

Resilient Master Planning



Bridgman, MI

9.12.17

Presentation Outline

- Background
 - Project team
- Introduction to Resilient Bridgman Analysis
 - Scenario-Based Planning Framework
 - High Risk Flood Areas
 - Build Out Comparisons
 - Best Management Practices
 - Fiscal Impacts
- Project Timeline
- Questions?

Project Team

Richard Norton - *Principle Investigator, University of Michigan*

Zach Rable - *Research Associate, University of Michigan*

Harry Burkholder – *Executive Director, LIAA*

Guy Meadows - *Director of Great Lakes Research Center, Michigan Tech University*



** Project Support from the Michigan Coastal Zone Management Program (CZMP)*

Scenario-Based Planning Framework

| | Climate Futures | | |
|---------------------------------------|-----------------|-------------|---------------|
| Management Options | Lucky | Expected | Perfect Storm |
| Current Conditions | Scenario 1A | Scenario 1B | Scenario 1C |
| Full Build-Out (Currently Allowed) | Scenario 2A | Scenario 2B | Scenario 2C |
| BMP Build-Out (Spatial BMPs) | Scenario 3A | Scenario 3B | Scenario 3C |

- Scenario-based planning enables users to conduct selected analyses given combinations of climate futures and growth management options.
- Assumptions are made in order to craft plausible future conditions
 - Example: Lake Michigan standing water level – we have observed low, “average”, and high elevations
- Analyses provide useful community information, such as: structures at risk of flooding under each combination of climate futures and management options

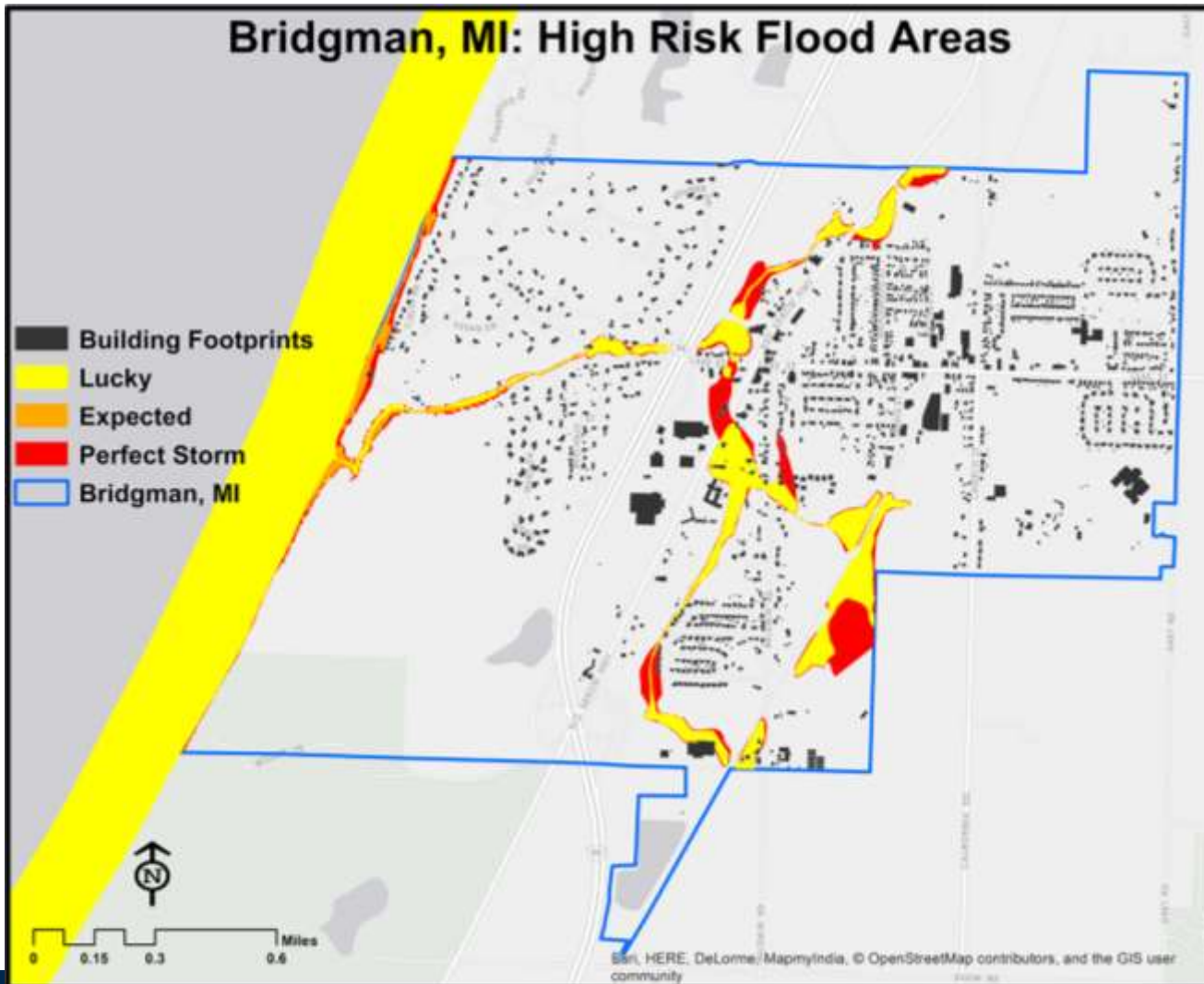
Future Conditions

- Possible Futures (*not predictions*)
- Varying:
 - Storminess
 - Great Lakes still water levels
- Derived by:
 - FEMA FIRMs (existing & proposed – Coastal Flood Study)
 - Observed Lake Michigan water levels (gauge data)
 - Available Digital Elevation Models (DEMs)
- “Planning storm” ~ 50 year storm

