TRINITY-BY-THE-COVE EPISCOPAL CHURCH
STORM RESILIENCE COMMITTEE

FINAL REPORT

April 2025

Naples, Florida

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Preface

Trinity-by-the-Cove Church was flooded in 2022 and 2024 as a result of hurricane-driven storm surge. The likelihood is that such flood events will continue. The Flood Resilience Committee was formed in late-2024 to develop a plan to prevent or mitigate damage from such floods in the future. With Fr. Edward's concurrence, the committee was rebranded as the "Storm Resilience Committee" to reflect storm-related consequences other than just flooding. This report documents the results of our investigations and offers recommendations to ensure the continuation of operations in the event of future storms.

Members of the Committee wish to thank the Rev. Edward Gleason for his leadership and guidance and for providing us with the opportunity to address this most important matter for the church. We also express our appreciation to Kim McQueen, Parish Administrator, who has already made great progress in implementing some of the interim solutions recommended in this report.

Respectfully submitted

Storm Resilience Committee

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EXECUTIVE SUMMARY

The Trinity-by-the-Cove Episcopal Church Storm Resilience Committee has prepared this final report to address the recurring issue of flooding at the church, which has been significantly impacted by hurricanes in recent years. The church, located in Naples, Florida, has experienced severe flooding twice in the past two years, causing extensive damage and disruption to its operations.

The report outlines the committee's comprehensive assessment of the church's physical assets, including the church building, parish hall, office wing, classroom wing, rectory, and parsonage. It details the challenges posed by the church's proximity to tidal waters and its low elevation, which make it vulnerable to storm surges.

Key recommendations include both interim and long-term strategies to prevent or mitigate flood damage. Interim measures involve the use of Xero Flood barriers and other solutions to protect the church during the upcoming hurricane seasons. Long-term strategies focus on more permanent solutions, such as raising the church structure or recreating it at a higher elevation to ensure its resilience against future floods.

The committee has also considered the financial implications of these recommendations, including the cost of construction, and the impact on the church's budget and fundraising efforts. The report emphasizes the importance of proactive measures to protect the church's assets and ensure the continuity of its mission and operations.

In conclusion, the committee recommends a combination of interim and long-term strategies to enhance the storm resilience of Trinity-by-the-Cove Episcopal Church. These measures will help safeguard the church's physical assets, minimize disruption to its activities, and support its mission for years to come.

SECTION 1—INTRODUCTION

Background

Trinity-by-the-Cove Episcopal Church is located in the Port Royal section of Naples, Florida. Its property spans Galleon Drive with the rectory, parish hall, classrooms and offices on the Jamaica Channel (north) side of the street and the church itself located in a triangle-shaped parcel on the south side of Galleon Drive. The area is characterized by distinctive residences, well-tended tropical landscaping and a serene ambiance conducive to worship and reflection.

This special location provides innumerable benefits. However, its proximity to tidal waters and site elevation of approximately 5 feet above sea level present some significant challenges and threats. The Storm Resilience Committee was established to proactively assess and develop strategies for mitigating the risk of flooding within our church facilities.

Physical Assets

The physical assets considered by the committee consist of the:

- church
- parish hall
- office wing
- classroom wing, including church mouse and facilities office
- rectory and
- parsonage.

We did not evaluate flood mitigation measures for the parish hall, since it did not flood during Ian or subsequent storms.

The church building was consecrated in 1953 and sits at an elevation of approximately 5 feet above mean sea level, which is 3 feet lower than the FEMA flood level for the area: AE 8[1]. The building has been improved and modified over the years. The main structure is original. Mechanical, electrical and security systems are of varying ages and typical of a 72-year-old building. There is no fire protection system, e.g. sprinklers. The building is not on pilings and there are structural elements that would not meet current codes, such as

[1] An AE 8 Flood Zone is a high-risk flood zone with a 1 percent annual chance of flooding at an elevation of 8 feet.

non-impact glass windows and raised electrical outlets. Current plans include installation of a new organ to replace that damaged by flooding in 2022. Structural and mechanical improvements to the building are necessary to accommodate the new organ and pipes.

