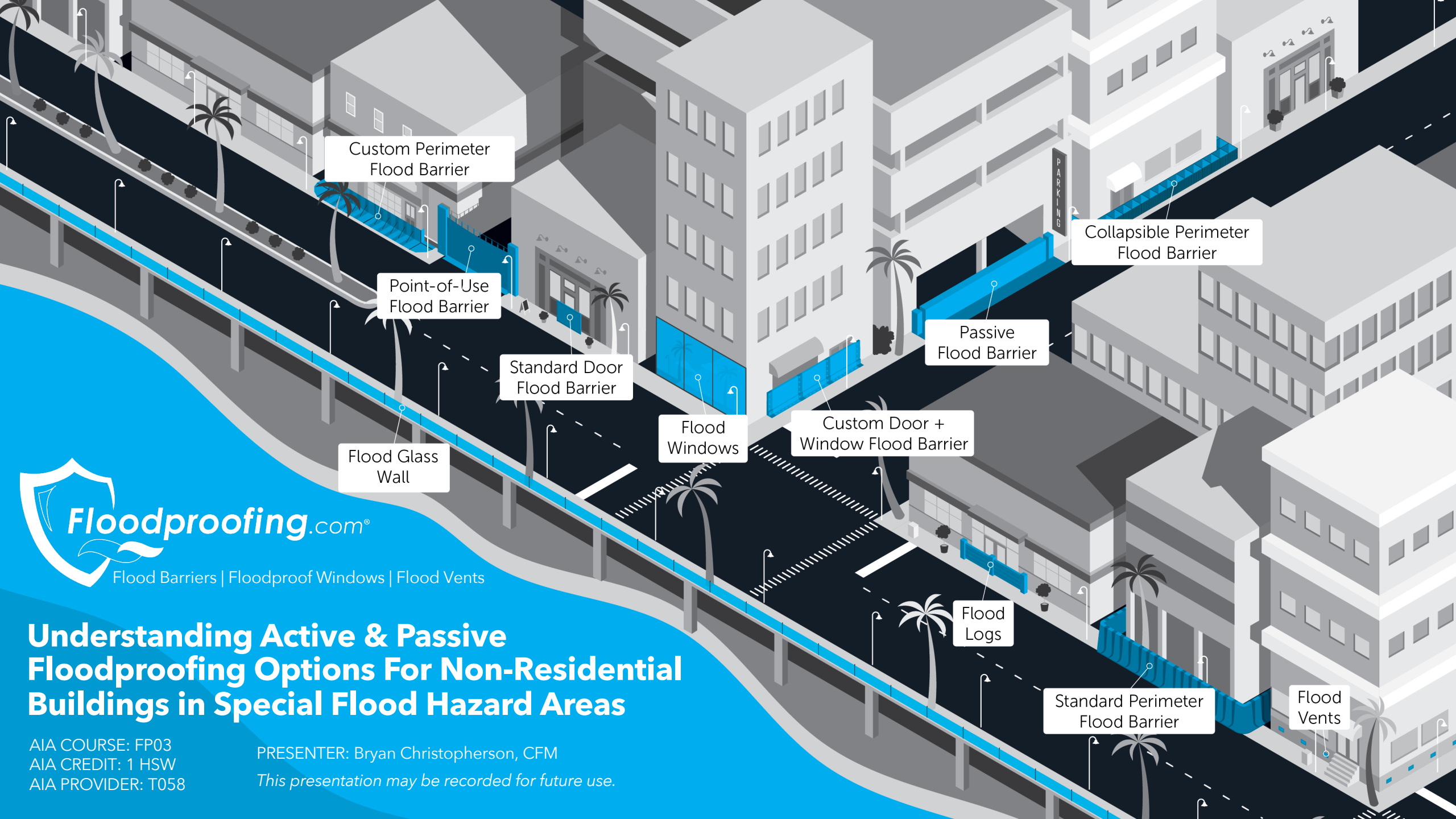


Floodproofing.com®

Flood Barriers | Floodproof Windows | Flood Vents

Understanding Active & Passive Floodproofing Options For Non-Residential Buildings in Special Flood Hazard Areas

AIA COURSE: FP03
AIA CREDIT: 1 HSW
AIA PROVIDER: T058

PRESENTER: Bryan Christopherson, CFM

This presentation may be recorded for future use.

Presenter Information

Bryan Christopherson, CFM

Certified Floodplain Manager

Midwest Regional Manager

bchristopherson@floodproofing.com

c 563-613-1654

Who We Are

- **Smart Vent Products** began as an Engineered Flood Vent Manufacturer 20+ years ago
    - 850,000+ vents and 170 million+ sq. ft. protected

- **Risk Reduction Plus Group** is an insurance brokerage developed to further help clients reduce flood insurance premiums
    - Complimentary Flood Risk Evaluation services

- **Floodproofing.com** was created to provide Dry Floodproofing Solutions for non-residential buildings
    - Active & Passive Flood Barriers, Shields, and Windows
    - Partnered with FENEX to develop and bring to market Floodproof Windows tested to ANSI 2510

- **Flood Design Team** works with architects to specify in compliant and optimal floodproofing solutions
    - 2,200+ Projects with Specification Assessments or Product Takeoffs since 2018

Installation Division

National Flood Protection LLC
- Our Dedicated Installation Partner

- Established in 2013
- Experienced with complex codes and standards
- Hundreds of high profile installs around the country
- Deployment training
- On-site verification sizing, retrofit quality checks
- Close out photo packets and more

IN-DEPTH PRODUCT KNOWLEDE

PROFESSIONAL INSTALLS

DEPLOYMENT TRAINING

NATIONAL FLOOD PROTECTION, LLC + Floodproofing.com

CEU Registration

Floodproofing.com is a registered provider with The American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES records for AIA members.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

AIA EDUCATION PROVIDER

AIA COURSE TITLE:	Understanding Active Vs Passive Floodproofing Options for Non-Residential Structures in a SFHA
AIA COURSE NUMBER:	FP03
AIA CREDIT:	1 HSW
AIA PROVIDER:	FLOODPROOFING.COM
AIA PROVIDER NUMBER:	T058

ICC PREFERRED EDUCATION PROVIDER

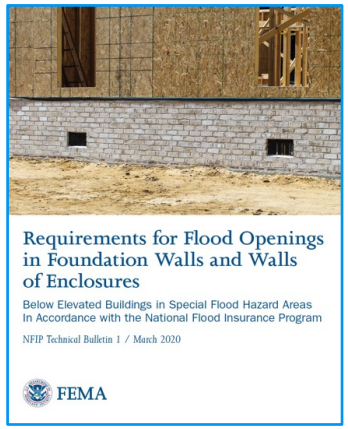
CFM ASFPM EDUCATION PROVIDER

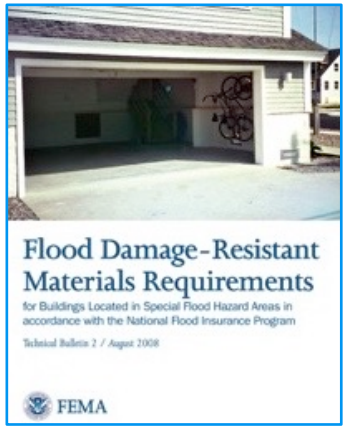
Learning Objectives

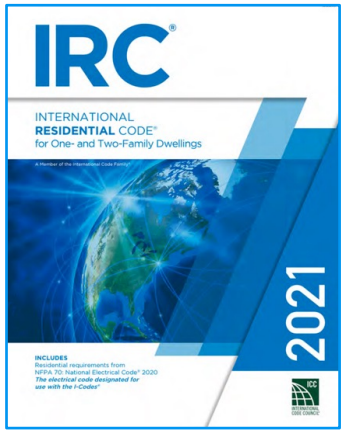
- Describe floods, floodplains, and the potential hazards to buildings.
- Identify regulations, codes, and standards as they relate to sustaining foundations and overall business continuity in flood hazard areas.
- Active vs. passive floodproofing solutions and the overall impact of ownership.
- Analyze the role of building compliance in securing lowering flood insurance rates and what mitigation solutions are available.

Floodplain Construction Regulations

- **ASCE 24-14 is the standard to follow**, IBC references back to these requirements.
- FEMA TB-1 has all details for flood vents and wet floodproofing.
- FEMA TB-2 provides information regarding flood resistant materials to use.
- FEMA TB-3 for flood barriers and dry floodproofing.
- Local Floodplain Ordinances.

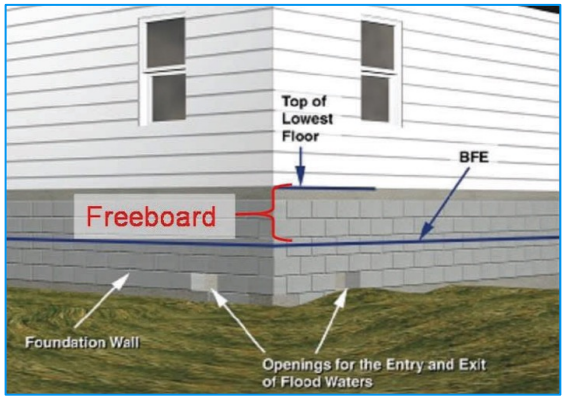






Basic Terms

- **Base Flood Elevation (BFE)** is the calculated level that flood waters will rise to during a Base Flood.
- **Design Flood Elevation (DFE)** is the elevation of the highest flood (generally the BFE including freeboard). Also, referred to as Flood Protection Elevation.
- **Special Flood Hazard Area (SFHA)**
  - **A zones** have low impact from waves.
  - **Coastal A zones** are expected to receive 1.5-foot or greater breaking waves.
  - **V zones** have high impact from waves.
- Both A and V zones subject to experiencing a 1% annual chance flood event. This translates to a 26% chance of flooding over the life of a 30-year mortgage.



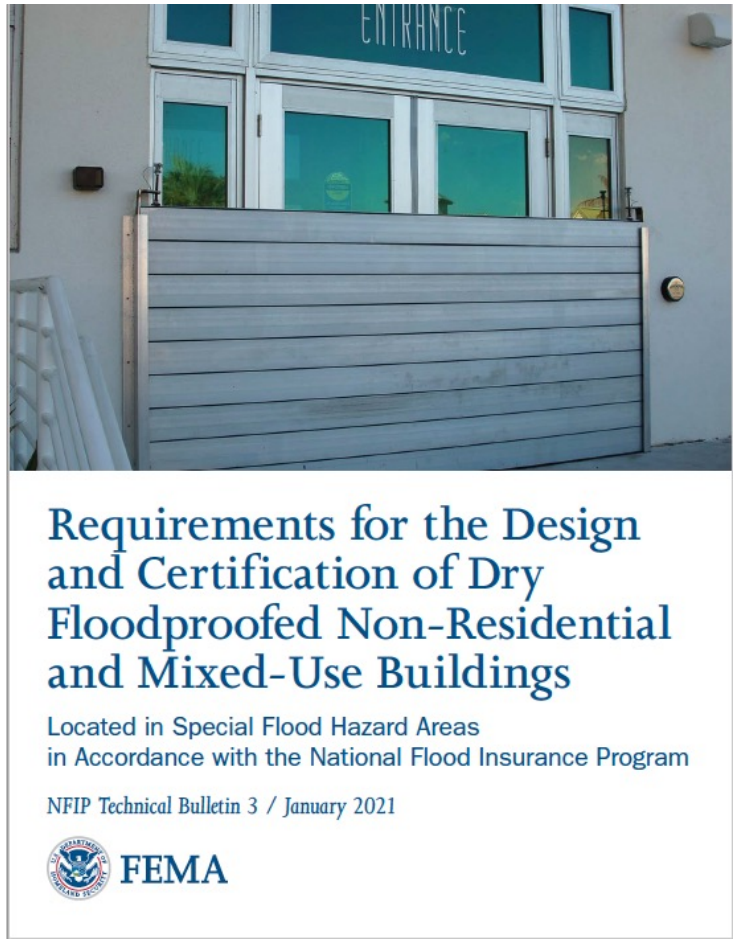
Freeboard: Elevating a building's lowest floor above and beyond BFE. This is a built-in safety factor resulting in lower flood insurance premiums. Freeboard ordinance regulations are popular in CRS communities.

