

## **IRRIGATION SYSTEM, SPRINKLER**

### **Design Survey**

The following information shall be obtained and recorded in the field notes:

- a. Water surface elevation or well elevation and depth to water at the inlet location.
- b. Survey elevations of the mainline and critical field elevations (Highest elevation and lowest elevation over which the sprinkler will traverse).
- c. Lengths of pipe required.
- d. Locate the edges of the field which will limit the area the sprinkler will cover.

### **Design Data**

The following shall be considered minimum in the design of all sprinkler irrigation systems. The information shall be recorded in the design notes.

- a. Determine the soil water holding capacity, water application rate, irrigation return interval, and water requirements for the acreage to be irrigated.
- b. Structural design computations.
- c. Area to be served.
- d. Hydraulic computations of the system including:
  1. System capacity.
  2. Pump and motor requirements (flow rate and total dynamic head).
  3. Main line sizing and pipe pressure requirements.
  4. Lateral line sizing, spacing and pressure requirements.
  5. Sprinkler nozzle sizing and spacing.
  6. Appurtenance selection and sizing (i.e. pressure and air relief valves, thrust blocks, etc.).

### **Drawings and Specifications**

The construction drawings shall include, but will not be limited to, the following:

- a. Location map with legal description and north arrow.
- b. Overall scaled plan view of entire system showing mainline stationing, etc. (This may serve as location map for (a) above).
- c. Size, type, and class of pipe required by reach for laterals (if needed).
- d. Nozzle spacing, size(s), pressure, and flow requirements (for all systems except center pivots). Center pivots nozzle packages vary by manufacturer. Therefore, pivot drawings must supply pivot dealers with system capacity (flow rate), highest and lowest elevations sprinkled, allowable water holding capacity, peak consumptive use rate (for the crop being irrigated), irrigation return period, and soil intake family for the limiting soil type in the field and required diameter of spray (if computed).
- e. Appurtenance sizes, types, and locations.
- f. Requirements for appurtenances (i.e. cracking pressure for PR valves, etc.).
- g. Structural details.

- h. Table of quantities.
- i. Construction notes.
- j. Engineering job classification is shown and proper engineering approval is obtained.
- k. Cooperator's signature of review and acceptance to construct the project according to the plans and specifications.

Practice specifications, along with applicable "Item of Work and Construction Details," shall be provided for each item or phase of construction.

### **Layout Survey Notes**

Layout survey notes will depend on the complexity of the system. Smaller systems involving no structures or buried pipe will require limited layout survey notes. On the more complex systems involving structures and buried pipe, the following layout survey notes shall be recorded in the field notes.

- a. Location and alignment stakes for irrigation water supply pipelines and pivot location for center pivots. Location and grade stakes for inlet structures and screening structures.
- b. Grade stakes with offset references stakes.

### **Compliance Checks**

The complexity of the installation will dictate the need for compliance checks during construction. All compliance checks shall be recorded in the field notes. Narratives of construction checks shall be recorded in the field office technical notes or on a sheet in the as-built field survey notes. Compliance checks shall include, but will not be limited to, the following.

- a. Profile of buried pipeline.
- b. Dimensions and elevations of structure(s).
- c. Lengths, diameters, class or type of pipe.
- d. Location, sizes, and types of appurtenances.
- e. Nozzle packages, verification of sizes and locations.
- f. Pump characteristics (horse power, pressure and flow rate).
- g. Statement of compliance signed by NRCS personnel with applicable job approval authority that the work meets the plans and specifications. (A NRCS employee, with proper job approval authority, shall certify on the as-built drawings whether the as-built practice does or does not meet the requirements of the standards and specifications).
- h. Changes in design are documented.

### **As-Built Plans**

As-built drawings shall be prepared for all permanently installed phases of the installation. These drawings shall reflect all significant changes in measurements, quantities, alignment, or material changes. If there were no significant changes, the original drawings shall be marked "As-Built".

**Operation and Maintenance Instructions.**

Operation and maintenance instructions shall be provided for all sprinkler systems. These instructions shall outline the designed application rate, time of application, irrigation return interval, number of laterals, maintenance requirements, and operation procedures required to avoid damaging the system. An irrigation water management plan shall be supplied with the system. Special operating and winterizing instructions shall be noted for all valves and pumping plants.

**Notes**

Note: Supplier or contractor designed installation will usually not have all the items listed above. Use the list to check the design and installation, making certain that the file contains an accurate location map and certification of any cost-shared quantities.

Note: For specific pumping plant and mainline pipe, refer to documentation requirements listed in WY-533, Pumping Plant for Water Control and WY-430 Irrigation Pipeline.