

Irene a chance to build better infrastructure

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The extensive road and bridge damage caused by Tropical Storm Irene provides us the opportunity to take a step back and reflect on the how, the why and the where we build roadways throughout the state of Vermont.

Nearly two months after the storm, the toll Irene took on Vermont's transportation infrastructure is now clear. On the combined town and state network, Irene washed out more than 2,000 roadway segments, undermined more than 1,000 culverts and damaged more than 300 bridges. The cost to rebuild everything could push \$1 billion.

Understanding that our climate is changing and that the frequency and intensity of storms will likely be greater during the next 100 years than it was during the past 100, it is prudent that as we rebuild, we also adapt. But doing so successfully will not be easy.

Limited-access roads, such as our interstate highways and "super" Route 7 south of Rutland, are highly engineered with bridges elevated well above Vermont's waterways. This type of roadway withstood Irene's wrath in most instances and sustained limited or no damage. It is highly unlikely, however, that we could ever afford — nor would Vermonters necessarily want — to build additional limited-access roadways throughout Vermont.

Vermont's river valleys are steep and narrow, making it a challenge to successfully engineer state highways. With the river on one side, steep slopes on the other, and villages and homes in between, there is little space left for roads that safely accommodate cars, trucks, bikes and, in some valley locations, a railroad line as well. Therefore, the long-term need to build more robust roads and bridges must be evaluated in conjunction with our desire to preserve Vermont's historic and archaeological resources, as well as environmental resources such as wetlands and wildlife habitat.

Our best opportunity to protect our transportation infrastructure against future flooding in these areas likely lies with our bridges. As we both rebuild from flood damage and replace aging bridges over time, we need to rethink their design. In the past, we built relatively short bridges with concrete abutments very close to, if not in, rushing water. These designs were cost-effective and made environmental sense at the time.

The time has come, however, to consider building longer bridges with foundations that sit outside our river channels, even if these bridges cost more and have a longer footprint. Doing this will accommodate future floodwaters, as well as allow river channels to move and not be constrained by the bridge opening and exacerbate flooding up- and downstream. Longer bridges also will improve passage for fish that are cut off from their habitat by undersized structures and allow safe passage for other animal species as they pass through the transportation network.

In many flood-damaged locations, temporary bridges will be erected before new, permanent bridges are built. This will not only buy us the time needed to reassess the hydraulics of each location with modern storms in mind, but also will provide communities the opportunity to work with the Vermont Agency of Transportation to best locate these costlier and sometimes larger structures within village centers.

As for town highways, the policy decisions are even greater and the choices more difficult.

In areas where roadways along rivers were badly damaged or even destroyed, towns may need to choose whether and where to rebuild. Redundant roadways, or those that serve one or two properties, may not make sense in the future.

Communities must also reassess their land-use patterns and ask such questions as: How close to the

water is too close to build? What kind of businesses or maintenance practices will be allowed where? When Montpelier flooded in the spring of 1992, one contributing factor that knocked out a railroad bridge was how and where the city dumped its snow along the river. With this lesson learned, the city altered its snow-disposal practice.

Land-use planning and zoning, stream-alteration practices and consideration of future risks are all critical to the landscape of issues that need to be considered as we build a flood-resilient infrastructure for Vermont. Further constriction of river corridors will only lead to additional problems. Adding more impervious surfaces without proper stormwater retention controls affects water quality and adds to future flooding woes.

Public policy should not focus solely on how to best design and construct our future transportation system; properly maintaining what we already have is just as important. Funding protective measures such as keeping ditches and riprap in good working condition is vital. Roadway drainage systems such as ditches, catch basins, culverts — and even bridges — need to be kept free of debris and sediment so rushing water during a storm can flow freely and stay within riverbeds, minimizing or even preventing overflow onto roads and over bridges.

The wake of Irene's destruction offers us an opportunity to think more broadly across the variety of disciplines that road building now entails. As we rebuild Vermont, the Transportation Agency will work with the Vermont Agency of Natural Resources as well as the Agency of Commerce and Community Development and other agencies so we can build Vermont to be even stronger than Irene found it.

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