Future Conditions (Forecasts)

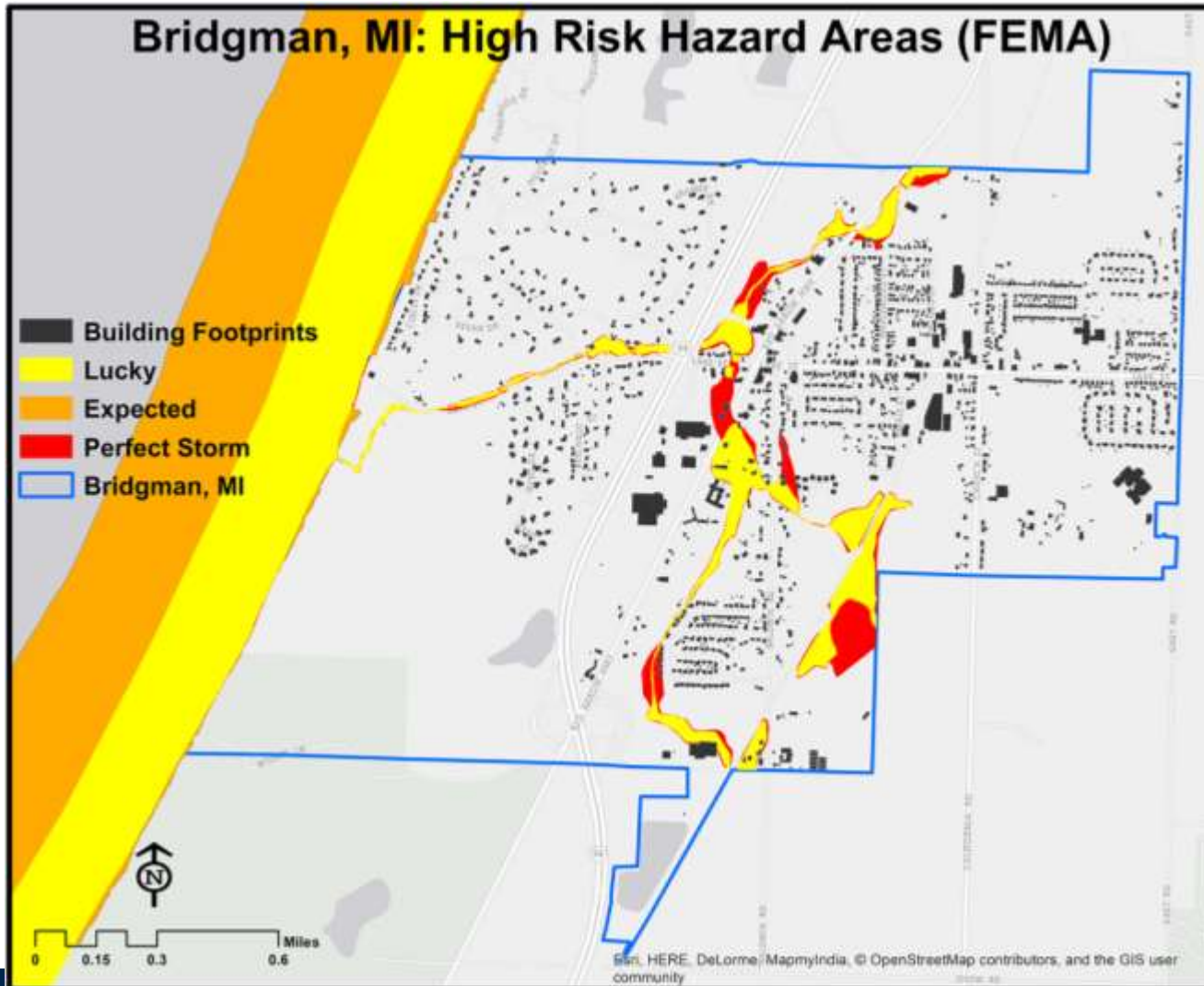
- Lucky:
 - All-time low lake water levels, no wave action (VE)
 - Current FIRM base flood elevations
 - Planning storm ~ current 2% storm
- Expected:
 - Long-term mean lake water levels
 - Proposed FIRM base flood elevations + elevation-derived VE
 - Planning storm ~ current 1% storm (more stormy)
- Perfect Storm:
 - All-time high lake water levels
 - Proposed FIRM base flood elevations + elevation-derived VE + Shaded-X (Mapped .2% flood areas)
 - Planning storm ~ current 0.2% storm (super stormy)

UM/MTU Method



- Number of Current Structures at Risk:
 - Lucky: 36
 - Expected: 39
 - Perfect Storm: 67

FEMA Coastal Flood Study Method



- Number of Current Structures at Risk:
 - Lucky: 36
 - Expected: 36
 - Perfect Storm: 61

Management Options

- Current Structures & Infrastructure
- Potential Build outs –
 - Full Build-Out allowable under current zoning ordinances
 - Build-Out with Wetland & Water Buffer Best Management Practices (BMPs)
 - 50 foot buffers around inland water features and National Wetlands Inventory wetlands between 2 and 5 acres in size

