



Checklists for building and planning for resilience and sustainability

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1 CHECKLISTS TO GUIDE ARCHITECTS / ENGINEERS. CONSTRUCTION & FACILITY MANAGERS

Guideline documents for planning, design and construction of facilities and sites.

2 COMMUNITY ENGAGEMENT

References for “whole community,” and stakeholder engagement, defined as part of FEMA Natural Hazard Mitigation, Programs for Public Information (PPI), and NFIP Community Rating System programs.

3 COMPREHENSIVE PLANNING & ZONING CHECKLISTS

State-of-art references that promote sustainability in planning and building standards and practices.

ADDITIONAL RESOURCES

- OARS List Organizations Addressing Resilience and Sustainability www.TheOARSlist.com
- FEMA guidelines and checklists: Site Evaluation and Building Evaluation are summarized in Donald Watson and Michele Adams, P.E. Design for Flooding (Wiley 2011).
- NEW: Alex Wilson et al. US GBC LEED “PILOT CREDITS” for Resilient Design
Source: <http://www.resilientdesign.org/leed-pilot-credits-on-resilient-design-adopted/>

SHORT TAKES

A SAFE & RESILIENT COMMUNITY

1. *Is knowledgeable and healthy. It has the ability to assess, manage, and monitor its risks. It can learn new skills and build on past experiences.*
2. *Is organized. It has the capacity to identify problems, establish priorities, and act.*
3. *Is connected. It has relationships with external actors (family, friends, faith groups, government) who provide a wider supportive environment and supply goods and services when needed.*
4. *Has infrastructure and services. It has strong housing, transport, power, water, and sanitation systems. It has the ability to maintain, repair, and renovate them.*
5. *Has economic opportunities. It has a diverse range of employment and income opportunities and financial services. It is flexible and resourceful and has the capacity to accept uncertainty and respond (proactively) to change.*
6. *Can manage its natural assets. It recognizes their value and has the ability to protect, enhance, and maintain them.*

Source: "Understanding Community Resilience and Program Factors That Strengthen Them", International Federation of Red Cross and Red Crescent Societies, Geneva, 2012.

RISK ANALYSIS Source: The World Bank Understanding Risk (UR) November 2014

Achieving resilience requires public policy makers, business leaders, and researchers to translate the current science into action and collaborate to accelerate the understanding of the evolving risk. In summary, measures to reduce risk should have a "trigger point" for implementation where cost effective measures of resilience are reasonable and actionable.

1. Climate science is not a long-term weather forecast. Climate trends have to be expressed in probabilistic terms due to the high degree of variability in what we observe as weather.
2. The specific hazards and the time frame of change are important.
3. Risk is currently driven by economic factors.
4. The need for energy is the driving factor of economic growth. Population growth and urbanization will continue to increase demand for energy in the most available and cost effective forms. Energy is the key challenge in terms of efficiency and overall business value stability.
5. There is a space full of opportunity for improved economic growth and reduced risk... Innovation (of all types) that is firmly in this space is yet another economic opportunity. [p. 10-11]

1. *Concentrate effort on the largest risks.*
2. *Base analysis on the best available information: where science is available, use it.*
3. *Avoid the dangers of averaging, which can understate or obscure extreme risks.*
4. *Carry out continual reassessment of the risk.*
5. *Cater for human factors by taking into account the possibility of human error and the risks arising from human behavior.*
6. *Take account of uncertainty by ensuring that the risks with the largest impacts are considered, even if their probability is very low or is itself uncertain.*

Trevor Maynard, Head of Exposure Management and Reinsurance, Lloyds of London

WHAT INDIVIDUAL PRACTITIONERS CAN DO

- Be informed of emerging practices, including professional responsibilities and liabilities.
- Document risks of natural hazards of project and site.
- Establish office practice protocols to review drawings and specifications for hazard & risk criteria.
- Keep records of risk analysis, engineering calculations and design decisions.
- Engage expertise of qualified consultants with special technical knowledge appropriate to project.
- Obtain formal sign-offs of communications that inform clients fully and formally of risks.

WHAT INDUSTRY PROFESSIONAL ASSOCIATIONS CAN DO

Industry associations and leaders can undertake consensus-based discussions to help define expected standards to preserve and protect public health and safety in building and civil infrastructure projects.

1 CHECKLISTS TO GUIDE ARCHITECTS / ENGINEERS. CONSTRUCTION & FACILITY MANAGERS

Guidance for planning, design and construction of facilities and sites.

ARCHITECTURAL SERVICE related to disaster risk reduction (DRR)

Source: Compiled by Donald Watson, FAIA

PRE-DESIGN / PROGRAM VERIFICATION (Additional services)

- Define risks, code requirements, and recommended safety measures.
- Define building commissioning and maintenance protocols (NIC or IC?)
- Define financial prospectus (life of property value & investment).

SCHEMATIC DESIGN (Basic services)

- Integrated design for risk assessment / “table top” scenarios
- Rapid prototyping of design options
- Confirmation of “prototype” vs. “established standard.”

Facilities Operation & Management (Owner)

- Define/test emergency evacuation/access.
- Define threat preparation procedures: floodgates, pumps, removals.
- Define recovery procedures (pumping, drying, replacement).

RETROFIT CHECKLIST

References: US GBC Resiliency Task Force; FTA Emergency Relief Program;
John Squerciati, FEMA 942 Hurricane Sandy in NJNY Nov. 2013 Critical Facilities.

A&E

- Remove/Elevate or protect subgrade equipment and critical functions.*
* triage non-essential services.
- Design appropriate combination of dryfloodproofing and wetfloodproofing.
- Elevate or floodproof elevator equipment.
- Protect emergency power / water systems.

M/E/P

- Install flood/other risk monitors/alarms (mold, corrosion).
- Install flotation / implosion protection fuel/storage tanks.
- Waterproof across all subgrade utility connections & equipment.
- Install backflow valves/cut outs, clean outs all water/sewer connects.
- Install sump pumps w/ emergency power.

Facilities Operation & Management (Owner)

- Define / test emergency evacuation/access.
- Define threat preparation procedures: floodgates, pumps, removals.
- Define recovery procedures (pumping, drying, replacement).

WHY MITIGATION PRACTITIONERS A&E HAVE A HIGHER STANDARD OF CARE

Source: Watson, Donald: Standard of Care (Working Paper 03)

- **Current codes and standards are in process of development, following new storm impacts and FEMA model regulations / IC updates.**

- **Not all jurisdictions fully or adequately reference or enforce their Codes.**
- **Responsible climate science experts state that design assumptions about climate trends, including Sea Level Rise, may underestimate probable events.**
- **ACSE and other standards setting organizations, including FEMA, state that meeting current codes and standards is a prerequisite, but not a complete professional standard of care in providing A&E services for buildings and sites.**

Standard of Care

Definition [1 Legal dictionary]: The watchfulness, attention, caution and prudence that a reasonable person in the circumstances would exercise. If a person's actions do not meet this standard of care, then his/her acts fail to meet the duty of care, which all people (supposedly) have toward others. Failure to meet the standard is negligence, and any damages resulting there from may be claimed in a lawsuit by the injured party. The problem is that the "standard" is often a subjective issue upon which reasonable people can differ.

Definition [2 Business Dictionary]: Ethical or legal duty of a professional to exercise the level of care, diligence, and skill prescribed in the code of practice of his or her profession, or as other professionals in the same discipline would in the same or similar circumstances.

ENTERPRISE FOUNDATION Criteria for HEALTHY LIVING ENVIRONMENT

Source: Enterprise Foundation Green Communities Criteria Checklist.

(selected items only related to energy conservation and healthy indoor environmental criteria).

Enterprise Foundation has a rating system that follows these criteria for funding evaluation.

7.2 Environmentally Preferable Flooring

Do not install carpets in entryways, laundry rooms, bathrooms, kitchens / kitchenettes, utility rooms, and all rooms of ground-connected floors. Any carpet products used must meet the Carpet and Rug Institute's Green Label or Green Label Plus certification for carpet, pad, and carpet adhesives. Any hard surface flooring products used must be either ceramic tile, unfinished hardwood floors, **OR** in compliance with the Scientific Certification System's Floor Score program criteria.

7.3 Environmentally Preferable Flooring: Alternative Sources

Use non-vinyl, non-carpet floor coverings in all rooms of building.

7.4a Exhaust Fans: Bathroom *(New Construction and Substantial Rehab only)*

Install Energy Star-labeled bathroom fans that exhaust to the outdoors, are connected to a light switch, and are equipped with a humidistat sensor, timer, or other control (e.g., occupancy sensor, delay off switch, ventilation controller).

7.4b Exhaust Fans: Bathroom *(Moderate Rehab only)*

Install Energy Star-labeled bathroom fans that exhaust to the outdoors, are connected to a light switch, and are equipped with a humidistat sensor, timer, or other control (e.g., occupancy sensor, delay off switch, ventilation controller).

