RPF Environmental
TESTING & CONSULTING SERVICES
Hazardous Materials Inspection & Assessment
Asbestos, Mold, Lead Paint, Radon, PCBs
Air Quality Testing and Investigations
Industrial Hygiene, Safety & Training

November 1, 2024

Chip Clunie
Facilities Director
Nantucket Public Schools
10 Surfside Road
Nantucket, MA 02554

Re: Indoor Air Quality Testing
Nantucket High School
10 Surfside Road, Nantucket, MA 02554
RPF File 240327

Dear Mr. Clunie,

In accordance with our scope of work dated August 8, 2024, RPF Environmental (RPF) completed indoor air quality (IAQ) testing at the school located at 10 Surfside Road in Nantucket, MA. As part of this preliminary survey, testing was completed for several common IAQ parameters as well as testing for radon. The survey was completed on October 4, 2024, and October 7, 2024, by Krystalle Diaz.

The Nantucket Public High School is a multi-story building with classrooms, common areas, and offices for staff and students in Grades 9-12. RPF was called in to conduct a routine IAQ survey that was a repeat of a prior survey performed in Fall 2023. Building occupants were present on the day of the testing.

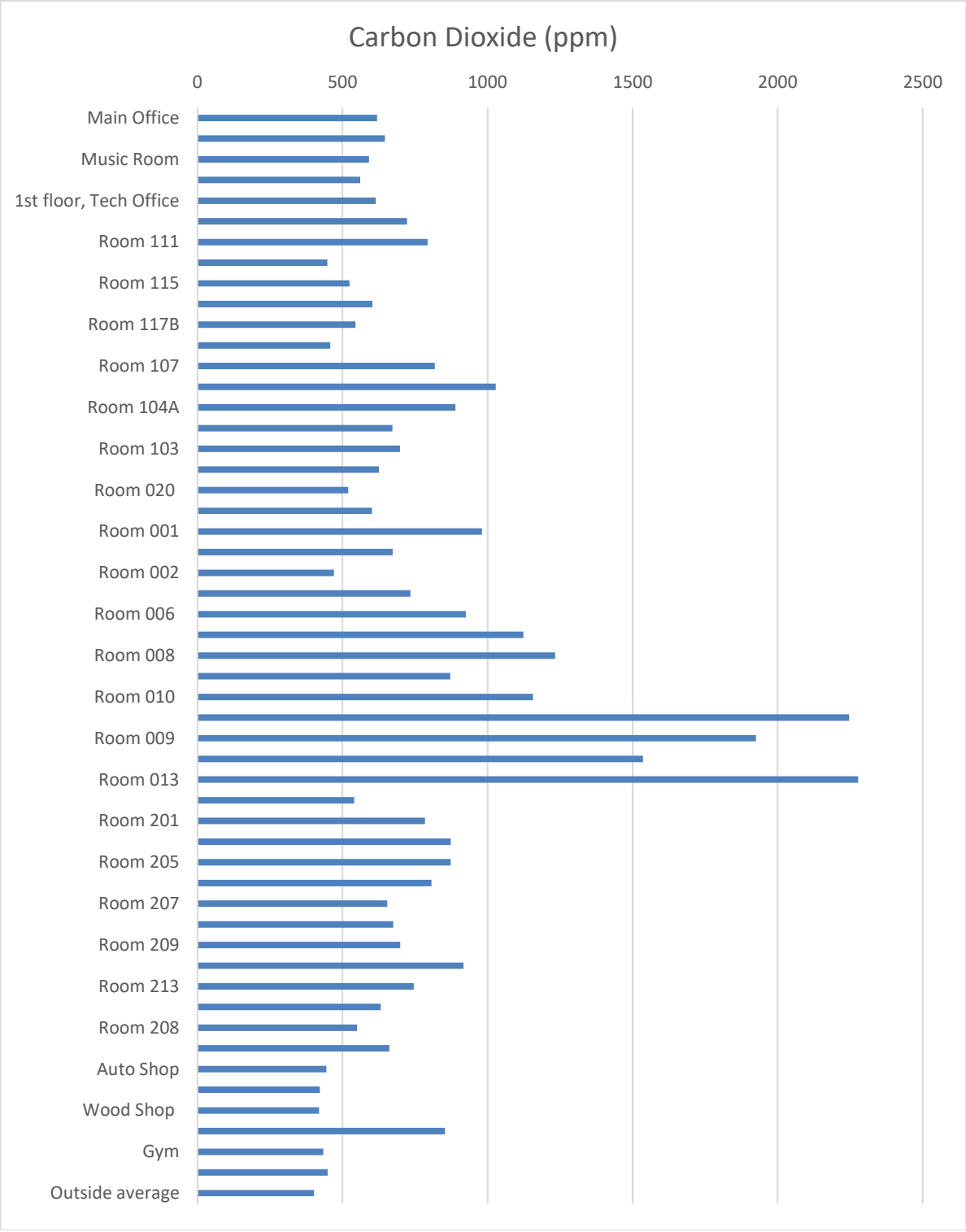
RESULTS

Carbon Dioxide

Carbon Dioxide (CO_2) gas is found in the atmosphere as a normal constituent at background levels of approximately 350 to 450 parts per million (ppm). CO_2 is also a by-product of human respiration. Typically, in building spaces with inadequate amounts of fresh air introduced and circulated, CO_2 levels and other building and occupant generated air contaminants will accumulate and increase over the course of a day. It is likely that the CO_2 levels will increase in any building space while occupied and fresh outside air is not brought into the space. CO_2 is typically not a problem in and of itself in general indoor environments; however, it is used as an indicator of the adequacy of the fresh air ventilation. CO_2 levels, in general, can be used as an indicator of sufficient ventilation in a space. The primary purpose of introducing fresh tempered outside air into buildings is to dilute the building of occupant generated air contaminants, which would improve the perceived IAQ and occupant comfort and productivity. Inadequate ventilation (and/or elevated temperatures) are frequent causes of complaints, such as respiratory, eye, nose and throat irritation, lethargy, and headaches.

The CO_2 results and testing locations are presented in Appendix A. CO_2 levels at all indoor locations tested were documented in the range of approximately 419 to 2,778 ppm, which is well below the Occupational Safety and Health Administration Permissible Exposure Limit (OSHA PEL) of 5,000 ppm. These concentration ranges are elevated above the generally accepted guideline limit of 800 to 1,000 ppm.

The Commonwealth of Massachusetts Bureau of Environmental Health Assessments (BEHA) has an IAQ standard for the state office buildings of 800 ppm for acceptable CO2 in occupied office buildings and 600 ppm or less for schools, which can be used as a reference value.


Carbon Dioxide (ppm)
0
500
1000
1500
2000
2500
Main Office
Music Room
1st floor, Tech Office
Room 111
Room 115
Room 117B
Room 107
Room 104A
Room 103
Room 020
Room 001
Room 002
Room 006
Room 008
Room 010
Room 009
Room 013
Room 201
Room 205
Room 207
Room 209
Room 213
Room 208
Auto Shop
Wood Shop
Gym
Outside average

The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) recommends a guideline in their Standard 62-2001 for Ventilation for Acceptable Indoor Air Quality for a maximum of 700 ppm CO_2 above outside air concentrations as a value under which employee complaints are minimized. On the day of this testing, the outdoor ambient concentration of CO_2 was recorded at 302 ppm with a corresponding value of 1,102 ppm, for a maximum CO_2 for perceived acceptable air quality. The ASHRAE standard also calls for a minimum of 20 cubic feet of outside air (FOA) per minute per occupant to be introduced into office spaces, and if applicable, 15 cfm per occupant of classrooms, to maintain dilution of contaminants and perceived indoor air quality.

