ALLIANCE FOR BUILDING REGULATORY REFORM IN THE DIGITAL AGE

GUIDE TO BENEFITS OF
STREAMLINING & INFORMATION TECHNOLOGY
TO DISASTER PREPAREDNESS, RESPONSE & RECOVERY

*Helping Communities Better Prepare for, Respond to,
and Recover from Manmade & Natural Disasters*

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*A Public-Private Partnership to Enable Governments to Improve the
Effectiveness and Efficiency of their Building and Land Use Regulatory Processes*
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GUIDE TO BENEFITS OF STREAMLINING & INFORMATION TECHNOLOGY TO DISASTER PREPAREDNESS, RESPONSE & RECOVERY

Policymakers have a responsibility to reach decisions that keep their constituents and communities safe. State and local governments should not be rewarded for poor public policy choices with lax statutory incentives and regulations. This is especially true when these bad choices result in inappropriate land use planning and preparedness, ineffective building code requirements, and insufficient enforcement.

are you READY? – An Elected Officials Guide to Emergency Management
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PURPOSE OF THIS GUIDE:

The purpose of this Guide is to provide elected officials, building officials, disaster preparedness and emergency response officials, and state and local information technology officers with a publication that describes the critical importance to enhancing disaster preparedness, response and recovery within their community from the acquisition and use of information technology in their building codes and land use administration and enforcement programs.

This Guide shares the lessons learned from recent disasters including Hurricanes Katrina (2005) and Ike (2008), Midwestern tornadoes and floods, earthquakes and earthquake disaster exercises in California and the Pacific Northwest where regulatory streamlining and the application of information technology (IT) aided in enhancing disaster preparedness, conducting damage assessments, and more rapid disaster recovery. This Guide includes:

- Lessons learned from natural and manmade disasters and information on ways in which streamlining* and IT are being used by a growing number of state and local jurisdictions to enhance code enforcement, economic recovery, and aid in disaster preparedness, response and recovery.

- Examples of applicable IT including: electronic permit processing; ePlan submittal, review and storage; remote field inspection technology (including damage assessment); GIS; and being able to share electronic as-built designs with first responders.

- Case studies documenting benefits of streamlining and applying IT from the States of Florida, Oregon and California; and from New Orleans, LA; Galveston, TX; Bend, OR; and Broward County, FL.

- Steps that your state or local government can take now to both assess how streamlining and IT can improve your disaster preparedness, response and recovery, and how to go about streamlining and putting relevant IT in place.

*Streamlining is NOT regulatory abandonment. It is maximizing the effectiveness and efficiency of the administration and enforcement of construction and building and land use codes and standards.

EXECUTIVE SUMMARY:

The Problem Statement

On average, every year natural and manmade disasters take several dozens of lives and do tens of billions of dollars in property damage.

How do you best prepare your community/state to handle future natural and manmade disasters? How do you do as much as you can to minimize loss of life and of property from the event and make disaster recovery as rapid, efficient and enduring as possible? How do you give your community, your state, your region disaster resiliency?

The Solution

Ranging from the earthquakes in the western U.S. to the hurricanes that struck the east and Gulf coasts over the past two decades, state and local governments have turned to the adoption and more effective and efficient enforcement of modern building codes with disaster mitigation provisions to make their communities more disaster "resilient" (better able to take the hit of the disaster and then more readily to recover from it).

At the same time, to strengthen their state's or community's economic competitiveness, these governments have looked at streamlining their regulatory processes and, where appropriate, added one or more information technologies to reduce the amount of time it takes to move construction through the regulatory system, increase code compliance, and also speed disaster recovery. Where such systems are in place, communities are seeing reduced losses in property and life to disasters and more rapid disaster recovery. In some communities, the amount of time it takes to process building permits, conduct plan reviews, schedule and conduct inspections, and issue certificates of occupancy have been reduced by as much as 60 percent.

Highlighting major **Lessons Learned** from past disasters, this Guide describes both the disaster resiliency and economic competitiveness benefits that jurisdictions are receiving from streamlining and applying information technologies, as follows:

- In the aftermath of Hurricane Andrew, Florida's Uniform Statewide Building Code & local ePermitting systems.

- In the aftermath of Katrina and Rita, Louisiana's Uniform Statewide Building Code, State IT Roadmap, New Orleans' use of mobile inspection technology to speed safety inspections, and Alabama's "Virtual Alabama" GIS system.

- In the wake of Hurricane Ike, Galveston's accelerated implementation of an ePermitting system to speed recovery.

- With California's history of earthquakes, the testing and initial development of an interoperable network of safety inspectors using diverse mobile field inspection technology.

INFORMATION TECHNOLOGY

Once jurisdictions have reviewed and, where needed, conducted business process re-engineering to eliminate inefficiencies from their regulatory processes, a growing number of state and local governments are applying information technology to their administrative and regulatory processes, resulting in making government services available to the public and private sector 24/7/365, speeding the construction process, and making communities more disaster resilient.

The benefits of the technologies covered in this Guide are:

- **ePermitting** enables customers to pull permits 24/7/365 and the jurisdiction to issue them with fewer trips to city hall thereby reducing staff and customer time by 40 percent and speeding post-disaster reconstruction.

- **Electronic Plan Submittal, Review, Tracking & Storage** provides significant reductions in paper and travel costs, increased code compliance, and speeding plans through the regulatory system by 60 percent and making it possible for communities to later provide electronic "as-builts" to first responders as they roll up on a disaster site.

- **Interactive Voice Response Systems (IVR)** reduces the amount of time it takes to schedule and conduct inspections by 30 percent.

- **Mobile field inspection technology** reduces the amount of time it takes to record inspection results by 30 percent and makes it possible to both spend more time actually conducting the inspection and speed disaster safety inspections and have the data transmitted to a central data point (something not possible with paper-based forms).

- **GIS systems** like "Virtual Alabama" make it possible to chart and monitor evacuation routes, critical infrastructure, and safety damage assessments to give emergency managers and elected officials a clearer picture of what is actually going on in response to and recovery from disasters.

Case Studies

These technologies are not in the development stage. A number have been around for nearly two decades in day-to-day building department operations even though most of them have only recently been applied to disaster response and recovery situations. In six case studies—New Orleans, LA; Broward County, FL; State of Oregon; Bend, OR; Galveston, TX; and the Los Angeles Basin/State of California—detailed information on the above technologies, how they were applied, and their documented benefits are provided in this Guide along with the names of individuals within those jurisdictions to contact for more information.

The City of New Orleans in 2005 applied mobile field inspection technology to reduce by 60 percent the amount of time it took to do post-disaster safety inspections and eliminated two person-years of labor that otherwise would have been necessary to copy safety inspection information onto mandated disaster forms.

In the aftermath of 2005's Hurricane Wilma, Broward County, Florida, demonstrated more effective code enforcement and compliance to the new Florida Uniform Statewide Building Code and sped disaster recovery using IT that supported the county's new contractor licensing and building permit issuing systems.

The State of Oregon is putting in place the nation's first statewide ePermitting system that links together all existing ePermitting systems within that state. It will ultimately make it possible for jurisdictions that have been hit by a major disaster to have sister jurisdictions throughout the state speed disaster recovery by issuing permits.

Bend, OR, has added electronic plan submission and review to their program to both speed economic development and future disaster recovery, reducing by as much as 60 percent the amount of time it takes to conduct such reviews.

The City of Galveston was part way into the installation of ePermitting software when Hurricane Ike struck. Galveston's software vendor provided an emergency response team that completed the installation of the ePermitting software in time to enable the jurisdiction to speed the city's recovery process.

The Los Angeles Basin Region, with funding from the State of California under a grant from the Office of Emergency Services and the U.S. Department of Homeland Security, in November 2008 successfully demonstrated the ability to link diverse mobile field inspection hardware and software to conduct safety inspections. California currently is building out a regional network and then expanding that system statewide, adding significant punch to local and regional mutual aid agreements.

Actions Your Jurisdiction Can Take Today

The dual benefit of regulatory streamlining and IT in making jurisdictions both more economically competitive (stimulating their recovery) and disaster resilient is causing a number of jurisdictions during the current recession to undertake the changes necessary to improve the effectiveness and efficiency of their regulatory system.

To help state and local jurisdictions consider taking similar action at this time, this Guide includes a "self-assessment checklist" to help jurisdictions evaluate their current need for streamlining and IT. (See Attachment A.)

Once you decide that streamlining and IT might be useful to your community, how do you go about taking the next steps? Based upon successful self-assessments and application of streamlining and IT in jurisdictions ranging in size from the City of Los Angeles (3,845,000) down to Cobleskill, NY (5,000), the Guide offers 12 specific actions or steps that jurisdictions have taken to improve the effectiveness and efficiency of their construction regulatory processes through streamlining and IT. Among those steps are:

- Establishing a streamlining and IT Task Force
- Gaining and keeping external and internal stakeholder support
- Researching vendors, hardware and ROI
- IT funding
- Guides to procurement and acquisition

- Implementation – training & testing
- Application under disaster conditions as well as day-to-day operations

Is now the right time to streamline your processes and apply IT to both your day-to-day and disaster response and recovery operations? A growing number of jurisdictions of all sizes and locations throughout the nation, from Bend, Oregon, to Philadelphia, Pennsylvania, think so and are at varying stages of this process.