Figure 1-Trinity-by-the-Cove Church Building, Circa 1953

The parish hall consists of a large central hall, kitchen, conference room, library, family room, choir room and other ancillary spaces. It was reconstructed in 2020 and raised 3.5 feet above its original elevation, which places it above the FEMA flood elevation of 8 feet.

The office wing was originally at the same elevation as the parish hall. When the parish hall was reconstructed and elevated in 2020, the office wing was renovated but not elevated.

The classroom wing was constructed in 2004 and consists of a nursery, three classrooms and a youth room. For purposes of this discussion, the classroom wing also includes the church mouse (dispensary of gently used goods) and the facilities office. Its finished floor elevation is approximately 5.5 feet.

The rectory is located adjacent to, and west of the parish hall complex. It was relocated to its current site in 2004 and raised in the process. Its finished floor elevation is approximately 9 feet.

The parsonage is a residence located in the Autumn Woods subdivision, some 9 miles north of the main church campus. Its finished floor elevation is above the FEMA flood level, so it is not as vulnerable to floods as the main campus.

Tropical Cyclones

For most of its existence, Trinity-by-the-Cove has not suffered from flooding caused by Hurricanes. The one exception to this was Hurricane Donna which made landfall near Goodland in September 1960 and flooded the church. However, for the next 62 years, despite many Gulf hurricanes, no significant floods affected the church

In the past 8 years, Naples has been struck by four major hurricanes. Each of these hurricanes affected Trinity by the Cove in different ways. The most salient feature of Hurricane Irma (September 2017) was wind. Gusts at Naples Airport were measured at more than 140 miles per hour (mph). This led to widespread and protracted power outages. Fortunately, the storm's path moved to the east prior to its landfall near Cape Romano. Had the storm continued on its forecast path just offshore of Southwest Florida, the storm surge elevation in Naples Bay, which reached approximately 6 feet above mean sea level, could have been 5-10 feet higher. Trinity suffered wind damage from Irma, but negligible flooding.

Hurricane Ian was a different story. Ian made landfall Sept. 28, 2022, near Cayo Costa as a Category 4 storm with maximum sustained winds of 150 mph. Ian pushed a storm surge of 15 feet above ground level into parts of southwest Florida, resulting in record inundation of coastal locations, especially Sanibel Island and Fort Myers.

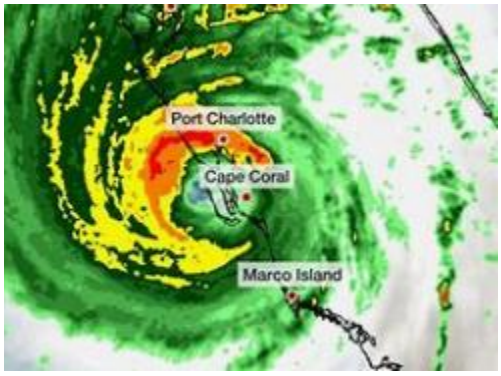

Figure 2—Hurricane Ian Making Landfall Near Cayo Costa

While the eye of the storm passed offshore of Naples, the counterclockwise motion of the storm and its low pressure forced a mound of Gulf waters onto the beaches and low-lying areas of Naples and Collier County. The storm surge from Ian reached an elevation of 8-10 feet, and inundated Port Royal, Old Naples, Downtown and areas south and east of the Tamiami Trail. Trinity suffered extensive flood damage. Flood waters inundated the church to a depth of approximately 3 feet. The office wing and classroom wing were similarly flooded. Fortunately, the parish hall which had been raised 3.5 feet during its reconstruction in 2020 suffered no flood damage. Also, the rectory structure, which was elevated when it was relocated, was not flooded. The cost of reconstruction was $1.2 million (excluding repair of the damaged organ, which was estimated at $400,000). The church was back in service by mid-November, but it was late January before the offices and classrooms were ready for use.

Helene (September 2024) was the strongest hurricane on record to strike the Big Bend region of Florida. The eye passed approximately 200 miles west of Naples. Despite this large distance, Helene drove storm surge into Naples Bay. The maximum water surface elevation in Naples Bay (at the City Dock) was 6.5 feet. The water level came within inches of our structures at Trinity, but no flood damage occurred.

