

**BROWARD MPO**

# **Hollywood Boulevard Transportation Resiliency Framework Study**

# AGENDA

- 1. Project Introduction**
- 2. What we heard from the community (Survey results)**
- 3. Small Group Discussion**
  - Proposed Design Alternatives
  - Preference for Safety & above ground improvements
- 4. Next Steps**

# WHAT IS THE MPO?

- ❑ The Broward MPO is **federally mandated public agency**
- ❑ The Broward MPO is responsible for **making policy on local transportation issues** and deciding how to **collaboratively spend federal money** on important transportation projects.
- ❑ MPO Board - **Elected officials** who represent the **Broward County Board of County Commissioners**, our **31 Broward municipalities**, the **South Florida Regional Transportation Authority (SFRTA/Tri-Rail)**, and the **School Board of Broward County**.

## Mission:

**To collaboratively plan, prioritize and fund the delivery of diverse transportation options.**

## Vision:

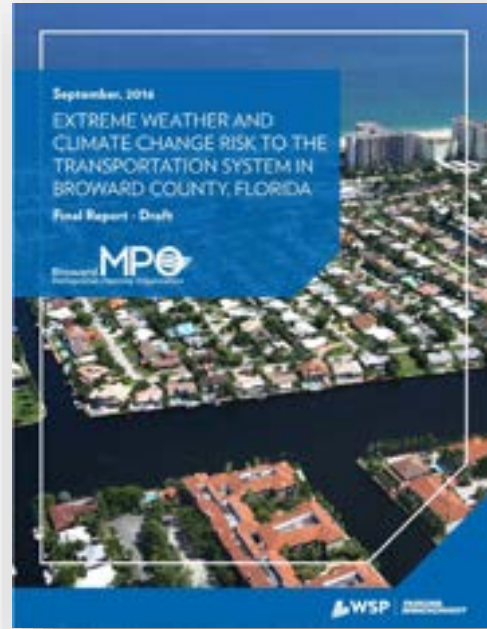
**Our work will have measurable positive impact by ensuring transportation projects are well selected, funded and delivered.**



# PREVIOUS RESILIENCY EFFORTS & THE 2045 MTP



2015

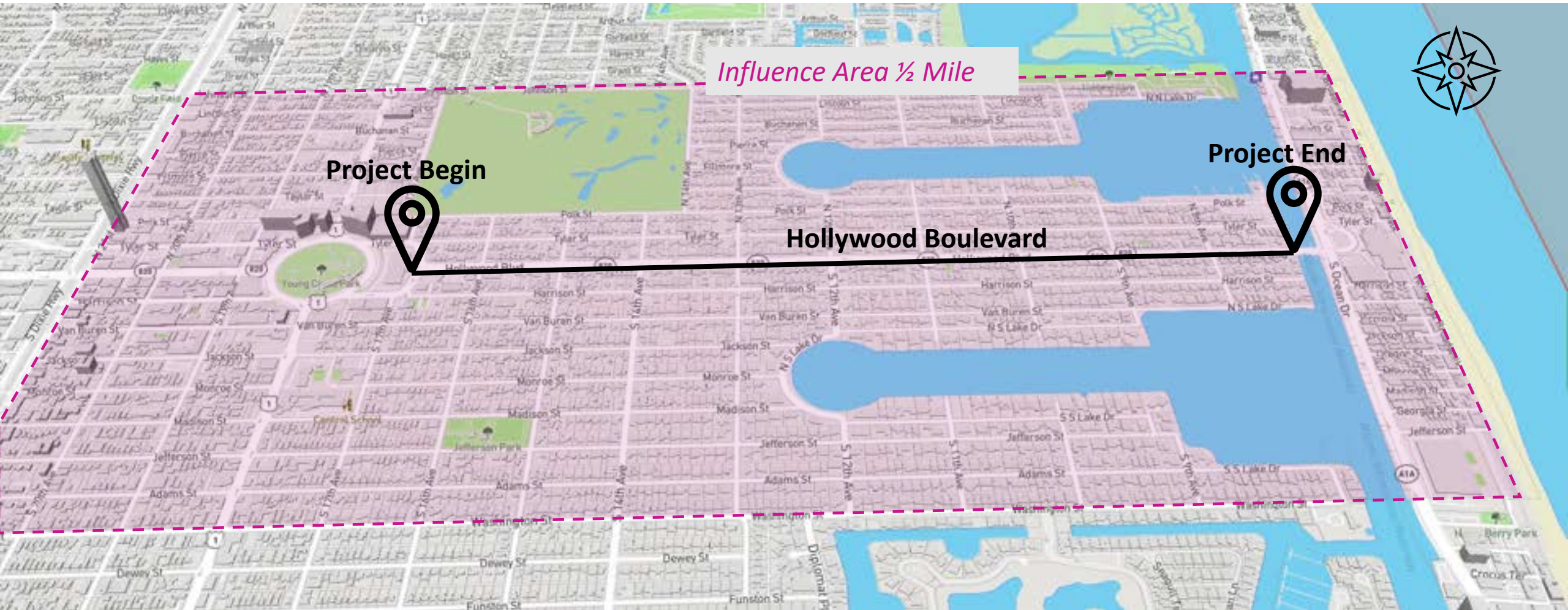


2016



2045 Metropolitan Transportation Plan (MTP)

# HOLLYWOOD BOULEVARD

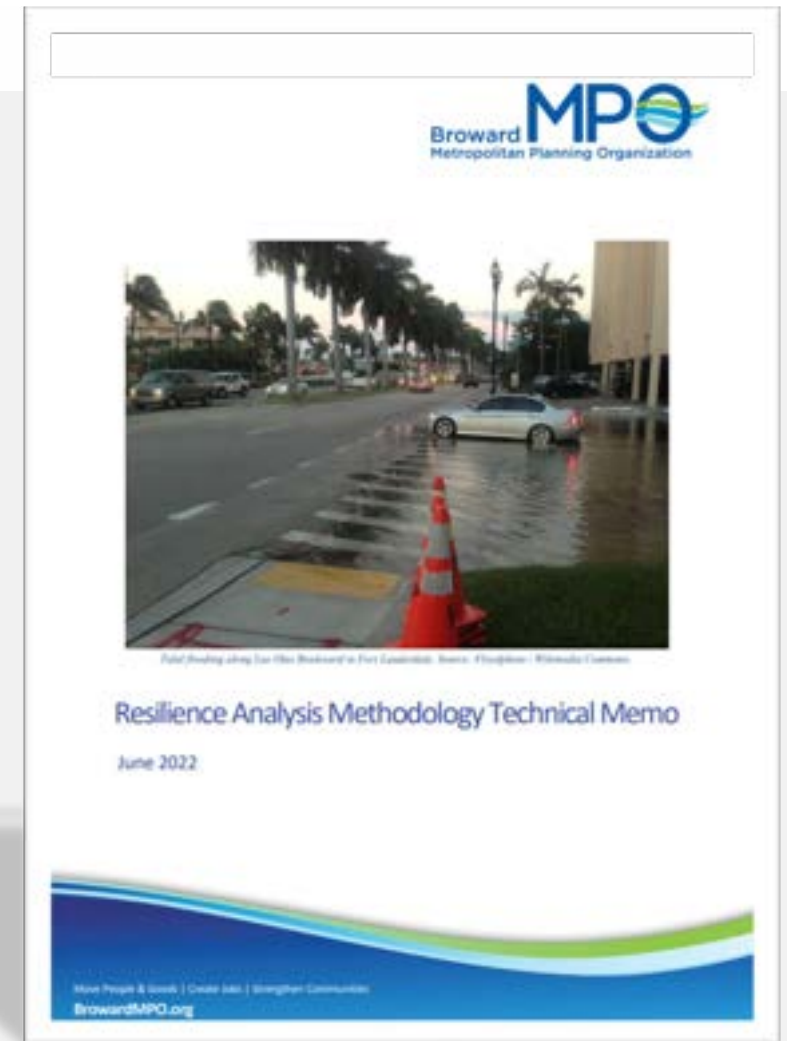




# RESILIENCY FRAMEWORK

Develop a framework to further enhance transportation resilience, identify and address network vulnerabilities from climate change, and to support incorporation of preparedness into project planning, design, and construction.

Enhance and further incorporate transportation resiliency into the MPO's 2050 Metropolitan Transportation Plan (MTP) and the future efforts of our partners.

