

# Environmental Dilemma of Administering and Maintaining Low-Volume Roads

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Across the United States, engineers, planners, and public works officials encounter environmental regulations as they administer and maintain the major portion of the country's total highway mileage—low-volume roads. Constructing, maintaining, and improving low-volume roads are major jobs; when combined with protecting the environment, the task can be daunting. Public works officials face budgetary, personnel, and equipment constraints, as well as additional political and public pressures. Because of this added burden, environmental regulations are often overlooked in infrastructure improvement projects. This paper provides an overview of various environmental regulations and restrictions imposed on Allegany County, a small rural county in western Maryland, for the maintenance, rehabilitation, or reconstruction of low-volume roads. These regulations include waterway construction, sediment and erosion control, stormwater management, pollution discharge, archaeological and historical site preservation, revegetation, and waste disposal. Environmental considerations concerning the feasibility, design, and construction phases of various highway-type projects are analyzed in conjunction with construction costs. The paper presents several suggestions to assist public works officials in lessening the impact of environmental constraints.

**L**ow-volume roads comprise a major portion of the world's total mileage. The tremendous size of the low-volume road system and its perceived

lesser importance compared to higher volume roadways present challenges to low-volume road operating agencies as they construct, maintain, and rehabilitate roads with limited budgets, personnel, and equipment. As they administer and maintain the system, engineers, planners, and public works officials must adhere to environmental-related rules and regulations.

This paper provides an overview of the environmental regulations and restrictions imposed on an agency in maintaining, rehabilitating, or reconstructing low-volume roads. A wide range of environmental regulations are considered, including waterway construction, sediment and erosion control, stormwater management, pollution discharge, archaeological and historical sites preservation, revegetation, and waste disposal. An effort will be made to quantify the environmental considerations in relation to the feasibility, design, and construction phases of a public works project. While the overview will concentrate primarily on a rural county in Maryland, the findings, conclusions, and recommendations have national applicability.

## BACKGROUND

Numerous laws and directives have been enacted by government agencies to ensure safe, healthy, productive, and pleasant surroundings and to preserve the his-

toric, cultural, and natural aspects of our heritage. Meeting these regulations has required that agencies change the way they do business, often at increased cost. However, these requirements are relatively new and agencies lack the resources to research and write about their impact. Therefore, little is known about the effect of these regulations on transportation agencies.

In the first major formal study of this issue, researchers at Auburn University compiled a report (1) on the effects of environmental regulations on highway maintenance and the ways state agencies are dealing with these directives. The researchers evaluated questionnaires submitted by maintenance personnel, closely examined several maintenance programs tailored to confront specific maintenance problems, and conducted numerous interviews with highway employees. The report identified 17 areas of concern for highway personnel.

This problem is not confined to the state level. Local agencies (e.g., counties, townships, and municipalities) must comply with the same regulations using smaller, less-specialized staffs and limited budgets. The authors are unaware of any formal evaluation of the regulations at the local level. One approach for a local analysis is to focus on the experiences and practices of a county in confronting these issues.

This paper describes how various environmental regulations affect the Transportation Division of the Public Works Department of Allegany County, Maryland. Allegany County, which has an area of 428 mi<sup>2</sup> and a population of 75,000, is a rural county in the mountainous terrain of western Maryland, bordered by Pennsylvania to the north and West Virginia to the south.

The Allegheny Plateau occupies the westernmost part of the county; east of this are the Appalachian ridges and valleys. These narrow mountain ridges, separated by narrow steep valleys, extend in a general northeast to southwest direction. They have many problems relating to flooding and internal soil drainage. The Potomac River, a major watershed in the county, is environmentally significant since it flows into the Chesapeake Bay.

Winters are typically long and cold, but summers are moderate. Farming and forestry are important. Coal mining was a major industry but is now limited to a few small operations. The area is a center of tourism and recreation.

Allegany County roads are under the supervision of the Transportation Division Chief. The county system has approximately 550 miles of roads and 120 bridges, which are subdivided into four districts. The Transportation Division, with 77 employees and an annual operating budget of \$4.5 million, is responsible for road construction, repair, and maintenance and snow removal. The division works with the State Highway Administration and the municipalities, which maintain streets in the incorporated areas. Funds for reconstruc-

tion and maintenance of roads come largely from state gasoline and motor vehicle taxes, which are refunded to the counties on the basis of their motor vehicle registration and road mileage.

