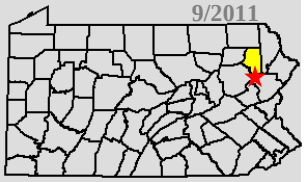
Worksite in Focus

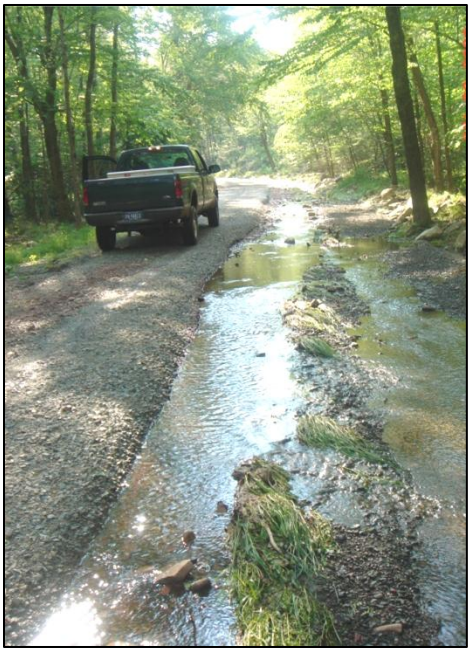
Tannery Road

Lackawanna State Forest



Project Overview:

Tannery Road is located in the 27,345 acre Lackawanna State Forest in the southern tip of Lackawanna County. The road provides access to the State Forest, several miles of hiking and snowmobile trails, and the Spruce Swamp Natural Area. This project is located on the eastern end of the road where Sand Spring Creek, a High Quality tributary to the Lehigh River (also HQ) crosses the road. The road passes through many springs, seeps, and flow channels in this area. To further complicate things, the stream crossing was undersized causing frequent road washouts. The Bureau of Forestry used a large French Mattress with embedded pipes to elevate the road out of the "swamp" and create a stable road base.



Tannery Road (before): Shown after a flow event that overtopped the stream pipe and ran down the road in 2006.

The Problem:

The adjacent Natural Area is called "Spruce Swamp" for a reason. Where Tannery road crosses Sand Spring Creek, it encounters numerous flow channels, springs, seeps and generally saturated conditions. The elevation of the road was very low compared to the surrounding terrain, causing a constantly saturated road base that was prone to potholes and rutting and required frequent maintenance. To further complicate the site, the undersized stream pipe was prone to overtopping during high flow events. Since the road was the lowest point in the area, the stream would run down the road for hundreds of feet when it overtopped the pipe. Water regularly flowed over the road at several other locations as well.

The Solution:

Because of the low road elevation and extremely saturated conditions, a large French Mattress was used to raise the road elevation. The mattress provided the necessary elevation to get the road above the saturated forest floor, and created an excellent road base. Several crosspipes were also placed in the French Mattress at ground level to handle extreme flows. The original stream pipe was left in place as an overflow while a larger 49"x33" "squash" pipe was installed a few feet downstream at a lower elevation. An emergency overflow was also constructed at the new pipe to direct extreme flows alongside the road and into a secondary pipe. If this pipe were to fill or plug, water could enter the French Mattress to cross the road.

Project Facts

Project:	Tannery Road
Project Owner:	Lackawanna State Forest
Watershed:	Sand Spring Creek **(HQ)** Lehigh River **(HQ)** Tributary
Project Length:	4,000 feet
Date Completed:	2003, 2006, 2009, 2010

Cost Summary:

2003-2005: ~$23,000
Initial pipes, surface aggregate, and washout repair

2006: Mattress & Culverts ~$24,000
Road fill, French mattress, 10 crosspipes

2009: New Stream Pipe ~$1,500
New stream pipe installed

2010: Pipes & DSA ~$44,000
12 additional crosspipes, underdrain, and DSA

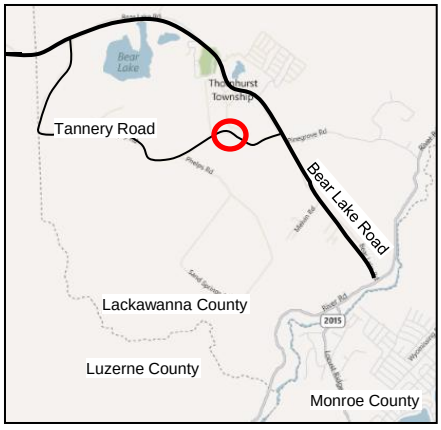
For More Information:

Center for Dirt and Gravel Road Studies
(814)865-5355 www.dirtandgravelroads.org

Lackawanna State Forest District
(570) 945-7133 www.dcnr.state.pa.us/forestry

Site Location:

Located in Thornhurst Township at the Southern tip of Lackawanna County. Adjacent to the Spruce Swamp Natural Area, about a mile southeast of Bear Lake, and about ½ mile off Bear Lake Road (SR 2016).



