



# Glossary

## A

**Acceptable level of risk** – The level of risk (above the minimum required by building code or regulation) judged by the building owner and designer to be appropriate for a particular building.

**Accretion** – The result of sediment transport when more sediment moves into a shoreline segment than leaves it.

**Adjacent grade** – Elevation of the natural or graded ground surface, or structural fill, abutting the walls of a building. See also *Highest adjacent grade* and *Lowest adjacent grade*.

**Angle of internal friction (soil)** – A measure of the soil’s ability to resist shear forces without failure.

**Appurtenant structure** – Under the National Flood Insurance Program, an “appurtenant structure” is “a structure which is on the same parcel of property as the principal structure to be insured and the use of which is incidental to the use of the principal structure.”

## B

**Barrier island** – A long, narrow sand island parallel to the mainland.

**Base flood** – Flood that has as 1-percent probability of being equaled or exceeded in any given year. Also known as the 100-year flood.

**Base Flood Elevation (BFE)** – The water surface elevation resulting from a flood that has a 1 percent probability of equaling or exceeding that level in any given year. Elevation of the base flood in relation to a specified datum, such as the National Geodetic Vertical Datum or the North American Vertical Datum. The Base Flood Elevation is the basis of the insurance and floodplain management requirements of the National Flood Insurance Program.

**Basement** – Under the National Flood Insurance Program, any area of a building having its floor subgrade on all sides. (Note: What is typically referred to as a “walkout basement,” which has a floor that is at or above grade on at least one side, is not considered a basement under the National Flood Insurance Program.)

**Beach nourishment** – A project type that typically involves dredging or excavating hundreds of thousands to millions of cubic yards of sediment, and placing it along the shoreline.

**Bearing capacity (soils)** – A measure of the ability of soil to support gravity loads without soil failure or excessive settlement.

**Berm** – Horizontal portion of the backshore beach formed by sediments deposited by waves.

**Best Practices** – Techniques that exceed the minimum requirements of model building codes; design and construction standards; or Federal, State, and local regulations.

**Breakaway wall** – Under the National Flood Insurance Program, a wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces without causing damage to the elevated portion of the building or supporting foundation system. Breakaway walls are required by the National Flood Insurance Program regulations for any enclosures constructed below the Base Flood Elevation beneath elevated buildings in Coastal High Hazard Areas (also referred to as Zone V). In addition, breakaway walls are recommended in areas where flood waters flow at high velocities or contain ice or other debris.

**Building code** – Regulations adopted by local governments that establish standards for construction, modification, and repair of buildings and other structures.

**Building envelope** – Comprises exterior doors, windows, skylights, exterior wall coverings, soffits, roof systems, and attic vents. In buildings elevated on open foundations, the floor is also considered a part of the envelope.

**Built-up roof covering** – Two or more layers of felt cemented together and surfaced with a cap sheet, mineral aggregate, smooth coating, or similar surfacing material.

**Bulkhead** – Wall or other structure, often of wood, steel, stone, or concrete, designed to retain or prevent sliding or erosion of the land. Occasionally, bulkheads are used to protect against wave action.

## C

**Cladding** – Exterior surface of the building envelope that is directly loaded by the wind.

**Closed foundation** – A foundation that does not allow water to pass easily through the foundation elements below an elevated building. Examples of closed foundations include crawlspace foundations, stem wall foundations (usually filled with compacted soil with slab on top), and monolithic slab-on-grade foundations.

**Coastal A Zone** – The portion of the coastal SFHA referenced by building codes and standards, where base flood wave heights are between 1.5 and 3 feet, and where wave characteristics are deemed sufficient to damage many NFIP-compliant structures on shallow or solid wall foundations.

**Coastal barrier** – Depositional geologic feature such as a bay barrier, tombolo, barrier spit, or barrier island that consists of unconsolidated sedimentary materials; is subject to wave, tidal, and wind energies; and protects landward aquatic habitats from direct wave attack.

**Coastal Barrier Resources Act of 1982 (CBRA)** – Act (Public Law 97-348) that established the Coastal Barrier Resources System (CBRS). The act prohibits the provision of new flood insurance

coverage on or after October 1, 1983, for any new construction or substantial improvements of structures located on any designated undeveloped coastal barrier within the CBRS. The CBRS was expanded by the Coastal Barrier Improvement Act of 1991. The date on which an area is added to the CBRS is the date of CBRS designation for that area.

**Coastal flood hazard area** – An area subject to inundation by storm surge and, in some instances, wave action caused by storms or seismic forces. Usually along an open coast, bay, or inlet.

**Coastal geology** – The origin, structure, and characteristics of the rocks and sediments that make up the coastal region.

**Coastal High Hazard Area** – Under the National Flood Insurance Program, an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high-velocity wave action from storms or seismic sources. On a Flood Insurance Rate Map, the Coastal High Hazard Area is designated Zone V, VE, or V1-V30. These zones designate areas subject to inundation by the base flood, where wave heights or wave runup depths are 3.0 feet or higher. See also *Zone V*.

