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GOLF COURSE WATER USE POLICY

Effective Date: June 8, 2000 **Policy #:** BRP/BWM/PeP-P00-5

Program Applicability: BRP/DWM/Watershed Permitting/Water Management Program

Supersedes Policy: None

Approved by: [SIGNED]
Arleen O'Donnell, Assistant Commissioner, Bureau of Resource Protection

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Purpose: The purpose of this policy is to articulate the position and approach DEP will take when evaluating the need for a Water Management Act (310 CMR 36:17) permit as it pertains to the construction, management and maintenance of both existing and proposed golf courses in Massachusetts.

Issue: Golf courses require large quantities of ground or surface water to maintain playing surfaces and managed turf areas. Actual irrigation needs can vary widely due to many factors including local climatic conditions, turf type, soil types, slope, ornamental irrigation, application of wetting agents and whether the course is proposed or newly constructed or has been in existence for more than two years. Frequently, course owners/operators develop their irrigation water supply from a variety of sources including groundwater, surface water, purchase, stormwater collection, or a combination of these.

Approach: DEP's approach to reviewing Water Management Act permit applications for golf courses, deciding whether an application and subsequent permit is necessary, or providing water use guidance to golf course construction or modification projects, is to use a researched, accepted water use planning volume believed to meet industry standards necessary for good turf and course management.

Authority: The basis and authority for this policy are contained in the Massachusetts Water Management Act, M.G.L. c. 21G, **(the "Act")** and the DEP regulations promulgated thereunder, at 310 CMR 36.00. Under section 7 of the Act, "no person may make a new withdrawal of more than the threshold volume of water from any water source, or construct any building or structure which may require that person to make such a new withdrawal of water unless such person obtains a (Water Management Act) permit in accordance with DEP's regulations". "Threshold volume" is defined in 310 CMR 36.03 to mean "an average daily volume of 100,000 gallons for any period of three consecutive months, from a total withdrawal of not less than 9 million gallons; or an average daily volume of 100,000 gallons for periods which exceed three consecutive months, calculated by dividing the total withdrawal by the period of operation."

Under section 14 of the Act and 310 CMR 36.43, DEP has the authority to issue such orders as are reasonably necessary to aid in the enforcement of the Act. The scope of DEP's enforcement authority includes requiring persons whom DEP has reasonably determined to be withdrawing in excess of the permit threshold or to have constructed any building or structure that requires such persons to make a withdrawal, to obtain a permit or otherwise demonstrate to DEP that no permit is required because the course uses, or will use, water withdrawal volumes less than the permitting threshold.

Research: DEP's research of typical golf course irrigation water use for turf maintenance included consultation with several golf course architects, both local and national, information from the National Fertilizer Institute and discussions with golf course irrigation specialists whose resumes included responsibility for irrigation systems on local and nationally known courses. In addition, in developing this policy DEP organized a Golf Course Technical Advisory Committee (TAC) comprised of DEP staff, environmental consultants who design courses, golf course industry representatives, and attorneys who represent golf courses and golf course developers. This TAC provided valuable review, comments, and recommendations for this policy.

DEP's research confirms that, for water use planning purposes, the irrigated turf should receive from 0.4 – 1.5 inches of water per acre per week during the peak three (3) month irrigation period. An application rate of 0.4 inches of water equals 10,861 gallons per week per acre; an application rate of 1.5 inches of water equals 40,728 gallons per week per acre, through the peak three (3) month irrigation period. The wide range in water use results from the previously noted variations in soil type, slope, vegetation, etc.

The irrigation levels were compared to documented metered water use on permitted courses in Massachusetts and were found to be comparable.

Evaluation Criteria & Procedure: To evaluate the need for a permit or compliance with the Water Management Act, DEP has chosen to use different application rates for existing and proposed courses. This decision is supported by DEP's research of standard industry practices for the irrigation of new and mature turf, and by the Golf Course Technical Advisory Committee. For planning purposes DEP recommends that golf course developers or those proposing to upgrade or modify an existing irrigation system evaluate their maximum water needs based upon their long term seasonal water needs and a 3 consecutive month peak irrigation season with drought conditions. DEP recognizes that the amount of irrigation will be dependent on weather conditions, particularly rainfall, and specifically that in a wet season, less irrigation will be needed than in a dry season. However, assessment of irrigation water needs during peak withdrawal season having less than normal precipitation is necessary to ensure compliance with the Act, since the Act's threshold is triggered any time that water use exceeds 9 million gallons in a 3 consecutive month period.

GENERAL EQUATION:

Acres (convert to square feet) x application rate in inches (convert to cubic feet) → convert to gallons

x 13 weeks = peak summer use (in gallons)

Conversion: 1 acre = 43,560 square feet 1 cubic foot = 7.48 gallons

In determining whether the combined water usage for golf course irrigation and other water use needs (including potable or ornamental irrigation) will trigger the Water Management Act permit threshold of 9 million gallons during any 3 consecutive month period, DEP will evaluate existing and proposed courses based upon the different irrigation and potable needs. To account for the impact of precipitation on water withdrawal volumes, DEP will evaluate withdrawal volumes based upon 5 inches of rain during the 13 week peak withdrawal period. Although this represents a significant reduction from the June – August statewide average of 11.02 inches of rainfall it has historically precedent in Massachusetts according to statistics provided by the Northeast Regional Climate Center.

