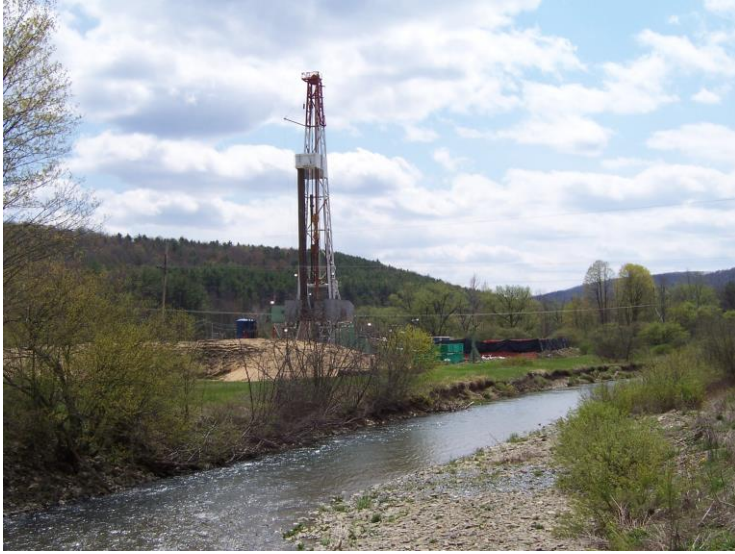


## Non-Building Floodplain Development



### What Is Covered by Floodplain Regulations?

For the purpose of floodplain management, “development” is defined as *any man-made change to improved or unimproved real estate*. A floodplain development permit is thus required for a wide range of activities within the mapped Special Flood Hazard Area (100-year floodplain). Site improvements that are made in conjunction with a building project and those made for other purposes must comply with standards for floodplain development. This includes (but is not limited to): mining; dredging; streets and other paving; bridges; docks; utilities; swimming pools; filling, grading, and excavation; drilling operations; storage of equipment or materials; and formation of manufactured home, recreational vehicle, or trailer parks.

### What Rules Apply?

Although specific requirements have not been established for many types of non-building floodplain development, the overriding principle is that the proposed project *shall be consistent with the need to minimize flood damage*. This can be evaluated by asking two questions:

- **Would a 100-year flood cause damage to the proposed project or improvements?** Techniques that should be used, as applicable, to reduce the potential for flood damage include: revising the site plan, providing adequate drainage, elevating vulnerable components, anchoring equipment or materials, utilizing flood resistant material, incorporating design elements that minimize flood damage, etc. The municipality can require professional certification that a proposed project design is resistant to flood damage.
- **Would the proposed development cause damage to any other property during a 100-year flood?** This damage could take the form of increased flood heights, diversion of flow, increased flood velocities, streambank erosion, flotation of materials, or release of pollutants. In order to minimize the potential for offsite damage, proposed development should be designed, located, and constructed so as to offer the minimum obstruction to the flow of water and have the minimum effect on the height of floodwater. Equipment and materials should be anchored to prevent flotation. The municipality can require a technical analysis, by a licensed professional engineer, demonstrating that the proposed project would not result in physical damage to any other property.

*Along rivers and streams for which a **regulatory floodway** has been delineated, the increased flood height that might result from fill or other obstructions in the floodplain fringe (outside of the floodway) is considered to be acceptably small. Additional technical analysis is always required for encroachments within the floodway. In all cases, the potential for damage to other properties from increased velocities or other causes should be evaluated.*

Development should be protected from flood damage to a level two feet above the Base Flood Elevation (100-year flood height) or at least three feet above grade if no Base Flood Elevation is available. Specific standards and guidance for some types of non-building floodplain development are presented below.

- **Filling and grading** should be conducted in a manner that provides adequate drainage to reduce exposure to flood damage. In order to avoid increased flooding elsewhere, the project should be designed to minimize any obstruction to the flow of water and have a minimum effect on the height of floodwater.
- **Subdivisions** and new or expanded manufactured home, recreational vehicle, and trailer parks should be laid out so that proposed development sites are “reasonably safe from flooding.” The potential for flood damage can be reduced by (1) locating structures on the highest natural ground, (2) designing and locating public utilities and facilities so as to minimize flood damage, and (3) providing adequate drainage for each building site.
- **Storage of equipment and materials** is considered floodplain development and should only be done in a manner that prevents flotation, flood damage, and the release of hazardous substances.
- **Public utilities and facilities**, such as sewer, gas, electrical, and water systems must be located and constructed so as to minimize flood damage. Sanitary sewer systems should be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into floodwaters. Manholes should be raised above the 100-year flood level or equipped with seals to prevent leakage. Pumping stations should have electrical panels elevated above the flood protection level.
- **Onsite waste disposal systems** must be located to avoid impairment to them or contamination from them during a flood. The best way to accomplish this is to locate the system outside of the flood hazard area, if that is feasible. Otherwise, a mound system can sometimes be used. At a minimum, an automatic backflow valve should be installed to prevent sewage from backing up into the building during flooding.
- **Water supply wells** should be designed to prevent infiltration of floodwater into the systems. Floodwater can be excluded from drilled wells by using the proper grouting methods around the well near the surface. The cover can either be sealed with a watertight gasket or the top of the well casing or pipe sleeve can be elevated to or above the flood protection level.
- **Gas and liquid storage tanks** are included in the definition of a “structure” for floodplain management purposes, and thus must comply with the requirements for buildings. (Installation guidance is in *Recommended Practice for Home Heating Oil Tank Flood Resistance* by National Oil Heat Research Alliance, <https://noraweb.org/storage-tanks>.)
- **Docks** should be adequately anchored to prevent damage to neighboring properties. In addition, a boathouse or other structure with walls and a roof should meet all applicable requirements for a building or accessory structure.
- **Fences** can catch debris and obstruct the flow of floodwater. If a fence will be oriented perpendicular to flow, it should be designed to break away under water loads to allow the free flow of floodwater.
- **Alteration or relocation of a watercourse** should not increase the community’s flood risks. Prior to commencing such a project, the applicant must provide a technical evaluation by a licensed professional engineer demonstrating that the altered or relocated segment will provide conveyance equal to or greater than that of the original stream segment and will not result in physical damage to any other property. Because the altered watercourse is an artificial situation, the applicant must assume responsibility for maintaining the modified channel so that the flood carrying capacity will not be diminished. If a floodplain map revision is warranted, the applicant is responsible for providing the Federal Emergency Management Agency with any necessary data, analyses, mapping, and fees.