



# Flood and Hurricane Home Retrofit Options



Modern building codes ensure that your home incorporates the latest practices and standards to protect against disasters like floods and hurricane wind. However, older homes may not have all the latest innovations provided by current codes.

Make your home safer and stronger against flooding or high winds by using the table below to identify upgrade options that increase home hurricane resilience.

Peril	Mitigation Name	How	Why	Cost
Flood	<i>Elevate the lowest floor</i>	Consult a professional engineer to evaluate home elevation options to ensure that the lowest floor is at or above the base flood elevation or the design flood elevation, whichever is higher.	Reduces potential flooding inside the home.	\$\$\$\$
Flood	<i>Provide flood protection for utilities and mechanical equipment</i>	Elevate appliances, water heaters, air conditioning units, furnaces, and other critical utilities at least one foot above the base flood elevation or the design flood elevation, whichever is higher.	Protects mechanical equipment from floodwater and reduces electrical shock hazards.	\$\$ - \$\$\$
Flood	<i>Install backflow preventers</i>	Consult a licensed plumber to determine if backflow systems are feasible and to identify types allowed by the building code in your area.	Prevents sewage from flowing back into the home during a flood.	\$ - \$\$
Flood	<i>Install flood vents</i>	Install engineered hydrostatic vents (flood vents) in the unoccupied areas of your home, such as the garage, storage areas, or crawlspace below the base flood elevation. This will allow water to enter and exit the structure at the same rate.	Prevents condition that causes wall collapse when weight and force of floodwaters are focused on only one wall.	\$\$\$
Flood	<i>Anchor fuel tanks</i>	Attach above-ground tanks inside or outside your property to a large concrete slab with adequate weight to resist the force of floodwaters. Outside tanks can also be anchored with straps attached to a concrete slab by using turnbuckles.	Prevents ruptured fuel supply lines and resulting oil and gas spillage as well as wall and property damage from dislodged tanks.	\$ - \$\$\$



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Peril	Mitigation Name	How	Why	Cost
Flood	<i>Add a sump pump with backup power</i>	Install a sump pump with battery backup to protect areas around mechanical equipment and utilities located in the basement. You may need a generator to ensure power is available to operate the pump for an extended period after a flood.	Prevents water from collecting in the basement by discharging it to the outdoors.	\$ - \$\$
Flood	<i>Improve basement/foundation wall drainage</i>	Improve grading around the house to ensure that water drains away from your home. Add French drains if needed to ensure that water does not collect and stand near basement walls.	Prevents or reduces water intrusion into basements or ponding near or under the house.	\$ - \$\$\$
Hurricane	<i>Brace gable-end walls</i>	Hire a professional to brace any gable-end walls taller than 4 feet so that loads on the gable-end walls are distributed over multiple roof trusses or rafters, through the ceiling and roof sheathing, to the side walls.	Resists lateral forces on the gable end wall and prevents roof collapse.	\$\$ - \$\$\$
Hurricane	<i>Brace soffit covers</i>	The most common soffit failure cause is inadequate or incorrect attachment or installation. Fix this problem by installing wood backing or supports to use as an attachment point for soffits. If you cannot install wood supports, secure the soffit at 12-inch intervals with adhesives or other methods.	Keeping soffit covers in place greatly reduces the amount of water blown into the attic resulting in damaged or collapsed ceilings and damage to interior walls and building contents.	\$ - \$\$\$
Hurricane	<i>Upgrade to wind-resistant roof cover</i>	Ensure roof coverings are high wind-rated and attached properly regardless of the type (tiles, shingles, or metal).	Helps prevent roof covering from blowing off during a hurricane which can lead to significant water entry to the attic and collapsing ceilings.	\$\$ - \$\$\$\$
Hurricane	<i>Window and door protection</i>	Install pressure and large missile impact rated products such as 1. Permanently-mounted hurricane shutters; 2. Temporary panels made from metal or other materials with permanently installed mounting hardware; or 3. Replacement products to significantly increase protection for windows, entry doors. Garage doors can be replaced, fitted with bracing kits provided by the manufacturer, or braced at mid-point or quarter-points with after-market kits.	Resists windborne debris impacts from flying missiles, tree limbs, roofing, or other building material that break windows, blow doors in, and breach garage doors. Prevents wind-driven rain from entering the home and stops internal pressurization inside the home, which can lead to roof failure.	\$\$ - \$\$\$\$



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Peril	Mitigation Name	How	Why	Cost
Hurricane	<i>Strengthen roof deck connection</i>	When reroofing, increase your roof deck attachment strength by having the roofer re-nail, add nails, and/or upgrade the nails to ring shank nails as appropriate to meet current code requirements for high-wind areas. If you are not reroofing and still want to strengthen your roof deck attachment, it can be done using a closed-cell spray foam adhesive or a Do-It-Yourself application of AFG-01 rated sub-floor adhesive along both sides of the intersection of the roof deck and rafters or truss.	Significantly reduces the chance of having part of your roof deck blown off creating a hole where wind and water can enter and destroy the interior of your home. If a closed-cell spray foam adhesive solution is selected, having it also sprayed over joints between the roof decking provides a secondary water barrier.	\$\$ - \$\$\$\$
Hurricane	<i>Strengthen roof-to-wall connections: Install hurricane clips or straps</i>	Anchor roof-to-wall connections securely using hurricane straps or clips at every wall-to-rafter or wall-to-truss connection to ensure the roof stays in place when severe winds blow. Do this during reroofing or by removing the soffit covers to access and upgrade existing connections.	Prevents the roof framing and trusses from disconnecting from the wall during high winds and hurricanes that can lead to loss of the whole roof or a large segment of it.	\$\$ - \$\$\$\$
Hurricane	<i>Install a secondary water barrier</i>	If reroofing, seal your roof deck by having the roofer install flashing tape over the joints between decking, cover the entire roof with a self-adhesive membrane, or apply two layers of wind-resistant underlayment attached with a high density of capped nails. If not reroofing, seal your roof deck by having a closed-cell polyurethane spray foam adhesive applied over all joints between decking on the underside of the roof deck. If the spray foam adhesive is also applied along both sides of the intersection between the roof deck and the rafters or trusses, it will improve the roof deck attachment to the roof structure.	A secondary water barrier will keep water out of your roof, attic, and home if part or all of your roof cover is damaged or blown off during a storm.	\$\$ - \$\$\$\$
Hurricane	<i>Improve anchorage of attached structures</i>	Make sure that attached structures such as carport and porch roofs are adequately restrained from wind uplift by ensuring that the roof structure is attached to columns and that the columns are anchored to the foundations.	Prevents attached structures from being lifted by winds and blown away or collapsing - both of which can damage the main structure - your home.	\$\$ - \$\$\$

Visit [www.Inspect2Protect.org](http://www.Inspect2Protect.org) to find the current building codes adopted in your area, upgrade options tied to house age, disaster history for your community, and more.