Less than 2 weeks after Helene, Hurricane Milton made landfall at Siesta Key. Milton was the second most intense Atlantic Basin Hurricane ever recorded over the Gulf of Mexico. The unique feature of Milton was the unprecedented number of tornadoes it spawned. With the storm center passing about 160 miles west of Naples, Milton generated storm surge in Southwest Florida. The water level in Naples Bay rose to 7.6 feet. The highest water level measured at the church exterior was 20 inches.

Fortunately, some flood prevention measures were put in place. Sandbags were placed and the door openings were taped. Due to these measures, the water depth in the church only reached 1-2 inches compared with the 20-inch depth in the churchyard. Still, floors and base trim were saturated, and the church was out of service for several weeks for dry out, bacteriological tests, and trim carpentry work. The classroom wing also suffered extensive damage with several inches of water, despite the placement of heavy aluminum flood panels on exterior doors. Also, the office wing suffered minor flood damage. The church was returned to service in late November. However, it was mid- January before limited activities in the classroom wing could resume and it will be summer before all of the construction will be complete. The church has spent $500,000 for reconstruction for Milton with another ~$125,000 still to be spent on construction in the classroom wing to be done this summer.

In summary, Trinity has suffered serious flooding twice in two years. Insurance payments have offset some of the costs of repairing the buildings and replacing damaged contents, but after the recent spate of hurricanes, insurance costs have dramatically increased and coverage may not only become unaffordable, but unavailable.

In addition to the financial impact, these floods have been highly disruptive to the church's mission. For example, with the classrooms out of service, workarounds had to be devised for Sunday school. Without a convenient childcare option on Sundays, many young families could not make it to church services. Streaming has mitigated some of these impacts, but there is no substitute for in-person worship and formation.

Further, these flood impacts have detracted from the morale and focus of clergy and staff. For example, for the 4 months following Ian, the rector, parish administrator and facilities manager devoted at least half of their time attending to the myriad details of the reconstruction process. While the most essential church activities continued, many less important functions were delayed or cancelled.

Purpose and Approach

Perhaps it will be another 62 years before we suffer from a destructive flood; however, recent history suggests otherwise. Accordingly, the vestry and clergy are resolved to minimize and hopefully avoid the cost, damage and disruption of future floods. For our building assets, the committee considered cost effective strategies to (1) prevent or mitigate flood intrusion and (2) if flooded, minimize the damage to ensure a return to normal operations quickly and inexpensively and (3) protect building contents.

In most cases, we considered both interim as well as long-term solutions, since most long-term solutions cannot be implemented by June 2025, the start of the next hurricane season. In making its recommendations, the committee has drawn upon its own expertise as well as that of outside experts in architecture, planning, engineering, construction, hydraulics, and flood mitigation. We have also been influenced by the absence of flooding at the rectory and the parish hall after they were raised. Suggestions from parishioners have been received, considered and continue to be welcomed. This report documents the committee's deliberations and provides a plan to provide continuity of operations when we are again faced with hurricane-induced flooding.

SECTION 2—THE CHURCH BUILDING

Goals and Constraints

The church building is central to Trinity-by-the-Cove's mission. Therefore, the goal for the church building is to prevent water intrusion to the maximum extent possible. We interpret this to mean no water intrusion from storms such as Ian when storm surge pushed 3 feet of water outside and inside the building. As best we can tell, this is about the level of water in Hurricane Donna in 1960. In other words, Ian and Donna constituted our "design storms". If we can prevent water intrusion from such storms in the future, we will have achieved our goal.

We realize that higher storm surges are possible; as noted earlier the surge from Hurricane Ian was 15 feet in the islands to our north. As a practical matter, there are no solutions to prevent water intrusion from such a storm. However, given our constraints we think that using Ian as the design storm strikes the proper balance between practicality and protection.

There are several constraints that place limits on what can be done. First is the project site. It is well suited to the current church footprint, but anything much larger would pose practical and regulatory challenges.

