



# CONTINENTAL PLACER INC.

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## **DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR A MINED LAND USE PLAN MODIFICATION**

**COUNTY LINE STONE CO., INC.  
AKRON QUARRY  
AKRON, NEW YORK**

**MLF #9043-21-0093  
DEC ID 9-1456-00004/00013**

## **VOLUME 5**

### **Appendix 11**

**Groundwater Data**

### **Appendix 12**

**Archeology Report**

### **Appendix 13**

**Property Value Study**

### **Appendix 14**

**Towns of Pembroke and Newstead  
Road Re-alignment Letters**

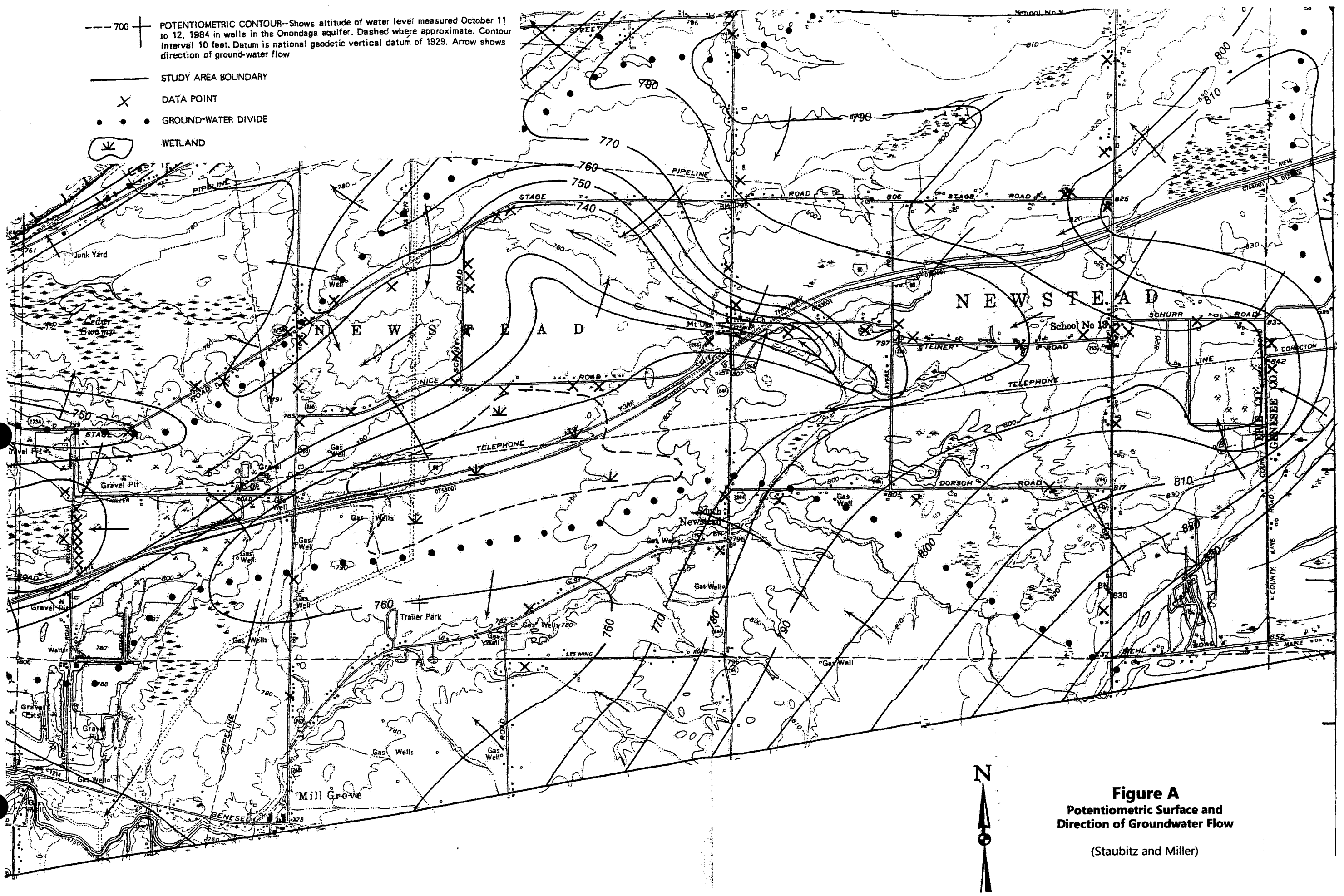
**April 1, 2019**



**Appendix 11**  
**Groundwater Data**

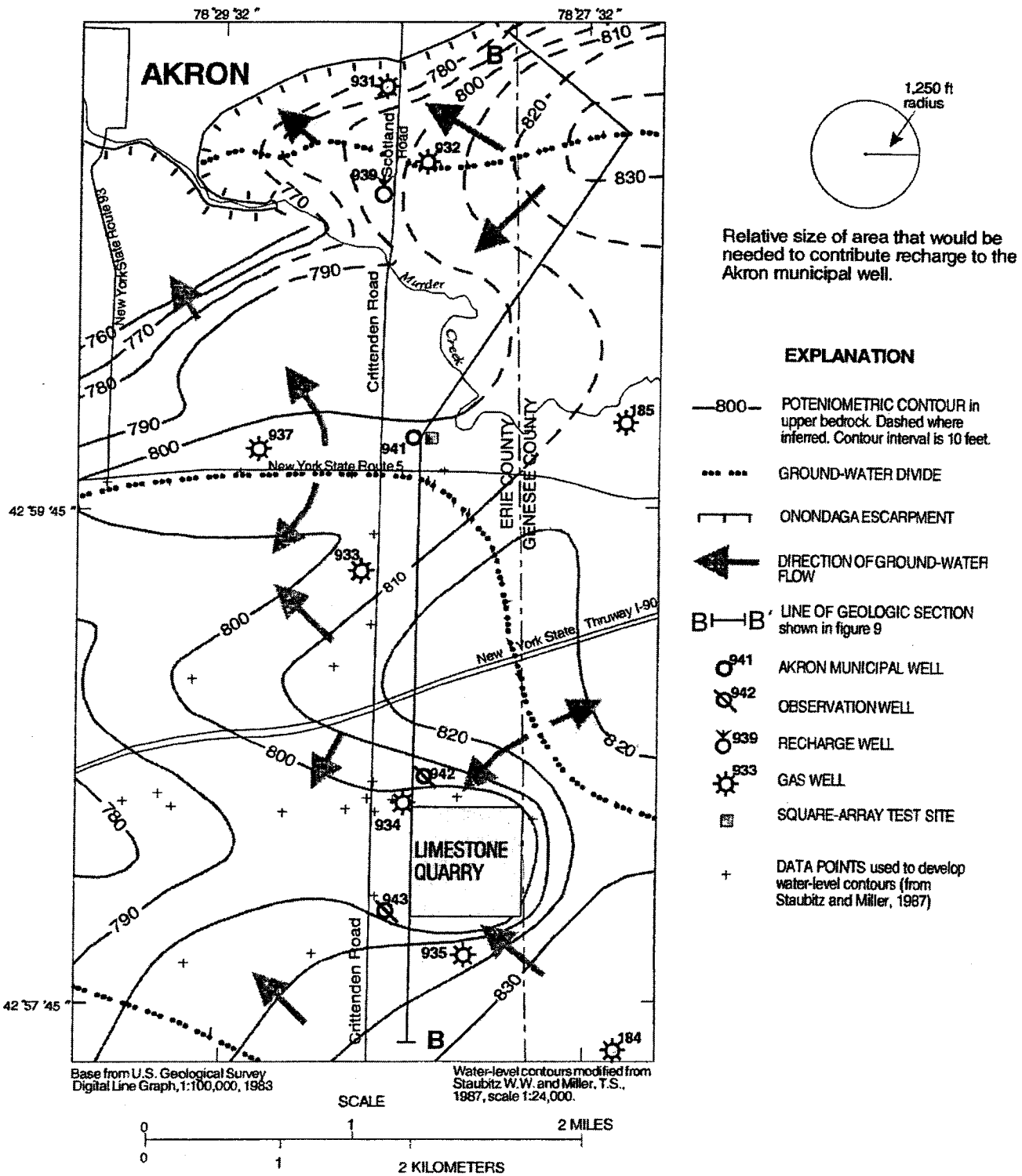
--- 700 + POTENTIOMETRIC CONTOUR--Shows altitude of water level measured October 11 to 12, 1984 in wells in the Onondaga aquifer. Dashed where approximate. Contour interval 10 feet. Datum is national geodetic vertical datum of 1929. Arrow shows direction of ground-water flow

- STUDY AREA BOUNDARY
- X DATA POINT
- GROUND-WATER DIVIDE
- W WETLAND



**Figure A**  
**Potentiometric Surface and**  
**Direction of Groundwater Flow**  
 (Staubitz and Miller)





**Figure B.** Potentiometric-surface altitude in upper bedrock and locations of ground-water divides north and south of Akron municipal well, Erie County, N.Y. (From Kappel & Miller, 1996)

**Table 1**  
**County Line Stone Co., Inc.**  
**Groundwater Monitoring**  
**Well Records**

Well	Depth (ft.)
1	67±
2	34±
3	93±
4	54 abandoned
5	28
6	113
7	
8	62±
1-96	144.5
2-96	137.8
3-96	132.6
4-96	127.7
5-96	168.8
14	45

Date	Well 1 Water Elev.	Well 2 Water Elev.	Well 3 Water Elev.	Well 4 Water Elev.	Well 5 Water Elev.	Well 6 Water Elev.	Well 7 Water Elev.	Well 8 Water Elev.	Well 1-96 Water Elev.	Well 2-96 Water Elev.	Well 3-96 Water Elev.	Well 4-96 Water Elev.	Well 5-96 Water Elev.	Well #14
08/16/93	777.3	795.5	782.6	NR	NR	NR	NR	NR						
08/18/93	776.7	796.2	783.9	NR	NR	NR	NR	NR						
08/21/93	777.0	796.8	781.5	NR	NR	NR	NR	NR						
08/25/93	776.8	797.2	784.1	777.7	824.4	816.7	NR	831.1						
09/02/93	775.2	797.3	784.4	776.0	821.4	816.5	816.6	828.1						
10/15/93	778.8	799.4	794.4	781.3	814.7	782.5	NR	NR						
11/09/93	781.4	802.7	797.6	786.9	814.7	813.4	819.6	831.3						
12/08/93	784.5	804.6	798.6	790.0	815.1	813.7	820.7	832.4						
02/01/94	784.2	804.4	798.6	789.6	814.9	808.6	820.6	832.5						
03/04/94	786.5	804.8	798.6	790.2	814.9	813.2	820.8	832.5						
04/05/94	790.1	806.2	798.8	791.9	815.3	813.5	821.1	833.0						
05/24/94	782.7	801.9	800.1	784.6	814.9	797.3	825.6	831.7						
06/21/94	781.5	799.9	798.9	783.0	814.9	791.7	824.3	831.2						
07/25/94	779.1	797.1	796.7	778.8	814.4	781.8	823.4	830.8						
09/16/94	773.9	796.5	792.0	774.7	814.1	795.2	821.9	830.0						
10/13/94	777.1	798.4	794.0	779.1	814.1	789.6	820.9	830.6						
11/08/94	779.1	803.6	794.8	782.8	813.7	800.3	819.5	831.0						
12/13/94	782.6	804.5	798.2	789.2	814.4	814.2	822.3	831.8						
01/12/95	782.2	803.1	796.8	787.4	814.3	813.3	821.6	808.2						
02/17/95	781.7	800.9	795.0	785.0	814.4	801.4	821.4	830.8						
03/22/95	785.1	801.1	794.4	783.8	814.5	805.0	822.7	830.8						
04/29/95	787.4	799.4	784.5	NR	814.4	811.3	829.9	831.3						
05/25/95	780.1	798.0	793.7	NR	814.2	790.4	822.1	830.6						
06/22/95	775.2	796.3	791.5	NR	813.6	777.7	820.1	829.8						
08/01/95	773.9	796.0	789.6	NR	813.3	780.7	818.8	829.1						
09/19/95	771.2	795.8	787.8	NR	813.1	772.3	817.5	828.6						
10/18/95	773.0	796.1	788.9	NR	813.4	777.1	818.4	829.1						
11/22/95	775.4	799.5	792.0	NR	813.7	779.0	818.9	830.6						
12/19/95	779.7	803.1	793.4	NR	814.4	786.0	820.4	831.1						
01/24/96	780.8	804.0	794.7	NR	814.5	788.5	820.9	830.8						
02/20/96	782.2	804.4	795.9	NR	814.7	789.9	821.5	831.2						
03/26/96	786.2	804.7	797.5	NR	815.1	790.7	822.1	831.6						
04/25/96	791.1	804.9	799.7	NR	815.1	788.7	822.7	831.6						
05/17/96	791.4	804.9	800.3	NR	815.2	789.6	822.8	831.7						
06/20/96	790.2	805.1	800.1	NR	815.0	785.3	822.3	830.5						
07/17/96	788.0	796.6	792.7	NR	814.9	782.1	819.8	825.7						
08/13/96	777.2	796.2	791.4	NR	814.2	781.1	819.3	828.7						
09/12/96	773.6	795.9	789.1	NR	813.7	775.9	818.5	829.1						

NR = No Reading

**Table 1 (continued)**  
**County Line Stone Co., Inc.**  
**Groundwater Monitoring**  
**Well Records**

	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8	Well 1-96	Well 2-96	Well 3-96	Well 4-962	Well 5-96	Well #14
Date	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.	Water Elev.
10/18/96	777.9	796.5	790.0	NR	814.3	781.1	823.3	830.5	NR	NR	NR	NR	NR	
11/19/96	783.9	800.0	792.0	NR	814.8	804.3	829.0	831.6	NR	NR	NR	NR	NR	
12/20/96	794.1	799.2	792.1	NR	814.7	808.5	829.6	831.6	NR	NR	NR	NR	NR	
01/14/97	784.4	799.1	791.6	NR	814.4	801.7	826.9	831.6	820.3	828.5	791.2	815.1	830.9	
02/18/97	784.3	798.6	791.5	NR	814.5	792.2	828.2	832.0	819.9	828.4	785.4	814.2	830.8	
03/21/97	786.0	800.6	792.8	NR	815.0	798.4	826.0	832.0	820.7	830.6	793.6	815.8	831.9	
04/22/97	784.4	799.4	792.4	NR	814.6	789.4	824.7	831.2	820.0	830.4	791.0	814.7	831.3	
05/16/97	781.7	797.7	792.0	NR	814.4	786.7	822.0	831.9	819.0	829.5	788.6	813.5	830.8	
07/02/97	779.1	795.8	790.6	NR	814.0	783.2	819.3	831.2	816.8	825.1	784.5	811.7	827.3	
08/01/97	775.3	795.4	787.3	NR	814.3	776.7	818.3	828.8	814.1	824.0	778.1	809.2	825.1	
10/22/97	777.4	796.7	781.3	NR	814.5	831.6	NR	830.8	816.2	827.6	802.1	811.5	825.1	
11/13/97	782.4	797.9	788.2	NR	815.4	809.2	834.6	826.8	818.5	830.5	804.1	816.5	829.1	
12/15/97	788.4	797.9	777.8	NR	814.9	821.7	838.6	831.8	819.5	831.1	803.1	817.5	830.6	
01/20/98	794.4	799.4	784.8	NR	815.4	812.7	833.1	826.8	820.0	826.1	792.6	818.0	831.1	
03/02/98	789.4	799.4	777.8	NR	821.4	815.2	837.6	831.8	820.5	831.1	793.1	818.0	832.1	
04/10/98	790.0	797.7	774.8	NR	815.9	790.8	838.0	831.3	819.6	830.9	803.2	817.4	831.0	
05/12/98	793.3	799.8	796.0	NR	815.3	803.0	838.2	831.4	819.5	830.5	803.4	819.3	831.4	
06/11/98	778.3	800.4	774.1	NR	812.8	790.5	836.7	830.5	816.5	824.3	801.9	815.1	826.9	
07/06/98	778.9	796.3	778.2	NR	815.7	791.0	819.9	830.5	816.4	825.1	803.2	814.6	827.5	
08/17/98	775.4	795.6	771.6	NR	813.8	780.4	818.4	829.9	813.9	824.3	803.0	812.9	824.9	
09/16/98	774.7	795.4	776.5	NR	814.5	767.8	817.9	827.2	813.6	824.2	802.7	810.8	822.3	
10/22/98	774.4	795.4	776.3	NR	814.4	780.7	818.6	827.8	813.5	824.6	802.1	810.5	823.1	
11/18/98	773.9	795.9	775.8	NR	813.9	806.7	833.6	828.8	813.0	824.1	783.1	809.5	823.1	
12/15/98	774.4	795.9	776.8	NR	814.4	786.7	831.6	830.2	813.5	824.1	783.6	810.5	823.5	
01/20/99	789.4	798.4	777.8	NR	814.4	824.2	NR	NR	815.0	825.1	804.1	814.0	821.6	
02/24/99	794.4	797.9	784.3	NR	815.4	823.2	834.6	829.8	818.5	830.6	804.1	819.5	825.1	
03/31/99	783.9	798.4	777.3	NR	813.4	789.7	837.6	830.8	819.0	831.1	NR	820.0	826.6	811.9
04/22/99	782.4	796.3	777.2	NR	812.4	791.7	838.1	830.3	817.5	831.6	NR	820.0	825.1	811.4





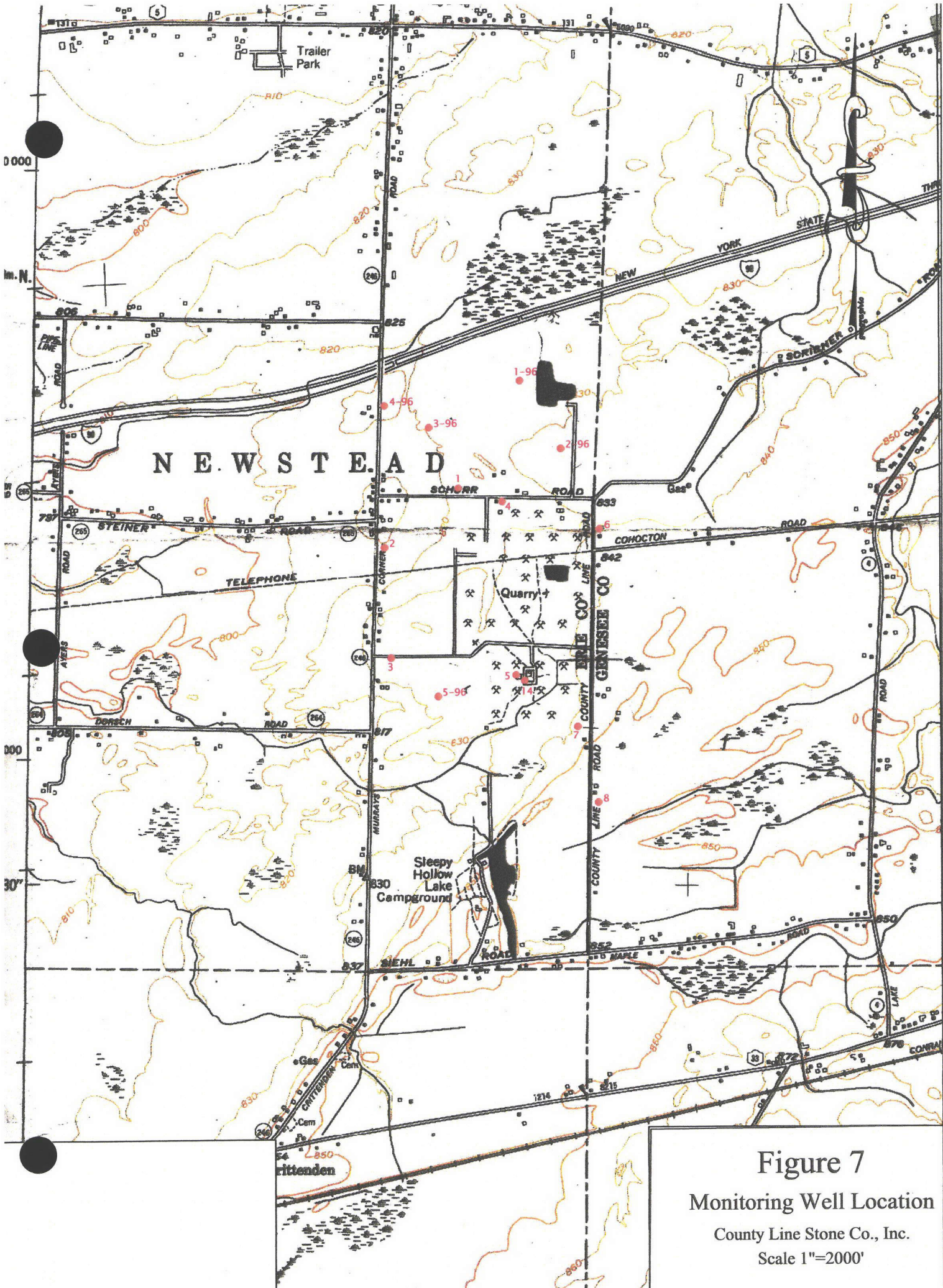


Figure 7  
 Monitoring Well Location  
 County Line Stone Co., Inc.  
 Scale 1"=2000'

**Table 2**

**Summary of Groundwater Elevations in Selected Residential Wells  
Surrounding County Line Stone Company, Inc. Akron Quarry**

Direction from Quarry	Residential Address	Approximate Distance From Nearest Quarry Highwall (feet)	Range of Groundwater Elevations* (feet)	Fall 2003 to Spring 2014 Average Groundwater Elevation* (feet)	Spring 2014 Groundwater Elevation (feet)
East	283 Cohocton Road	2030	775.7 to 801.9	788.9	784.5
	301 Cohocton Road	2300	760.9 to 794.4	785.8	762.3
	300 Cohocton Road	2330	774.2 to 810.1	787.2	810.1
	328 Cohocton Road	2740	817.5 to 827.6	823.3	821.3
	390 Cohocton Road	3630	826.9 to 838.3	832.3	837.3
	374 Scribner Road*	4075	780.0 to 802.0*	791.1*	ND
	472 Cohocton Road	4850	837.6 to 844.5	841.5	842.9
South	4118 Crittenden Road*	3680	811.0 to 823.2*	817.5*	ND
	13703 Siehl Road	4605	818.4 to 841.1	829.1	839.3
	13821 Siehl Road	4650	839.2 to 853.4	846.2	852.1
	13681 Siehl Road	4655	814.2 to 835.1	827.1	825.7
	3776 Crittenden Road*	6930	816.1 to 830.5*	817.6*	ND
	3754 Crittenden Road*	7225	817.9 to 826.8*	822.0*	ND
	3722 Crittenden Road*	7770	812.5 to 827.9*	822.0*	ND
West	4833 Crittenden Road	940	760.2 to 784.2	778.4	760.2
	4660 Crittenden Road	1000	775.4 to 798.3	786.6	790.3
	4820 Crittenden Road	1165	773.1 to 789.9	782.7	779.8
	4840 Crittenden Road*	1200	781.8 to 794.2*	787.7*	ND
	13600 Steiner Road	1550	754.5 to 782.3	774.4	757.8
	13620 Steiner Road*	1775	771.7 to 784.9*	778.2*	ND
	13590 Steiner Road	1950	774.8 to 789.1	780.8	781.9
	13293 Steiner Road	4360	786.1 to 798.4	790.9	790.2
	13221 Dorsch Road*	5065	785.7 to 794.9*	791.3*	ND
	13218 Dorsch Road	5160	780.6 to 788.4	785.4	786.7
4661 Ayers Road	6085	775.6 to 782.1	778.6	781.9	
North	13570 Stage Road	3085	795.4 to 808.0	801.8	805.8
	13517 Stage Road	3375	801.4 to 810.9	807.0	804.1
	5271 Crittenden Road	3830	794.6 to 810.6	805.3	809.4
	5271 Crittenden Road Barn	3830	800.0 to 810.2	805.8	808.9
	5220 Crittenden Road*	4075	788.3 to 806.8*	798.6*	ND
	13385 Stage Road	4430	794.1 to 806.5	800.9	800.0
	13356 Stage Road	4870	792.0 to 802.3	798.2	801.8
	5367 Crittenden Road	5710	793.5 to 805.5	799.0	804.6
	5360 Crittenden Road	5960	793.9 to 804.3	800.5	803.3
	5404 Crittenden Road	6365	797.9 to 806.5	801.4	805.8
	13223 Main Road*	9120	796.8 to 808.8*	804.6*	ND
	13177 Main Road	9290	808.0 to 812.4	810.3	811.7

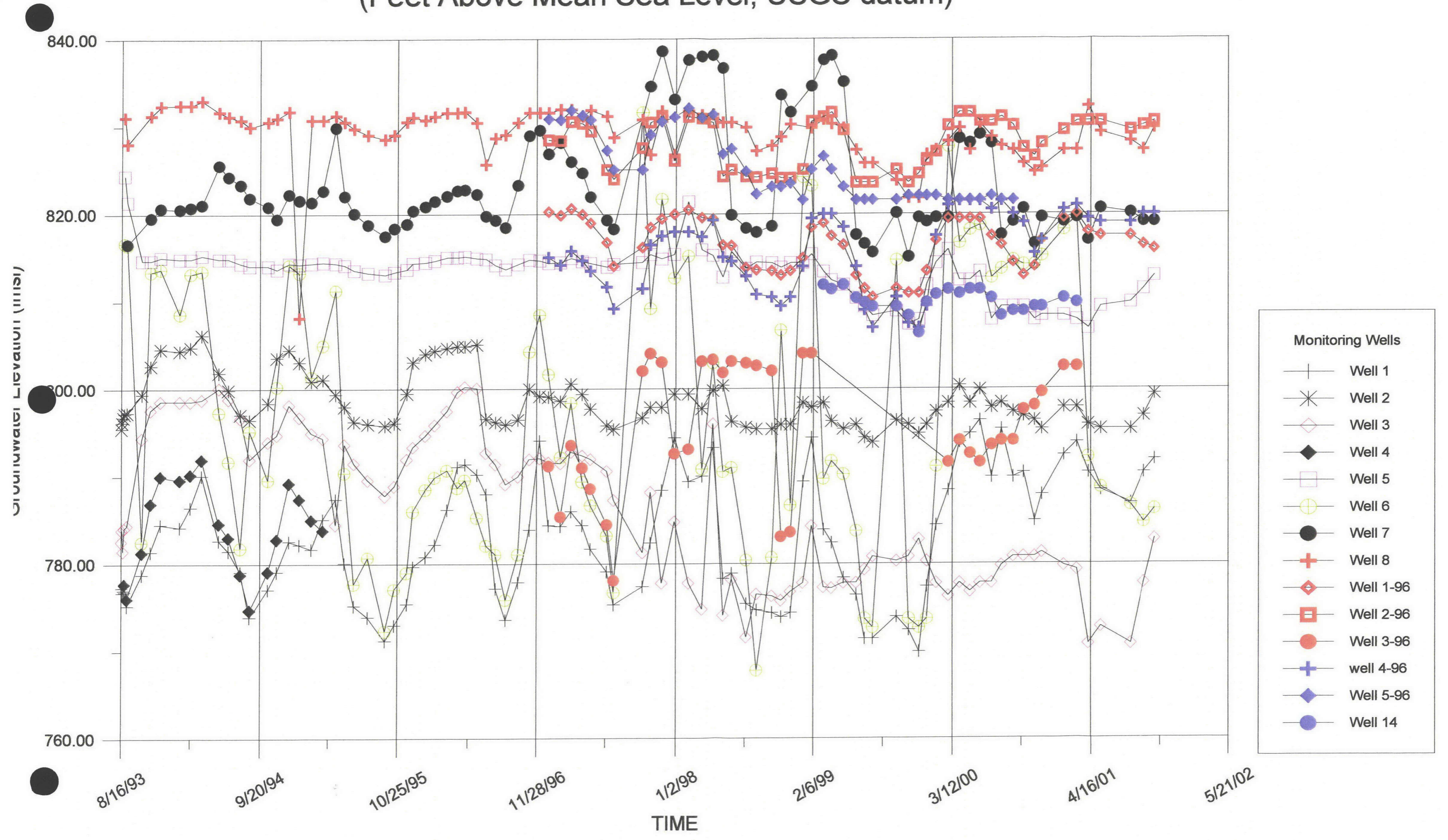
## Notes:

- 1) Groundwater levels have been measured by CLS personnel twice a year (Spring and Fall) since Fall 2003.
- 2) All elevations are in feet above mean sea level (amsl). ND = no data for that period.
- 3) All distances from quarry are approximate.

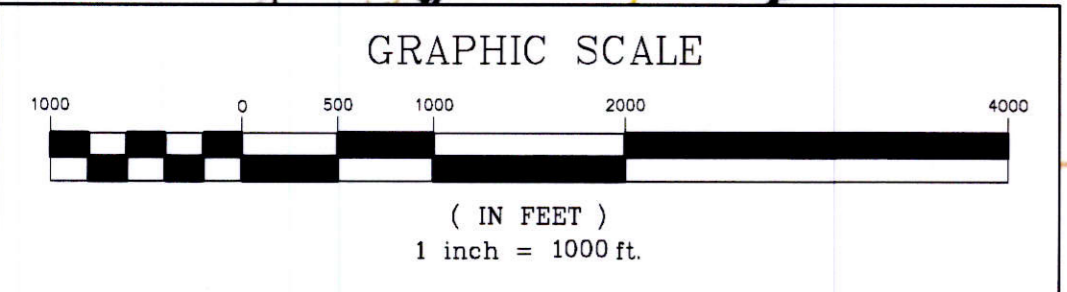
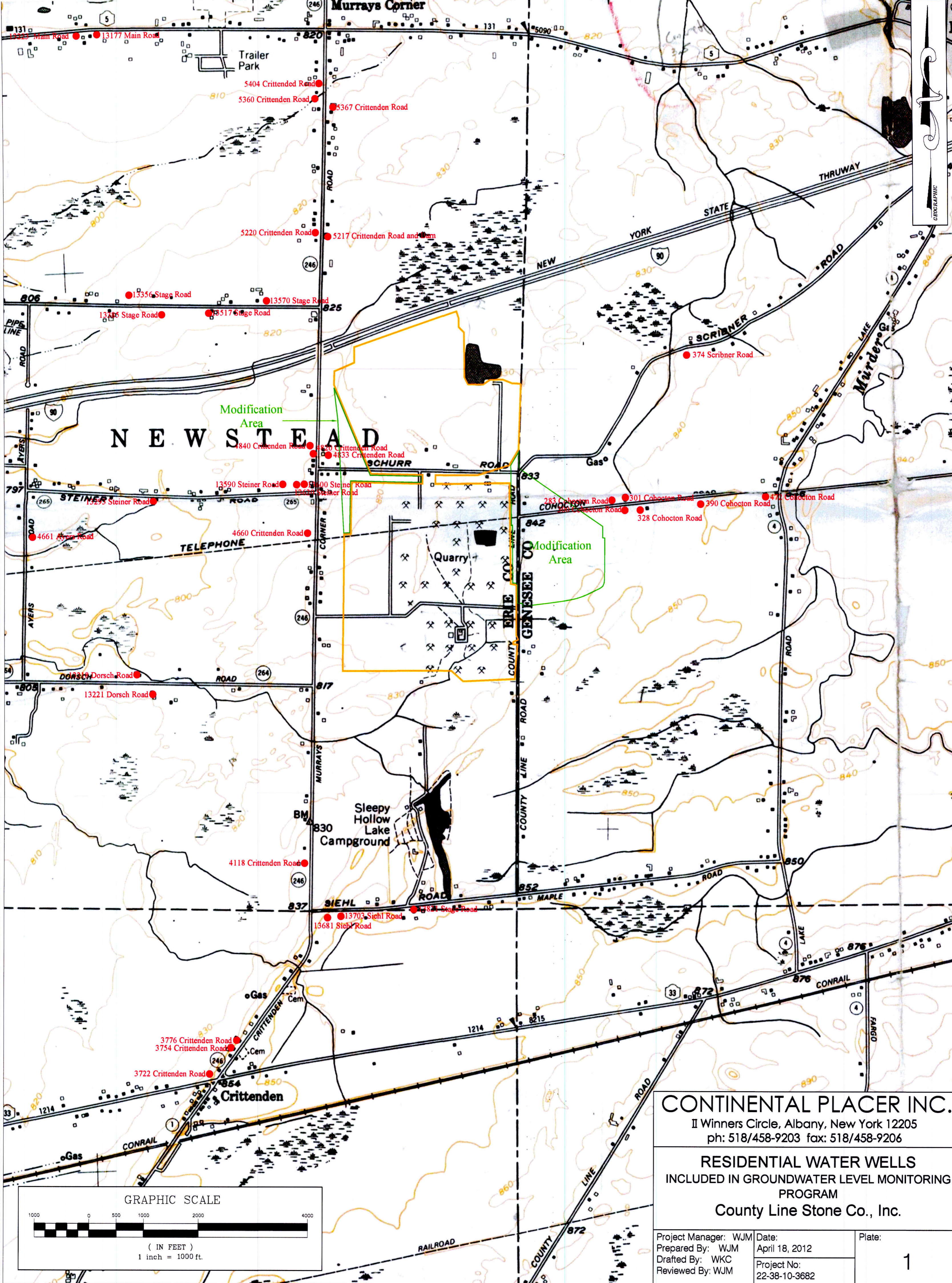
\* = Due to the long duration of measurements and ownership changes, access permission was again requested via letters after the Spring 2013 monitoring event. No response was received from ten properties even after second requests were mailed to these addresses. As a result, groundwater levels are no longer monitored at these residences. The average groundwater elevation and ranges for these locations encompasses the Fall 2003 to Spring 2013 period.



# Monitoring Well Groundwater Elevation Summary (Feet Above Mean Sea Level, USGS datum)







**CONTINENTAL PLACER INC.**  
 II Winners Circle, Albany, New York 12205  
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**RESIDENTIAL WATER WELLS  
 INCLUDED IN GROUNDWATER LEVEL MONITORING  
 PROGRAM**  
**County Line Stone Co., Inc.**

Project Manager: WJM	Date: April 18, 2012	Plate:  <b>1</b>
Prepared By: WJM	Project No: 22-38-10-3682	
Drafted By: WKC		
Reviewed By: WJM		



Table 3  
Groundwater Level Measurements in Selected Residential Wells  
Surrounding County Line Stone Company, Inc. Akron Quarry

Direction from Quarry	Location	Well Depth (feet)	MP Elevation (feet)	Fall 2003			Spring 2004			Fall 2004			Spring 2005			Fall 2005		
				Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation
East	283 Cohocton	82.4	842	66.3	16.1	<b>775.7</b>	51.8	30.6	790.2	61.0	21.4	781.0	50.2	32.2	791.8	55.4	27.0	786.6
	301 Cohocton	102.2	842	57.9	44.3	784.1	53.3	48.9	788.7	56.1	46.1	785.9	52.5	49.7	789.5	49.9	52.3	792.1
	300 Cohocton	75.2	843	68.7	6.5	<b>774.3</b>	60.4	14.8	782.6	62.1	13.1	780.9	60.1	15.1	782.9	66.1	9.1	776.9
	328 Cohocton	49.5	844	22.7	26.8	821.3	19.4	30.1	824.6	25.2	24.3	818.8	19.9	29.6	824.1	26.3	23.2	<b>817.7</b>
	390 Cohocton	41.4	848	13.8	27.6	834.2	13.0	28.4	835.0	17.9	23.5	830.1	12.7	28.7	835.3	16.1	25.3	831.9
	374 Scribner	71.9	833	53.0	18.9	<b>780.0</b>	39.9	32.0	793.1	47.1	24.8	785.9	40.0	31.9	793.0	40.3	31.6	792.7
	472 Cohocton	32.7	850	7.7	25.0	842.3	6.5	26.2	843.5	7.8	24.9	842.2	9.6	23.1	840.4	9.6	23.1	840.4
	9101 County Line	ND	842	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
South	4118 Crittenden	56.3	833	14.4	41.9	818.6	11.6	44.7	821.4	18.3	38.0	814.7	12.6	43.7	820.4	16.4	39.9	816.6
	13703 Siehl	117.7	863	28.0	89.7	835.0	32.3	85.4	830.7	26.2	91.5	836.8	30.1	87.6	832.9	33.9	83.8	829.1
	13821 Siehl	ND	866	20.8	ND	845.2	17.4	ND	848.6	22.8	ND	843.2	20.4	ND	845.6	26.8	ND	<b>839.2</b>
	13681 Siehl	80.9	851	20.1	60.8	830.9	17.6	63.3	833.4	22.1	58.8	828.9	19.4	61.5	831.6	26.9	54.0	824.1
	3776 Crittenden	90.0	850	24.3	65.7	825.7	19.5	70.5	<b>830.5</b>	29.0	61.0	821.0	23.7	66.3	826.3	27.0	63.0	823.0
	3754 Crittenden	76.7	850	22.6	54.1	827.4	18.2	58.5	<b>831.8</b>	27.1	49.6	<b>822.9</b>	22.4	54.3	827.6	21.6	55.1	828.4
	3737 Crittenden	17.3	835	13.8	3.5	821.2	11.9	5.4	823.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3722 Crittenden	82.4	845	24.3	58.1	820.7	18.8	63.6	826.2	32.5	49.9	<b>812.5</b>	23.3	59.1	821.7	24.0	58.4	821.0
West	4833 Crittenden	77.2	810	34.1	43.1	775.9	29.5	47.7	780.5	29.5	47.7	780.5	26.8	50.4	783.2	30.7	46.5	779.3
	4660 Crittenden	82.0	818	36.6	45.4	781.4	24.3	57.7	793.7	33.1	48.9	784.9	26.2	55.8	791.8	38.7	43.3	779.3
	4820 Crittenden	85.6	810	25.1	60.5	784.9	20.2	65.4	789.8	26.5	59.1	783.5	24.1	61.5	785.9	23.4	62.2	786.6
	4840 Crittenden	66.5	810	22.0	44.5	788.0	17.7	48.8	792.3	20.2	46.3	789.8	22.4	44.1	787.6	24.9	41.6	785.1
	13600 Steiner	72.0	810	38.9	33.1	771.1	33.6	38.4	776.4	37.4	34.6	772.6	30.8	41.2	779.2	35.6	36.4	774.4
	13620 Steiner	66.8	815	43.3	23.5	<b>771.7</b>	36.7	30.1	778.3	40.7	26.1	774.3	35.1	31.7	779.9	41.1	25.7	773.9
	13590 Steiner	70.8	815	39.4	31.4	775.6	32.1	38.7	782.9	37.8	33.0	777.2	31.8	39.0	783.2	34.0	36.8	781.0
	13293 Steiner	24.6	800	11.7	12.9	788.3	10.2	14.4	789.8	12.7	11.9	787.3	11.5	13.1	788.5	10.9	13.7	789.1
	13221 Dorsch	49.0	808	16.1	32.9	791.9	13.6	35.4	794.4	17.6	31.4	790.4	15.8	33.2	792.2	19.7	29.3	788.3
	13218 Dorsch	45.1	802	17.5	27.6	784.5	15.4	29.7	786.6	21.3	23.8	<b>780.7</b>	18.5	26.6	783.5	18.7	26.4	783.3
	4661 Ayers	37.4	794	17.5	19.9	776.5	15.2	22.2	778.8	17.4	20.0	776.6	13.9	23.5	780.1	13.8	23.6	780.2
North	13570 Stage	92.8	824	21.2	71.6	802.8	20.4	72.4	803.6	23.5	69.3	800.5	19.8	73.0	804.2	29.1	63.7	<b>794.9</b>
	13517 Stage	56.0	824	13.0	43.0	<b>811.0</b>	18.0	38.0	806.0	14.8	41.2	809.2	13.1	42.9	810.9	14.8	41.2	809.2
	5271 Crittenden	78.4	825	19.8	58.6	805.2	17.1	61.3	807.9	24.2	54.2	800.8	15.4	63.0	809.6	26.9	51.5	798.1
	5271 Crittenden Barn	45.0	825	19.9	25.1	805.1	15.2	29.8	809.8	24.9	20.1	<b>800.1</b>	20.1	24.9	804.9	23.9	21.1	801.1
	5220 Crittenden	58.3	825	30.1	28.2	794.9	24.0	34.3	801.0	35.3	23.0	789.7	29.9	28.4	795.1	32.5	25.8	792.5
	13385 Stage	53.9	822	19.1	34.8	802.9	26.1	27.8	795.9	23.4	30.5	798.6	20.9	33.0	801.1	22.0	31.9	800.0
	13356 Stage	45.9	819	20.9	25.0	798.1	18.9	27.0	800.1	24.2	21.7	794.8	23.4	22.5	795.6	23.7	22.2	795.3
	5367 Crittenden	31.5	809	11.5	20.0	797.5	8.8	22.7	800.2	13.5	18.0	795.5	15.4	16.1	<b>793.6</b>	12.2	19.3	796.8
	5360 Crittenden	48.1	808	5.0	43.1	803.0	4.7	43.4	803.3	6.6	41.5	801.4	8.4	39.7	799.6	7.7	40.4	800.3
	5404 Crittenden	22.5	808	5.0	17.5	803.0	4.5	18.0	803.5	6.5	16.0	801.5	8.6	13.9	799.4	6.5	16.0	801.5
	13223 Main	44.0	818	13.2	30.8	804.8	11.8	32.2	806.2	11.9	32.1	806.1	10.1	33.9	807.9	15.3	28.7	802.7
13177 Main	31.9	818	7.6	24.3	810.4	6.3	25.6	811.7	9.2	22.7	808.8	7.4	24.5	810.6	6.9	25.0	811.1	

Notes:  
 ND = No measurements taken.      Bold values lowest elevation in well during monitoring record.      Bold italic values highest elevation in well during monitoring record.

Table 3  
Groundwater Level Measurements in Selected Residential Wells  
Surrounding County Line Stone Company, Inc. Akron Quarry

Direction from Quarry	Location	Spring 2006			Fall 2006			Spring 2007			Fall 2007			Spring 2008			Fall 2008			
		Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	
East	283 Cohocton	46.9	35.5	795.1	61.8	20.6	780.2	50.9	31.5	791.1	58.4	24.0	783.6	50.0	32.4	792.0	60.1	22.3	781.9	
	301 Cohocton	49.8	52.4	792.2	56.0	46.2	786.0	50.6	51.6	791.4	50.2	52.0	791.8	52.3	49.9	789.7	57.1	45.1	784.9	
	300 Cohocton	55.8	19.4	787.2	61.8	13.4	781.2	55.7	19.5	787.3	55.6	19.6	787.4	58.9	16.3	784.1	60.1	15.1	782.9	
	328 Cohocton	17.7	31.8	826.3	21.9	27.6	822.1	18.9	30.6	825.1	19.4	30.1	824.6	17.4	32.1	826.6	23.9	25.6	820.1	
	390 Cohocton	16.7	24.7	831.3	12.7	28.7	835.3	15.7	25.7	832.3	19.0	22.4	829.0	12.9	28.5	835.1	15.6	25.8	832.4	
	374 Scribner	35.8	36.1	797.2	47.6	24.3	785.4	34.3	37.6	798.7	50.5	21.4	782.5	38.0	33.9	795.0	52.7	19.2	780.3	
	472 Cohocton	7.8	24.9	842.2	6.5	26.2	843.5	6.9	25.8	843.1	8.1	24.6	841.9	5.5	27.2	<b>844.5</b>	9.4	23.3	840.6	
	9101 County Line	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
South	4118 Crittenden	10.8	45.5	822.2	22.0	34.3	<b>811.0</b>	9.8	46.5	<b>823.2</b>	16.5	39.8	816.5	10.8	45.5	822.2	17.4	38.9	815.6	
	13703 Siehl	37.8	79.9	825.2	36.8	80.9	826.2	31.8	85.9	831.2	29.4	88.3	833.6	41.8	75.9	821.2	36.9	80.8	826.1	
	13821 Siehl	16.6	ND	849.4	22.1	ND	843.9	15.8	ND	850.2	18.4	ND	847.6	16.6	ND	849.4	22.9	ND	843.1	
	13681 Siehl	16.4	64.5	834.6	23.9	57.0	827.1	15.8	65.1	<b>835.2</b>	26.8	54.1	824.2	18.7	62.2	832.3	30.3	50.6	820.7	
	3776 Crittenden	25.9	64.1	824.1	28.4	61.6	821.6	23.0	67.0	827.0	23.9	66.1	826.1	24.1	65.9	825.9	25.4	64.6	824.6	
	3754 Crittenden	20.0	56.7	830.0	26.9	49.8	823.1	24.7	52.0	825.3	24.9	51.8	825.1	20.6	56.1	829.4	26.2	50.5	823.8	
	3737 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3722 Crittenden	18.0	64.4	827.0	26.9	55.5	818.1	23.8	58.6	821.2	20.3	62.1	824.7	20.1	62.3	824.9	23.1	59.3	821.9	
West	4833 Crittenden	28.7	48.5	781.3	36.3	40.9	773.7	25.5	51.7	784.5	32.0	45.2	778.0	26.8	50.4	783.2	35.6	41.6	774.4	
	4660 Crittenden	22.8	59.2	795.2	35.8	46.2	782.2	20.9	61.1	797.1	40.2	41.8	777.8	20.3	61.7	<b>797.7</b>	38.5	43.5	779.5	
	4820 Crittenden	22.8	62.8	787.2	27.8	57.8	782.2	19.8	65.8	<b>790.2</b>	23.9	61.7	786.1	25.9	59.7	784.1	27.7	57.9	782.3	
	4840 Crittenden	19.9	46.6	790.1	27.0	39.5	783.0	16.5	50.0	793.5	24.4	42.1	785.6	15.8	50.7	<b>794.2</b>	26.9	39.6	783.1	
	13600 Steiner	32.2	39.8	777.8	27.8	44.2	782.2	30.9	41.1	779.1	33.8	38.2	776.2	32.0	40.0	778.0	36.1	35.9	773.9	
	13620 Steiner	33.8	33.0	781.2	39.0	27.8	776.0	38.3	28.5	776.7	37.0	29.8	778.0	31.1	35.7	783.9	40.7	26.1	774.3	
	13590 Steiner	33.5	37.3	781.5	36.8	34.0	778.2	31.5	39.3	783.5	34.1	36.7	780.9	29.5	41.3	785.5	38.1	32.7	776.9	
	13293 Steiner	9.9	14.7	790.1	13.9	10.7	<b>786.1</b>	8.9	15.7	791.1	10.9	13.7	789.1	7.5	17.1	792.5	12.1	12.5	787.9	
	13221 Dorsch	14.5	34.5	793.5	15.9	33.1	792.1	14.9	34.1	793.1	14.8	34.2	793.2	13.1	35.9	<b>794.9</b>	18.6	30.4	789.4	
	13218 Dorsch	14.9	30.2	787.1	13.9	31.2	788.1	14.9	30.2	787.1	16.6	28.5	785.4	13.8	31.3	788.2	18.2	26.9	783.8	
	4661 Ayers	16.2	21.2	777.8	16.5	20.9	777.5	17.6	19.8	776.4	15.4	22.0	778.6	14.6	22.8	779.4	16.0	21.4	778.0	
North	13570 Stage	17.8	75.0	806.2	22.5	70.3	801.5	16.5	76.3	<b>807.5</b>	26.8	66.0	797.2	18.8	74.0	805.2	25.1	67.7	798.9	
	13517 Stage	14.8	41.2	809.2	16.4	39.6	807.6	14.7	41.3	809.3	14.0	42.0	810.0	16.8	39.2	807.2	15.9	40.1	808.1	
	5271 Crittenden	18.7	59.7	806.3	23.9	54.5	801.1	16.7	61.7	808.3	18.4	60.0	806.6	16.0	62.4	809.0	21.1	57.3	803.9	
	5271 Crittenden Barn	16.9	28.1	808.1	21.1	23.9	803.9	14.7	30.3	<b>810.3</b>	19.5	25.5	805.5	17.5	27.5	807.5	22.5	22.5	802.5	
	5220 Crittenden	22.7	35.6	802.3	36.7	21.6	<b>788.3</b>	20.6	37.7	804.4	32.3	26.0	792.7	21.6	36.7	803.4	32.8	25.5	792.2	
	13385 Stage	17.8	36.1	804.2	23.6	30.3	798.4	16.5	37.4	805.5	20.3	33.6	801.7	15.4	38.5	<b>806.6</b>	22.1	31.8	799.9	
	13356 Stage	20.4	25.5	798.6	26.7	19.2	<b>792.3</b>	19.5	26.4	799.5	22.2	23.7	796.8	16.8	29.1	802.2	23.6	22.3	795.4	
	5367 Crittenden	11.5	20.0	797.5	9.9	21.6	799.1	9.5	22.0	799.5	8.9	22.6	800.1	7.9	23.6	801.1	12.0	19.5	797.0	
	5360 Crittenden	6.6	41.5	801.4	6.1	42.0	801.9	5.4	42.7	802.6	5.8	42.3	802.2	9.8	38.3	798.2	6.4	41.7	801.6	
	5404 Crittenden	10.0	12.5	798.0	5.9	16.6	802.1	6.1	16.4	801.9	6.5	16.0	801.5	5.6	16.9	802.4	6.8	15.7	801.2	
	13223 Main	12.4	31.6	805.6	14.7	29.3	803.3	11.0	33.0	807.0	15.8	28.2	802.2	9.7	34.3	808.3	18.1	25.9	799.9	
	13177 Main	8.8	23.1	809.2	8.1	23.8	809.9	6.5	25.4	811.5	6.5	25.4	811.5	5.5	26.4	<b>812.5</b>	7.2	24.7	810.8	

Notes:  
 ND = No measurements taken.      Bold values lowest elevation in well during monitoring record.      Bold italic values highest elevation in well during monitoring record.

