Committee on the Environment & Resiliency

The AIA Baltimore COTE + Resiliency’s mission is to enhance the profession’s commitment to provide healthy and safe built environments; advance design quality and techniques; help prepare, respond and assist in local disasters and unrest; and educate the profession on the necessity of maintaining Earth’s capability to sustain future generations.
Sponsored events in 2017:
• Biophilia in Healthcare Design
• Urban Farm Ride
• Living Building Landscape Workshop and House Tour
• EmPOWER Maryland: Utility Rebate Opportunities
• Net Zero Energy School tour

Advocacy: Green Bldg Code, Transform Baltimore, Resiliency, Complete Streets
Complete Streets

Complete streets policies generally produce streets that have the following features:

- Traffic calming and lower maximum speeds
- Pedestrian improvements
- Bike lanes and paths
- Bus lanes and improved bus infrastructure (including bus shelters)
- Landscaping and other aesthetic/place-making improvements
- Improved connections between modes (i.e. good pedestrian infrastructure connected to transit facilities)
- Consideration of local land use (i.e. industrial, urban core, Main Street, mixed-use, residential, etc.)

Source: Ryan Dorsey, City Councilman
A complete streets law for Baltimore City would require transportation projects to design for all modes, users, and activities, rebalancing our transportation system for equitable urban development and growth by reducing congestion and increasing safety.

Source: Ryan Dorsey, City Councilman
A Complete Streets approach integrates people and place in the planning, design, construction, operation, and maintenance of our transportation networks. This helps to ensure streets are safe for people of all ages and abilities, balance the needs of different modes of transportation, and support local land uses, economies, cultures, and natural environments.
Streets are a vital part of livable, attractive communities. Everyone, regardless of age, ability, income, race, or ethnicity, ought to have safe, comfortable, and convenient access to community destinations and public places—whether walking, driving, bicycling, or taking public transportation.
Streets comprise a significant percentage of city-owned land, offering an opportunity to incorporate street elements that will not only protect the environment, but can improve community health and prosperity. By looking at streets holistically, there are many opportunities for benefits with no or minimal costs.

Rain gardens and bioswales can be combined with refuge islands and curb extensions to improve stormwater management and safety.
Complete Streets, in conjunction with green infrastructure, is a tremendous opportunity to improve the livability of our communities. These landscaping elements reduce the amount of paved surfaces and as a result reduce the heat island effect. Trees provide shade, oxygen, reduce CO2 levels, as well as help beautify the streetscape for residents.
A (Green and) Complete Streets policy will compliment current City policies:
• Bike sharing
• Bike lane network expansion
• Green Network
• Climate Action Plan
• Green Building Code
• Tree Baltimore
WHAT IS RESILIENCY?
CLIMATE CHANGE IS HAPPENING. DESIGNS NEED TO ADAPT.
RESILIENCY: CAPACITY TO ADAPT TO CHANGING CONDITIONS

FORCE MAJEURE
SOCIALLY UNREST, FAILING INFRASTRUCTURE, TERRORIST ATTACK, POWER OUTAGES, HEAT WAVE, NATURAL DISASTER, SNOW, WIND, RAIN

DESIGN RESPONSE
REINFORCED STRUCTURE, DESIGN ABOVE THE FLOODPLAIN, NATURAL VENTILATION, SOLAR POWER, CPTED
RESILIENT DESIGN IS LIKE MY RUBBER BALL

ITS MADE OF STUFF THAT WILL BOUNCE BACK
“The challenges facing the built environment are evolving with climate change, environmental degradation, and population growth. Architects have a responsibility to design a resilient environment that can more successfully ADAPT.”

--RESILIENCY MISSION FROM AIA NATIONAL
RESILIENT DESIGN PRINCIPLES

- Transcends Scales
- Provides for Basic Human Needs
- Diversity and Redundancy
- Simple, Passive, Flexible Systems
- Durability
- Regional, Renewable, or Reclaimed Resources
- Anticipates Interruptions and a Dynamic Future
- Find and Promote Resilience in Nature (Biomimicry)
- Social Equity and Community
- Resilience is Not Absolute
BRIEF HISTORY OF BUILDING CODE

1785 BC - Code of Hammurabi

Book of Deuteronomy (22:8)
When you build a new house, make a parapet around your roof so that you may not bring the guilt of bloodshed on your house if someone falls from the roof.

