

## GOSHEN COMMON COUNCIL

### Minutes of the Jan. 14, 2022 Work Session on draft Flood Resilience Plan

*Convened in the Schrock Pavilion, Shanklin Park, 411 West Plymouth Avenue, Goshen, Indiana*

**Present:** Mayor Jeremy Stutsman

**Council members:**

Megan Eichorn (District 4)

Julia King (At-Large)

Doug Nisley (District 2)

Gilberto Pérez Jr. (District 5)

Donald Riegsecker (District 1)

Matt Schrock (District 3)

Council President Brett Weddell (At-Large)

**City staff:**

Deputy Mayor and Community Development Director Mark Brinson

Director of Public Works & Utilities Director Dustin Sailor

Director of Environmental Resilience Aaron Sawatsky Kingsley and Grant Writer & Educator Theresa Sailor

Stormwater Coordinator Jason Kauffman and Stormwater Specialist Mattie Lehman

Planning & Zoning Administrator Rhonda Yoder

Superintendent of Parks & Recreation Tanya Heyde

**Christopher B. Burke Engineering, LLC consultants:**

Vice President & Principal Engineer Siavash Beik and Director of Planning Sheila McKinley

#### 1) Welcome and opening comments

**Mayor Stutsman** opened the work session on the City of Goshen's draft Flood Resilience Plan at 9 a.m. The Mayor said it was an important topic of discussion and that past floods in Goshen have proven the seriousness of the situation facing the City. He said the problem won't be solved easily, but he would like decisions made that minimize disruptions. Mayor Stutsman thanked **Director of Environmental Resilience Aaron Sawatsky Kingsley** and his staff for putting together today's program. He concluded by wishing **Councilor Eichorn** a happy birthday.

**Sawatsky Kingsley** thanked the Mayor for his comments, the Parks Department for hosting the work session and staff members who developed the day's program. He also asked the consultants from Christopher B. Burke Engineering, LLC to introduce themselves. They were **Vice President and Principal Engineer Siavash Beik and Director of Planning Sheila McKinley**.

Sawatsky Kingsley began a PowerPoint slide presentation, "Flood Resilience Plan." (**EXHIBIT #1**)

**Sawatsky Kingsley** named the members of the Flood Resilience Plan Project Team. Besides himself and Mayor Stutsman, they are: Rhonda Yoder, Planning & Zoning Administrator; Mark Brinson, Community Development Director; Dustin Sailor, Public Works Director; Jason Kauffman, Stormwater Coordinator; Mattie Lehman, Stormwater Specialist; Theresa Sailor, Environmental Educator; David Gibbs, Street Commissioner; Julia King, City Council member; Matt Schrock, City Council member; and Jennifer Tobey, Elkhart County Emergency Management. He noted the presence today of all of the project team members except for Gibbs and Tobey.

**Sawatsky Kingsley** stressed the importance of the work facing City leaders and said it was crucial for the community to be prepared for floods. He said the work session was an important step in developing a Flood Resilience Plan and that it will be an involved process that will require good Council and community input.



## 2) Review of past floods and climate change

**Stormwater Coordinator Jason Kauffman** said that the Stormwater Department's first-ever Stormwater Report, covering 2021, was nearing completion. He said he was working closely with Stormwater Specialist Mattie Lehman to evaluate flooding in Goshen and planned to provide background on the issue.

**Kauffman** began a new PowerPoint slide presentation, "Assessing Flood Vulnerability in Goshen, January 14, 2022, City of Goshen Stormwater Department." (**EXHIBIT #2**)

**Kauffman** discussed the last major flood in Goshen, in February 2018. He displayed photos showing the severity of the flooding, discussed the impact on residents and shared memories. He said the flooding occurred because mild temperatures and rainfall occurred after 12 inches of snow fell in the City. Kauffman said the Elkhart River crested at 12.5 feet, flooding nine major roads and many businesses and homes.

Despite being considered one of the City's worst floods, **Kauffman** said the February 2018 flood may not have been the worst one in Goshen. He showed a photo of an 1892 flood with water spread over a larger area than in 2018.

**Kauffman** said there was another major flood, in 1908, that was caused by the failure of a dam.

**Kauffman** next displayed a slide describing major historical flooding events in Goshen. He said that ever since the U.S. Geological Survey (USGS) installed a river gauge near the North Indiana Avenue Bridge in 1924, Goshen has experienced many flood events, including four major floods since 1982. He said each has been unique, depending on the time of year, the weather and other factors, but each has had economic impact.

**Stormwater Specialist Lehman** said that over the years, powerful tools have been developed to assess a community's vulnerability for floods, so there is a better understanding of risks. She displayed color maps developed by the Federal Emergency Management Agency (FEMA) showing a relatively low annual chance of flooding by the Elkhart River, expressed by percentage. A companion slide showing the same areas and a 30-year chance of flooding showed that there was a 95% chance of flooding in many areas.

**Lehman** showed a climate change vulnerability assessment developed with the Great Lakes Integrated Sciences and Assessments (GLISA). It encompassed five major elements: Regional Climate Predictions; Social Vulnerability Indicators, Landscape Features, Assessment Locations, and a Final Matrix. Lehman described each and then discussed the City of Goshen's potential flood risks based on the five major elements.

**Lehman** said the most vulnerable area in the City is northeast Goshen. She said some of the most affordable areas are most at risk because they have drainage issues, but potential flooding is an issue throughout the City. Lehman described the adaptive potential of areas to minimize flood risk, the impact of landscape features, including soil types and elevation. She discussed vulnerable infrastructure, including roads, water and sewer treatment facilities. Lehman said there was no practical way to address flood risks to areas such as Linway Plaza, but that action can be taken to minimize risks for other vulnerable areas. Lehman ended her presentation by showing a slide with an aerial photo of Shanklin Park during the February 2018 flood.

**Mayor Stutsman** pointed out that the only part of Shanklin Park that didn't flood in 2018 was the swimming pool.

## 3) Overview of flood resilience planning areas and strategies

**Sawatsky Kingsley** said Kauffman and Lehman had addressed the historical background and the City's vulnerability and that the Flood Resilience Plan was designed to address the risks.



**Sawatsky Kingsley** said the City's consultants from Christopher B. Burke Engineering, LLC would further describe the issue from national and state perspectives and offer possible solutions.

Using the PowerPoint that Sawatsky Kingsley used at the start of the meeting, **Vice President and Principal Engineer Siavash Beik** and **Director of Planning Sheila McKinley** presented a wide range of information.

**Siavash Beik** said the National Climate Change Assessment shows that substantial climate changes have taken place, including an increase in rainfall in the Midwest. He said a greater number and severity of extreme weather events are expected. He said Indiana's Climate Change Assessment is showing that there will be more rainfall and intense storms producing more water and less soil absorption because of increased development; so there will be higher levels of runoff, more water flowing into rivers – and more flooding.

**Siavash Beik** said communities cannot do much to control rainfall, but they can do something about land use policies to minimize runoff and they can do something about flood control. Moving forward, he said communities can take three basic approaches:

1. Mitigation – Secure major funding, allocate and spend the ever-increasing necessary funds to try to reduce the flooding.
2. Adaptation – Adapt to these unavoidable climate change impacts by adopting and implementing appropriate flood resilience strategies.
3. Do nothing/Status quo – Suffer the consequences and brace for more devastation and economic uncertainty.

**Siavash Beik** said the approach he recommended was Flood Resilience Planning, which he described as:

- (The) Ability to prepare for, absorb, recover from and adapt to adverse flood events;
- Define flood resilience areas and adopt smart growth strategies.
- Support natural and beneficial floodplain function – leave room for the river.

**Siavash Beik** said this is a new approach that allows development to continue, and even be promoted, but with less risk. This is accomplished using a two-pronged approach: Use land-use planning policies to direct growth to areas less vulnerable to flooding; and identify and implement projects to protect those already vulnerable to flood risk.

**Siavash Beik** said to effectively fight a fire, experts isolate the area and stop the spread to new areas and then put out the fire. He said it is best to use the same approach when it comes to flooding: vulnerable areas should be isolated to stop greater risks from spreading and then the underlying problems should be addressed.

**Siavash Beik** displayed a PowerPoint slide titled "Flood Resilience Planning Areas," which showed a map of the city with flood-prone high hazard, moderate hazard and safer areas. He described how the map could be used for planning purposes. He also answered questions about it.

**Siavash Beik** then reviewed these six major recommendations to address the City's flood issues:

### **1. RIVER CORRIDOR IMPACT AREA**

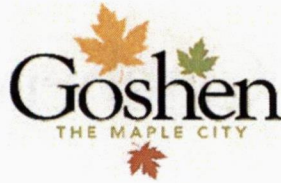
*To conserve land and prohibit development.*

RECOMMENDED ACTION:

1. Adopt fluvial erosion hazard (FEH) regulations
2. Protect undeveloped land

### **2. UNDEVELOPED HIGH HAZARD/FLOOD STORAGE AREA**

*To conserve land and maintain the natural and beneficial function of the floodway fringe; discourage future development.*



**RECOMMENDED ACTION:**

1. Protect undeveloped land in the floodway fringe
2. Establish compensatory floodplain storage requirement

**3. MODERATE FLOOD HAZARD AREA**

*To highlight areas subject to flood risk during extreme flood events, to avoid placement of critical facilities, and preserve these areas as additional flood storage.*

**RECOMMENDED ACTION:**

1. Discourage new development, especially critical facilities
2. Require higher standards for buildings

**4. VULNERABLE DEVELOPED AREA**

To protect people, buildings and facilities vulnerable to flooding and reduce future flood risk.

**RECOMMENDED ACTION:**

1. Prepare a Flood Response Plan
2. Prepare a citywide Stormwater Master Plan
3. Participate in the National Flood Insurance Program (NFIP) Community Rating System (CRS) program
4. Relocate and/or buyout structures inside the river corridor impact area
5. Retrofit, relocate and/or buyout structures outside the river corridor area
6. Bring nonconforming uses into compliance

**5. SAFER AREA**

*To plan for and promote development in areas that are less vulnerable to future floods.*

**RECOMMENDED ACTION:**

- Guide growth and development to safer areas
- Promote conservation design and development
- Promote placement of critical facilities in safer area.

**6. WATERSHED AREA**

*To promote coordination and partnerships and implement practices to slow, spread and infiltrate floodwater.*

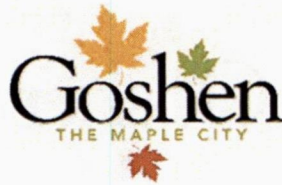
**RECOMMENDED ACTION:**

- Support USGS stream gauges
- Build partnerships within the watershed
- Support SWCD programs
- Reduce impact from tile and surface drains in the watershed

**Siavash Beik** also briefly discussed some citywide recommendations as follows:

**OVERALL STRATEGIES**

*To improve resiliency citywide. Emphasize importance of syncing plans, policies and regulations for consistency of resilience concepts and strategies.*



**RECOMMENDED ACTION:**

1. Update Stormwater Ordinance and conduct training
2. Improve flood risk communication and education
3. Conduct regular audits of plans, programs and policies
4. Update City Code and Zoning Ordinance
5. Update the stormwater utility fee
6. Integrate resilience into the Comprehensive Plan
7. Include flood resilience in capital projects
8. Implement the Multi-hazard Mitigation Plan flood mitigation measures

**Councilor Riegsecker** asked **Siavash Beik** what had a greater impact on flooding – rain or snow. Beik said both had an impact, but especially rain falling rapidly after a major snowfall. Riegsecker acknowledged that there has been a climate change, noting that having lived in Goshen for many years, he remembers snow falling in November and lingering for months. He said that rarely happens any more.

**BREAK: There was a break in the work session from 10:07 a.m. to 10:19 a.m.**

Referring to Councilor Riegsecker's comment before the break, **Director Sawatsky Kingsley** said Roger Taylor, a long-time parks employee has recalled that on his first day on the job, in November 1976, before Thanksgiving, one of his first jobs was to shovel snow off the frozen Millrace Pond. He said that in order for the pond to have frozen, there must have been several weeks of below-freezing temperatures. **Sawatsky Kingsley** said that's no longer the case and part of the new reality for the City.

**4) Detailed discussion of short-term implementation strategies**

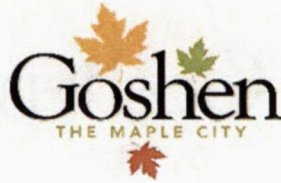
**Sheila McKinley**, Director of Planning for Christopher B. Burke Engineering, LLC, discussed her work for the City, including the development of a Goshen Flood Resilience Plan Implementation Guidance, a five-page document that is part of the City of Goshen Flood Resilience Plan. Copies were distributed at the work session (**EXHIBIT #3**)

**McKinley** said a model storm water ordinance would have three strategies:

1. Update Stormwater Ordinance and Technical Standards
2. Adopt fluvial erosion hazard (FEH) regulations
3. Adopt compensatory flood storage requirements

**McKinley described Fluvial Erosion Hazard Area regulations as follows:**

- (A) New primary building are not allowed to be constructed in FEHAs
- (B) Improvements to existing structures, and any associated fill as needed to comply with elevation requirements in the SFHA shall not decrease the distance between the existing structures and the top of bank and must comply with all compensatory flood storage requirements
- (C) Development shall not increase the potential for fluvial erosion damage on the property or on neighboring properties



(D) Development shall not increase the potential of materials being swept onto other lands or into stream and causing damage to other properties from fluvial erosion

(E) Development shall not cause an undue burden on public services and facilities including roads, bridges, culverts and emergency service providers during and after fluvial erosion event

**McKinley described Compensatory Flood Storage as follows:**

Whenever any portion of the SFHA is authorized for use, the volume of space which will be occupied by the authorized fill or structure below the BFE shall be compensated for and balanced by an equivalent volume of excavation taken below the BFE. The excavation volume shall be at least equal to the volume of storage lost (replacement ratio of 1 to 1) due to the fill or structure.

**Deputy City Manager Mark Brinson** asked where this might take place. **Siavash Beik** said it ideally would take place on the site being developed or upstream.

**McKinley described Landscape Standards as follows:**

1. Adopt tree mitigation and tree replacement requirements;
2. Promote use of native plants;
3. Allow vegetated stormwater practices to count toward landscape requirements.

**McKinley said another promising strategy would be requiring tree replacement or contributions to a tree fund. She described that as follows:**

1. Tree replacement ratios:
  - a. 1 to 1 tree replacement to removal for trees that are at least 5 inches DBH, but less than 16 inches DBH;
  - b. 2 to 1 tree replacement to removal for trees that are at least 16 inches DBH, but less than 24 inches DBH;
  - b. 3 to 1 tree replacement to removal for trees that are at least 24 inches DBH, but less than 30 inches DBH;
  - c. 4 to 1 tree replacement to removal for trees that are at least 30 inches DBH.
2. [specifies location, minimum caliper and/or height, native species]
3. In lieu of replacement, applicant shall pay \$200 per replacement tree to Tree Fund; maximum payment is \$10,000 per project

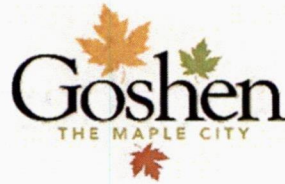
**McKinley** said it was important to diversify species when planting trees. She also Goshen could require the planting of native species.

In response to a question from **Councilor Eichorn** about the type of plantings desired, **Director Sawatsky Kingsley** said it's important to continually update lists of desired plantings. He said new maps were created three years ago with that in mind. **Mayor Stutsman** said a healthy system requires a diversity of plantings.

**Councilor Riegsecker** asked how requiring the planting of trees elsewhere, if they could not be planted on the site of a new development, would be beneficial. **Sawatsky Kingsley** said that if mature trees are removed for new development, replacing them with small trees results in a loss from the benefits mature trees provided. It could take several decades for the trees to grow and restore those benefits.

**Councilor Riegsecker** said he loves trees and understands about the value of replacement, but is unclear about the benefits of replacing them as part of flood resiliency. **Mayor Stutsman** said that there is a loss of benefits when mature trees are removed from a site, but putting them elsewhere could still be helpful. **Sawatsky Kingsley** said trees absorb and slow the flow of stormwater.

**Councilor King** asked if it is known which areas of the City would get new trees. **Sawatsky Kingsley** said his department is working to identify places that could become tree reserves.



**Councilors Schrock, Pérez and Riegsecker** continued the discussion about the removal and replacement of trees and how this might be accomplished. **McKinley** said planting trees in the right places is beneficial to water quality. **Councilor Schrock** asked if trees will be planted to replace those removed on Wilden Avenue. **Director of Public Works Dustin Sailor** said they would, but that this issue raises the longstanding conflict between maintaining the right-of-way to accommodate infrastructure and promoting more trees. He said the trees along Wilden Avenue grew and eventually destroyed sidewalks. And at present, he said, there is a narrow area to replant trees.

**Councilor Pérez** asked if that area was vulnerable to floods and whether replacement trees could be planted elsewhere. **Sawatsky Kingsley** said Sailor's point was correct and this comes down to the kind of development the city needs. He said the Wilden Avenue area isn't subject to flooding, but an area further east is vulnerable. Still, he said that without an adequate tree canopy, less rain water will be contained and there will be greater runoff.

**Councilor Pérez** said the City needs to create incentives to capture more water and that it is good to encourage more tree planting.

**Councilor Riegsecker** said it will be important to balance the need for flood mitigation while also facilitating development.

**Councilor King** said City leaders also need to think holistically. She said the City shouldn't do something in one area that will hurt something else. King said the City needs both a good tree canopy and good sidewalks. **Mayor Stutsman** agreed, pointing out that development that is good in one area could hurt another area.

**McKinley** said that implementing planning changes will require hard decisions. **Siavash Beik** said this discussion was good and has identified some of the key issues facing the City. He said often new regulations are perceived as hurting development and posed as harsh choices. However, he said if a community doesn't want a developer to pay flood mitigation costs, taxpayers eventually will pay for the negative impacts of that development when flood occur.

**Mayor Stutsman** said Goshen has imposed requirements in the past, but doesn't want to stop development. He said the City previously didn't do enough about flood control and it now must deal with the risks. The Mayor said taxpayers will have to pay some more, but it needs to be a balancing act.

