Basic Flooding Model Assumptions:

1) Medium height freshwater flooding; limited duration. No high-velocity action; no wave action.
2) A 1-story house (without a basement) is used for this example house to establish the Categories of Work percentages of total costs.

			Damage Threshold			
Foundation			**0-25%**	**25-50%**	**50-75%**	**Over 75%**
Description	**Continuous perimeter foundations, footings, and piers for internal beams and floor loads. Footing depth averages between 30 inches and 42 inches below ground level. Materials include unreinforced cast-in-place concrete, unreinforced masonry or concrete masonry units (CMUs), concrete slab on grade, or raised slab construction.**	Threshold Markers	**Water level does not rise to the level of the bottom of the first floor of the structure.**	**Water level rises just above first floor level.**	**Water level is 4-7 feet against the outside of the building.**	**Water level is 7 feet or higher against the outside of the building.**
			No scouring at the footings.	**Limited scouring at the footings.**	**Limited scouring at the footings.** **Soils are saturated and unstable**	**Limited scouring at the footings.** **Foundation is notably cracked and/or displaced. Structure has been knocked off its foundation.**
			Some undermining but no visible cracking at concrete slab.	**Soils are saturated.**	**Cracks noted on or along the foundation walls.**	**Portions of the foundation are damaged or missing**
				Undermining of the concrete slab, especially at corners - hairline cracks only.	**Significant undermining of the concrete slab – significant cracking is visible.**	**Significant undermining of the concrete slab - major cracking and separation of the concrete slab.**
		Common Damage	Short-term inundation to limited heights. Limited scouring and erosion - low flow and low velocity floodwaters. No noticeable cracking of the masonry or displacement of the foundation walls.	Short-term inundation - Foundation is inundated with flood waters but for a limited duration. Limited scouring or undermining of the foundation or footings is found. Minor cracking from some settlement but no displacement, heaving or discontinuities of the structural support systems.	Floodwaters extend over the top of the foundation system - significant inundation for over 12 hours. Some cracking of the masonry/concrete foundation walls. Some damage to the foundation wall from debris or settlement noted.	Settlement noted at the footings, due to erosion or unstable soils. Foundation wall damage – sections of the walls are cracking, displaced, and missing, causing an inherent instability to the support for the house. Use caution when approaching or entering the house.
	Special Considerations for Coastal/High Velocity Floods		**Coastal floods may show more evidence of scouring at the supports - the foundation system may be better designed to resist this scouring action.** **High velocity floodwaters may create erosion/scouring that the building has not been designed to resist.**			

Superstructure (Wood Frame/Masonry)			0- 25%	25-50%	50-75%	Over 75%
Description	**The wall support systems that extend from the foundation wall to the roof structure. Superstructures include the exterior wall sheathing panels, shear panels, or braced wall panels. This section also includes structural members that support the roof (rafters and trusses), but does not include the roof sheathing.**	Threshold Markers	**Water level does not rise to the level of the bottom of the first floor of the structure.**	**Water level rises just above first floor level.**	**Water level is up to 3 feet high on the first floor level.**	**Water is over 3 feet high on the first floor level of the house.**
				Damage to the exterior walls is limited	**Some damage to exterior walls.**	**Significant damage to exterior walls.**
	Wood frame construction: **Lightweight lumber or metal studs Interior wall framing (without sheathing) Typical exterior structural panel wall sheathing is plywood or hardboard**		**No damage to the roof framing.**	**Damage to the roof framing is limited.**	**Significant damage to sections of the roof framing.**	**Significant damage to the main portion or multiple sections of the roof framing.**
	Masonry construction: **Load bearing walls using unreinforced masonry (URM) and reinforced block or brick** **Typical exterior covers are stucco, siding (aluminum, vinyl, or wood), and masonry veneer** **(Reinforced concrete construction should be categorized under masonry.)**	Common Damage	**Minor damage to portions of the wall structure. Wall studs and sheathing suffered minor damage by contact with debris or from floodwater pressures against the structure. Minor missing or damaged sections of the roof structure. No deformation or distortion of the structural frame is evident.**	**Some missing sections or open damage to portions of the wall structure. Wall studs and sheathing suffered some damage by contact with debris or from floodwater pressures against the structure. Some missing or damaged sections of the roof structure. No deformation or distortion of the structural frame is evident.**	Missing sections or open damage to significant portions of the wall structure. Wall studs and sheathing damaged by contact, collision, or piercing with debris or from floodwater pressures against the structure. Significant missing or damaged sections of the roof structure. Some deformation or distortion of the structural frame is evident.	Missing exterior wall(s) or open damage to large portions of the wall structure. Wall studs and sheathing damaged by contact, collision, or piercing with debris or from floodwater pressures against the structure. Large missing or damaged sections of the roof structure. Significant deformation or distortion of the structural frame is evident.
	Special Considerations for Coastal/High Velocity Floods		**Coastal areas have higher wind conditions requiring additional exterior wall structural panels, shear walls, and braced wall panels.** **Damage to these wall structural systems would indicate a higher percent of damage, because they are already designed to resist higher wind conditions.**			

