

APPENDIX A

LOOP CLOSURES

2004

**GEODETTIC CONTROL DENSIFICATION
AND RESTORATION**

of

JEFFERSON COUNTY, KENTUCKY

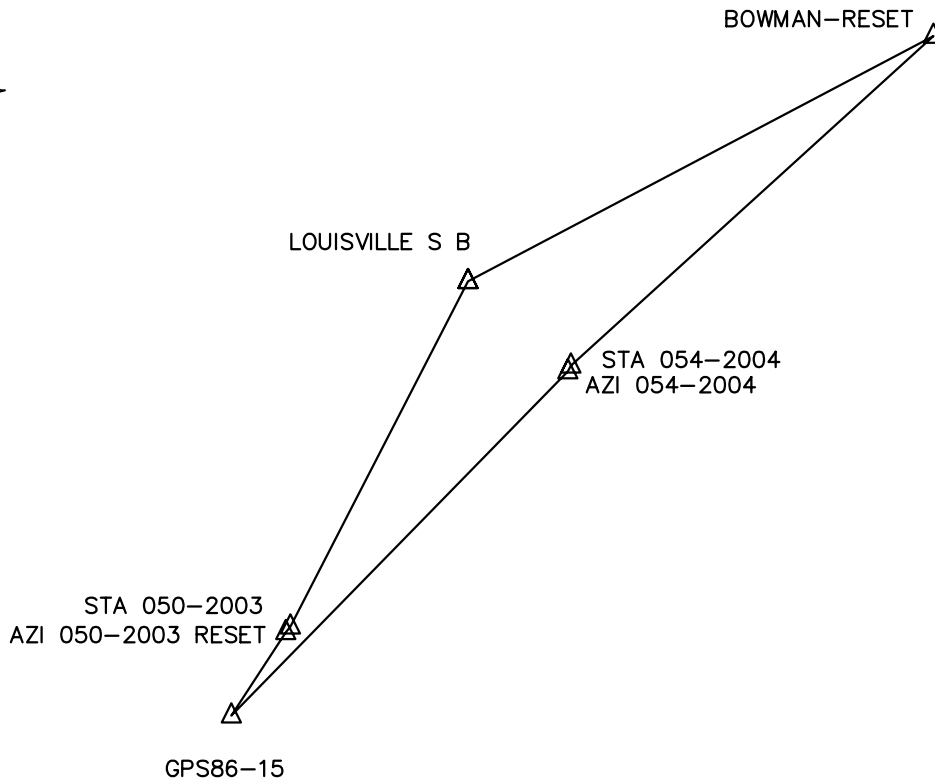
JUNE 2004

**Fuller, Mossbarger, Scott & May
1901 Nelson Miller Parkway
Louisville, Kentucky 40223-2177**



**Jacobi, Toombs and Lanz, Inc.
401 West Main Street, Suite 600
Louisville, Kentucky 40202**





GPS Loop # 1:				
LOUISVILLE S B: BOWMAN-RESET: STA 054-2004: AZI 054-2004: GPS 86-15				
AZI 050-2003 RESET: STA 050-2003: LOUISVILLE S B				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B51	S1	LOUISVILLE S B	BOWMAN-RESET	iono free fixed
B33	S2	BOWMAN-RESET	STA 054-2004	iono free fixed
B69	S28	STA 054-2004	AZI 054-2004	L1 fixed
B16	S47	GPS86-15	AZI 054-2004	iono free fixed
B18	S94	GPS86-15	AZI 050-2003RESET	iono free fixed
B36	S27	STA 050-2003	AZI 050-2003RESET	L1 fixed
B35	S45	LOUISVILLE S B	STA 050-2003	iono free fixed
Passed Combination for Loop #1:				
S1-S2-S28-S47-S49-S27-S45	Length	Horiz	Vert	PPM
	208238.758sft	0.025sft	-0.001sft	0.118



GPS NETWORK DENSIFICATION FOR
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #1 CLOSURE

JACOBI, TOOMBS & LANZ, INC.
CONSULTING ENGINEERS
120 BELL AVENUE
CLARKSVILLE, INDIANA 47129
(812) 288-6646



EXHIBIT
1 of 11

SCALE: 1" = 20000'

