Culvert replacement Q&A: DNR Liaisons a good resource

A healthy culvert.

EARLY ATTENTION to detail is good advice on any road project. When it comes to organizing the particulars of a culvert replacement project, local decision makers have an important local resource in their Wisconsin Department of Resources (DNR) Transportation Liaison. Transportation Liaisons operate in every county to streamline the mandated DNR review of culvert project plans and the process of securing necessary approvals, says Cameron Bump, Central Office Coordinator of Transportation Liaison Staff for the DNR in Madison. He describes each liaison as a "single point of contact," available even before a conceptual project plan is submitted to help local governments evaluate replacement priorities. "Early coordination on a culvert project saves time and money, things we know are critical for all local agencies today." Putting his claim into action, Cameron offers *CROSSROADS* readers answers to questions about culvert replacement.

Q *What is the DNR's role in my project?*

The DNR gets involved on road projects that affect fish, wildlife, water quality, and other sensitive natural resources. Where the Wisconsin Department of Transportation (DOT) takes the lead on a project, the two agencies coordinate reviews and approvals directly. On a bridge or culvert replacement project proposed by a local agency, the DNR works one-on-one with local officials to identify the issues requiring permits and then assists in getting approvals in place. Cameron says, "Our main role is to review plans and make sure environmental standards are met. But because we are local, DNR liaisons know the lay of the land, literally, and provide a knowledgeable assessment and practical advice on projects." For example, he notes Transportation Liaisons can identify the true quality of environmental components—like an outstanding trout stream—and whether they are home to endangered or threatened species.

Culvert replacement work site.

Q *What type of DNR review do I need for culvert replacement?*

Wisconsin Administrative Code Trans 207 defines standards local governments must follow in design and construction of public highway bridges, arches, and culverts over and in navigable streams. This includes replacement projects. Cameron says DNR Transportation Liaisons typically review the conceptual plans required by Trans 207 to be sure they comply with specified environmental regulations. These include preserving navigability of a stream, fish passage, adhering to flood flow, utilizing erosion control, and protecting critical habitat features. This is where, he points out, early coordination benefits most projects. "As soon as local authorities start to anticipate a project, they can tap us for site and habitat information that's useful in planning future expenditures and scheduling the replacement project."

Q *What is a navigable stream?*

Cameron explains that Wisconsin law categorizes a navigable stream as a waterway with a defined bed and bank capable of floating—on a regularly recurring basis—the lightest boat or skiff used for recreation or any other purpose. He adds the definition also includes dry runs that qualify as navigable during a seasonal high flow, and streams that appear impassible because of thick vegetation. If uncertain about the waterway involved in a culvert replacement, Cameron suggests talking to a DNR expert trained to evaluate navigability and profile a stream area before a project moves ahead.

Q *What size culvert do I need to install?*

Local governments faced with budgeting time and money for culvert replacement sometimes look for ways to save by installing the smallest structure allowed. That could cost more in the long run, Cameron says. "Rule of thumb is to figure out just how wide the stream is and try to match the new culvert with that width. This has a better chance of reducing future maintenance costs and prolonging the useful life of the structure." He notes if a culvert is too small it can become perched, or elevated, causing fish migration barriers. A perched culvert also increases stream velocity, causing erosion problems that can compromise the integrity of the structure and prompt having to fix or replace the culvert more often. A DNR Transportation Liaison can give guidance on accurately matching culvert width to stream width to avoid this and other problems.

Q *Do I need a hydrology and hydraulics analysis?*

This applies to flood flow requirements as outlined in Chapter NR116 of the Wisconsin Administrative Code. A hydrology and hydraulics analysis looks at how any proposed culvert installation—new or replacement—will affect stream flow. No analysis necessary, Cameron notes, if you replace the culvert with one the same size or larger, and if the culvert opening area is less than 50 square feet. Larger culverts and bridges (with

openings over 50 square feet) may require analysis of water capacity and velocity to protect against a negative effect on resources and adjacent landowners. He advises that local agencies are responsible for having an analysis done where required and providing it to the DNR for review.

Q *What does it mean to provide pass-through clearance for vessels?*

Typically, this is not a big issue, says Cameron. But it is critical where there is an expectation of moving people, goods, and equipment along a waterway. The goal with culvert replacements is to maintain existing flow capacity. Where a culvert opening allows pass-through clearance for watercraft, like canoes, constructing authorities must replace with a structure the same size or larger. The rule of thumb here, he adds, is that clearance of at least five feet is required for vessel passage. Where it is reasonable or necessary to reduce pass-through clearance, local agencies must provide a portage route to ensure public passage.