Roof Covering			0-25%	25-50%	50-75%	Over 75%
Description	Roofing includes a lightweight composition shingle, tile roofs, metal roofs, or a built-up roof with gravel or rock cover material. Roofing does not include structural framing members such as rafters or prefabricated trusses that support the roof deck. The roof sheathing and flashing is included in this section.	Threshold Markers	**Minor wind damage to the roof coverings.** **Main surface areas are unaffected.** **Flashings are intact.** **No damage to the roof sheathing.**	**Some damaged areas of the roof from high-winds or damage from debris.** **Some sections of the roof covering are missing or loose.** **Some damage to the flashings.** **Minimal damage to the roof sheathing.**	**Significant damaged areas of the roof from high winds or damage from debris.** **Significant sections of the roof covering are missing or loose.** **Damage to the flashings allows some water infiltration at joints and roof penetrations.** **Significant damage to the roof sheathing - some areas of the sheathing will need replacement.**	**Large damaged areas of the roof from high winds or damage from debris.** **Major sections of the roof covering are missing or loose.** **Damage to the flashings allows significant water infiltration at joints and roof penetrations.** **Major damage to the roof sheathing - most of the roof sheathing will need replacement.**
		Common Damage	Roof shingles or tiles mostly intact. Some minor damage to roof shingles - some torn or loose shingles in limited areas.	Some areas where the roof shingles were damaged by high winds. Several small areas of exposed roof sheathing as a result of missing/damaged shingles.	Some areas where the roof shingles were damaged by high winds. Several small areas of exposed roof sheathing as a result of missing/damaged shingles. Some damage to the roof covering and sheathing due to debris falling or penetrating the roof assembly.	**Major areas of the roof where the shingles/tile are missing, allowing rainwater to freely enter the house below.** **Significant damage to roof covering and roof sheathing from strong winds or windborne debris penetrating the roof assembly.**
	Special Considerations for Coastal/High Velocity Floods		**Coastal areas have higher wind conditions requiring additional roof covering requirements.** **Damage to these roof coverings would indicate a higher percent of damage, because they are designed to resist higher wind conditions.** **Damage to the roofing is more likely during high-wind conditions due to the loss of protection from missing roof coverings and water infiltration. This will increase the percent of damage.**			

Exterior Finish		0- 25%	25-50%	50-75%	Over 75%
Description	**The wall covering system that covers the wall sheathing, as well as insulation and weather stripping. This includes the water resistant materials and the finish materials: Stucco, Siding (aluminum, vinyl, or wood), Masonry, Stone veneer.** **Insulation is installed at the flooring beneath the lowest floor level and throughout the walls and ceilings. Types of insulation include: fiberglass wall and ceiling insulation, blown wall and ceiling insulation, and rigid wall insulation.**	**Threshold Markers** **Water level is less than 6 inches above the lowest floor level.** **The duration of the floodwaters is limited - less than 12 hours.**	**Water level is between 6 and 18 inches above the lowest floor level.** **The duration of the floodwaters is limited - less than 12 hours.**	**Water level is between 18 inches and 3 feet above the lowest floor level.** **The duration of the floodwaters is more than 12 hours.**	**Water level is more than 3 feet above the lowest floor level.** **The duration of the floodwaters is more than 12 hours.**
		Common Damage Water staining, contamination, and damage on some of the exterior wall finishes. 'Clean and repair' process is likely. Brick and stone veneer walls, stucco walls, and 'cultured stone' walls may need some water removal techniques to allow drying of the interior materials and wall cavities. Verify adherence of the finish materials to the wall substrate. A limited amount of the siding materials may require replacement as needed. No damage or replacement of the insulation system is necessary, except where water and high moisture conditions have caused the insulation to fall loose within the crawlspace sub-flooring.	Damage/losses to some areas of the exterior wall surfaces, in addition to water staining and contamination. Some repairs are required at damaged locations prior or during 'clean and repair' process. Brick and stone veneer walls, stucco walls, and 'cultured stone' walls may need some water removal techniques to allow drying of the interior materials and wall cavities. Verify adherence of the finish materials to the wall substrate. Damaged house trim work will require replacement. Water damage to the insulation in the sub-flooring above the crawlspace or basement levels. Damage to insulation is evident and insulation often has fallen loose. This insulation should be removed and replaced.	Damage/losses to significant sections of the exterior wall surfaces, in addition to water staining and contamination. Significant repairs are required at damaged locations prior to 'clean and repair' process. Replacement of some sections of the exterior siding is required. Brick and stone veneer walls, stucco walls, and 'cultured stone' walls may need some water removal techniques to allow drying of the interior materials and wall cavities. Verify adherence of the finish materials to the wall substrate. Water damage to the insulation in the sub-flooring above the crawlspace or basement levels. This insulation should be removed and replaced. Water saturation of wall insulation may be found in the lowest section of the exterior walls. Contaminants in the flood waters are cause for removal and replacement of lower sections of the saturated insulation. Clean, sanitize, and dry the structural systems before re-installing materials. Damaged house trim work will require replacement, especially at door and window casings.	Damage/losses to major sections of the exterior wall surfaces, in addition to water staining and contamination. Major repairs are required at damaged locations prior to 'clean and repair' process. Replacement of large sections of the exterior siding is required. Brick and stone veneer walls, stucco walls, and 'cultured stone' walls may need some water removal techniques to allow drying of the interior materials and wall cavities. Verify adherence of the finish materials to the wall materials. Damaged house trim will require replacement, especially at door and window casings. Water damage to the insulation in the sub-flooring above the crawlspace or basement levels. This insulation should be removed and replaced. Water saturation of wall insulation requires the removal of all of the insulation from the damaged sections of the exterior walls. Contaminants in the flood waters are cause for removal and replacement of lower sections of the saturated insulation. Clean, sanitize, and dry the structural systems before re-installing.
	Special Considerations for Coastal/High Velocity Floods	**The salt, erosion, and winds in coastal areas will have a damaging effect on the quality of exterior wall finishes.** **Damage to exterior finishes are more likely during high-wind conditions due to the loss of protection from missing exterior finishes and water infiltration. Damage to the insulation is more likely during high-wind conditions due to the loss of protection from missing roof coverings and exterior finishes, and from subsequent water infiltration. This will increase the percent of damage.**			