**McKinley continued her presentation by discussing four more short-term implementation strategies:**

#### **FLOOD CONTROL DISTRICT**

1. Update flood resilience planning areas based on updated FIRM information

#### **REDEVELOPMENT**

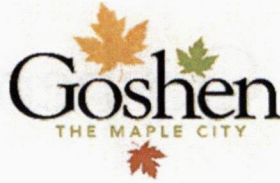
1. Promote growth and development in safer areas
2. Consider climate change and flood impacts in capital projects; promote low impact development and green infrastructure

#### **COMMUNICATION, EDUCATION & TRAINING**

1. Train city stormwater inspection staff about green infrastructure practices
2. Develop a flood risk education and outreach program

#### **PLANS, PROGRAMS & STUDIES**

1. Update the stormwater utility fee
2. Incorporate flood resilience planning areas into the proposed Future Growth Plan
3. Prepare a Flood Response Plan
4. Prepare a Stormwater Master Plan



Next, **McKinley** presented a slide titled “**Indiana Stormwater Utilities Monthly SFR Fees and Fee Types.**” The slide described the monthly single-family residential (SFR) fees charged to customers in 95 Indiana entities. The chart showed that the average of all 95 entities was \$5.74 per month. The charge in Goshen and Elkhart County was listed as \$1.25 per month.

**Goshen Public Utilities Director Dustin Sailor** said Goshen has accumulated about \$100,000 from the fees.

**Mayor Stutsman and Councilors engaged in a conversation about if, could or should the city raise the fee to pay for stormwater system improvements. There appeared to be a consensus that this could be done, but the City would have to take over the billing from the county and that might not be worthwhile.**

**McKinley** showed a slide titled “**Flood Response Plan,**” which depicted two maps of the City of Columbia, Indiana and indicated what actions could be taken in response to different flood events. **McKinley** said a Flood Response Plan puts institutional knowledge into a single document for quick access. The Columbus map showed areas to evacuate people, the locations of planned emergency shelters and accessible evacuation routes.

**Mayor Stutsman** said this type of plan would have been very useful to the City during the February 2018 flood. Councilor **Nisley** joked that everyone should remember to go to the Shanklin Pool during the next flood because it remained above the flood waters in February 2018.

**Councilor Schrock** asked if it would be helpful to have a USGS river gauge on the Elkhart River closer to the City of Goshen. **McKinley** said it would. **Sawatsky Kingsley** said the Draft Flood Resilience Plan calls for locating a river gauge closer to the City.

**McKinley** showed a PowerPoint slide titled “**Stormwater Master Plan,**” which is from the City of Jeffersonville. It featured the key elements of that City’s plan.

**McKinley** ended her presentation with a slide of a cartoon-like color drawing that showed a small tent set up in the middle of a road. The caption: “**Building in a floodplain is like pitching your tent on a highway when there are no cars coming.**” **McKinley** said the cartoon underscored the points she and Siavash Beik made today.

## 5) Open discussion and next steps

Following the formal presentations, **Mayor Stutsman, Councilors, City staff and the consultants from Christopher B. Burke** engaged in a far-ranging discussion on many topics, including:

- The impact of the Elkhart River on Rogers Park, erosion issues and possible development adjacent to it.
- Whenever there is flooding at Linway Plaza and related areas, people ask City staff about solutions to the problem, but the flooding really can’t be stopped.
- It may seem callous, but if people build in the flood plain, knowing the risks, it shouldn’t be the city’s responsibility to fix the problem.
- The Oasis restaurant was rebuilt and the building was raised, which may prevent future flooding there, but that also means the floodwater will just end up someplace else.
- What is the City’s ultimate responsibility to solve flooding problems?





- Is the City imposing sufficient requirements to address potential flood issues?
- Perhaps the City should acquire more property to prevent future development in flood-prone areas.
- Building in the flood plain is, and probably should be, expensive.
- People are allowed to build, even near flood zones, if they can meet the City's requirements. The City can require offsets for development, but it cannot ban it.
- One key issue is that the City is running out of developable land.
- Some cities have imposed ordinances to discourage development. In Goshen, people can build in flood zones, but structures must be elevated and that just displaces the problem.
- If the City limits development, that will just move problems elsewhere.
- Some flood-prone areas in Goshen are suitable for farming, open space or recreation. The City could acquire some of this land for parks.

**Deputy Mayor Brinson** briefly discussed next steps in the process of further developing the Draft Flood Resilience Plan and how to present it to the broader community.

**Mayor Stutsman** said he wants to advance the process and advise the community about the plan. He also said he would like three Council members to be involved in the process of creating draft ordinances.

**Councilor Pérez** said it seems there are some points of agreement among Councilors. He said it would be good to identify priority areas so ordinances can be developed.

**Siavash Beik** said in other communities, plans have been adopted by resolution and then leaders have move to implementation by imposing regulations that had broad support.

**Brinson** said he would like Council feedback and affirmation of certain policies, so staff time can be better used. Ideally, Brinson said, there would be broad agreement on some measures.

**Councilor Pérez** said the purpose of today work session was informational and that the Council doesn't necessarily have to indicate their preferences now. He said perhaps some measures should be brought to the Council.

**Director Sawatsky Kingsley** said today has been introduction of the flood plan to the Council. He said there is a lot to digest and there will be more to review over the next few months. He said the next step is to present the plan to the public, discuss options and further refine the plan. Sawatsky Kingsley said it will be important to interact with people and inform them of the flood risks and the potential solutions. He added that engagement with the public and Councilors will help improve the plan and build support for some of its recommendations.

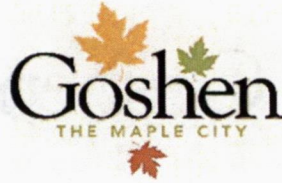
**Councilor Eichorn** said she understands the key elements of the situation, including the lack of developable space. She said it's important to inform people.

**Mayor Stutsman** said it's important to tell the full story and to point out that the City isn't just trying to hinder development.

**Councilor King** said that's exactly what she would say. The City needs to be careful and encourage green and creative development – and we do have a future.

**Councilor Nisley** said the City also needs to look upstream to see what neighboring communities are doing because they may be pushing more water to Goshen. He said if other communities aren't dealing with the problem, the City of Goshen could be spinning its wheels. Nisley said the City has to do something, but he isn't sure about the solutions.

**Councilor Pérez** said he believes others are taking action and some are doing more than Goshen. He said the City of Goshen should be doing more to address flood risks.



**Mayor Stutsman** said that whatever the City does will help reduce flooding. The Mayor said hopefully the City can persuade others to do more. Similar to water quality, Mayor Stutsman said the City is responsible for the amount of water that leaves our community.

**Siavash Beik** said that it's not likely runoff will decrease, so the City of Goshen must do more to address flood risks. The City also cannot rely on others to do more.

**Sawatsky Kingsley** said the draft plan calls for the City to evaluate what upstream communities are doing.

**Councilor Schrock** agreed with that recommendation and said the City should place a closer storm runoff monitoring station on the Elkhart River. He also asked if the City has an emergency response plan for floods.

**Mayor Stutsman** said the plan is not yet developed yet. In case of emergencies, key staff members gather at City Hall and activate a phone tree. He said he is proud of city staff because they mobilize quickly and do what's needed. In February 2018, the Mayor said many people praised the City's flood response.

**Siavash Beik** said he works with many communities and that the City of Goshen should be proud of its efforts because it is a leader. He said no other Indiana city has an Environmental Resilience Department head. He congratulated Councilors and said perhaps Goshen's actions can inspire other communities.

**Mayor Stutsman concluded the work session by thanking all for their participation today.**

**Adjournment:**

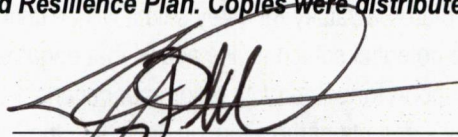
**Mayor Stutsman adjourned the work session at 11:50 a.m.**

**EXHIBIT #1: "Flood Resilience Plan, City of Goshen Common Council Work Session, Friday, January 14, 2022," a PDF copy of a PowerPoint slide presentation used throughout the work session.**

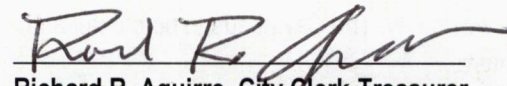
**EXHIBIT #2: "Assessing Flood Vulnerability in Goshen, January 14, 2022, City of Goshen Stormwater Department," a PDF copy of a PowerPoint slide presentation used during the work session.**

**EXHIBIT 3: "Goshen Flood Resilience Plan Implementation Guidance," a five-page document that is part of the City of Goshen Flood Resilience Plan. Copies were distributed at the work session.**

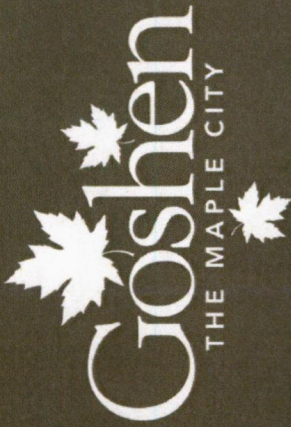
**APPROVED:**

  
\_\_\_\_\_  
Jeremy P. Stutsman, Mayor of Goshen

**ATTEST:**

  
\_\_\_\_\_  
Richard R. Aguirre, City Clerk-Treasurer

CHRISTOPHER B. BURKE ENGINEERING, LLC



# FLOOD RESILIENCE PLAN

City of Goshen Common Council Work Session  
Friday, January 14, 2022

Exhibit #1

# AGENDA

1. Welcome and opening comments
2. Review of past floods and climate change
3. Overview of flood resilience planning areas and strategies
4. Detailed discussion of short-term implementation strategies
5. Open discussion and next steps

**FLOOD RESILIENCE PLAN PROJECT TEAM**

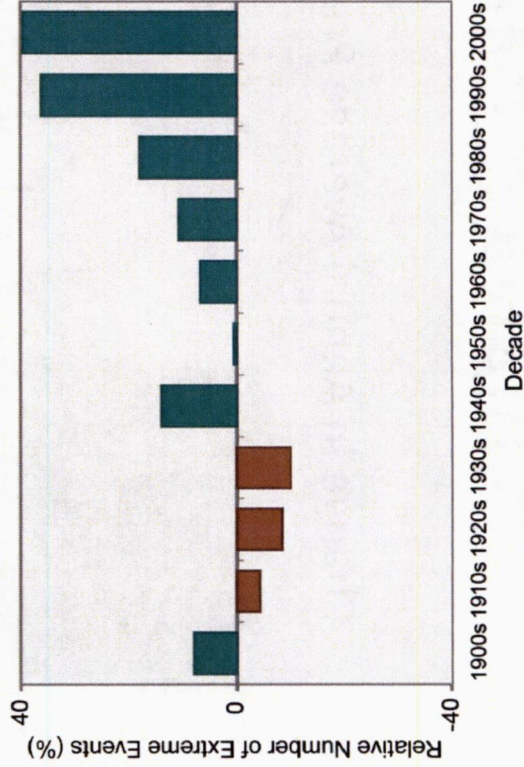
<b>Name</b>	<b>Responsibility</b>
<b>Aaron Satwatsky-Kingsley</b>	Project Manager/Environmental Resilience Director
<b>Jeremy Stutsman</b>	Mayor
<b>Rhonda Yoder</b>	Planning & Zoning Administrator
<b>Mark Brinson</b>	Community Development Director
<b>Dustin Sailor</b>	Public Works Director
<b>Jason Kauffman</b>	Stormwater Coordinator
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<b>David Gibbs</b>	Street Commissioner
<b>Julia King</b>	City Council
<b>Matt Schrock</b>	City Council
<b>Jennifer Tobey (invited)</b>	Elkhart County Emergency Management

# REVIEW OF PAST FLOODS AND VULNERABILITY ASSESSMENT STUDY

# NATIONAL CLIMATE CHANGE ASSESSMENT

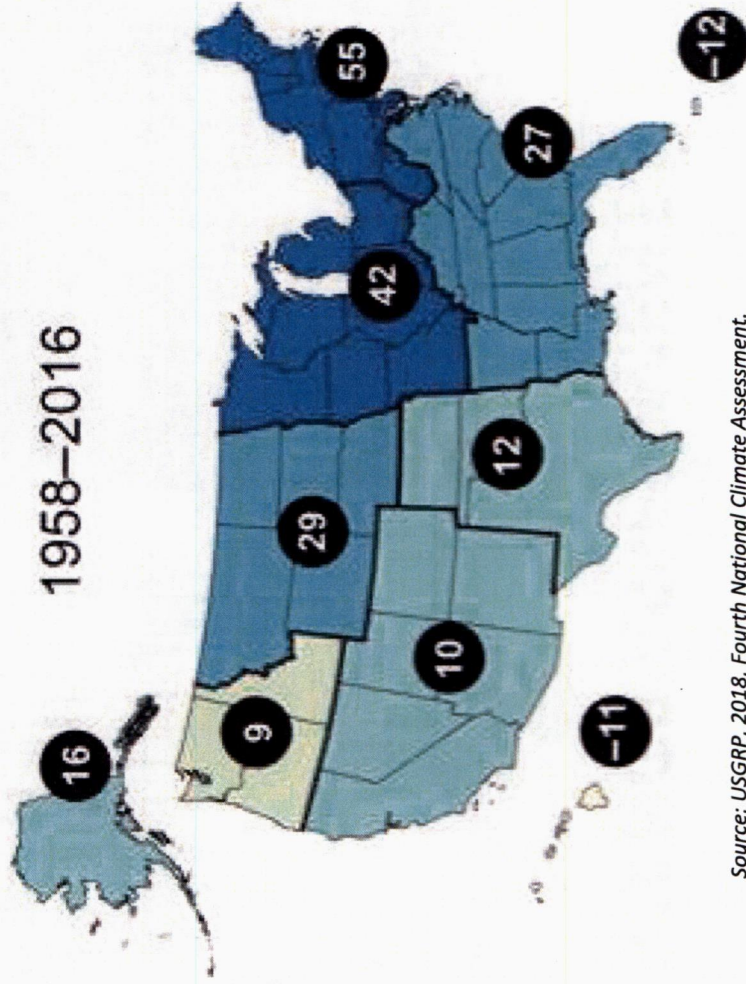
Observed Decadal Trend of Heavy Precipitation (2-day, 5-year RI) in Midwest (1901-2012 compared with 1901-1960)

Observed U.S. Trend in Heavy Precipitation



Source: USGRP, 2014, Third National Climate Assessment (adapted from Kunkel et al. 2013)

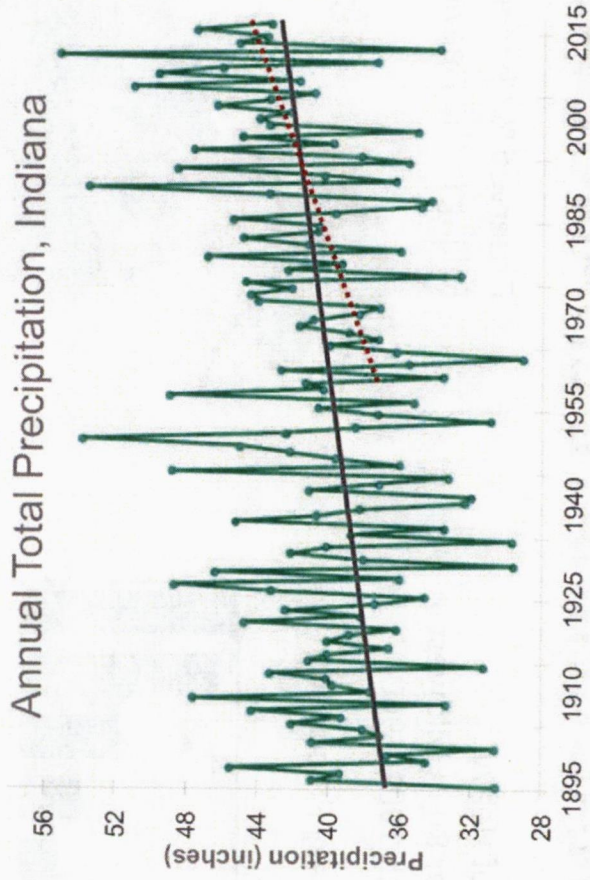
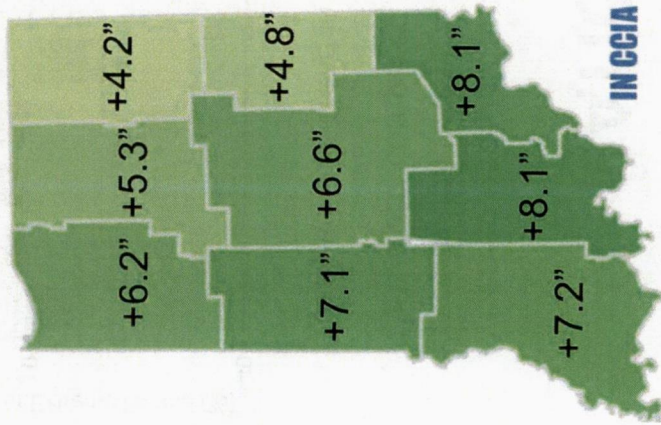
Observed % Change in Total Annual Precipitation Falling in the Heaviest 1% of Events (1958 – 2016)



Source: USGRP, 2018, Fourth National Climate Assessment.

