



**MCPS RADON TESTING – EXECUTIVE SUMMARY**

Site Name	Cloverly Elementary School
Date of Test Report	2/17/2023
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	2
# Rooms $\geq$ 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	2.3 pCi/L

Project Status:

1. Post remediation testing completed.



February 17, 2023

Mr. Brian Croyle  
Environmental Specialist  
Montgomery County Public Schools  
Gaithersburg, MD 20879

Re: **Radon Testing Services**  
KCI Job # 122210551

Location: Cloverly Elementary School  
800 Briggs Road  
Silver Spring, MD 20905

Dear Mr. Croyle:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to Montgomery County Public Schools (MCPS) pursuant to completing a “short-term” 3 day radon test for the Cloverly Elementary School, located at 800 Briggs Rd. Silver Spring, MD 20905 (subject site).

**Scope of Services:**

KCI conducted radon testing at the subject site to evaluate indoor radon levels relative to the USEPA's recommended action level of 4.0 picocuries per Liter (pCi/L) - the level at which EPA recommends that schools take action to reduce the level. KCI conducted the radon testing in accordance with American Association of Radon Scientists and Technologists (AARST) *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*. A National Radon Proficiency Program (NRPP) Radon Measurement Specialist (certification #111004 RT) supervised the testing. Additional information on radon management and the health effects of radon exposure is available from <https://www.montgomeryschoolsmd.org> or [www.epa.gov/radon](http://www.epa.gov/radon).

KCI visited the site on January 24, 2023 and deployed six (6) activated charcoal (AC) radon test kits. KCI deployed radon test kits in all frequently-occupied ground contact rooms, and other areas, (if applicable) in accordance with AARST guidance.

A floor plan map of the building with the test locations is included as Attachment A of this report.

As a quality control measure, KCI also included duplicate samples, field blanks, lab transit blanks, and office blanks in accordance with AARST recommendations. In addition, KCI submitted test kits to Bowser-Morner, Inc. as spike samples. The spiked tests were exposed to a known radon concentration by Bowser-Morner prior to being returned to the laboratory for analysis.

KCI returned to the site on January 27, 2023 to retrieve the radon sampling test kits. KCI shipped all radon tests via overnight delivery to Accustar Labs - MA. for analysis by gamma-ray spectroscopy.

Accustar Labs - MA is a NRSB certified analytical laboratory for radon analysis (certification #ARL0017) located at 2 Saber Way, Ward Hill, MA 01835.

**Evaluation of Testing Conditions:**

These tests represent:

- Follow up to post mitigation biennial testing.

These tests were conducted to:

- Confirm the success of the mitigation system(s).

According to AARST, *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*, ideal testing conditions would be when the building is fully occupied and the heating system is active. For this test, the facility’s HVAC system was operating in heating mode; therefore, KCI concludes that this test was conducted during ideal testing conditions.

KCI recorded observations of the following conditions in each room during the time of deployment and collection of the radon test kits:

- Indoor temperature,
- HVAC Operation,
- Dehumidifier operation,
- Humidifier operation,
- Ceiling fan operation, and
- Open windows or doors.

KCI also compiled weather data for the testing period and conducted observations of relevant field conditions. During the test period, weather records indicate temperatures ranged from the 31°F to 52°F. Maximum sustained winds ranged from 5-25 miles per hour. Average humidity was around 60% with .32 inches of precipitation (rain) was recorded during testing period.

**Results:**

The sampling locations and analytical results are listed on Table 1 (Attachment B). The quality control sample locations and analytical results are listed on Table 2 (Attachment B). Sampling locations and associated test kit identification numbers and relevant field observations are listed on Table 3 (Attachment B). The laboratory analytical results are included in Attachment C. Laboratory results and exposure data for the spike samples are also included in Attachment C.

The results of the radon test analysis indicated the following:

<b>Radon Concentration</b>	<b>Room</b>	<b>Result</b>
≥4.0 pCi/L	None	N/A
<4.0 pCi/L	See Attachment B	

Quality Control Samples	
Results of Blank Canisters:	The office blanks, and lab transit blanks had test results of less than the laboratory detection limit of 0.3 pCi/L.
Adequate Laboratory Precision?	Review of the duplicate sample analysis indicates that adequate laboratory measurement precision was achieved.
Spike Sample Analysis:	The Spike Sample analysis results indicate the laboratory is operating within statistical control limits.