Aesthetics and the Anglican tradition also pose constraints. For example, a wall surrounding the church might limit water intrusion, but could impair the beauty of the structure and suggest unintended exclusivity to visitors.

Time poses a constraint. We must be prepared for the 2025 hurricane season. This means that we will need to implement interim solutions that may not fully meet our goal, but provide reasonable protection given the limited time available.

FEMA regulations impose a potential constraint. If the church suffers flooding or wind damage and resultant repairs exceed 50 percent of the value of the structure, regulations require that the repaired structure would have to meet all current building code requirements, including being elevated above the FEMA 100-year flood level.

Of course, money is a constraint. The church has had two major fundraising drives in the past 5 years (parish hall and organ), and the capacity of the congregation to support additional fundraising is limited.

The key question is, "How do we achieve our goal in the most cost-effective manner while operating within the envelope of constraints?"

Long-Term Strategy

The committee considered several options to achieve its goal of preventing water intrusion. These include:

- Permanent perimeter wall
- Temporary perimeter barrier (AquaFence)
- Flood logs and panels at doors
- Xero Flood Inflatable barriers at doors
- Tiger Dams at doors
- Raising the church structure
- Replicating the current church at a higher elevation.

Permanent Perimeter Wall. The cost of a permanent perimeter wall is estimated to be between $500,000 and $1,000,000. Such a wall could achieve the goal. However, such a permanent structure would violate side, and backyard setbacks established by the City and would depend upon a zoning variance from the City to be feasible. Also, as mentioned earlier, such a wall would detract from the natural beauty of the site and erect a barrier between the larger community and the church. Because of this last factor, detailed regulatory and cost feasibility were not fully explored.

Temporary Perimeter Barrier (AquaFence). Several parishioners drew the committee's attention to the successful use of AquaFence (www.Aquafence.com) at the Tampa General Hospital during the storms of 2024. The committee gave serious consideration to this product. Its advantages are that, installed properly, it serves as an effective barrier to flood water. Committee members met with AquaFence representatives onsite and fully explored its capabilities and limitations. AquaFence staff provided a detailed proposal for the church site. The AquaFence would encircle all the site structures as well as the east and west churchyards. The cost, including twin buried concrete footings to secure the fence would be approximately $600,000. AquaFence has some limitations. It requires a trained crew to install. It must be properly stored offsite, it is unattractive when erected. Moreover, it is subject to damage and potential failure from trees or limbs. None of these limitations were deemed to be "Fatal flaws" and the committee considered AquaFence as a viable solution to the problem.

Figure 3--AquaFence

Flood Logs[2] and Panels at Doors. There are many types of flood panels on the market. We were drawn to the product line of Floodproofing.com since one of the committee members had realized successful results from this organization. Committee members met twice with representatives of Floodproofing.com to discuss our application. This resulted in a proposal covering the entire campus. The proposal was approximately $100,000, however with supplemental items, such as structural engineering evaluations and a few additions, the total cost is estimated to be approximately $150,000. The proposal covers 16 doorways, so for just the church with five doorways, the cost would be approximately $50,000.

Figure 4- Removable Flood Logs

Flood logs are a cost-effective solution, and the performance of this product has been good. There is some preparation work before a hurricane, but not as extensive as with the AquaFence. Storage requirements would be a fraction of those required for Aquafence. An unknown is whether this solution would fully satisfy our goal of preventing water intrusion

[2] Flood logs are aluminum planks measuring about 12 inches by 1 inch in section and of a length to cover a doorway that is susceptible to flooding. Some 3 to 5 "Logs" are inserted into a pair of vertical channels that are secured to the building. Properly gasketed, the assembly forms a seal with the building and blocks the entrance of flood water.

since the flood waters would be directly against the exterior church walls. A key unanswered question--would hydrostatic pressure against the exterior walls result in seepage under the structure and up into the interior from cracks or seams in the church's floor slab? Given the short duration of storm surges, we suspect that this would not be a problem, but we are not sure. If budget were severely constrained, the committee thought this would be a potentially acceptable solution.