# INDIANA CLIMATE CHANGE ASSESSMENT

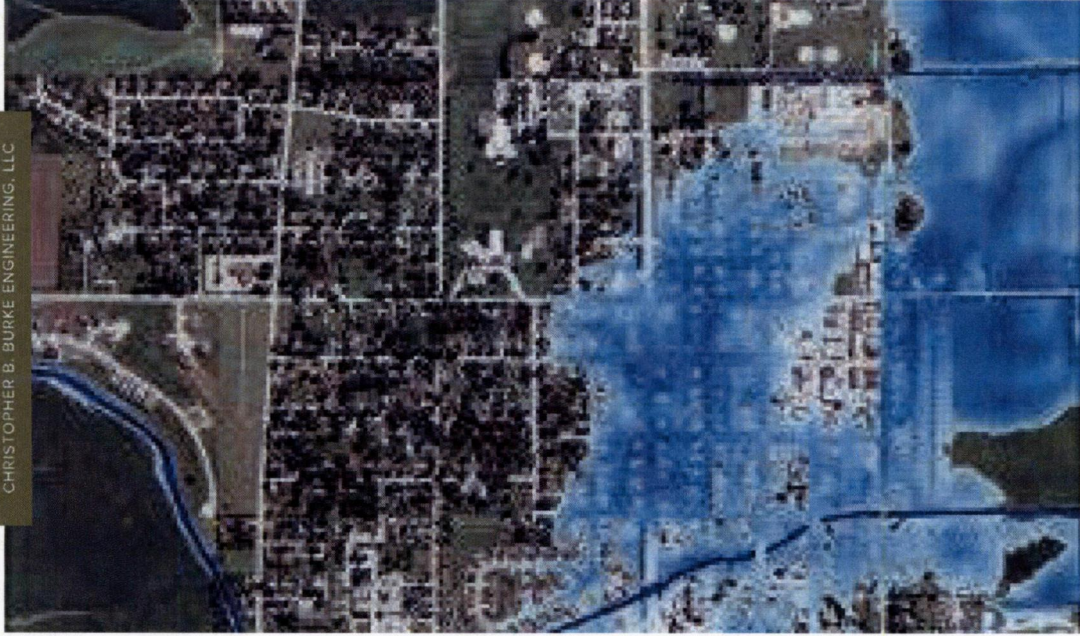
Change In Annual Average Precipitation 1895-2019



Indiana 2050...

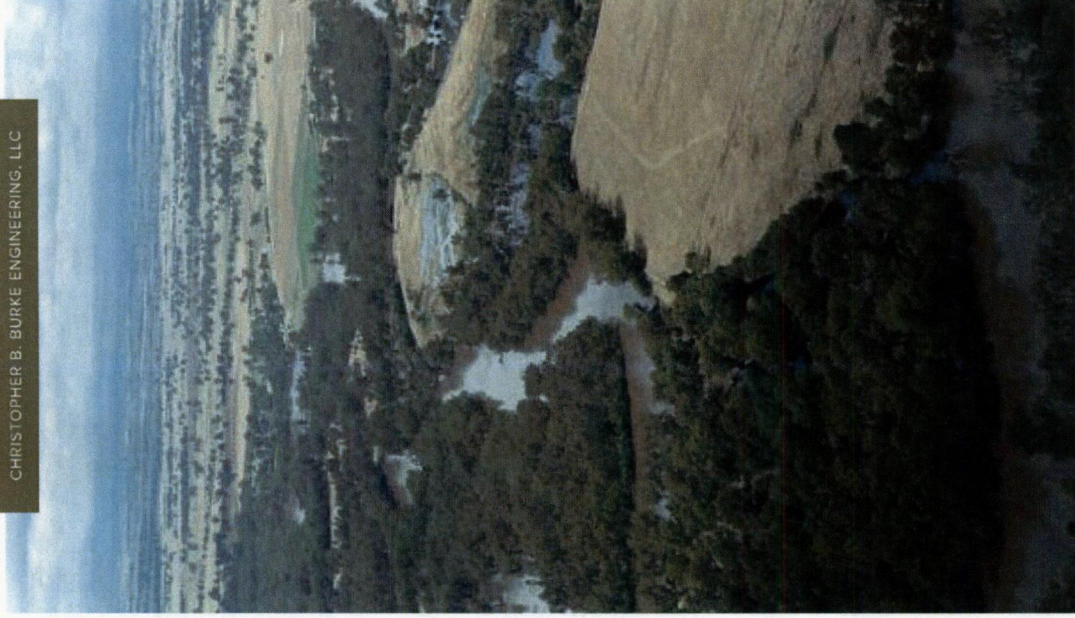
- 1. Total Annual Precipitation:** expected to increase 6-8%
- 2. Seasonal Precipitation:** expected to increase 25% in winter and 20% in spring
- 3. Storm Intensity & Extreme Events:** expected to increase 42%





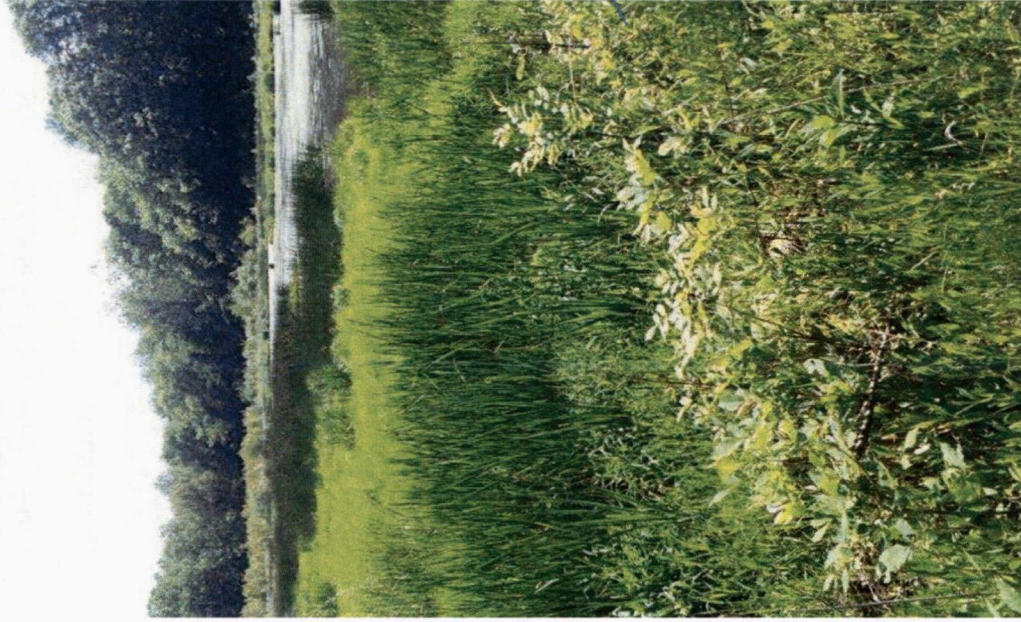
# MOVING FORWARD...

- 1. Mitigation:** Secure major funding, allocate, and spend the ever-increasing necessary funds to try to reduce the flooding.
- 2. Adaptation:** Adapt to these unavoidable climate change impacts by adopting and implementing appropriate flood resilience strategies.
- 3. Do Nothing/Status Quo:** Suffer the consequences and brace for more devastation and economic uncertainty.



## **FLOOD RESILIENCE PLANNING**

- Ability to prepare for, absorb, recover from and adapt to adverse flood events
- Define flood resilience areas and adopt smart growth strategies
- Support natural and beneficial floodplain function – leave room for the river



## **TWO-PRONGED APPROACH:**

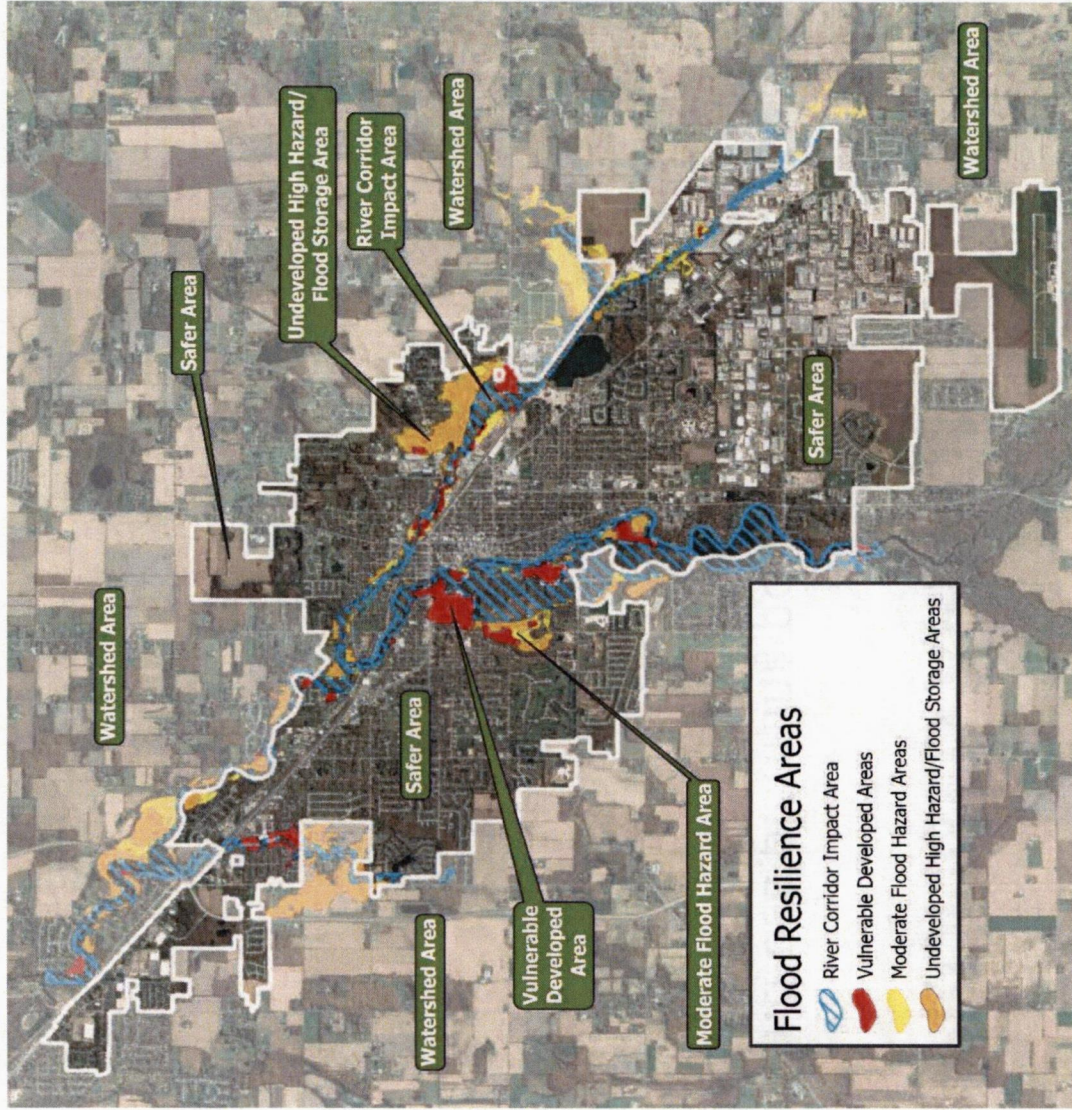
- 1. Use land-use planning policies to direct growth to areas less vulnerable to flooding**
- 2. Identify and implement projects to protect those already vulnerable to flood risk**

# FLOOD RESILIENCE PLANNING AREAS

Planning Area	Area Boundary
River Corridor	Floodway or FEH area, whichever is greater
Undeveloped High Flood Hazard/Flood Storage Area	Undeveloped land in the floodway fringe
Moderate Flood Hazard Area	0.2% or 500-year flood zone
Vulnerable Developed Area	Existing developed land in the SFHA
Safer Area	Outside SFHA, 0.2% and localized flooding areas
Watershed	Entire drainage area

FEH = Fluvial Erosion Hazard

SFHA = Special Flood Hazard Area



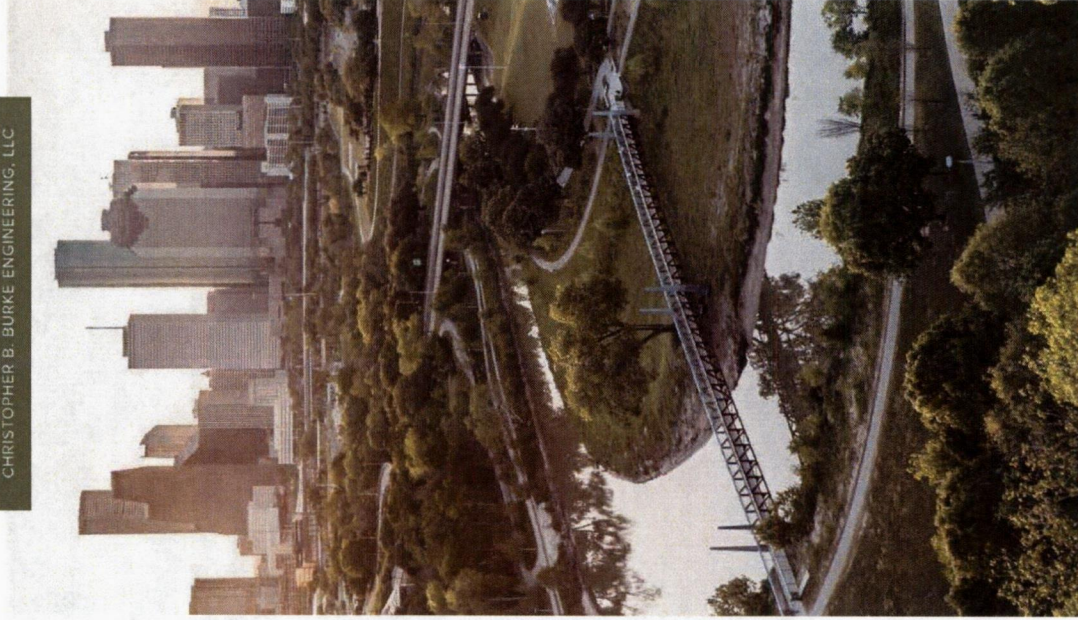
# 1. RIVER CORRIDOR IMPACT AREA

*To conserve land and prohibit development*

## **RECOMMENDED ACTION:**

1. **Adopt fluvial erosion hazard (FEH) regulations**
2. Protect undeveloped land





## 2. UNDEVELOPED HIGH HAZARD /FLOOD STORAGE AREA

*To conserve land and maintain the natural and beneficial function of the floodway fringe; discourage future development*

### **RECOMMENDED ACTION:**

1. Protect undeveloped land in the floodway fringe
2. **Establish compensatory floodplain storage requirement**

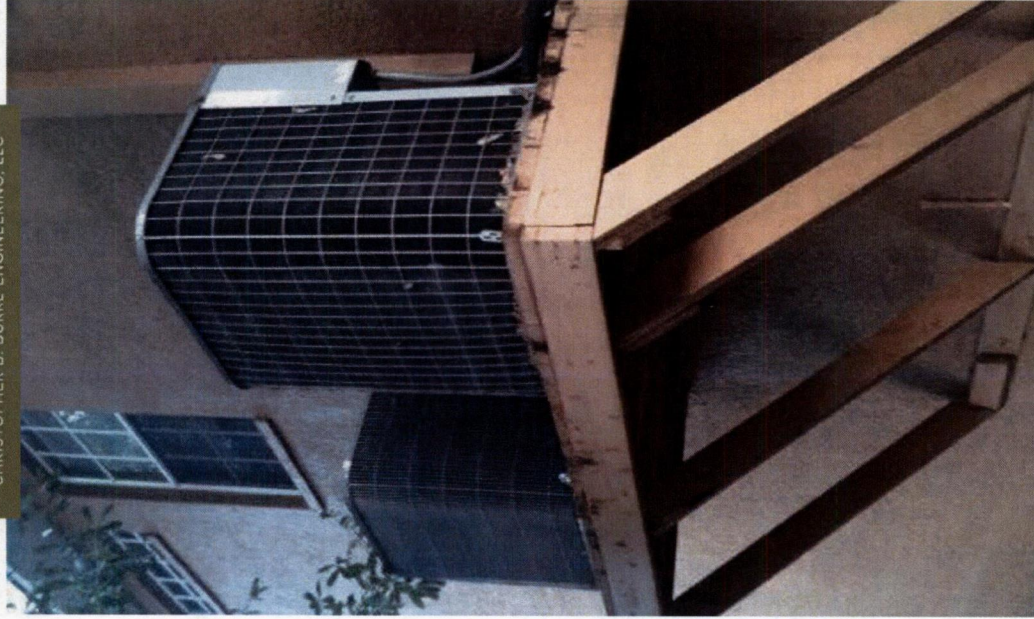


### 3. MODERATE FLOOD HAZARD AREA

*To highlight areas subject to flood risk during extreme flood events, to avoid placement of critical facilities, and preserve these areas as additional flood storage*

#### **RECOMMENDED ACTION:**

1. Discourage new development, especially critical facilities
2. Require higher standards for buildings



## 4. VULNERABLE DEVELOPED AREA

*To protect people, buildings and facilities vulnerable to flooding and reduce future flood risk*

### **RECOMMENDED ACTION:**

1. **Prepare a Flood Response Plan**
2. **Prepare a citywide Stormwater Master Plan**
3. Participate in the National Flood Insurance Program (NFIP) Community Rating System (CRS) program
4. Relocate and/or buyout structures inside the river corridor impact area
5. Retrofit, relocate and/or buyout structures outside the river corridor area
6. Bring nonconforming uses into compliance



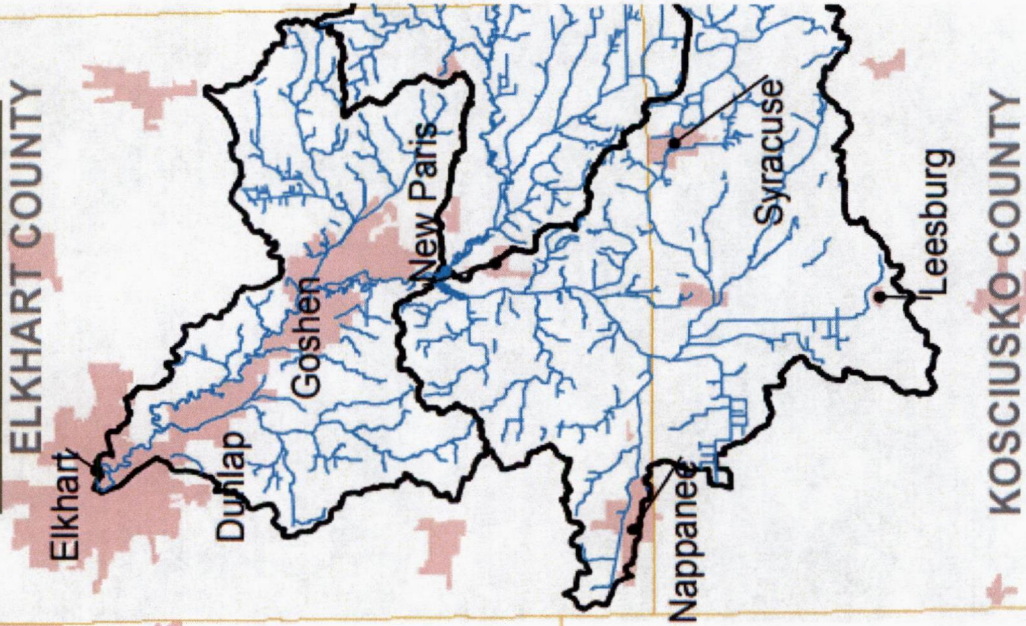


## 5. SAFER AREA

*To plan for and promote development in areas that are less vulnerable to future floods*

