St. Michaels
Maryland
Harbor Flooding & Stormwater Mitigation Project

Community Meeting January 25, 2024 – Cherry Street

OPPORTUNITIES:

- **Innovative Civic Infrastructure**: Prepare for Sea Level Rise strategically with an emphasis on civic green infrastructure
- **Creative Flood Adaptation**:
- Allow for resiliency flooding where soft green shoreline uses exist or can be planned
- **Economic Expansion**: Create new waterfront connections, destinations and event spaces to benefit the entire community

St. Michaels
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Harbor Flooding & Stormwater Mitigation Project

CONSTRAINTS:

- **Complicated Edge Conditions**: Establish a bulkhead/vertical edge where needed; landside fill is required to establish positive overland drainage
- **Property Lines**: Focus efforts on public land and/or public easements
- **Flood Protection from Flanking:** Continual flood control grade
- (Elev, 5.0) to prevent inundation from ends or backside

St. Michaels
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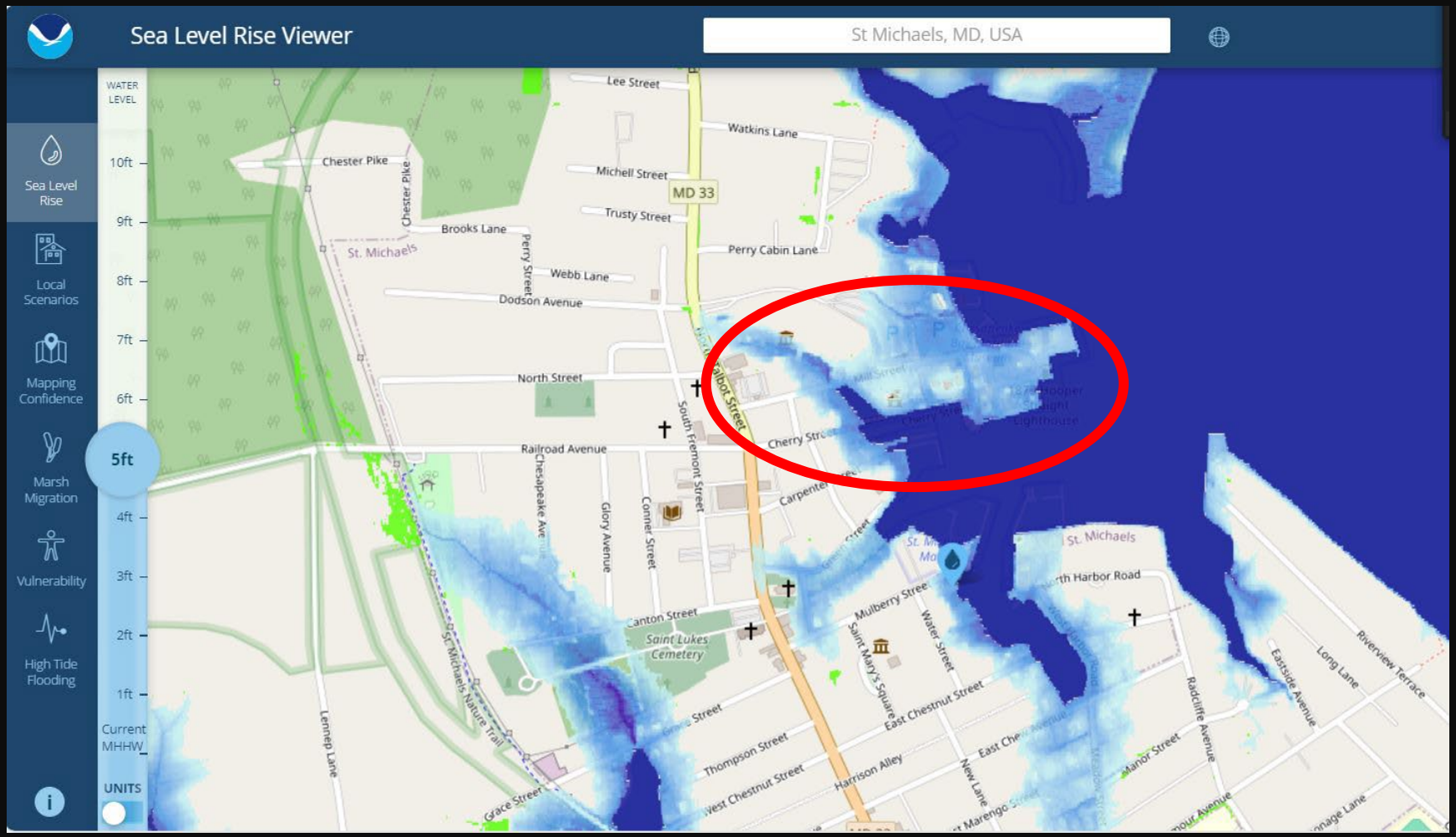
Harbor Flooding & Stormwater Mitigation Project



NOAA interactive mapping tools Sea Level Rise and Coastal Flooding Impacts (noaa.gov)

St. Michaels
Maryland

Elevation Review – Raising harbor infrastructure to elevation 5 is becoming the Town standard to provide a conservative safety factor for SLR projections

NOAA Datum Listing – Cambridge Tide Station

All elevations in feet are relative to NAVD88

- MHHW = 0.93
- MHW = 0.72
- NAVD88 = 0
- MSL = -0.09
- MLW = -0.90
- MLLW = -1.11

KEY TAKEAWAY:

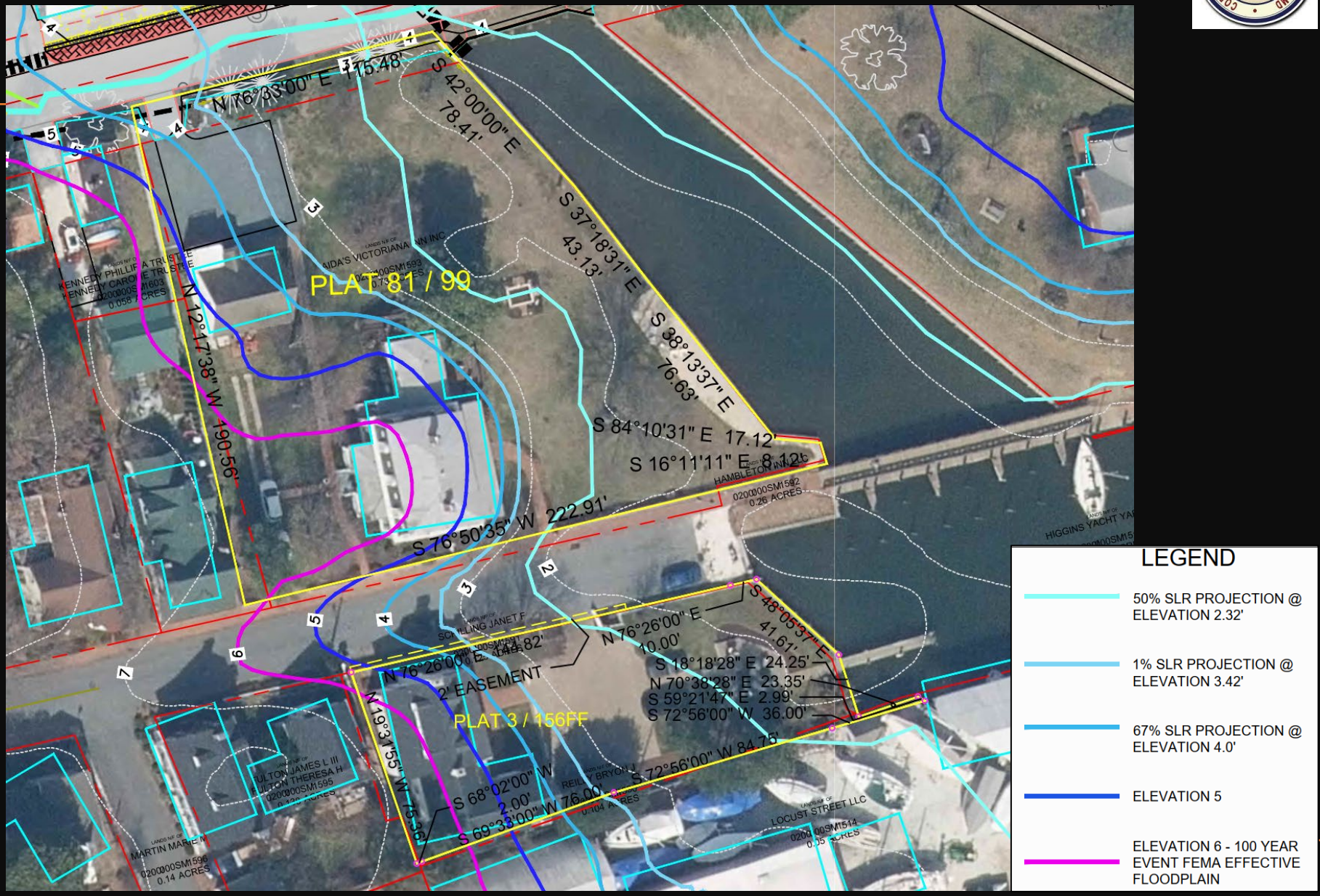
Raising flood protection measures to elevation 5 will protect harbor infrastructure and assets from most SLR scenarios and storm events.

