PEER Annual Meeting
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NIST Community Resilience Program

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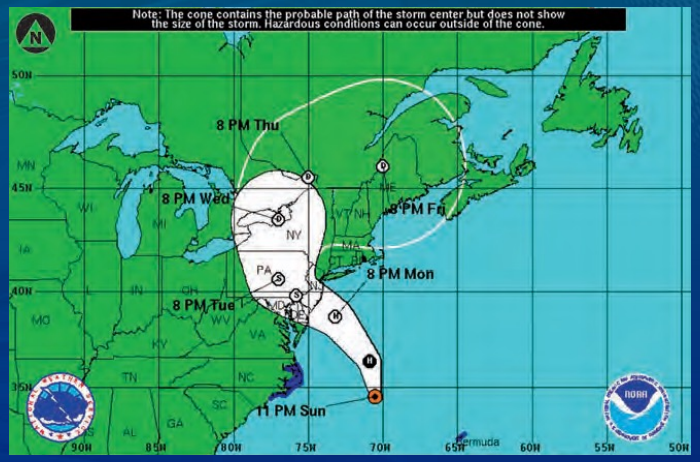
Why Community Resilience?

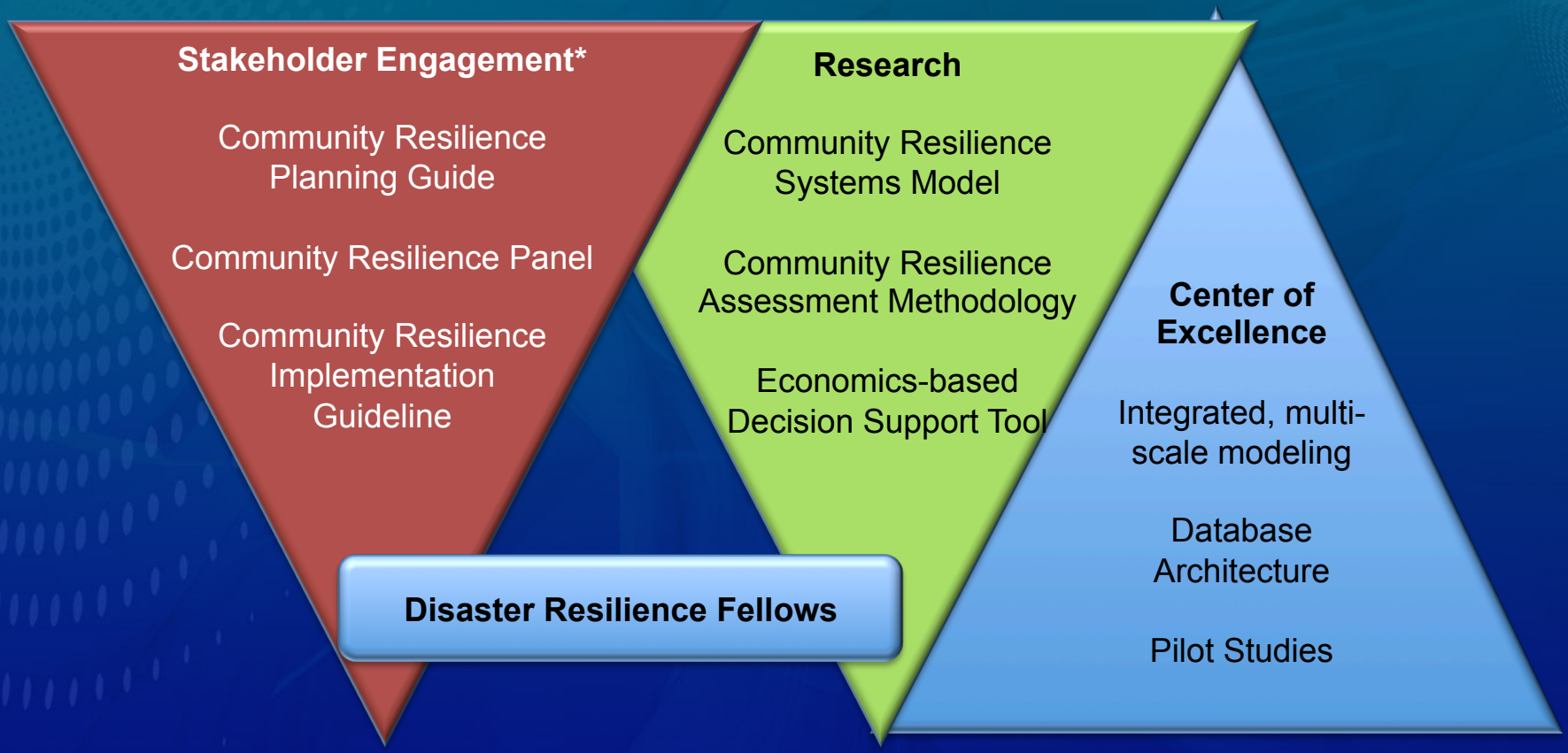
- All communities face potential disruption from natural, technological, and human-caused hazards.
- Disasters take a high toll in lives, livelihoods, and quality of life that can be reduced by better managing disaster risks.
- Communities are socio-technical systems. Buildings and infrastructure enable social and economic function. Therefore, social and economic needs and functions should drive the goals for performance of buildings and physical infrastructure.
- Planning and implementing *prioritized* measures can strengthen resilience and improve a community's ability to continue or restore vital services in a more timely way – and to build back *better*.
- New tools and guidance are needed to measure resilience and plan and implement measures to enhance resilience.



