14-104.1

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1:1
BOTTOM WIDTH 2'-0"

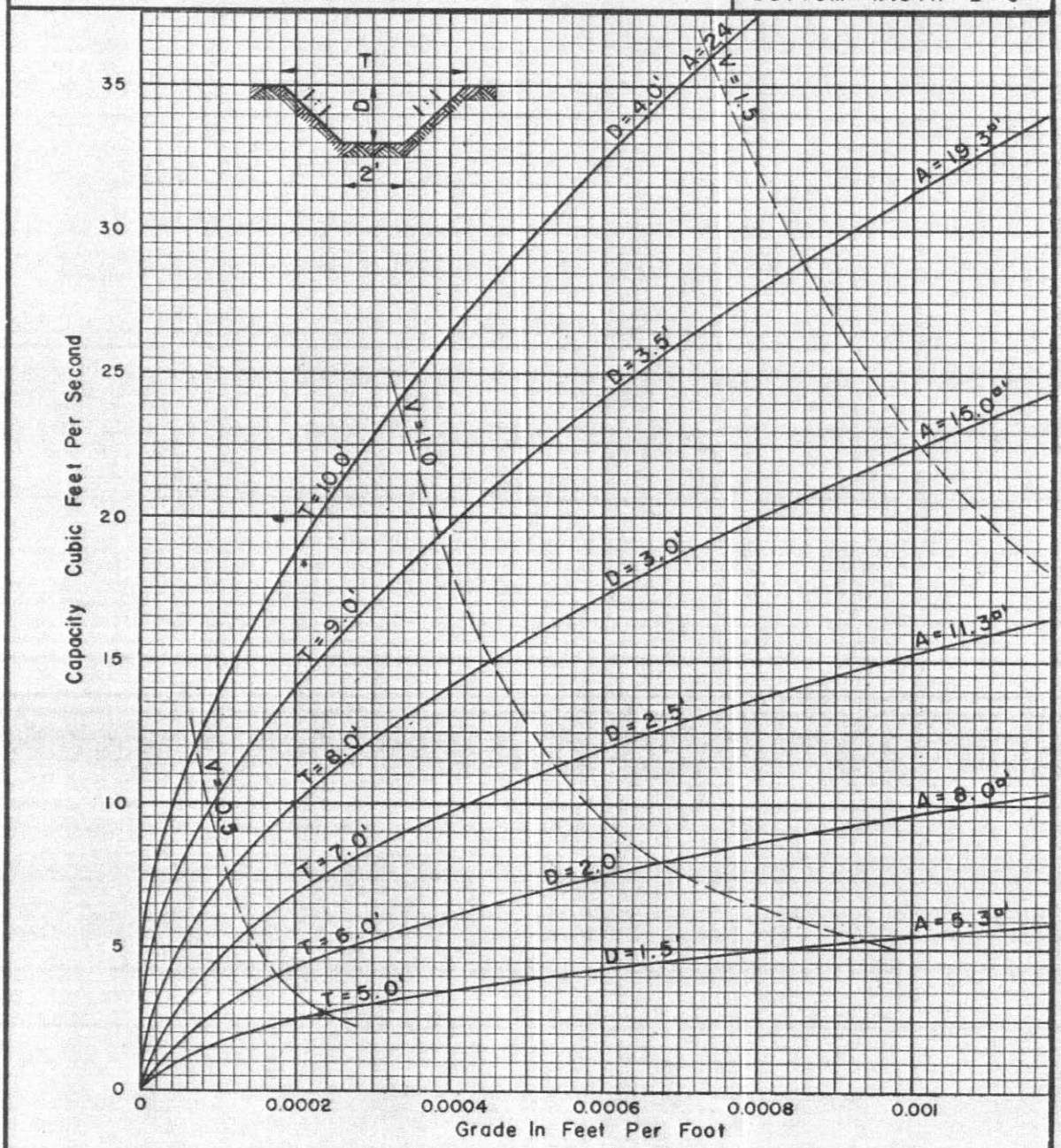


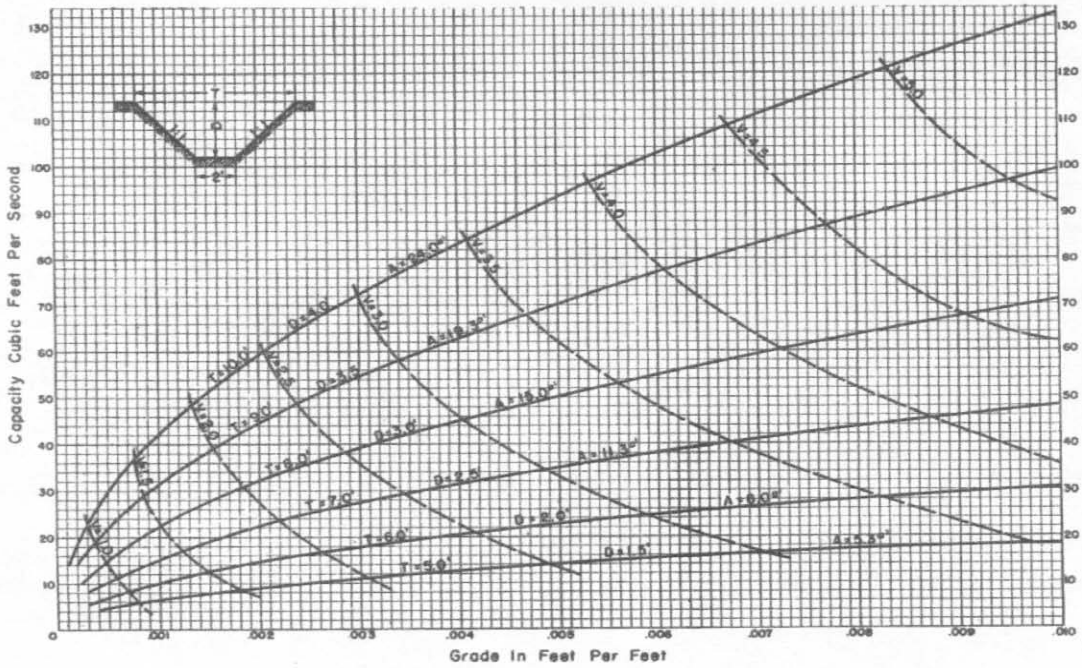
Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 1 OF 42

14-104.2

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1:1
BOTTOM WIDTH 2'-0"



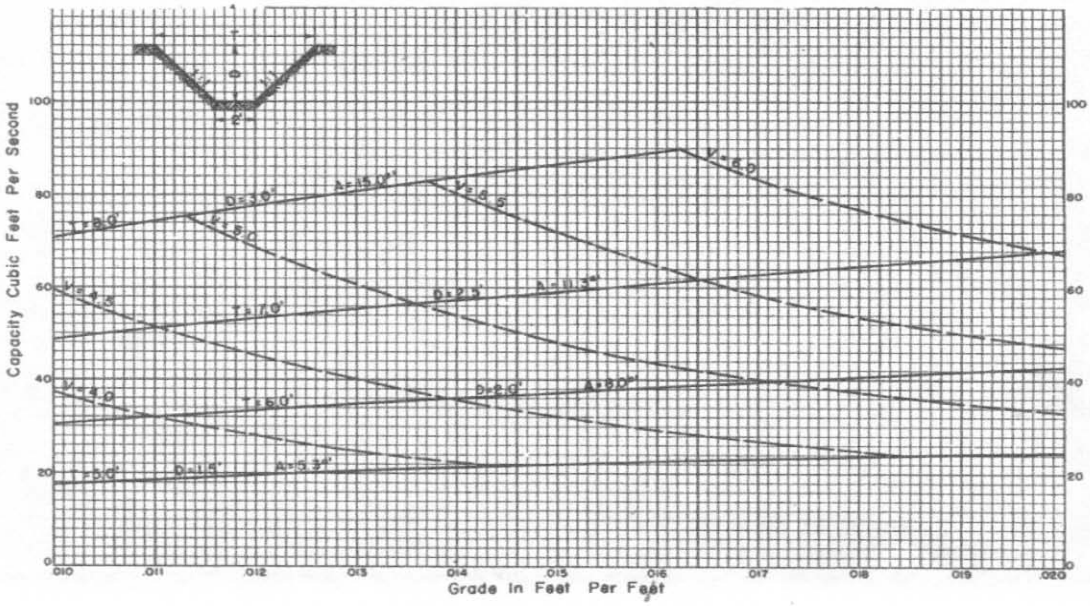


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 2 OF 42

14-104.3

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1:1
BOTTOM WIDTH 3'-0"

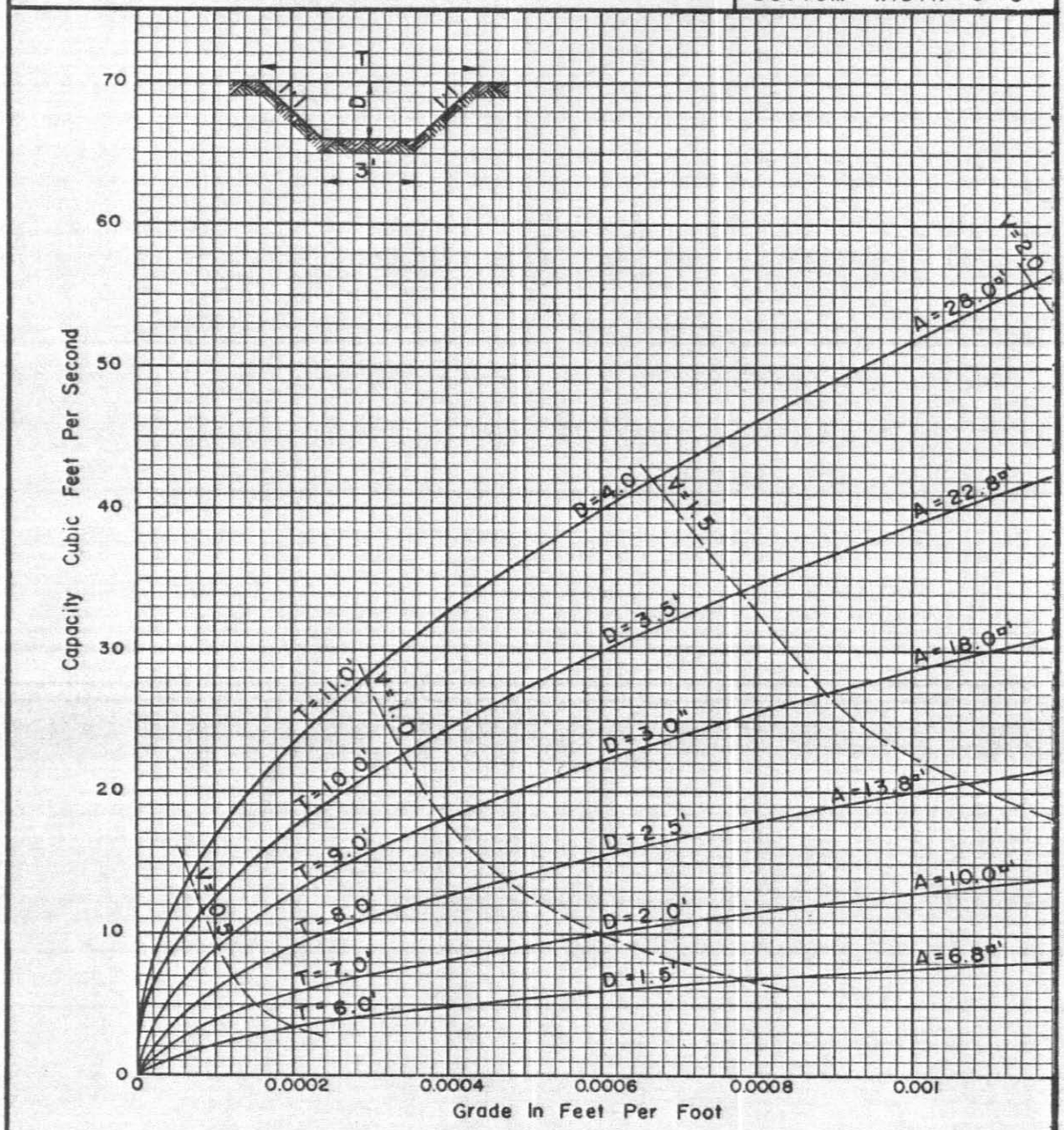
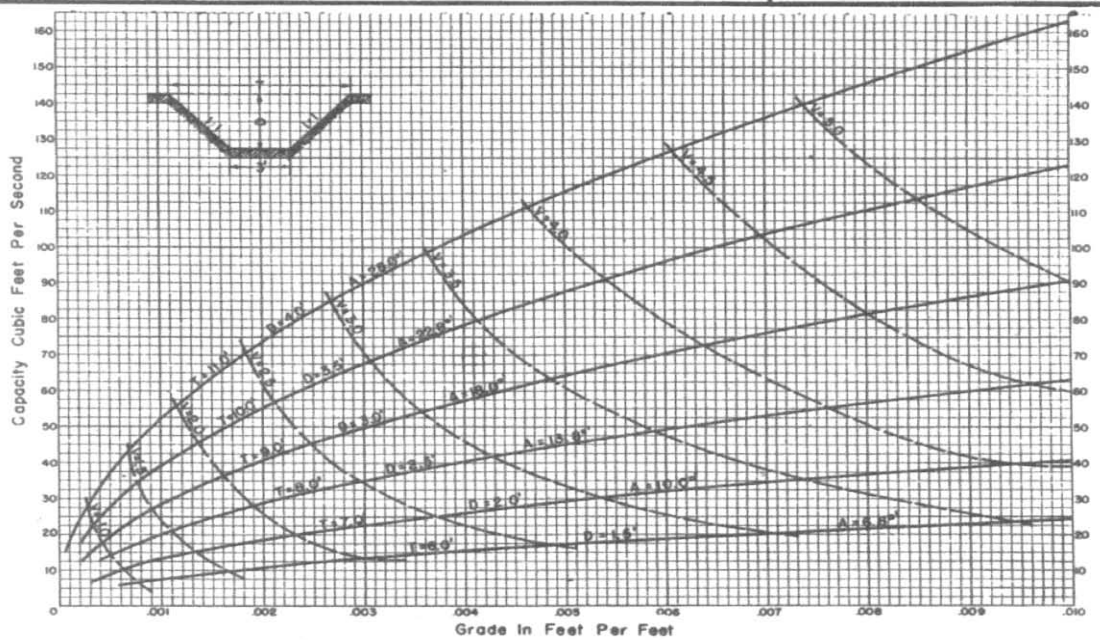


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 3 OF 42

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1:1
BOTTOM WIDTH 3'-0"



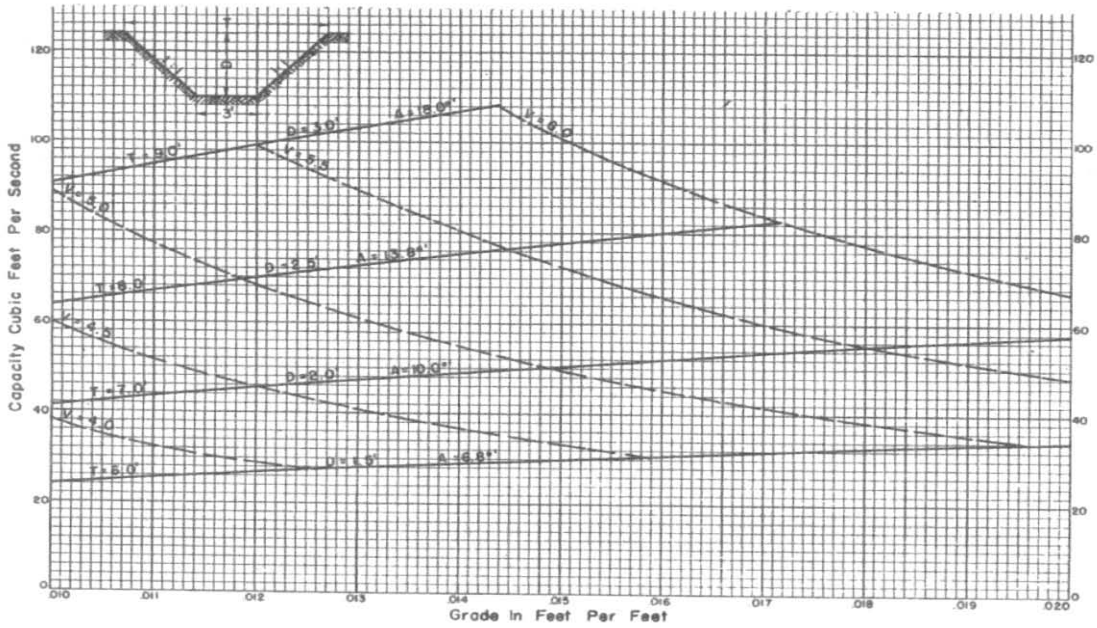


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 4 OF 42

14-104.5

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1:1
BOTTOM WIDTH 4'-0"

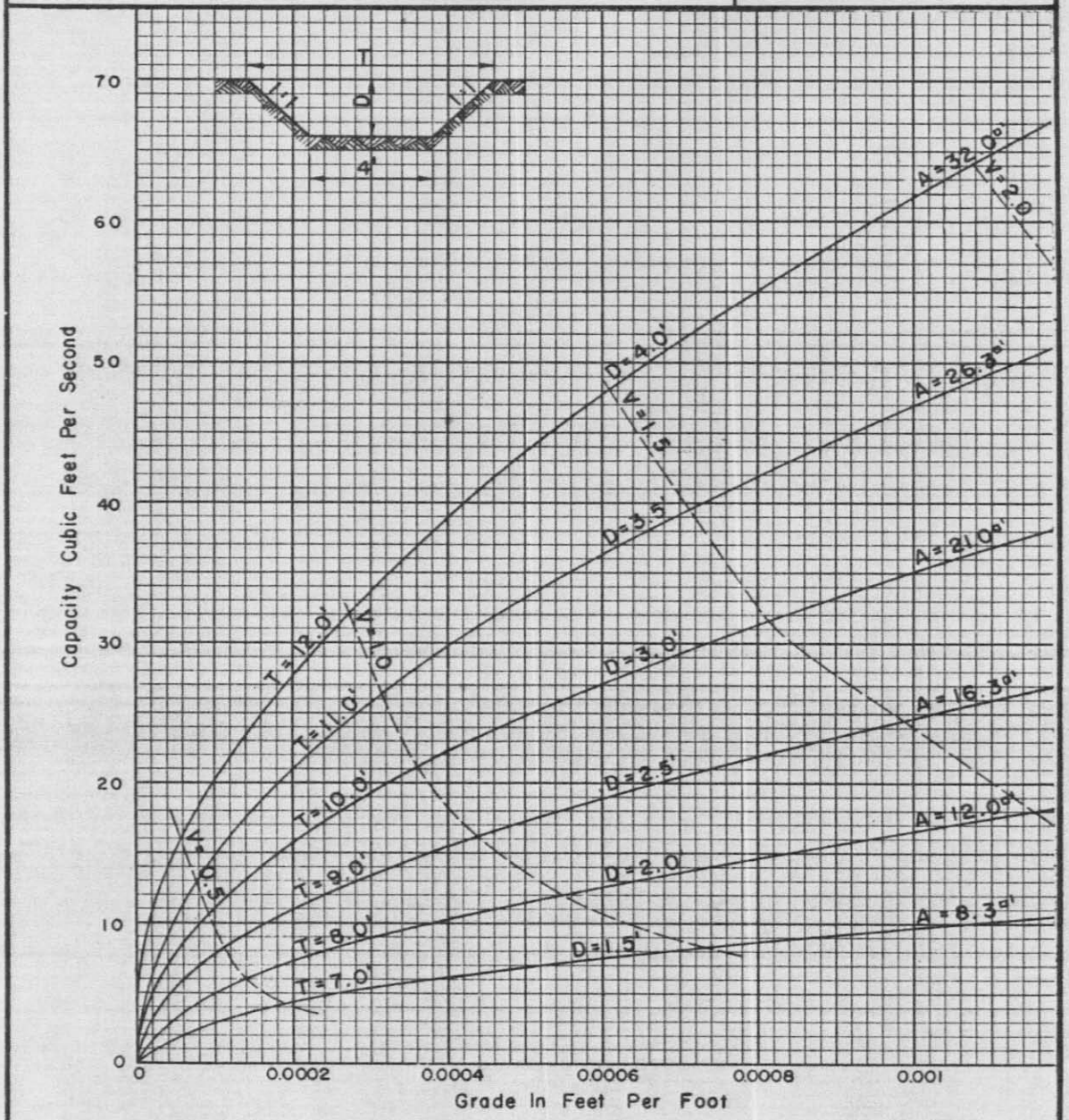


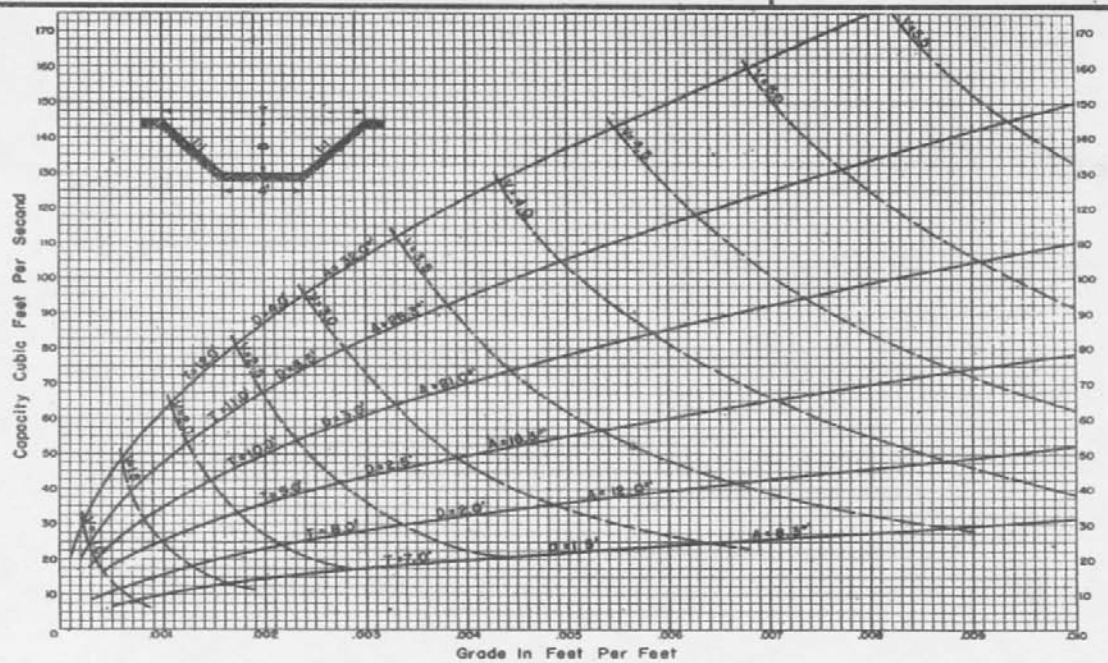
Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 5 OF 42

