

# EC Safe & Sound

## Maryland Ave. Culvert Four Building Removal Terraced Floodplain

### Certificate of Approval

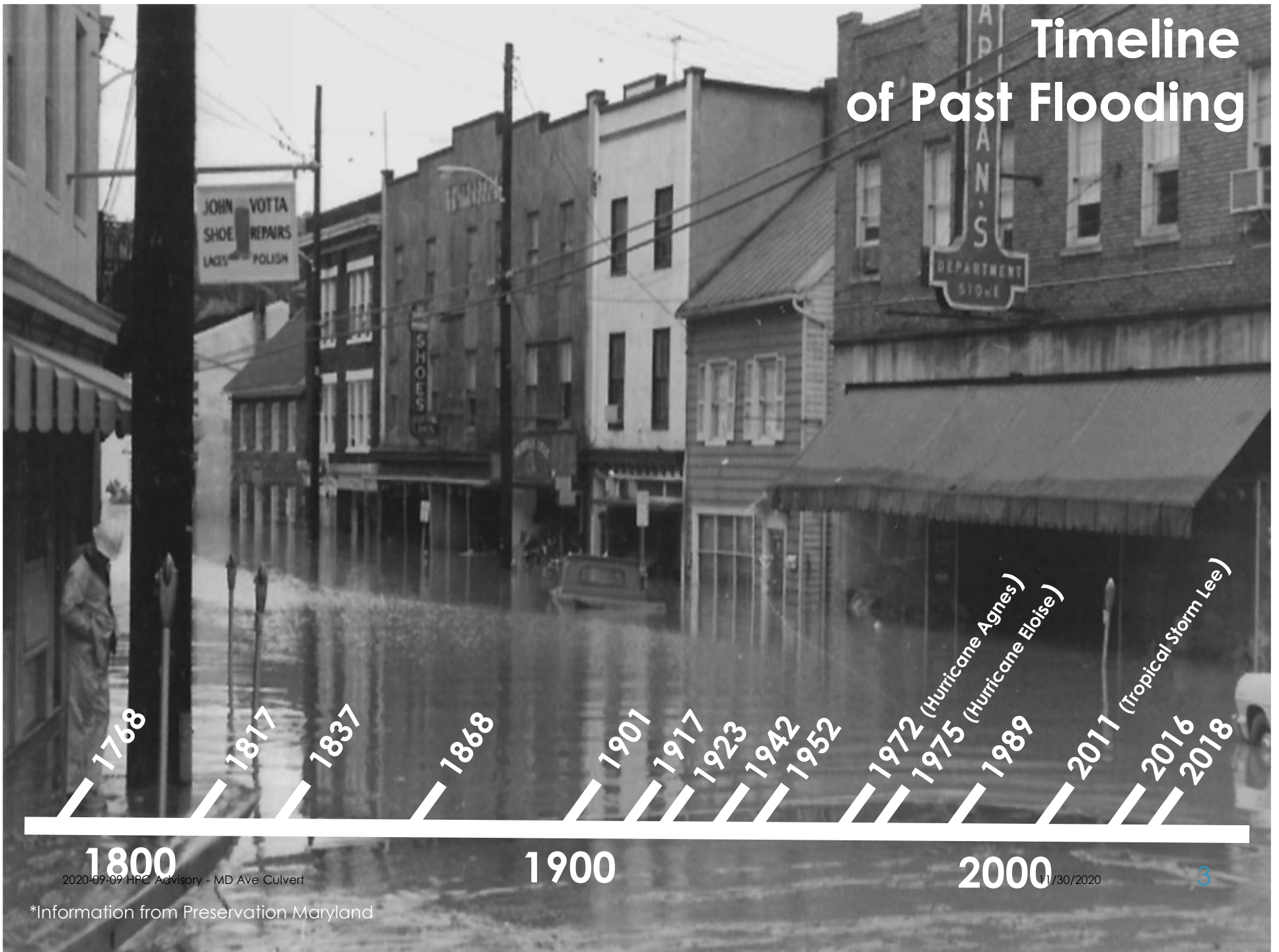
Howard County Department of Public Works  
Final Presentation for December 3, 2020 Hearing

# Overview



- **Major Improvement Program**
- **Substantial benefit to Ellicott City & Howard County**
- Supports County Seat of Howard County
- County's 2<sup>nd</sup> largest employment hub
- Historic Ellicott City is the center of the CDP
  - One of Howard County's most visible and recognizable historic communities
  - 955 jobs supported

# Timeline of Past Flooding



2020-09-09 HPC Advisory - MD Ave Culvert

11/30/2020

\*Information from Preservation Maryland

# Plan Development and Peer Review

- **“2016 Ellicott City Hydrology/Hydraulic Study and Concept Mitigation Analysis”**, June 16, 2017, McCormick Taylor.
  - Over 50 years of collective experience in watershed and hydraulic modeling analysis
  - Water Resources team has completed well over 100 floodplain modeling studies for municipal clients throughout the Mid-Atlantic over the last decade
  - Goal to develop potential improvements to the hydrology ...and the hydraulics of the conveyance network through the town
  - Define limitations of the existing network.

## Individual Projects Identified

- T-1
- H-7
- NC-3
- *Maryland Avenue Culvert*
- *West End Floodplain and Conveyance*
- H1-UG1
- H8-UG1
- H1-UG2
- H4
- H3
- H8-UG2
- H8-UG3
- H8-UG4
- *North Tunnel*
- *South Tunnel*
- *Quaker Mill Pond*
- *Lot D Channel Expansion (Hudson Bend)*

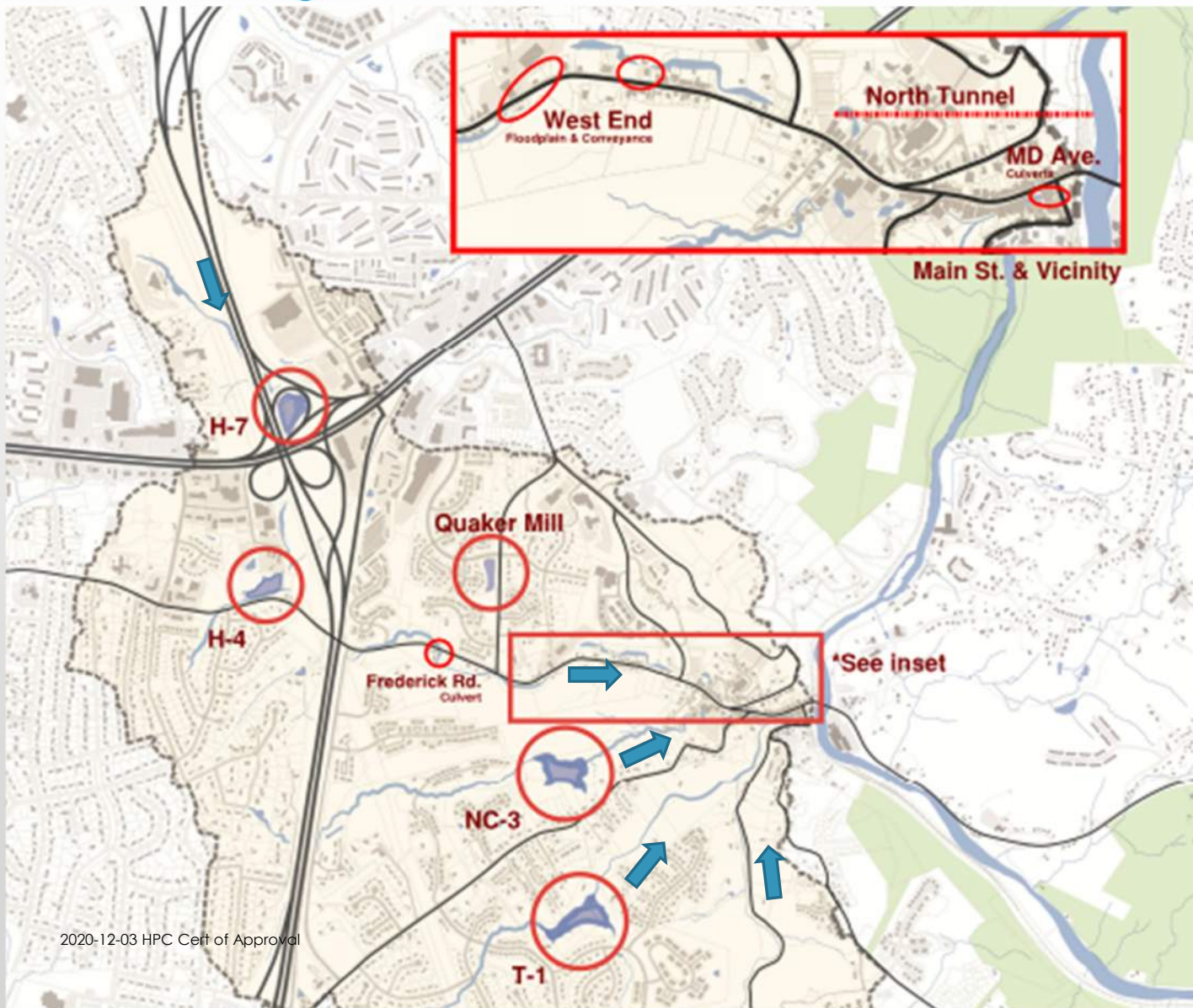
# EC Safe & Sound - Plan Development Process

- **Prior Administration's Plan**
  - Included removal of 10 buildings
- **Commenced review process upon taking office**
- **Goals included preservation of as many buildings as possible**
- **Considered >60 Scenarios**
  - Removal of no buildings
  - Removal of 4 buildings
  - Removal of 6 Buildings
- **Solicited Community Input**
  - 5 Plans advanced
  - Community Meeting
  - Online Comment Period
- **Selection of Option 3G7.0**
- **"Evaluation of Ellicott City Flood Risk Management Alternatives, Howard County, Maryland"**.  
*December 2019. Planning Division, US Army Corps of Engineers, Baltimore District.*
  - Goal to review flood studies, evaluate County's proposed FRM measures, and generate new ideas for consideration.
  - USACE FRM Experts from outside the Baltimore District, including engineers, planners, cultural and environmental subject matter experts
  - Consulted with national experts from Federal, State, Academia, and non-profit entities

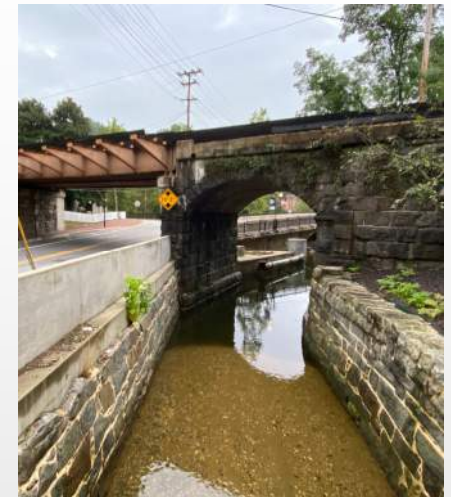
"Overall, the USACE review team found that the County is following a **sound process** and that the FRM measures being considered are typical of the measures considered for USACE FRM projects. **The current County-selected alternative (known as 3G.7.0) can significantly reduce flood risk to downtown Ellicott City.**"

reference: "Evaluation of Ellicott City Flood Risk Management Alternatives, Howard County, Maryland". December 2019. Planning Division, US Army Corps of Engineers, Baltimore District.

# EC Safe & Sound – Option 3G7.0



2020-12-03 HPC Cert of Approval



Existing Oliver Culvert, parallel to Main Street east of Maryland Ave.

11/30/2020

# Evaluation of Alternatives – Water Depth

Water Depths Comparison	Previous 5 year plan (16C) (Comparison Only)	Option 3G.7.0
Max Depth - Lower Main (100 year storm)*	4.5 feet	Less than 1 foot
Average Depth, Caplan's to Md Ave (100 year storm)	3.2 feet	Less than 1 foot
Max Depth - Lower Main (July 2016 storm)*	5.5 feet	3 feet
Average Depth, Caplan's to Md Ave (July 2016 storm)	4.1 feet	2 feet
Max Depth - Lower Main (May 2018 storm)*	Unknown	Less than 1 foot
Average Depth, Caplan's to Md Ave (May 2018 storm) <i>*Maximum depth reflects water depths on Lower Main Street above Maryland Avenue.</i>	Unknown	Less than 1 foot

- Goal of reducing depths as much as possible.
- **Reduction in street-level flooding to 3 feet or less a priority in support of non-structural flood proofing**

Chart Graphic: "Ellicott City 'Safe and Sound' Plan: Flood Mitigation Options" 17 April 2019. Howard County Executive Calvin Ball.