The feasibility of increasing the volume of fresh outside air to the lower level should be investigated.

According to the USEPA, pollutant or contaminant source control is usually the most effective way to improve indoor air quality. If source control efforts are not sufficient, increasing the amount of outdoor air coming indoors may prove to be helpful.

Carbon Monoxide

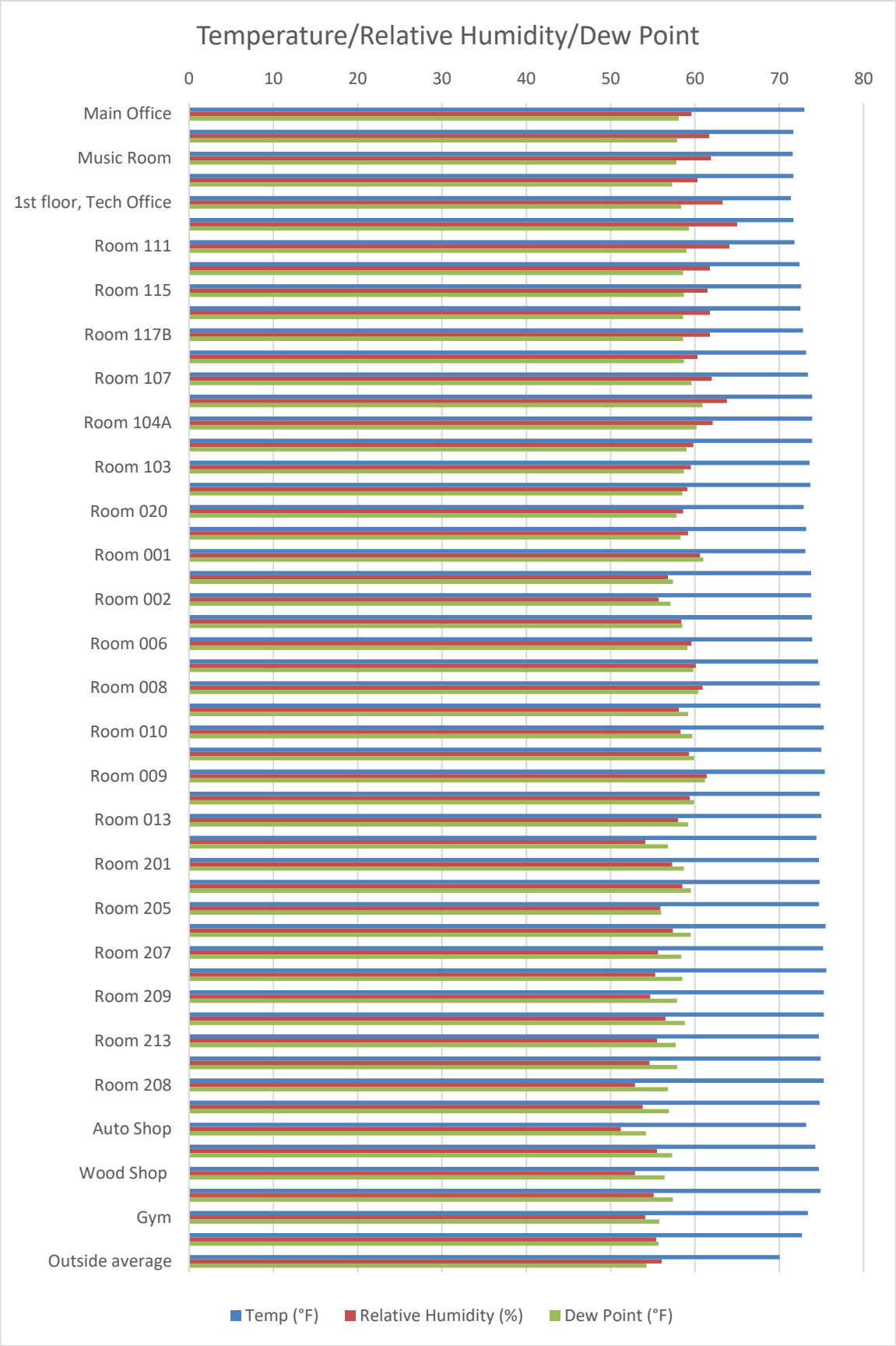
Carbon monoxide (CO) is an odorless, colorless, and toxic gas, and is a by-product of incomplete combustion. Exposure to CO can produce immediate and acute health effects. Transient low levels of CO in building spaces can sometimes be attributed to vehicle exhaust, cigarette smoke, or other sources of combustion in the actual space or adjacent to the air handlers for the space. Minor transient meter readings may also be due to changes in temperature and humidity depending on the test equipment used.

Carbon monoxide concentrations at the tested locations were documented to be less than 1 ppm, which is below the OSHA PEL of 50 ppm. These results and testing locations are presented in Appendix A.

RPF recommends the use of carbon monoxide alarms.

Temperature, Relative Humidity and Dew Point

Temperature, relative humidity and dew point are all interrelated, and all play a role in the interior environment. Measurements were taken for all three on the day of testing and are presented in the following chart with actual testing locations and results included in Appendix A.


Temperature/Relative Humidity/Dew Point
0
10
20
30
40
50
60
70
80
Main Office
Music Room
1st floor, Tech Office
Room 111
Room 115
Room 117B
Room 107
Room 104A
Room 103
Room 020
Room 001
Room 002
Room 006
Room 008
Room 010
Room 009
Room 013
Room 201
Room 205
Room 207
Room 209
Room 213
Room 208
Auto Shop
Wood Shop
Gym
Outside average
Temp (°F)
Relative Humidity (%)
Dew Point (°F)