14-104.6

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1:1
BOTTOM WIDTH 4'-0"



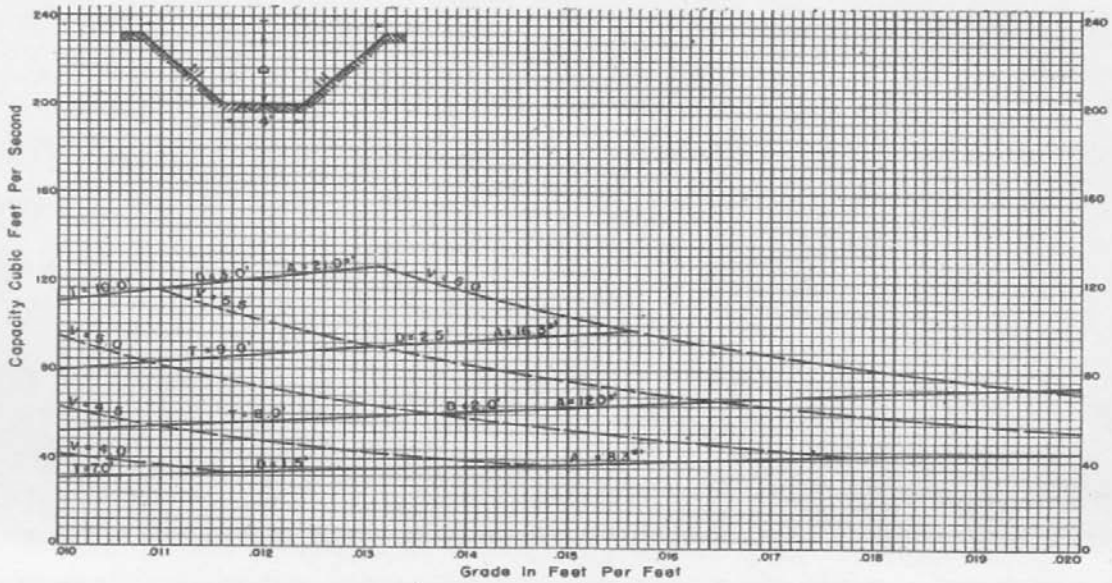


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 6 OF 42

USDA-SCS-HYATTSVILLE, MD. 1970

14-104.7

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1:1
BOTTOM WIDTH 5'-0"

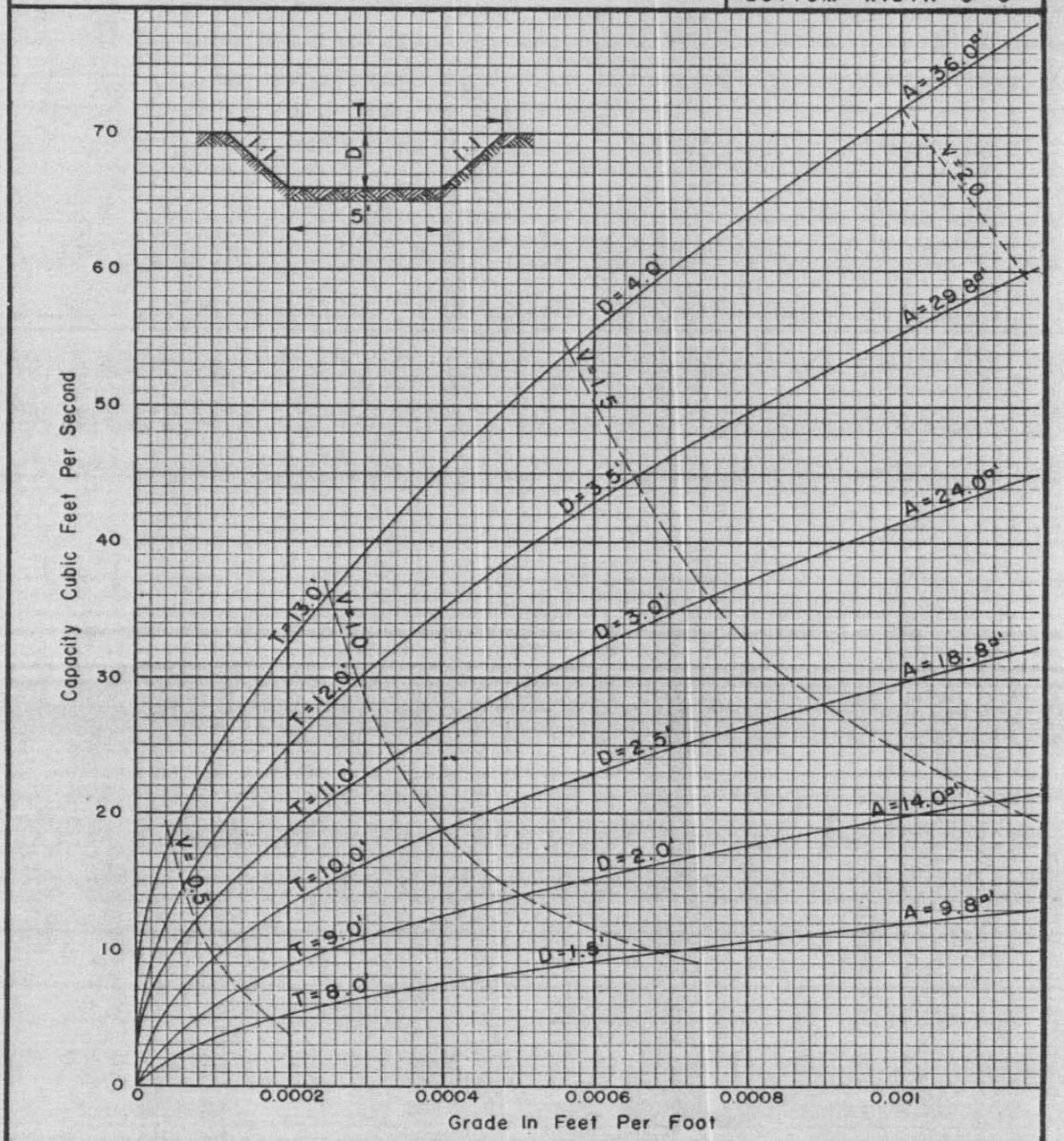


Exhibit 14-6.1

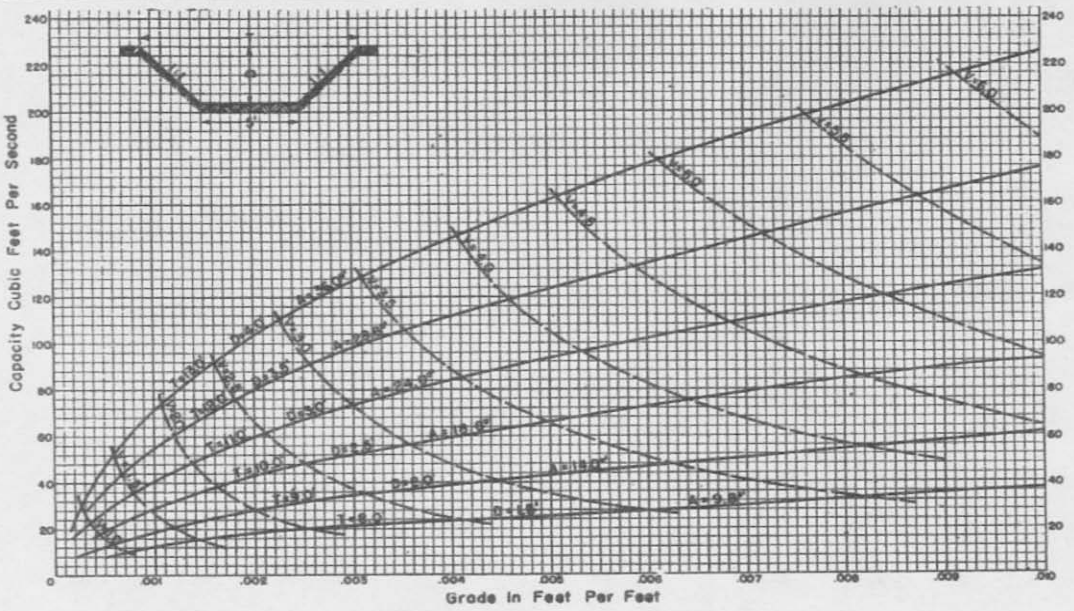
REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 7 OF 42

14-104.8

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1:1
BOTTOM WIDTH 5'-0"



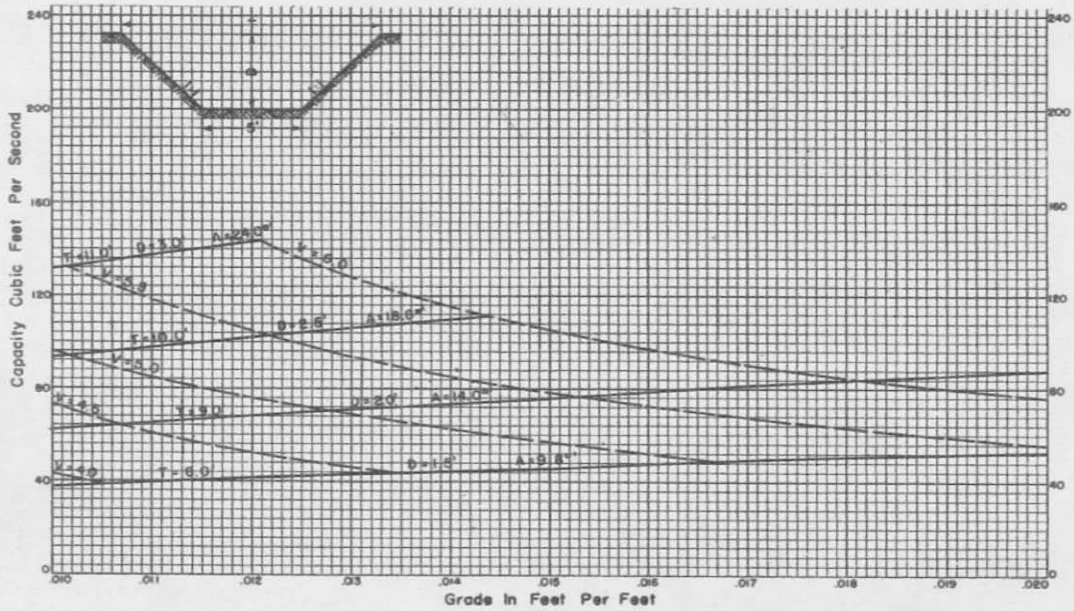


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 8 OF 42

USDA-SCS-HYATTSVILLE, MD. 1970

14-104.9

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1:1
BOTTOM WIDTH 6'-0"

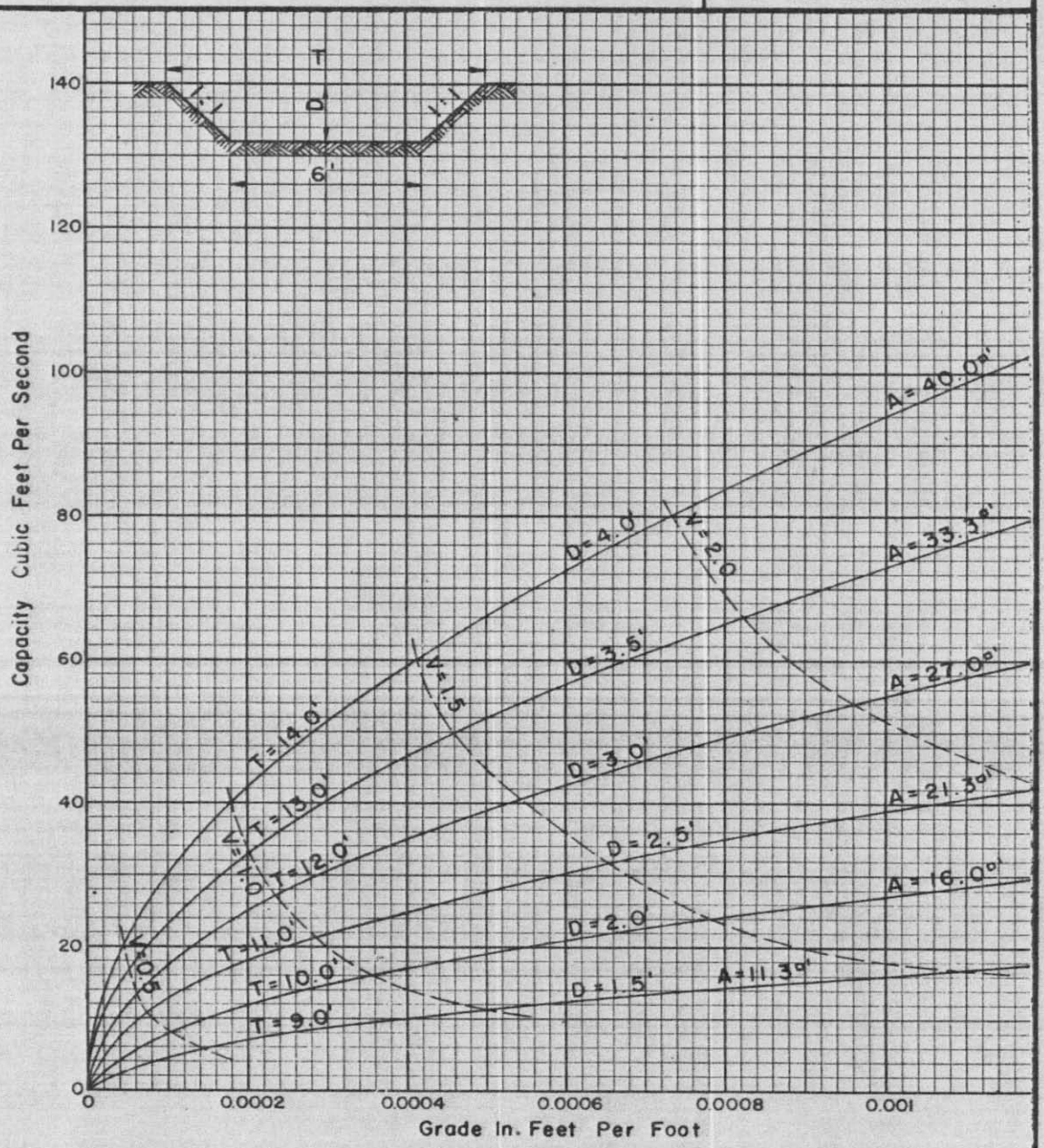


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 9 OF 42

14-104.10

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1:1
BOTTOM WIDTH 7'-0"

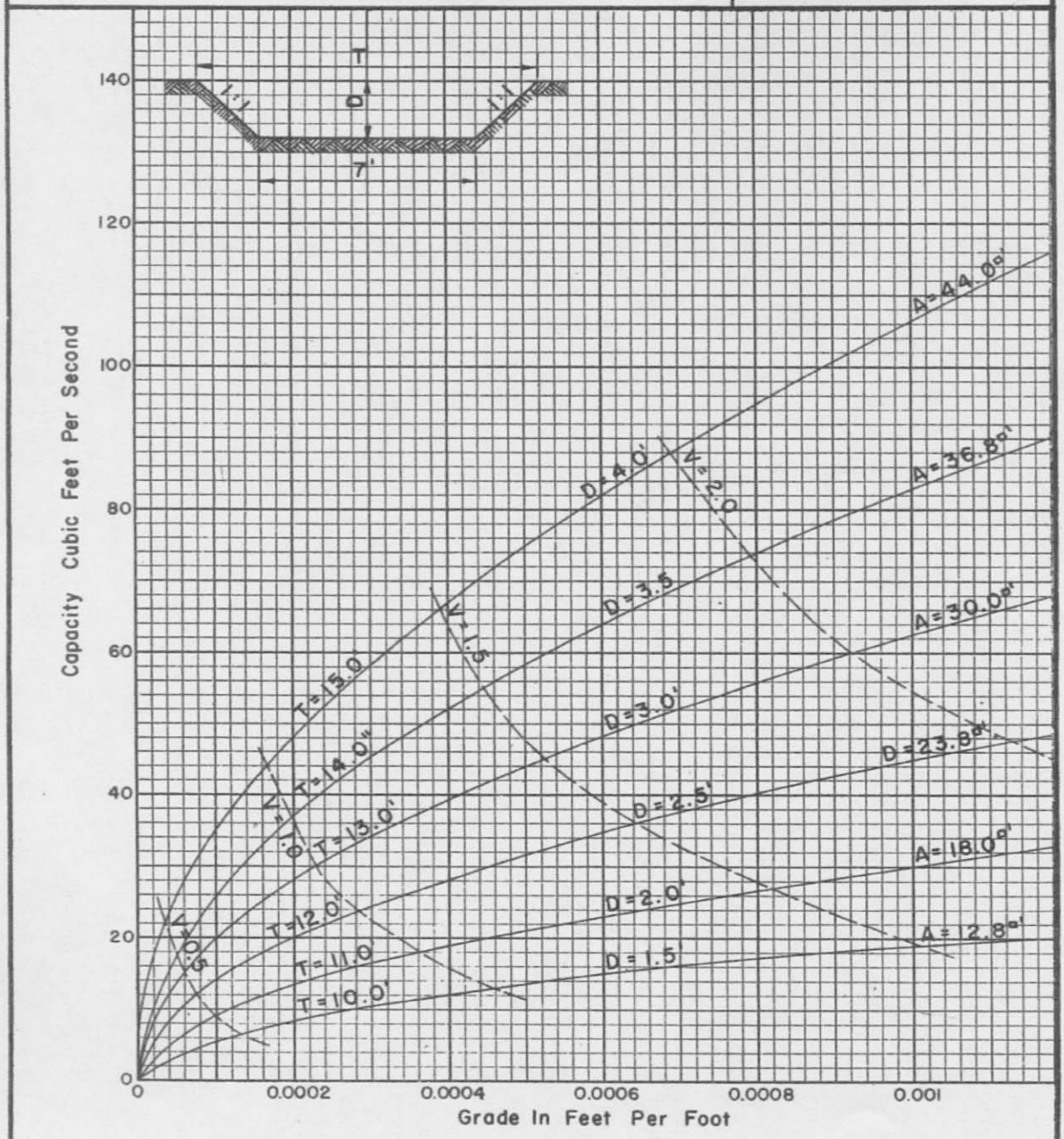


Exhibit 14-6.1

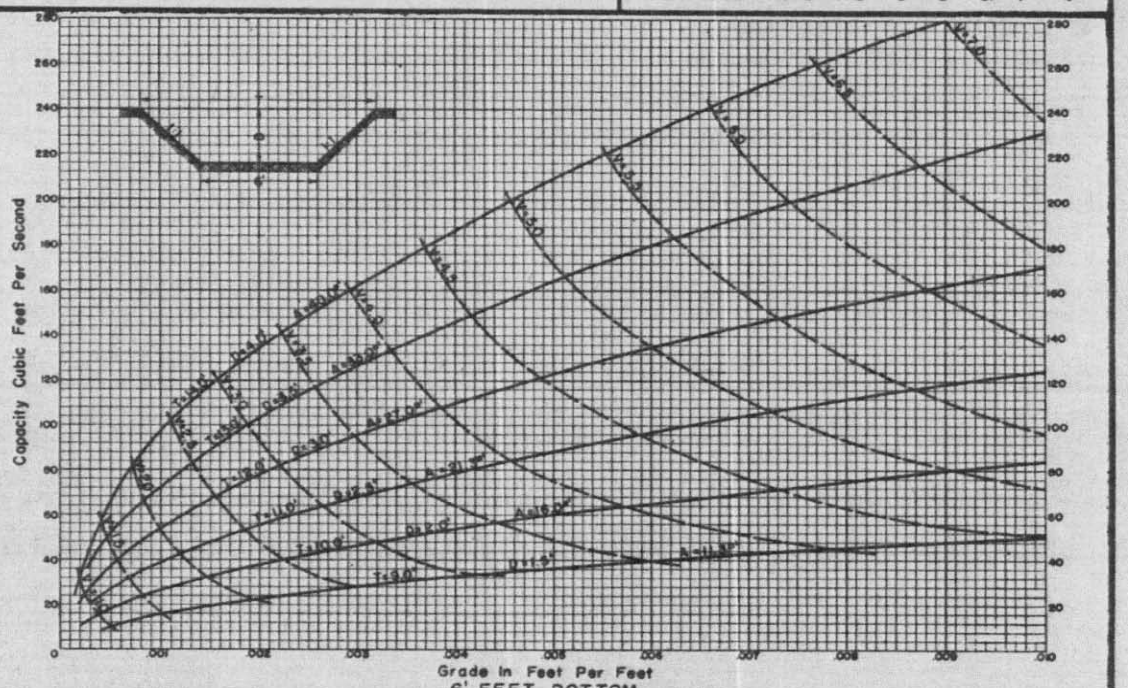
REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 10 OF 42

