



June 21, 2023: Public Meeting

Resilient Ways Forward

Transportation planning for our
changing climate

dctc



Welcome

- **Q&A:** Use the Q&A to ask questions during the presentation. Speakers will respond following the presentation.
- **Polls:** We have a few questions for you to respond to during the meeting. You will receive a notification when a poll is open.



Join the Conversation!
Use the Q&A function to ask questions.



The image shows a Zoom meeting toolbar with several icons: Invite, Participants (41), Share Screen, Q&A (highlighted with a red border), Record, and Reactions.


Agenda

- *Resilient Ways Forward* Overview
- How is the Climate Changing and How are We Vulnerable?
- Share Your Story: Map Survey
- Next Steps
- Q & A

Introductions

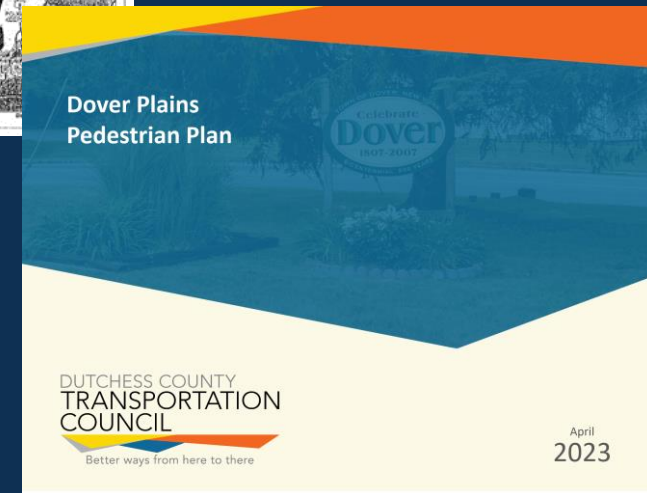
- Dutchess County Transportation Council
 - Mark Debald, Transportation Program Administrator
 - Tara Grogan, Planner
- ICF Project Team
 - Amanda Vargo, Climate Resilience Expert

What is the DCTC?

- Metropolitan Planning Organization (MPO) for Dutchess County
- Required by federal law for Urban Areas of 50,000+ population
- Established in 1982 as the 
- Forum for establishing regional transportation policies and priorities
- Programs federal highway, transit, and planning funds through a locally driven planning process



Poughkeepsie Journal, 1996



Dover Plains Pedestrian Plan, 2023

Overview

- *What is Resilient Ways Forward?*
 - **A climate vulnerability assessment** to identify where our transportation system is most vulnerable to heat, flooding, drought, wind, winter conditions, and landslides
 - **A suite of resources and an implementation plan** to better prepare our transportation system for climate change
- **How does it relate to other Dutchess County environmental planning efforts?**

Poll Question #1

Which type of extreme weather event has most impacted your ability to get around?

How is the Climate Changing and How are We Vulnerable?



Focus Climate Hazards

Extreme
Temperature



Flooding



Drought



Wind



Winter
Conditions



Landslides



Focus Transportation Assets

Roads

Bridges

Culverts

Rail Lines
& Stations

Bus
Routes

Sidewalks

Rail Trails

County
Airport

Highway
Garages

Park &
Rides

Ferry
Terminal

Transit
Hub



Extreme Temperature

Historical Trends

- Average temperatures have increased nearly 3°F since 1960
- High temperatures are occurring with greater frequency and intensity

Future Conditions

- Average temperatures will continue to rise
- Extreme temperatures will occur more frequently

Transportation concerns:

- Pavement can soften or crack
- Rail lines can buckle
- Traveler discomfort: walking, biking, & waiting for bus/train



Flooding

Historical Trends

- 44 inches of rain each year as well as many extreme precipitation events
- Hudson River water level has risen more than 1 foot since 1900

Future Conditions

- More frequent and intense heavy rain events
- Sea level rise and storm surge along the Hudson River



Flooding



Poughkeepsie waterfront flooding after Superstorm Sandy in 2012

Transportation concerns:

- Damage to roads, bridges, and rail lines
- Closures, delays, and safety risks



Flooded road after Hurricane Ida in 2021



Drought

Historical Trends

- Notable short-term droughts in 2002, 2017, and 2022

Future Conditions

- Longer periods without precipitation
- Specific timing/duration is difficult to predict

Transportation concerns:

- No direct impacts



Wind

Historical Trends

- Multiple high wind events

Future Conditions

- Greater potential for high winds as intensity of hurricanes, tropical storms, and tropical depressions increase



