Name _____ Ident. No. _____

Legal Desc. _____ County _____

Designed by _____ Date _____

Checked by _____ Date _____

Approved by _____ Date _____

The following are items that the landowner/designer shall provide. Mark the completed items.

☐ Irrigation development plan:

- Form KS-ENG-394, Irrigation Water Management Crop and Water Requirement
- Plan showing water rights, scheduling, and other management decisions made by operator

☐ Copy of Water Right Allocation for all wells involved (Kansas Department of Water Resources [DWR] form Certificate of Appropriation for Beneficial Use of Water)

☐ Pumping information (flow rate and pressure at pump discharge) - If there hasn't been a pump test run during the irrigation season within the most recent 3-year period, the design flow rate will not be greater than 80 percent of the original pump flow rate.

☐ Crop rotation on all fields

☐ Water quality test results and recommendations for SDI irrigation suitability, including suspended solids, pH (acid-base index), total dissolved solids (TDS), manganese, iron, hydrogen sulfide, and bacteria population

☐ Filter design including any chemical additives recommended

☐ Computer printouts of hydraulic designs showing pressures, velocities, emission uniformity (EU), manufacturer's coefficient of variation (Cv), emitter discharge exponent (x), emitter flow constant (k), hydraulic design factors, brand and size of drip tape, and emitter discharge and spacing

☐ Construction plans including dimensioned or scaled drawings of SDI system layout - Drawing shall show location, size, pressure rating, model number, etc., (if applicable) of the following:

- Field dimensions and topographic survey (200 feet x 200 feet for fields not leveled with NRCS design) include the following:

  --Cross slope along upper end of field for each zone
  --Slope along rows at sides of field and center of field for each zone
  --Changes in slope greater than 0.2 percent

- Location of zones
- Well locations
- Backflow prevention device
- Filtering system
- Mainlines - Size, type, pressure rating, and length of pipe
- Sub-mainlines - Size, type, pressure rating, and length of pipe
- Zones or blocks (label with number of drip tape), emitter spacing, inside diameter (ID) of drip tape
- Lateral (drip tape) spacing and depth of placement
- Air/vacuum relief valves
- Pressure regulators, pressure relief valves, and pressure gages
- Flush lines and flush valves

☐ Table of quantities of all components

☐ Material specifications and installation specifications for drip tape, emitters, filter, etc.

☐ Inspection plan - This can be as simple as a letter reviewed with the landowner. List the people who will provide construction inspection of the system and their qualifications.

☐ Operation and maintenance plan - At a minimum, it shall include the following:

- Flushing requirements for filter
- Chemical additions, when and how much
- Flushing requirements for system
- Calculation of system application rate per zone

Does the SDI design meet required design criteria? ☐ Yes ☐ No

System Data

Fill in the information below or mark the items provided in the design documentation:

☐ Water right: _____ gallons per minute (gpm) _____ acres

☐ Pump design flow rate (based on pump test) _____ gpm at _____ pounds per square inch (psi)

Note: If there hasn't been a pump test run during the irrigation season within the most recent 3-year period, the design flow rate will not be greater than 80 percent of the original pump flow rate.

☐ Irrigated by SDI system _____ acres

☐ Planned crops and rotation _____

☐ Water quality analysis: Suspended solids _____ parts per million (ppm)

pH _____ TDS _____ ppm

Manganese _____ ppm Hydrogen sulfide _____ ppm

Iron _____ ppm Bacteria population _____ no. per milliliter (ml)

☐ Application rate per zone _____ inches per hour

☐ Number of zones _____ No. watered concurrently _____

☐ Planned irrigation rotation schedule _____

☐ Mainline: Pipe size _____ inches Type _____

Pressure rating _____ psi Length _____ feet

☐ Submain: Pipe size _____ inches Type _____

Pressure rating _____ psi Length _____ feet

☐ Submain (if different pipe size from other submain):

Pipe size _____ in. Type _____

Pressure rating _____ psi Length _____ feet

☐ Flushline: Pipe size _____ inches Type _____

Pressure rating _____ psi Length _____ feet

☐ Drip tape (lateral): Brand _____ Inside diameter (ID) _____ inches
Spacing _____ feet Planned depth _____ inches
Pressure rating _____ psi Maximum length _____ feet

☐ Emitter: Spacing _____ inches
Discharge _____ gallons per hour (gph) at _____ psi
Factors Cv _____ x _____ k _____

☐ Filter system: Brand _____ Model _____
Capacity _____ gpm Pressure loss across filter _____ psi
Pressure at filter discharge _____ psi

☐ Flow meter (water meter): Brand _____ Model _____

☐ Sand separator (if needed): Type _____ Capacity _____ gpm

☐ Chemigation valve: Brand _____ Model _____

Zone/Block Data

Fill in the information below or mark here if it is provided in the design documentation ☐

Indicate "ALL" for "Zone number" if all zones are identical in all factors including topography. Complete only 1 set of data. Otherwise, complete 1 copy of the information below for each zone.

Zone number _____

Design zone inlet pressure (downstream of valve) _____ psi

Average design (Qave) emitter discharge _____ gph at _____ psi

Maximum emitter discharge _____ gph at _____ psi

Minimum emitter (Qmin) discharge _____ gph at _____ psi

Number of emitters (n) _____

$$\text{Flow rate variation} = \frac{\text{Max. Discharge - Min. Discharge}}{\text{Average Design Emitter Discharge}} \times 100$$

$$= \frac{\_\_\_\_\_ \text{ gph} - \_\_\_\_\_ \text{ gph}}{\_\_\_\_\_ \text{ gph}} \times 100 = \_\_\_\_\_ \%$$

$$\text{Emission Uniformity (EU)} = 100 \times (1.0 - [1.27 \times (Cv/(n)^{1/2})]) \times (Qmin/Qave)$$

$$= 100 \times (1.0 - [1.27 \times (\frac{\_\_\_\_\_}{(\_\_\_\_\_)^{1/2}})]) \times (\frac{\_\_\_\_\_ \text{ gph}}{\_\_\_\_\_ \text{ gph}}) = \_\_\_\_\_ \%$$

Subsurface Drip Irrigation (SDI) - Checkout

SDI Installation Data

Complete and mark the following items:

- ☐ Installation certification of pressure test for each zone or observation of system operation for each zone
- ☐ Drain valves present for each zone
- ☐ Air relief valves (ARV) and pressure relief valves (PRV) for each zone
- ☐ Filter system functioning and pressure drop observed across filter per design specifications
- ☐ Check for all components listed in the construction plans and specifications and document as required by the item and listed unit of measurement
- ☐ Measure the irrigated acres

The installed SDI system will irrigate _____ acres

Have the above items been checked and documented? ☐ Yes ☐ No

Does the checkout of the system installation agree with the design? ☐ Yes ☐ No

If not, explain why:

Checkout by _____ Date _____

Audited by _____ Date _____