Understanding National Flood Insurance / Building Code Requirements at the Local Level

1 hour Continuing Education Credit for Professional Engineers

Instructor – John Bayha, P.E.

John Bayha, P.E

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Water Resources Division
Kalamazoo District Office
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Pigeon River Flooding March 2014

Outline

- What is a floodplain?
- Floodplain maps
- Floodplain regulations
- State floodplain permits
- National Flood Insurance Program
- Local floodplain management
- Map revisions
- Community Rating System (CRS)

What is a floodplain?

Floodplain:

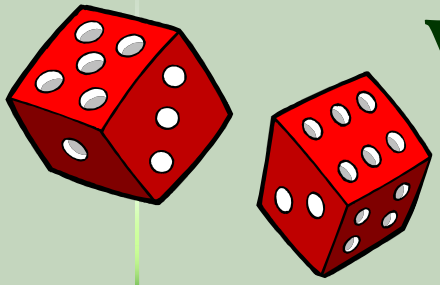
That area of land adjoining a river or stream that will be inundated by a 100-year flood

100-year flood:

A flood with a magnitude which has a 1 % chance of occurring or being exceeded in a given year

The natural function of the floodplain is to hold and carry floodwaters

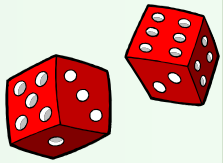
What is a 1% Chance



Odds of Winning the Jackpot:

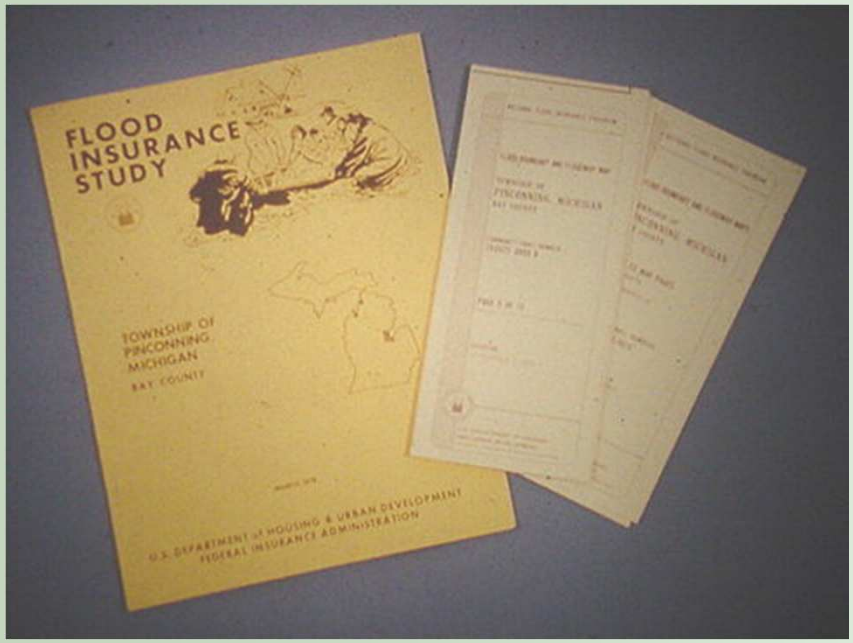
1 in 175,711,536

Chance having of a flood within the 100-year floodplain each year: **1 in 100**



In a 30 year time period, a structure located within the 100-year floodplain has over a 1 in 4 chance of being flooded

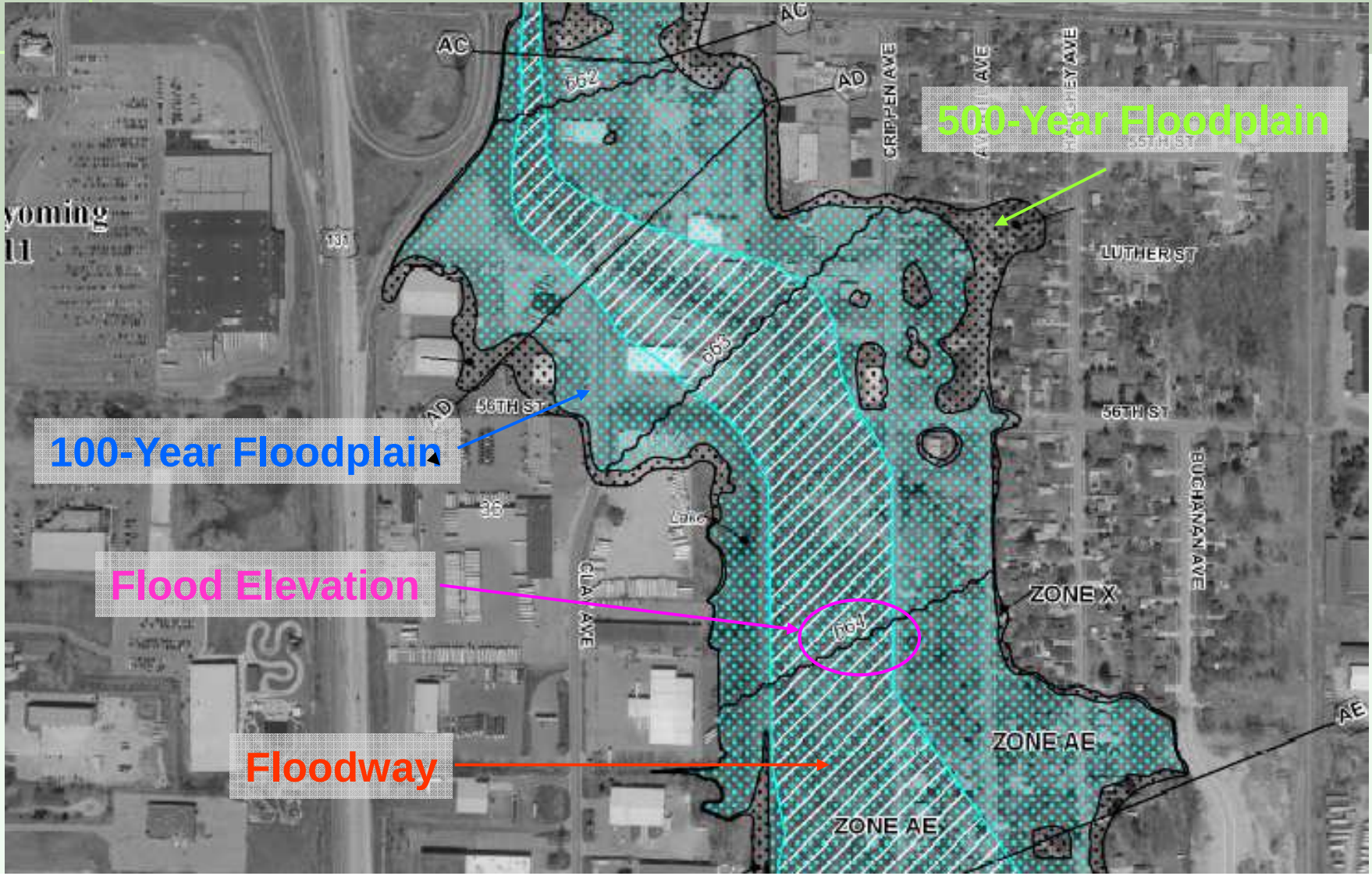
Identifying Floodplains in Mapped Areas



Many flood-prone communities belong to the National Flood Insurance Program, and have floodplains mapped on Flood Insurance Rate Maps (FIRM's).

These maps are available at the community's offices, can be obtained from the Federal Emergency Management Agency (FEMA) or can be viewed online.

