Planning for Resiliency: Indianapolis
An Introduction to Resiliency Master Planning

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Acknowledgments

I. Introduction

In January 2014, a blizzard shut the City of Indianapolis down and caused 30,000 homes to lose power. For the first time in 36 years, the City issued a travel ban. Four hundred residents were transported to shelters by emergency crews. This was the second largest snowfall to occur on one day and the days that ensued produced extreme temperatures. The City did not have the resources to plow the streets. Buses and local government were closed for two days, while schools were closed for a week. Overall, 70 percent of the annual snow removal budget was spent on this single storm.

Urban resilience initiatives across the globe are addressing such gaps in preparedness. According to the 100 Resilient Cities Initiative, urban resilience is "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience" (100 Resilient Cities, 2015). Examples of chronic stresses include aging infrastructure, pronounced poverty and inequity, under developed transportation systems, and insufficient educational infrastructure. Acute shocks include flooding, blizzards, heat waves, and civil unrest.

All cities undertake master planning as part of their development process. Master planning defines the vision for the city, establishes the programs, projects, and activities to be undertaken, and determines how resources should be prioritized to realize that vision and put actions into practice. It can drive investment that will build a city's capacity to respond to their unique shocks and stresses. Cities face these ever-growing challenges that are made more pronounced by rapid urbanization and the increasing frequency and intensity of disaster events. There are several ways that urban development can be made more resilient:

- Projects take into account hazard exposure, vulnerability, and risk in their design and implementation
- Services are designed to withstand the impact of extreme or catastrophic events
- Stakeholders understand the types of risk they face and are aware of the trade-offs they need to make in addressing those risks
- Actual investments are being made on measures that reduce the risk of physical assets and populations that are exposed to hazards

II. Methodology and Problem Statement

The goal of this Plan 2020 Fellowship was to set the stage for a resiliency master plan for the City of Indianapolis. This involved research, meeting with stakeholders, conducting expert interviews, documenting my findings, and making recommendations. Research was conducted throughout the fellowship, with most of it occurring from May 26 – June 9, 2015. Meetings with stakeholders and expert interviews took place from June 10 – July 24, 2015. Compiling and documenting findings and recommendations in this report occurred from July 25 – August 14, 2015.

In my problem statement, I stated that I would convene a group of stakeholders to educate them on information and tools needed for a resiliency master plan. This group of stakeholders would succeed me as a resiliency-working group. This meeting did not take

place due to schedule conflicts and time limitations; however, I prepared and delivered meeting materials for Plan 2020 to use in the future.

III. Literature Review

Many community-wide resilience assessment methodologies have been proposed in the research literature. For this report, I drew most heavily from the National Institute of Standards and Technology (NIST) Community Resilience Planning Guide. This guide emphasizes integrating resilience planning strategies into economic development, zoning, mitigation, and other local planning activities that impact buildings, public utilities, and other infrastructure systems. The guide also recommends including a broad range of community stakeholders and representatives in the planning process. Appendix C outlines stakeholder recommendations and their role.

Lastly, the NIST guide suggests and gives brief descriptions of other planning guides, methodologies, and assessment tools. Those descriptions are presented in this section, with a brief description of its local relevance in each subsection. Some of the methodologies described in this section are limited in scope, but the types of results they produce could become portions of other methodologies. The table in Appendix A summarizes the strengths and weaknesses of the following planning guides, methodologies, and assessment tools. Appendix D lists links to some of the more relevant methodologies listed below, as well as additional helpful resources.

A. **SPUR Methodology**
The San Francisco Planning and Urban Research Association (SPUR) is a member-supported nonprofit organization that brings various stakeholders together to develop solutions for cities in the San Francisco Bay Area. SPUR developed a framework for developing mitigation policies to increase local resilience. It focuses on establishing performance goals for several clusters of buildings (i.e., groups of buildings that provide a community service, such as critical response facilities, emergency housing, or neighborhood services) and establishing target recovery times for a specified earthquake scenario in the San Francisco area. The framework consists of the following goals:
1. Define the concept of "resilience" in the context of disaster planning
2. Establish performance goals for the "expected" earthquake that supports the definition of resilience
3. Define transparent performance measures that help reach performance goals
4. Suggest next steps for San Francisco's new buildings, existing buildings, and lifelines

Local Relevance: The SPUR Methodology outlines a straightforward approach to developing mitigation policy as it relates to the built environment. Economic and social metrics are not direct outputs of the SPUR methodology, however, the framework is intended to improve economic and social resilience.