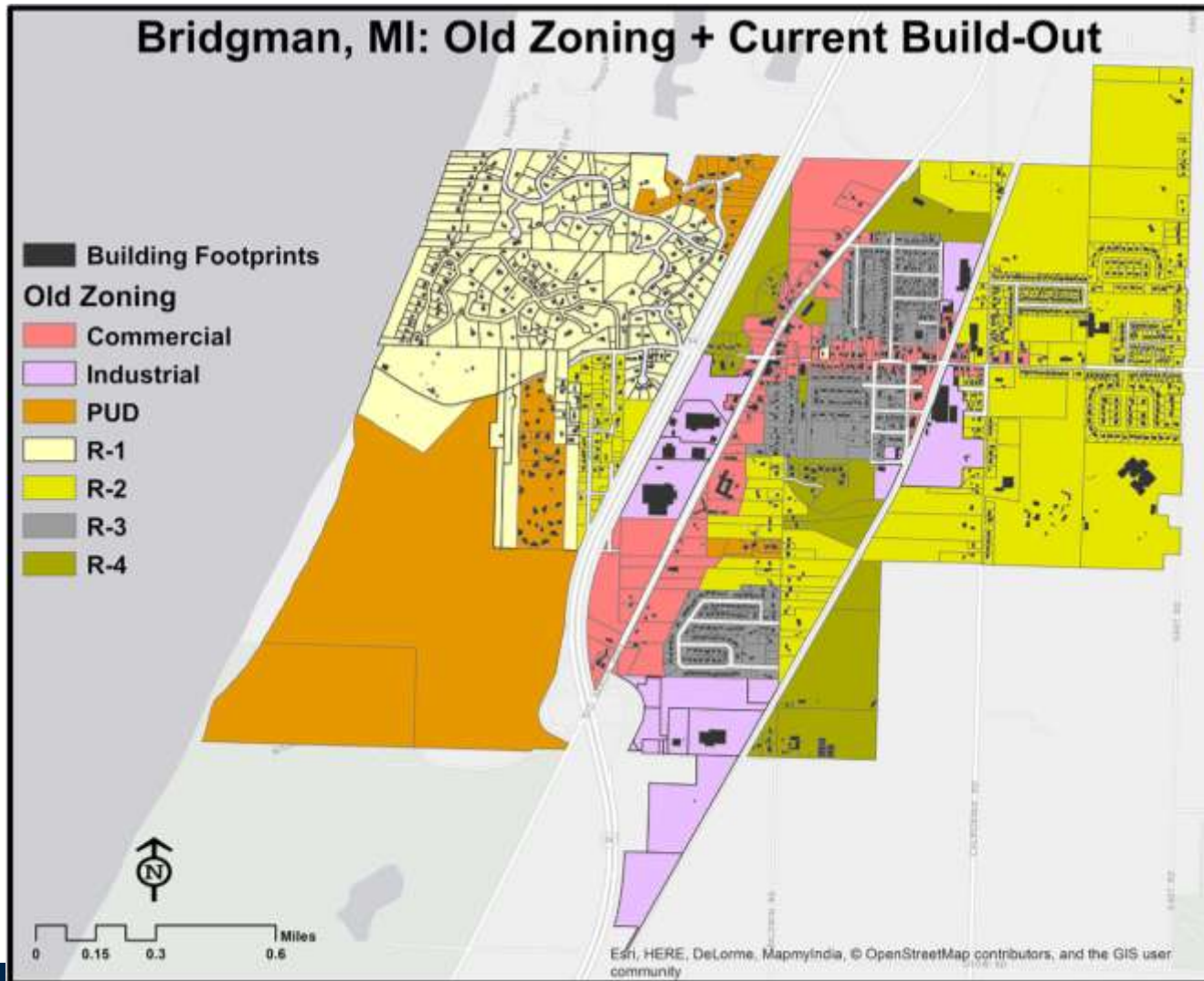
Potential Build outs

-These are-

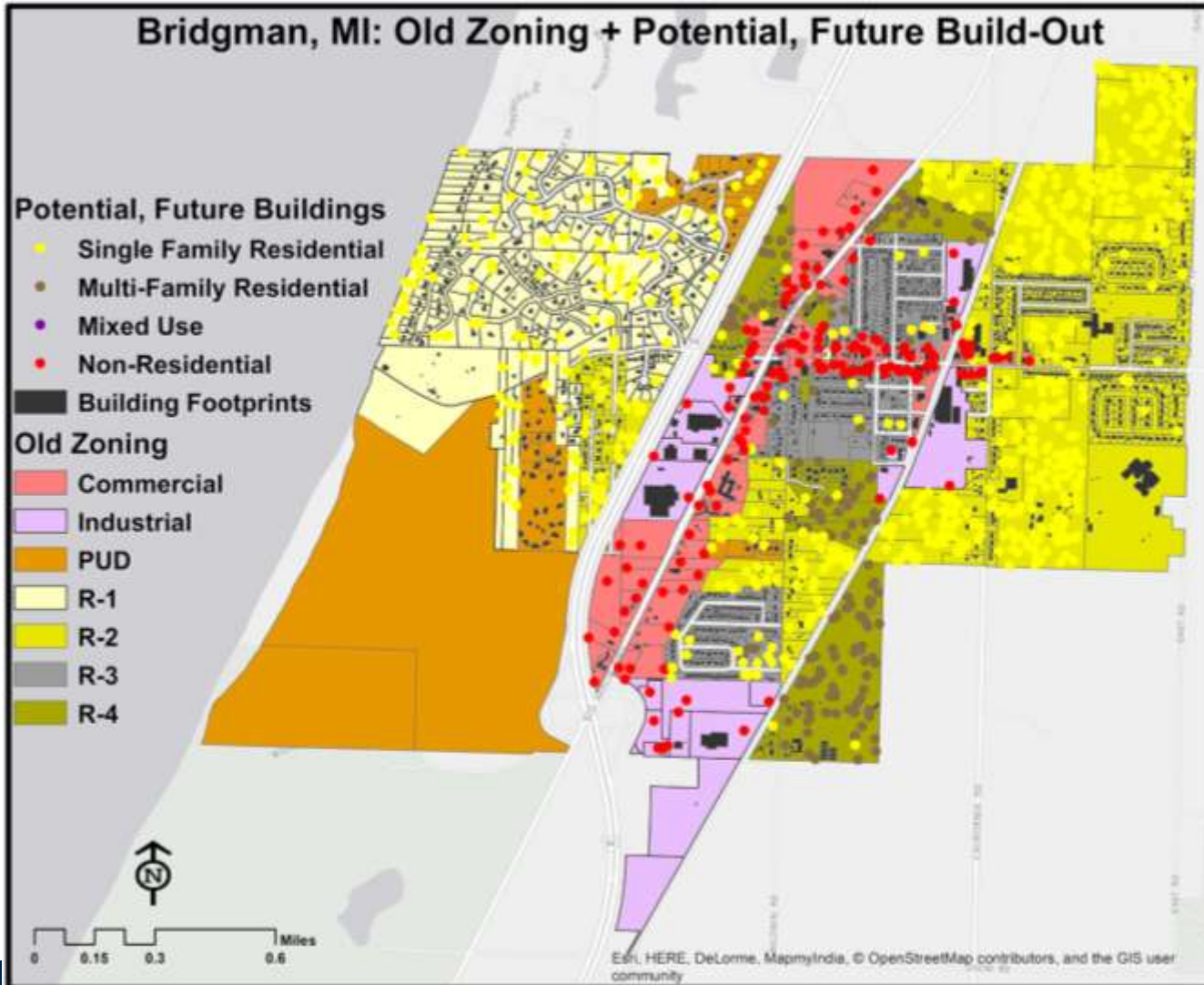
Not predictions; rather

Reasonable forecasts of what could be built
given current zoning, and given set BMPs

