

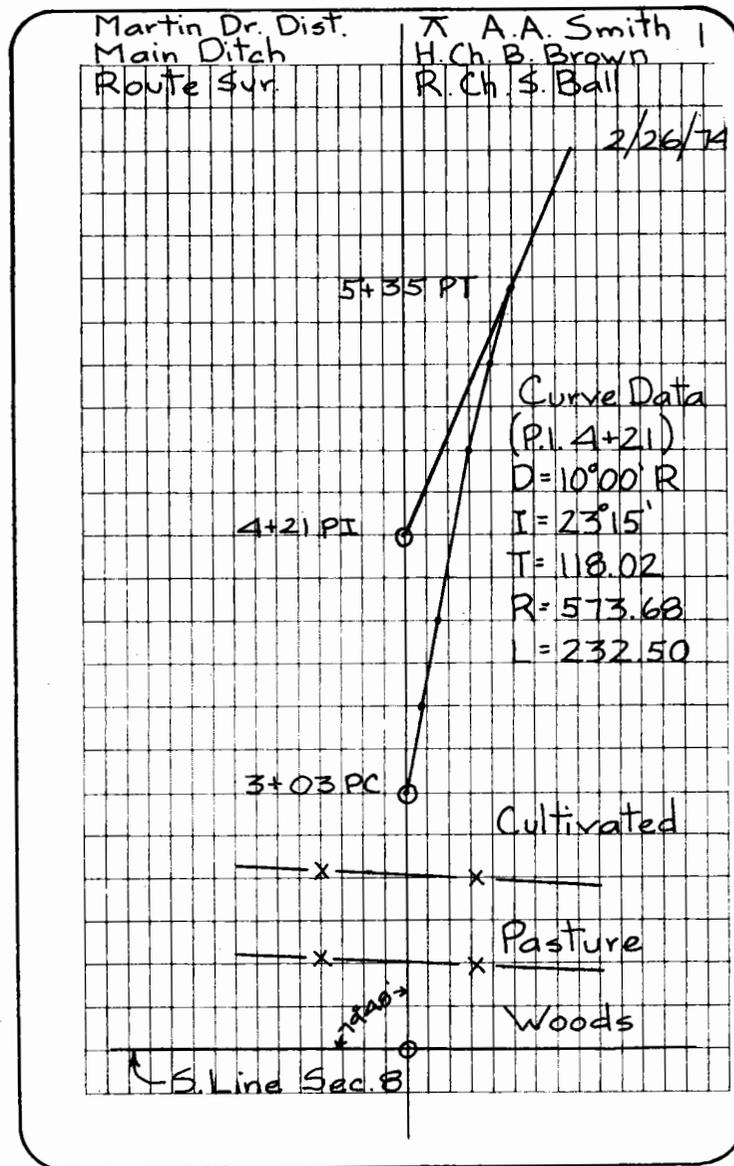
Figure 2-10 Sheet 2 of 3

2-62

Sta.	B.S.	H.I.	F.S. or Grade Rod	Elev. or Planned Elev.	
	Def <	Dbl. Def. <	Cal. Def. <	Mag. Bearing	Point
6+00				N13°03'E	Line Stake P.O.T.
5+35.5	11°37.5'				PT
5+00	9°51'				P.O.C.
4+50	7°21'				P.O.C.
4+47					w. Line SE 1/4 Sec. B
4+21	23°14'R	46°30'R	23°15'R		P.I.
4+00	4°51'				P.O.C.
3+50	2°21'				P.O.C.
3+03					P.C.
2+00					Fence
1+00					Fence
0+00				N10°12'W	

SCS-ENG-29
(5-70)