B. **Oregon Resilience Plan**
The Oregon Resilience Plan builds on the SPUR methodology to produce a statewide projection of the impacts of a natural disaster such as an earthquake or tsunami. The plan addresses impacts such as lives lost, buildings destroyed or

damaged, and households displaced. The plan also assesses the state's vulnerability as it relates to fuel supply and the resulting impacts induced by a long-term disruption of the supply. The study includes recommended actions to reduce the impacts of the selected hazard scenario and shorten the state's recovery time.

The Oregon Seismic Safety Policy Advisory Commission (OSSPAC) coordinated efforts to write the plan. OSSPAC assembled eight task groups (earthquake and tsunami scenario, business and work force continuity, coastal communities, critical buildings, transportation, energy, information and communications, water and wastewater) and assigned the following tasks to each group:

> 1. Determine the likely impacts of a magnitude 9.0 Cascadia earthquake and tsunami on its assigned sector, and estimate the time required to restore functions in that sector if the earthquake were to strike under present conditions
> 2. Define acceptable timeframes to restore functions after a future Cascadia earthquake to fulfill expected resilient performance
> 3. Recommend changes in practice and policies that, if implemented during the next 50 years, will allow Oregon to reach the desired resilience targets

Local Relevance: The Oregon Resilience Plan outlines a hazard mitigation and vulnerability assessment that is written with a resiliency "lens." It emphasizes a systems-based approach to hazard mitigation planning that anticipates a natural disaster's impact on natural resources, infrastructure, and the local economy.

C. **UNISDR Disaster Resilience Scorecard for Cities**
The United Nations International Strategy for Disaster Risk Reduction (UNISDR) Disaster Resilience Scorecard for Cities is a tool to establish a baseline measurement of current disaster resilience. The tool also provides guidance with identifying priorities for investment and action, and tracking progress for improving disaster resilience. There are 85 disaster resilience evaluation criteria grouped into the following areas:

1. Research: evidence-based compilation and communication of threats and needed responses
2. Organization: policy, planning, coordination, and financing
3. Infrastructure: critical and social infrastructure and systems and appropriate development
4. Response capability: information provision and enhancing capacity
5. Environment: maintaining and enhancing ecosystem services
6. Recovery: triage, support services, and scenario planning.

Local Relevance: The UNISDR scorecard is designed as a checklist that can be used to gather relevant information from different departments and other participating organizations/individuals according to the areas listed above. The checklist is user friendly and each evaluation criterion is broken down into the aspect of disaster resilience being measured. It is suggested that cities plan on two to three people working for a minimum of one week to complete an assessment section, ranging up to two months for a more detailed and comprehensive assessment.

D. **CARRI Community Resilience System**
The Community and Regional Resilience Institute's (CARRI) Community Resilience System (CRS) is a tool that helps communities to assess, measure, and improve their resilience. The system includes a process guide that provides a systematic approach to moving from interest and analysis to visioning and action planning. It also provides a collaborative mechanism for other interested stakeholders to support community efforts. The CRS is a Department of Homeland Security and FEMA funded initiative.

Local Relevance: The CRS addresses 18 distinct Community Service Areas (CSAs) and is designed specifically for use by community leaders. The web process is a checklist driven approach, with questions tailored for each of the CSAs. The answer to a question may trigger additional questions. For many of the questions, comment fields are provided so that communities may answer the questions as specifically as possible. CARRI recommends a facilitated approach with assistance from an external organization.

E. **CART**
The Communities Advancing Resilience Toolkit (CART) was developed by the Terrorism and Disaster Center at the University of Oklahoma Health Sciences Center. CART is designed to enhance community resilience through planning and action. It engages community organizations in collecting and using assessment data to develop and implement solutions for building community resilience for disaster prevention, preparedness, response, and recovery. The CART process uses a combination of qualitative and quantitative approaches, and it involves the following steps:
1. Generating a community profile (CART Team and Partners)
2. Refine the community profile (Community Work Groups)
3. Develop a strategic plan (Community Planning Groups)
4. Implement the plan (Community Leaders and Groups)

Local Relevance: The CART approach is not hazard specific, and it is applicable across communities of varying size and type. It allows communities to assess their resilience across a number of domains by providing a complete set of tools and guidelines. The toolkit includes the CART assessment survey, key informant interviews, data collection framework, community conversations, neighborhood infrastructure maps, community ecological maps, stakeholder analysis, SWOT analysis, and capacity and vulnerability assessment. The focus of the approach is to provide a process that engages communities in thinking about resilience and provide a foundation to move forward.

