Selecting Appropriate Mitigation Measures for Floodprone Structures

Information Packet

This information packet includes the following documents:

- Technical Considerations Scorecard (Worksheet A)
- Appropriate Mitigation Measures (Worksheet B)
- Initial Consultation with Property Owner (Worksheet C)
- Preliminary Cost Estimating Worksheet (Worksheet D)
- NT Basic Report

Date Prepared: July 24, 2006 Date Property Visited: July 13, 2006

Property Owner Name: Janet Wilson

Property Address: 19000 Main Street, Roanoke, VA 20202-6689

Repetitive Loss Property Locator Number: 1234567

Prepared by: Bryant Shea

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Worksheet A: Technical Considerations Scorecard

Date Prepared: July 24, 2006 Date Property Visited: July 13, 2006
Property Owner Name: Janet Wilson
Property Address: 19000 Main Street, Roanoke, VA 20202-6689
Repetitive Loss Property Locator Number: 1234567
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Legend
- Mitigation measure is not appropriate.
- Mitigation measure may be appropriate and requires additional consideration.
- Mitigation measure is appropriate.

NT Reference indicates where the information may be found in the National Tool.

Instructions to complete Worksheet A: Technical Considerations Scorecard

1. For each of the questions, based on the property information, put a check mark in the appropriate box in the "Response" column.
2. For the row with a check mark in the "Response" column, check all boxes that are not blacked out.
3. After completing the questions, review each of the mitigation measures columns. Select the "Appropriate Mitigation Measures" box only for those columns that do not have any blacked out boxes in the selected response row.

Question	Response	Drainage Improvements	Barriers	Wet Floodproofing	Dry Floodproofing	Elevation	Relocation	Acquisition	Comments
1. What is the structure type? *NT Reference - Limited Data View, Site Observations* tab	☐ Wood Frame/ Metal/ Other	☐	☐	☐	☐	☐	☐	☐	
	☒ Concrete/ Masonry/ Brick Faced	☒	☒	☒	☒	☒	☒	☒	Could be expensive, requires bracing
	☐ Manufactured Home	☐	☐			☐	☐	☐	
2. What is the condition of the structure? *NT Reference - Limited Data View, Site Observations* tab	☒ Good	☒	☒	☒	☒	☒	☒	☒	
	☐ Fair	☐	☐	☐	☐	☐	☐	☐	
	☐ Poor	☐	☐					☐	
3. What is the foundation type? *NT Reference - Limited Data View, Site Observations* tab Diagram numbers refer to Elevation Certificate found in the NT.	☐ Slab-on-grade (Diagram 1, 3, 6, or 7)	☐	☐	☐	☐	☐	☐	☐	
	☒ Basement/ Split level (Diagram 2 or 4)	☒	☒	☒	☒	☒	☒	☒	Pressure could cause foundation damage
	☐ Piers, Posts, Columns, or Crawlspace (Diagram 5 or 8)	☐	☐	☐		☐	☐	☐	

Question	Response	Drainage Improvements	Barriers	Wet Floodproofing	Dry Floodproofing	Elevation	Relocation	Acquisition	Comments
4. What is the number of stories? *NT Reference - Limited Data View, Site Observations* tab	☒ 1-2	☒	☒	☒	☒	☒	☒	☒	Structure has two stories
	☐ 3 or more	☐	☐	☐	☐	☐	☐	☐	
5. What is the building footprint? *NT Reference - Detailed Data View, Additional Site Information* tab	☒ < 2,500 sq ft	☒	☒	☒	☒	☒	☒	☒	Building footprint is 2,000 sq ft.
	☐ > 2,500 sq ft	☐	☐	☐	☐	☐	☐	☐	
6. What is the flood protection depth? *NT Reference - Detailed Data View, Elevation and Hazard* tab	☒ Deep (> 6ft)		☒			☒	☒	☒	Depth of 100 yr flood is 7 ft, plus 1 ft freeboard
	☐ Moderate (3 to 6 ft)	☐	☐	☐		☐	☐	☐	
	☐ Shallow (<3 ft)	☐	☐	☐	☐	☐	☐	☐	
7. Does flash flooding occur at the project site? *NT Reference - Detailed Data View, Elevation and Hazard* tab	☒ Yes	☒	☒	☒	☒	☒	☒	☒	Source is NOAA website
	☐ No	☐	☐	☐	☐	☐	☐	☐	
8. What is the flood velocity? *NT Reference - Detailed Data View, Elevation and Hazard* tab	☒ Fast (>5 fps)	☒	☒	☒	☒	☒	☒	☒	
	☐ Slow/Moderate (<5 fps)	☐	☐	☐	☐	☐	☐	☐	
9. Is the structure located in the floodway? *NT Reference - Detailed Data View, Elevation and Hazard* tab	☐ Yes	☐	☐	☐	☐	☐	☐	☐	
	☒ No	☒	☒	☒	☒	☒	☒	☒	
Appropriate Mitigation Measures		☐	☒	☐	☐	☒	☒	☒	

