

MEETS
AASHTO
STANDARD
• **M326** •



Snap-Tite®
Culvert Retrofit for
Fish Passageways

SnapTite®

*Illustration for show only.
See last page of brochure for further
information on erosion control.*

What is Snap-Tite? Snap-Tite is a no-dig solution to culvert lining and rehab challenges. The Snap-Tite® patented joint and installation system allows replacement of failing culvert piping without the removal of deteriorated pipe. Most jobs can be completed with a backhoe, shovels, a come-a-long and chains — without closing a road or dealing with traffic control. Also providing better flow capabilities than the CMPs it is replacing. Snap-Tite is made from high density polyethylene (HDPE) pipe and has a life expectancy of 100 years.

More and more culverts are being accessed as a crossing by fish and other aquatic organisms; however most culverts are not fully passable. For a fish on an upstream migration to successfully negotiate a culvert, it must enter the culvert barrel, traverse the barrel length, exit at the upstream end and proceed to the first resting area. As such, many states are implementing recommendations and guidelines for improving the effectiveness and ecological impact for waterway crossings. Experts tend to agree that the most effective solution for creating unobstructed fish passages is to replace problem culverts with new crossing structures such as bridges or oversized and/or embedded culverts that are able to simulate a natural streambed bottom.

However, many agencies have concluded that due to the number existing culverts and the limited amount of public

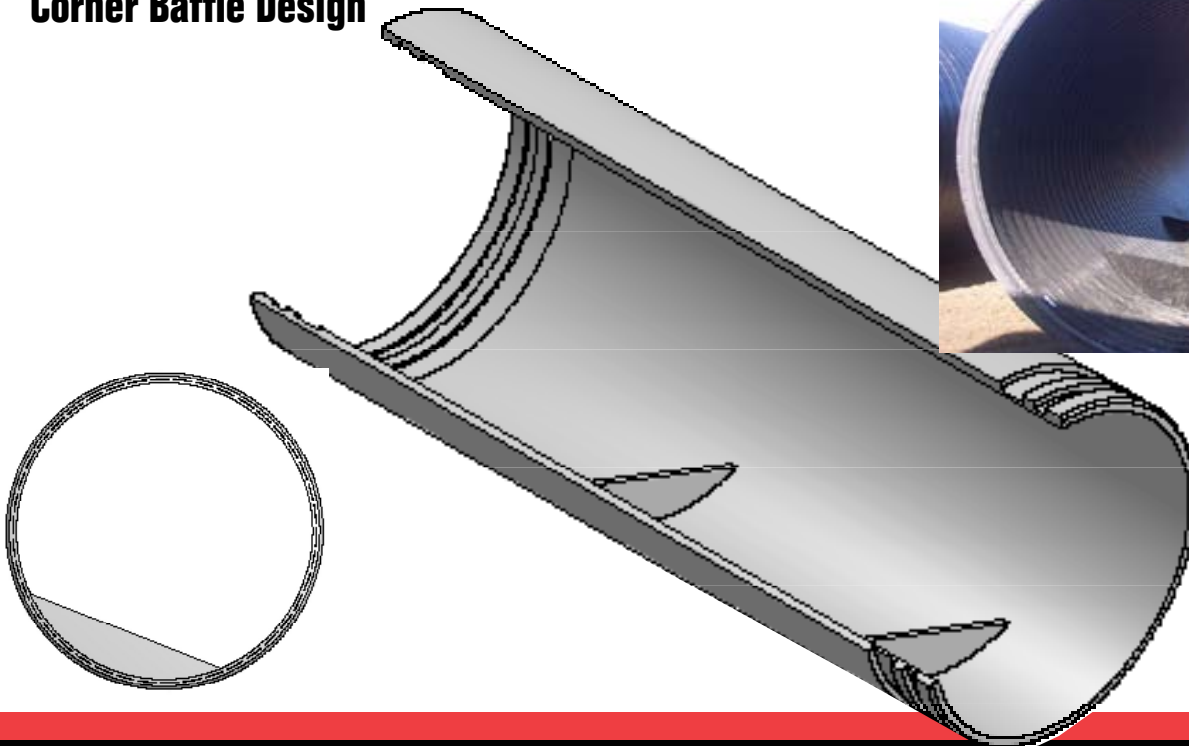
funds available, it is unlikely and/or impractical that every culvert that impairs fish passage will be removed and replaced with an adequate design. In situations where replacements are not practical or sensible, retrofitting a culvert with baffles may be a reasonable measure to provide some passage improvements. Culvert retrofits are modifications to an existing culvert and/or stream channel in an attempt to reduce barriers and improve fish passage. Baffle retrofits are not considered by many to be long-term solutions, but rather are viewed as a temporary solution until replacement can be logistically and financially viable.

