Urban Resilience

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Presentation Structure

- ULI’s Urban Resilience Program
- Defining resilience
- City or community-scale resilience
- Site/asset-scale resilience
  - Returns on Resilience
  - Harvesting the Value of Water
- Discussion Groups
Urban Land Institute

- Global membership organization of 40,000+ in the real estate and built environment industries
- Organization includes 50+ local District Councils in ULI Americas
- Mission is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide
- Sustainability portfolio addresses energy, health and urban resilience, with a focus on the business case for sustainability.
ULI’s Urban Resilience Program

▪ Conducting Research
▪ Advising Communities in Need
▪ Supporting Local-Level Resilience Work
▪ Convening Leaders in Resilience
Defining Resilience

▪ “The ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.”

▪ This definition is shared by ULI, the American Institute of Architects, the American Planning Association, the U.S. Green Building Council and others.

▪ Resilience concerns include
  ▪ Destructive storms
  ▪ Flooding – coastal & in-land
  ▪ Extreme heat & cold
  ▪ Drought & lack of water
  ▪ Related economic and social issues

▪ “Bouncing back better”
URBAN RESILIENCE

Is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.
Key themes and lessons after 2017 hurricane season

Increasing urgency – there are no more “storms of the century”:

- Destruction from this year’s hurricane season, including Harvey, Irma and Maria could total as much as $250 billion (Pew Charitable Trusts)
- Climate change will lead to an increased frequency and intensity of storm events. Long-term stresses such as sea level rise will also exaggerate the impact of storm events; 2017 NOAA figures estimate 1-8 feet global sea level rise projections.
- November 2nd 2017 CBO report forecasting disaster impact to 2075:
  - “Expected damage from hurricanes will grow more quickly than GDP”
  - “The share of the population facing substantial damage will grow fivefold by 2075”
  - “On the basis of past patterns, federal spending on hurricanes will also grow more quickly than GDP.”
  - Increased damage and costs foreseen due to both climate change and coastal development patterns
Planning for resilience makes business sense
- Planning for resilience can help protect residents, businesses and other assets more cost effectively; Investing $1 in hazard mitigation can save $4 in recovery costs (National Institute of Building Sciences)
- Resilience should foster business continuity, long-term investment and economic development; Goldman Sachs estimated that Harvey and Irma decreased U.S. 3rd quarter GDP by 1% (WaPo)

Land use and design are critical tools for building resilience
- Cities should position the least vulnerable places to be most attractive for investment.
- On the site scale, design, technology and green infrastructure offer solutions and opportunities.

Private sector involvement and leadership is critical
- Uncertain future for federal programs such as NFIP and current approach to federal relief (fed. govt currently covers roughly 60% of hurricane recovery, according to CBO)
- Public/private collaboration and leadership from the private sector will be critical for delivering resilient buildings, land use and infrastructure.
CBO Recommendations: Shift costs

Approaches (continued): Shift More Costs to State and Local Governments and to Private Entities

- To the extent that households, businesses, and state and local governments in coastal areas do not bear the full cost of hurricane damage, such growth is subsidized by U.S. taxpayers.

- Shifting costs would increase incentives for private and public entities to take measures to limit expected damage.

- Such a shift could be achieved by:
  - Expanding flood insurance and raising premiums
  - Increasing the minimum amount of statewide per capita damage used to determine when to provide federal assistance
  - Increasing state and local cost share of assistance for projects receiving money from FEMA’s Disaster Relief Fund
The many costs of climate change

- If not addressed, the impacts of climate change are likely to lead to additional costs:
  - Losses from peak events, including building damages, loss of productivity and even loss of life
  - Business disruption – 40% of businesses interrupted by a peak event fail (KPMG)
  - Increased insurance premiums
  - Decreased investor interest
  - Increasingly stringent regulations – e.g. stormwater management
  - Increased costs of resources such as water and energy
What might resilience look like at the city or district scale?

- Resilient land use
  - Development concentrated or encouraged in parts of a city which are by location or circumstance the least vulnerable
  - Land use patterns responding to existing natural systems
  - Potential Tools: Zoning, Comprehensive Planning, Incentives

- Resilient infrastructure
  - Combinations of grey and green infrastructure designed to both mitigate peak events and provide other benefits
  - Potential Tools: Bonds, dedicated resilience funds, PPPs, expenditures via Capital Improvement Plans

- Well-connected transportation facilities and infrastructure, including transit options and clear evacuation strategies

- Regional cooperation

- Economic resilience – diversified economy

- Social resilience – strong social networks, particularly for communication before, during and after peak events

- Equity – Low-income communities are hardest hit by disasters
What might resilience look like at the building scale?

