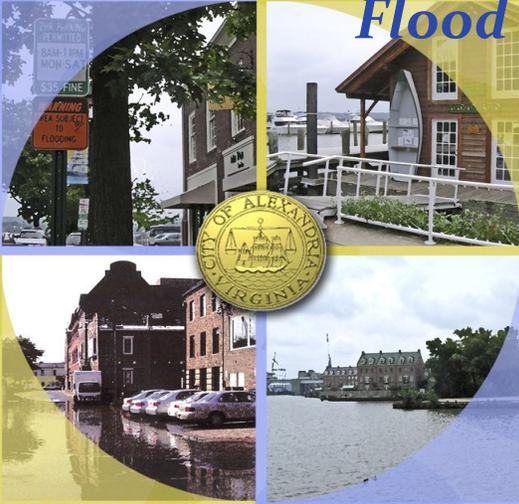


*Potomac River Waterfront
Flood Mitigation
Study*



Department of Transportation and
Environmental Services

**Waterfront
Committee
April 20, 2010**

Purpose

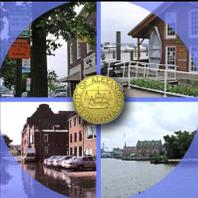
Purpose of the Study:
Identify, evaluate and recommend
flood mitigation solutions along
the Potomac River Waterfront



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Study Area



Public Input Themes

- **Criteria for selecting solutions**
 - ▶ No negative impacts on aesthetics/water viewshed
 - ▶ Reduce business interruptions
 - ▶ Reduce frequency of minor (nuisance) flooding
- **Specific input provided on potential solutions**

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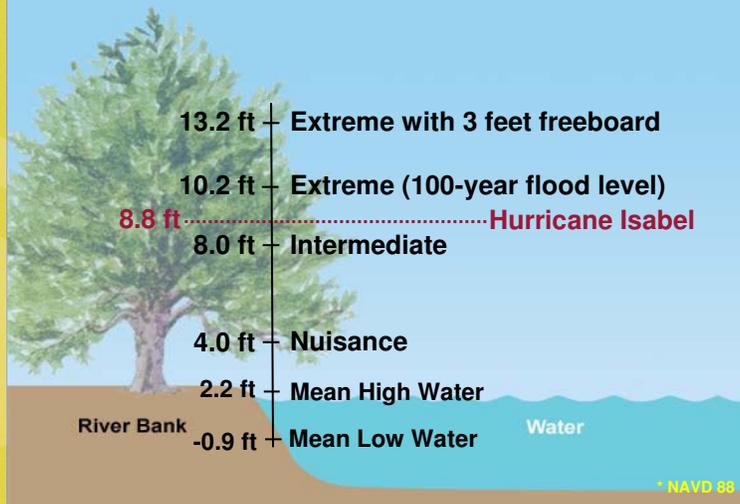


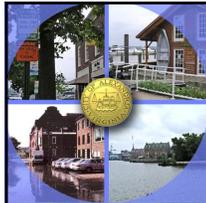
Waterfront Planning

- City is conducting waterfront planning envisioning sessions
- Waterfront plan includes:
 - ▶ Providing **connectivity** along waterfront
 - ▶ Creating new buildings, including restaurants, that afford **views of the water**
 - ▶ Ensuring drainage and flood protection features minimize impacts on view corridors and **historic structures**



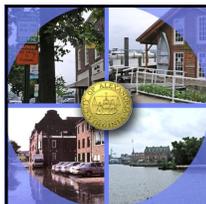
Flood Levels Studied





Study Process

- **Brainstorming sessions with public to identify wide range of potential solutions**
- **Solutions were evaluated based multiple criteria:**
 - ▶ Floodplain management
 - ▶ Aesthetic and cultural resources
 - ▶ Economic and environmental impacts
 - ▶ Cost and feasibility
- **Narrowed field to 9 potential solutions**



Study Process

- **Evaluated potential solutions using benefit-cost ratio**
- **Benefits: avoidance of costs**
 - ▶ Property damage (structure and content)
 - ▶ Lost revenues
 - ▶ Displacement costs
- **Costs: implementation and operation**
 - ▶ Design and permitting
 - ▶ Construction
 - ▶ Property acquisition
 - ▶ Operation and maintenance