F. **BRIC**
The Baseline Resilience Indicators for Communities (BRIC) guide is based on empirical research with conceptual and theoretical underpinnings. BRIC measures overall pre-existing community resilience. The approach provides an empirically based resilience metric for use in a policy context. Using data from 30 public and freely available sources, BRIC comprises 49 indicators associated with six domains:
1. Social (10 indicators)
2. Economic (8 indicators)
3. Housing and infrastructure (9 indicators)

4. Institutional (10 indicators)
5. Community Capital (7 indicators)
6. Environmental (5 indicators)

Local Relevance: BRIC is not hazard specific, and it has been implemented at the county level. Indicators in the aforementioned domains determine areas that policy makers should invest for intervention strategies to improve resilience scores. It is recommended by the U.S. Department of Housing and Urban Development; therefore, I completed some preliminary work to identify data sources for the aforementioned indicators (see Appendix B).

G. Rockefeller Foundation CRF

The City Resilience Framework (CRF) is a framework "for articulating city resilience" developed by Arup with support from the Rockefeller Foundation 100 Resilient Cities initiative. The framework organizes 12 "key indicators" into four categories:
1. Leadership and strategy
2. Health and wellbeing
3. Infrastructure and environment
4. Economy and social

This organization integrates social and physical aspects, and it considers human-driven processes as inherent components of the system-of-systems. Economic/financial constraints are also considered in an integral way, providing a realistic setting for its application for planning purposes.

Local Relevance: The Rockefeller Foundation is accepting applications for its 100 Resilient Cities Challenge. In the event that Indianapolis receives a winning bid, this framework will be utilized. For more information, see Section V: Recommendations.

H. The NOAA Coastal Community Resilience Index

The National Oceanic and Atmospheric Administration's (NOAA) index was developed to provide a simple and inexpensive self-assessment tool to give community leaders a method of predicting if their community will reach and maintain an acceptable level of functioning after a disaster. The tool is designed for experienced local planners, engineers, floodplain managers, and administrators and can be completed in less than three hours using readily available, existing sources of information, in a yes/no question format. The eight-page assessment form addresses six broad areas:
1. Critical facilities and infrastructure
2. Transportation issues
3. Community plans and agreements
4. Mitigation measures
5. Business plans
6. Social systems

Local Relevance: The index is specifically designed for coastal communities, however, it could be a starting point to understand other locally relevant vulnerabilities. The tool estimates the adaptability of a community to a disaster, but is not meant to replace a detailed study.

I. **The FEMA Hazus Tool**
The Federal Emergency Management Agency's (FEMA) Hazus tool is used for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. The tool produces outputs on expected loss of use for buildings, loss of use for infrastructure (earthquake and flood only), shelter requirements, casualties (earthquake only), building contents and inventory losses, lost wages and income and indirect economic losses (earthquake and flood only).

Local Relevance: Hazus graphically illustrates the limits of identified high-risk locations due to flooding so users can visualize the spatial relationships between populations and other fixed geographic assets. While Hazus can be used to assess losses avoided through some mitigation measures, it does not estimate mitigation costs and therefore does not output estimates of return on investment.

IV. Findings

A city resiliency master plan will require input from many stakeholders and experts. A public-private partnership approach is essential to the planning process. A planning team may include representatives from the local government; public and private owners of buildings and infrastructure systems; local businesses and industry representatives; representatives of the community's social institutions; and any other stakeholders or interested community groups.

Before the resiliency master planning process ensues, a baseline should be completed (see Appendix B: Resiliency Baseline). This document lists the key steps of a resiliency master planning process in each section, with stakeholder recommendations in Appendix B. A resiliency master planning process will involve the following steps, which are further described in the following subsections:

- Resiliency baseline
- Form a collaborative planning team
- Understand the situation
- Determine goals and objectives
- Plan development
- Plan preparation, review, and approval
- Plan implementation and maintenance

A. Resiliency Baseline
The Department of Housing and Urban Development (HUD) recommends the BRIC indicators for developing a resiliency baseline. I worked with the Polis Center at IUPUI to identify data sources for the BRIC set of resiliency indicators. Appendix B lists the data sources for each indicator. A few of the indicators are not currently available. The Polis Center should be able to easily compile and complete the data needed for a resiliency baseline.