Interior Finish		0-25%	25-50%	50-75%	Over 75%
Description	**Interior finish includes the gypsum board, drywall, plaster, or paneling that makes up the wall surfaces. It also includes trim around door baseboards, casings, chair rails, and ceiling moldings.** **Materials include low-grade wood/plastic composites, soft woods, and hard woods. Finishes include paint, stain, or varnish.** **This item also covers any exterior and interior painted surfaces. This includes all interior painted surfaces, but not the building or repairs of the underlying surfaces. This also includes those exterior siding materials (and trim work) that need to be painted, but not those that have inherent coloring within the materials themselves (brick, stucco, EIFS).**	**Threshold Markers**	**Water level does not rise to the level of the first floor structure.** **The duration of the floodwaters is limited - less than 12 hours.**	**Water level rises just above the first floor level.** **The duration of the floodwaters is limited - less than 12 hours.**	**Water level is up to 3 feet above the first floor level.** **The duration of the floodwaters is more than 12 hours.**	**Water is more than 3 feet above the first floor level of the house.** **The duration of the floodwaters is more than 12 hours.**
		Common Damage	Wicking of the water and high moisture conditions into the finished materials at the subflooring and at the bottom of the walls. Water staining and damage possible at baseboard and the casings at the bottoms of door openings. Some adjustment/repair/ replacement may be necessary. No damage anticipated on door, cabinet, and window hardware. The baseboards and the bottom of the door casings may need to be cleaned and painted.	Water staining and damage likely at the baseboard and the casings at the bottoms of door openings. Some adjustment/repair/replacement may be necessary. Water damage at the lowest levels of the wall assembly - lower wall and trim may need to be removed and replaced. Minor damage anticipated on door, cabinet, and window hardware. After repairs to surfaces, the lower wall finishes, baseboards, and door casings will need to be primed and repainted. The bottoms of the cabinet bases in the kitchen and bathrooms may require repainting.	Water staining and damage at the baseboards and the casings at door openings need to be replaced. Water damage at the lowest levels of the wall assembly - wall and trim, window sills and window aprons, wall paneling, wainscoting and chair rails require removal and replacement. Wall surfaces should be removed to a height of 4 feet. Some damage anticipated on door, cabinet, and window hardware. Some replacement needed. After repairs to surfaces, the entire wall finishes, baseboards, and door and window casings will need to be primed and repainted, along with the vanity cabinets in the bathrooms.	Water staining and damage at the baseboards, and running trim and casings at door and window openings need to be replaced. Water damage at all the levels of the wall assembly - wall and trim, window sills and window aprons, wall paneling, wainscoting, and chair rails require removal and replacement. Wall surfaces should be removed to a height of 8 feet. Significant damage anticipated on door, cabinet, and window hardware. Some replacement needed. After repairs to surfaces, the entire wall finishes, baseboards, door and window casings, and window sashes will need to be primed and repainted along with the vanity cabinets in the bathrooms. Repaint both the upper and lower kitchen cabinets, where these are paint-grade cabinets.
	Special Considerations for Coastal/High Velocity Floods		**Damage to the interior finishes are more likely during high-wind conditions due to the loss of protection from missing roof coverings and exterior finishes, and from subsequent water infiltration. The salt, erosion, and winds in coastal areas will have a damaging effect on the quality of exterior hardware. This will significantly increase the percent of damage.**			

