HOOSIER ENVIRONMENTAL COOUNCIL
Greening the Statehouse Conference

Indianapolis, Indiana
November 19, 2021

Local Strategies and Opportunities for Floodplain and Wetland Protection

CBB

Presented by:
Kerry Daily, E.I., CFM, CPESC, CPSWQ
Christopher B. Burke Engineering, LLC

REASONS FOR A STORMWATER MANAGEMENT ORDINANCE

- Land development alters the hydrologic response of watersheds, resulting in:
  - increased stormwater runoff rates and volumes
  - Increased concentration of pollutants
- Stream and drainage channel capacity
- Leads to flooding, which poses a danger to lives, property, and natural resources
- Illicit discharges result in degradation of water resources

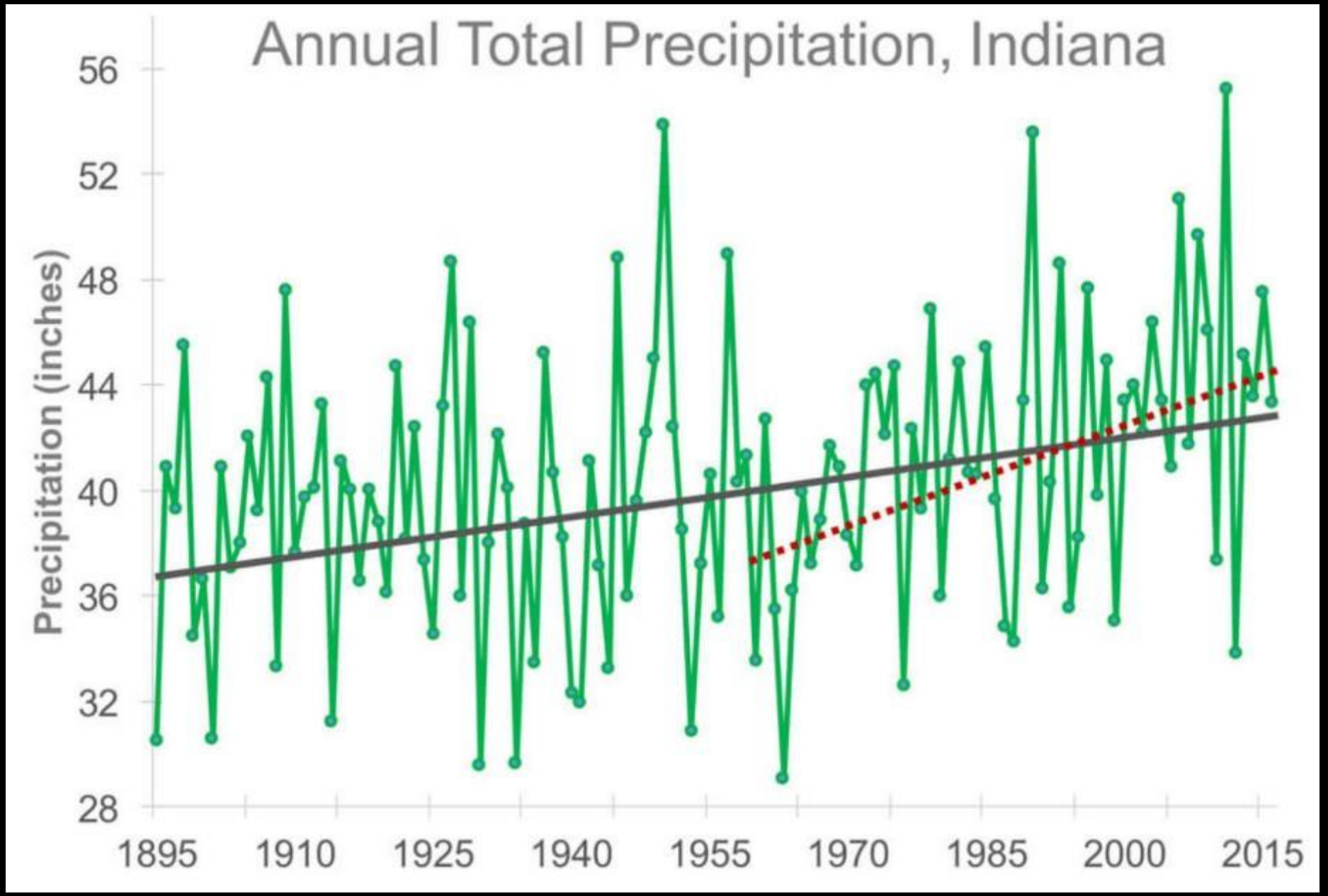
According to Purdue Climate Change Research Center, In Indiana:

- Increased frequency and intensity of rainfall
- Increased risk of stormwater runoff, pollutant loading, localized and riverine flooding
- Indiana (2050)