For many years, Snap-Tite has made its mark as an excellent option for rehabilitating culverts that are failing structurally, where replacement would be costly, untimely, and very disruptive to the surroundings. Snap-Tite with factory installed baffles can become a culvert retrofit option that provides the same construction advantages and cost saving benefits, while also providing improvements for aquatic passage.

Most culverts with fish passage problems were designed with a focus on the culvert diameter required to pass a high-flow event. As a result they are undersized because they were designed for stream flow only, without regard to velocity impact on fish passage and other aquatic organisms.

Examples of Fish Passage Baffles and Weirs

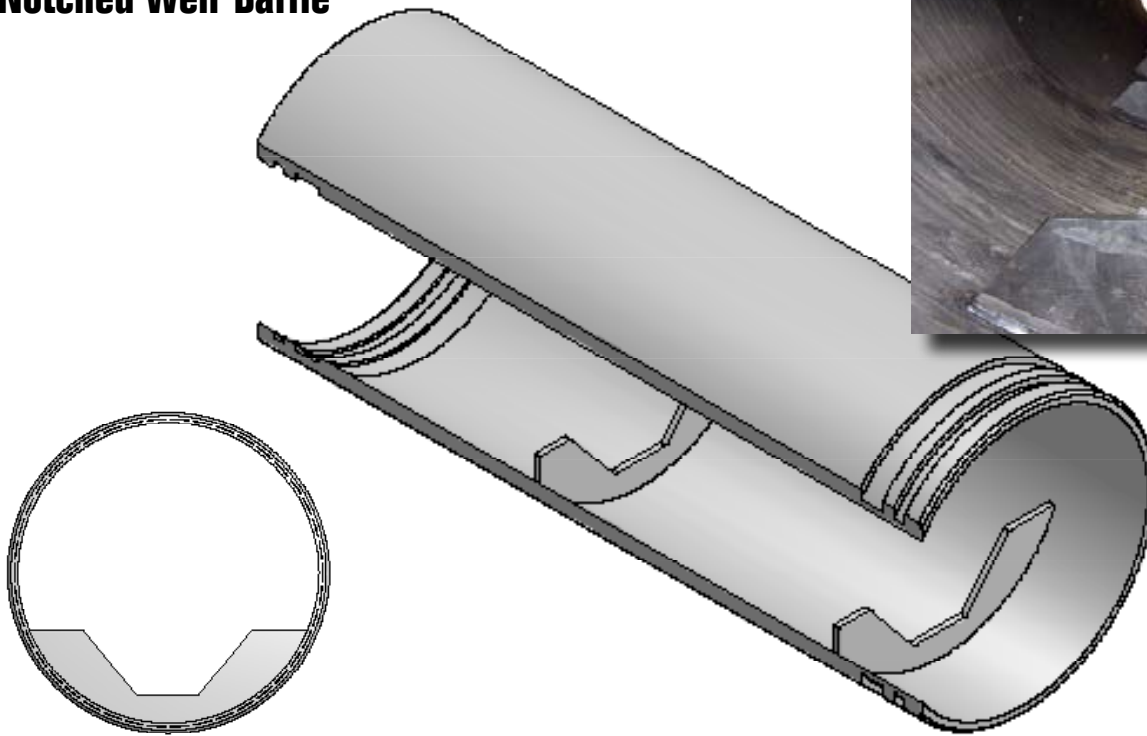
Corner Baffle Design



Baffles are placed off center from the invert or flowline of the culvert and remain on one side of the culvert and do not alternate.