USDA-SCS-HYATTSVILLE, MD. 1970

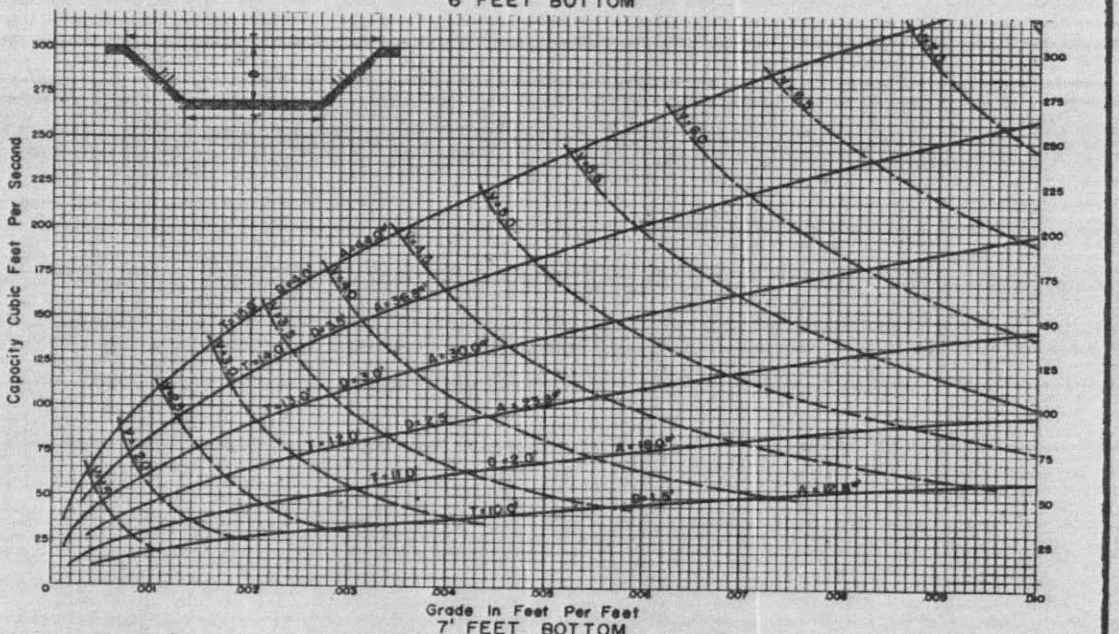
14-104.11

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1:1
BOTTOM WIDTHS 6'-0" & 7'-0"



6' FEET BOTTOM



7' FEET BOTTOM

Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	RTSC-NE-ENG. 1420 SHEET 11 OF 42
MANNING'S EQUATION		

14-104.12

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n=0.035
SIDE SLOPE 1:1
BOTTOM WIDTH 8'-0"

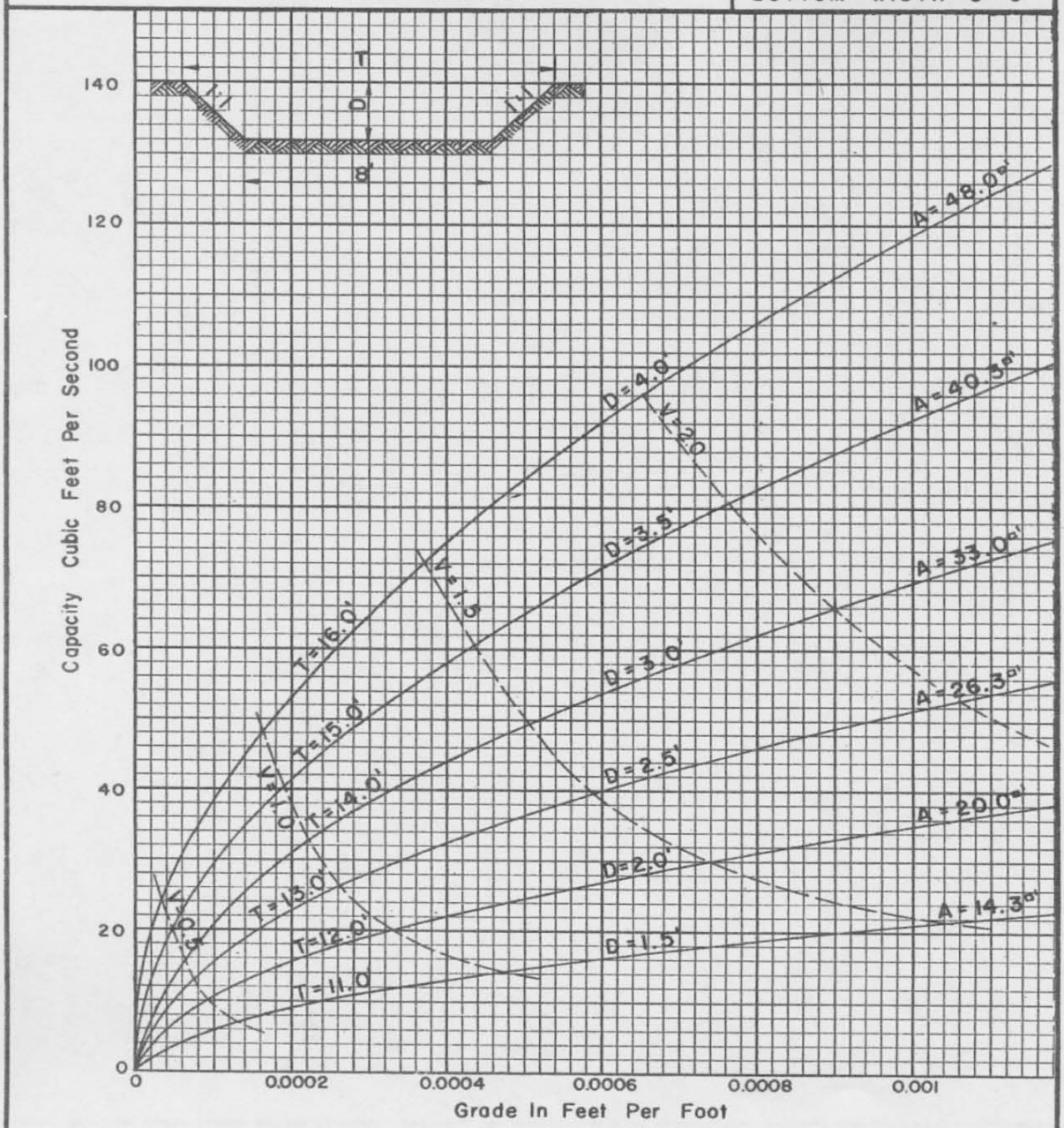


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 12 OF 42

USDA-SCS-HYATTSVILLE, MD. 1970

14-104.13

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1:1
BOTTOM WIDTH 10'-0"

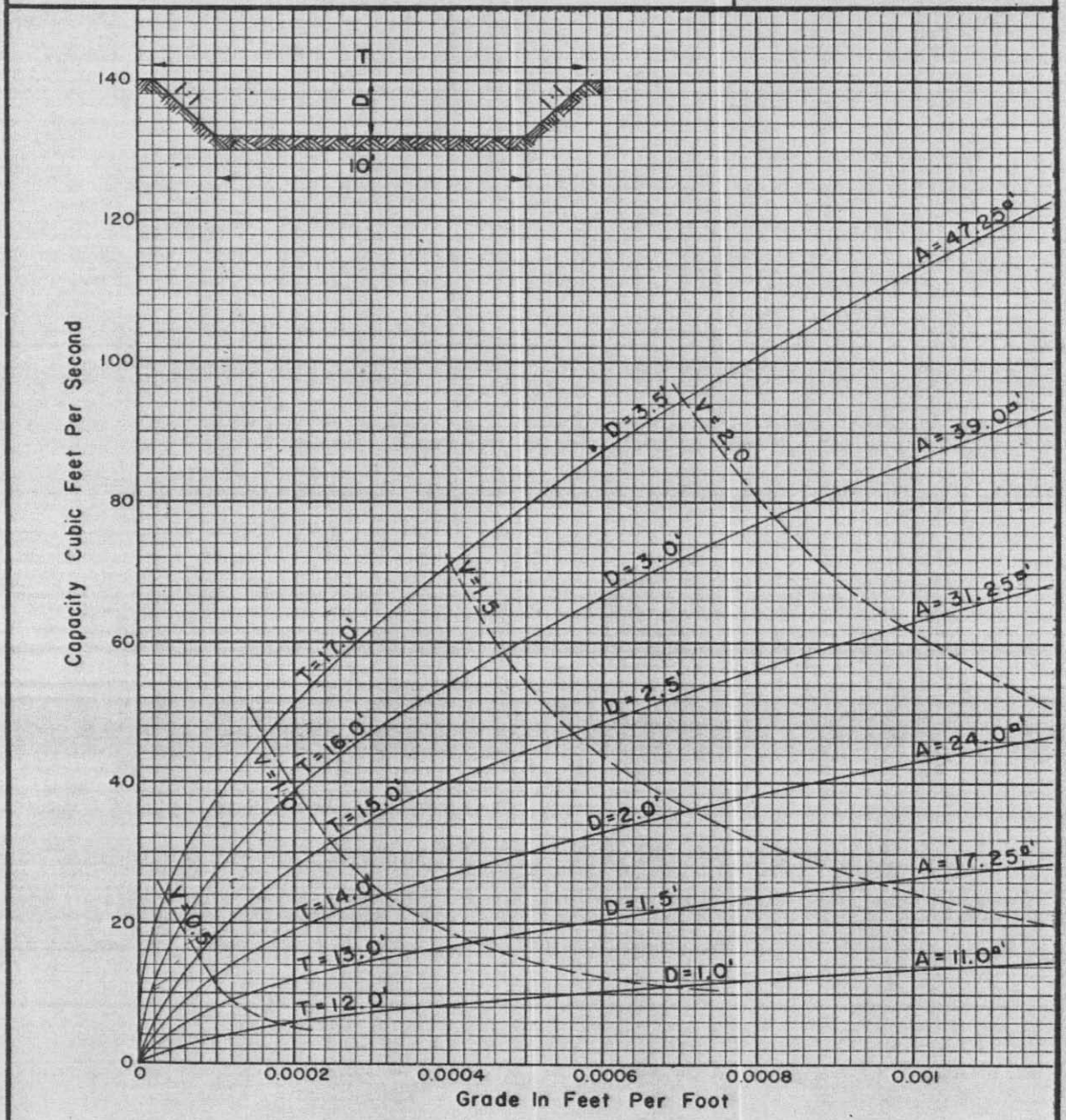


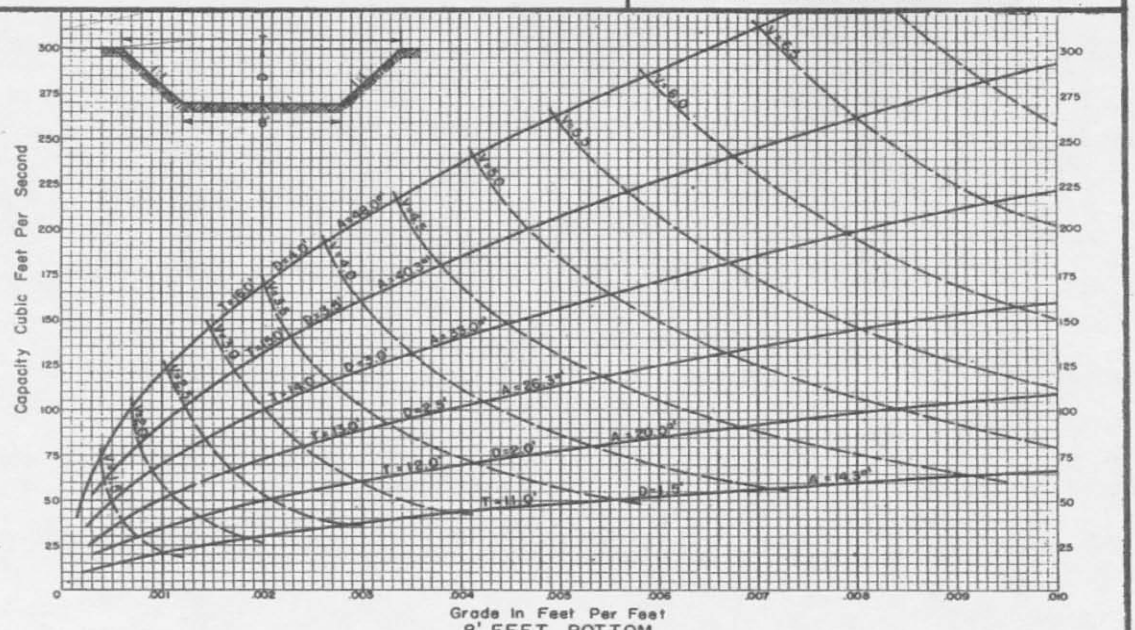
Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 13 OF 42

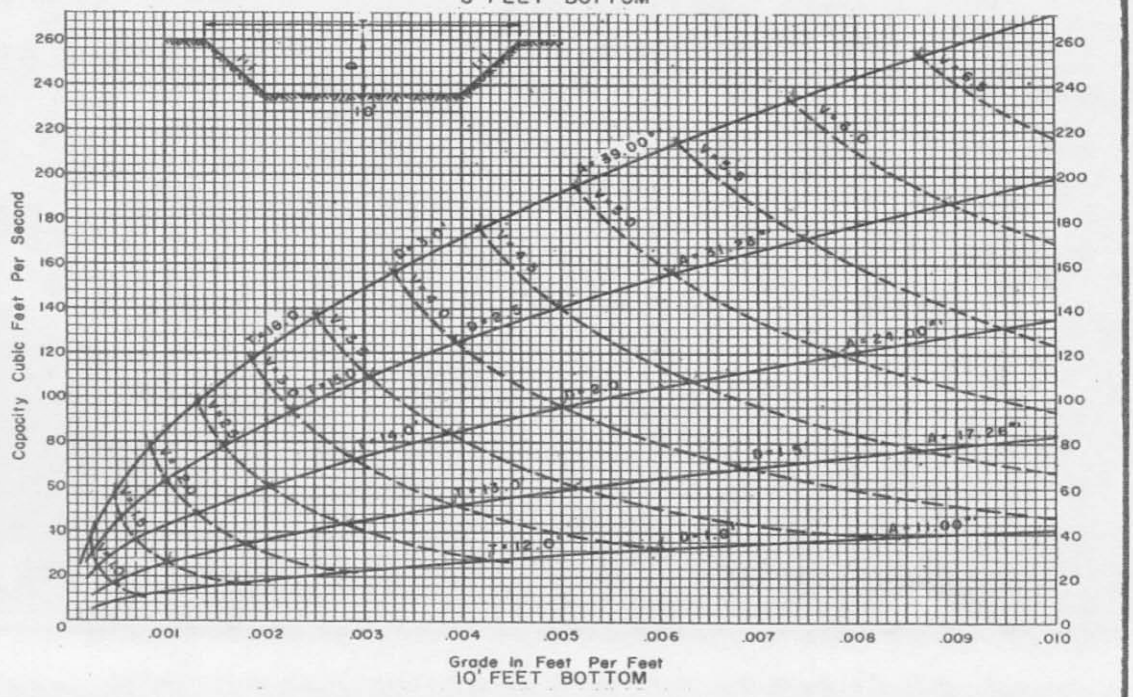
14-104.14

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1:1
BOTTOM WIDTHS 8'-0" & 10'-0"



8' FEET BOTTOM



10' FEET BOTTOM

Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 14 OF 42

USDA-SCS-HYATTSVILLE, MD. 1970

14-104.15

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 2'-0"

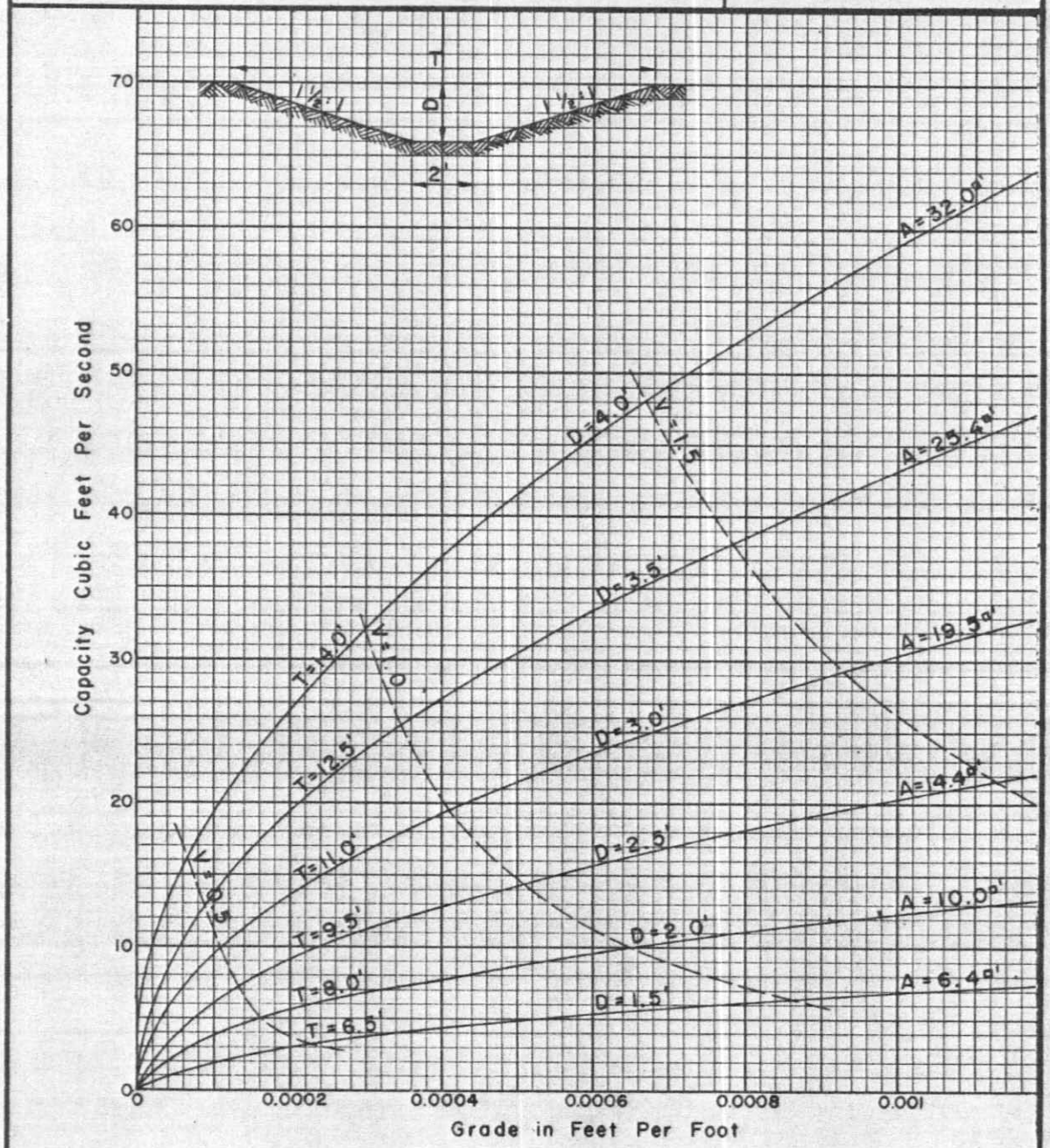


Exhibit 14-6.1

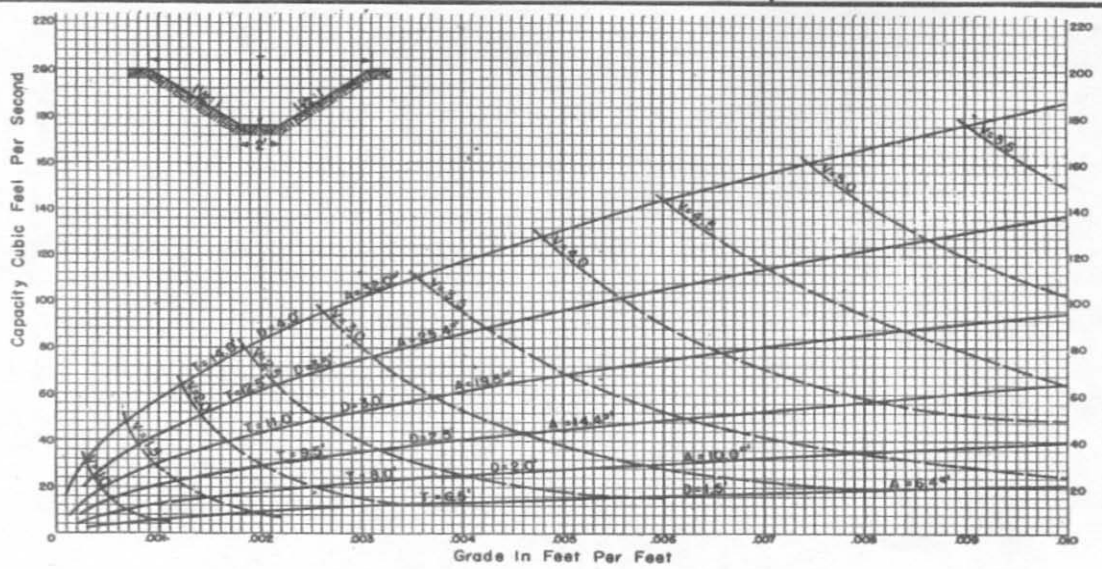
REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 15 OF 42

14-104.16

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 2'-0"



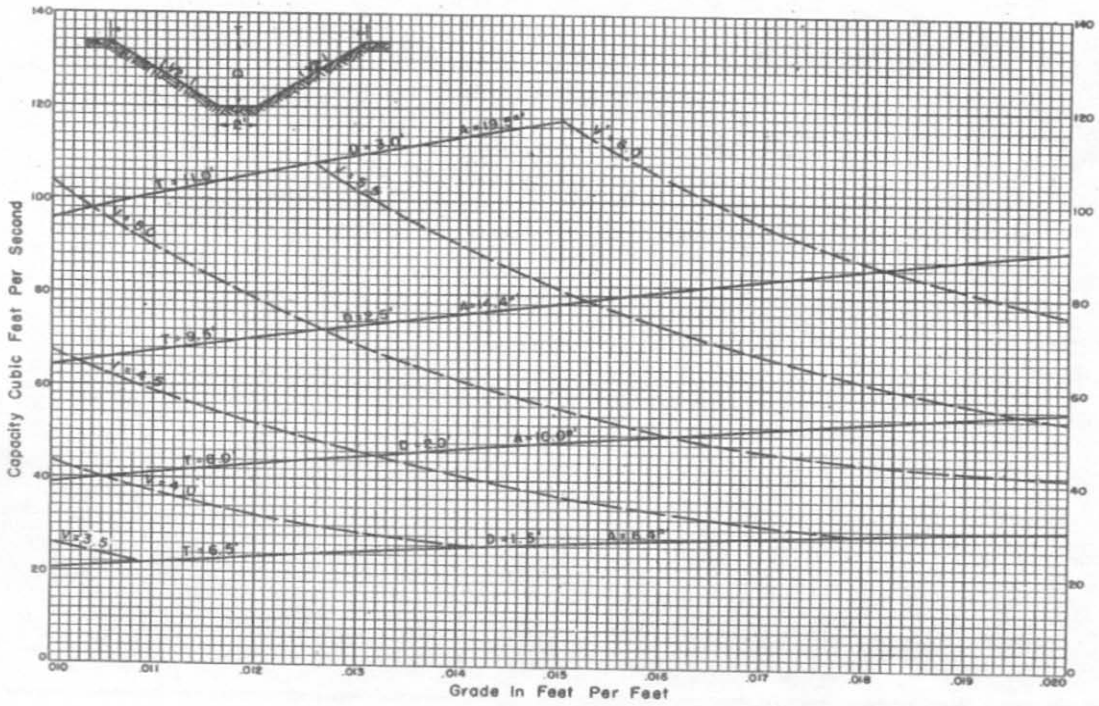


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 16 OF 42

USDA-SCS-HYATTSVILLE, MD. 1970

14-104.17

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 3'-0"

