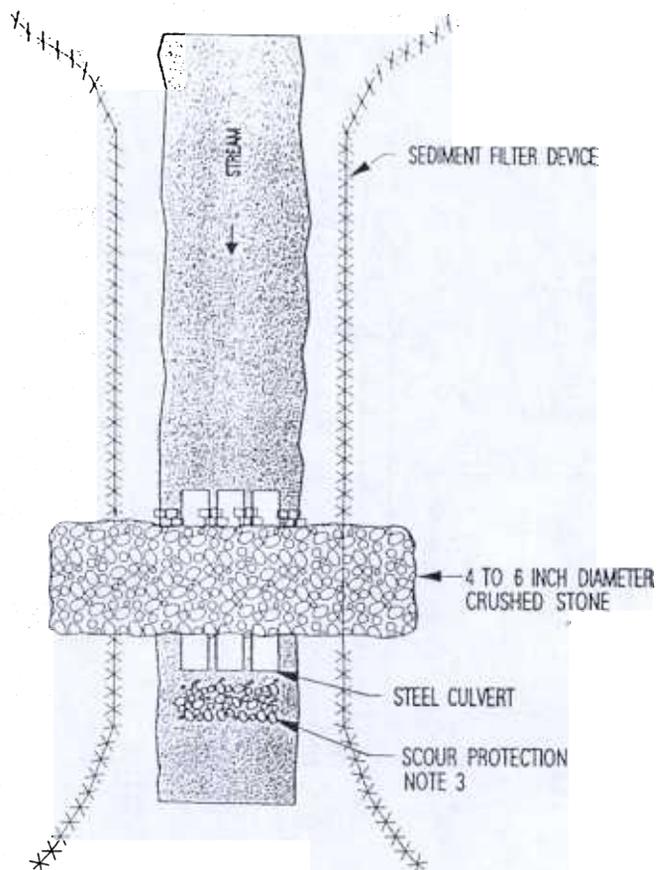
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL
STREAM CROSSING
INTERMITTENT
STREAMS

FIGURE 21



- NOTES:
1. MINIMUM CONTOURING OF THE BOTTOM NECESSARY TO LAY THE CULVERTS LEVEL IS PERMISSIBLE.
 2. USE AS MANY CULVERTS AS REQUIRED TO SPAN ENTIRE STREAM BED.
 3. STONES WILL BE PLACED AT THE OUTLET OF ALL CULVERTS TO PROVIDE SCOUR PROTECTION IN THE EXISTING CHANNELS. MINIMUM ROCK SIZE: 4 TO 6 INCHES.
 4. MINIMUM CULVERT DIAMETER 20 INCHES .

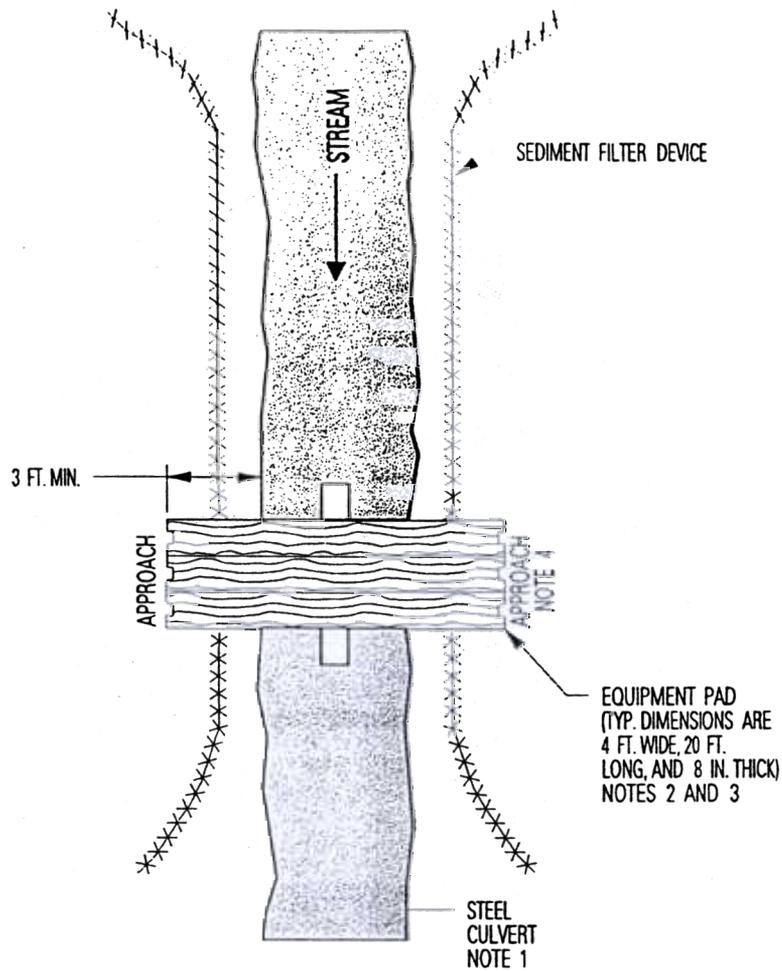
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TEMPORARY
EQUIPMENT CROSSING
CULVERT AND STONE