## OVERVIEW OF RELEVANT REGULATIONS AND REQUIREMENTS

### Introduction

A discussion of environmental laws and regulations must be cognizant of the applicable programs and requirements. The Auburn study (1) produced an excellent list of pertinent federal regulations and administering agencies (Table 1). Because of the regulations, even a cursory description of each is not possible here. However, the Auburn report provides excellent summaries (with references) of each federal regulation. This section will focus on the various state laws and local ordinances that Allegany County must also deal with in the administration of its low-volume roads and bridges.

### Waterways, Wetlands, and Water Quality

The state of Maryland is required to issue a Water Quality Certification that any federally permitted activity that might result in a discharge of dredged or fill material to waters or wetlands will not cause a violation of the state water quality standards. For nontidal waterway activities, the law requires a person to obtain a nontidal waterway permit when any activity changes the flow direction, pattern, or cross-section of a stream or body of water in the 100-year floodplain. Typical activities requiring a permit include dredging or filling a drainageway, wetland, or floodplain; stabilizing a streambank or channel; relocating any stream or channel by changing its cross section; and constructing any bridges, culverts, ponds, reservoirs, or dams.

Allegany County must follow federal and state regulations. Infrastructure projects generally require the submission of a joint federal/state permit application, along with supporting documentation to the Maryland Department of Natural Resources Administration to be reviewed and forwarded to other applicable federal/state agencies. Submission of an application is necessary since most road construction, rehabilitation, or maintenance involves bridges, culverts, streambank protection, and grading or ditching adjacent to, along, or within drainageways, streams, or floodplains. State law requires a permit for any activity within a Class IV (Recreational Trout) or Class III (Native Trout) tributary to the Potomac River and Chesapeake Bay with a drainage area greater than 100 acres. Allegany County's

**TABLE 1 Federal Regulations and Administering Agencies (1)**

ARPA-Archaeological Resources Protection Act
Agency: National Park Service
CAA-Clean Air Act
Agency: Environmental Protection Agency
CBRA-Coastal Barrier Resource Act
Agency: National Oceanic and Atmospheric Administration
CERCLA-Comprehensive Environmental Response Compensation and Liability Act
Agency: Environmental Protection Agency
CWA-Clean Water Act
Agency: Environmental Protection Agency
CWA 402(p)-Clean Water Act (Stormwater)
Agency: Environmental Protection Agency
CZMA-Coastal Zone Management Act
Agency: Army Corps of Engineers (Department of Defense)
EO 11988-Executive Order 11988, Flood Plain Management
Agency: Not applicable
EO 11990-Executive Order 11990, Wetlands
Agency: Not applicable
ESA-Endangered Species Act
Agency: Fish and Wildlife Service (Department of Interior)
FFDCA-Federal Food, Drug and Cosmetic Act
Agency: Food and Drug Administration
FIFRA-Federal Insecticide, Fungicide and Rodenticide Act
Agency: Environmental Protection Agency
FPPA-Farmland Protection Policy Act
Agency: Farmers Home Administration (Department of Agriculture)
FWCA-Fish and Wildlife Coordination Act
Agency: Fish and Wildlife Service (Department of Interior)
FWPCA-Federal Water Pollution Control Act
Agency: Environmental Protection Agency
HMTA-Hazardous Materials Transportation Act
Agency: Office of Hazardous Materials (Department of Transportation)

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watersheds routinely exceed 100 acres; therefore, authorization from the U.S. Corps of Engineers (nationwide permit), Maryland Department of Natural Resources (Waterway Construction and Non-Tidal Wetlands Division), and Maryland Department of the Environment (Water Quality Certification) is required.

### **Sediment and Erosion Control**

Maryland has enacted legislation and adopted guidelines to enforce sediment and erosion control statewide.

Before any construction begins, the local soil conservation district, municipality, or federal/state department, must approve the grading or construction of any project including the sediment control plan. Construction cannot begin until a permit is issued and sediment and erosion control countermeasures are in place.