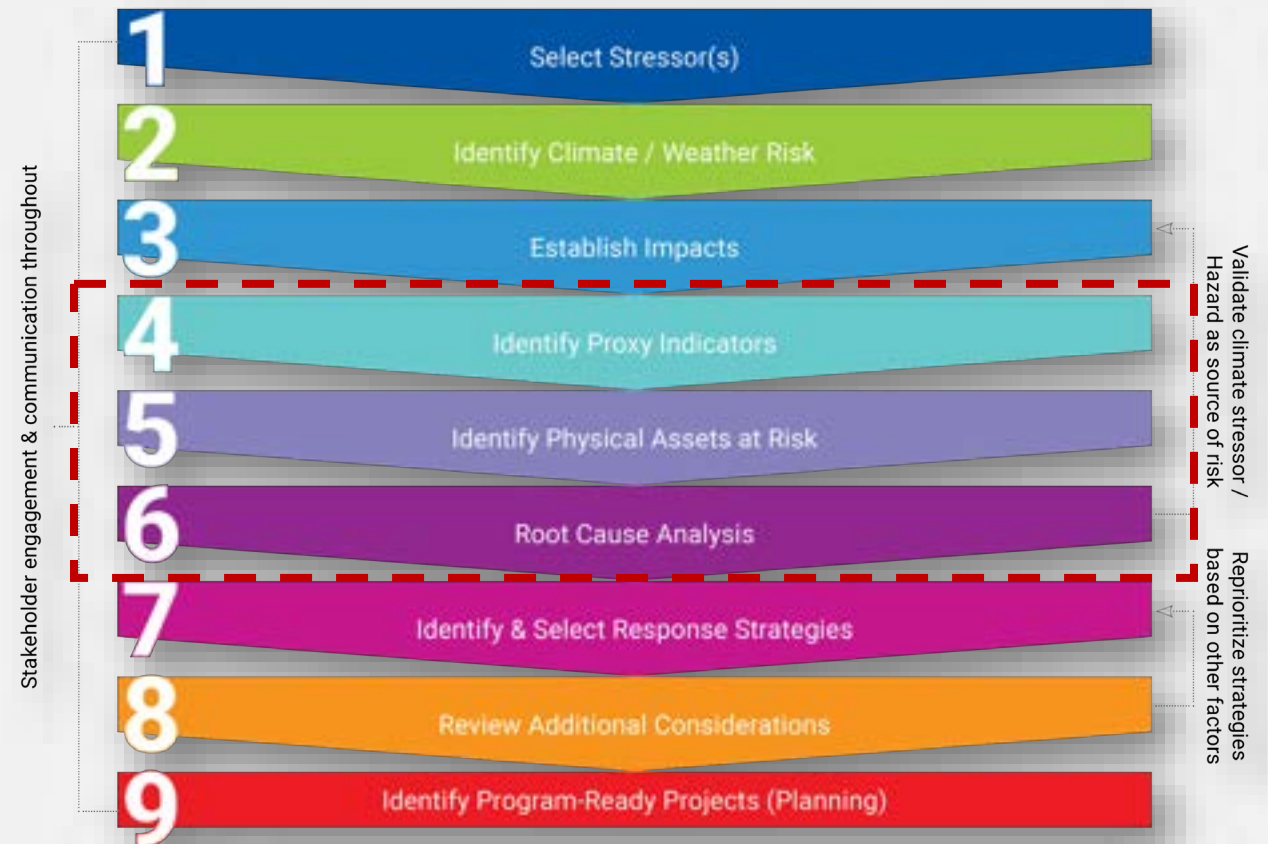


# THE WHAT

## Review and discuss the MPO's 9-step Transportation Resiliency Framework

- Repeatable and systematic process that identify, assess, and respond to risks to transportation-related infrastructure.
- Innovative approach to transportation planning, that takes a holistic perspective by examining the surrounding “influence” area of a corridor, and considering the impact on non-traditional factors, such as socioeconomics and land use.

### Steps to be conducted in this phase:



# PROJECT PHASES

Develop a constructable master plan based on community input.





# PROJECT SCHEDULE

**Meeting #1: Community Goals and Identification of Issues / Concerns**

**Meeting #2: Presentation of Conceptual Alternatives  
Community Feedback**

**Meeting #3: Presentation of Preferred Conceptual  
Alternative / Community Feedback / "Buy-in"**

2023

2024

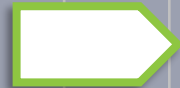
Major Tasks

Month

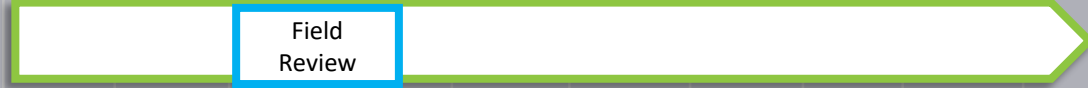
Week

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May

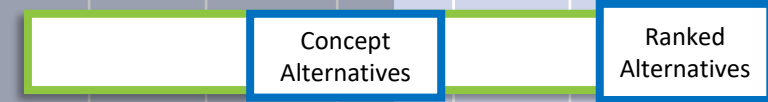
Kickoff: Consultant & City



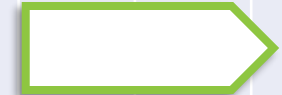
Data Collection & Analysis



Conceptual & Pre-design  
Project Development



Planning-level Cost Estimates



Community Outreach



# PROJECT PROCESS

Centered with community and stakeholder engagement

## PROJECT STEPS (using the BMPO framework)

### STEP 1-3: Understand Climate Risk

Look to the Future to Generate Data, Assess Impacts and Consequences

### STEP 4-6: Develop Resilient Design Alternatives

Assess Lifecycle Performance for Design Alternates in Future scenarios

### STEP 7-9: Identify Cost-Feasible Design, Supporting Strategies

Use Metrics to Select the Preferred Design Alternative

## COMMUNITY ENGAGEMENT

Public Meeting #1 [November 8, 2023]  
Understand Adaptation Preference

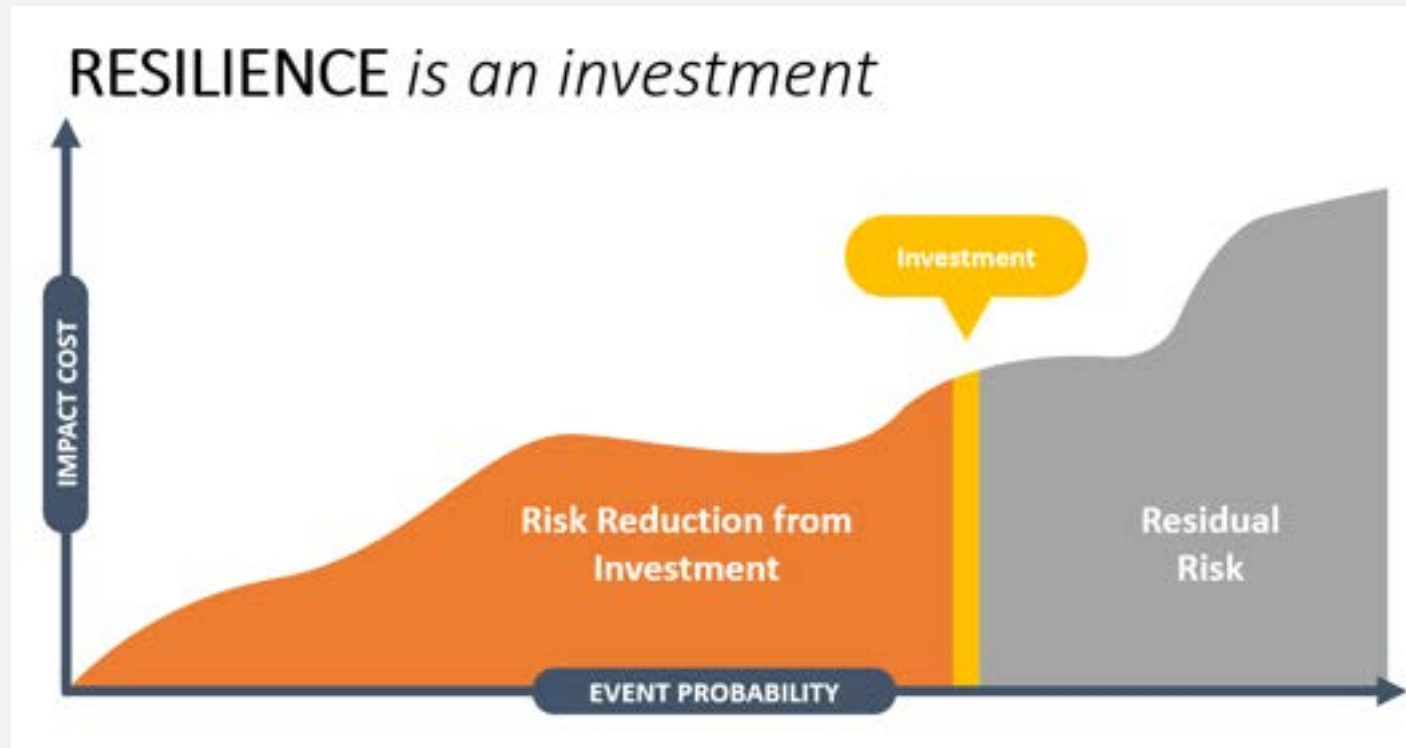
Public Meeting #2: [Today's session]  
Feedback on Identified Design Alternatives

Today!

