

Appendix D

Noise Analysis Supportive Files

Appendix D-1

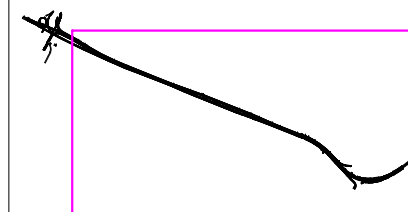
Noise Prediction Roadway Network Figure



LEGEND

 Noise Modeling Roadway Link

KEY MAP



Date April 11, 2023

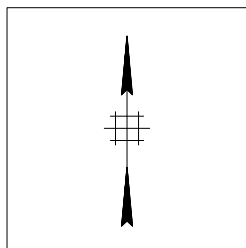
New Jersey Turnpike Authority

Newark Bay Hudson County
Extension

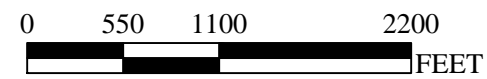
Figure D-1

Noise Modeling Roadway Network

Drawn by: M. Amabile Checked by: S.P. Carpenter
Paul Carpenter Associates, Inc.

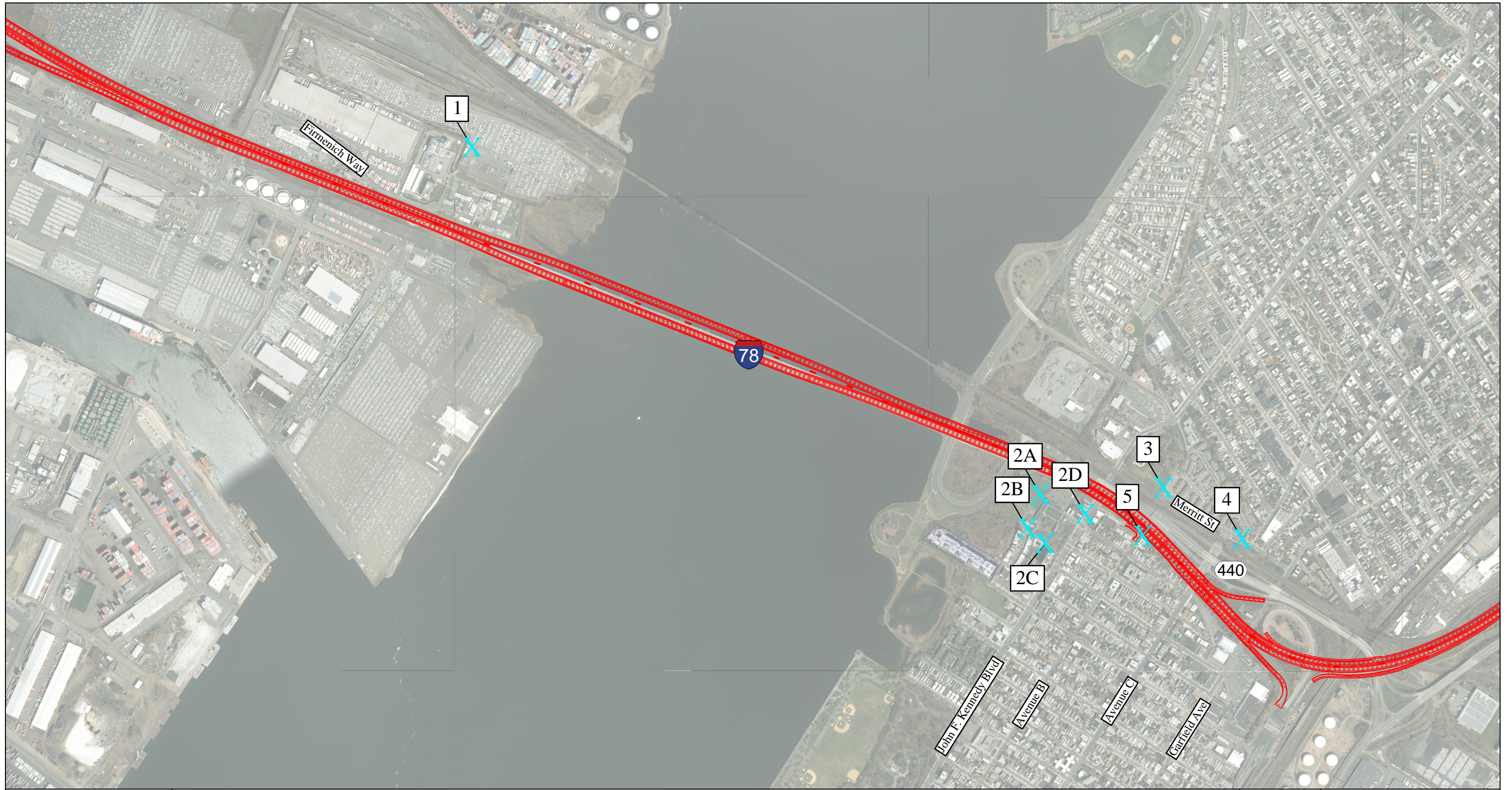


PROJECT NORTH



Appendix D-2

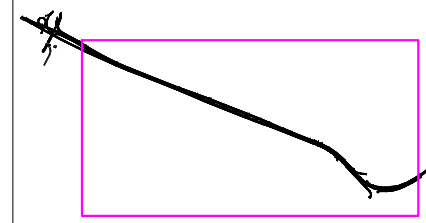
Noise Measurement Locations Figure



LEGEND

- X Noise Measurement Location
- # Noise Measurement Location Number
- Proposed Improvements

KEY MAP



Date April 11, 2023

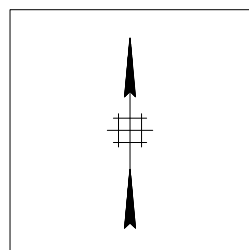
New Jersey Turnpike Authority

Newark Bay Hudson County
Extension

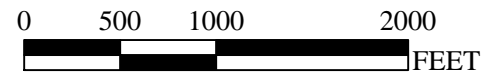
Figure D-2

Noise Measurement Locations

Drawn by: M. Amabile Checked by: S.P. Carpenter
Paul Carpenter Associates, Inc.



PROJECT NORTH



Appendix D-3

Noise Measurement Photo Log & Equipment Calibration Certificates

**NJTA Newark Bay - OPS T3820 NB-HCE
Hudson County Extension Improvements - Project Area 1
Noise Measurement Photos**



Site # 1: Behind 150 Firmenich Way - View Facing South

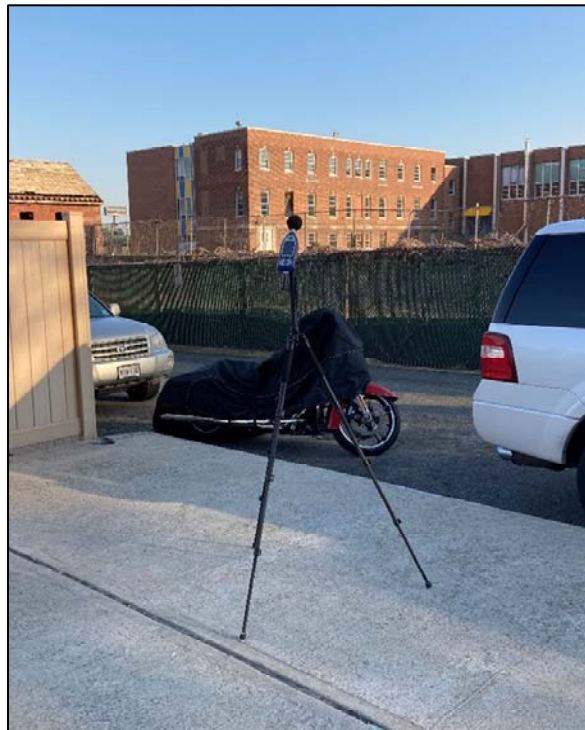


Site # 2A: Marist High School - View Facing North

**NJTA Newark Bay - OPS T3820 NB-HCE
Hudson County Extension Improvements - Project Area 1
Noise Measurement Photos (Cont.)**



Site # 2B: 35 Sunset Drive - View Facing Northwest



Site # 2C: Bayonne Tower Pool - View Facing Northwest

**NJTA Newark Bay - OPS T3820 NB-HCE
Hudson County Extension Improvements - Project Area 1
Noise Measurement Photos (Cont.)**



Site # 2D: 1261 JFK Boulevard - View Facing North



Site # 3: Mercer Park - View Facing South

**NJTA Newark Bay - OPS T3820 NB-HCE
Hudson County Extension Improvements - Project Area 1
Noise Measurement Photos (Cont.)**



Site # 4: 114 Merritt Street - View Facing East

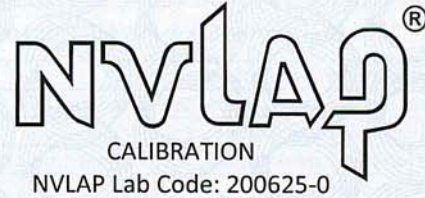


Site # 5: W 58th Street - View Facing South

Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCCL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)



Calibration Certificate No.46146

Instrument: Acoustical Calibrator
Model: CAL200
Manufacturer: Larson Davis
Serial number: 11291
Class (IEC 60942): 1
Barometer type:
Barometer s/n:
Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21 / 973-833-9221

Date Calibrated: 3/10/2021 **Cal Due:** 3/10/2022
Status:

Received	Sent
X	X

In tolerance:

X	X
---	---

Out of tolerance:

--	--

See comments:

--	--

Contains non-accredited tests: ___ Yes X No

Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
140-Norsonic	Real Time Analyzer	1403978	Mar 20, 2020	Scantek, Inc. / NVLAP	Mar 20, 2021
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4192-Brüel&Kjær	Microphone	2854675	Jan 15, 2021	Scantek, Inc. / NVLAP	Jan 15, 2022
1203-Norsonic	Preamplifier	21270	Jan 15, 2021	Scantek, Inc./ NVLAP	Jan 15, 2022

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/10/2021	Date	3/12/2021

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.
This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.
Document stored as: Y:\Calibration Lab\Cal 2021\LDL200_11291_M1.doc Page 1 of 2

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² The tests marked with (*) are not covered by the current NVLAP accreditation.

Main measured parameters ³:

Measured ⁴ /Acceptable ⁵ Tone frequency (Hz):	Measured ⁴ /Acceptable ⁵ Total Harmonic Distortion (%):	Measured ⁴ /Acceptable Level ⁵ (dB):
1000.16 ± 1.0/1000.0 ± 10.0	0.37 ± 0.10/ < 3	93.94 ± 0.12/94.0 ± 0.4
1000.17 ± 1.0/1000.0 ± 10.0	0.46 ± 0.10/ < 3	113.93 ± 0.12/114.0 ± 0.4

³ The stated level is valid at measurement conditions.