B. Form a Collaborative Planning Team
According to NIST, successful planning efforts in other communities have been led by a community official working with a planning team, developing recommendations through working groups of stakeholders and subject matter experts. Appendix C lists stakeholder group recommendations for Indianapolis.

C. Understand the Situation
Once a planning team is assembled, the next step is to characterize the community's social dimensions and built environment and identify links between them. The NIST Community Resiliency Planning Guide, Volume 2, goes into great detail about the process of understanding the situation locally. For guidance on understanding the situation, read Sections 9-15 in the NIST guide. The topics outlined are as follows:

1. Understanding and Characterizing the Social Community
2. Dependencies and Cascading Effects
3. Buildings
4. Transportation Systems
5. Energy Systems
6. Communication Systems
7. Water and Wastewater Systems

D. Determine Goals and Objectives
Plan 2020 embodies this step of a resiliency master plan. Building on Plan 2020's existing efforts through the lens of resiliency will consist of the following key steps:

1. Establish long-term community goals
2. Establish desired recovery performance goals for the built environment at the community level based on social needs, dependencies, and cascading effects between systems
3. Define community hazards and levels
4. Determine anticipated performance during and after a hazard event to support social functions

E. Plan Development
The American Planning Association document, Planning for Post-Disaster Recovery: Next Generation, discusses a recovery planning process and related issues. The APA reports that most disaster plans are standalone plans or integrated into other existing plans such as a community's comprehensive (general) plan. Standalone plans are easier to develop and update, and may be easier to individually implement. However, an integrated plan brings resources together and links community resilience to other standalone plans, which is essential for understanding performance and issues at a community level. Key activities for this step include:

1. Evaluate gaps between the desired and anticipated performance of the built environment to improve community resilience and summarize results
2. Identify solutions to address gaps that may include administrative and construction options
3. Prioritize solutions and develop an implementation strategy

F. Plan Preparation, Review, and Approval
To facilitate review and approval by all stakeholders and the community, the community goals and implementation strategy need to be documented with supporting information from Planning Steps A through D. Key activities for this step include:
1. Document community plan and implementation strategies
2. Obtain approval from stakeholders and community
3. Finalize and approve plan

G. Plan Implementation and Maintenance
Community resilience leaders and staff should maintain the master plan that tracks and documents the implementation of adopted strategies and solutions. Implementation also requires active outreach and communication through a variety of mechanisms about progress, support, and benefits accrued over time. Key activities for this step include:

1. Execute approved administrative and construction solutions
2. Evaluate and update on a periodic basis
3. Modify short or long-term implementation strategies to achieve performance goals as needed

V. Recommendations

Because a resiliency master plan is an ongoing, long-term process, leadership through a dedicated community official is needed to provide continuity, elevate the importance of resilience, provide authority for convening stakeholders, and engage public support. Strong support and endorsement from elected officials ensures that the planning process will have visibility, and is more likely to encourage community engagement through stakeholder participation.

Therefore, it is my recommendation that the City of Indianapolis administration creates a cabinet level city resiliency position. Furthermore, the Director of the Indianapolis Office of Sustainability should have a direct report to this position.

There are several support scenarios available to help make this possible. First, there is funding to hire a Chief Resilience Officer available through the Rockefeller Foundation's 100 Resilient Cities Challenge. Cities that are successful in the application process will receive membership in the 100 Resilient Cities Network, support to hire a Chief Resilience Officer, support to create a resilience plan, and tools and resources for implementation, helping to leverage additional billions through innovative finance. The deadline to apply is November 24, 2015.

Additionally, Second Nature has recently launched the Alliance for Resilient Campuses (ARC). Their President, Tim Carter, has shown great interest in Indianapolis as a possible participant. This scenario would potentially be spearheaded by Butler University and IUPUI in cooperation with the City. Such an effort would strengthen Plan 2020's anchor institution strategy.

Lastly, there are a number of consulting firms that specialize in urban resilience. I personally spoke with the Houston Advance Research Center, a not-for-profit organization with resiliency experience, about their previous work. During our discussion, they informed me that they have consulted for organizations outside of the

coastal Texas area. Another consulting firm to consider is Oliver Wyman. They completed a comprehensive sustainability assessment for the City of Chicago.