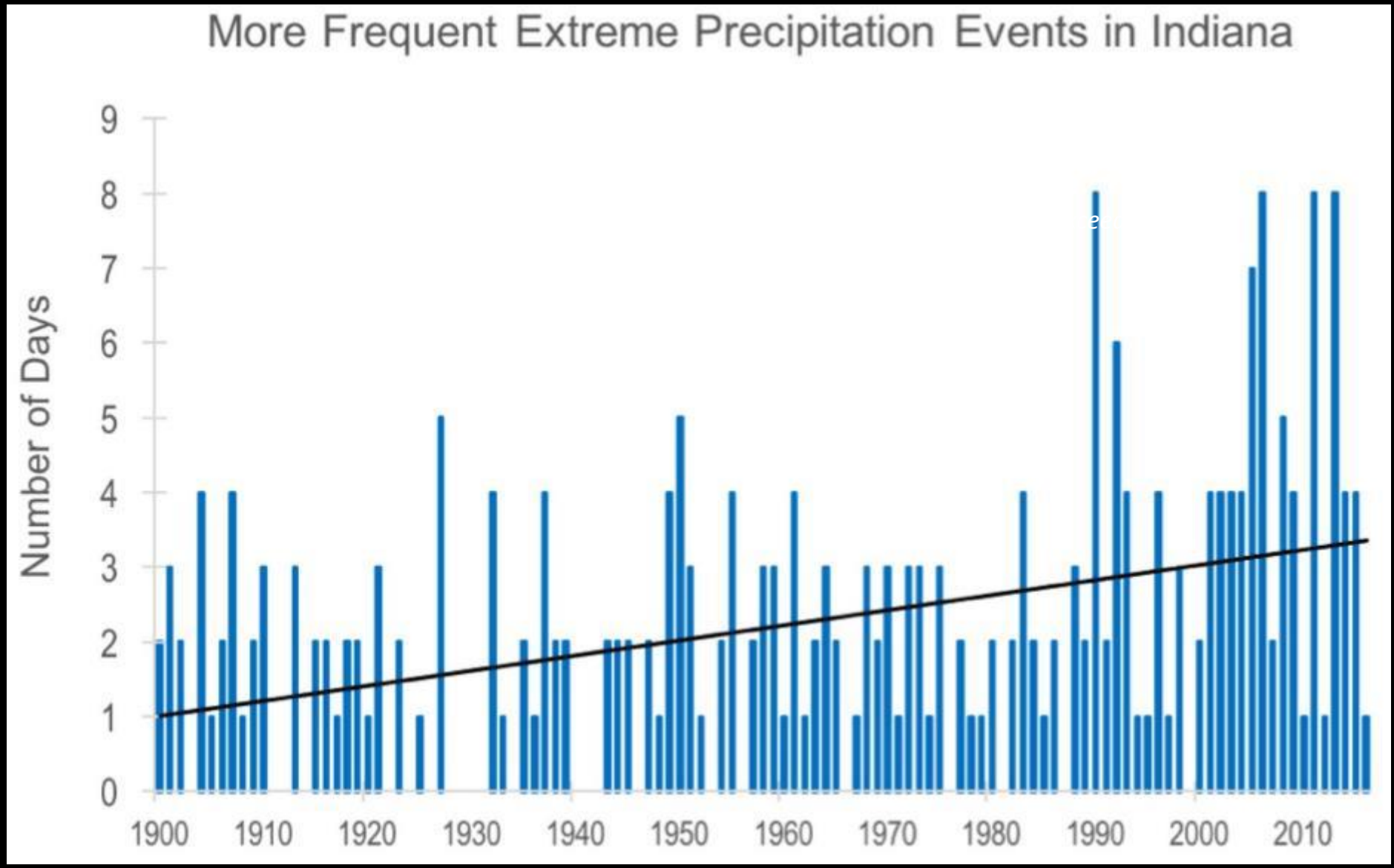
13% increase in runoff annually

16% increase in winter runoff

27% increase in spring runoff



Source: Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment. Purdue Climate Change Research Center, March 2018



Source: Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment. Purdue Climate Change Research Center, March 2018

REASONS FOR A STORMWATER MANAGEMENT ORDINANCE

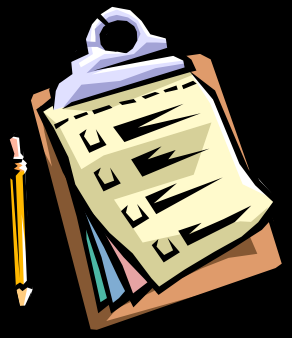
WITHOUT REASONABLE REGULATION AND CONTROL IN THE FORM OF A STORMWATER ORDINANCE, LAND DEVELOPMENT AND ILLICIT DISCHARGE MAY RESULT IN:

- Increased flooding
- Increased stream channel erosion
- Increased sediment transport and deposition
- General deterioration of water resources

WHY SHOULD YOU HAVE A STORMWATER MANGEMENT ORDINANCE?

- Comprehensive stormwater management ordinance is the backbone of a county-wide program that:
  - Reduces the risk of flooding
  - Reduces pollution
  - Reduces degradation of natural resources

- Provides the legal foundation for all other stormwater management program elements, including:
  - Design standards
  - Development review procedures
  - Inspections
  - Maintenance
  - Enforcement

