Map Reading & Flood Insurance Studies

Map Types

- FHBM – Flood Hazard Boundary Map
- FIRM – Flood Insurance Rate Map
- FBFM – Flood Boundary and Floodway Map
- DFIRM – Digital Flood Insurance Rate Map

Flood Hazard Boundary Map

Using Topographic Maps to Determine BFEs

- USGS topographic maps are used to transfer BFE data to FHBM
- If property is between elevation reference lines, then BFE is interpolated

Interpolation is a method of constructing new data points within the range of a discrete set of known data points.

What is the BFE at the Proposed Site?

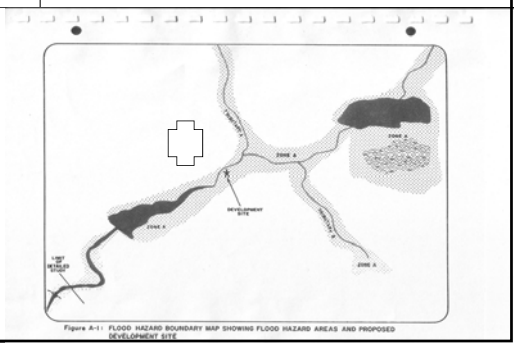
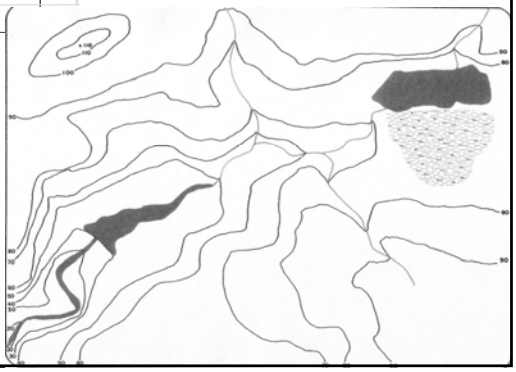


Figure A-1: FLOOD HAZARD BOUNDARY MAP SHOWING FLOOD HAZARD AREAS AND PROPOSED DEVELOPMENT SITE

USGS Topo Map To Scale of FHBM



Topo Map Overlaid on FHBM

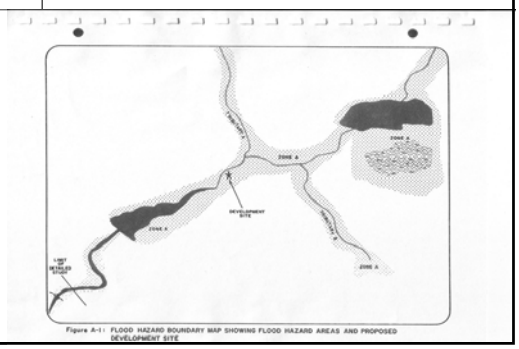
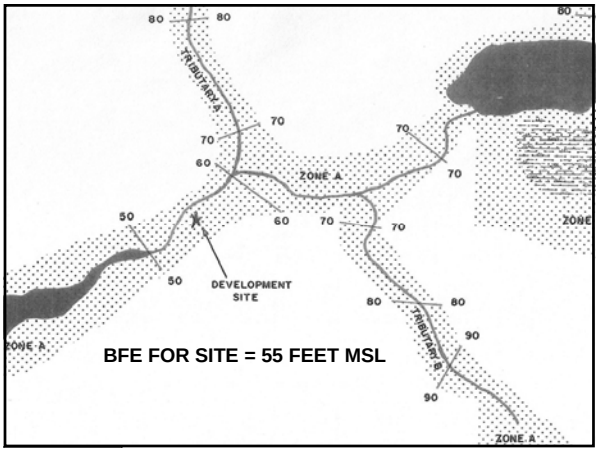
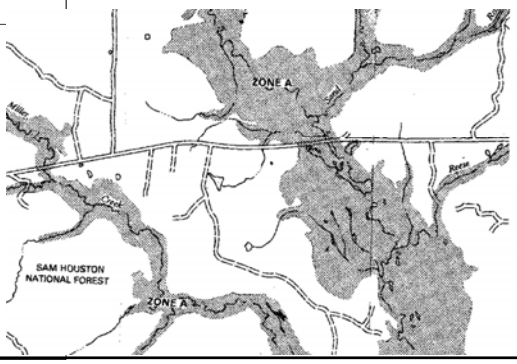


