

A photograph of a flooded street in a town square. The water is murky and reflects the surrounding buildings and trees. In the background, there are several buildings, including one with a prominent clock tower and another with a large sign. The scene is overcast and appears to be during a flood event.

Hancock County Flood Risk Reduction Program Update

May 24, 2017

A map of the state of Ohio with its county boundaries outlined in brown. The 15 counties in the northwest corner of the state are highlighted in a solid blue color. These counties include Cuyahoga, Lorain, Summit, Cuyahoga, Geauga, Portage, Huron, Seneca, Ashtabula, Mahoning, Columbiana, Stark, Franklin, Wayne, and Monroe. The rest of the state is shown in white.

Maumee Watershed Conservancy District

- Represents 15 Counties in Northwest Ohio
- Political subdivision of the State
- Oversees water management, including flood risk reduction
- Established under Ohio Revised Code Chapter 6101

Agenda

Project Overview

Stantec's Work

- Gap Analysis
- Project Refinements
- Project Alternatives
- Benefits & Impacts Summary
- Opinions of Probable Cost
- Stantec's Recommendation

Path Forward

Questions



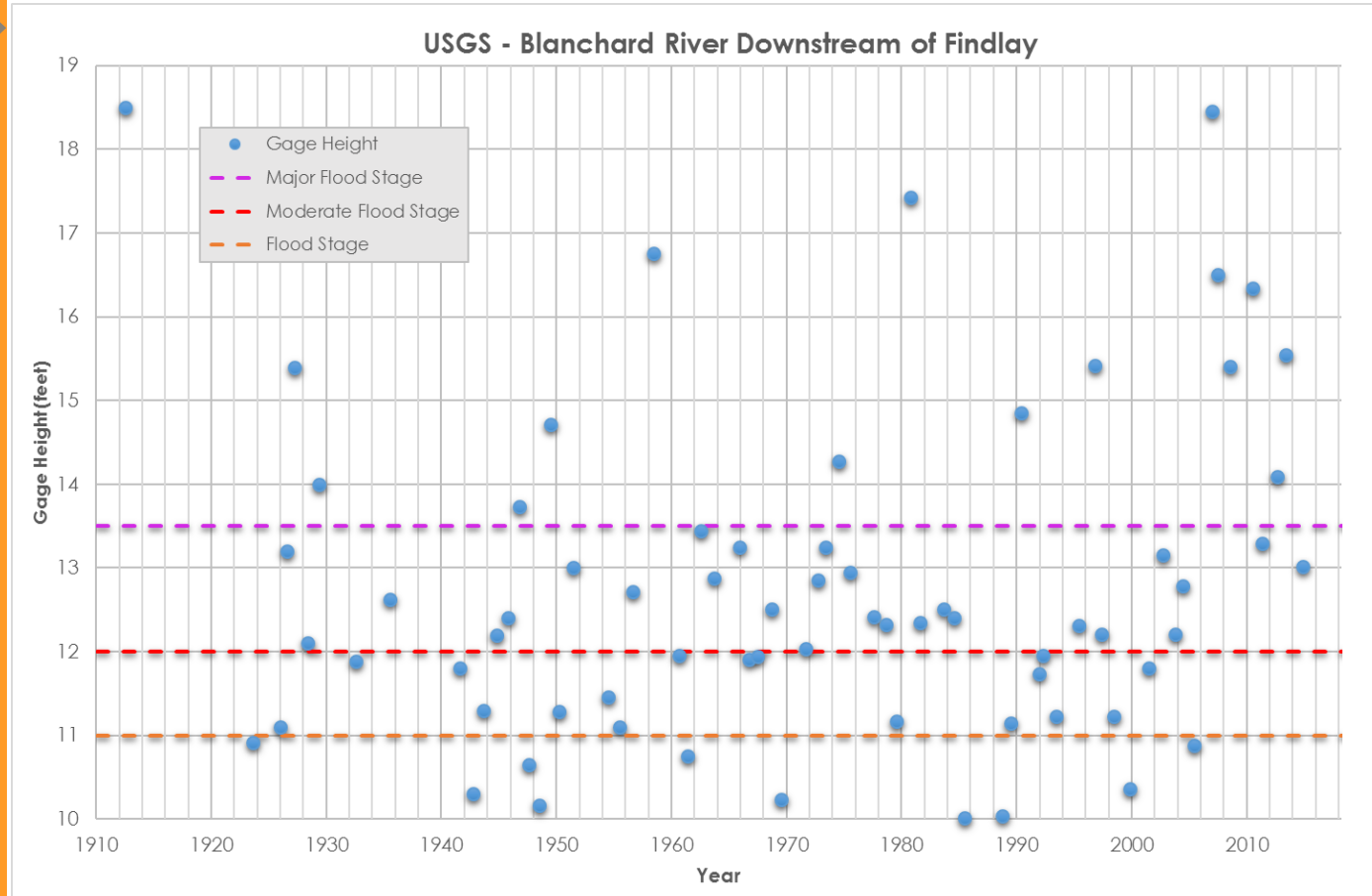
Blanchard St. Bridge

Project Overview



Our Challenge

Larger floods
have occurred
more frequently



August 2015 Recommended Plan

USACE Buffalo District



Western Diversion of Eagle Creek

USACE Opinion of Probable Cost

25-Year Channel Sizing Estimates		
01	Lands & Damages	\$ 6,580,000
02	Relocations	\$ 14,590,000
06	Fish & Wildlife	\$ 1,758,000
08	Roads, Railroads Bridges	\$ 2,657,000
09	Channels and Canals	\$ 34,587,000
15	Floodway Control & Diversion Structure	\$ 8,708,000
18	Cultural Resource Preservation	\$ 692,000
30	Planning, Engineering & Design	\$ 8,182,000
31	Construction Management	\$ 3,149,000
	First Costs	\$ 80,903,000
	Interest during construction	\$ 5,671,000
	Total Cost	\$ 86,574,000

About \$20 million allocated for new bridges and roads
Includes 27.5% Contingency

Eagle Creek Flows

25-year 3,000 cfs

50-year 3,500 cfs

100-year 4,050 cfs

500-year 5,400 cfs

Preliminary Scope

Complete

- Analyze the USACE Feasibility Report to understand their findings and recommend changes to the Corps' Plan
- Perform surveys and geotechnical explorations
- Determine preferred channel alignment

Not yet Authorized

- *Prepare property acquisition plan and legal descriptions*
- *Prepare final design and construction plans*
- *Prepare necessary documents to secure regulatory permits*

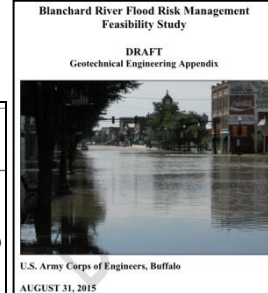
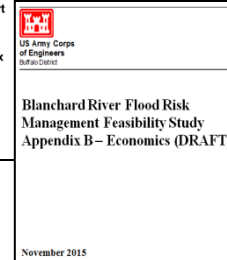
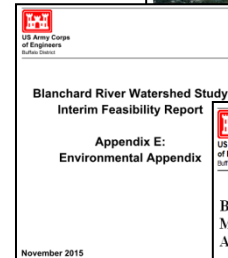
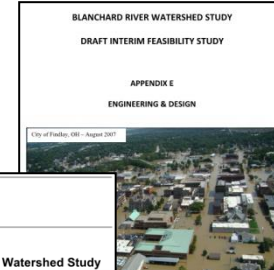
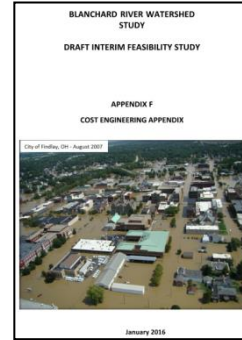
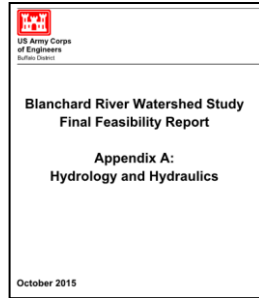
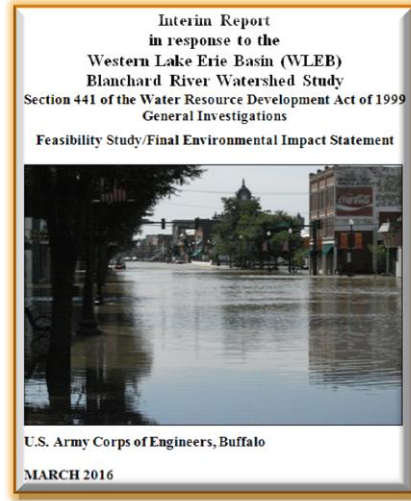
Gap Analysis

Data Reviewed

- Reports
- Digital Files:
USACE
- Public Data:
USGS, ODOT, others

Project Components

- **Hydrology & Hydraulics**
- Geotechnical
- Transportation
- **Cost**
- **Economics**
- Design
- Environmental



4 Key Gaps

Design and Engineering

Federally driven project objective

Cost and Economics

BCR less than 1.0

Hydrology & Hydraulics (H&H)

Risk based evaluation needed

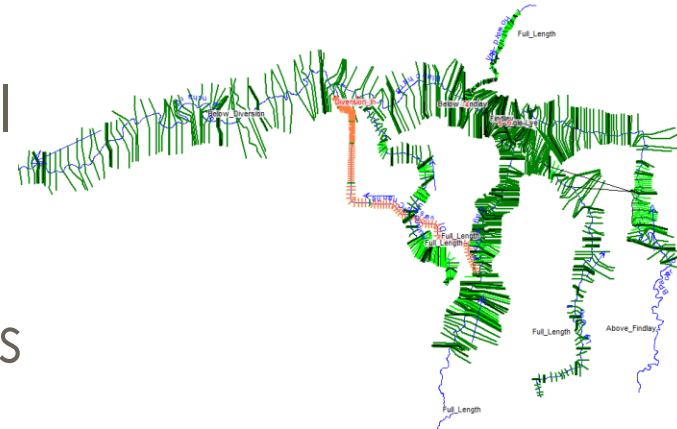
Conflicting results between USACE
model and report

Revised
Project
Objective

Lower the 1% ACE event water surface elevation at Main Street and other major egress routes to permit passage of emergency response vehicles (6"-9" maximum water depth)

Costs and Economics (BCR)

- Additional (non-federal) benefits include:
 - Road closures
 - Business losses
 - Lost income/wages
 - Temporary relocation/reoccupation costs
 - Agricultural benefits and losses
 - Others
 - Utility damages, debris removal costs, location benefits, intensification benefits, employment benefits.



Concept Design Analysis

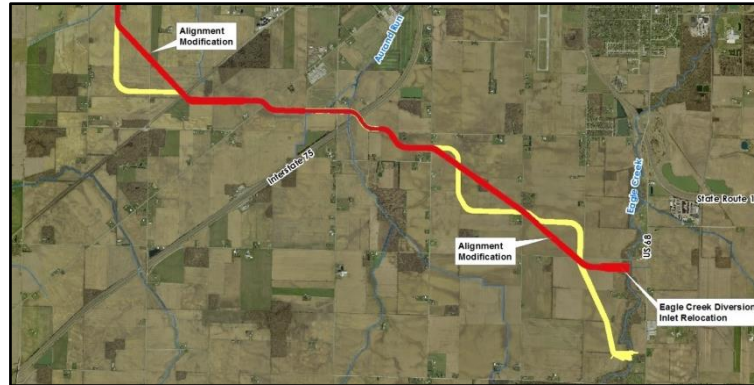
Diversion Channel Refinement

Size
Alignment
Profile
Inlet Location



Preliminary Recommendations

- **This Alternative is Feasible**
- Relocate entrance and reduce channel length
- At-grade intersection with Aurand Run
- Refine profile
 - Reduce overall excavation & waste
 - Reduce rock excavation
- Update Capacity from 25-year to 100-year flows



Why
Alternatives?