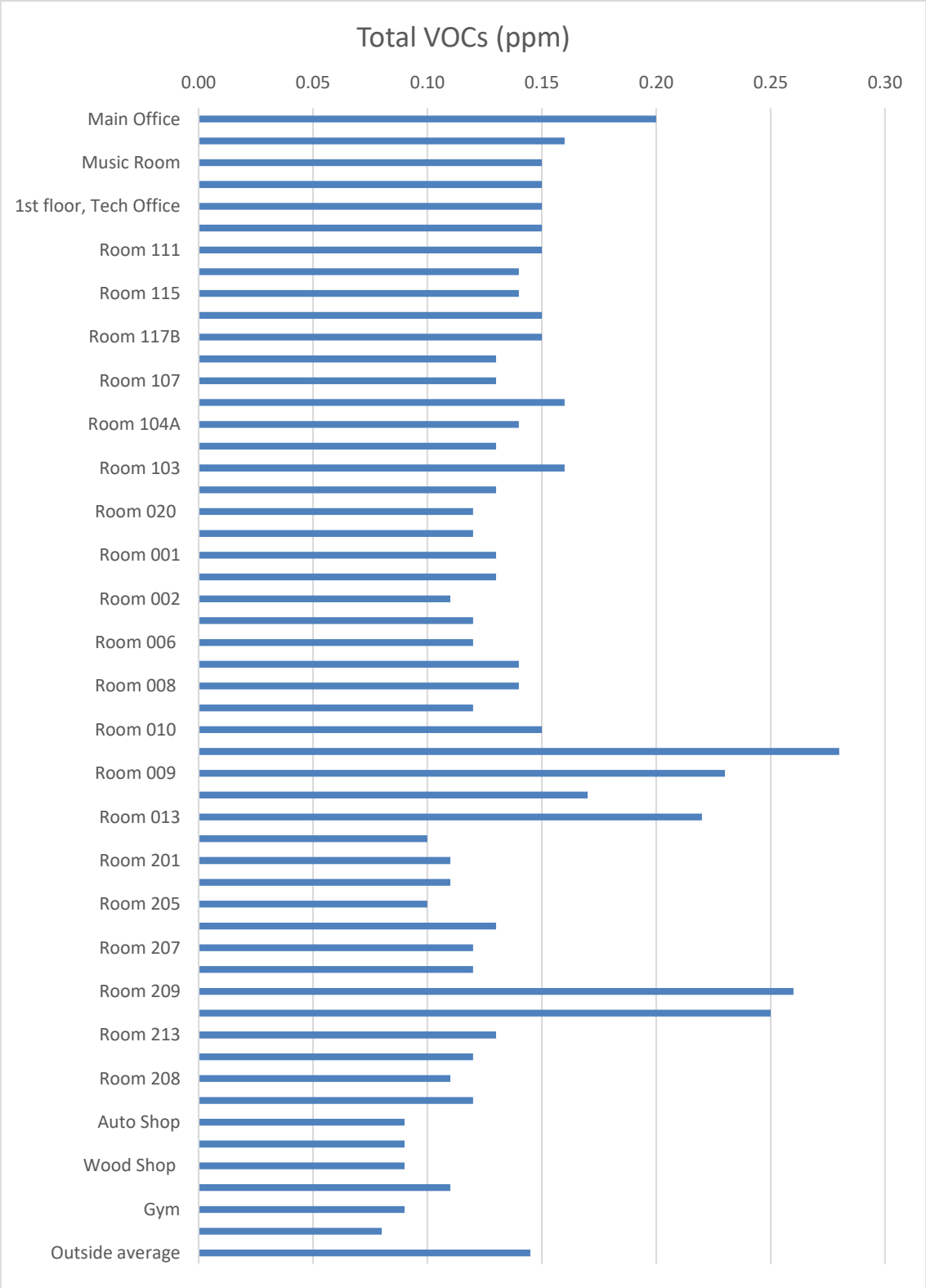
Temperature will affect the occupant's perception of IAQ based on employee comfort levels, effect of drafts or airflow, and humidity levels in a building. In most cases, simple adjustments to thermostats and direction of airflow from registers can improve the perceived IAQ. As a reference, the temperatures recommended by ASHRAE for general office space range from approximately 68° to 75° Fahrenheit in the winter, and from approximately 75° to 80° Fahrenheit in the summer. Temperature readings at all indoor locations tested were documented in the range of 71.4° to 75.6° Fahrenheit.

The amount of water vapor that can be contained in the air varies by the temperature and pressure of the air. The ratio of water vapor in the air to the maximum amount of water vapor the air can hold at a given temperature is expressed as relative humidity (RH). The recommended RH comfort range is 35% to 55%. In general, for buildings, the presence of excessive moisture can lead to mold growth and other biological contaminants. Low RH, common for buildings in New England during colder months, may contribute to irritated mucous membranes, dry eyes and sinus discomfort while high relative humidity, common in summer, may cause discomfort, as it hinders the body's use of perspiration as a cooling mechanism. RH levels at the indoor locations tested during this survey were mostly above the generally accepted comfort range.

Dew point is related to humidity and is the temperature below which water vapor may start to condense to form water droplets on a surface. If dew forms on interior building materials, the material may become wet, and subsequent fungal growth can occur. For instance, an uninsulated cold-water pipe may form condensation when the temperature of the metal surface is colder than the environmental dew point, and drip onto surfaces causing them to become wet. Dew point measurements on the day of testing ranged from 54.2° to 61.2° Fahrenheit. Based on these results, the interior temperature readings were all above the Dew Point readings. The results and testing locations are presented in Appendix A.

Volatile Organic Compounds

The scope of this survey included screening for total volatile organic compounds (VOCs). During this testing, total VOCs were measured at 0.28 parts per million (ppm) or less for all locations. These readings are within the "normal indoor air" range depicted below and are comparable to the outside air, which had an average reading of 0.145 ppm. These results are summarized below and presented in Appendix A.


Total VOCs (ppm)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Main Office
Music Room
1st floor, Tech Office
Room 111
Room 115
Room 117B
Room 107
Room 104A
Room 103
Room 020
Room 001
Room 002
Room 006
Room 008
Room 010
Room 009
Room 013
Room 201
Room 205
Room 207
Room 209
Room 213
Room 208
Auto Shop
Wood Shop
Gym
Outside average

The U.S. Environmental Protection Agency (EPA) reports that levels of volatile organic compounds (VOC) are almost always higher indoors compared to outdoors. Based on past testing, total VOC readings of up to 1 ppm are not atypical in general IAQ settings. In addition, the American Industrial Hygiene Association (AIHA) Technical Committee on Indoor Environmental Quality 1993 publication indicates that a general acceptable range for indoor air total VOC screening is less than 1.0 ppm. EPA studies have also found levels of about a dozen common organic pollutants to be 2 to 5 times higher inside homes than outside, regardless of whether the homes were located in rural or highly industrial areas.

Field experience also suggests the following guide for the use of PID test equipment (RAE Systems by Honeywell) to assess indoor environments:

- <0.1 ppm: normal outdoor air
- 0.1 to 0.4 ppm: normal indoor air
- ≥0.5 ppm: indicates the potential of IAQ contaminants

Individual VOCs can have vastly different standards for acceptable concentrations. Exposure to some specific compounds (such as formaldehyde) can result in health issues for some individuals, at even lower concentrations and levels even exceeding 0.1 ppm. In addition, an individual's odor and irritation responses to organic compounds may be highly variable. Therefore, the total VOC readings must be considered in that light. Further testing can be performed based on the screening results or other factors if you would like additional information on specific VOCs.

Total VOCs include a variety of chemicals that are emitted by a wide array of products used in building construction, maintenance, and consumer materials. Just a few examples of materials that commonly have VOC off-gassing include paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, carpets, upholstery, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, air fresheners, and photographic solutions. Exposure to VOCs may have short-term and long-term adverse health effects. Studies suggest that the irritant potency of these VOC mixtures can vary.

