

CHAPTER 8

DRAINAGE AND DRAINAGE SYSTEMS

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8.1 GENERAL CONSIDERATIONS

Drainage is an essential element to be considered in the maintenance of a highway system. The purpose of a highway drainage system is to convey water away from the road as quickly as possible to prevent erosion of the roadway and saturation of the subgrade, and to prevent standing water or ice on the roadway surface. An efficient highway drainage system provides for the disposal of surface water from the roadway section and the elimination or control of subsurface water.

Included in a surface drainage system are the roadway crown, shoulder, curbs, gutters, drop inlets, storm drains, ditches/swales and pipes/culverts. A surface drainage system is provided to permit water to flow from the roadway surface as rapidly as possible and away from the highway.

Subsurface drainage systems include pipe underdrains, pavement base drains and combination storm sewer and underdrain. Examples of these are shown on [Publication 72M](#), [Standard Drawing RC-30M](#). The objective of a subsurface drainage system is to convey away any water that gets into base material. Subsurface drainage is a practical and economical way of maintaining firm, stable subgrades and structure foundations, eliminating saturated ground and preventing or reducing frost heave.

All drainage facilities should be maintained in operating condition to work as designed, with special attention given to fall cleaning so that structures will be ready to handle spring and summer rains. This requires year-round maintenance with emphasis on side ditch cleaning in the fall and early cleanup in the spring.

Properly cut shoulders allow water to drain away from the road surface and to flow to the nearest inlet or swale. Side dozing operations (removal of accumulated material from beneath guiderail) on unpaved shoulders and side approaches provides efficient drainage. [Pub. 23, Chapter 5](#) contains additional information concerning shoulders.

Routine maintenance of drainage systems should consist of periodic inspections, to include pre and post storm inspections, and drainage cleaning activities. Regular inspections should be conducted to confirm that satisfactory conditions exist and to evaluate needs for cleanup and repair.

Marked settling of an area or part of a roadway (usually with pavement breakups or cracks) during or following the wet season is generally an indication that a drainage problem may exist.

In summary, proper drainage can keep water from collecting on and under a pavement. Keeping the subsurface properly drained will insure stability and minimize maintenance costs. Exhibits 1 and 2, "Background for Drainage Facilities Policy" and "Sources of Curb-to-Curb Maintenance Policy", respectively, will be helpful as handouts and reference documents when interfacing with the public.

8.2 SURFACE WATER DRAINAGE

Two types of water courses that handle surface drainage are natural water courses and manmade water courses. Natural water courses consist mainly of rivers and streams but may be a valley or swale that directs water into a river or stream. An important part of drainage maintenance is the cleaning of obstructions such as trees, branches, boulders and sandbars from around bridge structures to ensure that stream flow is not directed toward bridge abutments.

All surface water should eventually lead to the groundwater and/or a natural watercourse. In order to accomplish this, manmade watercourses are constructed which include open drainage systems such as ditches, detention basins, swales and gutters, or enclosed drainage structures such as pipes/culverts, which cross under or run parallel to a roadway and outlet to a natural water course.

Ditches/swales are generally classified as parallel ditches, diversion ditches and inlet or outlet ditches. Parallel ditches are channels that are constructed parallel to the roadway for the purpose of carrying runoff coming from the pavement, shoulders and adjacent areas. They are usually open unless crossing under side roads, driveway or walkways. A parallel ditch may be lined with paving material in mountainous terrain to limit erosion or they may be sodded or in a natural state provided it is adequate to accommodate the design capacity.

Diversion ditches are constructed parallel to the top of a cut and are intended to intercept surface drainage from flowing over the face of the slope, thus preventing erosion and slides due to excessive moisture. They may be paved or unpaved, depending again on design capacity.

Inlet and outlet ditches serve primarily to carry water to and from cross pipes, are generally perpendicular or slightly skewed to the centerline of the road, and often extend from or onto private property. PennDOT's responsibility to maintain these ditches extends only as far as necessary to achieve free flow of drainage to and from the cross pipe, while avoiding excessive volume or velocity of water discharged onto private property.

Typical sections for parallel ditches and diversion ditches are shown on [Publication 72M, Standard Drawing RC-10M](#).

Periodic inspections should be made, especially after heavy rains and in the spring after snow and ice melt. The inspection should include but not necessarily be limited to:

1. Checking ditch line for uniformity and obstructions.
2. Checking side slopes for erosion and possible need for protection of erosion.
3. Checking condition of ditch paving materials.
4. Checking sediment deposits and weeds and brush growth in ditch line.

Ditches, swales and drainage channels should be maintained to the line, grade, depth and cross section to which they were constructed or subsequently improved. They should be kept reasonably clear of weeds and obstructing materials which may restrict the normal flow of water. Presently approved herbicides (discussed in [Publication 23, Chapter 13](#)) are effective and may be used for this purpose. Paved ditches should be maintained in a condition to ensure a smooth and impervious surface to prevent underflow of water. Cracks and joints in asphalt or concrete paved ditches and paved gutters should be repaired as necessary and the joints sealed.

Gutters are channels or curbs used along the side of a roadway surface to collect and control the flow of water and direct it to an inlet or outlet ditch, a catch basin or shoulder drain leading the water into a nearby stream or other natural watercourse.

All ditches, swales and drainage channels should be kept clean of debris and trash. Any settlement should be corrected and repairs of broken or eroded surfaces should be made with appropriate materials.

Refer to [Publication 113, Highway Maintenance Foreman Manual](#), Activity Numbers 711-7311 and 711-7312-01 for additional information concerning activity requirements and production and planning units.

8.3 AUTHORIZATION TO ENTER PRIVATE PROPERTY FOR DRAINAGE ACTIVITIES

The purpose of this section is to clarify procedures for the Department or its authorized representatives to enter upon any property if entry is necessary to correct, maintain or restore existing drainage facilities.

[Section 417, State Highway Act of 1945, P.L.1242](#) supports the Commonwealth's position and the following policies and procedures discussed in this Chapter concerning this subject.

This policy applies in all cases where work is to be done by PennDOT Maintenance Forces or by contractors which have been engaged by PennDOT.

Drainage problems usually result from either a natural impairment (e.g., growth of weeds or siltation) or a physical blockage, intentional by the property owner. In the case of a natural impairment of drainage facilities requiring entry onto private property, the first step should be personal contact with the property owner to explain the problem and our plan to correct it. PennDOT's representative should request the property owner to sign an RW-397 "Authorization to Enter (Non-Waiver of Claim)" or an RW-397A "Authorization to Enter (Waiver of Claim)" for PennDOT's protection. However, refusal of the property owner to sign the form does not prevent PennDOT from taking necessary corrective action. If the property owner refused to allow PennDOT to enter the property to correct the problem, he should be sent a certified letter informing him of the problem, our plan to correct the problem and the date we intend to enter. The corrective work should then be performed on the date indicated. The RW-397 or RW-397A Forms may be obtained from the District Right-of-Way Unit.

NOTE: If a dangerous condition exists on the highway because of blocked drainage, the Maintenance Manager should act as soon as possible to correct the problem. Although the preceding steps are not required, personal contact should be made when and where possible.

In the case of a physical blockage caused by the property owner, the first step is also personal contact with the property owner. The property owner should be told the action is in violation of the law and that he must correct the problem within a reasonable time. If the property owner fails to correct the problem within a reasonable time he should be sent a certified letter detailing the problem, indicating that he is in violation of state law, and demanding correction within a reasonable time in consideration of all the circumstances, (generally, two weeks). If the property owner still does not correct the problem, PennDOT may:

1. File a complaint before a District Justice for a summary fine (to be filed by District personnel),
2. Submit the matter to the Office of Chief Counsel for filing of a legal action to require the property owner to correct the problem or
3. Do the work and bill the property owner (the property owner must be informed beforehand in writing).

Again, if a dangerous problem exists on the highway because of a blocked drainage facility, PennDOT should act immediately to correct the problem and the preceding steps are not required.

Suggested letters notifying the property owner that the ditch must be opened are included at the end of this Chapter, indicated as Exhibits 3 and 4.

The responsibility for insuring that authorization to enter has been obtained rests with the Maintenance Manager.

Caution should be exercised on private property to prevent damage to any trees, shrubs, etc. when reestablishing drainage facilities. Ditches should be dug only as deep, as wide and as long as necessary to assure flow to or from the pipe invert and appropriate erosion and sedimentation control measures must be taken. The placement of additional pipe on private property is not permitted. The property should be left in a clean and well-graded condition.

When opening the pipe under adverse circumstances, ask the property owner if he wants the excavated material. Do not, under any circumstances, leave it piled next to the excavated ditch. Leaving the material in a pile next to the ditch has in the past resulted in legal actions against the Commonwealth. If the owner wants it

placed on another portion of his property, oblige him. If he insists that you leave it next to the ditch, remove the material and store it at the local PennDOT stockpile for a maximum of thirty (30) days. Because it is considered the property owner's material, the material may need to be returned in the future.