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Study Process

- **BCR = Benefits ÷ Costs**
 - ▶ At least 1 for a project to be considered feasible
 - ▶ A useful tool, but must be applied with judgment
- **Other factors considered include potential impacts to**
 - ▶ Aesthetics
 - ▶ Business operations
 - ▶ Natural resources
 - ▶ Historic and archeological

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Recommended Flood Mitigation Solutions

- **Dry floodproofing**
- **Internal relocation of supplies**
- **Elevated pedestrian walkway (floodwall)**
- **Increase road and inlet elevations**
- **Improve floodplain ordinance**
- **Enhance sandbag program**

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Flood Mitigation Solutions Not Recommended

- Property acquisition
- Elevation of structures
- Floodwalls, including Jones Point berm
- Alternate temporary flood barriers (in lieu of sandbags)

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Recommended Solutions Dry Floodproofing

- Physical barrier to prevent floodwaters from entering building
- Protects contents and structure
- Can be passive or active
- Limited to water depths of 3 feet or less
- Not applicable for basements
- Impacts of natural resources are limited
- Possible impact on historical resources

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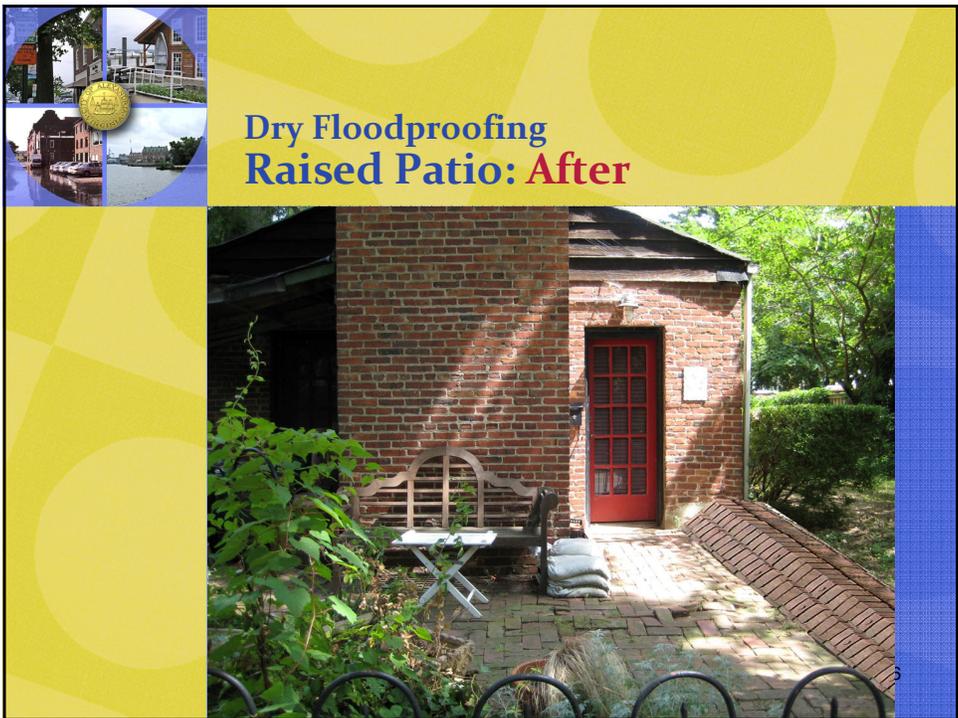
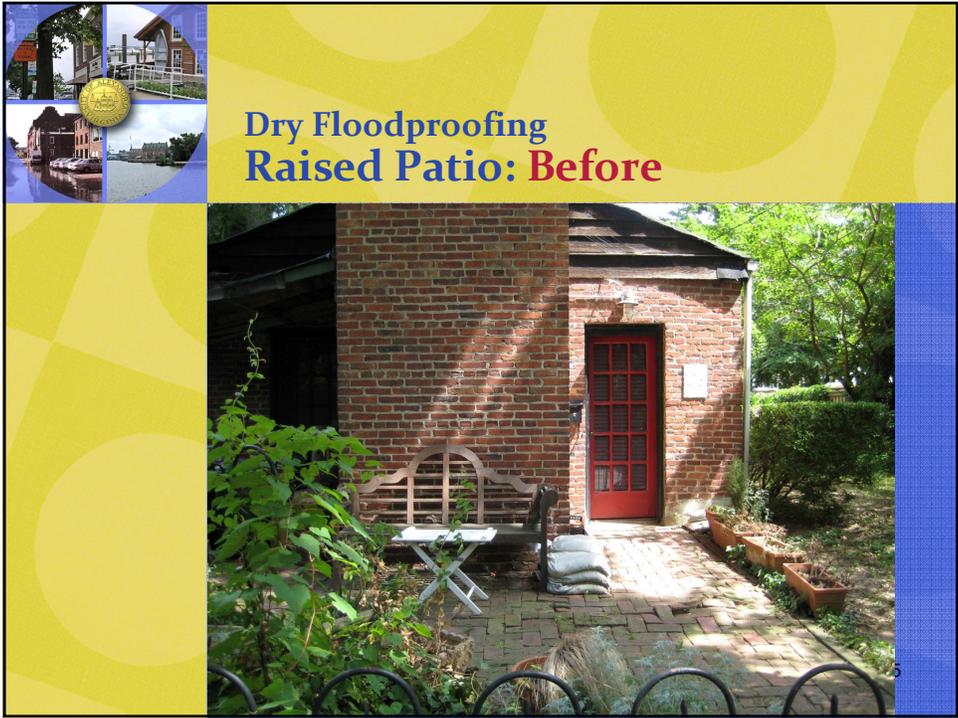