The publishers of this publication gratefully acknowledge the financial support of the Pennsylvania Bureau of Forestry. For additional information or assistance, contact: Center for Dirt & Gravel Roads Studies, Penn State University, 207 Research Unit D, University Park, PA 16802 (Toll-Free Phone: 1-866-668-6683, Fax: 814-863-6787, Email: dirtandgravel@psu.edu). Additional copies available on our website at: www.dirtandgravelroads.org

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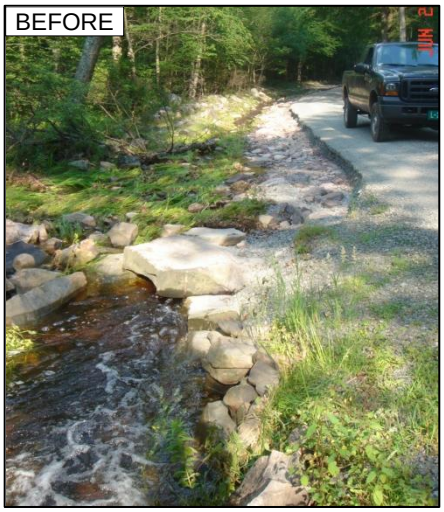
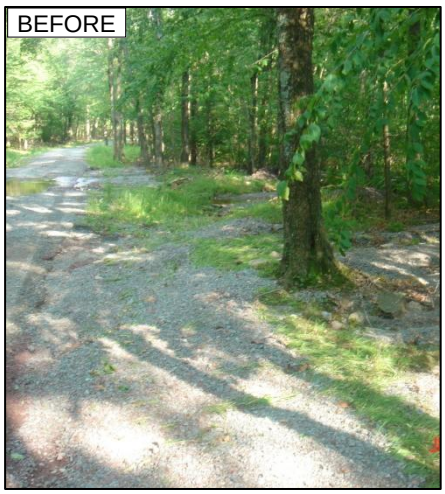
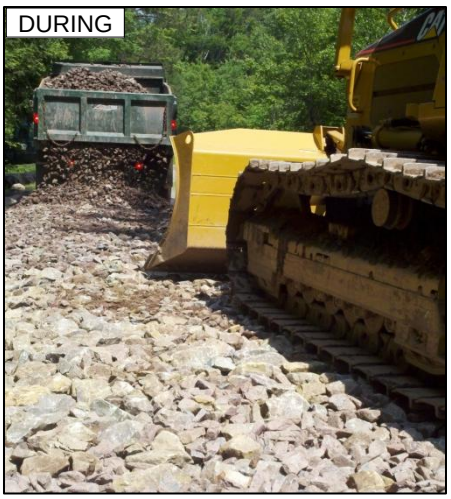


Before and After: Notice the elevation of the road compared to the stream. **BEFORE**, when water overtopped the road, it would flow down the edge of the road and eventually cross the road surface, tearing the road apart as it went. **AFTER**, the pipe has an "emergency spillway" on the left. Just before water would overtop the pipe, it hits the "spillway" and continues down the road. Because the road is elevated, the surface of the road is not affected. The overflow water is then directed to a newly placed crosspipe just out of view. Furthermore, any water that bypassed this second crosspipe would then be able to cross under the road in the French Mattress which contains several more crosspipes.





Notice the elevation of the road compared to the trees. **BEFORE**, a recent overtopping of the road has sent surface aggregate into the woods. **DURING**, the French Mattress is being installed. **AFTER**, notice the elevation of the road compared to the trees now. The inlet of an embedded pipe is located behind the rock labeled in the image.

Evolution of a Project

This section of Tannery Road was first addressed in 2003 when 3 crosspipes were and approximately 2,000 tons of aggregate were added to the road. In 2004, the remnants of Hurricane Ivan overtopped the stream pipe and washed away much of the road surface, which had to be replaced. In 2006, another flood cause the same damage and required additional aggregate. Later in 2006, the District decided to look for a more permanent solution and came up with the elevated road over a French mattress with overflow pipes you see today. In 2009, a larger stream pipe was installed. In 2010, 12 additional crosspipes were installed (away from stream crossing) and DSA was placed on the road. The system was tested in October of 2010 when a stalled front dumped 9" of rainfall on the watershed in a single day with no damage to this site.

This project illustrates how site plans can "evolve" over time. The District learned lessons from early problems to design a project that will handle the extremely wet and "flashy" watershed, while providing a stable road that requires minimal maintenance.

Stream pipe replacement: The new 49"x33" "squash" pipe is shown during installation in 2009. The existing smaller pipe was left in as an overflow channel.