DISCLAIMER
About this Training

• **Advisory** [always review local codes/regulations]
• **Guidance** [best practices and resources – not necessarily adopted codes/regulations]
• **Codes/regulations** are generally based upon adopted City of Philadelphia floodplain regulations [Building Codes (IRC, IBC, IBC Appendix G, & ASCE 24, ASCE 7)] and [Philadelphia Zoning Code]
  • City of Philadelphia has adopted higher standards
### Special Flood Hazard Area (SFHA) and 0.2% Annual Chance Flood Hazard

#### Map of City of Philadelphia

**Land Use** | **Sq. Mi.** | **%**
--- | --- | ---
Residential Low Density | 0.1 | 0%
Residential Medium Density | 0.2 | 1%
Residential High Density | 0.4 | 1%
Commercial | 0.6 | 2%
Industrial | 4.9 | 16%
Civic/Institution | 0.3 | 1%
Transportation | 5.5 | 18%
Culture | 1.3 | 4%
Park/Open Space | 3.8 | 12%
Water | 11.5 | 37%
Vacant Land/Other | 2.1 | 7%

**Public Land in Floodplain**
- 11.35 Acres

**Private Land**
- 253.46 Acres

**Existing Structures**
- 5,756

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*Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community*
WHAT IS A FLOODPLAIN?

“Living with floods involves two broad activities: better managing the risks and taking steps to reduce our vulnerability, and better managing the landscape to reduce the magnitude of destructive power of floods.”

--Connie Mutel, A Watershed Year: Anatomy of Iowa Floods of 2008

FLOOD HAZARD AREA
1% Annual Chance Flood Event

Fringe
Floodway
Fringe

Flood-prone areas are managed by restricting development in the floodway, but allowing development in the floodway fringe.

Rural areas produce flood causing runoff at a slower rate than do urban areas.

The ground water table is connected to rivers but experiences a delayed response to flood waters. Ground water rises in a flood event.
CITY OF PHILADELPHIA
CLIMATE CHANGE FLOODING

- Sea level rise
- Severe storm
CITY OF PHILADELPHIA
INFRASTRUCTURE FLOODING

- Stormwater
- Sewers
BACKGROUND - NATIONAL FLOOD INSURANCE PROGRAM [NFIP]

Created by the National Flood Insurance Act of 1968

- Participation is voluntary, but mandatory in PA
  - Adopt and enforce regulations
  - Eligible for flood insurance

- Benefits of participation:
  - Flood insurance
  - Grants and loans
  - Disaster assistance
  - Federally-backed mortgages
COST OF FLOOD INSURANCE

WHY YOU NEED FLOOD INSURANCE

1 INCH of water = $21,000 in property damage
(2,000 sq.ft. home, on average)

$50 BILLION in economic losses are incurred each year due to flooding

FLOODS:
#1 natural disaster in the US

$42,000 average flood insurance claim

26 major flood disasters in 2015

ONLY 14% of homeowners have flood insurance
COST OF FLOOD INSURANCE -
PHILADELPHIA EXAMPLE

+/- $500  +/– $3,000  +/– $5,000

• Above diagram is based on a 2,500 SF townhouse in Philadelphia located in the Special Flood Hazard Area.

• Buildings principally over water cannot get insurance through NFIP (IE. pier construction)
COST OF FLOOD INSURANCE -
Losses and Insurance

Repetitive Loss Properties

NFIP Policies (+/- 4,200)
NFIP ROLE: Federal and State

FEDERAL

• National program oversight
• Risk Identification (mapping)
• Establish development/building standards
• Provide insurance coverage

STATE

• State program oversight
• Establish development/building standards
• Provide technical assistance to local communities/agencies
• Evaluate and document floodplain
• Adopt and enforce floodplain management ordinance compliant with Federal/State laws
• Issue or deny development
• Inspect development and maintain records
• Make substantial damage determinations
• Regulations apply to Special Flood Hazard Area (SFHA) on the Flood Insurance Rate Map (FIRM)
• Development oversight is a local responsibility our local regulations are located in the Zoning and Building Codes
• Audit of the last 5 years of building permits issued in the special flood hazard area (SFHA)
• Tour of all SFHA’s throughout the City for non-permitted development
• Review of the City “floodplain program”

RESULT:
• Over 150 possible violations were discovered and additional documentation is required for full compliance with the regulations
• Violations may lead to the City being placed on Probation
  • $50 surcharge to policy holders (approx. 4,200 policy holders)