Table 3  
Groundwater Level Measurements in Selected Residential Wells  
Surrounding County Line Stone Company, Inc. Akron Quarry

Direction from Quarry	Location	Spring 2009			Fall 2009			Spring 2010			Fall 2010			Spring 2011			Fall 2011			
		Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	
East	283 Cohocton	47.8	34.6	794.2	55.4	27.0	786.6	44.2	38.2	797.8	54.2	28.2	787.8	40.1	42.3	<b>801.9</b>	52.1	30.3	789.9	
	301 Cohocton	49.5	52.7	792.5	62.1	40.1	779.9	55.9	46.3	786.1	55.4	46.8	786.6	47.4	54.8	<b>794.6</b>	56.4	45.8	785.6	
	300 Cohocton	55.1	20.1	787.9	54.8	20.4	788.2	52.2	23.0	790.8	58.4	16.8	784.6	50.3	24.9	792.7	51.9	23.3	791.1	
	328 Cohocton	16.9	32.6	827.1	20.0	29.5	824.0	17.2	32.3	826.8	23.9	25.6	820.1	16.2	33.3	<b>827.8</b>	20.6	28.9	823.4	
	390 Cohocton	19.4	22.0	828.6	17.4	24.0	830.6	18.8	22.6	829.2	13.1	28.3	834.9	16.3	25.1	831.7	16.4	25.0	831.6	
	374 Scribner	31.0	40.9	<b>802.0</b>	46.8	25.1	786.2	37.3	34.6	795.7	51.3	20.6	781.7	33.5	38.4	799.5	45.8	26.1	787.2	
	472 Cohocton	9.5	23.2	840.5	11.5	21.2	838.5	7.2	25.5	842.8	8.4	24.3	841.6	8.1	24.6	841.9	9.9	22.8	840.1	
	9101 County Line	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	42.0	ND	800.0	ND	ND	ND	ND	ND	ND
South	4118 Crittenden	12.9	43.4	820.1	16.9	39.4	816.1	19.2	37.1	813.8	13.4	42.9	819.6	18.9	37.4	814.1	15.9	40.4	817.1	
	13703 Siehl	35.9	81.8	827.1	33.1	84.6	829.9	36.9	80.8	826.1	39.4	78.3	823.6	30.2	87.5	832.8	44.6	73.1	<b>818.4</b>	
	13821 Siehl	22.3	ND	843.7	20.1	ND	845.9	18.5	ND	847.5	24.5	ND	841.5	17.1	ND	848.9	22.6	ND	843.4	
	13681 Siehl	25.9	55.0	825.1	25.1	55.8	825.9	21.6	59.3	829.4	33.5	47.4	817.5	16.7	64.2	834.3	36.7	44.2	<b>814.3</b>	
	3776 Crittenden	29.2	60.8	820.8	27.2	62.8	822.8	33.5	56.5	816.5	30.6	59.4	819.4	29.1	60.9	820.9	33.9	56.1	<b>816.1</b>	
	3754 Crittenden	23.1	53.6	826.9	24.9	51.8	825.1	24.7	52.0	825.3	19.9	56.8	830.1	19.9	56.8	830.1	25.2	51.5	824.8	
	3737 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3722 Crittenden	17.1	65.3	<b>827.9</b>	26.1	56.3	818.9	24.0	58.4	821.0	23.2	59.2	821.8	19.6	62.8	825.4	25.4	57.0	819.6	
West	4833 Crittenden	25.7	51.5	784.3	36.9	40.3	773.1	32.2	45.0	777.8	30.2	47.0	779.8	29.3	47.9	780.7	33.9	43.3	776.1	
	4660 Crittenden	27.7	54.3	790.3	39.5	42.5	778.5	31.2	50.8	786.8	33.6	48.4	784.4	29.0	53.0	789.0	39.4	42.6	778.6	
	4820 Crittenden	28.9	56.7	781.1	24.1	61.5	785.9	30.1	55.5	779.9	26.8	58.8	783.2	28.4	57.2	781.6	33.1	52.5	776.9	
	4840 Crittenden	18.8	47.7	791.2	25.6	40.9	784.4	23.9	42.6	786.1	21.2	45.3	788.8	20.2	46.3	789.8	25.5	41.0	784.5	
	13600 Steiner	34.8	37.2	775.2	33.6	38.4	776.4	30.2	41.8	779.8	38.4	33.6	771.6	27.4	44.6	<b>782.6</b>	35.9	36.1	774.1	
	13620 Steiner	36.8	30.0	778.2	39.7	27.1	775.3	32.4	34.4	782.6	35.1	31.7	779.9	30.1	36.7	<b>784.9</b>	39.7	27.1	775.3	
	13590 Steiner	36.8	34.0	778.2	40.2	30.6	<b>774.8</b>	33.9	36.9	781.1	33.6	37.2	781.4	25.9	44.9	<b>789.1</b>	36.9	33.9	778.1	
	13293 Steiner	8.9	15.7	791.1	10.4	14.2	789.6	7.7	16.9	792.3	9.5	15.1	790.5	8.4	16.2	791.6	1.6	23.0	<b>798.4</b>	
	13221 Dorsch	15.2	33.8	792.8	16.9	32.1	791.1	15.1	33.9	792.9	22.3	26.7	<b>785.7</b>	14.7	34.3	793.3	22.3	26.7	<b>785.7</b>	
	13218 Dorsch	17.1	28.0	784.9	20.1	25.0	781.9	14.5	30.6	787.5	15.9	29.2	786.1	13.5	31.6	<b>788.5</b>	16.5	28.6	785.5	
	4661 Ayers	18.4	19.0	<b>775.6</b>	15.4	22.0	778.6	14.6	22.8	779.4	15.1	22.3	778.9	11.9	25.5	782.1	16.5	20.9	777.5	
North	13570 Stage	26.9	65.9	797.1	21.4	71.4	802.6	23.5	69.3	800.5	26.4	66.4	797.6	22.1	70.7	801.9	25.9	66.9	798.1	
	13517 Stage	18.9	37.1	805.1	14.2	41.8	809.8	17.2	38.8	806.8	20.4	35.6	803.6	16.6	39.4	807.4	22.5	33.5	<b>801.5</b>	
	5271 Crittenden	22.8	55.6	802.2	19.4	59.0	805.6	16.8	61.6	808.2	18.2	60.2	806.8	15.5	62.9	809.5	25.4	53.0	799.6	
	5271 Crittenden Barn	21.9	23.1	803.1	20.9	24.1	804.1	17.5	27.5	807.5	19.2	25.8	805.8	16.7	28.3	808.3	22.9	22.1	802.1	
	5220 Crittenden	23.7	34.6	801.3	25.9	32.4	799.1	22.0	36.3	803.0	27.2	31.1	797.8	18.9	39.4	806.1	26.7	31.6	798.3	
	13385 Stage	17.9	36.0	804.1	21.4	32.5	800.6	18.5	35.4	803.5	22.6	31.3	799.4	18.1	35.8	803.9	26.1	27.8	795.9	
	13356 Stage	19.5	26.4	799.5	18.8	27.1	800.2	17.5	28.4	801.5	19.6	26.3	799.4	16.4	29.5	<b>802.6</b>	23.6	22.3	795.4	
	5367 Crittenden	10.4	21.1	798.6	9.9	21.6	799.1	12.3	19.2	796.7	6.6	24.9	802.4	11.1	20.4	797.9	8.9	22.6	800.1	
	5360 Crittenden	7.9	40.2	800.1	5.1	43.0	802.9	8.8	39.3	799.2	6.3	41.8	801.7	9.3	38.8	798.7	11.6	36.5	796.4	
	5404 Crittenden	7.1	15.4	800.9	7.8	14.7	800.2	6.1	16.4	801.9	6.8	15.7	801.2	6.6	15.9	801.4	8.1	14.4	799.9	
	13223 Main	9.2	34.8	<b>808.8</b>	15.8	28.2	802.2	10.4	33.6	807.6	16.6	27.4	801.4	9.6	34.4	808.4	20.6	23.4	797.4	
	13177 Main	7.6	24.3	810.4	9.9	22.0	808.1	8.4	23.5	809.6	6.5	25.4	811.5	8.8	23.1	809.2	9.6	22.3	808.4	

Notes:  
 ND = No measurements taken.      Bold values lowest elevation in well during monitoring record.      Bold italic values highest elevation in well during monitoring record.

Table 3  
Groundwater Level Measurements in Selected Residential Wells  
Surrounding County Line Stone Company, Inc. Akron Quarry

Direction from Quarry	Location	Spring 2012			Fall 2012			Spring 2013			Fall 2013			Spring 2014			Fall 2014		
		Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation
East	283 Cohocton	46.0	36.4	796.0	54.3	28.1	787.7	43.0	39.4	799.0	60.4	22.0	781.6	57.5	24.9	784.5	55.1	27.3	786.9
	301 Cohocton	51.7	50.5	790.3	58.4	43.8	783.6	48.5	53.7	793.5	81.1	21.1	760.9	79.7	22.5	762.3	78.8	23.4	763.2
	300 Cohocton	49.0	26.2	794.0	50.2	25.0	792.8	49.7	25.5	793.3	33.5	41.7	809.5	32.9	42.3	810.1	29.9	45.3	<b>813.1</b>
	328 Cohocton	22.5	27.0	821.5	21.8	27.7	822.2	17.7	31.8	826.3	22.1	27.4	821.9	22.7	26.8	821.3	20.7	28.8	823.3
	390 Cohocton	16.7	24.7	831.3	20.9	20.5	<b>827.1</b>	15.8	25.6	832.2	9.7	31.7	838.3	10.2	31.2	837.8	8.5	32.9	839.5
	374 Scribner	37.2	34.7	795.8	42.1	29.8	790.9	33.7	38.2	799.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
	472 Cohocton	12.4	20.3	<b>837.6</b>	11.7	21.0	838.3	7.7	25.0	842.3	7.0	25.7	843.0	7.1	25.6	842.9	7.7	25.0	842.3
	9101 County Line	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
South	4118 Crittenden	20.0	36.3	813.0	17.8	38.5	815.2	13.7	42.6	819.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
	13703 Siehl	36.8	80.9	826.2	40.2	77.5	822.8	32.3	85.4	830.7	21.9	95.8	<b>841.1</b>	23.7	94.0	839.3	24.7	93.0	838.3
	13821 Siehl	19.9	ND	846.1	20.1	ND	845.9	23.9	ND	842.1	12.6	ND	<b>853.4</b>	13.9	ND	852.1	14.1	ND	851.9
	13681 Siehl	21.8	59.1	829.2	30.1	50.8	820.9	22.2	58.7	828.8	27.6	53.3	823.4	25.3	55.6	825.7	25.8	55.1	825.2
	3776 Crittenden	33.9	56.1	<b>816.1</b>	28.0	62.0	822.0	28.8	61.2	821.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3754 Crittenden	23.4	53.3	826.6	22.6	54.1	827.4	21.5	55.2	828.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3737 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	3722 Crittenden	25.1	57.3	819.9	24.2	58.2	820.8	20.7	61.7	824.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
West	4833 Crittenden	32.8	44.4	777.2	34.7	42.5	775.3	27.4	49.8	782.6	21.4	55.8	788.6	49.8	27.4	760.2	47.3	29.9	762.7
	4660 Crittenden	34.7	47.3	783.3	43.2	38.8	<b>774.8</b>	29.3	52.7	788.7	29.9	52.1	788.1	27.7	54.3	790.3	25.1	56.9	792.9
	4820 Crittenden	31.3	54.3	778.7	36.6	49.0	<b>773.4</b>	26.3	59.3	783.7	31.5	54.1	778.5	30.2	55.4	779.8	30.2	55.4	779.8
	4840 Crittenden	23.9	42.6	786.1	28.2	38.3	<b>781.8</b>	20.2	46.3	789.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
	13600 Steiner	30.9	41.1	779.1	40.7	31.3	769.3	28.9	43.1	781.1	55.5	16.5	<b>754.5</b>	52.2	19.8	757.8	45.1	26.9	764.9
	13620 Steiner	35.9	30.9	779.1	37.4	29.4	777.6	31.5	35.3	783.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
	13590 Steiner	26.9	43.9	788.1	39.7	31.1	775.3	28.6	42.2	786.4	37.2	33.6	777.8	33.1	37.7	781.9	35.1	35.7	779.9
	13293 Steiner	7.5	17.1	792.5	2.2	22.4	797.8	2.7	21.9	797.3	12.0	12.6	788.0	9.8	14.8	790.2	12	12.6	788.0
	13221 Dorsch	16.9	32.1	791.1	21.5	27.5	786.5	14.2	34.8	793.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
	13218 Dorsch	17.8	27.3	784.2	17.6	27.5	784.4	14.7	30.4	787.3	17.3	27.8	784.7	15.3	29.8	786.7	17.3	27.8	784.7
	4661 Ayers	17.8	19.6	776.2	16.9	20.5	777.1	12.5	24.9	781.5	14.4	23.0	779.6	12.1	25.3	781.9	12.1	25.3	781.9
North	13570 Stage	26.8	66.0	797.2	24.0	68.8	800.0	21.7	71.1	802.3	19.0	73.8	805.0	18.2	74.6	805.8	21.8	71.0	802.2
	13517 Stage	18.4	37.6	805.6	21.2	34.8	802.8	16.0	40.0	808.0	21.2	34.8	802.8	19.9	36.1	804.1	19.4	36.6	804.6
	5271 Crittenden	14.2	64.2	<b>810.8</b>	30.2	48.2	<b>794.8</b>	15.7	62.7	809.3	17.8	60.6	807.2	15.6	62.8	809.4	17.2	61.2	807.8
	5271 Crittenden Barn	15.3	29.7	809.7	20.8	24.2	804.2	16.8	28.2	808.2	17.0	28.0	808.0	16.1	28.9	808.9	17.9	27.1	807.1
	5220 Crittenden	18.2	40.1	<b>806.8</b>	27.6	30.7	797.4	18.9	39.4	806.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
	13385 Stage	20.3	33.6	801.7	27.8	26.1	<b>794.2</b>	17.4	36.5	804.6	23.7	30.2	798.3	22.0	31.9	800.0	21.5	32.4	800.5
	13356 Stage	18.8	27.1	800.2	24.1	21.8	794.9	17.6	28.3	801.4	18.5	27.4	800.5	17.2	28.7	801.8	17.6	28.3	801.4
	5367 Crittenden	9.8	21.7	799.2	10.6	20.9	798.4	8.8	22.7	800.2	3.5	28.0	<b>805.5</b>	4.4	27.1	804.6	4.9	26.6	804.1
	5360 Crittenden	10.6	37.5	797.4	13.9	34.2	<b>794.1</b>	6.2	41.9	801.8	3.7	44.4	<b>804.3</b>	4.6	43.5	803.4	4.2	43.9	803.8
	5404 Crittenden	7.1	15.4	800.9	10.1	12.4	<b>797.9</b>	5.7	16.8	802.3	1.5	21.0	<b>806.5</b>	2.2	20.3	805.8	2.6	19.9	805.4
	13223 Main	10.1	33.9	807.9	21.2	22.8	<b>796.8</b>	10.2	33.8	807.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
	13177 Main	7.0	24.9	811.0	9.9	22.0	<b>808.1</b>	6.6	25.3	811.4	7.6	24.3	810.4	6.3	25.6	811.7	8.5	23.4	809.5

Notes:  
 ND = No measurements taken.      Bold values lowest elevation in well during monitoring record.      Bold italic values highest elevation in well during monitoring record.

Table 3  
County Line Stone Residential Well  
Groundwater Level Data

Direction from Quarry	Location	Spring 2015			Fall 2015			Spring 2016			Fall 2016			Spring 2017			Fall 2017			
		Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	Depth	Height	Elevation	
East	283 Cohocton	48.9	33.5	793.1	50.3	32.1	791.7	45.5	37.1	796.5	52.6	30.0	789.4							
	301 Cohocton	55.1	47.1	786.9	83.5	18.7	<b>758.5</b>	61.1	41.3	780.9	71.4	31.0	770.6							
	300 Cohocton	41.2	34.0	801.8	31.9	43.3	811.1	39.3	36.0	803.7	35.8	39.5	807.2							
	328 Cohocton	20.7	28.8	823.3	17.1	32.4	826.9	22.0	27.5	822.0	21.5	28.0	822.5							
	390 Cohocton	9.9	31.5	838.1	7.4	34.0	<b>840.6</b>	7.5	34.1	840.5	11.3	30.3	836.7							
	374 Scribner	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
	472 Cohocton	7.1	25.6	842.9	9.8	22.9	840.2	8.5	24.2	841.5	8.2	24.5	841.8							
	9101 County Line	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND						
South	4118 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
	13703 Siehl	29.5	88.2	833.5	26.9	90.8	836.1	27.6	90.4	835.4	30.2	87.8	832.8							
	13821 Siehl	17.7	ND	848.3	13.1	ND	852.9	18.1	ND	847.9	17.4	ND	848.6							
	13681 Siehl	27.2	53.7	823.8	22.1	58.8	828.9	24.1	56.9	826.9	26.3	54.7	824.7							
	3776 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
	3754 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
	3737 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
	3722 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
West	4833 Crittenden	25.9	51.3	784.1	50.9	26.3	<b>759.1</b>	22.1	55.4	<b>787.9</b>	40.2	37.3	769.8							
	4660 Crittenden	31.5	50.5	786.5	27.8	54.2	790.2	29.7	51.7	788.3	26.3	55.1	791.7							
	4820 Crittenden	28.3	57.3	781.7	26.2	59.4	783.8	30.1	55.8	779.9	30.3	55.6	779.7							
	4840 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
	13600 Steiner	35.6	36.4	774.4	41.7	30.3	768.3	32.2	40.1	777.8	35.8	36.5	774.2							
	13620 Steiner	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
	13590 Steiner	29.3	41.5	785.7	30.5	40.3	784.5	27.1	43.7	787.9	34.1	36.7	780.9							
	13293 Steiner	5.4	19.2	794.6	9.4	12.6	790.6	6.4	18.2	793.6	8.2	16.4	791.8							
	13221 Dorsch	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
	13218 Dorsch	13.6	31.5	788.4	16.6	26.6	785.4	15.1	30.1	786.9	13.9	31.3	788.1							
	4661 Ayers	11.7	25.7	782.3	10.7	26.7	783.3	9.9	27.5	<b>784.1</b>	13.8	23.6	780.2							
North	13570 Stage	22.5	70.3	801.5	24.8	68.0	799.2	24.8	67.5	799.2	22.5	69.8	801.5							
	13517 Stage	18.2	37.8	805.8	17.3	38.7	806.7	16.8	39.2	807.2	16.7	39.3	807.3							
	5271 Crittenden	18.2	60.2	806.8	20.6	57.8	804.4	19.5	59.1	805.5	17.6	61.0	807.4							
	5271 Crittenden Barn	18.1	26.9	806.9	15.4	29.6	809.6	18.8	26.3	806.2	17.7	27.4	807.3							
	5220 Crittenden	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
	13385 Stage	19.3	34.6	802.7	23.4	30.5	798.6	20.9	33.1	801.1	22.1	31.9	799.9							
	13356 Stage	18.4	27.5	800.6	16.4	29.5	<b>802.6</b>	17.3	28.9	801.7	17.0	29.2	802.0							
	5367 Crittenden	8.8	22.7	800.2	6.2	25.3	802.8	7.9	23.7	801.1	7.5	24.1	801.5							
	5360 Crittenden	8.7	39.4	799.3	5.5	42.6	802.5	7.4	40.9	800.6	9.1	39.2	798.9							
	5404 Crittenden	8.1	14.4	799.9	2.8	19.7	805.2	8.8	13.7	799.2	4.4	18.1	803.6							
	13223 Main	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND							
	13177 Main	8.2	23.7	809.8	7.7	24.2	810.3	7.5	24.5	810.5	6.8	25.2	811.2							

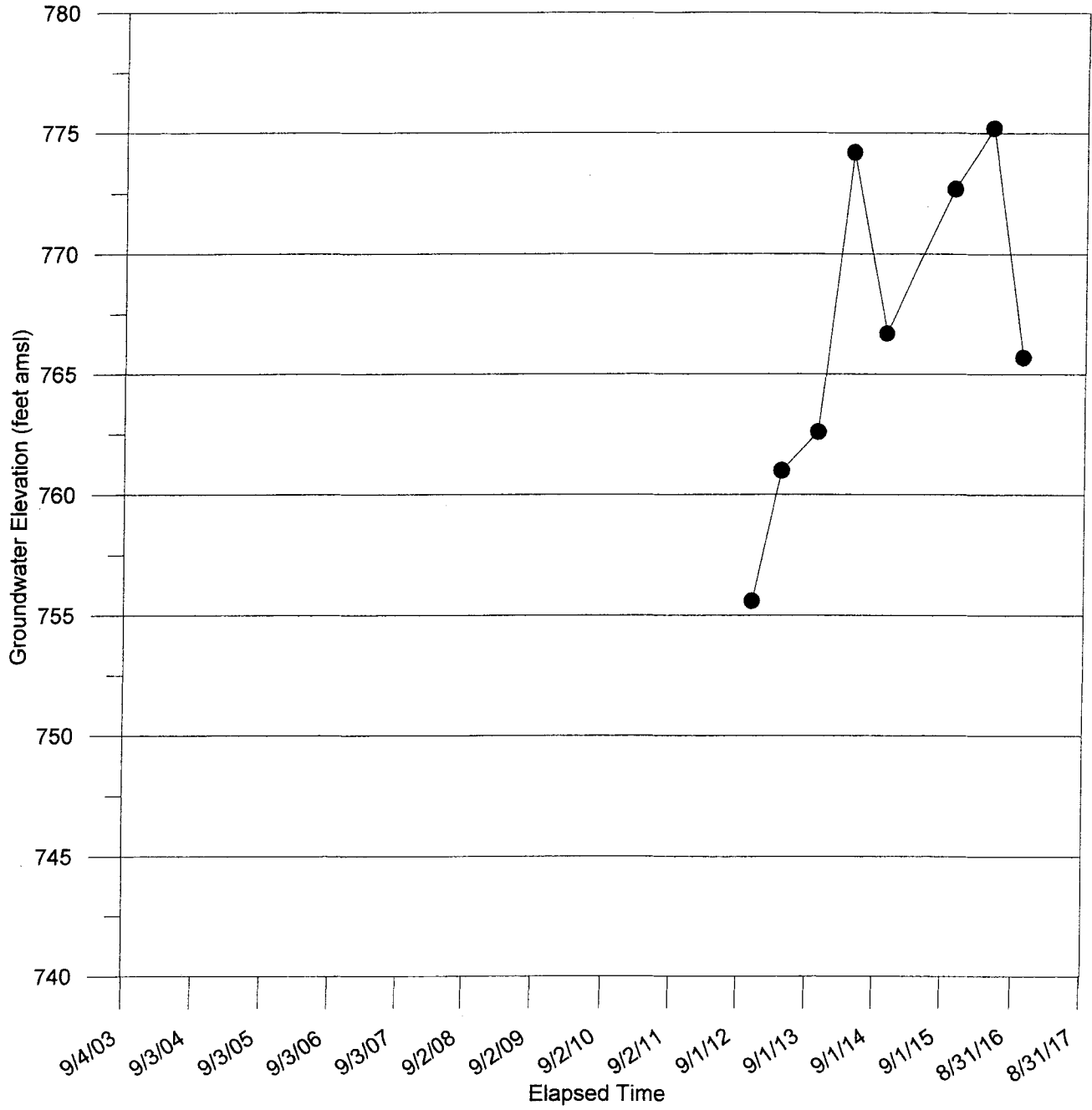
Notes:

ND = No measurements taken.

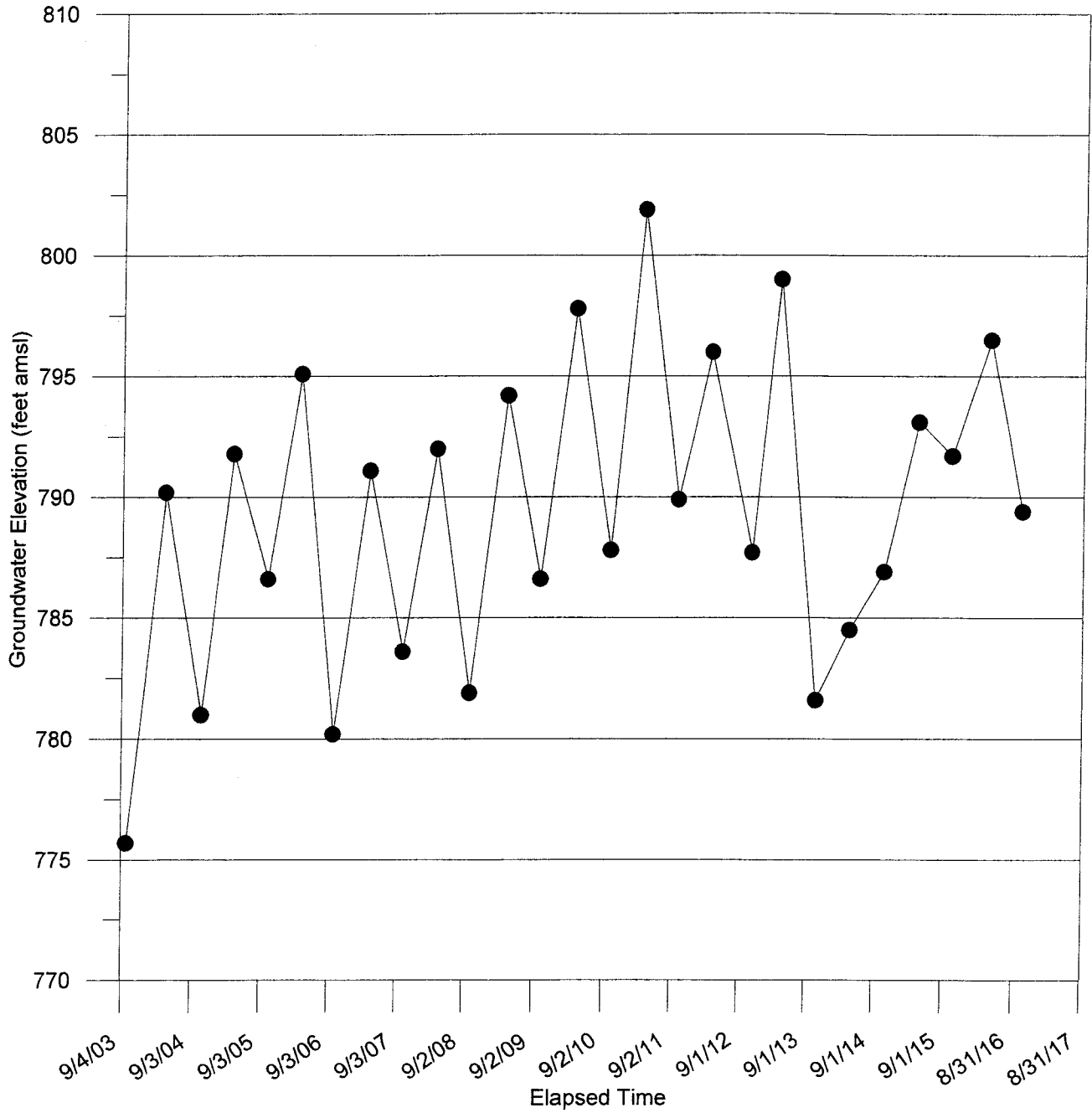
Bold values lowest elevation in well during monitoring record.

Bold italic values highest elevation in well during monitoring record.

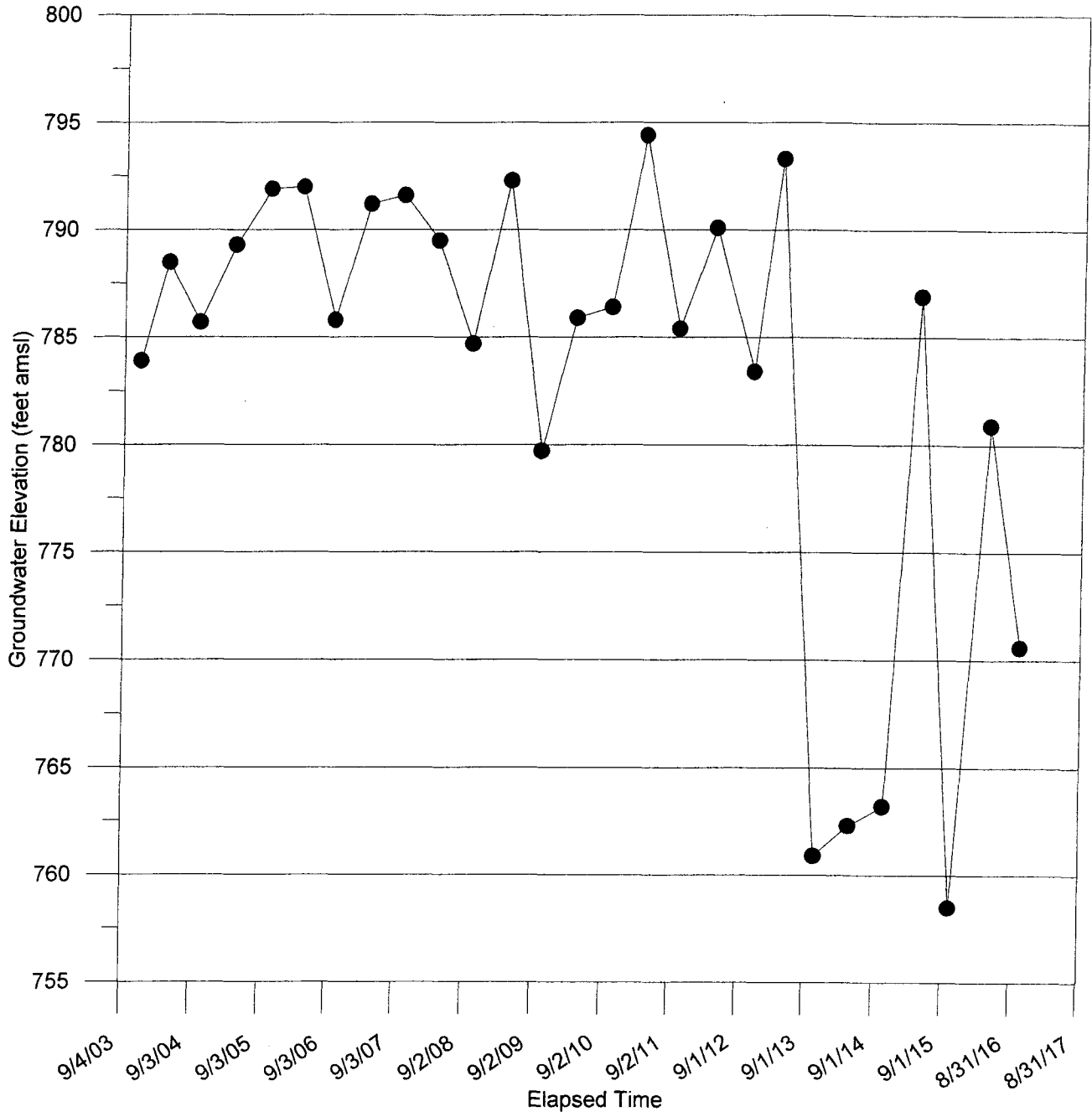
**Groundwater Elevations  
Well 4-12  
Corfu, NY  
County Line Stone Co., Inc.**



**Groundwater Elevations**  
**283 Cohocton Road**  
**Corfu, NY**  
**County Line Stone Co., Inc.**

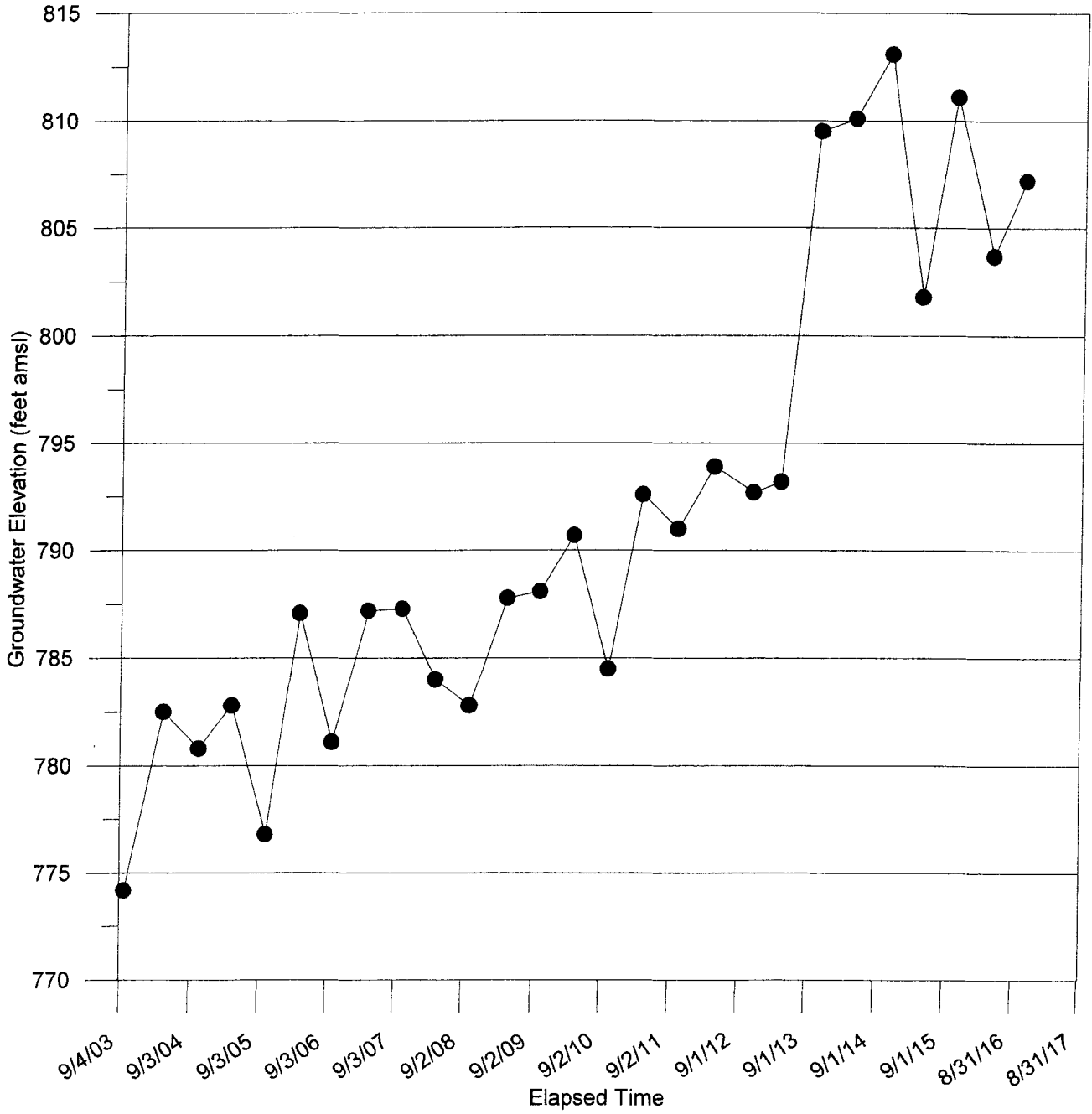


**Groundwater Elevations  
301 Cohocton Road  
Corfu, NY  
County Line Stone Co., Inc.**

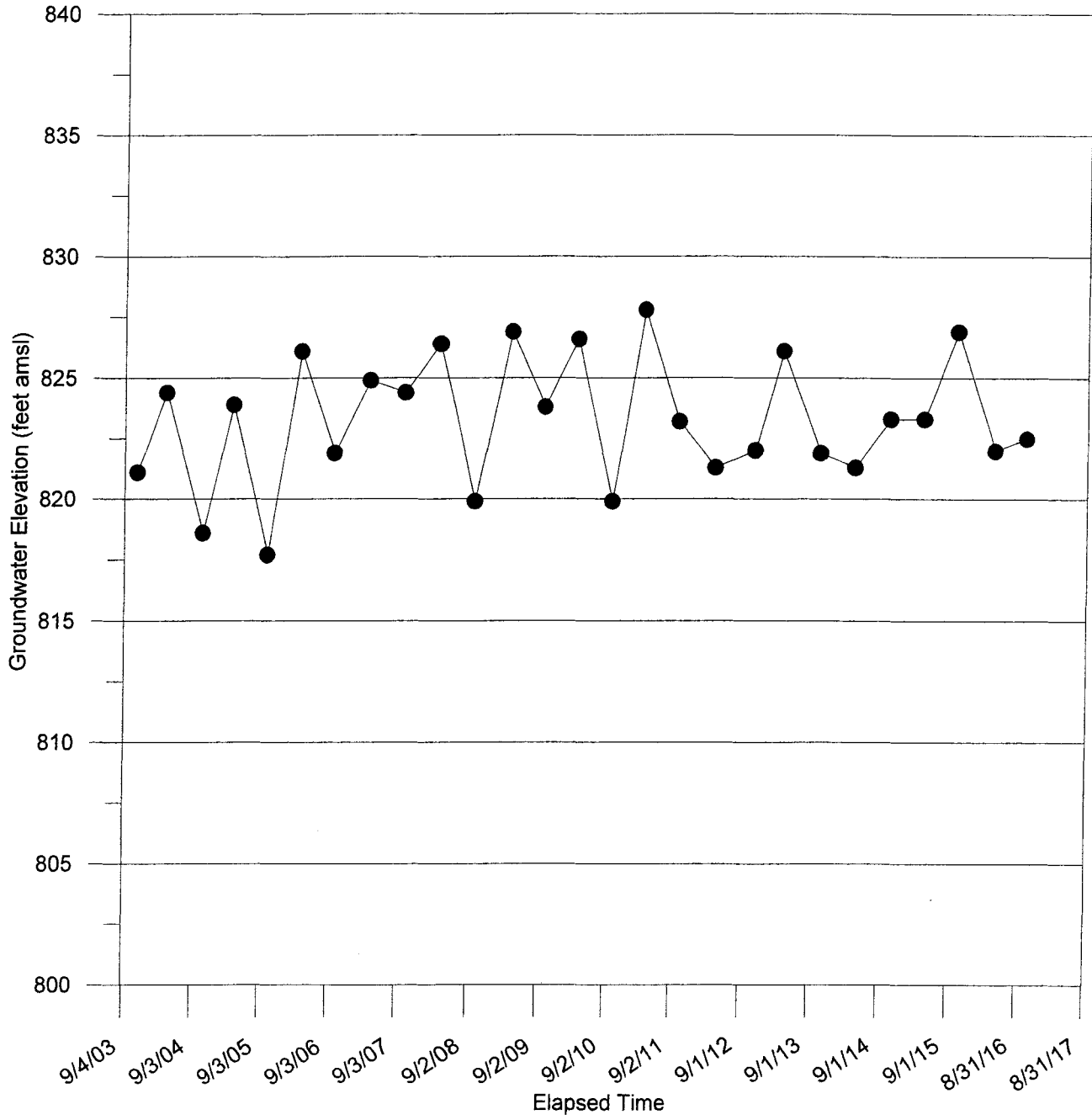




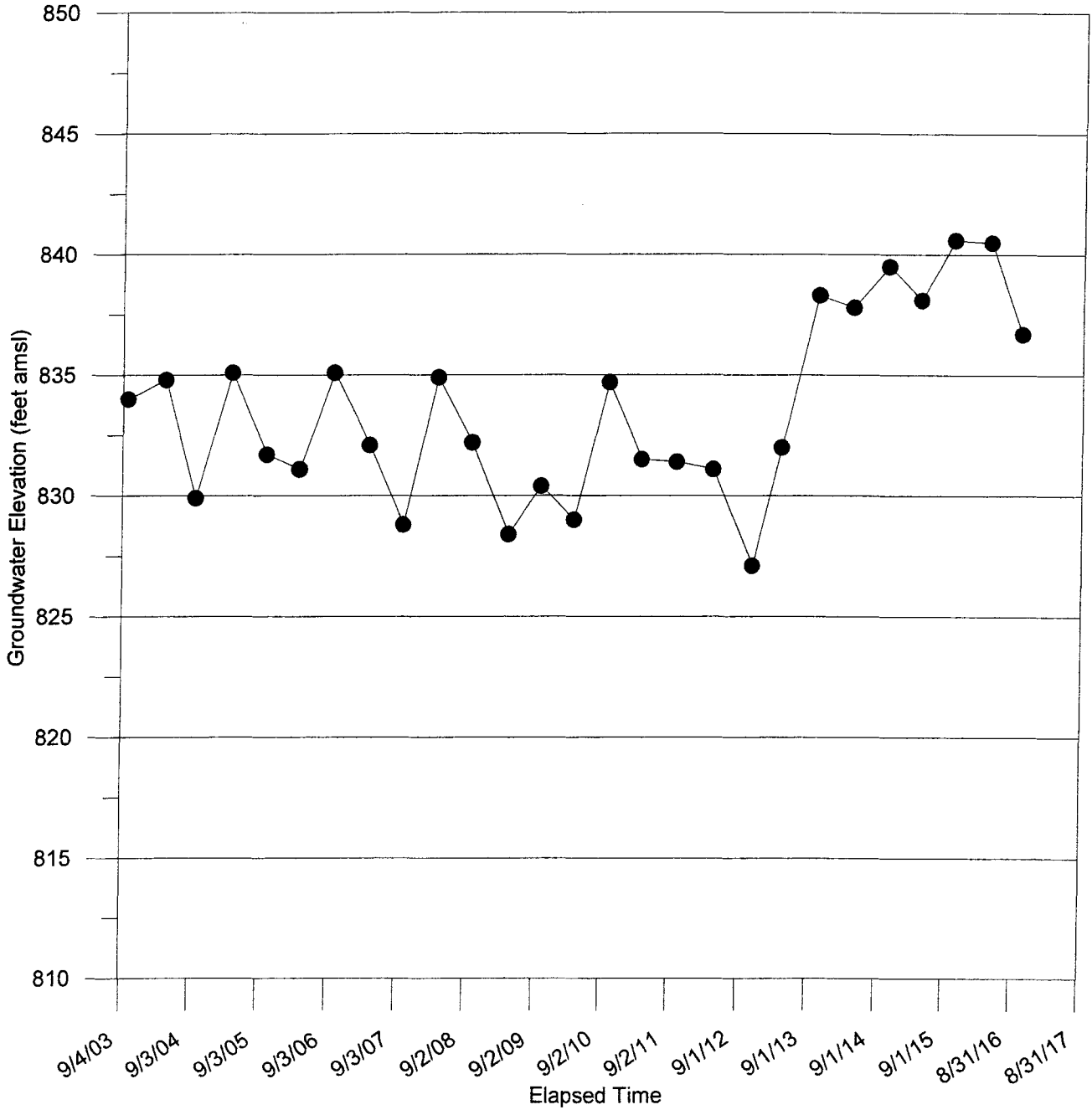
**Groundwater Elevations**  
**300 Cohocton Road**  
**Corfu, NY**  
**County Line Stone Co., Inc.**



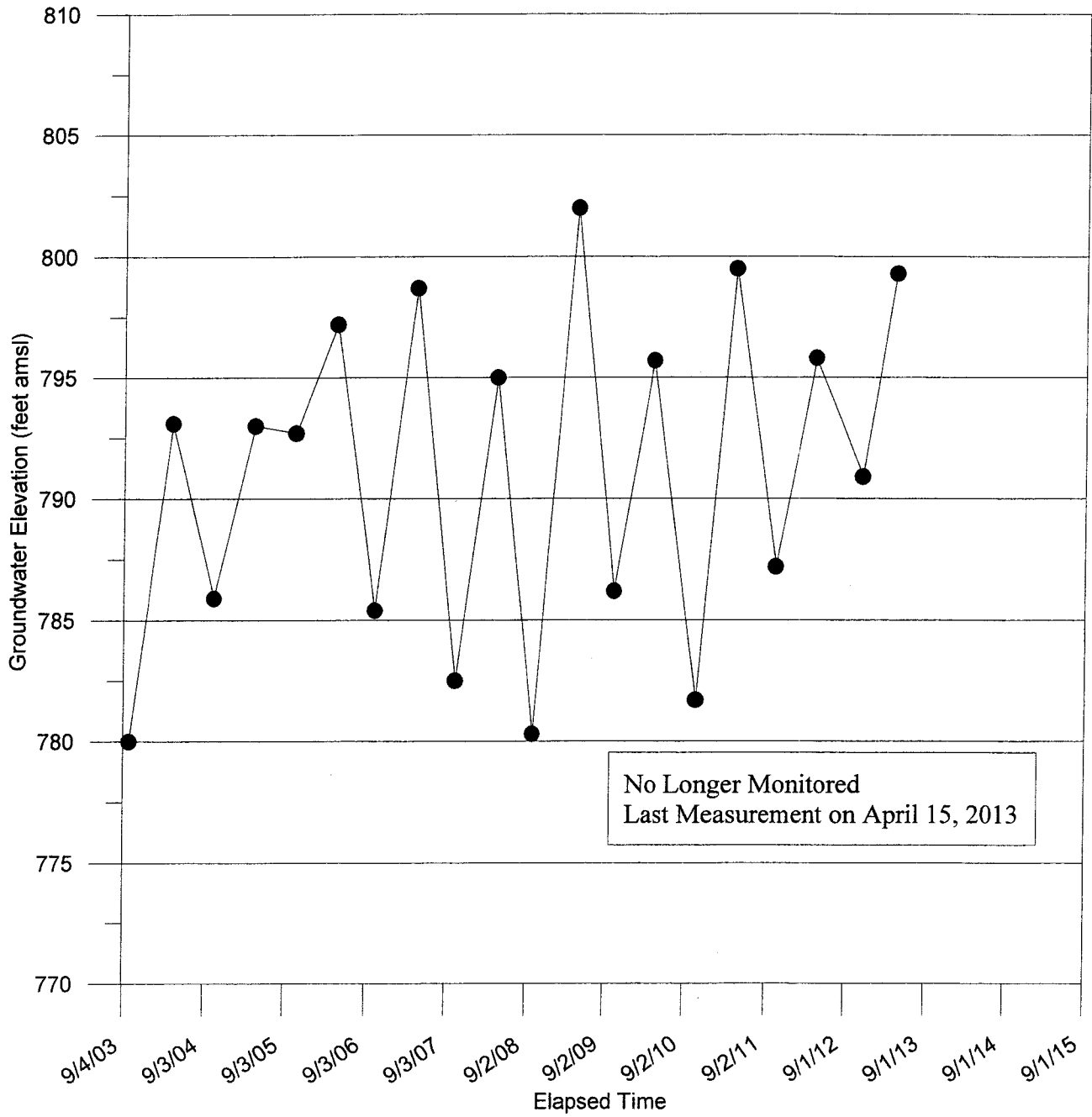
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328 Cohocton Road  
Corfu, NY  
County Line Stone Co., Inc.**



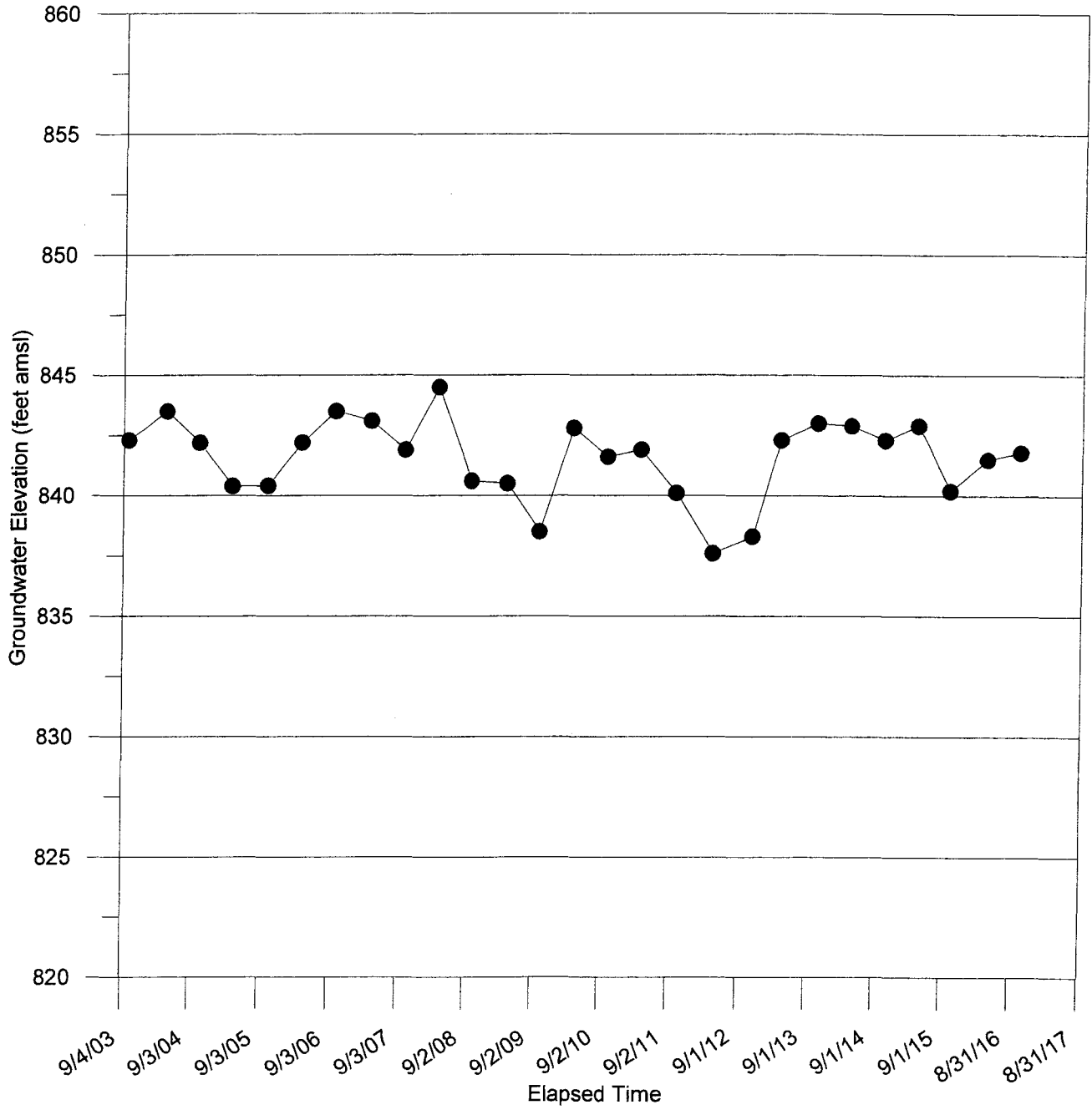
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390 Cohocton Road  
Corfu, NY  
County Line Stone Co., Inc.**



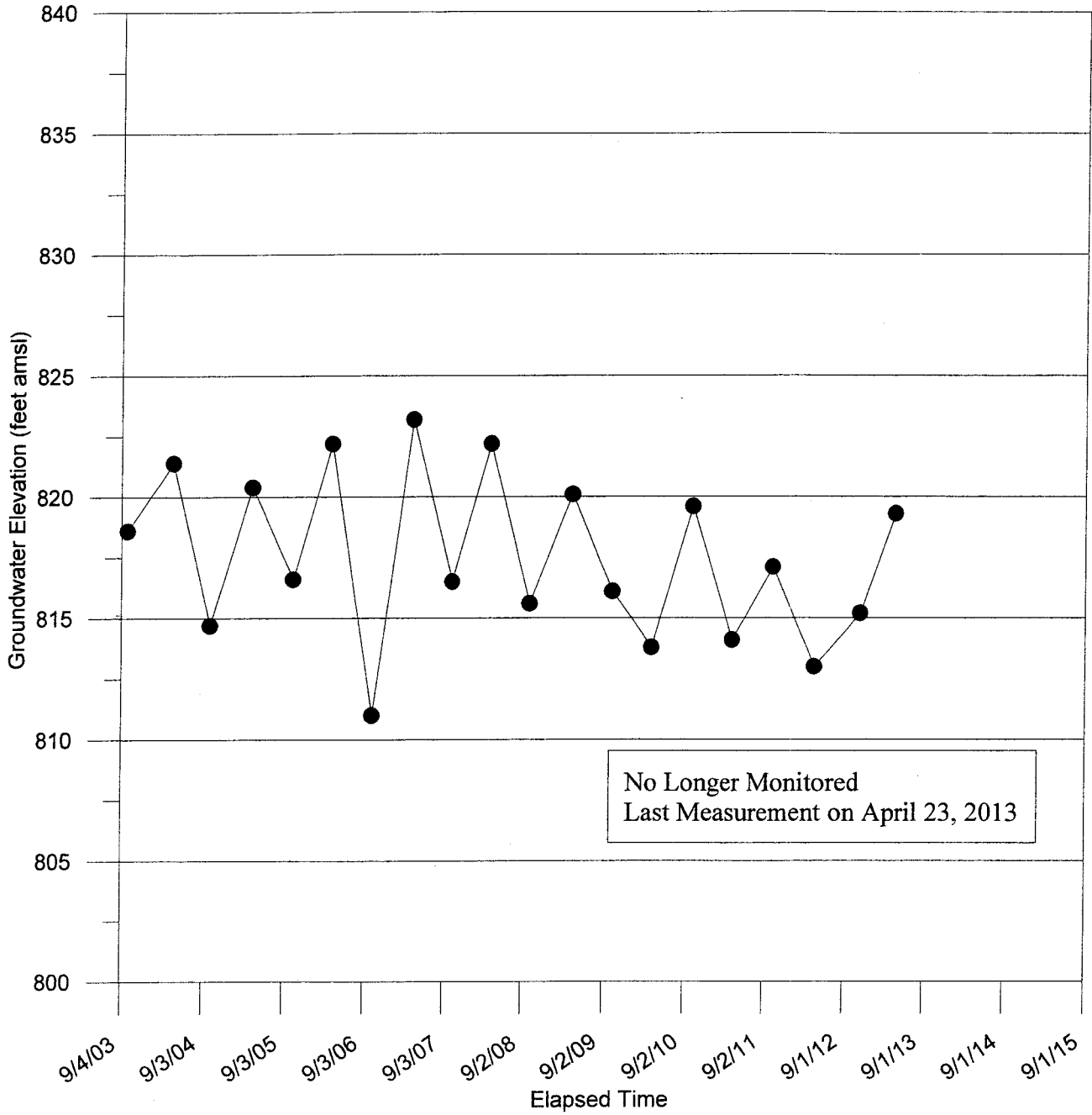
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374 Scribner Road  
Corfu, NY  
County Line Stone Co., Inc.**



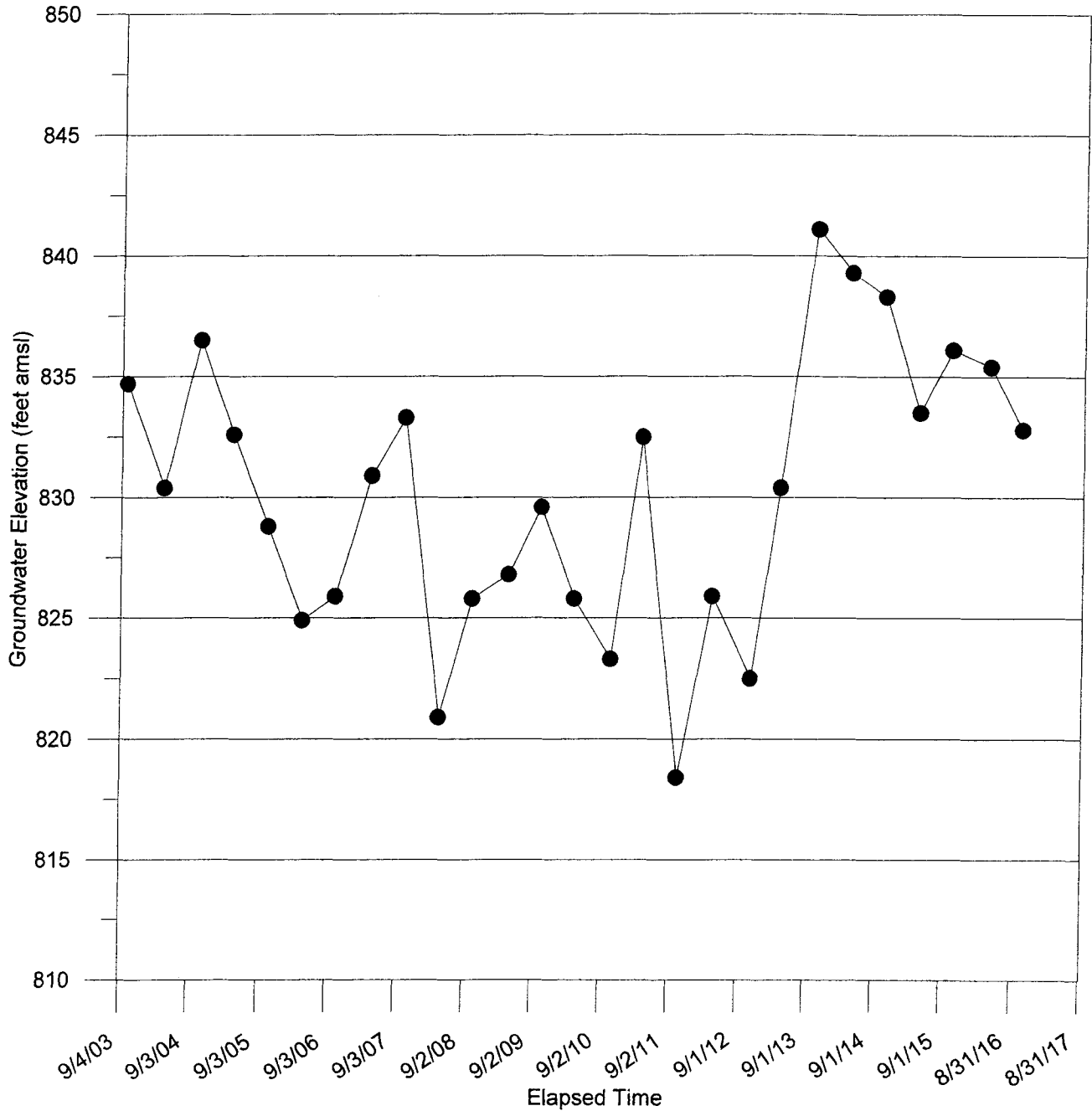
**Groundwater Elevations**  
**472 Cohocton Road**  
**Corfu, NY**  
**County Line Stone Co., Inc.**