7.5a Exhaust Fans: Kitchen *(New Construction and Substantial Rehab only)*

Install power-vented fans or range hoods that exhaust to the exterior at the appropriate CFM rate, per ASHRAE 62.2, or install a central ventilation system with rooftop fans that meet efficiency criteria.

7.5b Exhaust Fans: Kitchen *(Moderate Rehab only)*

Install power-vented fans or range hoods that exhaust to the exterior at the appropriate CFM rate, per ASHRAE 62.2, or install a central ventilation system with rooftop fans that meet efficiency criteria.

7.6a Ventilation *(New Construction and Substantial Rehab only)*

Install a ventilation system for the dwelling unit capable of providing adequate fresh air per ASHRAE requirements for the building type.

7.6b Ventilation *(Moderate Rehab only)*

Install a ventilation system for the dwelling unit capable of providing adequate fresh air per ASHRAE requirements for the building type.

7.7 Clothes Dryer Exhaust

Clothes dryers must be exhausted directly to the outdoors using rigid-type duct work.

7.8 Combustion Equipment

Specify power-vented or direct vent equipment when installing new space and water-heating equipment in New Construction and any Substantial and Moderate Rehab projects.

7.9a Mold Prevention: Water Heaters

Provide adequate drainage for water heaters that includes drains or catch pans with drains piped to the exterior of the dwelling.

7.9b Mold Prevention: Surfaces

In bathrooms, kitchens, and laundry rooms, use materials that have durable, cleanable surfaces.

7.9c Mold Prevention: Tub and Shower Enclosures

Use non-paper-faced backing materials such as cement board, fiber cement board, or equivalent in bathrooms.

7.10 Vapor Barrier Strategies *(New Construction and Rehab Projects with foundation work only)*

Install vapor barriers that meet specified criteria appropriate for the foundation type.

7.11 Radon Mitigation *(New Construction and Substantial Rehab only)*

For New Construction in EPA Zone 1 and 2 areas, install passive radon-resistant features below the slab. For Substantial Rehab projects in those Zones, test for the presence of radon and mitigate if elevated levels exist.

7.12 Water Drainage *(New Construction and Rehab projects replacing assemblies called out in Criterion only)* Provide drainage of water away from windows, walls, and foundations by implementing list of techniques.

7.13 Garage Isolation

Follow list of criteria for projects with garages, including: provide a continuous air barrier between the conditioned (living) space and any garage space to prevent the migration of any contaminants into the living space, and install a CO alarm inside the house in the room with a door to the garage *and* outside all sleeping areas.

7.14 Integrated Pest Management

Seal all wall, floor, and joint penetrations with low-VOC caulking or other appropriate sealing methods to prevent pest entry.

7.15 Lead-Safe Work Practices *(Substantial and Moderate Rehab only)*

For properties built before 1978, use lead-safe work practices consistent with the EPA's Renovation, Repair, and Painting Regulation and applicable HUD requirements.

7.16 Smoke-Free Building

Implement and enforce a no smoking policy in all common, individual living areas, and with a 25-foot perimeter around the exterior of all residential buildings.

8.1 Building Maintenance Manual *(All Multifamily Projects)*

Provide a building maintenance manual that addresses maintenance schedules and other specific instructions related to the building's green features.

8.2 Resident Manual

Provide a guide for homeowners and renters that explains the intent, benefits, use, and maintenance of green building features.

8.3 Resident and Property Manager Orientation

Provide a comprehensive walk-through and orientation for residents and property managers using the appropriate building maintenance or resident's manual.

8.4 Project Data Collection and Monitoring System

Collect and monitor project performance data on energy, water, and, if possible, healthy living environments for a minimum of five years.

Checklist: Resilient Design: A Checklist of Actions

Source: Alex Wilson Green Build

Ensure a home is safe in a storm

Avoid building in flood-prone areas: Always avoid building in 100-year flood zones, and try to avoid building in 500-year flood zones.

Design to stringent hurricane codes: Design to the Miami-Dade County Hurricane Code or comparable standards for resistance to wind and uplift.

Include a safe room: Include a safe room built to FEMA standards in the house or garage.

Build to resist or survive rain and flooding

Provide adequate overhang: Provide ample roof overhangs (24" minimum recommended) to keep rain away from walls.

Provide rainscreen: A rainscreen should be provided in the wall in all climates; this could be a full rainscreen created by strapping under siding, or a rainscreen housewrap.

Minimize the collection or amplification of stormwater: Provide for onsite infiltration of stormwater whenever possible; avoid curbs, relying instead on vegetated swales and infiltration basins.

Provide ample stormwater conveyance: When storm sewers and culverts are required, ensure that the diameter is suitable for the increasing stormwater flows expected with climate change.

In coastal and flood-prone areas, elevate living space: Common practice in the Gulf Coast and other low-lying areas is to situate living space on the second floor, supported by piers; the lower-floor space is designed to get wet.

Consider breakaway lower-floor components: In areas where rising creeks, rivers, or coastal storm surges could inundate a foundation, provide breakaway components so that flowing water will not knock the building down.

Elevate electrical and mechanical equipment: Even where rising water is not a risk, basement flooding may occur from intense storms or a failing washing machine; always elevate mechanical and electrical equipment in basements.

Specify materials that can get wet and dry out: Use materials that can get wet and then be dried out without permanent damage, such as non-paper-faced drywall.

Build superinsulated envelopes

In cold climates, follow the 10-20-40-60 rule: In Climate Zones 5–7, provide a minimum R-10 under slabs, R-20 in foundation walls, R-40 in above-grade walls, and R-60 in attics or roofs. (Climate zones from DOE and the International Energy Conservation Code.)

In hot climates, follow the 5-10-20-60 rule: In Climate Zones 1–2, provide R-5 under slabs and on below-grade foundation walls; R-10 for above-grade foundation walls; R-20 for above-grade walls; and R-60 in attics or roofs. (For Climate Zones 3-4, choose intermediate levels of insulation.)

In cold climates, specify R-5 windows; lower in moderate climates: In Climate Zones 5–7, windows should have unit R-values (averaging edges as well as center-of-glass as per NFRC standards) of 5.0 or higher. In milder climates, unit R-values of at least 3.0 are acceptable (see guidelines below on solar gain and heat rejection).

Build airtight homes: Aim for 1.5 air changes per hour at 50 pascals or 0.15 CFM per square foot of building shell at 50 pascals in Climate Zones 5–7, as measured with a blower door. In milder climates, 2 ACH (0.2 CFM/sf of shell) at 50 pascals is adequate.

Incorporate passive solar design in heating climates

Orient building to optimize wintertime solar gain: Orient homes and other skin-dominated buildings on an east-west axis so that the glazing area is greater on the south (for direct-gain passive solar heating) than on the east or west.

Tune glazings by orientation: Use window glazings with high solar heat gain coefficient (SHGC) on the south orientation to maximize solar gain, even if the R-value of that glazing is lower than on other orientations.

Use modeling tools to optimize passive solar design: Use an energy design software package that does a good job at modeling passive solar design (e.g., Energy-10, Energy Plus, PHPP, REM-Design).

Provide thermal mass: Include adequate thermal mass within the thermal envelope to store solar heat and prevent overheating (slab or tile floor, brick wall facings, plaster walls, etc.); darker surfaces on thermal mass will improve solar absorption.

Minimize cooling loads in cooling climates

Orient buildings wisely: Orient homes and other skin-dominated buildings on an east-west axis to minimize exposure to low-angle sun that's hard to shade against.

Tune glazings by orientation: Use window glazings with low solar heat gain coefficient (SHGC) but high visible light transmittance on east and west orientations to limit solar gain.

Block unwanted solar gain: Use such strategies as porches, fixed overhangs, awnings, exterior roller shades, exterior plantings, and exterior roller blinds on the south, east, and west to limit unwanted solar gain.

Specify reflective, high-emissivity roofing: For steep-slope roofs, specify roofing with a solar reflectance index (SRI) of at least 29, and for low-slope roofing at least 78—certified by the Cool Roof Rating Council (www.coolroofs.org). These roofs are also more durable.

Consider a radiant barrier for unheated attics: Radiant-barrier roof sheathing or a suspended radiant barrier can reduce air temperatures in an unheated attic, reducing heat transfer into the conditioned space below.

Provide natural cooling

Provide operable windows: Install operable windows, even in commercial buildings (even if windows are to be kept closed during normal operation).

Channel breezes through the building: Design the building geometry to channel cooling breezes through the building; allow for convenient nighttime flushing.

Provide training on building ventilation: Provide guidance to building occupants on effective ventilation strategies, such as closing the building up during the day and opening it at night for “night flushing.” Even if humidity concerns preclude natural ventilation during normal building operation, during times of emergency that higher humidity may be acceptable.

Maximize daylighting

Install clerestories, skylights, or windows high on walls: Use fenestration high on walls or roofs to bring daylight deep into rooms (but use care with skylights, especially, not to cause overheating).

