

# TPB REGIONAL EXTREME HEAT ANALYSIS

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Regional Public Transportation Subcommittee  
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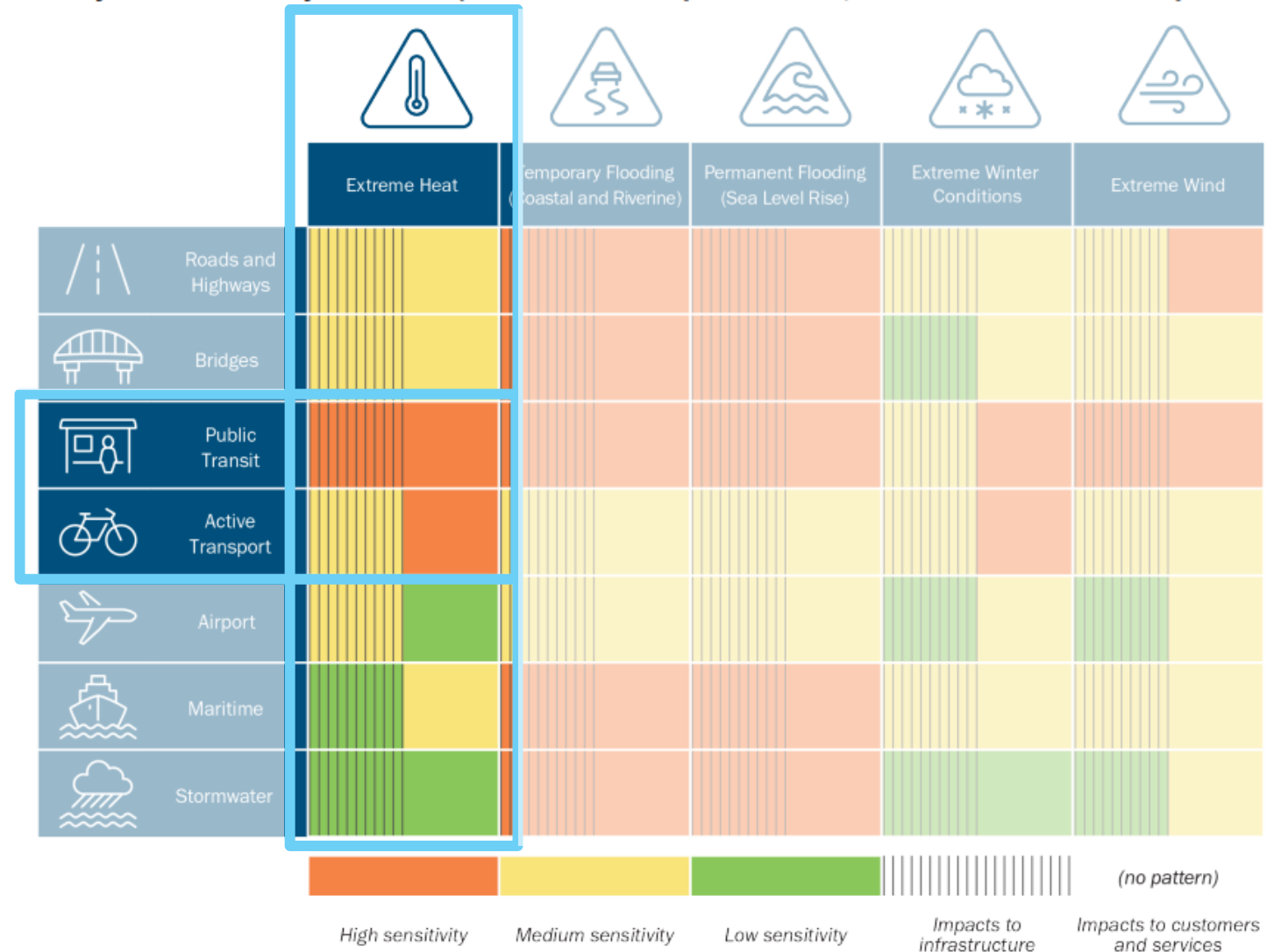
National Capital Region  
**Transportation Planning Board**



# What we know

The **Transportation Resilience Improvement Plan (TRIP)** provided a high-level summary of heat-related impacts to the system

**Figure 2. System-level analysis results (Infrastructure impacts on left; service and customer impacts on right).**



# What we know

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**Extreme heat poses serious risks to transportation users and assets in the TPB region, including:**



Impaired infrastructure performance



Potential for limited access to essential services



Altered transit use patterns and user behavior



Endangered public health



Server meltdowns impacting control rooms and communication



# What we need

The TRIP identified the need for deeper dives into extreme heat impacts and resources. **The Regional Extreme Heat Analysis will:**



## OBJECTIVE 1

Identify **where** transportation assets and systems in the region may experience the worst impacts of extreme heat.



