United States Department of Agriculture
Natural Resources Conservation Service

# STATEMENT OF WORK

# SPRINKLER SYSTEM (442)

**These deliverables apply to this individual practice. For other planned practice deliverables refer to those specific Statements of Work.**

## DESIGN

## Deliverables:

1. Design documentation that will demonstrate that the criteria in NRCS practice standard have been met and are compatible with other planned and applied practices.
    a. Practice purpose(s) as identified in the conservation plan
    b. List of required permits to be obtained by the client, along with other participant (client) responsibilities (Reference Form CO-ENG-13, Notification of Participant Responsibilities)
    c. Compliance with NRCS national and state utility safety policy (NEM Part 503-Safety, Subpart A - Engineering Activities Affecting Utilities 503.00 through 503.06)
    d. List of facilitating/component practices
    e. Practice standard criteria related computations and analyses to develop plans and specifications including but not limited to:
        i. System Capacity
        ii. Depth of Application, Rate, Frequency, Pressure, Uniformity and Runoff
        iii. Hydraulics
        iv. Filters and chemical injection
2. Other design information to be provided should include:
    a. Provide site specific design survey data, such as:
        i. Field elevations, as needed to identify the profile of main, sub-main & typical lateral lines; or the maximum rise and fall of the main line of moving systems. (USGS topographic map data may be used if the contour interval is < 10 feet)
        ii. Location of known utilities, and
        i. Location of field and property boundaries and any other site constraints associated with the project.
    b. Soils Investigation. When necessary, use on site observation to confirm assumptions made from soil survey reports, such as soil texture and depth, and to identify any features that may influence system design & operation.
    c. Provide well/pump performance data, as applicable.
    d. Obtain irrigation water quality test data where past history indicates water quality is a concern.
    d. Provide distribution system component design information, including:
        i. Design life expectancy (should be >15 years with proper maintenance),
        ii. System design capacity and rationale.
        iii. Hydraulic design requirements. (head loss, friction factors, coefficients, capacities, etc.).

iv. Evaluation of filtration needs.

v. A summary of system performance characteristics obtained from design data, simulation models, or field evaluation of as-built systems, including:

- Coefficient of Uniformity (CU) - shall conform to the minimum design values stated in Practice Standard 442, Sprinkler System.
- Pressure variation at the sprinkler heads; and
- Runoff.

vi. Adequate backflow prevention, chemical check valves, and other appurtenances as required.

vii. Electrical wiring, connections, and related components must comply with the National Electrical Code and applicable local codes.

viii. Chemical containment meets EPA and State requirements.

3. Written plans and specifications including sketches and drawings shall be provided to the client that adequately describes requirements to install the practice and obtain necessary permits. All applicable State and Federal (OSHA) safety requirements shall be addressed in the plans and specifications where appropriate.

   Construction drawings should include the following, as appropriate:

   a. Site Location Map.

   b. Plan views with Scale & Legend showing:

      i. Topography (USGS topographic map may be used if the contour interval is < 10 feet);

      ii. Major system component locations;

      iii. Approximate location of known utilities, (NOTE: UNCC notification statement should be placed on the cover sheet); and

      iv. Approximate Field boundaries & property lines.

   c. Include profiles of main supply line from water source, if part of the project.

   d. Include section views as needed.

   e. Include component details as needed.

   Construction specifications should include the following:

   a. Identify material requirements.

   b. State required installation method(s) and construction sequence.

   c. Note required performance testing requirements and acceptable tolerances.

*4.* Operation and Maintenance Plan to include:

   a. Provide an irrigation water management plan to describe:

      i. Water measurement method,

      ii. Soil moisture monitoring method,

      iii. Criteria for timing irrigations,

      iv. Proposed irrigation schedule for the anticipated crops to be irrigated, and

      v. Record keeping recommendations.

b. Provide written instructions for the operator's use that identifies method(s) for:
   i. Operation and maintenance of system components;
   ii. Accomplishing salinity management addressing site specific concerns;
   iii. Evaluating application uniformity; and
   iv. Winterizing system components.

c. Include the following information with the owner's copy of O&M plan, when available:
   i. Manufacturer's or vendor's literature for system components;
   ii. Equipment and installation warranties; and
   iii. Material Safety Data Sheets (MSDS) for all chemicals used in system.

*5.* Construction Quality Assurance Plan, where appropriate, (NEM Part 512, Subpart D Quality Assurance Activities, 512.30 through 512.32), to include, but not limited to, the following items:
   a. General description of work
   b. Items of work requiring inspection or testing
   c. Timing of inspections or tests
   d. Skills or certifications required by inspectors

6. Certification that the design meets practice standard criteria and comply with applicable laws and regulations (NEM Subpart A, 505.03 (a) (3)). For jobs completed by NRCS employees, affix the approval signature of the individual with delegated engineering job approval authority to the drawings. For jobs completed by non-NRCS employees, affix a Colorado Professional Engineer's seal to design and construction documents, when required by state laws and regulations.

7. Itemized cost estimate and list of materials.

*8.* Design modifications during installation as required.

## INSTALLATION

### Deliverables

1. Pre Installation conference with client and contractor. (Reference Form CO-ENG-13, Notification of Participant Responsibilities)
2. Verification that client has obtained required permits.
3. Staking and layout according to plans and specifications including applicable layout notes.
4. Installation inspection (according to inspection plan as appropriate).
   a. Actual materials used (Part 512, Subpart D Quality Assurance Activities, 512.33)
   b. Inspection records
5. Facilitate and implement required design modifications with client and original designer
*6.* Advise client/NRCS on compliance issues with all federal, state, tribal, and local laws, regulations and NRCS policies during installation.
7. Certification that the installation process and materials meet design and permit requirements. Form CO-ENG-1 may be used for this certification.

## CHECK OUT

### Deliverables

1. As-Built documentation.
    a. Extent of practice units applied
    b. Drawings
    c. Final quantities
2. Certification that the installation meets NRCS standards, specifications,and all design requirements and is in compliance with permits (NEM Subpart A, 505.03 (c) (1)). Form C)-ENG-12 may be used for this certification.
3. Progress reporting.

## REFERENCES

- NRCS Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard - Sprinkler System, 442
- NRCS National Engineering Manual (NEM).
- NRCS National Environmental Compliance Handbook
- NRCS Cultural Resources Handbook
- CO-ENG Forms: eFOTG, Section IV, Tools