# **RADON INVESTIGATION REPORT**

CENTRAL BOULEVARD
ELEMENTARY SCHOOL
60 CENTRAL BOULEVARD
BETHPAGE, NEW YORK 11714

PREPARED FOR:
BETHPAGE UNION FREE SCHOOL DISTRICT
10 CHERRY AVENUE
BETHPAGE, NEW YORK 11714

JCB PROJECT #: 19-42645 May 2019

J.C. BRODERICK & ASSOCIATES, INC. Environmental Consulting & Testing

1775 Expressway Drive North Hauppauge, New York 11788 631-584-5492 Fax: 631-584-3395



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## Section No. 1.0: Introduction

J.C. Broderick and Associates (JCB) was retained by the Bethpage Union Free School District (Bethpage) to perform an indoor air survey for radon gas as a result of identifying radium in the local groundwater by the Bethpage Water District and by JCB during our annual groundwater investigation at the Bethpage High School and Central Boulevard Elementary School.

### Section No. 2.0: Site Description and Location

The Subject Site is located at 60 Central Boulevard, Bethpage, New York 11714, at the western terminus of Central Boulevard. According to the United States Geological Survey (USGS) *Amityville, New York, 2016* 7.5 Minute Series Topographical Map, the Subject Site is situated at an approximate elevation of 98 feet (ft.) above mean sea level. The location of the Subject Site is shown on the Site Location Map, Appendix-A Figure-1.

# Section No. 3.0: Previous Radon Screening Sampling and Analysis

The detection of Radium 226 and 228 during annual testing of the groundwater at Bethpage High School prompted the sampling and analysis of the groundwater for Radium at the Central Boulevard Elementary School. In August 2017, JCB installed three (3) groundwater monitoring wells at the Central Boulevard Elementary School campus. During this investigation Radium was detected in the groundwater, as a result the building was tested for Radon. The laboratory analysis results from the Radon screening revealed concentrations of Radon exceeding 4.0 pCi/L; however, only in not frequently occupied rooms and spaces.

As a result of these findings in August 2017 an isolation barrier was installed over the sand floor of the crawl spaces throughout the school building. After the installation of the isolation barrier, JCB performed follow-up testing at the same sampling locations. The laboratory analysis results from the Radon in Air samples submitted indicated radon levels below 4.0 pCi/L at all sampling locations tested.

#### Section No. 4.0: Radon Sampling and Analysis

The United States Environmental Protection Agency (EPA) <u>Radon Measurement in Schools Revised Edition</u> (EPA 402-R-92-014), dated July 1993 guidance document recommends that a Radon assessment should be performed under closed conditions during the heating season. JCB coordinated with the school district to conduct the sampling during the winter recess.

On February 15, 2019, JCB set up short-term Radon in Air test kits in six (6) basement storage rooms and spaces and eight (8) crawl spaces within the basement of the elementary school building that were in contact with the ground. The sampling devices were collected on February 19, 2018 after at least three days of exposure.

The following table summarizes the Radon samples submitted for laboratory analysis:

Table No. 1: Summary of Radon Samples Submitted for Laboratory Analysis							
Sample ID#	Sample Start Date	Sample End Date	Description of Sample	Analysis Method			
Basement/Crawlspace							
Rm 0004	02/15/19	02/19/19	Basement Storage Room	Radon in Air			
Rm 0005	02/15/19	02/19/19	Basement Storage Room	Radon in Air			
Hall 0011	02/15/19	02/19/19	Basement Hallway	Radon in Air			
Rm 0006	02/15/19	02/19/19	Basement Storage Room	Radon in Air			
Rm 0006 Dup	02/15/19	02/19/19	Basement Storage Room	Radon in Air			
Rm 0007	02/15/19	02/19/19	Basement Storage Room	Radon in Air			
Crawl 0003	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0003 Blank	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0002	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0002 Dup	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0002A	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0002B	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0008	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0009	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0010	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0010 Dup	02/15/19	02/19/19	Crawl Space	Radon in Air			
Crawl 0010A	02/15/19	02/19/19	Crawl Space	Radon in Air			
Hall 0011A	02/15/19	02/19/19	Basement Hallway	Radon in Air			
Hall 0011A Blank	02/15/19	02/19/19	Basement Hallway	Radon in Air			

#### **Notes:**

 $\overline{Rm} = Room$ 

Crawl = Crawl Space

Dup = Duplicate Sample

Blank = Field Blank

## Section No. 5.0: Radon Laboratory Analytical Summary

The short-term Radon in Air sampling was performed utilizing laboratory supplied test kits, assigned individual identification numbers and were secured. Chain of Custody documents were prepared, and the samples were then delivered to an independent New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory for analysis of Radon in Air.