- Adherence to a stringent building code or beyond; Miami-Dade as gold standard; FORTIFIED offers another example of preparedness for storms/wind
- Elevation and access above 500-year floodplain
- Connectivity to resilient infrastructure
- Elevated mechanicals
- Incorporation of green infrastructure/landscape barriers
- Site planning incorporating existing natural systems, e.g. mangroves
- Ability to “island” - i.e. on-site co-generation, on-site water recycling/purification systems etc.
- Back-up systems such as chillers, HVAC
- Super-insulated windows, operable windows
- Well-developed emergency, business continuity and evacuation plans
Opportunities to generate value

- Avoided losses/decreased vulnerability
- Incentives/opportunities for increased density, FAR
- Increased market value
- Fast lease-up
- Increased likelihood of/speed for permitting
- Decreased insurance premiums
- Enhanced user experience
- Enhanced aesthetics and placemaking
- Energy and water usage reductions and savings
- Marketing/brand value
- Extended building life
- Better chance of business continuity
ULI city-scale examples: Advisory Services Panels

- Program started in 1947.
- ULI has hosted more than 600 panels.
- Interdisciplinary teams provide local governments and communities with strategic, unbiased advice on complex land use challenges.
- Panelists include real estate developers, architects, planners, engineers, development consultants, investors and others.
- Norfolk, Seattle, Duluth, Colorado, Portland, Maine and St Tammany Parish, Louisiana have hosted resilience panels.
Arch Creek Basin, Miami-Dade Panel

- 2800-acre drainage basin, across 5 jurisdictions
- Diversity of communities
- Leveraging transit-oriented development
Arch Creek Basin: Land Use Concept
Arch Creek Basin, Miami: Recommendations

- **Build social resilience**: considered community engagement strategy; support of existing community groups and grassroots leadership; and development of more inclusionary housing policies.

- **Build on high ground**: addressed strategies for developing a TOD, including affordable relocation housing.

- **Restore natural systems**: proposed a “city slough” – a signature city green space developed on areas vulnerable to flooding, as well as household-scale green infrastructure interventions.

- **Implement a pilot Adaptation Action Area**: explored financing, policy and land management tools which could be implemented using an AAA.
Norfolk, Virginia
Assessing Risk and Protecting Value
Norfolk, Virginia

Study Area: Fort Norfolk, located on the Elizabeth River, northwest of downtown Norfolk. The terminus of the Tide, the local light rail system, was located on one edge of the study area. Uses within the area included a senior living facility; office of the US Army Corps of Engineers, the American Red Cross and PETA; a television station and surface parking.

Panel Scope:

- What are the highest and best uses for the site considering sea level rise and flood risk scenarios?
- How should future land use planning consider the impact of sea level rise on property values and financing mechanisms?
- What are some recommended techniques for protecting development against flooding while also creating a walkable, human-scaled place?
- How can equity impacts be best addressed?
Norfolk, Virginia

Key Recommendations

- Build out from the Tide Station
  - development potential in the study area was limited
  - focusing any new development near the Tide Light Rail Station draws activity into the neighborhood.

- Create a Coastal Urban Resilience Institute
  - activates and incubates small business, create partnerships with local universities, and drives activity to the study area.

- Community Space at the Water’s Edge
  - open space, connectivity, and community engagement with the waterfront through bike trails and recreational space.

- Activate the Site
  - Maker’s fairs, food truck events, and temporary art spaces to create an interest in the area and begin to define a character for it.
Norfolk, Virginia

- Focus Development Near Tide Station
- Implement Living Shoreline
- Establish Public Space / Waterfront Resilience Zone
- Create visual connection to the water
- Raise Front Street to support site resilience
- Emphasize views to the water and incorporate bio-retention in streetscape
- Improve connections and visibility of Ft Norfolk
- Connect Elizabeth River Trail thru Site
In August 2016, Lafayette experienced a 1,000-year rain event.

- 24 in. of rain fell over a 3 day period.
- The flood damaged approx. 3,500 homes and some received as much as 5 ft. of water.
- Required an estimated $100 million in repairs.
- Parish government issued 1,700 building permits in the first 6 mo. after the storm, about 50% of these properties had flood insurance.