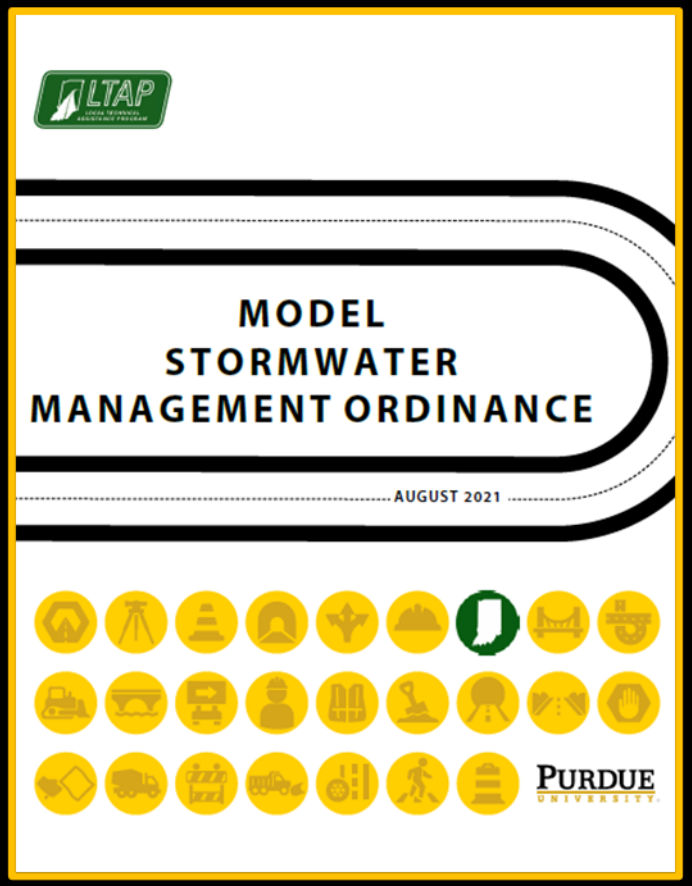


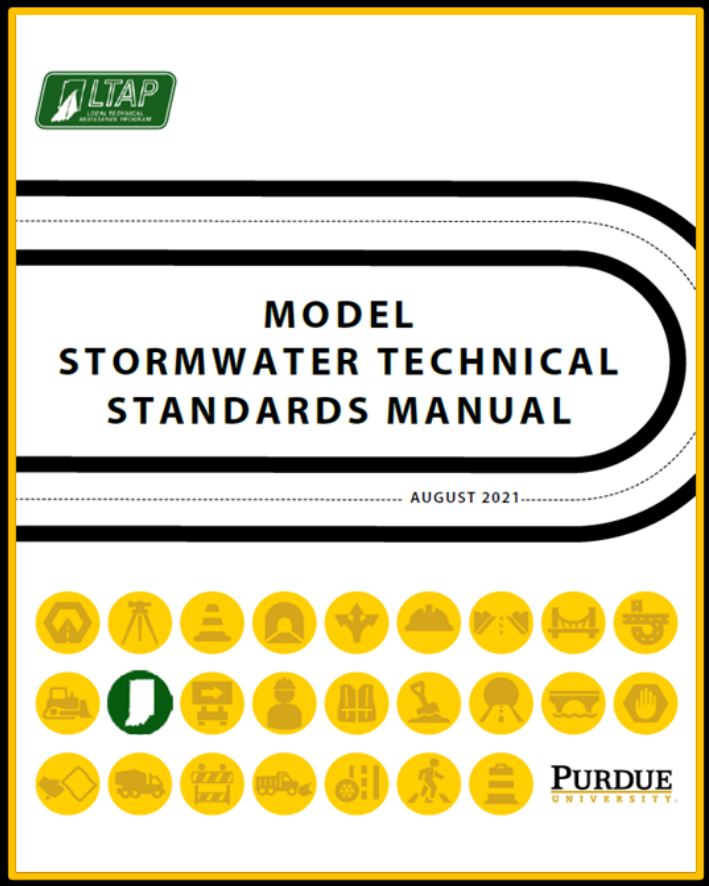
STATE OF INDIDNA ACTIONS

- IC 36-9-28.5 – Management of Stormwater Runoff From Developed Real Property
  - Section 3: By January 1, 2001, the legislative body of a unit (county or municipality) shall establish a policy of the unit for the management of stormwater runoff from developed real property in the unit
  - Section 4: The policy may, but is not required to, provide for the actual management of stormwater runoff from developed real property
- Construction Stormwater General Permit (CSGP)
  - Section 3.2 (a) (9) (A): The rate of stormwater runoff and/or volume from the project site must meet local requirements to address stormwater quantity as established by ordinance or other regulatory mechanism. When a local requirement does not exist, the post-development runoff discharge from the project site must not exceed the pre-development discharge based on the two-year, ten-year and one-hundred year peak storm events.

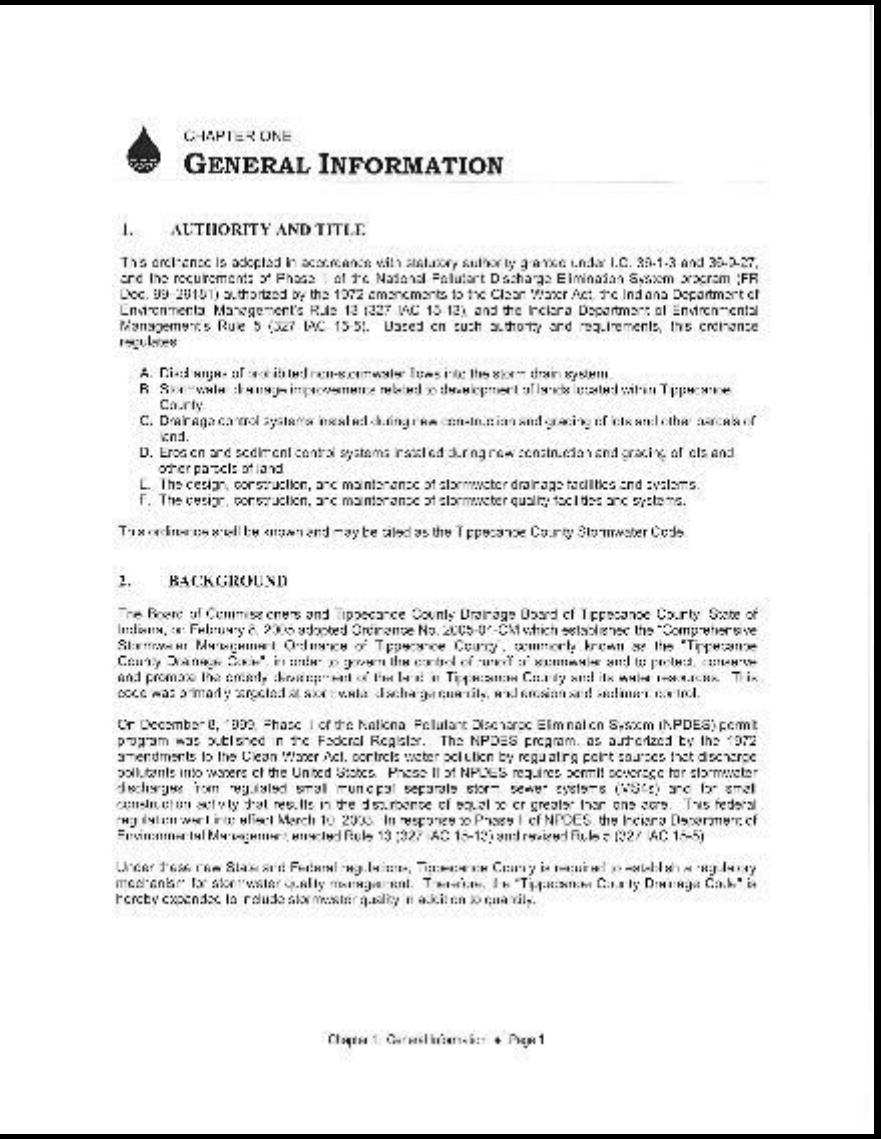
Local Technical Assistance Program (LTAP)

https://www.purdue.edu/inltap/resources/publications.php





APPROACH



CHAPTER ONE

GENERAL INFORMATION

1. AUTHORITY AND TITLE

This ordinance is adopted in accordance with statutory authority granted under I.C. 36-1-3 and 36-9-27, and the requirements of Phase I of the National Pollutant Discharge Elimination System program (FR Doc. 99-29161) authorized by the 1972 amendments to the Clean Water Act, the Indiana Department of Environmental Management's Rule 13 (327 IAC 15-13), and the Indiana Department of Environmental Management's Rule 5 (327 IAC 15-5). Based on such authority and requirements, this ordinance regulates:

A. Discharges of non-stormwater flows into the storm drain system.
B. Stormwater drainage improvements related to development of lands located within Tippecanoe County.
C. Drainage control systems installed during new construction and grading of lots and other parcels of land.
D. Erosion and sediment control systems installed during new construction and grading of lots and other parcels of land.
E. The design, construction, and maintenance of stormwater drainage facilities and systems.
F. The design, construction, and maintenance of stormwater quality facilities and systems.