Different Types of Flood Risk

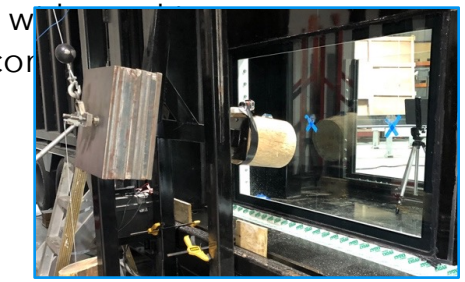
Hurricane Harvey – Pluvial Flooding


Dry Floodproofing Methods

FEMA Technical Bulletin 3 / January 2021



- Goal to make a building watertight, impermeable to floodwaters.
- NFIP allows dry floodproofing in **non-residential buildings only**.
- For new construction or substantial improvements to existing buildings. Acceptable in A, AE, A1-A30, AO, & AH Zones.
- Design must be certified.
- Page 26 – *"ASCE 7 should be used as the source of how to calculate debris impact loads.."*
- FEMA has identified that dry floodproofing solutions should w
  from a minimum weight of 500 to 1,000 lbs. at a minimum, co
  specific conditions.



FEMA Technical Bulletin 3 / January 2021

ASCE INTERPRETATION OF ASCE 24-14 FLOOD SHIELD REQUIREMENTS AND FEMA POSITION ON WHETHER A FLOOD SHIELD CONFIGURATION MEETS NFIP DRY FLOODPROOFING REQUIREMENTS

In November 2016, ASCE issued a formal interpretation of whether a specific configuration of flood shields meets the dry floodproofing requirements of ASCE 24-14.[1] The configuration is described as a building that is supported by an impermeable reinforced concrete stem wall (foundation) with permeable exterior walls such as glass curtain walls. The question was whether the use of removable flood shields as a component of the exterior building façade would render the exterior walls impermeable along the entire length of the façade. Diagrams included in the request for the interpretation show flood shields attached at the base to the impermeable foundation stem wall and attached to vertical, structural columns between spans of the glass curtain wall system.

The ASCE interpretation determined that the flood shield configuration described and shown in the request meets the dry floodproofing requirements of ASCE 24-14 provided the building and shields meet all other dry floodproofing requirements, provided the flood shields are "close to and attached to the building façade," and provided the shield attachment is "via guides, fasteners or supports that are permanent parts of the building façade."[2]

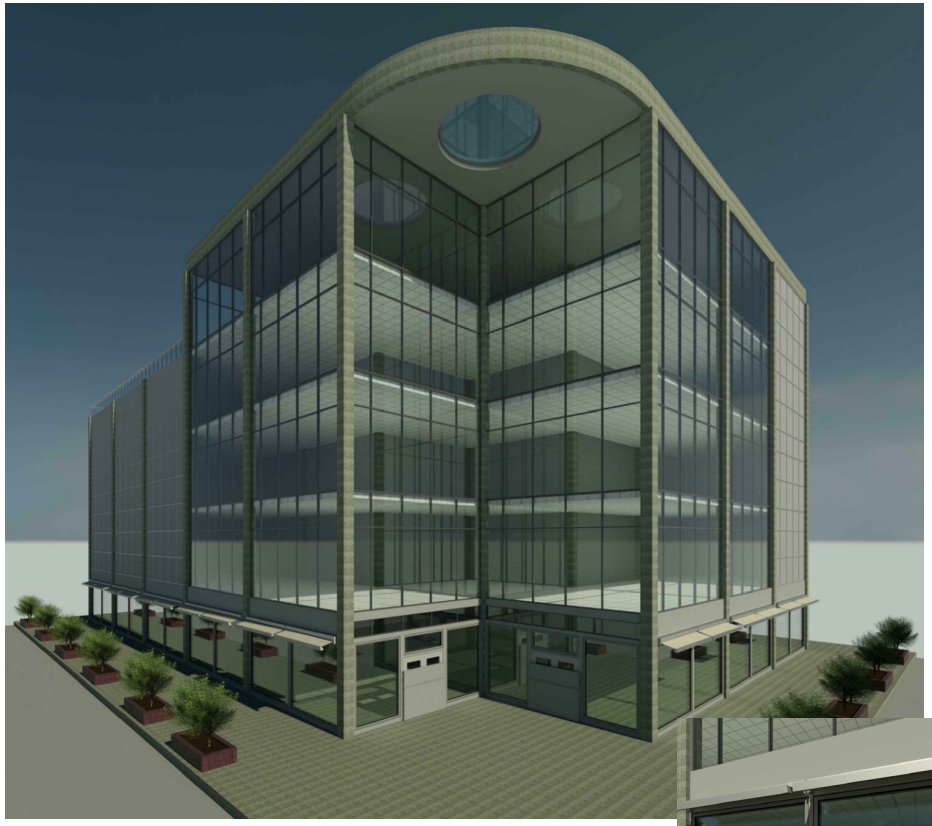
The FEMA position is that the ASCE interpretation is contrary to the NFIP requirements because exterior wall sections that are neither substantially impermeable nor able to resist flood loads will not meet the intent of 44 CFR § 60.3(c)(3) that walls must be "substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy." Therefore, any temporarily installed means of flood protection that cover such walls would not be considered compliant.

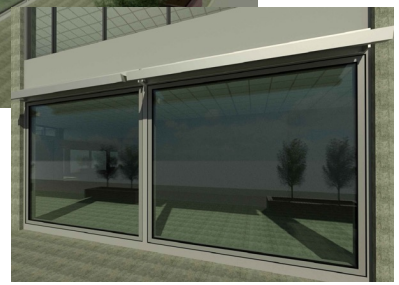
1 Jonathan C. Esslinger, Director, Technical Advancement and Codes & Standards, ASCE, written communication, November 29, 2016.
2 Ibid, Page 5.

- ASCE 24-14 allows you to have glass curtain walls protected by deployable flood barriers as long as they bolt back into the structural and substantially impermeable elements of the building, including the building facade.
- FEMA identifies a glass curtain wall as a "wall", therefore a deployable flood barrier system over a glass curtain wall, that is not structural and substantially impermeable, **would not be compliant** and does meet the CFR, in their eyes.
- NFIP participating communities always have to meet the minimum FEMA requirements. The CFR states walls need to be substantially impermeable. A community not enforcing FEMA's stance on glass wall systems is technically not meeting the minimum requirements.
- A CAV performed by FEMA could put a town on probation due to non-compliance, if these FEMA standards are not met.

Comparison

Floodproof Window Wall

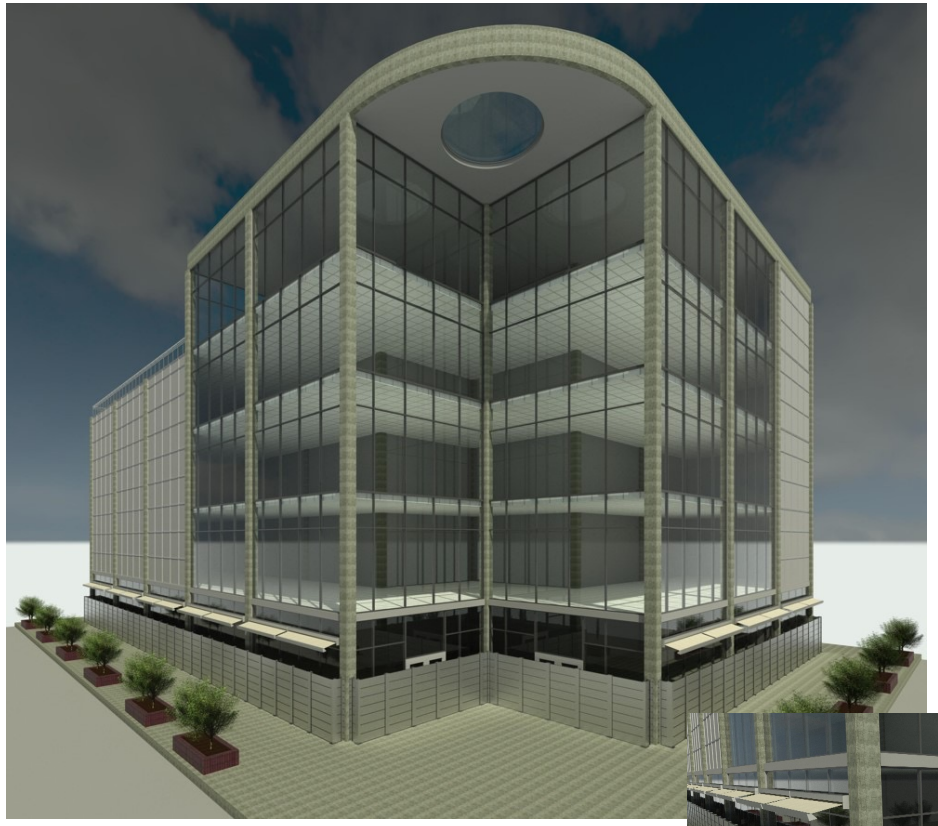


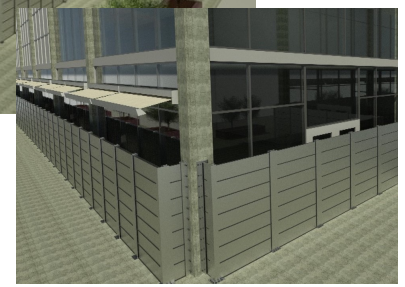


✓ FEMA Compliant

✓ ASCE 24-14 Compliant

Non-floodproof Window Wall with Deployable Flood Barriers





✗ FEMA Compliant

✓ ASCE 24-14 Compliant

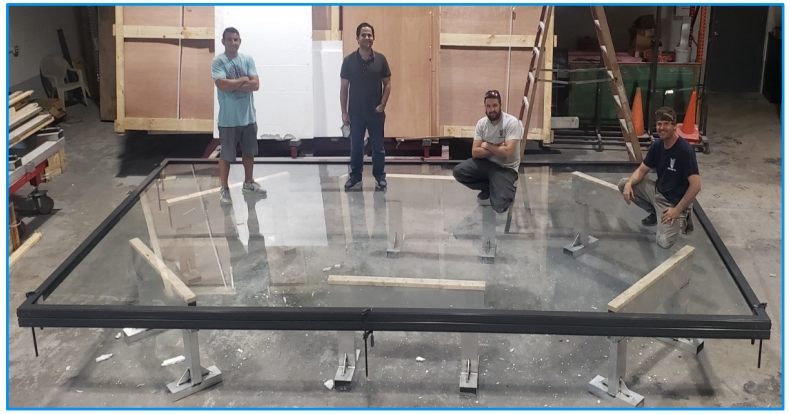
FLOODPROOF GLASS SYSTEMS

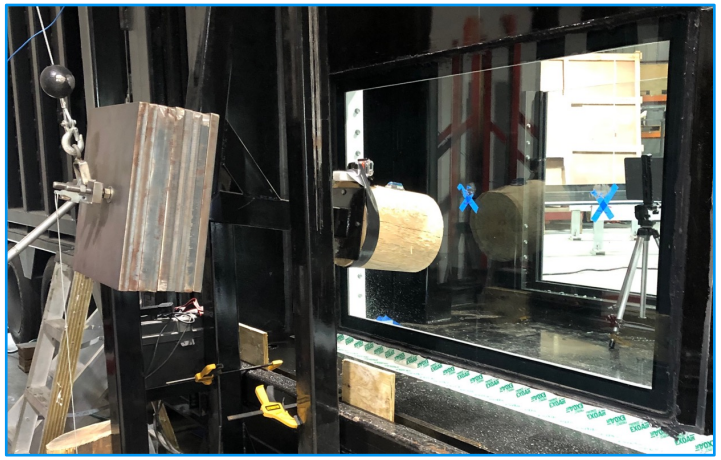
Floodproof Window

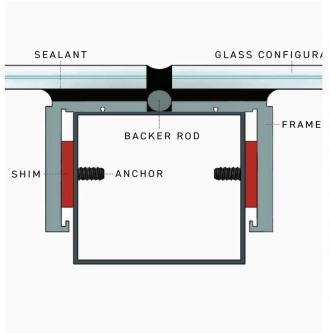
Glass Flood Wall

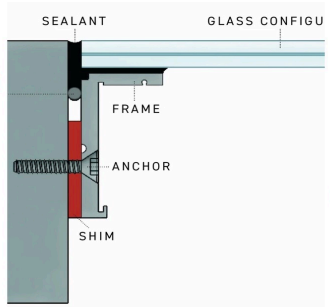
Floodproof Windows

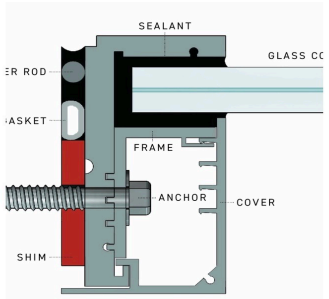
- **Passive flood barriers** that maintain your view and aesthetic
- Patented customizable frames designed to withstand impact & heavy loads
- Tested up to 10’ of water
- Tested to FM/ANSI 2510