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Sta.	-S-	++	f.S. or Grade Rod	Slo. or Planned Slo.
	Def. <	Dbl. Def. <	Cal. Def. <	Mag. Bearing Point
Continue Survey to End				
14+51				Pipeline N13°03'E
14+02				P.O.T.
11+48				R.O.W. Fence S.H. 20
11+08				Edge Conc. Slab S.H. 20
10+88				Edge Conc. Slab S.H. 20
10+48				R.O.W. Fence S.H. 20
9+00				Line Stake
8+00				Line Stake
7+00				Line Stake
				N13°03'E
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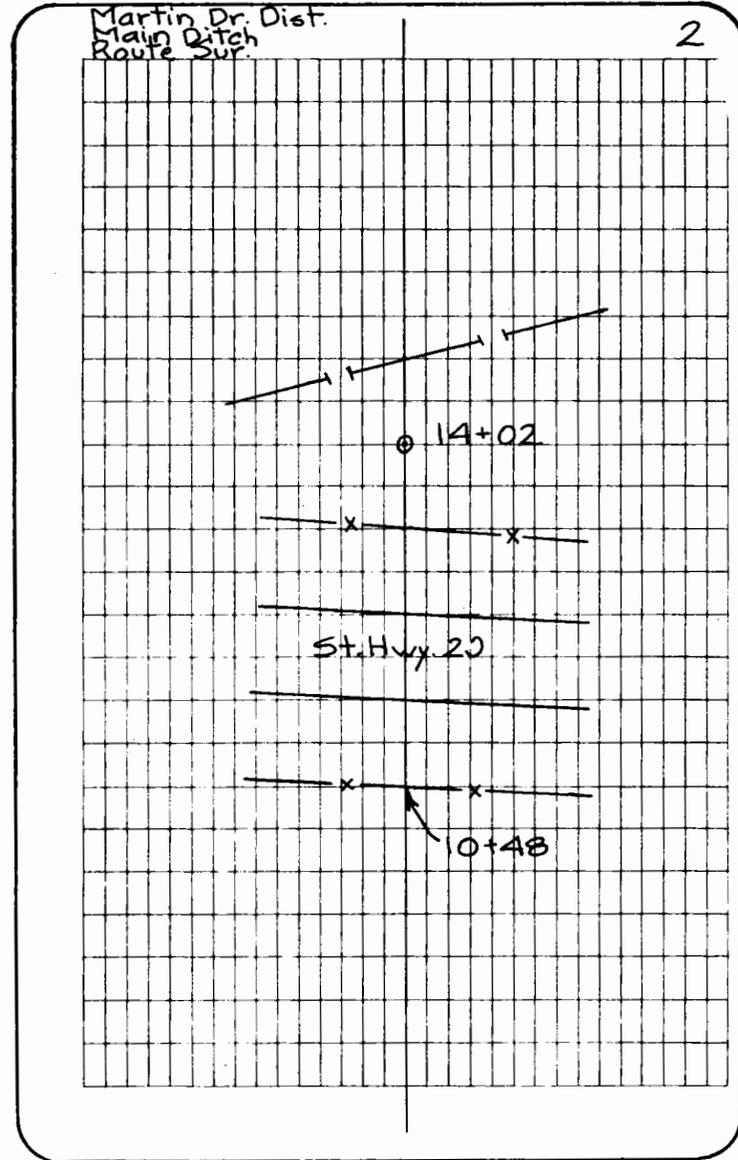


Figure 2-10 Sheet 3 of 3

FIGURE 2-11

Engineering Notes for Closed Traverse

These notes illustrate the format for a closed traverse by the deflection angle method. The traverse is to serve as horizontal control for a topographic survey of a reservoir site.

Transit station elevations will be established by a bench level survey from a permanent bench mark. Locations and elevations of pertinent topographic features will then be obtained with the transit by means of horizontal and vertical angles and stadia or chained distances.

See Figure 2-12 for a method of obtaining all needed information during one operation.

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
SCD <u>N. Cache</u>	Date <u>2/26/74</u>
Field Office <u>Logan</u>	
Name <u>Blue River Watershed</u>	
Individual <input checked="" type="radio"/> Unit of Govt. (circle one)	
Job <u>Horizontal Control for Res. Topo.</u>	
Design Sur.	Const. Layout
Const. Check	Other
Ident. No.	Field No.
Scale	
1" =	
Legal Description	
<u>SE 1/4</u> Sec <u>6</u> T <u>12N</u> R <u>2E</u>	
or	
Location:	
SCS-ENG-28 REV. 5-75	

Sta.	B.S.	I.T.	F.S. or Grade Rod	Elev. or Planned Elev.	
	Def. <	Dbf. Def. <	Cal. Def. <	Hor. Dist.	Mag. Br.
A				588.08' South	
B	28°02'L	56°06'L	28°03'L	259.65'	528°03'E
C	119°02'L	238°04'L	119°02'L	711.78'	N32°54'E
D	68°41'L	137°24'L	68°42'L	336.15'	N35°47'W
E	63°51'L	127°40'L	63°50'L	316.75'	S80°23'W
A	80°24'L	160°46'L	80°23'L		South
B					