Appendix A: Assessment Comparison Table

Group	Category	Sub-Category	SPUR	Oregon	Scorecard	CARRI CRS	CART	BRIC	CRF	CRI	Hazus		Symbol	Description
														Existing Assessment Methodologies
1	Scope	Community size	•	•	+	+	+	+	+	•	+		+	Addresses a broad range
		Hazards	•	•	+	+	+	+	+	-	-		•	Not inherently limited
		Recovery time scales	+	+	?	?	?	?	+	•	•		-	Limitation
		Systems	+	+	?	+	-	-	+	•	•		?	Additional info. required
		Interdependencies	•	•	?	+?	-	-	+?	-	-			
2	Utility	User friendliness	•	•	+	+	+	+	•	+	•		+	High
		Utility without SMEs available	-	-	+	•?	•?	•?	•	•?	•?		•	Moderate
		Value of outputs for planning	+	+	•	?	?	?	+?	•	•?		-	Low
		Consistency with PPD-21	+	+	•	+	+	•	•	•	-		?	Additional info. required
3	Impacts Assessed	Recovery times	+	+	•	•	•	•	•	•	•		+	Explicitly assessed
		Economic impacts	•	+?	•	•	•	•	+?	-	•		•	Partially/indirectly assessed
		Social impacts	•	•	•	•	•	•	+?	•	•		-	Not assessed
													?	Additional info. required
4	Techniques Used	Checklists	-	-	Y	Y	Y	-	Y	Y	O		Y	Yes
		Interviews, Surveys	-	-	-	O	Y	-	Y	O	O		o	Optional
		Ratings	Y	Y	Y	O	Y	-	Y	O	Y			
		Existing national data sets	-	-	-	-	-	Y	-	-	Y			
		Physical inspections	O	O	O	O	-	-	-	O	O			
		Engrg. analysis or expert opinion	Y	Y	O	O	-	-	-	O	Y			
		Statistical inference	O	O	-	O	-	-	-	-	Y			
		Simulations	O	O	-	O	-	-	-	-	Y			

Source: NIST Community Resilience Planning Guide V. 2, 2015, p 240

Appendix B: Resiliency Baseline

	Variable	Effect on Resilience	Data Source
Ecological	% Land area in 100-year flood plain	-	Polis
	% Land area subject to SLR	-	No
	% Soil erosion	-	? Polis has soil data, calculating erosion around waterways only
	% Green space/undisturbed land	+	Polis can calculate by parcel class code
	% Urban (access variable)	+	Polis can calculate
	% Forested land cover (wildfire potential)	-	Polis can calculate
	% Land with hydric soils (liquefaction)	-	Polis
	% Wetland loss (ecosystem services)	-	?
	Variable	**Effect on Resilience**	**Data Source**
Social	Racial/ethnic inequality (abs. value of difference in % black, % white, etc.)	-	SAVI – is this counts of ppl or income inequality?
	Educational inequality (abs. value of difference less than 9th grade & college)	-	SAVI –diff in ed attain. rates
	Physicians/10,000 (health access)	+	? using INPC data covers 90% of county
	Elderly (%)	-	SAVI
	Social vulnerability index (SoVI)	-	SAVI has SES index
	Transport challenged (% no vehicle)	-	SAVI
	Communication challenged (% no phone)	-	SAVI
	Language competency (% ESL)	-	SAVI
	Crime rate (per 10,000)	-	SAVI (per 1,000)
	Special needs (% pop with disabilities)	-	SAVI
	Health coverage (% pop with coverage)	+	SAVI

	Variable	Effect on Resilience	Data Source
	Population wellness (% minority infant mortality rate)	-	SAVI – by race
Economic	**Variable**	**Effect on Resilience**	**Data Source**
	Housing capital (difference % white homeowner and % minority homeowners)	-	SAVI
	Homeowners (%)	+	SAVI
	Employment (%)	+	SAVI
	Median household income	+	SAVI
	Poverty (%)	-	SAVI
	Single sector employment (% primary sector + tourism)	-	SAVI – employment by industry
	Female labor force participation (%)	+	SAVI
	Business size (% large > 100 employees)	+	?
Institutional	**Variable**	**Effect on Resilience**	**Data Source**
	Recent hazard mitigation plan (yes/no)	+	n/a
	NFIP policies (per occupied housing unit)	+	Polis can calculate
	StormReady participation (yes/no)	+	n/a
	Municipal expenditures (fire, police, emergency services as a %)	+	?
Infrastructure	**Variable**	**Effect on Resilience**	**Data Source**
	Mobile homes (%)	-	SAVI
	Shelter capacity (% rental vacancy)	+	?
	Medical capacity (hospital beds/10,000)	+	Polis can calculate
	Building permits for new construction (#)	-	Polis
	Evacuation potential (arterial miles/mi^2)	+	Polis can calculate
	Evacuation potential (#highway bridges)	-	Polis
	Housing age (% built 1970-1994)	-	SAVI
Community Competence	**Variable**	**Effect on Resilience**	**Data Source**
	Political fragmentation (# local governments and special districts)	-	Polis

