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Expanding the Mitigation Toolbox: The Demolish/Rebuild Option

This is a position paper prepared by the Association of State Floodplain Managers, (ASFPM), a non-profit professional organization dedicated to the reduction of flood losses in the United States.

The Association of State Floodplain Managers (ASFPM) fully supports the Federal Emergency Management Agency's (FEMA's) hazard mitigation efforts and programs. Technical expertise and funding for an array of mitigation options and a full mitigation "toolbox" are important to communities throughout the nation who are facing increasingly complex combinations of hazards and environmental, economic, and social issues. States and communities must have the flexibility to choose among alternative mitigation options, within sensible guidelines, to tailor an approach that addresses their unique situations as they work to become more resilient in the face of the threat of disasters.

The Mitigation Committee of the ASFPM developed this white paper based on comments both from its members and from mitigation professionals across the nation, which has been adopted by the ASFPM Board of Directors. The following discussion summarizes the reasons for adding the demolish/rebuild option to the mitigation toolbox used by floodplain managers.

Background

The flood hazard mitigation toolbox has been expanding as knowledge of mitigation techniques has deepened. This has been especially true since the advent of the various mitigation programs administered by FEMA. The Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (P.L. 93-288), and subsequent regulations, allow federal funding to be used for many different types of mitigation techniques provided that those techniques:

- Meet certain criteria of cost effectiveness;
- Reduce the risk of future damage, hardship, loss, or suffering;
- Address a problem that has been repetitive or one that poses a significant risk to public health and safety if left unresolved;
- Have been determined to be the most practical, effective, and environmentally sound solution;
- Contribute to a long-term solution; and

- Consider long-term changes to the areas and entities they protect (44 *CFR* 206.434(c)).

That section of the regulations goes on to identify examples of types of acceptable mitigation projects but also clearly indicates that eligibility for federal mitigation funding is not limited to the examples given. Thus, it can be concluded that the regulations anticipate the inclusion of new mitigation techniques provided that they can meet the aforementioned criteria. This interpretation is further substantiated by the February 15, 2006, Policy Memorandum from David Maurstad, Director of FEMA's Mitigation Division, which confirms the use of a technique called "HMGP reconstruction," which is essentially demolish/rebuild on a large-scale pilot basis in the areas affected by Hurricanes Katrina, Rita, and Wilma, with funding provided under FEMA's Hazard Mitigation Grant Program (HMGP).

The Flood Insurance Reform Act of 2004 (P.L. 108-264) was the first statutory recognition of a mitigation option that involves the "demolition and rebuilding of properties to at least base flood elevation" (42 *U.S.C.* 4102 §1362A), more often called "demolish/rebuild." This concept has been tested for several years in pilot projects along the Gulf Coast. Jefferson Parish, Louisiana, used the technique successfully as a pilot project under FEMA's Flood Mitigation Assistance (FMA) program, and it has been piloted in different Florida communities as well. It has also been used extensively by the Huntington District of the U.S. Army Corps of Engineers (West Virginia) under its Section 202 authority (Section 202 of the Energy and Water Development Act of 1981 (P.L. 96-367) was enacted after severe flooding in the Big Sandy and Cumberland River basins in 1977). Most recently, demolish/rebuild is being piloted on a large scale in the Gulf Coast states under FEMA's HMGP program, although in that pilot the technique is called "mitigation reconstruction."

In its basic form, demolish/rebuild is a mitigation technique that provides an amount of funding to a property owner toward the cost of demolishing a structure and replacing it with a new structure on the same lot. The new structure must be constructed to meet existing flood and other hazard and building codes. In most instances, this involves elevating the new structure as one of the mitigation measures.

To date, the implementation of the demolish/rebuild technique has been restricted in several ways, making it unique as a mitigation option:

- It has not been automatically eligible for funding under most programs, but instead has been allowable only if certain criteria are met,*
- It has been disallowed in certain high hazard areas, and
- It has required detailed feasibility and cost analysis and comparison with other mitigation options before approval and construction.

Mitigation Options are Needed

Many lessons have been learned from the development and implementation of mitigation projects, especially since the Stafford Act first authorized mitigation projects under the HMGP. The ASFPM has long been an advocate both for mitigation and for an expandable mitigation "toolbox" from which states and communities can choose appropriate options to address the

* Other mitigation options are also subject to certain criteria. For example, under FEMA mitigation programs, dry floodproofing is only allowable for non-residential structures.

unique characteristics of the hazards and other issues they face. Alternatives to acquisition, elevation in place, and the other more common approaches are increasingly important in the continuing evolution of hazard mitigation practices.