Q *How deep should I plan to set the culvert?*

Below streambed level is the simple answer, according to Cameron, who acknowledges this is sometimes easier said than done. Bedrock beneath the streambed can present a blasting challenge, for instance, if you want to sink a replacement culvert to the desired depth. The DNR recommends setting the culvert anywhere from six inches to a foot below streambed level, sometimes more depending on the stream. Cameron cautions that when replacing the culvert at that level, planners should maintain the amount of flow capacity. This could mean installing a culvert slightly larger than what was there to make up for lost capacity from sinking the new structure lower. He also cautions the slope of the culvert needs to match the slope of the stream. "Slope it the wrong way and you'll end up with a perched culvert and all the resulting problems. If the stream skews one way, the culvert should skew likewise to make sure velocity is constant upstream and down." Setting the culvert correctly protects the fish habitat and reduces maintenance.

Q *Why is construction erosion control important?*

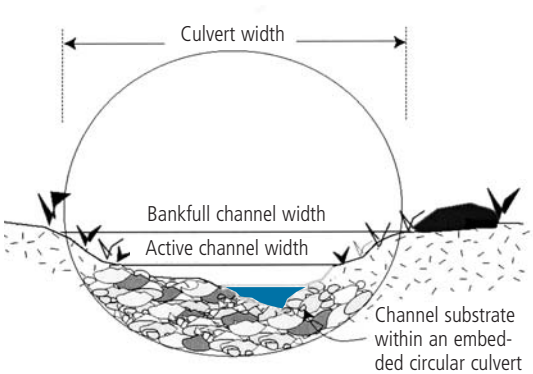
Trans 207 spells out requirements for protecting stream bank slopes from erosion as part of culvert replacement. A conceptual plan submitted under these standards must address how the project will minimize siltation of navigable waters. The DNR reviews the erosion controls outlined in the plan and gives recommendations for improvements, Cameron says. Liaisons can provide information on effective treatments—from silt fences during construction to riprap for the finished installation—and refer local agencies to resources about recommended materials to use and how to install them. "Our focus on natural resource and habitat protection means the DNR sees erosion control as an essential consideration in a replacement project," he says. "Bare soils on steep banks that slope into a stream wear away quickly and have a direct negative impact on fish and their habitat. That is why effective erosion controls are essential to protecting fish." He suggests checking out the Wisconsin Erosion Control Product Acceptability List compiled by WisDOT. For guidance on installing certain measures, see the DNR Construction Site Erosion and Sediment Control Technical Standards.

Culvert installed without erosion control measures quickly affects water quality.

Q *What other permits do I need for a local road project?*

When local agencies planning a highway bridge or culvert replacement project in navigable waterways comply with Trans 207, they are exempt from having to secure permits. Beyond that, Cameron says, there are issues not covered by those exemptions that do require additional permits. The Army Corp of Engineers may get involved along with the DNR where certain wetlands are in play, requiring a federal permit. If a project covers an area bigger than an acre, the constructing authority must file for a storm water permit from the DNR. Extensive dredging and channel relocation for a culvert replacement requires Chapter 30 permits. Other state approvals may involve identifying any historic or archeological feature affected by a replacement project. Again, Cameron reminds readers that DNR Transportation Liaisons are ready to help local governments evaluate both the construction site and a replacement plan, and aid them in identifying required permits. "Single point of contact and experienced in the field—we make a good resource for bringing projects along effectively and efficiently." ■

Channel cross section



Schematic shows the proper setting of culvert below the streambed.

Resources

Learn who your DNR Transportation Liaison is: *http://dnr.wi.gov/org/es/science/DOT_liaison_list.pdf*

Trans 207, Wisconsin Administrative Code: *http://www.legis.state.wi.us/rsb/code/trans/trans207.pdf*

Culverts: Proper Use and Installation, Wisconsin Transportation Bulletin No. 15, TIC, 2004, 12 pp. From TIC website: *http://tic.engr.wisc.edu/publications.lasso*

National Extension Water Outreach Education website: *http://wateroutreach.uwex.edu/CPBhomepage.cfm*

Fish Friendly Culverts from UW–Extension: *http://clean-water.uwex.edu/pubs/pdf/shore.fishfriendlyculverts.pdf*