This ordinance shall be known and may be cited as the Tippecanoe County Stormwater Code.

2. BACKGROUND

The Board of Commissioners and Tippecanoe County Drainage Board of Tippecanoe County, State of Indiana, on February 6, 2006 adopted Ordinance No. 2006-07-CM which established the "Comprehensive Stormwater Management Ordinance of Tippecanoe County", commonly known as the "Tippecanoe County Drainage Code", in order to govern the control of runoff of stormwater and to protect, conserve and promote the orderly development of the land in Tippecanoe County and its water resources. This code was primarily adopted to address flooding issues generally, and erosion and sediment control.

On December 8, 1999, Phase I of the National Pollutant Discharge Elimination System (NPDES) permit program was published in the Federal Register. The NPDES program, as authorized by the 1972 amendments to the Clean Water Act, controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Phase II of NPDES requires permit coverage for stormwater discharges from regulated small municipal separate storm sewer systems (MS4s) and for small construction activity that results in the disturbance of equal to or greater than one acre. This federal regulation went into effect March 10, 2003. In response to Phase I of NPDES, the Indiana Department of Environmental Management enacted Rule 13 (327 IAC 15-13) and revised Rule 5 (327 IAC 15-5).

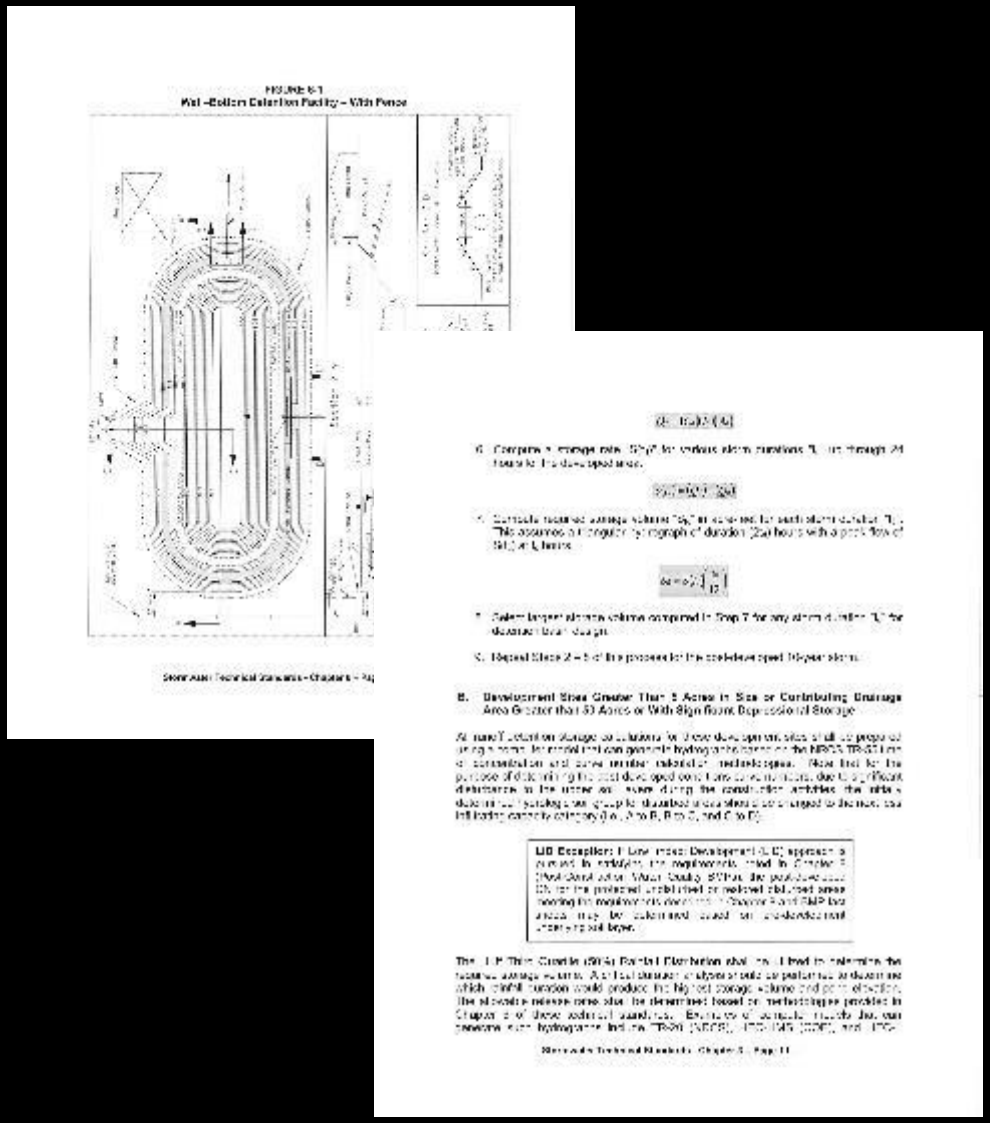
Under these new State and Federal regulations, Tippecanoe County is required to establish a regulatory mechanism for stormwater quality management. Therefore, the "Tippecanoe County Drainage Code" is hereby expanded to include stormwater quality in addition to quantity.

