Introduction

The growing focus and movement towards environmental sustainability is having a tremendous impact on grounds management practices. Many property owners and organizations have adopted policy statements and are implementing operational procedures that emphasize sustainable goals and objectives. They are also taken into consideration the local and global impacts of the products and services being delivered. The challenges facing grounds management and the ongoing transformations to address sustainability expectations are running parallel to changes that are exponentially occurring across all disciplines that address the modern built environment. This imperative becomes evident when assessing the requirements for LEED certification, SITES rating, STARS rating, PGMS accreditation or other similar “green industry” performance-based evaluation programs.

Critical to the fulfillment of the sustainability goals affixed to any particular sector that has a grounds component is the effective and responsible management of its various functioning parts. The introduction of many new and innovative sustainability features are now surfacing as a regular part of the landscape palette. The management of these new as well as older and existing landscaped sites requires strategies from a different maintenance paradigm. Landscape features such as roof gardens, living walls, rain gardens, bioswales and naturalistic sites are becoming increasingly commonplace on the list of grounds sites needing special maintenance
consideration. Understandably, the steady rise in the occurrence of these landscape maintenance features and activities will inevitably bring with them certain additional budgetary implications to the organization. Ensuring that an appropriate post-installation maintenance cost is factored in for the success of sustainability projects is essential and should be in the discussions at the front end of work that is being considered for this purpose.

The maintenance complexities associated with these changing new landscapes as well as those that already exist is compounded by a mandate to reduce the property’s carbon footprint. This environmentally responsive outcome is expected to be achieved without compromising the attractiveness, quality, health or safety attached to landscape sites. Clearly, meeting today’s grounds management challenges that are being highly driven by the environmental sustainability movement is necessitating grounds management strategies and practices that will deliver superior results. A routine and general approach to standard grounds maintenance practices would be insufficient to this challenge. What will be needed are the understanding, acceptance and implementation of grounds management “best practices”. Those practices that when properly employed will produce a consistent, responsive and sustainable product to the property owner with increased accuracy and efficiency.

This publication will suggest and present best practices that will be specific to the business of grounds management and show examples of how and where these practices are working for organizations striving to stay current with demands and those that realize the many benefits to be gained from appropriately benchmarking the grounds operations.
What is a Grounds Management Best Practice?

There are numerous definitions and descriptions of best practices being utilized in various industries and businesses across the country. The following are a few representative definitions:

A “National Energy Efficiency Best Practice Study” that was prepared in 2004 for the California Best Practices Project Advisory Committee defines a best practice as “the business practices that, when compared to other business practices that are used to address a similar business process, produces superior results. Best practices are documented strategies and tactics employed by successful organizations and programs.”

In the book titled, “Project Management Best Practices” by Harold Kerzner, Ph.D., he states that, “best practices are those actions or activities undertaken by companies or individuals that lead to a sustained competitive advantage in project management while providing value for both the company and the client.”

And finally, the definition that captures the common thread around quality and is most fitting for use in a grounds management discussion comes from the “Encyclopedia of Management (2009)” which states that, “the term best practice refers to the most efficient way of doing something. The fastest method that uses the least resources (including labor and parts) to create the highest quality output is the best practice.”

Three important factors come into play when developing best practices:

1. Performance based practices should come from industry standards.
2. The practice should quantitatively demonstrate sufficient improvements in quality, efficiency, cost, and/or cycle time.

3. Best practices are to be determined by knowledge transfer that is captured, adopted and assigned to an analytical pool.

Grounds management best practices have a vitally important and integral role in the PGMS Landscape Management and Operations Accreditation (LMOA) program. The best practices that were established for the program came from the work of a Task Force convened by the PGMS to structure an industry-specific accreditation process for grounds organizations. This Task Force consisted of highly knowledgeable and respected leaders in the grounds management profession and certified grounds managers (CGMs).

