

Appendix F Application: Topographic Survey for Relocation of Red Feather Prairie Bike Trail, Saylorville Lake Project, Iowa (Rock Island District)

F-1. Purpose

This is a metric design project performed by Rock Island District personnel. The purpose of the project was to relocate an existing bike trail at the site. Additional topographic survey data was needed to cover potential relocation areas. The field survey of the 11-acre site was performed on 17-20 Nov 97 and 27-29 Jan 98--a total of seven crew days in the field. Two- and four-man field crews were used at different points in time on this project. Approximately 538 control and topographic observations were recorded on a Pentax total station with an external data collector. Differential levels were also run through the primary control points. A total of 12 primary control points were connected by an open-ended total station traverse. The traverse originated at a fixed point (Control Monument SV 127.1A--1965) with a fixed azimuth to Point SV 130.1A--1966. Topography was taken after the control traverse was completed at the project site. The field data were reduced in the Rock Island District Office and the final dataset was created in MicroStation. Fourteen level assignments were used for data collected on this project, as outlined on the drawing note below. The coordinate system used was NAD 27 and elevations were referenced to NGVD 29.

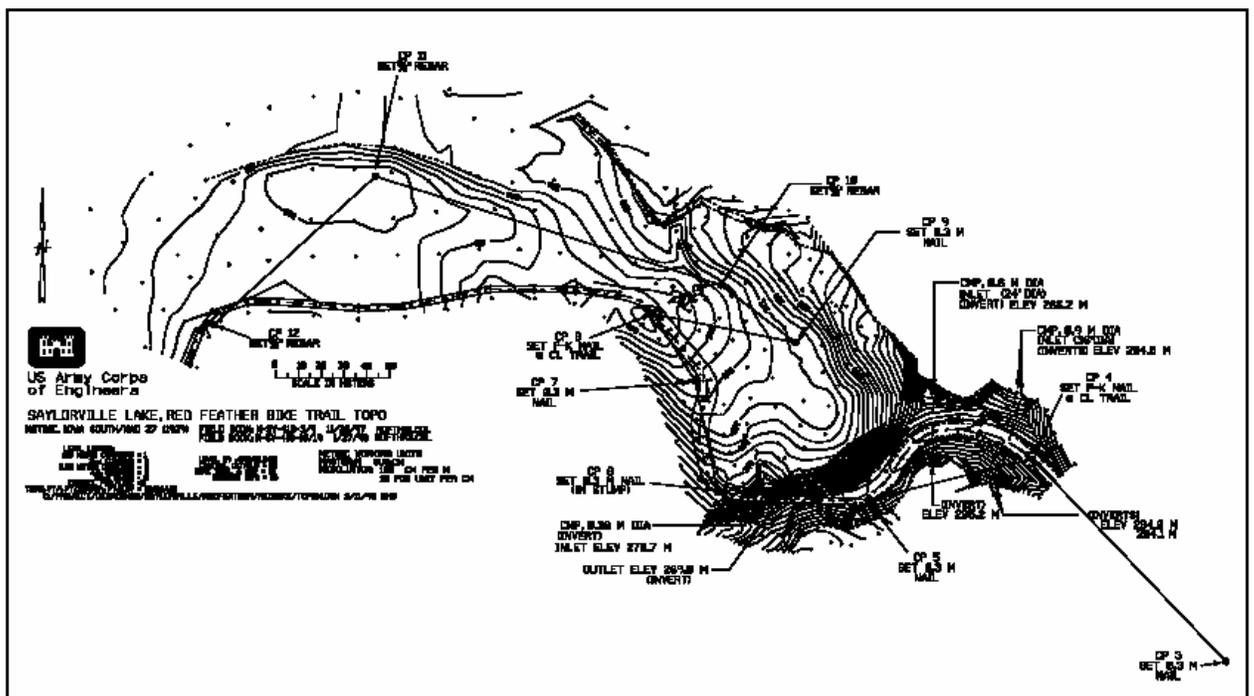


Figure F-1. Overall scheme of 11-acre project area



Figure F-2. Title block and legend from final drawing depicting level assignments in dgn file

F-2. Original Request for Survey

CENCR-ED-DG

22 October 1997
Mr. Kizak/5587

MEMORANDUM THRU

ED-D *JKR/ycb*

FOR ED-S *[Signature]*

SUBJECT: Request for Survey Support, 1998 Bike Trail Repairs, Lake Saylorville, Des Moines River, Polk County, Iowa

1. The following survey support is required for the subject contract.

Topographic data to develop a detailed plan for the relocation of the existing bike trail. This data should include the location of the existing trail centerline and have enough point elevations to develop an accurate topographic map. This information will be used in *Road Calc*.

This information is required in t Red Feather Prairie. See the highlighted section on the attached sheet for the exact location.

2. This is a metric project. Therefore, all data should be surveyed in meters. Thus eliminating the need for conversion and reducing error.
3. The point of contact for this project is Eric R Kizak, ext. 5587. Please coordinate prior to the survey. The labor cost code, ordering work item, the funded work item, and the work category codes for this work are L05787, 001WQY, 001TD7, and 63432 respectively.

John J. Copeland
JOHN J. COPELAND, P.E.
Chief, General Engineering Section

CF:
ED-DG (Kizak)
OD-Y (DeMarce)

F-3. Instructions to Field Survey Team

**SURVEY INSTRUCTIONS
RED FEATHER PRAIRIE – BIKE TRAIL REPAIRS
SAYLORVILLE LAKE POLK COUNTY, IOWA**

We have been requested to complete the subject surveys described in the attached memo from Mr. Kizak and Mr. Copeland. Previous to this memo, we talked to Mr. Kizak regarding his needs and techniques. The following instructions, and project philosophy reflect that discussion with Mr. Kizak as interpreted somewhat due to knowledge of the area and research into our previous work there.