	Previous disaster experience (PDD, yes or no)	+	?
	Social connectivity (VOADs yes or no)	+	?
	Dependency ratio (debt/revenue)	-	SAVI can do age-based ration but not debit to revenue
	International migration (%)	-	SAVI can calculate
	Sense of place (% born in state and still live here)	+	SAVI can calculate
	Social capital (churches/capita)	+	SAVI can calculate
	Social capital (% registered voters voting in election)	+	Polis can calculate
	Internal migration (% outmigration)	-	County level?

Appendix C: Stakeholders and Local Experts

	Role	Function	Stakeholder
Elected Officials	Office of the Mayor	Provides leadership, encourages collaboration between departments, and serves as link to the stakeholders in organizing, compiling, and vetting plan throughout community.	Current Mayor or Deputy Mayor
	City Council	Represents diversity of community opinion, adopts needed plans, enacts legislation.	One Republican and one Democrat
Local Government	Code Enforcement	Identifies appropriate codes and standards for adoption; reviews building plans and provides inspection services, as needed, to assure proper construction; and provides post-event inspection services aimed at restoring functionality as soon as possible.	Manuel Mendez, Director
	Department of Public Works	Responsible for publicly owned buildings, roads, and infrastructure, and identifies emergency response and recovery routes.	Andy Lutz, Director
	Fire Department	Responsible for codes and enforcement of construction standards related to fire safety and brings expertise related to urban fires, wildfires, and fire following hazard events.	Captain Dale Rolfson, IT Manager at IFD and Indiana Task Force 1
	IndyParks	Identifies open spaces available for emergency or interim use for housing and other neighborhood functions.	
	Public Utilities Commission	Responsible for overseeing private and public owned utility systems, setting rates and service levels, and assisting in developing recovery goals.	
	Department of	Identifies pre-event land use	Brad Beaubien,

	Metropolitan Development	and mitigation opportunities and post-event recovery opportunities that will improve the city's layout and reduce vulnerabilities through repair and reconstruction projects and future development.	Acting Director
	Division of Homeland Security and Department of Public Safety	Identifies what is needed from the physical infrastructure to streamline response and recovery of the social institutions within the community.	Gary Coons, Chief of Homeland Security and Troy Riggs, Director of Public Safety
	Marion County Schools Board of Education	Represent all levels of education will clarify the system's tolerance for disruptions and ability to operate under temporary conditions.	Richard Pellegrin, Board President
	Health and Hospital Corporation of Marion County	Identifies the services vital to support community member needs, including senior, youth, people with disabilities, and family services and programs (including childcare).	Matt Gutwein, President and CEO
Business and Service Professionals	Indy Chamber	Represent business and industry interests and include many of the community's business leaders who will bring a clear perspective on the economic impact of potential disasters and also the impact of resilience plans.	Michael Huber, President and CEO
	Community business districts	Represent the large and small businesses that support the neighborhoods and play a key role in community recovery.	
	Building owners	Provide the individual building owners' perspective on resilience and recovery in terms of their needs for labor, buildings, utilities, and other infrastructure systems, as well as how their needs influence the performance levels selected.	Gus Miller, Principal of Office Indy