Allegany County has enacted its own sediment and erosion control ordinance, which requires issuance of a permit for any proposed development, including subdivision of land, buildings, miscellaneous structures, dredging, earthwork, or storage of equipment or materials. Minor development plans may be approved and

TABLE 1 (Continued)

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LWCFA-Land and Water Conservation Fund Act
Agency: Bureau of Land Management (Department of Interior)
NEPA-National Environmental Policy Act
Agency: Environmental Protection Agency
NHPA-National Historic Preservation Act
Agency: National Park Service
OSHA-Occupational Safety and Health Act
Agency: Occupational Safety and Health Administration
PHADA-Preservation of Historical and Archaeological Data Act
Agency: National Park Service
RCRA-Resource Conservation and Recovery Act
Agency: Environmental Protection Agency
SARA-Superfund Amendments and Reauthorization Act
Agency: Environmental Protection Agency
SDWA-Safe Drinking Water Act
Agency: Environmental Protection Agency
SWDA-Solid Waste Disposal Act
Agency: Environmental Protection Agency
TSCA-Toxic Substance Control Act
Agency: Environmental Protection Agency
WSRA-Wild and Scenic Rivers Act
Agency: National Park Service

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the grading permit issued by the Soil Conservation District. However, plans for major developments are reviewed and approved by the soil conservation and county engineer and require a performance bond to guarantee adherence to standards.

From the county roads' perspective, new construction or rehabilitation work must have an approved sediment and erosion control plan since it generally exceeds 5,000 ft<sup>2</sup> in disturbance or the work falls within the regulations pertinent to a stream or drainageway. Routine maintenance work (e.g., slope regrading, intersection widening, and so forth) normally involves smaller areas of disturbance. This work would be permitted under the county's blanket permit issued by County Planning and Zoning Department, which states an agency may disturb up to 5,000 ft<sup>2</sup> without obtaining special permission. Implementation and upkeep of sediment and erosion control devices and specifications are still enforced. County roads' supervisors are also required to complete a state-sponsored sediment and erosion control training course and carry the appropriate license.

### Stormwater Management

The state of Maryland has enacted legislation that establishes criteria and procedures for stormwater man-

agement. The primary goals are to maintain post-development runoff at predevelopment runoff rates, prevent undesirable downstream effects of increased stormwater runoff, oversee local ordinances, maintain or improve water quality practices, and monitor the construction of stormwater structures. Any state or federal agency or private citizen developing land for residential, commercial, industrial, or institutional use is required to submit a stormwater management plan to the applicable county or municipality and receive approval before a grading or building permit will be issued.

Allegany County's stormwater management ordinance follows the state's statute. Proposed development within a stream channel or floodplain is regulated by the Maryland Water Resources Administration. Under the county's ordinance, agricultural land management systems and non-residential activity disturbing less than 5,000 ft<sup>2</sup> of land are exempt from a stormwater management plan. Application for development of less than 20,000 ft<sup>2</sup> must provide stormwater flow attenuation/infiltration measures.

Development beyond the exemptions, channelization, or drainage structure, pipe, culvert, stream channel, or activity within a 100-year floodplain must be accompanied by a stormwater management design prepared by a registered Maryland land surveyor or pro-



fessional engineer. A waiver may be granted if the applicant can demonstrate that the initial half inch of runoff is managed through infiltration standards, that the development will not generate more than a 10 percent increase in the 2-year predevelopment peak discharge rate, or that the development is surrounded by existing developed areas already served by a drainage system(s) of adequate capacity.

On county roads' projects, new construction or rehabilitation activities periodically require stormwater management practices if the project falls within the specified criteria. Stormwater management quantitative practices are not employed for routine maintenance activities, since minimal land is disturbed and the activities are short-term and result in little change in the imperviousness of the disturbed area. However, stormwater qualitative controls must still be implemented.

### **National Pollution Discharge Elimination System (NPDES)**

In 1987 Congress passed amendments to the Federal Clean Water Act whereby the EPA implemented a program that identified 11 categories of industrial and municipal activities that require National Pollution Discharge Elimination System permits for stormwater discharges. The activity most pertinent to low-volume roads is clearing, grading, or excavation that disturbs 5 acres or more. Maryland requires approved sediment and erosion control and stormwater plans for earth disturbances exceeding 5,000 ft<sup>2</sup>. Programs under the auspices of the local soil conservation district or county already exist to control erosion, sediment and stormwater; coverage under the EPA General Permit is obtained by filing a Notice of Intent (NOI) form with Maryland Department of the Environment, Sediment, and Stormwater Administration.

For projects where land disturbance is less than 5 acres, the local agency is required to develop contract documents. Agencies generally use Maryland standard details and conform to these documents during construction. If a project is less than 5,000 ft<sup>2</sup>, (e.g., routine highway maintenance-type activities) the County Roads Division's blanket agreement through the County Planning and Zoning Department would be applicable. The County Roads Division is required to provide sediment and erosion control and stormwater management water quality controls on-site during any activity. However, no formal plan or prior approval is necessary.