**Coastal processes** – The physical processes that act upon and shape the coastline. These processes, which influence the configuration, orientation, and movement of the coast, include tides and fluctuating water levels, waves, currents, and winds.

**Coastal sediment budget** – The quantification of the amounts and rates of sediment transport, erosion, and deposition within a defined region. See also *Cross-shore sand transport* and *Longshore sand transport*.

**Coastal Special Flood Hazard Area** – The portion of the Special Flood Hazard Area where the source of flooding is coastal surge or inundation. It includes Zone VE and Coastal A Zone.

**Code official** – Officer or other designated authority charged with the administration and enforcement of the code, or a duly authorized representative, such as a building, zoning, planning, or floodplain management official.

**Column foundation** – Foundation consisting of vertical support members with a height-to-least-lateral-dimension ratio greater than three. Columns are typically set on below-grade footings atop compacted material. They are usually made of concrete or masonry and may require bracing. Columns are sometimes known as posts, particularly if they are made of wood.

**Components and Cladding (C&C)** – American Society of Civil Engineers (ASCE) 7-10 defines C&C as “... elements of the building envelope that do not qualify as part of the MWFRS [Main Wind Force Resisting System].” These elements include but are not limited to roof coverings, roof sheathing, exterior siding, wall sheathing, windows, doors, soffits, fascia, and chimneys. Furthermore, individual MWFRS elements of shear walls and roof diaphragms (studs and chords) may also act as components and should also be analyzed under the loading requirements of C&C.

**Connector** – Mechanical device for securing two or more pieces, parts, or members together, including anchors, wall ties, and fasteners.

**Continuous load paths** – The structural condition required to resist loads acting on a building. The continuous load path starts at the point or surface where loads are applied, moves through the building, continues through the foundation, and terminates where the loads are transferred to the soils that support the building.

**Corrosion-resistant metal** – Any nonferrous metal or any metal having an unbroken surfacing of nonferrous metal, or steel with not less than 10 percent chromium or with not less than 0.20 percent copper.

**Cross-shore sand transport** – Wave- and/or tide-generated movement of shallow-water coastal sediments toward or away from the shoreline. See also *Coastal sediment budget* and *Longshore sand transport*.

## D

**Dead load** – Weight of all materials of construction incorporated into the building, including but not limited to walls, floors, roofs, ceilings, stairways, built-in partitions, finishes, cladding, and other similarly incorporated architectural and structural items and fixed service equipment. See also *Loads*.

**Debris** – Solid objects or masses carried by or floating on the surface of moving water, or carried by wind.

**Debris impact loads** – Loads imposed on a structure by the impact of floodborne debris. These loads are often sudden and large. Though difficult to predict, debris impact loads must be considered when structures are designed and constructed. See also *Loads*.

**Design event** – The minimum code-required event (for natural hazards, such as flood, wind, and earthquake) and associated loads that the structure must be designed to resist.

**Design flood** – The greater of either (1) the base flood or (2) the flood associated with the flood hazard area depicted on a community's flood hazard map, or otherwise legally designated.

**Design Flood Elevation (DFE)** – Elevation of the design flood, or the flood protection elevation required by a community, including wave effects, relative to the National Geodetic Vertical Datum, North American Vertical Datum, or other datum. The DFE is the locally adopted regulatory flood elevation. If a community regulates to minimum National Flood Insurance Program (NFIP) requirements, the DFE is equal to the Base Flood Elevation (BFE). If a community chooses to exceed minimum NFIP requirements, the DFE exceeds the BFE. See ASCE-24, *Flood Resistant Design and Construction*. Good engineering design practice requires elevation above the Base Flood Elevation.

**Design flood protection depth** – Vertical distance between the eroded ground elevation and the Design Flood Elevation.

**Design stillwater flood depth** – Vertical distance between the eroded ground elevation and the design stillwater flood elevation.

**Design stillwater flood elevation** – Stillwater elevation associated with the design flood, excluding wave effects, relative to the National Geodetic Vertical Datum, North American Vertical Datum, or other datum. See also *Stillwater elevation*.

**Development** – Under the National Flood Insurance Program, any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations or storage of equipment or materials.

**Dry floodproofing** – A flood retrofitting technique in which the portion of a structure below the flood protection level (walls and other exterior components) is sealed to be impermeable to the passage of floodwaters.

**Dune** – See *Frontal dune* and *Primary frontal dune*.

**Dune toe** – Junction of the gentle slope seaward of the dune and the dune face, which is marked by a slope of 1 on 10 or steeper.

## E

**Effective Flood Insurance Rate Map** – See *Flood Insurance Rate Map*.

**Elevation** – Raising a structure to prevent floodwaters from reaching damageable portions.

**Enclosure** – The portion of an elevated building below the lowest elevated floor that is either partially or fully shut in by rigid walls.