Downtown presented key area of opportunity:
- Located on high ground.
- Transportation infrastructure.
- Limited residential development.
Lafayette, Louisiana
Lafayette, Louisiana

Recommendations:

▪ Embrace catalytic projects and seek opportunities to engage in public/private partnerships

▪ Focus on safety, cleanliness, and accessibility to attract investment in the downtown

▪ Promote Lafayette’s unique character with marketing and public programming to foster vibrancy

▪ Build resilience by institutionalizing stormwater management best practices, like as green infrastructure and LID, and fund these projects by introducing a stormwater fee

▪ Implement organizational changes that ensure neighborhood leaders have a seat at the table

▪ Align responsibility of city officials, staff, and economic development groups with authority, and set realistic expectations
Gowanus, Brooklyn: Urban Heat Island

- Gentrifying neighborhood, known for New York’s first Superfund site

Recommendations:
- Capture value to address UHI mitigation; back-of-the-envelope value creation figure: $600 million
  - FAR/Density bonuses
  - Potential for green infrastructure fund
- Invest in infrastructure which would provide multiple positive outcomes and benefit both long-term and new residents
- Explore strategies for UHI mitigation:
  - Vegetation & a “Path of Respite”
  - Responsive Urban Design – prevailing summer winds
  - Efficiency of Urban Systems – i.e. transportation, reducing, reusing and redirecting waste heat
Returns on Resilience

ULI’s Urban Resilience Program works to help communities prepare for increased climate risk in ways that not only allow a quicker, safer return to normalcy after an event, but also enable them to thrive going forward.

The Returns on Resilience project showcases real estate developments that incorporate resilient design measures, with positive financial, operational and other business outcomes. To suggest a project for inclusion, email resilience@uli.org.

http://returnsonresilience.uli.org
Returns on Resilience

Accessible at http://returnsonresilience.uli.org

The projects profiled:

- Developed and employed innovative solutions
- Took a long view
- Combined resilience and sustainability in a unified plan
- Use resilience and sustainability to create value
- Used resilience to reduce risk
- Gained market recognition on account of resilience investments
Spaulding Hospital, Boston

- Location: Boston, Massachusetts
- 260,000 sf hospital
- Development team: Partners Healthcare, Perkins + Will, Copley Wolff Design Group, Hoerr Schaudt Landscape Architects, Thompson Consultants, Buro Happold Engineering
- Project Cost $225 million, including $1.5 million investment in resilience features
Spaulding Hospital, Boston
Spaulding Hospital, Boston

Resilient design features:

- Elevated first floor --- 30 inches above 500 year flood plain. Elevated mechanical features: penthouse level
  - Designed for 4 days “island mode”
  - On-site cogeneration. Diesel storage in flood-proof vault. Back up chiller/HVAC
- Super insulated; triple-paned, operable windows
- Landscape barrier system, including swales & berms
- Total cost estimated at $1.5 million, half of which is covered by rebates. Half of cost was for electrical rise + encasing
Spaulding Hospital, Boston

1. Ground floor and top of parking ramp set 3.3’ above current 100-year flood level.
2. Plantings & retaining walls act as protective barriers to storm surge.
3. Critical patient programs located above the ground floor.
4. Operable windows keyed open in event of systems failure.
5. Mechanical, electrical, & emergency services located above the Ground floor in the Penthouse to avoid flooding issues.
Spaulding Hospital, Boston

Returns:

- $500,000 saved per year in operating costs
- Co-generation system provides about 25% of power needed; energy requirement is about half of comparable hospitals. Costs will be recouped in 8 years.
- Super-insulation in building envelope avoids the need for baseboard heating.
- Enhanced reputation, improved patient experience & improved positioning in marketplace
- Reduced future losses
- Currently in discussions with insurance provider regarding potential savings
1450 Brickell, Miami

- Location: Miami, Florida
- 586,000 sf Class A office tower including commercial/mixed use
- Development team: 1450 Brickell LLC, Rilea Group, Nichols Brosch Wurst Wolfe & Assoc (NBWW), Blanca Commercial Real Estate, Coastal Construction Group
- Project cost: $250 million, including approx. $15 million resilience investments
1450 Brickell, Miami

Resilient design aspects:

- High impact resistant windows and framing, for the entire building, rather than the first 30 vertical ft (code requirement). Wind tunnel tests ensured that the glass could withstand a CAT 5 hurricane or 157 mph winds
- Back-up generator for emergency power
- Ground floor elevated 8 feet above grade
1450 Brickell, Miami

Returns:

- More competitive insurance bids
- Lower operating costs, i.e. less air conditioning due to window glass. Estimated annual electric cost savings of $1 million.
- Improved lease-up and market positioning: fully leased the building in 2013 in comparison to 40% lease-up rates of two comparable commercial properties. The building’s 67 tenants value guaranteed business continuity, particularly across timezones (JP Morgan, Chase, American Express, etc).
Arverne by the Sea, New York