Few technologies have as proven a track record at both strengthening a community's economic competitiveness and disaster resiliency as the information technologies described in this paper.

This Guide closes with information on how to access more detailed information on each of the technologies it covers as well as connect with the ongoing activities of federal, state and local partners and the construction and IT industry who are working together to improve the effectiveness, efficiency and disaster resiliency of the nation's building regulatory and land use processes.

BACKGROUND ON THE GUIDE: The Current Situation

Natural and manmade disasters annually cost our nation scores of lives, tens of billions of dollars, and result in countless business failures due to both the disaster itself and the inability of the affected community to more rapidly restore basic utility services and repair damages, thus enabling affected businesses to reopen. (U.S. Department of Commerce data show that 85 percent of all small businesses fail if they are closed for three weeks.)

Consider the following recent disaster losses:

- The 2008 U.S. hurricane season was the nation's third costliest with over $41 billion in property losses and taking 104 lives (Gustav-22 and Ike-82).

- The 2008 tornado season was the tenth deadliest in U.S. history (since 1953) with 1,685 confirmed tornados that took 125 lives and causing over $1.9 billion in property losses/damages.

- The March and June 2008 flooding in the Midwest took 30 lives and cost an estimated $2 billion in property losses.

- Galveston, TX, news media report that in mid-February 2009, five months after Hurricane Ike, 75 percent of the shops in downtown Galveston were still closed.

- By January 1, 2009, four and a quarter years after Hurricane Katrina, the estimated population of New Orleans is only 74 percent of its pre-Katrina population level.

- The U.S. Geological Survey and the State of California (in preparing for the November 2008 Golden Guardian "Great Shakeout" exercise of a 7.8 earthquake on the southern portion of the San Andreas Fault) estimated that such an event would cause at least 1,800 deaths, create 53,000 hospitalized injured, displace 255,000 people, and total approximately $213 billion in property losses. The USGS study notes that the death, injury and property loss totals would be even higher if California had not adopted and was enforcing modern building codes with seismic safety provisions.

Recent surveys by the Alliance for Building Regulatory Reform in the Digital Age and reports from building departments in communities that have streamlined their building regulatory processes and applied information technology to their building and land use regulatory processes have documented:

- Increased effective enforcement of their modern building codes with disaster mitigation provisions.

- Reduced amount of time to move a new building or building renovation through their regulatory system by 60 percent (Osceola County, FL).

- Sped safety/damage assessments by 30 percent and, at the same time, eliminated 2 person years of labor to enter safety inspection results on appropriate insurance recovery forms (City of New Orleans after Katrina).

- The average return on investment (ROI) for the acquisition and use of most IT by building departments is less than one year.
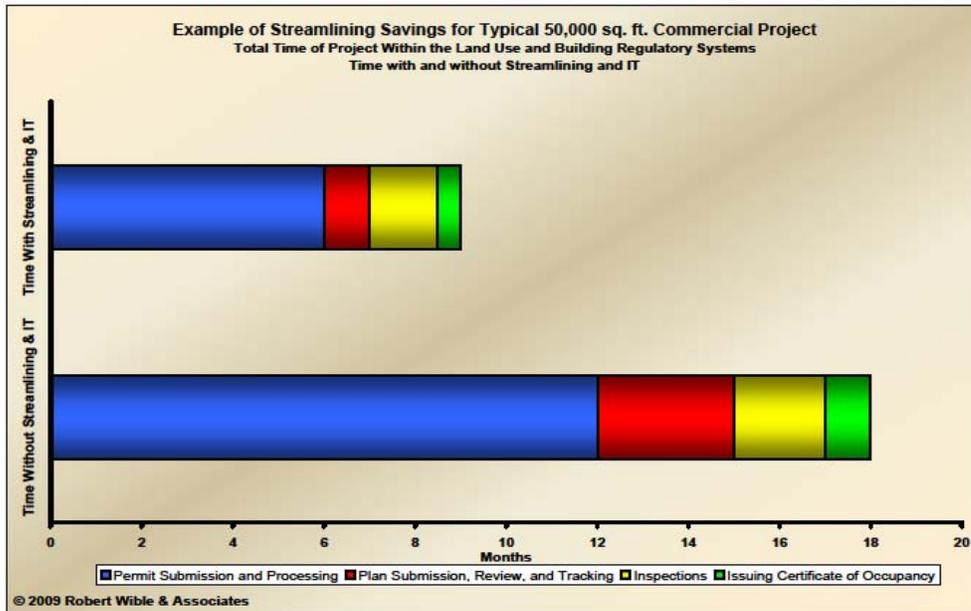
Examples of Time Savings Possible from Applying Information Technology

Despite these facts, however, today only 10 percent of the nation's 40,000 building departments currently use IT in one or more parts of their program. Out of that number:

- less than 9 percent are using IT in permit application and tracking processes;

- less than 4 percent are using remote field inspection technologies; and

- less than ½ of 1 percent are using IT for the submission, review, tracking and storage of building plans.

Not only do all of the above technologies strengthen the ability of communities to more effectively and efficiently administer and enforce modern building codes that include provisions for disaster resistance for construction, they also reduce regulatory inefficiency, enabling the public and private sectors to build "faster, better, safer and at less cost." This is a factor of growing importance in assisting communities and states in the nation's economic recovery.

In the winter/spring of 2006, the Alliance for Building Regulatory Reform in the Digital Age began a series of meetings with their national partners to discuss the expansion of the Alliance's work to: build upon lessons learned from Hurricanes Katrina, Rita and Wilma; expand their regulatory streamlining project's scope to include zoning and land use issues; and develop new streamlining tools targeted at both elected and administrative officials.

Over the next three years, the Alliance obtained funding support for the production and release of several guides, white papers and a Streamlining Tool Kit, all designed to share with elected and administrative officials, the construction industry, and the general public information on the benefits of streamlining and applying IT to improve the effectiveness and efficiency of the nation's building regulatory and land use processes. (See listing and information on how to download these materials at the end of this Guide.)

The Guide to Benefits of Streamlining and Information Technology to Disaster Preparedness, Response and Recovery both expands the disaster related contents of the Streamlining Tool Kit and in the following sections addresses:

- Lessons Learned
- Examples of applicable IT
- Case studies
- Steps you can take to enhance disaster preparedness, response and recovery through the use of IT

Among the problems discussed here are the:

- failure to adopt and/or effectively enforce modern building codes with disaster resistant construction provisions;

- the inability to adequately involve and train building officials for their role in disaster preparedness response and recovery;

- the inability for first responders to have access to current as-built building plans;

- the inability for jurisdictions using remote field inspection technology to use that technology to conduct damage assessments and have different technologies from other jurisdictions exchange data; and

- the inability for jurisdictions to put in place information technologies that speed reconstruction after a disaster, reconstruction to codes that reduce future losses of lives and property.

LESSONS LEARNED FROM DISASTERS & BENEFITS FROM STREAMLINING AND APPLYING IT

With the above as basic background, here are the some of major disasters and the lessons learned by state and local governments throughout the United States.

Florida's Lessons from Hurricane Andrew, 1992: The Benefits of a Uniform Single Statewide Building Code with Disaster Mitigation Provisions & Effective Code Administration and Enforcement

On August 24, 1992, Category 5 Hurricane Andrew slammed into South Florida killing 39 people and causing over $40.7 billion (2008 dollars) in damages, exposing ineffective building code enforcement and inadequate building code provisions. Classic aerial photographs after Andrew showed homes on one side of a street that marked a jurisdiction boundary suffering minimal

damage while those on the other side of the street in a different jurisdiction were totally destroyed.

Floridians learned the very harsh lesson that inadequate code enforcement and diverse and outdated building codes contributed significantly to property losses in that storm. Over the next ten years, elected officials and the public and private sector worked together to develop, adopt and begin enforcement of a single uniform statewide building code with updated disaster mitigation provisions and safeguards to assure better code enforcement and compliance.

Enforced by local governments, employing certified building officials, plan reviewers and inspectors, the Florida Uniform Building Code is updated on a three year code change cycle by the Florida State Building Code Commission. Education and training and code administration and enforcement support are provided to local governments through the Florida Department of Community Affairs.

Subsequent to the new statewide building codes adoption and implementation in 2002-2003, storm damage, property losses and deaths and injuries attributable to new building construction caused by more recent hurricanes (2003-2008) have shown significant reductions from pre-statewide code levels. The 2004 and 2005 hurricanes, such as Charley and Wilma, in Florida demonstrated how much better buildings performed to this updated statewide code and how properly trained and certified building officials deserve their new title of "first preventor."

An additional benefit to Floridians of the uniform statewide code was it helped to increase the availability of many code complying construction materials by allowing for statewide market aggregation, thereby also helping reduce costs.

Lessons from 9-11: Immediate First Responder Access to As-Builts

On September 11, 2001, first responders rolling up onsite to the World Trade Center had no access whatsoever to any of the building plans (either as they were designed or as they were built), nor did they have the ability to contact the architects or engineers who designed the building and were in New York City. Consequently, emergency responders had no knowledge to the following facts that ended up costing countless lives:

- Heavy fire equipment was parked over thin concrete slabs with voids underneath them that gave way causing several trucks to fall through.

- There was no sense of what the exits might be like both at the site of and above where the aircraft impacted each of the twin towers.