Identifying Floodplains in Mapped Areas

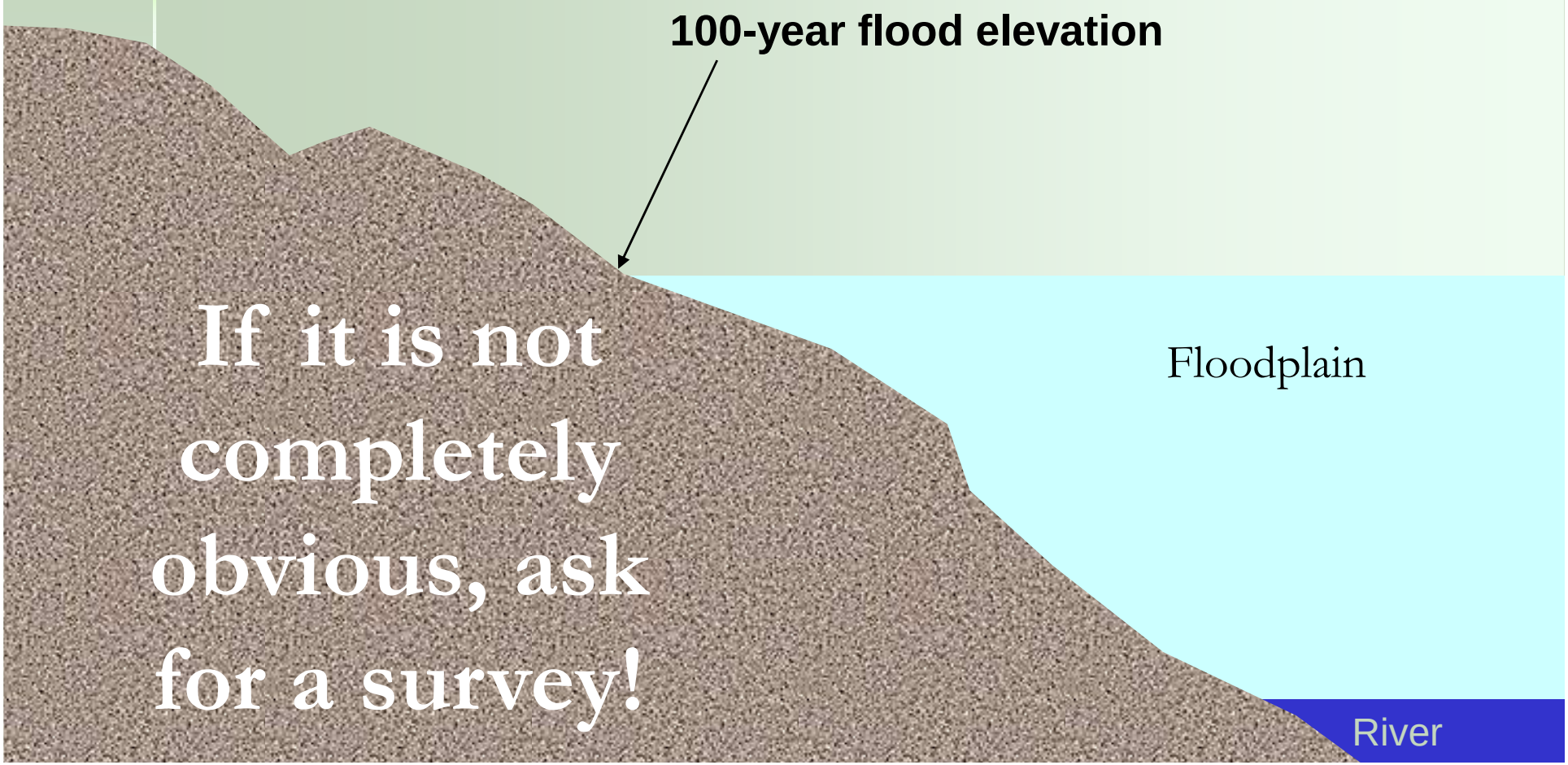


Where to Get Floodplain Maps

- Online FEMA's Map Service Center
  http://msc.fema.gov
- FEMA 1-877-336-2627
- Community Offices

The community should always have flood maps available for public viewing

The ultimate determination of whether or not a site is within the 100-year floodplain is **Elevation**



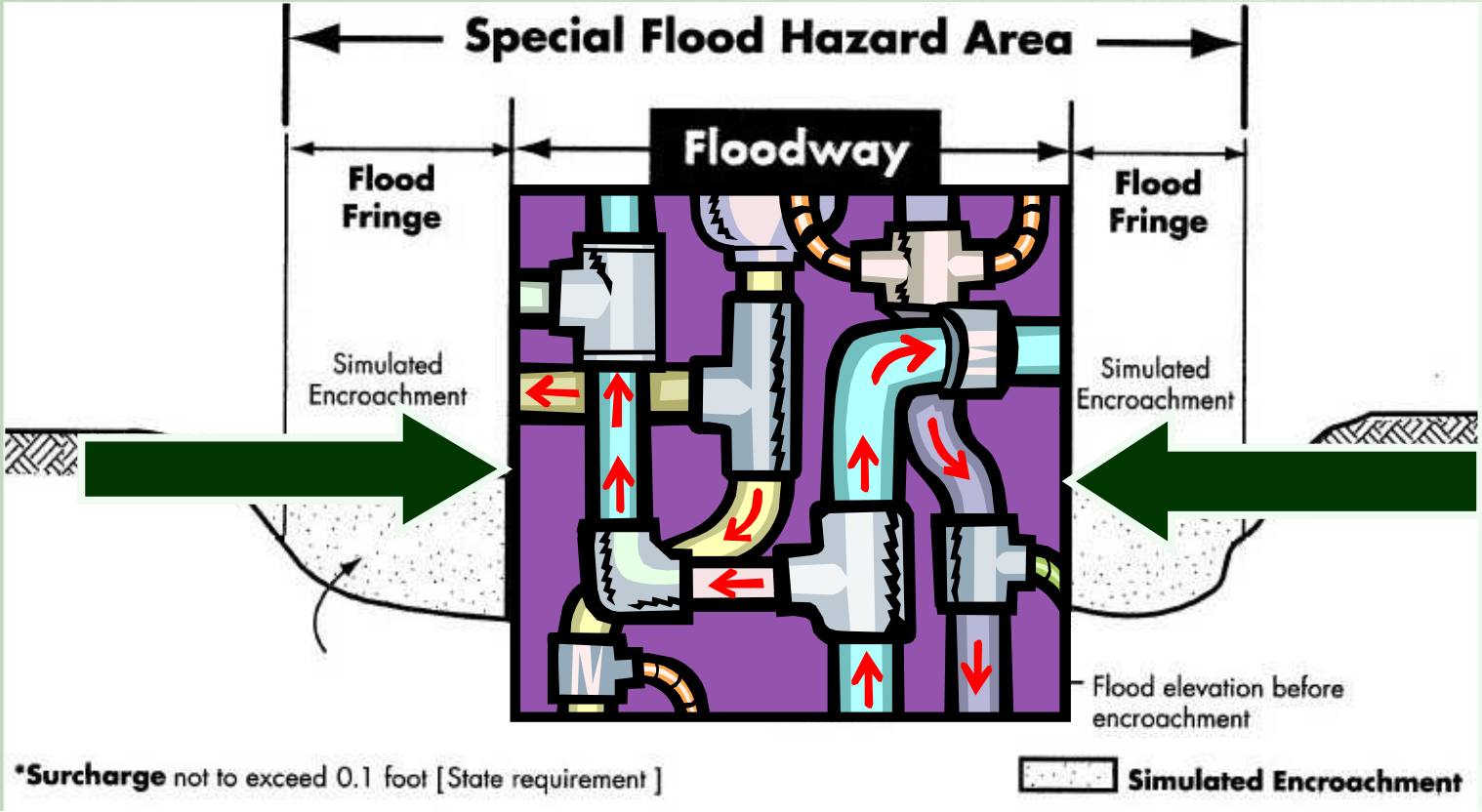
If it is not completely obvious, ask for a survey!

Identifying Floodplains in Unmapped Areas

- Development purposes:
  - DEQ can provide estimates of flood elevations on streams when floodplain maps do not exist.
  - Requestor submits a request with a site location map

