

## **Construction Standards for Water/Sewer Transmission Mains Located Wholly or Partially in an Agricultural District**

### **PIPELINES LESS THAN EIGHT INCHES OUTER - DIAMETER**

The following standards focus on measures which minimize or mitigate the impacts on farmland from small pipeline trenching/construction. These standards cover practical agricultural issues including: pipeline depth-of-cover, topsoil protection, waste stone/rock materials, soil rutting and compaction, and existing and future farm drainage.

#### **Pipeline Depth-of-Cover**

Pipeline depth within the soil profile is important from the farming standpoint due to the permanence of a pipe's position in the soil profile. Inappropriate depth of a water/sewer line will diminish the current and future farm operators' capacities to administer the range of land-fitting practices needed for cropping specializations and rotations, ranging from deep tillage to the installation of subsurface tile drain lines.

From the pipeline operator's standpoint, appropriate depth-of-cover is essential for protection against puncture from surface disturbance and against bursting due to frost penetration and freeze up. A common minimum depth-of-cover employed in water/sewer pipelines is 4.5 feet.

**Standard: In agricultural land, the minimum depth-of-cover from restored ground surface to top of the buried pipe should be 4.0 feet. (See "Existing and Future Farm Drainage" regarding depth adjustment.)**

#### **Topsoil Resource**

The topsoil layer of the soil profile is the fertile material needed for sustained crop productivity and must be protected against degradation and loss due to pipeline construction activity.

**Standard:** For small pipelines to be constructed in agricultural land the "ditch and spoil-side" topsoil stripping practice should be employed:

The topsoil ("A" horizon) of the trench and adjacent trench-spoil storage zones should be stripped down to the top of the subsoil zone. The stripped topsoil should be segregated from all other materials in its separate stockpile at the edge of the construction right-of-way, with not less than two feet of open buffer between the respective toe of the topsoil stockpile and the nearest toe of the trench-spoil stockpile.

The trench should be backfilled with the excavated spoil material. (For areas with stones/rocks, see "Waste Rock")

Topsoil should not be used as trench-backfill.

After backfilling the trench with the spoil material, the stripped topsoil should be replaced uniformly over the area from which it was removed .

### Waste Rock

The upper portion of the soil profile (topsoil and upper subsoil) on tillable land contains a relatively low concentration of stones and rocks. Trench excavation for pipelines can unearth substantial quantities of stone and rock spoil from deeper portions of the soil profile. It is important to prevent either large rocks or concentrations of stone material used as backfill from obstructing normal farm tillage operations and disabling farm machinery.

**Standard:** In agricultural land, blasted or excavated bedrock, boulders and concentrations of excavated stone or rock materials should not be returned to the trench any closer than 24 inches from the exposed work surface of the stripped portion of right-of-way. The remainder of the backfill should be limited to suitable subsoil material, backfilled up to top of the exposed work surface. Excess waste/rock stone materials should be removed and then disposed of safely.

### Soil Rutting and Compaction

The construction work/traffic zone of the right-of-way for a small diameter pipeline is not generally stripped of the topsoil. However, construction equipment can seriously rut, compact and damage the topsoil and upper subsoil. Damage from small-diameter pipeline construction is usually the result of work when soils are too wet after rains, or from seasonal saturation.

**Standard:** Project traffic over topsoil on unstripped agricultural land should not be scheduled during seasonally wet soil conditions in early spring or late fall.

During the period of right-of-way construction/restoration, the movement of project vehicles and equipment over unstripped topsoil should be halted through periods of soil saturation from rainfall, until the soils are drained sufficiently to avoid rutting, and through periods of thaw until the upper soil profile is sufficiently frozen to avoid rutting.

### **Existing and Future Farm Drainage**

Surface drainage ways for storm runoff as well as for the outletting of subsurface drain lines are afforded agricultural lands by natural creeks, swales, ditches, diversion terraces, etc. Subsurface drainage is managed through installed practices of random and pattern tile drain lines. Protection of existing surface and subsurface drainage is important for crop production, as is the capability to install future tile drain lines and maintain ditches.

#### **Standard:**

**Existing drainage:** Surface drainage systems affected by the pipeline project should be protected and their function maintained by temporary fluming.

Earthen berms of surface drainage systems (e.g. diversion terraces) should not be breached. Where breaching is unavoidable, the earthen berm will be fully restored by engineering methods and materials consistent with the specifications of the USDA Soil Conservation Service.

Maintaining original gradient, all severed tile drain lines should be repaired using methods and materials consistent with the specifications of the USDA Soil Conservation Service, with all repairs and protective sleeving shouldered firmly at least three feet beyond the limit of the water/sewer line excavation.

**Future drainage:** During project planning and design, all operators of affected farmland should be inventoried for future locations of surface or subsurface drainage. All such locations should be noted in the design.

Depth and gradient for such future surface or subsurface drainage installation, consistent with USDA Soil Conservation Service engineering specifications, should be accommodated by appropriate engineering of the depth-of pipeline beyond the minimum burial of 4.0 feet as applicable.

## **Deep Ripping and Stone Removal**

The dense compaction of the soil should be alleviated together with stone removal prior to the final seedbed preparation.

**Standard:** During periods of relatively low to moderate soil moisture, the affected right-of-way should be alternately deep chiseled and rock-picked until uplifted stone/rock materials of four inches and larger size are cleared off the site and disposed of properly.

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