When replacing pipes use the following guidelines:

1. The size of the pipe should be determined. If the pipe is in poor condition, it should be replaced with the same type, unless excessive acidity or alkalinity of water or surrounding soil appears to cause corrosion; then the pH value of the water or soil should be determined and the proper type of replacement pipe chosen.
2. Guidelines concerning the size of replacement pipe are discussed in Section 8.6 of this Chapter.
3. Pipes should be replaced, if possible, at the same location, direction of flow, etc. If it is determined that an alternate location is more feasible, the pipe may be relocated at our discretion and with the property owner's approval. The property owner must agree to sign a new "Drainage Easement" Form [M950D3 "Drainage Easement \(Fee Consideration\)"](#) or [M950D4 "Drainage Easement" \(Non-work Consideration\)](#) for the new location. The outlet at the new location must empty onto the same owner's land as specified in the Deed of Easement. It should be determined that the land needed for the new channel location is owned by the person giving the Deed of Easement. All property owners must sign the Deed of Easement and the Deed of Easement must be filed in the local court. Form [RW-319](#), Deed of Release and Quit Claim may also be used, if applicable, and can also be obtained from the District Right-of-Way Unit.
4. The outlet ditch should be located as shown on the plan, or in the absence of a plan, along the flow line of the existing pipe. The only exception to this is if the property owner has constructed an improvement in the direct line of flow of the pipe such as a home, garage, etc. The outlet ditch may be relocated to avoid the improvement, but should not be located to direct water toward the improvement or toward an adjacent property owner. The property owner must agree to sign a new "Deed of Easement", as noted previously for relocation.

5. Photographs should be taken at the area before the work is performed and after the work is completed. Identify the date, location and name of the person taking the photograph to provide important documented evidence if the property owner claims that damage occurred to shrubs or other parts of his property during the drainage work. Video documentation is permissible. (Video documentation strategy and instruction may be found in [Publication 23, Chapter 15](#), "Weight Restrictions on Highways", "Inspection Procedures.")
6. When land development caused the replacement of drainage systems, the developer is responsible for the replacement costs.

8.4 DRIVEWAYS AND DRAINAGE PROBLEMS

When an icing, debris or drainage problem is caused by an improperly constructed or maintained driveway, the following policies are established to define and clarify District Maintenance and Permit responsibilities:

Should a driveway introduce drainage onto the roadway, the District should notify the property owner to have the problem corrected as soon as possible. This is true even if the driveway was authorized by permit. It is not necessary to determine whether a permit exists before notifying the property owners.

Sections 421 and 420 of the State Highway Law of 1945, 36 P.S. §§670-421 and 670-420, as amended, and 67 Pa. Code Chapters 441 and 459 support PennDOT's position in this matter.

Section 420 empowers PennDOT to make reasonable rules and regulations governing the use of all State highways. 67 Pa. Code [Chapters 441 \(Access to and Occupancy of Highways by Driveways and Local Roads\)](#) and [459 \(Occupancy of Highway by Utilities\)](#) are regulations promulgated under this authority.

Section 420(e) makes it a summary offense for any person to:

1. Violate any rule or regulation promulgated under authority of Section 420.
2. Willfully destroy, injure or damage any State highway by any method or device.

Section 421 makes it unlawful for any person to discharge sewage or drainage, except surface drainage, on or within the legal limits, of any State Highway. Any sewer outlet placed or located within the limits of a State Highway, or so located that the discharge therefore enters a State Highway, is a public nuisance under Section 421, and may be blocked or removed by PennDOT. Violation of Section 421 is also a summary criminal offense. See [Pub. 282 \(Highway Occupancy Permit Guidelines\)](#) on issuance on issuance of permits for drainage facilities.

Chapter 441 states: "All driveways shall be located, designed and maintained in such a manner as not to interfere or be inconsistent with the design, maintenance and drainage of the highway." A driveway that is draining surface water onto the road surface or shoulders and is damaging the shoulder pavement or causing icing is not being maintained in a manner consistent with the highway's drainage.

If a landowner refuses to correct a driveway drainage problem after he has been notified, he is violating Section 420(e) by willfully allowing the damage to continue, whether or not a permit exists. In some cases a permit may authorize drainage onto the highway. If the property owner should introduce the permit as a defense to any court action or revocation proceeding, it can generally be demonstrated that the drainage is a threat to safety and thus provides a basis for modifying the permit.

If a drainage problem causes a clear and present danger to the driving public, i.e., icing, immediate action should be taken to correct the situation, regardless of whether a permit does or does not exist.

Permit Managers should be notified about any drainage problems related to driveways, but it is not necessary to routinely refer drainage problems to the Permit Manager for resolution. Permit Managers are responsible for enforcing the terms of the driveway permit. Maintenance Managers are responsible for resolving and correcting all drainage problems within the right-of-way.

8.5 DRAINAGE MAINTENANCE RESPONSIBILITIES CONCERNING MUNICIPALITIES

PURPOSE

Storm water system maintenance has proven complex and contentious throughout PennDOT's history. Commonwealth statutory and common law has proscribed shared responsibility for the land constituting the State highway right-of-way, which includes shared storm water system responsibility. These responsibilities vary among municipality types as specified in the law.

This policy statement is intended as guidance to PennDOT maintenance staff, not as a binding norm. Statements made herein about the maintenance responsibilities of PennDOT and municipalities are not intended to admit or acknowledge ownership of storm water facilities by PennDOT or any municipality and any such admission or acknowledgement is hereby expressly disclaimed.

See Exhibit 1 "Background for Storm Water Facilities Policy."

DEFINITIONS

"Capacity": The maximum expected quantity of water, created by the peak design storm that can be accommodated at a particular location (inlet, ditch, etc.). Capacity design standards are located within [Chapter 10 of Design Manual Part 2, Publication 13M](#).

"Structural Conditions": An enclosed surface storm water facility's strength, structural integrity, plasticity, and fracture toughness. Structural conditions for maintenance purposes include natural deterioration, structural failure, and exceeded design life.

"Surface drainage": surface or sheet flow.

"Surface water drainage": Water from rain that lies or flows on the surface of the earth.

"Subsurface water drainage": Water from beneath the surface of the earth. See Section 8.7 of this Chapter, entitled "Subsurface Water Drainage".

"Surface water drainage facilities": Roadway crown, shoulder, curbs, gutters, drop inlets, storm drains, ditches/swales and pipes/culverts.

"Open surface water drainage facilities": Ditches, swales, gutters, roadway crowns, shoulders, and curbs. See Section 8.2 of this Chapter, entitled "Surface Water Drainage."

"Enclosed surface water drainage facilities": Storm water cross pipes/culverts and parallel pipes/culverts including any attached inlets, headwalls, and end walls. See Section 8.6 of this Chapter, entitled "Pipes, Culverts, Inlets, Endwalls."

"Subsurface water drainage facilities": Pipe underdrains, pavement base drains, subgrade drains, and combination storm sewer and underdrains. PennDOT is generally responsible for these facilities as identified in Section 8.7 of this Chapter, entitled "Subsurface Water Drainage".

"Projected curblines": The extension of an existing curblines across an intersection or short uncurbed section between curbed sections.

LIMITED ACCESS HIGHWAYS IN ALL MUNICIPALITIES

Drainage facilities installed solely to remove storm water from limited access highways are PennDOT's responsibility.

STATE-MAINTAINED BRIDGES IN ALL MUNICIPALITIES

PennDOT is responsible for bridge storm water facilities, except as provided by specific legislation, agreement or order of the Public Utility Commission.

HIGHWAY OCCUPANCY PERMITS IN ALL MUNICIPALITIES

Under sections 411 and 420 of the State Highway Law of 1945, any storm water facility installed under a highway occupancy permit (HOP) is the responsibility of the permittee to maintain. PennDOT does not assume responsibility for the maintenance of storm water facilities, curbing, or sidewalk installed by HOP. Detailed policy regarding storm water facility HOPs is located within PennDOT Publication 282. See also Section 8.4 of this Chapter, entitled "Driveways and Drainage Problems."

AGREEMENTS IN ALL MUNICIPALITIES

Legal agreements may exist that establish maintenance responsibility for storm water facilities. These agreements may be for specific facilities or for all facilities within an area. Maintenance of such facilities is as assigned in the agreement.

One type of legal agreement is an Agility Agreement based on intergovernmental cooperation language found in Act 57, 1998. PennDOT's Agility Program Guidelines are found within [Publication 23, Chapter 23](#).

The National Pollutant Discharge Elimination System (NPDES) program and other laws also support the ability to enter into legal agreements with local governments to maintain storm water facilities.

COMBINATION SYSTEMS IN ALL MUNICIPALITIES

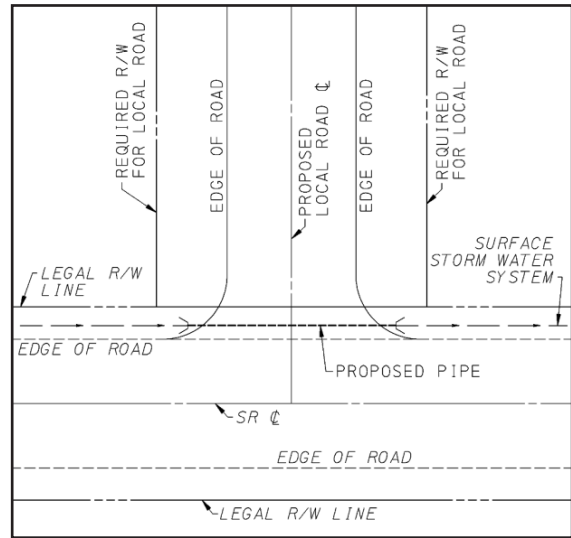
Storm water facilities that incorporate any type of sanitary waste water treatment prior to discharging are the responsibility of the local government or other public or private owner to maintain. Some local governments may have combined storm water and sanitary sewer facilities as part of their storm water systems. With the exception of inlet grates forming part of a paved surface, PennDOT will not be responsible for maintaining a combined storm water and sanitary sewer facility under any circumstance.