Chapter 1: General Information ♦ Page 1

Ordinance should:

- Remain simple and readable for widest possible audience
- Reference appropriate Technical Standards, but not make these standards part of code language

APPROACH



Design standards should:

- Be a separate, but accompanying document for a technical audience
- Include diagrams, computations, and tables
- Be updated from time-to-time

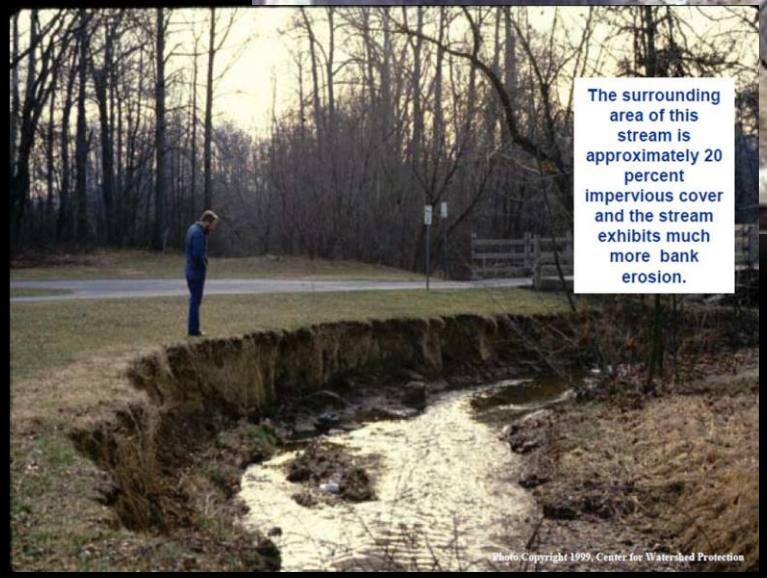
As such, want Technical Standards to be separate and easily revised so that code language does not have to be revised every time

Ordinances and Technical Standards should be site-specific

BASIC MENU

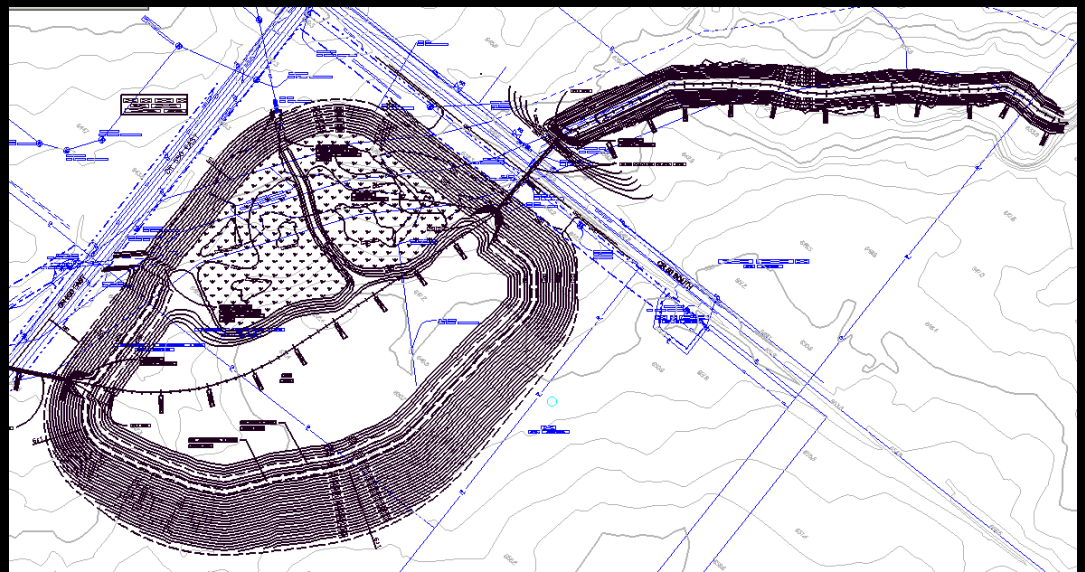
Focus on reducing the hazard to public health and safety caused by:

- Excessive stormwater runoff and erosion
- Contribution of pollutants from active construction sites
- Contribution of pollutants from runoff from new development and redevelopment
- Illicit discharges



BASIC MENU

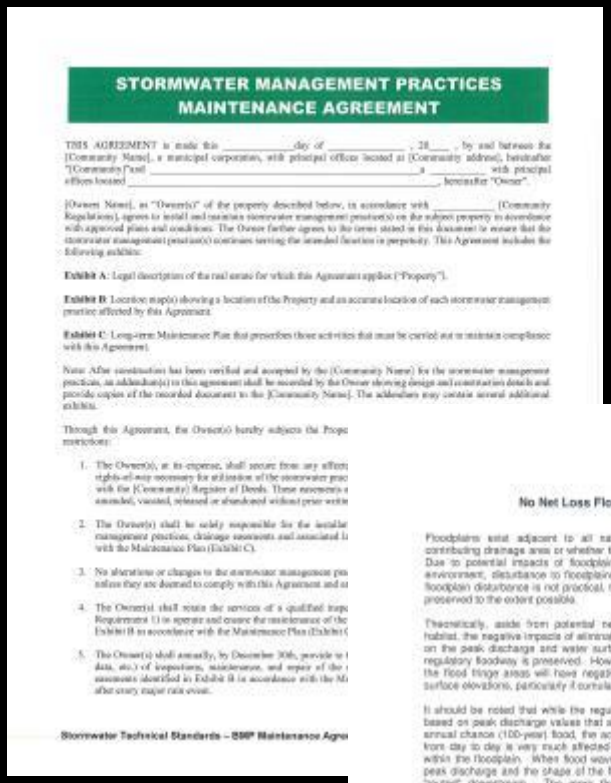
- Define applicability based on type of development and/or size of development
- Define exemptions
- Provide mechanism for variances
- Provide design requirements and criteria for designers, owners, and plan reviewers
- Provide plan submission and review requirements
- Provide policies on inspections, monitoring, enforcement



ALA CARTE MENU

- Lay the groundwork for long-term maintenance with:
  - Easements
  - Maintenance agreements

- Define policies such as:
  - Detention
  - Downstream restrictions
  - Floodplain storage
  - Wetlands
  - Adjoining properties
  - Sensitive areas
  - Fluvial erosion
  - Dams
  - Channel protection volume



STORMWATER MANAGEMENT PRACTICES MAINTENANCE AGREEMENT

THIS AGREEMENT is made this _____ day of _____, 20___, by and between the [Community Name], a municipal corporation, with principal offices located at [Community address], hereinafter "[Community]"and _____, a _____ with principal offices located _____, hereinafter "Owner".

[Owners Name], as "Owner(s)" of the property described below, in accordance with _____ [Community Regulations], agrees to install and maintain stormwater management practice(s) on the subject property in accordance with approved plans and conditions. The Owner further agrees to the terms stated in this document to ensure that the stormwater management practice(s) continues serving the intended function in perpetuity. This Agreement includes the following exhibits:

Exhibit A: Legal description of the real estate for which this Agreement applies ("Property").