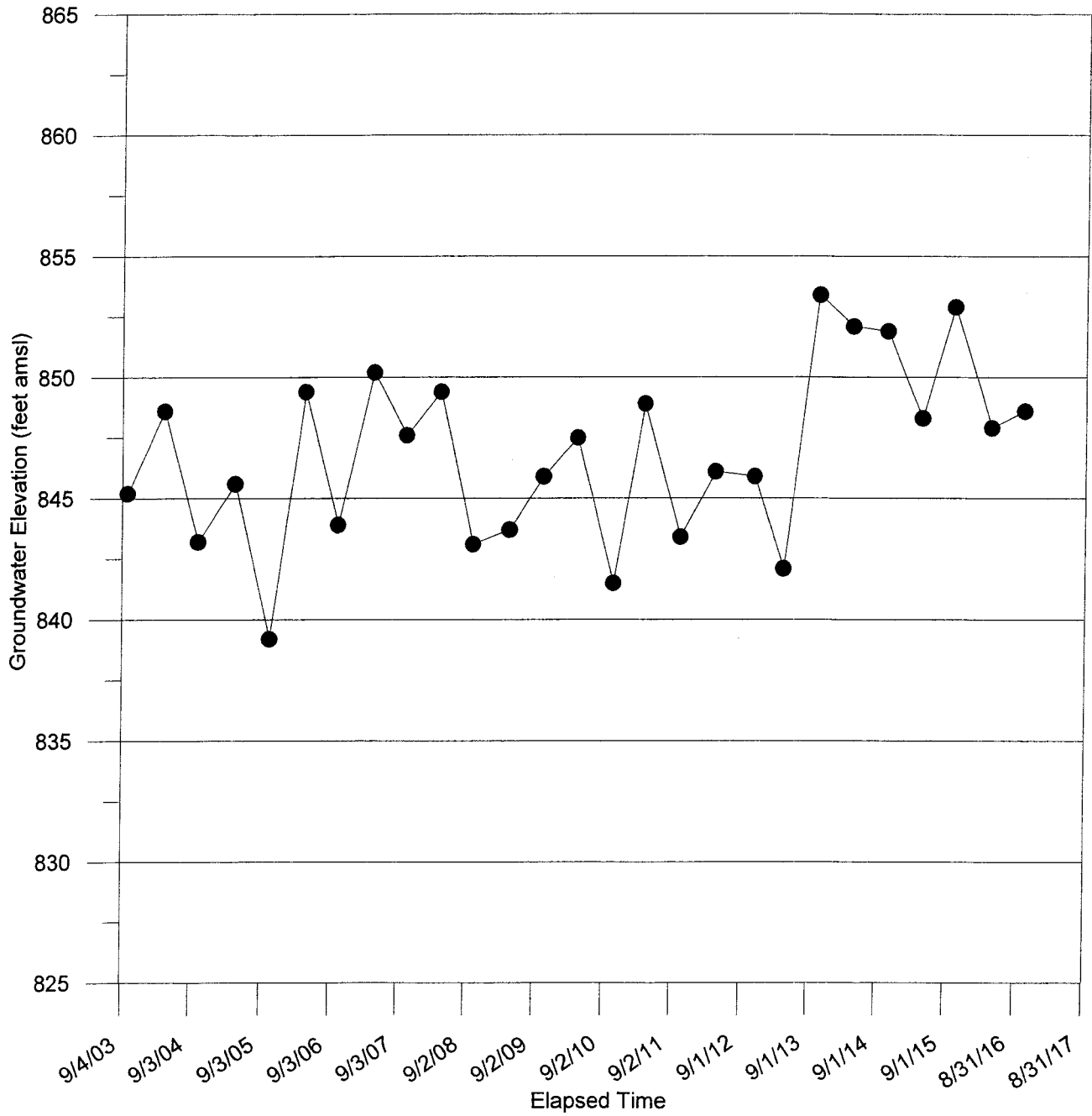
**Groundwater Elevations  
4118 Crittenden Road  
Alden, NY  
County Line Stone Co., Inc.**



**Groundwater Elevations  
13703 Siehl Road  
Akron, NY  
County Line Stone Co., Inc.**

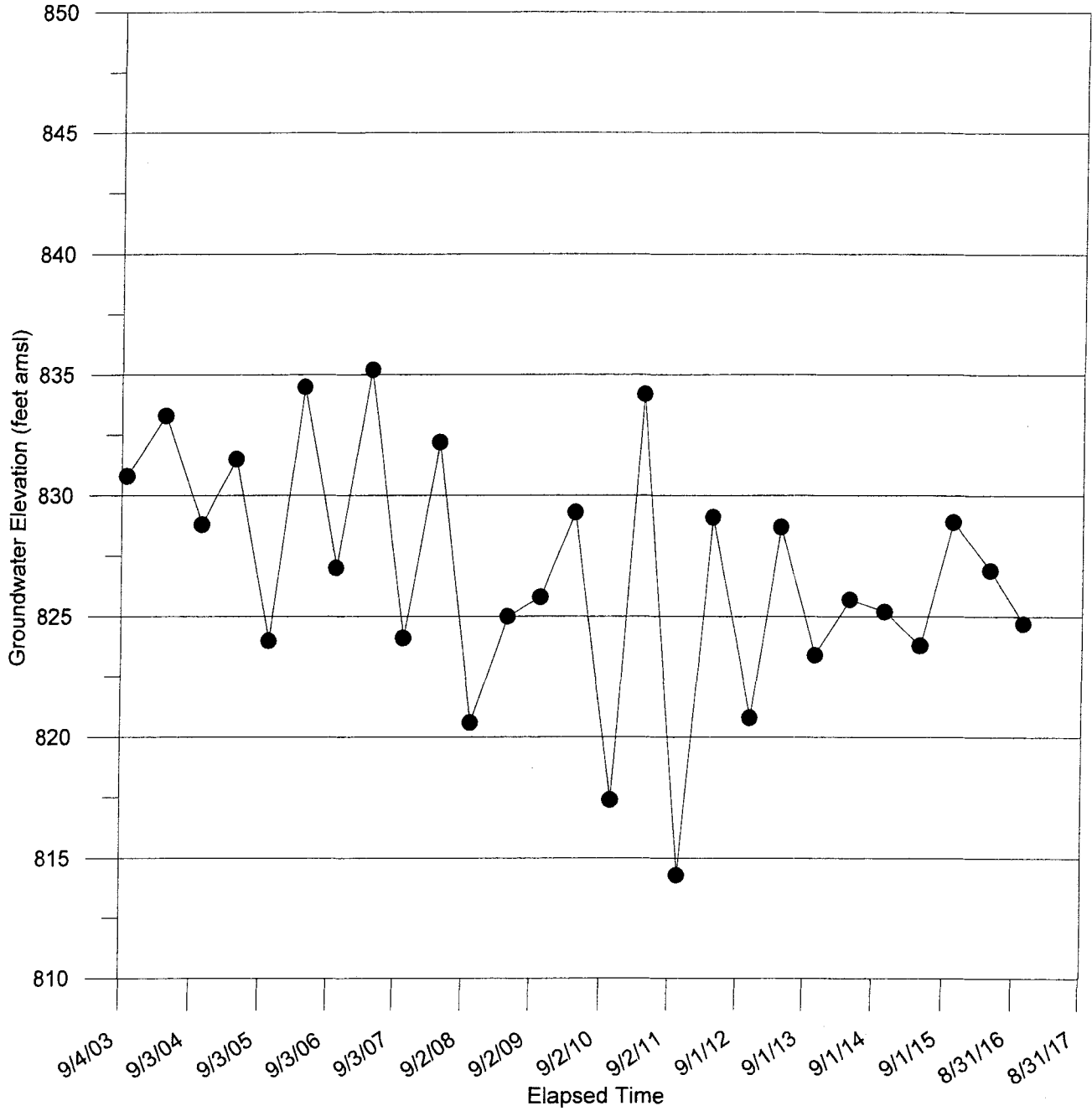


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**13821 Siehl Road**  
**Akron, NY**  
**County Line Stone Co., Inc.**

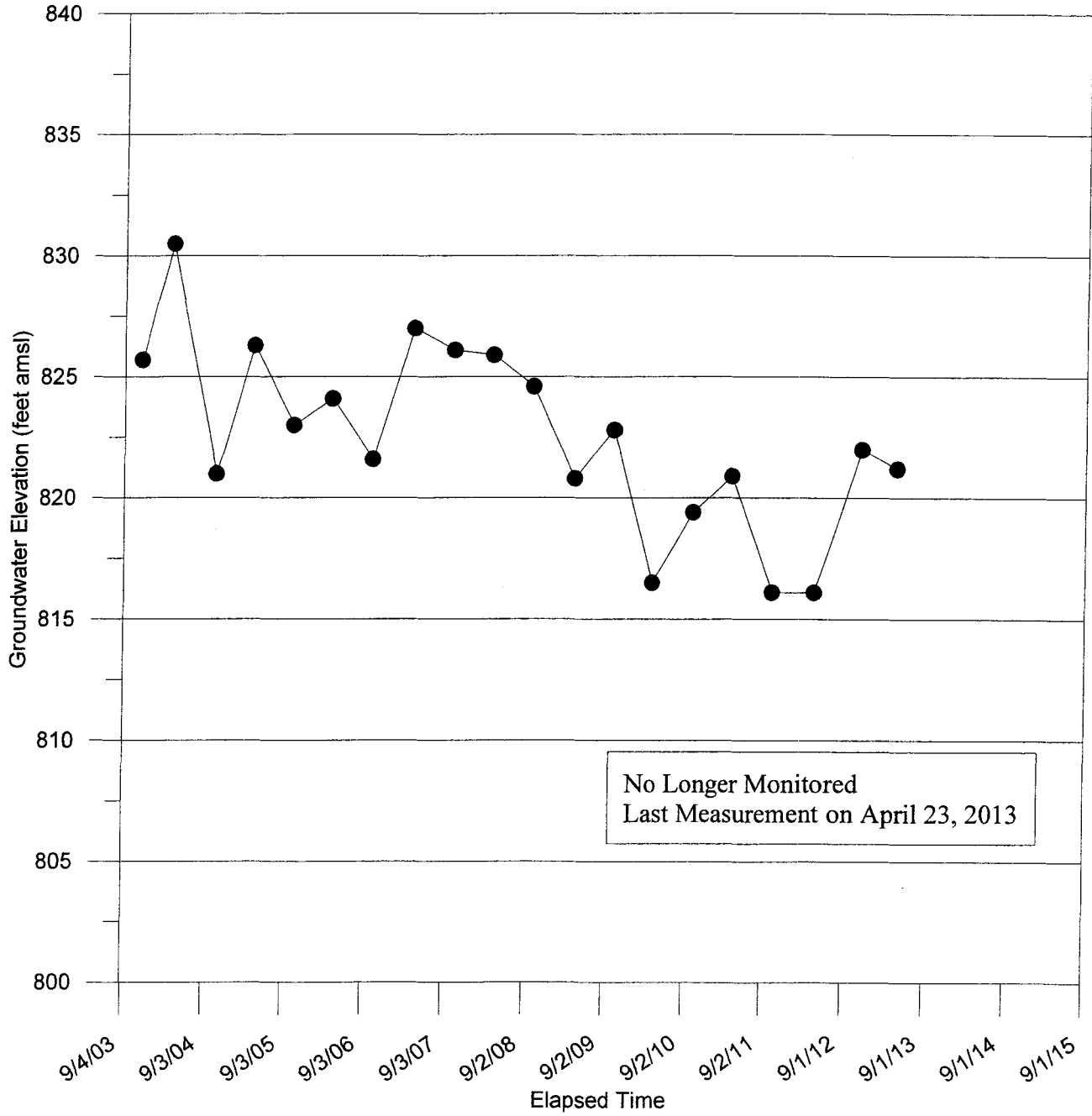




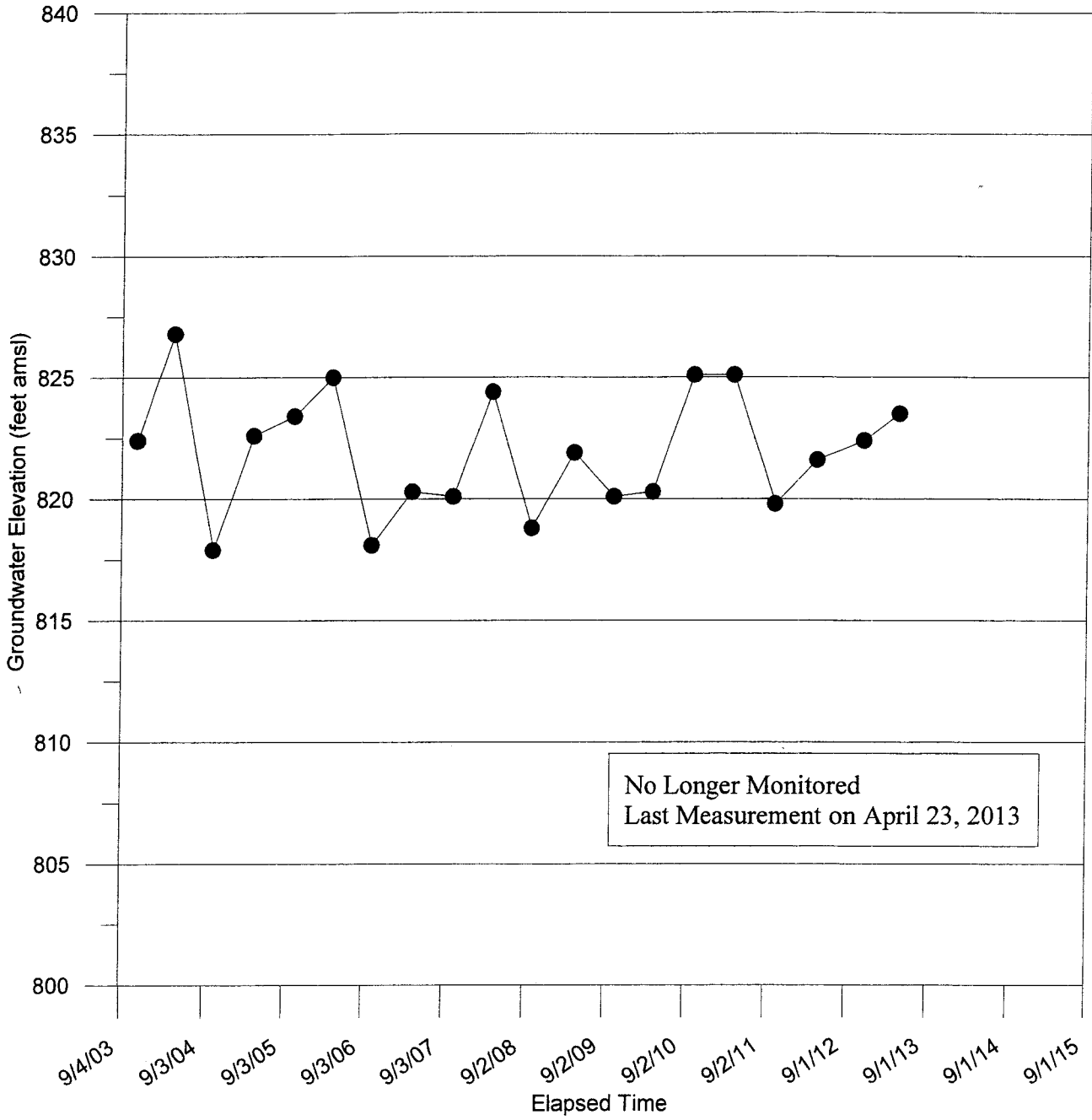
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13681 Siehl Road  
Akron, NY  
County Line Stone Co., Inc.**



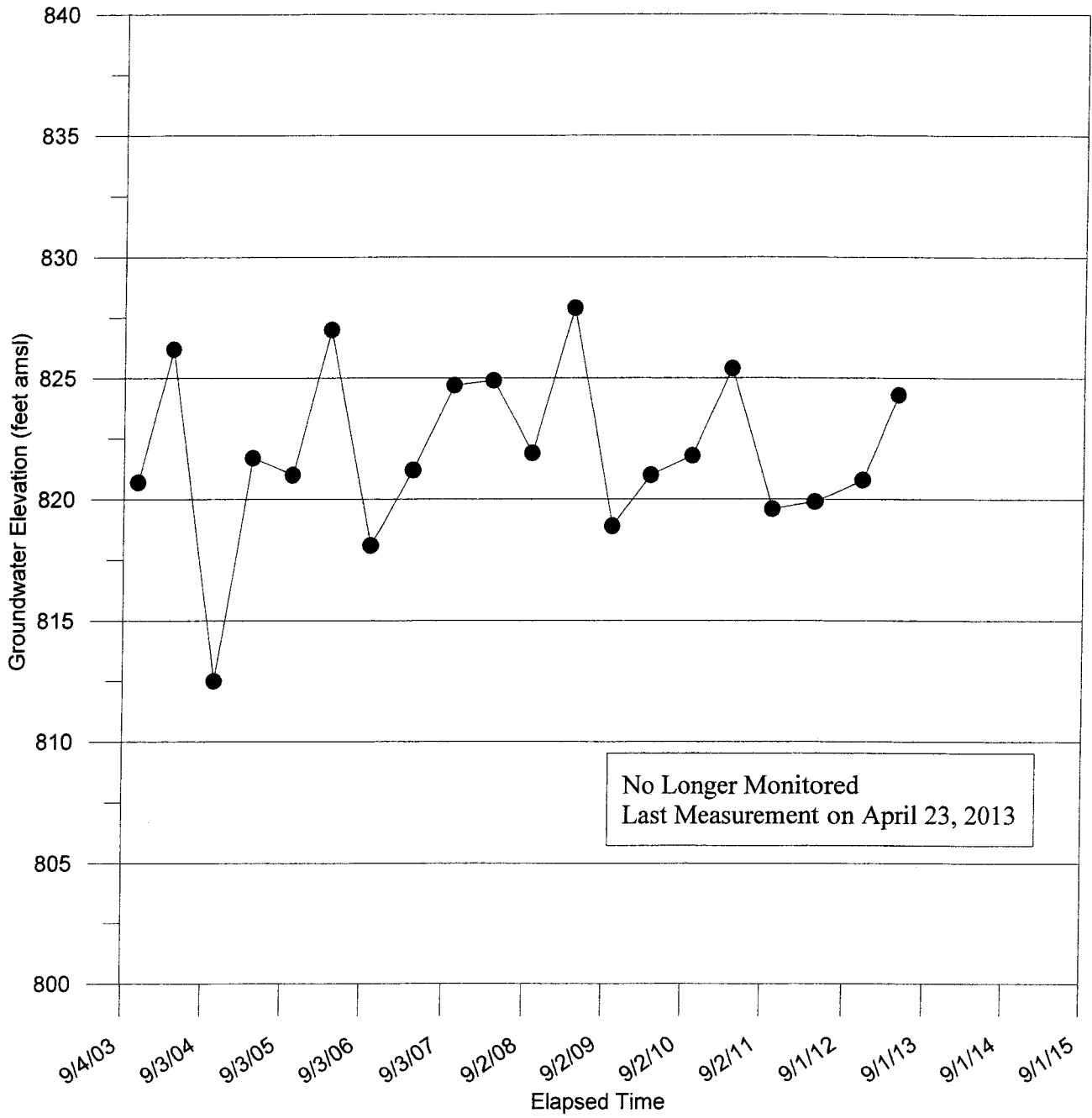
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3776 Crittenden Road  
Alden, NY  
County Line Stone Co., Inc.**



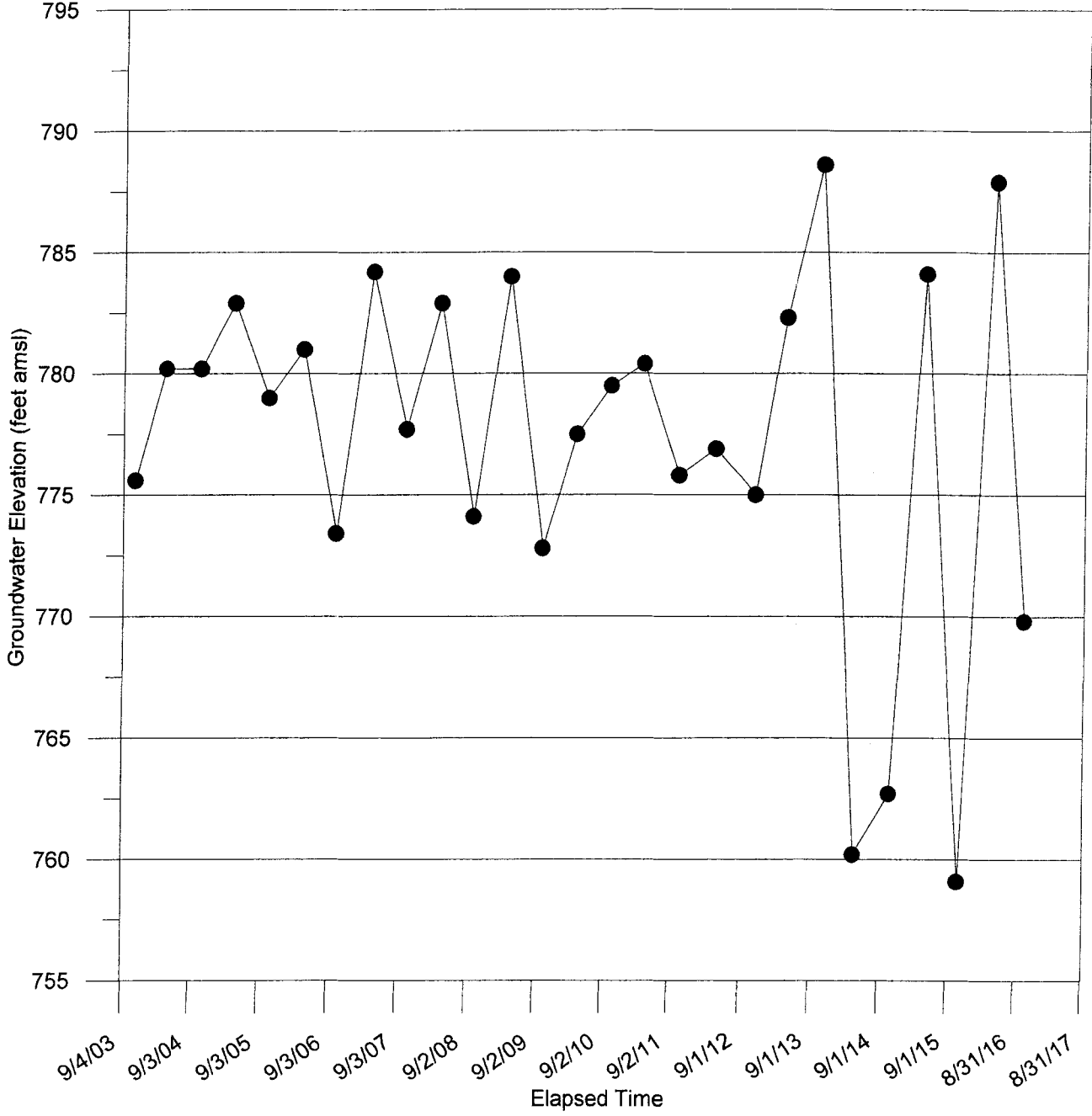
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3754 Crittenden Road  
Alden, NY  
County Line Stone Co., Inc.**



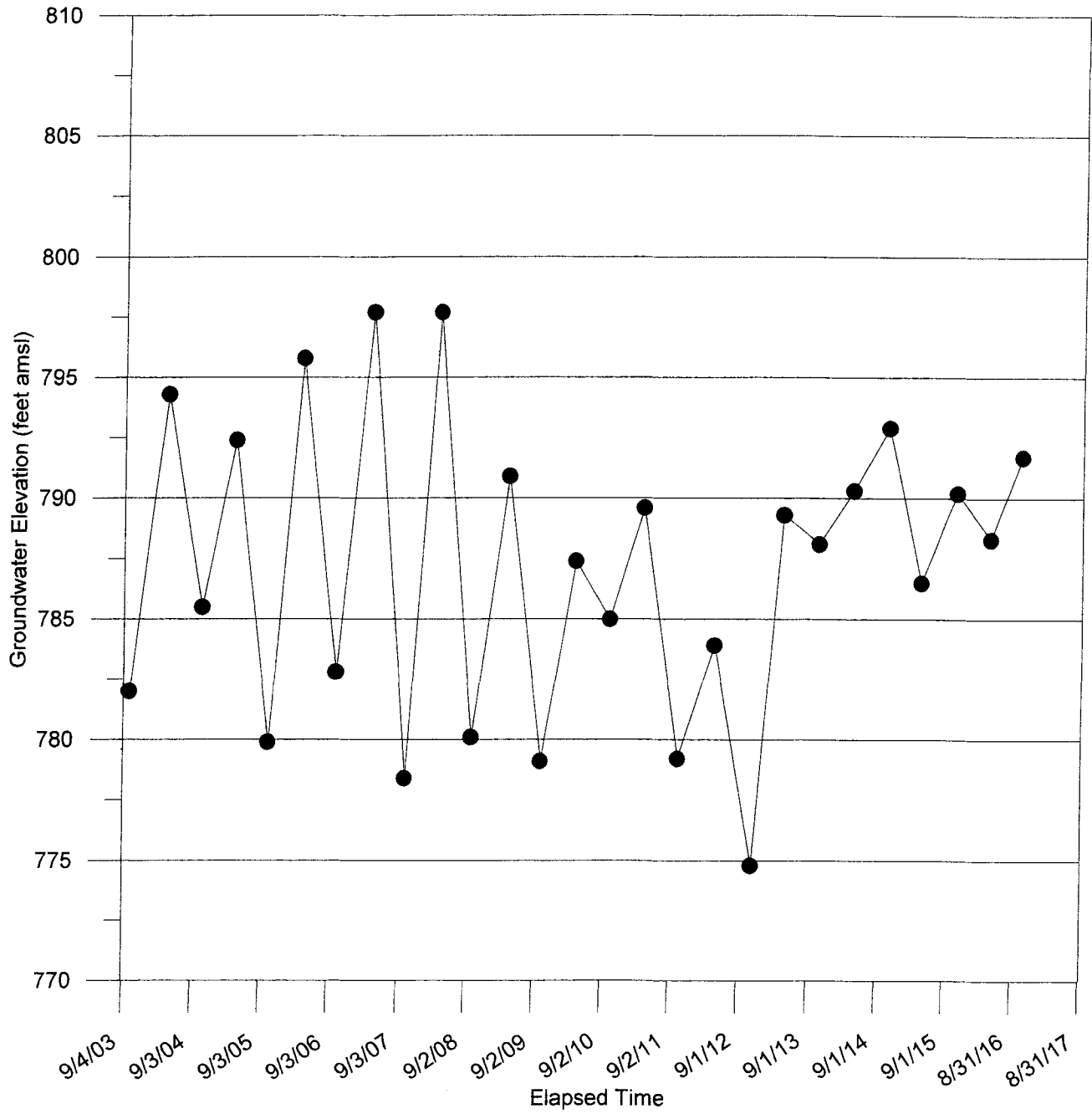
**Groundwater Elevations  
3722 Crittenden Road  
Alden, NY  
County Line Stone Co., Inc.**



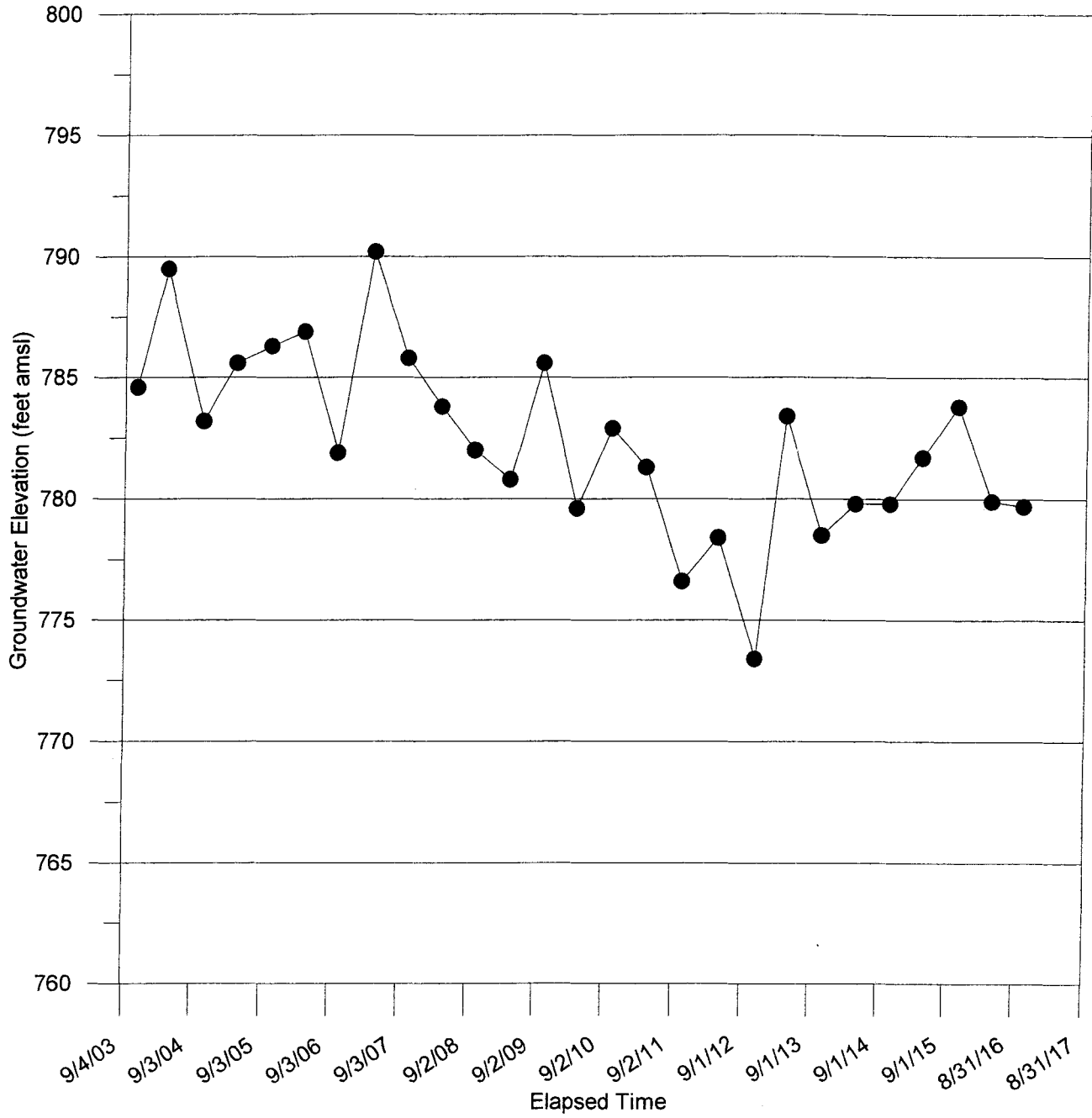
**Groundwater Elevations  
4833 Crittenden Road  
Akron, NY  
County Line Stone Co., Inc.**



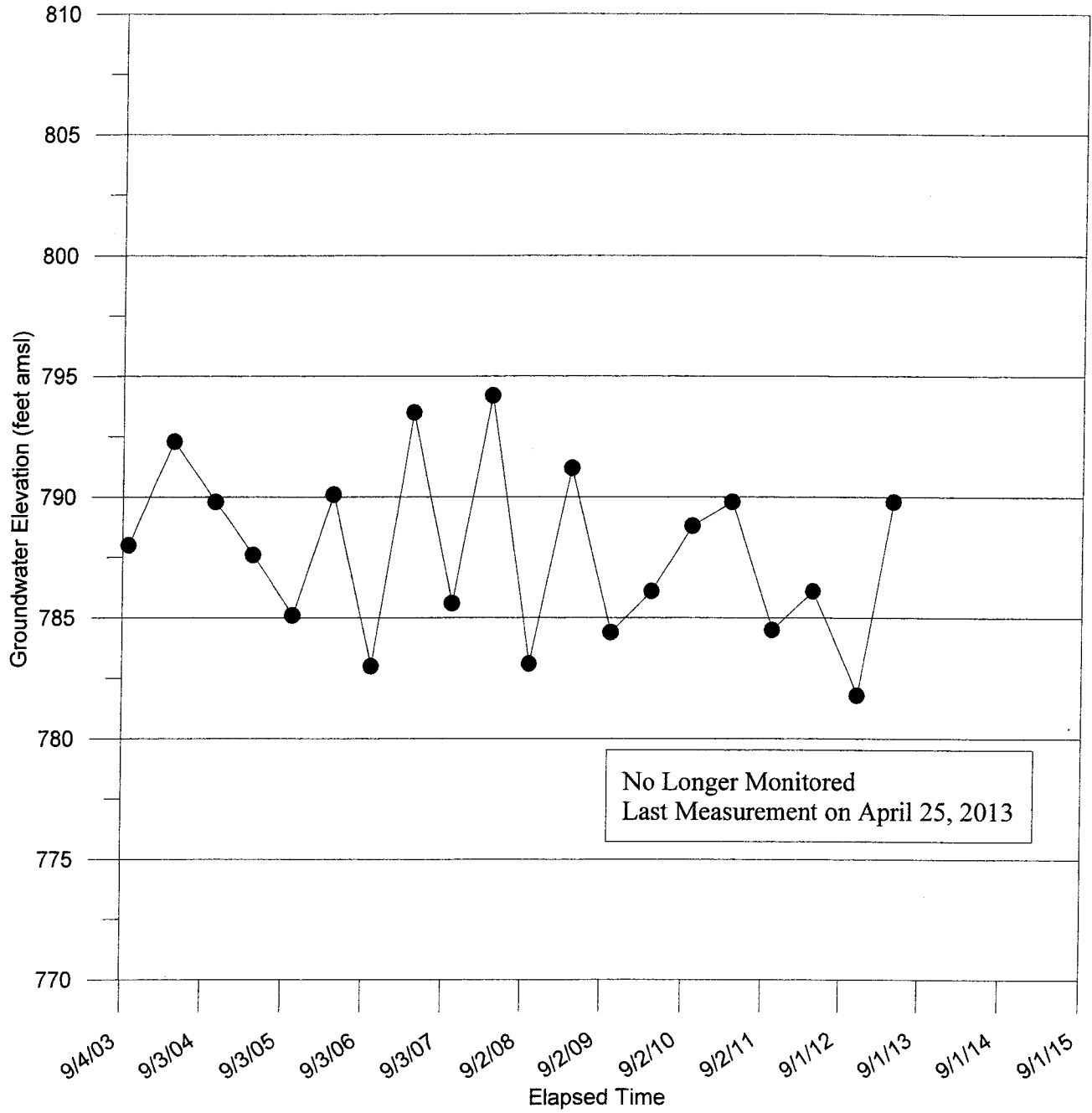
**Groundwater Elevations  
4660 Crittenden Road  
Akron, NY  
County Line Stone Co., Inc.**



**Groundwater Elevations  
4820 Crittenden Road  
Akron, NY  
County Line Stone Co., Inc.**

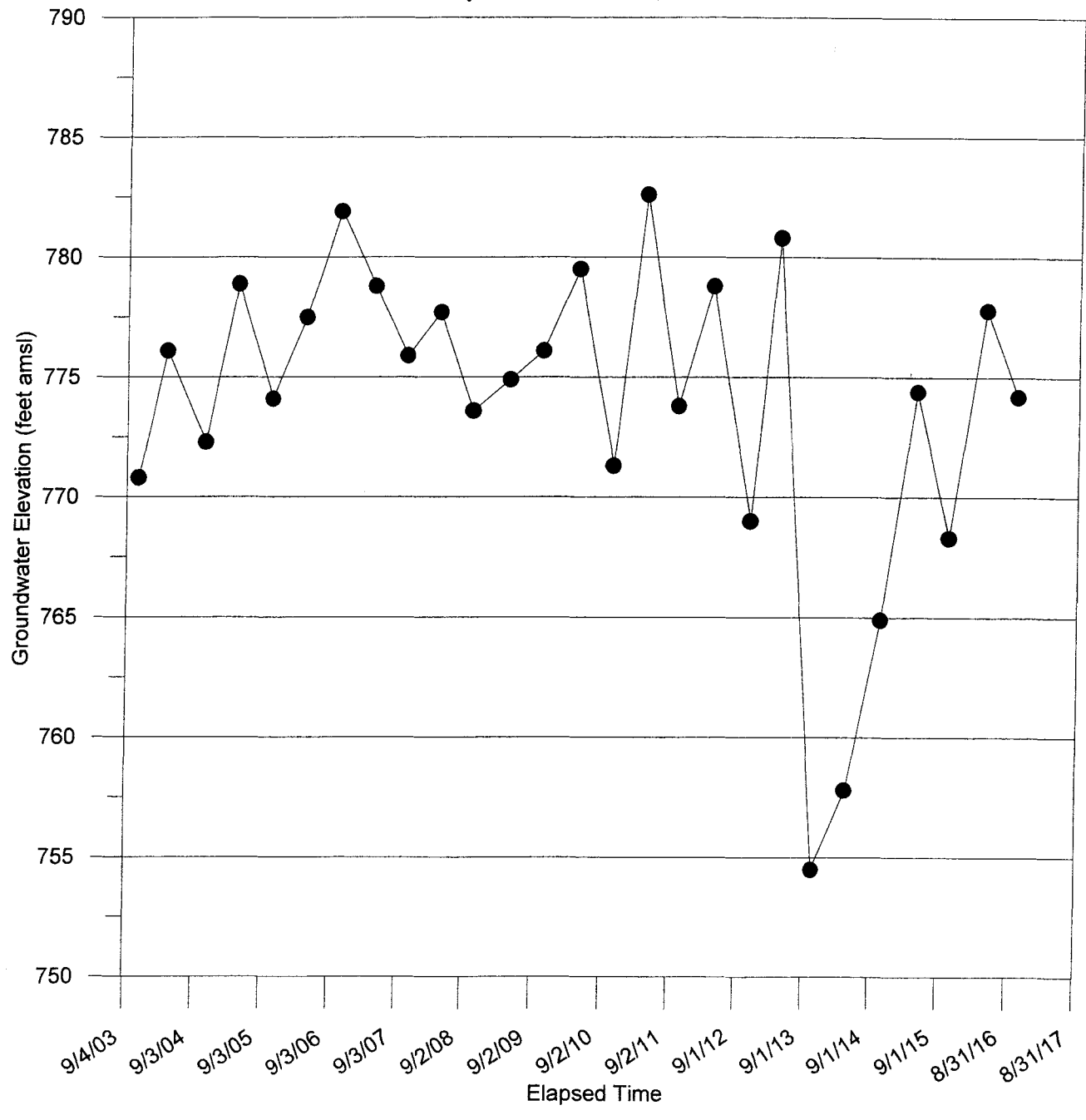


**Groundwater Elevations  
4840 Crittenden Road  
Alden, NY  
County Line Stone Co., Inc.**

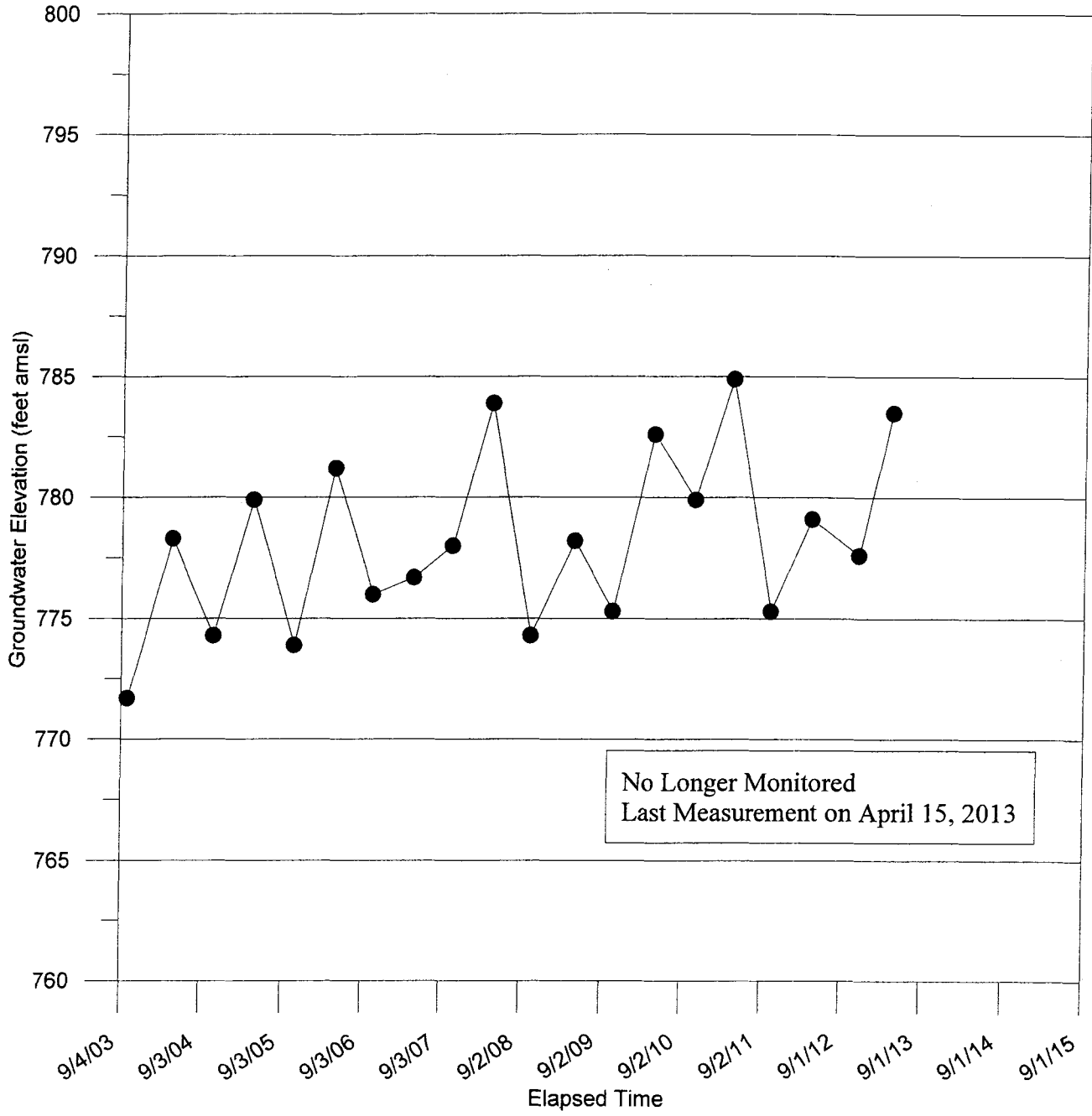




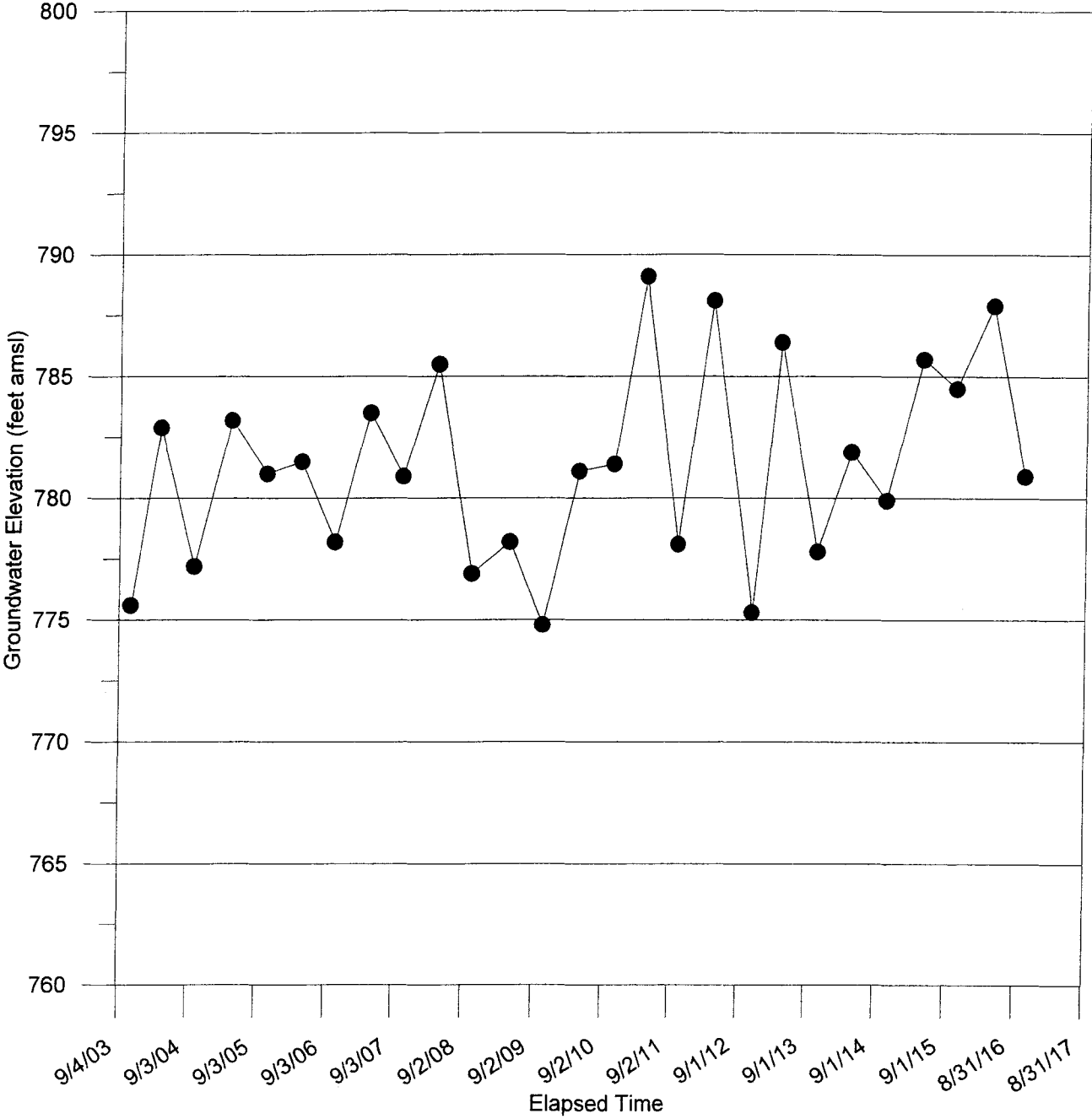
**Groundwater Elevations  
13600 Steiner Road  
Akron, NY  
County Line Stone Co., Inc.**



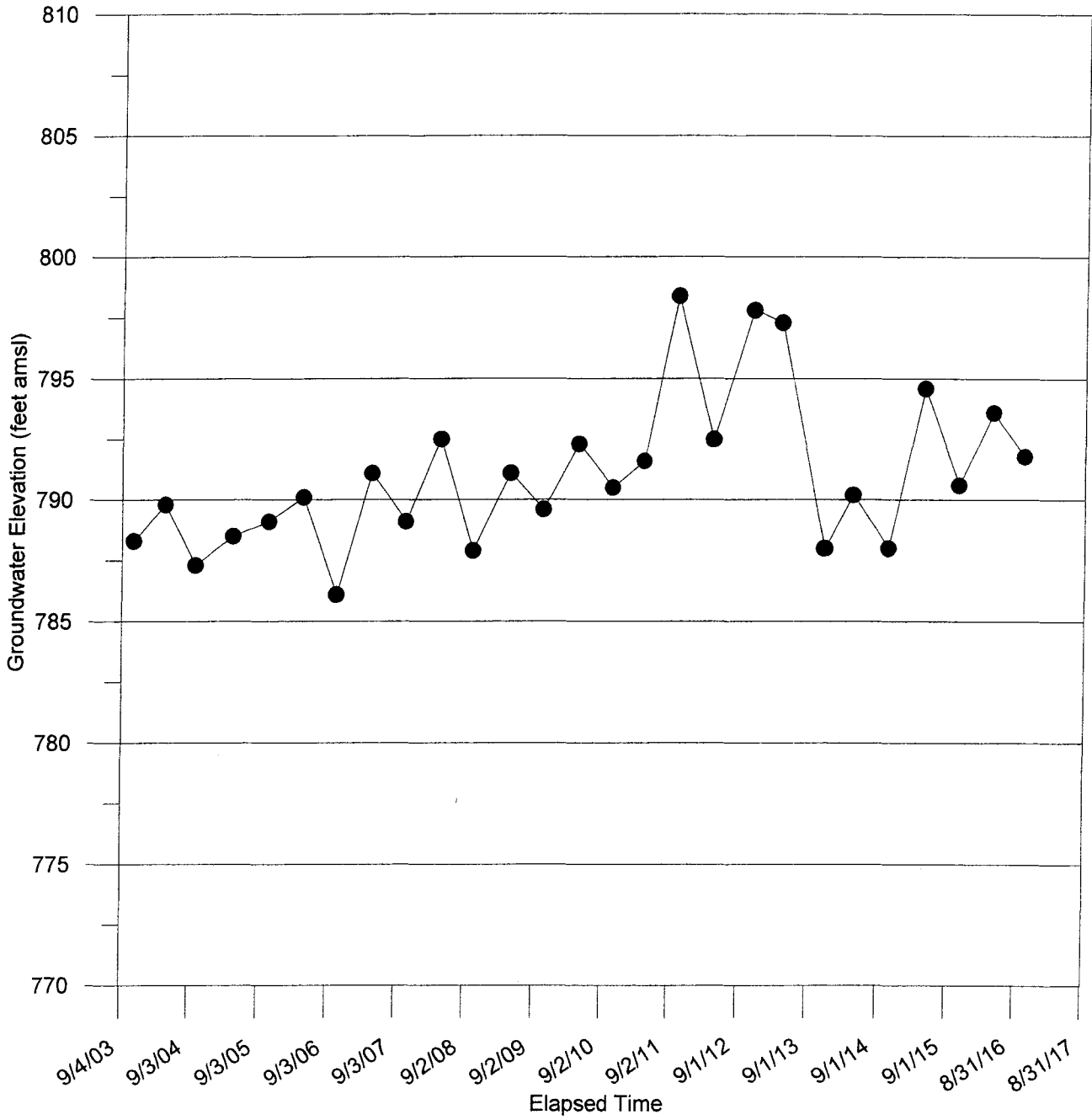
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13620 Steiner Road  
Akron, NY  
County Line Stone Co., Inc.**



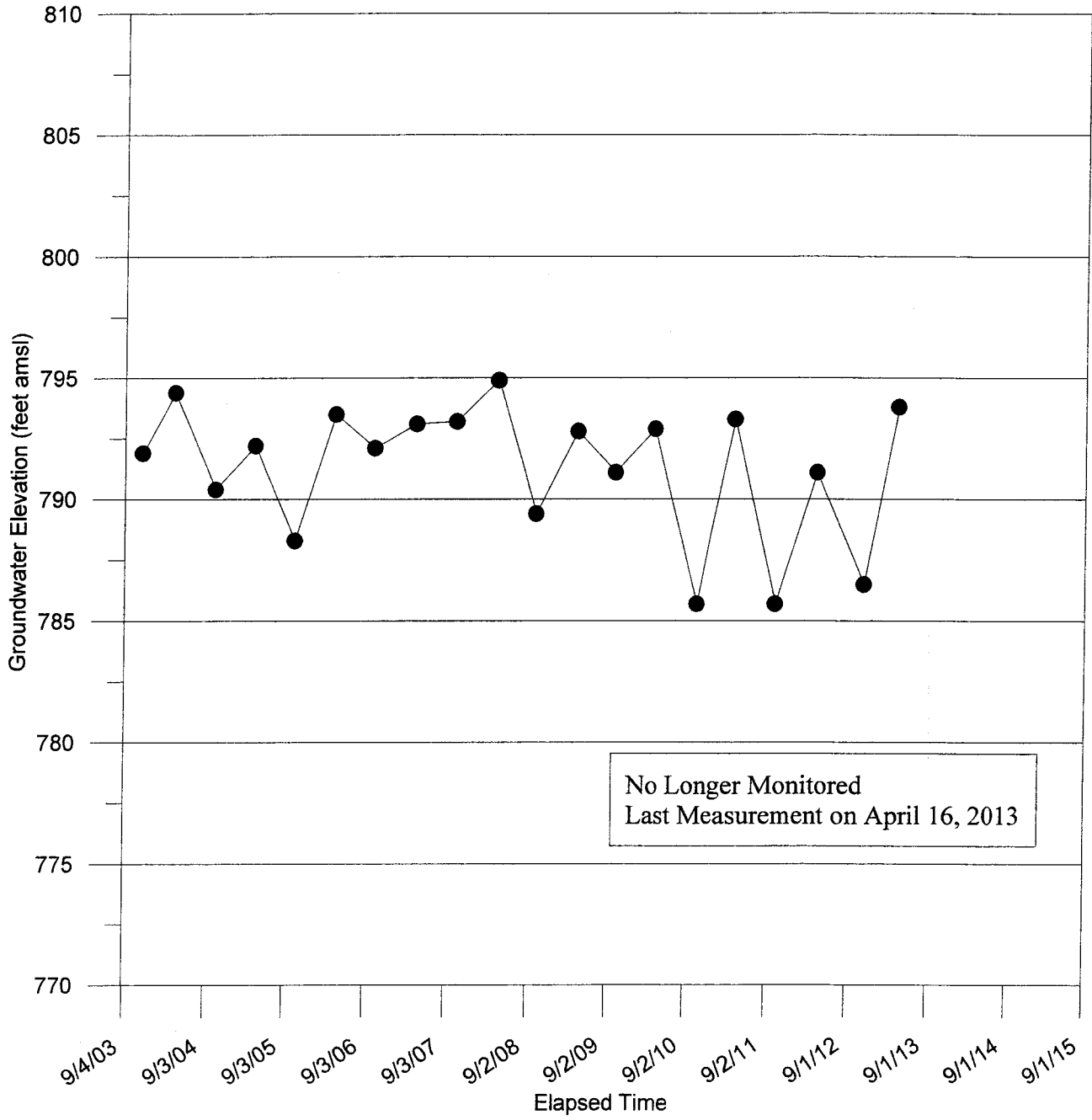
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13590 Steiner Road  
Akron, NY  
County Line Stone Co., Inc.**



