HILLIS-CARNES
ENGINEERING ASSOCIATES

Vibration, Noise, and Ambient Air Monitoring Services
Savage Stone Quarry Blast
Monitoring at Future School Site
8653 Mission Road, Jessup, MD 20794
HCEA Project Number 18069A

Submitted To:

Mr. Daniel Lubeley
Manager of Design and Preconstruction Services
Howard County Public School System
10910 Clarksville Pike (Route 108)
Ellicott City, MD 21042

Prepared By:

Hillis-Carnes Engineering Associates, Inc.
10975 Guilford Road, Suite A
Annapolis Junction, Maryland 20701

March 5, 2018

HILLIS-CARNES
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March 5, 2018

Mr. Daniel Lubeley
Manager of Design and Preconstruction Services
Howard County Public School System
10910 Clarksville Pike (Route 108)
Ellicott City, MD 21042

Re: Vibration, Noise, and Ambient Air Monitoring Services
Savage Stone Quarry Blast
Monitoring at Future School Site (8653 Mission Road, Jessup, MD)
HCEA Project Number 18069A

Dear Mr. Lubeley:

Hillis-Carnes Engineering Associates, Inc. (HCEA) is pleased to submit this letter report to Howard County Public School System (Client) for the Vibration, Noise, and Ambient Air Monitoring services provided for the above referenced project. This letter report includes project methodology, results and conclusions.

I. PROJECT PURPOSE

The purpose of the project was to monitor vibration levels, noise levels and air quality parameters (i.e., respirable particulate, asbestos and crystalline silica) at the future school site (for two future Howard County Public Schools) proposed to be located at 8653 Mission Road in Jessup, Maryland (refer to Appendix A) during rock quarry blast events at an adjoining quarry. The future school site is located adjacent to Savage Stone, a granite rock quarry. Specifically, Savage Stone is located northeast of the future school site, across the CSX Transportation rail lines illustrated on the site plan included in Appendix A.

II. MONITORING METHODOLOGIES

The monitoring was conducted in accordance with HCEA Proposal Number P171720HCI, revised on January 29, 2018, as authorized by the Client. The monitoring was conducted on February 13, 2018 and February 19, 2018. On each of these days, one blasting event occurred at the Savage Stone property. The Client coordinated with quarry representatives on the dates and times of the blasting events so that the monitoring services provided by HCEA could occur prior to, during, and subsequent to, the blasting event that occurred on each of those two days. Per the Client's request, the following services were provided for this project.

A. Vibration and Noise Monitoring

Vibration Monitoring was performed to record the vibration levels produced during quarry blasting. HCEA provided an on-site Staff Scientist to install two (2) seismographs for Vibration Monitoring. The seismographs utilized for this project were White Industrial manufactured MINI-Seis III instruments. These units were equipped with tri-axial velocity transducers with a frequency range of 2 to 250 Hertz (Hz) and a dynamic range of 0.0025 to 10.0 inches per second (in/sec) to measure vibration for the events requested. Seismograph data was downloaded.

B. Ambient Air Monitoring

Total respirable dust monitoring was conducted utilizing two (2) respirable particulate (2.5 microns and 10 microns, designated PM-2.5 and PM-10, respectively) samplers following USEPA methodology described in 40 CFR Part 50 and other applicable references for ambient air monitoring. In addition, in-air samples were collected for the determination of crystalline silica and asbestos fibers in air. Further, a weather station was operated on-site to record wind speed/direction, temperature, and relative humidity during the monitoring events.

III. FINDINGS

As previously indicated, monitoring was conducted on February 13, 2018 and February 19, 2018. The monitoring occurred prior to, during, and subsequent to, the off-site blasting event that occurred on each of those two days. The findings are presented below.

A. Vibration and Noise Monitoring

The monitoring was performed using two (2) seismographs model MINI-Seis III unit manufactured by White Seismology. The monitoring units were installed in the area of the proposed elementary school location (Unit 1) and proposed high school location (Unit 2).

The monitors were set to record in a histogram and Waveform modes where vibration levels in Peak Particle Velocity (PPV) were continuously recorded on February 13, 2018 and February 19, 2018.

The testing performed resulted in a maximum PPV of 0.0634 inches per second (in/sec) at a frequency of 18.3 Hertz (Hz) recorded on February 13, 2018 at 1:01 pm at the proposed elementary school location.

The data collected during the vibration and noise monitoring on February 13, 2018 and February 19, 2018 is included in Appendix B. Also included in Appendix B is an illustration of the placement locations of the two monitors during the monitoring events.

B. Ambient Air Monitoring

HCEA conducted respirable particulate, asbestos and crystalline silica monitoring at the proposed future school site.

Samples were collected for asbestos following NIOSH 7400 methodology. Crystalline silica was evaluated following NIOSH 7500 protocols. Samples were analyzed by EMSL Laboratories of Beltsville Maryland and Cinnaminson, New Jersey.

Real-time particulate measurements and wind speed/direction were accomplished using a Met-One E-SAMPLER. The E-SAMPLER provides real-time particulate measurement through near-forward light scattering. An internal rotary vane pump draws air at 2 liters per minute (LPM) into the sensing chamber where it passes through visible laser light. Aerosols in the air scatter light in proportion to the particulate load in the air. Scattered light is collected by precise glass optics and focused on a PIN diode. The output is linear to concentrations greater than 65,000 micrograms per cubic meter ($\mu g/m^3$).

The air monitoring location was selected due to the proximity to the proposed elementary school and blast location at Savage Stone (refer to Appendix C).

The results of laboratory analyses indicate that crystalline silica and asbestos were not detected above the instrument level of detection and were below applicable regulatory limits. See results in Table 1 and applicable regulatory limits in Table 2.

Particulate levels for PM-10 and PM-2.5 were within National Ambient Air Quality Standards (NAAQS) during the dates and times tested. See results in Table 1 and applicable regulatory limits in Table 2.

Table 1
Howard Schools Site Jessup, Maryland
Results of Ambient Air Monitoring
Test Dates: February 13, 2018 and February 19, 2018

Date	PM-10 mg/m^3	PM-2.5 mg/m^3	Crystalline silica mg/m^3	Asbestos fibers/cc
2/13/2018	Average 0.009 Maximum 0.015 Blast 0.011	Average 0.008 Maximum 0.009 Blast 0.008	α-Quartz <0.006 Cristiblite <0.011 Trydymite <0.007	<0.003
2/19/2018	Average 0.011 Maximum 0.011 Blast 0.010	Average 0.006 Maximum 0.009 Blast 0.008	α-Quartz <0.004 Cristiblite <0.007 Trydymite <0.007	<0.004

Table 2
Regulatory Limits

OSHA	Crystalline silica		50 $\mu g/m^3$ (0.050 mg/m^3)		Permissible Exposure Level (PEL) 8 hr-TWA
OSHA	Asbestos		0.01 fibers/cc		Permissible Exposure Level (PEL) 8 hr-TWA
USEPA AHERA	Asbestos fibers in Air		0.001 fibers/cc		Occupancy Level Asbestos
USEPA NAAQS Particle Pollution (PM)	PM-2.5	primary	1 year	12.0 $\mu g/m^3$ (0.012 mg/m^3)	annual mean, averaged over 3 years
		secondary	1 year	15.0 $\mu g/m^3$ (0.015 mg/m^3)	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 $\mu g/m^3$ (0.035 mg/m^3)	98th percentile, averaged over 3 years
	PM-10	primary and secondary	24 hours	150 $\mu g/m^3$ (0.15 mg/m^3)	Not to be exceeded more than once per year on average over 3 years

The data collected during the ambient air monitoring on February 13, 2018 and February 19, 2018 is included in Appendix C. Also included in Appendix C is an illustration of the placement of the monitors on that day.

IV. CONCLUSIONS

A. Vibration and Noise Monitoring

The vibration levels recorded during our testing were compared against the United States Bureau of Mines (USBM) Standards with respect to recommended safe vibration levels. The USBM Standard consists of an upper threshold which steps upward from a PPV level of 0.20 in/sec at a frequency of 1 Hz to a PPV level of 2.0 in/sec at a frequency of 100 Hz. Based on the results of our monitoring, and the above referenced

generally accepted industry standard, it is our opinion the vibrations recorded at both monitoring locations during both monitoring events fall within typically accepted limits.

B. Ambient Air Monitoring

As seen in Tables 1 and 2, results of sampling and analysis indicate that on the days of testing and during periods when the proposed future school site may have been impacted by mine blast particulate, each of the tested parameters was within applicable regulatory levels.

V. LIMITATIONS

Our professional services have been performed and our findings have been obtained in accordance with customary principles and practices in the engineering field. This letter does not warrant against future operations or conditions, nor does it warrant against conditions present of a type or at locations not investigated.

The conclusions drawn from this assessment are considered reliable; however, concentrations and chemistry of airborne particulate in air may vary on dates and times differing from those monitored for this project.

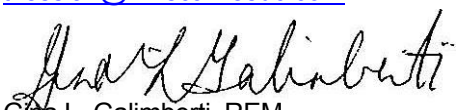
This letter was prepared for the sole use of our Client. The scope of services performed for this assessment may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings or conclusions is at the risk of said user.

We appreciate the opportunity to be of service to you for this project. If you have any questions regarding information in this letter report or if we can be of further assistance, please do not hesitate to contact us at 410-880-4788.

Sincerely,
HILLIS-CARNES ENGINEERING ASSOCIATES, INC.

Brett Lauer
Project Manager
blauer@hcea.com

Anthony Kesslak, C.I.H. CP 6923
Certified Industrial Hygienist
tkesslak@hilliscarnesdc.com



Gina L. Galimberti, REM
Assistant Vice President, Environmental Services Manager
ggalimberti@hcea.com

Appendices Appendix A - Site Plan for Proposed Mission Road School Campus
Appendix B - Vibration and Noise Monitoring Data
Appendix C - Ambient Air Monitoring Data

Appendix A

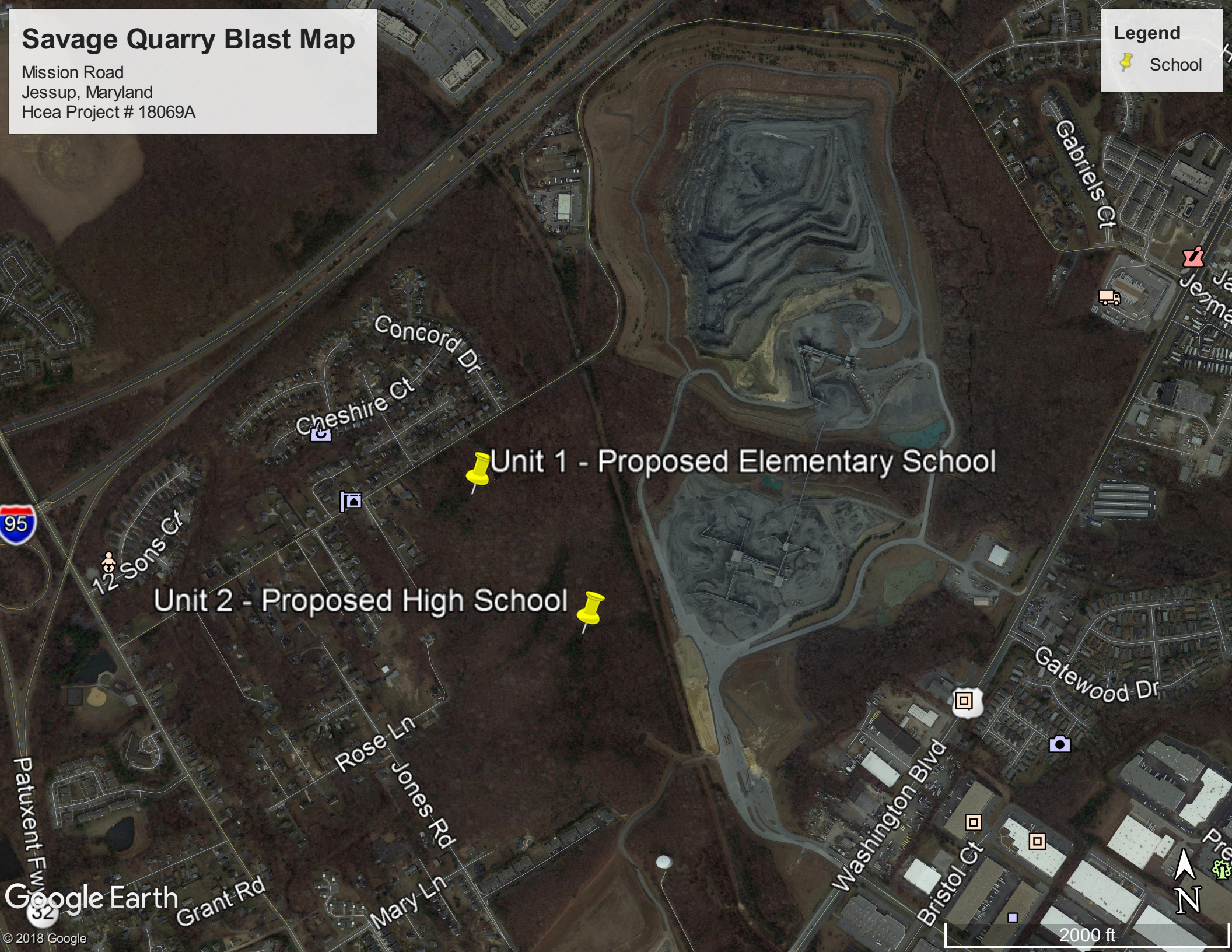
FISHER, COLLINS & CARTER, INC.
CIVIL ENGINEERING CONSULTANTS & LAND SURVEYORS
CENTENNIAL SQUARE OFFICE PARK – 10272 BALTIMORE NATIONAL PIKE
ELLICOTT CITY, MARYLAND 21042
(410) 461 – 2855

MISSION ROAD CAMPUS
HIGH SCHOOL #13
and
ELEMENTARY SCHOOL #43
SCALE: 1"=60' DATE: AUGUST 9, 2017

Appendix B

Savage Quarry Blast Map

Mission Road
Jessup, Maryland
Hcea Project # 18069A



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Hillis-Carnes Engineering
Savage Quarry Monitoring
Mission Road, Jessup, MD
Client - HCPS
HCEA Project # - 18069A
Unit 1 - Proposed Elementary School

File Name: 718420180213105849000 2.hst
Number: 0002
Job Range: 2/13/2018 10:58:49 AM - 2/13/2018 2:05:40 PM
Serial Number: 7184
Sample Interval: 60 seconds
Samples: 187
Acoustic Gain: 148.2 dBL
Seismic Gain: 10.2 in/s
Voltage Range: 6.11 - 6.21

Peaks and Frequencies	Graph Information
PPV Maximum: 0.0634 in/sec (2/13/2018 2:01:49 PM)	Date Range: 2/13/2018 10:58:49 AM - 2/13/2018 2:05:40 PM
Radial: 0.0384 in/sec @ 12.8 Hz (2/13/2018 2:01:49 PM)	Samples: 187
Vertical: 0.0634 in/sec @ 18.3 Hz (2/13/2018 2:01:49 PM)	Acoustic Scale: 126.0 dBL
Transverse: 0.0372 in/sec @ 24.4 Hz (2/13/2018 2:01:49 PM)	Seismic Scale: 0.100 in/sec (0.0250 in/sec/div)
Acoustic: 109.6 dBL @ 2.3 Hz (2/13/2018 1:47:49 PM)	Time Intervals: 2 Hours
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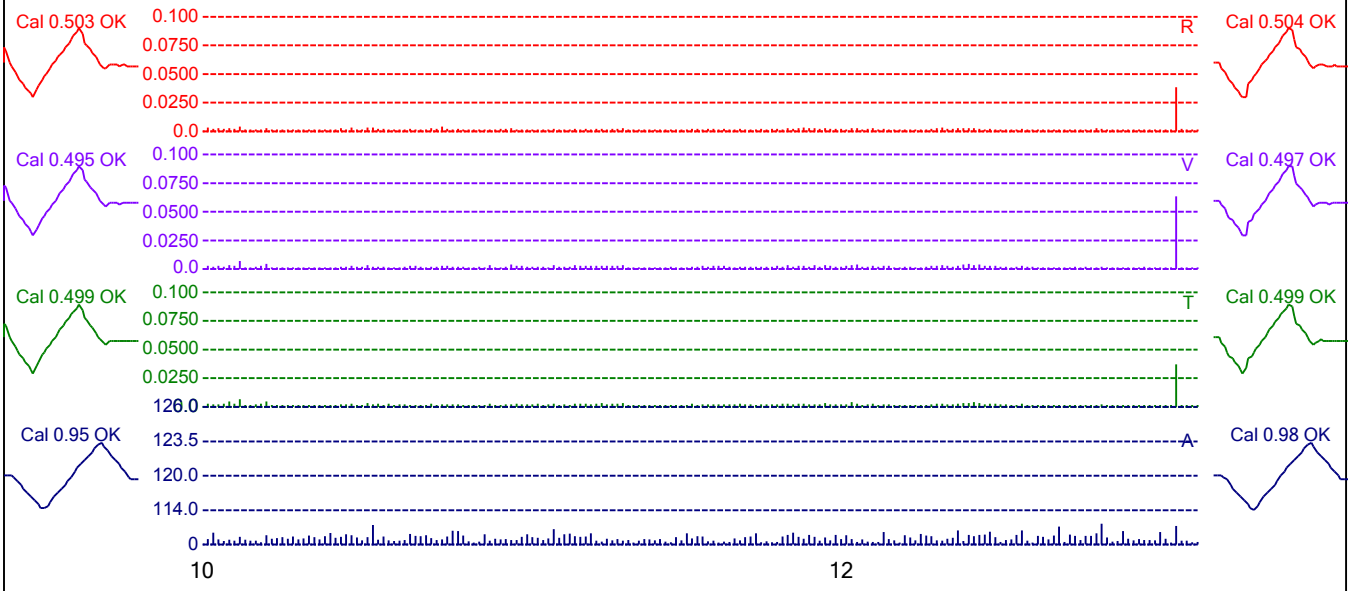
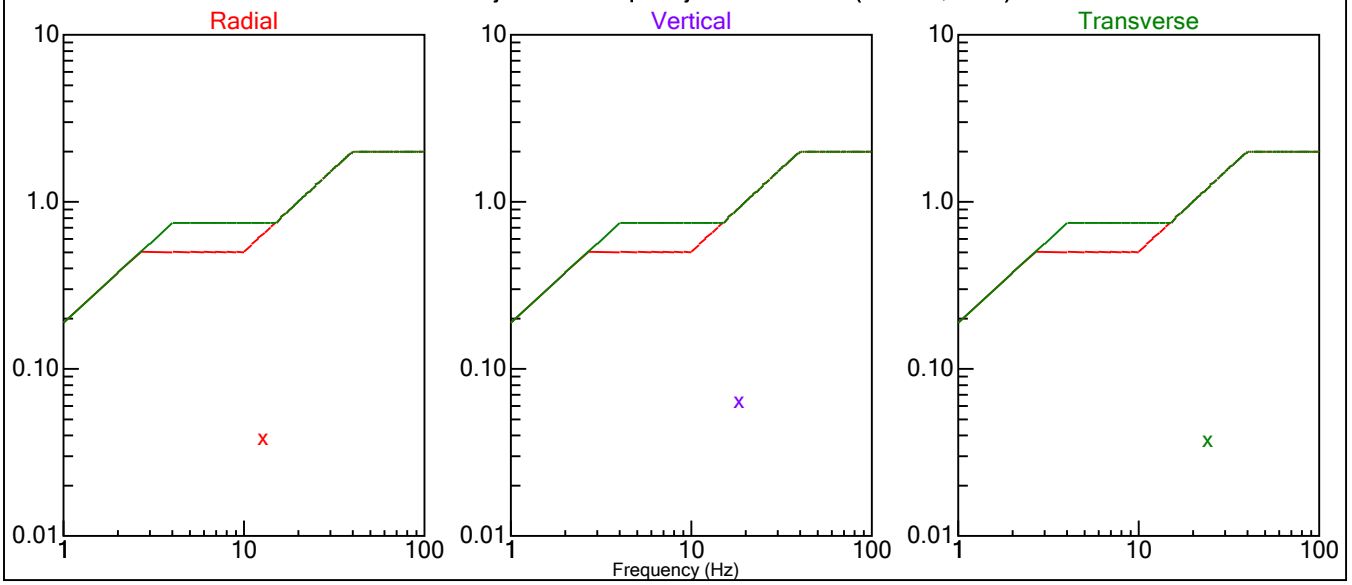
Air Calibration Date (SN): 8/31/2017 (7184)	



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)



White Seismograph Data Analysis V11 - Version 11.1.0.104

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Hillis-Carnes Engineering
Savage Quarry Monitoring
Mission Road, Jessup, MD
Client - HCPS
HCEA Project # - 18069A
Unit 1 - Proposed Elementry School

