



## City of Oelwein Request for Proposals for Project Scoping of Flood Mitigation Efforts for Dry Run Creek

February 2023

The City of Oelwein is requesting proposals from firms for engineering and other services for developing a flood mitigation project to submit application to FEMA for HMA funding for construction costs. The flood mitigation is for Otter Creek which runs through Oelwein from the east, cuts through town, and exits on the south end of Oelwein into Lake Oelwein.

Upon selection of the qualified firm(s), contract negotiation with the City will take place to develop a contract with the firm for engineering services at a fair and reasonable price to complete all work necessary for the phase and shall include not-to-exceed amounts for broad categories of work within the phase.

After the firm is selected by the City, the City will host a public meeting solicit input on the project.

The scope of work for such engineering and other services include:

### Scope of Work and Budget Narrative

The scope of work includes pre-application work as it relates to helping the city develop and prepare an application for submittal to Iowa HSEMD for state or FEMA funding opportunities. The city anticipates that this work will include preparation of preliminary concept drawings, preliminary design, cost estimates, and other engineering and design work pre-requisite to development of a cost benefit analysis (BCA). The BCA determines the difference between likely pre- and post-mitigation flood damages to the City's infrastructure and/or residents and businesses, and compares that difference (aka losses avoided, or "the benefit") to the cost of the project. The scope of work includes:

- Selection and procurement of an engineering firm
- Meetings with engineering firm, City Council, and stakeholders
- Engagement of engineering firm to complete analysis tasks 1-4 below and provide a report that documents the analysis

### Engineering Analysis Tasks

1. Document and list all buildings that would flood at the determined elevations, and for each building determine and list how many feet above finished floor elevation would be inundated with floodwater for each determined flood elevation.
2. Based on current hydrology and hydraulics, document the recurrence intervals at which floodwaters reach the elevations determined in task 1 (the elevations at which floodwaters inundate buildings with one foot or more of floodwaters).
3. Determine:
  - a. How much storage is technically feasible and available in upstream areas. While this will necessitate some engineering design work, full design is not anticipated in the scope of work for this first phase; the engineer need only provide enough design



details in order to perform the calculations and analysis for the next item and to write the report with elements listed below.

- b. How proposed culverts and storm sewer improvements will lower the water surface elevations and/or change the recurrence intervals of flood events,
4. [Either a or b]:
- a. Calculate the new recurrence intervals, after construction of proposed storage basins and other structures, at which floodwaters will reach that same elevations determined in task 1 that flood buildings with one foot or more of water over the finished floor elevation.
  - b. For the same recurrence intervals at which flooding occurs in the pre-mitigation scenario (as determined in task 2), calculate the new flood elevations after construction of proposed storage basins and other structures. For each recurrence interval, document how much lower (in feet) flood inundation will be for each building that floods in the pre-mitigation situation.

Deliverables:

- A. Engineering Analysis Report
  1. The selected firm must provide a report that documents the analysis to make the above determinations and calculations, as well as proposes one or more projects to mitigate flooding and identifies for such project(s):
    1. A scope of work for potential flood mitigation project(s);
    2. All parties and agreements necessary to complete the project ;
    3. The applicable model codes/edition and engineering standards used that are required and how a proposed project will satisfy these accepted engineering practices.
    4. Any deviation from standard procedures, methods, techniques, technical provisions of the applicable codes or best practices.
    5. A proposed activity completion timeframe, and description of all anticipated phases of a project schedule, with explanation of how all timeframes are reasonable and consistent with the scope of work.
    6. Summary and enumeration of past damages and risk(s) to people, structures or infrastructure that the planned mitigation activity is designed to avoid in the future.
    7. Ways that the risks of damage or harm will be reduced or eliminated and explanation of the residual risk
    8. Estimate and description of anticipated initial project costs, how they are consistent with the scope of work; and an estimate of operations and maintenance costs, annualized over the project's useful life.
- B. Benefit Cost Analysis completed on FEMA's BCA Toolkit 6.0
- C. Other Deliverables:
  2. Included as part of this work is any related work to ensure adequate engineering and design, which may include, but are not limited to: development of biological evaluation,



property or cultural resource assessments, Phase 1 and 2 Environmental Site Assessment for hazardous materials presence or contamination, soil borings, Archeological Phase 1 services, permit acquisition as needed, and other testing, monitoring, modeling, or subconsultant type work.

