



Tipton Flood Resilience Plan - Strategies for Smart Growth and Long-Term Flood Risk Reduction

An Action Discovery Project as part of the
Upper White River Watershed Discovery Report

Presented by:
Siavash Beik
Christopher B. Burke Engineering, LLC



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RiskMAP
Increasing Resilience Together



Flood Resilience Planning

- **Flood resilience** means “measures taken to reduce the vulnerability of communities to damages from flooding and to support long-term recovery after an extreme flood.”
 - Integrating Smart growth principles into state and local policies
 - Enhancing Local development regulations
 - Integrating strategies in Hazard Mitigation and Comprehensive Land Use Plans
- **Why was Tipton selected for this project?**
 - First community in Indiana for this approach
 - Previous flood risk management studies and plans developed for the Big Cicero Creek Watershed
 - No feasible structural alternatives
 - Continued vulnerability to significant flooding

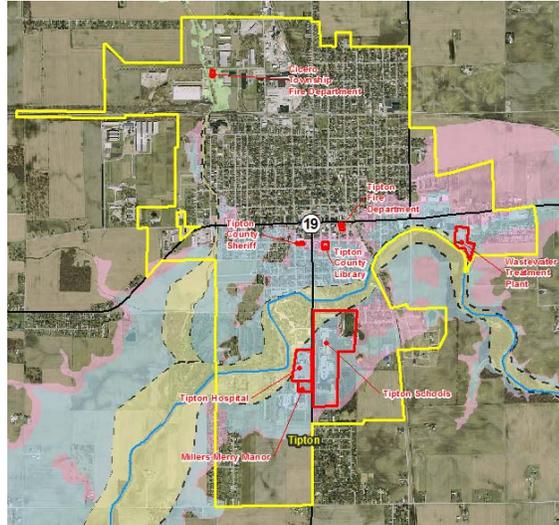


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The City of Tipton – Flood Zones

- Flood Zones**
-  Floodway
 -  1.0% ACFH
 -  0.2% ACFH
 -  Zone A
 -  Critical Facility

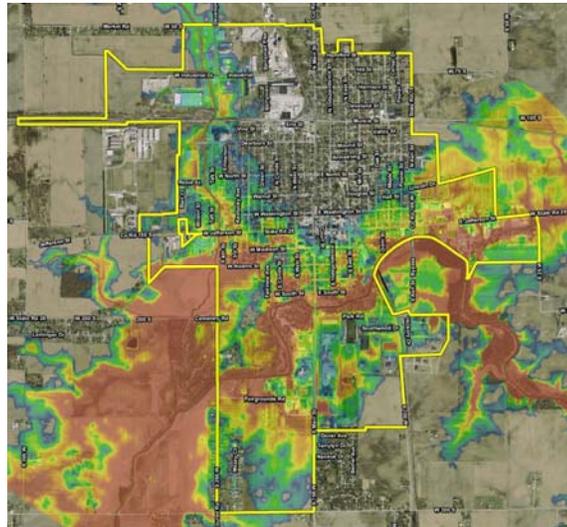


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The City of Tipton – Flood Depths

- 0.2% ACFH (500-yr)
Flood Depths**
-  0 - 0.5 feet
 -  0.5 - 1 feet
 -  1 - 1.5 feet
 -  1.5 - 2 feet
 -  2 - 2.5 feet
 -  2.5 - 3 feet
 -  3 - 3.5 feet
 -  3.5 - 4 feet
 -  4 - 4.5 feet
 -  4.5 - 5 feet
 -  5+ feet

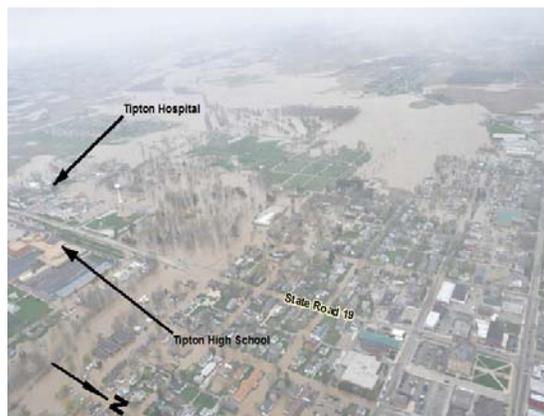


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Why Tipton Flood Resilience Plan