1.02' is the difference between MSL and MHHW & reflects the average elevation potential of the tide

Depicted Event	SLR	Tide	Surge	Top Elev.
50% SLR Projection by 2050	1.3'	1.02'	-	2.32'
1% SLR Projection by 2050	2.4'	1.02'	-	3.42'
Elev. 4 (67% SLR) by 2050	1.7'	1.02'	1.28'	4.0'
FEMA Elev. 6.0	-	-	6.0'	6.0'

See *Harbor & Stormwater Infrastructure Study* for more information

Cherry Street & SLR Scenarios



SCENARIO 1

CHERRY STREET REGRADED TO EXTEND ELEVATION 5.0 TOWARD WATER
MAINTAIN ACCESS TO PRIVATE PARKING

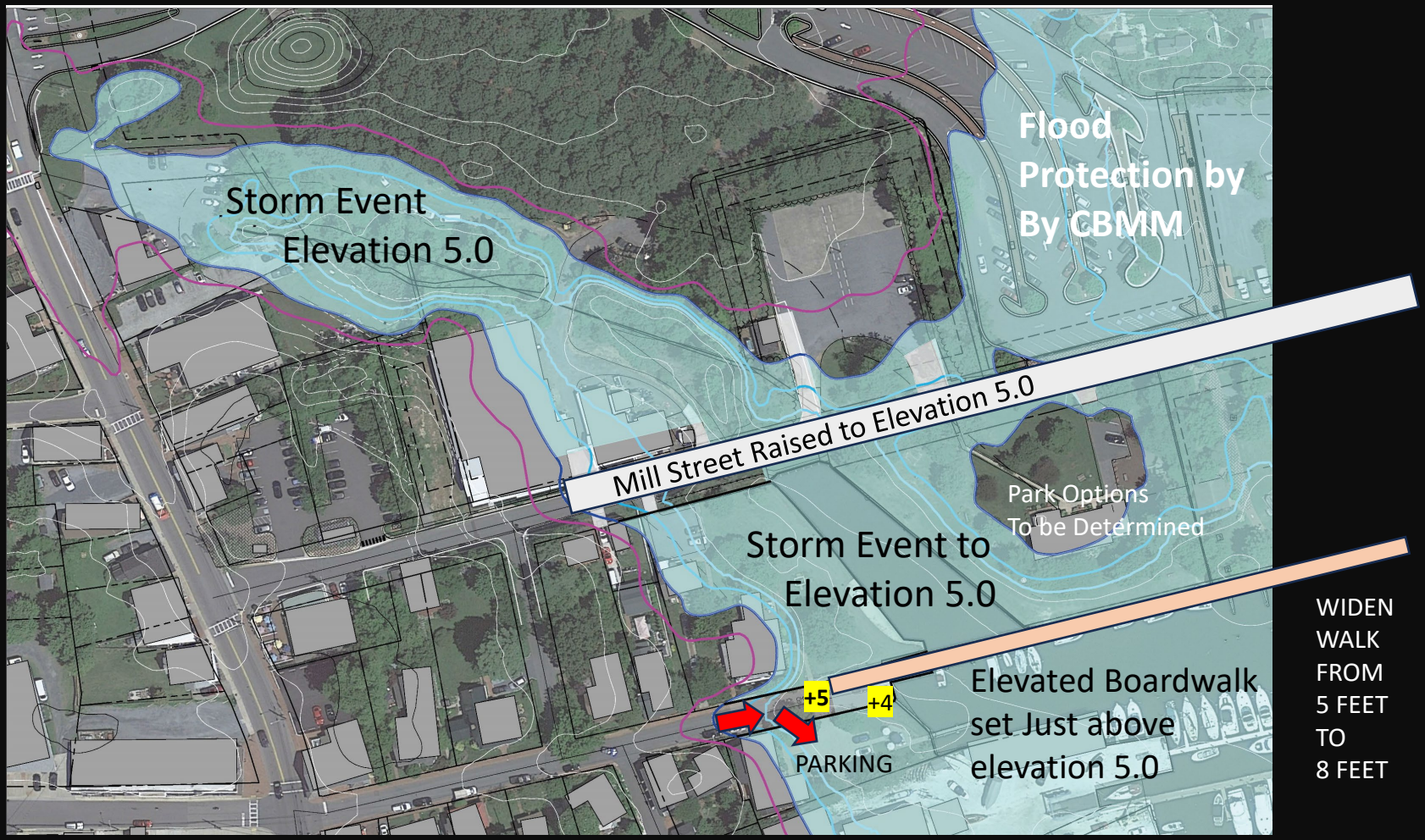
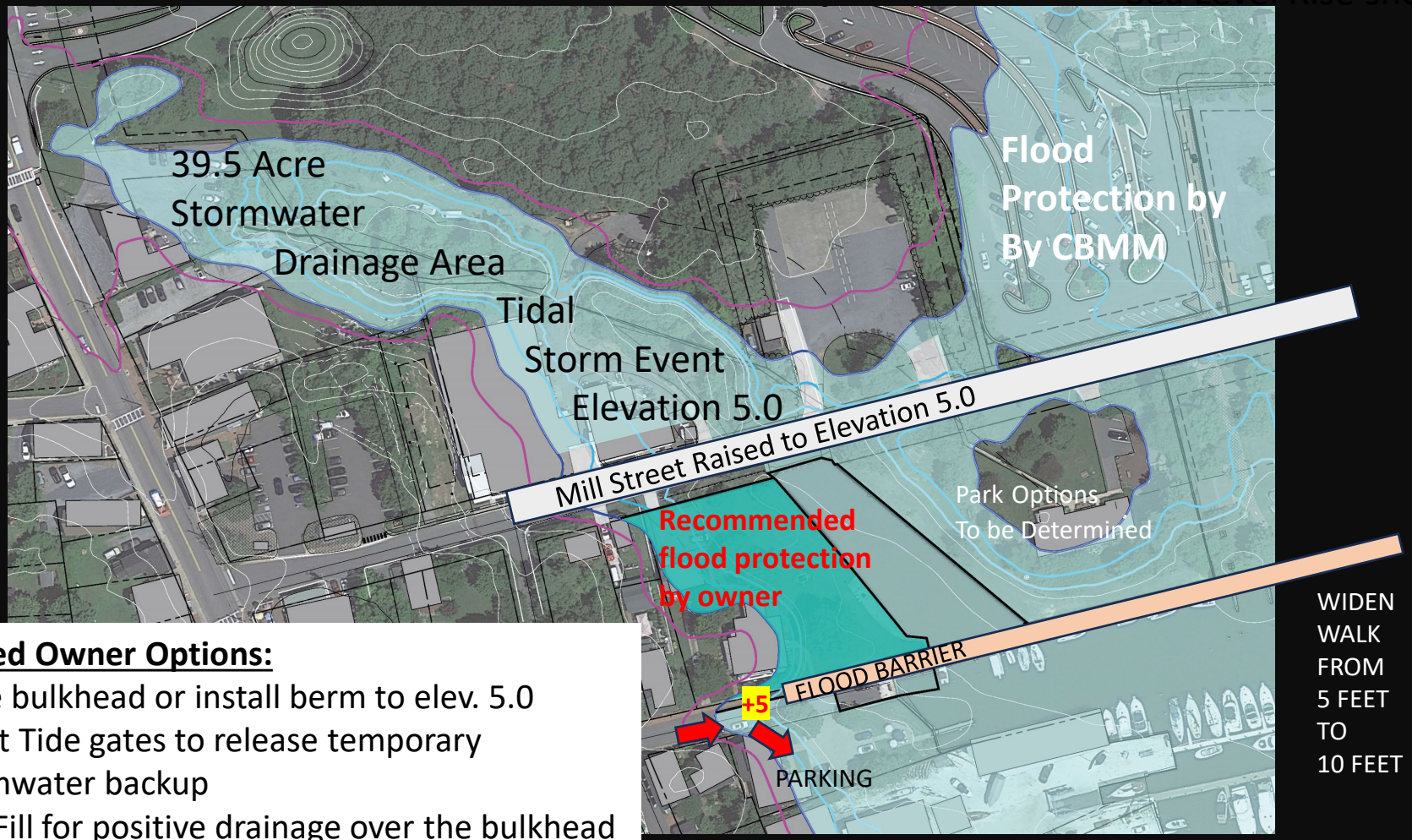