EMSL Analytical Inc. (EMSL) of Cinnaminson, New Jersey provided laboratory analytical services. Copies of EMSL's NYSDOH certifications are available upon request.

The laboratory analytical results for the Radon in Air samples were reviewed and compared to the United States Environmental Protection Agency (EPA) recommended action level of 4.0 pCi/L as reported in *Radon Measurement in Schools Revised Edition* (EPA 402-R-92-014), dated July 1993.

The following table summarizes the Radon Analytical Results:

Table No. 2: Summary of Radon Samples Analysis Results - February 19, 2019							
Sample ID#	Box Number	Sample Device Number	Radon Activity pCi/L				
Rm 0004	188516	327027	1.3				
Rm 0005	188517	327032	1.3				
Hall 0011	188524	327156	1.4				
Rm 0006	188518	327074	1.1				
Rm 0006 Dup	188518	327089	1.1				
Rm 0007	188519	327062	1.3				
Crawl 0003	188515	327154	NT				
Crawl 0003 Blank	188515	327145	0.1				
Crawl 0002	188512	327101	2.3				
Crawl 0002 Dup	188512	327148	2.1				
Crawl 0002A	188513	327011	2				
Crawl 0002B	188514	327102	1.9				
Crawl 0008	188520	327114	0.7				
Crawl 0009	188521	327141	1.7				
Crawl 0010	188522	327100	1.3				
Crawl 0010 Dup	188522	327035	1.7				
Crawl 0010A	188523	327146	1.3				
Hall 0011A	188525	327131	1.7				
Hall 0011A Blank	188525	327026	0				

Rm = Room

Crawl = Crawl Space

NT = Not Tested, Sample Compromised

Dup = Duplicate Sample

Blank = Field Blank

The laboratory analysis results from the Radon in Air samples and duplicates submitted did not reveal any elevated concentrations of Radon exceeding 4.0 pCi/L, the referenced guidance value established by the EPA.

## Section No. 6.0: Quality Assurance and Quality Control (QA/QC) Procedures

To ensure that measurement results are reliable, JCB performed unexposed control detectors (blanks) side-by-side with the sampling device at each sampling location.

The field sampling team-maintained Radon sampling chain of custody records used to track samples from sampling point to analysis which summarized the following:

- > Sample identification;
- Test Kit ID number;
- > Device ID number;
- > Sampling beginning date and time;
- > Sampling ending date and time;
- > Temperature, °F;
- ➤ Humidity, %;

### **Section No. 7.0: Recommendations**

Based upon the sampling results reported, the USEPA decision matrix does not recommend any additional mitigation for Radon.

Due to the detection of Radium 226 and 228 in the local groundwater, JCB does recommend that continued monitoring for Radon in Air within the school building be performed to confirm the effectiveness of the installed isolation barrier.

Sincerely,

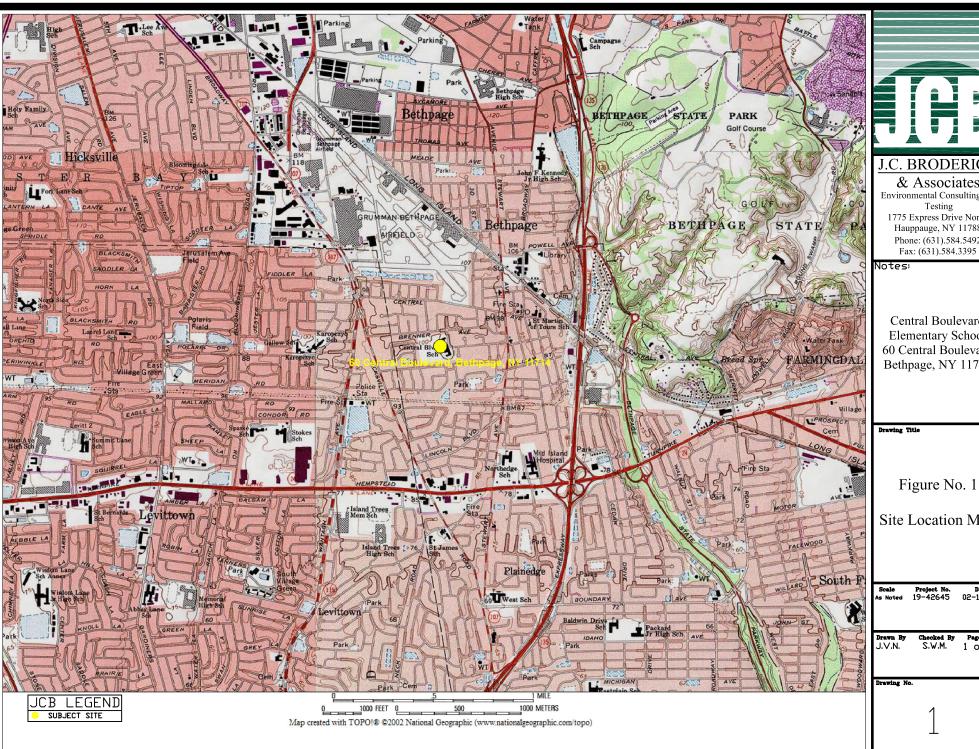
J.C. Broderick & Associates, Inc.

