

IRRIGATION PIPELINE

Design Survey

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

- a. Profile along centerline of proposed pipeline route.
- b. Cross-sections at critical locations.
- c. Detailed topographic survey elevations along pipeline route and at structure locations.
- d. Pertinent water surface elevations.
- e. Soils investigations (classification and corrosion potential if required). (Soils can be shown on soils map.)

Design Data

The following shall be considered minimum in the design of all underground irrigation water conveyance systems. The information shall be recorded in the design documentation.

- a. Capacity requirements based on needs.
- b. Hydraulic design including appurtenances.
- c. Structural design (pipe and structures).
- d. Pipeline design (consideration of internal pressure and external loading where applicable). When velocities exceed 5 fps or the working pressure exceeds 72 percent of the pressure rating of the pipe, a water hammer analysis will be made.
- e. Corrosion analysis if required.
- f. Quantity computations.
- g. Records indicating NRCS obligations regarding State and Federal regulations have been met including, but not limited to, the following: ground water laws, water rights, easements, 404 permits, NPDES storm water permits, cultural resources, etc.

Drawings and Specifications

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

- a. Overall scaled plan layout of pipeline showing stationing and area to be served.
- b. Location map with legal description and north arrow.
- c. Plan and profile showing ground surface and pipeline design grade(s).
- d. Details for pipe inlet and outlet structures, if needed.
- e. Location, types, size and requirements of appurtenances (i.e. air vacuum, pressure relief valves w/cracking pressure, standpipes, etc.).
- f. Size, length, material and class of pipe by reach.
- g. Special requirements for pipe bedding.
- h. Location and details for thrust and/or anchor blocks if needed.
- i. Table of quantities.
- j. Construction notes.
- k. Engineering job classification is shown and proper engineering approval is obtained.

1. Cooperator's signature of review and acceptance to construct the project according to the plans and specifications.

Practice specifications along with applicable "Items of Work and Construction Details" shall be provided for each item or phase of construction as needed, to clarify the work.

Layout Survey Notes

The following information shall be recorded in the field notes:

- a. Centerline alignment stakes with offset grade stakes.
- b. Appurtenance locations.
- c. Structure layout, alignment and reference stakes.

Compliance Checks

The complexity of the conveyance 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 job diary or on a sheet in the field notes. Compliance checks shall include but will not be limited to the following:

- a. Pipeline grade(s).
- b. Manufacturer and pipe markings.
- c. Adequacy of bedding and backfill.
- d. Depth of cover over pipe.
- e. Pipe diameters, lengths, and class or pressure rating.
- f. Size and location of appurtenances (i.e. air/pressure relief valves, thrust blocks, etc.).
- g. Dimension and elevation of structures.
- h. Results of pressure test if required.
- i. 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.)
- j. Changes in design are documented.

As-Built Plans

As-Built plans shall be prepared for all underground irrigation water conveyance systems. These drawings shall reflect all significant changes in linear measurements, quantities, alignment, pipe classification or design changes. If there were no significant changes, the original drawings shall be marked "As-Built".