⁴ The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

⁵ Acceptable parameters values are from the current standards

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.1 ± 0.0	101.06 ± 0.000	43.1 ± 0.0

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:
Other:

Adjustments: Unit was not adjusted.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.

Compliance with any standard cannot be claimed based solely on the periodic tests.

Measured Data: in Acoustical Calibrator Test Report # 46146 of two pages.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCCL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)



Calibration Certificate No.46147

Instrument: Acoustical Calibrator **Date Calibrated:** 3/10/2021 **Cal Due:** 3/10/2022
Model: CAL200 **Status:**

Received	Sent
X	X

Manufacturer: Larson Davis **In tolerance:**

X	X
---	---

Serial number: 11811 **Out of tolerance:**

--	--

Class (IEC 60942): 1 **See comments:**

--	--

Barometer type: **Contains non-accredited tests:** Yes No
Barometer s/n:
Customer: Paul Carpenter Associates, Inc. **Address:** 7 Columbia Turnpike, Suite 101,
Tel/Fax: 973-822-8221 x21 / 973-833-9221 **Florham Park, NJ 07932**

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
140-Norsonic	Real Time Analyzer	1403978	Mar 20, 2020	Scantek, Inc. / NVLAP	Mar 20, 2021
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4192-Brüel&Kjær	Microphone	2854675	Jan 15, 2021	Scantek, Inc. / NVLAP	Jan 15, 2022
1203-Norsonic	Preamplifier	21270	Jan 15, 2021	Scantek, Inc./ NVLAP	Jan 15, 2022

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/10/2021	Date	3/12/2021

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Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² The tests marked with (*) are not covered by the current NVLAP accreditation.

Main measured parameters ³:

Measured ⁴ /Acceptable ⁵ Tone frequency (Hz):	Measured ⁴ /Acceptable ⁵ Total Harmonic Distortion (%):	Measured ⁴ /Acceptable Level ⁵ (dB):
1000.21 ± 1.0/1000.0 ± 10.0	0.23 ± 0.10/ < 3	93.90 ± 0.12/94.0 ± 0.4
1000.20 ± 1.0/1000.0 ± 10.0	0.33 ± 0.10/ < 3	113.90 ± 0.12/114.0 ± 0.4

³ The stated level is valid at measurement conditions.

⁴ The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

⁵ Acceptable parameters values are from the current standards

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.1 ± 0.0	101.06 ± 0.000	43.1 ± 0.0

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:
Other:

Adjustments: Unit was not adjusted.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.

Compliance with any standard cannot be claimed based solely on the periodic tests.

Measured Data: in Acoustical Calibrator Test Report # 46147 of two pages.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCCL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP[®]

CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.46652

Instrument:	Acoustical Calibrator	Date Calibrated:	7/9/2021	Cal Due:	7/9/2022				
Model:	CAL200	Status:	<table border="1"><tr><td>Received</td><td>Sent</td></tr><tr><td>X</td><td>X</td></tr></table>	Received	Sent	X	X		
Received	Sent								
X	X								
Manufacturer:	Larson Davis	In tolerance:							
Serial number:	12145	Out of tolerance:							
Class (IEC 60942):	1	See comments:							
Barometer type:		Contains non-accredited tests:	<u> </u> Yes <u> </u> No						
Barometer s/n:									
Customer:	Paul Carpenter Associates, Inc.	Address:	7 Columbia Turnpike, Suite 101, Florham Park, NJ 07932						
Tel/Fax:	973-822-8221 x21 / 973-833-9221								

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31052	Oct 31, 2020	Scantek, Inc./ NVLAP	Oct 31, 2021
DS-360-SRS	Function Generator	33584	Oct 23, 2019	ACR Env./ A2LA	Oct 23, 2021
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Feb 4, 2021	ACR Env. / A2LA	Feb 4, 2022
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2020	ACR Env./ A2LA	Dec 7, 2021
140-Norsonic	Real Time Analyzer	1406423	Nov 3, 2020	Scantek / NVLAP	Nov 3, 2021
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Oct 26, 2020	Scantek, Inc. / NVLAP	Oct 26, 2021
1203-Norsonic	Preamplifier	14059	March 3, 2021	Scantek, Inc./ NVLAP	March 3, 2022

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Lydon Dawkins	Authorized signatory:	William Gallagher
Signature	<i>Lydon Dawkins</i>	Signature	<i>William Gallagher</i>
Date	7/9/2021	Date	7/12/2021

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Page 1 of 2

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² The tests marked with (*) are not covered by the current NVLAP accreditation.

Main measured parameters ³:

Measured ⁴ /Acceptable ⁵ Tone frequency (Hz):	Measured ⁴ /Acceptable ⁵ Total Harmonic Distortion (%):	Measured ⁴ /Acceptable Level ⁵ (dB):
1000.01 ± 1.0/1000.0 ± 10.0	0.24 ± 0.10/ < 3	93.97 ± 0.12/94.0 ± 0.4
1000.01 ± 1.0/1000.0 ± 10.0	0.33 ± 0.10/ < 3	113.95 ± 0.12/114.0 ± 0.4

³ The stated level is valid at measurement conditions.

⁴ The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

⁵ Acceptable parameters values are from the current standards

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.7 ± 1.2	99.59 ± 0.000	49.5 ± 2.2

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:
Other:

Adjustments: Unit was not adjusted.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.

Compliance with any standard cannot be claimed based solely on the periodic tests.

Measured Data: in Acoustical Calibrator Test Report # 46652 of two pages.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)



Calibration Certificate No.46145

Instrument: Acoustical Calibrator
Model: CAL200
Manufacturer: Larson Davis
Serial number: 7100
Class (IEC 60942): 1
Barometer type:
Barometer s/n:
Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21 / 973-833-9221

Date Calibrated: 3/10/2021 **Cal Due:** 3/10/2022
Status:

Received	Sent
X	X

In tolerance: X
Out of tolerance:
See comments:
Contains non-accredited tests: Yes No

Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
140-Norsonic	Real Time Analyzer	1403978	Mar 20, 2020	Scantek, Inc. / NVLAP	Mar 20, 2021
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4192-Brüel&Kjær	Microphone	2854675	Jan 15, 2021	Scantek, Inc. / NVLAP	Jan 15, 2022
1203-Norsonic	Preamplifier	21270	Jan 15, 2021	Scantek, Inc./ NVLAP	Jan 15, 2022

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/10/2021	Date	3/12/2021

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Page 1 of 2

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² The tests marked with (*) are not covered by the current NVLAP accreditation.

Main measured parameters ³:

Measured ⁴ /Acceptable ⁵ Tone frequency (Hz):	Measured ⁴ /Acceptable ⁵ Total Harmonic Distortion (%):	Measured ⁴ /Acceptable Level ⁵ (dB):
1000.14 ± 1.0/1000.0 ± 10.0	0.33 ± 0.10/ < 3	93.89 ± 0.12/94.0 ± 0.4
1000.13 ± 1.0/1000.0 ± 10.0	0.35 ± 0.10/ < 3	113.91 ± 0.12/114.0 ± 0.4

³ The stated level is valid at measurement conditions.

⁴ The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

⁵ Acceptable parameters values are from the current standards

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.2 ± 0.0	101.06 ± 0.000	41.0 ± 0.0

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:

Other:

Adjustments: Unit was not adjusted.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.

Compliance with any standard cannot be claimed based solely on the periodic tests.

Measured Data: in Acoustical Calibrator Test Report # 46145 of two pages.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Calibration Certificate No.47188

Instrument: Acoustical Calibrator
Model: CAL200
Manufacturer: Larson Davis
Serial number: 10494
Class (IEC 60942): 1
Barometer type:
Barometer s/n:

Date Calibrated: 11/29/2021 **Cal Due:** 11/29/2022
Status:

Received	Sent
X	X

In tolerance:
Out of tolerance:
See comments:
Contains non-accredited tests: Yes No


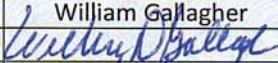
Customer: Paul Carpenter Associates, Inc. **Address:** 7 Columbia Turnpike, Suite 101,
Tel/Fax: 973-822-8221 x21 / 973-833-9221 **Florham Park, NJ 07932**

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31052	Nov 8, 2021	Scantek, Inc./ NVLAP	Nov 8, 2022
DS-360-SRS	Function Generator	88077	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Feb 4, 2021	ACR Env. / A2LA	Feb 4, 2022
PTU300-Vaisala	Environmental Monitor	P5011262	Sept 10, 2021	ACR Env./ A2LA	Sept 10, 2022
140-Norsonic	Real Time Analyzer	1406423	Nov 8, 2021	Scantek / NVLAP	Nov 8, 2022
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 8, 2021	Scantek, Inc. / NVLAP	Nov 8, 2022
1203-Norsonic	Preamplifier	14059	March 3, 2021	Scantek, Inc./ NVLAP	March 3, 2022

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Bailey Partoza	Authorized signatory:	William Gallagher
Signature		Signature	
Date	11 / 29 / 21	Date	12 / 2 / 2021

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Page 1 of 2

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		

- ¹ The results of this calibration apply only to the instrument type with serial number identified in this report.
- ² The tests marked with (*) are not covered by the current NVLAP accreditation.

Main measured parameters ³:

Measured ⁴ /Acceptable ⁵ Tone frequency (Hz):	Measured ⁴ /Acceptable ⁵ Total Harmonic Distortion (%):	Measured ⁴ /Acceptable Level ⁵ (dB):
1000.24 ± 1.0/1000.0 ± 10.0	0.34 ± 0.10/ < 3	113.97 ± 0.12/114.0 ± 0.4
1000.26 ± 1.0/1000.0 ± 10.0	0.31 ± 0.10/ < 3	93.98 ± 0.12/94.0 ± 0.4

- ³ The stated level is valid at measurement conditions.
- ⁴ The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00
- ⁵ Acceptable parameters values are from the current standards

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.5 ± 1.0	100.17 ± 0.000	43.3 ± 2.0

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:
Other:

Adjustments: Unit was not adjusted.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. The measurement results are reported as Pass / Fail simple acceptance; measured values are in the tolerance interval.