Our professional services have been performed in accordance with customary principles and practices in the field of industrial hygiene and engineering. If you have any questions or comments regarding this report, please feel free to contact me at (410) 891-1769.

Sincerely,



Tyler P. McCleaf  
Radon Measurement Provider  
#111004 RT  
KCI Technologies, Inc.

Attachments:     A- Floor Plan with Test Locations  
                      B- Table 1-3, Radon Test Summary Spreadsheets  
                      C- Laboratory Analytical Results

# ATTACHMENT A

## Floor Plan With Test Locations

# ATTACHMENT B

## Radon Test Summary Spreadsheet

**Table Notes:**

AC- Activated Charcoal

ACI- Air Check, Inc.

D- Duplicate

FB- Field Blank

KCI- KCI Technologies, Inc.

OB- Office Blank

PM- Project Manager

OC- Quality Control

Table 1- Radon Testing Results		
Cloverly ES		
Test Period: 01/24/2023 - 01/227/2023		
Kit Number	Room / Area	Result
11633103	MEDIA STORAGE	1.5
11633112	MEDIA STORAGE	< 0.3
11633161	MEDIA STORAGE	1.9
11633108	MEDIA STORAGE 2	2.3
11633111	MEDIA STORAGE 2	1.7
11633113	MEDIA STORAGE 2	< 0.3



Table 2- Radon Testing Results			
Cloverly ES			
Test Period: 01/24/23 - 01/27/23			
Kit Number	QC Type	Room / Area	Result
11633112	FB	Media Storage	< 0.3
11633161	D	Media Storage	1.9
11633111	D	Media Storage 2	1.7
11633113	FB	Media Storage 2	< 0.3
11633975	OB	OFFICE BLANK	< 0.3
11633983	TB	TRAVEL BLANK	< 0.3

Summary of Missed Locations		
Cloverly ES		
Test Period: 01/24/23 - 01/27/23		
Kit Number	Room/Area	Result
	N/A	

Summary of Missing, Compromised and >= 4 piC/L Tests		
Cloverly ES		
Test Period: 01/24/23 - 01/27/23		
Kit Number	Room/Area	Result
	N/A	

Table Note:  
\* Missing or Compromised Sample

# ATTACHMENT C

## Laboratory Analytical Results

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February 1, 2023

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11633103	MEDIA STORAGE	2023-01-24 @ 11:00 am	2023-01-27 @ 12:00 pm	1.5 ± 0.4	2023-01-31
11633112	MEDIA STORAGE	2023-01-24 @ 11:00 am	2023-01-27 @ 12:00 pm	< 0.3	2023-01-31
11633161	MEDIA STORAGE	2023-01-24 @ 11:00 am	2023-01-27 @ 12:00 pm	1.9 ± 0.4	2023-01-31
11633108	MEDIA STORAGE 2	2023-01-24 @ 11:00 am	2023-01-27 @ 12:00 pm	2.3 ± 0.4	2023-01-31
11633111	MEDIA STORAGE 2	2023-01-24 @ 11:00 am	2023-01-27 @ 12:00 pm	1.7 ± 0.4	2023-01-31
11633113	MEDIA STORAGE 2	2023-01-24 @ 11:00 am	2023-01-27 @ 12:00 pm	< 0.3	2023-01-31

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Air Chek 1936 Butler Bridge Rd, Mills River, NC 28759-3892 Phone: (828) 684-0893 Fax: (828) 684-8498

# EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KC1 TECHNOLOGIES, INC Job Number 208343

NOMINAL Conditions: Radon Conc 34.7 pCi/L Rel. Hum 49.4 % Temp. 69.6 F

Date Start: 12/24/22 Date Stop: 12/27/22 Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: 0810 Time Stop: 0810 Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: (5) CHAR BAGS - Device No.'s: \_\_\_\_\_

11285109, 11285110, 11285101

THRU 11285103

BY LEFT

Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_ Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_ Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: \_\_\_\_\_ Device No.'s: \_\_\_\_\_

Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_ Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_ Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: \_\_\_\_\_ Device No.'s: \_\_\_\_\_

Note: All times are in 24-hour (military) notation, Eastern Standard Time (EST)  
Background = 7  $\mu$ R/h Elevation = 820 ft

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December 29, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:

**OFFICE**

**MAIN**

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11285110	SK1	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	31.7 ± 2.5	2022-12-29
11285101	SK2	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	30.1 ± 2.4	2022-12-29
11285103	SK3	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	34.0 ± 2.7	2022-12-29
11285102	SK4	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	30.9 ± 2.5	2022-12-29
11285109	SK5	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	32.0 ± 2.6	2022-12-29