Jeffrey V. Nannini Environmental Scientist

Otoum.le

Steven Muller, P.G. Project Manager

# Appendix A Figures





#### J.C. BRODERICK

#### & Associates

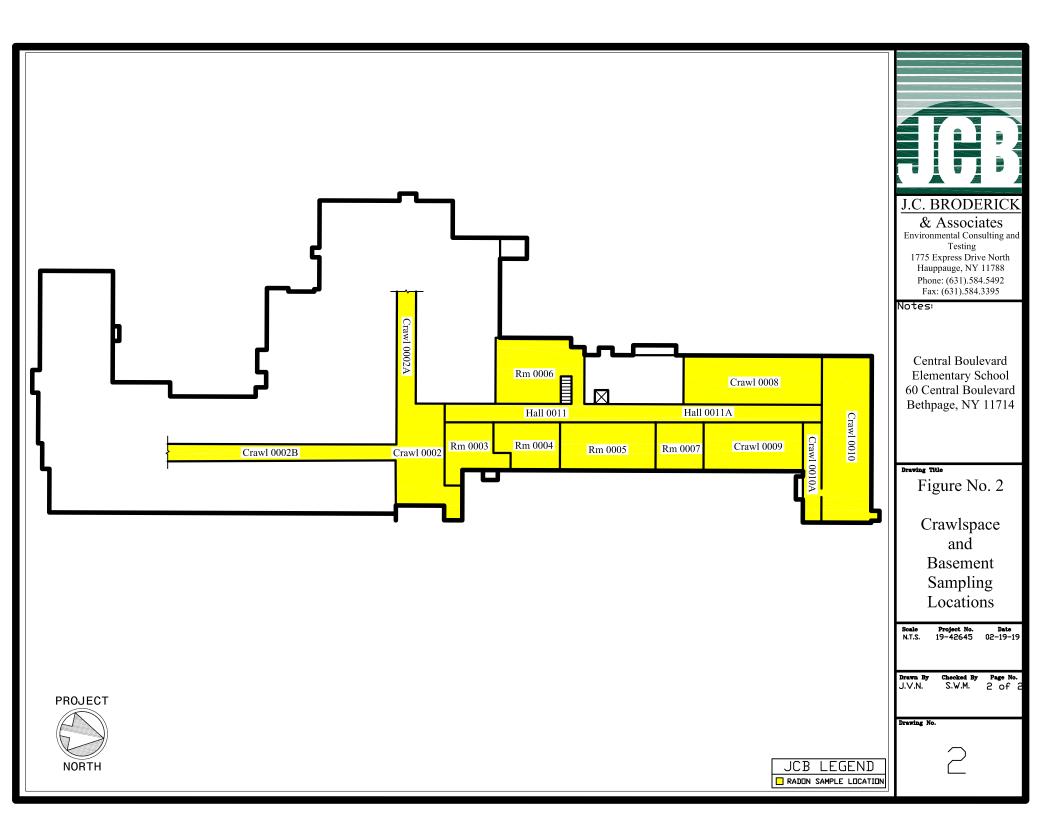
Environmental Consulting and Testing

1775 Express Drive North Hauppauge, NY 11788 Phone: (631).584.5492 Fax: (631).584.3395

Central Boulevard Elementary School 60 Central Boulevard Bethpage, NY 11714

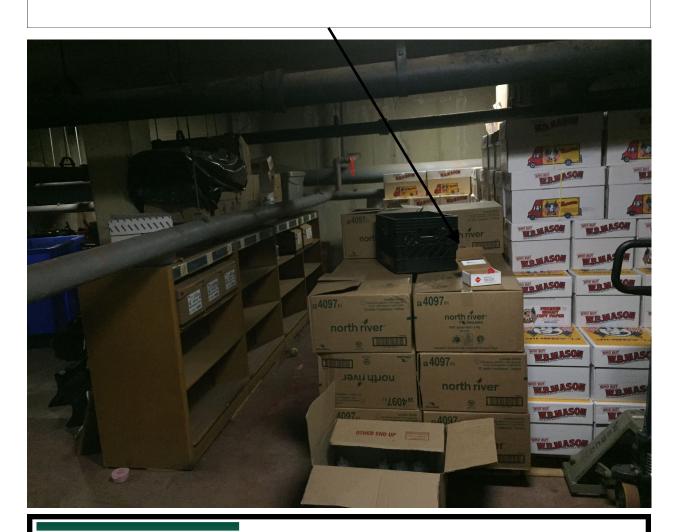
Site Location Map

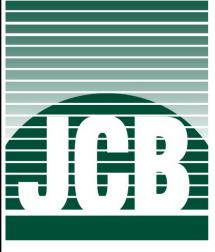
Date 02-19-19



# Appendix B Field Photograph Logs

# **Radon Sampling Location Within Storage Room in Basement**





# Field Photograph Log

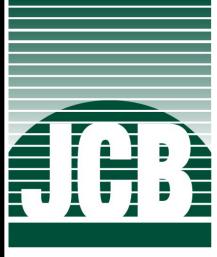
**Radon Investigation Report** 

Central Boulevard Elementary School 60 Central Boulevard Bethpage, New York 11714

Photo No. 01

# **Radon Sampling Location Within Hallway in Basement**





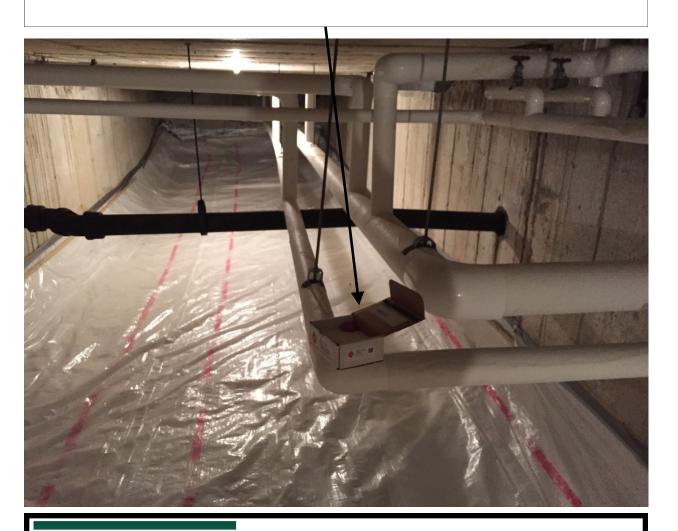
# Field Photograph Log

**Radon Investigation Report** 

Central Boulevard Elementary School 60 Central Boulevard Bethpage, New York 11714

Photo No. 02

# **Radon Sampling Location Within Crawlspace**





# Field Photograph Log

**Radon Investigation Report** 

Central Boulevard Elementary School 60 Central Boulevard Bethpage, New York 11714

Photo No. 03

# **Radon Sampling Location Within Basement Office**





# Field Photograph Log

**Radon Investigation Report** 

Central Boulevard Elementary School 60 Central Boulevard Bethpage, New York 11714

Photo No. 04

# **Appendix C Laboratory Analysis Reports**



200 Route 130 North, Cinnaminson, NJ 08077 Phone/Fax: (800) 220-3675 / (856) 786-0327

http://www.EMSL.com cinnaminsonradonlab@emsl.com EMSL Order: 381901783 CustomerID: JCBR50 CustomerPO:

19-42654

ProjectID:

Attn: Steven Muller J.C. Broderick & Associates 1775 Expressway Drive North, Suite 1 Hauppauge, NY 11788