FIGURE 22



- NOTES:
1. CULVERT PIPE UTILIZED IF ADDITIONAL SUPPORT IS REQUIRED.
 2. ADDITIONAL PADS CAN BE PUT SIDE BY SIDE IF EXTRA WIDTH IS REQUIRED.
 3. EQUIPMENT PAD TYPICALLY CONSTRUCTED OF HARD-WOOD; MUST ACCOMMODATE THE LARGEST EQUIPMENT USED.
 4. RAMP APPROACHES CAN EITHER BE GRADED OR DUG INTO GROUND. IF NECESSARY, CRUSHED STONE WILL BE USED TO RAMP UP TO THE EQUIPMENT PADS.
 5. MINIMUM CULVERT DIAMETER 20 INCHES.
 6. MAINTAIN PADS SO AS NOT TO ALLOW MUD TO ENTER THE STREAM

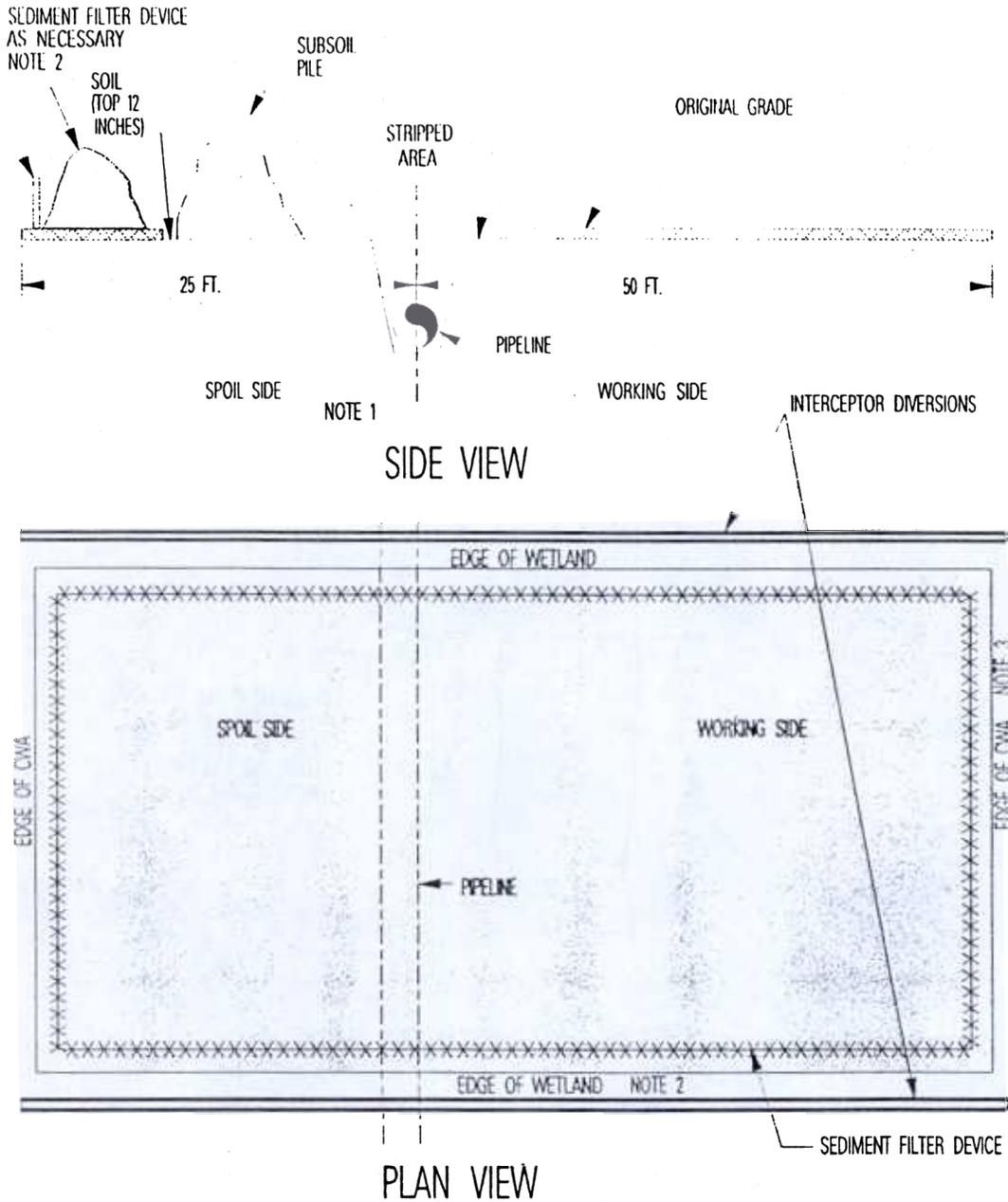
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TEMPORARY
EQUIPMENT CROSSING
EQUIPMENT PADS