Required Survey Tasks

Horizontal control tie. Though there is no *stated* need to tie the project to horizontal control (Iowa State Plane Coordinate System), we believe it should be done. It may be done by Total Station or GPS, from the three or four Tract Corners for which description cards and coordinates are supplied. The result should be a "PK" in the center of the trail at each end of the project as shown on *my* sketch. Since the trail site is in a timbered area you may find the Total Station to be the best technology for the work.

Vertical control tie. We are including copies of work, on the last trail revision in the area by Graham and Meeker, that may provide a close-at-hand benchmark. That data is 11 years old and the turns, TBMs, etc. set by the party may have been destroyed in more recent road reconstruction as well as completion of the trail revision for which the work was done. One point referred to (TP "E" in N-SV-357, page 5) was destroyed by removal of a trail bridge on which it was located. Another ("TP 8" in N-SV-357, page 2) in a power pole, may have been destroyed by reconstruction of NW 35th Street, which is now Ia. Hwy. #415. The best alternate starting point is SV control monument DS-3, near the east abutment of the main dam, for which the description is attached.

Site topo control. Since a relatively dense matrix of topo points and existing trail detail point will be needed, I suggest you establish one or two control points in the 90 X 155 -meter site area (cross-hatched on the photomap) to aid in collecting the topo data. *Suggested locations* are shown in green.

Existing trail features. Because the repair/relocation of the trail may utilize some parts of the existing alignment it is essential to map that feature. My suggestion is a centerline profile and shoulder and toe profiles with data points at 10-meter (or closer) intervals, plus data on any existing culverts under that trail. Those shots will be used to construct topo break lines here in the office. Typical cross-sections of the trail at its highest fill station and at two other locations will be of great help also.

Other topo features. To facilitate re-siting the trail in the relatively rough terrain a matrix of topo data points that will provide half-meter contours is required. A rough 10-meter (33-foot) grid matrix would be sufficient. In many cases it will be more efficient and show the contours better if the data points are on ridges, valleys, or water courses. That determination can only be made in the field.

Execution, prosecution, etc.

The work is estimated to require four days field and travel time for the two-person Slight-Ellershoff crew. While it is not difficult it is comprehensive. The operative technical requirement is that the results be furnished in S.I. ("Metric") units. We prefer that the field work be done in that system, though we will discuss options. The cost code data, etc., is included on the copy of the request letter as attached.

ESSAYONS

Attachments



WILLIAM C. RIEBE, L.S.
Chief, Survey Branch

F-4. Control Surveys

An open-ended traverse was run concurrently with the topographic work--see Figure F-3 below. Twelve primary control points were occupied (two control [points outside the project area are not shown below]). Control data were observed/logged with the Pentax total station and also hand recorded in a field survey book.

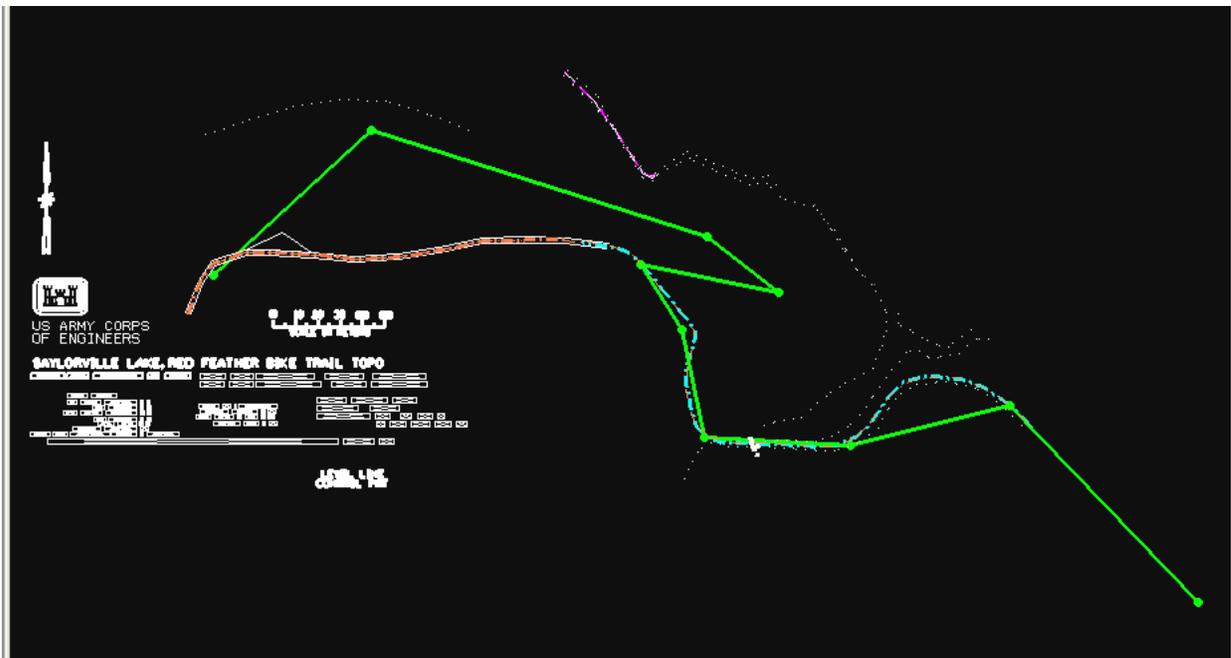


Figure F-3. Primary control traverse (in green) used for controlling topographic mapping of site

F-5. Data Collection Codes (Rock Island District)

The Rock Island District numerical coding system below was used for the Saylorville Project.