### **Archaeological and Historic Sites**

The Maryland Historic Trust has compiled an inventory of historic properties and U.S. Department of Interior

National Register of Historic Places that encompasses all districts, sites, buildings, structures, and objects of known or potential value to the prehistory, history, upland and underwater archaeology, architecture, engineering, and culture of Maryland. Any state unit developing a capital project through general obligation bonds by the Board of Public Works or the Department of Budget and Fiscal Planning or as part of a transportation project under State Transportation auspices must consult with the Trust to determine if the work will adversely affect any property listed in (or eligible for) the Maryland Register of Historic Properties. Owners or developers of projects that have a significant effect on a listed or eligible property must determine and evaluate means to avoid, mitigate, or reduce the adverse effect. If alteration or destruction of historic property is unavoidable, the agency is obligated to make appropriate investigations (e.g., Historic American and Engineering Recordation); develop records; or salvage the property and forward the results of the study, records, objects, and materials to the Trust.

Allegany County's history dates back to the late 1700s. George Washington's first military headquarters was in the county; General Edward Braddock commanded the British army in the Revolutionary War in Cumberland; the Potomac River served as first "highway" to carry travelers westward to Ohio River; the C & O Canal from Cumberland to Washington, D.C. functioned as the first inland waterway for coal transportation; and the first iron rails in America were made in Allegany County. Currently, the County has approximately 950 individual sites and historic districts on the Maryland Register and 38 historic and archaeological sites on the Federal register. The County's historical features play a major role on infrastructure projects.

### **Reforestation Law**

Since 1989, Maryland law has required that all bid construction activities involving land clearing of one acre or more by any state agency, local government, or political subdivision using state funding for construction could clear only the minimum number of trees or other woody plants, in conjunction with sound design practices. If clearing is necessary, an equivalent area must be reforested on or near the construction site. If this is not possible, then the constructing agency must locate an adequate reforestation site on state- or publicly-owned land in the county where the project is being constructed. As a last resort, the agency may deposit a monetary settlement into the Department of Natural Resources' Reforestation Fund for each acre cleared. The impact of the Reforestation Law on the rehabilitation and maintenance work of the county's road sys-

tem has been negligible since most of the county is exempt and activities are within road rights-of-way that have already been cleared.

## Waste Disposal of Materials

The increasing number of regulations do not terminate with the construction phase; they are now mandated during maintenance and operation of infrastructure systems. For example, right-of-way management programs offer economical maintenance practices through use of herbicides. However, water quality, personal health standards, and hazardous material laws have affected the use, transportation, and disposal of herbicides. Highway departments are being forced to spend more money through mowing.

The Resource Conservation and Recovery Act (RCRA) has impacted the use of lead-based paints for traffic markings and steel structures. Costs are high for sandblasting, residue disposal, and handling and containment. Containment systems for lead paint removal are resulting in bid prices varying by tenfold (2), based on the contractor's knowledge and experience with the regulations. Some states have reduced the number of bridges painted annually or have found that it is more economical to replace a bridge rather than strip and repaint it.

RCRA has also affected the shipping, storage, and use of hazardous materials. The highway operations hazardous materials list is lengthy. Additionally, products used to clean, operate, and maintain equipment and vehicles must be handled more carefully, and material safety data sheets and an inventory must be available for employees' review at all times. In Allegany County, used batteries and motor and hydraulic oils are recycled, anti-freeze is disposed of through an approved agency, and scrapped tires are forwarded to an acceptable tire recycling facility.

Another commonly used highway material in Western Maryland is de-icing salt. Improperly applied salt can lead to degradation of vehicles, structures, and roads, as well as pollution of surface and groundwater. In Allegany County, three of the four districts use salt during the winter. Until recently, salt was stored outside and covered with sawdust and tarpaulins. Now, regulations and liability concerns have led to the purchase of a salt storage dome or intergovernmental agreements with other agencies to store salt at their facilities.

The storage of and accessibility to gasoline and diesel fuels used in equipment is another issue. Underground storage tank regulations have seriously increased operating costs. State and federal laws require that all new tanks and piping have leak and corrosion protection; all spill and overfill protection systems be in-place; and

owners and operators demonstrate financial ability to provide corrective action or compensate third parties for injuries and damages caused by accidental releases. Agencies are removing older underground fuel storage systems and replacing them with aboveground tanks. To date, aboveground tanks are not subject to all of the imposed regulations, and the tort liability issue appears to be less. In Allegany County, underground tanks will be removed and aboveground tanks installed during the next three years. Furthermore, a large quantity of gasoline (existing tank is 4,000 gallon) will not be stored on-site. The county departments will purchase gasoline from independent service stations to lower liability and insurance premiums.