Current Build-Out: Old Zoning

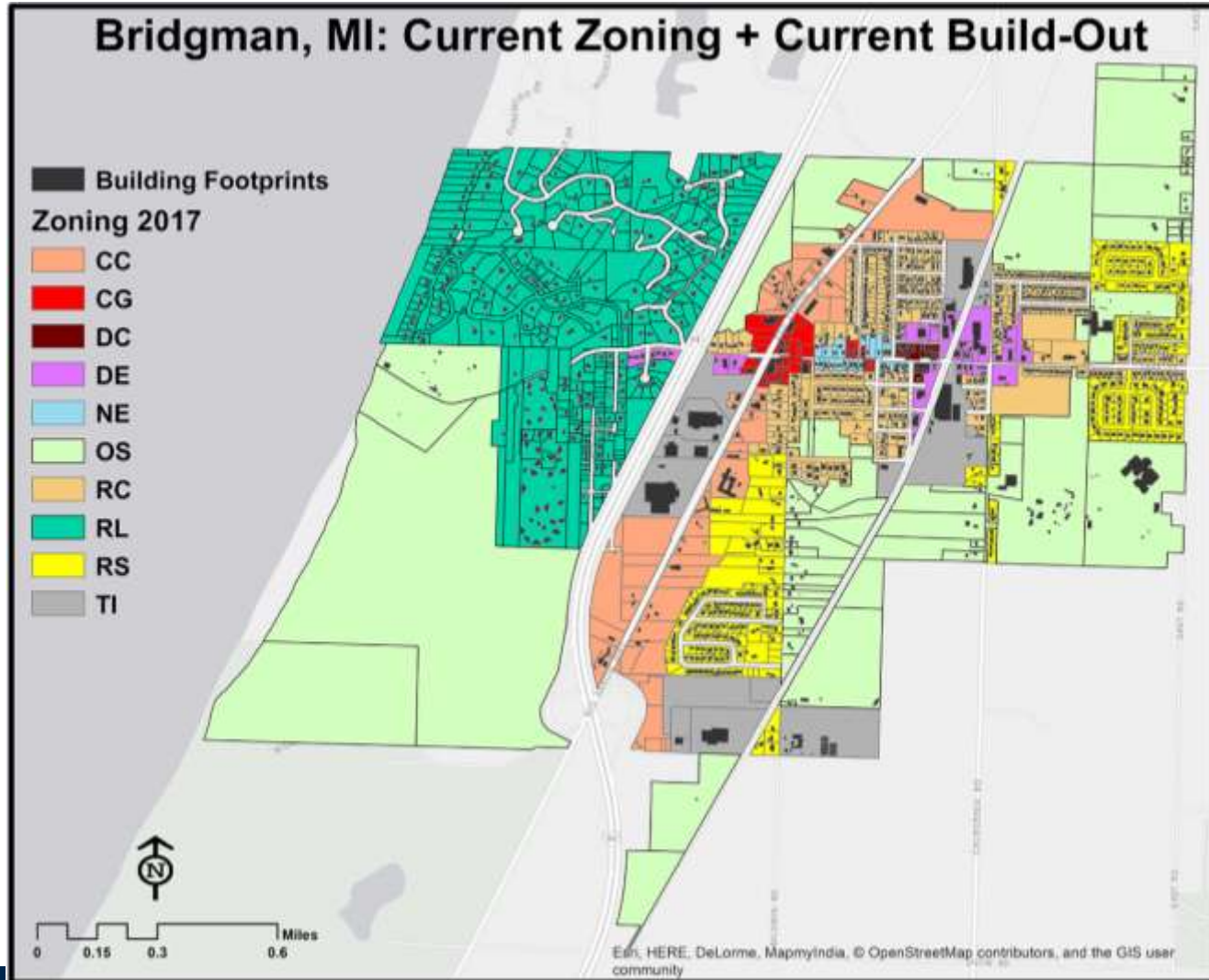


Potential, Future Build-Out: Old Zoning

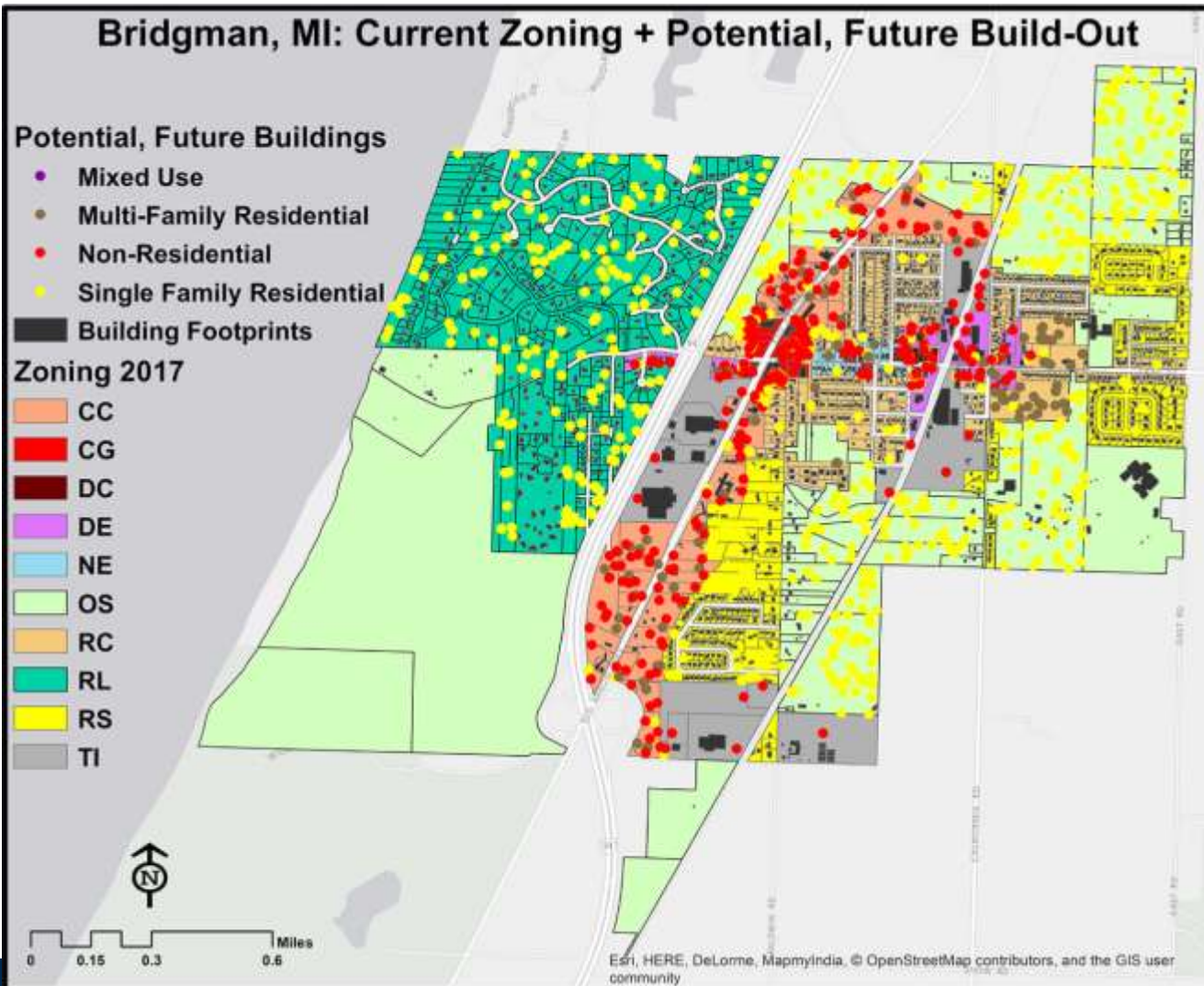


- Total Potential, Future Structures: 980
 - Single Family Residential: 678
 - Multi-Family Residential: 151
 - Non-Residential: 151