101: GRD SHT	155: MON	308: ASPHALT	601: CL BRIDGE
102: TOP BANK	156: STONE	309: BLACK TOP	602: EDGE BRIDGE
103: TOE BANK	157: PHONE	310: RIPRAP	603: BACKWALL
104: CTR DITCH	158: GUY P	311: GRAVEL	604: BRIDGE SEAT
105: TREE LINE	159: PED P	312: DRIVEWAY	605: LOW STEEL
106: EDGE FIELD	160: P/P	313: DIRT ROAD	606: LOW CONCRETE
107: TREE	161: SIG P	314: APRON	607: PIER
108: EDGE MARSH	162: TEL P	315: CL BIKE TRAIL	608: ABUTEMENT
109: SHOULDER	163: POND	316: PARKING CURB	609: COR. BRDGE
110: EDGE CAMPER PAD	164: POOL	317: TOP RIP RAP	610: CTR TRACKS
111: EDGE PARKING LOT	165: PUMP	318: TOE RIP RAP	611: TOP BALLAST
112: SAND	166: RET WALL	319: EDGE BIKE TRAIL	612: TOE BALLAST
113: TOP/TOE OF BANK	167: R/R	320: TOE CURB	613: EDGE BOAT RAMP
114: CL DRAW	168: S POST	321: SHLDR RD.	620: CL TRACKS
115: CL RIDGE	169: SIGN	322: FIGURE SIGN1	621: TOP BALLAST
116: DRILL HOLE	170: SIG CONT	323: FIGURE SIGN2	622: TOE BALLAST
117: SLOPE INDICATOR	171: SPRING	324: FIGURE TREEC	701: CENTERLINE
118: FENCE LINE	172: S PIPE	325: FIGURE TREED	702: BASE LINE
119: TEMP GUAGE	173: STOP BAR	326: FIGURE WM	703: FLOW LINE
120: EP	174: STREAM	327: FIGURE WV	704: TBM
121: CL FEN	175: SUMP	328: FIGURE WHLCHR	705: BM
122: WD FEN	176: TEL MH	401: INVERT	706: P.I.
123: WI FEN	177: TEL RIS	402: CULVERT	707: P.C.
124: F COR	178: TEL VLT	403: TOP HEADWALL	708: P.T.
125: FH	179: TREE D	404: INLET	709: P.O.T.
126: FOG LN	180: TREE E	405: OUTLET	710: SECTION CORNER
127: GAS FILL	181: VAULT	406: CMP	711: QUARTER CORNER
128: GAS PUMP	182: AC WALK	407: RCP	712: PROPERTY CORNER
129: GM	183: C WALK	408: PVC	713: BOUNDARY
130: GV	184: X WALK	409: TOP PIPE	714: PROPERTY LINE
131: GATE	185: B WALL	501: POWER POLE	715: NORTH
132: GRAV	186: C WALL	502: MANHOLE	716: SOUTH
133: GRD RAIL	187: R WALL	503: HYDRANT	717: EAST
134: GUY	188: WELL	504: TELE. PEDESTAL	718: WEST
135: HEDGE	189: WM	505: CATCH BASIN	719: ROW MARKER
136: SHRUB	190: WV	506: FUEL SHUTOFF	720: P.K. NAIL
137: BUSH	191: WHL CH RAMP	VALVE	721: FND 1/2 IRON PIN
138: INLET	200: WE\WS	507: SPRINKLER VALVE	790: 1/2" rebar
139: CB	201: WE/WS	508: WATER VALVE	801: REF.TREE
140: AC ISL	202: SOUNDING	509: ELECTRIC BOX	802: BLAZED REF TREE
141: CONC ISL	203: CL FLOW	510: GUY WIRE	803: BOAT SPIKE
142: JUNC BOX	204: SILT SOUNDING	511: LITE POLE	804: R.R. SPIKE
143: LAKE	205: THALWAG	512: GAS PUMP	805: NAIL
144: EOW	206: CENTER LEVEE	513: POWER POLE	806: REF.TREE
145: LAWN	207: SHLD LEVEE	W\NAIL&TAB	W\NAIL&TAB
146: LOOP	208: TOE LEVEE	514: OBSERVATION	807: REF.TREE
147: LITE P	300: FIGURE STO	WELL	W/TAB&NAIL
148: ML BOX	301: EDGE RD	515: ELEC. LINE	811: turn
149: MON BOX	302: CL ROAD	516: NAT. GAS LINE	901: VERT WALL
150: MH SEW	303: TOP CURB	517: TEL. LINE	902: CORNER BLDG
151: MH STRM	304: FLOW LINE	518: STORM SEWER	903: BLDG
152: MH TEL	305: EDGE CONC.	519: CABLE LINE	904: RADIO TOWER
153: MH ELEC	306: EDGE SIDEWALK	520: WATER LINE	905: WATER TOWER
154: MARSH	307: CONCRETE	521: SAN. SEWER	906: FLAG POLE

