



# MALLETTS BAY



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## **Stormwater Management & Transportation Scoping Study**

September 26, 2017

# Project Team



Bryan Osborne – Director of Public Works

Karen Adams – Technical Services Manager



Marshall Distel – Transportation Planner

Eleni Churchill – Transportation Program Manager



# Project Team – Consultants



David Saladino, PE, AICP – Project Manager

Evan Detrick, PE – Bike and Pedestrian Task Leader

Erica Quallen, EIT – Transportation Engineer



Amy Macrellis – Stormwater Task Leader



Wayne Elliot, PE – Stormwater Technical Advisor



# Agenda

- **Introduction of Project Team – David Saladino**
- **Project Overview – David Saladino**
- **West Lakeshore Drive Bicycle/Pedestrian Alternatives – Evan Detrick**
- **Lakeshore Drive/Blakely Road Intersection Alternatives – David Saladino**
- **Stormwater Management Alternatives – Amy Macrellis**
- **Next Steps**





# Project Overview

- **Three Scoping Studies**

- Stormwater, Bicycle/Pedestrian, Intersection
- Synergy Between Projects
- Identify issues > Develop & analyze alternatives > **Select preferred alternative**

- **Schedule**

- Kick-Off Meeting November 2016
- Evaluate Existing Conditions November – December 2016
- Local Concerns Meeting January 2017
- Alternatives Assessment April – September 2017
- **Presentation of Alternatives** **Tonight**
- Selection of Preferred Alternative October 2017
- Scoping Report November 2017

- **Tonight's Goal**

- Acquire public input on proposed alternatives to work towards identification of Town's preferred alternative.



# West Lakeshore Drive Improvements

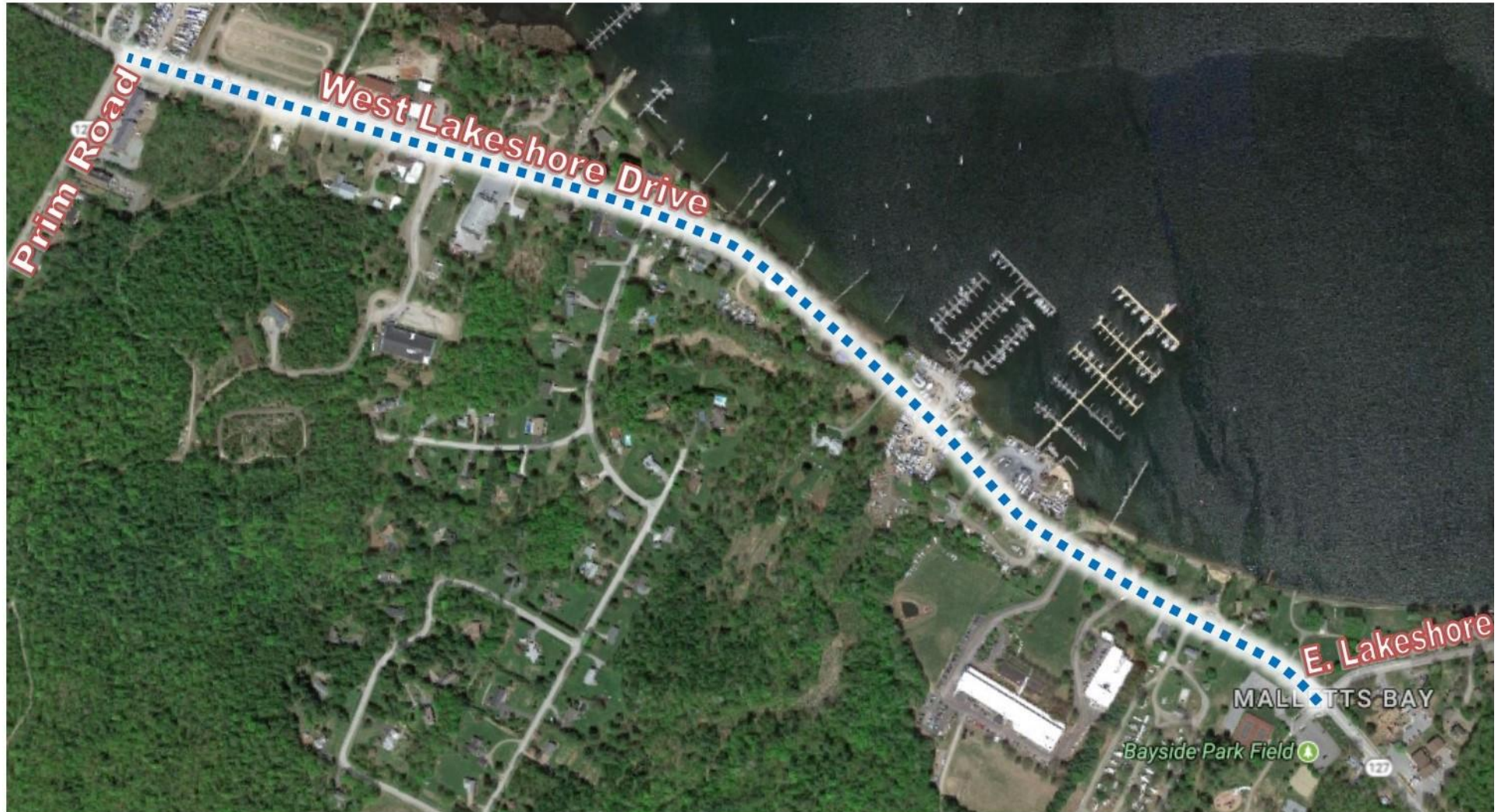
## Bicycle and Pedestrian Facilities

- **Purpose**
  - Improve safety and mobility for pedestrians and bicyclists along West Lakeshore Drive between Blakely Road and Prim Road.
- **Need**
  - Safe bicycle facilities
  - Decrease pedestrian and cyclist conflicts
  - Create path connection





# West Lakeshore Drive Alternatives





# West Lakeshore Drive Alternatives

## Alternative #1 – No Build

- No change to existing bicycle and pedestrian facilities.





# West Lakeshore Drive Alternatives

## Alternative #2 – Shared Use Lanes

- Improve cyclist visibility through the use of pavement markings and signage.
- Design & Construction Cost Estimate: \$30,000
- Major Impacts: None





# West Lakeshore Drive Alternatives

## Alternative #3 – On-Road Bike Lanes

- Construct 5' bike lanes on both sides of the roadway to provide adequate space for bicyclists on roads.
- No change to pedestrian facilities.
- **Design & Construction Cost Estimate\*:**  
\$1,530,000
- **Major Impacts:** Reduces opportunities for stormwater treatment along road.



*\*Cost Estimate includes \$900,000 in stormwater improvements to Meet standards. Additional \$1,500,000 to Exceed standards.*



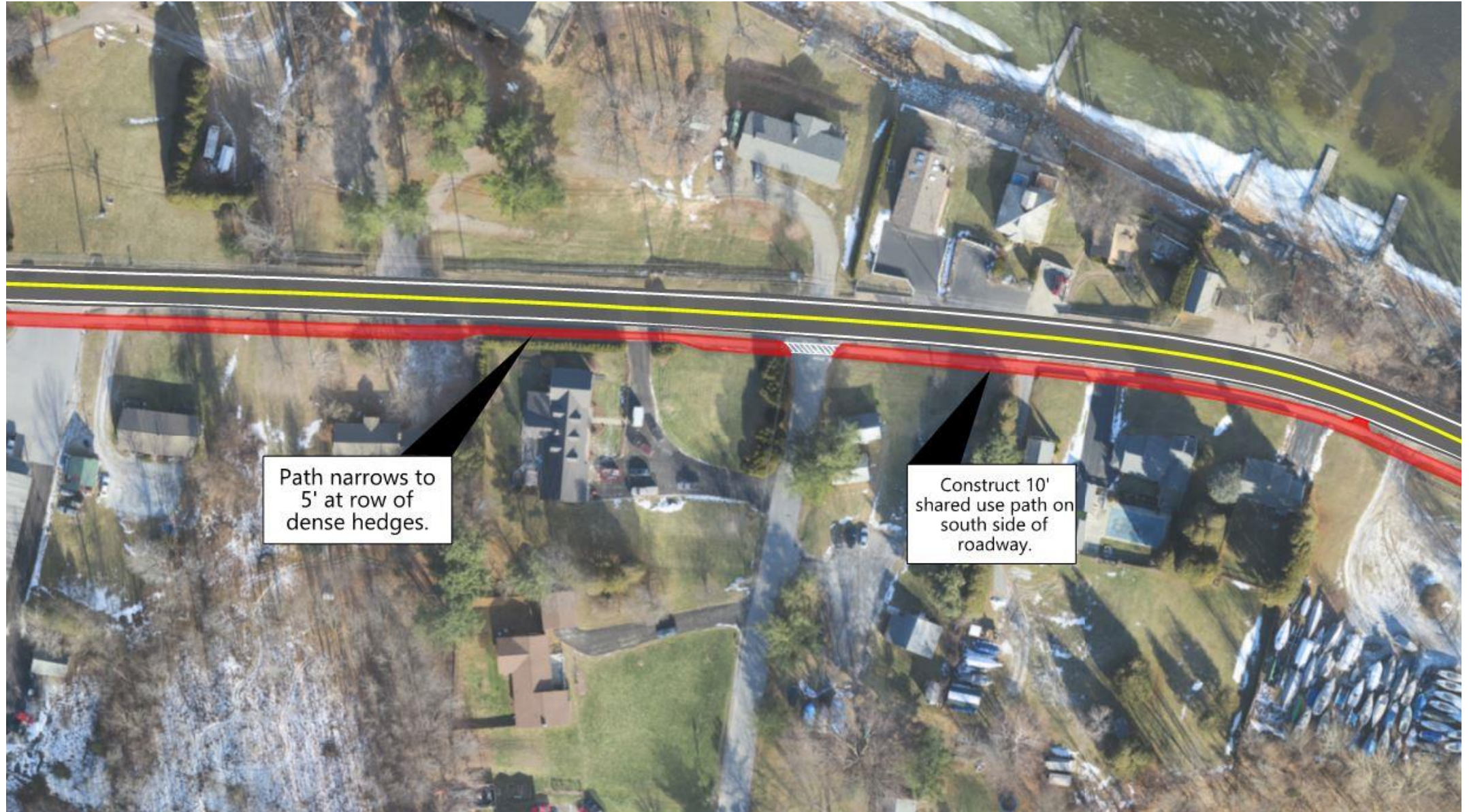
# West Lakeshore Drive Alternatives

## Alternative #4 – Shared Use Path

- Construct 10' shared use path on south side of road to create a widened separated path for both pedestrians and cyclists.
- Possible extensions...
- **Design & Construction Cost Estimate\*:** \$5,050,000
- **Major Impacts:** Private property and utility impacts, Waterline relocation required



*\*Cost Estimate includes \$3,400,000 in stormwater and waterline improvements to Meet standards. Additional \$1,500,000 to Exceed standards.*



Path narrows to 5' at row of dense hedges.

