



By Rebecca Quinn, CFM

Time for another grab bag of topics. There are a lot of questions and topics that don't take a full column to answer, so this month I'll share a few I've been asked about recently.

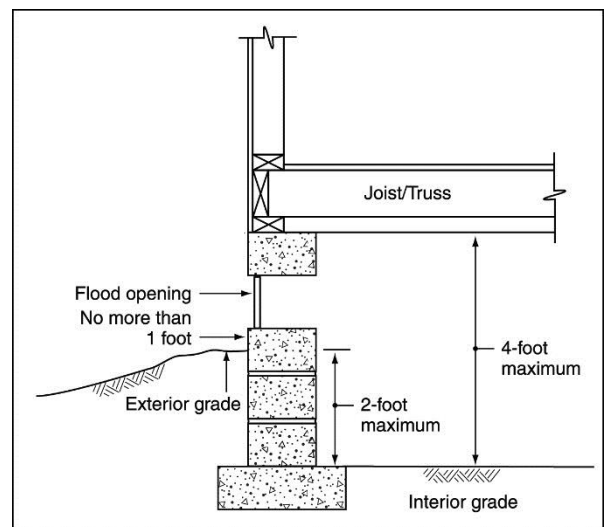
What if Elevating a Building on a New Foundation Doesn't Trigger SI/SD? I have to say this one catches me off guard every time! Really? An owner elects to go to all the trouble and expense to elevate a building on a new foundation but doesn't want to elevate it to at least the BFE? That's the only scenario I can conceive where a community might do a Substantial Improvement determination and, if the result is the work doesn't exceed 50 percent of the market value of the building, the owner wouldn't have to bring it into compliance. Under the basic NFIP rules, that's the answer if SI isn't triggered. But please tell me you'd do everything you can to convince the owner to fully elevate on a fully compliant foundation. Just the flood insurance savings alone should be convincing, to say nothing about avoiding damage caused by shallower, more frequent floods!

Well, it turns out this scenario is covered explicitly in Section 1103.5 of the 2015 *International Existing Building Code*, which states: "Additions and foundations in flood hazard areas shall comply with the following requirements: (5) For a new foundation or replacement foundation, the foundation shall comply with Section 1612 of the IBC, or Section R322 of the IRC, as applicable." Now, to be complete, I should also cite item (4) of the same code section, which does still leave a loophole for "raised or extended foundations" and requires compliance only if the work constitutes Substantial Improvement.

Does Technical Bulletin 11 Allow Any Crawlspace Below Grade? No, look at the limitations described in TB 11 and you discover this option is only available in Special Flood Hazard Areas with relatively shallow depths during base flood conditions. I think this question comes up because it's human nature to dip into guidance documents to find the answers you want to find ... sometimes skipping over important content that doesn't necessary support your preferred outcome. Do that with FEMA TB 11 and it could get your community in trouble, although the real financial consequences would be borne by property owners.

TB 11 is titled [Crawlspace Construction for Buildings Located in Special Flood Hazard Areas](#). Sounds like the go-to source for crawlspaces, right? Wrong. The second sentence states it "provides guidance on crawlspace construction and supports a recent policy decision to allow construction of crawlspaces with interior grades up to 2 feet below the lowest adjacent grade (LAG), referred to as below-grade crawlspaces, provided that other requirements are met." I've added the underlining – those are the parts that too many people seem to skip over.

In addition to the physical limitations illustrated in the graphic, the TB makes it clear that "Communities that choose to allow below-grade crawlspace construction will be required to amend their floodplain management ordinance to include the provisions outlined in the following sections on below-grade crawlspace construction." Again, I added the underlining for



emphasis. Remember, ANY change to ordinances must be reviewed by NFIP state coordinating agencies or FEMA regional offices.

The Floodproofing Certificate: Do You Have the Most Recent? There's been considerable confusion about the most recent edition of the Floodproofing Certificate. I'm not entirely clear on the chronology, but I do know there were changes between the final and an earlier version that, I think, was distributed to the Write-Your-Own insurance companies. The final has an OMB Control Number and expiration date of Nov. 11, 2018 in the upper right corner and is available here: [FEMA Form 086-0-34](#).

As stated on the cover page of the recently-released NFIP Floodproofing Certificate, the principal purpose of the information collected is to "estimate risk premium rates necessary to provide flood insurance." Keep that in mind as you review the key changes I'm describing here. One change is separation of certification of the "floodproofed elevation" from certification of "floodproofed construction."