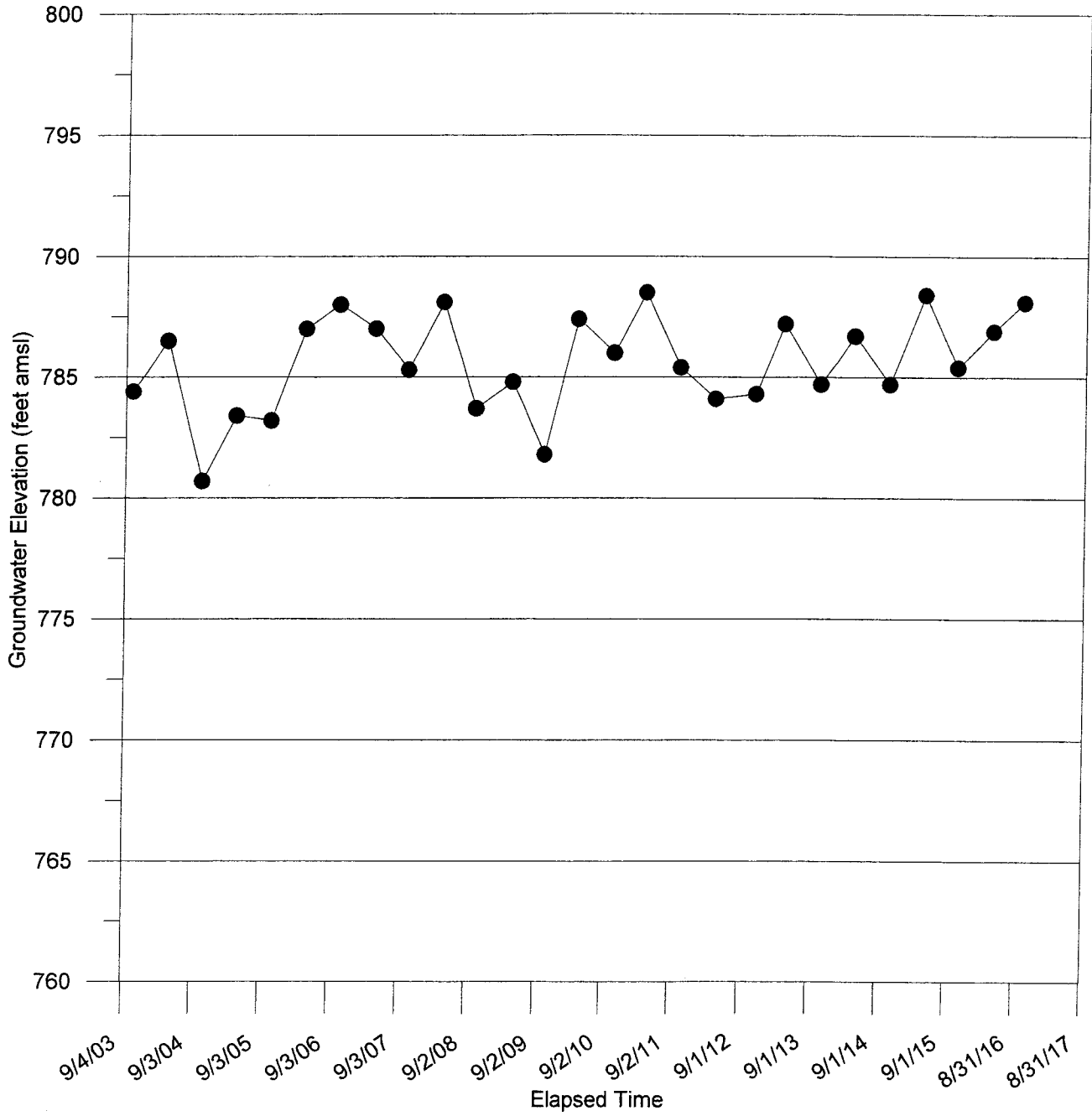
**Groundwater Elevations**  
**13293 Steiner Road**  
**Akron, NY**  
**County Line Stone Co., Inc.**



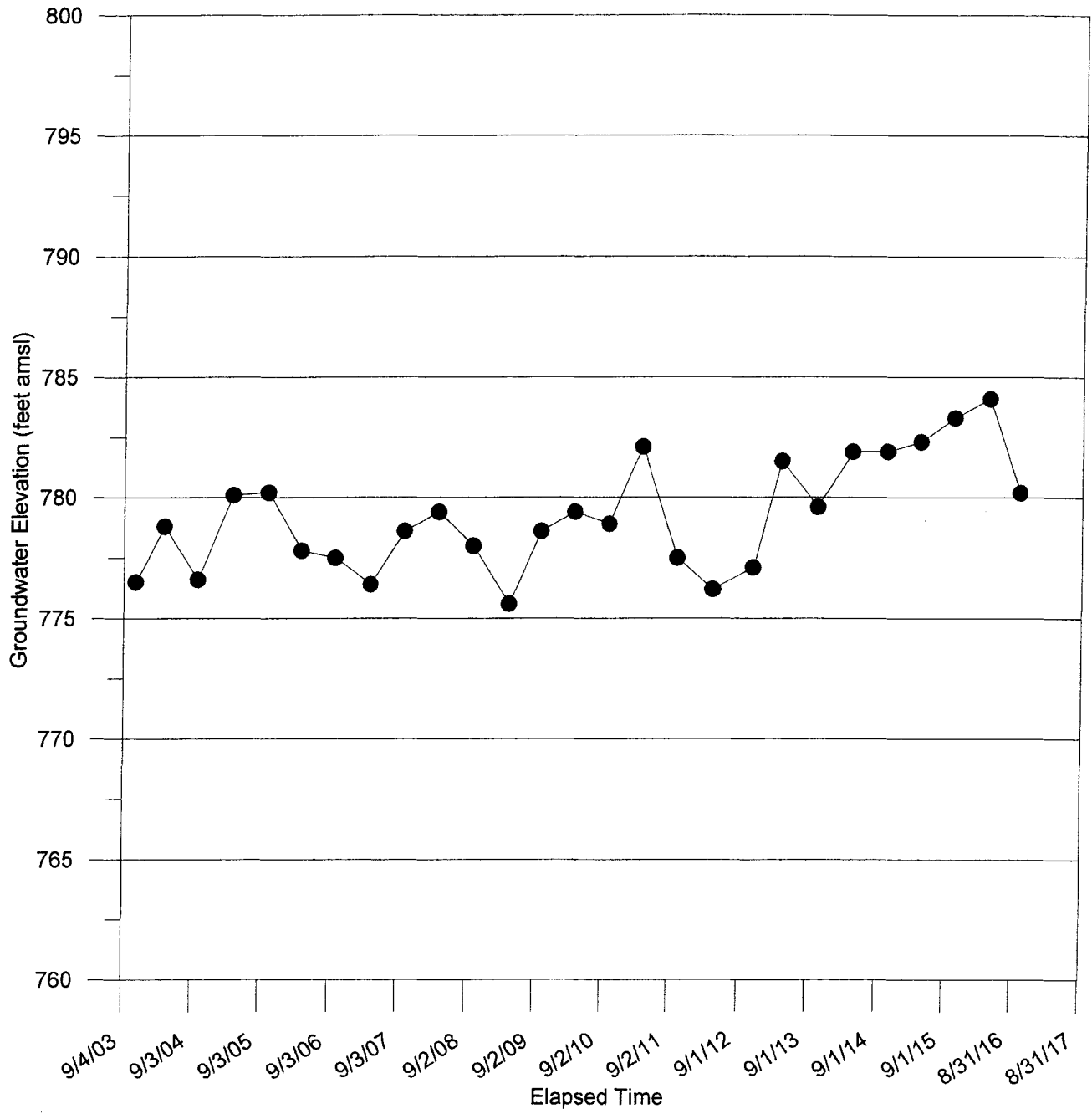
**Groundwater Elevations  
13221 Dorsch Road  
Akron, NY  
County Line Stone Co., Inc.**



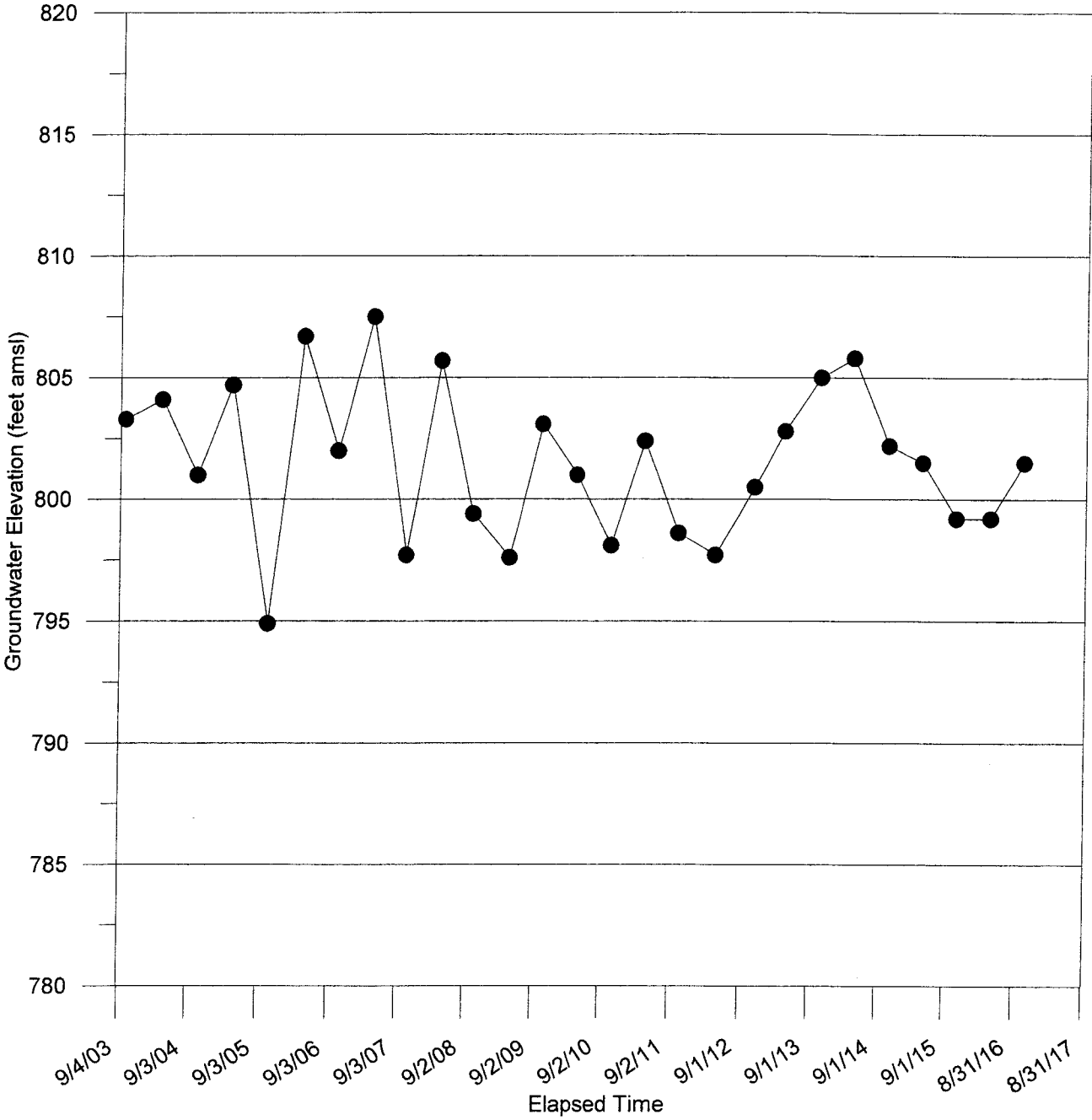
**Groundwater Elevations  
13218 Dorsch Road  
Akron, NY  
County Line Stone Co., Inc.**



**Groundwater Elevations**  
**4661 Ayers Road**  
**Akron, NY**  
**County Line Stone Co., Inc.**

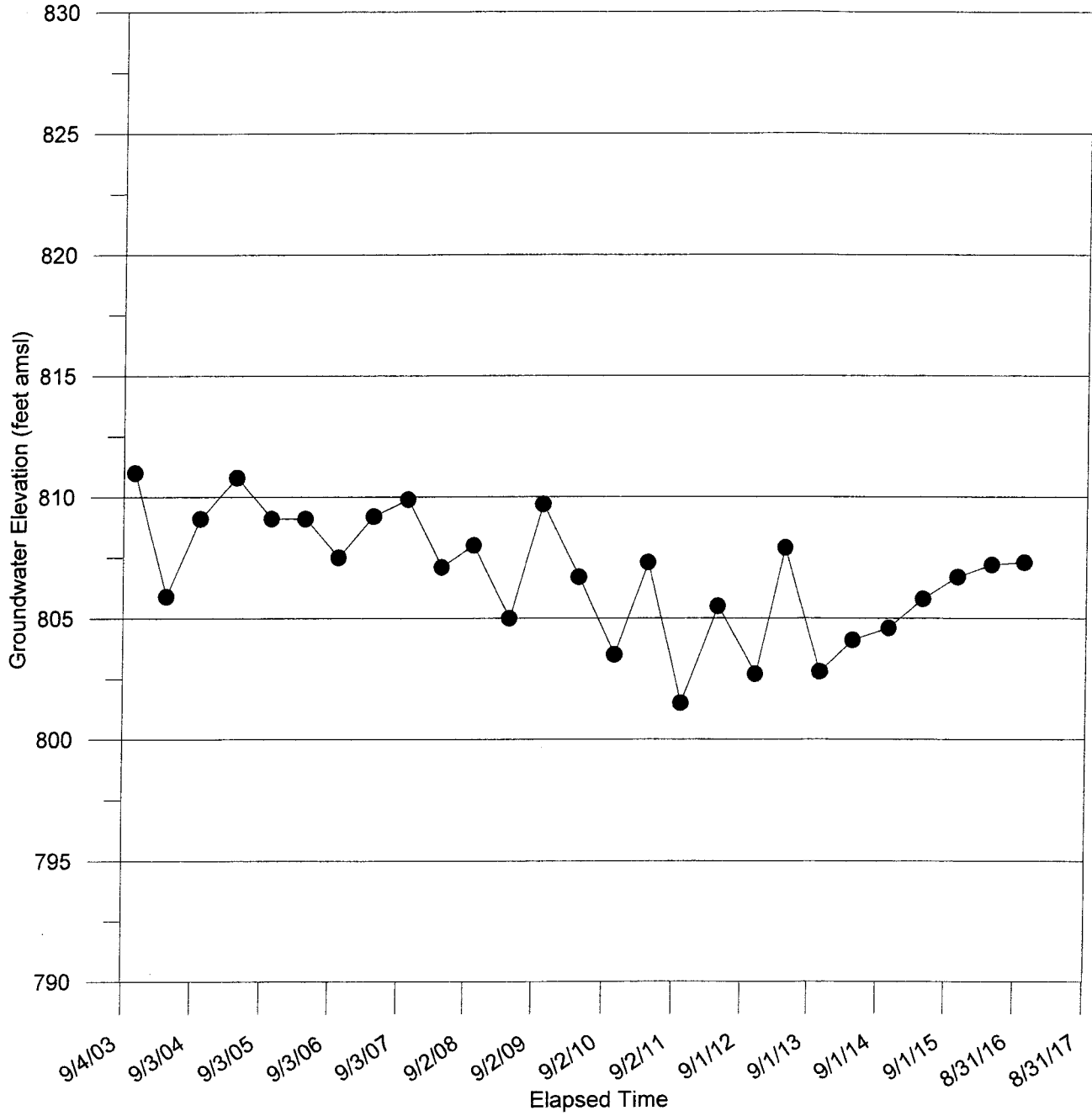


**Groundwater Elevations**  
**13570 Stage Road**  
**Akron, NY**  
**County Line Stone Co., Inc.**

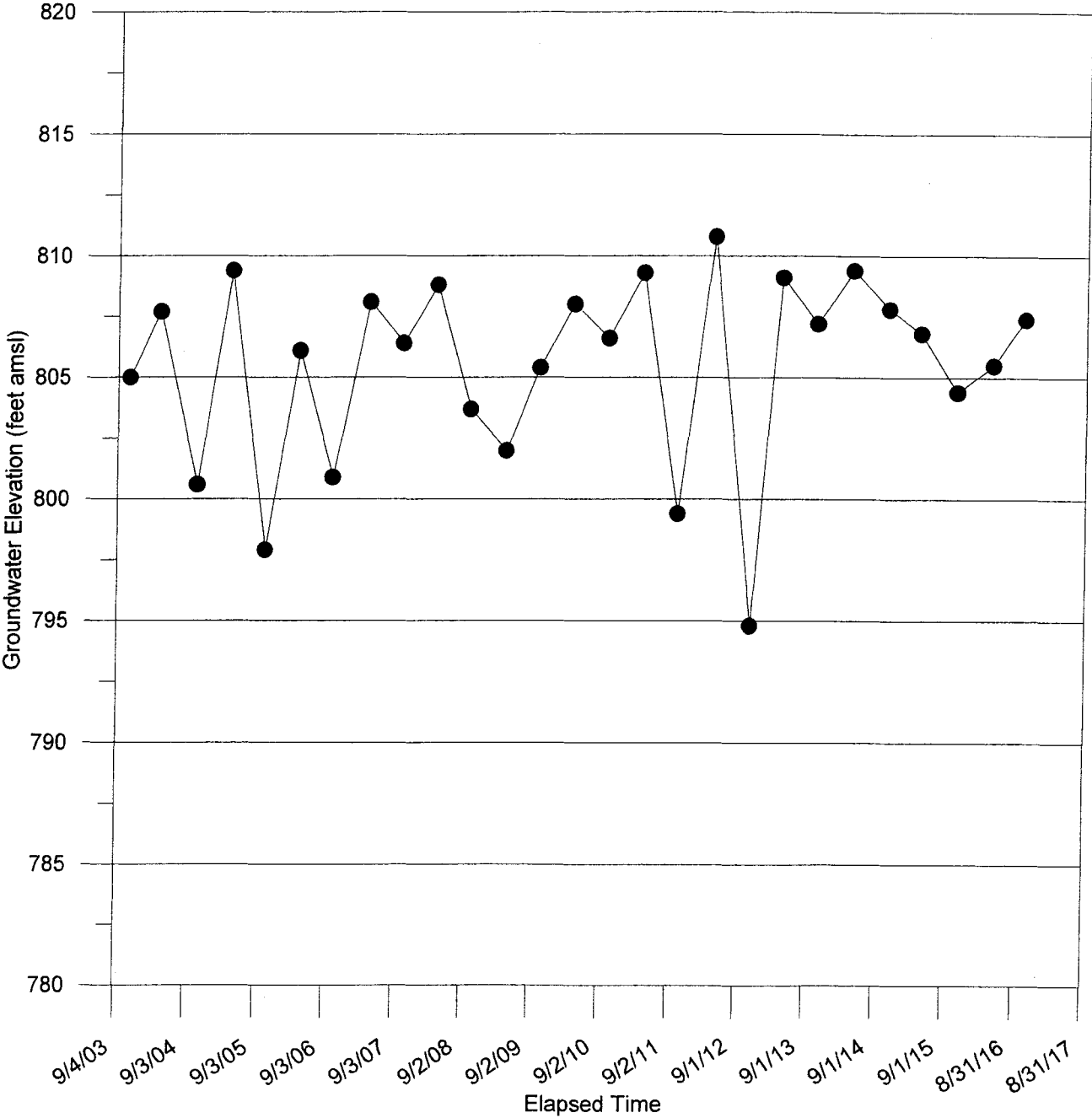




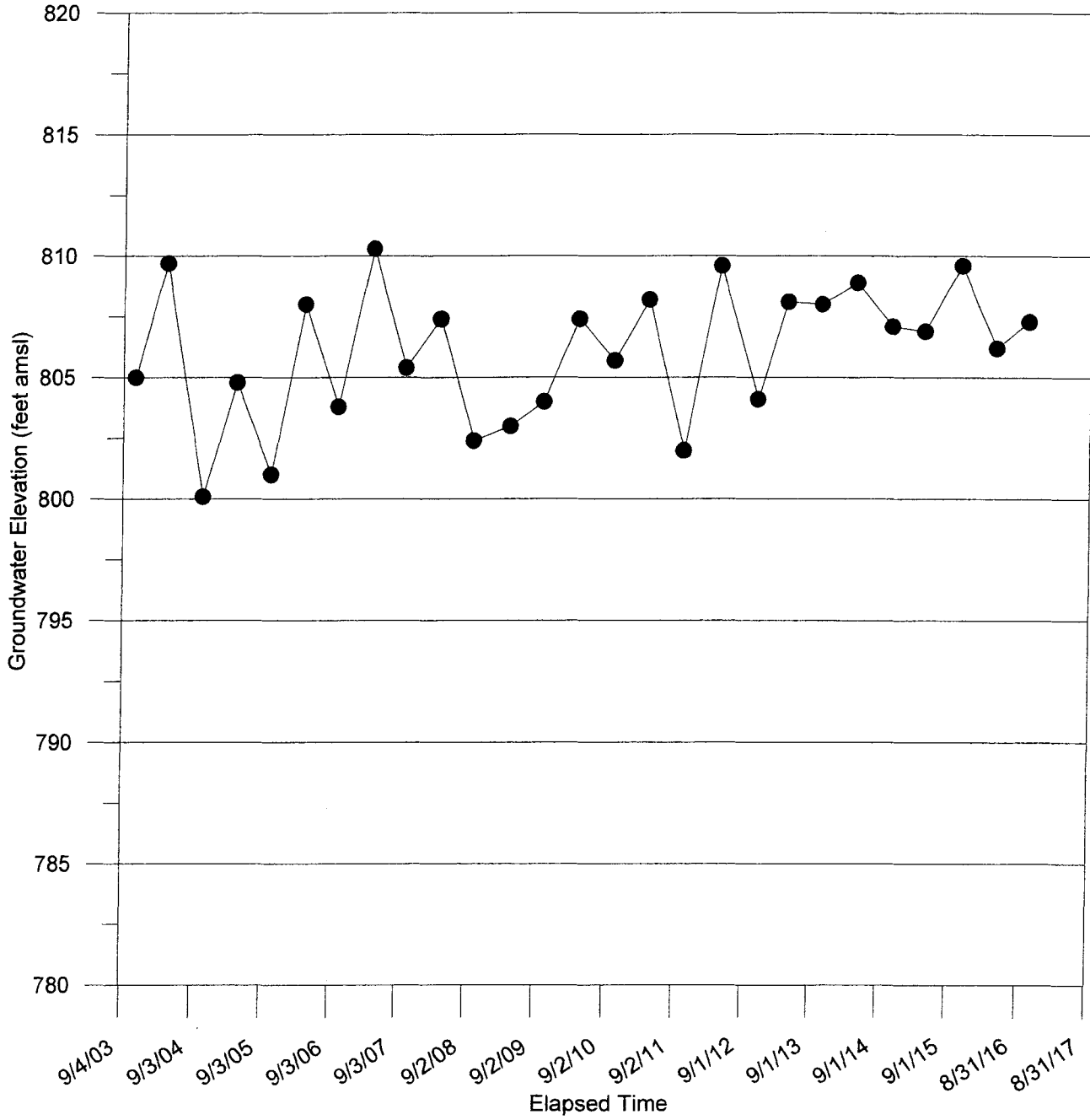
**Groundwater Elevations**  
**13517 Stage Road**  
**Akron, NY**  
**County Line Stone Co., Inc.**



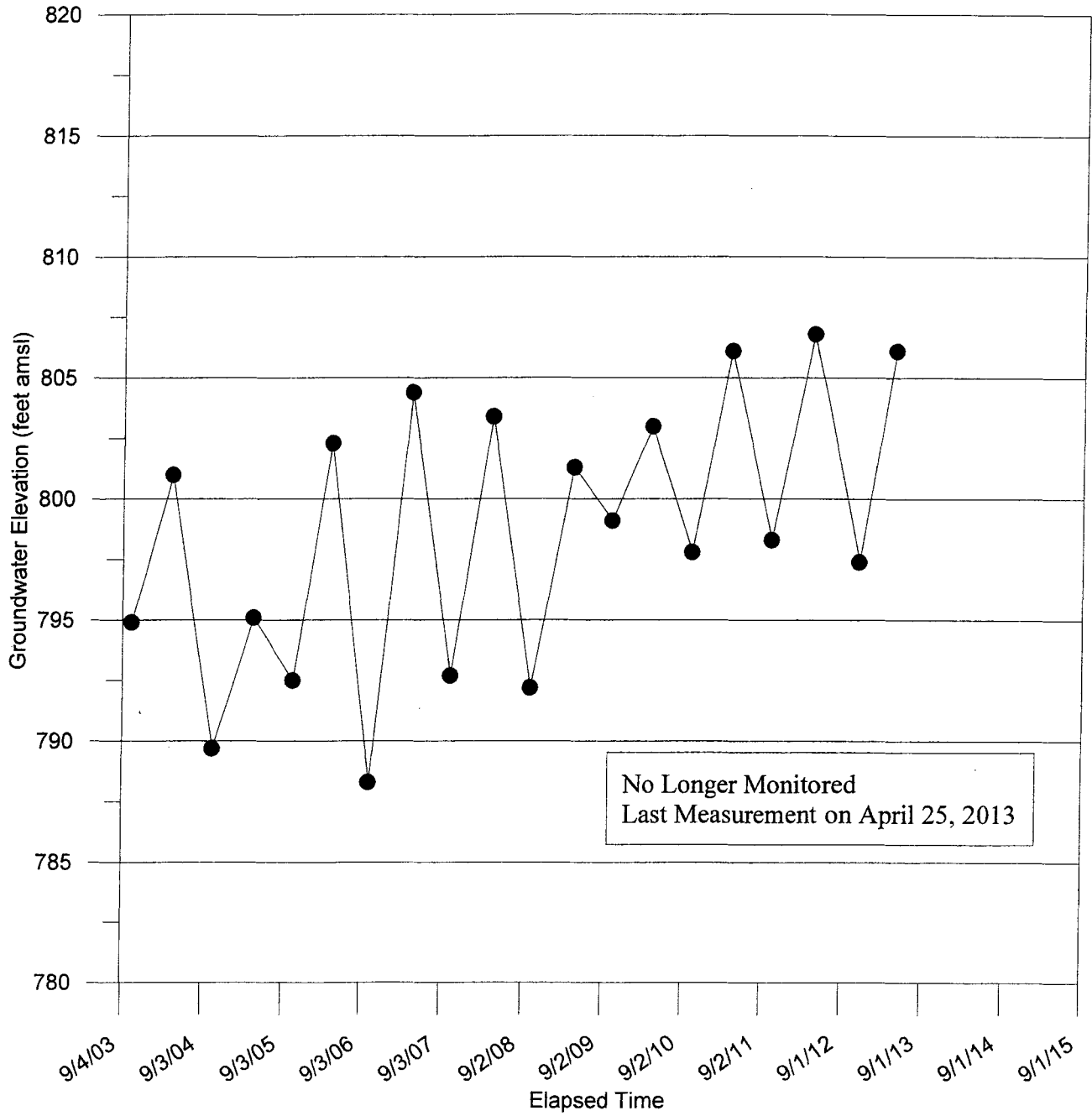
**Groundwater Elevations  
5271 Crittenden Road  
Akron, NY  
County Line Stone Co., Inc.**



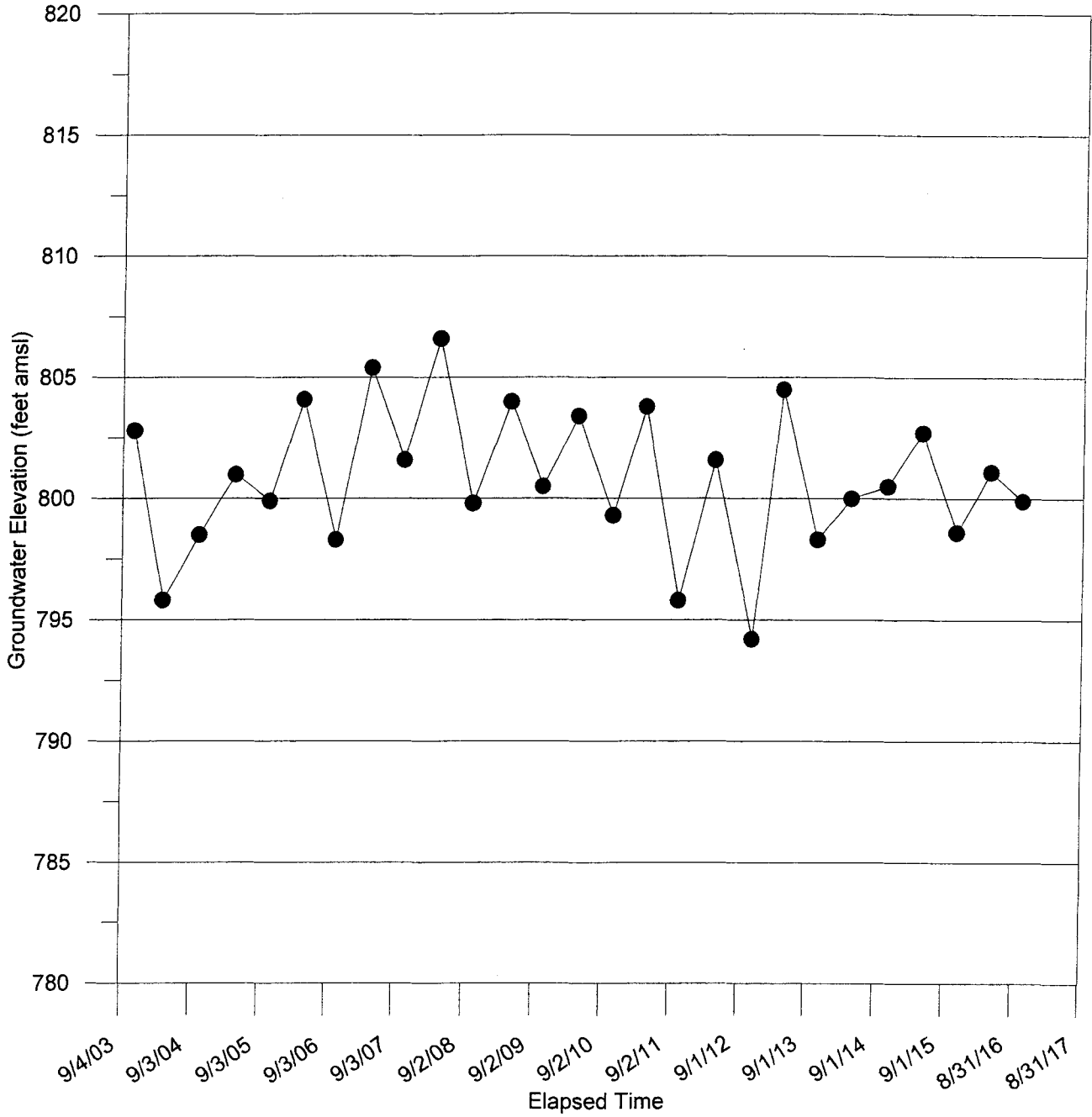
**Groundwater Elevations**  
**5271 Crittenden Road Barn**  
**Akron, NY**  
**County Line Stone Co., Inc.**



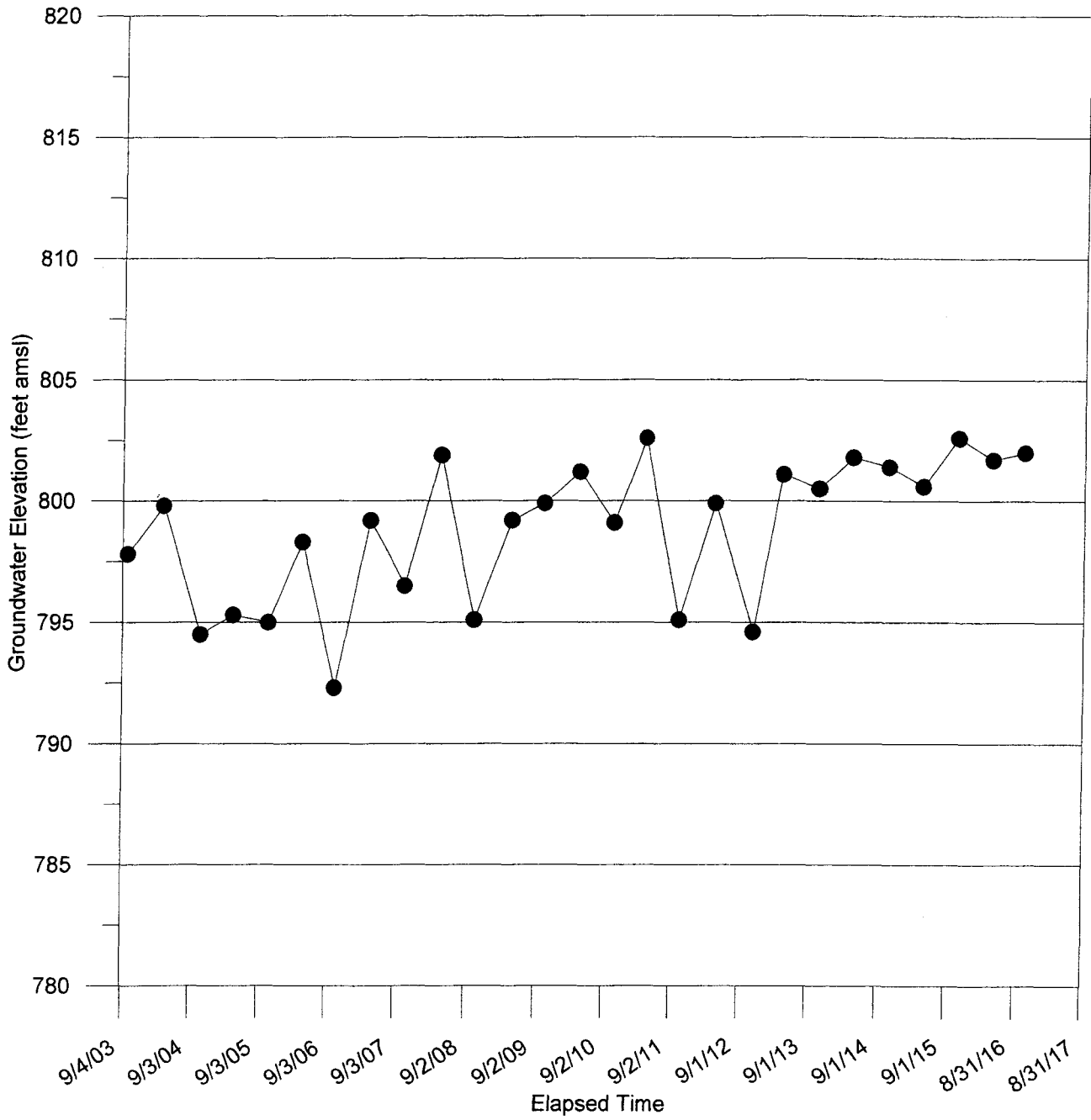
**Groundwater Elevations  
5220 Crittenden Road  
Alden, NY  
County Line Stone Co., Inc.**



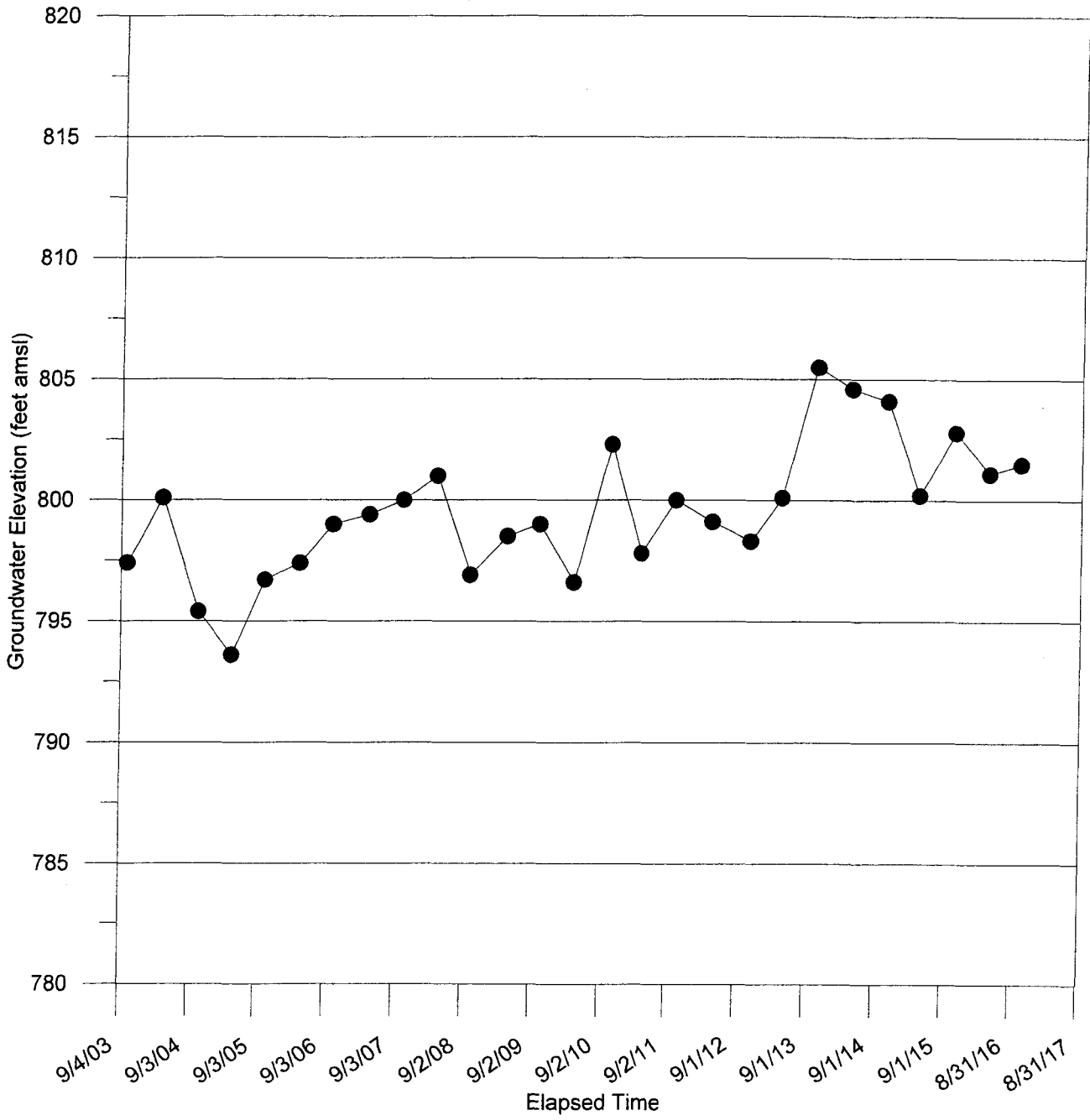
**Groundwater Elevations**  
**13385 Stage Road**  
**Akron, NY**  
**County Line Stone Co., Inc.**



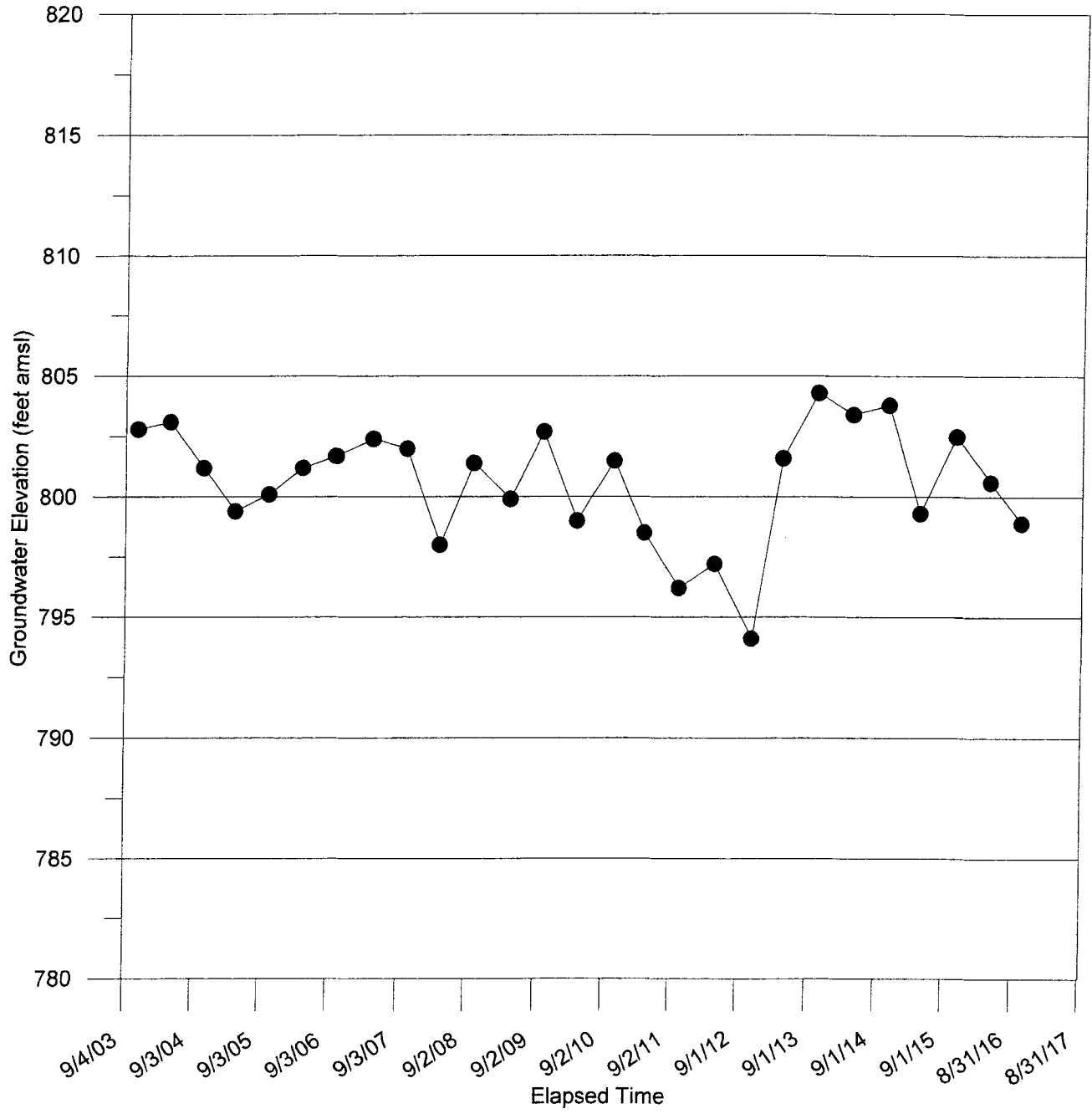
**Groundwater Elevations**  
**13356 Stage Road**  
**Akron, NY**  
**County Line Stone Co., Inc.**



**Groundwater Elevations  
5367 Crittenden Road  
Akron, NY  
County Line Stone Co., Inc.**

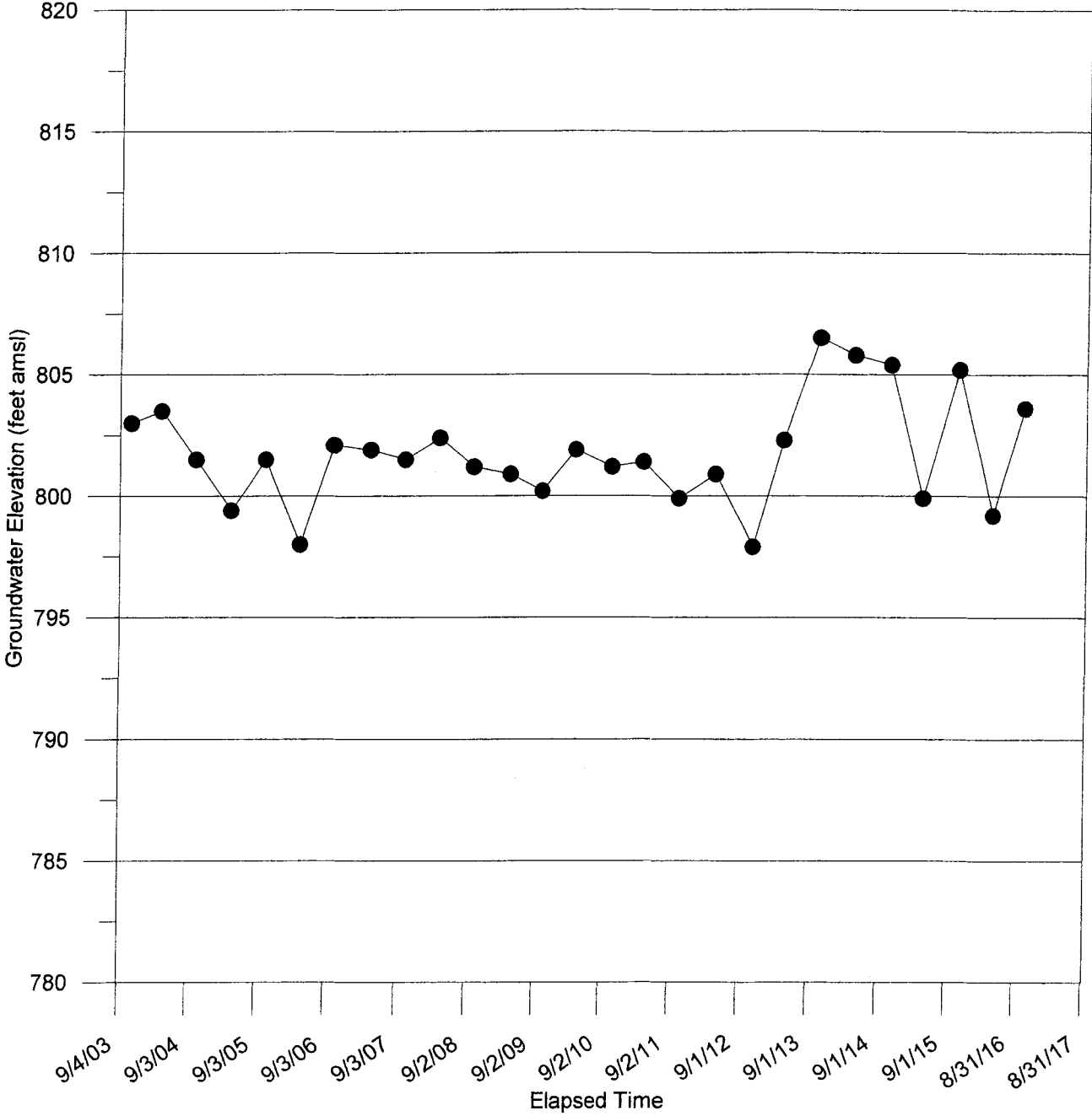


**Groundwater Elevations**  
**5360 Crittenden Road**  
**Akron, NY**  
**County Line Stone Co., Inc.**

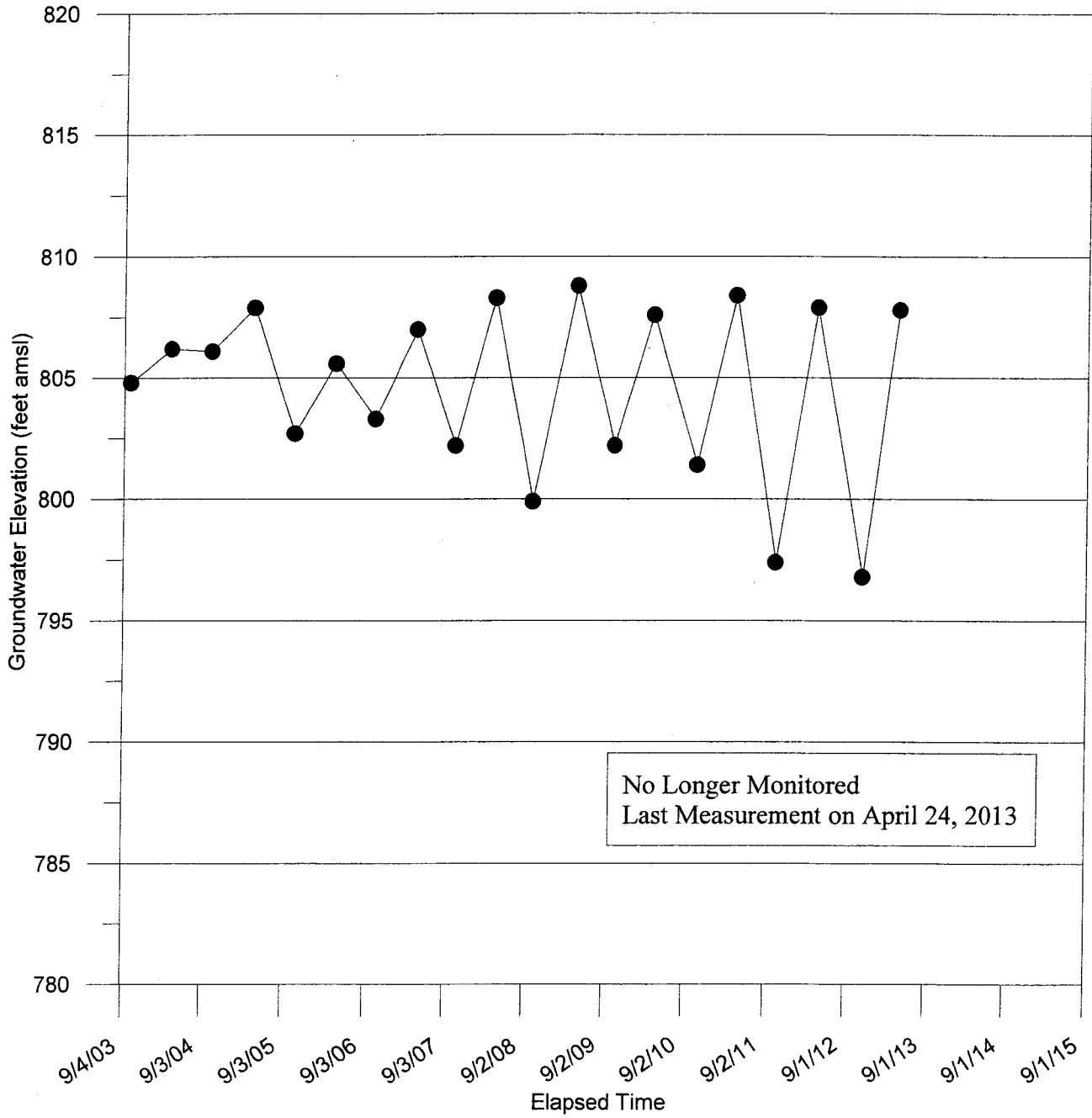




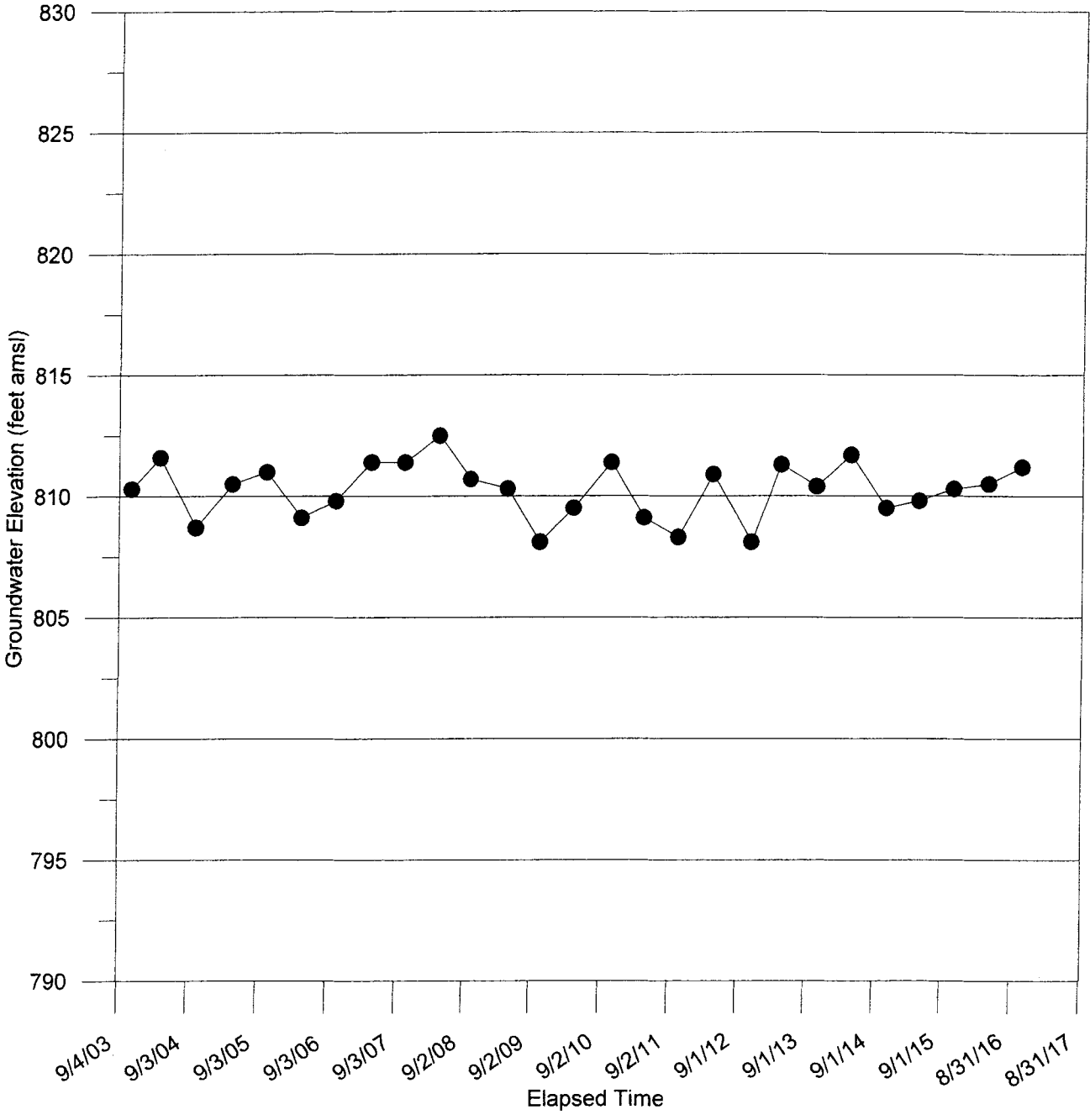
**Groundwater Elevations**  
**5404 Crittenden Road**  
**Akron, NY**  
**County Line Stone Co., Inc.**