Doors and Windows			0-25%	25-50%	50-75%	Over 75%
Description	**This section includes all doors and windows of a structure, as well as locks, hinges, frames, and handles. Assumptions are hollow core doors with low-cost hardware for low, fair, and average quality construction, raised-panel hardwood veneer with good quality hardware for good or excellent quality construction.** **(This section does not include paint or stain.)**	Threshold Markers	**Water level rises just to the floor structure of the first floor level.** **The duration of the floodwaters is limited - less than 12 hours.**	**Water level is just above the first floor.** **The duration of the floodwaters is limited - less than 12 hours.**	**Water rises to at least 12 inches above the first floor level.** **The duration of the floodwaters is more than 12 hours.**	**Water rises more than 12 inches above the first floor level.** **The duration of the floodwaters is more than 12 hours.**
		Common Damage	Bottoms of some interior doors may be deformed, delaminated, or have some swelling damage. Doors may need adjustment and/or repairs to close and latch properly. No impact on normal sill-height windows. Damage may be found at floor-level windows (hopper windows, awning windows, and floor-to-ceiling windows).	Bottoms of interior and exterior doors may be deformed, delaminated or have some swelling damage. Doors may need adjustment and/or repairs to close and latch properly. No impact on normal sill-height windows. Damage may be found at floor-level windows (hopper windows, awning windows and floor-to-ceiling windows).	Bottoms of interior and exterior doors will be deformed, delaminated, or have some swelling damage. Interior doors will likely need replacement. Exterior doors may need adjustment, repairs, or replacement. No impact on normal sill-height windows. Repairs or replacements may be needed at floor-level windows (hopper windows, awning windows, and floor-to-ceiling windows).	Bottoms of interior and exterior doors will be deformed, delaminated, or have some swelling damage. Interior and exterior doors will likely need replacement. Deformation or other damage will be found at normal sill-height windows. Replacement will be necessary at floor-level windows (hopper windows, awning windows, and floor-to-ceiling windows). Replacement may be necessary for other windows.
	Special Considerations for Coastal/High Velocity Floods		**Wind-driven rain in coastal areas will have a damaging effect on the quality of exterior doors and windows.**			

Cabinets and Countertops		0-25%	25-50%	50-75%	Over 75%
Description	**The basic cabinets for bathroom vanities and kitchens include paint-grade cabinets made of a fiberboard or plywood material. The countertop is laminated plastic or a manmade 'cultured stone' surface.** **Paint-grade cabinets are the baseline because they can be painted to match upper wall cabinets, when they are repairable, to return the house to pre-disaster conditions.** **Damaged cabinets with hardwood face-frames, doors, and drawers will require replacement based on the depth of flooding above the floor. Therefore, if the flood depth only damages the base cabinet and countertops, the percent damage will be 60% or less.**				
Threshold Markers		**Water level is less than 4 inches above the finished floor level.**	**Water level is between 4 and 12 inches above the finished floor level.** **Flood duration is short - no prolonged exposure to water or contaminants.**	**Water level is between 1 foot and 3 feet above the finished floor level.** **Flood duration is longer than 12 hours - prolonged exposure to water and contaminants.**	**Water level is more than 3 feet above finished floor level.** **Flood duration is longer than 12 hours - prolonged exposure to water and contaminants.**
Common Damage		Base cabinets have minimal water damage. Swelling and deterioration of manufactured case goods, especially cabinet bases, sides, and drawers using engineered wood products. Bathroom vanity cabinets and kitchen base cabinets may need cleaning, sanitizing, and limited repairs. Repainting will be required to match upper cabinets in kitchen.	Base cabinets of particleboard or medium-density fiberboard need to be replaced. Repaint to match upper cabinets in kitchen. Wood and plywood base cabinets may need cleaning, sanitizing, and some repairs at cabinet base. Repainting will be required to match upper cabinets in kitchen.	Replace base cabinets. Water damage and exposure is prolonged - deformation, delamination, and warping of cabinet base drawers and doors. Water contains debris and contaminants. The countertops may need to be replaced.	Replace base cabinets and upper wall cabinets. Water damage and exposure is prolonged - deformation, delamination, and warping of cabinet base drawers and doors. Water contains debris and contaminants. The countertops will need to be replaced.

Floor Finish		0-25%	25-50%	50-75%	Over 75%
Description	**Materials for floor finish include: carpet, hardwood, vinyl composition tile, sheet vinyl floor cover, ceramic tile, and marble. Sub-flooring is also included.** **Carpeting, hardwood flooring, vinyl flooring tiles, and sheet vinyl are typically replaced after water inundation. Brick, stone, and clay tile floor can be cleaned, sanitized, and reused. These types of floors may have areas where the mortar setting compound has broken loose. These tiles should be replaced. The floor sheathing is included in this Category of Work, as compared to the Superstructure Category.**	**Threshold Markers**	**Water level does not rise to the level of the bottom of the first floor structure.**	**Water level rises just to the first floor level.**	**Water level is above the first floor.**	**Water level is well above the first floor.**
				Water level inundates the sub-flooring but does not rise to the finished floor materials.	**Water level inundates above the sub-flooring and finished floor materials.**	**Water level inundates above the sub-flooring and finished floor materials.**
			No damage to the floor sheathing.	**Minimal damage to the floor sheathing.**	**Significant damage to the floor sheathing - some areas of the sheathing will need replacement.**	**Major damage to the floor sheathing - most of the floor sheathing will need replacement.**
		Common Damage	No damage is anticipated in the floor finish system at this water level.	The sub-flooring may be damaged or delaminated by high-humidity conditions, and may need to be repaired or replaced.	The sub-flooring may be damaged or delaminated by water inundation. Floor covering will need removal, drying, sanitizing, and replacement, depending upon the type of floor covering. Carpets (with padding) should be removed and replaced. Wood floors will need to be replaced. Ceramic tiles and stone flooring may be re-used if they are still secured to the substrate. Sheet vinyl and vinyl tiles will need to be replaced to facilitate drying and repair of damage of the subfloor.	The sub-flooring may be damaged or delaminated by water inundation. Floor covering may need removal, drying, sanitizing, and replacement, depending upon the type of floor covering. Carpets (with padding) should be removed and replaced. Wood floors will need to be replaced. Ceramic tiles and stone flooring may be re-used if they are still secured to the substrate. Sheet vinyl and vinyl tiles will need to be replaced to facilitate drying and repair of damage of the sub-floor.
	Special Considerations for Coastal/High Velocity Floods		**Damage to the floor finishes and floor sheathing are more likely during high-wind conditions due to the loss of protection from missing roof coverings and exterior finishes, and from subsequent water infiltration. This will significantly increase the percent of damage.**			