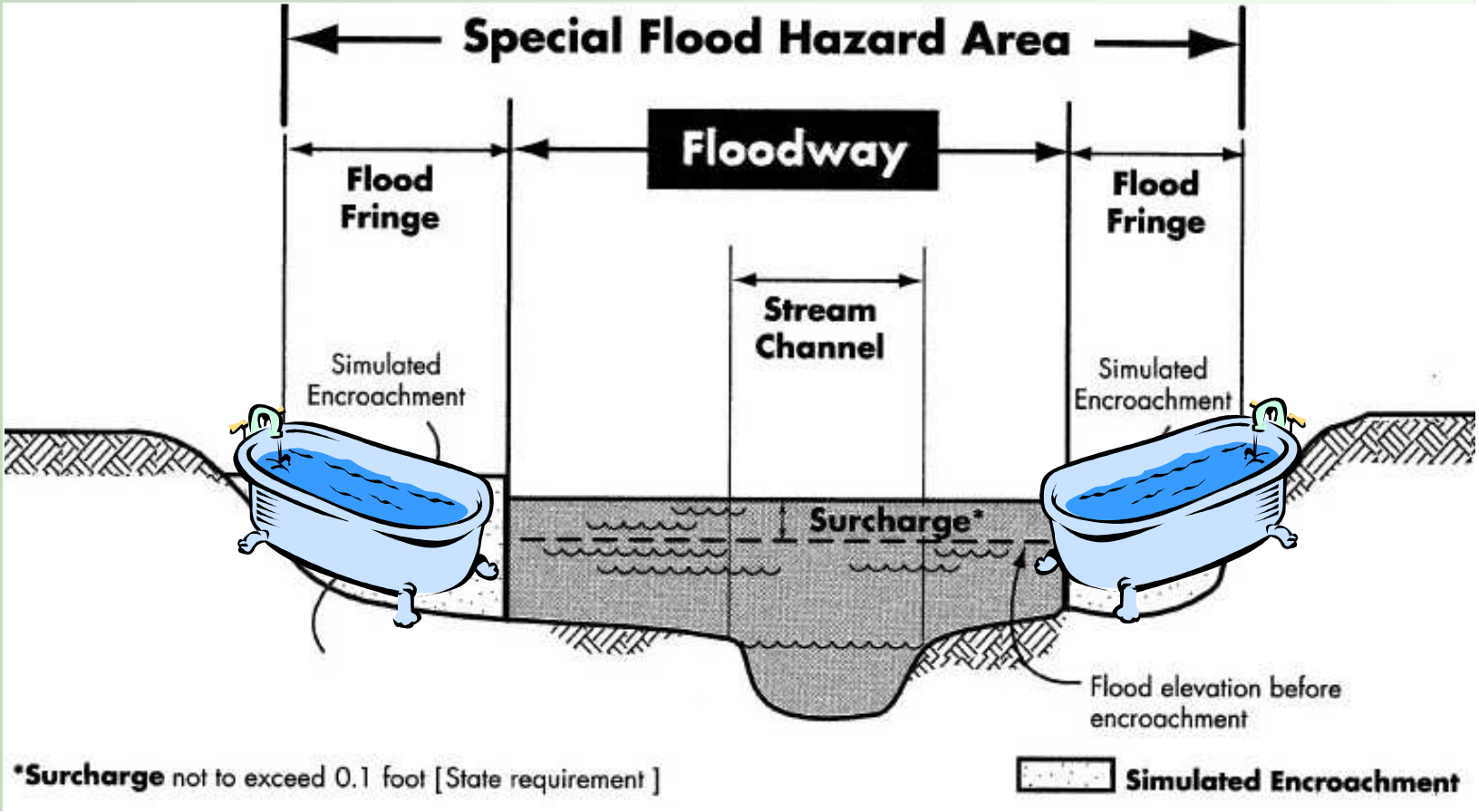
The Floodplain - Floodway

- Floodway limits are determined in a hydraulic analysis by "encroachments"
- It acts like a pipe to convey floodwaters.
- Narrow the floodplain until a rise is detected



The Floodplain – Floodway Fringe

- The floodway fringe stores floodwaters.
- It acts like a big bathtub.



Floodplain Regulations

- State: Part 31 of Public Act 451
- Local: Michigan Building and Residential Codes, Other Floodplain Ordinances
- Federal: National Flood Insurance Program

Local Floodplain Regulations

- Michigan Building Codes
- Local Ordinances
- Regulation of Great Lakes Shoreline Floodplains

Building Codes

- Both the Michigan Building Code and the Michigan Residential Code have detailed floodplain management and construction requirements.
- Proper enforcement of the Michigan building codes is a large part of NFIP compliance.

Building Codes

- In general, structures located within the floodplain must be elevated or floodproofed
- In Michigan a 1.0 foot freeboard requirement is in effect.
  - The lowest finished floor must be 1.0 feet above the floodplain elev.

Michigan Building Code Appendix G

- **G103.2 Other permits**
  It shall be the responsibility of the *building official* to assure that approval of a proposed development shall not be given until proof that necessary permits have been granted by federal or state agencies having jurisdictions over such development.

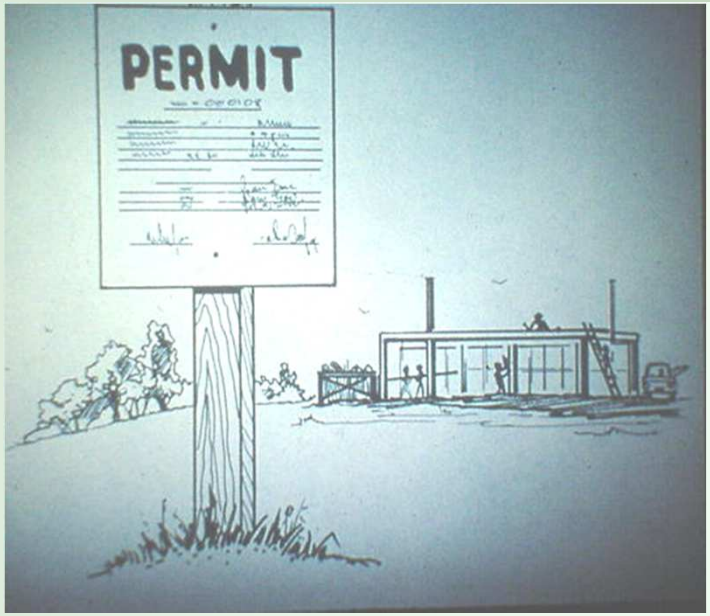
Local Floodplain Ordinances

- A critical requirement of a local community's participation in the NFIP is a strong and up-to-date floodplain ordinance.
- A sample ordinance for Michigan communities is available from the DEQ.

State Floodplain Permits

Portage Creek floodplain shelf construction 2014

DEQ Floodplain Permits



- Any Occupation,
- Construction,
- Filling, or grade changes within the floodplain of a river or stream (lakes?)

DEQ Floodplain Permits

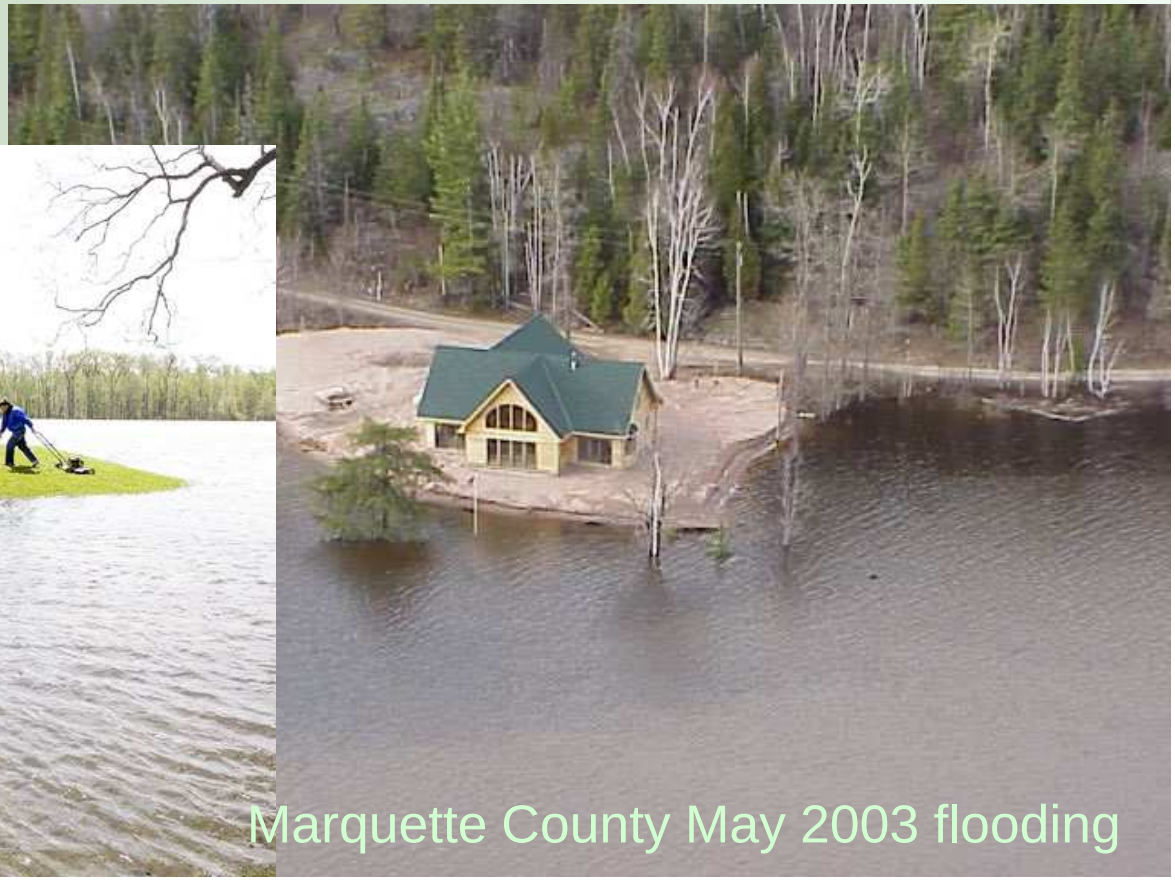
- DEQ Floodplain permits include the following State law review and coordination:
  - Wetlands
  - Inland Lakes and Streams
  - Sand Dunes
  - High Risk Erosion
  - **State Threatened and Endangered Species**