Measured Data: in Acoustical Calibrator Test Report # 47188 of two pages.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCCL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP[®]
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.47187

Instrument: Acoustical Calibrator
Model: CAL200
Manufacturer: Larson Davis
Serial number: 11126
Class (IEC 60942): 1
Barometer type:
Barometer s/n:

Date Calibrated: 11/29/2021 **Cal Due:** 11/29/2022
Status:

Received	Sent
X	X

In tolerance:

X	X
---	---

Out of tolerance:

--	--

See comments:

--	--

Contains non-accredited tests: Yes X No

Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21 / 973-833-9221

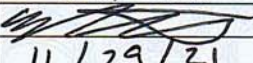
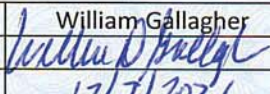
Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31052	Nov 8, 2021	Scantek, Inc./ NVLAP	Nov 8, 2022
DS-360-SRS	Function Generator	88077	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Feb 4, 2021	ACR Env. / A2LA	Feb 4, 2022
PTU300-Vaisala	Environmental Monitor	P5011262	Sept 10, 2021	ACR Env./ A2LA	Sept 10, 2022
140-Norsonic	Real Time Analyzer	1406423	Nov 8, 2021	Scantek / NVLAP	Nov 8, 2022
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 8, 2021	Scantek, Inc. / NVLAP	Nov 8, 2022
1203-Norsonic	Preamplifier	14059	March 3, 2021	Scantek, Inc./ NVLAP	March 3, 2022

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Bailey Partoza	Authorized signatory:	William Gallagher
Signature		Signature	
Date	11/29/21	Date	12/7/2021

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Document stored as: Y:\Calibration Lab\Cal 2021\LDLAL200_11126_M2.doc

Page 1 of 2

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM STANDARDS REFERENCED IN PROCEDURES:	MET ²	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² The tests marked with (*) are not covered by the current NVLAP accreditation.

Main measured parameters ³:

Measured ⁴ /Acceptable ⁵ Tone frequency (Hz):	Measured ⁴ /Acceptable ⁵ Total Harmonic Distortion (%):	Measured ⁴ /Acceptable Level ⁵ (dB):
1000.18 ± 1.0/1000.0 ± 10.0	0.37 ± 0.10/ < 3	113.96 ± 0.12/114.0 ± 0.4
1000.19 ± 1.0/1000.0 ± 10.0	0.31 ± 0.10/ < 3	93.97 ± 0.12/94.0 ± 0.4

³ The stated level is valid at measurement conditions.

⁴ The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

⁵ Acceptable parameters values are from the current standards

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.5 ± 1.0	100.17 ± 0.000	43.3 ± 2.0

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:
Other:

Adjustments: Unit was not adjusted.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. The measurement results are reported as Pass / Fail simple acceptance; measured values are in the tolerance interval.

Measured Data: in Acoustical Calibrator Test Report # 47187 of one page.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Document stored as: Y:\Calibration Lab\Cal 2021\LDCAL200_11126_M2.doc



RION CO., LTD.

3-20-41 Higashimotomachi Kokubunji Tokyo 185-8533
Phone:042(359)7888, Facsimile:042(359)7442

Certificate of Calibration

Name : **Sound Level Meter, Class 1**
Model : **NL-52** **S/No.** : **00219946**
Date of Calibration : **March, 08, 2021**

We hereby certify that the above product was tested and calibrated according to the prescribed Rion procedures, and that it fulfills specification requirements..

The measuring equipment and reference devices used for testing and calibrating this unit are managed under the Rion traceability system and are traceable according to official Japanese standards and official standards of countries belonging to the International Committee of Weights and Measures.

RION CO., LTD.

Manager, Quality Control Department

Calibration Certificate No.46655

Instrument: Sound Level Meter
Model: NL52
Manufacturer: Rion
Serial number: 01032443
Tested with: Microphone UC-59 s/n 05827
Preamplifier NH25 s/n 32471
Type (class): 1
Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21 / 973-833-9221

Date Calibrated: 7/9/2021 **Cal Due:** 7/9/2022

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		

See comments:
Contains non-accredited tests: __ Yes No
Calibration service: __ Basic Standard
Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31052	Oct 31, 2020	Scantek, Inc./ NVLAP	Oct 31, 2021
DS-360-SRS	Function Generator	33584	Oct 23, 2019	ACR Env./ A2LA	Oct 23, 2021
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Feb 4, 2021	ACR Env. / A2LA	Feb 4, 2022
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2020	ACR Env./ A2LA	Dec 7, 2021
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.2	99.63	42.7

Calibrated by:	Lydon Dawkins	Authorized signatory:	William Gallagher
Signature	<i>Lydon Dawkins</i>	Signature	<i>William Gallagher</i>
Date	7/9/2021	Date	7/12/2021

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Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	RESULT ^{2,3}	EXPANDED UNCERTAINTY (coverage factor 2) [dB]
INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED.2 CLAUSE 10	Passed	0.15
SELF-GENERATED NOISE - IEC 61672-3 ED.2 CLAUSE 11	Passed	0.30
FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14	Passed	0.20
LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.2 CLAUSE 16	Passed	0.25
TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18	Passed	0.30
PEAK C SOUND LEVEL - IEC 61672-3 ED.2.0 CLAUSE 19	Passed	0.35
OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20	Passed	0.25
HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21	Passed	0.1
LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15	Passed	0.1
COMBINED ELECTRICAL AND ACOUSTICAL TEST - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	See test report

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Comments: The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2, to demonstrate that the model of sound level meter fully conforms to the requirements in the IEC 61672-2, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.

Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

Microphone:	Rion UC-59 s/n 05827 for acoustical test
Preamplifier:	Rion NH25 s/n 32471 for all tests
Other:	line adaptor ADP005 (18pF) for electrical tests
Accompanying acoustical calibrator:	Larson Davis CAL200 s/n 12145
Windscreen:	none

Measured Data: in Test Report # 46655 of 7 + 1 pages.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Document stored Y:\Calibration Lab\SLM 2021\RIONLS2_01032443_M1.doc

Calibration Certificate No.46656

Instrument: **Microphone**
Model: **UC-59**
Manufacturer: **Rion**
Serial number: **05827**
Composed of:

Date Calibrated: **7/9/2021** Cal Due: **7/9/2022**

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: Yes No

Customer: **Paul Carpenter Associates, Inc.**
Tel/Fax: **973-822-8221 x21/973-833-9221**

Address: **7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932**

Tested in accordance with the following procedures and standards:

Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31052	Oct 31, 2020	Scantek, Inc./ NVLAP	Oct 31, 2021
DS-360-SRS	Function Generator	33584	Oct 23, 2019	ACR Env./ A2LA	Oct 23, 2021
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Feb 4, 2021	ACR Env. / A2LA	Feb 4, 2022
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2020	ACR Env./ A2LA	Dec 7, 2021
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021
1203-Norsonic	Preamplifier	14059	March 3, 2021	Scantek, Inc./ NVLAP	March 3, 2022
4180-Brüel&Kjær	Microphone	2246115	Oct 1, 2019	DPLA / DANAK	Oct 1, 2021

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Lydon Dawkins	Authorized signatory:	William Gallagher
Signature	<i>Lydon Dawkins</i>	Signature	<i>William Gallagher</i>
Date	7/9/2021	Date	7/12/2021

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Page 1 of 2

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES / METHODS ¹ FROM PROCEDURES		MET ^{2,3}	NOT MET	NOT TESTED	MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2)
Open circuit sensitivity (insert voltage method, 250 Hz)		X			See below
Frequency response	Actuator response	X			63 – 200Hz: 0.3 dB 200 – 8000 Hz: 0.2 dB 8 – 10 kHz: 0.5 dB 10 – 20 kHz: 0.7 dB 20 – 50 kHz: 0.9 dB 50 – 100 kHz: 1.2 dB
	FF/Diffuse field responses	X			63 – 200Hz: 0.3 dB 200 – 4000 Hz: 0.2 dB 4 – 10 kHz: 0.6 dB 10 – 20 kHz: 0.9 dB 20 – 50 kHz: 2.2 dB 50 – 100 kHz: 4.4 dB
	Scantek, Inc. acoustical method			X	31.5 – 125 Hz: 0.16 dB 250, 1000 Hz: 0.12 dB 2 – 8 kHz: 0.8 dB 12.5 – 16 kHz: 2.4 dB

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Note: The free field/diffuse field characteristics were calculated based on the measured actuator response and adjustment coefficients as provided by the manufacturer. The uncertainties reported for these characteristics may include assumed uncertainty components for the adjustment coefficients.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.6 ± 1.2	99.61 ± 0.020	43.5 ± 2.4

Main measured parameters:

Tone frequency (Hz)	Measured ⁴ /Acceptable Open circuit sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
250	-26.27 ± 0.12/ -27.0 ± 2.0	48.58

⁴ The reported expanded uncertainty is calculated with a coverage factor k=2.00

Tests made with following attachments to instrument and auxiliary devices:

Protection grid mounted for sensitivity measurements
Actuator type: G.R.A.S. RA0014

Measured Data: Found on Microphone Test Report # 46656 of one page.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCCL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP[®]

CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.46137

Instrument: Sound Level Meter
Model: NL52
Manufacturer: Rion
Serial number: 01243608
Tested with: Microphone UC-59 s/n 07650
Preamplifier NH25 s/n 43637
Type (class): 1
Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21 / 973-833-9221

Date Calibrated: 3/11/2021 **Cal Due:** 3/11/2022

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: ___ Yes X No
Calibration service: ___ Basic X Standard
Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
21.6	101.03	45.5

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/11/2021	Date	3/12/2021

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Page 1 of 2

Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	RESULT ^{2,3}	EXPANDED UNCERTAINTY (coverage factor 2) [dB]
INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED.2 CLAUSE 10	Passed	0.15
SELF-GENERATED NOISE - IEC 61672-3 ED.2 CLAUSE 11	Passed	0.30
FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14	Passed	0.20
LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.2 CLAUSE 16	Passed	0.25
TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18	Passed	0.30
PEAK C SOUND LEVEL - IEC 61672-3 ED.2.0 CLAUSE 19	Passed	0.35
OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20	Passed	0.25
HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21	Passed	0.1
LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15	Passed	0.1
FILTER TEST 1/OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
FILTER TEST 1/3OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
COMBINED ELECTRICAL AND ACOUSTICAL TEST - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	See test report

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Comments: The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2, to demonstrate that the model of sound level meter fully conforms to the requirements in the IEC 61672-2, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

Microphone: Rion UC-59 s/n 07650 for acoustical test
Preamplifier: Rion NH25 s/n 43637 for all tests
Other: line adaptor ADP005 (18pF) for electrical tests
Accompanying acoustical calibrator: Larson Davis CAL200 s/n 11811
Windscreen: none

Measured Data: in Test Report # 46137 of 9+1 pages.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)