fps = feet per second

ft = feet

sq ft = square feet

Worksheet B: Appropriate Mitigation Measures

Date Prepared: July 24, 2006 Date Property Visited: July 13, 2006
Property Owner Name: Janet Wilson
Property Address: 19000 Main Street, Roanoke VA 20202-6689
Repetitive Loss Property Locator Number: 1234567
Prepared by: Bryant Shea

Instructions to complete Worksheet B: Appropriate Mitigation Measures

1. List the mitigation measures from the "Appropriate Mitigation Measures" row from Worksheet A, Technical Considerations Scorecard (all checked boxes in last row of Worksheet A).
2. Using information from Chapters 4 through 10 of FEMA 551, *Selecting Appropriate Mitigation Measures for Floodprone Structures,* rank each measure as High, Moderate, or Low. See "Tips to Rank Mitigation Measures" on the next page for additional information.
3. Check the appropriate box (High, Moderate, or Low) under each of the decision factors.
4. Total the points for each mitigation measure. **The LOWEST total points indicates the most appropriate mitigation measure(s).**
5. Include notes describing how the determination was made for a particular ranking.

*NOTE: Since Technical Considerations and Relative Costs are more significant in selecting appropriate mitigation measure(s), they are weighted higher than Human Intervention and Annual Maintenance.

Decision Factors – LOWEST score is most appropriate – See Reverse for Notes					
Mitigation Measures	**Technical Considerations***	**Relative Costs***	**Human Intervention**	**Annual Maintenance**	**Total Score**
Barriers	H ☒ (6 pts) M ☐ (4 pts) L ☐ (2 pts)	H ☐ (6 pts) M ☐ (4 pts) L ☒ (2 pts)	H ☒ (3 pts) M ☐ (2 pts) L ☐ (1 pts)	H ☐ (3 pts) M ☒ (2 pts) L ☐ (1 pts)	13 pts
Elevation	H ☒ (6 pts) M ☐ (4 pts) L ☐ (2 pts)	H ☐ (6 pts) M ☒ (4 pts) L ☐ (2 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☒ (1 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☒ (1 pts)	12 pts
Relocation	H ☐ (6 pts) M ☒ (4 pts) L ☐ (2 pts)	H ☐ (6 pts) M ☒ (4 pts) L ☐ (2 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☒ (1 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☒ (1 pts)	10 pts
Acquisition	H ☐ (6 pts) M ☐ (4 pts) L ☒ (2 pts)	H ☐ (6 pts) M ☒ (4 pts) L ☐ (2 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☒ (1 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☒ (1 pts)	8 pts
__________	H ☐ (6 pts) M ☐ (4 pts) L ☐ (2 pts)	H ☐ (6 pts) M ☐ (4 pts) L ☐ (2 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☐ (1 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☐ (1 pts)	__ pts
__________	H ☐ (6 pts) M ☐ (4 pts) L ☐ (2 pts)	H ☐ (6 pts) M ☐ (4 pts) L ☐ (2 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☐ (1 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☐ (1 pts)	__ pts
__________	H ☐ (6 pts) M ☐ (4 pts) L ☐ (2 pts)	H ☐ (6 pts) M ☐ (4 pts) L ☐ (2 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☐ (1 pts)	H ☐ (3 pts) M ☐ (2 pts) L ☐ (1 pts)	__ pts

Tips to Rank Mitigation Measures (Worksheet B Cont.)

Technical Considerations

Use the responses in Worksheet A, Technical Considerations Scorecard, to determine a ranking of High, Moderate, or Low for each mitigation measure.

- If there are no grayed out boxes checked for a mitigation measure, the technical consideration ranking is Low.
- If there are 1 or 2 grayed out boxes checked for a mitigation measure, the technical consideration score is Moderate.
- If there are 3 or more grayed out boxes checked for a mitigation measure, the technical consideration score is High.

List any considerations in the implementation process that could be a limiting factor or clear constraint in the Notes section.