The latest edition has a new Section II, Floodproofed Elevation Certification. This is where a land surveyor, engineer or architect authorized by law (of the state in which the project is located) to certify elevations which "must be based on finished construction." From time to time I get questions on who can certify elevations. Just because the NFIP certificates list all three professionals does not override limitations imposed by state laws. Many states do not authorize architects and engineers to do land survey work.

Pay close attention to the new Section III, Floodproofed Certification and the exact changes made, which I show here:

I certify the structure ~~that~~, based upon development and/or review of the ~~structural~~ design, specifications, as-built drawings ~~and plans~~ for construction and physical inspection, has been designed and constructed ~~the design and methods of construction are~~ in accordance with accepted standards of practice (ASCE 24-05, ASCE 24-14 or their equivalent) and any alterations also meet those standards and ~~for meeting~~ the following provisions:

As you can see, one big change is the certification clearly is not just about the design, but about whether a building was constructed as designed based on as-built drawings and physical inspection. Keep that in mind because the NFIP regulations at 44 CFR 60.3(c)(4) require certification of the design, not the "as-built" construction. That makes sense when the certificate is part of the permit application. But, given it's fairly common for dry floodproofing measures to fail (or not be properly installed if human intervention is necessary), it also makes sense for communities to use the FEMA certification based on as-built drawings and inspection as part of close out before issuing a certificate of occupancy.

So I'm left with this question: If the revised Floodproofing Certificate is used to certify actual, as-built elevations and construction, what do communities use to satisfy the NFIP requirements for certification of the design? I suggest the certification statement from the previous edition is a good starting point, with a few tweaks to the verb tense so it's clearly certifying the design. Here's what I would consider using, if I was still in the regulatory business:

Non-Residential Floodproofing Design Certification:

I certify that, based upon development and/or review of structural design, specifications and plans for construction, the design and proposed methods of construction are in accordance with accepted standards of practice (ASCE 24-05, ASCE 24-14, or their equivalent) for meeting the following provisions:

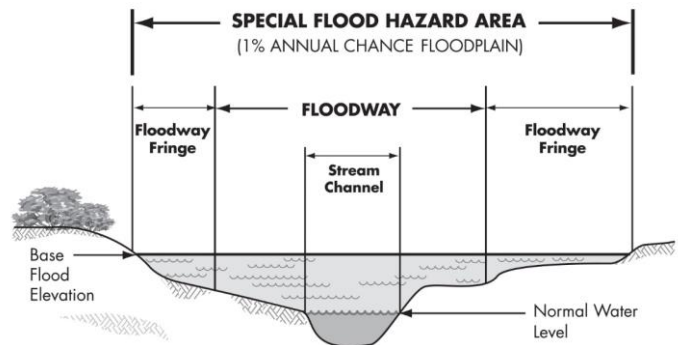
The structure, together with attendant utilities and sanitary facilities, is designed to be watertight to the floodproofed design elevation of [INSERT ELEVATION RELATIVE TO DATUM ON THE FIRM], with walls that are substantially impermeable to the passage of water.

All structural components are capable of resisting hydrostatic and hydrodynamic flood forces, including the effects of buoyancy, and anticipated debris impact forces.

I certify that the information on this certificate represents my best efforts to interpret the data available.

Floodway Encroachment – Can Floodway Boundaries be Shifted, Perhaps to Avoid BFE Increases? Yes, floodway boundaries can be shifted, but obviously that’s the short answer based on theory. Whether this is an option at specific locations depends on the results of floodway encroachment analyses and whether a proposal satisfies FEMA’s requirements for changes to FIRMs.

First, some basics on the floodway concept. The floodway is the channel of a watercourse and adjacent land areas that must be reserved to convey the base flood discharge (see graphic). This is an oversimplification of the process, but the first step in delineating a floodway is preparation of a hydraulic model of the area inundated by the base flood (i.e., the SFHA). Then the computer model is incrementally modified to artificially encroach, or fill, into the SFHA until there is a predicted increase in water surface elevation of up to one foot somewhere along a reach of the watercourse (some states use a lower threshold than 1 foot, which results in wider floodways). When that 1-foot limit is triggered, FEMA draws the floodway boundary to reflect the modeled artificial encroachment. The benefit of doing this is we already have analyses showing “worst case” scenario assuming the floodway fringe is completely encroached. This means engineering analyses don’t have to be prepared for individual development proposals that stay within the fringe.



