Municipal Vulnerability Preparedness Program Action Grant Case Study

Municipality: City of Fitchburg
Project Title: John Fitch Highway – A Resilient Road Corridor
Award Year (FY): 2021
Grant Award: $ $271,787
Match: $ 139,260
Match Source: Cash funding and in-kind services. The City's in-kind match includes time to collection information, support site visits, review deliverables and provide feedback, participate in and help coordinate public engagement events, and submit monthly progress reports.
One or Two Year Project: One Year
Municipal Department Leading Project: Department of Public Works
Project Website URL: http://www.fitchburgma.gov/955/John-Fitch-Highway

Community Overview:

- *What is the population size of your community and where is it located?* The population of Fitchburg, MA is about 40,318 (according to the 2010 MA Executive Office of Energy and Environmental Affairs statistics that were referenced in the study). The town of Fitchburg is in Worcester County near Leominster, off of Route 2.
- *Do you have any Environmental Justice or other Climate Vulnerable communities?* Fitchburg is a Gateway City, with lower household income and educational attainment than the state average, and it has a significant environmental justice (EJ) population near the project site that are lower income and from minority groups. Almost two-thirds (61.2%) or 24,680 people reside in environmental justice block groups.
- *Other unique traits of your municipality like who the top employers are, geography, history, etc.* Fitchburg is located in northern Worcester County, in central Massachusetts. Before colonization and associated epidemics and exiles, this land was home to the Nipmuc, Nashaway, and the Pennacook, tribes within the Algonquian Indians. After the Revolutionary war, citizens settled near the Nashua River. A dam was constructed, and the river was utilized to power mills and shops that allowed the town to prosper as an industrial community. Once a railroad was built connecting Boston to Fitchburg, rapid development and growth occurred in the manufacturing industry. Automobiles gave way to suburban development, the General Electric plant closed, and the downtown area slowly declined during the 20th century but it remains a commercial area with rich history. Top employers include Fitchburg State University and other educational institutions, healthcare and biomedical research, paper products (Avery Dennison) and metal fabrication.

Project Description and Goals:

- *Where was the project located?* John Fitch Highway from Lunenberg St./2A down to Summer Street, the focus of this application, is a regional commercial corridor with a

grocery store and urgent care clinic. The route is also a connector from Route 2A (an evacuation route) to the St. Bernard Elementary School and Fire Station – 1.

- *What climate change impacts did the project address?* Since construction of John Fitch Highway in the 1950's, the roadway and associated development have disrupted the natural drainage system dominated by Baker's Brook. Commercial development in the 1960's filled many wetlands and sections of Baker's Brook were realigned to create more developable parcels. A portion of this area generally experiences flooding at least once a year, and most of the project site is located within the 100-year floodplain. Future precipitation increases from climate change impacts are expected to exacerbate the flooding damage and disruptions in this area, making a redesign of the area critical to make the community climate resilient. The roadway traffic is fast moving, with little pedestrian refuge from automobiles or urban heat. The surrounding land uses have expansive parking lots with unwelcoming building setbacks.
- *What were the specific goals and tasks of the project as stated in your application?*
    - The vision for this area was to develop a resilient commercial corridor. Once the design is implemented, the corridor will have improved walkability and bikability, a reduced urban heat island effect, and reduced vulnerability to flooding. Planting more trees in areas with minimal urban tree canopy and reducing stormwater flows into Baker Brook from John Fitch Highway will be accomplished by designing the roadway with complete street principles and low impact development techniques.
    - The design identifies improvements including permeable bike lanes, more crosswalks, and larger sidewalks to advance Complete Streets and Context Sensitive Design concepts. The design also takes into account future implementation of the Complete Street Prioritization Plan, which will occur at the intersection of John Fitch Highway/ Summer St and John Fitch Highway/Bemis St. Also explore options of acquiring land and redesigning the large commercial parking lot and parcels to address flooding of Baker Brook.
    - Tasks included a Functional Design Report, Preliminary Roadway Design, Preliminary Stormwater and Streetscape Design, Public Engagement, and Permitting.
- *Did your project meet the goals set forth in your application in terms of:*
    - *Employing nature-based solutions* - The design incorporated green infrastructure solutions such as bioretention, water quality swales, impervious cover removal, tree box planters and landscaping of a few small plaza areas. This will improve water quality and support groundwater recharge.
    - *Improving equitable outcomes for, and fostering strong partnerships with, EJ and other Climate Vulnerable Populations* – Investment in the neighborhood will directly benefit EJ and Climate Vulnerable Populations by increasing their public safety, access to the corridor including nearby schools and grocery stores. We anticipate less cars on the roads and more vegetation will lead to improved air quality. The reduction in impervious surface will also reduce the urban heat island effect. The entire community will benefit from the potential economic development opportunities that could be spurred by public investment.