Phone: (631) 584-5492

Fax:

02/21/19 3:15 PM Received: Analysis Date: 2/22/2019

Collected: 2/15/2019

Project: Central Blvd ES

Central Blvd ES Test Site:

60 Central Blvd. Bethpage, NY 11714

# Test Report: Radon in Air Test Results

	16	est Report: F	kadon in Ai	r Test Res	uits		
Samples for EMSL Kit	188512	Dadas Astistus		<del>-</del>		Humidity	
Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	emperature F	%	Sample Type
327101	Crawl 0002	2.3	2/15/2019	2/19/2019	76	20	Customer
381901783-0001			6:35:00 PM	8:50:00 AM			
Sample Notes:							
327148	Crawl 0002	2.1	2/15/2019	2/19/2019	76	20	Duplicate
381901783-0002			6:35:00 PM	8:50:00 AM			
Sample Notes:							
				D	uplicate RPD	= 9.1%	
Samples for EMSL Kit	188513						
Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	T Stop	emperature F	Humidity %	Sample Type
327011	Crawl 0002A	2	2/15/2019	2/19/2019	78	20	Customer
381901783-0003			6:36:00 PM	8:51:00 AM			
Sample Notes:							
Complete for EMCL Vit	400544						
Samples for EMSL Kit	100014	Radon Activity		Т	emperature	Humidity	
Liquid Scintillation ID	Location	pCi/L	Start	Stop	F	%	Sample Type
327102	Crawl 0002B	1.9	2/15/2019	2/19/2019	76	30	Customer
381901783-0004			6:37:00 PM	8:52:00 AM			
Sample Notes:							
Samples for EMSL Kit	188515						
Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	T Stop	emperature F	Humidity %	Sample Type
327154	Crawl 0003		2/15/2019	2/19/2019	76	30	Customer
381901783-0005			6:41:00 PM	8:55:00 AM			
Sample Notes: Not Ana Receive	llyzed d open; unable to analyze.						
327145	Crawl 0003 Blank	0.1	2/15/2019	2/19/2019	0	0	Blank
381901783-0006			6:41:00 PM	8:55:00 AM			
Sample Notes:							



200 Route 130 North, Cinnaminson, NJ 08077 Phone/Fax: (800) 220-3675 / (856) 786-0327

http://www.EMSL.com cinnaminsonradonlab@emsl.com EMSL Order: 381901783 CustomerID: CustomerPO:

JCBR50 19-42654

ProjectID:

Attn: Steven Muller J.C. Broderick & Associates 1775 Expressway Drive North, Suite 1 Hauppauge, NY 11788

Phone: (631) 584-5492

Fax:

Received: 02/21/19 3:15 PM Analysis Date: 2/22/2019 Collected: 2/15/2019

Project: Central Blvd ES

Central Blvd ES Test Site:

60 Central Blvd. Bethpage, NY 11714

# **Test Report: Radon in Air Test Results**

		rest report.	tuuoii iii Ai	1 10311103	uito		
Samples for EMSL Kit	188516	Dadan Astiritus		-		Humidity	
Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	emperature F	%	Sample Type
327027	Rm 0004	1.3	2/15/2019	2/19/2019	70	20	Customer
381901783-0007			6:43:00 PM	9:07:00 AM			
Sample Notes:							
Samples for EMSL Kit	188517						
Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	emperature F	Humidity %	Sample Type
327032	Rm 0005	1.3	2/15/2019	2/19/2019	72	20	Customer
381901783-0008			6:45:00 PM	8:56:00 AM			
Sample Notes:							
Samples for EMSL Kit	188518						
Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	T Stop	emperature F	Humidity %	Sample Type
327074	Rm 0006	1.1	2/15/2019	2/19/2019	76	20	Customer
381901783-0009			6:46:00 PM	8:57:00 AM			
Sample Notes:							
327089	Rm 0006 Dup	1.1	2/15/2019	2/19/2019	76	20	Duplicate
381901783-0010			6:46:00 PM	8:57:00 AM			
Sample Notes:							
				D	uplicate RPD	) = 0%	
Samples for EMSL Kit	188519	<b>D</b> 1 <b>A</b> 2 5		_	. ,	Humidity	
Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	emperature F	%	Sample Type
327062	Rm 0007	1.3	2/15/2019	2/19/2019	72	20	Customer
381901783-0011			6:47:00 PM	8:58:00 AM			
Sample Notes:							
Complete Ser ENGL 100	400500						
Samples for EMSL Kit	188520	Radon Activity		Т	emperature	Humidity	
Liquid Scintillation ID	Location	pCi/L	Start	Stop	F	%	Sample Type
327114	Crawl 0008	0.7	2/15/2019	2/19/2019	66	20	Customer
381901783-0012			6:51:00 PM	9:02:00 AM			
Sample Notes:							