DEQ Floodplain Permits

- DEQ Floodplain permits include the following Federal review and coordination:
  - Section 404 of the Clean Water Act (federal wetlands)
  - Section 401 Clean Water Act Certification
  - Federal Threatened and Endangered Species
  - State & Federal Historic Preservation
  - Files are also automatically referred to the US Army Corps of Engineers when there is overlapping authority

Typical Floodplain Projects

- Building Construction



Marquette County May 2003 flooding

Typical Floodplain Projects

- Bridges and Culverts

Typical Floodplain Projects

- Filling and Grading

Floodway Development

Residential construction, including structural additions, is PROHIBITED within the Floodway

An engineer analysis is required for fill and other obstructions within the floodway

Floodway

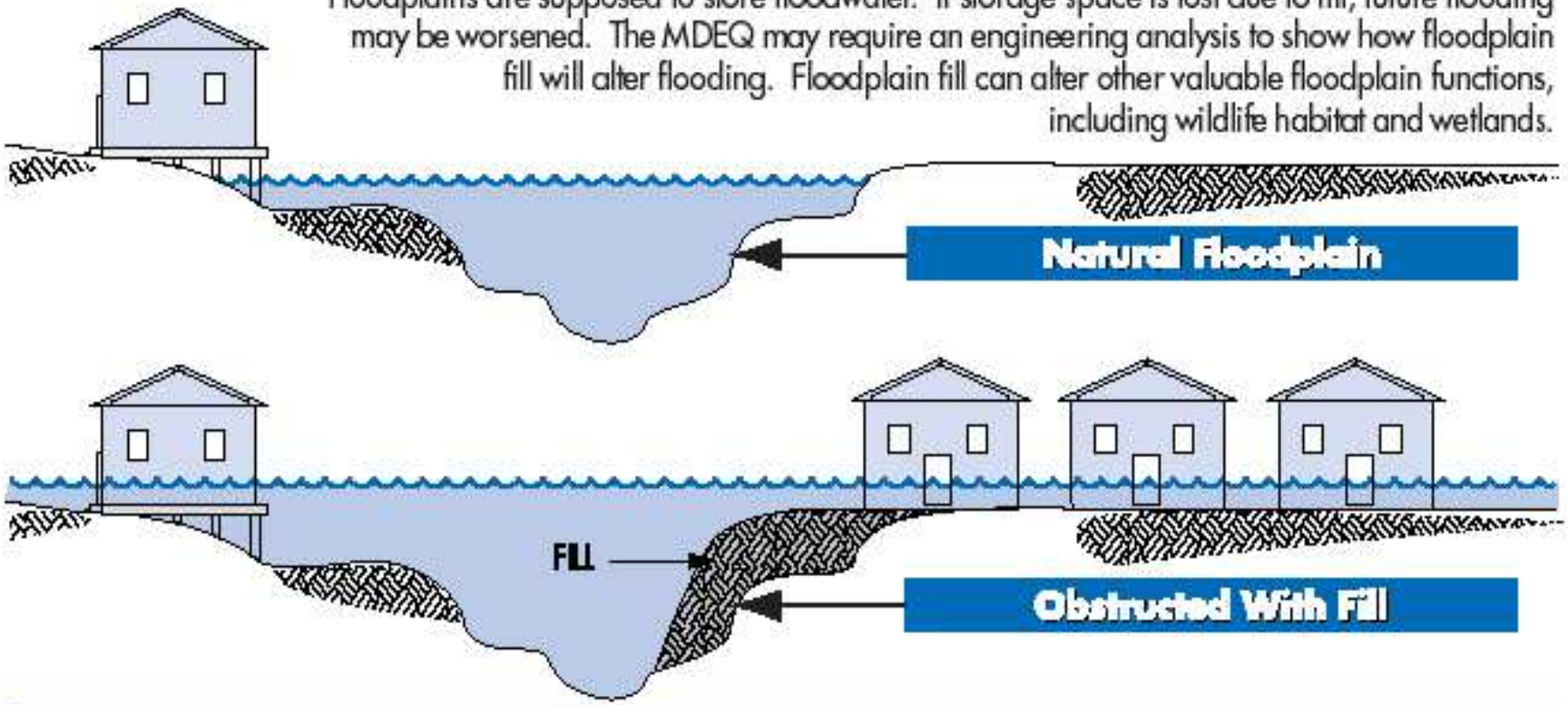
Floodway Fringe

http://www.woodradio.com/onair/the-insider-48410/watch-remotecontrolled-helicopter-provides-birdseye-view-11209870/

Cut and Fill

Floodplain Fill Can Make Things Worse

Floodplains are supposed to store floodwater. If storage space is lost due to fill, future flooding may be worsened. The MDEQ may require an engineering analysis to show how floodplain fill will alter flooding. Floodplain fill can alter other valuable floodplain functions, including wildlife habitat and wetlands.



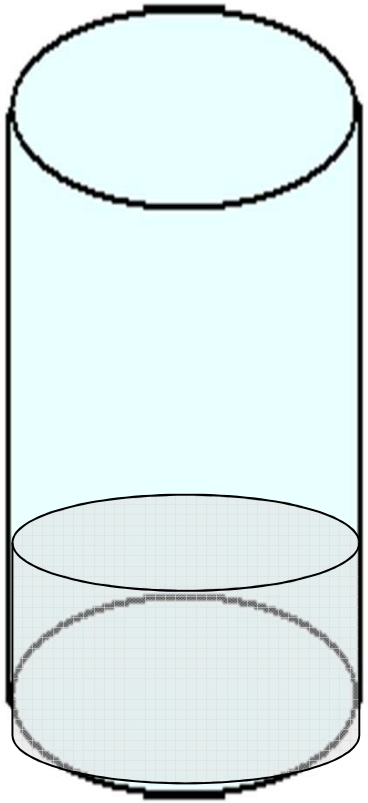
Make sure your floodplain fill project won't harm your neighbors. Floodway fill is allowed only if compensating excavation is provided or if an engineering evaluation demonstrates that "no harmful increase" in flood level will result.

