



## vantage point

# Winter Flooding Lessons

**H**ere it is, the first full week of the New Year, and my neighborhood is in the midst of major flooding. It has everything to do with snowmelt and not all that much to do with rivers rising out of their banks from heavy precipitation. It has much to do with the 8 inches of snow that fell on frozen ground as the temperatures dropped last week from 30 to single digits, and the sudden rise over the weekend to the 40s, today in the 50s, followed by more precipitation, this time in the form of rain.

We don't often think about winter flooding, focusing more on the summer and fall months, but it is memorable when it happens. January of 1996 was one such event here in southeastern Pennsylvania, when 32 inches of snow fell on frozen ground (already covered by a prior 24 inches) within 24 hours, followed by rapid snow melt the following week. That particular occasion stands out for me as I had just moved here before getting married, and my betrothed was out in Colorado at a convention, complaining about not enough snow for skiing. Having shoveled through endless hours and three changes of clothing, I was not sympathetic, and the now classic line in our home is, "Come on home: two shovels—no waiting." At any rate, much of Philadelphia was underwater when a rapid melt flooded streets and homes. To a lesser extent it's happening again now.

This is a reminder that siting and designing buildings is more than just about the slope of the ground. Absolutely, grading matters, as does the elevation of the lowest floor above both the adjacent ground and Base Flood Elevation (BFE). Whether in an

A-type or V-type zone, it is the relationship of lowest floor to BFE that sets flood insurance rates – the top of that floor in A zones and the bottom of it (its lowest structural member) in V zones, where height of mechanical and electrical equipment above BFE also affects annual rates.

What else matters is the soil. This is not something noted in the insurance tables, but definitely plays a role in the flood worthiness of a structure. Does the soil drain well? Does it retain water? Does it stand up to a soaking or tend to erode or slump away from foundations? How high is the water table at different times of the year?

FEMA's Technical Bulletin 10 includes a big warning box telling us that we need to consider what happens beneath the surface as well as on top of the ground. Saturated soils can exert enough pressure against foundation walls to deform or collapse them. Depending upon circumstances, it is also possible for structures to be subject to buoyancy forces that will pop them up out of the ground like an underground burial plot in New Orleans. That means the building is no longer anchored to the ground, and will move wherever surface waters and wind take it, sometimes only a few feet, sometimes down the street, sometimes into the river.

By NFIP regulations, 44 CFR 65.2(c) requires communities to verify in the process of issuing permits that construction will be "reasonably safe from flooding." This phrase means that "... base flood waters will not inundate the land or damage structures to be removed from the SFHA and that any subsurface waters related to the base flood will not damage existing or proposed buildings." That's a pretty clear statement

about the responsibility of permit applicants for new or re-construction. Also remember that substantial improvement, worth 30% or more of the original pre-improved fair market value of a structure, requires the entire structure to be brought up to current building codes and standards.

Technical Bulletin 10 (regarding filled sites) and Technical Bulletin 11 (addressing crawlspaces and when they may be considered basements) both talk about subgrade construction and how to do it in a manner that is technically compliant with the NFIP. But both also note that subgrade construction can increase flood insurance premiums, even if technically compliant. You can build this way, but your client will pay a price for it. As we move toward actuarially rated premiums, this price is likely to be higher than what the building owner originally was willing to pay.

Heed the technical mandates of 44 CFR 60.3(c) that require the lowest floor of both residential and non-residential construction to be at or above BFE, or at or above the depth of inundation on the FIRM, or at least two feet above highest adjacent grade if no depth or BFE is published. But also be aware of the factors not so clearly scripted in the NFIP. They could save a building, save your client insurance and repair dollars, and build your professional reputation. ■

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