

# FLOOD EDUCATION/ FEMA

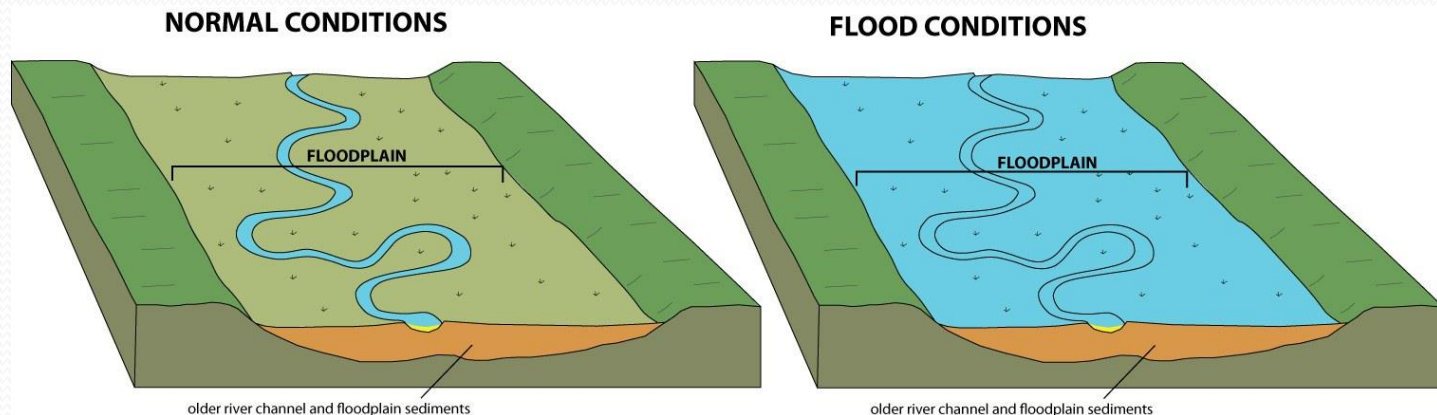
Metro Water Services

# FLOOD EDUCATION/FEMA

- Floodplains
- Mapping Floodplains
- Protect Your Home
- Home Buyout Program

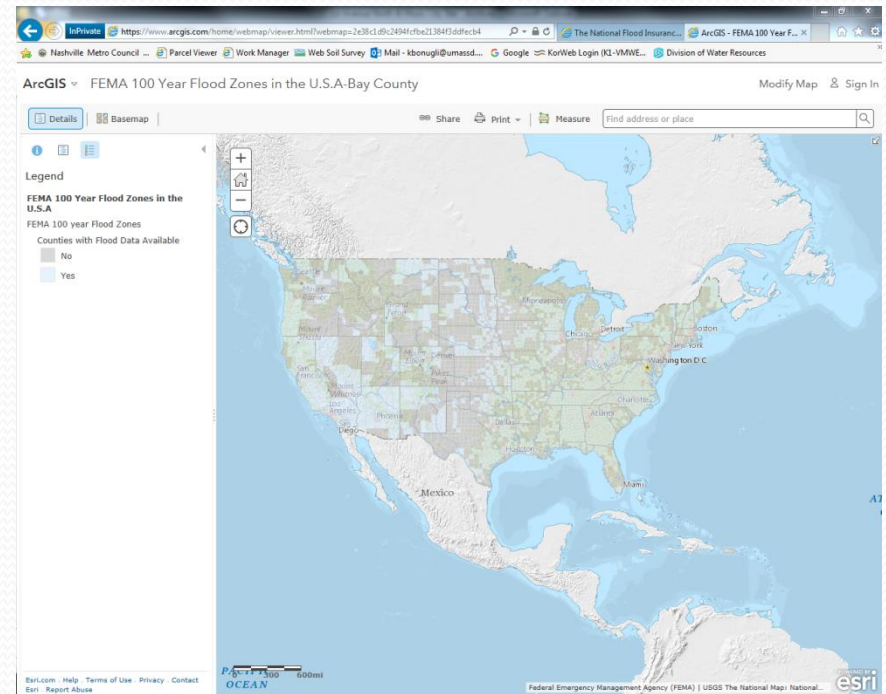
# What Are Floodplains?