Return to p.11 Old Format Flood Boundary and Floodway Map

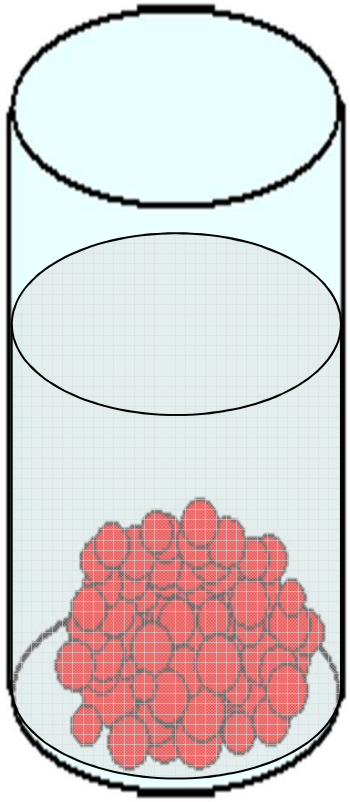
TOC

Filling the Floodplain

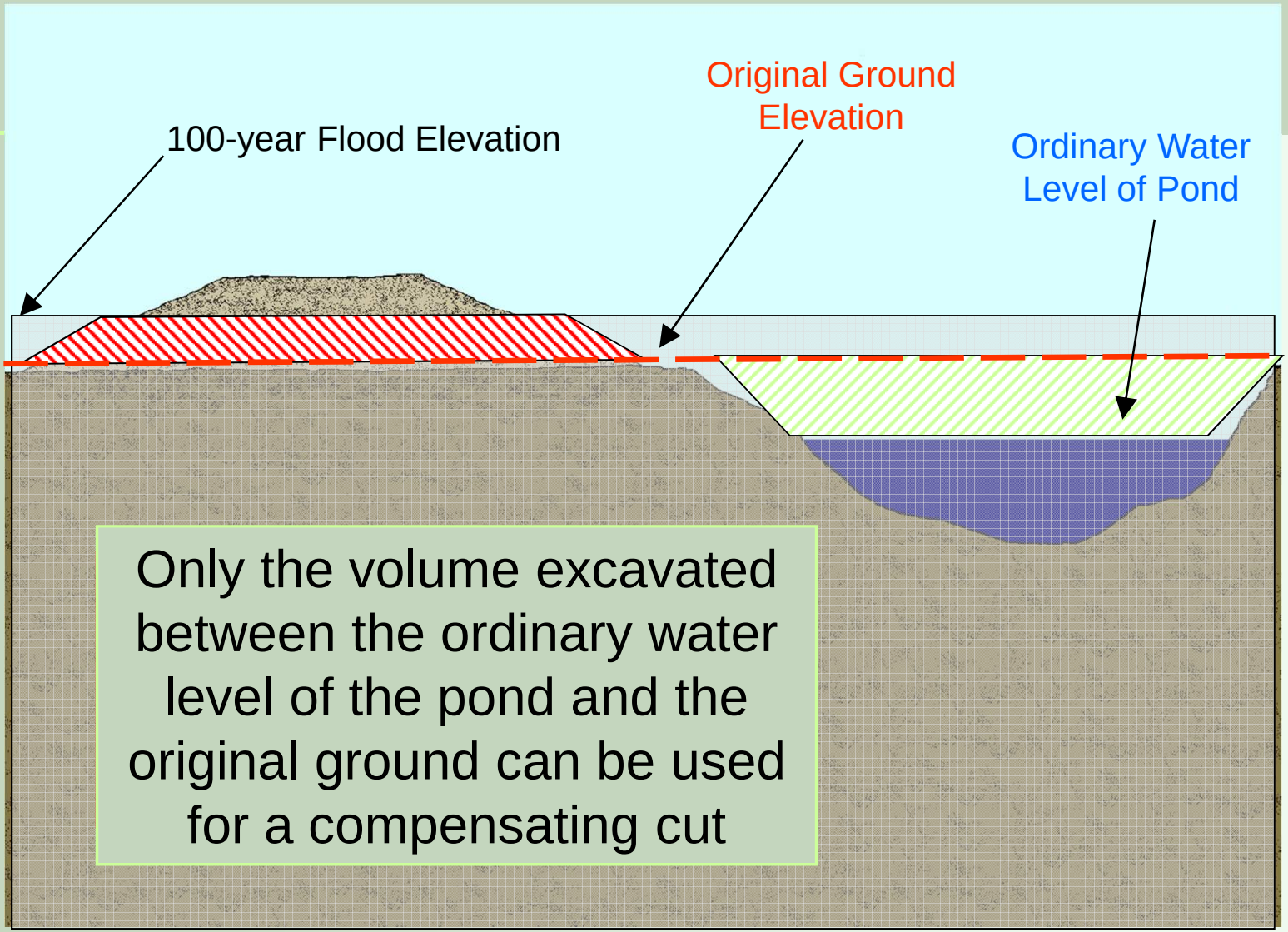
This is your floodplain



This is your floodplain *on fill*



Cut for Fill



Only the volume excavated between the ordinary water level of the pond and the original ground can be used for a compensating cut

Cut for Fill in Unstudied Areas

Compensating cuts are required for floodplain fill at a 1:1 ratio minimum

Cuts should be provided on site at approximately the same elevations as the filled areas

-or-

A watershed hydrologic analysis that shows no adverse affects to stage and discharge characteristic of the watercourse may be provided in lieu of cut for fill

