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Guide Brief 15 -

Additional Applications of the

Community Resilience Planning Guide

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Guide Brief 15: Additional Applications of the Community Resilience Planning Guide

Applicable Section(s) of Guide: Volume 1, Section 1.2, Defining Communities

1. Purpose and Scope

This Guide Brief provides examples of how the NIST Community Resilience Planning Guide can also be used for resilience planning at the state, regional, county, and organizational scales. The Guide is written for use by communities that have distinct boundaries and function under the jurisdiction of a governance structure, but the concepts can be applied at other scales as well. When a common approach is used to develop resilience plans between interacting or cooperative government agencies (e.g., state, county, community), regional planning agencies (e.g., councils of governments), institutions (e.g., universities, corporate campuses) and organizations, their resilience plans may better align. The level of collaboration and consistency can improve significantly if participants use a common vocabulary, planning process, and shared set of performance goals for built and social environments. The NIST Guide can help provide this consistency. A summary of the Guide’s alignment with the FEMA National Planning System and its mission areas is also described.



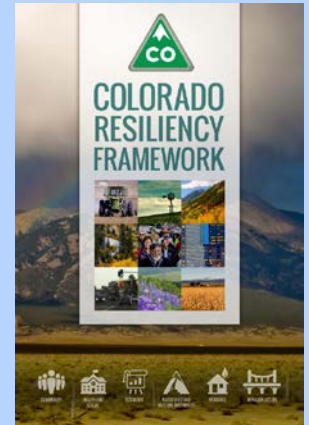
2. Resilience Planning Among Various Levels of Government

The Guide establishes an efficient, rigorous, and effective process for preparing a comprehensive resilience plan that integrates the performance of social, economic, and infrastructure systems. Resilience planning is most effective when a prioritized set of resilience goals are established, documented for reference, and incorporated into existing plans. Collaborative resilience planning from state to county to organizational levels, will improve communication, coordination, and outcomes.

2.1. Coordination of Community and State Resilience Plans

State plans for social, economic, and infrastructure systems often focus on property ownership, education, welfare, judicial systems, highway systems, protecting people from hazards, and environmental protection. States also coordinate counties and municipalities, regulate industry and utilities, implement federal mandates, administer federal block grants, and (in some states) may control building codes, planning codes, and zoning authority. Coordination of state and community resilience planning can occur in many ways. One example is the collaboration between the Colorado State Resiliency Framework and the Boulder County Collaborative, which developed a Resilience Design Performance Standard, based on the Guide, to meet HUD Community Development Block Grant Disaster Recovery (CDBG-DR) evaluation criteria.

Example: Community Collaboration with a State Plan. After the September 2013 floods, the State of Colorado determined that striving for resilience to hazards should be a priority. A coalition of agencies came together with over 150 federal and state stakeholders to develop the Colorado Resiliency Framework [State of Colorado Office of the Governor 2015]. By focusing on six resiliency sectors, the framework provided guiding principles, tools, and project prioritization resiliency criteria for use by Colorado communities to implement strategies to improve resiliency. Colorado’s Infrastructure, Housing, and Community sectors align with the Guide approach.



The Colorado framework is not only a commitment to a long-term investment in resilience, but also a call to action. The Colorado Resiliency and Recovery Office was subsequently formed and given the dual responsibility of managing the recovery – a build back better process – and coordinating the state’s long-term commitment to implementation. The Boulder County Collaborative, with the help of a consulting team, used the Guide and the Colorado Framework to create a Resilience Design Performance Standard [Boulder County CDBG-DR Collaborative 2016]. The nine project prioritization resiliency criteria from the Colorado Framework were integrated with sustainability principles to measure their recovery projects against indicators of resilience and direct future mitigation projects.

2.2. Coordination with Regional Plans

Many areas have regional planning cooperatives—such as Councils of Governments, regional planning commissions, economic development corporations, or associations—addressing common issues for adjacent cities and counties. These regional bodies may extend across state lines. Such efforts are particularly helpful to the small to mid-sized communities that can benefit from collaborative planning and policy development. Such a *Regional Resilience Initiative* is ongoing in the San Francisco Bay area led by the Association of Bay Area Governments [ABAG 2013].