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## Radon Test Kit Chain of Custody

Project Name: MCPS Radon – Week 2 January Schools

Name of Schools:

1. Springbrook HS
2. White Oak MS
3. Cloverly ES
4. Georgian Forest ES
5. Harmony Hills ES
6. Poolesville ES
7. Montrose Center
8. Kingsley Wilderness
9. Poolesville HS
10. Carl Sandburg Learning Center

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	Date	Initials
Radon Test Kits Deployed	01/24/2023	BMMY
Radon Test Kits Collected	01/27/2023	BMM
Radon Test Kits Shipped to Lab*	01/27/2023	BMM
Radon Test Kits Received by Lab*	01/31/2023	BMM

\*All samples sent to Air Check, inc., 2 Saber Way, Ward Hill, MA 01835



**MCPS RADON TESTING – EXECUTIVE SUMMARY**

Site Name	Cloverly Elementary School
Date of Test Report	05/31/2022
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	2
# Rooms $\geq$ 4.0 pCi/L	0
Lowest Value	0.5 pCi/L
Highest Value	3.8 pCi/L

**Project Status**

Current Project Status at this time: Testing completed; no further action needed;

Mitigation needed - Media Center





May 31, 2022

Mr. Brian Croyle, PG, CHMM  
Environmental Specialist  
Montgomery County Public Schools  
Gaithersburg, MD 20879

Re: **Radon Testing Services**  
KCI Job # 122108316

Location: Cloverly Elementary School  
800 Briggs Chaney Rd.  
Silver Spring, MD 20905

Dear Mr. Croyle:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to Montgomery County Public Schools (MCPS) pursuant to completing a “short-term” 3 day radon test for the Cloverly Elementary School, located at 800 Briggs Chaney Rd. Silver Spring, MD 20905 (subject site).

**Scope of Services:**

KCI conducted radon testing at the subject site to evaluate indoor radon levels relative to the USEPA's recommended action level of 4.0 picocuries per Liter (pCi/L) - the level at which EPA recommends that schools take action to reduce the level. KCI conducted the radon testing in accordance with American Association of Radon Scientists and Technologists (AARST) *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*. A National Radon Proficiency Program (NRPP) Radon Measurement Specialist (certification #111004 RT) supervised the testing. Additional information on radon management and the health effects of radon exposure is available from <https://www.montgomeryschoolsmd.org> or [www.epa.gov/radon](http://www.epa.gov/radon).

KCI visited the site on April 19, 2022 and deployed five (5) activated charcoal (AC) radon test kits. KCI deployed radon test kits in all frequently-occupied ground contact rooms, and other areas, (if applicable) in accordance with AARST guidance.

KCI sampled the following locations during this follow-up test:

1. Rooms with missing test kits from the Radon 2022 testing period (i.e. test kit was deployed but not recovered),
2. Rooms with invalidated test kits from the Radon 2022 testing period (e.g. an open window in the room or disturbed test kit),
3. Rooms which were locked/inaccessible during the Radon 2022 testing period,
4. Rooms with elevated radon results (i.e.  $\geq 3.5$  pCi/L),
5. Rooms previously tested for radon but not tested in Radon 2022, and
6. Additional rooms that require testing (if applicable.)

A floor plan map of the building with the test locations is included as Attachment A of this report.

As a quality control measure, KCI also included duplicate samples, field blanks, lab transit blanks, and office blanks in accordance with AARST recommendations. In addition, KCI submitted test kits to Bowser-Morner, Inc. as spike samples. The spiked tests were exposed to a known radon concentration by Bowser-Morner prior to being returned to the laboratory for analysis.

KCI returned to the site on April 22, 2022 to retrieve the radon sampling test kits. KCI shipped all radon tests via overnight delivery to Airchek, Inc. for analysis by gamma-ray spectroscopy. Airchek, Inc. is a NRSB certified analytical laboratory for radon analysis (certification # ARL1402) located at 1936 Butler Bridge Road, Mills River, North Carolina.

### **Evaluation of Testing Conditions:**

These tests represent:

- Follow-up to initial testing.

These tests were conducted to:

- Evaluate radon concentrations at the facility.

According to AARST, *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*, ideal testing conditions would be when the building is fully occupied and the heating system is active. For this test, the facility's HVAC system was operating in heating mode; therefore, KCI concludes that this test was conducted during ideal testing conditions.