- No information was available about the buildings' construction that could have given them a sense that it indeed was possible that the towers could collapse and so they placed their command center within one of the two towers.

Immediate access to "as-builts" for the two towers and access to the building's architect and engineering firms could have provided them that data. Such data for surrounding buildings that were later destroyed by the falling towers likewise would have been useful.

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Gulf Coast Region's Lessons from Katrina & Rita: The Benefits of Adoption and Effective Enforcement of Updated Model Building Codes & Application of IT Services

The costliest Atlantic Hurricane in U.S. history ($82 billion), Katrina took over 1,850 lives in the Gulf Coast, flooded over 80 percent of the City of New Orleans, displaced over one million citizens, and totally devastated towns along the Mississippi Gulf Coast and the coastal parishes of Louisiana.

The aftermath of the August 29, 2005, event sent shock waves, not only through the devastated communities, but served as a wake-up call to the rest of the country as to what the tremendous impact of a large scale disaster (manmade or natural) can be both to an entire region and to the nation's economy.

Close on Katrina's heals, on September 24, 2005, Hurricane Rita struck western Louisiana parishes and Texas' eastern Gulf Coast communities, devastating communities, taking 10 lives and doing another $10 billion in damage.

In many ways Katrina and Rita, to use the language of homeland security, were a WMD (weapons of mass destruction) event. These hurricanes brought about a major long- term evacuation of over a million Americans and deprived a portion of our population of the use of their land, infrastructure, jobs and housing for what has been for some nearly 3 ½ years (if ever). While no terrorists were involved, the impact was much the same as if someone had set off a dirty bomb in the heart of New Orleans or released anthrax all along the Gulf.

Lessons learned from Katrina & Rita were not only for the Gulf Coast but for the nation as a whole. These included the following:

1. **Truly large scale disasters can happen.**

Prior to Katrina, most Americans, including those living in the Gulf Region, believed that when disasters happen, the impact is largely within several towns/cities or, at most, several counties.

Katrina demonstrated that truly large scale disasters do happen; disasters so large that they can overwhelm all existing government planning, training and preparations, not just in cities, counties or a single state, but in multiple states and an entire region.

Moreover, Katrina demonstrated that such events can be so large that neither FEMA nor any existing mutual aid agreements, or even the Emergency Management Assistance Compact (EMAC), can adequately address all disaster response, damage assessment, and recovery/rebuilding issues.

For example, how do you go about building a million homes? How do you avoid the law of unintended consequences when you suddenly have to figure out which existing statutes, rules, regulations, processes and procedures should be kept, suspended or modified to speed response and recovery?

2. **Large scale events damage/destroy not only physical infrastructure (buildings, bridges, highways, rail) but can permanently remove people who are needed to both rebuild and oversee rebuilding.**

When Katrina struck and when the levees around New Orleans subsequently failed, communities lost more than buildings, bridges and roads, they lost the qualified first responders and building department staff and construction personnel vital to disaster response and recovery.

In New Orleans, for example, nearly all of the clerical workers left the city. Only half of the building department staff was able to retain their jobs after loss of revenues forced the city into major layoffs. Moreover, many towns in the counties and parishes struck by the storm that had building departments not only lost the buildings that housed those agencies, but their construction industry lost nearly all of their construction equipment, including the heavy earthmoving machinery needed for response and recovery.

Where do you go for first responders knowledgeable about your kind of construction and topography when your first responders are among the victims?

Where do you get qualified contractors, and how do you get and then house qualified construction workers?

How do you weed out and keep out the unqualified construction workers and contractors who always descend upon a disaster community?

Building officials from across the nation volunteered and spent two to four weeks of their time in New Orleans and in Gulf Coast communities doing damage assessments and helping with some reconstruction permit processing. Their assistance was greatly appreciated, but they were hampered in their work by a lack of temporary housing; the diverse nature of construction types (and in some cases, materials) from their respective home state; and (with the exception of New Orleans) the inability to take advantage of information technology tools, such as laptops and PDAs, to conduct damage assessment inspections.

The benefit of IT during the post-disaster phase was demonstrated in New Orleans when the building department was provided with 24 ruggedized laptop computers and software to conduct damage assessment inspections that transferred the data directly to insurance forms to initiate claims processing. By using these IT tools and, even with its dramatically reduced staff, the city was able to complete 127,000 residential damage assessments within 70 days. (See Case Study.)

3. **Adequately enforced updated model building codes can reduce property loss and save lives.**

Louisiana learned Florida's lesson the hard way. When Katrina hit, less than a third of the state's citizens lived in parishes or local jurisdictions that had adopted a building code. Even then, not every one of those jurisdictions was staffed to perform adequate code enforcement. As a result, even in jurisdictions with codes on the books, storm damage from wind and water were greater than they otherwise would have been under a uniform statewide building code that was adequately staffed, administered and enforced. While few structures were able to withstand the full force of 28 foot storm surges in the coastal communities of Mississippi and in the coastal

parishes of Louisiana, unnecessary levels of damage occurred in homes and other structures outside the storm surge areas due to improper construction, especially, in some cases, improper connections between the home's frame and its foundation.

Improper location of backup generators even in communities with building codes led to untold misery for residents of high-rise and other structures trapped on upper floors without electricity for elevators, air conditioning or refrigeration.

As a result, in early 2006 Louisiana moved to adopt a uniform statewide building code based upon the most current editions of the International Construction Codes with disaster mitigation provisions appropriate for both the Gulf Coast and inland regions of the state.

To support the implementation of the statewide code, the Louisiana State Uniform Construction Code Council established mandatory certification requirements for code enforcement personnel and adopted model administrative procedures for new building departments. The Council also contracted with a not-for-profit organization representing state and local governments (the Institute for Building Technology and Safety (IBTS)) to immediately provide qualified code enforcement personnel on an interim basis while the new building departments were being established.

In addition to the above, Louisiana, through the Alliance for Building Regulatory Reform in the Digital Age, developed an Information Technology Roadmap for the state. The Roadmap identified existing building department IT uses and laid out several possible approaches the Council and local governments could take to assure the effectiveness and efficiency of all building departments through the acquisition and use of appropriate information technology.

By late 2008 the Louisiana State Uniform Construction Code was being enforced throughout the state and the Council was considering its first actions to support local government acquisition and use of IT.

4. **Region and nation cannot afford to just build back the way things were.**

The magnitude of Katrina proved that the nation can no longer afford the luxury of continuing to pour more funds into the Federal Flood Insurance Program to cover communities that do not adopt and enforce modern building codes and standards. The current program is not adequately funded to cover more such disasters, especially when reports on Hurricane Katrina and other disasters produced by the National Institute of Standards and Technology (NIST) and others document the fact that code complying structures do relatively well in the face of natural disasters. (See NIST Technical Note 1476 "Performance of Physical Structures in Hurricane Katrina and Hurricane Rita: A Reconnaissance Report.")

5. **Regulatory streamlining is imperative and, where applied, IT should be used in disaster drills.**

An additional lesson from Katrina is that jurisdictions benefit from taking a serious look prior to the next disaster at the effectiveness and efficiency of their regulatory systems and, where necessary, re-engineering those processes to make them as efficient as possible both within their day-to-day operations and when those systems are put under the incredible stress of responding to and recovering from a disaster. In this regard, a lesson painfully learned by a number of early adopters of information technology in this nation is that IT should be applied to

administrative programs after they have undergone such reviews and necessary re-engineering, not after the technology has been acquired.

A secondary lesson is that once acquired IT should be used wherever and whenever possible in disaster drills. While having IT in place and using it in day-to-day operations certainly helps increase employee familiarity with it, there is no substitute for testing (repeatedly) how that technology and the people who operate it will perform under disaster conditions.

While these have been the major lessons learned, what then are the benefits of different types of information technology to aiding communities in improving their ability to prepare for, respond to and recover from disasters?

In this next section the Guide addresses that question by focusing on the following proven information technologies: electronic permit processing; electronic plans submittal, review and storage; interactive voice response systems (IVR); remote field inspection technology; and geographic information systems (GIS).

TYPES OF IT & BENEFITS OF EACH:

As noted previously, there are five major types of information technology that currently are being applied to both building department day-to-day operations and increasingly to building department preparations for, responses to and recovery from natural and manmade disasters.

The five are: Electronic Permit Processing (ePermitting), Electronic Plan Submission & Review (ePlan Review), Interactive Voice Response Systems (IVR), mobile field inspection technologies, and geographic information systems (GIS).

The following descriptions are drawn from the Alliance's Streamlining Tool Kit and from the guides and white papers listed at the end of this Guide.

ALLIANCE FOR BUILDING REGULATORY REFORM IN THE DIGITAL AGE
STREAMLINING TOOL KIT

Tools & Resources to Enable State and Local Governments to Strengthen Public Safety, Economic Competitiveness and Disaster Resiliencey by Improving the Effectiveness and Efficiency of Their Building and Planning Regulatory Processes

Electronic Permitting Processes (ePermitting)

The oldest and the most mature application of IT to the construction regulatory process is ePermitting. It involves use of the Internet to apply for permits (and in many cases also pay for) for different types of construction (and in a growing number of jurisdictions land use and zoning) 24/7/365.