- Floodplains are the areas along streams or rivers that are likely to experience repeated flooding
- Over thousands of years, nature shaped the floodplain to hold excess water that spills over the banks
- Floodplains are meant to flood
  - Nature designed floodplains to flood, the floodplain is considered to be a part of a healthy creek system
  - floodplains can be dangerous during heavy storms and should be avoided
- In the past homes and buildings were often built in floodplains
  - This is because water was easily available for drinking or commercial uses and the floodplain land was often flat and easier to develop than hilly land
- Building in local floodplains is now restricted
  - Protecting floodplains from additional development can reduce flood losses and improve the environment
- MWS does not widen or deepen streams
  - Streams are regulated by the state of Tennessee
  - To avoid ponding water, streams would need to be deepened all the way to the Cumberland River and all culverts replaced in the process



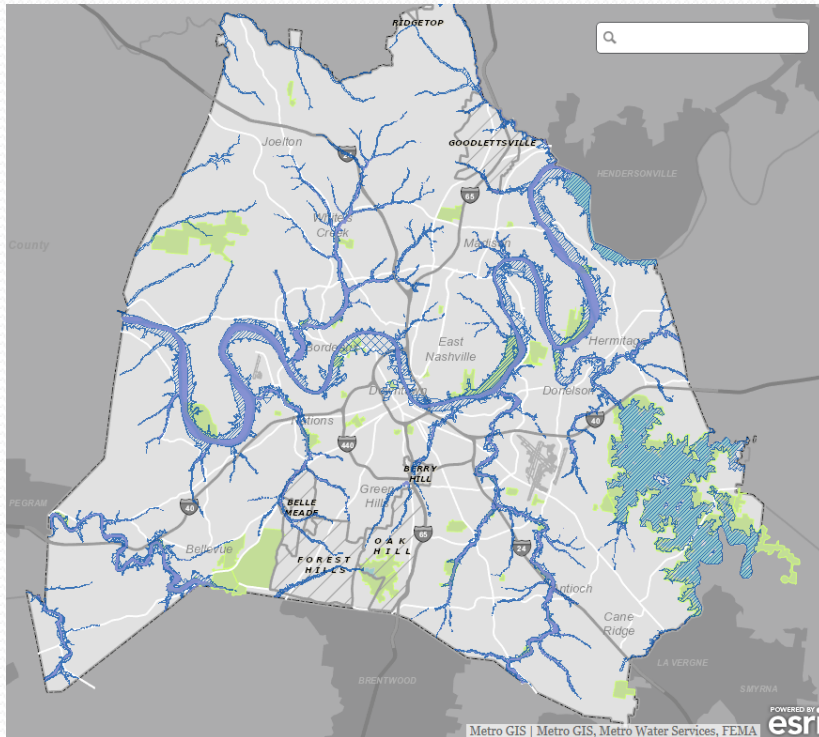
# Floodplains

- Flooding occurs in all 50 states with nearly 12.5 million square miles at risk.
- A 6-inch deep creek in the mountains can swell to a 10-foot deep raging river in less than an hour.
- Floods are the most common natural disaster in the U.S.
  - standard homeowners insurance doesn't cover flooding
- Typically areas located in and around high-risk floodplains experience flooding. There are few if any measures that can be taken to prevent flooding in these areas.
- We urge you to contact the company with whom you have home owners insurance and add the flood insurance policy provided by FEMA.
  - To learn more about the NFIP, visit [www.floodsmart.gov](http://www.floodsmart.gov).
- People outside of mapped high-risk flood areas file nearly 1 in 4 of all National Flood Insurance Program (NFIP) claims and receive one-third of Federal Disaster Assistance for flooding.



<https://www.arcgis.com/home/webmap/viewer.html>

# Mapping Floodplains



- Flood maps or Flood Insurance Rate Maps (FIRMs), inform communities about the local flood risk, they are created by the Federal Emergency Management Agency (FEMA)
- These maps determine the cost of flood insurance, which helps property owners to financially protect themselves against flooding
  - The lower your degree of risk, the lower your flood insurance premium will be.
  - You might be required to get flood insurance, in high risk flooding areas.
- The flood maps are developed using the sound science generated by engineering experts, and FEMA always accepts additional validated flood information from property owners and communities
  - Through this collaborative process, a community can review, appeal, and contribute to the development of a flood map before it is adopted by the community