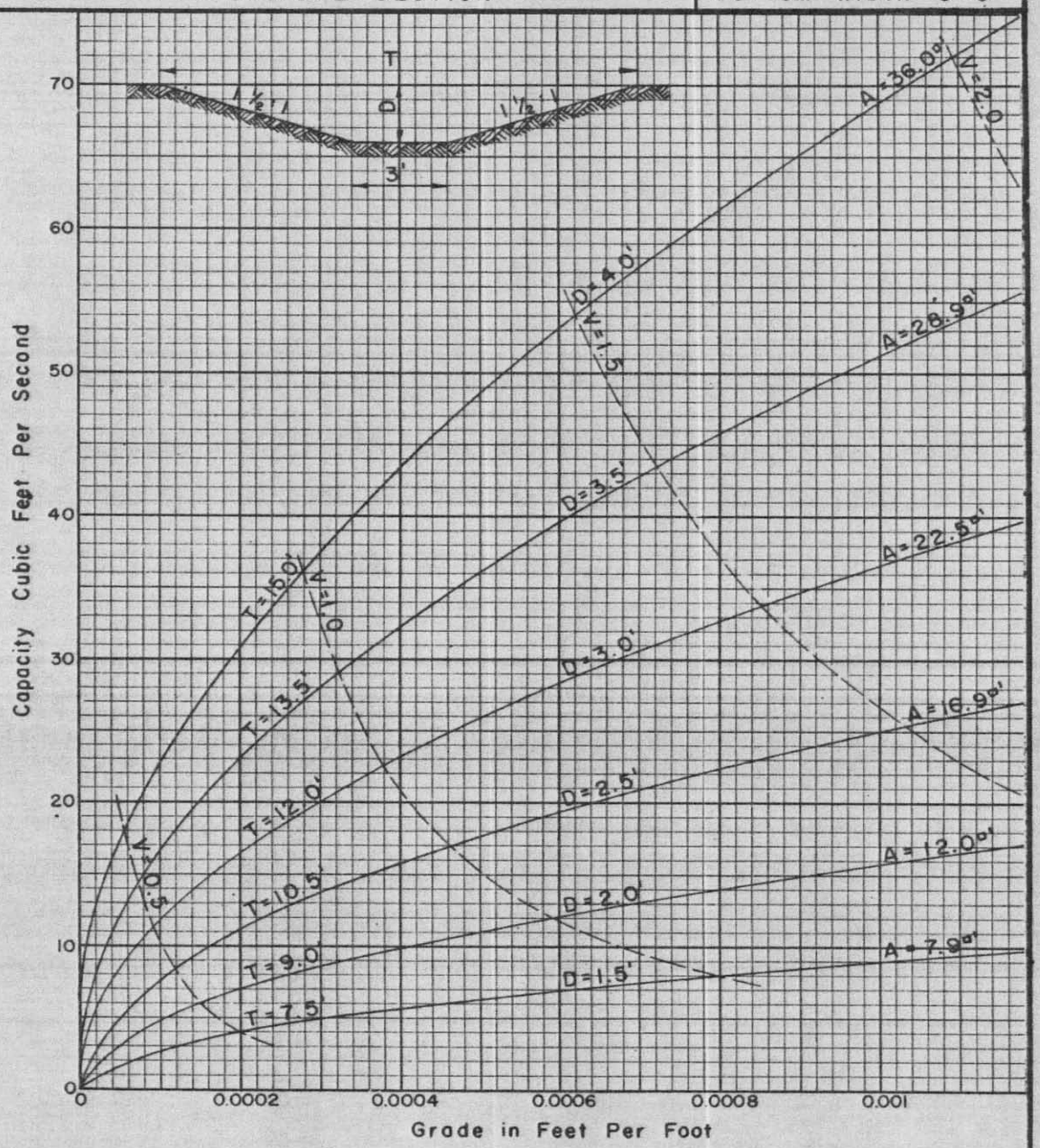


Exhibit 14-6.1

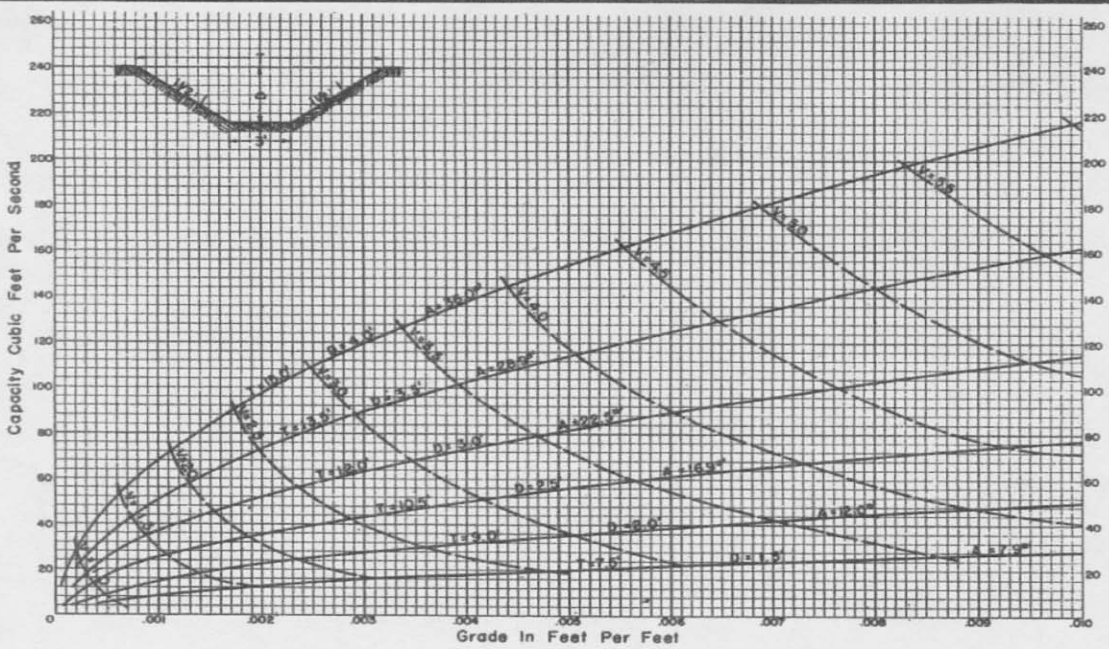
REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	RTSC-NE-ENG. 1420 SHEET 17 OF 42
MANNING'S EQUATION		

USDA-SCS-HYATTSVILLE, MD. 1979

14-104.18

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 3'-0"



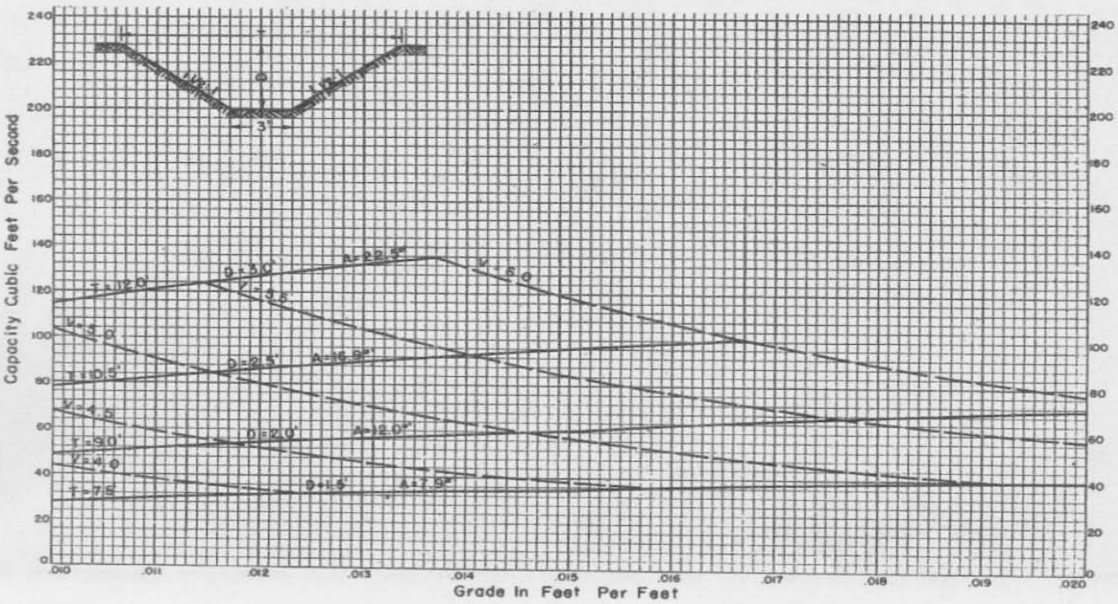


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 18 OF 42

14-104.19

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 4'-0"

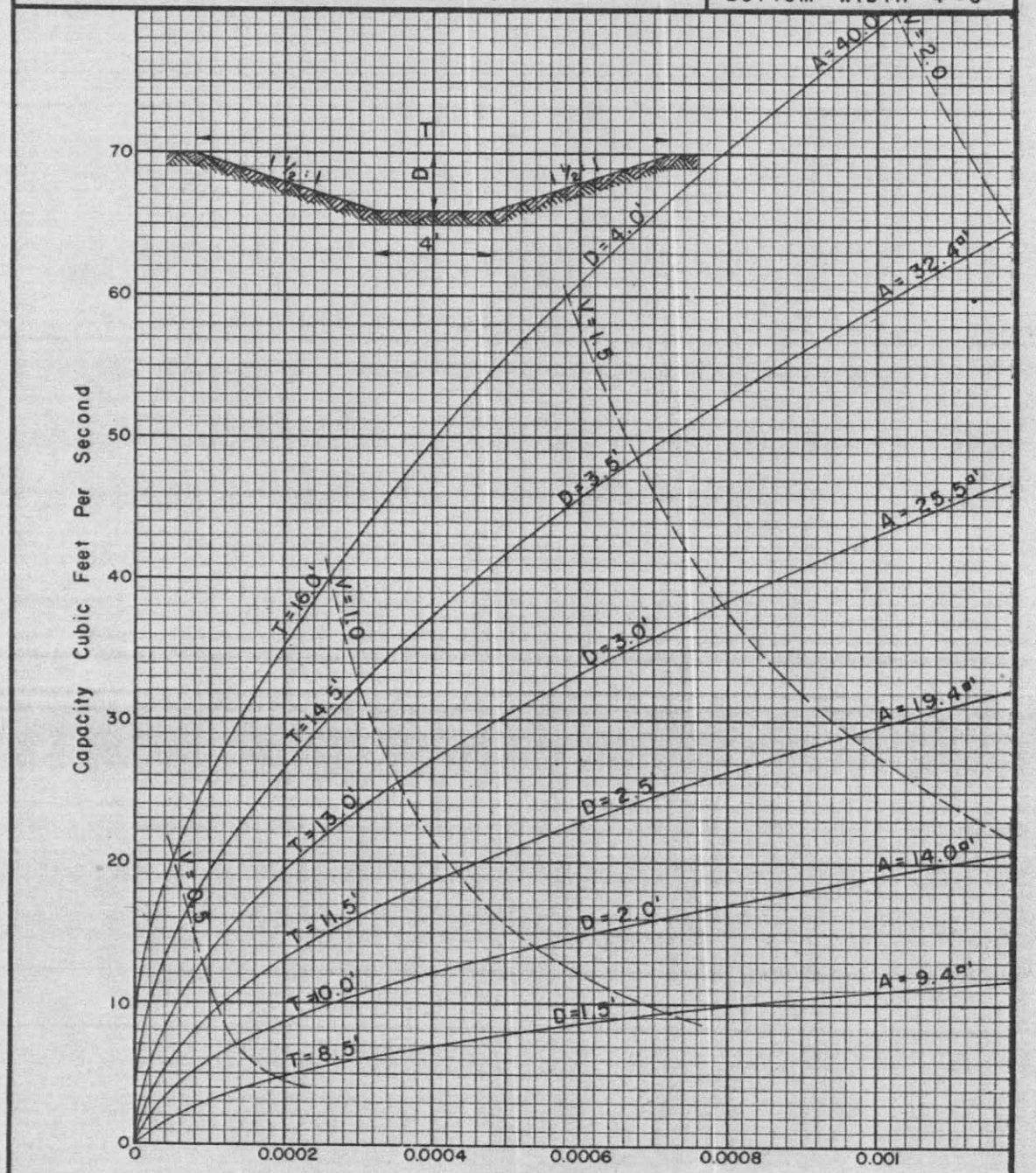


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 19 OF 42

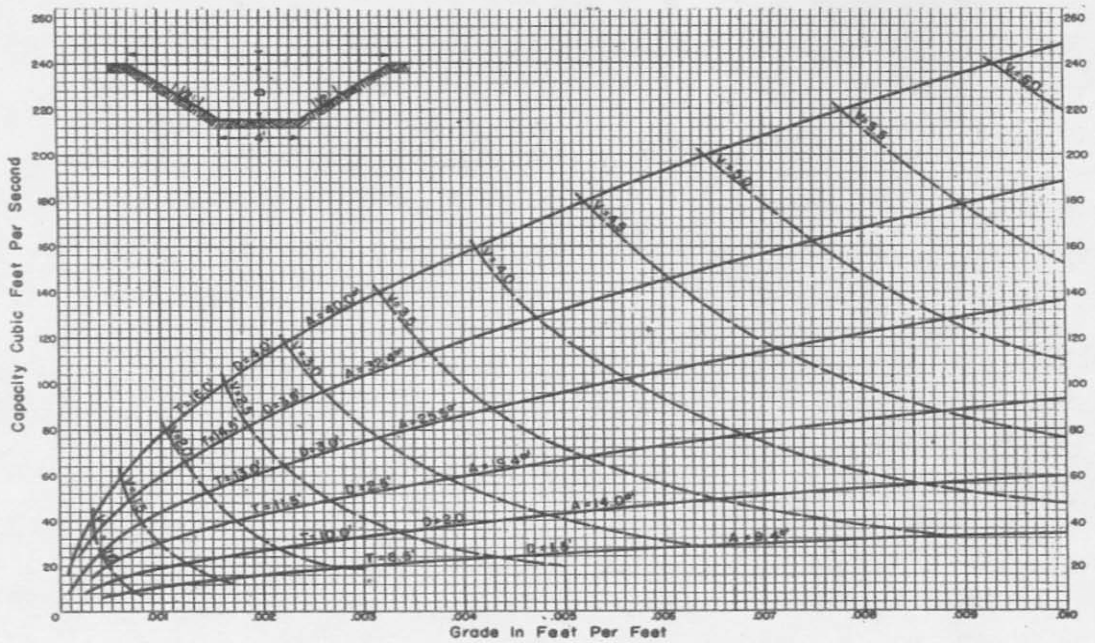
USDA-SCS-HYATTSVILLE, MD. 1970

14-104.20

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 4'-0"



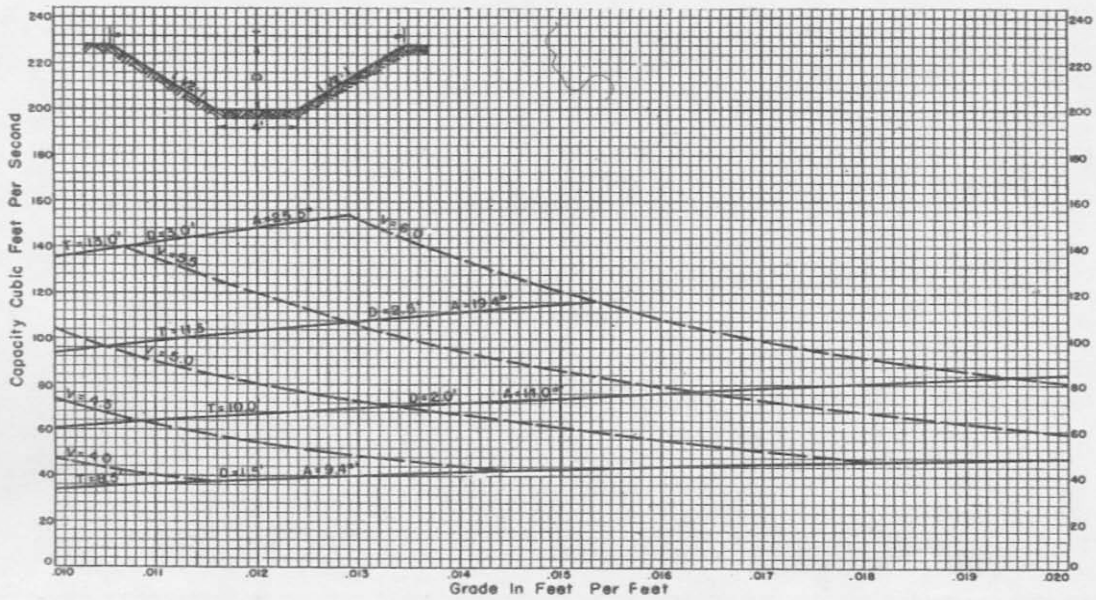


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 20 OF 42

14-104.21

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 5'-0"

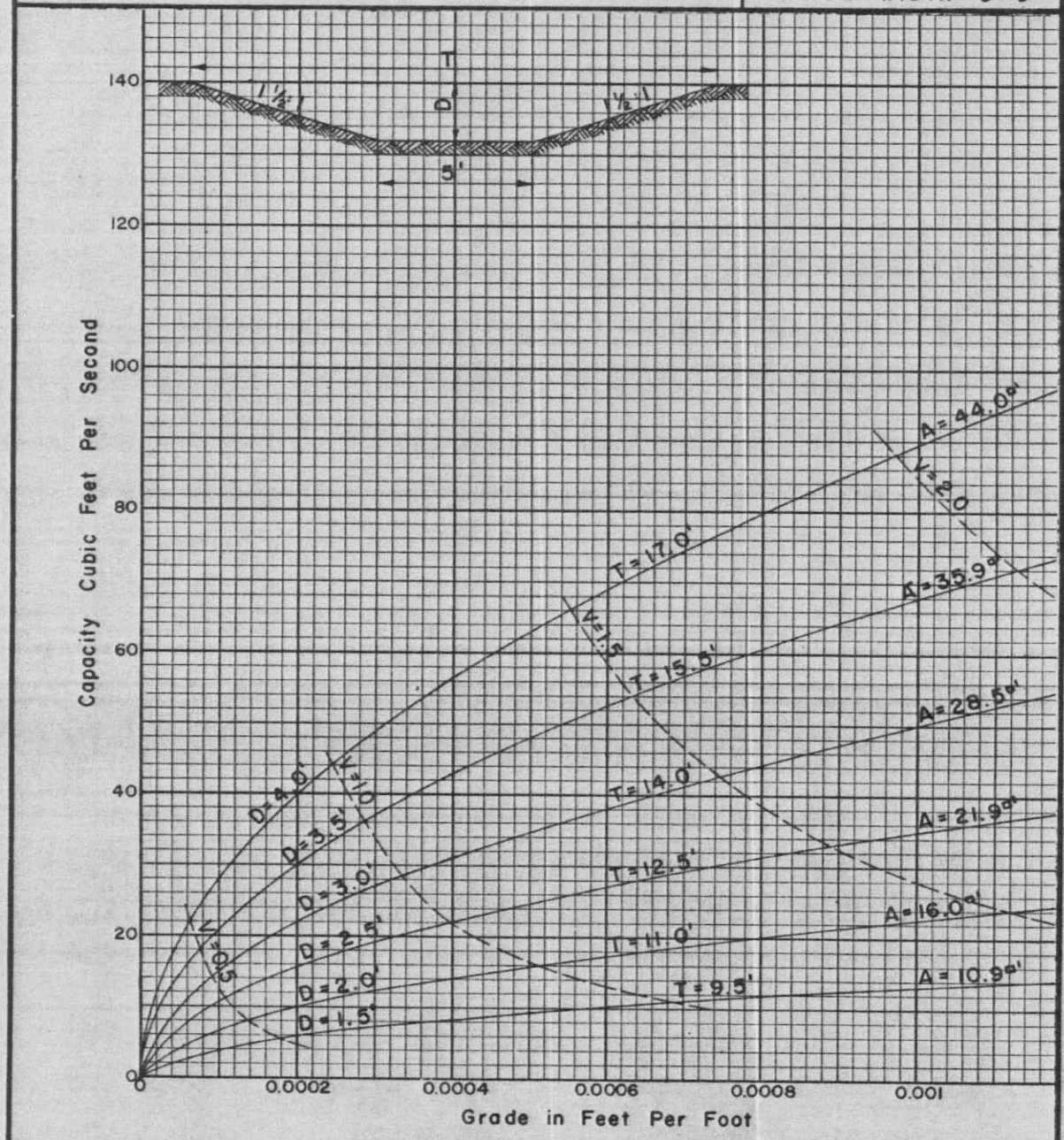


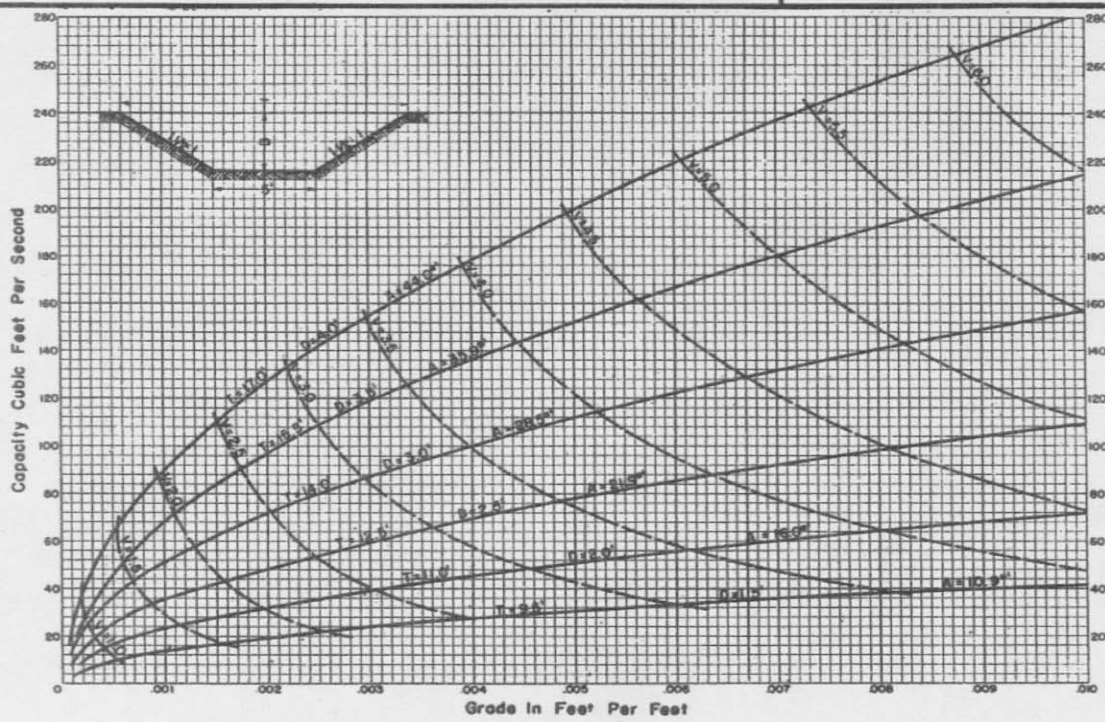
Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 21 OF 42

