International Green Construction Code (IgCC) Revision Process

ICC Code Revisions occur in three groups with one group addressed each year. The IgCC is in Group C which is being addressed in 2014. The next time proposed revisions to the IgCC will be entertained is in 2017. ASFPM worked with EPA and FEMA to draft three proposals for revisions to the IgCC.

Schedule:

<table>
<thead>
<tr>
<th>Action</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code Change Proposals due</td>
<td>January 10, 2014</td>
</tr>
<tr>
<td>Proposed Changes Posted</td>
<td>March, 2014</td>
</tr>
<tr>
<td>Committee Action Hearing – Memphis, TN</td>
<td>April 27 – May 4, 2014</td>
</tr>
<tr>
<td>Report of Committee Action posted</td>
<td>June 6, 2014</td>
</tr>
<tr>
<td>Public Comments Deadline</td>
<td>July 16, 2014</td>
</tr>
<tr>
<td>Public Comments Posted</td>
<td>August 27, 2014</td>
</tr>
<tr>
<td>Public Comment Hearing – Fort Lauderdale, FL</td>
<td>September 28 – October 1, 2014</td>
</tr>
</tbody>
</table>

Summary of Actions at April 28, 2014 Code Development Committee Hearing in Memphis, TN

Susan Gitlin testified in support for EPA. Alan Lulloff testified in support for ASFPM. FEMA provided a document that indicated they were in support of 104, 105 and 106. Testimony limited to 2 minutes with a 60 sec rebuttal opportunity.

104 - Critical Facilities

**402.3 (NEW): Protection of high-risk buildings and structures.** Where this section is indicated to be applicable in Table 302.1, buildings and structures classified as risk categories III or IV as per Section 1604.5 of the International Building Code shall not be located within a 500-year floodplain.

Testimony Against – this could be limiting on private commercial development. If a government agency was renting office space this could be a limiting factor.

Vote: unanimous against. Reason – certain facilities cannot be located out of the 500 year floodplain due to need for proximity – fire station, hospitals

105 - Limitation on Fill

**402.2.3 (NEW) Flood hazard area preservation, limitation on fill.** Where this section is indicated to be applicable in Table 302.1, use of fill to support slab-on-grade foundations for new buildings and structures and substantial improvements shall not be permitted.
International Green Construction Code (IgCC) Revision Process

Testimony Against – will prevent the use of stemwalls. Wetland protection regulations will prevent wetland habitat from being adversely impacted.

Committee member comment: The chair of the committee requested the vice chair to preside over this portion of the hearing. It appears that he did this so that he could vote on these proposals. The chair indicated that he has twice had to rescue people from the floodplain in recent years – this is needed to help prevent such issues.

Vote: 4 to 4 Tie – The tie was broken by the vice-chair who was chairing the committee for this portion of the code hearing – who voted in support of the proposal.

The moderator asked if an assembly vote was requested. The representative of the Homebuilders Association came forward and requested an assembly vote. The ICC has implemented an on-line viewing and voting process. The results are posted after the hearing and voting members have a window of time to vote. For this round of proposals the vote is from May 19th through the end of May. If it does not get voted down at this point, at the September 15 Ft. Lauderdale annual meeting a two thirds vote would be needed to overturn the committee recommendation.

106 - Limitations on Encroachment – no increase in flood heights or flow velocity

402.2.3 Development in flood hazard areas. New buildings, structures and substantial improvements constructed in flood hazard areas shall be in compliance with Section 1612 of the International Building Code provided the lowest floors are elevated or dry floodproofed to not less than 1 foot (305 mm) above the elevation required by Section 1612 of the International Building Code, or the elevation established by the jurisdiction, whichever is higher and, if located in riverine flood hazard areas, it has been demonstrated through hydrologic and hydraulic analyses performed by a registered design professional in accordance with standard engineering practice that the proposed buildings and structures, including associated grading or fill, when combined with all other existing and potential future flood hazard area encroachments, will not result in any increase in flood levels during the occurrence of the design flood and will not increase the floodwater velocity at the project site.

Testimony Against –

1) Longest provision of code proposed to-date
2) Two foot of freeboard takes care of this issue
3) Individual encroachments will not have a large impact
4) Will be an onerous requirement assoc with any type of development – even barns & ag bldgs

Committee member comment: Attempting to address a FEMA problem via the IgCC

Vote: 8 to 3 to not approve

Prepared by Alan Lulloff
May 15, 2014
International Green Construction Code (IgCC) Revision Process

Notes:

Code Development Committee made up of 15 representatives from construction, design and regulatory community. Proposals approved by majority vote of the CD Committee.

Committee action – Committee (50% majority) can Approve as Submitted, Approve with Modifications or Disapprove.