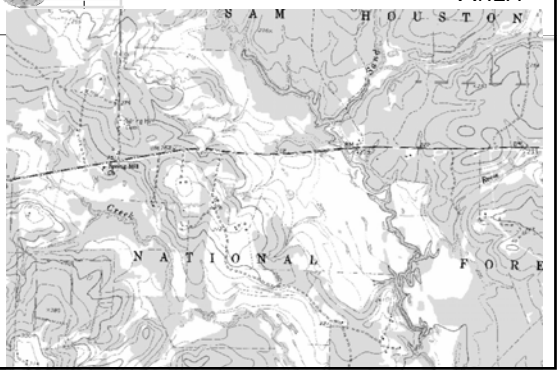
Figure A-1: FLOOD HAZARD BOUNDARY MAP SHOWING FLOOD HAZARD AREAS AND PROPOSED DEVELOPMENT SITE



Flood Hazard Boundary Map Exercise

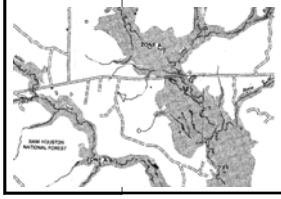


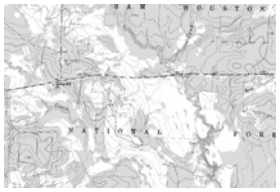
Find USGS Quad Sheet for Area

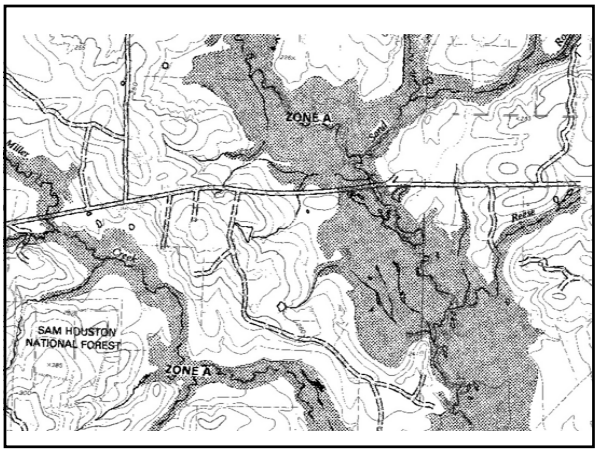


Overlay USGS Topo Maps onto FHBM

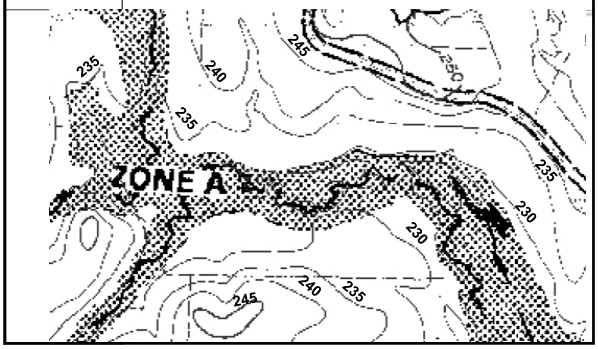
- Scale USGS Quad sheet to match scale of FHBM