INTERSECTING STATE AND LOCAL ROADS IN ALL MUNICIPALITIES

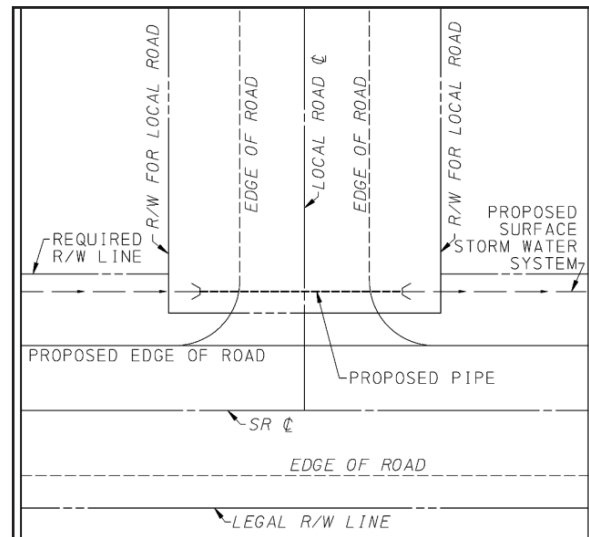
The following policy should be followed in maintaining and replacing enclosed surface water drainage facilities parallel to state highways within state right-of-way at intersections with municipal roads. As noted below, there are three categories to be considered.

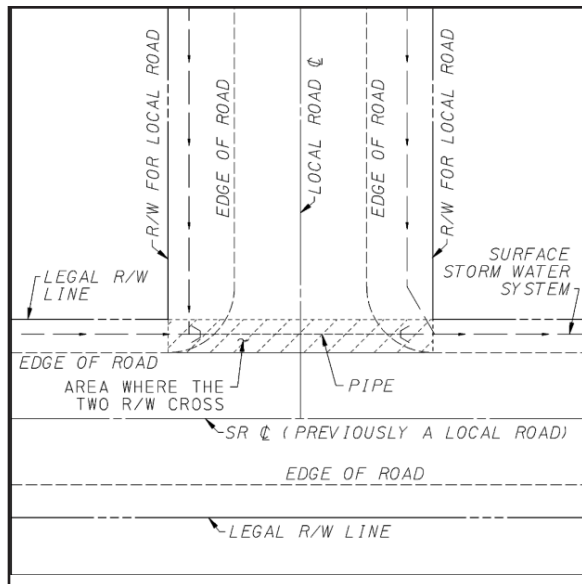
1. Category One involves an existing state road and a local government agency building or reconstructing a local road, or accepting a local road from a developer. Section 36 P.S. 670-420(b) clearly provides that "the Secretary may issue permits for the opening of streets and driveways onto state highways.... on terms and conditions established in department regulations...." If a newly constructed or reconstructed local road must traverse a drainage area to access a state highway, the

drainage must be properly controlled and any changes in storm water runoff must be addressed. Accordingly, the HOP shall require the municipality to design, construct and maintain any and all affected storm water appurtenances subject to any agreement with the developer and in accordance with Publication 282.



2. Category Two involves an existing local road and the construction or reconstruction of a state highway. If the state highway, for its proper drainage, requires the placement of a cross-pipe under the existing local road, PennDOT bears the responsibility for installing the cross-pipe and for maintaining it consistent with the policies outlined below on enclosed surface water drainage facilities in townships and cities, boroughs and incorporated towns, depending on the location of the facility.





3. **Category Three** usually involves two roads which were built by a local government and, by statute, the state assumed jurisdiction of one of these two intersecting roads. Under these circumstances there is joint jurisdiction and responsibility over the intersection area. The state right-of-way includes the paved cartway on the state road and the associated drainage swales. The local right-of-way includes the paved cartway on the local road and the associated drainage swales. The area where the two rights-of-way cross does not become the sole right-of-way of the state. If a cross-pipe serves both the state and local road and there exists joint responsibility for the maintenance of this cross-pipe, an agreement may be reached with the local government to cooperate in the joint maintenance of the cross-pipe under the Agility Program or by separate agreement.

OPEN SURFACE WATER DRAINAGE FACILITIES IN CITIES, BOROUGH AND INCORPORATED TOWNS

PennDOT's maintenance responsibility for open surface water drainage facilities is between curblines (actual or projected), including inlet grates in the roadway surface. PennDOT will not perform any maintenance beyond the curblines except to maintain the structural integrity of the highway, such as slopes, walls, etc.

If the capacity of an open surface water drainage facility is compromised by upgrade surface water drainage not from the State highway, PennDOT reserves the right to take appropriate action against the private party or local government that caused or failed to prevent the capacity issue.

OPEN SURFACE WATER DRAINAGE FACILITIES IN TOWNSHIPS

PennDOT will maintain all open surface water drainage facilities within the right of way, including inlet grates in the roadway surface.

Districts are encouraged to use grass swales when possible rather than curbing. Curbing is not always necessary, particularly in areas of unrestricted right-of-way and topography. Depending on physical limitations, shoulders can be designed to accommodate pedestrians and bicyclists, if necessary, using wider, flatter areas and dedicated bike lanes. Sidewalks can also be set back from the roadway as to eliminate the need for curbing and its associated enclosed surface water drainage facilities.

When an enclosed surface water drainage facility is opened, the District must report the change to the Chief of the Maintenance Technical Leadership Division, Bureau of Maintenance and Operations (BOMO). BOMO will maintain a list of these changes.

If the capacity of an open surface water drainage facility is compromised by upgrade surface water drainage not from the State highway, PennDOT reserves the right to take appropriate action against the private party or local government that caused or failed to prevent the capacity issue.

WORK OUTSIDE PENNDOT LEGAL RIGHT OF WAY

PennDOT will not perform storm water maintenance activities outside the legal right-of-way, except to exercise rights granted under the "Ditch and Drainage Act," 36 P.S. 670-417, to reestablish drainage flow. Once drainage flow is established, maintenance activities will cease, except for any continuing obligations imposed by environmental permitting. When performing activities off PennDOT right-of-way, employees or contractors must follow the procedures set forth in Section 8.3 of this Chapter, entitled "Authorization to Enter Private Property for Drainage Activities."

ENCLOSED SURFACE WATER DRAINAGE FACILITIES IN CITIES, BOROUGHES AND INCORPORATED TOWNS

PennDOT does not maintain enclosed surface water drainage facilities within cities, boroughs and incorporated towns. This includes inlets below grates, cross pipes/culverts, parallel pipes/culverts, headwalls and endwalls unless PennDOT has assumed maintenance by agreement, or has installed facilities located in 1st or 2nd Class Cities.

Street cleaning and sweeping at and along curb lines (actual and projected) is considered to be a drainage function of cross and parallel pipes within the curb section. The Department, through past practice or agreement, may sweep these sections but is not obligated to do so.

If there is an emergency condition involving public safety where the integrity of the road surface has been compromised due to the failure of a local government to maintain an enclosed surface water drainage system, PennDOT may correct the condition and bill the local government for the cost of the work.

PennDOT's discretionary authority to install enclosed surface water drainage facilities in 1st and 2nd Class Cities must be exercised in a limited manner and only if the City agrees to future maintenance, in writing.

ENCLOSED SURFACE WATER DRAINAGE FACILITIES IN TOWNSHIPS

Maintenance activities may occur under four circumstances: deficiencies relating to structural conditions; lack of capacity; routine maintenance; and emergency repairs. PennDOT will maintain enclosed surface water drainage facilities of the state highway within townships for structural conditions, but not lack of capacity.

1. Structural conditions. PennDOT's responsibility for deficiencies relating to structural conditions includes the repair and replacement of inlets below grates, cross pipes/culverts, parallel pipes/culverts, headwalls and endwalls for structural condition reasons unless the township has assumed maintenance by written agreement or HOP, a combination or system with treatment facilities is involved, or there is joint responsibility at intersecting roads.

PennDOT may, where it is feasible and safe, remove, reconstruct, or replace deteriorated parallel pipes with appropriate grass or similar swales or other alternative drainage designs in accordance with all storm water management requirements. PennDOT will notify the Township in writing 30 days in advance of replacement, if feasible, in order for the Township to properly assess and comment. If the township does not desire the piping to be replaced by a grass swale, the township must assume complete maintenance responsibility for the parallel pipes by HOP or legal agreement. The abutting land owner can be a co-applicant on such an HOP. The complete maintenance responsibility assumed by the township will be limited to the facilities that PennDOT would have otherwise replaced with a grass or similar swale or other alternative designs. Both PennDOT and the Township will make every effort in good faith to resolve any disputes over the feasibility and safety of these alternatives.

Districts must determine enclosed surface water drainage facility replacement needs based upon safety concerns to the traveling public and the integrity of the surface of the highway; the willingness of the local government and abutting property owners to partner; and the priority of roadway resurfacing needs under the Transportation Improvement Program (TIP) and County Maintenance Surfacing Improvement Program.

2. Lack of capacity. Townships are responsible when cross or parallel pipes must be repaired or replaced due to lack of capacity. A repair or replacement due to lack of capacity shall mean the repair or replacement of enclosed surface water drainage facilities because the facility can no longer accommodate increased storm water flows from upstream development that occurred since the roadway was established and the storm water facility originally installed. The owners or occupiers of property abutting those facilities shall be required to maintain their storm water on their property or repair or replace the facility, thus requiring an HOP. Lack of capacity does not include failures that occur during storm events that exceed design intensity and duration standards as defined in Publication 13M. Such capacity issues usually arise when storm water issues are not properly addressed in the land development process or

where a property owner has altered drainage courses on his property which cause a re-direction or increased flow towards the highway.