# Evaluation of Alternatives – Water Velocity

Water Velocity Comparison	Distance on Road Profile (feet)	Existing (feet/sec)	Previous Plan (feet/sec)	Option 3G.7.0 (feet/sec)
Columbia Pike to MD Avenue along Main Street	0-840	10.3	3.0	2.9
Abbreviated length - Approx. Caplans to MD Avenue	430-840	11.1	2.8	2.6
Abbreviated length - Approx. Tea on the Tiber to MD Avenue	600-840	13.9	3.5	2.5

*Values generated using the 2016 storm*

**Values generated using the 2016 storm**

- Goal of reducing water velocity as much as possible.
- **Reduction in flood velocities down to 5 feet/second (or below) are a priority in support of non-structural flood proofing**

Chart Graphic: "Ellicott City 'Safe and Sound' Plan: Flood Mitigation Options" 17 April 2019. Howard County Executive Calvin Ball.



# Plan Development Process – Building Removal

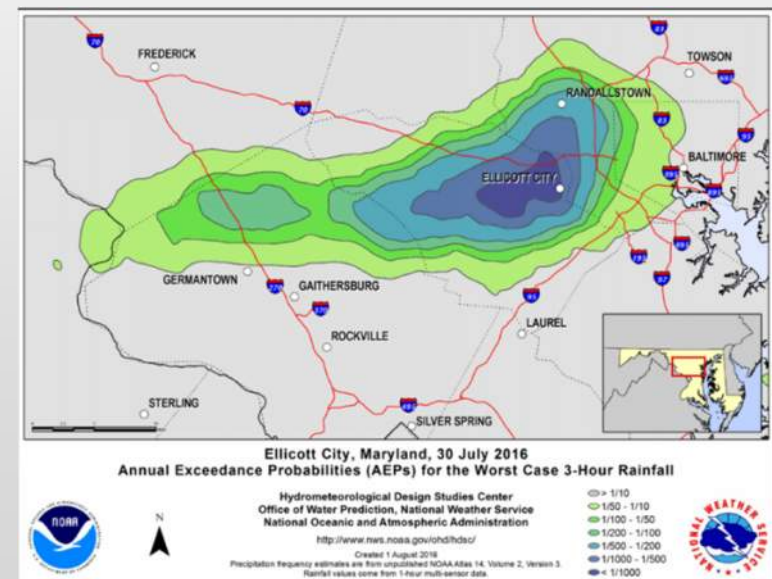
## ○ Constructability

- Not possible to construct the Maryland Avenue Culverts and/or Terraced Floodplain projects without removal of the four buildings.
- Plan Development analyzed three options that retained all buildings on Lower Main Street
- Resultant of analysis determined that **no option** met the goals of the plan (*reduction of water depth and velocities*)

Option	Avg. Water Depth, Lower Main
3A	7 to 8 Feet
3B	7 to 8 Feet
3C	6 Feet

## ○ Planning for the future

- During the 2018 Storm, Catonsville experienced ~2 more inches of rain than Ellicott City during the same time period\*
- Conveyance out of the lowest point of the watershed reduces the impact of flash flooding no matter where a storm event is located.



# Application for Certificate of Approval

- **Application for HPC Certificate of Approval**
  - Visible and built features of culvert and terraced floodplain (*Chapters 9 & 10*)
  - Building / Structure Removal (*Chapter 12*)
  - Streetscape (by future application)
- **Received HPC Advisory Comments on October 1, 2020**
  - Provide 3D model for visualization
  - Simulate impact of not implementing project
  - Data to gauge impact on each building
  - Address front of 8069
  - Plans / renderings of area once buildings are removed
  - Timeline of flood mitigation post building removal

○ "According to the National Weather Service's Baltimore/Washington Weather Forecast Office, Old Ellicott City is the **most vulnerable location** for catastrophic flash flooding in its 44-county forecast region."

James E. Lee, Meteorologist-in-Charge,  
National Weather Service

# Structures of Unusual Importance

- **Chapter 12: Demolition (Ellicott City Historic District Design Guidelines)**
- **Section 300: Rules of Procedure, Howard County Historic Preservation Commission**
  - *Requires the Commission to determine if the structures proposed for removal are of unusual importance*
- **Howard County Code 16.608 – Structures of unusual importance**
  - (d) *Special Circumstances.* The Commission may approve the proposed alteration, moving or demolition of a structure of unusual importance despite the fact that the changes come within the provisions of subsections (a) through (c) of this section, if:
    - (1) The structure is a deterrent to a major improvement program which will be of substantial benefit to the County;
    - (2) Retention of the structure would be a threat to public safety;
    - (3) Retention of the structure would cause undue financial hardship to the owner; or
    - (4) Retention of the structure would not be in the interest of a majority of the persons in the community.

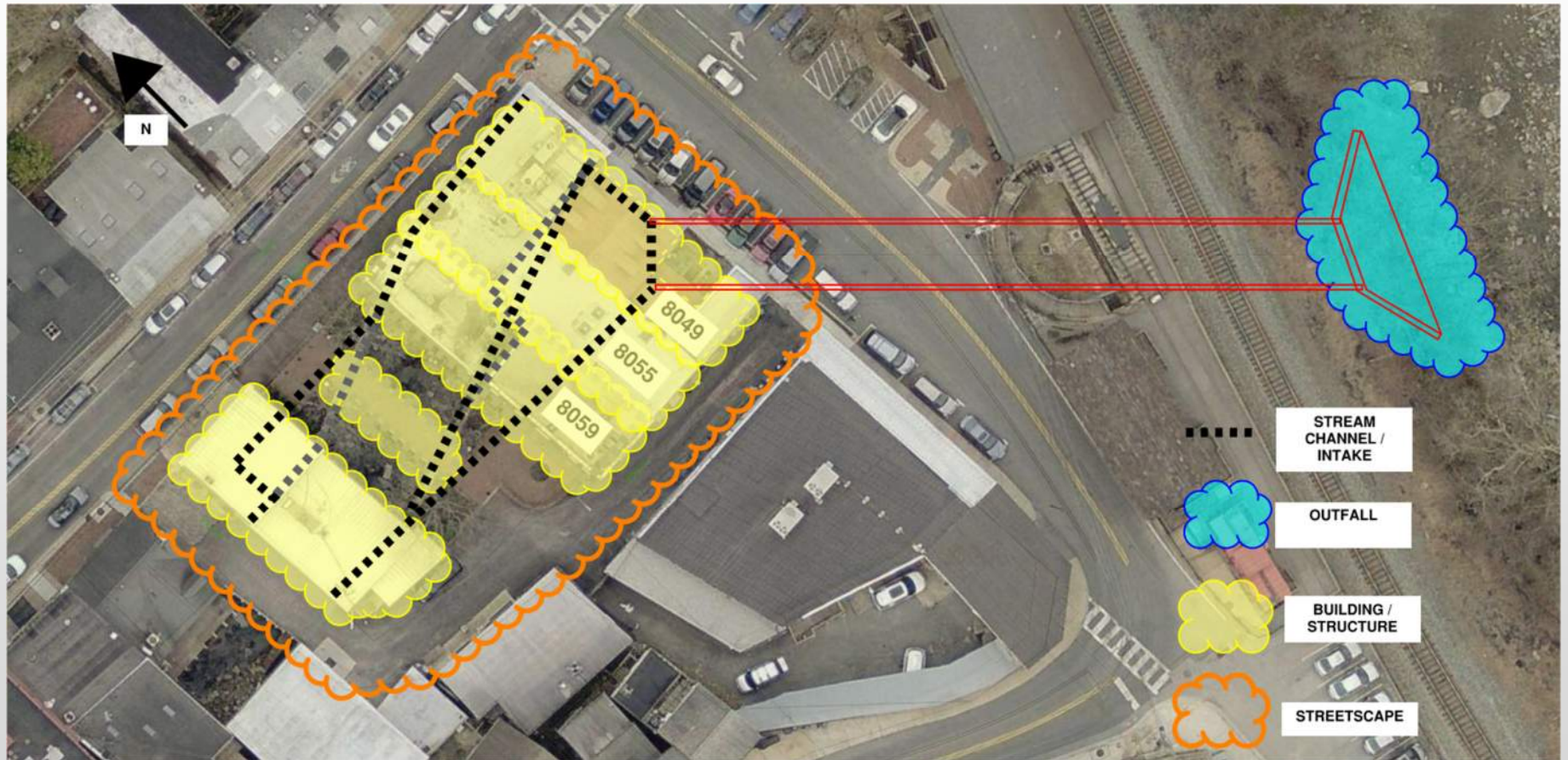
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Howard County Code 16.608 (d)

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# Maryland Avenue Culvert Overview



# Advantages of Maryland Avenue Culvert

## ○ Maryland Avenue Culvert:

- “Advantages: The model outputs show significant reductions to flood depths and velocities on Maryland Ave. and lower Main St. as a result of this measure.”

## ○ Terraced Floodplain:

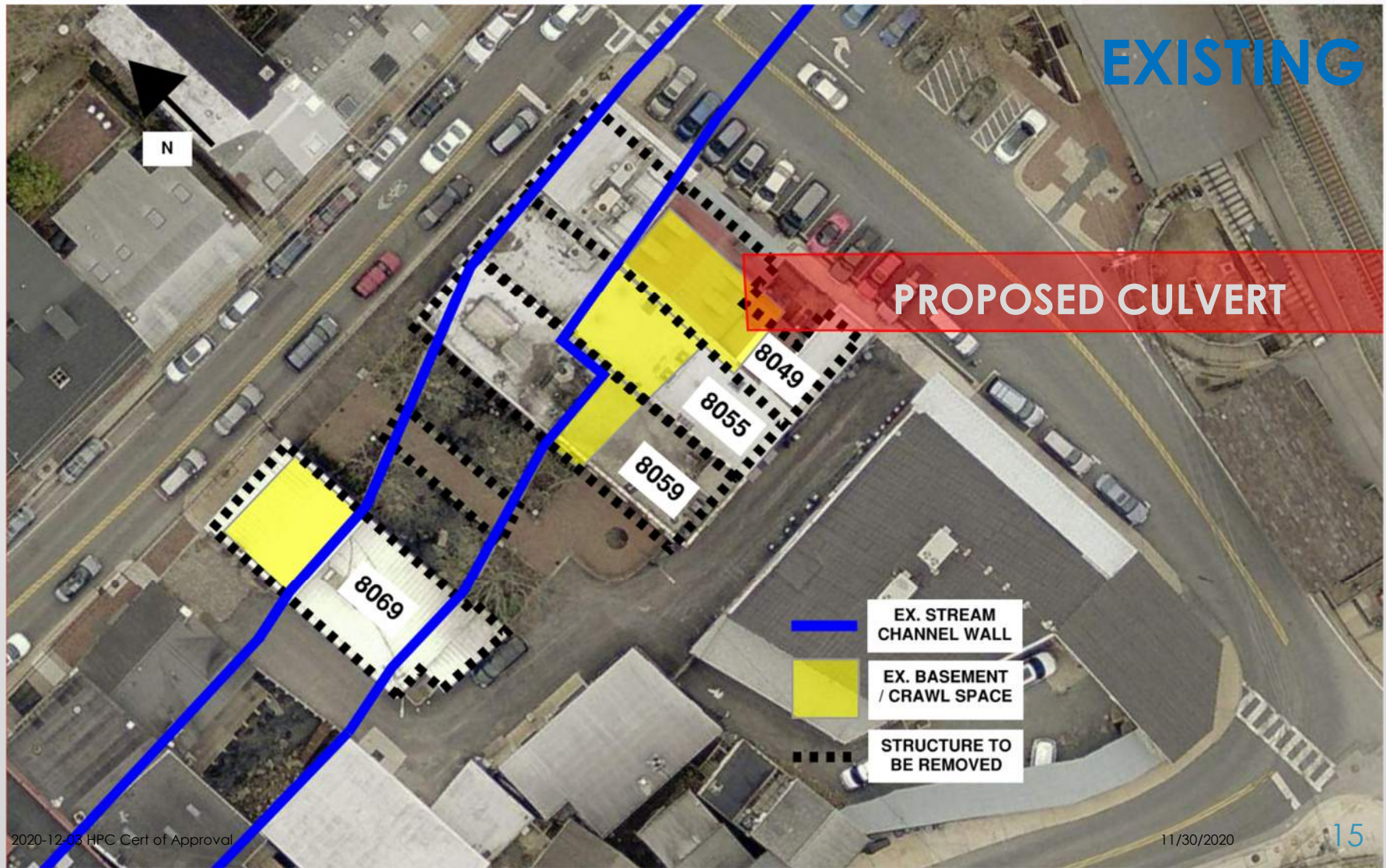
- “Advantages: Increased conveyance decreases flooding along lower Main Street although modeling results show only a minimal impact from this measure. The removal of structures reduces risk of loss of life associated with upstream flash flood events and the removal of the rear portions of structures which span the stream would increase conveyance. Additionally, the building removal component on lower Main St. has the coincident benefit of mitigating risk related to property damage and loss of life from future Patapsco River flood events. Many recreational opportunities exist (including terraced park space could allow for events/amphitheater type shows), and the area may be a tourist attraction. The channelized stream reach currently present has poor in-stream and little to no riparian habitat present; this measure, if implemented, would allow for the opportunity to develop both types of habitat.”

