# American Water Resources Association
# Philadelphia Metropolitan Area Section

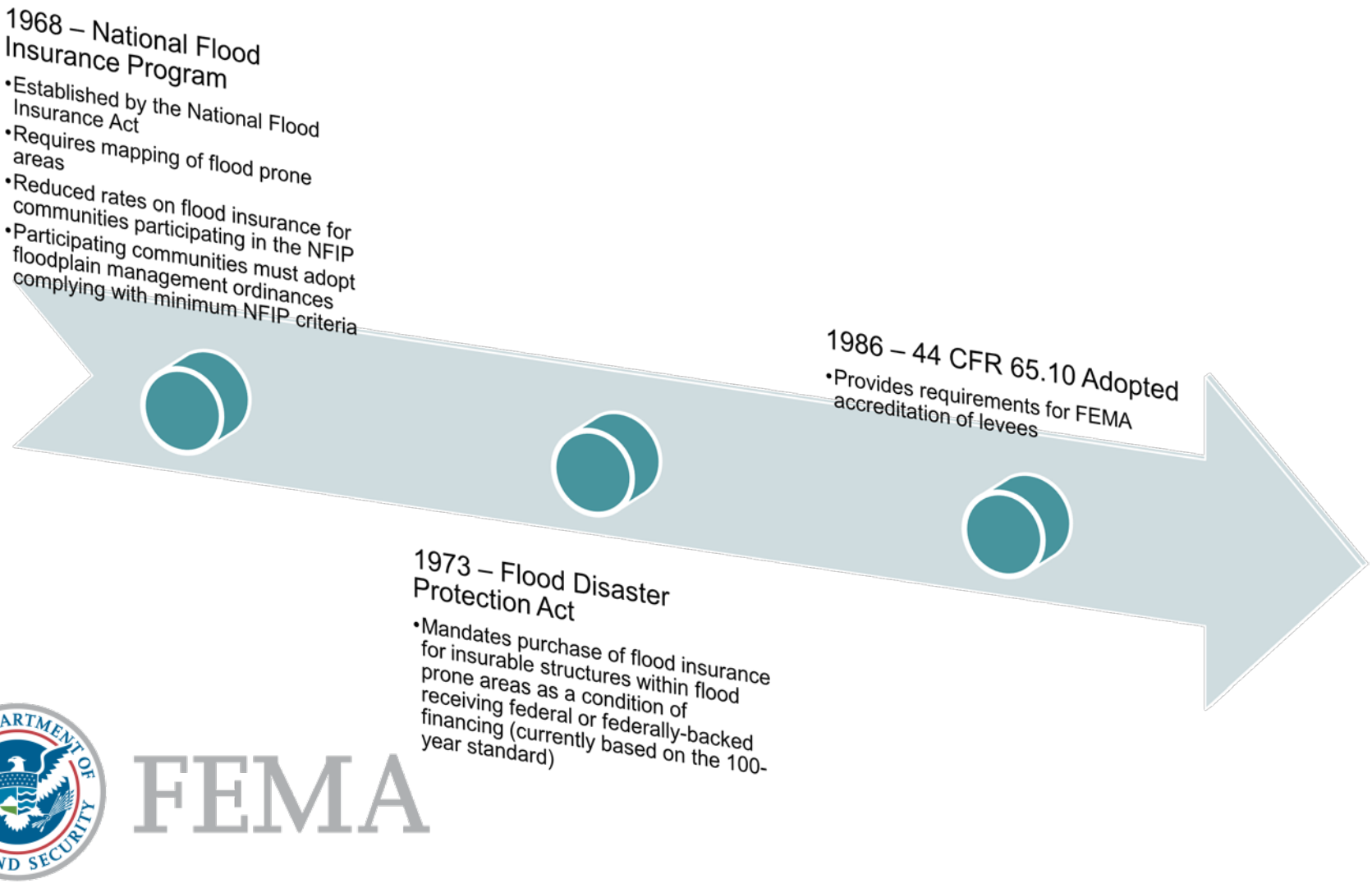
Levee Evaluation and Certification under the NFIP