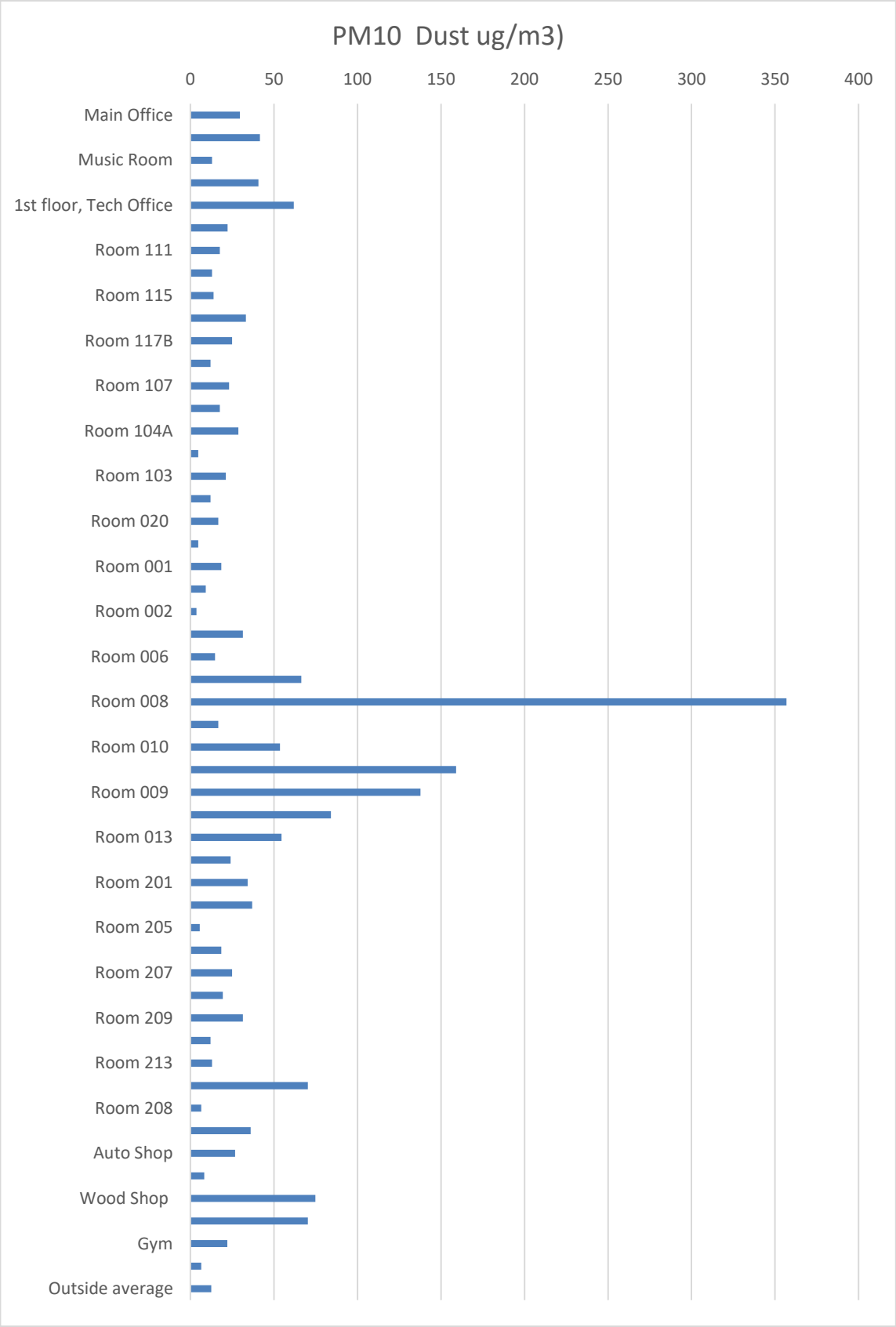
Total VOC screening does not include specific and individual chemical compound testing for the makeup of the overall VOCs concentrations; and, as with other pollutants, the extent and nature of the health effects will depend on many factors, including level of exposure and length of time exposed. Among the immediate symptoms that some people have experienced soon after exposure to some organics include:

- Eye and respiratory tract irritation
- Headaches
- Dizziness
- Visual disorders and memory impairment

Particulate Matter (PM_{10})

Particulate matter (PM) is a complex mixture of solid and/or liquid particulates suspended in air. Exposure to inhalable particulates, especially those at 10 microns and smaller, commonly referred to as PM_{10}, are a health concern. Concern of adverse effects to the heart and lungs is well established, especially in children, older adults, and those with existing heart or lung conditions. Outdoor concentrations of PM are of great concern to the EPA, but less is known about the health impacts of indoor PM. Some indoor sources of PM include cooking, combustion activities, some hobbies, outdoor sources introduced indoors, and biological sources.

Direct reading determinations for PM_{10} at all indoor locations tested were in the range of approximately 3.70 to 356.87 micrograms per cubic meter of air ($\mu g/m^3$). The results at most of the interior locations tested were elevated above the values found outside, which was approximately 12.48 $\mu g/m^3$. The US EPA does have a National Ambient Air Quality Standard at 150 $\mu g/m^3$ which was exceeded during the testing. The World Health Organization (WHO) also has set a standard of 50 $\mu g/m^3$ as a 24-hour average and 25 $\mu g/m^3$ as an annual average exposure. These results and testing locations are presented in Appendix A.


PM10 Dust ug/m3)
0
50
100
150
200
250
300
350
400
Main Office
Music Room
1st floor, Tech Office
Room 111
Room 115
Room 117B
Room 107
Room 104A
Room 103
Room 020
Room 001
Room 002
Room 006
Room 008
Room 010
Room 009
Room 013
Room 201
Room 205
Room 207
Room 209
Room 213
Room 208
Auto Shop
Wood Shop
Gym
Outside average

These results indicate that the HVAC filters are not reducing the overall particle loading inside the building when compared to the outside air. For a building that implements the use of an HVAC system, it is typical to see a 25% to 35% reduction in total particulates inside a building compared to the outside concentration of particulates while the HVAC units are operational. The feasibility of upgrading the HVAC systems' filter efficiency rating could be investigated if complaints were to be increased at this building. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) has recommended filter minimum efficiency reporting value (MERV) of not less than six (6) for filters in HVAC systems supplying air to occupied office space (ASHRAE Standard 62.1-2004-5.9). Follow the manufacturer's recommendations for a filter change out schedule.

Other steps to reduce indoor PM_{10} concentrations include proper ventilation, away from HVAC intakes, combustion appliances to the outdoors, proper exhaust vents in cooking areas, proper use of wood stoves, and professional maintenance of heating systems.

Radon Testing

RPF completed preliminary radon testing at the Nantucket High School in Nantucket, MA. The focus of the testing was on the entire school. Screening through the school was completed by placing a test kit in one room in each section of the school. Testing was performed in accordance with United States Environmental Protection Agency (EPA) testing methods.

Radon testing was completed utilizing four (4) EMSL Analytical, Inc. (EMSL) passive radon monitor kits in accordance with the manufacturer's recommendations. The laboratory randomly supplied duplicate and blank samples. The monitors were deposited on October 4, 2024, and retrieved on October 7, 2024, during normal school year building occupancy. The radon concentrations were reported at a range of 0.1 to 0.5 picocuries of radon per liter of air (pCi/L). Radon concentrations are presented in the attached laboratory results.

The following table shows the radon kit number, sample location, and radon testing result expressed in pico-curries per liter of air (pCi/L). For the sampled locations, the results of the radon testing as presented were satisfactory when compared to the EPA's recommended action level of 4 pCi/L. Laboratory results are in Appendix C.

