

Mapping

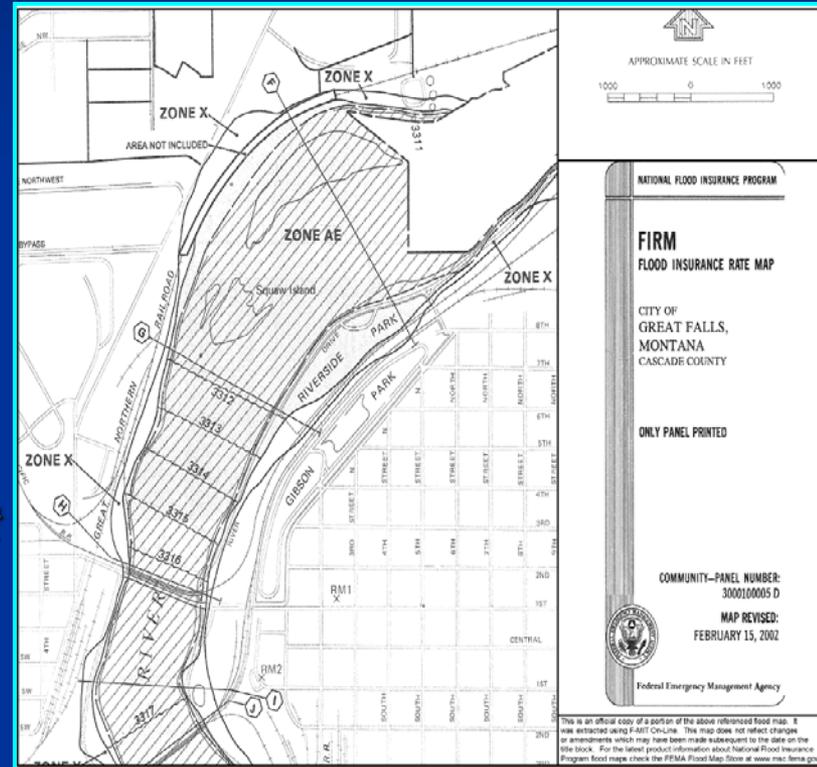
Montana Mapping Statistics

- Montana has 130 communities participating in the NFIP.
- 19 (15%) of those communities are participating, but have no maps.
- Of the communities with maps, 38 (29%) have maps with no BFE's, approximate A zones.
- Most NFIP communities in Montana with maps, have portions of their floodplain with no detailed data (BFE's).
- The average age of Flood maps in Montana is 19 years.

Mapping

FEMA has prepared a floodplain map and developed flood hazard data for most communities in the country. These maps are used for the following:

- ➡ *Basis for regulating new development*
- ➡ *Used for determination of the flood insurance purchase requirement.*
- ➡ *Used to determine insurance rating*



Mapping

FEMA has issued 3 types of maps:

- 1) Flood Hazard Boundary Map (FHBM): The 1st map received by most communities. Illustrates the flood-plain using “approximate” methods.
- 2) Flood Insurance Rate Map (FIRM): A more detailed depiction of the floodplain based on a flood insurance study. A FIRM usually provides base flood elevations for portions of the flood-plain.
- 3) Digital Flood Insurance Rate Map (DFIRM)

Reading Flood Maps

FEMA offers an excellent tutorial on how to properly read and interpret a FIRM that can be found at the following website:

http://www.fema.gov/plan/prevent/fhm/ot_firmr.shtm



The #1 Issue



The most prominent issues with regards to mapping for a Floodplain Administrator are:

- ? How do you adequately manage your floodplains with little or no detailed data provided by the existing mapping?
- ? What is your obligation under minimum NFIP requirements?
- ? What are your options?

Approximate A Zones

What is “best available data”?

44CFR 60.3(b)(4) requires you to make every effort to use any data available in order to make a reasonable measure of flood protection.

- ✓ Data can be used from other sources as long as they:
- ✓ Reasonably reflect flooding conditions expected during the base flood.
- ✓ Are known to be technically correct, and
- ✓ Represent the best data available

Examples of Best available data:

- Historical-observed flood of record
- Site specific data generated by developer.
Preliminary flood insurance study data
- Data generated by Transportation Department for road and bridge construction.
- USACE/NRCS
- Montana DNRC

Approximate A Zones

What are your options?