November 18, 2010

# Agenda

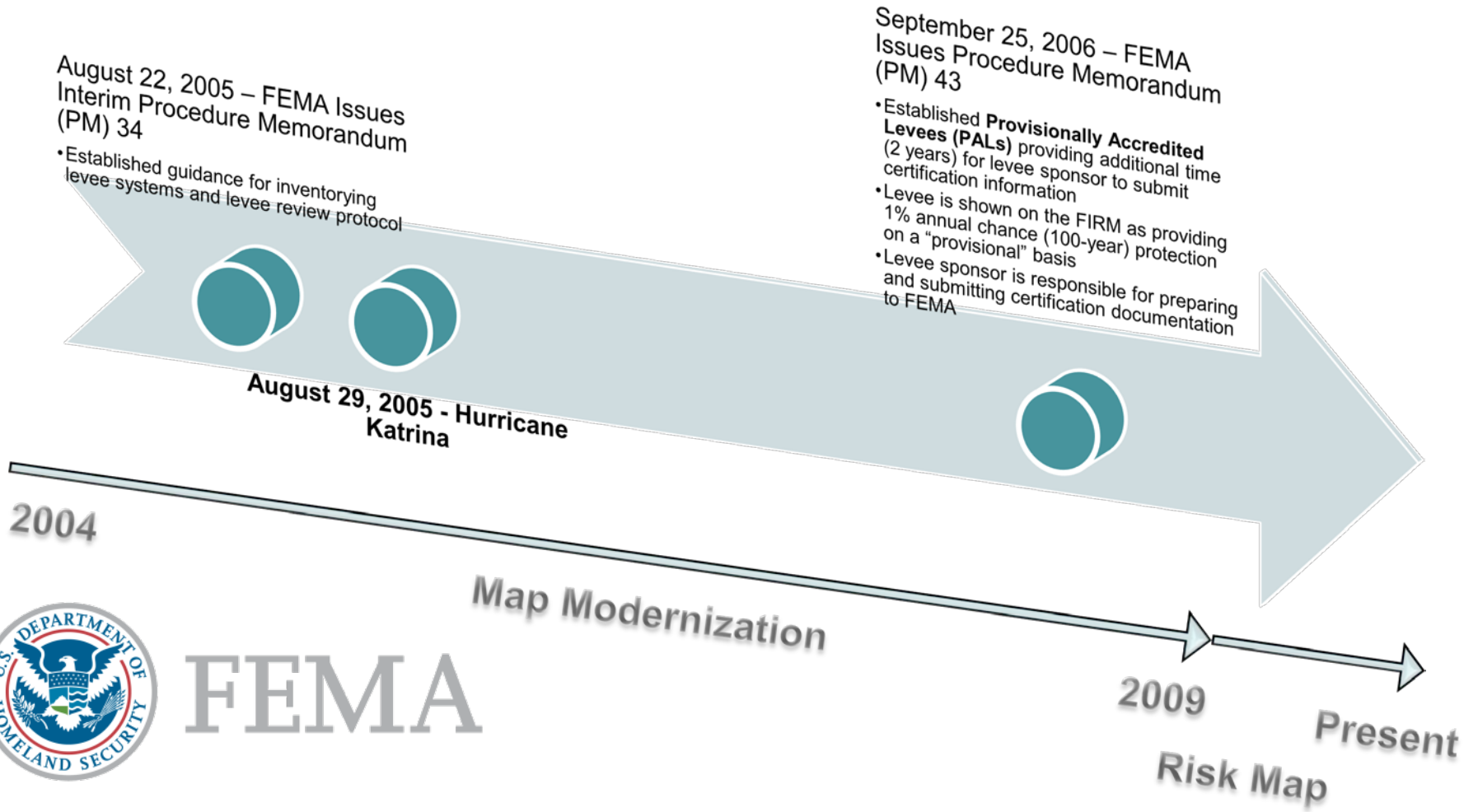
- Background and Overview
- Flood Insurance Rate Maps (FIRMs) & Levee Accreditation by FEMA
- Provisionally Accredited Levees (PALs)
- Consequences of De-Certification
- Role of FEMA and USACE
- Technical Requirements for Certification
- Questions

