Agenda:

- Welcome and Introductions – All
- Mission Statement Review
- Review of Organization Structure and Four Areas of Focus
- Sub-committee Vice Chair and Service Liaison briefs.
- Local POC Report and Discussion
- Presentation by Wendi Goldsmith, PG, Bioengineering Group
- Q/A and Open Discussions
Mission Statement:

- Promote Architectural Practice within SAME.
- Broaden SAME’s exposure in the architectural community to attract more architects in SAME.
- Networking and mentoring.
2013 Initiatives Progress Review:

1. Quarterly Committee Video Conference Calls:
   - January, April, each meeting with a guest speaker
   - 1 AIA LU/HSW for each conference web meeting
   - About 50–60 participants, including three service branches.

2. Annual Architectural Practice Committee Meeting
   - Discussing, and establishing committee annual initiatives
   - Presentations by this year’s Urbahn Medal Phil Tobey and Gus Ardura on DoD healthcare topic, receiving 1.5 AIA LU/HSW
   - APC leadership social outing at Salk Institute and Dinner at Torrey Pines Golf Course
3. Establishing Service Branch Liaison Each for USACE, NAVFAC, and AFCEC:

- Advising the committee on initiatives benefiting service branch architects.
- Encouraging and supporting interactions among industry and service branches.
- Encouraging participation from all service branches in SAME architectural activities.
- **Army Liaison:** Ed Gauvreau, USACE HQ, Edmond.G.Gauvreau@usace.army.mil
- **Navy Liaison:** Kathleen Reid, NAVFAC Atlantic, kathleen.o.reid@navy.mil
- **Air Force Liaison:** Rick Sinkfield, Air Force Civil Engineer Center, ralph.sinkfield@us.af.mil
4. Establishing POCs at Local SAME Posts

- Encouraging quality architectural programs at major SAME posts.

<table>
<thead>
<tr>
<th>Post</th>
<th>Name</th>
<th>Email</th>
<th>Company</th>
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</thead>
<tbody>
<tr>
<td>Atlanta</td>
<td>Caimbeul, David, AIA, NCARB, FAC-PPM</td>
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<td>DIGERONIMO ARCHITECTS</td>
</tr>
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5. SAME Continuing Education Course Webinars:
- Co-host with Sustainable Committee on The new High Performance and Sustainable Building Requirements UFC Webinar on June 24
- Over 200 in attending, receiving 2 AIA LU/HSW
- Very positive feedback from participants

6. Building up a Professional Material Library
- All Architectural Practice Committee presentations are stored at committee webpage under Meetings and Presentations category.
- Presentations can be downloaded from our committee webpage - http://www.same.org/index.php/companies-a-councils/committees/architectural-practice-committee.
- Comprehensive article on Urbahn Medal History and the Past Recipients. As a historical document, it is stored at APC webpage.
7. Effective Communication via Newsletter, and Social Media

- The Establishment of Architectural Practice Committee was announced via social media – LinkedIn, Tweeter, Bricks & Clicks blog, TME magazine
- Our committee activities via LinkedIn and direct email to our members
- Our committee’s first newsletter is out! Please check it out.

8. Maintaining Architectural Practice Committee Webpage

- Events and announcements
- Downloadable resources
- Professional material presentation library
- The webpage is updated on monthly bases.

9. Urbahn Sessions at Major SAME Regional Conferences:

- Architectural session at SAME regional conferences.
- Having someone representing our committee working directly with selected conference program chair
Guest Speaker –

Wendi Goldsmith, PG, CEO, Bioengineering Group

“Climate Change and Disaster Resiliency: New Design Parameters”

Ms. Goldsmith is the founder and CEO of Bioengineering Group, a Salem, MA-based firm whose mission statement is "Building Sustainable Communities on an Ecological Foundation." She has been a pioneer in the field of ecological restoration and the application of sustainability principles to site planning, development, and resource management. Wendi has led R&D programs for DOD developing methods for evaluating and optimizing renewable energy and efficient and resilient infrastructure and building and site design. She played a lead role on the planning, design, and program management of the $14 billion post-Katrina Hurricane Storm Damage Risk Reduction System, the first regional-scale climate adapted infrastructure system in the US.
Climate Change and Disaster Resiliency: New Design Parameters

Wendi Goldsmith, PG, CPSWQ
Yogi Berra once said, "The future ain't what it used to be."
We've all seen the mutual fund disclaimer: "Past performance is no guarantee of future results."

