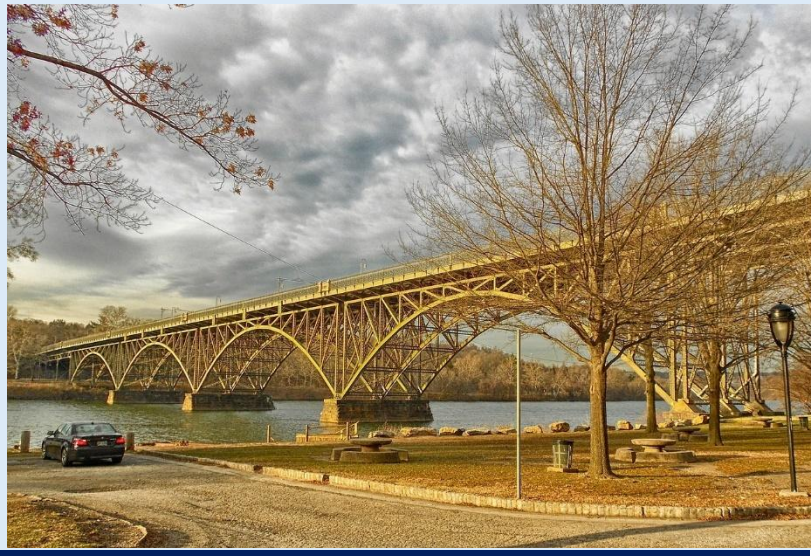
Pennsylvania
Emergency Management Agency

PENNSYLVANIA FLOODPLAIN DEVELOPMENT GUIDE

JUNE 2025



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1. Introduction

The Pennsylvania Emergency Management Agency (PEMA) is tasked with the response to, preparedness for, recovery from, and the mitigation or prevention of disasters and other emergencies throughout the Commonwealth. Flooding is one of the most costly hazards in Pennsylvania, causing millions of dollars worth of damage to communities and structures.

At a Glance: Flooding in PA

- 831,000 Pennsylvanians (6.5 percent of the population) live in floodplains (Water Resource Center, nd).
- There were 43,486 active NFIP policies in PA as of June 2025, more than 10 percent of the national total.

As such, PEMA has developed this guide to present foundational information about regulating development within the riverine floodplain. It is designed to help communities, localities, municipalities, towns/townships, villages, and counties (collectively referred to as "municipalities") across the Commonwealth of Pennsylvania to **(1) understand the risks of floodplain development and the associated regulatory process and (2) become more resilient to current and future flooding events.**

The guide can assist those involved in floodplain management, land development, building code supervision and enforcement, and others who oversee and regulate development within the floodplain at the municipal level. This guidance helps to develop and implement standard procedures for regulating floodplain development and to reduce future costs associated with property damage, emergency response, and flood insurance premiums.

Municipalities can utilize this guide to navigate the regulatory process of floodplain development in compliance with the Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP), understand best practices when developing within the floodplain, and identify methods for reducing flooding, damages, and risks to communities.

This document is designed to be concise and actionable.

- **Section 1** presents the introduction to the guide.
- **Section 2** presents key concepts related to floodplain function and
- **Section 3** outlines floodplain regulations and governing agencies.

- **Section 4** outlines key steps for municipalities in regulating development within the floodplain, including identifying special flood hazard areas (SFHAs), making substantial improvements and substantial damages (SI/SD) determinations, reviewing floodplain development permit applications, conducting inspections, and others.
- **Section 5** presents best practices for floodplain development. This guide also includes appendices with key terms, additional contextual information, and additional considerations for special cases in floodplain development. Lastly, the guide includes appendices with key terms, additional information on key concepts, and of fillable template that can be utilized for floodplain development permit applications.

It is the responsibility of each municipality to adopt and enforce regulations for floodplain development that meet NFIP criteria. Municipalities may elect to develop ordinances, regulations, and policies that exceed NFIP minimum requirements.

2. Floodplain Overview Key Concepts

The following section describes key concepts for understanding the natural condition of floodplains, their function, and how development activities impact floodplains, flooding, and risk to public safety. This section also highlights the criticality of regulating floodplain development, introduction to the NFIP and state regulations, and key terms and concepts to better understand the regulatory floodplain.

2.1. Natural Floodplain Function

Floodplains are flat land areas adjacent to rivers and streams that periodically flood, shaping the local topography. Floodplains play a critical role in managing flows from precipitation and snow melt and temporarily storing excess water and reducing waterflow velocity during flood events (Figure 1). Floodplains also provide other numerous environmental, economic, and social benefits by supporting ecosystems, controlling floods and erosion, recharging groundwater, and improving water quality, among others.

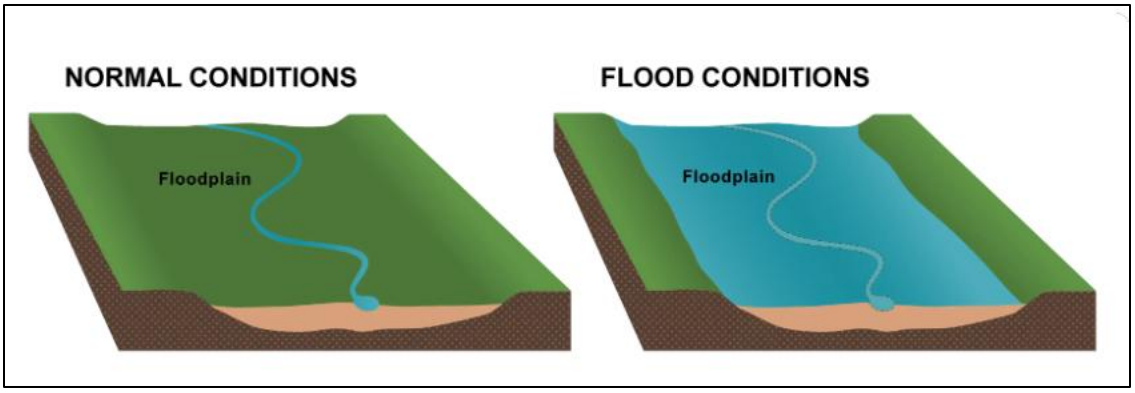

Figure 1: Normal vs. flood conditions of a floodplain. Image source: USACE.

Land development activities in floodplains bring populations into hazard-prone areas and disrupt natural protective barriers. Development or channelization can disturb riparian buffers (vegetated areas along rivers and streams), while severing the plain from rivers and streams adds pressure to human-made flood control structures like levees and dams, which can result in disaster if those structures fail. Development can also damage vital habitat for wildlife, which in some cases further hinders flood protection.

Disrupting the natural protective functions of floodplains increases the risk of natural hazard impacts, putting people, property, and assets at risk. The resulting floods can have significant impact on both environmental and human health. Risks include loss of life and property, contamination and degradation of water quality, spread of water-borne diseases, damage to public infrastructure, damage or loss of crops, obstruction of emergency services, loss of electricity, harmful algal bloods in local waterways, and heavy siltation, erosion, and aquatic habitat destruction (FEMA, 2017).

Across the US, **flooding continues to be one of the most costly and damaging** types of natural disasters. Pennsylvania has experienced over $758M in repetitive loss damages and $288M in severe repetitive loss damages (Bradfield, 2024).

Therefore, regulating development in floodplains is critical to mitigate risks and preserve the natural functions of these areas. Floodplain management regulations protect the public, prevent loss of life and property damage, and conserve natural and beneficial uses of floodplains in communities and across the Commonwealth.

2.2.Regulatory Floodway Concepts

To facilitate use of this guide, it is critical to understand the regulatory floodplain elements and associated functions as defined below and illustrated in Figure 2.

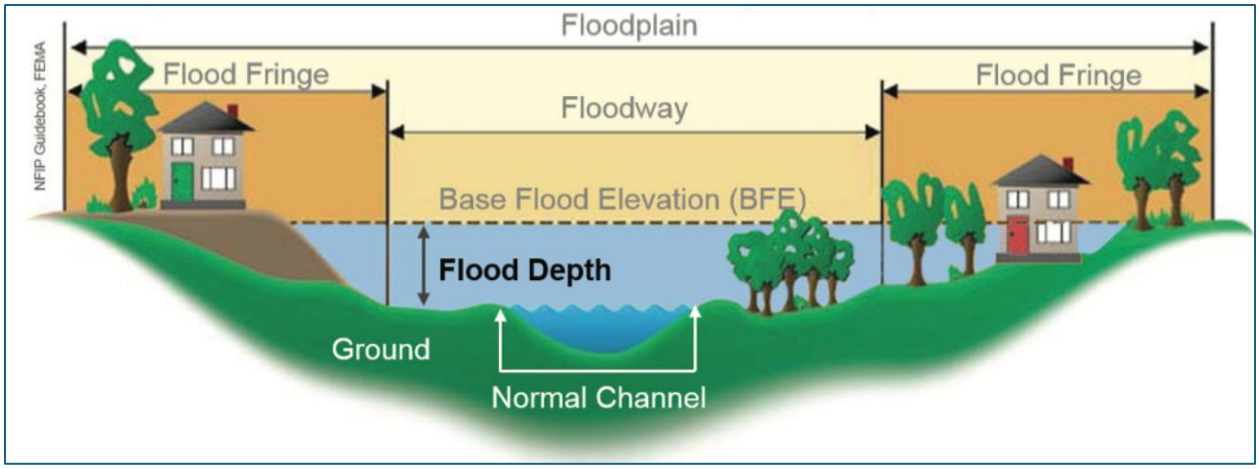

Figure 2: Key elements of the floodplain. Image Source: FEMA.