# Background and Overview

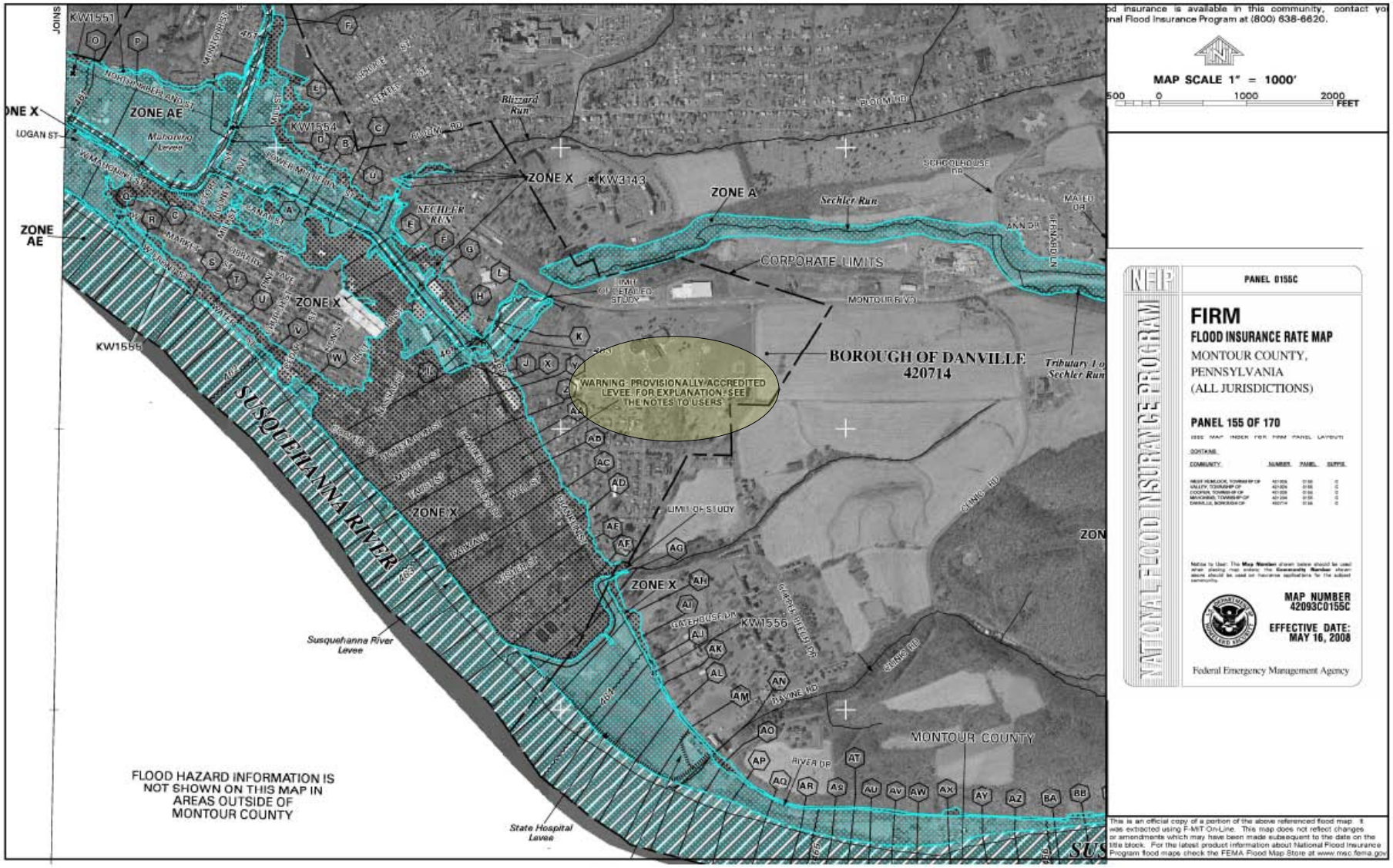



FEMA

# Background and Overview

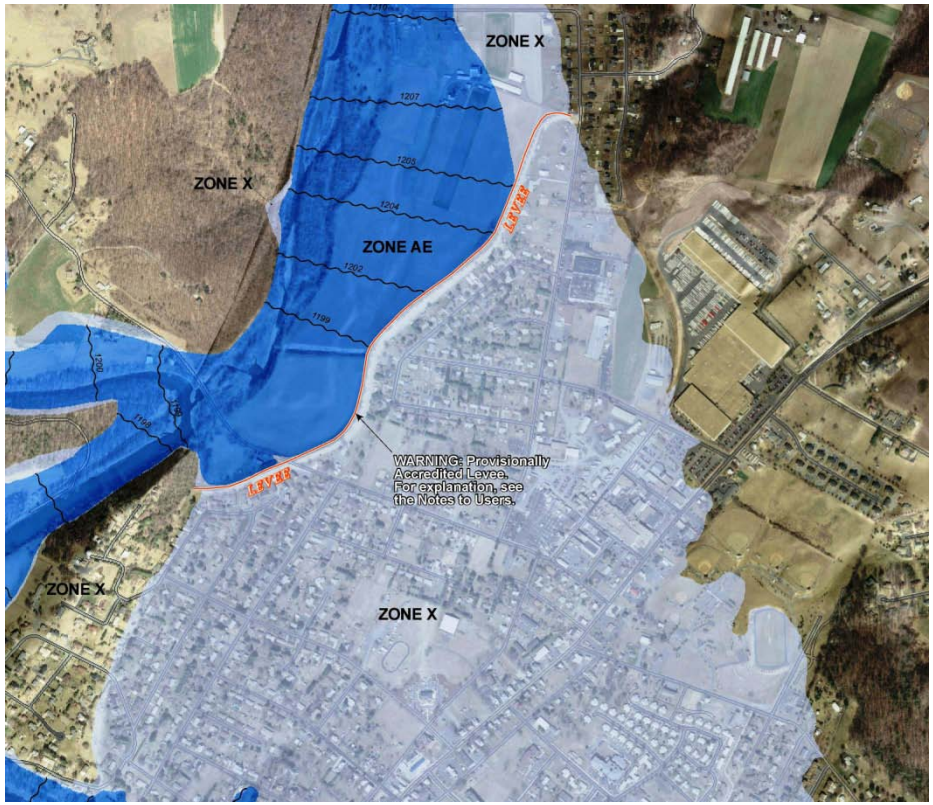