KCI recorded observations of the following conditions in each room during the time of deployment and collection of the radon test kits:

- Indoor temperature,
- HVAC Operation,
- Dehumidifier operation,
- Humidifier operation,
- Ceiling fan operation, and
- Open windows or doors.

KCI also compiled weather data for the testing period and conducted observations of relevant field conditions. During the test period, weather records indicate low temperatures were in the low 40°Fs and high temperatures ranged from the low 60°Fs to the mid 80°Fs. Maximum sustained winds ranged from 0-30 miles per hour. Average humidity was around 49% with 0.03 inches of precipitation (rain) was recorded during testing period.

### **Results:**

The sampling locations and analytical results are listed on Table 1 (Attachment B). The quality control sample locations and analytical results are listed on Table 2 (Attachment B). Sampling locations and associated test kit identification numbers and relevant field observations are listed on Table 3 (Attachment B). The laboratory analytical results are included in Attachment C. Laboratory results and exposure data for the spike samples are also included in Attachment C.

The results of the radon test analysis indicated the following:

Radon Concentration	Room	Result
≥4.0 pCi/L	None	N/A
<4.0 pCi/L	See Attachment B	

Quality Control Samples	
Results of Blank Canisters:	The office blanks, and lab transit blanks had test results of less than the laboratory detection limit of 0.3 pCi/L.
Adequate Laboratory Precision?	Review of the duplicate sample analysis indicates that adequate laboratory measurement precision was achieved.
Spike Sample Analysis:	The Spike Sample analysis results indicate the laboratory is operating within statistical control limits.

Our professional services have been performed in accordance with customary principles and practices in the field of industrial hygiene and engineering. If you have any questions or comments regarding this report, please feel free to contact me at (410) 891-1769.

Sincerely,



Tyler P. McCleaf  
Radon Measurement Provider  
#111004 RT  
KCI Technologies, Inc.

Attachments:   A- Floor Plan with Test Locations  
                  B- Table 1-3, Radon Test Summary Spreadsheets  
                  C- Laboratory Analytical Results

# ATTACHMENT A

## Floor Plan With Test Locations

# ATTACHMENT B

## Radon Test Summary Spreadsheet

**Table Notes:**

AC- Activated Charcoal

ACI- Air Check, Inc.

D- Duplicate

FB- Field Blank

KCI- KCI Technologies, Inc.

OB- Office Blank

PM- Project Manager

OC- Quality Control

Table 1- Radon Testing Results		
Cloverly ES RT		
Test Period: 04/19/2022 - 04/22/2022		
Kit Number	Room / Area	Result
11139390	MEDIA CENTER	3.8
11139398	MEDIA CENTER	3.4
11139387	MEDIA WORK ROOM	0.5
11139388	MEDIA WORK ROOM	2.2
11139389	MEDIA WORK ROOM	2.7

Table 2- Radon Testing Results			
Cloverly ES RT			
Test Period: 04/19/2022 - 04/22/2022			
Kit Number	QC Type	Room / Area	Result
11139388	D	Media Work Room	2.2
11139387	FB	Media Work Room	0.5
11139882	OB	OFFICE BLANK	< 0.3
11139881	TB	TRAVEL BLANK	< 0.3





# ATTACHMENT C

## Laboratory Analytical Results

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April 25, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11139390	MEDIA CENTER	2022-04-19 @ 1:00 pm	2022-04-22 @ 10:00 am	3.8 ± 0.3	2022-04-25
11139398	MEDIA CENTER	2022-04-19 @ 1:00 pm	2022-04-22 @ 10:00 am	3.4 ± 0.3	2022-04-25
11139387	MEDIA WORK ROOM	2022-04-19 @ 1:00 pm	2022-04-22 @ 10:00 am	0.5 ± 0.3	2022-04-25
11139388	MEDIA WORK ROOM	2022-04-19 @ 1:00 pm	2022-04-22 @ 10:00 am	2.2 ± 0.3	2022-04-25
11139389	MEDIA WORK ROOM	2022-04-19 @ 1:00 pm	2022-04-22 @ 10:00 am	2.7 ± 0.3	2022-04-25

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Air Chek 1936 Butler Bridge Rd, Mills River, NC 28759-3892 Phone: (828) 684-0893 Fax: (828) 684-8498

# EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KCI Technologies, Inc. Job Number 204620

NOMINAL Conditions: Radon Conc 27.0 pCi/L Rel. Hum 50.1 % Temp. 70.0 F

Date Start: 3/18/22 Date Stop: 3/21/22 Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: 0705 Time Stop: 0705 Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: (5) Char Bags - Device No.'s: \_\_\_\_\_