Storefronts | Commercial Windows | Seawalls | Beachfront Homes

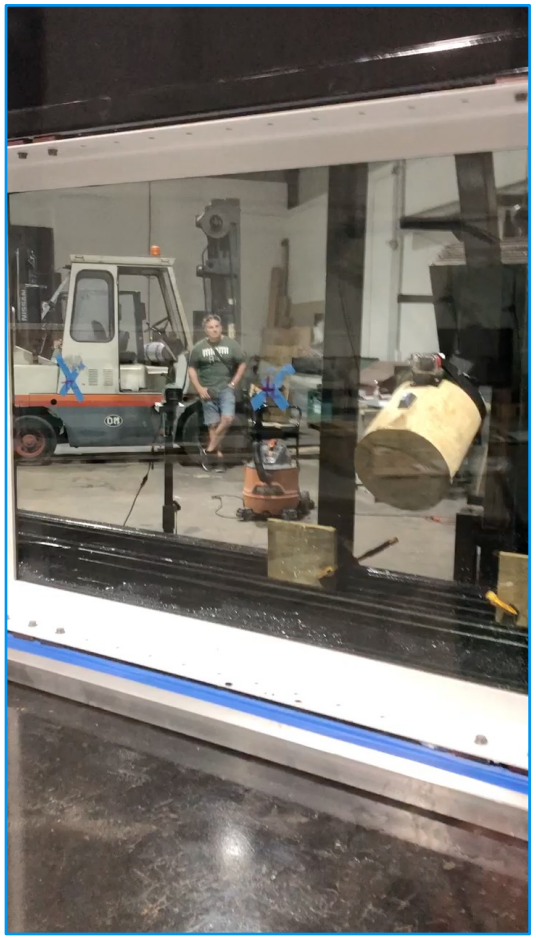
Case Study: Whitehall Mill

- PROJECT LOCATION: Baltimore, MD
- TYPE: Passive Floodproof Windows
- FLOOD PROTECTION: 6'8" DFE
- SIZE: (14) 4'x6' flood windows with faux mullions
- INDUSTRY : Historic Repurposed Mill Turned Wedding Venue

Before Faux Mullions

First-Ever Tested to FM/ANSI 2510

1,000 LB. IMAPCT AT 8 FPS ASCE 7 REQUIREMENTS



LOAD TEST OF 9’ OF WATER ON 20’ X 11’ FLOOD WINDOW

Glass Flood Walls

- A permanent, passive system. Always ready. Extremely resistant to coastal and environmental corrosion.
- Installation feasible on sea walls/bulk heads to avoid blocking the view.
- Resists up to 8-ft. of water with debris. 1,000 LB impact tested.
- Can be used as a railing in addition to a aesthetic pleasing flood wall solution by waterfront application.

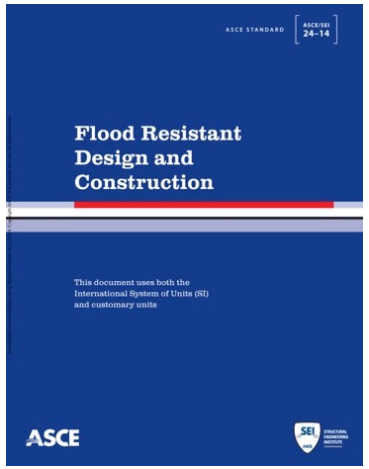
Charleston, SC Battery Seawall - 4,800 linear ft.
Glass Flood Wall Sections: 7' wide x 2' high

"The reconstruction of the Low Battery Seawall will serve as one of the City's newest lines of defense against rising sea levels and the constant threat of flooding to the downtown peninsula. This sample represents a possible solution to provide additional future flood protection with minimal visual obstruction to the Charleston Harbor and surrounding area."

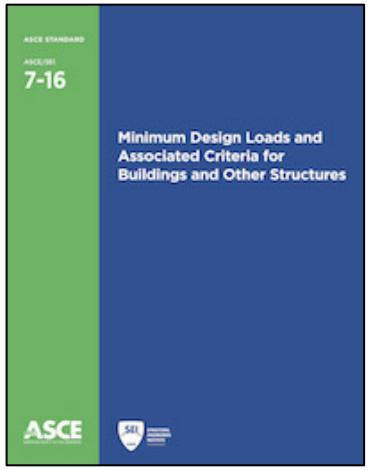
Ryan Mattie, PE, Senior Associate at Johnson, Mirmiran & Thompson, Inc.

ASCE 24 & 7, International Building Code (IBC)

ASCE 24-14



ASCE 7-16



1612.5 Flood hazard documentation. The following documentation shall be prepared and sealed by a *registered design professional* and submitted to the *building official*:

1. For construction in *flood hazard areas* not subject to high-velocity wave action:
   - 1.1. The elevation of the lowest floor, including the basement, as required by the lowest floor elevation inspection in Section 110.3.3.
   - 1.2. For fully enclosed areas below the design flood elevation where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.6.2.1 of ASCE 24, *construction documents* shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.6.2.2 of ASCE 24.
   - 1.3. For dry floodproofed nonresidential buildings, *construction documents* shall include a statement that the dry floodproofing is designed in accordance with ASCE 24.
2. For construction in flood hazard areas subject to high-velocity wave action:
   - 2.1. The elevation of the bottom of the lowest horizontal structural member as required by the lowest floor elevation inspection in Section 110.3.3.
   - 2.2. *Construction documents* shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored

- IBC points to ASCE 24 for requirements
- ASCE-24 Dry Floodproofing Sections: 6.2.1, 6.2.2, 6.2.3

ASCE-24 Dry Floodproofing is a combination of measures that results in a structure, including the attendant utilities and equipment, **being watertight with all elements substantially impermeable and with structural components having the capacity to resist flood loads.**

Substantially Impermeable means the maximum accumulation of 4 in. of water depth in such space during a period of 24 hours.

Periodic Drills & Deployment Time

Where removable shields are to be used, a flood emergency plan shall be approved by the authority having jurisdiction and shall specify, at a minimum, the following information: storage locations of the shields, the method of installation, conditions activating installation, maintenance of shields and attachment devices, periodic practice of installing shields, testing sump pumps and other drainage measures, and inspecting necessary material and equipment to activate or implement floodproofing. The flood emergency plan shall be posted permanently in at least two conspicuous locations within the structure.

ASCE 24-14 (Section 6.2.3 pg. 21)

- Flood Emergency Plan that includes:
  - > Chain of command;
  - > Notification procedures;
  - > Personnel duties;
  - > Location of floodproofing components, install procedures, repair procedures;
  - > Evacuation procedures for building occupants;
  - > Component maintenance procedures during flooding event;
  - > Drill and training program (at least once a year);
  - > Regular review/update of Flood Emergency Plan; *and*

NFIP FLOOD INSURANCE MANUAL
APRIL 2020 (pg. 70)

PERIODIC PLAN REVIEWS, DRILLS, AND INSPECTIONS

An annual review of flood emergency operations plans, with exercises for personnel to practice installing and deploying measures that require human intervention, is critical for success when flooding occurs.

Some communities conduct periodic inspections of dry floodproofed buildings, and some require the submission of reports documenting third-party inspections.

FEMA TB-3 (pg. 16)

6.2.3 Limits on Human Intervention Dry floodproofing measures that require human intervention to activate or implement prior to or during a flood shall be permitted only when all of the following conditions are satisfied:

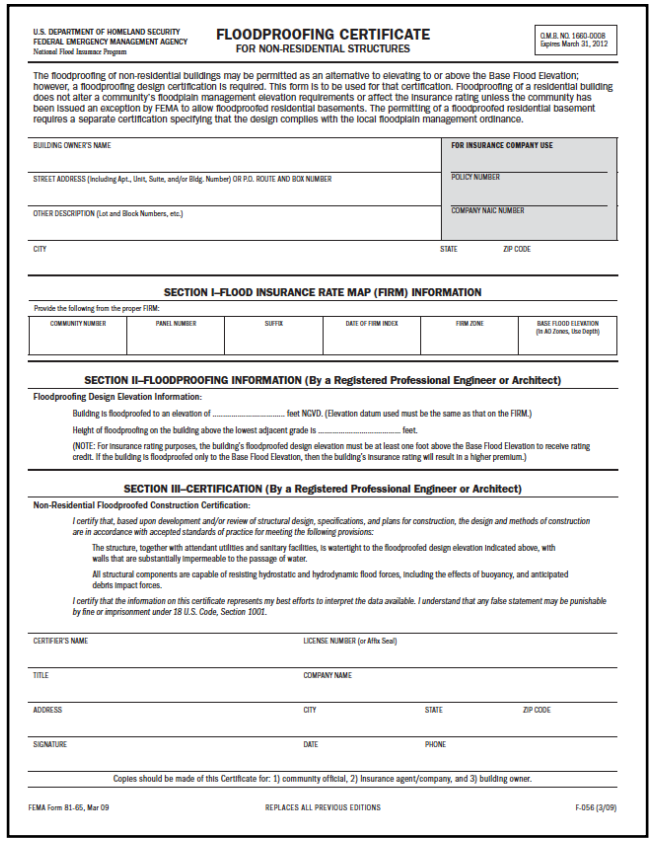
1. The flood warning time (alerting potential flood victims of a pending flood situation) shall be a minimum of 12 h unless the community operates a flood warning system and implements an emergency plan to ensure safe evacuation of flood hazard areas, in which case human intervention is allowed only if the community can provide a minimum flood warning time equal to or longer than the cumulative time
   (a) to notify persons responsible for installation of floodproofing measures,
   (b) for responsible persons to travel to structures to be floodproofed,
   (c) to install, activate, or implement floodproofing measures, and
   (d) to evacuate all occupants from the flood hazard area.

ASCE 24-14 (Section 6.2.3 pg. 21)

- ASCE 24-14, FEMA TB-3, & NFIP FLOOD INSURANCE MANUAL require **flood emergency and inspection plans** approved by authority having jurisdiction.
- Calls for a **periodic and annual deployment** of shields and barriers.
- Just like a fire drill we need to practice to ensure the system will work.
- Calls for the flood warning time to be a minimum of **12 hours**. Floodproofing measures should be installed within the warning time.

FEMA Floodproofing Certificate

FEMA "DRY" FLOODPROOFING CERTIFICATE



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

FLOODPROOFING CERTIFICATE
FOR NON-RESIDENTIAL STRUCTURES

O.M.B. NO. 1660-0008
Expires March 31, 2012

The floodproofing of non-residential buildings may be permitted as an alternative to elevating to or above the Base Flood Elevation; however, a floodproofing design certification is required. This form is to be used for that certification. Floodproofing of a residential building does not alter a community's floodplain management elevation requirements or affect the insurance rating unless the community has been issued an exception by FEMA to allow floodproofed residential basements. The permitting of a floodproofed residential basement requires a separate certification specifying that the design complies with the local floodplain management ordinance.

BUILDING OWNER'S NAME

STREET ADDRESS (Including Apt., Unit, Suite, and/or Bldg. Number) OR P.O. ROUTE AND BOX NUMBER

OTHER DESCRIPTION (Lot and Block Numbers, etc.)

FOR INSURANCE COMPANY USE

POLICY NUMBER

COMPANY NAIC NUMBER

CITY STATE ZIP CODE

SECTION I–FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

Provide the following from the proper FIRM:

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	DATE OF FIRM INDEX	FIRM ZONE	BASE FLOOD ELEVATION (In AO Zones, Use Depth)

SECTION II–FLOODPROOFING INFORMATION (By a Registered Professional Engineer or Architect)

Floodproofing Design Elevation Information:

Building is floodproofed to an elevation of ..... feet NGVD. (Elevation datum used must be the same as that on the FIRM.)

Height of floodproofing on the building above the lowest adjacent grade is ..... feet.

(NOTE: For insurance rating purposes, the building's floodproofed design elevation must be at least one foot above the Base Flood Elevation to receive rating credit. If the building is floodproofed only to the Base Flood Elevation, then the building's insurance rating will result in a higher premium.)

SECTION III–CERTIFICATION (By a Registered Professional Engineer or Architect)

Non-Residential Floodproofed Construction Certification:

I certify that, based upon development and/or review of structural design, specifications, and plans for construction, the design and methods of construction are in accordance with accepted standards of practice for meeting the following provisions:

The structure, together with attendant utilities and sanitary facilities, is watertight to the floodproofed design elevation indicated above, with walls that are substantially impermeable to the passage of water.