DIAGRAM – NORTH OF MILL STREET AND CHERRY STREET OPTION 1

SCENARIO 2

CHERRY STREET REGRADED TO EXTEND ELEVATION 5.0 TOWARD WATER
MAINTAIN ACCESS TO PRIVATE PARKING

Sea Level Rise shown



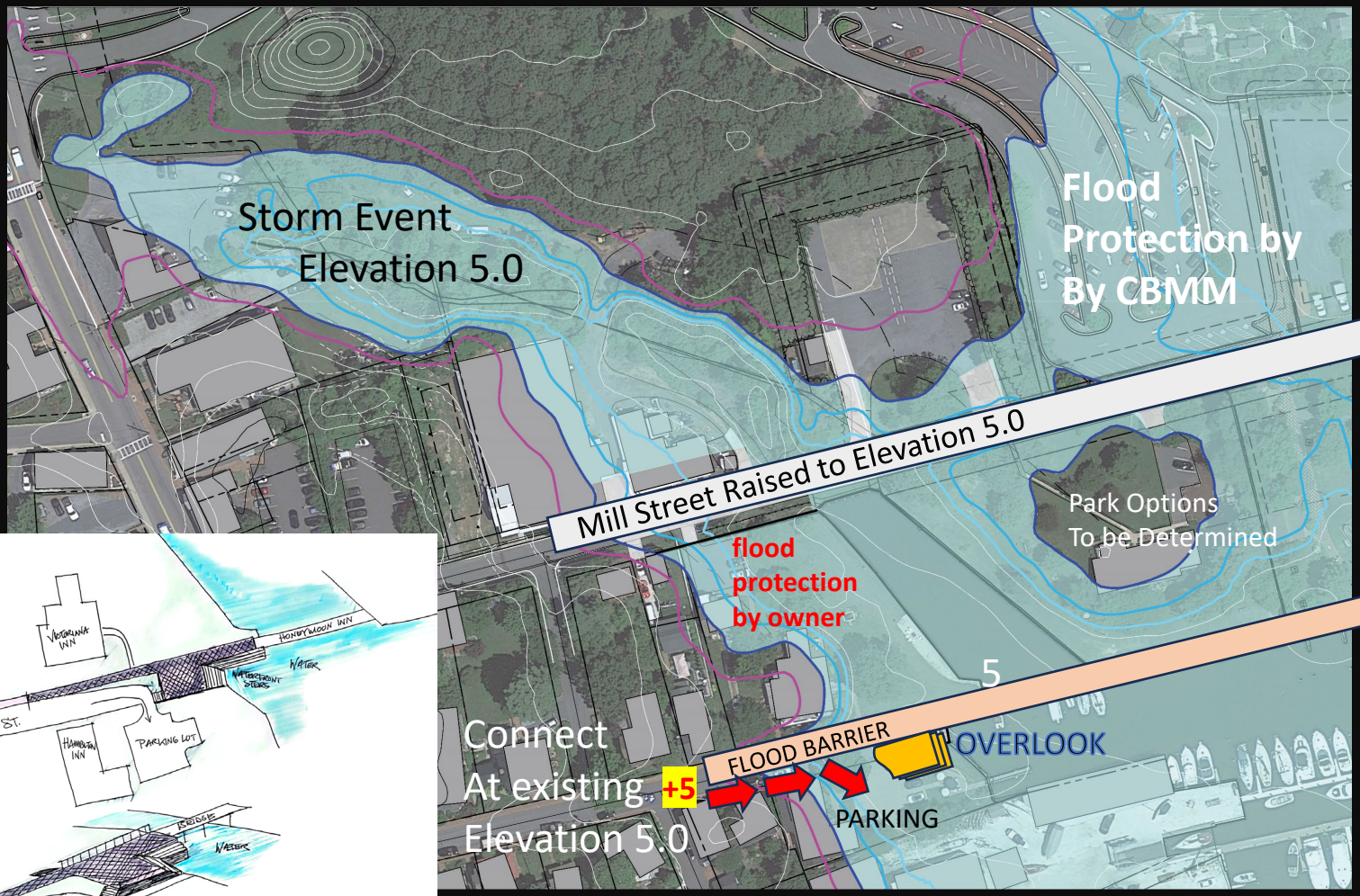
Suggested Owner Options:

- Raise bulkhead or install berm to elev. 5.0
- Insert Tide gates to release temporary stormwater backup
- Add Fill for positive drainage over the bulkhead
- Floodproof Structures
- Strategic Flooding (allow some areas to flood)

ERRY STREET OPTION 1

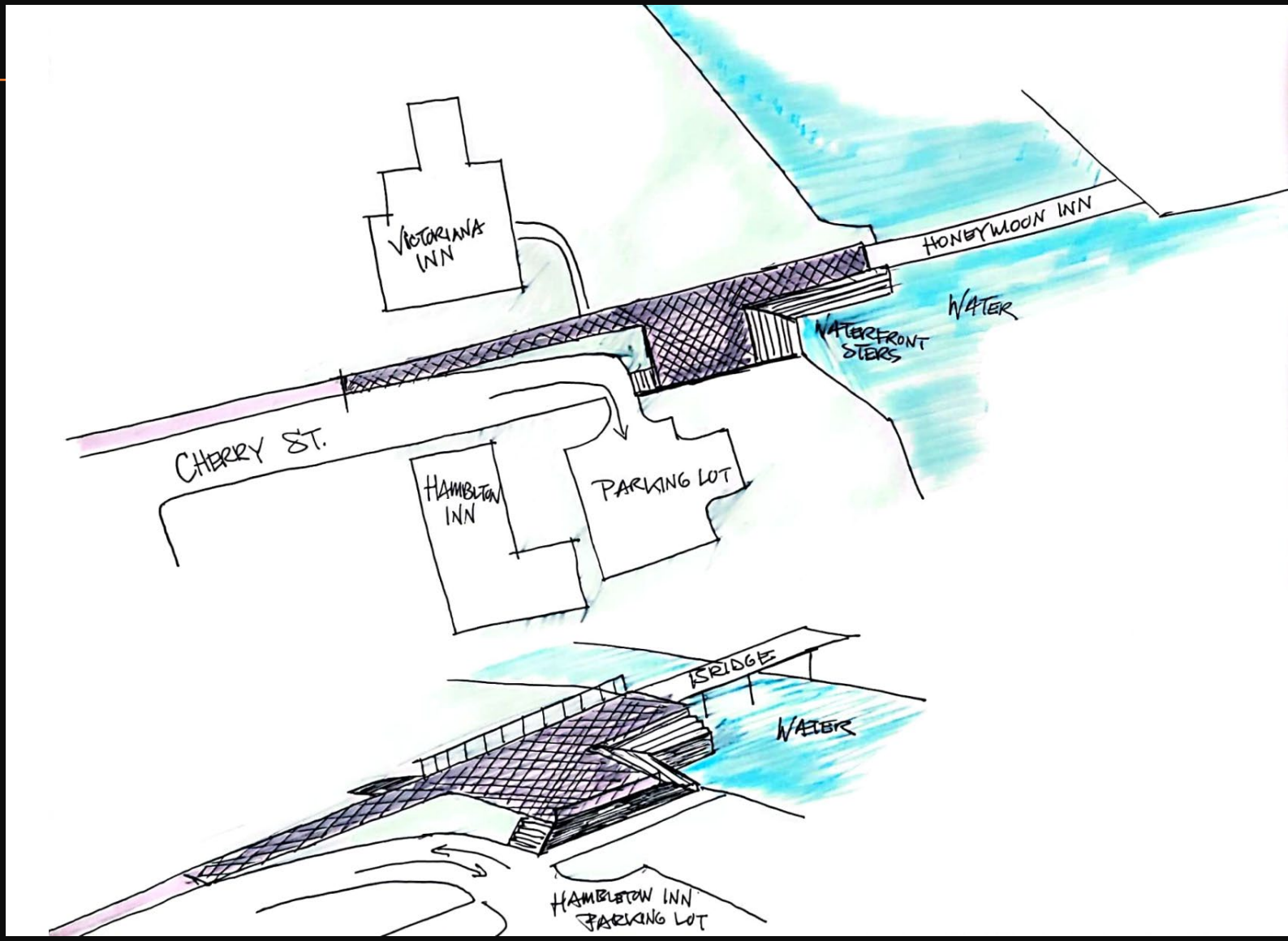
SCENARIO 3

MINIMAL REGRADING OF CHERRY STREET
FLOOD BARRIER IS PROMENADE WALK



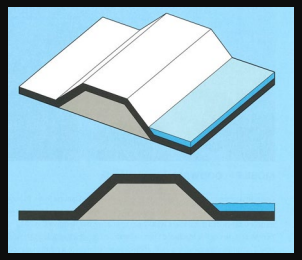
SCENARIO 3

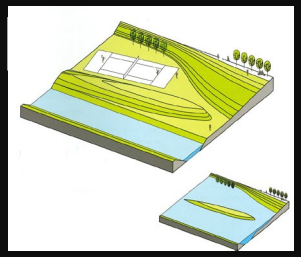
All public improvements proposed within Cherry Street Right-of-way