**Project Budget: Line-Item Budget Breakdown**

	Estimated Hours	Estimated \$/Hr	Total Estimate
<b>Engineering for Engineering Analysis Report:</b>			
<b>Benefit Cost Analysis:</b>			
<b>Environmental and other assessments</b>			

**Procurement Process:**

The city sends out request for proposals on February 1.

Proposals from firms are to be emailed to Dylan Mulfinger at [dmulfinger@cityofuelwein.org](mailto:dmulfinger@cityofuelwein.org) by March 1.

A group of city employees review and score the proposals and interview the top two firms.

A recommendation is provided to City Council on March 20.

The selected firm is notified by the city and is required to start with 30 days of notification.



## Scoring Criteria

The city will use the following scoring criteria to determine the top two firms to interview for the project.

Experience on FEMA projects specifically project scoping	40	
Experience with flood plain management	20	
Experience working on FEMA funded projects	20	
Experience working with the City of Oelwein	10	
Experience with flood mitigation efforts	10	
Total	100	



# Iowa CTP Real Time Technical Assistance

City of Oelwein, Fayette County, IA

01 November 2021

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## Background

The City of Oelwein, Iowa, has experienced repeated and significant flooding along Dry Run Creek upstream of the railroad crossing, downstream of 2nd Avenue SW, and especially from the railroad crossing to 3rd Avenue NE (see Appendix A). The City has expressed an interest in mitigation measures that would reduce or eliminate the flooding in this reach. The Iowa DNR, as a FEMA Cooperating Technical Partner (CTP), has offered to develop high level mitigation solution(s) through Real Time Technical Assistance (RTTA).

## Problem Statement

Development of three or more high level mitigation solutions that reduce or eliminate the flooding along Dry Run Creek upstream of the railroad crossing to 3rd Avenue NE. In addition, the solutions should work to avoid or minimize flooding from Dry Run Creek in the West Charles Street underpass.

## Technical Approach

The major contributing factor to flooding along Dry Run Creek is the culvert under the railroad embankment that cannot handle the flow from the now urbanized areas upstream.

In discussions with the City of Oelwein, the following mitigation measures were put forth as possible solutions:

- Removal of 1<sup>st</sup> Avenue SW bridge
- Removal of parking deck North of W. Charles Street
- Reconfiguration and replacement of W. Charles Street bridge
- Storage in Wings Park
- Storage upstream in watershed

However, during our analysis we found that these measures taken cumulatively did not provide the desired reduction in floodplain extents upstream of the railroad culvert. The following additional measures were also taken into consideration:

- Deepening, widening, and concrete lining of Dry Run Creek from 2<sup>nd</sup> Ave SW to 3<sup>rd</sup> St NW.
- Deepening, widening, and concrete lining of Dry Run Creek from 4<sup>th</sup> St SW to the railroad culvert.
- Addition of flood wall (i.e., levee) along the south bank (i.e., left bank) of Dry Run Creek immediately upstream of the railroad culvert to prevent flows extending to properties to the south<sup>1</sup>.
- Addition of flood wall (i.e., levee) along the north bank (i.e., right bank) of Dry Run Creek immediately upstream of the railroad culvert to prevent flows northward to the West Charles Street underpass<sup>1</sup>.

The models and GIS shapefiles used in this analysis are provided for City of Oelwein use.

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<sup>1</sup> The terrain between the Dry Run Creek Culvert and the West Charles Street underpass is flat and the levee is needed to keep the flow in the Dry Run Creek channel.

## Summary of Alternatives

The various mitigation measures (see Figures in Appendix B) considered in the various alternatives are listed below.