3. **Routine maintenance.** Routine maintenance involves, as necessary, removal of leaves and other obstructions from and at the enclosed facilities, and may involve street cleaning and sweeping. It does not include the repair or replacement of enclosed surface water drainage facilities for structural conditions.

Routine maintenance of enclosed surface water drainage facilities may be addressed under PennDOT's Agility Program. If the Agility Program is not used, the past practice of the township and PennDOT with respect to those facilities will determine who is responsible for routine maintenance.

4. **Emergency repairs.** If there is an emergency condition involving public safety or where the integrity of the road surface has been compromised due to the failure of a township to maintain an enclosed surface water drainage system for which it is responsible, PennDOT may correct the condition. PennDOT reserves the right to bill the township for the associated costs if it gave prior notice to the township.

8.6 PIPES, CULVERTS, INLETS, ENDWALLS

Highway maintenance activities that are generally performed by PennDOT forces and are associated with pipes, culverts, inlets, and endwalls include the following:

1. Cleaning pipes and culverts (Activity 711-7314-01).
2. Cleaning inlets and endwalls (Activity 711-7311-01).
3. Repair and/or replacement of inlets and endwalls (Activity 711-7321-01).
4. Replacement of pipes and culverts (Activities 711-7324-01 and 711-7324-02).

All activities can be found in the [Highway Foreman Manual, Pub. 113](#). PennDOT's objective is to maintain the above referenced structures in a condition to efficiently carry away collected surface and/or subsurface water.

Surface water that does not drain from the roadway surface and the shoulder or subsurface water that reaches the roadway during periods of freezing weather can accelerate pavement deterioration and result in ponding and icing. Chapter 4 (Winter Services) provides guidance for treating and signing such locations as a temporary remedy.

Annual inspections should be made after the snow and ice season and routine inspections after heavy rains. PennDOT maintenance employees should watch for signs of drainage problems or failures whenever they travel the roadways.

Inlets and endwalls should be checked to determine if any structural repair work is necessary. Frames and grates should be properly seated. Pipe culverts should be checked for condition of pipe, alignment of inlet and outlet ditches and for blockages.

Necessary repairs to concrete and masonry structures should be made as required to provide structurally sound units. Replacement of inlets and endwalls should be made in accordance with Section 605 of [Publication 408](#) and Standard Drawings [RC-31M](#), [RC-45M](#), and [RC-46M](#).

Culverts should be kept reasonably clean and unobstructed. Obstructions and sediment deposits should be removed as quickly as practical. Inlet and outlet channels should be properly aligned and maintained so that culverts can function to capacity. Often the inlet channel needs realignment to prevent sedimentation. Areas around culvert inlets and outlets should be controlled to limit vegetation and permit free flow of water.

It may be necessary to clean debris from a channel or natural water course beyond the right-of-way line to keep rains from washing material into a culvert inlet. Written permission should be obtained from the property owner before entering private property to clean up debris. (Refer to discussion in Section 8.3 on "Authorization to Enter Private Property").

Clogging of pipe by silt, leaves or other debris is a common occurrence. The solution for the leaves and other debris is frequent cleaning. If silting continues to occur, consideration should be given to determining the cause or source of the erosion and stabilizing where appropriate to preclude the introduction of silt and debris to the drainage system.

Scour at inlet ends of pipe is caused by turbulence that results when more water is collected at the inlet than can rapidly be discharged by the pipe. When water collects at the inlet end of pipe culverts, the cause should be determined as soon as possible and the necessary correction should be made promptly to preclude culvert failure. If the ground is not protected a headwall, pipe end section, or riprap should be installed.

Scour at outlet ends of pipe is caused by fast, uncontrolled discharge of a volume of water into an outlet channel that is easily eroded or from a pipe whose discharge elevation is not complimentary to that of the drainage channel into which it discharges. Undermining and failure of the outlet head wall can result from such scouring. When scour occurs at the outlet end of a pipe culvert, the alternatives for correcting this condition are to build a concrete or stone apron on the spillway beneath the end of the pipe or to construct an energy dissipater in accordance with Standard Drawing [RC-70M](#). It may also be necessary to line the bed of the outlet channel or where practical, change the outlet elevation of the pipe.

References to be reviewed when replacing pipe include the following:

1. Publication 408, Sections 601 to 605.
2. [Standard Drawing RC-30](#). Excavation for pipe bedding and trench details are shown on this drawing.
3. [Design Manual, Part 2, Chapter 10](#), "Drainage Design and Related Procedures".
4. [Publication 113](#) (Plant Maintenance Highway Foreman Manual) Performance Standards for Activity 711-7324 and Related Quality Assurance Review Format for Pipe Replacement.

Before replacements are made, it is important to determine the causes of pipe failure. It may be necessary to complete a hydraulic design and to determine the pH value of the water or soil to determine the type and/or size of the culvert to accommodate the flow. The drainage system should be adequate to prevent flooding of pavement, shoulders, and adjacent property.

As discussed in Publication 408, the joining of individual pipe sections requires additional emphasis. If the sections are not joined properly,

water will seep through the joints and into the bedding, thus causing erosion and settlement and additional associated maintenance problems.

The use of approved "pipe liners" should also be considered when the condition of the existing deteriorated pipe will allow the introduction of a "liner" without adversely constricting the flow. Primary candidates for this treatment may include cross drains located under significant depths of fill and/or in areas of heavy traffic where detouring is not an option and operational width is a concern.

Hydraulic reviews should be part of the decision making process when "pipe liners" are considered an option to completely replacing an existing deteriorated drainage system.

Excessive acidity or alkalinity of water or surrounding soil may exist and cause corrosion of metal pipes and deterioration of steel reinforced concrete pipes thus accelerating the need for the replacement of a pipe. The pH value of the water or soil should be determined before a pipe is replaced. Below is a guide for the selection of pipe types based on pH values of the water and the pH and resistivity values of the soil:

TYPE OF PIPE WATER AND/OR SOIL

COATING	SOIL pH	RESISTIVITY Omm-cm
Aluminum Alloy (Uncoated)	4.0 to 8.5	>1500
Concrete (Uncoated)	4.0 or Greater	All
Concrete (Epoxy Lined)	<4.0	All
Plastic	All	All
Steel (Metallic Coated)	5.5 to 8.5	>6000
* Steel (Polymer-Type B)	4.0 to 8.5	2000 to 6000
Steel (Polymer-Type C)	<8.5	<6000
* Steel (Fiber Bonded)	4.0 to 8.5	2000
* Stainless Steel	<4.0	<6000
* Not shown in DM-2		

In areas where abrasive conditions exist, metal coated or uncoated pipe should have a paved invert, concrete pipe should be epoxy lined and plastic pipe should be double-walled, smooth-lined corrugated polyethylene pipe.

For the repair and maintenance of existing pipes, the Department of [Environmental Protection 25PA Code, Chapter 105 Regulations](#), Section 105.12 (b-7) waves the permit requirement for a culvert, bridge or stream enclosure on a watercourse where the drainage area above the structure is five (5) square miles or less and the structure was completed and in place prior to July 1, 1979. Additionally, for pipes or culverts installed after July 1, 1979, 25 PA Code, Chapter 105 Regulations, Section 105.11(d) provides that all installations permitted by DEP shall incorporate authorization for normal repairs and maintenance within the original specifications. Therefore, to ensure compliance with DEP regulations regarding existing pipes or culverts, the following shall be the Department of Transportation policy:

1. Existing pipes or culverts forty-eight (48) inches or less in diameter [i.e. drainage area one hundred (100) acres] may be replaced at the same location with the same size or equivalent size pipe or culvert as routine maintenance as directed by county management.
2. If by field observation an existing pipe of less than forty-eight (48) inches in diameter does not appear to be adequate to accommodate the existing flow of water, a maximum six (6) inch diameter increased size pipe or culvert, up to and including a maximum size of forty-eight (48) inches, may be installed at the same location as routine maintenance as directed by county management.
3. In accordance with the Design Manual, the minimum diameter pipe should be eighteen (18) inches.
4. All existing pipes or culverts, greater than forty-eight (48) inches in diameter, shall have a hydraulic analysis completed in accordance with the Design Manual, Part 2, Chapter 10 prior to replacement. Likewise, pipes or culverts replaced by pipes greater than one pipe size [six (6) inches] larger shall have a hydraulic analysis completed. A file should be maintained in the District Office on all pipes or culverts with diameters greater than forty-eight (48) inches (or equivalent). Changes to this list should be forwarded on a quarterly basis to the Bureau of Project Delivery, Hydrology and Hydraulics Unit.
5. If the hydraulic analysis determines that the drainage area of an existing pipe or culvert to be replaced is greater than one hundred (100) acres, a permit in accordance with the applicable DEP, Chapter 105 regulations, must be obtained either by registration for a [General Permit, GP-7](#) (Minor Road Crossings), where applicable, or by submission of an application for permit. The replacement of all existing pipes and culverts shall comply with all Erosion and Sedimentation control measures contained in Section 8.8 of this chapter.

For the installation of pipes or culverts at new locations where no pipe or culvert exists, DEP 25PA Code, Chapter 105 Regulations, Section 105.12 (A.2) provides that a permit is required for all new installations with a drainage area of greater than one hundred (100) acres or where wetlands are located in the floodway.