UPDATE:
• +/- 40 still in review/mitigation
• Mostly documentation requests (Elevation Certificates, cost estimates, etc)
Failure to adopt a compliant ordinance by map effective date or having non-compliant ordinance = easiest way to get suspended

• Serious ramifications:
  • Suspension of NFIP eligibility
    • No mortgages or home equity loans in floodplain areas
    • No renewals of existing flood insurance policies
    • Loss of most forms of Disaster Assistance
    • No federal grants or loans
    • Loss of subsidized insurance for Pre-FIRM structures
FLOOD HAZARD INFORMATION
FEMA FLOOD MAP SERVICE CENTER

Enter an address, place, or coordinates:

Search

Search Results—Products for PHILADELPHIA, CITY OF

FIRM DATE
01/17/2007

FIRM PANEL #
4207570183G

ADDRESS
philadelphia pa

CREATE FIRMeta-8.5x11" Print of property on FIRM Map

DYNAMIC MAP

You can choose a new flood map or move the location pin by selecting a different location on the locator map below or by entering a new location in the search field above. It may take a minute or more during peak hours to generate a dynamic FIRMeta.
FIRMette
with mapped floodway

National Flood Hazard Layer FIRMette

Legend

SPECIAL FLOOD HAZARD AREA - regulated by City of Philadelphia
CROSS SECTION - w/BFE
ZONE AE - FLOODWAY ZONE AE
0.2% (not regulated)
FIRMette w/o mapped floodway [Coastal Flood Hazard]

- areas mapped with a LiMWA, must comply with Coastal A Zone codes/regulations

National Flood Hazard Layer FIRMette

SPECIAL FLOOD HAZARD AREA - regulated by City of Philadelphia

COASTAL FLOOD HAZARD ZONE AE

0.2% (not regulated)

LiMWA - limit of moderate wave action
FLOOD INSURANCE STUDY [FIS]
Riverine flood profile to determine BFE

Flood Profiles from Flood Insurance Study reports can be used to determine the BFE at a specific site. Profiles also show estimated water surface elevations for floods other than the 1% annual chance flood (100-year).

1. On the effective flood map, locate your site by measuring the distance, along the profile baseline of the stream channel, from a known point such as a road or cross section, for example, JM or JN.

2. Scale that distance on the Flood Profile and read up to the profile of interest, then across to determine the BFE, to the nearest 1/10 of a foot. (Answer: 123 feet).

Legend
- 0.2% Annual Chance Flood
- 1% Annual Chance Flood
- 2% Annual Chance Flood
- 10% Annual Chance Flood
- Stream Bed
- Cross Section Location
FEMA Flood Map Service Center: Search By Address

Enter an address, place, or coordinates: philadelphia pa

Search

Search Results—Products for PHILADELPHIA, CITY OF

The flood map for the selected area is number 4207570183G, effective on 01/17/2007.

Search Results for PHILADELPHIA, CITY OF

Click subscribe to receive email notifications when products are updated.

Please Note: Searching All Products by county displays all products for all communities within the county. You can refine your search results by specifying your specific jurisdiction location using the drop-down menus above.

- Effective Products (89)
- Preliminary Products (0)
- Pending Product (0)
- Historic Products (139)
- Flood Risk Products (5)

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**CODES + REGULATIONS**

**NFIP + Building Codes**

**Figure 1-1: Relationship of NFIP regulations to building code flood provisions**

NFIP Regulations (44 CFR Parts 59 & 60) 

Local Floodplain Management Regulations* OR IBC Appendix G* 

Building Code 

ASCE 7 

ASCE 24 

Flood Resistant Buildings and Development 

* NFIP-consistent administrative provisions, community-specific adoption of Flood Insurance Studies and maps, and technical requirements for development outside the scope of the building code (and higher standards, in some communities).
DEFINITION OF DEVELOPMENT in Special Flood Hazard Areas [SFHA]

- development located in flood hazard areas, including the subdivision of land; installation of utilities; placement and replacement of manufactured homes; new construction and repair, reconstruction, rehabilitation or additions to new construction; substantial improvement of existing buildings and structures, including restoration after damage; temporary structures and temporary or permanent storage; utility and miscellaneous buildings and structures
NFIP
Key Dates

PRE-FIRM
BUILT BEFORE
DECEMBER 31, 1979
or structures mapped into SFHA's post construction, see historical FIRM maps

POST-FIRM
BUILT AFTER
DECEMBER 31, 1979

- December 31, 1979 to August 2012 = BFE+12"
- September 2012 to present = BFE+18"

Although NFIP was created in 1968 the City of Philadelphia joined on December 31, 1979

Regulations do not apply unless substantially improved, but mitigation is always highly suggested

MUST maintain compliance from date of initial construction and/or substantial improvement
Lowest Floor - lowest enclosed floor including: crawl space, basement, garage.