Feature	Option										
	1	2	3	4	5	6	7	8	9	10	11
Increased railroad culvert size	✓										
Removal of 1st Ave SW Bridge		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Removal of parking deck North of W. Charles Street		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reconfiguration & replacement of W. Charles Street Bridge		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Storage in Wings Park			✓								
Storage reservoirs upstream of Outer Rd				✓		✓	✓	✓	✓	✓	
Lined rectangular channel, upstream of railroad					✓	✓					
Deepened & Lined rectangular channel, upstream of railroad							✓	✓	✓	✓	✓
Deepened & Lined trapezoid channel, downstream of railroad									✓	✓	✓
Small flood wall on left side of channel upstream of railroad								✓			
Small flood wall on right side of channel upstream of railroad								✓		✓	
<b>Recommended</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>~</b>	<b>X</b>	<b>~</b>	<b>~</b>	<b>✓</b>	<b>✓</b>	<b>✓</b>	<b>X</b>

## Resulting Flood Extents from Recommended Alternatives

The figures in the Appendix display the flood extents for the 1% annual chance flood for Options 8, 9 and 10. Additionally, the reduction in flows resulting from the scenarios with storage basins can be found below.

River Station	Option		
	Effective Flows (cfs)	Flows with Wings Storage (cfs)	Flows with Upstream Storage (cfs)
15074.01	1041	1041	620
13944.2	2195	2195	1206
10931.86	3165	3098	1987
5165.161	3328	3260	2194

## Conclusions

Urbanization in Oelwein upstream of the railroad culvert has resulted in increased runoff and exposed properties to flooding during frequent and infrequent flood events. Given the limitation of not being able to replace the railroad culvert, high level planning alternatives have been developed that address the flood hazard.

It is worth noting that the modeling used to develop these results are intended for a high-level planning discussion as opposed to design and construction. Additional detailed analyses to inform design decisions will be needed.

Furthermore, given the potential community acceptance of shallow flooding the identified measures may be further refined. For example, if a flood depth of 1.5 ft is acceptable then the levees identified for Options 8 and 10 may not be required.



# Appendix A

(Source: City of Oelwein, Iowa)





PARKS / CEMETERY / AQUATICS / CAMPGROUND / TRAILS

Park and Recreation

[www.oelwein.fun](http://www.oelwein.fun)

2016

CITY



WINGS



WINGS



WINGS



CITY



CITY



CITY



REDGATE







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Park and Recreation

[www.oelwein.fun](http://www.oelwein.fun)

2017

CITY



CITY



CITY



CITY



CITY



CITY







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CITY



CITY



CITY



DAM



DAM





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DAM



PLATT PARK - 1 INCH OF RAIN IN AN HOUR







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Park and Recreation

[www.oelwein.fun](http://www.oelwein.fun)