Xero Flood Barriers at Doors. Xero Flood (Xeroflood.com) is a double-chambered bladder, custom fit to each door and window opening. The bladders are filled with air with pressure between 10 and 15 psi. Because they are custom fit to each opening, they fit snugly when uninflated. When inflated by a portable air pump, they expand laterally and become impossible to dislodge. The air provides rigidity, so the barrier is tight, rugged and waterproof. The barrier locks into place in the framed recess of the door. Most often, the recess is on the outside, such as in the illustration below, but sometimes it is on the inside. The recess must be structurally sound to resist the lateral force of the barrier. Any exterior cracks in adjoining sidewalks are sealed to prevent water intrusion under the barrier.

Figure 5—Xero Flood Barrier

Xero Flood barriers are a relatively new product. They were recently subjected to full-scale testing by the National Research Council of Canada along with other types of flood barriers. They were effective at preventing leakage into the sample building. The only possible drawback is that the standard barrier, shown above, is limited to an effective height of 31.5 inches. This means that floods with surges higher than elevation 8 feet could overtop the units (Ian's surge elevation at the church was approximately 8 feet. Milton's

surge elevation at the church was approximately 7.5 feet.) We have received proposals from Xero Flood that cover the doors in the church and its outbuildings. Based on the proposals the estimated cost to secure all these openings is $11,000.

Tiger Dams at Doors. Tiger dams are water-filled bladders placed in door openings. They are backed up with a tarp, acting as flashing, that is secured to the opening with waterproof tape. The combination of the inflatable bladder and the tarp have proved to be an effective, low-cost barrier to flood waters.

Figure 6--Tiger Dam System

Raising the Church Structure. All the previous options depend upon engineered solutions to prevent water intrusion. Despite proper design and construction, these can still fail. The most reliable means of preventing water intrusion into a structure is to elevate it above anticipated flood levels. Therefore, one of the first strategies considered was to elevate the existing church structure. After all, it was successfully done with the parish hall and rectory.

To properly evaluate this strategy, we engaged with two highly respected general contractors: D. Garrett Construction Company and Suffolk Construction Company. We also discussed the matter with Tim McCarthy, Managing Principal of Hart Howerton Architects. The firm is the architect-of-record for several notable commercial waterfront projects in Naples.

While all the individuals the committee consulted noted that raising the church structure some 4 feet might be technically feasible, they advised against doing so. The reasons mentioned were:

- Exploratory investigations would be costly and time-consuming
- Jacking pits would disrupt the site and potentially affect the east and west churchyards
- Foundation installation under the raised structure would be challenging
- Raising the masonry structure will induce cracking that will likely continue for years after the construction
- Such extensive work will trigger a requirement that all current building codes be met. This will be prohibitively expensive on a retrofit basis for a 75-year-old building.
- There are few firms capable of performing such work. With limited competition, bid prices will be high.

In summary, there are too many unknowns to consider this as a viable option as long as other options are available.

Replicating the Current Church at a Higher Elevation. Once it became apparent that raising the existing structure is inadvisable, the committee's attention turned to replicating the current church at a higher elevation. The new finished floor elevation would be approximately 4 feet higher than existing, thereby raising the church about 1 foot above the FEMA 100-year flood elevation of 8 feet.

Trinitarians love their church! The restrained beauty of the exterior, its scale, proportions and simplicity evoke feelings of order, peace and tranquility. The simple elegance of the white interior with its classical moldings and windows, rich wood finishes and soaring nave are all conducive to worship and prayer. The Cuban tile floor reminds us we are in South Florida and adds a colorful, informal touch.

Any consideration of a new church at a higher level must acknowledge our enduring affection for the current church. The committee's view of this alternative is that the existing church would be replicated at a higher level with all new structural, mechanical, electrical, lighting, audio-visual and security systems. These new systems would "sit in the background". The look and feel of the church would be indistinguishable from the current church, a few new steps in the front of the building notwithstanding.

As the committee evaluated this alternative, it adopted a broad view and considered factors beyond just water intrusion. Several of the foregoing alternatives can achieve our goal. However, after investing in the flood proofing alternative, we will still have a 75-year-old building with older mechanical and electrical systems and no fire protection (sprinkler

system) and vulnerable windows. While the steeple has survived high winds, its ability to do so in the future is unknown.