Construct 10' shared use path on south side of roadway.



# West Lakeshore Drive Alternatives

## Alternative #4 – A, B, C Extensions

- 4A – Construct 10' path at water elevation.
- 4B – Construct 10' overlook area at roadway elevation with water access.
- 4C – Construct 5' sidewalk from Harbor View Plaza to Public Boat Launch.





# West Lakeshore Drive Alternatives

## Alternative #4A – Additional Path with Lookout

- Construct 10' wide path at water elevation, beginning at Moorings Marina.
- Design & Construction Cost Estimate\*: \$360,000
- Major Impacts: Floodplains, shoreland, private property



\*Cost Estimate excludes cost of Alternative 4 path and stormwater improvements



# West Lakeshore Drive Alternatives

## Alternative #4B – Additional Path with Overlook

- Construct 10' wide path at roadway elevation with stairs for water access.
- Design & Construction Cost Estimate\*: \$1,970,000
- Major Impacts: Floodplains, shoreland, private property



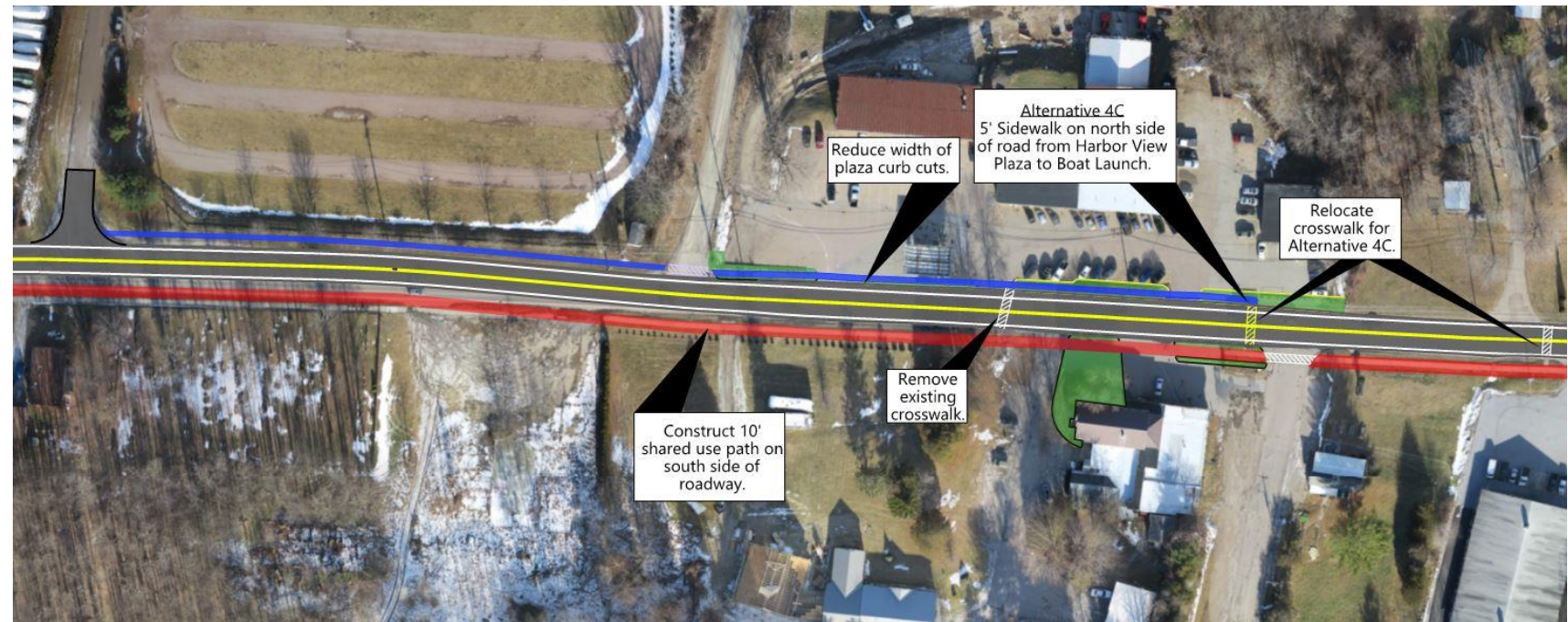
*\*Cost Estimate excludes cost of Alternative 4 path and stormwater improvements*



# West Lakeshore Drive Alternatives

## Alternative #4C – Additional Northern Sidewalk



















































































- Construct 5' wide sidewalk along northern side of road at west end of project area with improvements to existing curb cuts and crosswalks.
- **Design & Construction Cost Estimate\***: \$360,000
- **Major Impacts**: None



*\*Cost Estimate excludes cost of Alternative 4 path and stormwater improvements*

# West Lakeshore Drive Alternatives

## Evaluation Matrix Summary

Evaluation Metric	Alt. 1 No Build	Alt. 2 Shared Use Lanes	Alt. 3 Bike Lanes (both sides of road)	Alt. 4 Shared Use Path (south side of road)	Alt. 4A Alt. 4 + Section at Water Elevation	Alt. 4B Alt. 4 + Overlook Area	Alt. 4C Alt. 4 + North side path at western end
Cost		  				  	
Pedestrian/Bicyclist Safety			 	  	  	  	  
Vehicle Safety							
Utility / ROW Impacts					 		
Environmental Impacts							
Stormwater Accommodations	 						
Satisfies Purpose & Need	  	  		  	  	  	  
Permit Needs							



# Bayside Intersection Improvements

## Blakely Road and Lakeshore Drive

- **Purpose**
  - Identify and develop a preferred approach to improve safety and efficiency for all users through the Lakeshore Drive and Blakely Road intersection and adjacent areas.
- **Need**
  - Insufficient capacity
  - Inadequate pedestrian accommodations
  - Existing safety issues





# Bayside Intersection Alternatives

## Alternative #1 – No Build

- No changes to existing intersection geometry or signal configuration.
- 2037 PM Operations: LOS F,  $v/c = 0.97$
- **Movements of Interest:**
  - Blakely Road NB Through: LOS F,  $v/c = 1.3$
  - W Lakeshore Drive SB Left: LOS D,  $v/c = 0.82$
- **Safety:** No change

