SUN-A05: Is it working? Practical approaches to the measurement and verification of landscape performance

As performance-driven landscapes are expected to contribute more directly, discretely, and economically, how do we confirm their real-world effectiveness? This panel will discuss systematic methods to assess performance, methods situated within the total project commissioning model that enable designers to practice more creatively and assume more expansive roles.

LEARNING OBJECTIVES

— Understand the industry-accepted commissioning model and how it could apply to landscape design and construction.

— Understand alternative approaches to designing and evaluating landscape performance

— Review tools to convince your clients to support performance analysis and influence their decision making process.

— Understand the critical importance of adaptive management based on real time monitoring data
Tom Amoroso, ASLA, is a principal at Andropogon Associates, a firm known both nationally and internationally for its sustainable design approach. He is a landscape architect with a strong background in ecological design and construction. At Andropogon, Tom is responsible for the integration of his firm’s design implementation strategies and construction processes with the firm’s research and monitoring efforts. This approach to design establishes and evaluates benchmarks for site performance while creating landscapes that are both beautiful and functional. Some of Tom’s projects include: University of Pennsylvania’s Shoemaker Green, The United States Coast Guard Headquarters project in Washington DC, and the Perelman Plaza at Drexel University.

Christian Gabriel, ASLA, is the National Design Director for Landscape Architecture at the US General Service Administration’s Office of Chief Architect in Washington DC. At the Agency he works to set design standards in the realm of public space, landscape, site security and sustainability. In that role he reviews and approves design proposals, serves on team selection panels, assists on special projects, and advocates for innovation. Prior to joining the GSA he practiced as a senior design associate in the offices of Ken Smith and Thomas Balsley developing numerous noteworthy projects. Christian has served on national design juries and as a studio critic at Harvard, UPENN, Columbia, and City College of New York.

Eric Kramer, ASLA, is a principal of Reed Hilderbrand in Cambridge, MA. He leads projects associated with the renewal and enrichment of campuses, cities, and institutions. Eric is committed to communicating design knowledge, rooted equally in rigorous scientific field research and the engagement of people and communities. His works include Boston’s Central Wharf Plaza and the newly completed Clark Art Institute in Williamstown, Massachusetts, as well as projects at Harvard, Duke, and Hamilton College. He edited Visible | Invisible, the firm’s award-winning monograph. Eric is an adjunct professor in the Rhode Island School of Design’s landscape architecture program.
WHY DO WE CARE IF IT REALLY WORKS?

1. We are designing increasingly complex projects, but our discipline has few quality controls

2. Landscape systems are dynamic and often need time and active management to meet performance expectations

3. Part contractor quality control, part research, part prototyping, landscape architects are increasingly taking it upon themselves to assess performance after construction
1. Total Project Commissioning
   a. Emerging Need-
      i. Identifying a need to verify;
      ii. Application to the building sciences;
   b. Purpose and Definition
      i. Operational definition and permutations on the theme;
      ii. Optimizing Outcomes;
      iii. Instrumentation;
      iv. A need for forecasting;
   c. Functionality-
      i. Balancing program benefits against project outcomes;
      ii. Evolving to incorporate new applications;
      iii. Involvement in the commissioning process;
      iv. Value proposition and fee structure;

2. Relevance and application
   a. Scale, Drivers, and Change
      i. Multi-Scalar Issue- beyond parts dealers and superficial stylists;
      ii. The Regulatory and Economic Drivers;
      iii. Proxy Analysis and Instrumentation;
      iv. Changing Land-Use;
      v. Using revelatory data to create a participatory process;
   b. The Absence of Certainty.
      i. Coalescing around an issue;
      ii. Knowledge based design, the generation without hang-ups;
      iii. Building automation systems, simply an add-on;
      iv. Bringing forward utility;
   c. Ecology of site commissioning;
      i. Assessing externalities;
      ii. Elevating benefits vs outcomes;
      iii. Optimization of roles, commissioning agents, and multi-tiered suppliers;
      iv. Measuring the efficiency of integrated performance and establishing key performance indicators (relaying ‘Sparks’).
3. Force x Distance = Work (in progress)
   a. Agency complexity presents challenges; nested programs and authorities;
      i. Program (education, awareness, approvals, studies)
      ii. Policy (pollinator, facility performance standard) (LAF standard study)
      iii. Capital Projects
   b. Client-sponsored research; the sea-trials stage;
      i. Brief Overview of Graduated Research Projects
         -Domenici Courthouse, LAF study of a SITES project;
         -USCG, LAF/UMD study of a high performance project;
         -A focus on greater instrumentation;
1. Why does monitoring/research matter? How we apply our findings to our practice
   a. Verification: Do our designs perform as they were intended?
      i. How performance monitoring informs our design approach
         1. Detailing
         2. Specifications
         3. Construction
         4. Maintenance
      ii. Apply the lessons learned from the data/results better understand the successes and more importantly, the failures
   b. Adaptive Management: How to properly maintain complex landscapes
      i. Develop specific strategies to effectively maintain landscapes to ensure performance
      ii. Help to reduce maintenance costs
      iii. Real-time information to help trouble shoot issues
   c. Inform Policy: How data can inform policy change
      i. Work with Local and Federal Agencies to properly assess landscape performance
      ii. Provide the proper credit for landscape based systems
      iii. How to incentivize owners to monitor their landscapes (e.g. the ability to bank credits for a large land owner)