Coordination between regional communities can be improved by using the same tools and measures for resilience planning. For example, by using the Guide’s Performance Goal Tables to develop plans based on *time to recovery of function*, regional and community plans can establish a common basis for evaluating their local building clusters and region-wide infrastructure systems. Benefits to common evaluation criteria include a consistent “playing field” for neighboring communities and increased opportunities to align or leverage projects between communities.

Example: Regional Resilience Planning by the Association of Bay Area Governments. The Association of Bay Area Governments established a sustainable process through which the stakeholder cities could progressively build resilience through collaborative planning. Five planning papers were produced on Background and Context, Governance, Housing, Infrastructure, and Economy and Business [ABAG 2013]. Housing recommendations include programs to facilitate rapid housing recovery and to promote housing mitigation. Recommendations related to the infrastructure sought to increase technical understanding of region-wide vulnerabilities, and increase ways to share and reduce risk. Business-related recommendations focused on retaining big business, keeping neighborhood businesses open, and minimizing impacts on the supply chain. The agenda’s action plan includes short-, medium-, and long-term actions that are consistent with the Guide’s six-step process. A systematic application of the Guide process and development of region-wide performance goals tables could facilitate collaboration and stimulate consistency in each of the implementation plans action categories.



2.3. Coordination with County Plans

Counties generally provide a wide range of services that support social, economic, and infrastructure systems for cities, towns, and unincorporated areas. Such services may include vital statistics management, public health, social services, law enforcement, judicial services, public works, parks and recreation facilities, county emergency response plans, and continuity of operation plans (COOP) [NACO 2016]. County government planning documents—such as comprehensive (or general) plans, economic development plans, land use plans, hazard mitigation plans, etc.—focus on providing services in both incorporated and unincorporated areas within their jurisdiction.

Using the Guide provides counties with the opportunity to integrate resilience planning into their routine planning activities in a way that will benefit all of the cities in their jurisdiction by understanding their situation from a wider county perspective, establishing performance goals for county-wide infrastructure systems, and monitoring progress toward resilience.

County collaboration with cities, towns, and unincorporated areas in developing integrated city-county resilience plans can be facilitated with the Guide’s six-step process, particularly through shared Performance Goals Tables. A network of planning committees that represent county-wide needs and individual community needs provides a powerful opportunity to create an integrated city-county resilience plan. Potential benefits include cost-effective leveraging of available mitigation resources and efficient deployment of recovery resources. The Boulder County Collaborative resilience planning process supported a more effective distribution of available resources between the cities, towns, and unincorporated areas and the county [Clavin 2016].

Example: Boulder County Collaborative Resilience Plan. Colorado experienced severe flooding in 2013 that affected communities in 24 counties. Subsequently, Colorado initiated a statewide effort to improve resilience to natural hazards. The Boulder County Collaborative, a cooperative group consisting of Boulder County, four cities, and three towns within it, formed to allocate federal recovery funding from HUD to the most pressing housing and infrastructure needs in the county, regardless of jurisdictional boundary. The Boulder County Collaborative used the Guide as a basis for developing a Resilient Design Performance Standard [Boulder County Collaborative 2016] to evaluate reconstruction projects, as required for HUD’s CDBG-DR funding support. The standard provides both a means to evaluate and prioritize funding for recovery projects and also serves as a guide for the design of new projects.



The first step in the development of the Resilience Design Performance Standard was to apply the Guide’s process for establishing countywide recovery performance goals to all building clusters and infrastructure systems through a series of stakeholder workshops and a separate utility provider workshop. The recovery performance goals were then reviewed and modified based on input from individual focus groups representing the four cities, three towns, and unincorporated areas of the county, plus stakeholders that represented cross-jurisdictional interests.

Performance goals, set for the county as a whole, served as planning level goals for the CDBG-DR funding process. These goals are available for incorporation into the County plans and could provide the basis for integrating resilience planning. At present, application of the performance goals outside of the funding process is left to individual jurisdictions. Each was free to tailor the goals to suit their own needs. The preliminary community-specific goals are included in Appendix B of Volume 2 of the report. Included are the jurisdiction-specific performance goals tables with commentary related to when modification from the country level goals was proposed.