**Pre-FIRM** and **Post-FIRM** are insurance terms tied to a community's initial FIRM. The terms are used to determine flood insurance rates. Although common, the terms should not be used to distinguish between new construction built before a community joined the NFIP and those built after, especially in communities where the FIRMs have been revised.
• Prohibited - Hospitals, group living uses housing the elderly or disabled persons with limited mobility, detention or correctional facilities, new or substantially improved manufactured homes

• Floodway – development prohibited, unless dock, trail, roadway & bridges
  • Floodway analysis

• Watercourse modifications/alterations

• Changes to Special Flood Hazard Areas
DEFINITIONS
Zoning Code vs. ASCE 24-14

• **RESIDENTIAL** - building or structures and portions thereof where people live or that are used for sleeping purposes on a transient or non-transient basis - including but not limited to 1-family, 2-family, townhouses, condominiums, multifamily dwellings, apartments, congregate residences, boarding houses, lodging houses, rooming houses, hotels, motels, convents, monasteries, dormitories, fraternity houses, sorority houses, vacation time-share properties and institutional facilities: halfway houses, social rehabilitation facilities, alcohol and drug centers, detoxification facilities (ASCE 24-14)

• **NON-RESIDENTIAL** – not mentioned above

• **NON-RESIDENTIAL** (required to have 24” freeboard) - Generally structures needed in emergency events (see ASCE 24-14 for full list)
**ZONING APPLICATION**

**Process**

Complete **FP-Zoning/Use Registration Form**

**Refusals** issued for:
- Prohibited uses
- Floodway development
- Placement of fill
- Changes to the Special Flood Hazard Area

**NOTE:**
Although you may receive Zoning Approval for a project located in the Special Flood Hazard Area, Building Permits will require further compliance based on building codes/regulations.
REGULATIONS

Floodway

• New development is prohibited, unless dock, trail, roadway & bridges
• Docks, trails, roads & bridges must show a **No Rise** study/analysis must be completed as well as a FEMA CLOMR/LOMR analysis
• Other local, state, and federal permits apply (DEP, USACE, Submerged Lands License)
• FEMA uses existing information - not engineering studies - to draw Approximate Zone A boundaries. Information may have been provided by the USACE, other federal agencies, State and local agencies, and historic records.

• For existing single family residential and accessory structures, the City may specify the BFE through contour interpolation, for all other development a Hydrologic and Hydraulic Study must be completed to determine a BFE.
REGULATIONS
Coastal A Zones

• See ASCE 24-14 Chapter 4 Coastal High Hazard Areas and Coastal A Zone
• Jurisdiction- areas seaward of the LiMWA line
• Highlights:
• No new construction shall be located landward of the reach of the mean high tide
BUILDING PERMIT APPLICATION
Floodplain Scoping Meeting Process

If the project value is more than $50k in then **Floodplain Scoping Meeting** is required before permit submission

- If the parcel is in the floodplain but the development is clearly not then meeting may be waived (must still submit form)
- If the project is clearly not a substantial improvement of a structure that is PRE-FIRM or PRE-FIRM structure that hasn’t already been brought into compliance, then meeting may be waived (must still submit form)

For more information see **Floodplain Scoping Meeting Information** sheet.
• means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure (or smaller percentage if established by the community) before the “start of construction” of the improvement. This term includes structures that have incurred “substantial damage,” regardless of the actual repair work performed.
EXISTING STRUCTURES
Substantial Improvements - Process

1. Complete **FP-Existing Building Form**
2. Attach Cost Estimate

3. Substantial Improvement Calculation

   ![Image](image.png)

   **IMPROVEMENT VALUE**
   **MARKET VALUE**

   ![Image](image.png)

   **PERCENTAGE OF IMPROVEMENT**

**ESTIMATED COST**

- Materials and labor, including the estimated value of donated or discounted materials and owner or volunteer labor, plus sales tax
- Site preparation related to the improvement or repair (e.g., foundation excavation or filling in basements)
- Demolition and construction debris disposal
- Construction management and supervision
- Structural elements and exterior/interior finishes
- Utility and service equipment