Assembly Actions – Remote voting on assembly motions occurs following the hearings from May 19th through May 30th. Voting is open to all ICC members. Successful assembly action (simple majority) results in an automatic public hearing comment at Public Comment Hearings.

Following are the full proposals as submitted with reason statements included:
International Green Construction Code (IgCC) Revision Process

PUBLIC CODE CHANGE PROPOSAL FORM
FOR PUBLIC PROPOSALS TO THE INTERNATIONAL CODES
2012-2014 CODE DEVELOPMENT CYCLE

CLOSING DATES:
- Group A Codes: January 3, 2012
- Group B Codes: January 3, 2013
- Group C Codes: January 6, 2014

*See Item 3 of these instructions for additional information concerning Group A, B and Group C Code Development Committees Responsibilities*

1) Name: John McShane  
Date: 1/10/14  
Jurisdiction/Company: US Environmental Protection Agency  
Submitted on Behalf of: US Environmental Protection Agency  
Address: 1200 Pennsylvania Avenue NW  
City: Washington  
State: DC  
Zip Code: 20460  
Phone: 202-566-1381  
Fax:  
E-mail address (see # 4 below): McShane.john@epa.gov

<table>
<thead>
<tr>
<th>Name</th>
<th>Date: 1/10/14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisdiction/Company:</td>
<td></td>
</tr>
<tr>
<td>US Environmental</td>
<td></td>
</tr>
<tr>
<td>Protection Agency</td>
<td></td>
</tr>
</tbody>
</table>

Name: Alan Lulloff  
Date: 1/10/14  
Jurisdiction/Company: Association of State Floodplain Managers  
Submitted on Behalf of: Association of State Floodplain Managers  
Address: 575 D’Onofrio Drive, Suite 200  
City: Madison  
State: WI  
Zip Code: 53719  
Phone: 608-828-3000  
Fax:  
E-mail address (see # 4 below): alan@floods.org

2) Copyright Release: In accordance with Council Policy #28 Code Development, all Code Change Proposals, Floor Modifications and Public Comments are required to include a copyright release. A copy of the copyright release form is included at the end of this form. Please follow the directions on the form. This form as well as an alternative release form can also be downloaded from the ICC website at www.iccsafe.org. If you have previously executed the copyright release for this cycle, please check the below:  
___X___ 2012-2014 Cycle copyright release on file

3) Code: Indicate appropriate International Code(s) associated with this Public Proposal – Please use Acronym:  
__IGCC____

If you have also submitted a separate coordination change to another I-Code, please indicate the code: __________  
(See section below for list of names and acronyms for the International Codes).

NOTE: Sections of the International Codes that have a letter designation in brackets in front of them are the responsibility of a different committee than the committee normally responsible for that code. For instance, Section 301.1.4 of the IEBC has a [B] in front of it, meaning that this section is the responsibility of one of the IBC Code Development Committees (in this case, IBC-S). Any proposed changes to Section 301.1.4 will be heard by the IBC-Structural committee.

Therefore, some code change proposals to Group B code text may be due by January 3, 2012, in order to be heard by Group A code development committees, and vice versa (proposed revision to a Group A code due January 3, 2013). Please go to www.iccsafe.org/responsibilities for detailed information on Group A, B and Group C Code Development Committee responsibilities.

4) Multiple Proposals: A proponent shall not submit multiple code change proposals to the same code section. When a proponent submits multiple code change proposals to the same section, the proposals shall be considered as incomplete proposals and not processed in accordance with Section 4.3 of CP #28. This restriction shall not apply to code change proposals that attempt to address differing subject matter within a code section.

Prepared by Alan Lulloff  
May 15, 2014
104 - Code: IGCC –12-14

Code Sections/Tables/ Figures Proposed for Revision (3.3.2); 202, Table 302.1, 402.3 (NEW)

Proponent: Name/Company/Representing (3.3.1):

John McShane, US Environmental Protection Agency and Alan Lulloff, Association of State Floodplain Managers

New definition:

500-YEAR FLOODPLAIN. The area within a floodplain subject to a 0.2-percent or greater chance of flooding in any given year.

Revise as follows:

Table 302.1
Add a line:

<table>
<thead>
<tr>
<th>402.3</th>
<th>Protection of high-risk buildings and structures</th>
<th>□Yes</th>
<th>□No</th>
</tr>
</thead>
</table>

402.3 (NEW): Protection of high-risk buildings and structures

Where this section is indicated to be applicable in Table 302.1, buildings and structures classified as risk categories III or IV as per Section 1604.5 of the International Building Code shall not be located within a 500-year floodplain.