907: SIGN	912: GUARD RAIL POST	918: CHECK POST	991: corn.ramp/top conc.
908: RETAINING WALL	913: FENCE COR POST	919: LOCK CRANE	992: ed.conc.ramp/clrr trks
909: CORNER CONC.PAD	914: PP ANCHOR	920: VENT PIPE	993: corner Sidewalk
910: PEDESTAL CAMP GRILL	915: SIGN POST W/NAIL&TAB	921: EDGE LOCKWALL	
911: GARBAGE CAN HOLDER	916: MAILBOX	922: E.O.BLOCK PLANTER	
	917: SINK HOLE	990: corn.refrig.unit	

F-6. Descriptor Codes (Rock Island District)

Topo Code	Description	Group			
				Rocks/Boulders	
			VV	Void Point	Misc
			VV*	Void Point	Misc
BC	Bldg Corner	Building			
BF	Building Face	Building			
BO-*	Building Opening/Doorway	Building	GLT	Ground Light	Power
			GUY	Guy Wire	Power
CMN	Column	Building	LP	Light Pole	Power
DECK	Decks	Building	OH	Overhead Wire	Power
FF	Finish Floor Elevation	Building	PP	Power Pole	Power
PORCH	Porch	Building	PRSR	Power Riser	Power
			UGVP*	Vault-Under Ground Power	Power
CP	Control Point	Control/Found			
FD	Found Monument	Control/Found			
			CL	Center Line	Roads/Walks
FNC	Fence Line Corner	Fences/Gates	EA	Edge of Asphalt	Roads/Walks
FNL	Fence Line	Fences/Gates	EC	Edge of Concrete	Roads/Walks
GP	Gate Post	Fences/Gates	EDR	Edge of Dirt Road	Roads/Walks
			EG	Edge of Gravel	Roads/Walks
GM	Gas Meter	Gas	EW	Edge of Sidewalk	Roads/Walks
GV	Gas Valve	Gas	GRDRL	Guard Rail	Roads/Walks
			GRV	Top of Gravel	Roads/Walks
DAY	Daylight (Top=Toe)	Ground/Walls	GUT	Gutter	Roads/Walks
GB	Grade Break	Ground/Walls	PATH	Path (Specify!)	Roads/Walks
GS	Ground Shot	Ground/Walls	RR	Railroad Tracks	Roads/Walks
STEP	Step (Specify!)	Ground/Walls	TCG*	Top of Curb (Curb and Gutter Combo)	Roads/Walks
STEP*	Steps (Specify!)	Ground/Walls	TCS*	Top of Standard Curb	Roads/Walks
TOE*	Toe of Slope	Ground/Walls	TP*	Top of Pavement	Roads/Walks
TOP*	Top of Slope	Ground/Walls	XCG*	Extruded Curb Shot at Gutter	Roads/Walks
WET*	Wetland Flagging	Ground/Walls			
WOE*	Toe of Wall	Ground/Walls			
WOP*	Top of Wall	Ground/Walls			
			SSCO	Sanitary Clean Out	
BEN	Bench	Misc	SSMH	Sanitary Manhole	Sanitary
BOL	Bollard	Misc			
LOG	Log	Misc	AD	Area Drain	Storm
M-	Misc. (Specify!)	Misc	CB	Catch Basin	Storm
MB	Mailbox	Misc	CI	Curb Inlet	Storm
P-	Play Ground Equipment	Misc	FL	Flow Line	Storm
PICB	Picnic Table	Misc	IE	Invert Elevation	Storm
ROCK	Large	Misc	RD	Roof Drain	Storm
			RIPRAP	Rip Rap (Outfalls)	Storm

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STMH	Storm Manhole	Storm			ing
			BUSH ##	Bush ## (dia. Feet)	Trees/Landscap ing
SPDB	Speed Bump	Taffic			
SGN	Sign-Misc	Traffic	EL	Edge of Landscape	Trees/Landscap ing
SGNSP	Sign-Speed	Traffic	TRC##	Coniferous Tree (##=size in inches)	Trees/Landscap ing
SGNST	Sign-Stop	Traffic			
SGNY	Sign-Yield	Traffic	TRD##	Deciduous Tree (##=size in inches)	Trees/Landscap ing
SIGB	Signal/Junction Box	Traffic			
SIGP	Traffic Signal Pole	Traffic	CO	Unknown Clean Out	Unknown Utilities
SIGX	Ped Pole w/ Button	Traffic			
TS*	Traffic Striping Misc.	Traffic	MH	Unknown Manhole	Unknown Utilities
TSA*	Traffic Arrow	Traffic	PAINT	Misc Paint Markings	Unknown Utilities
TSDW*	Traffice Stripe Dashed White	Traffic	RSR	Riser-Unknown	Unknown Utilities
TSDY*	Traffic Stripe Dashed Yellow	Traffic	STP	Stand Pipe- Unknown	Unknown Utilities
TSSW*	Traffic Stripe solid White	Traffic	U*	Misc. Utility- Unknown	Unknown Utilities
TSSY*	Traffic Stripe Solid Yellow	Traffic	UGVU*	Vault-Under Ground Unknown	Unknown Utilities
##ALD_*	Alder	Trees/Landscap ing	PNCTV	Cable TV Paint	Utilities
##ASH_*	Ash Tree	Trees/Landscap ing	PNG	Gas Paint	Utilities
##BIR_*	Birch	Trees/Landscap ing	PNP	Power Paint	Utilities
##CED_*	Cedar	Trees/Landscap ing	PNSS	Sanitary Paint	Utilities
##COT_*	Cotton	Trees/Landscap ing	PNST	Storm Paint	Utilities
##DF_*	Doug Fir	Trees/Landscap ing	PNT	Telephone Paint	Utilities
##HOL_*	Holly	Trees/Landscap ing	PNW	Water Paint	Utilities
##MAP_*	Mapple	Trees/Landscap ing	TRSR*	Telephone Riser	Utilities
##OAK_*	Oak	Trees/Landscap ing	TVRSR*	Cable TV Riser	Utilities
##PIN_*	Pine	Trees/Landscap ing	UGVT*	Vault-Under Ground Telephone	Utilities
##SPR_*	Spruce	Trees/Landscap ing	ASP	Auto Sprinkler (FDC)	Water
##UC_*	Unknown Conifer	Trees/Landscap ing	FH	Fire Hydrant	Water
##UD_*	Unknown Deciduous	Trees/Landscap ing	SH	Sprinkler Head	Water
##WIL_*	Willow	Trees/Landscap	SV	Sprinkler Valve	Water
			UGVW*	Vault-Under Ground Water	Water
			WELL*	Well-Water	Water
			WM*	Water Meter	Water
			WV*	Water Valve	Water