Calibration Certificate No.46138

Instrument: **Microphone**
Model: **UC-59**
Manufacturer: **Rion**
Serial number: **07650**
Composed of:

Date Calibrated: **3/10/2021** Cal Due: **3/10/2022**

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: Yes No

Customer: **Paul Carpenter Associates, Inc.**
Tel/Fax: **973-822-8221 x21/973-833-9221**

Address: **7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932**

Tested in accordance with the following procedures and standards:

Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021
1203-Norsonic	Preamplifier	21270	Jan 15, 2021	Scantek, Inc./ NVLAP	Jan 15, 2022
4180-Brüel&Kjær	Microphone	2246115	Oct 1, 2019	DPLA / DANAK	Oct 24, 2021

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/10/2021	Date	3/12/2021

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Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES / METHODS ¹ FROM PROCEDURES		MET ^{2,3}	NOT MET	NOT TESTED	MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2)
Open circuit sensitivity (insert voltage method, 250 Hz)		X			See below
Frequency response	Actuator response	X			63 – 200Hz: 0.3 dB 200 – 8000 Hz: 0.2 dB 8 – 10 kHz: 0.5 dB 10 – 20 kHz: 0.7 dB 20 – 50 kHz: 0.9 dB 50 – 100 kHz: 1.2 dB
	FF/Diffuse field responses	X			63 – 200Hz: 0.3 dB 200 – 4000 Hz: 0.2 dB 4 – 10 kHz: 0.6 dB 10 – 20 kHz: 0.9 dB 20 – 50 kHz: 2.2 dB 50 – 100 kHz: 4.4 dB
	Scantek, Inc. acoustical method			X	31.5 – 125 Hz: 0.16 dB 250, 1000 Hz: 0.12 dB 2 – 8 kHz: 0.8 dB 12.5 – 16 kHz: 2.4 dB

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Note: The free field/diffuse field characteristics were calculated based on the measured actuator response and adjustment coefficients as provided by the manufacturer. The uncertainties reported for these characteristics may include assumed uncertainty components for the adjustment coefficients.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.1 ± 0.0	101.06 ± 0.000	43.1 ± 0.0

Main measured parameters:

Tone frequency (Hz)	Measured ⁴ /Acceptable Open circuit sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
250	-27.16 ± 0.12/ -27.0 ± 2.0	43.83

⁴ The reported expanded uncertainty is calculated with a coverage factor k=2.00

Tests made with following attachments to instrument and auxiliary devices:

Protection grid mounted for sensitivity measurements
Actuator type: G.R.A.S. RA0014

Measured Data: Found on Microphone Test Report # 46138 of one page.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP[®]

CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.46653

Instrument: Sound Level Meter
Model: NL52
Manufacturer: Rion
Serial number: 01243610
Tested with: Microphone UC-59 s/n 06943
Preamplifier NH25 s/n 32470
Type (class): 1
Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21 / 973-833-9221

Date Calibrated: 7/9/2021 **Cal Due:** 7/9/2022

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		

See comments:
Contains non-accredited tests: ___ Yes **X** No

Calibration service: ___ Basic **X** Standard

Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31052	Oct 31, 2020	Scantek, Inc./ NVLAP	Oct 31, 2021
DS-360-SRS	Function Generator	33584	Oct 23, 2019	ACR Env./ A2LA	Oct 23, 2021
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Feb 4, 2021	ACR Env. / A2LA	Feb 4, 2022
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2020	ACR Env./ A2LA	Dec 7, 2021
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.2	99.63	42.7

Calibrated by:	Lydon Dawkins	Authorized signatory:	William Gallagher
Signature	<i>Lydon Dawkins</i>	Signature	<i>William Gallagher</i>
Date	7/9/2021	Date	7/12/2021

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Page 1 of 2

Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	RESULT ^{2,3}	EXPANDED UNCERTAINTY (coverage factor 2) [dB]
INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED.2 CLAUSE 10	Passed	0.15
SELF-GENERATED NOISE - IEC 61672-3 ED.2 CLAUSE 11	Passed	0.30
FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14	Passed	0.20
LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.2 CLAUSE 16	Passed	0.25
TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18	Passed	0.30
PEAK C SOUND LEVEL - IEC 61672-3 ED.2.0 CLAUSE 19	Passed	0.35
OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20	Passed	0.25
HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21	Passed	0.1
LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15	Passed	0.1
FILTER TEST 1/OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
FILTER TEST 1/3OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
COMBINED ELECTRICAL AND ACOUSTICAL TEST - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	See test report

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Comments: The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2, to demonstrate that the model of sound level meter fully conforms to the requirements in the IEC 61672-2, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

Microphone:	Rion UC-59 s/n 06943 for acoustical test
Preamplifier:	Rion NH25 s/n 32470 for all tests
Other:	line adaptor ADP005 (18pF) for electrical tests
Accompanying acoustical calibrator:	Larson Davis CAL200 s/n 12145
Windscreen:	none

Measured Data: in Test Report # 46653 of 9 + 1 pages.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCCL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP[®]
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.46654

Instrument: **Microphone**
Model: **UC-59**
Manufacturer: **Rion**
Serial number: **06943**
Composed of:

Date Calibrated: **7/9/2021** Cal Due: **7/9/2022**

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: Yes **X** No

Customer: **Paul Carpenter Associates, Inc.**
Tel/Fax: **973-822-8221 x21/973-833-9221**

Address: **7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932**

Tested in accordance with the following procedures and standards:

Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31052	Oct 31, 2020	Scantek, Inc./ NVLAP	Oct 31, 2021
DS-360-SRS	Function Generator	33584	Oct 23, 2019	ACR Env./ A2LA	Oct 23, 2021
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Feb 4, 2021	ACR Env. / A2LA	Feb 4, 2022
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2020	ACR Env./ A2LA	Dec 7, 2021
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021
1203-Norsonic	Preamplifier	14059	March 3, 2021	Scantek, Inc./ NVLAP	March 3, 2022
4180-Brüel&Kjær	Microphone	2246115	Oct 1, 2019	DPLA / DANAK	Oct 1, 2021

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Lydon Dawkins	Authorized signatory:	William Gallagher
Signature	<i>Lydon Dawkins</i>	Signature	<i>William Gallagher</i>
Date	7/9/2021	Date	7/12/2021

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Page 1 of 2

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES / METHODS ¹ FROM PROCEDURES		MET ^{2,3}	NOT MET	NOT TESTED	MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2)
Open circuit sensitivity (insert voltage method, 250 Hz)		X			See below
Frequency response	Actuator response	X			63 – 200Hz: 0.3 dB 200 – 8000 Hz: 0.2 dB 8 – 10 kHz: 0.5 dB 10 – 20 kHz: 0.7 dB 20 – 50 kHz: 0.9 dB 50 – 100 kHz: 1.2 dB
	FF/Diffuse field responses	X			63 – 200Hz: 0.3 dB 200 – 4000 Hz: 0.2 dB 4 – 10 kHz: 0.6 dB 10 – 20 kHz: 0.9 dB 20 – 50 kHz: 2.2 dB 50 – 100 kHz: 4.4 dB
	Scantek, Inc. acoustical method			X	31.5 – 125 Hz: 0.16 dB 250, 1000 Hz: 0.12 dB 2 – 8 kHz: 0.8 dB 12.5 – 16 kHz: 2.4 dB

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Note: The free field/diffuse field characteristics were calculated based on the measured actuator response and adjustment coefficients as provided by the manufacturer. The uncertainties reported for these characteristics may include assumed uncertainty components for the adjustment coefficients.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.7 ± 1.0	99.61 ± 0.020	43.3 ± 2.0

Main measured parameters:

Tone frequency (Hz)	Measured ⁴ /Acceptable Open circuit sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
250	-25.39 ± 0.12/ -27.0 ± 2.0	53.77

⁴ The reported expanded uncertainty is calculated with a coverage factor k=2.00

Tests made with following attachments to instrument and auxiliary devices:

Protection grid mounted for sensitivity measurements
Actuator type: G.R.A.S. RA0014

Measured Data: Found on Microphone Test Report # 46654 of one page.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCCL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)



Calibration Certificate No.46141

Instrument: Sound Level Meter
Model: NL52
Manufacturer: Rion
Serial number: 01243611
Tested with: Microphone UC-59 s/n 07653
Preamplifier NH25 s/n 43640
Type (class): 1
Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21 / 973-833-9221

Date Calibrated: 3/11/2021 **Cal Due:** 3/11/2022

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: ___ Yes X No
Calibration service: ___ Basic X Standard
Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
21.6	101.03	45.5

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/11/2021	Date	3/12/2021

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Page 1 of 2

Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	RESULT ^{2,3}	EXPANDED UNCERTAINTY (coverage factor 2) [dB]
INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED.2 CLAUSE 10	Passed	0.15
SELF-GENERATED NOISE - IEC 61672-3 ED.2 CLAUSE 11	Passed	0.30
FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14	Passed	0.20
LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.2 CLAUSE 16	Passed	0.25
TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18	Passed	0.30
PEAK C SOUND LEVEL - IEC 61672-3 ED.2.0 CLAUSE 19	Passed	0.35
OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20	Passed	0.25
HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21	Passed	0.1
LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15	Passed	0.1
FILTER TEST 1/OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
FILTER TEST 1/3OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
COMBINED ELECTRICAL AND ACOUSTICAL TEST - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	See test report

- 1 The results of this calibration apply only to the instrument type with serial number identified in this report.
- 2 Parameters are certified at actual environmental conditions.
- 3 The tests marked with (*) are not covered by the current NVLAP accreditation.

Comments: The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2, to demonstrate that the model of sound level meter fully conforms to the requirements in the IEC 61672-2, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

Microphone: Rion UC-59 s/n 07653 for acoustical test
Preamplifier: Rion NH25 s/n 43640 for all tests
Other: line adaptor ADP005 (18pF) for electrical tests
Accompanying acoustical calibrator: Larson Davis CAL200 s/n 11811
Windscreens: none

Measured Data: in Test Report # 46141 of 9+1 pages.

Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

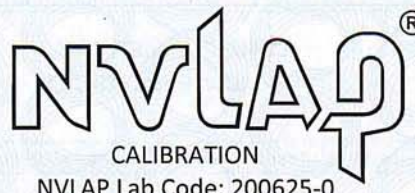
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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)



Calibration Certificate No.46142

Instrument: **Microphone**
Model: **UC-59**
Manufacturer: **Rion**
Serial number: **07653**
Composed of:

Date Calibrated: **3/11/2021** Cal Due: **3/11/2022**

Status:	<u>Received</u>	<u>Sent</u>
In tolerance:	<u>X</u>	<u>X</u>
Out of tolerance:		
See comments:		

Contains non-accredited tests: Yes X No

Customer: **Paul Carpenter Associates, Inc.**
Tel/Fax: **973-822-8221 x21/973-833-9221**

Address: **7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932**

Tested in accordance with the following procedures and standards:

Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021
1203-Norsonic	Preamplifier	21270	Jan 15, 2021	Scantek, Inc./ NVLAP	Jan 15, 2022
4180-Brüel&Kjær	Microphone	2246115	Oct 1, 2019	DPLA / DANAK	Oct 24, 2021

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	<i>3/11/2021</i>	Date	<i>3/12/2021</i>

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Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES / METHODS ¹ FROM PROCEDURES		MET ^{2,3}	NOT MET	NOT TESTED	MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2)
Open circuit sensitivity (insert voltage method, 250 Hz)		X			See below
Frequency response	Actuator response	X			63 – 200Hz: 0.3 dB 200 – 8000 Hz: 0.2 dB 8 – 10 kHz: 0.5 dB 10 – 20 kHz: 0.7 dB 20 – 50 kHz: 0.9 dB 50 – 100 kHz: 1.2 dB
	FF/Diffuse field responses	X			63 – 200Hz: 0.3 dB 200 – 4000 Hz: 0.2 dB 4 – 10 kHz: 0.6 dB 10 – 20 kHz: 0.9 dB 20 – 50 kHz: 2.2 dB 50 – 100 kHz: 4.4 dB
	Scantek, Inc. acoustical method			X	31.5 – 125 Hz: 0.16 dB 250, 1000 Hz: 0.12 dB 2 – 8 kHz: 0.8 dB 12.5 – 16 kHz: 2.4 dB

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Note: The free field/diffuse field characteristics were calculated based on the measured actuator response and adjustment coefficients as provided by the manufacturer. The uncertainties reported for these characteristics may include assumed uncertainty components for the adjustment coefficients.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
21.6 ± 0.0	101.03 ± 0.000	45.5 ± 0.0

Main measured parameters:

Tone frequency (Hz)	Measured ⁴ /Acceptable Open circuit sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
250	-28.00 ± 0.12/ -27.0 ± 2.0	39.83

⁴ The reported expanded uncertainty is calculated with a coverage factor k=2.00

Tests made with following attachments to instrument and auxiliary devices:

Protection grid mounted for sensitivity measurements
Actuator type: G.R.A.S. RA0014

Measured Data: Found on Microphone Test Report # 46142 of one page.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCCL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP[®]

CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.46143

Instrument: Sound Level Meter
Model: NL52
Manufacturer: Rion
Serial number: 01254347
Tested with: Microphone UC-59 s/n 08808
Preamplifier NH25 s/n 54429
Type (class): 1
Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21 / 973-833-9221

Date Calibrated: 3/11/2021 **Cal Due:** 3/11/2022

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: ___ Yes X No

Calibration service: ___ Basic X Standard

Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:

Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015

SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
21.7	100.62	46.2

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/11/2021	Date	3/12/2021

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Page 1 of 2

Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	RESULT ^{2,3}	EXPANDED UNCERTAINTY (coverage factor 2) [dB]
INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED.2 CLAUSE 10	Passed	0.15
SELF-GENERATED NOISE - IEC 61672-3 ED.2 CLAUSE 11	Passed	0.30
FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14	Passed	0.20
LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.2 CLAUSE 16	Passed	0.25
TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18	Passed	0.30
PEAK C SOUND LEVEL - IEC 61672-3 ED.2.0 CLAUSE 19	Passed	0.35
OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20	Passed	0.25
HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21	Passed	0.1
LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15	Passed	0.1
FILTER TEST 1/OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
FILTER TEST 1/3OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
COMBINED ELECTRICAL AND ACOUSTICAL TEST - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	See test report

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Comments: The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2, to demonstrate that the model of sound level meter fully conforms to the requirements in the IEC 61672-2, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

Microphone:	Rion UC-59 s/n 08808 for acoustical test
Preamplifier:	Rion NH25 s/n 54429 for all tests
Other:	line adaptor ADP005 (18pF) for electrical tests
Accompanying acoustical calibrator:	Larson Davis CAL200 s/n 11811
Windscreens:	none

Measured Data: in Test Report # 46143 of 9+1 pages.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

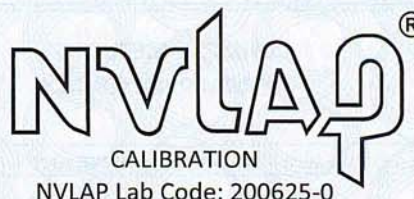
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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)



Calibration Certificate No.46144

Instrument: **Microphone**
Model: **UC-59**
Manufacturer: **Rion**
Serial number: **08808**
Composed of:

Date Calibrated: **3/11/2021** Cal Due: **3/11/2022**

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: Yes No

Customer: **Paul Carpenter Associates, Inc.**
Tel/Fax: **973-822-8221 x21/973-833-9221**

Address: **7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932**

Tested in accordance with the following procedures and standards:

Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021
1203-Norsonic	Preamplifier	21270	Jan 15, 2021	Scantek, Inc./ NVLAP	Jan 15, 2022
4180-Brüel&Kjær	Microphone	2246115	Oct 1, 2019	DPLA / DANAK	Oct 24, 2021

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/11/2021	Date	3/12/2021

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Document stored as: Y:\Calibration Lab\Mic 2021\Rion59_08808_M1.doc

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES / METHODS ¹ FROM PROCEDURES		MET ^{2,3}	NOT MET	NOT TESTED	MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2)
Open circuit sensitivity (insert voltage method, 250 Hz)		X			See below
Frequency response	Actuator response	X			63 – 200Hz: 0.3 dB 200 – 8000 Hz: 0.2 dB 8 – 10 kHz: 0.5 dB 10 – 20 kHz: 0.7 dB 20 – 50 kHz: 0.9 dB 50 – 100 kHz: 1.2 dB
	FF/Diffuse field responses	X			63 – 200Hz: 0.3 dB 200 – 4000 Hz: 0.2 dB 4 – 10 kHz: 0.6 dB 10 – 20 kHz: 0.9 dB 20 – 50 kHz: 2.2 dB 50 – 100 kHz: 4.4 dB
	Scantek, Inc. acoustical method			X	31.5 – 125 Hz: 0.16 dB 250, 1000 Hz: 0.12 dB 2 – 8 kHz: 0.8 dB 12.5 – 16 kHz: 2.4 dB

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Note: The free field/diffuse field characteristics were calculated based on the measured actuator response and adjustment coefficients as provided by the manufacturer. The uncertainties reported for these characteristics may include assumed uncertainty components for the adjustment coefficients.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
21.6 ± 0.0	101.03 ± 0.000	45.5 ± 0.0

Main measured parameters:

Tone frequency (Hz)	Measured ⁴ /Acceptable Open circuit sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
250	-26.58 ± 0.12/ -27.0 ± 2.0	46.88

⁴ The reported expanded uncertainty is calculated with a coverage factor k=2.00

Tests made with following attachments to instrument and auxiliary devices:

Protection grid mounted for sensitivity measurements
Actuator type: G.R.A.S. RA0014

Measured Data: Found on Microphone Test Report # 46144 of one page.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)



Calibration Certificate No.46139

Instrument: Sound Level Meter
Model: NL52
Manufacturer: Rion
Serial number: 01254349
Tested with: Microphone UC-59 s/n 08810
Preamplifier NH25 s/n 54431
Type (class): 1
Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21 / 973-833-9221

Date Calibrated: 3/11/2021 **Cal Due:** 3/11/2022
Status:

Received	Sent
X	X

In tolerance:

X	X
---	---

Out of tolerance:

--	--

See comments:
Contains non-accredited tests: __ Yes X No
Calibration service: __ Basic X Standard
Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
21.6	101.03	45.5

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/11/2021	Date	3/12/2021

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Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES ¹ FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	RESULT ^{2,3}	EXPANDED UNCERTAINTY (coverage factor 2) [dB]
INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED.2 CLAUSE 10	Passed	0.15
SELF-GENERATED NOISE - IEC 61672-3 ED.2 CLAUSE 11	Passed	0.30
FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14	Passed	0.20
LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.2 CLAUSE 16	Passed	0.25
TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18	Passed	0.30
PEAK C SOUND LEVEL - IEC 61672-3 ED.2.0 CLAUSE 19	Passed	0.35
OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20	Passed	0.25
HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21	Passed	0.1
LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15	Passed	0.1
FILTER TEST 1/OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
FILTER TEST 1/3OCTAVE: RELATIVE ATTENUATION - IEC 61260, CLAUSE 4.4 & #5.3	Passed	0.25
COMBINED ELECTRICAL AND ACOUSTICAL TEST - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	See test report

- 1 The results of this calibration apply only to the instrument type with serial number identified in this report.
- 2 Parameters are certified at actual environmental conditions.
- 3 The tests marked with (*) are not covered by the current NVLAP accreditation.

Comments: The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2, to demonstrate that the model of sound level meter fully conforms to the requirements in the IEC 61672-2, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

Microphone:	Rion UC-59 s/n 08810 for acoustical test
Preamplifier:	Rion NH25 s/n 54431 for all tests
Other:	line adaptor ADP005 (18pF) for electrical tests
Accompanying acoustical calibrator:	Larson Davis CAL200 s/n 11811
Windscreen:	none

Measured Data: in Test Report # 46139 of 9+1 pages.

Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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Scantek, Inc.