…and Leviticus (14:39-45)
On the seventh day the priest shall return to inspect the house. If the mildew has spread on the walls, he is to order that the contaminated stones be torn out and thrown into an unclean place outside the town. He must have all the inside walls of the house scraped and the material that is scraped off dumped into an unclean place outside the town. Then they are to take other stones to replace these and take new clay and plaster the house. If the mildew reappears in the house after the stones have been torn out and the house is scraped and plastered the priest is to go and examine it and, if the mildew has spread in the house, it is a destructive mildew: the house is unclean. It must be torn down—its stones, timbers and all the plaster—and taken out of the town to an unclean place.
1667 - London Building Act (Great Fire of London 1666)
1884 – London Building Act (Industrial Revolution)
1867 – Tenement Housing Act (Immigration in NYC)
BRIEF HISTORY OF BUILDING CODE

1859 - Baltimore passes first building code in 1859

1875 - Ordinances in Chicago (Chicago Fire in 1871)

1876 – NFPA is formed

1904 - Handbook of the Baltimore City Building Laws (Great Fire in 1904)
BRIEF HISTORY OF BUILDING CODE

1915-1940 - BOCA, UBC, SBC


1990 – Americans with Disabilities Act
1992 - Hurricane Andrew
BRIEF HISTORY OF BUILDING CODE

1994 - International Building Code

2000 - IBC becomes standard, LEED is introduced
BRIEF HISTORY OF BUILDING CODE

LET ME EXPLAIN.

NO, THERE IS TOO MUCH TO SUM UP.
RESILIENCY: CAPACITY TO ADAPT TO CHANGING CONDITIONS

FORCE MAJEURE
SOCIAL UNREST, FAILING INFRASTRUCTURE, TERRORIST ATTACK, POWER OUTAGES, HEAT WAVE, NATURAL DISASTER, SNOW, WIND, RAIN

DESIGN RESPONSE
REINFORCED STRUCTURE, DESIGN ABOVE THE FLOODPLAIN, NATURAL VENTILATION, SOLAR POWER, CPTED
Proactive
KNOW YOUR HAZARDS. OPTIMIZE YOUR DESIGN TO RESPOND.
RESEARCH THE LATEST SCIENTIFIC MODELING FOR YOUR SITE. KNOW THE POSSIBILITIES.
DESIGN TO BEST PRACTICES, NOT JUST TO CODE
MAKE GOOD [DESIGN] CHOICES.
SO WHAT IS BALTIMORE DOING ABOUT PROMOTING RESILIENCY?
DISASTER PREPAREDNESS AND PLANNING PROJECT (DP3)

ALL HAZARDS MITIGATION PLAN + CLIMATE ADAPTATION PLAN = DP3

HAZARDS MITIGATION: ACTIONS TO REDUCE LONG-TERM RISKS FROM KNOWN HAZARDS (STUFF WE HAVE SEEN IN THE PAST)

CLIMATE ADAPTATION: ACTIONS TO RESPOND TO NEW CLIMATE CONDITIONS (STUFF WE HAVEN’T SEEN YET)
DISASTER PREPAREDNESS AND PLANNING PROJECT (DP3)
2013
what will you do?

Architecture for Humanity and AIA National partnered to hold a nationwide grant competition. AIA Baltimore wins grant and creates THE DISASTER ASSISTANCE COMMITTEE.

FEMA created as an independent agency.

1972

1978

1986

AIA National formally recognizes the role architects can play in disaster response.

1998

Architecture for Humanity is founded.

2001

Following the September 11 terrorist attacks, the Department of Homeland Security is established.

2003

2005

2007

2010

2012

2013

FEMA becomes part of the Department of Homeland Security.

The Disaster Assistance Comprehensive Response System (CRS) is organized by AIA National.

 Hurricanes Katrina strikes the United States, raising awareness for disaster response in the architectural community.

MEMA is established. Open Architecture Network launched to share ideas on worldwide issues like disaster response.
Establishing a Disaster Assistance Committee for your state can be a daunting task. Below is an example of how AIA Baltimore helped to establish a Disaster Assistance Committee for the state of Maryland during 2012-2013 through the help of the 2012 Disaster Assistance Grant Award from AIA and Architecture for Humanity.

**Informational Meeting**

- **START**
  - We held an informational meeting for interested architects about what a Disaster Assistance Committee can do and the goals we hoped to establish. A representative from AIA National helped us to give an overview of the program.

