PART 590 - SURFACE DRAINAGE - FIELD DITCH - 607
OR MAIN OR LATERAL - 608

§ 590.00 Design Critera and Surveys

(a) Design will be in accordance with the guidelines in chapter 14 of the Engineering Field Manual and the criteria listed in the Kansas Standards and Specifications for Surface Drainage - Field Ditch - 607 or Main or Lateral - 608.

(b) Use a standard loose-leaf or bound field notebook to record the following:

(1) Profile and cross section notes on the centerline of the ditch. Station spacing is usually 100 feet (30.5 meters) or closer if needed to show significant changes in land slope. Two hundred-foot (61 meters) stationing or spacing may be used if the ground surface is uniformly even or level.

(2) Layout notes should provide columns for grade rod, grade, centerline, and stake or slope cuts in addition to the regular headings of standard notes. Also include a column for reference hubs which should be set at each station. Grade and cuts should be shown to the nearest tenth of a foot (3 cm); bench mark levels to the nearest hundredths of a foot (0.3 cm).

(3) Centerline shots will be taken on all stations and pluses. Cross sections should be taken at frequent enough intervals to provide an accurate measurement of yardage. As a minimum, they should be taken at least every 200 feet (61 meters).

(4) The following additional information should be recorded on the field notes:

(i) Elevation and description of all bench marks

(ii) A check indicating closure of the level circuit

(iii) Bottom widths, side slopes, and grades of ditches or mains

§ 590.01 Design.

(a) Use the field sheet for Surface Drainage, Field Ditch, and Main or Lateral, Form KS-ENG-5. Record the following:

(1) Owner and identification number

(2) Legal description of field or fields and county

(3) Under "Design Data" block, record:

§KS590.01

(i) Ditch number

(ii) Drainage area in acres (square kilometers)

(iii) Design curve used - Refer to National Engineering Handbook, Section 16, Drainage of Agricultural Land. Note: For drainage areas of 100 acres (405 square kilometers) and less, build as a minimum a 6-foot (1.8 meter) bottom ditch with side slopes to match field location. In these cases, omit the columns for design curve, Q-cfs and "n" value.

(iv) List Q in cubic feet per second (cubic meters per second) and "n" value when drainage area exceeds 100 acres (0.405 square kilometers)

(v) List side slopes used - 4:1 or flatter where ditch is crossed by field machinery but field is farmed parallel to the ditch, 8:1 or flatter where ditches are farmed across or drainage enters the ditch. Where ditches will not be crossed by farm equipment, 2:1 side slopes may be used.

(vi) List bottom width(s) in feet (meters)

(vii) List grades in percent (feet per hundred feet) or (meters per hundred meters). Where variable grades are used in any ditch, list the grade at the most critical section. Actual grades by elevations will show in the field notes.

(4) Record type of outlet, that is, grassed drain, outlet structure, etc.

(5) Location map:

(i) Show all ditches with station numbers and direction

(ii) Show outlet location

(iii) Show direction of field drainage when applicable

(iv) Show map scale

(v) Show bench mark location

(vi) Show signature of person doing the design, design approved by, and the date

(6) Compute excavated yardage (cubic meters)

(i) Use computation sheet on the back of Form KS-ENG-5. Attach standard earthwork computation sheets when extra space is needed. The quantity section on the back of Form KS-ENG-5 need not be filled out if printer output or photocopy from an approved programmable calculator or computer program is attached. Proper notation shall be made on the field sheet if this method is used.

§ 590.01

(ii) Show station numbers, cuts in feet, (meters) and end areas in cubic feet per foot, or cubic yards per foot (cubic meters per meter)

(iii) Calculate the yardage (cubic meters) using end areas taken from standard tables or using end areas from plotted cross sections measured by a planimeter or by calculation

(iv) Record calculated yardage (cubic meters) in the summary table on the front side of Form KS-ENG-9 for each ditch.

§ 590.02 Layout.

Use loose-leaf or field notebook to record the following:

(1) Set stakes (if not done during the design survey)

(2) Mark cuts to grade from ground surface on slope or centerline stakes. Reference centerline cut to top of reference hubs or offset stakes. Reference hubs or stakes are offset a sufficient distance, so they do not get in the way of construction activities but are close enough to be of ready access for checking the ditch during construction and final checkout. Cuts should be recorded to the nearest tenth of a foot (3 centimeters).

(3) Run a check indicating the closure of the level circuit.

(4) List layout date and sign Form KS-ENG-5

§ 590.03 Check Out Procedure.

Use loose-leaf or bound field book to record the following:

(1) Check constructed ditch grades at each station.