Reason:

The purpose of this proposal is to provide communities with an option to maximize the protection of buildings that offer essential services or that in severe floods present high risk to building occupants or the larger community. Such buildings, often referred to as “critical facilities,” include buildings that offer shelter during times of emergency, buildings that house community protection services, water treatment facilities, facilities that house people who are immobile, and so forth. The International Building Code categorizes these buildings as Risk Category III and IV.

Increased levels of freeboard is one approach to protecting such facilities, but could be insufficient, particularly in communities that are highly vulnerable to sea level rise. Coastal communities may want to use climate change adaptation strategies that minimize the risk of damage to critical facilities, strategies that take into consideration the reduced predictability of hydrologic and meteorological conditions. The placement of critical facilities outside of the 500 year floodplain is one such approach.

Cost Impact: The code change proposal may increase the cost of construction.
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105 - Code: IGCC –12-14

Proponent: Name/Company/Representing (3.3.1): Alan Lulloff, Association of State Floodplain Managers and John McShane, US Environmental Protection Agency

Revise as follows:

Table 302.1

<table>
<thead>
<tr>
<th>Requirements Determined by the Jurisdiction</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>402.2.1 Flood hazard area preservation, general</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>402.2.2 Flood hazard area preservation, specific</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>402.2.3 Flood hazard area preservation, limitation on fill</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

402.2. Flood hazard areas. For locations within flood hazard areas, unless compliance with Section 402.2.1, or Section 402.2.2, or Section 402.2.3 is required by Table 302.1, new buildings and structures and substantial improvements shall comply with Section 402.2.4.

402.2.1 Flood hazard area preservation, general. Where this section is indicated to be applicable in Table 302.1, new buildings and structures, site disturbance, and development of land shall be prohibited within flood hazard areas.

402.2.2 Flood hazard area preservation, specific. Where this section is indicated to be applicable in Table 302.1, new buildings and structures, site disturbance, and development of land shall be prohibited within the specific flood hazard areas established pursuant to local land use authority.

402.2.3 Flood hazard area preservation, limitation on fill. Where this section is indicated to be applicable in Table 302.1, use of fill to support slab-on-grade foundations for new buildings and structures and substantial improvements shall not be permitted.

402.2.4 Development in flood hazard areas. New buildings, structures and substantial improvements constructed in flood hazard areas shall be in compliance with Section 1612 of the International Building Code provided the lowest floors are elevated or dry floodproofed to not less than 1 foot (305 mm) above the elevation required by Section 1612 of the International Building Code, or the elevation established by the jurisdiction, whichever is higher.

Reason: Fill used to elevate buildings in flood hazard areas can cause adverse environmental impacts. Most communities specify a maximum 2:1 slope for fill, in part to make lawn maintenance safer. That slope requirement can lead to significant areas of ground disturbance, loss of mature trees, and possible wetlands encroachment. Changes in drainage patterns can increase flooding of neighboring properties, creating liability for damage. Fill that is used to elevate buildings on slab foundations may slump when saturated or be eroded by moving flood waters, leading to structural damage when the slab is unsupported. For these reasons, some communities elect to limit the use of fill. This proposal gives communities that option, which has the added benefit of reinforcing other measures to preserve natural resources specified in Section 402. The National Flood Insurance Program’s Community Rating System...
International Green Construction Code (IgCC) Revision Process

provides credits to communities that limit the use of fill, helping to reduce the cost of flood insurance for all property owners in those communities.

Cost Impact: This proposal could lower costs because, on average, elevating buildings on fill costs more than elevating buildings on other types of foundations.

106 - Code: IGCC –12-14

Code Sections/Tables/ Figures Proposed for Revision (3.3.2); 202, 402.2.3

Proponent: Name/Company/Representing (3.3.1):

Alan Luloff, Association of State Floodplain Managers and John McShane, US Environmental Protection Agency

Add new definitions to Section 202 as follows:

FLOOD INSURANCE RATE MAP (FIRM). An official map of a community on which the Federal Emergency Management Agency (FEMA) has delineated both the special flood hazard areas and the risk premium zones applicable to the community.

SPECIAL FLOOD HAZARD AREA. The land area subject to flood hazards and shown on a Flood Insurance Rate Map or other flood hazard map as Zone A, AE, A1-30, A99, AR, AO, AH, V, VO, VE, or V1-30.