What is Resilience?

- *"the ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies".* (Presidential Policy Directive (PPD) 8)
- *"the ability to prepare for and adapt to changing conditions and to withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents."* (PPD 21)
- Resilience addresses all activities through recovery:
  - Prevention, Protection, Mitigation, Response, and Recovery
  - Risk assessments address the potential consequences of hazard's impact on existing construction and identify vulnerabilities
  - Emergency management addresses immediate response, with a focus on life safety

NIST Community Resilience Program



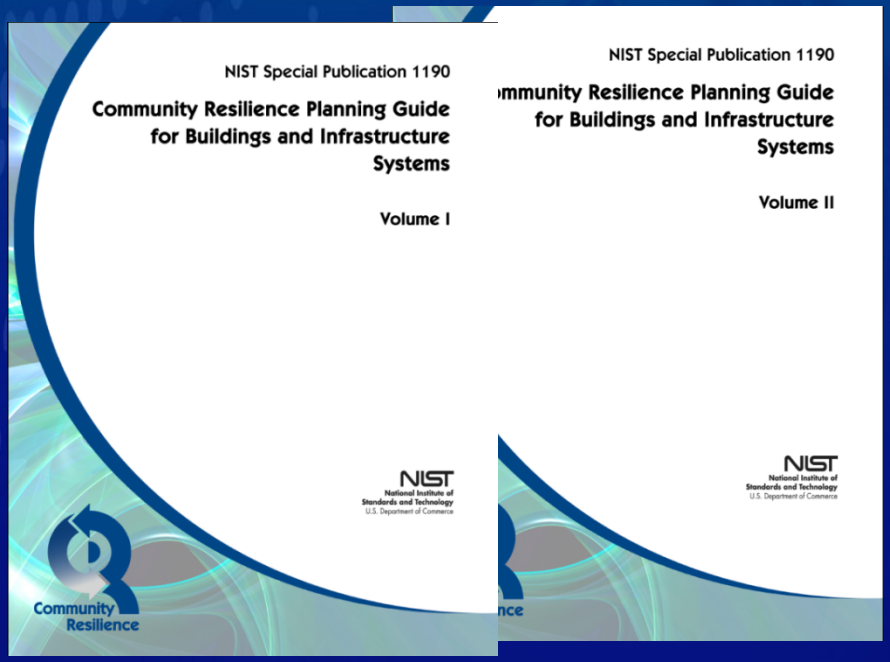
*Stakeholder Engagement component is called out in the President's Climate Action Plan

Planning Guide Outline

Volume 1 - Methodology

Executive Summary

- Introduction
- 6 Step Methodology
- Planning Example – Riverbend
- Glossary and Acronyms