Flood Insurance Studies include Floodway Data Tables for watercourses with floodways (see graphic below). Note well that if the SFHA outside the floodway is completely encroached with development, the BFEs will increase (see the “with floodway” column) up to 1 foot higher than the BFE shown on the FIRM (see the “regulatory” BFE column). This is one of the driving forces behind ASFPM’s development of the [No Adverse Impact](#) approach to floodplain management.

| Floodway | | | Base Flood Water Surface Elevation | | | |
|-------------|------------------------|--------------------------------|------------------------------------|------------------|---------------|----------|
| WIDTH (FT.) | SECTION AREA (SQ. FT.) | MEAN VELOCITY (FT. PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| 450 | 4,013 | 4.2 | 459.0 | 459.0 | 460.0 | 1.0 |
| 507 | 2,536 | 6.7 | 459.4 | 459.4 | 460.3 | 0.9 |
| 560 | 2,453 | 7.0 | 460.6 | 460.6 | 460.9 | 0.3 |
| 570 | 2,579 | 6.6 | 461.9 | 461.9 | 462.3 | 0.4 |
| 645 | 2,262 | 7.5 | 464.4 | 464.4 | 465.3 | 0.9 |
| 520 | 2,434 | 7.0 | 466.7 | 466.7 | 467.3 | 0.6 |

The Flood Insurance Study (FIS) has a Floodway Table for every waterway that was studied by detailed methods for which floodways were delineated.

- 1 This is the only readily available velocity data to use in computations of hydrodynamic loads
- 2 Computed BFE (rounded values are shown on the FIRM)
- 3 Amount of allowable increase – not more than 1-foot at any location

Next, let’s do a high level look at modifying the floodway. Usually, the computer-modeled encroachment considers equal encroachment on both sides of the watercourse unless the topography on one side rises more steeply than on the other side. Now let’s get back to the initial question – suppose a property owner whose land is constrained by the floodway shown on the current FIRM wants to move the boundaries to make it easier to develop – can that be done?

This is where the answer depends on a site-specific analysis. The hydraulic models FEMA used to produce the FIRM (or new models that replicate the current BFE and floodway boundaries) can be used to examine options to shift the floodway boundaries.

Before anyone gets too excited about it, the NFIP requires changes in boundaries, including floodway boundaries, to be submitted for FIRM revision. Shifting floodway boundaries, even without changing BFEs, potentially means someone else's property would be affected by the floodway designation (and thus subject to the encroachment limitations). As part of the map revision process, FEMA requires a public notice or statement by the community that it has notified all affected property owners. It wouldn't surprise me to learn that property owners who anticipate developing their land might object to having more of their land included in the floodway, and thus constrained by the floodway encroachment requirements.

Submit your own items or suggestions for future topics to column editor Rebecca Quinn, CFM, at rcquinn@earthlink.net. Comments welcomed!

Chapter Corner

Is your chapter “outstanding?” Let ASFPM know about it!

ASFPM is now accepting 2016 “Outstanding Chapter Award” nominations. There is a separate nomination form for this award and nominations will be accepted until April 1, 2016. [Click here](#) to submit an ASFPM chapter nomination for consideration. Preview the form at: www.floods.org/ace-files/chapters/2016_Chapter_Award_NOMINATION_PREVIEW.pdf



Flood Loss Avoidance Benefits of Green Infrastructure for Stormwater Management

Prepared for Environmental Protection Agency by Atkins (December 2015)

This [modeling study estimates the flood loss avoidance benefits](#) from application of small storm retention practices for new development and redevelopment nationwide. Twenty HUC8 watersheds were modeled in areas where significant growth is expected between 2020 and 2040, using the FEMA Hazus model and national-scale datasets. The area of the watersheds ranges between 500 and 3,000 square miles.



The study was conducted in consultation with other federal agencies including the US Army Corps of Engineers, National Oceanic and Atmospheric Administration and Federal Emergency Management Agency.

The approach was vetted by a panel of experts from government, academia and industry. The results show that, over time, the use of green stormwater infrastructure can save hundreds of millions of dollars in flood losses, while just applying the practices to new development and redevelopment only. If retrofitting were to occur, the avoided losses would be even more significant.