Plumbing			0-25%	25-50%	50-75%	Over 75%
Description	**The plumbing system includes the incoming water service (municipal water supply or well service), the water heater, water distribution piping, and the wastewater system. Wastewater will be conveyed away from the structure by either a connection to the municipal sewer system or a septic system.** **When floodwaters saturate the soils, septic systems may be unable to discharge their waste, causing a back-up of the septic systems. If floodwaters raise above the level of the municipal sewer manhole covers, the sewage can back-up into the house through the sewer lines. Verify the condition of the potable water supply to determine if it can provide a safe water supply.**	Threshold Markers	**Water level is less than 6 inches above the lowest floor level.** **Flood duration is short - no prolonged exposure to water or contaminants.**	**Water level is between 6 inches and 18 inches above the lowest floor level.** **Flood duration is short - no prolonged exposure to water or contaminants.**	**Water level is between 18 inches and 3 feet above the lowest floor level.** **Flood duration is longer than 12 hours - prolonged exposure to water and contaminants.**	**Water level is more than 3 feet above the lowest floor level.** **Flood duration is longer than 12 hours - prolonged exposure to water and contaminants.**
		Common Damage	Floor drains can backflow into the house. Under floor (or under slab) plumbing systems should be purged, cleaned, and sanitized. Any materials that might contain remnants of waste materials or other contaminants in the floodwaters will require replacement.	Floor drains, shower drains, bathtubs, and toilets can back flow into the house. Septic contamination is likely. The water heater may need to be replaced.	Floor drains, shower drains, bathtubs, toilets, bathroom sinks, utility sinks, and toilets will backflow into the house. Septic contamination will occur. The water heater will need to be replaced.	All plumbing fixtures will backflow into the house. Septic contamination will occur. The water heater will need to be replaced.
	Special Considerations for Coastal/High Velocity Floods		**Houses in coastal areas may have additional plumbing fixtures and piping on the exterior of the house.**			

Electrical			0-25%	25-50%	50-75%	Over 75%
Description	**100- to 200-amp electrical service providing circuit breaker panels and distribution wiring. B. Basic wiring (15/20 amp) for outlets, switches, receptacles, and lighting; 25- to 60-amp wiring systems for outlets for a washer, dryer, stove, and refrigerator.** **(A minimum number of outlets and lighting fixtures, sometimes quantified by local building code, begin to increase in number and application as the quality level of the residence increases.) The basic approach listed here is for slab-on- grade or elevated houses; crawlspace and basement houses will have higher damage levels more quickly due to the main panel and horizontal wiring runs located below the lowest floor level.**	Threshold Markers	**Water level is less than 12 inches above the finished floor level.** **Minor electrical components and limited wiring are inundated but remain below normal receptacle height.**	**Water level is between 12 inches and 18 inches above the finished floor level.** **A significant number of wiring components and limited wiring are inundated, floodwaters above the normal receptacle height.**	**Water level is between 18 inches and 3 feet above the lowest floor level.** **A significant number of wiring components and a significant amount of wiring is inundated - floodwaters above normal wall switch height.**	**Water level is more than 3 feet above the lowest floor level.** **Most of the wiring components and a significant amount of wiring are inundated - floodwaters above normal wall switch height.**
		Common Damage Details	If the main electrical power source is located in the basement, the panel will need to be replaced. All outlets (receptacles, switches, and lights) located in the basement should be replaced. All receptacles, switches, and outlets located above the flood water high mark can be left in place and reused.	Modern Romex wiring that is inundated only for short durations (without wetting the ends/joints/terminations) can be dried and reused. Older nonmetallic cable (with impregnated braided sheathings) should be replaced when wetted. When chemical contaminants are suspected in the floodwaters, all inundated electrical wiring and components will require replacement.	Modern Romex wiring that is inundated only for short durations while wetting the ends/joints/terminations should be replaced. Older non-metallic cable (with impregnated braided sheathings) should be replaced when wetted. When chemical contaminants are suspected in the floodwaters, all inundated electrical wiring and components will require replacement.	Modern Romex wiring that is inundated only for long durations should be replaced. Older nonmetallic cable (with impregnated braided sheathings) should be replaced when wetted. When chemical contaminants are suspected in the floodwaters, all inundated electrical wiring and components will require replacement.