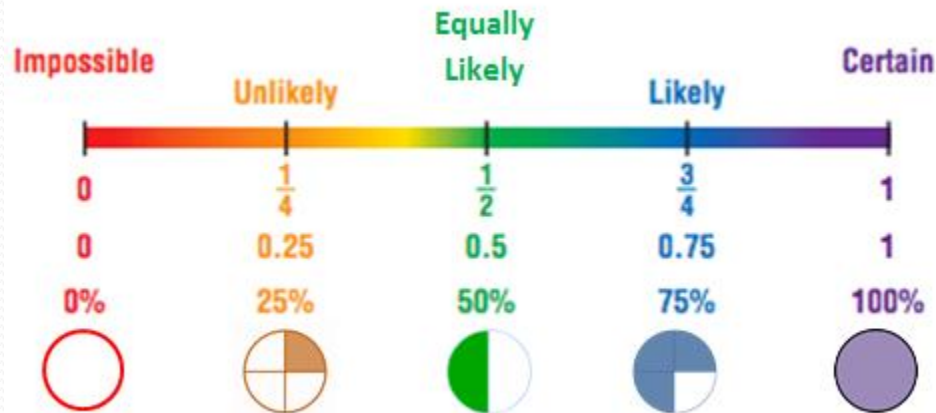
<http://maps.nashville.gov/FEMAVIEWER>

# Mapping Floodplains

- Flood risks change over time. Floodplain maps must be updated regularly to accurately show flooding risk.
- FEMA follows these steps when remapping floodplains:
  1. Planning
  2. Development
  3. Draft
  4. Preliminary
  5. Effective
- The remapping process includes a series of public meetings to inform the public about the pending changes, gather feedback and allow the public to provide input and comments throughout the process.

# Mapping Floodplains


- Flood maps are based on probability not history
  - FEMA identifies high-risk flood areas such as 100-year and 500-year storm event flood zones
    - This means, during these storm events, these areas will flood
  - There are also 1000-year flood zones and so on...
  - Flood zones are everywhere, it just depends on the percentage chance each area has of flooding
- Theoretically a 500-year flood event has a 1 in 500 chance of happening in a single year. In other words a .2% probability of happening each year. Or once every 500 years.
  - The sort of event that is so rare that it is not practical to plan and design stormwater infrastructure around the possibility of it happening

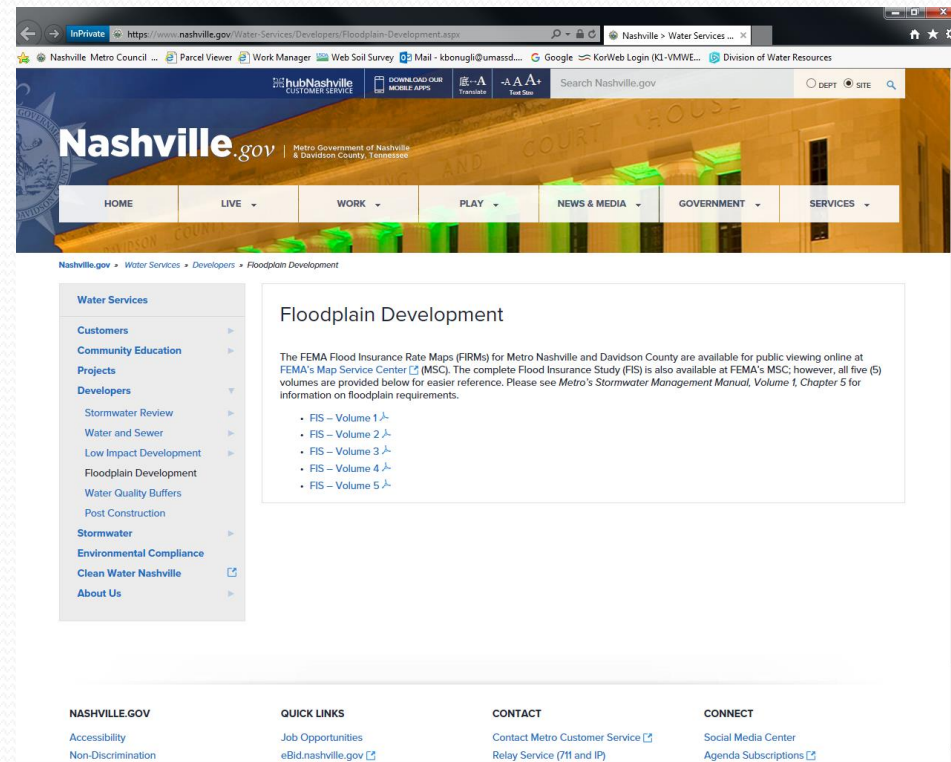


# Floodplain Development

- The FEMA Flood Insurance Rate Maps (FIRMs) for Davidson County are available for public viewing online at FEMA's Map Service Center (MSC).