“...the water courses themselves are not highly visible in the center of the historic district. ... Tiber Creek flows parallel to Main Street, through Ellicott City’s central commercial area, but is confined to channels behind buildings or culverts beneath roads and buildings. Recent changes {c. 1990} in downtown Ellicott City have helped to make Tiber Creek visible from public areas. **These and similar projects that open up views of the streams or rivers help to emphasize the relationship of Ellicott City to its natural setting.**”

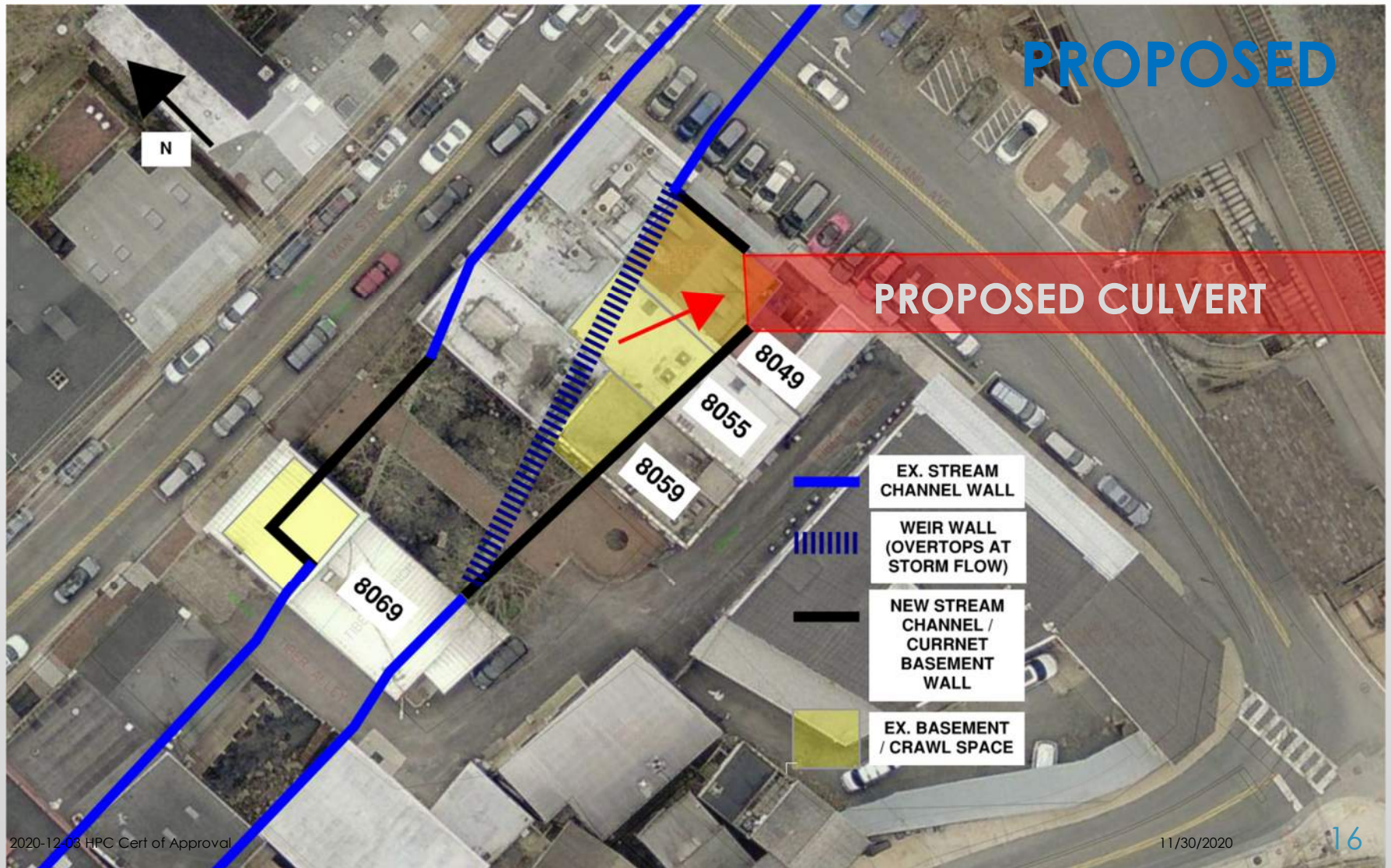
Chapter 9, *Ellicott City Historic District Design Guidelines*. 7 May 1998

Quotes reference: “*Evaluation of Ellicott City Flood Risk Management Alternatives, Howard County, Maryland*”. December 2019. Planning Division, US Army Corps of Engineers, Baltimore District.

# Culvert & Water Conveyance Improvements

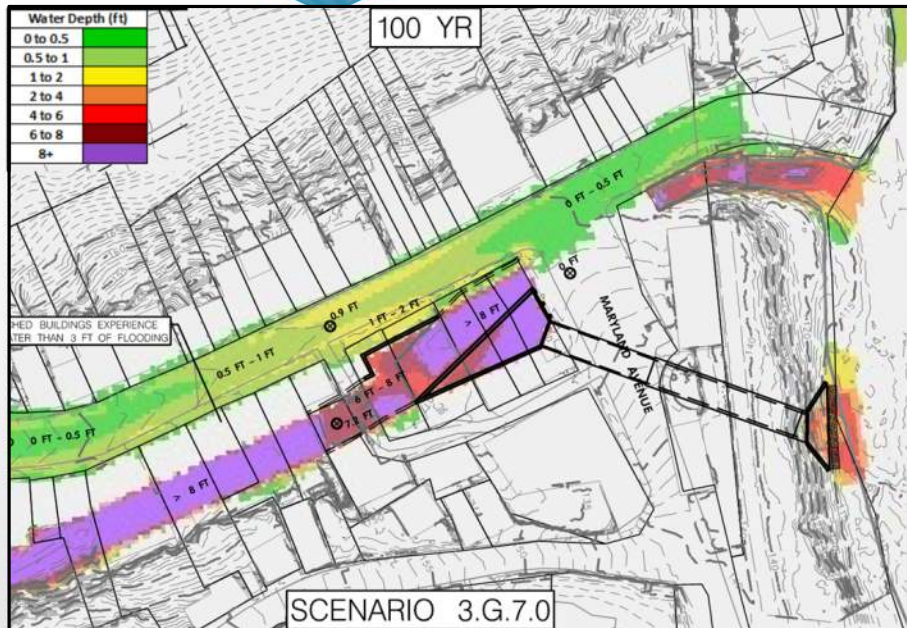


# Culvert & Water Conveyance Improvements



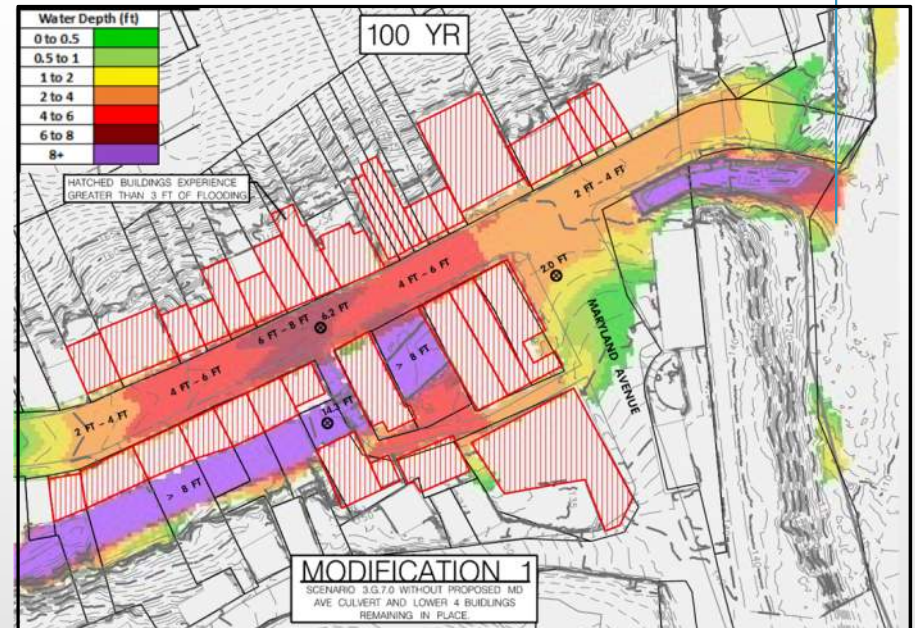


# Simulating 3G7.0 without project – 100 Year



**Full implementation of projects in Option 3G7.0**

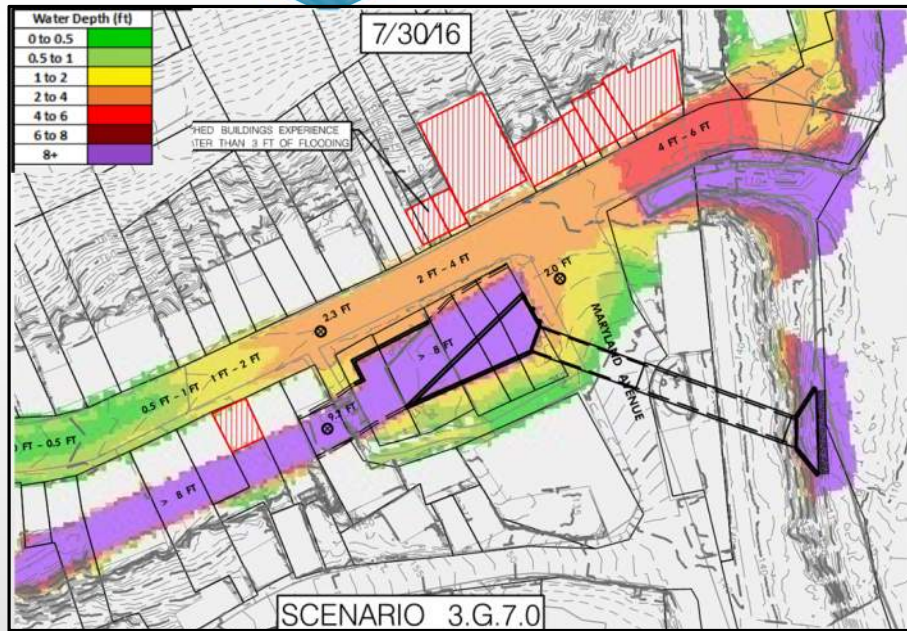
- Simulating water depth at a **100 Year** Storm Event
- Modeling depicts full implementation of projects in Option 3G7.0
- Target <3 feet depth against building