11139367, 11139368, 11139371, \_\_\_\_\_

11139710, 11139717 \_\_\_\_\_

E3 light

Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_ Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_ Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: \_\_\_\_\_ Device No.'s: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_ Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_ Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: \_\_\_\_\_ Device No.'s: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Note: All times are in 24-hour (military) notation, Eastern Standard Time (EST)  
Background = 7  $\mu$ R/h Elevation = 820 ft

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March 30, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:

MCPS - Spike Sample Lab Results. Measured values are satisfactory, i.e., within  $\pm 25\%$  of the chamber's reference value (25.7 pCi/L).

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11139367	SK1	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	25.9 $\pm$ 2.1	2022-03-30
11139368	SK2	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	23.9 $\pm$ 2.0	2022-03-30
11139371	SK3	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	25.7 $\pm$ 2.1	2022-03-30
11139710	SK4	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	26.4 $\pm$ 2.1	2022-03-30
11139717	SK5	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	24.6 $\pm$ 2.0	2022-03-30

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Air Chek 1936 Butler Bridge Rd, Mills River, NC 28759-3892 Phone: (828) 684-0893 Fax: (828) 684-8498



### Radon Test Kit Chain of Custody

Project Name: MCPS Radon – April 2022 Schools – Retesting

Name of Schools:

1. Pine Crest ES
2. Montgomery Knolls ES
3. Poolesville ES
4. Cloverly ES

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	Date	Initials
Radon Test Kits Deployed	04/19/2022	BMM
Radon Test Kits Collected	04/22/2022	BMM
Radon Test Kits Shipped to Lab*	04/22/2022	BMM
Radon Test Kits Received by Lab*	04/25/2022	BMM

\*All samples sent to Air Check, Inc., 1936 Butler Bridge Rd, Mills River, NC 28759



**MCPS RADON TESTING – EXECUTIVE SUMMARY**

Site Name	Cloverly ES
Date of Test Report	4/29/2022
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	60
# Rooms ≥ 4.0 pCi/L	1
Lowest Value	<0.3 pCi/L
Highest Value	5.0 pCi/L

Project Status:

Initial testing completed; Missing, elevated, or compromised samples need re-sampling



April 29, 2022

Brian T. Croyle, PG, CHMM  
Environmental Specialist  
Montgomery County Public Schools  
Gaithersburg, MD 20879

Re: **Radon Testing Services**  
KCI Job # 122108316

Location: Cloverly Elementary School  
800 Briggs Chaney Rd.  
Silver Spring, MD 20905

Dear Mr. Croyle:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to Montgomery County Public Schools (MCPS) pursuant to completing a “short-term” 3 day radon test for the Cloverly Elementary School, located at 800 Briggs Chaney Rd. Silver Spring, MD 20905. (subject site).

**Scope of Services:**

KCI conducted radon testing at the subject site to evaluate indoor radon levels relative to the USEPA's recommended action level of 4.0 picocuries per Liter (pCi/L) - the level at which EPA recommends that schools take action to reduce the level. KCI conducted the radon testing in accordance with American Association of Radon Scientists and Technologists (AARST) *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*. A National Radon Proficiency Program (NRPP) Radon Measurement Specialist (certification #111004 RT) supervised the testing. Additional information on radon management and the health effects of radon exposure is available from <https://www.montgomeryschoolsmd.org> or [www.epa.gov/radon](http://www.epa.gov/radon).

KCI visited the site on March 8, 2022 and deployed seventy (70) activated charcoal (AC) radon test kits. KCI deployed radon test kits in all frequently-occupied ground contact rooms, and other areas, (if applicable) in accordance with AARST guidance.

A floor plan map of the building with the test locations is included as Attachment A of this report.

As a quality control measure, KCI also included duplicate samples, field blanks, lab transit blanks, and office blanks in accordance with AARST recommendations. In addition, KCI submitted test kits to Bowser-Morner, Inc. as spike samples. The spiked tests were exposed to a known radon concentration by Bowser-Morner prior to being returned to the laboratory for analysis.

KCI returned to the site on March 11, 2022 to retrieve the radon sampling test kits. KCI shipped all radon tests via overnight delivery to Airchek, Inc. for analysis by gamma-ray spectroscopy. Airchek, Inc. is a



NRSB certified analytical laboratory for radon analysis (certification # ARL1402) located at 1936 Butler Bridge Road, Mills River, North Carolina.