3. Resilience Planning by Organizations

Resilience planning by organizations (e.g., universities, corporations, utilities) can support improved planning, as well as clarifying their role in and reliance on the resilience of the community. Organizations may focus on emergency-oriented business continuity and supply chains, and performance of their facilities. Resilience planning also helps identify specific needs and vulnerabilities (e.g., staffing, water, power, transportation), as well as critical sources of supplies and services (e.g., fuel, food, medicines) to maintain their operations.

Resilience planning can also help identify an organization's reliance on the community (e.g., employees, customers), their dependence on other buildings and infrastructure systems within the community, and how they can support community resilience (e.g., health care, rebuilding materials, utility services). After a hazard event, organizations are important participants in recovery. They may provide immediate services and/or support temporary and long-term recovery solutions. Collaborative resilience planning among organizations and communities will minimize disruption and lead to more efficient and effective response and recovery.

The Guide's six steps were expanded in the description below to illustrate how the 6-step process and principles can be applied by organizations to align their business continuity and resilience plans with a community's resilience plans.

1. **Form a Collaborative Planning Team:** Public and private organizations can benefit from a collaborative planning team with diverse areas of internal and external expertise, including local government representatives, emergency response personnel, and internal risk managers, business continuity planners, key stakeholders, and internal emergency response personnel.
2. **Understanding the Situation:** Understanding the situation includes assessing the products and services the organization provides, the organization's position and uniqueness in the supply chain, their impact on the community and local region, and their clientele, employees, and capital assets.
3. **Determine Desired Performance Goals and Objectives:** Desired performance goals may include setting performance goals life-safety protection, business continuity plans (e.g., supplies arriving in x days), and providing recovery support for employees and community residents (e.g., temporary housing for y days).
4. **Resilience Plan Development:** Resilience plans may consider organizational recovery from hazard events and the impact on their clientele and employees and the broader community; organizational dependencies on other products, services, and infrastructure systems; and the organization's ability to operate under temporary conditions until permanent repairs are made to the facilities within the organization and externally within the community. These plans may include improvements in the organization's built environment to facilitate recovery in areas that cannot be easily addressed with temporary solutions until permanent solutions can be implemented. For example, electronics and other materials critical to an organization's operations (e.g., cables in a telecommunications central office) should be elevated if flooding is a concern.
5. **Plan Preparation, Review and Approval:** Plan preparation is a collaborative, transparent, organization-based planning process that must be thoroughly reviewed, refined, and communicated both internally and externally to ensure each party or collaborative partner fully understands their roles and responsibilities and the roles and responsibilities of others.
6. **Plan Implementation:** Plan implementation may be achieved by either being ready for mitigation opportunities as they occur, or incorporating resilience projects into capital construction plans. Regular organizational resilience plan updates will provide the opportunity for evaluation of the organization's current situation and the development of improvements.

Example: University of Washington Resilience Planning. The University of Washington initiated its resilience planning process in 2012 based on concepts that are now part of the Guide process. The Office of Planning and Budgeting initiated the process, creating a planning team that represented the various functions of the university [Jenny, Poland and Pawlowski 2013]. The team defined their building clusters around their research laboratories, essential facilities, IT facilities, instructional facilities, housing, and administrative offices. They then set an overall goal to restore university instruction within one quarter (i.e., 10 weeks) based on a *Design Level* Earthquake Event (not a Maximum Level Earthquake Event)¹ and set performance goals for each building cluster and supporting infrastructure system as follows:

- Research facilities: special equipment and research materials protected
- Essential facilities remain fully operational
- IT restored within 24 hours
- Instruction completed via distance learning during the effected quarter
- Housing repaired in time to re-open at the end of the lost quarter
- Administrative functions restart within one week

In the event of an *Extreme Level* earthquake, performance goals focused on avoiding loss of life, restoring infrastructure systems within two weeks, protecting long-term research material, conducting operations from remote-temporary locations and reestablishing operations as soon as possible using temporary facilities.