As the infrastructure deteriorates, highway forces continue to upgrade and modernize certain facilities such as bridges and at-grade railroad crossings. That upgrade frequently requires the removal and disposal of creosote-treated timbers. Environmental regulations prohibit the disposal of this wood through burning. Many agencies let the timber disintegrate through rotting or dispose of it in the local landfill (if permitted). Employees are also forced to take certain precautions in handling to avoid personal health problems.

Highway facility upgrades create another problem, the disposal of tree stumps or demolition waste. Until recently, these items were buried in an open pit, ravine, or landfill. Today, the county must follow state laws and use permitted landfills for the disposal of these materials, which costs additional money for hauling and tipping.

Another health-related issue that Allegany County frequently faces is the disposal of animal carcasses from roadways. Presently, these remains are removed by county crews and disposed of in the local landfill. However, it is likely that stricter regulations will be enacted and an alternate method of disposal required.

## IMPACT OF REGULATIONS FROM PUBLIC WORKS PERSPECTIVE

### Introduction

These regulations have a dramatic impact from an operational perspective; they are also significant during the planning, design, and construction of a project. In the past, local municipalities committed to a project then considered the scope of work, the capital outlay, and the environmental impact. Today, however, these items must be evaluated from project inception.

In the following sections, the impact of these environmental regulations are examined. Support documentation includes associated costs for six new construction and five rehabilitation projects completed by Allegany



County. These will be compared to seven new and five rehabilitation projects in Allegany County's neighbor to the east, Washington County. Several projects will be presented that depict actual case studies of the dilemma Allegany County has encountered as it attempts to maintain or upgrade its transportation infrastructure. In closing, the procedure for obtaining permits, including the fee process and costs for disposal of highway wastes, is discussed.

## Discussion

During the planning phase, the County assesses which environmental regulations are applicable and to what extent these conditions will have an impact on the proposed project. Many of the applicable state statutes have supplemental requirements regarding funding and issuance of permits or certificates. These require adjustments in the project schedule. If an environmental impact statement or assessment is necessary, the county incurs added expense to provide the supplemental documentation. These regulations also address particular environmental mandates, such as wetlands, air and water quality, and historic value. Therefore, the county periodically must contract for services from an outside firm, which results in increased costs and scheduling delays.

During the design phase, the county frequently considers various alternatives and makes prudent concessions. For example, state agency standard details or specifications that do not exactly meet county standards may be used to facilitate the design and review approval process. A project scope might be intentionally limited to comply with certain requirements. For example, Army Corps of Engineers Nationwide Permit Condition No. 14 requires that a fill for a road crossing water have a limited width, that the filled area be less than 1/3 acre, and that less than 200 feet of roadway fill occur in a special aquatic site (including wetlands).

Another way to reduce the magnitude of work is to minimize the permit process. A capital improvement project will be broken down into smaller components, and the design process, including permit application, will be submitted in stages. Projects have been designed to avoid certain physical features, such as wetlands or streams, by proposing dual systems. Bridges are being replaced at the same location to avoid hydraulic/hydrology studies, to minimize impact on 100-year floodplain or existing waterway openings, or to avoid the lengthy environmental impact statement process.

Quantifying the costs and labor associated with the design phase is difficult since the county does not usually compile this information in a consistent format. However, reviewing records for several projects has pro-

vided valuable input to evaluate design phase versus project expenditures. On six county bridge replacement and rehabilitation projects, records indicate that 23 months passed from the initial permit application submittal to receipt of permit (including review comments and changes). Similarly, for a recent bridge project that involved replacing a 29-foot steel girder, simple span bridge with a low-profile corrugated steel pipe arch, the county incurred approximately 42 hours of engineering, drafting, and clerical services (\$1,100±) in the permit application submission and review process. However, six months later, the permit has not been received. The total estimated cost of the project is \$40,000±.

Another project was the replacement of a 108.5-foot bowstring truss arch bridge with a prefabricated, pre-engineered, steel truss bridge. The original structure, built in the early 1900s, was placed on the National Register of Historic Places in 1984. The bridge was closed to all traffic in March 1990 because of the failing structure. Since the bridge was in the National Register of Historic Places and state funds were funding the project, the county had to develop a marketing plan for transferring or selling the bridge and complete a Historic American and Engineering Recordation (HAER) study before it could be removed. This process required approximately 10.5 months. In September 1992, original bids were received for the work. However, costs particularly for removing, dismantling, packaging, loading, and shipping the structure to a private citizen were too high. The scope of work was then modified and the project rebid. The total construction cost for the project was \$266,595; the county's administrative cost associated with the historic issue including the marketing and recordation process was about \$7,500 or 2.8 percent of the construction cost. This quantity does not contain money and time devoted to addressing sediment and erosion control and waterway construction.