Remaining Problems to Solve

Conflicting Model/Reporting Results

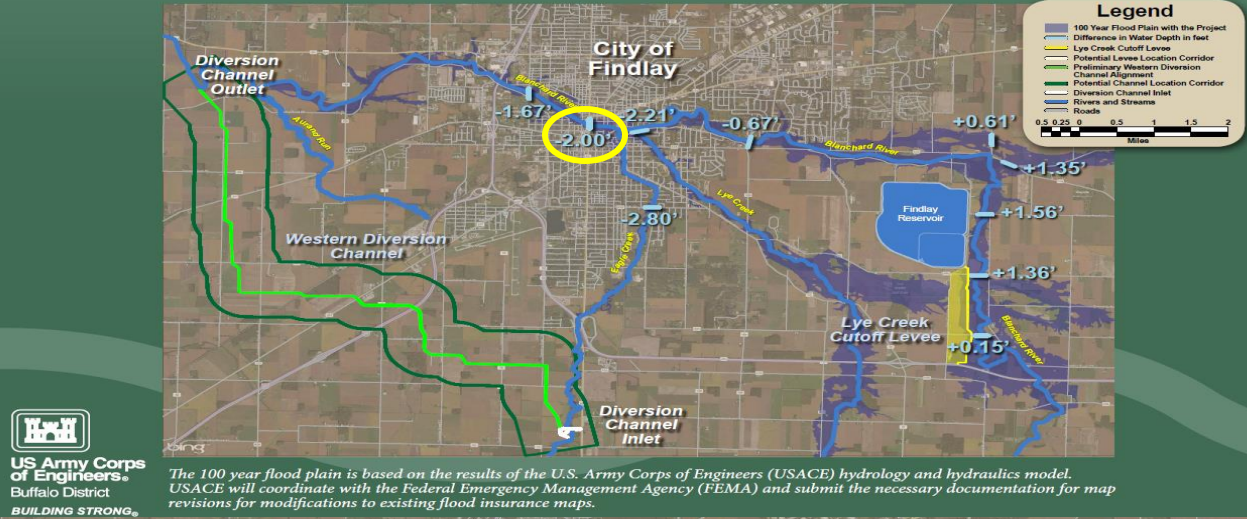
Residual Risk of Project

Double-Peaked Hydrograph

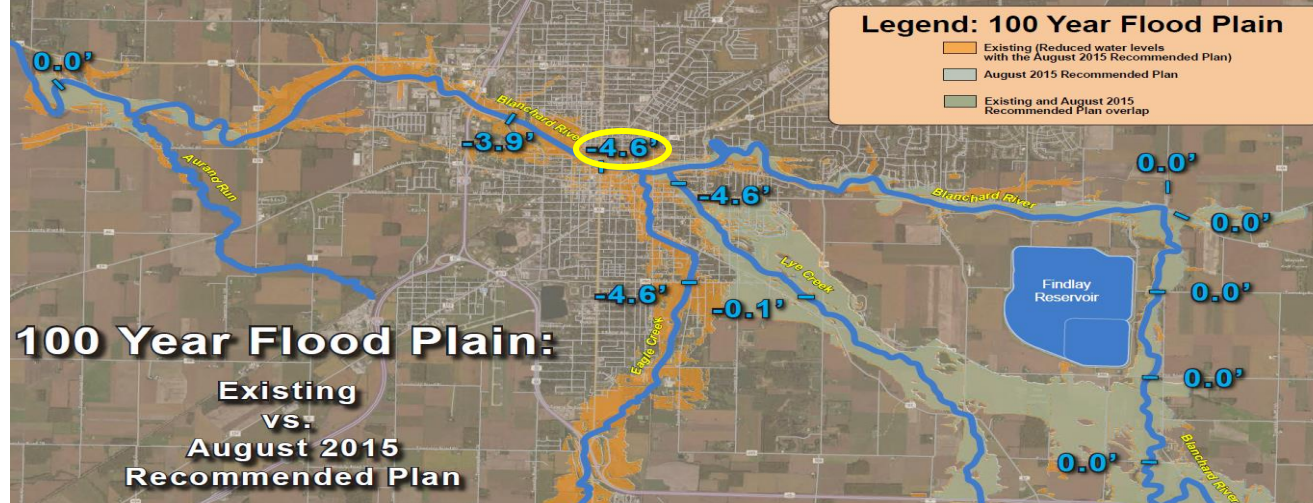
Conflicting Results

April 2015

100 Year Storm Event with Proposed Project

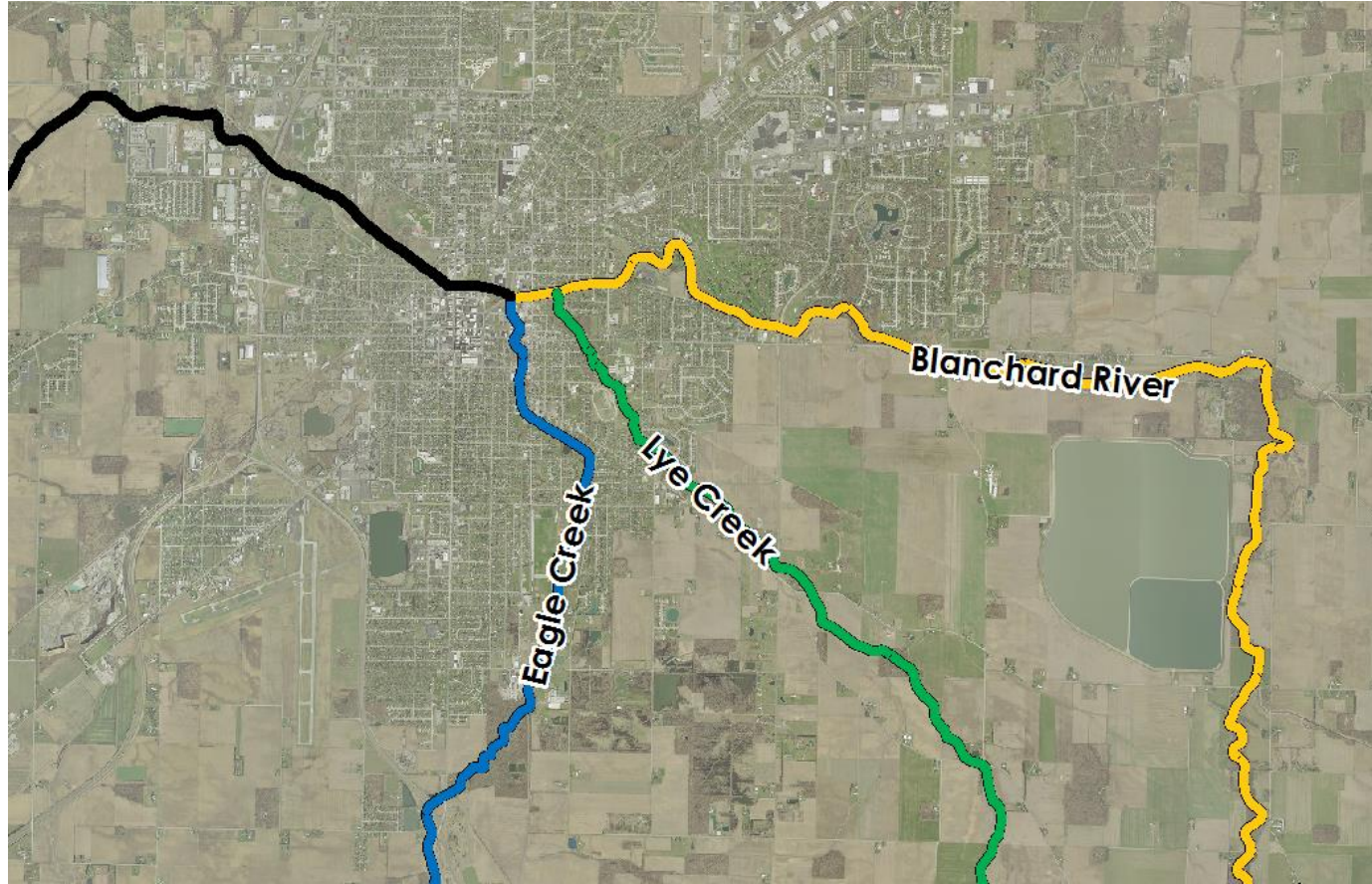


August 2015



Where does
the water
come from?

Blanchard River – Eagle Creek – Lye Creek

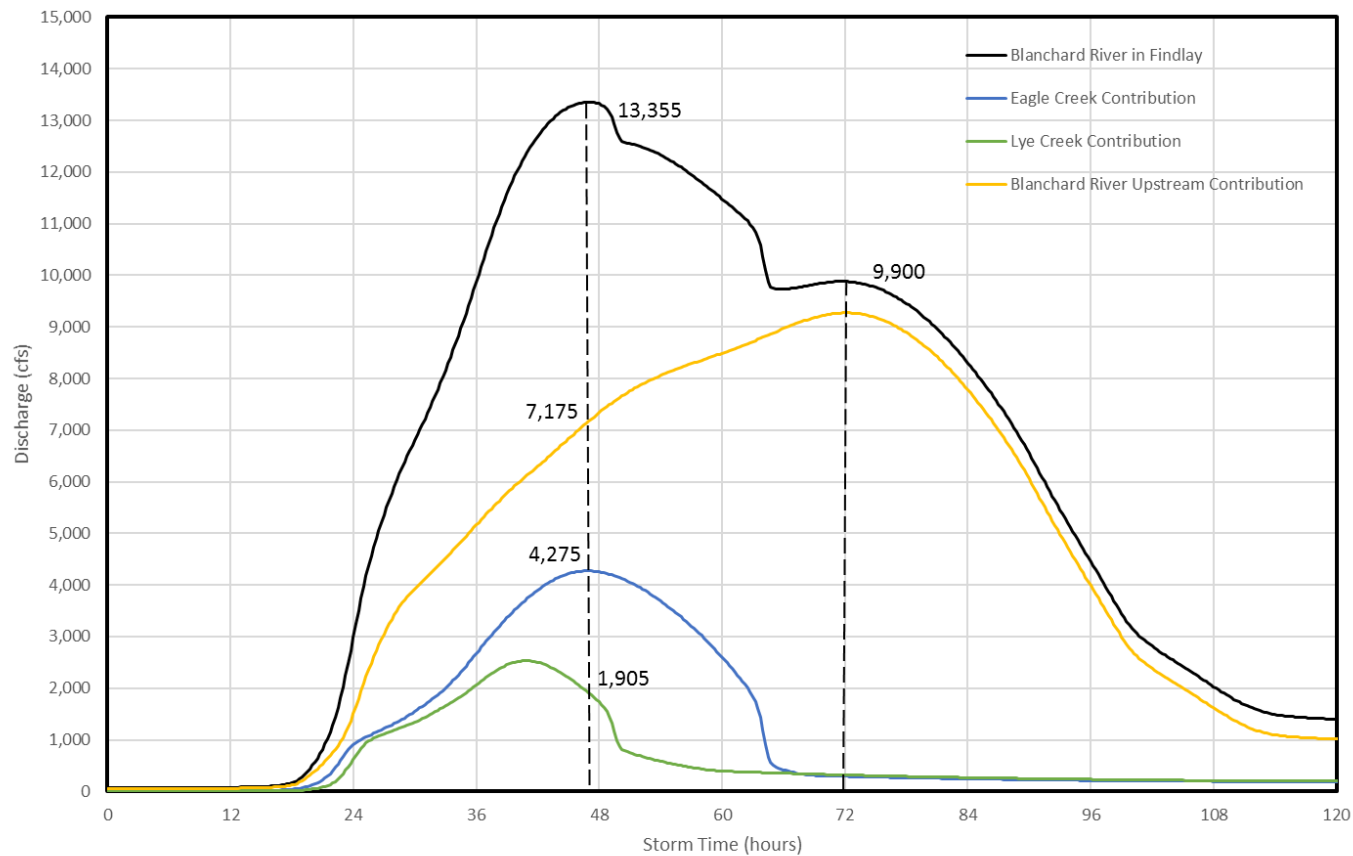


1% ACE

USACE HEC-HMS

- Existing Conditions

HEC-HMS -- Blanchard River in Findlay
Existing Conditions
100Yr, 24Hr = 5.26" SCS Type II



1% ACE

USACE HEC-HMS

- Existing Conditions
- USACE Plan (Expected)

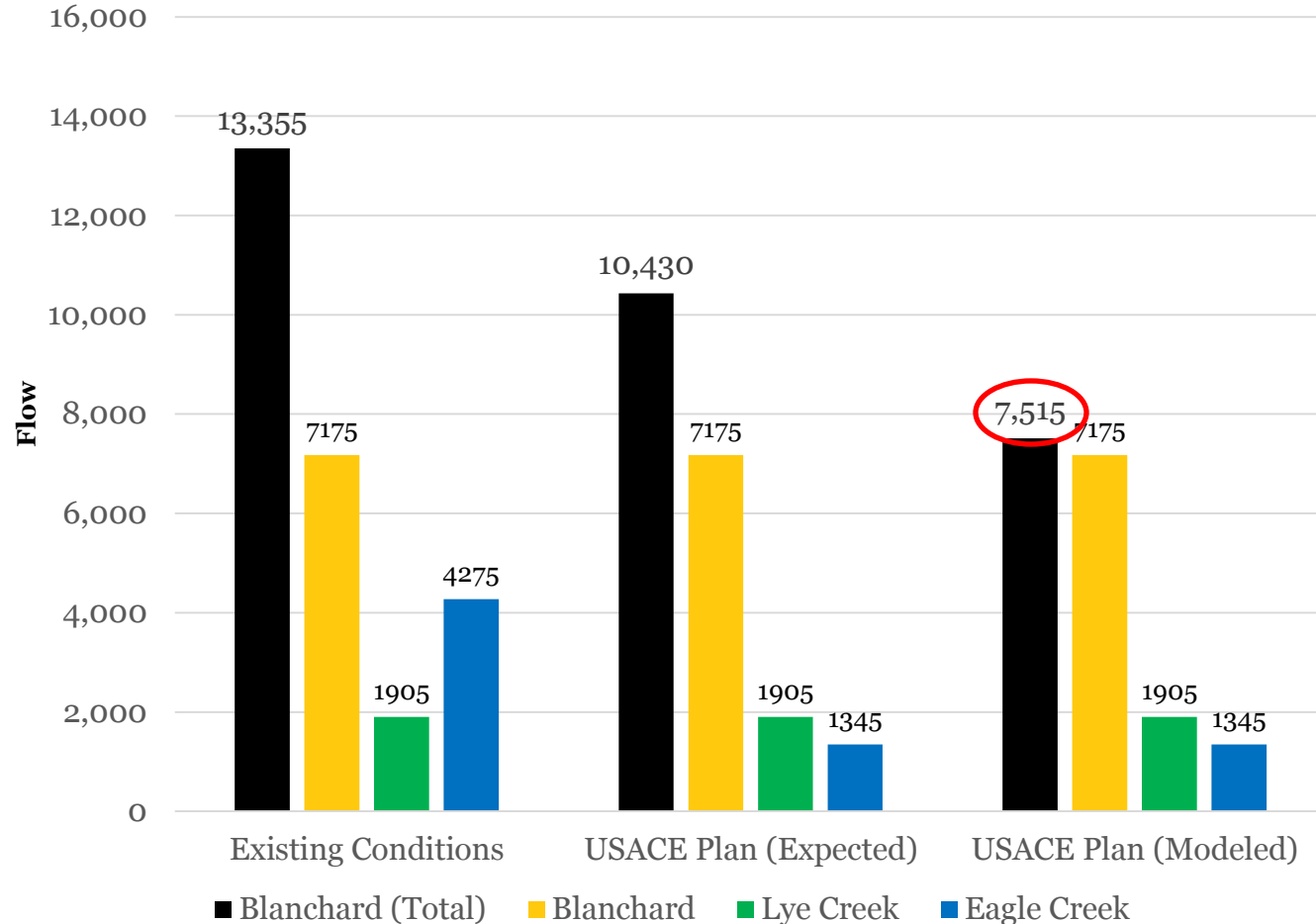
USACE HEC-RAS

- USACE Plan (Modeled)

“The 4.6’ drop in WSE in downtown Findlay is based on a model run where the flow optimization feature did not properly converge on an internally consistent result.” - USACE