- **DETERMINE THE NEED**
  - It was discovered that AIA Maryland did not have any Disaster Assistance program established. There was no state Disaster Assistance Network Coordinator and there were few resources for Maryland architects to get involved with Disaster Assistance.

**Outreach**

- The committee worked to outreach to more architects to spread the news about the new committee. We also talked to emergency management agencies across the state to see how architects can help within the established system within Maryland.

**Workshop With the State**

- The Maryland Emergency Management Agency worked with the committee to hold a MEMA 101 workshop to teach architects how they can be involved with disaster assistance through the state.

**Safety Assessment Training Preparation**

- **STEP 1**
  - In order to hold a Safety Assessment Training, a lot of research was undertaken. It was determined to hold a training based on the CalEMA program.
  - Arranged a featured speaker to give the presentation.
  - Brought materials for the training, including copies of ATC-20 and ATC-40. FYs of the CalEMA Student Handbook were distributed to participants.

- **STEP 2**
  - Met with participants.
  - Brainstormed about next steps.

- **STEP 3**
  - Established long and short-term goals.

- **STEP 4**
  - Active Committee Established!!

**Follow-Up**

- We trained 20 architects and engineers during our first training session. Over 20% of the group were registered professionals.

**SAFETY ASSESSMENT TRAINING OUTCOME**

- The first training was held on February 22, 2013.
- 25 + 4 = 29

  - AIA
  - ASCE

- *We trained 20 architects and engineers during our first training session. Over 20% of the group were registered professionals.

  - The inaugural training was a great success and increased awareness about how architects can help with disaster response.*
AIA Baltimore and Baltimore Architecture for Humanity Present:

**AN ARCHITECT’S ROLE IN DISASTER RESPONSE**

**MEMA WORKSHOP**

**THURSDAY, OCTOBER 25**

6:00PM-8:00PM

MEMA (Maryland Emergency Management Agency) has partnered with us to present a workshop on how we, as architects, can assist during a disaster emergency.

The workshop is free and light refreshments will be provided.

For more information (including carpool opportunities), please visit the AIA Disaster Assistance Committee webpage or email: baltimore@architectureforhumanity.org

Workshop will be held at the MEMA facility:
5401 Rue St. Lo Drive
Reisterstown, MD 21136
THE EXISTING FABRIC HAS A HISTORIC BEAUTY THAT IS WORTH PRESERVING...

...AND A COMMUNITY THAT DESERVES MORE.
COMPETITION SITE: BROADWAY EAST NEIGHBORHOOD
15 teams entered the competition.

7 different schools were represented.

7 awards were given, including honorable mention.
1. Planters provide a layer of security and reduce heat island effect
2. Low-E insulated windows
3. Original brick facade
4. Closed cell water proof spray foam insulation R-18 with in 2x3 wood framing (roof R-30 spray foam insulation, basement R-10 rigid insulation)
5. Shading/Weather protection system plugs into brick wall
6. Sealed coil ducts, exposed for easy access
7. Rinnai gas tankless water heater; electric powered tankless water heaters currently do not have enough power to supply hot water and heating for typical household
8. Trane XL16c Packaged Heat Pump (16.40 SEER) Energy Star provides cooling and heating; when temperatures drop too low the water heater will provide additional heating through radiators
9. Storm water collection provides water for garden
10. Energy Star Appliances and LED lighting
11. Gardens for homegrown produce
12. Solar Panels feed into electric meter
13. Vented skylight supplies natural light to center of house
14. White roof membrane reduces heat island effect
15. Airtight construction prevents drafts and allergens and saves energy

Component 1 Additional solar panels feed into the electric meter
Component 2 Green Roof reduces heat island effect and provides a garden
Component 3 Additional living room or bedroom allow families to expand
Component 4 Rental Unit creates a studio apartment with a kitchen and bathroom when paired with Component 3
CENTRAL PLANT FOR FUEL CELL POWERED MICRO-GRID

THE NATURAL GAS FUEL CELL ENABLES HOMES TO BE NET ZERO. FUEL CELLS PRODUCE ELECTRICITY WITH WASTE HEAT THAT IS CONVERTED TO HOT WATER TO BE USED FOR DOMESTIC WATER AND HYDRONIC HEATING SYSTEMS.

