GOLF COURSES AND STORMWATER MANAGEMENT

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GOLF COURSES IN THE WAC 4 STUDY AREA

Part or all of 12 golf courses exist in the WAC 4 study area. These golf course are Hickory Pine at Purchase Golf Club, Old Oaks Country Club, Brae Burn Country Club, and Century Country Club in Harrison; Ridgeway Country Club, Westchester Hills Golf Club, and Maple Moor Golf Course in White Plains; Fenway Golf Club, Quaker Ridge Golf Club, and Saxon Woods County Park and Golf Course in Scarsdale; Winged Foot Country Club and Bonnie Briar Country Club in Mamaroneck Town. The size of these properties totals 2,147 acres. Most of this acreage is devoted to golf, but a portion it used for passive recreation and other uses (e.g., a sizeable portion of Saxon Woods County Park and Golf Course is woodlands and a large swimming pool and parking lot).

A major environmental concern of these and all golf courses is the degradation of water quality as a result of the use of high rates of fertilizers, pesticides and fungicides on the managed turf that makes up the courses. The use of these chemicals is often shown to be incompatible with management strategies for both ground and surface waters. Other concerns are the loss of riparian vegetation needed to filter pollutants, stabilize stream banks, shade stream channels, and provide shelter for wildlife which may use streams as migratory corridors.

Some studies have shown that golf courses are not major sources of pollution from nitrates and phosphate. A study at Pennsylvania State University, for example, concluded that managed turf grasses do not display a high potential for movement of pesticides and fertilizers by stormwater runoff or percolation. However, some of these studies compared golf courses to agricultural uses, concluding only that surface runoff, sediment loss and total nitrogen and phosphate movement were significantly lower for golf courses than for agricultural activities, which are traditionally the most significant source of nonpoint source pollution. Other studies confirmed that the application of best management practices, such as the use of slow-release fertilizers, will reduce the level of pollutants and nutrients in ground and surface waters.

Nevertheless, most golf courses require substantial land disturbance during construction and maintenance afterwards. Although many courses in Westchester County, including those operated by the County, have developed programs to minimize the application of chemicals and properly manage stormwater, environmental degradation as a result of golf course construction and maintenance is a very real concern. Therefore, it is important for golf course managers in the area to develop or improve their stormwater management and maintenance programs. Successful programs will result in better water quality not only for the tributaries which flow through or near golf courses, but also for the primary receiving water body - Long Island Sound.

WAC 4 recommends that, because they are publicly-owned, Saxon Woods County Park and Golf Course and Maple Moor Golf Course serve as models for water quality protection on golf

courses throughout the WAC 4 study area. State and federal funding, as well as other funding sources, should be sought to develop or improve and then implement environmentally-sound stormwater management and maintenance programs at these golf courses. In the meantime, the managers of privately-owned golf courses in the area should be asked to work with the committee, municipalities, County Soil and Water Conservation District, and other appropriate entities to develop and implement programs of their own. Once the County's golf course programs have been developed and implemented, the managers of privately-owned courses may use its programs for guidance - in effect, the County-owned golf courses will serve as outdoor classrooms or models for endeavors on privately-owned courses.

PRINCIPLES FOR PLANNING, SITING, DESIGNING, CONSTRUCTING, AND MANAGING GOLF COURSES

WAC 4 recommends that turf and stormwater management strategies be re-examined at the study area's eight existing golf courses, as well as any new golf courses in the future. Tees, greens, fairways and roughs should be maintained not only from a golfer's perspective but also from that of a natural resources steward. Golf course managers should anticipate potential impacts to natural resources as a result of golf course construction and maintenance before these impacts degrade water quality and other environmental features. This can best be achieved by first avoiding any impacts, then minimizing impacts that cannot reasonably be avoided, and finally mitigating any unavoidable impacts that have been fully minimized. For example, irrigation should be avoided to the fullest practicable extent to avoid hydrologic impacts to nearby water resources, particularly pollutant filtering wetlands. Because irrigation is needed to keep most golf courses "green" and is, in most cases, unavoidable, irrigation should be minimized by lessening the volume of water used for irrigation. This can be accomplished in a number of ways, such as restricting watering to times of the day and year when the effects of evapotranspiration and evaporation are lowest, planting turf grasses that are tolerant of drought, shrinking the size of managed fairways, and establishing proper drainage and soil conditions for optimum plant growth. Potential impacts may be mitigated by properly sited, designed, and constructed stormwater management systems, such as infiltration basins and trenches, porous pavement and grassed swales.