The university assessed its current conditions, determined where mitigation was beneficial, built new facilities and lifelines to established performance standards, and developed prioritized retrofit programs to deal with structural and non-structural deficiencies.

Example: National Academy of Medicine Resilience Planning. The National Academy of Medicine published “Strengthening the Disaster Resilience of the Academic Biomedical Research Community: Protecting the Nation’s Investment” [NASEM 2017] that includes a method for applying the NIST Guide to an individual academic research institution with a biomedical research facility. Biomedical research facilities support high value research experiments that include rare lab samples gathered over extended periods of time. Multiple occurrences of significant losses due to hazard events has brought attention to the need to better prepare and protect the experiments, research related assets, and materials.

The report covers the full spectrum of preparedness, response, and recovery activities needed to create a resilient laboratory that protects the people, the contents, and the research activities. It recognizes that buildings—and the structural, nonstructural, utility, and control systems that support them—were built over many generations and under constrained budgets and code provisions that primarily focused on occupant safety and not protection of building contents or rapid recovery of function after a hazard event. The report points out that academic research institutions and researchers may not clearly understand the impact of constructing facilities to minimum code requirements that remain focused on safety without adequate consideration of functionality. A planning process based on the Guide is presented to illustrate how resilience can address both safety and functional recovery by understanding the needs, the status quo, the available design criteria, and interdependencies. This holistic system of planning can lead to cost-effective restoration of operations.

The Guide was used to identify and organize the elements of the built environment needed to support the laboratory. Because of the unique value of the experiments, research assets, and materials, the report recommends that academic institutions adopt performance-based design criteria for their new facilities and rehabilitation projects. The performance criteria are customized to the functions and needs of each facility. For example, a vivarium (an area, usually enclosed, for keeping and raising animals or plants for observation or research) needs to be fully functional and require a high-performance building and infrastructure systems that can support operation with limited interruption. Research laboratories, their sample storage facilities, and infrastructure systems need to be designed to protect the experiments and samples, but the labs do not need to be fully functional until the experiments can be continued. Offices and classrooms need only be designed to be safe and repairable.

The report recommends adapting the six-step planning process beginning with a planning team made up of senior

¹ At the time, the term *expected* hazard level was used. This was revised to *design* hazard level for the published version of the Guide. Both terms have the same meaning.

institutional leaders including capital planners and business continuity specialists, academic and research personnel. In the second step, the team defines the building clusters that support the academic and research functions along with the needed infrastructure systems. In step three, time to recovery goals are set for the building clusters, which in turn define the infrastructure goals.

The results were organized into a one-page performance table shown in Table 1, which was based on the Summary Resilience Table in the Guide. Only two functional groups were needed to organize the building clusters and related infrastructure systems as opposed to the four groups recommended for use in community-wide resilience planning. In this example, hurricane is the critical hazard being considered at the design level with the critical facilities group designated to remain functional to protect the samples and animals. The ancillary facilities needed to be restored in time to resume instruction.

The planning process, as illustrated in Table 1, includes a wealth of information that is applicable to response planning, the need for temporary solutions to outages, as well as the criteria needed for new design projects and rehabilitation projects. The report also provides an excellent overview for how this information can be incorporated into a holistic resilience plan.

Table 1. Academic Research Facility Performance Goals

Disturbance ¹		Restoration Levels ^{2,3}	
Hazard Type	Hurricane with storm surge	Minimal (Min)	Emergency functions
Hazard Level	Design	Functional (Func)	Primary services/functions
Affected Area	Regional	Operational (Oper)	All services/functions
Disruption Level	Moderate	As Is	Anticipated performance