**Implementation of Option 3G7.0, except MD Ave Culvert**

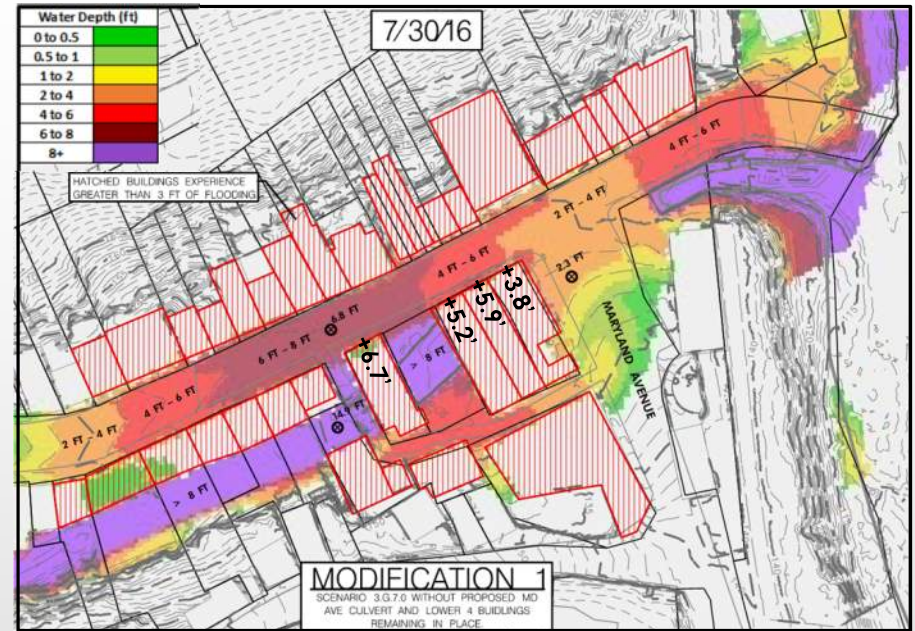
- Simulating water depth at a **100 Year** Storm Event
- Modeling depicts implementation of projects in Option 3G7.0; **except the Maryland Avenue Culvert and Four Building Removal**
- Water depth greater than 3' feet present anticipated at **33 buildings**

# Simulating 3G7.0 without project – July 2016



Full implementation of projects in Option 3G7.0

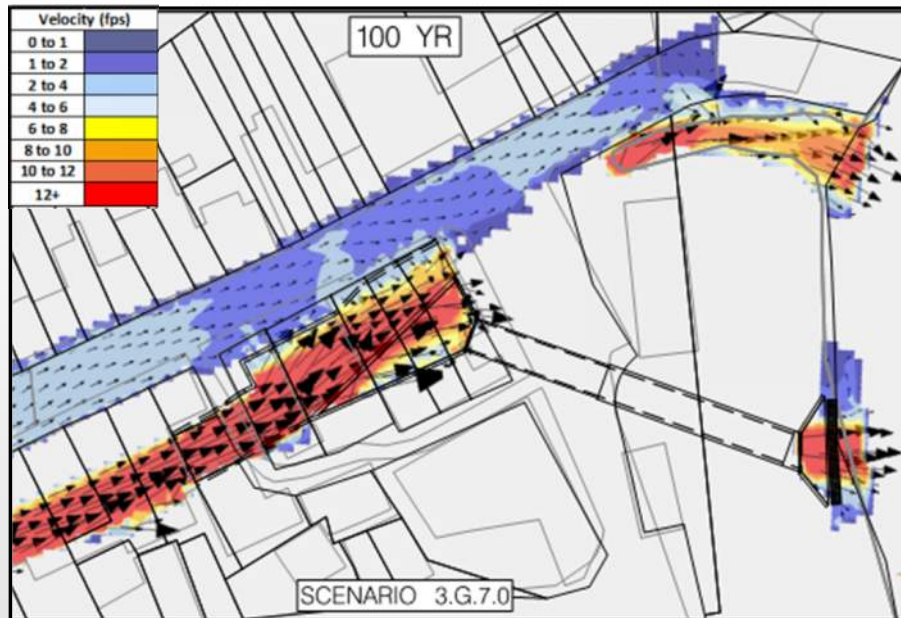
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Implementation of Option 3G7.0, except MD Ave Culvert

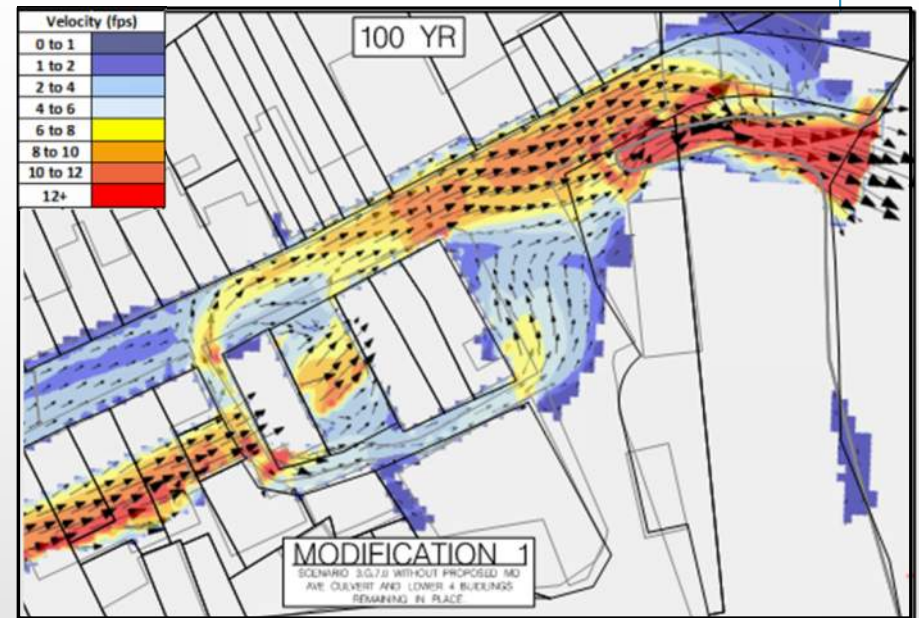
- Simulating water depth at a **July 2016** Storm Event
- Modeling depicts implementation of projects in Option 3G7.0; **except the Maryland Avenue Culvert and Four Building Removal**
- Water depth greater than 3' feet present anticipated at **34 buildings**

# Simulating 3G7.0 without project – 100 Year



Full implementation of projects in Option 3G7.0

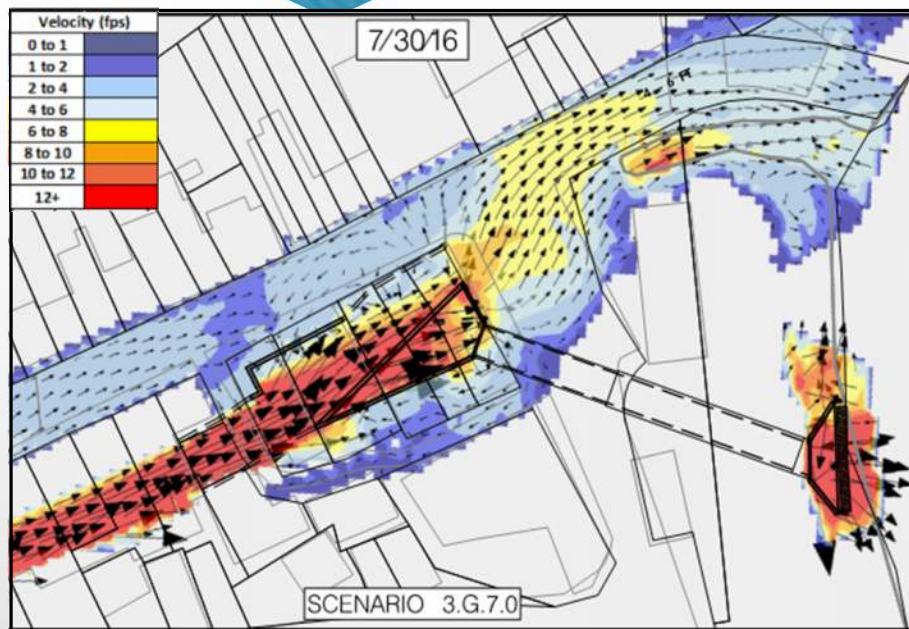
- Simulating water velocity at a **100 Year** Storm Event
- Modeling depicts implementation of projects in Option 3G7.0
- High velocity flows are contained within the stream channel
- Target <5 feet per second (fps) – shown in blue tones on graphic



Implementation of Option 3G7.0, except MD Ave Culvert

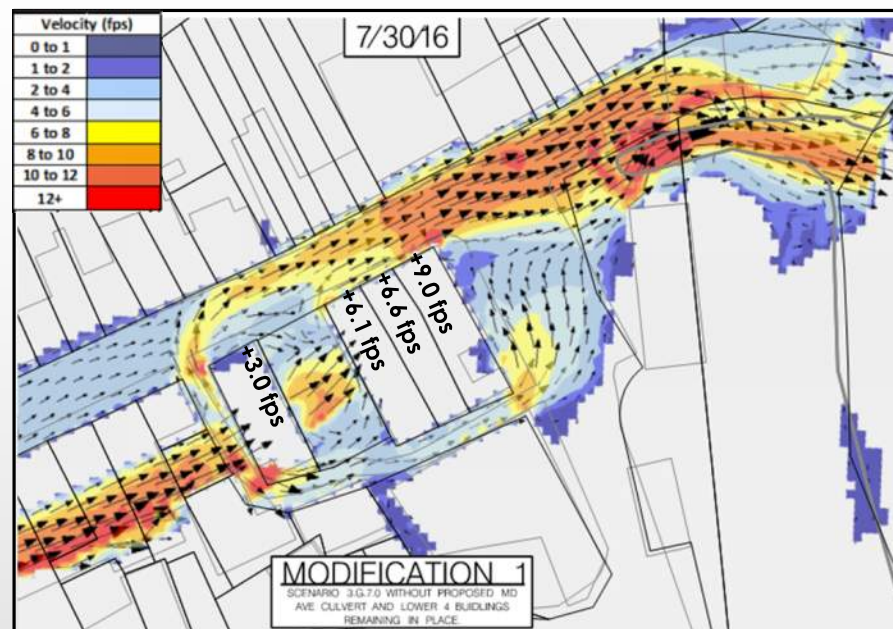
- Simulating water velocity at a **100 Year** Storm Event
- Modeling depicts implementation of projects in Option 3G7.0; **except the Maryland Avenue Culvert and Four Building Removal**
- High velocity flows (>5 fps) impact the western side of 8069, causing flow out to Main Street, with impact to additional structures downstream

# Simulating 3G7.0 without project – July 2016



**Full implementation of projects in Option 3G7.0**

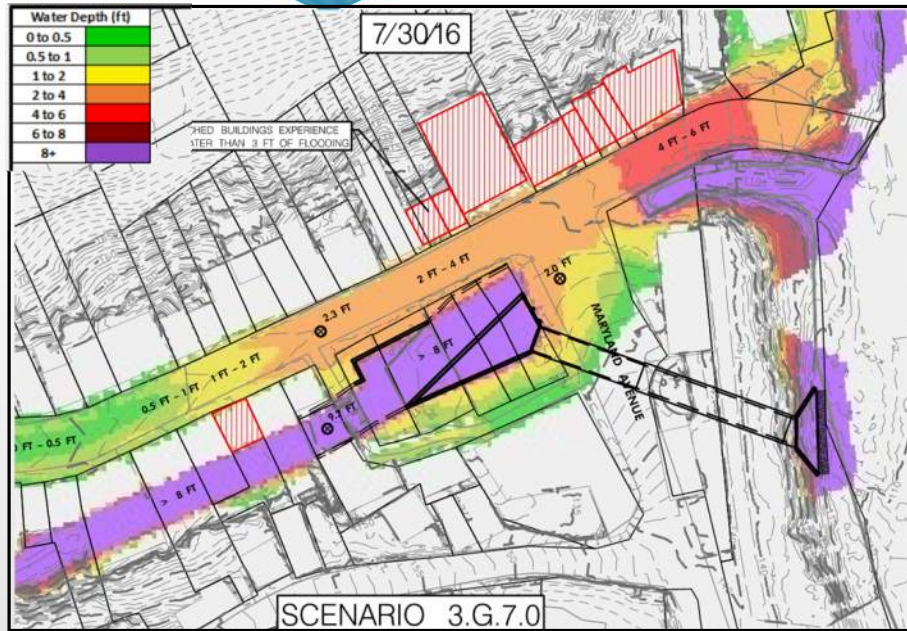
- Simulating water velocity at a **July 2016** Storm Event
- Modeling depicts implementation of projects in Option 3G7.0
- High velocity flows are primarily contained within the stream channel
- Target <5 feet per second (fps) - shown in blue tones on graphic