**Items that can be excluded:**

- Costs to obtain or prepare plans and specifications
- Land survey costs
- Permit fees and inspection fees
- Outside improvements, including landscaping, irrigation, sidewalks, driveways, fences, yard lights, swimming pools, pool enclosures, and detached accessory structures (e.g., garages, sheds, and gazebos)
- Costs required for the minimum necessary work to correct existing violations of health, safety, and sanitary codes
EXISTING STRUCTURES

Substantial Improvements - MARKET VALUE

City of Philadelphia
Property
WWW.ATLAS.PHLA.GOV

2301 MARKET ST
Philadelphia, PA 19103-1338

ADD TO GET MARKET VALUE

ADD TO GET MARKET VALUE
EXISTING STRUCTURES
Substantial Improvements - MARKET VALUE

IF 1 PARCEL & MULTIPLE STRUCTURES, THEN:

2018 MARKET VALUE OF TAXABLE IMPROVEMENT (STRUCTURE/BUILDING ONLY)

IMPROVEMENT AREA (SQFT) × PRICE PER SQFT

THEN:

PRICE PER SQFT × EACH STRUCTURE/BUILDING SQFT = EXISTING MARKET VALUE

DETERMINING EXISTING MARKET VALUE (CONDO)

<table>
<thead>
<tr>
<th>Address</th>
<th>Lot Number</th>
<th>Tax Class</th>
<th>Assessor Code</th>
<th>Owner Name</th>
<th>Price Per Sqft</th>
</tr>
</thead>
<tbody>
<tr>
<td>1234 S Main St</td>
<td>123</td>
<td>12</td>
<td>23</td>
<td>John Doe</td>
<td>100.00</td>
</tr>
<tr>
<td>4567 N Ave</td>
<td>45</td>
<td>56</td>
<td>78</td>
<td>Jane Smith</td>
<td>150.00</td>
</tr>
</tbody>
</table>

TO CHALLENGE THE MARKET VALUE: CERTIFIED APPRAISAL

- Licensed Appraiser in Pennsylvania
- Report
  - Identify intended user (including property owner)
  - Completed less than 1 year before floodplain application
  - “Market Approach” is preferred - for structure only, land must be broken out (NOTE: to separate the market value of a structure from the value of the land on which it is located, appraisers may need to do more research than is normally undertaken in order to reasonably allocate the total value between the structure and the land) - for multiple buildings on one parcel, each must be assessed for existing market value
  - “Income Capitalization Approached” is not acceptable
- All values must be for existing conditions, without any proposed improvements
EXISTING STRUCTURES
EZ Permits

When in a Special Flood Hazard Area:

- One or multiple EZ Permits could constitute “substantial improvement”
  - The department, at its discretion, will ensure that phased improvements do not circumvent the substantial improvement requirements
- Some otherwise eligible EZ permit work may be ineligible for EZ Permit when in the floodplain
- Additional standards for floodplain development apply to EZ Permit work above EZ Permit standards information.
If substantial improvement, maintaining compliance and/or new construction then **FP-General Form** must be completed.
BUILDING PERMITS

Residential

• Lowest “livable” floor must be BFE+18”
  • Living room, office, bedrooms, bathrooms, etc.
• If spaces below BFE+18”, can only be used for: parking, building access, and incidental storage.
  • Fully enclosed spaces must be “wet-floodproofed” - allow the automatic entry and exit of floodwater, through Flood Vents
  • No bathrooms, offices, bedrooms, furniture, etc.
  • No basements or crawl spaces that are below-grade on all sides
• Non-conversion clause on Certificate of Occupancy for space(s) below BFE+18”
  • Space can never be converted to “livable” space
  • Future underpinning is prohibited
• Use of Flood Damage Resistant Materials
**Building Permits**

Residential - w/ enclosures

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**Important Information**

**Note:**
- Total net area of all total openings is 1 sq. in. per sq. ft. of enclosed area.
- A 25' x 45' building needs 1,125 sq. inches of openings.
- Standard ventilation units used in foundation walls must be disabled in the open position to allow water to flow in and out.
- A standard ventilation unit with screen provides 42 to 65 sq. inches of opening.

**Alternative:** Engineered openings are acceptable if certified to allow adequate automatic inflow and outflow of floodwaters.