Wind



Fallen trees and utility wires after a severe thunderstorm and high winds in 2018

Transportation concerns:

- Speed or travel restrictions
- Road closures from fallen trees, power lines, or utility poles
- Damage to supporting infrastructure like traffic signals and road signs



Winter Conditions

Historical Trends

- Winters have warmed 3x faster than summers
- Later snowfall and earlier snowmelt

Future Conditions

- Fewer days each year below freezing
- More precipitation in the form of rain than snow
- When winter storms occur, they will be more severe with greater snowfall



Winter Conditions



2010 snowstorm

Transportation concerns:

- Dangerous driving conditions and low visibility
- Speed or travel restrictions
- Road closures
- Increased maintenance costs during/after event
- Melting/freezing cycle can cause road cracking and buckling



Landslides

Historical Trends

- Southwest and eastern parts of Dutchess County have steep slopes where landslides are more likely

Future Conditions

- Precipitation-driven landslides could occur more frequently

Transportation concerns:

- Major damage to infrastructure
- Safety risks for travelers

Poll Question #2

Which part of our transportation system do you think is the most vulnerable to extreme weather events?

Share Your Story: Map Survey

Go to:

https://bit.ly/RWF_MapSurvey

Resilient Ways Forward
Dutchess County Transportation Council

- Comments
- Hazards
 - FEMA 100 year Floodplain
 - FEMA 500 year Floodplain
- Transportation
 - Bridges
 - Culverts
 - Passenger Rail Lines
 - Rail Stations
 - Bus Routes
 - Transit Hub
 - Park & Rides

Resilient Ways Forward ×

Dutchess County Transportation Council

Share Your Story

How have extreme weather events affected your ability to get around? We want to hear from you!

The [Dutchess County Transportation Council](#) is preparing a Climate Vulnerability Assessment of our [transportation system](#), titled [Resilient Ways Forward](#).

To help inform this assessment, we want to learn from you about where the transportation system in Dutchess County is most vulnerable to extreme weather events such as flooding, extreme heat, winter storms, high winds, drought, and landslides.

Instructions

Please use the map comment tool located in the top right corner (**+**) to drop a comment on the map and tell us how extreme weather events have affected your ability to get around. Provide as much information as you can about the event and location using our questionnaire, along with any photos of the event that you may have. Once submitted, the comment will be reviewed and approved before it is available to other viewers.

If you would like to search for a specific address, please use the address locator tool

+ ADD COMMENT

Map labels: North Canaan, Salisbury, Stone Man Mountain, Sharon, Goshen, Mohawk Mountain, Torri