A major consideration in many areas of the country is that it not may be feasible to elevate an older structure in place because the building is structurally unsound and therefore cannot be elevated, or if it is marginally feasible to elevate, and that may not be the wisest mitigation solution in all cases. Older buildings tend to have known or potential deficiencies in their structure, foundation, wiring, or plumbing. Because of improvements in building codes and construction techniques, a new elevated structure on the same site not only will be protected from floods but also will have a stronger foundation, be safer and code compliant overall, and be more likely to withstand other hazards as well.

One lesson has been that some communities are resistant to acquisition as a mitigation technique, and thus may refuse to participate in the mitigation program. Some of these communities have small and stable populations and limited space available for development—either because their developable area is fully built out or because of topographic considerations. Community officials in these situations do not want acquisition projects undertaken because the local tax base will be reduced when the acquired property is placed in open space in perpetuity and there is no new development to compensate for the loss of tax revenue on the acquired parcels. In addition, if enough residents were to relocate, the community could experience a diminished ability to provide adequate public services, be forced to default on financial obligations such as infrastructure investments, or even cease to exist. In fact, a community in Ohio was reported to have come close to defaulting on a loan it had taken for improvements to its wastewater treatment plant after several successful HMGP acquisition projects altered the community's financial status. In addition, many difficult issues must be faced—as they were after the 1993 Midwest floods, in balancing the acquisition of commercial structures against the impacts on small rural communities of the loss of those businesses.

Similarly, in many small communities or close-knit neighborhoods, a social element influences a property owner's decision to participate in a mitigation project. Some property owners, even those that are repetitively flooded, will refuse to move to another location. The sense of place, community, friends, family, and even the unavailability of comparable housing in the community all are given as reasons to opt out of an acquisition project. Research has documented the feeling of displacement or loss of community that people experience after having to relocate because of a disaster. This was seen in St. Charles, Missouri, after the 1993 Midwest floods and can be devastating to the point of being a factor in death rates.

Using a New Mitigation Technique

Three different projects using the demolition/rebuild mitigation option are explained below. Although each project had different parameters, restrictions, and criteria; they all included the demolition of an existing building (either substantially or in its entirety) and the construction of a new one on the same site. The two pilot projects conducted by FEMA were done over the past several years. However, the Corps of Engineers' program is more than 25 years old.

The Corps' "Replacement Option"

The Corps of Engineers' "replacement option," available with projects implemented under the agency's Section 202 authority (which is limited to two basins in West Virginia and Kentucky), is essentially a demolish/rebuild technique. According to the Corps, when it determines that, because of structural deficiencies, a structure cannot be "floodproofed"* in ways other than to use the replacement option, the Corps is left with the acquisition option. In this situation, the property owner may ask for the "buy up to rebuild" option, in which the Corps evaluates demolishing the home and replacing it with a new elevated home, comparable in size to the existing one. The cost of the replacement option must be less than the cost of acquisition plus standard relocation benefits before it will be considered (U.S. Army Corps of Engineers, n.d.).

Replacement cannot be used if the home is located in a floodway or if it must be elevated more than 12 feet, so the only option available in that case is acquisition. Also, if a structure does not have an approved sanitation disposal system and one cannot be provided as part of the floodproofing option, the only option is acquisition. Finally, the structure must be elevated to 1 foot above the 1977 flood, the flood of record in that area.

One interesting aspect of the Corps' approach to the replacement option is that a design team, not the local community, conducts a site evaluation to determine the feasibility of various floodproofing options. A determination must be made that the building is structurally unsound and therefore cannot be elevated. Another unique aspect of this particular Corps program is that these mitigation projects, regardless of the mitigation technique used, are not required to have a benefit/cost (B/C) ratio greater than one. The authorizing language in Section 202 states that all projects funded under that section are to be cost beneficial. However, the process set up by the Corps results in only the most cost-effective and technically feasible floodproofing option being offered to the homeowner. If the government makes an offer of floodproofing using a technique other than replacement, the replacement option is not allowed.

Homeowners are made aware that the purpose of floodproofing their home, whether by elevation or replacement, is to protect the building from future flood damage, not to make improvements to the home at government expense. However, homeowners are allowed to contribute additional funds to make improvements to the home, and many have done so. The homeowner is responsible for all costs that exceed the government offer.

The Huntington District has used the replacement option extensively in the Tug Fork Valley. Corps officials conducting a technical field tour of the project during the ASFPM's 2005 National Floodproofing Conference indicated that problems with the replacement technique are the same as those experienced with traditional elevation—conversion of uninhabitable space into habitable space below the first floor (which was designed to be a storage area or garage below the replacement structure) and local enforcement of floodplain management requirements to limit these conversions. They indicated that anticipated problems with the perception that the government was "building new homes" did not materialize. Some credit for that success may be due to having established very clear requirements for circumstances in which the option could or could not be used. Although Corps officials indicated that there were instances of property owners' selling their homes after they had been replaced, those cases were infrequent and flood risk to the structure still was reduced.