- **Floodplain**: Any land area susceptible to being inundated by floodwaters from any source.
- **Regulatory Floodway**: The channel of a river or other watercourse and the adjacent land areas that must be reserved to discharge the base flood without increasing the water surface elevation. Communities must regulate development within the floodway to ensure that there are no increases in upstream flood elevations. Regulatory floodways only apply to riverine floodplains.
- **Base Flood**: A flood event that has a 1 percent chance of being equaled or exceeded in a given year. This is also known as the 100-year flood or the 1 percent annual chance flood.
- **Base Flood Elevation (BFE)**: The elevation of surface water resulting from a flood that has a 1 percent chance of equaling or exceeding that level in any given year.
- **Flood Fringe**: The remaining area of the floodplain, outside of the regulatory floodway.

Additional information regarding other regulatory definitions and concepts are provided in Appendix A – Key Terms

2.2.1. Floodplain Mapping and Special Flood Hazard Areas

FEMA develops Flood Insurance Rate Maps (FIRMs) that delineate flood hazard areas within a community and support floodplain management and flood insurance (Figure 3). The FIRMs show areas of low, moderate, and high flood risk through the designation of flood zones, a summary of which is presented in Table 1.

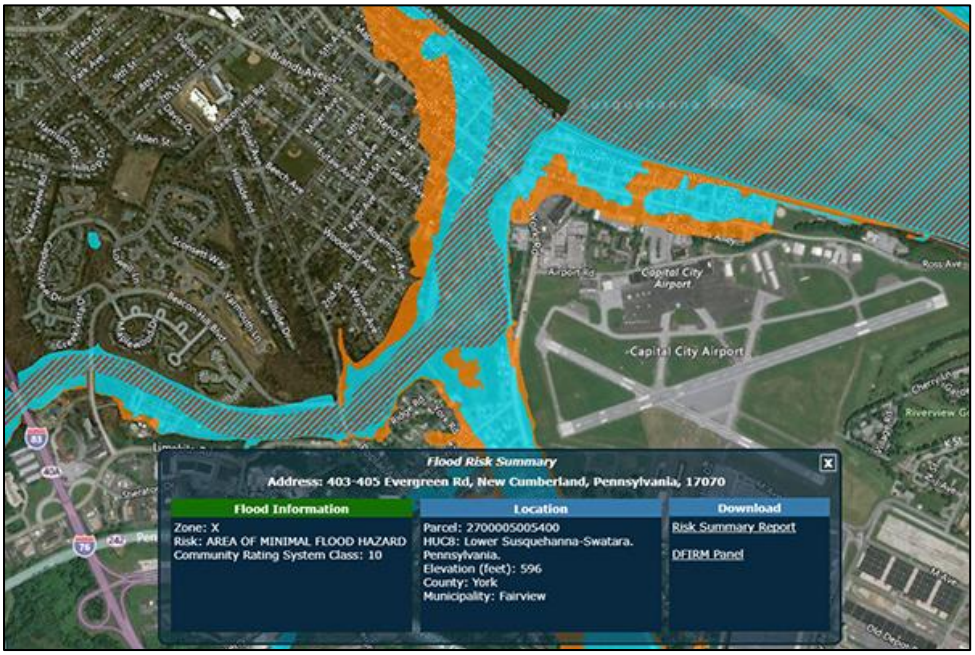

Figure 3. Example of FIRM. Photo source: PEMA.

Municipalities are required to work with FEMA to delineate and adopt the **regulatory floodway** depicted on the FIRMs (shown in Figure 3 as the red and blue hatched area). If FIRMs or studies do not show the regulatory floodway, it is assumed to extend from the stream to 50 feet landward from the top of the bank.

Table 1. A summary of FEMA Flood Zone Designations (FEMA, n.d.).

Risk Level	Flood Zone(s) and Description
High Flood Risk (Special Flood Hazard Area, shown as blue area on FIRM)	**A, AE, AH, AO, AR, and A99 Zones**: Non-coastal areas with a high risk of flooding, due to their proximity to a pond, stream, river, or protective barrier under construction. **VE or V Zone**: Coastal areas with a high risk of flooding with an additional hazard from storm waves.
Moderate Flood Risk (shown as orange area on FIRM)	**B or Zone X** (shaded): Area with moderate flood risk, typically between the limits of 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year floods, or shallow flooding areas with average depths of less than 1 foot or drainage areas less than 1 square mile.

Low Flood Risk (no shading on FIRM)	**C or Zone X** (unshaded): Area with minimal flood hazard, typically above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood limit and is protected by a levee from 100-year floods.
Undetermined Risk (shown as tan/yellow area on the FIRM)	**D Zone**: Areas where flood risk has not been determined and no flood hazard analysis has been conducted.

Special Flood Hazard Area (SFHAs) are defined as "an area having special flood, mudflow, or flood-related erosion hazards as shown on a FIRM as the land area covered by floodwaters of a base flood. This is the area where the NFIP's floodplain management regulations must be enforced." Additional information regarding flood maps and flood zones is provided here: FEMA How to Read a Flood Map.

3. Floodplain Regulations and the NFIP

The following section describes overall floodplain development regulations and requirements in Pennsylvania and highlights the connection between FEMA's NFIP and floodplain development, including requirements for NFIP Communities.

3.1. Pennsylvania Flood Plain Management Act

The Pennsylvania Flood Plain Management Act (also known as Act 166) regulates land and water use in the state for flood control purposes. Municipalities within Pennsylvania with SFHAs are required to join the NFIP, and, if suspended from the NFIP program, must take action to rejoin and comply with program requirements within 90 days of receiving a suspension notice. Act 166 requires that, at a minimum, municipalities adopt floodplain management ordinances that meet NFIP standards. Municipalities are required to develop and submit annual floodplain management reports detailing all development permits issued within their municipality.

Further, Act 166 includes regulations for development in floodplain areas to reduce flood hazards and vulnerability and protect human life. PEMA has developed a list of obstructions determined to present a special hazard to health and safety, including hospitals, nursing homes, jails, new mobile home parks, and subdivision or substantial

25 PA Code Section 105.12 includes **waivers** for obtaining floodplain development permits for structures such as dams and public infrastructure in addition to select agricultural activities. However, if an activity eligible for a waiver has a significant effect on public safety, the owner/operator may be required to apply for a permit.

additions to mobile home parks or subdivisions. Building special hazard structures in a floodplain is prohibited unless a special exemption is granted.

3.2.National Flood Insurance Program (NFIP)

FEMA created the NFIP to decrease flood risk and damage in communities across the U.S. through hazard identification, floodplain management, incentivizing risk reduction, and issuing flood insurance (Figure 4).

NFIP provisions are meant to break the cycle of disaster damage, reconstruction, and repeated flooding. The NFIP and floodplain management regulations are tools that can be utilized to reduce future costs associated with property damage and help Pennsylvanian municipalities bolster resilience as flooding risks increase due to climate change. There are multiple benefits to municipalities in joining the NFIP, including:

- **Reduced Flood Damage**: communities participating in the NFIP agree to adopt and enforce floodplain management ordinances, which help to reduce flood risk.
- **Access to flood insurance**: the NFIP allows members of the municipality to purchase federal-backed flood insurance, providing financial protection against flooding.

PEMA developed Suggested Provisions which municipalities can use as an example floodplain ordinance meeting NFIP requirements.

Figure 4. Four key elements of the NFIP.

FEMA is responsible for developing and disseminating guidance on the NFIP and generating and maintaining FIRMs. PEMA connects the regulations and guidance from FEMA to municipalities across the state by supporting participation in the NFIP; helping municipalities develop, implement, and maintain floodplain management regulations; and provides other types of technical assistance and training to municipalities on floodplain management. NFIP training information is available at Floods.org.

3.2.1. NFIP Community Requirements

Participation in the NFIP requires municipalities to adopt rules, regulations, and standards that meet or exceed the requirements of the program. For floodplain management regulations, municipalities may either adopt a single purpose ordinance containing all necessary NFIP provisions or may elect to modify existing ordinances (e.g., zoning ordinances) to incorporate required provisions. Additional information on community participation, including an overview of requirements and application form, is available on FEMA's NFIP webpage.

4. General Floodplain Development and Regulatory Processes

The NFIP requirements apply to development within the SFHA, which encompasses "man-made change to improved or unimproved real estate and includes new construction, modification or improvements to existing structures, excavation, filing, paving, drilling, driving of piles, mining, dredging, land clearing, grading, and permanent storage of materials and/or equipment." (FEMA, 2020a).

Generally, **NFIP community responsibilities** include:

- ✓ Adopting and enforcing a floodplain management ordinance to ensure development is reasonably safe from flooding.
- ✓ Requiring permits for development in the floodplain.
- ✓ Estimating base flood elevation (BFE) and requiring structures to be elevated above the BFE or otherwise floodproofed.
- ✓ Making substantial improvement and substantial damage determinations.
- ✓ Conducting inspections to evaluate compliance with permits and floodplain regulations.
- ✓ Requiring elevation surveys to document NFIP compliance.
- ✓ Reviewing requests for variances.
- ✓ Coordinating with PEMA and FEMA when flood map updates are needed.
- ✓ Maintaining all records for development activities within the SFHA.