Jurisdictions that have applied electronic permit processing to their building and land use regulatory programs are saving staff time by 30 to 40 percent over traditional paper-based and "walk into the office" systems. Customers (builders, contractors, homeowners) meanwhile find that being able to apply for and later track the status of their permit online from any remote location is saving them even more time and the costs and fuel involved in pulling and tracking paper-based permits.

Two immediate benefits of ePermitting related to better disaster preparedness, response and recovery. First, it speeds the day-to-day regulatory process and code compliance. Second, in the aftermath of a disaster, it speeds recovery. For persons who have evacuated out of the disaster area, they can connect to the city's web portal and pull and track the progress of their permit.

The overall 30 to 40 percent savings in staff time through greater efficiency of ePermitting likewise speeds the pace of rebuilding the community.

In some areas of the country, multiple jurisdictions within a region are developing regional (in Oregon, a statewide) uniform ePermitting systems. (See Case Studies.) The benefit of this multi-jurisdictional or statewide approach is that, if a building department becomes devastated and unable to function because of a disaster, neighboring jurisdictions not so adversely affected can use their ePermitting system to issue permits in the disaster area.

Electronic Plan Submission, Review, Tracking, Storage & Retrieval (ePlan Review)

Over the past five years, a growing number of jurisdictions have begun accepting building and site plans electronically online or via CD-ROM and are using software programs that allow them to track building plans, either in hardcopy blueprints or in electronic format.

While the actual review of building plans electronically initially was slow to develop, software solutions are now available that enable state and local governments to review and electronically markup 2-D plan files submitted online. There are also specialized programs that help the building department focus on code compliance regarding accessibility for the disabled, energy conservation, and lately, structural reviews for the entire building. In addition, a growing number of jurisdictions are using one of several technologies to store building plans electronically–on tape or in dedicated servers. (See companion *White Papers on "Best Practices in Electronic Plan Submittal, Review, Tracking & Storage" and "From Paper to Digits".*)

Key benefits from ePlan submittal, review, tracking and storage include:

- Electronic plans submittal, tracking, review and storage reduce traditional plan processing times up to 60 percent by reducing the number of physical trips to and from

government offices and by making these services available 24/7/365 and enabling jurisdictions to shift staff resources to other areas in need of attention.

- Improved accuracy of data transmitted contained on the plans and reduced number of building permits and plans being filed by non-licensed architects, engineers or contractors.

- Enhanced collection of revenues owed to the jurisdiction by getting buildings up and on the tax rolls sooner.

- Enhanced ability of government departments to conduct parallel plan review rather than perform them sequentially.

- Reduced or eliminated space and retrieval problems associated with both storing paper blueprints and the need for redundant copies associated with recovery backup.

- Significantly reduced travel time and energy use/expenses of customers helping the community meet sustainability and green community goals. For example, savings for a community that annually issues 3,000 permits include: 312,000 miles driven and 20,800 gallons of gas; 457,600 lbs. carbon monoxide emitted; $57,200 in fuel costs; 12,480 hours of drive-time; 192,000 lbs. of paper used (239 trees); and approximately 12,000 lbs. of paper requiring storage. (From Alliance Elected Officials Guide.)

- Prepare communities for the adoption of future technology in a non-disruptive manner.

ePlan in Facilitating Disaster Resiliency – In the aftermath of 9-11, the devastating hurricanes that impacted the Gulf Region in 2004 and 2005, and recent tornadoes in the Midwest, a number of building departments are looking at electronic plan submittal, review, tracking and storage as a major tool in helping their communities better prepare for, respond to and recover from disasters.

Electronic plan storage affords communities, such as San Jose, California, and Osceola County, Florida, the opportunity to store all plans digitally at several sites, one within their community and another outside of their potential disaster area, should they be impacted by a major manmade or natural disaster.

Electronic plan submission, review and storage provides communities with the ability to collect and provide "as-built plans" of public and other important buildings that a first responder can download from a secure database as they roll up on a disaster site and then use to guide rescue operations or speed damage assessment reports. At present Bend, Oregon; Osceola County, Florida; and the State of Idaho are developing such systems.

When it comes to rebuilding a community, electronic plan submission, review, tracking and storage can speed up the reconstruction process by shortening the traditional paper-based plan review process by 50 to 80 percent. This is a major benefit when it is so critical to get both residential and commercial buildings back into operation as quickly as possible after a major disaster.

In addition, putting ePlan review in place now will facilitate the ability of the community to have code complying plans submitted to the jurisdiction using Building Information Modeling (BIM) and the International Code Council's "SMARTcodes" electronic plan check tool. (See chart below for what a building department's plan review system will look like in coming years.)

Digital Building Departments: The Big Picture

1. External Stakeholders:

Access multiple web services for permit application, plan submission and status updates through public portal, based on pre-defined workflows. File upload priviledges only. Documents submitted in original format for high quality review and archive management. Minimal training required.

External Stakeholders
Owners
Architects
Contractors
Design/Build Firms
Engineering Firms

Public Portal

2. Internal Users:

Have direct access and visibility to systems based on roles and responsibilities. Systems remain specialized to support departmental best-practices, yet integrated at specific points to support common data sharing (XML). Pre-defined, automated workflows drive all major processes from permit generation to "as built" drawing archiving. Key is that multiple internal departments realize benefits of interoperability and process engineering/integration. Valuable metrics are gathered and analyzed to maximize and maintain efficiency.

Building Permits **Land Development** **Admin. & Mgmt.** **Internal Stakeholders**

firewall

Web Servers (web services interface)

firewall

Permitting/GIS/ Asset Mgmt.

ePlan Review & Approval

Inspection

Fee Payment (accounting)

Secure Local Area Network

Document Management (archive)

3. External Users:

Can be granted higher security-level access and greater system visibility, depending on user-requirements. Partner jurisdictions actually share common projects through their respective environments due to overflow or emergency/disaster scenarios. Key is access to "as-built" drawings which may be located in ePlan review or document management (archive) systems.

External Users
Field Personnel
Fire/Police/Emergency Svcs.
Partner Jurisdictions
Federal Emergency Mgmt.
Homeland Security
Maintenance

VPN Port

firewall

Web Servers (web services interface)

firewall

4. Archive

Document management functions are utilized to store and manage all "as built" drawings and permanent records. Meta-data and advanced search via web services is created to enable quick access on demand by internal/external users.

5. BIM (Building Information Model)

In the future, jurisdictions will use advanced BIM data visualization and code-compliance systems, integrated with cross-departmental workflow and archival processes.

avolve software

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Interactive Voice Response Systems (IVR)

Interactive Voice Response (IVR) has been a staple service for many building and planning departments. Today's citizens expect to connect to their government services around the clock using the latest technologies to conduct a growing range of activities. IVR automates specific business transactions utilizing a touch-tone telephone to connect customers with a jurisdiction's building code and land management application database. Such routine, but often time consuming, requests as scheduling an inspection, posting inspection results, and even inspection result notifications, can be performed through implementing IVR technology.

IVR systems began appearing in building, planning and other local government and private sector programs in the early 1990's. Subsequent refinements in both telephone and computer technology have expanded the range of traditional fax and e-mail applications that are available to nearly every jurisdiction across the nation. IVR today offers speech recognition, text-to-speech, fax back forms and information, VoiceXML, converged IVR/Web host integration and VoIP/telephony integration.

IVR systems have evolved to address basic customer service and communications problems associated with scheduling and managing inspections, thus freeing up staff positions to undertake more complex tasks. Sample savings cited by jurisdictions using IVR range from between one- and four-person years of labor, depending on the size of the community and construction volume. Benefits to customers have included being able to call after hours and overnight schedule inspections for the next day as opposed to waiting several days for those inspections.

IVRs today can:

- Automate the scheduling of inspections and retrieval of inspection results.
- Enable communities to use the telephone, e-mail, fax or text messaging to communicate to citizens – from sending out public safety messages to notices of meetings.
- Provide inspectors the ability to post inspection results via a cell phone.
- Complete credit card payments with real time update of the payment files.
- Some communities are using IVR systems to send out disaster alert notifications to citizens.

Mobile Field Inspection Technology & Interoperability & Linking with Paper-based Systems

Approximately 96 percent of the nation's building department's still conduct inspections using traditional paper-based inspection checklists and forms. Since the late 1990's, however, there have been a growing number of diverse, durable, and reliable hardware devices, from ruggedized laptops and notepads to PDA's, and, most recently, SMARTphones. These can be taken into the field by inspectors to more accurately gather and document inspection data, issue inspection reports, and transmit them instantly to building owners, architects, contractors and to the building department.

Jurisdictions using such technology report increasing the accuracy of inspection data and reducing the amount of time it takes to record and transmit inspection results by between 25 and 30 percent. Mobile inspection technology is enabling jurisdictions to spend more time

actually conducting site inspections while reducing inspection costs by eliminating the need for inspectors to record data by hand and to start and end each day back in the building department.

As noted in two of the case studies, building departments in Louisiana and in California are using their mobile inspection devices to conduct safety inspections after natural disasters and put that data directly onto ATC-20 (for earthquakes) and ATC-45 (for floods) forms. In addition, the State of California is in the process of building the nation's first regional (in Southern California) network that enables building departments to bring and use diverse mobile field inspection technology and paper forms and connect them all into an interoperable central database to collect and assemble safety inspection reports from a disaster area. (See Case Studies.)