<https://msc.fema.gov/portal>

- The complete Flood Insurance Study (FIS) is available on the Metro Nashville Floodplain Development website 
- Floodway (directly next to creeks and streams) development is not allowed



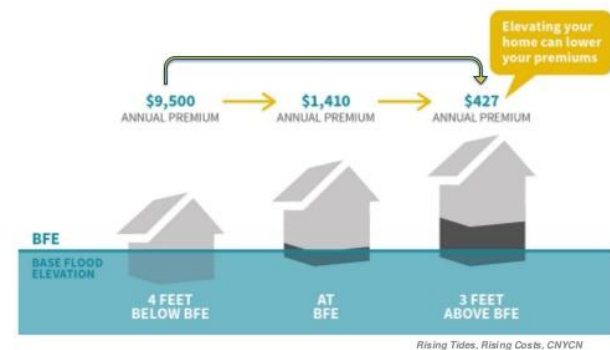
<https://www.nashville.gov/Water-Services/Developers/Floodplain-Development.aspx>

# Protect Your Property

- Get Flood Insurance
  - Through your home insurance provider and/or the National Flood Insurance Program (NFIP).
- Elevate your home
- Dry floodproof your home
- Wet floodproof your home

## National Flood Insurance Program Reform

Rates increase based on building height relative to expected flood height. Home elevation will reduce risk and premiums.

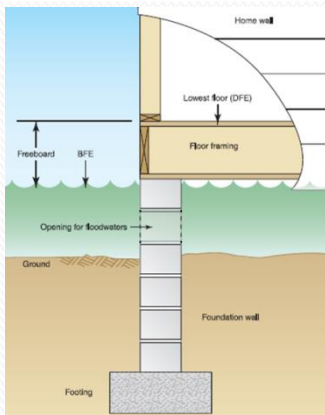


<https://www.fema.gov/national-flood-insurance-program#>

# Elevate Your Home



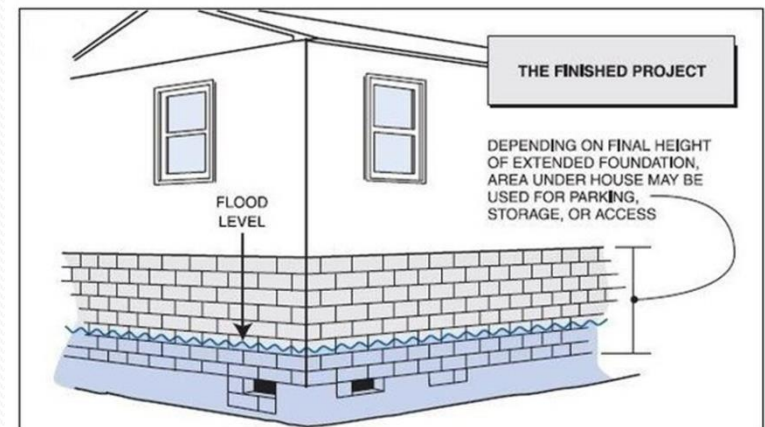
<https://www.fema.gov/hazard-mitigation-assistance-hma-grant-resources>



- FEMA HMA grants will support elevation projects to the flood protection elevation level
  - Minimum elevation is to the base flood elevation (BFE), based on the 100 or 500 year storm event, plus at least 1 foot of freeboard.
- The relationship between the BFE and a structure's elevation determines the flood insurance premium
  - As shown on the previous slide

# Elevate Your Home

- There are several techniques
- Elevating by:
  - Extended Foundation Walls
  - Extending the Walls of the House
  - Abandoning the Lower Enclosed Area
  - An Open Foundation
  - Posts, Columns, or Pilings



# Consider

- Prior to elevating a home there a number of factors:
  - How high to elevate
  - Can the existing foundation be used
  - How to access to the house
  - Which elevation technique is appropriate
- The most economical approach is to use as much of the existing foundation as possible
- If your house has a basement, you will be required to fill it in as part of any elevation project.
- Keep in mind, potential future changes to the factors that influence floods may result in higher flood events
- Check the National Flood Insurance Program (NFIP) requirements at [www.floodsmart.gov](http://www.floodsmart.gov)