200 Route 130 North, Cinnaminson, NJ 08077 Phone/Fax: (800) 220-3675 / (856) 786-0327

http://www.EMSL.com cinnaminsonradonlab@emsl.com EMSL Order: 381901783 CustomerID: JCBR50 CustomerPO: 19-42654

ProjectID:

Attn: Steven Muller J.C. Broderick & Associates 1775 Expressway Drive North, Suite 1 Hauppauge, NY 11788

Phone: (631) 584-5492

Fax:

Received: 02/21/19 3:15 PM Analysis Date: 2/22/2019 Collected: 2/15/2019

Project: Central Blvd ES

Central Blvd ES Test Site:

60 Central Blvd. Bethpage, NY 11714

# **Test Report: Radon in Air Test Results**

Samples for EMSL Kit	188521						
•		Radon Activity			Temperature	Humidity	
Liquid Scintillation ID	Location	pCi/L	Start	Stop	F	%	Sample Type
327141	Crawl 0009	1 7	2/15/2019	2/19/2019	70	20	Customer

381901783-0013 6:49:00 PM 9:05:00 AM Sample Notes:

Samples for EMSL Kit 188522		Radon Activity		Te	mperature	Humidity	
Liquid Scintillation ID	Location	pCi/L	Start	Stop	F	%	Sample Type
327100	Crawl 0010	1.3	2/15/2019	2/19/2019	64	30	Customer
381901783-0014			6:50:00 PM	9:03:00 AM			
Sample Notes:							
327035	Crawl 0010	1.7	2/15/2019	2/19/2019	64	30	Duplicate
381901783-0015			6:52:00 PM	9:03:00 AM			

Sample Notes:

		Duplicate RPD = 26.7%					
Samples for EMSL Kit 188523					_	11	
Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
327146	Crawl 0010A	1.3	2/15/2019	2/19/2019	64	20	Customer
381901783-0016			6:59:00 PM	9:04:00 AM	1		
Sample Notes:							

	Radon Activity		Te	mperature	Humidity	
Location	pCi/L	Start	Stop	F	%	Sample Type
Hall 0011	1.4	2/15/2019	2/19/2019	76	20	Customer
		7:01:00 PM	8:54:00 AM			
•		11 11 0044	Hall 0011 1.4 2/15/2019	Hall 0011 1.4 2/15/2019 2/19/2019	Hall 0011 1.4 2/15/2019 2/19/2019 76	Hall 0011 1.4 2/15/2019 2/19/2019 76 20



**200 Route 130 North, Cinnaminson, NJ 08077** Phone/Fax: (800) 220-3675 / (856) 786-0327

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

 EMSL Order:
 381901783

 CustomerID:
 JCBR50

 CustomerPO:
 19-42654

ProjectID:

Attn: Steven Muller
J.C. Broderick & Associates
1775 Expressway Drive North, Suite 1
Hauppauge, NY 11788

Fax:

Phone:

(631) 584-5492

Received: 02/21/19 3:15 PM
Analysis Date: 2/22/2019
Collected: 2/15/2019

Project: Central Blvd ES

Test Site: Central Blvd ES

60 Central Blvd. Bethpage, NY 11714

# **Test Report: Radon in Air Test Results**

#### Samples for EMSL Kit 188525

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
327131	Hall 0011A	1.7	2/15/2019	2/19/2019	70	20	Customer
381901783-0018			7:03:00 PM	9:00:00 AM			
Sample Notes:							
327026	Hall 0011A	0	2/15/2019	2/19/2019	0	0	Blank
381901783-0019			7:03:00 PM	9:00:00 AM			
Sample Notes:							

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)	Lama France Public Mrs
Drew Bush (18)	

Laura Freeman, 10872 & Michael Menz, CIF

In no event shall EMSL be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages, arising out of or in connection with EMSL's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. In no event shall EMSL be liable to a client or any third party, whether based upon theories of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereunder. The test results meets all NELAC requirements unless otherwise specified

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ Accreditations: NRSB ARL6006, NJ DEP 03036, MEB 92525, PA 2573, IN 00455, IA L00032, ME 20200C, NE RMB-1083, NY ELAP 10872, NM 885-10L, FL RB2034, OH RL-39, NRPP #109000AL, KS-LB-0005, IL RNL2008202.