Is this the way to engineer major public investments?
Current Craziness

• Risk and Uncertainty poorly addressed
  – Human nature resists knowing risks
  – Uncertainty is posed as lack of reality
  – Climate change and sustainability cast as partisan issue

• Integration between public agencies and private institutions has many gaps
  – No single source of “risk maps”
  – Insurance risk coverage not well linked to actions
  – Critical Infrastructure not focus of spending, even if ESSENTIAL to health, safety, community viability
  – Reaction costs more than prevention
Managing Exposure

• Let’s do better than a 50% chance of flood risk management
• Let’s go beyond covering some portion of financial losses - and reduce risk of damage to lives and property
• Let’s address future issues
  – Sea Level Rise
  – Land subsidence
  – Storm Intensity
  – Other disasters
• Let’s use methods that combine Adaptation and Resilience
• Let’s focus on VALUE through ROI (financial and other)
The Missing Sequence

1. Convene Stakeholders
2. Facilitate Engagement
3. Conduct Vulnerability Assessments
4. Establish Design Criteria
5. ID Hazard Mitigation Alternatives
6. Develop Scenarios
7. Perform Benefit Cost Analysis
8. Evaluate Hazard Mitigation Synergies
9. Apply Rigorous Decision Science
10. Formulate Plan
11. Proceed to A/E Design Phase

GOAL: Adaptation and Resilience
What Is Resilience?

Resilience—from the Latin resilio, meaning “to spring back”—is the ability to recover after an impact or misfortune. It is the ability to adapt to the consequences associated with an instance of failure or systemic breakdown.

Applying “resilience thinking” to cities and communities requires us to think not only about bouncing back from environmental, economic, and social crises, but adapting to changing circumstances by “bouncing forward” through new frames, processes, and ways of working that address future changing conditions.

Don’t just BOUNCE BACK, take the opportunity to BOUNCE FORWARD!
Value of Adaptation and Resilience

• Earthquakes damages in Japan have cost billions to property owners and business operations
• In Japan, earthquake resilient modern buildings command lease pricing 40% higher than vulnerable buildings
• In the US, property located in flood prone areas is subsidized, making it artificially cheaper to build or own: vulnerable property costs less!
• Commercial insurers stand ready to offer policies based on rates that reflect actual known risks
• Past public policy fostered “affordable” premiums through national flood insurance program
• Program is now changing, and was never a “value”
Low Impact Development (LID)

DEFINITION:
✓ Comprehensive planning and design approach that maintains and enhances the pre-development hydrologic regime of urban and developing watersheds

OBJECTIVES:
✓ Small scale facilities
✓ Manage runoff as close to source as possible
✓ Slow down, cleanse, infiltrate and reuse rainwater
✓ Improve quality of life

APPLICATION:
✓ New Development, Redevelopment, and Retrofits
Scales for Sustainability of Water Resources

- Planetary scale – global sustainability
- Regional scale – quality of life
- Watershed scale – stream health
- Site scale – Decisions/Actions made here
- Meter scale – soil volume, land area
- Micro scale – biogeochemistry
Low Impact Development (LID)

VOICED CONCERNS:

✓ Won’t work in our [region, neighborhood, ordinances, budgets, etc....]
✓ Too costly
✓ Too ugly
✓ No maintenance required
✓ Maintenance too difficult
✓ Single “silver bullet”
Graphic Communication
Graphic Communication
Permeable Paving

Porous Concrete

Permeable Pavers
Bioretention Swale
Bioretention Basin

Illustrative Section

1-year later

Installed plantings
Green Street

Illustrative Plan
Alewife Reservation and Surrounding Areas
Large Scale Stormwater Wetland
Stormwater Wetland - Cambridge, MA
LID SITE SUITABILITY

• Resource Area
• Terrain (Slope)
• Soil (Infiltration)
• Hydrology
• Depth to seasonal high water
LID COSTS

- Design
- Testing and Permitting
- Construction
- Maintenance
- Monitoring
Design Phase

1. Determine water volume to be retained
2. Choose appropriate LID Practice(s)
3. Perform on-site Soils Testing
4. Solicit Input Owner and End Users
5. Develop Effective Specifications
   ✓ Prescriptive- vs. Performance- based
6. Maintenance and Monitoring
Sketch Plan - Curb Extension
Green BMP Maintenance Costs

UNH Stormwater Center

**Yearly BMP Maintenance (per acre treated)**

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<td>Vegetated Swale</td>
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<tr>
<td>Bioretention Ave (3)</td>
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<tr>
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<tr>
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### Green BMP Maintenance per Labor (hrs)

#### UNH Stormwater Center

#### BMP Maintenance/acre/yr by Category

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<tr>
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<th>Predictive</th>
<th>Periodic</th>
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<td>10</td>
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<tr>
<td>Porous Asphalt</td>
<td>0</td>
<td>1</td>
<td>0</td>
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**Legend:**
- Reactive
- Proactive
- Predictive
- Periodic
Existing Site Conditions