FIGURE 23



- NOTES:
1. IN WETLAND AREAS WHICH CONTAIN NO STANDING WATER OR SATURATED SOILS, SOIL (TOP 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.

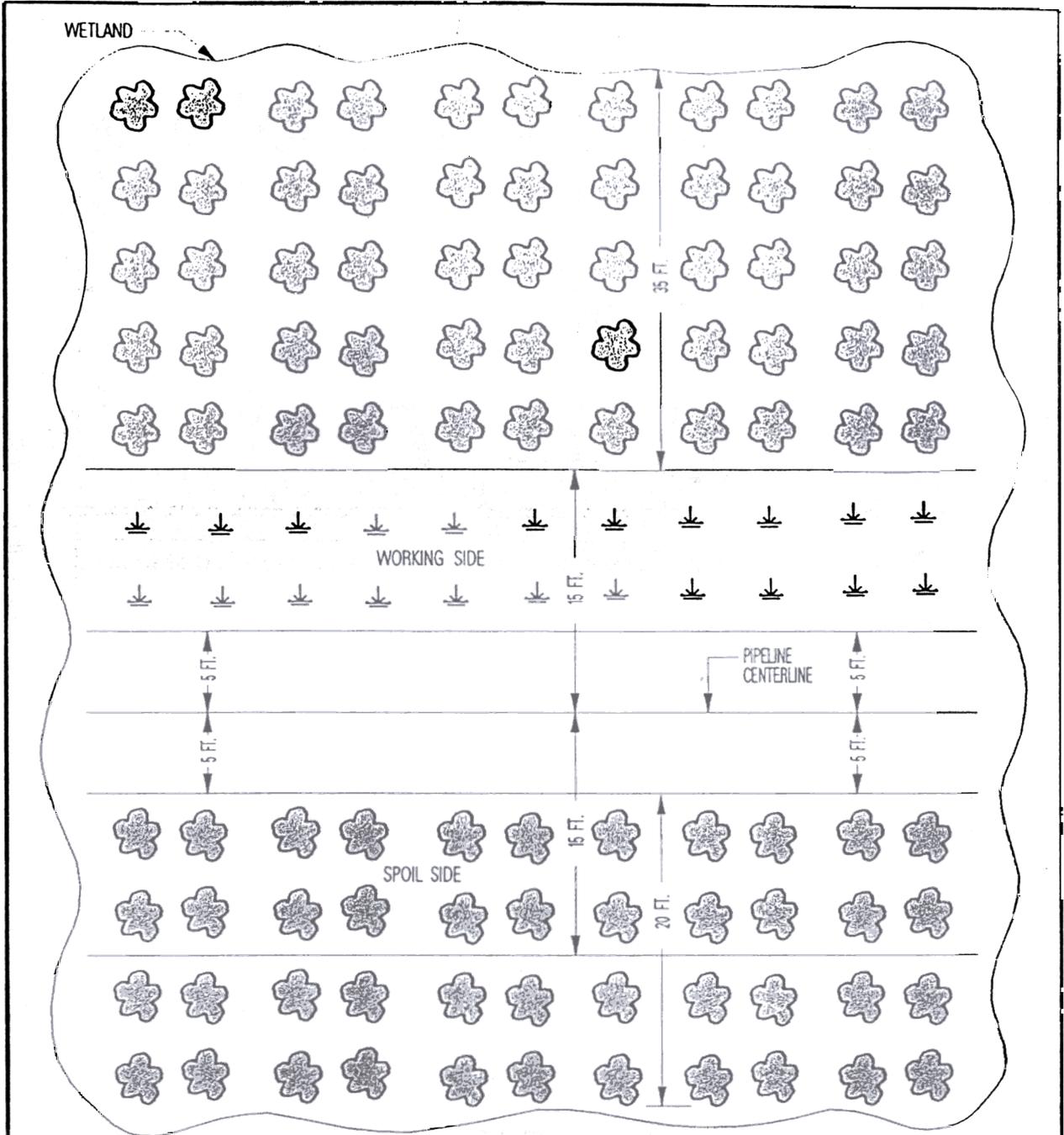
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL
WETLAND
CROSSING