Solid perimeter walls can enclose flood-prone areas. A crawlspace is a good way to elevate just a couple of feet. In all cases, the following are required: flood openings, utilities elevated to or above the BFE, flood-resistant materials, and limitations on use of enclosures below the lowest floor. Check with the local permit office for details and restrictions.
BUILDING PERMITS
Residential - townhouses w/ flood vents

• Townhouses/row-homes must be structurally independent
• Bottom of vent no higher than 12” above adjacent grade
• Vents on at least 2 sides of a structure
• 2 vents per enclosed space
• 1 sq/in for every 1 sq/ft of enclosed space
• Only vent openings below BFE count
BUILDING PERMITS

Flood Vents - crawl space

- The Lowest Floor Elevation must be at or above the BFE.
- The bottom of flood openings must be no more than 1 foot above the grade.
- Standard ventilation units must be permanently disabled in the “open” position to allow water to flow in and out.
- Interior and exterior grades should be equal on at least one side.

Calculate Net Flood Opening:
A building that measures 25' x 45' has 1,125 square feet of enclosed crawlspace. Flood vents must provide 1,125 sq. in. of net open area (or have certified engineered openings). If a standard air vent unit provides 60 sq. in. of net open area, then to satisfy the flood opening requirement 19 vent units are required (1,125 divided by 60).
BUILDING PERMITS
Flood Vents - Elevation Certificate

• See A8 and A9 on Elevation Certificate

• Air vents and/or manually operated vents are not allowed
BUILDING PERMITS
Flood Damage Resistant Materials

• any building product [material, component or system] capable of withstanding direct and prolonged (at least 72 hours) contact with floodwaters without sustaining significant damage

• See Table 2 in FEMA Technical Bulletin “Flood Damage-Resistant Material Requirements”

BUILDING PERMITS
Non-Residential

• Option: **Wet-floodproofed or Dry-floodproofed**
  
  • If **Wet-floodproofed**, then spaces below BFE+18”, can only be used for: parking, building access, and incidental storage.
  
  • Fully enclosed spaces must be “wet floodproofed” - allow the automatic entry and exit of floodwater, through **Flood Vents**
  
  • **Non-conversion** clause on Certificate of Occupancy for space(s) below BFE+18”
  
  • Use of **Flood Damage Resistant Materials**
  
  • If **Dry-floodproofed**, below BFE+18”
  
  • structure, including utilities and equipment, being watertight with all elements substantially impermeable to the entrance of floodwater and with structural components having the capacity to resist flood loads.
  
  • typical use up to 3 feet
  
  • **Not** allowed in Coastal A Zones (along Delaware River)
Considerations:

- **Commercial portions:**
  - *Wet-floodproofed*, spaces below BFE+18”, use only as parking, building access, and incidental storage
  - or
  - *Dry-floodproofed*, commercial spaces below BFE+18”

- **Residential portions:** must be elevated BFE+18”, including lobbies with furniture, desk attendants, mailboxes, trash receptacles, and resident only facilities (gyms, game rooms, amenity spaces, etc)
  - *Wet-floodproofed*, spaces below BFE+18”, use only as parking, building access, and incidental storage
    - bicycle parking, stairwell enclosure, elevator vestibule, etc.
• **Dry-floodproofed considerations:**
  - Building strength
  - Warning time
  - Level of protection
  - Operational
    - Inspection/maintenance plans
  - **Flood Emergency Operation Plan**, see FEMA technical bulletin “Floodproofing Non-Residential Buildings”
  - Seepage
    - Sump pumps
    - Back-flow preventers
  - **Floodproofing Certificate**
    - Must be submitted for Certificate of Occupancy
BUILDING PERMITS

Dry-floodproofing - examples
BUILDING PERMITS
Below-Grade Parking

• Must be **Dry-floodproofed**, to BFE+18’’
  • **Not** allowed in Coastal A Zones (along Delaware River)
  • **Not** allowed in fully residential structures (IE. condominium and apartment buildings)
BUILDING PERMITS
Machinery/Equipment

- Mechanical
- Fuel Systems
- Electrical
- Water supply
- Elevator/escalators
- Plumbing
- Transformers
- Generators
- BFE + 18” unless designed to be submersible/dry floodproofed/waterproof

- Systems and components emerging from underground shall be designed to be anchored to resist flood loads and debris impact
Utility Service Inside Enclosures

Appliances and mechanical equipment (including duct work) must be elevated to or above the BFE. Utilities (plumbing, electrical, gas lines, heating, ventilating & air conditioning) must be elevated or designed and installed to prevent intrusion of flood waters into their components.
Utility Service / Fuel Tanks

All utilities, appliances, and equipment must be elevated to or above the BFE. Utilities include plumbing, electrical, gas lines, fuel tanks, and heating, ventilating and air conditioning equipment.