Public Meeting #3:  
Feedback on the Preferred Alternative

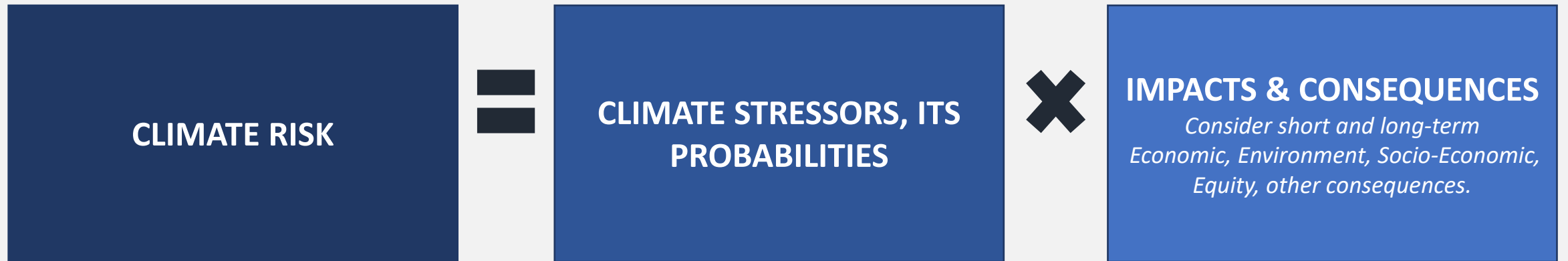
# PROJECT PROCESS

WHY? Understanding climate risk helps investment decision-making

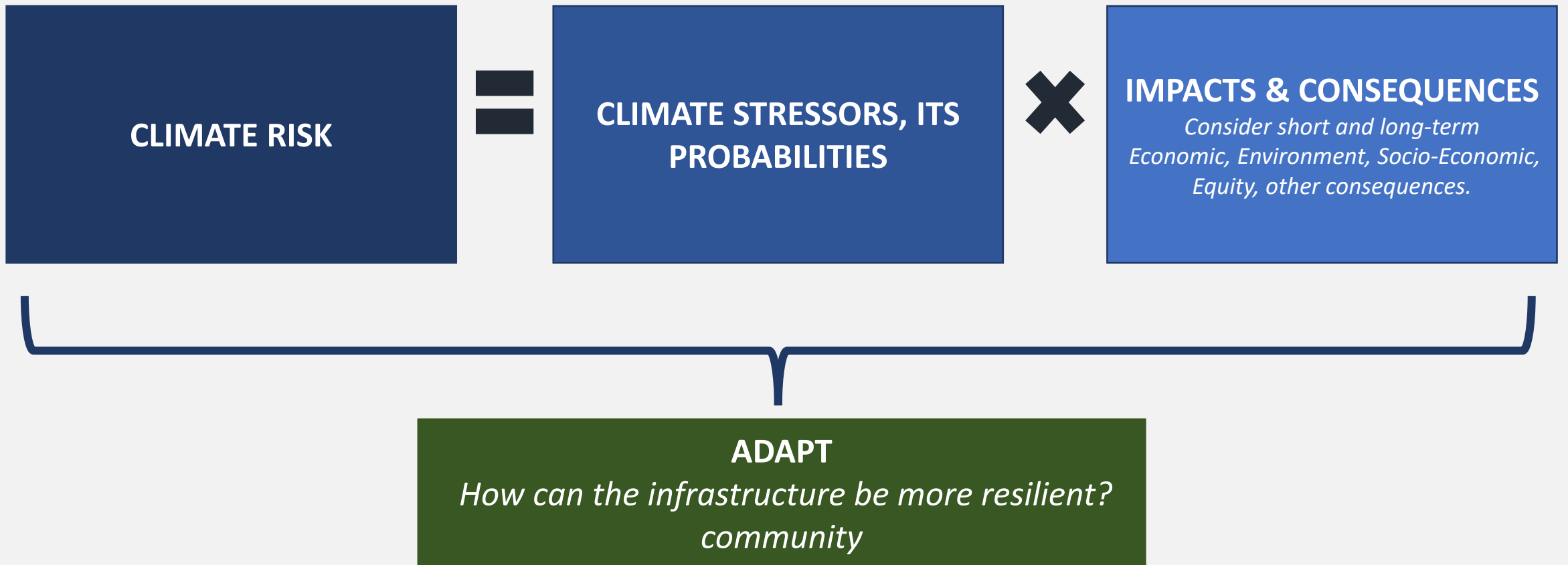




# STEP 1-3: UNDERSTAND (QUANTIFY) CLIMATE RISK



# STEP 4-6: DEVELOP RESILIENT DESIGN ALTERNATIVES



# CLIMATE STRESSORS

In Hollywood Lakes area, the stressors are:

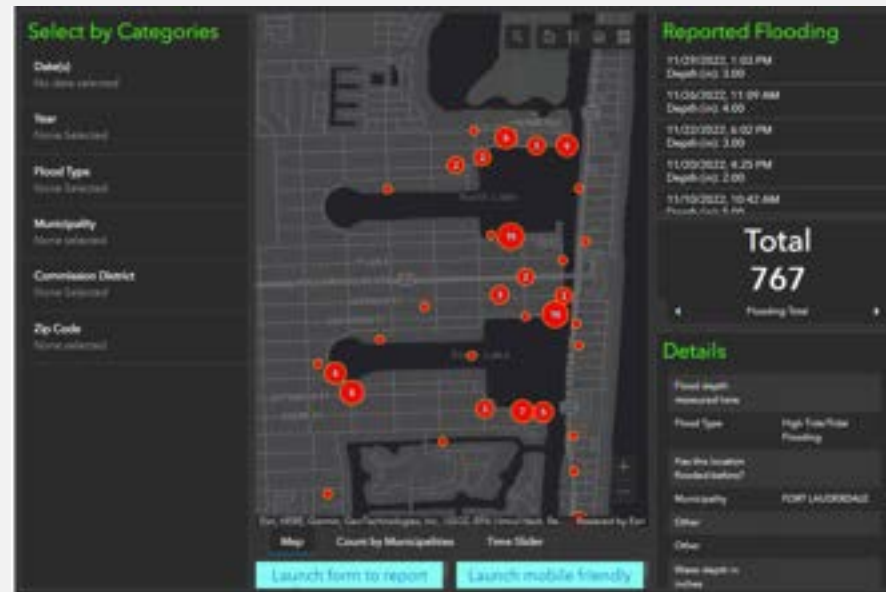
## Flooding

- Sea Level Rise
- Extreme Precipitation
- Storm Surge after hurricane
- High Tide, King Tide
- Groundwater Elevation

## Others

- Extreme Heat & Humidity
- Extreme Wind

## Community Reported Flooding



Source: Broward County Resilience Dashboard



KING TIDE & RAIN. October 15, 2017. Hollywood Boulevard.



KING TIDE. October 15, 2016. Hollywood Lakes Neighborhood.



EXTREME RAIN. Dec 23, 2019. Hollywood Lakes Neighborhood.



# PROBABILITY

- **Return period:** “Describes how likely a hazard event is to occur at, or above, a specific intensity within a time frame defined by a probability.”

$$AEP = \frac{1}{Return\ Period}$$

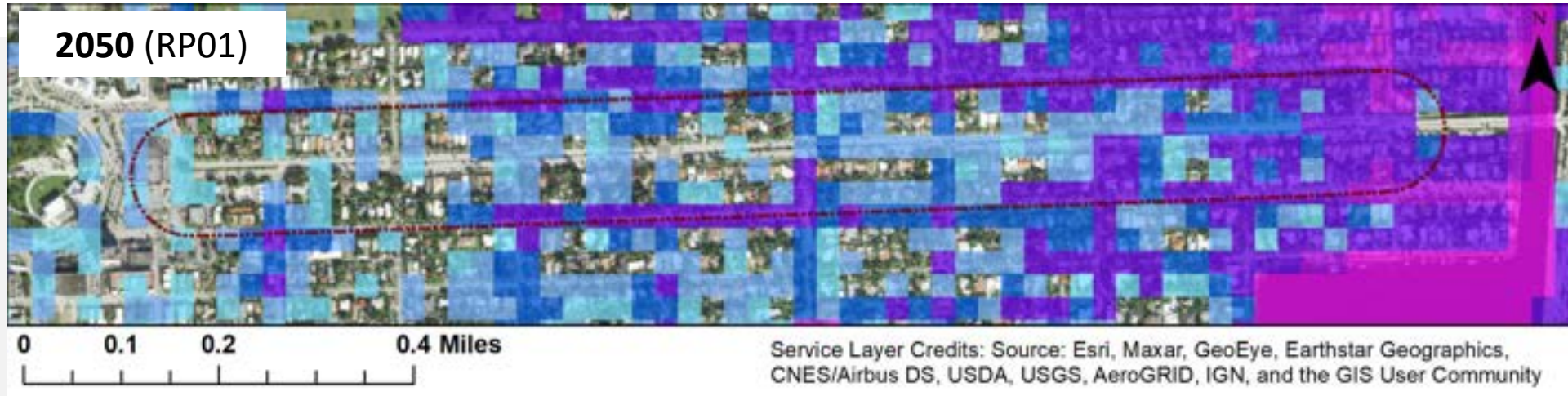
- A given flood depth in the 10-year return period event, has an annual chance of 10% (1/10) of being exceeded.