Examining the composition and requirements for this accreditation will provide the means for explaining and understanding best practices within grounds management.

**Establishing Key Principles that Generate Best Practices**

A prerequisite to the formation of the best practices was to settle on an appropriate systems model to be used in developing the accreditation process. Utilizing an environmental management system (EMS) concept was determined to be a good fit for the intention and purpose of the PGMS accreditation. EMSs which have existed in various forms since the 1970s, typically to assure regulatory compliance, reduce liability, identify waste-minimization
opportunities and to basically manage the environmental impacts of a business’s activities gained broader appeal and accelerated use after the 1996 publication of the International Organization for Standardization (ISO) 14001 international voluntary standard.

Infusing a grounds management template in the EMS model, the PGMS accreditation process in effect helps grounds organizations in a structured way with their business decisions about maintaining or improving regulatory compliance, increasing efficiency in nonregulated environmental performance outcomes (such as use of energy, water and materials), promoting sustainable practices, increasing employees environmental awareness and morale, standardizing and integrating management procedures and also for projecting and promoting a positive image to business customers, stakeholders and the public.

Three major interrelated categories drive the strategic thinking process in the PGMS accreditation (figure 1). They are:

- **Environmental Stewardship**
- **Economic Performance**
- **Social responsibility**
The integration of these overriding categories within a management system will guide the facilitation of greater benefits from the performance of the grounds organization. For each category, a list of “key principles” relevant to the heading and the associated grounds management activities was established.

The new Webster Encyclopedic Dictionary of the English Language defines a ‘principle’ as “a general truth, a law on which others are founded or from which others are derived...” In the
publication, “A Project Management Dictionary of Terms” (Cleland, David, & H. Kerzner, 1985, p187), it expands on a ‘principle’ as being:

1. A fundamental rule or law of action based upon desirable ends or objectives. A principle is more basic than a policy or a procedure and generally governs both.

2. A fundamental truth, or what is believed to be true at a given time, explaining relationships between two or more sets of variables, usually an independent variable and a dependent variable; may be descriptive, explaining what will happen, or prescriptive (or normative), indicating what a person should do. In the latter case, principles reflect some scale of values, such as efficiency, and therefore imply value judgments.

Another definition pertinent to this topic is presented in the 2015 “Quality Management Principles Publication” produced by the ISO, states that a ‘principle’ is...” a basic belief, theory or rule that has a major influence on the way in which something is done. “Quality management principles” are a set of fundamental beliefs, norms, rules and values that are accepted as true and can be used as a basis for quality management.” A more concise and condensed definition used in the PGMS accreditation program for “key principles” is that they, simply put, are, “the values that guide the accreditation process”.

The PGMS Landscape Management and Operations Accreditation ruling categories and key principles are:
ENVIRONMENTAL STEWARDSHIP

KEY PRINCIPLES

• Provide leadership and effective communication

• Value ecosystem services

• Manage resources within natural limitations

• Evaluation of existing natural resources to preserve and conserve

• Establish environmental policies and evaluation processes

• Implement environmentally sustainable initiatives

ECONOMIC PERFORMANCE

KEY PRINCIPLES

• Use renewable and sustainable resources

• Eliminate or reduce the use of resources that are difficult or impossible to renew

• Improve grounds management performance through policies and programs

• Investigate the use of advanced and emerging technologies

• Conduct life cycle assessments and costing

• Produce contingency plans that reflect budget reductions

SOCIAL RESPONSIBILITY

KEY PRINCIPLES

• Ecosystems are safe, healthy and productive

• Natural processes and human activities co-exist
• Involve stakeholders to define and link long-term maintenance strategies

• Find new resources and technologies that enhance the user’s quality of life and the environment

• Routine assessment of training and development needs is being performed

• Workplace environment is responsive to employee’s health, safety and welfare needs

**High Impact Best Practices at High Preforming Grounds Organizations**

Just as the management of grounds has evolved over the years, so have the definition, purpose and application of best practices. After gaining broad recognition in the early 1990s, by 2006 as a result of the rapid spreading of the usage of project management in virtually every industry, best practices have been captured, formulated and implemented.¹ Generally, in the “green industry” and particularly in the grounds management business, best practices have taken on different shapes and meanings. By affixing best practices to key principles, as it is done in the PGMS accreditation process, they may appear in some instances to be overlapping or redundant. However, the intended distinction of ‘key principle’ and ‘best practice’ can be best understood as the difference between ‘what’ and ‘how’.