Important Information

For floodplain management purposes, a gas or a liquid storage tank that is principally above ground is considered a structure and must be elevated to or above the BFE.

Fuel and propane tanks may cause explosion and pollution risks during floods. Even shallow water can create significant buoyant forces on tanks so extra care must be taken to ensure that all tanks are appropriately anchored.

Fuel and propane tanks can pose serious threats to people, property, and the environment during flood conditions. Even shallow water can create a large buoyant force on tanks. Videos on “Fuel Tank Flood Hazards” and “How to Anchor Home Fuel Tanks” are available from FEMA Publications at 1-800-480-2520 and “How-To Guides” on anchoring fuel tanks and other flood damage reduction techniques are available at: http://www.fema.gov/library/viewRecord.do?id=3262.
Shafts below BFE+18”
- Flood vents no required in enclosed shafts
- All mechanicals elevated to BFE+18”
- Float switch
- Programed for cab to rest on the floor above BFE+18”
Accessory Structures in a Special Flood Hazard Area:

- Cannot be modified for a different use in the future
- Must be used only for parking or storage
- Must have flood openings
- Must be built of flood resistant materials
- Must have elevated utilities
- Must be anchored to resist floating
- Must not be inhabited
- Must have a documented floor elevation

Even small buildings are considered “development” and permits or variances with noted conditions are required. **CAUTION!** Remember...everything inside is likely to get wet when flooding occurs.
Recreational Vehicles

In a Special Flood Hazard Area, a Recreational Vehicle (RV) must:

- Remain on site for fewer than 180 consecutive days, and
- Be fully licensed and ready for highway use; or
- Meet the permitting, elevation, and anchoring requirements for manufactured homes of the community’s Flood Damage Prevention Ordinance.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick-disconnect type utilities and security devices, and has no permanently attached additions.

RVs that do not meet these conditions must be installed, elevated, and secured like a manufactured home, including a permanent foundation and tie-down.
BUILDING PERMITS
Seasonal/Temporary Structures

Non-enclosed
• Anchored to withstand the hydrostatic & hydrodynamic loads as well as not become buoyant
• Examples: event tents, pergolas, ice rinks, event stage, etc.

Enclosed
• Anchored to withstand the hydrostatic & hydrodynamic loads as well as not become buoyant
• Parking and Incidental storage use
  • Flood vents
• Use other than parking and incidental storage uses
  • See residential or non-residential standards
Prohibited, unless:

• designed to be easily movable (no equipment required for removing), in the event of a flood (IE. outdoor furniture, items on wheels, etc.),

• anchored to withstand the hydrostatic & hydrodynamic loads as well as not become buoyant

• elevated above BFE+18”
Licensed and Road-ready
- On site less than 180 days
- Must be on wheels/chassis
- No connected mechanicals (electric service, plumbing, etc)

More than 180 days and/or connected to mechanicals and/or not on wheels/chassis
- Anchored to withstand the hydrostatic & hydrodynamic loads as well as not become buoyant
- Elevated to BFE+18”
BUILDING PERMITS

Fill

- Compaction requirements
- **GEO-TECHNICAL REPORT** if over 12”
  - Requires Special Inspections
- Requires a Zoning Permit, and a Building Permit if over 5,000 SF
- **FEMA LOMC** may be required

Floodplains are supposed to store floodwater. If storage space is blocked by fill material, future flooding may be worsened. Floodplain fill can alter other valuable floodplain functions, including wildlife habitat and wetlands. Your community may apply the same restrictions to fill in the floodway fringe as those applied in floodways.
• Analysis that elevating and/or floodproofing would remove it from historic designation
  • Singed and seal analysis from an Architect
• Variance **required** through Board of Building Standards
• Mechanicals should be elevated to BFE+18”
• Flood damage resistant materials should be used in areas below BFE+18”
REGULATIONS

Variance

Requirements:

• Applicant conditions
• Applicant technical requirements
• Community’s conditions when granting a variance

Considerations:

• Annual reporting of variances to State and FEMA
• Community:
  • Liability
  • Cumulative impacts on the floodplain of granting multiple similar variances
  • Variance decision will last the life of the structure
  • NFIP participation impact

See FP-Variences
REQUIRED 3 times:
(see section C on Elevation Certificate)

- **Building Permit submission**
- During Construction
  - **Lowest Floor installation**
    - No vertical work can occur until submitted
- **Final completion, prior to Certificate of Occupancy**