Development within the SFHA extends beyond the construction of new buildings and structures and may also include:

- Additions to existing buildings and structures (including substantial improvements).
- Renovations to existing structures (both interior and exterior).
- Repair of substantially damaged structures.
- Movement or placement of manufactured/mobile homes and/or temporary structures.
- Construction of other assets or infrastructure (e.g., roads, bridges, culverts).
- Alteration of waterways or stream channels.
- Placement of fill and/or related activities such as grading, excavating, mining, and dredging.

Zoning Changes and Permits

In addition to floodplain development activities, municipalities should consider changes in proposed land use, which could require additional zoning permit requirements.

In regulating floodplain development, municipalities will need to follow the steps generally outlined in Figure 5 and as further discussed in the subsections, below. These steps include evaluating if a project is occurring within the SFHA and the type of work to be conducted. Municipalities are required to regulate development activities within the SFHA by reviewing permit applications and issuing or denying permits. Municipalities must also conduct periodic inspections to ensure floodplain development activities are occurring in alignment with the proposed plans and in compliance with the floodplain ordinance.

Once the development activity is complete, the municipality will review the required certificates, ensure the development is compliant with the local floodplain ordinance, and issue a certificate of occupancy, accordingly. Floodplain managers and municipalities are encouraged to develop written standard procedures for regulating floodplain development.

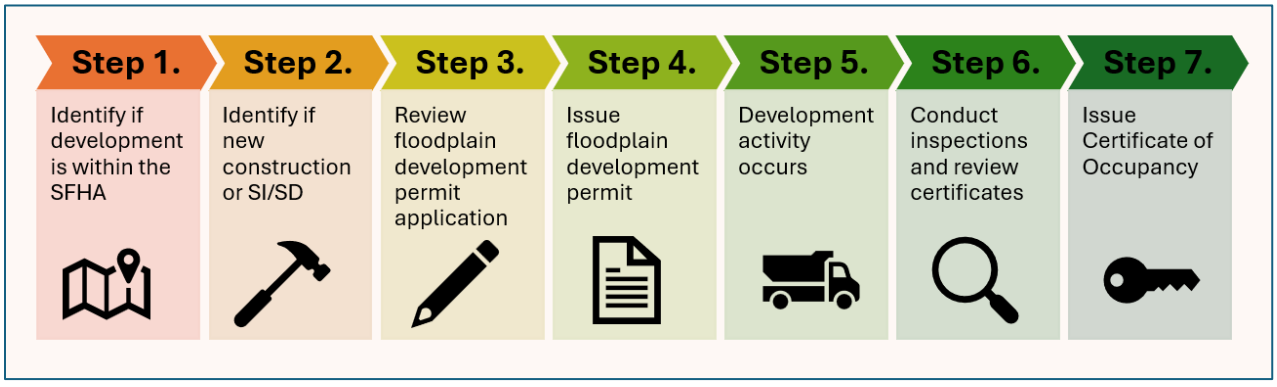

Figure 5. General process for regulating development in the floodplain.

Step 1: Identify If the Project is Within the SFHA

The municipality must adopt a set of floodplain maps (e.g., FIRMs) and regulations that meet minimum federal requirements, including delineation of the SFHA. Municipalities should refer to the Adopted Flood Maps to evaluate if the proposed projects site is within the SFHA, particularly the regulatory floodway. Municipalities may sant to consider construction that occurs in flood-prone areas outside of the SFHA by referring to county- or municipality-specific GIS or other mapping software.

Flood Risk Assessment Resources

- PA Flood Risk Tool
- Flood Map Service Center

Step 2: Identify If the Project is New Construction, Substantial Improvement, or Substantial Damage

The NFIP includes minimum building design criteria that apply to the following:

- **New construction**.
- Work determined to be a **substantial improvement** (SI), including improvements, alterations, and additions.
- Repair of buildings determined to have incurred **substantial damage** (SD).

NFIP communities must make a SI/SD determination for structures located in the SFHA.

Substantial Damages and Substantial Improvements

According to NFIP 44 CFR § 59.1, substantial damage is defined as "damage to a structure in a Special Flood Hazard Area for which the total cost of repairs is 50 percent or more of the structure's market value before the disaster occurred, regardless of the cause of damage." Substantial improvement is defined as "any reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement," including structures which have incurred substantial damage.

Additional information regarding SI/SD is presented in Appendix C – Additional

The municipality's floodplain administrator or local building official will be responsible for making the SI/SD determination based on the comparison of cost estimates and market value of the structures, as highlighted below.

Activity A. Review Cost Estimates

To determine the costs of all work necessary when making substantial improvements (in the case of SI) or restoring a building to pre-damage condition (in the case of SD), municipalities will need to obtain cost information from property owners.

Trainings on SI/SD Determinations

- FEMA SD Estimator Training
- An Introduction to SI and SD
- Making SD Determinations
- Making SI Determinations

The cost estimate should reflect the costs associated with all things related to completing the improvement or repair, such as:

- Materials and labor.
- Site preparation.
- Demolition and debris removal.
- Structural elements and exterior finishes (foundations, bearing and non-bearing walls, joists, ceilings, and framing).
- Interior finishes (cabinetry, flooring, wall finishes, hardware, and insulation).
- Utility and service equipment (electrical wiring, plumbing, heating and cooling, ventilation, and built-in appliances).

The determination must also include the costs necessary to bring the building or structure in question into compliance with all relevant building code requirements and regulations (e.g., structure elevation and floodproofing).

Activity B. Review Market Value

To make SI/SD determinations, a structure's market value must be assessed by local officials. The NFIP does not define market value, but it is generally interpreted as the price at which a seller is willing accept and a buyer is willing to pay. More localized definitions of market value may be found in zoning codes, property taxation codes, and real estate transactions.

Photo source: PEMA

The market value must be based on the condition of the structure prior to the improvement or before damage has occurred. Generally, property value assessments are determined by the state or local taxing or assessment authority or those who have access to historic land and tax documents. There are four main methods for determining market value:

- **Independent appraisal** prepared by a qualified and licensed professional.
- **Adjusted assessed value**, as determined by the state or local tax assessor.
- **Actual cash value** estimates, including depreciation.
- Additional **qualified estimates** such as values from NFIP claims data or best professional judgement by tax assessor or building department staff.

Activity C. Compare Costs and Market Value and Make Determination

After evaluating if the cost and market value estimates are reasonable, local officials will compare the prices to evaluate if the proposed work meets the definition of SI/SD. Figure 6 and Figure 7 depict a simplistic formula for SD and SI determinations, respectively.

Property owners should be reminded that **permits are required prior to making repairs to their structures**.

Municipalities may waive permit fees but not requirements.

After conducting an evaluation to determine if the modifications to the structure meets the definition of SI/SD, the municipality issues a formal letter with this determination to the property owner, including a reminder that they need to adhere to all required building codes and obtain permits prior to making repairs/improvements. Local officials should issue final determination letters on municipal letterhead and maintain these documents in perpetuity.

Following the issuance of the determination letter, municipalities must be prepared to answer property owners' questions about bringing their buildings into NFIP compliance and how they can appeal determinations made regarding substantial damage to their property. Refer to the Appendix D for additional information.

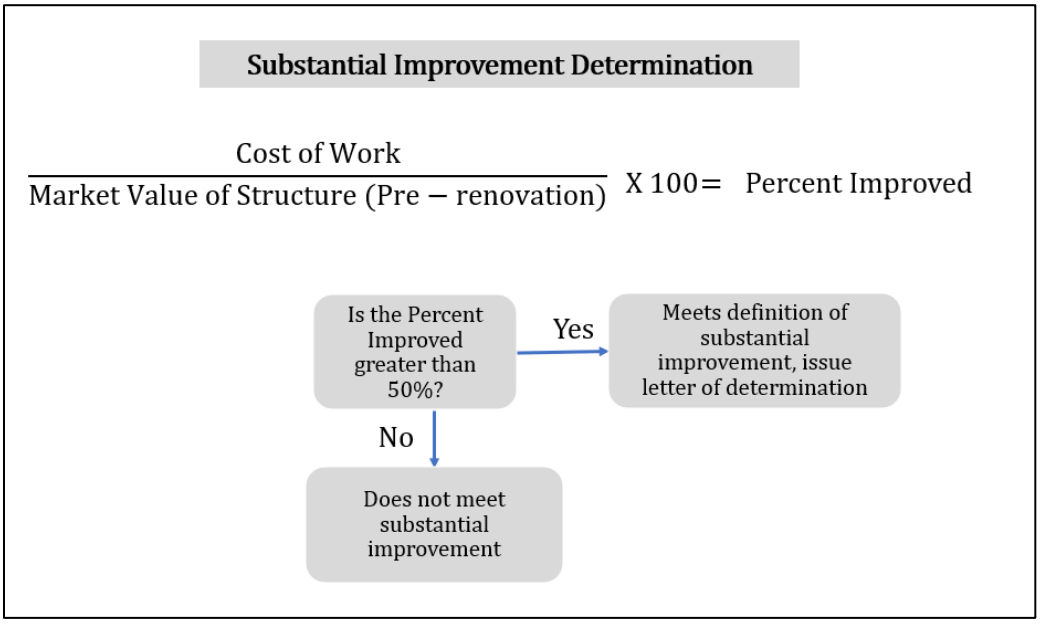

Figure 6. General formula for making substantial improvement determinations.

