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: _____   Date Property Visited: _____

Property Owner Name: _____

Property Address: _____

Repetitive Loss Property Locator Number: _____

Prepared by: _____

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Worksheet A: Technical Considerations Scorecard

Date Prepared: _____ Date Property Visited:_____
Property Owner Name: _____
Property Address: _____
Repetitive Loss Property Locator Number: _____
Prepared by: _____

Legend

▮ Mitigation measure is <u>not</u> appropriate.

▨ Mitigation measure <u>may</u> 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	☐	☐	☐	☐	▨	▨	☐	
	☐ 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)	☐	▨	☐	▨	▨	☐	☐	
	☐ 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	☐	☐	☐	☐	☐	☐	☐	
	☐ 3 or more	☐	☐	☐	☐	☐ (shaded)	☐ (shaded)	☐	
5. What is the building footprint? *NT Reference - Detailed Data View, Additional Site Information tab*	☐ < 2,500 sq ft	☐	☐	☐	☐	☐	☐	☐	
	☐ > 2,500 sq ft	☐	☐	☐	☐	☐ (shaded)	☐ (shaded)	☐	
6. What is the flood protection depth? *NT Reference - Detailed Data View, Elevation and Hazard tab*	☐ Deep (> 6ft)	■	☐ (shaded)	■	■	☐	☐	☐	
	☐ Moderate (3 to 6 ft)	☐	☐ (shaded)	☐ (shaded)	■	☐	☐	☐	
	☐ Shallow (<3 ft)	☐	☐	☐	☐	☐	☐	☐	
7. Does flash flooding occur at the project site? *NT Reference - Detailed Data View, Elevation and Hazard tab*	☐ Yes	☐	☐ (shaded)	☐ (shaded)	☐ (shaded)	☐	☐	☐	
	☐ No	☐	☐	☐	☐	☐	☐	☐	
8. What is the flood velocity? *NT Reference - Detailed Data View, Elevation and Hazard tab*	☐ Fast (>5fps)	☐ (shaded)	☐ (shaded)	☐ (shaded)	☐ (shaded)	☐ (shaded)	☐	☐	
	☐ Slow/Moderate (<5 fps)	☐	☐	☐	☐	☐	☐	☐	
9. Is the structure located in the floodway? *NT Reference - Detailed Data View, Elevation and Hazard tab*	☐ Yes	☐ (shaded)	☐ (shaded)	☐ (shaded)	☐ (shaded)	☐ (shaded)	☐ (shaded)	☐	
	☐ No	☐	☐	☐	☐	☐	☐	☐	
Appropriate Mitigation Measures		☐	☐	☐	☐	☐	☐	☐	

fps = feet per second

ft = feet

sq ft = square feet

Worksheet B: Appropriate Mitigation Measures

Date Prepared: _____ Date Property Visited: _____
Property Owner Name: _____
Property Address: _____
Repetitive Loss Property Locator Number: _____
Prepared by: _____

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 Four 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 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**
_____	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
_____	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
_____	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 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 cost indicates Low ranking and high 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

Worksheet C: Initial Consultation with Property Owner

Date Prepared: _____ Consultation Date: _____
Property Owner Name: _____
Property Address: _____
Repetitive Loss Property Locator Number: _____
Prepared by: _____

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   ☐ Elevation
☐ Barriers   ☐ Relocation
☐ Dry Floodproofing   ☐ Acquisition
☐ Wet Floodproofing

Comments

_____
_____
_____
_____

Response from Property Owner

_____
_____
_____
_____

Property Owner Preferred Mitigation Measure(s)

_____

Action Items for Follow-Up

_____
_____
_____

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Worksheet D: Preliminary Cost Estimating Worksheet

Date Prepared: _____ Date Property Visited:_____

Property Owner Name: _____

Property Address:_____

Repetitive Loss Property Locator Number:_____

Prepared by: _____

Mitigation Measure: _____

Cost Component	Unit	Unit Cost	Quantity	Total
Subtotal Retrofitting Measure(s)				
Contractor's Profit (10%)				
Design Fee (10%)				
Loss of Income (optional)				
Displacement Expenses (optional)				
Contingency				
Subtotal Other Costs				
Total Costs				

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