	SUMMARY OF RADON TESTING RESULTS		
EMSL Kit No.	**Sample ID#**	**Location**	**Radon Activity (pCi/L)**
298325	528734	Tech Office – Lower Level	0.2
	528622	Tech Office – Lower Level	0.2
298324	528859	Room 005	0.5
	528739	Room 005 (Duplicate)	0.1
316518	566317	Room 015 – Utility Closet	0.5
298323	528782	Room 009	0.3
	528876	Room 009 (Duplicate)	0.4

Moisture

Moisture readings were collected on various representative portions of accessible interior building flooring and building components throughout the school. The moisture reading results were in the range of approximately 10-15 percent. Readings of <10 percent moisture can be considered non-detect for moisture content. These results and testing locations are presented below.

Location	Moisture (%)
Room 205, walls, drywall	<10
Room 205, windowsills, wood	10-15
Room 209, walls, drywall	<10
Room 112, desktops, wood	<10
Tech Office – Lower Level, walls, drywall	<10
Approximate Detection Limit	<10

PRELIMINARY OBSERVATIONS AND COMMENTS

In addition to the findings and recommendations provided above, RPF opinions related to the IAQ within the areas of the facility tested based on the results and our observations are presented below:

- Overall, the readings collected inside the building for each IAQ parameter tested during this survey were either within or below their respective standard and/or comfort range, except for CO_2 and RH. Most of the RH levels in the building were elevated above the generally accepted comfort range of 35 to 55%. On the day of the testing, the RH level outside of the building at the conclusion of testing was also elevated above the generally accepted comfort range and could have contributed to the elevated RH levels in the building. The RH levels will naturally decrease with the coming colder weather but, in the meantime, dehumidifiers can be used to decrease moisture in the air. However, it should be noted that if not properly cleaned and maintained, these units can become sources of future fungal growth.

- There were CO_2 readings in Room 104B, Room 003, Room 008, Room 010, Room 007, Room 009, Room 011, and Room 013 that were elevated above the generally accepted guideline of 800 to 1,000 ppm, but all readings collected within the building were below the OSHA PEL of 5,000 ppm. These elevated readings were taken during class changes. All but one of these elevated readings was taken in the lower level of the school. As indicated above, investigating the feasibility of increasing the tempered FOA to the lower level would help to dilute the concentrations of CO_2 in the air.

- There were PM10 readings within the building that were elevated above the outside readings. Most of the readings collected within the building were well below the NAAQS of 150 ug/m^3, except for readings collected in Room 008 and Room 007, which were above the standard. RPF recommends the feasibility of increasing/adding FOA to these areas. As indicated above, investigating the feasibility of upgrading the filters to a better MERV rating (such as MERV-13) could help make the system more efficient in removing particles.

- RPF recommends that building occupants document and track concerns of indoor air quality issues. Occupants should be encouraged to record perceived IAQ discomforts in an effort to track potential concerns and aid in diagnosing future problems. RPF also recommends periodic inspection of areas in and around occupant concern areas throughout the year.

- Each of the radon samples collected during this survey had concentrations well below the 4 pCi/L standard.

- Heating systems should be inspected on an annual basis or more frequently as required by the manufacturer. RPF recommends implementing and maintaining a preventative maintenance and inspection program for the HVAC system including air filter change-out schedule on a quarterly basis and inspecting for the proper seating of air filters within the filter housing of each air handling unit in order to help eliminate potential air bypass of air filters.

- Prior to any demolition or renovation of building materials, the areas of impact must be inspected for the presence of asbestos by a qualified asbestos inspector pursuant to various state and federal regulations. This inspection should also address other items that could be impacted by work resulting in contamination or health risks, including but not limited to lead paint, mercury containing products, and other common hazardous building materials.

If you have any questions or require additional information on any sample results or recommendations, please feel free to contact our office. Thank you for utilizing the services of RPF for this important project.

Sincerely,

RPF Environmental, Inc.

Krystalle S. Diaz, CMI
EH&S Technician

Enclosures:
Appendix A: Testing Results
Appendix B: Example Picture
Appendix C: Radon Laboratory Results
Appendix D: Limitations and Methodologies

240327 Nantucket High School IAQ Rpt October 2024

APPENDIX A

RPF Environmental
TESTING & CONSULTING SERVICES

TABLE 1

Preliminary IAQ Testing

Client: Nantucket Public Schools	**Site Address:** Nantucket High School, 10 Surfside Road, Nantucket, MA 02554				**Date Samples Collected**:		10/4/2024	
Location / Room	**Time**	**TVOC (ppm)**	**Carbon Dioxide (ppm)**	**Carbon Monoxide (ppm)**	**Temp (°F)**	**Relative Humidity (%)**	**Dew Point (°F)**	**PM10 (ug/m^3)**
Outside	09:51	0.19	359	0.5	68.4	66.5	57.4	4.62
Main Office	10:1	0.20	619	0.7	73.0	59.6	58.1	29.59
Room ARR	10:4	0.16	646	0.8	71.7	61.7	57.9	41.60
Music Room	10:5	0.15	591	0.6	71.6	61.9	57.8	12.94
Room 158	10:6	0.15	561	0.5	71.7	60.3	57.3	40.68
1st floor, Tech Office	10:7	0.15	615	0.4	71.4	63.3	58.4	61.94
Room 109	10:10	0.15	722	0.5	71.7	65.0	59.3	22.19
Room 111	10:11	0.15	793	0.5	71.8	64.1	59.0	17.57
Room 106A	10:13	0.14	448	0.5	72.4	61.8	58.6	12.94
Room 115	10:14	0.14	524	0.5	72.6	61.5	58.7	13.87
Room 117	10:15	0.15	603	0.6	72.5	61.8	58.6	33.28
Room 117B	10:16	0.15	545	0.6	72.8	61.8	58.6	24.96
Room 106	10:17	0.13	458	0.6	73.2	60.3	58.7	12.02
Room 107	10:19	0.13	818	0.4	73.4	62.0	59.6	23.11
Room 104B	10:21	0.16	1028	0.6	73.9	63.8	60.9	17.57
Room 104A	10:22	0.14	889	0.6	73.9	62.1	60.2	28.66
Room 105	10:24	0.13	672	0.6	73.9	59.8	59.0	4.62
Room 103	10:26	0.16	698	0.7	73.6	59.5	58.7	21.26
Room 102	10:28	0.13	625	0.7	73.7	59.1	58.5	12.02
Room 020	10:30	0.12	520	0.6	72.9	58.6	57.8	16.64
Tech Office - Lower Level	10:31	0.12	601	0.4	73.2	59.2	58.3	4.62
Room 001	10:35	0.13	981	0.6	73.1	60.6	61.0	18.49
Teacher's Lounge	10:36	0.13	673	0.4	73.8	56.8	57.4	9.25
Room 002	10:38	0.11	470	0.7	73.8	55.7	57.1	3.70
Room 004	10:39	0.12	734	0.5	73.9	58.4	58.5	31.43
Room 006	10:40	0.12	925	0.6	73.9	59.6	59.1	14.79
Room 003	10:43	0.14	1123	0.5	74.6	60.1	59.8	66.37
Room 008	10:44	0.14	1233	0.7	74.8	60.9	60.4	356.87
Room 005	10:45	0.12	871	0.5	74.9	58.1	59.2	16.64