Map markers: 7, 44, 202



Resilient Ways Forward

Dutchess County Transportation Council



Comments



Hazards



FEMA 100 year Floodplain

FEMA 500 year Floodplain

Transportation

Bridges

Culverts

Passenger Rail Lines

Rail Stations

Bus Routes

Transit Hub

Park & Rides

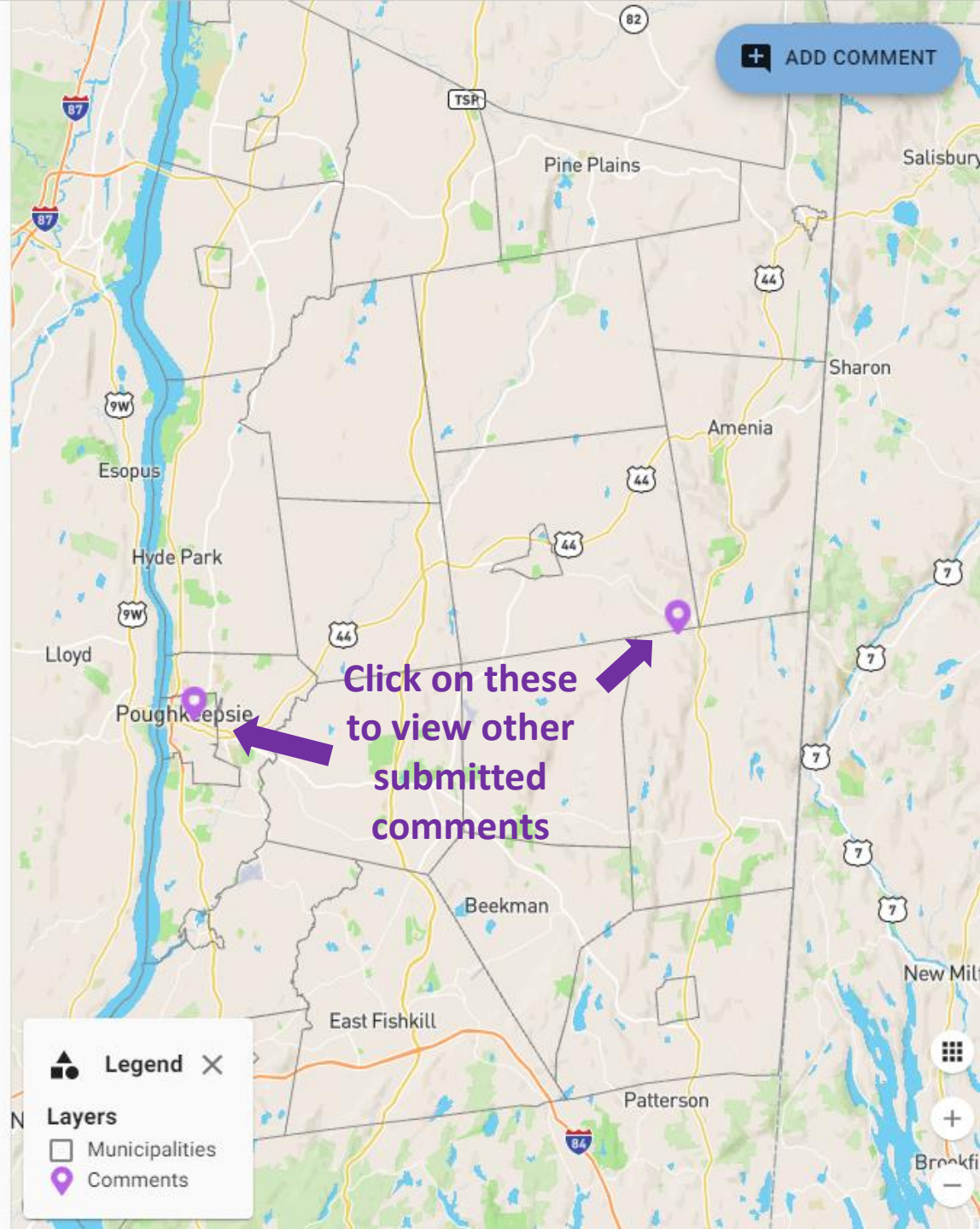
County Airport

Ferry Terminal

Rail Trails

Sidewalks

Click on the boxes to view different layers



+ ADD COMMENT

Click on these to view other submitted comments

Legend X

Layers

- Municipalities
- Comments



Resilient Ways Forward

Dutchess County Transportation Council



Comments



Hazards



FEMA 100 year Floodplain

FEMA 500 year Floodplain

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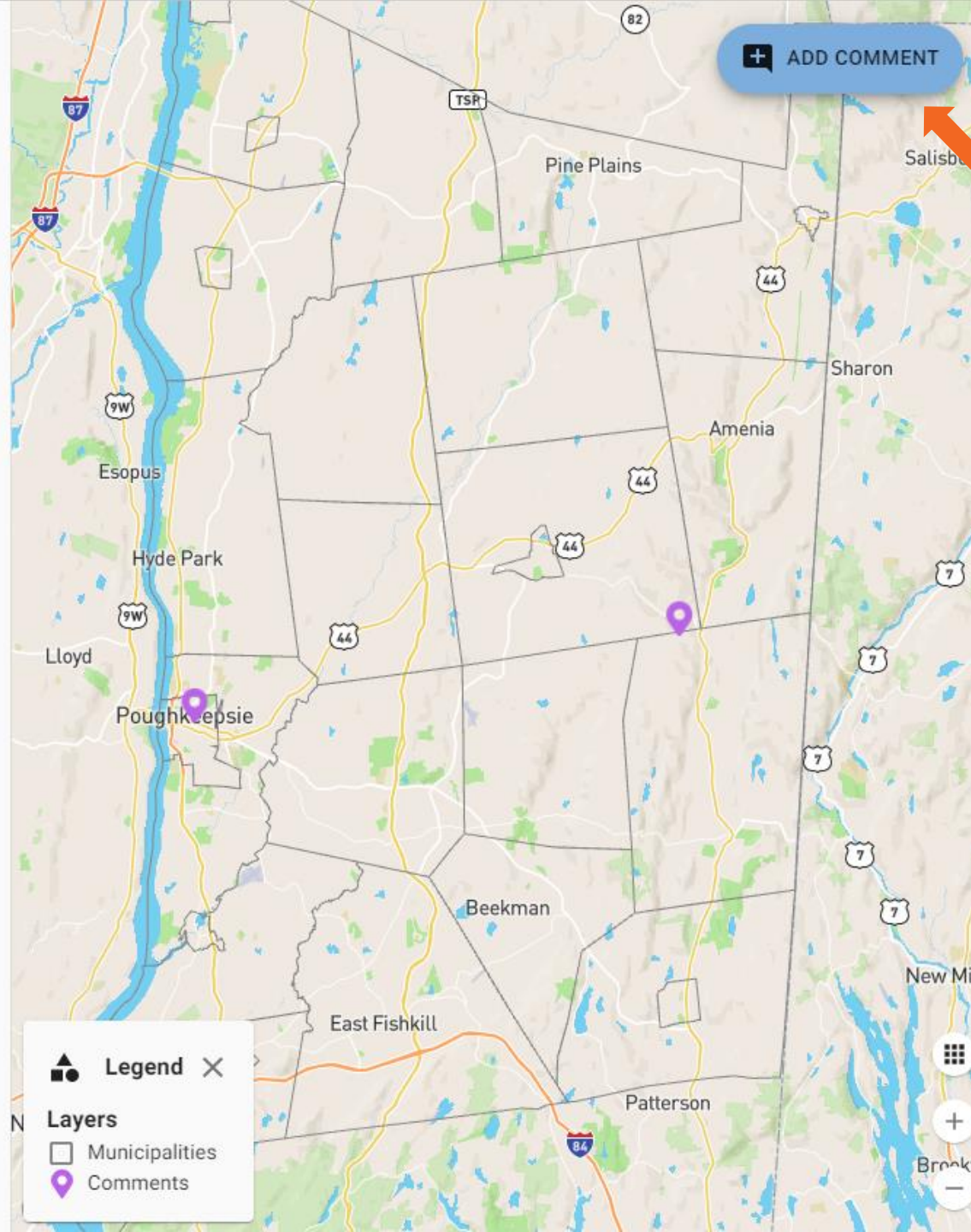
Park & Rides

County Airport

Ferry Terminal

Rail Trails

Sidewalks



Legend X

Layers



Municipalities



Comments

+ ADD COMMENT

Step 1. Click here to add a comment about your experience!

Step 2. Zoom in to where you had this experience and click to place your comment at that location



Resilient Ways Forward

Dutchess County Transport



Comments

Hazards

FEMA 100 year F

FEMA 500 year F

Transportation

Bridges

Culverts

Passenger Rail L

Rail Stations

Bus Routes

Transit Hub

Park & Rides

County Airport