The final step in any improvement project is the construction phase. In Allegany County, the standard procedure is to provide a separate breakdown at a unit cost basis for various items, including the environmentally-related requirements (e.g., sediment and erosion control excavation, temporary culverts, silt fence, riprap, temporary seeding and mulching, and maintenance of stream flow).

Typical construction costs related to the environmental regulations are presented for new construction and rehabilitation/maintenance transportation projects using information gathered from a variety of projects. Similar projects are examined for Washington County, Maryland. A comparison of environmental expenditures and percentage of total construction cost follows.

We used specific criteria to prepare these tables. New construction projects require total replacement or new

TABLE 2 Costs for New Construction Projects, Allegany County, Maryland

Project	Total	Costs, \$ (%)				
		Admin.	Water— way	Sediment Erosion	Storm— Water	Misc.
Wagner Road Widening	\$116,910	\$3,000 (2.6)	N/A	\$9,371 (8.0)	N/A	—
Lower Consol Bridge Replacement	\$36,891	\$520 (1.4)	\$1,392 (3.8)	\$1,995 (5.4)	N/A	—
Klondike Road Bridge Replacement	\$161,184	\$445 (0.28)	\$20,500 (12.7)	\$8,871 (5.5)	N/A	—
Town Creek Rd Bridge Replacement	\$421,324	\$900 (0.21)	\$11,000 (2.6)	\$21,887 (5.2)	N/A	—
Stoney Run Road Landslide	\$156,041	\$325 (0.21)	N/A	\$7,897 (5.1)	N/A	—
Slabtown Road Bridge Replacement	\$38,761	\$925 (2.4)	\$1,286 (3.3)	\$2,117 (5.5)	N/A	—
Average		1.18%	5.60%	5.78%		

alignment. Rehabilitation/maintenance-type projects are based on repairs, rehabilitation, or maintenance work, such as installing road culverts, constructing retaining walls, widening existing roads, and stabilizing slopes.

Total construction costs include change orders. Administrative costs concentrate on personnel and funds related to permit applications, fees, public hearings, and advertisements. Waterway related costs include bid items associated with stream diversion, dewatering structures, temporary culverts or crossings, pumping, and excavation. Sediment and erosion costs include funds expended on sediment traps, silt fence, temporary seeding and mulching, and slope stabilization. Costs for stormwater management include mowing, routine maintenance, and removal of silt, for any stormwater ponds or dams under jurisdiction of the County. Miscellaneous items pertain to the cost of adhering to Na-

tional Pollution Discharge Elimination System, archaeological investigation, historic sites determination, reforestation, and waste disposal of highway-related by-product requirements.

Tables 2, 3, 4, and 5 are a compilation of this information for Allegany County and Washington County. The information presented in Tables 2 and 3 indicate that the administrative and sediment erosion control costs associated with new construction compared to rehabilitation/maintenance-type projects are consistent for Allegany County. Specifically, administrative costs are approximately 1.25 percent of the construction costs, while sediment and erosion control expenditures are about 5.4 percent. For waterway-related items, costs range from about 3 to 5.6 percent of the construction costs. This variance could be explained by scope and magnitude of project, since a rehabilitation project for

TABLE 3 Costs for Rehabilitation/Maintenance Projects, Allegany County, Maryland

Project	Total	Costs, \$ (%)				
		Admin.	Water— way	Sediment Erosion	Storm— Water	Misc.
Buskirk Hollow Bridge Rehabilitation	\$29,251	\$375 (1.2)	\$2,259 (7.7)	\$3,249 (11.1)	N/A	—
East Wilson Road Widening	\$18,437	\$200 (1.1)	N/A	\$1,261 (6.8)	N/A	—
Drainage Braddock/Fayette St.	\$8,715	\$198 (2.3)	N/A	\$565 (6.5)	N/A	—
Gabion Wall Shaft/Midlothian Road	\$55,015	\$639 (1.2)	\$426 (0.77)	\$139 (0.25)	N/A	—
Waverly Street Bridge Rehabilitation	\$266,595	\$2,550 (0.96)	\$1,946 (0.73)	\$1,095 (0.41)	N/A	\$4,912 (1.8)
Waste Disposal of Roads Materials	N/A	\$75	N/A	N/A	N/A	\$500
Average		1.35%	3.07%	5.01%		