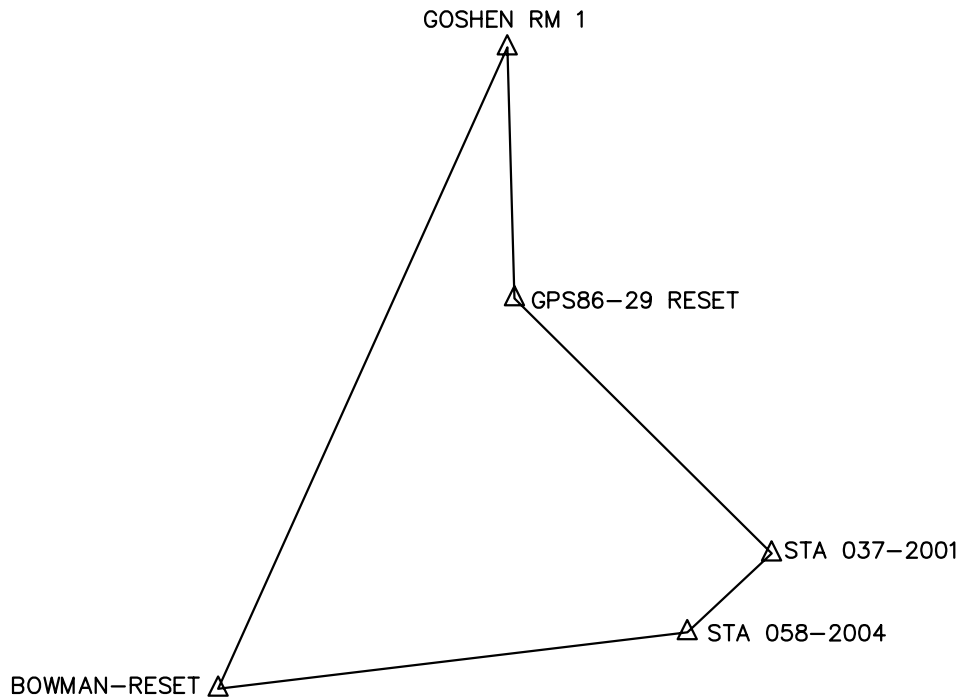
DATE: 6/29/2004

DRAWN: JAT

CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 2:				
BOWMAN-RESET: GOSHEN RM1: GPS86-29 RESET: STA 037-2001: STA 058-2004:				
BOWMAN-RESET				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B20	S10	BOWMAN-RESET	GOSHEN RM 1	iono free fixed
B38	S12	GOSHEN RM 1	GPS86-29 RESET	iono free fixed
B40	S18	STA 037-2001	GPS86-29 RESET	iono free fixed
B4	S116	STA 037-2001	STA 058-2004	L1 fixed
B3	S23	BOWMAN-RESET	STA 058-2004	iono free fixed
Passed Combination for Loop #2:				
S10-S12-S18-S116-S23	Length	Horiz	Vert	PPM
	198435.278sft	0.075sft	0.035sft	0.417



GPS NETWORK DENSIFICATION FOR
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STATIC NETWORK LOOP #2 CLOSURE

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CLARKSVILLE, INDIANA 47129
(812) 288-6646



EXHIBIT
2 of 11

SCALE: 1" = 20000'