Building Clusters	Support Needed ⁴	Design Hazard Performance								
		Phase 1: Short-Term			Phase 2: Intermediate			Phase 3: Long-Term		
		Days			Weeks			Months		
		0	1	1-3	1-4	4-8	8-12	4	4-24	24+
Critical Facilities										
Research Laboratory	F	Min			Func		Oper			As Is
Animal Facilities	F	Min			Func		Oper			As Is
IT Facilities	L		Oper					As Is		
Emergency Operations Center	L		Oper	As Is						
Police and Fire Facilities	L			Min	Oper	As Is				
Infrastructure supporting Critical Facilities										
Transportation	R,S		Min	Func	Oper			As Is		
Power	R,S			Oper				As Is		
Communication	L			Min	Func	Oper		As Is		
Water	L		Min	Func	Oper			As Is		
Waste Water	L			Min	Func	Oper		As Is		
Ancillary Facilities										
Instructional Facilities	F					Func	Oper		As Is	
Student and Faculty Offices	F				Min	Func	Oper		As Is	
Administrative Offices	F				Min	Func		Oper		As Is
On Campus Housing	F					Func	Oper		As Is	
Infrastructure supporting Ancillary Facilities										
Transportation	R,S				Min	Func	Oper		As Is	
Power	R,S				Min	Func	Oper		As Is	
Communication	L				Min	Func	Oper		As Is	
Water	L				Min	Func	Oper		As Is	
Waste Water	L				Min	Func	Oper		As Is	

Footnotes:

- Specify hazard type being considered to determine anticipated performance
Specify hazard level used to determine anticipated performance – Design, Extreme
Specify the anticipated size of the area affected – Local, Community, Regional
Specify anticipated severity of disruption – Minor, Moderate, Severe
- Desired usability restoration times:

Min	Emergency functions including shelter-in-place and protect research material, etc.
Func	Primary services and functions to permit usual operations without student instruction
Oper	All services and functions at normal capacity
As Is	Anticipated time required to restore operational level if a hazard event occurs given current state
- Indicate levels of support anticipated by plan: L=Local; R = Regional; S= State; MS=Multi-State; F=Federal; C = Civil (Corporate/Local)

4. Guide Alignment with FEMA National Planning System

The Guide was developed to align with the FEMA National Planning System [FEMA 2016a], which provides a unified approach for national threats and hazards across all missions areas (Prevention, Protection, Mitigation, Response and Recovery). The Guide’s six-step process (which is the same process in the NPS) recognizes a community’s social institutions and the support they require from the built environment is expressed in terms of performance goals, anticipated performance, and vulnerabilities.

As part of the NPS, the National Planning Frameworks were developed for each mission area to address core capabilities. The Guide’s 6-step process can help communities incorporate and coordinate data and analyses for the core capabilities listed below in Table 2.

Table 2. Alignment of NPA Core Capabilities and the Guide 6-Step Process

NPS Core Capabilities	Guide Step
<p><i>Community Resilience</i></p> <p>Recognize interdependent nature of economy, health, and social services, housing, infrastructure, and natural and cultural resources in a community.</p>	<p><i>2. Understand the Situation</i></p> <p>Provides a structured process to identify dependencies and linkages between community systems, to help better identify their likelihood of functioning after a hazard event.</p>
<p><i>Risk and Disaster Resilience Assessment</i></p> <p>Perform risk assessment using scientific and widely used techniques.</p>	<p><i>2. Understand the Situation</i></p> <p>Helps a community characterize current social dimensions (e.g., community members, social institutions, etc.), infrastructure condition (e.g., buildings, water, transportation, energy, etc.) and associated community needs, dependencies, and metrics.</p> <p><i>3. Determine Goals and Objectives</i></p> <p>Helps identify community resilience goals and evaluate the anticipated performance (e.g., damage or loss of function) for social and physical systems for a hazard event. Risk assessments will support these steps as they examine the integrated performance of social and physical across the community. Steps 2 and 3 lead to a prioritized list of goals and risks to support informed decisions and appropriate actions by the community and stakeholders.</p>
<p><i>Threats and Hazard Identification</i></p> <p>Develop and/or gather required data to identify threats and hazards.</p>	<p><i>3. Determine Goals and Objectives</i></p> <p>Encourages identifying threats and hazards at three levels: routine, design and extreme. Community resilience plans are based on the design hazard levels from codes and standards. Additional consideration of the performance of physical, social, and economic systems for routine and extreme hazard levels will help communities better understand their resilience risks and vulnerabilities.</p>

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Guide Alignment with FEMA National Planning System

