NEBRASKA PRACTICE DOCUMENTATION REQUIREMENTS
IRRIGATION SYSTEM, SURFACE AND SUBSURFACE (443) [1]

I. GENERAL

Minimum documentation requirements for this practice are outlined below. Documentation for associated practices or system components shall follow the appropriate practice documentation requirements. Additional documentation requirements can be found in the General Documentation Requirements section of the Nebraska Practice Documentation Requirements Manual.

A. References
1. National Engineering Manual (NEM)
2. NRCS National Environmental Compliance Handbook
3. NRCS Cultural Resources Handbook
4. Nebraska Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard - Irrigation System, Surface and Subsurface, 443
5. National Engineering Handbook (NEH), Part 650, Chapters 3 and 15
6. NEH, Part 652, Irrigation Guide with Nebraska Supplements
7. NEH-15 Irrigation, Chapters 3, 4, 5, and 6
8. NEH-5 Hydraulics
9. NEH, Part 650, Appendix 1
10. Worksheets: NE-ENG-22, NE-ENG-69 and NE-ENG-70
11. University of Nebraska NEB FACT(S): 94-176, 94-177, 94-178, and 94-179,
12. University of Nebraska NEB GUIDE: 97-1338-A
13. Computer software (i.e. SRFR, IWR, FIRI)
14. Conservation plan for the unit
15. Local supplemental criteria

II. RESOURCE INVENTORY AND SURVEYS

A. Design Investigations
1. Water source, quality, and quantity of supply
2. Field and irrigation system layout
3. Soils and Geological Investigation: consider soil types, characteristics, depths, topography, water tables, inhibiting layers, etc
4. Structural Components – location and type
5. Location of utilities
6. Runoff and Erosion potential

[1] This does not apply to NRCS Practice Standard 441 – Micro Irrigation, which includes subsurface drip irrigation.

B. Design Surveys
   1. Topographic map -- where required to aid in irrigation system positioning, component layout, irrigation methods, etc.
   2. Critical elevations: control points, critical field features which impact the function and operation of the irrigation system, downstream features / issues.
   3. All pertinent water surface elevations -- water supply ditch, reservoir, or well, check structures, high water marks, etc.
   4. Field survey notes will conform to NEM Part 540 and follow standard field note documentation as illustrated in Technical Release 62 (TR-62) and/or Nebraska Standard Format for Engineering Notes Transmittal Sheets No. 3. Survey notes will be prepared such that they exhibit legible, logical, clear and concise data.

C. Environmental Inventory
   1. NEPA inventory of resources -- form NE-CPA-52 must be completed by NRCS during planning.
   2. Wetland effects, if applicable.
   3. Archeological/Historical/Cultural Resources.
      a. Complete all continuing environmental requirements stemming from planning as expressed in the General Documentation Requirements section of the Nebraska Practice Documentation Requirements Manual.

III. DESIGN

A. Design data
   1. Complete the NE-ENG-70 Form – Design Sheet for Surface Irrigation Systems or equivalent.
   2. Run the irrigation software program SRFR (or equivalent) simulating the proposed irrigation system based upon the design parameters selected. Include support documentation for input parameters and values used to run the simulation.
   3. Capacity requirements -- determination of design capacity as related to meeting the needs of the intended use, maximum irrigation system application efficiency, quantity and timing of the irrigation water availability.
   4. Does system capacity meet the crop water requirements? Will there be deficit irrigation? Document accordingly in IWM Plan.
   5. Field and Zone(s) design details: zone size, zone flow rate, gpm / row, grade, duration of irrigation, etc.
   6. Hydraulic data – plot or graph critical (hardest point to get water) system hydraulics, with associated computations, from source to outlet.
   7. Irrigation appurtenance design (type, size, pressure settings, capacity, head loss, location, published performance data, and etc).
   8. Flow measurement information, NE-ENG-83.
   9. Structural design component computations, depending on structural needs.
   10. Quantities and cost estimates.
   11. Initials/signatures and dates by the person(s) responsible for the design, approval, and checking of the design.