☆ U.S. GOVERNMENT PRINTING OFFICE: 1976-0-200-611

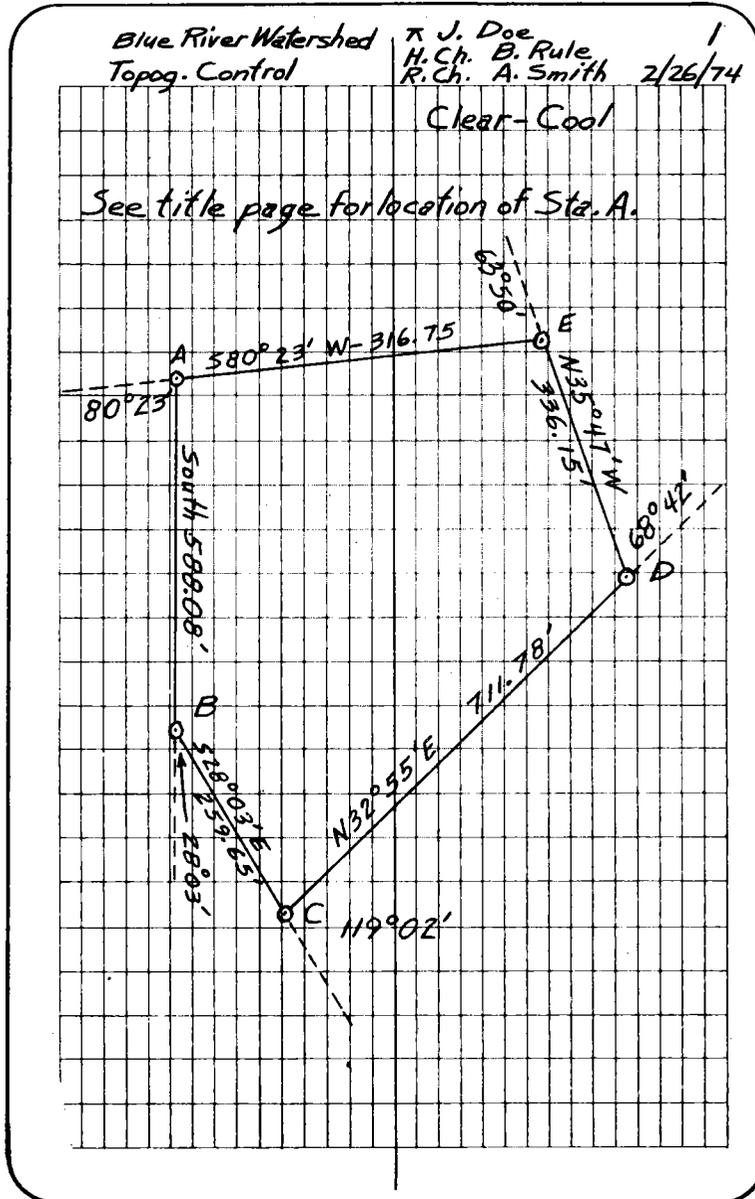


Figure 2-11 Sheet 2 of 3

Sta.	B.S.	I.I.	F.S. or Grade Rod	Elev. or Planned Elev.	
Check for angular error					
EAB = 99°37'					
ABC = 151°57' Σ int. angles = $n-2(180^\circ)$					
BCD = 60°58' = $5-2(180^\circ)$					
CDE = 111°18' = 540°					
DEA = 116°10'					
$\Sigma = 537^\circ18' = 540^\circ$ OK.					
Check for horizontal closure.					
Latitude and departures.					
Course	A-B	B-C	C-D	D-E	E-A
Bearing	South	52°03'E	N32°55'E	N35°47'W	S80°23'W
Lat.	588.08	229.15	259.75	107.26	529.16
Cosine		.88254	.83946	.81123	.16706
Dist.	588.08	259.65	711.78	336.15	316.75
Sine		.47024	.54342	.58472	.98595
Dep.	0.0	122.09	386.79	196.55	312.300

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Blue River Watershed
Topog. Control 2

Σ N
870.21

Σ S
870.15

Σ E
508.89

Σ W
508.85

$AM = \sqrt{(0.06)^2 + (0.05)^2}$
 $= 0.078$

Traverse Perimeter = 2212.41
 Error of closure = $\frac{0.08}{2212}$
 $= \frac{1}{27,650} \pm$
 OK

Checked by
A. L. Jones
 Engr. Tech.
 2/26/74

FIGURE 2-12

Engineering Notes for Topographic Survey with Transit

These notes illustrate a method of running a closed traverse and obtaining topographic information in one operation. The traverse can be checked for closure as shown in Figure 2-11.