(2) Take cross sections at least every 400 feet (122 meters), or every 200 feet (61 meters) on ditches less than 400 feet (122 meters) in length, preferably near each end. (0+50 and 3+50)

(3) Record the final lengths in the table on Form KS-ENG-5

(4) List checkout date and sign Form KS-ENG-5

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PART 590 SURFACE DRAINAGE FIELD DITCH - 607
OR MAIN OR LATERAL - 608

§ 590.04 Sample of Form KS-ENG-5

USDA
SCS

FIELD SHEET: SURFACE DRAINAGE
FIELD DITCH - 607
MAIN OR LATERAL - 608

KS-ENG-5
Rev. 12/79

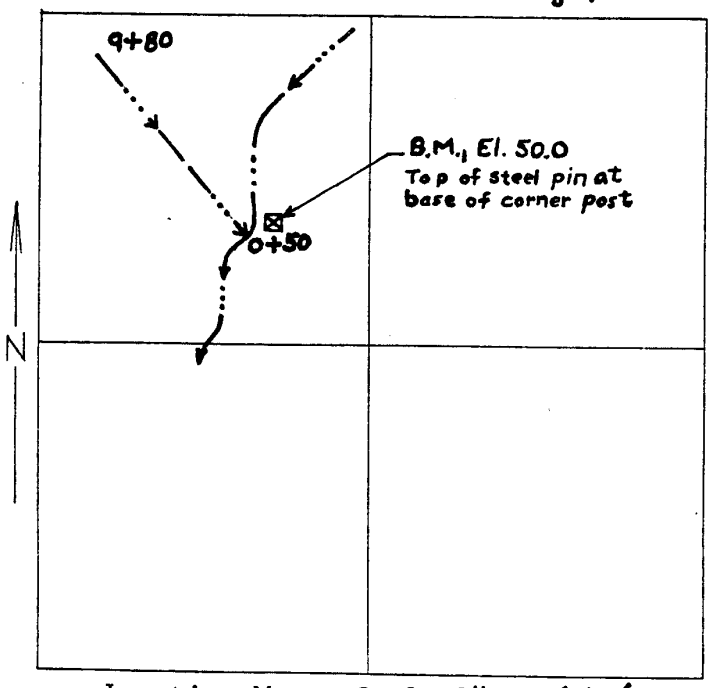
Owner Robert Brown Ident No.

Legal Description NW^4 Sec. 17-T29S-R20E County Neosho

Design and Construction Data

Ditch No.	D.A. Acres	Design Curve	Q c.f.s.	"n" Value	Flow Depth	Side Slope	Bottom Width	% Grade	
1	60	—	—	—	1.3	8:1	10*	0.2	Design
1					1.3	8:1	10'	0.2	Check

* Overbuilt to facilitate farmability & maintenance



Type of Outlet: Stable grassed channel

Excavation and Length Totals

Ditch No.	Length Lin. Ft.	Excavation Cu. Yds.
1	930	1,599
Totals	930	1,599

Location Map: Scale 1" = 660'