Engagement strategies included providing Spanish translated-materials and alternative (i.e. artwork) forms of participation to engage a broader swath of the community.

- *Providing regional benefits* - The JFH roadway is a major regional connector. Mitigating flooding of the roadway and commercial buildings is beneficial to the broader public that uses this corridor. Improving water quality in Baker Brook and air quality will also have regional benefits for the North Nashua River and neighboring communities.
- *Implementing the public involvement and community engagement plan set forth in your application* - We received community feedback on the vision and design for the corridor through the range of engagement strategies proposed, including online public meetings and the Envision JFH Artwork Challenge, as well as a focus group with local businesses. The input collected informed the design team and steering committee's choices and priorities in the final design.
- *Finishing the project on time* – The preliminary design concepts and public engagement activities have all been completed on schedule.

Results and Deliverables:

- *Describe, and quantify (where possible) project results (e.g. square footage of habitat restored or created, increase in tree canopy coverage, etc.). Report out on the metrics outlined in your application.*
  - 163 people from 122 entities were engaged in the planning process, including:
    - 12 Members of the steering committee
    - 36 participants in the Envision JFH artwork challenge and comment period
    - 12 abutters attended a focus group meeting
    - 15 surveys were received on the design choices
    - 37 participated in public meetings
  - Identified 30 potential green infrastructure locations on the corridor
  - Stormwater system designed to collect and treat 213,737 SF of paved surface area**.**
  - Amount of Storage designed (assuming R-Tank Double) = 21,106 CF Storage
    - Amount of water infiltrated and pollutant removal of a typical system is assumed to be no infiltration and no pollutant removal.
  - Pollutant removal of proposed system was said to include percentages of what is reduced. Biofiltration will reduce pollution in the following percentages:
    - Total Suspended Solids (TSS): Greater than or equal to 80%
    - Total Phosphorus: Greater than or equal to 60%
    - Total Nitrogen: Greater than or equal to 48%
    - Indicator Bacteria: Greater than or equal to 50%
  - Not able to report on the decrease of flood damage or number of days of flooding at this time.

    - The extent of flooding mapped for future mitigation actions shows that several parcels in the JFH corridor are in the 2-year floodplain, and by late century, significant flood inundation is expected during events as small as the 2-year flood.
    - Design events used: 2-year, 5-year, 10-year, and 25-year. The City does not currently have definitive historic flood damage in dollars or day of flooding, but they do have local knowledge that has been collected.
    - Net increase in trees:
        - Proposed street trees: 125
        - Existing street trees (to remain): 18
        - Existing street trees (to be removed): 15
    - Designed changes to street should help address intersections with higher than average crash rates and the higher than average arterial crash rate (5.63 MVMT).
- *Provide a brief summary of project deliverables with web links, if available.*
    - Task 1: Meeting notes and sign-in sheet for coordination and steering committee meetings; monthly reporting
    - Task 2: Functional Design Report, GIS data, existing conditions information, site visit notes, traffic counts, and TMCs
    - Task 3: 25% Design Plans, Design Justification Workbook, Meeting Notes for MassDOT and utilities, roadway profiles and cross sections, stormwater and treatment layout, base plans, typical sections, field reconnaissance documentation & topographic survey
    - Task 4: Stormwater and Streetscape Design report, Designs/Drainage plans, Vision Implementation Strategy report on findings
    - Task 5: Website content, flyers, public meeting materials and notes, Envision JFH Artwork Challenge Summary, Press release, Focus group materials and notes, Video and survey, social media posts, Survey results summary, Temporary sign in the corridor, Feedback Summary, fact sheet
    - Task 6: Wetland Delineation Report and MassDOT 25% Early Environmental Coordination Checklist