**Encroachment** – The placement of an object in a floodplain that hinders the passage of water or otherwise affects the flood flows.

**Erodible soil** – Soil subject to wearing away and movement due to the effects of wind, water, or other geological processes during a flood or storm or over a period of years.

**Erosion** – Under the National Flood Insurance Program, the process of the gradual wearing away of land masses.

**Erosion analysis** – Analysis of the short- and long-term erosion potential of soil or strata, including the effects of flooding or storm surge, moving water, wave action, and the interaction of water and structural components.

**Exterior-mounted mechanical equipment** – Includes, but is not limited to, exhaust fans, vent hoods, air conditioning units, duct work, pool motors, and well pumps.

## F

**Federal Emergency Management Agency (FEMA)** – Independent agency created in 1979 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response, and recovery. FEMA administers the National Flood Insurance Program.

**Federal Insurance and Mitigation Administration (FIMA)** – The component of the Federal Emergency Management Agency directly responsible for administering the flood insurance aspects of the National Flood Insurance Program as well as a range of programs designed to reduce future losses to homes, businesses, schools, public buildings, and critical facilities from floods, earthquakes, tornadoes, and other natural disasters.

**Fill** – Material such as soil, gravel, or crushed stone placed in an area to increase ground elevations or change soil properties. See also *Structural fill*.

**500-year flood** – Flood that has as 0.2-percent probability of being equaled or exceeded in any given year.

**Flood** – Under the National Flood Insurance Program, either (a) a general and temporary condition or partial or complete inundation of normally dry land areas from:

(1) the overflow of inland or tidal waters,

(2) the unusual and rapid accumulation or runoff of surface waters from any source, or

(3) mudslides (i.e., mudflows) that are proximately caused by flooding as defined in (2) and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when the earth is carried by a current of water and deposited along the path of the current, or

(b) the collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in (1), above.

**Flood-damage resistant material** – Any construction material capable of withstanding direct and prolonged contact without suffering significant damage

**Flood elevation** – Height of the water surface above an established elevation datum such as the National Geodetic Vertical Datum, North American Vertical Datum, or mean sea level.

**Flood hazard area** – The greater of the following: (1) the area of special flood hazard, as defined under the National Flood Insurance Program, or (2) the area designated as a flood hazard area on a community's legally adopted flood hazard map, or otherwise legally designated.

**Flood insurance** – Insurance coverage provided under the National Flood Insurance Program.

**Flood Insurance Rate Map (FIRM)** – Under the National Flood Insurance Program, an official map of a community, on which the Federal Emergency Management Agency has delineated both the special hazard areas and the risk premium zones applicable to the community. (Note: The latest FIRM issued for a community is referred to as the “effective FIRM” for that community.) Newer, digitized FIRMs are called DFIRMs.

**Flood Insurance Study (FIS)** – Under the National Flood Insurance Program, an examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation, and determination of mudslide (i.e., mudflow) and flood-related erosion hazards in a community or communities. (Note: The National Flood Insurance Program regulations refer to Flood Insurance Studies as “flood elevation studies.”)

**Flood-related erosion area or flood-related erosion prone area** – A land area adjoining the shore of a lake or other body of water, which due to the composition of the shoreline or bank and high water levels or wind-driven currents, is likely to suffer flood-related erosion.

**Flooding** – See *Flood*.

**Floodplain** – Under the National Flood Insurance Program, any land area susceptible to being inundated by water from any source. See also *Flood*.

**Floodplain management** – Operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works, and floodplain management regulations.

**Floodplain management regulations** – Under the National Flood Insurance Program, zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as floodplain ordinance, grading ordinance, and erosion control ordinance), and other applications of police power. The term describes State or local regulations, in any combination thereof, that promulgate standards for the purpose of flood damage prevention and reduction.

**Floodwall** – A flood retrofitting technique that consists of engineered barriers designed to keep floodwaters from coming into contact with the structure.

**Footing** – Enlarged base of a foundation wall, pier, post, or column designed to spread the load of the structure so that it does not exceed the soil bearing capacity.

**Footprint** – Land area occupied by a structure.

**Freeboard** – Under the National Flood Insurance Program, a factor of safety, usually expressed in feet above a flood level, for the purposes of floodplain management. Freeboard is intended to compensate for the many unknown factors that could contribute to flood heights greater than the heights calculated for a selected size flood and floodway conditions, such as the hydrological effect of urbanization of the watershed. Freeboard is additional height incorporated into the Design Flood Elevation, and may be required by State or local regulations or be desired by a property owner.

**Frontal dune** – Ridge or mound of unconsolidated sandy soil extending continuously alongshore landward of the sand beach and defined by relatively steep slopes abutting markedly flatter and lower regions on each side. See also *Primary frontal dune*.

**Frontal dune reservoir** – Dune cross-section above 100-year stillwater level and seaward of dune peak.

## G

**Gabion** – Rock-filled cage made of wire or metal that is placed on slopes or embankments to protect them from erosion caused by flowing or fast-moving water.