All structural components are capable of resisting hydrostatic and hydrodynamic flood forces, including the effects of buoyancy, and anticipated debris impact forces.

I certify that the information on this certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

CERTIFIER'S NAME LICENSE NUMBER (or Affix Seal)

TITLE COMPANY NAME

ADDRESS CITY STATE ZIP CODE

SIGNATURE DATE PHONE

Copies should be made of this Certificate for: 1) community official, 2) Insurance agent/company, and 3) building owner.

FEMA Form 81-65, Mar 09 REPLACES ALL PREVIOUS EDITIONS F-056 (3/09)

Planning: What to consider?

- Warning time, Safety & Access
- Flood Velocities, Depths, and Debris
- Frequency
- Cost & Liability

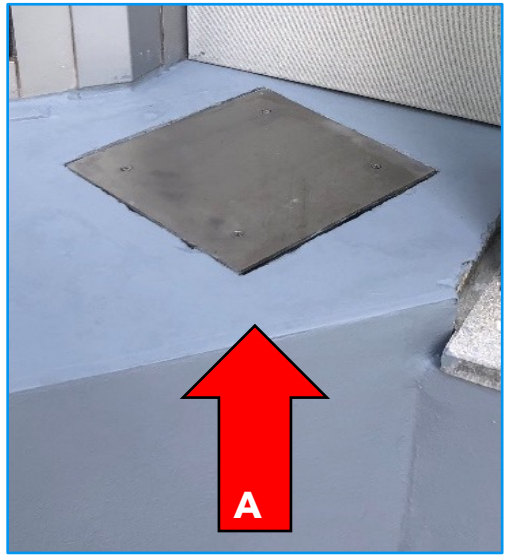
Inspection & Maintenance Plan

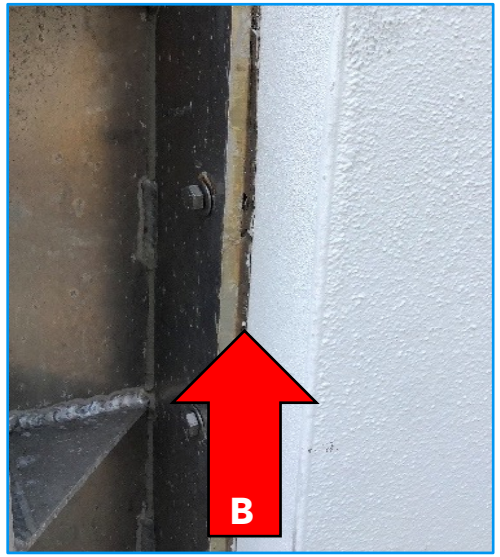
- Mechanical equipment, sump pumps & generators
- Inspect & test all flood shields (check gaskets)
- Inspect foundation walls for cracks

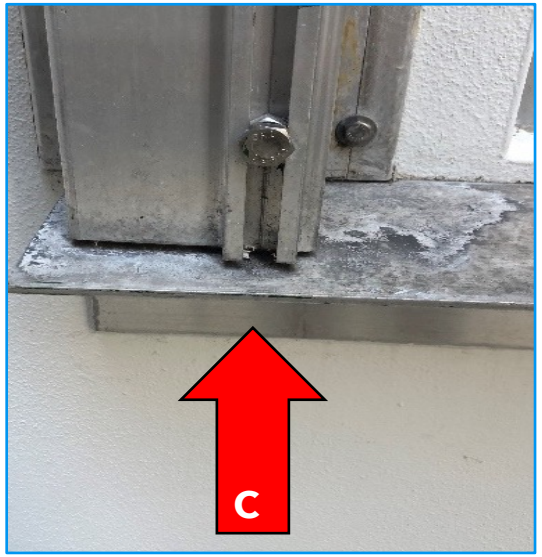
Emergency Operation Plan

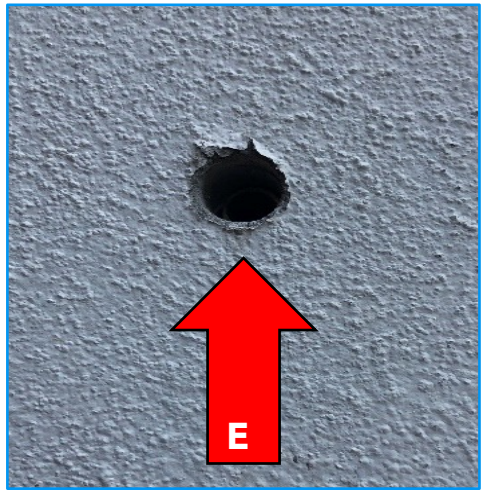
- Establish the chain of command & responsibilities
- Procedure for notifying necessary parties
- A list of specific duties & location of all dry floodproofing materials
- Evacuation plan with and without duties
- Annual training drills with community officials
- The plan is required to ensure that the floodproofing components will operate properly under all conditions, including a power failure which is often seen during floods.

Proper Installation is Critical: Specify Trained Installers









Issues:

A. Cast in place post sleeve was not installed plum

B. Wall bracket was left installed, gasket deteriorated in the Miami sun

C. Gap between the wall bracket and sill

D. Concrete leveler used, created uneven mounting surface and exposed gap. (Mouse Nest)

E. Drop in anchor not installed with adhesive and fell out

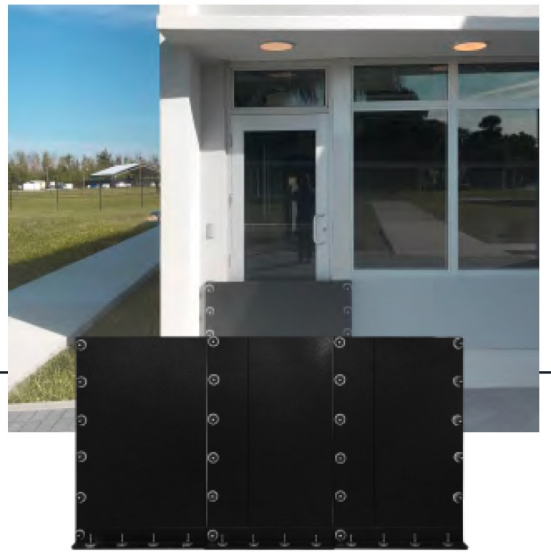
FLOOD LOG SYSTEMS

Flood Logs

Flood Planks

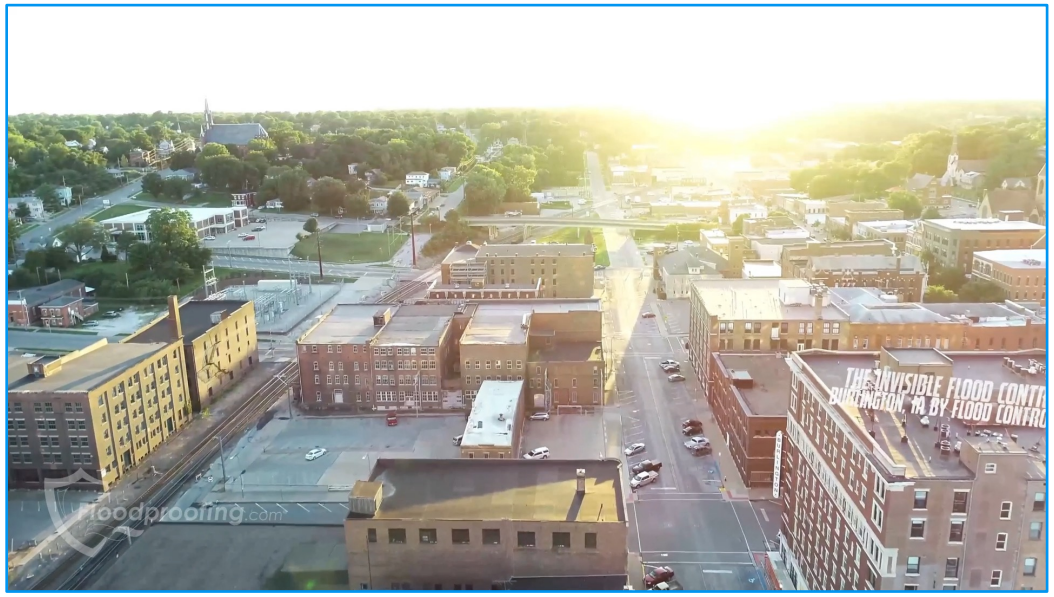
FLOOD BARRIER PANELS

Standard



Custom

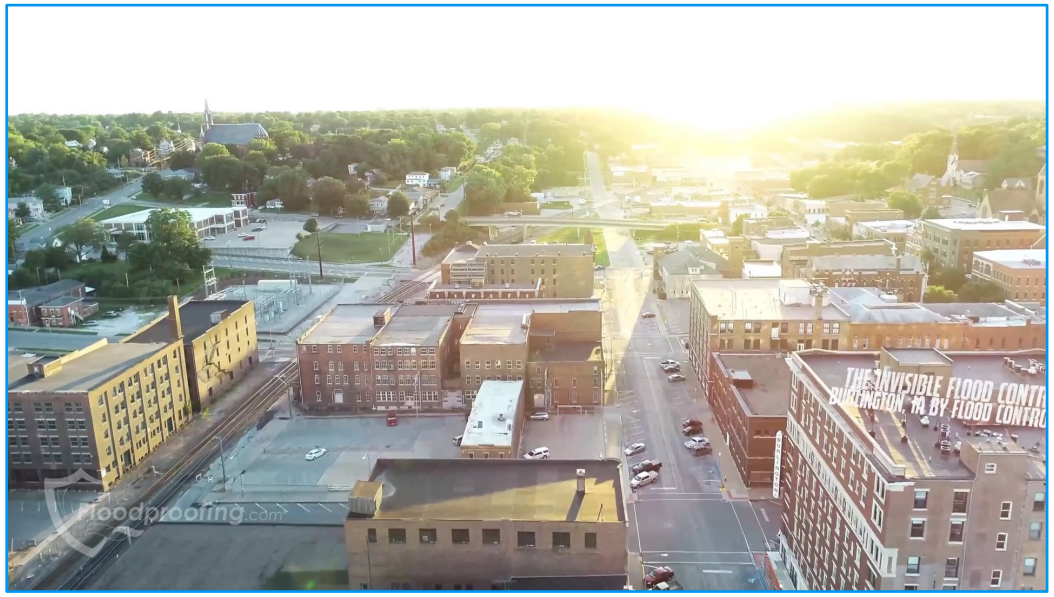
Flood Logs & Flood Planks



Largest removable flood wall in USA (MN)

Holman Field, St. Paul Downtown Airport

Flood Logs & Flood Planks



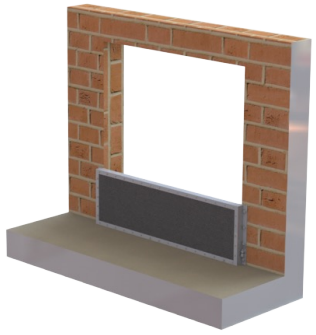
Largest removable flood wall in USA (MN)

Holman Field, St. Paul Downtown Airport

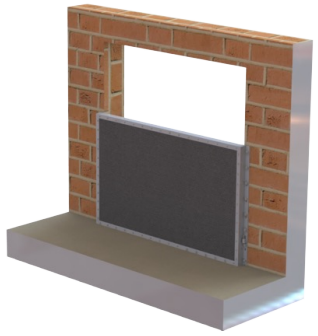
Standard Door Flood Barriers

- High strength, “water-tight”, deployable barrier.
- Hydrostatic; High-impact; Low Leakage: ANSI/FM 2510 Approved
- Comprised of aluminum structural frame, structural impact resistant webbings, coated fabric water barrier, outer fabric impact cover.
- No bottom anchors
- Rapid Deployment & Removal: 1-2 people – 5-10 minutes
- Automatic Bottom Gasket Protection (while in storage)

2 ft. DFE



4 ft. DFE



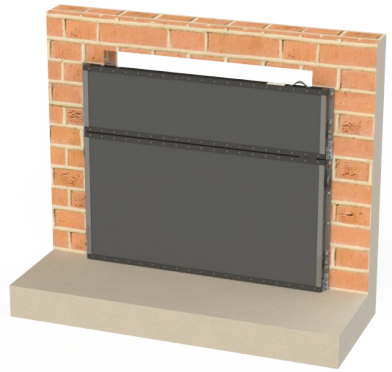
6 ft. DFE

FM APPROVED

ANSI/FM 2510 American National Standard for Flood Abatement Equipment for Openings