Building		PP	Power Pole	SGNRRX	Sign-Railroad Crossing
BC	Bldg Corner	PRSR	Power Riser		
BF	Building Face	STLT	Street Light	SGNY	Sign-Yield
BO_##	Building Opening (##= Feet)	UGVP	Vault-Under Ground Power	SIGB	Signal/Junction Box
				SIGP	Traffic Signal Pole
CMN	Column			SIGX	Ped Pole w/ Button
DECK	Decks	Roads/Walks		TS	Traffic Striping Misc.
FF	Finish Floor Elevation	CL	Center Line	TS2YS	Traffic Stripe Double Yellow Solid
PORCH	Porch	EA	Edge of Asphalt		
		EC	Edge of Concrete	TS2YC	Traffic Stripe Double Yellow Solid w/ Dashed
Control/Found		EDR	Edge of Dirt Road		
CHK	Check Point	EG	Edge of Gravel	TSA	Traffic Stripe Arrow
CP	Control Point	EP	Edge of Pavement	TSA2W	Traffic Stripe Arrow 2-Way
FD	Found Monument	EW	Edge of Sidewalk		
		GRDRL	Guard Rail	TSAL	Traffic Symbol-LEFT
Fences/Gates		GRV	Top of Gravel	TSALR	Traffic Symbol-LEFT-RIGHT
FNC	Fence Line Corner	GUT	Gutter		
FNL	Fence Line	PATH	Path (Specify!)	TSALRS	Traffic Symbol-LEFT-RIGHT-STRAIGHT
GP	Gate Post	RR	Railroad Tracks	TSALS	Traffic Symbol-LEFT-STRAIGHT
		TCG	Top of Curb (Curb and Gutter Combo)	TSAR	Traffic Symbol-RIGHT
Gas		TCS	Top of Standard Curb	TSARS	Traffic Symbol-RIGHT-STRAIGHT
GM	Gas Meter	TP	Top of Pavement		
GV	Gas Valve	XCG	Extruded Curb Shot at Gutter	TSBIKE	Traffic Symbol-BIKE
PNG	Gas Paint			TSDW	Traffic Stripe Dashed White
				TSDY	Traffic Stripe Dashed Yellow
Ground/Walls		Sanitary		TSHC	Traffic Symbol-HANDICAP
DAY	Daylight (Top=Toe)	PNSS	Sanitary Paint	TSRRX	Traffic Symbol-RAILROAD CROSSING
GB	Grade Break	SSCO	Sanitary Clean Out		
GS	Ground Shot	SSMH	Sanitary Manhole	TSSKL	Traffic Symbol-SCHOOL
STEP	Step (Specify!)			TSST	Traffic Symbol-STOP
STEP	Steps (Specify!)	Storm		TSSW	Traffic Stripe solid White
TOE	Toe of Slope	AD	Area Drain	TSSY	Traffic Stripe Solid Yellow
TOP	Top of Slope	CB	Catch Basin		
WET	Wetland Flagging	CI	Curb Inlet	Trees/Landscaping	
WOE	Toe of Wall	FL	Flow Line	## = Dia. in Inches, _ =space,	
WOP	Top of Wall	IE	Invert Elevation	\$\$\$ = Tag Number	
		PNST	Storm Paint	##ALD_\$\$\$	Alder
Misc		RD	Roof Drain	##ASH_\$\$\$	Ash Tree
BEN	Bench	RIPRAP	Rip Rap (Outfalls)	##BIR_\$\$\$	Birch
BOL	Bollard	STMH	Storm Manhole	##CED_\$\$\$	Cedar
LOG	Log			##COT_\$\$\$	Cotton
M_	Misc. (Specify!)	Telephone and TV		##DF_\$\$\$	Doug Fir
MB	Mailbox	PNCTV	Cable TV Paint	##HOL_\$\$\$	Holly
P_	Play Ground Equipment	PNT	Telephone Paint	##MAP_\$\$\$	Mapple
		TMH	Telephone Manhole	##OAK_\$\$\$	Oak
PICB	Picnic Table	TRSR	Telephone Riser	##PIN_\$\$\$	Pine
RIPRAP	Large Rocks/Boulders	TVRSR	Cable TV Riser	##SPR_\$\$\$	Spruce
ROCK	Rock	UGVT	Vault-Under Ground Telephone	##UC_\$\$\$	Unknown Conifer
RR	Railroad			##UD_\$\$\$	Unknown Deciduous
RRXG	Railroad Crossing Gate	Traffic		##WIL_\$\$\$	Willow
TOMB	Grave Site	SPDB	Speed Bump		
VV	Void Point	SGN	Sign-Misc		
		SGN##	Sign-Speed (##= 10,15,20,25,30,etc.)		
Power		SGNDE	Sign-Dead End		
GLT	Ground Light	SGNNP	Sign-No Parking		
GUY	Guy Wire	SGNSA	Sign-Stop Ahead		
LP	Light Pole	SGNST	Sign-Stop		
OH	Overhead Wire				
PM	Power Meter				
PNP	Power Paint				