A number of individual activities, policies, procedures and programmatic approaches can be responsive and compliant to a single best practice. Exactly, what those particular action steps are will likely differ depending on the type, structure and mission of the organization.
Determining the applicability of the action(s) or responses to the best practices as stipulated in the PGMS accreditation process is made from a community of grounds leaders that collectively have a wealth of knowledge, experience and expertise in grounds management on a variety of scales and with varying complexities.

A few examples of best practices in their respective categories and some excellent responses from organizations that have been successful in the Landscape Management and Operations Accreditation Program follows:
Category: Environmental Stewardship

Key Principle → Value ecosystem services

Best Practice → Ecosystem services value included in organization's mission and vision statement

Rationale:

A Mission and Vision Statement should be developed with concise wording on the value of ecosystem services and how the protection and conservation of natural systems will fit into the overall organization’s mission and vision.

Example:
Landscape Services Mission Statement

Landscape Services is responsible for the maintenance of grounds and landscape of Georgia Tech’s 426 acre campus. The mission of the department is to help Georgia Tech achieve its goal of environmental sustainability by maintaining an integrated ecologically based landscape and open space system that serves as a beautiful, attractive, and safe campus environment where students, faculty, staff and visitors can enjoy, live, work, and study in comfort.

Georgia Institute of Technology

Landscape Services Vision Statement

Develop, manage and maintain the outdoor resources of UNL campuses; providing excellence in landscape design, grounds maintenance, surfaces, and amenities. This also includes the botanical resources of the campus, including the gardens, arboretum, and plant collections in a condition of high quality.

University of Nebraska-Lincoln
Category: Environmental Stewardship

Key Principle → Provide leadership and effective communication

Best Practice → Publicizes environmental connection to maintenance activities

Rationale:

Educating the organization’s customers on the environmental correctness of maintenance activities can eliminate misconceptions and conflicts. Internal and external media outlets should be used for this purpose along with the publication and dissemination of information specifically on grounds maintenance activities.
Example:

UC Davis Arboretum and Public Garden team takes water conservation to new lows!

Matt Forrest, Irrigation Supervisor (left) with the Arboretum and Public Garden irrigation team Abel Figueroa, Keith Tipton, Jeff Farnham and Rick Bonin.

HOW LOW CAN THEY GO? UC Davis Arboretum and Public Garden team takes water conservation to new lows!

http://publicgarden.ucdavis.edu/blog/how-low-can-they-go
Category: Environmental Stewardship

Key Principle → Establish environmental policies and evaluation processes

Best Practice → Implement an integrated pest management (IPM) program

Rationale:

Developing and implementing an IPM program that takes a holistic approach to pest management using economic and environmentally responsive methods along with total plant health care monitoring procedures should be viewed as a stewardship necessity for grounds managers.

Example:
WMU IPM Plan

Western Michigan University

IPM Plan

Western Michigan University
Don Penskar, Director of Logistical Services
269-387-8804 Phone
269-387-8824 Fax
Western Michigan University
1903 West Michigan Avenue, MS 5324
Kalamazoo, Michigan

Introduction
Pests are populations of living organism (animals, plants, or microorganism) that interfere with use of campus facilities for human purposes.

Integrated Pest Management (IPM) is an approach that establishes a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks.

