

KEEP
SAFE
MAMHazard
Strategies
Guide





Introduction

Keep Safe Miami strategies related to the potential vulnerabilities identified during the self-assessment. These are informative in nature and are to be used solely to inspire building resilience, potential solutions, and a path to a safer and healthier building, safer residents and a resilient community.

Complexity Key

Complexity	Range
Difficult	Strategies that require detailed engineering or architectural analysis and requires specialize contractors to implement.
Moderate	Strategies that will require use of a general contractor and may include light engineering analysis.
Low	Strategies that could be implemented with building staff.

Costs Key

Estimated cost ranges are not intended to be investment guidance. Given the wide variation of building stock, materials, measurements, and existing condition, the cost range is informative guidance.

Low	\$ 0-10,000
Medium	\$\$ 10,001-25,000
High	\$\$\$ 25,001-75,000
Very High	\$\$\$\$ 75,001+

Criticality Key

Priority Sca	le - Criticality
Critical	Strategies that relate to structural and safety concerns that can lead to life and safety issues for building occupants.
Moderate	Strategies that will mitigate impact by reducing/minimizing exposure of crucial building elements to natural disasters.
Low	Strategies that will improve how occupants handle disaster aftermath and improve life cycle of building.

Hazards Key

Hazard	Definitions	
<u>in</u>	Sea Level Rise	Sea level rise is caused primarily by two factors related to global warming: the added water from melting ice sheets and glaciers and the expansion of seawater as it warms. Sea level rise is a leading factor in flooding.
Ģ,	Flooding (river, rain, surge)	Flooding is an overflow of water that submerges areas that are usually dry.
Ŷ	Extreme Wind	Exposure to high wind risks can vary depending on location, terrain, and other geophysical conditions. Open terrain has more potential for wind damage, but densely populated areas have the potential for more windborne debris.
	Extreme Heat	Extreme heat is a combination of increased temperature, high humidity, and evaporation that reaches 10 degrees or more above the average high for the region.
Ø	Unhealthy Housing	The CDC has defined unhealthy housing as the presence of any additional characteristics that might negatively affect the health of its occupants, including evidence of rodents, water leaks, peeling paint in homes built before 1978, and absence of a working smoke detector.

Primary Sources

The following list are the primary resources developed by Enterprise Community Partners and applicable for the Keep Safe Miami Initiative	Other Notable Resources
Keep Safe A Guide for Resilient Housing Design in Island Communities (KS)	Flood Mitigation Measures for Multi-Family Buildings FEMA P-2037 / October 2019
Multifamily Strategies Guide (MS)	Zero Waste Design Guidelines (ZWD)
Enterprise Mold Guide Creating a Healthy Home: A Field Guide for Clean-up of Flooded Homes (M)	EPA Lead Paint Abatement Guidelines (LPA)
Ready to Respond Business Continuity Tool (R2R)	AIA Covid Multifamily Guidelines (COVID)
Enterprise Green Communities (EGC)	Tank Storage Guidance (TSG)
Communities Together Resilience Hubs (CT)	