WHITE ROOFS
ALL ROOFTOPS ARE COVERED WITH LOW ALBEDO ROOFING TO REDUCE HEAT ISLAND EFFECT

PV ARRAY CANOPY
PHOTOVOLTAIC PANELS GENERATE SUPPLEMENTAL POWER DIRECTED TO THE CENTRAL PLANT. BENEATH THE CANOPY ARE SHARED COMMUNAL PARKING SPACES

VODNERF
PRIORITIZING PEDESTRIANS OVER CARS TRANSFORMS THE STREET INTO SOCIAL SPACES

PERMEABLE PAVING ZONE
AT VODNERF

COMMUNITY GARDENS
URBAN AGRICULTURE CAN FOSTER A SENSE OF COMMUNITY, UTILIZE OPEN SPACE, AND REDUCE THE IMPACT OF FOOD DESERTS

NEW ALLEYS
WITH PERMEABLE PAVING

COMMUNITY OPEN SPACE
WITH PLAYGROUND AND RAIN GARDEN

COMMONS BUILDING
PROVIDING A SHARED COMMONS BUILDING REINFORCES NEIGHBORS TO BUILD RELATIONSHIPS. WITHIN THE BUILDING IS THE COMMUNITY LIVING ROOM, MANAGEMENT OFFICE AND CENTRAL PLANT. ADDITIONALLY, A LARGE COVERED OUTDOOR SPACE BECOMES A COMMUNAL “FRONT PORCH” FOR INFORMAL GATHERINGS
1. Commercial Pop-up Space
2. Resiliency Hub
3. Power Hub
4. Resilience Storehouse
5. Community Outreach Police Station
6. Grey Water Hub
7. Water Hub
8. Black Water Micro-treatment plant
9. Community Gardens
10. Community Greenhouses over existing commercial
11. Commercial Space
12. Steel diagrid truss structure
13. PV Panels
14. Green wall / roof systems
15. Glazing System
Utility Infrastructure

- Grey-water collection and filtration systems
- Water is stored in elevated tanks and uses gravity system
- Flows through green-wall filtration system, used for irrigation
100% of stormwater to be captured, treated, infiltrated or released for use on site.

Treated run-off from rooftops supplies 28% of annual potable water.

44% of run-off is treated + reused.
56% is infiltrated, slow release.

Stormwater runoff control and capture through biofiltration and cistern storage for gray water irrigation and toilet flushing.

One designated 10,500 gallon B.A.S. Cistern will be treated with reverse osmosis and UV disinfection to provide the entire neighborhood with 10 days of water;
existing residential energy demand: 3,618 megawatts/yr

post-retrofit residential energy demand: 659 megawatts/yr

82% energy reduction

In the event of a 5 day power outage in peak cooling season, bMORE co*op is completely energy independent with 4000kWh surplus energy to support emergency cooling + communication centers for surrounding neighborhoods.

Highly insulated, foam-free and tightly sealed, healthy envelopes

Methods can be constructed with little to no extra cost and are cost positive when considering energy bills.

Passive House Standard casement or tilt-turn windows.

PV curve for optimal year round production - 5.6 kW per house, 65% of total roof area
GREEN INFRASTRUCTURE

- Alleyways are repaved with permeable paving to reduce storm water run-off
- Community Gardens provide residents with a means to grow their own food
- Green Walls and Roofs to combat the heat island effect and provide fresh air/greenery for residents
extensive green cloaks, native lawns and pervious paving and agriculture areas reduce the heat island effect and contribute positively to building efficiency, slowing stormwater runoff, and creating wildlife habitat.

increase tree canopy to sequester carbon, reduce the heat island effect, create cooling summer shade, separate street traffic from sidewalk activities, and establish comfortable and pleasant civic environments.
WHAT: SOCIAL INFRASTRUCTURE

- **Tool library** allows for neighbors to borrow tools and share them
- **Agricultural and Commercial** spaces allow for interaction
- **Resiliency Hub** for classes / meetings
- **Community Outreach Police Station**
bMORE co*op NO. 1 has 1.7 acres of on-site community food production

100% increase

neighborhood goods market

cooperative agriculture via community gardens + greenhouses

private garden boxes (shade devices) + front gardens

cooperauve goat + chicken + beehive barn

5 days of resiliency
connecting
creating workshops
supplying fresh food
supplementing
WHY:
**WHY: OUR INTENT**

- Keep existing residents in place to ensure stability of population
- Improve resiliency through interconnected system of utilities and social infrastructure
- Increase population and community interaction
- Maintain the dignity of the place, and of the residents
- Honor historic context of the neighborhood
- Respect row house vernacular, specific to Baltimore
QUESTIONS?