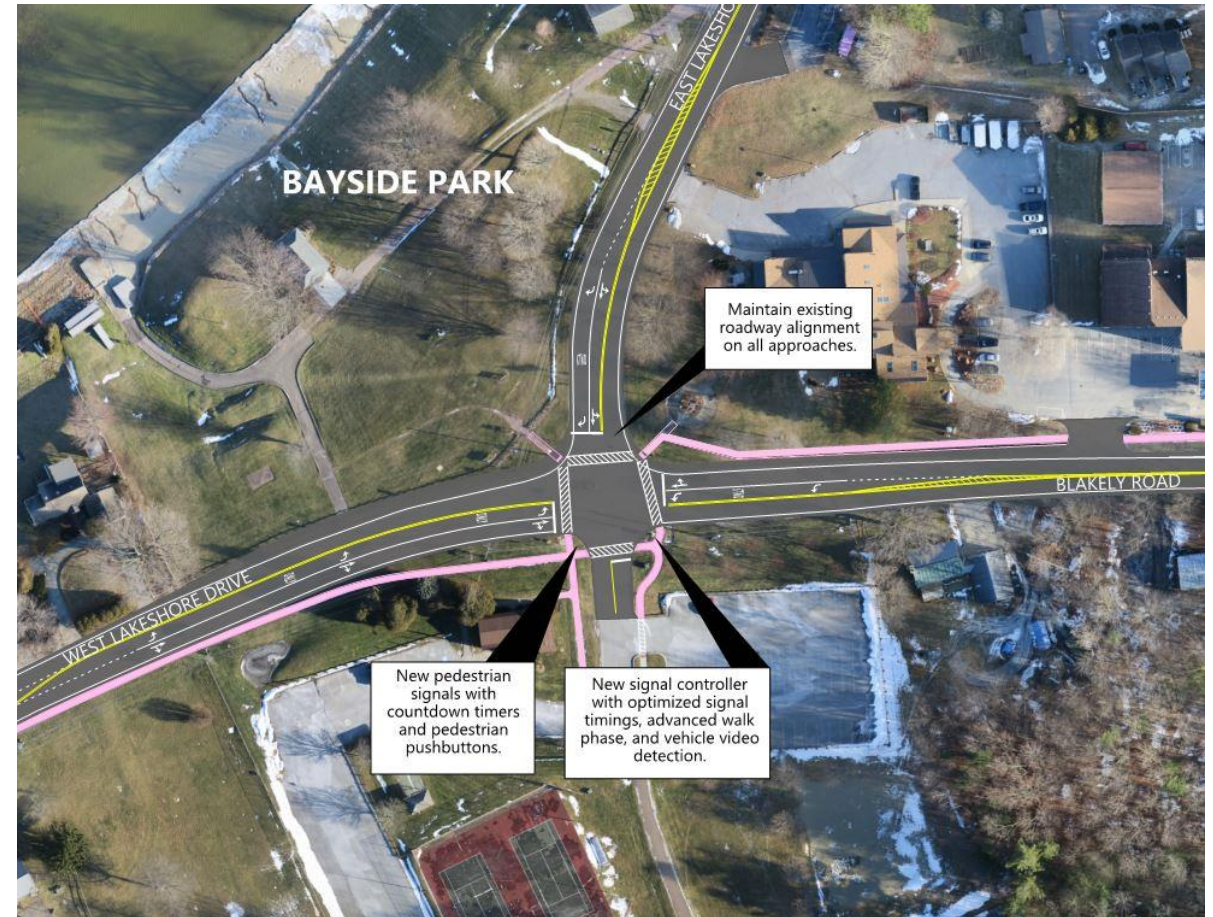




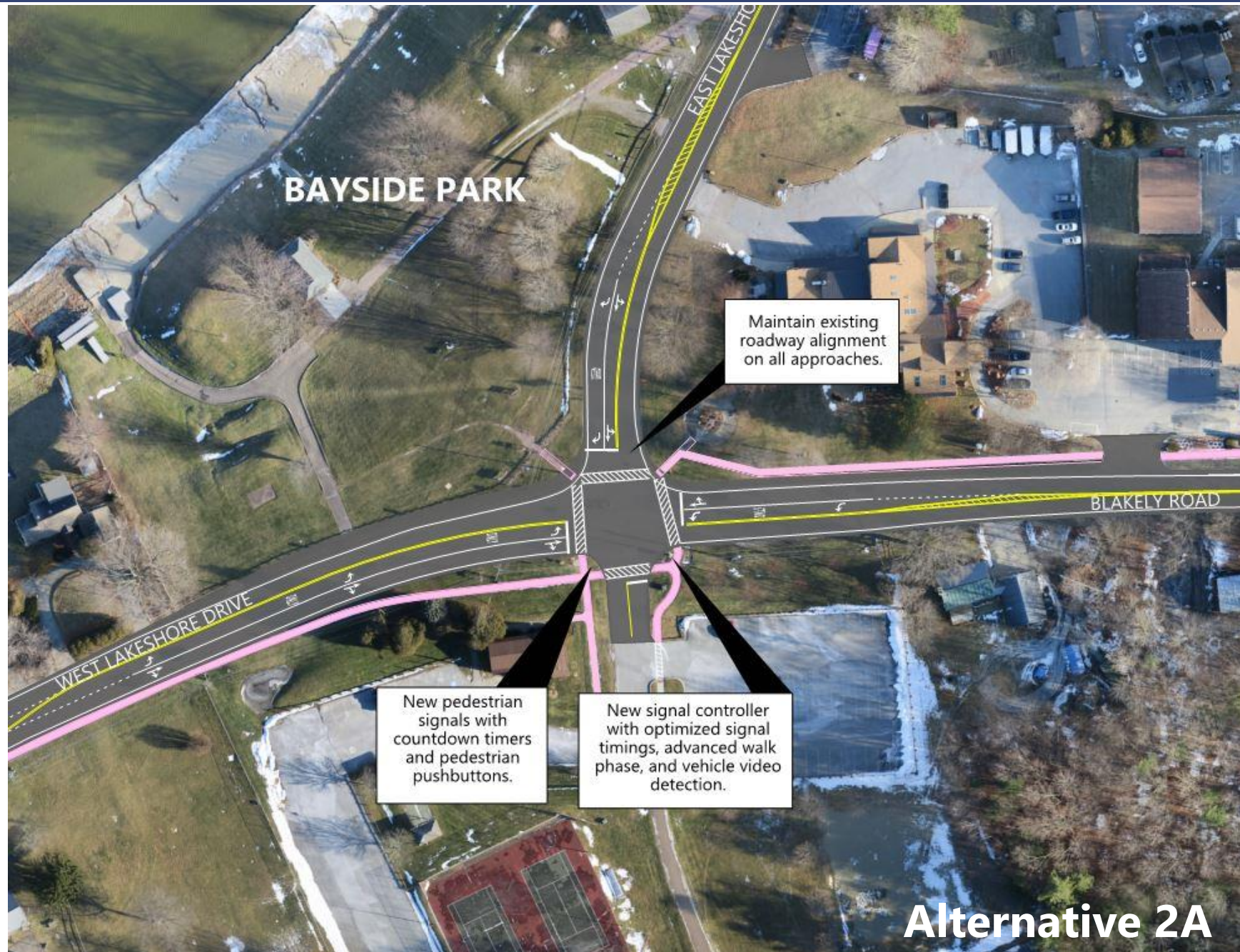
# Bayside Intersection Alternatives

## Alternative #2A – Operational Modifications

- Optimize signal timing and provide advanced walk phase for pedestrians. No changes to existing geometry.
- **2037 PM Operations:** LOS C,  $v/c = 0.95$
- **Movements of Interest:**
  - Blakely Road NB Through: LOS D,  $v/c = 0.94$
  - W Lakeshore Drive SB Left: LOS E,  $v/c = 0.86$
- **Design & Construction Cost Estimate\*:** \$420,000
- **Safety:** Decreased for pedestrians during advanced walk phase.



*\*Cost Estimate includes \$300,000 in stormwater improvements to Meet standards. Additional \$400,000 to Exceed Standards.*

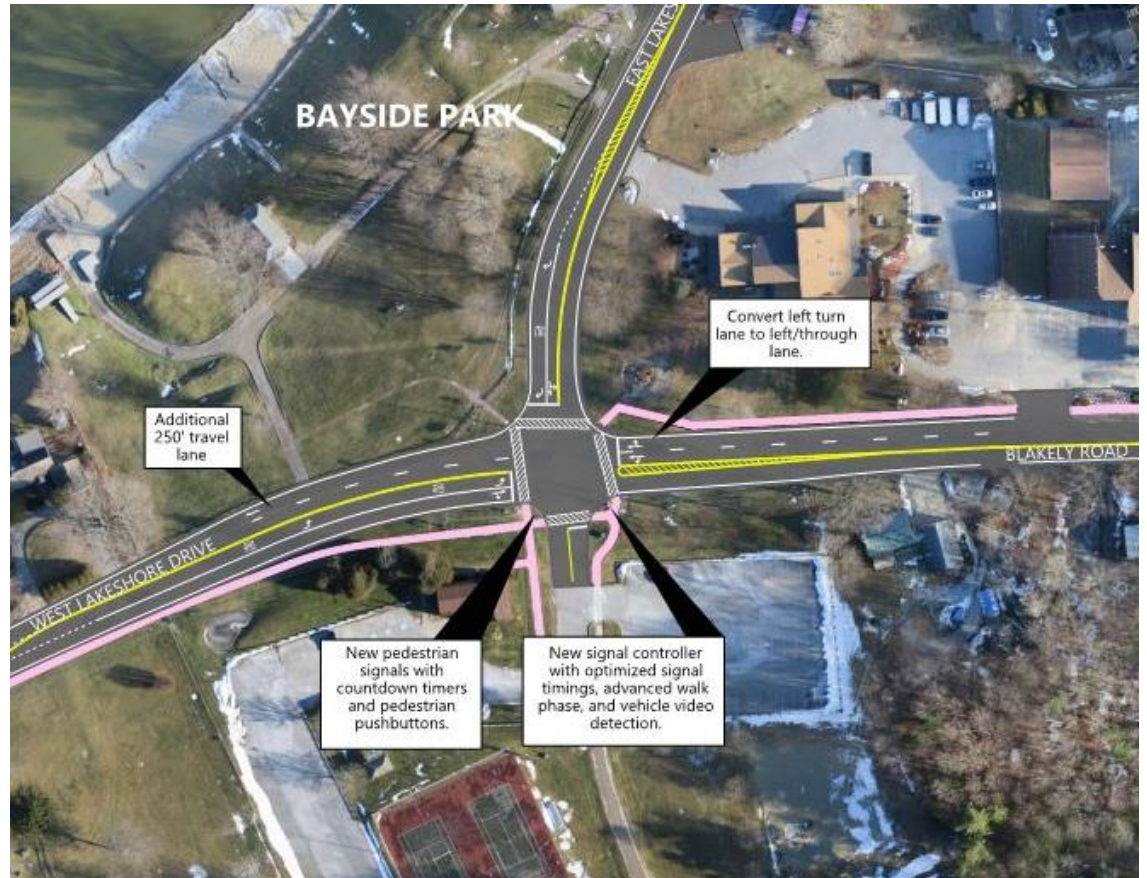




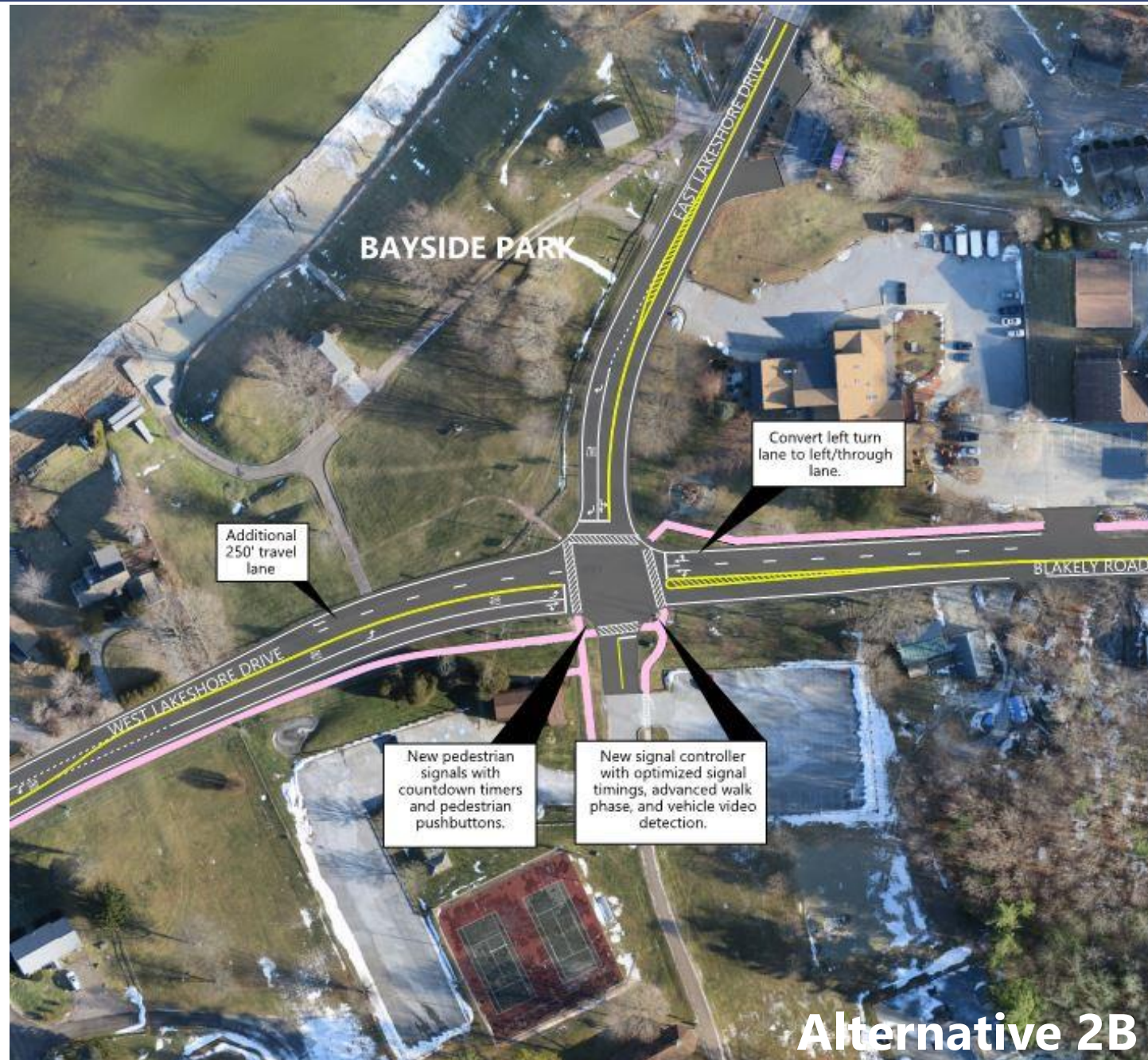
# Bayside Intersection Alternatives

## Alternative #2B – Operational and Geometric Modifications

- Convert Blakely Road left turn lane to left/through lane and continue through lane 250' beyond intersection. Optimize signal timing and provide advanced walk phase for pedestrians.
- **2037 PM Operations:** LOS C,  $v/c = 0.78$
- **Movements of Interest:**
  - Blakely Road NB Through: LOS C,  $v/c = 0.73$
  - W Lakeshore Drive SB Left: LOS E,  $v/c = 0.88$
- **Design & Construction Cost Estimate\*:**  
\$500,000
- **Safety:** Decreased for pedestrians during advanced walk phase.