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BUSH ##	Bush ## (dia. Feet)	RSR	Riser-Unknown	PNW	Water Paint
EL	Edge of Landscape	STP	Stand Pipe-Unknown	SH	Sprinkler Head
TRC##	Coniferous Tree	U	Misc. Utility-Unknown	SV	Sprinkler Valve
TRC##_\$\$\$	Code Space Tag	UGVU	Vault-Under Ground	UGVV	Vault-Under Ground
TRD##	Deciduous Tree		Unknown		Water
TRD##_\$\$\$	Code Space Tag#			WBO	Water Blow-off Valve
		Water		WELL	Well-Water
Unknown Utilities		ASP	Auto Sprinkler	WET	Wetland
CO	Unknown Clean Out	FDC	Fire Department	WM	Water Meter
MH	Unknown Manhole		Connection	WV	Water Valve
PAINT	Misc Paint Markings	FH	Fire Hydrant		

F-7. Field Data Shots

The following excerpt is representative of the field data collected for shots 50 through 549. The observed horizontal and vertical angles are shown for each shot, along with the slope distance. The individual shots are correlated with the coded descriptor data.

=====
 FIELD DATA ENTRY AND TRAVERSE CALCULATIONS
 =====

Field Data File Log

Units of Measurement:
 Angles: DDD.mmsss Distances: Meters
 Methods of Measurement:
 Angles: DIRS Distances: EDM

```
-----
  Rec.  Command      HZ          VT          SD
-----
  0001   1 START         4            5            S 75 58 18.2 W
-----
  0002   2 OCCUPY         4            1.7465
  0003  32 RADIAL        50            5
  0004   BS              00 00 00.0    91 46 36.0    74.0330
  0005   FS              90 47 29.0    101 49 00.0   30.3341
  0006   FS              51            CMP, 36"DIA,  OUTLET INVER  2.4384
  0007   FS              334 00 53.0   107 13 47.0   21.1251
  0008   FS              52            CMP, 36"DIA,OUTLET INVERT  2.4384
  0009   FS              338 50 48.0   106 16 54.0   22.7089
  0010   FS              53            CMP, 24"DIA,  INLET INVERT  3.7490
  0011   FS              45 28 19.0    93 12 51.0    50.7271
  0012   FS              54            CMP, 24"DIA,OUTLET INVERT  3.7490
  0013   FS              11 09 04.0    95 00 54.0    44.3400
  0014   FS              55            CMP                                3.7490
  0015   FS              94 43 27.0    98 25 40.0    29.0188
  0016   FS              56            CENTER BIKE TRAIL                1.8288
  0017   FS              238 28 12.0   88 52 27.0    13.5929
  0018   FS              57            CENTER BIKE TRAIL                1.8288
  0019   FS              232 21 20.0   88 01 59.0    3.8490
  0020   FS              58            CENTER BIKE TRAIL                1.8288
  0021   FS              50 53 19.0    90 11 30.0    6.1850
  .
  .
  .
  0029   FS              74            TOP BANK                          1.8288
  0030   FS              269 31 20.0   90 15 53.0    4.8171
  0031   FS              75            TOP BANK                          1.8288
-----
```

0031	FS	249 32 25.0	89 29 55.0	13.9279	
		76	TOE BANK		1.8288
0032	FS	258 24 11.0	91 23 35.0	14.7310	
		77	TOE BANK		1.8288
	FS	294 25 11.0	98 28 53.0	8.6731	
.					
.					
.					
0109		151	GRD SHT		2.7737
	FS	14 23 12.0	88 13 38.0	74.5481	
0110		152	GRD SHT		2.7737
	FS	20 38 59.0	85 46 05.0	91.8291	
0304		331	CHK SHOT CP 7		1.6246
	FS	359 59 58.0	93 50 27.0	34.7241	
.					
.					
.					
0233		548	GRD SHT		5.8000
	FS	187 08 40.0	100 04 26.0	98.8290	
0234		549	CHK SHOT CP 10		5.0000
	FS	58 31 36.0	88 40 11.0	135.4920	

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The plate below is a sample topographic field log sheet for 28 January 1997. This sheet covers Points 447-473 that were observed from a radial setup. The Pentax total station was set at Point 11 and backsighted on Point 8, with HI/HRs measured and recorded as indicated on the form. Feature codes are recorded in groups, e.g., Top of Bank (code 102) observed from Point 447 through 453, etc. The prism height (HR) is recorded in the "Comments" column, e.g., "8.00 ft."