Appliances			0-25%	25-50%	50-75%	Over 75%
Description	**Common, built-in appliances that would be included are the dishwasher, hot water tank, and some stoves.**	Threshold Markers	**Water level is less than 6 inches above the finished floor level.** **Water level is in the floor area of the appliances but not into the equipment operating system.** **The appliances may be cleaned and reconditioned.**	**Water level is between 6 inches and 12 inches above the finished floor level.** **Water level is in the floor area of the appliances and into the equipment operating system.** **Some of the appliances will need to be replaced.**	**Water level is between 12 inches and 18 inches above the finished floor level.** **Water level is in the floor area of the appliances and into the equipment operating system.** **Most of the appliances will need to be replaced.**	**Water level is between 18 inches and 3 feet above the finished floor level.** **Water level is in the floor area of the appliances and into the equipment operating system.** **All of the appliances will need to be replaced.**
		Common Damage	If appliances (water heater, clothes washer/dryer) are located in the basement or under the floor spaces, these should be replaced. Appliances at or above the first-floor level should be cleaned and reconditioned, as needed. Gas-fired appliances should be checked by a service technician to verify whether the gas burners and controls and electric wiring systems were compromised. Replacement may be required.	If appliances (water heater, clothes washer/dryer) are located in the basement or the under floor spaces, these should be replaced. Appliances at or above the first-floor level should be cleaned and reconditioned, as needed. Gas-fired appliances should be checked by a service technician to verify whether the gas burners and controls and electric wiring systems were compromised. Replacement may be required. The clothes dryer and dishwasher systems and controls will likely be inundated and may require replacement.	All appliances located at or above the first-floor level should be cleaned and reconditioned, as needed. Gas-fired appliances should be checked by a service technician to verify whether the gas burners and controls and electric wiring systems were compromised. Replacement may be required. The clothes dryer and dishwasher systems and controls will be inundated and need to be replaced.	All appliances at or above the first floor level should be cleaned and reconditioned, as needed. Gas-fired appliances should be checked by a service technician to verify whether the gas burners and controls and electric wiring systems were compromised. Replace as necessary. The clothes dryer, washing machine, and dishwasher systems and controls will be inundated and need to be replaced.

HVAC			0-25%	25-50%	50-75%	Over 75%
Description	**The base HVAC system is a forced-air heating system (furnace) with ductwork. The air handler system is located inside the thermal barrier of the house.** **The percent damaged will be less for a boiler. A boiler system has a sealed piping system to distribute the heat while the furnace uses a duct system. Ducts with water infiltration will need to be cleaned, repaired, and re-insulated. By contrast, a boiler piping system only needs to have the distribution piping clean and re-insulated. Note: Old duct and HVAC insulation may contain asbestos - use appropriate caution and adjust the costs for removal, if found.** **A gas-fired or oil-fired furnace located in a basement or crawlspace will require replacement of the furnace assembly as soon as 12 inches of floodwaters are present. This will require an adjustment of the percent damaged to 75%, as soon as the water reaches the firebox level of this heating equipment. A central air conditioner or heat pump will have a ducted air distribution system. The outside condenser unit(s) will require reconditioning after any flooding conditions.**	Threshold Markers	**Water level is less than 6 inches above the lowest floor level.** **Water level is in the lower ducts but not into the air handler or equipment operating system.** **The condenser unit may be reconditioned if the water level is less than 6 inches from the bottom of the appliance. If the condenser unit is located below the flood level, it will need to be replaced.**	**Water level is between 6 inches and 12 inches above the finished floor level.** **Water level is into the lower ducts and the air handler, but not into the equipment operating system.** **The condenser unit may be reconditioned if the water level is up to 12 inches from the bottom of the appliance. If the condenser unit is located below the flood level, it will need to be replaced.**	**Water level is between 12 inches and 3 feet above the finished floor level.** **Water level is into the lower ducts, air handler, and the equipment operating system.** **The fuel-fired equipment (burners/controls) is inundated.** **The condenser unit needs to be replaced.**	**Water level is more than 3 feet above the lowest floor level.** **Water level is into the duct distribution system, air handler, and the equipment operating system.** **The fuel-fired equipment (burners/controls) is inundated.** **The condenser unit needs to be replaced.**
		Common Damage	If HVAC equipment (furnace, air handler, heat pump) are located in the basement or the under floor areas, the equipment should be reconditioned or replaced. Water-inundated duct insulation should be removed and replaced. If the duct insulation is integral to the ducts (duct board or secured interior duct liners), the ducts should be replaced. All ducts that are being reused will require cleaning.	If portions of the HVAC equipment (furnace, air handler, heat pump) are located in the basement or the under floor areas, the equipment should be reconditioned or replaced. Water-inundated duct insulation should be removed and replaced. If the duct insulation is integral to the ducts (duct board or secured interior duct liners), the ducts should be replaced. All ducts that are being reused will require cleaning.	Portions of the HVAC equipment (furnace, air handler, heat pump) should be replaced. Water-inundated duct insulation should be removed and replaced. If the duct insulation is integral to the ducts (duct board or secured interior duct liners), the ducts should be replaced. All ducts that are being reused will require cleaning.	All HVAC equipment (furnace, air handler, heat pump) should be replaced. Water-inundated duct insulation should be removed and replaced. If the duct insulation is integral to the ducts (duct board or secured interior duct liners), the ducts should be replaced. All ducts that are being reused will require cleaning.