	Utility providers	Key to rapid recovery of functionality, and will bring perspective on the changes needed in current regulations and rate limitations. Collaboration between providers is essential to understand the community needs and priorities for recovery, as well as the dependencies they share.	Jan Diggins, Community Redevelopment at Citizens Energy Group Bill Henley, Vice President of Regulatory and Government Affairs at IPL
	Healthcare providers	Including public health officials, providers of acute, sub-acute, rehabilitation, mental health, behavioral and end of life care, who will bring clarity to the services that are being provided before and those that are needed immediately after a significant event throughout the recovery period.	Dr. Jonathan Gottlieb, Executive Vice President and Chief Medical Executive for IU Health
	Architects and urban planners	Bring a vision for an improved community that supports transit, housing, integrated neighborhoods, and improved quality of life.	Justin Ferguson, Director of the Ball State College of Architecture and Planning: Indianapolis Center
	Engineers	Determine the design and performance capabilities for the built environment and assist in developing suitable standards and guidelines. They can help establish desired performance goals and the likely performance anticipated for the existing built environment.	Peter Schubert, Director of the Richard G. Lugar Center for Renewable Energy
	Construction professionals	Provide perspective on the feasibility and consequences of changing building design and construction practices, and also provide perspective from their clean up and reconstruction activities after	Ty M. Price, Construction Manager

		a disaster.	
	Media	Plays a key role in disseminating important information about the response and recovery efforts, as well as the resilience process and progress, to community members.	Kevin McKinney, Editor and Publisher of NUVO
Community and Volunteer Organizations	Nongovernmental Organizations	NGOs perform a variety of service and humanitarian functions, bring community members' concerns to governments, advocate and monitor policies and encourage political participation through provision of information. Within the Community Service social institution, NGOs provide support to other social institutions, especially those that provide services to vulnerable and at-risk populations.	Jesse Kharbanda, Executive Director of Hoosier Environmental Council Jamie Palmer, Senior Policy Analyst at IU Public Policy Institute Dr. Gabriel Filippelli, Director of Center for Urban Health at IUPUI Sharon Kandris, Director of Community Informatics at the Polis Center Dr. Yi Wang, Assistant Professor at IU Fairbanks School of Public Health
	Voluntary Organizations Active in Disaster (VOAD)	Nonprofit, nonpartisan, membership-based organizations that help to build resiliency in communities nationwide. These serve as the forum where organizations share knowledge and resources	Red Cross Connect2Help Silver Jackets (team of federal, state, and local agencies

		throughout the disaster preparedness cycle to help survivors and their communities.	focused on reducing flood risk and other natural disasters)
	Community service organizations and Religious/cultural groups	Volunteer, membership-based groups that provide services to the community's members and have a role in the post-disaster environment.	Mayor's Neighborhood Liaisons Wheeler Mission Churches

Appendix D: Helpful Links and References

NIST Community Resilience Planning Guide
http://www.nist.gov/el/building_materials/resilience/guide.cfm

Baseline Resilience Indicators for Communities
http://resiliencesystem.com/sites/default/files/Cutter_jhsem.2010.7.1.1732.pdf

Rockefeller Foundation 100 Resilient Cities Initiative
http://www.100resilientcities.org/

Resilience Alliance
http://www.resalliance.org/

ResilientCity.Org
http://www.resilientcity.org

Communities Advancing Resilience Toolkit
http://www.oumedicine.com/docs/ad-psychiatry-workfiles/cart_online-final_042012.pdf?sfvrsn=2

UNISDR Disaster Resilience Scorecard for Cities
http://www.unisdr.org/2014/campaign-cities/Resilience Scorecard V1.5.pdf

Assessing Urban Resilience: Lessons from Using the UNISDR Self Assessment Tool
http://pdf.usaid.gov/pdf_docs/pnaec709.pdf

Urban Resilience Master Planning for Practitioners and Policy Makers
http://emi-megacities.org/wp-content/uploads/2015/03/URMP-GB-Final-July2015.pdf

The Institute for Social and Environmental Transition (ISET)—International Climate Resilience Framework
http://i-s-e-t.org/resources/training/climate-resilience-framework.html

Climate Change Adaptation Guidebook for Municipalities in the Chicago Region
http://www.cmap.illinois.gov/documents/10180/14193/FY13-0119+Climate+Adaptation+toolkit+lowres.pdf/98b5e57c-453f-4111-bc02-6e2cdea0dabc

Wilson Center Disaster Response Guide
http://www.wilsoncenter.org/publication/connecting-grassroots-and-government-for-disaster-response-1

Ready.gov Assessment
http://www.ready.gov/risk-assessment

Green Infrastructure and the Sustainable Communities Initiative
http://portal.hud.gov/hudportal/documents/huddoc?id=greeninfrastructsci.pdf

ICLEI Resilient Cities Series
http://resilient-cities.iclei.org/

CERES and ICLEI Joint Report
http://communitascoalition.org/pdf/climate_resilience_cities.pdf

New Orleans Resilience Strategy
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