FIGURE 24



 = PLANTED AREA

- NOTES:
1. WHERE STUMPS HAVE BEEN REMOVED, WOODY VEGETATION ADAPTED TO WETLANDS WILL BE REPLANTED, EXCEPT WITHIN 5 FEET OF THE PIPELINE CENTERLINE OR APPURTENANCES.
 2. PLANT NATIVE TREES TO ULTIMATELY RESTORE THE CWA, EXCEPT FOR MAINTAINED PORTION OF THE PERMANENT ROW, TO ITS PRE-CONSTRUCTION STATE.

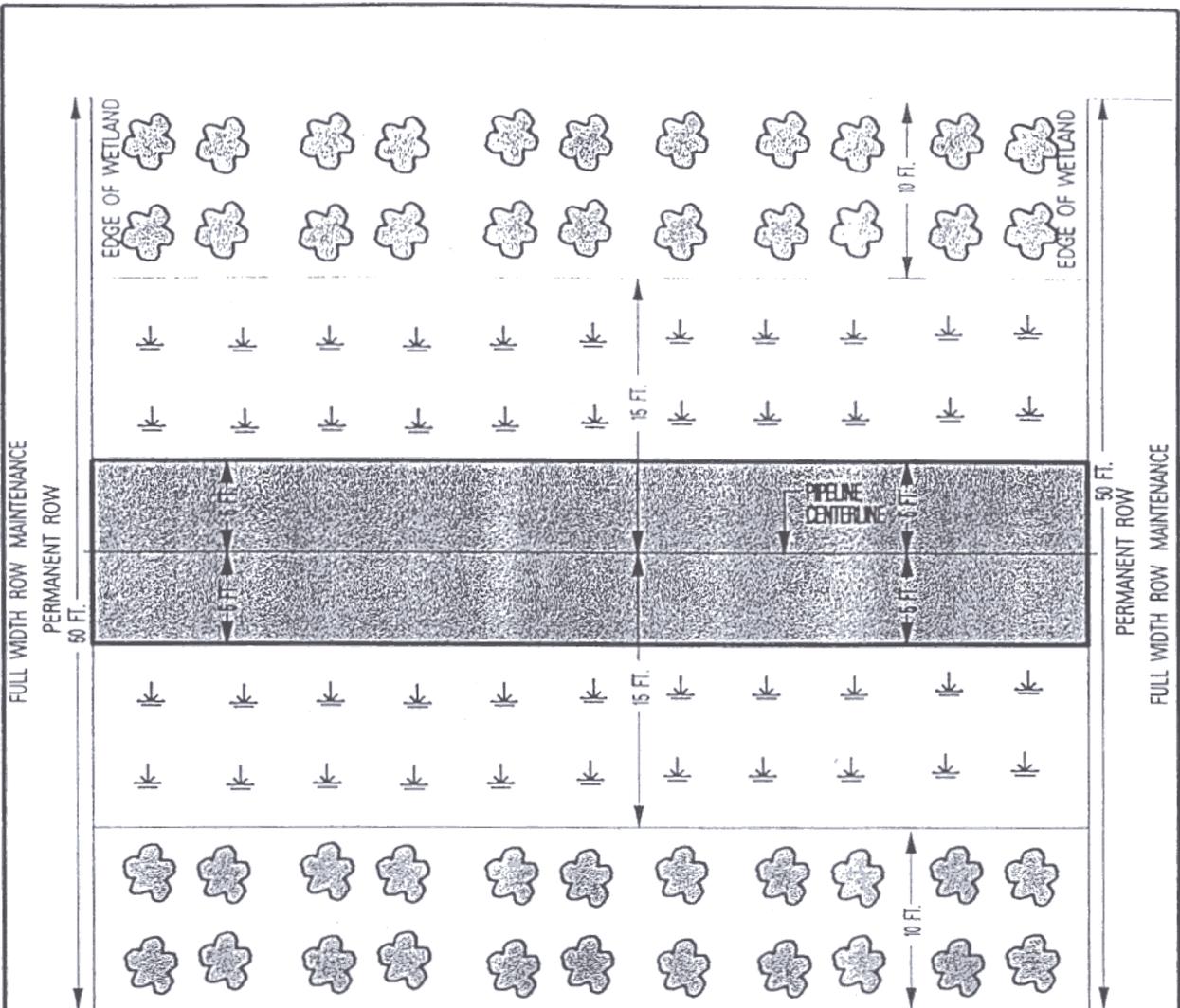
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ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL FORESTED WETLAND PLANTING