The new organ project has loomed large in the committee's evaluation. Some $900,000 in structural and mechanical improvements to the existing church are necessary to accommodate the new organ. We wonder if placing a new organ in an old building with an unknown future lifespan is prudent?

All these factors suggest that a replicated church at a higher elevation may be the best way to proceed.

However, many questions remain—technical, regulatory, logistical and financial.

Technical questions include:

- How can a sacred structure that holds so many memories be respectfully deconstructed?
- How can the east and west churchyards be integrated into the new site plan; how will they be protected during construction?
- Does it make sense to make modest changes such as enlargement of the restroom and sacristy?
- How best to ensure smooth transitions (steps, ramps, sidewalks) between the current level to the new higher level so that the church is fully accessible?

Several regulatory questions would have to be addressed. The church is in a PS zoning district. In this district, virtually every exterior feature of the church requires conditional use approval by the City.

- Will the City approve the new higher floor elevation for the church along with the placement of fill that it will entail?
- Is there an overall height limitation such that a new steeple would have to be 4 feet shorter so that overall height remains the same?
- Can the west outbuilding (small chapel) which partially encroaches on the side yard setback be replicated in its non-conforming status?

Logistical questions are:

- How can we best maintain continuity of worship while a new structure is under construction for 12 to 24 months?
- How can organ installation best be integrated into the new construction?

The key financial questions include:

- What is the total project cost of such an undertaking?
- What are the anticipated recurring costs such as utilities, maintenance, etc?
- Can such a project be financed without compromising other church ministries?

Most of these questions can be answered in the course of planning and design. In the committee's estimation, there are four questions that could pose fatal flaws to this plan.

1. Will the City approve the higher elevation and the fill that it will entail?
2. How can the east and west churchyards be integrated into the new site plan?
3. How much will it cost?
4. Can such a project be financed without compromising other church ministries?

The committee has made some early steps in addressing these potential fatal flaws. In late March, a preliminary meeting was held with the City Planning Department to discuss regulatory feasibility. The discussion was general, but no major roadblocks to the plan were identified.

The impact of flooding extends beyond the church building, affecting the sacred grounds of the churchyards, both east and west. These are spaces of deep spiritual significance where we commit those who have died to the eternal care of God. Special measures would be taken to protect, preserve and elevate the gardens by 2 feet while maintaining their beauty and accessibility. Any additional earth added would be consecrated. Provisions would be made such that burials would continue during construction.

With respect to cost, the Committee has requested that both D. Garrett and Suffolk Construction Companies provide a preliminary estimate of construction cost. Our architect, McWard, will evaluate the input from the contractors, add estimates for other necessary cost categories and develop the most probable estimate of total project cost.

In the meantime, some have asked the question "How much does it cost to build a nice home of size comparable to the church in Port Royal?" The new church would encompass about 3,300 square feet. A *highly preliminary* estimate of the cost to build in the area is about $1,500 per square foot. Multiplying, these yield a *highly preliminary estimate of construction costs* just under $5 million. We are already committed to spending $900,000 on the existing church to prepare it for the new organ; this expense would be included in the cost of replicating the church. In other words, we are already committed to spending almost 20 percent of the construction cost of a new church just to accommodate the organ.

However, construction cost is only one element, albeit the largest, in total project cost. Also included in total project cost are the following categories: deconstruction of the

existing church, architect and engineering fees, permitting fees, FFE (furniture, fixtures and equipment), temporary storage, contingency and diocesan tithe. With a little bit of rounding up, these costs could come close to equaling the construction cost. We should have a better estimate once we receive input from the general contractors.

As to the third question, preliminary outreach has been made to several donors, and there seems to be a willingness and capacity to consider such an investment in the church's future.

Committee Recommendation. The committee recommends that the church be replicated at a higher elevation.

The result will be a structure that will be above recent (65 years) flood levels equipped with the latest building technology and systems, acoustically optimized for the new organ. It will look and feel like the current church, both inside and out and serve our congregation well into the next century.