- **A Major recommendation of the Nov 2014 Big Cicero Creek Watershed Flood and Erosion Risk Management Plan**
- **Recognition that severe floods are expected to occur again, while no feasible effective flood control alternative exists**
- **Desire for a resilient, economically viable City despite its flood vulnerable settings**



April 2013 Flood – Tipton, Indiana



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Overview of the Planning Process

- **10-month Planning Process**
- **Review and Consolidation of Flood-related Data and Studies**
- **Meeting with Stakeholders**
 - 2 Group Meetings and Several One on One Meetings
 - Completed Resiliency Checklist at First Meeting
- **Develop Flood Resilience Planning Areas and Strategies**



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Flood Resilience Strategies for Tipton

- **Adopt Overall Strategies**
 - Conducting regular audits of policies, regulations, and budgets
 - Checking for consistency, updating, integrating, and revising plans, policies, and regulations
 - Participation in the Community Rating System

- **Adopt Specific Land Use Strategies for Distinct Geographical Areas**
 - River Corridors (floodway and erosional corridors)
 - Other Flood Hazard Areas (floodway fringe areas)
 - Vulnerable Settlements (developments already existing in harms way)
 - Safer Areas (low flood risk areas)
 - The entire Watershed (the Big Cicero Watershed)



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Strategies for Flood Resilience

- **Overall Strategies**
 1. Update floodplain regulations
 2. Adopt flood elevation data from updated flood studies
 3. Adopt a comprehensive stormwater ordinance and technical stds
 4. Update, integrate and revise plans, policies and regulations
 5. Conduct regular audits of programs and policies
 6. Participate in the Community Rating System



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Overall Strategies – in detail

- **Adopt a comprehensive stormwater ordinance and technical standards**
 - Basic and very general stormwater standards in zoning and subdivision control ordinances
 - Freestanding stormwater ordinance and technical standards that:
 1. Preserves upstream floodplain storage
 2. Institutes requirements for channel protection volume
 3. Promotes low impact development and green infrastructure
 - Tipton should adopt stormwater ordinance and technical standards recently adopted by Big Cicero Creek Joint Drainage Board and Tipton County



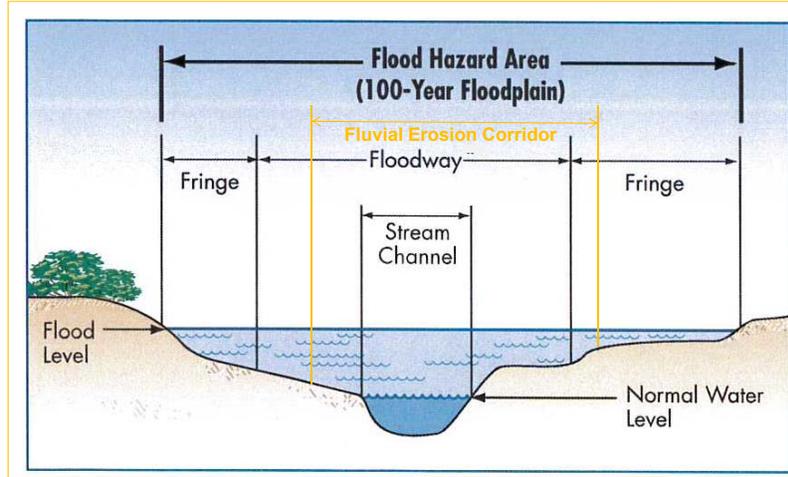
Overall Strategies – in detail

- **Conduct regular audits of programs and policies**
 - Multiple plans, policies, and regulations play role in resilience including:
 - Comprehensive Plan
 - Multi-hazard Mitigation Plan
 - Zoning Ordinance
 - Subdivision Control Ordinance
 - Capital Improvement Plan
 - Economic Development Plan
 - Need for coordination and complementary language
 - Tipton should review current language and conduct regular audits to ensure consistency