Examples of Fish Passage Baffles and Weirs (cont.)

Notched Weir Baffle



The notched weir baffle design and corner baffle designs are recognized by Fed Highway Administration along with many state transportation and environmental agencies.

About Baffles

Baffles are used to solve depth and velocity problems within a culvert during flow extremes. In low flow situations, most baffles act like weirs to create small pools of standing water. As the flow increases, the water rises up on the baffle and the baffles act as roughness elements that decrease the flow velocity, creating resting areas for fish to escape high velocity water streaming through the culvert. Again it should be noted that baffles are not recommended by leading research organizations for new installations or complete replacement of culverts where fish passage is of concern.

When adding baffles to a retrofitted culvert, the culvert now becomes more prone to become blocked or clogged. It is imperative that a regular schedule inspection and maintenance program is developed, otherwise the crossing has exchanged one fish passage problem with another. Inspections and maintenance are typically important during and immediately after high flow events, especially as fish migration occurs in these events.

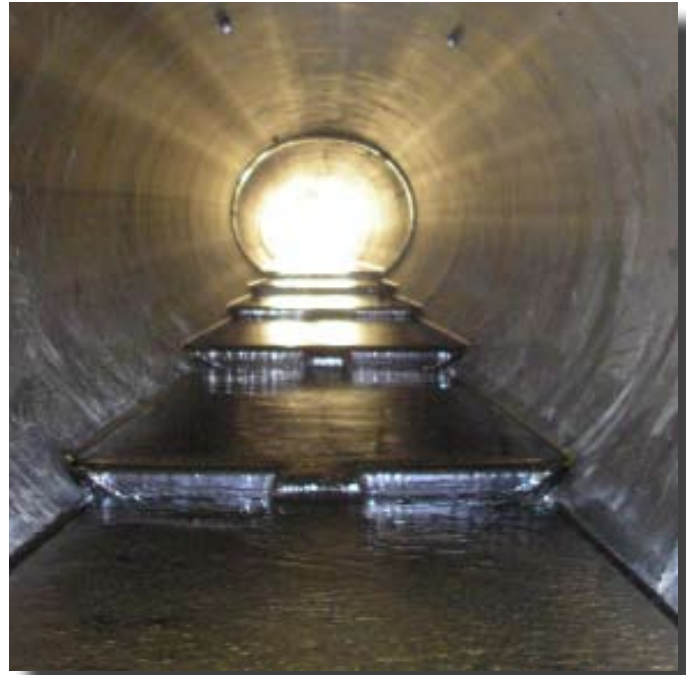
Baffles (and culvert retrofits) are considered part of the Hydraulic Design Option for design methods used in fish passage analysis. Baffles are typically recommended for culverts with a maximum slope of 2.5%-3.5%. (Corner baffles are typically used for slopes less than 2.5% while notched weir baffles are used between 2.5% and 3.5%) It is acknowledged that while the goal is to optimize culvert capacity, limit sediment deposition and debris accumulation, limit maximum velocity and maximum turbulence; each criterion will have to be balanced against each of the others for a compromise in the overall design. Culvert retrofits are not expected to be able to satisfy all the requirements of the Hydraulic Design option. The retrofit design should also be analyzed in conjunction with inlet and outlet control features such as tailwater control measures. The design engineer should consider and evaluate these conditions when specifying the baffle criterion to Snap-Tite for fabrication.

For further information contact your local Snap-Tite representative or visit: www.culvert-rehab.com.