GIS Systems – Virtual Alabama

Alabama applied its lessons from Katrina to develop and make operational in 2008 "Virtual Alabama," a web services based GIS database that uses a Google Earth platform to provide government officials (across state, county and municipal levels) with immediate situation data during a disaster. Everything from:

- critical infrastructure mapping;
- emergency evacuation routing;
- common operational picture for emergency personnel;
- vehicle & asset tracking;
- situation awareness, including plume modeling & real-time sensor feeds; and
- through "Sketch-up," a three dimension modeling tool, the ability of first responders to build and use accurate models of schools and other critical buildings.

The Virtual Alabama database is secure from non-authorized users and is fulfilling its mission to "ensure that the right people have the right information at the right time." For more information, visit www.virtualalabama.gov.

SIX CASE STUDIES: IT YOU CAN APPLY

Based upon the lessons learned, the following jurisdictions offer basic information on their streamlining and application of IT to strengthen their ability to better prepare for, respond to and recover from disasters. Contact information for each jurisdiction is provided at the end of each case study.

1) City of New Orleans, LA: IT to Conduct Safety Inspections

Shortly after the levees collapsed in August 2005, 80 percent of the City of New Orleans was underwater, and 100 percent of the city was without power. A skeletal staff remained within the city's Department of Safety and Permits to go out and conduct safety inspections to enable the mayor and his emergency management staff, police, fire and public utilities, to understand the extent of the damage.

The New Orleans Director of the Department of Safety and Permits, Michael Centineo, called upon their software vendor and a national hardware vendor to solicit their assistance in donating to the city, software and ruggedized laptop computers to conduct post disaster safety inspections (tagging buildings "red," "yellow," or "green") more rapidly and send data reports to a central database to give the city an accurate assessment of the magnitude of the disaster.

As a result of that donation, a process through which the average inspector could be expected to perform 30 such inspections a day by using paper forms, was accelerated to each inspector conducting 130 such inspections. In addition, none of the inspection data had to be transcribed by a clerk onto appropriate state and local forms. As a result, 124,000 safety inspections were conducted in less than 10 weeks and two person-years of labor were saved by not having to copy over safety inspection data onto proper government forms.

Coupled with GIS, that effort enabled New Orleans to see where portions of the city could be repopulated and enabled the utilities to know where they could concentrate their efforts to bring electrical, water, and gas systems back on line. It also enabled the city to keep track of its teams out in the field.

Moreover, the City of New Orleans was able to share much of that information through its web portal with the citizens who had fled the city, by posting the inspection results on the city website.

FOR MORE INFORMATION CONTACT: Bhola Dhume, Deputy Director, City of New Orleans Department of Safety and Permits, bdhume@cityofno.net.

2) Broward County, FL: Implementation of the Statewide Building Code and Contractor Licensing and ePermitting

Hurricane Wilma was the 22nd named storm and 4th Category 5 hurricane of the 2005 hurricane season. This hurricane had the lowest barometric pressure ever recorded for an Atlantic hurricane and did $16.8 billion in damage in the United States after it came ashore on Florida's southwestern tip on October 24, 2005.

Wilma was the worst storm to hit Broward County in 55 years. As it exited Florida, the hurricane did over $1 billion in damage, cut power to 98 percent of the county, destroyed 5,500 homes and 1,515 mobile homes, and cost the county government over $28 million in insurance deductibles for property losses alone.

While technically a much less intense hurricane by the time it crossed over the tip of Florida to strike Broward County on the Atlantic Coast, Wilma fully tested the changes that had been put in place in the county's building codes administration and enforcement system over the previous five years.

The county continued to see that buildings built in recent years to the provisions of the upgraded Florida statewide building code performed well during the hurricane with most property losses occurring in older structures.

Drawing upon lessons learned from earlier storms and Wilma, the county put in place an expedited licensing process for contractors and an expedited damage assessment and building inspection process that was aided by building officials from neighboring jurisdictions not impacted by the storm. Today contractors can not only go online to request license renewals but to pull and track their building permits 24/7/365, and use a voice activated response system to call in and schedule inspections.

The above IT processes speed up not only day-to-day operations for the construction industry, but significantly speeds (by 40 percent) the issuance of permits and scheduling of inspections for construction following future manmade and natural disasters.

FOR MORE INFORMATION CONTACT**:** Cynthia Chambers, Director, Department of Urban Planning & Redevelopment Administration, Broward County, FL, cchambers@broward.org.

3) State of Oregon: Statewide ePermitting System to Speed Economic Development and Disaster Recovery

The passage and signing into law in early 2007 of Oregon HB 2405 authorized a 4 percent surcharge on all building permits issued within the State of Oregon over a ten-year period to pay for the development and implementation of a uniform statewide ePermitting program. An RFP was issued in the summer of 2007, awarded in mid-2008, and Oregon is now working with a national ePermitting software vendor to develop and extend to the first three selected jurisdictions (Eugene, Springfield and Lane County) the first unified ePermitting system that subsequently will be made available to all jurisdictions within the state. Moreover, the Oregon statewide ePermitting program affords jurisdictions that already have an ePermitting system of their own to keep that system and interface directly with the new statewide system.

Seventeen states today have a pre-emptive uniform statewide building code. Oregon's program effectively addresses one of the major issues plaguing most states with such programs. That issue is the ability of the state and local governments to act together to identify and take common actions to reduce those portions of construction costs that are attributable to the confusion and time delays caused by regulatory duplication, conflict, and overlap that occurs where widely diverse administrative processes and procedures exist between each local jurisdiction that administers some portion of the statewide code. A study commissioned by Oregon in 2006 estimated that when complete, the statewide ePermitting system would save the construction industry over $1.5 million a year in time delays.

Oregon's ePermitting program ultimately has the added benefit of also addressing issues relevant to Hurricane Katrina and potential disasters of similar region-wide impact. A large scale natural (or manmade) disaster on the magnitude of Hurricane Katrina or of the level 9 earthquake along the Pacific Northwest subduction zone, (envisioned by the Pacific Northwest Economic Region's Blue Cascade III disaster exercise conducted in Seattle February 2006), demonstrated the importance of two aspects of building codes administration and enforcement.

The first aspect is the importance of states and their localities to effectively and efficiently enforce modern building codes with disaster resilience provisions.

The second is the beneficial role that a uniform online permitting system can play in speeding disaster recovery in those states with a statewide building code. Such a system enables a state

agency or local units of government not adversely impacted by the disaster to offer ePermitting, along with mobile inspection and even (in some cases) plan review services, to that portion of the state devastated by the disaster.

With growing interest in ePermitting and ePlan review, there even is potential for building connections between the ePermitting, and later electronic plan review systems, between states within a region. This would allow Oregon to more readily assist Washington and California, and Washington and California could assist Oregon's disaster recovery more effectively should a magnitude 9 earthquake event ever occur within that region.

FOR MORE INFORMATION CONTACT: Patrick Allen, Deputy Administrator, Building Codes Division, Oregon Department of Consumer and Business Services, Patrick.allen@state.or.us.

4) Bend, OR: Electronic Plan Review Speeds Economic Development and Future Recovery

Located in Deschutes County at the geographic center of Oregon, the City of Bend is the heart of the scenic and rapidly growing Central Oregon region. Since 1990, Deschutes, Crook and Jefferson counties have collectively doubled in size, with Bend more than tripling its own population. During 2007, Bend's development activity percentages exceeded Las Vegas, NV, making it one of the nation's busiest growth centers.

Over the past six years, Robert Mathias, Building Official for the city, had been steadily applying information technology to his department operations. The idea of ePlan technology was something he had already decided he would implement if he could find a viable product, which the city did in late 2007. By May 2008, Bend became the first community in the State of Oregon to implement a complete online solution for construction and land-use plan approval. It has enabled the Bend Building Department to further apply its service-centric philosophy and paved the way for a fully-integrated, electronic community development program that touches all city departments.

The Challenge—Raise the Service Bar Despite Economic Uncertainty

The unprecedented population growth in Central Oregon created a number of pressures for the building department. Between 2002 and 2007, the department staff grew from 12 to 20 and then 40 at the height of the construction boom. According to Mathias, Bend's relative geographic isolation made it difficult to draw from a large pool of local building and engineering talent, and outsourcing overflow to remote plan review services was considered too problematic. Maintaining a high level of service to citizens could only be solved in two ways: continue to grow and train a freshman staff and figure out a way to do more with less, or applying new technology to solve problems. For Mathias, deploying ePlan technology was a solid investment that would improve the city's ability to serve its expanding community in the near and long-term.

To secure funding for the ePlan system, Mathias presented the merits of ePlan software tools. He had identified tools and methods and told the City Council that he felt there was more value in ePlan technology than that of two new employees that were scheduled to be hired. The Council was in favor of a capital expense over the long-term commitment to human resources. Based on his budget projections, the ePlan system would pay for itself in 18-24 months.

The Council gave their approval which turned out to be a fortunate decision. In 2008 a severe economic downturn slowed building activity significantly. The building department had to cut its staff back to 20, a 50 percent reduction. This put a greater burden on the department to sustain the status quo in terms of exceptional customer service. Rather than settle for business-as-usual, Mathias and his team exploited their new ePlan system to improve customer service in the midst of economic insecurity.

<u>Up and Running Fast – Preparing for Future Disasters</u>

Bend's long-standing commitment to use new technology wherever possible and early streamlining to optimize internal workflow of their regulatory processes made the implementation of their electronic plan review and markup solution relatively straightforward and fairly painless.