54” wide
for 48 in. Opening

92” wide
for 86 in. Opening



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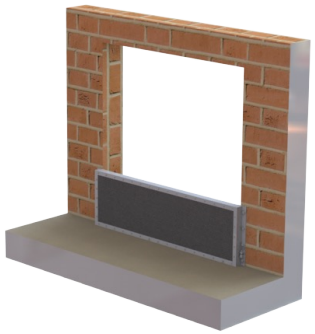
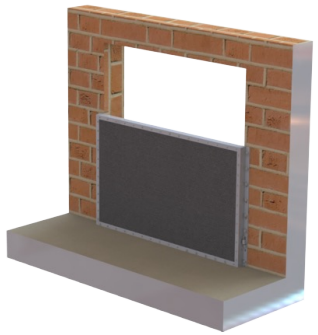
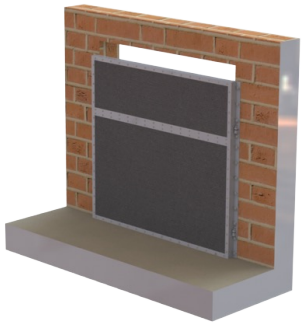


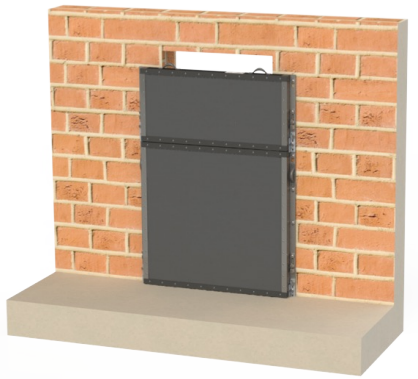
4 ft. DFE



6 ft. DFE



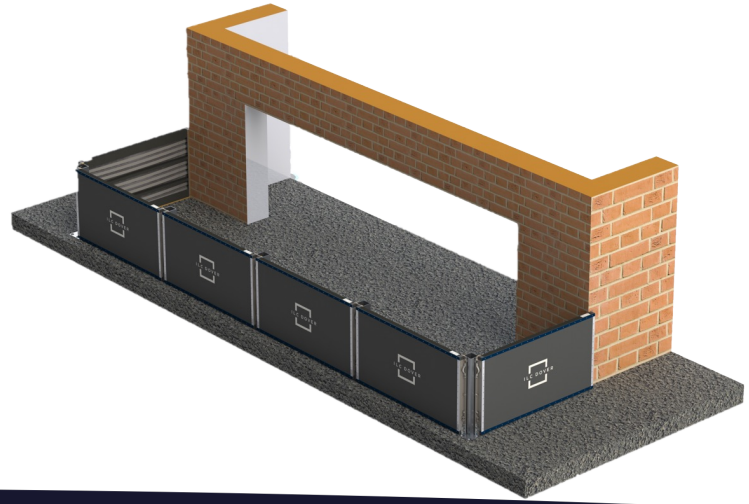
54″ wide
for 48 in. Opening



92″ wide
for 86 in. Opening

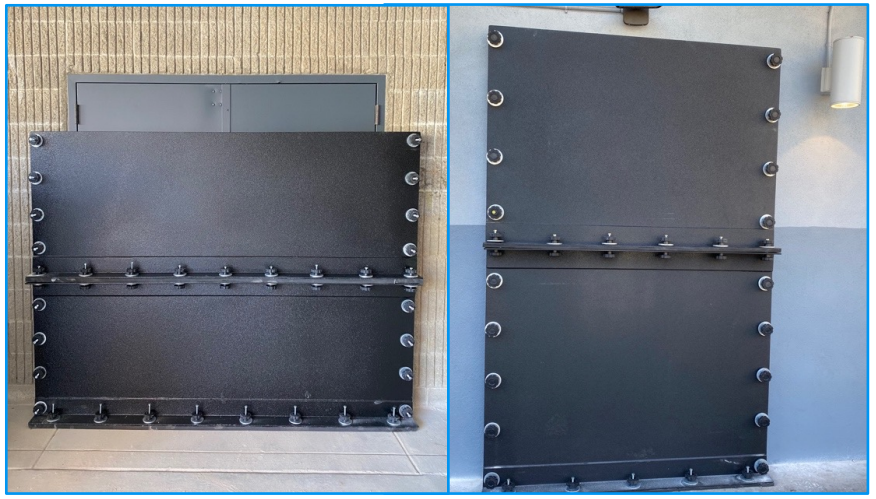
Standard Door Flood Barriers

The Pont in Sea Isle City, NJ



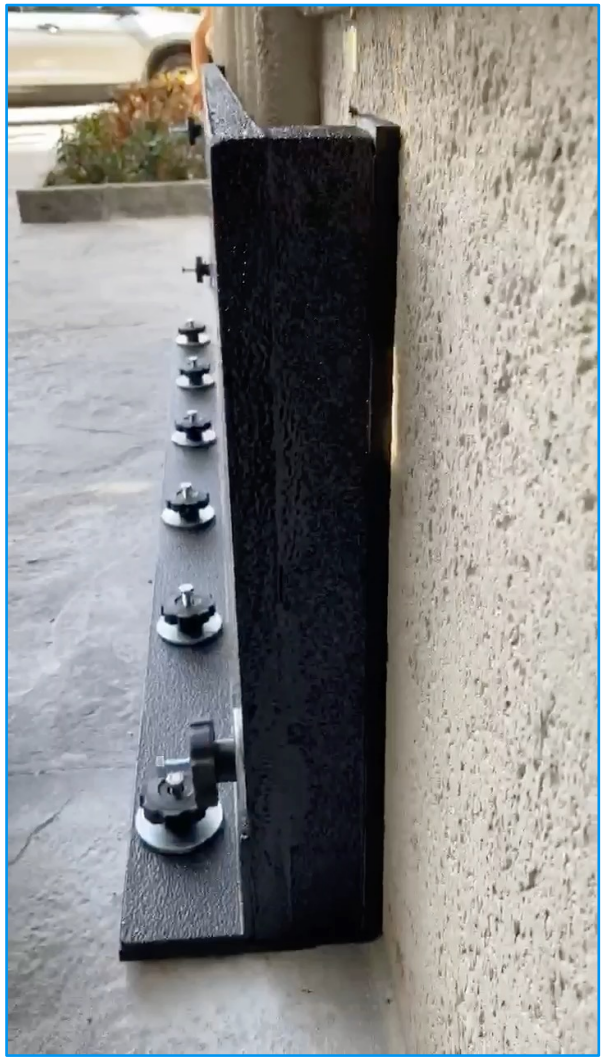
Custom Door & Window Flood Barriers

- Custom sizes available
- Lightweight (less than 5 pounds per sq. ft.)
- Easy to install and remove
- Fiber-reinforced plastic skin
- Decorative caps to cover anchors when not in use



Custom Door & Window Flood Barriers: Installations & Deployment

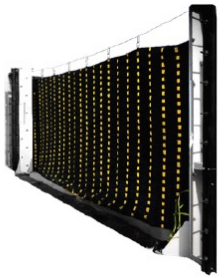
Tooless Deployment

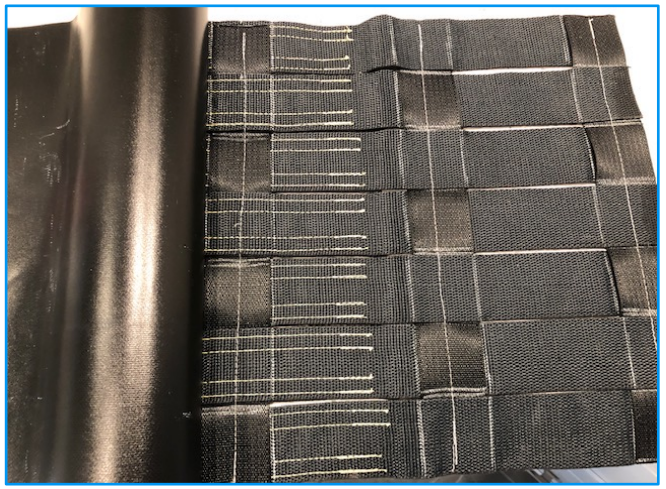


POINT-OF-USE BARRIERS

Point-Of-Use

Point-of-Use Flood Barriers: Side-Deployed Flexible Gate





Point-of-Use Flood Barriers: Vertical-Deployed Flexible Gate

8-ft. length packed in an 8-in. x 8-in. space

PASSIVE FLOOD BARRIERS

Horizontal

Vertical

Passive Flood Barriers: Self-Activating Walls

KEY BENEFITS

- Fully passive operation – protecting people & property 24/7 without human intervention or power.
- Passive flood mitigation measures preferred by FEMA.
- Flood barriers that remain hidden, blended into the surrounding architecture.
- Long service life with minimal maintenance.
- Proven: field tested for over a decade, including real world deployment & long-term exposure in a variety of field conditions.
- Over 2,500 flood barriers installed worldwide.

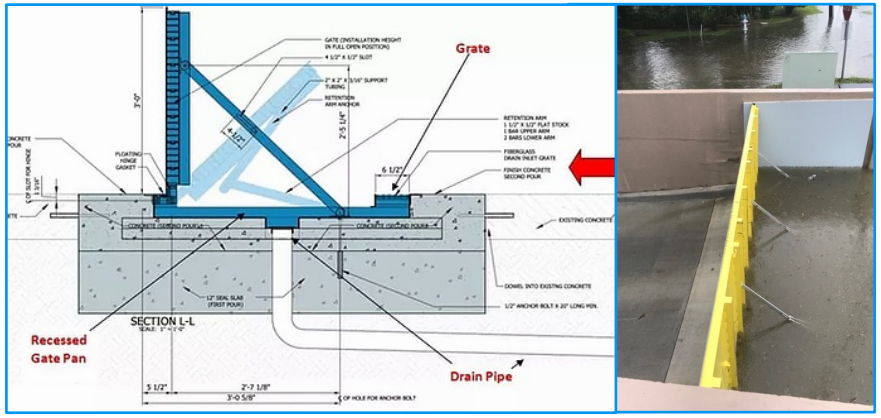
MD Anderson – Houston, TX

Lourdes Hospital – Binghamton, NY
2011 *FEMA Mitigation Best Practices Story*

Passive Flood Barriers: Self-Activating Walls

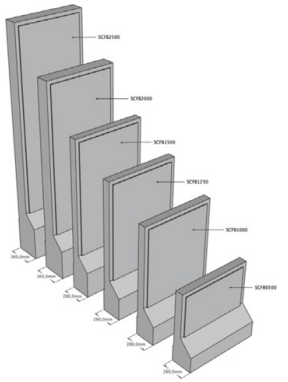
KEY FEATURES

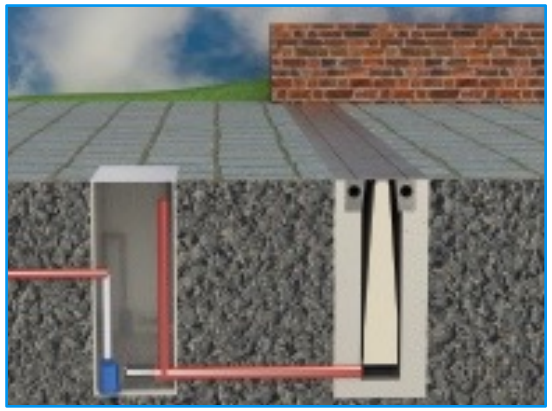
- Buoyant barrier is lifted by water
- Hinged beam floats up with water.
- Self closing – floats back down to hidden position as water recedes.
- Permanently installed beneath grade to protect 24/7.
- Structurally anchored to prevent overturning.
- Self activating gaskets seal against the wiper walls.



Passive Flood Barriers: Self-Activating Walls

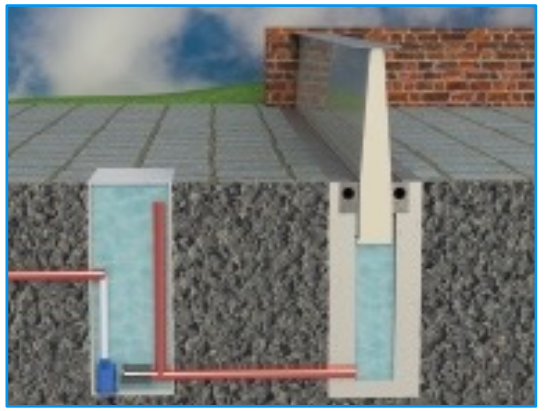
Passive Flood Barriers: Self-Activating Walls





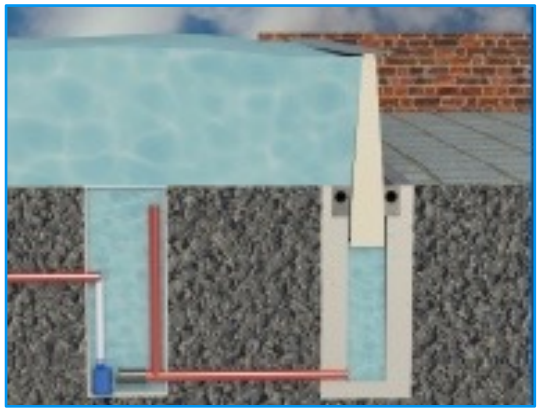
Resting Position

In non-flood conditions, all operational parts of the barrier are concealed in the underground basin.