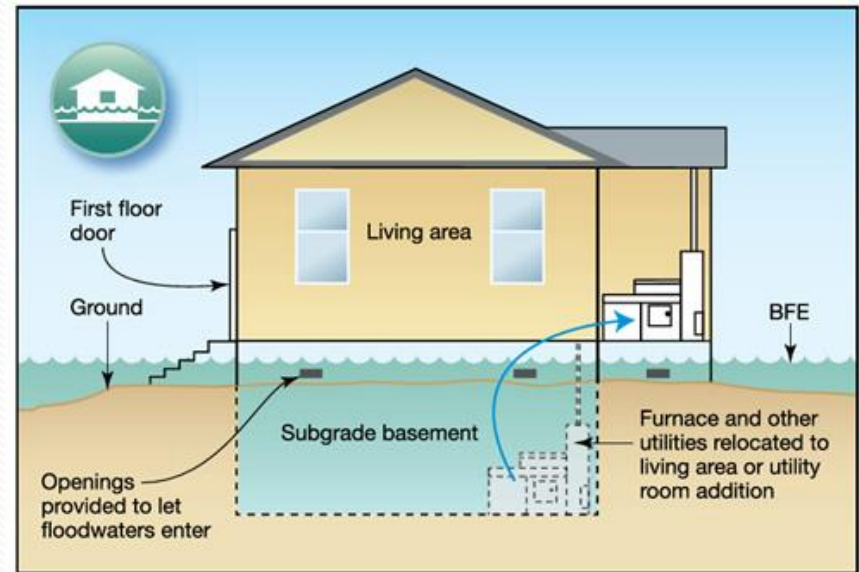
# Cost

- Factors include:
  - Design
  - Construction
    - Size of house
    - Number of floors
    - Condition of house and foundation
  - Permits
  - Labor
  - Time
  - Landscaping
  - Liability



# Wet Floodproofing

- Modifying the uninhabited portions
  - such as a crawlspace or an unfinished basement
- Allow floodwaters to enter and exit



# Wet Floodproofing

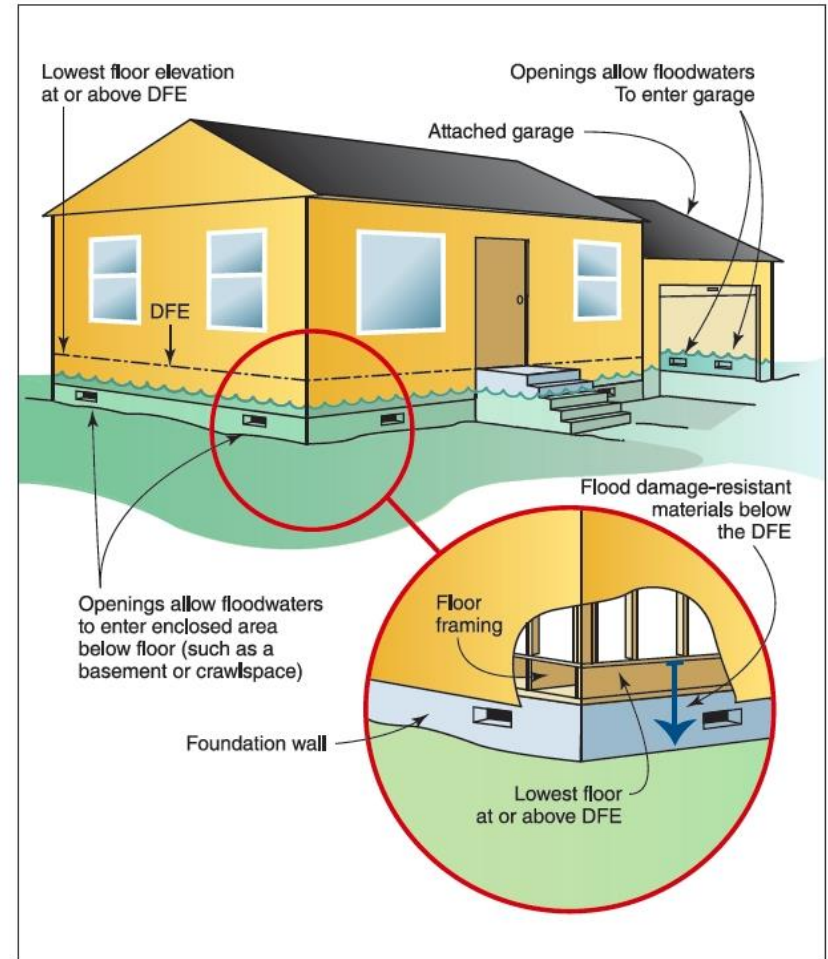


© Baca Architects

- Advantages
  - Wet floodproofing measures are often less costly than other mitigation measures.
  - Allows internal and external hydrostatic pressures to equalize, reducing the likelihood of wall failures and structural damage.
- Disadvantages
  - Extensive cleanup may be necessary
  - Inside structure could possibly get contaminated by sewage, chemicals, and other materials borne by floodwaters.
  - Pumping floodwaters out of a basement too soon after a flood may lead to structural damage.
  - Periodic maintenance may be required.
  - Does not minimize the potential damage from high-velocity flood flow and wave action.
  - Does not reduce flood insurance premium rates on residential structures. Premium rates can only be reduced through elevation of the residential structure above the Base Flood Elevation (BFE).