2018

FLOODING AT CITY PARK



FLOODING AT CITY PARK



CITY PARK FLOODING



CITY







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Park and Recreation

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# 2019

## WOODLAWN SPRING FLOODING



# 2020 + TORNADO

Diamond 1 – storm damage



City Park bridge



Diamond 1 fencing



City Park road



City Park road



Platt Park





1<sup>st</sup> Ave SW 10 block





2<sup>nd</sup> Ave SW to South Lot



150 to Chrysler Park





Viaduct



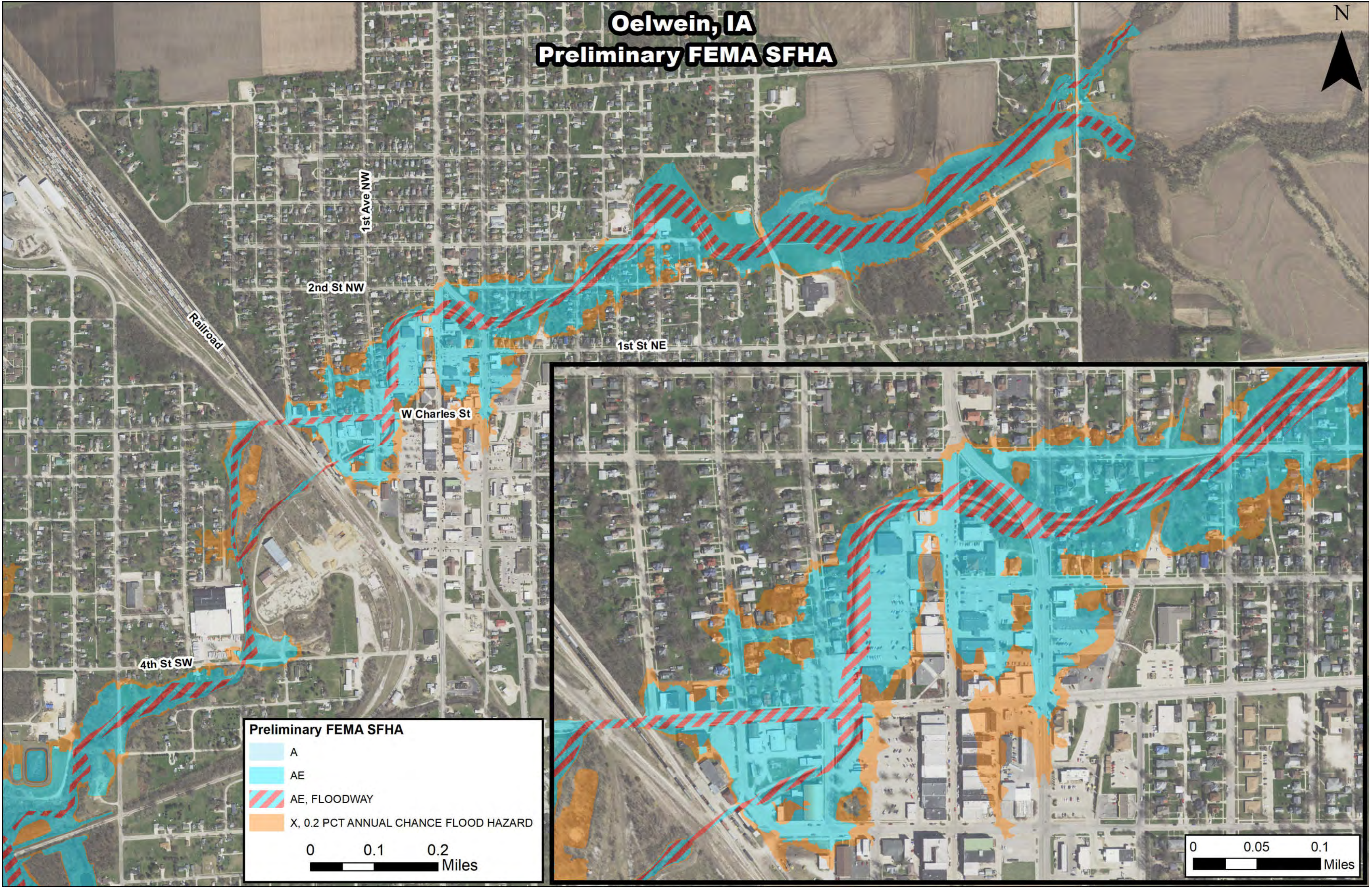


# Appendix B





# Oelwein, IA Preliminary FEMA SFHA



**Preliminary FEMA SFHA**

- A
- AE
- AE, FLOODWAY
- X, 0.2 PCT ANNUAL CHANCE FLOOD HAZARD

0 0.1 0.2  
Miles

0 0.05 0.1  
Miles

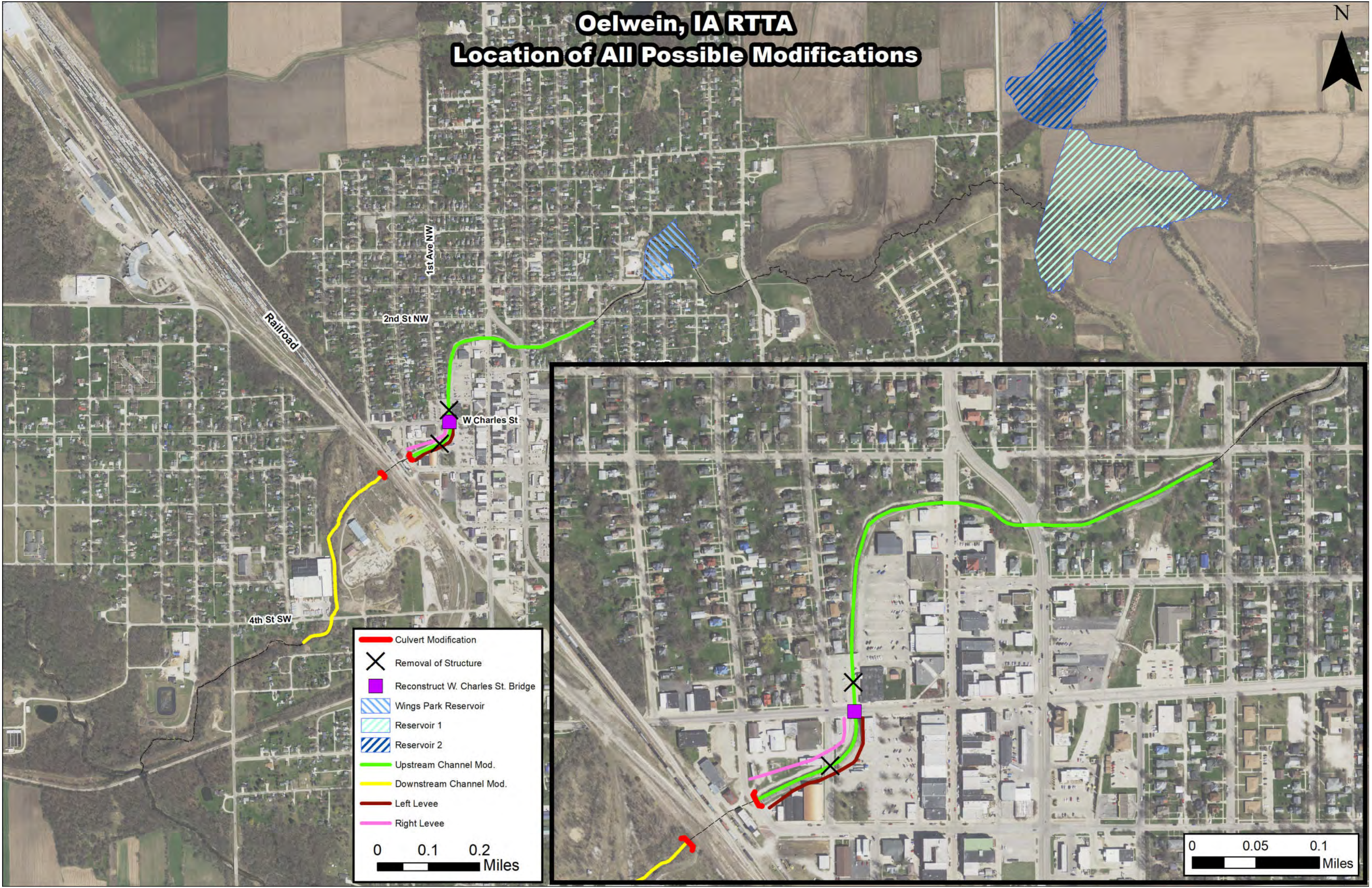
1st Ave NW  
2nd St NW  
Railroad  
4th St SW