										Garden Style Apartments		
	Strategy	Criticality	😥 Sea Level Rise	Flooding (river, rain, surge	🖒 Extreme Wind	 Extreme € Heat 	Unhealthy Housing	Cost (\$)	Level of Complexity	Cost (\$)	Level of Complexity	b Resources for Action
Access to Potable Water	Access to portable water is a backup measure to ensure residents have a dependable source of water during power outage. This resiliency strategy includes having gravity-fed water tanks as electric water pumps will not work during a power outage; adopting water efficiency measures and using efficient toilets, shower and faucet to reduce the amount of water used; sealing all leaks; connecting water pump to the emergency backup generator and adding emergency water faucet, which is a bypass valve that allows the building to bypass the pumps and supply water to lower floors. Rainwater can also be stored in enclosed water tanks or barrels to be used as grey water.		٠	•	•	٠		ю	Low	ю	Moderate	<u>KS</u>
Backup Power to Critical Systems	During a power outage it is important to have a back-up power system in place for residential buildings with high occupancy allowances. In a high rise residential building, a backup power generator can be vital and lifesaving during a power outage by providing power to critical equipment such as the elevator and fire-suppression pump. Therefore, in cases where the residents are sheltered in place during a power outage caused by flood or a storm, it is recommended that a generator be provided above Design Flood Elevation (DFE) to power essential functions such as: emergency outlets to charge cell phones and computers, water-booster pumps to deliver potable water to upper floors, fans and pumps for heating systems, etc. On-site energy generation, storage & islandability is an important factor to consider. Use of solar panels and energy storage can provide emergency power to critical systems during an outage.		•	•	•	•		\$\$-\$\$	Moderate	\$\$\$-\$\$	Moderate	KS
Backwater Valves	A backwater valve is a moderately economical retrofit that can prevent significant problems from sewer line failure by blocking reverse flow from entering the building through wastewater pipes. A backwater valve should be installed in any building that has a sewer connection below the highest manhole cover on the sewer system, specifically, if the building is in the Special Flood Hazard Area (SFHA).	Moderate	•	•				S	Low	S	Low	<u>MS</u>
Clearing Debris on Site	When possible, clean site or neighboring area of debris that may become airborne during a high wind event. Understand state/city mandated requirements for disposal of debris after a hurricane.	Moderate			٠			\$\$\$\$-\$	Moderate	\$\$\$\$-\$	Moderate	<u>KS; EGC</u>
Community Resilience	Coming together with other housing organizations can help you identify local and shared resources, pool information about equipment and infrastructure pricing and the best ways to get residents involved. To start a multi-organizational learning group, identify a facilitator and make a list of potential members. Actions of an effective collaboration include: developing a group mission statement; effective planning and consistency of group meetings; capacity building of group's connection to the community; developing a communication platform easily accessible to group members; and dedicated funding.		٠	•	•	•	•	ଡ଼	Moderate	ю	Moderate	<u>MS; CT</u>

									Garden Style Apartments Mid-Rise			
	Strategy	Criticality	Sea Level Rise	Flooding (river, rain, surge	🖒 Extreme Wind	e Extreme ≩ Heat	Unhealthy Housing	Cost (\$)	Level of Complexity	Cost (\$)	Level of Complexity	b Resources for Action
Community Resilience Spaces	Community spaces play a vital role in building resilience—getting residents involved and connected to each other. A designated community resilience space can be the location for relief efforts during an emergency. Resilience spaces could be located in an existing multi-purpose area such as a dining or activity room, where residents will feel comfortable taking shelter or receiving emergency services. When setting up a resilience space: put together a plan; provide backup power; store emergency supplies; provide multiple communication options; provide access to potable water; have access to functioning toilets; provide emergency food supplies and cooking equipment; and have designated information boards.	Moderate	٠	•	•	•		89- 95- 95-	Moderate	ያ የ የ	Moderate	MS; CT
Community Ties	Residents who know one another will be more likely to turn to each other for support during an emergency. This becomes especially critical if they shelter in place. Develop infrastructure to support community engagement and interaction. Set aside common space for posting information, convening meetings and hosting parties and other group activities.	Moderate	٠	٠	٠	٠	٠	ф	Low	Ф	Low	<u>MS; CT</u>
Disaster Recovery	Dealing with the immediate and prolonged aftermath of a natural disaster can be one of the most difficult phases of recovery. This strategy focuses on what to do during the emergency and how to manage early response for your building or organization and tenants so that your process of long-term recovery will be a foundation for future resilience. For detailed information, please see Keep Safe Guide.	Critical	٠	•	•			÷	Low	÷	Low	<u>KS, R2R</u>
Distributed Heating and Cooling	Installation of distributed heating and cooling systems throughout a building lowers energy cost and minimizes flood damage. This strategy works well in high performance buildings maintaining a livable temperate during power outages. During extreme heat, this strategy also saves energy by allowing residents to meet power usage requirements.	Low				•		\$	Low	\$	Moderate	<u>MS</u>
Dry Floodproofing	Dry floodproofing involves completely sealing the exterior of a building to reduce the potential for flood damage by reducing the probability that the building interior will be inundated. The purpose of dry floodproofing a building is to make it watertight to floods of limited duration and depth. Effective dry floodproofing requires a design by a qualified engineer and an operations and maintenance plan. The hydrostatic pressure of floodwaters places enormous stress on the structure of a dry floodproofed building, so it is not suitable for buildings with wood frames or which share party walls.	Moderate	•	•				NA	NA	\$\$-\$\$	Moderate	<u>MS</u>
Elevated Equipment (mechanical and electrical)	Elevating mechanical and electrical equipment above the base flood elevation reduces the risk that the equipment will be damaged or destroyed in the event floodwaters enter the lowest level of the building and increases the likelihood that the building will remain operational even if the building floods. Critical equipment can be elevated in place by moving it off the floor to a wall or by moving it onto a platform and out of harm's way. Equipment that is replaced as a result of elevating it should be replaced with an energy efficient alternative. Engage an engineer or contractor with experience designing and specifying efficient equipment.	Moderate	•	•				\$\$\$ \$\$ \$\$ \$\$	Moderate	\$\$\$-\$ \$\$\$ \$	Moderate	MS