# Consider

- Check the National Flood Insurance Program (NFIP) requirements at [www.floodsmart.gov](http://www.floodsmart.gov)
- If the duration of the flood is longer than 1 day, wet floodproofing is not a reasonable approach to protecting a structure
  - Long periods of wet conditions can structurally damage buildings from long exposure to floodwaters
  - The high moisture content of the atmosphere can lead to the growth of mold and mildew.



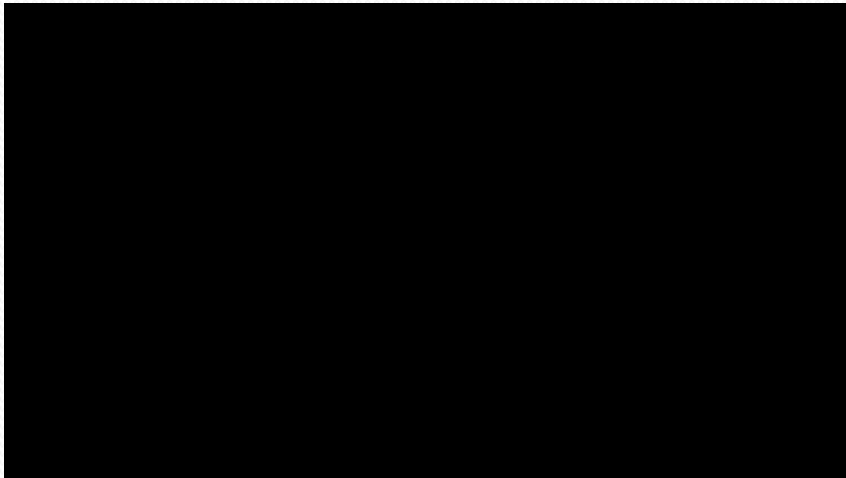
# Wet Floodproofing

- Methods:
  - Create openings floodwater can enter basement or crawl space
  - Use flood-resistant construction materials in basement or crawl space
    - To avoid deterioration and mold
  - Relocate or elevate electrical outlets
    - Move to areas on the wall above the base flood elevation (BFE)
  - Relocate or elevate HVAC and ductwork.
    - Ducts may be pulled from their supports
    - Silt and contaminants can be recirculated



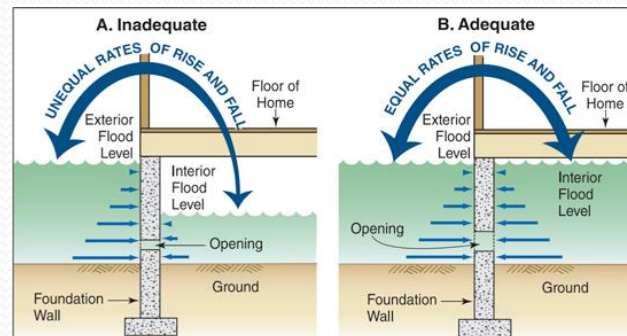
# Cost

- Cost estimating items to be considered:
  - Design
  - Construction
  - Relocation of utility systems that may be flooded.
    - HVAC, electrical, fuel supply, storage, water and sewer



# Annual Maintenance

- Check the floodwater access vents/openings
  - ensure they are easily opened and unobstructed to allow floodwater to enter the structure as planned
- Check the condition of impervious painted surfaces
- Check pumps and pipes or hoses used for draining the structure are in working order
- Verify that electrical service panels have been relocated to an area above expected flooding
- Make any necessary repairs/replacement of damaged or worn components
- Check to ensure that any fuel tanks are secure
  - Either strapped to the walls or set on concrete footings that are anchored to the floor and securely fastened



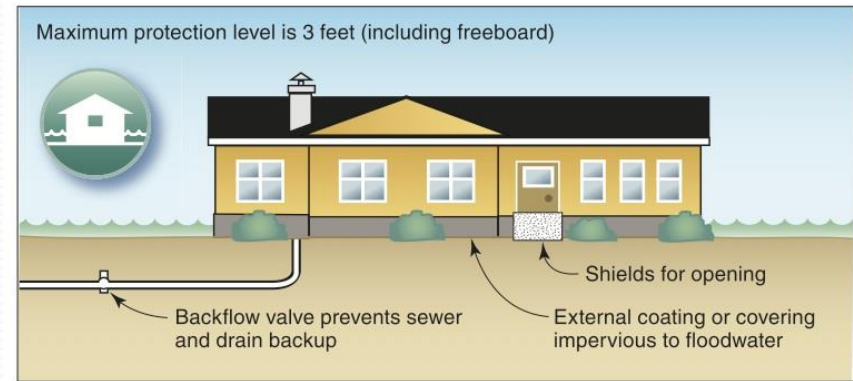
# Wet Floodproofing

- Post-Flood Concerns
  - Hydrostatic pressure
    - Water should not be pumped out of the basement area or enclosed crawlspace until the water outside has receded.
    - Doing so will cause a pressure differential on the walls and could result in basement wall failure.