New FEMA Elevation Certificate dated 2019, published February 2020
ELEVATION CERTIFICATE
How to complete fully and correctly

General:
• All lines shall be completed, and when not applicable an “N/A” should be entered
• Should be signed and sealed by a licensed surveyor/architect/engineer
• A8-9: Flood Vents
  • Complete fully per design plans
• B9: Base Flood Elevation
  • Always in NGVD 29 datum
  • Rounded to nearest tenth degree, no whole numbers
  • Should be based from Flood Insurance Study [FIS] when cross sections are available. If, no cross section, then use the Flood Insurance Rate Map [FIRM]
ELEVATION CERTIFICATE
How to complete fully and correctly

- **C2.a-h**: Structure design elevations (must be in NGVD 29)
  - **C2.a** lowest floor elevation of lowest enclosed space (IE. crawlspace (rat slab), basement slab, garage slab (if attached - townhouse/rowhouse)
  - **C2.c** is N/A in Philadelphia (No velocity or wave action zones)
  - **C2.e** Lowest machinery/equipment should be identified
    - In “Comments” section at bottom of PG2, list lowest elevations of these mechanicals/equipment if applicable: HVAC, electrical, gas, plumbing, elevators, transformer pad, generator, etc.

Any site plans illustrating flood elevations shall be in datum NGVD 29, if your converting City Datum to NGVD 29 - see conversion table as there are 7 survey districts with varying conversion factors. A note of which conversion factor must be placed on the plans.
ELEVATION CERTIFICATE

DATUM

- FEMA FIRM maps: NGVD 29
- US standard: NAVD 88
- City Philadelphia standard: City Datum

Since FEMA FIRM’s are in NGVD 29, then Elevation Certificates should be completed in NGVD 29. If surveying in City Datum, use chart to convert to NGVD 29. Plan drawings should clearly show datum used, and conversion factors used.
LETTER OF MAP REVISION [LOMC]

General

WHAT IS A LOMC?

A LOMC is a letter that reflects an official revision or amendment to an effective FIRM.

To remove a property from an SFHA or to update a map to reflect changes due to development, FEMA must issue a LOMC.

WHY WOULD YOU WANT A LOMC?

Owners of property within SFHAs who have federally backed mortgages are required to purchase flood insurance.

If a LOMC removal is issued, property owners may be eligible for lower flood insurance premiums or have the option not to purchase flood insurance.

FEMA

RiskMAP
Increasing Resilience Together
LETTER OF MAP REVISION [LOMC]

General

MT-1
- LOMA
- CLOMA
- LOMR-F
- CLOMR-F
- LOMA-OAS

MT-2
- LOMR
- CLOMR
- PMR

LOMA
- DEN
- eLOMA
- LOMR-F-DEN
- LOMR-FW
- LOMR-VZ

FEMA

Risk MAP
Increasing Resilience together
LETTER OF MAP REVISION [LOMC]

General

MT-1

• LOMA, CLOMA, LOMR-F, CLOMR-F
• Single or multiple structures or parcels receive a determination letter
• **Do not result in changes to the physical effective Flood Insurance Rate Map (FIRM)**
• Goal is usually to remove the insurance requirement, local permit requirements may still apply
• Homeowners who successfully remove their homes from the 1% floodplain should be encouraged to keep their flood insurance

MT-2

• LOMR, CLOMR, PMR
• Floodplains, floodways, BFEs, Cross Sections, etc. are revised
• **Result in an official revision to the physical effective FIRM and/or FIS; therefore, the community must be involved**
• More complicated than an MT-1
• Technical engineering changes resulting from a new study, development, or infrastructure projects.
• New or better data can trigger a LOMR
LETTER OF MAP REVISION [LOMC]

General

• **Reasons for a LOMR:**
  • Modified hydrology (flood discharges)
  • Modified hydraulics (elevations)
  • Better topography (e.g. LiDAR, site-specific survey)
  • Modified floodway
  • New bridges/culverts
  • Channel improvements/flood control projects (levees, dams, culverts)
  • Large developments or roadway projects

• **CLOMR-F/LOMR-F:** Use of Fill: Generally, excavation of basements into fill may expose the structure to residual risk and damage associated with flooding and saturated fill. Designers proposing basements in fill are advised that the elevation requirements of this standard apply to the basement, unless the building and structure is dry-floodproofed in accordance with Section 6.2. See ASCE 24-14 2.4 Use of Fill
LETTER OF MAP REVISION [LOMC]