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	Strategy	Criticality	😭 Sea Level Rise	Flooding (river, rain, surge	🖒 Extreme Wind	 Extreme € Heat 	Unhealthy Housing	Cost (\$)	Level of Complexity	Cost (\$)	Level of Complexity	b Resources for Action
Elevated Living Space	Abandoning living space that is below Design Flood Elevation (DFE) or using them for non-residential purposes can minimize damage to electrical and mechanical equipment along with livable space during a flood. Some examples of repurposing spaces below DFE includes, converting the space into parking garage, storage, entryways etc.	Critical	٠	•				\$\$\$-\$\$\$\$	Difficult	\$\$\$-\$\$\$\$	Difficult	<u>MS</u>
Emergency Lighting	Emergency lighting refers to usage of natural and battery powered lighting to keep public spaces well-lit during a black-out. This include using battery powered lights, solar powered outdoor lights and allowing day-light into stairwells and corridors.	Critical	٠	•	•	•		& -& & -&	Low	ያ .	Low	<u>KS</u>
Emergency Management Manual	An organization which has a clear, well-rehearsed emergency plan will better manage a more coordinated, effective response. Organizations should first assess the hazards buildings are vulnerable to and develop an appropriate emergency plan that considers building protection, resident engagement, and business continuality. Organizations should host training exercises to test their emergency plan and practice communication and coordination among staff members at least once a year, which may include a simulated emergency event, emphasizing the importance of emergency planning and allowing staff to practice their roles.	Critical	٠	•	•	•		θ	Low	θ	Low	R2R
Energy and Resilience Audit	The goal of Energy and Resilience Audit is to assist property owner and managers to understand how their building maybe venerable to natural and man-made disasters and suggest ways to reduce potential impact of these hazards. Homeowners/managers can utilize specific multifamily tools and resources set forth by The U.S. Department of Energy (DOE) can that help alleviate lender and building owner uncertainty about energy upgrade results. Additionally, DOE resources has the ability to directly retrofit many of the nation's multifamily resources means that contractors, trainers, and program managers will have the resources and experience to complete retrofits following industry best practices.	Low	•	•	•	•	•	ያ የት		ଓ ଓ -୫		<u>KS</u>
Enhanced Ventilation, Healthy Air Quality	Research has shown that heathy homes promotes good physical and mental health. As such, healthy housing should be encouraged across the board. It is recommended that enhanced ventilation methods are used for multifamily housing through installation of appropriately sized roof fans and shaft to sealing for increased airflow from dwellings along those ventilation shafts. Increased ventilations rates can result in reduced relative humidity, carbon monoxide and formaldehyde. Also, install or replace carbon monoxide (CO) monitors.						•	ዓ ዓንት ዓ	Moderate	ያ ያ	Moderate	<u>KS</u>
Envelope Efficiency (insulation, air leakage)	Envelope efficiency can reduce heating and cooling load in buildings resulting in lower utility bills and increasing a building's "passive survivability" during a power outage. Energy efficiency measures include an adequately insulated roof and walls, energy-efficient windows, sealing air leaks and reduction urban heat island effect through increased vegetation and albedo roofs.	Low				٠		\$\$\$-\$\$\$\$	Difficult	\$\$\$-\$\$\$\$	Difficult	<u>MS</u>