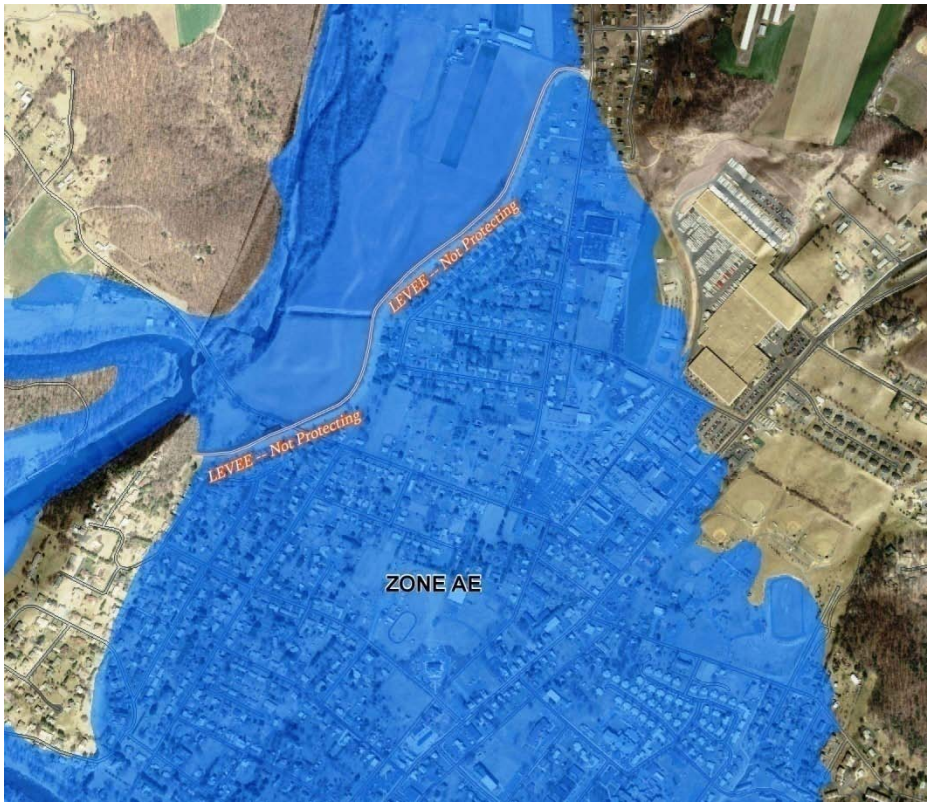
# Flood Insurance Rate Maps (FIRMs) & Levee Accreditation by FEMA