Direct leveling was done wherever possible. Vertical angles were used only where the observed point was above the instrument, too far below it, or where the line of sight, with vertical arm at zero, was obscured by brush.

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
SCD Price River	Date 2/26/74
Field Office Price	
Name John Davis	
Individual <input checked="" type="radio"/> Unit of Govt.	(circle one)
Job Topographic Survey	
Design Sur. <input checked="" type="checkbox"/>	Const. Layout
Const. Check	Other
Ident. No.	Field No.
Scale	
1"	
Legal Description	
NW 1/4	Sec 8 T. 12N R. 13E
	or
Location:	
SCS-ENG-28 REV. 5-75	

Figure 2-12 Sheet 1 of 2

Sta.	Azi.	Horiz. Distance	Vert. Δ	Diff. in Elev.	Elev.
	\pm	\pm	F.S. or Grade Rod	Elev. or Planned Elev.	
π at A, Elev. 101.6, H.I. = 4.8					
BMI	301 ⁰⁰	281	$\frac{00}{6.4}$	-1.6	100.00
1	323 ³⁰	388	$\frac{00}{10.4}$	-5.6	96.0
2	269 ⁴⁵	307	$\frac{00}{9.6}$	-4.8	96.8
3	269 ⁵⁰	453	$\frac{-1^{\circ}26'}{4.8}$	-11.3	90.3
4	240 ⁰⁰	386	$\frac{00}{9.5}$	-4.7	96.9
B	223 ⁴⁰	752	$\frac{00}{10.9}$	-6.1	95.5
π at B, Elev. 95.5, H.I. = 4.4					
A	43 ⁴⁰	752	$\frac{+0^{\circ}28'}{4.4}$	+6.1	101.6
5	24 ⁵⁰	83 ⁻¹	$\frac{-4^{\circ}26'}{8.4}$	-6.4	85.1
6	16 ¹⁰	445	$\frac{+0^{\circ}31'}{4.4}$	+4.0	99.5
7	275 ⁴⁰	290	$\frac{0^{\circ}52'}{4.4}$	+4.4	99.9
C	333 ¹⁵	722	$\frac{0^{\circ}52'}{4.4}$	+10.9	106.4
π at C, Elev. 106.4, H.I. = 4.5					
B	153 ¹⁵	722	$\frac{-0^{\circ}52'}{4.5}$	-10.9	95.5
8	92 ²⁵	228 ⁻²	$\frac{-4^{\circ}50'}{4.5}$	-19.0	87.4
9	45 ⁴⁰	190	$\frac{-2^{\circ}13'}{4.5}$	-7.4	99.0
10	22 ²⁰	157	$\frac{-2^{\circ}44'}{4.5}$	-7.5	98.9
A	96 ⁴⁸	850	$\frac{00}{9.3}$	-4.8	101.6

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(5-70)

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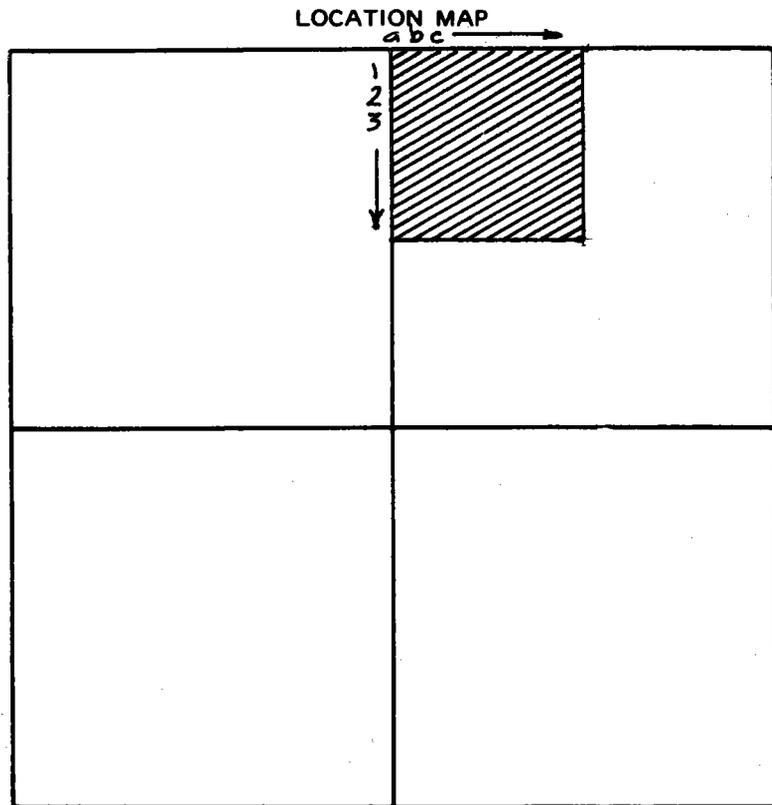
John Davis Topo. J. Gunn
T. Smith 2/26/74

Azimuths From Magnetic North

Top of painted bolt head SE corbridge
Elev. assumed.