COMMUNITY RESILIENCE CHECKLIST		
Completed By: _____	Date of Completion: _____	
Notes: _____		
Overall Strategies to Enhance Resilience		
1. Does the community's comprehensive plan have a hazard element or flood planning section?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
a. Does the comprehensive plan cross-reference the local Hazard Mitigation Plan and any disaster recovery plans?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. Does the comprehensive plan identify flood and erosion-prone areas, including river corridor and flood-erosion hazard areas, if applicable?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
c. Did the local government emergency response personnel, floodplain manager, and department of public works participate in developing/updating the comprehensive plan?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2. Does the community have a local Hazard Mitigation Plan approved by the Federal Emergency Management Agency (FEMA) and the state emergency management agency?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
a. Does the Hazard Mitigation Plan cross-reference the local comprehensive plan?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. Was the local government planner or zoning administrator involved in developing/updating the Hazard Mitigation Plan?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
c. Were groups such as local businesses, schools, hospitals/medical facilities, agricultural landowners, and others who could be affected by floods involved in the Hazard Mitigation Plan drafting process?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
d. Were groups such as local businesses, schools, hospitals/medical facilities, agricultural landowners, and others who could be affected by floods involved in the Hazard Mitigation Plan drafting process?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
e. Does the Hazard Mitigation Plan emphasize non-structural pre-disaster mitigation measures such as ensuring flood-prone lands and adopting flood-resistant floodplain regulations?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
f. Does the Hazard Mitigation Plan encourage using green infrastructure techniques to help prevent flooding?	<input type="checkbox"/> Yes	<input type="checkbox"/> No



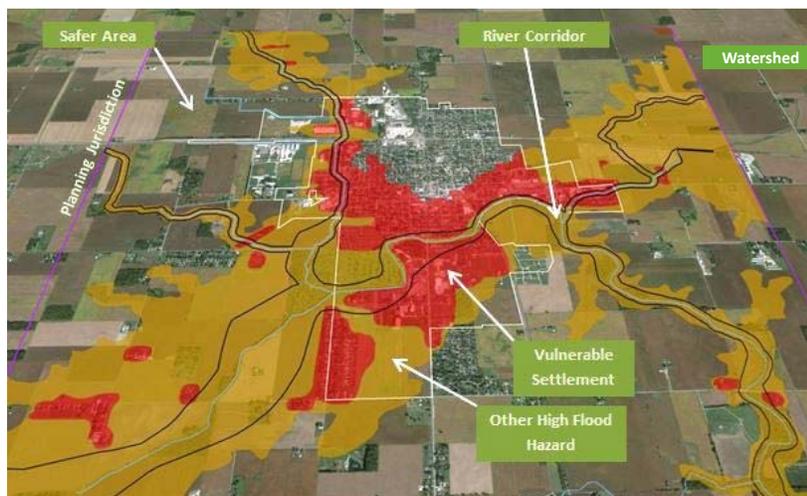
Floodplain Terminology Refresher



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Flood Resilience Planning Areas



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Flood Resilience Planning Areas

Planning Area	Area Boundary	Intent of Area Strategy
River Corridor	Floodway or fluvial erosion hazard area, whichever is greater	To conserve land and prohibit new development
Other High Flood Hazard Areas	Undeveloped land in the floodway fringe	To conserve land and maintain the natural and beneficial function of the floodway fringe
Vulnerable Settlements	Existing developed land in the SFHA (floodway fringe and floodway)	To protect people, buildings, and facilities in vulnerable areas and reduce future flood risk
Safer Areas	Outside the SFHA but within the planning jurisdiction	To plan for and promote development in areas that are less vulnerable to future floods
Watershed	Entire drainage area	To promote coordination and partnerships and implement practices to slow, spread, and infiltrate flood water


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- ## Strategies for Flood Resilience
- **River Corridor**
 1. Adopt a river corridor overlay zone and prohibit land disturbance in this zone
 2. Protect undeveloped land in the river corridors
 3. Minimize streambank erosion
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River Corridor – in detail

- **Adopt a river corridor overlay zone and prohibit land disturbance in this zone**

- Establish additional or stricter standards and criteria to those of the underlying zoning district
- Defined by floodway and fluvial erosion hazard area, whichever is greater
- Due to susceptibility and vulnerability to flooding and erosion, development or disturbance should be prohibited
- Tipton should adopt more restrictive overlay zone into zoning ordinance



