MIT Campus Sustainability Working Group Recommendations

An Integrative Vision for Our Buildings, Materials, Stormwater, Landscape and Labs

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MIT / Office of Sustainability

sustainability.mit.edu

Cover photo of MIT Sloan School of Management by Andy Ryan

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SECTION 1. INTRODUCTION

Developing a State-of-the-Art Sustainable Campus

The MIT Office of Sustainability (MITOS) facilitates a collaborative, multi-departmental working group process to lay the foundation for an MIT that re-imagines, invents, and models campus-based solutions to the challenges posed by a changing planet and for a campus that advances MIT's emergent commitment to climate leadership. In fall 2014, MITOS launched four working groups at the same time that the MIT Climate Change Conversation kicked off its nine-month campus-wide discussion on how MIT can lead in confronting this urgent problem, which informed the Institute's recently released MIT Plan for Action on Climate Change. That plan outlines a comprehensive five-year strategy to address the disruption to our global climate via scientific exploration, an expanded commitment to new research in energy technology and carbon reduction strategies, and the development of educational models to reach the next generation of MIT alumni and decision makers, public policy makers, and the general public. The recommendations presented in this report, generated by the four working groups, advance the objectives outlined in the MIT Plan for Action on Climate Change section titled, "Use our Community as a Test Bed for Change," and will provide the critical link between the emergent research in science and technology to combat climate change and our goals for educating our community to engage with the campus environment in more sustainable ways.

The four sustainability working groups convened for a ten-month period to recommend solutions—ranging from newly informed decision-making processes and organizational structures to the integration of new technology and innovative design strategies—to advance MIT's commitment to becoming a state-of-the-art sustainable campus. Over the next five years, MITOS will continue to launch and facilitate a series of working groups and committees tasked with redefining our campus systems to improve performance, reduce environmental and human health impacts, and become the living lab that we seek as a community to create. The end result will be the development of a comprehensive blueprint for a sustainable MIT. Each set of recommendations that emerges from the working groups will build on those that came before and be integrated into those to follow.

The David H. Koch Institute for Integrative Cancer Research at MIT.
Photo by Peter Vanderwarker

The first series of working groups, whose recommendations are compiled in this report, focused on six key operational areas organized into four areas of focus:

- Sustainable design, construction, and renovation of buildings
- Stormwater and landscape management
- Materials management: procurement and waste management
- Green labs

Working groups, made up of staff appointed by administrative leadership, were supported by faculty expertise as they engaged in a process to assess current conditions, evaluate best and innovative practices within the higher education and private sectors, and develop an informed set of recommendations in each area.

This document organizes the recommendations into the first phase of a robust foundational framework for sustainability at MIT. MIT will move forward to implement the recommendations presented here, which will set MIT on a path to align its campus operations along a core set of sustainability principles, setting a strong foundation for rigorous and innovative Institute-wide goal setting, measurement and verification, and implementation of strategies moving forward.

Shared Principles

The four working groups called for a set of guiding principles to direct and align the proposed strategies across operational areas. They are based on a common vision that acknowledges the deep and vital connection between thriving communities and healthy ecosystems. Shared principles—*and our commitment to them as a community*—are crucial to the successful implementation of the recommendations presented here. These shared principles demonstrate MIT's emerging values around campus sustainability and will continue to inform future reports and recommendations:

- **Stewardship:** Steward urban land resources and plan comprehensively for a campus that supports the health and well-being of the MIT community and surrounding living systems.
- **Life-cycle thinking:** Adopt strategic and mindful decision-making frameworks that consider the full life-cycle costs and impacts of MIT's operations and management on our social, economic, and ecological systems.
- **Resiliency:** Design sustainable campus and ecological systems with the dynamic capacity to absorb, recover, and/or successfully adapt to unexpected and changing conditions.
- **Innovation and demonstration:** Innovate and demonstrate solutions to shared local, regional, and global sustainability challenges.
- **Transparency:** Prioritize decision-making platforms that accelerate transparency, collaboration, innovation, and accountability.