14-104.22

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 5' - 0"



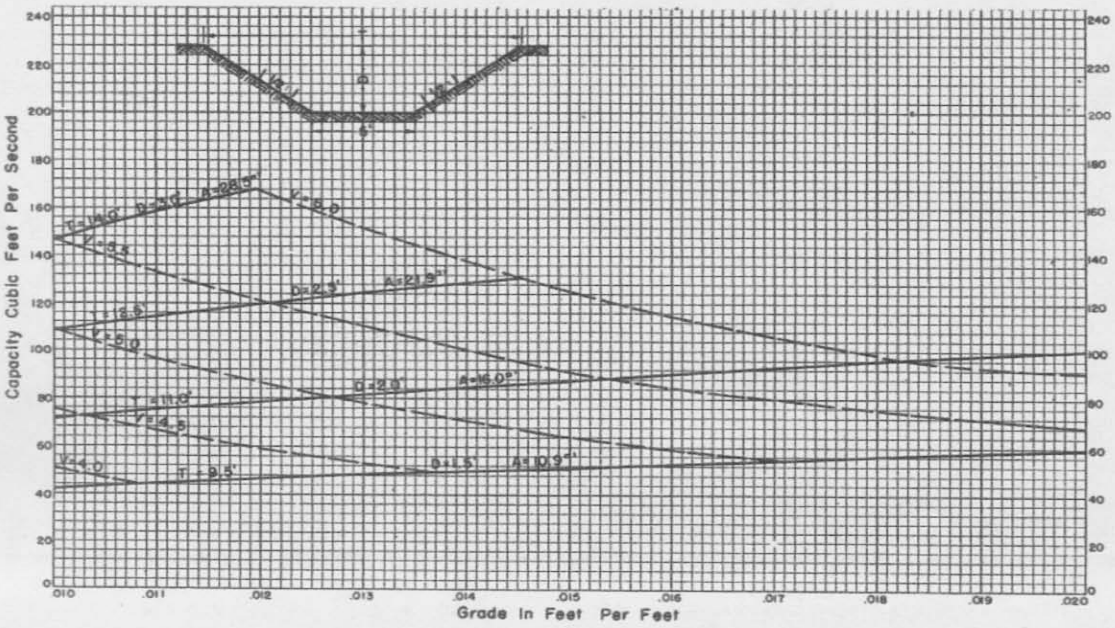


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 22 OF 42

14-104.23

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 6'-0"

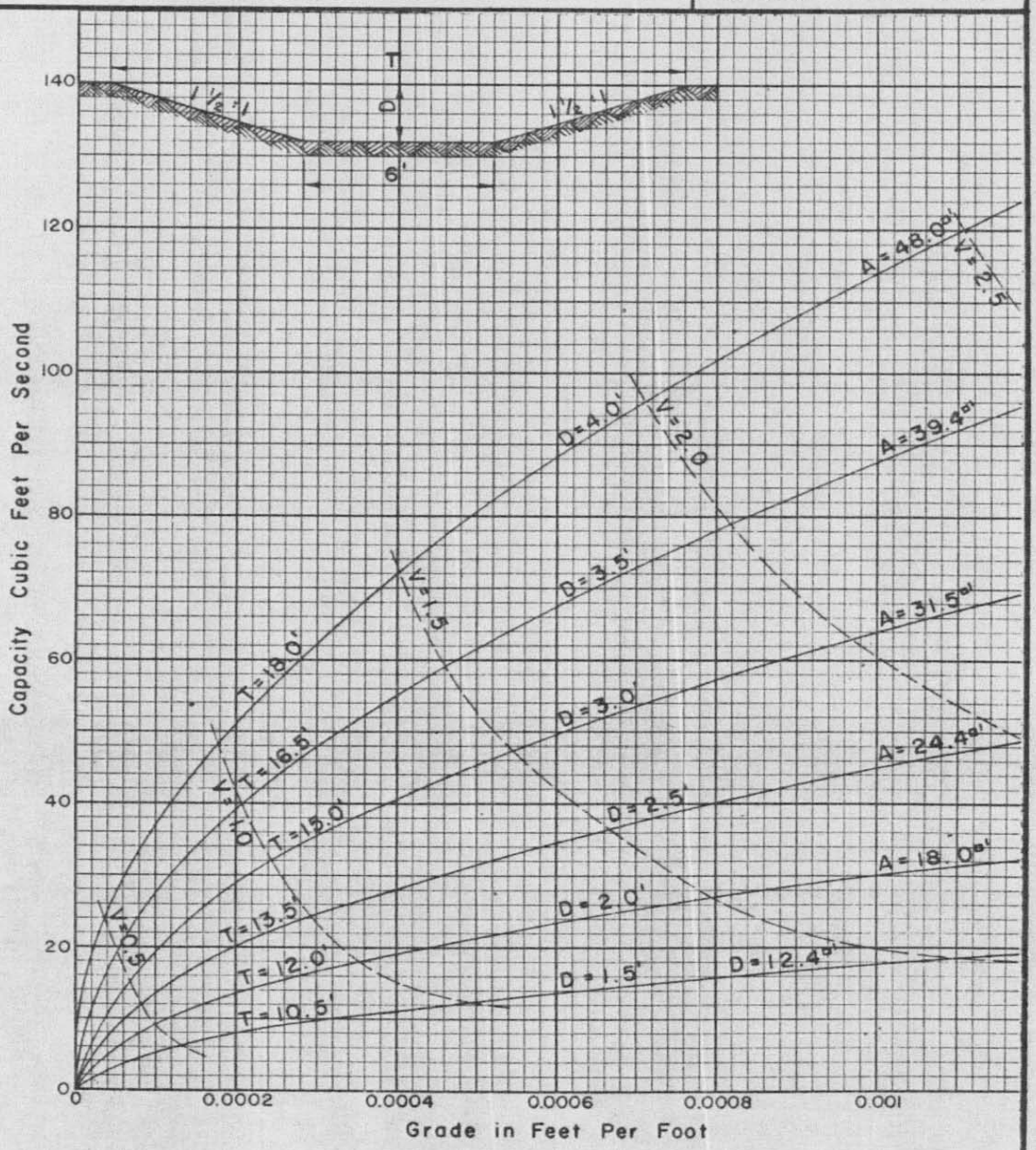


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 23 OF 42

14-104.24

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 7'-0"

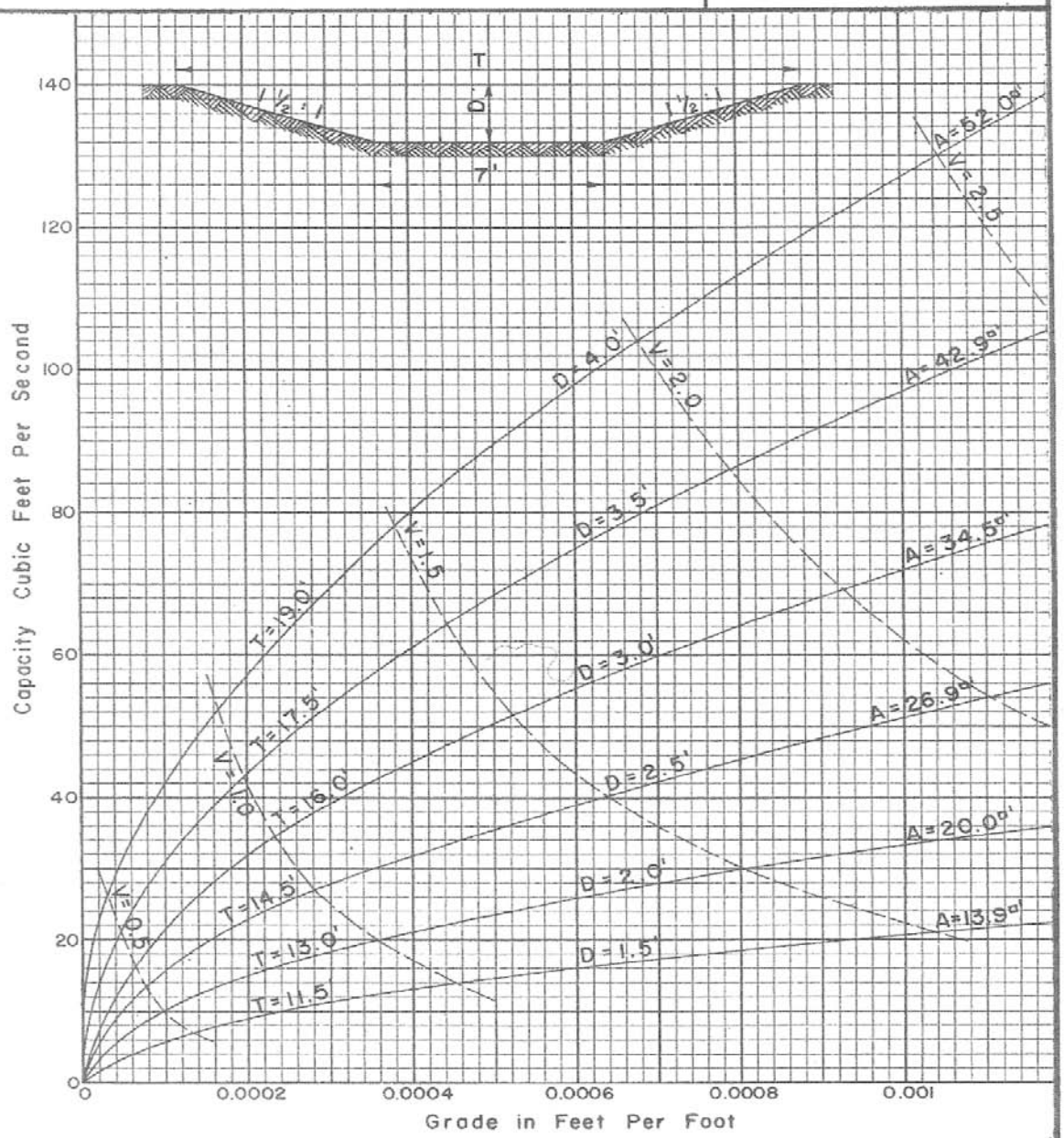


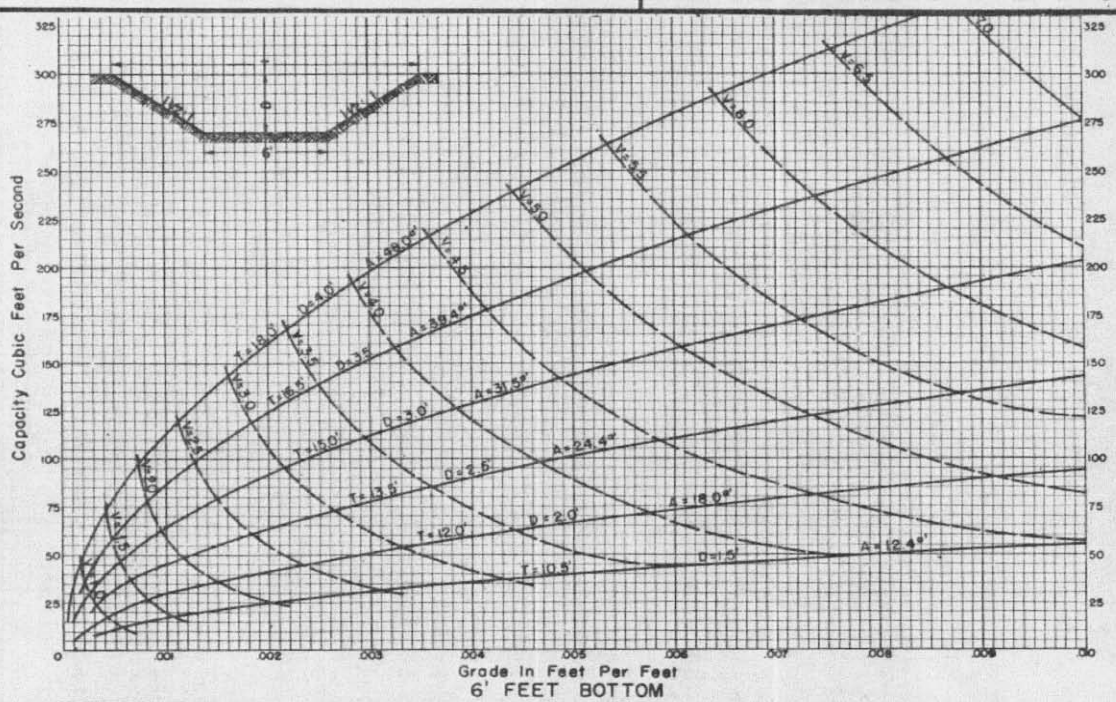
Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 24 OF 42

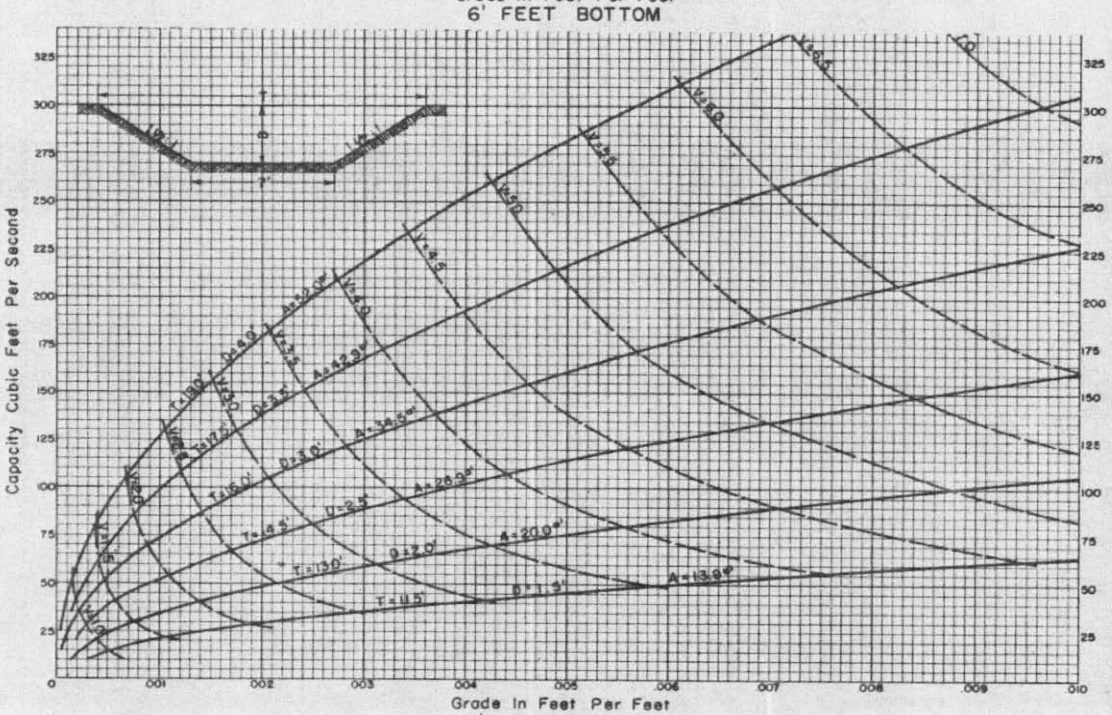
14-104.25

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1½ : 1
BOTTOM WIDTHS 6'-0" & 7'-0"



6' FEET BOTTOM



7' FEET BOTTOM

Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 25 OF 42

14-104.26

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 8' - 0"

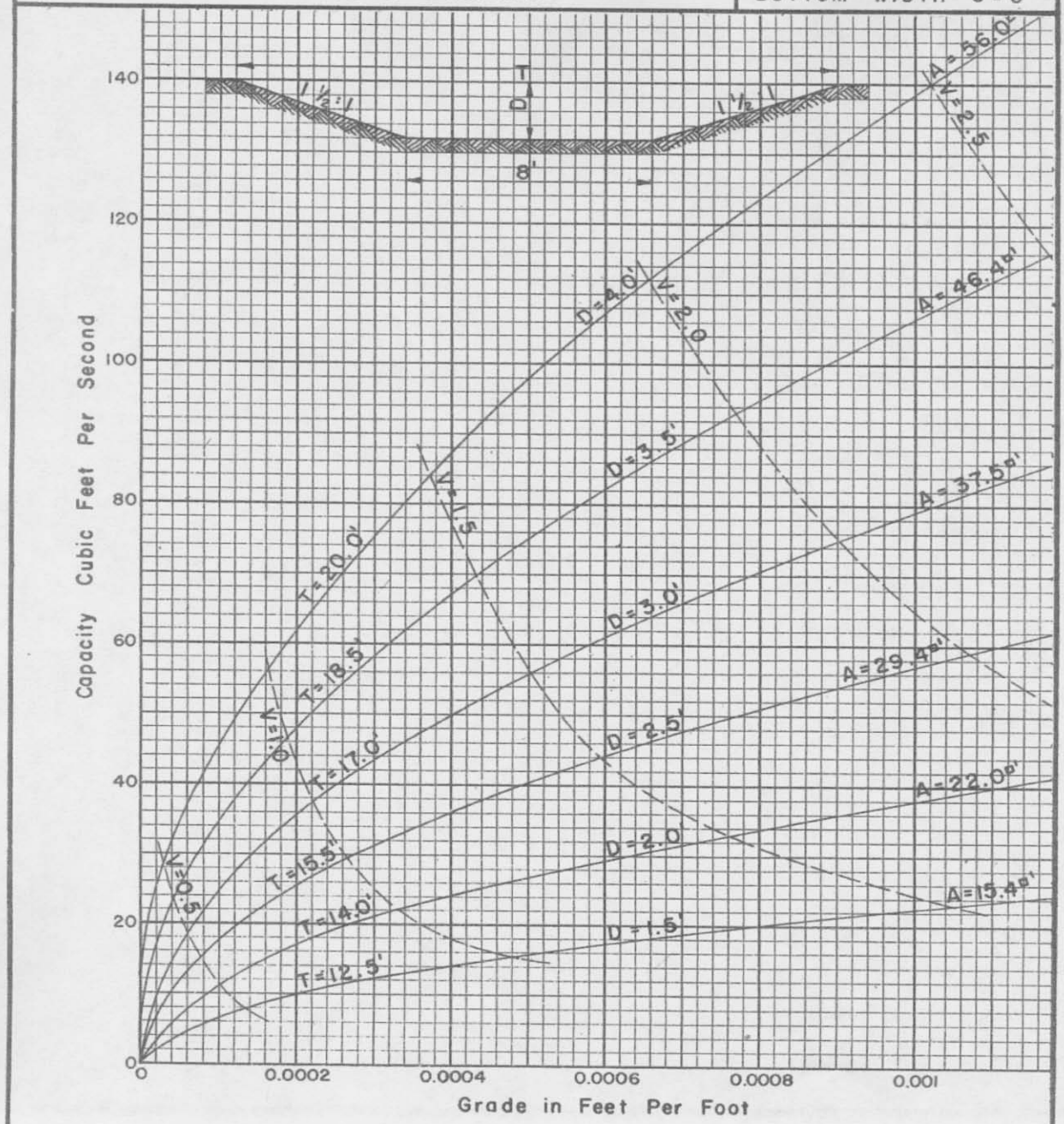


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 26 OF 42

14-104.27

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1½ : 1
BOTTOM WIDTH 10'-0"