File: 718420180213140111000 1.evt
Number: 0001
Date and Time: 2/13/2018 2:01:11 PM
SN: 7184
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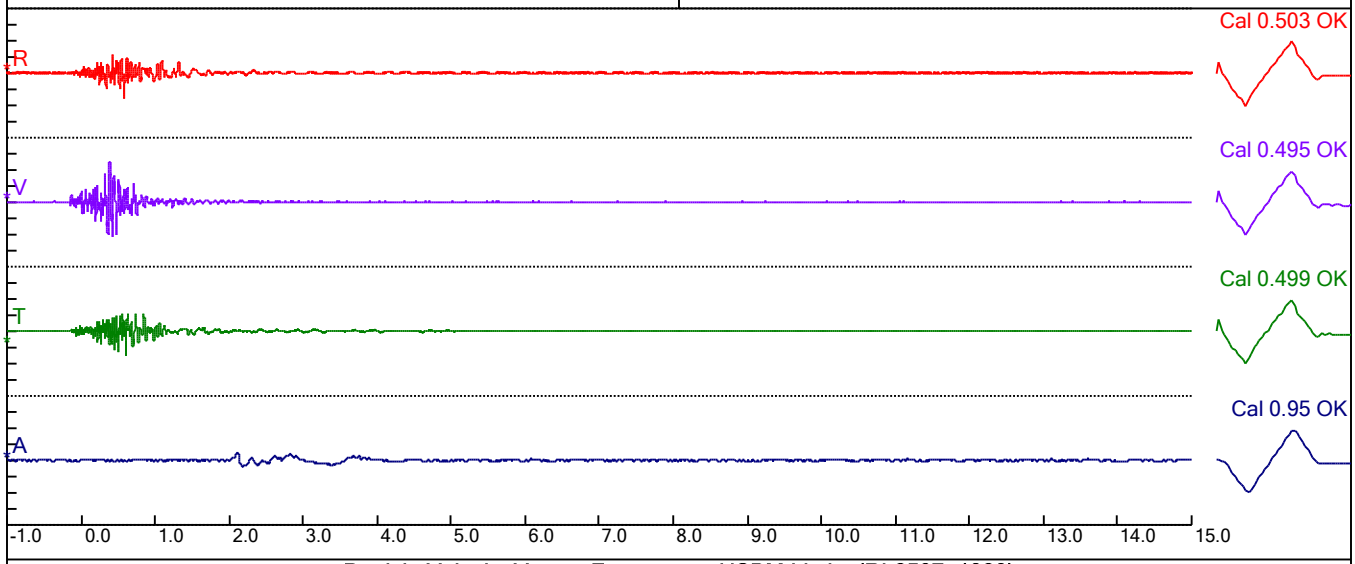
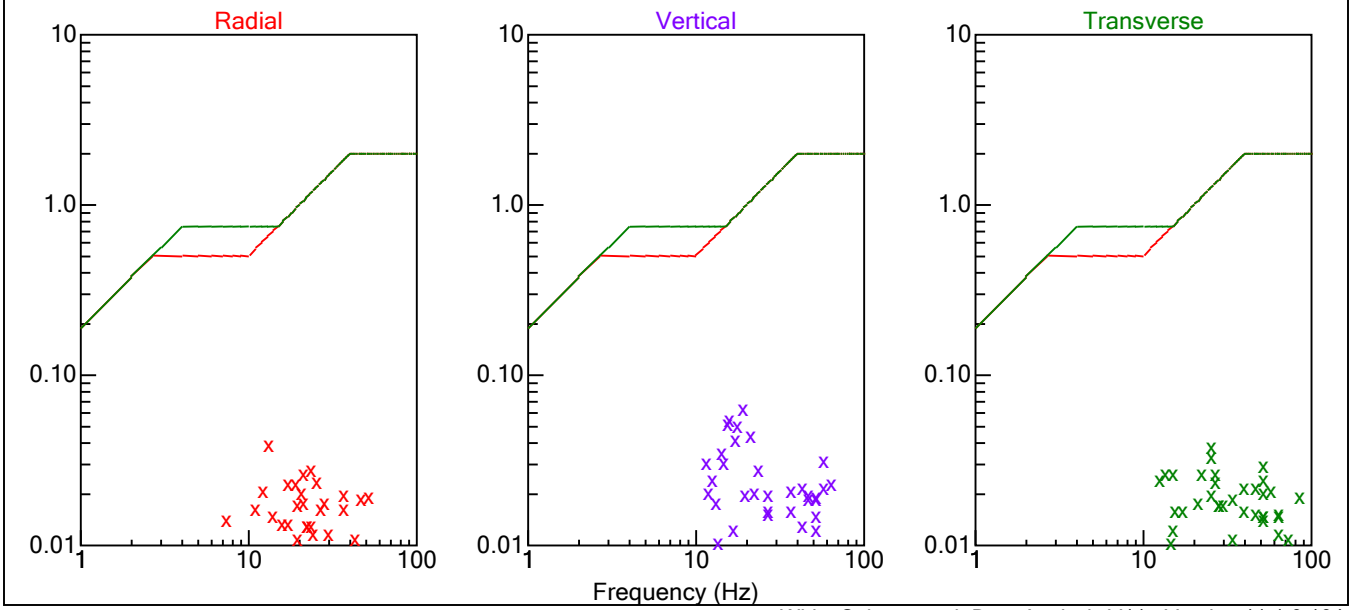
Air Trigger: 125.0 dBL
Sample Rate: 1024
Duration: 15 Seconds
Pre-Trigger: 1.0 Second
Seismic Gain: 10.2in/sec
Acoustic Gain: 148.2 dBL
Voltage: 6.18

Peaks and Frequencies	Graph Information
PPV Maximum: 0.0634 in/sec (-1.0000 sec)	Duration: -1.000 s To: 15.000 s
Radial: 0.0384 in/sec @ 12.8 Hz (-1.0000 sec)	Acoustic Scale: 126.0 dBL
Vertical: 0.0634 in/sec @ 18.3 Hz (-1.0000 sec)	Seismic Scale: 0.100 in/sec (0.0250 in/sec/div)
Transverse: 0.0372 in/sec @ 24.4 Hz (-1.0000 sec)	Time Intervals: 1.00 sec
Acoustic: 108.7 dBL @ 3.5 Hz (-1.0000 sec)	
Seis Calibration Date (SN): 8/31/2017 (7184)	
Air Calibration Date (SN): 8/31/2017 (7184)	



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)



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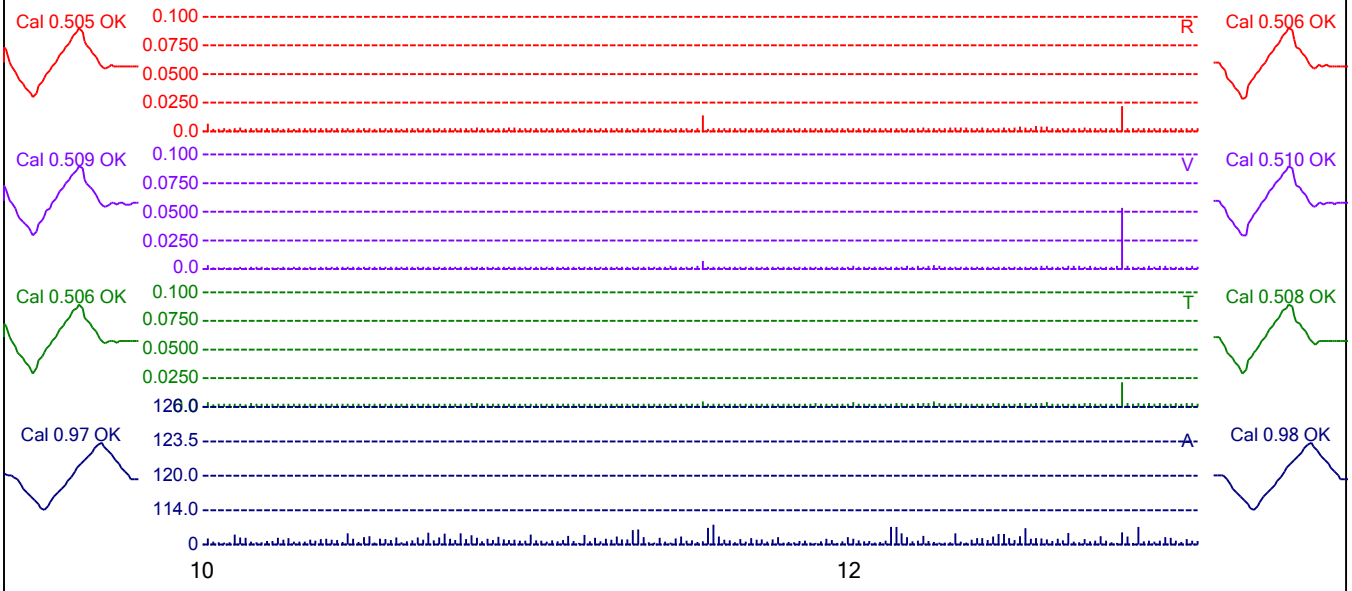
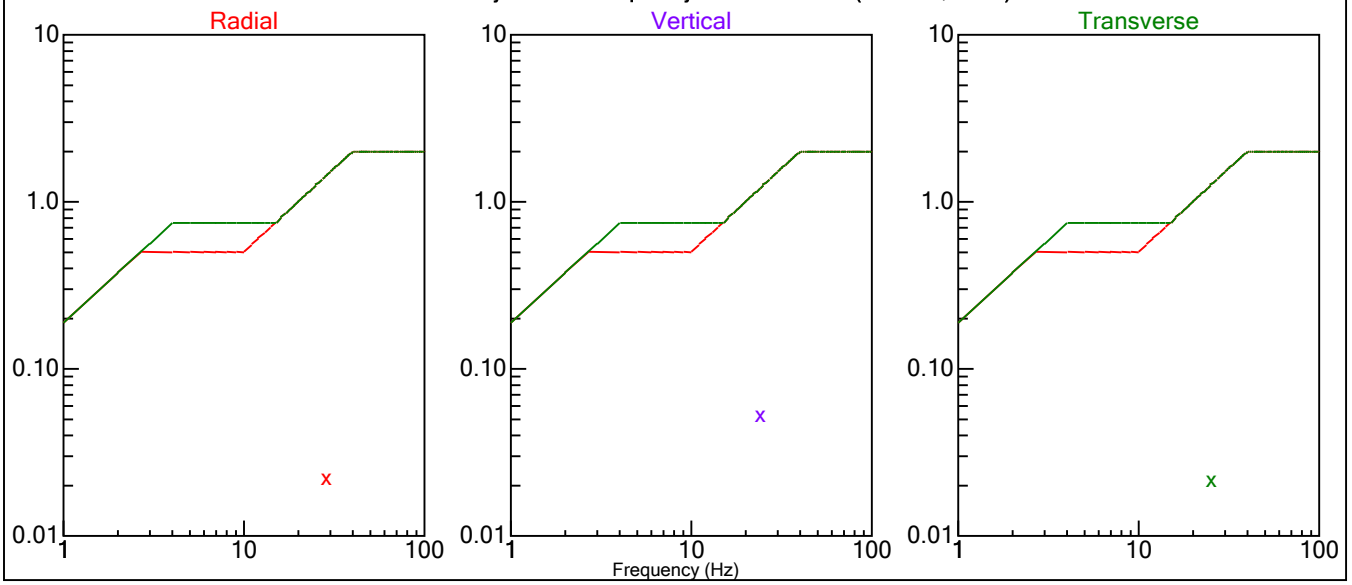
Savage Quarry Monitoring
Mission Road, Jessup, MD
Client - HCPS
HCEA Project # - 18069A
Unit 2 - Proposed High School

File Name: 7178201802131009440002.hst
Number: 0002
Job Range: 2/13/2018 10:09:44 AM - 2/13/2018 1:14:18 PM
Serial Number: 7178
Sample Interval: 60 seconds
Samples: 185
Acoustic Gain: 148.2 dBL
Seismic Gain: 10.2 in/s
Voltage Range: 6.32 - 6.27

Peaks and Frequencies	Graph Information
PPV Maximum: 0.0534 in/sec (2/13/2018 1:00:44 PM)	Date Range: 2/13/2018 10:09:44 AM - 2/13/2018 1:14:18 PM
Radial: 0.0222 in/sec @ 28.4 Hz (2/13/2018 1:00:44 PM)	Samples: 185
Vertical: 0.0534 in/sec @ 24.4 Hz (2/13/2018 1:00:44 PM)	Acoustic Scale: 126.0 dBL
Transverse: 0.0216 in/sec @ 25.6 Hz (2/13/2018 1:00:44 PM)	Seismic Scale: 0.100 in/sec (0.0250 in/sec/div)
Acoustic: 109.2 dBL @ 7.5 Hz (2/13/2018 11:44:44 AM)	Time Intervals: 2 Hours
Seis Calibration Date (SN): 7/10/2017 (7178)	
Air Calibration Date (SN): 7/10/2017 (7178)	



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)



White Seismograph Data Analysis V11 - Version 11.1.0.104

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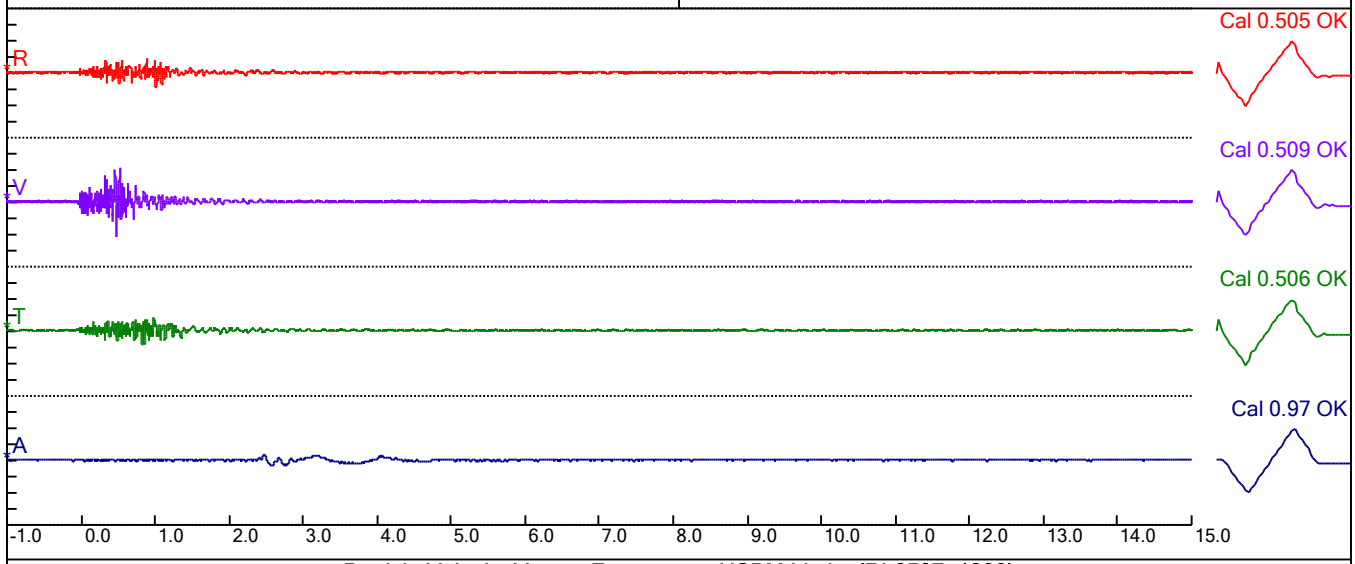
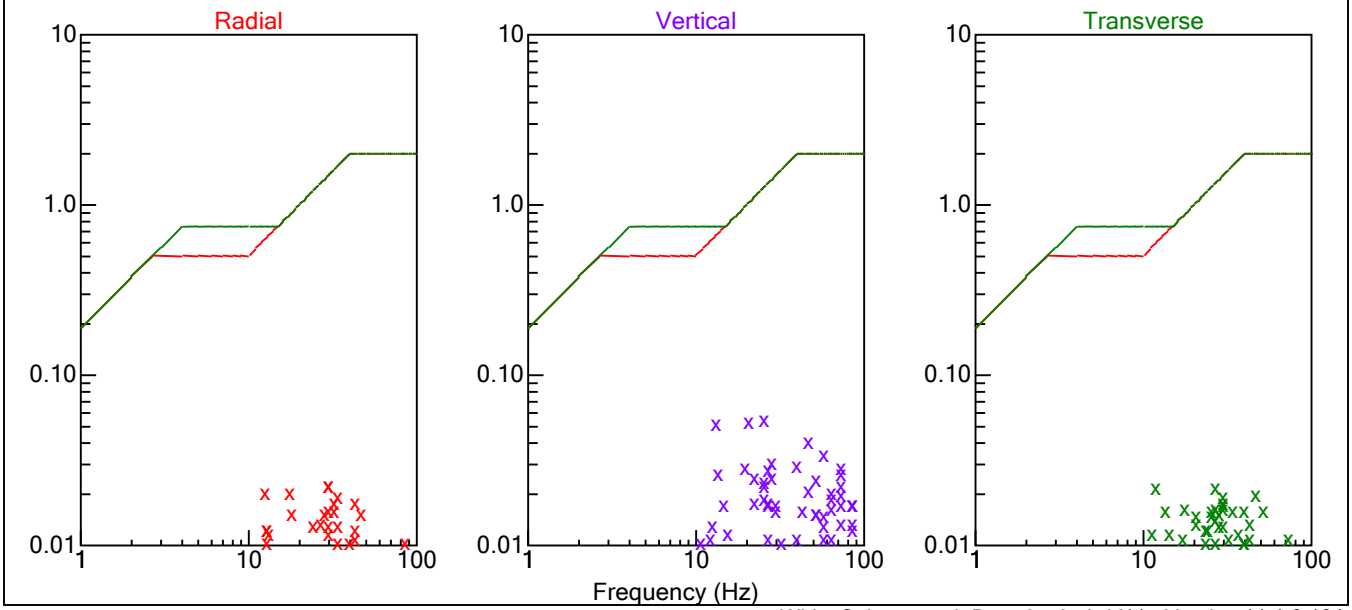
Savage Quarry Monitoring
Mission Road, Jessup, MD
Client - HCPS
HCEA Project # - 18069A
Unit 2 - Proposed High School

File: 717820180213130042001.evt
Number: 0001
Date and Time: 2/13/2018 1:00:42 PM
SN: 7178
Seismic Trigger: 0.0150 in/sec
Air Trigger: 135.0 dBL
Sample Rate: 1024
Duration: 15 Seconds
Pre-Trigger: 1.0 Second
Seismic Gain: 10.2in/sec
Acoustic Gain: 148.2 dBL
Voltage: 6.34

Peaks and Frequencies	Graph Information
PPV Maximum: 0.0534 in/sec (-1.0000 sec)	Duration: -1.000 s To: 15.000 s
Radial: 0.0222 in/sec @ 28.4 Hz (-1.0000 sec)	Acoustic Scale: 126.0 dBL
Vertical: 0.0534 in/sec @ 24.4 Hz (-1.0000 sec)	Seismic Scale: 0.100 in/sec (0.0250 in/sec/div)
Transverse: 0.0216 in/sec @ 25.6 Hz (-1.0000 sec)	Time Intervals: 1.00 sec
Acoustic: 105.0 dBL @ 3.7 Hz (-1.0000 sec)	
Seis Calibration Date (SN): 7/10/2017 (7178)	
Air Calibration Date (SN): 7/10/2017 (7178)	

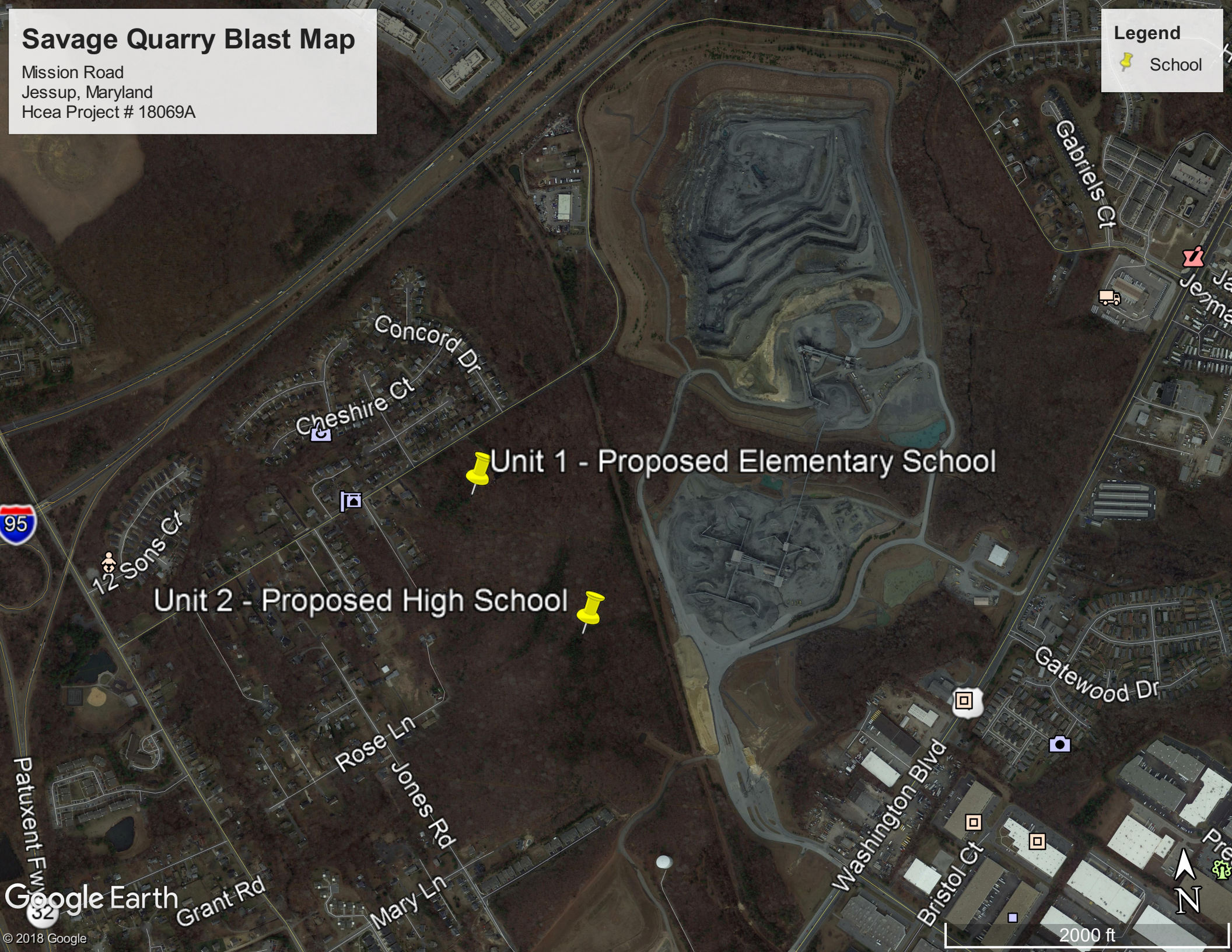


Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)