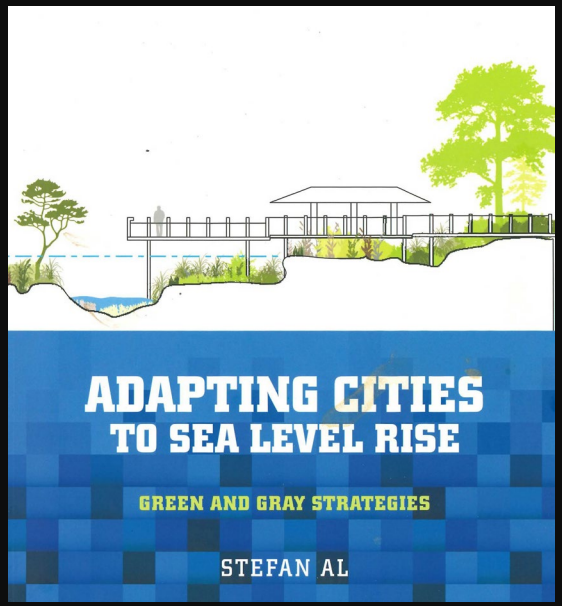
FLOOD PROTECTION OPTIONS

- ❑ STRATEGIES
- ❑ POTENTIAL GRANT FUNDING





Resources Available



- ❖ No action – anticipate flooding
- ❖ *Fill – prevent flooding, plan for overland drainage
- ❖ *Berm/Dike/Levee with tide gates
- ❖ *Bulkhead/Seawall
- ❖ Strategic Retreat