## OBJECTIVE 2

Demonstrate **how** this could impact the local economy and the ability of the region to meet its broader goals.



## OBJECTIVE 3

Provide **resources** to help member agencies kick-start their efforts to adapt to these risks.



# Increase understanding of where the risks are

## Goal

Improve understanding of where the worst extreme heat exposure may occur

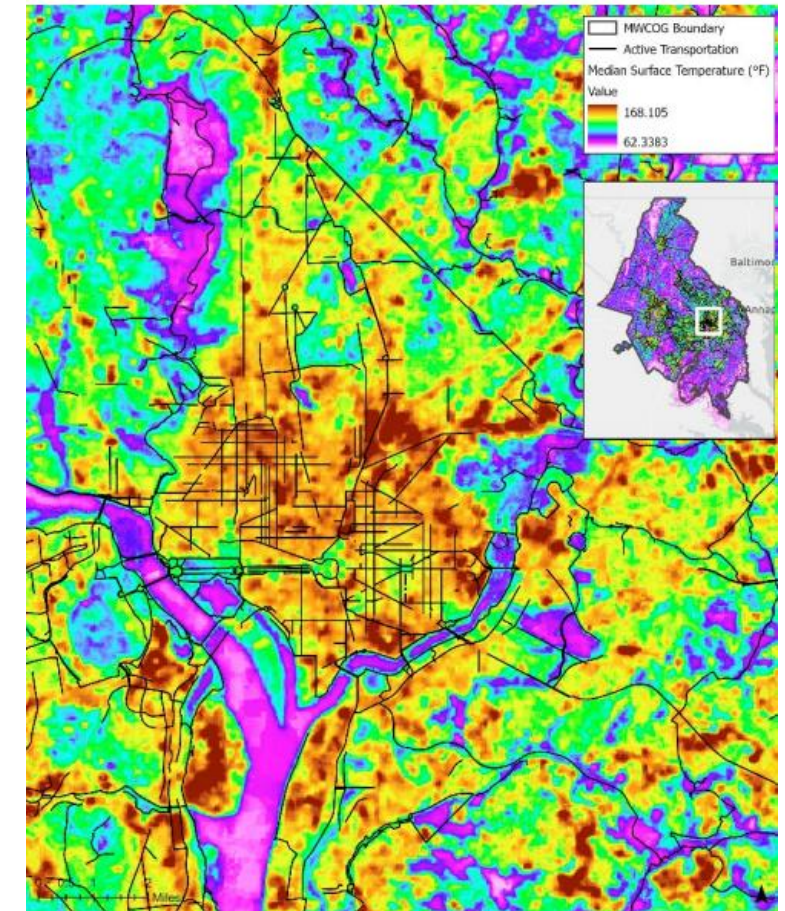
## Approach

- Conduct targeted heat vulnerability assessment for transportation assets and users
- Explore creative approaches to pinpointing risk

## Example Outcomes

- Extreme heat datasets that go beyond surface temperature

**Figure 18. Downtown Washington, DC bike and heat map.**



# Increase understanding of specific impacts and provide resources to enhance adaptation

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**Some initial ideas include:**

Transit  
Infrastructure  
Resilience  
Analysis

Commuter  
Survey  
Enhancement

Model Policy  
Language

Decision Tree for  
Cooling  
Solutions

Grant  
Application  
Support  
Packages

Best Practice  
Design Guidance



# Options

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1. **Transit Infrastructure Resilience Analysis**
2. Commuter Survey Enhancement
3. Model Policy Language
4. Decision Tree for Cooling Solutions
5. Grant Application Support Packages
6. Best Practice Design Guidance



## Goal

Understand how extreme heat affects transit infrastructure and operations regionally

## Approach

- Analyze resilience of infrastructure, operations, and users to extreme heat

## Example Outcomes

- Impacts assessment
- Slow/stop order frequency (historic and projected)
- Ridership data on high heat days

# Options

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1. Transit Infrastructure Resilience Analysis
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## Goal

Understand **heat-related behavioral changes** (e.g., mode shifts) and implications for planning and service delivery

## Approach

- Suggested question additions to existing commuter surveys

## Example Outcomes

- Updates to TPB's Commuter Connections survey or other partner agency survey efforts



# Options

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1. Transit Infrastructure Resilience Analysis
2. Commuter Survey Enhancement
3. **Model Policy Language**
4. Decision Tree for Cooling Solutions
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## Goal