Dry Floodproofing Floodgate



Dry Floodproofing Elevation of First Floor





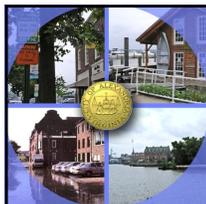


Internal Relocation of Supplies



- Relocate internal supplies, products/ goods, and utilities above flooding depths
- Reduces damage to contents
- Does not reduce structure damage

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Internal Relocation Recommendations

- Internal elevation of goods and supplies recommended for large commercial buildings
- Recommend public outreach activities to inform business owners of potential activities they can implement

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Elevated Pedestrian Walkway (Floodwall)



Walkway in
Sault Sainte Marie,
Ontario, Canada

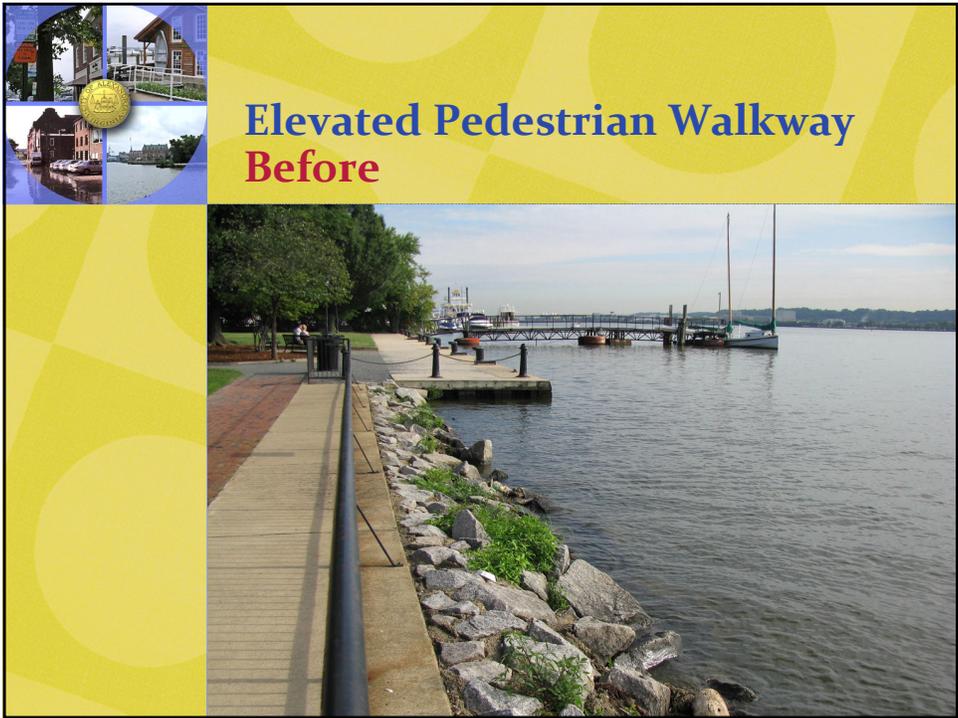
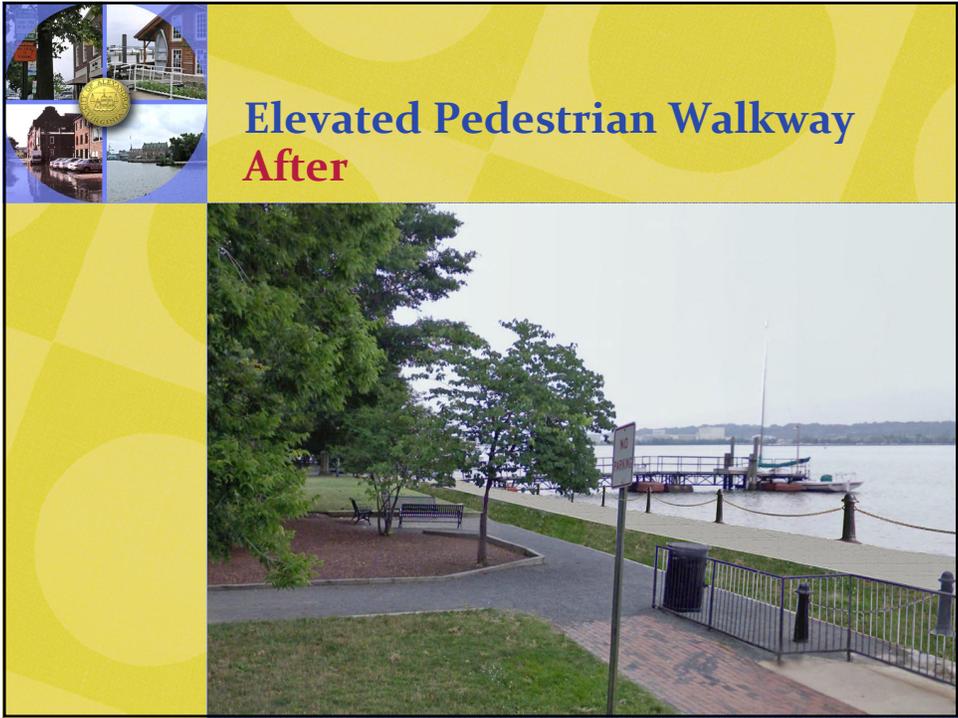
- Build a pedestrian boardwalk that will act as an engineered floodwall
- Would be integrated with the waterfront plan

