5.4 Park Conservation

Applicability

This BMP is intended for all Municipal Water User Groups ("utility") which manage parks or serve customers with parks which consume water. These include facilities such as irrigated parks, recreation centers, fountains or pools at which the visible use of water often comes under scrutiny by the public and water resource managers both because of large water demand to maintain a park and because of the perception that the water use may be excessive.

The specific measures listed as part of this BMP can be implemented individually or as a group. Utilities may already be implementing one or more these elements and they may want to adopt additional elements outlined in this document. Once a utility decides to adopt this BMP, the utility should follow the BMP closely in order to achieve the maximum water efficiency benefit from this BMP.

Description

Park irrigation conservation practices as well as the careful use of water in operation and maintenance of park facilities can effectively reduce water demands. Under this BMP, the utility requires the management of each park with an irrigation system to develop a conservation plan that includes the elements described in this section. A Municipal Park Department should develop comprehensive written water conservation policies and procedures that cover all irrigated parks under its jurisdiction. Maintenance and operations of park facilities such as pools are also addressed. All park facilities should be metered and water use billed as means of reinforcing the importance of water use efficiency to park management.

Under the plan the park manager implements a watering regimen that uses only the amounts of water necessary to maintain the viability of the turf and landscape material appropriate for the use of the park. Water should only be applied to areas that are essential to the use of the park. For parks with athletic fields, the fields should be irrigated in accordance with the guidelines of the Athletics Fields BMP. Utilities should consider methods to encourage park managers to cease irrigation of areas that do not affect the use of the park by the public.

The utility should coordinate with Park Department or customer staff to ensure implementation of a large landscape water-use survey of irrigated areas and develop reference evapotranspiration ("ETo")-based water-use budgets equal to no more than 80 percent ETo per square foot of landscape area. The landscape survey should include the following elements: measurement of landscape area; measurement of total irrigable area; irrigation system checks and distribution uniformity analysis; and review or development of irrigation schedules. Alternatively, the utility may allow individual customers to perform their own surveys with properly trained staff or consultants and provide documentation of the survey to the utility.

The statewide Texas Evapotranspiration Network (http://texaset.tamu.edu/) should be consulted for historical evapotranspiration data, historical precipitation, and methodology for calculating reference evapotranspiration and allowable stress. Communities located in the North Plains areas may find local historical data on potential evapotranspiration at http://amarillo2.tamu.edu/nppet/whatpet.htm

At a minimum, compliance with this BMP should require the replacement of all manually controlled or quick couple irrigation systems with automatic irrigation systems and controllers. The automatic controllers must be capable of shutting off flow when a sudden pressure loss occurs from a broken system. It is important that access to such controllers be limited to the authorized landscape manager, or be designed to shut off flow automatically if the irrigation system is activated manually. The authorized landscape manager should be trained in good soil management and cultural practices such as proper aeration, nutrient management, mowing and soil testing as well as in irrigation management.

When cost-effective, the park irrigation user should be required to provide methods for achieving enhanced water conservation through computer controlled irrigation systems ("CCIS") or similar technology. In order to achieve maximum efficiency a CCIS should include at least the following components: computer controller (digital operating system), software, interface modules, satellite field controller, soil moisture sensors, and weather station. A CCIS should be designed so as to prevent overwatering, flooding, pooling, evaporation, and run-off of water, and should prevent sprinkler heads from applying water at an intake rate exceeding the soil holding capacity. Park organizations with a number of remotely located park irrigation systems should consider a CCIS with satellite systems. The utility may choose to offer incentives for park irrigation management in direct relation to the size and sophistication of the system.

The utility implementing this BMP should consider offering training for park irrigation management or co-sponsoring training with qualified horticulture or park management programs. Documentation of cultural practices and soil management measures should be included in a successful program.

Water wasting practices during park irrigation should be eliminated, including water running in gutter, irrigation heads or sprinklers spraying directly on paved surfaces, operation of automatic irrigation systems without a functioning rain shut off device, operation of an irrigation system with misting or broken heads, and irrigation during summer months between the hours of at least 10 a.m. and 6 p.m.

Use of reclaimed, reused, and/or recycled water for park irrigation offers excellent opportunities for conservation of potable water. However, specific uses must meet Texas Commission on Environmental Quality ("TCEQ") water quality standards for reclaimed water and human contact and must be appropriate for the specific use of the park. Reclaimed water should be applied based on the appropriate water budget.