# Provisionally Accredited Levees (PALs)

- If CFR 65.10 certification material submitted and approved → PAL designation removed
- If certification not achieved → levee de-accredited



# Consequences of De-Certification

- Mandatory Flood Insurance Requirements
- Floodplain Management Requirements
- Property Values and Tax Base
- Public Perception

| RESIDENTIAL (A ZONES) | |
|---|---|
| Building and Contents | |
| Coverage (Building/Contents) | Annual Premium |
| $35,000/$10,000 | $509 |
| $50,000/$15,000 | $686 |
| $75,000/$20,000 | $887 |
| $100,000/$30,000 | $1,143 |
| $125,000/$40,000 | $1,399 |
| $150,000/$50,000 | $1,653 |
| $250,000/$100,000 | $2,766 |
| Source: www.floodsmart.gov | |

| NON-RESIDENTIAL (A ZONES) | |
|---|---|
| Building and Contents | |
| Coverage (Building/Contents) | Annual Premium |
| $100,000/$50,000 | $1,832 |
| $200,000/$100,000 | $3,680 |
| $300,000/$200,000 | $6,012 |
| $400,000/$300,000 | $8,133 |
| $500,000/$400,000 | $10,240 |
| $600,000/$500,000 | $11,237 |
| Source: www.floodsmart.gov | |

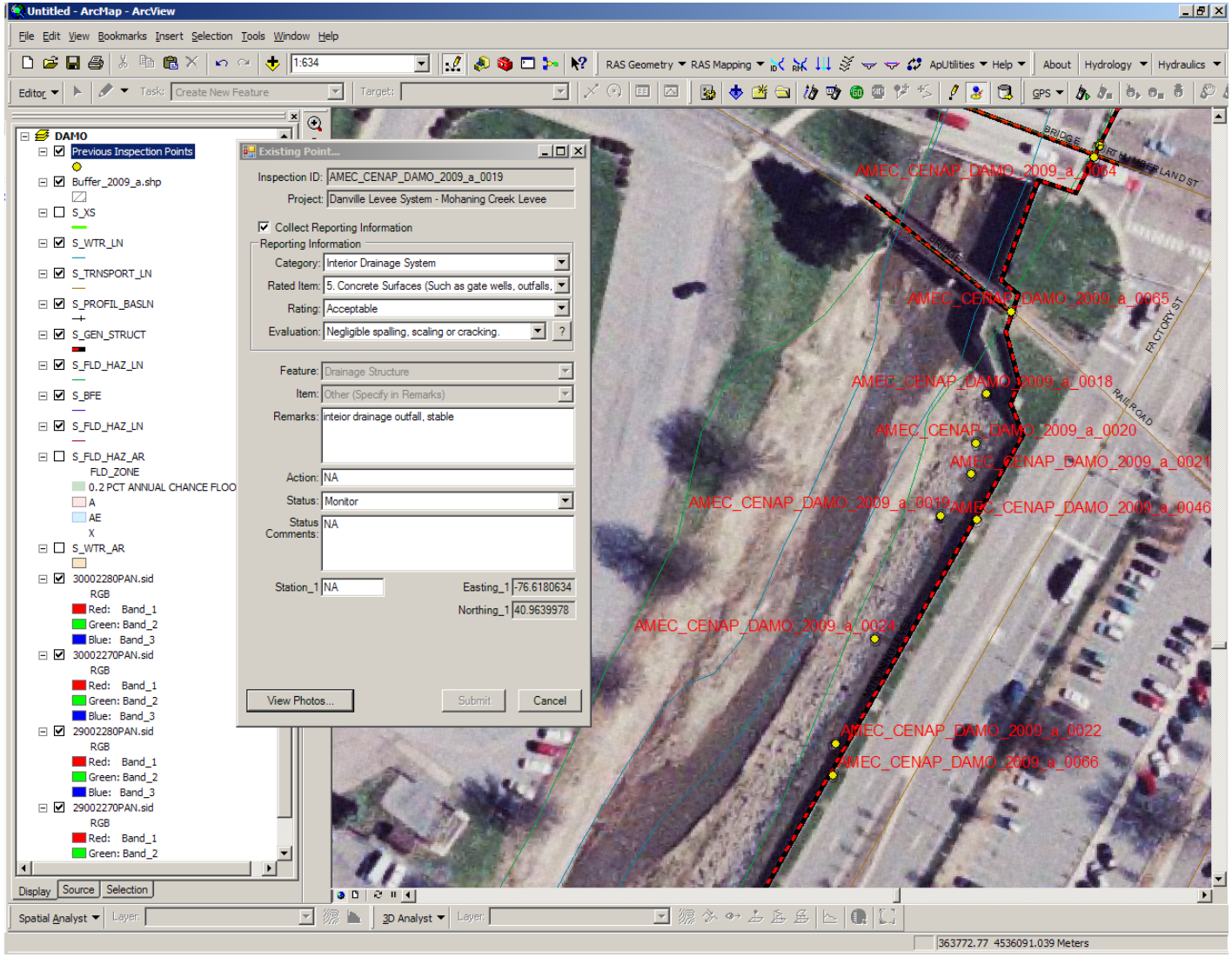
# Does Certification Always Make Sense?