### **RECOMMENDED ACTION:**

- Guide growth and development to safer areas
- Promote conservation design and development
- Promote placement of critical facilities in safer areas

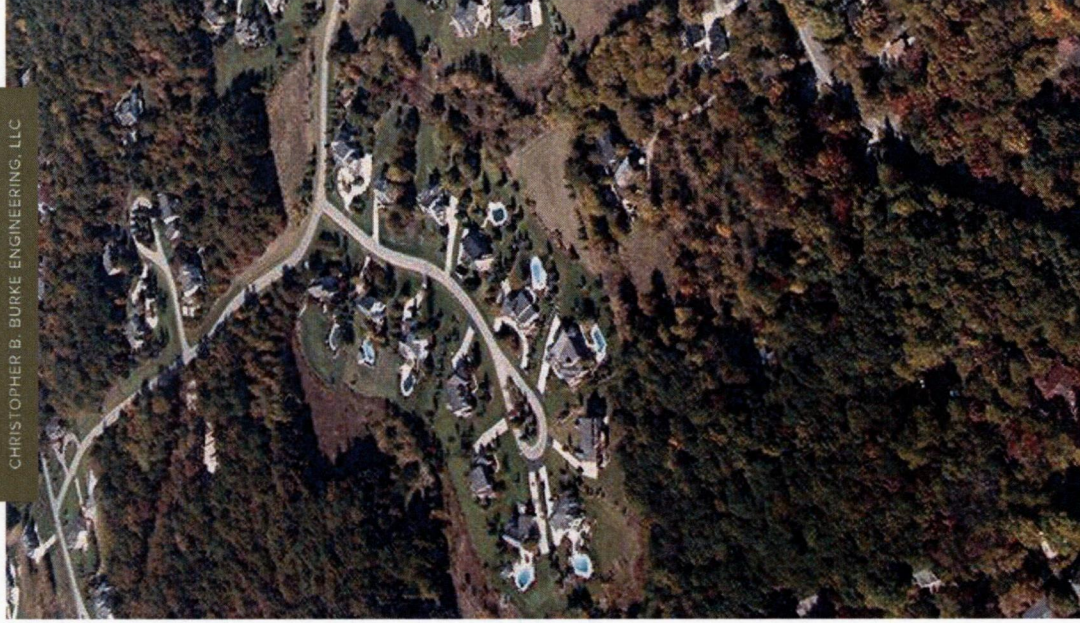


## 6. WATERSHED AREA

*To promote coordination and partnerships and implement practices to slow, spread and infiltrate floodwater*

### **RECOMMENDED ACTION:**

- Support USGS stream gages
- Build partnerships within the watershed
- Support SWCD programs
- Reduce impact from tile and surface drains in the watershed



# OVERALL STRATEGIES

*To improve resiliency citywide. Emphasize importance of syncing plans, policies and regulations for consistency of resilience concepts and strategies.*

## **RECOMMENDED ACTION:**

1. **Update Stormwater Ordinance and conduct training**
2. **Improve flood risk communication and education**
3. Conduct regular audits of plans, programs and policies
4. **Update City Code and Zoning Ordinance**
5. **Update the stormwater utility fee**
6. Integrate resilience into the Comprehensive Plan
7. **Include flood resilience in capital projects**
8. Implement the Multi-hazard Mitigation Plan flood mitigation measures

# DETAILED DISCUSSION OF SHORT-TERM IMPLEMENTATION STRATEGIES

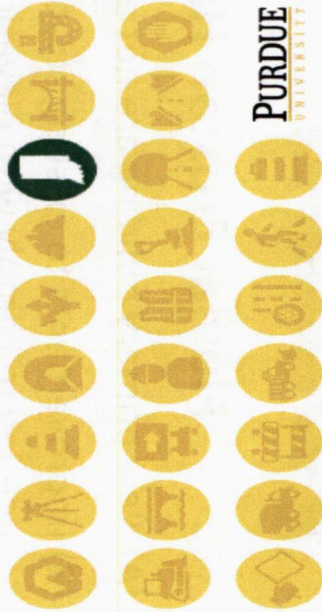


# STORMWATER ORDINANCE

1. Update Stormwater Ordinance and Technical Standards
2. Adopt fluvial erosion hazard (FEH) regulations
3. Adopt compensatory flood storage requirements

## MODEL STORMWATER MANAGEMENT ORDINANCE

AUGUST 2021



## Fluvial Erosion Hazard (FEH) Area

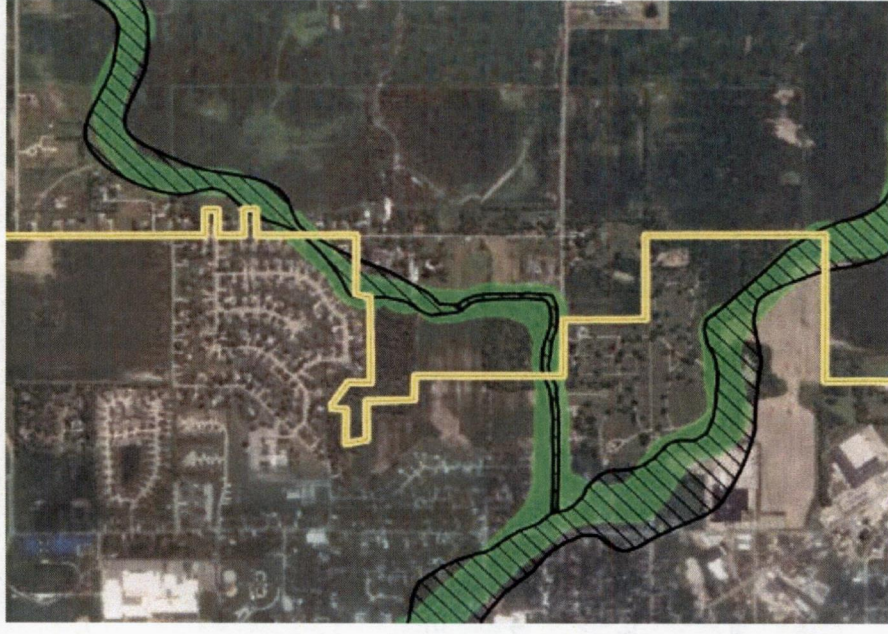
- (A) New primary building are not allowed to be constructed in FEHAs
- (B) Improvements to existing structures, and any associated fill as needed to comply with elevation requirements in the SFHA shall not decrease the distance between the existing structures and the top of bank and must comply with all compensatory flood storage requirements
- (C) Development shall not increase the potential for fluvial erosion damage on the property or on neighboring properties
- (D) Development shall not increase the potential of materials being swept onto other lands or into stream and causing damage to other properties from fluvial erosion
- (E) Development shall not cause an undue burden on public services and facilities including roads, bridges, culverts and emergency service providers during and after fluvial erosion events



Floodway



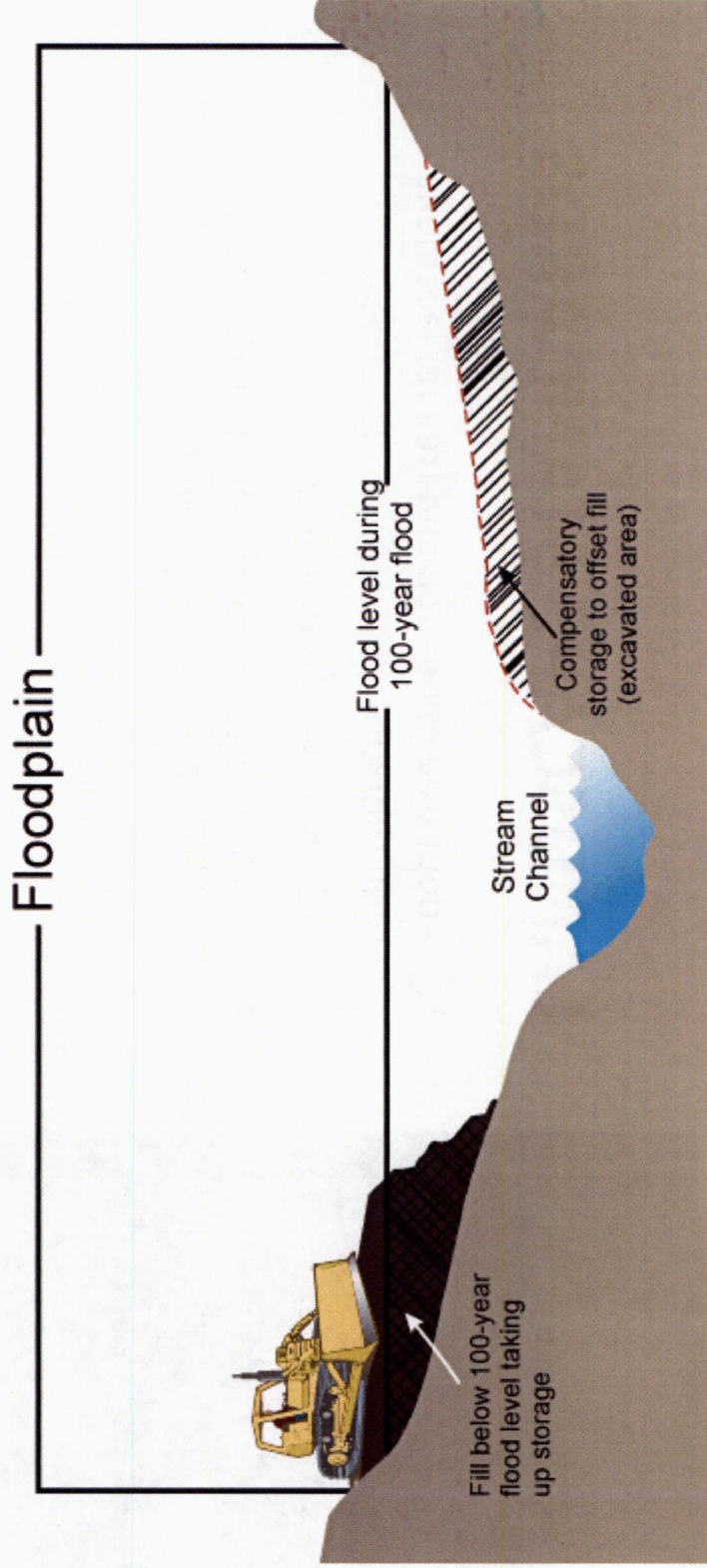
Fluvial Erosion Hazard Area



## Compensatory Flood Storage

Whenever any portion of the SFHA is authorized for use, the volume of space which will be occupied by the authorized fill or structure below the BFE shall be compensated for and balanced by an equivalent volume of excavation taken below the BFE. The excavation volume shall be at least equal to the volume of storage lost (replacement ratio of 1 to 1) due to the fill or structure.

*Noble County, IN Ordinance for Flood Hazard Areas, Article 5: Provisions for Flood Hazard Reduction*





# LANDSCAPE STANDARDS

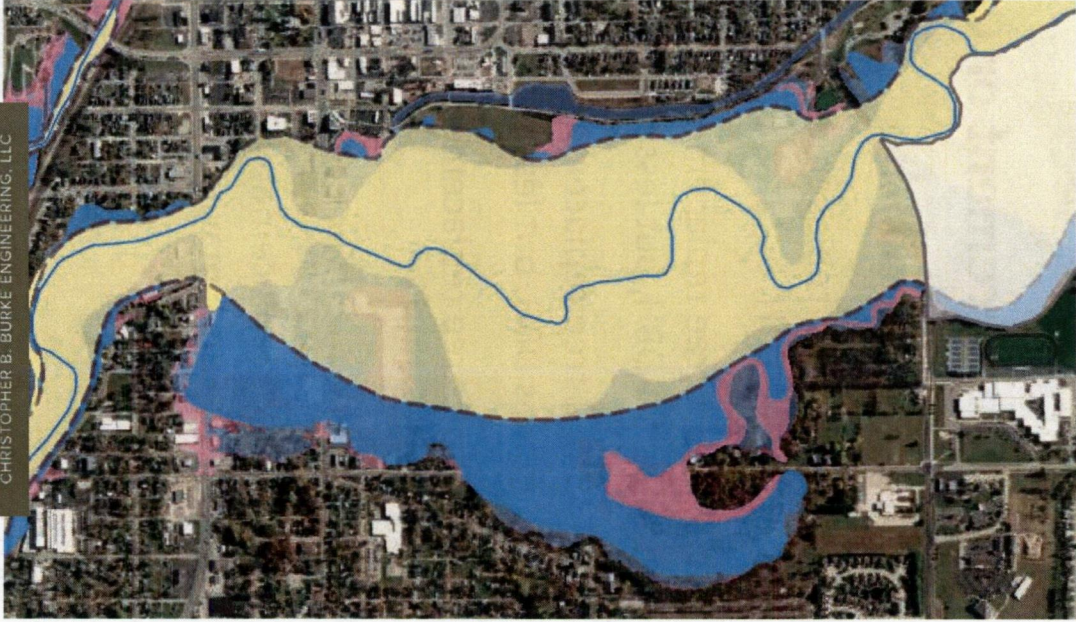
1. Adopt tree mitigation and tree replacement requirements
2. Promote use of native plants
3. Allow vegetated stormwater practices to count toward landscape requirements



## Tree Replacement or Contribution to Tree Fund

1. Tree replacement ratios:
  - a. 1 to 1 tree replacement to removal for trees that are at least 5 inches DBH, but less than 16 inches DBH;
  - b. 2 to 1 tree replacement to removal for trees that are at least 16 inches DBH, but less than 24 inches DBH;
  - b. 3 to 1 tree replacement to removal for trees that are at least 24 inches DBH, but less than 30 inches DBH;
  - c. 4 to 1 tree replacement to removal for trees that are at least 30 inches DBH.
2. *[specifies location, minimum caliper and/or height, native species]*
3. In lieu of replacement, applicant shall pay \$200 per replacement tree to Tree Fund; maximum payment is \$10,000 per project





# FLOOD CONTROL DISTRICT

1. Update flood resilience planning areas based on updated FIRM information



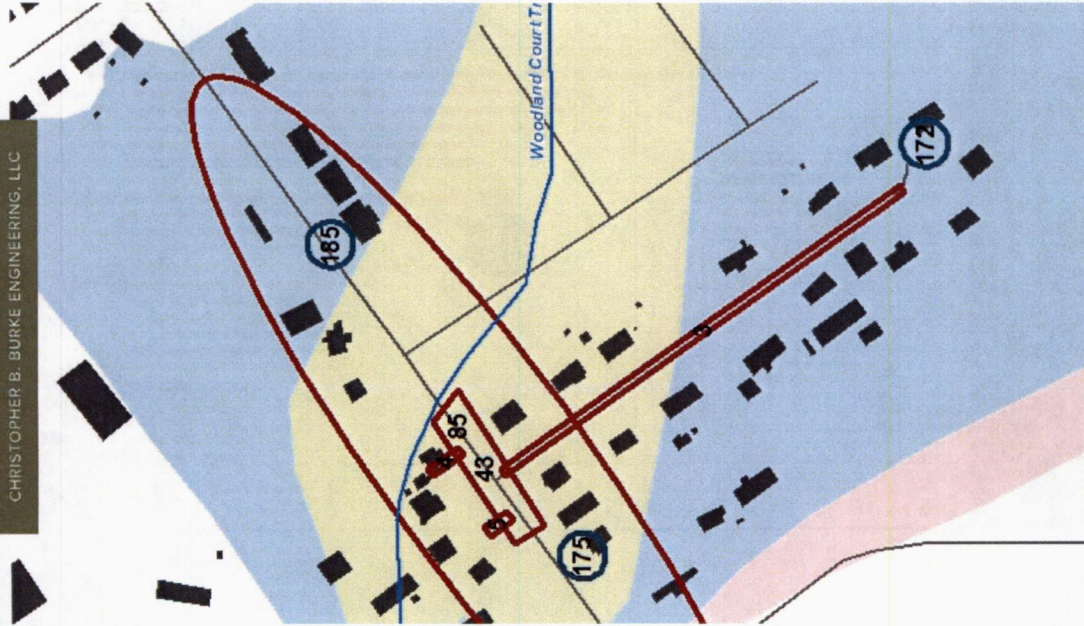
# REDEVELOPMENT

1. Promote growth and development in safer areas
2. Consider climate change and flood impacts in capital projects; promote low impact development and green infrastructure