**Implementation of Option 3G7.0, except MD Ave Culvert**

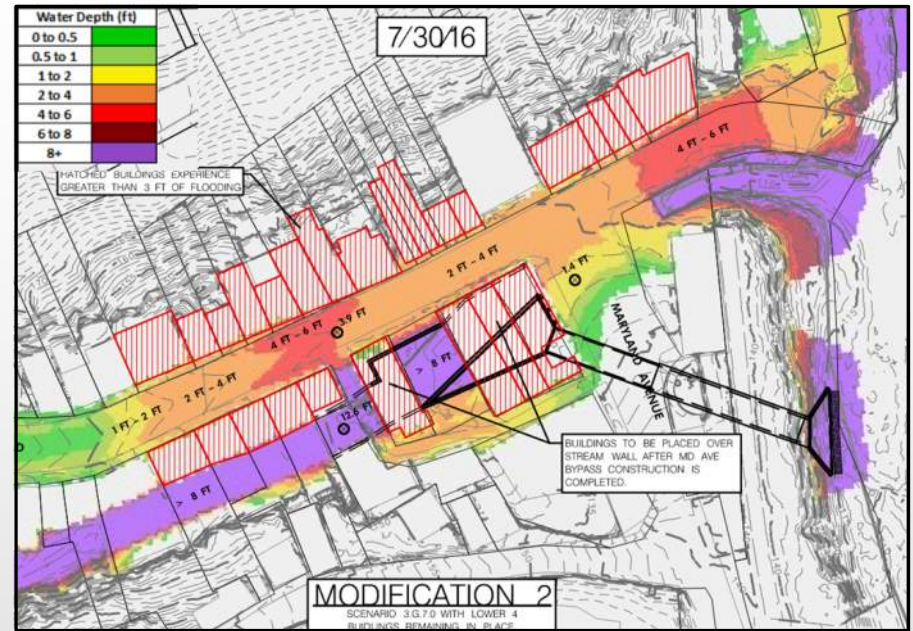
- Simulating water velocity at a **July 2016** Storm Event
- Modeling depicts implementation of projects in Option 3G7.0; **except the Maryland Avenue Culvert and Four Building Removal**
- High velocity flows (>5 fps) impact the western side of 8069, causing flow to Main Street, with significant impact to additional structures downstream

# Simulating improvements with buildings above



Full implementation of projects in Option 3G7.0

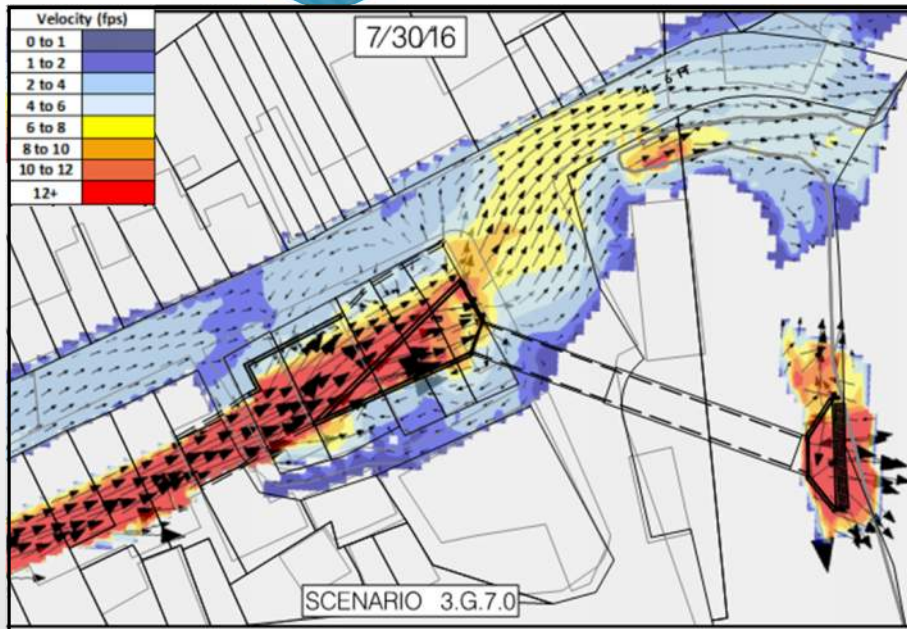
- Simulating water depth at a **July 2016** Storm Event
- Modeling depicts implementation of projects in Option 3G7.0 including Maryland Avenue.
- Water depth greater than 3' feet present at **9 buildings**



Implementation of Option 3G7.0, with buildings placed atop completed project

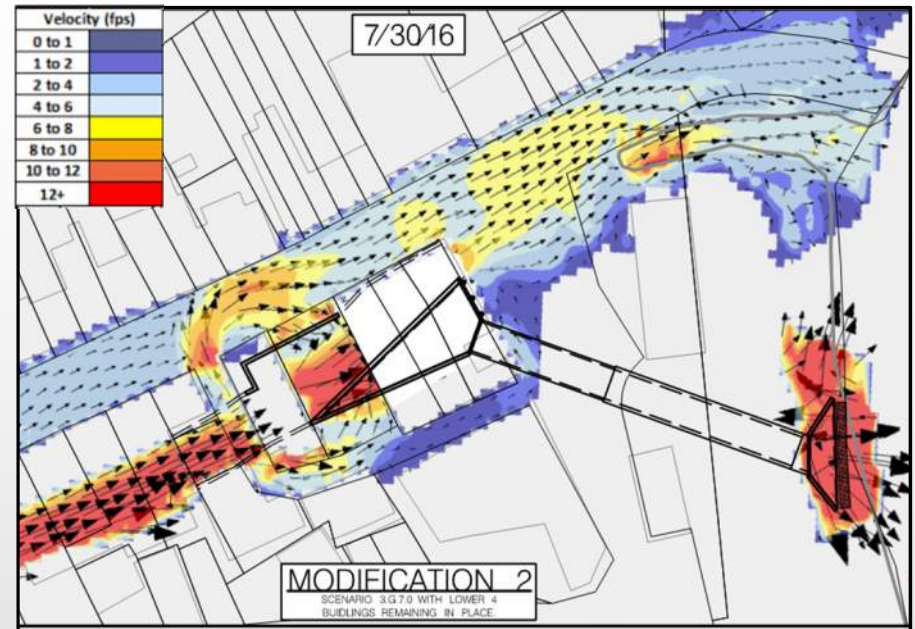
- Simulating water depth at a **July 2016** Storm Event
- Modeling depicts implementation of projects in Option 3G7.0 including Maryland Avenue, **with buildings placed atop completed project.**
- Water depth greater than 3' feet present at **34 buildings**

# Simulating improvements with buildings above



Full implementation of projects in Option 3G7.0

- Simulating water depth at a **July 2016** Storm Event
- High velocity flows are primarily contained within the stream channel
- Target <5 feet per second (fps)



Implementation of Option 3G7.0, with buildings placed atop completed project

- Simulating water velocity at a **July 2016** Storm Event
- Modeling depicts implementation of projects in Option 3G7.0 including Maryland Avenue, **with buildings placed atop completed project.**
- High velocity flows (>5 fps) are experienced on the North side of Main Street due to the obstructions the buildings create on the South side.

# Effect of High Velocity, High Depth Flood Water



# HPC Advisory Comments

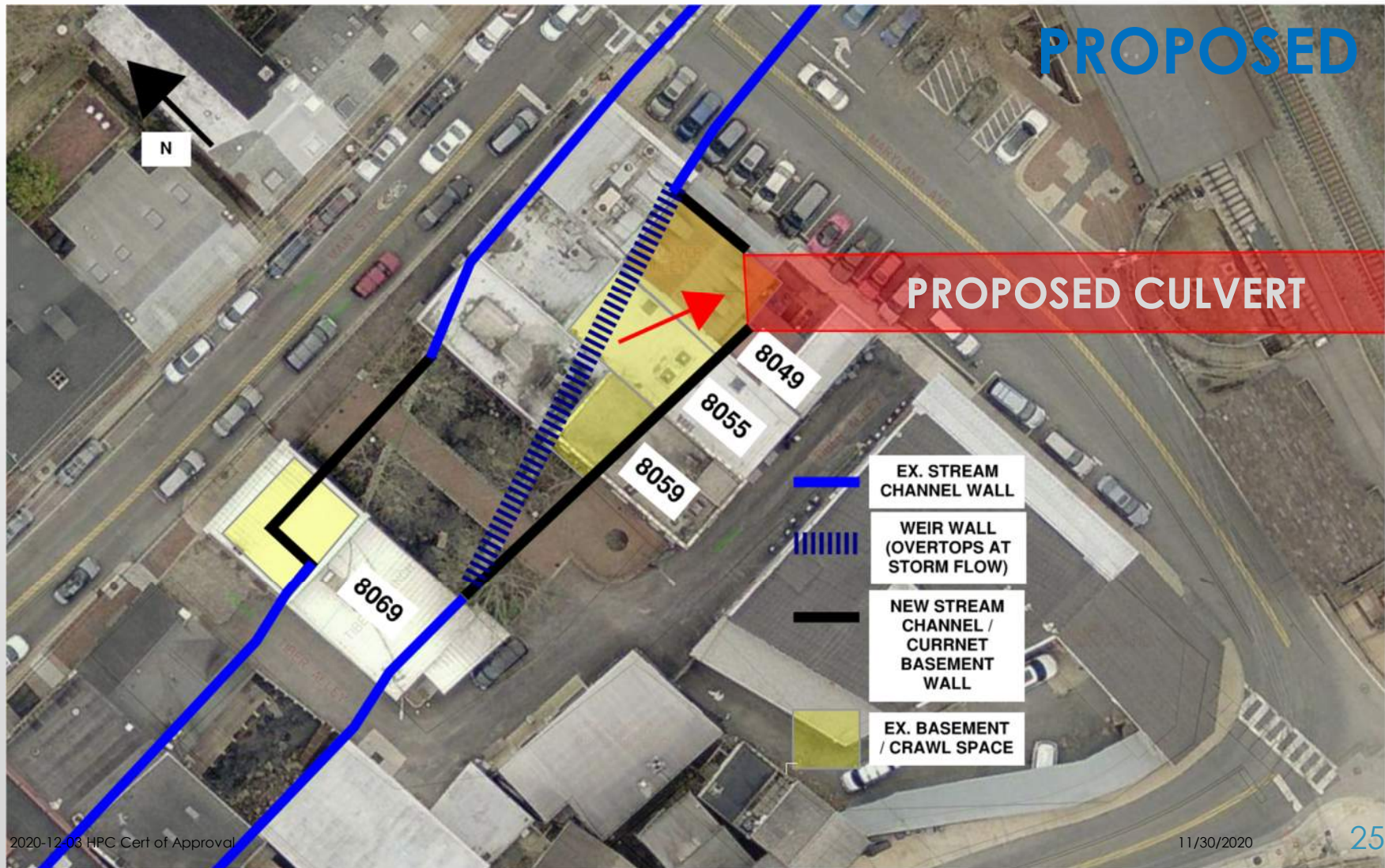
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Howard County Code 16.608 (d)