B. Permits
   1. Water rights -- owner is responsible for obtaining required water rights from NE DNR; see GM, 450, Part 405.
   2. 404 Permit – document if individual permit obtained, nationwide permit applies, or if practice is exempt.

IV. PLANS AND SPECIFICATIONS

A. Plans
   1. Use standard sized drawing sheets no smaller than (11”x17”). Drawings with construction notes should be sufficient to provide full installation instructions. Scaled or Dimensioned Irrigation Distribution Map -- sufficient size to show each field zone(s), alignment, stationing, areas involved, cultural features, reference points, structural features, and pipeline appurtenances. Includes a map orientation symbol and bar scale.
   2. A stationed profile along the centerline of the distribution system to the most critical outlet point-- original ground line, bury depths, outlets, appurtenances, pipe gradelines, hydraulic gradelines, maximum static pressure, changes in pipe sizes and ratings, etc.
   3. Structural details -- as needed to show construction details, including plan and sectional views.
   4. Table of quantities.
   5. Site location map with legal description.
   6. Construction notes -- add notes to clarify components and furnish directions for installations to supplement standard specifications as needed.
      a. Construction plans shall include a statement requiring the contractor to notify the Nebraska One-Call System (Diggers Hotline) regarding utilities on the construction site. See the General Documentation Requirements section of the Nebraska Practice Documentation Requirements Manual for the recommended statement.
      b. Add notes as necessary to identify avoidance and, if needed, protection areas and boundaries associated with cultural resources, threatened or endangered species, or other resources needing temporary protection during installation.
   7. NRCS Engineering Job Class from NE-ENG-14.
   8. Applicable Practice Standard(s), usually shown on the cover sheet

B. Specifications
   1. Nebraska FOTG Conservation Practice specifications, component specifications from NEH Part 650, Engineering Field Handbook Appendix 1, or equivalent, modified as needed. Additional specifications may be written to provide full material and installation instructions.

C. O&M Plans
   1. Irrigation component maintenance as provided by the manufacturer

D. Plans, Specifications, O&M Plans Delivery
   1. Case folder
   2. Transmittal letter copy

V. LAYOUT

A. Layout Surveys
   1. Centerline alignment stakes
   2. Offset grade stakes
   3. Location and grade stakes for structures and pipeline appurtenances
   4. Use field notebook, forms, etc.

B. Quantity Computations
   1. Final quantities are based on staked lines and grades or approved changes.

VI. COMPLIANCE CHECKING

A. Record in field notebook, on construction plans
   1. If the site was **NOT** formerly irrigated, does the irrigation system function as planned and designed? If not, document.
   2. If the site was formerly irrigated, does the new system facilitate a higher overall system efficiency? What was the system efficiency before and after?
   3. Quantity of materials installed.
   4. Location of flow measurement device(s)
   5. Do number, type, location of appurtenances including drains, screens, valves, pressure regulators, pressure reducers, pressure gauges, outlets, air vents, stand pipes, etc. match the design? Document
   6. Do elevations of water control structures match the plans? Include check out notes.
   7. Construction inspection reports.
   8. Statement of compliance -- statement that construction is completed according to plans and specifications signed and dated by the person certifying completion.

B. “As Built” Plans
   1. Refer to NEM, 512.51 and 512.52
   2. “As Built” plans are a record of constructed facilities. “As Built" plans are required when a significant change in design occurs during construction or when the job is designated Class V or higher. Changes are superimposed in a different color (usually red), or differentiated in some other manner (such as a drawing a box around the as-built value) on the official file copy and show:
      a. Significant[2] design changes.
      b. Significant[2] changes in linear measurement.
      c. Final quantities -- may be based on layout stake notes, if no changes were approved and work meets planned lines and grades.
      d. Identify as “As Built” on plans.

[2] Determination of “significant” is a matter of judgment by the technician. As a general rule, changes that exceed normal measuring error allowances, normal construction tolerances, and methods of mathematical computation, should be considered as significant.