[A "100-Year Flood" doesn't only happen once every 100 years. | GFDRR](#)

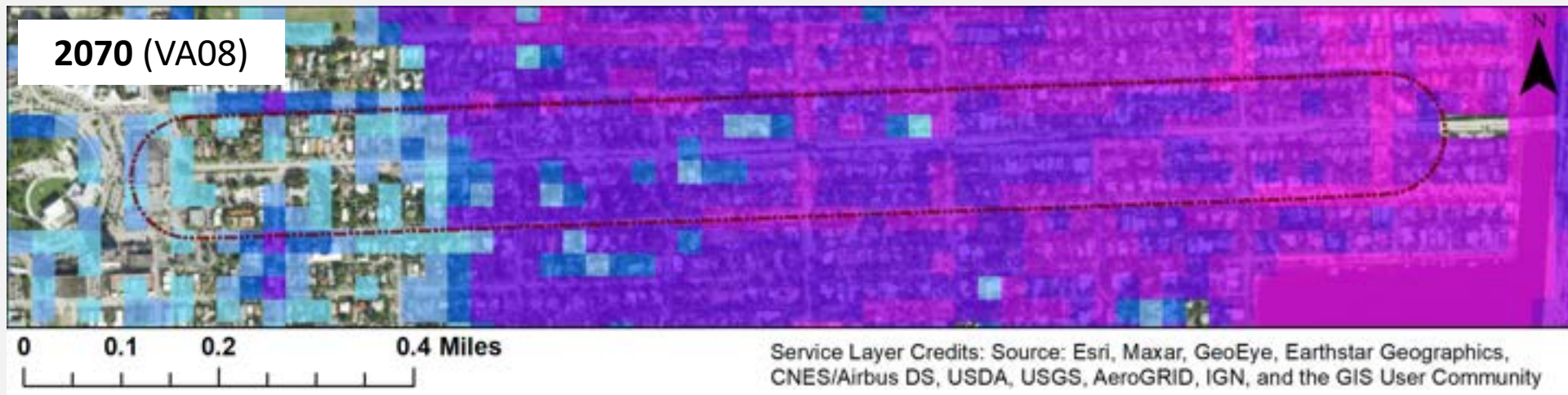


# LIKELY IMPACTS FROM FLOODING EVENTS

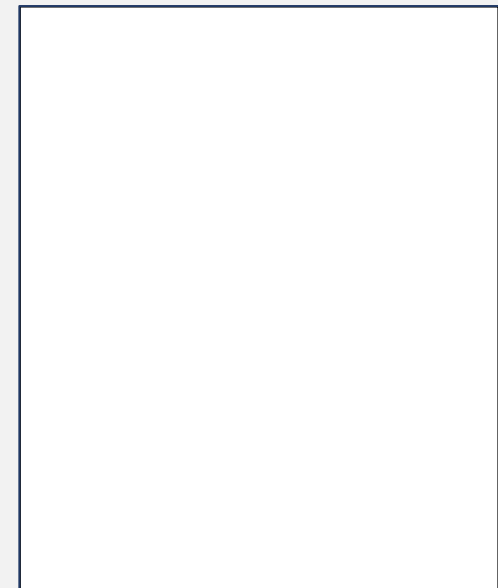
2050 (RP01)



2070 (VA08)



Rainfall	25-year
Tidal Conditions	King Tide
Storm surge	-





# CONSEQUENCES

**Hollywood Boulevard is a designated evacuation route, serving the Lakes and the Beaches.**

- Detours within the neighborhood are limited as most local streets will likely be flooded too.
- So, emergency vehicles may be disrupted frequently, and for extended time periods.

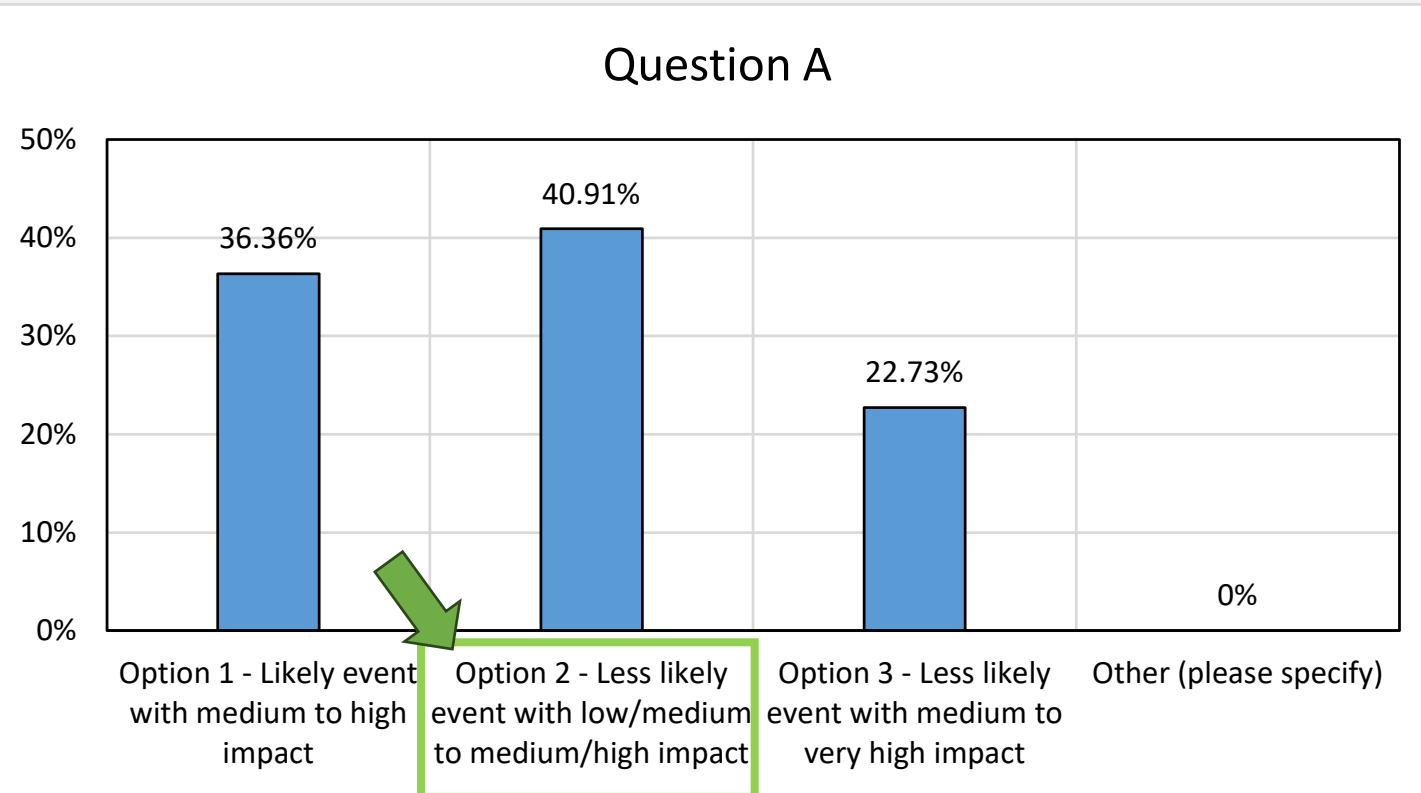
Source: <https://www.broward.org/Hurricane/pages/evacuationroutes.aspx>