Exhibit B: Location map(s) showing a location of the Property and an accurate location of each stormwater management practice affected by this Agreement.

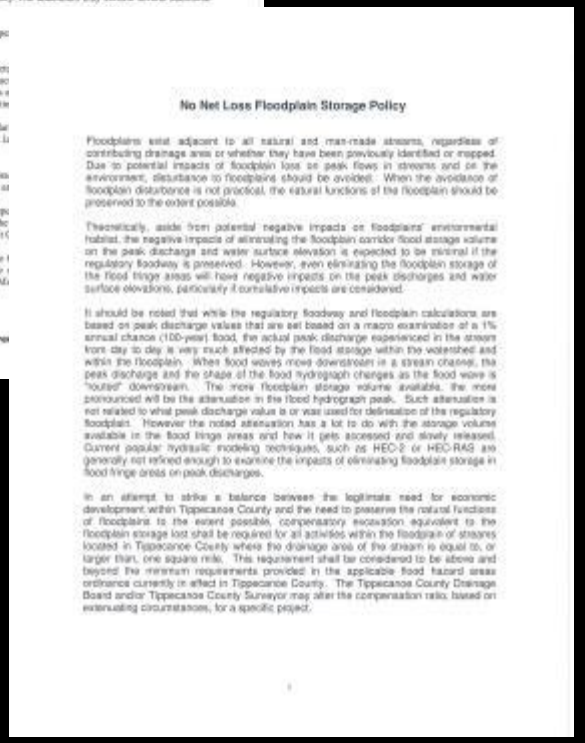
Exhibit C: Long-term Maintenance Plan that prescribes those activities that must be carried out to maintain compliance with this Agreement.

Note: After construction has been verified and accepted by the [Community Name] for the stormwater management practices, an addendum(s) to this agreement shall be recorded by the Owner showing design and construction details and provide copies of the recorded document to the [Community Name]. The addendum may contain several additional exhibits.

Through this Agreement, the Owner(s) hereby subjects the Prope restrictions:

1. The Owner(s), at its expense, shall secure from any affect rights-of-way necessary for utilization of the stormwater prac with the [Community] Register of Deeds. These easements a amended, vacated, released or abandoned without prior writte
2. The Owner(s) shall be solely responsible for the installat management practices, drainage easements and associated l with the Maintenance Plan (Exhibit C).
3. No alterations or changes to the stormwater management pra unless they are deemed to comply with this Agreement and a
4. The Owner(s) shall retain the services of a qualified [typ Requirement 1) to operate and ensure the maintenance of the Exhibit B in accordance with the Maintenance Plan (Exhibit C
5. The Owner(s) shall annually, by December 30th, provide to t data, etc.) of inspections, maintenance, and repair of the assessments identified in Exhibit B in accordance with the M after every major rain event.

Stormwater Technical Standards – BMP Maintenance Agre



No Net Loss Floodplain Storage Policy

Floodplains exist adjacent to all natural and man-made streams, regardless of contributing drainage area or whether they have been previously identified or mapped. Due to potential impacts of floodplain loss on peak flows in streams and on the environment, disturbance to floodplains should be avoided. When the avoidance of floodplain disturbance is not practical, the natural functions of the floodplain should be preserved to the extent possible.

Theoretically, aside from potential negative impacts on floodplains' environmental habitat, the negative impacts of eliminating the floodplain corridor flood storage volume on the peak discharge and water surface elevation is expected to be minimal if the regulatory floodway is preserved. However, even eliminating the floodplain storage of the flood fringe areas will have negative impacts on the peak discharges and water surface elevations, particularly if cumulative impacts are considered.

It should be noted that while the regulatory floodway and floodplain calculations are based on peak discharge values that are set based on a macro examination of a 1% annual chance (100-year) flood, the actual peak discharge experienced in the stream from day to day is very much affected by the flood storage within the watershed and within the floodplain. When flood waves move downstream in a stream channel, the peak discharge and the shape of the flood hydrograph changes as the flood wave is "routed" downstream. The more floodplain storage volume available, the more pronounced will be the attenuation in the flood hydrograph peak. Such attenuation is not related to what peak discharge value is or was used for delineation of the regulatory floodplain. However the noted attenuation has a lot to do with the storage volume available in the flood fringe areas and how it gets accessed and slowly released. Current popular hydraulic modeling techniques, such as HEC-2 or HEC-RAS are generally not refined enough to examine the impacts of eliminating floodplain storage in flood fringe areas on peak discharges.

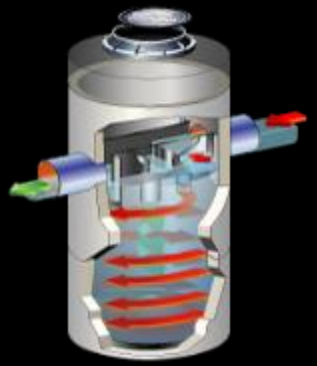
In an attempt to strike a balance between the legitimate need for economic development within Tippecanoe County and the need to preserve the natural functions of floodplains to the extent possible, compensatory excavation equivalent to the floodplain storage lost shall be required for all activities within the floodplain of streams located in Tippecanoe County where the drainage area of the stream is equal to, or larger than, one square mile. This requirement shall be considered to be above and beyond the minimum requirements provided in the applicable flood hazard areas ordinance currently in effect in Tippecanoe County. The Tippecanoe County Drainage Board and/or Tippecanoe County Surveyor may alter the compensation ratio, based on extenuating circumstances, for a specific project.

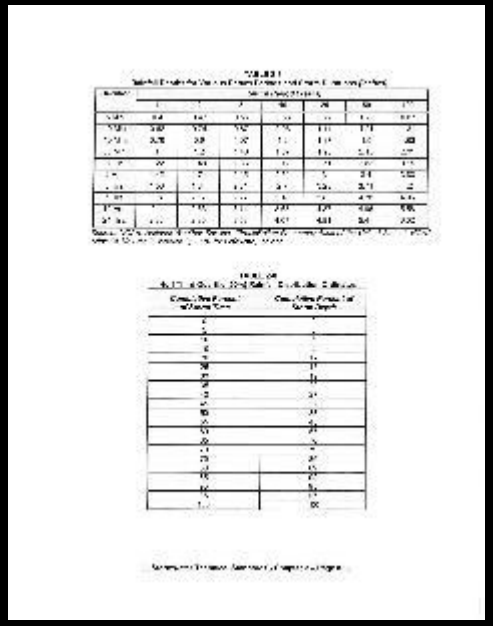
REMEMBER!!