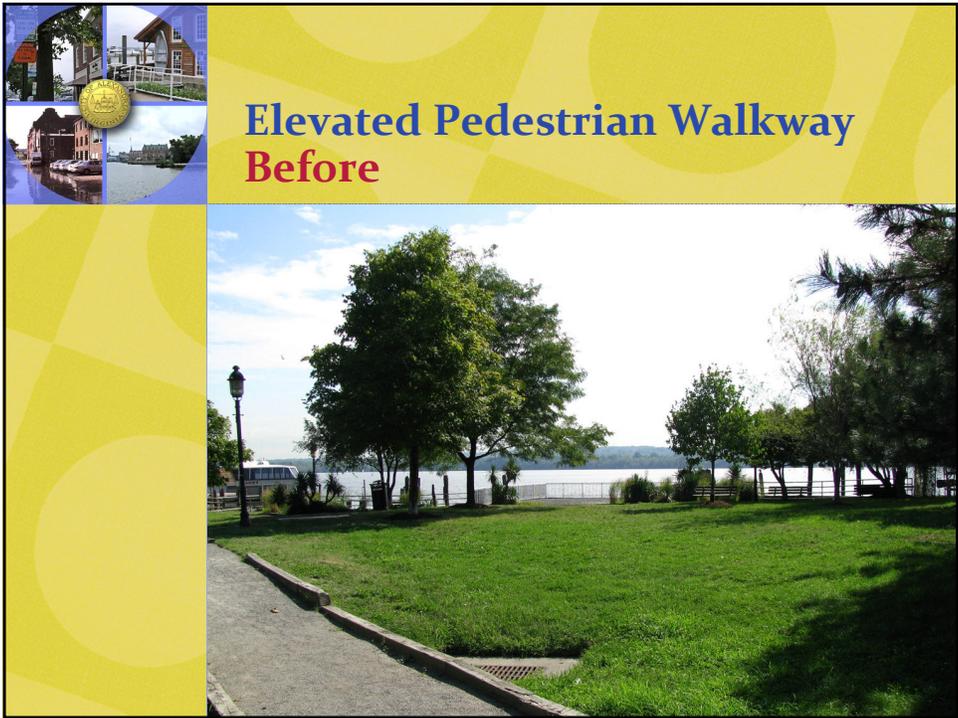
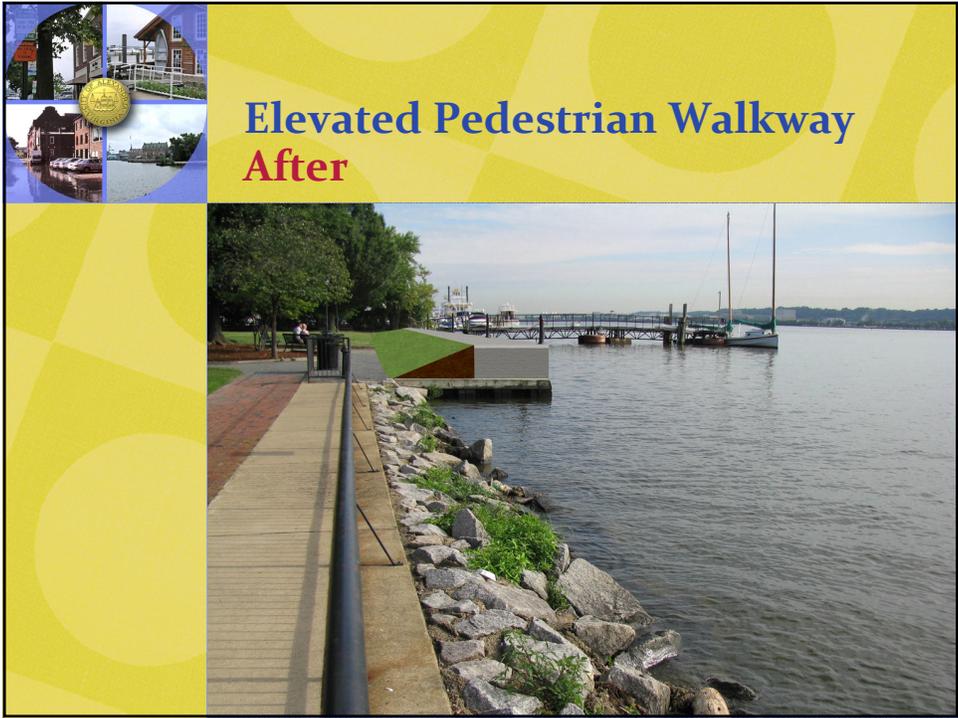
