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Turf and Landscape Irrigation Best Management Practices

Purpose

The purpose of this document is to present irrigation Best Management Practices (BMP's) for turf and landscapes. These BMP's are a supplement to the information found in the adopted Rules (minimum standards). They support the design, installation, maintenance and management of turf and landscape irrigation systems in ways that further save water and protect water quality and better serve the citizen's of North Carolina. These BMP's are recommendations, not rules. Contractors are asked to consider these recommendations in all phases of their work.

These BMP's are in no way intended to supersede the published rules governing irrigation contracting or any local or state laws or ordinances or any manufacturer's recommendations for installation and maintenance.

These BMPs will be reviewed, evaluated, and updated periodically by the board. All comments and suggestions are welcomed by the Board.

Turf and Landscape Irrigation Best Management Practice

A Best Management Practice is a recommended irrigation practice that is intended to reduce water usage and protect water quality. A BMP is economical, practical and sustainable, and maintains a healthy, functional landscape without exceeding the water requirements of the landscape.

IRRIGATION DESIGN

See section .0400 of the adopted rules for minimum standards for irrigation design.
All irrigation systems do not utilize all elements outlined herein. Consider only those items pertinent to the specific design. It is thoroughly acknowledged that each site poses its own set of conditions and constraints in regards to irrigation design and installation. The irrigation design must take these into account and the designer/installer must use their best judgment in applying these standards with the intent of compliance wherever possible and practical.

I. PLAN STANDARDS

Provide a plan to the following standards:

A. Graphic Standards

1. Accurately portray the site – show all pertinent site information
2. Legible

3. Reproducible
4. Drawn to scale
5. Contractor's seal
6. Contractor's/Designer's name/address/phone number
7. Client's name
8. Project name
9. Date of plan and all revisions

B. Plan Components

1. Site-specific Information
    a. North arrow
    b. Topography and/or key elevations where pertinent
    c. Scale
    d. Property lines and easements
    e. All constructed site elements
    f. Utilities
    g. Planting plan
    h. Existing trees – depict canopies to scale
2. Water Source Information
    a. Point of connection (i.e. well, pump, municipal system…)

    b. Type of connection (i.e. split tap water meter, stand alone water meter, well, pond, cistern…)Note: a split tap is created when an existing tap to a domestic meter is split to service a second meter for irrigation use.

3. Power Source Information and Location
4. Irrigation System Components (Note manufacturer/model number where allowable by law) – Show all pertinent items listed. Size items where appropriate
    a. Backflow prevention device
    b. Master valve
    c. Pressure regulation device
    e. Main line (dashed)
    f. Lateral lines (solid)
    g. Note pipe size and locations where pipe sizes change
    h. Control wire routing if not along the main line
    i. Isolation valve location
    j. Quick couplers, hydrants, or other points of connection
    k. Thrust blocking where appropriate
    l. Station/Zone valve location
    m. Sprinkler head locations
    n. Controller location(s)
    o. Controller sensors (i.e. rain switch, soil moisture sensors, flow sensors)
    p. Sleeves
    q. Special trenching areas (i.e. hand trench, direct bore)
    r. If the system has a two wire control system, decoder number and valve code and descriptions

5. Design Information

   a. Estimated GPM at POC
   b. Static pressure at POC
   c. Design criteria – pressure and volume
   d. Pipe type and sizing
   e. Backflow prevention device size and type of enclosure
   f. Control wire type and sizing
   g. Valve enclosure types and sizes
   h. Hydrozone information
   - Zone number and valve size
   - Estimated pressure
   - Estimated GPM
   - Estimated precipitation rate
   - Sprinkler type

   i. Special design considerations

6. Installation Information
   a. Construction details
   - Sprinkler/swing joint assembly
   - Backflow prevention device and enclosure
   - Sleeving
   - Isolation valves
   - Valve configuration
   - Thrust blocking on ring and gasket pipe
   - Grounding *(ground rod and ground plate location)*
   - Lightning Protection
   - Controller installation
   - Ditch cross section showing pipe and wire

   b. Construction notes
   c. Reference to locating and protecting underground utilities and improvements
   d. Specifications (if not presented elsewhere)
   e. Special construction techniques required

II. RECORD IRRIGATION DRAWING STANDARDS

See section .0300 of the adopted rules for minimum standards for record drawings.
Provide the plan to scale. Include locations and product information regarding the lateral piping, and sprinklers.