2. Imbedding research in to our practice: How we did it
   a. Creation of an Integrated Research Group
      Appointment of a Director of Integrated Research
      i. Staffing
      ii. What skillsets are needed?
      iii. Equipment
      iv. Protocols and standards
      v. Our internal feedback loop
   b. Project types
      i. Public
      ii. Private
      iii. Certification (LEED, Living Building Challenge, SITES)
c. What we monitor/research
   i. Water
   ii. Soils
   iii. Plants
   iv. People
   v. Materials

d. How it's paid for:
   i. Paid services
   ii. Overhead cost
   iii. Grants
   iv. Strategic partnerships

3. Case Study: Shoemaker Green, Philadelphia, PA
   a. Project Description
      i. 3.25 Acre Urban Site
      ii. SITES Pilot Project (completed in 2012)
   b. Research team
      i. Andropogon Integrative Research Group in collaboration with the University of Pennsylvania's School of Environmental Sciences Department and Meliora Design Engineers
   c. What equipment was purchased
      i. Funding Sources
   d. What we tested:
      i. Stormwater quality and quantity
      ii. Soil chemical, physical, and biological components
      iii. Soil Compaction
      iv. Soil Moisture and Temperature
      v. Plant health and vigor
      vi. Evapotranspiration rates
      vii. Water Harvesting and Usage
      viii. Monthly Rainfall
      ix. Stormwater and AC Condensate Harvesting
      x. Irrigation
      xi. Site Overflows
      xii. Behavior Mapping
      xiii. Adaptive Maintenance (based on research findings)

4. What we learned
   a. Summary of Findings
KRAMER: BUILDING ON BUILDING COMMISSIONING
CASE STUDY: THE CLARK ART INSTITUTE

1. Introduction: Why Commissioning
   a. The Goal: Design the most efficient system possible
      i. Increasing regulation
      ii. Greater expectations for sustainability (LEED and Internal)
      iii. Increasing interconnectivity between the disciplines
   b. The problem: Designed systems assume ideal world, not real-world conditions. New systems don’t work the first time
   c. The Solution: Commissioning the Landscape by building on the existing scope of the building commissioning agent

2. Our Process: A Piecemeal Approach
   a. Phase 1: Begin with small scale testing by contractor and on-site testing agency
   b. Phase 2: Engage building commissioning agent to coordinate the testing / documentation
      i. Educating the agents
      ii. Gathering & Developing the right equipment
   c. Phase 3: Engage Third-party commissioning agent to retroactively commission the water system
      i. Gather a summit of disciplines
      ii. Set basis of design
      iii. Document the processes / overlap of scopes
      iv. Review the contractor’s work
      v. Assess the testing / documentation
      vi. Make adjustments
      vii. Try again

3. Lessons Learned
   a. Piecemeal does not really work
   b. It must be a holistic approach
   c. Begin Day 1
   d. Build it into the design phases, specs, and construction
   e. Educate, Educate, Educate
   f. Plan for when something doesn’t work: It WILL happen
   g. Do It Yourself has limited applicability in large scale projects
   h. There ARE real benefits to owners, LAs, and Contractors. The mistakes we made are proof enough.
MODERATED DISCUSSION: APPLICATIONS FOR PROJECT PLANNING

1. How these data sets can help us plan for better projects?
   (policy, regulatory framework, planning tools)

2. How these data sets can help us design better projects?
   (integrating findings in client and consultant practice)

3. How these data sets can help us maintain projects to a higher standard?
   (utilizing this data to create a sharper standard for project maintenance funding, training, and care)

4. What types of protocols/industry standards are used for assessing site performance?

5. Who should pay?

6. How do you convince a client to undertake commissioning?

7. What are the next steps to make this process more accepted?