Current Build-Out: Current Zoning



Potential, Future Build-Out: Current Zoning

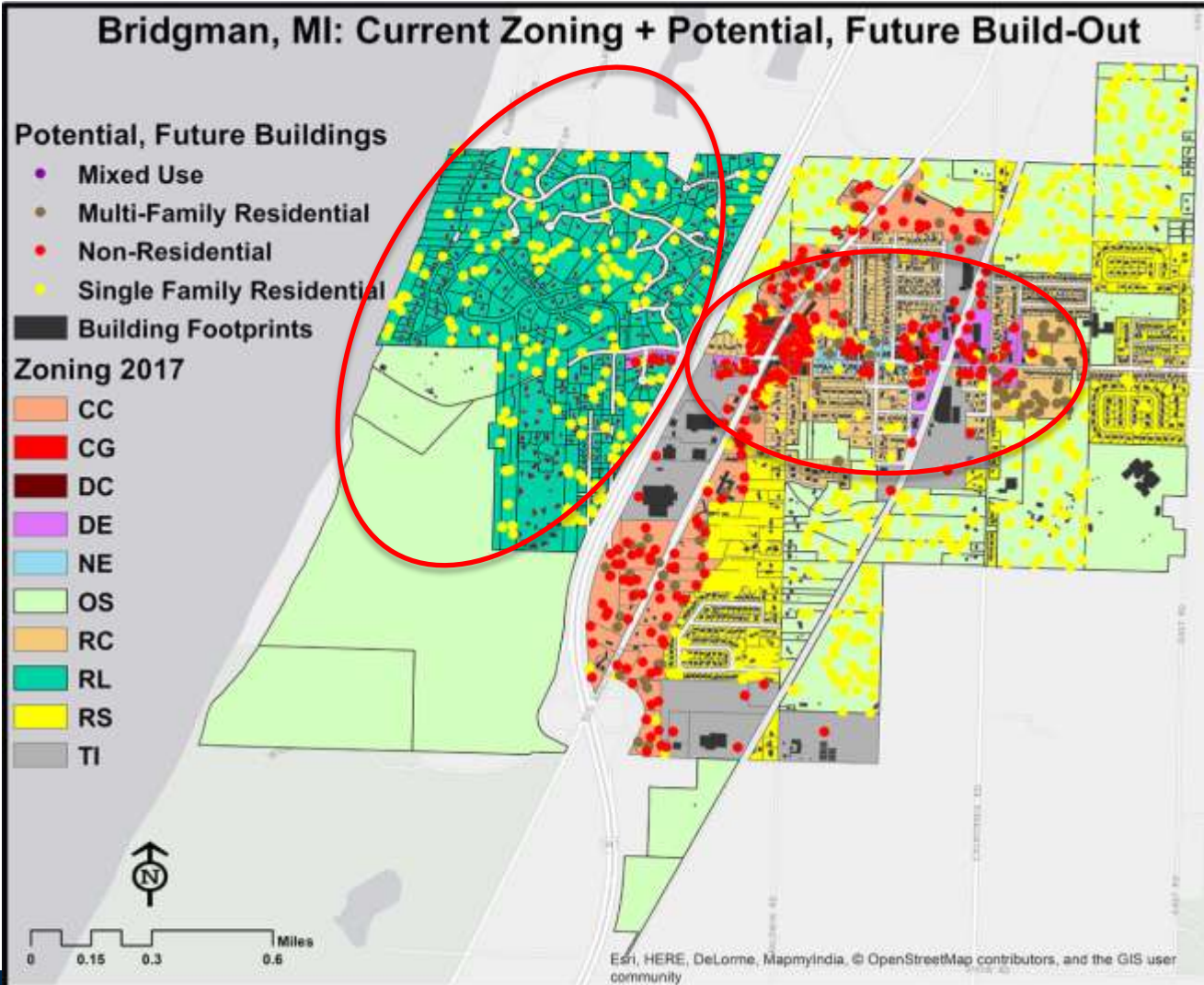


- Total Potential, Future Structures: 1,017
 - Single Family Residential: 641
 - Multi-Family Residential: 98
 - Non-Residential: 278

Comparing the Potential Build- Outs

- Main Takeaways:
 - **Bridgman is not fully built-out** – using “by right” zoning regulations shows that there is room to grow should there be a demand
 - **Shift in potential, future structures** from the East and South of Downtown Bridgman in the old zoning **to more central development** along Lake St. between Red Arrow Hwy. & Church St. in the new, current zoning (Especially, residential development)
 - A rough estimate shows:
 - Old Zoning – 150 new, potential central structures
 - New Zoning – 300 new, potential central structures
 - **This aligns well with stated goals of the current zoning ordinance...**
 - On switching to hybrid zoning because it’s better at “regulating diverse, urban, mixed-use environments”
 - On the benefits of using form-based code “...not just to create a good individual building, but rather a high-quality urban place.”
 - **Lots of room for potential development in the Residential Lake district**
 - Might make sense to revisit setback regulations for Lake Michigan fronting properties to avoid future exposure to coastal hazards

Potential, Future Build-Out: Current Zoning



- Central development is a positive
 - Development within RL District might not be because...
 - Can lead to degradation of dune system
 - Might lead to imprudent development near Lake Michigan
- *Potential BMP is downzoning to current DU/Acre (.896 DU/Acre) instead of what's allowed (2.178 DU/Acre)