1. Brownfield Site
2. Protected Resource Areas
3. Active Neighbors

Context | Strategy | Implementation
Existing Site Conditions

1. Brownfield Site
2. Protected Resource Areas
3. Active Neighbors
Stormwater Approach

• Comply with state and federal environmental regulations
• Capture and treat runoff at its source
• Promote sustainability through environmental education
• Promote functional landscapes
• Exceed LEED Silver standards
• Natural Systems Approach
• Mimic Pre-Colonial Runoff Rates

Context | Strategy | Implementation
Three-Phase Approach

1. Identifying ecological constraints and opportunities for every project, and setting clear goals and objectives.

2. Integrating stable landforms, healthy soils, and balanced hydrology by using applied earth science to guide design.

3. Ensuring excellence in design and constructability through sound engineering and landscape architectural practices, emphasizing diverse, low-maintenance solutions.
Low Impact Design Tools

1. Vegetated Roof
2. Rooftop Harvesting
3. Subsurface Infiltration Chambers
4. Bioretention Basins and Swales
5. Porous Asphalt
6. Sediment Forebays
7. Extended Basins
8. Water Quality Inlets
9. Constructed Wetland
Vegetated Roof

Context | Strategy | Implementation
Rooftop Harvesting

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<th>Context</th>
<th>Strategy</th>
<th>Implementation</th>
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Lexington DPW Facility

Minuteman Bikeway

North Lexington Brook
Rooftop Harvesting
Biobasins

Context | Strategy | Implementation
Porous Asphalt
(public parking stalls)
Porous Asphalt

Context | Strategy | Implementation
Constructed Wetlands

Context | Strategy | Implementation
Constructed Wetlands
24-HOUR, 100-YEAR STORM CAPTURE

Context | Strategy | Implementation
Implementation

Context | Strategy | Implementation
### Context

The Town of Lexington receives on average 47 inches of rain per year. Stormwater management, the process of diverting stormwater from rivers, streams or infrastructure by treating and infiltrating the water onsite, is accomplished at the Samuel Hadley Public Services Building site, through a variety of techniques, including underground storm infiltrators, bioretention basins, rain harvesting tanks, a green roof and constructed wetlands.

### Strategy

Located throughout the site are several depressions in the landscape, known as Rain Gardens, or swale basins. During a rain event, water flows off impermeable surfaces, such as paved areas or roofs, into the Rain Gardens, where the water gradually infiltrates back into the ground. Allowing water from these areas to infiltrate this way replenishes groundwater using natural processes. The Rain Gardens are also designed to treat polluted pavement runoff resulting from the "first flush," the part of the storm containing the largest concentration of pollutants.

These Rain Gardens contain native herbaceous plant species chosen for their ability to adapt to being submerged during rain events, while tolerating periods of drought. The plants' roots take up nutrients and the soils bond to pollutants originating from parking lots and roof surfaces. Contaminants such as Nitrogen, Phosphorus, and heavy metals, which are normally directed into storm drains, are beneficial to the plants in Rain Gardens. The plants and soil return moisture to the air through the process of evapotranspiration. The roots contribute to a healthy soil structure and facilitate filtration by penetrating the soil and providing passages for the movement of water and oxygen.

Rain Gardens are a valuable sustainable feature in the landscape at The Samuel Hadley Public Services Building as they prevent fine soil particles and attached pollutants from entering the storm drain system, which eventually discharges into North Lexington Brook. Rain Gardens can be used in many settings as a method to capture and treat stormwater, even at your home where you can direct roof and driveway runoff into a depression or swale and plant water tolerant plants.

### Implementation

#### What are our Sustainable Features?

The Samuel Hadley Public Services Building and site include many sustainable features. The use of passive design principles such as building orientation to take advantage of solar paths and to minimize the effects of off-site winter winds was the first step taken to achieve this goal. This project also utilized the LEED® Leadership in Energy and Environmental Design program as a metric to ensure that the project was sustainably sustainable. LEED includes six sections: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality and Innovation in Design.