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	Strategy	Criticality	Sea Level Rise	Flooding (river, rain, surge	Mind Wind	Extreme≥ Heat	Unhealthy Housing	Cost (\$)	Level of Complexity	Cost (\$)	Level of Complexity	D Resources for Action
Evacuation Routes, Shelter Plans, and Flash Flood Response	Having an evacuation plan in place before an event occurs can help avoid confusion and prevent injuries and property damage. A thorough evacuation plan should include: conditions that will activate the plan, chain of command, emergency functions and who will perform them, specific evacuation procedures, including routes and exits, procedures for accounting for tenants and personnel, customers and visitors, equipment for personnel, and review the plan with staff.		•	*	•			ю	Low	θ	Low	<u>R2R</u>
Foundation Reinforcement	A strong building begins with the construction of an adequate foundation. The building and site should be designed and constructed with materials and principles that maximize a building's resistance to climate change hazards, as well as a building's overall longevity. In addition, building owners should install impact resistant glazing or impact resistant shutters, and have the envelope checked for compliance with code. The International Code Council Code (I-Codes) and the building standards of the National Flood Insurance Program (NFIP) require that a foundation must be designed to prevent floatation, collapse, and lateral movement. Please consult with a licensed building professional to determine foundation needs for your building.		♦	•				\$\$\$-\$ \$	Difficult	\$\$-\$\$ \$	Difficult	<u>KS</u>
Hazardous Site Conditions	Uneven surfaces and broken steps are trip and fall hazards and should be repaired for safety during routine and emergency use. Entry safety lighting should be maintained in good condition. Adequate pathway lighting helps reduce the risk of trips and falls on exterior pathways. Wayfinding includes signage indicating exit locations, the location of fire extinguishers, first aid kits, and other emergency supplies. In addition to code-required exit signs, add wayfinding maps and reflective strips on the edge of stairs and ramps to enable safe egress from the building. To improve energy efficiency, swap out existing non-LED exit signs with low wattage LED signs. Install battery-powered emergency egress lighting if not currently in place.						•	θ	Moderate	θ	Moderate	<u>EGC</u>
Hurricane Resistant Building Envelope (including windows and shutters)	Hurricane resistance includes, installing impact resistant glazing, replacing windows and doors with ones that are rated for impact, as well as installing impact resistant shutters for doors windows and garage openings and strategies for other aspects of the envelope.				*			\$-\$\$\$\$ \$	Moderate	\$\$\$\$- \$	Moderate	<u>KS</u>
Improved Load Path	Improved or upgraded load path refers to strengthening connections between roof, walls and foundation of a buildings. This mitigation strategy helps prevent damage to a structure, its contents and minimizes injuries to residents. This strategy includes; anchoring base or sill plates to the foundation, safeguarding a continuous load path from the roof to the wall with metal anchors and anchoring the walls to the foundation, sheathing the walls with plywood or OSB to prevent penetration from debris and strengthen walls against lateral winds, etc.				♦			\$\$\$- \$\$	Moderate	N/A	N/A	<u>KS</u>