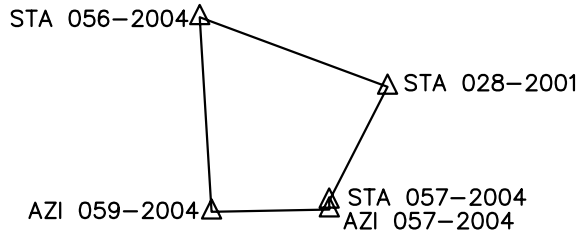
DATE: 6/29/2004

DRAWN: JAT

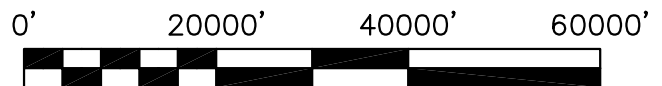
CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 3:				
STA 028-2001: STA 057-2004: AZI 059-2004: AZI 059-2004: STA 056-2004				
STA 028-2001:				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B65	S16	STA 028-2004	STA 057-2004	L1 fixed
B45	S83	AZI 057-2004	STA 057-2004	L1 fixed
B27	S85	AZI 059-2004	AZI 057-2004	L1 fixed
B29	S93	STA 056-2004	AZI 059-2004	iono free fixed
B79	S92	STA 028-2001	STA 056-2004	iono free fixed
Passed Combination for Loop #3:				
S16-S83-S85-S93-S92	Length	Horiz	Vert	PPM
	67685.612sft	0.030sft	-0.081sft	1.278



GPS NETWORK DENSIFICATION FOR
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #3 CLOSURE

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CLARKSVILLE, INDIANA 47129
(812) 288-6646



EXHIBIT
3 of 11

SCALE: 1" = 20000'

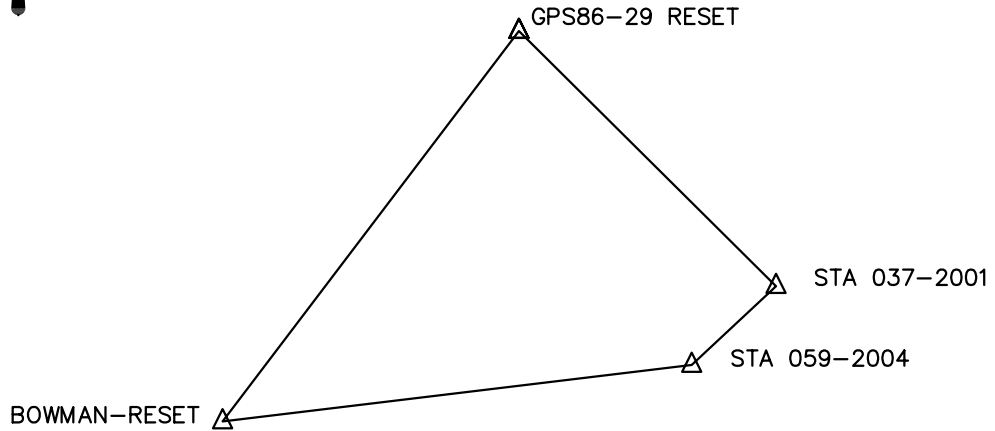
DATE: 6/29/2004

DRAWN: JAT

CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 4:				
BOWMAN-RESET: GPS86-29 RESET: STA 037-2001: STA 058-2004: BOWMAN-RESET				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B2	S9	BOWMAN-RESET	GPS86-29 RESET	iono free fixed
B40	S18	STA 037-2001	GPS86-29 RESET	iono free fixed
B4	S116	STA 037-2001	STA 058-2004	L1 fixed
B3	S23	BOWMAN-RESET	STA 058-2004	iono free fixed
Passed Combination for Loop # 4:				
S9-S18-S116-S23	Length	Horiz	Vert	PPM
	128006.057sft	0.067sft	-0.001sft	0.527



GPS NETWORK DENSIFICATION FOR
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #4 CLOSURE

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120 BELL AVENUE
CLARKSVILLE, INDIANA 47129
(812) 288-6646



EXHIBIT
4 of 11

SCALE: 1" = 20000'