FIGURE 25



-  = HERBACEOUS PLANTS
-  = NON-MAINTAINED AREA
-  = SHRUB & HERBACEOUS PLANTS

- NOTES:
1. FULL WIDTH ROW MAINTENANCE PRACTICES IN WETLANDS ARE PROHIBITED.
 2. A CORRIDOR UP TO 10 FEET WIDE CENTERED ON THE PIPELINE OR APPURTENANCES MAY BE MAINTAINED IN A HERBACEOUS STATE.
 3. TREES LOCATED WITHIN 15 FEET OF THE PIPELINE AND GREATER THAN 15 FEET TALL MAY BE SELECTIVELY CUT AND REMOVED FROM THE ROW. (SHRUB AND HERBACEOUS PLANTS)
 4. STUMPS AND ROOTS WILL BE LEFT IN PLACE.

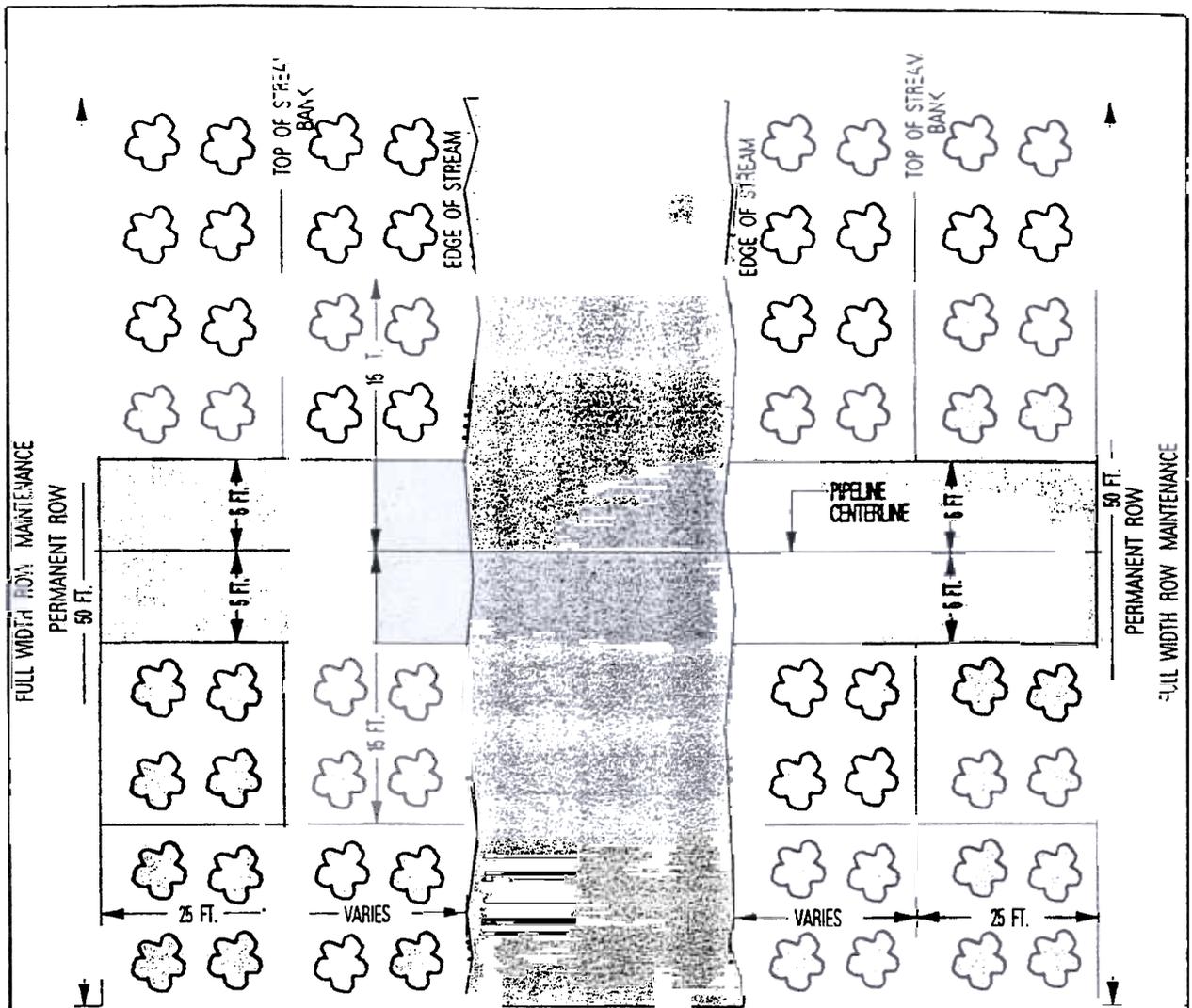
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ENVIRONMENTAL CONSTRUCTION STANDARDS