DATE	1-28-98	INSTRUMENT #	11 SLACITT	TEMP	40	BARR	30.00	P.P.M.	-0.11	WEATHER	P.C.	PAGE	2 OF 5
CHD BY		DATE		INSTRUMENT #	PENTAX	TEMP	40	BARR	30.00	P.P.M.	-0.11	WEATHER	P.C.
LOCATION OF SURVEY	SAYLORVILLE LAKE - RED FEATHER					TYPE OF SURVEY	TOPO						
DETAILS	JOB NAME: RDT4RZ												
LOCATION		H.I.	POINT #	DESCRIPTION									
A@	721	5.68	11	5/8" REBAR									
B/S	721	5.48	8	P-K NAIL									
C/S													
F/S													
FIRST C/S	POINT #	HORIZONTAL ANGLE		SLOPE DIST.	ZENITH ANGLE								
	-												
	-												
	-												
LAST C/S	-												
POINT #	POINT #	PCODE	COMMENTS	POINT #	PCODE	COMMENTS							
FROM	TO						FROM	TO					
447	453	102	TOP BANK 8.00			PT	HR						
454	460	102	TOP BANK 8.00										
461	467	104	6 DITCH 8.00										
468	472	101	CRD SHT. 8.00										
473		721	CP 8 5.48										

F-8. Final Coordinates of Observed Points

The following file is a portion of the final control and topographic points observed on the project. Points 50 through 549 are the topographic shots observed from various radial points. A file such as this can be imported into MicroStation for generating the final drawing.

	<u>X-Y-Z (FEET)</u>			<u>X-Y-Z (METERS)</u>			<u>DESCRIPTOR</u>
REF. CONTROL							
1	624992.18	1955427.99	883.88	190497.997	596015.643	269.407	CP1,SV127.1A 1965
2	627014.12	1955452.98	884.54	191114.286	596023.260	269.608	CP2,SV130.1A 1966
CONTROL							
3	625810.26	1955570.39	905.55	190747.348	596059.046	276.012	CP3,SET 12"NAIL
4	626101.32	1955291.88	889.37	190836.065	595974.155	271.081	CP4,SET PK@BKETRL CL
5	626042.48	1955056.34	882.47	190818.128	595902.365	268.977	CP5,SET12"NAIL
6	626052.86	1954839.40	899.70	190821.294	595836.242	274.229	CP6,SET12"NAIL STUMP
7	626212.78	1954806.48	913.59	190870.036	595826.206	278.463	CP7,SET 12"NAIL
8	626309.37	1954746.55	920.88	190899.477	595807.940	280.685	CP8,SET PK@CL TRAIL
9	626267.99	1954950.83	908.95	190886.865	595870.204	277.049	CP9, SET 12"NAIL
10	626350.63	1954843.51	912.86	190912.053	595837.493	278.240	cp 10, set 5/8"rebar
11	626506.80	1954346.73	926.82	190959.655	595686.075	282.495	cp 11, set 5/8"rebar
12	626294.23	1954113.58	926.24	190894.862	595615.012	282.319	cp 12, set 5/8"rebar
TOPO							
50	626196.15	1955269.57	868.72	190864.967	595967.357	264.786	CMP,36"DIA,IN INVT
51	626058.76	1955241.17	866.57	190823.092	595958.702	264.131	CMP,36"DIA,OUT INVT
52	626060.12	1955233.42	866.21	190823.505	595956.339	264.022	CMP,36"DIA,OUT INVT
53	626188.00	1955150.11	873.47	190862.486	595930.946	266.234	CMP,24"DIA,IN INVERT
54	626094.05	1955147.14	870.08	190833.848	595930.041	265.202	CMP,24"DIA,OUT INVT
55	626194.26	1955276.65	868.85	190864.393	595969.514	264.825	CMP
56	626070.10	1955323.71	889.98	190826.549	595983.858	271.265	CENTER BIKE TRAIL
57	626093.50	1955301.78	889.53	190833.679	595977.173	271.130	CENTER BIKE TRAIL
58	626113.50	1955275.64	889.03	190839.775	595969.207	270.978	CENTER BIKE TRAIL
.							
.							
540	626279.55	1955088.02	886.62	190890.388	595912.020	270.243	TOP BANK
541	626300.92	1955065.22	891.77	190896.904	595905.071	271.812	TOP BANK
542	626332.37	1955044.49	893.46	190906.487	595898.751	272.327	TOP BANK
543	626320.32	1955024.22	895.30	190902.814	595892.575	272.887	GRD SHT
544	626310.18	1955007.02	896.35	190899.726	595887.332	273.208	GRD SHT
545	626278.48	1955025.74	895.52	190890.061	595893.038	272.955	GRD SHT
546	626257.64	1955037.90	894.71	190883.712	595896.745	272.709	GRD SHT
547	626277.72	1955066.91	891.27	190889.831	595905.587	271.660	GRD SHT
548	626291.18	1955045.33	891.64	190893.933	595899.008	271.773	GRD SHT
549	626350.63	1954843.50	912.88	190912.053	595837.490	278.245	CHK SHOT CP 10

F-9. Final Drawing Details

The following plates show the eastern and western portions of the survey area. The primary control traverse points CP 4 through CP 12 are shown. Invert elevations are indicated for various culverts crossing the bike trail. Ground shots used to delineate the topographic contours are shown by red "+" signs.