*\*Cost Estimate includes \$300,000 in stormwater improvements to Meet standards. Additional \$400,000 to Exceed standards.*



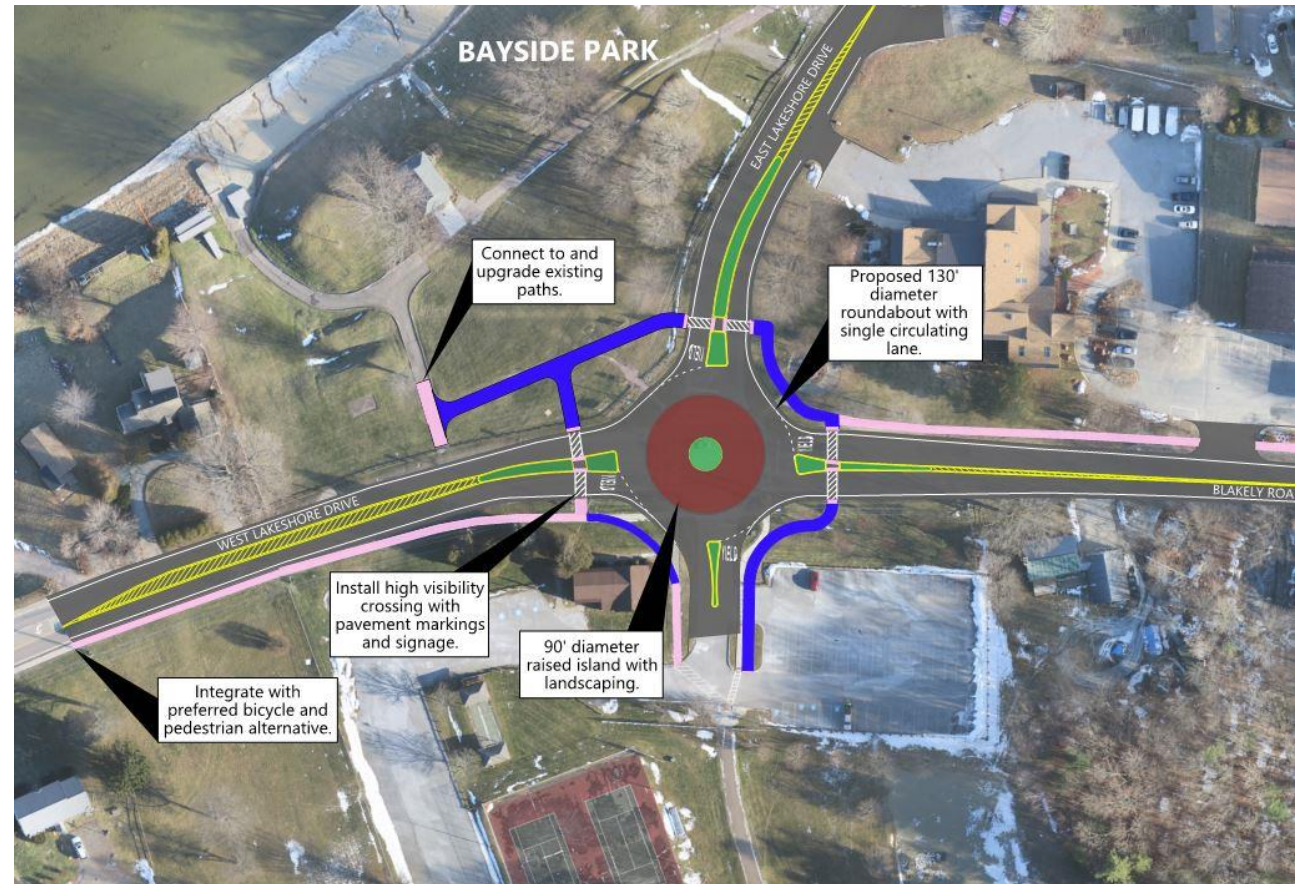
**Alternative 2B**



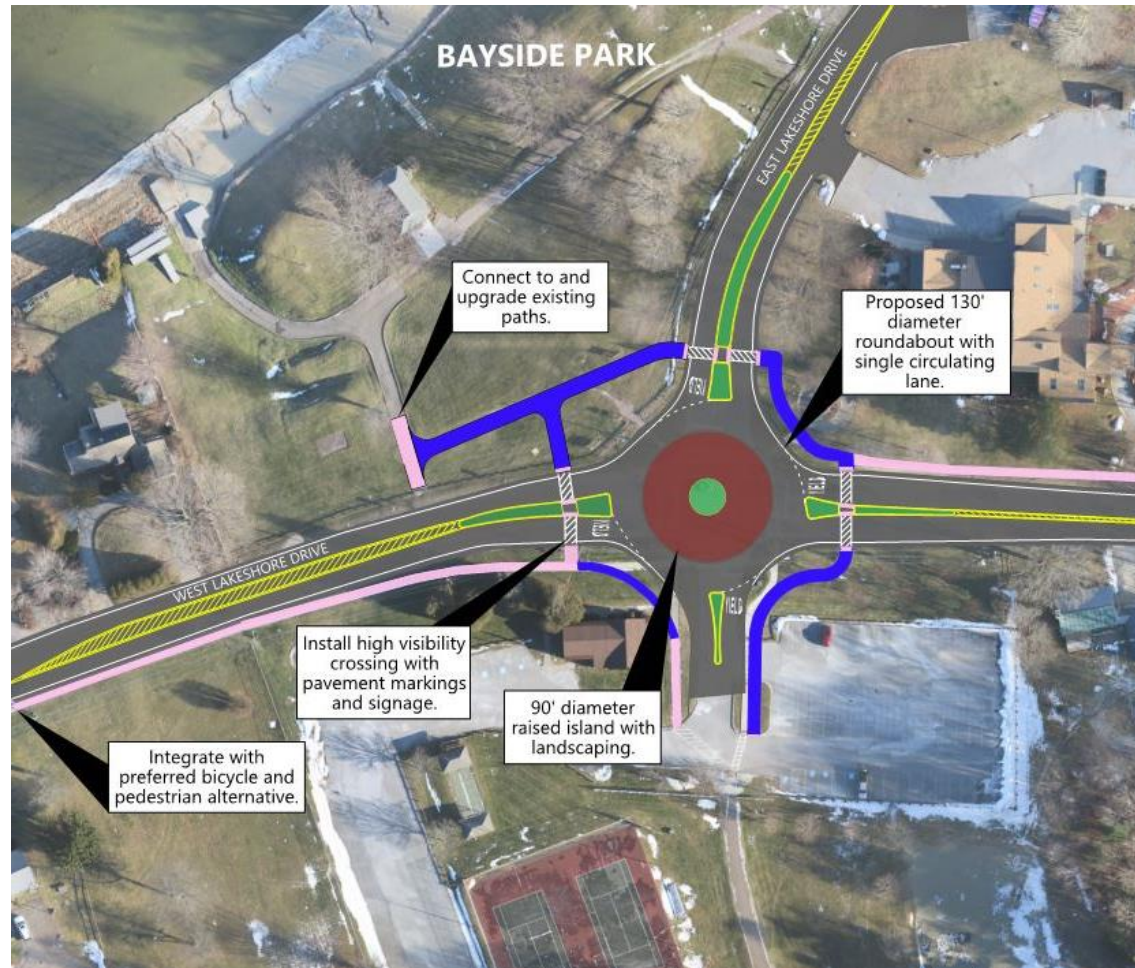
# Bayside Intersection Alternatives

## Alternative #3 - Roundabout

- Construct a single lane roundabout in place of the existing intersection.
- 2037 PM Operations: LOS A,  $v/c = 0.85$
- Movements of Interest:
  - Blakely Road NB Through: LOS B,  $v/c = 0.85$
  - W Lakeshore Drive SB Left: LOS A,  $v/c = 0.71$
- Cost\*: \$3,310,000
- Safety: Improved for all users



\*Cost Estimate includes \$300,000 in stormwater improvements to Meet standards. Additional \$400,000 to Exceed standards.