CALIBRATION LABORATORY

ISO 17025: 2017, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP[®]

CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.46140

Instrument: Microphone
Model: UC-59
Manufacturer: Rion
Serial number: 08810
Composed of:

Date Calibrated: 3/11/2021 **Cal Due:** 3/11/2022

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: Yes No

Customer: Paul Carpenter Associates, Inc.
Tel/Fax: 973-822-8221 x21/973-833-9221

Address: 7 Columbia Turnpike, Suite 101,
Florham Park, NJ 07932

Tested in accordance with the following procedures and standards:

Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 31, 2020	Scantek, Inc./ NVLAP	Jul 31, 2021
DS-360-SRS	Function Generator	61646	Dec 3, 2020	ACR Env./ A2LA	Dec 3, 2022
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Dec 04, 2020	ACR Env./ A2LA	Dec 04, 2021
HM30-Thommen	Meteo Station	1040170/39633	Dec 7, 2021	ACR Env./ A2LA	Dec 7, 2022
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Oct 26, 2020	Scantek, Inc./ NVLAP	Oct 26, 2021
1203-Norsonic	Preamplifier	21270	Jan 15, 2021	Scantek, Inc./ NVLAP	Jan 15, 2022
4180-Brüel&Kjær	Microphone	2246115	Oct 1, 2019	DPLA / DANAK	Oct 24, 2021

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Ronnie Buchanan	Authorized signatory:	William D. Gallagher
Signature	<i>Ronnie Buchanan</i>	Signature	<i>William D. Gallagher</i>
Date	3/11/2021	Date	3/12/2021

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Document stored as: Y:\Calibration Lab\Mic 2021\Rion59_08810_M1.doc

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES / METHODS ¹ FROM PROCEDURES		MET ^{2,3}	NOT MET	NOT TESTED	MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2)
Open circuit sensitivity (insert voltage method, 250 Hz)		X			See below
Frequency response	Actuator response	X			63 – 200Hz: 0.3 dB 200 – 8000 Hz: 0.2 dB 8 – 10 kHz: 0.5 dB 10 – 20 kHz: 0.7 dB 20 – 50 kHz: 0.9 dB 50 – 100 kHz: 1.2 dB
	FF/Diffuse field responses	X			63 – 200Hz: 0.3 dB 200 – 4000 Hz: 0.2 dB 4 – 10 kHz: 0.6 dB 10 – 20 kHz: 0.9 dB 20 – 50 kHz: 2.2 dB 50 – 100 kHz: 4.4 dB
	Scantek, Inc. acoustical method			X	31.5 – 125 Hz: 0.16 dB 250, 1000 Hz: 0.12 dB 2 – 8 kHz: 0.8 dB 12.5 – 16 kHz: 2.4 dB

¹ The results of this calibration apply only to the instrument type with serial number identified in this report.

² Parameters are certified at actual environmental conditions.

³ The tests marked with (*) are not covered by the current NVLAP accreditation.

Note: The free field/diffuse field characteristics were calculated based on the measured actuator response and adjustment coefficients as provided by the manufacturer. The uncertainties reported for these characteristics may include assumed uncertainty components for the adjustment coefficients.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
21.6 ± 0.0	101.03 ± 0.000	45.5 ± 0.0

Main measured parameters:

Tone frequency (Hz)	Measured ⁴ /Acceptable Open circuit sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)
250	-26.46 ± 0.12/ -27.0 ± 2.0	47.54

⁴ The reported expanded uncertainty is calculated with a coverage factor k=2.00

Tests made with following attachments to instrument and auxiliary devices:

Protection grid mounted for sensitivity measurements
Actuator type: G.R.A.S. RA0014

Measured Data: Found on Microphone Test Report # 46140 of one page.

Place of Calibration: Scantek, Inc.

6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory. This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

Document stored as: Y:\Calibration Lab\Mic 2021\Rion59_08810_M1.doc

Appendix D-4

Certified Meteorological Data from Newark Liberty International Airport (EWR)

**NJTA Newark Bay - OPS T3820 NB-HCE
Hudson County Extension Improvements - Project Area 1
Peak Hour Noise Monitoring**

Newark Airport Meteorological Observations (10/19/2021)

Date/Time	Hourly Precipitation	Hourly Relative Humidity	Hourly Wind Speed
2021-10-19T05:51:00	0	68	13
2021-10-19T06:51:00	0	69	13
2021-10-19T07:00:00	0	69	13
2021-10-19T07:51:00	0	61	13
2021-10-19T08:51:00	0	57	11
2021-10-19T09:51:00	0	51	9

Date/Time	Hourly Precipitation	Hourly Relative Humidity	Hourly Wind Speed
2021-10-19T13:51:00	0	30	18
2021-10-19T14:51:00	0	27	16
2021-10-19T15:51:00	0	28	17
2021-10-19T16:51:00	0	33	14
2021-10-19T17:51:00	0	39	10
2021-10-19T18:51:00	0	41	9

Newark Airport Meteorological Observations (11/17/2021)

Date/Time	Hourly Precipitation	Hourly Relative Humidity	Hourly Wind Speed
2021-11-17T05:51:00	0	73	3
2021-11-17T06:51:00	0	68	0
2021-11-17T07:00:00	0	68	0
2021-11-17T07:51:00	0	73	5
2021-11-17T08:51:00	0	63	0
2021-11-17T09:51:00	0	56	0

Date/Time	Hourly Precipitation	Hourly Relative Humidity	Hourly Wind Speed
2021-11-17T13:51:00	0	53	10
2021-11-17T14:51:00	0	60	9
2021-11-17T15:51:00	0	60	10
2021-11-17T16:51:00	0	65	7
2021-11-17T17:51:00	0	69	7
2021-11-17T18:51:00	0	74	0

**NJTA Newark Bay - OPS T3820 NB-HCE
Hudson County Extension Improvements - Project Area 1
Peak Hour Noise Monitoring (cont.)**

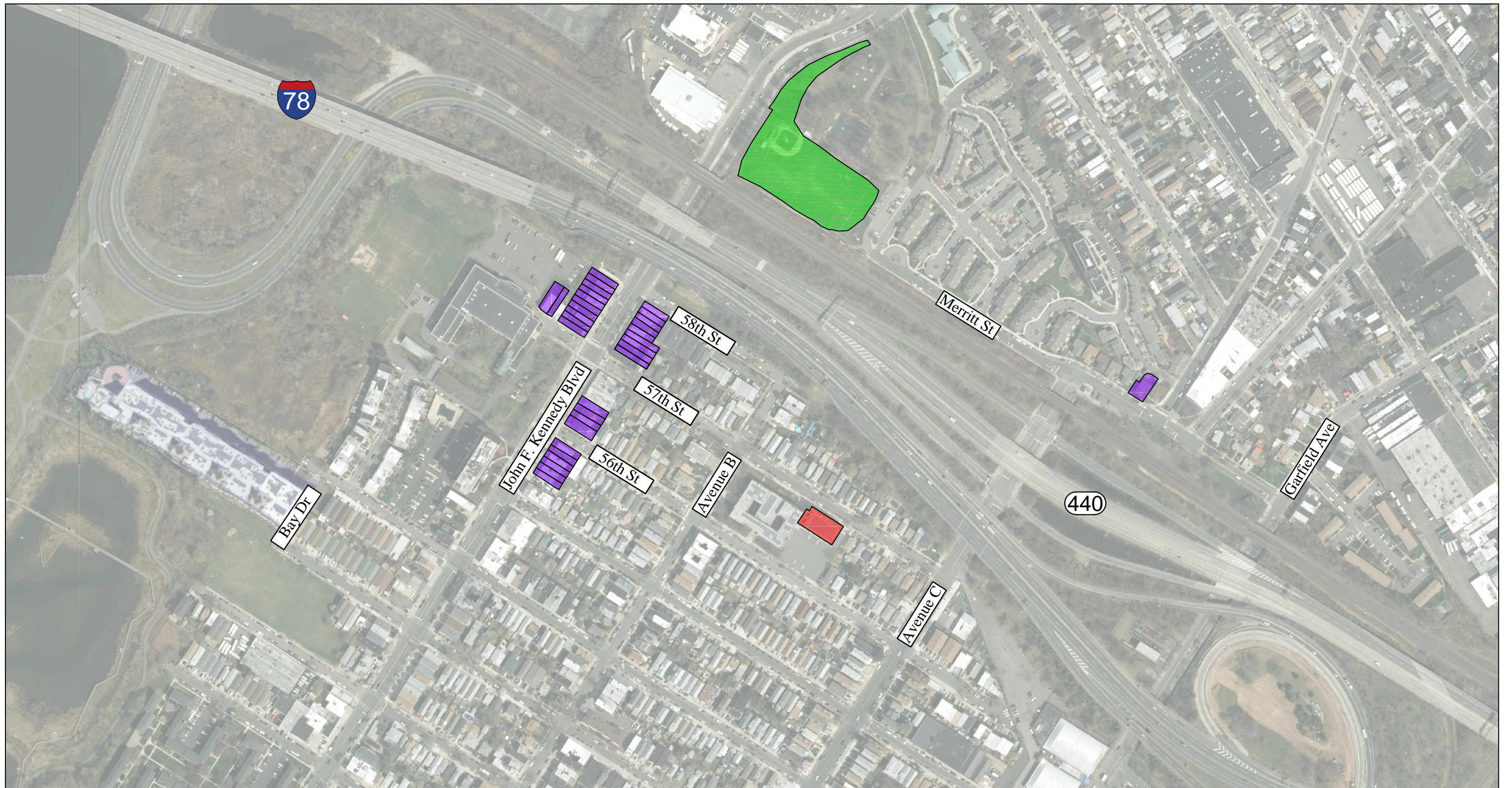
Newark Airport Meteorological Observations (03/16/2022)

Date/Time	Hourly Precipitation	Hourly Relative Humidity	Hourly Wind Speed
2022-03-16T05:51:00	0	66	3
2022-03-16T06:51:00	0	61	5
2022-03-16T07:00:00	0	61	5
2022-03-16T07:51:00	0	53	5
2022-03-16T08:51:00	0	46	5
2022-03-16T09:51:00	0	44	6

Date/Time	Hourly Precipitation	Hourly Relative Humidity	Hourly Wind Speed
2022-03-16T13:51:00	0	46	13
2022-03-16T14:51:00	0	47	13
2022-03-16T15:51:00	0	55	11
2022-03-16T16:51:00	0	55	11
2022-03-16T17:51:00	0	64	9
2022-03-16T18:51:00	0	64	6

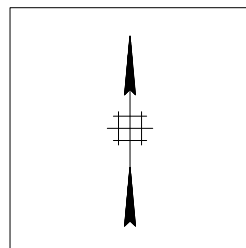
Appendix D-5

2050 No-Build & Build Noise Impact Figures

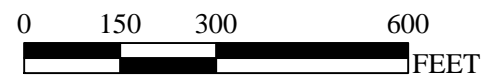


LEGEND

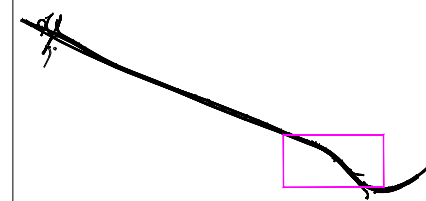
- Category B - Dual-Family Structure that Approaches or Exceeds the NAC (67 dBA L_{eq})
- Category C - Special-Use Property that Approaches or Exceeds the NAC (67 dBA L_{eq})
- Category D - Special-Use Property that Approaches or Exceeds the NAC (52 dBA L_{eq} Interior)