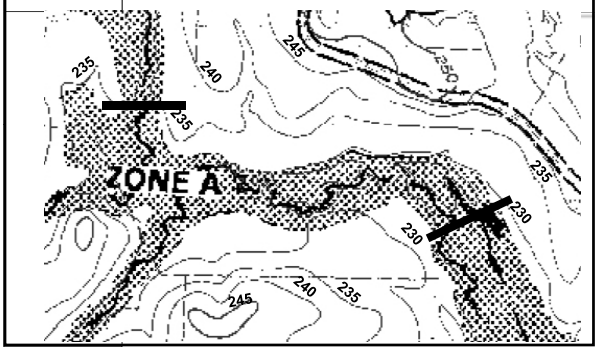




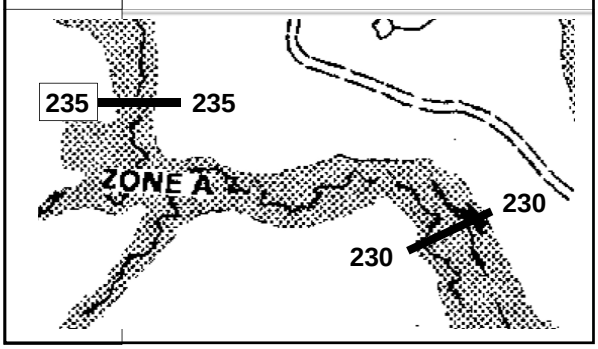
Overlay USGS Topo Maps onto FHBM



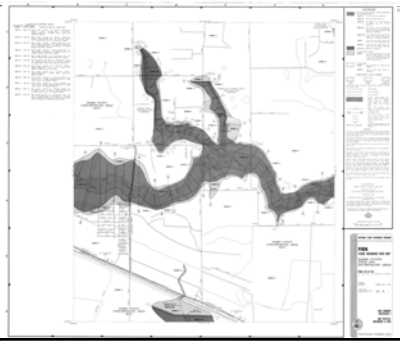
Where Contours Intersect SFHA, Draw Perpendicular Elevation Lines for BFE



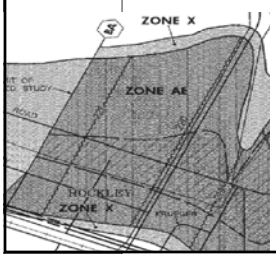
BFE Determined on FHBM From Quad Sheet



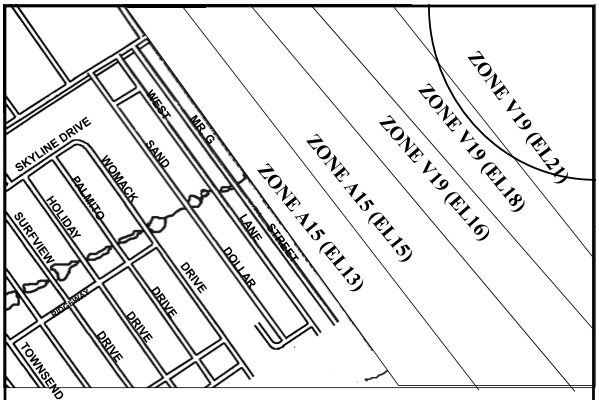
Flood Insurance Rate Map (FIRM)



NFIP Base Flood



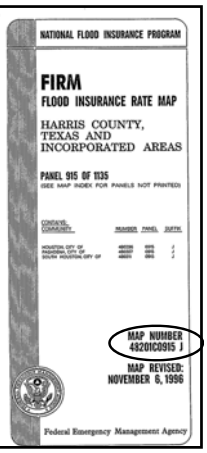
- 1% event or "100-year" flood
- 1% chance that storm will be equaled or exceeded in any given year
- Zone AE – 1% floodplain on FIRM
- 100-Year Flood on Profile



COASTAL FIRM

FIRM LEGEND

- Map Number 48201C0915 J
- Six Digit Community ID No.
  - 480296 (City of Houston)
- Panel Number
  - 0915
- Map Panel Suffix
  - J – 10th publishing of map
- Panel Revision Date
  - November 1996


NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HARRIS COUNTY, TEXAS AND INCORPORATED AREAS

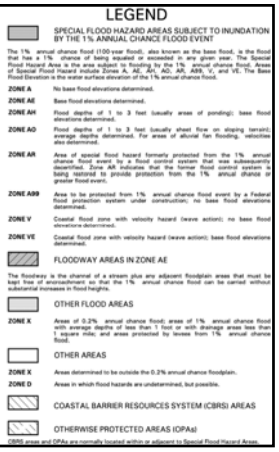
PANEL 915 OF 1135
(SEE MAP INDEX FOR PANELS NOT PRINTED)

MAP NUMBER 48201C0915 J

MAP REVISED: NOVEMBER 6, 1996

Federal Emergency Management Agency

- SFHA – 1% event Zones
  - A – no BFEs
  - AE – BFEs
  - AH – Ponding, BFEs & Depth 1-3
  - AO – Sheet flow, Depth 1-3
  - AR – flood control structure being restored
  - A99 – Soon protected by structure, no BFEs
  - V – Coastal flood, no BFEs
  - VE – Coastal flood, BFEs


LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A — No base flood elevations determined.