# COMMUNICATION, EDUCATION & TRAINING

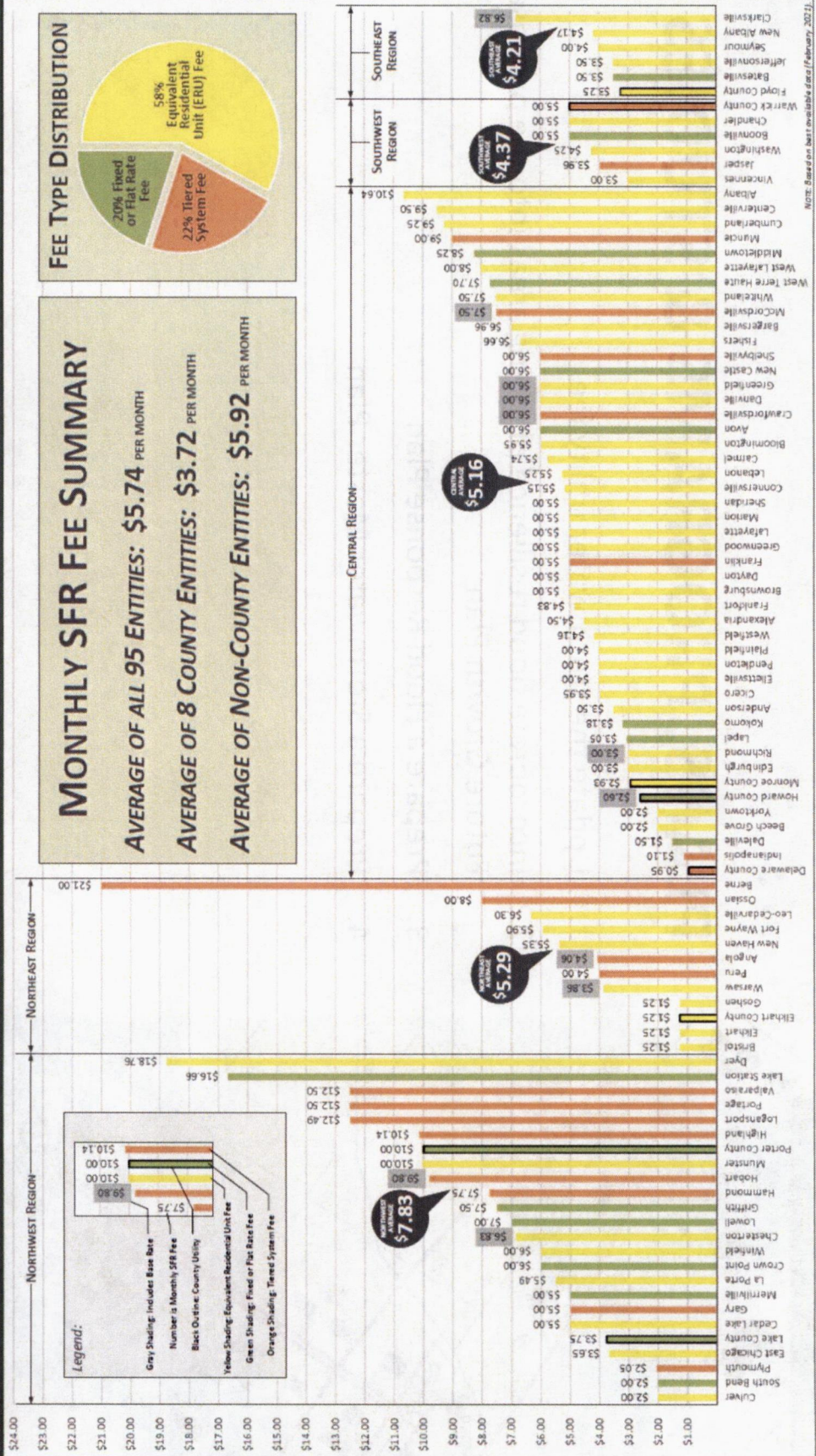
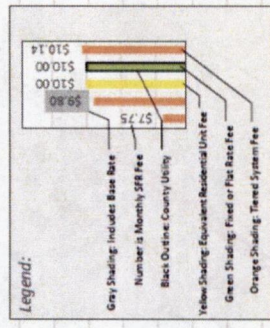
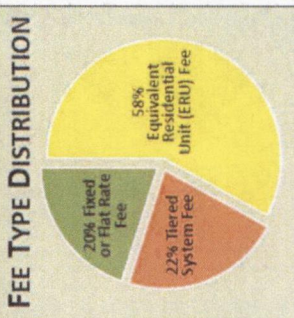
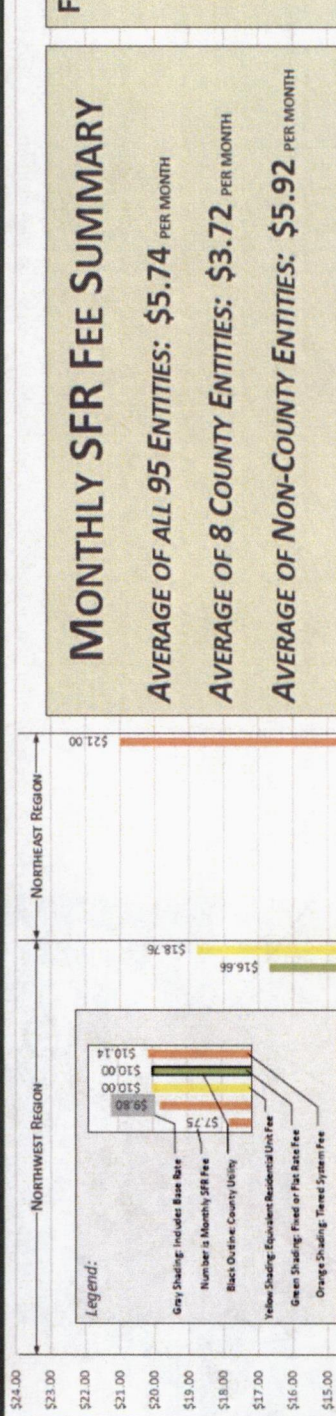
1. Train city stormwater inspection staff about green infrastructure practices
2. Develop a flood risk education and outreach program



# PLANS, PROGRAMS & STUDIES

1. Update the stormwater utility fee
2. Incorporate flood resilience planning areas into the proposed Future Growth Plan
3. Prepare a Flood Response Plan
4. Prepare a Stormwater Master Plan

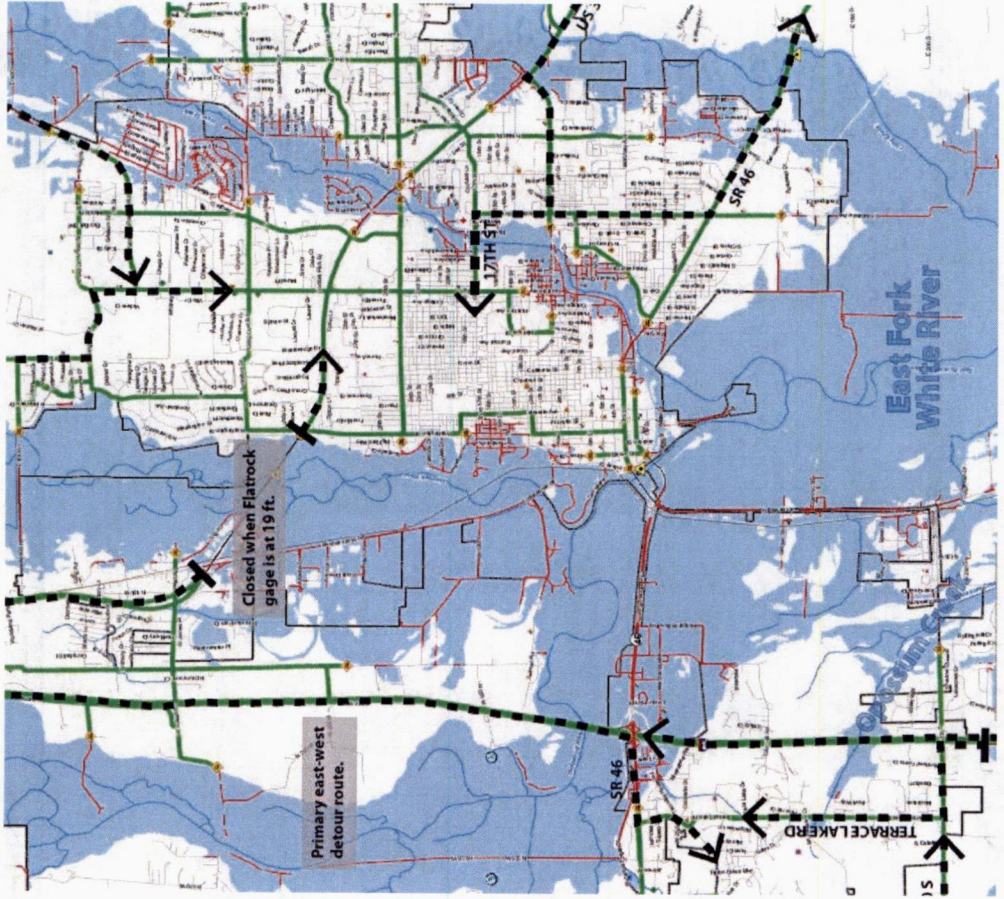
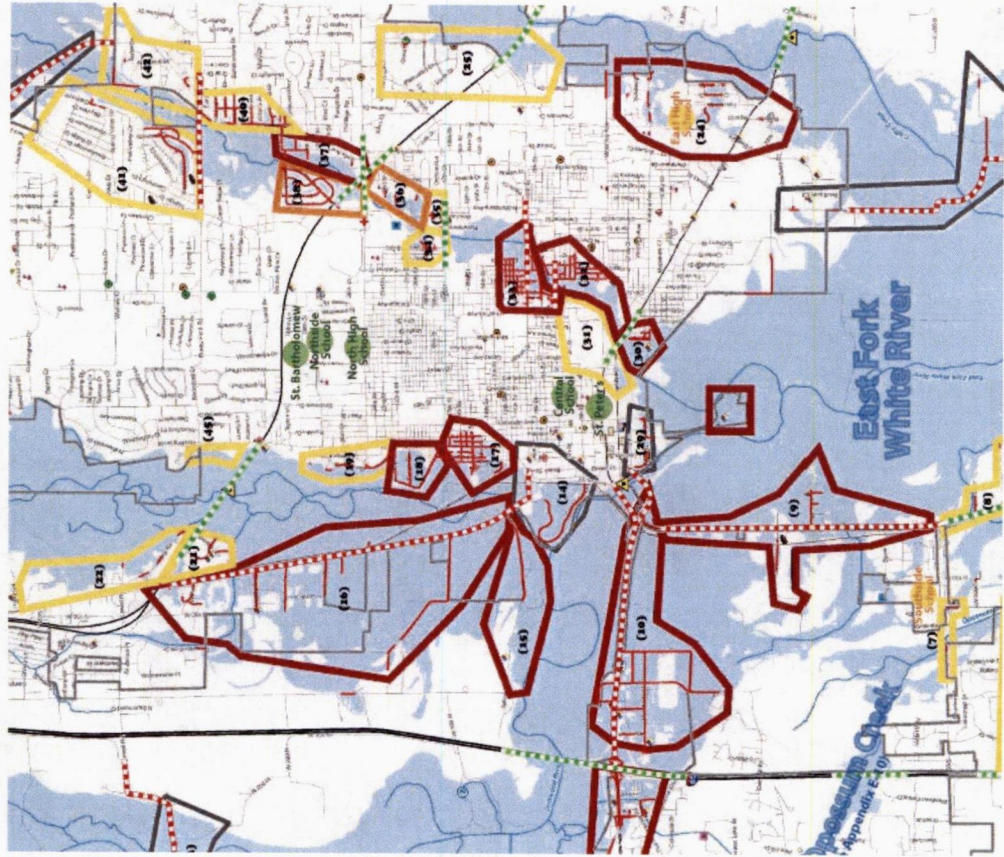
# INDIANA STORMWATER UTILITIES MONTHLY SFR FEES AND FEE TYPES



NOTE: Based on best available data (February 2021).

# Flood Response Plan

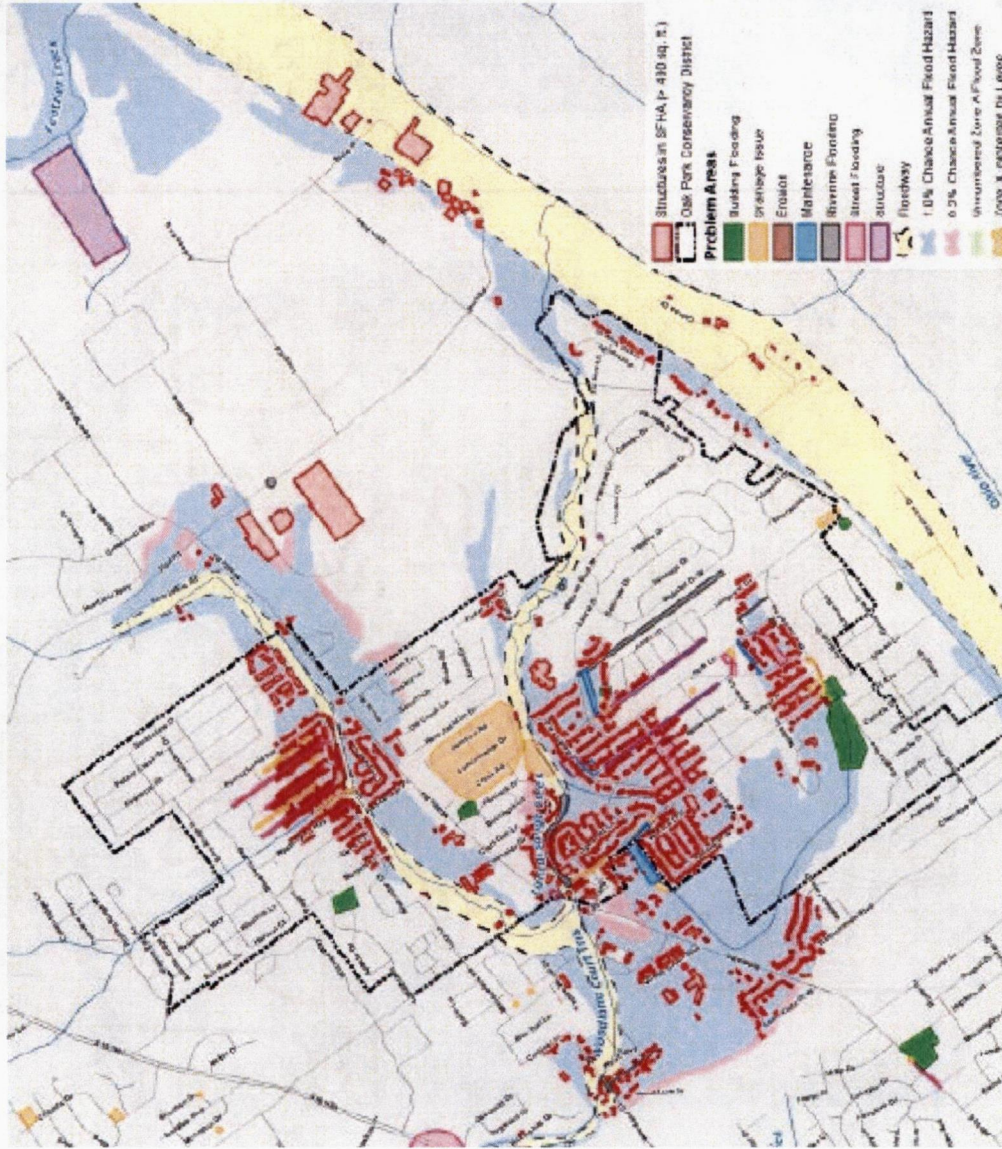
CHRISTOPHER B. BURKE ENGINEERING, LLC



City of Columbus, IN Flood Response & Evacuation Plan

# Stormwater Master Plan

CHRISTOPHER B. BURKE ENGINEERING, LLC



**2012 STORMWATER MASTER PLAN RECOMMENDED PROJECTS**

**Quick facts on...**

**Bypass Channel of Lancassange Creek (Master Plan Project PS-22)**

**CITY OF JEFFERSONVILLE**  
Mayor Mike Moore

**The Situation...**  
Much of the Oak Park Conservancy District (OPCD) area is in the Lancassange Creek floodplain. Many structures flood & roads become impassable during large rainfall events.

**What Can We Do?**  
A 4,800 foot long bypass channel is proposed to convey floodwater away from the OPCD and reduce flooding in the area. The bypass channel would also significantly reduce the size of the Lancassange Creek floodplain within OPCD and reduce the need for structures to carry flood insurance.

**Target Study Areas**

The larger neighborhood and regional scale problem areas identified in this Master Plan fall into the following 9 Target Study Areas:

- 1) Buildings in the Floodplain
- 2) CSO/Downtown Area
- 3) Mill Creek
- 4) Woodland Court
- 5) Oak Park Conservancy District
- 6) Waverly
- 7) Lick Run
- 8) Lantzler Creek
- 9) Citywide Programs & Policies

**What are the Next Steps?**

1. To correctly size the bypass channel and accurately measure its benefits, an updated storm hydraulic study for Lancassange Creek in OPCD (PS-22) is needed.
2. Prepare for and meet with representatives from the Indiana Port Authority to discuss the feasibility of obtaining easements or acquiring land needed for construction of the bypass channel.
3. Summarize findings and conceptual drawings in a Preliminary Engineering Report.