RPF Environmental
TESTING & CONSULTING SERVICES

TABLE 1

Preliminary IAQ Testing

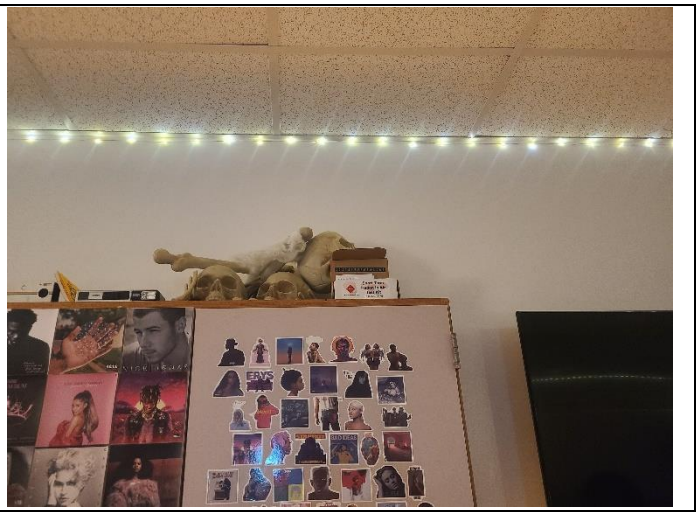
Client: Nantucket Public Schools	**Site Address:** Nantucket High School, 10 Surfside Road, Nantucket, MA 02554				**Date Samples Collected**:		10/4/2024	
Location / Room	**Time**	**TVOC (ppm)**	**Carbon Dioxide (ppm)**	**Carbon Monoxide (ppm)**	**Temp (°F)**	**Relative Humidity (%)**	**Dew Point (°F)**	**PM10 (ug/m^3)**
Room 010	10:47	0.15	1156	0.7	75.3	58.3	59.7	53.62
Room 007	10:49	0.28	2246	0.7	75.0	59.3	59.9	159.02
Room 009	10:51	0.23	1925	0.9	75.4	61.4	61.2	137.76
Room 011	10:53	0.17	1536	0.9	74.8	59.4	59.9	84.13
Room 013	10:55	0.22	2278	0.9	75.0	58.0	59.2	54.55
Room 202	11:4	0.10	540	0.4	74.4	54.1	56.8	24.04
Room 201	11:6	0.11	784	0.6	74.7	57.3	58.7	34.21
Room 203	11:9	0.11	873	0.5	74.8	58.5	59.5	36.98
Room 205	11:11	0.10	873	0.6	74.7	55.9	56.0	5.55
Room 204	11:13	0.13	807	0.6	75.5	57.4	59.5	18.49
Room 207	11:14	0.12	654	0.5	75.2	55.6	58.4	24.96
Room 206	11:17	0.12	675	0.6	75.6	55.3	58.5	19.42
Room 209	11:18	0.26	699	0.6	75.3	54.7	57.9	31.43
Room 211	11:19	0.25	917	0.7	75.3	56.5	58.8	12.02
Room 213	11:21	0.13	746	0.7	74.7	55.5	57.7	12.94
Room 215	11:25	0.12	632	0.7	74.9	54.6	57.9	70.26
Room 208	11:26	0.11	550	0.6	75.3	52.9	56.8	6.47
Room 217	11:28	0.12	661	0.4	74.8	53.8	56.9	36.06
Auto Shop	11:31	0.09	444	0.6	73.2	51.2	54.2	26.81
Room 112	11:33	0.09	422	0.5	74.3	55.5	57.3	8.32
Wood Shop	11:36	0.09	419	0.6	74.7	52.9	56.4	74.89
Cafeteria	11:39	0.11	853	0.5	74.9	55.1	57.4	70.26
Gym	11:44	0.09	433	0.6	73.4	54.1	55.8	22.12
Auditorium	11:45	0.08	449	0.5	72.7	55.4	55.7	6.47
Outside	11:59	0.10	444	0.6	71.7	45.6	51.1	20.34
ACGIH TLV	-	-	5,000	25	-	-	-	-
OSHA PEL	-	-	5,000	50	-	-	-	-
ASHRAE recommended	-	-	1,102	2.5	-	35-55	-	-
EPA Reference Level Indicator	-	-	1,000	9	-	-	-	150

ppm – parts per million in air; ppb – parts per billion in air

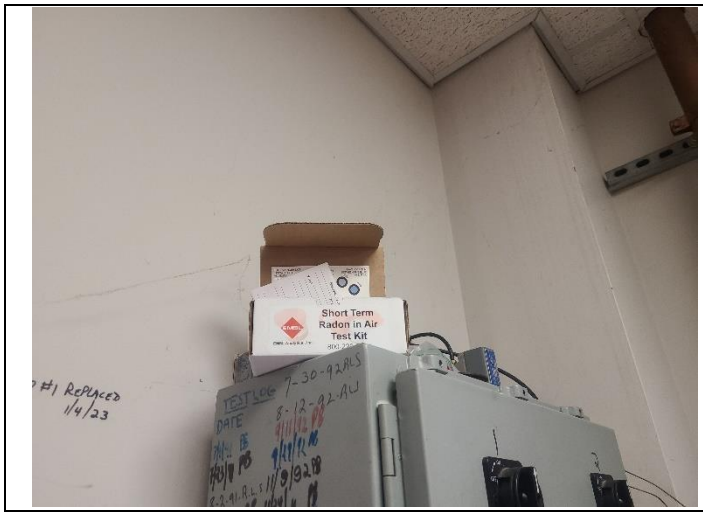
APPENDIX B

1. Nantucket High School exterior by Main Office.

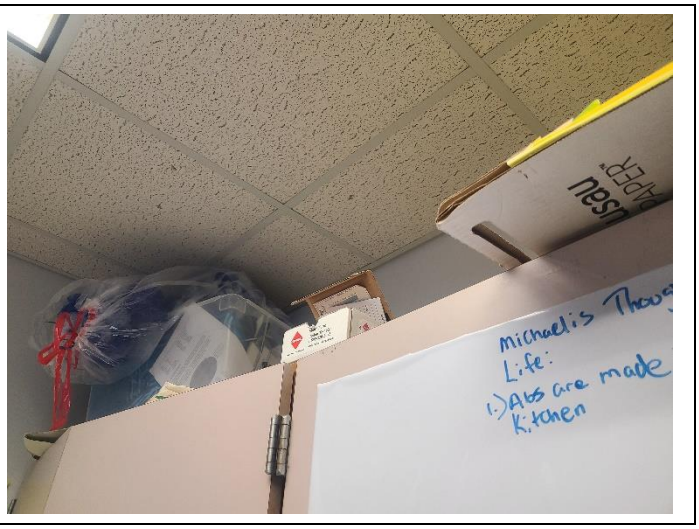
2. Tech Office, Lower-Level radon sample.