1st St NE  
W Charles St



# Oelwein, IA RTTA

## Location of All Possible Modifications



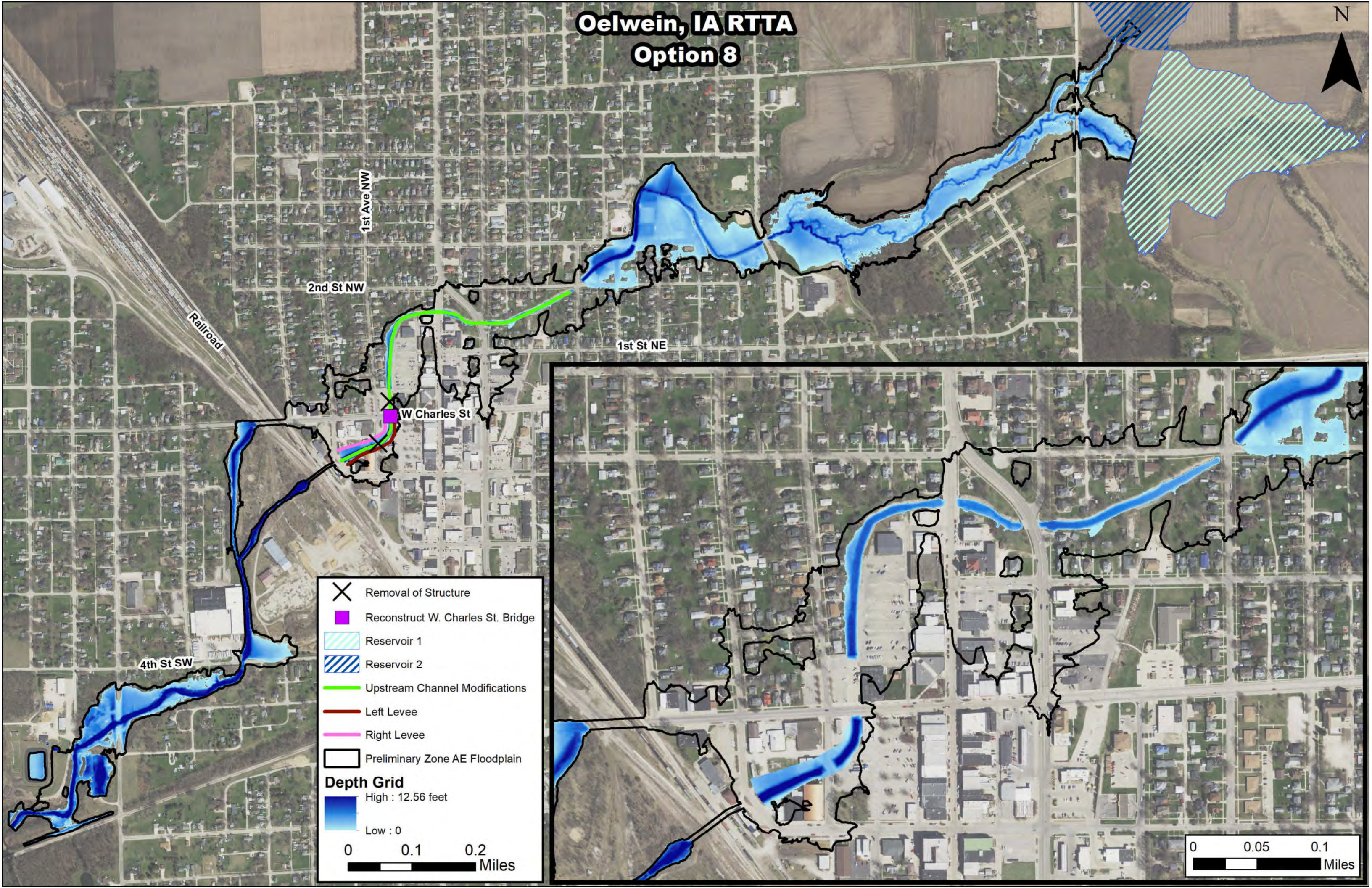
	Culvert Modification
	Removal of Structure
	Reconstruct W. Charles St. Bridge
	Wings Park Reservoir
	Reservoir 1
	Reservoir 2
	Upstream Channel Mod.
	Downstream Channel Mod.
	Left Levee
	Right Levee

0 0.1 0.2 Miles

0 0.05 0.1 Miles



# Oelwein, IA RTTA Option 8



- X Removal of Structure
- Reconstruct W. Charles St. Bridge
- ▨ Reservoir 1
- ▨ Reservoir 2
- Upstream Channel Modifications
- Left Levee
- Right Levee
- ▭ Preliminary Zone AE Floodplain