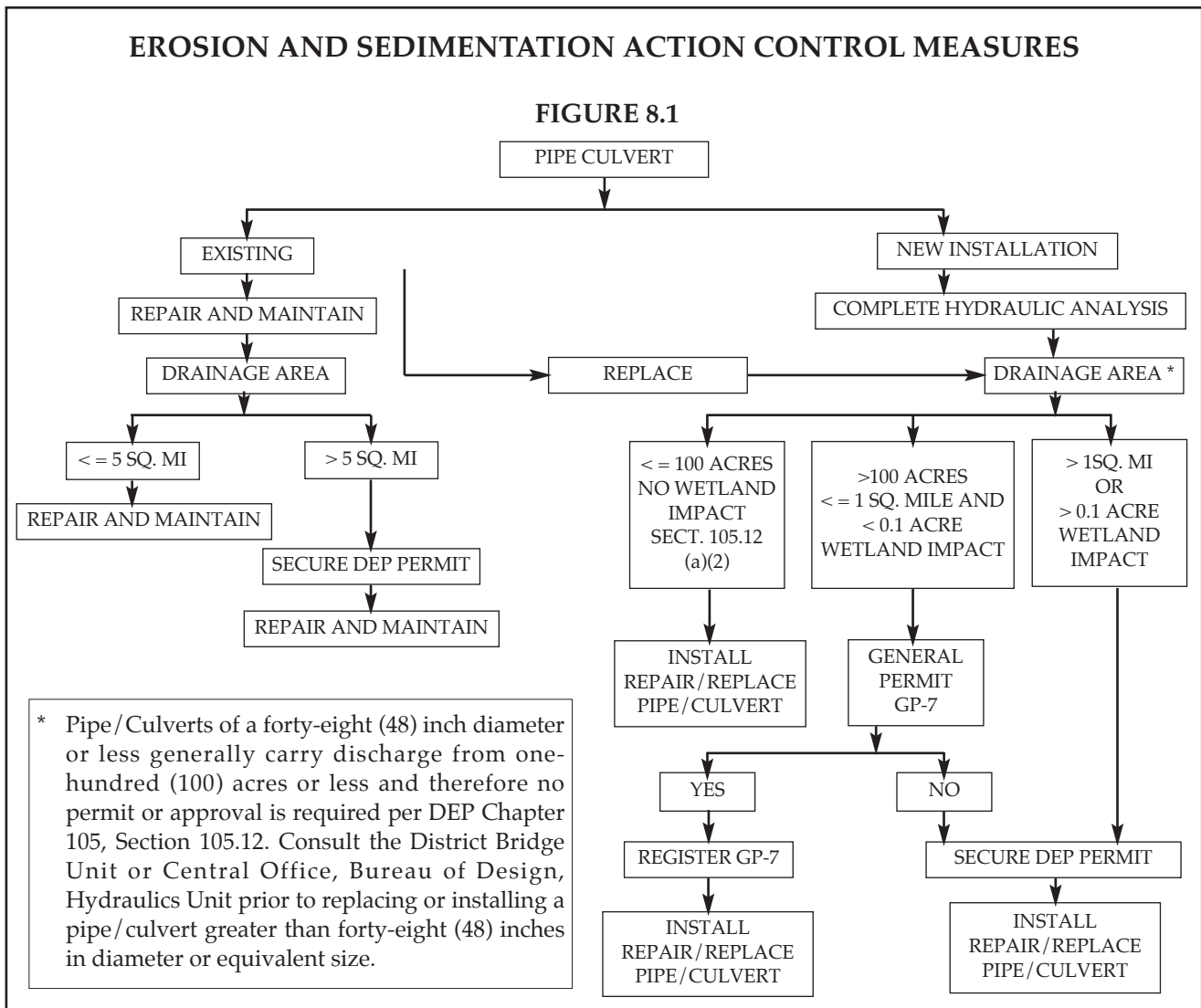
Therefore, to ensure compliance with DEP, Chapter 105 Regulations for new installation of pipes or culverts, the following shall be the Department of Transportation policy:

- 1) All new installations of pipes or culverts at locations where no pipe or culvert exists shall have a hydraulic analysis completed by the District in accordance with the [Design Manual, Part 2, Chapter 10](#) prior to installation.
- 2) If the hydraulic analysis determines that the drainage area is in excess of one hundred (100) acres or wetlands are located in the floodway, a permit in accordance with the applicable DEP, Chapter 105 regulations must be obtained either by registration for a General Permit GP-7 (Minor Road Crossings), where applicable, or by submission of an application for permit.
- 3) All new installations of pipes or culverts shall comply with all Erosion and Sediment action control measures contained in Section 8.8 of this chapter. The flow chart in Figure 8.1 shows the process described herein. In addition to the previously outlined DEP regulations, care must be taken when working in and around wetland or suspected wetland areas. There have been several confirmed cases of endangered plant and or aquatic species identified in Pennsylvania. It is important to protect both

these species of concern and their habitat. For further assistance in dealing with these regulations, consult the District Environmental Coordinator or District Maintenance Office.

EROSION AND SEDIMENTATION ACTION CONTROL MEASURES

FIGURE 8.1



8.7 SUBSURFACE WATER DRAINAGE

In addition to providing facilities for draining water from surface areas of the highway, it is also important to provide drainage for the removal of water from beneath the surface. Subsurface water conditions can be more damaging than surface water conditions. Subsurface water can soften the subgrade of a pavement causing weakness and eventual failure of the pavement. Roadside problems such as landslides and rock falls can also result from excessive amounts of subsurface water.

All subsurface water must be drained away from the highway. Subsurface drains should have free flowing outlets, and should be located to direct water to some type of surface watercourse such as a parallel ditch, flume, or pipe. Properly functioning drainage will prevent subsurface water from collecting under the roadway or reaching the surface of the roadway.

The following types of subsurface drains are shown on Standard Drawing RC-30M and are specified in Sections 610 and 612 of Publication 408:

1. Pipe Underdrain
2. Pavement Base Drain
3. Subgrade Drain
4. Combination Storm Sewer and Underdrain

Also noted are subsurface drain outlets that serve the purpose of out letting the underdrain.

Pipe underdrains are generally used for the following purposes:

1. To drain springs and cut off seepage in the original ground either under an embankment, or along benches where the highway is located on the side of a hill.
2. To lower the ground water level so that it will be below the surface of the subgrade.
3. To provide an outlet for water that gets into the base and subbase.

Subgrade drains are designed to handle water from springs or seepage that cannot be cut off before it gets to the subgrade or water that may get to the subgrade from the surface of the road.

Frequent inspection of subsurface drains is very important. Subsurface drains should have outlets and these outlets should be kept open. Otherwise the subsurface drain acts as a reservoir for water and does more harm than good.

Information concerning pipe size and proper spacing of outlets can be found in the Design Manual, Part 2, Chapter 10.

All repair and replacement work of subsurface drains should be done in accordance with the associated Roadway Construction Standards and Publication 408 Specifications previously referenced in this section.

8.8 EROSION AND SEDIMENTATION CONTROL

BACKGROUND

In general, an Earth Disturbance Permit will not be required for most maintenance activities. However, a countywide Erosion and Sedimentation Plan is required for those activities involving the movement of earth.

The standard erosion and sedimentation control plan for road maintenance activities (Exhibit 5 page 8-27) is based on the use of erosion control measures as detailed in the maintenance activity performance standards. In the event a maintenance activity is planned within 50 feet of a flowing stream, appropriate erosion and sedimentation control best management practices (BMP's) will be incorporated into the maintenance activity to protect the stream. Authority to initiate a site specific plan and responsibility to assure compliance with the requirements of the plan rests with the Maintenance Manager.

For routine maintenance activities involving earth disturbance such as side dozing, shoulder cutting and grading, shoulder repair, pipe installation and cleaning, culvert installation and cleaning, day lighting, etc., erosion and sedimentation control BMP's will be incorporated into work operation in accordance with the approved work activity performance standard. Guidance and additional information is provided in [Publication 464 \(Maintenance Field Reference for Erosion and Sediment Control\)](#) relative to the selection and application of erosion and sedimentation Best Management Practices.

In order to ensure that erosion and sedimentation control BMP's are properly implemented, the County Conservation District and/or the Pennsylvania Department of Environmental Protection (DEP) will periodically inspect Department maintenance activities and forward inspection reports to the Maintenance Manager.

POLICY

It is the policy of the Department to incorporate erosion and sedimentation control BMP's into all maintenance operations involving earth disturbance activities which are likely to cause accelerated erosion and resulting sedimentation.

The Maintenance Manager shall arrange to meet with the County Conservation District once in the spring to review the proposed work plan. Additional meetings may be conducted as required.

The PA Clean Streams Law authorizes the regulation of activities that create or have the potential to create pollution in the waters of the Commonwealth. The DEP Administrative Code 25, Chapter 102 regulates earth disturbing activities such as highway maintenance to prevent accelerated erosion and the resulting sediment pollution.

PROCEDURE

Figure 8.2, page 8-15, outlines the erosion and sedimentation control procedures for the Maintenance Manager to follow when planning and implementing maintenance activities involving earth disturbances. This procedure provides maximum flexibility by allowing management personnel to select and implement additional erosion and sedimentation control BMP's only where they are needed. In cases where there are technical questions relative to the design and implementation of erosion and sedimentation control BMP's, the District Environmental Manager shall be consulted. The County Conservation District may also be consulted.