Ferry Terminal

Rail Trails

Sidewalks



Share Your Story



(Optional) Name

This information will not be shared.

Type of Extreme Weather Event *

Transportation Asset *

Select all that apply.

Date of Event (if known) and/or Name of Event (e.g. Hurricane Irene)

Damage Level *

How the weather event affected the transportation asset.

Travel Method

Describe the issues you experienced at this location and how they affected your ability to travel (e.g. I had to detour around a flooded

CLOSE

SUBMIT



ADD COMMENT

Step 3.
Respond to
the prompts





Resilient Ways Forward

Dutchess County Transport



Comments



Hazards



FEMA 100 year F

FEMA 500 year F

Transportation

Bridges

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Passenger Rail L

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Share Your Story



Type of Extreme weather Event ^

Transportation Asset *

Select all that apply.

Date of Event (if known) and/or Name of Event (e.g. Hurricane Irene)

Damage Level *

How the weather event affected the transportation asset.

Travel Method

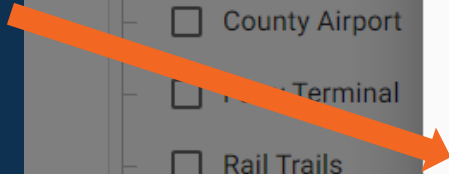
Describe the issues you experienced at this location and how they affected your ability to travel (e.g. I had to detour around a flooded road), and how long the impacts lasted.