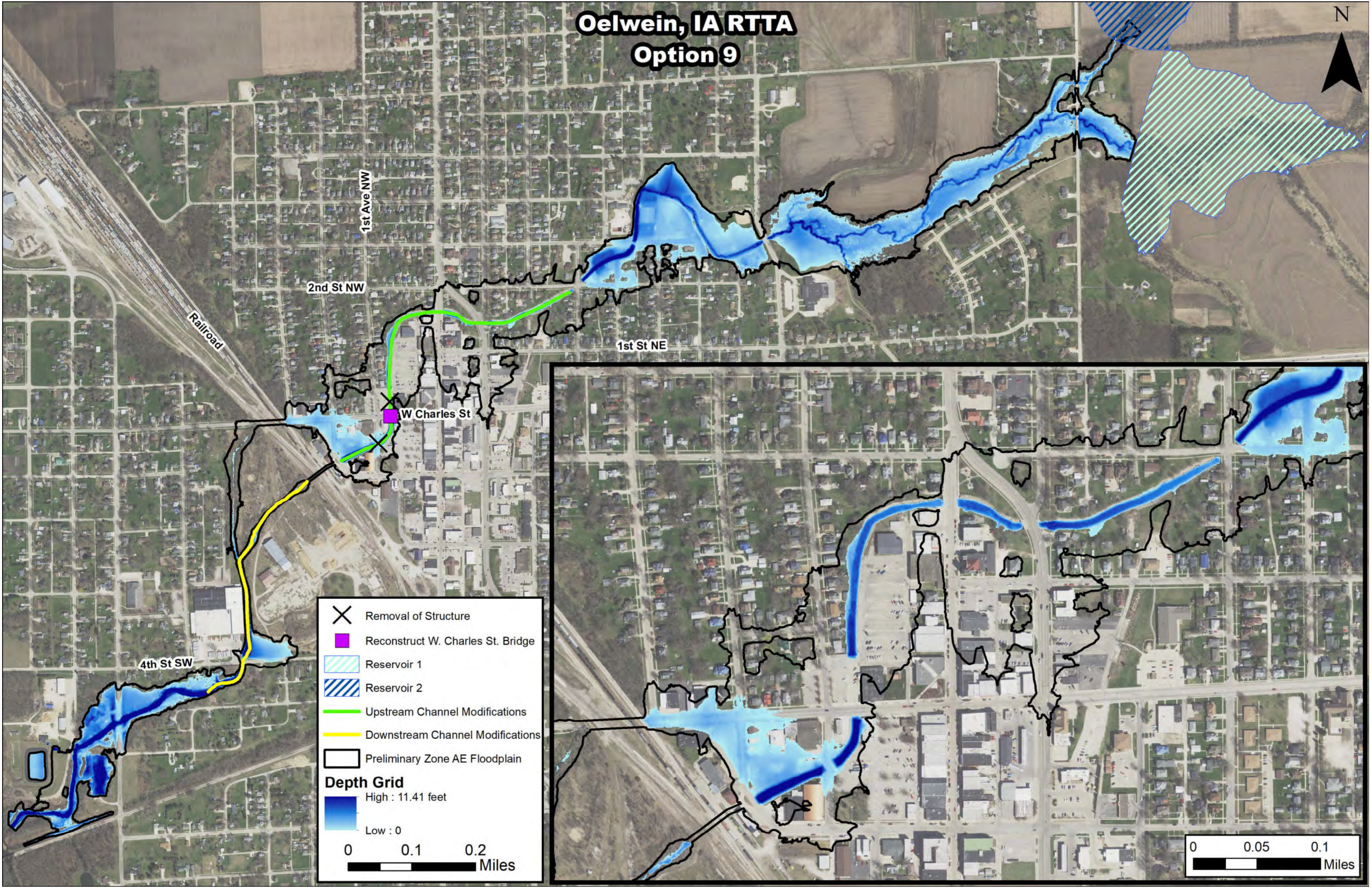
**Depth Grid**  
High : 12.56 feet  
Low : 0