Deploying

When floodwater rises to within a predetermined level below flood level, the basin housing the floating wall starts to fill up through an inlet pipe from the adjacent service pit.



Fully Deployed

The flood wall floats and rises. When the basin is totally filled, the angled support block will lock the barrier into position making it watertight.

PERIMETER FLOOD BARRIERS

Customizable

Standard

Collapsible

Standard Perimeter Flood Barriers: Rigid, Portable

FLOOD CONTROL

CONTAINMENT

STORMWATER MANAGEMENT

ROAD CROSSING

- One 4-foot section replaces 468 sand bags.
- Unlike sand bags, can be installed during the flooding event.
- Sustainable, reusable, and reliable.
- Can be deployed quickly and safely when time is low.
- Stackable for use and storage.
- Tongue and groove panel interface for easy connections.
- Connections allow for 11-degree flexibility in either direction.
- Corner pieces allow for 90-degree turns.
- All-season compatibility.

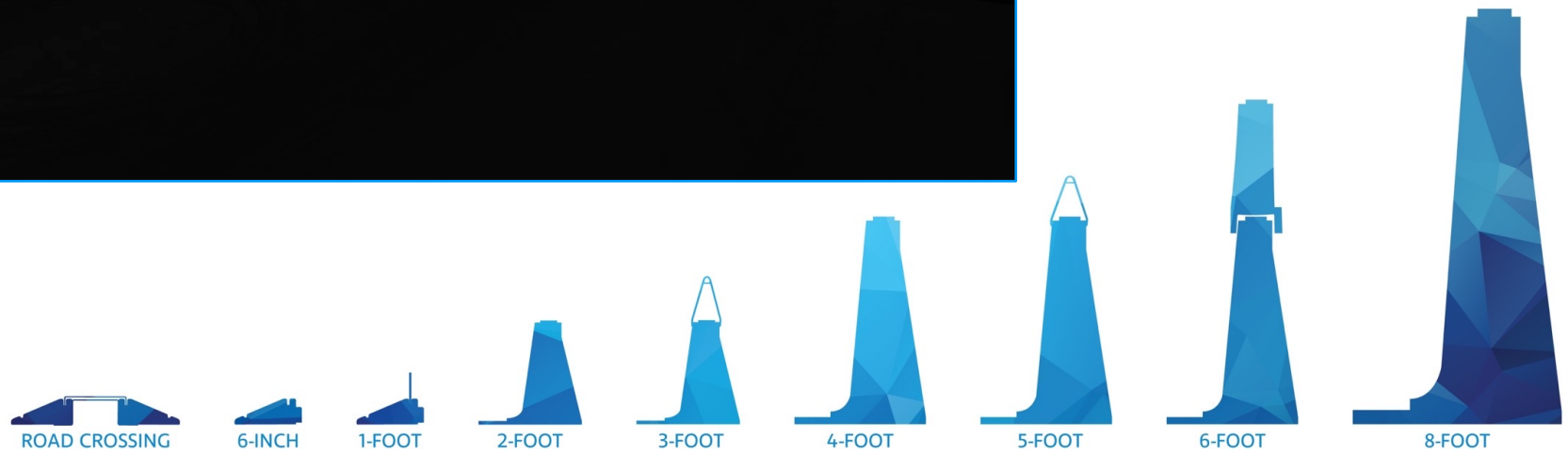
FM APPROVED

Standard Perimeter Flood Barriers: Rigid, Portable

California Department of Water Resources Flood-Fighting Specialists being trained on how to most effectively deploy on a levee.

"We were able to set up 200 feet of barriers with three people in less than 45 minutes."
Larry Bowler, Operation Manager of Sandy City Utilities

Solutions for terminating against a wall



Standard Perimeter Flood Barriers: Rigid, Portable

- Solution for existing buildings that aren't being substantially improved.
- Temporary solution while renovation work is being completed.
- Stormwater Management & Erosion Control.
- Environmental and containment applications.
- Golf course and agricultural applications.

Custom Perimeter Flood Barriers: Flexible, Portable

Waterproof Zipper Connection

Section Lengths Transport Easily

- One person can unroll the barrier and deploy in minutes
- Attach multiple pieces together as needed with a double waterproof zipper connection
- Applications – Protection for Commercial, Residential, Transit, Farmland, Livestock
- No stitching. All High Frequency welding; Corners options are available
- Materials – Coated PVC Fabric, Fiberglass Batons & Rods, Stainless Steel Cables
- Weight – 0.75 lbs. per sq. ft.
- Available in 3, 4, 5, 6 ft. heights

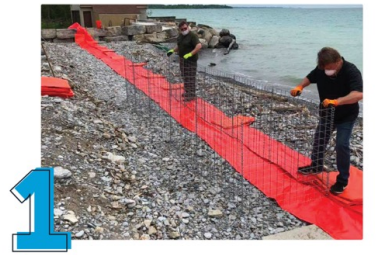
Custom Perimeter Flood Barriers: Flexible, Portable

Custom Perimeter Flood Barriers: Flexible, Portable

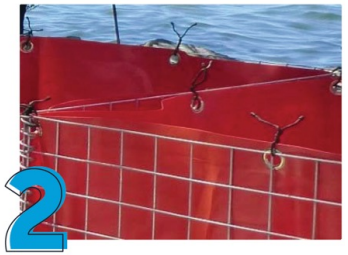
Collapsible Perimeter Flood Barriers: Compact Storage, Portable

- Quick & efficient deployment and retraction
- Pin multiple 16.4 ft. sections together as needed
- 28 in. protection height
- Durable multi-layer polymeric reservoir, military grade steel frame
- Fill with any available water source

QUICK, 4 STEP DEPLOYMENT



Unfold cage on top of liner

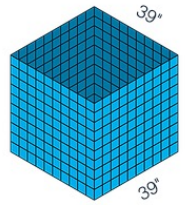


Line cages with reservoirs

Fill using an available water source

Pull liner over barrier

COMPACT – 100 LINEAR FT. CAN FIT IN A PICKUP TRUCK

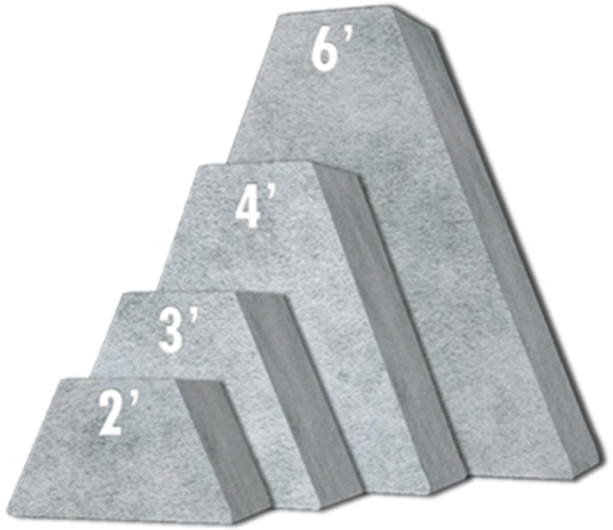


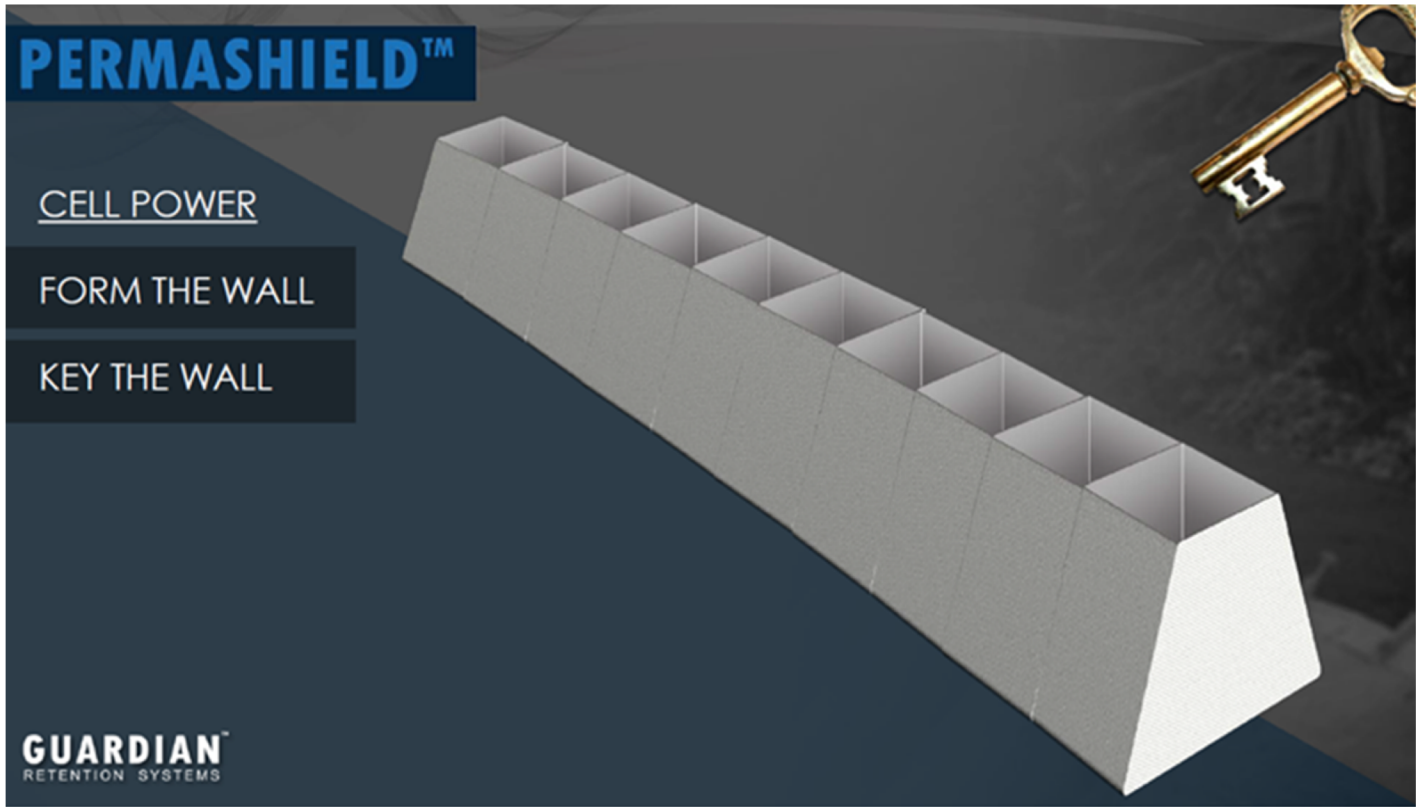
ONE RESERVOIR SHOWN

Sand Filled Flood Fight System

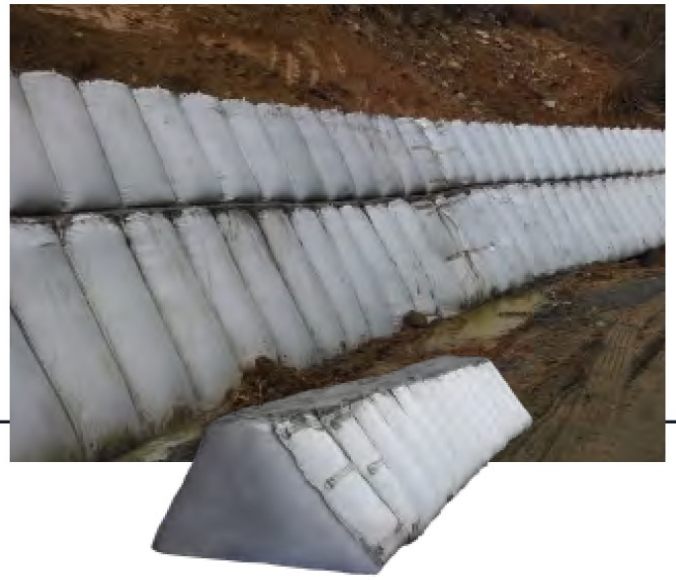
Patented System

- Sold in 50’ L sections; vary in height from 2’ to 6’
- Can be cut to size to fit in confined spaces
- Baffles sewn together forming 25 trapezoidal shaped compartments
- Highly resistant to damage from debris impacts
- If damage occurs, the design isolates damage to the impacted cell