*Where funding, engineering design and permit process allow

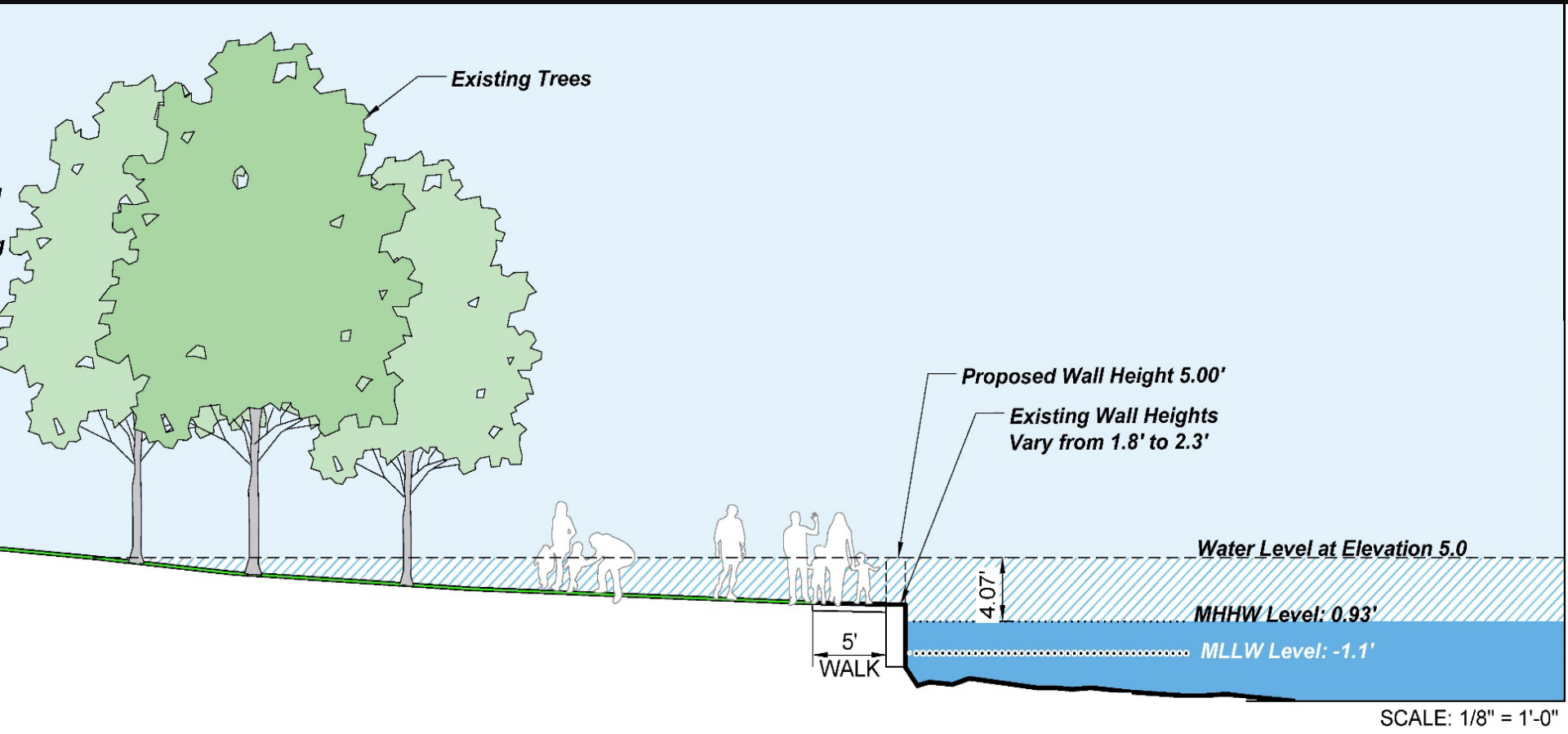
PARKING

TIDE GATE CLOSED

LAND SIDE

FLOOD PROTECTION OPTIONS

EXISTING CONDITIONS 2023



LAND SIDE

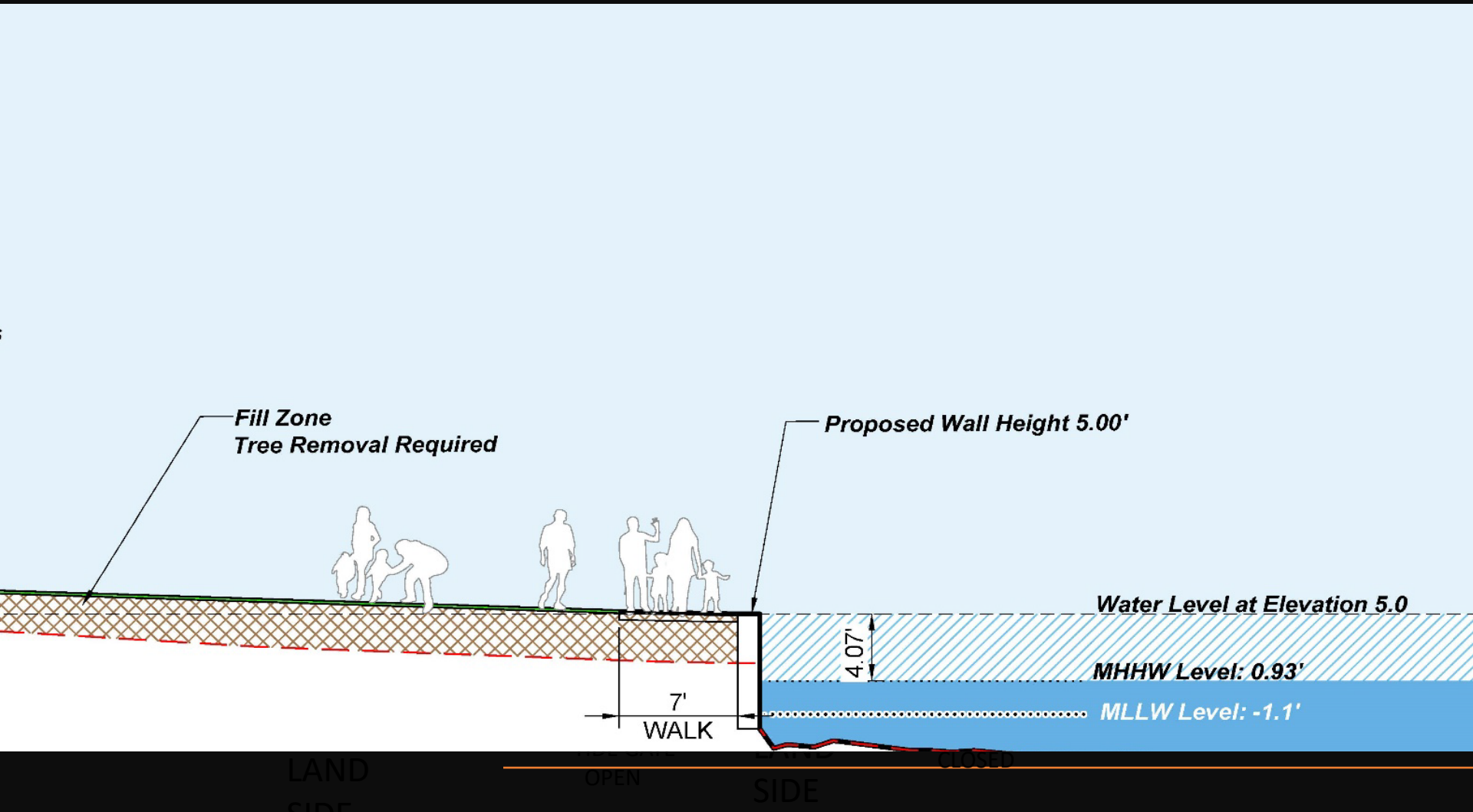
OPEN

SIDE

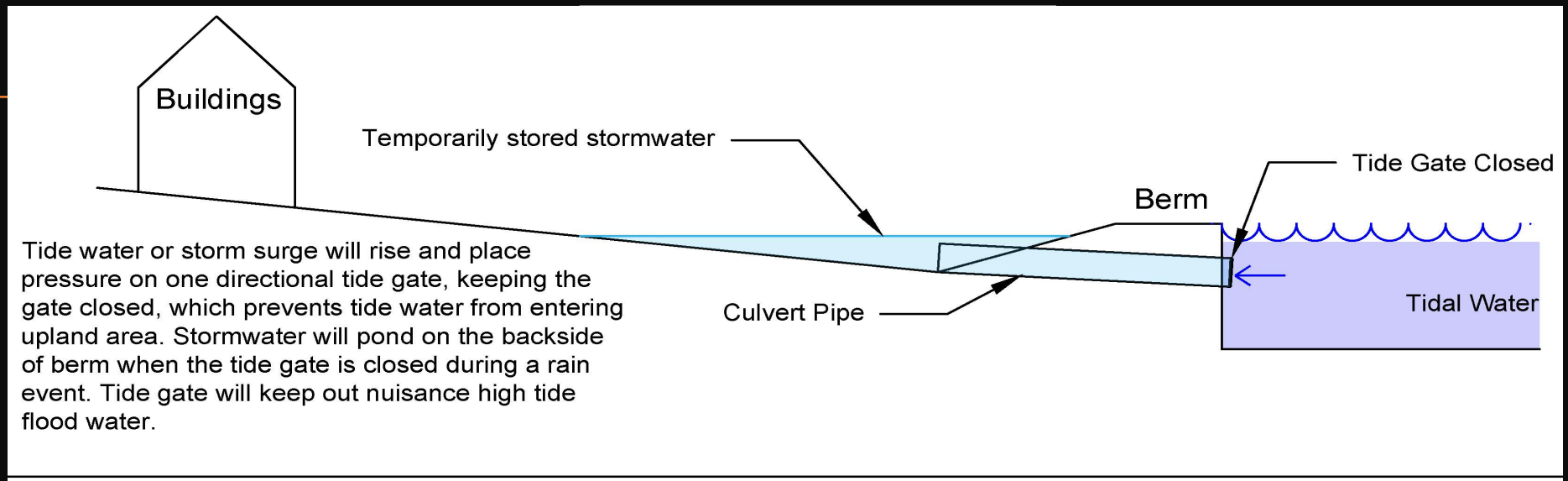
CLOSED

FLOOD PROTECTION OPTIONS

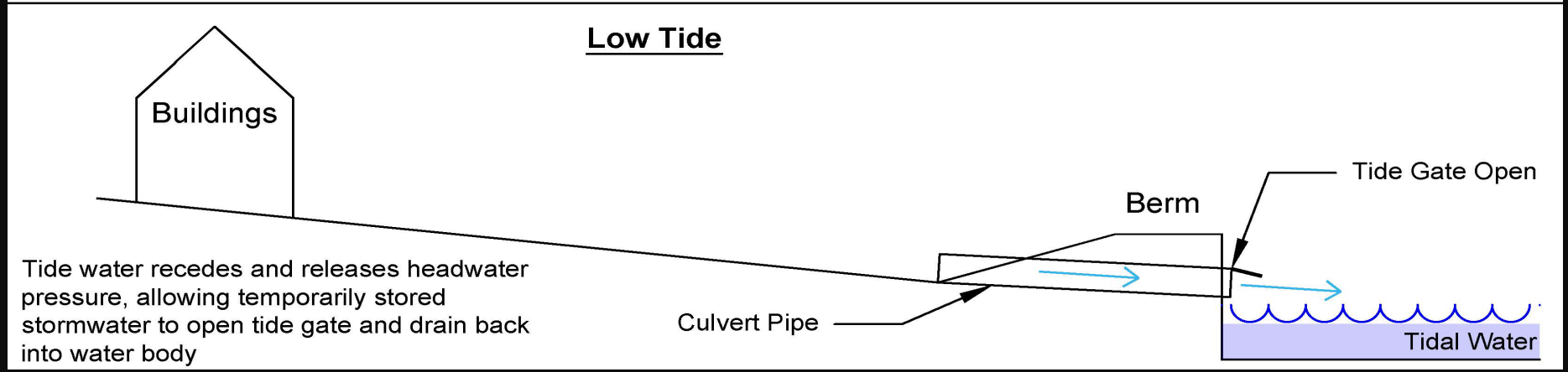
FILL BEHIND BULKHEAD FOR POSITIVE SURFACE DRAINAGE



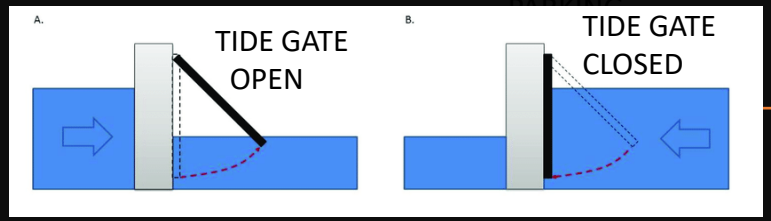
FLOOD PROTECTION OPTIONS – STORM EVENT



Tide water or storm surge will rise and place pressure on one directional tide gate, keeping the gate closed, which prevents tide water from entering upland area. Stormwater will pond on the backside of berm when the tide gate is closed during a rain event. Tide gate will keep out nuisance high tide flood water.



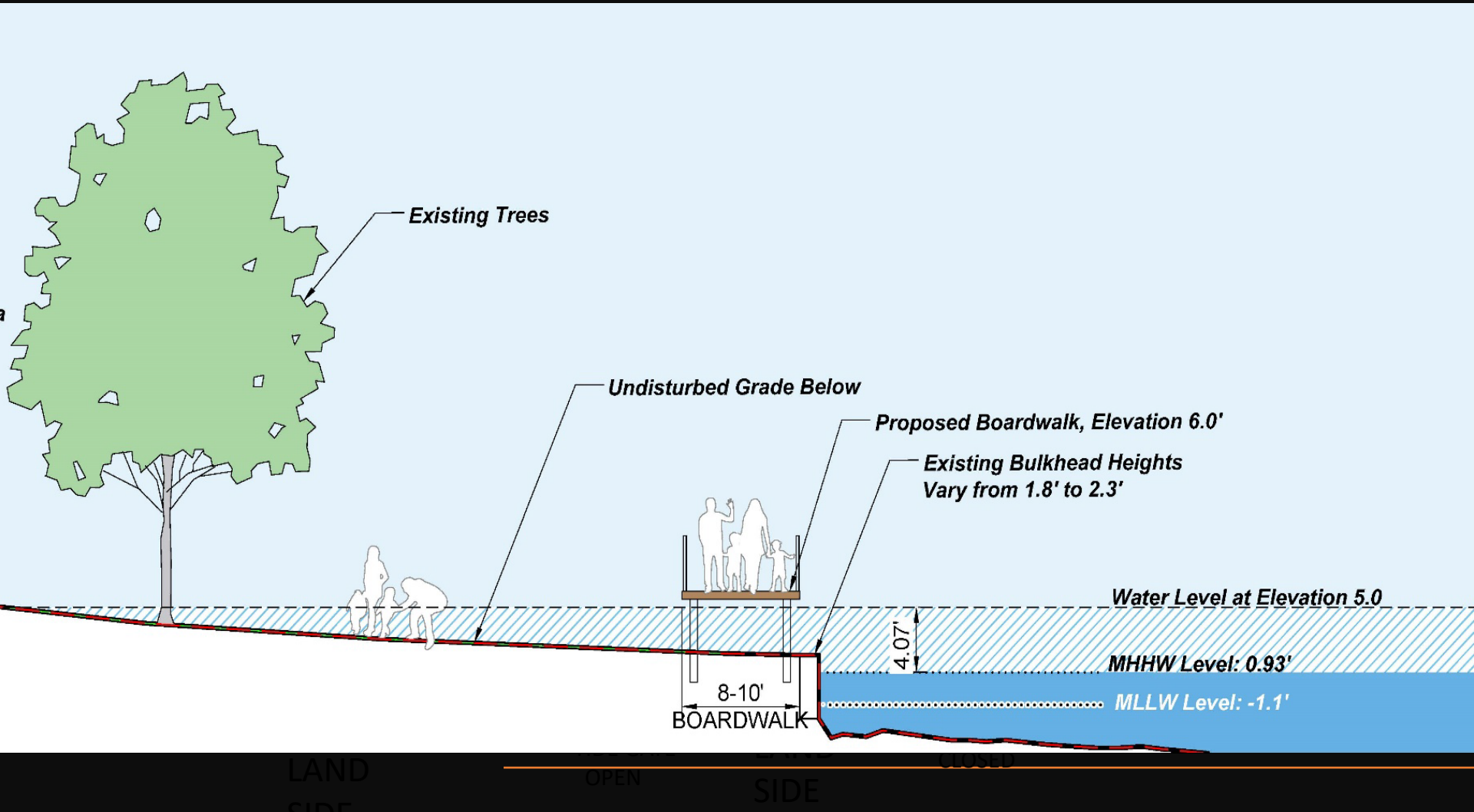
Tide water recedes and releases headwater pressure, allowing temporarily stored stormwater to open tide gate and drain back into water body