General

**Permitting**
- Lowest Floor Elevation
- Elevation Certificate

**LOMC**
- Elevation Form
- Lowest Adjacent Grade

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[Diagram showing floodplain management concepts]
Community Acknowledgment Form Required (CLOMR-F/LOMR-F):

- Community Official Signs acknowledging:
  - Fill will not be placed in floodway
  - Complies with Endangered Species Act (ESA)
  - Have all necessary federal, state, & local permits
  - Existing and proposed structures will be “reasonably safe from flooding”
  - Supporting documentation is available to submit to FEMA upon request
- **Community Officials do not have to sign if they do not concur!**

- Similar process for CLOMR/LOMR as part of MT-2 applications
  - Additional public comment/appeal period
RESOURCES
Licenses + Inspections Website

RESOURCES

Highlights:
- Published when I-Codes releases any new editions
  - 2009 – Current PA
  - 2015 – City of Philadelphia IRC
  - 2018 – City of Philadelphia IBC
- More restrictive code applies
- Local amendments could effect which sections apply
- During building permit review this document can assist in comment/request for information from applicant

Flood Resistant Provisions of the 2009 International Codes (2011)

The 2009 edition of the International Codes (I-Codes) contains provisions that meet or exceed the minimum flood-resistant design and construction requirements of the NFIP for buildings and structures. This page contains the following document: A compilation of flood resistant provisions from the 2018 editions of the IBC, IRC, IFRC, IFGC, IF, ISPSC, IPSCD, and ICC Performance Code.

2018 International Building Code
[a compilation of flood resistant provisions, prepared by FEMA]

[CHAPTER 1 ADMINISTRATIVE]
[A] 101.2 Scope. The provisions of this code shall apply to the construction, alteration, relocation, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures.
Exception: Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress, and that necessary structures are more than three stories above grade plane in height, shall comply with the code or the International Residential Code.
Tips:

- Published when I-Codes releases any new editions
- 2009 – Current PA
- 2015 – City of Philadelphia IRC
- 2018 – City of Philadelphia IBC

- For purchase [here](#)
- Local amendments could effect which sections apply
- During building permit review this document can assist in comment/request for information from applicant
- 8 concise pages
- Quick guide that can easily sit on your desk
RESOURCES
FEMA LOMC’s

- FEMA website: www.fema.gov
- MT-1 Application and instructions
- MT-2 Application and instructions
- FEMA online submissions: www.fema.gov/online-lomc
- FEMA Flood Map Service Center: http://msc.fema.gov
- FEMA Map Information eXchange (FMIX): 877-FEMA MAP (877-336-2627)
- State NFIP Coordinator: Bill Bradfield wbradfield@pa.gov

Other resources:
- FEMA Flood Hazard Mapping Frequently Asked Questions
- Flood Map Revision Processes
- LOMA and LOMR-F Processes
- Establishing Effective Dates for LOMRs
- Fee Schedule
- eLOMA information
RESOURCES
FEMA Technical Bulletins

Technical Bulletins:
• **Openings in Foundation Walls and Walls of Enclosures Below Elevated Buildings Flood**
• **Damage Resistant Materials**
• **Non-Residential Floodproofing and Certification**
• **Elevator Installation**
• **Free-of-Obstruction Requirements**
• **Below-Grade Parking Requirements**
• **Wet Floodproofing Requirements**
• **Corrosion Protection for Metal Connectors**
• **Design and Construction Guidance for Breakaway Walls Below Elevated Buildings in Coastal Zones**
• **Ensuring that Structures Built on Fill in or Near SGHA are Reasonably Safe from Flooding**
• **Crawlspace Construction**

[www.fema.gov/nfip-technical-bulletins](http://www.fema.gov/nfip-technical-bulletins)

*note all development is subject to local codes/regulations*

*note FEMA Technical Bulletin provide guidance on min. NFIP standards*
RESOURCES
Other FEMA Guidance

*Nnote all development is subject to local codes/regulations*
RESOURCES
Other

- WATERFRONT EDGE DESIGN GUIDELINES
  WATERFRONT ALLIANCE

- DESIGN AND PLANNING FOR FLOOD RESILIENCY
  NYC PARKS DEPARTMENT

- EXTREME WEATHER VULNERABILITY STUDY
  PENNDOT
PROCEDURES FOR COORDINATING WITH FEMA REQUIREMENTS

FEDERAL HIGHWAY
RESOURCES
Training

Others
- ASFPM.org
- PAFPM.org
- FEMA Emergency Management Institute
THANK-YOU!

Questions and/or comments?

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