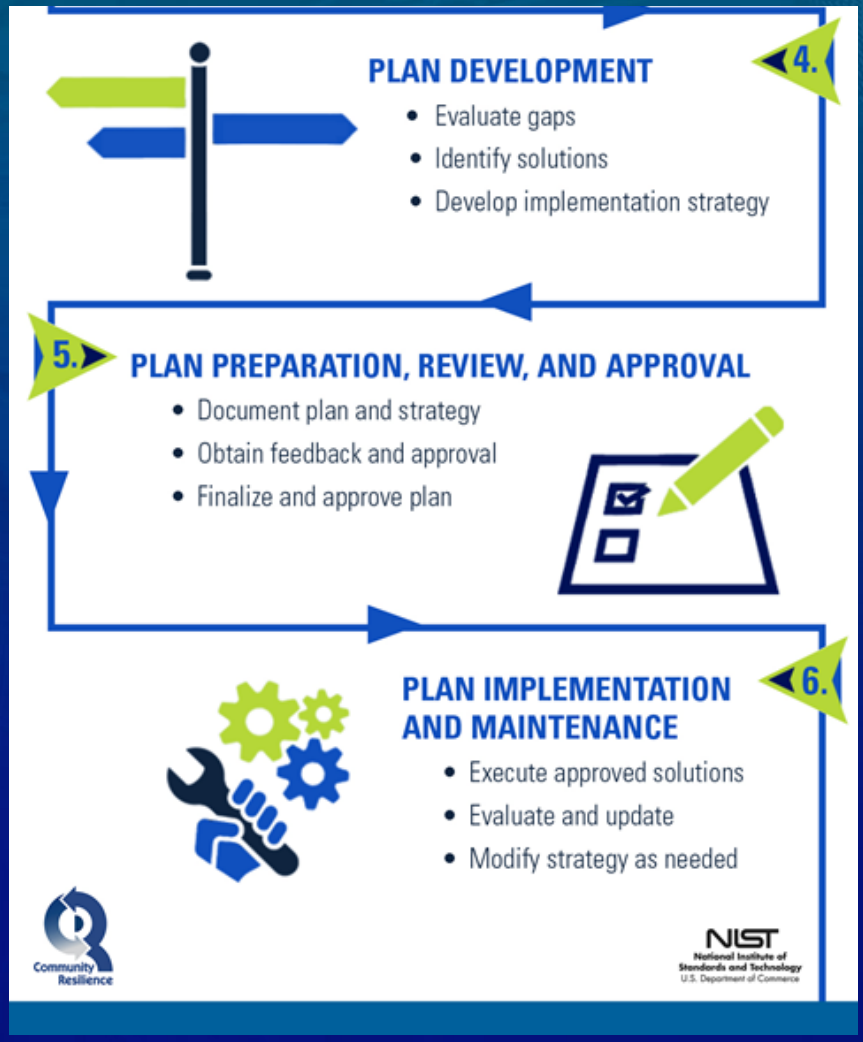


Volume 2 - Reference

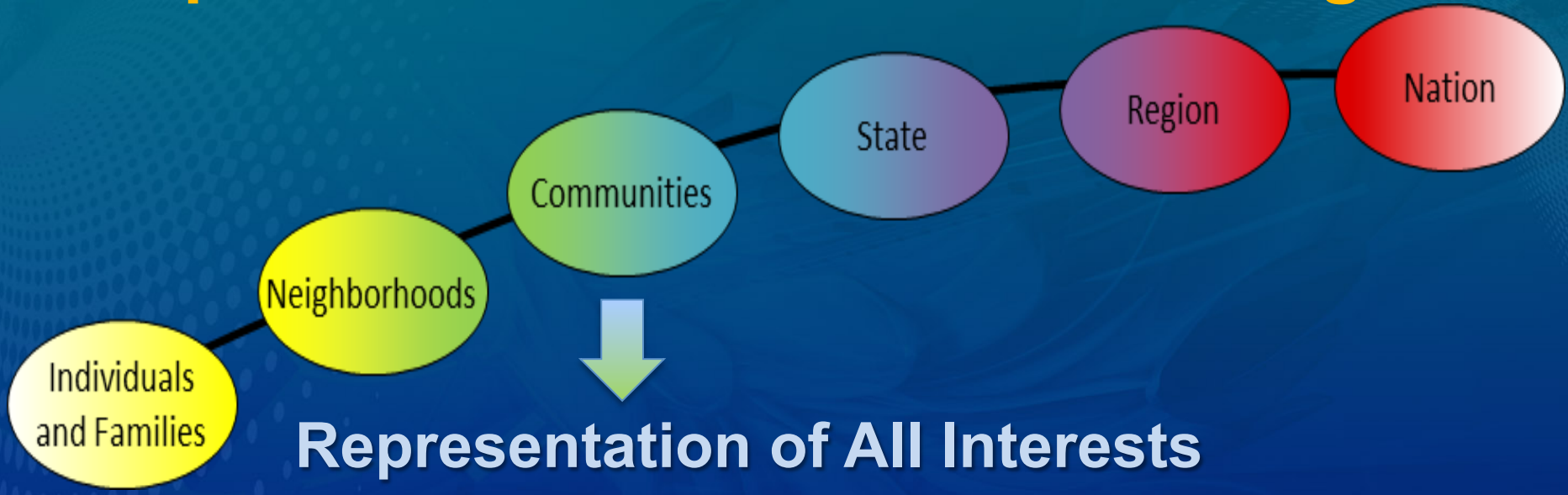
Executive Summary

- Social Community
- Dependencies and Cascading Effects
- Buildings
- Transportation Systems
- Energy Systems
- Communications Systems
- Water & Wastewater Systems
- Community Resilience Metrics