Savage Quarry Blast Map

Mission Road
Jessup, Maryland
Hcea Project # 18069A



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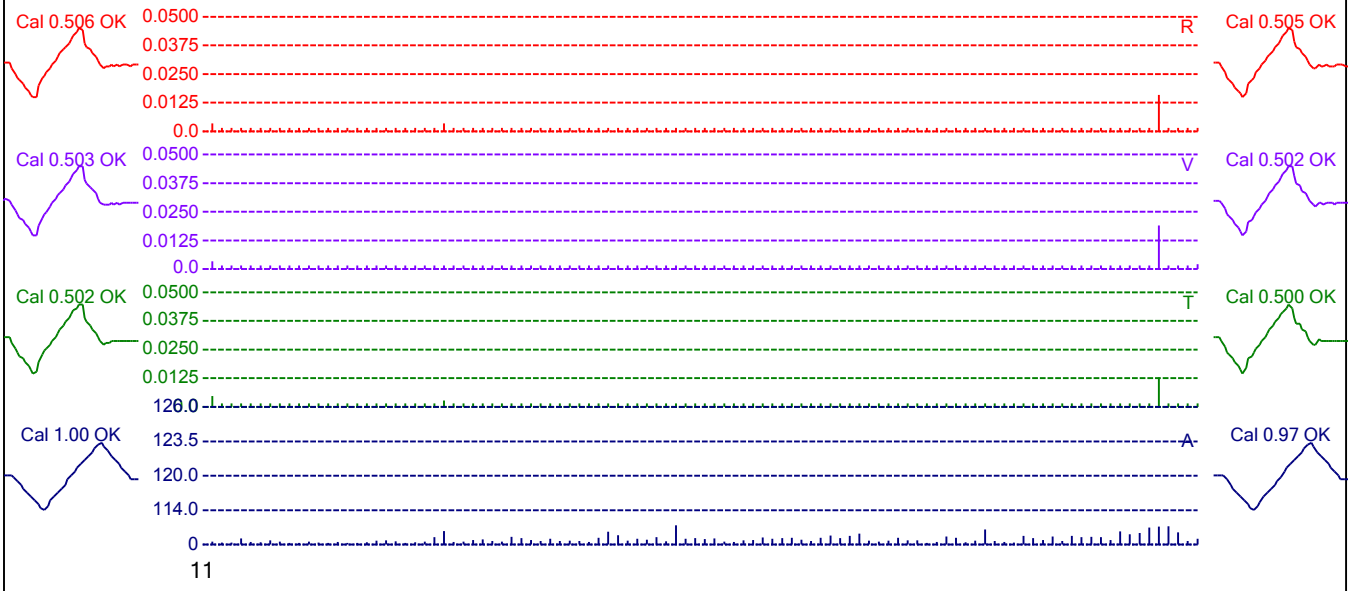
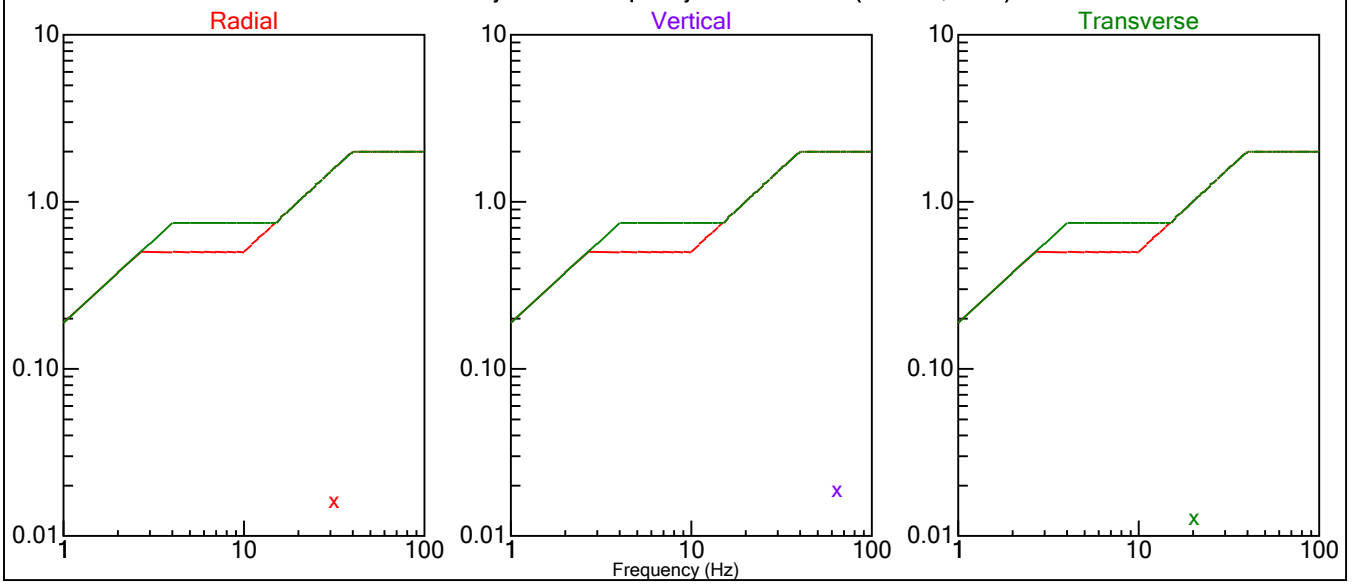
Savage Quarry Monitoring
Mission Road, Jessup, MD
Client - HCPS
HCEA Project # - 18069A
Unit 1 - Proposed Elementary School

File Name: 718420180219110944 0004.hst
Number: 0004
Job Range: 2/19/2018 11:09:44 AM - 2/19/2018 12:52:46 PM
Serial Number: 7184
Sample Interval: 60 seconds
Samples: 103
Acoustic Gain: 148.2 dBL
Seismic Gain: 10.2 in/s
Voltage Range: 6.25 - 6.17

Peaks and Frequencies	Graph Information
PPV Maximum: 0.0191 in/sec (2/19/2018 12:48:44 PM)	Date Range: 2/19/2018 11:09:44 AM - 2/19/2018 12:52:46 PM
Radial: 0.0159 in/sec @ 32.0 Hz (2/19/2018 12:48:44 PM)	Samples: 103
Vertical: 0.0191 in/sec @ 64.0 Hz (2/19/2018 12:48:44 PM)	Acoustic Scale: 126.0 dBL
Transverse: 0.0128 in/sec @ 20.5 Hz (2/19/2018 12:48:44 PM)	Seismic Scale: 0.0500 in/sec (0.0125 in/sec/div)
Acoustic: 108.9 dBL @ 14.6 Hz (2/19/2018 11:58:44 AM)	Time Intervals: 2 Hours
Seis Calibration Date (SN): 8/31/2017 (7184)	
Air Calibration Date (SN): 8/31/2017 (7184)	



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)



White Seismograph Data Analysis V11 - Version 11.1.0.104

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Savage Quarry Monitoring
Mission Road, Jessup, MD
Client - HCPS
HCEA Project # - 18069A
Unit 1 - Proposed Elementary School

File: 718420180219124828003.evt
Number: 0003
Date and Time: 2/19/2018 12:48:28 PM
SN: 7184
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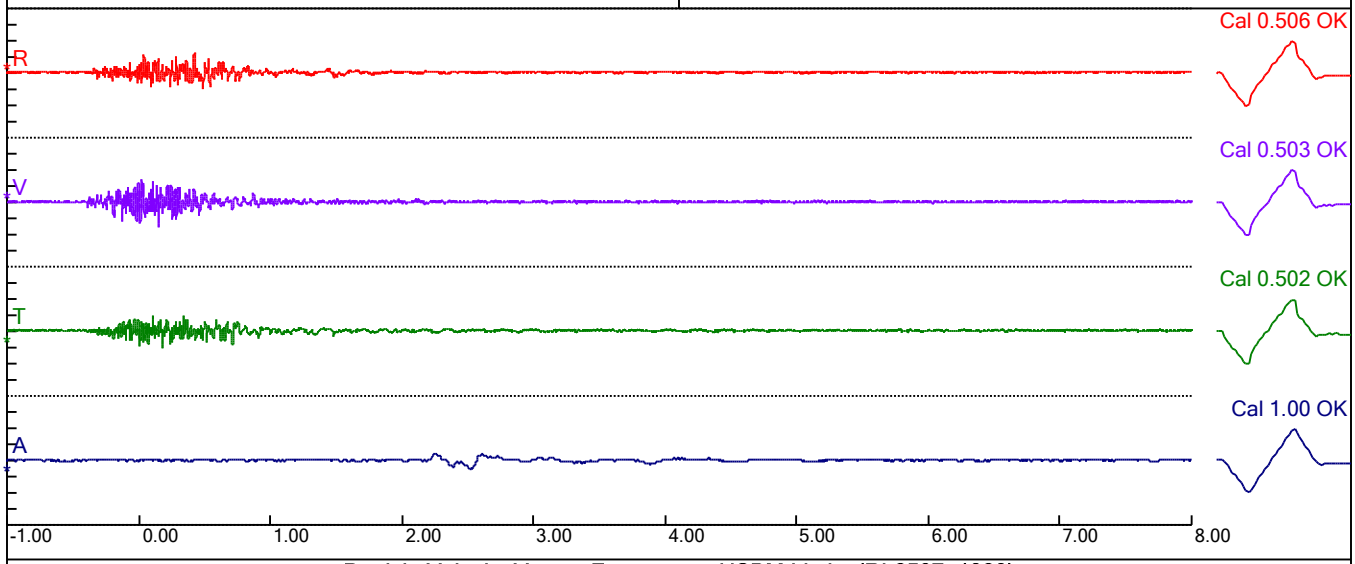
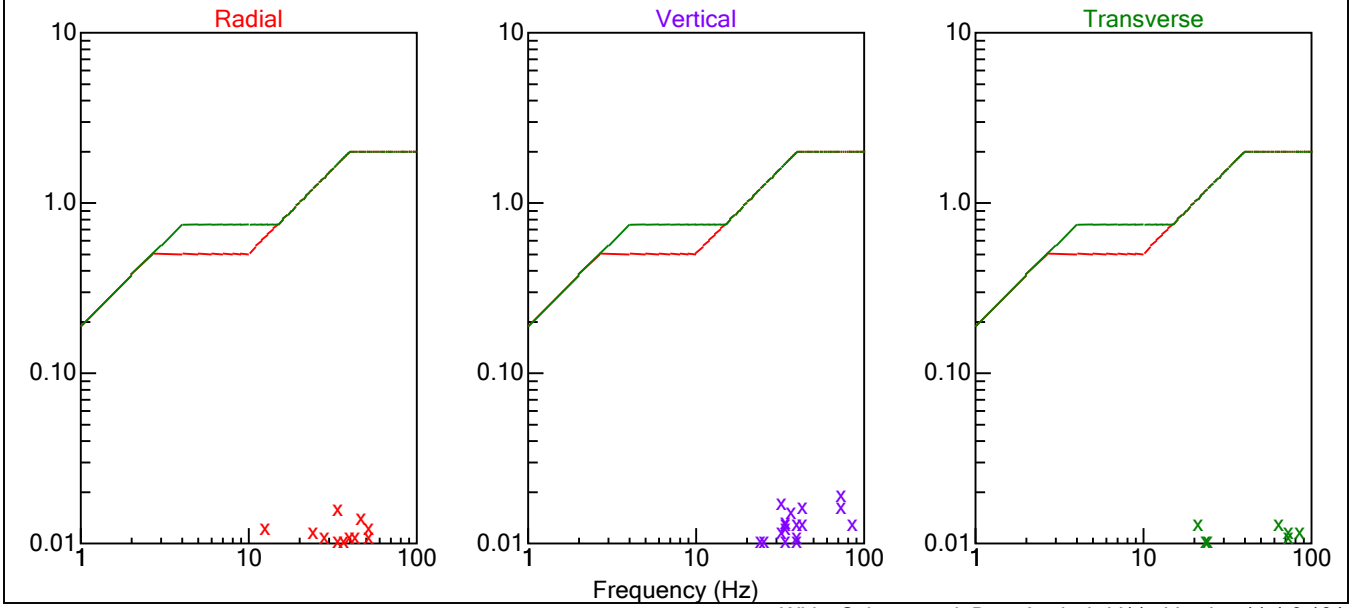
Air Trigger: 125.0 dBL
Sample Rate: 1024
Duration: 8 Seconds
Pre-Trigger: 1.0 Second
Seismic Gain: 10.2in/sec
Acoustic Gain: 148.2 dBL
Voltage: 6.25

Peaks and Frequencies	Graph Information
PPV Maximum: 0.0191 in/sec (-1.0000 sec)	Duration: -1.000 s To: 8.000 s
Radial: 0.0159 in/sec @ 32.0 Hz (-1.0000 sec)	Acoustic Scale: 126.0 dBL
Vertical: 0.0191 in/sec @ 64.0 Hz (-1.0000 sec)	Seismic Scale: 0.0500 in/sec (0.0125 in/sec/div)
Transverse: 0.0128 in/sec @ 20.5 Hz (-1.0000 sec)	Time Intervals: 1.00 sec
Acoustic: 108.4 dBL @ 2.1 Hz (-1.0000 sec)	
Seis Calibration Date (SN): 8/31/2017 (7184)	
Air Calibration Date (SN): 8/31/2017 (7184)	



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)



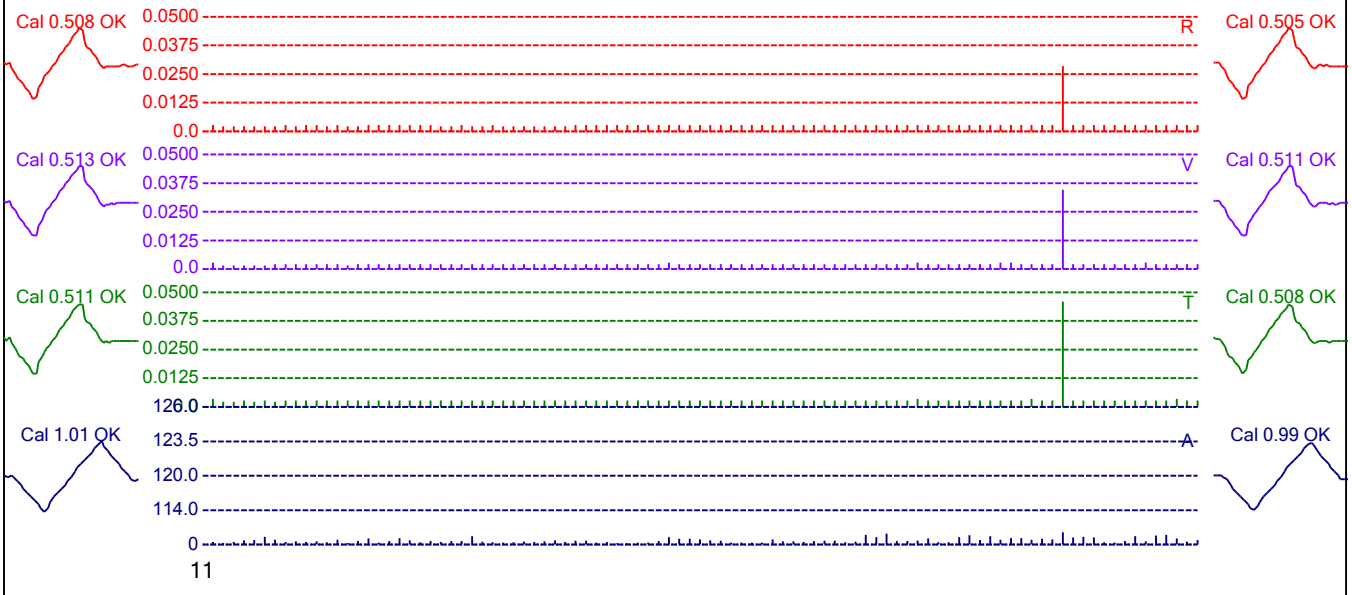
White Seismograph Data Analysis V11 - Version 11.1.0.104

HILLIS-CARNES
ENGINEERING ASSOCIATES

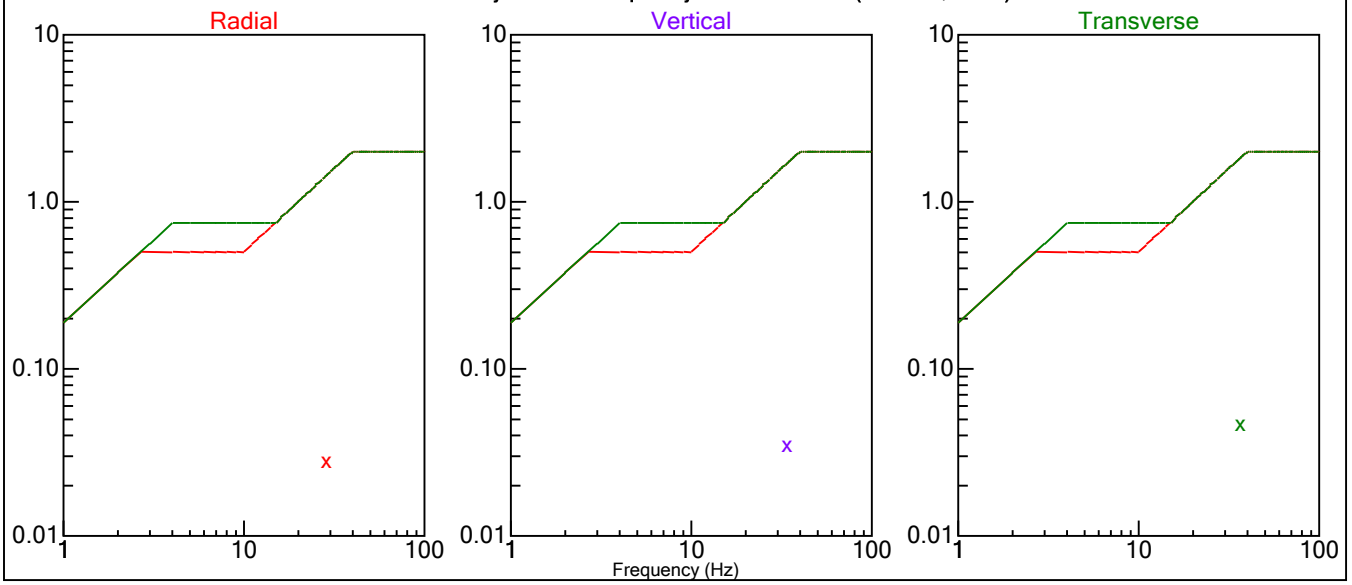
Hillis-Carnes Engineering
Savage Quarry Monitoring
Mission Road, Jessup, MD
Client - HCPS
HCEA Project # - 18069A
Unit 2 - Proposed High School

File Name: 7178201802191125450007.hst
Number: 0007
Job Range: 2/19/2018 11:25:45 AM - 2/19/2018 1:02:01 PM
Serial Number: 7178
Sample Interval: 60 seconds
Samples: 96
Acoustic Gain: 148.2 dBL
Seismic Gain: 10.2 in/s
Voltage Range: 6.24 - 6.22

Peaks and Frequencies	Graph Information
PPV Maximum: 0.0459 in/sec (2/19/2018 12:48:45 PM)	Date Range: 2/19/2018 11:25:45 AM - 2/19/2018 1:02:01 PM
Radial: 0.0284 in/sec @ 28.4 Hz (2/19/2018 12:48:45 PM)	Samples: 96
Vertical: 0.0347 in/sec @ 34.1 Hz (2/19/2018 12:48:45 PM)	Acoustic Scale: 126.0 dBL
Transverse: 0.0459 in/sec @ 36.6 Hz (2/19/2018 12:48:45 PM)	Seismic Scale: 0.0500 in/sec (0.0125 in/sec/div)
Acoustic: 105.1 dBL @ 4.0 Hz (2/19/2018 12:48:45 PM)	Time Intervals: 2 Hours
Seis Calibration Date (SN): 7/10/2017 (7178)	
Air Calibration Date (SN): 7/10/2017 (7178)	