TABLE 4 Costs for New Construction Projects, Washington County, Maryland

Project	Total	Costs, \$ (%)				
		Admin.	Water— way	Sediment Erosion	Storm— Water	Misc.
Hopewell Road Reconstruction	\$710,845	Unknown	N/A	\$18,014 (2.5)	N/A	—
Hopewell Road Reconstruction	\$539,486	Unknown	N/A	\$ 9,454 (1.8)	N/A	—
King Road Bridge Replacement	\$161,854	Unknown	\$13,365 (8.3)	\$ 6,784 (4.2)	N/A	—
Maugans Avenue Extended	\$756,829	Unknown	N/A	\$11,048 (1.5)	\$21,000 (2.8)	—
Old Forge Road Bridge Replacement	\$ 98,439	Unknown	\$ 5,720 (5.8)	\$ 940 (0.95)	N/A	—
Howell Road Reconstruction	\$254,265	Unknown	—	\$ 2,800 (1.1)	N/A	—
Beaver Creek Rd Bridge Replacement	\$127,567	Unknown	N/A	\$ 9,000 (7.1)	N/A	—
Average		Unknown	7.05%	2.73%	2.8%	

Allegany County would not usually involve major waterway construction activities.

For Washington County, records on administrative costs are not compiled routinely; therefore, it is not possible to provide any conclusions. However, for waterway construction costs, Tables 4 and 5 indicate that rehabilitation-type projects are more costly and equate to about 10 percent of construction costs. Similarly, for sediment and erosion control items, rehabilitation-type projects contain a higher percentage and equal 5 percent± of the construction costs. These differences can be explained by scope and magnitude of project and building costs associated with this region.

Overall, the costs shown are fairly consistent between the two counties for waterway and sediment and erosion control-type work, regardless of whether the project is classified as new construction or rehabilitation/

maintenance. Furthermore, it appears that Allegany County is encountering approximately 1.3 percent of the construction costs in overhead for administrative duties and about 4.3 percent and 5.4 percent for waterway activities and sediment and erosion control, respectively. These administrative costs appear low. This could be explained by the fact that Allegany County has not completed any major projects involving wetlands determination and mitigation. No Allegany County stormwater management transportation projects have required NPDES consideration. In the future, the administrative and environmental costs will probably be significant since the County has seen expenditures of up to 7.5 percent of construction costs for stormwater compliance in building and industrial park projects.

No definitive conclusions can be drawn for waste disposal. However, the County Roads Division has enacted

TABLE 5 Costs for Rehabilitation/Maintenance Projects, Washington County, Maryland

Project	Total	Costs, \$ (%)				
		Admin.	Water— way	Sediment Erosion	Storm— Water	Misc.
Dam 5 Road Bridge Rehabilitation	\$120,831	Unknown	\$17,311 (14.3)	N/A	N/A	—
Hanging Rock Rd. Bridge Rehab.	\$ 44,246	Unknown	N/A	\$ 5,100 (11.5)	N/A	—
Harpers Ferry Rd. Bridge Rehab.	\$ 29,125	Unknown	N/A	\$ 3,620 (12.4)	N/A	—
Spickler Rd. Bridge Rehab.	\$ 23,392	Unknown	\$ 1,550 (6.6)	\$ 437 (1.9)	N/A	—
Garretts Mill Rd. Bridge Rehab.	\$ 67,045	Unknown	N/A	\$ 1,300 (1.9)	N/A	—
Average		Unknown	10.45%	6.93%		

steps to document and quantify personnel and costs pertinent to these environmental regulations for future budget and scheduling considerations.

Previously, the County Department of Public Works submitted the permit application to the federal, state, or local agency at about 50 percent design completion and at the initial design and review meeting. Review comments and questions were addressed and resubmitted to the applicable agencies at 90 percent design completion. Generally, the permit was issued by the agency within several months.

To date, the County has been exempt from fees associated with environmental permits. Discussions with agencies throughout the state and trends in recent legislation seem to indicate that future fees will be assessed and additional costs to the total project and/or increased user fees to cover these expenditures will be incurred.