**Groundwater Elevations  
13223 Main Road  
Alden, NY  
County Line Stone Co., Inc.**



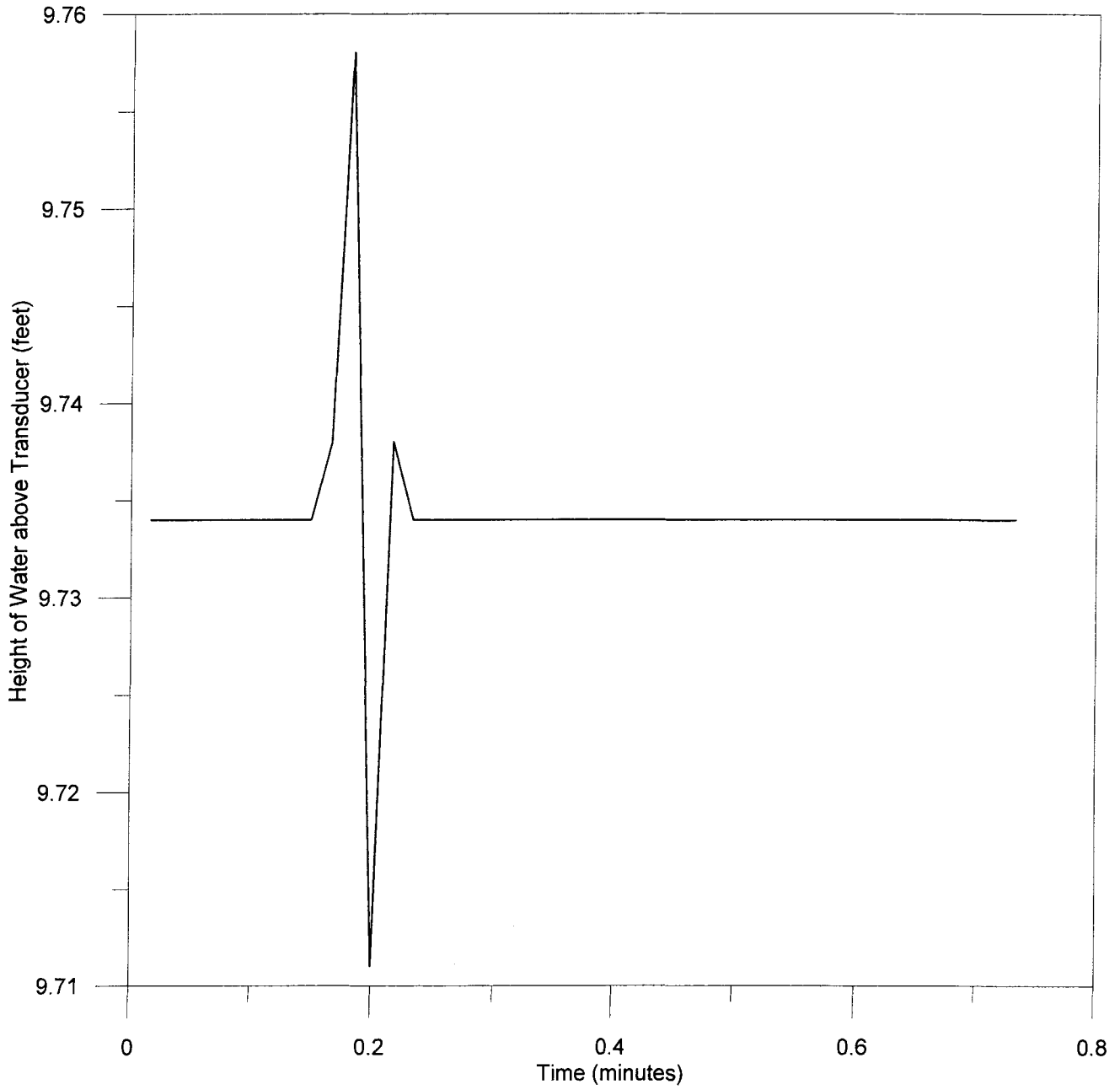
**Groundwater Elevations  
13177 Main Road  
Akron, NY  
County Line Stone Co., Inc.**



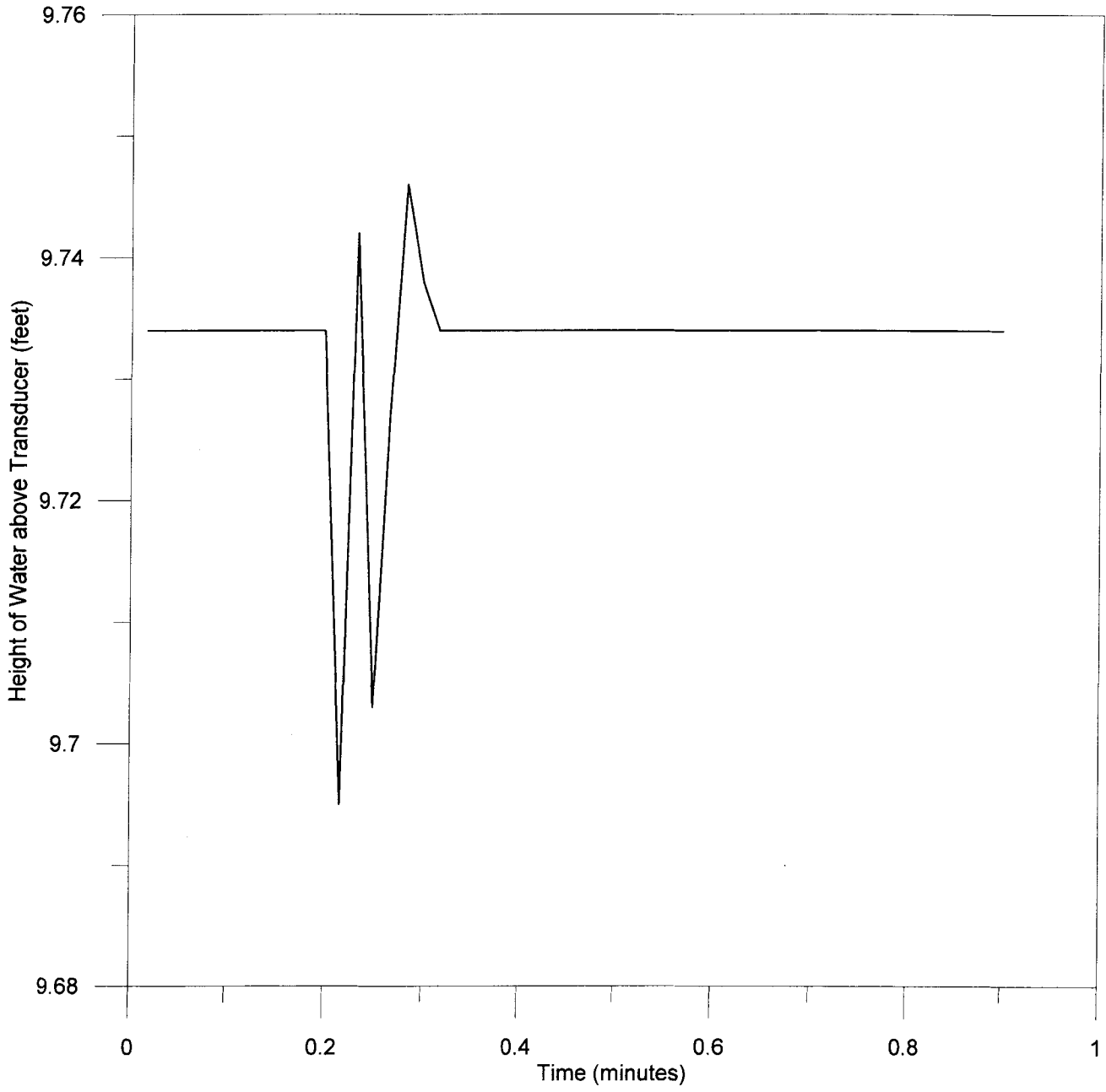
**ATTACHMENT A**

**Slug Test Water Level Change Plots**

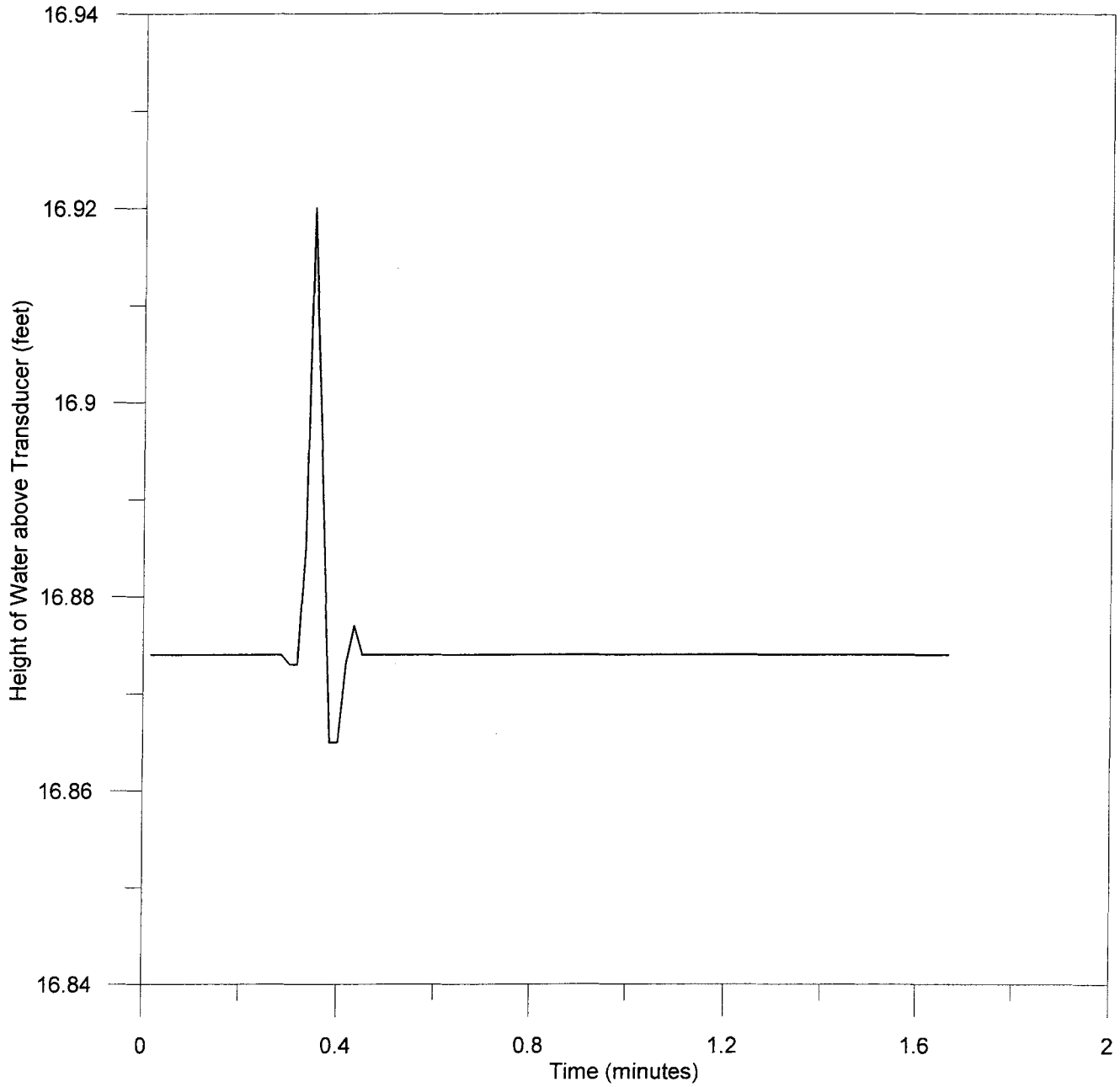
**Figure A-1**  
**Falling Head Slug Test 1 in 1-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**



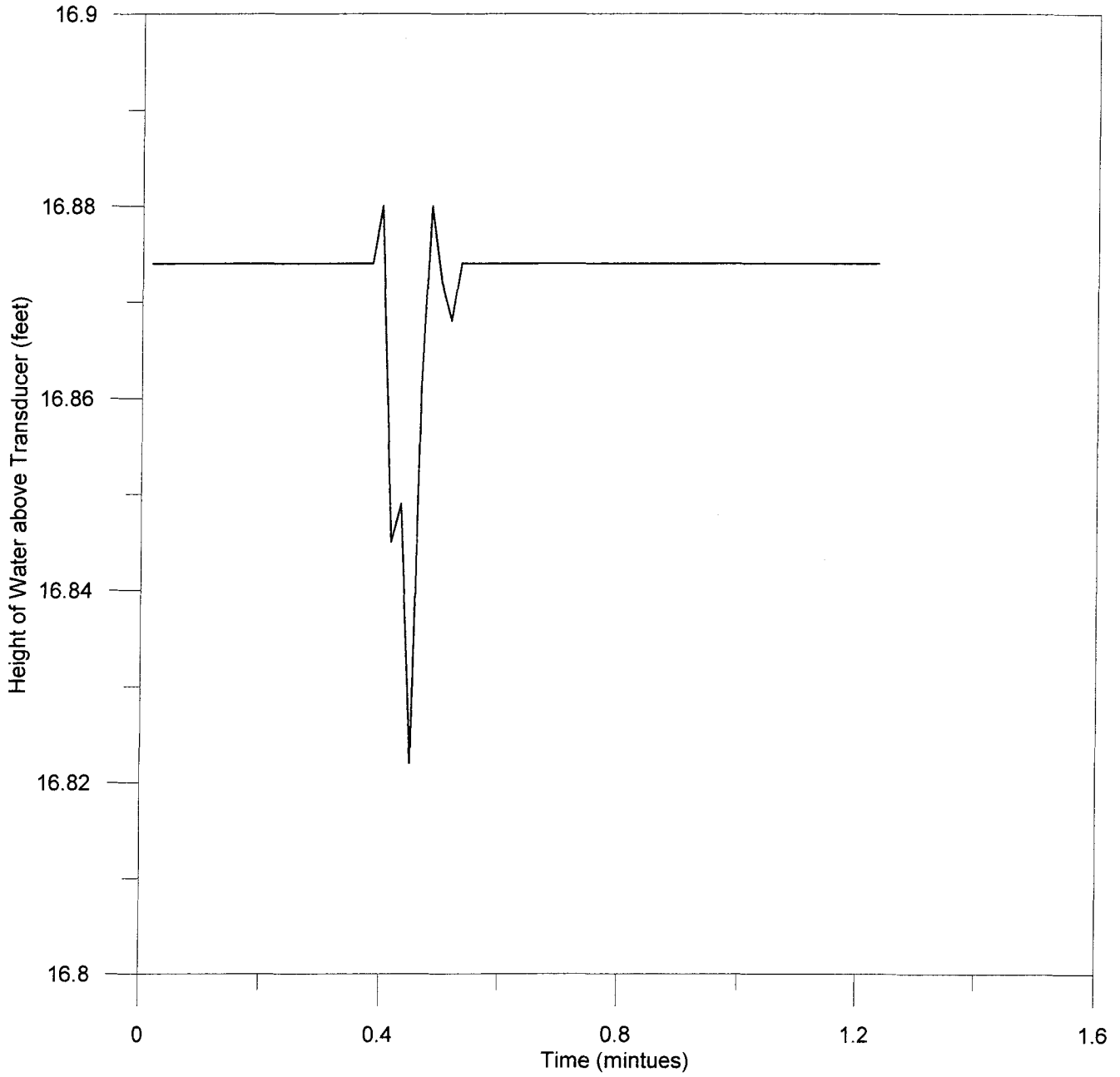
**Figure A-2**  
**Rising Head Slug Test 1 in 1-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**



**Figure A-3**  
**Falling Head Slug Test 2 in 1-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**

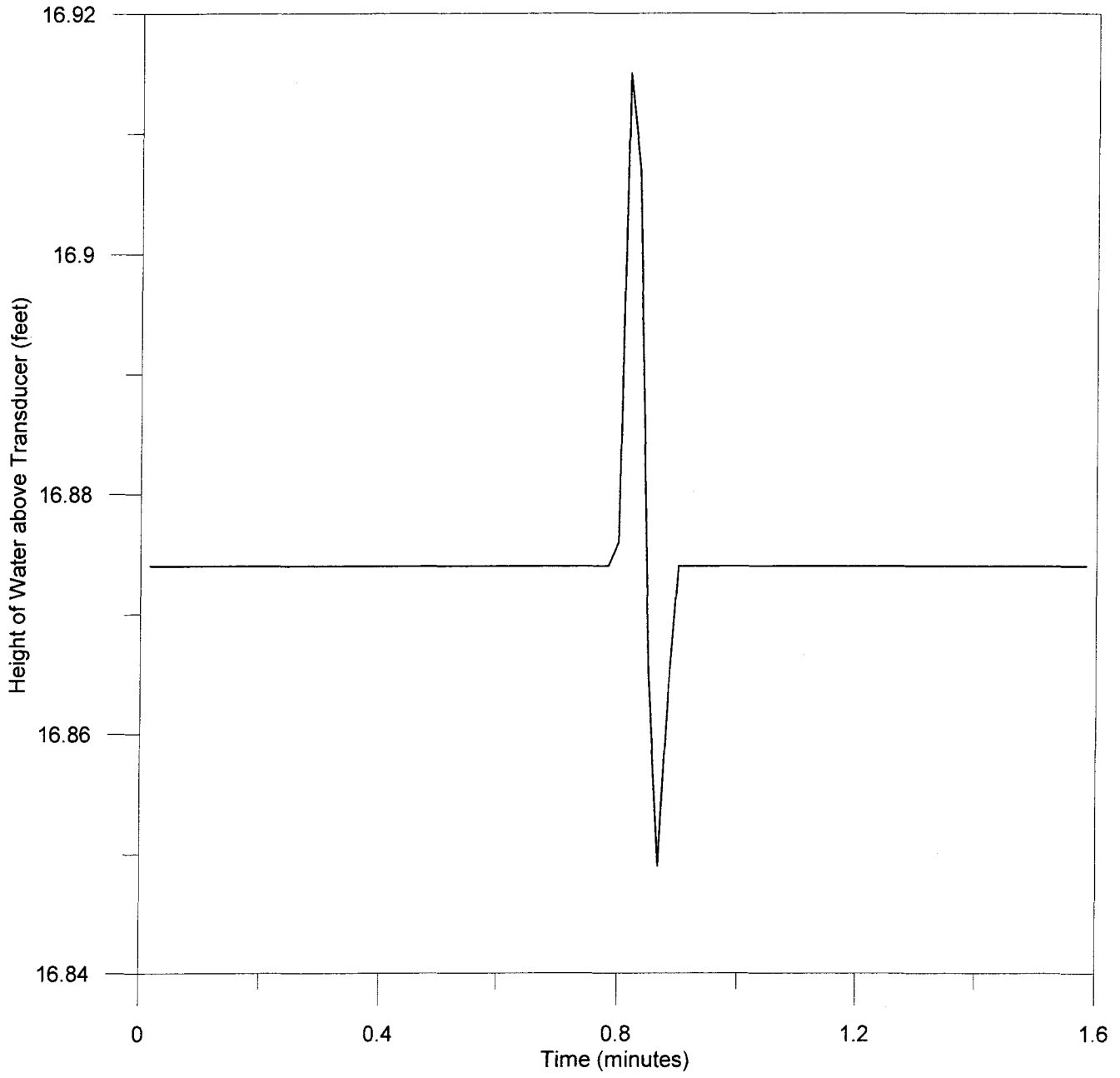


**Figure A-4**  
**Rising Head Slug Test 2 in 1-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**

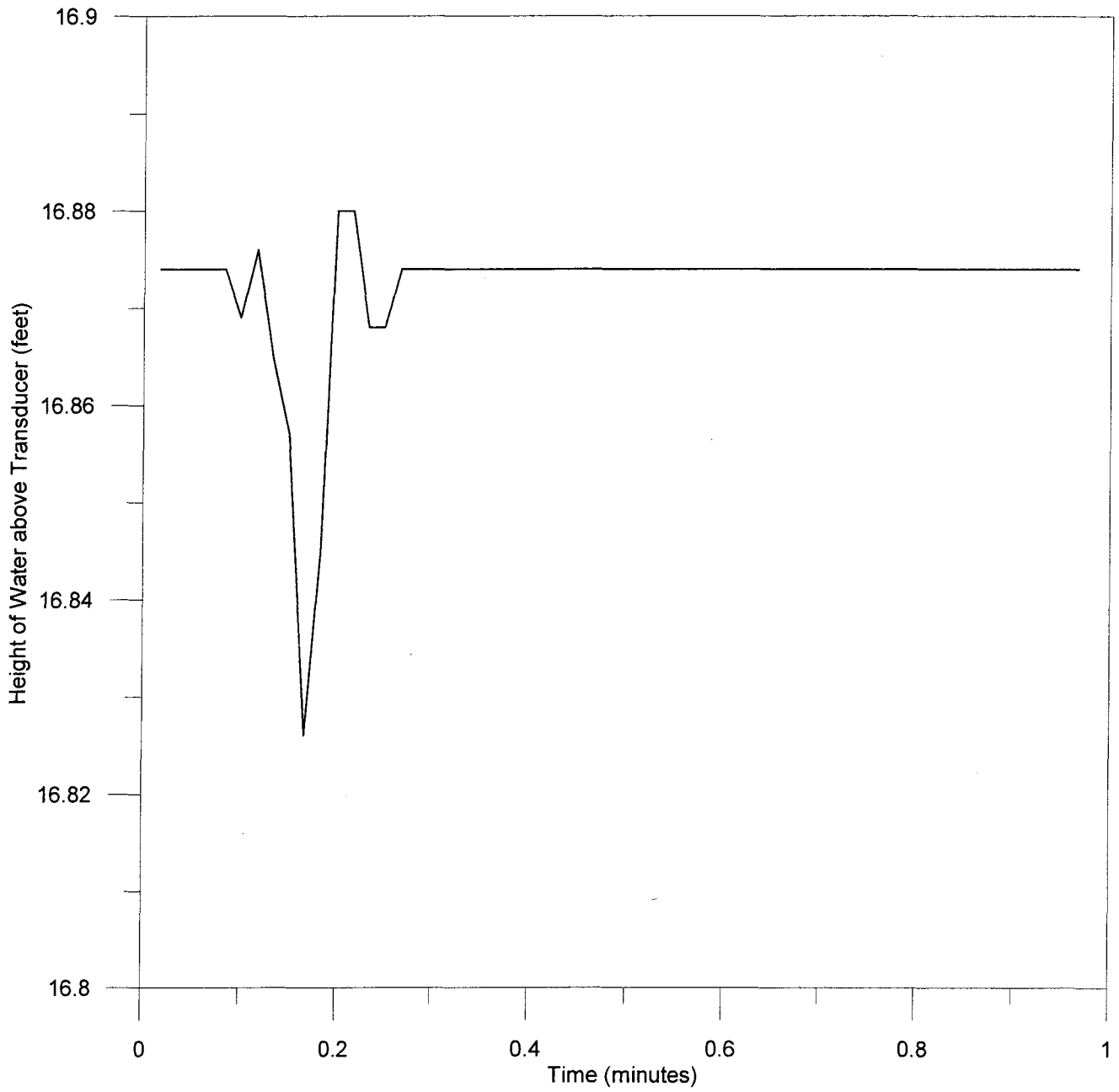




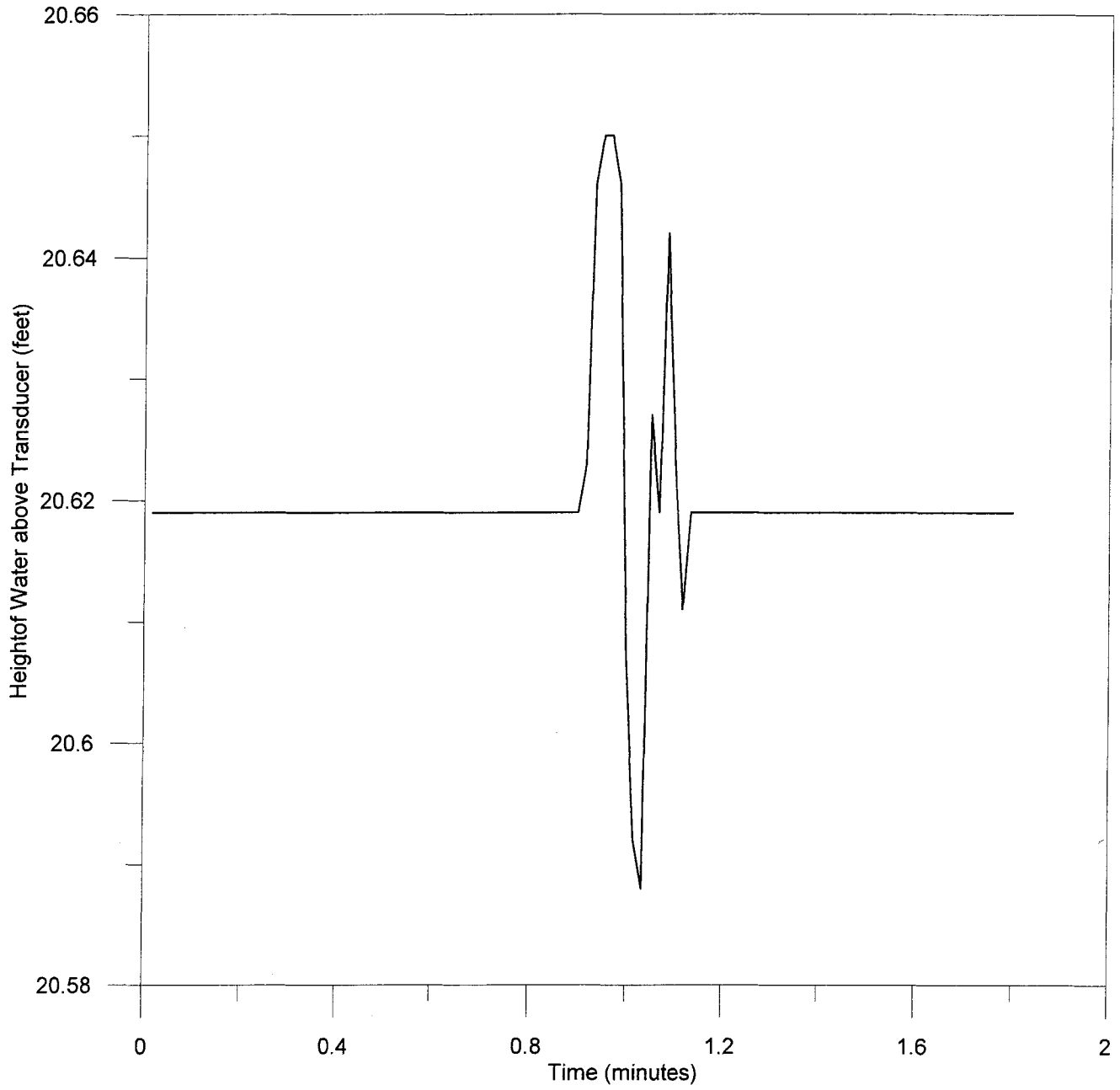
**Figure A-5**  
**Falling Head Slug Test 3 in 1-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**



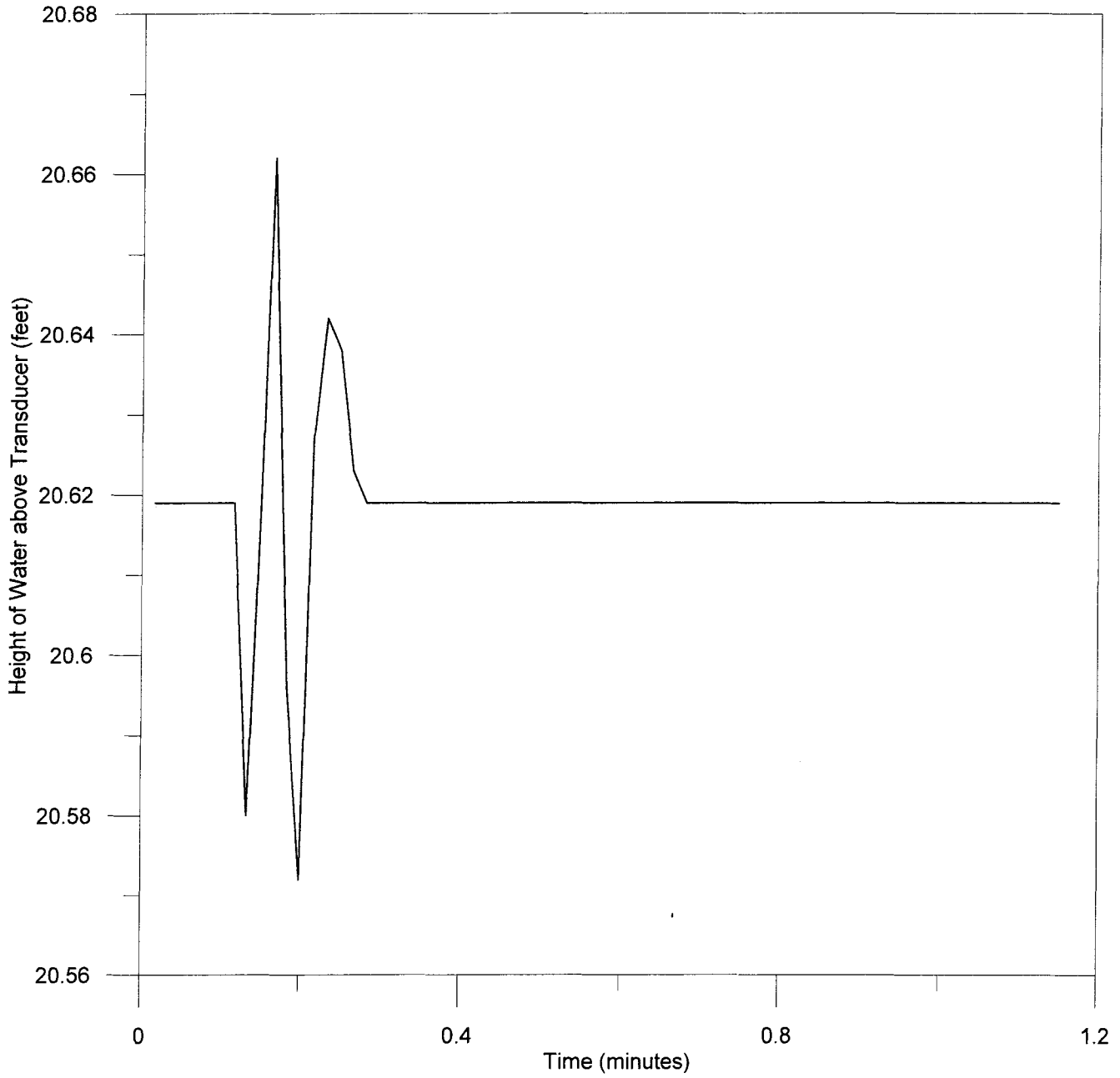
**Figure A-6**  
**Rising Head Slug Test 3 in 1-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**



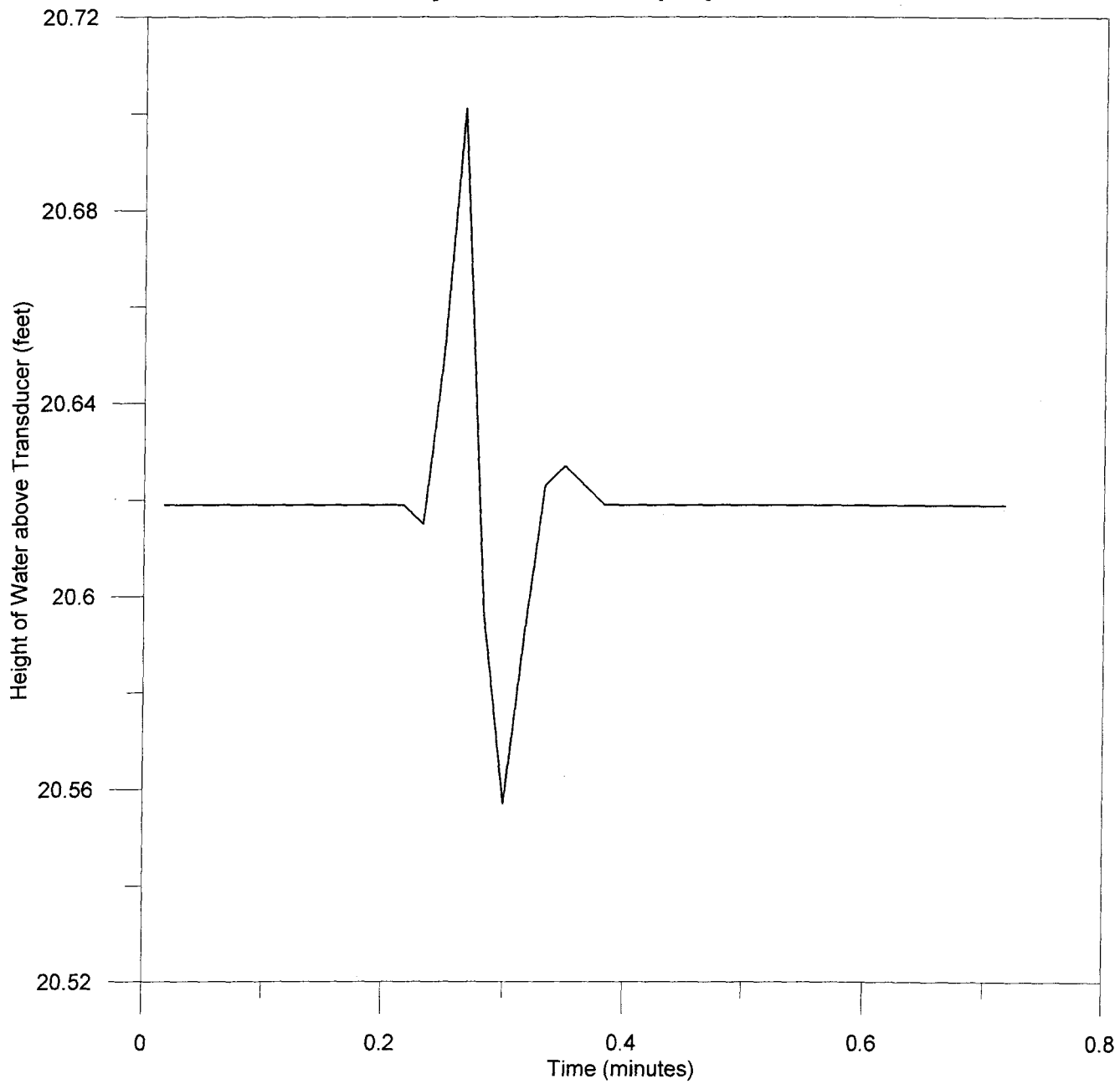
**Figure A-7**  
**Falling Head Slug Test 1 in 2-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**



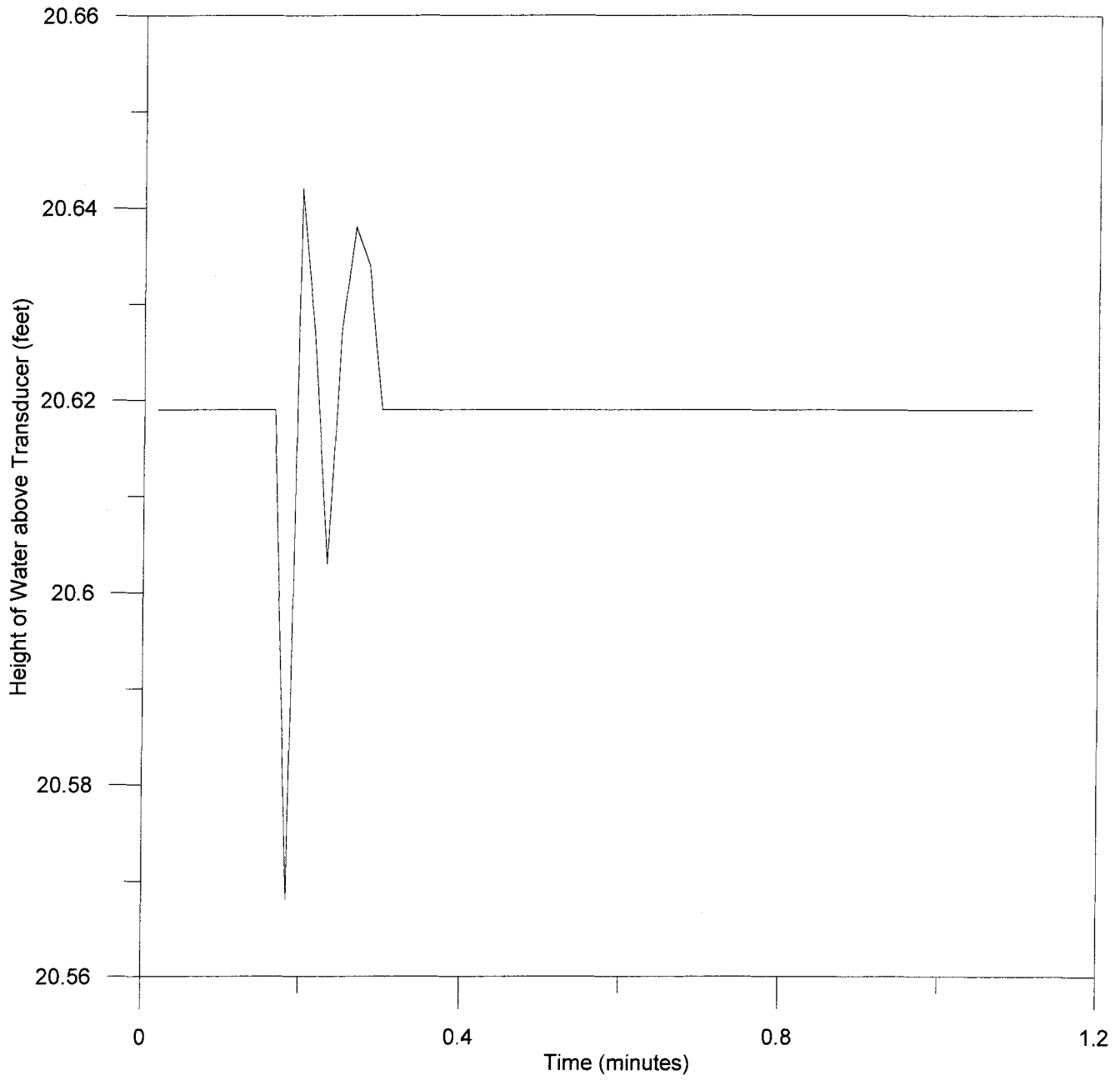
**Figure A-8**  
**Rising Head Slug Test 1 in 2-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**



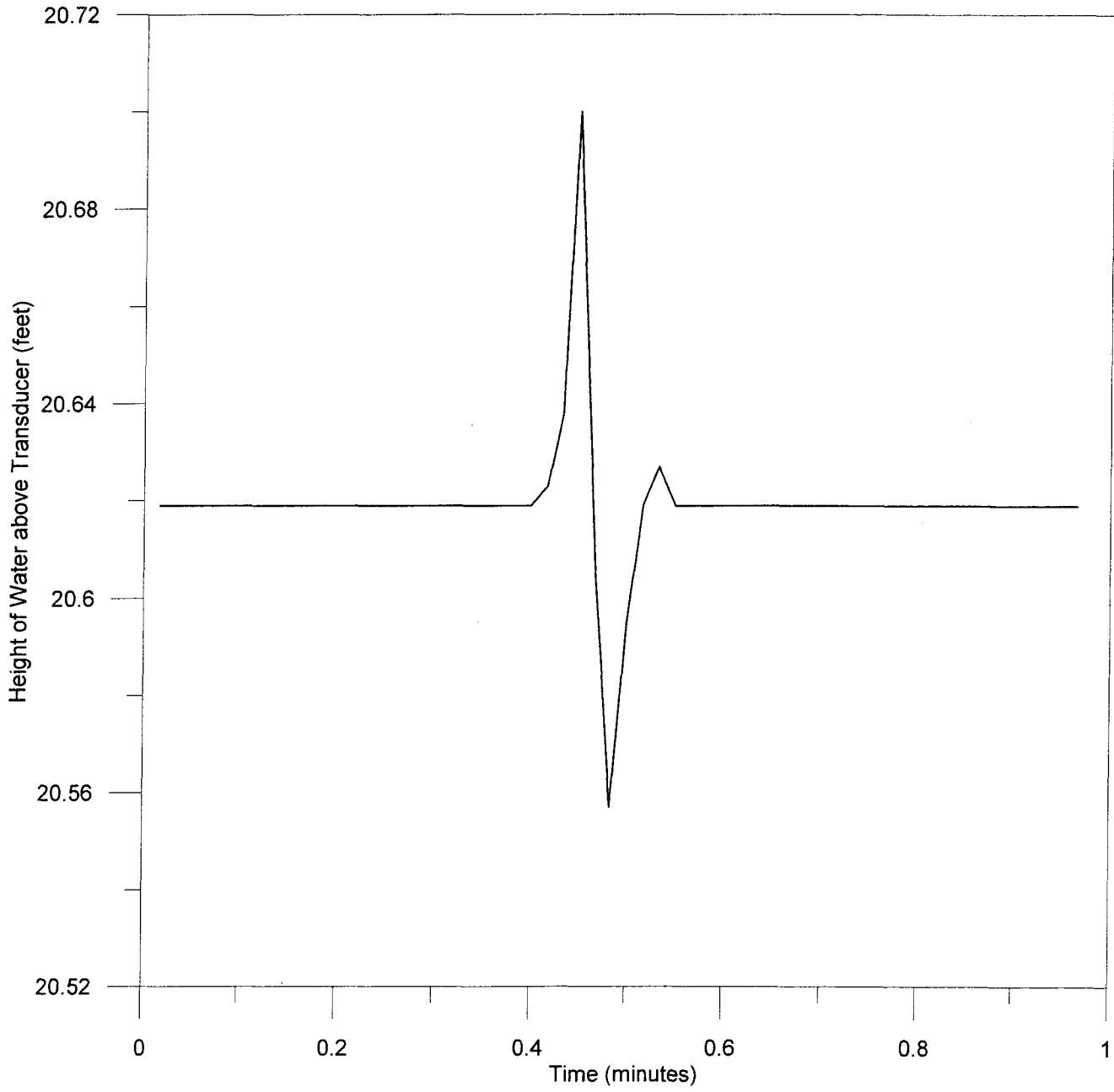
**Figure A-9**  
**Falling Head Slug Test 2 in 2-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**



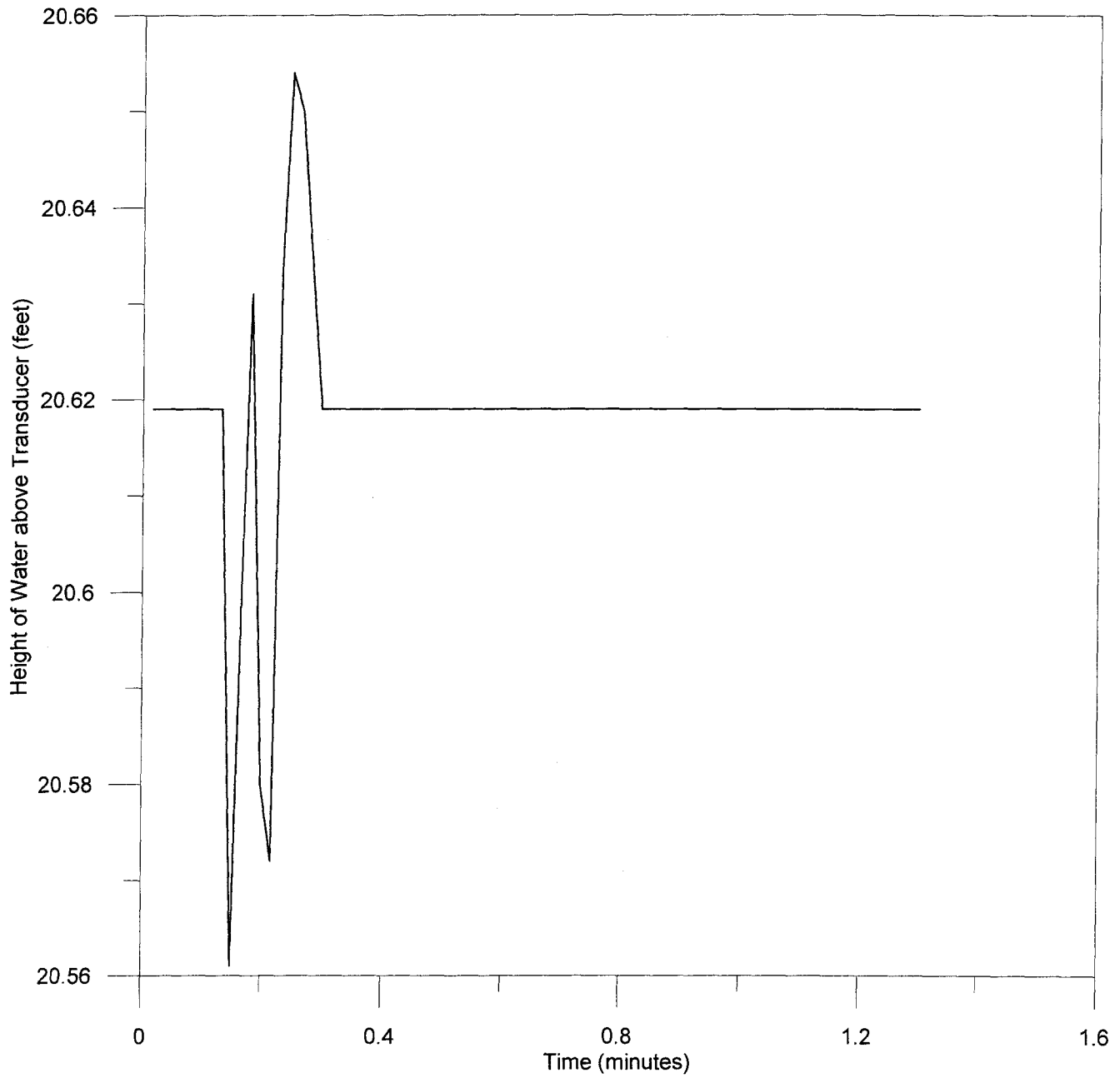
**Figure A-10**  
**Rising Head Slug Test 2 in 2-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**



**Figure A-11**  
**Falling Head Slug Test 3 in 2-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**



**Figure A-12**  
**Rising Head Slug Test 3 in 2-12 Corehole**  
**Akron Quarry**  
**County Line Stone Company, Inc.**





**ATTACHMENT B**

**Water Level Raw Data from Transducer**

**Table B-1**  
**Raw Data for Falling Head Slug Test 1 in Core Hole 1-12**

Sensor Type                   PT2X  
 Sensor Name                   aquistar  
 Session Name                 1-12Slug1  
 # Records                     44

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		9.711	9.6
Maximum		9.758	9.8
Mean		9.733	9.7
Variance		0	0.01
Std Deviation		0.0056	0.08
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 9:31:37	9.734	9.6
2	11/15/2012 9:31:39	9.734	9.6
3	11/15/2012 9:31:41	9.734	9.6
4	11/15/2012 9:31:43	9.734	9.6
5	11/15/2012 9:31:45	9.734	9.6
6	11/15/2012 9:31:47	9.734	9.6
7	11/15/2012 9:31:49	9.734	9.6
8	11/15/2012 9:31:51	9.734	9.6
9	11/15/2012 9:31:53	9.734	9.6
10	11/15/2012 9:31:55	9.738	9.6
11	11/15/2012 9:31:57	9.758	9.6
12	11/15/2012 9:31:59	9.711	9.6
13	11/15/2012 9:32:01	9.738	9.6
14	11/15/2012 9:32:03	9.734	9.6
15	11/15/2012 9:32:05	9.734	9.6
16	11/15/2012 9:32:07	9.734	9.7
17	11/15/2012 9:32:09	9.734	9.7
18	11/15/2012 9:32:11	9.734	9.7
19	11/15/2012 9:32:13	9.734	9.7
20	11/15/2012 9:32:15	9.734	9.7
21	11/15/2012 9:32:17	9.734	9.7
22	11/15/2012 9:32:19	9.734	9.7
23	11/15/2012 9:32:21	9.734	9.7
24	11/15/2012 9:32:23	9.734	9.7
25	11/15/2012 9:32:25	9.734	9.7
26	11/15/2012 9:32:27	9.734	9.7
27	11/15/2012 9:32:29	9.734	9.7
28	11/15/2012 9:32:31	9.734	9.7
29	11/15/2012 9:32:33	9.734	9.7
30	11/15/2012 9:32:35	9.734	9.8
31	11/15/2012 9:32:37	9.734	9.7

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 9:32:39	9.734	9.7
33	11/15/2012 9:32:41	9.734	9.7
34	11/15/2012 9:32:43	9.734	9.8
35	11/15/2012 9:32:45	9.734	9.8
36	11/15/2012 9:32:47	9.734	9.8
37	11/15/2012 9:32:49	9.734	9.8
38	11/15/2012 9:32:51	9.734	9.8
39	11/15/2012 9:32:53	9.734	9.8
40	11/15/2012 9:32:55	9.734	9.8
41	11/15/2012 9:32:57	9.734	9.8
42	11/15/2012 9:32:59	9.734	9.8
43	11/15/2012 9:33:01	9.734	9.8
44	11/15/2012 9:33:03	9.734	9.8

**Table B-2**  
**Raw Data for Rising Head Slug Test 1 in Core Hole 1-12**

**Sensor Type**                    **PT2X**  
**Sensor Name**                 **aquistar**  
**Session Name**               **11-12Slug2**  
**# Records**                    **54**

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		9.695	9.6
Maximum		9.746	9.8
Mean		9.73	9.7
Variance		0	0.01
Std Deviation		0.0069	0.09
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 9:36:32	9.734	9.6
2	11/15/2012 9:36:33	9.734	9.6
3	11/15/2012 9:36:34	9.734	9.6
4	11/15/2012 9:36:35	9.734	9.6
5	11/15/2012 9:36:36	9.734	9.6
6	11/15/2012 9:36:37	9.734	9.6
7	11/15/2012 9:36:38	9.734	9.6
8	11/15/2012 9:36:39	9.734	9.6
9	11/15/2012 9:36:40	9.734	9.6
10	11/15/2012 9:36:41	9.734	9.6
11	11/15/2012 9:36:42	9.734	9.6
12	11/15/2012 9:36:43	9.734	9.6
13	11/15/2012 9:36:44	9.695	9.6
14	11/15/2012 9:36:45	9.742	9.6
15	11/15/2012 9:36:46	9.703	9.6
16	11/15/2012 9:36:47	9.727	9.6
17	11/15/2012 9:36:48	9.746	9.6
18	11/15/2012 9:36:49	9.738	9.6
19	11/15/2012 9:36:50	9.734	9.7
20	11/15/2012 9:36:51	9.734	9.6
21	11/15/2012 9:36:52	9.734	9.7
22	11/15/2012 9:36:53	9.734	9.7
23	11/15/2012 9:36:54	9.734	9.7
24	11/15/2012 9:36:55	9.734	9.7
25	11/15/2012 9:36:56	9.734	9.7
26	11/15/2012 9:36:57	9.734	9.7
27	11/15/2012 9:36:58	9.734	9.7
28	11/15/2012 9:36:59	9.734	9.7
29	11/15/2012 9:37:00	9.734	9.7
30	11/15/2012 9:37:01	9.734	9.7
31	11/15/2012 9:37:02	9.734	9.7