1) Park Facilities

Playground equipment and facilities such as recreational facilities, tennis courts, basketball courts, and park and pool buildings should be swept for regular sanitary purposes and only cleaned with the amounts of water needed for human health and safety purposes. Showerheads, faucets and toilets in park facilities should be retrofitted with efficient fixtures.

All public swimming pools should be equipped with recirculation and chlorination equipment. While not common, there are pools that are filled and drained everyday with potable water and that practice should be discontinued. Overflow drains should be plumbed back into the recirculation system. Swimming pools should be managed to minimize operational losses due to evaporation, splashing and filter backwashing. Proper design, optimal backwash scheduling, and use of a pool cover can help limit all these losses. Regular maintenance during the off-season should include testing for water loss and repair of leaks. Use of pool covers is also an important consideration for reducing water losses due to evaporation, although safety concerns where pools are accessible after hours require careful implementation.

Decorative water features at parks including fountains and augmented streams should use recirculation systems. During high temperature seasons reduced operating procedures and use of covers can reduce evaporation losses. Reuse of non-potable water such as reclaimed water should also be considered where available. Rainwater harvesting is also an option for many park facilities with large roof areas.

2) Botanical Gardens

Botanical Gardens or other related areas in parks are usually run by staff trained in proper water management techniques to meet plant needs. However, water saving opportunities should be explored in leak detection and repair, installation of low-water-use demonstration gardens, and the use of rainwater harvesting or alternative water supplies as conservation techniques. The planting and maintenance of low-water-use demonstration gardens can assist the utility in the implementation of the WaterWise Landscaping, School Education, and Public Information BMPs.

Soil improvement is an effective method for reducing irrigation water usage while maintaining healthy soils. Soil improvement programs on high visibility areas such as public parks can demonstrate to the public the effectiveness of this method. For parks, compost applications of 1/4 to 1/2 inch annually on turf areas and one inch annually on flower beds are recommended. Compost is most beneficial when applied in the fall.

Implementation

Prior to development of a specific park conservation plan, the utility should consider a series of planning meetings with park irrigation personnel and management to discuss water

conservation issues and to prepare an adequate scope of action for the plan. Additionally, a number of voluntary environmental management programs exist in which park irrigation staff could participate. There are two approaches to be considered for implementing the park irrigation conservation plan: an incentive or voluntary approach and an ordinance or other enforceable requirement approach.

1) Incentive or Voluntary Compliance Approach

The utility may provide staff or contract with a third party to develop the conservation plan, including a water audit of the park irrigation system and practices. The water-use survey, at a minimum, includes measurement of the irrigated turf areas; determination if hydrozones within the irrigation system are proper for the type of turf present; irrigation system checks and distribution uniformity analysis; review of irrigation schedules or development of schedules as appropriate; and provision of a customer survey report and information packet.

If indicated by survey results and if cost-effective, the utility may offer incentives to the park irrigation user for upgrading irrigation systems, installing or upgrading controllers, changing hydrozones to eliminate irrigation of areas that do not receive high foot traffic, or for reducing the amounts of potable water used.

When cost-effective, the utility should offer workshops by trained professionals on pesticide, soil and nutrient management for optimal water use efficiency. An advantage to using third parties is that assistance in implementation can be provided at minimal cost to the utility.

To ensure that water savings goals are met, the utility should be explicit about the efficiency expectations of any voluntary or incentive programs. Park facilities and operations other than irrigation systems should also be included in the incentive or voluntary compliance approach.

2) Ordinance or Enforceable Requirements Approach

For utilities with ordinance or rule making powers:
In the first twelve (12) months: Plan, develop, and pass an ordinance that requires development and implementation of the conservation plan, including stakeholder meetings as needed. Develop a plan for educating customers, especially those directly affected by the requirements of the ordinance. Plan customer follow-up compliance and education after ordinance passage. Implement ordinance and tracking plan for violations, compliance notifications, and enforcement.

After ordinance passage (in the 2nd year and on): Continue implementation and outreach program for customers. Continue compliance education and initiate

enforcement programs. Enforcement can include citations with fines and service interruption for repeat offenders.