- Sometimes levee certification may not be fiscally reasonable
- Cost-benefit analysis appropriate to make determination
- AMEC typically takes a phased approach to certification evaluations

# Role of FEMA and USACE

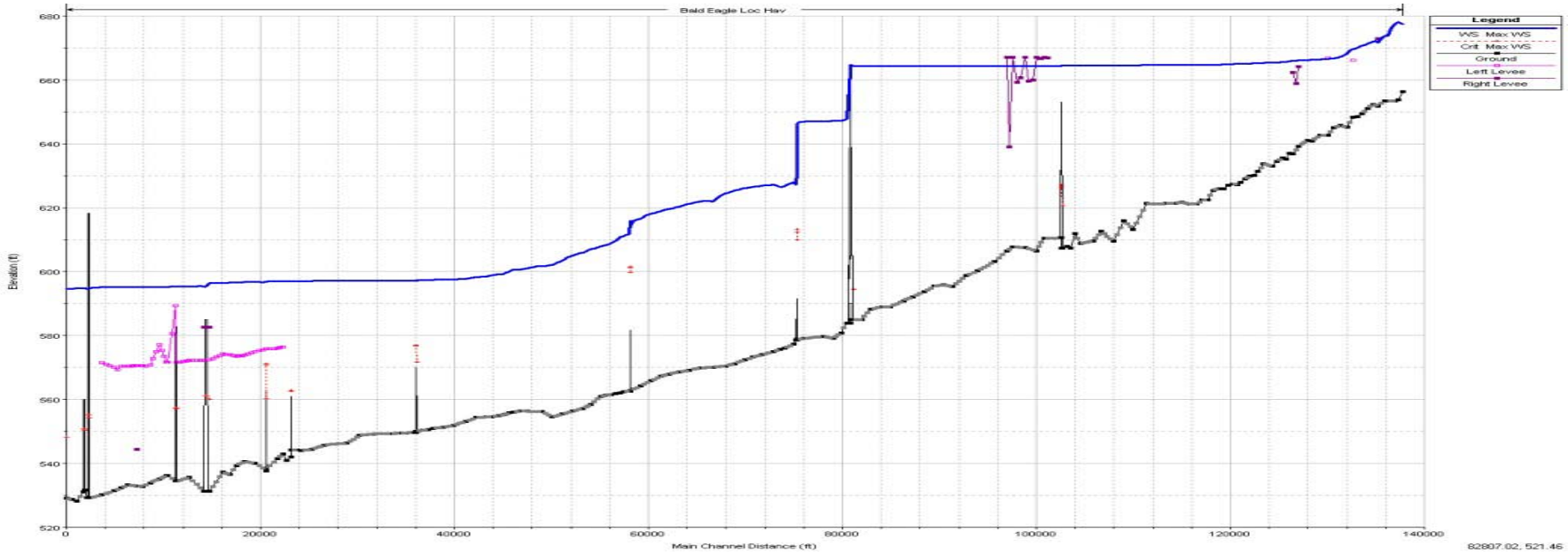
- FEMA does not certify levees; it is the responsibility of the levee owner or local sponsor requesting accreditation to provide technical information demonstrating compliance with 44 CFR 65.10
- Generally, other than active federal projects, the USACE:
  - Is not funded, staffed, or mandated to conduct certification evaluations; and
  - Does not have jurisdiction to perform certifications (per the Thomas Act), except:
    - On a direct cost reimbursable basis with funding from local sponsors or communities
    - If local sponsor provides documentation that certification services cannot be procured “reasonably and expeditiously” through ordinary business channels