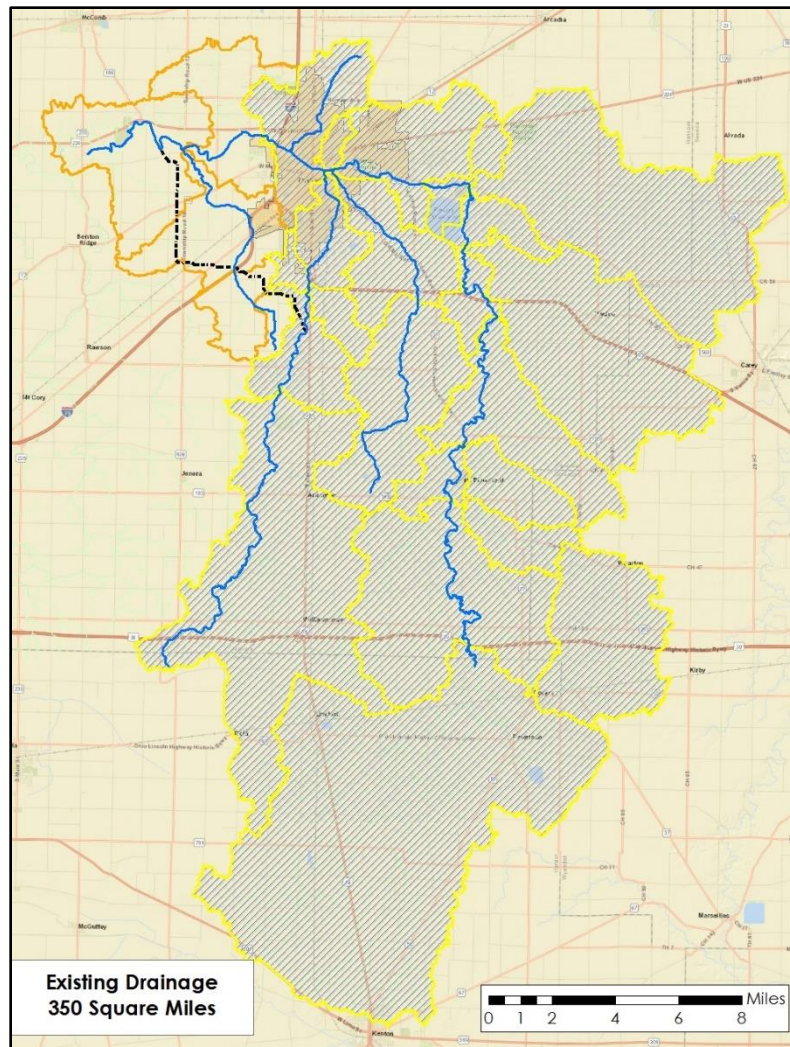


USACE Model Flow Error



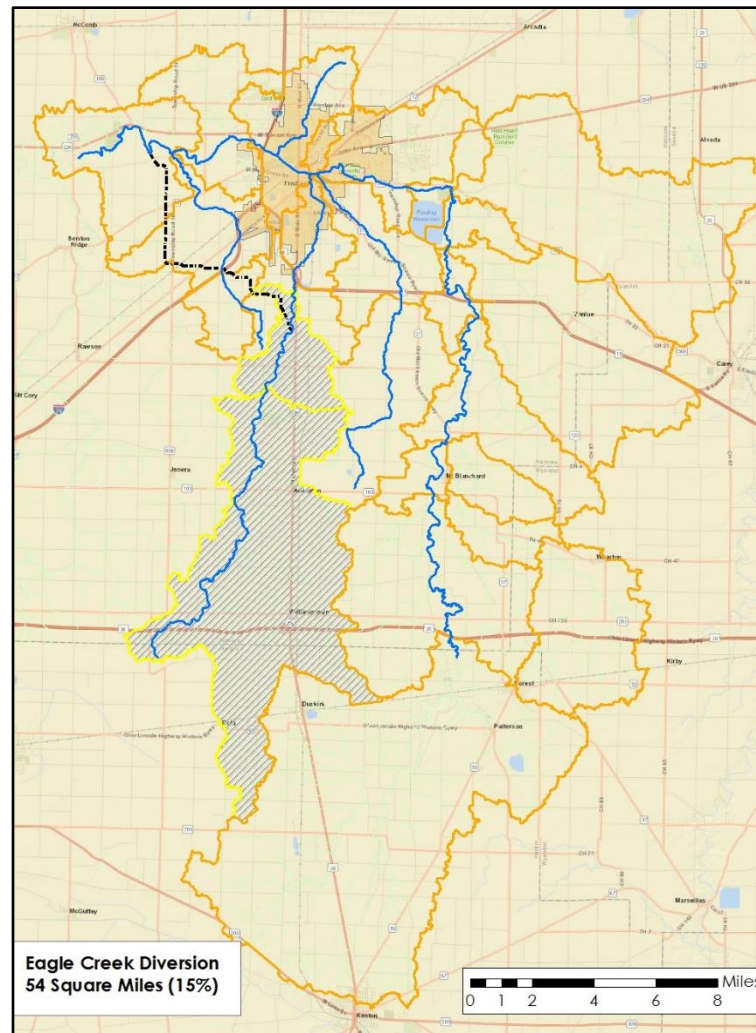
Residual Risk

The Blanchard River Watershed



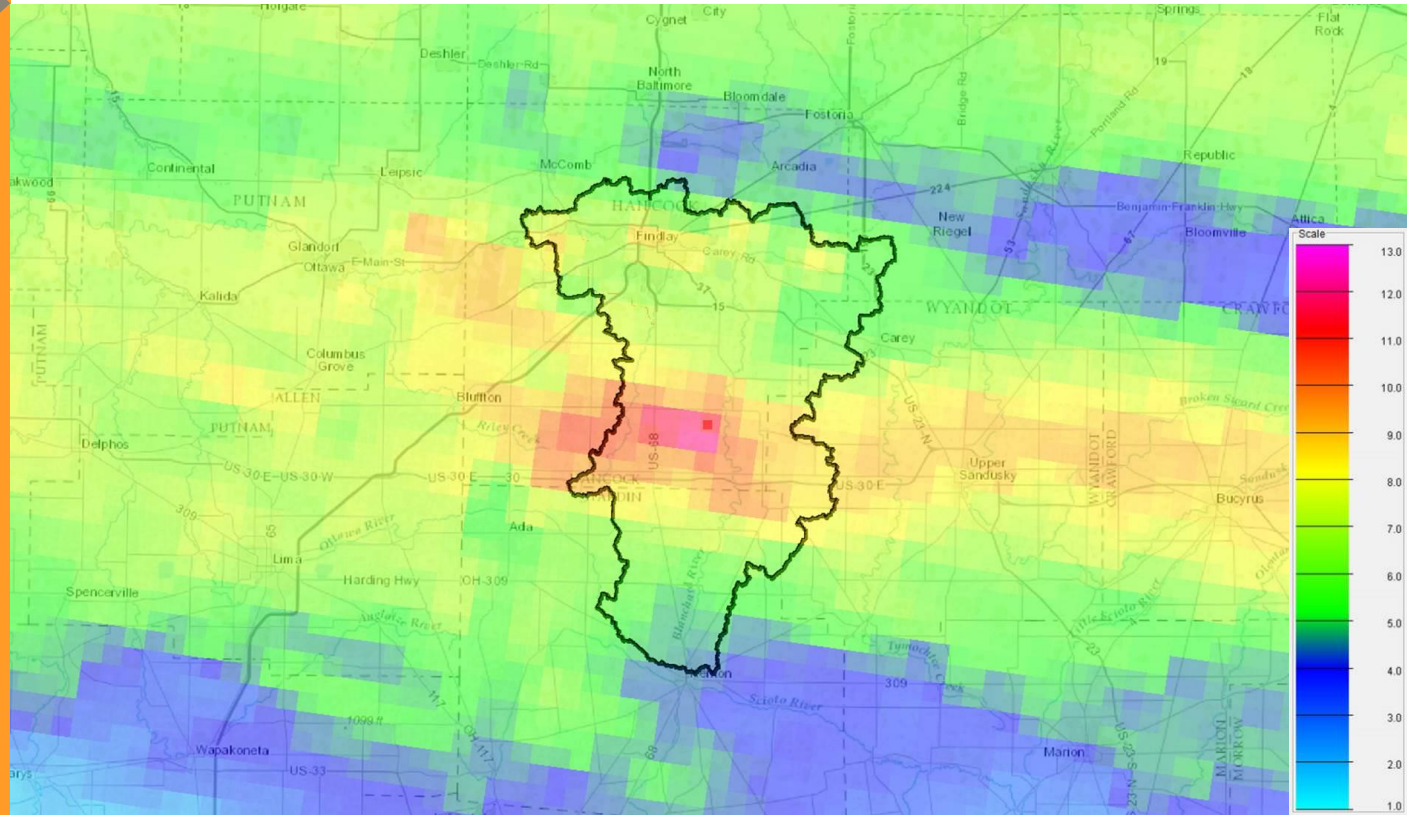
Residual Risk

15% of
Watershed
Influenced



Residual Risk

2007 Storm



Alternatives

Concept
Designs
Reviewed

Hydraulic Improvements

Remove Inline
Riffles/Dams

Floodplain
Bench Widening

Bridge
Modifications



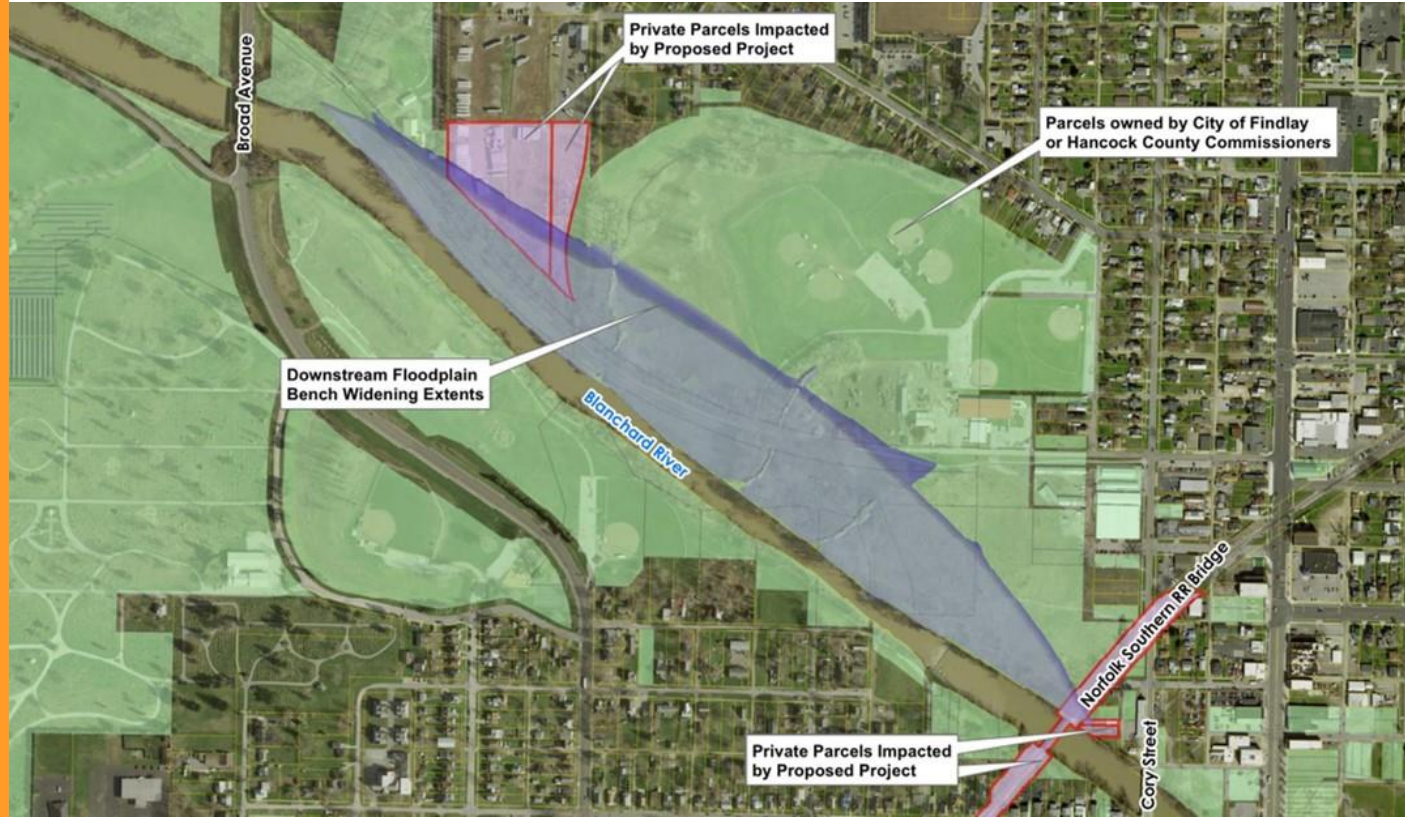
Concept
Designs
Reviewed

Hydraulic Improvements

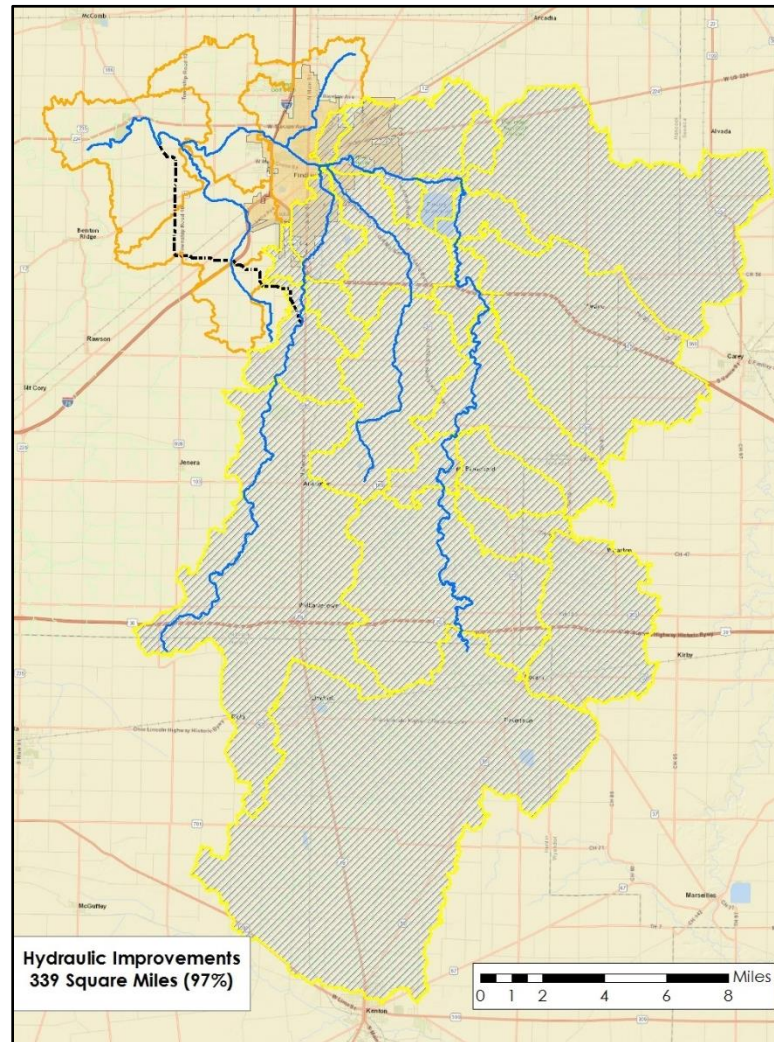