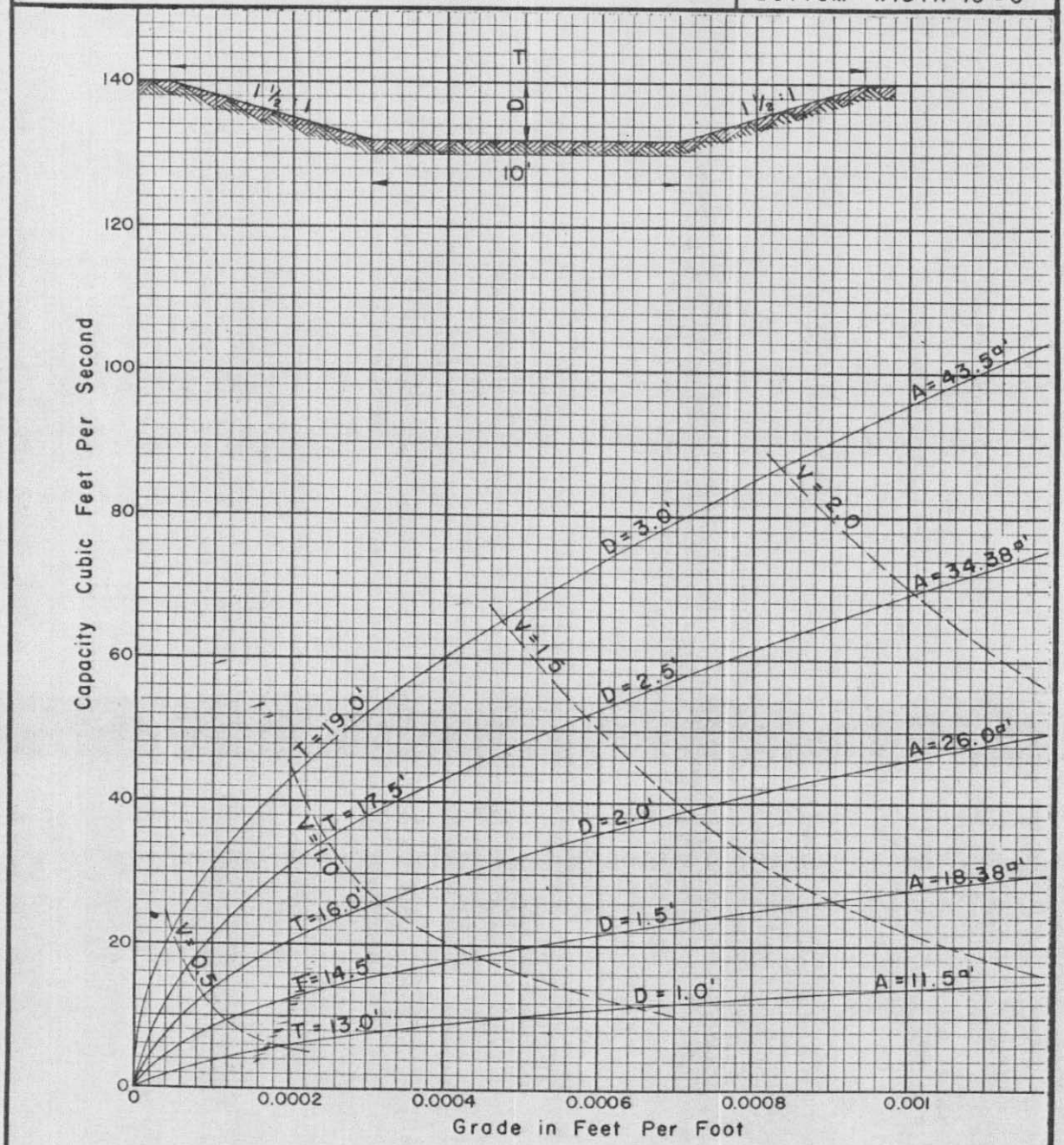


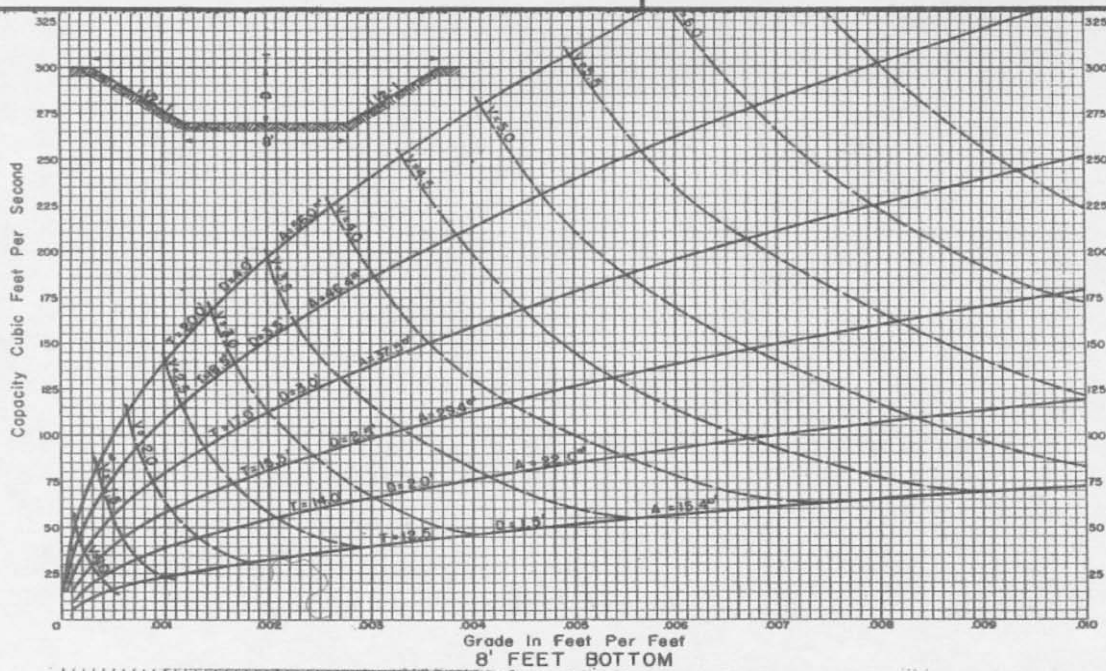
Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 27 OF 42

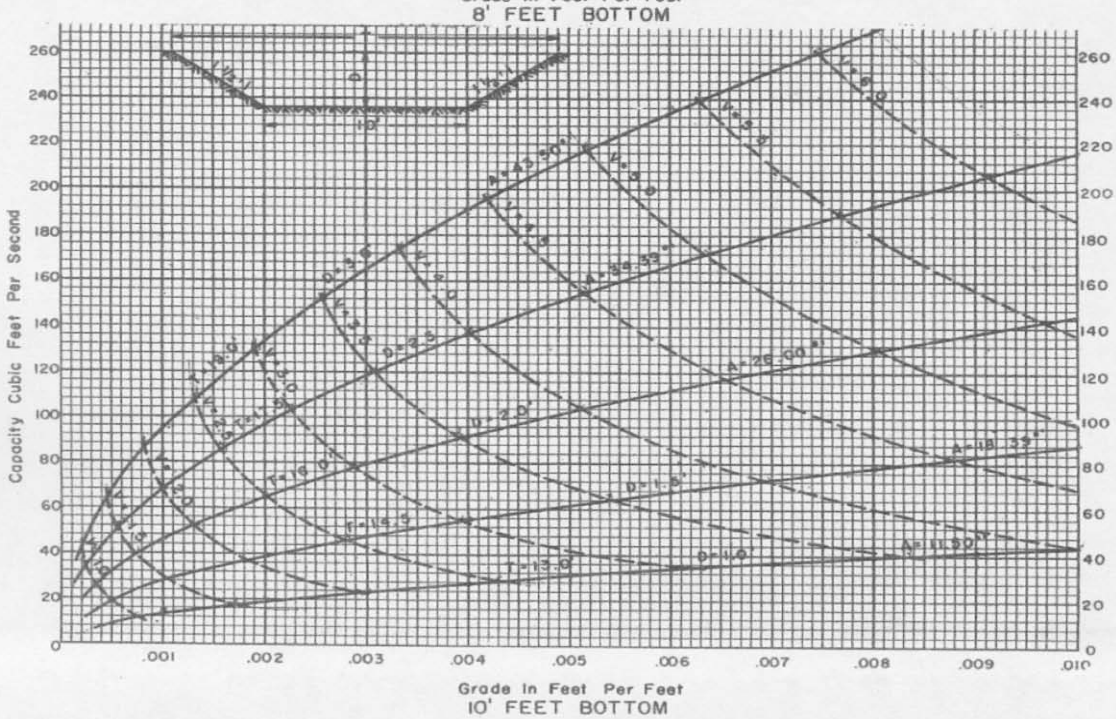
14-104.28

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 1½ : 1
BOTTOM WIDTHS 8'-0" & 10'-0"



8' FEET BOTTOM



10' FEET BOTTOM

Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 28 OF 42

14-104.29

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 2:1
BOTTOM WIDTH 2'-0"

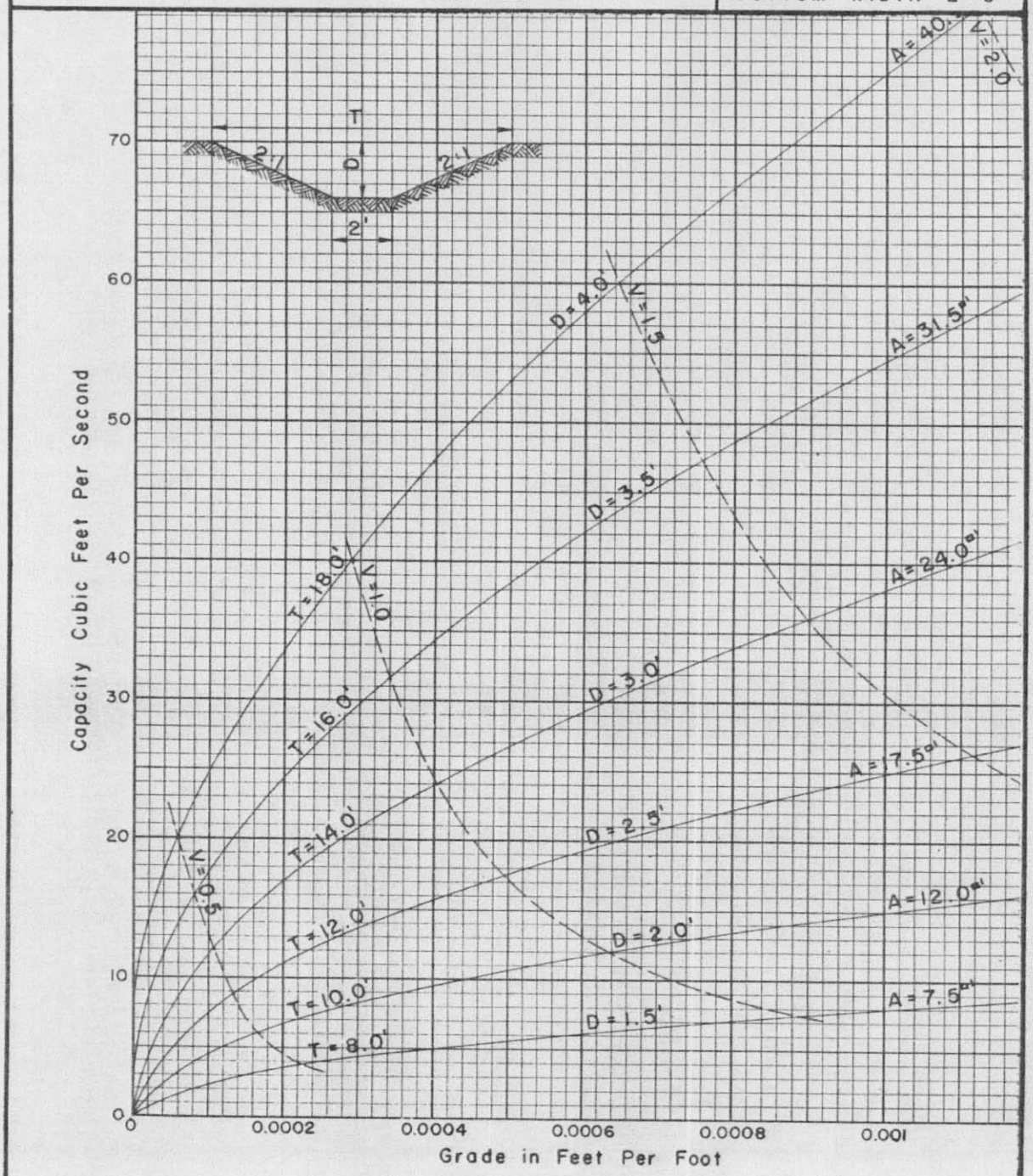


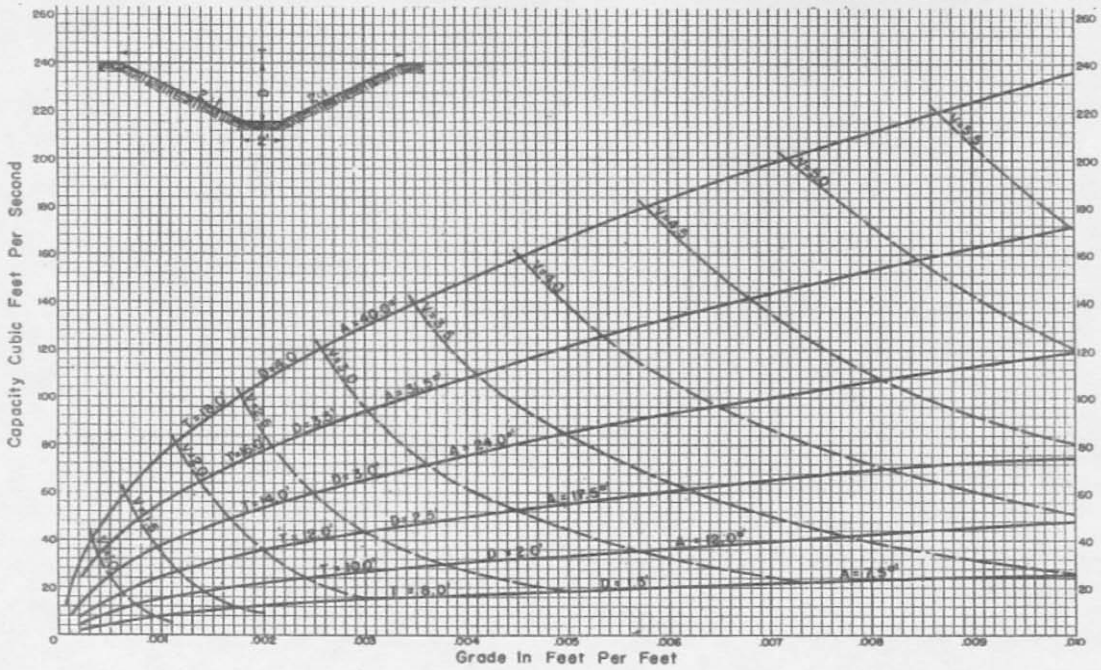
Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 29 OF 42

14-104.30

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 2:1
BOTTOM WIDTH 2'-0"



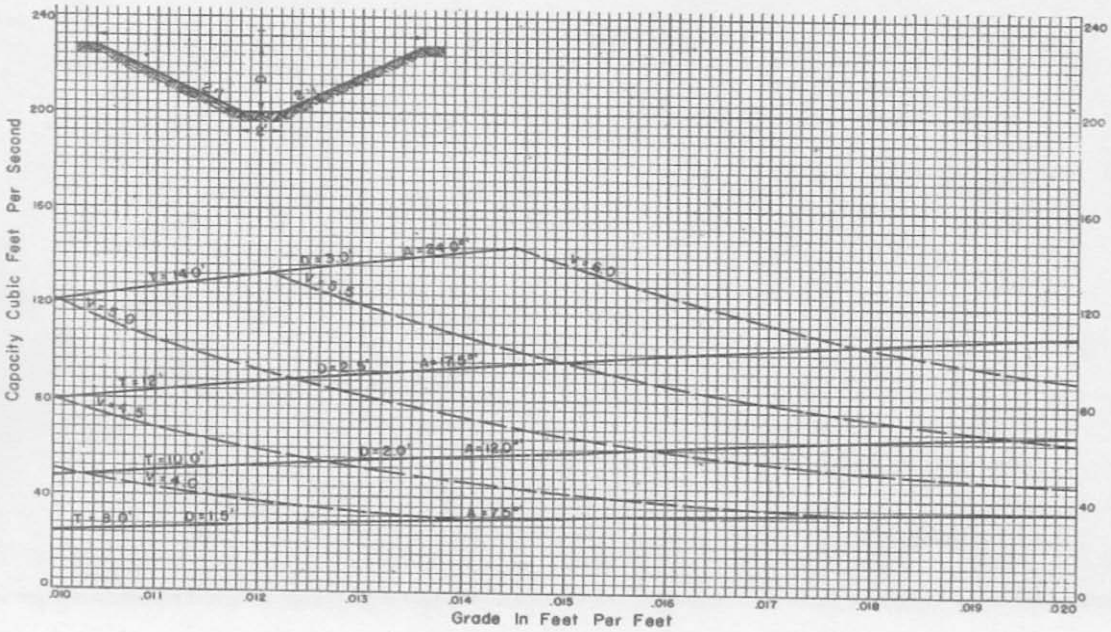


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 30 OF 42

14-104.31

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 2:1
BOTTOM WIDTH 3'-0"

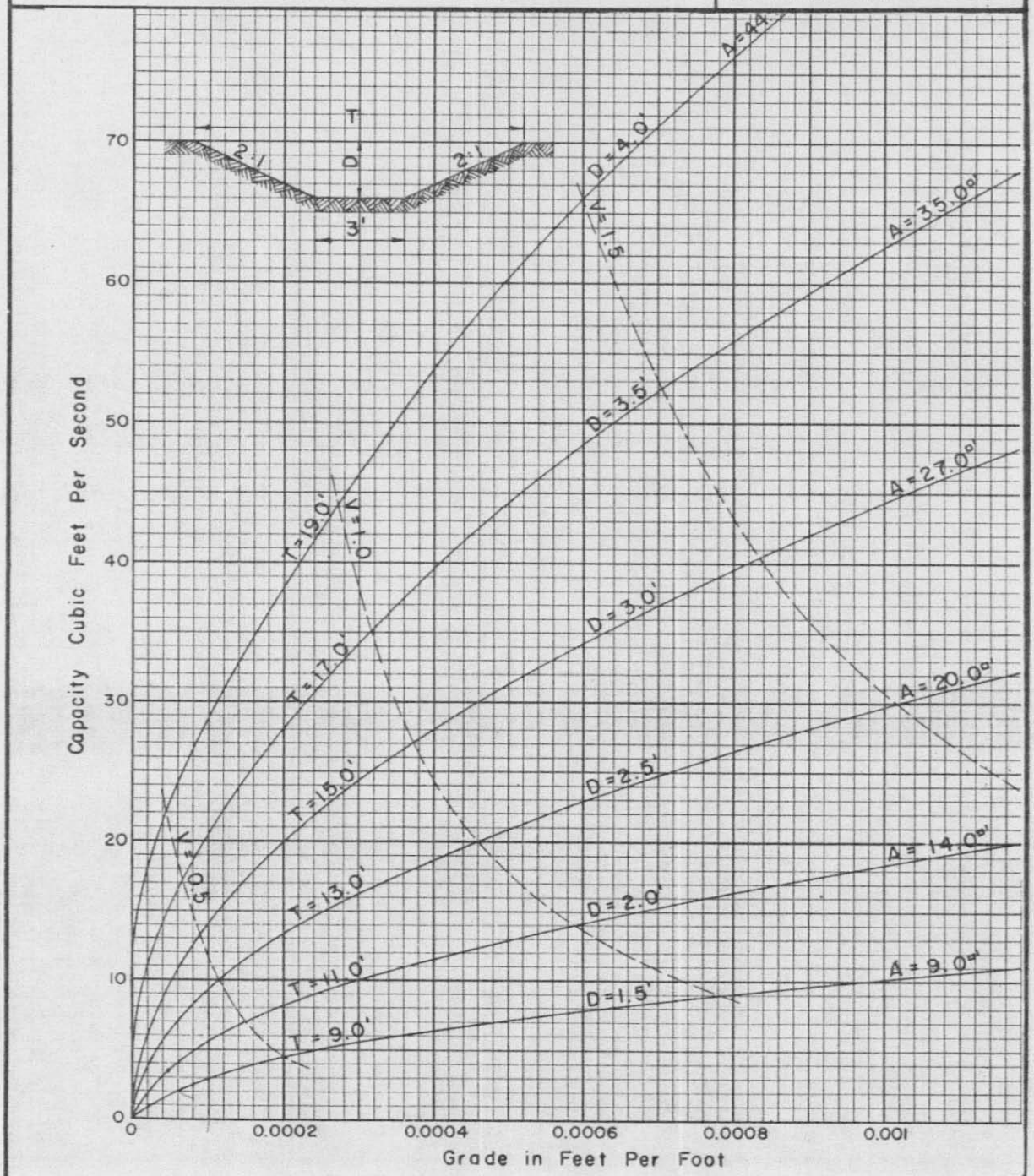


Exhibit 14-6.1

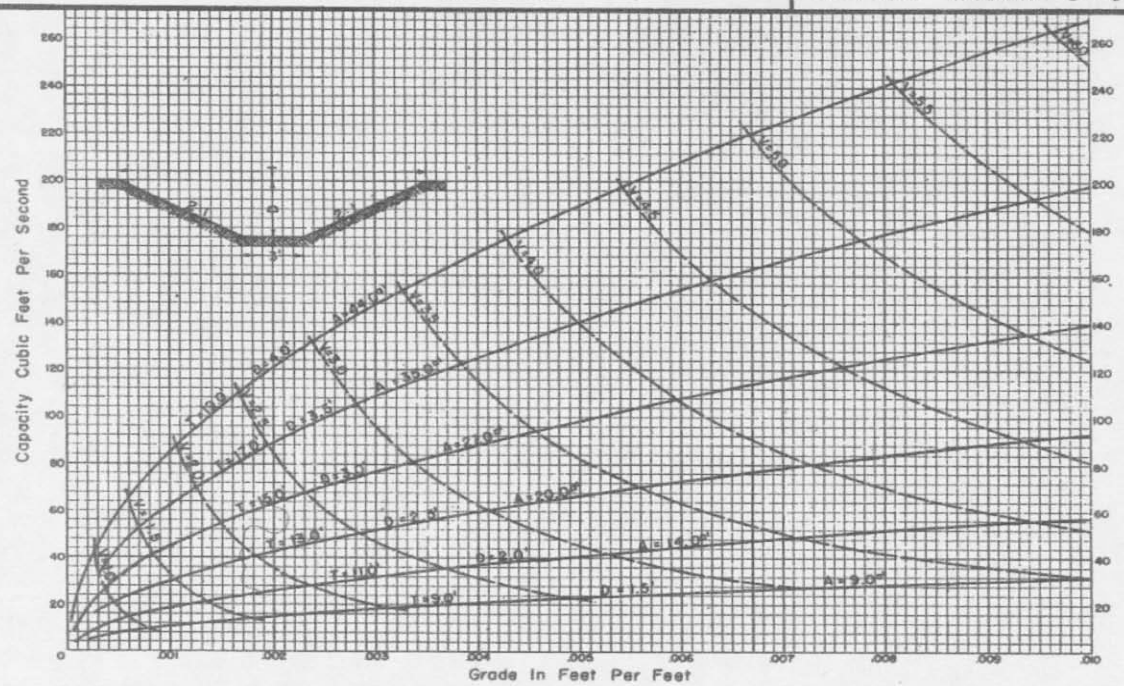
REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 31 OF 42

14-104.32

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 2:1
BOTTOM WIDTH 3'-0"



