

Flood Prevention Options

The options listed below are based on the research done by myself and a team of people from St. Michael's Church who were interested in finding a solution that would be the best for the buildings on our property, located at 2304 Periwinkle Way, Sanibel. One of our buildings is on a concrete slab, built in 2021, but the main buildings are on a wood foundation (concrete piers, wood joists and wood subfloor), so the options were more limited for those buildings. Several of the options we were shown need to be on a concrete slab/have concrete footing to bolt into. The following is our notes after having on site visits by several companies that presented exterior and interior flood prevention methods. We encourage anyone interested in flood prevention to do their own research, have company representatives visit your property and help you determine what is the best solution for your situation. This report is our experience only, and your experience might differ. Sue Van Oss communications@saintmichaels-sanibel.org

Start with a drainage plan for your property:

Drainage on the island has changed since Hurricane Ian; the topography of the island has changed, recent storms have overwhelmed the weirs systems on the island and water levels are higher than in the past. Before looking at external flood prevention options, consider the drainage on your property; is it adequate? Have the elevation levels changed since the storms? (ours had and we paid a company to move the earth and correct the elevation in some areas back into it's proper place, reopen swales that had been covered over, etc. Are any culverts the city owns that adjoin your property cleaned out? Some of ours had storm debris in them. Consult with the City Public Works department; we found them very helpful to work with. See if the city has any drainage plans for your property or if you have them on any surveys for your property.

Unfortunately, the recent storm events can push the water in reverse, overflowing the weirs and systems and bring it from the bay/lake onto our property; the only thing that can help with that is flood panels so we then explored various flood prevention options listed below.

External Flood Prevention Options:

- We researched many different companies and selected vetted ones to do on site assessments with a resiliency team composed of senior warden, junior warden, property chair, our property restoration team chair, rector and myself who serves as our restoration project coordinator.
- We also talked to several island business owners about the resiliency measures they are taking, both about external flood prevention methods and internal water proofing options. Ask the companies you research for references of local businesses that have purchased their products. Talk to business owners on Sanibel and Fort Myers/Beach
- There are many different types of flood prevention strategies and it will depend on which is the most appropriate for your situation, but here is a brief summary of the 3 main types of systems and the options within each one.
- The one the church decided one is a deployable system- composite flood panel

DEPLOYABLE FLOODPROOFING SYSTEMS

Flood Logs



Flood Planks



Customizable, stackable aluminum flood barriers that are easily assembled and customizable for most structures

Custom Flood Panel



Composite Flood Panel



Expandable Flood Barrier



PASSIVE FLOODPROOFING SYSTEMS

Horizontal Automatic Lifting Barrier



Vertical Automatic Lifting Flood Barrier



Floodproof Window



Glass Flood Walls



PERIMETER FLOOD BARRIERS

Includes tiger dams & concrete walls

Modular Perimeter Flood Barrier



Standard Water-Filled Interlocking Flood Barrier



Water-Filled Tube Flood Barrier



Semi Water-Filled Interlocking Flood Barrier



Trapezoidal Sand-Filled Flood Barrier



Short-Run Sand-Filled Flood Fighting System



Options for St. Michael's:

When considering options to make St. Michael's more resilient we divided up the options into two categories; a Helene/Milton type event (minor/moderate flooding) and an Ian event (severe flooding/damage). Below are the options for both scenarios that we have looked at and our focus was on finding a system that would prevent a Helene/Milton type event, in which we got 3-5 inches of water in the buildings, something to prevent up to 4 feet of water. There is not much that can be done if we would get another Ian event- almost 6 feet of water intrusion.

Factors we considered, in priority order:

- Success rate
- Viability with our present structures- office on concrete slab, main building wood
- Deployment – how long, how much and what type of labor needed
- Storage- where and how would the items be stored
- Cost
- Aesthetics

Surviving a Milton type event:

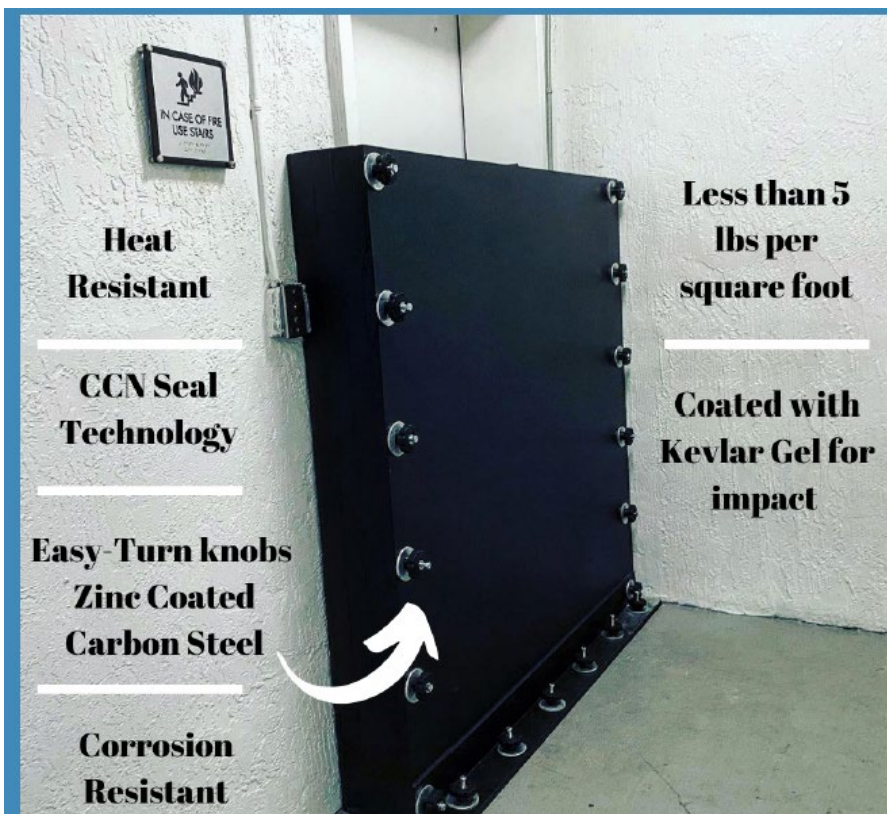
Flood Risk America -Stephen Gill www.floodriskamerica.com

Best solution for our application: FRA Composite (Rubber) flood panels

- Install a 1/2 " rubber on the ground in front of each door, which would extend out and be beveled at the edge for ADA access
- On top of that rubber are placed panels that are anchored every 12 inches on sides and bottom
- Anchors are hidden when not in use with caps that can be colored to match the siding
- Easy to install, each panel is 22 pounds, a double door panel is 45 pounds

- Takes about 6-15 minutes to install each panel with no special tools, screw in the anchor bolts until no daylight is seen, can be done by our volunteers
- Water acts as additional sealant on gasket
- Initial installation is the rubber on the ground, get a flooring professional to install the rubber
- When you install the panels, you add silicon to the wood below to prevent seepage.
- We have 11 single doors, 6 doubles and the 16 foot sliders, would work on all of them, plus the 2 office doors
- They are a certified company and would provide engineering and all plans that we could approach insurance with to obtain a discount
- Exceeds FEMA guidelines
- Can be stored in 1/2 of our outdoor storage room, which is about 10' x 30', (remember this is for 18 sets of doors)
- Lifetime warranty
- Flood deployment training is provided

****** This will not protect the building from an “under and up” event through our wood subfloors like we had with Ian that knocked the piers off their foundation and pushed the wood subfloor up several feet. If storm surge is fast and furious, the hydrostatic pressure will build underneath and push the water up through the floors, not through our concrete slab foundation but the wood ones.**





Easy-Turn knob for fast deployment and toolless system



Superior bracing support to connect for longer lengths



American-Made Flood Protection



Protect Your Properties From Flooding



Custom- Fabricated Sizes, Lengths, Thickness, and Shapes





FRA FLOOD PANEL

- Light-weight
- Marine-Grade Material
- Lifetime Warranty
- Made in USA
- Custom- Fabricated
- Withstands 13,000 PSI
- Cost-effective
- Easy to Deploy
- Exceeds ANSI 2510 requirements
- Color Options Available



FRA PANEL PROTECTION BOXES

The FRA Panel can be custom-designed to create a box for unmovable equipment such as generators, fuel tanks, electrical boxes, waste management systems, and all types of vulnerable equipment.



ELEVATOR PROTECTION

The FRA Panel was first designed to protect elevators from flooding, but it is now widely used to protect every vulnerable area of a property from flooding.

For our HVAC system and our AAON air purifying system, they have FRA Panel protection boxes that are attached to the concrete slab under the equipment. Can also be used for elevators. Floodrisk's other option was Tiger Dams:-minimum 50 foot length, need to be filled with water, would have to get water trucks, need a deployment team, they weigh 300 lbs, to get height need to pyramid stack them. Not a realistic option for our situation due to the size of our buildings and the amount of tiger dams needed. It would take dozens of water trucks days to fill them and a professional crew with heavy equipment to put them in place.



**18" FM
Approved Tiger
Dam™**

**24" FM
Approved Tiger
Dam™**

**30" FM
Approved Tiger
Dam™**

Options for an Ian Event

Everything was on the table when considering another catastrophic hurricane like Ian.