Appliances

0-25% Damage (Up to 6” above FFE)

Built-in appliances may be cleaned and reconditioned; check gas-fired appliances

25-50% Damage (6” to 12” above FFE)

Increased damage, some floor appliances unusable

damage percentage for this element.

Appliances

50-75% Damage (12” to 18” above FFE)

Damages increase; floor appliances need repair or replacement

Over 75% Damage (Over 18” above FFE)

Most or all built-in appliances need replacement

occurs in high levels of flooding

Cabinets and Countertops

0-25% Damage (Up to 4" above FFE)

Minimal damage to base cabinets

25-50% Damage (4" to 12" above FFE)

Increased damage to base cabinets, possibly some damage to counters

Cabinets and countertops are frequently

Cabinets and Countertops

50-75% Damage (12” to 3’ above FFE)

Replace base cabinets and possibly counters

Over 75% Damage (Over 3’ above FFE)

Replace base cabinets, counters, and wall cabinets

there may be a jump in damage percentages as

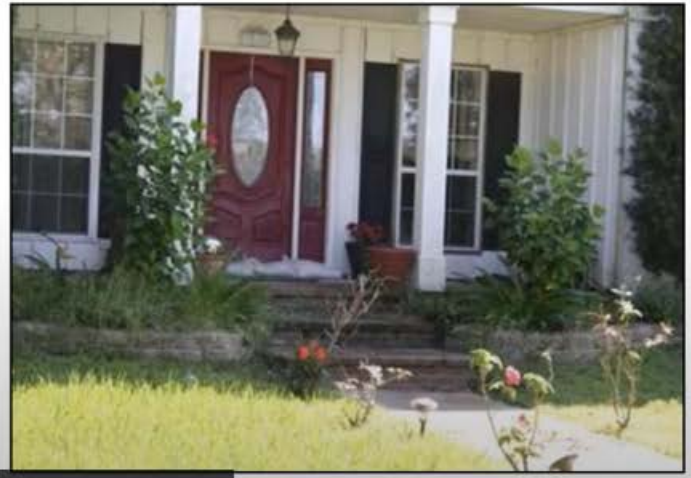
Doors and Windows

0-25% Damage (Just below FFE)

Bottoms of interior doors may be deformed, delaminated or swelled, one or two windows blown out

25-50% Damage (0" to 6" above FFE)

Several doors or windows damaged, some cleaning from floodwaters required on doors/windows



and windows of a structure.

Doors and Windows

50-75% Damage (6” to 12” above FFE)

Doors replaced, multiple windows need to be replaced from wind damage

Over 75% Damage (Over 12” above FFE)

Interior and exterior doors likely need replacement; deformation and other damages at normal sill-height windows

your damage percentage.

Electrical

0-25% Damage (Up to 12” above FFE)

Minor electrical components and limited wiring inundated, flooding below normal receptacle/outlet height

25-50% Damage (12” to 18” above FFE)

Receptacles impacted, major components of the electrical system not affected

or in any scenario where

Electrical

50-75% Damage (18” to 3’ above FFE)

Significant receptacle/wire damage; flooding above normal switch height

Over 75% Damage (Over 3’ above FFE)

Most wiring components and significant amount of electrical system is inundated and needs replacement

High water marks over 3 feet

Exterior Finish

0-25% Damage (Up to 6” above FFE)

Water staining, cleaning, some water removal of brick/stone veneer walls; minor siding repairs from wind damage

25-50% Damage (6” to 18” above FFE)

Some wall surface damage, some repairs needed to siding

covering on the outside of a structure.

Exterior Finish

50-75% Damage (18" to 3' above FFE)

Damages/losses to significant sections of exterior wall surfaces, highly visible damage to exterior

Over 75% Damage (Over 3' above FFE)

Extensive damages/losses of exterior wall surfaces, major repairs to wall surfaces, possibly accompanied by structural damage

that requires replacement of siding or veneer.