The bigger challenge would be promoting ePlan to city agencies involved with plan review and educating customers. The fire, engineering, environmental and other review departments typically used pencil and paper checklists that were circulated by hand. With their ePlan system, they now had an opportunity to participate in a fully electronic, automated workflow that required some changes in thinking. Yet, it did not take long for all the review departments to embrace the system. Mathias is currently directing the incorporation of planning, engineering, signs, fire, and public works into the ePlan system, as well as other parts of the organization.

That activity will facilitate the city's goal of not only speeding day-to-day plan review processes but, should a manmade or natural disaster occur within the city, speed Bend's economic recovery. A secondary disaster related goal of the city is to be able to provide first responders with electronic plans of critical structures as they roll up on a future disaster site.

 "We estimate that we're seeing at least a 50 percent reduction in the overall process per review", comments Mathias. "We could probably squeeze out some more efficiency, but the truth is now the real delays are nearly always on the customer side of the cycle." He also points out that remote companies, such as national retail and restaurant chains, that want to build in Bend will not need to travel as often or be concerned about communication and process delays or breakdowns. Local and remote customers applying for permits and submitting plans have been quick to express their approval

In less than a year, the building department can boast that 60 percent of its plan submissions are electronic, and Mathias is pushing for 100 percent in 2010. This aggressive schedule is partly due to the care that is taken to introduce new customers to Bend's ePlan process. City customers are still able to deliver blueprints to the counter as in the past, but the paper is scanned and uploaded directly into the ePlan review system.

FOR MORE INFORMATION CONTACT: Robert Mathias, Building Official, City of Bend Oregon, rmathias@ci.bend.or.us.

5) City of Galveston, TX: Hurricane Ike—Property Management and Permitting Database—A Trial by Fire

When Hurricane Ike roared ashore on Galveston Island on September 13, 2008, the City of Galveston was forced to abandon business as usual and respond to the catastrophic emergency.

For the last several years, storms have made landfall up and down the Gulf Coast. Learning from their coastal neighbors, the City of Galveston was nearing the end of a multi-year software implementation designed to expedite planning and permitting issues city-wide. While the roll out had been completed, the system was in transition as staff got up to speed on the new processes and procedures. Additional modules had been purchased but not yet installed.

The Galveston Property Management Database wasn't even fully implemented when Ike came ashore. The city had its roll out a couple of months before and many of its inspectors still preferred to use paper and pen in the field and then come back to the office to enter the data in at their desks. Ike changed all of that.

Ike's tidal surge inundated 75 percent of Galveston's homes and businesses. With substantial structure damage throughout the Island, the city's Planning and Community Development Department was immediately besieged by property owners filing paperwork for repairs. City staff quickly realized they had to abandon their old methods of information gathering and permitting in favor of utilizing the software it acquired.

Once electrical service was restored and staff reactivated the city's server, it became apparent the Emergency Management System database was not configured correctly. Initially, staff had opted for remote storage of this portion thinking that this would protect the data from destruction by storms. However, to respond to the demands of the public, staff needed this data in the local system so that it could be referenced. This deficiency made the system of little to no use to the Planning Department.

Recognizing the emergency, the software company's CEO authorized his company to do "whatever it takes" to fully implement the software and come to Galveston's rescue. The vendor's chief technical officer led a small team of highly talented, dedicated people who helped the City of Galveston completely revamp the database system. Working together for four to five days, the city's system was reconfigured so that staff could quickly reference information and efficiently process building permits. What normally would have taken months was completed in a matter of days.

Seven months later, the City of Galveston is still recovering from the damage left behind by Hurricane Ike. Thanks to its vendor, more than 15,000 building permits have been processed. The city can regularly supply FEMA with critical information about the recovery. Volunteers have been trained to enter data and access the database. Looking forward, city leadership understands the value the software provides and sees potential new applications.

FOR MORE INFORMATION CONTACT: Ryan Young, IT Administrator, Galveston Planning and Community Development Department, Galveston, TX, YoungRya@cityofgalveston.org.

6) Los Angeles Basin/State of California: Interoperable Mobile Field Inspection Technology and Regional Safety Inspection Network

A large scale natural or manmade disaster in California would place major demands on the ability of governments and their building code agencies throughout the affected region to respond to and later recover from that event. After Hurricane Katrina, New Orleans successfully used mobile field inspection technology to rapidly conduct and compile safety inspections. With this in mind, during summer 2006 the Alliance for Building Regulatory Reform in the Digital Age met with building officials in the Los Angeles Basin and Matthew Bettenhausen, Director of California's Office of Homeland Security, to explore the possibility of how this technology could be used to speed the conduct and assembly of safety/damage assessment reports after a catastrophic event in the state.

New Orleans' experience proved that a single jurisdiction could make great use of mobile inspection technology to speed safety inspections. However, the question remained could multiple jurisdictions with diverse mobile field inspection capabilities come together and use their technology to conduct safety/damage assessment inspections? Moreover, could that data compiled through diverse hardware automatically roll-up to a central data source to speed the understanding of the magnitude of a disaster and also populate appropriate disaster forms to speed recovery?

A project to answer these questions subsequently was funded by a grant from the California Office of Emergency Services (forerunner of the California Emergency Management Agency). In May 2008, Robert Wible and Associates and the L.A. Basin Chapter of the International Code Council began work as a Project Team on the *Project to Demonstrate Regional Interoperability of Mobile Damage Assessment and Inspection Technologies in the Los Angeles Basin, the "L.A. Basin Project."*

Over a seven month period, the "L.A. Basin Project" first studied the feasibility of, and then developed and demonstrated a process for, interoperability of information technology used to do safety assessment in the field after a catastrophic event. The project identified practical technologies and, where needed, recommended the development of protocols for the linking of disparate hardware and software systems used by local building officials to develop an interoperable network to gather and disseminate safety and damage assessments and other field inspection data in the wake of a major natural or human-caused disaster. In that effort, the project proved it was possible to support mutual aid among local building and code inspection personnel to:

- perform immediate safety assessments of critical infrastructure;
- conduct general safety assessments of the structural integrity, safety and reoccupancy of governmental, residential, and commercial structures;
- authorize reconnection of utilities after damage repairs have been made; and
- roll all of that data up to a central database location to provide government officials with a rapid understanding of the magnitude of the disaster event.

In two demonstrations, one held in late August 2008 and the other during the State of California Golden Guardian "Great Shakeout" exercise in mid-November 2008, 12 different types of hardware (including SMARTphones), three different types of software and hardcopy safety inspection forms were shown to be able to interconnect and be uploaded to a central data point.

Based upon the successful demonstrations in 2008, the new state California Emergency Management Agency (CalEMA) is moving to design, build, test and make operational in Southern California its first workable Regional Network of Safety Damage Assessment Inspectors. That network would use both existing paper inspection systems and interoperable mobile inspection technology.

FOR MORE INFORMATION CONTACT: James Barnes, P.E. , Associate Civil Engineer, State of California Governor's Office of Emergency Services, Technical Assistance Programs, Jim.Barnes@oes.ca.gov.

STEPS YOUR JURISDICTION CAN TAKE NOW:

Are Streamlining and IT Right for Your Community Now or in the Near Future?

With all of the above benefits and features of regulatory streamlining and the application of diverse information technology systems for building, planning and zoning departments, how can you decide what the benefits are to your community and, in turn, determine whether or not your agency is ready for streamlining and IT? Fortunately you don't have to walk this pathway alone. Others have successfully walked it before you and provide some of their recommended actions which are included in the Self-Assessment Checklist found as **ATTACHMENT A** to this Guide.

Included in the checklist are questions that can help your jurisdiction conduct an evaluation of disaster resiliency benefits and such day-to-day operation issues as: customer input, work flow, workload, and personnel.

The Outcome of Your Self-Assessment

What are your next steps if your brief self-assessment has identified areas where streamlining and IT can facilitate faster and better day-to-day operations and disaster response and recovery performance? Based upon the experience of jurisdictions that have successfully streamlined and applied IT to their operations, here are some of the next steps you should consider taking.

IF YOU HAVE DECIDED YOU NEED TO STREAMLINE AND APPLY IT, THEN WHAT DO YOU DO NEXT?

Step-by-Step Process: Finalize your decision; Gain support for streamlining; Funding methods; and Acquisition & Implementation of IT services.

To date, over 4,000 state and local jurisdictions across the United States have successfully acquired and implemented information technology in one or more of their building and/or planning/zoning codes administration and enforcement processes. Although most of these acquisitions have been for electronic permit processes, it is estimated that nearly half of these jurisdictions have already acquired and implemented one or more additional forms of IT. Most commonly that includes some form of IVR for one or more department process, including such activities as inspection scheduling, reporting inspection results, collecting fees and providing public notifications. In addition, a growing number of those jurisdictions with IT in their day-to-

day operations are discovering the benefits of those technologies to strengthening their disaster response and recovery. With that in mind, the steps outlined below include recommendations for coordinating your IT acquisition activity with your disaster managers and first responder colleagues.

1. **Use a task force to gather data and best practices from jurisdictions that have already made this transition.**

A number of jurisdictions that have streamlined and acquired IT for both day-to-day operations and disaster resiliency have found it useful to assemble a work group or task force comprised of both internal and external stakeholders to conduct a more detailed self-assessment of the need for streamlining and the application of information technology in their community. These jurisdictions also found it helpful to use that task force to serve as an IT Acquisition and Implementation Work Group.