BMP Build Out Rules

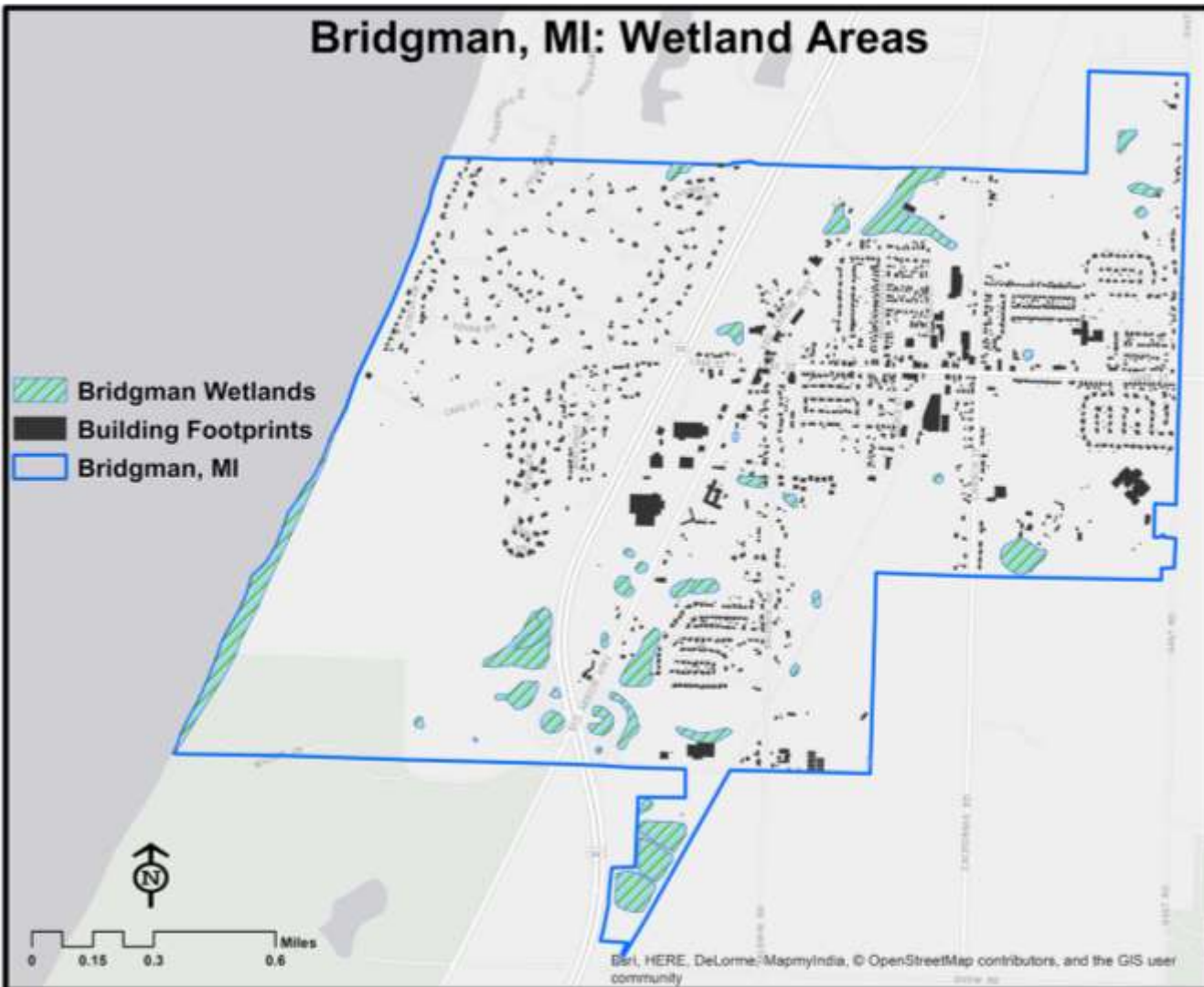
-Wetland & Water Buffers-

- 50 ft from Inland Water Features and
- 50 ft from Wetlands between 2 & 5 acres*