Remove Inline
Riffles/Dams

Floodplain
Bench Widening

Bridge
Modifications



Percent of Watershed Influenced



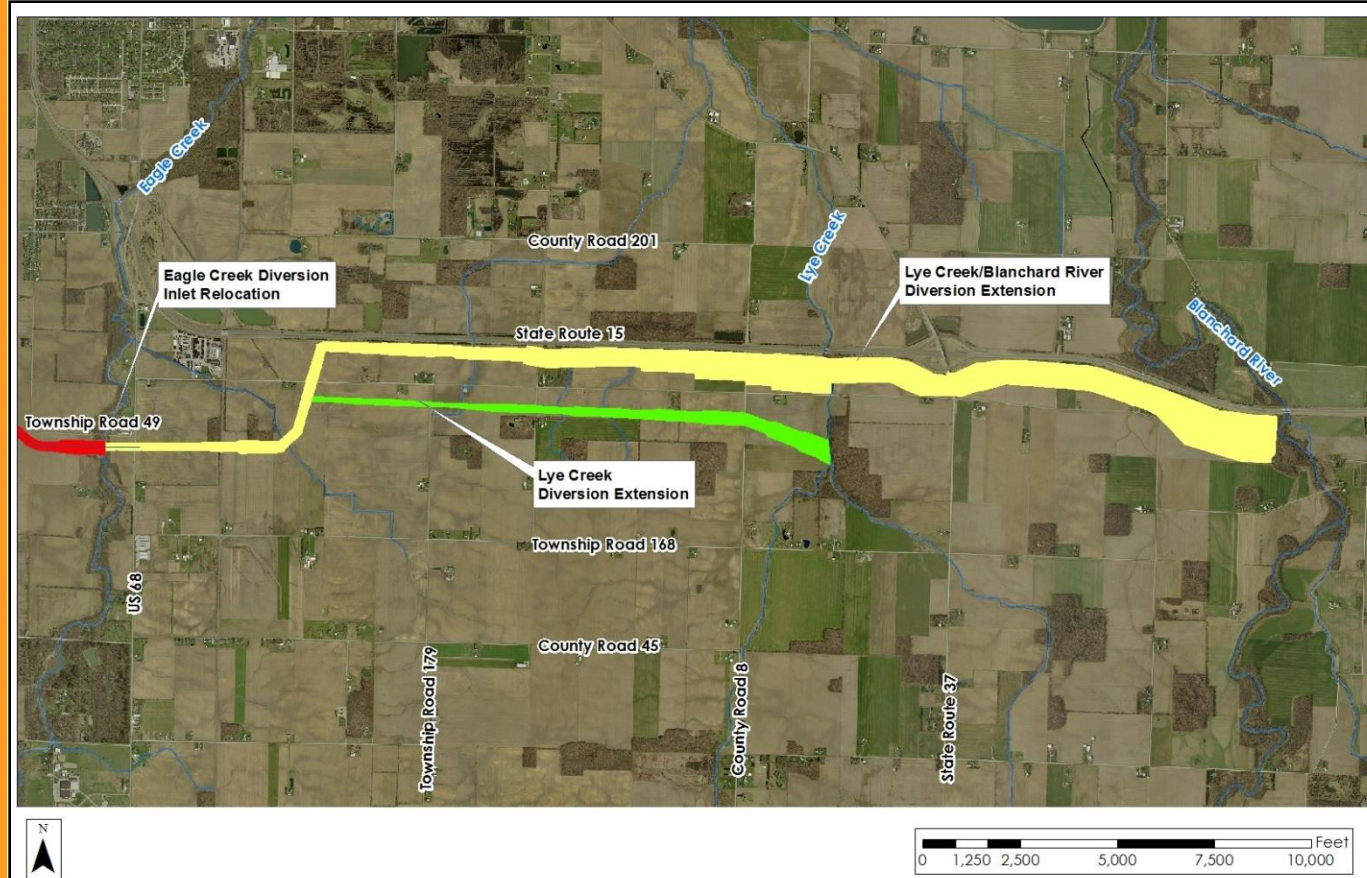
Diversion Extension

Up to 1,200 ft wide

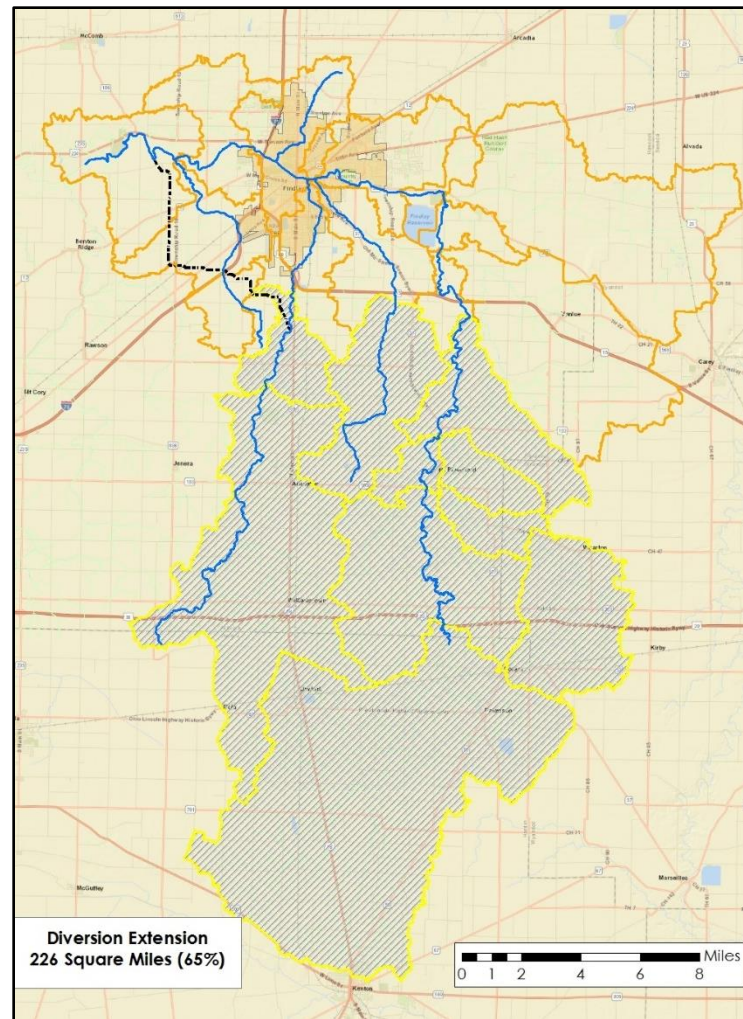
Between 2 and
7 ft deep

14 New Bridges
and 5 Cul-de-sacs

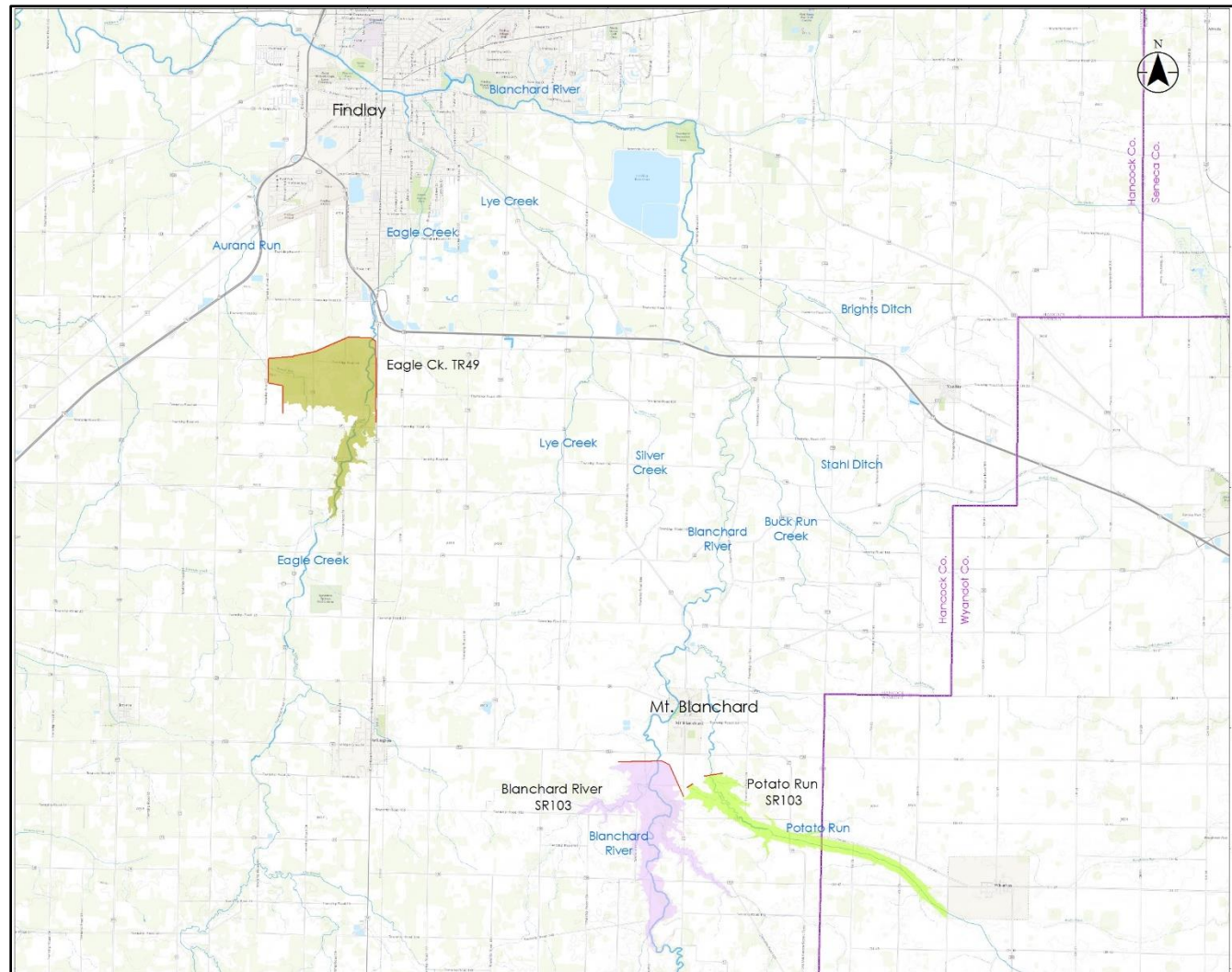
Eagle to Lye to Blanchard



Percent of Watershed Influenced

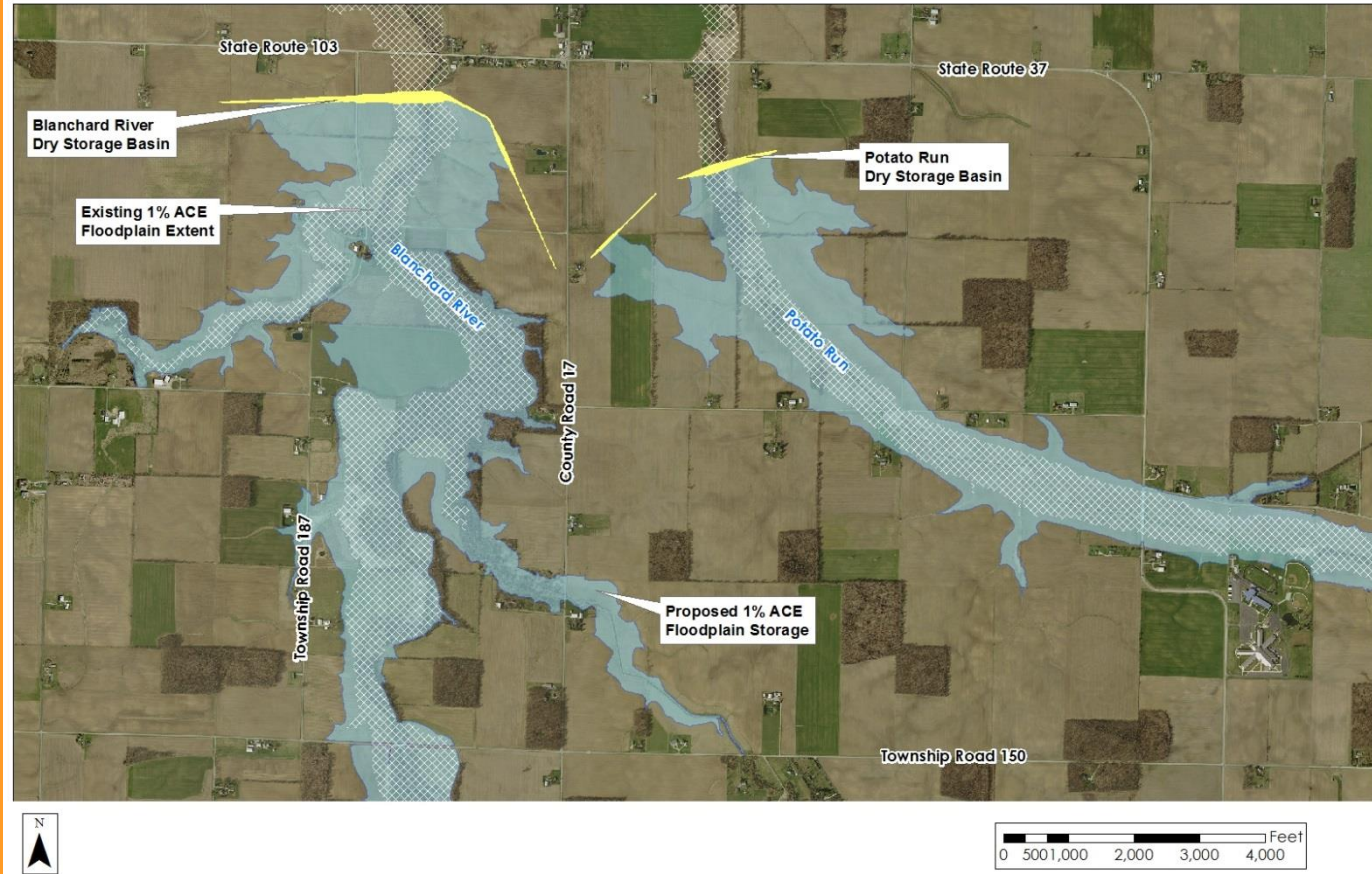


Storage



Storage

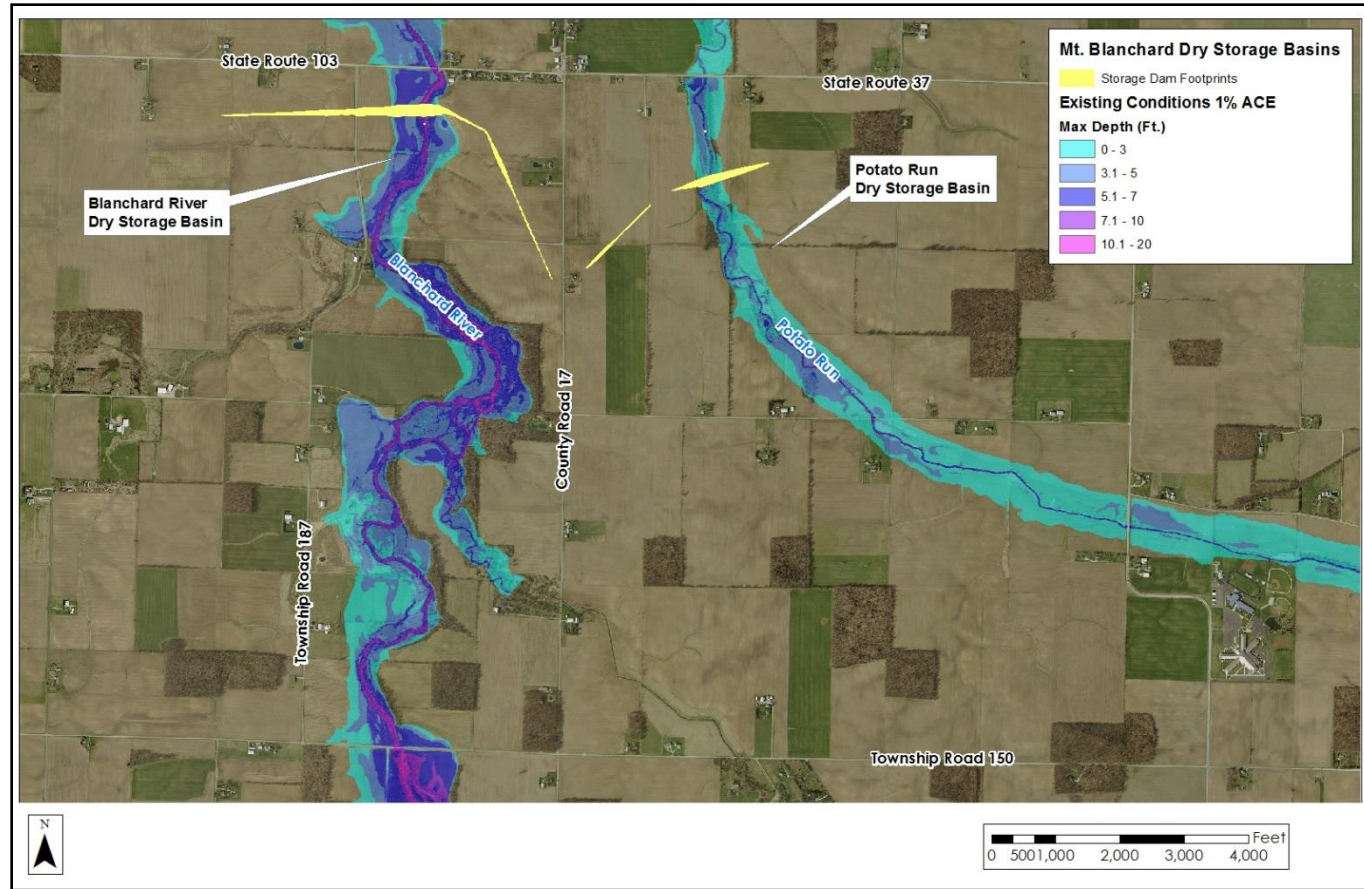
Blanchard River & Potato Run at Mt. Blanchard