#### INNOVATIVE WAYS TO SIMPLIFY ENVIRONMENTAL REGULATION PROCESS

As an agency with chronic high unemployment, the Allegany Department of Public Works is severely limited in available personnel and funds. Personnel must be able to administer a project from planning through design and construction. This requirement applies to highway maintenance and operation. District supervisors and road forepersons must complete road maintenance and rehabilitation work in an efficient manner that uses the least amount of labor, equipment, and materials. In the past, adherence to environmental regulations was not a top priority. This is no longer the case. The Roads Division is now subject to a higher degree of scrutiny in following the environmental mandates.

In Allegany County, steps are being taken to simplify the environmental approval process at a local level and through intergovernmental agency involvement. For example, in the planning and scheduling phase, highway maintenance and rehabilitation projects are being developed on a yearly basis throughout the County Roads Districts. Based on certain criteria—type and scope of work; site logistics; labor, materials and equipment availability; budgetary considerations; traffic service; environmental impact; and public safety—projects are grouped in designated routes. To reduce the paperwork and minimize time delays due to the review of several permit requests, the county periodically submits a permit application for combined projects.

Another process simplification deals with sediment and erosion. The County Roads Division obtains an annual blanket grading permit from the County's Planning and Zoning office. This permits the disturbance of an area up to 5,000 square feet before separate approval

is needed from Soil Conservation Service or the state. The permit clearly outlines the conditions for seeding and mulching, on-site sediment and erosion control provisions, and other site restoration criteria.

The environmental rules and regulations have often been too cumbersome for the magnitude of the project. The county has been forced to delay projects while attempting to satisfy these requirements. The situation often worsens and an emergency develops. At this point, the county must apply for emergency approval from appropriate agencies and proceed with the work before permit is granted.

The most encompassing document currently under consideration between Allegany County and Maryland Department of Natural Resources is Water Resources Administration (DNR-WRA), an intergovernmental memorandum of understanding or Regional Letter of Authorization (RLOA). This document is a contractual agreement between DNR-WRA and the county that establishes DNR's authority to approve routine road-related maintenance and repair activities via a single-regional authorization as they relate to nontidal wetlands, waterways, and floodplains. These activities include general maintenance and repair of roadways, bridges, culverts, utility lines, water/sewer pump stations, meter vaults and test stations, stormwater facilities and temporary access roads, installation of water/sewer mains and service connections, roadside vegetation control, and other related items. Each of these activities has been assigned certain guidelines and criteria that dictate whether a permit is necessary.

At an internal level, responding to environmental and health regulations requires cooperation among various agencies. Many state agencies have local representatives available to review on-site work and address the regulations during the planning, design, and construction phases. Road personnel are informed of the regulations and urged to meet with agency representatives to discuss matters in the field. This action not only provides supervisory personnel the opportunity to build trust with agency representatives, it also encourages a better understanding of the regulations.

At staff meetings, projects and environmental issues are discussed to ensure consistency county-wide and provide intra-departmental communication. The contact between the various state and federal agencies and the Roads Division is usually the roads superintendent or transportation chief who reviews the matter with the appropriate field personnel.

If permits are necessary, the information for the application is developed under the auspices of the Transportation Division Chief. This procedure ensures that the appropriate and pertinent information is submitted, creating consistency and uniformity in the permit application process. The goal is to develop and sustain the

image that the Roads Division is working in good faith and attempting to confront the problems of regulatory compliance from an organizational perspective.

## CONCLUSIONS

Public works personnel face a proliferation of ever-changing regulatory laws from an environmental and personal health standpoint. In Allegany County, funds are being spent to comply with these regulations. Many are concerned that the important issue of providing a safe, well-maintained highway system is being neglected in an attempt to meet the environmental edicts. Environmental groups have lobbied for stiffer regulations to protect the environment, but these groups may not realize that their efforts are hindering public works officials in addressing taxpayer demands for increased services. Citizens do not understand the lengthy delays in completing a project. The real issue is meeting citizen demands, coping with the environmental regulations, and simultaneously operating a public works department in a productive, efficient manner.

Allegany County personnel are striving to provide the best services available. Current approaches include blanket grading permits, use of state-approved specifications and details, intergovernmental agreements, and combined projects under one environmental permit application. In the future, creative new methods such as self-certification for environmental issue compliance, development of internal enforcement program, and creation of a central contact for dissemination of regulatory laws might constitute new ways for Allegany

County to address the environmental safety and health regulations. The dilemma may never be completely resolved, but environmental compliance will become an important daily assignment for all those involved in the maintenance, rehabilitation, and reconstruction of low-volume roads. Agencies are encouraged to view the environmental issues in terms of the engineering challenges and ways to preserve the land rather than as obstacles to overcome.

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