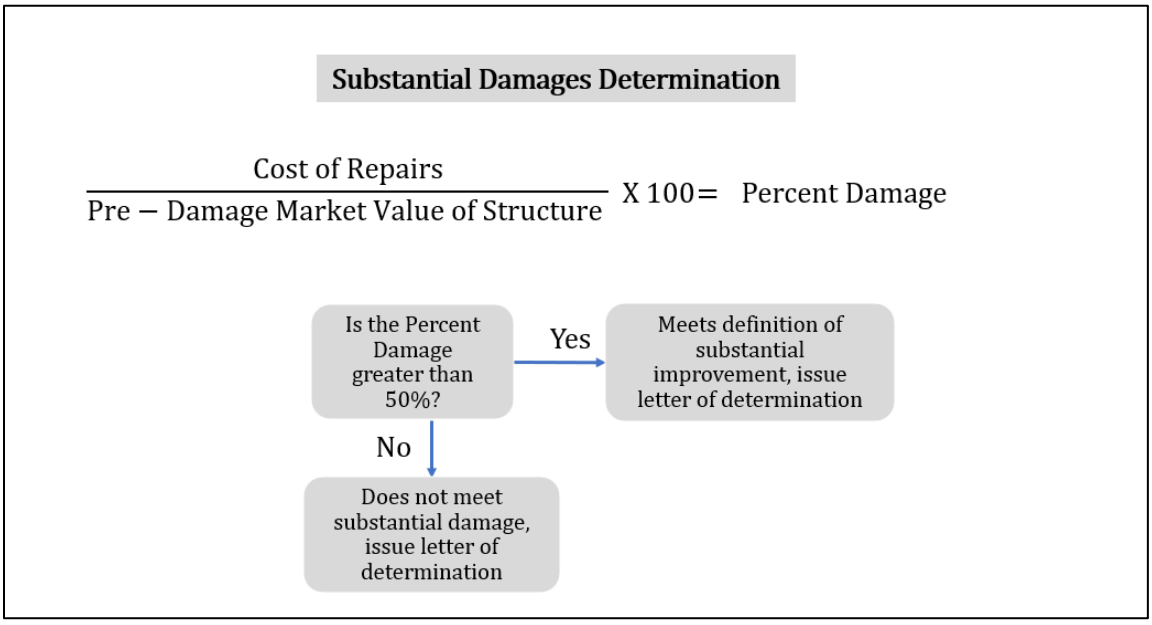

Figure 7. General formula for making substantial damage determinations.

Step 3: Review Floodplain Permit Application

A floodplain development permit (or its equivalent) must be issued by the municipality before development activities occur within the SFHA. These permits are required to ensure that proposed development projects are conducted in compliance with the requirements of the NFIP and the municipality's floodplain management ordinance. Additionally, the permit requirement is intended for the municipality to monitor activities within the floodplain to ensure BFEs do not change because of development and that buildings meeting the definition of SI/SD are brought into compliance with current floodplain regulations.

Those wishing to conduct development activities within the floodplain will need to complete a permit application. A fillable Floodplain Development Permit Application template is presented in Appendix D. Floodplain Development Permit Application TemplateThe municipality will review the permit application for completeness and accuracy.

Permit applications will request information about the owners of the property and which proposed modifications are to occur, including the proposed cost of improvements and the market value of the structure to make an SI/SD determination. Permit applications will also request certification that the proposed development will not increase in the BFEs. Permit applications may also include requests for:

- **Site plans and/or maps**. Depicting and describing the nature, location, dimensions, and elevations of the areas including floodplain and floodways, rivers, and locations of permanent or temporary reference marks. Documents may include site plans, maps, and tax assessor maps.
- **Development plan**. Plan and location for the type of development that will be occurring.
- **Construction drawings**. Drawings that detail the current structures and proposed structures, including the elevation of structures and grading plans.
- **Costing information**. The approximate cost of the work to be conducted and the market value of the structure(s).
- **Certificates**. Including certificates regarding the base flood and how the proposed development may impact the base flood.
    - FEMA **elevation certificate**, including completion of the lowest floor and the finished construction. Supporting documentation includes construction drawings and evaluations of the project during development activities and after the completion of development activities. The final elevation certificate will need to be required and obtained after construction is complete.
    - **Floodproofing certification**, including dry-floodproofing for non-residential structures and wet floodproofed areas of engineered flood vent openings.
    - **No-rise certification** and supporting documentation to show there is no anticipated rise in floodwaters from the project, as discussed in the Floodway Encroachment Review, below.
    - **Engineering analysis** (as applicable). Engineering analysis is required for the following scenarios:
        - Development within the regulatory floodway (e.g., hydraulic and hydrology model)
        - Cumulative development within riverine flood hazard areas with no regulatory floodway
        - Development in coastal areas that affects dune-like structures
        - As otherwise required
- **Other permits**. Based on the location of the work and type of work to be conducted, additional permits may be required, such as site/utility permits, residential building permits, demolition permits, and permits for modifications to historic structures, wetlands, and others. Some ordinances state that a building permit will only be issued if other agencies agree to issue a permit as well. Refer to Appendix C for additional information.

During their review, floodplain managers (or their designees) will consider items such as:

- What is the proposed development activity?
- How close is the site to a waterway or floodplain?
- How vulnerable is the site to flooding?
- Does the application/site plan identify the flood zone, BFE, and structure location(s)?
- Is a substantial improvement or repair of substantial damage being proposed? Does the application include methods for SI/SD determinations (i.e., costs of work and value of structure)?

Floodway Encroachment Review

If the project occurs within the **regulatory floodway**, it must undergo an encroachment review to evaluate if the project will increase flood heights and downstream flooding. Development projects occurring within the flood fringe do not need an encroachment review.

Under NFIP requirements, the **permissible rise of any encroachment is zero.**

Municipalities may conduct the encroachment review or may require a property developer to do so. To ensure the encroachment review is performed correctly, municipalities may require the applicant to provide certification that an encroachment review has been conducted by a licensed engineer and supported by a technical analysis. The applicant must provide documentation of the technical analysis (often a hydrologic and hydraulic study) and a certification, sometimes referred to as a "**no rise certification**," stating that there will be no rise in flood heights due to the project. If it is determined that no increases in flood height will occur from the project and the applicant has submitted all other required information satisfactorily, the municipality may elect to issue the floodplain permit and development activities can commence, similar to the process shown in Figure 8.

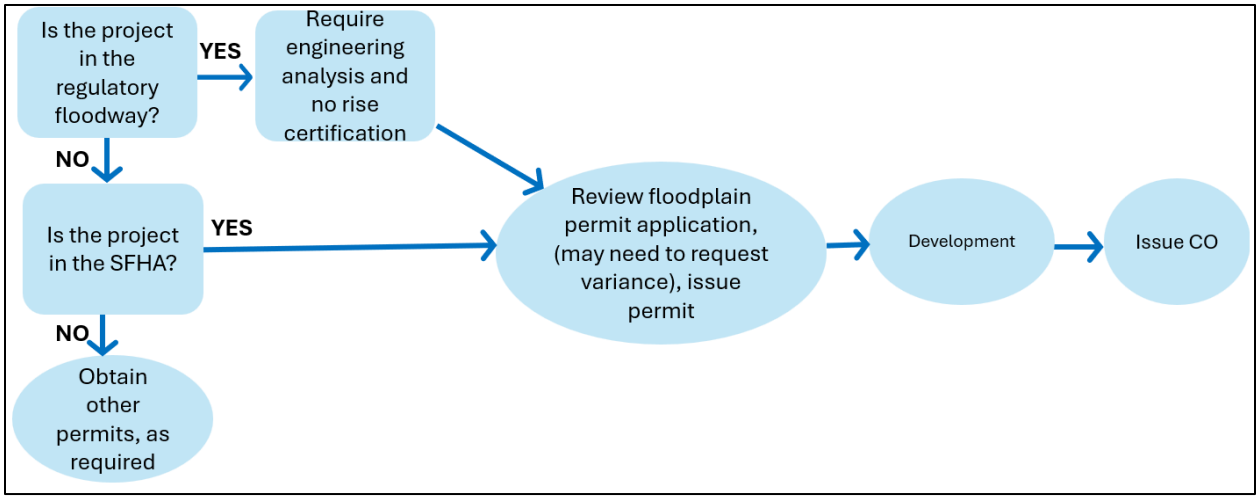

Figure 8. Process for development in the floodplain when work will not encroach floodplain.

Lack of Regulatory Floodway

If your municipality does not have a mapped regulatory floodway, the community must evaluate all development activities to ensure it will not increase flood waters by more than one foot.

However, if the engineering analysis and encroachment review find that the project will contribute to an increase in the BFE, there is another, more complicated process for the applicant, which requires FEMA approval (Figure 9). Additional analysis and certifications may be required, depending on the impact on the regulatory floodway, including a request for a Letter of Map Amendment (LOMA), Letter of Map Change (LOMC), and others. Additional considerations and details for variances are presented in Appendix C.

