



CEI Talks Climate Change & Flood Management at NEWEA

In 2013 Super Storm Sandy and in 2011 Tropical Storm Irene brought devastating floods to the Northeastern United States. With severe impacts on an untold number of culverts and bridges, these events focused attention on a growing concern among public works directors and program managers at both state and municipal levels: our roadway stream crossings are becoming increasingly susceptible to damage by storm events. Even without these catastrophic events, municipalities and state transportation agencies have been reporting an increase in road failures due to overwhelmed culverts, eroded ditches, undercut embankments, and roadway washouts.

On January 28th CEI Senior Civil Engineer, David Nyman, P.E. presented at the New England Water Environment Association's (NEWEA) Annual Conference and Exhibit in Boston, MA. In a session on Planning for Climate Change, David delivered a two part presentation beginning with possible impacts of climate change on stream morphology followed by a presentation that explored the design of replacement culvert and bridge structures in New England.

Presentation material focused on how stream crossings can be improved for greater flood resiliency and improved wildlife passage, by designing to accommodate natural stream processes. By preserving or simulating the stream's natural cross section to the extent practicable, new and replacement structures can improve conveyance of not only water, but also sediment and debris, in addition to wildlife. The discussion provided an overview of a three-part design approach for providing climate resilience in crossing design:

1. Design for base flows - preserve the habitat:

Use stream simulation to provide streambed integrity and habitat resilience;

2. Designing for peak flows - preserve the structure and the habitat:

Provide both hydraulic capacity and structural and streambed stability to meet current bridge design standards for withstanding flood conditions;

3. Design for extreme events - prevent loss of the structure:

Provide measures to avoid catastrophic loss and to facilitate recovery from events exceeding design standards. Some damage to structure and habitat may occur, but restoration will be feasible.

If you are interested in receiving a copy of this presentation or speaking directly with David about a specific culvert design issue please contact him directly at 508.281.5160 x 320 or at

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