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 9:37:03	9.734	9.7
33	11/15/2012 9:37:04	9.734	9.7
34	11/15/2012 9:37:05	9.734	9.8
35	11/15/2012 9:37:06	9.734	9.8
36	11/15/2012 9:37:07	9.734	9.8
37	11/15/2012 9:37:08	9.734	9.8
38	11/15/2012 9:37:09	9.734	9.8
39	11/15/2012 9:37:10	9.734	9.8
40	11/15/2012 9:37:11	9.734	9.8
41	11/15/2012 9:37:12	9.734	9.8
42	11/15/2012 9:37:13	9.734	9.8
43	11/15/2012 9:37:14	9.734	9.8
44	11/15/2012 9:37:15	9.734	9.8
45	11/15/2012 9:37:16	9.734	9.8
46	11/15/2012 9:37:17	9.734	9.8
47	11/15/2012 9:37:18	9.734	9.8
48	11/15/2012 9:37:19	9.734	9.8
49	11/15/2012 9:37:20	9.734	9.8
50	11/15/2012 9:37:21	9.734	9.8
51	11/15/2012 9:37:22	9.734	9.8
52	11/15/2012 9:37:23	9.734	9.8
53	11/15/2012 9:37:24	9.734	9.8
54	11/15/2012 9:37:25	9.734	9.8

**Table B-3**  
**Raw Data for Falling Head Slug Test 2 in Core Hole 1-12**

**Sensor Type**                    **PT2X**  
**Sensor Name**                 **aquistar**  
**Session Name**               **1-12Slug3**  
**# Records**                    **101**

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		16.865	9.7
Maximum		16.989	10.1
Mean		16.874	10
Variance		0.0002	0.02
Std Deviation		0.0128	0.12
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 9:44:55	16.874	9.7
2	11/15/2012 9:44:56	16.874	9.7
3	11/15/2012 9:44:57	16.874	9.7
4	11/15/2012 9:44:58	16.874	9.8
5	11/15/2012 9:44:59	16.874	9.8
6	11/15/2012 9:45:00	16.874	9.8
7	11/15/2012 9:45:01	16.874	9.8
8	11/15/2012 9:45:02	16.874	9.8
9	11/15/2012 9:45:03	16.874	9.8
10	11/15/2012 9:45:04	16.874	9.8
11	11/15/2012 9:45:05	16.874	9.8
12	11/15/2012 9:45:06	16.874	9.8
13	11/15/2012 9:45:07	16.874	9.8
14	11/15/2012 9:45:08	16.874	9.8
15	11/15/2012 9:45:09	16.874	9.8
16	11/15/2012 9:45:10	16.874	9.8
17	11/15/2012 9:45:11	16.874	9.8
18	11/15/2012 9:45:12	16.873	9.8
19	11/15/2012 9:45:13	16.873	9.8
20	11/15/2012 9:45:14	16.885	9.9
21	11/15/2012 9:45:15	16.92	9.9
22	11/15/2012 9:45:16	16.893	9.9
23	11/15/2012 9:45:17	16.865	9.9
24	11/15/2012 9:45:18	16.865	9.9
25	11/15/2012 9:45:19	16.873	9.9
26	11/15/2012 9:45:20	16.877	9.9
27	11/15/2012 9:45:21	16.874	9.9
28	11/15/2012 9:45:22	16.874	9.9
29	11/15/2012 9:45:23	16.874	9.9
30	11/15/2012 9:45:24	16.874	9.9
31	11/15/2012 9:45:25	16.874	9.9

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 9:45:26	16.874	9.9
33	11/15/2012 9:45:27	16.874	9.9
34	11/15/2012 9:45:28	16.874	9.9
35	11/15/2012 9:45:29	16.874	9.9
36	11/15/2012 9:45:30	16.874	9.9
37	11/15/2012 9:45:31	16.874	9.9
38	11/15/2012 9:45:32	16.874	9.9
39	11/15/2012 9:45:33	16.874	9.9
40	11/15/2012 9:45:34	16.874	9.9
41	11/15/2012 9:45:35	16.874	9.9
42	11/15/2012 9:45:36	16.874	9.9
43	11/15/2012 9:45:37	16.874	9.9
44	11/15/2012 9:45:38	16.874	9.9
45	11/15/2012 9:45:39	16.874	9.9
46	11/15/2012 9:45:40	16.874	9.9
47	11/15/2012 9:45:41	16.874	9.9
48	11/15/2012 9:45:42	16.874	10
49	11/15/2012 9:45:43	16.874	10
50	11/15/2012 9:45:44	16.874	10
51	11/15/2012 9:45:45	16.874	10
52	11/15/2012 9:45:46	16.874	10
53	11/15/2012 9:45:47	16.874	10
54	11/15/2012 9:45:48	16.874	10
55	11/15/2012 9:45:49	16.874	10
56	11/15/2012 9:45:50	16.874	10
57	11/15/2012 9:45:51	16.874	10
58	11/15/2012 9:45:52	16.874	10
59	11/15/2012 9:45:53	16.874	10.1
60	11/15/2012 9:45:54	16.874	10
61	11/15/2012 9:45:55	16.874	10
62	11/15/2012 9:45:56	16.874	10.1
63	11/15/2012 9:45:57	16.874	10
64	11/15/2012 9:45:58	16.874	10
65	11/15/2012 9:45:59	16.874	10.1
66	11/15/2012 9:46:00	16.874	10.1
67	11/15/2012 9:46:01	16.874	10.1
68	11/15/2012 9:46:02	16.874	10.1
69	11/15/2012 9:46:03	16.874	10
70	11/15/2012 9:46:04	16.874	10.1
71	11/15/2012 9:46:05	16.874	10.1
72	11/15/2012 9:46:06	16.874	10.1
73	11/15/2012 9:46:07	16.874	10.1
74	11/15/2012 9:46:08	16.874	10.1
75	11/15/2012 9:46:09	16.874	10.1
76	11/15/2012 9:46:10	16.874	10.1
77	11/15/2012 9:46:11	16.874	10.1

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
78	11/15/2012 9:46:12	16.874	10.1
79	11/15/2012 9:46:13	16.874	10.1
80	11/15/2012 9:46:14	16.874	10.1
81	11/15/2012 9:46:15	16.874	10.1
82	11/15/2012 9:46:16	16.874	10.1
83	11/15/2012 9:46:17	16.874	10.1
84	11/15/2012 9:46:18	16.874	10.1
85	11/15/2012 9:46:19	16.874	10.1
86	11/15/2012 9:46:20	16.874	10.1
87	11/15/2012 9:46:21	16.874	10.1
88	11/15/2012 9:46:22	16.874	10.1
89	11/15/2012 9:46:23	16.874	10.1
90	11/15/2012 9:46:24	16.874	10.1
91	11/15/2012 9:46:25	16.874	10.1
92	11/15/2012 9:46:26	16.874	10.1
93	11/15/2012 9:46:27	16.874	10.1
94	11/15/2012 9:46:28	16.874	10.1
95	11/15/2012 9:46:29	16.874	10.1
96	11/15/2012 9:46:30	16.874	10.1
97	11/15/2012 9:46:31	16.874	10.1
98	11/15/2012 9:46:32	16.874	10.1
99	11/15/2012 9:46:33	16.874	10.1
100	11/15/2012 9:46:34	16.874	10.1
101	11/15/2012 9:46:35	16.874	10.1



**Table B-4**  
**Raw Data for Rising Head Slug Test 2 in Core Hole 1-12**

Sensor Type                   PT2X  
 Sensor Name                 aquistar  
 Session Name                1-12Slug4  
 # Records                    74

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		16.822	10.1
Maximum		16.88	10.2
Mean		16.87	10.1
Variance		0.0001	0.01
Std Deviation		0.0074	0.07
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 9:50:20	16.874	10.1
2	11/15/2012 9:50:21	16.874	10.1
3	11/15/2012 9:50:22	16.874	10.1
4	11/15/2012 9:50:23	16.874	10.1
5	11/15/2012 9:50:24	16.874	10.1
6	11/15/2012 9:50:25	16.874	10.1
7	11/15/2012 9:50:26	16.874	10.1
8	11/15/2012 9:50:27	16.874	10.1
9	11/15/2012 9:50:28	16.874	10.1
10	11/15/2012 9:50:29	16.874	10.1
11	11/15/2012 9:50:30	16.874	10.1
12	11/15/2012 9:50:31	16.874	10.1
13	11/15/2012 9:50:32	16.874	10.1
14	11/15/2012 9:50:33	16.874	10.1
15	11/15/2012 9:50:34	16.874	10.1
16	11/15/2012 9:50:35	16.874	10.1
17	11/15/2012 9:50:36	16.874	10.1
18	11/15/2012 9:50:37	16.874	10.1
19	11/15/2012 9:50:38	16.874	10.1
20	11/15/2012 9:50:39	16.874	10.1
21	11/15/2012 9:50:40	16.874	10.1
22	11/15/2012 9:50:41	16.874	10.1
23	11/15/2012 9:50:42	16.874	10.1
24	11/15/2012 9:50:43	16.88	10.1
25	11/15/2012 9:50:44	16.845	10.1
26	11/15/2012 9:50:45	16.849	10.1
27	11/15/2012 9:50:46	16.822	10.1
28	11/15/2012 9:50:47	16.861	10.1
29	11/15/2012 9:50:48	16.88	10.1
30	11/15/2012 9:50:49	16.872	10.1
31	11/15/2012 9:50:50	16.868	10.1

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 9:50:51	16.874	10.1
33	11/15/2012 9:50:52	16.874	10.1
34	11/15/2012 9:50:53	16.874	10.1
35	11/15/2012 9:50:54	16.874	10.2
36	11/15/2012 9:50:55	16.874	10.1
37	11/15/2012 9:50:56	16.874	10.2
38	11/15/2012 9:50:57	16.874	10.1
39	11/15/2012 9:50:58	16.874	10.2
40	11/15/2012 9:50:59	16.874	10.2
41	11/15/2012 9:51:00	16.874	10.2
42	11/15/2012 9:51:01	16.874	10.2
43	11/15/2012 9:51:02	16.874	10.2
44	11/15/2012 9:51:03	16.874	10.2
45	11/15/2012 9:51:04	16.874	10.2
46	11/15/2012 9:51:05	16.874	10.2
47	11/15/2012 9:51:06	16.874	10.2
48	11/15/2012 9:51:07	16.874	10.2
49	11/15/2012 9:51:08	16.874	10.2
50	11/15/2012 9:51:09	16.874	10.2
51	11/15/2012 9:51:10	16.874	10.2
52	11/15/2012 9:51:11	16.874	10.2
53	11/15/2012 9:51:12	16.874	10.2
54	11/15/2012 9:51:13	16.874	10.2
55	11/15/2012 9:51:14	16.874	10.2
56	11/15/2012 9:51:15	16.874	10.2
57	11/15/2012 9:51:16	16.874	10.2
58	11/15/2012 9:51:17	16.874	10.2
59	11/15/2012 9:51:18	16.874	10.2
60	11/15/2012 9:51:19	16.874	10.2
61	11/15/2012 9:51:20	16.874	10.2
62	11/15/2012 9:51:21	16.874	10.2
63	11/15/2012 9:51:22	16.874	10.2
64	11/15/2012 9:51:23	16.874	10.2
65	11/15/2012 9:51:24	16.874	10.2
66	11/15/2012 9:51:25	16.874	10.2
67	11/15/2012 9:51:26	16.874	10.2
68	11/15/2012 9:51:27	16.874	10.2
69	11/15/2012 9:51:28	16.874	10.2
70	11/15/2012 9:51:29	16.874	10.2
71	11/15/2012 9:51:30	16.874	10.2
72	11/15/2012 9:51:31	16.874	10.2
73	11/15/2012 9:51:32	16.874	10.2
74	11/15/2012 9:51:33	16.874	10.2

**Table B-5**  
**Raw Data for Falling Head Slug Test 3 in Core Hole 1-12**

**Sensor Type**                    **PT2X**  
**Sensor Name**                 **aquistar**  
**Session Name**               **1-12Slug5a**  
**# Records**                    **95**

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		16.849	9.9
Maximum		16.915	10.2
Mean		16.873	10.1
Variance		0	0.01
Std Deviation		0.0068	0.1
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 9:55:57	16.874	9.9
2	11/15/2012 9:55:58	16.874	9.9
3	11/15/2012 9:55:59	16.874	9.9
4	11/15/2012 9:56:00	16.874	9.9
5	11/15/2012 9:56:01	16.874	9.9
6	11/15/2012 9:56:02	16.874	9.9
7	11/15/2012 9:56:03	16.874	9.9
8	11/15/2012 9:56:04	16.874	9.9
9	11/15/2012 9:56:05	16.874	9.9
10	11/15/2012 9:56:06	16.874	9.9
11	11/15/2012 9:56:07	16.874	9.9
12	11/15/2012 9:56:08	16.874	9.9
13	11/15/2012 9:56:09	16.874	9.9
14	11/15/2012 9:56:10	16.874	9.9
15	11/15/2012 9:56:11	16.874	9.9
16	11/15/2012 9:56:12	16.874	10
17	11/15/2012 9:56:13	16.874	10
18	11/15/2012 9:56:14	16.874	10
19	11/15/2012 9:56:15	16.874	10
20	11/15/2012 9:56:16	16.874	10
21	11/15/2012 9:56:17	16.874	10
22	11/15/2012 9:56:18	16.874	10
23	11/15/2012 9:56:19	16.874	10
24	11/15/2012 9:56:20	16.874	10
25	11/15/2012 9:56:21	16.874	10
26	11/15/2012 9:56:22	16.874	10
27	11/15/2012 9:56:23	16.874	10
28	11/15/2012 9:56:24	16.874	10
29	11/15/2012 9:56:25	16.874	10
30	11/15/2012 9:56:26	16.874	10
31	11/15/2012 9:56:27	16.874	10.1

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 9:56:28	16.874	10.1
33	11/15/2012 9:56:29	16.874	10
34	11/15/2012 9:56:30	16.874	10.1
35	11/15/2012 9:56:31	16.874	10
36	11/15/2012 9:56:32	16.874	10
37	11/15/2012 9:56:33	16.874	10.1
38	11/15/2012 9:56:34	16.874	10.1
39	11/15/2012 9:56:35	16.874	10.1
40	11/15/2012 9:56:36	16.874	10.1
41	11/15/2012 9:56:37	16.874	10.1
42	11/15/2012 9:56:38	16.874	10.1
43	11/15/2012 9:56:39	16.874	10.1
44	11/15/2012 9:56:40	16.874	10.1
45	11/15/2012 9:56:41	16.874	10.1
46	11/15/2012 9:56:42	16.874	10.1
47	11/15/2012 9:56:43	16.874	10.1
48	11/15/2012 9:56:44	16.876	10.1
49	11/15/2012 9:56:45	16.915	10.1
50	11/15/2012 9:56:46	16.907	10.1
51	11/15/2012 9:56:47	16.865	10.1
52	11/15/2012 9:56:48	16.849	10.1
53	11/15/2012 9:56:49	16.864	10.1
54	11/15/2012 9:56:50	16.874	10.1
55	11/15/2012 9:56:51	16.874	10.1
56	11/15/2012 9:56:52	16.874	10.1
57	11/15/2012 9:56:53	16.874	10.1
58	11/15/2012 9:56:54	16.874	10.1
59	11/15/2012 9:56:55	16.874	10.1
60	11/15/2012 9:56:56	16.874	10.1
61	11/15/2012 9:56:57	16.874	10.1
62	11/15/2012 9:56:58	16.874	10.1
63	11/15/2012 9:56:59	16.874	10.1
64	11/15/2012 9:57:00	16.874	10.1
65	11/15/2012 9:57:01	16.874	10.1
66	11/15/2012 9:57:02	16.874	10.1
67	11/15/2012 9:57:03	16.874	10.1
68	11/15/2012 9:57:04	16.874	10.1
69	11/15/2012 9:57:05	16.874	10.1
70	11/15/2012 9:57:06	16.874	10.1
71	11/15/2012 9:57:07	16.874	10.1
72	11/15/2012 9:57:08	16.874	10.1
73	11/15/2012 9:57:09	16.874	10.1
74	11/15/2012 9:57:10	16.874	10.1
75	11/15/2012 9:57:11	16.874	10.1
76	11/15/2012 9:57:12	16.874	10.1
77	11/15/2012 9:57:13	16.874	10.1

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
78	11/15/2012 9:57:14	16.874	10.1
79	11/15/2012 9:57:15	16.874	10.1
80	11/15/2012 9:57:16	16.874	10.1
81	11/15/2012 9:57:17	16.874	10.1
82	11/15/2012 9:57:18	16.874	10.1
83	11/15/2012 9:57:19	16.874	10.1
84	11/15/2012 9:57:20	16.874	10.2
85	11/15/2012 9:57:21	16.874	10.1
86	11/15/2012 9:57:22	16.874	10.2
87	11/15/2012 9:57:23	16.874	10.2
88	11/15/2012 9:57:24	16.874	10.2
89	11/15/2012 9:57:25	16.874	10.1
90	11/15/2012 9:57:26	16.874	10.2
91	11/15/2012 9:57:27	16.874	10.2
92	11/15/2012 9:57:28	16.874	10.2
93	11/15/2012 9:57:29	16.874	10.2
94	11/15/2012 9:57:30	16.874	10.2
95	11/15/2012 9:57:31	16.874	10.2

**Table B-6**  
**Raw Data for Rising Head Slug Test 3 in Core Hole 1-12**

**Sensor Type**                      **PT2X**  
**Sensor Name**                      **aquistar**  
**Session Name**                      **1-12Slug6**  
**# Records**                              **63**

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
	<b>Sensor Range</b>	50 psig	-40 - +125 degC
	<b>Minimum</b>	16.826	10
	<b>Maximum</b>	16.895	10.2
	<b>Mean</b>	16.871	10.1
	<b>Variance</b>	0.0001	0
	<b>Std Deviation</b>	0.008	0.07
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 9:59:20	16.874	10
2	11/15/2012 9:59:21	16.874	10.1
3	11/15/2012 9:59:22	16.874	10.1
4	11/15/2012 9:59:23	16.874	10.1
5	11/15/2012 9:59:24	16.874	10.1
6	11/15/2012 9:59:25	16.869	10.1
7	11/15/2012 9:59:26	16.876	10.1
8	11/15/2012 9:59:27	16.865	10.1
9	11/15/2012 9:59:28	16.857	10.1
10	11/15/2012 9:59:29	16.826	10.1
11	11/15/2012 9:59:30	16.845	10.1
12	11/15/2012 9:59:31	16.88	10.1
13	11/15/2012 9:59:32	16.88	10.1
14	11/15/2012 9:59:33	16.868	10.1
15	11/15/2012 9:59:34	16.868	10.1
16	11/15/2012 9:59:35	16.874	10.1
17	11/15/2012 9:59:36	16.874	10.1
18	11/15/2012 9:59:37	16.874	10.1
19	11/15/2012 9:59:38	16.874	10.1
20	11/15/2012 9:59:39	16.874	10.1
21	11/15/2012 9:59:40	16.874	10.1
22	11/15/2012 9:59:41	16.874	10.1
23	11/15/2012 9:59:42	16.874	10.1
24	11/15/2012 9:59:43	16.874	10.1
25	11/15/2012 9:59:44	16.874	10.1
26	11/15/2012 9:59:45	16.874	10.1
27	11/15/2012 9:59:46	16.874	10.1
28	11/15/2012 9:59:47	16.874	10.1
29	11/15/2012 9:59:48	16.874	10.1
30	11/15/2012 9:59:49	16.874	10.1
31	11/15/2012 9:59:50	16.874	10.1

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 9:59:51	16.874	10.1
33	11/15/2012 9:59:52	16.874	10.1
34	11/15/2012 9:59:53	16.874	10.2
35	11/15/2012 9:59:54	16.874	10.2
36	11/15/2012 9:59:55	16.874	10.1
37	11/15/2012 9:59:56	16.874	10.1
38	11/15/2012 9:59:57	16.874	10.2
39	11/15/2012 9:59:58	16.874	10.2
40	11/15/2012 9:59:59	16.874	10.1
41	11/15/2012 10:00:00	16.874	10.1
42	11/15/2012 10:00:01	16.874	10.2
43	11/15/2012 10:00:02	16.874	10.2
44	11/15/2012 10:00:03	16.874	10.2
45	11/15/2012 10:00:04	16.874	10.2
46	11/15/2012 10:00:05	16.874	10.2
47	11/15/2012 10:00:06	16.874	10.2
48	11/15/2012 10:00:07	16.874	10.2
49	11/15/2012 10:00:08	16.874	10.2
50	11/15/2012 10:00:09	16.874	10.2
51	11/15/2012 10:00:10	16.874	10.2
52	11/15/2012 10:00:11	16.874	10.2
53	11/15/2012 10:00:12	16.874	10.2
54	11/15/2012 10:00:13	16.874	10.2
55	11/15/2012 10:00:14	16.874	10.2
56	11/15/2012 10:00:15	16.874	10.2
57	11/15/2012 10:00:16	16.874	10.2
58	11/15/2012 10:00:17	16.874	10.2
59	11/15/2012 10:00:18	16.874	10.2
60	11/15/2012 10:00:19	16.874	10.2
61	11/15/2012 10:00:20	16.874	10.2
62	11/15/2012 10:00:21	16.874	10.2
63	11/15/2012 10:00:22	16.874	10.2

**Table B-7**  
**Raw Data for Falling Head Slug Test 1 in Core Hole 2-12**

Sensor Type                   PT2X  
 Sensor Name                   aquistar  
 Session Name                 2-12Slug1  
 # Records                     119

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		20.568	9.9
Maximum		20.65	10.4
Mean		20.618	10.2
Variance		0.0001	0.02
Std Deviation		0.0088	0.13
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 10:24:48	20.619	9.9
2	11/15/2012 10:24:49	20.619	10
3	11/15/2012 10:24:50	20.619	10
4	11/15/2012 10:24:51	20.619	10
5	11/15/2012 10:24:52	20.619	10
6	11/15/2012 10:24:53	20.619	10
7	11/15/2012 10:24:54	20.619	10
8	11/15/2012 10:24:55	20.619	10
9	11/15/2012 10:24:56	20.619	10
10	11/15/2012 10:24:57	20.619	10
11	11/15/2012 10:24:58	20.619	10.1
12	11/15/2012 10:24:59	20.619	10.1
13	11/15/2012 10:25:00	20.619	10.1
14	11/15/2012 10:25:01	20.619	10.1
15	11/15/2012 10:25:02	20.619	10.1
16	11/15/2012 10:25:03	20.619	10.1
17	11/15/2012 10:25:04	20.619	10.1
18	11/15/2012 10:25:05	20.619	10.1
19	11/15/2012 10:25:06	20.619	10.1
20	11/15/2012 10:25:07	20.619	10.1
21	11/15/2012 10:25:08	20.619	10.1
22	11/15/2012 10:25:09	20.619	10.1
23	11/15/2012 10:25:10	20.619	10.1
24	11/15/2012 10:25:11	20.619	10.1
25	11/15/2012 10:25:12	20.619	10.1
26	11/15/2012 10:25:13	20.619	10.1
27	11/15/2012 10:25:14	20.619	10.1
28	11/15/2012 10:25:15	20.619	10.1
29	11/15/2012 10:25:16	20.619	10.2
30	11/15/2012 10:25:17	20.619	10.2
31	11/15/2012 10:25:18	20.619	10.2



Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 10:25:19	20.619	10.2
33	11/15/2012 10:25:20	20.619	10.2
34	11/15/2012 10:25:21	20.619	10.2
35	11/15/2012 10:25:22	20.619	10.2
36	11/15/2012 10:25:23	20.619	10.2
37	11/15/2012 10:25:24	20.619	10.2
38	11/15/2012 10:25:25	20.619	10.2
39	11/15/2012 10:25:26	20.619	10.2
40	11/15/2012 10:25:27	20.619	10.2
41	11/15/2012 10:25:28	20.619	10.2
42	11/15/2012 10:25:29	20.619	10.2
43	11/15/2012 10:25:30	20.619	10.2
44	11/15/2012 10:25:31	20.619	10.2
45	11/15/2012 10:25:32	20.619	10.3
46	11/15/2012 10:25:33	20.619	10.3
47	11/15/2012 10:25:34	20.619	10.3
48	11/15/2012 10:25:35	20.619	10.3
49	11/15/2012 10:25:36	20.619	10.3
50	11/15/2012 10:25:37	20.619	10.3
51	11/15/2012 10:25:38	20.619	10.3
52	11/15/2012 10:25:39	20.619	10.3
53	11/15/2012 10:25:40	20.619	10.3
54	11/15/2012 10:25:41	20.619	10.3
55	11/15/2012 10:25:42	20.623	10.3
56	11/15/2012 10:25:43	20.646	10.3
57	11/15/2012 10:25:44	20.65	10.3
58	11/15/2012 10:25:45	20.65	10.3
59	11/15/2012 10:25:46	20.646	10.3
60	11/15/2012 10:25:47	20.607	10.3
61	11/15/2012 10:25:48	20.592	10.3
62	11/15/2012 10:25:49	20.588	10.3
63	11/15/2012 10:25:50	20.627	10.3
64	11/15/2012 10:25:51	20.619	10.3
65	11/15/2012 10:25:52	20.642	10.3
66	11/15/2012 10:25:53	20.623	10.3
67	11/15/2012 10:25:54	20.611	10.3
68	11/15/2012 10:25:55	20.619	10.3
69	11/15/2012 10:25:56	20.619	10.3
70	11/15/2012 10:25:57	20.619	10.3
71	11/15/2012 10:25:58	20.619	10.3
72	11/15/2012 10:25:59	20.619	10.3
73	11/15/2012 10:26:00	20.619	10.3
74	11/15/2012 10:26:01	20.619	10.3
75	11/15/2012 10:26:02	20.619	10.3
76	11/15/2012 10:26:03	20.619	10.3
77	11/15/2012 10:26:04	20.619	10.3

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
78	11/15/2012 10:26:05	20.619	10.3
79	11/15/2012 10:26:06	20.619	10.3
80	11/15/2012 10:26:07	20.619	10.3
81	11/15/2012 10:26:08	20.619	10.3
82	11/15/2012 10:26:09	20.619	10.3
83	11/15/2012 10:26:10	20.619	10.3
84	11/15/2012 10:26:11	20.619	10.3
85	11/15/2012 10:26:12	20.619	10.3
86	11/15/2012 10:26:13	20.619	10.3
87	11/15/2012 10:26:14	20.619	10.3
88	11/15/2012 10:26:15	20.619	10.3
89	11/15/2012 10:26:16	20.619	10.3
90	11/15/2012 10:26:17	20.619	10.3
91	11/15/2012 10:26:18	20.619	10.3
92	11/15/2012 10:26:19	20.619	10.3
93	11/15/2012 10:26:20	20.619	10.3
94	11/15/2012 10:26:21	20.619	10.3
95	11/15/2012 10:26:22	20.619	10.3
96	11/15/2012 10:26:23	20.619	10.3
97	11/15/2012 10:26:24	20.619	10.4
98	11/15/2012 10:26:25	20.619	10.3
99	11/15/2012 10:26:26	20.619	10.4
100	11/15/2012 10:26:27	20.619	10.4
101	11/15/2012 10:26:28	20.619	10.4
102	11/15/2012 10:26:29	20.619	10.4
103	11/15/2012 10:26:30	20.619	10.4
104	11/15/2012 10:26:31	20.619	10.4
105	11/15/2012 10:26:32	20.619	10.4
106	11/15/2012 10:26:33	20.619	10.4
107	11/15/2012 10:26:34	20.619	10.4
108	11/15/2012 10:26:35	20.619	10.4
109	11/15/2012 10:26:36	20.619	10.4
110	11/15/2012 10:26:37	20.619	10.4
111	11/15/2012 10:26:38	20.619	10.4
112	11/15/2012 10:26:39	20.619	10.4
113	11/15/2012 10:26:40	20.619	10.4
114	11/15/2012 10:26:41	20.619	10.4
115	11/15/2012 10:26:42	20.619	10.4
116	11/15/2012 10:26:43	20.619	10.4
117	11/15/2012 10:26:44	20.619	10.4
118	11/15/2012 10:26:45	20.619	10.4
119	11/15/2012 10:26:46	20.619	10.4

**Table B-8**  
**Raw Data for Rising Head Slug Test 1 in Core Hole 2-12**

**Sensor Type**                      **PT2X**  
**Sensor Name**                    **aquistar**  
**Session Name**                  **2-12Slug2**  
**# Records**                        **77**

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		20.572	10.2
Maximum		20.662	10.4
Mean		20.618	10.3
Variance		0.0001	0.01
Std Deviation		0.0097	0.07
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 10:28:09	20.619	10.2
2	11/15/2012 10:28:10	20.619	10.2
3	11/15/2012 10:28:11	20.619	10.2
4	11/15/2012 10:28:12	20.619	10.3
5	11/15/2012 10:28:13	20.619	10.3
6	11/15/2012 10:28:14	20.619	10.3
7	11/15/2012 10:28:15	20.619	10.3
8	11/15/2012 10:28:16	20.58	10.3
9	11/15/2012 10:28:17	20.619	10.3
10	11/15/2012 10:28:18	20.662	10.3
11	11/15/2012 10:28:19	20.596	10.3
12	11/15/2012 10:28:20	20.572	10.3
13	11/15/2012 10:28:21	20.627	10.3
14	11/15/2012 10:28:22	20.642	10.3
15	11/15/2012 10:28:23	20.638	10.3
16	11/15/2012 10:28:24	20.623	10.3
17	11/15/2012 10:28:25	20.619	10.3
18	11/15/2012 10:28:26	20.619	10.3
19	11/15/2012 10:28:27	20.619	10.3
20	11/15/2012 10:28:28	20.619	10.3
21	11/15/2012 10:28:29	20.619	10.3
22	11/15/2012 10:28:30	20.619	10.3
23	11/15/2012 10:28:31	20.619	10.3
24	11/15/2012 10:28:32	20.619	10.3
25	11/15/2012 10:28:33	20.619	10.3
26	11/15/2012 10:28:34	20.619	10.3
27	11/15/2012 10:28:35	20.619	10.3
28	11/15/2012 10:28:36	20.619	10.3
29	11/15/2012 10:28:37	20.619	10.3
30	11/15/2012 10:28:38	20.619	10.3
31	11/15/2012 10:28:39	20.619	10.3

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 10:28:40	20.619	10.3
33	11/15/2012 10:28:41	20.619	10.3
34	11/15/2012 10:28:42	20.619	10.3
35	11/15/2012 10:28:43	20.619	10.3
36	11/15/2012 10:28:44	20.619	10.3
37	11/15/2012 10:28:45	20.619	10.3
38	11/15/2012 10:28:46	20.619	10.3
39	11/15/2012 10:28:47	20.619	10.4
40	11/15/2012 10:28:48	20.619	10.4
41	11/15/2012 10:28:49	20.619	10.4
42	11/15/2012 10:28:50	20.619	10.4
43	11/15/2012 10:28:51	20.619	10.4
44	11/15/2012 10:28:52	20.619	10.4
45	11/15/2012 10:28:53	20.619	10.4
46	11/15/2012 10:28:54	20.619	10.3
47	11/15/2012 10:28:55	20.619	10.3
48	11/15/2012 10:28:56	20.619	10.4
49	11/15/2012 10:28:57	20.619	10.4
50	11/15/2012 10:28:58	20.619	10.4
51	11/15/2012 10:28:59	20.619	10.4
52	11/15/2012 10:29:00	20.619	10.4
53	11/15/2012 10:29:01	20.619	10.4
54	11/15/2012 10:29:02	20.619	10.4
55	11/15/2012 10:29:03	20.619	10.4
56	11/15/2012 10:29:04	20.619	10.4
57	11/15/2012 10:29:05	20.619	10.4
58	11/15/2012 10:29:06	20.619	10.4
59	11/15/2012 10:29:07	20.619	10.4
60	11/15/2012 10:29:08	20.619	10.4
61	11/15/2012 10:29:09	20.619	10.4
62	11/15/2012 10:29:10	20.619	10.4
63	11/15/2012 10:29:11	20.619	10.4
64	11/15/2012 10:29:12	20.619	10.4
65	11/15/2012 10:29:13	20.619	10.4
66	11/15/2012 10:29:14	20.619	10.4
67	11/15/2012 10:29:15	20.619	10.4
68	11/15/2012 10:29:16	20.619	10.4
69	11/15/2012 10:29:17	20.619	10.4
70	11/15/2012 10:29:18	20.619	10.4
71	11/15/2012 10:29:19	20.619	10.4
72	11/15/2012 10:29:20	20.619	10.4
73	11/15/2012 10:29:21	20.619	10.4
74	11/15/2012 10:29:22	20.619	10.4
75	11/15/2012 10:29:23	20.619	10.4
76	11/15/2012 10:29:24	20.619	10.4
77	11/15/2012 10:29:25	20.619	10.4

**Table B-9**  
**Raw Data for Falling Head Slug Test 2 in Core Hole 2-12**

**Sensor Type**                    **PT2X**  
**Sensor Name**                 **aquistar**  
**Session Name**               **2-12Slug3**  
**# Records**                    **47**

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		20.557	10.1
Maximum		20.701	10.3
Mean		20.621	10.2
Variance		0.0004	0.01
Std Deviation		0.0188	0.09
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 10:31:51	20.619	10.1
2	11/15/2012 10:31:52	20.619	10.1
3	11/15/2012 10:31:53	20.619	10.1
4	11/15/2012 10:31:54	20.619	10.1
5	11/15/2012 10:31:55	20.619	10.1
6	11/15/2012 10:31:56	20.619	10.1
7	11/15/2012 10:31:57	20.619	10.2
8	11/15/2012 10:31:58	20.619	10.2
9	11/15/2012 10:31:59	20.619	10.2
10	11/15/2012 10:32:00	20.619	10.2
11	11/15/2012 10:32:01	20.619	10.2
12	11/15/2012 10:32:02	20.619	10.2
13	11/15/2012 10:32:03	20.619	10.2
14	11/15/2012 10:32:04	20.615	10.2
15	11/15/2012 10:32:05	20.65	10.2
16	11/15/2012 10:32:06	20.701	10.2
17	11/15/2012 10:32:07	20.596	10.2
18	11/15/2012 10:32:08	20.557	10.2
19	11/15/2012 10:32:09	20.592	10.3
20	11/15/2012 10:32:10	20.623	10.3
21	11/15/2012 10:32:11	20.627	10.3
22	11/15/2012 10:32:12	20.623	10.3
23	11/15/2012 10:32:13	20.619	10.3
24	11/15/2012 10:32:14	20.619	10.3
25	11/15/2012 10:32:15	20.619	10.3
26	11/15/2012 10:32:16	20.619	10.3
27	11/15/2012 10:32:17	20.619	10.3
28	11/15/2012 10:32:18	20.619	10.3
29	11/15/2012 10:32:19	20.619	10.3
30	11/15/2012 10:32:20	20.619	10.3
31	11/15/2012 10:32:21	20.619	10.3

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 10:32:22	20.619	10.3
33	11/15/2012 10:32:23	20.619	10.3
34	11/15/2012 10:32:24	20.619	10.3
35	11/15/2012 10:32:25	20.619	10.3
36	11/15/2012 10:32:26	20.619	10.3
37	11/15/2012 10:32:27	20.619	10.3
38	11/15/2012 10:32:28	20.619	10.3
39	11/15/2012 10:32:29	20.619	10.3
40	11/15/2012 10:32:30	20.619	10.3
41	11/15/2012 10:32:31	20.619	10.3
42	11/15/2012 10:32:32	20.619	10.3
43	11/15/2012 10:32:33	20.619	10.3
44	11/15/2012 10:32:34	20.619	10.3
45	11/15/2012 10:32:35	20.619	10.3
46	11/15/2012 10:32:36	20.619	10.3
47	11/15/2012 10:32:37	20.619	10.3

**Table B-10**  
**Raw Data for Rising Head Slug Test 2 in Core Hole 2-12**

**Sensor Type**                      **PT2X**  
**Sensor Name**                    **aquistar**  
**Session Name**                  **2-12Slug4**  
**# Records**                        **71**

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		20.568	10.2
Maximum		20.642	10.4
Mean		20.619	10.3
Variance		0.0001	0.01
Std Deviation		0.008	0.07
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 10:34:47	20.619	10.2
2	11/15/2012 10:34:48	20.619	10.2
3	11/15/2012 10:34:49	20.619	10.2
4	11/15/2012 10:34:50	20.619	10.3
5	11/15/2012 10:34:51	20.619	10.3
6	11/15/2012 10:34:52	20.619	10.3
7	11/15/2012 10:34:53	20.619	10.3
8	11/15/2012 10:34:54	20.619	10.3
9	11/15/2012 10:34:55	20.619	10.3
10	11/15/2012 10:34:56	20.619	10.3
11	11/15/2012 10:34:57	20.568	10.3
12	11/15/2012 10:34:58	20.642	10.3
13	11/15/2012 10:34:59	20.627	10.3
14	11/15/2012 10:35:00	20.603	10.3
15	11/15/2012 10:35:01	20.627	10.3
16	11/15/2012 10:35:02	20.638	10.3
17	11/15/2012 10:35:03	20.634	10.3
18	11/15/2012 10:35:04	20.619	10.3
19	11/15/2012 10:35:05	20.619	10.3
20	11/15/2012 10:35:06	20.619	10.3
21	11/15/2012 10:35:07	20.619	10.3
22	11/15/2012 10:35:08	20.619	10.3
23	11/15/2012 10:35:09	20.619	10.3
24	11/15/2012 10:35:10	20.619	10.3
25	11/15/2012 10:35:11	20.619	10.3
26	11/15/2012 10:35:12	20.619	10.3
27	11/15/2012 10:35:13	20.619	10.3
28	11/15/2012 10:35:14	20.619	10.3
29	11/15/2012 10:35:15	20.619	10.3
30	11/15/2012 10:35:16	20.619	10.3
31	11/15/2012 10:35:17	20.619	10.3

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 10:35:18	20.619	10.3
33	11/15/2012 10:35:19	20.619	10.3
34	11/15/2012 10:35:20	20.619	10.4
35	11/15/2012 10:35:21	20.619	10.3
36	11/15/2012 10:35:22	20.619	10.4
37	11/15/2012 10:35:23	20.619	10.3
38	11/15/2012 10:35:24	20.619	10.3
39	11/15/2012 10:35:25	20.619	10.4
40	11/15/2012 10:35:26	20.619	10.4
41	11/15/2012 10:35:27	20.619	10.4
42	11/15/2012 10:35:28	20.619	10.4
43	11/15/2012 10:35:29	20.619	10.3
44	11/15/2012 10:35:30	20.619	10.4
45	11/15/2012 10:35:31	20.619	10.4
46	11/15/2012 10:35:32	20.619	10.4
47	11/15/2012 10:35:33	20.619	10.4
48	11/15/2012 10:35:34	20.619	10.3
49	11/15/2012 10:35:35	20.619	10.4
50	11/15/2012 10:35:36	20.619	10.4
51	11/15/2012 10:35:37	20.619	10.4
52	11/15/2012 10:35:38	20.619	10.4
53	11/15/2012 10:35:39	20.619	10.4
54	11/15/2012 10:35:40	20.619	10.4
55	11/15/2012 10:35:41	20.619	10.4
56	11/15/2012 10:35:42	20.619	10.4
57	11/15/2012 10:35:43	20.619	10.4
58	11/15/2012 10:35:44	20.619	10.4
59	11/15/2012 10:35:45	20.619	10.4
60	11/15/2012 10:35:46	20.619	10.4
61	11/15/2012 10:35:47	20.619	10.4
62	11/15/2012 10:35:48	20.619	10.4
63	11/15/2012 10:35:49	20.619	10.4
64	11/15/2012 10:35:50	20.619	10.4
65	11/15/2012 10:35:51	20.619	10.4
66	11/15/2012 10:35:52	20.619	10.4
67	11/15/2012 10:35:53	20.619	10.4
68	11/15/2012 10:35:54	20.619	10.4
69	11/15/2012 10:35:55	20.619	10.4
70	11/15/2012 10:35:56	20.619	10.4
71	11/15/2012 10:35:57	20.619	10.4



**Table B-11**  
**Raw Data for Falling Head Slug Test 3 in Core Hole 2-12**

Sensor Type                   PT2X  
 Sensor Name                 aquistar  
 Session Name                2-12Slug5  
 # Records                    58

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		20.557	10.2
Maximum		20.7	10.4
Mean		20.619	10.3
Variance		0.0002	0
Std Deviation		0.0142	0.05
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 10:37:18	20.619	10.2
2	11/15/2012 10:37:19	20.619	10.2
3	11/15/2012 10:37:20	20.619	10.3
4	11/15/2012 10:37:21	20.619	10.2
5	11/15/2012 10:37:22	20.619	10.3
6	11/15/2012 10:37:23	20.619	10.3
7	11/15/2012 10:37:24	20.619	10.3
8	11/15/2012 10:37:25	20.619	10.3
9	11/15/2012 10:37:26	20.619	10.3
10	11/15/2012 10:37:27	20.619	10.3
11	11/15/2012 10:37:28	20.619	10.3
12	11/15/2012 10:37:29	20.619	10.3
13	11/15/2012 10:37:30	20.619	10.3
14	11/15/2012 10:37:31	20.619	10.3
15	11/15/2012 10:37:32	20.619	10.3
16	11/15/2012 10:37:33	20.619	10.3
17	11/15/2012 10:37:34	20.619	10.3
18	11/15/2012 10:37:35	20.619	10.3
19	11/15/2012 10:37:36	20.619	10.3
20	11/15/2012 10:37:37	20.619	10.3
21	11/15/2012 10:37:38	20.619	10.3
22	11/15/2012 10:37:39	20.619	10.3
23	11/15/2012 10:37:40	20.619	10.3
24	11/15/2012 10:37:41	20.619	10.3
25	11/15/2012 10:37:42	20.623	10.3
26	11/15/2012 10:37:43	20.638	10.3
27	11/15/2012 10:37:44	20.7	10.3
28	11/15/2012 10:37:45	20.607	10.3
29	11/15/2012 10:37:46	20.557	10.3
30	11/15/2012 10:37:47	20.595	10.3
31	11/15/2012 10:37:48	20.619	10.3

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 10:37:49	20.627	10.3
33	11/15/2012 10:37:50	20.619	10.3
34	11/15/2012 10:37:51	20.619	10.3
35	11/15/2012 10:37:52	20.619	10.3
36	11/15/2012 10:37:53	20.619	10.3
37	11/15/2012 10:37:54	20.619	10.3
38	11/15/2012 10:37:55	20.619	10.3
39	11/15/2012 10:37:56	20.619	10.3
40	11/15/2012 10:37:57	20.619	10.3
41	11/15/2012 10:37:58	20.619	10.3
42	11/15/2012 10:37:59	20.619	10.3
43	11/15/2012 10:38:00	20.619	10.3
44	11/15/2012 10:38:01	20.619	10.3
45	11/15/2012 10:38:02	20.619	10.4
46	11/15/2012 10:38:03	20.619	10.4
47	11/15/2012 10:38:04	20.619	10.3
48	11/15/2012 10:38:05	20.619	10.4
49	11/15/2012 10:38:06	20.619	10.4
50	11/15/2012 10:38:07	20.619	10.4
51	11/15/2012 10:38:08	20.619	10.4
52	11/15/2012 10:38:09	20.619	10.4
53	11/15/2012 10:38:10	20.619	10.4
54	11/15/2012 10:38:11	20.619	10.4
55	11/15/2012 10:38:12	20.619	10.4
56	11/15/2012 10:38:13	20.619	10.4
57	11/15/2012 10:38:14	20.619	10.4
58	11/15/2012 10:38:15	20.619	10.4

**Table B-12**  
**Raw Data for Rising Head Slug Test 3 in Core Hole 2-12**

Sensor Type                   PT2X  
 Sensor Name                   aquistar  
 Session Name                 2-12Slug6  
 # Records                     88

Statistical Data		Pressure(Ft H2O)	Temperature(degC)
Sensor Range		50 psig	-40 - +125 degC
Minimum		20.514	10.2
Maximum		20.654	10.4
Mean		20.617	10.3
Variance		0.0002	0.01
Std Deviation		0.0155	0.08
Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
1	11/15/2012 10:39:28	20.619	10.2
2	11/15/2012 10:39:29	20.619	10.2
3	11/15/2012 10:39:30	20.619	10.3
4	11/15/2012 10:39:31	20.619	10.3
5	11/15/2012 10:39:32	20.619	10.3
6	11/15/2012 10:39:33	20.619	10.3
7	11/15/2012 10:39:34	20.619	10.3
8	11/15/2012 10:39:35	20.619	10.3
9	11/15/2012 10:39:36	20.561	10.3
10	11/15/2012 10:39:37	20.599	10.3
11	11/15/2012 10:39:38	20.631	10.3
12	11/15/2012 10:39:39	20.58	10.3
13	11/15/2012 10:39:40	20.572	10.3
14	11/15/2012 10:39:41	20.634	10.3
15	11/15/2012 10:39:42	20.654	10.3
16	11/15/2012 10:39:43	20.65	10.3
17	11/15/2012 10:39:44	20.634	10.3
18	11/15/2012 10:39:45	20.619	10.3
19	11/15/2012 10:39:46	20.619	10.3
20	11/15/2012 10:39:47	20.619	10.3
21	11/15/2012 10:39:48	20.619	10.3
22	11/15/2012 10:39:49	20.619	10.3
23	11/15/2012 10:39:50	20.619	10.3
24	11/15/2012 10:39:51	20.619	10.3
25	11/15/2012 10:39:52	20.619	10.3
26	11/15/2012 10:39:53	20.619	10.3
27	11/15/2012 10:39:54	20.619	10.3
28	11/15/2012 10:39:55	20.619	10.3
29	11/15/2012 10:39:56	20.619	10.3
30	11/15/2012 10:39:57	20.619	10.3
31	11/15/2012 10:39:58	20.619	10.4

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
32	11/15/2012 10:39:59	20.619	10.3
33	11/15/2012 10:40:00	20.619	10.3
34	11/15/2012 10:40:01	20.619	10.3
35	11/15/2012 10:40:02	20.619	10.3
36	11/15/2012 10:40:03	20.619	10.3
37	11/15/2012 10:40:04	20.619	10.4
38	11/15/2012 10:40:05	20.619	10.4
39	11/15/2012 10:40:06	20.619	10.3
40	11/15/2012 10:40:07	20.619	10.3
41	11/15/2012 10:40:08	20.619	10.4
42	11/15/2012 10:40:09	20.619	10.4
43	11/15/2012 10:40:10	20.619	10.4
44	11/15/2012 10:40:11	20.619	10.4
45	11/15/2012 10:40:12	20.619	10.4
46	11/15/2012 10:40:13	20.619	10.4
47	11/15/2012 10:40:14	20.619	10.4
48	11/15/2012 10:40:15	20.619	10.4
49	11/15/2012 10:40:16	20.619	10.4
50	11/15/2012 10:40:17	20.619	10.4
51	11/15/2012 10:40:18	20.619	10.4
52	11/15/2012 10:40:19	20.619	10.4
53	11/15/2012 10:40:20	20.619	10.4
54	11/15/2012 10:40:21	20.619	10.4
55	11/15/2012 10:40:22	20.619	10.4
56	11/15/2012 10:40:23	20.619	10.4
57	11/15/2012 10:40:24	20.619	10.4
58	11/15/2012 10:40:25	20.619	10.4
59	11/15/2012 10:40:26	20.619	10.4
60	11/15/2012 10:40:27	20.619	10.4
61	11/15/2012 10:40:28	20.619	10.4
62	11/15/2012 10:40:29	20.619	10.4
63	11/15/2012 10:40:30	20.619	10.4
64	11/15/2012 10:40:31	20.619	10.4
65	11/15/2012 10:40:32	20.619	10.4
66	11/15/2012 10:40:33	20.619	10.4
67	11/15/2012 10:40:34	20.619	10.4
68	11/15/2012 10:40:35	20.619	10.4
69	11/15/2012 10:40:36	20.619	10.4
70	11/15/2012 10:40:37	20.619	10.4
71	11/15/2012 10:40:38	20.619	10.4
72	11/15/2012 10:40:39	20.619	10.4
73	11/15/2012 10:40:40	20.619	10.4
74	11/15/2012 10:40:41	20.619	10.4
75	11/15/2012 10:40:42	20.619	10.4
76	11/15/2012 10:40:43	20.619	10.4
77	11/15/2012 10:40:44	20.619	10.4

Rec #	Date/Time	Pressure(Ft H2O)	Temperature(degC)
78	11/15/2012 10:40:45	20.619	10.4
79	11/15/2012 10:40:46	20.619	10.4
80	11/15/2012 10:40:47	20.619	10.4
81	11/15/2012 10:40:48	20.619	10.4
82	11/15/2012 10:40:49	20.619	10.4
83	11/15/2012 10:40:50	20.619	10.4
84	11/15/2012 10:40:51	20.619	10.4
85	11/15/2012 10:40:52	20.619	10.4
86	11/15/2012 10:40:53	20.619	10.4
87	11/15/2012 10:40:54	20.619	10.4
88	11/15/2012 10:40:55	20.619	10.4

**ATTACHMENT C**

**Results of Slug Test Analysis from Aquifer Test Pro**

**Continental Placer Inc.**  
**2 Winners Circle**  
**Albany, New York**

**Slug Test - Analyses Report**

Project: Akron Quarry Slug Tests

Number: 22-38-10-3682

Client: County Line Stone Company, Inc.

Location: Akron, New York

Slug Test: 2-12 Rising Head Test

Test Well: 2-12

Test conducted by: Wm. Miller

Test date: 12/17/2012

Aquifer Thickness: 85.00 ft

	Analysis Name	Analysis performed by	Date	Method name	Well	T [ft <sup>2</sup> /d]	K [ft/d]	S	
1	2-12 Falling Head 1	Wm. Miller	12/17/2012	Hvorslev	2-12		4.08 × 10 <sup>3</sup>		
2	2-12 Falling Head 2	Wm. Miller	12/17/2012	Hvorslev	2-12		1.62 × 10 <sup>3</sup>		
3	2-12 Falling Head 3	Wm. Miller	12/17/2012	Hvorslev	2-12		8.32 × 10 <sup>2</sup>		
Average								2.18 × 10 <sup>3</sup>	

**Continental Placer Inc.  
2 Winners Circle  
Albany, New York**

**Slug Test - Analyses Report**

Project: Akron Quarry Slug Tests

Number: 22-38-10-3682

Client: County Line Stone Company, Inc.

Location: Akron, New York

Slug Test: Slug Test 2

Test Well: 2-12

Test conducted by: Wm. Miller

Test date: 12/17/2012

Aquifer Thickness: 85.00 ft

	Analysis Name	Analysis performed by	Date	Method name	Well	T [ft <sup>2</sup> /d]	K [ft/d]	S	
1	2-12 Rising Head 1	Wm. Miller	12/17/2012	Hvorslev	2-12		$2.04 \times 10^3$		
2	2-12 Rising Head 2	Wm. Miller	12/17/2012	Hvorslev	2-12		$5.86 \times 10^2$		
3	2-12 Rising Head 3	Wm. Miller	12/17/2012	Hvorslev	2-12		$1.80 \times 10^3$		
Average								$1.48 \times 10^3$	



**Continental Placer Inc.  
2 Winners Circle  
Albany, New York**

**Slug Test - Analyses Report**

Project: Akron Quarry Slug Tests

Number: 22-38-10-3682

Client: County Line Stone Company, Inc.

Location: Akron, New York

Slug Test: 1-12 Rising Head Slug Tests

Test Well: 1-12

Test conducted by: Wm. Miller

Test date: 12/4/2012

Aquifer Thickness: 43.00 ft

	Analysis Name	Analysis performed by	Date	Method name	Well	T [ft <sup>2</sup> /d]	K [ft/d]	S	
1	1-12 Rising Head 1	Wm. Miller	12/4/2012	Hvorslev	1-12		$1.36 \times 10^3$		
2	1-12 Rising Head 2	Wm. Miller	12/4/2012	Hvorslev	1-12		$2.51 \times 10^3$		
3	1-12 Rising Head 3	Wm. Miller	12/4/2012	Hvorslev	1-12		$1.77 \times 10^3$		
Average								$1.88 \times 10^3$	

**Continental Placer Inc.  
2 Winners Circle  
Albany, New York**

**Slug Test - Analyses Report**

Project: Akron Quarry Slug Tests

Number: 22-38-10-3682

Client: County Line Stone Company, Inc.

Location: Akron, New York

Slug Test: 1-12 Falling Head Tests

Test Well: 1-12

Test conducted by: Wm. Miller

Test date: 12/6/2012

Aquifer Thickness: 43.00 ft

	Analysis Name	Analysis performed by	Date	Method name	Well	T [ft <sup>2</sup> /d]	K [ft/d]	S	
1	1-12 Falling Head 1	Wm. Miller	12/6/2012	Hvorslev	1-12		$3.58 \times 10^3$		
2	1-12 Falling Head 2	Wm. Miller	12/6/2012	Hvorslev	1-12		$2.64 \times 10^3$		
3	1-12 Falling Head 3	Wm. Miller	12/6/2012	Hvorslev	1-12		$2.64 \times 10^3$		
Average								$2.95 \times 10^3$	



**Appendix 12**  
**Archeology Report**



**HARTGEN**

archeological associates inc

**PHASE IA LITERATURE REVIEW AND  
ARCHEOLOGICAL SENSITIVITY ASSESSMENT**

**County Line Stone Company, Inc.  
Akron Quarry Expansion**

Crittenden Road  
Towns of Newstead and Pembroke  
Erie and Genesee Counties, New York

HAA # 4548-11

**Submitted to:**

County Line Stone Company, Inc.  
4515 Crittenden Road  
Akron, New York 14001

**Prepared by:**

Hartgen Archeological Associates, Inc.