**ESTIMATED TIME TO COMPLETE NEXT STEP:**  
6 Months

**ESTIMATED COST TO COMPLETE NEXT STEP:**  
\$50,000

**ESTIMATED COST FOR FULL IMPLEMENTATION OF PROJECT:**  
\$2,400,000

**BENEFITS OF THIS PROJECT:**

- Reduce flooding
- Remove structures from the floodplain

Prepared by **CB**  
CHRISTOPHER B. BURKE ENGINEERING, LLC

Jeffersonville City Council District(s) Benefitted by the above Stormwater Master Plan Project:

District 1	District 2	District 3	District 4	District 5	District 6
------------	------------	------------	------------	------------	------------

Visit [WWW.CITYOFFEFF.NET](http://WWW.CITYOFFEFF.NET) to view the full Stormwater Master Plan

City of Jeffersonville, IN Stormwater Master Plan





CHRISTOPHER B. BURKE ENGINEERING, LLC

## **Flood Resilience Plan ArcGIS Online Map**

<https://cbbel-in.maps.arcgis.com/apps/webappviewer/index.html?id=1544826de5ee48d8923bc79c26c6a250>

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Vice President, Principal Engineer  
[sbeik@cbbel-in.com](mailto:sbeik@cbbel-in.com)

**Sheila McKinley, AICP, CFM, LEED Green Associate**  
Director, Planning  
[smckinley@cbbel-in.com](mailto:smckinley@cbbel-in.com)

**Christopher B. Burke Engineering, LLC**  
[www.cbbel-in.com](http://www.cbbel-in.com)  
317-266-8000



# Assessing Flood Vulnerability in Goshen

January 14, 2022

City of Goshen Stormwater Department

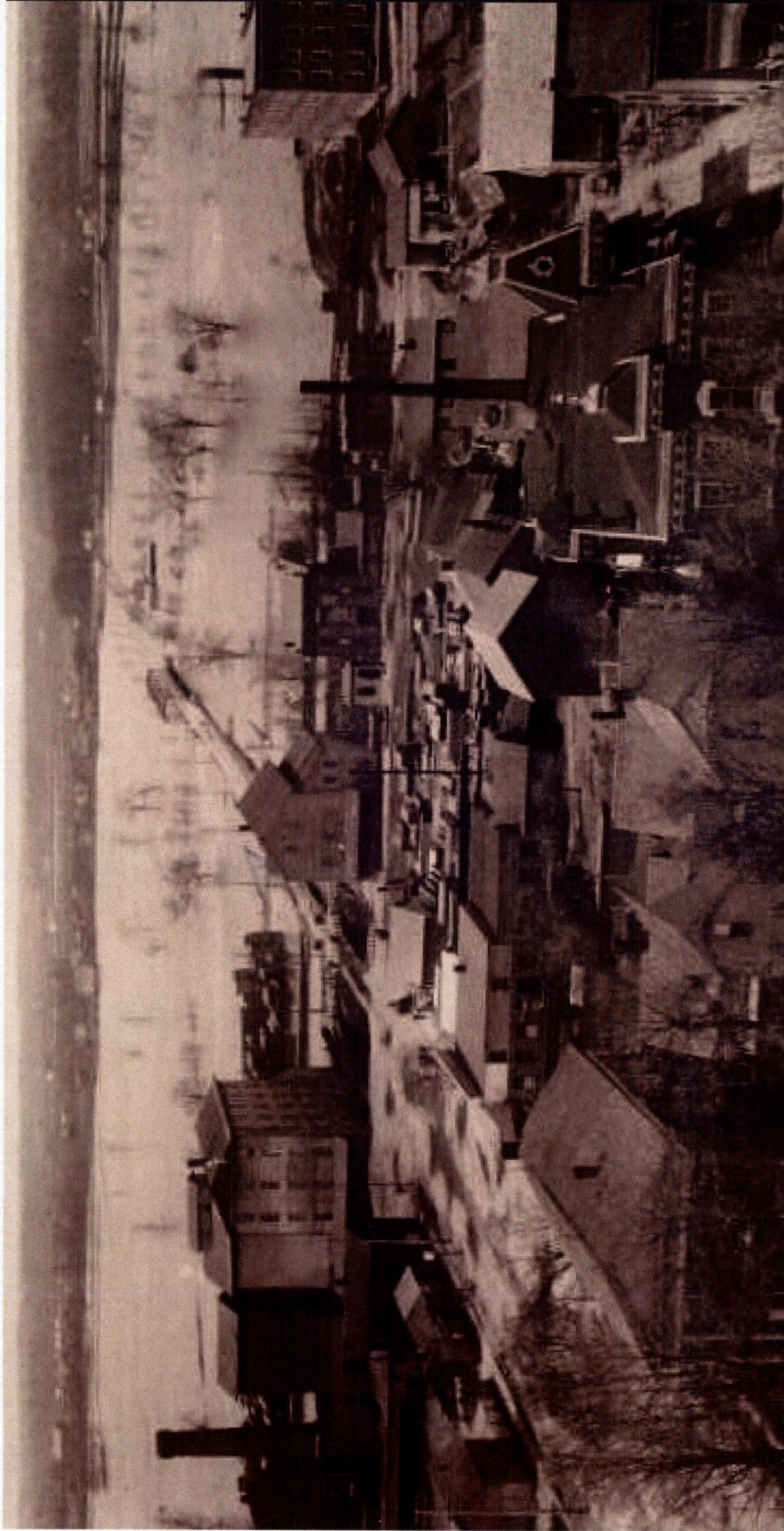
Exhibit #2



Shanklin and Mullet Parks (left) and Creekside Manner (right)



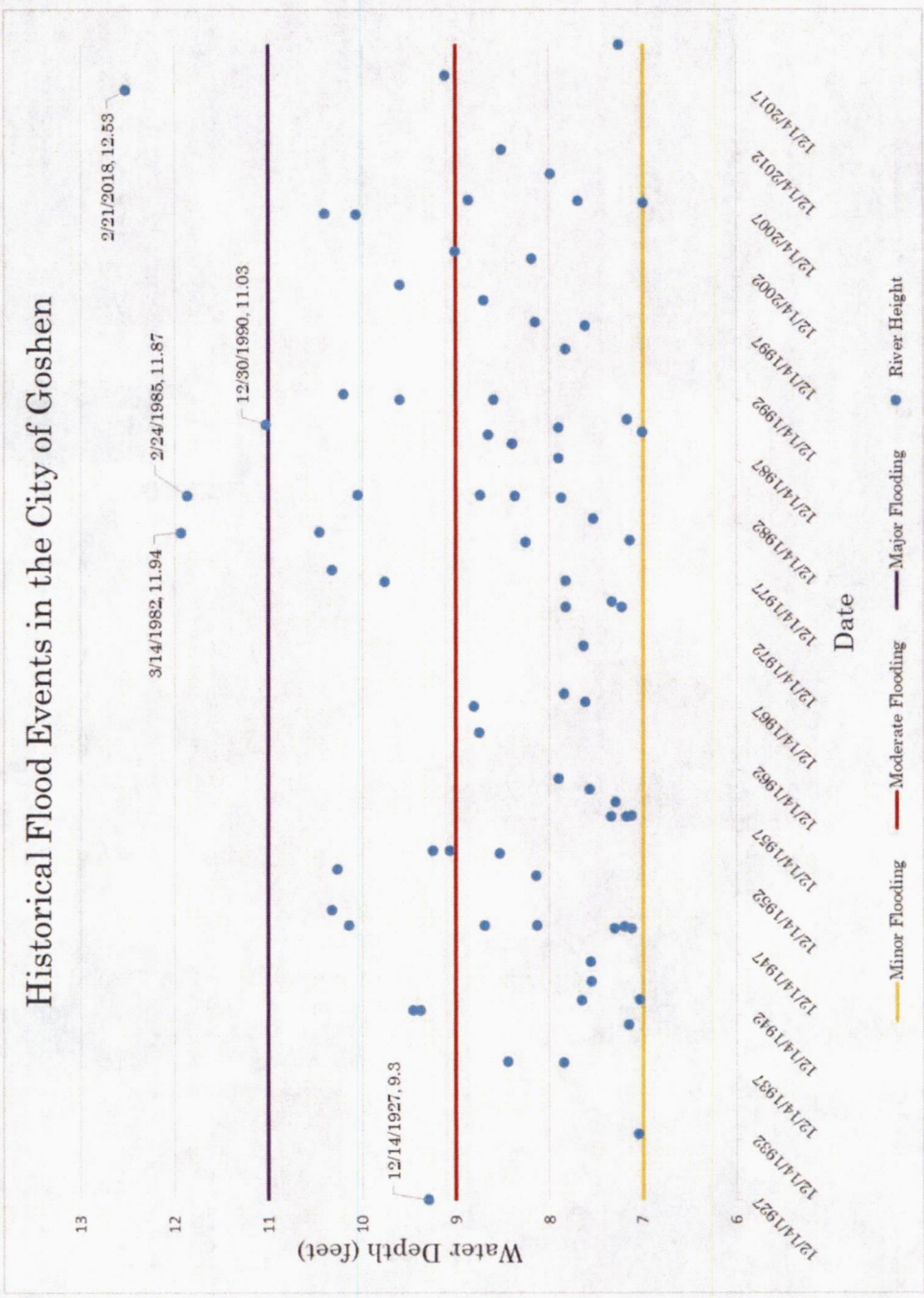
February 21, 2018 – Trinity Square and Linway Plaza



1892 – View of Lincoln Ave. bridge from County Courthouse

# Major Historical Flooding Events

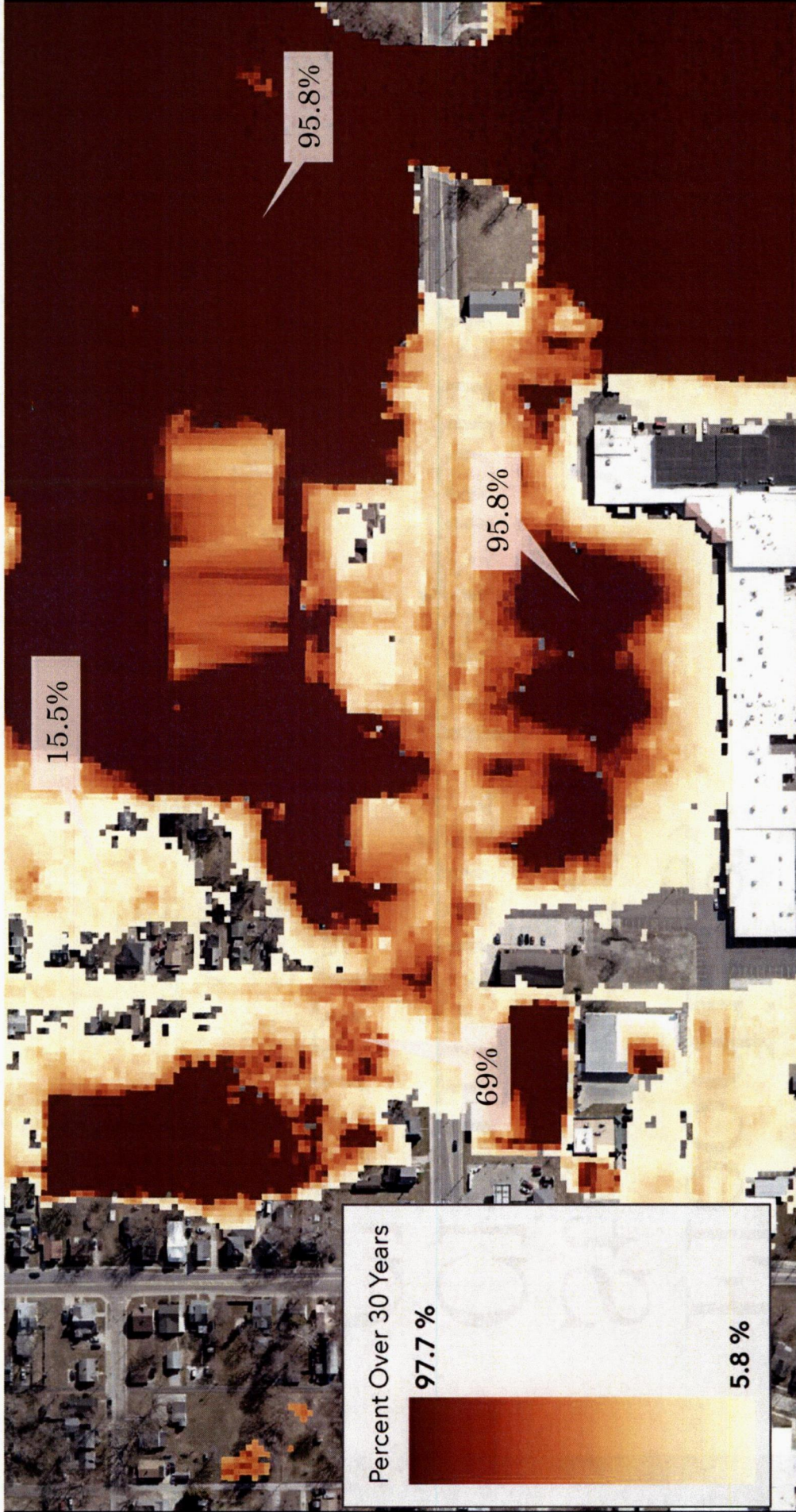
- USGS River Gauge has been located near N Indiana Avenue Bridge over the Elkhart River since September 11, 1924.
- First recorded flood occurred on December 14, 1927.
- Four major flood events (11+ feet) have occurred since 1982.







Percent Annual Chance of Flooding



Percent 30-year Chance of Flooding

# Flooding, Stormwater, and a Changing Regional Climate

Partnering with the Great Lakes Integrated Sciences and  
Assessments (GLISA) for a Climate Change Vulnerability Assessment  
for Stormwater

# Assessment at a Glance

- Regional Climate Predictions
- Social Vulnerability Indicators
- Landscape Features
- Assessment Locations
- Final Matrix

Climate Change in the Great Lakes Region		
Risk	By Mid-Century	By End of Century
<b>Convective Weather</b> (Severe Winds, Lightning, Tornadoes, Hail)	Uncertain*	↑
<b>Severe Winter Weather</b> (Ice/Sleet Storms, Snow Storms)	Uncertain*	↑
<b>Extreme Heat</b>	↓	<b>Wildfires</b> Uncertain*
<b>Extreme Cold</b>	↓	<b>Drought</b> Uncertain*
		<b>Infestation</b> ↑
		<b>Dam Failures</b> ↑
		<b>Flood Hazards</b> ↑

Stronger and more extreme precipitation events coupled with aging dam infrastructure will increase the probability of dam failure, if appropriate measures are not taken.

Stronger and more extreme precipitation events will be more likely to overwhelm stormwater infrastructure without appropriate adaptation efforts.

Summer drought and the number of consecutive dry days may increase in the future, despite more precipitation annually, increasing the risk of wildfires.

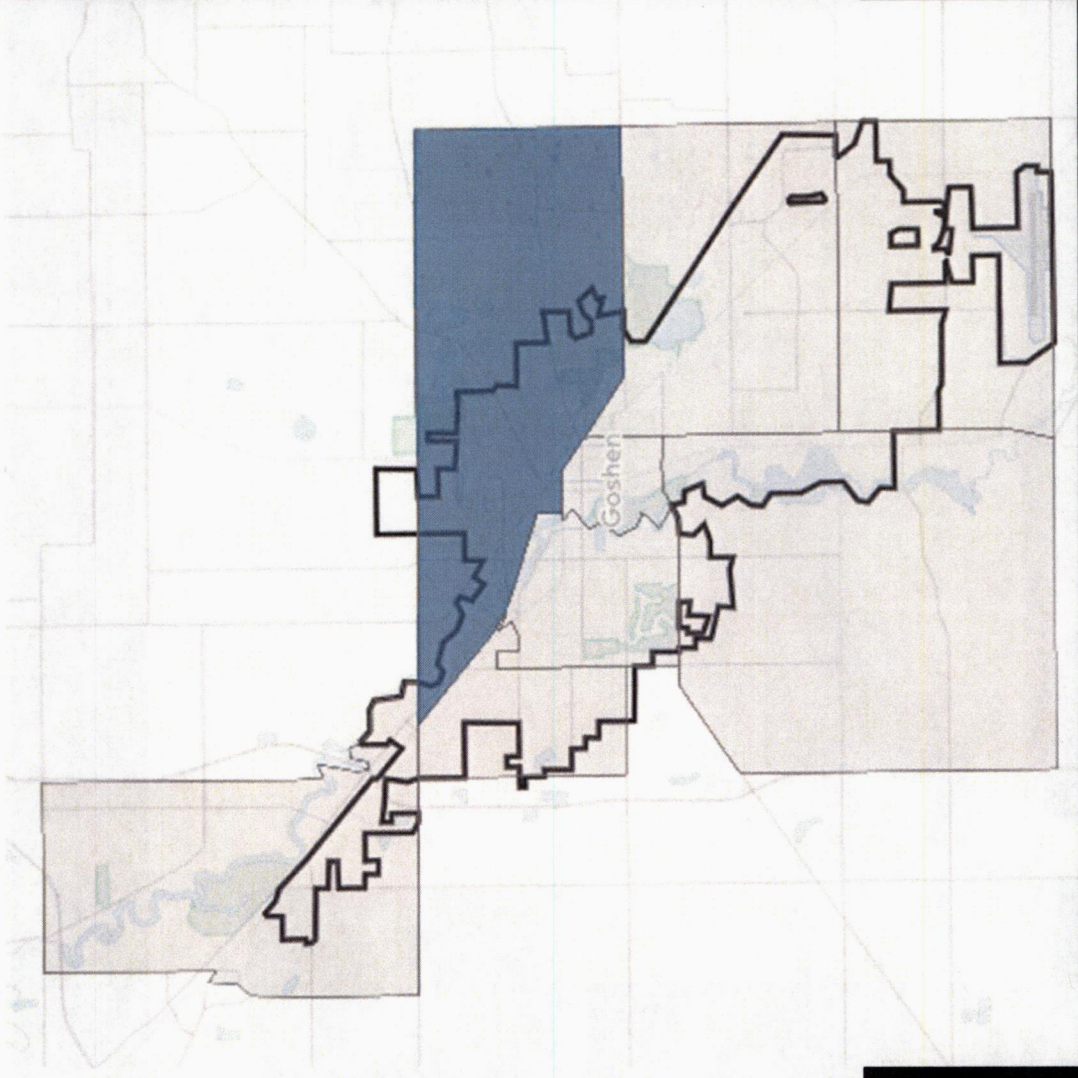
Summer drought and the number of consecutive dry days may increase in the future.

With shorter winters and longer growing seasons, conditions may become more suitable for invasive species and pests currently found elsewhere and distribute vector-borne illnesses.