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)



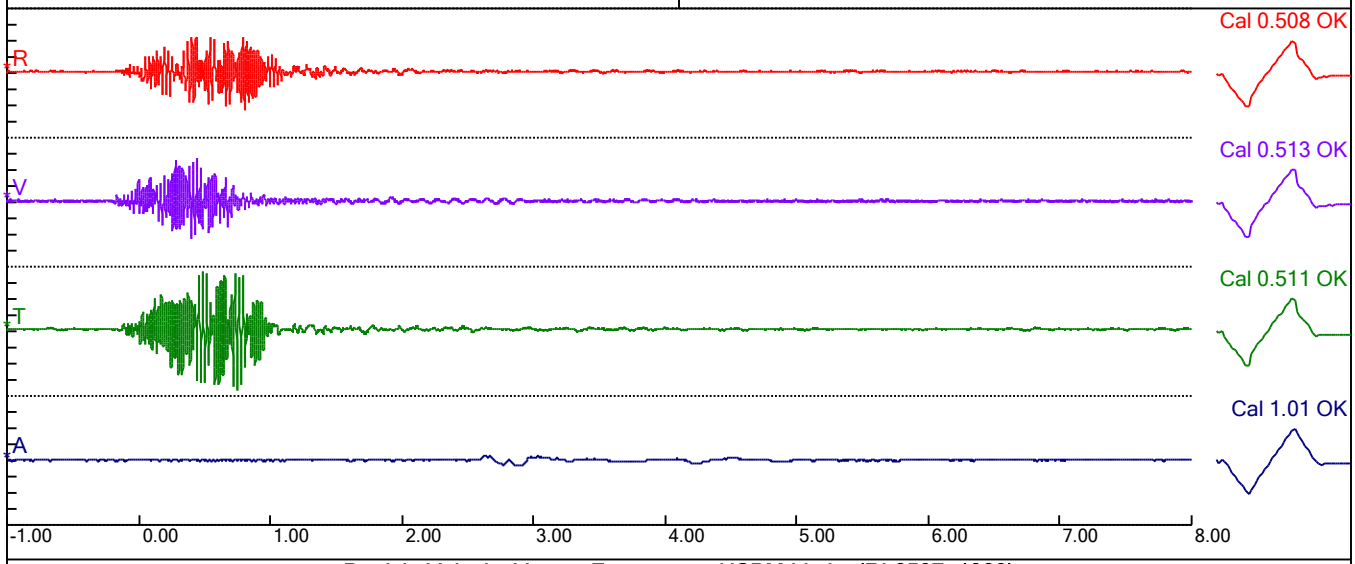
White Seismograph Data Analysis V11 - Version 11.1.0.104

HILLIS-CARNES
ENGINEERING ASSOCIATES

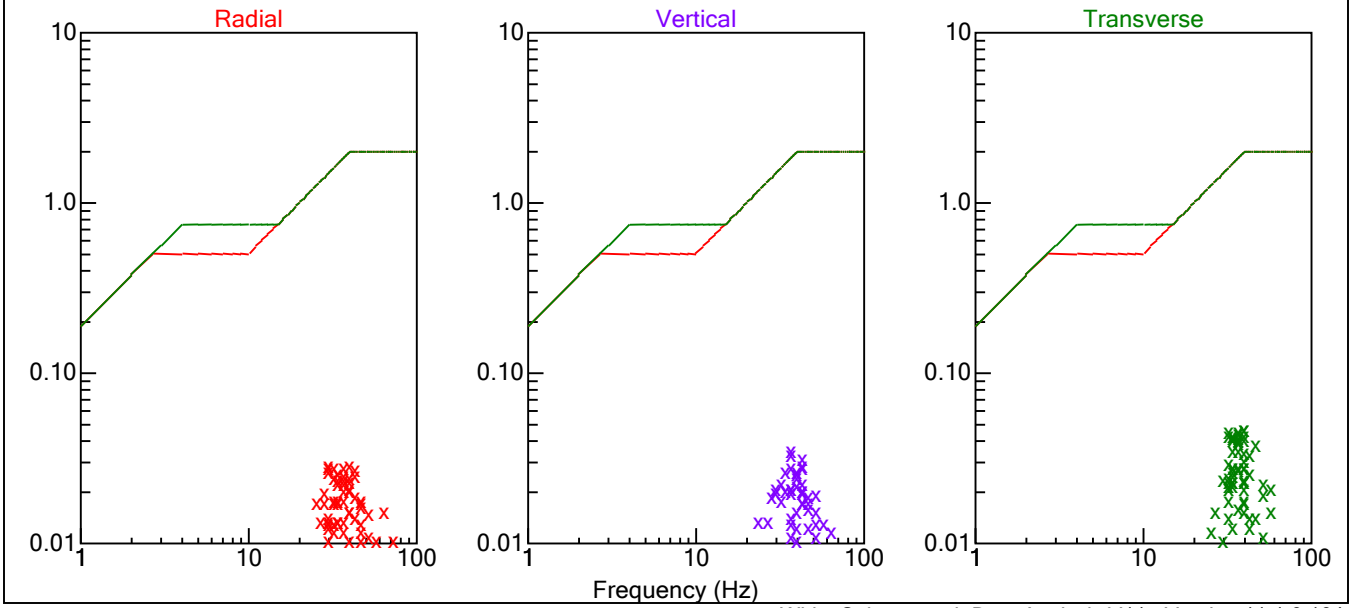
Hillis-Carnes Engineering
Savage Quarry Monitoring
Mission Road, Jessup, MD
Client - HCPS
HCEA Project # - 18069A
Unit 2 - Proposed High School

File: 717820180219124811006.evt
Number: 0006
Date and Time: 2/19/2018 12:48:11 PM
SN: 7178
Seismic Trigger: 0.0150 in/sec
Air Trigger: 135.0 dBL
Sample Rate: 1024
Duration: 8 Seconds
Pre-Trigger: 1.0 Second
Seismic Gain: 10.2in/sec
Acoustic Gain: 148.2 dBL
Voltage: 6.27

Peaks and Frequencies	Graph Information
PPV Maximum: 0.0459 in/sec (-1.0000 sec)	Duration: -1.000 s To: 8.000 s
Radial: 0.0284 in/sec @ 28.4 Hz (-1.0000 sec)	Acoustic Scale: 126.0 dBL
Vertical: 0.0347 in/sec @ 34.1 Hz (-1.0000 sec)	Seismic Scale: 0.0500 in/sec (0.0125 in/sec/div)
Transverse: 0.0459 in/sec @ 36.6 Hz (-1.0000 sec)	Time Intervals: 1.00 sec
Acoustic: 105.1 dBL @ 4.0 Hz (-1.0000 sec)	
Seis Calibration Date (SN): 7/10/2017 (7178)	
Air Calibration Date (SN): 7/10/2017 (7178)	



Particle Velocity Versus Frequency - USBM Limits (RI 8507, 1980)



Appendix C


Savage Quarry Blast Map
Mlssion Road
Jessup, Maryland
HCEA Project #18069A
Legend
School
Mission Rd
Cheshire Ct
Proposed Elementary School
Ambient Air Monitoring Location (February 13, 2018 and February 19, 2018)
95
12 Sons Ct
Mission Rd
Fawn Run
Oak Trail
Proposed High School
Rose Ln
Jones Rd
Google Earth
© 2018 Google
N
2000 ft

EMSL Analytical, Inc.

10768 Baltimore Avenue Beltsville, MD 20705

Tel/Fax: (301) 937-5700 / (301) 937-5701

http://www.EMSL.com / beltsvillelab@emsl.com

EMSL Order:	191802316
Customer ID:	HCCS29
Customer PO:	18069A
Project ID:	

Attention:	Anthony Kesslak Hillis-Carnes, Capitol Services 1408 N. Capitol Street, NW 20002 Washington, DC 20002	**Phone:**	(724) 309-3568
		Fax:	
		Received Date:	02/26/2018 10:05 AM
		Analysis Date:	02/28/2018
		Collected Date:	02/23/2018
Project:	18069A MISSION RD QUARRY BLAST		

Test Report: Fiber Count by Phase Contrast Microscopy (PCM), NIOSH 7400 Method - A Rules, Revision 3, Issue 2, 8/15/94

Sample	*Location*	*Sample Date*	*Volume (liters)*	*Fibers*	*Fields*	*LOD (fib/cc)*	*Fibers/ mm²*	*Fibers/ cc*	*Notes*
#2	ES SITE ASBESTOS	2/23/2018	845.00	<5.5	100	0.003	<7.01	<0.003	
191802316-0001									
#4	ES SITE ASBESTOS	2/23/2018	608.00	<5.5	100	0.004	<7.01	<0.004	
191802316-0002									

This method requires the submission of field blanks with each sample set. No discernable field blanks were submitted, samples are not blank corrected.

Analyst(s):

George Malone PCM (2)

Joe Centifonti, Laboratory Manager
or Other Approved Signatory

Limit of detection is 7 fibers/mm². Intra-laboratory Sr values: 5-20 fibers = 0.29, 21-50 fibers = 0.17, 51-100 fibers = 0.14. Inter-laboratory Sr. values (Average of EMSL round robin data) = 0.30. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. Results have been blank corrected as applicable. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD AIHA-LAP, LLC --IHLAP Accredited #102891

Initial report from: 03/01/2018 09:38:44

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 /
http://www.EMSL.com / IndustrialHygienelab@emsl.com

EMSL Order ID:	281800899
Customer ID:	HCCS29
Customer PO:	18069A
Project ID:	

Attn: Anthony Kesslak
Hillis-Carnes, Capitol Services
1408 N. Capitol Street, NW 20002
Washington, DC 20002

Phone: (202) 430-3585
Fax:
Collected: 02/19/2018
Received: 02/27/2018
Analyzed: 02/28/2018

Proj: 18069A Mission Rd. Quary Blast

Test Report: Respirable Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction and Respirable Dust Analysis (Gravimetric) of Air Samples NIOSH 0600, Issue 3, 1/15/98 Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

XRD-Silica

Sample ID	Collected	Location / Description	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	% Silica	Weight (mg)	Conc. (mg/m³)	Analytical Sensitivity (mg/m³)
#1	2/13/2018	ES Site Silica	890	<0.050	<0.056	α-Quartz	N/A	<0.005	<0.006	0.006
281800899-0001						Cristobalite	N/A	<0.010	<0.011	0.011
						Tridymite	N/A	<0.010	<0.011	0.011
Comment: Customer										
#3	2/19/2018	ES Site Silica	1440	<0.050	<0.035	α-Quartz	N/A	<0.005	<0.004	0.004
281800899-0002						Cristobalite	N/A	<0.010	<0.007	0.007
						Tridymite	N/A	<0.010	<0.007	0.007
Comment: Customer										

Analyst(s)

Katherine Foster

Scott Van Etten, CIH, Laboratory Manager
or Other Approved Signatory

Any questions please contact Scott VanEtten.

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations . Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical - Industrial Hygiene Cinnaminson, NJ AIHA-LAP, LLC--IHLAP Accred. Lab 100194

Initial report from: 03/01/2018 10:24:25

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 /
http://www.EMSL.com / IndustrialHygienelab@emsl.com

EMSL Order ID:	281800899
Customer ID:	HCCS29
Customer PO:	18069A
Project ID:	

Attn: Anthony Kesslak
Hillis-Carnes, Capitol Services
1408 N. Capitol Street, NW 20002
Washington, DC 20002

Phone:	(202) 430-3585
Fax:	
Collected:	02/19/2018
Received:	02/27/2018
Analyzed:	02/28/2018

Proj: 18069A Mission Rd. Quary Blast

Test Report: Respirable Silica, Crystalline Analysis of Air Samples Performed by X-Ray Diffraction and Respirable Dust Analysis (Gravimetric) of Air Samples NIOSH 0600, Issue 3, 1/15/98 Via NIOSH Method 7500 (Modified), Issue 4, 3/15/2003

QC Batch ID: 28Q180301-013

XRD-Silica

	Collected	Location / Description	Volume (L)	Respirable Dust (mg)	Respirable Dust (mg/m³)	Silica	% Silica	Weight (mg)	Conc. (mg/m³)	Analytical Sensitivity (mg/m³)
Method Blank				<0.050	N/A	α-Quartz	N/A	<0.005		N/A
						Cristobalite	N/A	<0.010		N/A
						Tridymite	N/A	<0.010		N/A

Reference Standards	% Silica	Weight (mg)	Conc. (mg/m³)	Analytical Sensitivity (mg/m³)
α-Quartz (0.250 mg)	N/A	0.211		N/A
α-Quartz (0.005 mg)	N/A	0.005		N/A
Cristobalite (0.010 mg)	N/A	0.010		N/A

Analyst(s)

Katherine Foster

Scott Van Etten, CIH, Laboratory Manager
or Other Approved Signatory

Any questions please contact Scott VanEtten.

The laboratory can only verify the concentration of silica on the filter and not the final concentration due to data obtained by non-laboratory personnel. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations . Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical - Industrial Hygiene Cinnaminson, NJ AIHA-LAP, LLC--IHLAP Accred. Lab 100194

Initial report from: 03/01/2018 10:24:25

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
Phone: 1-800-220-3675
Fax: (856) 786-5974

Chain of Custody

EMSL Order Number *(Lab Use Only)*: 191802316

Company: Hillis Carnes – Capital Service #1414
Street: north Captial Street
City: Washington **State/Province:** DC **Zip/Postal Code:** 20002 **Country:** US
Report To (Name): Anthony Kesslak **Telephone #:** 724 309-3568
Email Address: tkesslak@hotmail.com **Fax #:**
Project Name/Number: 180894 Mission Rd Quarry Blast **Purchase Order:** 1806-9H
U.S. State Samples Taken: MD **Please Provide Results:** ☐ FAX ☑ E-mail ☐ Mail
Connecticut Samples: Commercial Residential

EMSL-Bill to: ☒ Same ☐ Different
If Bill to is Different note instructions in Comments**
Third Party Billing requires written authorization from third party

Turnaround Time (TAT) Options* - Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☒ 1 Week ☐ 2 Week

*For RUSH TAT's Please Call Ahead to Confirm Lab Hours and Availability. Not all TAT options are valid for every test.
Materials Science and IAQ TATs are in Business Days rather than Hours (i.e. 24 Hour = End of Next Business Day)

Asbestos

PCM - Air
☒ NIOSH 7400
☐ w/ 8hr. TWA

TEM– Air ☐ 4-4 5hr TAT(AHERA ONLY)
☐ AHERA 40 CFR, Part 763
☐ NIOSH 7402
☐ *EPA Level II*
☐ ISO 10312

TEM - Water
Fibers ≥10µm ☐ Waste ☐ Drinking
All Fiber Sizes ☐ Waste ☐ Drinking

PLM - Bulk
☐ PLM EPA 600/R-93/116
☐ PLM EPA NOB (<1%)
☐ NYS 198.1 (friable-NY)
☐ NYS 198 6 (non-friable-NY)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
Point Count w/ Gravimetric
☐ 400 (<0.25%) ☐ 1000 (<0.1%)

TEM - Dust
☐ Microvac – ASTM D 5755
☐ Wipe-ASTM D6480

TEM - Bulk
☐ TEM EPA NOB
☐ NYS NOB 198.4 (non-friable-NY)
☐ Chatfield SOP

Soil/Rock/Vermiculite
☐ PLM CARB 435 – A (0.25% sensitivity)
☐ PLM CARB 435 – B (0.1% sensitivity)
☐ TEM CARB 435 – B (0.1% sensitivity)
☐ EPA Reg. 1 Screening Protocol (Qualitative)

Other:

Lead (Pb)

Flame Atomic Absorption
☐ Chips SW846-7000B or AOAC 974.02
☐ Soil SW846-7000B/7420
☐ Air NIOSH 7082
☐ Wastewater SM3111B or SW846-7000B/7420
☐ ASTM Wipe SW846-7000B/7420
☐ non ASTM Wipe SW846-7000B/7420
☐ TCLP SW846-1311/7420/SM 3111B

ICP
☐ Air NIOSH 7300 Modified
☐ non ASTM Wipe SW846-6010B or C
☐ ASTM Wipe SW846-6010B or C
☐ Soil SW846-6010 B or C
☐ Waste Water SW846-6010B or C
☐ TCLP SW846-6010B or C

Graphite Furnace Atomic Absorption
☐ Soil SW846-7421 ☐ Wastewater EPA 200.9
☐ Air NIOSH 7105 ☐ Drinking Water EPA 200.9

Other: ☐

Microbiology

Wipe and Bulk Samples
☐ Mold & Fungi – Direct Examination
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi Culture (Genus & Species)
☐ Bacterial Count & ID (Up to Three Types)
☐ Bacterial Count & ID (Up to Five Types)
☐ MRSA
☐ *Pseudomonas aeruginosa*

Water Samples
☐ Total Coliform & E.coli (P/A)
☐ Fecal Coliform (SM 9222D)
☐ Sewage Screen
☐ Heterotrophic Plate Count (SM 9215)

Air Samples
☐ Mold & Fungi (Spore Trap)
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi (Genus & Species)
☐ Bacterial Culture & ID (Up to Three Types)
☐ Bacterial Culture & ID (Up to Five Types)
☐ Endotoxin Testing

Real Time Q-PCR (See Analytical Guide for Code)
Code:

Legionella
☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

Other: ☐

Materials Science

☐ Common Particle ID (large particles)
☐ Fuel Particle ID (environmental dust)
☐ Basic Material ID (solids)
☐ Advanced Material ID
☐ Physical Testing (Tensile, Compression)
☐ Combustion-by-products (soot, char, etc.)
☐ X-Ray Fluorescence (elem. analysis)
☐ X-Ray Diffraction (Crystalline Part.)
☐ MMVF's (Fibrous glass, RCF's)
☐ Particle Size (sieve/microscopy/laser)
☐ Combustible Dust
☐ Petrographic Examination
Other: ☐

IAQ

Nuisance Dust NIOSH ☐ 0500 ☐ 0600
Airborne Dust ☐ PM10 ☒ TSP
Silica Analysis: ☒ All Species
Silica Analysis – Single Species
☐ Alpha Quartz ☐ Cristobalite ☐ Tridymite
☐ HVAC Efficiency
☐ Carbon Black
☐ Airborne Oil Mist
Radon Testing Call for Kit and COC
Other: ☐

****Comments/Special Instructions:** BillTo: Hillis Carnes, north Captial Street, Washington, DC, 20200. US Attention: Anthony Kesslak Phone: 724 309-3568 Email: tkesslak@hotmail.com Purchase Order:

Client Sample #'s	1-4	**Total # of Samples:**
Relinquished (Client):	**Date:** 2/23/18	**Time:** 10:40
Received (Lab):	**Date:** 2/26/18	**Time:** 12:30 pm

UPS Ground

Analysis Completed in Accordance with EMSL's Terms and Conditions located in the Analytical Price Guide

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

EMSL Analytical, Inc.
200 Route 130 North

Cinnaminson, NJ 08077
Phone: 1-800-220-3675
Fax: (856) 786-5974

Chain of Custody

EMSL Order Number *(Lab Use Only)*:

Mission Rd Quarry Blast

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
#1	ES Site Silica Crystalline	890 l	2/13/18 Atm
#2	ES Site Asbestos	845 l	2/13/18 Atm
#3	ES Site Silica Crystalline	1440 l	2/19/18 Atm
#4	ES Site Asbestos	608 l	2/19/18 Atm

***Comments/Special Instructions:**
BillTo: Hillis Carnes, north Captial Street, Washington, DC, 20200, US
Attention: Anthony Kesslak Phone: 724 309-3568 Email: tkesslak@hotmail.com Purchase Order:

Analysis Completed in Accordance with EMSL's Terms and Conditions located in the Analytical Price Guide

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
PHONE: 1-800-220-3675
FAX: (856) 786-5974

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Chain of Custody

EMSL Order Number *(Lab Use Only)*: 281800899

Company: Hillis Carnes – Capital Service #1414	**EMSL-Bill to:** [X] Same [ ] Different If Bill to is Different note instructions in Comments**
Street: north Captial Street	Third Party Billing requires written authorization from third party
City: Washington **State/Province:** DC	**Zip/Postal Code:** 20002 **Country:** US
Report To (Name): Anthony Kesslak	**Telephone #:** 724 309-3568 PM:
Email Address: tkesslak@hotmail.com Mission RQ	**Fax #:** **Purchase Order:** 180691A
Project Name/Number: 180691A Quarry Blast	**Please Provide Results:** [ ] FAX [✓] E-mail [ ] Mail
U.S. State Samples Taken: MD	**Connecticut Samples:** Commercial Residential

Turnaround Time (TAT) Options* - Please Check

[ ] 3 Hour [ ] 6 Hour [ ] 24 Hour [ ] 48 Hour [ ] 72 Hour [ ] 96 Hour [X] 1 Week [ ] 2 Week

For RUSH TAT's Please Call Ahead to Confirm Lab Hours and Availability. Not all TAT options are valid for every test. Materials Science and IAQ TATs are in Business Days rather than Hours (i.e. 24 Hour = End of Next Business Day)