# 44 CFR 65.10 Requirements



# 44 CFR 65.10 Requirements

- Freeboard
  - Detailed hydrologic and hydraulic analysis @ 1% annual chance (100-year) standard
  - Standard Minimum – 3 feet minimum overall; 4 feet within 100’ of structures; + ½ foot at upstream end of levee based on “expected” flow
  - Absolute Minimum – 2 feet minimum for “expected” flow with uncertainty analysis which considers:
    - Discharge-frequency uncertainty (i.e. confidence limits);
    - Stage-discharge uncertainty (i.e. roughness & geometry); and
    - Sensitivity to downstream assumptions, sediment transport, and debris/ice jams.



# 44 CFR 65.10 Requirements

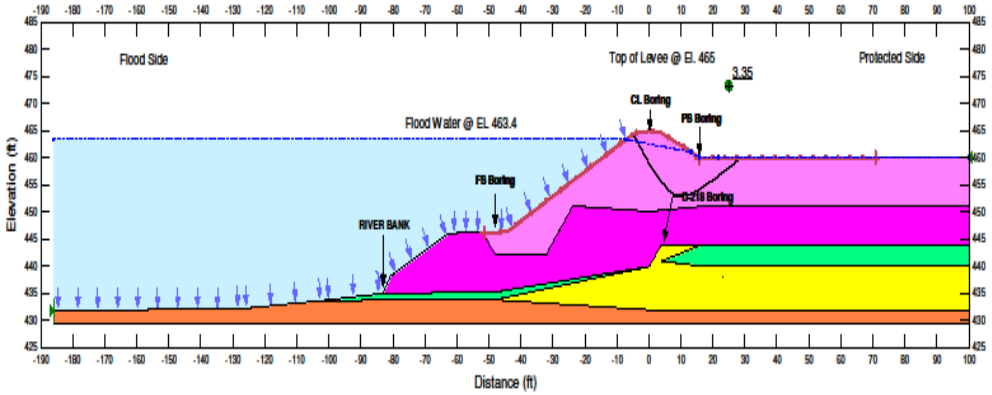
- Closures
  - All openings must be provided with closure devices that are structural parts of the system during operation and design according to sound engineering practice
  - Structural and mechanical evaluation

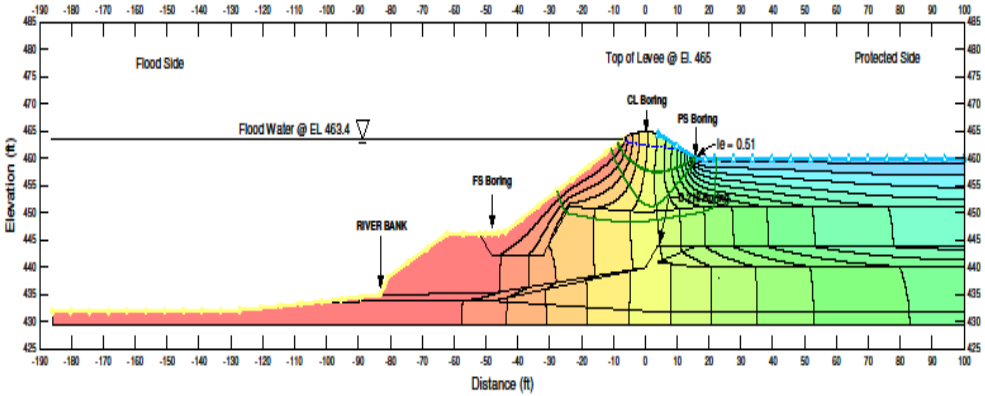
# 44 CFR 65.10 Requirements

- Embankment Protection
  - No appreciable erosion during 1% flood from currents, waves, ice loading, impact of debris, flood duration, and bends
  - Anticipated erosion will not result in embankment or foundation failure

# 44 CFR 65.10 Requirements

- Embankment and Foundation Stability
  - Demonstrate that seepage into or through embankment will not jeopardize stability
  - Factors include depth of flooding, embankment geometry, length of seepage path, materials, compaction, penetrations, drainage layers, woody vegetation, etc.