Conditions for Success

The working groups articulated five key conditions for success that are the essential organizational characteristics that must be in place to ensure the robust implementation of the recommendations. The future of the proposed recommendations will therefore depend heavily upon the systems that we develop at MIT that enable follow-through and communication to all members of the MIT community. In collaboration with the appropriate departments, the Office of Sustainability will take the lead on institutionalizing the proposed systems to ensure accountability and assessment of progress. The five conditions for success, and the actions that must be taken to achieve them, are as follows:

- **Data platforms are accessible.** Develop open, accessible, and comprehensive data platforms.
- **Distributed leadership is enabled.** Engage and empower faculty, students, and staff in shaping, applying, and continuously improving sustainability frameworks and strategies. Optimize capacity and resources across departments to ensure implementation of recommendations without redundancy.
- **Capacity building is prioritized.** Build internal capacity through access to sustainability education and training. Integrate related, department-specific skills into the hiring process.
- **Capital investments are leveraged.** Leverage existing resources within the Capital Renewal Program and other sources to enable strategic investment in projects that advance MIT's commitment to sustainability and lead to measurable outcomes.
- **The campus becomes a "living lab."** Transform the campus into a "living" resource to prototype, test, and pilot research with the potential to solve complex sustainability challenges.

SECTION 2. RECOMMENDATIONS

The recommendations in this report are arranged by working group topic. Each section provides a brief overview of the scope of the working group's mission, the current conditions or "context" of the operational area addressed by the working group, and the specific recommendations developed by each group. Across working groups, the recommendations have been organized into the following set of categories, where applicable:

- Goal setting
- New/improved standards, processes, and tools
- Recommended plans
- Data collection and management strategies
- Education, training, and collaboration

Sustainable Design and Construction

Overview of Working Group Scope

The Sustainable Design and Construction Working Group was tasked with identifying methods to mitigate the effects of the Institute's greenhouse gas emissions and outlining robust mechanisms to ensure that each stage of every future building project—from planning to renewal—integrates the most advanced measures of sustainability possible. These recommendations are a vital component in ensuring that MIT succeeds in reducing its greenhouse gas emissions by at least 32% by 2030 below a 2014 baseline, as outlined in the Institute's recently announced Plan for Action on Climate Change.

The recommendations seek to integrate the principles and measured impacts of sustainability into new and existing buildings managed by MIT Facilities (i.e., the academic portfolio of the campus) and the MIT Investment Management Company (i.e., MIT's commercial real estate portfolio).

The recommendations specifically target the following areas:

- Project delivery process: planning, design, and construction
- Commissioning, turnover, and ongoing operations
- Repair, maintenance, and replacement

Setting the Context

MIT's Cambridge campus was originally built in 1916 on 50 acres of land reclaimed from the Charles River. Today, the campus is composed of 158 buildings and occupies approximately 168 acres. These existing buildings account for 97% of MIT's greenhouse emissions and require significant resources to ensure their upkeep, renovation, and renewal. As MIT embarks on an aggressive capital renewal plan, its existing buildings pose significant opportunities to address the challenges of sustainability.

MIT has a recent track record of building to high performance standards, with notable projects including the new headquarters of the MIT Sloan School of Management and the Koch Institute for Integrative Cancer Research, both of which achieved LEED Gold Certification. Rigorous local regulations combined with MIT policies have ensured that new buildings consistently exceed state and local energy code requirements.

MIT's ambitious capital renewal plan and an Institutional commitment to sustainability necessitate an even more strategic, innovative, and consistent approach to integrating sustainable, high-performance practices across all building types.

Recommendations

The Sustainable Design and Construction Working Group established a set of principles to guide the development and implementation of their recommendations:

- Commit to an integrated design process that embeds sustainability into the design, construction, and renovation of all new and existing MIT buildings, including their systems, materials, sites, and infrastructure.
- Prioritize energy efficiency strategies and reduction in carbon emissions in new and existing MIT buildings based on a life-cycle approach.
- Create feedback loops for all stakeholders that result in continuous improvement and ongoing performance optimization and enhancement of the buildings.
- Develop internal resources to ensure the implementation of sustainable design and construction for all projects, ranging from small-scale renovations to large-scale new construction.

Goal Setting

- Set campus-wide energy- and water-reduction goals by June 2016.

