

NEBRASKA PRACTICE DOCUMENTATION REQUIREMENTS

IRRIGATION WATER CONVEYANCE PIPELINE

**Nonreinforced Concrete Pipeline(430-CC)
High Pressure Underground Plastic Pipeline(430-DD)
Low Pressure Underground Plastic Pipeline (430-EE)
Steel Pipeline (430-FF)
Rigid Gated Pipe (430-HH)**

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. Nebraska Field Office Technical Guide (FOTG)
3. National Engineering Handbook (NEH), Part 650, Chapters 3 and 15
4. NEH, Part 652, Irrigation Guide with Nebraska Supplements
5. NEH-15 Irrigation, Chapter 3 Planning Farm Irrigation Systems
6. NEH-5 Hydraulics
7. NEH, Part 650, Appendix 1
8. [NE-ENG-22](#), [NE-ENG-83](#), [NE-ENG-85](#) and [NE-ENG-59](#)
9. Conservation plan for the unit
10. Local supplemental criteria

II. RESOURCE INVENTORY AND SURVEYS

A. Design Investigations

1. Water source, quality and quantity of supply
2. Debris and or sediment within the water
3. Soil and geological investigation considering soil depths and topography
4. Corrosion potential or conditions (for metal pipe) -- soil resistivity readings or other published soils data
5. Well pressure(s) at source for design flows
6. Outlets – location and type
7. Location of underground utilities

B. Design Surveys

1. Profile along centerline of pipeline -- include all control points, such as structure elevations, critical field elevations which impact the function and operation of the irrigation system, road crossings, drain points, etc.
2. Topographic map -- where required to aid in positioning pipeline, determine outlet locations, irrigation methods, etc.
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. Record on NE-ENG-22 - Data Sheet for Irrigation Pipelines, NE-ENG-85 - Pumping Plant Inventory and Evaluation Worksheet, NE-ENG-59 – Center Pivot Sprinkler Design Worksheet (Hydraulic Analysis, Mainline) and/or other equivalent worksheets.
 - a. Capacity requirements -- determination of design capacity as related meeting the needs of the intend use, irrigation application efficiency, quantity and timing of irrigation water availability
 - b. Hydraulic data – system minimum and actual hydraulic grade lines pump performance data at design high and design low ranges of flow, operating pressures (psi), water hammer, etc.
 - c. Irrigation Appurtenance Design (location, size, pressure settings, capacity, head loss, published performance data, and etc)
 - d. Water measurement - NE-ENG-83 or equivalent
 - e. Structural design computations, depending on structural needs.
 - f. Quantities and cost estimates.
2. 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. Drawings with construction notes should be sufficient to provide full installation instructions.
2. Scaled or Dimensioned Plan View Map -- sufficient size to show alignment, stationing, areas involved, cultural features, reference points, structural features, and pipeline appurtenances. Includes a map orientation symbol and bar scale.
3. A stationed profile along centerline of pipelines -- original ground line, bury depths, outlets, appurtenances, pipe gradelines, hydraulic gradelines, maximum static pressure, changes in pipe sizes and ratings, etc.
4. Hydraulic data design pipe capacities and pressures.
5. Structural details -- as needed to show construction details, including plan and sectional views.
6. Table of quantities.
7. Site location map with legal description.
8. Construction notes -- add notes to clarify a component 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.
9. NRCS Engineering Job Class from NE-ENG-14.
10. Applicable Practice Standard(s) usually shown on the cover sheet

B. Specifications

1. Irrigation Water Conveyance Specification for:
 - a. [S-430-CC](#), IWC Pipeline, Non-reinforced Concrete
 - b. [S-430-DD](#), IWC High Pressure, Underground, Plastic Pipeline
 - c. [S-430-EE](#), IWC Low Pressure, Underground, Plastic Pipeline
 - d. [S-430-FF](#), IWC, Pipeline, Steel
 - e. [S-430-HH](#), IWC Rigid Gated Pipeline
2. 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. All types of Irrigation Water Conveyance Pipelines (430) Standard in Nebraska FOTG.

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, NE-ENG-22, etc.
 - 1. Profiles of pipe trench bottom.
 - 2. Quantity of pipe sizes installed.
 - 3. Location of flow measurement device(s).
 - 4. Number, type, location of appurtenances including drains, screens, valves, pressure regulators, pressure reducers, pressure gauges, outlets, air vents, stand pipes, etc.
 - 5. Material certification including nominal pipe size, type of plastic material i.e. PVC 1120 or 1220, rated allowable working pressure, designation i.e. PIP or IPS, and manufacturers name (trademark) and code
 - 6. Pipe pressure and leakage test – description of method used and subsequent results.
 - 7. Elevations at water control structures.
 - 8. Protective coating used and/or cathodic protection provided.
 - 9. Construction inspection reports.
 - 10. Material certification statement.
 - 11. 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. Significant¹ design changes.
 - b. Significant¹ 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.

¹ 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.