Promote use of **cooling strategies** through redevelopment projects

## Approach

- Review policy language in other regions that facilitate or support cooling projects

## Example Outcomes

- Draft language for design standards, RFPs, or development guidelines

# Options

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1. Transit Infrastructure Resilience Analysis
2. Commuter Survey Enhancement
3. Model Policy Language
4. **Decision Tree for Cooling Solutions**
5. Grant Application Support Packages
6. Best Practice Design Guidance



## Goal

Identify **feasible cooling solutions** based on site-specific constraints (e.g., land ownership, space, permitting)

## Approach

- Develop inventory of entities that are doing this type of work already and review for lessons learned

## Example Outcomes

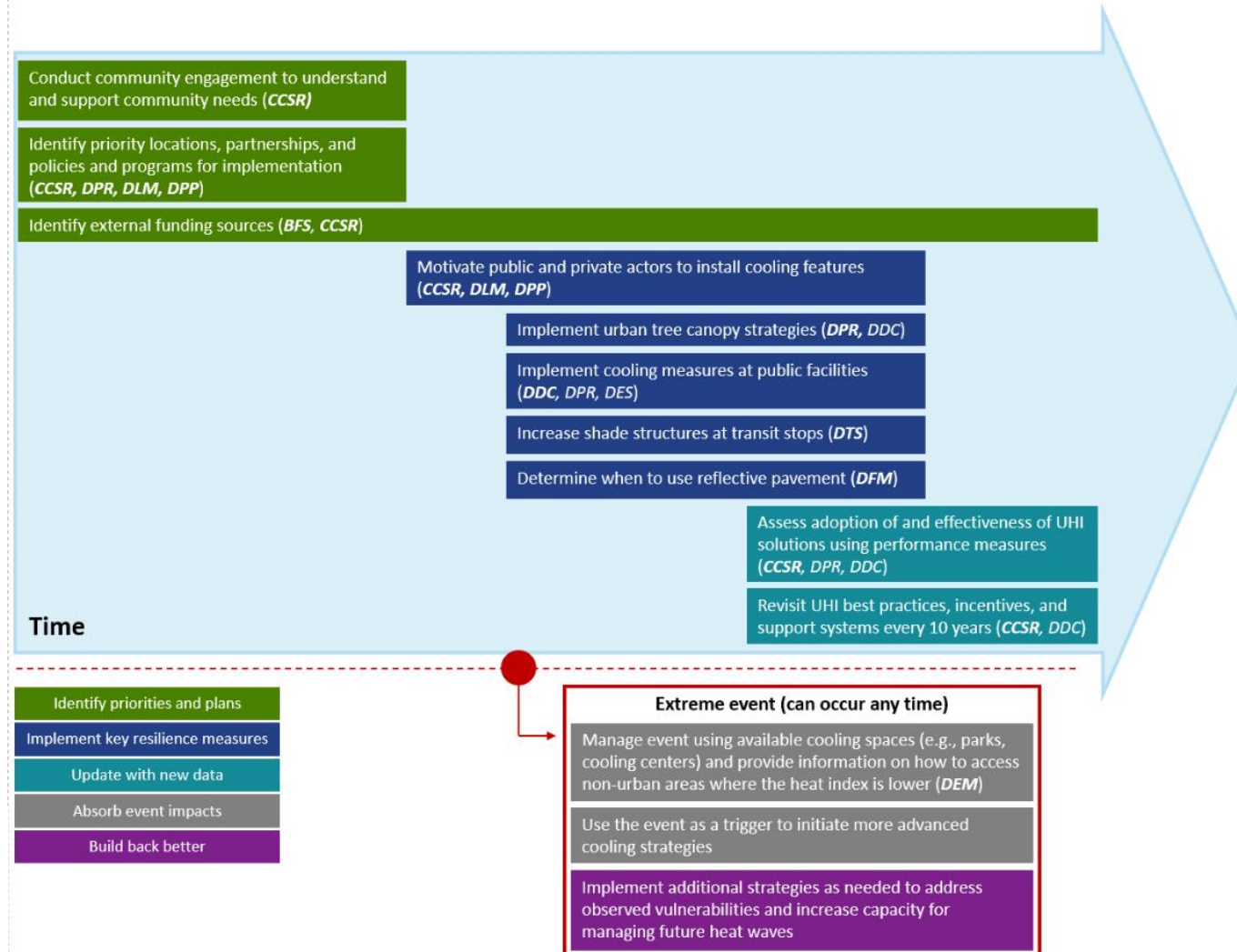
- Decision-tree tool and cost estimates
- Guidance on selecting potential solutions

# Decision Tree & Example Outcomes

## Example Outcome – Heat Adaptation Pathways

### Reduce Urban Heat Island Effect

Departments proceed with actions in the blue arrow over time, increasing or diverting resources as needed to respond to extreme events (indicated by the red dot) as they occur.