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September 2012

## **MANAGEMENT SUMMARY**

SHPO Project Review Number: n/a

Involved State and Federal Agencies: New York State Department of Environmental Conservation

Phase of Survey: IA

## **LOCATION INFORMATION**

Location: Akron Quarry

Minor Civil Division: Towns of Newstead (02919) and Pembroke (03712)

County: Erie and Genesee Counties

## **SURVEY AREA**

### **Area A**

Length: 366 meters (1200 ft)

Width: 76 meters (250 ft)

### **Area B**

Length 366 meters (1200 ft)

Width: 244 meters (800 ft)

### **Area C**

Length: 122 meters (400 ft)

Width: 183 meters (600 ft)

Number of Acres Surveyed: 110 acres (44.5 hectares)

7.5 Minute Quadrangle Map: Corfu

## **RESULTS OF RESEARCH**

Sites within one mile: 0

Surveys in vicinity: 3

NR/NRE sites in or adjacent: 0

OPRHP inventoried structures in or adjacent: 0

Precontact Sensitivity: Low to Moderate

Historic Sensitivity: High

## **RECOMMENDATIONS**

Consultation with DEC regional office

Report Authors: Andre Krievs

Date of Report: September 2012

**TABLE of CONTENTS**

PHASE IA LITERATURE REVIEW AND ARCHEOLOGICAL SENSITIVITY ASSESSMENT ..... 1

Introduction..... 1

Project Information..... 1

    Project Location..... 1

    Description of the Project Area ..... 1

    Description of the Area of Potential Effects (APE)..... 1

Environmental Background..... 1

    Present Land Use and Current Conditions..... 1

    Soils ..... 2

    Bedrock Geology ..... 3

    Physiography and Hydrology..... 3

Documentary Research..... 3

    Archeological Sites..... 3

    State and National Register ..... 3

    Previous Surveys ..... 4

Historical Map Review..... 4

    Map-Documented and Existing Structures ..... 4

Archeological Sensitivity Assessment..... 5

    Precontact Archeological Sensitivity..... 5

    Historic Archeological Sensitivity ..... 5

Archeological Potential ..... 6

Recommendations ..... 6

Bibliography..... 7

MAPS

PHOTOGRAPHS

APPENDIX 1: OPRHP Project Review Cover Form

## Map List

1. Project Location (NYSDOT 1998)
2. Project Map (NYSCSCIC 2011, Hartgen 2012)
3. Soil Map (USDA 2006)
4. Historic Map (Stone and Steward 1866/Beers 1866)
5. Historic Map (USGS 1905)
6. Historic Map (USGS 1949)

## Photograph List

1. View south of the southern portion of Area A. This narrow section of the parcel is mostly wooded.
2. View west of the central portion of Area A. The parcel is mostly wooded interspersed with patches of thick brush. No bedrock outcrops were detected during the surface reconnaissance.
3. View northwest of the northern portion of Area A. This section of the parcel is partially wooded and contains sections that have experienced prior disturbance.
4. View northeast of the eastern and central portions of Area B. The parcel is mostly soy bean field that parallels County Line Road.
5. View northeast of the eastern portion of Area B. The parcel contains mostly open fields interspersed within occasional pine trees.
6. View east of the central portion of Area B. The parcel is mostly wooded and contains several large sections of thick brush. No bedrock outcrops were detected during the surface reconnaissance.
7. View northwest of the northern portion of Area B. The parcel lies west of the gas line and contains mostly soy bean field. Thick brush is evident at the western end of the parcel.
8. View northeast of a small cottage-style house located along the western perimeter of Area B near the intersection of County Line Road and Cohocton Road.
9. View north of the western portion of Area C located north of Scribner Road. The parcel contains a mixture of fields and thick brush.
10. View northeast of the northern portion of Area C located along the north side of Scribner Road. The parcel contains a mixture of woods and thick brush. No bedrock outcrops were detected during the surface reconnaissance.
11. View southeast of the south portion of Area C located south of Scribner Road. The parcel contains mostly thick brush.

## Table List

1. Soils in the Project Area
2. Summary of map-documented and existing structures within the Project Area/APE



# **PHASE IA LITERATURE REVIEW AND ARCHEOLOGICAL SENSITIVITY ASSESSMENT**

## **INTRODUCTION**

Hartgen Archeological Associates, Inc. (HAA, Inc.) was retained by Continental Placer, Inc. and County Line Stone Company, Inc. to conduct a Phase IA archeological investigation for the proposed expansions to the Akron Quarry located east of Crittenden Road in the Towns of Newstead and Pembroke, Erie and Genesee Counties, New York. The project requires approvals by the New York State Department of Environmental Conservation (DEC). Therefore, this investigation was conducted to comply with Section 14.09 of the State Historic Preservation Act and will be reviewed by the New York State Office of Parks, Recreation and Historic Preservation (OPRHP). The investigation was conducted according to the New York Archaeological Council's *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections* (1994), which are endorsed by OPRHP. This report has been prepared according to OPRHP's *State Historic Preservation Office (SHPO) Phase I Archeological Report Format Requirements* (2005).

## **PROJECT INFORMATION**

A site visit was conducted by Andre Krievs on July 31, 2012 to observe and photograph existing conditions within the project area. The information gathered during the site visit is included in the relevant sections of the report.

### **Project Location**

The project includes three separate areas (A, B, and C) located along the perimeter of the existing Akron Quarry (Maps 1 and 2). Area A is located along the western perimeter of the Quarry east of Crittenden Road Area B is situated east of the Active quarry and County Line Road and Area C is located along the north and south sides of Scribner Road.

### **Description of the Project Area**

The project area encompasses a mostly level topography containing a mixture of forest growth and agricultural lands. The forested lands include most of Area A, the central portion of Area B, and the northern and eastern perimeters of Area C. The agricultural lands include a majority of Area B and the central portion of Area C.

### **Description of the Area of Potential Effects (APE)**

The area of potential effects (APE) includes all portions of the property that will be directly or indirectly altered by the proposed undertaking. The project components will include expansion of the existing quarry pit by approximately 90 acres accompanied by the creation of a 20-acre overburden storage area. The APE encompasses approximately 110 acres.

## **ENVIRONMENTAL BACKGROUND**

The environment of an area is significant for determining the sensitivity of the project area for archeological resources. Precontact and historic groups often favored level, well-drained areas near wetlands and waterways. Therefore, topography, proximity to wetlands, and soils are examined to determine if there are landforms in the project area that are more likely to contain archeological resources. In addition, bedrock formations may contain chert or other resources that may have been quarried by precontact groups. Soil conditions can provide a clue to past climatic conditions, as well as changes in local hydrology.

### **Present Land Use and Current Conditions**

The three project area footprints have a mostly level to moderately sloping topography and are located along the perimeter of an operating quarry pit. Area A is located along the northwestern perimeter of the quarry pit

and contains a mixture of forest and thick brush (Map 2; Photos 1 and 2). The northernmost portion of the parcel has experienced some vegetation clearing (Map 2; Photo 3).

Area B is located east of the quarry pit (Map 2). The western portion of Area B encompasses a large soybean field (Map 2; Photo 4) that parallels the east side of County Line Road while the southeastern portion of Area B is mostly fields with a scattering of pine trees (Map 2; Photo 5). The east central portion of the parcel is mostly wooded (Map 2; Photo 6). The northernmost portion of the parcel is located north of Cohocton Road and southwest of a gas pipeline. It contains a mixture of fields and thick brush (Map 2; Photo 7). A small one-story structure is located within the northwestern corner of the parcel near the intersection of County Line Road and Cohocton Road (Map 2; Photo 8).

Area C lies northeast of the quarry pit and encompasses the lands located on either side of Scribner Road. (Map 2) The northern portion of the parcel contains a mixture of fields, thick brush, and woods (Map 2; Photos 9 and 10). The section of the parcel located south of Scribner Road contains a mixture of fields and thick brush (Map 2; Photo 11).

### Soils

Soil surveys provide a general characterization of the types and depths of soils that are found in an area. This information is an important factor in determining the appropriate methodology if and when a field study is recommended. The soil type also informs the degree of artifact visibility and likely recovery rates. For example, artifacts are more visible and more easily recovered in sand than in stiff glacial clay, which will not pass through a screen easily. The soil maps for Erie and Genesee Counties show multiple soil types for each project area (Map 3). Area A contains mostly Kendaia silt loam and Honeoye loam with lesser amounts of Wassaic silt loam. The Area B soils consist most of Lima Loam and Lamsom very fine sandy loam with lesser amounts of Orpark silt loam, Appleton silt loam and Minoa very fine sand. Area C contains mostly Arkport very fine sandy loam and Stratford loamy fine sand with lesser amounts of Galen very fine sand.

Table 1. Soils in Project Area

Symbol	Name	Depth	Textures	Slope	Drainage	Landform
<b>Area A</b>						
Ke	Kendaia silt loam	0-51 cm (0-20 in) 51-206 cm (20-81 in) 206-386 cm (81-152 in)	Si Lo Gr Fi Sa Lo Gr Fi Sa Lo	0-3%	Poorly drained	Till plains
Hob	Honeoye loam	0-64 cm (0-25 in) 64-163 cm (25-64 in) 163-386 cm (64-152 in)	Lo Clay Lo Gr Si Lo	0-3%	Poorly drained	Till plains
WaA	Wassaic silt loam	0-64 cm (0-25 in) 64-147 cm (25-58 in) 147-180 cm (58-71 in) 180-206 cm (71-81 in)	Si Lo Gr Si Lo Gr Fi Sa Lo Bedrock	0-3%	Well drained	Till plains
<b>Area B</b>						
LmA	Lima loam	0-58 cm (0-23 in) 58-168 cm (23-66 in) 168-386 cm (66 to 152 in)	Lo Gr Lo Gr Lo	0-3%	Well drained	Till plains
StA	Stratford loamy fine sand			0-3%		
OrA	Orpark silt loam	0-58 cm (0-23 in) 58-142 cm (23-56 in) 142-175 cm (56-69 in) 175-201 cm (69-79 in)	Si Clay Lo Si Clay Lo Si Lo Si Clay Lo	0-3%	Poorly drained	Till plains
ApA	Appleton silt loam	0-58 cm (0-23 in) 58-97 cm (23-38 in) 97-188 cm (38-74 in) 199-386 cm (74-152 in)	Si Lo Gr Sa Lo Gr Si Lo Fi Sa Lo	0-3%	Poorly drained	Till plains

Symbol	Name	Depth	Textures	Slope	Drainage	Landform
MnA	Minoa very fine sand			0-3%		
<b>Area C</b>						
ArB	Arkport very fine sandy loam			0-3%		
StA	Stratford loamy fine sand			0-3%		
Ld	Lamson mucky very fine sandy loam	0-58 cm (0-23 in) 58-259 cm (23-102 in) 259-386 cm (102-152 in)	Mucky Vy Fi Sa Lo Fi Sa Lo Fi Sa	0-3%	Poorly drained	Till plains
Key:	Color:	Br-Brown, Dk-Dark, Gr-Gray, Re-Red, Y-Yellow, Bk-Black, Ol-Olive				
	Texture:	Co-Coarse, Fi-Fine, Gv-Gravelly, Lo-Loam, Sa-Sand, Si-Silt, Vy-Very				

### Bedrock Geology

The Geologic Map of New York indicates the underlying Bedrock is part of the Onondaga Formation which consists of Seneca, Morehouse, Clarence, and Edgecliff limestones, several of which are chert bearing. It is bordered to the south by Skaneateles Formation Levanna shale and Stafford limestone which is not chert bearing (Fisher et al 1970).

### Physiography and Hydrology

Steeply sloped areas are considered largely unsuitable for human occupation. As such, the standards for archeological fieldwork in New York State generally exclude areas with a slope in excess of 12% from archeological testing (NYAC 1994). Exceptions to this rule include steep areas with bedrock outcrops, overhangs, and large boulders that may have been used by precontact people as quarries or rock-shelters. Such areas may still warrant a systematic field examination.

The site visit walkover revealed a level to moderately sloping topography for the three proposed impact areas. No bedrock outcrops, overhangs, or boulders suggesting evidence of rock-shelters or chert bearing formations were encountered during the site visit.

## DOCUMENTARY RESEARCH

### Archeological Sites

Previously reported archeological sites provide an overview of both the types of sites that may be present in the project area and relation of sites throughout the surrounding region. The presence of few reported sites, however, may result from a lack of previous systematic survey and does not necessarily indicate a decreased archeological sensitivity within the project area.

An examination of the archeological site files at the Office of Parks, Recreation and Historic Preservation (OPRHP) and the New York State Museum (NYSM) revealed no reported archeological sites within a one mile (1.6 km) radius of the project area.

### State and National Register

A search of the computer files at OPRHP identified no properties listed on the State/National Registers of Historic Places (NR) located in the general vicinity of the project area

## Previous Surveys

Two previous archeological surveys were completed in the general vicinity of the project area. A Phase I cultural resources investigation was conducted by PanAmerican Consultants, Inc. in 1999 and 2001 for the proposed Town of Newstead Water District #5 project. The project area included sections of County Line Road located south of Area B. No precontact or significant historic cultural resources were encountered during the field survey and no further archeological investigation was recommended (PanAmerican Consultants, Inc. 1999 and 2001).

A Phase I cultural resource investigation was conducted in 2002 by PanAmerican Consultants, Inc. for a Toll Barrier Improvement project located along a section of the New York State Thruway north of Area A. No precontact or significant historic cultural resources were encountered during the field survey and no further archeological investigation was recommended (PanAmerican Consultants, Inc. 2002).

## HISTORICAL MAP REVIEW

Several historic maps were examined for this study including 19<sup>th</sup>-century tenant property owner maps and 20<sup>th</sup>-century topographic quadrangles. The maps are discussed in chronological order.

The earliest 19<sup>th</sup>-century tenant property owner maps examined include the 1866 Stone and Steward *New Topographical Atlas of Erie County, New York* and the 1866 Beers *New Topographical Atlas of Genesee and Wyoming Counties, New York* (Map 4). By the mid 19<sup>th</sup>-century, the road alignments are generally the same as those that exist today. Structures are indicated east and west of Area A along the roadways. No structures are shown within or directly adjacent to Area A. Seven structures are indicated along the eastern perimeter of Area B, along what is now referred to as County Line Road, and one structure is indicated near the eastern perimeter of Area C.

The 1905 USGS *Attica 15' Topographic Quadrangle, New York* (Map 5) indicate similar road alignments as the earlier 19<sup>th</sup> century atlases. No structures are indicated within Area A. Four structures are shown along the western perimeter of Area B and no structures are indicated within or directly adjacent to Area C.

The 1949 USGS *Attica 15' Topographic Quadrangle, New York* (Map 6) shows no structures within or directly adjacent to Area A. Five structures are indicated along the eastern perimeter of Area B, and no structures are shown within or directly adjacent to Area C.

The 1998 NYSDOT *Corfu 7.5' Planimetric Quadrangle, New York* (Map 1) shows the active quarry southeast of Area A and west of Area B. A cluster of recent homes is indicated west of Area A. Two structures are indicated along the western perimeter of Area B near the intersection of County Line Road and Cohocton Road. A rectangular shaped structure is indicated near the southern perimeter of Area C.

The most recent Ortho-image (2011) of the project area shows a significant quarry footprint (Map 2). A cluster of single-family residential structures are indicated west of Area A. Schurer Road, which once bordered the northern limits of the quarry (Map 5) has become part of the quarry operation along with the lands located to the north and south. One structure is indicated within the western limits of Area B near the intersection of County Line Road and Cohocton Road. No structures are indicated within or directly adjacent to Area C.

## Map-Documented and Existing Structures

Each past or current structure within the Project Area is assigned a unique structure number. Map-documented structures—those structures that are depicted on one or more maps—are distinguished using the abbreviation “MDS” after the structure number (e.g. Structure 3 (MDS)). Currently, there is one standing structure along the western perimeter of Area B. The 19<sup>th</sup> century Beers *New Topographical Atlas of Genesee and Wyoming Counties, New York* show five structures (MDS 1-5) along the western perimeter of Area A and another structure (MDS 6) lies near the southeastern corner of Area C. Four of the Structures (MDS 1, 2, 4 and 5) appear on the 1905 USGS *Attica 15' Topographic Quadrangle, New York*. The 1949 USGS *Attica 15'*

*Topographic Quadrangle, New York* show three of the structures (MDS 2, 4, and 5) and additional outbuildings are indicated adjacent to MDS's 4 and 5. It appears that by the late 20<sup>th</sup> century, mining operations have impacted the western perimeter of Area B including the general locations of MDS's 1, 2, and 3. The most recent Ortho-image shows a standing structure in the general vicinity of MDS 4.

Table 2. Summary of map-documented and existing structures within the Project Area/APE

Structure #	Map 4 (1866)	Map 5 (1905)	Map 6 (1949)	Map 2 (1998)	Extant (2012)
1	D. Wagner	X			
2	C. Holdenfalder	X	X	x	
3	W. Philips				
4	X	X	X	x	x
5	Scribner	X	X	x	
6	Yune				
7				x	

## ARCHEOLOGICAL SENSITIVITY ASSESSMENT

The New York Archaeological Council provides the following description of archeological sensitivity:

Archaeologically sensitive areas contain one or more variables that make them likely locations for evidence of past human activities. Sensitive areas can include places near known prehistoric sites that share the same valley or that occupy a similar landform (e.g., terrace above a river), areas where historic maps or photographs show that a building once stood but is now gone as well as the areas within the former yards around such structures, an environmental setting similar to settings that tend to contain cultural resources, and locations where Native Americans and published sources note sacred places, such as cemeteries or spots of spiritual importance (NYAC 1994:9).

The archeological potential of an area consists of its sensitivity modified by modern disturbance. Recommendations for additional investigation are based on the project area's archeological sensitivity and potential, and are discussed below.

### Precontact Archeological Sensitivity

The site file data revealed no recorded precontact sites within a one mile radius of the project area. The geologic map for New York State indicates the underlying bedrock is part of the Onondaga Formation which is chert bearing, thus increasing the possibility of encountering possible Native American quarry sites. Several chert quarry extraction and workshop sites have been recorded in the region including the Divers Lake Quarry Site located northeast of the project area west of Batavia, Genesee County, New York (Ritchie 1969:8). The 21 meter (70 ft) high outcrop of chert bearing Onondaga Formation Limestone overlooks a small glacial lake. The farm fields surrounding the quarry have produced numerous chert tools and workshop sites (Prisch 1976:8-9). Although no chert bearing bedrock outcrops were encountered during the site visit, the presence of chert bearing bedrock formations in the area suggests a low to moderate sensitivity for precontact workshop sites.

### Historic Archeological Sensitivity

The historic sensitivity of an area is based largely on the examination of historical maps as well as the presence of documented archeological sites in the vicinity. The late 19<sup>th</sup> and 20<sup>th</sup> century maps indicate five map documented structures (MDS) along the western perimeter of Area B and one near the southeastern corner of Area C. Three of the buildings (MDS 1, 2 and 3) located on the west side of County Line Road

have been impacted by the quarry operation and any remnants have been removed. Therefore, this section of the project area has a very low sensitivity for the presence of intact historic cultural resources.

A small one-story structure is located within the northwestern corner of the Area B. The building is surrounded by agricultural fields and is located near the intersection of County Line Road and Cohocton Road in the general vicinity of MDS 4 (Map 2; Photo 8). Examination of the general landscape and surface soils in the vicinity of MDS 5 indicate the area has experienced significant disturbance resulting from the removal of the structure and any surrounding outbuildings. No structural evidence (cellar hole or foundation remains) were encountered during the site visit. The area in the vicinity of MDS 6 was also examined for structural remains and none were identified during the site visit. The northwestern most portion of Area B and the southeastern most end of Area C are considered moderately sensitive for the presence of 19<sup>th</sup> century historic cultural resources.

### **ARCHEOLOGICAL POTENTIAL**

The archeological potential is the likelihood of locating intact archeological remains within the project area. The historical maps suggest the undisturbed sections of the westernmost portion of Area B and the southeastern corner of Area C have a moderate potential for the presence of 19<sup>th</sup> century historic cultural resources. Although no surface evidence of any bedrock formations containing chert deposits were encountered during the site visit, the regional archeological evidence suggests that lithic quarry or workshop materials obtained from other Onondaga Formation quarry sites (Diver Lake Precontact Quarry) have a fairly wide distribution radius. Therefore, it is possible that workshop materials extracted from a quarry site located on an adjacent property may have been deposited onto the property. The undisturbed sections of the three properties are considered to have a low to moderate potential for containing precontact cultural resources.

### **RECOMMENDATIONS**

The Phase IA research revealed no recorded archeological sites within a mile radius of the project area and no properties listed on the State/National Registers of Historic Places (NR) located in the general vicinity of the project area. A review of the historic maps revealed several map documented structures dating from the 19<sup>th</sup> century along the western perimeter of Area B and at the south end of Area C. The northwestern most portion of Area B and the southeastern most end of Area C are considered moderately sensitive for the presence of 19<sup>th</sup> century historic cultural resources and subsurface testing may be warranted. Although no precontact sites were identified within a mile radius of the project area, the presence of chert bearing Onondaga Formation limestone increases the probability of encountering precontact workshop sites, and may require some subsurface testing. Consultation with the DEC regional office is recommended to access the archeological potential, and to determine if Native American consultation is warranted.

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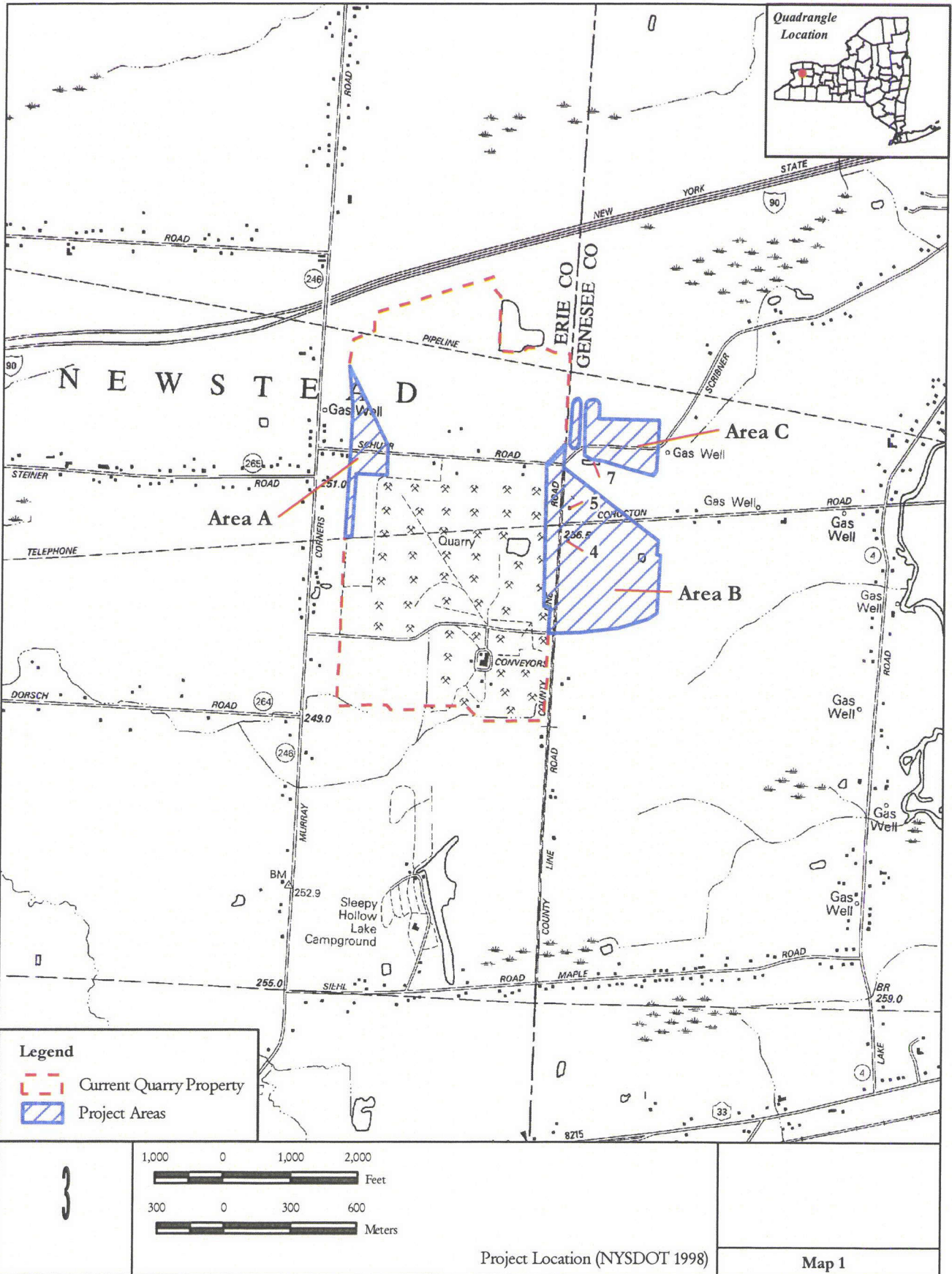
1935 *Attica 15' Topographic Quadrangle, New York*. U.S. Government Printing Office, Washington, D.C. Originally printed in 1905.

1949 *Attica 15' Topographic Quadrangle, New York*. U.S. Government Printing Office, Washington, D.C.

**MAPS**



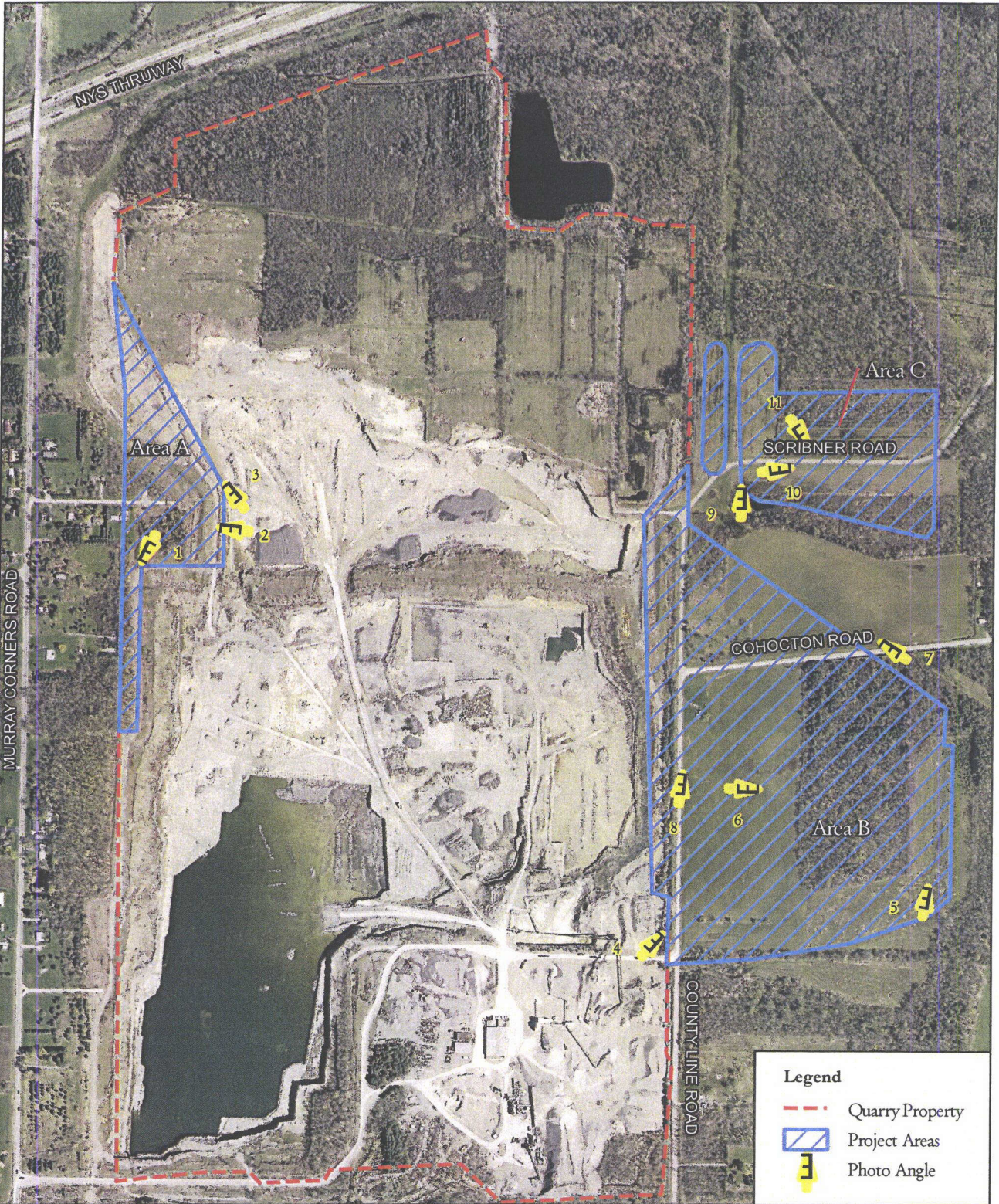
County Line Stone Quarry Expansion, Towns of Newstead and Pembroke, Erie and Genesee Counties  
Phase IA Archeological Investigation



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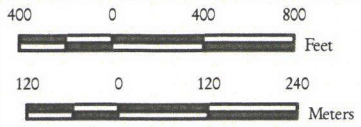


County Line Stone Quarry Expansion, Towns of Newstead and Pembroke, Erie and Genesee Counties  
Phase IA Archeological Investigation



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3



- Legend**
- - - Quarry Property
  - Project Areas
  - E Photo Angle

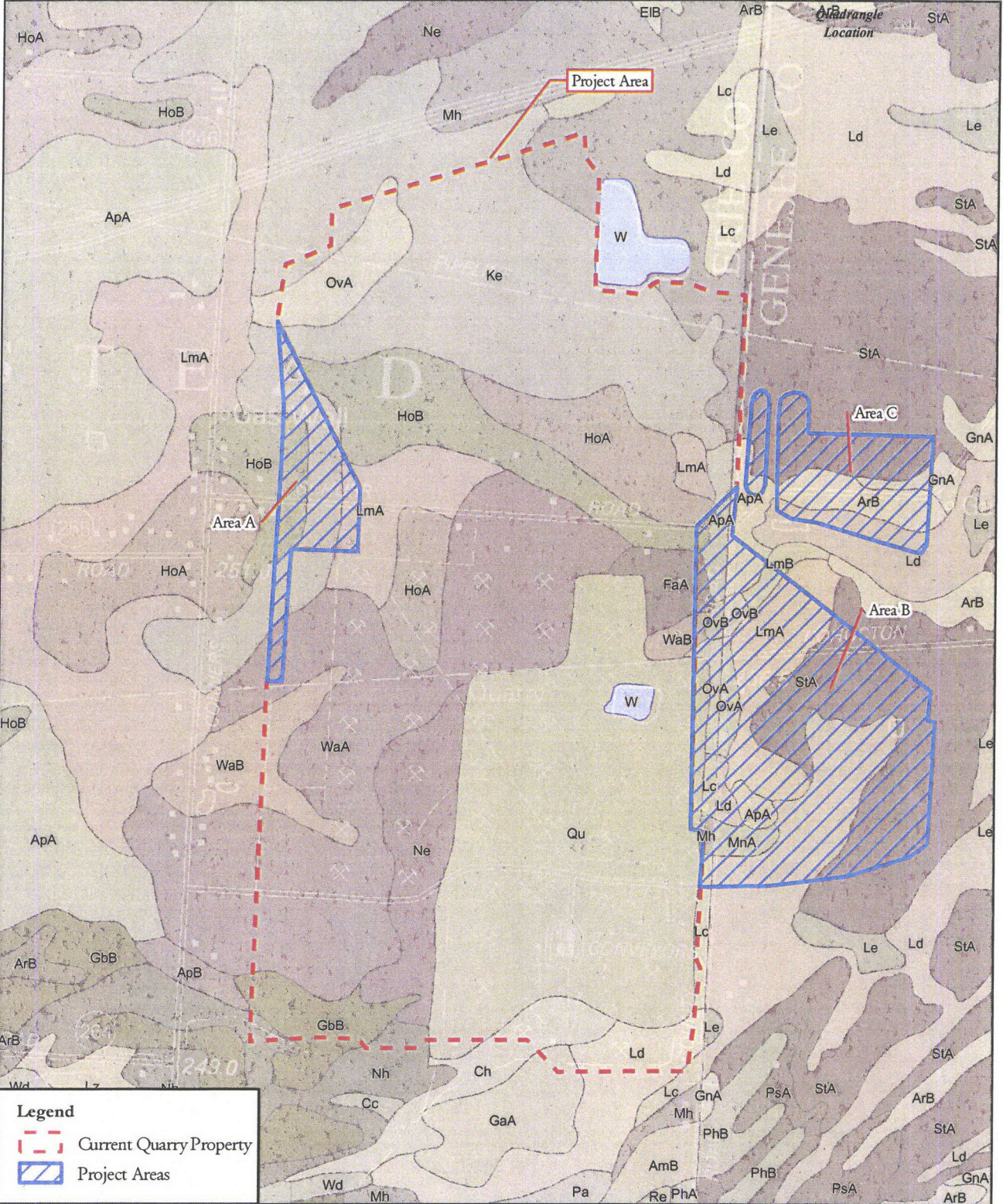
Project Map  
(NYSCSIC 2011, Hartgen 2012)



Map 2

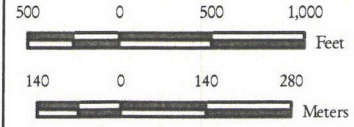


County Line Stone Quarry Expansion, Towns of Newstead and Pembroke, Erie and Genesee Counties  
 Phase IA Archeological Investigation



**Legend**

- Current Quarry Property
- Project Areas



3

Soils Map  
 (USDA NRCS 2006, NYSDOT 1998)

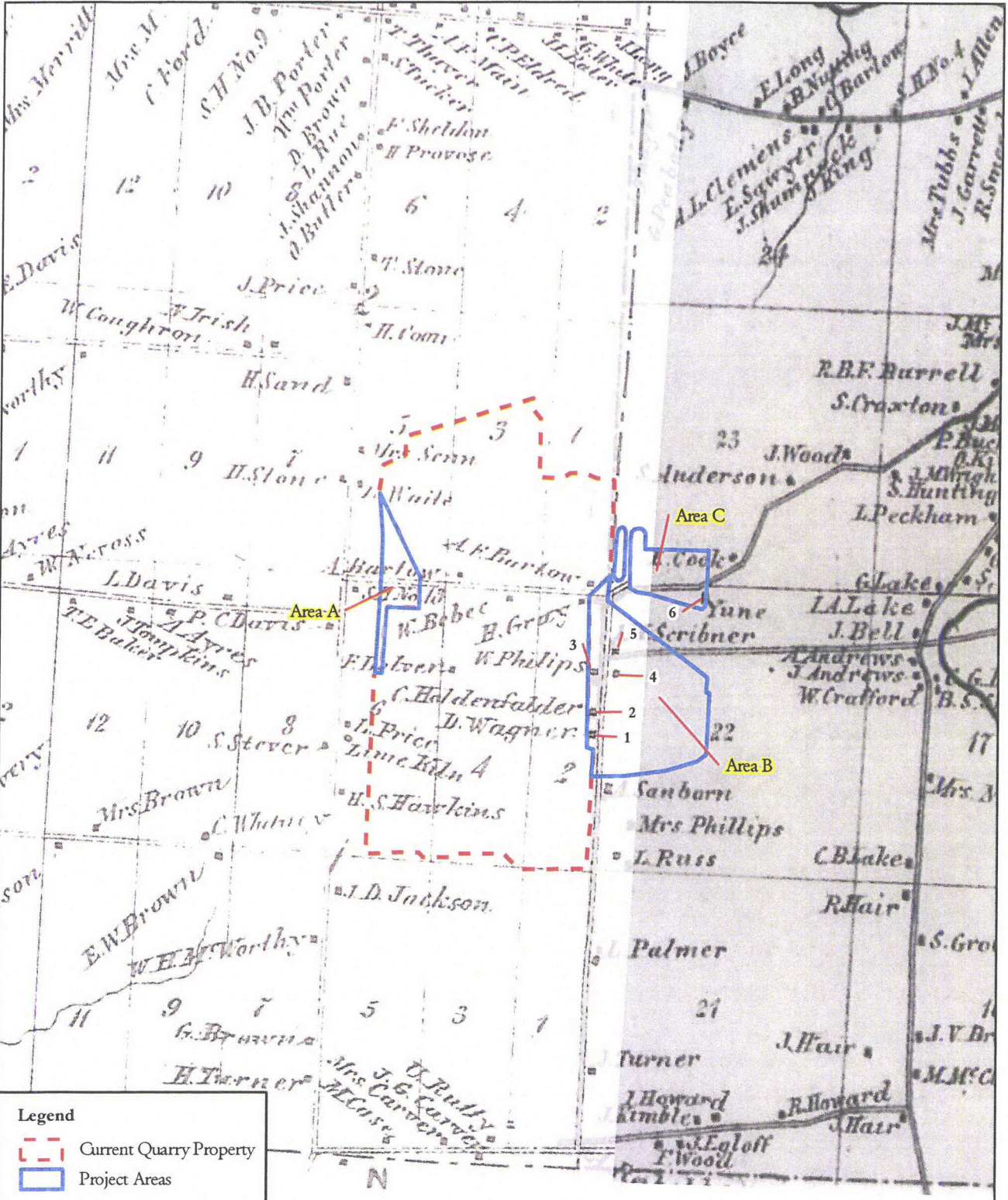
**HARTGEN**  
 archeological associates inc.

Map 3

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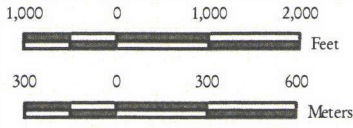


County Line Stone Quarry Expansion, Towns of Newstead and Pembroke, Erie and Genesee Counties  
 Phase IA Archeological Investigation



**Legend**

- Current Quarry Property
- Project Areas



3



**HARTGEN**  
 archeological associates inc

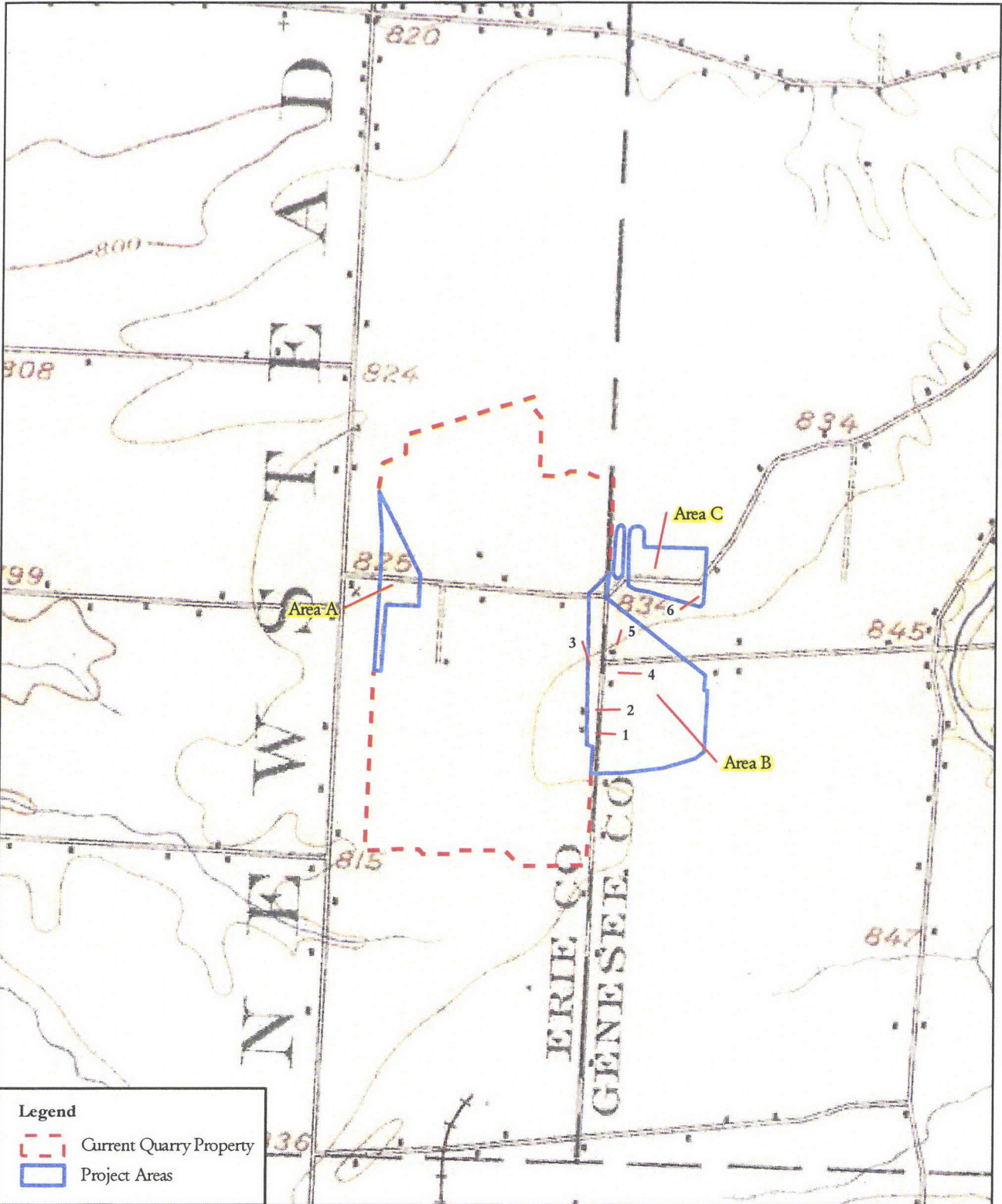
Stone & Steward 1866/Beers 1866

Map 4

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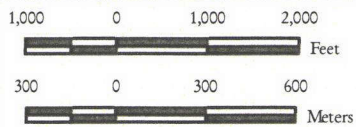
County Line Stone Quarry Expansion, Towns of Newstead and Pembroke, Erie and Genesee Counties  
Phase IA Archeological Investigation



**Legend**

- Current Quarry Property
- Project Areas

3



USGS 1905

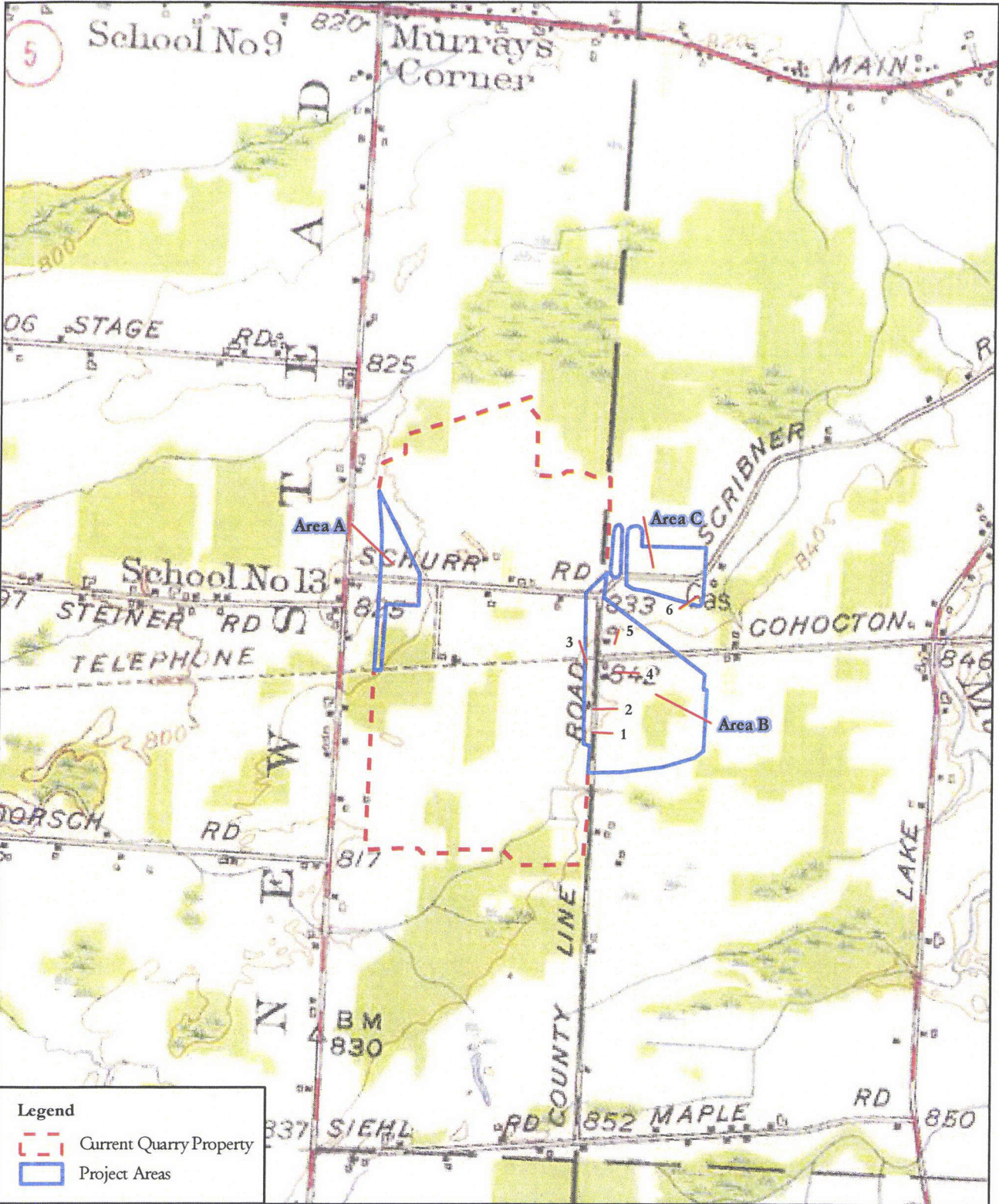
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Map 5

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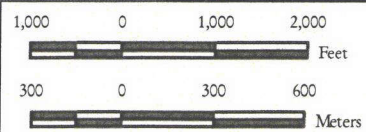


County Line Stone Quarry Expansion, Towns of Newstead and Pembroke, Erie and Genesee Counties  
 Phase IA Archeological Investigation



**Legend**

- Current Quarry Property
- Project Areas



3

**HARTGEN**  
 archeological associates inc

USGS 1949

Map 6

TSM, August 13, 2012 R:\Active Projects\4548 Comp\Line Stone Quarry\4548-11\Map\GIS\1866.mxd

**PHOTOGRAPHS**





Photo 1. View south of the southern portion of Area A. This narrow section of the parcel is mostly wooded.



Photo 2. View west of the central portion of Area A. The parcel is mostly wooded interspersed with patches of thick brush. No bedrock outcrops were detected during the surface reconnaissance.





Photo 3. View northwest of the northern portion of Area A. This section of the parcel is partially wooded and contains sections that have experienced prior disturbance.



Photo 4. View northeast of the eastern and central portions of Area B. The parcel is mostly soy bean field that parallels County Line Road.





Photo 5. View northeast of the eastern portion of Area B. The parcel contains mostly open fields interspersed within occasional pine trees.



Photo 6. View east of the central portion of Area B. The parcel is mostly wooded and contains several large sections of thick brush. No bedrock outcrops were detected during the surface reconnaissance.





Photo 7. View northwest of the northern portion of Area B. The parcel lies west of the gas line and contains mostly soy bean field. Thick brush is evident at the western end of the parcel.



Photo 8. View northeast of a small cottage-style house located along the western perimeter of Area B near the intersection of County Line Road and Cohocton Road.





Photo 9. View north of the western portion of Area C located north of Scribner Road. The parcel contains a mixture of fields and thick brush.



Photo 10. View northeast of the northern portion of Area C located along the north side of Scribner Road. The parcel contains a mixture of woods and thick brush. No bedrock outcrops were detected during the surface reconnaissance.





Photo 11. View southeast of the south portion of Area C located south of Scribner Road. The parcel contains mostly thick brush

**APPENDIX 1: OPRHP Project Review Cover Form**







**Appendix 13**  
**Property Value Study**

**DO ROCK QUARRY OPERATIONS  
AFFECT APPRECIATION RATES OF  
RESIDENTIAL REAL ESTATE**

Anne M. Dorrian

Clifford G. Cook

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April 4, 1996

DO ROCK QUARRY OPERATIONS  
AFFECT APPRECIATION RATES OF  
RESIDENTIAL REAL ESTATE

Anne M. Dorrian and Clifford G. Cook

INTRODUCTION

It is a well researched fact that disamenities have a negative impact on residential property values and appreciation rates. Studies have shown that factors such as air pollution (Murdoch and Thayer 1988), airport noise (Nelson 1979), waste disposal sites (Thayer et al 1992), earthquake and flood zones (Murdoch et al 1993) and federal and/or state laws (Brookshire et al 1982) all have a negative impact on value. To identify a factor, such as quarry operations, as a disamenity, there should exist a significant increase in property values and/or appreciation rates as the distance from the disamenity increases. Two prior studies were done to test the impact of quarry operations on residential property values. Neither study identified a significant negative impact on real estate near the quarries and this study will confirm that evidence.

The U.S. Department of the Interior, Bureau of Mines, conducted a study published in 1981 (Radnor et al 1981). The authors studied residential properties near seven existing quarries in Illinois, Kentucky, Pennsylvania and Missouri and determined that quarry operations did not have a significant impact on property values. In fact, in some cases, property values adjacent to the quarry were higher than those located some distance away. The study results indicated that no consistent relationship exists between active quarries and property values. That other factors seemed to dominate value differences. Due to staff and budget reductions, the Bureau of the Mines has not performed an update of this report.

Two Georgia State University professors conducted a second study in 1987 (Rabianski and Carn 1987). Their study was designed to determine if a new quarry located off U.S. 41 in Bolingbroke, Georgia would reduce the property values of adjacent residential properties. They used the repeat sales method to estimate annual appreciation rates and they found that if a quarry is properly designed and operated, it should not have a significant impact, either positive or negative, on adjacent property values. Proper design and operation of a quarry would control for air pollution from crushing or blasting, traffic hazards, noise and visual unattractiveness. Rabianski and Carn found that some property owners actually preferred living near the quarry, believing the added amenity of increased open space far offset any disamenity resulting from blasting noise.

Following are the results of a study conducted in central Ohio. At issue is the question of whether or not the expansion of an existing quarry in Delaware County will reduce nearby residential property values. The primary focus of this study will be on residential appreciation rates near the Delaware County quarry and a second central Ohio quarry located in Franklin County.

### VARIABLES TO CONTROL

In order to isolate the impact of quarry operations on residential property values it is important to eliminate, and/or control for, other possible variables known to effect property values. By choosing the repeat sales method to determine annual appreciation rates, the authors have eliminated several of these variables. The repeat sales method used in several studies to \* estimate real estate price indices (Abraham 1991, Case et al 1991, and Clapp et al 1991), involves the use of a sample of properties which have sold more than once. The annual appreciation rate is then calculated for each property and a statistical analysis is performed on the sample appreciation rates. By using properties which have had repeat sales, we are able to control for structural differences between properties, thereby maintaining a constant quality in the sample. For example, because we are using two sales prices for the same property, we do not have to adjust for differences in lot or house size, number of rooms or type of house.

Locational and economic variables must also be identified and addressed. Economic variables such as interest and inflation rates will impact all properties for sale during a given time period and may therefore be evident in the number and price of all properties sold. Because economic variables will impact all properties and because the purpose of this study is to determine if a difference exists between quarry and non-quarry properties, economics variables will not affect the results of this study.

Locational variables include items such as school district, distance from the quarry and municipalities. The authors have controlled for these variables in the condominium sample by estimating annual appreciation rates for: 1) the total samples (Table 1); 2) by school district (Table 2); 3) by price range, a proxy also for size (Table 3) and; 4) by map area (Table 4). The single family Franklin County sample controls for locational variables by comparing the two subdivisions closest to the quarry (The Glen and Highpoint) to two subdivisions directly north of, but at some distance from, the quarry (Villages of Hayden run and Saddlebrook). All four subdivisions (Table 5) are in the same school district and price range and the houses are of a similar age.

## SITE SELECTION

The 340 acre Shawnee Quarry located in southern Delaware County, Ohio began operations around 1920. The Scioto River makes up the eastern border of the existing quarry and a women's correctional facility borders the quarry to the north. Properties to the west and south of the quarry are a combination of agricultural land, small older homes and large newer homes. This study estimates the appreciation rates for thirty properties, both vacant lots and homes, located near the Shawnee Quarry. Some of these properties are located east of the Scioto River, but are included in the study due to the fact that they could be affected by the impact of noise from quarry blasting. Due to the variety of property types along with the lack of sufficient repeat sales, the authors believed results from this area would not be statistically significant, therefore an analysis of residential properties adjacent to the Marble Cliff Quarry was also conducted. It is believed that the results reflected in the Marble Cliff analysis should also accurately reflect any potential impact caused by expanded operations near the Shawnee Quarry.

The 600 acre Marble Cliff Quarry located in Franklin County, Ohio opened in 1920. This quarry is bordered to the north by two condominium complexes, Stonebrook and Walden Ravine, and to the northwest by two single family subdivisions, The Glen and Highpoint. Because condominiums provide more sales data (1,352 properties), the initial study was conducted comparing the quarry complexes to forty complexes located north of I70 and west of I71. The second study compared the sales of 340 single family homes located near the quarry to the sales of 350 single family homes located north of the quarry in similar subdivisions.

## METHODOLOGY

Real estate price indices are typically estimated using either the Repeat Sales Method or the Hedonic Method. The Hedonic Method requires the use of regression analysis to "price" different attributes which contribute to the composite price of the property. This is the appropriate method to use for properties with varying structural or locational variables. The drawback to the Hedonic Method is that all sales data comes from different properties and there is no way to control for all types of variables which might impact value. Because the Repeat Sales Method calculates the appreciation rate for a particular property over a given period of time, most of the impacting variables are eliminated since the structure and location do not change. Therefore, the Repeat Sales Method results in a "constant quality" index.