Consider tubular skylights: Particularly for corridors and interior rooms, install tubular skylights to bring daylight through attics or upper-floor spaces (specify models that minimize heat loss).

Specify high-visible-transmittance glazing: To maximize the transmission of daylight, specify glazings with high visible light transmittance (VT or Tvis).

Reflect light deeper into rooms: Use light shelves or specially designed reflective-louvered blinds to reflect light deep into rooms (more appropriate in commercial buildings).

Paint interior ceilings and walls light colors: To improve internal distribution of daylight, use light-colored paints on ceilings and walls.

Provide backup renewable energy systems

Install wood stoves for backup heat: In rural areas without significant air pollution problems, install clean-burning wood stoves for backup heat.

Consider pellet stoves for backup heat: Particularly in high-pollution areas where wood stoves are not desirable, consider pellet stoves that have DC fans with kits or operation using battery power.

Install solar water heating: Provide solar water heating using a system that will operate without AC electricity (passive thermosiphon or integral-collector-storage system, or an active system with integral PV module for power).

Provide onsite renewables: A high level of resilience can be provided with a photovoltaic (PV) system that will operate when the utility grid is down (most net-metered, grid-connected systems will not work during a power outage); a battery bank will be needed for nighttime use, but a few inverters can provide daytime use of electricity during power outages.

Consider a site-charged electric vehicle: Oversize a PV system for the home and use excess power for charging an electric or plug-in-hybrid car.

Plan for water shortages

Maximize water conservation: Install high-efficiency plumbing fixtures: 1.28 gallon-per-flush toilets; 1.5 gallon-per-minute showerheads; 0.5 gallon-per-minute bathroom faucets. Using water efficiently is critically important if stored water is to be relied on in an emergency.

Consider composting toilets and waterless urinals :For even greater water savings in the right applications, install composting toilets and waterless urinals; these can be used during times with no water.

Avoid lawns: Landscape with plants adapted to the local climate that can survive droughts.

Develop a gravity-flow or hand-pump water source: In rural areas, seek a traditional spring located above the building to provide for gravity-flow water delivery, or add a hand pump to an onsite well.

Store water onsite: Provide an onsite cistern or other long-term water storage; keep containers sealed and out of direct sun.

Provide rainwater harvesting: Install a rainwater harvesting system with storage; these can range from simple rain barrels to sophisticated systems with large cisterns and full water treatment; provide for gravity distribution if possible.

Address fire resistance and durability

Build for fire safety: Follow FEMA or other guidelines for safe construction practices in areas prone to wildfires.

Use only fire-resistant decking: Particularly in areas prone to wildfires or drought, use decking that resists combustion, such as sodium-silicate-treated wood, or install non-combustible stone or brick patios.

Install non-combustible cladding and fire-resistant construction details: Use non-combustible cladding in areas prone to wildfire or drought; design soffits and vents to prevent wind-borne ember entry; specify noncombustible metal or Class A fire-resistive roofing.

Plan for insect ranges to expand: Incorporate rigorous measures to control termites and other wood-boring insects whose ranges will expand. For example, use below-grade insulation that is impervious to insects, such as cellular glass, and consider borate-treated wood framing.

Prevent ice dams: Follow proper building science guidance on detailing to prevent ice dams on roofs (see www.buildingscience.com).

Consider resilience at the community scale

Create pedestrian-friendly communities: Make getting around without cars more feasible through traffic-calming measures and other features to improve walkability.

Provide bike lanes and paths: Making communities accessible to bicycle travel is one of the best ways to reduce dependence on cars.

Provide preferential parking for bikes and electric cars: Make car parking less convenient (and more expensive) and make bicycle and electric vehicle parking more convenient.

Encourage mixed-use, higher-density development: Mixed-use, high-density communities are inherently more walkable and less dependent on cars, and public transit is much more viable in these places.

Look to schools as resilient gathering places: Schools and other public spaces are typically designated as emergency shelters during extended power outages or other emergencies; these buildings should embody a wide range of resilience features.

Encourage smaller, locally owned businesses: Keeping more money circulating within a community may make more money available for emergency response, infrastructure improvements, and other aspects of resilience.

Consider “islandable” electric utility systems: Smaller municipal or private microgrids may be able to be isolated from the regional power grid during widespread outages.

Support local food production

Encourage home and community gardens: With back yards and vacant lots in cities, families can grow a significant percentage of their own food.

Protect open, arable land : Work through planning commissions and zoning bodies to protect open, arable land for long-term agricultural potential.

Encourage CSAs and other forms of agricultural business: Community-supported agriculture (CSA) operations connect farmers and their markets directly.

Remove impediments to farming: Review zoning bylaws and regulations that may restrict farming operations, such as backyard chickens, and remove unneeded impediments.



2 COMMUNITY ENGAGEMENT

This section provides references for “whole community,” and stakeholder engagement, defined as part of FEMA Natural Hazard Mitigation Program, Programs for Public Information (PPI and NFIP Community Rating System programs. The references outline actions for organizations and municipalities to fully engage community residences, property and business owners, and municipal officials in preparedness for natural disasters.

A conclusion supported by these references is that, ***to engage the “whole community” as recommended in FEMA NHMP guidance, a first and necessary component for each jurisdiction (municipality) is to establish local taskforce and/or teams***, comprised of municipal staff, community representatives, including specialists in natural hazards. The appointed teams would:

- (1) support the responsibilities of the municipal staff,
- (2) provide advice for local planning boards related to natural hazard mitigation,
- (3) support municipal and private initiatives in funding, community education, and private-public sector partnerships to address community plans of economic development, natural hazards, climate action, and emergency preparedness.

These support functions could be assigned to public and private sector members of Conservation Commissions, Planning Boards or Emergency Management Operation Teams. ***The resilience and preparedness of a community can be most directly evaluated by looking at how clearly and effectively these planning groups are addressing these issues.***

FEMA (December, 2011a) *A Whole Community Approach to Emergency Management: Principles, Themes, and Pathways for Action*. Federal Emergency Management Agency, Washington, DC. (28 p.)
URL: www.fema.gov/media-library/assets/documents/23781

FEMA (December, 2011b) *Lessons in Community Recovery: Seven Years of Emergency Support Function #14 Long-Term Community Recovery from 2004 to 2011*. Federal Emergency Management Agency, Washington, DC. (76 p.)
URL: www.fema.gov/pdf/rebuild/ltrc/2011_report.pdf

CDC Foundation (October 2013). “Building a Learning Community and Body of Knowledge: Implementing a Whole Community Approach to Emergency Management.” Centers for Disease Control and Prevention (CDC). Atlanta, GA: CDC Foundation. (37 p.)
URL: http://www.cdc.gov/phpr/documents/whole_community_program_october2013.pdf

FEMA (2013) *National Flood Insurance Program Community Rating System Coordinator’s Manual*. FIA-15/2013. Washington, DC, Federal Emergency Management Administration. (615 p.)
URL: www.fema.gov/media-library/assets/documents/8768 Jan 15, 2015 =

Tulsa Partners (2014) *City of Tulsa Program for Public Information*. Tulsa OK: Tulsa Partners and R.D. Flanagan. December 2014 (53 p.)
URL: [:/www.stmarysga.gov/department/community_development/ppi/Tulsa__OK_2014_PPI.pdf](http://www.stmarysga.gov/department/community_development/ppi/Tulsa__OK_2014_PPI.pdf)

CDC Foundation (2013). “Project Report: Building a Learning Community and Body of Knowledge by Implementing ‘Whole Community’ Approach to Emergency Management” Office of Public Health Preparedness and Response (OPHPR). Atlanta GA: Centers for Disease Control and Prevention. (37 p)
URL: www.cdc.gov/

CRSI (2011) *Steering Committee Final Report – A Roadmap to Increase Community Resilience*, August 2011, Community Resilience System Initiative (CRSI). Washington, DC: Community and Regional Resilience Institute. (p. 141)

URL: www.resilientus.org/wp-content/uploads/2013/05/CRS-Final-Report.pdf

FEMA (March 2013) *Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials*. Washington DC: U.S. Federal Emergency Management Administration. (84 pp.)

URL: www.fema.gov

FEMA (2011) *Local Mitigation Plan Review Guide* Oct. 1, 2011. Washington DC: U.S. Federal Emergency Management Administration. (45 pp.)

URL: www.fema.gov

Whole Community Philosophy

FEMA defines an overarching approach to involve the “Whole Community” as the process of fully engage members from all part of the community, in *breadth* of representation of all sectors, but also, *depth* of involvement, that is, participation in risk analysis and selection of priorities and projects.