The IPMP will encompass all aspects of pest management in and around University buildings as well as grounds and agricultural areas. Building plans are grouped together because of building use, structural design, and similar operational environments and procedures. Many buildings within the University may have situations or control measures which are specific only to those buildings. When this is encountered during an inspection and a treatment needs to be made, it will be annotated on the appropriate inspection and application logs. When a service call is received, an inspection of the area as well as positive pest identification is undertaken. At this time, all applicable IPM methods are evaluated and appropriate treatments are made only when necessary.

Objectives of this IPM plan include:
- Elimination of significant threats caused by pests to the health and safety of students, staff and the public.
- Prevention of loss or damage to structures or property by pests.
- Protection of environmental quality inside and outside buildings.
- Erosion and sedimentation control for ongoing landscape operations and future construction activity.
- Diversion of landscape waste from the waste stream via mulching, composting and other low impact means.

This IPM plan will be stored in the office of the Landscape Management.

IPMP Coordination
Timothy Holysz, Director of Landscape Management will be Western Michigan IPM Coordinator and be responsible to implement the IPM plan and to coordinate pest management-related communications between WMU, Rose Pest Solutions, staff, students and visitors.
Key Principle → Use renewable and sustainable resources

Best Practice → Evaluating the use of alternative fuels and vehicles within maintenance operation

Rationale:

The organization should be committed to exploring all opportunities within its fleet and equipment operations that will contribute to the reduction of the organization’s carbon footprint.
Example:

Michigan State University Grounds Shop
Economic Performance

Key Principle → Eliminate or reduce the use of resources that are difficult or impossible to renew

Best Practice → Resource conservation plans have been developed

Rationale:

Projects and plans specific to the grounds operations should be developed with the primary goal of saving water, minimizing land degradation, reducing chemical use and labor cost.

Example:
Category: Economic Performance

Key Principle → Investigate the use of advanced and emerging technologies

Best Practice → Utilizing remote site monitoring systems

Rationale:

Database systems utilizing iPads in the field to record and update maintenance records for tree inventories and for trouble-shooting while checking irrigation systems and other landscape maintenance activities will save time and help with making accurate data driven decisions.

Example:
Central Control Irrigation
- UNL Landscape Services is in the process of implementing central control for the campus irrigation system
- Study team determined that there would be an anticipated initial reduced water use of 20% as well as a reduced labor cost that would equal a savings of approximately $78,500/year
- Payback on the University’s investment in the system is estimated at 10 years
- Project budget is $742,000 for a 30-36 month long project
- Each system update is reviewed for other improvements that can be made to increase efficiencies
- Phase 1 was completed in March 2016 with 33 controllers
- Phase 2 is anticipated to be completed in December 2016 with approx. 50 controllers
- Phase 3 will be completed in 2017
Category: Social Responsibility

Key Principle → Natural processes and human activities co-exist

Best Practice → Incorporating events management plan with grounds maintenance strategies

Rationale:

Collaboration with organizers of grounds events on timing and location that offers the least negative impact on the maintenance of green and open spaces contributes to the sustainability of the landscape.

Example:
Physical Plant's Role for Outdoor Events

Physical Plant oversees the use of land for outdoor events. A student or academic group wanting to host an event outdoors on campus coordinates with Physical Plant.

Second, Readiness:
Your event area will be readied for you: clean and tidy, with whatever you’ve requested in place.

Third, Preventive Measures:
The university is shared by all of us. At all times, be mindful.

Fourth: Permits & Approvals.
We assist with multiple permits (Dig Safe, tent, building) and will coordinate approvals (parking, athletics, etc.) or refer you to the appropriate department.
Category: Social Responsibility

Key Principle → Involve stakeholders to define and link long-term maintenance strategies

Best Practice → Identifying and meeting regularly with stakeholders to inform and educate

Rationale:

Identifying all stakeholders, i.e. students, faculty, staff, employees, visitors, etc. and determining ways to survey and obtain engagement on different levels will provide valuable feedback on the organization’s total performance.