0 0.1 0.2 Miles

0 0.05 0.1 Miles



# Oelwein, IA RTTA Option 9

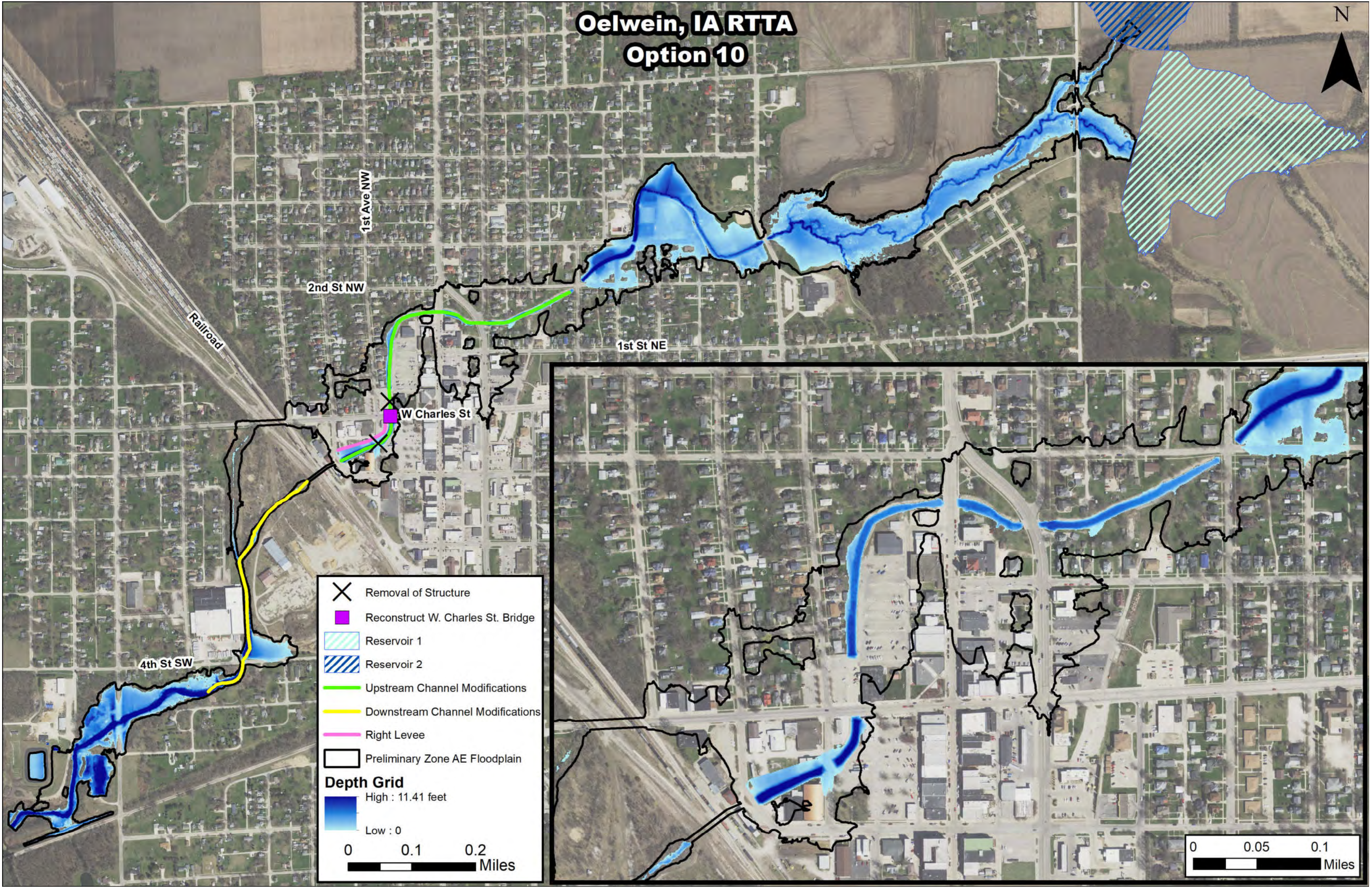










	Removal of Structure
	Reconstruct W. Charles St. Bridge
	Reservoir 1
	Reservoir 2
	Upstream Channel Modifications
	Downstream Channel Modifications
	Preliminary Zone AE Floodplain
<b>Depth Grid</b>	
	High : 11.41 feet
	Low : 0
0      0.1      0.2 Miles	

0	0.05	0.1
Miles		



# Oelwein, IA RTTA Option 10



-  Removal of Structure
-  Reconstruct W. Charles St. Bridge
-  Reservoir 1
-  Reservoir 2
-  Upstream Channel Modifications
-  Downstream Channel Modifications
-  Right Levee
-  Preliminary Zone AE Floodplain

**Depth Grid**  
High : 11.41 feet  
Low : 0