The following recommendations should be applied to any new golf course construction as well as alterations to existing golf courses in the WAC 4 study area:

Planning and Siting

1. Developers, designers and others involved in golf course development should work closely with local community groups and regulatory/permitting bodies during planning and siting and throughout the development process.

2. Site selection is a critical determinant of the environmental impact of golf courses. A thorough analysis of the site or sites under consideration should be completed to evaluate environmental suitability. Both the designer and a team of qualified golf and environmental professionals should be involved in this process.

3. Based on the site analysis and/or regulatory review process, it may be determined that some sites are of such environmental value or sensitivity that they should be avoided. Other less environmentally sensitive or valuable sites may be more suitable or even improved by the development of a golf course if careful design and construction are used to avoid, minimize and mitigate environmental impacts.

4. There may be opportunities to restore or enhance environmentally sensitive areas through golf course development by establishing buffer zones or by setting unmaintained or low maintenance areas aside within the site.

5. Golf course development can be an excellent means of restoring or rehabilitating previously degraded sites (e.g., landfills, quarries and mines). Golf courses are also excellent treatment systems for effluent water and use of effluent irrigation is encouraged when it is available, economically feasible, and agronomically and environmentally acceptable.

Design

1. When designing a golf course, it is important to identify existing ecosystems. Utilizing what nature has provided is both environmentally and economically wise. A site analysis and feasibility study should be conducted by experienced professionals. The identification of environmentally sensitive areas and other natural resources is important so that a design can be achieved that carefully balances environmental factors, playability, and aesthetics.

2. Cooperative planning and informational sessions with community representatives, environmental groups and regulatory agencies should be part of the initial design phase. Early input from these groups is very important to the development and approval process. This dialogue and exchange of information should continue even after the course is completed.

3. Native and/or naturalized vegetation should be retained or replanted when appropriate in areas that are not in play. In play areas, designers should select grasses that are best adapted to the local environmental conditions to provide the necessary characteristics of playability yet permit the use of environmentally sustainable maintenance techniques.

4. Emphasis should be placed on the design of irrigation, drainage and retention systems that provide for efficient use of water and the protection of water quality. Drainage and stormwater retention systems should, when possible, be incorporated in the design as features of the course to help provide for both the short- and long-term irrigation needs of the maintained turf and unmaintained areas.

5. Water reuse for irrigation should be practiced when economically feasible and environmentally and agronomically acceptable. It is important that recycled water meets applicable health and environmental standards and that special consideration be given to water quality issues and adequate buffer zones. Water reuse may not be feasible on some sites that drain into high quality wetlands or sensitive surface waters. Suitable soils,

climatic conditions, groundwater hydrology, vegetative cover, adequate storage for treated effluent and other factors will all influence the feasibility of water reuse.

6. Buffer zones or other protective measures should be maintained and/or created, if appropriate, to protect high quality surface water resources or environmentally sensitive areas. The design and placement of buffer zones will vary based on the water quality classifications of the surface waters being incorporated into the course. Regulatory agencies and environmental groups can assist in the planning of buffer zones.

7. The course should be designed with sustainable maintenance in mind. The design should incorporate integrated plant management and resource conservation strategies that are environmentally responsible, efficient, and cost-effective. Integrated plant management includes Integrated Pest Management (IPM) and emphasizes plant nutrition and overall plant health.

8. The course design should enhance and protect special environmental resource areas and improve or revive previously degraded areas, if any, within the site through the use of plants that are well adapted to the region.

Construction

1. Best management practices for construction include the following:

    a. use only qualified contractors who are experienced in the special requirements of golf course construction.
    b. develop and implement strategies to effectively control sediment, minimize the loss of topsoil, protect water resources, and reduce disruption to wildlife, plant species and designated environmental resource areas.
    c. schedule construction and turf establishment to allow for the most efficient progress of the work while optimizing environmental conservation and resource management.
    d. retain a qualified golf course superintendent/project manager early in the design and construction process(es) to integrate sustainable maintenance practices in the development, maintenance and operation of the course.

Maintenance

1. Plant protection and nutrition include the following:

    a. the principles of Integrated Pest Management (IPM) should be employed. IPM is a system that relies on a combination of common sense practices of preventing and controlling pests (e.g., weeds, diseases, insects) in which monitoring is utilized to identify pests, damage thresholds are considered, all possible management options are evaluated and selected controls) are implemented. IPM involves a series of steps in the decision-making process:

        - Through regular monitoring and record keeping, identify the pest problem,

analyze the conditions causing it, and determine the damage threshold level below which the pest can be tolerated.

- Devise ways to change conditions to prevent or discourage recurrence of the problem. Examples include: utilizing improved (e.g., drought resistant, pest resistant) turfgrass varieties, modifying microclimate conditions, or changing cultural practice management programs.