Revise as follows:

402.2.3 Development in flood hazard areas. New buildings, structures and substantial improvements constructed in flood hazard areas shall be in compliance with Section 1612 of the International Building Code provided the lowest floors are elevated or dry floodproofed to not less than 1 foot (305 mm) above the elevation required by Section 1612 of the International Building Code, or the elevation established by the jurisdiction, whichever is higher and, if located in riverine flood hazard areas, it has been demonstrated through hydrologic and hydraulic analyses performed by a registered design professional in accordance with standard engineering practice that the proposed buildings and structures, including associated grading or fill, when combined with all other existing and potential future flood hazard area encroachments, will not result in any increase in flood levels during the occurrence of the design flood and will not increase the floodwater velocity at the project site.

Exception: New buildings, structures and substantial improvements in flood hazard areas designated on the Flood Insurance Rate Map as Zone AO or Zone AH.

Reason:
The costs of recovering from floods are the highest of all natural disasters and even with substantial federal, state and local government risk management efforts damage costs are on a steady upward trend. One of the reasons that the costs associated with flood recovery are increasing is encroachments into the floodplain (Galloway, 2013). Current minimum standards of the National Flood Insurance Program and the International Code Series -- and the current *International green Construction Code* -- allow encroachments into riverine floodplains that can cause up to a foot of increased flooding (see figure 1 below). These encroachments on-average pinch in conveyance areas to half their normal width, increase flood velocities by one-third and cause the extent of the flood hazard area to increase by 10 percent (Lulloff, 2013).

![Figure 1- impact of encroachments into riverine flood hazard areas](image)

It is important to note that this section, as written, only applies in riverine flood hazard areas, not in areas subject to coastal flooding where encroachments such as fill do not affect the base flood elevation in the same way they affect riverine floodplains.

The engineering analysis methods required by these revisions are routinely used by civil engineers and the engineering models used are available in the public domain. FEMA provides guidance on the use of these engineering models on their web site. The engineer conducting the analysis basically runs the analysis without the proposed encroachment (pre-development condition), and then uses the model to show the effect of the encroachment. The engineering model output shows the resulting differences in both flood elevations and flow velocities.

Construction that encroaches into the floodplain negatively impacts floodplain ecosystems and infringes upon the property rights of others by increasing flooding for existing development. A basic property legal principle that dates back to ancient Justinian (Roman) law is: “Sic utere tuo ut alienum non laedas”, or “so use your own property that you do not injure others”. Allowing new development that increases flood elevations and velocities on existing development injures others and therefore violates their property rights. (Kusler and Thomas, 2007; Thomas and Medlock,
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2008) In addition, construction that encroaches into the floodplain is a public safety concern. Not only does it risk the health and safety of homeowners and their neighbors it puts at risk emergency response personnel that are called upon to rescue people trapped by flood water. More deaths are caused by flooding than any other natural disaster even though there is better knowledge about where flooding will occur than where tornados will strike, where forest fires will flare up and where the earth will quake.

Allowing new development to encroach into floodplains and increase flood elevations also impacts that long-term viability of the community. Allowing increased flooding increases costs for maintaining infrastructure (roads, bridges, sewer and water, pumping stations) and often results in blighted areas and commercial operations being closed for periods of time.

This revision is consistent with the National Flood Insurance Program which explicitly supports community standards that are higher than the federal minimum. One of the mechanisms FEMA uses to provide financial incentives to communities that adopt higher standards is the Community Rating System (CRS). Communities that adopt this component of the IgCC could be eligible for up to 110 points under the CRS program. Seven States and significant number of communities have restrictions on encroachments that go beyond the federal minimum.

These code revisions will help ensure that this “green” building code serves to prevent building construction that increases flooding on existing development or negatively impacts floodplain ecosystems. It should be noted that while these revisions minimize adverse impacts there are areas of the SFHA in which there is little or no velocity and therefore these revisions will not preclude any and all development in the SFHA.

The proposal in Section 402.2.3 closes an often exploited aspect of hydrologic and hydraulic analyses that allows an engineer to manipulate the roughness coefficient to obtain favorable results. For example, if an analysis shows that a proposed development with encroachment will increase flooding by a 0.3 of a foot trees could be removed to decrease friction to offset the increase. However, in doing so the flood water is sped up - in other words the velocity is increased (which in itself is a hazard because of increased scour, erosion, and hydrodynamic loads). Requiring no increase in flood velocity in addition to no increase in flood elevation closes this loop hole.

Bibliography:


Thomas, Edward and Medlock, Samantha, 2008, Mitigating Misery: Land Use and Protection of Property Rights Before the Next Big Flood.
Cost Impact: The code change proposal may increase the cost of construction.

In floodplains where the NFIP and the I-Codes already require analysis of the effect of encroachments there will be no additional cost associated with preparation of the analysis. There is an additional cost in the other areas. Long term cost savings to the homeowner and community could be substantial due to reduced flood damages recognizing that in some instances items damaged are irreplaceable (family heirlooms, photographs, etc.).