							Garo Apa	den Style rtments	<u> </u>	lid-Rise		
	Strategy	Criticality	Sea Level Rise	Flooding (river, rain, surge	Extreme Wind	Extreme Heat	, Unhealthy Housing	Cost (\$)	Level of Complexity	Cost (\$)	Level of Complexity	Resources for Action
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Increase the Albedo of Roofs and Pavement (make more reflective)	Albedo refers to the reflectivity of a surface. Lighter colors reflect (rather than absorb) more sunlight. Having white roofs and light color pavements will reduce a building's heat absorption.	Low				•		\$	Low	\$	Low	<u>KS; EGC</u>
Integrated Pest Management Plan	Integrated pest management combines safe, effective, non-toxic means of preventing pests from becoming established in buildings and controlling and eliminating pests when they do enter buildings. Integrated pest management is an holistic approach that protects human health and well-being by avoiding the use of hazardous chemicals. Engage an integrated pest management firm to develop an integrated pest management plan to reduce pest infestations and to minimize the use of toxic chemicals in the treatment of pest infestations.						٠	ю	Low	ю	Low	<u>KS</u>
Lead Paint Abatement	Lead can affect almost every organ and system in the body. While everyone is at risk of lead poisoning, children six years old and younger are most susceptible to the effects of lead. Lead abatement is an activity designed to permanently eliminate lead-based paint hazards. Abatement is sometimes ordered by a state or local government, and can involve specialized techniques not typical of most residential contractors. Contaminated soil under eaves may become exposed, subjecting residents and staffs to potential contact with hazards such as lead. Test soil for lead and cap soil with other landscaping, or remove and replace contaminated soil with clean soil if lead contamination is found.						•	θ	Low	ю	Low	<u>LPA</u>
Mold Remediation	Mold growth can lead to asthma and other respiratory impairments, therefore, moldy materials should be removed and replaced with mold-resistant materials. When possible, identify the source of moisture and remediate.						•	÷	Low	Ф	Low	<u>KS; M</u>
Pandemic/ COVID-19	Multifamily housing building owners and operators can utilize a seven-step Risk Management Plan for Buildings from the AIA to assess hazard impacts, apply architectural and engineering strategies, and reduce the risk of virus transmission in buildings. Duration of exposure and proximity of individuals are key elements to analyzing the risk associated with each of the six space types. Research and public health data for COVID-19 should also be considered and regularly monitored. Multifamily entry, circulation, service, and even lobby spaces typically have a lower risk of transmission despite the high frequency of use because occupants do not usually spend extended time in these spaces. Amenity spaces are typically utilized for longer time periods, such as for meals, games, celebrations, and other activities involving multiple residents and visitors, making these spaces higher risk for transmission.						•	θ	Low	Ф	Low	COVID

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	Strategy	Criticality	😥 Sea Level Rise	Flooding (river, rain, surge	🖒 Extreme Wind	 Extreme € Heat 	Unhealthy Housing	Cost (\$)	Level of Complexity	Cost (\$)	Level of Complexity	b Resources for Action
Properly Vented Equipment	Properly vent appliances and equipment to prevent combustion by-products such as carbon monoxide (CO) from entering the breathing space. Carbon monoxide is odorless, colorless, tasteless, and deadly. Other appliances should be vented to remove lint or dust as these can lead to respiratory diseases and other health impairments.	Moderate					٠	ю	Low	θ	Low	<u>KS</u>
Reduce Thermal Heat Transfer	Materials and orientation of homes on a site impact the indoor temperature of a living space. Reflective surfaces and shading prevent heat gain directly from sun while insulation slows heat transfer from the outside building surfaces through walls and roof toward the cooler interior environment. This strategy focuses on slowing down heat transfer to reduce dependence on cooling systems and maintain a habitable indoor temperature, year-round, after a storm, or during power outages.	Moderate				٠		\$	Low	\$\$	Low	KS
Reinforce Site with Vegetation	Reinforcing a site with vegetation such as trees, shrubs, and grasses is the leading component in green infrastructure and can serve as a protection element against several hazards. Trees reduce energy use by shading a building to decrease demand for air conditioning, assist with stormwater management and reduce urban heat island effect. Further benefits of vegetation include: soil stabilization; restoration of local ecosystems, shading and wind breaks, air and water quality enhancement, and can be a potential source of food or medicine. When reinforcing a site with vegetation, an organization must first identify soil type and properties, then choose and plant vegetation appropriate to the region, and lastly implement resilient site scaping through strategies such as green roofs or xeriscaping. Incorporate these strategies with berms, bioswales, and other storm water management techniques when possible.	Moderate	•	•		•		θ	Low	θ	Low	<u>KS</u>
Remove Stone Ballast From Roof	Numerous studies of post-hurricane damage specifically cite roof gravel as a significant source of damaging debris. Both low-rise and high-rise gravel roof systems with and without significant parapets have been documented as a primary source of window breakage and subsequent water penetration and roof system loss from internal pressurization. FEMA 490 (2005) refers to roofing aggregate as a major cause of window breakage, including essential facilities. Remove stone ballast from the roof.	Moderate						\$\$-\$\$	Moderate	\$\$-\$\$\$	Moderate	<u>KS</u>
Resilient Elevators	There are two types of resilient elevators: hydraulic and holeless hydraulic elevators. The main feature of a resilient elevator is that its motors are placed above the design flood elevation to reduce flood/water related damage. A resilient elevator will have a reinforced shaft below the Design Flood Elevation and a sump pump installed in the elevator pit. Program elevator controls to return the car to a flood safe floor in the event of flooding, shut down all but one elevator in the event of a power outage, and install flood alarms in pits.		٠	•	♦			NA	NA	\$\$-\$\$\$	Moderate	<u>MS</u>