FEMA (December, 2011a) *A Whole Community Approach to Emergency Management: Principles, Themes, and Pathways for Action*. FDOC 104-008-1. Federal Emergency Management Agency, Washington, DC (28 p.)
URL: www.fema.gov/media-library/assets/documents/23781

In a congressional testimony, the Administrator of the Federal Emergency Management Agency (FEMA), Craig Fugate, described today’s reality as follows: “Government can and will continue to serve disaster survivors. However, we fully recognize that a government-centric approach to disaster management will not be enough to meet the challenges posed by a catastrophic incident. That is why we must fully engage our entire societal capacity...” To that end, FEMA initiated a national dialogue on a Whole Community approach to emergency management, an approach that many communities have used for years with great success, and one that has been gathering strength in jurisdictions across the Nation. [p. 2]

As a concept, Whole Community is a means by which residents, emergency management practitioners, organizational and community leaders, and government officials can collectively understand and assess the needs of their respective communities and determine the best ways to organize and strengthen their assets, capacities, and interests. By doing so, a more effective path to societal security and resilience is built. In a sense, Whole Community is a philosophical approach on how to think about conducting emergency management. [p. 3]

Whole Community Principles:

§ Understand and meet the actual needs of the whole community. Community engagement can lead to a deeper understanding of the unique and diverse needs of a population, including its demographics, values, norms, community structures, networks, and relationships. The more we know about our communities, the better we can understand their real-life safety and sustaining needs and their motivations to participate in emergency management-related activities prior to an event.

§ Engage and empower all parts of the community. Engaging the whole community and empowering local action will better position stakeholders to plan for and meet the actual needs of a community and strengthen the local capacity to deal with the consequences of all threats and hazards. This requires all members of the community to be part of the emergency management

team, which should include diverse community members, social and community service groups and institutions, faith-based and disability groups, academia, professional associations, and the private and nonprofit sectors, while including government agencies who may not traditionally have been directly involved in emergency management. When the community is engaged in an authentic dialogue, it becomes empowered to identify its needs and resources to address them.

§ Strengthen what works well in communities on a daily basis. A Whole Community approach to building community resilience requires finding ways to support and strengthen the institutions, assets, and networks that already work well in communities and are working to address issues that are important to community members on a daily basis. Existing structures and relationships that are present in the daily lives of individuals, families, businesses, and organizations before an incident occurs can be leveraged and empowered to act effectively during and after a disaster strikes.

Whole Community Strategic Themes:

- § Understand community complexity.
- § Recognize community capabilities and needs.
- § Foster relationships with community leaders.
- § Build and maintain partnerships.
- § Empower local action.
- § Leverage and strengthen social infrastructure, networks, and assets.

Understand Community “DNA”

Learn how communities’ social activity is organized and how needs are met under normal conditions. A better understanding of how segments of the community resolve issues and make decisions—both with and without government as a player—helps uncover ways to better meet the actual needs of the whole community in times of crisis.

Recognize Community Capabilities and Broaden the Team

Recognize communities’ private and civic capabilities, identify how they can contribute to improve pre- and post-event outcomes, and actively engage them in all aspects of the emergency management process.

Plan for the Real

Plan for what communities will really need should a severe event occur and not just for the existing resources on hand.

Meet People Where They Are

Engage communities through the relationships that exist in everyday settings and around issues that already have their attention and drive their interactions. Connect the social, economic, and political structures that make up daily life to emergency management programs.

Build Trust through Participation

Successfully collaborating with community leaders to solve problems for non-emergency activities builds relationships and trust over time.

As trust is built, community leaders can provide insight into the needs and capabilities of a community and help to ramp up interest about emergency management programs that support resiliency.

Partners to Consider Engaging

[Extensive List of community stakeholders]

Create Space at the Table

Open up the planning table and engage in the processes of negotiation, discussion, and decision making that govern local residents under normal conditions.

Encourage community members to identify additional resources and capabilities. Promote broader community participation in planning and empower local action to facilitate buy-in.

Let Public Participation Lead

Enable the public to lead, not follow, in identifying priorities, organizing support, implementing programs, and evaluating outcomes. Empower them to draw on their full potential in developing collective actions and solutions.

Strengthen Social Infrastructure

Align emergency management activities to support the institutions, assets, and networks that people turn to in order to solve problems on a daily basis.

FEMA (December, 2011b) *Lessons in Community Recovery: Seven Years of Emergency Support Function #14 Long-Term Community Recovery from 2004 to 2011*. Federal Emergency Management Agency, Washington, DC (76 p.)

URL: www.fema.gov/pdf/rebuild/ltrc/2011_report.pdf

The report is organized into three sections:

The first section, Achieving Disaster Recovery, establishes the context for community recovery by describing the process, the role of LTRC teams, and the elements known to facilitate a successful long-term recovery.

The second section, Recovery in Action, summarizes certain LTRC efforts and analyzes the common trends and lessons learned from community case studies.

The final section, Lessons for the Future, translates the understanding gained from these experiences into actions and guidance that can inform future community recovery efforts under the National Disaster Recovery Framework. [p. 5]

The following recommendations are based on lessons learned from multiple LTRC engagements, U.S. Government Accountability Office reports and Inspector General recommended actions.

1. Build capacity at all levels of government to successfully implement recovery concepts identified in the NDRF – Increase stakeholder capacity by engaging in training, exercises and planning in advance for recovery support at the local, state and federal level.

2. Prepare for recovery by developing pre-disaster plans and guidance – Develop plans and strategies that include roles and responsibilities to more fully prepare communities to address recovery challenges.

3. Encourage and support local ownership, leadership and management of the recovery process – Recovery must be owned at the local level if it is to be successful. Local involvement provides continuity, fosters trust in the process and encourages stakeholder participation and investment in recovery.

4. Foster and strengthen connectivity between all stakeholders to effectively leverage recovery resources – A systematic method to connect local, state and federal stakeholders will ensure that resources are optimized and recovery is expedited. [p. 3]

CDC Foundation (October 2013). “Building a Learning Community and Body of Knowledge: Implementing a Whole Community Approach to Emergency Management.” Centers for Disease Control and Prevention (CDC). CDC Foundation, Atlanta GA. (37 p.)

URL: http://www.cdc.gov/phpr/documents/Whole_Community_Program_October_2013.pdf

FOSTERING A WHOLE COMMUNITY APPROACH

How do promising examples understand community complexity;

- *By using a community’s available information systems and data at the neighborhood, city, or state-level (e.g., school data, city bus routes, city-conducted surveys);*
- *By recognizing and addressing all demographics of a population living, working, or visiting a community; demographics may include vulnerable populations (children, older adults, individuals with access or functional disabilities), those without private transportation, homeless*

- population, refugees, and non-English speaking individuals;*
- *By identifying and working closely with community members who can provide specific information about the community, its policies, and its organizations;*
 - *By acknowledging the culture and the value system of the community;*
 - *By using differences in levels of preparedness (perceived or actual) as a criterion to target services (e.g., rural versus urban preparedness, younger versus older populations);*
 - *By becoming a subject matter expert on a community's landscape and potential risks. [p. 7]*

FEMA (2013) *National Flood Insurance Program Community Rating System Coordinator's Manual*. FIA-15/2013. Washington, DC, Federal Emergency Management Administration. (615 p.)
URL: www.fema.gov/media-library/assets/documents/8768 Jan 15, 2015 =

FEMA Community Rating System (CRS) is a voluntary program by which communities enrolled in the National Flood Insurance Program (NFIP) can qualify for community-wide reductions in flood insurance. Measures that received points towards flood insurance reduction include public Information Activities.

The objective of the Community Rating System (CRS) is to reward communities that are doing more than meeting the minimum NFIP requirements to help their citizens prevent or reduce flood losses. The CRS also provides an incentive for communities to initiate new flood protection activities. The CRS Coordinator's Manual is the guidebook for the CRS and sets the criteria for CRS classification. It explains how the program operates, what is credited, and how credits are calculated. Although it is primarily a reference for CRS activities and credits, it can also help guide communities that want to design or improve their floodplain management programs.

CRS Manual defines explicit measures:

Developing a master public information program: Activity 330

Reaching out to people about floods and flood protection: Activity 330

Providing detailed information on the potential for flooding and protecting against flood damage: Activity 320, Activity 350, and Activity 360

Libraries: Activity 350

Websites: Activity 350

Disseminating information on flood insurance: Activity 370 and Activity 330

Assisting with real estate disclosure: Activity 340.

Credit Criteria for PPI

For CRS credit, the PPI must be developed according to a seven-step planning and public involvement process, similar to the process credited under Activity 510 (Floodplain Management Planning). There are seven steps to preparing a PPI:

Step 1: Establish a PPI committee. The community's PPI must be developed by a committee of people from both inside and outside the local government. The number of participants and their identities is determined by the community, but the committee must:

- *Meet at least twice: once to review the assessment (step 2) and once to review the PPI document before it is sent to the governing body (step 6). More meetings are recommended to ensure adequate input from the committee members;*
- *Comprise at least five people;*
- *Include one or more representatives from the community's floodplain management office;*
- *Include one or more representatives from the community's public information office, if there is one.*

A multi-jurisdictional committee can prepare a PPI for several communities that want to work together. To receive this credit,

- *Each community wanting the credit must send at least two representatives to the regional committee,*
- *At least half of the community's representatives must be from outside the local government, and*
- *At least half of the representatives must attend ALL the meetings of the regional committee. In*

effect, there must be a quorum from each community. Remote attendance via a webinar that allows for everyone to talk is permissible. It is recommended that communities use existing committees, such as the floodplain management planning committee credited under Activity 510, in cases in which such organizations meet the above criteria.