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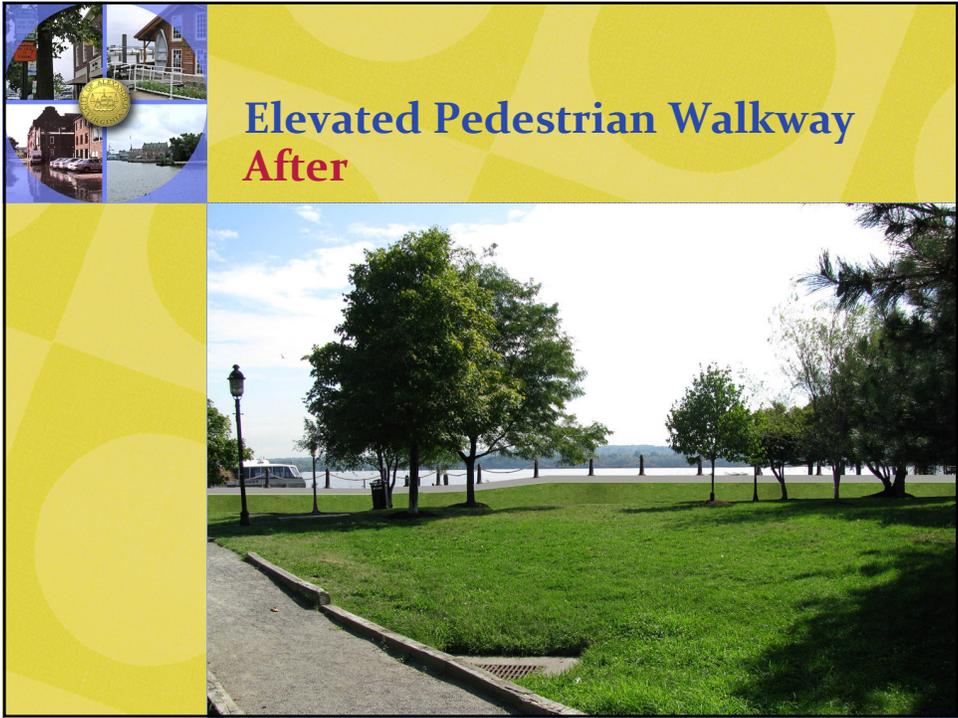