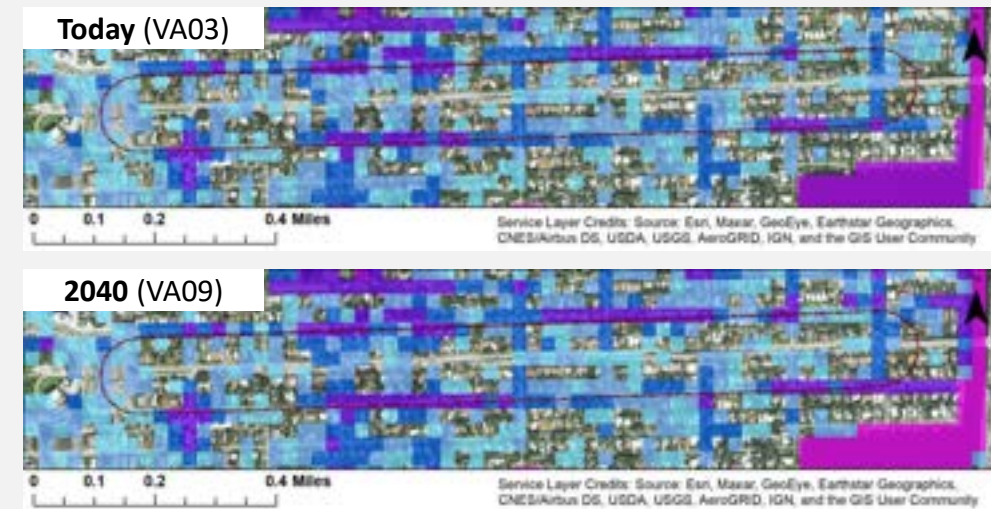


**COMMUNITY FEEDBACK FROM  
PUBLIC MEETING # 1  
NOV 8, 2023**

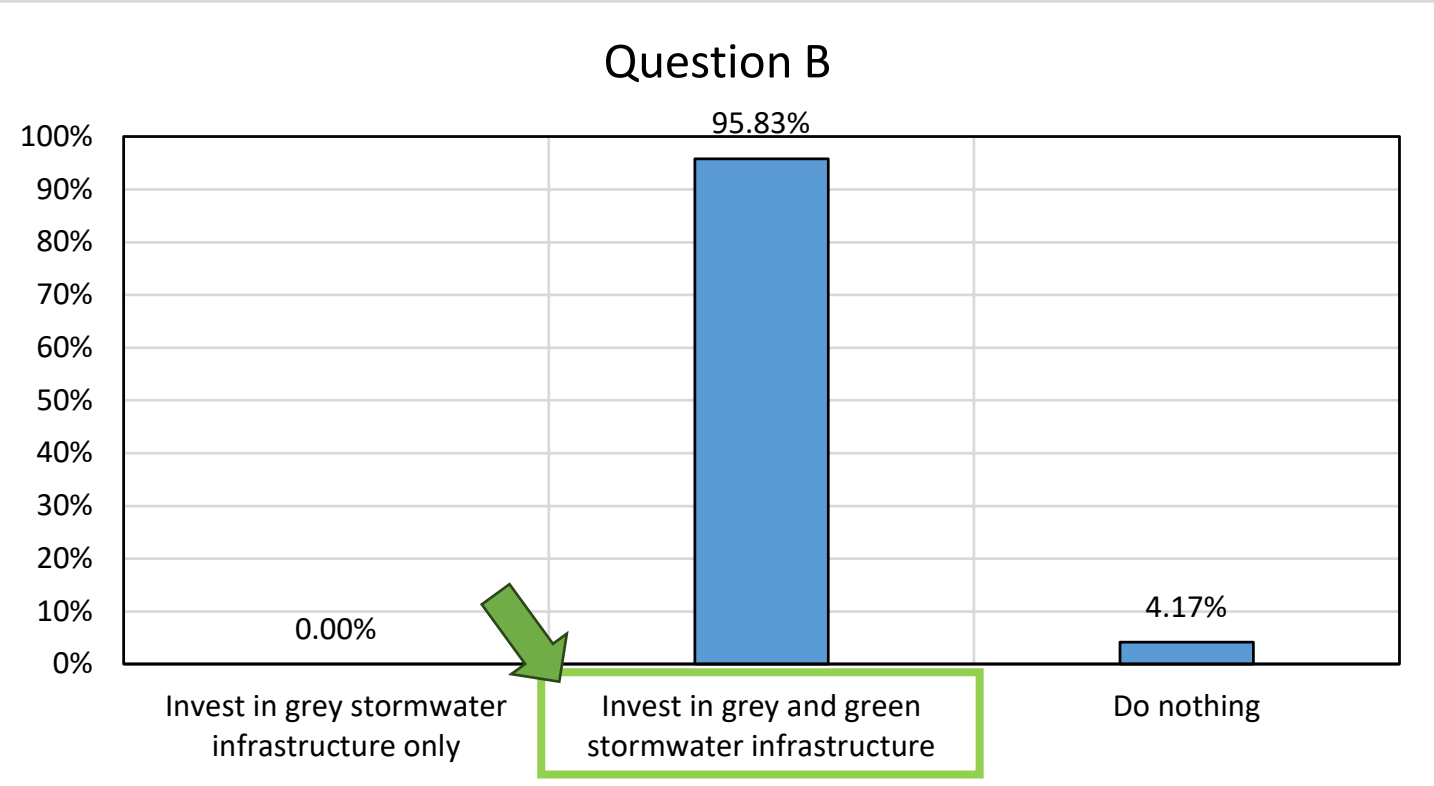
# Question A: How much resilience (or climate risk reduction) do you want along Hollywood Boulevard?