3. Room 005 radon sample.



4. Room 015 radon sample.



5. Room 009 radon sample.

EXAMPLE PICTURES		RPF Environmental TESTING & CONSULTING SERVICES www.airpf.com **888-SAFE AIR**
Site Address: Nantucket High School 10 Surfside Road, Nantucket, MA 02554		**File No. 240327**

APPENDIX C

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-0327
http://www.EMSL.com cinnaminsonradonlab@emsl.com

EMSL Order: 382405010
CustomerID: RPFA50
CustomerPO:
ProjectID:

Attn: **Krystalle Diaz**
RPF Environmental Inc.
320 First NH Turnpike
Northwood, NH 03261

Phone: (603) 942-5432
Fax: (603) 942-5300
Received: 10/9/2024 03:16 PM
Analysis Date: 10/11/2024
Collected: 10/4/2024

Project: **Nantucket HIgh School IAQ w/Radons**

Test Site: **Nantucket HIgh School**
10 Surfside Rd
Nantucket, NH 02554

Test Report: Radon in Air Test Results

Samples for EMSL Kit 298325

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
528734	Tech Office - Lower Level	0.2	10/4/2024	10/7/2024	73	58	Customer
382405010-0001			10:33:00 AM	10:01:00 AM			
Sample Notes:							
528622	Tech Office - Lower Level	0.2	10/4/2024	10/7/2024	73	58	Customer
382405010-0002			10:33:00 AM	10:01:00 AM			
Sample Notes:							
Summary for EMSL Kit 298325		**Average Radon Result:**	**0.2 pCi/L**				

Samples for EMSL Kit 298324

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
528859	Room 005	0.5	10/4/2024	10/7/2024	75	59	Customer
382405010-0003			10:46:00 AM	10:06:00 AM			
Sample Notes:							
528739	Room 005	0.1	10/4/2024	10/7/2024	75	59	Customer
382405010-0004			10:46:00 AM	10:06:00 AM			
Sample Notes:							
Summary for EMSL Kit 298324		**Average Radon Result:**	**0.3 pCi/L**				

Samples for EMSL Kit 316518

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
566317	Room 015 - Utility Closet	0.5	10/4/2024	10/7/2024	75	57	Customer
382405010-0005			10:56:00 AM	10:08:00 AM			
Sample Notes:							

Samples for EMSL Kit 298323

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
528782	Room 009	0.3	10/4/2024	10/7/2024	75	61	Customer
382405010-0006			11:00:00 AM	10:12:00 AM			
Sample Notes:							
528876	Room 009	0.4	10/4/2024	10/7/2024	75	61	Customer
382405010-0007			11:00:00 AM	10:12:00 AM			
Sample Notes:							
Summary for EMSL Kit 298323		**Average Radon Result:**	**0.4 pCi/L**				

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EMSL Order:	382405010
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Project: **Nantucket HIgh School IAQ w/Radons**

Test Site: **Nantucket HIgh School**
10 Surfside Rd
Nantucket, NH 02554

Test Report: Radon in Air Test Results

The radon test was performed using a liquid scintillation radon detector/s and counted on a liquid scintillation counter using approved EPA testing protocols for Radon in Air testing. The EPA recommends fixing your home if the average of two short-term tests taken in the lowest lived-in level of the home show radon levels that are equal to or greater than 4.0pCi/L.
The EPA recommends retesting your home every two years.

Please contact EMSL Analytical, Inc. or your State Health Department for further information.
All procedures used for generating this report are in complete accordance with the current EPA protocols for the analysis of Radon in Air.

Report Note

Analyst(s)

Jeanel Zoll (7)

Dominic Gehret, Radiochemistry Laboratory Manager, NJ Radon
Measurement Specialist MES 13910
or other approved signatory

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ FL RB2034/R2687,IL RNL2008202,IN RTL00935,IA RNLAB10005,KS KS-LB-0005/KS-MS-0482,ME SPC202,MN RL-0005,NE 474/RMB-1083,NJ 03036/MEB92525/MES13910,NY 10872,OH RL39,OK D9952,PA 2573/3393/68-00367,RI RMB-108/RI00179,WV RL000220,NRSB-ARL6006,NRPP

Initial report from 10/11/2024 13:39:37

Please visit www.radontestinglab.com

APPENDIX D

LIMITATIONS

1. The observations and conclusions presented in the Report were based solely upon the services described herein, and not on scientific tasks or procedures beyond the RPF Environmental, Inc. Scope of Work (SOW) as discussed in the proposal and/or agreement. The conclusions and recommendations are based on visual observations and testing, limited as indicated in the Report, and were arrived at in accordance with generally accepted standards of industrial hygiene practice and asbestos professionals. The nature of this survey or monitoring service was limited as indicated herein and in the report or letter of findings. Further testing, survey, and analysis is required to provide more definitive results and findings.

2. For site survey work, observations were made of the designated accessible areas of the site as indicated in the Report. While it was the intent of RPF to conduct a survey to the degree indicated, it is important to note that not all suspect ACBM material in the designated areas were specifically assessed and visibility was limited, as indicated, due to the presence of furnishings, equipment, solid walls and solid or suspended ceilings throughout the facility and/or other site conditions. Asbestos or hazardous material may have been used and may be present in areas where detection and assessment is difficult until renovation and/or demolition proceeds. Access and observations relating to electrical and mechanical systems within the building were restricted or not feasible to prevent damage to the systems and minimize safety hazards to the survey team.

3. Although assumptions may have been stated regarding the potential presence of inaccessible or concealed asbestos and other hazardous material, full inspection findings for all asbestos and other hazardous material requires the use of full destructive survey methods to identify possible inaccessible suspect material and this level of survey was not included in the SOW for this project. For preliminary survey work, sampling and analysis as applicable was limited and a full survey throughout the site was not performed. Only the specific areas and /or materials indicated in the report were included in the SOW. This inspection did not include a full hazard assessment survey, full testing or bulk material, or testing to determine current dust concentrations of asbestos in and around the building. Inspection results should not be used for compliance with current EPA and State asbestos in renovation/demolition requirements unless specifically stated as intended for this use in the RPF report and considering the limitations as stated therein and within this limitations document.

4. Where access to portions of the surveyed area was unavailable or limited, RPF renders no opinion of the condition and assessment of these areas. The survey results only apply to areas specifically accessed by RPF during the survey. Interiors of mechanical equipment and other building or process equipment may also have asbestos and other hazardous material present and were not included in this inspection. For renovation and demolition work, further inspection by qualified personnel will be required during the course of construction activity to identify suspect material not previously documented at the site or in this survey report. Bordering properties were not investigated and comprehensive file review and research was not performed.

5. For lead in paint, observations were made of the designated accessible areas of the site as indicated in the Report. Limited testing may have been performed to the extent indicated in the text of the report. In order to conduct thorough hazard assessments for lead exposures, representative surface dust testing, air monitoring and other related testing throughout the building, should be completed. This type of in depth testing and analysis was beyond the scope of services for the initial inspection. For lead surveys with XRF readings, it is recommended that surfaces found to have LBP or trace amount of lead detected with readings of less than 4 mg/cm^2 be confirmed using laboratory analysis if more definitive results are required. Substrate corrections involving destructive sampling or damage to existing surfaces (to minimize XRF read-through) were not completed. In some instances, destructive testing may be required for more accurate results. In addition, depending on the specific thickness of the paint films on different areas of a building component, differing amounts of wear, and other factors, XRF readings can vary slightly, even on the same building component. Unless otherwise specifically stated in the scope of services and final report, lead testing performed is not intended to comply with other state and federal regulations pertaining to childhood lead poisoning regulations.

6. Air testing is to be considered a "snap shot" of conditions present on the day of the survey with the understanding that conditions may differ at other times or dates or operational conditions for the facility. Results are also limited based on the specific analytical methods utilized. For phase contrast microscopy (PCM) total airborne fiber testing, more sensitive asbestos-specific analysis using transmission electron microscopy (TEM) can be performed upon request.