Planning Steps for Community Resilience



Step 1. Form a Collaborative Planning Team



Representation of All Interests

Public

- Elected Officials
- Local Government
- Community Members

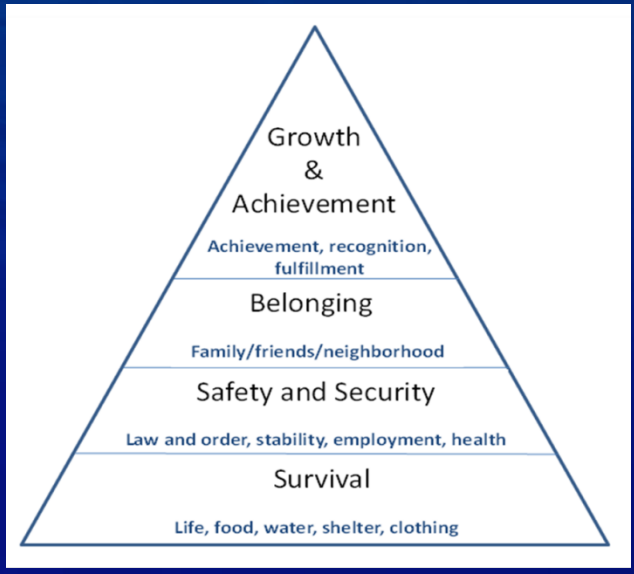
Private

- Business and Services
  - Banking, Health care
  - Utilities
  - Media
- Organizations
  - NGOs (VOAD, Relief)