ZONE AE — Base flood elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.

ZONE A99 — Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

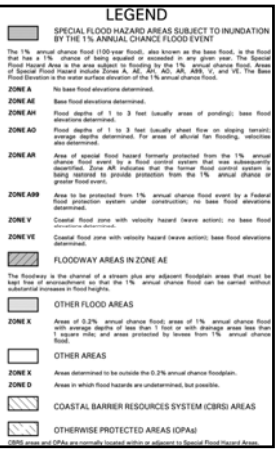
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodway Areas – AE or AO
- Other Flood Areas
  - X – 0.2% event
- Other Areas
  - X – outside 0.2% event
  - D – flood hazard possible
- Coastal Barrier Resources System
- Otherwise Protected Areas


LEGEND

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ZONE A — No base flood elevations determined.

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Base Flood Elevation (BFE)
- Cross-sections
- Elevations
- Reference Marks
  - Datum on Index
- Effective Date
  - Countywide FIRM
  - Revisions
- Map Scale

Floodplain Boundary
Floodway Boundary
Zone D Boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.
Base Flood Elevation line and value; elevation in feet*
(EL 987)
Base Flood Elevation value where uniform within zone; elevation in feet*
*Referenced to the National Geodetic Vertical Datum of 1929
Cross Section Line
Transect Line
97°07'30", 32°22'30"
Geographic coordinates referenced to the North American Datum of 1927 (NAD 27)
4276000M
1000-meter Universal Transverse Mercator grid values, zone 10
600000 FT
5000-foot grid ticks
DX5510
Bench mark (see explanation in Notes to Users section of this FIRM panel).
M1.5
River Mile
MAP REPOSITORY
Refer to Repository Listing on Index Map
EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
NOVEMBER 6, 1999
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
_____ to increase base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to add roads and road names, and to reflect updated topographic information.
For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.
To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.
MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

Map Reading Exercise

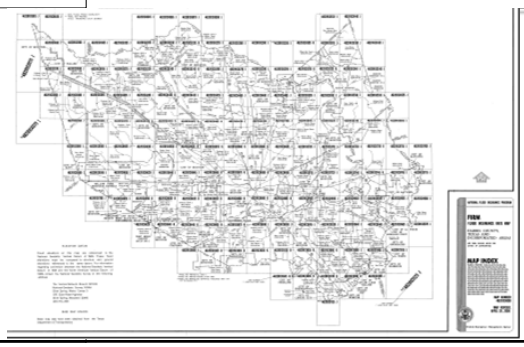
The subject property is located at Aberdeen Way and Sewanee Street in Houston, Texas, Harris County.

Step 1 - Select the Correct Map Panel

NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
HARRIS COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 595 OF 835
MAP NUMBER
MAP REVISED:
NOVEMBER 6, 1999
Federal Emergency Management Agency

- Refer to map index map if community in question has several map panels.

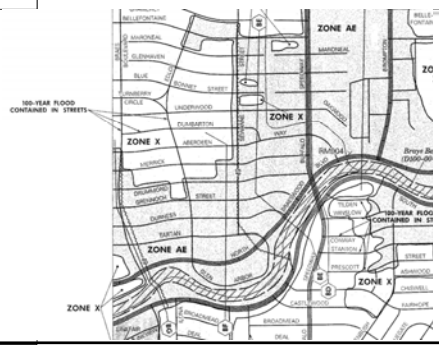
Locate Property on Map Index



Step 2 - Find General Location

- Find identifying landmarks or road intersections.
- Use other maps to supplement FIRM (it is recommended that your community overlay FEMA's flood maps with your planning or zoning maps).

Locate Property on FIRM Panel



Step 3 – Identify Specific Location

- Refer to subdivision plats, tax maps, or legal descriptions.
- Scale the information about the property from these other sources and delineate on FIRM.