New/Improved Standards and Tools

- Transition to the LEED Gold version 4 rating system for all capital construction projects and integrate LEED certification strategies into renovations and capital renewal projects (FY2016).
- Develop MIT-specific sustainability standards for capital construction, renovation, and capital renewal projects (FY2016).
    - Develop an MIT-specific LEED framework and sustainability standards for new construction and large renovations (FY2016).
    - Develop sustainability standards for system-wide initiatives, partial renovations, and limited-scope projects that do not comply with LEED (FY2016).
- Develop a product sustainability assessment and building materials list to integrate with building design standards (FY2016).
- Develop a streamlined life-cycle cost analysis framework and calculator applicable to capital construction and capital renewal projects (FY2017).
- Develop benchmarks for building types (labs, offices, classrooms, and residences) (FY2017), and review and update them annually.
- Develop Sustainable Building Operations and Maintenance Guidelines (FY2018).
- Assess the effectiveness of a carbon “shadow pricing” strategy to influence all future capital renewal projects.

Recommended Plans

- Develop an Energy Management Plan (FY2017) as a component of MIT’s Climate Action Plan.

Data Collection and Management Strategies

- Develop and manage a data collection framework to maintain a comprehensive building energy modeling and forecasting tool (FY2016).
- Institute a new process by which to measure campus energy use and provide access to the data to students, staff, and faculty via an open data platform (FY2016).

Education, Training, and Collaboration

- Ensure that all project managers and relevant operational staff receive LEED Green Associate certification by December 2016.
- Develop an education and outreach program to teach building occupants to engage with their buildings in ways that optimize human health and building performance (FY2017).

Storm Water and Landscape Management

Overview of Working Group Scope

The Stormwater and Landscape Management Working Group was tasked with identifying strategies for achieving cost-effective, comprehensive, and sustainable stormwater and landscape management practices to support the health of the Charles River Watershed; enhance campus and residential life for students, faculty, and staff; and advance MIT's sustainability objectives. Their recommendations target the following areas of campus management and design:

- Utilities
- Grounds maintenance
- Planning and landscape engineering
- Stormwater and landscape management practices

MIT's athletic fields and portion of west campus. Photo by AboveSummit with Christopher Harting

Setting the Context

MIT's campus occupies 168 acres that extend more than one mile along the Charles River Watershed. Initially constructed on 50 acres of landfill, the campus was built amidst factories during a time when Cambridge was a thriving industrial town. As factories closed and MIT expanded, the Institute acquired additional property and gradually transformed into a livable campus where the management of stormwater and landscapes is increasingly important.

Approximately 64% of MIT's landscape, however, is now composed of impervious surfaces (roof and paved surfaces). Rain falling on these surfaces results in stormwater runoff that flows into the City of Cambridge's drainage system and eventually discharges into the Charles River, carrying pollutants and potentially compromising the health of the watershed. Changes in the amount, timing, and intensity of precipitation events in combination with development in and around campus will further affect the amount and quality of stormwater runoff that needs to be controlled, highlighting the need to plan for changing future conditions.

Recommendations

The Stormwater and Land Management Working Group established a set of principles to guide the development and implementation of their recommendations:

- Foster the resiliency of our land and water systems in a changing New England climate.
- Enhance the water quality of the Charles River Watershed.
- Plan comprehensively for a renewed campus commons that supports the health and well-being of the MIT community and other living systems.
- Develop systems and practices in the built environment that mimic the natural hydrological cycle, build healthy soils, and support biodiversity.

The recommendations developed by the group suggest critical steps the Institute can take to mitigate the rate and improve the quality of stormwater runoff to the Charles River as well as to enhance the campus landscape to support the biodiversity of living systems.

Goal Setting

- Develop a set of Institute-wide landscape management targets aimed at improving the health and management of our campus landscape and waterways (FY2018).

New/Improved Standards, Processes, and Tools

- Integrate stormwater and landscape performance and management standards into the MIT Design Standards by FY2017.
  - Develop MIT-specific stormwater and landscape design standards and a Sustainable Sites checklist for capital renewal and capital construction projects (FY2018).
  - Develop Sustainable Operations and Maintenance Procedures for landscape and stormwater projects (FY2018).
- Leverage the Capital Renewal Program to enable sustainable stormwater and land management practices as outlined by the upcoming plan (FY2017–FY2019).