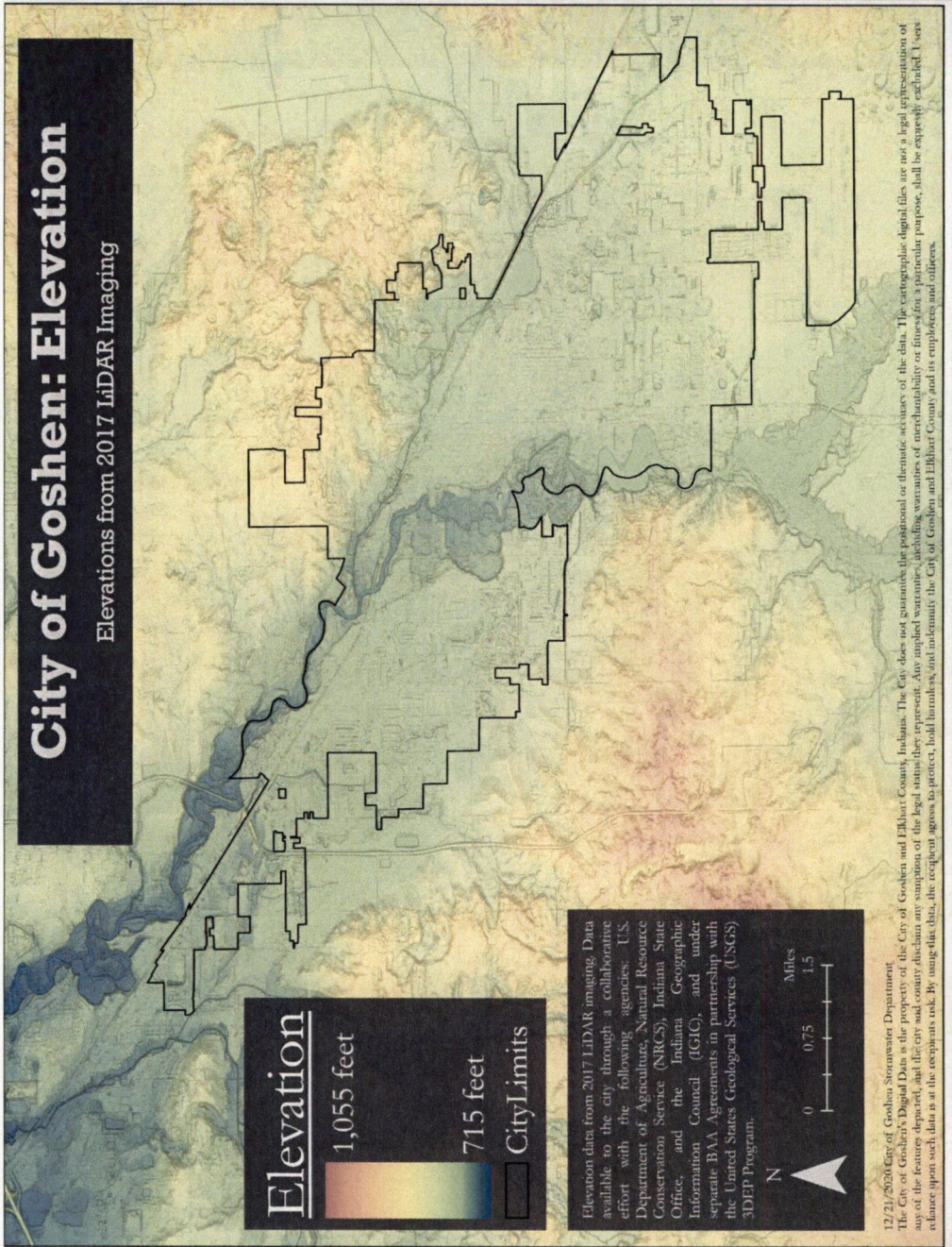
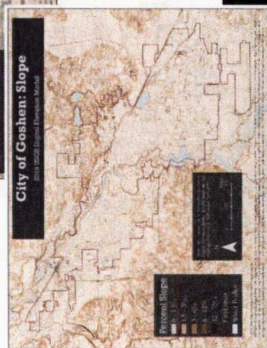
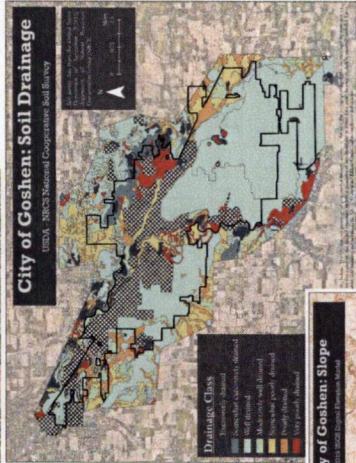
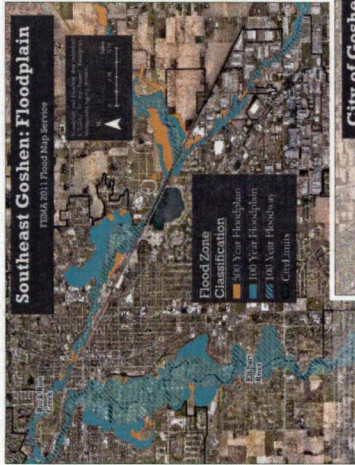
## Climate Change in Great Lakes and Goshen

Section assembled from a variety of sources by the Great Lakes Integrated Sciences and Assessments (GLISA)—a NOAA supported collaboration between University of Michigan and Michigan State University.

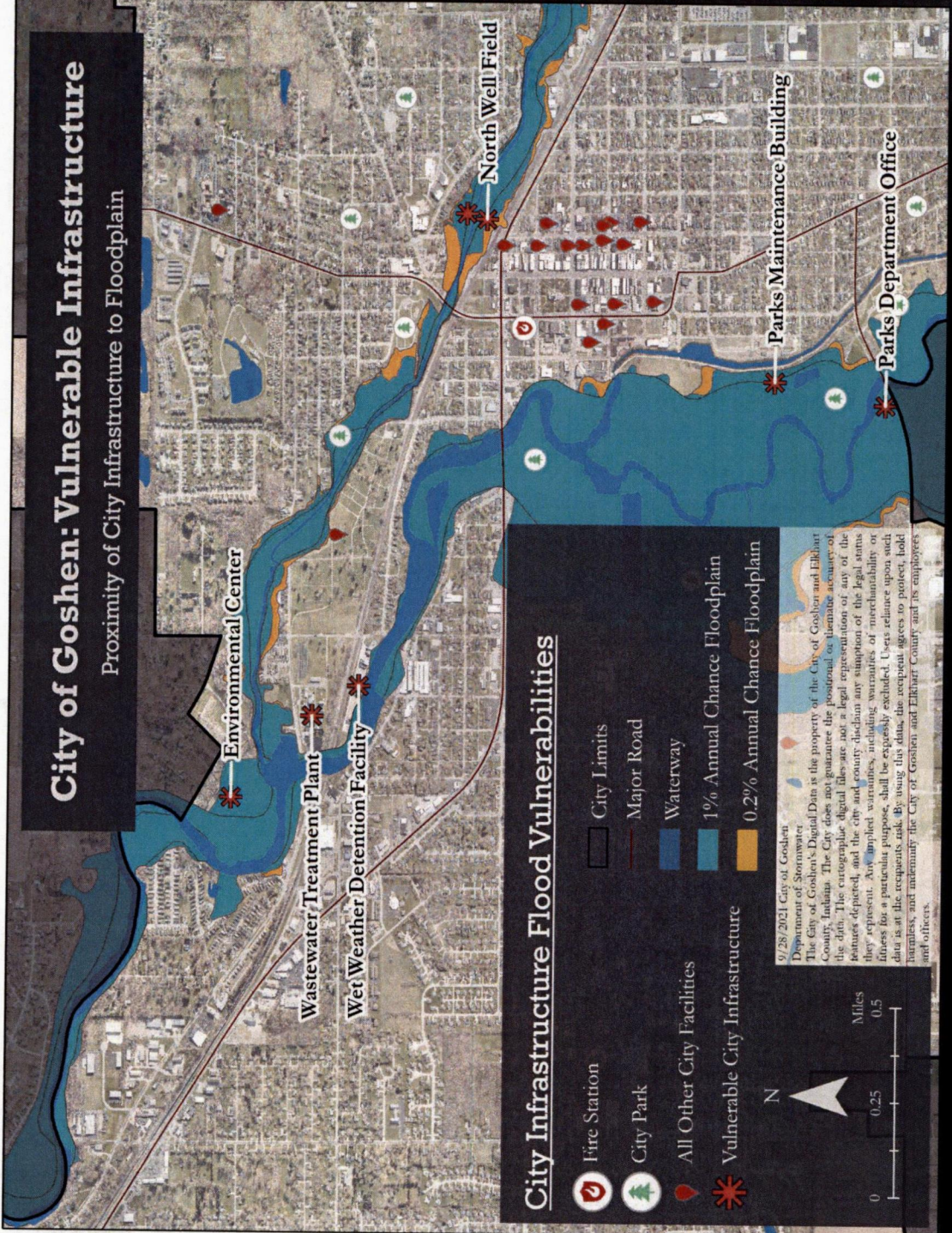
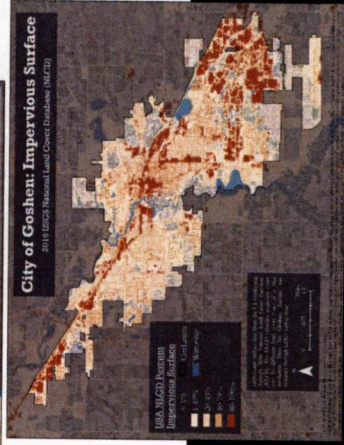
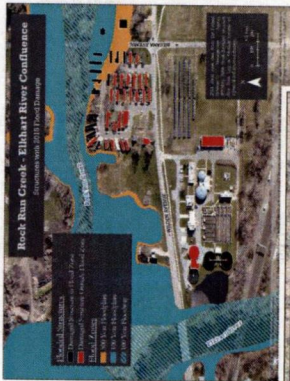
- 92<sup>nd</sup> vulnerability percentile in State
- Factors Impacting
  - Poverty
  - Limited English proficiency
  - Persons of Color or Hispanic
  - Persons without health insurance
  - Persons without a car
  - Persons with disabilities
  - Percent rental and mobile homes,
  - Persons without a high school diploma



## Demographic Trends



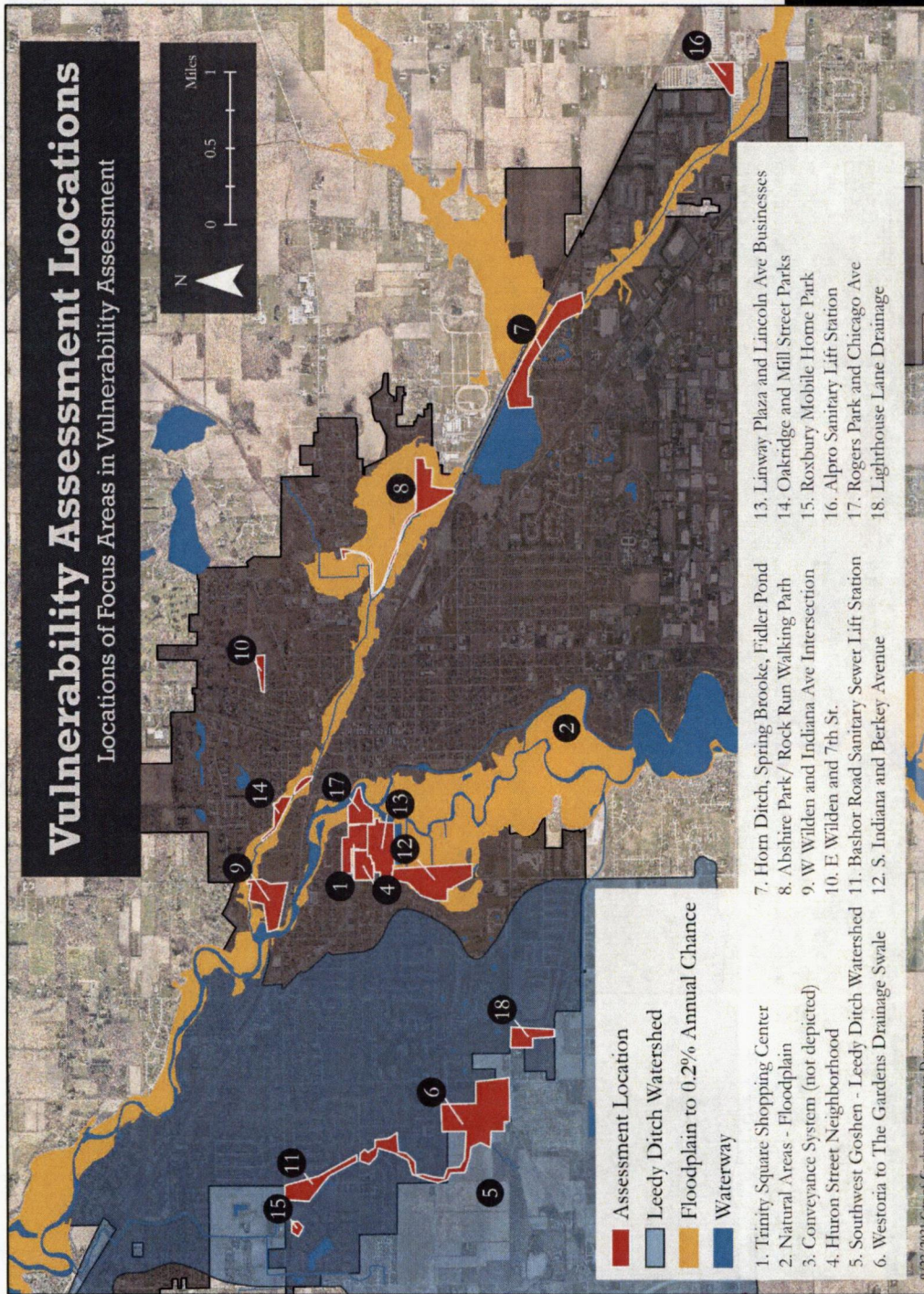
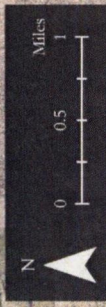
# Landscape Features





# Vulnerability Assessment Locations

Locations of Focus Areas in Vulnerability Assessment



- Assessment Location
- Leedy Ditch Watershed
- Floodplain to 0.2% Annual Chance
- Waterway

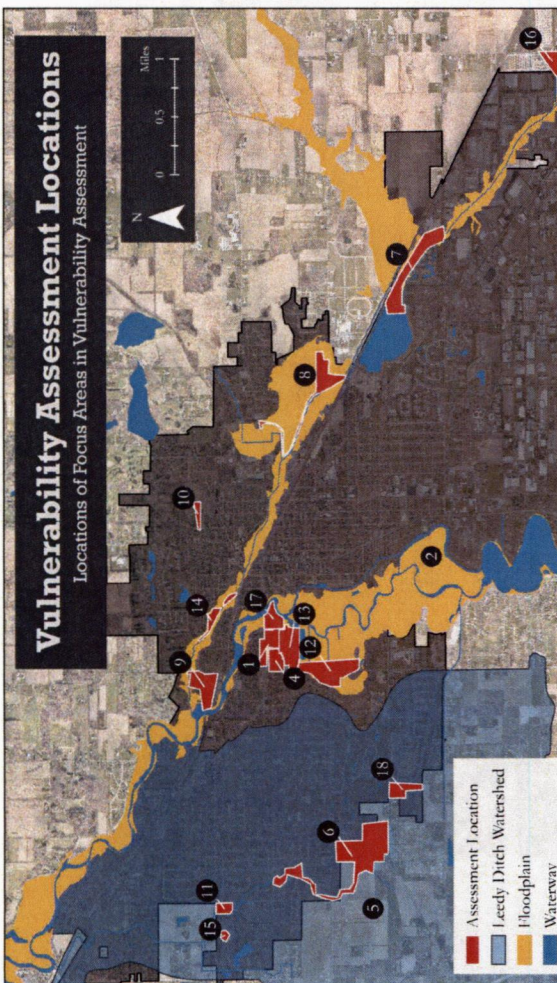
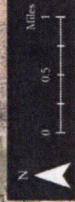
1. Trinity Square Shopping Center
2. Natural Areas - Floodplain
3. Conveyance System (not depicted)
4. Huron Street Neighborhood
5. Southwest Goshen - Leedy Ditch Watershed
6. Westoria to The Gardens Drainage Swale
7. Horn Ditch, Spring Brooke, Fidler Pond
8. Abshire Park/ Rock Run Walking Path
9. W Wilden and Indiana Ave Intersection
10. E Wilden and 7th St.
11. Bashor Road Sanitary Sewer Lift Station
12. S. Indiana and Berkey Avenue
13. Linway Plaza and Lincoln Ave Businesses
14. Oakridge and Mill Street Parks
15. Roxbury Mobile Home Park
16. Alpro Sanitary Lift Station
17. Rogers Park and Chicago Ave
18. Lighthouse Lane Drainage

9/23/2021 City of Goshen Stormwater Department

# Assessment Locations

# Vulnerability Assessment Locations

Locations of Focus Areas in Vulnerability Assessment



- 1. Trinity Square Shopping Center
- 2. Natural Areas - Floodplain
- 3. Conveyance System (not depicted)
- 4. Huron Street Neighborhood
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- 7. Horn Ditch, Spring Brooke, Fidler Pond
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- 9. W. Wilken and Indiana Ave Intersection
- 10. E. Wilken and 7th St.
- 11. Bushor Road Sanitary Sewer Lift Station
- 12. S. Indiana and Berkey Avenue
- 13. Linway Plaza and Lincoln Ave Businesses
- 14. Oakridge and Kauffman Parks
- 15. Roxbury Mobile Home Park
- 16. Kenber Road Sanitary Lift Station
- 17. Rogers Park and Chicago Ave
- 18. Lighthouse Lane Drainage

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# Sensitivity

		Low					High						
		S0	S1	S2	S3	S4							
AC4	High	15											
AC3		2		8, 14, 16	6, 10, 11, 18								
AC2					3, 5, 7, 12	9, 17							
AC1					4								
AC0	Low					1, 13							

# Adaptive Capacity



**Goshen Flood Resilience Plan Implementation Guidance**

This table is meant to help prioritize and track implementation progress of flood resilience strategies. As circumstances change, the timeline for implementation will change and some flood resilience strategies may get implemented sooner and others later than listed below. Implementation is dependent on available funding and staff resources. This table should be reviewed and updated at least annually with the flood resilience checklist in Appendix 2.