Blanchard River & Potato Run at Mt. Blanchard

Existing
Conditions

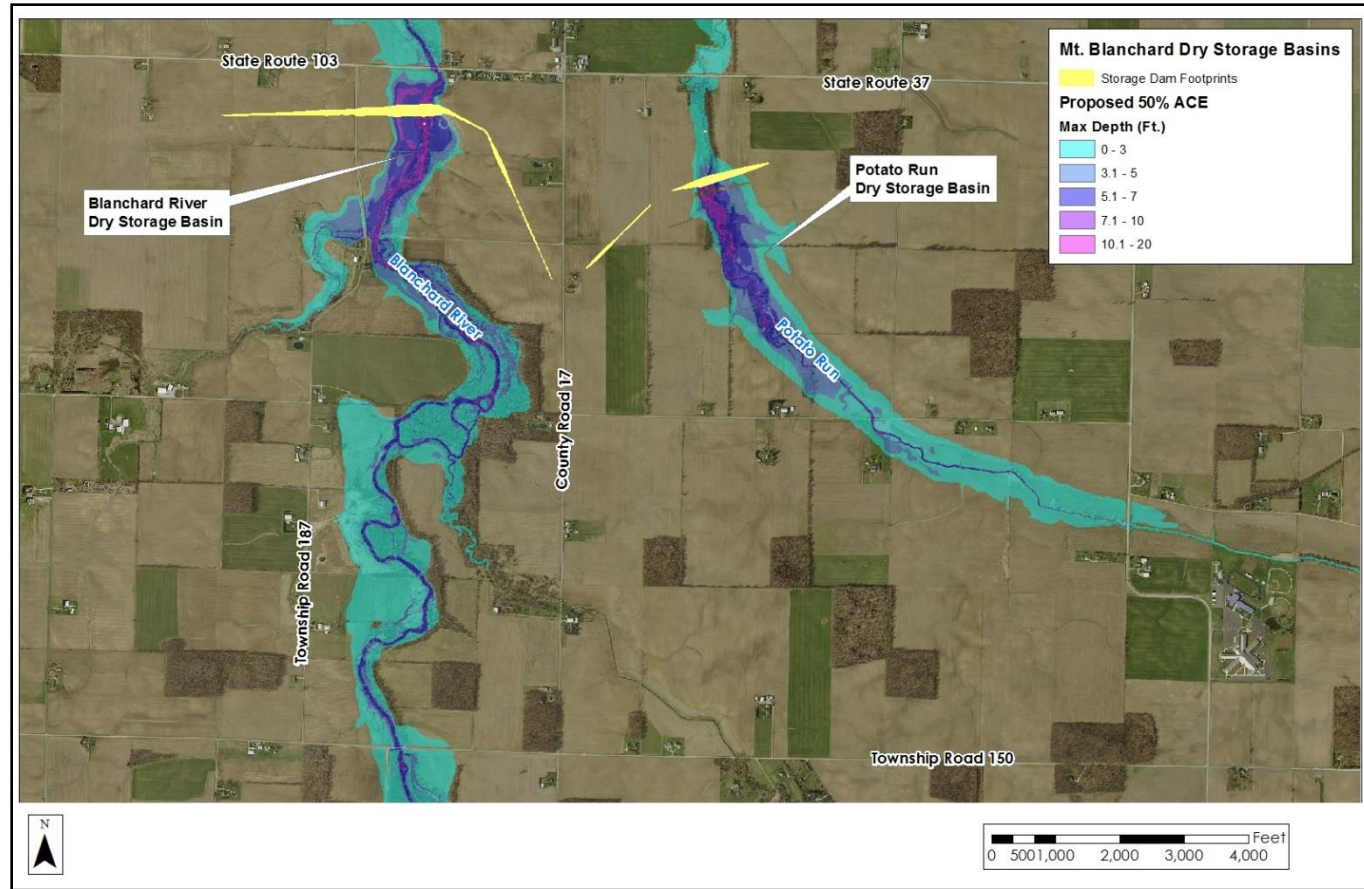
1% ACE event



Blanchard River & Potato Run at Mt. Blanchard

Proposed
Conditions

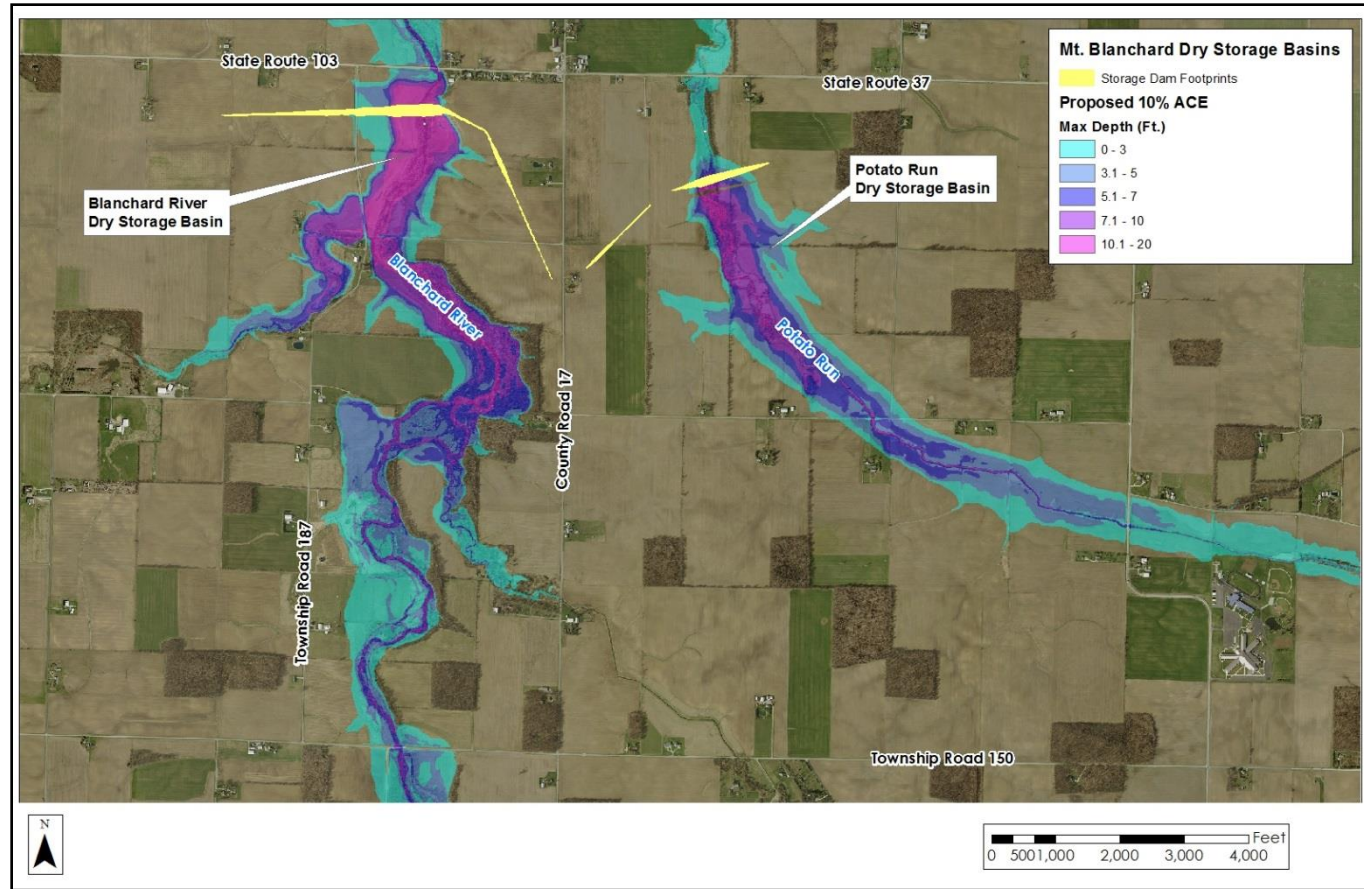
50% ACE event



Blanchard River & Potato Run at Mt. Blanchard

Proposed
Conditions

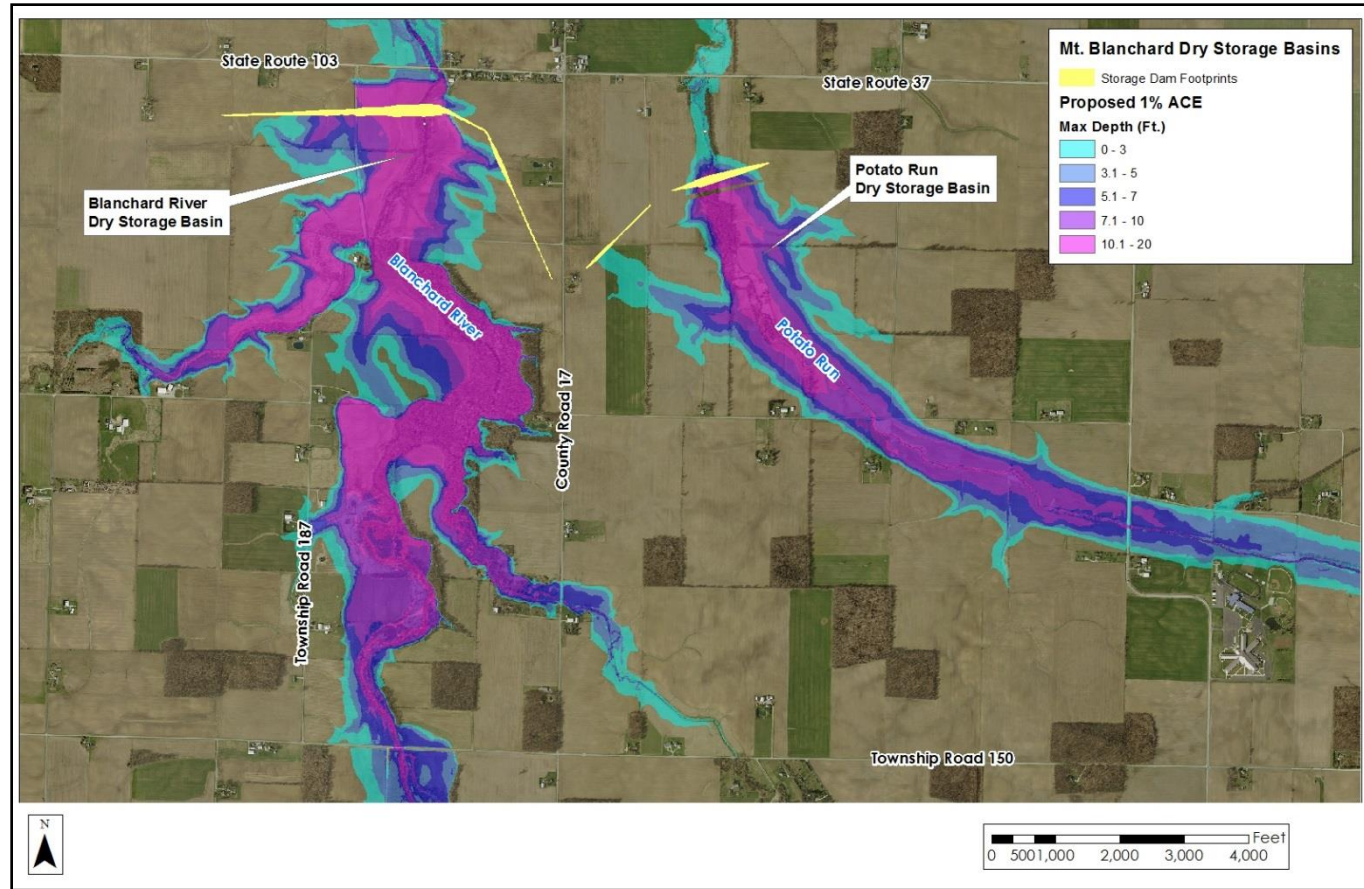
10% ACE event



Blanchard River & Potato Run at Mt. Blanchard

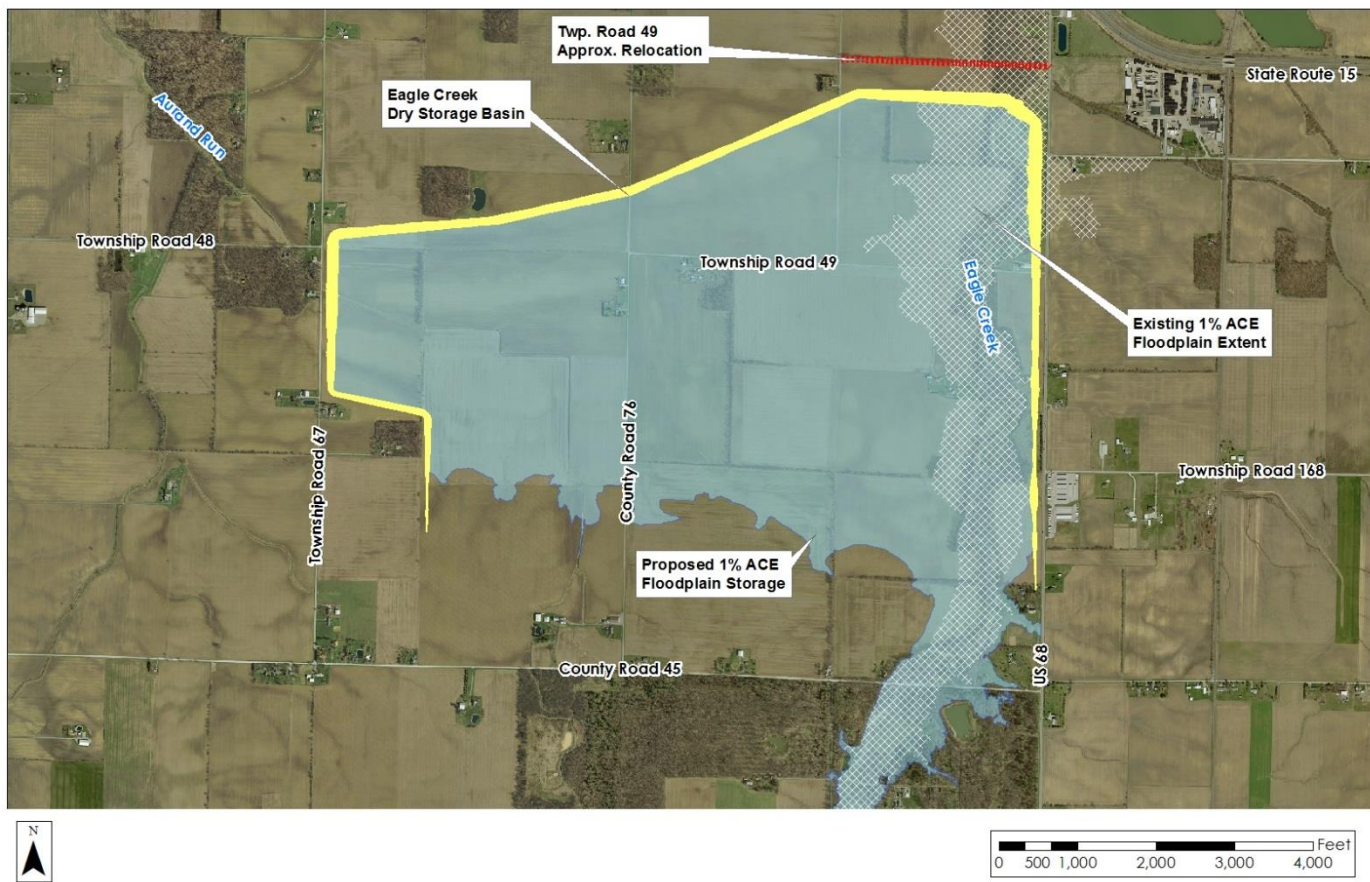
Proposed
Conditions

1% ACE event



Storage

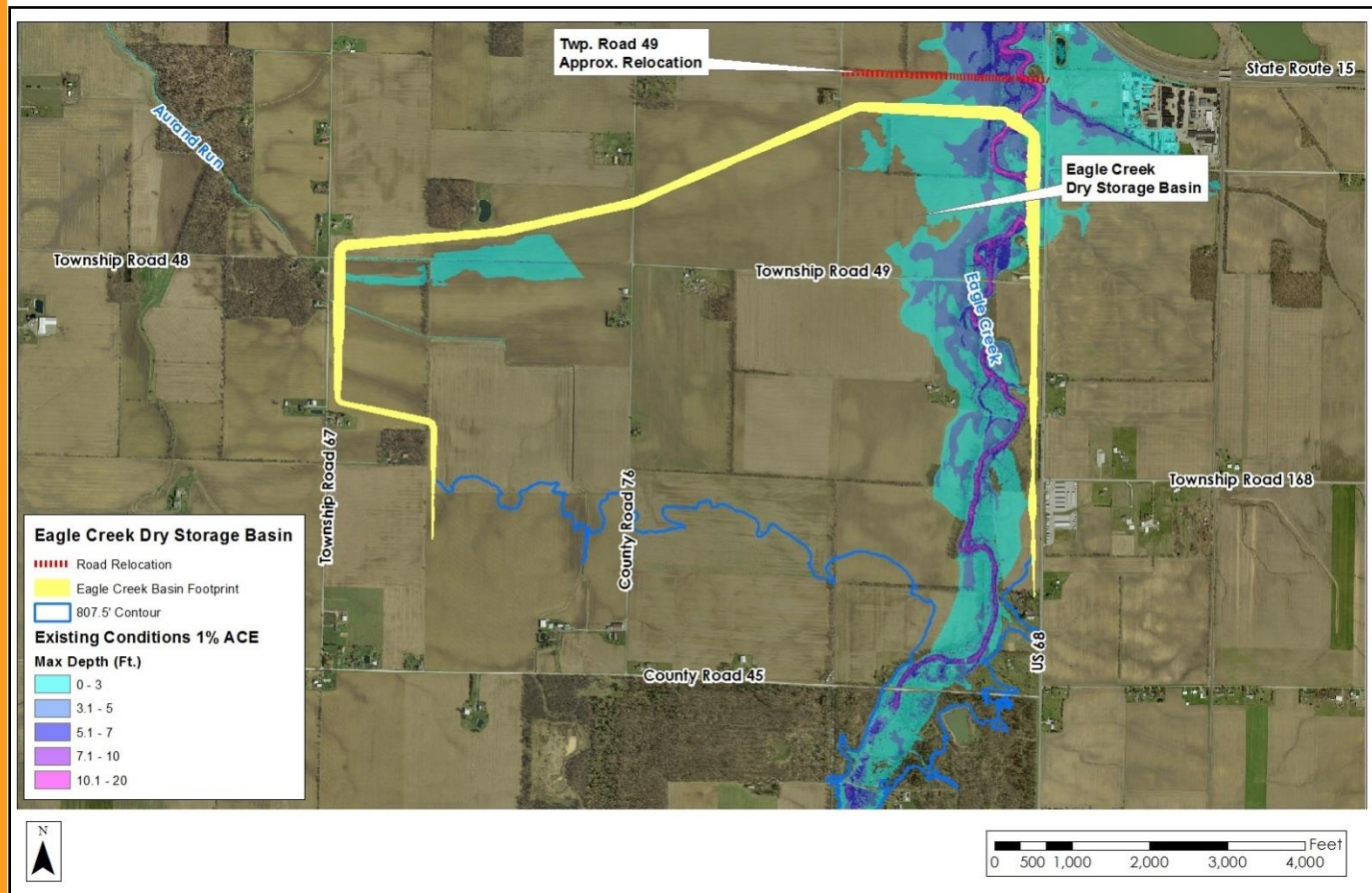
Eagle Creek Dry Storage



Eagle Creek Dry Storage

Existing
Conditions

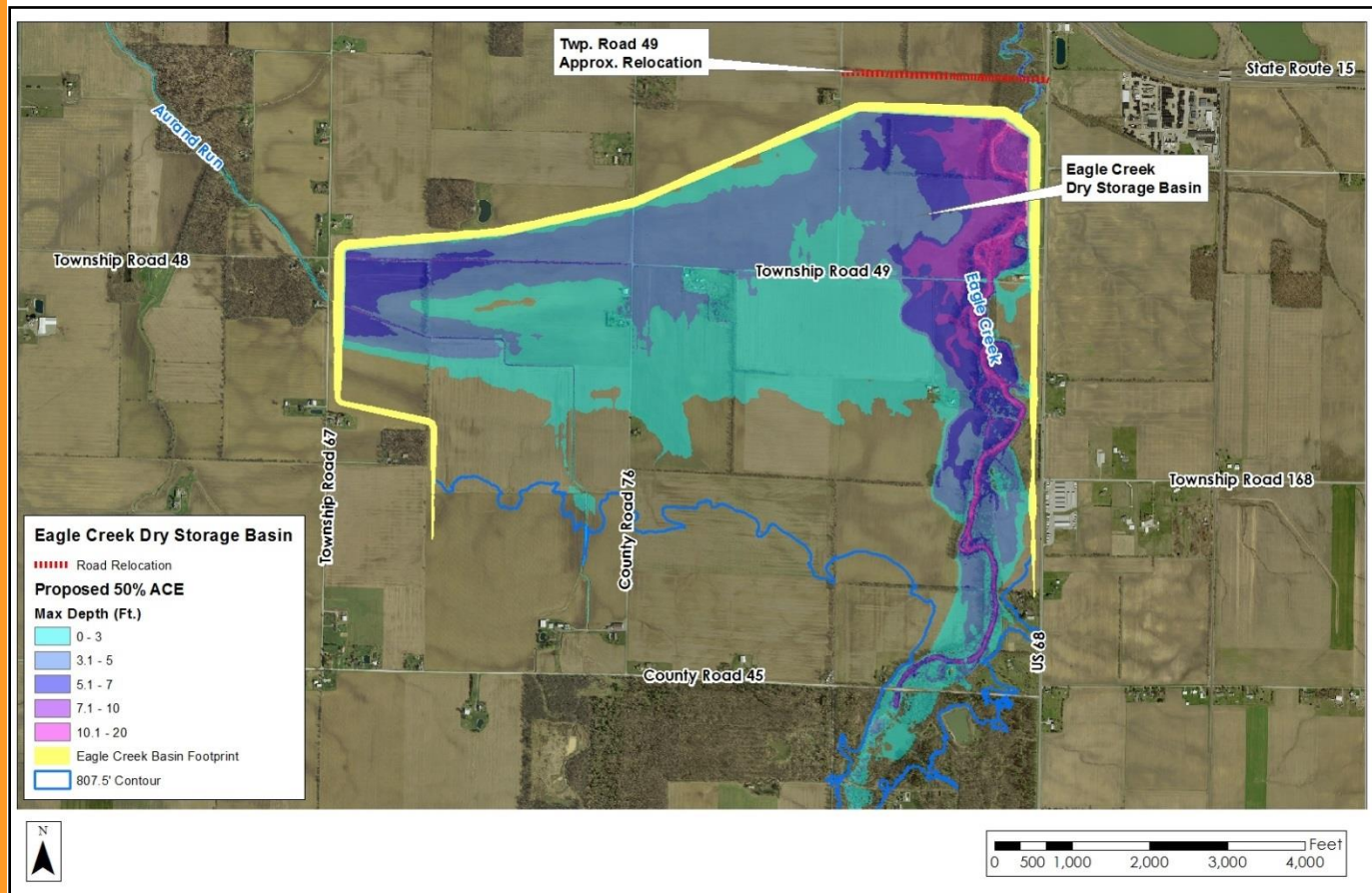
1% ACE event



Eagle Creek Dry Storage

Proposed