PROJECT NORTH



KEY MAP



Date April 11, 2023

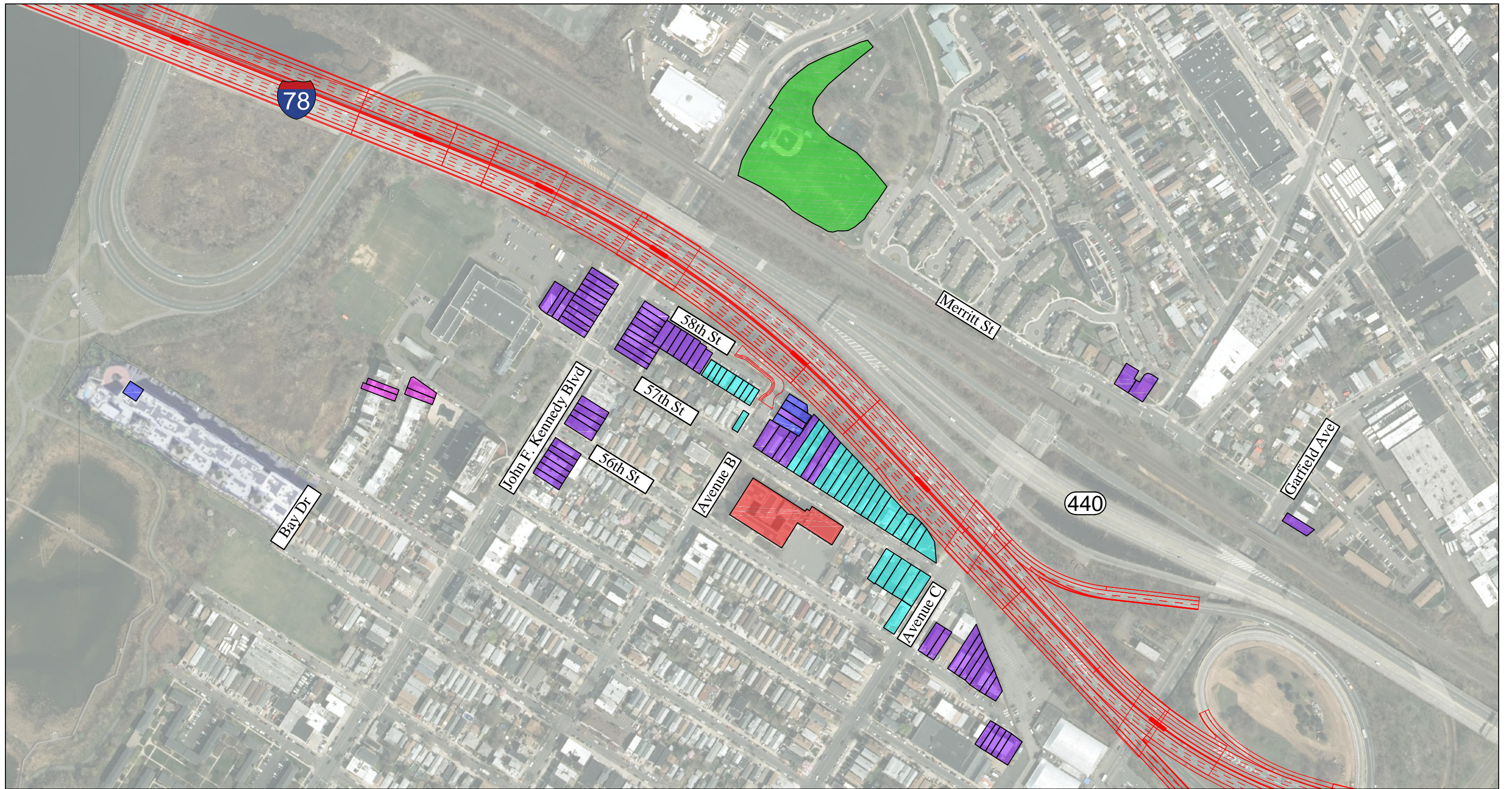
New Jersey Turnpike Authority

Newark Bay Hudson County Extension







Figure D-3


2050 No Action Alternative Noise Impacts

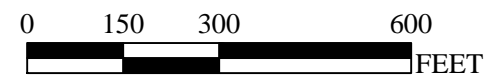
Drawn by: M. Amabile Checked by: S.P. Carpenter
Paul Carpenter Associates, Inc.



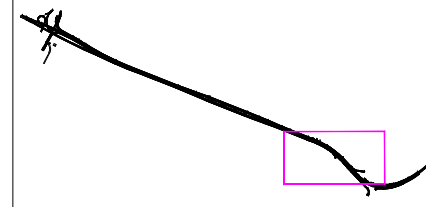
LEGEND

- | | |
|---|---|
|  Category B - Single-Family Structure that Approaches or Exceeds the NAC (67 dBA L_{eq}) |  Category B - Multi-Family Structure that Approaches or Exceeds the NAC (67 dBA L_{eq}) |
|  Category B - Dual-Family Structure that Approaches or Exceeds the NAC (67 dBA L_{eq}) |  Category C - Special-Use Property that Approaches or Exceeds the NAC (67 dBA L_{eq}) |
|  Category B - Dual-Family Structure with Build Noise Levels 10 dBA L_{eq} over Existing Noise Levels |  Category D - Special-Use Property that Approaches or Exceeds the NAC (52 dBA L_{eq} Interior) |

 Proposed Improvements



KEY MAP



Date April 11, 2023

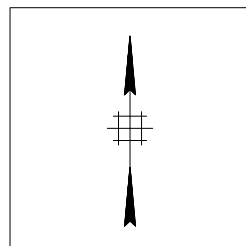
New Jersey Turnpike Authority

Newark Bay Hudson County Extension

Figure D-4

2050 Proposed Action Noise Impacts

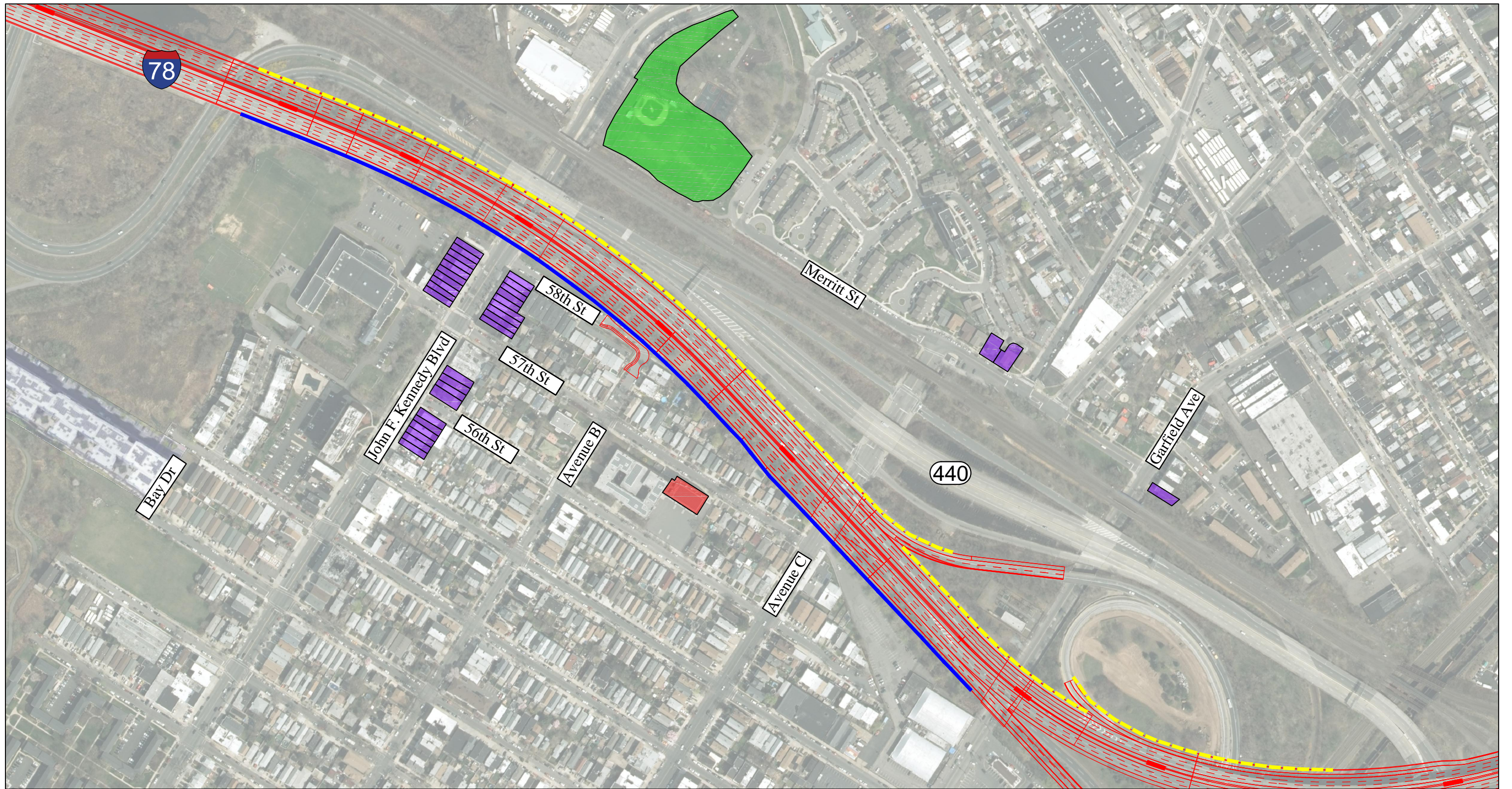
Drawn by: M. Amabile Checked by: S.P. Carpenter
Paul Carpenter Associates, Inc.



PROJECT NORTH

Appendix D-6

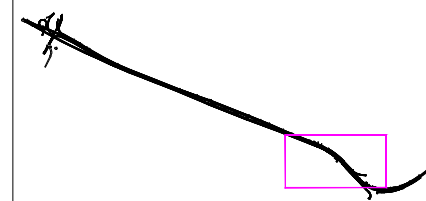
2050 Build With Noise Wall & Noise Impact Figure



LEGEND

- Category B - Dual-Family Structure that Approaches or Exceeds the NAC (67 dBA L_{eq})
- Category C - Special-Use Property that Approaches or Exceeds the NAC (67 dBA L_{eq})
- Category D - Special-Use Property that Approaches or Exceeds the NAC (52 dBA L_{eq} Interior)
- Proposed Improvements
- Proposed 18' Noise Wall (NB-HCE Eastbound Mainline Roadway)
- Not-Proposed 18' Noise Wall System (NB-HCE Westbound Mainline Roadway)

KEY MAP



Date April 11, 2023

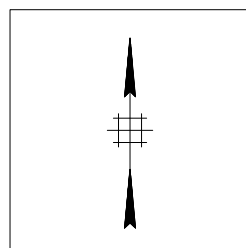
New Jersey Turnpike Authority

Newark Bay Hudson County Extension

Figure D-5

2050 Proposed Action With Noise Wall and Noise Impacts

Drawn by: M. Amabile Checked by: S.P. Carpenter
Paul Carpenter Associates, Inc.