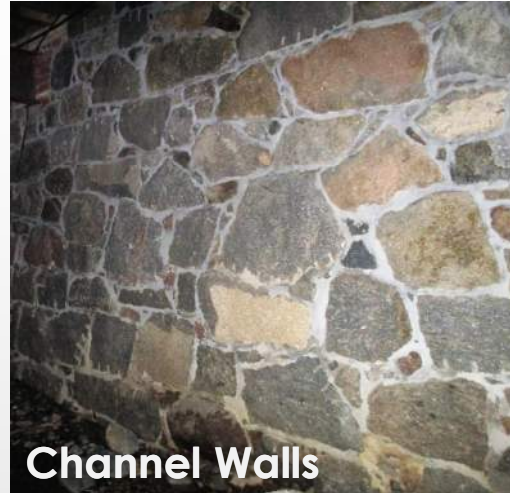
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# Culvert & Water Conveyance Improvements



# Culvert Inlet Design Considerations



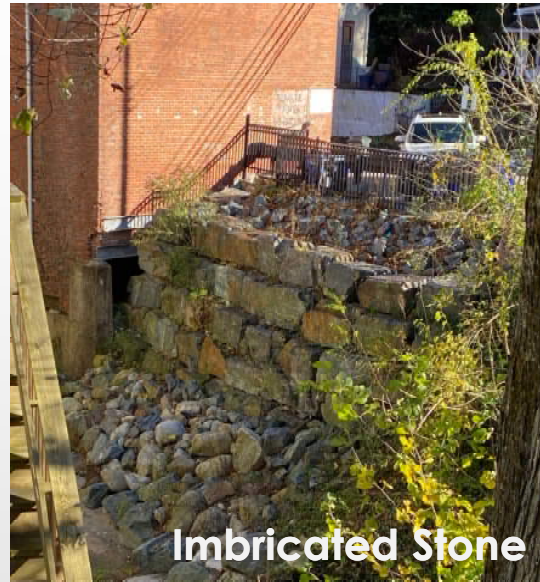
- All visible portions of stream channel walls will be clad in stone.
- Stone to be salvaged from the removal of basement and indicated channel walls. Stone will be used in current form



## Chapter 9: Landscape & Site Elements

- Minimizes grading by using existing topography, installs new retaining walls in accordance with historic development patterns
- Reinforces and expands views to natural elements (tributary to the Patapsco)
- Maintains natural elements (stream channel bottom)
- Constructs new site features using materials compatible with setting and nearby / adjacent structures
- Preserves historic features (stone stream channel walls) to greatest extent possible
- Utilizes open fencing, not greater than five feet in height, of dark metal.
- Bollards consistent with other locations in the Historic District

# Channel Bottom & Weir Wall Considerations



## Chapter 9: Landscape & Site Elements

- Maintains natural elements (stream channel bottom)
- Constructs new site features using materials compatible with setting and nearby / adjacent structures

### ○ Transition from Weir Wall to Inlet (Imbricated Stone Spillway)

- All visible portions of weir wall to be clad in stone salvaged from the removal of basement walls removal of indicated stream channel walls.
- Transition from Weir Wall to culvert inlet will be constructed from imbricated stone installed horizontally
- Large, roughly elongated rectilinear, varied color stones will be sourced and arranged in a manner that produces a roughly sloped but slightly irregular transition



# Culvert Outfall Design Considerations



## ○ Outfall Considerations

- All visible portions of outfall structure will be clad in stone.
- Stone will consist of salvaged rubble and natural stone from removed basement walls or stream channel walls.
- If there is not a sufficient amount of stone left from basement removals, entirety of stone used will be matched to the stone used on the Ellicott Mills Culvert.
- Class III Rip-Rap will be dark gray with variations to blend with natural stone found along river bank.

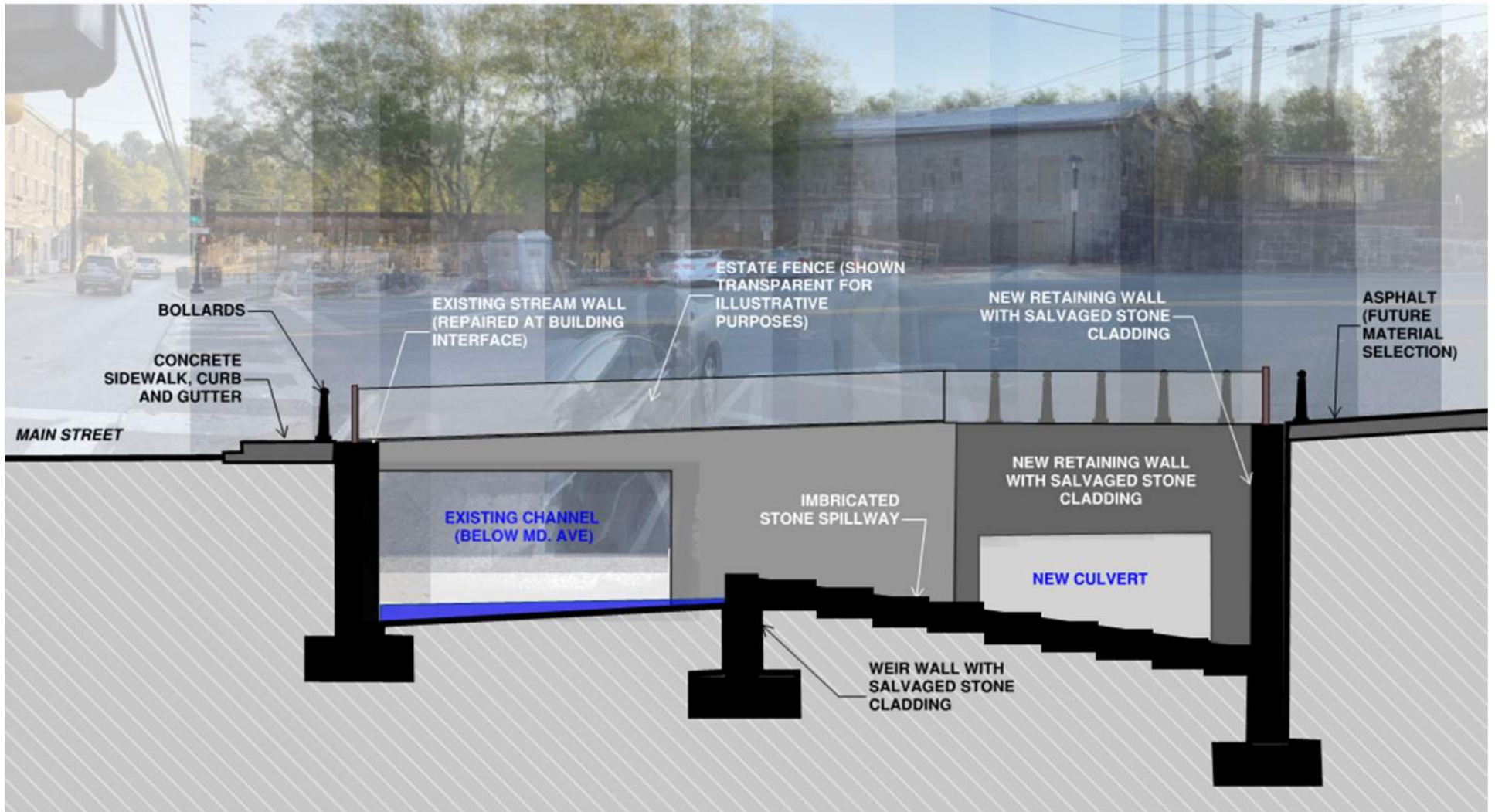
### **Chapter 9: Landscape & Site Elements**

- *Minimizes grading by using existing topography, installs new retaining walls in accordance with historic development patterns*
- *Constructs new site features using materials compatible with setting and nearby / adjacent structures*

# 3D Visualization – East Birds-Eye Perspective



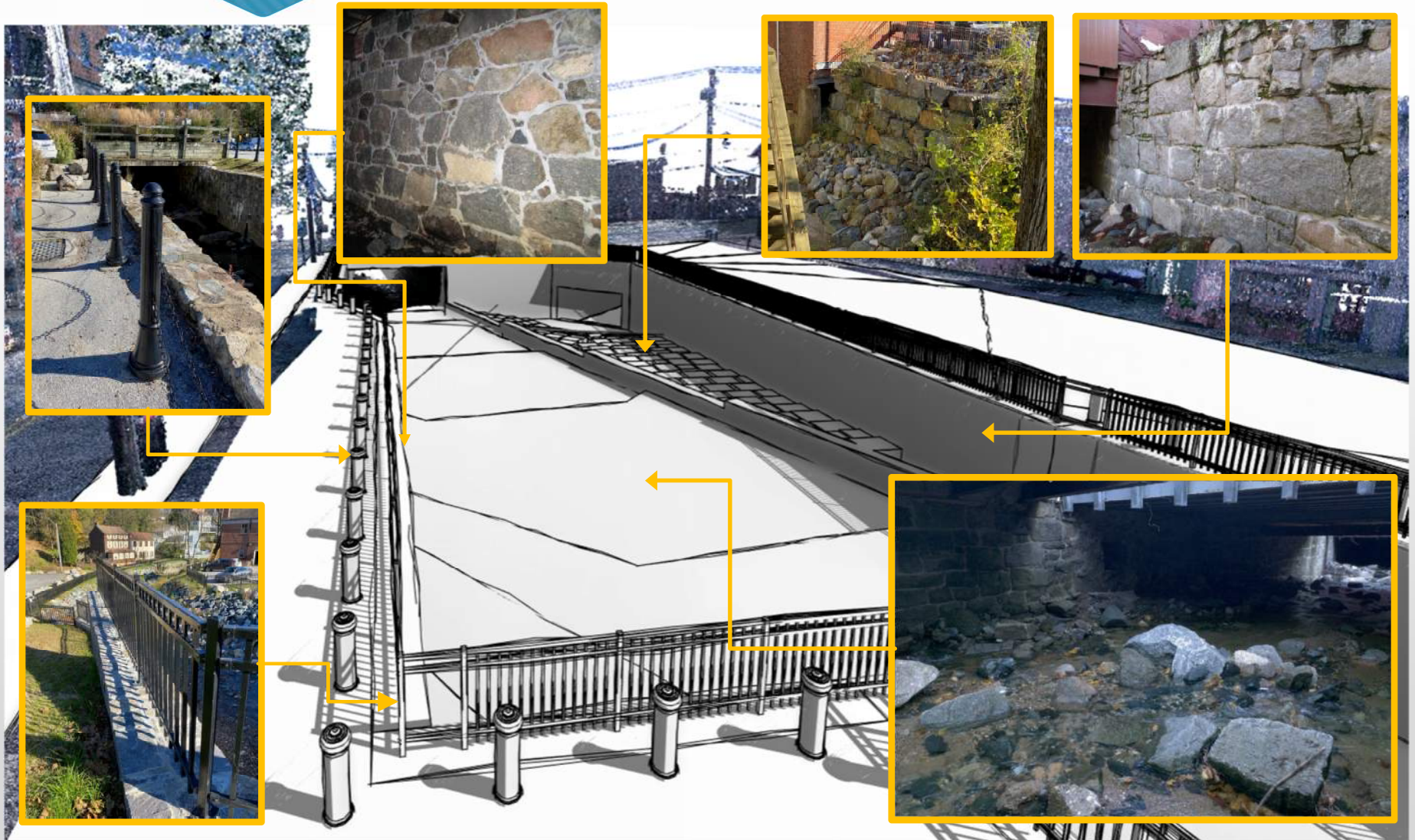
# 2D Visualization – Section @ Maryland Ave.