III. DESIGN STANDARDS
See section .0400 of the adopted rules for minimum standards for design standards.

A. To ensure that the irrigation system is designed to efficiently and uniformly distribute the water, to conserve and protect water resources, and to function well as a component of the overall landscape, the irrigation designer shall:

1. Provide a complete irrigation design package to the owner of the system, including to-scale drawings, details, and product data.
2. Piping. Apply the following BMP's of maximum safe flow rate for municipal water suppliers, with the lowest safe flow rate prevailing as the design guideline.

a. For mainlines over 2.5", utilize bell and gasket piping.

b. Include blocking details and locations when straight main line runs exceed 500 feet.

3. Always recommend the use of a reduced pressure zone backflow prevention device.
4. Consider the use of a solenoid-controlled master valve to prevent excessive water loss from a pipe burst or a defective solenoid.
5. When possible and available, specify a metering device that measures the total landscape water use separate from other use.
6. For zones with drip/micro-irrigation:

g. Use flush valves to flush the laterals after completion of the irrigation cycle.

7. Select components and design zones to achieve a minimum operational lower quarter distribution in the range of

a. Spray Lower Quarter DU 55%

b. Rotor Lower Quarter DU 70%

c. Drip/micro-irrigation Emission Uniformity 80%

8. In regions where a landscape water allowance applies, include an estimate of the future monthly landscape water allowance, based on historical reference ET, landscape area, and the landscape water adjustment factor provided by the purveyor or water provider.
9. Recommend the following water-conserving concepts and equipment where appropriate and economically justified:

a. Use an alternative non-potable water source (such as rain water) where practical and allowed by law. Special management practices and components may be required when using alternative water sources.

b. Install water-conserving devices such as:

- Freeze, and/or wind sensors to suspend irrigation during weather conditions that are unfavorable for irrigation.
- Environmental sensors that can actively measure weather conditions to determine daily plant water needs.
- Soil moisture sensors to monitor soil moisture and suspend irrigation if the moisture reserve in the root zone is significantly above the allowable depletion limit.

c. To simplify manual reading of the total landscape irrigation water use, a water meter with an electronic output signal that supports a remote display mounted at the controller.

d. For automated management of the landscape irrigation water use, a landscape irrigation meter with an electronic flow rate output signal that is compatible with the controller. This allows the controller to measure and control the amount of water use, as well as to indicate leaks (e.g., broken pipes or sprinklers).

e. For larger sites where a significant potential water savings may result, specify a controller that allows for flexible irrigation scheduling and advanced water management features. These features may include incorporating current (real time or daily) evapotranspiration (ET) data, water budgeting, and soil moisture monitoring.

f. Specify a separate common wire from the controller to each hydrozone station valve to allow for sensor-based control of each hydrozone.
g. Provide a high flow sensor to warn of pipe bursts or faulty valves.

IRRIGATION SYSTEM INSTALLATION

See section .0500 of the adopted rules for minimum standards for system installation.

Water Supply

1. Use a master valve on all systems with a pressurized water source to minimize water waste.

Trenching and Piping

1. If serious damage could result consider boring as a less invasive procedure.

Sprinklers:

1. It is best for the sprinklers to operate at the midrange of pressures listed in the manufacturer's literature.

Owner's Manual

1. It is recommended that the contractor perform a final "walk through" with the irrigation system's owner or the owner's representative to explain the operation of the system, show the working system and to have the owner or the owner's representative system accept the system.

IRRIGATION SYSTEM MANAGEMENT FOR WATER EFFICIENCY STANDARDS

See section .0600 of the adopted rules for system management.

Make written notes of repairs so that a history profile can be developed to prioritize future improvements to the system and provide copies to owners or owner representative.

Employ a certified landscape-irrigation auditor at least once every two years to conduct a thorough and comprehensive check for efficiency of water application.

Differences in the irrigation system's required design operating pressure and actual water pressure can affect efficiency. Install pressure reducing valves (PRVs) where needed, and pressure regulating control devices on individual sprinklers to stop misting due to excessive pressure. Verify that pressure regulators are adjusted for desired operating pressure.

Whenever possible, irrigation scheduling should incorporate the use of evapotranspiration data, or soil moisture measurements, coupled with rainfall data.