SAND-FILLED FLOOD FIGHTING SYSTEMS



Long Run

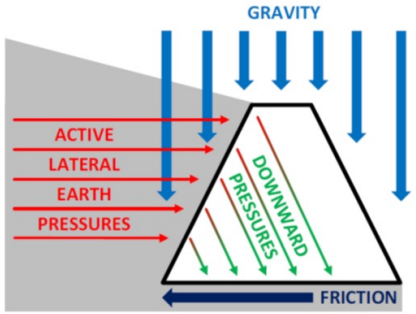
Short Run

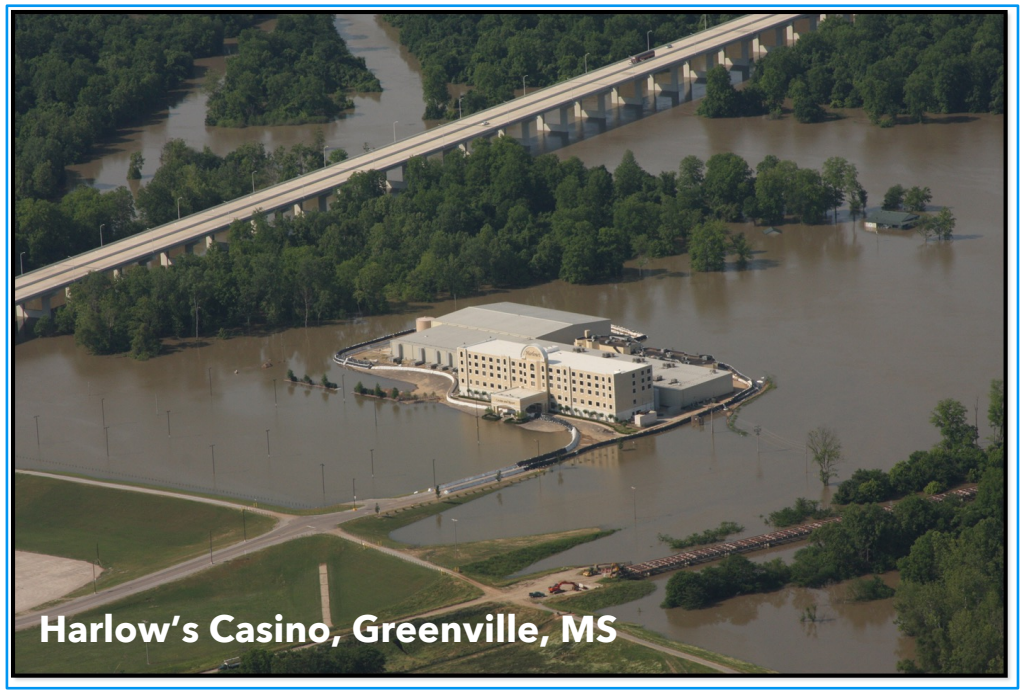
Sand-Filled Flood Fighting System

- Sold in 50′ L sections; vary in height from 2′ to 6′
- Can be cut to size to fit in confined spaces
- Baffles sewn together forming 25 trapezoidal shaped compartments
- Highly resistant to damage from debris impacts
- Rapid deployment and stackable
- USACE Tested
- Resists sliding and withstands rotational forces
- Angular walls redirect active lateral water pressure downward
- Uses gravity and system weight to self-stabilize

Applications

- Flood protection
- Stabilized Earthen Mound
- Bank stabilization, levees and dunes




Harlow's Casino, Greenville, MS

Tybee Island, GA Flooding From Irma

After

Singular, Connectable Version also available

Sand-Filled Flood Fighting System

Material:

- 8 oz. woven polypropylene with highest UV protection.
- Pliable material that has strong tensile and elastomeric properties.
- Water-tight.
- Mounting knobs sewn on top to mount on installation platform to aid in the speed of installation.

Straps with D-Rings

Female to Male Connection

2 SLEDS (one with wheels)
Hopper on Top

Skid Steer loads hopper
Backhoe/excavator pulls sled

Sand Filled Flood Fight System is a Rapidly Deployable Barrier System with the Sand-Fill Install Platform and typical 4-person installation team.

Emergency Sand-Filled Flood Wall (Temporary)

Pumps for Floodproofing Designs

- Required for any dry floodproofed design
- Special consideration for perimeter flood barrier systems
- Float switches, wheel kits, remote monitoring & operation available
- Diesel driven permanent installation models
- FM Approved models for large areas

ASCE 24-14 (Section C6.2 pg. 61)

Sump pumps should be provided to handle inevitable seepage, and emergency power should be provided to run the pumps, especially in areas where inundation duration is expected to last more than 12 h.

Electric
Submersible Pumps

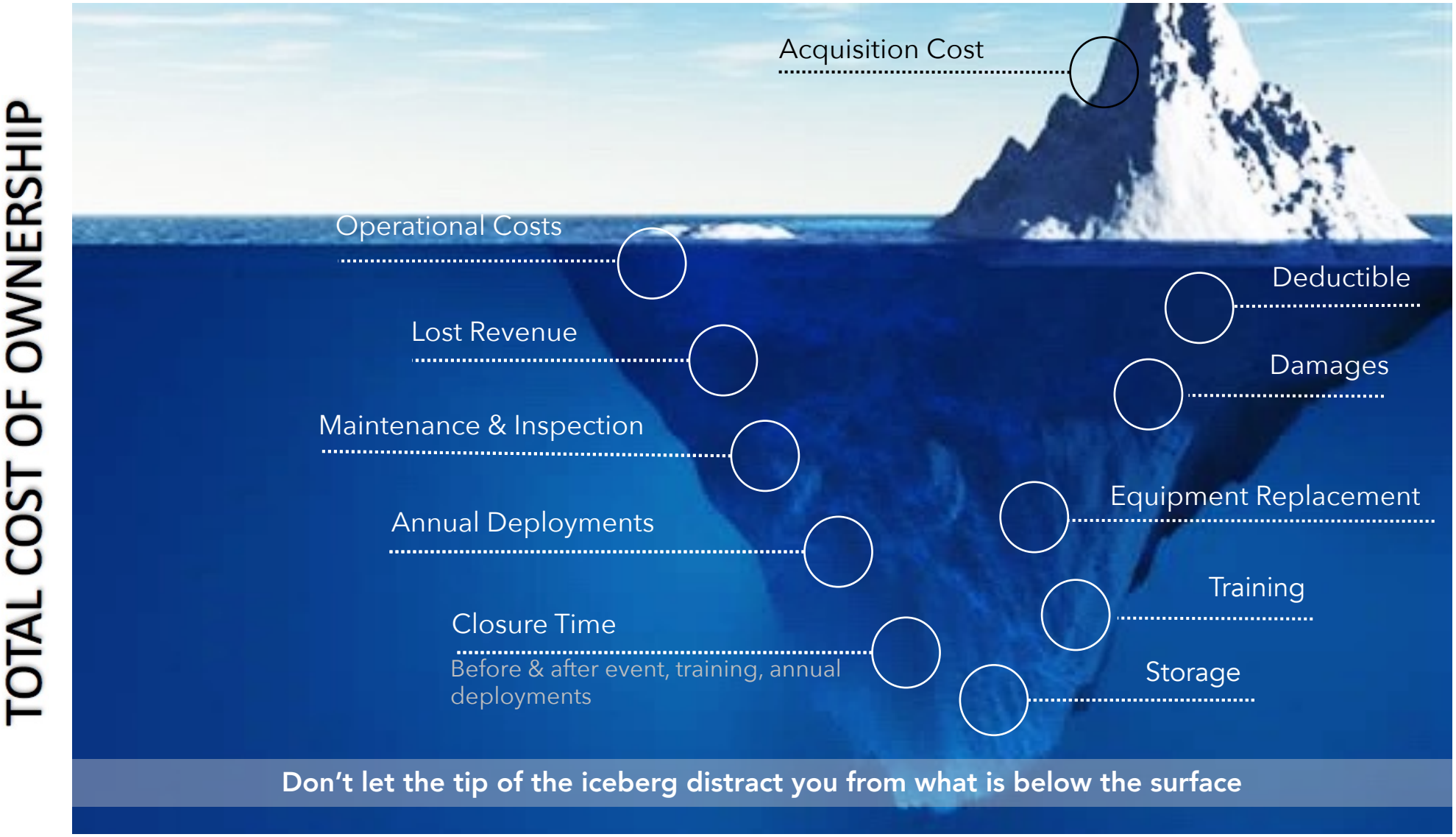
Gasoline Driven
Wet-Prime Pumps

Gasoline Driven
Dri-Prime Pumps

Inside Installation

Permanent Installation

Considerations for Floodproofing Strategy



Thank You For Your Time!

GO TO www.floodproofing.com/education
TO RECEIVE AIA CONTINUING EDUCATION CREDITS & COURSE CERTIFICATE

AIA COURSE TITLE: Understanding Active & Passive Flood Barriers for Non-Residential Structures in a Special Flood Hazard Area

AIA COURSE NUMBER: FP03

AIA CREDIT: 1 HSW

AIA PROVIDER: FLOODPROOFING.COM

AIA PROVIDER NUMBER: T058

Bryan Christopherson, CFM
Certified Floodplain Manager
Midwest Regional Manager
bchristopherson@floodproofing.com
c 563-613-1654

FLOOD DESIGN TEAM

Send plans to: **PLANS@floodproofing.com**

The Flood Design Team

HELPING YOU NAVIGATE YOUR PROJECT IN A FLOOD ZONE

Save time to focus on other tasks

Clear communication & deliverables

Peace of mind your design is compliant

Save money & fit in your budget

Want to learn more about our Flood Design Team? Stay on for an extra 15 minutes for a brief introduction.

Floodproofing.com®

Floodplain Design

(Simplified)

HELPING YOU

Navigate Your Project in A Flood Zone

plans@floodproofing.com / Floodproofing.com / 1-800-507-0865

FLOOD DESIGN TEAM

- Comparing product solutions
- Meeting specific testing standards
- Building for code compliance
- Proper installation and deployment
- Maintenance schedules