Asbestos

PCM - Air
[X] NIOSH 7400
[ ] w/ 8hr. TWA

TEM– Air [ ] 4-4.5hr TAT(AHERA ONLY)
[ ] AHERA 40 CFR, Part 763
[ ] NIOSH 7402
[ ] EPA Level II
[ ] ISO 10312

TEM - Water
Fibers ≥10µm [ ] Waste [ ] Drinking
All Fiber Sizes [ ] Waste [ ] Drinking

PLM - Bulk
[ ] PLM EPA 600/R-93/116
[ ] PLM EPA NOB (<1%)
[ ] NYS 198.1 (friable-NY)
[ ] NYS 198.6 (non-friable-NY)
Point Count [ ] 400 (<0.25%) [ ] 1000 (<0.1%)
Point Count w/ Gravimetric [ ] 400 (<0.25%) [ ] 1000 (<0.1%)

TEM - Dust
[ ] Microvac – ASTM D 5755
[ ] Wipe-ASTM D6480

TEM - Bulk
[ ] TEM EPA NOB
[ ] NYS NOB 198.4 (non-friable-NY)
[ ] Chatfield SOP

Soil/Rock/Vermiculite
[ ] PLM CARB 435 – A (0.25% sensitivity)
[ ] PLM CARB 435 – B (0.1% sensitivity)
[ ] TEM CARB 435 – B (0.1% sensitivity)
[ ] EPA Reg. 1 Screening Protocol (Qualitative)

Other:

Lead (Pb)

Flame Atomic Absorption
[ ] Chips SW846-7000B or AOAC 974.02
[ ] Soil SW846-7000B/7420
[ ] Air NIOSH 7082
[ ] Wastewater SM3111B or SW846-7000B/7420
[ ] ASTM Wipe SW846-7000B/7420
[ ] non ASTM Wipe SW846-7000B/7420
[ ] TCLP SW846-1311/7420/SM 3111B

ICP
[ ] Air NIOSH 7300 Modified
[ ] non ASTM Wipe SW846-6010B or C
[ ] ASTM Wipe SW846-6010B or C
[ ] Soil SW846-6010 B or C
[ ] Waste Water SW846-6010B or C
[ ] TCLP SW846-6010B or C

Graphite Furnace Atomic Absorption
[ ] Soil SW846-7421 [ ] Wastewater EPA 200.9
[ ] Air NIOSH 7105 [ ] Drinking Water EPA 200.9

Other: [ ]

Materials Science

[ ] Common Particle ID (large particles)
[ ] Full Particle ID (environmental dust)
[ ] Basic Material ID (solids)
[ ] Advanced Material ID
[ ] Physical Testing (Tensile, Compression)
[ ] Combustion-by-products (soot, char, etc.)
[ ] X-Ray Fluorescence (elem. analysis)
[ ] X-Ray Diffraction (Crystalline Part.)
[ ] MMVF's (Fibrous glass, RCF's)
[ ] Particle Size (sieve/microscopy/laser)
[ ] Combustible Dust
[ ] Petrographic Examination
Other: [ ]

RECEIVED EMSL CINNAMINSON, N.J. FEB 27 A 11:10

Microbiology

Wipe and Bulk Samples
[ ] Mold & Fungi – Direct Examination
[ ] Mold & Fungi Culture (Genus Only)
[ ] Mold & Fungi Culture (Genus & Species)
[ ] Bacterial Count & ID (Up to Three Types)
[ ] Bacterial Count & ID (Up to Five Types)
[ ] MRSA
[ ] *Pseudomonas aeruginosa*

Water Samples
[ ] Total Coliform & E.coli (P/A)
[ ] Fecal Coliform (SM 9222D)
[ ] Sewage Screen
[ ] Heterotrophic Plate Count (SM 9215)

Air Samples
[ ] Mold & Fungi (Spore Trap)
[ ] Mold & Fungi Culture (Genus Only)
[ ] Mold & Fungi (Genus & Species)
[ ] Bacterial Culture & ID (Up to Three Types)
[ ] Bacterial Culture & ID (Up to Five Types)
[ ] Endotoxin Testing

Real Time Q-PCR (See Analytical Guide for Code)
Code:

Legionella
[ ] Level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Other: [ ]

IAQ

Nuisance Dust NIOSH [ ] 0500 [ ] 0600
Airborne Dust [ ] PM10 [X] TSP
Silica Analysis: [X] All Species
Silica Analysis – Single Species
[ ] Alpha Quartz [ ] Cristobalite [ ] Tridymite
[ ] HVAC Efficiency
[ ] Carbon Black
[ ] Airborne Oil Mist
Radon Testing: Call for Kit and COC
Other: [ ]

****Comments/Special Instructions:** BillTo: Hillis Carnes, north Captial Street, Washington, DC, 20200, US Attention: Anthony Kesslak Phone: 724 309-3568 Email: tkesslak@hotmail.com Purchase Order:

Client Sample #'s	1-4	**Total # of Samples:**
Relinquished (Client):	**Date:** 2/23/18	**Time:** 10:40
Received (Lab): N. Farnworth	**Date:** 2/26/18	**Time:** 12:30 pm

Analysis Completed in Accordance with EMSL's Terms and Conditions located in the Analytical Price Guide

UPS Ground

Rec'd Bob N 2/27/18 11:10 (2)

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
PHONE: 1-800-220-3675
FAX: (856) 786-5974

EMSL ANALYTICAL INC.
LABORATORY • PRODUCTS • TRAINING

Chain of Custody

EMSL Order Number (*Lab Use Only*): 281800899

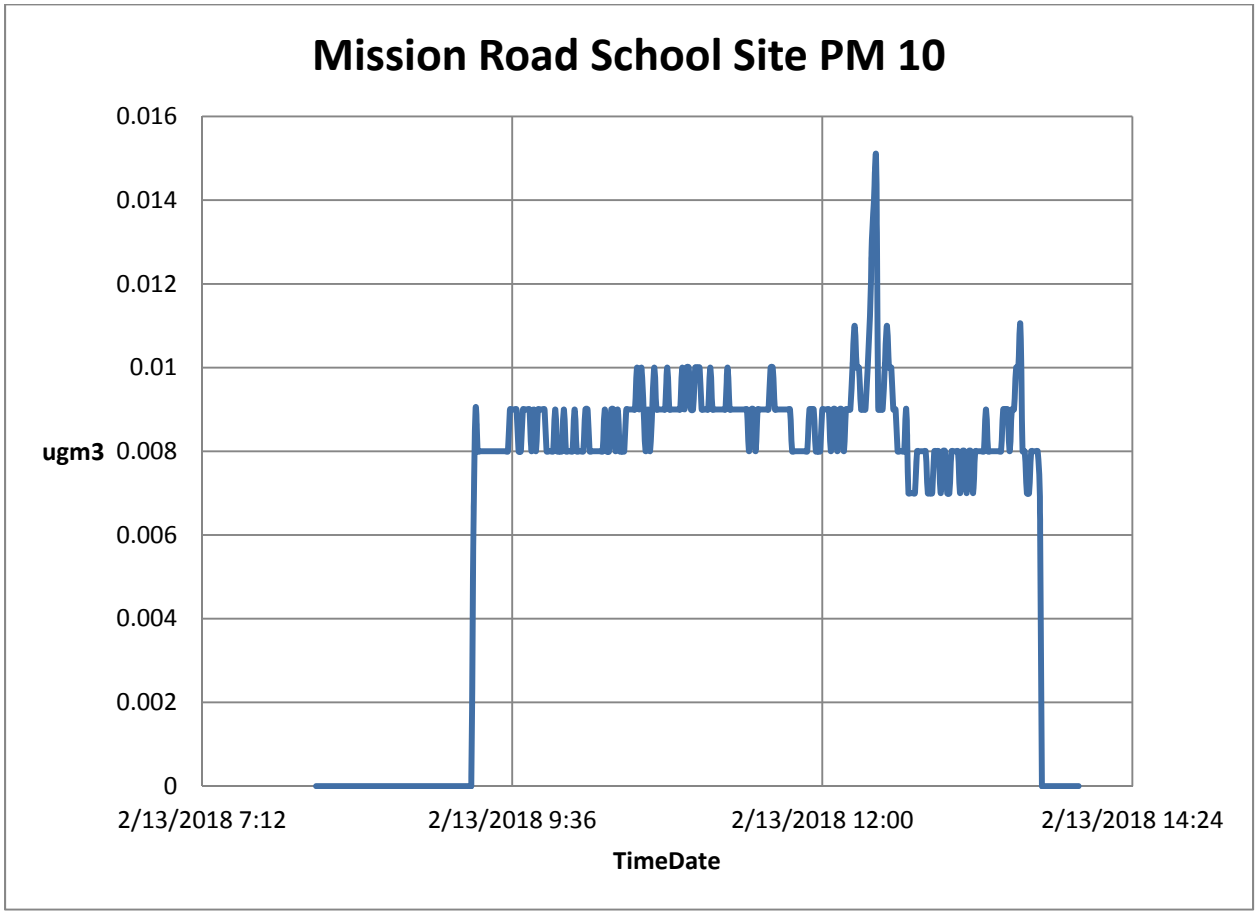
Mission Rd Quarry Blast

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
#1	ES Site Silica Crystalline	890 l	2/13/18 AM
#2	ES Site Asbestos	845 l	2/13/18 AM
#3	ES Site Silica Crystalline	1440 l	2/19/18 AM
#4	ES Site Asbestos	608 l	2/19/18 AM

RECEIVED
EMSL
CINNAMINSON, N.J.
2018 FEB 27 A 11:10

***Comments/Special Instructions:**
BillTo: Hillis Carnes, north Capital Street, Washington, DC, 20200, US
Attention: Anthony Kesslak Phone: 724 309-3568 Email: tkesslak@hotmail.com Purchase Order:

Analysis Completed in Accordance with EMSL's Terms and Conditions located in the Analytical Price Guide



Time	Conc (MG/M3)	WS (MPH)	WD (Deg)
2/13/2018 9:00	0	0.3	2
2/13/2018 9:01	0	0.3	2
2/13/2018 9:02	0	0.3	2
2/13/2018 9:03	0	0.3	2
2/13/2018 9:04	0	0.3	2
2/13/2018 9:05	0	0.3	1
2/13/2018 9:06	0	1	24
2/13/2018 9:07	0	6.0	52
2/13/2018 9:08	0	4.3	90
2/13/2018 9:09	0	5.8	63
2/13/2018 9:10	0	6.3	95
2/13/2018 9:11	0	7.8	108
2/13/2018 9:12	0	6.9	91
2/13/2018 9:13	0	7.4	85
2/13/2018 9:14	0	5.1	150
2/13/2018 9:15	0	4.5	175
2/13/2018 9:16	0	4.9	177
2/13/2018 9:17	0	6.3	152

2/13/2018 9:18	0.006	6.0	127
2/13/2018 9:19	0.009	5.4	119
2/13/2018 9:20	0.008	5.8	124
2/13/2018 9:21	0.008	5.8	127
2/13/2018 9:22	0.008	4.5	116
2/13/2018 9:23	0.008	4.0	128
2/13/2018 9:24	0.008	4.7	160
2/13/2018 9:25	0.008	6.3	162
2/13/2018 9:26	0.008	6.5	129
2/13/2018 9:27	0.008	5.6	155
2/13/2018 9:28	0.008	5.1	142
2/13/2018 9:29	0.008	6.5	125
2/13/2018 9:30	0.008	7.6	162
2/13/2018 9:31	0.008	6.5	125
2/13/2018 9:32	0.008	6.0	121
2/13/2018 9:33	0.008	5.1	153
2/13/2018 9:34	0.008	4.9	127
2/13/2018 9:35	0.009	4.7	106
2/13/2018 9:36	0.009	6.3	114
2/13/2018 9:37	0.009	6.7	156
2/13/2018 9:38	0.009	4.7	137
2/13/2018 9:39	0.008	6.5	119
2/13/2018 9:40	0.008	5.8	120
2/13/2018 9:41	0.009	5.6	145
2/13/2018 9:42	0.009	6.0	113
2/13/2018 9:43	0.009	6.5	110
2/13/2018 9:44	0.009	5.8	106
2/13/2018 9:45	0.008	5.6	133
2/13/2018 9:46	0.009	5.8	100
2/13/2018 9:47	0.008	7.8	115
2/13/2018 9:48	0.009	6.7	96
2/13/2018 9:49	0.009	8.1	106
2/13/2018 9:50	0.009	4.7	99
2/13/2018 9:51	0.009	5.1	103
2/13/2018 9:52	0.008	4.7	104
2/13/2018 9:53	0.008	4.3	77
2/13/2018 9:54	0.008	4.5	128
2/13/2018 9:55	0.008	6.0	112
2/13/2018 9:56	0.009	5.8	113
2/13/2018 9:57	0.008	7.8	102
2/13/2018 9:58	0.008	4.5	102
2/13/2018 9:59	0.008	8.9	104
2/13/2018 10:00	0.009	6.7	125
2/13/2018 10:01	0.008	4.9	114
2/13/2018 10:02	0.008	7.4	104
2/13/2018 10:03	0.008	6.0	103
2/13/2018 10:04	0.008	5.8	106

2/13/2018 10:05	0.009	6.3	92
2/13/2018 10:06	0.008	7.2	102
2/13/2018 10:07	0.008	6.5	96
2/13/2018 10:08	0.008	4.3	126
2/13/2018 10:09	0.008	2.9	77
2/13/2018 10:10	0.009	2.9	111
2/13/2018 10:11	0.009	4.5	127
2/13/2018 10:12	0.008	8.7	106
2/13/2018 10:13	0.008	7.2	99
2/13/2018 10:14	0.008	9.2	103
2/13/2018 10:15	0.008	7.4	104
2/13/2018 10:16	0.008	6.0	94
2/13/2018 10:17	0.008	5.8	126
2/13/2018 10:18	0.008	2.9	121
2/13/2018 10:19	0.009	3.6	154
2/13/2018 10:20	0.008	5.1	174
2/13/2018 10:21	0.008	4.7	150
2/13/2018 10:22	0.009	6.0	160
2/13/2018 10:23	0.009	4.7	154
2/13/2018 10:24	0.008	4.9	111
2/13/2018 10:25	0.009	6.5	125
2/13/2018 10:26	0.008	5.6	145
2/13/2018 10:27	0.008	4.3	160
2/13/2018 10:28	0.008	3.6	155
2/13/2018 10:29	0.009	5.4	139
2/13/2018 10:30	0.009	5.8	107
2/13/2018 10:31	0.009	3.8	130
2/13/2018 10:32	0.009	4.7	149
2/13/2018 10:33	0.009	5.8	167
2/13/2018 10:34	0.01	5.4	151
2/13/2018 10:35	0.009	4.5	132
2/13/2018 10:36	0.01	4.0	121
2/13/2018 10:37	0.009	5.4	151
2/13/2018 10:38	0.008	8.3	140
2/13/2018 10:39	0.009	5.6	148
2/13/2018 10:40	0.008	6.5	162
2/13/2018 10:41	0.009	4.7	141
2/13/2018 10:42	0.01	3.8	149
2/13/2018 10:43	0.009	4.7	118
2/13/2018 10:44	0.009	6.7	97
2/13/2018 10:45	0.009	5.4	132
2/13/2018 10:46	0.009	5.8	151
2/13/2018 10:47	0.009	5.8	119
2/13/2018 10:48	0.01	4.9	87
2/13/2018 10:49	0.009	5.6	87
2/13/2018 10:50	0.009	6.5	89
2/13/2018 10:51	0.009	5.6	97

2/13/2018 10:52	0.009	7.4	99
2/13/2018 10:53	0.009	4.3	88
2/13/2018 10:54	0.009	5.1	90
2/13/2018 10:55	0.01	7.6	96
2/13/2018 10:56	0.009	6.7	94
2/13/2018 10:57	0.01	7.6	89
2/13/2018 10:58	0.01	5.6	92
2/13/2018 10:59	0.009	5.1	123
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2/13/2018 11:01	0.01	8.3	95
2/13/2018 11:02	0.01	5.6	107
2/13/2018 11:03	0.01	4.7	140
2/13/2018 11:04	0.009	5.6	116
2/13/2018 11:05	0.009	6.3	95
2/13/2018 11:06	0.009	6.9	141
2/13/2018 11:07	0.009	5.1	158
2/13/2018 11:08	0.01	6.5	99
2/13/2018 11:09	0.009	7.2	90
2/13/2018 11:10	0.009	6.3	120
2/13/2018 11:11	0.009	4.9	98
2/13/2018 11:12	0.009	5.6	89
2/13/2018 11:13	0.009	5.4	85
2/13/2018 11:14	0.009	4.0	98
2/13/2018 11:15	0.009	5.4	117
2/13/2018 11:16	0.01	7.8	96
2/13/2018 11:17	0.009	5.4	89
2/13/2018 11:18	0.009	6.3	100
2/13/2018 11:19	0.009	5.1	103
2/13/2018 11:20	0.009	4.7	114
2/13/2018 11:21	0.009	3.6	63
2/13/2018 11:22	0.009	3.6	105
2/13/2018 11:23	0.009	7.4	93
2/13/2018 11:24	0.009	6.9	98
2/13/2018 11:25	0.009	4.7	76
2/13/2018 11:26	0.008	4.0	89
2/13/2018 11:27	0.009	4.9	129
2/13/2018 11:28	0.009	4.5	136
2/13/2018 11:29	0.008	5.4	132
2/13/2018 11:30	0.009	5.1	136
2/13/2018 11:31	0.009	5.6	143
2/13/2018 11:32	0.009	4.3	157
2/13/2018 11:33	0.009	5.4	114
2/13/2018 11:34	0.009	4.9	110
2/13/2018 11:35	0.009	6.5	97
2/13/2018 11:36	0.01	5.4	87
2/13/2018 11:37	0.01	4.5	78
2/13/2018 11:38	0.009	5.8	81

2/13/2018 11:39	0.009	3.4	70
2/13/2018 11:40	0.009	6.3	76
2/13/2018 11:41	0.009	3.6	61
2/13/2018 11:42	0.009	4.0	85
2/13/2018 11:43	0.009	7.2	92
2/13/2018 11:44	0.009	5.1	111
2/13/2018 11:45	0.009	4.0	90
2/13/2018 11:46	0.008	4.9	107
2/13/2018 11:47	0.008	6.5	112
2/13/2018 11:48	0.008	6.7	121
2/13/2018 11:49	0.008	5.1	95
2/13/2018 11:50	0.008	7.6	94
2/13/2018 11:51	0.008	6.0	85
2/13/2018 11:52	0.008	5.4	123
2/13/2018 11:53	0.008	6.0	92
2/13/2018 11:54	0.009	5.8	116
2/13/2018 11:55	0.009	3.8	119
2/13/2018 11:56	0.009	5.1	110
2/13/2018 11:57	0.008	4.9	88
2/13/2018 11:58	0.008	4.5	102
2/13/2018 11:59	0.008	6.3	119
2/13/2018 12:00	0.009	3.4	89
2/13/2018 12:01	0.009	4.0	91
2/13/2018 12:02	0.009	3.1	75
2/13/2018 12:03	0.009	3.1	80
2/13/2018 12:04	0.008	3.1	83
2/13/2018 12:05	0.009	4.3	122
2/13/2018 12:06	0.009	5.4	155
2/13/2018 12:07	0.008	5.6	165
2/13/2018 12:08	0.009	4.7	138
2/13/2018 12:09	0.009	4.0	90
2/13/2018 12:10	0.008	4.5	105
2/13/2018 12:11	0.009	4.7	78
2/13/2018 12:12	0.009	6.0	87
2/13/2018 12:13	0.009	5.1	93
2/13/2018 12:14	0.01	4.5	210
2/13/2018 12:15	0.011	4.3	149
2/13/2018 12:16	0.01	5.4	125
2/13/2018 12:17	0.01	4.9	91
2/13/2018 12:18	0.009	3.1	111
2/13/2018 12:19	0.009	3.8	7
2/13/2018 12:20	0.009	3.4	7
2/13/2018 12:21	0.01	4.9	7
2/13/2018 12:22	0.011	3.1	85
2/13/2018 12:23	0.013	3.4	136
2/13/2018 12:24	0.014	4.3	152
2/13/2018 12:25	0.015	4.5	166