Step 2: Assess the community's public information needs. During this step, the committee delineates different target areas within the community, based on different flooding or development conditions. This may have been done as part of the community's floodplain management planning. The CRS Community Self Assessment, described in Section 240, is an online tool that can help identify target areas and audiences. Another documented process may suffice, provided that it includes an evaluation of the flood hazard(s) and the buildings exposed to the hazard(s), and identifies flood-prone target areas.

The assessment must also inventory existing public information and outreach efforts being conducted in the community. These should include non-flood programs, such as efforts to inform people about other hazards, automobile safety, home improvements, or other activities where the community could leverage attention to flood protection.

Step 3: Formulate messages. The public information messages needed for each target audience are determined. The PPI committee identifies a desired outcome for each message.

Step 4: Identify outreach projects to convey the messages. The committee considers what media to use to deliver the identified messages to the target audiences. This may include continuing or revising existing public information and outreach efforts that are already being conducted in the community. Step 4 must produce a list of specific projects and identify who is responsible for them and when they will be implemented. A multi-jurisdictional PPI must identify which communities benefit from each project.

Step 5: Examine other public information initiatives. The PPI committee looks at other public information activities in addition to outreach projects. This could include how to best set up a website on flood protection (Activity 350), what technical assistance is needed throughout the community (Activity 360), or how to publicize flood protection services (Activities 320, 350, and 360).

Step 6: Prepare the PPI document. The committee's work is recorded in a formal document. The PPI and the annual report that evaluates it can be stand-alone documents or they can be sections or chapters in a floodplain management or hazard mitigation plan credited under Activity 510. The document does not need to be a long, formal report. Much of the key information can be displayed in a spreadsheet, such as the example in Figure 330-2.

For multi-jurisdictional programs, the document must show which communities benefit from which projects. For example, an inland community would not benefit from a project oriented to beachfront property owners, but all communities would benefit from articles in a regional newspaper about flood insurance. This documentation may be in the form of a matrix or table included in, or attached to, the PPI document. The PPI must be adopted by the community, through either:

- *Formal approval by the community's governing body, or*
- *Formal approval by another body or office of the community that has the authority and funding to implement the PPI, such as a flood control district.*

Step 7: Implement, monitor, and evaluate the program. The PPI committee meets at least annually to monitor the implementation of the outreach projects. The committee assesses whether the desired outcomes were achieved and what, if anything, should be changed. This work is described in

an evaluation report that is prepared each year, sent to the governing body, and included in the annual recertification.

Tulsa Partners (2014) *City of Tulsa Program for Public Information*. Tulsa OK: Tulsa Partners and R.D. Flanagan. December 2014 (53 p.)
http://www.stmarysga.gov/departments/community_development/ppi/Tulsa__OK_2014_PPI.pdf

An award-winning Public Information Program consists of 10 City of Tulsa employees and 15 non-local government representatives from the public and private sectors.

The Whole Community approach is the latest iteration of a long term trend to include citizen and private/nonprofit sector participation in minimizing disaster losses. Tulsa is, of course, no stranger to this trend. As an example, the City of Tulsa has regularly surpassed requirements for public information, education, and outreach for its Multi-Hazard Mitigation Plan and for the National Flood Insurance Program's (NFIP) Community Rating System (CRS). However, the need to engage citizens and the private sector often demands the review of old methods and development of new strategies in order to increase and keep stakeholders involved and engaged. [p. 1]

Target Areas affected by floods (not in priority order) [p. 5]

1. Areas subject to flooding by levee failure
2. Repetitive loss properties/areas
3. Areas within City Regulatory and Special Flood Hazard Areas
4. Areas outside City Regulatory and Special Flood Hazard Areas
5. Areas subject to flooding by a dam failure
- Other Target Audiences for outreach
6. Vulnerable Populations (as defined by City of Tulsa Multi-Hazard Mitigation Plan)*
7. Bankers/Lenders/Insurance/Builders/Real Estate Agents
8. Chambers of Commerce and Civic Groups
9. Critical Facilities (as defined by City of Tulsa Multi-Hazard Mitigation Plan)**
10. Neighborhood Associations

* In the 2014 Multi-Hazard Mitigation Plan, page 24, "vulnerable populations" may include:

- The elderly;
- People in poverty;
- People who speak a language other than English;
- People with mobility, hearing, visual or other physical disabilities;
- People with developmental or other cognitive disabilities;
- People with no access to private transportation;
- People with medical needs or medical/life support devices;
- people with pets.

Significant outreach activities subject to CRS [p. 12]

The PPI Committee has agreed to include the following activities in the Program for Public Information and to review annually projects associated with these outreach activities:

- Activity 320 Publicity on Map information Service provided by City. (See under Projects and Initiatives / Outreach Projects table for areas 3 and 4 on pages 16 and 18.)
- Activity 330 In addition to Outreach Projects, this activity includes Flood Response Preparations-- a pre-flood plan for public information projects that will be implemented during and after a flood. This will be under development during the coming year, although there is initial work under Flood Response Projects table, pages 21-22.
- Activity 340 Disclosure of Flood Hazards—See Realtor's brochure under OP 7 under Builders and

Realtors on page 19. Real estate agents will be involved in the development and distribution of this home hunters guide to check out the flood hazard before buying.

- *Activity 350 Information provided through City of Tulsa flood control website: <https://www.cityoftulsa.org/city-services/flood-control.aspx>. (See under Outreach Projects table for areas 3 and 4 on pages 17 and 18.) The website will be reviewed to ensure that all PPI messages are included.*
- *Activity 360 Flood Protection Advice and Assistance, including after a site visit, offered through City of Tulsa. See reference under Areas 3 and 4, pages 16 and 18. The staff designated to provide this one-on-one technical assistance service to homeowners are familiar with structural / non-structural flood protection and mitigation measures including flood insurance. Reviewing program records, the PPI Committee will determine whether the service is being adequately promoted and used.*
- *Activity 360 Financial Assistance Advice-Providing information on all available sources of assistance. This will be under development during the coming year.*
- *Activity 370 Flood Insurance Assessment and Flood Insurance Coverage improvement plan— this will be under development during the coming year. We currently know the percent of the floodplain properties that have coverage, amount of coverage and total value of those structures.*
- *Activity 420 Open Space Preservation: Educational materials and tours in open space areas that have identified natural floodplain function. Since keeping open space areas with a natural floodplain function is considered a low impact development strategy, this is included under Message H, with OP 8 for areas 3 and 4 on pages 16 and 17.*
- *Activity 540 Drainage System Maintenance: Publicizing regulations prohibiting dumping in streams and ditches. Information on this would be included in outreach projects tied to Message G: “Storm Drains are for Rain,” protecting natural floodplain functions.*
- *Activity 610 Flood Warning and Response. Information on flood warning and response, including flood warning sirens, are included in Outreach Projects for Messages A, I and J, and are especially included in City of Tulsa website and City Life utility bill stuffers.*
- *Activity 620 Levees. See Area 1 on page 15. - Activity 630. Dams. See Area 5 on page 18.*

CDC Foundation (2013). “Project Report: Building a Learning Community and Body of Knowledge by Implementing ‘Whole Community’ Approach to Emergency Management” Office of Public Health Preparedness and Response (OPHPR). Atlanta GA: Centers for Disease Control and Prevention (37 p)
URL: www.cdc.gov/

Building a Learning Community & Body of Knowledge

- *Addressing all demographics of a population living, working, or visiting a community, including vulnerable populations.*
- *Working closely with community members who can provide specific information about the community, its policies, and its organizations.*
- *[Mentoring local] subject matter experts on a community’s geographic landscape and potential risks.*

CDC’s Office of Public Health Preparedness and Response’s (OPHPR) Learning Office is working on a pilot program to promote promising examples of existing community efforts that embody FEMA’s whole community approach to emergency management.