**Geomorphology** – The origin, structure, and characteristics of the rocks and sediments that make up the coastal region.

**Glazing** – Glass or transparent or translucent plastic sheet in windows, doors, skylights, and shutters.

**Grade beam** – In coastal areas, grade beams may be installed between piles to create resistance to rotation (fixity) at the top of the pile. However, pile and grade beam foundations should be designed and constructed so that the grade beams act only to provide fixity and not to support to the lowest elevated floor or slab, in which case they are considered the lowest horizontal structural member and significantly increase flood insurance premiums. If not placed deeply enough, grade beams may be exposed by moving floodwaters, a condition that has been observed to significantly increase scour beneath the structure.

**Groin** – Short, shore-perpendicular structures designed to trap available littoral sediments.

## H

**High-velocity wave action** – Condition in which wave heights or wave runup depths are 3.0 feet or higher.

**Highest adjacent grade** – Elevation of the highest natural or regraded ground surface, or structural fill, that abuts the walls of a building.

**Hurricane** – Tropical cyclone, formed in the atmosphere over warm ocean areas, in which 1-minute sustained wind speeds reach 74 miles per hour or more and blow in a large spiral around a relatively calm center or “eye.” Hurricane circulation is counter-clockwise in the northern hemisphere and clockwise in the southern hemisphere.

**Hurricane clip or strap** – Structural connector, usually metal, used to tie roof, wall, floor, and foundation members together so that they resist wind forces.

**Hurricane-prone region** – In the United States and its territories, hurricane-prone regions are defined by The American Society of Civil Engineers (ASCE) 7-10 as: (1) The U.S. Atlantic Ocean and Gulf of Mexico coasts where the basic wind speed for Risk Category II buildings is greater than 115 mph, and (2) Hawaii, Puerto Rico, Guam, the Virgin Islands, and American Samoa.

**Hydrodynamic loads** – Loads imposed on an object, such as a building, by water flowing against and around it. Among these loads are positive frontal pressure against the structure, drag effect along the sides, and negative pressure on the downstream side.

**Hydrostatic loads** – Hydrostatic loads occur whenever floodwaters come into contact with a foundation, building, or building element. Hydrostatic loads can act laterally or vertically. Lateral pressures increase with the square of water depth, while vertical pressures are a function of buoyancy.

## I

**Initial costs** – Include property evaluation, acquisition, permitting, design, and construction.

**Interior mechanical equipment** – Includes, but is not limited to, furnaces, boilers, water heaters, and distribution ductwork.

## J

**Jetting (of piles)** – Use of a high-pressure stream of water to embed a pile in sandy soil. See also *Pile foundation*.

**Jetty** – Wall built from the shore out into the water to restrain currents or protect a structure.

**Joist** – Any of the parallel structural members of a floor system that support, and are usually immediately beneath, the floor.

## L

**Lacustrine flood hazard area** – Area subject to inundation from lakes.

**Landslide** – Occurs when slopes become unstable and loose material slides or flows under the influence of gravity. Often, landslides are triggered by other events such as erosion at the toe of a steep slope, earthquakes, floods, or heavy rains, but can be worsened by human actions such as destruction of vegetation or uncontrolled pedestrian access on steep slopes.

**Levee** – Typically a compacted earthen structure that blocks floodwaters from coming into contact with the structure, a levee is a manmade structure built parallel to a waterway to contain, control, or divert the flow of water. A levee system may also include concrete or steel floodwalls, fixed or operable floodgates and other closure structures, pump stations for rainwater drainage, and other elements, all of which must perform as designed to prevent failure.

**Levee-impacted area** – The floodplain area landward of a levee system for which the levee system provides a certain level of risk reduction.

**Limit of Moderate Wave Action (LiMWA)** – A line indicating the limit of the 1.5-foot wave height during the base flood. FEMA requires new flood studies in coastal areas to delineate the LiMWA.

**Littoral drift** – Movement of sand by littoral (longshore) currents in a direction parallel to the beach along the shore.

**Live loads** – Loads produced by the use and occupancy of the building or other structure. Live loads do not include construction or environmental loads such as wind load, snow load, rain load, earthquake load, flood load, or dead load. See also *Loads*.

**Load-bearing wall** – Wall that supports any vertical load in addition to its own weight. See also *Non-load-bearing wall*.

**Loads** – Forces or other actions that result from the weight of all building materials, occupants and their possessions, environmental effects, differential movement, and restrained dimensional changes.

**Longshore sand transport** – Wave and/or tide-generated movement of shallow-water coastal sediments parallel to the shoreline. See also *Coastal sediment budget* and *Cross-shore sand transport*.

**Long-term costs** – Include preventive maintenance and repair and replacement of deteriorated or damaged building components. A hazard-resistant design can result in lower long-term costs by preventing or reducing losses from natural hazards events.