The Samuel Hadley Public Services has achieved LEED® Silver Certification and includes the following features:

- **Sustainable Sites**
  - A bike rack and shower facilities encourage biking to work
  - Native species planted to restore local biodiversity
  - Stormwater management techniques to meet requirements for a 10-year storm
  - Highly reflective "cool" roof to reduce the heat island effect

- **Energy & Atmosphere**
  - Highly insulated roof and walls
  - Operable windows allow ventilation
  - Energy efficient mechanical and ventilation equipment utilized

- **Materials & Resources**
  - Building products with recycled content, glass, fiber, concrete and steel
  - 85% of construction waste was diverted from landfills
  - Workstation made with biocomposite materials

- **Indoor Environmental Quality**
  - Implemented an Indoor Air Quality Management plan during construction to reduce dust and indoor air irritants in facility
  - Occupied rooms have natural daylighting, operable windows and balconies
  - Low-emitting adhesives, sealants paint and carpets incorporated

- **Innovation in Design**
  - Harvest rain water to fill Town street swepers and supplement vehicle washing
  - Educational signage and connection to the Minuteman bike path
Post-Katrina Regional Infrastructure System

**Multiple Lines of Defense**

- Linear Infrastructure: Levees, Walls, Gates, etc.
- Natural sun-gathering ecosystems
- Landforms as barriers, self-generating

**Behavior:** Evacuation, pumps, raised buildings,

**Adaptive Management**

- Works for different storm events today
- Capable of performing and evolving over time
- Designed for modified structures and operation
- Could address scenarios not currently known

1st US Federal Climate Change Adaptation Job
• Communities need support to develop rational approaches in order to guide decision-making under uncertainty and methods to develop and compare the performance of alternative and/or synergistic strategies within an overall adaptive management approach.

$14 Billion in infrastructure

One chance to get it right!
Yes big construction works have been developed. But within the context of climate change, with an emphasis on optimizing life cycle cost-effectiveness and adaptability for multiple scenarios.
• Focus on ways to integrate energy, water, and materials decisions into broad infrastructure systems with management plans that factor in threats, risks, and uncertainty posed by climate change.
A combination of restoration and repair plus construction of new measures spanning green and hard solutions designed to operate with synergy.
The biggest and best results are not visible

• New Ways to Collaborate
  – Government ↔ Industry
  – Government ↔ Public
  – Government ↔ Researchers

• New Ways to Communicate
  – Risk and Uncertainty
  – Future Scenarios
  – Transparency and Verification
Accomplishes what Insurance Can’t

– Physical reduction of potential future disaster losses (not just insured)
– Resolution of uncertainties related to future vulnerability
– Established standards for appropriate repair/redevelopment
– Clarified basis for business investment and community planning
– Improved life, health, safety risk levels = less stress for people
– Reduced exposure to contaminant dispersal during storms
– Avoided business and utility services interruption
Tangible Benefits

Improve Stakeholder Understanding
Demonstrate Targeted Concepts
Rainfall, SLR, Wind/Surge Baseline Data for Regions
ID Geomorphic Hazard, Inundation, At-Risk Infrastructure
ID Site-scale and Regional Level Alternatives
Estimate ROI
Evaluate Options and Preferences
Rigorously Develop Inputs and Scenarios
Concept Level Planning to Inform Subsequent Engineering

FRAMEWORK FOR FUTURE PROJECTS
Sustainability implies healthy ecosystem function and efficient economies with social equity.

- Water is retained
- Soil is improved
- Nutrients are recycled
- Contaminants are degraded/assimilated
- Impacts and benefits are distributed fairly
- Materials are reused
- Entropy is minimized
We need a cultural shift

Current: use water & energy once & dispose of it (tax payer costs)

Integrated Resource recovery (tax payer revenues)

Open linear system: waste management

Closed loop system: resource recovery

Modified from Dr. Nicholas Ashbolt, EPA
Treat Green Infrastructure as an Opportunity
Reduce Waste by Designing Cycles and Networks to Capture and Re-Purpose Water, Materials, and Energy Between Scales and Functions

Relationship between the 13 Themes
Modern buildings attempt to balance their own heating and cooling demands to reduce the energy required to heat and cool the building.

**District Energy Sharing & Water Recovery**

District Energy and Water Sharing balances the heating and cooling demands of an entire community to reduce the energy and water required to meet the needs of the community.

Energy sharing for communities with:

- 45% residential
- 30% office
- 25% retail

Can supply 25% to 34% of the total thermal energy.

Using the Energy Imbalance
Heat recovery and alternative high or low grade thermal energy sources are used to store or provide the net energy demand.

50% of peak heating/cooling provides 90% of annual energy

60% of a building's energy consumption is heating & cooling

Reduction in energy demand maximizes feasibility of other alternative energy sources
NATO Advanced Research Working Group on *Climate Change Resiliency for Military Installations and Cities*

- Ongoing Program since 2004
- Regular Workshops and Publications
- Sharing Global Best Practices
- Understanding Threats
- Focus on Infrastructure Solutions
- Risk and Uncertainty Inform Scenarios
- Multi-Criteria Decision Analysis
Architectural Practice Committee

- Q/A
- Open Discussions
- Next APC video conference call in October.
- Please email your AIA number to Rad Delaney raddelaney@gmail.com for your 1 AIA CEU.
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