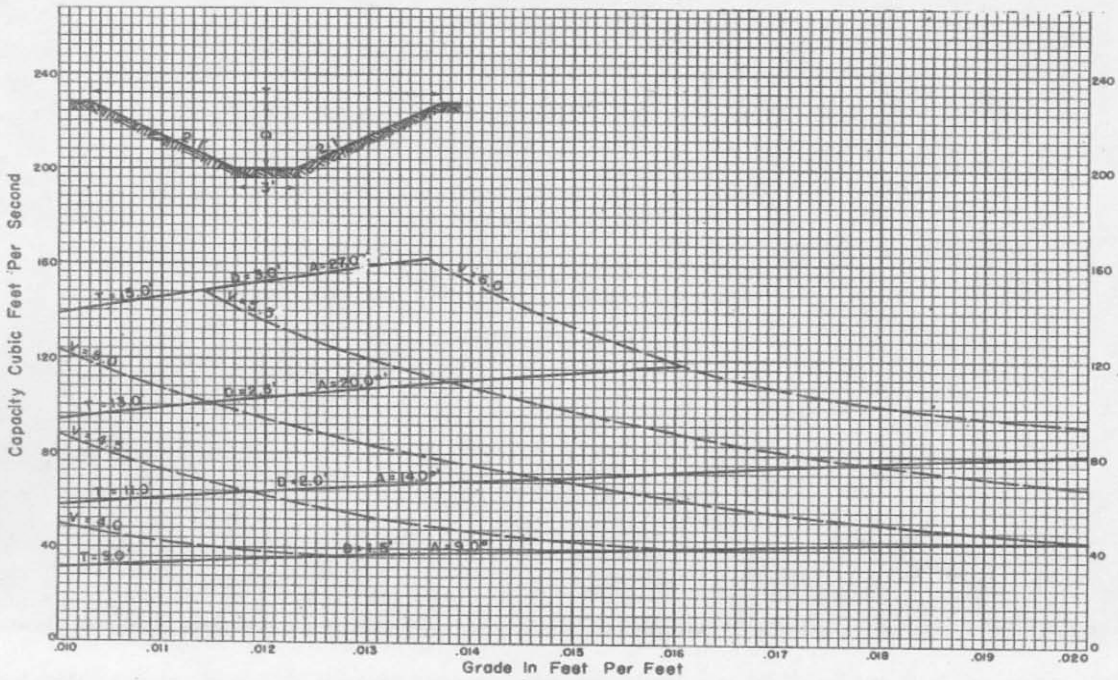


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 32 OF 42

14-104.33

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 2:1
BOTTOM WIDTH 4'-0"

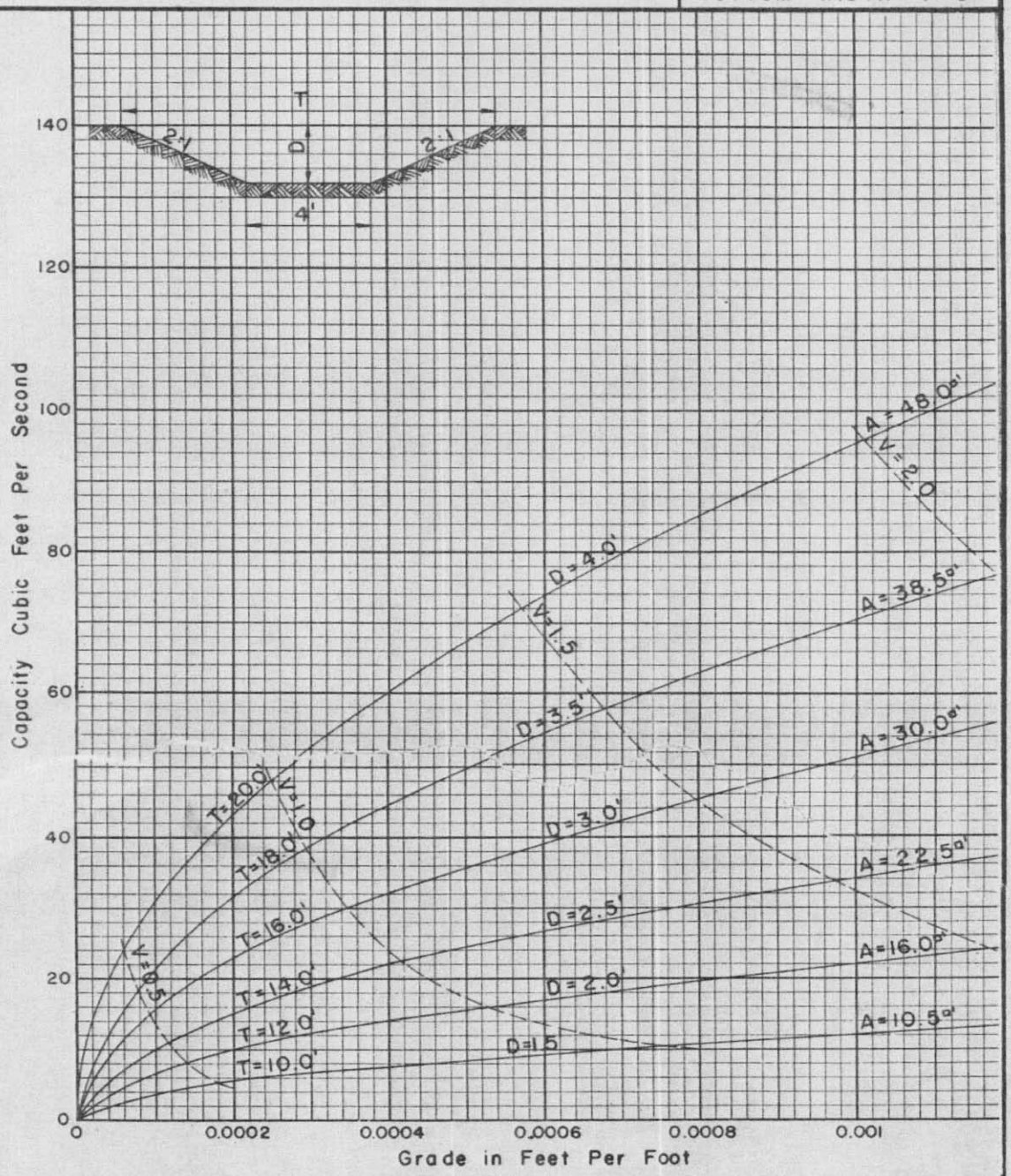


Exhibit 14-6.1

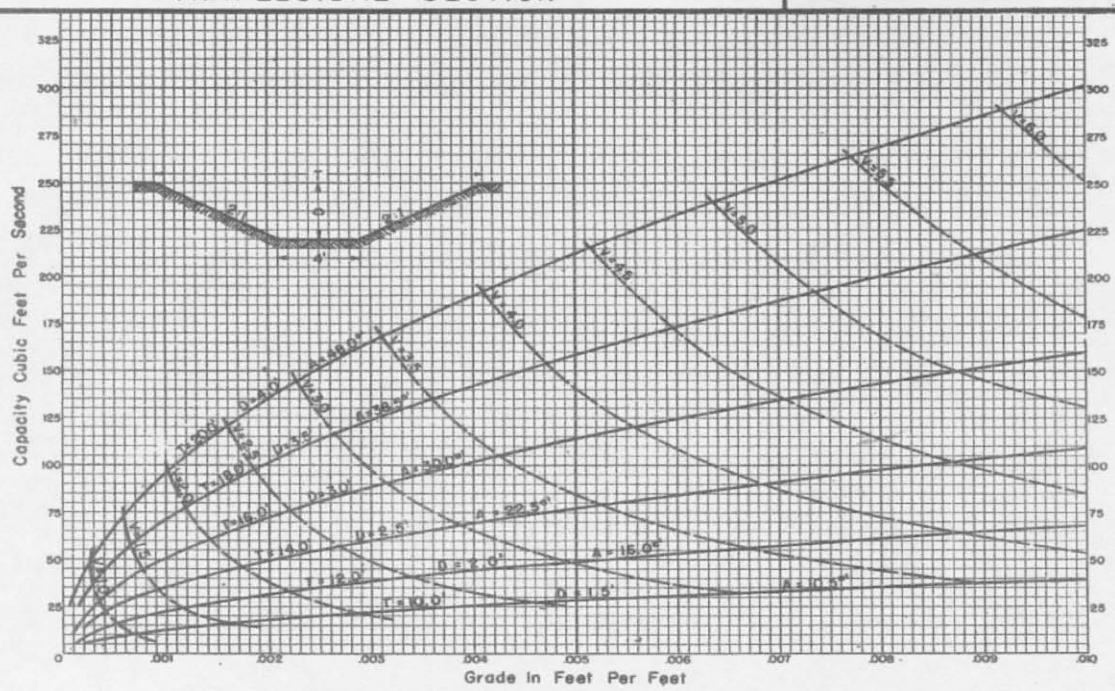
REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 33 OF 42

14-104.34

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 2:1
BOTTOM WIDTH 4'-0"



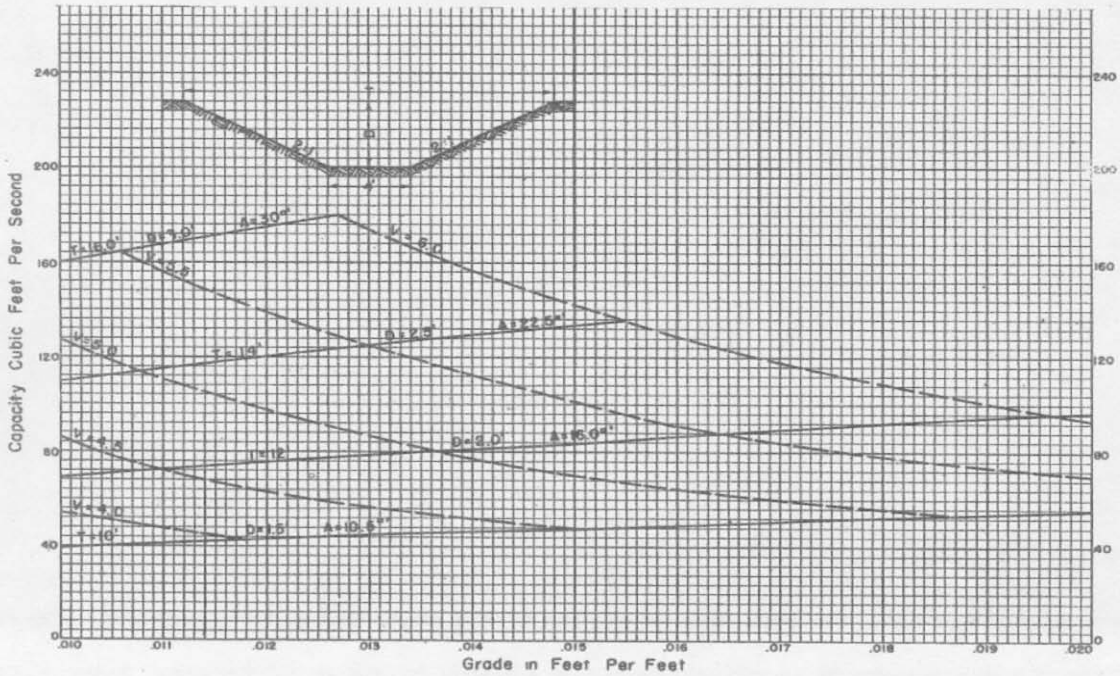


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 34 OF 42

14-104.35

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 2:1
BOTTOM WIDTH 5'-0"

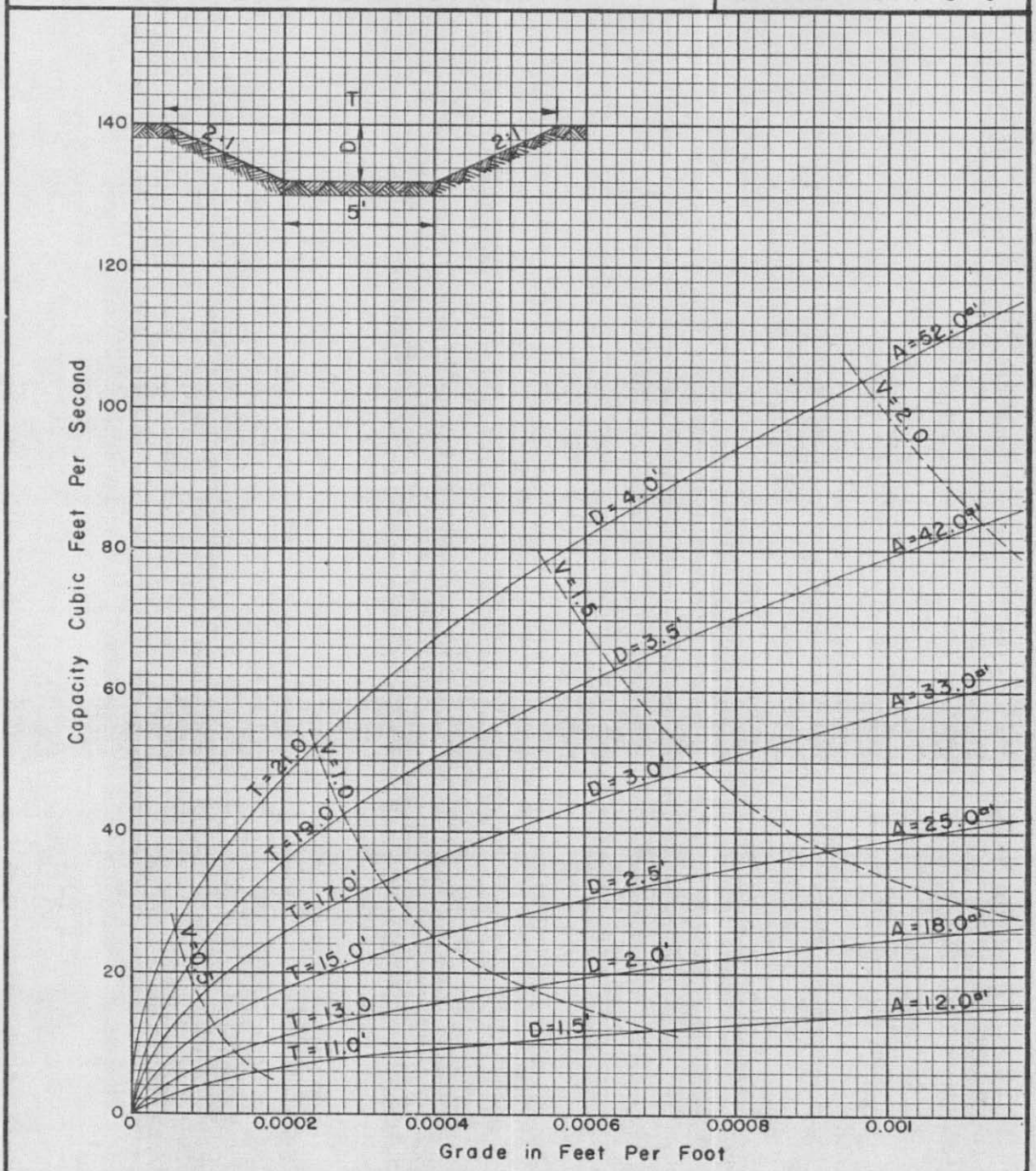


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 35 OF 42

14-104.36

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.04
SIDE SLOPE 2:1
BOTTOM WIDTH 5'-0"

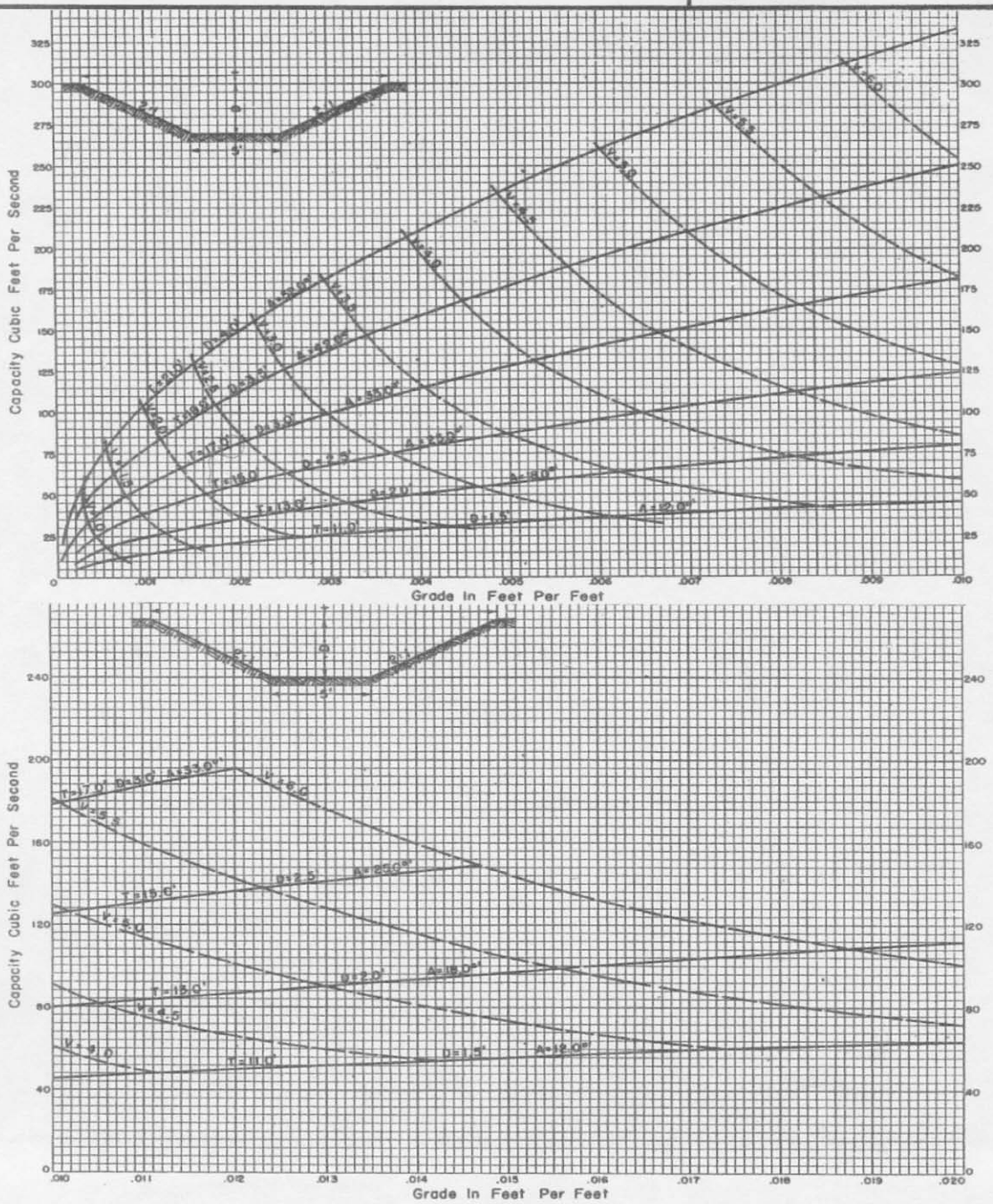


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 36 OF 42

14-104.37

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 2:1
BOTTOM WIDTH 6'-0"

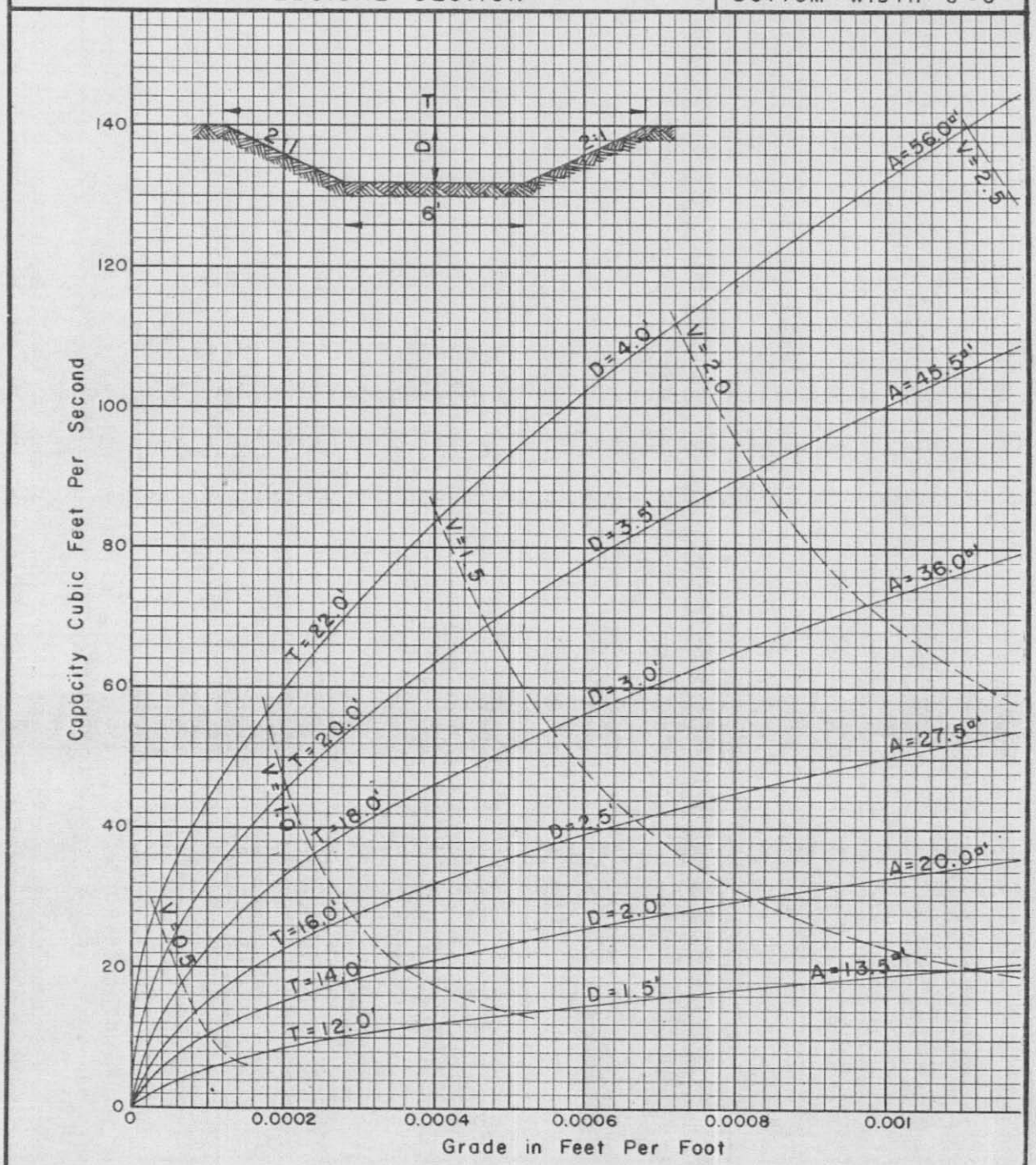


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 37 OF 42

14-104.38

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n=0.035
SIDE SLOPE 2:1
BOTTOM WIDTH 7'-0"