Require the developer to generate a BFE based on a detailed study.

This is required for any sub-division of 50 or more lots or 5 or more acres.

Estimate a BFE

- *Recorded flood of record*
- *Contour Interpolation*
- *Data Extrapolation*
- *“Quick 2”*

Require elevation above Highest Adjacent Grade by a specified number of feet based on local knowledge of flooding conditions

Approximate A Zones

What is DNRC's Recommendation?

- It is DNRC's recommendation that a detailed flood study be performed for all development that occurs in an approximate "A" zone.
- This will be required for any permit that is submitted to DNRC for review.
- A detailed study will provide the best gage of flood risk for a site, and assure the highest level protection for the property.

Approximate A Zones

What are the benefits to generating a BFE?

- Provides a higher confidence level of protection to the building.
- Building will qualify for significantly lower insurance rates.
- Places less burden on the permit official to qualify “reasonably safe”.
- In some cases, it can result in the property being eligible for a LOMC.

Floodplain Management Concepts

The Base Flood

Sometimes referred to as the 100-year flood.

Has a 1% chance of occurring in any given year.

(note): A home located within the 100-year floodplain has a 26% chance of being inundated by the base flood over the life of a 30 year mortgage

The Base Flood Elevation (BFE) is the elevation for which the base flood is expected to reach.

Flood frequency (years)	Chance of flooding in any given year	Percent chance of flooding during 30-year mortgage
10	10 out of 100 96%	96%
50	2 out of 100 46%	46%
100	1 out of 100 26%	26%
500	0.2 out of 100 6%	6%

Floodplain Management Concepts

The Floodway

That portion of the floodplain required to carry the bulk of the floodwater.

Portion of the floodplain where water forces and velocities are the greatest.

Regulations strive to keep floodways open.

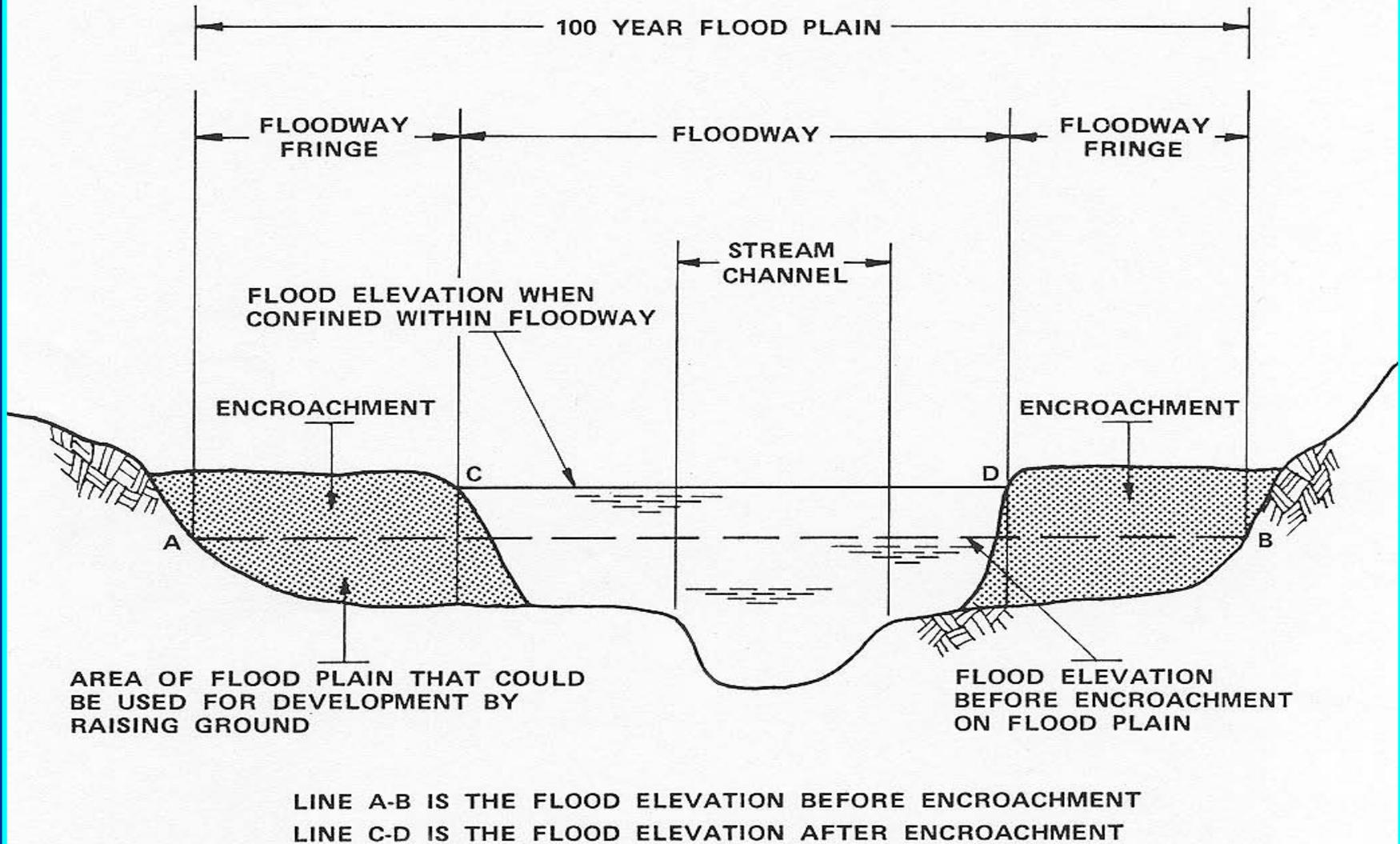
They can be modeled and mapped.