CRITICAL ELEMENTS

- *Program leadership is persistent, responsive, knowledgeable and dedicated.*
- *Program leadership is passionate about the community they serve.*

- *Program leadership consists of a visionary and a realist. T*
- *There is dedicated staff or volunteers for relationship building.*
- *Program uses community extenders to engage communities.*
- *Programs and partners distribute uniform, consistent messages.*
- *Program uses “sparkplugs.”*
- *Programs offer incentives as a mechanism to engage and maintain relationships.*
- *Programs host social community events.*
- *Programs consistently market and publicize efforts...*
- *Programs are creative, simple, and fun.*
- *Programs work with non-traditional partners* Programs utilize disasters as teachable moments.*
- *Programs strategically engage specific demographics to meet mission.*
- *Programs encourage friendly peer-pressure to empower action.*

CRSI (2011) *Steering Committee Final Report – A Roadmap to Increase Community Resilience*, August 2011, Community Resilience System Initiative (CRSI). Washington, DC: Community and Regional Resilience Institute (p. 141)
www.resilientus.org/wp-content/uploads/2013/05/CRS-Final-Report.pdf

Why Communities Need a Community Resilience System (CRS)

Diffuse lessons – *The lessons from previous disasters and crises are long and varied but not easily accessible to the communities who want to learn from them and take action.*

Growing complexity within and between communities – This increased complexity stems from interdependencies, workforce mobility, and demographic shifts such as the retirement of the baby boomers and a more diverse younger generation.

New spectrum of threats facing communities – In addition to natural disasters and pandemics, communities face new threats such as terrorism, economic change, demographic shifts, and climate change impacts.

Increasingly constrained resources – Demand for services and functions provided by local communities has continued to expand while the resource base has remained relatively unchanged or diminished. Communities must make informed choices between supporting current needs and addressing future challenges.

Diverse stakeholders – Given the broad spectrum of individuals and groups who need to be involved in building a community’s resilience, there is a need for a systems approach that can capture the contributions of these diverse groups and help communities collaboratively develop a path forward.

Conclusion

As this report describes, resilience building is an imperative for American communities and requires across-the-board participation from virtually all quarters of society. The CRSI has been an important player in initiating dialogue about the practicalities of community resilience and championing what is truly needed to improve communities’ resilience to all manner of threats.

There is much more work to be done at the national, regional, and state levels to promote the CRS as a resource, to improve it, and to continue the dialogue with diverse stakeholders that will help to facilitate both. [p. vii]

[beginning p. 22]

Stage 1 – Engage Community Leadership at Large

Five key questions:

1. *What are the characteristics of the community?*
2. *What are the community’s strengths and weaknesses?*
3. *What are the significant threats facing the community?*
4. *What are the community’s critical assets, and which are at risk?*

5. What resources does the community have to recover, if it is disrupted or threatened?

Stage 2 – Perform a Resilience Assessment

Stage 3 – Develop a Shared Community Vision

Stage 4 – Action Planning

Stage 5 – Establish a Mechanism to Implement the Plan and Sustain the Program

Stage 6 – Evaluate and Revise the Community’s Resilience Program

IV. OBSERVATIONS AND NEXT STEPS FOR INCREASING COMMUNITY RESILIENCE [p. 27]

Foster Cross-Sector Collaboration for Resilience

Strengthen Local Capacity for Greater Resilience

Make the Business Case for Resilience

Continue Resilience Research Efforts

Promote Resilience Awareness and Education

Guiding Principles [p. 45]

- 1. Community resilience begins with human capital (all community members, both public and private) and is the result of their daily activities.*
- 2. The CRS will aid the community in understanding the tangibles (resources and assets) as well as the intangibles (e.g., sense of place, cohesion, culture, etc.).*
- 3. The CRS will help communities develop a pre-crisis vision, outline a path to achieve a “new normal” (future baseline), address the deficiencies of the “old normal” (pre-crisis baseline), and ultimately create a more resilient community.*
- 4. The CRS will lead to “triple bottom line” outcomes involving the environment, human capital, and the economy.*
- 5. The CRS will capture and reflect the needs and capabilities of the whole community. It will encourage and support community- and region-wide, cross-sector partnerships, and it will reflect the full fabric of the community.*
- 6. The CRS will help communities understand, optimize, and leverage existing assets and interdependencies (local and regional) while simultaneously identifying and mitigating vulnerabilities in the aftermath of a crisis.*
- 7. The CRS will help communities identify their cross-sector core leaders and networks of champions who are able to implement and manage efforts before, during, and after crises.*
- 8. The CRS will be understandable to and usable by everyone in the community, whether experts or the general public.*
- 9. The CRS will be flexible and agile enough to be adapted and applied in communities of different sizes with diverse forms of government, demographics, geography, and cultural identity.*
- 10. Evaluating community resilience and providing rewards for continuous, incremental improvement will lead to greater community vitality.*

FEMA (March 2013) Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials. Washington DC: U.S. Federal Emergency Management Administration (84 pp.)
URL: www.fema.gov

How to Plan Resilient Communities Through Integration

Step 1: Assess Your Community’s Planning Framework with a Lens for Resilience

Step 2: Inform and Engage Local Leadership, Staff, and Stakeholders.

Step 3: Establish an Integration Agenda of Resilient Community Principles and Actions

Step 4: Be Opportunistic

Step 5: Monitor, Measure, Report, Repeat

Overcoming Obstacles to Successful Integration
Increasing Hazard Awareness and Understanding of Mitigation Solutions
Carefully Frame the Issue to Resonate with Your Community
Balancing the Appearance of Competing Priorities
Building Political Will..
Finding Incentives and Drivers for Integrated Planning
Expanding Local Capacity to Support Local Resources
Building a Framework for Intergovernmental Coordination

§ Hazard mitigation plans are often developed or updated without the active participation or leadership of local planning and community development staff;
§ Local land use planners are less willing to embrace hazard mitigation planning as falling within their professional purview;
§ Hazard mitigation plans often include mitigation strategies or actions that are focused on a disconnected series of emergency services, structure or infrastructure protection projects, and public outreach initiatives, with less emphasis on non-structural measures available through local land use planning or policy alternatives;
§ Hazard mitigation plans are typically completed as stand-alone documents that cover multiple jurisdictions, and it is relatively uncommon for them to be directly linked or integrated with other community-specific planning tools such as comprehensive land use plans and development regulations.

FEMA (2011) *Local Mitigation Plan Review Guide* Oct. 1, 2011 . Washington, DC: Washington DC: U.S. Federal Emergency Management Administration. (45 pp.)
URL: www.fema.gov

1.1 PURPOSE OF LOCAL MITIGATION PLAN REVIEW GUIDE

The purpose of this *Local Mitigation Plan Review Guide* is to help Federal and State officials assess Local Mitigation Plans in a fair and consistent manner, and to ensure approved Local Mitigation Plans meet the requirements of the Stafford Act and Title 44 Code of Federal Regulations (CFR) §201.6.1

An important distinction must be made between the words “shall” and “should” in the Mitigation Planning regulation at 44 CFR Part 201. The Regulation Checklist only includes the requirements where the regulation uses the words “shall” and “must,” and does not include the “should.” When the word “should” is used, the item is strongly recommended to be included in the plan, but its absence will not cause FEMA to disapprove the plan.

4.1 ELEMENT A: PLANNING PROCESS Requirements

§201.6(b) An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

§201.6(b)(1) (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

§201.6(b)(2) (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and

§201.6(b)(3) (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

§201.6(c)(1) [The plan shall document] the planning process used to develop the plan,

including how it was prepared, who was involved in the process, and how the public was involved.

§201.6(c)(4)(i) [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

§201.6(c)(4)(iii) [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

(p. 15) ***Involved in the process*** means engaged as participants and given the chance to provide input to affect the plan's content. This is more than simply being invited or only adopting the plan.

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? 44 CFR 201.6(b)(2)

a. The plan **must** identify all stakeholders involved or given an opportunity to be involved in the planning process. At a minimum, stakeholders **must** include:

- 1) Local and regional agencies involved in hazard mitigation activities;
- 2) Agencies that have the authority to regulate development; and
- 3) Neighboring communities.

An opportunity to be involved in the planning process means that the stakeholders are engaged or invited as participants and given the chance to provide input to affect the plan's content.

(p. 16) **A3. Does the Plan document how the public was involved in the planning process during the drafting stage? 44 CFR 201.6(b)(1) and 201.6(c)(1)**

Intent: To ensure citizens understand what the community is doing on their behalf, and to provide a chance for input on community vulnerabilities and mitigation activities that will inform the plan's content. Public involvement is also an opportunity to educate the public about hazards and risks in the community, types of activities to mitigate those risks.



3 COMPREHENSIVE PLANNING BENCHMARKING CHECKLISTS

This section reviews state-of-art references that promote sustainability in planning and building standards and practices.

There are many benchmarking references and best practices proposed to represent sustainability, disaster preparedness, and resilience goals and standards for planning and building regulations. These references are continually being updated and adopted into International Building Codes, representing recommendations and guidance, which may be adopted in whole or part by each State as State Building Codes. In addition, higher standards are promoted as “best practices” by various incentive systems, rating systems, and other recognition (awards) for accomplishment over and above regulatory minimum standards.

These references and checklists meet a variety of different purposes. They may be intended to promote best practices, to qualify for funding incentives, or may represent regulatory requirements for permitting. Best practices that demonstrate effective and affordable measures are often adopted into codes and regulations. That is, the measures currently promoted as “best practices” may anticipate what may be required in future as zoning and building code requirements.