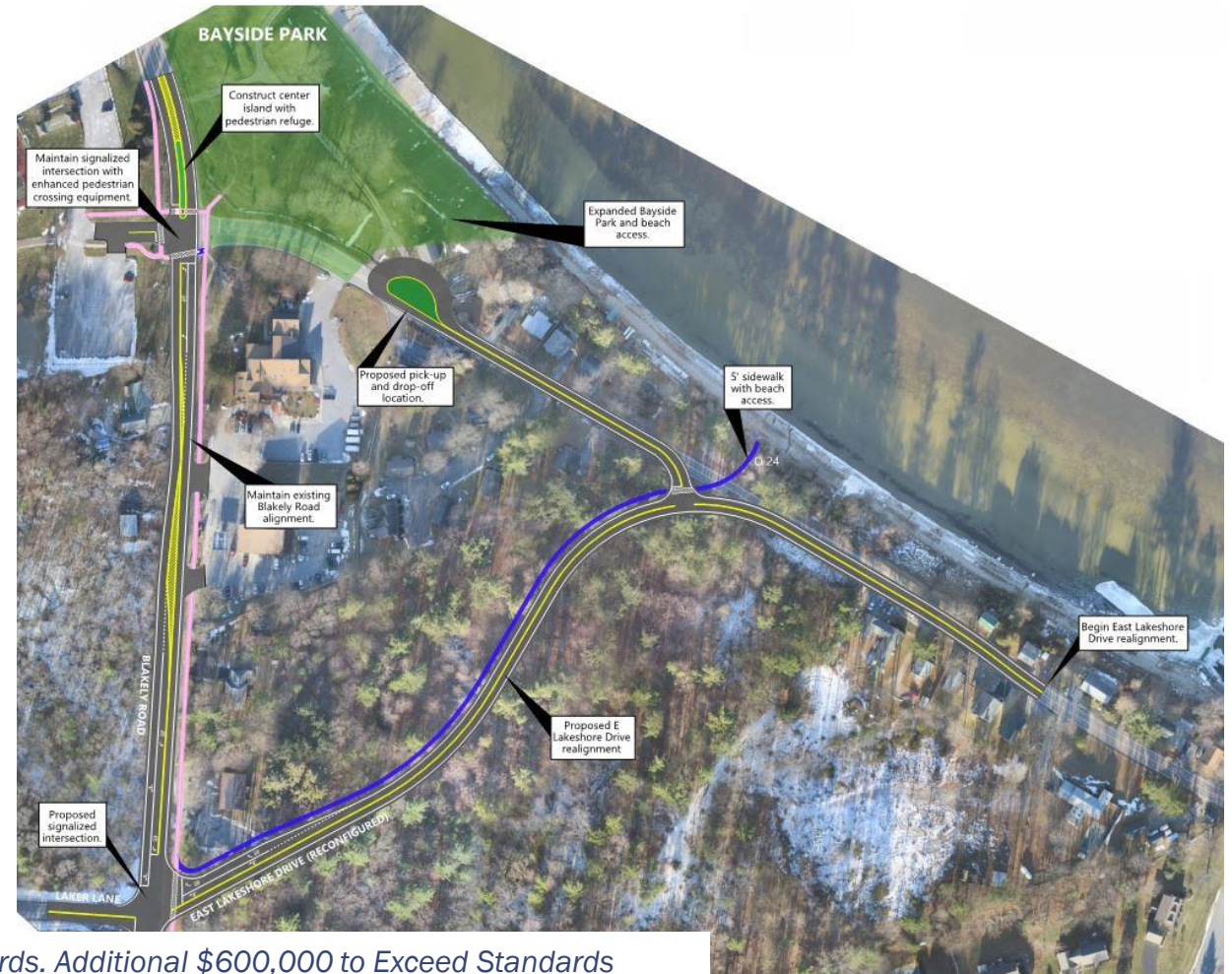




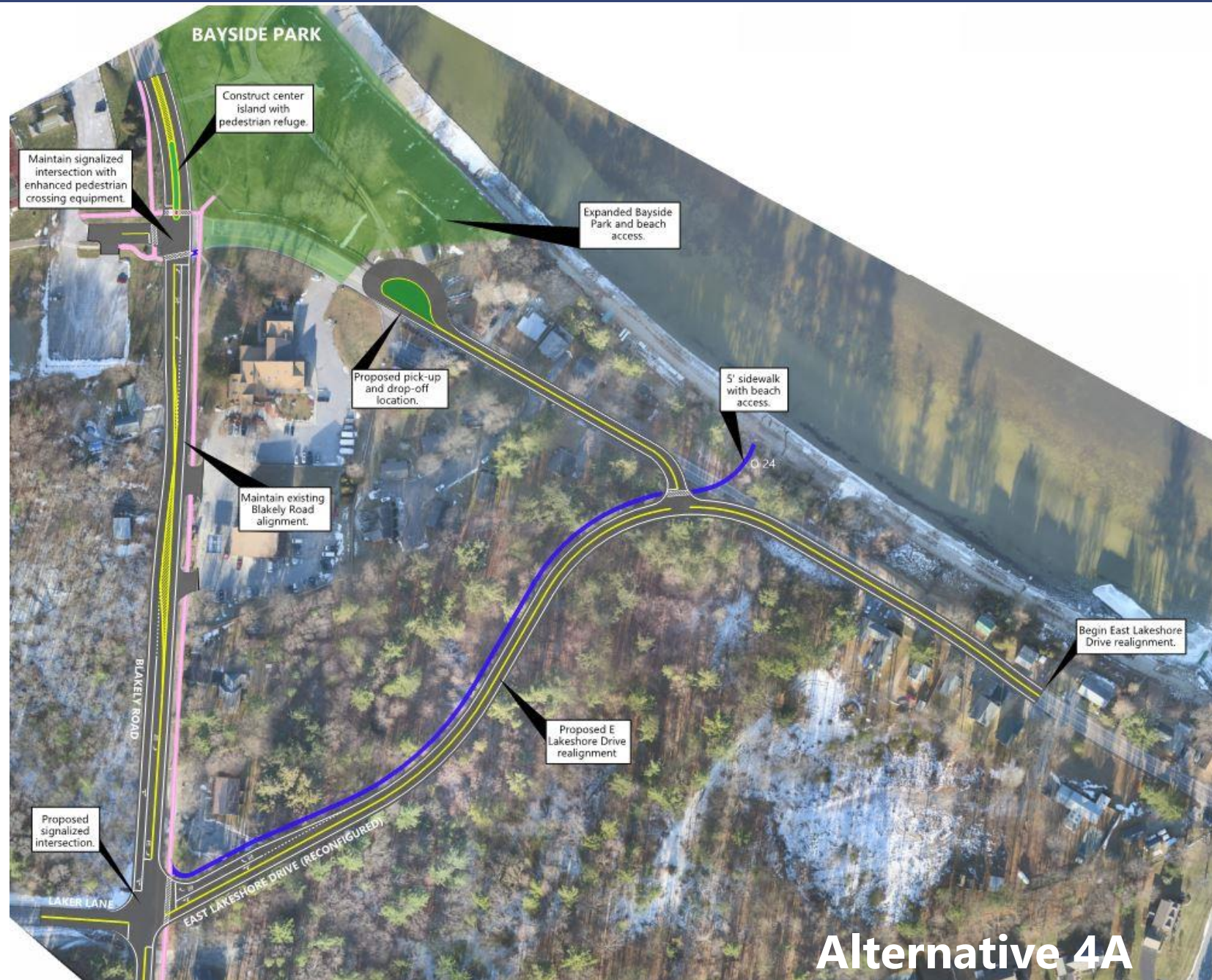
# Bayside Intersection Alternatives

## Alternative #4A – Dead End E Lakeshore Drive with Connector Road

- Dead End E Lakeshore Drive at Bayside Park and construct new road connecting at newly signalized intersection at Blakely Road and Laker Lane.
- **2037 Operations:**
  - Bayside Intersection (PM): LOS A,  $v/c = 0.81$
  - Blakely/Laker (AM): LOS B,  $v/c = 0.86$
- **Movements of Interest:**
  - Blakely Road NB Through: LOS A,  $v/c = 0.78$
  - W Lakeshore Drive SB Left: Does Not Exist
- **Cost\*:** \$2,940,000
- **Safety:** Improved for all users



\*Cost Estimate includes \$500,000 in stormwater improvements to Meet standards. Additional \$600,000 to Exceed Standards



Alternative 4A



# Bayside Intersection Alternatives

## Alternative #4B – Dead End E Lakeshore Drive

- Dead End E Lakeshore Drive at Bayside Park with no new connector road.
- 2037 PM Operations: LOS A,  $v/c = 0.81$
- Movements of Interest:
  - Blakely Road NB Through: LOS A,  $v/c = 0.78$
  - W Lakeshore Drive SB Left: Does Not Exist
- Cost\*: \$930,000
- Safety: Improved for all users



\*Cost Estimate includes \$500,000 in stormwater improvements to Meet standards. Additional \$600,000 to Exceed Standards



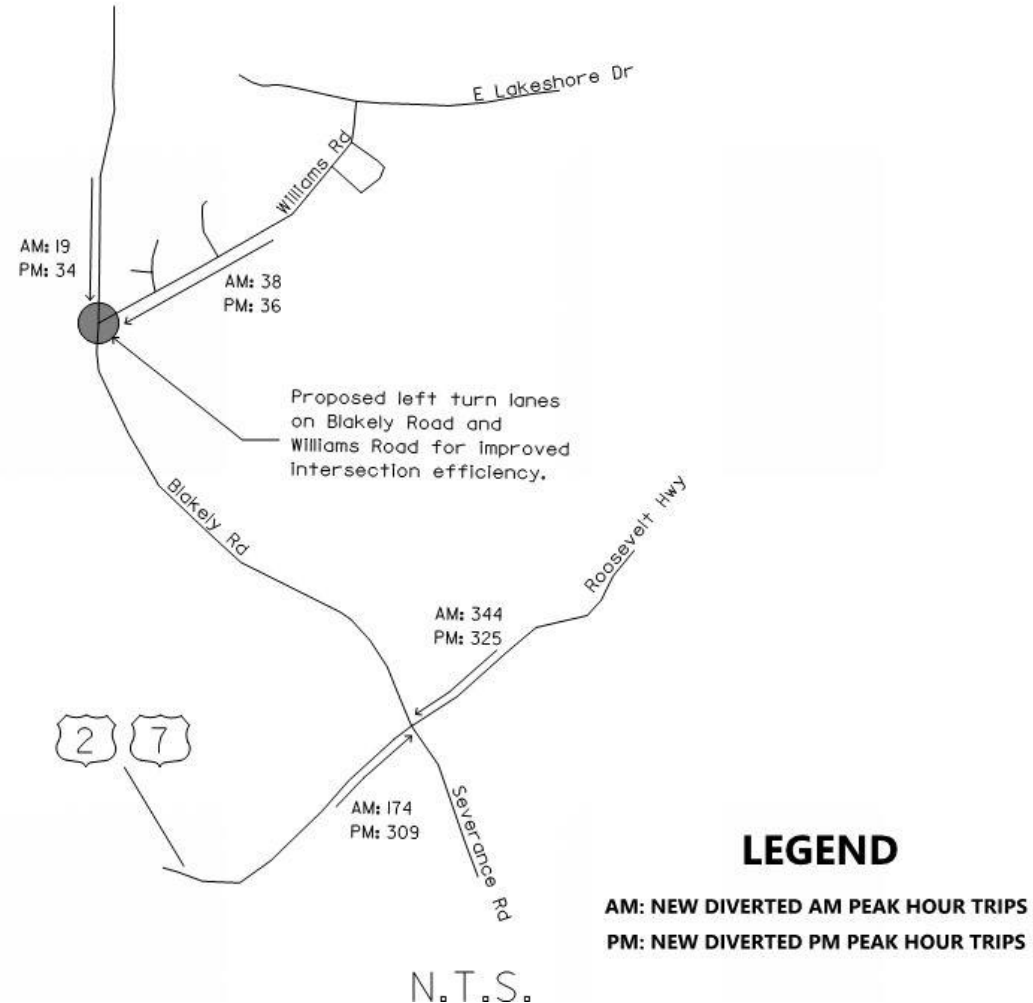
**Alternative 4B**



# Bayside Intersection Alternatives

## Alternative #4B – Dead End E Lakeshore Drive

- Additional PM Peak Hour Trips:
  - Blakely Rd/Williams Rd – 70 trips
  - Severance Corners – 634 trips
- Proposed left turn lanes on Blakely Road SB and Williams Road WB to accommodate additional trips
- **2037 PM Operations**
  - Williams Rd: LOS D,  $v/c = 0.46$
  - Severance Corners: LOS E,  $v/c = 1.40$