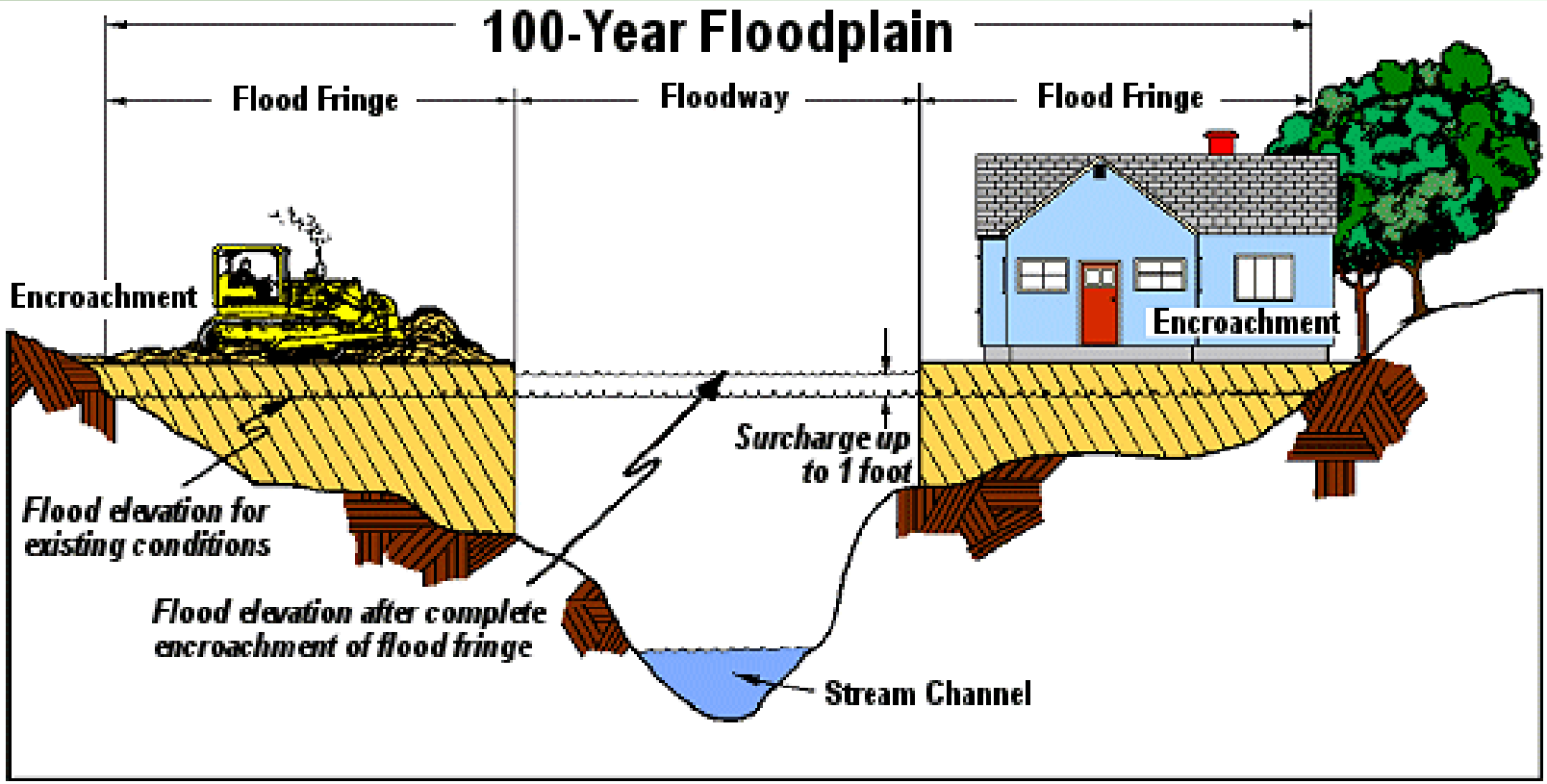
Fill for Small Projects

There is a one-time cut for fill exemption for small projects in unstudied areas

Small project = 300 cubic yards ***or less***

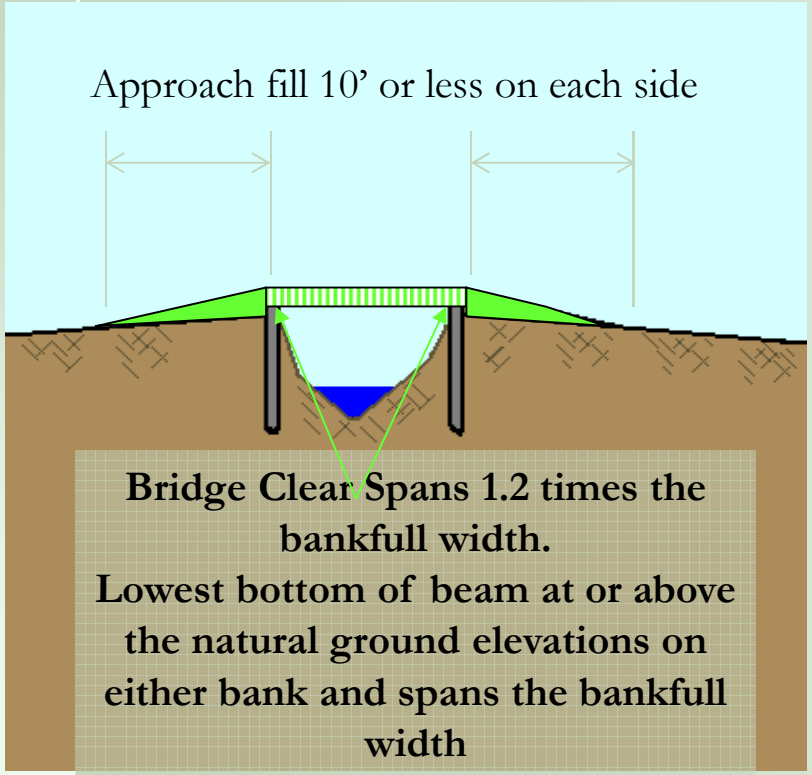
State Floodplain Permits Minor Projects

- Fill, grade changes or occupation of the floodway fringe

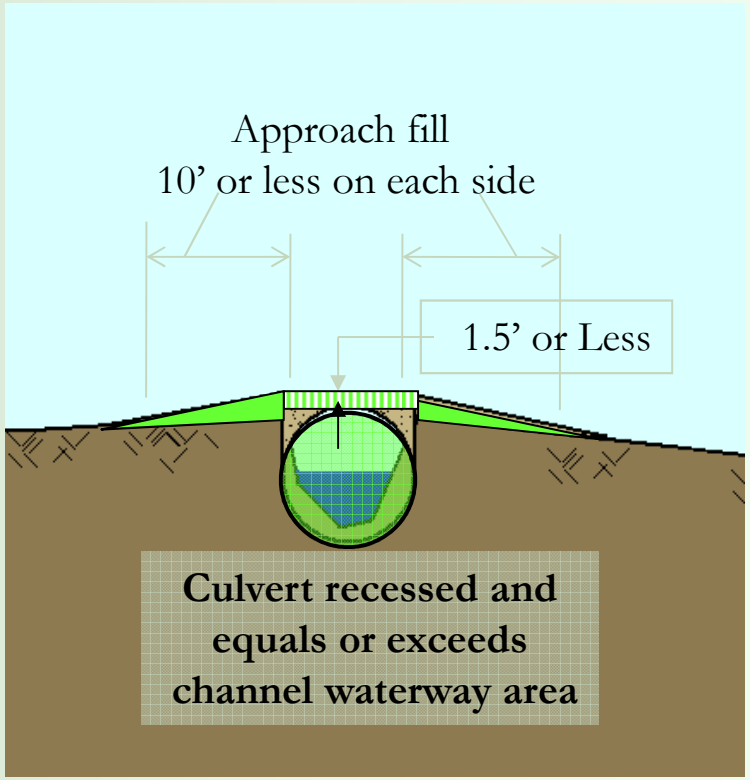


Stream Crossing Minor Projects

Clear Span Bridges



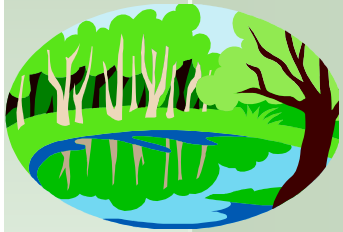
Culverts



Part 31 Minor Projects

Boardwalks

- Open pile construction
- landward or along existing shoreline



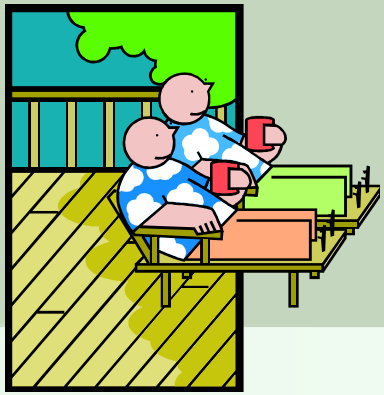
Ponds

- Excavated materials are placed landward of the floodway and out of regulated wetlands

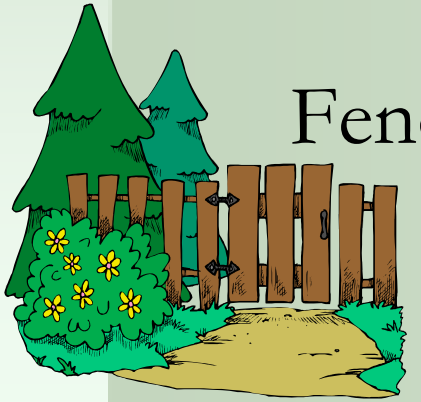
Parking Lot

- Constructed at grade
- resurfacing that is not more than 4 inches above the existing surface

- Decks placed on a residential structure
  - Open pile design
  - Anchored to prevent flotation
  - Does not extend over the bed or bank of a river



- Stormwater outfalls
  - Conforms to the side slope of the river, stream or waterway
  - Does not project beyond the shoreline



Fences in the floodway fringe

DEQ Permit

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
PERMIT

ISSUED TO:

Michael Roenicke
968 Commonwealth Street
Saginaw, MI 48604

Permit No.	12-73-0023-P
Issued	July 3, 2012
Extended	
Revised	
Expires	July 3, 2017

This permit is being issued by the Michigan Department of Environmental Quality (MDEQ) under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and specifically:

- ☐ **Part 301, Inland Lakes and Streams**
- ☐ **Part 325, Great Lakes Submerged Lands**
- ☐ **Part 303, Wetlands Protection**
- ☒ **Part 31, Floodplain/Water Resources Protection**
- ☐ **Part 315, Dam Safety**
- ☐ **Part 323, Shorelands Protection and Management**
- ☐ **Part 353, Sand Dunes Protection and Management**

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Permitted Activity:

Construct a 12-foot by 16-foot addition to a residential structure within the 100-year floodplain of the Saginaw River.

All work must be completed in accordance with the attached plans.

Water Course Affected: Saginaw River
Property Location: Saginaw County, City of Zilwaukee, **Section** 31
Subdivision, Lot **Town/Range** 12N, 5E **Property Tax No.** 02-13-5-2622-000

Authority granted by this permit is subject to the following limitations:

DEQ Permit
(Permit Conditions)

8. The Michigan Residential Building Code R102.7.1 and R322.2.1 require the lowest floor of any building addition to be elevated to one foot above the design flood elevation.

9. For an addition, reconstruction, rehabilitation or other improvement to a structure that is determined to be a "substantial improvement" under R105.3.1.1 and R112.2.1, the existing portions of the structure must meet the requirements of Section R322.

10. The Michigan Residential Building Code 2009 (R 322.1.9) requires that new or replacement manufactured homes be elevated in accordance with R322.2. The anchor and tie-down requirements of Sections AE604 and AE605 of Appendix E shall apply. R322.1.10 requires that a registered design professional shall prepare and seal documents of the elevations specified in R322.2.

11. This permit does not waive the requirements of the Michigan Residential Code 2009 (Code) for the construction of, or substantial improvements to, buildings and structures. The following is a summary of the requirements in areas prone to flooding, please reference the Code for the exact language:

    R 109.1.3 - A registered professional engineer or land surveyor must submit an elevation certificate to the local building official upon placement of the lowest floor, including basement, prior to further vertical construction. When the project is located in a National Flood Insurance Program (NFIP) community, using the elevation certificate form, found at www.fema.gov/nfip, is encouraged. The form is required if the community participates in the Community Rating System. The form may be used in non-NFIP communities.

    R 322.1.2 - Structural systems of all buildings and structures shall be designed, connected, and anchored to resist flotation, collapse, or permanent lateral movement due to structural loads and stresses from flooding equal to the design flood elevation.

    R 322.1.3 - Buildings and structures shall be constructed by methods and practices that minimize flood damage.

    R 322.1.4 - The design flood elevation shall be used to define areas prone to flooding and shall describe, at a minimum, the base flood elevation at the depth of peak elevation of flooding (including

The National Flood Insurance Program

NATIONAL FLOOD
INSURANCE PROGRAM

National Flood Insurance Program (NFIP)

- Began in 1968 with the National Flood Insurance Act
- Voluntary Membership
- Federally subsidized flood Insurance is available throughout the local community
- Local community *commits* to managing current and future development in the floodplain to mitigate losses

History of Floodplain Management

- Old Thinking: Remove the water from the building site
  - Build dams, levees, and other structures
  - Costly to build structures
  - Costly to repair structures
  - Costly to mitigate when failure occurs.
- 1968: New Thinking
  - Rather than move the water, move the building (or make it safer)

NFIP Purpose

- National Flood Insurance Act, which created the NFIP
  - Charge premiums for insurance coverage
  - Use those premiums to mitigate for flooding
  - Steer development away from flood-prone areas
  - Takes the burden off the taxpayer
  - Puts it on the floodplain residents
  - Only works *if* local communities get involved and stay involved!
- DEQ is charged by FEMA to aid in this goal.