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	Strategy	Criticality	Sea Level Rise	Flooding (river, rain, surge	 Extreme Wind 	 Extreme ₹ Heat 	Unhealthy Housing	Cost (\$)	Level of Complexity	Cost (\$)	Level of Complexity	C Resources for Action
	A roof is part of the Main Wind Force Resisting System (MWFRS). It is held				2	<u>ی</u>						
Roof Reinforcement	by the walls and the foundation, and maintains a continuous load path by transferring wind loads from wind-facing walls into parallel structural walls on the sides, and down to the foundation. A roof must be properly anchored to resist wind loads and hold building equipment, have drainage to prevent rainwater ponding, and be leak-free and crack-free, as any holes may compromise its structural integrity. Please consult with a licensed building professional to determine construction needs for your building.				*			\$\$\$- \$\$	Difficult	\$\$\$-\$\$\$	Difficult	<u>KS</u>
Rooftop Equipment Preparation	Properly secure or relocate equipment prior to a storm. Utilize a qualified architect or engineer to perform a wind vulnerability assessment. Damaged equipment can impair the operation of the facility, and the equipment can detach and become damaging wind-borne debris. In addition, water can enter the facility where equipment was displaced or damaged. The most common problems typically relate to inadequate equipment anchorage, inadequate strength of the equipment itself, and corrosion of equipment and connectors.	Moderate			*			ያ ያ እ	Moderate	୫୫୫-୫ ୫	Moderate	<u>R2R</u>
Safeguard Fuel Storage and Mechanical Equipment	Unanchored fuel tanks can be easily moved by flood waters, posing serious threats to people, property, public safety, and the environments. Remove cooling equipment, HRV, ERV, etc. from the roof or engineer their anchorage for high velocity wind. One way to anchor a fuel tank is to attach it to a large concrete slab whose weight is great enough to resist the force of flood waters and can be used for all tanks above ground, both inside and outside of the property. An outside tank may also be anchored to the concrete slab by running straps over it and tightening them using turnbuckles.	Moderate	•	•				ዓ ዓት- ዓ	Moderate	ያ እ -	Moderate	<u>TSG</u>
Site Perimeter Floodproofing	Site perimeter flood proofing encompasses installing physical barriers that can help prevent floodwater from reaching the building and does not require any modification to the building. These protective barriers can be temporary or permanent. Examples of temporary barriers include; sandbags, water-inflated tube systems, panelized systems installed into foundation slots, etc. Flood walls and berms can be used as permanent barriers.	Moderate	•	•				\$\$\$- \$\$	Moderate	\$\$\$-\$\$ \$	Moderate	<u>MS; KS</u>
Structural Assessment and Prioritization	The condition of a building's structure depends on continuous monitoring and frequent maintenance. This strategy focuses on how to evaluate a structure by identifying points of weakness and implementing solutions. Be aware of the following conditions: cracks and fissures, exposed interior rebar and corrosion, lose or rusted joints, and condition in fastening of windows, doors, and other apertures. Consult with a building professional (can be a contractor, engineer, or architect) to get the most thorough inspection possible.			•		•		\$\$ \$ -\$\$	Difficult	\$\$-\$\$\$	Difficult	<u>KS</u>
Sump Pumps	Sump pumps are submersible pumps set in sump pits and designed to remove water from the lowest point in a building as water accumulates during minor or moderate flood events. Sumps are typically built in sump basins in basement floors but can also be incorporated into slab-on-grade floors and elevator pits. Sump pumps are designed for intermittent use. Chronic water problems require repairing the drainage system in addition to or in lieu of installing a pump.			•				θ	Low	↔	Low	<u>MS</u>