7. For asbestos bulk and dust testing, although polarize light microscopy (PLM) is the method currently recognized in State and federal regulations for asbestos identification in bulk samples, some industry studies have found that PLM may not be sensitive enough to detect all of the asbestos fibers in certain nonfriable material, vermiculate type insulation, soils, surface dust, and other materials requiring more sensitive analysis to identify possible asbestos fibers. In the event that more definitive results are requested, RPF recommends that confirmation testing be completed using TEM methods or other analytical methods as may be applicable to the material. Detection of possible asbestos fibers may be made more difficult by the presence of other non-asbestos fibrous components such as cellulose, fiber glass, etc., by binder/matrix materials which may mask or obscure fibrous components, and/or by exposure to conditions capable of altering or transforming asbestos. PLM can show significant bias leading to false negatives and false positives for certain types of materials. PLM is limited by the visibility of the asbestos fibers. In some samples the fibers may be reduced to a diameter so small or masked by coatings to such an extent that they cannot be reliably observed or identified using PLM.

8. For hazardous building material inspection or survey work, RPF followed applicable industry standards; however, RPF does not warrant or certify that all asbestos or other hazardous materials in or on the building has been identified and included in this report. Various assumptions and limitations of the methods can result in missed materials or misidentification of materials due to several factors including but not limited to: inaccessible space due to physical or safety constraints, space that is difficult to reach to fully inspect, assumptions regarding the determination of homogenous groups of suspect material, assumptions regarding attempts to conduct representative sampling, and potential for varying mixtures and layers of material sampled not being representative of all areas of similar material.

9. Full assessments often requires multiple rounds of sampling over a period of time for air, bulk material, surface dust and water. Such comprehensive testing was beyond the scope of RPF services. In addition clearance testing for abatement, as applicable, was based on the visual observations and limited ambient area air testing as indicated in the report and in accordance with applicable state and federal regulations. The potential exists that microscopic surface dust remains with contaminant present even in the event that the clearance testing meets the state and federal requirements. Likewise for building surveys, visual observations are not sufficient alone to detect possible contaminant in settled dust. Unless otherwise specifically indicated in the report, surface dust testing was not included in the scope of the RPF services.

10. For abatement or remediation monitoring services: RPF is not responsible for observations and test for specific periods of work that RPF did not perform full shift monitoring of construction, abatement or remediation activity. In the event that problems occurred or concerns arouse regarding contamination, safety or health hazards during periods RPF was not onsite, RPF is not responsible to provide documentation or assurances regarding conditions, safety, air testing results and other compliance issues. RPF may have provided recommendations to the Client, as needed, pertaining to the Client's Contractor compliance with the technical specifications, schedules, and other project related issues as agreed and based on results of RPF monitoring work. However, actual enforcement, or waiving of, contract provisions and requirements as well as regulatory liabilities shall be the responsibility of Client and Client's Contractor(s). Off-site abatement activities, such as waste transportation and disposal, were not monitored or inspected by RPF.

11. For services limited to clearance testing following abatement or remediation work by other parties: The testing was limited to clearance testing only and as indicated in the report and a site assessment for possible environmental health and safety hazards was not performed as part of the scope of this testing. Client, or Client's abatement contractor as applicable, was responsible for performing visual inspections

of the work area to determine completeness of work prior to air clearance testing by RPF.

12. For site work, including but not limited to air clearance testing services, in which RPF did not provide full site safety and health oversight, abatement design, full shift monitoring of all site activity, RPF expresses no warranties, guarantees or certifications of the abatement work conducted by the Client or other employers at the job site(s), conditions during the work, or regulatory compliance, with the exception of the specific airborne concentrations as indicated by the air clearance test performed by RPF during the conditions present for the clearance testing. Unless otherwise specifically noted in the RPF Report, visual inspections and air clearance testing results apply only to the specific work area and conditions present during the testing. RPF did not perform visual inspections of surfaces not accessible in the work area due to the presence of containment barriers or other obstructions. In these instances, some contamination may be present following RPF clearance testing and such contamination may be exposed during and after removal of the containment barriers or other obstructions following RPF testing services. Client or Client's Contractor is responsible for using appropriate care and inspection to identify potential hazards and to remediate such hazards as necessary to ensure compliance and a safe environment.

13. The survey was limited to the material and/or areas as specifically designated in the report and a site assessment for other possible environmental health and safety hazards or subsurface pollution was not performed as part of the scope of this site inspection. Typically, hazardous building materials such as asbestos, lead paint, PCBs, mercury, refrigerants, hydraulic fluids and other hazardous product and materials may be present in buildings. The survey performed by RPF only addresses the specific items as indicated in the Report.

14. For mold and moisture survey services, RPF services did not include design or remediation of moisture intrusion. Some level of mold will remain at the site regardless of RPF testing and Contractor or Client cleaning efforts. RPF testing associated with mold remediation and assessments is limited and may or may not be representative of other surfaces and locations at the site. Mold growth will occur if moisture intrusion deficiencies have not been fully remedied and if the site or work areas are not maintained in a sufficiently dry state. Porous surfaces in mold contaminated areas which are not removed and disposed of will likely result in future spore release, allergen sources, or mold contamination.

15. Existing reports, drawings, and analytical results provided by the Client to RPF, as applicable, were not verified and, as such, RPF has relied upon the data provided as indicated, and has not conducted an independent evaluation of the reliability of these data.

16. Where sample analyses were conducted by an outside laboratory, RPF has relied upon the data provided, and has not conducted an independent evaluation of the reliability of this data.

17. All hazard communication and notification requirements, as required by U.S. OSHA regulation 29 CFR Part 1926, 29 CFR Part 1910, and other applicable rules and regulations, by and between the Client, general contractors, subcontractors, building occupants, employees and other affected persons were the responsibility of the Client and are not part of the RPF SOW.

18. The applicability of the observations and recommendations presented in this report to other portions of the site was not determined. Many accidents, injuries and exposures and environmental conditions are a result of individual employee/employer actions and behaviors, which will vary from day to day, and with operations being conducted. Changes to the site and work conditions that occur subsequent to the RPF inspection may result in conditions which differ from those present during the survey and presented in the findings of the report.

METHODOLOGY

The results of the air quality testing are representative of the conditions present on the day of the testing and should be considered a snapshot of conditions within the facility. Additional rounds of testing may be required to obtain a statistically valid set of data representative of a variety of conditions which may be present within the facility.

Each of the methods used is discussed separately below.

(GRAYWOLF) Carbon Dioxide, Carbon Monoxide, Relative Humidity, Temperature, Dew Point, and Volatile Organic Compounds

Direct reading determinations for carbon dioxide (CO_2), carbon monoxide (CO), relative humidity (RH), temperature (T), dew point, and total volatile organic compounds (VOCs) were completed using a Greywolf Indoor Air Quality Monitor. The Greywolf was calibrated for CO_2 and CO with a span gas of known concentration prior to the start of the testing program.

Airborne Particulates

Direct reading determinations for airborne particulates at the size range of 10 microns and lower were measured using a Greywolf Handheld 3016-IAQ Airborne Particulate Meter. Thirty second samples were collected at each sampling location.