LAND SIDE

FLOOD PROTECTION OPTIONS

ELEVATED BOARDWALK
OVER STORM EVENT PROJECTED @ ELEVATION 5.0



St. Michaels
Maryland
Hollis Park

- Public Open Space Land Acquisition Funding
- Approximately One Acre
- Central Location

St. Michaels Maryland

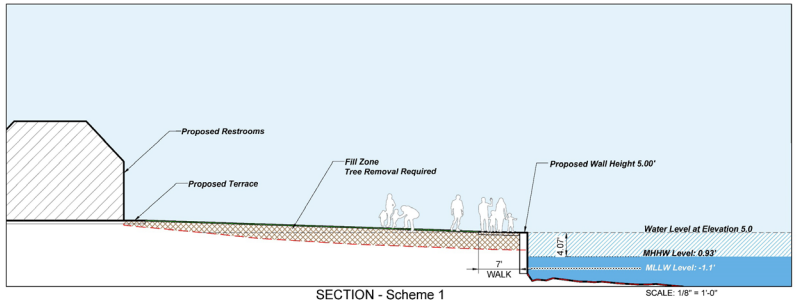
Honeymoon Bridge

- Key Pedestrian Connector
- Named for a scene in the 1928 silent film “The First Kiss”

St. Michaels
Maryland
Harbor Promenade

2024

Looking East



SECTION - Scheme 1

MILL STREET

EXISTING TREES TO REMAIN

DROP OFF

CRITICAL AREA 100 FOOT BUFFER

KAYAK RENTAL PAVILION

AMPHITHEATER

STAGE

RESTROOMS

TERRACE

LAWN OVERLOOK

BERM

Private Property flood protection by owner

HONEYMOON BRIDGE

BULKHEAD @ ELEV. 5.0

SLR PROTECTION TO BE DETERMINED

RAMP TO GRADE

STEPS TO DOCK

CHERRY STREET

Private Property flood protection by owner

SLR PROTECTION TO BE DETERMINED

N

W E

S

0 20 40 60

SCALE: 1" = 20'

RAUCH

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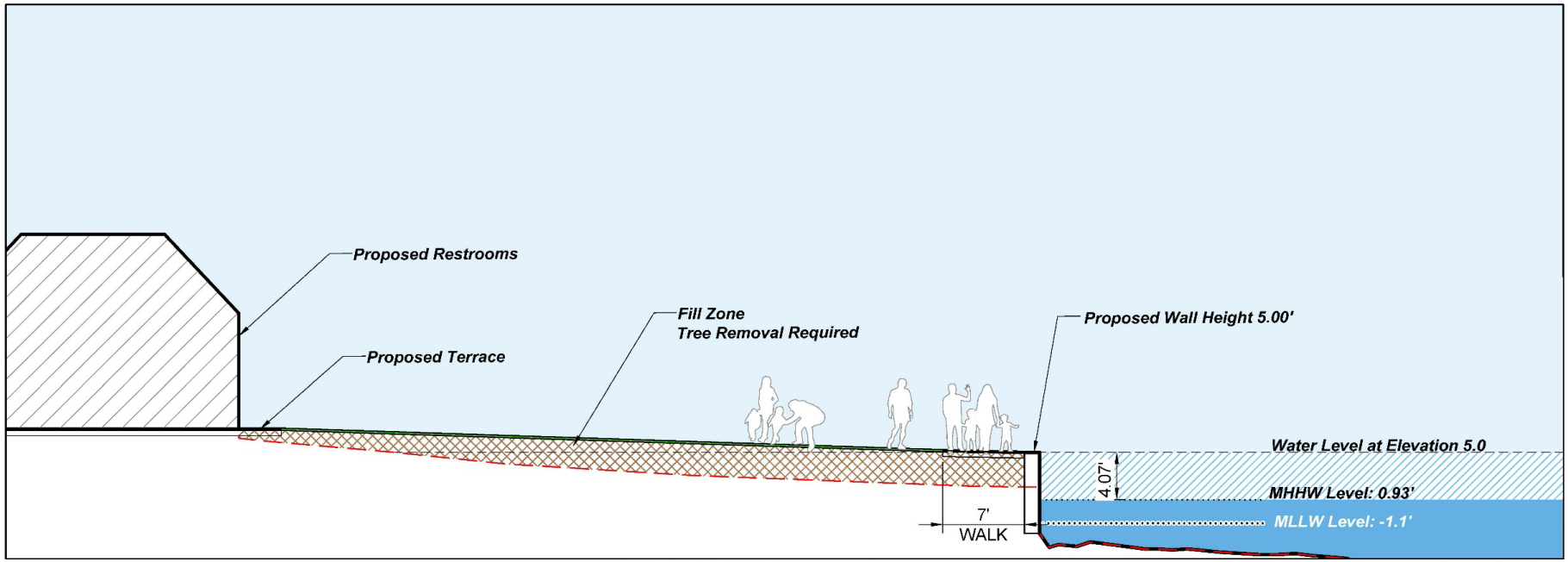
SCHEME 1
AMPHITHEATER

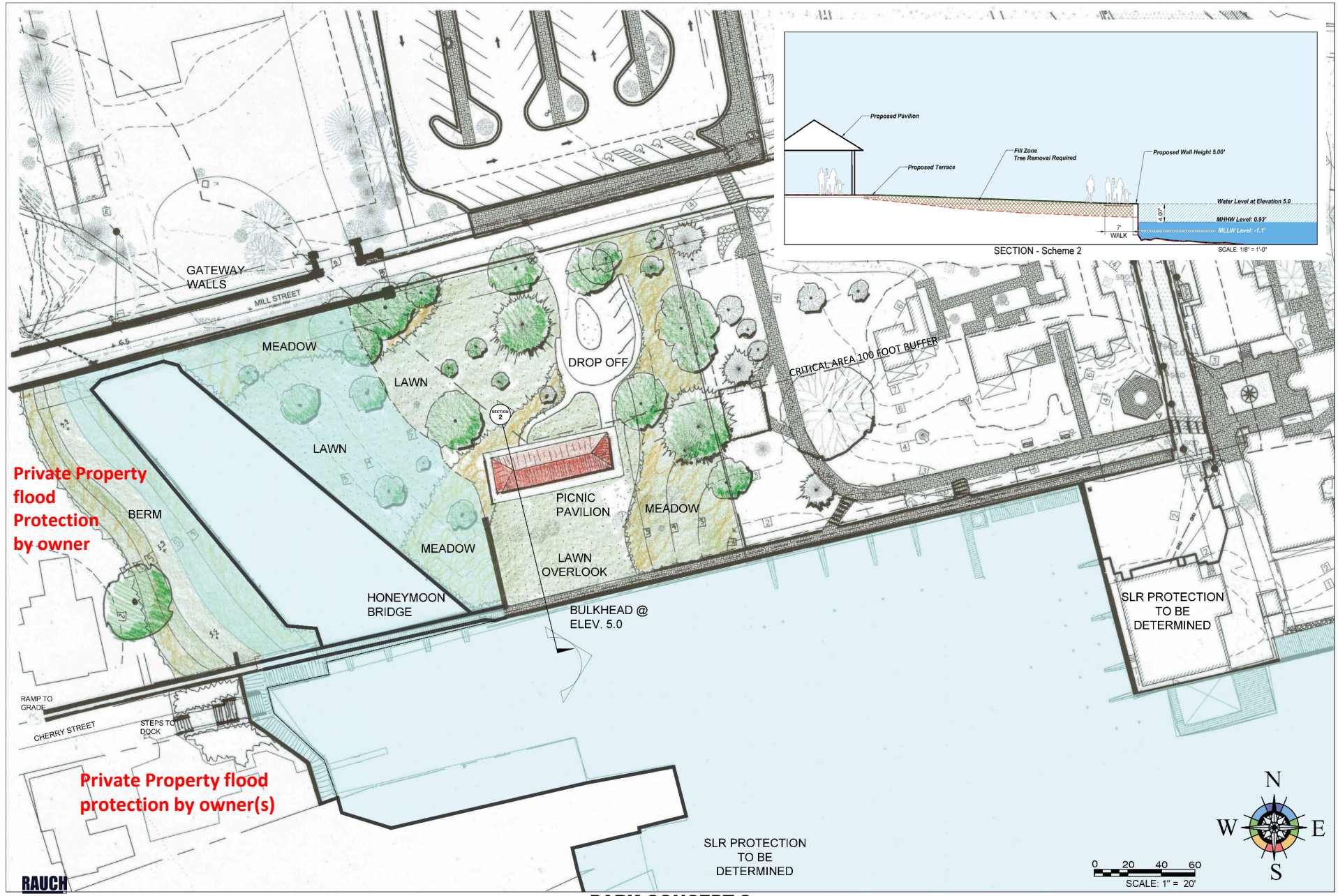
FLOODING AND STORMWATER MITIGATION PROJECT
ST. MICHAEL'S, MARYLAND

St. Michaels
Maryland
Scheme 1 Section



St. Michaels
Maryland
Amphitheater

- Detailed park Design is a future task
  but understanding potential concepts is required
  to design the water's edge thoughtfully