Just as you can go online to Consumer Reports for major household purchases or consult an Edmonds Guide when purchasing a used car, you can gather as much information as possible from other jurisdictions that have already made the decision and acquired the technology. The contacts listed in the case studies in this and in other Alliance IT guides can give you a starting place.

2. **Gain and maintain external stakeholder (customer) support.**

An often critical element to successful preparations for acquisition, implementation and use of any information technology is the effective involvement of both internal and external stakeholders. On the disaster side, this includes your emergency management staff, police, fire, public works and related agencies.

As noted earlier, external stakeholders include your clients, as well as those who visit your building department day-in/day-out (architects, engineers, contractors, building owners, managers, and homeowners). These external stakeholders have a tremendous vested interest in ensuring that regulatory streamlining and IT implementation are effective. Typically, they are most exposed to cross-department interaction; and, as a result, often they can provide guidance to areas where the process needs possible restructuring prior to your applying information technology to it. This group also can be important later on in helping you identify and obtain funding support for the acquisition of IT and to provide input to help drive the demand and use. Your business community here also should be a major supporter of the benefits of IT to speed disaster recovery – business continuity is everything!

3. **Gain and maintain internal stakeholder support (elected officials, agency heads, agency staff).**

Gaining and maintaining internal stakeholder (elected officials, agency heads and staff) support is vital to successful streamlining and applications of information technology. This is true, for example, with IVR where the traditional approach of a switchboard and routine calls routed to individual inspectors can present some challenges when transitioning to an Interactive Voice Response system. Likewise, transitioning from paper-based plan reviews to doing such reviews on computer screens can prove to be a challenge for many (especially older) staff members. As noted earlier, regarding the benefits of IT to disaster resiliency, your internal stakeholders include your colleagues in sister agencies that are responsible for EMS, police, fire and public works.

Where not properly involved, internal stakeholders have slowed more than one jurisdiction's best efforts at streamlining their administration and enforcement processes and applying IT. (See discussion in the *White Paper on Best Practices in Electronic Plan Submittal, Review, Tracking & Storage* on pages 8-10 "What Have Been the Barriers to Using IT.")

Not to be forgotten are your elected officials. These are the individuals who not only frequently are the recipients of complaints about the slowness or inefficiency of a jurisdiction's traditional regulatory system, but also can be most concerned with a community's economic viability and can hold the purse strings regardless of how a jurisdiction funds IT. Frequent update meetings with elected officials throughout acquisition and installation process are invaluable.

4. Research IT vendors and hardware providers that will fit the needs of your agency.

There are a growing number of vendors for IT hardware and software. Based upon lessons learned by other jurisdictions, it is very important not to try and cobble together an IT system, but to carefully analyze the components you need and in what timeframes you want to acquire and implement them. This will facilitate your ability to shop for both the "best of breed" and also consider vendors who provide a complete package of software services. For more detailed recommendations concerning acquisition of specific types of IT– ePermitting, ePlan Review, and IVR systems—download the relevant Alliance white papers referenced at the end of this Guide from www.natlpartnerstreamline.org.

In this step you also may wish to look at the Alliance's Model Procurement Guidelines that were developed and endorsed by the National Association of State Chief Information Officers (NASCIO).

Contacting other jurisdictions that have put IT in place and getting their candid recommendations regarding software and hardware is still the most reliable way to get meaningful input. The above referenced white papers provide such contacts for day-to-day operations, but many of these contacts along with those referenced in this Guide's case studies have experience with disaster applications of IT.

5. Internal assessment of cost/benefit and setting a realistic timetable to acquire and implement.

Working with the task force formed in Step 1, the building and/or planning/zoning department heads can assemble all of the information gathered in the above four steps. This will enable them to complete a final assessment of the costs and benefits of applying IT to their current business processes, set realistic costs and timetable to conduct, where necessary, business process restructuring, and then develop a formal plan to procure and implement IT for both day-to-day operations and for disaster resiliency.

6. IT Funding.

Funding during these difficult financial times is a major stumbling block for most jurisdictions. This need not be the case. Return on Investment (ROI) data gathered by the Alliance from a wide-range of jurisdictions applying IT to one or more codes administration and enforcement processes show the payback period in savings of staff time and customers for any investment in hardware, software and training to be less than one year in most cases.

Overall the cost of both hardware and software has come down in recent years while the quality has gone up. Moreover, the successful involvement of external stakeholders from the start of this process has reaped major dividends when it comes to funding for IT.

The three major revenue sources for IT remain: dedicated funds of the building department from its own revenue stream; general funds from the jurisdiction; and placing a surcharge on all permits issued by a jurisdiction to cover all costs associated with acquiring and implementing an IT program. Surprisingly, the last one is receiving greater support from building department stakeholders, especially where those surcharge funds are guaranteed to go only for the acquisition and implementation of that specific software/hardware.

A fourth funding source that has been used less frequently in recent years has been the funding of IT through municipal bonds. The City of Los Angeles in the late 1990s and the State of Kentucky both have successfully used this mechanism.

7. Procurement and acquisition issues.

Many jurisdictions do not have an IT officer and have had little experience in developing, issuing and awarding contracts for hardware and software used in the administration and enforcement of their building and planning/zoning programs. Recognizing this potential barrier, the Alliance in 2003-2004 worked with the National Association of State Chief Information Officers to develop *Model Procurement Requirements*. As noted earlier, this document is available to jurisdictions along with Chapter 6 from the 2006 *Guide to More Effective and Efficient Building Regulatory Processes Through Information Technology* to provide a roadmap through the IT acquisition process. Both of these documents can be downloaded from the Alliance website, www.natlpartnerstreamline.org.

In addition to the above, the building officials listed in the five case studies are available to answer questions concerning RFP issuance and acquisition. The Alliance continues to work with state and local governments and the IT industry to promote the development and use of open source standards and true interoperability of IT systems. In 2009, working with the State of California and the IT community, the Alliance is considering developing interoperability guidelines for mobile inspection technologies.

8. Build it right the first time with customer input to the IT you build.

A potential concern for some jurisdictions has been the issue: "If you build it, they won't necessarily come." In reality, because of the tremendous convenience of IT and its use in other day-to-day business contexts, once in place IT is quickly accepted by internal and external stakeholders. A key element here, however, is designing the system right the first time so it maximizes user friendliness. Getting your users input here on the business process work flow can be most helpful to IT selection, acquisition and implementation. Additionally, educating

contractors, building owners, architects, and building, planning and emergency management department staff on how to use your IT will promote acceptance.

9. **Test extensively in both day-to-day operations and under simulated disaster conditions.**

When your department develops and deploys IT, most vendors allow for a period of testing and system acceptance prior to the time when your IT "goes live" to external stakeholders. It is important to take full advantage of this opportunity to fully test the behavior of your IT to ensure it is functioning as expected. This is especially true about testing how you plan to use that IT under disaster circumstances. That approach pays dividends in both customer satisfaction and assuring that whenever a disaster occurs you can rely upon the IT you have put in place to perform as needed.

Among issues that such testing may identify are how to handle major power failures, disruptions in cell phone transmission, and adequacy of training IT users.

A side benefit to in-depth internal testing is that it involves the jurisdiction's internal stakeholders in the process, giving staff the opportunity to learn how the IT works without the added pressure of trying to get their regular job done. This approach helps staff become educated, well trained and to see the time-saving benefits of IT early on. It also helps some staff see that IT does not threaten their jobs. Moreover, once your IT "goes live" to the public, your staff will possess the expertise to guide external stakeholders in using the system.

10. **Get the word out about your new IT and its benefit to disaster resiliency as well as to day-to-day operations.**

This is one of the most frequently cited lessons learned from the jurisdictions that have successfully applied IT. Local government spends considerable time and energy in selecting and implementing IT solutions, but often less time is spent planning how that new system will be publicized.

It takes time and strong promotion to change old habits of external stakeholders and to overcome a natural fear of existing staff that by using IT they are somehow going to be replaced.

The overwhelming recommendation from successful jurisdictions has been to begin promoting the IT implementation to external stakeholders early in your process and build steadily in your outreach efforts. Jurisdictions that have done so have found that IT soon becomes routine and their contractors, homeowners and business community appreciated the flexibility and convenience they were offered and the benefits that are derived to speed disaster response and recovery.

In this same regard, it is important to share word about your new IT with neighboring jurisdictions and to explore with them ways of linking each other's IT systems for mutual support during and after a minor or major disaster.

11. **Build upon successes.**

A recommendation from several jurisdictions is to establish a review cycle for IT following its launch. In that review, analyze IT use and determine whether the system achieves the goals

you originally outlined. If not, determine what steps to take. Also continue to drive business and workload to the IT in order to achieve maximum return on your investment. A number of jurisdictions that were early adopters of IT have found it beneficial to work with their vendors to consider adding additional features at a fraction of the cost of their original system.

12. Plan for routine maintenance and test its application during drills.

Like any technology, IT must be managed and tweaked for optimum performance. Departments need to plan for occasional system downtime for routine maintenance, database backups, etc.