Elevated Pedestrian Walkway Before







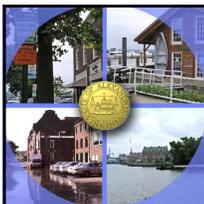




Elevated Pedestrian Walkway Design Opportunities

- Critical feature is protection to elevation 6.0 feet NAVD88 (10-year event)
- Between nuisance and intermediate flood levels
- Optimal elevation for BCR and constructability
- Incorporate this elevation into landscape and building design
- Incorporate into Waterfront Plan

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Elevated Pedestrian Walkway Potential Impacts

- Possible obstruction of view of Potomac River
- Impact on boating access
- Access considerations for several commercial buildings
- Potential impact of existing walkway near Thompson's Alley

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Elevated Pedestrian Walkway Recommendations

- Recommended as the primary flood mitigation measure for the King Street and Waterfront Commercial Focus Areas
- BCR = 2.4
- Provides protection for approximately
 - ▶ 43 commercial structures
 - ▶ 23 residential structures
- Limitation – does not protect against large storms

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S3: Elevate Inlets and Roads



Increase Inlet and Road Elevations King Street and The Strand

- Constrained by existing building entrances
- Similar to successful project at Prince Street and The Strand intersection

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Increase Inlet and Road Elevations - Recommendations

- **Recommended as an interim flood mitigation measure for King Street area**
- **Impacts and limitations:**
 - ▶ Minor impacts during construction
 - ▶ Adjacent curbs and building entrances limit elevation
 - ▶ Protects buildings to less than nuisance flood

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Improve Floodplain and Zoning Ordinance Recommendations

- **Goal: Reduce future flooding impacts**
- **Based on improving the City's Community Rating System (CRS) rating**
- **Six potential ordinance changes recommended**

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Temporary Flood Measure Program Improvements



Temporary Flood Measures Sandbag Program

- **Recommend maintaining program**
- **Implement following enhancements:**
 - ▶ Expand sandbag service areas to include all floodprone areas
 - ▶ Document guidelines for determining when to initiate sandbag distribution
 - ▶ Post information for sandbag policy on city website

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Summary of Recommendations

- **Floodproofing – for all applicable structures**
- **Relocate internal supplies – for many commercial structures**
- **Elevated pedestrian walkway (floodwall)**
- **Zoning ordinance modifications**
- **Sandbag program enhancements**

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Next Steps

- **Study available at:**
Alexandriava.gov/Waterfront
- **Send comments to:**
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Alexandria, VA 22314
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703.746.4057

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