2/13/2018 12:26	0.009	3.1	172
2/13/2018 12:27	0.009	4.0	198
2/13/2018 12:28	0.009	3.8	164
2/13/2018 12:29	0.01	4.9	108
2/13/2018 12:30	0.011	3.4	129
2/13/2018 12:31	0.01	3.6	157
2/13/2018 12:32	0.01	4.0	173
2/13/2018 12:33	0.009	4.3	154
2/13/2018 12:34	0.009	6.3	130
2/13/2018 12:35	0.008	5.4	159
2/13/2018 12:36	0.008	3.8	165
2/13/2018 12:37	0.008	2.5	160
2/13/2018 12:38	0.008	3.6	149
2/13/2018 12:39	0.009	4.0	99
2/13/2018 12:40	0.007	3.6	119
2/13/2018 12:41	0.007	5.4	96
2/13/2018 12:42	0.007	5.4	111
2/13/2018 12:43	0.007	2.9	158
2/13/2018 12:44	0.008	3.6	161
2/13/2018 12:45	0.008	4.0	109
2/13/2018 12:46	0.008	4.0	131
2/13/2018 12:47	0.008	2.7	154
2/13/2018 12:48	0.008	4.0	201
2/13/2018 12:49	0.007	2.7	231
2/13/2018 12:50	0.007	3.1	216
2/13/2018 12:51	0.007	3.1	119
2/13/2018 12:52	0.008	4.5	108
2/13/2018 12:53	0.008	4.9	94
2/13/2018 12:54	0.008	7.4	100
2/13/2018 12:55	0.007	3.1	102
2/13/2018 12:56	0.008	4.0	107
2/13/2018 12:57	0.008	2.7	136
2/13/2018 12:58	0.007	5.8	107
2/13/2018 12:59	0.007	5.4	131
2/13/2018 13:00	0.008	4.7	80
2/13/2018 13:01	0.008	6.5	187
2/13/2018 13:02	0.008	3.1	205
2/13/2018 13:03	0.008	2.7	215
2/13/2018 13:04	0.007	2.2	220
2/13/2018 13:05	0.008	4.3	0
2/13/2018 13:06	0.008	4.3	4
2/13/2018 13:07	0.007	3.1	4
2/13/2018 13:08	0.008	5.1	4
2/13/2018 13:09	0.008	6.3	4
2/13/2018 13:10	0.007	6.3	4
2/13/2018 13:11	0.008	5.6	4
2/13/2018 13:12	0.008	4.5	4

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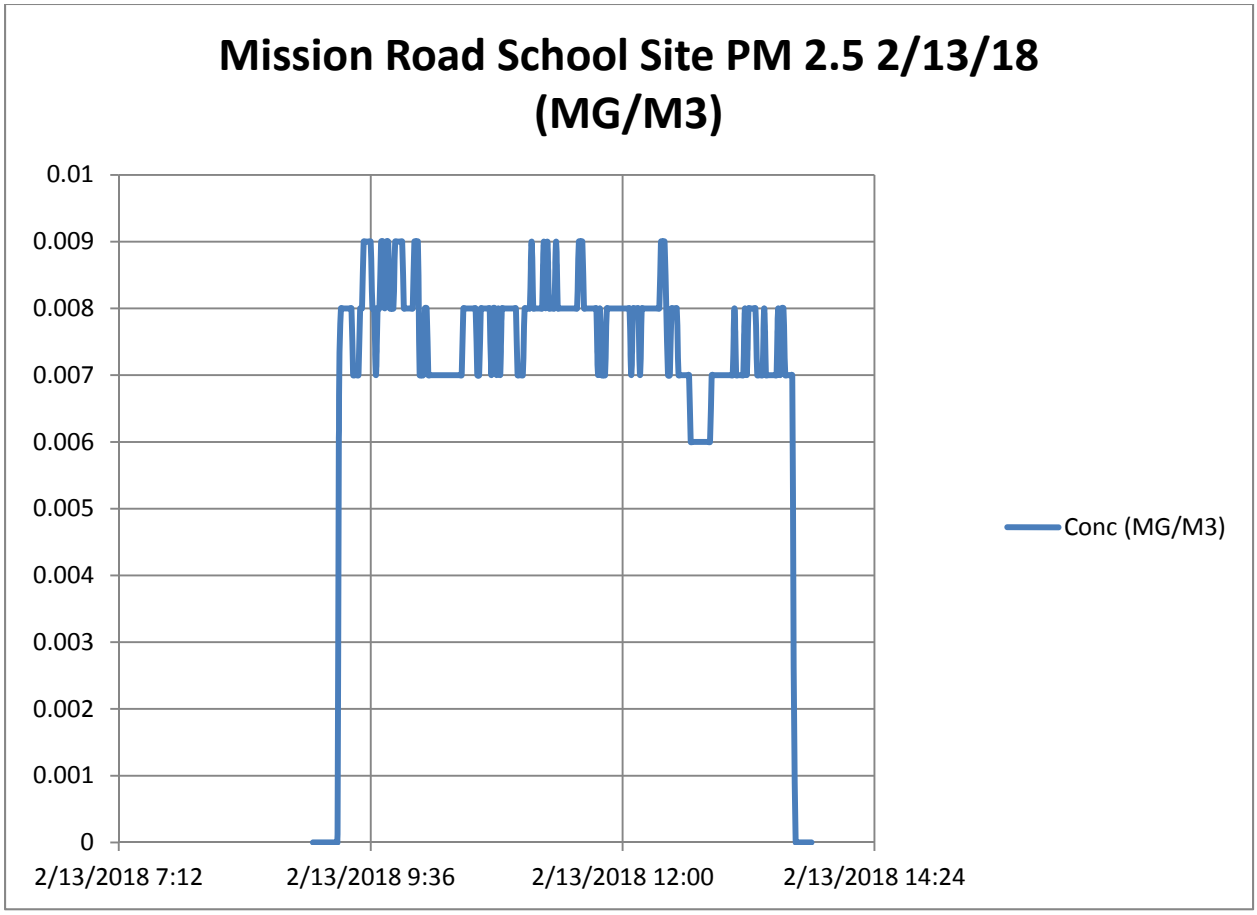
2/13/2018 13:14	0.008	5.1	4
2/13/2018 13:15	0.008	4.5	5
2/13/2018 13:16	0.009	5.8	88
2/13/2018 13:17	0.008	6.5	91
2/13/2018 13:18	0.008	5.1	116
2/13/2018 13:19	0.008	4.0	98
2/13/2018 13:20	0.008	2.2	56
2/13/2018 13:21	0.008	2.7	76
2/13/2018 13:22	0.008	4.5	118
2/13/2018 13:23	0.008	6.5	129
2/13/2018 13:24	0.009	6.7	126
2/13/2018 13:25	0.009	4.7	129
2/13/2018 13:26	0.009	6.7	130
2/13/2018 13:27	0.008	6.3	114
2/13/2018 13:28	0.009	5.8	130
2/13/2018 13:29	0.009	4.9	125
2/13/2018 13:30	0.01	4.5	124
2/13/2018 13:31	0.01	4.5	164
2/13/2018 13:32	0.011	5.1	108
2/13/2018 13:33	0.008	5.8	120
2/13/2018 13:34	0.008	5.6	146
2/13/2018 13:35	0.007	4.5	136
2/13/2018 13:36	0.007	4.9	141
2/13/2018 13:37	0.008	6.3	142
2/13/2018 13:38	0.008	4.3	104
2/13/2018 13:39	0.008	4.0	95
2/13/2018 13:40	0.008	6.0	133
2/13/2018 13:41	0.007	7.8	121
2/13/2018 13:42	0	2.7	165
2/13/2018 13:43	0		
2/13/2018 13:44	0		
2/13/2018 13:45	0		
2/13/2018 13:46	0		
2/13/2018 13:47	0		
2/13/2018 13:48	0		
2/13/2018 13:49	0		
2/13/2018 13:50	0		



PM 2.5 2/13/2018

Time	Conc (MG/M3)
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2/13/2018 9:04	0
2/13/2018 9:05	0
2/13/2018 9:06	0
2/13/2018 9:07	0
2/13/2018 9:08	0
2/13/2018 9:09	0
2/13/2018 9:10	0
2/13/2018 9:11	0
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2/13/2018 9:14	0
2/13/2018 9:15	0
2/13/2018 9:16	0
2/13/2018 9:17	0
2/13/2018 9:18	0.007
2/13/2018 9:19	0.008
2/13/2018 9:20	0.008
2/13/2018 9:21	0.008
2/13/2018 9:22	0.008
2/13/2018 9:23	0.008

2/13/2018 9:24	0.008
2/13/2018 9:25	0.008
2/13/2018 9:26	0.007
2/13/2018 9:27	0.007
2/13/2018 9:28	0.007
2/13/2018 9:29	0.007
2/13/2018 9:30	0.008
2/13/2018 9:31	0.008
2/13/2018 9:32	0.009
2/13/2018 9:33	0.009
2/13/2018 9:34	0.009
2/13/2018 9:35	0.009
2/13/2018 9:36	0.009
2/13/2018 9:37	0.008
2/13/2018 9:38	0.008
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2/13/2018 9:40	0.008
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2/13/2018 9:43	0.009
2/13/2018 9:44	0.008
2/13/2018 9:45	0.009
2/13/2018 9:46	0.009
2/13/2018 9:47	0.008
2/13/2018 9:48	0.008
2/13/2018 9:49	0.008
2/13/2018 9:50	0.009
2/13/2018 9:51	0.009
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2/13/2018 9:57	0.008
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2/13/2018 10:03	0.009
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2/13/2018 10:13	0.007
2/13/2018 10:14	0.007
2/13/2018 10:15	0.007
2/13/2018 10:16	0.007
2/13/2018 10:17	0.007
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2/13/2018 10:28	0.007
2/13/2018 10:29	0.008
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2/13/2018 10:36	0.008
2/13/2018 10:37	0.007
2/13/2018 10:38	0.007
2/13/2018 10:39	0.008
2/13/2018 10:40	0.008
2/13/2018 10:41	0.008
2/13/2018 10:42	0.008
2/13/2018 10:43	0.008
2/13/2018 10:44	0.008
2/13/2018 10:45	0.007
2/13/2018 10:46	0.008
2/13/2018 10:47	0.008
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2/13/2018 10:59	0.008
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2/13/2018 11:07	0.008
2/13/2018 11:08	0.009
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2/13/2018 11:16	0.008
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2/13/2018 11:18	0.008
2/13/2018 11:19	0.008
2/13/2018 11:20	0.008
2/13/2018 11:21	0.008
2/13/2018 11:22	0.009
2/13/2018 11:23	0.008
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2/13/2018 11:26	0.008
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2/13/2018 11:29	0.008
2/13/2018 11:30	0.008
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2/13/2018 11:36	0.009
2/13/2018 11:37	0.009
2/13/2018 11:38	0.008
2/13/2018 11:39	0.008
2/13/2018 11:40	0.008
2/13/2018 11:41	0.008
2/13/2018 11:42	0.008
2/13/2018 11:43	0.008
2/13/2018 11:44	0.008

2/13/2018 11:45	0.008
2/13/2018 11:46	0.007
2/13/2018 11:47	0.008
2/13/2018 11:48	0.007
2/13/2018 11:49	0.007
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2/13/2018 11:59	0.008
2/13/2018 12:00	0.008
2/13/2018 12:01	0.008
2/13/2018 12:02	0.008
2/13/2018 12:03	0.008
2/13/2018 12:04	0.008
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2/13/2018 12:07	0.008
2/13/2018 12:08	0.008
2/13/2018 12:09	0.008
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2/13/2018 12:23	0.009
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2/13/2018 12:31	0.008

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2/13/2018 12:34	0.007
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2/13/2018 12:36	0.007
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2/13/2018 12:38	0.007
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2/13/2018 12:47	0.006
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2/13/2018 12:58	0.007
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2/13/2018 13:00	0.007
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2/13/2018 13:04	0.008
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2/13/2018 13:06	0.007
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2/13/2018 13:08	0.007
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2/13/2018 13:10	0.008
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2/13/2018 13:12	0.008
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2/13/2018 13:14	0.008
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2/13/2018 13:16	0.008
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2/13/2018 13:18	0.007

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2/13/2018 13:20	0.007
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2/13/2018 13:22	0.007
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2/13/2018 13:24	0.007
2/13/2018 13:25	0.007
2/13/2018 13:26	0.007
2/13/2018 13:27	0.007
2/13/2018 13:28	0.007
2/13/2018 13:29	0.008
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2/13/2018 13:36	0.007
2/13/2018 13:37	0.007
2/13/2018 13:38	0.002
2/13/2018 13:39	0
2/13/2018 13:40	0
2/13/2018 13:41	0
2/13/2018 13:42	0
2/13/2018 13:43	0
2/13/2018 13:44	0
2/13/2018 13:45	0
2/13/2018 13:46	0
2/13/2018 13:47	0
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2/13/2018 13:49	0
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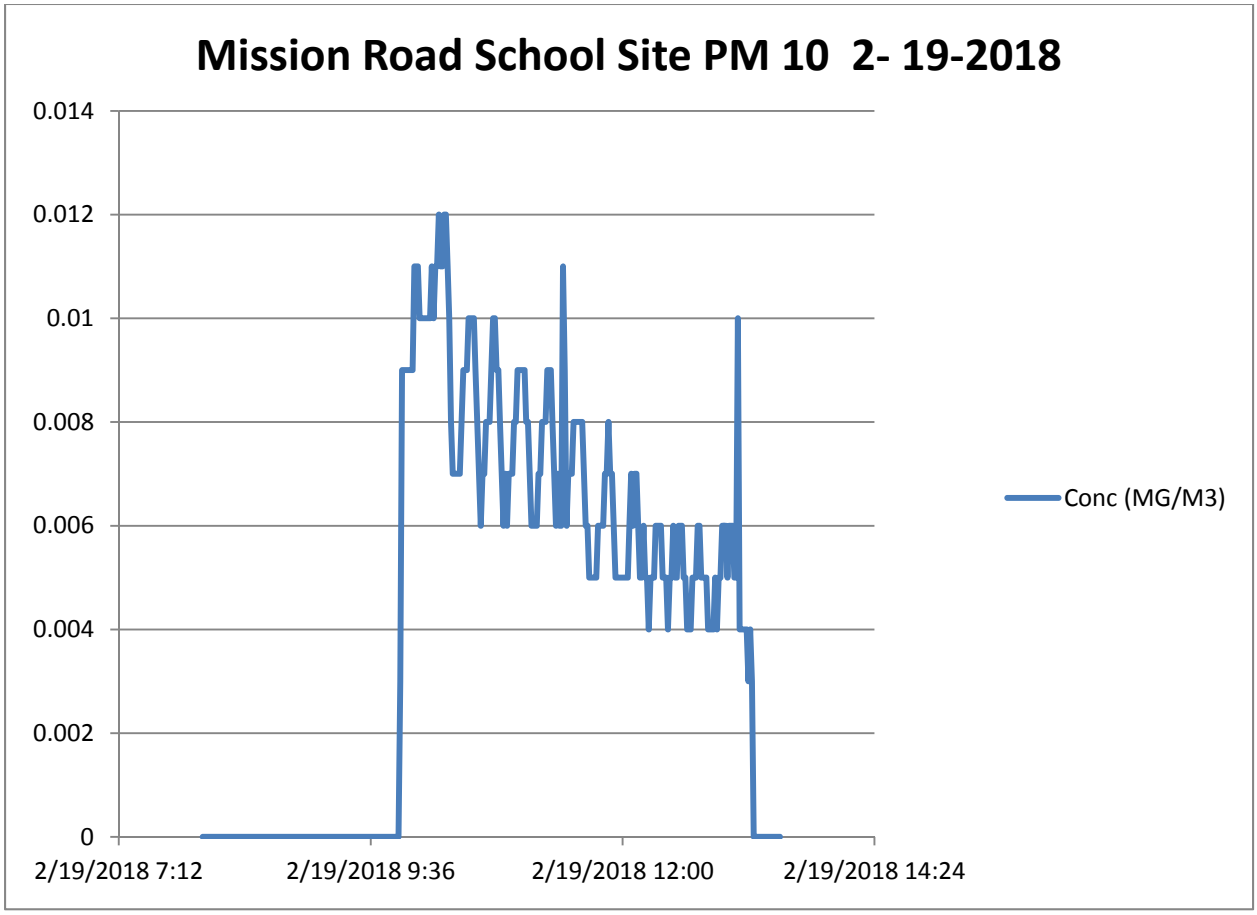

PM-10

Time	Conc (MG/M3)
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2/19/2018 8:06	0
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2/19/2018 9:50	0
2/19/2018 9:51	0
2/19/2018 9:52	0
2/19/2018 9:53	0
2/19/2018 9:54	0.006
2/19/2018 9:55	0.008
2/19/2018 9:56	0.008
2/19/2018 9:57	0.008
2/19/2018 9:58	0.008
2/19/2018 9:59	0.009

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2/19/2018 10:02	0.011
2/19/2018 10:03	0.011
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2/19/2018 10:05	0.009
2/19/2018 10:06	0.009
2/19/2018 10:07	0.008
2/19/2018 10:08	0.008
2/19/2018 10:09	0.009
2/19/2018 10:10	0.008
2/19/2018 10:11	0.009
2/19/2018 10:12	0.009
2/19/2018 10:13	0.009
2/19/2018 10:14	0.01
2/19/2018 10:15	0.008
2/19/2018 10:16	0.007
2/19/2018 10:17	0.006
2/19/2018 10:18	0.005
2/19/2018 10:19	0.004
2/19/2018 10:20	0.004
2/19/2018 10:21	0.005
2/19/2018 10:22	0.006
2/19/2018 10:23	0.007
2/19/2018 10:24	0.007
2/19/2018 10:25	0.007
2/19/2018 10:26	0.007
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2/19/2018 10:28	0.008
2/19/2018 10:29	0.008
2/19/2018 10:30	0.008
2/19/2018 10:31	0.008
2/19/2018 10:32	0.006
2/19/2018 10:33	0.005
2/19/2018 10:34	0.005
2/19/2018 10:35	0.004
2/19/2018 10:36	0.004
2/19/2018 10:37	0.004
2/19/2018 10:38	0.005
2/19/2018 10:39	0.005
2/19/2018 10:40	0.006
2/19/2018 10:41	0.006
2/19/2018 10:42	0.007
2/19/2018 10:43	0.007
2/19/2018 10:44	0.008
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2/19/2018 10:46	0.008

2/19/2018 10:47	0.008
2/19/2018 10:48	0.008
2/19/2018 10:49	0.007
2/19/2018 10:50	0.006
2/19/2018 10:51	0.005
2/19/2018 10:52	0.004
2/19/2018 10:53	0.004
2/19/2018 10:54	0.004
2/19/2018 10:55	0.005
2/19/2018 10:56	0.006
2/19/2018 10:57	0.006
2/19/2018 10:58	0.006
2/19/2018 10:59	0.006
2/19/2018 11:00	0.007
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2/19/2018 11:02	0.007
2/19/2018 11:03	0.007
2/19/2018 11:04	0.007
2/19/2018 11:05	0.008
2/19/2018 11:06	0.007
2/19/2018 11:07	0.005
2/19/2018 11:08	0.005
2/19/2018 11:09	0.004
2/19/2018 11:10	0.005
2/19/2018 11:11	0.005
2/19/2018 11:12	0.005
2/19/2018 11:13	0.005
2/19/2018 11:14	0.005
2/19/2018 11:15	0.005
2/19/2018 11:16	0.005
2/19/2018 11:17	0.006
2/19/2018 11:18	0.006
2/19/2018 11:19	0.007
2/19/2018 11:20	0.007
2/19/2018 11:21	0.008
2/19/2018 11:22	0.008
2/19/2018 11:23	0.008
2/19/2018 11:24	0.007
2/19/2018 11:25	0.008
2/19/2018 11:26	0.01
2/19/2018 11:27	0.005
2/19/2018 11:28	0.004
2/19/2018 11:29	0.005
2/19/2018 11:30	0.005
2/19/2018 11:31	0.005
2/19/2018 11:32	0.005
2/19/2018 11:33	0.004

2/19/2018 11:34	0.005
2/19/2018 11:35	0.005
2/19/2018 11:36	0.005
2/19/2018 11:37	0.006
2/19/2018 11:38	0.007
2/19/2018 11:39	0.007
2/19/2018 11:40	0.007
2/19/2018 11:41	0.007
2/19/2018 11:42	0.006
2/19/2018 11:43	0.005
2/19/2018 11:44	0.004
2/19/2018 11:45	0.003
2/19/2018 11:46	0.003
2/19/2018 11:47	0.004
2/19/2018 11:48	0.004
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2/19/2018 11:58	0.004
2/19/2018 11:59	0.003
2/19/2018 12:00	0.003
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2/19/2018 12:02	0.004
2/19/2018 12:03	0.004
2/19/2018 12:04	0.006
2/19/2018 12:05	0.005
2/19/2018 12:06	0.005
2/19/2018 12:07	0.004
2/19/2018 12:08	0.004
2/19/2018 12:09	0.005
2/19/2018 12:10	0.005
2/19/2018 12:11	0.005
2/19/2018 12:12	0.005
2/19/2018 12:13	0.004
2/19/2018 12:14	0.004
2/19/2018 12:15	0.004
2/19/2018 12:16	0.004
2/19/2018 12:17	0.005
2/19/2018 12:18	0.006
2/19/2018 12:19	0.007
2/19/2018 12:20	0.006

2/19/2018 12:21	0.006
2/19/2018 12:22	0.005
2/19/2018 12:23	0.005
2/19/2018 12:24	0.005
2/19/2018 12:25	0.005
2/19/2018 12:26	0.005
2/19/2018 12:27	0.004
2/19/2018 12:28	0.004
2/19/2018 12:29	0.004
2/19/2018 12:30	0.004
2/19/2018 12:31	0.004
2/19/2018 12:32	0.004
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2/19/2018 12:34	0.006
2/19/2018 12:35	0.006
2/19/2018 12:36	0.006
2/19/2018 12:37	0.005
2/19/2018 12:38	0.005
2/19/2018 12:39	0.005
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2/19/2018 12:41	0.004
2/19/2018 12:42	0.004
2/19/2018 12:43	0.004
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2/19/2018 12:45	0.004
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2/19/2018 12:47	0.004
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2/19/2018 12:49	0.005
2/19/2018 12:50	0.005
2/19/2018 12:51	0.005
2/19/2018 12:52	0.005
2/19/2018 12:53	0.005
2/19/2018 12:54	0.004
2/19/2018 12:55	0.005
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2/19/2018 12:58	0.004
2/19/2018 12:59	0.004
2/19/2018 13:00	0.004
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2/19/2018 13:02	0.004
2/19/2018 13:03	0.004
2/19/2018 13:04	0.004
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2/19/2018 13:06	0.005
2/19/2018 13:07	0.005