**Lowest adjacent grade (LAG)** – Elevation of the lowest natural or regraded ground surface, or structural fill, that abuts the walls of a building. See also *Highest adjacent grade*.

**Lowest floor** – Under the National Flood Insurance Program (NFIP), “lowest floor” of a building includes the floor of a basement. The NFIP regulations define a basement as “... any area of a building having its floor subgrade (below ground level) on all sides.” For insurance rating purposes, this definition applies even when the subgrade floor is not enclosed by full-height walls.

**Lowest horizontal structural member** – Under the National Flood Insurance Program (NFIP), in Zone V, new construction must have the elevation of the lowest horizontal structural member at or above the Base Flood Elevation (BFE). Horizontal structural members are obstructions and can transmit the force of wave impacts to rest of the structure. This elevation is used as the reference level to determine

insurance rates. This contrasts with construction and insurance rating in Zone A, which uses the elevation of the lowest floor including basement as the reference level. This requirement is to keep the entire building in a Zone V above the anticipated breaking wave height of a base flood storm surge. In an elevated building, the lowest beam, joist, or other horizontal member that supports the building is the lowest horizontal structural member. Grade beams installed to support vertical foundation members where they enter the ground are not considered lowest horizontal members.

## M

**Main Wind Force Resisting System (MWFRS)** – Consists of the foundation; floor supports (e.g., joists, beams); columns; roof rafters or trusses; and bracing, walls, and diaphragms that assist in transferring loads. The American Society of Civil Engineers (ASCE) 7-10 defines the MWFRS as “... an assemblage of structural elements assigned to provide support and stability for the overall structure.”

**Manufactured home** – Under the National Flood Insurance Program, a structure, transportable in one or more sections, built on a permanent chassis and designed for use with or without a permanent foundation when attached to the required utilities. Does not include recreational vehicles.

**Marsh** – Wetland dominated by herbaceous or non-woody plants often developing in shallow ponds or depressions, river margins, tidal areas, and estuaries.

**Masonry** – Built-up construction of building units made of clay, shale, concrete, glass, gypsum, stone, or other approved units bonded together with or without mortar or grout or other accepted methods of joining.

**Mean return period** – The average recurrence interval of an event over an extended period of time. For example, the average time (in years) between landfall or nearby passage of a tropical storm or hurricane. See also *Recurrence interval*.

**Mean water elevation** – The surface across which waves propagate. The mean water elevation is calculated as the stillwater elevation plus the wave setup.

**Mean sea level (MSL)** – Average height of the sea for all stages of the tide, usually determined from hourly height observations over a 19-year period on an open coast or in adjacent waters having free access to the sea. See also *National Geodetic Vertical Datum*.

**Metal roof panel** – Interlocking metal sheet having a minimum installed weather exposure of 3 square feet per sheet.

**Minimal Wave Action area (MiWA)** – The portion of the coastal Special Flood Hazard Area where base flood wave heights are less than 1.5 feet.

**Mitigation** – Any action taken to reduce or permanently eliminate the long-term risk to life and property from natural hazards.

**Mitigation Assessment Team (MAT) report** – Report that summarizes investigations conducted by the Federal Emergency Management Agency shortly after major disasters. Previously called Flood Damage Assessment Reports and Building Performance Assessment Team reports.

**Moderate Wave Action area (MoWA)** – See *Coastal A Zone*.

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## N

**National Flood Insurance Program (NFIP)** – Federal program created by Congress in 1968 that makes flood insurance available in communities that enact and enforce satisfactory floodplain management regulations.

**National Geodetic Vertical Datum (NGVD)** – Datum established in 1929 and used as a basis for measuring flood, ground, and structural elevations, previously referred to as Sea Level Datum or Mean Sea Level. The Base Flood Elevations shown on most of the Flood Insurance Rate Maps issued by the Federal Emergency Management Agency are referenced to NGVD or, more recently, to the *North American Vertical Datum*.

**Naturally decay-resistant wood** – Wood whose composition provides it with some measure of resistance to decay and attack by insects, without preservative treatment (e.g., heartwood of cedar, black locust, black walnut, and redwood).

**New construction** – For the purpose of determining flood insurance rates under the National Flood Insurance Program, structures for which the start of construction commenced on or after the effective date of the initial Flood Insurance Rate Map or after December 31, 1974, whichever is later, including any subsequent improvements to such structures. (See also *Post-FIRM structure*.) For floodplain management purposes, new construction means structures for which the start of construction commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

**Non-load-bearing wall** – Wall that does not support vertical loads other than its own weight. See also *Load-bearing wall*.

**Nor'easter** – A type of storm that occurs along the East Coast of the United States where the wind comes from the northeast. Nor'easters can cause coastal flooding, coastal erosion, hurricane-force winds, and heavy snow.

**North American Vertical Datum (NAVD)** – Datum established in 1988 and used as a basis for measuring flood, ground, and structural elevations. NAVD is used in many recent Flood Insurance Studies rather than the National Geodetic Vertical Datum.