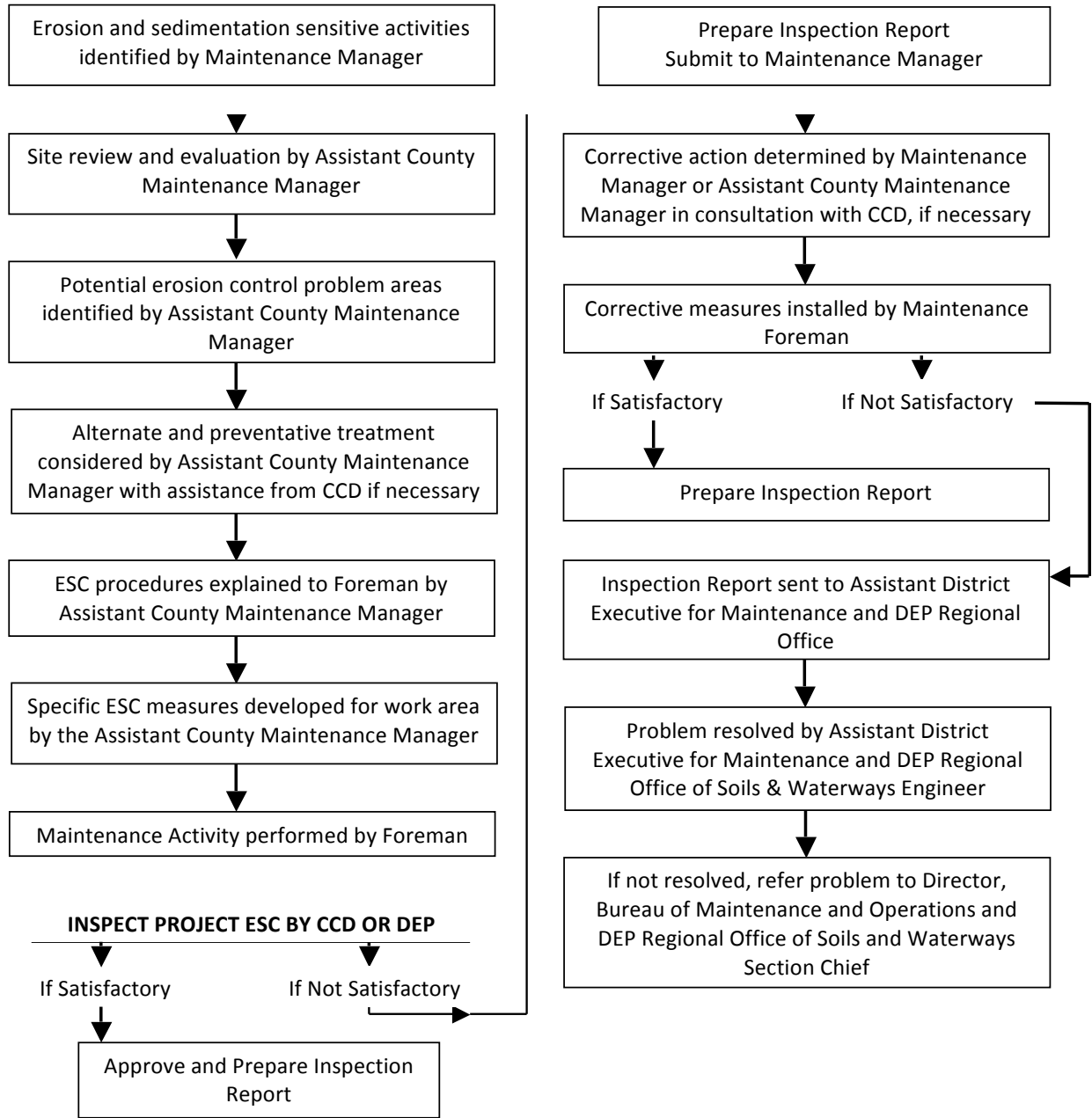
An inspection will be completed. If deficiencies are noted and corrective measures are necessary, a mutually agreed upon deadline will be given to correct the conditions. Re-inspection will be conducted. In the event a problem cannot be resolved at the county level, the Assistant District Executive for Maintenance (for the District Executive) and the appropriate DEP Regional

Office will receive a copy of the inspection report. These parties will initiate coordination to satisfactorily resolve the problem. If resolution cannot be reached at this level, Soils and Waterway Section Chief or the Water Quality Program Manager of the appropriate Regional DEP office and the Director of the Bureau of Maintenance and Operations (for the Deputy Secretary for Highway Administration) will be contacted to resolve the problem.

In instances where transportation facilities are affected by erosion and sedimentation from properties outside the Department right-of-way, the Maintenance Manager should notify the County Conservation District or DEP Regional Office of the problem and request that appropriate action be taken.

EROSION AND SEDIMENTATION CONTROL PROCEDURES FOR DEPARTMENT OF TRANSPORTATION MAINTENANCE ACTIVITIES

Figure 8.2



Legend

- ESC – Erosion and Sedimentation Control
- CCD – County Conservation District
- DEP – Department of Environmental Protection

Prepared by:

Return To:

Site Location:



M950D3 (8-12)

**COMMONWEALTH OF PENNSYLVANIA
DRAINAGE EASEMENT
(FEE CONSIDERATION)**

THIS INDENTURE, made this _____ day of _____, _____ [year], by _____ County, Pennsylvania, owners of property to be affected by the proposed construction and/or maintenance work on the above-mentioned State Route, their heirs, executors, administrators, successors, and/or assigns, hereinafter, whether singular or plural, called the GRANTOR, and the Commonwealth of Pennsylvania, Department of Transportation, hereinafter called the COMMONWEALTH.

WITNESSETH:

IN CONSIDERATION of the sum of one dollar (\$1.00) lawful money of the United States of America to it well and truly paid by the Grantee at and before the ensealing and delivery of these presents, receipt whereof is hereby acknowledged, the GRANTOR does hereby grant and convey to the COMMONWEALTH an easement for drainage purposes, unlimited in vertical dimension as shown on the pertinent section of a plan which is attached hereto and made a part thereof, said easement to be taken from the premises conveyed or devised to GRANTOR by _____, dated _____, and recorded in the _____ County Recorder of Deeds Office at Deed Book _____, page _____, together with the improvements, hereditaments and appurtenances to the said easement, except those which may have been retained by the GRANTOR.

THE GRANTOR does further remise, release, quitclaim, and forever discharge the COMMONWEALTH or any agency, bureau, or political subdivision thereof or its or their employees or representatives of all suits, damages, claims, and demands which the GRANTOR might otherwise have been entitled to assert under the provisions of any law, for or on account of any injury to or destruction of the aforesaid property of the GRANTOR through or by reason of the aforesaid highway construction and/or maintenance work.

FURTHER, the GRANTOR does acknowledge that he has been fully informed by the COMMONWEALTH of his possible right to the payment of just compensation for the taking of the herein described easement and that he does hereby waive such right.

NOW, it is hereby agreed by the GRANTOR herein and the COMMONWEALTH that a Drainage Easement shall be granted and conveyed from the GRANTOR to the COMMONWEALTH to construct and outlet a storm drain upon GRANTOR's property for the purpose of carrying runoff and waters away from State Route _____, Segment _____, Offset _____, being at or about Highway Station _____ and proceeding along a course more particularly and graphically set forth on the attached section of Highway Plan, which is made a part hereof.

FURTHERMORE, the COMMONWEALTH shall not be liable for any change in grade, depth, or location caused by the discharge of waters through said course or caused by other natural elements.

FURTHERMORE, GRANTOR also conveys to the COMMONWEALTH the right and privilege to enter upon said land for the purpose of cleaning, opening, or maintaining said drainage facilities; and further agrees that no claim shall be brought against the COMMONWEALTH for said cleaning, opening, or maintaining.

Certificate of Residence

I hereby certify the Grantee's precise residence to be:

Witness my hand this _____ day of _____, _____

Agent for the Commonwealth of Pennsylvania
Department of Transportation

The Grantor has executed or caused to be executed these presents, intending to be legally bound thereby:

INDIVIDUALS

ENTITIES*

GRANTOR:

(Name of entity)

By: _____

By: _____

* Use this block for a corporation, partnership, LLC, government entity, school district, church, trust, club, association, POA, attorney-in-fact, executor, administrator or any other entity. See R/W Manual Section 3.06

Prepared by:

Return To:

Site Location:



M-950D4 (8-12)

**COMMONWEALTH OF PENNSYLVANIA
DRAINAGE EASEMENT
NON-WORK CONSIDERATION**

THIS INDENTURE, made this _____ day of _____, _____ [year], by _____ County, Pennsylvania, owners of property to be affected by the proposed construction and/or maintenance work on the abovementioned State Route, their heirs, executors, administrators, successors, and/or assigns, hereinafter, whether singular or plural, called the GRANTOR, and the Commonwealth of Pennsylvania, Department of Transportation, hereinafter called the COMMONWEALTH.

WITNESSETH:

IN CONSIDERATION of the COMMONWEALTH not opening a blocked drainage crosspipe and drainage outlet ditch which carries water over and through GRANTOR's property at or about Highway Station _____, and which by Act of 1945, P.L. 1242, art. IV, 670-417, the COMMONWEALTH has the right and authority to reopen the same, the GRANTOR does hereby grant and convey to the COMMONWEALTH an easement for drainage purposes, unlimited in vertical dimension as shown on the pertinent section of a plan which is attached hereto and made a part thereof, said easement to be taken from the premises conveyed or devised to GRANTOR by _____, dated _____, and recorded in the _____ County Recorder of Deeds Office at Deed Book _____, page _____, together with the improvements, hereditaments and appurtenances to the said easement, except those which may have been retained by the GRANTOR.