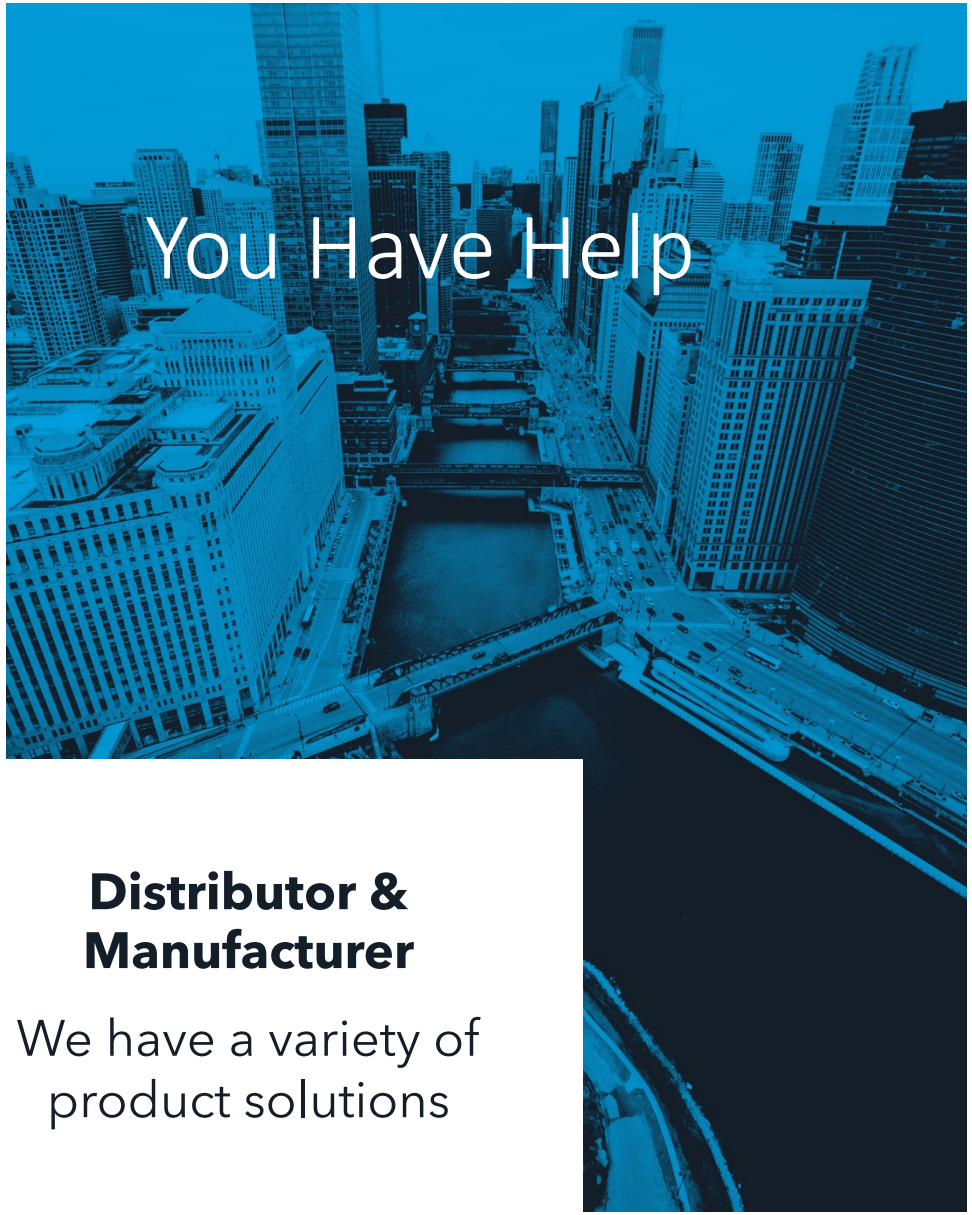
FLOODPROOFING.COM

02

We Have An Experienced In-House Team

20+ years of working in the floodplain

- Certified Floodplain Managers
- Engineers
- Flood Insurance Risk Specialists



Extensive Knowledge of Standards

We study Federal, State & Local Building Codes

Product Installation Partners

We can supply expert installers

Distributor & Manufacturer

We have a variety of product solutions

FLOODPROOFING.COM

03

Where We Come From

04

Our Complimentary Solutions

Educational AIA Flood Courses

Multiple AIA approved courses on Floodplain Design

Complimentary Design Analysis

Product Comparisons, Timelines & Deliverables, 3-Part Specs, & Budgetary Estimates

Flood Insurance Review & Quotes

Dry Floodproofing Credits, Mitigation Savings

FLOOD DESIGN TEAM

FLOODPROOFING.COM

05

Custom Product Options

Door & Window Barriers

Custom

Standard

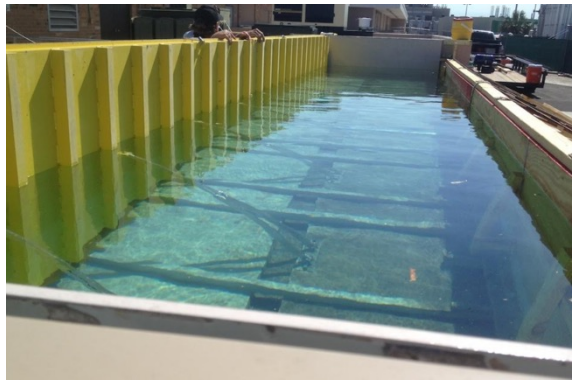
Flood Logs

Flood Planks

Flood Logs

FLOODPROOFING.COM

Passive Barriers



Horizontal

Vertical

Floodproof Glass Systems

Window Systems

Wall Systems

Perimeter Barriers

Standard

Collapsible

Custom

Point-of-Use Barriers

Point-of-Use Barriers

Flood Vents

Flood Vents

06

BENEFITS OF

Working With Us

Save time to focus on other tasks

Clear communication & deliverables

Peace of mind from compliant solutions

Save money & fit in your budget

FLOODPROOFING.COM

PSSST....
Did I mention it was Complimentary?

07

Who We've Helped

THIS YEAR, IN 2021

1,000+

PLANS REVIEWED

1,200+

ASSESSMENTS COMPLETED

850+

FIRMS HELPED

08

We've Worked For Some of the Best

RETAIL

CVS pharmacy

DOLLAR TREE

RESTAURANTS

TACO BELL

DUNKIN' DONUTS

CRITICAL FACILITY

RWJBH

TRANSPORTATION

LGA

EDUCATION

DANVILLE HIGH SCHOOL

HOSPITALITY

Marriott INTERNATIONAL

FLOODPROOFING.COM

09

What You Can Expect

01

Submit Plans & Project Documents

Send us the necessary plans & drawings so we can review the details of your design

02

Review Call with Project Coordinator

Get your own Project Coordinator to review any issues, budgets and design requirements

03

Get Complimentary Design Analysis

A complete assessment with product solutions, budgetary estimates & 3-part specs

04

Follow Up With Project Coordinator

Review assessment to address any questions & talk through the best solution for your project

10

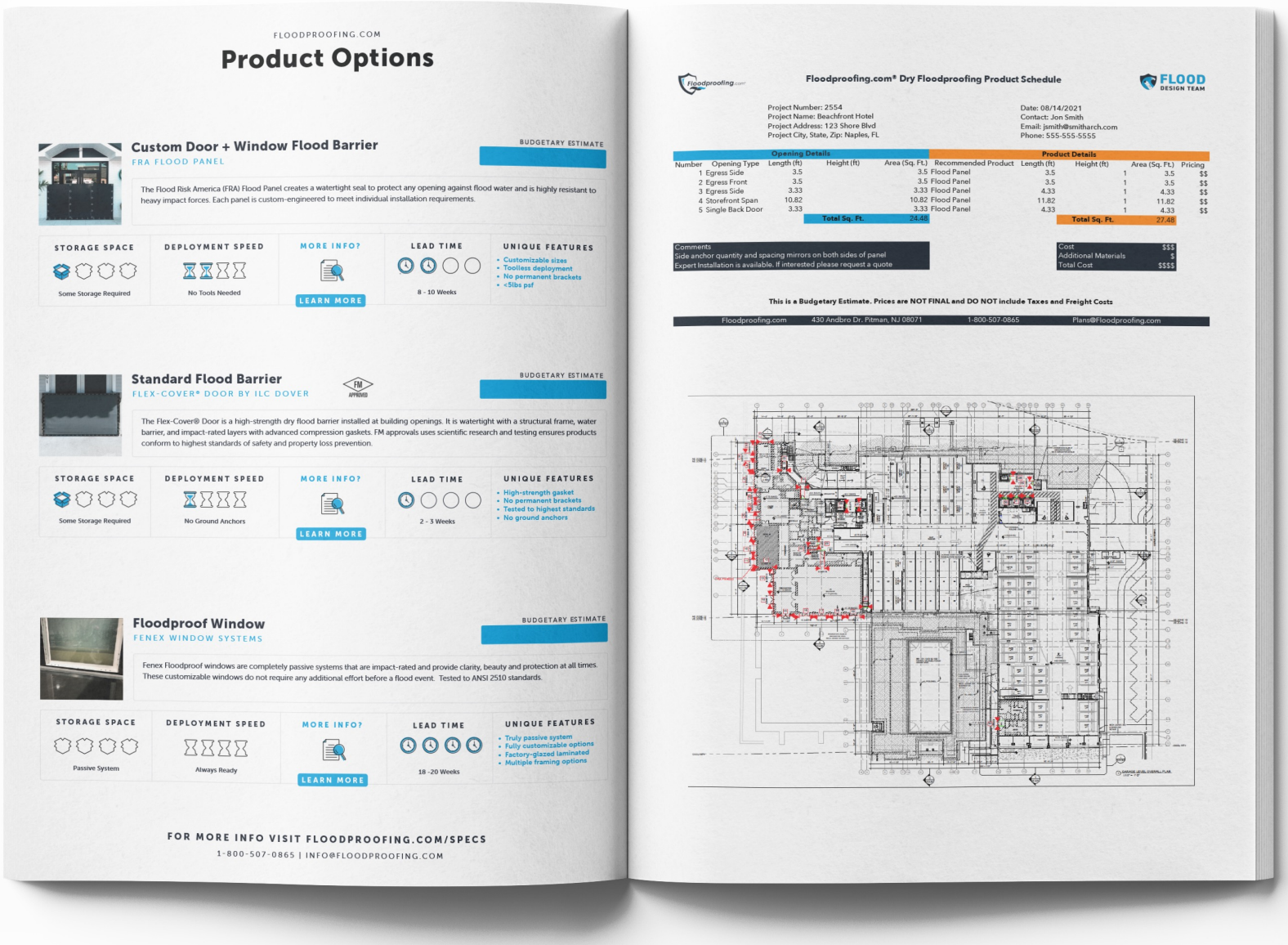
What You Receive

Design Analysis

- Good | Better | Best
- Timelines & Deliverables
- 3-Part Specs
- Budgetary Estimates

Added Bonus!

Ownership Cost Calculations



FLOODPROOFING.COM

Product Options

Custom Door + Window Flood Barrier
FRA FLOOD PANEL

BUDGETARY ESTIMATE

The Flood Risk America (FRA) Flood Panel creates a watertight seal to protect any opening against flood water and is highly resistant to heavy impact forces. Each panel is custom-engineered to meet individual installation requirements.

STORAGE SPACE	DEPLOYMENT SPEED	MORE INFO?	LEAD TIME	UNIQUE FEATURES
Some Storage Required	No Tools Needed	LEARN MORE	8 - 10 Weeks	• Customizable sizes • Toolless deployment • No permanent brackets • <5lbs psf

Standard Flood Barrier
FLEX-COVER® DOOR BY ILC DOVER

BUDGETARY ESTIMATE

The Flex-Cover® Door is a high-strength dry flood barrier installed at building openings. It is watertight with a structural frame, water barrier, and impact-rated layers with advanced compression gaskets. FM approvals uses scientific research and testing ensures products conform to highest standards of safety and property loss prevention.

STORAGE SPACE	DEPLOYMENT SPEED	MORE INFO?	LEAD TIME	UNIQUE FEATURES
Some Storage Required	No Ground Anchors	LEARN MORE	2 - 3 Weeks	• High-strength gasket • No permanent brackets • Tested to highest standards • No ground anchors

Floodproof Window
FENEX WINDOW SYSTEMS

BUDGETARY ESTIMATE

Fenex Floodproof windows are completely passive systems that are impact-rated and provide clarity, beauty and protection at all times. These customizable windows do not require any additional effort before a flood event. Tested to ANSI 2510 standards.

STORAGE SPACE	DEPLOYMENT SPEED	MORE INFO?	LEAD TIME	UNIQUE FEATURES
Passive System	Always Ready	LEARN MORE	18 -20 Weeks	• Truly passive system • Fully customizable options • Factory-glazed laminated • Multiple framing options

FOR MORE INFO VISIT FLOODPROOFING.COM/SPECS
1-800-507-0865 | INFO@FLOODPROOFING.COM

Floodproofing.com® Dry Floodproofing Product Schedule

FLOOD DESIGN TEAM

Project Number: 2554
Project Name: Beachfront Hotel
Project Address: 123 Shore Blvd
Project City, State, Zip: Naples, FL

Date: 08/14/2021
Contact: Jon Smith
Email: jsmith@smitharch.com
Phone: 555-555-5555

	Opening Details				Product Details			
Number	Opening Type	Length (ft)	Height (ft)	Area (Sq. Ft.)	Recommended Product	Length (ft)	Height (ft)	Area (Sq. Ft.)	Pricing
1	Egress Side	3.5		3.5	Flood Panel	3.5	1	3.5	$$
2	Egress Front	3.5		3.5	Flood Panel	3.5	1	3.5	$$
3	Egress Side	3.33		3.33	Flood Panel	4.33	1	4.33	$$
4	Storefront Span	10.82		10.82	Flood Panel	11.82	1	11.82	$$
5	Single Back Door	3.33		3.33	Flood Panel	4.33	1	4.33	$$
			Total Sq. Ft.	24.48			Total Sq. Ft.	27.48	

Comments
Side anchor quantity and spacing mirrors on both sides of panel
Expert Installation is available. If interested please request a quote

Cost	$$$
Additional Materials	$
Total Cost	$$$$

This is a Budgetary Estimate. Prices are NOT FINAL and DO NOT include Taxes and Freight Costs

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It Doesn't End There

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FLOOD DESIGN TEAM

Thank You

Questions? Ask Away.

You can also send plans to plans@floodproofing.com

REACH OUT

Let's discuss your project

1 (563) 613 - 1654

bchristopherson@floodproofing.com

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