Relative Costs

Rank each of the mitigation measures based on the estimated cost to address the flood risk and the likelihood of cost-effectiveness. Chapters 4 through 10 and Appendix D include information to rank each mitigation measure based on FEMA 312, *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House From Flooding*, and FEMA 259, *Engineering Principles and Practices of Retrofitting Floodprone Residential Structures*. Low relative cost indicates Low ranking and high relative cost indicates High ranking.

Need for Human Intervention

This reflects the need for human intervention to operate the mitigation measure and the warning time to conduct the required activity. Generally, the more "passive" the system (i.e., requiring the least human interaction), the more reliable the system will be over time, thereby resulting in a Low ranking. Mitigation measures that require human intervention, such as barriers and dry floodproofing, receive a High ranking,.

Need for Annual Maintenance

This reflects the level of effort of annual maintenance required by each mitigation measure. Similar to human intevention, less annual maintenance results in a Low ranking.

NOTE: If two or more mitigation measures tie with the lowest score, other decision factors should be considered in determining the most appropriate mitigation measure(s). These considerations include, but are not limited to aesthetics; access to site; housing of occupants during the project; compliance with all applicable codes, ordinances, and regulations; historic preservation concerns; and availability of contractors.

The other decision factors should be listed in the Comments section of Worksheet C.

NOTES:

Mitigation Measures	Technical Considerations
Barriers	Technical considerations include depth and velocity of flood and flash flooding (see Worksheet A). Estimated cost of constructing a floodwall or levee will be low and the likelihood of cost-effectiveness is High for small barrier – relative cost ranking is Low (approximately $25,000 for a 4-foot levee and $35,000 for a 4-foot floodwall based on FEMA 312). Human intervention is High since the property owner must be able to install flood gates as a flood event occurs and adequate warning time must be provided. Flash flooding occurs at the project site, therefore barriers will be ranked as High for human intervention. Annual maintenance is required by the property owner to check the barrier for leaks and will be Moderate.
Elevation	Technical considerations include structure type (masonry), foundation type (basement), and flood velocity (> 5 fps) (see Worksheet A). Estimated cost to elevate 8 feet to BFE is Moderate (approximately $83,000) based on the estimate from FEMA 312 and the likelihood of cost-effectiveness is Moderate – relative cost ranking is Moderate. Little or no human intervention is required once the structure has been elevated and is therefore ranked Low. Annual maintenance of an elevated structure will be minimal; ranking is set as Low.
Relocation	Technical considerations include structure type (masonry) (see Worksheet A). Relative cost to relocate a masonry structure on a basement foundation to a site less than 5 miles away on the same type of foundation is Moderate (approximately $128,000) and the likelihood of cost-effectiveness is Moderate – relative cost ranking is Moderate. Human intervention is not required once the structure has been relocated from the floodprone site. Low ranking. Annual maintenance for a relocated or acquired property includes maintenance of the abandoned site by the community, ranking is Low.
Acquisition	Technical considerations – none. Low ranking (see Worksheet A). Estimated cost is High (see Worksheet D for sample cost estimate) and the likelihood of cost-effectiveness is High – relative cost ranking is moderate. Human intervention is not required once the structure has been acquired. Low ranking. Annual maintenance for a relocated or acquired property includes maintenance of the abandoned site by the community, ranking is Low.

Worksheet C: Initial Consultation with Property Owner

Date Prepared: July 24, 2006 Consultation Date: August 1, 2006
Property Owner Name: Janet Wilson
Property Address: 19000 Main Street, Roanoke, VA 20202-6689
Repetitive Loss Property Locator Number: 1234567
Prepared by: Bryant Shea

Instructions to complete Worksheet C: Initial Consultation with Property Owner

1. Record recommended mitigation measure(s) with the lowest score from Worksheet B and include any comments for the discussion with the property owner.
2. Record property owner's response to recommended mitigation measure(s).
3. If an appropriate mitigation measure has been agreed upon, record it under "Property Owner Preferred Mitigation Measure(s)". A detailed cost estimate and/or benefit/cost analysis (BCA) will be necessary to ensure the preferred mitigation measure is appropriate. The cost analysis and additional required actions are recorded under "Action Items for Follow-Up."

Recommended Mitigation Measure(s)

- ☐ Drainage Improvements
- ☐ Barriers
- ☐ Dry Floodproofing
- ☐ Wet Floodproofing
- ☐ Elevation
- ☐ Relocation
- ☒ Acquisition

Comments

Acquisition is the recommended mitigation measure. Elevation and relocation are alternate mitigation measures. In order to select the most appropriate mitigation measure, the following decision factors should be discussed with the property owner: aesthetic concerns, housing of occupants during the project, compliance with all applicable codes, regulations and ordinances, and access to the site.

