

Park, Golf Course and Other Large Landscape Design and Management

Description

Large landscaped areas such as parks and golf courses should be well designed and properly managed to be an aesthetically-pleasing environmental amenity and to minimize runoff to waterbodies.

This BMP is based primarily on “Guidelines for Water Quality Enhancement at Golf Courses Through the Use of Best Management Practices” (Wright Water Engineers and Denver Regional Council of Governments 1996).

BMP Type			
Design			X
Installation			X
Maintenance/Operations			X
Green Industry Relevance			
ASLA	X	GCC	
ALCC	X	ISA	X
CALCP	X	RMSGGA	X
CGGA		WFC	
CNA			

Basic Practice Guidelines

The basic practice guidelines for large landscapes are categorized into the design, construction and maintenance phases.

Design

1. A pre-design natural resources inventory and evaluation should provide the basis for subsequent planning and design, to avoid impacts to natural resources. It is essential to include appropriate parties such as the engineer, the landscape contractor and the golf course superintendent or park manager. A full range of issues should be considered such as aquatic life, terrestrial life, riparian corridors, wetlands, open space, native and endangered species, hydrology and drainage, soils, stream standards, irrigation, stormwater, groundwater, water rights, water sources, geology, geomorphology, topography, etc.
2. Identify applicable pollutant source controls early in the design stage by taking a “management unit” approach consistent with the principles of Integrated Pest Management (IPM). Think about maintenance issues up-front as part of the design process.
3. When designing overall site drainage, use “natural” drainage practices when possible such as:
 - Preserving or enhancing natural drainages, wetlands and ponds, etc.
 - Maintaining wide, undisturbed riparian (stream) corridors.
 - Avoiding flow concentration on site and to adjacent hydrologically connected areas.
 - Site-grading to maximize infiltration in the large available pervious areas.
 - Reverse-grading in localized areas to limit direct discharges into wetlands and streams where necessary.

4. Large landscaped areas may require implementation of engineered stormwater retention facilities such as retention ponds (wet ponds) and detention basins (dry ponds). Such features should be designed in accordance with local drainage criteria regulations.
5. Utilize “edge treatments” or buffer zones of natural vegetation along ponds, waterways and riparian corridors to provide water quality protection and stormwater management benefits.
6. Uniform, dense grass buffer strips and grass-lined swales can be designed for sheet-flow conditions to treat return flows or natural runoff, improve water quality and limit the quantity of runoff, and to help protect wetland and sensitive areas from fertilizer and pesticide contamination. These features should be designed so that water does not “pond” for more than two days.
7. Structural BMPs that control runoff velocities may be required in drainages at the boundaries of golf courses or within drainages on the course. Examples include drop structures and other energy dissipaters. These BMPs help to control erosion and water quality problems associated with sediment loading.
8. Stream crossings should be minimized and, where necessary, should be designed with minimal impact. Always consult with the U.S. Army Corps of Engineers and obtain required permits when altering streams and wetlands.
9. Man-made wetlands can be incorporated into site designs to enhance water quality where soil and hydrologic conditions are appropriate.
10. Large landscape design should be based on advanced irrigation design principles. Water application rates should correspond to consumptive use requirements. Return flow reuse, stormwater reuse and use of treated wastewater effluent for irrigation should be used when environmentally, legally (e.g., water rights) and agronomically feasible. Recycled water must meet all applicable standards and not pose a health risk in accordance with Colorado Department of Public Health and Environment Water Quality Control Commission *Regulation No. 84: Reclaimed Domestic Wastewater Control Regulation*.

Construction

11. Minimize exposure of large areas to wind and water erosion by developing a grading plan that minimizes the total acres graded and left exposed without a surface protection strategy. Proper scheduling and timing are essential.
12. Minimize disturbance of areas designated for native species. Replacement of native species is more difficult and costly than species protection. Protected habitats should be isolated during construction by a barrier system (e.g., fence).
13. Seed mixes used during erosion control and stabilization during construction should be compatible with the final seeding selection for the landscape.