## O

**Open foundation** – A foundation that allows water to pass through the foundation of an elevated building, which reduces the lateral flood loads the foundation must resist. Examples of open foundations are pile, pier, post, and column foundations.

**Operational costs** – Costs associated with the use of the building, such as the cost of utilities and insurance. Optimizing energy efficiency may result in a higher initial cost but save in operational costs.

**100-year flood** – See *Base flood*.

**Oriented strand board (OSB)** – Mat-formed wood structural panel product composed of thin rectangular wood strands or wafers arranged in oriented layers and bonded with waterproof adhesive.

**Overwash** – Occurs when low-lying coastal lands are overtopped and eroded by storm surge and waves such that the eroded sediments are carried landward by floodwaters, burying uplands, roads, and at-grade structures.

## P

**Pier foundation** – Foundation consisting of isolated masonry or cast-in-place concrete structural elements extending into firm materials. Piers are relatively short in comparison to their width, which is usually greater than or equal to 12 times their vertical dimension. Piers derive their load-carrying capacity through skin friction, end bearing, or a combination of both.

**Pile foundation** – Foundation consisting of concrete, wood, or steel structural elements driven or jettied into the ground or cast-in-place. Piles are relatively slender in comparison to their length, which usually exceeds 12 times their horizontal dimension. Piles derive their load-carrying capacity through skin friction, end bearing, or a combination of both.

**Platform framing** – A floor assembly consisting of beams, joists, and a subfloor that creates a platform that supports the exterior and interior walls.

**Plywood** – Wood structural panel composed of plies of wood veneer arranged in cross-aligned layers. The plies are bonded with an adhesive that cures when heat and pressure are applied.

**Post-FIRM structure** – For purposes of determining insurance rates under the National Flood Insurance Program, structures for which the start of construction commenced on or after the effective date of an initial Flood Insurance Rate Map or after December 31, 1974, whichever is later, including any subsequent improvements to such structures. This term should not be confused with the term new construction as it is used in floodplain management.

**Precast concrete** – Structural concrete element cast elsewhere than its final position in the structure. See also *Cast-in-place concrete*.

**Pre-FIRM structure** – For purposes of determining insurance rates under the National Flood Insurance Program, structures for which the start of construction commenced before the effective date of an initial Flood Insurance Rate Map or before December 31, 1974.

**Premium** – Amount to be charged for a certain amount of insurance coverage.

**Pressure-treated wood** – Wood impregnated under pressure with compounds that reduce the susceptibility of the wood to flame spread or to deterioration caused by fungi, insects, or marine borers.

**Primary frontal dune** – Under the National Flood Insurance Program, a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.

## R

**Rating factor (insurance)** – A factor used to determine the amount to be charged for a certain amount of insurance coverage (premium).

**Recurrence interval** – The frequency of occurrence of a natural hazard as referred to in most design codes and standards.

**Reinforced concrete** – Structural concrete reinforced with steel bars.

**Relocation** – The moving of a structure to a location that is less prone to flooding and flood-related hazards such as erosion.

**Residual risk** – The level of risk that is not offset by hazard-resistant design or insurance, and that must be accepted by the property owner.

**Retrofit** – Any change or combination of adjustments made to an existing structure intended to reduce or eliminate damage to that structure from flooding, erosion, high winds, earthquakes, or other hazards.

**Revetment** – Facing of stone, cement, sandbags, or other materials placed on an earthen wall or embankment to protect it from erosion or scour caused by flood waters or wave action.

**Riprap** – Broken stone, cut stone blocks, or rubble that is placed on slopes to protect them from erosion or scour caused by flood waters or wave action.

**Risk** – Potential losses associated with a hazard, defined in terms of expected probability and frequency, exposure, and consequences.

**Risk assessment** – Process of quantifying the total risk to a coastal building (i.e., the risk associated with all the significant natural hazards that may impact the building).

**Risk category** – As defined in American Society of Civil Engineers (ASCE) 7-10 and the 2012 International Building Code, a building's risk category is based on the risk to human life, health, and welfare associated with potential damage or failure of the building. These risk categories dictate which design event is used when calculating performance expectations of the building, specifically the loads the building is expected to resist. Risk category was called occupancy category in previous codes and standards.

**Risk reduction** – The process of reducing or offsetting risks. Risk reduction is comprised of two aspects: physical risk reduction and risk management through insurance.

**Risk tolerance** – A person's willingness and ability to assume physical and financial risk.

**Riverine Special Flood Hazard Area** – The portion of the SFHA mapped as Zone AE and where the source of flooding is riverine, not coastal.

**Roof deck** – Flat or sloped roof surface not including its supporting members or vertical supports.

## S

**Sand dunes** – Under the National Flood Insurance Program, natural or artificial ridges or mounds of sand landward of the beach. See also *Dune*.