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PARK CONCEPT 2
PAVILION OVERLOOK

FLOODING AND STORMWATER MITIGATION PROJECT

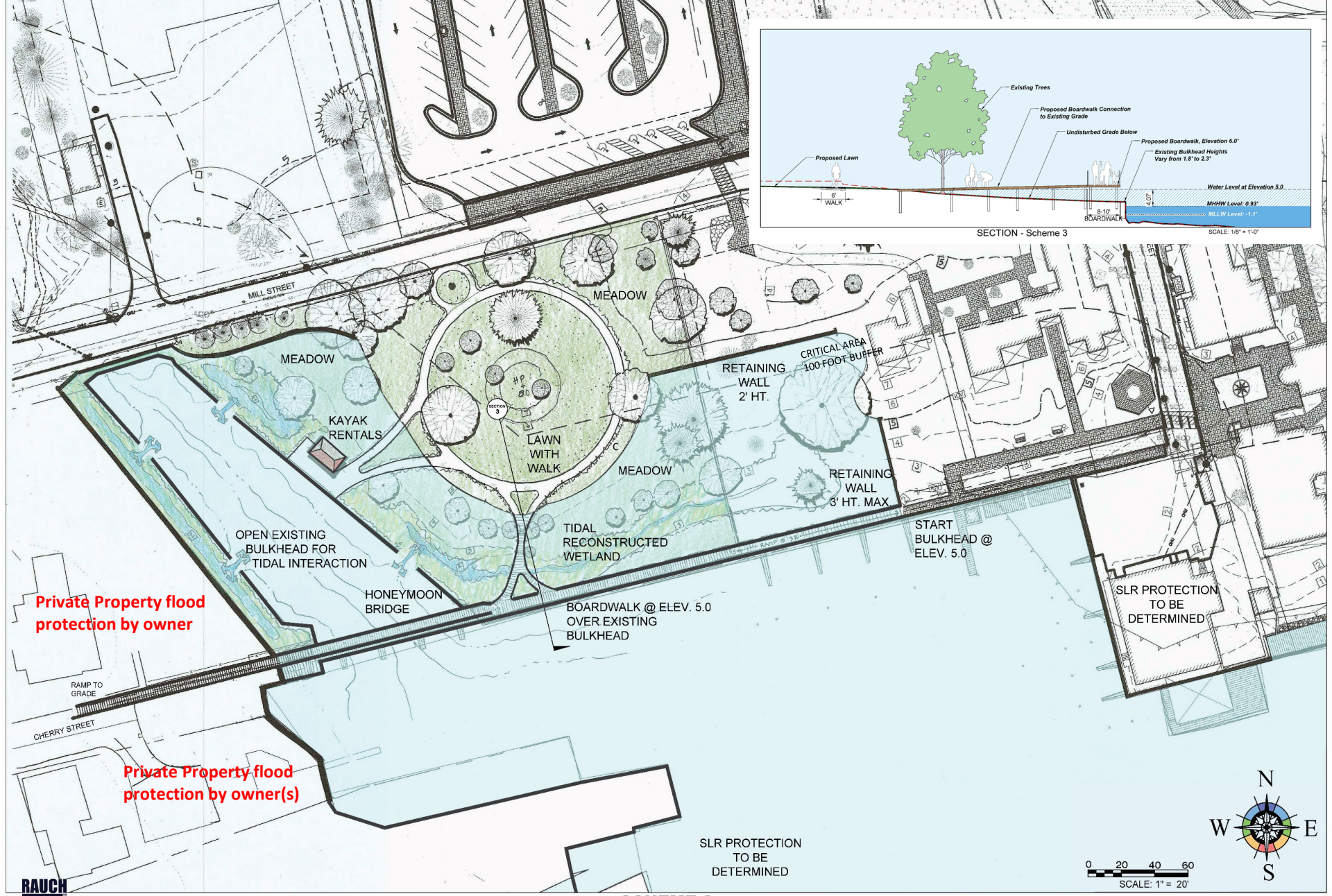
ST. MICHAEL'S, MARYLAND

St. Michaels Maryland

Pavilion

2024

Picnic Shelter Pavilion



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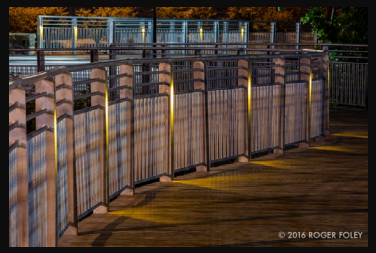
SCHEME 3
OPEN SPACE & NATURAL SYSTEMS

FLOODING AND STORMWATER MITIGATION PROJECT
ST. MICHAEL'S, MARYLAND

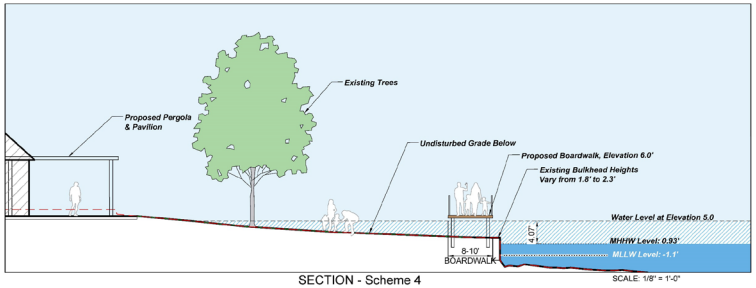
St. Michaels
Maryland
Harbor Promenade

Traditional Wood Boardwalk
& Railings

Contemporary Metal Railings on Wood Boardwalk



custom design with
integrated lighting



SECTION - Scheme 4

OPEN NATURAL SYSTEM

MILL STREET

BRIDGE

RETAINING WALL 2' HT.

STREET

SECTION 4

RESTROOMS

PAVILION

ARBOR

Private Property flood protection by owner

HONEYMOON BRIDGE

BOARDWALK AT ELEV. 5.0 ABOVE EXISTING BULKHEAD
WIDEN WALKWAY FROM 5' TO MINIMUM OF 8'

SLR PROTECTION TO BE DETERMINED

RAMP TO GRADE

CHERRY STREET

STEPS TO DOCK

Private Property flood protection by owner

SLR PROTECTION TO BE DETERMINED

N

W E

S

0 20 40 60

SCALE: 1" = 20'

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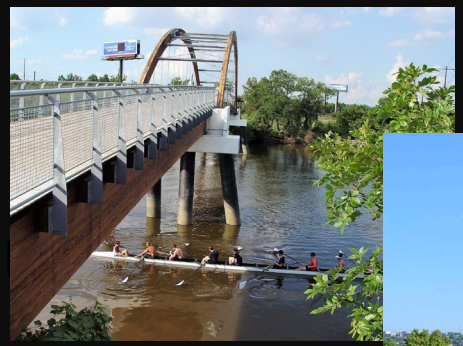
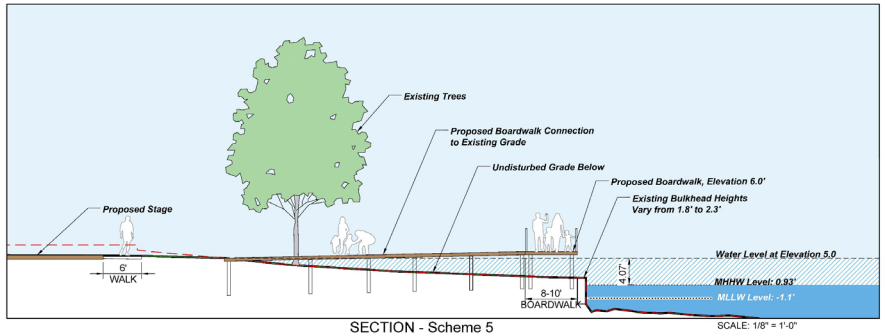
PARK CONCEPT 4
MILL STREET BRIDGE & PARK FACILITIES

FLOODING AND STORMWATER MITIGATION PROJECT
ST. MICHAEL'S, MARYLAND

St. Michaels
Maryland
Harbor Promenade; with metal railings



- Metal railings are an option for less long-term maintenance
- Ornamental metal has a more contemporary style for civic infrastructure



SECTION - Scheme 5

SCALE: 1/8" = 1'-0"