Lessons Learned:

- *What lessons were learned as a result of the project? Focus on both the technical matter of the project and process-oriented lessons learned.*
    - A marked reduction in impervious cover throughout the Baker Brook watershed would significantly reduce flooding depths and extents in the study area, during all events up to and including the 25-year flood, even under a late-century climate. Significant flooding would still be expected in the JFH Plaza, however, during events greater than or equal to the 10-year flood in the mid- to late-century.
    - One of the key findings was that flood levels in the John Fitch Plaza area were unimproved with removing all four bridge crossings, indicating that the area is controlled not by backwatering but by the shape, size, and slope of the channel

in that area. The takeaway from this finding is that successful flood reduction measures will need to do one or more of the following:

1) Increase the hydraulic capacity of the brook by expanding its cross-sectional area;
2) Reduce design flows beneath Lunenburg Street through any number of green or grey infrastructure and watershed management projects/changes in the upgradient watershed;
3) Reduce runoff generation in the project area;
4) Improve connection of the brook with its floodplain in a manner that mitigates impacts to developing within that floodplain; and
5) Retreat (movement of people and assets out of harms way).

- We learned how to design for and work with the ACF Environmental Focal Point technology, an ultra-efficient, modular biofiltration system that treats and drains large volumes of stormwater runoff in a small footprint.
- There were a lot of manholes that were not anticipated during scoping. This was a concern when doing the topo survey. We ended up needing completing a survey of a sample set and comparing it to the data that the City had.
- Holding a focus group with abutting businesses helped to increase their engagement and get more robust input on design considerations. Phasing the public engagement with multiple touch points enabled better reach and gave people options to participate when it worked for them.
- A compressed project timeline meant that outreach was constrained by limited relationship-building time. For example, schools were very interested in participating in the artwork challenge, but most teachers needed more lead time to involve their students than was available in the project timeline, because it was compressed by a late start date.
- The City is often also limited in their time available to build relationships or carry outreach activities, and can often have competing priorities for their engagement channels and their time.
- MVP scoring means that multiple engagement activities are rewarded instead of rewarding activities with higher quality relationship building and reach. This leads to a quantity over quality tradeoff.
- We built processes to offer Spanish translation in materials and meetings, but we did not have anyone request translation services, so we may not be effectively reaching people or lowering barriers to participation. That said, many Spanish speakers are multilingual and may be participating in English.
- Asking for demographics and asking where people heard about our project helps to ensure participants are representative and test effectiveness of various outreach methods.
- There are some challenges of funding the 25% design through MVP and then looking to MassDOT for future funding. MassDOT did not express a lot of interest or support for going the additional mile for climate resiliency, but at the end of the meeting did say that the stormwater features should be eligible for reimbursement under the TIP. There was a strong ask for surface level

stormwater controls, which are not feasible in many urban roadway project and that appeared to be a possible barrier.

- *What is the best way for other communities to learn from your project/process?*
    - The artwork challenge and associated rules, guidelines, and forms could be reused by other communities. Most of the information is available here: https://experience.arcgis.com/experience/f1731f3827834d8d88a7f1e0c8606498/ Interested communities can contact Fitchburg Engineering or Weston & Sampson for the full set of files for the artwork challenge.
    - A CAD drawing and typical biofiltration system details for the 3 BMP types on this project could easily be reused on other stormwater projects. [The drawing is located here: P:\MA\Fitchburg MA\John Fitch Highway\Task 4 -Design and Vision\Stormwater GI\CAD Design\WSE Stormwater Details.dwg]
    - View the public meeting recordings to see how we collected input and presented the project.

Partners and Other Support:

- *Include a list of all project partners and describe their role in supporting/assisting in the project.*
    - See the attached stakeholder list for a list of all project partners and steering committee members.

Project Photos:

- In your electronic submission of this report, please attach (as .jpg or .png) a few high-resolution (at least 300 pixels per inch) representative photos of the project. Photos should not show persons who can be easily identified, and avoid inclusion of any copyrighted, trademarked, or branded logos in the images. MVP may use these images on its website or other promotional purposes, so please also let us know if there is someone who should receive credit for taking the photo.