THE GRANTOR does further remise, release, quitclaim, and forever discharge the COMMONWEALTH or any agency, bureau, or political subdivision thereof or its or their employees or representatives of all suits, damages, claims, and demands which the GRANTOR might otherwise have been entitled to assert under the provisions of any law, for or on account of any injury to or destruction of the aforesaid property of the GRANTOR through or by reason of the aforesaid highway construction and/or maintenance work.

FURTHER, the GRANTOR does acknowledge that he has been fully informed by the COMMONWEALTH of his possible right to the payment of just compensation for the taking of the herein described easement and that he does hereby waive such right.

NOW, it is hereby agreed by the GRANTOR herein and the COMMONWEALTH that a Drainage Easement shall be granted and conveyed from the GRANTOR to the COMMONWEALTH to construct and outlet a storm drain upon GRANTOR's property for the purpose of carrying runoff and waters away from State Route _____, Segment _____, Offset _____, being at or about Highway Station _____ and proceeding along a course more particularly and graphically set forth on the attached section of Highway Plan, which is made a part hereof.

FURTHERMORE, the COMMONWEALTH shall not be liable for any change in grade, depth, or location caused by the discharge of waters through said course or caused by other natural elements. FURTHERMORE, GRANTOR also conveys to the COMMONWEALTH the right and privilege to enter upon said land for the purpose of cleaning, opening, or maintaining said drainage facilities; and further agrees that no claim shall be brought against the COMMONWEALTH for said cleaning, opening, or maintaining.

Certificate of Residence

I hereby certify the Grantee's precise residence to be:

Witness my hand this _____ day of _____, _____

Agent for the Commonwealth of Pennsylvania
Department of Transportation

The Grantor has executed or caused to be executed these presents, intending to be legally bound thereby:

INDIVIDUALS

ENTITIES*
GRANTOR:

(Name of entity)

By: _____

By: _____

* Use this block for a corporation, partnership, LLC, government entity, school district, church, trust, club, association, POA, attorney-in-fact, executor, administrator or any other entity. See R/W Manual Section 3.06

INDIVIDUAL	ENTITY
<p>STAE OF PENNSYLVANIA COUNTY OF _____ On this _____ day of _____ 20____, before me _____, the undersigned officer, personally appeared _____ _____ _____, known to me (or satisfactorily proven) to be the person(s) whose name(s) _____ subscribed to the within instrument, and acknowledged that _____ executed the instrument for the purposes contained in it. In witness whereof, I hereto set my hand and official seal. _____ [Signature] _____ [Title] [Seal]</p>	<p>STAE OF PENNSYLVANIA COUNTY OF _____ On this _____ day of _____ 20____, before me _____, the undersigned officer, personally appeared _____ _____, who acknowledged _____ self to be the _____ [Title] of _____ [Name of Entity], and that as such _____ _____, [Title] being authorized to do so, executed the foregoing instrument for the purposes contained in it by signing on behalf of the entity as _____ [Title], In witness whereof, I hereto set my hand and official seal. _____ [Signature] _____ [Title] [Seal]</p>

EXHIBIT 1Background for Storm Water Facilities Policy

The Department has historically implemented a curb-to-curb maintenance policy as to State highways based on the provisions of the State Highway Law of 1945, 36 P.S. §670-101 et seq., relating to designation of local roads as State highways. Responsibility was divided between the Department and the local government through which the State highway traverses. The underlying legal provisions are tied to the type of municipality in which the State highway is located (i.e. a city, borough, town, or township). The State Highway Law refers to State highways in townships as the Rural State Highway System.

The statutory provisions in the State Highway Law of 1945 can be summarized as follows:

- a. Cities of the 1st and 2nd Class: Section 542 of the State Highway Law of 1945, 36 P.S. §670-542, provides that the Department's maintenance responsibility does not include "the curbing and footways" of any adopted State highway or the responsibility "to remove snow or keep streets clean." In addition, "repairs and maintenance shall be of such type as shall be determined by the secretary." If necessary, the Department, pursuant to section 543 of the State Highway Law, 36 P.S. §670-543, can elect to construct "storm water conduits, drains and gutters, culverts, bridges, viaducts and retaining walls, curbing and recurbing . . . excepting water pipe and sanitary sewers." Because items installed pursuant to the Department's discretionary authority will be the Department's future responsibility to maintain, the Department has always exercised that authority in a limited manner, and the policy has always been that storm water drainage facilities should not be installed unless the City has agreed to future maintenance, in writing.
- b. Cities of the 2nd A and 3rd Class: Section 522 of the State Highway Law of 1945, 36 P.S. §670-522, provides that the Department's maintenance responsibility is limited to the areas "between curb lines as established at the time of the passage of the act by which the street was designated a state highway" or where the Secretary of Transportation otherwise designates the curb lines. "Repairs and maintenance shall be of such type as shall be determined by the Secretary." Also, according to section 521 of the State Highway Law, 36 P.S. §670-521, in these cities the Department's responsibility does not extend to "maintenance, construction, reconstruction or resurfacing of said streets other than the base and surface courses" or to "any structure of any kind or character whatsoever," including "storm and sanitary sewers."
- c. Boroughs and Incorporated Towns: Section 513 of the State Highway Law of 1945, 36 P.S. §670-513, gives the Secretary of Transportation the power to determine the width and type of maintenance activities the Department will perform. The Department's maintenance policy has therefore always excluded maintenance of storm and sanitary sewers in boroughs.
- d. Townships: Section 502 of the State Highway Law of 1945, 36 P.S. §670-502, gives the Secretary of Transportation the power to determine the width, type, and location of any state highway it constructs or improves, and to determine the types of maintenance activities the Department will perform. The Department's policy in townships has been to limit maintenance responsibility for municipal storm and sanitary sewer systems to the greatest extent possible, maintaining systems necessary only to support the function of the highway.

EXHIBIT 1

The control of storm water within their jurisdictions has long been a function of local governments. Legal authority for the construction and maintenance of storm water drainage facilities, including highway storm water drainage facilities, has traditionally been separate from the legal authority that enables construction and maintenance of roads themselves. For example: (a) the Act of May 24, 1901, P.L. 294, and the Act of April 28, 1899, P.L. 104, both related to municipal construction of sewers and drains; (b) the Act of June 13, 1836, P.L. 551, related to establishment and maintenance of drains and ditches necessary to carry water off roads; and (c) 53 P.S. §57401 et seq., of the current First Class Township Code, and 53 P.S. §§67320 and 67701 et seq., of the current Second Class Township Code relate to storm water facilities. Storm water is addressed in the Municipalities Planning Code, 53 P.S. §10503, and is part of all municipal planning and private land development approvals. In addition, the Storm Water Management Act, 32 P.S. §680.1 et seq., was enacted in response to the impacts of accelerated storm water runoff resulting from land development in the state. It requires counties to prepare and adopt watershed-based storm water management plans and requires local governments to adopt and implement ordinances to regulate development consistent with these plans.

In 2007, the Pennsylvania State Transportation Advisory Committee (TAC), consisting of members from the legislature, the public and state agencies, studied and issued a report entitled Storm Water Facilities on State Highways. The TAC report recognized that the management of storm water on state highways is a complex issue. Legally, cities and boroughs have the responsibility for maintenance of storm water facilities along State highways, and Department policy requires townships to maintain storm water systems as well. It also recognized that the Department's policies for the maintenance of state highways have their roots in the State Highway Law of 1945, which is the basis of the Department's curb-to-curb maintenance policy.

The TAC report recommended that the General Assembly enact legislation to enable the establishment of special purpose municipal authorities to allow for the collection of appropriate fees to adequately maintain storm water facilities along State highways. Key attributes such as ease of fee collection, maintenance and administrative capabilities and other factors should be considered in establishing such entities. Legislation furthering the recommendations of the TAC report has not been introduced to date.

The Department's drainage maintenance policy is reflected in Appendix C to Chapter 7 of this manual, page 5 through 7 of the findings in the TAC report, and the Department's Drainage Manual. The 2011 modifications to Section 8.5 of this manual are not intended to alter the Department's legal interpretations as reflected in these documents or the Department's policies relating to municipalities other than townships. The 2011 modifications were implemented only to alter the types of maintenance activities the Department will perform in townships.

The assumption of responsibility for the structural condition of most enclosed facilities in townships does not alter the requirement that local governments must be the applicant for and responsible for the maintenance of enclosed surface drainage facilities under Highway Occupancy Permits issued pursuant to the State Highway Law and PennDOT Publication 282, as revised by Strike-off Letter 470-10-3, dated June 24, 2010. This is required in view of Section 421 of the State Highway Law, 36 P.S. §670-421, and the local government can address responsibility with the abutting landowner as part of the land development process. A model agreement between a local government and property owner for maintenance responsibilities in relation to facilities within State highway right-of-way is located on PennDOT's website and can also be requested from PennDOT's Bureau of Highway Safety and Traffic Engineering's Central Permit Office (717)-787-7350.

EXHIBIT 2**Sources of Curb-to-Curb Maintenance Policy**Policy

PennDOT's curb-to-curb maintenance policy can be found in Circular Letters E-2211 and RM 93-04, Chapter 8.5 of the Maintenance Manual, and Appendix C to Chapter 7.