NFIP specifies 100-year flows and increase of 1'

State specifies 100-year flows and increase of .5'

This is a hydraulic, not hydrologic, concept

FLOODWAY RELATIONSHIPS



Floodplain Management Concepts

The Flood Fringe

- ▶▶ The area on either side of the floodway.
- ▶▶ Is subject to inundation by the base flood, but conveys little or no velocity flows.
- ▶▶ This area is often subject to a different scope of regulation

Floodplain Management Concepts

The Special Flood Hazard Area (SFHA)

- The area covered by floodwaters from the base flood, as depicted on a NFIP map.
- The minimum area subject to floodplain management regulation under the NFIP.
- The SFHA can include both the floodway and flood fringe.

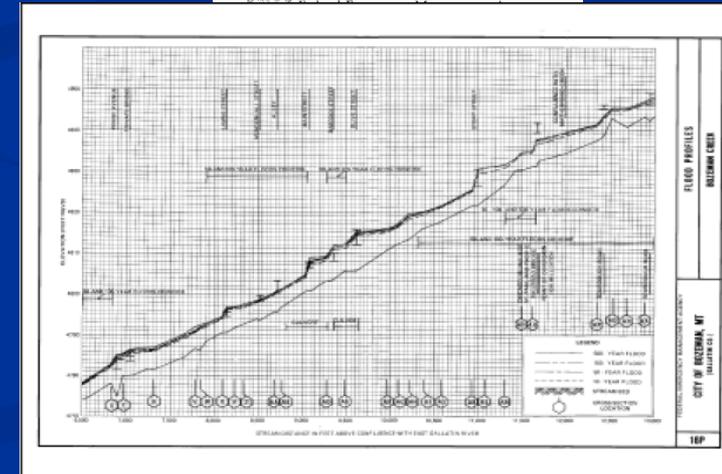
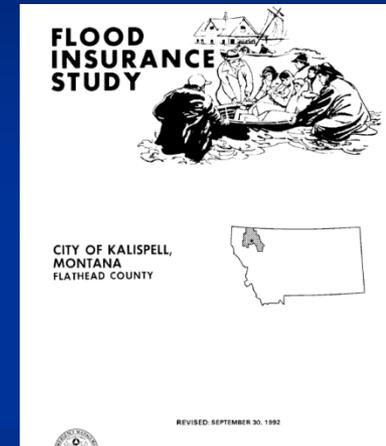
Interpreting the Floodplain

Using the Flood Insurance Study (FIS)

A FIS is a report prepared by FEMA that summarizes an analysis of the flood hazards in a community.