- If damage thresholds are met, select the combination of control strategies to suppress the pest populations with minimal environmental impact, to avoid surpassing threshold limits. Control measures include biological, cultural, physical, mechanical, and chemical methods. Biological control methods must be environmentally sound and should be properly screened and tested before implementation.

- Non-chemical control measures should focus on practices such as the introduction of natural pest enemies (e.g., parasites and predators). Utilizing syringing techniques, improving air movement, soil verification techniques, and mechanical traps. The selection of chemical control strategies should be utilized only when other strategies are inadequate.

b. When chemical and nutrient products need to be applied, the following practices should be used:

- Always read and follow label directions when using any plant protectant products. Strive to treat problems at the proper time and under the proper conditions to maximize effectiveness with minimal environmental impact. Spot treatments may provide early, effective control of problems before damage thresholds are reached.

- Store and handle all pest control and nutrient products in a manner that minimizes worker exposure and/or the potential for point and nonpoint source pollution. Employ proper chemical storage practices and use suitable personal protective equipment and handling techniques.

- Use nutrient products and practices that reduce the potential for contamination of ground and surface water. Strategies include: use of slow-release fertilizers, selected organic products, and/or soluble fertilizers applied during irrigation.

- Test and monitor soil conditions regularly and modify practices accordingly. Choose nutrient products and time applications to meet, not exceed, the needs of the turfgrass.

- All plant protectant products should only be applied by or under supervision of a trained, licensed applicator or as dictated by law.

- Maintain excellence in the continuing education of applicators (including state licensing, professional association training and IPM certification). Training for non-English speaking applicators should be provided in the worker's native language.

- Facilities should inform golfers and guests about golf course chemical applications. Common methods include permanent signs on the first and tenth tees and/or notices posted in golf shops and locker rooms.

c. To minimize water use, the following practices should be used:

- Use native, naturalized or specialized drought-tolerant plant materials wherever possible. For areas in play (greens, tees and fairways), use plant materials that are well-adapted to local environmental conditions and can be efficiently managed, as well as provide the desired playing characteristics.

- Plan irrigation patterns and/or program irrigation control systems to meet the needs of the plant materials in order to minimize overwatering. When feasible, use modern irrigation technologies that provide highly efficient water usage. Inspect systems regularly for leaks and monitor water usage.

- Water at appropriate times (usually during the morning) to minimize evaporation and reduce the potential for disease.

- Consider converting to effluent irrigation systems when available, economically feasible and agronomically and environmentally acceptable.

- Manage water use effectively to prevent unnecessary depletion of local water resources.

d. For waste management, the following practices should be used:

- Leave grass clippings and other organic materials in place whenever agronomically possible. If clippings are removed, compost and, if possible, recycle them.

- Dispose of chemicals in a manner that will not increase the potential for point or nonpoint source pollution. Methods include rinsate recycling or "spraying out" diluted compound in previously untreated areas.

- Dispose of chemical packaging according to label directions (e.g., triple rinsing, recycling or returning to manufacturer).

- Other waste products, such as used motor oil, electric batteries and unused solvents, should be recycled or disposed of according to the law and available community disposal techniques.

- Seek to reduce waste by purchasing products that minimize unnecessary packaging.

e. To manage wildlife, the following practices should be used:

- Habitat for wildlife species (e.g., bats, bluebirds, purple martins, etc.) that help control pests should be protected. Additional habitat for these beneficial species should be created whenever feasible and environmentally desirable.

- Manage habitat to maintain healthy populations of wildlife and aquatic species.

- Species, such as skunks, non-migratory Canada geese and deer, that become damaging should be managed through non-harmful means whenever possible. Non-harmful control methods could include dogs, noisemakers, repellents, and trapping and removal.

f. The operation of facilities (golf courses) should include the following practices:

- An environmental assessment to develop and implement an overall environmental policy and/or long-range plan that reflects or expands upon these principles.

- Ongoing records to measure and document progress toward environmental improvement.

- The environmentally responsible practices adopted for golf course maintenance should extend to all other areas of the facility, including those not directly related to golf, such as parking lots, maintenance and storage facilities, and unmanaged natural areas.

- Facilities should adopt practices and technologies that conserve natural resources, including water and energy.

- Facilities should develop and initiate comprehensive programs for reducing waste, including recycling and reusing.

- Facilities should properly store and dispose of solvents, cleaning materials, paints and other potentially hazardous substances.

- Facilities should take active steps to educate golfers, neighbors and the general public about their environmental policies and practices.

- Recycling Program