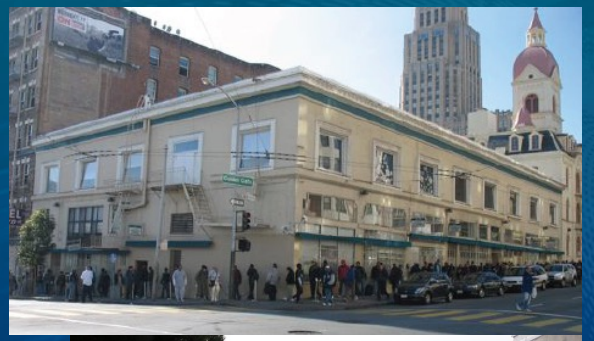
Step 2. Understand the Situation

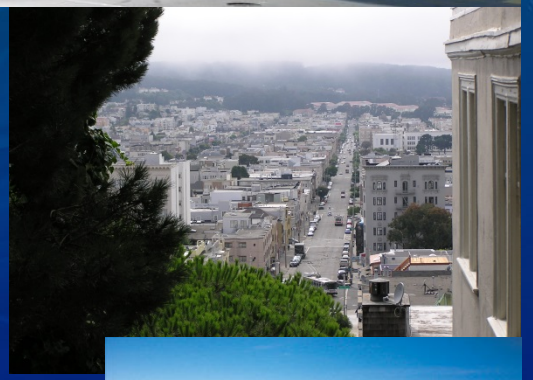
Characterize the Social Dimensions

- Community members
  - Present and future needs
  - Demographics and economic indicators
  - Social Capital/Social Vulnerabilities
- Social institutions
  - Social functions
  - Gaps in capacity
  - Dependencies on other institutions
- Community metrics



Characterize the Built Environment





Buildings

Individual structures, including equipment and contents that house people and support social institutions

Building Clusters

A set of buildings that serve a common function such as housing, healthcare, retail, etc.

Infrastructure Systems

Physical networks and structures that support social institutions, including transportation, energy, communications, water and waste water systems.

Dependencies

Internal and External, Time, Space, Source

Characterize

Location, number, construction, demands and use, etc.

Link Social Dimensions and Built Environment

Some rely more on the built environment

Emergency Rooms

Industrial Plants

Some functions change

Schools ⟶ Shelters

Identify how services are supported

- Services provided to meet needs
- Dependency on other services and systems
- Dependency on built environment
- Consequences of loss

Step 3. Determine Goals and Objectives

Establish Long Term Community Goals

- Long term goals to improve the community can guide the prioritization and implementation process.
  - Improve reliability of infrastructure systems
  - Enhance community functions
  - Reduce travel time impacts to residents and businesses
  - Revitalize an existing blighted area
- Community resilience is achieved over time
  - Resilience can be achieved with resources for current maintenance and capital improvements

Establish Desired Performance Goals for the Built Environment

- Performance goals are independent of hazard events.
  - Community functions are needed during recovery, such as acute health care, 911 call centers, emergency response
  - Consider role of a facility or system that impacts others outside the community.
- Define goals in terms of '*time needed to restore functionality*'.
- Use goals to help prioritize repair and reconstruction efforts.
- Goals may suggests criteria for new construction and retrofit of existing construction.

Determine and Characterize Hazards

- Identify prevalent hazards
  - Wind, Earthquake, Inundation
  - Fire, Snow, Rain
  - Human-caused or Technological
- Evaluate hazards for 3 levels
  - Routine — Level expected to occur frequently
    - *Should have minimal disruption*
  - Design — Level used to design buildings
    - *Anchor for community planning*
  - Extreme — Maximum considered possible
    - *Plan for critical services*

Anticipated Performance of Existing Built Environment

- Anticipated performance (restoration of function) during recovery depends
  - Damage level - Condition and capacity of structural and nonstructural systems
  - Recovery time - Materials, equipment, and labor needed for restoration
  - Dependencies on other systems that may be damaged

Hurricane Irene

Hurricane Katrina

Example Summary Resilience Matrix

Infrastructure	Recovery Time								
	Days 0	Days 1	Days 1-3	Wks 1-4	Wks 4-8	Wks 8-12	Mos 4	Mos 4-24	Mos 24+
Critical Facilities									
Buildings	90%							X	
Transportation		90%	X						
Energy		90%	X						
Water			90%		X				
Wastewater				90%				X	
Communication		90%		X					
Emergency Housing									
Buildings									
Transportation				X					
Energy				X					
Water					X				
Waste Water									
Communication				90%	X				
Housing/Neighborhoods									
Buildings						90%			X
Transportation			90%	X					
Energy			90%	X					
Water				90%				X	
Waste Water					90%			X	
Communication				90%			X		
Community Recovery									
Buildings								90%	X
Transportation				90%	X				
Energy			90%	X					
Water				90%				X	
Waste Water							90%	X	
Communication				90%			X		