UPLOAD PHOTOS

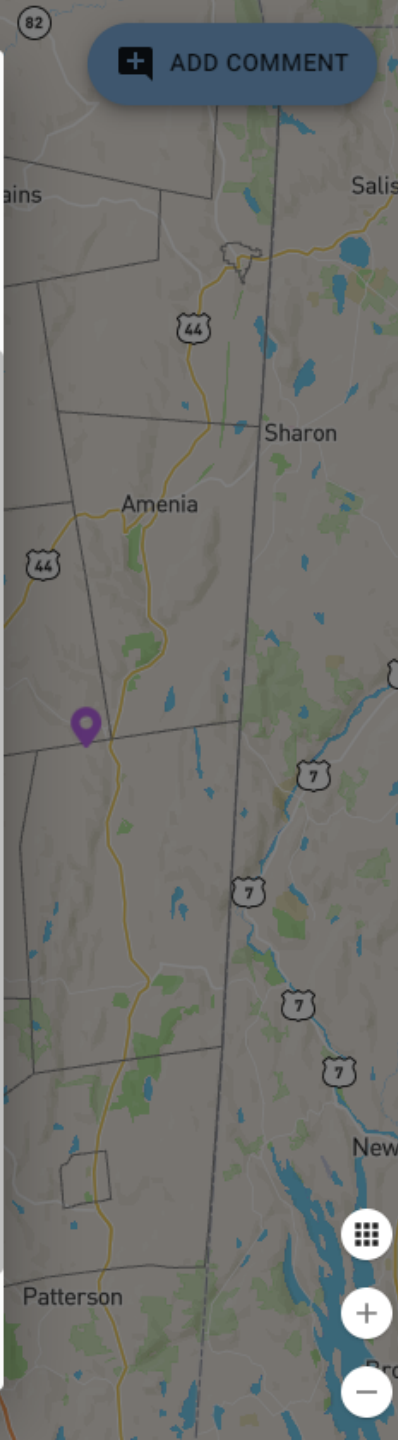
SUBMIT

+ ADD COMMENT

Click here to upload any photos (optional)



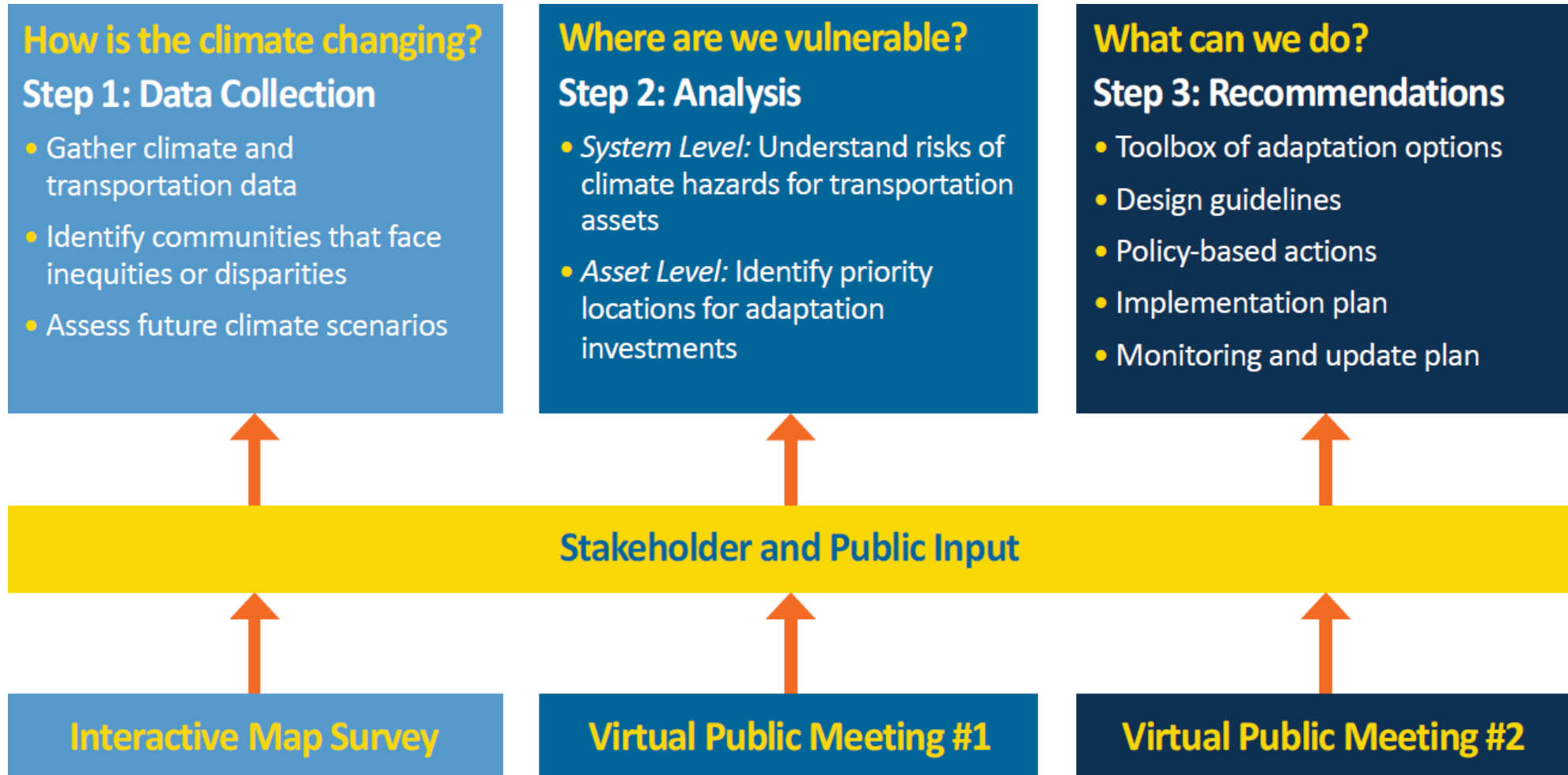
Click here to submit!