For utilities that lack ordinance or rule making powers:
In the first twelve (12) months: Plan a program including stakeholder meetings as needed. Develop a plan for educating customers, especially those directly affected, about the requirements of park irrigation conservation plans. Develop follow-up compliance and education program. Implement water conservation program and tracking plan for violations and compliance notifications. Consider passing excess-use rates as a disincentive to park irrigation operations that do not stay within a budgeted amount of water (See Conservation Pricing BMP).

Schedule

To accomplish this BMP, the water user should do the following:

1) The utility with ordinance or rule making powers should adopt an incentive program or an ordinance or rules within twelve (12) months of commencing this BMP.
2) The utility with ordinance or rule making powers should implement the incentive plan or commence enforcement upon adoption of the ordinance or rule.

Scope

To accomplish this BMP, the utility should adopt park irrigation conservation policies, programs or ordinances consistent with the provisions for this BMP specified in Section C.

Documentation

To track the progress of this BMP, the utility should gather and have available the following documentation:

1) Copy of incentive plan or park irrigation conservation ordinances or rules enacted in the service area;
2) Metered water readings before and after any changes are implemented.
3) Copy of compliance or enforcement procedures implemented by utility, if applicable;
4) Survey of public swimming pools and actions taken to increase the efficiency of the pools.
5) Records of enforcement actions including public complaints of violations and utility responses, if applicable;
6) Where incentives are used, the number of park facilities completing the incentive plan;
7) Changes to irrigation systems, retrofits, or upgrades, regular leak detection and maintenance policies, and estimated water savings from conservation practices.
8) Water savings attributable to changes implemented; and

9) Costs of incentive plan(s) or ordinance if applicable.

Determination of Water Savings

Estimating total water savings for this BMP may be difficult; however, water savings can be estimated from each water-wasting measure eliminated through the actions taken under this BMP. For the replacement of inefficient equipment, the water savings are the difference in use between the new or upgraded equipment and the inefficient equipment. For landscape water waste, the savings can be calculated based on estimated savings from each water waste incident. For an irrigation survey, water savings can be expected in the range of 15 percent to 25 percent for park irrigation operations that do not yet have a CCIS and which choose to implement the efficiency measures recommended by the survey.

Switching to reuse or other nonpotable water or other alternatives can save up to 100 percent of the potable water supply used in irrigation. The savings are determined by comparing water use before and after the conversion to the new water supply. The savings for swimming pools that have been modified or repaired can be measured in the same way.

Cost-Effectiveness Considerations

The labor costs for an irrigation survey of a park range from $250 to more than $1000 for an irrigation survey depending on the efficiency in scheduling the surveys, the size of the facility, and the scope of the survey. Surveys can be performed by utility staff or by contractors.

Marketing and outreach costs range from $5 to $15 per survey depending upon whether parks are owned by the same municipality as the utility. Administrative and overhead costs are in the range of 10 to 20 percent of labor costs. Costs for upgrades to irrigation systems and controllers can be much more extensive depending upon the scale of changes needed. While less expensive, costs for pool leakage repair and other water efficient equipment are also very site specific. Incentive programs for park conservation equipment upgrades or maintenance will need to evaluate costs on a case-by-case basis.

References for Additional Information

1) *Handbook of Water Use and Conservation*, Amy Vickers, Waterplow Press, May 2001.
2) *Maintaining Park Irrigation,* J. A. Murphy. http://www.rce.rutgers.edu/pubs/pdfs/fs105.pdf
3) *Managing Bermudagrass Turf: Selection, Construction, Cultural Practices, and Pest Management Strategies*, L. B. McCarty, Grady Miller, John Wiley & Sons, July 2002.
4) *Managing Healthy Sports Fields: A Guide to Using Organic Materials for Low-Maintenance and Chemical-Free Playing Fields*, by Paul D. Sachs, John Wiley & Sons, January 2004.

5) *Water Management Stretches Irrigation Water*, E. K. Chandler. http://www.txplant-soillab.com/page32.htm
6) *Park Irrigation and Water Conservation,* Texas Agricultural Extension Service. http://soilcrop.tamu.edu/publications/pubs/b6088.pdf
7) *Irrigation System Design and Management Courses*, Irrigation Technology Center, Texas A&M, http://irrigation.tamu.edu/courses.php