**Scour** – Removal of soil or fill material by the flow of flood waters. Flow moving past a fixed object accelerates, often forming eddies or vortices and scouring loose sediment from the immediate vicinity of the object. The term is frequently used to describe storm-induced, localized conical erosion around

pilings and other foundation supports, where the obstruction of flow increases turbulence. See also *Erosion*.

**Seawall** – Solid barricade built at the water’s edge to protect the shore and prevent inland flooding.

**Setback** – For the purpose of this Manual, a State or local requirement that prohibits new construction and certain improvements and repairs to existing coastal buildings in areas expected to be lost to shoreline retreat.

**Shearwall** – Load-bearing wall or non-load-bearing wall that transfers in-plane lateral forces from lateral loads acting on a structure to its foundation.

**Shoreline retreat** – Progressive movement of the shoreline in a landward direction; caused by the composite effect of all storms over decades and centuries and expressed as an annual average erosion rate. Shoreline retreat is essentially the horizontal component of erosion and is relevant to long-term land use decisions and the siting of buildings.

**Single-ply membrane** – Roofing membrane that is field-applied with one layer of membrane material (either homogeneous or composite) rather than multiple layers. The four primary types of single-ply membranes are chlorosulfonated polyethylene (CSPE) (Hypalon), ethylene propylene diene monomer (EPDM), polyvinyl chloride (PVC), and thermoplastic polyolefin (TPO).

**Siting** – Choosing the location for the development or redevelopment of a structure.

**Special Flood Hazard Area (SFHA)** – Under the National Flood Insurance Program, an area having special flood, mudslide (i.e., mudflow), or flood-related erosion hazards, and shown on a Flood Hazard Boundary Map or Flood Insurance Rate Map as Zone A, AO, A1-A30, AE, A99, AH, V, V1-V30, VE, M, or E. The area has a 1 percent chance, or greater, of flooding in any given year.

**Start of construction (for other than new construction or substantial improvements under the Coastal Barrier Resources Act)** – Under the National Flood Insurance Program, date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor the installation of streets or walkways; excavation for a basement, footings, piers, or foundations or the erection of temporary forms; or the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

**State Coordinating Agency** – Under the National Flood Insurance Program, the agency of the State government, or other office designated by the Governor of the State or by State statute to assist in the implementation of the National Flood Insurance Program in that State.

**Stillwater elevation** – The elevations of the water surface resulting solely from storm surge (i.e., the rise in the surface of the ocean due to the action of wind and the drop in atmospheric pressure association with hurricanes and other storms).

**Storm surge** – Water pushed toward the shore by the force of the winds swirling around a storm. It is the greatest cause of loss of life due to hurricanes.

**Storm tide** – Combined effect of storm surge, existing astronomical tide conditions, and breaking wave setup.

**Structural concrete** – All concrete used for structural purposes, including plain concrete and reinforced concrete.

**Structural fill** – Fill compacted to a specified density to provide structural support or protection to a structure. See also *Fill*.

**Structure** – For floodplain management purposes under the National Flood Insurance Program (NFIP), a walled and roofed building, gas or liquid storage tank, or manufactured home that is principally above ground. For insurance coverage purposes under the NFIP, structure means a walled and roofed building, other than a gas or liquid storage tank, that is principally above ground and affixed to a permanent site, as well as a manufactured home on a permanent foundation. For the latter purpose, the term includes a building undergoing construction, alteration, or repair, but does not include building materials or supplies intended for use in such construction, alteration, or repair, unless such materials or supplies are within an enclosed building on the premises.

**Subsidence (land)** – The ground level falling due to various geological processes. See also *Uplift (land)*.

**Substantial damage** – Under the National Flood Insurance Program, damage to a building (regardless of the cause) is considered substantial damage if the cost of restoring the building to its before-damage condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

**Substantial improvement** – Under the National Flood Insurance Program, improvement of a building (such as reconstruction, rehabilitation, or addition) is considered a substantial improvement if its cost equals or exceeds 50 percent of the market value of the building before the start of construction of the improvement. This term includes structures that have incurred substantial damage, regardless of the actual repair work performed. The term does not, however, include either (1) any project for improvement of a structure to correct existing violations of State or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to ensure safe living conditions, or (2) any alteration of a “historic structure,” provided that the alteration will not preclude the structure’s continued designation as a “historic structure.”

**Super typhoons** – See *Typhoon*.

## T

**Tornado** – A rapidly rotating vortex or funnel of air extending groundward from a cumulonimbus cloud.

**Tributary area** – The area of the floor, wall, roof, or other surface that is supported by the element. The tributary area is generally a rectangle formed by one-half the distance to the adjacent element in each applicable direction.

**Tropical cyclone** – A low-pressure system that generally forms in the tropics, and is often accompanied by thunderstorms.

**Tropical depression** – Tropical cyclone with some rotary circulation at the water surface. With maximum sustained wind speeds of up to 39 miles per hour, it is the second phase in the development of a hurricane.