Step 4 – Determine if Site is in the Floodplain

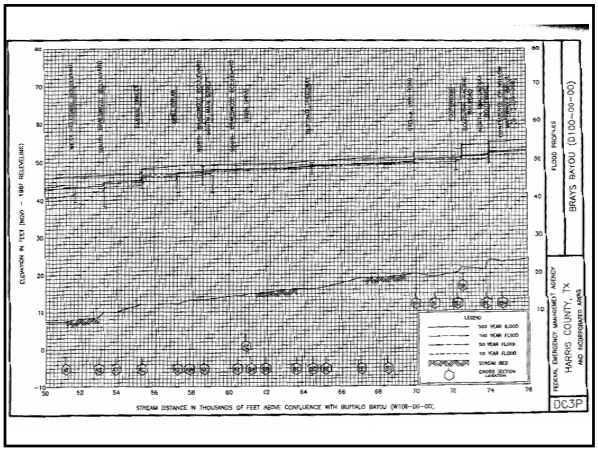
- May be obviously in or out
- May be questionable
- Site elevations in relation to BFE may be deciding factor

Step 5 – Determine if Site is in the Floodway

- Floodway boundaries are determined by horizontal measurement, not elevation.
- Must scale from map to locate boundary on site.

Step 6 – Determine BFE

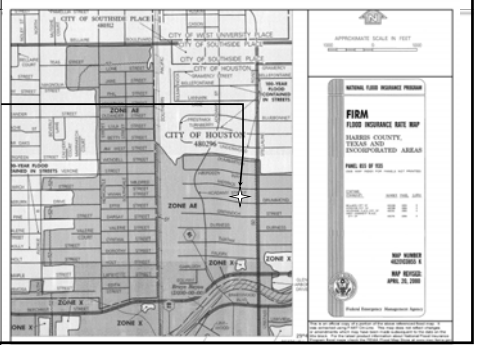
- Use flood profiles in FIS Booklet.
- BFEs shown on FIRMS will serve to verify the figure determined from the profile.



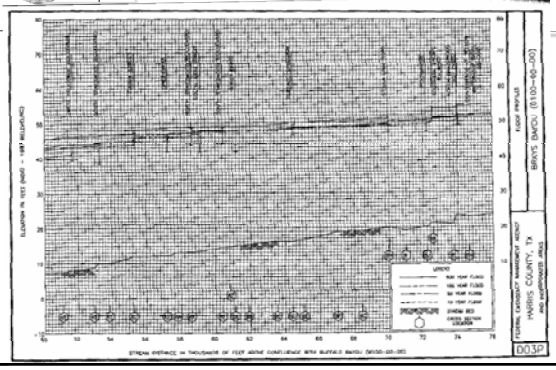
Importance of Using the Profile when Determining BFE

Site Location

What is the BFE?



What is the BFE on the Profile? Does it Match BFE on the FIRM?



The BFE on FIRM differs from BFE on Profile

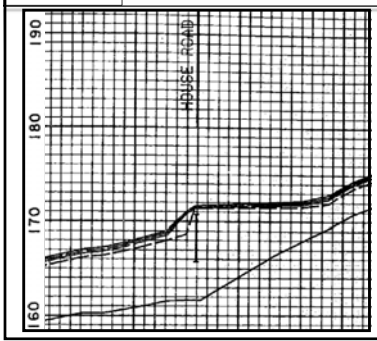
FIRM BFE = 50.1 feet

Profile BFE = 50.5 feet

0.4 foot difference

could drastically alter an analysis!

Head Loss Across a Structure will cause a jump in BFE

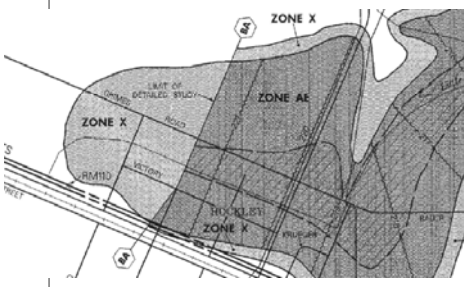


This jump cannot be seen on the FIRM

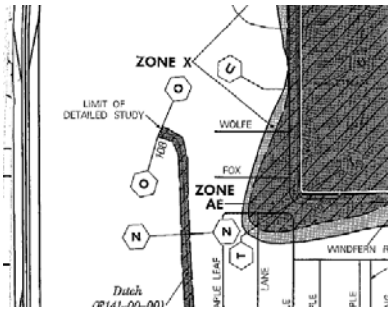
Beyond Limit of Detailed Study (LODS) Mapped 4 Ways