NAUTICAL FLAGS

MILL STREET

FOOD TRUCKS

MINOR BERM

NAUTICAL PLAY SPACE

PERFORMANCE LAWN

CRITICAL AREA 100 FOOT BUFFER

WETLAND EXPLORATION BOARDWALK

SECTION 5

TIDAL INTERACTION

STAGE

REMOTE CONTROL TOY BOAT RENTAL / FLOATING DOCK

NAUTICAL PLAY SPACE

WETLAND

Private Property flood protection by owner

HONEYMOON BRIDGE

BOARDWALK AT ELEV. 5.0 ABOVE EXISTING BULKHEAD

SLR PROTECTION TO BE DETERMINED

RAMP TO GRADE

CHERRY STREET

Private Property flood protection by owner

WALL TO TURN BACK AND FOLLOW PROPERTY LINES TO MEET ELEVATION 5.0
TEMPORARY MEASURE UNTIL SLR PROTECTION IS BUILT CONTINUING SOUTH

N
W E
S

0 20 40 60

SCALE: 1" = 20'

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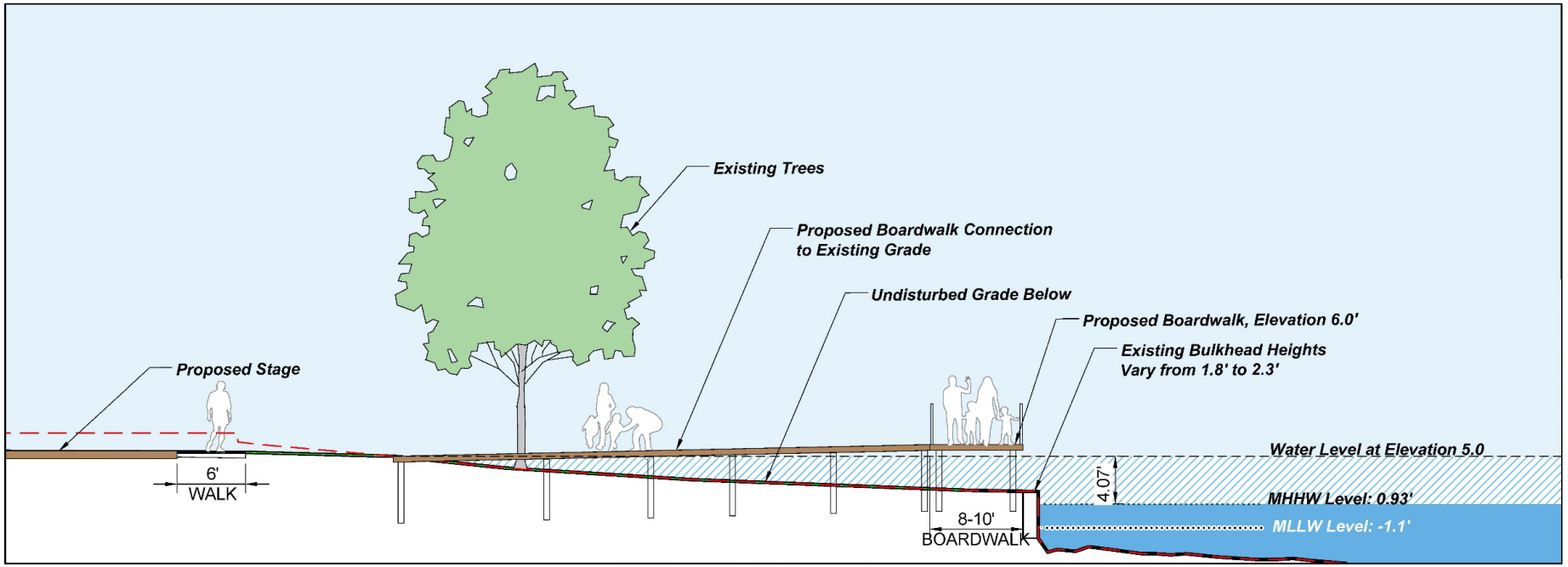
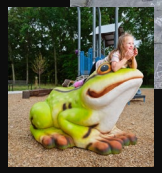
PARK CONCEPT 5
PLAY PARK - NAUTICAL THEME

FLOODING AND STORMWATER MITIGATION PROJECT
ST. MICHAEL'S, MARYLAND

St. Michaels
Maryland
Scheme 5 Section

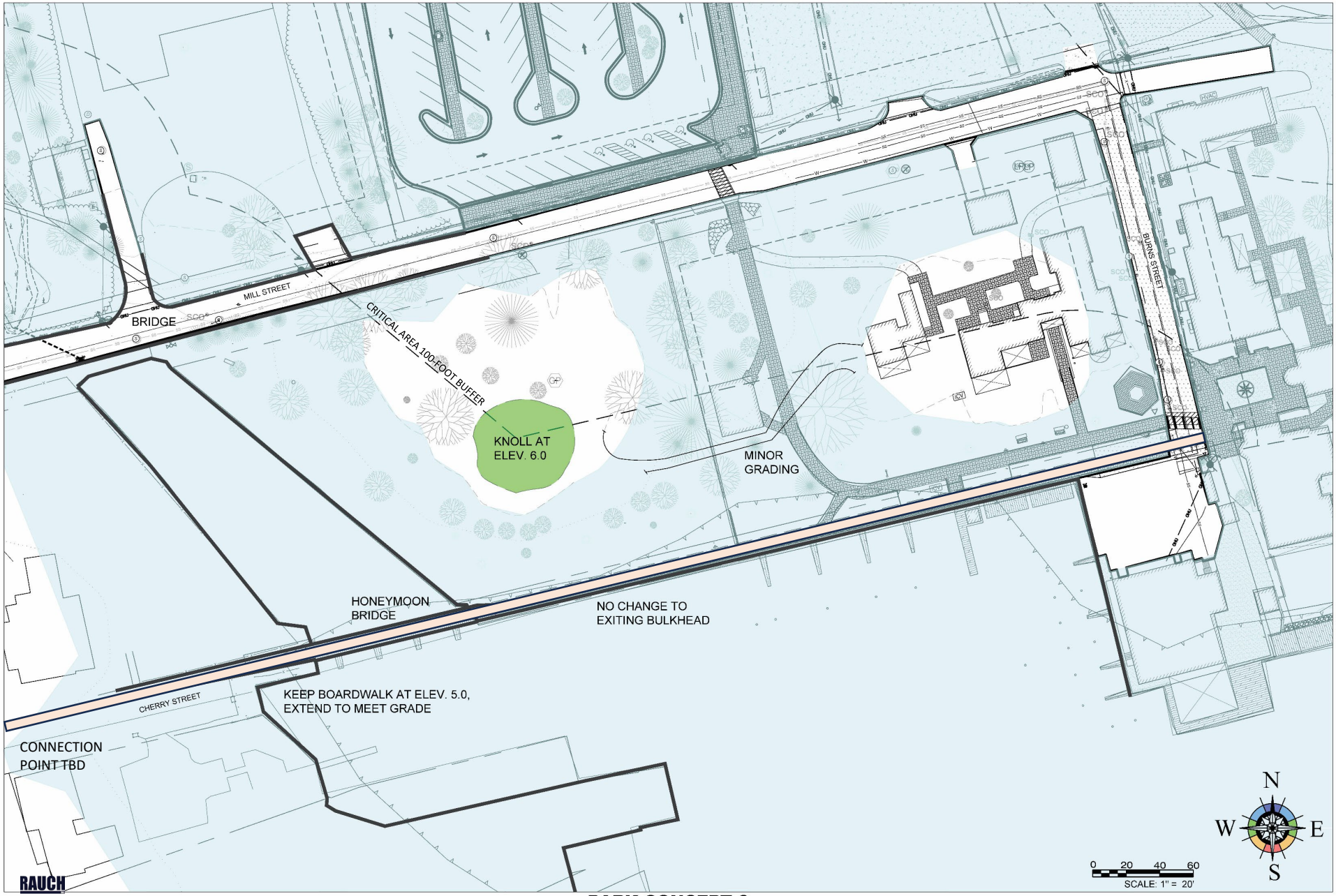


St. Michaels
Maryland
Nautical and Wetland Exploratory Garden for Kids



St. Michaels
Maryland
Nautical and Wetland Exploratory Garden for Kids

- Low boardwalks for kids to get close to nature



PARK CONCEPT 6

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FLOODING AND STORMWATER MITIGATION PROJECT
ST. MICHAEL'S, MARYLAND

St. Michaels
Maryland
Harbor Promenade – Example Centreville Wharf Park

Elevated
Boardwalk
With Overlook
Seating Areas

2024

St. Michaels
Maryland
Harbor Flooding & Stormwater Mitigation Project

QUESTIONS?

- Where should the design and engineering team focus efforts moving forward?
- Possible approaches have been discussed – the goal is to quickly focus on fewer options; does the group have a leaning toward a particular scenario(s)?

St. Michaels
Maryland
Mill Street Phase 1 – Raise to Elevation 5.0 ±

St. Michaels
Maryland
Phase 2 - Mill Street Sidewalk and Burns Street – Raise to Elevation 5.0 ±