- Defining applicability, policies, submission requirements, mechanisms for variances and exemptions, and related elements in your Ordinance and Technical Standards should provide consistency:
  - From site-to-site
  - From year-to-year, including changes in the
    - County Surveyor
    - Drainage Board
    - City/Town Engineer
    - Board of Public Works

REASONS TO UPDATE YOUR ORDINANCE AND TECHNICAL STANDARDS

- Emerging technology
  - New hydrologic/hydraulic models
  - New stormwater BMPs
- National trends
  - No net loss of floodplain storage
  - Channel Protection Volume
- Reflect community values
  - Low Impact Development
  - Green Infrastructure
- Adaptation to Climate Change
  - Revisions to rainfall depths, distribution, intensities
- Lessons learned at a local level
  - Fix unintended consequences





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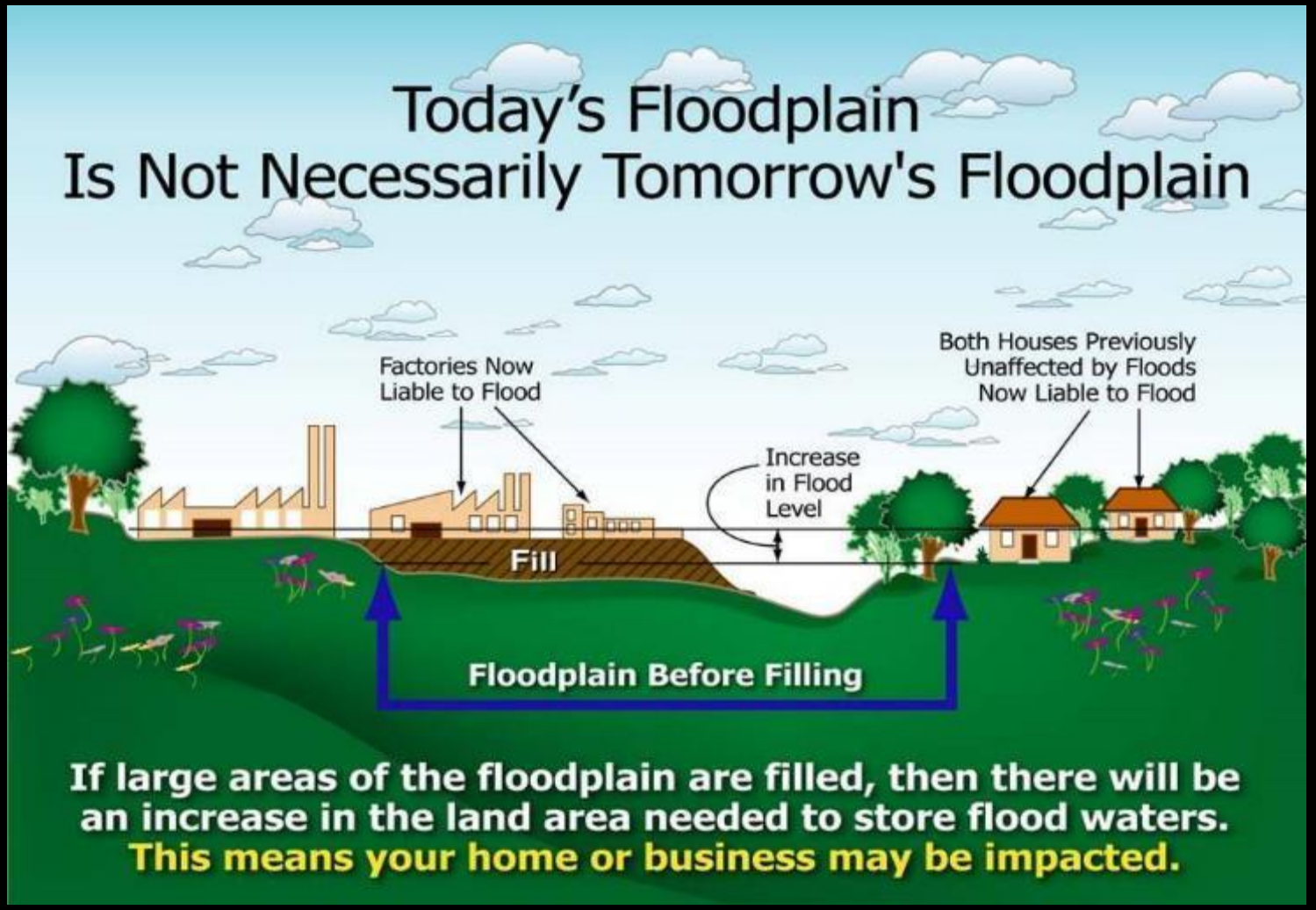
   f) Policy on Dams and Levees
   g) Requirements Associated with Proposed Developments Downstream of Dams

Appendix A : Abbreviations and Definitions
Appendix B : Standard Forms
Appendix C : Construction BMP Fact Sheets
Appendix D : Post-Construction BMP Appendices