**Tropical disturbance** – Tropical cyclone that maintains its identity for at least 24 hours and is marked by moving thunderstorms and with slight or no rotary circulation at the water surface. Winds are not strong. It is a common phenomenon in the tropics and is the first discernable stage in the development of a hurricane.

**Tropical storm** – Tropical cyclone that has 1-minute sustained wind speeds averaging 39 to 74 miles per hour (mph).

**Tsunami** – Long-period water waves generated by undersea shallow-focus earthquakes, undersea crustal displacements (subduction of tectonic plates), landslides, or volcanic activity.

**Typhoon** – Name given to a hurricane in the area of the western Pacific Ocean west of 180 degrees longitude. Typhoons with sustained winds less than 150 miles per hour (mph) are referred to as typhoons, while those with sustained winds equal to or greater than 150 mph are known as super typhoons.

## U

**Underlayment** – One or more layers of felt, sheathing paper, non-bituminous saturated felt, or other approved material over which a steep-sloped roof covering is applied.

**Undermining** – Process whereby the vertical component of erosion or scour exceeds the depth of the base of a building foundation or the level below which the bearing strength of the foundation is compromised.

**Uplift** – Hydrostatic pressure caused by water under a building. It can be strong enough lift a building off its foundation, especially when the building is not properly anchored to its foundation.

**Uplift (land)** – The ground level rising due to various geological processes. See also *Subsidence (land)*.

## V

**Variance** – Under the National Flood Insurance Program, grant of relief by a community from the terms of a floodplain management regulation.

**Violation** – Under the National Flood Insurance Program (NFIP), the failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in Sections 60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) of the NFIP regulations is presumed to be in violation until such time as that documentation is provided.

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## W

**Water surface elevation** – Under the National Flood Insurance Program, the height, in relation to the National Geodetic Vertical Datum of 1929 (or other datum, where specified), of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

**Wave** – Ridge, deformation, or undulation of the water surface.

**Wave height** – Vertical distance between the wave crest and wave trough. Wave crest elevation is the elevation of the crest of a wave, referenced to the National Geodetic Vertical Datum, North American Vertical Datum, or other datum.

**Wave overtopping** – Occurs when waves run up and over a dune or barrier.

**Wave runup** – Is the rush of water up a slope or structure. Wave runup occurs as waves break and run up beaches, sloping surfaces, and vertical surfaces.

**Wave runup depth** – At any point is equal to the maximum wave runup elevation minus the lowest eroded ground elevation at that point.

**Wave runup elevation** – Is the elevation reached by wave runup, referenced to the National Geodetic Vertical Datum or other datum.

**Wave setup** – Increase in the stillwater surface near the shoreline due to the presence of breaking waves. Wave setup typically adds 1.5 to 2.5 feet to the 100-year stillwater flood elevation and should be discussed in the Flood Insurance Study.

**Wave slam** – The action of wave crests striking the elevated portion of a structure.

**Wet floodproofing** – A flood retrofitting technique that involves modifying a structure to allow floodwaters to enter it in such a way that damage to a structure and its contents is minimized.

## Z

**Zone A** – Under the National Flood Insurance Program, area subject to inundation by the 100-year flood where wave action does not occur or where waves are less than 3 feet high, designated Zone A, AE, A1-A30, A0, AH, or AR on a Flood Insurance Rate Map.

**Zone AE** – The portion of the Special Flood Hazard Area (SFHA) not mapped as Zone VE. It includes the Moderate Wave Action area, the Minimal Wave Action area, and the riverine SFHA.

**Zone B** – Areas subject to inundation by the flood that has a 0.2-percent chance of being equaled or exceeded during any given year, often referred to the as 500-year flood. Zone B is provided on older flood maps, on newer maps this is referred to as “shaded Zone X.”

**Zone C** – Designates areas where the annual probability of flooding is less than 0.2 percent. Zone C is provided on older flood maps, on newer maps this is referred to as “unshaded Zone X.”

**Zone V** – See *Coastal High Hazard Area*.

**Zone VE** – The portion of the coastal Special Flood Hazard Area where base flood wave heights are 3 feet or greater, or where other damaging base flood wave effects have been identified, or where the primary frontal dune has been identified.

**Zone X** – Under the National Flood Insurance Program, areas where the flood hazard is lower than that in the Special Flood Hazard Area. Shaded Zone X shown on recent Flood Insurance Rate Maps (Zone B on older maps) designate areas subject to inundation by the 500-year flood. Unshaded Zone X (Zone C on older Flood Insurance Rate Maps) designate areas where the annual probability of flooding is less than 0.2 percent.

**Zone X (Shaded)** – Areas subject to inundation by the flood that has a 0.2-percent chance of being equaled or exceeded during any given year, often referred to the as 500-year flood. This area also includes areas protected by accredited levee systems.

**Zone X (Unshaded)** – Designates areas where the annual probability of flooding is less than 0.2 percent.