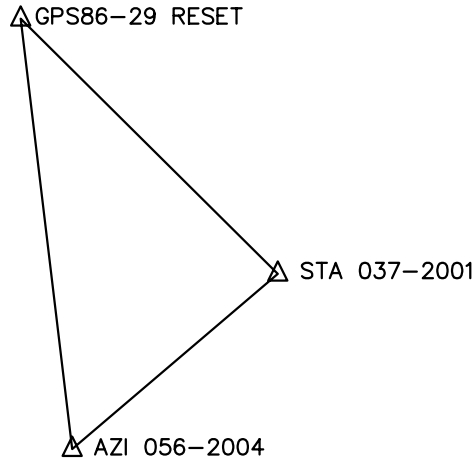
DATE: 6/29/2004

DRAWN: JAT

CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 5:				
STA 037-2001: GPS86-29 RESET:AZI 056-2004:STA 037-2001				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B40	S18	STA 037-2001	GPS86-29 RESET	iono free fixed
B73	S48	GPS86-29 RESET	AZI 056-2004	iono free fixed
B42	S115	STA 037-2001	AZI 056-2004	iono free fixed
Passed Combination for Loop #5:				
S18-S48-S115	Length	Horiz	Vert	PPM
	111024.26sft	0.012sft	-0.153sft	1.385



GPS NETWORK DENSIFICATION FOR
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #5 CLOSURE

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CLARKSVILLE, INDIANA 47129
(812) 288-6646



EXHIBIT

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SCALE: 1" = 20000'

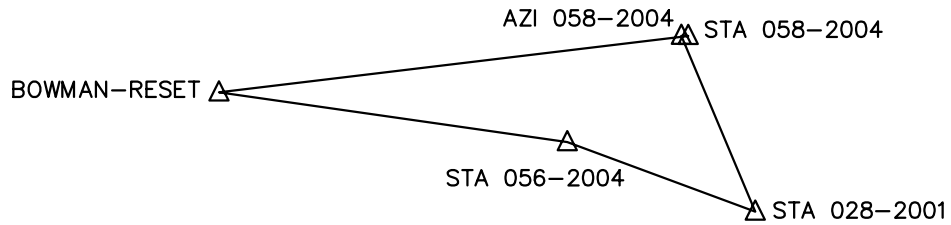
DATE: 6/29/2004

DRAWN: JAT

CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 6:				
BOWMAN-RESET: STA 056-2004: STA 028-2001: AZI 058-2004: BOWMAN-RESET				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B58	S22	BOWMAN-RESET	STA 056-2004	iono free fixed
B79	S92	STA 028-2001	STA 056-2004	iono free fixed
B61	S112	STA 028-2001	AZI 058-2004	iono free fixed
B23	S34	STA 058-2004	AZI 058-2004	L1 fixed
B3	S23	BOWMAN-RESET	STA 058-2004	iono free fixed
Passed Combination for Loop # 6:				
S22-S92-S112-S34-S23	Length	Horiz	Vert	PPM
	127353.359sft	0.075sft	-0.146sft	1.287



GPS NETWORK DENSIFICATION FOR
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STATIC NETWORK LOOP #6 CLOSURE

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(812) 288-6646



EXHIBIT

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SCALE: 1" = 20000'

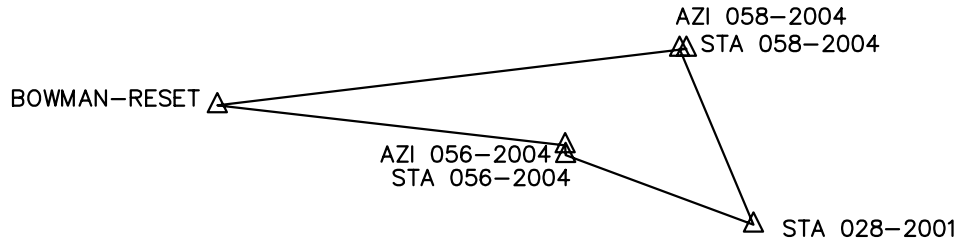
DATE: 6/29/2004

DRAWN: JAT

CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 7:				
BOWMAN-RESET:AZI 056-2004:STA 056-2004:STA 028-2001:AZI 058-2004:				
STA 058-2004: BOWMAN-RESET				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B57	S11	BOWMAN-RESET	AZI 056-2004	iono free fixed
B8	S94	AZI 056-2004	STA 056-2004	L1 fixed
B79	S92	STA 028-2001	STA 056-2004	iono free fixed
B61	S112	STA 028-2001	AZI 058-2004	iono free fixed
B23	S34	STA 058-2004	AZI 058-2004	L1fixed
B3	S23	BOWMAN-RESET	AZI 058-2004	iono free fixed
Passed Combination for Loop # 7:				
S11-S94-S92-S112-S34-S23				
		Length	Horiz	Vert
		128197.151sft	0.068sft	-0.119sft
				PPM
				1.068