Floor Finish

0-25% Damage

Tile floors that may only need cleaning

25-50% Damage

Only certain rooms/areas damaged or major cleaning efforts are needed

because if the water level is

Floor Finish

50-75% Damage

Floor coverings damaged in most areas, major damage, some floors will not need to be fully replaced

Over 75% Damage

Major damages to floor sheathing; most or all floor coverings require replacement, major surge/wave damage to floors, partial or complete collapse

will have major damage to

Foundations

0-25% Damage (Up to 6” above FFE)

Limited scouring, no noticeable cracks in slab, minor damages to elements located below elevated floor

25-50% Damage (6” to 4’ above FFE)

Limited scour, erosion, undermining, cracking; No displacement of slab/walls; No damage/destruction of elements located below elevated floor

and undermining of the foundation.

Foundations

50-75% Damage (4’ to 7’ above FFE)

Limited scouring, some noticeable cracks in slab, significant surge/wave damage, visible structural issues

Over 75% Damage (over 7’ above FFE)

Foundations cracked, displaced/missing, major surge/wave damage, partial or complete structural collapse

75% and 100%.

HVAC

0-25% Damage (Up to 6” above FFE)

Fix condenser unit if at finished floor level; remove and replace inundated crawlspace ducts

25-50% Damage (6” to 12” above FFE)

Damage/destruction to HVAC equipment/ducts at or near grade

unit that needs to be replaced or repaired

HVAC

50-75% Damage (12” to 3’ above FFE)

Portions of HVAC equipment replaced; remove and replace inundated ducts, insulation

Over 75% Damage (Over 3’ above FFE)

All HVAC equipment, inundated ducts, and duct insulation replaced

in the range of 50-75%.

Interior Finish

0-25% Damage (Just below FFE)

Possible water stains/damage at baseboard, bottoms of door casings, minor damage from rainwater infiltration

25-50% Damage (0" to 6" above FFE)

Likely water stains/damage, high water mark a few inches above first floor, some damage from rainwater infiltration or other damage limited to a few rooms

elements of the home's interior.

Interior Finish

50-75% Damage (6” to 3’ above FFE)

Replace baseboards and door casings; water damage at lower wall assemblies, repair or replace wall/trim

Over 75% Damage (Over 3’ above FFE)

Replace baseboards, door casings, walls and trim; complete repainting; partial/complete structural collapse

Typically homes that experience up

Plumbing

0-25% Damage (Up to 12” above FFE)

Backflow/contamination, fixture/piping damage may occur; sanitize any under floor/slab plumbing, minor damages to plumbing below elevated floor

25-50% Damage (12” to 18” above FFE)

Increased damage, damage/destruction to plumbing at/near grade

and clean pipes around plumbing fixtures

Plumbing

50-75% Damage (18" to 3' above FFE)

Significant backflow/contamination; replace water heater; some fixture damage

Over 75% Damage (Over 3' above FFE)

Most or all plumbing fixtures and piping contaminated/damaged

The floodwaters in this home were damaging

Roof Covering

0-25% Damage
(varies based on wind conditions)

Minor roof covering damage,
no visible roof sheathing damage

25-50% Damage
(varies based on wind conditions)

More roof covering damage,
minimal roof sheathing damage

such as shingles or tiles.

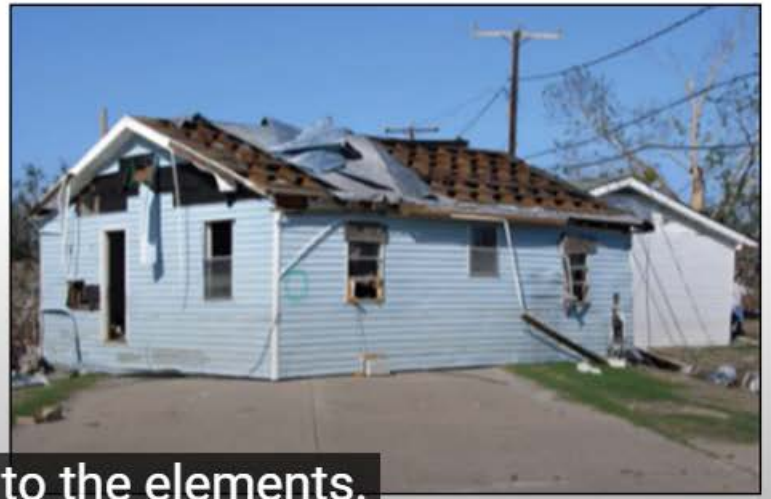
Roof Covering

50-75% Damage
(varies based on wind conditions)

Significant roof covering and roof sheathing damage

Over 75% Damage
(varies based on wind conditions)

Extensive damage, missing wall/roof framing, open walls; significant evidence of framing deformation or distortion



that expose the interior to the elements.

Superstructure

0-25% Damage (just below FFE)

Minor wall damage, but no deformation or distortion of framing

25%-50% Damage (0” to 12” above FFE)

Some wall damage, but no major deformation/distortion

homes that have minor damage

Superstructure

50-75% Damage (1' to 3' above FFE)

More damage to wall/roof framing; some evidence of framing deformation or distortion, significant surge/wave damage, visible structural issues

Over 75% Damage (Over 3' above FFE)

Extensive damage, missing wall/roof framing, open walls; significant evidence of framing deformation or distortion, major surge/wave damage, partial or complete structural collapse

but it is likely that there is at least some