Joe Roe — Design by — 5/14/80 Date

Bill Johns — Design checked by — 5/14/81 Date

Bob Williams — Design approved by — 5/15/80 Date

Joe Roe — Layout by — 5/14/81 Date

Joe Roe — Checkout by — 6/26/80 Date

(KS210-KNKDM, May 1981) KS590-5

§ 590.04-2

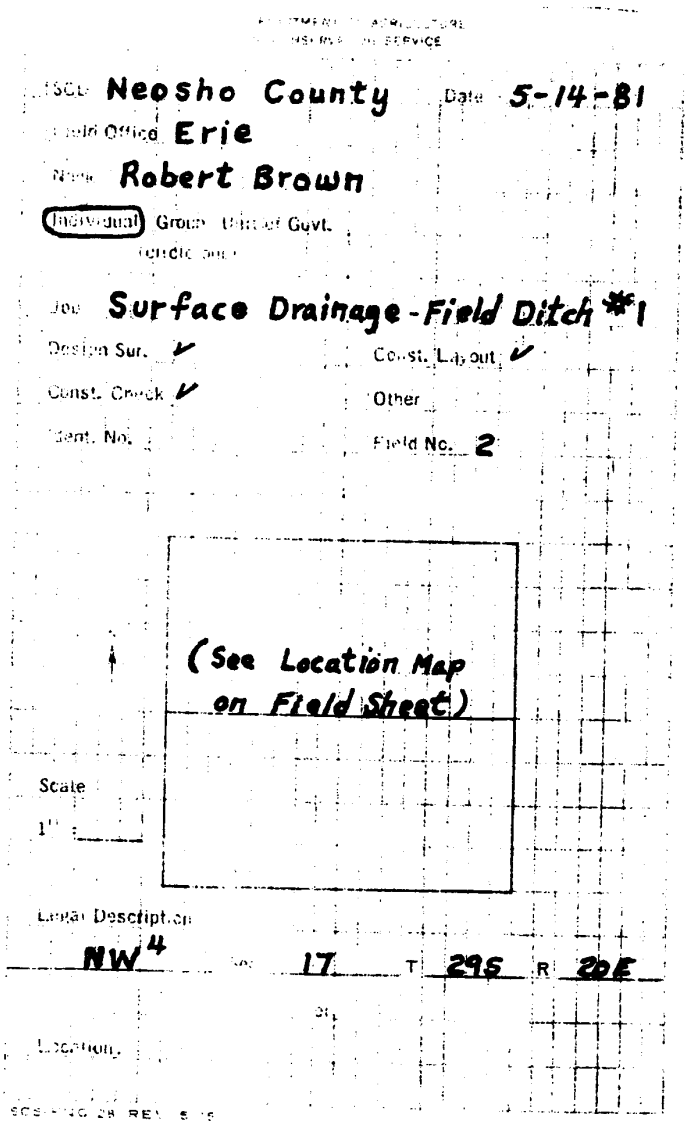
Standard Earthwork Computation Sheet

1	2	3	4	5	6
Station	Average Cut or Fill	End Area	Sum of End Areas	Distance Between Stations	Product Cols. 4 x 5
0+50	1.4	29.68			
			56.20	50	2810.0
1+00	1.3	26.52			
			59.52	100	5952.0
2+00	1.5	33.00			
			108.00	200	21600.0
4+00	2.5	75.00			
			131.28	200	26256.0
6+00	2.1	56.28			
			96.40	200	19280.0
8+00	1.7	40.12			
			58.12	180	10461.5
9+80	1.0	18.00			
			Divide sum by: 2* 54** →		86,359.5
			Total cubic yards →		1,599

* If sum is in cubic yards
**To convert cubic feet to cubic yards

PART 590 - SURFACE DRAINAGE-FIELD DITCH - 607
OR MAIN OR LATERAL - 608

§ 590.05 - Sample of Form SCS-ENG-28 - field notes for surface drainage



SCS Neosho County Date 5-14-81

Field Office Erie

Name Robert Brown

Individual Group Other Govt.

Job Surface Drainage - Field Ditch #1

Design Sur. ✓ Const. Layout ✓

Const. Check ✓ Other

Cent. No. Field No. 2

(See Location Map on Field Sheet)

Scale

1" =

Legal Description

NW 4 Sec. 17 T 29S R 20E

Location

SCS-ENG-28 REV. 5-75

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§ 590.06 Sample of Form SCS-ENG-29 - field notes for layout of surface drainage

Robert Brown
Drainage- Field Ditch #1
Design & Constr. Layout

J. Roe
F. Jones
5/14/81

Trapezoidal Ditch- b=10', 8:1 s.s., 0.2% grade

Top of steel pin at base of corner post 50' east of Sta 0+50.

Sta.	B.S.	H.I.	F.S. or Grade Rod	Elev. or ~~Planned Elev.~~ Grade
B.M.1	4.22	54.22		50.00
Side Shot	Bottom of Outlet ditch			
0+50			+7.0	47.2
1+00			+6.9	47.3
2+00			+6.7	47.5
4+00			+6.5	47.7
6+00			+6.3	47.9
8+00			+6.1	48.1
9+80	End of Cut		+5.9	48.3
TP1	4.84	52.84	6.22	48.00
BM1			2.84	50.00
	9.06	O.K.	9.06	

	Left	℄	Right
	←50'→		
R. Hubs	℄		℄
5.0 / C2.0	5.5 / C1.5-17.0'	5.6 / C1.4	5.7 / C1.3-15.4
4.9 / C2.0	5.6 / C1.3-15.4	5.6 / C1.3	5.6 / C1.3-15.4
4.6 / C2.1	5.2 / C1.5-17.0	5.2 / C1.5	5.2 / C1.5-17.0
3.5 / C3.0	4.0 / C2.5-25.0	4.0 / C2.5	4.0 / C2.5-25.0
3.7 / C2.6	4.3 / C2.0-21.0	4.2 / C2.1	4.1 / C2.2-22.6
3.9 / C2.2	4.4 / C1.7-18.6	4.4 / C1.7	4.4 / C1.7-18.6
4.4 / C1.5	4.9 / C1.0-13.0	4.9 / C1.0	4.9 / C1.0-13.0

Note: ℄ cuts to be checked from top of Reference Hubs.

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§ 590.07 - Sample of Form SCS-ENG-29 - field notes for check out of surface drainage

Robert Brown
Drainage - Field Ditch #1
Contr. Check
Trapezoidal Ditch, b=10', S.S.=8:1
Top of steel pin at base of corner post, 50' east of Sta 0+50

π J. Roe
9 F. Jones
6/26/81

Sta	B.S.	H.I.	F.S. or Grade Rod	Elev. Planned Flow
B.M.1	5.1	55.1		50.0
0+50			+7.9	47.2
1+00			+7.8	47.3
2+00			+7.6	47.5
4+00			+7.4	47.7
6+00			+7.2	47.9
8+00			+7.0	48.1
9+80			+6.8	48.3

Left			℄	Right		
			7.9			
			7.8			
			7.7			
4.8/35	4.9/25	7.4/5	7.5	7.4/5	4.9/26	4.8/35
			7.3			
5.2/30	5.3/19	7.1/5	7.0	7.0/5	5.3/20	5.8/30
			6.8			