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<p><i>Planning</i></p> <p>Incorporate findings from risk and disaster resilience assessment into planning processes.</p>	<p><i>3. Determine Goals and Objectives</i></p> <p>Helps community establish resilience goals for recovery of function in social and physical systems following a hazard event, define community hazards, and determine the anticipated performance of buildings and infrastructure systems relative to the resilience goals and hazards.</p>
<p><i>Long-term Vulnerability Reduction</i></p> <p>Develop plans for prepared individuals and families as a foundation of a resilience community.</p>	<p><i>2. Understand the Situation</i></p> <p><i>3. Determine Goals and Objectives</i></p> <p><i>4. Plan Development</i></p> <p>Support identifying vulnerabilities of and resilience planning for all community buildings, infrastructure systems, and the social and economic functions they support. Residential buildings and their occupants are an essential component of the Guide process.</p>
<p><i>Public Information and Warning</i></p> <p>Communicate resilience priorities, actions, and plans to stakeholders and those expected to take action to reduce risks.</p>	<p><i>5. Plan Preparation Review and Approval</i></p> <p>Requires communication with and feedback from the community about resilience goals, plans, and strategies to ensure community support and comprehensive consideration of multiple perspectives.</p>
<p><i>Operational Coordination</i></p> <p>Capitalize on opportunities for mitigation actions following disasters and incidents.</p>	<p><i>6. Plan Implementation and Maintenance</i></p> <p>Acts on prioritized mitigation activities based on community goals and vulnerabilities. These actions may be led by the community or in collaboration with partners.</p>

5. References

- Association of Bay Area Governments (ABAG 2013). *Regional Resilience Initiative: Policy Agenda for Recovery*. Oakland California. http://resilience.abag.ca.gov/projects/resilience_initiative/ Viewed June 2019.
- Boulder County CDBG-DR Collaborative (2016). *Resilient Design Performance Standard for Infrastructure and Dependent Facilities*. Boulder County Collaborative, Colorado. http://www.bccollaborative.org/uploads/6/6/0/6/66068141/resilientdesignperformancstandard_adopctd_05.13.2016.pdf Viewed June 2019.
- Clavin, C.T., Z.E. Petropoulos, N. Gupta, C.K. Tokita (2016). *Case Studies of Community Resilience and Disaster Recovery from the 2013 Boulder County Floods*. NIST GCR-16-011, National Institute of Standards and Technology, Gaithersburg, MD. <http://doi.org/10.6028/NIST.GCR.16-011>
- Federal Emergency Management Agency (FEMA 2016a). *National Planning System*. February 2016. Federal Emergency Management Agency, Washington, DC. https://www.fema.gov/media-library-data/1454504745569-c5234d4556a00eb7b86342c869531ea0/National_Planning_System_20151029.pdf
- Federal Emergency Management Agency (FEMA 2016b). *National Mitigation Framework*. Second Edition. June 2016. Federal Emergency Management Agency, Washington, DC. https://www.fema.gov/media-library-data/1466014166147-11a14dee807e1ebc67cd9b74c6c64bb3/National_Mitigation_Framework2nd.pdf
- Housing and Urban Development (HUD 2019). *HUD Exchange, Community Resilience*. <https://www.hudexchange.info/programs/community-resilience> Viewed June 2019.
- Jenny, P. and C. Poland (2013). *Seismic Resilient University of Washington Briefing for the City of Seattle*. Seattle, WA. http://clerk.ci.seattle.wa.us/~public/meetingrecords/2013/cbriefing20130401_4a.pdf Viewed June 2019.
- National Association of Counties (2016). *Counties Matter*. <http://www.naco.org/sites/default/files/documents/Counties-Matter.pdf> Viewed June 2019.
- National Academies of Sciences, Engineering, and Medicine (NASEM 2017). *Strengthening the Disaster Resilience of the Academic Biomedical Research Community: Protecting the Nation's Investment*. Washington, DC: The National Academies Press. DOI: <https://doi.org/10.17226/24827>
- State of Colorado Office of the Governor (2015). *Colorado Resiliency Framework*. Denver, CO. https://docs.google.com/file/d/0B_gHrzLAL2NTb3BiVFBaVkJtOFU/view Viewed June 2019.



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