NFIP Requirements

- To participate in the National Flood Insurance Program, your community agrees to:
  - Adopt and enforce a flood damage prevention ordinance.
  - Require local permits for all types of development in the floodplain.
  - Assure that building sites are reasonably safe from flooding.
  - Estimate flood elevations that were not determined by FEMA.

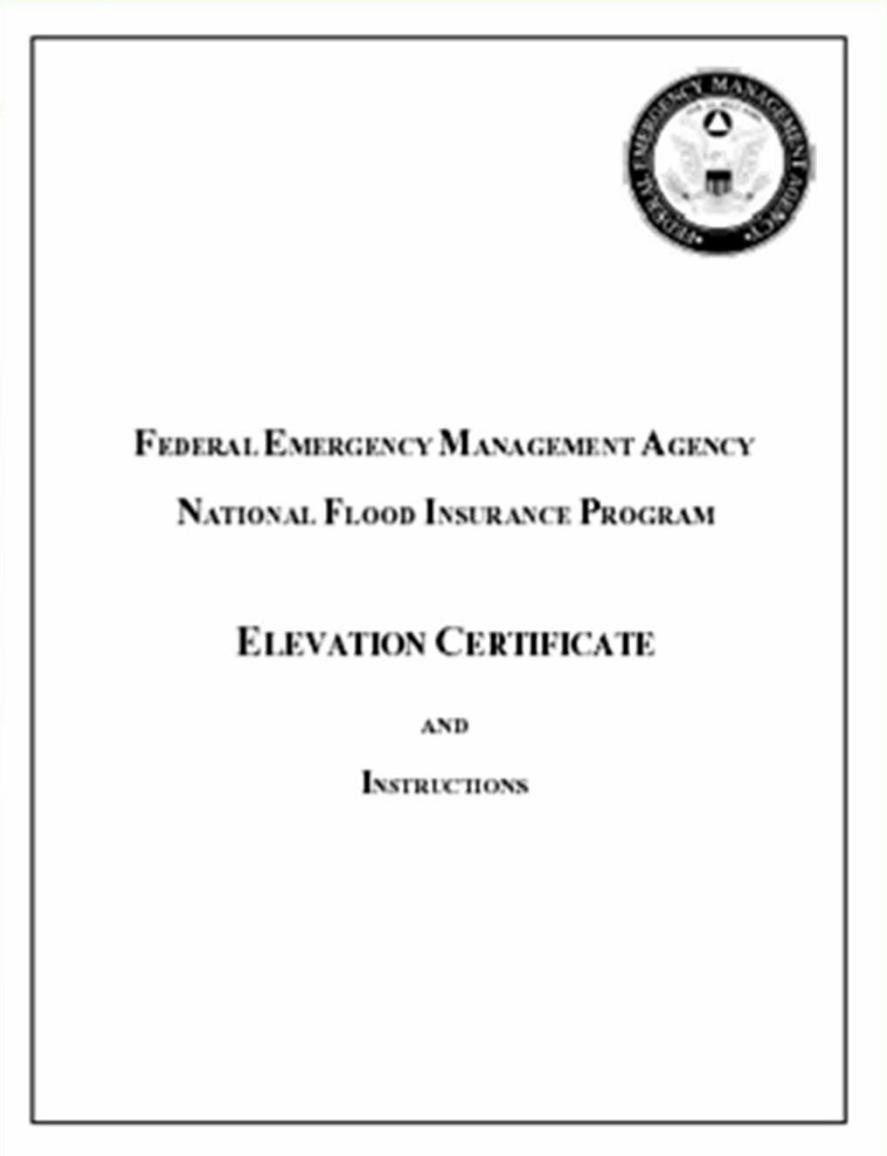
NFIP Requirements

- Require new or improved 1 and 2 family homes and manufactured homes to be elevated above the Base Flood Elevation (BFE), the 100-year (1% chance) flood elevation.
- Require other buildings to be elevated or flood proofed.
- Conduct field inspections and cite violations.
- Require **Elevation Certificates** to document compliance.
- Carefully consider requests for variances (not advisable under most circumstances).
- Resolve noncompliance and violations.
- Advise FEMA when updates to flood maps are needed.

NFIP Requirements

- Most construction-related requirements are also found in the 2009 (and now 2012) State Building Codes
- Other Requirements:
  - Require that applicants obtain DEQ (and other applicable) permits
  - Maintain the floodplain maps in the community

Elevation Documentation



FEDERAL EMERGENCY MANAGEMENT AGENCY

NATIONAL FLOOD INSURANCE PROGRAM

ELEVATION CERTIFICATE

AND

INSTRUCTIONS

Under the Michigan Building and Residential Codes, A registered design professional shall prepare and seal documentation of the elevations of the lowest floor including basement of new construction (*including additions*).

Elevation Documentation

- Elevation certificates and other documentation must be retained by the local NFIP community for perpetuity.
- Record of floodproofing documentation must also be retained.
- Failure to do so is viewed as a very serious lapse in floodplain management by FEMA and could lead to probation if it is not addressed.

Local Floodplain Management

- Building Officials *are* the designated floodplain managers in the sample State of Michigan floodplain ordinances
  - The building official is *already* responsible for the floodplain construction and development regulations under the building codes.

Common Issues

- Some of the most commonly encountered issues for local floodplain management are:
  - Lack of enforcement of current ordinances
  - Failure to maintain records
  - Accessibility of FIRM's to the local public
  - Non-resolution of ongoing violations
  - Failure to require State of Michigan permits

Effects of Non-Compliance

- Probation
  - If violations to NFIP can't be or won't be resolved
  - $50 charge to each policy in the community
- Suspension
  - Follows Probation
  - Compliance is not possible or desired
  - No insurance policies can be written
  - No federal disaster assistance in SFHA is available

Post FIRM Flood Insurance Costs

Effects of Floodplain Management requirements on Insurance Rating (effective June 2014)

Annual Premium Comparison – Non-elevated SFR, AE-Zone

Lowest floor 4 feet below BFE:	**$10,000**
Lowest floor at BFE:	**$ 1,800**
Lowest floor 4 feet above BFE:	**$ 550**

Based on $250,000/building; $100,000/contents

(Courtesy of FEMA)

Post FIRM Flood Insurance Costs

Effects of Floodplain Management requirements on Insurance Rating (effective June 2014)

Annual Premium Comparisons – Non-elevated SFR, Unnumbered A-Zone

Est. BFE, 0 or 1 foot above BFE: $1,669
No Est. BFE, 1 foot above HAG: $2,956

Based on $250,000/building; $100,000/contents

(Courtesy of FEMA)