Example of a Less likely event with low/medium to medium/high impact



# B. What type of resilient infrastructure would you like to see along Hollywood Boulevard?



### BENEFITS

**ROAD SAFETY:**

*NOT APPLICABLE*

**COST EFFECTIVE:**

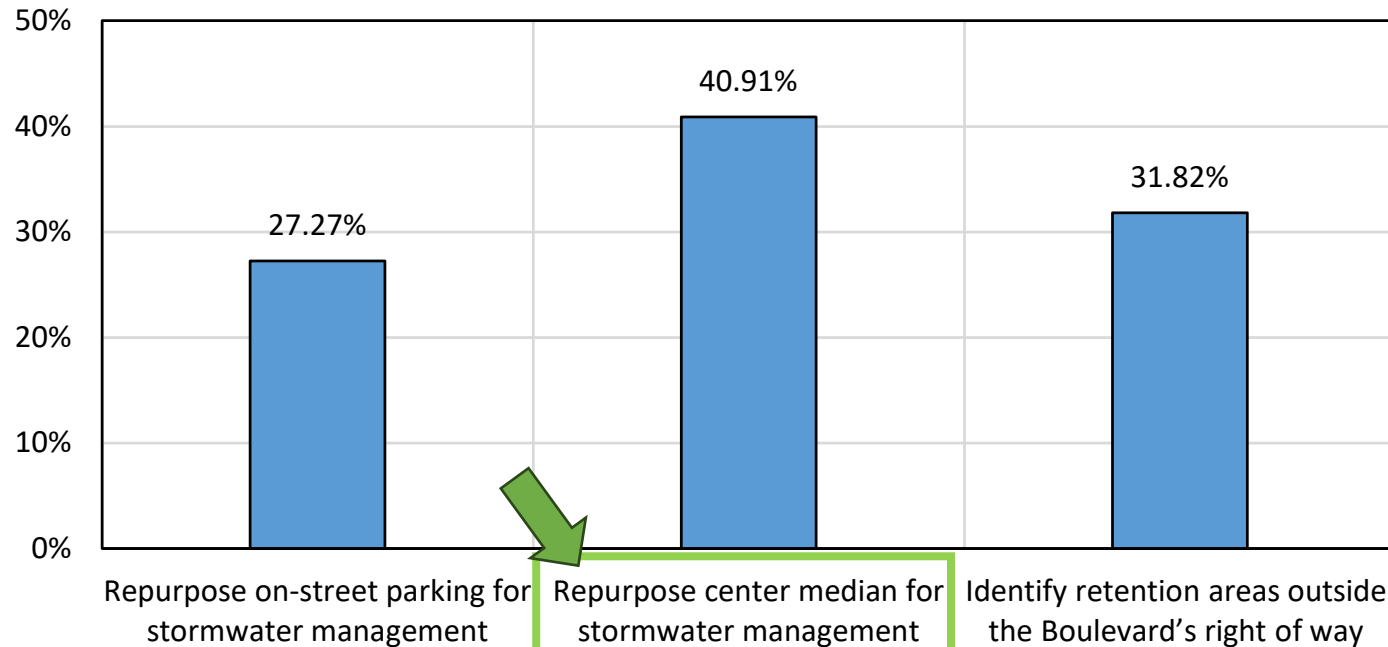


**CO-BENEFITS:**



# C. Trade-offs may be required to integrate resilience. Which tradeoffs are you willing to make?

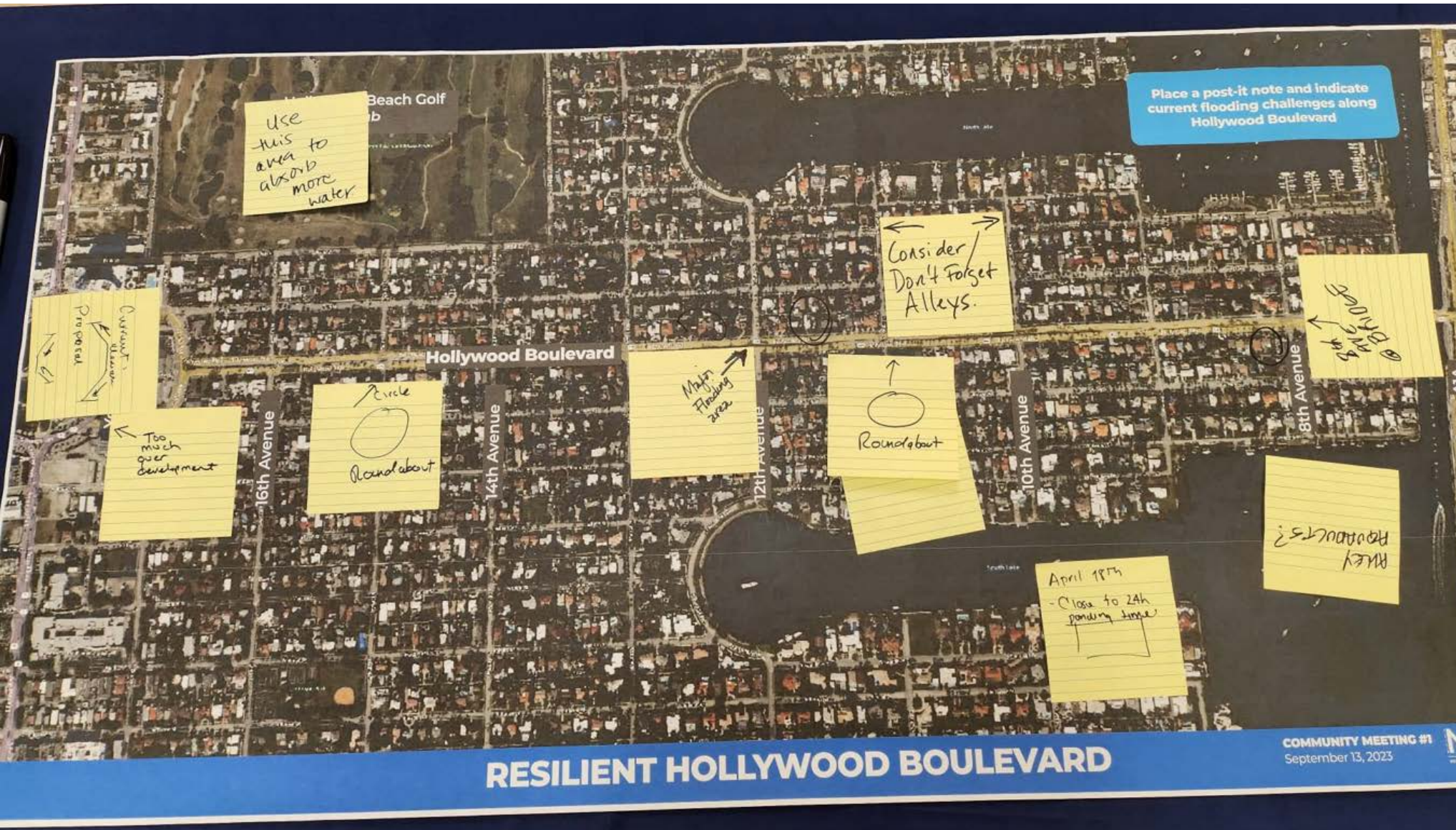
Question C



**BENEFITS**

- ROAD SAFETY: *NOT APPLICABLE*
- COST EFFECTIVE: ★★☆☆
- CO-BENEFITS: ★★☆☆





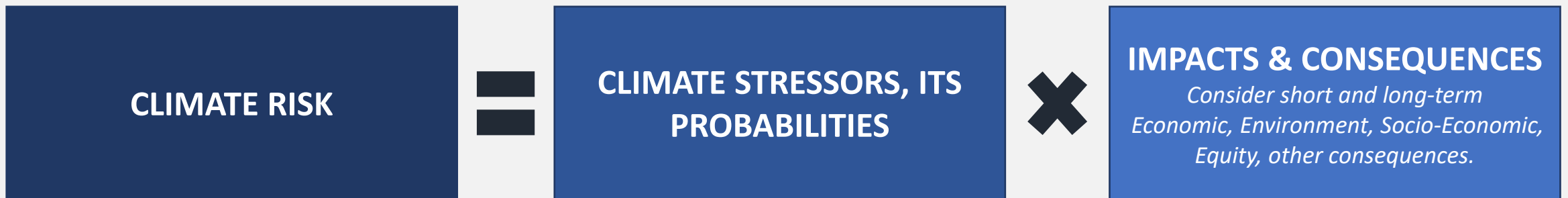
**Additional highlights:**

- Add roundabouts
- Consider repurposing the alleys for stormwater
- Identified 'flooding hotspots'
- Concerned that the roadway profile may be pushing water to the neighborhood.

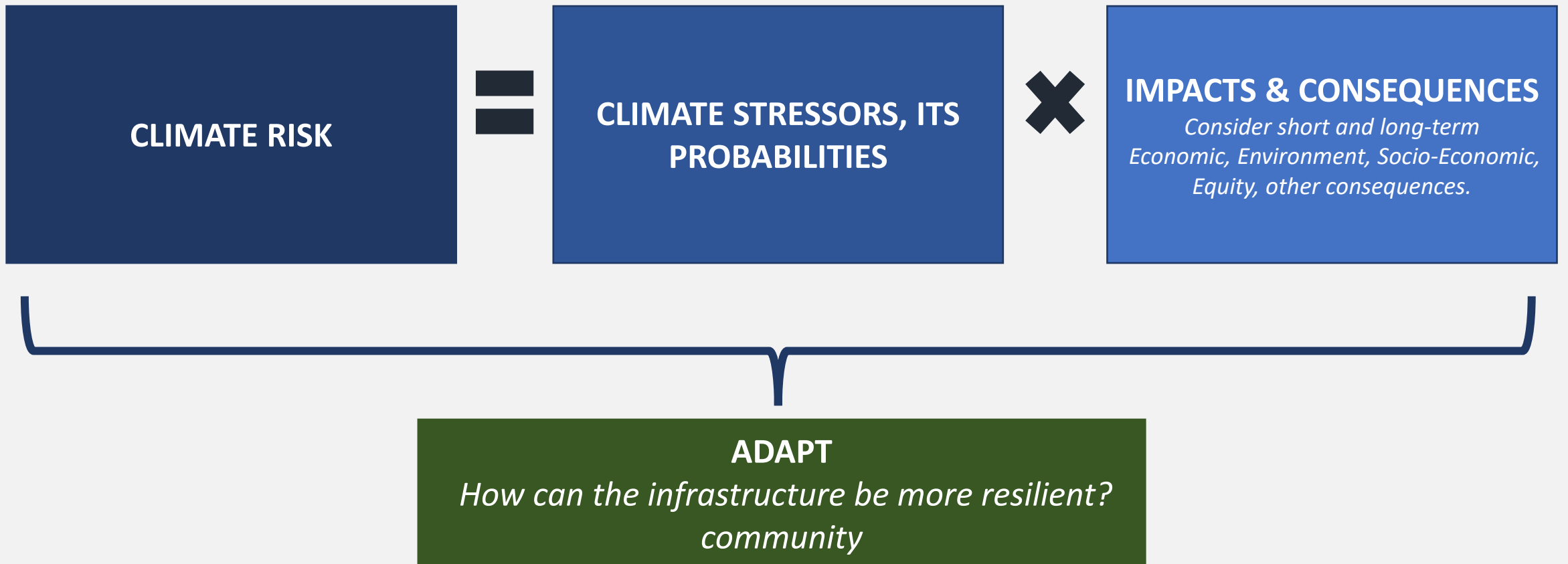
# STEP 1-3: UNDERSTAND (QUANTIFY) CLIMATE RISK

Most sections of Hollywood Boulevard are expected to be functionally impacted\* today and in future conditions.

And the impacts to emergency vehicle access are high.