For an existing course, where mature turf is established, DEP will assume that an application rate of 1.12" of water per week will be required over the total irrigated area. Using the application rate of 1.12" of water per acre per week and crediting a precipitation contribution of 0.38" per acre per week (equivalent of the 5" of rain during the 13 week peak cited above), this policy assumes an irrigation water application rate of 0.74" of water per acre per week, a system-supplied application rate of 20,093 gallons per acre per week and a 13 week period volume of 261,209 gallons per irrigated acre.

For a proposed course, a course where mature turf has yet to be established, or a course undergoing substantial turf area expansion or modification, an application rate of 1.50" of water per week will be required over the total irrigated area. Using the 1.50" per acre application rate and reducing it by the precipitation contribution of 0.38", this policy assumes an application rate of 1.12" of water per acre per week, a system application rate of 30,410 gallons per acre per week and a 13 week period volume of 395,330 gallons per acre.

When applying the method above with respect to the number of irrigated acres and the appropriate application rate, if the total volume exceeds the 9 million gallon threshold, DEP in accordance with this policy will presume that a Water Management Act permit is required. For example:

Example 1: Existing course with 35 irrigated *acres* of mature turf*).*

$$35\ acres \times 43{,}560\ sq.\ ft. \times \frac{0.74"}{week} \times \frac{1'}{12"} \times \frac{7.48\ gallons}{1\ cu.\ ft.} \times 13\ weeks = 9.14\ million\ gallons$$

Example 2: Proposed course with 23 irrigated acres .

$$23\ acres \times 43{,}560\ sq.\ ft. \times \frac{1.12"}{week} \times \frac{1'}{12"} \times \frac{7.48\ gallons}{1\ cu.\ ft.} \times 13\ weeks = 9.09\ million\ gallons$$

In either scenario a Water Management Act permit will be required by DEP since the 9.14 *million gallons and* 9.09 *million gallons both exceed the 9 million gallon threshold for the 3 consecutive month peak period.*

** For the purposes of estimating potential water needs on golf courses water from storage* has not *been included in the standard equation.*

More specifically, applying the above optimal irrigation volumes, DEP will presume that all existing courses irrigating **35** acres or more, or proposed courses irrigating **23** acres or more, will categorically exceed the Water Management Act permitting threshold value of 9 million gallons during their peak 3 consecutive month irrigation period. Thus, this presumption will be the basis for DEP's determination that the threshold volume has or will be exceeded and that the golf course must obtain a Water Management Act permit, unless the golf course demonstrates to DEP's satisfaction that actual water use at the golf course is, and will remain, below the permitting threshold.

DEP recognizes that the water volume assumptions used in this policy may in some cases be higher than what is actually used on some courses, especially those courses with established drought resistant turf and ideal conditions. For these reasons, the policy affords an opportunity for a golf course to rebut DEP's presumption that the irrigation exceeds the Water Management Act permit threshold. Conversely, these assumptions may not adequately address the total volume of water required for some golf courses due to variations in soil types, potable supply sources and needs, ornamental irrigation, slope, vegetation, and climatic conditions.

Acceptable methods of demonstrating that withdrawals are below the permitting threshold include actual metered withdrawal volumes (for existing courses only) from each withdrawal point, detailed water use logs estimating usage on the hours pumped (for existing courses only**)** for each withdrawal point, a detailed discussion and documentation of the irrigation system's inability to provide volumes in excess of the threshold volume, or other credible evidence sufficient to indicate that a volume of water below the applicable threshold will actually be withdrawn. Any showing to rebut DEP's water use presumption should include information on the pumping capacity of the water sources, usable storage in the system including size, capacity and depth of lined storage ponds, acreage irrigated, volumes necessary per acre, soils, slope and specific

information on the size and capacity of the irrigation system. DEP will consider "usable" storage available at the beginning of a peak withdrawal season. For the purposes of this policy, DEP considers "usable" storage to be the volume available to be withdrawn from a lined storage pond(s) with only 5" of precipitation during the 90 day peak (3 month) withdrawal season. DEP will assume that the entire capacity of the storage pond(s) may not reasonably be withdrawn without seriously impacting the operation of the turf irrigation system or the aesthetic quality of the golf course. Developers and/or designers need to discuss the resulting impacts of withdrawals from storage on the depth, slope and exposed banks of the storage ponds, and the impact of evaporation on storage volumes.

The policy is the basis for assessing whether an existing or proposed course triggers the Water Management Act permitting threshold based upon irrigated acreage. The policy does not address where additional volumes of water are withdrawn for the irrigation of ornamentals, practice facilities, or for other water supply purposes (e.g. clubhouse, banquet facilities, residential units, etc.) a permit may be necessary even where one of the above thresholds does not trigger the threshold. It will not be the basis for calculating the volume of water actually withdrawn, for which the permit must be obtained. Each Water Management Act permit applicant will be required to explain and justify in detail the requested demand volume. The Act requires that the course and resulting irrigation system be designed or redesigned to be as water efficient as possible. Best Management Practices such as the installation of tensiometers and automated sprinklers, low trajectory sprinkler systems, use of wetting agents, Integrated Pest Management (IPM) and Golf Course Management Plans will be required where feasible and appropriate. Applicants are required to assess their permitting needs based upon the drought situation defined previously in this policy of 5" of precipitation during the 90 day (3 month) peak withdrawal season.

Following permit issuance, DEP will evaluate several years of actual metered water use and may modify permitted withdrawal volumes downward to reflect actual usage after initial turf grow-in. Usage above the permitted volume that exceeds the Water Management Act threshold volume of 100,000 gallons per day will require the filing of a new permit application.

Please contact Duane LeVangie @ 617/292-5706 for further information.