Poll Question #3

What would be most helpful to government agencies and elected officials in order to make the transportation system more resilient?

Next Steps



Resilient Ways Forward

www.ResilientWaysForward.com

- Climate Change Fact Sheet and Summary Report
https://bit.ly/RWF_FactSheet1
- Add comments to the interactive Map Survey:
https://bit.ly/RWF_MapSurvey
- Today's presentation will be posted to the website

Resilient Ways Forward
Transportation planning for our changing climate

How is the climate changing? Step 1: Data Collection

To become more resilient to climate change, we need to better understand regional climate trends and the likely impacts on our transportation system.

Climate Hazard Summary for Dutchess County

Hazard	Current	Future	Transportation Concerns
Temperature	<ul style="list-style-type: none">Average annual temperature has increased by nearly 3°F since 1960High temperatures occur with greater frequency and intensity	<ul style="list-style-type: none">Average temperatures continue to riseMore extreme temperatures will occur	<ul style="list-style-type: none">Pavement can soften, crack, or buckleRail lines can buckleTravelers experience discomfort
Flooding	<ul style="list-style-type: none">About 44 inches of rain/yearMany extreme precipitation eventsHudson River water level has risen more than one foot since 1900	<ul style="list-style-type: none">Precipitation will become increasingly variableMore frequent and intense heavy rain eventsSea level rise and storm surge along the Hudson River more frequently	<ul style="list-style-type: none">Damage to roads, bridges, and rail linesClosures, delays, and safety risks
Drought	<ul style="list-style-type: none">Notable flash droughts in 2002, 2017, and 2022.	<ul style="list-style-type: none">Longer periods without precipitation	<ul style="list-style-type: none">No direct impacts
Wind	<ul style="list-style-type: none">Multiple high wind events	<ul style="list-style-type: none">Greater potential for high winds as intensity of hurricanes, tropical storms, and tropical depressions increases	<ul style="list-style-type: none">Speed or travel restrictionsRoad closuresDamage to traffic signals, road signs
Winter Conditions	<ul style="list-style-type: none">Winters have warmed 3x faster than summersLater snowfall and earlier snowmelt	<ul style="list-style-type: none">Fewer days below freezing [32°F]Greater snowfall during major winter storm events	<ul style="list-style-type: none">Dangerous driving conditionsSpeed or travel restrictionsRoad closuresIncreased maintenance costsRoads can crack and buckle
Landslides	<ul style="list-style-type: none">Southern and eastern parts of Dutchess County at risk due to steep slopes	<ul style="list-style-type: none">Precipitation-driven landslides could occur more frequently	<ul style="list-style-type: none">Major damage to infrastructureSafety risks for travelers

What can we do?
Step 3: Recommendations

- Toolbox of adaptation options
- Design guidelines
- Policy-based actions
- Implementation plan
- Monitoring and update plan

Virtual Public Meeting #2

dctc
Dutchess County Transportation Council
85 Civic Center Plaza, Suite 107
Poughkeepsie, NY 12601
(845) 486-3600

Q & A



**Join the
Conversation!**
Use the Q&A function
to ask questions.



Invite



Participants



Share Screen



Q&A



Record



Reactions

Stay Engaged

- Send a comment or question
- Sign up for email updates
https://bit.ly/DCTC_EmailUpdates
- Virtual Public Meeting #2:
Targeted for Early 2024



www.ResilientWaysForward.com

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Thank you!



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