**Evaluation of Testing Conditions:**

These tests represent:

- Follow-up to post-mitigation biennial testing.

These tests were conducted to:

- Confirm the success of the mitigation system(s).

According to AARST, *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*, ideal testing conditions would be when the building is fully occupied and the heating system is active. For this test, the facility's HVAC system was operating in heating mode; therefore, KCI concludes that this test was conducted during ideal testing conditions.

KCI recorded observations of the following conditions in each room during the time of deployment and collection of the radon test kits:

- Indoor temperature,
- HVAC Operation,
- Dehumidifier operation,
- Humidifier operation,
- Ceiling fan operation, and
- Open windows or doors.

KCI also compiled weather data for the testing period and conducted observations of relevant field conditions. During the test period, weather records indicate low temperatures were in the mid 20s and high temperatures ranged from the high 70s to the low 50s Fahrenheit. Maximum sustained winds ranged from 0-32 miles per hour. Average humidity was around 65% with 1.09 inches of precipitation (rain) was recorded during testing period.

**Results:**

The sampling locations and analytical results are listed on Table 1 (Attachment B). The quality control sample locations and analytical results are listed on Table 2 (Attachment B). Sampling locations and associated test kit identification numbers and relevant field observations are listed on Table 3 (Attachment B). The laboratory analytical results are included in Attachment C. Laboratory results and exposure data for the spike samples are also included in Attachment C.

The results of the radon test analysis indicated the following:

Radon Concentration	Room	Result
≥4.0 pCi/L	Media Center	5.0
<4.0 pCi/L	See Attachment B	

Quality Control Samples	
Results of Blank Canisters:	The office blanks, and lab transit blanks had test results of less than the laboratory detection limit of 0.3 pCi/L.
Adequate Laboratory Precision?	Review of the duplicate sample analysis indicates that adequate laboratory measurement precision was achieved.
Spike Sample Analysis:	The Spike Sample analysis results indicate the laboratory is operating within statistical control limits.

Our professional services have been performed in accordance with customary principles and practices in the field of industrial hygiene and engineering. If you have any questions or comments regarding this report, please feel free to contact me at (410) 891-1769.

Sincerely,



Tyler P. McCleaf  
Radon Measurement Provider  
#111004 RT  
KCI Technologies, Inc.

Attachments:      A- Floor Plan with Test Locations  
                          B- Table 1-3, Radon Test Summary Spreadsheets  
                          C- Laboratory Analytical Results

# ATTACHMENT A

## Floor Plan With Test Locations

# ATTACHMENT B

## Radon Test Summary Spreadsheet

**Table Notes:**

AC- Activated Charcoal

ACI- Air Check, Inc.

D- Duplicate

FB- Field Blank

KCI- KCI Technologies, Inc.

OB- Office Blank

PM- Project Manager

OC- Quality Control

Table 1- Radon Testing Results		
Cloverly ES		
Test Period: 03/08/2022 - 03/11/2022		
Kit Number	Room / Area	Result
11132238	1	< 0.3
11132257	2	0.6
11132283	2	< 0.3
11132245	3	0.7
11132260	3	0.8
11132265	4	0.5
11132255	5	0.9
11132240	6	1.2
11132237	7	0.5
11132266	8	0.7
11132274	9	0.8
11132282	10	< 0.3
11132273	11	0.5
11132262	12	< 0.3
11132268	13	0.7
11132225	15	0.6
11132235	15	< 0.3
11132224	16	0.7
11132234	16	0.7
11132236	17	< 0.3
11132229	18	0.6
11132217	19	0.8
11132218	20	< 0.3
11132259	21	1.9
11132258	22	3.4
11132232	23	2.5
11132230	24	2.2
11132254	25	1.4
11132253	26	< 0.3
11132214	30	2.1
11132243	31	1.9
11132227	34	2.2
11132226	35	1.7
11132222	36	0.6
11132228	38	< 0.3
11132246	121	0.8
11132247	122	1.0
11132251	125	1.7
11132244	123 ESOL	1.6
11132248	123 ESOL	1.3
11132256	124 OT/PT	1.2
11132220	37 ESOL	< 0.3