# 3D Visualization – East Eye-Level Perspective



# 3D Visualization





# HPC Advisory Comments

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Howard County Code 16.608 (d)

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# Scope – 4 Building Removal



*Remove / Salvage*

**Phoenix Emporium**  
8049 Main St.  
Brick: c. 1851 Frame: c. 1870s



*Remove*

**Discoveries**  
8055 Main St.  
Block: c. 1920s-30s



*Remove / Salvage*

**Bean Hollow**  
8059 Main St.  
Stone & Frame: c. 1930s



*Remove / Salvage*

**Great Panes**  
8069 Main St.  
Brick & Stone: c. 1841

*"...building removal from high risk flood areas is one of the most effective ways to prevent damages and loss of life from flooding. In downtown Ellicott City, the reduction in risk to loss of life from building removal comes with the impact of potential losses to historical and cultural resources, as well as potential adverse impacts to the local economy and community cohesion. The County ... (has) worked to define an appropriate balance between the loss of historically significant structures and protecting lives... The USACE review team and national FRM experts ... recognized this, and still noted that the County should continue to develop options for building acquisitions and removal throughout the highest flood risk areas."*

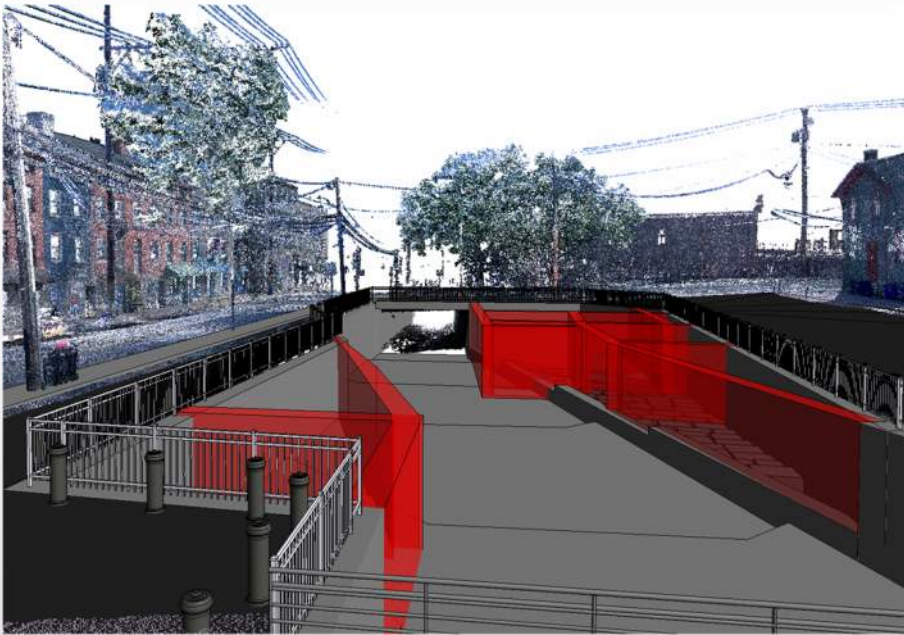
# Process – 4 Building Removal

- **Recordation** *(complete)*
  - Laser scan (LIDAR) of entire structure. *(included in Application)*
  - Development of architectural drawings *(included in Application)*
  - Survey by County's Architectural Historian
  - Detailed photography per MHT standards; HABS Documentation *(in progress)*
- **Salvage of Components**
  - *Identification and designation of character-defining elements (included in Application)*
  - Engaged qualified preservation Architect and Contractor, technical specifications for salvage operations *(in progress)*
  - Documentation / inventory for future re-use
  - Long-term planning for potential reuse & secure storage
- **Master Plan adoption by County Council**
- **Final Design Process(es)**
- **Reuse of Salvaged Components & Education**

# Effect of High Velocity, High Depth Flood Water



# 3D Visualization - Existing basements



**East Eye-level view from Tiber Bridge**

Culvert and channel improvements with existing basement and channel walls proposed for demolition shown in transparent red

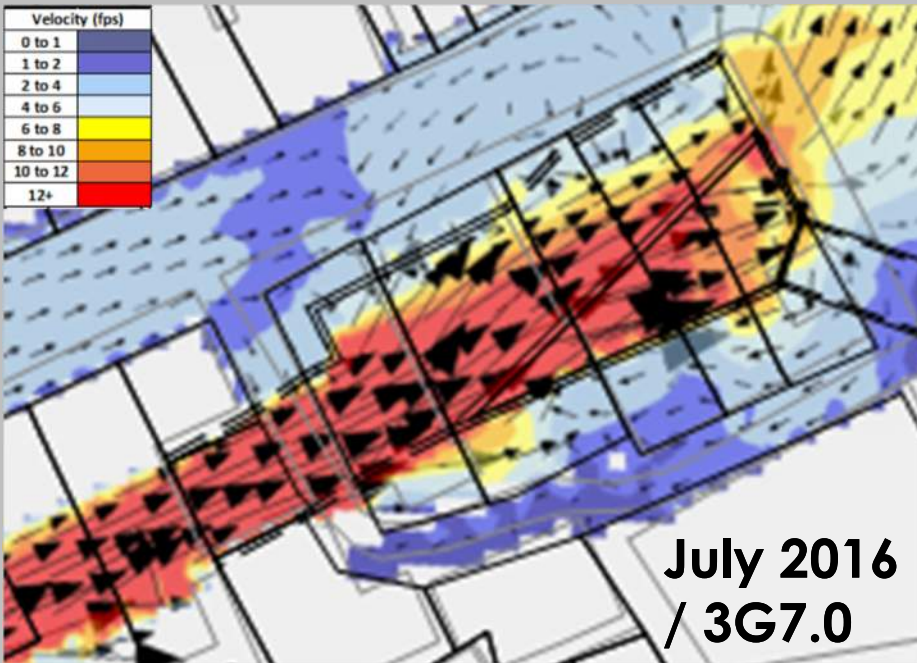


**East Eye-level view from Tiber Bridge**

Culvert and channel improvements



July 2016



July 2016  
/ 3G7.0

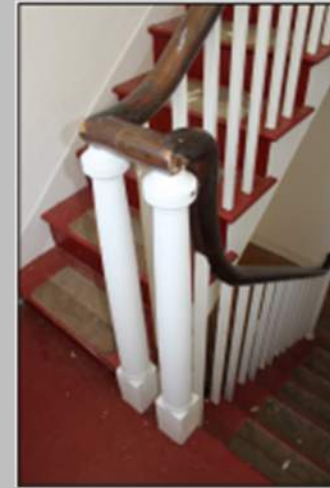
# 8069 Main St.

c. 1840s-1860s ...?

- Modeling was developed with façade / front section of this building staying. No scenario decreased water depth and velocity to target levels.
  - Velocity of **~15 fps** at North Façade in July 2016 Storm
  - Water Depth **~8.2'** at North Façade in July 2016 Storm
  
- Demonstrated that building would be an impediment to flow reentering channel from Main St.
  
- 'Bulls-eye' for floating debris and high flows.
  
- Back of building (portion over stream) – this is proposed for removal due to conveyance restriction in channel
  
- Basement area proposed for removal for channel capacity / increased storage

# 8069 Main St.

- Salvage Exterior Components:
  - Fieldstone walls
  - Fieldstone basement walls
  - Original wood windows
- Salvage Interior Components:
  - Wood panel doors
  - Balustrade / railing components
  - Interior fireplace mantles / surrounds



# 8069 Main St.





## 8059 Main St.

- Salvage Exterior Components:
  - 'Easton Sons' Limestone façade
  - Granite steps and base
  - First floor ornate window
  - Transom window on right door
  - Left side front door
  - Fieldstone basement walls
- Salvage Interior Components:
  - Machine from dumb waiter



# 8059 Main St.



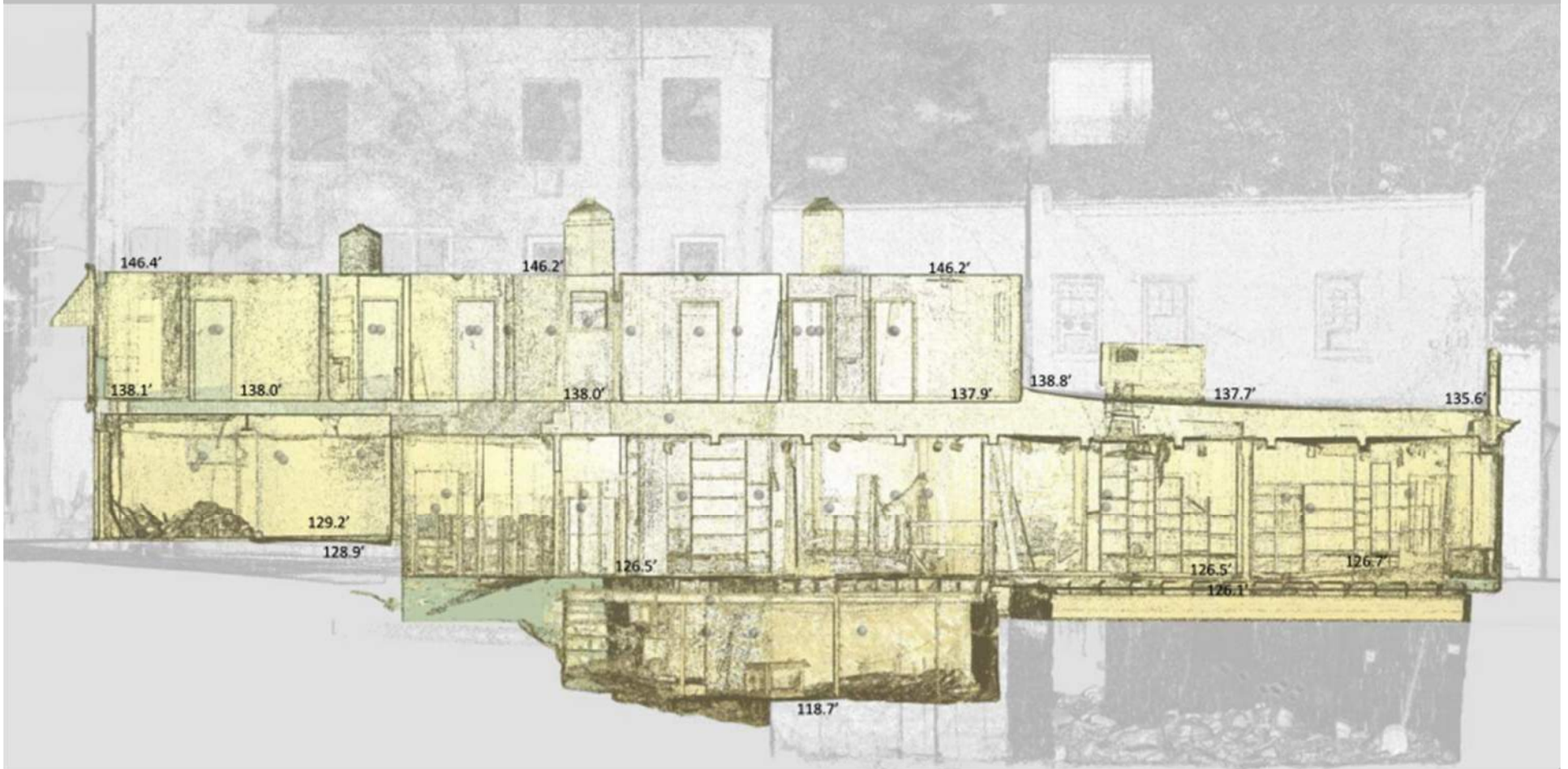


## 8055 Main St.

- Salvage Exterior Components:
  - Cornice
  - Metal Skylights
  - Wood Windows / Door
  - Fieldstone basement walls



# 8055 Main St.



# 8049 Main St.



- Salvage Exterior Components:
  - Cornice and Brackets
  - Ornamental metal railing (2<sup>nd</sup> Floor east side)
  - Original wood windows (rear)
  - Standing Seam Metal Roofing
  - Fieldstone basement walls
- Salvage Interior Components:
  - Fireplace / brick surrounds
  - Wood framing at roof

# 8049 Main St.



# South Side of Lower Main



## ○ Periods of Significant Change

## ○ Looking towards the Future

*"Ellicott City has been growing and changing since it was founded by the Ellicott brothers. It is not a museum to be preserved as a pure example of one period of history. Consequently, the ...Commission may often make decisions not based solely on historic preservation goals."*