This analysis is used to prepare the FIRM.

It is the most accurate tool for determining a BFE for regulatory purposes.



FIS Report Contents

Provides background information on the Community.

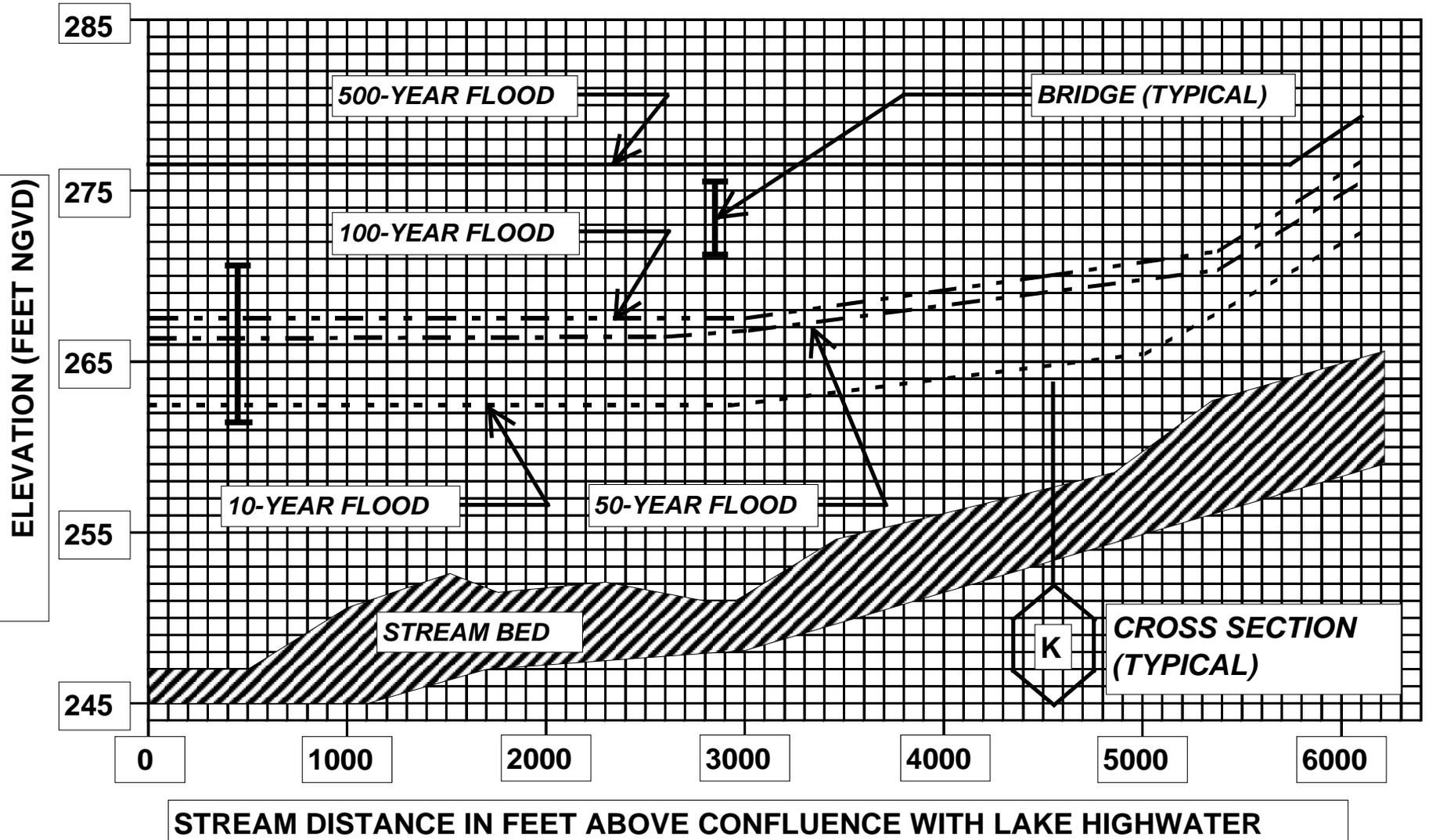
Discusses the engineering methods utilized.