Secondly, while each of the five major information technologies covered in the Guide will be used in day-to-day code administration and enforcement operations, it is critical to schedule time to put these technologies to use under simulated disaster conditions. In that manner, you will now be able to correct in advance problems that may arise from their use under such conditions. Such problems may include loss of backup generator power, loss of cell towers or cell transmissions, etc.

As noted above and as witnessed by the case study from the Los Angeles Basin and State of California, it also is beneficial to seek opportunities to test your new IT in disaster drills that are coordinated with neighboring jurisdictions with similar technology capabilities.

IS NOW THE TIME FOR YOUR COMMUNITY?

Beginning in late 2007, construction across the nation has dropped significantly. Some jurisdictions recently have asked the Alliance if this is a good time to undertake regulatory streamlining and acquisition and implementation of IT. That same question has been posed to a number of major jurisdictions now using IT and the answer, surprisingly to many, is an emphatic, "yes!"

One official said: *Contrary to a person's first reaction to construction downturn (recession), now is precisely the time when communities should be starting the process to ascertain and then undertake streamlining and application of IT in relevant parts of their programs. With construction volume down, we have the time to step back and look at how our departments are working, how efficient or inefficient they are, and determine what needs fixing and then work with our customers to get the funding to make those fixes. We need to do so now to be better prepared both to operate as efficiently as we can once the construction cycle turns upward again and when a disaster strikes our community.*

Additionally, recent research shows that up to 60 percent of government workers will be eligible to retire in the next decade, and nearly 20 percent will retire by the end of 2010. These retiring workers will take with them their accumulated expertise in their departments. For building departments that fit these statistics, waiting to deploy IT may rob your department of vital institutional memory these staff members can contribute to helping you build the most effective and efficient IT service possible for your community.

A CLOSING THOUGHT, COMMENT AND THANK YOU:

One of the primary challenges for emergency management is to gain the attention and support of the public and elected officials BEFORE a disaster happens. Support for emergency management tends to be reactive rather than proactive, and preparedness resources flow most readily after a tragic event has occurred. Proactive investments in emergency management can lead to the successful mitigation of potential losses as well as a more effective disaster response and recovery.

are you READY? – An Elected Officials Guide to Emergency Management,
Challenges and Opportunities Section
published by National Emergency Management Association 2009

In this time of deep economic recession, future natural and manmade disasters will take even heavier tolls upon the communities they strike and upon the national economy as a whole. Few technologies have as proven a track record at both strengthening a community's economic competitiveness and disaster resiliency as the information technologies described in this Guide. The Alliance, its partner organizations and the associations and companies that provided funding to produce this Guide, hope that you found its contents useful in considering streamlining and putting such technology in place in your community.

The Alliance wishes to thank the jurisdictions that provided the five case studies and the Property Casualty Insurers Association of America (PCIAA); ISO – the Insurance Services Organization; FIATECH, Accela Corporation, Avolve Software, and Selectron Technologies for their funding contribution that made this Guide possible.

FOR MORE INFORMATION:

Please contact Alliance Secretary/FIATECH Streamlining Project Director, Robert Wible, at either FIATECH wible@fiatech.org or at Robert Wible & Associates rcwible@comcast.net if you have any questions. You also can reach Mr. Wible by phone at 703-568-2323. Copies of other Alliance materials including those mentioned in this Guide can be viewed and/or downloaded from the Alliance's website www.natlpartnerstreamline.org.

OTHER ALLIANCE GUIDES & WHITE PAPERS:

- White Paper on Best Practices in Electronic Plan Submittal, Review, Tracking and Storage
- From Paper to Digits – Steps to Take to Move Your Plan Submittal, Review, Tracking and Storage Processes into the Digital Age
- Interactive Voice Response Systems – Building Blocks to Faster, Better Service to Citizens and Construction Industry
- The Elected Officials Guide to Enhance Public Safety & Economic Competitiveness Through Using IT in Building Department Plan Submittal, Review, Tracking and Storage
- Streamlining Tool Kit (9-one sheet summaries on IT for elected officials)

ABOUT THE ALLIANCE

The Alliance for Building Regulatory Reform in the Digital Age was formed in the summer of 2001 by national associations representing state and local government, the construction industry and federal agencies to promote improvements in the effectiveness and efficiency of the building regulatory process through streamlining and use of information technology.

Partners in the public/private sector Alliance include:

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American Institute of Architects
Associated General Contractors
Building Owners and Managers Association
FIATECH
National Association of Home Builders
U.S. Conference of Mayors
National Association of Counties
National Governors Association
The National Association of State Chief Information Officers
The National Institute of Standards and Technology
U.S. Department of Energy
U.S. Department of Housing and Urban Development
Accela
Avolve
Selectron Technologies
Intel
Marriott Corporation
Target Corporation
DuPont

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In June 2007, the Alliance accepted an invitation from Alliance partner FIATECH for secretariat services as "The FIATECH Project on Streamlining the Building and Land Use Regulatory Processes."

***ALLIANCE VISION:** The Alliance vision is for a future state in which the building and land use regulatory process is online, streamlined, effective and efficient. In this future state, there is no regulatory overlap or duplication and information flows digitally between the construction and building community and the regulatory community.*

STREAMLINING & APPLYING IT TO ENHANCE DISASTER PREPAREDNESS, RESPONSE & RECOVERY – Building Blocks to Faster, Better Service to Citizens and Construction Industry and Community Safety

ATTACHMENT A – A SELF-ASSESSMENT CHECKLIST
To Assess Benefit of IT for Day-to-Day Operations & Disasters

SELF-ASSESSMENT CHECKLIST

As you review each heading, check the box that best fits your situation and then gauge your overall status.			
Customer Input & Work Flow			
Yes	No	More Info	
			Does your department receive complaints from your customers as to how they communicate with you? The timeliness? Having to call only during business hours?
			Do you receive complaints about miscommunications?
			Do you receive complaints about the amount of time it takes to schedule meetings?
			Do you receive complaints about the amount of time it takes to issue permits?
			Do you receive complaints about the amount of time it takes to conduct plan reviews?
			Are customers complaining about how much time it takes to schedule or reschedule an inspection?
			Are inspectors missing their appointed inspection times?
			Are inspectors showing up on job sites that are not ready for inspection?
			Do you have a mechanism through which you can readily shift inspections and convey that information to your inspectors?
			Do you have a mechanism whereby safety inspections after disasters can be rapidly conducted, the data immediately transmitted to a central county or region-wide database, and data automatically entered onto government forms without transcription?
Workload			
Yes	No	More Info	
			Do you have a backlog of permits for processing, plans for review and/or inspections to be conducted? How big are these backlogs?_____
			Are customers complaining about them?
			Are there any projections or plans to respond to future growth in these backlogs?
			Are you adequately staffed to reduce these backlogs? In the wake of a major disaster, would you be able to provide staff to rapidly conduct safety inspections?
			Do you have the ability to draw upon staff from neighboring jurisdictions to conduct post disaster safety inspections?
			If you are able to draw upon neighboring staff can they conduct safety inspections using mobile field inspection technology?

Yes	No	More Info	Workload (continued)
			Are you able to draw upon neighboring jurisdiction staff to supplement your staff to more rapidly process permits, do plan reviews, and conduct inspection during the recovery period?

			Personnel Issues
Yes	No	More Info	
			In addition to recent downsizing, are you facing a large number of retirements of your remaining building permit, plan review and inspection staff?
			Are staff member's willing to learn to use information technology instead of handling permitting, plan review and/or inspections manually?
			Is there labor union issues involved here in changing work requirements or tasks?

			Organizational Issues
Yes	No	More Info	
			Are there government departments that should be included in adopting an IT system?
			Will such coordination through use of IT in multiple agencies increase efficiency, reduce duplication of effort, avoid lost or misplaced data?
			Do your Civil/Land Development, Water Works, GIS, Utilities, Building and Fire departments currently work/communicate well together during the scheduling and conducting regulatory processes?

			Operating Budgets
Yes	No	More Info	
			Can IT be funded through either your department's business fund or a surcharge on permits?
			Would stakeholders support one or both approaches?
			Has your jurisdiction investigated the possible availability of federal, state and local government grant/budget moneys from paperless and green funding or from disaster mitigation programs?

			Technical Expertise
Yes	No	More Info	
			Does your building department or government already have an information technology team it can rely on for acquiring a system or conducting an RFP and collaborating with vendors during the design, implementation and management or maintenance of the system?

			Existing Technology
Yes	No	More Info	
			Can your existing technology be used to incorporate the technology needed for these new processes?
			Can new IT be integrated into other IT technologies being used, such as ePermitting systems?

Building a Task Force to Study & Analyze			
Building departments that have successfully gone through the process of determining that their processes need streamlining and then selecting, acquiring, and putting in place IT to improve the effectiveness and efficiency of their programs have done so by assembling a task force comprised of representatives from key internal and external stakeholder groups to gather the answers to the above "Self- Assessment" questions.			
Yes	No	More Info	
			Can you put together such a review team?
			Do you have a plan for how to manage the assessment process?
			Do you need to acquire outside assistance, and do you have budget for this?

Prepared by

Robert Wible & Associates
Alliance for Building Regulatory Reform in the Digital Age
– FIATECH Streamlining Project –

A Public-Private Partnership to Enable Governments to Improve the
Effectiveness and Efficiency of their Building and Land Use Regulatory Processes
www.natlpartnerstreamline.org – www.fiatech.org