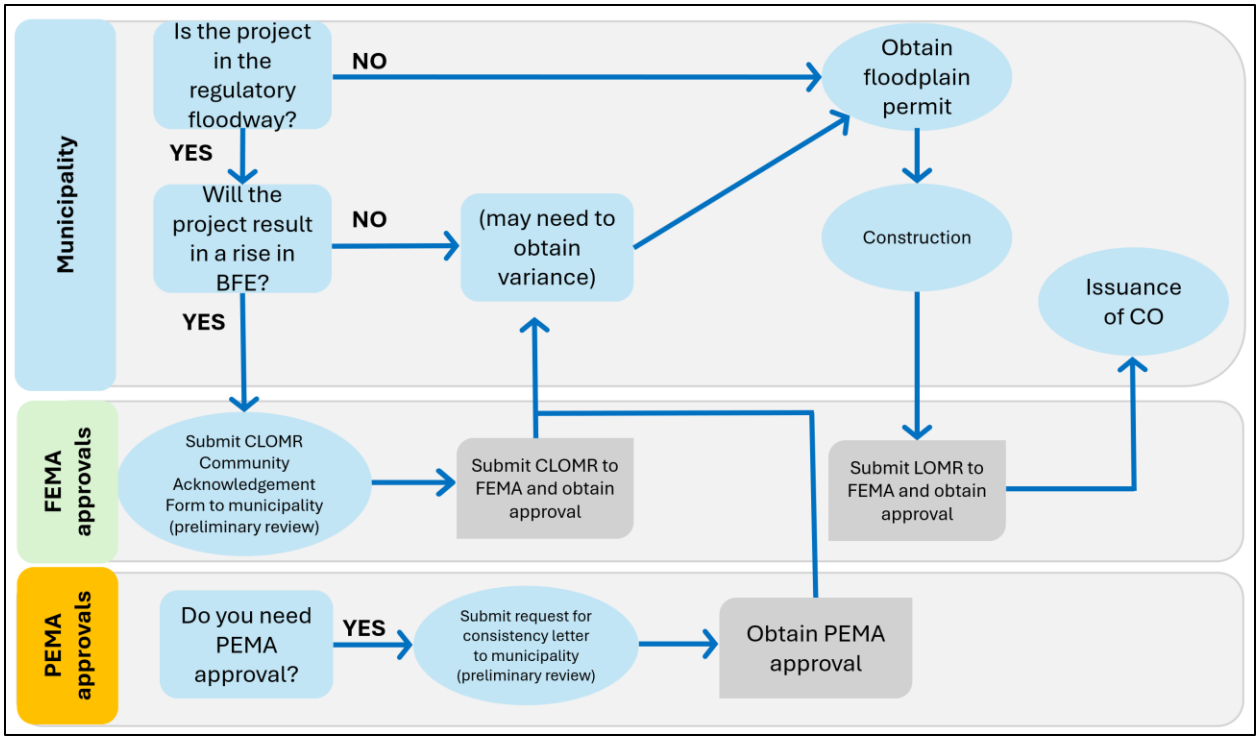

Figure 9. Process for floodplain development when floodplain encroachment occurs.

Step 4: Issue or Deny Floodplain Permit

Once the municipality has reviewed the permit application, they will decide to grant or deny the application (or take similar action, such as approve with conditions), in accordance with the municipality's floodplain ordinance and NFIP requirements. The municipality will notify the applicant and should provide a copy of the permittee's application and documentation of the final decision. Another copy of these documents should be maintained by the municipality.

Step 5: Commencement of Development Activities within the Floodplain

Once the floodplain development permit has been issued, development activities can commence and may include construction, additions, renovation, and placing fill, among others.

New Construction and Substantial Improvements

It is important to ensure that development does not contribute to or cause increased flooding elsewhere. The NFIP aims to ensure that the substantially improved (or substantially damaged) buildings are protected from damage by the base flood. There are different requirements for residential and non-residential buildings, as residential

buildings require a higher level of flood protection. FEMA's 2022 NFIP Flood Insurance Manual categorizes buildings based on usage:

If **residential** buildings must be built in the floodplain, buildings must be elevated above the BFE. **Non-residential** buildings may be elevated or floodproofed below the BFE.

- **Residential**: A noncommercial building designed for habitation by one or more families or a mixed-use building that qualifies as a single-family, two-to-four family, or other residential building.
- **Other Residential**: A residential building that is designated for a residential space for 5 or more families or a mixed-use building in which the total floor area developed to non-residential uses is less than 25 percent of the total floor area within the building.
- **Non-Residential**: A commercial or mixed-use building where the primary use is commercial or non-habitational.

There are also specific requirements for residential and non-residential structures and the risk associated with the structure, based on its location within the floodplain, as presented in

Table 2.

Table 2. Summary of requirements for residential structures determined to meet the definition of new construction or substantial improvement.

Flood Zone	Requirement
Residential Structures	
AE, A1-30, AH Zones and A Zones (no BFE on FIRM)	The lowest floor (including basement) elevated at least 1.5 feet above BFE.
AO Zones	The lowest floor (including basement) at or above the highest adjacent grade at least as high as the depth number specified on the FIRM.
Non-residential Structures	
AE, A1-30, and AH Zones and A Zones (no BFE on FIRM)	The lowest floor (including basement) elevated at least to the Regulatory Flood Elevation or designed and constructed so that the space enclosed below the Regulatory Flood Elevation and is floodproofed.
AO Zones	The lowest floor elevated or completely floodproofed above the highest adjacent

	grade to at least as high as the depth number specified on the FIRM.

All A Zone criteria also apply to new and substantially improved buildings in V Zones, (high hazard areas along coastlines) unless otherwise specified. New or substantially improved buildings in the V Zone must be located landward of the reach of mean high tide and cannot be built over water. All new construction and substantial improvements to structures in the V Zones must be elevated using columns, piers, posts, or pilings. Fill may not be used in these areas, as it impacts wave action. Regarding elevation, within V Zones, the lowest floor is measured from the bottom of the lowest horizontal structure member. Construction within V Zones may require additional technical analysis and permitting.

The **Delaware Estuary Coastal Zone** and **Lake Erie Coastal Zones** are not within the riverine floodplain, so other regulations may apply.

Step 6: Conduct Inspections and Enforcement Activities

In accordance with the NFIP, the floodplain ordinance must provide the municipality with the authority to conduct inspections and take enforcement actions (including penalties for violations) to correct noncompliance. Through these actions, the municipality can protect public safety and maintain its eligibility to participate in the NFIP and receive flood insurance and disaster assistance.

Municipalities should conduct inspections at various stages of the development project, including:

- **Before development**: Inspections to ensure that the site matches the plans within the permit application, including the setbacks and floodway encroachments.
- **During development**: Inspections to ensure work is being performed in accordance with approved permits and plans and that disturbance is not occurring outside the identified development area. Inspections for new structures should be conducted before the installation of the lowest floor to ensure the elevation matches that of the permit application and is in compliance with the floodplain ordinance.
- **Before issuing the certificate of occupancy**: This is likely the final inspection to be conducted and should ensure the elevation is compliant to obtain final elevation and/or floodproofing certificates.

To ensure consistency and adequate documentation, it is recommended that communities develop written procedures for conducting inspections in addition to templates or checklists for inspections and enforcement actions.

Review Final Elevation Certification

Municipalities are required to obtain the elevation of the lowest floor of all new and substantially improved structures and maintain records of this information. To comply with this NFIP requirement, municipalities can utilize elevation certificates to document the property features, including flood zone, location, building characteristics, and the elevation of its lowest floor, to compare to the estimated height of floodwaters during a major flood. The elevation certificate provides information for communities to evaluate compliance with floodplain ordinances and to determine flood risk and flood insurance premium costs for policy holders (ASFPM, 2023). The lowest floor must be at or above the required elevation in accordance with floodplain regulations/building codes.

Municipalities must retain official elevation certificate records that document new buildings and substantial improvements occurring in SFHAs and ensure elevation is in accordance with local floodplain regulations. FEMA provides an elevation certificate and instructions to assist homeowners and communities. Funding support may be available to assist with elevation projects through FEMA's Hazard Mitigation Grant Program (HMGP). Similarly, NFIP communities may apply for funding for elevation projects through FEMA's Flood Mitigation Assistance Grant Program.

Step 7. Issue Certificate of Occupancy

The certificate of occupancy (CO) is the final permit that allows the owner to enter the structure. It should not be issued by the municipality until a final inspection is conducted to verify that site work conforms to the floodplain ordinance and plans. Municipalities must ensure that they have all required documentation, including the elevation certificate and other required forms, before issuing the CO.

5. Floodplain Development Best Practices

To most effectively reduce risk and protect public health, development within the floodplain and in flood-prone areas should be avoided. The following section highlights best practices of floodplain development that should be considered by municipalities and homeowners alike.

5.1.Avoiding Developing the Floodplain

This practice protects floodplains and communities by restricting development activities in vulnerable areas. By limiting construction and development in flood-prone zones, entities can minimize damage to structures and reduce the risk to human lives, resources, and assets. Further, municipalities can reduce emergency response costs, insurance costs, and overall burdens on communities by avoiding losses from floodplain development and allowing floodplains to function naturally.