Cities – First and Second Classes

Section 542 of the State Highway Law of 1945, 36 P.S. §670-542, provides that PennDOT's maintenance responsibility does not include "the curbing and footways" of any adopted state highway. The City of Philadelphia was found to be responsible for a sidewalk in the city along a state highway in *White v. City of Philadelphia* 712 A.2d 345 (Pa. Cmwlth. 1998).

Cities – Second Class A and Third Class

Section 522 of the State Highway Law of 1945, 36 P.S. §670-522, provides that PennDOT's maintenance responsibility is limited to the "curblines as established at the time of the passage of the act by which the street was designated a state highway" or where the Secretary of Transportation otherwise designates the curblines. PennDOT's curb-to-curb maintenance policy was upheld as in conformance with this section in *Wallace v. PennDOT*, 701 A.2d 307 (Pa. Cmwlth. 1997).

Boroughs and Incorporated Towns

Section 513 of the State Highway Law of 1945, 36 P.S. §670-513, gives the Secretary of Transportation the power to determine the width and type of maintenance activities PennDOT will perform. PennDOT's curb-to-curb maintenance policy was upheld as in conformance with this section in *O'Brien v. Borough of Jeannette*, 128 Pa. Super. 443, 194 A. 314 (1937).

Townships

PennDOT's policies on maintenance vary based upon the type of local government. These variations are based upon the State Highway Law of 1945 and in some cases have been confirmed by appellate court decisions. Section 502 of the State Highway Law of 1945, 36 P.S. §670-502, gives the Secretary of Transportation power to determine the width, type, and location of any state highway PennDOT constructs or improves, and to determine the types of maintenance activities PennDOT will perform. There is no reported case law in Pennsylvania reviewing PennDOT's policy in townships, which does allow for maintenance beyond curblines in certain circumstances.

EXHIBIT 3

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

IN REPLY REFER TO

_____ County

S.R. _____, Seg. _____, Offset _____

_____ Township / Borough Blocked Drainage

TO: _____

Dear _____:

The Department of Transportation has been experiencing drainage problems at the above referenced location. Our drainage facility at this site is blocked and must be cleaned and reopened.

It is apparent that recent earthwork on your property altered the existing drainage facilities and drainage courses in this area.

The blockage of any highway drainage facility is a violation of the Pennsylvania Highway Law, 1945, Section 417. Therefore, please be advised that you are hereby ordered to reopen the above referenced highway storm water facility on or before _____. Failure to do so will subject you to legal action under the above referenced section of the highway law.

The drainage facility in question is a legal Commonwealth drainage easement and is shown on sheet ____ of the plans for the above referenced route. These plans were signed by Governor _____ on _____ [date] and recorded in _____ County Book, _____, pages _____ to _____. The road in question is legally described in _____ County Road Docket _____, Page(s) _____, _____. The road became a state highway by Act of the Legislature, Public Law _____, _____ [date].

A copy of this plan is available for your review at our _____ County Office, between the hours of _____ to _____.

[NOTE: If the plans are old they may not have been recorded in the local court house. If this is the case, omit this paragraph.]

Should you have any questions concerning this matter, please contact me at _____.

Very truly yours,

cc: Chief, Maintenance Technical Leadership Division

[NOTE: Send certified mail, return receipt requested.]

EXHIBIT 4

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

IN REPLY REFER TO

_____ County

S.R. _____, Seg. _____, Offset _____ in _____ Township/Borough
Blocked Drainage

TO: _____

Dear _____:

The Department of Transportation has been experiencing drainage problems at the above referenced location. Our drainage facility at this site is blocked and must be cleaned. When the drainage facility is reopened, the water will enter upon your property. The drainage facility in question is a legal Commonwealth drainage easement and is shown on sheet _____ of the plans for the above referenced route. These plans were signed by Governor _____ on _____ [date] and recorded in _____ County Book, _____ pages _____ to _____. A copy of this plan is available for your review at our _____ County Office, between the hours of _____ to _____.

[NOTE: If the plans are old they may not have been recorded in the local courthouse. If this is the case, omit this paragraph.]

Please be advised that on _____, the Commonwealth of Pennsylvania Department of Transportation will enter your property at the above referenced location solely for the purpose of reestablishing drainage.

Our authority to enter your property to reestablish drainage is contained in the State Highway Law, Section 417, which states in part:

"The Department shall have authority to enter upon any lands or enclosures and cut, open, maintain, and repair such drains or ditches, inlets, or outlets through the same as are necessary to carry the waters from roads, highways, or within, at the top, or base of, slope areas, constructed or improved at the expense of the Commonwealth or under its supervision."

Should you have any questions concerning this matter, please contact me at _____.

Very truly yours,

cc: Chief, Maintenance Technical Leadership Divison

[NOTE: Send certified mail, return receipt requested.]

EXHIBIT 5 - EROSION & SEDIMENTATION CONTROL PLAN

A. PROJECT NAME: _____ DATE: _____

1. LOCATION: _____
(Municipality) (County)

2. PERSON(S) RESPONSIBLE FOR CONSTRUCTION AND MAINTENANCE OPERATIONS AND EROSION AND SEDIMENT POLLUTION CONTROLS:

Note: List all responsible positions if duties are assigned to more than one party.

(Name)

(Address)

(State) (Zip)

(Signature)

Telephone #: (_____) _____

3. EROSION AND SEDIMENTATION PLAN PREPARER:

(Name)

(Address)

(State) (Zip)

(Signature)

Telephone #: (_____) _____

This permit is valid for the following dates: _____ through _____

EXHIBIT 5

4. **MAPS:** Attach to this plan those maps necessary to show the length of road to be maintained and general topographic features of the area through which the road travels. At a minimum, all streams and other waters of the Commonwealth crossed or located in close proximity to the road must be identified. Type 3 or municipal road maps may be used for this purpose and kept in the County Office. Complete the applicable sections of the following checklist:
- Work Plan includes projects for the activities noted below.
 - The reference project map is made part of this plan.
 - The location (or road section) of culvert replacement work, tail ditch repairs and similar work are shown on the work schedule.
5. **PROPOSED ALTERATIONS:** Regarding of unpaved shoulders and roadways, replacement of existing pipes, removal of sediment from roadside ditches, restacking of stone endwalls, etc., shall adhere to Department of Transportation performance standards. Maintenance activities under the plan include the following:
- | | |
|---|--|
| <input type="checkbox"/> 711-7112 Unpaved Roads - Shaping | <input type="checkbox"/> 711-7311 Inlet/Endwall Cleaning |
| <input type="checkbox"/> 711-7113 Unpaved Roads - Restabilization | <input type="checkbox"/> 711-7312 Reshaping/ditch cleaning |
| <input type="checkbox"/> 711-7136 Pavement Widening | <input type="checkbox"/> 711-7314 Pipe Cleaning |
| <input type="checkbox"/> 711-7212 Shoulder Grading | <input type="checkbox"/> 711-7324 Pipe Installation |
| <input type="checkbox"/> 711-7213 Shoulder Stabilization | <input type="checkbox"/> 711-7332 Slope Stabilization |
| <input type="checkbox"/> 711-7215 Shoulder Cutting | <input type="checkbox"/> 711-7341 Emergency Damage |
| <input type="checkbox"/> 711-7216 Shoulder upgrading | |
6. **THE AMOUNT OF RUNOFF FROM PROJECT:** This requirement does not apply to most road maintenance projects. If the project involves significant new areas of earthmoving, or if the maintenance activity is correcting an unstable site condition such as a culvert outlet or drainage ditch, refer to DEP's Erosion & Sediment Pollution Control Program Manual for plan information and guidance necessary to meet this requirement.
7. **THE STAGING OF EARTHMOVING ACTIVITIES:** The sequencing of earthmoving activities associated with the maintenance project are detailed in the maintenance activity performance standard.

EXHIBIT 5

8. **TEMPORARY CONTROL MEASURES AND FACILITIES FOR USE DURING EARTHMOVING:**
 Vegetated areas may be used to filter sediment from runoff from grading, ditch cleaning, and culvert replacements. The length of the vegetated areas must equal or exceed the minimum distance shown in the following table. Other measures, as indicated in the performance standards, must be used when adequate vegetated areas are not available.

CROSS SLOPE	MINIMUM DISTANCE TO STREAM
10:1	50
5:1	65
4:1	85
3:1	105
2:1	125
1:1	135

Temporary measures may be removed when upstream areas are stabilized.

9. **PERMANENT CONTROL MEASURES:** Where above standards cannot be met or field conditions indicate severe erosion problems, permanent control measures may require on a site specific basis.

10. **A MAINTENANCE PROGRAM FOR THE CONTROL FACILITIES INCLUDING DISPOSAL OF MATERIALS REMOVED FROM THE CONTROL FACILITIES OR PROJECT AREA:**
 Erosion and sediment pollution control measures and facilities will be checked periodically. Necessary maintenance work will be performed as required by the Performance Standards to keep the measure or facility in operating condition.

11. **OTHER**
EARTH DISTURBANCE PERMIT:
 DEP regulations require earth disturbance permits for projects involving more than 25 acres of earth disturbance. For example, 10.5 miles of unpaved forest roads, with an average of 19.5 feet would equal 25 acres. If the total length of unpaved road to be maintained results in more than 25 acres of earth disturbance, the project must be divided into sections of less than 25 acres. The limits of the sections must be shown on the attached maps. All work, including culvert replacements, tail ditch construction, etc., must be completed and any required interim stabilization measures or facilities must be in place before any work on an adjoining section may begin