ROW MAINTENANCE
WETLANDS

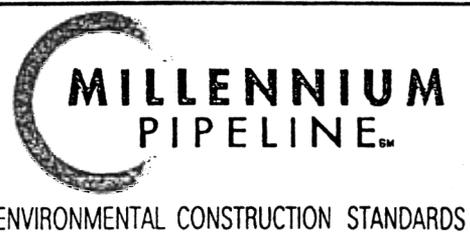
FIGURE 26



 = TREE

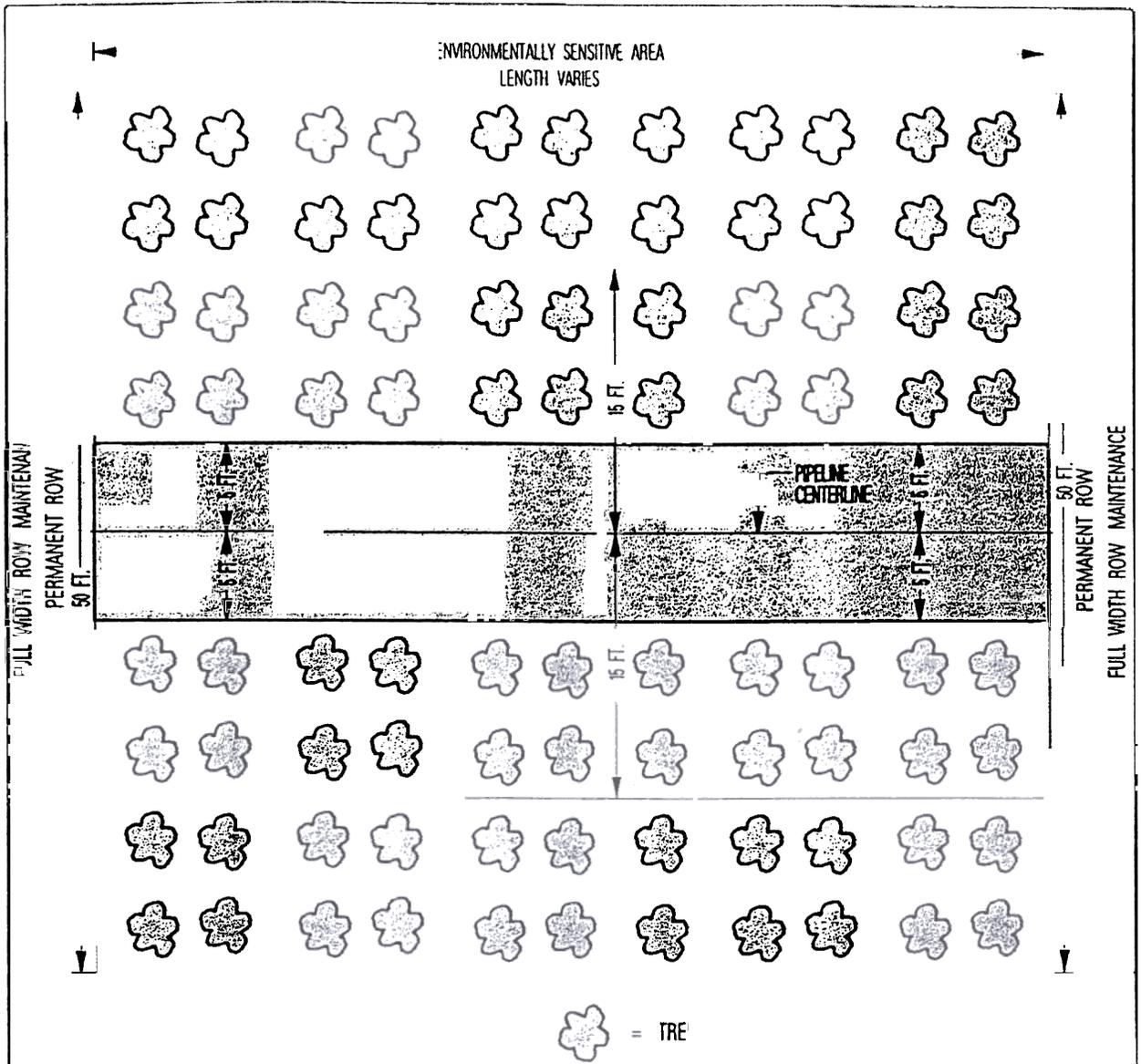
- NOTES:
1. FULL WIDTH ROW MAINTENANCE PRACTICES WITHIN 25 FEET OF WATERBODY'S MEAN HIGH WATER MARK ARE PROHIBITED.
 2. A CORRIDOR UP TO 10 FEET WIDE CENTERED ON THE PIPELINE OR APPURTENANCES MAY BE MAINTAINED IN A HERBACEOUS STATE.
 3. TREES LOCATED WITHIN 15 FEET OF THE PIPELINE AND GREATER THAN 15 FEET TALL MAY BE SELECTIVELY CUT AND REMOVED FROM THE ROW.
 4. STUMPS AND ROOTS WILL BE LEFT IN PLACE.

NOT TO SCALE



ROW MAINTENANCE
PERENNIAL STREAMS

FIGURE 27



- NOTES:
1. FULL WIDTH ROW MAINTENANCE PRACTICES IN ENVIRONMENTALLY SENSITIVE AREAS ARE PROHIBITED.
 2. A CORRIDOR UP TO 10 FEET WIDE CENTERED ON THE PIPELINE OR APPURTENANCES MAY BE MAINTAINED IN A HERBACEOUS STATE.
 3. TREES LOCATED WITHIN 15 FEET OF THE PIPELINE AND GREATER THAN 15 FEET TALL MAY BE SELECTIVELY CUT AND REMOVED FROM THE ROW.
 4. STUMPS AND ROOTS WILL BE LEFT IN PLACE.

TO SCALE



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ENVIRONMENTAL CONSTRUCTION STANDARDS

ROW MAINTENANCE
ENVIRONMENTALLY
SENSITIVE AREAS

FIGURE 28