Changing NFIP Maps

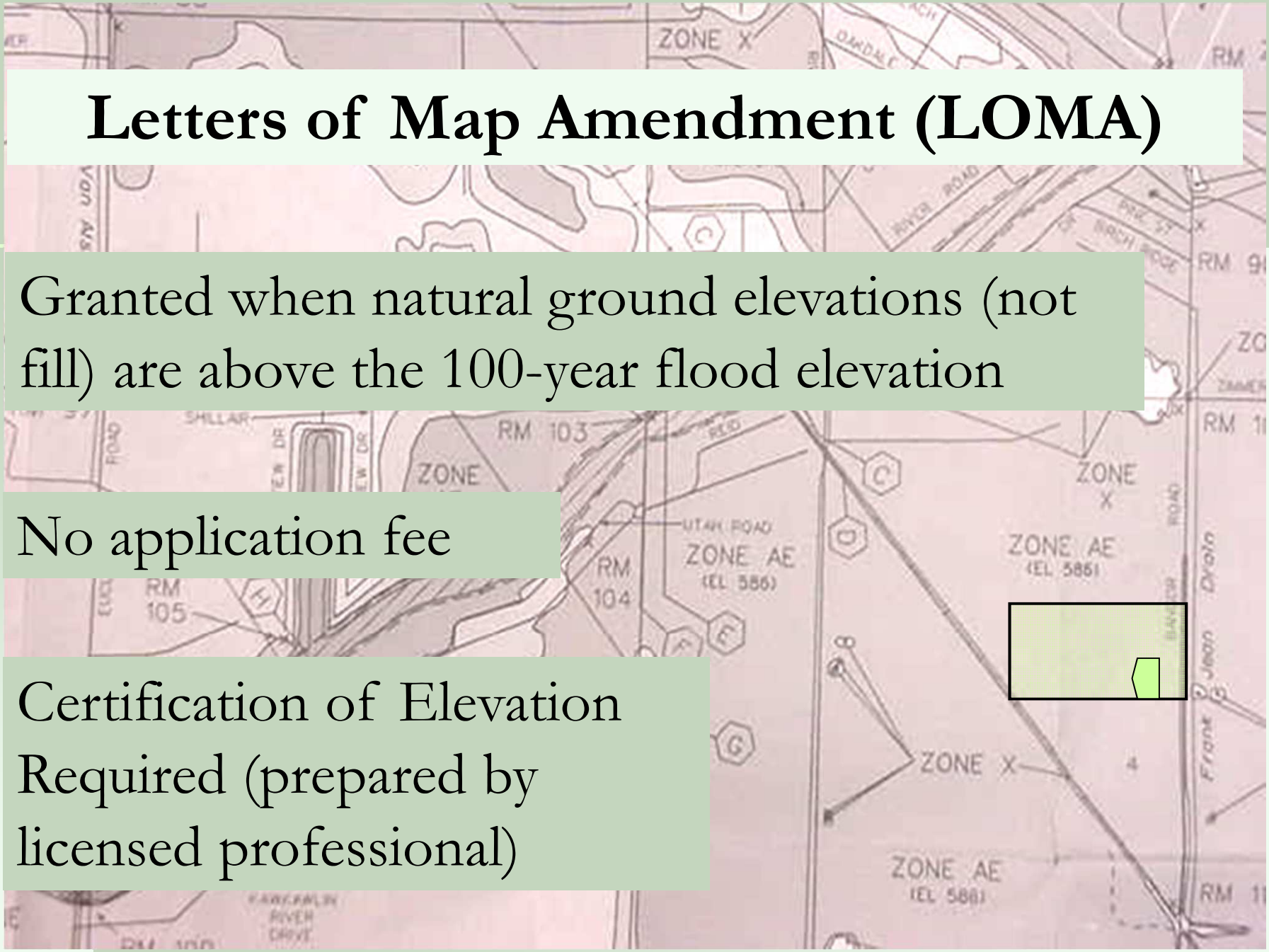
Marquette County May 2003 flooding

Letters of Map Amendment (LOMA)

Granted when natural ground elevations (not fill) are above the 100-year flood elevation

No application fee

Certification of Elevation Required (prepared by licensed professional)



Letters of Map Revision

- Granted when existing conditions are altered under permit, so that new ground elevations are above the 100-year flood elevation
- Application fees apply

Map Revisions

- **Required** when there are floodway projects and the watercourse will be changed
  - New and replacement bridges and culverts
  - Stream relocation
  - Fill in the floodway
  - https://hazards.fema.gov/femaportal/onlinelomc/signin

Community Acknowledgement for LOMRs

DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY **COMMUNITY ACKNOWLEDGMENT FORM**	*O.M.B. NO. 1660-0015* *Expires February 28, 2014*

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this data collection is estimated to average 1.38 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and submitting the form. This collection is required to obtain or retain benefits. You are not required to respond to this collection of information unless a valid OMB control number is displayed on this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0015). **NOTE: Do not send your completed form to this address.**

This form must be completed for requests involving the existing or proposed placement of fill (complete Section A) ***OR*** to provide acknowledgment of this request to remove a property from the SFHA which was previously located within the regulatory floodway (complete Section B).

This form must be completed and signed by the official responsible for floodplain management in the community. **The six digit NFIP community number and the subject property address must appear in the spaces provided below. Incomplete submissions will result in processing delays.** Please refer to the MT-1 instructions for additional information about this form.

Community Number: _____ **Property Name or Address:** _____

A. REQUESTS INVOLVING THE PLACEMENT OF FILL

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision Based on Fill (LOMR-F) or Conditional LOMR-F request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a Conditional LOMR-F, will be obtained. For Conditional LOMR-F requests, the applicant has or will document Endangered Species Act (ESA) compliance to FEMA prior to issuance of the Conditional LOMR-F determination. For LOMR-F requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. Section 9 of the ESA prohibits anyone from "taking" or harming an endangered species. If an action might harm an endangered species, a permit is required from U.S. Fish and Wildlife Service or National Marine Fisheries Service under Section 10 of the ESA. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by DHS-FEMA, all analyses and documentation used to make this determination. For LOMR-F requests, we understand that this request is being forwarded to DHS-FEMA for a possible map revision.

Community Comments:

Community Official's Name and Title: (*Please Print or Type*)		Telephone No.:
Community Name:	Community Official's Signature: (required)	Date:

Community Acknowledgement for LOMRs

- The local community assumes a great deal of responsibility by signing a LOMR

A. REQUESTS INVOLVING THE PLACEMENT OF FILL

As the community offi… Letter of Map Revision R… ject meets … regulatory … ained. For Conditional LOMR-F requ… prior to issuance of the Conditional LOMR-F determination. For LOMR-F … that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. Section 9 of … anyone from "taking" or harming an endangered species. If an action might harm an endangered species, a permit is required … and Wildlife Service or National Marine Fisheries Service under Section 10 of the ESA. For actions authorized, funded, or being ca… by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitt… In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by DHS-FEMA, all analyses and documentation used to make this determination. For LOMR-F requests, we understand that this request is being forwarded to DHS-FEMA for a possible map revision.

reasonably safe from flooding

Community Acknowledgement for LOMRs

- 44 CFR 65.2 (c) – Definition of *"reasonably safe from flooding"*

(c) For the purposes of this part, ''reasonably safe from flooding'' means base flood waters will not inundate the land or damage structures to be removed from the SFHA and that any subsurface waters related to the base flood will not damage existing or proposed buildings.

Community Acknowledgement for LOMRs

- When is it required?
  - Requests involving the placement of fill
  - Existing: Letters of Map Revision based on fill (LOMR-F)
  - Proposed: Conditional Letters of Map Revision based on fill (CLOMR-F)
  - Requests for land or structures that are inadvertently included in the regulatory floodway
  - Letters of Map Amendment (LOMA) in floodway
  - See page 12 of MT-1 application and Form 1 of MT-2 application

(Courtesy of FEMA)

Community Acknowledgement for LOMRs

- Why a Community Acknowledgement Form? (retain local control)
  - A community's FIRM/FIS is being changed.
  - Actions resulting in LOMCs generally require local floodplain permits.
  - FEMA wants to assure that:
    - All necessary permits were obtained.
    - The LOMC does not undermine the authority of the community.

(Courtesy of FEMA)

Community Acknowledgement for LOMRs

- Steps for the local Floodplain Manager
  - Review the LOMC proposal
  - Ensure the proposal meets a series of conditions
  - Sign the Community Acknowledgement Form if the proposal is acceptable
  - Forwards the LOMC request to FEMA

(Courtesy of FEMA)

Community Acknowledgement for LOMRs

- Section A – Requests Involving the Placement of Fill
  - Guidance from Technical Bulletin 10-01 What is "Reasonably Safe from Flooding?"
    - Compliance with TB 10-01
    - Simplified Approach, must meet ALL requirements (page 15-18)
    - Engineered Basement Option
      - Professional Engineer, Professional Geologist, Professional Soil Scientist, or Other qualified design professional

http://www.fema.gov/media-library-data/20130726-1511-20490-3169/tb1001.pdf

(Courtesy of FEMA)

Community Acknowledgement for LOMRs

- Section B – Property Located Within the Regulatory Floodway
  - Signature by the community acknowledges the community's acceptance of a revision to the regulatory floodway within the community.

(Courtesy of FEMA)

Community Assistance Visits
Community Assistance Contact

- Designed to help NFIP communities
- Assessment of the floodplain management within the community
- FEMA or the State NFIP Coordinating Agency may inspect local community records during a CAV or CAC

Community Rating System

- FEMA's reward to communities who have floodplain management beyond the minimum NFIP requirements.
- Participating communities receive reductions in flood insurance premiums for all residents.
- All NFIP communities in MI with no floodplain violations are immediately eligible for a 5% reduction (based on enforcement of MI regs & building codes).
- Audit (CAV) required, showing no existing violations.

Questions…
September 2008 flooding on the Kalamazoo River

Upcoming Events:

St. Joseph Watershed Phased Discovery Meetings

Starting January, 2015
FEMA and STARR hosting

Annual MSFA Conference

February 25-27, 2015
Radisson Hotel
Lansing, MI
http://mi.floods.org/

Annual ASFPM National Conference

June 19 - 24, 2016
Grand Rapids, MI
http://www.floods.org/index.asp?menuID=223&firstlevelmenuID=181&siteID=1

August 2014 Macomb County flooding
Photo by Maria Zingas