Sensitive assets (critical infrastructure, emergency facilities, etc.) in flood-prone areas should be relocated. Entities should also evaluate the location of sensitive critical assets, such as electrical systems, and ensure they are not in an area that is vulnerable to flooding. Specifically, electrical components (e.g., outlets, switches, panels, emergency generators) should be positioned where regular maintenance can occur and above the BFE to reduce the risk of damage during flood events.

If development within the floodplain must occur, municipalities should provide full disclosures to potential buyers that properties are located within the SFHA and that development within the area may increase flooding risk resulting in property damage and risk to themselves and their belongings. Further, municipalities and homeowners are encouraged to take additional actions to mitigate flooding impacts through practices such as elevating structures, wet-proofing, dry-proofing, and selecting materials that are more resistant to flooding, as discussed in greater detail below.

5.2.Relocating Structures Outside of the Floodplain

For structures that have already been constructed in a SFHA, floodplain, or area prone to flooding, entities may consider relocation as a potential solution to mitigate risk of flood damage. With relocation, structures are physically moved from a flood-prone area to an upland area outside the floodplain. Municipalities and conservation entities may obtain

funding from FEMA's HMGP and through other sources to perform floodplain buyouts in which all structures are removed from the SFHA. The area is then deed restricted and maintained as an undeveloped floodplain. Those interested in floodplain buyouts can find additional information in FEMA Acquisition of Property After a Flood Event and Property Acquisition Handbook for Local Communities.

Photo source: FEMA

5.3. Elevating Structures

Elevation activities involve physically raising an existing structure to reduce flooding impacts. Municipalities are encouraged to require elevation methods such as pilings, columns, and stilts to keep structures above potential flood levels; use of fill material is not recommended because it can negatively impact the storage capacity of the floodplain. The NFIP requires elevating to the BFE level, but municipalities have the option to adopt more stringent requirements, such as BFE plus additional freeboard (e.g., BFE + 3 feet).

Photo source: PEMA

Remember that structures must comply with the designated flood elevation (BFE + freeboard). The amount of freeboard must comply with the federal guidelines (2 feet) and may vary by municipality.

5.4.Floodproofing

Floodproofing is a method to protect buildings from flood damage. FEMA defines floodproofing as "any combinations of structure and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or

Floodproofing must be implemented up to 1.5 feet above the BFE to receive full credit for flood insurance rating.

improved real property, water and sanitary facilities, structures and their contents." There are two primary types of floodproofing—dry and wet—as discussed below.

Note that the NFIP does not permit floodproofing areas below the BFE in a residential building except for in communities that have been granted an exception for floodproofed basements. In this case, the community is required to adopt standards for design and construction of floodproofed basements before FEMA will allow a basement exception.

Photo source: PEMA

Any **non-residential structure** that will be floodproofed must submit the following to the Floodplain Administrator prior to the issuance of a CO:

- Floodproofing Certificate.
- Inspection and Maintenance Plan detailing the annual maintenance of floodproofed components.
- Flood Emergency Operation Plan detailing procedures to be followed during a flooding event.

Additional information is presented in PA's Model Floodplain Ordinance (Appendix C) and in FEMA's NFIP Technical Bulletins.

Additionally, the NFIP does not permit floodproofing in Coastal High Hazard Areas. Funding support may be available to assist with floodproofing projects through FEMA's HMGP.

5.4.1. Dry Floodproofing

Dry floodproofing aims to prevent water from entering the structure by sealing the exterior. The NFIP allows non-residential buildings to be floodproofed up to (or above) the BFE, meaning that the building would be designed and constructed in a way to be watertight below the BFE. Dry floodproofing may be performed by creating barriers, utilizing sealants, and installing specially constructed watertight flood panels for windows and doors. Before dry floodproofed buildings can be designed, there are numerous planning considerations, including flood warning time, building uses, mode of entry/exit in the building, flood depth and frequency, and other local requirements. Dry floodproofing in Zone V is not allowed.

5.4.2. Wet Floodproofing

Wet floodproofing allows for floodwaters to enter but protects the structure, contents, and building system independently. It includes practices such as properly anchoring structures, using flood resistant materials (below BFE), protecting/elevating sensitive assets, and using opening or breakaway walls to allow water to flow through.

Wet floodproofing provides greater flexibility than dry floodproofing and may be more cost effective and less labor intensive. When conducting wet floodproofing, and prior to a flooding event, contents, furniture, and other valuables should be elevated or moved from the area to avoid damage. After the flood occurs, cleanup, decontamination, and drying of the space are necessary. Although some damage may still occur, wet floodproofing should provide a method for reducing the overall burden and effort for restoration and/or replacement.

Utilizing wet floodproofing as a method for flood protection under the NFIP is limited to enclosures below elevated residential and non-residential structures and other categories of structures (e.g., agricultural and accessory structures) that have been issued variances by the municipality. The NFIP does not grant reductions in insurance premiums for wet floodproofing.

5.5.Utilizing Flood-resistant Materials

The use of sturdy, flood-resistant materials can often help mitigate damages from flooding, and it is particularly important to incorporate when utilizing wet floodproofing methods. For buildings located in the SFHA, the NFIP has specific requirements for the use of flood damage-resilient materials (both structural, finished materials, connectors, and fasteners). Specifically, structures within the SFHA must be constructed with flood-resistant materials below the BFE.

Additional information can be found in FEMA's 2025 Flood Damage-Resistant Materials Requirements.

6. Conclusion

In summary, flooding is one of the most detrimental and expensive natural hazards in Pennsylvania. Floodplains are critical areas for communities and provide many benefits, including resilience to flooding. As such, development activities should not be conducted within the floodplain to most effectively protect people, property, and reduce risk. Due to the floodplain having high risk areas for flooding damage, it is critical that communities

regulate development within the SFHA to implement NFIP provisions in addition to developing standardized procedures for floodplain development.

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Appendix A – Key Terms[1]

Base Flood Elevation (BFE): The elevation of surface water resulting from a flood that has a 1 percent chance of equaling or exceeding that level in any given year. The BFE is shown on the Flood Insurance Rate Map (FIRM) for Zones AE, AH, A1–A30, AR, AR/A, AR/AE, AR/A1– A30, AR/AH, AR/AO, V1–V30, and VE.

Building Codes: Sets of regulations governing the design, construction, alteration, and maintenance of structures. They specify the minimum requirements to adequately safeguard the health, safety, and welfare of building occupants.

Development: Any man-made 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.

Flood Insurance Rate Map (FIRM): Official map of a community on which FEMA has delineated the Special Flood Hazard Areas (SFHAs), the BFE, and the risk premium zones applicable to the community.

Floodproofing: Any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures, and their contents.

Highest Adjacent Grade (HAG): The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure. In AO Zones, all new construction and substantial improvements of residential structures shall have the lowest floor, including basement, elevated above the highest adjacent grade, at least as high as the depth number specified in feet on the community's Flood Insurance Rate Map (FIRM) or at least two feet if no depth number is specified. All new construction and substantial improvements of non-residential structures shall meet the above requirements or, together with attendant utility and sanitary facilities, be floodproofed to the same elevation.

Individual Assistance (IA): A FEMA program which ensures that individuals and families affected by disasters have access to the full range of FEMA support and information in a timely manner. IA staff communicate with applicants about their case status and disaster assistance programs; coordinate disaster resources with state, local and non-governmental organizations; develop partnerships with stakeholders; and support the delivery of lifesaving, life-sustaining services.

[1] Most definitions presented here are of a regulatory nature and are direct from FEMA and PEMA regulations unless otherwise specified.

Letter of Map Amendment/Letter of Map Revision Based on Fill (LOMA/LOMR-F): An official amendment made to an effective flood map determining whether a building, lot, or portion of a property is inadvertently included in the SFHA.

Letter of Map Change (LOMC): A document issued by FEMA that revises or amends the flood hazard information shown on the flood map. Types of LOMCs include Letters of Map Revision (LOMRs), Letters of Map Revision Based on Fill (LOMR-Fs), and Letters of Map Amendment (LOMAs).

Letter of Map Revision (LOMR): A document that officially revises a community's effective flood map based on technical data or other information provided by the community. Developers, engineering firms, and community officials may apply for a LOMR with acknowledgement from a community.

Lowest floor: The lowest floor of the lowest enclosed area (including basement). An unfinished or flood-resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of Sec. 60.3.

National Flood Insurance Program (NFIP): A FEMA program that makes federally-backed flood insurance available in those states and communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage.

New construction: Buildings for which the "start of construction" commenced on or after the effective date of an initial Flood Insurance Rate Map (FIRM) or after December 31, 1974, whichever is later, including any subsequent improvements.

- *For Floodplain Management Purposes*: 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.
- *For Determining Insurance Rates*: Structures for which the start of construction commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. Flood insurance rates for new construction are based on the elevation of the lowest floor (including basement) in relation to the BFE.

Post-FIRM: A building for which construction or substantial improvement occurred after December 31, 1974, or on or after the effective date of an initial Flood Insurance Rate Map (FIRM), whichever is later. Post- FIRM buildings are new construction and those built after the effective date of the first FIRM for a community.

Pre-FIRM: A building for which construction or substantial improvement occurred on or before December 31, 1974, or before the effective date of an initial Flood Insurance Rate

Map (FIRM). Pre-FIRM buildings are those built before the effective date of the first FIRM for a community. This means they were built before detailed flood hazard data and flood elevations were provided to the community and usually before the community enacted comprehensive regulations on floodplains. Pre-FIRM buildings can be insured using subsidized rates. These rates are designed to help people afford flood insurance even though their buildings were not built with flood protection in mind.