Bottom of streambed.
Top of streambank.

SPECIAL DESIGN INSTRUCTIONS:



Scale: 4" = 1 mile
Legal Description: NW 1/4 of NE 1/4, Sec. 18, T. 21, R. 32
District Agreement No. _____; GPCP No. _____
Design Survey Construction Check

Date 8/30/77 John W. Branden, Civil Eng. Tech.
Technician and Title

The symbol * is a note to the computer for blank space or for information not used by the computer.

* DESIGN REQUIREMENTS

*

TITLE = RALPH KREY, RUN NO.1

*

HUNDREDTH = 1.

ORIGIN = UPPER LEFT

C/F RATIO = 1.50

SLOPE (X) = + 0.1, - 0.1

SLOPE (Y) = - 0.1, - 0.7 * Slope to South

BENCH = (A.1), (N.1), (N.14), (A.14)

BORROW = _____

WASTE = _____

MAXELEV (,) = _____

MINELEV (,) = _____

GO, DETAIL

*

TITLE = RALPH KREY, RUN NO.2

SLOPE (X) = + 0.1, - 0.1

SLOPE (Y) = + 0.1, + 0.7 * Slope to North

Bench (A.1), (N.1), (N.14), (A.14)

GO, DETAIL

*

TITLE = RALPH KREY, RUN NO.3

SLOPE (X) = 0.0, - 0.1

SLOPE (Y) = + 0.1, + 0.7 * Slope to West

Bench (A.1), (N.1), (N.14), (A.14)

GO, DETAIL

*

TITLE = _____

SLOPE (X) = _____

SLOPE (Y) = _____

GO, DETAIL

END JOB

*

CROSS OUT ALL FRINGE POINTS IN DATA GRID AFTER ENTERING IN FRINGE AREAS.

CROSS OUT ALL COMPUTER COMMAND LINES NOT USED.



STANDARDS FOR PROJECT AND LARGER GROUP JOBS

Standard staking and note keeping procedures are shown for representative type structures and portions of structures. They do not cover every situation. The illustrations show format and procedure in sufficient detail for the field engineer or survey party chief to apply them to the particular job. Construction staking must be consistent with contract provisions, and some of the illustrations may represent portions that are the responsibility of the contractor.

Unless otherwise specified basic staking for embankments and excavations includes centerline, slope (toe of slope or edge of cut) and offset reference stakes with hubs at each station and more frequently on curves along the axis of the embankment or excavation. It also includes stakes at significant breaks in topography or changes in section of the planned work. Basic staking for structures includes alignment and grade along the principal axis and may include offset stakes for long structures such as a principal spillway through a dam.

Computations are closely related to notekeeping. These samples can be used to compute quantities directly from the field notes. Placing the cut or fill above the distance from centerline or reference point facilitates direct computations. A sample plotted dam cross section and computation are shown.

Figures 3-1 through 3-4 show components of a typical floodwater retarding structure. These exhibits are referred to in the presentation of the sample field notes for layout and also for calculations. Although these figures and the field notes presented are for an earth dam, the content, procedures and completeness of note keeping are directly applicable to other major construction work.

Engineering Notes - Bench Mark Surveys

The engineering notes shown in Figure 3-5 illustrate the format for setting and checking bench marks (vertical control) for construction layout.

Note that B.M. No 81-1 and B.M. 81-6 are permanent monuments, and are so recorded on the drawings. Temporary benches should be run from the datum described in the contract drawings. All bench mark elevations should be thoroughly checked before other level work is started.

Engineering Notes - Construction Grades

Figures 3-6 through 3-8 show the planned grades for the embankment, cut-off trench, principal spillway, and emergency spillway.

Elevations and stationing or dimensions for all the major structure elements should be entered in the field notebook prior to layout. Spacing between entries should be sufficient for the field notes. Crowded notes are difficult to read and can cause errors. The inspector may find a condensed version of the same information helpful for a quick reference.