- Location: Queens, New York
- 120-acre mixed-use development, including 2,300 residential units
- Development team: the Benjamin Companies, The Beechwood Companies, The Beechwood Organization, EE&K Architects (a Perkins Eastman company), Meltzer/Costa & Assoc, Wohl & O’Mara LLP, C.A.C. Industries
- Project Cost: $1 billion
Arverne by the Sea, New York

Resilient design aspects:

- Fortified dunes along entire development periphery, bordered by roadway with below-grade drainage system
- Streets angled against storm winds
- Buried utilities, including accessible waterproof transformers
- Grade raised 3-9 feet above the 100 year flood plain
- Enhanced stormwater drainage & landscape
- Highly-weather resistant siding, including steel framing and durable siding
- Hurricane-resistant windows
Arverne by the Sea, New York

Returns:

- Half of the community, including the Stop & Shop and 1,000 residential units, was completed at the time of Sandy. The site experienced minimal damage and became a hub for recovery efforts. S & S was the only area supermarket for 6 months.

- Higher than market-rate rental and sale prices

- Homeowners will save flood insurance costs, due to higher grade of construction

- Improved company brand & new business, including FEMA Rapid Repairs program
Identifying a new case study: The Wharf, DC

$2.5 billion waterfront project; Phase 1 recently opened

Resilient Design Features:

- Water management
  - Stormwater Retention, Green Infrastructure/Permeable Surfaces, Water Re-use Systems
- Setbacks & Elevation
- Overall commitment to dense, transit-accessible development pattern

Returns:

- Currently considering: Role of resilience in the vision that brought the project to fruition, projected resource savings, potential marketing premium, insurance savings, as well as returns to the city – tax base, job creation, etc.
Harvesting the Value of Water

STORMWATER, GREEN INFRASTRUCTURE, AND REAL ESTATE
A Perfect Storm

- Urbanization, impervious surfaces and the American legacy of car-centric planning
- Failing infrastructure: 700+ EPA Consent Decrees
- Strapped municipal budgets
- Climate change & likelihood of increased precipitation & number of extreme storm events
Key themes: Policy Shifts

• Cities are prioritizing green infrastructure over gray infrastructure, due to costs and opportunities for co-benefits, including co-benefits related to public health.

• The private sector is expected to play an increasingly prominent role in stormwater management and the implementation of green infrastructure.
Green Infrastructure Benefits

- Improved water quality
- Flood risk mitigation
- Resilience to climate change impacts
- Wildlife habitat
- Reduced temperatures in developed areas
- Recreation opportunities
- Enhanced community aesthetics
- Increased property values
- … many more

Canal Park, photo courtesy Bruce Damonte
City Policies & Tools Profiled

- On-site water retention requirements
- Credit-trading schemes
- Green Area Ratios
- Development incentives
- Fee structures
- Implementation of Total Maximum Daily Loads
- Community grant programs
- Design frameworks & LID toolkits
- Design competitions

Washington D.C. Green Area Ratio, courtesy D.C. Department of Energy and the Environment
Value Proposition: Development Yield

- Increased developable land

Encore!, photo courtesy Tampa Housing Authority
Value Proposition: Process and Timing

- Smooth permitting process
- Reduced concerns from community

*Market at Colonnade, photo courtesy Regency Centers*
Value Proposition: Design + User Experience

• Place-making, marketing, amenity value and improved building user experience

*Burbank Water + Power, photo courtesy Helio 135*
Value Proposition: Operational Efficiencies

- Opportunities to reduce potable water usage, achieve long-term savings
- Importance of monitoring systems

"Targeting a goal of no potable water use for nonpotable needs led to creative thinking, such as building a large concrete cistern in the exposed basement instead of purchasing a metal tank, which in turn made the system more cost-effective. The environmental benefits associated with the large volumes of water reused will benefit the community for years to come."—RENEE LAVELAND, SUSTAINABILITY MANAGER, GERIONI EDIL

Meier Frank Delivery Depot, photo courtesy Jeremy Bitterman
Value Proposition: Resilience to extreme events

• Increased preparedness for major storms and events, as well as ability to better manage water scarcity/drought

Stonebrook Estates, courtesy Terra Visions LLC
Discussion Questions

- What role could climate vulnerabilities and urban resilience play in NCREIF’s work providing commercial real estate data and investment analysis?

- Do climate vulnerabilities and preparedness currently factor into your own investment decisions? Which metrics have you used and what factors would move the needle for you?

- What resilience building investments would you like to see led by the public sector in the markets where you invest?

- Have you seen investment in climate resilience lead to asset-level returns?

- What would you like to see from ULI’s Urban Resilience program?