								Garden Style Apartments		Mid-Rise		
Strategy		Criticality	Sea Level Rise	Flooding (river, rain, surge	Extreme Wind	 Extreme Extreme 	Unhealthy Housing	Cost (\$)	Level of Complexity	Cost (\$)	Level of Complexity	C Resources for Action
Surface Storm Water Management (berms, swales, pervious surfaces, rain gardens, increased vegetation)	According to EPA "Stormwater management is the effort to reduce runoff of rainwater or melted snow into streets, lawns and other sites and the improvement of water quality". Containment and infiltration are the two most popular approaches to onsite stormwater management. Bioswales, green roofs and dry wells are example of containment, they retain water and release them slowly. Pervious surfaces, rain gardens, and increased vegetation infiltrate water into the soil below.	Moderate	•	•				\$\$-\$\$	Moderate	\$\$ \$ \$\$\$	Moderate	KS
Trash Enclosure Maintenance	Trash enclosures may harbor and support pests that carry disease or cause damage to the facility. Trash bins may also become dislodged and create hazards during heavy flooding conditions. Maintaining Trash enclosers and securing trash containers helps prevent these outcomes.	Moderate					٠	¢	Low	φ	Low	ZWD
Vehicle Protection	Ensuring that the residents have mobility after a natural disaster is crucial to ensure that residents are able to get vital supplies and return to work, especially for LMI communities. Keeping that in mind a vehicle protection plan should be in place. Building portfolio owners should work with local authorities to have information ready to distribute to tenants on where to move vehicles to be safe and, if appropriate, provide transportation back to residences before the flooding event and back to the safe storage after the event.	Moderate		•	٠			ю	Low	ю	Low	<u>R2R</u>
Wall Reinforcement	Strong walls enable the foundation and roof to function together as a resilient structural system. The building should be designed and constructed with materials and principles that maximize a building's resistance to climate change hazards, as well as a building's overall longevity. Please consult with a licensed building professional to determine construction needs for your building.		٠	•	٠			\$\$\$-\$\$	Difficult	\$\$\$-\$\$	Difficult	<u>KS</u>
Water Consumption and Energy Use Reduction	Building energy and water utility tracking and benchmarking allows the building operator to identify spikes in usage that may be related to maintenance concerns and to understand the highest usage and cost utilities for which to target building upgrades. Benchmarking tools available include WegoWise, ENERGY STAR Portfolio Manager, and EnergyScoreCards. Consider having an energy and water use analysis performed on the building to highlight specific areas for improvement.	Moderate	٠	•	♦		•	θ	Low	θ	Low	KS
Wet Floodproofing	FEMA defines wet floodproofing as "permanent or temporary measures applied to a structure or its contents that prevent or provide resistance to damage from flooding while allowing floodwaters to enter the structure or area. Generally, this includes properly anchoring the structure, using flood resistant materials below the Base Flood Elevation (BFE), protection of mechanical and utility equipment, and use of openings or breakaway walls."	Moderate		•				\$\$\$- \$\$\$	Moderate	\$\$\$- \$\$	Moderate	<u>MS</u>
Window Shading	Window shading and awning can help reduce the amount of heat that enters the building during extreme heat events.	Moderate				•		÷	Low	θ	Low	<u>MS</u>