GPS NETWORK DENSIFICATION FOR
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #7 CLOSURE

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120 BELL AVENUE
CLARKSVILLE, INDIANA 47129
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EXHIBIT

7 of 11

SCALE: 1" = 20000'

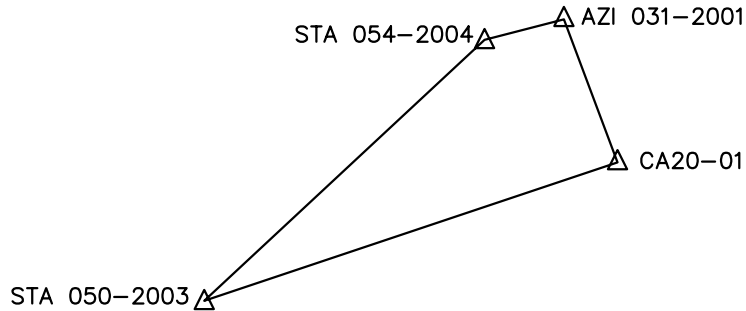
DATE: 6/29/2004

DRAWN: JAT

CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 8:				
STA 050-2003: STA 054-2004: AZI 031-2001: CA20-01: STA050-2003				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B17	S46	STA 050-2003	STA 054-2004	iono free fixed
B118	S126	STA 054-2004	AZI 031-2001	L1 fixed
B114	S125	CA20-01	AZI 031-2001	L1 fixed
B115	S140	CA20-01	STA 050-2003	iono free fixed
Passed Combination for Loop # 8:				
S46-S126-S125-S140	Length	Horiz	Vert	PPM
	109738.242sft	0.061sft	-0.041sft	0.674



GPS NETWORK DENSIFICATION FOR
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STATIC NETWORK LOOP #8 CLOSURE

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(812) 288-6646



EXHIBIT
8 of 11

SCALE: 1" = 20000'

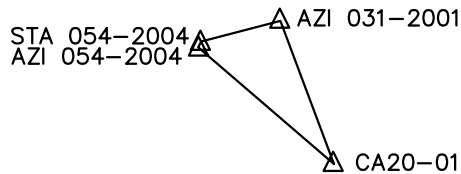
DATE: 6/29/2004

DRAWN: JAT

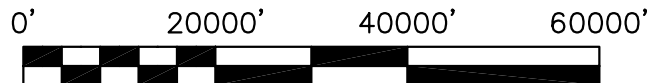
CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 9:				
CA20-01: AZI 054-2004: STA 054-2004: AZI 031-2001: CA20-01				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B87	S25	CA20-01	AZI 054-2004	iono free fixed
B86	S29	STA 054-2004	AZI 054-2004	L1 fixed
B118	S126	STA 054-2004	AZI 031-2001	L1 fixed
B114	S125	CA20-01	AZI 031-2001	L1 fixed
Passed Combination for Loop # 9:				
S25-S29-S126-S125	Length	Horiz	Vert	PPM
	43785.508sft	0.093sft	0.111sft	3.306



GPS NETWORK DENSIFICATION FOR
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #9 CLOSURE

JACOBI, TOOMBS & LANZ, INC.
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120 BELL AVENUE
CLARKSVILLE, INDIANA 47129
(812) 288-6646



EXHIBIT
9 of 11

SCALE: 1" = 20000'