Strategies for Flood Resilience

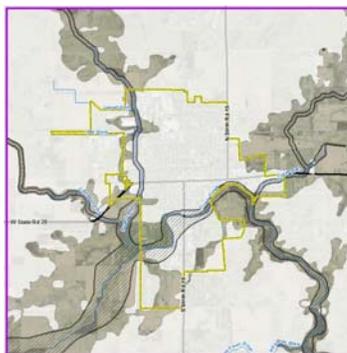
- **Other High Flood Hazard Areas**

1. Prohibit development in the floodway fringe (including critical facilities)
2. Protect undeveloped land in the floodway fringe
3. Adopt compensatory floodplain storage requirement (where placement of fill is unavoidable and variance is granted)

Other High Flood Hazard – in detail

- **Prohibit development in the floodway fringe (including critical facilities)**

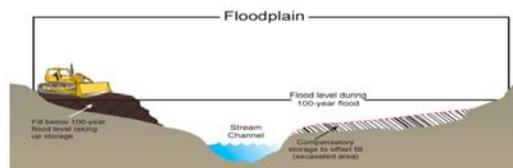
- Intent is to maintain natural and beneficial function of the floodplain
- Prohibit new development on undeveloped land in floodway fringe
- Suitable uses include parks, woods, and fields that can flood without causing significant damage to life and property or exacerbate flooding elsewhere
- Tipton should adopt more restrictive language as amendment to zoning ordinance



Other High Flood Hazard – in detail

- **Adopt compensatory floodplain storage requirements (where placement of fill is unavoidable and variance is granted)**

- Loss of floodplain storage on one property could negatively impact other properties
- Effective regulatory tool to compensate for any fill, structure, or other materials above grade in the regulatory floodplain
- Tipton should adopt a 3:1 compensation of floodplain storage into the proposed comprehensive stormwater ordinance



Strategies for Flood Resilience

▪ Vulnerable Settlements

1. Protect existing critical facilities
2. Buyout structures
3. Floodproof structures
4. Bring nonconforming uses into compliance
5. Create new flood storage capacity through redevelopment
6. Require building expansion and new accessory structure to meet additional requirements
7. Adopt a flood response plan
8. Adopt post-flood damage assessment data collection and protocols
9. Connect people to the river



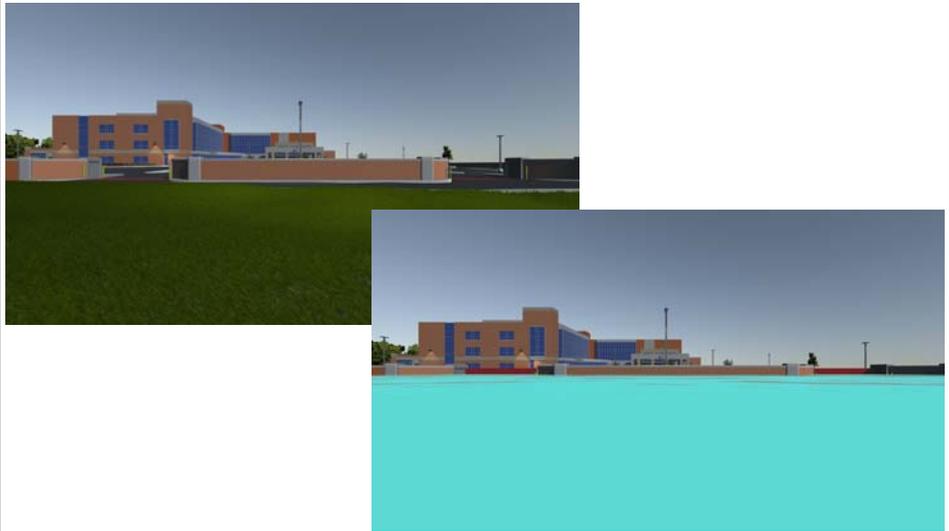
Vulnerable Settlements – in detail

▪ Protect existing critical facilities

- Intent is to protect critical facilities built in older communities prior to flood maps and advanced flood modeling
- Eight critical facilities in the SFHA
- Structural flood protection methods needed – floodwalls and levees to protect 3 feet above BFE or 500-yr + 2 ft.
- Need to minimize impact from floodplain storage and/or flow conveyance losses
- Tipton should secure funding from FEMA for floodproofing projects



Conceptual Flood protection of Hospital



FEMA

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Hospital Conceptual Flood protection Simulation



FEMA

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Vulnerable Settlements – in detail