2/19/2018 13:08	0.005
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2/19/2018 13:12	0.005
2/19/2018 13:13	0.004
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2/19/2018 13:18	0
2/19/2018 13:19	0
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2/19/2018 13:22	0
2/19/2018 13:23	0
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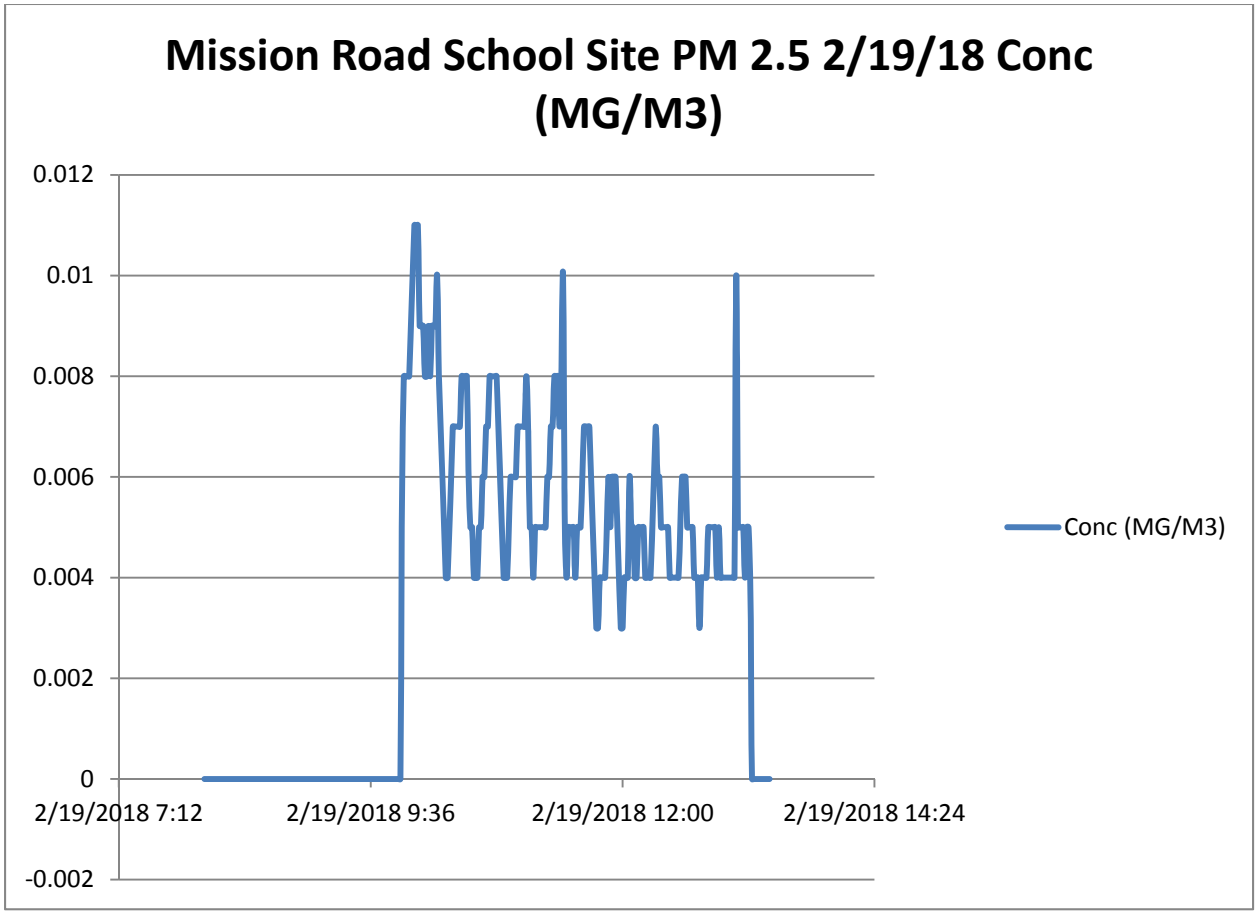

PM 2.5

Time	Conc (MG/M3)
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2/19/2018 8:05	0
2/19/2018 8:06	0
2/19/2018 8:07	0
2/19/2018 8:08	0
2/19/2018 8:09	0
2/19/2018 8:10	0
2/19/2018 8:11	0
2/19/2018 9:50	0
2/19/2018 9:51	0
2/19/2018 9:52	0
2/19/2018 9:53	0
2/19/2018 9:54	0.006
2/19/2018 9:55	0.008
2/19/2018 9:56	0.008
2/19/2018 9:57	0.008
2/19/2018 9:58	0.008
2/19/2018 9:59	0.009

2/19/2018 10:00	0.01
2/19/2018 10:01	0.011
2/19/2018 10:02	0.011
2/19/2018 10:03	0.011
2/19/2018 10:04	0.009
2/19/2018 10:05	0.009
2/19/2018 10:06	0.009
2/19/2018 10:07	0.008
2/19/2018 10:08	0.008
2/19/2018 10:09	0.009
2/19/2018 10:10	0.008
2/19/2018 10:11	0.009
2/19/2018 10:12	0.009
2/19/2018 10:13	0.009
2/19/2018 10:14	0.01
2/19/2018 10:15	0.008
2/19/2018 10:16	0.007
2/19/2018 10:17	0.006
2/19/2018 10:18	0.005
2/19/2018 10:19	0.004
2/19/2018 10:20	0.004
2/19/2018 10:21	0.005
2/19/2018 10:22	0.006
2/19/2018 10:23	0.007
2/19/2018 10:24	0.007
2/19/2018 10:25	0.007
2/19/2018 10:26	0.007
2/19/2018 10:27	0.007
2/19/2018 10:28	0.008
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2/19/2018 10:30	0.008
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2/19/2018 10:34	0.005
2/19/2018 10:35	0.004
2/19/2018 10:36	0.004
2/19/2018 10:37	0.004
2/19/2018 10:38	0.005
2/19/2018 10:39	0.005
2/19/2018 10:40	0.006
2/19/2018 10:41	0.006
2/19/2018 10:42	0.007
2/19/2018 10:43	0.007
2/19/2018 10:44	0.008
2/19/2018 10:45	0.008
2/19/2018 10:46	0.008

2/19/2018 10:47	0.008
2/19/2018 10:48	0.008
2/19/2018 10:49	0.007
2/19/2018 10:50	0.006
2/19/2018 10:51	0.005
2/19/2018 10:52	0.004
2/19/2018 10:53	0.004
2/19/2018 10:54	0.004
2/19/2018 10:55	0.005
2/19/2018 10:56	0.006
2/19/2018 10:57	0.006
2/19/2018 10:58	0.006
2/19/2018 10:59	0.006
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2/19/2018 11:03	0.007
2/19/2018 11:04	0.007
2/19/2018 11:05	0.008
2/19/2018 11:06	0.007
2/19/2018 11:07	0.005
2/19/2018 11:08	0.005
2/19/2018 11:09	0.004
2/19/2018 11:10	0.005
2/19/2018 11:11	0.005
2/19/2018 11:12	0.005
2/19/2018 11:13	0.005
2/19/2018 11:14	0.005
2/19/2018 11:15	0.005
2/19/2018 11:16	0.005
2/19/2018 11:17	0.006
2/19/2018 11:18	0.006
2/19/2018 11:19	0.007
2/19/2018 11:20	0.007
2/19/2018 11:21	0.008
2/19/2018 11:22	0.008
2/19/2018 11:23	0.008
2/19/2018 11:24	0.007
2/19/2018 11:25	0.008
2/19/2018 11:26	0.01
2/19/2018 11:27	0.005
2/19/2018 11:28	0.004
2/19/2018 11:29	0.005
2/19/2018 11:30	0.005
2/19/2018 11:31	0.005
2/19/2018 11:32	0.005
2/19/2018 11:33	0.004

2/19/2018 11:34	0.005
2/19/2018 11:35	0.005
2/19/2018 11:36	0.005
2/19/2018 11:37	0.006
2/19/2018 11:38	0.007
2/19/2018 11:39	0.007
2/19/2018 11:40	0.007
2/19/2018 11:41	0.007
2/19/2018 11:42	0.006
2/19/2018 11:43	0.005
2/19/2018 11:44	0.004
2/19/2018 11:45	0.003
2/19/2018 11:46	0.003
2/19/2018 11:47	0.004
2/19/2018 11:48	0.004
2/19/2018 11:49	0.004
2/19/2018 11:50	0.004
2/19/2018 11:51	0.005
2/19/2018 11:52	0.006
2/19/2018 11:53	0.005
2/19/2018 11:54	0.006
2/19/2018 11:55	0.006
2/19/2018 11:56	0.006
2/19/2018 11:57	0.005
2/19/2018 11:58	0.004
2/19/2018 11:59	0.003
2/19/2018 12:00	0.003
2/19/2018 12:01	0.004
2/19/2018 12:02	0.004
2/19/2018 12:03	0.004
2/19/2018 12:04	0.006
2/19/2018 12:05	0.005
2/19/2018 12:06	0.005
2/19/2018 12:07	0.004
2/19/2018 12:08	0.004
2/19/2018 12:09	0.005
2/19/2018 12:10	0.005
2/19/2018 12:11	0.005
2/19/2018 12:12	0.005
2/19/2018 12:13	0.004
2/19/2018 12:14	0.004
2/19/2018 12:15	0.004
2/19/2018 12:16	0.004
2/19/2018 12:17	0.005
2/19/2018 12:18	0.006
2/19/2018 12:19	0.007
2/19/2018 12:20	0.006

2/19/2018 12:21	0.006
2/19/2018 12:22	0.005
2/19/2018 12:23	0.005
2/19/2018 12:24	0.005
2/19/2018 12:25	0.005
2/19/2018 12:26	0.005
2/19/2018 12:27	0.004
2/19/2018 12:28	0.004
2/19/2018 12:29	0.004
2/19/2018 12:30	0.004
2/19/2018 12:31	0.004
2/19/2018 12:32	0.004
2/19/2018 12:33	0.005
2/19/2018 12:34	0.006
2/19/2018 12:35	0.006
2/19/2018 12:36	0.006
2/19/2018 12:37	0.005
2/19/2018 12:38	0.005
2/19/2018 12:39	0.005
2/19/2018 12:40	0.005
2/19/2018 12:41	0.004
2/19/2018 12:42	0.004
2/19/2018 12:43	0.004
2/19/2018 12:44	0.003
2/19/2018 12:45	0.004
2/19/2018 12:46	0.004
2/19/2018 12:47	0.004
2/19/2018 12:48	0.004
2/19/2018 12:49	0.005
2/19/2018 12:50	0.005
2/19/2018 12:51	0.005
2/19/2018 12:52	0.005
2/19/2018 12:53	0.005
2/19/2018 12:54	0.004
2/19/2018 12:55	0.005
2/19/2018 12:56	0.004
2/19/2018 12:57	0.004
2/19/2018 12:58	0.004
2/19/2018 12:59	0.004
2/19/2018 13:00	0.004
2/19/2018 13:01	0.004
2/19/2018 13:02	0.004
2/19/2018 13:03	0.004
2/19/2018 13:04	0.004
2/19/2018 13:05	0.01
2/19/2018 13:06	0.005
2/19/2018 13:07	0.005

2/19/2018 13:08	0.005
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2/19/2018 13:16	0
2/19/2018 13:17	0
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2/19/2018 13:19	0
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2/19/2018 13:21	0
2/19/2018 13:22	0
2/19/2018 13:23	0
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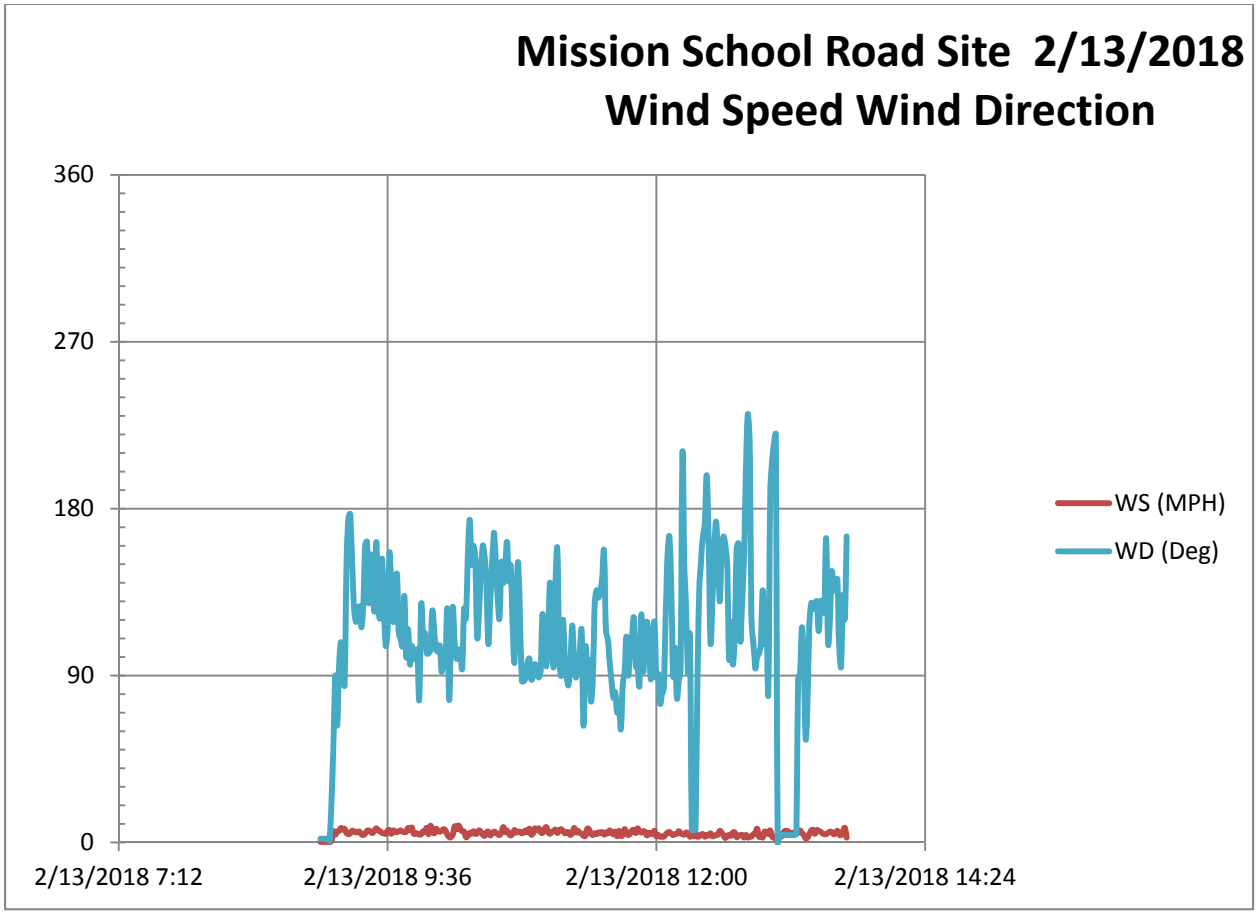

Time	WS (MPH)	WD (Deg)
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2/13/2018 9:02	0.3	2
2/13/2018 9:03	0.3	2
2/13/2018 9:04	0.3	2
2/13/2018 9:05	0.3	1
2/13/2018 9:06	1	24
2/13/2018 9:07	6.0	52
2/13/2018 9:08	4.3	90
2/13/2018 9:09	5.8	63
2/13/2018 9:10	6.3	95
2/13/2018 9:11	7.8	108
2/13/2018 9:12	6.9	91
2/13/2018 9:13	7.4	85
2/13/2018 9:14	5.1	150
2/13/2018 9:15	4.5	175
2/13/2018 9:16	4.9	177
2/13/2018 9:17	6.3	152
2/13/2018 9:18	6.0	127
2/13/2018 9:19	5.4	119
2/13/2018 9:20	5.8	124
2/13/2018 9:21	5.8	127

2/13/2018 9:22	4.5	116
2/13/2018 9:23	4.0	128
2/13/2018 9:24	4.7	160
2/13/2018 9:25	6.3	162
2/13/2018 9:26	6.5	129
2/13/2018 9:27	5.6	155
2/13/2018 9:28	5.1	142
2/13/2018 9:29	6.5	125
2/13/2018 9:30	7.6	162
2/13/2018 9:31	6.5	125
2/13/2018 9:32	6.0	121
2/13/2018 9:33	5.1	153
2/13/2018 9:34	4.9	127
2/13/2018 9:35	4.7	106
2/13/2018 9:36	6.3	114
2/13/2018 9:37	6.7	156
2/13/2018 9:38	4.7	137
2/13/2018 9:39	6.5	119
2/13/2018 9:40	5.8	120
2/13/2018 9:41	5.6	145
2/13/2018 9:42	6.0	113
2/13/2018 9:43	6.5	110
2/13/2018 9:44	5.8	106
2/13/2018 9:45	5.6	133
2/13/2018 9:46	5.8	100
2/13/2018 9:47	7.8	115
2/13/2018 9:48	6.7	96
2/13/2018 9:49	8.1	106
2/13/2018 9:50	4.7	99
2/13/2018 9:51	5.1	103
2/13/2018 9:52	4.7	104
2/13/2018 9:53	4.3	77
2/13/2018 9:54	4.5	128
2/13/2018 9:55	6.0	112
2/13/2018 9:56	5.8	113
2/13/2018 9:57	7.8	102
2/13/2018 9:58	4.5	102
2/13/2018 9:59	8.9	104
2/13/2018 10:00	6.7	125
2/13/2018 10:01	4.9	114
2/13/2018 10:02	7.4	104
2/13/2018 10:03	6.0	103
2/13/2018 10:04	5.8	106
2/13/2018 10:05	6.3	92
2/13/2018 10:06	7.2	102
2/13/2018 10:07	6.5	96
2/13/2018 10:08	4.3	126

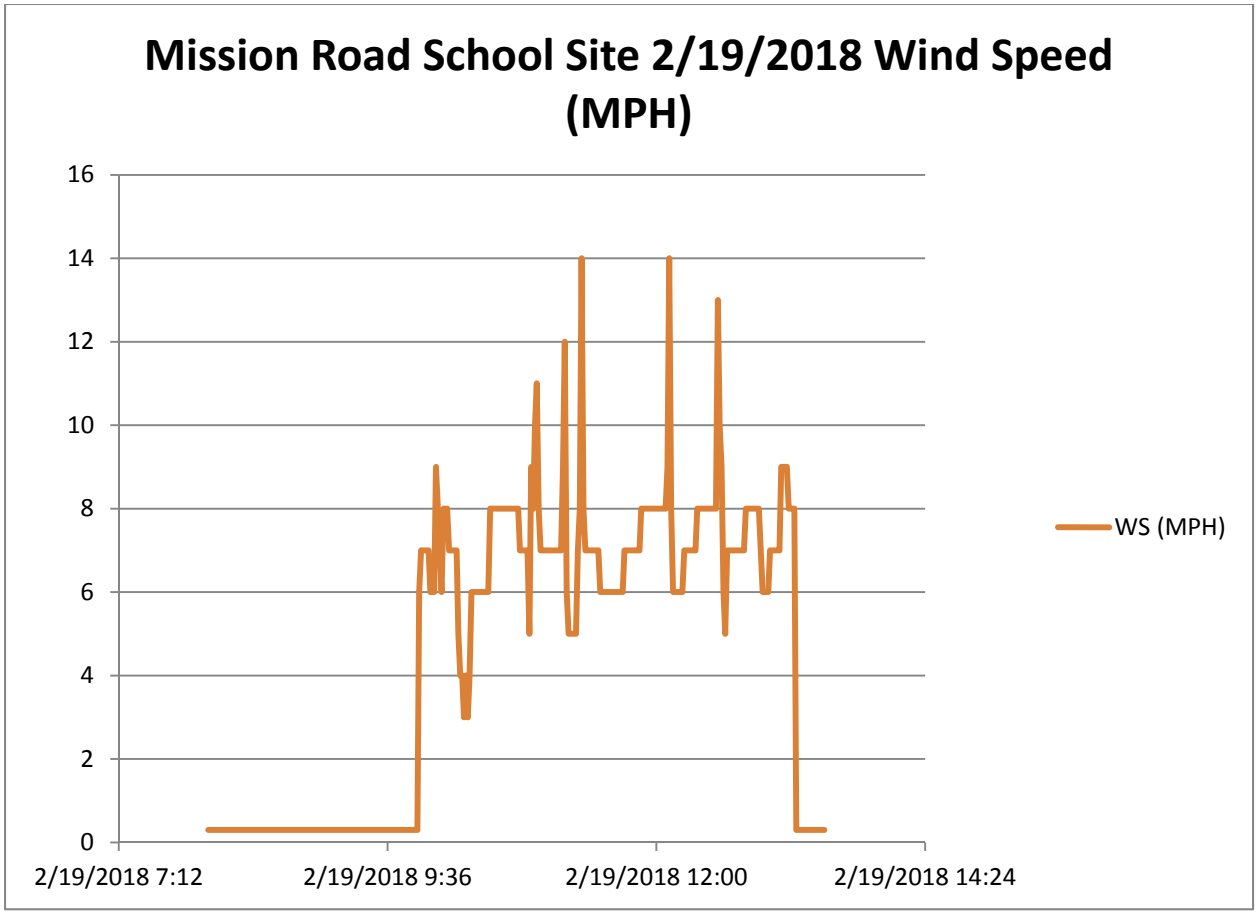
2/13/2018 10:09	2.9	77
2/13/2018 10:10	2.9	111
2/13/2018 10:11	4.5	127
2/13/2018 10:12	8.7	106
2/13/2018 10:13	7.2	99
2/13/2018 10:14	9.2	103
2/13/2018 10:15	7.4	104
2/13/2018 10:16	6.0	94
2/13/2018 10:17	5.8	126
2/13/2018 10:18	2.9	121
2/13/2018 10:19	3.6	154
2/13/2018 10:20	5.1	174
2/13/2018 10:21	4.7	150
2/13/2018 10:22	6.0	160
2/13/2018 10:23	4.7	154
2/13/2018 10:24	4.9	111
2/13/2018 10:25	6.5	125
2/13/2018 10:26	5.6	145
2/13/2018 10:27	4.3	160
2/13/2018 10:28	3.6	155
2/13/2018 10:29	5.4	139
2/13/2018 10:30	5.8	107
2/13/2018 10:31	3.8	130
2/13/2018 10:32	4.7	149
2/13/2018 10:33	5.8	167
2/13/2018 10:34	5.4	151
2/13/2018 10:35	4.5	132
2/13/2018 10:36	4.0	121
2/13/2018 10:37	5.4	151
2/13/2018 10:38	8.3	140
2/13/2018 10:39	5.6	148
2/13/2018 10:40	6.5	162
2/13/2018 10:41	4.7	141
2/13/2018 10:42	3.8	149
2/13/2018 10:43	4.7	118
2/13/2018 10:44	6.7	97
2/13/2018 10:45	5.4	132
2/13/2018 10:46	5.8	151
2/13/2018 10:47	5.8	119
2/13/2018 10:48	4.9	87
2/13/2018 10:49	5.6	87
2/13/2018 10:50	6.5	89
2/13/2018 10:51	5.6	97
2/13/2018 10:52	7.4	99
2/13/2018 10:53	4.3	88
2/13/2018 10:54	5.1	90
2/13/2018 10:55	7.6	96