Response from Property Owner

Property Owner Preferred Mitigation Measure(s)

Action Items for Follow-Up

1. Develop detailed cost estimate for each preferred mitigation measure
2. Conduct BCA
3. Determine funding sources

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.Worksheet D: Preliminary Cost Estimating Worksheet

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Property Owner Name: Janet Wilson
Property Address: 19000 Main Street, Roanoke VA 20202-6689
Repetitive Loss Property Locator Number: 1234567
Prepared by: Bryant Shea

Mitigation Measure: Acquisition and demolition of 19000 Main Street

Cost Component	Unit	Unit Cost	Quantity	Total
Acquisition of Structure		$275,000	1	$275,000
Acquisition of Land		$149,000	1	$149,000
Certified Real Estate Appraisal		$500	1	$500
Disconnect Utilities		$500	1	$500
Surveying		$1,000	1	$1,000
Title Search, Deed Preparation, Attorney Fees, Permits and Plan Review Costs		$1,100	1	$1,100
Installation of Erosion Controls		$600	1	$600
Demolition		$7,000	1	$7,000
Grading and Restabilization		$1,500	1	$1,500
Uniform Relocation Assistance (URA)		$6,500	1	$6,500
Other (Environmental Report, Advertising)		$1,000	1	$1,000
Subtotal Retrofitting Measure(s)				$443,700
Contractor's Profit (10%)				$44,370
Design Fee (10%)				
Loss of Income (optional)				
Displacement Expenses (optional)				
Contingency				
Subtotal Other Costs				$44,370
Total Costs				$488,070

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Basic Report

Property Locator / Rep Loss # 1234567

Community Name/CID # ROANOKE COUNTY * #510090

Address: 19000 MAIN STREET , ROANOKE, VA 20202-6689

Latitude: **Longitude**

Tax ID:

Local Lot/Parcel ID:

Foundation Type:

Basement with walkout

Pre or Post FIRM: Pre **Total Sq. Ft.:** 3100

Date of Construction: 1/1/1982 **No. of Stories:** 2

Condition of Foundation: Good (optional minor repairs)

Structure Type: Unreinforced masonry

EC Diagram No

2. Basement

Condition of Structure: Good (optional minor repairs)

Bldg Mkt Value: $275,000.00 **Land Value:** $149,000.00

Currently Occupied: Yes **Occupancy:** SINGLE FMLY

Residence: **Land Use:** Single-family residential

Flood Zone: AE A1-30

Top of Bottom Floor: 100.00 ft. **BFE/Depth** 107

Top of Next Higher Flr: 107.00 ft.

Lowest Adjacent Grade: 100.00 ft.

Bottom of Lowest Horizontal Structural Member:

Likely Source of Flooding:

Stre... urce of riverine fl...g

...tes:

Likely Areas or ... Damag...

W...er in areas belo... rade-...ding is a bile... split le... or has ...ish... a... below grade

N... ...seme...

Potential Hydraulics Impacts:

Notes:

Mitigation Observations

☑ **Possible mitigaton measures observed**

Pendi... Actions:

No...

Struct... may be protected wit... retrofitting projec...

Structu... may be: elevated; prote... acqu...

Notes:

Flooding may be relieved by a flood control project:

Notes:

Most Recent Claims and Summary

Current Insured's Name: JANET WILSON

Name of Last Claimant: MICHAEL S JOHNSON

No. of Claims per BureauNet: 4

	Building	Contents	Total
Total Payments Made:	$118,833.00	$23,489.00	$142,322.00

Date	Building	Contents	Total
2/10/1988	$5,731.00	$0.00	$5,731.00
1/18/1993	$19,472.00	$2,591.00	$22,063.00
6/25/1996	$37,138.00	$9,304.00	$46,442.00
7/22/1999	$56,492.00	$11,594.00	$68,086.00

Mitigation Updates

	Field	FEMA	Field	FEMA
Unable to Locate Property	☐	☐		
Flood Protection Provided	☐	☐	1	1
No Building on Property	☐	☐	2	2
Historic Building	☐	☐	3	3
Notes:			4	4

☐ **Additional Research Needed**

Notes:

Mitigation Observed:

Notes:

Mitigation Verified:

Notes:

☐ **Updates Made** ☐ **Duplicate Listing / with RL #:**

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SAMPLE

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