Example:
It is a portal for engagement that will help sustain the university into the future...

As much as our medical center, museums, performing arts centers, and athletic events cut across multiple audiences and gain long-term support from a variety of people, the UC Davis GATEways Project is a portal for engagement that will set our university apart from ALL others and help sustain it into the future. It is the primary opportunity we have to co-create our environment with campus-wide, multi-disciplinary, cross-generational participants.

The UC Davis GATEways Project strengthens and builds upon the best of what UC Davis has to offer as a place—growing ways that people can connect to the physical place as well as support and engage in our academic mission, providing a welcome environment to visitors, reinforcing our college town atmosphere, supporting our cooperative ties with the community, as well as developing our connection to the region and beyond.
Category: Social Responsibility

Key Principle → Workplace environment is responsive to employee’s health, safety and welfare needs.

Best Practice → Conducting regular safe work training sessions

Rationale:

Methods and measures to monitor employees’ compliance in the field to all safety standards and to encourage the reporting of any safety concerns should be mandatory.

Example:
Grounds staffer Nelson Randolph wins Safety Star Award
Implementing and Maintaining Grounds Management Best Practices

With best practices identified and the accompanying action steps being implemented as determined to bring about compliance, the process is still less than complete when modeling an EMS concept. For the on-site evaluation phase of the PGMS accreditation program, the highest rating for an applicant’s response to a best practice is identified as being, “in place, monitored and reviewed”. This implies that for the organization to be in total conformity, they should have clear procedures to verify and qualitatively and quantitatively display the effectiveness of the action steps. A monitoring and reviewing component is important and must meet at least the following requirements:

- Documented procedures for regularly monitoring and measuring the action steps of the facility operations and activities that significantly impact the best practices
- Documented procedures for tracking and recording information on the performance and progress of action steps towards meeting the intentions of the best practice
- Documented procedures for periodically reviewing and evaluating the organization’s compliance with the best practices

Ultimately, the overall effectiveness and appropriateness of the best practices to an organization’s mission and purpose will be determined by top management. Proper and well documented data on the various best practices should be available for management review so
that their performance and adequacy can show to be beneficial and rightly responsive to both internal and external conditions.

Picture Gallery of Best Practices
Landscape installation with sustainable theme.
Green roof top garden.
Stormwater management streetscape installation
Natural resource conservation project
Stream bank restoration.
Displaying the company values.
Utilizing educational signage.
Community engagement project.
Grounds management best practices documentation.
Bioswale limiting stormwater runoff.
Xeriscape does not mean cactus and gravel. There are perfect plants for low, wet areas too.

Informational signage for special landscape sites.
Interactive and educational landscape space.
**LANDSCAPE MASTER PLAN AND DESIGN GUIDELINES**

**Quadrangles/Legacy Plaza**
- *Invest in the civic realm*
- *Create places for people*
- *Sustainable landscape*
Cultural and historically significant site.
Landscape retrofit project.
Maximizing the user experience.
Creek bank treatment on commercial site.
Partnership project.
Conclusion

The interpretation and development of grounds management best practices as presented in this publication were generated in response to current day demands and expectations of organizations that have a grounds component. Being able to prove and systematically show that an organization is meeting its responsibilities in the most accountable and sustainable manner is critical in today's business climate. The search for and implementation of effective best practices are being vigorously pursued by organizations to add value to the services that they are providing to customers and stakeholders.

Integrating grounds management best practices in the PGMS accreditation program offers grounds organizations with an external source process that captures input from professional grounds managers across the United States. The program not only embodies institutional best practices, it is also inclusive of insightful benchmarking and has a peer review element that is site and organization specific.

Over time and as the management of grounds continues to evolve, the need for reassessing the benefits and effectiveness of the current best practices will be warranted. The data, research and analysis made available and retained by the LMOA program will position the PGMS to be that continuous improvement vessel for grounds management best practices.