FLOOD RESILIENCE STRATEGY	IMPLEMENTATION STEPS	REPORT REFERENCE	IMPLEMENTATION LEAD	IMPLEMENTATION TIMELINE				COMPLETED
				Short-term (1-5 yrs)	Mid-term (5-10 yrs)	Long-term (10+ yrs)	Ongoing	
<b>COMPREHENSIVE PLAN</b> Add a discussion on flooding, climate change, and flood resilience planning areas to the Comprehensive Plan.	<ul style="list-style-type: none"> <li>Draft language from Flood Resilience Plan (Chapter 1 and Section 4.3)</li> <li>Incorporate into next plan update (Natural Environment)</li> </ul>	5.6	Planning		X			
<b>STORMWATER ORDINANCE</b> Customize and adopt the LTAP Model Stormwater Ordinance and Technical Standards and include requirements for fluvial erosion hazard areas, channel protection volume, compensatory flood storage, low impact development/green infrastructure and climate change.	<ul style="list-style-type: none"> <li>Review model language from LTAP</li> <li>Customize to meet local needs and resources</li> <li>Adopt ordinance into City Code (Title 6, Article 6: Stormwater)</li> <li>May require assistance from a consultant</li> </ul>	5.1	Engineering		X			
Adopt standalone fluvial erosion hazard regulations to prohibit and if not possible, discourage new development and redevelopment in this area or include it as part of the customized LTAP Model Stormwater Ordinance and Technical Standards recommendation.	<ul style="list-style-type: none"> <li>If not included in stormwater ordinance and technical standards, draft language for fluvial erosion hazard regulations</li> <li>Adopt language into City Code (Title 6, Article 6: Stormwater)</li> <li>May require assistance from a consultant</li> </ul>	6.1.1	Engineering		X			
Adopt a standalone minimum 3:1 compensatory flood storage requirement or include it as part of the customized LTAP Model Stormwater Ordinance and Technical Standard recommendation.	<ul style="list-style-type: none"> <li>If not included in stormwater ordinance and technical standards, draft language for compensatory flood storage requirements</li> <li>Adopt language into City Code (Title 6, Article 6: Stormwater)</li> <li>May require assistance from a consultant</li> </ul>	6.2.2	Engineering		X			
<b>CITY CODE AND ZONING ORDINANCE – LANDSCAPE STANDARDS</b>								
Expand the tree preservation language in the Zoning Ordinance to include replacement of trees lost to development. Consider a tree mitigation ratio of 5:1 based on tree size and require a variety of native species to reduce the risk of mass tree casualties from future pest damage.	<ul style="list-style-type: none"> <li>Draft language to specify tree species, size, etc. and agreed upon ratio for replacement</li> <li>Adopt language into Zoning Ordinance (Article V, Section 5000: Landscape Requirements); refer to updated native tree list in City Code (5.4)</li> </ul>	5.4	Planning Environmental Resilience		X			
Promote the use of native plants in the Zoning Ordinance by requiring a high percentage to meet the landscape standards and update the recommended tree list in the City Code to include more native species and cultivars.	<ul style="list-style-type: none"> <li>Draft language to encourage use of more natives; list species</li> <li>Adopt language into Zoning Ordinance (Article V, Section 5000: Landscape Requirements)</li> <li>Adopt tree list into City Code (Title 6, Article 8: Trees)</li> </ul>	5.4	Planning Environmental Resilience		X			
Allow vegetated green infrastructure practices, including parking areas, to count toward landscape requirements in the Zoning Ordinance.	<ul style="list-style-type: none"> <li>Draft language to incentivize green infrastructure</li> <li>Coordinate with stormwater green infrastructure standards</li> <li>Adopt language into Zoning Ordinance (Article V, Section 5000: Landscape Requirements)</li> </ul>	5.4	Planning Stormwater		X			

FLOOD RESILIENCE STRATEGY	IMPLEMENTATION STEPS	REPORT REFERENCE	IMPLEMENTATION LEAD	IMPLEMENTATION TIMELINE				COMPLETED
				Short-term (1-5 yrs)	Mid-term (5-10 yrs)	Long-term (10+ yrs)	Ongoing	
<b>ZONING ORDINANCE – FLOOD CONTROL DISTRICT</b>								
Update flood resilience planning areas based on updated FIRM information.	<ul style="list-style-type: none"> <li>Compare updated FIRM boundaries and revise the flood resilience planning areas accordingly</li> </ul>	5.4	Planning Environmental Resilience	X				
Amend the Flood Control District regulations to require new critical facilities to be located outside of known flood hazard areas only, including the 0.2% AEP flood zone. If placement of new critical facilities in flood hazard area is unavoidable, the facility, including access, should be protected to at least one foot above the 0.2% AEP flood elevation.	<ul style="list-style-type: none"> <li>Draft language specifying location and access to critical facilities</li> <li>Adopt language into Zoning Ordinance (Article IV, Section 4270: Flood Control District)</li> </ul>	5.4 6.3.1 6.5.3	Planning		X			
Amend the Flood Control District regulations to prohibit and if not possible, discourage new development and redevelopment in the floodway and undeveloped high flood hazard storage areas in the floodway fringe.	<ul style="list-style-type: none"> <li>Draft language to direct growth outside flood hazard areas</li> <li>Adopt language into Zoning Ordinance (Article IV, Section 4270: Flood Control District)</li> </ul>	5.4 6.1.2 6.2.1	Planning		X			
Discourage new development and preserve the 0.2% AEP flood zone for additional flood storage for extreme flood events.	<ul style="list-style-type: none"> <li>Draft language to preserve flood storage for extreme events</li> <li>Adopt language into Zoning Ordinance (Article IV, Section 4270: Flood Control District)</li> </ul>	6.3.1	Planning			X		
Require new development and redevelopment in the 0.2% AEP flood to have a flood protection grade equal to or greater than that required in SFHA (a minimum of two feet above the 1% AEP).	<ul style="list-style-type: none"> <li>Draft language to set flood protection grade</li> <li>Adopt language into Zoning Ordinance (Article IV, Section 4270: Flood Control District)</li> </ul>	6.3.2	Planning		X			
Guide growth and development including utilities and infrastructure to safer areas outside the SFHA, 0.2% AEP flood zone and localized flooding areas.	<ul style="list-style-type: none"> <li>Draft language direct growth and development outside known flood hazard areas</li> <li>Adopt language into Zoning Ordinance (Article IV, Section 4270: Flood Control District)</li> </ul>	6.5.1	Planning Redevelopment Engineering		X			
<b>ZONING ORDINANCE – LAND USE</b>								
Promote development that is sensitive to the natural environment through conservation design and development.	<ul style="list-style-type: none"> <li>When reviewing site plans, offer suggestions to protect natural areas, minimize impervious footprint and onsite stormwater management</li> <li>Encourage use of planned unit development in the Zoning Ordinance for more innovative development options (Article IV, Section 4250) and low impact development in proposed stormwater standards update (5.1)</li> </ul>	6.5.2	Planning Engineering Stormwater				X	
<b>CAPITAL PROJECTS - REDEVELOPMENT</b>								
Focus redevelopment efforts (site preparation, remediation and public infrastructure) in locations that are designated as safe growth areas outside the 0.2% AEP floodplain and local flooding areas.	<ul style="list-style-type: none"> <li>Identify safe growth areas; include these in the Future Growth Plan (5.7)</li> <li>Prioritize redevelopment efforts in safe growth areas</li> </ul>	5.7	Redevelopment	X				
Consider climate change and flood impacts in capital projects; promote low impact development/green infrastructure to manage stormwater.	<ul style="list-style-type: none"> <li>Be concerned about future climate conditions and use sustainable stormwater management practices on redevelopment projects</li> </ul>	5.7	Redevelopment	X				

FLOOD RESILIENCE STRATEGY	IMPLEMENTATION STEPS	REPORT REFERENCE	IMPLEMENTATION LEAD	IMPLEMENTATION TIMELINE				COMPLETED
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<b>CAPITAL PROJECTS – LAND ACQUISITION</b>								
Continue to acquire available land in the SFHA for flood storage and compatible open space uses; build on the city-owned parkland along the Elkhart River and create a Central Park like amenity for the city and region.	<ul style="list-style-type: none"> <li>Identify and prioritize desirable parcels in the SFHA, determine land ownership and availability</li> <li>As resources allow, continue to acquire land and connect active and passive park properties and natural areas</li> </ul>	5.7	Redevelopment					
		6.1.2 6.2.1					X	
Acquire and demolish structures in the river corridor impact area first then acquire and demolish structures outside the river corridor impact area and inside the SFHA as properties become available and funding allows.	<ul style="list-style-type: none"> <li>Inventories and prioritize structures for acquisition and demolition using the Voluntary Acquisition Plan (6.4.4)</li> <li>Secure funding through FEMA's Building Resilient Infrastructure and Communities (BRIC) grant program</li> <li>May require additional staff to implement</li> </ul>	6.4.4 6.4.5	Redevelopment			X		
<b>COMMUNICATION, EDUCATION AND TRAINING</b>								
Train city stormwater inspection and maintenance staff about green infrastructure practices to improve function, performance and appearance.	<ul style="list-style-type: none"> <li>Conduct regular trainings for field crews responsible for inspection and maintenance of green infrastructure practices; emphasize preventative maintenance</li> <li>Cross train all field crews on basic green infrastructure function to provide early detection of a problem</li> <li>Require green infrastructure to be designed with ease of maintenance in mind (access, limited plant varieties, etc.)</li> <li>May require assistance from a consultant</li> </ul>	5.1	Stormwater		X			
Expand current flood communication efforts and develop a flood risk education and outreach program to improve people's risk awareness and motivate them to take measures to protect themselves and their property.	<ul style="list-style-type: none"> <li>Use ASFPM and other resources (Appendix 3) to develop a flood risk communication program</li> </ul>	5.2	Mayor's Office		X			
<b>SUPPORTING EFFORTS AND PARTNERSHIPS</b>								
Complete the Flood Resilience Checklist at least annually to track progress made and continue to do so until all questions are marked "Yes".	<ul style="list-style-type: none"> <li>Annually reconvene the project team from the Flood Resilience Plan to complete the checklist (Appendix 2)</li> <li>Review implementation progress on these flood resilience strategies (this table)</li> </ul>	5.3	Environmental Resilience				X	
Cross-reference the Flood Resilience Plan, Comprehensive Plan, Redevelopment Capital Plan and Elkhart County MHMP for strategies and mitigation measures related to flooding, growth and development priorities.	<ul style="list-style-type: none"> <li>As plans are updated, review for consistency</li> <li>Update plans with new information as it becomes available</li> </ul>	5.6 5.7 5.8	Environmental Resilience Planning Redevelopment County EMA				X	
Ensure the City of Goshen is represented in the MHMP five-year update.	<ul style="list-style-type: none"> <li>Contact the County EMA to express interest to participate and share how implementation of this Flood Resilience Plan meets many of the mitigation strategies listed in the MHMP (5.8)</li> </ul>	5.8	Planning Public Safety County EMA				X	

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<b>SUPPORTING EFFORTS AND PARTNERSHIPS – PLANS, PROGRAMS AND STUDIES</b>								
Work with the County to study and update the stormwater utility rate collectively, otherwise complete an Independent Stormwater Utility Rate Study that includes stormwater program costs and a fair and equitable rate structure; update the stormwater utility accordingly within the City of Goshen.	<ul style="list-style-type: none"> <li>Meet with the County to discuss their intentions and participate if a countywide rate study and rate increase is being considered</li> <li>If working with the County is not an option, prepare a rate study and identify a rate that meets current and future stormwater needs; explore options for billing</li> <li>May require assistance from a consultant</li> </ul>	5.5	Stormwater	X				
Incorporate the flood resilience planning areas into the proposed Future Growth Plan.	<ul style="list-style-type: none"> <li>Analyze need and type of growth, industry trends</li> <li>Identify and prioritize areas for growth outside the SFHA and 0.2% AEP flood zone</li> <li>Document implementation timeline and funding</li> <li>May require assistance from a consultant</li> </ul>	5.7	Redevelopment Planning	X				
Identify willing landowners of undeveloped land in the SFHA and partner them with entities willing to purchase, accept donations or hold conservation easements.	<ul style="list-style-type: none"> <li>Identify and prioritize undeveloped land in the SFHA</li> <li>Facilitate a meeting with landowners and conservation entities (USDA, NRCS, IDNR, SWCD and land trusts)</li> <li>May require assistance from a consultant</li> </ul>	6.1.2 6.2.1	Environmental Resilience Redevelopment				X	
Prepare a Flood Response Plan that documents flood detection, warning, response and follow-up protocols	<ul style="list-style-type: none"> <li>Correlate river flood stages with expected extent and severity of flooding (road closures, flooded areas, evacuations, etc.)</li> <li>Document procedures and protocols for flood response notification, communication and expected actions</li> <li>Adopt, maintain and periodically test procedures in plan</li> <li>May require assistance from a consultant</li> </ul>	6.4.2	Mayor's Office	X				
Prepare a comprehensive citywide Stormwater Master Plan to understand and resolve drainage, flooding and water quality conditions citywide.	<ul style="list-style-type: none"> <li>Identify existing and future problem areas; complete analysis and recommend structural and nonstructural solutions; conduct detailed evaluation, costs and funding; prioritize solutions for implementation</li> <li>Prepare report summarizing findings</li> <li>May require assistance from a consultant</li> </ul>	6.4.2	Stormwater Engineering	X				
Upon implementation of flood resilience strategies, participate in the NFP Community Rating System (CRS) program to reduce flood risk and improve flood resiliency and reduce flood insurance premiums for all flood insurance policy holders within the city.	<ul style="list-style-type: none"> <li>Review CRS materials and meet with ISO representative to discuss potential points</li> <li>Assemble initial application</li> <li>Once enrolled, gather documentation for annual recertification and 5-year cycle visit</li> <li>Annually revisit CRS checklist and look for opportunities to improve score (and flood insurance premium savings)</li> </ul>	6.4.3	Planning			X		

FLOOD RESILIENCE STRATEGY	IMPLEMENTATION STEPS	REPORT REFERENCE	IMPLEMENTATION LEAD	IMPLEMENTATION TIMELINE					
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Prepare a Voluntary Acquisition Plan to prioritize structures for relocation and/or buyout in the vulnerable developed area	<ul style="list-style-type: none"> <li>Inventory structures in flood hazard areas; prioritize based on inside/outside river corridor impact area and depth of flooding</li> <li>May require assistance from a consultant</li> </ul>	6.4.4 6.4.5	Redevelopment Planning Stormwater		X				
Create a Floodproofing Assistance Program to prioritize nonresidential structures for floodproofing, establish partnerships with willing landowners and secure available funding.	<ul style="list-style-type: none"> <li>Inventory nonresidential structures in flood hazard area;</li> <li>Identify appropriate dry and wet floodproofing methods</li> <li>Establish partnerships with willing landowners</li> <li>Secure funding through FEMA BRIC grant program</li> <li>May require assistance from a consultant</li> </ul>	6.4.5	Planning			X			
Implement a Flood Compliance Program to encourage owners of nonconforming uses to voluntarily meet flood regulations.	<ul style="list-style-type: none"> <li>Identify noncompliant structures in flood hazard area</li> <li>Meet with interested landowners and secure funding through FEMA BRIC grant program</li> <li>May require assistance from a consultant and/or additional staff to implement</li> </ul>	6.4.6	Planning			X			
<b>SUPPORTING EFFORTS AND PARTNERSHIPS – COUNTY PARTNERSHIPS</b>									
Support (non-monetary) SWCD programs upstream in the watershed to improve flood resiliency in the City of Goshen.	<ul style="list-style-type: none"> <li>Be aware of SWCD efforts and look for opportunities to connect landowners and support implementation of their programs</li> </ul>	6.6.3	Stormwater					X	
Partner with the County Surveyor to investigate methods to store flood water in the watershed, in flood control facilities, two-stage ditches or similar, to reduce flooding downstream.	<ul style="list-style-type: none"> <li>Identify regulated drains upstream of Goshen</li> <li>Determine maintenance and reconstruction schedule; discuss options for regional facilities, two-stage ditch or similar</li> </ul>	6.6.4	Stormwater		X				
<b>SUPPORTING EFFORTS AND PARTNERSHIPS – WATERSHED PARTNERSHIPS</b>									
Partner with the USGS to add a new gage upstream of Goshen to improve flood detection and provide early warning through the NWS.	<ul style="list-style-type: none"> <li>Work with the USGS to determine the location for a new gage</li> <li>Secure funding with partners in watershed to support placement and long-term maintenance of new gage</li> </ul>	6.6.1	Stormwater		X				
Partner with the NWS to expand the capabilities of the Elkhart River at Goshen gage to provide daily forecast information.	<ul style="list-style-type: none"> <li>Work with NWS to discuss options and costs associated with expanding capabilities of gage</li> </ul>	6.6.1	Stormwater		X				
Participate in the Elkhart River Restoration Association and the St Joseph River Basin Commission planning activities and studies that help slow, spread and infiltrate flood water upstream in the watershed.	<ul style="list-style-type: none"> <li>Network with watershed groups and collaborate on efforts to manage stormwater and reduce flooding</li> </ul>	6.6.2	Stormwater					X	
Partner with the St Joseph River Basin Commission to define a natural resource overlay zone and support local adoption throughout the basin.	<ul style="list-style-type: none"> <li>Work collectively to delineate and define the zone (forested areas, wetlands, urban tree canopy, etc.); identify landowners and conservation entities (USDA, NRCs, IDNR, SWCD and land trusts); work to limit encroachment and fragmentation</li> </ul>	6.6.2	Environmental Resilience Stormwater Planning			X			
Work with the St Joseph River Basin Commission to promote adoption of comprehensive No-Adverse-Impact (NAI) development ordinance and standards, as reflected in the LTAP Model Stormwater Ordinance and Technical Standards, by all counties and communities within the watershed.	<ul style="list-style-type: none"> <li>Manage overlay zone within city</li> <li>Participate in drafting NAI ordinance and standards with other entities in watershed</li> <li>Compare with language adopted through implementation of this Flood Resilience Plan and update/amend if needed</li> </ul>	6.6.2	Environmental Resilience				X		