Checklist	Property		Community		Municipal		State/National	
	1a	1b	2a	2b	3a	3b	4a	4b
USGBC 2013	√		√			√		*
NYSERDA CSC 2014	√	√	√	√	√	√	√	*
Yonkers 2014	√		√	√	√	√	√	*
Enterprise 2015	√	√						*
EcoDistricts 2016	√		√					
Kusler 2016			√		√			
RMLUI 2016	√		√		√			
Yudelson 2016	√		√			√		

* Checklist measures lists items defined in International Building Codes, including the International Green Construction Code, subject to future adoption in each State.

1 Property owner/business owner focus

- 1a Checklists to improve property and/or business operations
- 1b Measures required to qualify for funding for individual properties

2 Local community focus (for use in organizing local initiatives)

- 2a Measures that can serve as “targets” to activate local action
- 2b Measures required to qualify for funding for community scale projects

3 Municipal focus (for use in municipal administration)

- 3a Measures adopted as benchmarks for initiatives and regulatory review
- 3b Measures used for promotion of city public/private development

4 State/Regional/National (for use in administration at all levels of government)

- 4a Measures required to qualify for funding municipal/State projects
- 4b Measures required for regulatory review (e.g., State building codes)

Selected References: comprehensive planning

A representative set of checklist references, listed chronologically, are annotated below, selected because they are particularly useful for comprehensive planning and community plans.

[31] USGBC (2013) *Technical Guidance Manual for Sustainable Neighborhoods*

[32] NYSERDA (2014) *Climate Smart Communities Certification Manual*

- [33] City of Yonkers, NY (2014) *Yonkers Green Development Workbook Checklist and Standards*.
- [34] Enterprise Communities (updated 2015) *Enterprise Green Communities Criteria*
- [35] EcoDistricts (2016) *EcoDistricts Protocol*
- [36a] Kusler, Jon (2016) Protecting and Restoring Riparian Areas.
- [36b] Kusler, Jon (2016) Model “Riparian” Protection Ordinance
- [37] Rocky Mountain Land Use Institute (2016) Sustainable Community Development Code
- [38] Yudelson, Jerry (2016) *Reinventing Green Building* Sustainability Key Performance Indicators

USGBC LEED-ND [31] is a common-cited reference as a rating system for evaluation of comprehensive plans, smart growth, and green development best practices. The emphasis of the LEED rating system has been upon energy. The LEED-UD enlarged the criteria to include Smart Growth and health as criteria for planning beyond the building scale. Its publisher, the U.S. Green Building Council, regularly updates the LEED documentation and criteria. Similar rating systems for buildings and land-use planning are promoted by other organizations, particularly in response to emerging requirements for GHG reduction and climate mitigation and adaptation.

The NYSERDA (2014) *Climate Smart Communities Certification Manual* [32] provides a more comprehensive set of measures. It provides a framework for funding to support the NYSERDA Cleaner Greener CSC Program.

The City of Yonkers adopted a Green Development Ordinance [33], implementing green standards for public and private construction. The City adopted the criteria and process developed by the Enterprise Communities Foundation [34]. Yonkers has successfully adopted green building standard by working in consultation with the local building industry and also streamlining permitting processes. The checklist is very simple and accepted by builders as an effective way to promote good building practices that demonstrate health and safety provisions.

The EcoDistricts Protocol [35] represents a voluntary approach to neighborhoods and districts, that is, smaller scale projects. As such the approach can guide grassroots and local organizations for projects of any scale.

Two recent papers published by the Association of State Wetland Managers [36a,b] provide research and language for ordinance and other zoning guidance for protection of wetlands, streams and waterways, compiled from lessons learned and legal search of national exemplars.

Rocky Mountain Land Use Institute Sustainable Community Development Code [37] has the goal of making the goals of sustainable development more easily applied to zoning and code practices. It defines a range of measures and goals, from entry-level to upper range more demanding than LEED-ND.

A recent book by Jerry Yudelson [38] represents a “very simple” visible approach, but very high standards. The approach has the advantage of being easily communicated and also allowing local community self-assessment, thus more economical for a project application than a fee-based certification process.

Annotated references

[31] USGBC (2013) *Technical Guidance Manual for Sustainable Neighborhoods: How to Use the LEED for Neighborhood Development Rating System to Evaluate and Amend Local Plans, Codes, and Policies*. USGBC / PACE Law Center (129 pp.)

URL:http://www.usgbc.org/sites/default/files/Technical%20Guid.%20Man.%20for%20Sust.%20Neighborhoods_2012_Part%20A_1f_web.pdf

Quoting from the Introduction to the Manual (p. 5):

The Land Use Law Center at Pace Law School, in conjunction with the USGBC, prepared this Technical Guidance Manual for Sustainable Neighborhoods for elected officials, local planners, and other professionals who work with municipalities to create sustainable neighborhoods. The LEED-ND rating system aligns the principles of smart growth, New Urbanism, and green building into a set of national standards for green planning and design at the neighborhood scale. As a result, the rating system represents the next evolution in the development of LEED and aims to push both the public and private sectors to look beyond the individual building to the larger community, recognizing that a building is only as green as its surroundings. LEED-ND allows local governments to achieve market transformation at a greater rate than ever before by making the “greenness” of a building as much about where it is as what it is. As our cities continue to thrive and our regions continue to urbanize, tools such as LEED-ND will play an ever-meaningful role in creating livable communities. (p. 5)

The sections of the manual are designed to parallel a typical municipality’s land development plans, regulations, and related policies. It begins by presenting strategies to integrate LEED-ND criteria into local planning policies as expressed in comprehensive plans and special area plans. It then presents strategies for incorporating LEED-ND criteria into traditional zoning code sections, site plan and subdivision regulations, and other land use development standards, including building and related codes. Finally, it introduces strategies for including LEED-ND criteria in non-regulatory initiatives, streamlining the project review and approval process, and providing incentives and assistance for sustainable neighborhood development. (p. 5)

[32] NYSERDA (2014) *Climate Smart Communities Certification Manual* Version 2 (296 pp.)

URL: http://www.dec.ny.gov/docs/administration_pdf/certman.pdf

The CSC Certification Program is designed to encourage ongoing implementation of actions related to climate action mitigation of climate change through reduction of greenhouse gas emissions and adaptation to effects of climate change, and to recognize achievements of local governments.

Any local government whose legislative body adopts the Climate Smart Community Pledge is designated a Climate Smart Community. The certification program described in this manual provides information on a number of climate mitigation and adaptation actions. Communities can be awarded a specified number of points toward certification and the higher levels of bronze, silver and gold for each action they complete. In addition to accumulating a minimum number of points for to achieve each level of recognition, each community must complete a number of “priority” actions. This manual describes each action, the number of points that may be earned, minimum requirements and the documentation that must be submitted to earn points. (p. 1-6)

Town of Brighton signed the Climate Smart Community Pledge in 2013. The report describes the follow-on requirements to achieve certification as a NYS Climate Smart Community.

1. Pledge to be a Climate Smart Community
2. Set goals, inventory emissions, plan for climate action.
3. Decrease community energy use.
4. Increase community use of renewable energy
5. Realize benefits of recycling and other climate-smart solid waste management practices
6. Reduce greenhouse gas emissions through use of climate-smart land-use tools
7. Enhance community resilience and prepare for the effects of climate change
8. Support development of a green innovation economy
9. Inform and inspire the public.

[33] City of Yonkers, NY (2014) *Yonkers Green Development Workbook Checklist and Standards* September 2014 Yonkers: City of Yonkers Department of Planning and Development. (117 pp.)

URL: <http://yonkersny.gov/home/showdocument?id=9801>

Adopted by city ordinance 2014, the Standards apply to city-owned facilities and to private development in downtown Yonkers new construction and renovations. For other private development projects outside of the Downtown Districts, submitting a completed checklist with the site plan application is the only requirement, whereby compliance with the standards is encouraged, but is purely voluntary.

Follows Enterprise Community Guidelines (op. cit.)