If all goes reasonably smoothly, construction could begin in late summer 2026 with completion in late 2027.

Interim Strategy.

Assuming we proceed with the plan outlined above, the existing church building will need to be protected from flooding for at least one hurricane season before construction begins. It does not make sense to invest in an expensive solution, since it will only be used for a few years. Products such as Tiger Dams, removable log system or the Xero Flood barriers would be viable solutions. The Committee recommends the acquisition of Xero Flood barriers for the five door openings in the church and the single door openings in the east and west outbuildings. The reasons for this recommendation are low cost, ease of installation, simplicity and no need for tape that left a stubborn residue post-Milton.

The cost would be approximately $11,000 and the barriers can be onsite by July 1, 2025, if ordered in the next few weeks. These can be installed in about 2 hours by church staff or volunteers. No special tools are necessary except an air pump.

The No-Action Alternative.

The committee interpreted its charge as action-oriented, i.e. to recommend cost-effective strategies to eliminate or mitigate storm damage to the church in the future. However, before contemplating any course of action, it is always useful to answer the question "What if we do nothing?". What if we just husband our resources and make repairs if or when the flooding recurs.

In the most optimistic scenario, another 62 years elapses before we have another hurricane that floods the church. As part of normal obsolescence, we would have to replace the electrical and HVAC systems, roof, windows, doors, and perhaps shore up parts of the structure. We might be contemplating a new church because of the expense and inconvenience of maintaining the then century-old structure.

In the more likely scenario, hurricanes continue to track northward from the Caribbean and periodically send storm surge into Naples. If we chose to do nothing, the church would be periodically out of commission due to costly repairs. The focus of the clergy and staff would be on flood recovery, not the core mission of the church. Worship, weddings, funerals, etc. would be held in the parish hall. The cost of recovery from each flood would be in the hundreds of thousands of dollars, and soon insurance would become prohibitively expensive or unavailable. Membership would plateau and then begin to fall, as the disruption and increased costs prompt existing and prospective parishioners to search out other churches. Eventually, clergy would look for other opportunities more in keeping with their vocations, and the vibrant church we see today would be but a memory.

Trinity-by-the-Cove has always pursued excellence—in its worship, formation, music and facilities. While briefly considering the No-Action Alternative, the Committee quickly rejected it. None of us wish to consider the spectre of a church in decline.

SECTION 3—CLASSROOM WING

Goals and Constraints

The classroom wing includes: three classrooms, youth room, nursery, church mouse and facilities office. Like the church building, the goal is to prevent water intrusion from storms such as Hurricane Ian.

Significant steps have already been taken to prepare for future flooding. Hurricane Milton drove flood water into all rooms in this wing. Rather than replacing damaged walls and floors in-kind, the committee chose to reconstruct these rooms with PVC wainscoting and PVC base moldings, epoxy floor finishes and starboard[3] cabinets. The work in the facilities office and church mouse is complete. The repairs in the classrooms, youth room and nursery are mostly completed; final completion will be realized this summer when usage of these rooms is low. These measures will not prevent water intrusion but will ensure that if water does again enter these rooms, recovery will be rapid and much less expensive than in the past.

Constraints for this section of campus include its low elevation (~5.5 feet), proximity to Jamaica Channel, and for the church mouse and facilities office, their connection to the upper courtyard and its roof.

Interim Strategy

We discuss the interim strategy for this wing in the hope that it will fully satisfy the goal, and no long-term strategy will be needed. The Committee considered several alternatives, including: AquaFence, Tiger Dams, removable logs and panels and Xero Flood barriers. We recommend the Xero Flood barriers for all doors, and windows below elevation 8 feet. Xero Flood barriers are relatively low cost, easy to store, simple to install and effective. The limitation of a 31.5-inch height will be subject to overtopping in storms with surge greater than Ian. However, as an interim solution, backed up with measures to get the classrooms back in service promptly (e.g. epoxy-coated floors, PVC moldings, and PVC lower walls) this appears to be the best solution balancing all relevant factors.