Conditions

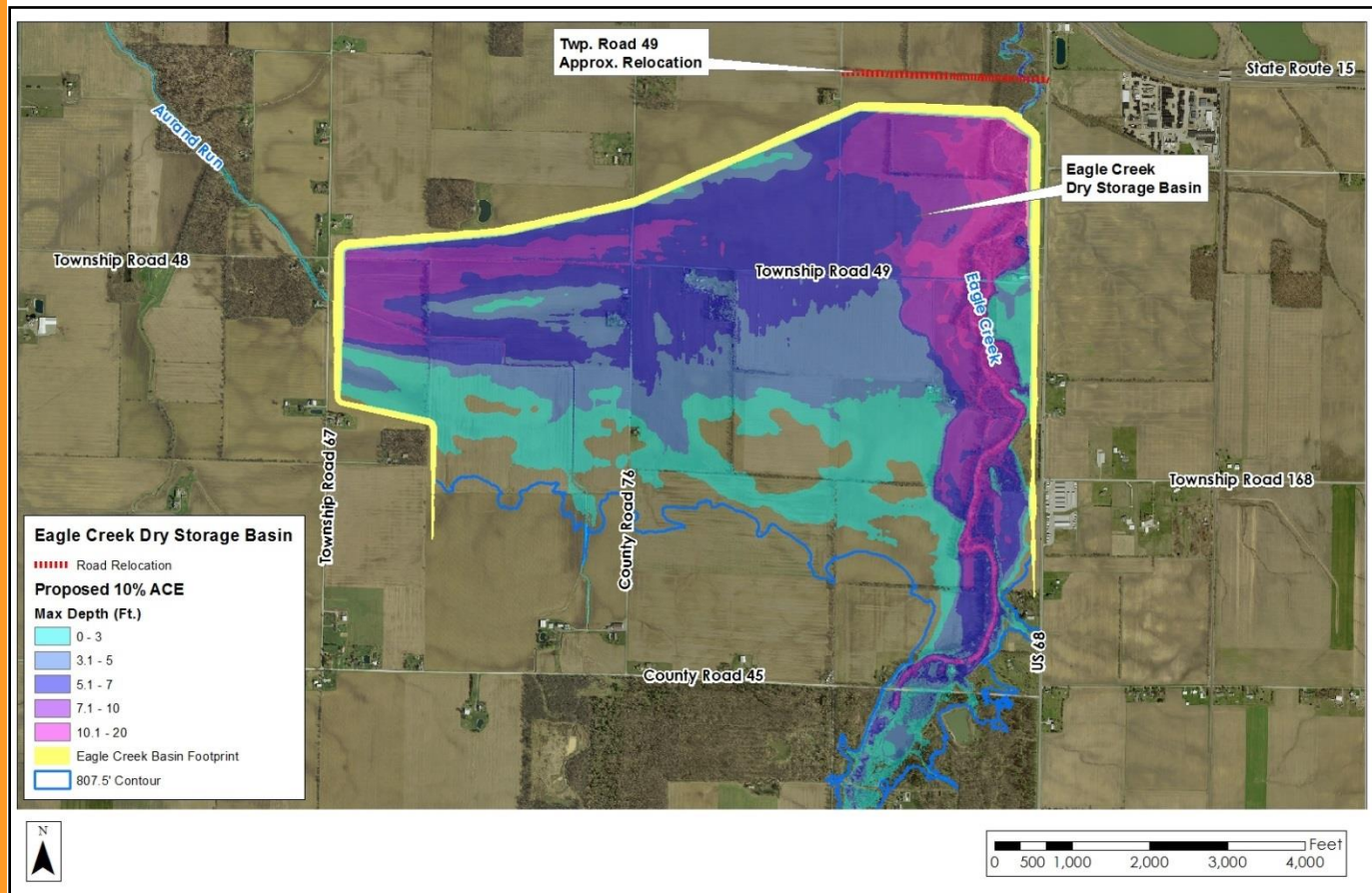
50% ACE event



Eagle Creek Dry Storage

Proposed
Conditions

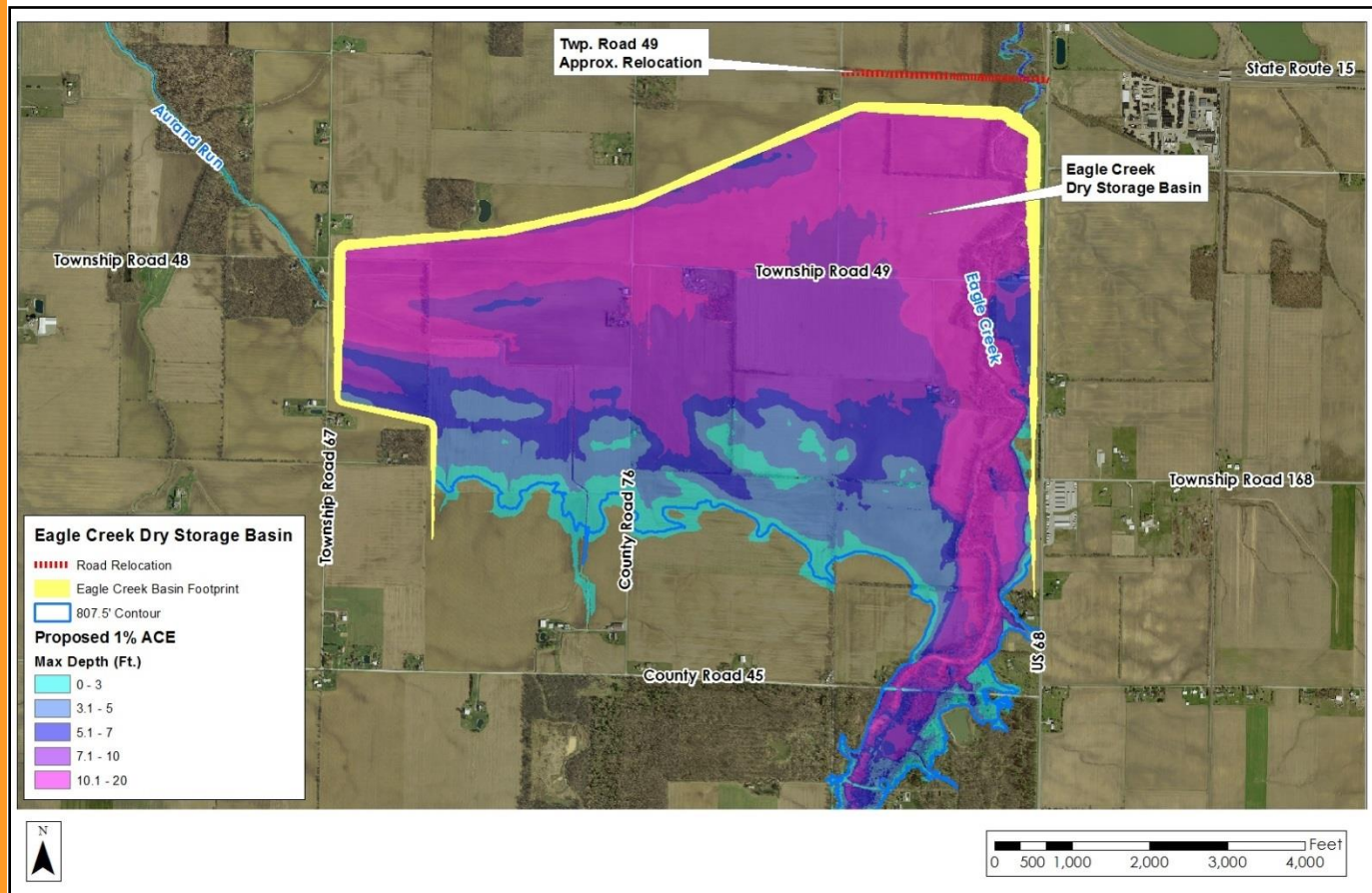
10% ACE event



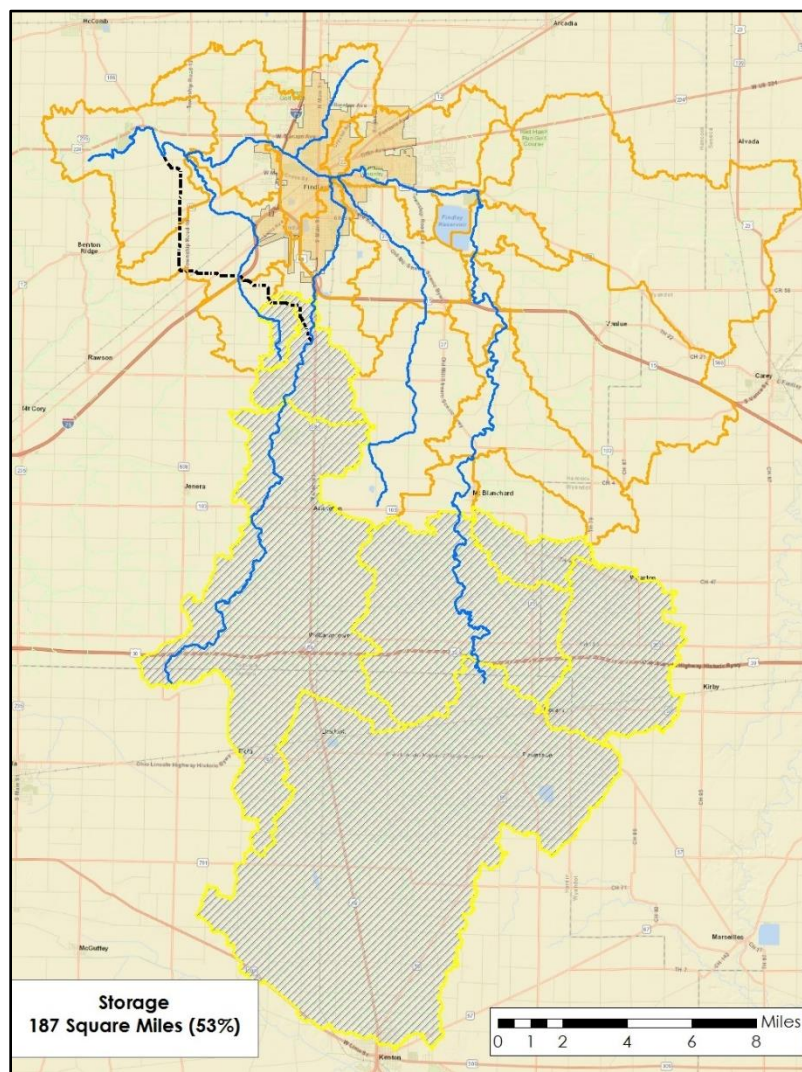
Eagle Creek Dry Storage

Proposed
Conditions

1% ACE event



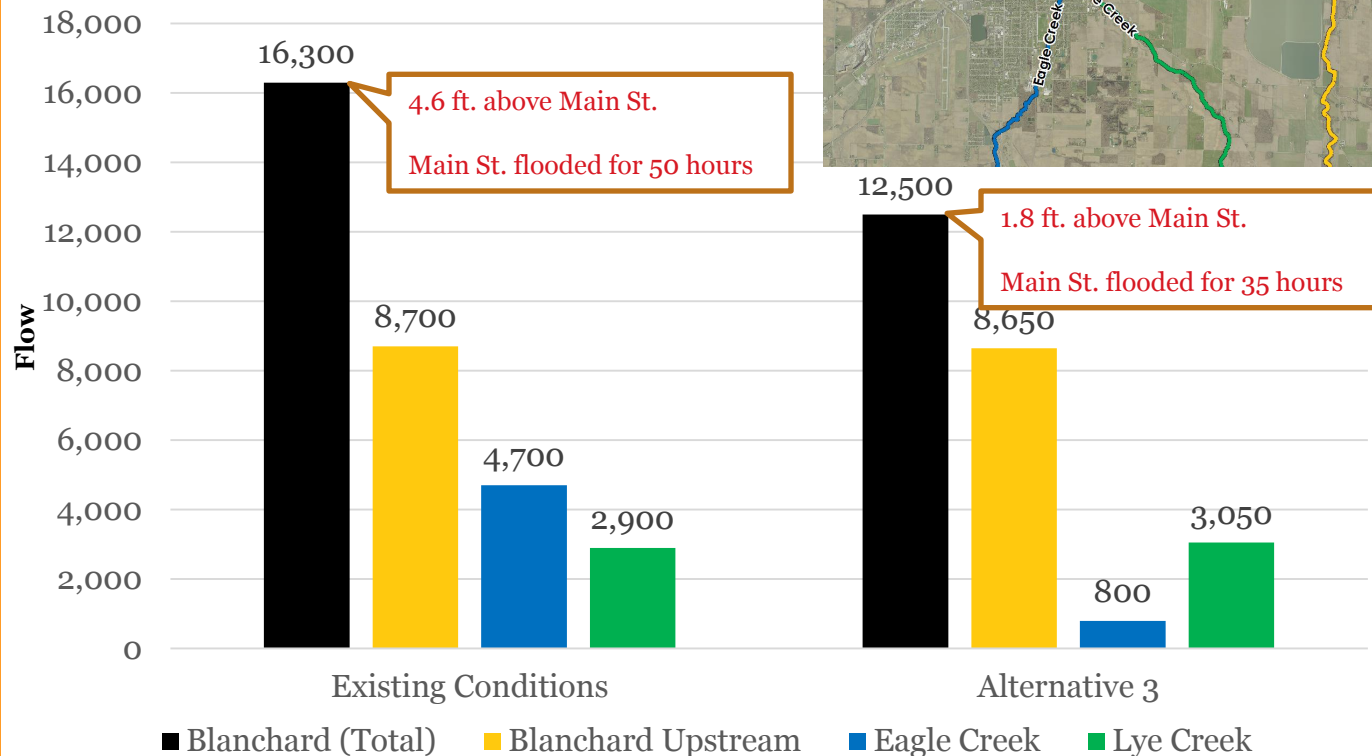
Percent of Watershed Influenced



1% ACE
100-Year, 24-Hour
SCS Type II = 5.26"

Blanchard River
in Findlay

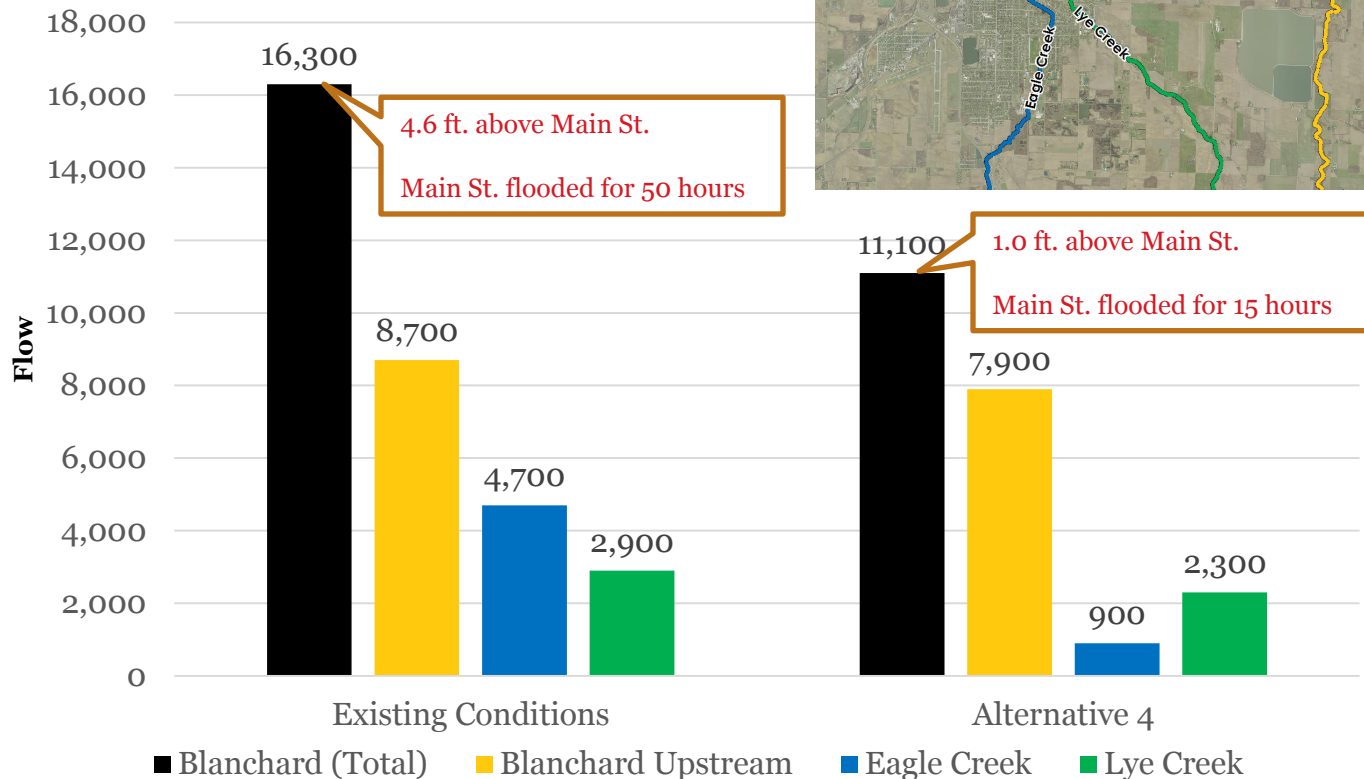
Eagle Creek Storage



1% ACE
100-Year, 24-Hour
SCS Type II = 5.26"

Blanchard River
in Findlay

Eagle Creek Storage + Blanchard R. and Potato Run Storage



Opinions of Probable Cost

Alternative Components

Alternative Option	Base Cost	Cost With Contingency
USACE Plan (25-Year Diversion of Eagle Creek)	\$63,804,000	\$80,902,000
Refined Diversion (100-Year Diversion of Eagle Creek)	\$81,300,000	\$105,690,000
Diversion Channel Extension (Eagle Creek to Blanchard River)	\$67,800,000	\$88,140,000
Total Diversion Channel Extension	\$149,100,000	\$193,830,000
Riffle/Inline Structures Removal	\$780,000	\$1,014,000
Floodplain Bench Widening and Railroad Bridge Modifications	\$14,500,000	\$18,850,000
Total Hydraulic Improvements	\$15,280,000	\$19,864,000
Eagle Creek Dry Storage Basin	\$53,500,000	\$69,550,000
Blanchard River Dry Storage Basin	\$34,400,000	\$44,720,000
Potato Run Dry Storage Basin	\$19,700,000	\$25,610,000
Total Storage	\$107,600,000	\$139,880,000