- Zone X Shaded
  - Areas inundated by 0.2% event
- Zone X Unshaded
  - Areas outside 0.2% event
- Zone A
  - Areas inundated by 1% event
  - No BFEs determined
- Not Mapped
  - Can be community defined

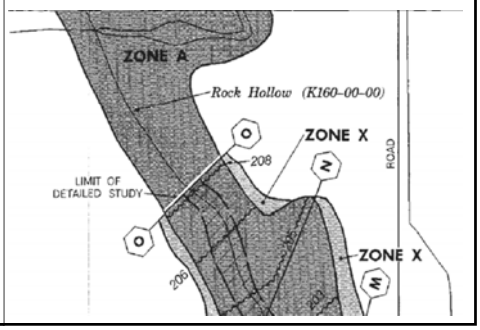
LODS – Zone X Shaded



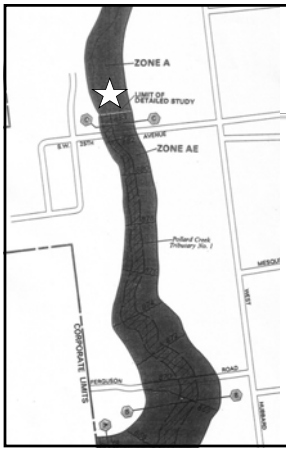
LODS – Zone X Unshaded



LODS – ZONE A

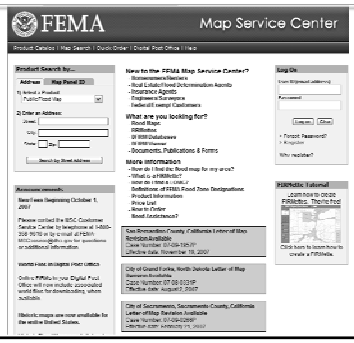


UNNUMBERED A ZONES

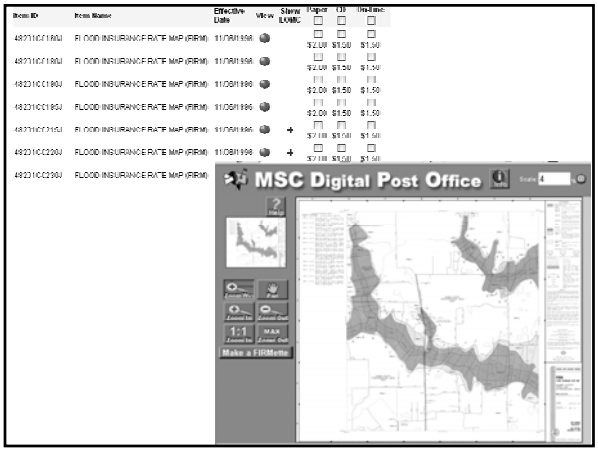


- Hydraulic Model computes 100-year Water Surface Elevation
- If complete study, then BFE from average depth of water to ground elevation of channel

WWW.MSC.FEMA.GOV



Available Data



Request information from FEMA

- Go to www.msc.fema.gov

Requests for Flood Insurance Back-up Data	Fee
1. Paper copies, diskettes or microfiche of hydrologic and hydraulic back-up data	$120 initial fee. Final fee based on $33/hour research plus expenses
2. Paper or mylar copies of topographic mapping	$120 initial fee. Final fee based on $33/hour research plus expenses
3. Paper copies or microfiche of survey notes	$120 initial fee. Final fee based on $33/hour research plus expenses
4. Paper copies of individual Letters of Map Change	$40 for first letter. Additional letters are $10 each
5. Paper copies of Preliminary Flood Insurance Rate Maps	$35 for first panel of the community. Additional panels $2 each. Additional communities $24 first panel, $2 additional panels
6. Computer tapes and CD-ROMs of Digital Line Graphs or DFIRMs	$150 for first community, $100 each additional community
7. Computer diskettes and user manuals for FEMA computer programs	$25 per copy