Discusses how the FIRM was prepared.

Flood data and tables:

- Summary of Discharges
- Floodway data
- Flood Profiles

FLOOD PROFILES



FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Green River								
A	0	188	1,691	6.9	267.5	257.3 ²	257.4 ²	0.1
B	380	161	1,539	7.6	267.5	258.0 ²	258.1 ²	0.1
C	480	161	1,550	7.6	267.5	258.1 ²	258.2 ²	0.1
D	980	155	1,143	10.3	267.5	259.6 ²	259.7 ²	0.1
E	1,560	319	2,103	5.6	267.5	262.9 ²	262.9 ²	0.0
F	1,770	288	2,345	5.0	267.5	265.2 ²	265.2 ²	0.0
G	2,270	73	849	13.8	267.5	265.3 ²	265.3 ²	0.0
H	2,770	119	1,564	7.5	267.5	267.5	268.5	1.0
I	2,940	169	1,971	6.0	267.5	267.5	268.5	1.0
J	3,440	170	1,802	6.5	268.1	268.1	269.1	1.0
K	4,540	207	2,164	5.4	270.1	270.1	270.7	0.6
L	4,840	227	1,839	6.4	270.3	270.3	271.0	0.7
M	5,370	113	837	14.0	271.2	271.2	271.5	0.3

¹ Feet Above Confluence With Lake Highwater

² Elevation Computed Without Consideration of Backwater From Lake Highwater

TABLE 1	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	City of Floodville, CA	GREEN RIVER

Reading Flood Insurance Studies

FEMA offers an excellent tutorial on how to properly read and interpret a FIS that can be found at the following website:

http://www.fema.gov/media/fhm/fis/ot_fis.htm



Interpreting the Floodplain

Using Other Data

The NFIP requires utilization of the “Best Available Data” in the management of floodplains.

This can frequently be by data other than the FIRM or FIS.

Potential sources of Other Data:

New H&H studies generated by the community or developer.

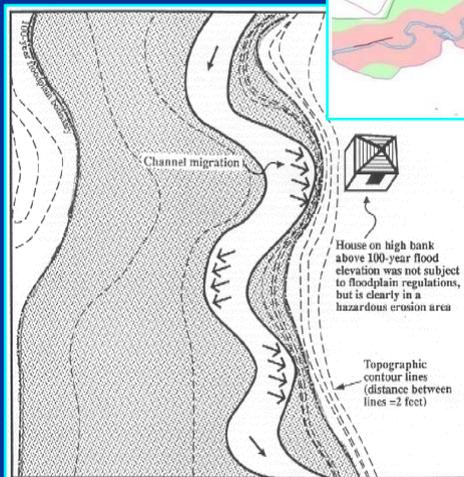
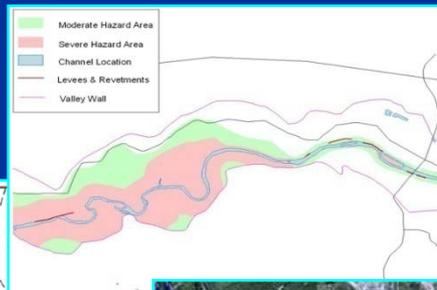
New “preliminary” FIRM’s issued by FEMA.

USACE/NRCS or other Federal Agency

The State

Historical Flood Information

Letters of Map Correction (LOMC)



The Order of Precedence for determining a BFE at a Specific Location

- 1) The Floodway Data Table (if available) is the most accurate source for BFE's. These BFE's are listed to 0.1 foot. However, this data is only good for sites on or next to a cross section.
- 2) The Flood Profile.
- 3) The FIRM. This is the least accurate source of elevation data, because BFE's are rounded to the nearest whole foot, and often involves "interpolation".

What if you have no maps?

Once again, as a participant in the NFIP, you are obligated to use “best available data”.

What are your options?

- Topographic Maps
- Historical data (High water marks, photos)
- FEMA's HAZUS program
- LOMC's
- Elevation Certificates