# Bayside Intersection Alternatives

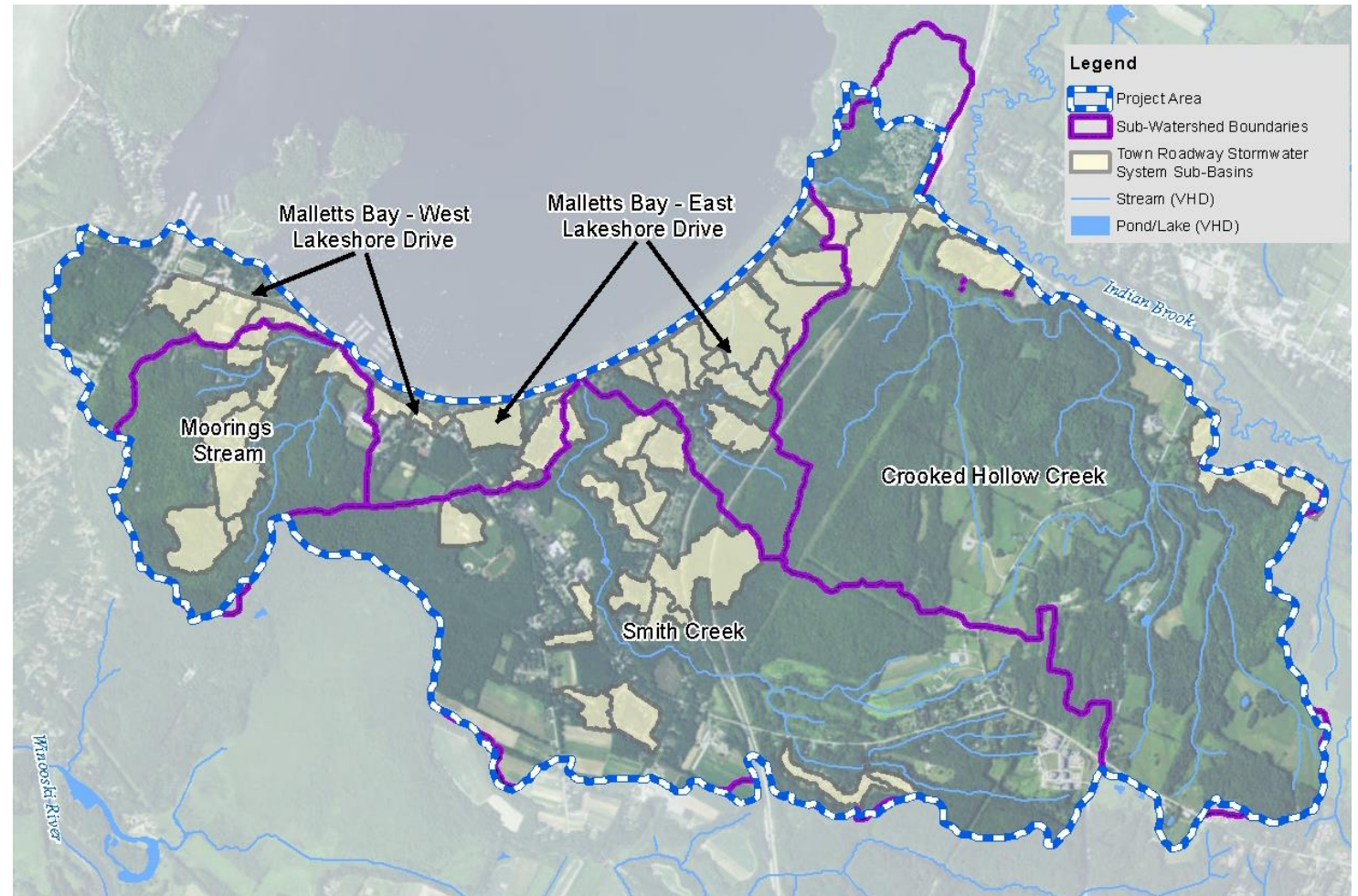
## Evaluation Matrix Summary

Evaluation Metric	Alt. 1 No Build Alternative	Alt. 2A Operational Modifications @ Blakely & Lakeshore	Alt. 2B Operational & Geometric Modifications @ Blakely & Lakeshore	Alt. 3 Roundabout @ Blakely & Lakeshore	Alt. 4A Dead End E Lakeshore and New Connector Road	Alt. 4B Dead End E Lakeshore with No Connector Road
Cost	👎	+	+	-	-	+
Intersection Operations	- -	- -	👎	+	++	++
Pedestrian/Bicyclist Safety	👎	-	-	+	++	++
Vehicle Safety	👎	👎	👎	+	+	+
Utility / ROW Impacts	👎	👎	-	- -	- - -	- -
Environmental Impacts	👎	👎	+	+	+	+
Stormwater Accommodations	- -	👎	- -	👎	👎	- - -
Community Impacts	👎	👎	👎	+++	+	- - -
Satisfies Purpose & Need	- - -	+	+++	+++	+++	+++
Permit Needs	👎	+	+	+	+	+

# Stormwater Management

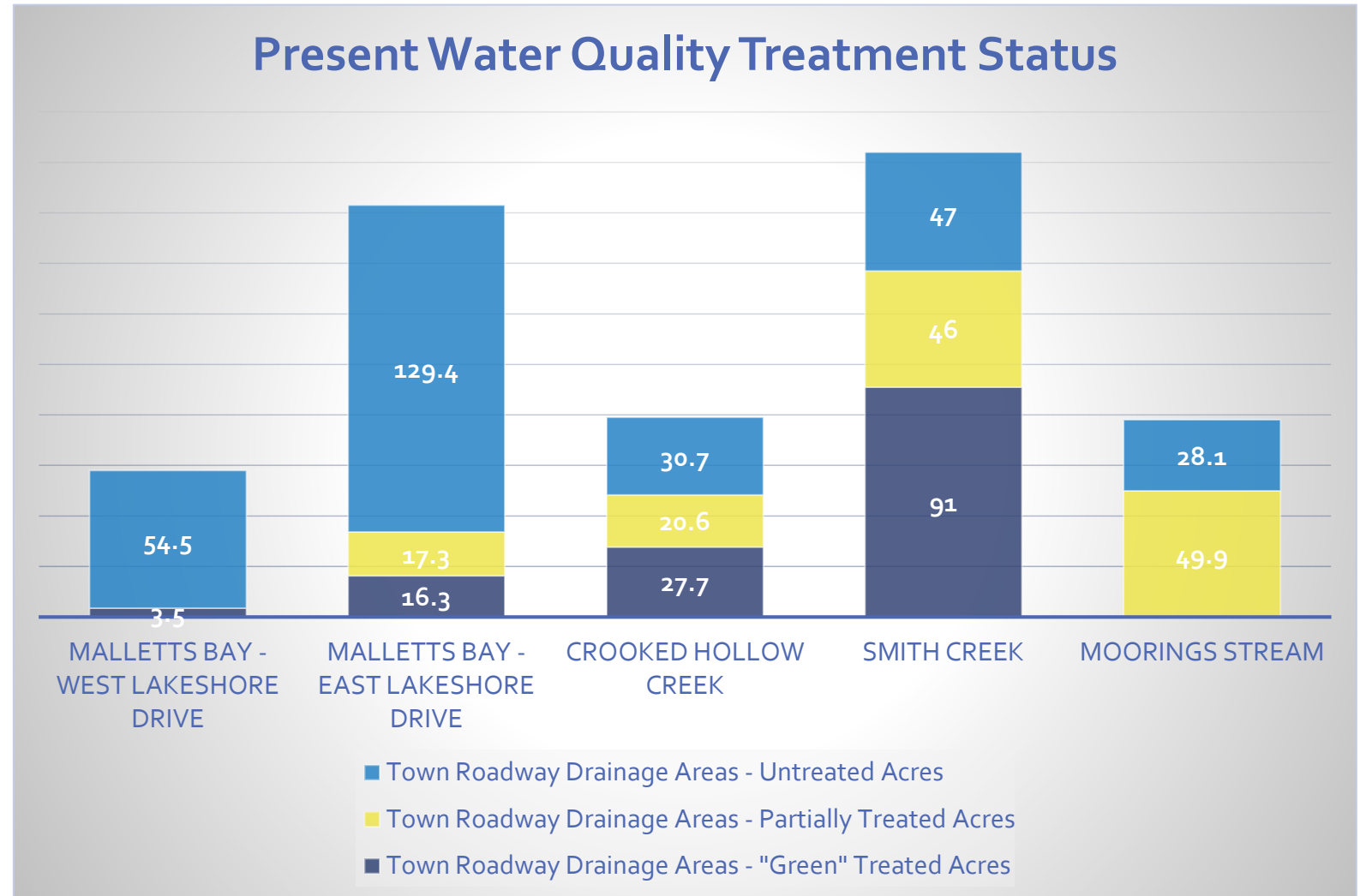
- Purpose

- Reduce damage on public roadways and private property due to inadequate management of stormwater on town-owned roadways
- Reduce volumes of stormwater, sediment, and phosphorus discharged from roadways to Malletts Bay



# Existing Conditions

- 16% of the total project area (562 acres) drains to one of 49 Town roadway drainage systems.
- Of that, 139 acres (25%) are treated using “green” or other infiltration-based practices.