▪ Relocation/Buyout Structures

- Intent is to remove individual flood prone structures from harm's way and create open space within flood hazard areas
- 800 homes and businesses are vulnerable to flooding
- About 50 are in floodway and another 200 in fringe areas but with flood depths expected over 2.5 feet – good candidates for buyout
- Tipton should secure funding from FEMA for continued buyout and floodproofing



Vulnerable Settlements – in detail

▪ Require building expansion and new accessory structure to meet additional requirements

- Preference for structures in vulnerable areas to be relocated or bought out and land converted to open space
- Intent to safely allow expansion of structures in floodway fringe
- Additional requirements needed to reduce flood losses including 1:1 compensatory floodplain storage and not allow building expansion, or new accessory structure, to be any closer to the river
- Tipton should adopt more restrictive language in both the proposed comprehensive stormwater ordinance and floodplain ordinance and identify incentives (flexible zoning, floodproofing assistance, or stormwater utility credits)

Vulnerable Settlements – in detail

▪ Adopt a flood response plan

- Overwhelming level of activity and need for quick information and response during flood fight
- Plan needed for flood detection/level determination, notification/communication, expected actions, and termination/follow-up
- Reduces duplication of efforts and avoids gaps in response and recovery efforts
- Tipton should prepare a flood response plan



Strategies for Flood Resilience

▪ Safer Areas

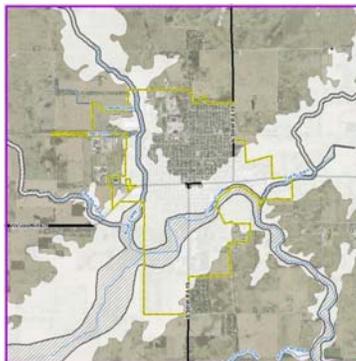
1. Steer public policy and investment to support development in safer areas
2. Promote conservation design
3. Promote placement of critical facilities in safer areas



Safer Areas – in detail

- **Steer public policy and investment to support development in safer areas**

- Core of comprehensive plan is the land use and development section
- Current plan includes future growth and development in the SFHA which is in conflict with resilience planning
- Guide development with capital improvement projects and expansion of utilities and infrastructure into safer areas
- Tipton should promote smart growth principles in the comprehensive plan and zoning ordinance



Strategies for Flood Resilience

- **Watershed**

1. Support the efforts of the Big Cicero Creek Drainage Board (and implementation of the 2014 Big Cicero Watershed Flood and Erosion Risk Management Plan)
2. Adopt a natural resource overlay zone

Watershed – in detail

- **Support the efforts of the Big Cicero Creek Joint Drainage Board (and implementation of 2014 Plan)**

- BCCJDB regulates drainage in watershed in Hamilton, and Tipton Counties (+ small areas in Boone & Clinton Counties)
- Efforts to improve situation – cover crops, maintain stream gages, 2-stage ditch construction, BMPs to minimize erosion, flood elevation studies
- Tipton should continue to support efforts of the Board and implementation of the 2014 Plan



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Where do we start?



- **Prevent** any increase in flood vulnerability (steer new development to safer areas)
- **Prepare** for the next flood (flood response plan, education, outreach)
- **Reduce** Flood vulnerability (relocate and/or floodproof bldgs and infrastructure)



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Bottom Line

- **Enough is enough**
- **Implications of climate change**
- **Need to change mindsets – balance structural and nonstructural (planning and policy-based) solutions**
- **Prevent, Prepare, Reduce!**



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Call to Action

- **Start implementing the plan!**
 - Modify the City's comprehensive plan, floodplain ordinance, and other documents to reflect the recommended changes and facilitate their adoption by the City Council
 - Secure funding and develop a Flood Response Plan
 - Start conversation with FEMA & IDHS to secure funding for general structure buyouts and protection of critical facilities
 - Encourage and support the hospital to initiate design process for the recommended flood protection measures



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Questions or Comments?



Indiana Department of Natural Resources – Division of Water
Indianapolis, Indiana
317.232.4173
dknipe@dnr.in.gov



CHRISTOPHER B. BURKE ENGINEERING, LLC
Indianapolis, Indiana
317.266.8000
sbeik@cbbel-in.com
mrummel@cbbel-in.com
smckinley@cbbel-in.com



The Polis Center
Indianapolis, Indiana
317.278.4935
mhriggs@iupui.edu
lardunca@iupui.edu