Photos of Fish Passageways using HDPE pipe



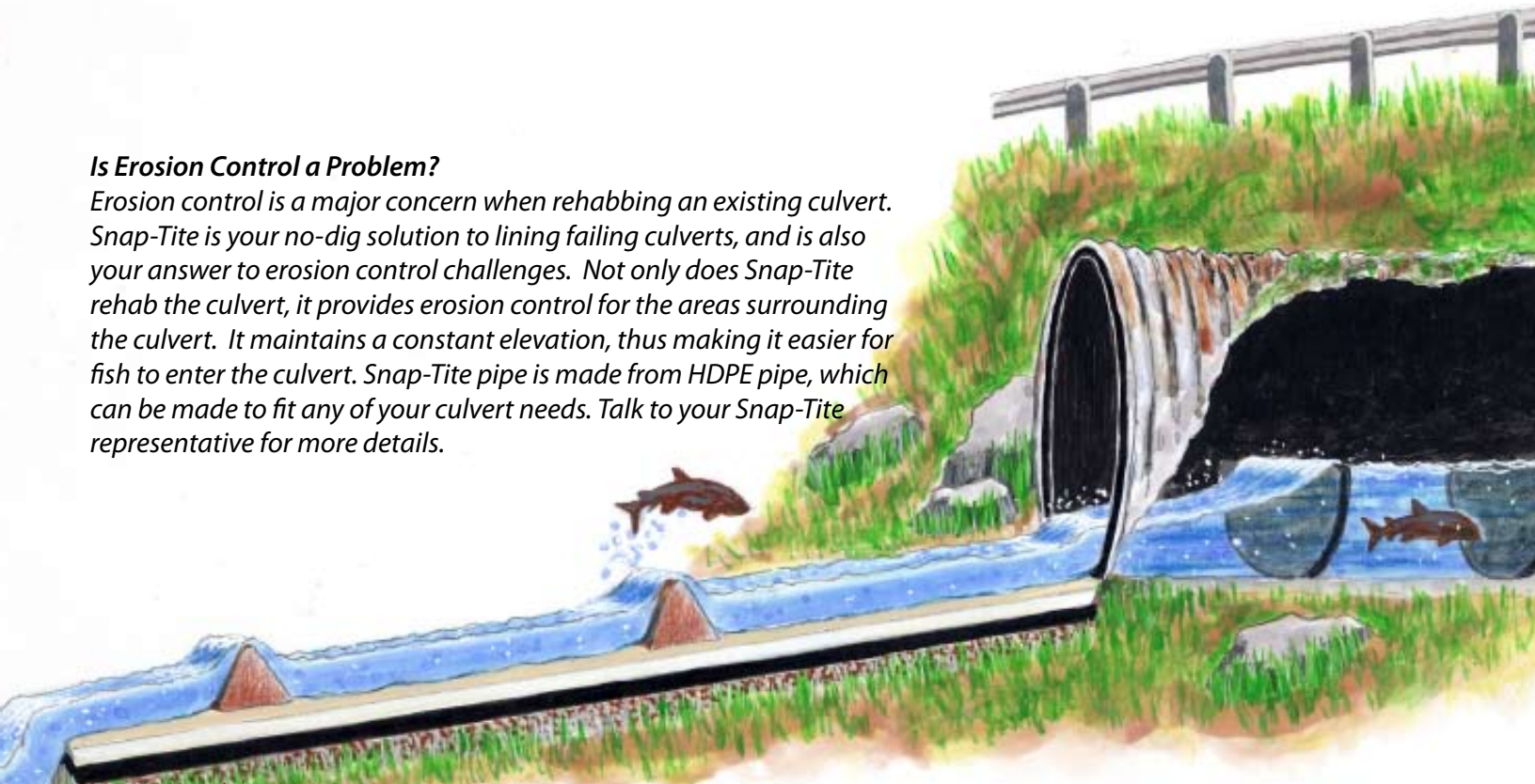
Pools adjacent to culvert can play important design elements in aquatic passage.



Ponding effect created by baffle/weir design during low flow.

Is Erosion Control a Problem?

Erosion control is a major concern when rehabbing an existing culvert. Snap-Tite is your no-dig solution to lining failing culverts, and is also your answer to erosion control challenges. Not only does Snap-Tite rehab the culvert, it provides erosion control for the areas surrounding the culvert. It maintains a constant elevation, thus making it easier for fish to enter the culvert. Snap-Tite pipe is made from HDPE pipe, which can be made to fit any of your culvert needs. Talk to your Snap-Tite representative for more details.



Make the connection! For more information visit
www.culvert-rehab.com or call us at
1-800-CULVERT

See Snap-Tite's brochure "Top Five Concerns When Rehabilitating a Culvert Utilized for Fish Passage" for more helpful information