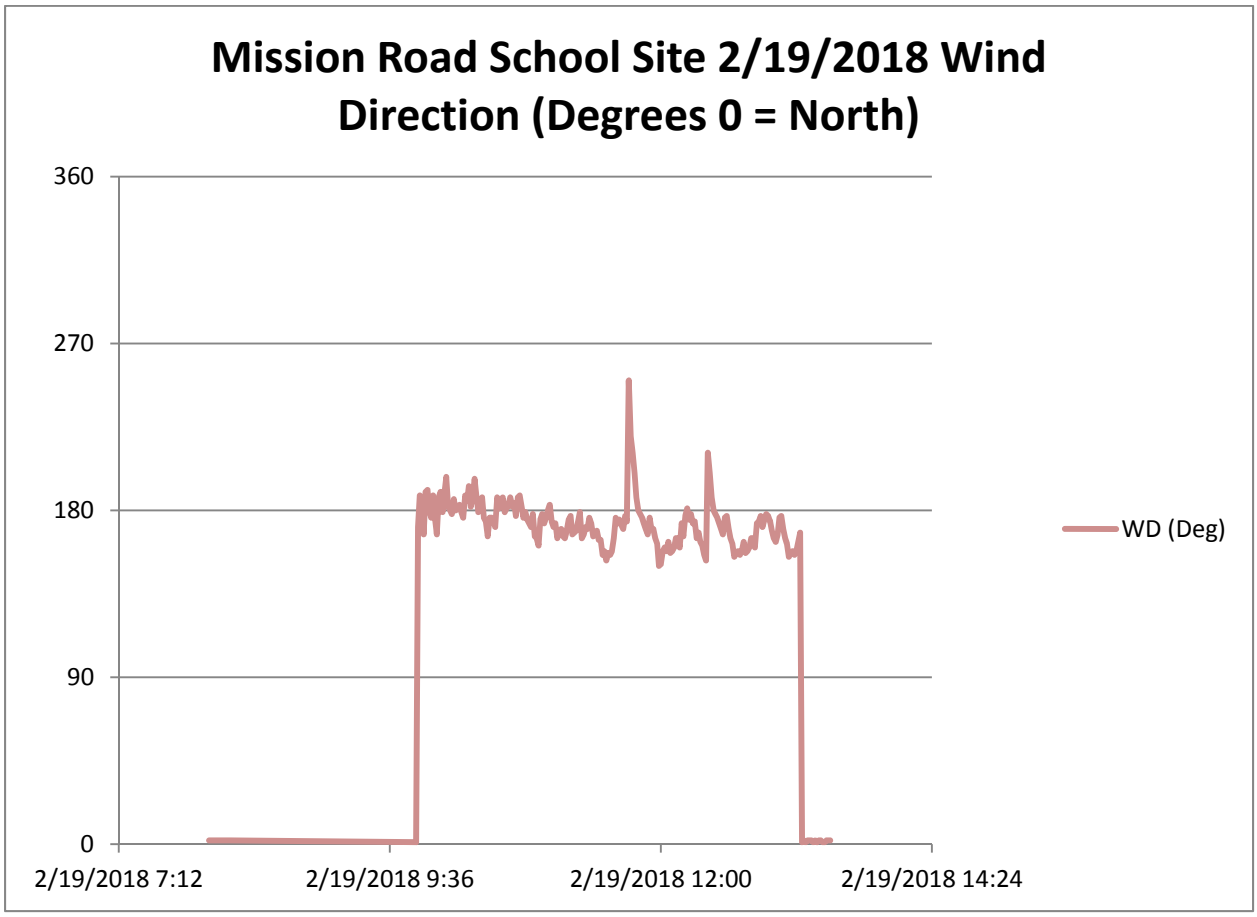
2/13/2018 10:56	6.7	94
2/13/2018 10:57	7.6	89
2/13/2018 10:58	5.6	92
2/13/2018 10:59	5.1	123
2/13/2018 11:00	6.9	106
2/13/2018 11:01	8.3	95
2/13/2018 11:02	5.6	107
2/13/2018 11:03	4.7	140
2/13/2018 11:04	5.6	116
2/13/2018 11:05	6.3	95
2/13/2018 11:06	6.9	141
2/13/2018 11:07	5.1	158
2/13/2018 11:08	6.5	99
2/13/2018 11:09	7.2	90
2/13/2018 11:10	6.3	120
2/13/2018 11:11	4.9	98
2/13/2018 11:12	5.6	89
2/13/2018 11:13	5.4	85
2/13/2018 11:14	4.0	98
2/13/2018 11:15	5.4	117
2/13/2018 11:16	7.8	96
2/13/2018 11:17	5.4	89
2/13/2018 11:18	6.3	100
2/13/2018 11:19	5.1	103
2/13/2018 11:20	4.7	114
2/13/2018 11:21	3.6	63
2/13/2018 11:22	3.6	105
2/13/2018 11:23	7.4	93
2/13/2018 11:24	6.9	98
2/13/2018 11:25	4.7	76
2/13/2018 11:26	4.0	89
2/13/2018 11:27	4.9	129
2/13/2018 11:28	4.5	136
2/13/2018 11:29	5.4	132
2/13/2018 11:30	5.1	136
2/13/2018 11:31	5.6	143
2/13/2018 11:32	4.3	157
2/13/2018 11:33	5.4	114
2/13/2018 11:34	4.9	110
2/13/2018 11:35	6.5	97
2/13/2018 11:36	5.4	87
2/13/2018 11:37	4.5	78
2/13/2018 11:38	5.8	81
2/13/2018 11:39	3.4	70
2/13/2018 11:40	6.3	76
2/13/2018 11:41	3.6	61
2/13/2018 11:42	4.0	85

2/13/2018 11:43	7.2	92
2/13/2018 11:44	5.1	111
2/13/2018 11:45	4.0	90
2/13/2018 11:46	4.9	107
2/13/2018 11:47	6.5	112
2/13/2018 11:48	6.7	121
2/13/2018 11:49	5.1	95
2/13/2018 11:50	7.6	94
2/13/2018 11:51	6.0	85
2/13/2018 11:52	5.4	123
2/13/2018 11:53	6.0	92
2/13/2018 11:54	5.8	116
2/13/2018 11:55	3.8	119
2/13/2018 11:56	5.1	110
2/13/2018 11:57	4.9	88
2/13/2018 11:58	4.5	102
2/13/2018 11:59	6.3	119
2/13/2018 12:00	3.4	89
2/13/2018 12:01	4.0	91
2/13/2018 12:02	3.1	75
2/13/2018 12:03	3.1	80
2/13/2018 12:04	3.1	83
2/13/2018 12:05	4.3	122
2/13/2018 12:06	5.4	155
2/13/2018 12:07	5.6	165
2/13/2018 12:08	4.7	138
2/13/2018 12:09	4.0	90
2/13/2018 12:10	4.5	105
2/13/2018 12:11	4.7	78
2/13/2018 12:12	6.0	87
2/13/2018 12:13	5.1	93
2/13/2018 12:14	4.5	210
2/13/2018 12:15	4.3	149
2/13/2018 12:16	5.4	125
2/13/2018 12:17	4.9	91
2/13/2018 12:18	3.1	111
2/13/2018 12:19	3.8	7
2/13/2018 12:20	3.4	7
2/13/2018 12:21	4.9	7
2/13/2018 12:22	3.1	85
2/13/2018 12:23	3.4	136
2/13/2018 12:24	4.3	152
2/13/2018 12:25	4.5	166
2/13/2018 12:26	3.1	172
2/13/2018 12:27	4.0	198
2/13/2018 12:28	3.8	164
2/13/2018 12:29	4.9	108

2/13/2018 12:30	3.4	129
2/13/2018 12:31	3.6	157
2/13/2018 12:32	4.0	173
2/13/2018 12:33	4.3	154
2/13/2018 12:34	6.3	130
2/13/2018 12:35	5.4	159
2/13/2018 12:36	3.8	165
2/13/2018 12:37	2.5	160
2/13/2018 12:38	3.6	149
2/13/2018 12:39	4.0	99
2/13/2018 12:40	3.6	119
2/13/2018 12:41	5.4	96
2/13/2018 12:42	5.4	111
2/13/2018 12:43	2.9	158
2/13/2018 12:44	3.6	161
2/13/2018 12:45	4.0	109
2/13/2018 12:46	4.0	131
2/13/2018 12:47	2.7	154
2/13/2018 12:48	4.0	201
2/13/2018 12:49	2.7	231
2/13/2018 12:50	3.1	216
2/13/2018 12:51	3.1	119
2/13/2018 12:52	4.5	108
2/13/2018 12:53	4.9	94
2/13/2018 12:54	7.4	100
2/13/2018 12:55	3.1	102
2/13/2018 12:56	4.0	107
2/13/2018 12:57	2.7	136
2/13/2018 12:58	5.8	107
2/13/2018 12:59	5.4	131
2/13/2018 13:00	4.7	80
2/13/2018 13:01	6.5	187
2/13/2018 13:02	3.1	205
2/13/2018 13:03	2.7	215
2/13/2018 13:04	2.2	220
2/13/2018 13:05	4.3	0
2/13/2018 13:06	4.3	4
2/13/2018 13:07	3.1	4
2/13/2018 13:08	5.1	4
2/13/2018 13:09	6.3	4
2/13/2018 13:10	6.3	4
2/13/2018 13:11	5.6	4
2/13/2018 13:12	4.5	4
2/13/2018 13:13	5.1	4
2/13/2018 13:14	5.1	4
2/13/2018 13:15	4.5	5
2/13/2018 13:16	5.8	88

2/13/2018 13:17	6.5	91
2/13/2018 13:18	5.1	116
2/13/2018 13:19	4.0	98
2/13/2018 13:20	2.2	56
2/13/2018 13:21	2.7	76
2/13/2018 13:22	4.5	118
2/13/2018 13:23	6.5	129
2/13/2018 13:24	6.7	126
2/13/2018 13:25	4.7	129
2/13/2018 13:26	6.7	130
2/13/2018 13:27	6.3	114
2/13/2018 13:28	5.8	130
2/13/2018 13:29	4.9	125
2/13/2018 13:30	4.5	124
2/13/2018 13:31	4.5	164
2/13/2018 13:32	5.1	108
2/13/2018 13:33	5.8	120
2/13/2018 13:34	5.6	146
2/13/2018 13:35	4.5	136
2/13/2018 13:36	4.9	141
2/13/2018 13:37	6.3	142
2/13/2018 13:38	4.3	104
2/13/2018 13:39	4.0	95
2/13/2018 13:40	6.0	133
2/13/2018 13:41	7.8	121
2/13/2018 13:42	2.7	165
2/13/2018 13:43		
2/13/2018 13:44		


Mission Road School Site 2/19/2018 Wind Speed (MPH)
16
14
12
10
8
6
4
2
0
2/19/2018 7:12
2/19/2018 9:36
2/19/2018 12:00
2/19/2018 14:24
WS (MPH)


Mission Road School Site 2/19/2018 Wind Direction (Degrees 0 = North)
360
270
180
90
0
2/19/2018 7:12
2/19/2018 9:36
2/19/2018 12:00
2/19/2018 14:24
WD (Deg)

Time	WS (MPH)	WD (Deg)
2/19/2018 8:00	0.3	2
2/19/2018 8:01	0.3	2
2/19/2018 8:02	0.3	2
2/19/2018 8:03	0.3	2
2/19/2018 8:04	0.3	2
2/19/2018 8:05	0.3	2
2/19/2018 8:06	0.3	2
2/19/2018 8:07	0.3	2
2/19/2018 8:08	0.3	2
2/19/2018 8:09	0.3	2
2/19/2018 8:10	0.3	2
2/19/2018 8:11	0.3	2
2/19/2018 9:50	0.3	1
2/19/2018 9:51	0.3	171
2/19/2018 9:52	0.3	188
2/19/2018 9:53	6	181
2/19/2018 9:54	7	167
2/19/2018 9:55	7	190
2/19/2018 9:56	7	191
2/19/2018 9:57	7	180
2/19/2018 9:58	7	176
2/19/2018 9:59	6	188
2/19/2018 10:00	6	175
2/19/2018 10:01	6	167
2/19/2018 10:02	9	187
2/19/2018 10:03	8	190
2/19/2018 10:04	7	179
2/19/2018 10:05	6	189
2/19/2018 10:06	8	198
2/19/2018 10:07	8	182
2/19/2018 10:08	8	180
2/19/2018 10:09	7	178
2/19/2018 10:10	7	186
2/19/2018 10:11	7	180
2/19/2018 10:12	7	181
2/19/2018 10:13	7	183
2/19/2018 10:14	5	179
2/19/2018 10:15	4	176
2/19/2018 10:16	4	188
2/19/2018 10:17	3	185
2/19/2018 10:18	4	193
2/19/2018 10:19	3	182
2/19/2018 10:20	4	187
2/19/2018 10:21	6	197
2/19/2018 10:22	6	188

2/19/2018 10:23	6	179
2/19/2018 10:24	6	180
2/19/2018 10:25	6	187
2/19/2018 10:26	6	176
2/19/2018 10:27	6	174
2/19/2018 10:28	6	166
2/19/2018 10:29	6	176
2/19/2018 10:30	6	176
2/19/2018 10:31	8	175
2/19/2018 10:32	8	171
2/19/2018 10:33	8	187
2/19/2018 10:34	8	181
2/19/2018 10:35	8	183
2/19/2018 10:36	8	187
2/19/2018 10:37	8	179
2/19/2018 10:38	8	181
2/19/2018 10:39	8	183
2/19/2018 10:40	8	187
2/19/2018 10:41	8	182
2/19/2018 10:42	8	184
2/19/2018 10:43	8	177
2/19/2018 10:44	8	187
2/19/2018 10:45	8	188
2/19/2018 10:46	8	182
2/19/2018 10:47	7	176
2/19/2018 10:48	7	179
2/19/2018 10:49	7	175
2/19/2018 10:50	7	173
2/19/2018 10:51	7	171
2/19/2018 10:52	5	178
2/19/2018 10:53	9	166
2/19/2018 10:54	8	165
2/19/2018 10:55	10	161
2/19/2018 10:56	11	175
2/19/2018 10:57	8	178
2/19/2018 10:58	7	173
2/19/2018 10:59	7	176
2/19/2018 11:00	7	180
2/19/2018 11:01	7	183
2/19/2018 11:02	7	174
2/19/2018 11:03	7	171
2/19/2018 11:04	7	173
2/19/2018 11:05	7	165
2/19/2018 11:06	7	168
2/19/2018 11:07	7	170
2/19/2018 11:08	7	166
2/19/2018 11:09	7	165

2/19/2018 11:10	9	169
2/19/2018 11:11	12	175
2/19/2018 11:12	6	177
2/19/2018 11:13	5	167
2/19/2018 11:14	5	168
2/19/2018 11:15	5	169
2/19/2018 11:16	5	174
2/19/2018 11:17	5	179
2/19/2018 11:18	7	165
2/19/2018 11:19	8	167
2/19/2018 11:20	14	171
2/19/2018 11:21	8	170
2/19/2018 11:22	7	176
2/19/2018 11:23	7	173
2/19/2018 11:24	7	166
2/19/2018 11:25	7	167
2/19/2018 11:26	7	169
2/19/2018 11:27	7	164
2/19/2018 11:28	7	164
2/19/2018 11:29	7	156
2/19/2018 11:30	6	158
2/19/2018 11:31	6	153
2/19/2018 11:32	6	157
2/19/2018 11:33	6	156
2/19/2018 11:34	6	158
2/19/2018 11:35	6	165
2/19/2018 11:36	6	176
2/19/2018 11:37	6	173
2/19/2018 11:38	6	175
2/19/2018 11:39	6	172
2/19/2018 11:40	6	170
2/19/2018 11:41	6	177
2/19/2018 11:42	6	174
2/19/2018 11:43	7	250
2/19/2018 11:44	7	220
2/19/2018 11:45	7	211
2/19/2018 11:46	7	200
2/19/2018 11:47	7	187
2/19/2018 11:48	7	180
2/19/2018 11:49	7	178
2/19/2018 11:50	7	176
2/19/2018 11:51	7	173
2/19/2018 11:52	8	170
2/19/2018 11:53	8	167
2/19/2018 11:54	8	176
2/19/2018 11:55	8	170
2/19/2018 11:56	8	170

2/19/2018 11:57	8	165
2/19/2018 11:58	8	162
2/19/2018 11:59	8	150
2/19/2018 12:00	8	151
2/19/2018 12:01	8	158
2/19/2018 12:02	8	160
2/19/2018 12:03	8	158
2/19/2018 12:04	8	163
2/19/2018 12:05	8	157
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2/19/2018 12:07	14	160
2/19/2018 12:08	8	165
2/19/2018 12:09	6	165
2/19/2018 12:10	6	160
2/19/2018 12:11	6	173
2/19/2018 12:12	6	166
2/19/2018 12:13	6	177
2/19/2018 12:14	6	181
2/19/2018 12:15	7	175
2/19/2018 12:16	7	178
2/19/2018 12:17	7	173
2/19/2018 12:18	7	174
2/19/2018 12:19	7	165
2/19/2018 12:20	7	168
2/19/2018 12:21	7	163
2/19/2018 12:22	8	161
2/19/2018 12:23	8	156
2/19/2018 12:24	8	153
2/19/2018 12:25	8	211
2/19/2018 12:26	8	200
2/19/2018 12:27	8	187
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2/19/2018 12:29	8	178
2/19/2018 12:30	8	176
2/19/2018 12:31	8	173
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2/19/2018 12:33	13	167
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2/19/2018 12:35	9	177
2/19/2018 12:36	6	170
2/19/2018 12:37	5	165
2/19/2018 12:38	7	162
2/19/2018 12:39	7	155
2/19/2018 12:40	7	157
2/19/2018 12:41	7	158
2/19/2018 12:42	7	156
2/19/2018 12:43	7	158

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2/19/2018 12:46	7	158
2/19/2018 12:47	7	160
2/19/2018 12:48	8	165
2/19/2018 12:49	8	165
2/19/2018 12:50	8	160
2/19/2018 12:51	8	173
2/19/2018 12:52	8	174
2/19/2018 12:53	8	177
2/19/2018 12:54	8	171
2/19/2018 12:55	8	175
2/19/2018 12:56	7	178
2/19/2018 12:57	6	177
2/19/2018 12:58	6	174
2/19/2018 12:59	6	169
2/19/2018 13:00	6	165
2/19/2018 13:01	7	163
2/19/2018 13:02	7	167
2/19/2018 13:03	7	176
2/19/2018 13:04	7	177
2/19/2018 13:05	7	170
2/19/2018 13:06	7	165
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2/19/2018 13:12	8	158
2/19/2018 13:13	8	163
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