Recommended Plans

- Develop an Ecological Landscape and Stormwater Quality Plan (FY2016).
- Develop a Roof Sustainability Assessment to explore opportunities for stormwater and land management on rooftops that integrates with the Capital Renewal Roof Replacement Plan (FY2016).

Data Collection and Management Strategies

- Create a centralized repository of existing stormwater runoff, green infrastructure, and landscape data for the campus (FY2016).
- Collect data on the performance of existing green infrastructure projects (FY2016).
- Develop an online collaborative platform for data collection, analysis, and sharing (FY2018).

Education, Training, and Collaboration

- Identify and develop educational opportunities for facilities, utilities, and planning staff that focus on sustainable landscape management practices (FY2016).
- Continuously identify opportunities to partner with the City of Cambridge, the Massachusetts Department of Conservation and Recreation, and the Charles River Watershed Association in order to advance a collaborative approach to stormwater and land management.

Materials and Waste Management

Overview of Working Group Scope

Materials management refers to the full life cycle of materials and products as they move through the economy, enter the MIT campus via procurement, and leave the campus via waste management, recycling, compost, and reuse programs. The Materials and Waste Management Working Group was tasked with determining how to manage material in-flow and out-flow on campus.

The recommendations target the range of administrative processes at MIT that determine the selection and procurement of products and the disposal, recycling, and reuse of waste materials.

Setting the Context

MIT relies on a wide range of goods and services to operate and carry out its educational mission. Each year the Institute procures goods ranging from office supplies, food, and computers to lab equipment, vehicles, and construction materials. The type, quality, and quantity of commodities being procured have far-reaching impacts and implications that extend beyond MIT's borders, from the companies and markets being supported by our purchases to the environmental and human health impacts of the products' manufacturing, use, and disposal.

Procurement activities at MIT include vendor selection, contract negotiation, and purchasing transactions for the entire community. Tools, ranging from online purchasing catalogs to building design standards, help determine how and what materials we source for our offices, labs, and operations. Within MIT's "culture of choice," purchasers exercise a high degree of flexibility and independence when deciding when, what, and how much to order.

The Institute's waste stream includes several different types of discarded material, including:

- Municipal solid waste (including organic waste, single-stream recyclables, bulky waste)
- Regulated hazardous waste (including chemical, biological, radiological, oil wastes)
- Universal waste (including electronic waste, bulbs, batteries)
- Construction and demolition waste (including wood, concrete, brick, metal)

MIT students and staff conduct a waste audit of Building W20 to identify types of materials and waster generated, and how much of each is recovered or discarded. Photo by Chi Feng

Many of these waste categories entail separate, often distinct, collection and disposal methods, and must therefore be addressed in different ways. MIT has a variety of programs for the collection and disposal of solid and hazardous waste streams, the collection and transportation of recycling and organic materials, and the reuse of items such as furniture, clothes, and other goods for materials that have reached their end of life.

Recommendations

The Materials and Waste Management Group established a set of principles to guide the development and implementation of their recommendations:

- Support and facilitate a life-cycle approach to the purchase of products, services, and materials that maximize benefits to human and ecological health.
- Maximize the potential of existing systems to reduce waste and the unnecessary consumption of materials.
- Engage vendors as partners in transforming MIT's supply chain.
- Reduce the impact of material flows on the environment.
- Integrate concepts of the circular economy framework, which essentially "designs out waste" to ensure that all materials used can be dissembled and re-purposed, to inform materials management practices at MIT.

The recommendations developed by the group address institutional next steps for collecting better data about our current materials management systems, the integration of procurement and waste systems, the adoption of a life-cycle approach to materials management on campus, and the education of students, staff, and researchers.

Goal Setting

- Set a waste reduction and diversion goal for the Institute (FY2016).