Table 1- Radon Testing Results		
Cloverly ES		
Test Period: 03/08/2022 - 03/11/2022		
Kit Number	Room / Area	Result
11132202	APR 45	1.0
11132203	APR 45	0.8
11132208	ASST PRINCIPAL	0.7
11132212	BS OFFICE	1.0
11132210	CONFERENCE	0.6
11132215	GYM	1.0
11132221	GYM	1.4
11132223	GYM OFFICE	2.2
11132231	GYM OFFICE	2.1
11132216	HEALTH	0.5
11132211	HEALTH OFFICE	< 0.3
11132201	KITCHEN OFFICE	0.7
11132219	MAIN OFFICE	0.6
11132249	MEDIA CENTER	5.0
11132252	MEDIA CENTER	3.5
11132242	MEDIA OFFICE	3.3
11132250	MEDIA OFFICE	3.4
11132233	MEDIA WORKROOM	< 0.3
11132241	MEDIA WORKROOM	3.7
11132261	MUSIC 14	< 0.3
11132239	MUSIC WORKROOM	< 0.3
11132267	MUSIC WORKROOM	< 0.3
11132207	PRINCIPAL	0.5
11132213	RESOURCE	2.6
11132206	STAFF LOUNGE	0.6
11132204	STAGE	0.8
11132209	STAGE	0.8
11132205	TRIAGE	0.6

Table 2- Radon Testing Results			
Cloverly ES			
Test Period: 03/08/2022 - 03/11/2022			
Kit Number	QC Type	Room / Area	Result
11132209	D	Stage	0.8
11132224	D	16	0.7
11132235	FB	15	< 0.3
11132231	D	Gym Office	2.1
11132242	D	Media Office	3.3
11132233	FB	Media Workroom	< 0.3
11132248	D	123 ESOL	1.3
11132260	D	3	0.8
11132283	FB	2	< 0.3
11132239	D	Music Workroom	< 0.3
11131663	OB	OFFICE BLANK	< 0.3
11131669	TB	TRAVEL BLANK	< 0.3



Summary of Missed Locations		
Cloverly ES		
Test Period: 03/08/22 - 03/11/22		
Kit Number	Room/Area	Result
	NA	

Summary of Missing, Compromised and >= 4 piC/L Tests		
Cloverly ES		
Test Period: 03/08/22 - 03/11/22		
Kit Number	Room/Area	Result
11132249	MEDIA CENTER	5.0

Table Note:  
 \* Missing or Compromised Sample

# ATTACHMENT C

## Laboratory Analytical Results

Radon test result report for:**CLOVERLY ES**

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11132238	1	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132282	10	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132273	11	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.5 ± 0.3	2022-03-14
11132262	12	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132246	121	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.8 ± 0.3	2022-03-14
11132247	122	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	1.0 ± 0.3	2022-03-14
11132244	123 ESOL	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	1.6 ± 0.3	2022-03-14
11132248	123 ESOL	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	1.3 ± 0.3	2022-03-14
11132256	124 OT/PT	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	1.2 ± 0.3	2022-03-14
11132251	125	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	1.7 ± 0.3	2022-03-14
11132268	13	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.7 ± 0.3	2022-03-14
11132225	15	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.6 ± 0.3	2022-03-14
11132235	15	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132224	16	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.7 ± 0.3	2022-03-14
11132234	16	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.7 ± 0.3	2022-03-14
11132236	17	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132229	18	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.6 ± 0.3	2022-03-14
11132217	19	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.8 ± 0.3	2022-03-14
11132257	2	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.6 ± 0.3	2022-03-14
11132283	2	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132218	20	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132259	21	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	1.9 ± 0.3	2022-03-14
11132258	22	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	3.4 ± 0.4	2022-03-14
11132232	23	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	2.5 ± 0.3	2022-03-14
11132230	24	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	2.2 ± 0.3	2022-03-14
11132254	25	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	1.4 ± 0.3	2022-03-14
11132253	26	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132260	3	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.8 ± 0.3	2022-03-14
11132245	3	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.7 ± 0.3	2022-03-14
11132214	30	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	2.1 ± 0.3	2022-03-14
11132243	31	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	1.9 ± 0.3	2022-03-14
11132227	34	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	2.2 ± 0.3	2022-03-14
11132226	35	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	1.7 ± 0.3	2022-03-14
11132222	36	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.6 ± 0.3	2022-03-14
11132220	37 ESOL	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132228	38	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132265	4	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.5 ± 0.3	2022-03-14