This checklist provides an overview of the technical elements of the Yonkers Green Development Standards. To comply with the standards, the project must integrate all yes/no measures applicable to that construction type. In addition, New Construction projects must achieve 35 optional points and Substantial Rehab projects must achieve 30 optional points. Moderate Rehab projects must achieve a minimum of 20% of the optional points that are applicable to the project based on the project's scope. Refer to the Yonkers Green Development Workbook for details regarding each measure. (p. 6)

1: Integrative Design

- 1.1a Green Development Plan: Integrative Design Meeting(s)
- 1.1b Green Development Plan: Checklist Documentation
- 1.2a Universal Design

2: Location + Neighborhood Fabric

- 2.1 Sensitive Site Protection
- 2.2 Proximity to Services
- 2.3 Preservation of and Access to Open Space
- 2.4 Access to Public Transportation
- 2.5 Smart Site Location: Passive Solar Heating / Cooling
- 2.6 Brownfield Site
- 2.7 Access to Fresh, Local Foods

3: Site Improvements

- 3.1 Environmental Remediation
- 3.2 Erosion and Sedimentation Control
- 3.3 Landscaping
- 3.4 Efficient Irrigation and Water Reuse
- 3.5 Surface Stormwater Management
- 4: Water Conservation
- 4.1 Water-Conserving Fixtures
- 4.2 Advanced Water-Conserving Appliances and Fixtures
- 4.3 Water Reuse

5: Energy Efficiency

- 5.1 Building Performance Standards (for various residential types)
- 5.2 Additional Reductions in Energy Use
- 5.3 Sizing of Heating and Cooling Equipment
- 5.4 Energy Star Appliances
- 5.5a Efficient Lighting: Interior Units
- 5.5b Efficient Lighting: Common Areas and Emergency Lighting
- 5.5c Efficient Lighting: Exterior
- 5.6a Electricity Meter
- 5.6b Electricity Meter
- 5.7a Renewable Energy
- 5.7b Photovoltaic / Solar Hot Water Ready
- 5.8 Advanced Metering Infrastructure

6: Materials Beneficial to the Environment

- 6.1 Low / No VOC Paints and Primers
- 6.2 Low / No VOC Adhesives and Sealants
- 6.3 Construction Waste Management
- 6.4 Construction Waste Management
- 6.5 Recycling Storage
- 6.6 Recycled Content Material (All Projects)
- 6.7 Regional Material Selection
- 6.8 Certified, Salvaged, and Engineered Wood Products
- 6.9a Reduced Heat-Island Effect: Roofing
- 6.9b Reduced Heat-Island Effect: Paving

7: Healthy Living Environment

- 7.1 Composite Wood Products that Emit Low/ No Formaldehyde
- 7.2 Environmentally Preferable Flooring
- 7.3 Environmentally Preferable Flooring: Alternative Sources
- 7.4 Exhaust Fans: Bathroom
- 7.5 Exhaust Fans: Kitchen
- 7.6 Ventilation
- 7.7 Combustion Equipment
- 7.8 Mold Prevention: Water Heaters, Surfaces, Tub and Shower Enclosures
- 7.9 Vapor Barrier Strategies
- 7.10 Radon Mitigation
- 7.11 Water Drainage
- 7.12 Garage Isolation
- 7.13 Integrated Pest Management
- 7.14 Lead-Safe Work Practices

8: Operations + Maintenance

- 8.1 Building Maintenance Manual
- 8.2 Tenant Manual
- 8.3 Resident and Property Manager Orientation
- 8.4 Project Data Collection and Monitoring System

[34] Enterprise Communities (updated 2015) *Enterprise Green Communities Criteria: solutions and innovations* (168 pp.)

URL: <http://www.enterprisecommunity.com/solutions-and-innovation/enterprise-green-communities/criteria>

Green Communities™ a major initiative by Enterprise Community Partners (Enterprise) is a five-year, \$555 million initiative to create more than 8,500 homes that deliver significant health, economic and environmental benefits for low-income families and communities. Criteria updated 2015 are suitable for all development types, including new Construction, substantial rehab, and Moderate Rehab (less than 50% aggregate area of the building) in both multifamily and single-family projects.

[35] Ecodistricts (2016) *Ecodistricts Protocol: Global performance standard that empowers sustainable neighborhood- and district-scale development*. Version 1.1. Portland OR: Ecodistricts (56 pp.)

URL: <https://ecodistricts.org/wp-content/uploads/2016/05/ed-protocol-guide-V1-1B.pdf>

The Ecodistricts Protocol and Certification program is promoted as a community-scale tool for fostering neighborhood- and district-scale sustainability. The Protocol is designed as a flexible framework rather than a prescriptive standard. Local district teams tailor the Protocol to local circumstances, set their own performance targets based on local conditions and aspirations, and measure progress against the Protocol Imperatives and Priorities.

Imperatives Commitment (p. 24)

Equity: This obligation is an equity commitment that describes how a district will embrace procedural, distributional, structural, and transgenerational equity in district activities.

Resilience: This obligation is a resilience commitment that describes how a district will work to withstand environmental, social, and economic stresses and shocks.

Climate Protection: This obligation is a climate protection commitment that describes how a district will strive for carbon neutrality.

District Assessment Plan Priorities & Objective Categories (p. 39-46)

Place: create inclusive and vibrant communities

engagement + inclusion, culture + identity, public spaces, housing

Prosperity: support education and economic opportunities that build prosperity and accelerate innovation

access to opportunity, economic development, innovation

Health + Wellbeing: nurture people's health and happiness:

active living, health, safety, food systems

Connectivity: build effective and equitable connections between people and places:

street network, mobility, digital network

Living Infrastructure: enable flourishing ecosystems and restore natural capital:

natural features, ecosystem health, connection with nature.

Resource Restoration: moving towards a net positive world:

air, water, land

[36a] Kusler, Jon (2016) Protecting and Restoring Riparian Areas. Association of State Wetland Managers (12 pp.)

[36b] Kusler, Jon (2016) Model "Riparian" Protection Ordinance (17 pp.)

These two papers describe the functions and values of "riparian" areas, including functions and values of riparian area protections within legal requirements for policy- and rule-making, as well as specific measures by which states, local governments, federal agencies, and not for profit organizations can take to better protect and restore riparian areas. A model ordinance is provided, based on a national survey of applicable regulations.

Representative recommendations for local governments include:

Local governments should require building setbacks from rivers and streams as part of their comprehensive zoning, watershed management, or stormwater management regulations.

Local governments should amend existing floodplain and wetland ordinances to apply to riparian areas. They should also amend existing regulations to include ecological criteria for riparian areas.

Local governments should adopt special riparian protection regulations to prohibit or tightly control drainage, diking, and fills in riparian areas.

Local governments should include riparian protection as part of their floodplain management and disaster mitigation planning efforts.

Local governments should prepare and adopt greenway plans for riparian areas.

[37] Rocky Mountain Land Use Institute (2016) Sustainable Community Development Code: a code for the 21st century. Beta Version 1.1 (40 pp.)

The Beta 1.1 version is a DRAFT, with some sections well developed, others to be completed. The overall framework is helpful as a summary of best practices and suggestions, including reference for local

code frameworks and adoptions. Special topics include open space to fulfill health criteria, wildfire, solar and wind energy system applications.

The code provides provisions for regulations that address each of the following topics:

- Energy
- Healthy Neighborhoods, Housing, Food Systems
- Environmental Health and Natural resources
- Mobility
- Natural Hazards
- Urban Form/Community Character

The basic organization and approach to each topic is to examine relevant obstacles, incentives, and regulations. The Code identifies obstacles to achieving stated goals that might be found in a local zoning code (e.g., bans on solar panels as accessory uses). It suggests incentives that might be created to achieve a goal (e.g., increased density in a multi-family development that installs green roofs). A third focus is upon regulations that might be adopted to ensure progress in a particular area (e.g., mandatory water-conserving landscape standards)

[38] Yudelson, Jerry (2016) *Reinventing Green Building Sustainability Key Performance Indicators (KPIs)*
URL: <http://www.reinventinggreenbuilding.com/news/2016/5/24/sustainability-kpis>

A rating system focusing on these Key Performance Indicators (KPIs), based on these criteria, using *absolute performance* as the measure, instead of *relative improvement*.

1. *Energy Use*—With a “net zero energy” goal (setting aside the likelihood that very few buildings will or can ever become “plus-energy” buildings), this will include both direct combustion (natural gas or diesel for water heating, for example) and indirect combustion (electricity), while incentivizing onsite production from renewables or biomass boilers.

2. *Water Use*—Recognizing that we are entering a time of global water scarcities, brought on by population growth, climate change, increasing water footprints from agriculture, cities and industry, we need to reduce water use to an average achieved by lowest-using developed countries.

3. *Waste Diversion*—Most U.S. urban waste recycling systems seem to have peaked at around 35 percent waste diversion from landfill. It seems reasonable then to assess green buildings by starting with 50 percent diversion as a higher goal and embracing a zero waste ideal for waste generation and disposal.

4. *Scope 3 Carbon Emissions*—Scope 3 emissions are essentially “induced” emissions from corporate travel, freight deliveries and employee commuting. All can be easily tracked on a monthly basis from vendor invoices (which can be formatted for upload to FTP sites and then “grabbed” by dashboard APIs) and quarterly or semi-annually from employee surveys. The goal is to encourage companies to reduce Scope 3 carbon emissions to zero through many means, including purchasing carbon offsets.

5. *Ecological Purchasing*—While it may be limited initially to office products and similar items bought from a handful of vendors, this measure would provide useful data. Some larger US office supply companies such as Staples and Office Depot have clear and valuable programs for labeling ecological products, which can then provide input to monthly invoices for determining the total percentage of purchases that meets these criteria. The goal is to get 100 percent ecological purchasing for ongoing operations.