We have a proposal from Xero Flood for the classroom wing and the office wing. The cost for the barriers for the classroom wing is estimated to be $20,000.

All floor drains should be equipped with sealable caps to prevent water intrusion through underground piping

[3] Starboard is a marine grade polymer frequently used as a substitute for wood on boats that is impermeable to water and not damaged by moisture and humidity.

Long-Term Strategy

If the interim strategy fails to achieve the goal of no water intrusion, the long-term strategy is to raise the floor elevations in this wing. The approach for the classrooms and the nursery is like that employed in part of the parish hall. The distance between the acoustical tile ceiling and the roof in these rooms is sufficient that both the floor and ceiling can be raised the necessary ~4 feet without major structural modifications to the rooms. McWard has prepared a sketch detailing this approach. The atrium courtyard would have to be raised a commensurate amount and the roofs modified.

Unfortunately, the same approach cannot be used with the church mouse and the facilities office, since there is not enough space between the ceilings and the roofs. These rooms would have to be demolished and rebuilt at a higher elevation. They sit between the west courtyard and the classroom courtyard, and their roofs are integral to both courtyards. Bottom line, raising the floors in these rooms will be complex and costly. Hence, our hope that the interim strategy will fully achieve our goal of no water intrusion during the design storm.

Hurricane Preparation Committee

The committee recommends formation of a hurricane preparation committee to lift contents of the classroom wing off the floors when a hurricane is forecast. This approach, albeit slightly ad hoc, worked very well in advance of Hurricane Milton, saving books, equipment, furniture and supplies from the damaging effects of water.

SECTION 4—OFFICE WING

Goals and Constraints

Like the other facilities, the goal for the office wing is no water intrusion from storms comparable to Hurricane Ian. Most of the same constraints as the classroom wing apply here as well—low elevation, proximity to Jamaica Channel. Time also poses a constraint; the day-to-day work of the church occurs in this wing. While the church and the classrooms are in operation 1 or 2 days per week, the office wing functions 6 or 7 days per week. This wing cannot be out of service for extended periods such as has been the case with recent hurricanes.

Interim Strategy

The interim strategy here is the same as for the classroom wing—Xero Flood barriers on doors and vulnerable windows to prevent flood waters from entering the structure. Based on a proposal, the anticipated cost is approximately $10,000.

All floor drains should be equipped with sealable caps to prevent water intrusion through underground piping

Long-Term Strategy

Should the interim strategy not meet our goal, the long-term strategy is to raise the office wing up to the same level as the parish hall. This would be done by demolishing the current wing and filling approximately 4 feet prior to placing the foundation for the new structure.

McWard has developed a conceptual design for a new office wing. It includes a 2-story structure with the church mouse, facilities office and storage on the first floor and offices on the second floor. This is a multi-million-dollar project, and it is in the church's interest if it can be avoided or delayed, given the other capital needs discussed earlier.

SECTION 5—RECTORY AND PARSONAGE

Goals

The goal is the same as for all the other structures. Fortunately, both the rectory and the parsonage are elevated. The rectory sits at approximate elevation 9 feet. It survived Hurricane Ian with some yard flooding, but no water reached the structure. The parsonage is in the Autumn Woods subdivision, well removed from the coast and at a sufficiently high elevation that no flooding occurred during Hurricane Ian. Therefore, both structures have already achieved the goal of no water intrusion in storms comparable to Ian.

Recommendations

Rectory. Notwithstanding the above, the Committee recommends that any mechanical equipment on the rectory site be elevated to at least elevation 10. The crawl space under the structure is outfitted with a sump pump that must be manually plugged in to activate. We recommend a more permanent sump pump with float switch be installed in the rectory crawl space. Moreover, since Xero Flood barriers are to be installed in the adjacent classroom wing, we recommend that the exterior doors at the rectory be outfitted with the same system. While protecting the church's investment in this property, this may also ease the mind of the current or future occupants as they contemplate whether to evacuate in advance of a forecast hurricane. The cost of these improvements will be in the $5,000 range.

Parsonage. The parsonage is well situated with respect to flooding. Therefore, we have no specific recommendations for this home other than normal, prudent hurricane precautions.