New/Improved Standards, Processes, and Tools

- Develop a program to incentivize vendors to advance MIT's commitment to sustainability by identifying and implementing sustainable solutions for procurement and materials management. Identify vendors to engage with (FY2016) and implement strategies (FY2017).
- Develop a program to assess, pilot, evaluate, and scale up innovative materials management strategies on campus.
  - Develop a method to select and evaluate pilot projects (FY2016).
  - Identify 2–3 projects per year to assess, pilot, and evaluate for potential scale-up. Possibilities may include a Styrofoam packaging take-back program (FY2016) and a chemical-sharing program (FY2017).
  - Evaluate and develop a comprehensive database of pilot projects (FY2017).
- Evaluate existing waste management processes (i.e., solid waste and food scraps disposal and recycling) at MIT, assess best practices, and identify opportunities for new, innovative, and sustainable waste diversion, collection, and disposal methods (FY2017).
  - Evaluate current electronic waste disposal and collection practices (FY2017).
  - Evaluate opportunities to integrate waste-to-energy technology on the MIT campus (FY2017).
- Develop and implement Sustainable Procurement guidelines and metrics for vendors and purchasers (FY2017).
  - Annually assess the top five commonly purchased products by quantity and seek sustainable alternatives for them where feasible (FY2017).
- Evaluate the potential to integrate MIT's reuse and recycling networks with its procurement systems and develop supporting integration tools.
  - Develop a framework and identify a location for a "smart reuse" facility that integrates information technology to dynamically manage and share information on materials and products for reuse (FY2017).
  - Develop an Institute-wide tool that integrates MIT's reuse and recycling networks with its procurement systems (FY2018).

Recommended Plans

- Develop a Materials and Waste Management Plan (FY2017).

Data Collection and Management Strategies

- Refine the waste data collection process (FY2016).
- Establish a process by which to collect and analyze procurement data (FY2017).

Education, Training, and Collaboration

- Develop an education and outreach program targeting authorized purchasing personnel (FY2017).
- Create an incentive program to encourage purchasers to choose environmentally preferred products (FY2018).

Green Labs

Overview of Working Group Scope

The Green Labs Working Group sought to address the multifaceted challenges of laboratories to support safer, more efficient, and productive practices while fostering continued innovation. Initiatives that target occupant behavior, materials procurement, and recycling and waste disposal, and that optimize energy use can play a significant role in reducing the environmental impact of campus operations. The group focused on the energy and water needs of labs, waste minimization and diversion, equipment requirements, chemical storage and use, research practices, and human behavior.

Because of the nature of lab operations, many recommendations from the Sustainable Design and Construction and Materials Management working groups also support the intent of the Green Labs Working Group. To avoid redundancy, only those recommendations not addressed by other working groups are included in this section.

Setting the Context

With MIT's foundation in science, technology, and engineering, laboratories are at the core of the Institute's research and academic mission. Laboratories account for approximately 15% of MIT's existing academic space and consistently rank among the highest energy users on campus MIT laboratories vary widely in age, scale, operating schedules, and type and volume of activities and of resources consumed.

By their very nature though, laboratories are resource intensive, using more water and energy than a typical office or classroom building. Labs often require increased ventilation for occupant safety and contain energy-intensive equipment, such as chemical fume hoods, autoclaves, and clean rooms. In addition, many generate hazardous waste and use toxic chemicals, and operate during extended hours.

Recommendations

The Green Labs Working Group established the following key principles to guide the development and implementation of their recommendations:

- Optimize energy and water use within lab facilities.
- Develop processes to ensure continuous improvement and optimized performance of our labs.
- Reduce waste and encourage use of less-hazardous materials.
- Engage and inform lab occupants to promote the adoption of sustainable practices.

Biological engineering lab. Photo by Christopher Harting

New/Improved Standards, Processes, and Tools

- Identify lab renovation projects and use them to pilot sustainable design and construction (FY2016), in order to test strategies and technologies for wider implementation.
- Develop a Green Lab Certification framework, with a focus on lab occupants (FY2017).
  - Evaluate the potential for developing an ultra-low-temperature freezer program (FY2017).
  - Identify and pilot Green Lab Certification framework in 2–3 labs (FY2018).

Education, Training, and Collaboration

- Develop an annual sustainability training program that targets lab occupants, including faculty, researchers, students, and staff (FY2017).