# 44 CFR 65.10 Requirements

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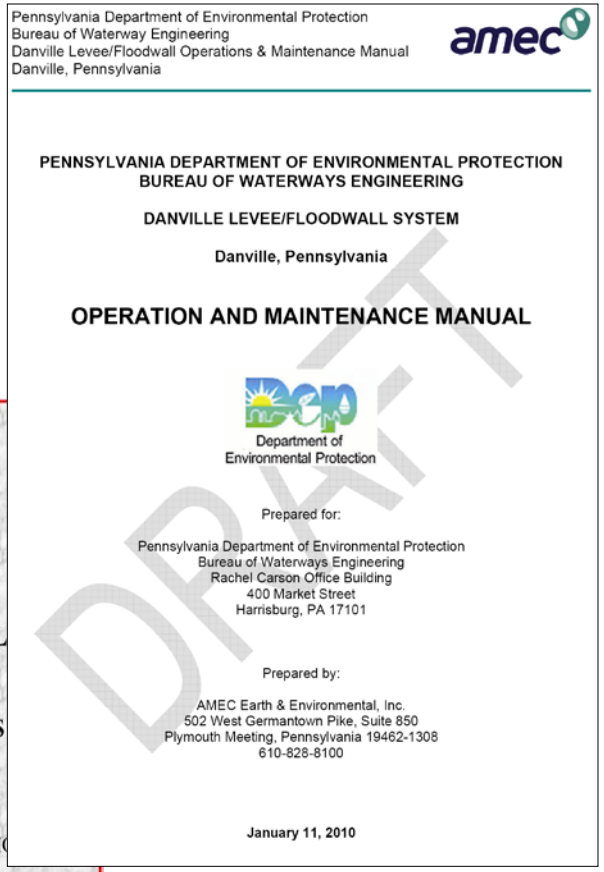
- Settlement
  - Demonstrate that minimum freeboard will be maintained with potential future settlement
  - Analysis must consider  embankment loads, compressibility of soil (embankment and foundation), age of levee, and compaction method during construction
  - Analysis per USACE EM 1100-2-1904 must be submitted

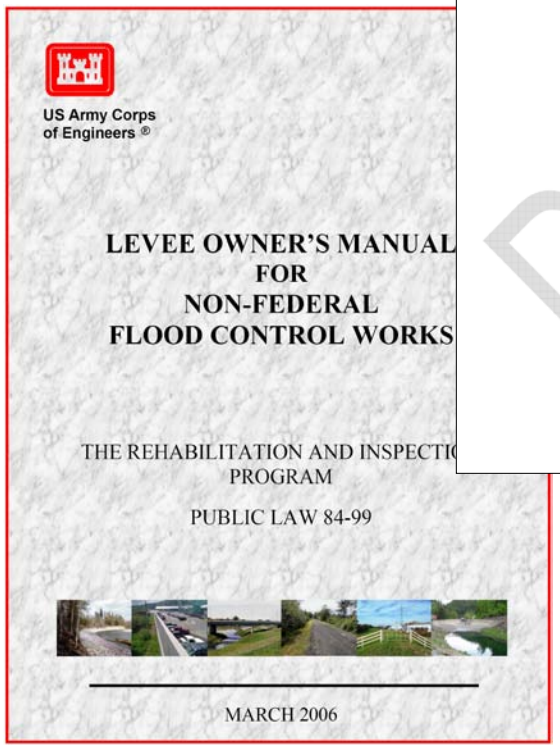
# 44 CFR 65.10 Requirements

- Interior Drainage
  - An analysis must be submitted that identifies the sources of such flooding, the extent of the flooded area, and, if the average depth is greater than one foot, the water-surface elevations of the 100-year flood
  - Analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwater
  - Mechanical and electrical evaluation
  - Failure mode analysis

# 44 CFR 65.10 Requirements

- Operations Plans
  - Closures
  - Interior drainage systems (i.e. pumps, storage areas, backflow prevention, etc.)
  - Flood warning systems
  - Actions and assignments of responsible personnel
  - Training
  - Periodic testing and operation (1-year intervals maximum)
- Maintenance Plans
  - Maintain stability, height, and overall integrity of levee and associated structures
  - Replacement of mechanical and electrical parts per manufacturers specifications



# Questions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