Radon test result report for:**CLOVERLY ES**

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11132255	5	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.9 ± 0.3	2022-03-14
11132240	6	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	1.2 ± 0.3	2022-03-14
11132237	7	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.5 ± 0.3	2022-03-14
11132266	8	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.7 ± 0.3	2022-03-14
11132274	9	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	0.8 ± 0.3	2022-03-14
11132202	APR 45	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	1.0 ± 0.3	2022-03-14
11132203	APR 45	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.8 ± 0.3	2022-03-14
11132208	ASST PRINCIPAL	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.7 ± 0.3	2022-03-14
11132212	BS OFFICE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	1.0 ± 0.3	2022-03-14
11132210	CONFERENCE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.6 ± 0.3	2022-03-14
11132221	GYM	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	1.4 ± 0.3	2022-03-14
11132215	GYM	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	1.0 ± 0.3	2022-03-14
11132231	GYM OFFICE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	2.1 ± 0.3	2022-03-14
11132223	GYM OFFICE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	2.2 ± 0.3	2022-03-14
11132216	HEALTH	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.5 ± 0.3	2022-03-14
11132211	HEALTH OFFICE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132201	KITCHEN OFFICE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.7 ± 0.3	2022-03-14
11132219	MAIN OFFICE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.6 ± 0.3	2022-03-14
11132252	MEDIA CENTER	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	3.5 ± 0.4	2022-03-14
11132249	MEDIA CENTER	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	5.0 ± 0.4	2022-03-14
11132242	MEDIA OFFICE	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	3.3 ± 0.3	2022-03-14
11132250	MEDIA OFFICE	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	3.4 ± 0.3	2022-03-14
11132241	MEDIA WORKROOM	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	3.7 ± 0.4	2022-03-14
11132233	MEDIA WORKROOM	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132261	MUSIC 14	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132239	MUSIC WORKROOM	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132267	MUSIC WORKROOM	2022-03-08 @ 9:00 am	2022-03-11 @ 8:00 am	< 0.3	2022-03-14
11132207	PRINCIPAL	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.5 ± 0.3	2022-03-14
11132213	RESOURCE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	2.6 ± 0.3	2022-03-14
11132206	STAFF LOUNGE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.6 ± 0.3	2022-03-14
11132209	STAGE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.8 ± 0.3	2022-03-14
11132204	STAGE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.8 ± 0.3	2022-03-14
11132205	TRIAGE	2022-03-08 @ 8:00 am	2022-03-11 @ 8:00 am	0.6 ± 0.3	2022-03-14

# EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KCI Technologies, Inc. Job Number 204620

NOMINAL Conditions: Radon Conc 27.0 pCi/L Rel. Hum 50.1 % Temp. 70.0 F

Date Start: 3/18/22 Date Stop: 3/21/22 Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: 0705 Time Stop: 0705 Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: (5) Char Bags - Device No.'s: \_\_\_\_\_

11139367, 11139368, 11139371, \_\_\_\_\_

11139710, 11139717 \_\_\_\_\_

E3 light

Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_ Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_ Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: \_\_\_\_\_ Device No.'s: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_ Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_ Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: \_\_\_\_\_ Device No.'s: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Note: All times are in 24-hour (military) notation, Eastern Standard Time (EST)  
Background = 7  $\mu$ R/h Elevation = 820 ft

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March 30, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:

MCPS - Spike Sample Lab Results. Measured values are satisfactory, i.e., within  $\pm 25\%$  of the chamber's reference value (25.7 pCi/L).

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11139367	SK1	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	25.9 $\pm$ 2.1	2022-03-30
11139368	SK2	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	23.9 $\pm$ 2.0	2022-03-30
11139371	SK3	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	25.7 $\pm$ 2.1	2022-03-30
11139710	SK4	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	26.4 $\pm$ 2.1	2022-03-30
11139717	SK5	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	24.6 $\pm$ 2.0	2022-03-30

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Air Chek 1936 Butler Bridge Rd, Mills River, NC 28759-3892 Phone: (828) 684-0893 Fax: (828) 684-8498



## Radon Test Kit Chain of Custody

Project Name: MCPS Radon – March 2022 Schools

Name of Schools:

1. Fairland Center
2. Cloverly ES
3. Drew, Dr. Charles ES
4. Weller Road ES
5. Wheaton HS
6. East Silver Spring ES
7. Rosemary Hills ES

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	Date	Initials
Radon Test Kits Deployed	03/08/2022	BMM
Radon Test Kits Collected	03/11/2022	BMM
Radon Test Kits Shipped to Lab*	03/11/2022	BMM
Radon Test Kits Received by Lab*	03/13/2022	BMM

\*All samples sent to Air Check, Inc., 1936 Butler Bridge Rd, Mills River, NC 28759