SECTION 3. LOOKING AHEAD

The MIT Office of Sustainability began to support the strategic implementation of the recommendations presented in this report in fall 2015 while continuing to lay the groundwork for a comprehensive sustainability framework. In support of the ongoing work of the Institute-wide Campus Sustainability Task Force to build a vision and blueprint for sustainability at MIT, MITOS launched and now facilitates the following committees:

- Sustainability Data Analytics Committee
- Climate Resiliency Committee
- Student Leadership in Sustainability Working Group

Appendix A. Working Group Membership

The following members of the Office of Sustainability facilitated and supported the working groups, and contributed to their recommendations:

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APPENDIX B. GLOSSARY

Note: URLs for the websites that supplied the definitions that follow were accessed between October 9 and 19, 2015.

Benchmark: A point of reference from which measurements may be made; also a standard by which a process may be evaluated.

Biodiversity: "The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part." *http://www.biodiversitya-z.org/content/biodiversity*

Building Energy Model: A campus building energy planning tool to test impacts of energy-efficiency investments.

Capital Construction: At MIT, capital construction includes building construction projects exceeding a capital cost of $5 million.

Capital Renewal Program: Created by the MIT Corporation, the Capital Renewal Program was established to ensure the stewardship of MIT's physical assets on campus. The program's objective is to renovate and renew buildings and infrastructure to support the educational, research, and student life activities essential to the MIT mission. This work is managed through a partnership of the Office of the Provost and the Department of Facilities, and is guided by an assessment of needs and priorities. Learn more at *http://web.mit.edu/mit2030/themes/renovation-renewal-stewardship/index.html*.

Carbon Shadow Pricing: The cost of carbon applied to the emissions related to decisions for campus capital expenditures, such as the power plant, new buildings, existing building upgrades, energy systems, and transportation infrastructure.

Charles River Watershed Association: One of the country's oldest watershed organizations, formed in 1965 in response to public concern about the declining condition of the Charles. Its mission is to protect, preserve, and enhance the Charles River and its watershed through science, advocacy, and the law. *http://www.crwa.org/mission*

Circular Economy: An economy that is "restorative and regenerative by design, and which aims to keep products, components, and materials at their highest utility and value at all times." *http://www.ellenmacarthurfoundation.org/circular-economy/overview/concept*

Department of Conservation and Recreation (DCR): A department of the Massachusetts Executive Office of Energy and Environmental Affairs, DCR is steward of one of the largest state park systems in the country. It is focused on improving outdoor recreation opportunities and natural resource conservation in the Commonwealth. *http://www.mass.gov/eea/agencies/dcr/*

Distributed Leadership: The result of an open culture within and across an institution where people at all levels engage in leadership. It is an approach in which reflective practice is integrated through cycles of planning, action and reflection. *https://emedia.rmit.edu.au/distributedleadership/?q=node/10*

Ecosystem Services: The "benefits provided by ecosystems that contribute to making human life possible and worth living." Ecosystem services provide basic needs (food and water), regulate systems (climate or disease control), support life (crop pollination), and enrich cultural systems (spiritual or recreational benefits). *http://uknea.unep-wcmc.org/EcosystemAssessmentConcepts/EcosystemServices/tabid/103/Default.aspx*

Electronic Waste (E-waste): Discarded electrical devices. E-waste processing is a highly complex and hazardous process, often delegated to, or occurring informally in developing countries.

Environmentally Preferred Products: Products that have lower environmental impacts than other products in the same category. Advanced life-cycle analysis is used to determine whether or not a product or material is environmentally preferred. *http://www.scsglobalservices.com/environmentally-preferable-product*

Green Infrastructure: Stormwater management systems that mimic the natural hydrological cycle and use vegetation, soils, and natural processes to reduce and slow the flow of water into the sewer systems and to enhance urban environments. *http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm*

Green Lab: A lab that strives to reduce the environmental impact of its operations and enhance the health and safety of its occupants through strategies such as energy efficiency, green chemistry, sustainable purchasing and waste management, and user education.

Hydrological Cycle: The cycle through which water evaporates from the surface of the ocean, rises into the atmosphere as moist air, cools, and forms clouds of condensed vapor that is transported around the globe until the moisture returns to the earth's surface as precipitation. *http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/hyd/smry.rxml*

Integrated Design Process: A design process that requires the participation and collaboration of all involved parties throughout all phases of the building project, with a focus on optimizing the building performance and enhancing human and environmental benefits (identifying synergies between building systems and components to achieve higher levels of performance and human and environmental benefits.) *http://www.wbdg.org/design/engage_process.php*, *http://designsynthesis.betterbricks.com, http://www.aia.org/groups/aia/documents/pdf/aiab083423.pdf*

Land Management: The process of managing the use and development (in both urban and rural settings) of land resources. Land resources are used for a variety of purposes, which may include organic agriculture, reforestation, water resource management, and ecotourism projects.