Initial report from 02/27/2019 13:33:12

Please visit www.radontestinglab.com



# CHAIN OF CUSTODY RADON LABORATORY SERVICES (COMMERCIAL USE)

EMSL ANALYTICAL, INC. 200 ROUTE 130 NORTH CINNAMINSON, NJ 08077

PHONE: 800-220-3675

5

EUSL Job#

Fax: 856-786-0327

Company Information	Project / Property Information:
Company Name: JCBKODEXUCK & ASSOC	Name: CENTRAL BLVD ES =
EMSL Account #: JCB \$250 30000	Address: 60 CENTRAL BLUD?
Contact: STEVEN MULLON	City: BETHPASE
Address: 1775 EXPRESSURY DN. A	Municipality: County: Ne-25AU
City: Hauppaugis	State: NEW YORK Zip Code: 1714
State: Ny Zip Code: 1) 788	PO#/Project#: 19-42654  Please check box if this is a Post Mitigation Test
Phone: 631-584-5492	Technician Name: STEVEN MULLER
Fax: 631-584-5895	Technician Certification #:
Email: Smulen e Scorodouck. com	Technician Signature:

#### Disclaimer

In no event shall EMSL be liable for indirect, special, consequential, or incidental damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages arising out of or in connection with EMSL's services there under or the delivery, use, reliance upon or interpretation of test results by client or third party. We accept no legal responsibility for the purposes for which the client uses the test results. In no event shall EMSL be liable to a client or any third party, whether based upon theories of tort contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereafter.

		Device Number	Location	Exposure Period Beginning Date and Time	Exposure Period Ending Date and Time	Temperature,	Humidity, %
ļ	,		CRAWL 0002	2/15/19 1835	2/19/19 850	76	20
	188512/	327148	Chawl a ool Dup	2/15/19 1835	2/19/19 850	76	20
	188513	3270(1	CKAMIOOOSA	2/15/19 1836	2/19/19 851	78	20
ļ	188514 1	327102	CROUL OOG ZB	2/15/19 1837	2/19/19852	76	34
	188515	827154)	CROWL 0003	2/15/19 1841	2/19/19855	76	30
Je No			CRAUL 0003 BLANK				
	88516	327027		2/15/19 1843	2/19/19 907	70	20
19	885171	327032	Rm 0005	2/15/19 1845	2/19/19 8056	72	≅2a <sub>2</sub>
	188518/	327074	Rm 0006	2/15/19 1846	2/19/19 55	76	720
	885181	327089	Rm ouse oup	2/15/19 1846	2/19/19 857	76	828 828
1	<del></del> /		Rm 0007	2/15/19/1847	2/19/19 858	72	24 55
l	1885200	327114	CHANC 0008	2/15/19/1851	2/19/19 902	65	Za ==

Relinquished By:

Received By:

Page 1 of 2 www.emsl.com OrderID: 381901783



# **CHAIN OF CUSTODY** RADON LABORATORY SERVICES

(COMMERCIAL USE)

EMSL ANALYTICAL, INC. 200 ROUTE 130 NORTH CINNAMINSON, NJ 08077

PHONE: 800-220-3675 Fax: 856-786-0327

EMSL Job #: 301783

Box	Device	Location	Exposure Period Beginning Date	Exposure Period Ending Date	Temperature,	Humidity,
Number	Number	LOCALION	and Time	and Time	°F	% 
1885211	1327 141	CROWL	2/15/19 1849	2/19/19 905	70	200
188522	327100	CRAUL	2/15/19 1853	2/19/19 903	64	30
188522/	327035	CRAWL 2010 DUP	2/10/19 1850	2/19/19 903	64	30
188523	1327146	CRAUL	2/15/10/1859	2/19/19 904	64	20
	327157	Harrooll	2/15/19/1901	2/19/19 854	70	وی
188525	327131	HALL DOLLA	2/15/19 1903	2/19/19 900	70	Zo
188525	32709 gnk	HALL OSHA BLANK			<u>.</u>	
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