* In this context, floodproofing includes the techniques of elevation in place, moved on site, dry floodproofing, construction of a ringwall or levee, replacement, or a combination of these.

Two positive aspects of this program are that, first, people are able to remain within their communities and second, homeowners were often willing to use personal funds to pay for improvements beyond those provided by the government funds. These factors led to the enhancement of the local housing stock, an increase in the community's tax base, and social stability in the community.

FEMA's Pilot Project in Jefferson Parish

Over the last several years Jefferson Parish, Louisiana, FEMA headquarters, and FEMA Region VI have been exploring the potential for an alternative or additional method of mitigation besides the traditional acquisition and elevation programs. In July 2002 the negotiations were finalized in the creation of the FEMA Pilot Program Test Project (Demo/Rebuild). The prerequisites for this alternative were that designated homeowners would be required to demolish the structure; the structure would be rebuilt at 2 feet above the base flood elevation (BFE) or 2 feet above the highest flood level experienced, whichever was higher; the new structure would be restricted to the footprint of the former structure (i.e., not exceed the gross square footage living area); and the original structure, the land, or the rebuilt structure would not be sold until the project was completed and evaluated by appropriate FEMA and Parish officials.

Six target "repetitive loss" structures were identified, based on criteria outlined by FEMA Region VI, and formal structure appraisals were conducted using Parish-sponsored funding. Parish officials contacted all six homeowners for a meeting to discuss the possibility of their participation in the project. The next step was the signature of a homeowner agreement outlining the project history, prerequisites, cost responsibilities, and pertinent hold-harmless and liability requirements. Appropriate title restrictions were placed on the properties, especially the requirement for building at 2 feet above BFE or above the highest previous flood level. This was critical because this requirement exceeds the Parish's normal code standards and would affect any future homeowner's plans to remodel or add on to the structure.

Three structures participated in the pilot. Parish officials consider the progress of the project to have been very favorable and that it has created a win-win-win situation for the National Flood Insurance Program/FEMA, the Parish, and most importantly, the homeowner. It has been observed that the ideal participant is a homeowner who does not have a current mortgage or has a minimal balance remaining on the mortgage (less than \$50,000). This mitigation technique is considered to be less attractive to a homeowner with a large mortgage or multiple mortgages already existing on the structure.

The table below compares the cost for the demolition/rebuild option vs. elevation in place for the Jefferson Parish pilot.

Structure No.	Demo-Rebuild Cost	Elevation-in-Place Cost	Cost Difference for Demo/Rebuild
1	\$ 85,100	\$ 77,000	+ \$ 8,100
2	\$ 103,575	\$ 85,100	+ \$ 18,475
3	\$ 165,300	\$ 136,500	+ \$ 28,800

Demolition-rebuild was somewhat more expensive than traditional elevation. However, the elevation-in-place figures were based on a general cost estimate of \$75.00 per square foot. Also, in this particular project, the structures are rebuilt 2 feet above BFE while the current requirement for traditional elevation projects is only 1 foot above BFE.

FEMA's Pilot Projects in Florida

The demolish/rebuild concept in Florida began as a Flood Mitigation Assistance project that could not be completed under normal circumstances. The project, which included the removal of a roof, addition of a second story, and abandonment of the first story for uses other than parking/storage, could not be finished because of unforeseen problems with the existing foundation. As a result, the structure was allowed to be demolished and rebuilt so the mitigation measures could be completed. From this beginning, it was determined that such an option might be suitable for those property owners who had no other options to mitigate their repetitively flooded structures. Initially FEMA and the state took the position that if the structure could be elevated, then demolish/rebuild was not an available option.

However, such a position proved problematic. A project application from a property owner in Palm Beach showed the cost of a proposed demolish/rebuild project to be about \$64,000. FEMA and the state required that, before demolish/rebuild could be considered, the property owner had to provide documentation that the building was structurally unsound and could not be elevated. After consulting with a builder and engineer, the property owner determined that the building was structurally sound and could be elevated, but the estimated cost of that option was \$97,000. From a cost-effectiveness standpoint, it was certainly preferable to demolish and rebuild the structure. FEMA and the state concluded that, for certain structures, demolish/rebuild could be a more cost-effective option.