Opinions of
Probable Cost

Spatial Spread
of Projects

Independent
Projects that
make up a
Program



Alternatives

Alternative	Base Cost	Cost With Contingency
Alternative 0 – Existing Conditions	--	--
Alternative 1 – USACE Plan (25-Year Diversion of Eagle Creek)	\$63,804,000	\$80,902,000
Alternative 2 – Blanchard River Modifications	\$15,280,000	\$19,864,000
Alternative 3 – Alt. 2 + Eagle Creek Dry Storage Basin	\$68,780,000	\$89,414,000
Alternative 4 – Alt. 3 + Blanchard & Potato Dry Storage Basins	\$122,880,000	\$159,744,000

- Alternative 4 is Stantec's Recommended Plan
 - Hydraulic improvements
 - Eagle Creek dry storage basin
 - Blanchard River dry storage basin
 - Potato Run dry storage basin

Benefits and Impacts Summary

Alternative	Modeled Scenario	Reduction in WSE at Main St (Feet)	Max Water Depth on Main St (Feet)	Duration Water is 6" Above Main St (Hours)	Total Acres Directly Impacted by Project Construction	Home Buyouts	New Bridges or Cul-De-Sacs	Acres Impacted Outside of Ex. Regulatory Floodplain	Acres Removed from Floodplain	Agricultural Acres Removed from Floodplain	Parcels Directly Impacted by Project Construction	Parcels Removed from Floodplain
0	Existing Conditions	n/a	4.6	50	--	--	--	--	--	--	--	--
1	USACE Plan (25-Yr Diversion)	0.9	3.6	45	960	1	13	960	1,690	1,140	75	1,670
2	Blanchard R. Modifications	0.9	3.7	40	2	0	0	2	280	40	5	760
3	Blanchard R. + Eagle Cr. Storage	2.8	1.8	35	1,140	14	1	863	2,780	1,180	55	2,460
4	Blanchard R. + Eagle Cr. Storage + Blanchard & Potato Storage	3.6	1	15	2,430	19	2	1,514	5,060	2,850	135	2,850

Benefit / Impact Summary HEC-RAS Results (SCS Type II – NOAA Atlas 14 100-Year, 24-Hour event (5.26 inches) equally distributed across watershed)

Hancock County Flood Risk Reduction Program: Benefit Cost Analysis

(STANTEC Project # 174316204)

Prepared for:



Submitted by:



Point of Contact:

Michael F. Lawrence, JFA President
4915 Saint Elmo Avenue, Suite 205
Bethesda, Maryland 20814
Phone: (301) 961-8835 Fax: (301) 469-3001
lawrence@ifaucett.com

March 2017

Opinion of Probable Construction Cost

Alternative Option	Base Cost	Cost With 30% Contingency
Riffle/Inline Structures Removal	\$780,000	\$1,014,000
Floodplain Bench Widening and Railroad Bridge Modifications	\$14,500,000	\$18,850,000
Total Hydraulic Improvements	\$15,280,000	\$19,864,000
Eagle Creek Dry Storage Basin	\$53,500,000	\$69,550,000
Blanchard River Dry Storage Basin	\$34,400,000	\$44,720,000
Potato Run Dry Storage Basin	\$19,700,000	\$25,610,000
Total Storage	\$107,600,000	\$139,880,000

Operations and Maintenance Cost:

- Hydraulic Improvements - \$17,700 annually
 - Mowing, debris removal
- Dry Storage Basins - \$155,000 annually
 - Annual inspections, EAP updates, mowing, embankment repair, debris removal

Benefit-Cost Analysis

Program Benefits

- NED Benefits/Damages Avoided:

- Structures & Content
- Motor Vehicles Transportation

Phase 1 – Hydraulic Improvements		Phase 2 – Eagle Creek Dry Storage Basin	Phase 3A – Blanchard River Dry Storage Basin	Phase 3B – Potato Run Dry Storage Basin
Timeline (Years)	NFIP Administrative Cost 2017-2021	2019-2025	2020-2027	2020-2029
• RED Benefits/Damages Avoided:	– Environmental / Landuse Business Losses		2022	2022
			2023	2023
			2024	2024
			2025	2025
			2026	2026
			2027	2027
			2028	2028
			2029	2029
2030	2030			

- RED Benefits/Damages Avoided:

- Business Losses
 - Income, Clean-up, Emergency Plan
- Environmental / Landuse

Hydraulic Improvements

Costs / Benefits - NPV
(Thousands of 2017 Dollars)

Category	Cost	Benefit	Benefit-Cost Ratio
Program Costs	\$20,233		
Structures (Residential)		\$33,896	
Structures (Business)		\$24,901	
Motor Vehicles		\$2,523	
Transportation		\$5,969	
Emergency Response		\$4,050	
NFIR Administrative Cost	5,969	\$5,698	
Business Losses (Income)		\$2,067	
Business Losses (Cleanup)		\$2,673	
Business Losses Emergency Plan		\$797	
Agricultural		\$163	
Environmental		\$11,229	
Total	\$20,233	\$93,966	4.64

Full Program

Costs / Benefits - NPV

(Thousands of 2017 Dollars)

Category	Cost	Benefit	Benefit-Cost Ratio
Program Costs	\$159,876		
Structures (Residential)		\$107,450	
Structures (Business)		\$42,867	
Motor Vehicles		\$5,388	
Transportation		\$8,992	
Emergency Response		\$6,419	
NFIP Administrative Cost		\$18,311	
Business Losses (Income)		\$3,276	
Business Losses (Cleanup)		\$3,153	
Business Losses Emergency Plan		\$1,277	
Agricultural		\$368	
Environmental		\$57,707	
Total	\$159,876	\$255,208	1.60

1% ACE Flood

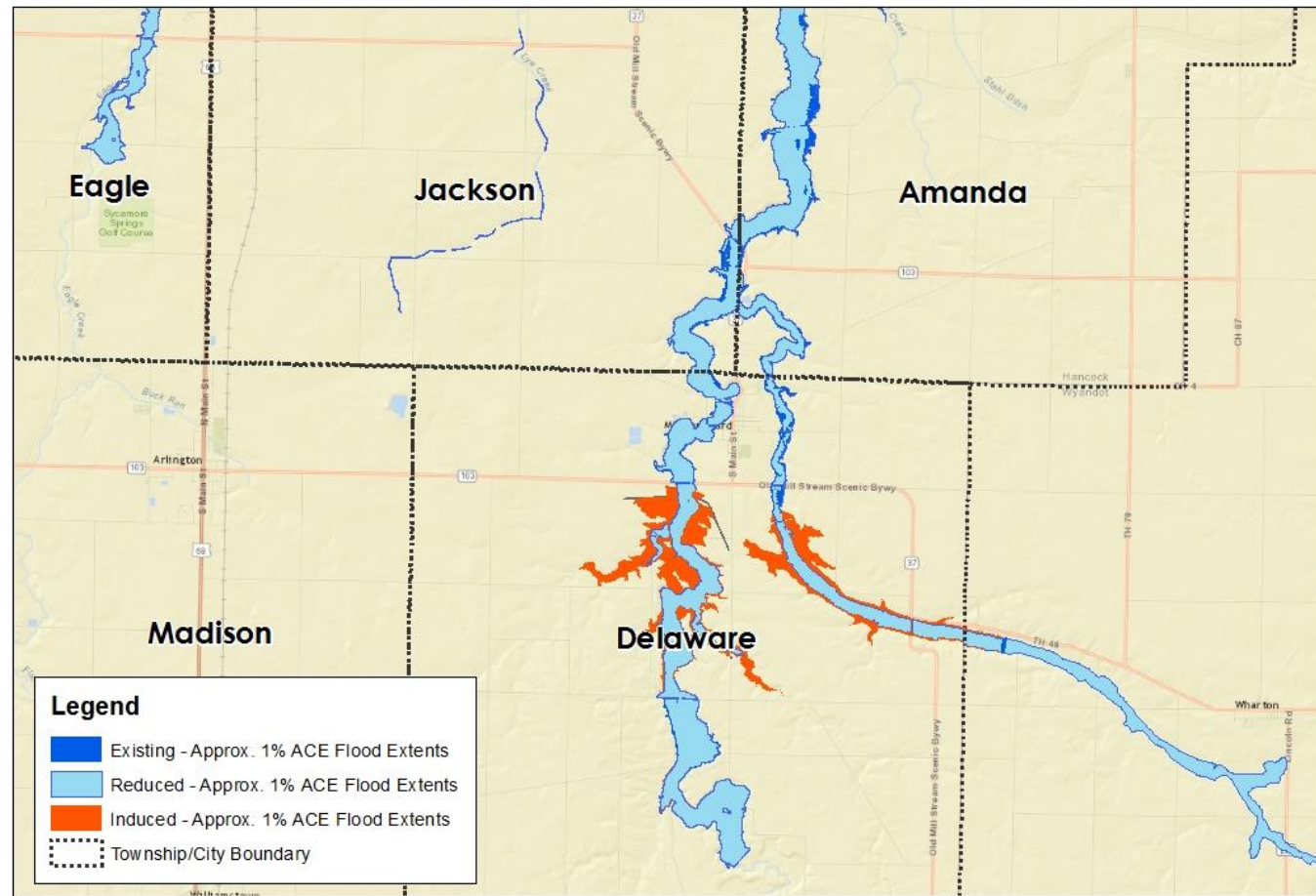
Mt. Blanchard
Storage

+

Eagle Creek
Storage

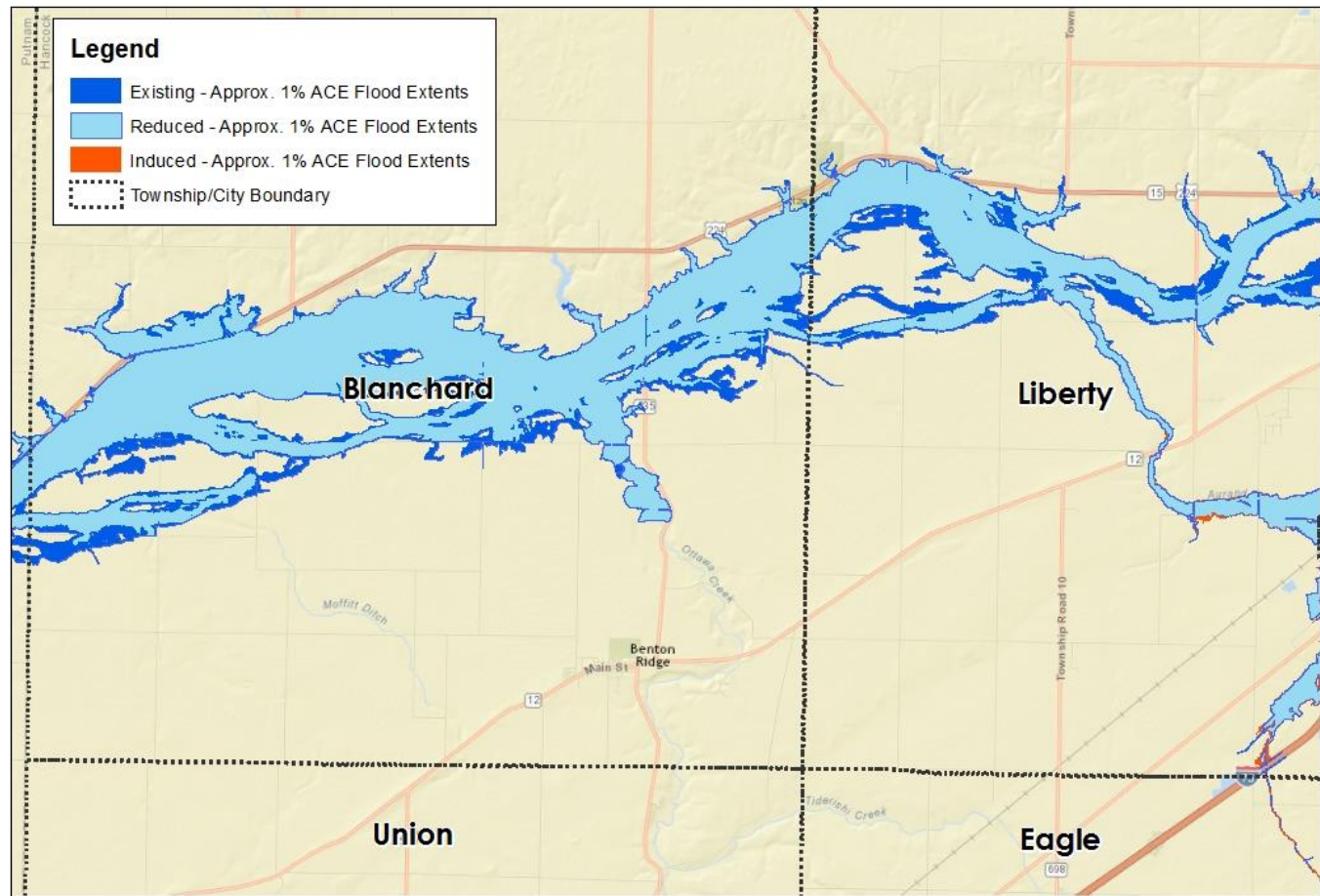
+

Hydraulic
Improvements



1% ACE Flood

Mt. Blanchard
Storage
+
Eagle Creek
Storage
+
Hydraulic
Improvements



Additional Notes from MWCD

- The MWCD Board and Conservancy Court have only authorized the detailed design and permitting related to the Hydraulic Improvements. Additional authorization will be required for construction of these improvements;
- The MWCD Board and Conservancy Court have neither endorsed nor accepted the conceptual program within the Proof of Concept report, beyond the Hydraulic Improvements;

Additional Notes from MWCD

- Funding for the Hydraulic Improvements is anticipated to come from the existing Hancock County Flood Reduction fund, resulting from the county tax revenues dedicated for such purposes;
- Funding methods and strategies for the remainder of the conceptual program have not been defined and will not be developed until after a formal program is adopted within the Official Plan, if that occurs; and
- Additional opportunity for public review and input of the proposed Hydraulic Improvements will occur during the detailed design of those improvements.

Questions

www.HancockCountyFlooding.com

Hancock County Flood Risk Reduction Program Report

Steve Wilson - scwilson@co.hancock.oh.us

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Maumee Watershed Conservancy District

1900 Lima Ave.

Findlay, OH 45840

Phone: 419-424-5050