Landscape Management: The process of overseeing the design, creation, and maintenance of landscapes. *http://www.wisegeek.com/what-is-landscape-management.htm*

Leadership in Energy and Environmental Design (LEED): A green building certification program that recognizes best-in-class building strategies and practices.

LEED Green Associate: A professional LEED credential. *http://www.usgbc.org/leed*

Life-Cycle Assessment: A technique to assess the environmental aspects and potential impacts associated with a product, process, or service throughout its lifecycle. *http://www.unep.org/resourceefficiency/Default.aspx?tabid=101348*

Life-Cycle Cost Analysis: A method for assessing the total cost of facility ownership that takes into account all costs of acquiring, owning, and disposing of a building or building system. *http://www.wbdg.org/resources/lcca.php*

Life-Cycle Thinking: Recognizing how our choices influence what happens at each point in the life cycle of a product, process, or service so that we can balance trade-offs and positively impact the economy, environment, and society. *http://www.unep.fr/shared/publications/pdf/DTIx0585xPA-WhyLifeCycleEN.pdf*

Living Lab: A research concept that implies a user-centered, open-innovation ecosystem, often operating in a territorial context (e.g., city, agglomeration, region), integrating concurrent research and innovation processes within a public-private-people partnership.

Material Flow Analysis: A quantitative procedure that uses input/output methodologies, including both material and economic information, for determining the flow of materials and energy through the economy. It uses input/output methodologies. *http://www.sustainablescale.org/conceptualframework/understandingscale/Measuringscale/Materialflowanalysis.aspx*

MIT Design Standards: Design, construction, and operations standards that facilitate alignment across the Institute, ensuring a consistent approach to the development of buildings and landscapes.

Procurement: Purchasing performed on behalf of a business or organization.

Procurement System: Typically a computerized system designed to manage the procurement process.

Resiliency: The human or system ability to thrive under pressure and bounce back from setbacks. A resilient system absorbs shocks to the system without compromising functionality.

Scale-Up Solutions: Designed technical solutions to sustainability problems that are implemented at a small, local scale but that can also be implemented at a larger scale.

Stormwater: Water that originates during precipitation events such as rain, sleet, snow, or ice. Stormwater can soak into the soil, be held on the surface and evaporate, or run off, ending up in nearby water bodies (lakes, streams, or rivers).

Styrofoam Take-Back Program: A program that pays researchers to ship the Styrofoam (expanded polystyrene, or EPS foam) coolers used to ship products for the life-science industry back to the vendor for reuse. *http://www.labconscious.com/blog/2015/4/16/styrofoam-cooler-take-back-programs*

Supply Chain: A complex supply and demand network that functions as a system of organizations, people, activities, information, and resources involved in moving a product from supplier to customer.

Sustainable Materials Management: An approach to managing the flow of materials into an organization that addresses the full life cycle of products and materials with the intention of reducing costs, conserving resources and reducing environmental impacts. *http://www2.epa.gov/smm*

Sustainable Procurement Guidelines: Guidelines for purchasing goods, services, and utilities that not only meet cost-benefit requirements but also maximize net environmental benefits.

Ultra-Low-Temperature (ULT) Freezer Program: A program advocating best practices for the use and procurement of energy-efficient ULT freezers, which are widely used in research to store living samples and are significant energy consumers at research facilities and on campus.

Waste Diversion: The prevention and reduction of generated waste through source reduction, recycling, reuse, or composting. Waste diversion generates a host of environmental, financial, and social benefits, including conserving energy, reducing disposal costs, and reducing the burden on landfills and other waste disposal methods. *http://www2.epa.gov/greeningepa/waste-diversion-epa*

Waste Management: Practices to facilitate the collection, transport, treatment, and disposal of waste, the regulation of waste production, and the prevention of waste through reuse and recycling.

Waste-to-Energy Technology: A form of alternative energy by which heat or electricity is generated from the incineration of waste.