1. Permanent Perimeter concrete wall, on the other end of the spectrum, we could build a 6 foot high concrete wall around the entire building complex, but would cost well over half a million \$, might not even be allowed with permitting, plus would need concrete slabs with flood gates on top of slabs for openings, in addition would need pumps run on gas/solar to also pump out inside the wall and destroy the aesthetic look of the property.
2. Elevating the buildings – office could be accomplished, nearly impossible for sanctuary,- would have to take it apart piece by piece, number all the pieces and then reconstruct it
3. Demolition of buildings and rebuilding an elevated sanctuary and multipurpose building
4. Go through the process of having the sanctuary designated as a Sanibel historical site, 50% rule would not then apply but you would have other restrictions, and build a barrier around that structure, and then rebuild an elevated multipurpose building

We want to be thinking about this and have a plan decided in advance.

Internal Waterproofing Options if we have another moderate/major flood:

Flood Protective Baseboard/Walls **Geno Accra** www.floodguardians.com

Flood Protective Base/Walls- Custom Flood Prevention and Airflow Remediation Systems for Long-Lasting Protection from Moisture and Storm Damage. They offer innovative airflow remediation systems that reduce moisture buildup and enhance your home's ability to withstand storms. Stop the cycle of replacing drywall and furniture after every storm.

We our case, if we have water intrusion again, we would consider installing a flood-protective baseboard system with kick trim and apply caulking to all installed areas for a secure and water

resistant finish. If water intrusion occurs, baseboard is removed, insulation dried out, and same baseboard reinstalled. Could decide what height, it would be custom designed and could be 8 inches or 12 inches of baseboard, and then water resistant wall boards as well.

Enduraflood panels www.enduraflood.com This is another option for water proof wall boards instead of drywall, the panels are installed on a track system and can be popped out if water impacts them, hosed off and dried off, wet insulation removed and replaced, and then the panels are reused and put back in place. We ordered a sample kit to see the material but did not have a rep come on site as we only needed to replace the baseboard in the buildings and did not have to replace the wall boards. We would consider some type of flood protective wall boards/baseboards in the future.

Epoxy Floors- Miles Sweiss www.sanibelepox.com

Sanibel Epoxy is a concrete floor coating business helping residents and businesses flood proof their concrete floors with commercial grade coatings. It is a 5-Step Industrial Grade Epoxy-Polyaspartic System that creates beautiful and highly durable floors that will withstand the elements. In our case the resistant flooring application would have to go over a new subfloor that is also water resistant, would not work on our present subfloor but this is a good option for retail locations, (worked very well with island business that had water intrusion- just squeegeed water off, hosed down, dried with fans and back in business) and garages and lower levels.

Water resilient subfloor – Christopher Bainbridge

www.caconstructiongroup.com Chris works in tandem with Miles if you need both options

Chris is a local general contractor with many years of experience that would come in and in our case remove both layers of plywood subfloor in all ground level areas of main building and replace with 1 layer of ¾ T & G Advantech water resistant subfloor material. Then we could apply the epoxy floors.

Other option for a subfloor is a decking material, in 4 x 8 sheets instead of planks usually used for a deck.

Other companies:

Floodproofing.com www.floodproofing.com Mike Fults www.floodproofing.com

- Company started with smart vents, expanded to include several different types of flood prevention techniques
- Out of all the options for a **Milton Event**, he recommended the **Dam Easy panels** that require smooth, flat, hard surface behind them and a concrete post in the center for the double doors. <https://store.floodproofing.com/dam-easy-flood-barrier-c4.aspx>
 - Door jams and thresholds on some doors would have to be **retro fitted in our case for some of our door openings so we decided against this option, but could be a good option for a home owner**
 - For double doors, a concrete post has to go in the center, so a concrete footer would have to be installed. Posts are a female thread in the concrete to a male thread
 - Jams need to be at least 4 1/2" to serve as support posts- this is an important thing to consider! We would have had to retrofit several of our door jams for this to fit, but if they fit into your door openings, it can be one of the most inexpensive but successful options for a home.

- Mike came with an actual Dam Easy panel and demonstrated how to deploy it and walked the property to determine if it would work for each door opening and what, if anything needed to be done for it to work in each opening.
- Pricing varies based on the width but can be as low as \$800 for a door opening panel.
- These are fairly easy to deploy, you place in the door opening and then use a pump with a visible gauge on the device to pressurize it. They are easy to store and don't take up much room- smallest of all the options.
- Other Options for our application from floodproofing.com for an **Ian Event**:
 - Concrete perimeter wall and flood panels at openings- Ian event
 - Concrete footers as a fence with slats for panels- deployment time is a week with heavy equipment- Ian Event
 - Tiger Dams- Water filled tubes, 50 foot lengths, attached together with ratchet straps, up to 43" high on a pyramid pattern, need a water source to fill it, and additional pumps on the dry side with a generator to keep the pumps going- Ian or Milton event
 - Industrial sand bags – Milton event
 - Water activated tube deployment barrier- they can get pushed out of the way if the water comes in too fast

Garrison Floods: We attempted to have Garrison Floods come for an on site assessment, but they cancelled on us twice so decided not to pursue this company. Their products are similar to the ones listed above.

Photos are from company websites listed in this report.