14. Topsoil removed during construction should be carefully stored and treated as an important resource. Berms should be placed around topsoil stockpiles to prevent runoff during storm events.
15. Appropriate sediment control measures should be implemented to minimize off-site transport of pollutants. *(See Appendix A for more information.)*

Maintenance

16. IPM should be implemented. This includes measures such as “prescriptive” pest control on a “management unit” basis; use of pest-resistant turfgrass and other plant cultivars; establishing populations of natural pest enemies; maintaining balanced turfgrass ecosystems; use of competitive species that put weeds and pests at a disadvantage; use of traps and attractants; and careful irrigation and fertilization.
17. Proper irrigation is a key component of an IPM system. Irrigation system design should consider the water resource, need for reuse, drainage requirements and water quality issues.
18. Proper fertilization is a key component of IPM. Fertilizer for each management unit should be based on soil or vegetation tests. Over-application of fertilizers can contaminate surface runoff and groundwater.
19. Landscaping and vegetative practices can reduce stormwater runoff rates and volumes, sediment loads and pollutants. A landscape and vegetation management plan should be established as part of the IPM plan.
20. A turf management plan that considers irrigation, fertilization, IPM and environmental constraints is vital to evaluate ongoing maintenance and operation.
21. Ponds and lakes require special attention to limit eutrophication. For example, runoff from fertilized areas should be controlled and in-lake management techniques such as aeration or maintaining flow-through conditions may also be required.
22. Proper storage and handling of pesticides, fertilizers, fuel and other maintenance chemicals is necessary to minimize pollutant loading. Be aware of regulatory requirements such as Community-Right-to-Know requirements, Material Safety Data Sheets (MSDS) and Spill Prevention Control and Countermeasures (SPCC) Plans for maintenance facilities.
23. Monitoring is useful to identify strengths and weaknesses of existing golf course management. Results should be used to revise management strategies.
24. Record keeping is important to document changes in turf quality, pest levels and water quality. A computerized database or spreadsheet is recommended.
25. Consult with state and local wildlife and water quality authorities on strategies for controlling water-quality impacts (e.g., fecal coliform) of high-density geese populations and burrowing animals that can damage drainage structures.

26. The best-designed BMPs will fail without regular maintenance including regular monitoring, repairs and other adjustments.

Regional or Industry Considerations/Adaptations

1. Some local governments may have landscape and stormwater control ordinances in place with specific requirements that must be followed.

Key References

Associated Landscape Contractors of America. 2003. *Landscape Installation Training*. Herndon, VA: ALCA.

Associated Landscape Contractors of America. 2003. *Landscape Irrigation Training*. Herndon, VA: ALCA.

Associated Landscape Contractors of America. 2003. *Landscape Maintenance Training*. Herndon, VA: ALCA.

Balogh, J.C. and W.J. Walker. 1992. *Golf Course Management & Construction: Environmental Issues*. Boca Raton, FL: Lewis Publishers.

Beer, A.R. 1990. *Environmental Planning for Site Development*. London: E & F N Spon.

Center for Resource Management. 1996. *Golf and the Environment: Environmental Principles for Golf Courses in the United States*. Salt Lake City, UT: The Center for Resource Management.

City and County of Denver. 2000. *Denver Landscape Design and Maintenance Guidelines for Water Conservation on City Owned and Operated Properties*. Denver, CO: City.

City of Colorado Springs City Planning. 1998. *Landscape Code and Policy Manual*. Colorado Springs, CO: City.

Colorado Department of Public Health and Environment Water Quality Control Commission, 2000. *Reclaimed Domestic Wastewater Control Regulation, Regulation 84*. Denver, CO: CWQCC.

Molnar D.J. and A.J. Rutledge. 1992. *Anatomy of a Park: The Essentials of Recreation Area Planning and Design*. Prospect Heights, IL: Waveland Press.

Porterfield, G.A. and K.B. Hall Jr. 1994. *A Concise Guide to Community Planning*. New York: McGraw-Hill.

Schumann, G.L., P.J. Vittum, M.L. Elliott and P.P. Cobb. 1997. *IPM Handbook for Golf Courses*. Ann Arbor, MI: Ann Arbor Press.

Urban Drainage and Flood Control District. 1999. *Urban Storm Drainage Criteria Manual, Volume 3, Stormwater Best Management Practices*. Denver, CO: UDFCD.

Wright Water Engineers and Denver Regional Council of Governments. 1996. *Guidelines for Water Quality Enhancement at Golf Courses Through the Use of Best Management Practices*. Denver, CO: DRCOG.