Sales for condominium and single family properties located in Franklin County were identified through the use of the Columbus Board of Realtors M.L.S. computer system. The tax record data base was utilized to retrieve the sales prices of all properties which sold more than once. The M.L.S. system for Delaware County properties includes only the most recent sale, therefore a physical search of the tax records in the Delaware County Auditor's Office was required. This search resulted in only thirty identified repeat sales for both houses and vacant lots.

Once sales prices were obtained, annual appreciation rates were calculated for each property by estimating their internal rates of return. The individual appreciation rates were then combined to arrive at composite annual and total appreciation rates. In order to control for



structural and locational variables possibly impacting condominium appreciation rates, the sample was also sorted by price range, taxing district and map area and separate appreciation rates were determined for each category.

## RESULTS

### Study #1: Marble Cliff Quarry - Condominiums

Forty-two condominium complexes containing 1,352 repeats sales from 1980 - 1995 were identified in central Ohio, north of I70 and west of I71. Table 1 describes each complex in terms of: number of units sold; annual appreciation rate (return); standard deviation; price range; taxing/school district; and map area. The two complexes adjacent to the quarry, Stonebrook and Walden Ravine, are identified as "Quarry Condos". The graphs following Table 1 reflect significantly higher appreciation rates for quarry condominiums both on an annual basis and for the entire time period. Quarry condominiums exhibited a 2.9% fifteen year average appreciation rate whereas the rate for all other condominiums is only 1.1%. This figure alone appears to indicate that quarry operations have not had a negative impact on the value of residential real estate near the quarry. \*

In order to control for possible discrepancies due to price, all condominium complexes were sorted into three categories. The medium price range (\$65,000 to \$125,000) includes all

condominiums in the same price range as the quarry condominiums. All other condominiums were placed in categories either above (high price range) or below (low price range) the quarry condominiums. The results presented in Table 2 and the following graph again indicate that the quarry has created no negative impact on property values (Quarry condos 2.9% versus Medium Priced condos 1.5%).

Table 3 and its graph sort al condominium complexes by taxing/school district. The quarry condominiums are in taxing district 560 (city of Columbus, Hilliard Schools). There are no other condominium complexes in this district. Therefore the next logical comparison would be to taxing districts 590, 600 and 610, all in the city of Columbus, but with suburban school districts (Dublin, Westerville and Worthington respectively). Again the results reflect that the 2.9% average appreciation rate for quarry condominiums is higher than the appreciation rates for comparable areas (0.3%, 1.0% and 1.3%). In fact, the appreciation rate for quarry condominiums is higher than that for all other taxing districts.

The condominium sample was also sorted by the Columbus Board of Realtor's M.L.S. map areas. Quarry condominiums are located in area I25. Table 4 and its graph show that only two areas (M22 & O24) have appreciation rates higher than the quarry area.. Again, this data reflects evidence that quarry operations do not have a negative impact on residential property values.

## Study #2: Marble Cliff Quarry - Single Family Homes

Six hundred and ninety single family homes were analyzed in four subdivisions from 1985 through 1995. The Glen and Highpoint subdivisions located adjacent to the Marble Cliff Quarry operation exhibited a 3.8% average appreciation rate whereas the Villages of Hayden Run and Saddlebrook subdivisions located north of the quarry had a 3.5% appreciation rate. The overall appreciation rate for quarry homes was slightly higher but not significantly different from the homes north of the quarry, and the annual appreciation rate for the quarry subdivisions was below the other subdivision in only one out of eleven years studied. Again the results indicate that the quarry has had no negative impact on the value of nearby homes. The results of this study are found on Table 4 and its graph.

## Study #3: Shawnee Quarry - Single Family Homes

Table 5 presents the annual appreciation rates for properties located near the quarry which were identified to have experienced repeat sales. Because the authors were able to identify only thirty properties, the results are not considered to be statistically significant. Recognizing this fact, the annual appreciation rates for all eleven years are still higher than those reflected in Table 4 for the Marble Cliff Quarry single family homes. Although there is not sufficient data from which to derive statistical conclusions, it appears that the Shawnee Quarry operations have not had a negative impact on the value of nearby properties. ✓

## CONCLUSION

The results of both the condominium and single family studies for the Marble Cliff Quarry operation show that property owners have not experienced a negative impact on their property values as a result of being located adjacent to an existing quarry. Although there is insufficient data to support a statistical analysis of property values near the Shawnee Quarry, there is no indication that further data would contradict the results at Marble Cliff. Therefore an expansion of the Shawnee Quarry in Delaware County should also result in no negative impact on adjacent and nearby residential properties.

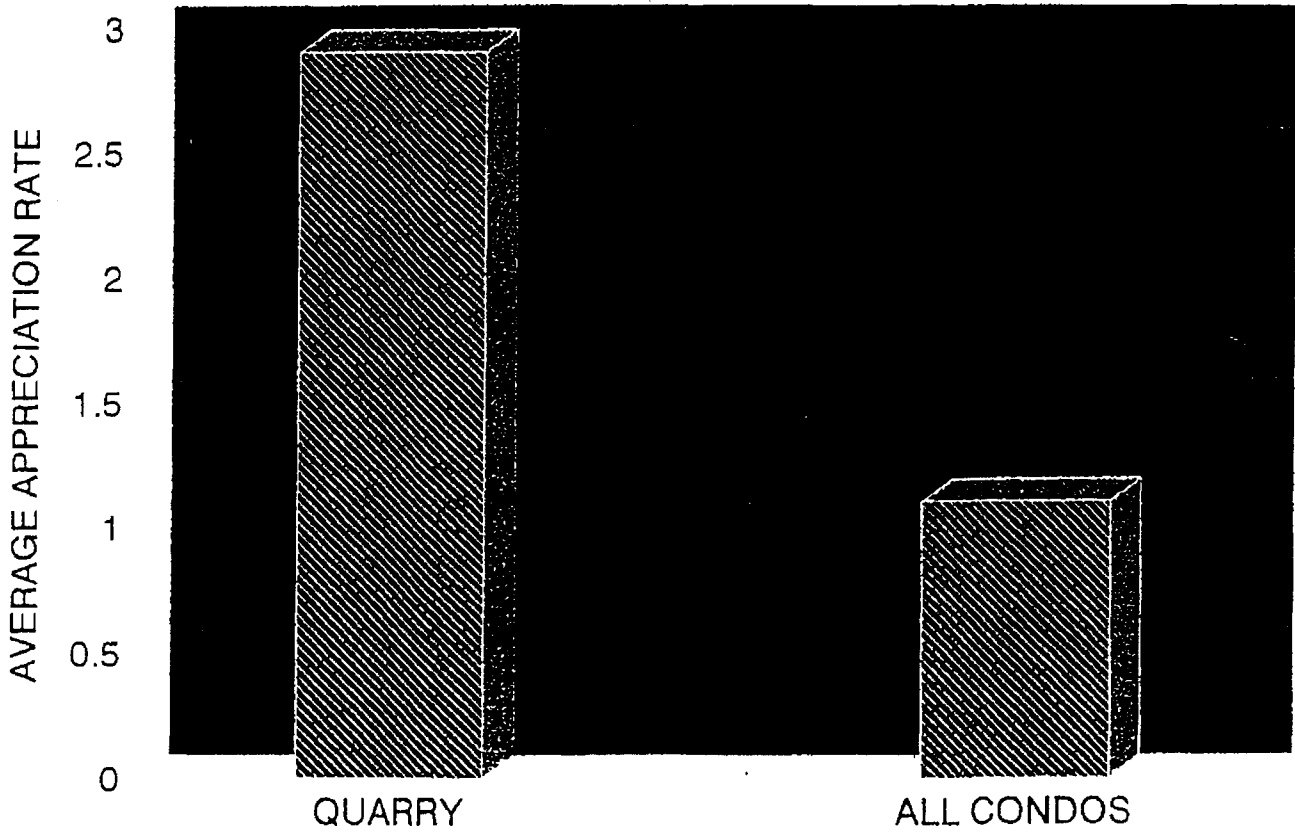
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**TABLE 1**  
**Condominium Complexes**  
**1980 - 1995**

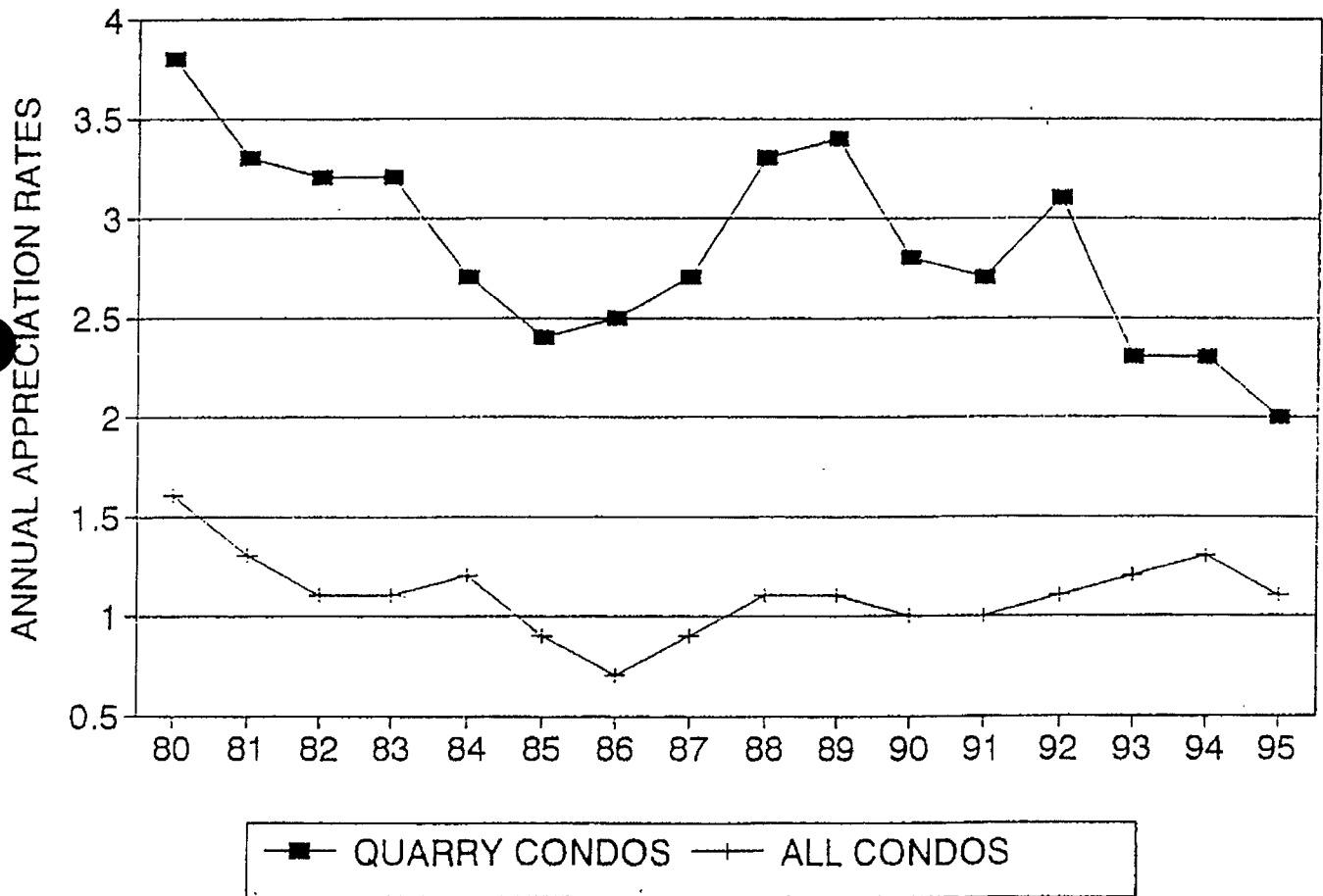
COMPLEX	UNITS	RETURN	S. D.	PRICE	T.D.	MAP
Arlingate	12	3.6	0.020	med	070	J22
Arlingtowne	16	2.1	0.010	low	070	J25
Branford	17	1.3	0.015	low	070	K23
Carriage Hill	56	1.9	0.019	low	070	K23
Chatham Village	79	-0.1	0.021	low	010	L25
Chaucer	14	4.1	0.011	med	070	K22
Colony Hill	28	2.9	0.017	low	010	I28
Edinborough	12	1.0	0.014	med	590	K22
Enclave	57	-0.1	0.028	low	590	I22
Fallcreek	50	0.4	0.026	low	610	I22
Glenbar	17	1.1	0.022	high	273	P17
Hayden Falls	4	3.4	0.022	high	590	O23
Hearthstone	61	-1.9	0.074	low	010	L23
Hendereed	117	0.3	0.018	low	010	K23
Hidden Acres	5	0.2	0.011	med	010	K23
Hidden Lakes	7	3.0	0.030	med	070	J27
Hillside	13	2.7	0.030	med	590	I22
Landings	11	2.3	0.020	med	070	N18
Latin Quarter	5	2.0	0.020	med	590	I23
Meadowlands	23	0.9	0.024	med	010	H32
Olde Sawmill	8	-1.4	0.021	med	590	I22
Olentangy Commons	62	1.1	0.010	med	010	K22
Olentangy Village	13	3.0	0.012	med	010	M22
QUARRY CONDOS	44	2.9	0.016	MED	560	I25
Rirttenhouse	27	1.9	0.010	med	010	K22
Saltergate	3	-0.6	0.012	low	590	I18
Shadow Lakes	5	2.1	0.041	med	010	K21
Sherwood Colony	47	1.0	0.029	med	600	P20
Shiloh Station	6	-0.7	0.015	low	590	I22
Strathaven	13	1.3	0.014	high	100	K19
Summitchase	37	2.0	0.026	med	030	K28
Tamarack	59	0.0	0.029	low	010	P20
Ville Charmante	102	2.7	0.019	high	100	M19
Willoway	20	1.1	0.020	low	010	K23
Woodbridge	43	2.3	0.043	low	610	P20
Woodrun	74	0.0	0.013	med	590	J22
Worthington Heights	105	2.0	0.014	med	610	O18
Worthington Lakes	2	-3.9	0.064	med	610	O18
Worthington Row	10	1.6	0.055	med	610	O18
Worthington Woods	47	0.2	0.030	low	610	O18
Worthington Glen	22	2.7	0.023	med	100	M19

# CONDOMINIUM APPRECIATION RATES 1980 - 1995



# CONDOMINIUM APPRECIATION RATES

1980 - 1995





**TABLE 2**  
**Comparison of Condominiums by Price Range**  
**1980 - 1995**

**Price Range: LOW - Less than \$65,000**  
Average Appreciation Rate: 0.02%  
Standard Deviation: 0.30  
Number of Units: 659

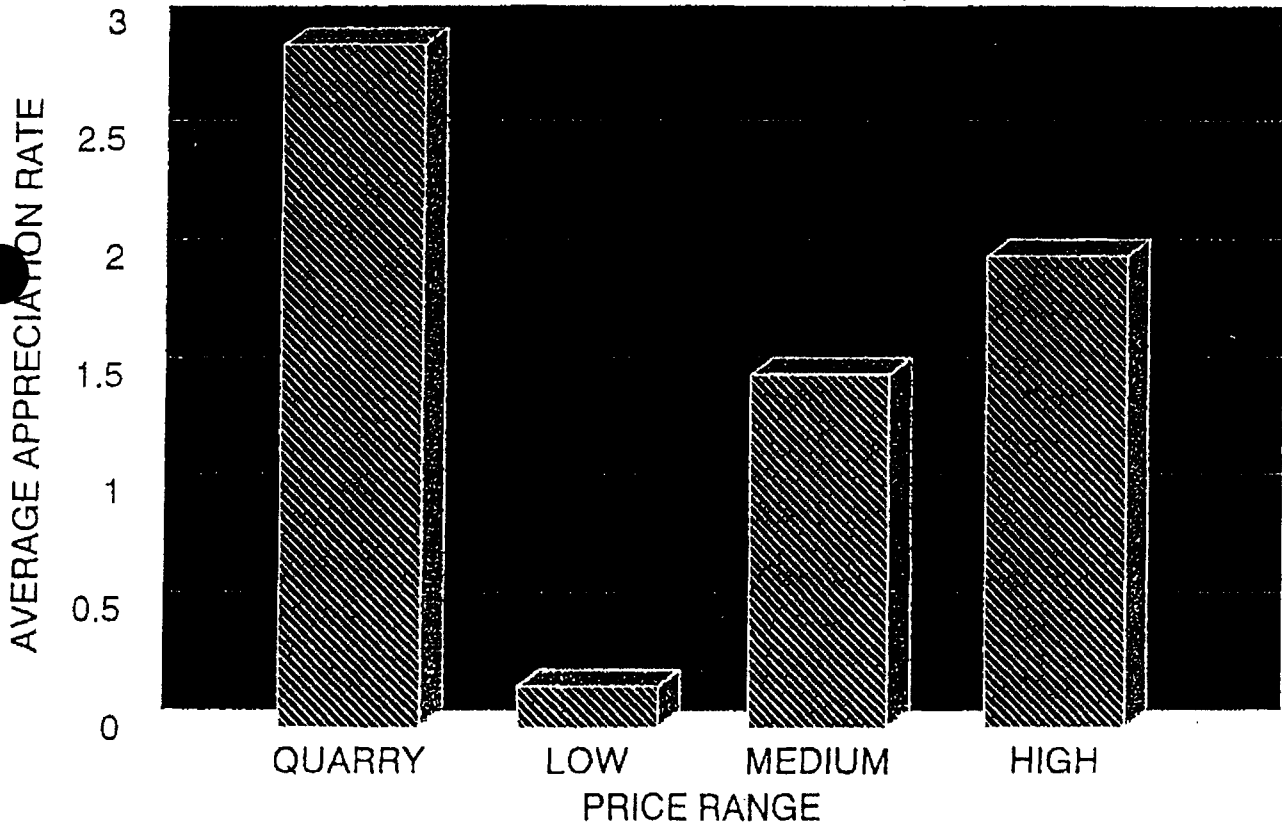
**Price Range: MEDIUM - \$65,000 - \$125,000**  
Average Appreciation Rate: 1.50%  
Standard Deviation: 0.02  
Number of Units: 514

**Price Range: HIGH - More than \$125,000**  
Average Appreciation Rate: 2.00%  
Standard Deviation: 0.02  
Number of Units: 136

**Quarry Condos (Medium Priced)**  
**Stonebrook and Walden Ravine**  
Average Appreciation Rate: 2.90%  
Standard Deviation: 0.02  
Number of Units: 44

# CONDOMINIUM APPRECIATION RATES

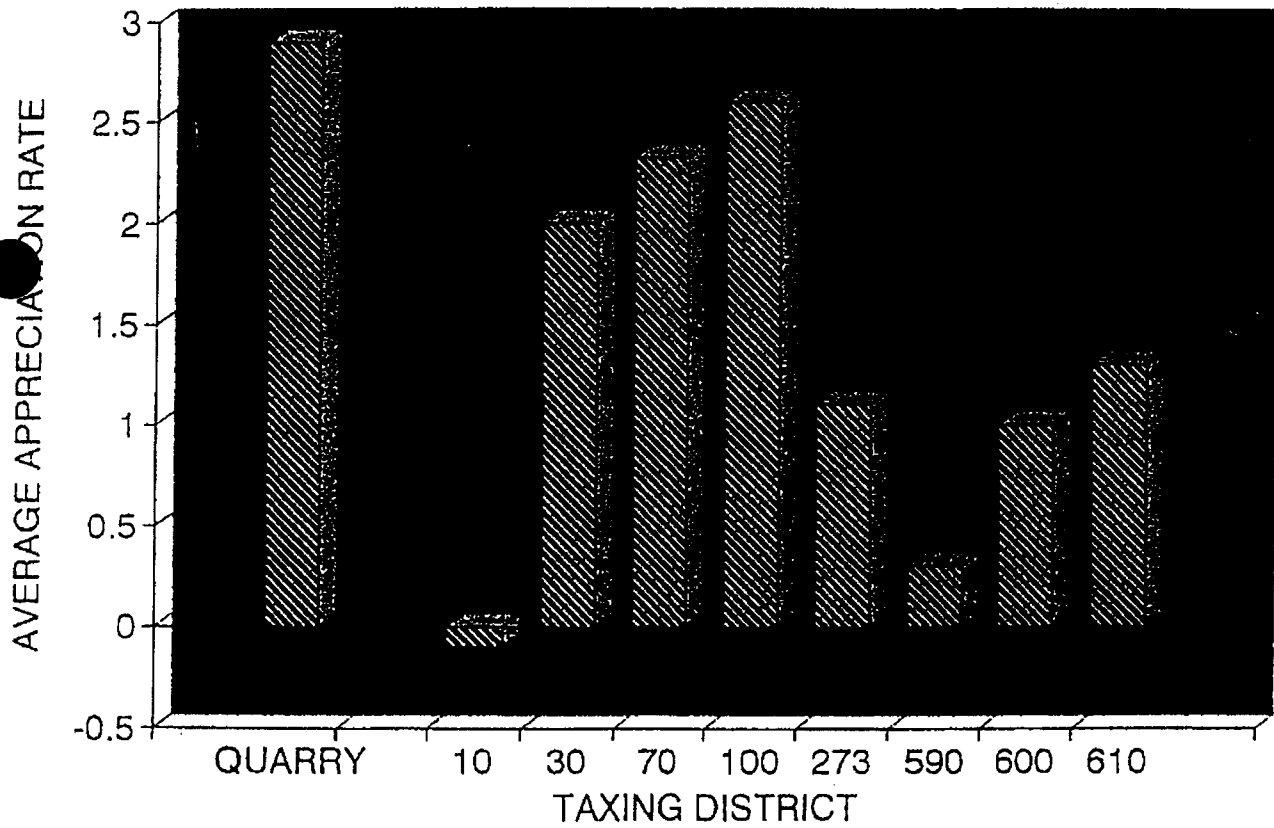
1980 - 1995



**TABLE 3**  
**Comparison of Condominiums by Taxing (School) District**  
**1980 - 1995**

<u>Municipality-School District</u>	<u>Appreciation</u>	<u>Std. Dev.</u>	<u>Units</u>
<b>Quarry Condos</b>			
560 Columbus - Hilliard	2.90%	0.02	44
010 Columbus - Columbus	-0.10%	0.32	499
030 Grandview - Grandview	2.00%	0.03	37
070 Upper Arlington - Upper Arlington	2.33%	0.02	133
100 Worthington - Worthington	2.60%	0.02	137
273 Dublin - Dublin	1.10%	0.02	17
590 Columbus - Dublin	0.30%	0.02	182
600 Columbus - Westerville	1.00%	0.03	47
610 Columbus - Worthington	1.30%	0.03	257

# CONDOMINIUM APPRECIATION RATES 1980 - 1995



**TABLE 4**  
**Comparison of Condominiums by MLS Map Area**  
**1980 - 1995**

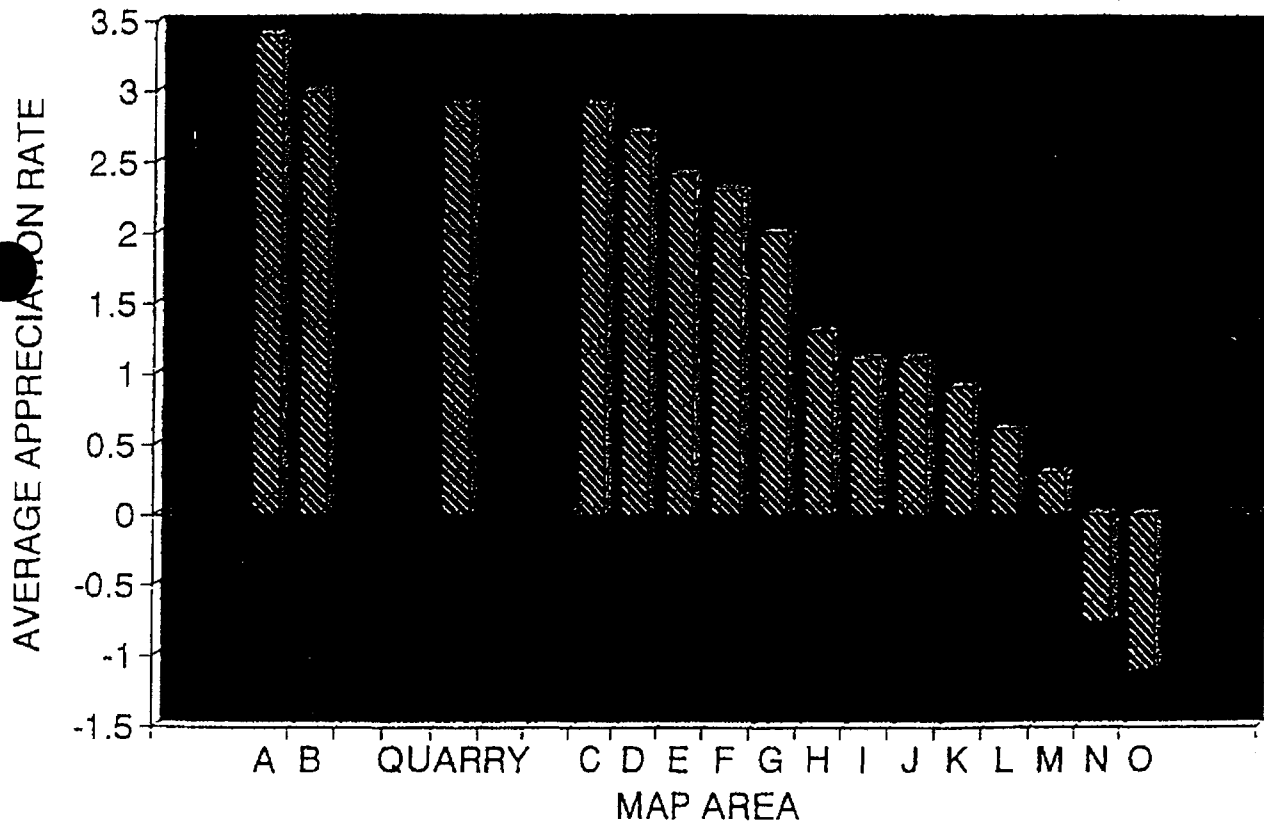
	H	I	J	K	L	M	N	O	P
17									1.1%
18		0.3%					2.3%	1.3%	
19				1.1%		2.7%			
20				1.1%					-1.1%
21				1.1%					
22		0.3%	0.6%	1.1%		3.0%			
23		0.3%		1.1%	-0.8%			3.4%	
24									
25		2.9%	2.4%		-0.8%				
26									
27			2.4%						
28		2.9%		2.0%					
29									
30									
31									
32	0.9%								

- A O23
- B M22
- C I28
- D M19
- E J25 & J27
- F N18
- G K28
- H O18
- I P17
- J K19 - K23
- K H32
- L J22
- M I18, I22, & I23
- N L23 & L25
- O P20

QUARRY - I25

# CONDOMINIUM APPRECIATION RATES

1980 - 1995



**TABLE 5**  
**Single Family Home Appreciation Rates**  
**1985 - 1995**

	<b>QUARRY HOMES</b> The Glen & Highpoint			<b>OTHER HOMES</b> Saddlebrook & Villages of Hayden Run		
	HOMES	RETURN	S.D.	HOMES	RETURN	S.D.
1985	158	3.8%	.029	59	2.8%	.036
1986	205	3.8	.020	87	3.2	.031
1987	246	3.7	.035	140	3.7	.035
1988	249	3.9	.017	183	3.2	.082
1989	241	3.8	.017	227	3.1	.078
1990	225	3.8	.017	278	3.6	.076
1991	203	3.8	.017	266	4.0	.038
1992	169	3.7	.016	240	3.7	.042
1993	123	3.8	.015	193	3.7	.041
1994	90	4.1	.018	126	3.8	.045
1995	37	3.9	.016	63	3.2	.044

**TEN YEAR COMPOSITE**

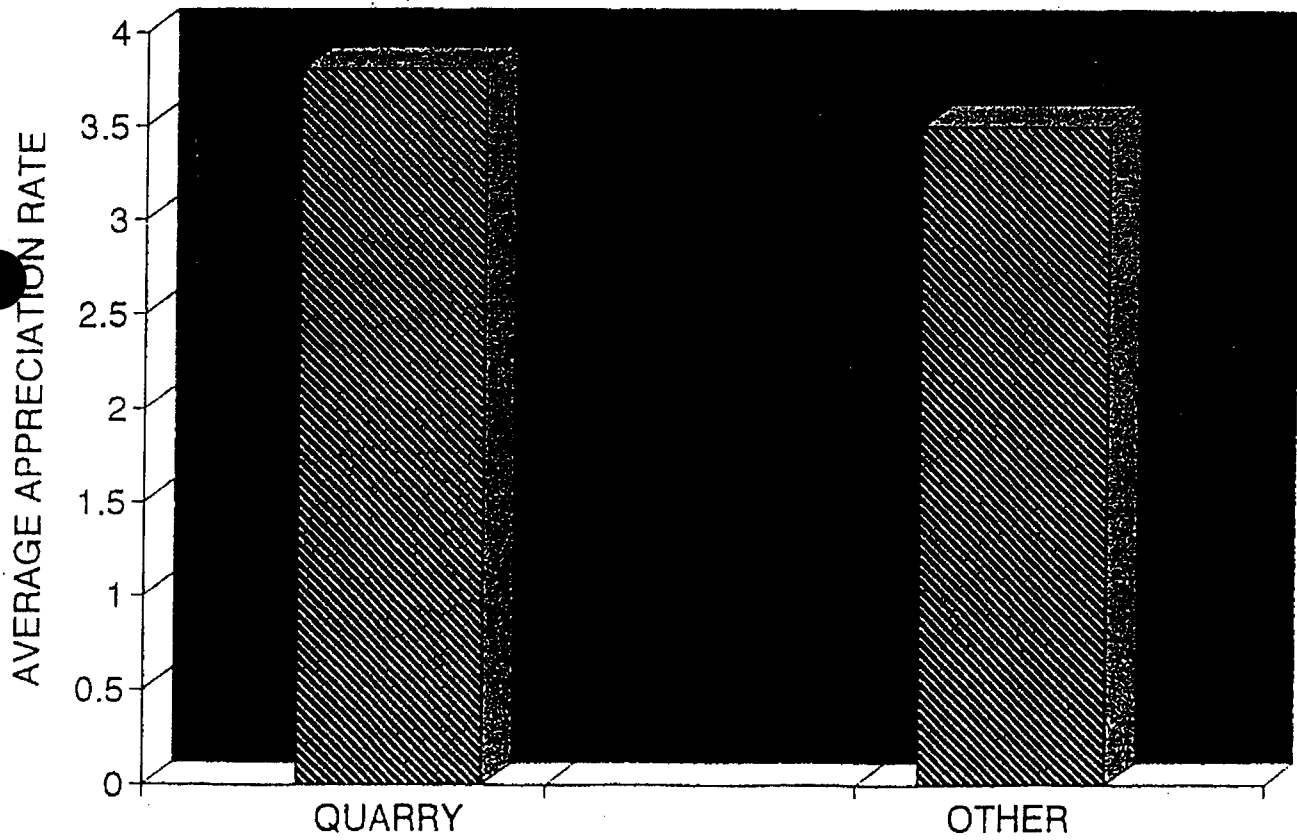
**QUARRY HOMES**

Return	3.8%
Number of Homes	340
Number of Observations	1946
Standard Deviation (S.D.)	.019

**OTHER HOMES**

Return	3.5%
Number of Homes	350
Number of Observations	1862
Standard Deviation (S.D.)	.057

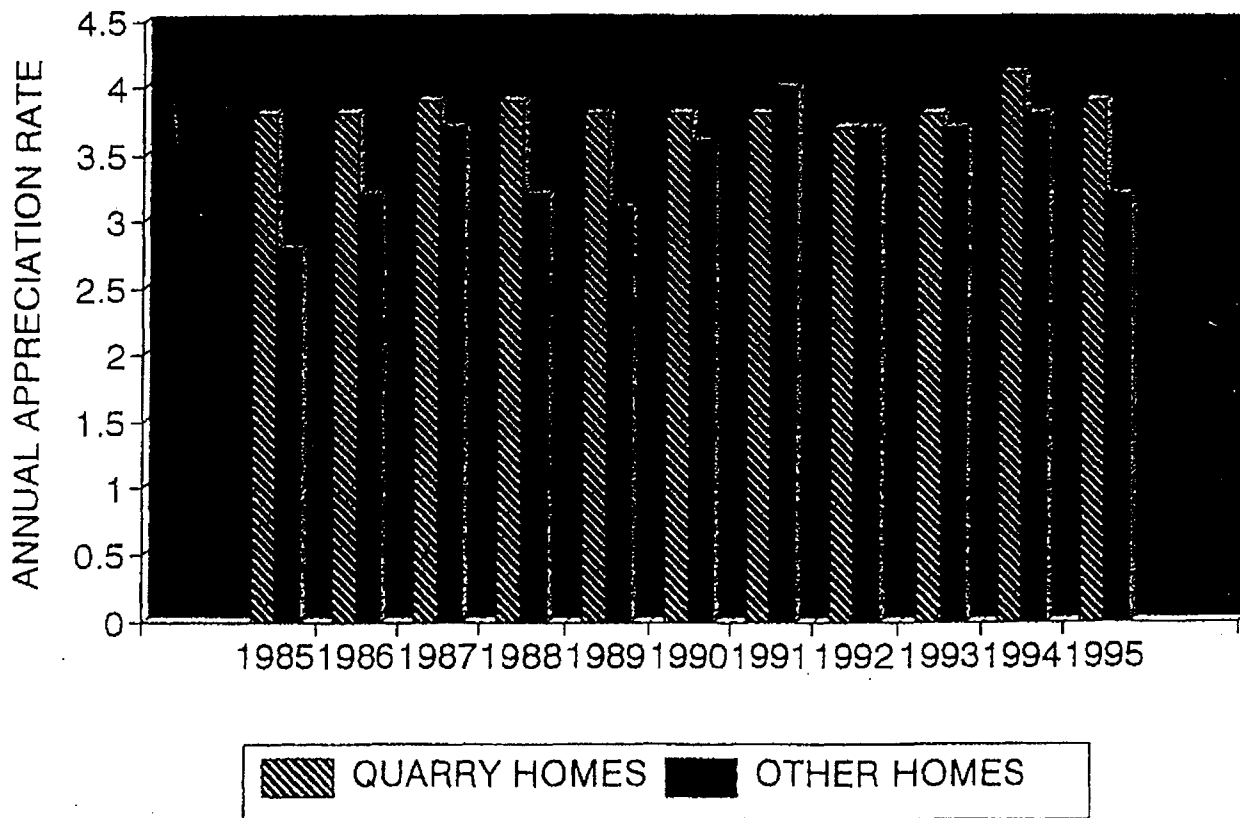
# SINGLE FAMILY APPRECIATION RATES 1985 - 1995





# SINGLE FAMILY APPRECIATION

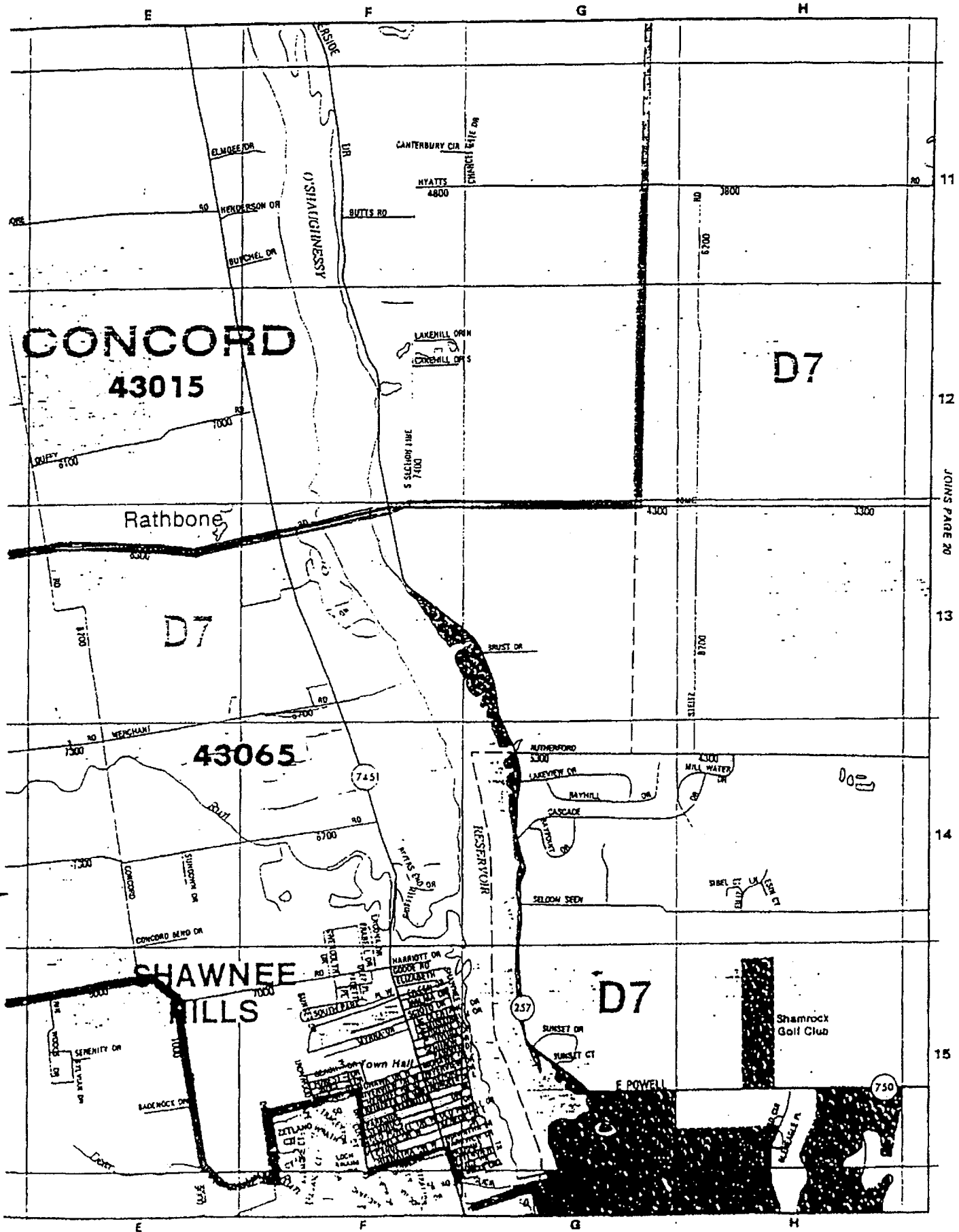
1985 - 1995





COLUMBUS BOARD OF REALTORS  
M.L.S. MAPS

M.L.S. MAP AREAS: SHAWNEE QUARRY & COMPARABLE SALES

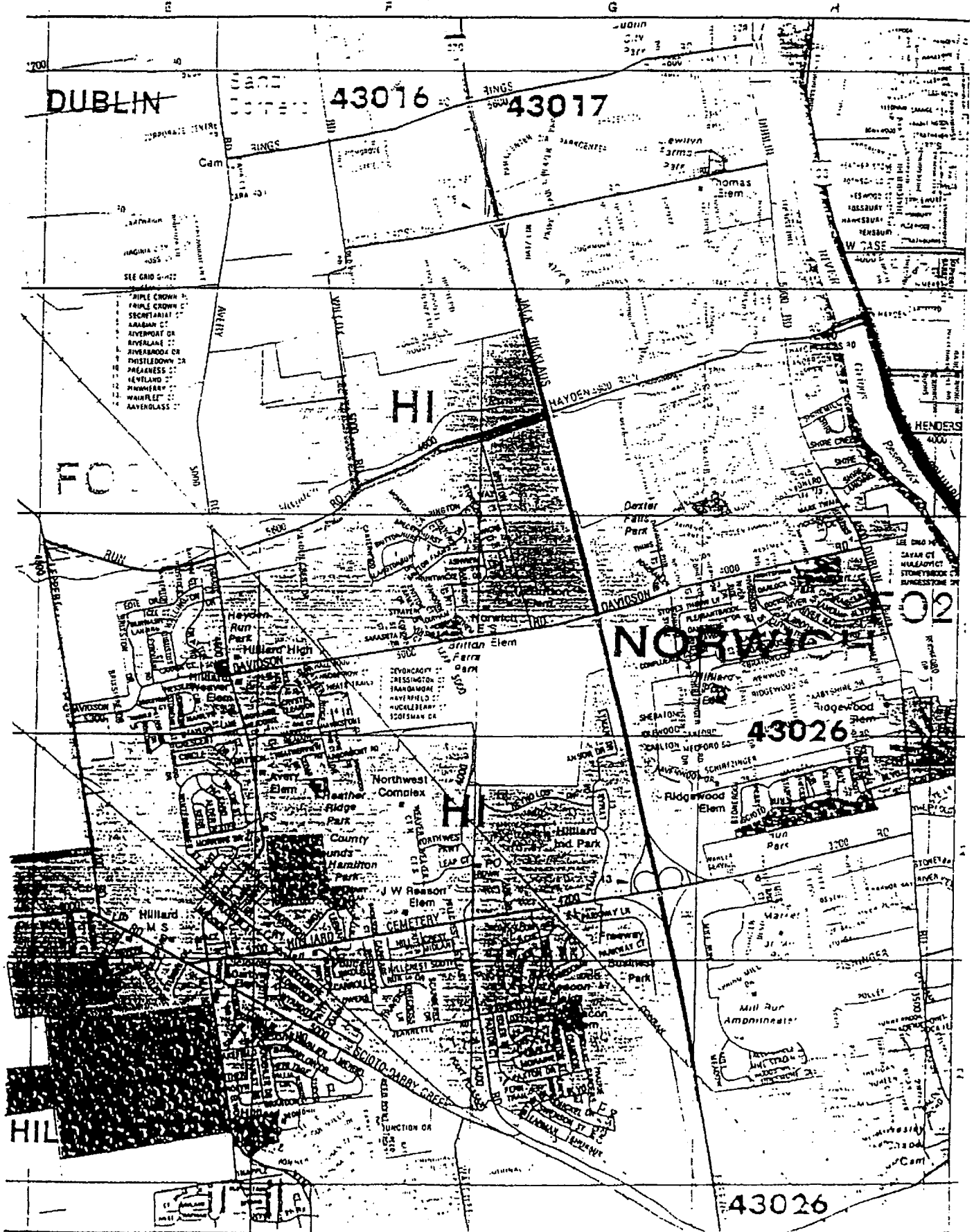


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12  
13  
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15  
JOINS PAGE 20

M.L.S. MAP AREAS: QUARRY, E (J25), J (K21-23), L (J22), M (I22-23), N (L23 & 25)

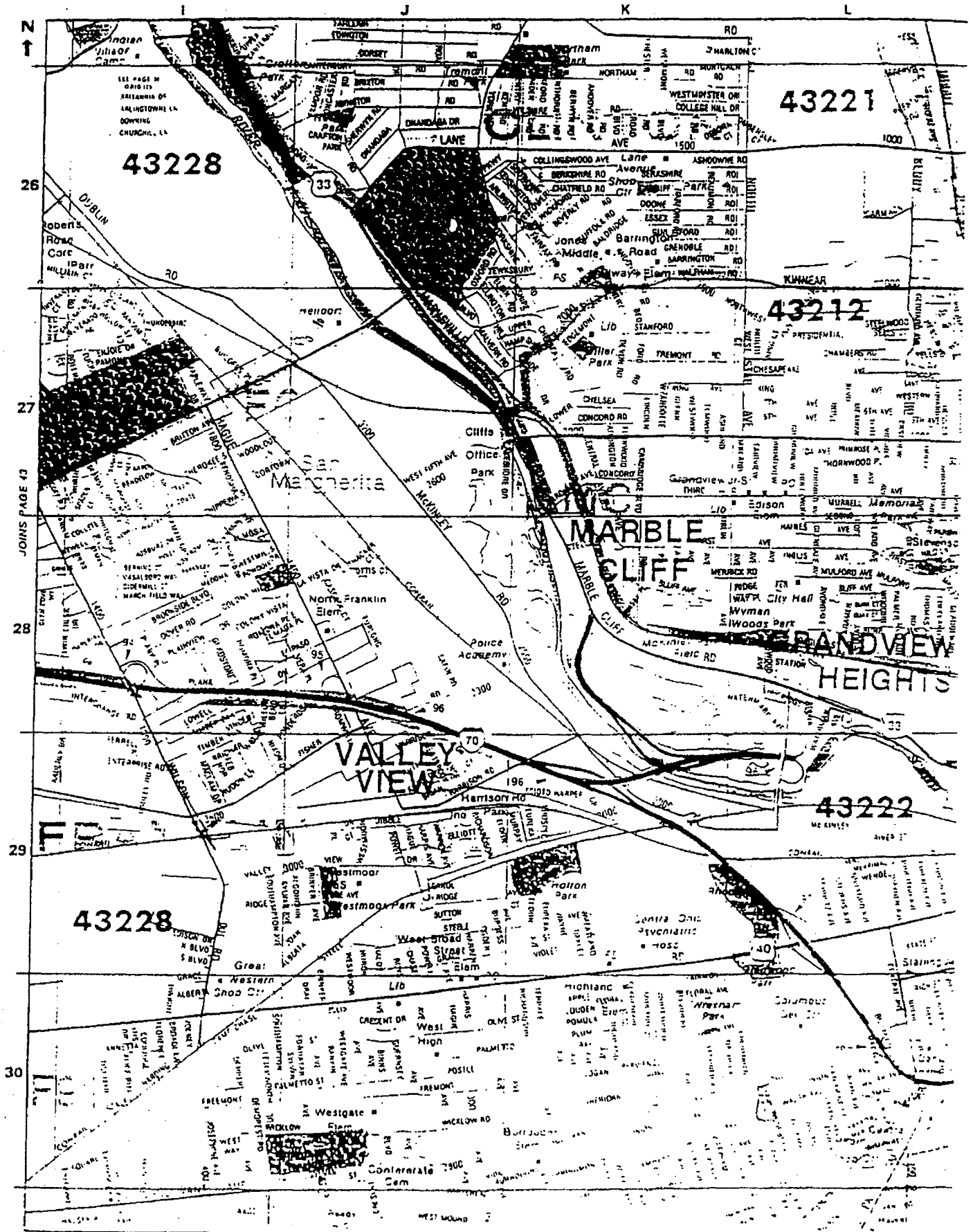


M.L.S. MAP AREAS: THE GLEN & HIGHPOINT (H25), SADDLEBROOK & VILLAGES OF HAYDEN RUN (G & H22)





M.L.S. MAP AREAS: C (I28), E (J27), G (K28)

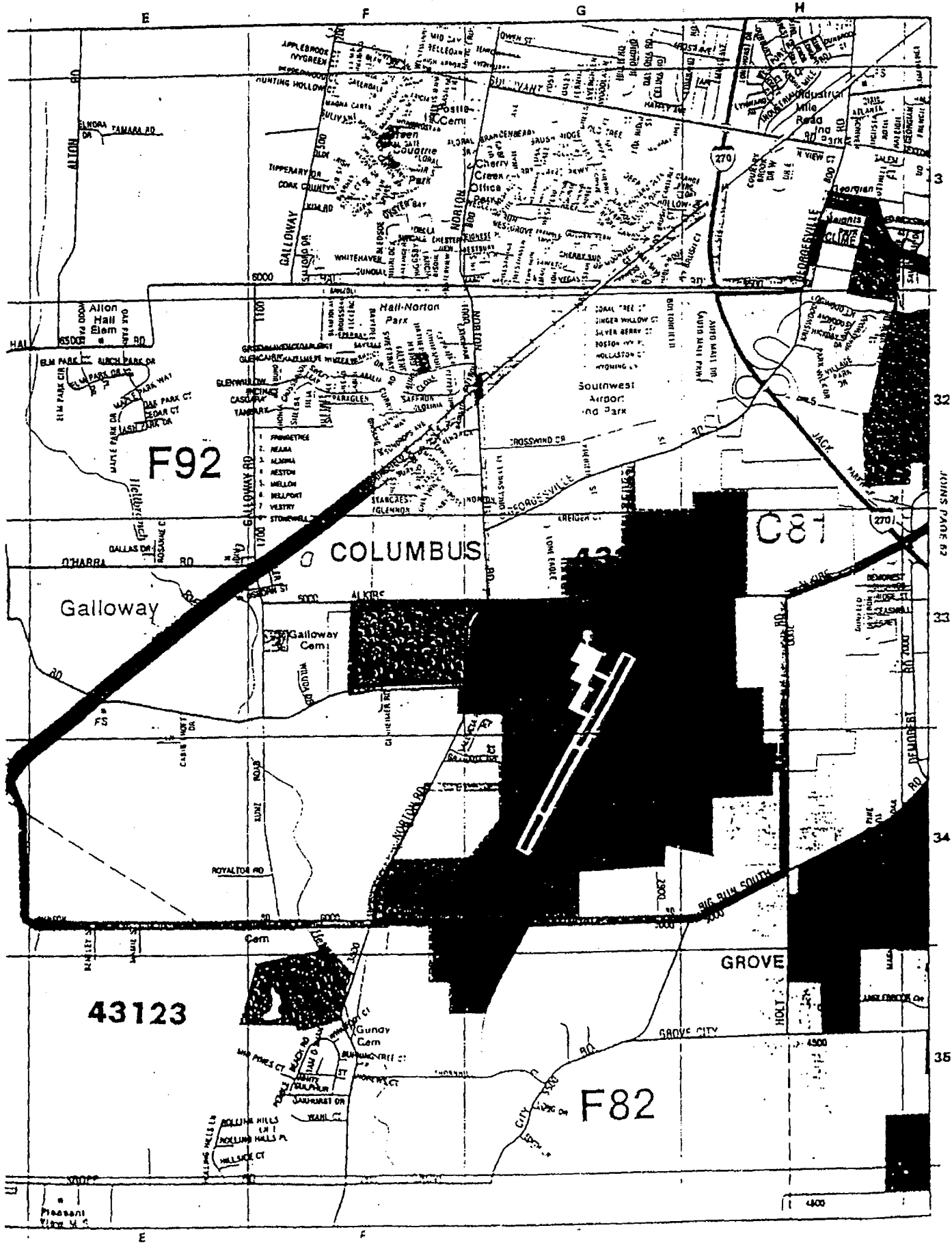








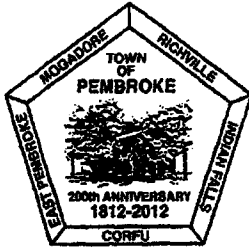
M.L.S. MAP AREA: K (H32)





**Appendix 14**

**Towns of Pembroke and  
Newstead Road Re-alignment Letters**



# TOWN OF PEMBROKE

1145 Main Road Corfu, New York 14036

(585) 599-4892 or (585) 762-8246

Fax (585) 762-8233

TDD/TYY 1-800-662-1220

*John J. Worth, Town Supervisor*

*Edward G. Arnold, Jr., Deputy Supervisor*

*Thomas Dix, Councilman*

*Kathleen Manne, Councilwoman*

*K. Warren Clark, Councilman*

August 11, 2016

Michael Meyers, MLRS II  
New York State Department of Environmental Conservation  
182 East Union – Suite 3  
Allegany, NY 14706

Re: County Line Stone Co., Inc. Expansion  
DEC No. 9-1456-0004/00013  
MLR No. 904321

Dear Mr. Meyers:

County Line Stone Co, Inc. (CLS) has discussed with us their proposal to expand mining operations in the Town of Pembroke. We are aware that this may entail a request by CLS that the Town of Pembroke abandon portions of Scribner, Cohocton and County Line roads and the construction of an alternative route. The Town has reviewed the Mining Plan Map which contains a generalized conceptual plan of the proposed re-routing design. Upon preliminary review, the Town has no objection to the concept of re-routing the roadway with the understanding that a formal engineering study will be completed and input gathered from the local residents will be considered. In addition, formal engineering plans will have to be approved by the Town prior to any abandonment and construction. Any and all expenses incurred as the result of the planned rerouting and execution of the plan will be the sole responsibility of CLS.

Be advised this letter does not serve in any way as an endorsement, either express or implied, of the CLS proposed expansion. This letter serves only to address safety concerns raised during the Town's review of the proposed expansion plan along with input from a community group composed of residents most directly impacted by the proposal, due to their proximity to the possible expansion and road realignment.

Respectfully,

John Worth, Town Supervisor

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# TOWN OF NEWSTEAD

P.O. Box 227 5 Clarence Center Rd. Akron, NY 14001

Supervisor: (716) 542-1231 • Town Court: (716) 542-4575 • Town Clerk: (716) 542-4573

Assessor/Code Enforcement: (716) 542-4574 • Fax: (716) 542-3702

Calls for Hearing Impaired: 1-800-662-1220

December 3, 2014

Michael Meyers, MLRS II  
New York State Department of Environmental Conservation  
182 East Union – Suite 3  
Allegany, NY 14706

RE: County Line Stone Co., Inc. Expansion DEC No. 9-1456-0004/00013 MLR No. 904321

Dear Mr. Meyers:

County Line Stone Co., Inc. (CLS) has discussed with us their proposal to expand mining operations in the Town of Newstead. We are aware that this will entail the abandonment of portions of County Line Road and the construction of an alternate route in the Town of Pembroke.

County Line Stone would be responsible for all costs involving design, construction, drainage, and signage. The new roads would meet all town requirements.

The Town has reviewed the Mining Plan Map which contains a generalized conceptual plan of the proposed re-routing design. The Town preliminarily has no objection to the roadway re-routing concept that lies within the Town of Newstead with the understanding that formal engineering plans will have to be approved by the Town prior to any abandonment and construction. At this time, the Town of Newstead feels that the Town of Pembroke should be replying to any concerns within their town.

Sincerely,

A handwritten signature in black ink, appearing to read "David L. Cummings".

David L. Cummings  
Supervisor  
Town of Newstead

CC: County Line Stone  
Town of Pembroke  
Newstead Town Board  
Newstead Town Attorney  
Newstead Town Clerk