** These are the size wetlands that a local government can regulate without having to prove ecological value.*

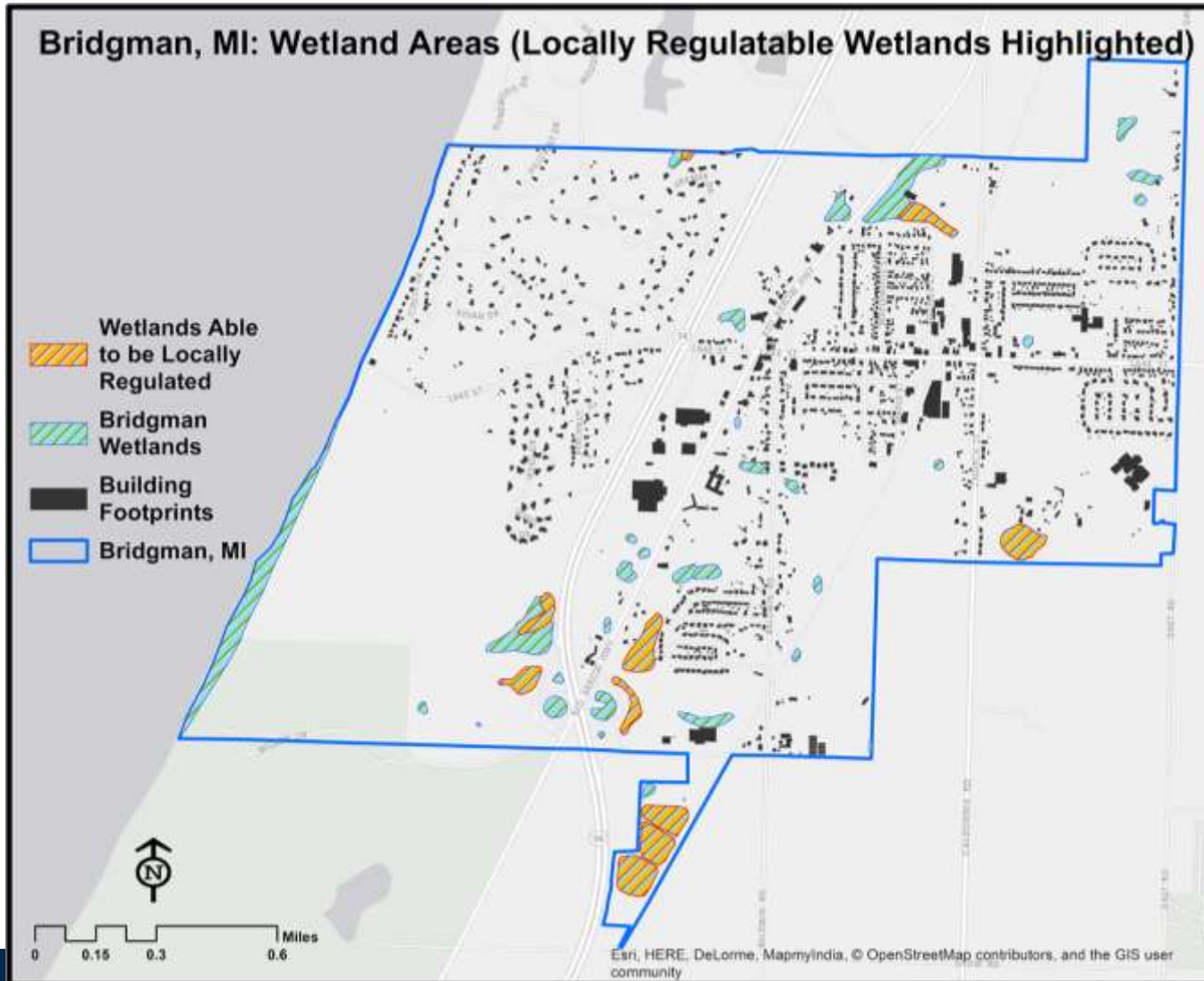
** The State of Michigan regulates wetlands 5 acres and larger*