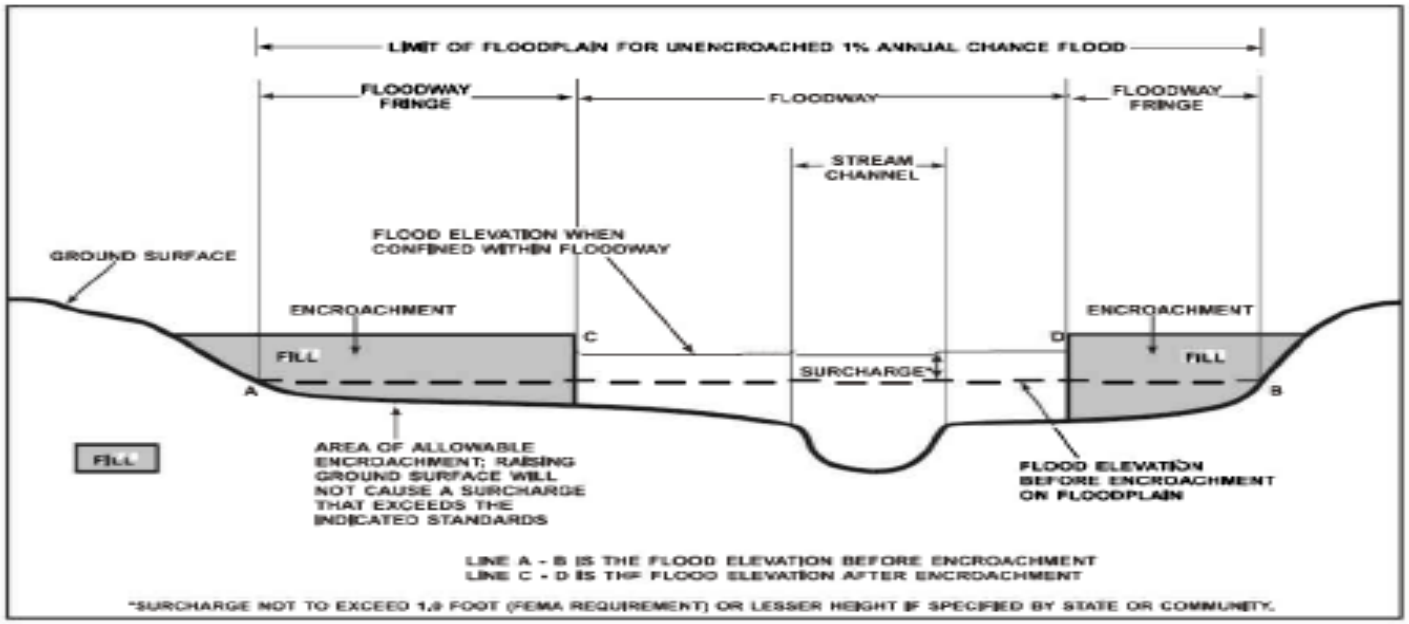
No Net Loss Floodplain Storage



No Net Loss Floodplain Storage

Floodplain and Floodway

Figure 1: Floodway Schematic



No Net Loss Floodplain Storage

- Chapter 10 of LTAP Model Technical Standards
- Replacement of existing floodplain storage lost due to fill
- Provided **in addition to** stormwater detention storage
- Equal to at least one times the volume filled below the floodplain elevation
- Be provided in immediate vicinity of the storage lost

No Net Loss Floodplain Storage

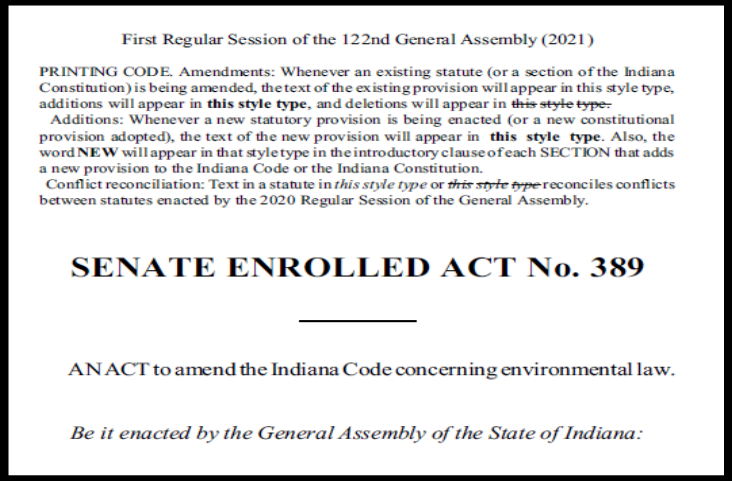
- Floodplain Fringe fill requires compensatory storage in the Floodplain Fringe
- Floodway fill requires compensatory storage in the Floodway
- All fill should be compensated
  - => No Threshold!
- IDNR Model Ordinance for Flood Hazard Areas Article 5 Section A (11)

Local Wetland Protection Measures

- Existing Depressional Storage Areas
- (Chapter 6 of LTAP Model Technical Standards)

- Existing Rule 5 and Proposed CSGP
  - Natural features including wetlands and sinkholes must be protected

Local Wetland Protection Measures



First Regular Session of the 122nd General Assembly (2021)

PRINTING CODE. Amendments: Whenever an existing statute (or a section of the Indiana Constitution) is being amended, the text of the existing provision will appear in this style type, additions will appear in **this style type**, and deletions will appear in ~~this style type.~~

Additions: Whenever a new statutory provision is being enacted (or a new constitutional provision adopted), the text of the new provision will appear in **this style type**. Also, the word **NEW** will appear in that style type in the introductory clause of each SECTION that adds a new provision to the Indiana Code or the Indiana Constitution.

Conflict reconciliation: Text in a statute in *this style type* or ~~*this style type*~~ reconciles conflicts between statutes enacted by the 2020 Regular Session of the General Assembly.

SENATE ENROLLED ACT No. 389

AN ACT to amend the Indiana Code concerning environmental law.

Be it enacted by the General Assembly of the State of Indiana:

- Senate Bill 389:
- Exempted from State Permitting Dredge and Fill activities in a Class 2 Wetland less than 0.75 acres in size within a Municipality

Local Wetland Protection Measures

Can More Be Done?

- Locally require identification of wetlands as part of project plan submittal
- Require copies of any required state or federal wetland impact permits
  - Required for local floodplain development permits

SUMMARY

- Land development alters the hydrologic response of a watershed, causing increased flooding and increased concentration of pollutants
- Illicit discharges result in degradation of natural resources
- Reasonable regulation and control in the form of a comprehensive stormwater management ordinance reduces the risk of flooding and degradation of natural resources
- An ordinance also provides a legal foundation for technical standards, plan review, inspections, maintenance, and enforcement
- An ordinance provides consistency from site-to-site and from year-to-year
- An ordinance and the accompanying technical standards should be updated from time-to-time to address changing technology, trends, community values, and to respond to lessons learned

SUMMARY

- Ensure that local ordinances and standards include compensatory floodplain storage requirements
- Ensure that local ordinances and standards account for depressional storage areas on lands to be developed
- Ensure that local ordinances and standards or stormwater/floodplain permitting procedures include documentation of wetland resources

Questions?

Kerry Daily, E.I., CFM, CPESC, CPSWQ

kdaily@cbbel-in.com

Phone: (317) 266-8000

CHRISTOPHER B. BURKE ENGINEERING, LLC

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