Example from the City and County of Honolulu Climate Ready Oahu Report

# Options

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1. Transit Infrastructure Resilience Analysis
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4. Decision Tree for Cooling Solutions
5. **Grant Application Support Packages**
6. Best Practice Design Guidance



## Goal

Provide resources to improve grant application **competitiveness**

## Approach

- Identify funding sources
- Evaluate criteria analysis from key resilience grant programs
- Develop “win themes” to incorporate into applications

## Example Outcomes

- Grant application support package

# Options

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6. **Best Practice Design Guidance**



## Goal

Support **implementation and efficacy** of cooling solutions

## Approach

- Identify contexts, typologies and best practices
- Evaluate tradeoffs (scale, level of impact, cost, ROI, etc.)
- Design concepts and guidelines (for transit, pedestrian, bicycle, etc.)

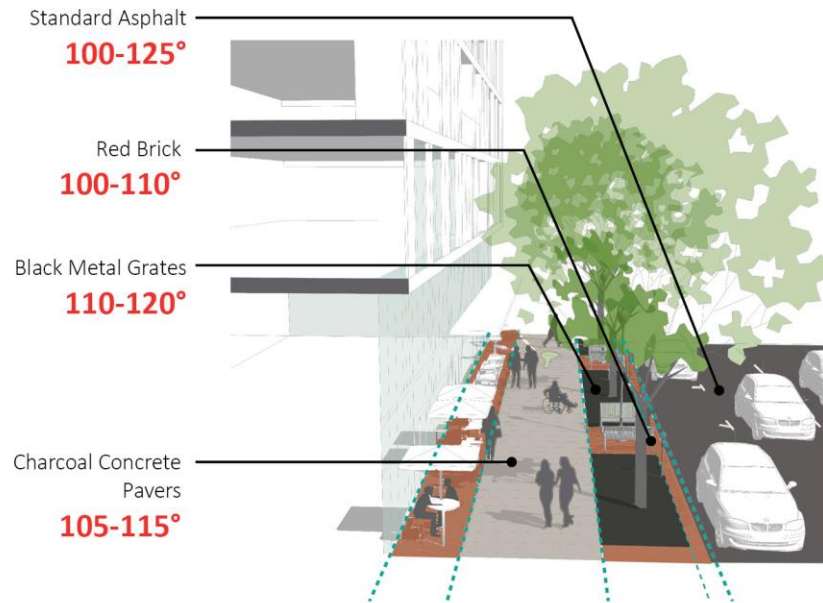
## Example Outcomes

- Best practices and design guidance for heat-resilient infrastructure

# Design Guidelines & Example Outcomes

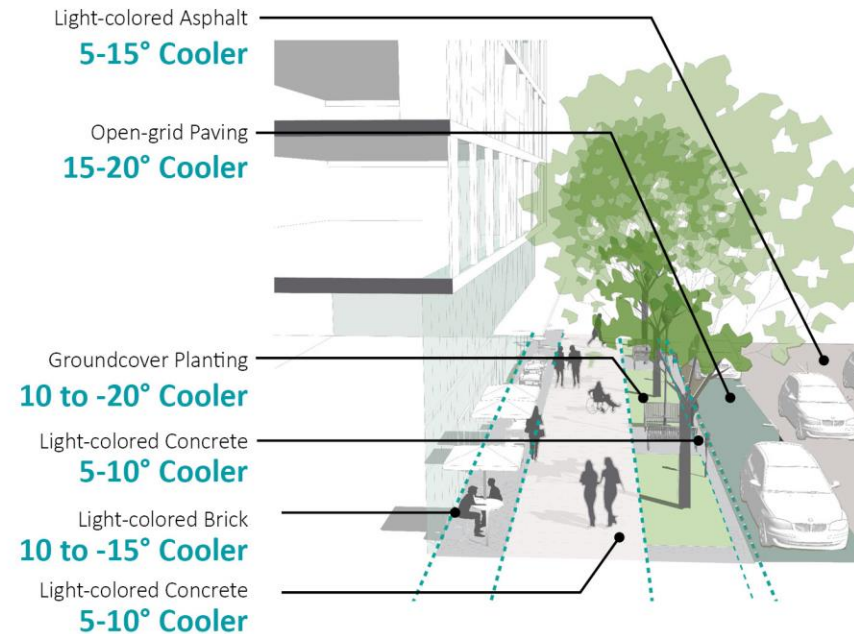
## Example Outcome – Pedestrian Infrastructure