Public Assistance: Supplementary federal assistance provided under the Stafford Act to state and local governments or certain private nonprofit organizations other than assistance for the direct benefit of individuals and families.

Repetitive Loss (RL): Any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within a rolling ten-year period.

Severe Repetitive Loss (SRL): Any building that is (1) covered under a Standard Flood Insurance Policy made available under this title and (2) has incurred flood damage for which: (a) four or more separate claim payments have been made under a Standard Flood Insurance Policy issued pursuant to this title, with the amount of each such claim exceeding $5,000, and with the cumulative amount of such claims payments exceeding $20,000 or (b) at least two separate claims payments have been made under a Standard Flood Insurance Policy, with the cumulative amount of such claim payments exceeding the fair market value of the insured building on the day before each loss.

Special Flood Hazard Area (SFHA): An area having special flood, mudflow, or flood-related erosion hazards and shown on a Flood Hazard Boundary Map or a Flood Insurance Rate Map (FIRM) Zone A, AO, A1-A30, AE, A99, AH, AR, AR/A, AR/AE, AR/AH, AR/AO, AR/A1-A30, V1-V30, VE, or V. The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. For the purpose of determining Community Rating System (CRS) premium discounts, all AR and A99 Zones are treated as non-SFHAs.

Substantial Damage (SD): Damage of any kind sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure.

Substantial Improvement (SI): 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.

Appendix B – Background information and Critical Concepts on Floodplain Management and Regulations

- PA Floodplain Manager's Basic Checklist
- PA Local Floodplain Manager's Orientation Guide
- PA Floodplain Management Activities Reimbursement Application Form
- PA NFIP Floodplain Ordinance Suggested Provisions
- PA Uniform Construction Code
- PA Substantial Improvements / Substantial Damages Toolkit
- FEMA How to Read a Flood Map
- FEMA Substantial Damage Estimator Tool
- FEMA Letter of Map Amendment & Letter of Map Revision-based on Fill Process

Appendix C – Additional Considerations

This appendix includes information and additional resources to supplement the key concepts and processes discussed in the main document.

C.1 Substantial Improvements and Substantial Damages

According to NFIP 44 CFR § 59.1, substantial improvement (SI) is defined as "any reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement," including structures which have incurred substantial damage. Substantial damage (SD) is defined as "damage to a structure in a Special Flood Hazard Area for which the total cost of repairs is 50% or more of the structure's market value before the disaster occurred, regardless of the cause of damage."

Participation in the NFIP requires municipalities to adopt rules, regulations, and standards that meet or exceed the requirements of the program and to make SI/SD determinations. FEMA developed SI/SD provisions with the recognition that there were many buildings and structures already located in flood hazard areas prior to the adoption of NFIP policies and local floodplain ordinances, thus, damaged structures need to be updated and brought into compliance with NFIP requirements (e.g., floodproofing and elevation).

SI/SD provisions adopted within local ordinances are designed to bring non-conforming structures into compliance with the NFIP and municipality's floodplain management ordinance. Note that some communities have adopted provisions for lower substantial damage percentages. Refer to the applicable municipal floodplain ordinance for different definitions of SI/SD, remembering that the most stringent regulations apply.

Property owners must submit information to the municipality in support of an SI/SD determination, including the cost estimates for performing the work and the market value of the structure. If the cost to repair the damage is 50 percent or more of the pre-damaged market value of the structure, then it is considered to be "substantially damaged" and must be evaluated for compliance with current floodplain regulations/building codes (e.g., elevation). If the structure does not comply, then it must be upgraded to at least the minimum standards, accordingly.

Additional information about SI/SD determinations can be found in FEMA's Substantial Improvement / Substantial Damage Desk Reference and PA Substantial Improvements / Substantial Damages Toolkit.

C.2 Variances

A variance is a grant of relief by a community from the terms of a floodplain management regulation (FEMA, 2014). When a community grants a variance, it is allowing development to occur which otherwise would be prohibited by the ordinance. Since a variance from flood elevation requirements or other floodplain management requirements can lead to an increased risk to life and property, they should be granted rarely. In terms of this guide, a variance may be granted to issue a floodplain development permit that may not otherwise be issued by the municipality.

Variances are strictly meant to address unique, site-specific, and individual circumstances where the application of the ordinance may result in an extreme hardship to a property owner while still accomplishing the following:

- Maintaining the intent of the floodplain ordinance.
- Minimizing legal challenges to the floodplain management regulations and avoid an unconstitutional "taking" of private property without compensation.
- Protecting the safety, health, and welfare of the public and emergency responders. (FEMA, 2014)

Process for Handing and Regulating Variances

Typically, a request for a variance will need to be heard and approved by various entities, which may include a Municipality's Zoning Hearing Board or similar governing authority.

Variances that are likely to be approved include the following set of circumstances:

- Those with "good and sufficient" cause and those situations in which not granting the variance would result in exceptional hardship to the applicant.
- Will neither result in an unacceptable or prohibited increase in flood heights, additional threats to public safety, or extraordinary public expense.
- Will not create nuisances, cause fraud on, or victimize the public or conflict with any other applicable state or local ordinances and regulations.

A municipality should consider the following important issues before granting a variance:

- The municipality's liability.
- The cumulative impacts on the floodplain of granting multiple similar variances.
- Impacts of the variance on public health and safety.
- How granting the variance may impact flood insurance premiums.
- The variance decision will last for the life of the structure.
- Whether granting a variance will jeopardize the municipality's participation in the NFIP.

Documentation of Variances

It is critical for municipalities to document the issuance of variances, including:

- Variance request.
- Notification to applicant.
- All variance actions/procedures (including denials and justifications).

Increased Cost of Compliance and Financial Assistance

Increased cost of compliance (ICC) is one of several resources for flood insurance policyholders who need additional help rebuilding after a flood. ICC can provide up to $30,000 to help cover the cost of mitigation measures that will reduce flood risk. To be eligible for ICC coverage, a building must meet one of two criteria:

FEMA's AW-501 Form can be used to make updates regarding NFIP Repetitive Loss Properties.

- Determined to be "substantially damaged."
- Determined to be a "repetitive loss structure." (FEMA, 2023)

If a home or business is substantially or repetitively damaged by a flood, specific building updates may need to be conducted to meet local regulations and reduce future flooding before structure repair occurs. To receive ICC coverage, property owners must have a Standard Flood Insurance Policy through the NFIP.

There are some limitations to ICC:

- Only covers damage caused by flooding.
- It is only available if there was a flood insurance policy applicable to the structure before it was flooded.
- There is a cap of $30,000 per structure.
- Claims must be accompanied by a substantial damage determination by the floodplain management or appropriate representative.
- ICC funds may be used towards non-federal shares for approved FEMA grants.

In accordance with CFR 44 Part 61, ICC will not pay for:

- The cost to comply with any floodplain management law or ordinance in communities participating in the Emergency Program (the initial phase of a community's participation in the NFIP. During this phase, only limited amounts of insurance are available).

- The cost associated with enforcement of any ordinance or law that requires any insured or others to test for, monitor, clean up, remove, contain, treat, detoxify or neutralize, or in any way respond to or assess the effects of pollutants.
- The loss in value to any insured building due to the requirements of any ordinance or law.
- The loss in residual value of the undamaged portion of a building demolished as a consequence of enforcement of any state or local floodplain management law or ordinance.
- Any code upgrade requirements (e.g., plumbing, electrical wiring) not specifically related to the state or local floodplain management law or ordinance.
- Any compliance activities needed to bring additions or improvements made after the loss occurred into compliance with state or local floodplain management laws or ordinances.
- Loss due to any ordinance or law one was required to comply with before the current loss.
- Any rebuilding activity to standards that do not meet the NFIP's minimum requirements. This includes any situation where the insured has received from the state or community a variance in connection with the current flood loss to rebuild the property to an elevation below the BFE.
- ICC for a garage or carport.
- Any building insured under an NFIP Group Flood Insurance Policy.
- Assessments made by a condominium association on individual condominium unit owners to pay increased costs of repairing commonly owned buildings after a flood in compliance with state or local floodplain management ordinances or laws.

C.3 Appeals Process

If an individual disagrees with the requirements of the local floodplain ordinance or with the decisions of the municipality regarding development within the SFHA, they may appear to a Zoning Hearing Board or an applicable entity. The Zoning Hearing Board (or their equivalent) will consider the appeal in accordance with the Municipality's Planning Code or equivalent local ordinance.

Specifically, homeowners may be disappointed with the determination of SI/SD or restrictions for floodplain development and may want to appeal the decision(s). Municipalities should develop and implement community education and outreach processes and standardized procedures for collecting data and making SI/SD determinations and regulating development within the floodplain to increase the transparency of the decision-making approach and reduce the likelihood of appeals.

Additionally, municipalities are encouraged to develop an appeals process that is congruent with their respective floodplain ordinance to handle disagreements in determinations made by property owners.

Depending on the reason for the appeal, the municipality will need to review all original documentation provided by the homeowner to ensure it is accurate and representative of the development activity to occur within the floodplain, including required documentation and evaluation by engineers and surveyors certified within Pennsylvania.