Chapter 1, *Ellicott City Historic District Design Guidelines*. 7 May 1988

**Overall focus on implementation of flood mitigation, while setting building blocks for future improvements.**

# HPC Advisory Comments

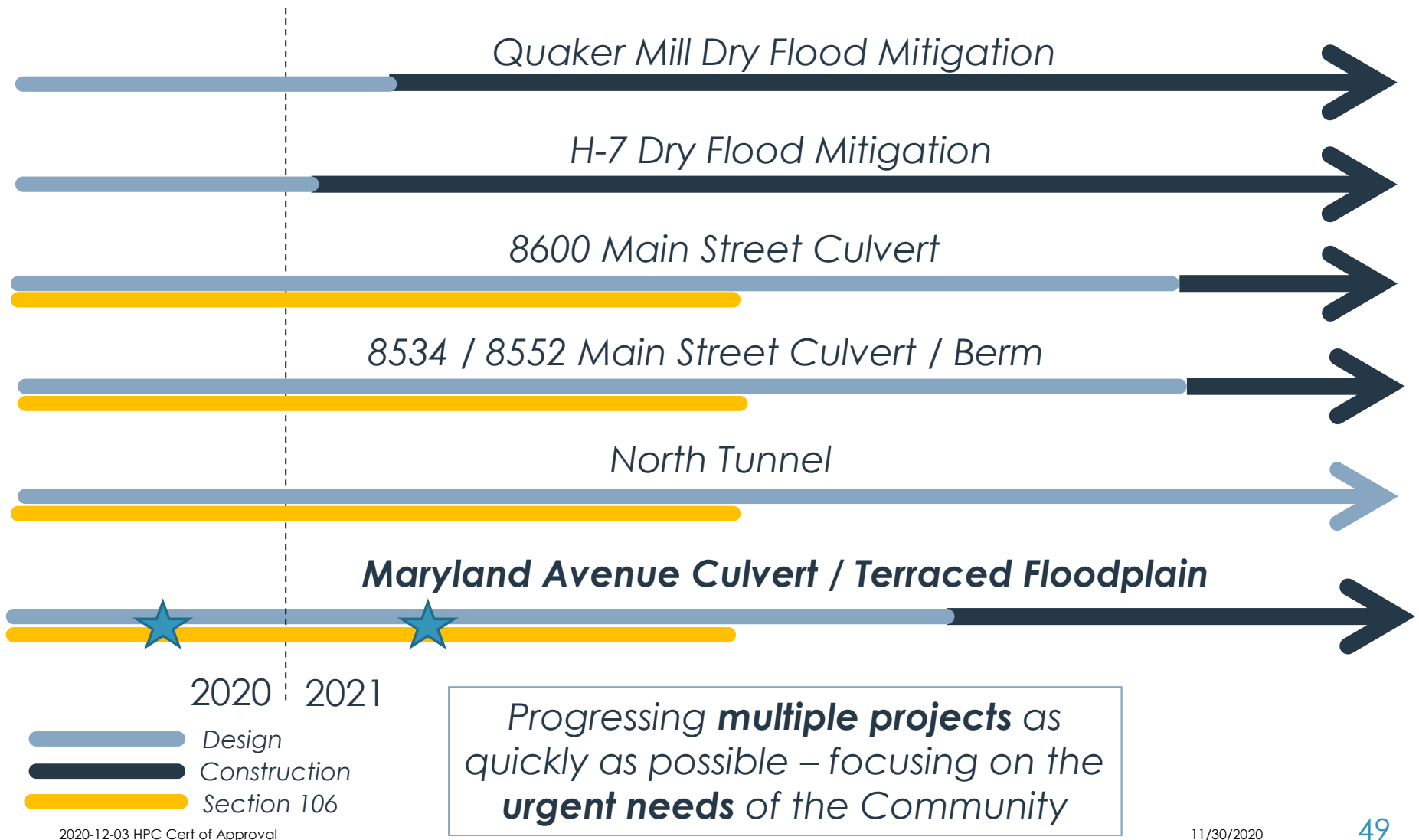
- **Received HPC Advisory Comments on October 1, 2020**
  - Provide 3D model for visualization
  - Simulate impact of not implementing project
  - Data to gauge impact on each building
  - Address front of 8069
  - Plans / renderings of area once buildings are removed
  - Timeline of flood mitigation post building removal

Howard County Code 16.608 (d)

- (1) The structure is a deterrent to a major improvement program which will be of substantial benefit to the County;
- (2) Retention of the structure would be a threat to public safety;
- (3) Retention of the structure would cause undue financial hardship to the owner; or
- (4) Retention of the structure would not be in the interest of a majority of the persons in the community.

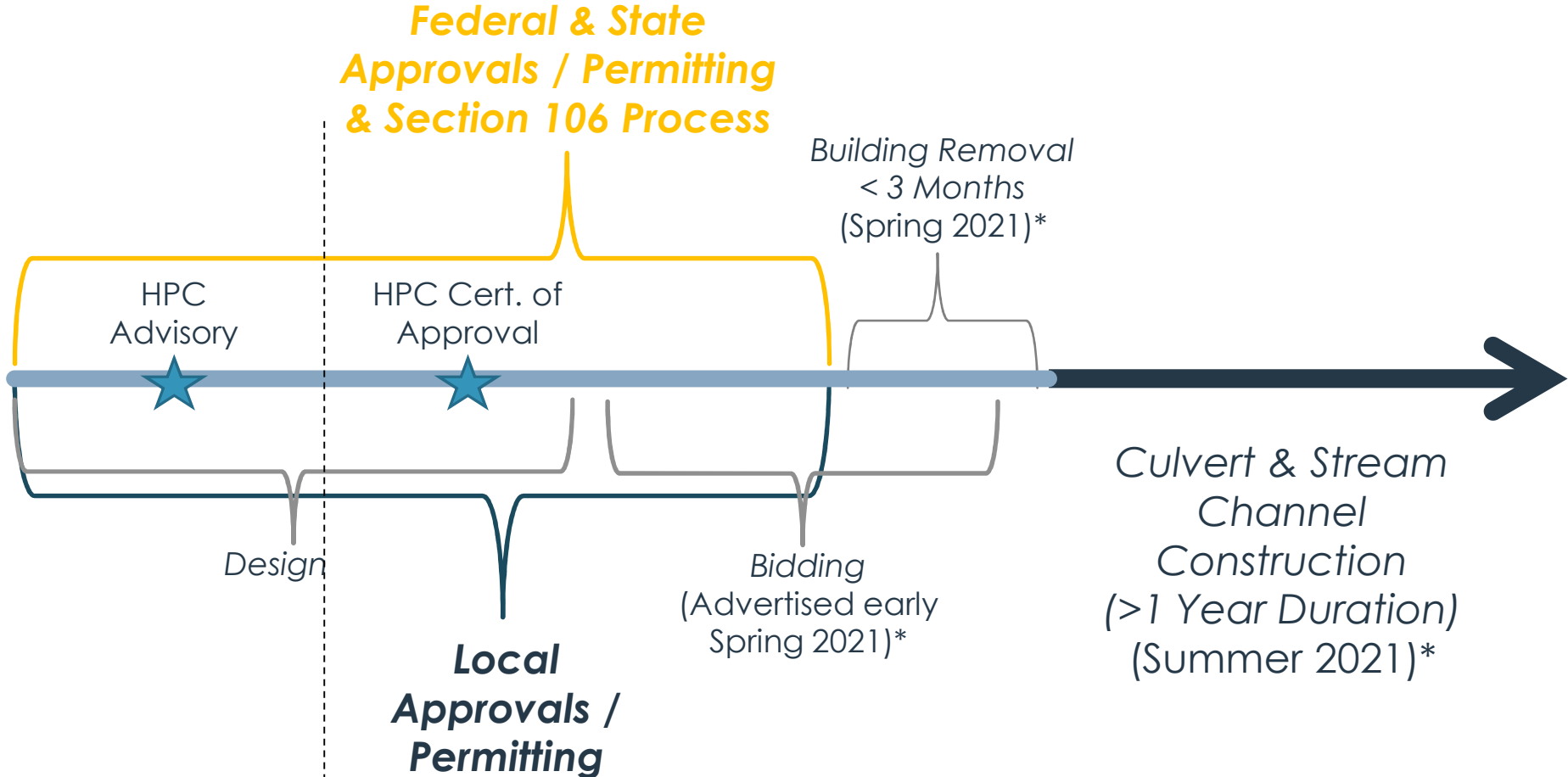


# Other EC Safe & Sound Projects – Timeline



Progressing **multiple projects** as quickly as possible – focusing on the **urgent needs** of the Community

# Maryland Avenue Culvert - Timeline

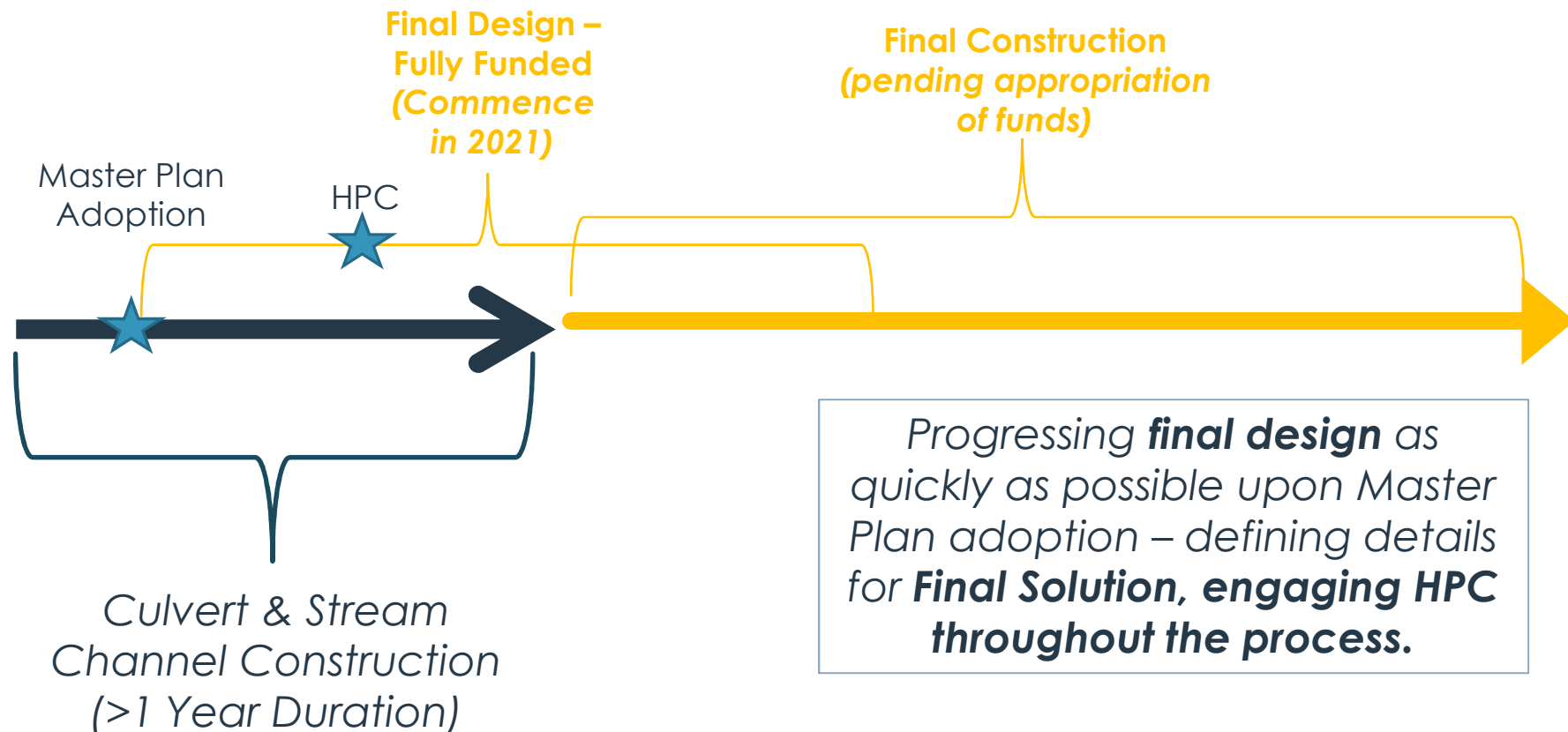


2020-12-03 HPC Cert of Approval 2020 2021

\*Anticipated commencement pending approvals / permitting

11/30/2020

# Terraced Floodplain / Streetscape Final Treatment- Timeline



# Path Forward

- **HPC Certificate of Approval**