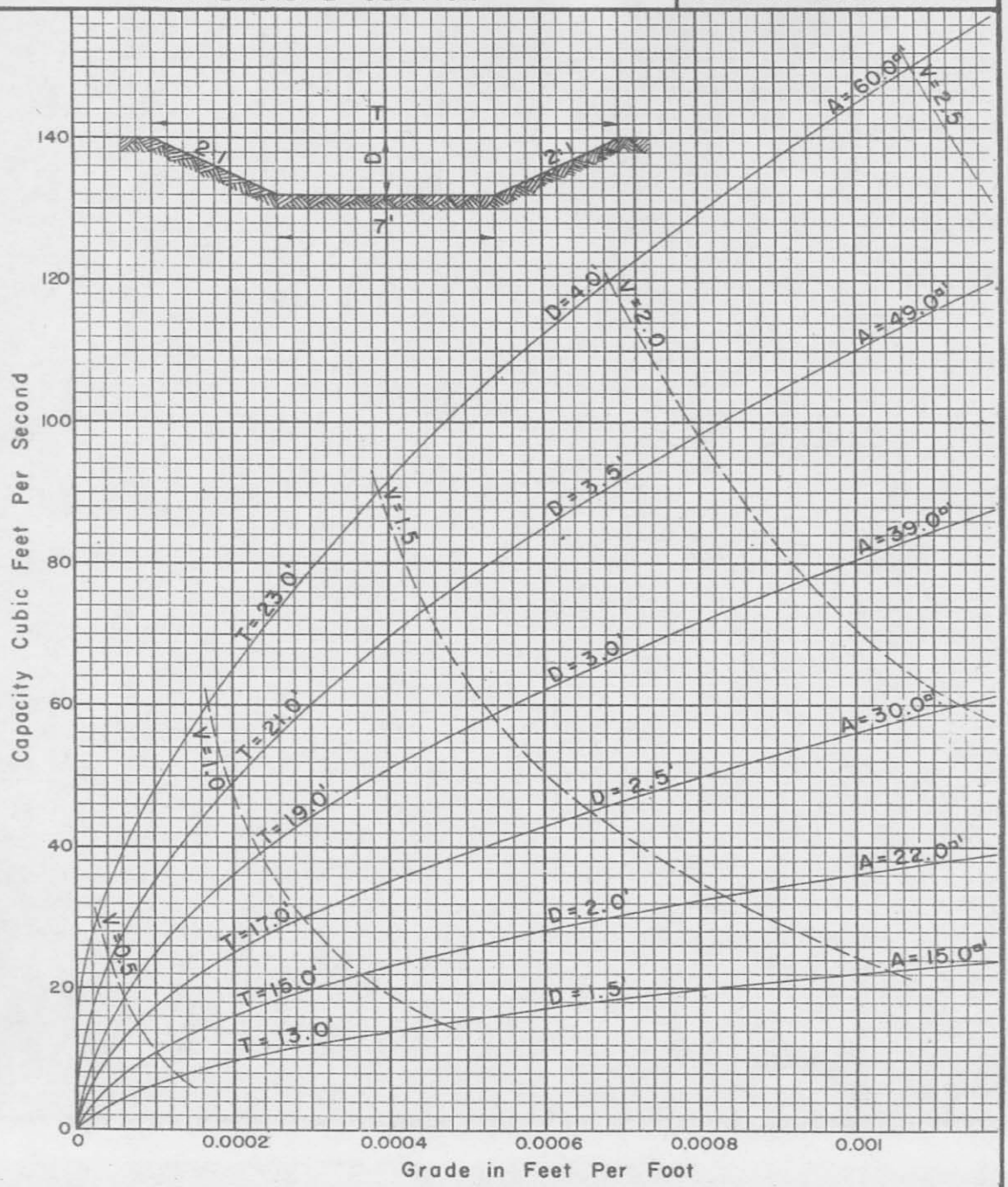


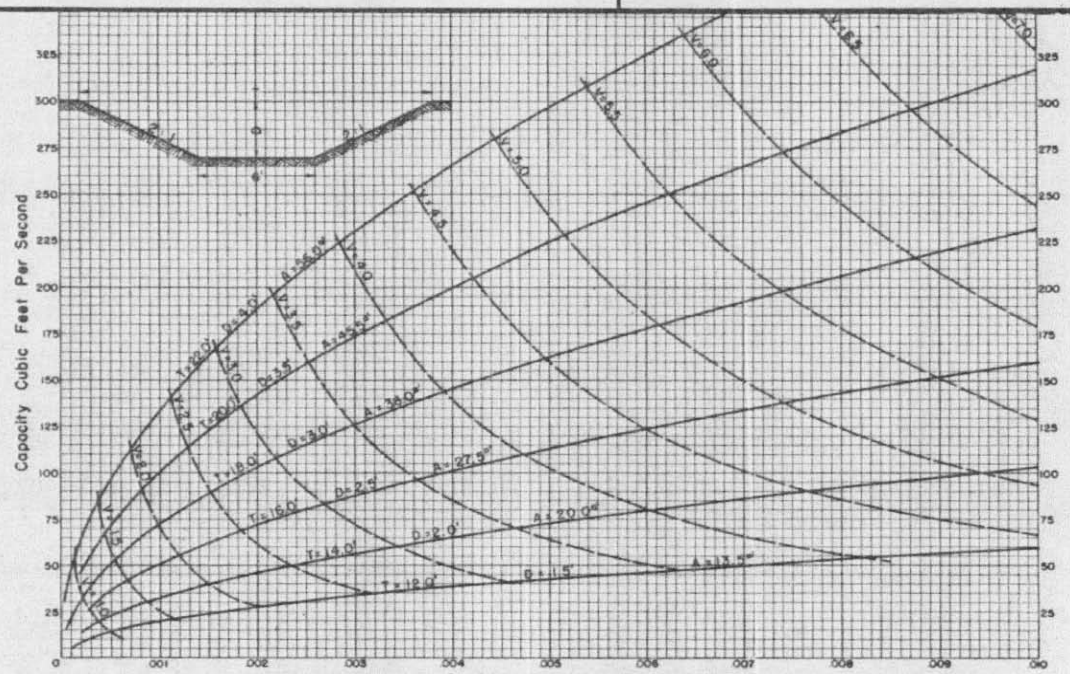
Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 38 OF 42

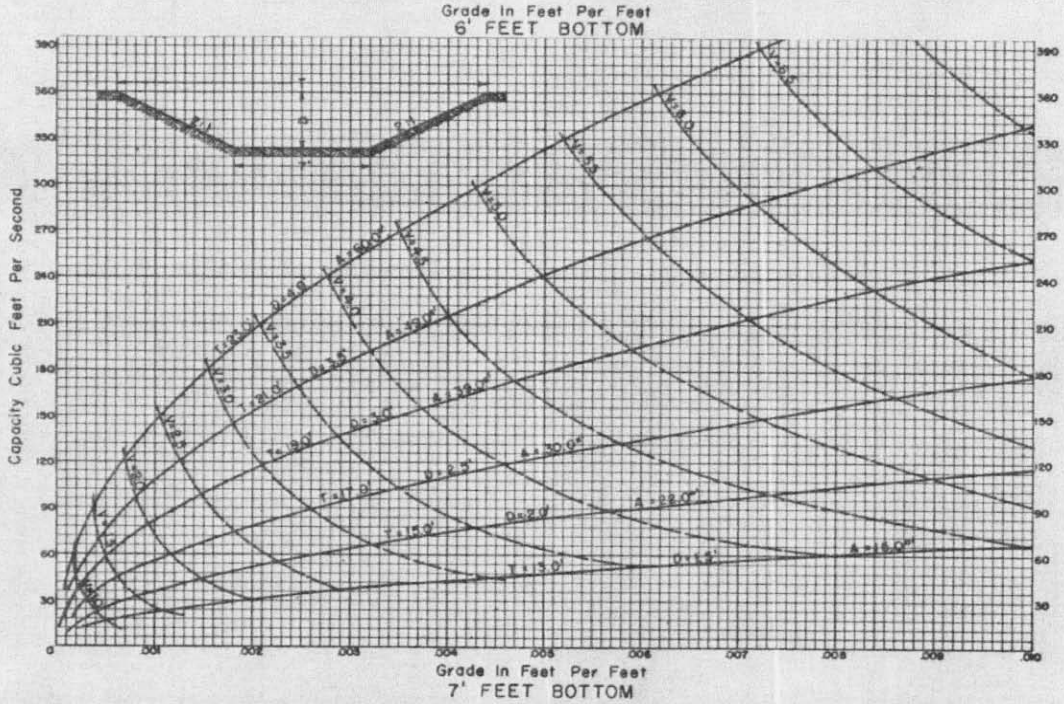
14-104.39

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 2:1
BOTTOM WIDTHS 6'-0" & 7'-0"



6' FEET BOTTOM



7' FEET BOTTOM

Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 39 OF 42

14-104.40

DITCH DESIGN CURVES

TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 2:1
BOTTOM WIDTH 8'-0"

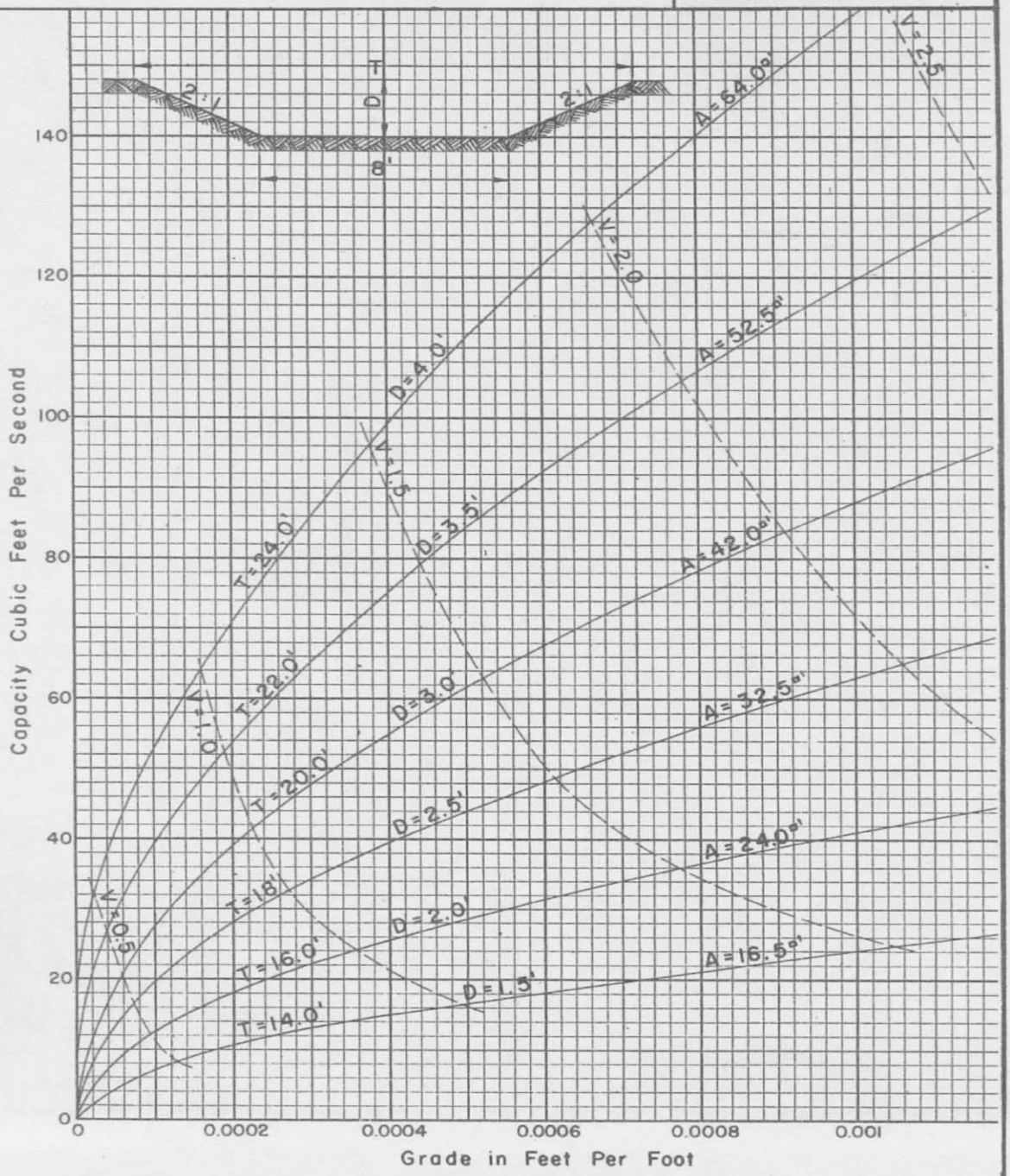


Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 40 OF 42

14-104.41

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n = 0.035
SIDE SLOPE 2:1
BOTTOM WIDTH 10'-0"

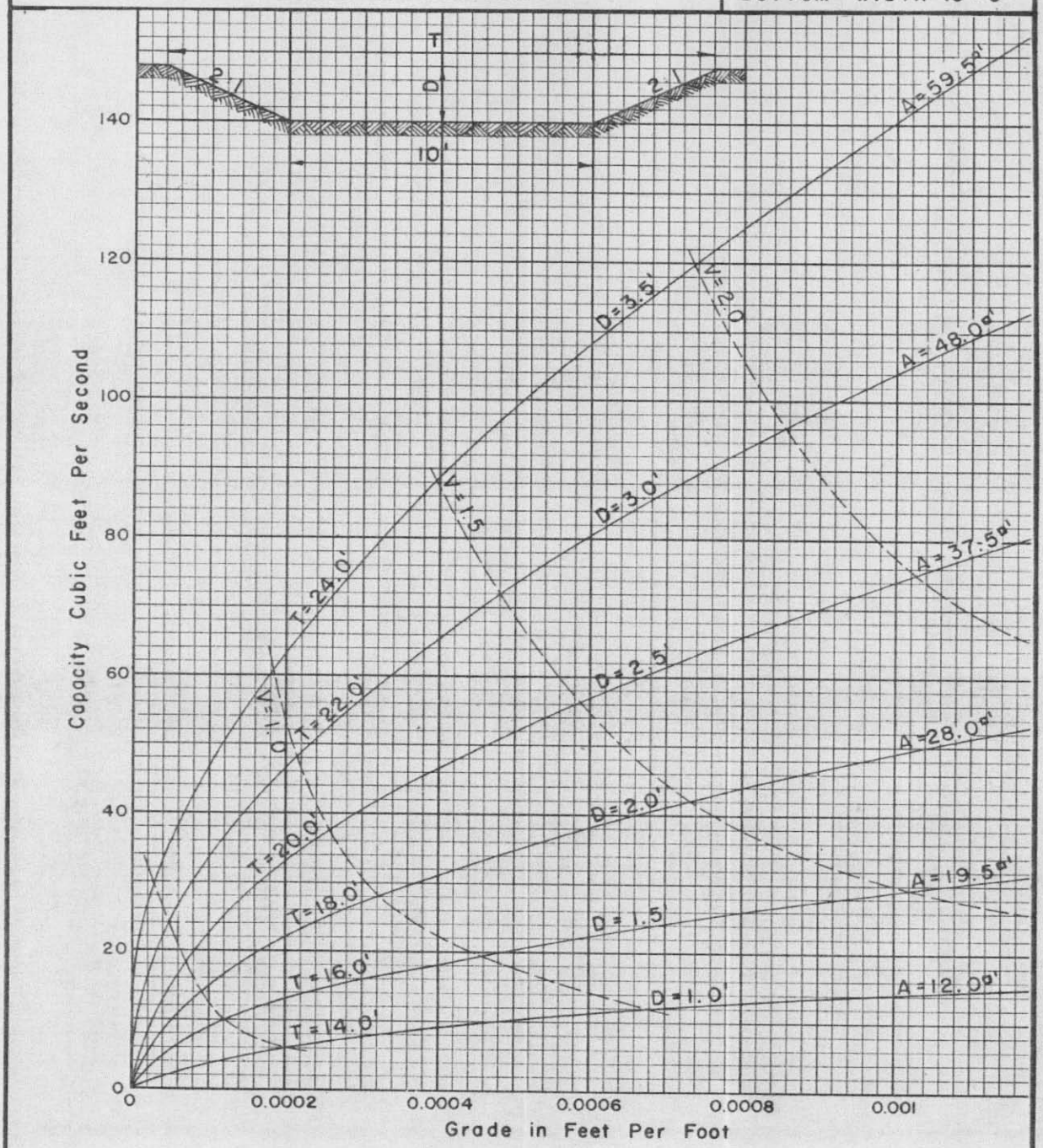


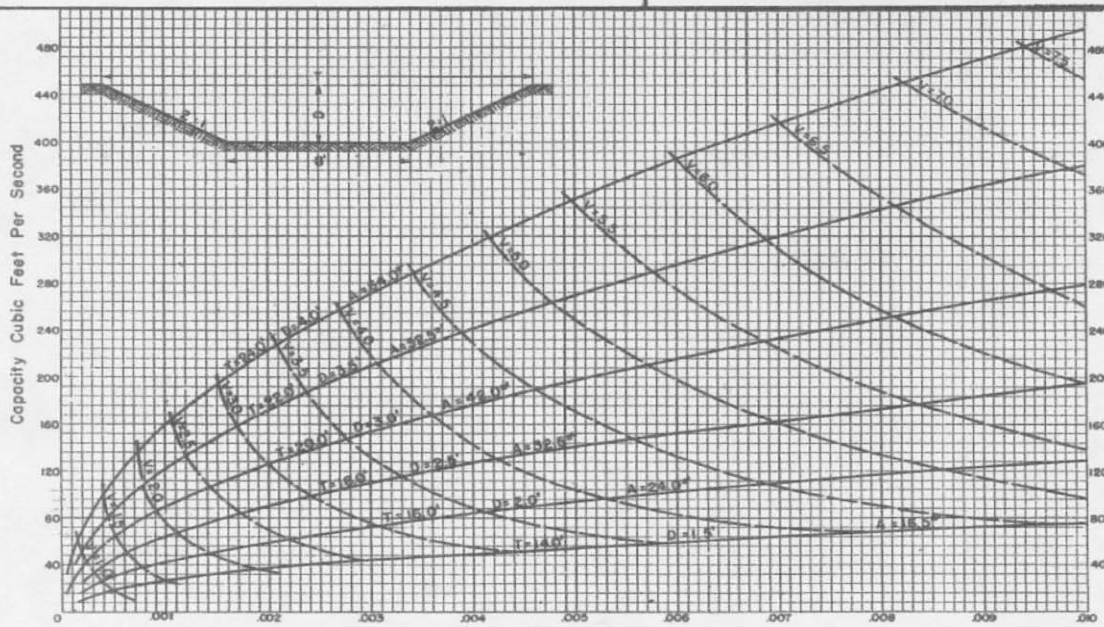
Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	RTSC-NE-ENG.
MANNING'S EQUATION	ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 41 OF 42

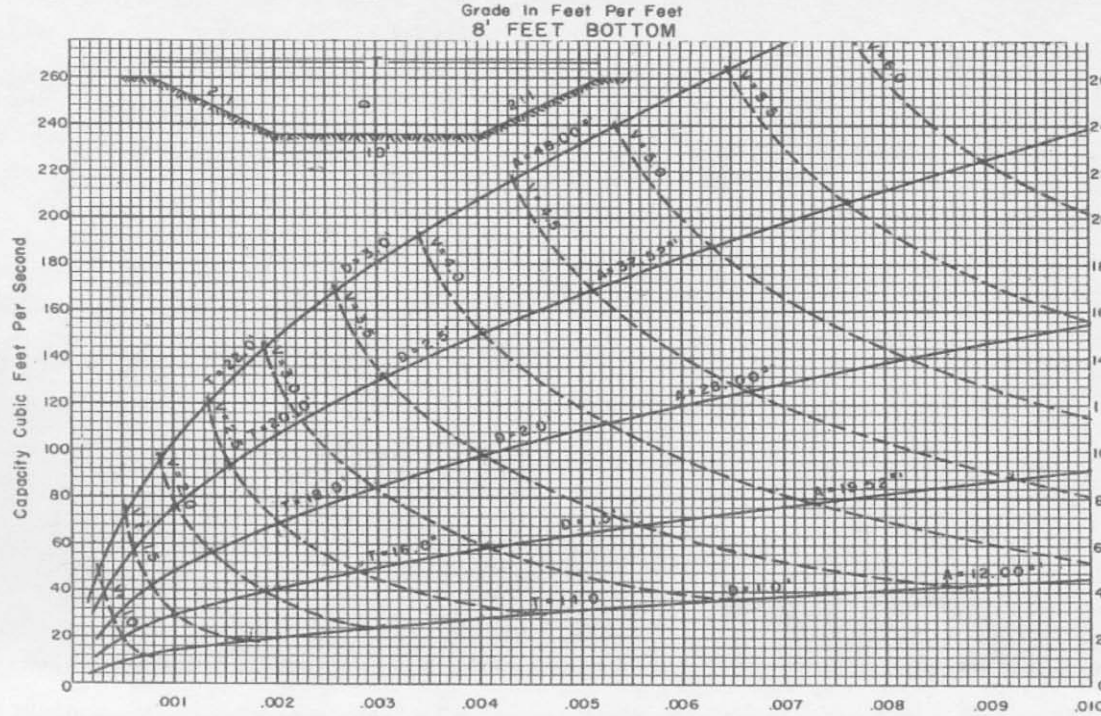
14-104.42

DITCH DESIGN CURVES
TRAPEZOIDAL SECTION

n=0.035
SIDE SLOPE 2:1
BOTTOM WIDTHS 8'-0" & 10'-0"



8' FEET BOTTOM



10' FEET BOTTOM

Exhibit 14-6.1

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE	RTSC-NE-ENG.
MANNING'S EQUATION	SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	1420 SHEET 42 OF 42