# Stormwater Alternatives

- **Meets Standards:**
  - Improve basic roadway drainage issues along East and West Lakeshore Drives
  - Provide water quality treatment for runoff along these corridors and for runoff reaching Town roadway closed drainage systems in upland areas
  - Coordinate with other planned infrastructure projects along the corridors
- **Exceeds Standards:**
  - Maximize water quality treatment wherever practicable, above and beyond Meeting Standards



Gravel wetland, end-of-pipe practice for redevelopment, Burlington, VT



Linear subsurface gravel wetland, end-of-pipe retrofit, Durham, NH



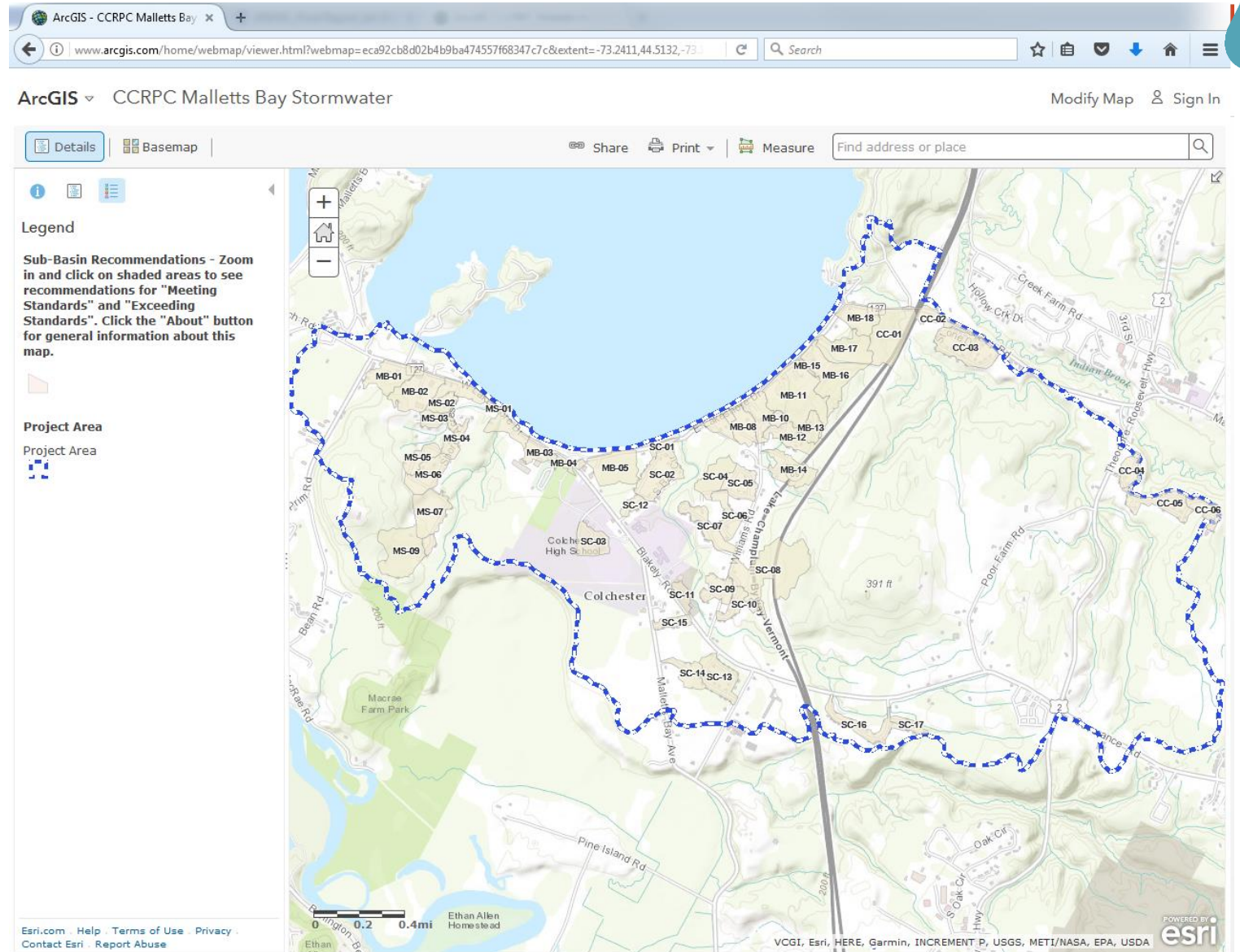
Curb cut bioretention, residential street retrofit, St. Paul, MN



Bioswale, redevelopment for recreational path, skate park, and parking, Burlington, VT

# What's Proposed in Your Area?

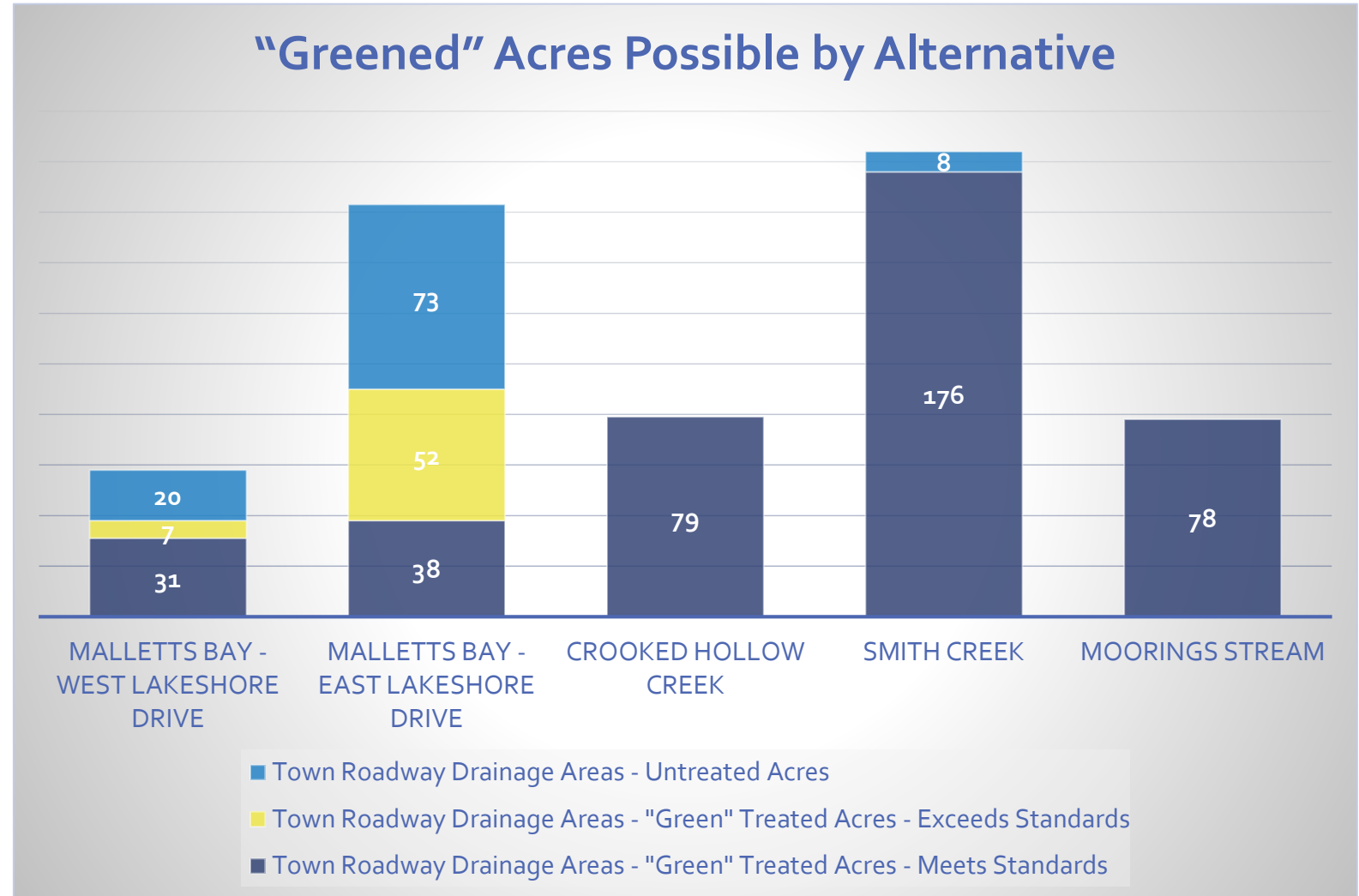
- Web map of detailed recommendations for all 49 sub-basins, with costs and phosphorus removal benefits, is available: <http://arcg.is/maiOX>





# “Greened” Acres By Alternative

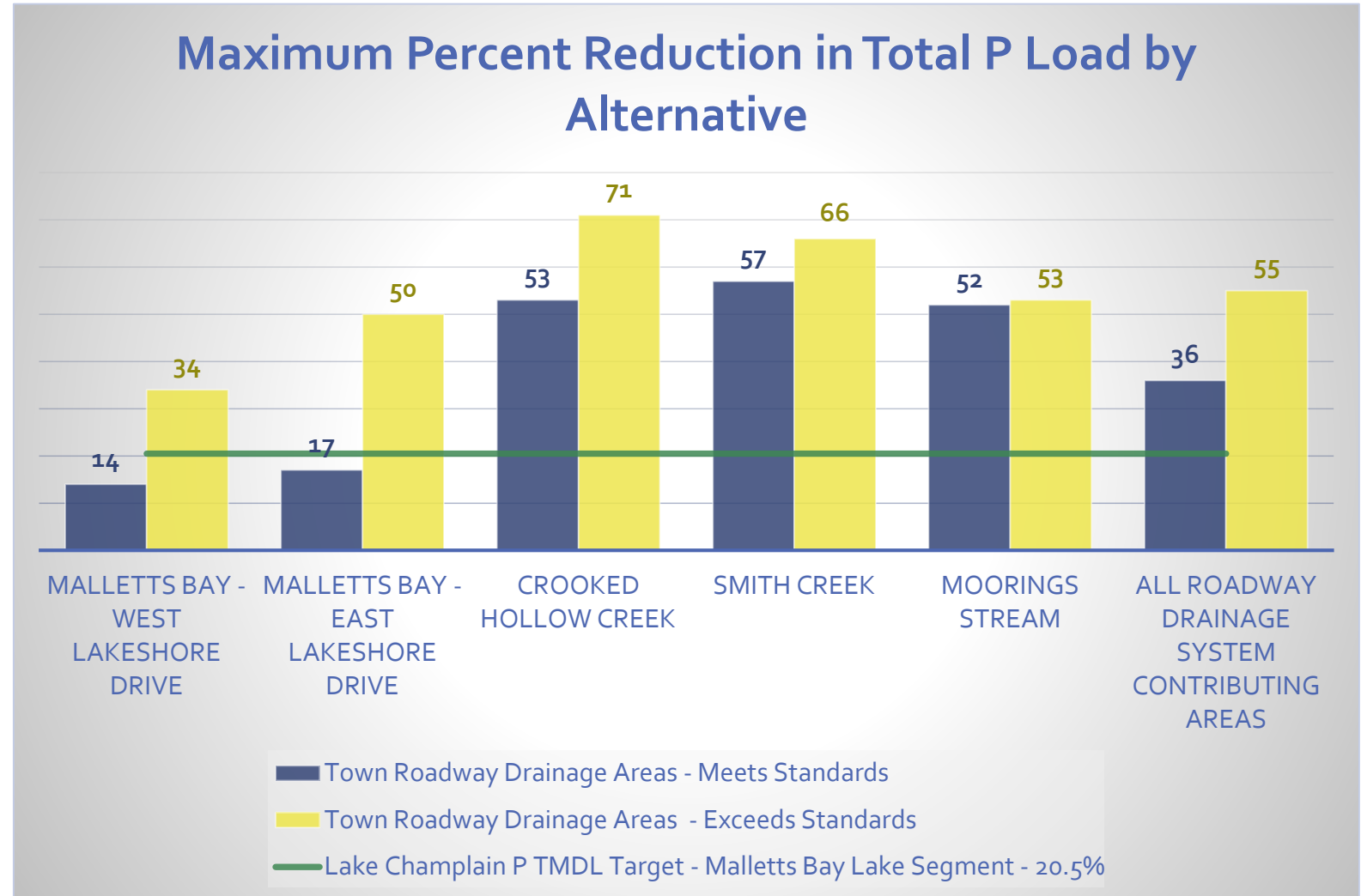
- Along East and West Lakeshore Drives, what can be “greened” is constrained.
- Upland watersheds have more right-of-way area for treatment retrofits.
- ~70% of Town roadway drainage area can be “greened”.