### Baseline Materials



Existing Silver Spring streetscape conditions and average daily temperatures (July 24th)

### Proposed Cool-Street Materials

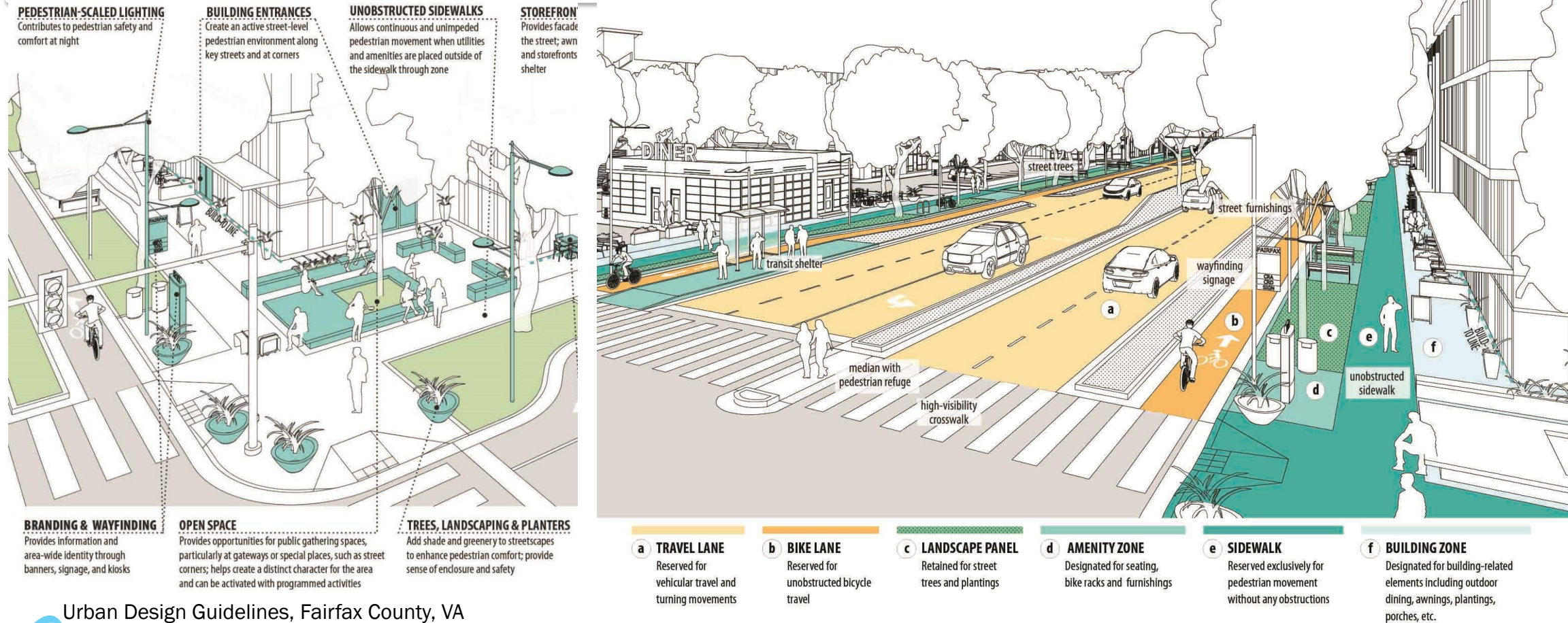


Cool-street recommendations including temperature differences compared to existing conditions



# Design Guidelines & Example Outcomes

## Example Outcome – Pedestrian Infrastructure



Urban Design Guidelines, Fairfax County, VA



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# Preliminary Work Plan

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## **Transit Infrastructure Resilience Analysis**

- Proposed Deliverables: Memo/White Paper documenting analysis results of historic and projected heat impacts to rail and bus operations ridership

## **Grant Application Support**

- Proposed Deliverables: Excel database documenting relevant funding sources and key details (e.g. critical deadlines, criteria, potential win themes)

## **Best Practice Design Guidance**

- Proposed Deliverables: Region-specific design guidance for resilient transportation infrastructure, specifics still in development

## **Decision Support Tool or Model Policy Language**

- Proposed Deliverables: Specifics still in development





# What do you think?

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- Based on your needs and interests, do any aspects of this project and the proposed preliminary work plan jump out at you?
- Any other ideas you would like to see considered?
- Of the types of resources introduced today, what are you most interested in?
- Do you (or does your agency) have data or plans/reports that would be useful in this effort that you would be willing to share?