# STEP 4-6: DEVELOP RESILIENT DESIGN ALTERNATIVES



# RECOMMENDATIONS

Consider stormwater management strategies to address flooding concerns by:

1. Increasing the capacity of the stormwater system through a green-grey system:
  - Improve water quality and capacity with green infrastructure.
  - Enhancing stormwater conveyance with grey infrastructure.
2. Change the direction of stormwater flow towards the sidewalk, adjacent homes & neighborhood.
  - Sidewalk is the last section to flood

**The proposed alternatives were informed by your feedback.**



# INTRODUCTION TO THE WORKSHOP

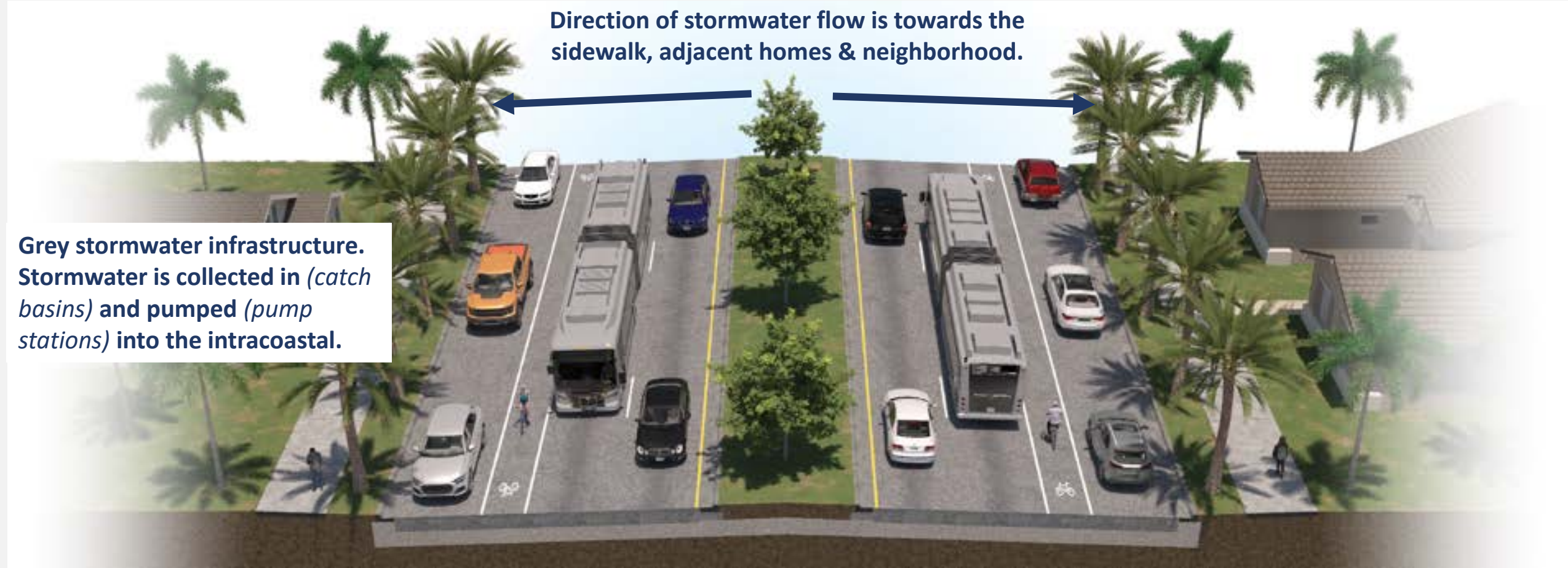
1. Selection of alternatives
2. Roadway intersection treatment and other improvements

# 1) SELECTION OF ALTERNATIVES

# EXISTING CONDITIONS

Direction of stormwater flow is towards the sidewalk, adjacent homes & neighborhood.

Grey stormwater infrastructure. Stormwater is collected in (*catch basins*) and pumped (*pump stations*) into the intracoastal.



# BENEFIT OF RECOMMENDED ALTERNATIVES

BENEFITS	COMPARING THE ALTERNATIVES
<b>SAFETY</b> for people walking, biking	☆☆☆
<b>STORMWATER CO-BENEFITS</b> (Use of green infrastructure shade, aesthetics)	☆☆☆
<b>EMERGENCY VEHICLE ACCESS</b> – accessibility, evacuation, and emergency vehicles during flood events	Similar
On-street parking	Similar
Resilience/ Stormwater System Capacity	Similar



# ALTERNATIVE A

Direction of stormwater flow away from the sidewalk, adjacent homes & neighborhood.



- ① Inverted slope to redirect stormwater drainage to the median swale. It has stormwater capacity 6,500 Ft<sup>3</sup> per 100 Ft.
- ② Existing (unprotected) bike lane.
- ③ Sidewalk at the existing sidewalk elevation.

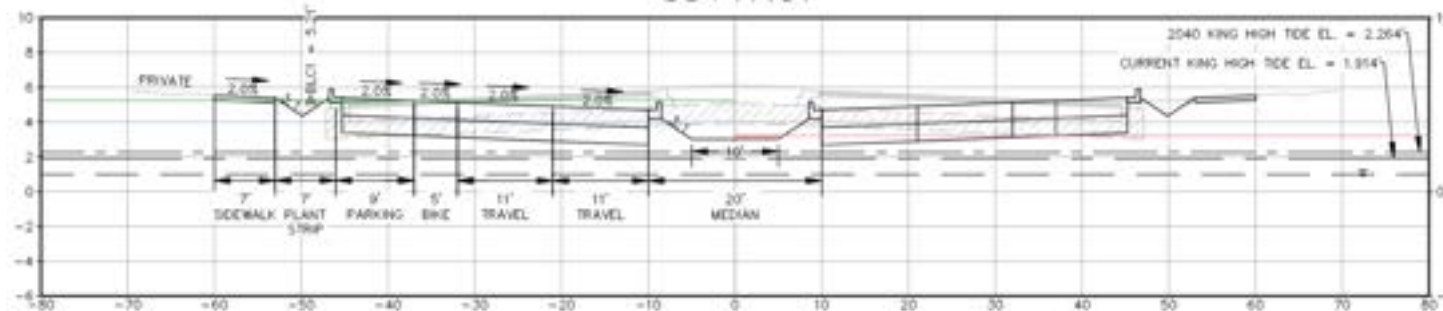
## BENEFITS

SAFETY: ☆☆☆

STORMWATER CO-BENEFITS: ★★★★★

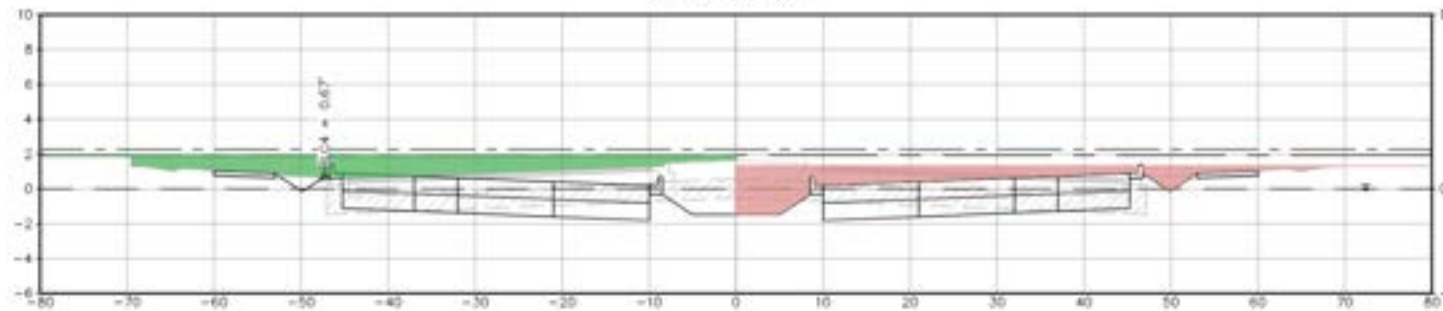
GREEN INFRASTRUCTURE CAPACITY: 6,500 ft<sup>3</sup> for every 100'

# ALTERNATIVE A. CROSS SECTIONS



West section

96+49.24



East section (near the bridge)

# ALTERNATIVE B

Direction of stormwater flow away from the sidewalk, adjacent homes & neighborhood.



- ① Inverted slope to redirect stormwater towards the median swale. It has stormwater capacity of 6,250 Ft<sup>3</sup> per 100 Ft.
- ② Parking-protected bike lane
- ③ Sidewalk at the existing sidewalk elevation.

## BENEFITS

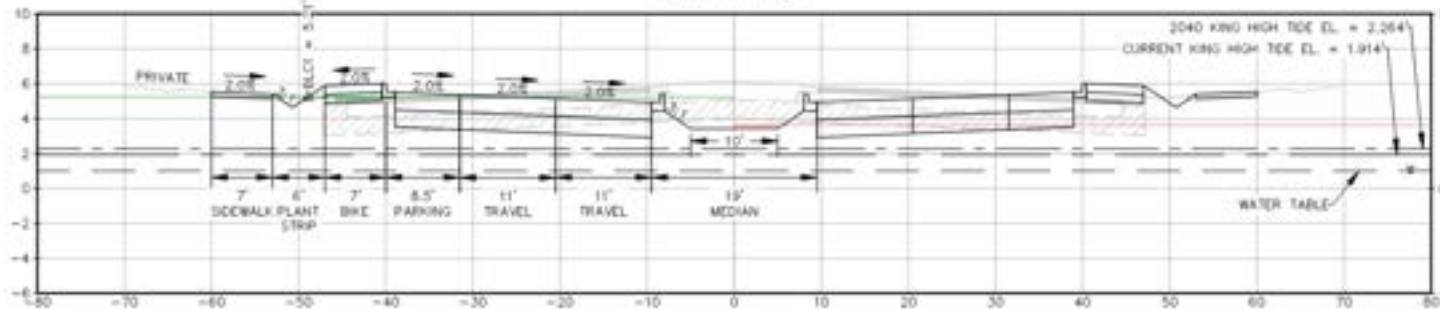
SAFETY: ★★ ★

STORMWATER CO-BENEFITS: ★★ ★

GREEN INFRASTRUCTURE CAPACITY: 5,800 ft<sup>3</sup> per 100'