# P Reductions by Alternative

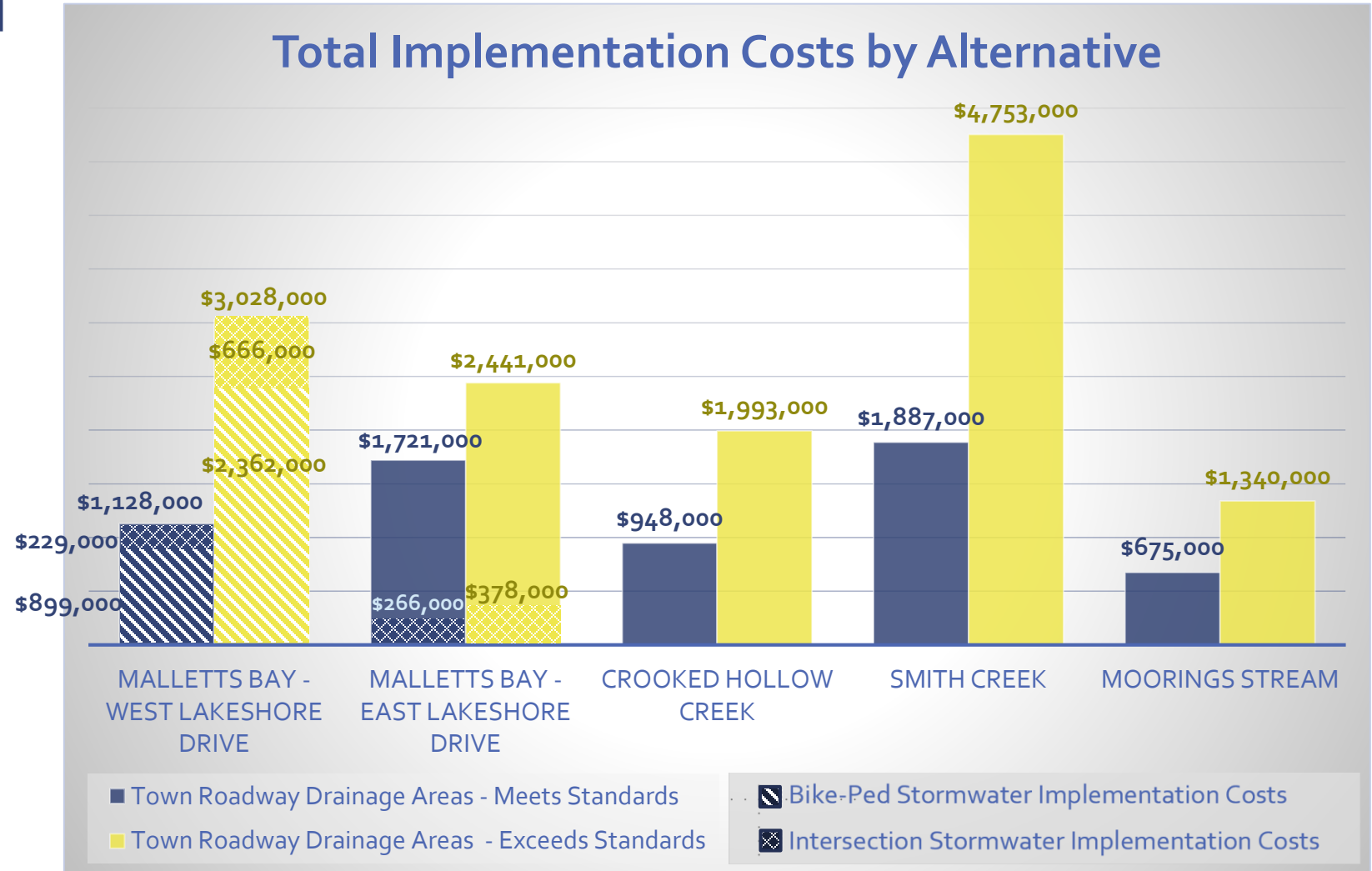
- Maximum possible phosphorus (P) reductions are higher than Lake Champlain P Total Maximum Daily Load (TMDL) targets for roadway drainage systems contributing runoff to Malletts Bay.





# Implementation Costs

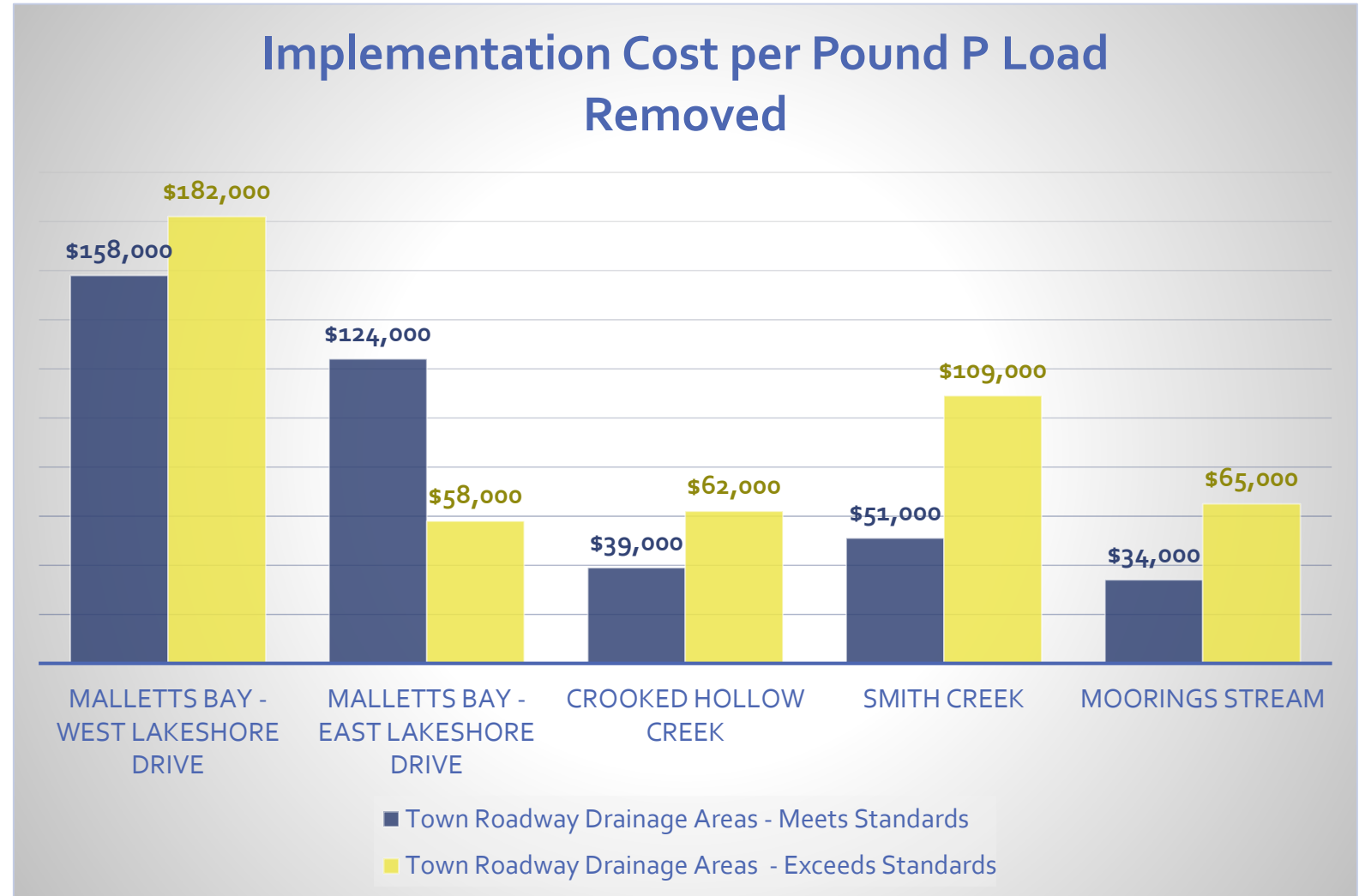
- Total costs if ALL recommendations are implemented:
  - Meets Standards - \$6,400,000
  - Exceeds Standards - \$13,600,000





# Phosphorus Cost-Benefit

- Implementation cost per pound P load removed if ALL recommendations are implemented:
  - Meets Standards - \$62,000/lb P
  - Exceeds Standards - \$87,000/lb P



# Next Steps

- Preferred Alternative Identification
  - *End of September/Early October*
- Selectboard Presentation – Selection of Preferred Alternatives
  - *October 10<sup>th</sup>*
- Final Scoping Report
  - *Early November*



# We Want Your Feedback!

Our online survey will be available until September 29<sup>th</sup> – please go online and submit your thoughts on our alternatives:

<https://www.surveymonkey.com/r/MBIScoping>

Don't forget to check out our project website to stay up to date on project meetings and materials:

<http://www.ccrpcvt.org/our-work/transportation/current-projects/scoping/malletts-bay-initiative-stormwater-transportation-project/>