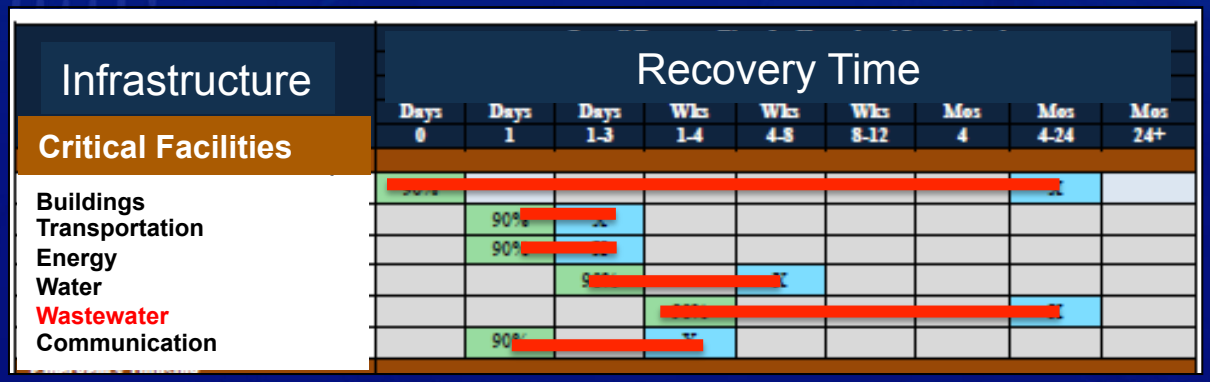
Desired Performance

Anticipated Performance

Superstorm Sandy

Step 4. Plan Development
Evaluate Gaps and Identify Solutions

- Prioritize gaps
  - Long-term community goals
  - Social needs during recovery
- Identify alternative solutions
  - Multiple stages
  - Temporary and permanent
  - Administrative
  - Construction



- Flood plain management
  - Reduce threat: relocate, elevate
- Wind and seismic preparedness
  - Strengthen: retrofit, redundancy
- Recovery Plans
  - Mutual aid agreements
  - Improvement plans

Prioritize Solutions and Develop I n Strategy

- Select solutions for prioritized performance gaps
  - Determine how alternative solutions can be combined to meet community goals.
  - Consider collaborative projects.
- Develop implementation strategies
  - Quantify benefits of impact on public safety and social needs.
  - Evaluate economic impacts on community - costs and savings.
  - Consider short- and long-term benefits versus costs.
- Determine preferred implementation strategy

2013 Mandatory Soft Story Retrofit program for all older, wood-framed, multi-family buildings ensures the safety and resilience of San Francisco.

North Texas 2050 plan integrates land use, natural resources, transportation, housing, water and wastewater infrastructure, parks and open spaces.

Step 5. Plan Preparation, Review, and Approval

Plan Approval

- Document proposed implementation strategy and supporting assessments and solutions.
- Share with all stakeholders and community members
  - Public Meetings, review and comment period
- Finalize and approve community plan.

APPROVED

Final Community Plan: Implementation Strategy

Step 6. Plan Implementation and Maintenance

Implementation

- Formally adopt community plan to guide local government and agencies
- Identify and obtain resources to implement solutions
- Track and *communicate progress* to stakeholders

Plan Maintenance

- Review strategy and solutions on a regular basis
- Modify or update as needed

Next Steps …

Community Resilience Panel

- Engage and connect community and cross-discipline stakeholders.
- Identify policy and standards-related gaps and impediments to community resilience.
- Develop and maintain a Resilience Knowledge Base.

Panel's Federal Co-Sponsors

Use of the Guide

- Encourage use of the Guide for community resilience plans.
- Develop training tools and user forum to support implementation
- Collect data on implementation of resilience planning to inform future versions of the Guide and other products.

NIST Contact

Website:

http://www.nist.gov/el/resilience/

Guide:

http://www.nist.gov/el/resilience/guide.cfm

Or google “NIST Resilience Planning Guide”

General E-mail: resilience@nist.gov

Questions?