# Dry Floodproofing

- Making home watertight below the base flood elevation (BFE)
- A watertight structure requires sealing of all walls with either:
  - waterproof coating
  - impermeable membranes
  - additional layer of concrete



# Dry Floodproofing

- Advantages

- Less costly than other retrofitting methods
- Does not require additional land that may be needed for walls or levees
- May be fundable under FEMA mitigation grant programs

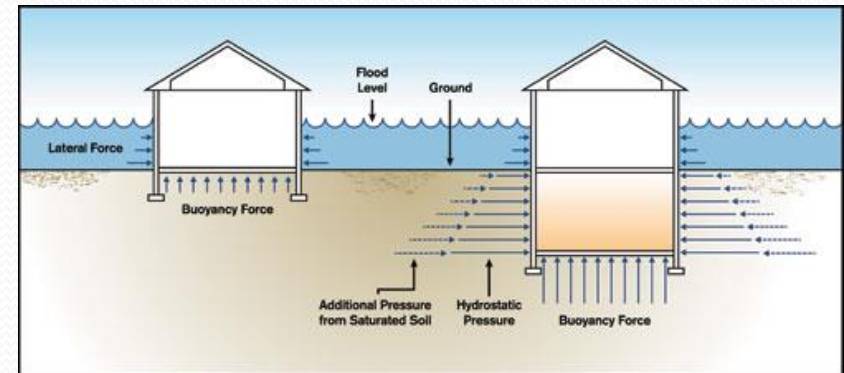
- Disadvantages

- Requires human intervention to install protective measures
- Does not minimize the potential damage from high-velocity flood flow and wave action
- Maintenance
- May not be aesthetically pleasing
- Can not be used to bring substantially damaged or improved property in compliance with a community floodplain management ordinance or law.



# Consider

- Check the National Flood Insurance Program (NFIP) requirements at [www.floodsmart.gov](http://www.floodsmart.gov)
- Warning time is limited, generally streams reach flood levels quickly
- Must be able to install all flood proofing systems before flooding occurs
- Seeming slow moving floodwater can damage floodproofing methods
- The longer the building is exposed to floodwater and the higher the flood level
  - Increases hydrostatic pressure on structures
  - May cause method to fail



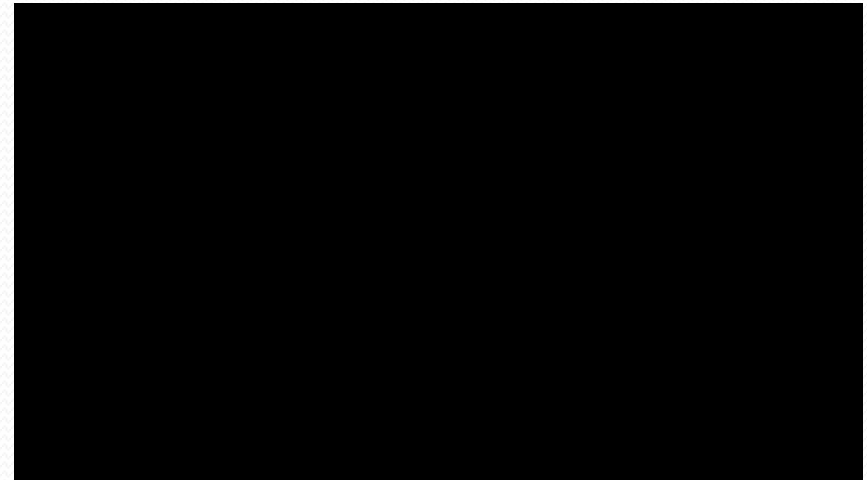
# Dry Floodproofing

- Methods
  - Watertight shields for doors and windows
  - Reinforcing walls to withstand flood pressure and impact of floating debris
  - Sump pumps to control interior water level and reduce hydrostatic pressure of walls
  - Membranes and/or sealants to reduce seepage of floodwater through walls and cracks
  - Anchoring the building to avoid flotation, collapse, and lateral movement