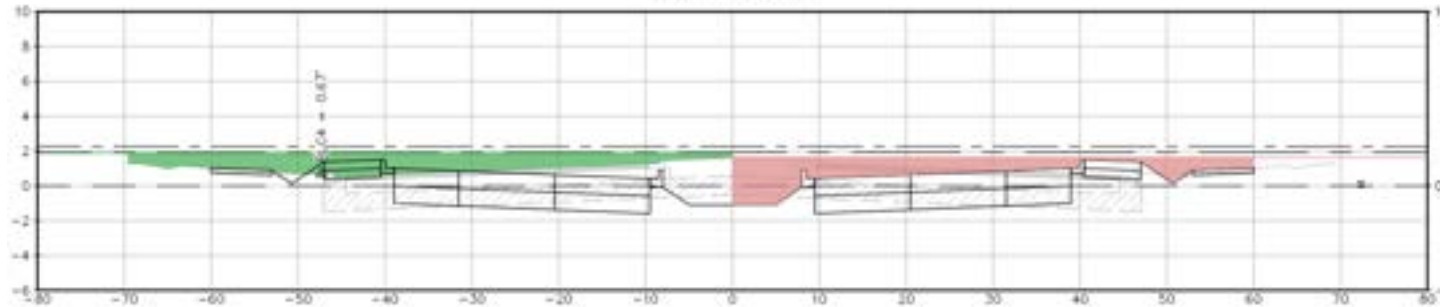


# ALTERNATIVE B. CROSS SECTIONS



West section (near Young Circle)

96+49.24



East section (near the bridge)



# ALTERNATIVE C

Direction of stormwater flow away from the sidewalk, adjacent homes & neighborhood.



- ① Inverted slope to redirect stormwater drainage to the median swale. It has stormwater capacity 2,400 Ft<sup>3</sup> for every 100 Ft.
- ② Elevated sidewalk 6" higher than existing.
- ③ Parking-and- curb protected bike lane.
- ④ Swales stormwater capacity 3,300 Ft<sup>3</sup> for every 100Ft.

## BENEFITS

SAFETY:



STORMWATER CO-BENEFITS:

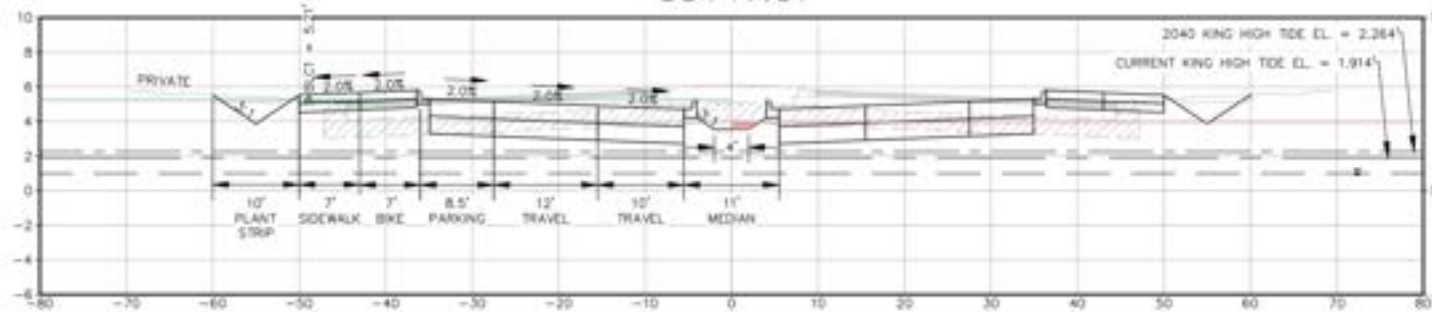


GREEN INFRASTRUCTURE CAPACITY: 5,700 ft<sup>3</sup> for every 100'

# ALTERNATIVE C - CROSS SECTIONS

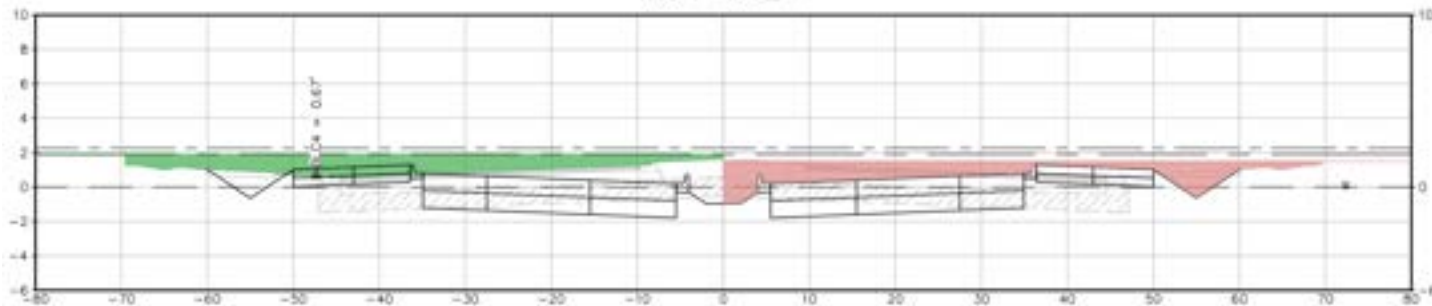


35+17.01



West section (near Young Circle)

96+49.24



East section (near the bridge)

### Alternative A:



### Alternative B:



# HOW WOULD YOU RANK THEM?

#### ALTERNATIVE A BENEFITS:

SAFETY: ☆☆☆

STORMWATER CO-BENEFITS: ★★★★★

GREEN INFRASTRUCTURE CAPACITY: 6,500 ft<sup>3</sup> for every 100'

#### ALTERNATIVE B BENEFITS:

SAFETY: ★★★★★

STORMWATER CO-BENEFITS: ★★★★★

GREEN INFRASTRUCTURE CAPACITY: 6,250 ft<sup>3</sup> per 100'

#### ALTERNATIVE C BENEFITS:

SAFETY: ★★★★★

STORMWATER CO-BENEFITS: ★★★★★☆

GREEN INFRASTRUCTURE CAPACITY: 5,700 ft<sup>3</sup> for every 100'

## 2) ROADWAY INTERSECTION TREATMENT AND OTHER IMPROVEMENTS



# INTERSECTION IMPROVEMENT OPTIONS

**Option A: Compact Roundabout**



**Option B: Signal & Geometric Improvements**



# OPTION A: COMPACT ROUNDABOUT



- ✓ Safer intersection for all users
- ✓ Improves traffic operations
- ✓ School buses and trucks can access
- ✓ Expensive to implement but lower lifecycle cost

## BENEFITS

SAFETY: ★★ ★

TRAFFIC OPERATIONS: ★★ ★

CO-BENEFITS: ★★ ★

# OPTION B: SIGNAL & GEOMETRIC IMPROVEMENTS



- ✓ Examples of geometric improvements include pedestrian refuge islands, curb extensions, closing road access, and realigning roads
- ✓ Increases safety of intersection without completely rebuilding

## BENEFITS

SAFETY: ★★☆☆

TRAFFIC OPERATIONS: ★★☆☆

CO-BENEFITS: ★★☆☆



# OTHER MOBILITY & SAFETY IMPROVEMENTS

**Option A: Mid-block crossings  
refuge islands**



**Option B: High Intensity Activated  
crosswalk (HAWK)**



**Option C: Rectangular rapid-flashing  
beacons (RRFB)**





# OPTION A: MID-BLOCK CROSSINGS REFUGE ISLANDS



- ✓ Improves safety by increasing car yielding to crossing pedestrians
- ✓ Acts as street calming, reducing vehicle speeds
- ✓ Co-benefits for placemaking and stormwater-management

## BENEFITS

SAFETY: ★★ ★

TRAFFIC OPERATIONS: ★★ ★

CO-BENEFITS: ★★ ☆

# OPTION B: HIGH INTENSITY ACTIVATED CROSSWALK (HAWK)



- ✓ Increases driver awareness at crosswalks
- ✓ Safe and improves yielding rate for cars
- ✓ Does not slow traffic overall

## BENEFITS

SAFETY: ★★ ★

TRAFFIC OPERATIONS: ★★ ★

CO-BENEFITS: ★★ ☆

# OPTION C: RECTANGULAR RAPID-FLASHING BEACONS (RRFB)



- ✓ Increases driver awareness at crosswalks
- ✓ Safe and improves yielding rate for cars
- ✓ Does not slow traffic overall

## BENEFITS

SAFETY: ★★ ★

TRAFFIC OPERATIONS: ★★ ★

CO-BENEFITS: ★ ☆ ☆

**WHAT DO YOU THINK?**



# BREAKOUT WORKSHOPS

1. Selection of alternatives
2. Roadway intersection treatment and other improvements

**THANK YOU.**