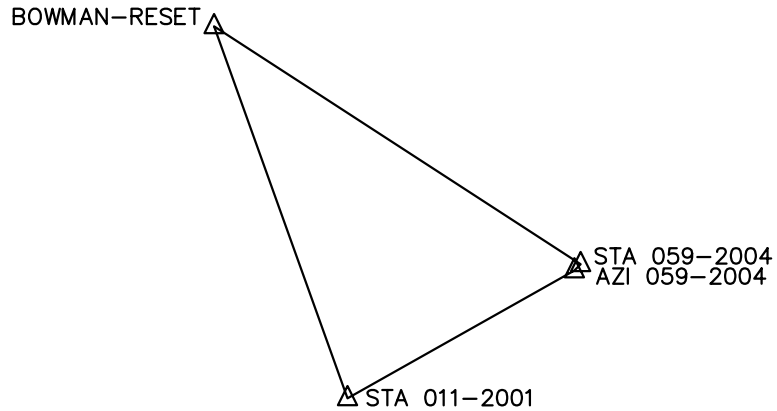
DATE: 6/29/2004

DRAWN: JAT

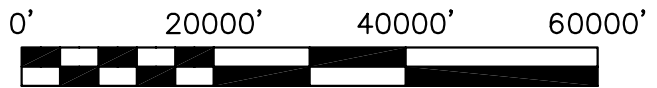
CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 10:					
STA 011-2001: AZI 059-2004: STA 059-2004: BOWMAN-RESET: STA011-2001					
Observations:					
Baseline ID	Solution ID	From	To	Solution Type	
B12	S15	STA 011-2001	AZI 059-2004	iono free fixed	
B83	S72	AZI 059-2004	STA 059-2004	L1 fixed	
B110	S55	BOWMAN-RESET	STA 059-2004	iono free fixed	
B112	S129	BOWMAN-RESET	STA 011-2001	iono free fixed	
Passed Combination for Loop # 10:					
S15-S72-S55-S129		Length	Horiz	Vert	PPM
		114743.654sft	0.019sft	0.041sft	1.240



GPS NETWORK DENSIFICATION FOR
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #10 CLOSURE

JACOBI, TOOMBS & LANZ, INC.
CONSULTING ENGINEERS
120 BELL AVENUE
CLARKSVILLE, INDIANA 47129
(812) 288-6646



EXHIBIT
10 of 11

SCALE: 1" = 20000'

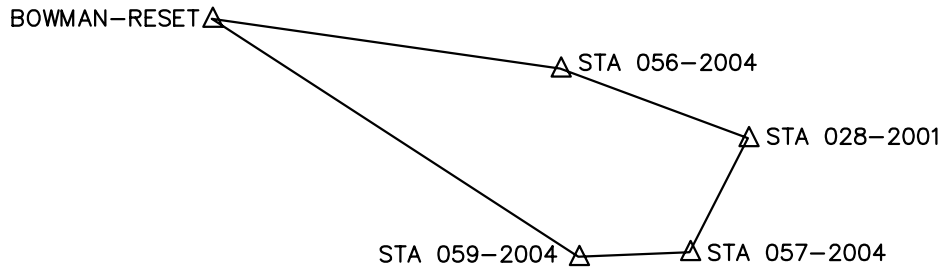
DATE: 6/29/2004

DRAWN: JAT

CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260



GPS Loop # 11:				
STA 028-2001: STA 057-2004: STA 059-2004: BOWMAN-RESET: STA 056-2004:				
STA 028-2001				
Observations:				
Baseline ID	Solution ID	From	To	Solution Type
B65	S16	STA 028-2004	STA 057-2004	L1 fixed
B81	S86	STA 059-2004	STA 057-2004	L1 fixed
B110	S55	BOWMAN-RESET	STA 059-2004	iono free fixed
B58	S22	BOWMAN-RESET	STA 056-2004	iono free fixed
B79	S92	STA 028-2001	STA 056-2004	iono free fixed
Passed Combination for Loop 11:				
S16-S86-S55-S22-S92	Length	Horiz	Vert	PPM
	128006.057sft	0.067sft	-0.001sft	0.527



GPS NETWORK DENSIFICATION FOR
LOUISVILLE/JEFFERSON COUNTY INFORMATION CONSORTIUM

STATIC NETWORK LOOP #11 CLOSURE

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CLARKSVILLE, INDIANA 47129
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EXHIBIT

11 of 11

SCALE: 1" = 20000'

DATE: 6/29/2004

DRAWN: JAT

CHECKED: HLH

DRW#: 0260.DWG

JOB No. 0260