All Wetland Areas



- This map is based on data from the National Wetlands Inventory (NWI), which may differ from other wetland maps and/or inventories.
- We are reviewing these other maps and inventories to account for discrepancies

Wetland Areas That Can be Locally Regulated



Structures Impacted

UM/MTU Method

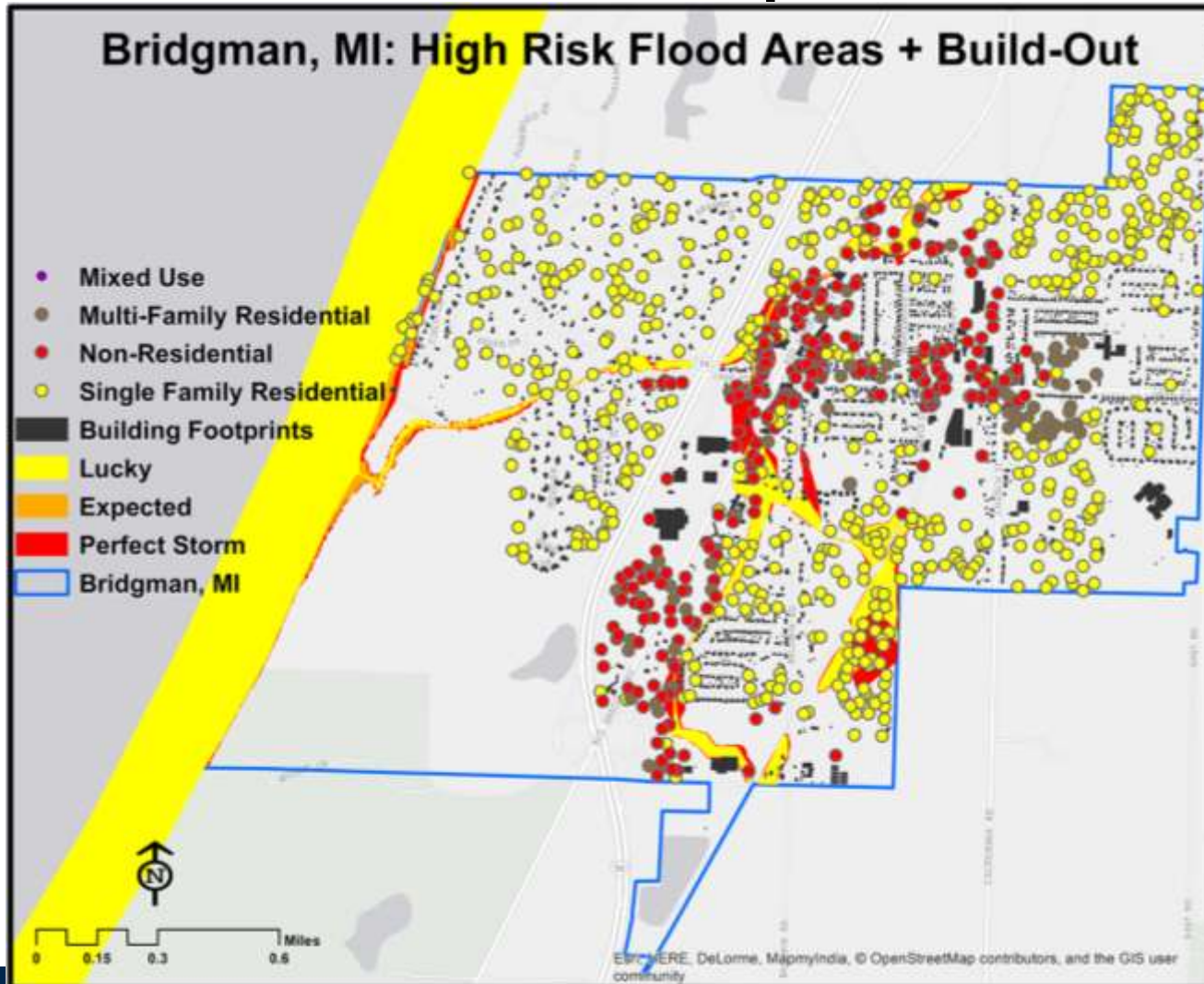
| | Lucky | Expected | Perfect Storm |
|-----------|-------|----------|---------------|
| Current | 36 | 39 | 67 |
| Build-Out | +92 | +93 | +133 |
| BMPs* | +90 | +91 | +127 |

* The wetland & water buffer BMPs do reduce the number of potential future structures at risk of being flooded, but there isn't that much room for growth near inland water and wetland features in Bridgman.

Other BMP options include, for example:

- Downzoning in high risk flooding areas
- Structural regulations (e.g., elevating first floor above base flood elevation)
- Low Impact Development (LID) practices

Structures Impacted



Fiscal Impact: Total Property Value at Risk Under Each Climate Future

UM/MTU Method

| | Lucky | Expected | Perfect Storm |
|---------|----------------|----------------|---------------|
| Current | ~ \$10 Million | ~ \$11 Million | \$17 Million |

* To put things in perspective, the total property value for all of Bridgman is about \$113 Million. So, roughly 8-15% of the total property value is at risk

Project Timeline

- June – August 2017: Community Meetings, Data Collection, Begin Analyses
- September – October 2017: Presentations of Findings, Draft Master Plan
- November – December 2017: Formal Review and Adoption of Master Plan



Questions?