C.4 Watercourse Alterations and Wetland Development

Special regulations and permitting requirements at both the federal and state level apply to development that is projected to alter watercourses or wetlands. Specific permits may include Section 404 of the Clean Water Act and USACE, Section 105 Permits from PDEP, and others from county conservation districts and municipalities.

C.5 Historic Structures

FEMA (2020b) defines historic structures as "any structure that is:

- Listed (or eligible for listing) in the National Register of Historic Places.
- Certified by the Secretary of Interior as contributing to a historic district that is listed (or eligible for listing) on the National Register.
- Listed on a state inventory of historic places (in states with approved preservation programs).
- Listed on a local inventory of historic places (in communities with certified historic preservation programs)."

Overall, designated historic structures are exempt from NFIP floodplain management requirements for new construction, substantial improvements, and substantial damages, so long as they maintain their historic structure designation. However, municipalities should consider if mitigation measures (e.g., elevation, floodproofing) can be incorporated for the historic structure. NFIP requirements may apply in cases where an addition is built to a historic structure if it is located in the regulatory floodway, particularly if the project will cause floodway encroachment and increase flooding (FEMA, 2008).

C.6 Consideration of Hazardous Materials

Where possible, avoid utilizing hazardous materials in the floodplain to reduce risk of floodway contamination and related public health concerns. The presence of hazardous materials in the floodplain may require debris management, which can be costly and complicated to implement. It is wise to include standards in ordinances to facilitate

hazardous material management. The items in Table 3 are considered hazardous within the floodplain (FEMA, 2005).

Table 3. Hazardous materials to prohibit from the floodplain.

Materials that are extremely hazardous or vulnerable to flooding that should be prohibited from the SFHA and 500-year floodplain:
Acetone, ammonia, benzene, calcium carbide, carbon disulfide, celluloid, chlorine, hydrochloric acid, prussic acid, magnesium, nitric acid, oxides of nitrogen, phosphorus, potassium, sodium, sulfur
Items that are sufficiently hazardous to be prohibited in spaces below the BFE:
Acetylene gas containers, storage tanks, lumber/buoyant items, gasoline, charcoal, petroleum products
Items that should be prohibited in space below the BFE:
Matches/sulfur products, soaps/detergents, tires, food products

Appendix D. Floodplain Development Permit Application Template

[enter municipality name]

FLOODPLAIN DEVELOPMENT PERMIT/APPLICATION

Application No. Click or tap here to enter text. **Date** Click or tap here to enter text.

TO THE ADMINISTRATOR: The undersigned hereby makes application for a permit to develop in a floodplain. The work to be performed, including flood protection works, is as described below and in attachments hereto. The undersigned agrees that all such work shall be in accordance with the requirements of the Floodplain Management Ordinance and with all other applicable [enter municipality name] ordinances, federal programs, and the laws and regulations of the Commonwealth of Pennsylvania. I certify that the Floodplain Administrator or their representative shall have the authority to enter the property, at any reasonable hour during the installation process, to enforce the provisions of the Codes governing this project. I understand and assume responsibility for the establishment of official property lines for required setbacks prior to the start of construction and agree to conform to all applicable laws of this jurisdiction. I further certify that this information is true and correct to the best of my knowledge and belief.

General Provisions:

- No work of any kind may start until a Floodplain permit is issued or the Floodplain Administrator determines that a Floodplain permit is not required.
- Work may only be performed to the extent identified in the application and/or permit.
- A permit may be revoked if any incomplete, false, or misleading statements are made herein.
- If revoked, all work must cease until a revised permit is re-issued.
- Use or occupancy is prohibited until a "Certificate of Occupancy" is issued.
- As-Built elevations certified by a registered professional engineer, licensed land surveyor, or architect must be submitted by the applicant before a "Certificate of Occupancy" may be issued.
- This permit shall expire if no work is commenced within six months of issuance.
- Applicant is hereby informed that other permits may be required to comply with local, state, and federal regulatory requirements as identified in the Ordinance.

Section 1: Project or Development Contact Information

Click or tap here to enter text. **Owner or Agent**	Click or tap here to enter text. **Tax Parcel No.**	Click or tap here to enter text. **Builder**	Click or tap here to enter text. **Date**
Click or tap here to enter text. **Phone**	Click or tap here to enter text. **Cell**	Click or tap here to enter text. **Phone**	Click or tap here to enter text. **Cell**

Zoning District: Click or tap here to enter text. **Flood Zone:** Click or tap here to enter text.

Click or tap here to enter text. **Address**	Click or tap here to enter text. **Street**	Click or tap here to enter text. **City**	Click or tap here to enter text. **State**	Click or tap here to enter text. **Zip**

Section 2: Description of Work

Please submit additional information on additional sheet(s) if needed. ☐ Additional sheet(s) attached

1. Type of Development: ☐ Filling ☐ Grading ☐ New Construction ☐ Minimum Improvement ☐ Routine Maintenance ☐ Excavation ☐ Substantial Improvement ☐ Other Click or tap here to enter text.

2. Description of Development Activity: Click or tap here to enter text.

Section 3: Location Details

1. Premise Details: Structure Size Click or tap here to enter text. ft. by Click or tap here to enter text. ft. Area of site: Click or tap here to enter text. sq. ft.

Principal Use: Click or tap here to enter text. Accessory Use (storage, parking, etc.): Click or tap here to enter text.

2. Value of Improvement (fair market value): $Click or tap here to enter text. Pre-Improvement/Assessed Value of Structure: $Click or tap here to enter text.

3. Property Located in a Designated FLOODWAY? ☐ Yes ☐ No

IF ANSWERED YES, CERTIFICATION AND SUPPORTING ANALYSIS MUST BE PROVIDED INDICATING THE PROPOSED DEVELOPMENT WILL RESULT IN NO INCREASE IN THE BASE (100-YEAR) FLOOD EVALUATIONS, PRIOR TO THE ISSUANCE OF A PERMIT TO DEVELOP

4. Property Located in a Designated Floodplain FRINGE? ☐ Yes ☐ No

5. Elevation of the 100-Year Flood (ID source): Click or tap here to enter text. NAVD88

6. Elevation of the Proposed Development Site: Click or tap here to enter text. NAVD88

7. Elevation/Flood proofing Requirement: Click or tap here to enter text. NAVD88

8. Other Floodplain Elevation Information (ID and describe source): Click or tap here to enter text.

All Provisions of Ordinance Number: Click or tap here to enter text. the "Floodplain Management Ordinance," shall be in Compliance.

Section 4: Permit Submittal Checklist

The application may be required to provide one or more of the following documents before the application can be processed.

☐Itemized estimate of construction costs.
☐Appraisal showing current market value.
☐A site plan showing the location of all existing structures, waterbodies, watercourse relocation, adjacent roads, landform alterations, lot dimensions, and proposed development.
☐Construction plans drawn to scale, with specifications, which must include as applicable:

- Elevation of lowest floor proposed or existing (including basement)
- Details for anchoring structures
- Above ground tanks elevated / anchored above Base Flood Elevation (BFE)
- Below ground tanks design to resist flotation with vents above BFE
- Engineer approved foundation system for manufactured homes
- Types of water-resistant materials used below the first floor
- Details of flood proofing utilities located below the first floor
- Details of enclosures below the first floor
- Details for protecting utilities as per FEMA P-348
- On site water supply designed to minimize inflow under flood conditions

☐Elevation Certificate.
☐Change in water elevation due to construction (as measured in feet).
☐Top of new compacted fill elevation measured in feet.
☐Flood proofing protection level (non-residential only) measured in feet.
☐Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the "100-year" flood including a copy of all data and hydraulic/hydrologic calculations.
☐On lot sewage disposal system reviewed by Sewage Enforcement Officer.
☐On lot water supply system designed to prevent contamination during flood conditions.

All other necessary government permits required by state and federal law must be submitted:
☐Pennsylvania Sewage Facilities Act 537
☐Pennsylvania Dam Safety and Encroachment Act 325
☐Pennsylvania Clean Streams Act 394
☐U.S. Clean Water Act, Section 404
☐Other DEP Permits

Section 5: Permit Approval/Denial (TO BE COMPLETED BY FLOODPLAIN ADMINISTRATOR)

Substantial Improvement Determination

☐Market Value of existing structure (appraised value or tax assessed value): $ Click or tap here to enter text.
☐Estimated construction costs: $ Click or tap here to enter text.
☐Estimated construction cost equal to or in excess of 50% of the market value
☐Estimated construction cost under 50% of market value of existing structure
☐Repetitive loss (combined damage incurred on two or more occasions during 10-year period) equal to or in excess of 50% of the market value of the existing structure

☐All required information submitted
☐Application fee Paid

Permit Determination

After reviewing the permit application as submitted it has been determined:

☐No Floodplain permit required – proposed project is not located in a Special Flood Hazard Area
☐No Floodplain permit required – property partially located in Special Flood Hazard Area but construction/development activities are not
☐No Floodplain permit required – minor repair
☐DENIED

Provide reason for denial: Click or tap here to enter text.

☐APPROVED

The proposed construction/development activity complies with the provisions of the [insert name of Municipality's floodplain ordinance] and approval is given to obtain the applicable building and zoning permits.

Floodplain Administrator Signature: _____

Date: _____

Pennsylvania
Emergency Management Agency