Optimization of Floodways

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Presenter:

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Agenda

1. Introductions
2. Floodway Regulations
3. Optimizing floodways and 1D / 2D considerations of floodways
4. Floodway Revisions for LOMR
5. Who can Change the way we think of floodways (roles and responsibilities)
6. Hydrology and Hydraulics reviews (Meeting Minimum Criteria)
FEMA regulatory floodway

- “A regulatory floodway is defined as the channel of a river or other watercourse and the adjacent land area that is reserved from encroachment in order to discharge the base flood without cumulatively increasing the water-surface elevation more than a designated height (normally 1 foot)
- Floodway is a tool to assist communities in balancing development within the floodplain against the resulting increase in flood hazard
FEMA regulatory floodway

- Streams with flooding dominated by storage, equal storage reduction may be used
- For unsteady flow use a steady flow encroachment analysis to approximate floodways and import the encroachment stations to the unsteady flow model to verify that the surcharge is within the maximum allowable limit
- If surcharges increased the floodway width must be increased to meet the allowable surcharge limit or other restrictive requirement
Floodway Revisions for LOMRs

- If a state or other jurisdiction has established more stringent regulations these regulations take precedence over NFIP regulatory standard.
- The baseline model for the allowable surcharge model used to determine the BFEs the first time a floodway was adopted for that reach.
- All subsequent revisions are limited to the maximum allowable surcharge above the elevations determined in the base model.
Floodway Revisions for LOMRs

- If it is demonstrated that the baseline model is revised for reasons other than encroachments in the floodplain, the revised model becomes the baseline model.
- When encroachment in the floodway causes BFE increases greater than allowed in 60.3, the following must be submitted:
Floodway Revisions for LOMRs

- 60.3(d)(3) – Zone AE with floodway
  - Increase in BFE due to proposed project should not be more than 0.00 foot

- Compliance with 65.12 required for a CLOMR if the above-mentioned criteria not satisfied
Floodway Revisions for LOMRs

- Certification that no structures are impacted by the BFE increase
- An evaluation of alternatives that would not have caused the BFE increase
- Individual legal notice to all impacted property owners
Floodway Revisions for LOMRs

- Applies to the Community’s level of ordinances
  - 60.3(a), (b), (c), (d), (e), (d&e), (f)

- 60.3(c)(10) – Zone AE with no floodway established
  - Increase in BFE due to proposed project should not be more than 1.00 foot
Floodway Revisions for LOMRs

- 65.7 Requirements Floodway Revisions for LOMRs Include:
  - Copy of public notice distributed by the community stating intent to revise the floodway must be submitted, or
  - Statement by the state/community that it has notified all affected property owners and affected adjacent jurisdictions
  - State notification and approval if they have jurisdiction
  - Engineering Analysis
1D/2D considerations on floodway

- 1D steady state modeling is by nature more conservative because the peak of the flood remains constant throughout the simulation.
- Most communities and reviewers have engineers know the use of 1D models for both riverine and floodways.
- 1D models can produce the equivalent of 2D models when most of the flow direction of the river of floodplain flow the general river path.
1D/2D considerations on floodway

- Better data, better calibration, better decision making process
- If the data does not support the 2D model, 1D model should be used
- 2D calculations are as good as the data used to produce the model
- Model results developed by different modelers are in general different (different n values, different approach)
Case Study

Silvies River, OR

- 1D USACOE’s model and Floodway analysis
- City of Burns under Floodway
Case Study

Silvies River, OR
• 1D USACOE’s model and Floodway analysis
• City of Burns under Floodway
2D Mash Model (1% AEP)
2D Mash Model (Encroachment)
Comparison (1% AEP vs. FW)
1D/2D considerations on floodway

- Pre-approval from FEMA Project Office and/or impacted communities and states with floodway authorities is required.
- Consider the 2D Floodplain as floodway (some communities already do).
- Model your 2D floodplain as the quality of data dictates (high quality DTM, time series of flow rates, roughness coefficients for channel and FP, Data for model calibration and validation).
1D/2D considerations on floodway

- Model 2D floodway as the high conveyance area (high velocity and high depth)
- Use q factor unit flow (VxD) values. The higher the q, the greater hydraulic importance and flood hazard.
- If floodway was previously determined by a 1D model, the encroachment stations should be incorporated into the 2D model and run the 2D model to verify that the maximum allowable surcharge is not exceeded.
1D/2D considerations on floodway

- Shallow flooding modeled by 2D shall not have modeled floodways due to the uncertainties in their flow patterns.
- Communities can choose to have administrative floodways for areas shallow flooding.
- Other considerations for 2D floodway modeling are cost, time, regulatory and modeling complications.
Roles and Responsibilities

State Role

- State coordinating agencies usually:
  - Ensure communities have authority to adopt and enforce regulations
  - Establish minimum state regulatory requirements
  - Provide technical and specialized assistance
  - Coordinate activities of various state agencies that affect the
Change the way we think of floodways

- Who can change/challenge the way we think of floodways:
  - Is 2D modeling a reason to advance the floodway regulations?
  - Can 2D floodplains as floodway minimize the risk?
  - What are the standards in FEMA review process in revising 2D floodways?
  - Are the standards vested on 1D review process?
  - Who is responsible?
Roles and Responsibilities

Federal Role

- FEMA (Department of Homeland Security) administers the NFIP through Regional Offices and it’s Mitigation Division

- Regional Office responsibilities:
  - Assist state NFIP coordinating agencies
  - Assess community compliance
  - Advise local officials
Roles and Responsibilities

State Role

- Community Assistance Program (CAP) – NFIP funds available to help state coordinating agency provide technical assistance

- Floodplain management of state owned properties
Roles and Responsibilities

Federal Role

- Answer questions from the public
- Help review and adopt new maps and data
- Approve community floodplain management regulations
- Provide information on flood insurance purchasing
Federal Role

- FEMA Mitigation Division
  - Sets national policy
  - Administers the mapping program
  - Administers the insurance portion of program
  - Sets rates; Monitors applications and claims; Markets flood insurance
Hydrology data requirements for LOMRs

Hydrology:

- Modeling
  - Digital format
- Supporting data
  - Drainage areas, curve numbers, back-up report, and time of concentration
Hydrology

• Reflect longer periods of gauging records
• Reflect changed physical conditions of the watershed and/or the streams
• Improved methodology
• Correct an error in effective hydrology analysis
• Revise an effective SFHA designated Zone A
• Tie within to the effective within 0.5 foot of the profile.
• Outside the 95 percentile difference not to use the effective hydrology
Hydraulics data requirements for LOMRs

Hydraulics – Modeling:

- All applicable models submitted
  - Duplicate Effective
  - Corrected Effective
  - Existing / Pre-project
  - Post-project / Proposed
Hydraulics

Digital format
Effective = Duplicate Effective
   Same model as Effective (within 0.1’)
   Different model than Effective (within 0.5’)
Starting Water Surface Elevation Method (SWSEL)
   Slope area vs. known elevation
Floodway Surcharges
Questions?
For more information contact:

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