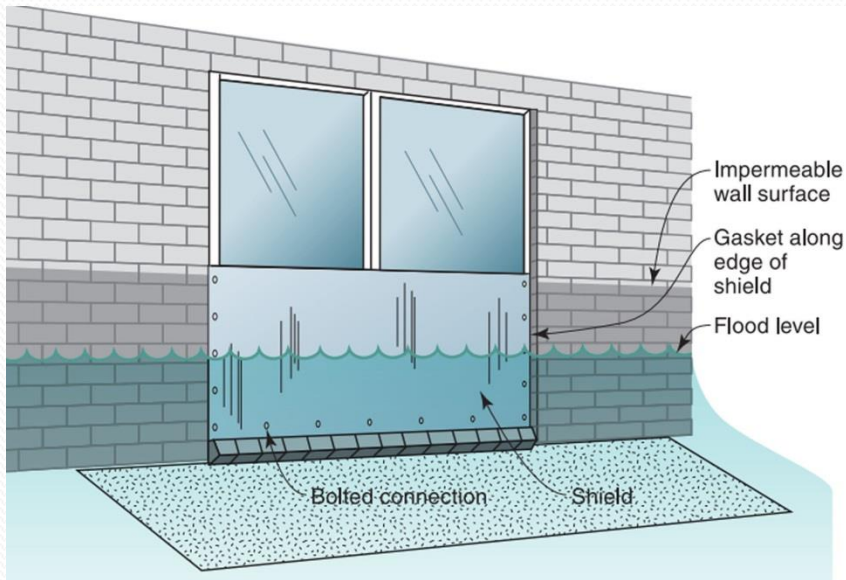


# Cost

- Cost depends on:
  - Size of structure
  - Height of Flood Protection Elevation (FPE)
  - Type of sealant/material used
  - Number of check valves
  - Number of openings that have to be covered



# Annual Maintenance



- Components must be inspected and maintained on a regular basis, consider an:
  - Inventory, location and inspection list of all flood shields and closers
  - Inspection of walls, floors, and floodproof coatings for cracks or leaks

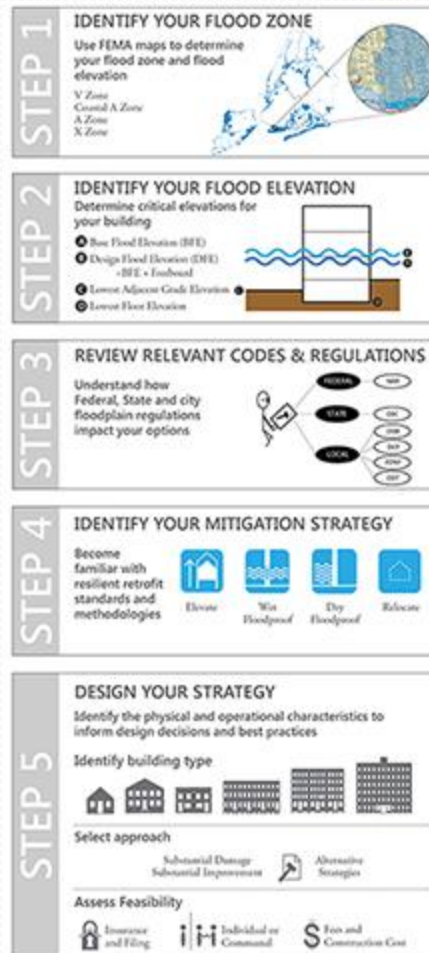
# Home Buyout Program



England Park

- FEMA works with local agencies, like Nashville's Metro Water Services, to purchase homes damaged by natural events such as floods
- A formula is used to determine which properties warrant acquisition.
  - Those that have been damaged repeatedly and are most likely to be damaged again have the best chances of qualifying.
- To satisfy federal requirements, a cost benefit analysis must show that every dollar spent for a buyout will result in at least a dollar saved.
  - To determine potential savings, officials examine the history of flood insurance claims.
- Buyouts are voluntary
  - A homeowner can refuse the offer and stay put.
  - Homeowners who accept the offer are paid the pre-disaster fair market value of their homes.

# 5 Steps to Remember



# Summary

- Floodplains Are Meant To Flood
- Flood Maps Are Available At:
  - <https://www.arcgis.com/home/webmap/viewer.html>
  - <http://maps.nashville.gov/FEMAViewer>
- Flood Maps Are Based On Probability
- It Is Not Practical To Plan And Design Stormwater Infrastructure Around Every Storm Event
- Protect Your Property
  - Get Flood Insurance
  - Elevate Your Home
  - Wet/Dry floodproof Home
- Inquire About The Home Buyout Program



Visit

[www.FloodSmart.gov](http://www.FloodSmart.gov)

for more information