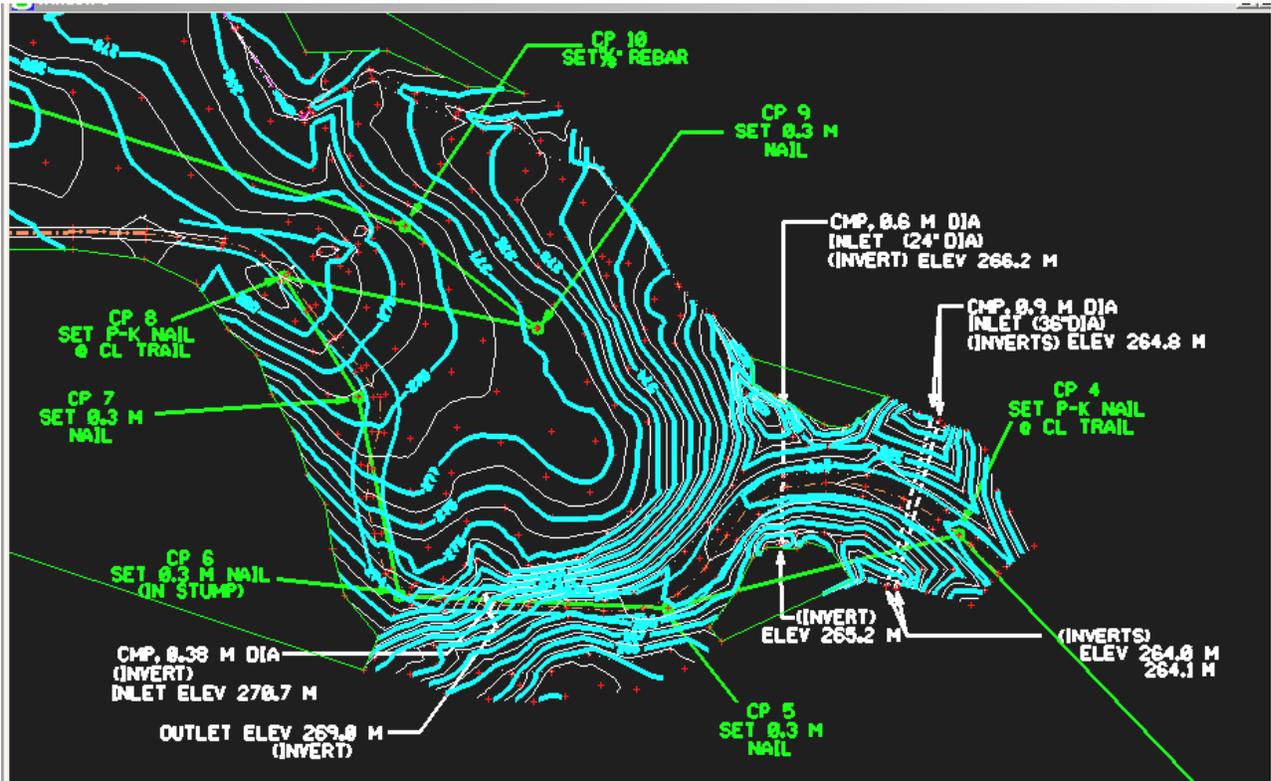


Figure F-4. Eastern portion of survey area



Figure F-5. Western portion of survey area

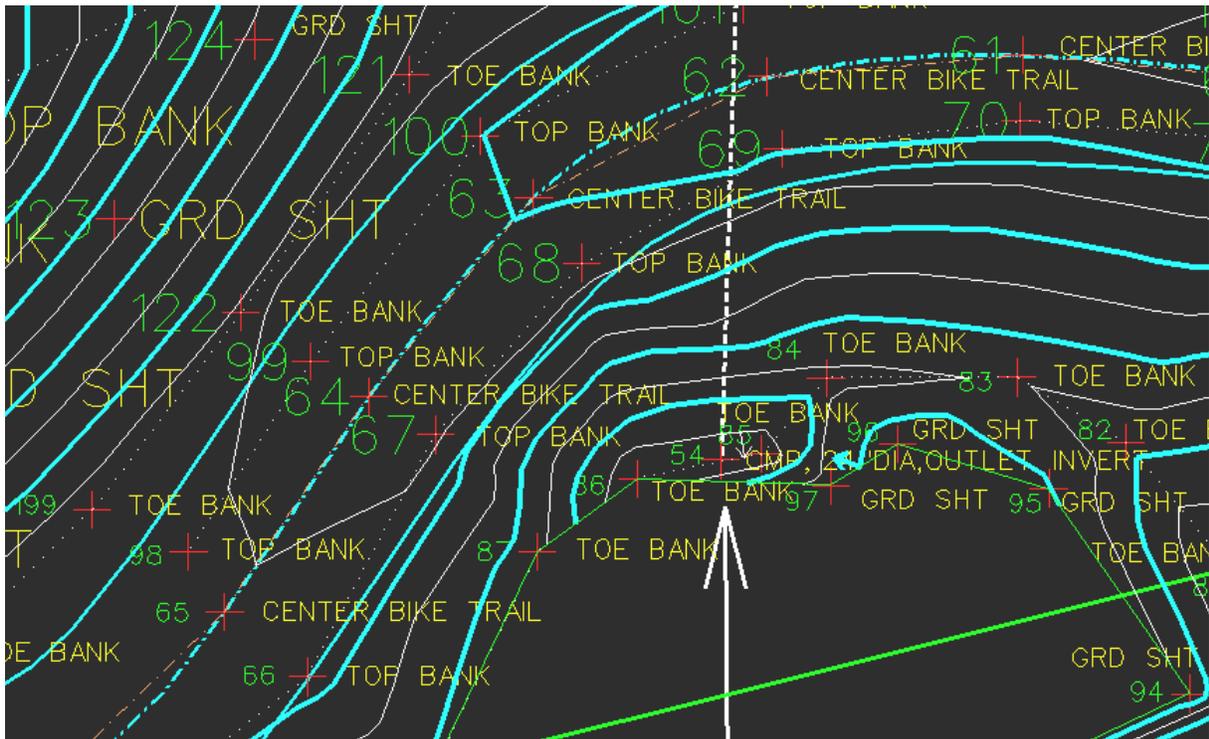


Figure F-6. Screen capture detailing point numbers and descriptors, breaklines, culvert alignment, and trail centerline