Acknowledgements

Keep Safe Miami was developed by a cross-sector team of Resilience and Affordable Housing Experts, as well as a team of Technical Advisors:

Keep Safe Miami Program Team

- Sara Haas, Director Southeast Market, Enterprise Community Partners
- Laurie Schoeman, National Director, Resilience and Disaster Recovery, Enterprise Community Partners
- Adam Guy, Director, Donor Visibility and Campaign Communications, Enterprise Community Partners
- Alan Dodd, Chief Resilience Officer, Department of Resilience and Public Works, City of Miami
- Jon Klopp, Special Projects Coordinator, Department of Resilience and Public Works, City of Miami
- Melissa Hew, Resilience Programs Manager, Department of Resilience and Public Works, City of Miami
- George Mensah, Director Department of Housing and Community Development, City of Mlami
- Alfredo Duran, Assistant Director, Department of Housing and Community Development, City of Miami

Institute for Building Technology and Safety Ranata Reeder, Executive Director, South Florida Community Development Coalition Gladys Cook, Disaster Resilience and Recovery

Director, Florida Housing Coalition

Technical advisors

Ricardo Alvarez Diaz, Alvarez-Diaz y Villalon Alec Bogdanoff, Brizaga Stephanie Berman, Carrfour Supportive Housing Maya Cruz, Catalyst Miami Alan Dodd, City of Miami Francisco Garcia, City of Miami George Mensah, City of Miami Jonathan Klopp, City of Miami Melissa Hew, City of Miami Rob Hevia, City of Miami George Mensah, City of Miami Rob Hevia, City of Miami Joyce Coffee, Climate Resilience Consultants Elizabeth Perez, Collective Water Ways Dawn Shirreffs. EDF Jelani Newton, Enterprise Community Partners Tim Carpenter, Fannie Mae John Plitisch, FEMA John Ingargiola, FEMA Linda Furrow, FEMA Aashka Patel, Fern Leaf Interactive Jeff Hicks, Fern Leaf Interactive Ken Dierks, Fern Leaf Interactive Jim Walker, Florida Community Loan Fund Gladys Cook, Florida Housing Coalition Bradford Goar, Florida Power & Light Janet McIlvanie, Florida Solar Energy Center Robin Viera, Florida Solar Energy Center Cesar Garcia Pons, Garcia Pons Michael Freedberg, HUD Chris Fennell, IBTS Matt Anderson, IBTS Michael Newman, IBTS

Ryan Colker, ICC Safe Jacob Bird, Jacobs Engineering Sussy Torriente, Jacobs Engineering Amy Knowles, Miami Beach Maria Ruiz, Miami Beach Ines Mato, Miami Beach Alba Tarr, Miami Beach Annika Holder, Miami-Dade County Clarence Brown, Miami-Dade County Delores Holley, Miami-Dade County Susannah Troner, Miami-Dade County Katherine Hageman, Miami-Dade County Lynette Cardoch, Moffatt & Nichols Jose Gelabert-Navia, Perkins & Will Hank Hodde, Pinellas County Florida Steve Kirk, Rural Neighborhoods Duanne Andrade, SELF Arathi Gowda, Skidmore, Owings & Merrill Renata Reeder. South Florida Community **Development Coalition** CJ Reynolds, TBRPC Bill O'Dell, University of FL Shimberg Center Jen Posner, University of Miami Katherine Burgess, Urban Land Institute

Keep Safe Miami was developed in partnership with the <u>City of Miami, Florida Housing Coalition, South Florida Community</u> <u>Development Coalition, Miami-Dade County, City of Miami Beach,</u> <u>Communities United</u>, and <u>IBTS</u>, and made possible thanks to the generous support of <u>JPMorgan Chase</u>, <u>Southeast Sustainability Directors</u> <u>Network</u>, <u>Regions Bank</u> and <u>City National Bank</u>.



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