After other experiences, it was soon determined that demolish/rebuild projects in Florida would only be undertaken if

1. The property owner submitted both cost estimates for a demolish/rebuild and an elevation project so that a cost-effectiveness comparison could be made. If the demolish/rebuild project was considerably less expensive than an elevation project, the demolish/rebuild project would be approved.
2. Demolish/rebuild projects must meet the FEMA-approved benefit/cost ratio of 1.0 or greater.
3. The property owner would only receive a new foundation and the shell of a new house (rough electrical, rough plumbing, etc). Any additional construction would be at the homeowner's expense.
4. The new structure would be approximately the same size as the existing structure.
5. The new project would not make the homeowner substantially better off than he/she would have been if the structure had been elevated.
6. All costs would be screened for eligibility. Cost estimates must be sufficiently detailed so that an eligibility review could be conducted.

Action Recommendations

Mitigation is absolutely necessary to reduce the flood hazard risk to existing housing stocks across the nation. The ASFPM believes that an array of mitigation options should be available to ensure that this can be done.

- The demolish/rebuild option should be available as a mitigation technique across all FEMA mitigation programs, provided that there are clear guidelines showing when and how it can be used. With such conditions, demolish/rebuild can be another effective mitigation tool. The ASFPM suggests the following guidelines:
 - **Site restrictions**—There should be site and elevation restrictions that dictate when the demolish/rebuild option can be considered. Demolish/rebuild should be disallowed in all floodways and V zones.
 - **Consistency with community plans**—Demolish/rebuild must be compatible with community plans including comprehensive plans, zoning plans, capital improvement plans, coastal zone management plans and local mitigation plans. If the community mitigation plan indicates that the neighborhood is slated for acquisition/relocation, for example, demolish/rebuild should not be an available option. Similarly, if a comprehensive plan identifies an area as conservation area or one where existing houses are considered non-conforming uses, demolish/rebuild should not be used.
 - **Conditions for rebuilding of the structure**—The structure should be rebuilt ensuring that local flood codes and other building and hazard codes are met. Demolished/rebuilt homes should incorporate at least 2 feet of freeboard or that required by the community code, whichever is greater. The demolish/rebuild option should provide for a modest, no-frills complete home (including basic finishes, but not including furnishings). Other mitigation options (elevation, relocation, acquisition) result in a complete housing unit. FEMA needs to develop a realistic policy that results in the construction of a basic home complete with what would normally be included in the purchase of a home on the private market. Otherwise, the demolish/rebuilt option may be unacceptable to homeowners and thus ineffective as a mitigation technique. Finally, in instances where FEMA or any other agency publishes advisory flood data that indicates flood elevations higher than those currently adopted, participation in the mitigation program should be tied to the use of the new data.
 - **Cost analysis**—A cost and feasibility analysis should be done to compare the option of elevating the structure vs. demolishing and rebuilding it. If it is found to be cost effective, demolish/rebuild should be considered an option. The Florida experience illustrates an important lesson: although it may be feasible to elevate a building, it may be significantly more expensive to do so. There should be flexibility in allowing demolish/rebuild if it would result in significant cost-savings or at least be no more than costs compared to elevating the building.
- After disasters, FEMA should analyze the performance of structures to which the demolish/rebuild mitigation technique was applied. Were any of the Florida structures or those in Jefferson Parish affected by the hurricanes of the last two years? If so, how did they fare? FEMA should provide for analyses of these structures to yield background information for future policymaking.

- FEMA should draw upon the expertise of the Corps in developing policies on the demolish/rebuild technique. Based on Corps experience, it does not appear that there are significant public perception issues with the government's providing a basic home. Also, the Corps has considerable practical experience in implementing this mitigation measure.

Benefits of using Demolish/Rebuild

Although it is similar to elevation, the demolish/rebuild option offers several benefits:

- The entire structure would be fully code compliant. With elevation of an older structure, the flood code standards would be met, but wind, electrical, seismic and other standards may not be achieved. This is especially important where there are significant seismic or wind hazards.
- The community will benefit from the addition of improved housing stock.
- Residents will enjoy improved living conditions.
- The community's tax base will be strengthened because of the increased value of the new structure(s).
- A sense of community will be maintained, and the physical community will be preserved.

The demolish/rebuild technique provides another mitigation option that can be exercised by communities when appropriate. It may be a preferred choice when considered along with community goals, property owner compatibility, and the standards of appropriate mitigation measures under the Stafford Act.

Resources

Federal Emergency Management Agency. n.d. "Demolition/Rebuild Concept/Pilot Program." Memorandum.

Federal Emergency Management Agency. January 2004. "FEMA Region IV Policy: Modified Elevation Projects." Memorandum.

U.S. Army Corps of Engineers. September 2005. "Technical Field Tour – Tug Fork Valley." Brochure published by the Huntington District for the Association of State Floodplain Managers National Floodproofing Conference III.

U.S. Army Corps of Engineers. n.d. "Flood-proofing Program." Brochure published by the Huntington District.