PROJECT NORTH



Appendix D-7

NB-HCE Eastbound Noise Barrier Analysis Worksheet

Barrier Analysis: HCE South NW_18ft Extension

Barrier Analysis	
Primary Benefits	116
Supplemental Benefits	46
Total Benefits	139
Total Barrier Area (sf)	53,852
Cost per SF	\$70
Additional Costs	\$0
Total Cost	\$3,769,640
Total Budget	\$6,990,000
Cost Per Benefit	\$27,120
Cost Effective	YES
50% 1st Row Impacts Achieve 5 dBA?	YES (97%)
50% 1st Row Achieve 7 dBA NRDG?	YES (73%)
One Receptor Achieves 10 dBA NRDG?	YES

Barrier Insertion Loss	
Minimum Insertion Loss	0.5
Maximum Insertion Loss	16.3

# of Barriers: 1				
Barrier Information				
Barrier #	Barrier Name	Length (ft)	Height (ft)	Area (sf)
1	Build Noise Wall - HCE South	2,990	18	53,852

(Please note that all noise level values/calculations are rounded off. Therefore, there may be slight mathematical discrepancies.)

Receiver Information									Totals							
Receiver ID	Receiver Address	NAC Activity Category	Existing Noise Level (dBA Leq)	Build No Noise Wall (dBA Leq)	Existing to Build Noise Level Increase (dBA Leq)	Build With Noise Wall (dBA Leq)	Insertion Loss	Number of Dwelling Units	85	186	79	116	46	77	62	\$ 6,990,000
									1st Row Receptors	Impacts	1st Row Impacts	Primary Benefits	Suppl. Benefits	No. 1st Row Impact Benefits	No. 1st Row Achieve NRDG	Budget
1	35 Sunset Ave	B	53	59	6	54	6	2					2			\$ 50,000
2	35 Sunset Ave	B	62	63	1	62	2									
3	33 Sunset Ave	B	49	58	9	53	5	2					2			\$ 50,000
4	33 Sunset Ave	B	62	63	1	62	1									
5	31 Sunset Ave	B	52	58	6	55	3	2								
6	31 Sunset Ave	B	62	63	1	62	1									
7	29 Sunset Ave	B	47	57	10	51	6	2		2		2				\$ 100,000
8	29 Sunset Ave	B	62	62	1	61	1									
9	27 Sunset Ave	B	47	56	10	51	6	2		2		2				\$ 100,000
10	27 Sunset Ave	B	62	62	1	61	1									
11	25 Sunset Ave	B	47	56	9	50	6	2					2			\$ 50,000
12	25 Sunset Ave	B	61	62	1	61	1									
13	23 Sunset Ave	B	47	55	9	50	6	2					2			\$ 50,000
14	23 Sunset Ave	B	61	62	1	61	1									
15	21 Sunset Ave	B	50	56	6	52	4	2								
16	21 Sunset Ave	B	61	62	1	61	1									
17	19 Sunset Ave	B	47	55	8	49	6	2					2			\$ 50,000
18	19 Sunset Ave	B	61	62	1	61	1									
19	17 Sunset Ave	B	46	54	8	48	6	2					2			\$ 50,000
20	17 Sunset Ave	B	61	62	1	61	1									
37	36 Sunset Ave	B	58	62	3	60	2	2		2						
38	36 Sunset Ave	B	50	61	12	57	4									
39	34 Sunset Ave	B	57	60	3	58	2	2		2		2				\$ 100,000
40	34 Sunset Ave	B	48	59	11	53	6									
41	32 Sunset Ave	B	55	59	4	56	2	2					2			\$ 50,000
42	32 Sunset Ave	B	48	57	9	52	6									
43	30 Sunset Ave	B	54	58	4	55	3	2					2			\$ 50,000
44	30 Sunset Ave	B	48	56	8	51	5									
45	28 Sunset Ave	B	54	58	4	54	4	2					2			\$ 50,000
46	28 Sunset Ave	B	48	55	7	50	5									
47	26 Sunset Ave	B	52	56	5	52	4	2					2			\$ 50,000
48	26 Sunset Ave	B	48	55	7	50	5									
49	24 Sunset Ave	B	51	56	5	52	4	2					2			\$ 50,000
50	24 Sunset Ave	B	47	54	7	49	5									
73	1225 JFK Blvd	B	56	61	5	58	3	144								
74	1269 JFK Blvd	B	67	73	6	68	5	2	2	2	2	2		2		\$ 100,000
75	1269 JFK Blvd	B	64	72	8	65	7									
76	1267A JFK Blvd	B	67	72	5	68	4	2		2						
77	1267A JFK Blvd	B	64	70	6	64	6									
78	1267B JFK Blvd	B	67	72	5	68	4	2		2						
79	1267B JFK Blvd	B	64	70	6	64	6									
80	1265 JFK Blvd	B	67	71	5	68	3	2		2						
81	1265 JFK Blvd	B	64	69	5	63	6									
82	1263 JFK Blvd	B	67	71	4	68	3	2		2						
83	1263 JFK Blvd	B	64	69	5	63	5									
84	1261 JFK Blvd	B	67	70	4	68	2	2		2						
85	1261 JFK Blvd	B	64	69	5	63	5									
86	1259 JFK Blvd	B	67	70	4	68	2	2		2						
87	1259 JFK Blvd	B	64	68	5	63	5									
88	1257 JFK Blvd	B	67	70	3	68	2	2		2						
89	1257 JFK Blvd	B	64	68	4	63	5									
90	1255B JFK Blvd	B	67	70	3	68	2	2		2						
91	1255B JFK Blvd	B	64	68	4	63	4									
92	1255 JFK Blvd	B	66	70	3	68	2	2		2						
93	1255 JFK Blvd	B	64	68	4	64	4									
94	1270 JFK Blvd	B	67	74	7	69	5	2	2	2	2	2		2		\$ 100,000
95	1268 A JFK Blvd	B	66	72	6	68	4	2		2						
96	1268 A JFK Blvd	B	59	71	12	59	12									
97	1268 JFK Blvd	B	66	71	5	68	4	2		2						
98	1268 JFK Blvd	B	56	68	12	56	12									
99	1266 JFK Blvd	B	66	71	5	68	3	2		2						
100	1266 JFK Blvd	B	54	66	12	54	12									
101	1264 JFK Blvd	B	66	71	5	68	3	2		2						
102	1264 JFK Blvd	B	53	64	11	53	11									
103	1262 JFK Blvd	B	66	70	4	68	3	2		2						
104	1262 JFK Blvd	B	53	63	10	53	10									
105	1260 JFK Blvd	B	66	70	4	67	2	2		2						
106	1260 JFK Blvd	B	53	63	9	54	9									
107	1258 JFK Blvd	B	66	69	4	67	2	2		2						
108	1258 JFK Blvd	B	54	62	8	55	7									
109	1256 A+B JFK Blvd	B	66	69	3	67	2	2		2						

Receiver ID	Receiver Address	NAC Activity Category	Existing Noise Level (dBA Leq)	Build No Noise Wall (dBA Leq)	Existing to Build Noise Level Increase (dBA Leq)	Build With Noise Wall (dBA Leq)	Insertion Loss	Number of Dwelling Units	1st Row Receptors	Impacts	1st Row Impacts	Primary Benefits	Suppl. Benefits	No. 1st Row Impact Benefits	No. 1st Row Achieve NRDG	Budget
221	71 56th Street	B	54	59	5	55	3	1								
222	69 56th Street	B	55	59	5	56	3	1								
223	67 56th Street	B	55	60	5	56	3	1								
224	65 56th Street	B	57	61	4	58	3	1								
225	63 56th Street	B	59	63	4	60	3	1								
226	63 56th Street	B	62	67	5	63	4	1		1						
227	53 56th Street	B	57	61	3	59	2	2	2	2	2	2		2		\$ 100,000
228	53 56th Street	B	61	67	7	62	6									
229	51 56th Street	B	57	60	3	58	2	2	2	2	2	2		2		\$ 100,000
230	51 56th Street	B	60	67	7	61	6									
231	49 56th Street	B	54	58	3	55	3	2	2				2			\$ 50,000
232	49 56th Street	B	56	63	7	57	6									
233	47 56th Street	B	54	57	3	55	3	2	2				2		2	\$ 50,000
234	47 56th Street	B	57	65	8	58	8									
235	45 56th Street	B	52	56	4	52	3	2	2	2	2	2		2	2	\$ 100,000
236	45 56th Street	B	58	68	10	58	10									
237	43 56th Street	B	51	55	4	51	3	2	2	2	2	2		2	2	\$ 100,000
238	43 56th Street	B	59	69	10	59	10									
239	41 56th Street	B	51	54	4	51	4	2	2	2	2	2		2	2	\$ 100,000
240	41 56th Street	B	60	69	9	59	10									
241	39 56th Street	B	50	54	4	50	4	2	2	2	2	2		2	2	\$ 100,000
242	39 56th Street	B	61	69	9	59	10									
243	37 56th Street	B	50	54	4	51	3	2	2	2	2	2		2	2	\$ 100,000
244	37 56th Street	B	61	69	8	60	9									
245	35 56th Street	B	50	54	4	51	3	2	2	2	2	2		2	2	\$ 100,000
246	35 56th Street	B	61	69	8	60	9									
247	33 56th Street	B	59	61	2	60	1	2	2	2	2	2		2	2	\$ 100,000
248	33 56th Street	B	60	68	8	60	8									
255	34 56th Street	B	60	65	5	61	4	2								
256	32 56th Street	B	60	66	5	61	5	2		2		2				\$ 100,000
257	30 56th Street	B	61	66	6	62	5	2		2		2				\$ 100,000
258	28 56th Street	B	61	66	6	62	5	2		2		2				\$ 100,000
259	26 56th Street	B	61	67	6	62	4	2		2						
260	24 56th Street	B	62	67	5	63	4	2		2						
494	101 W 56th Street	C	50	52	3	50	2	1								
1041	101 W 56th Street	C	53	60	7	56	4	1								
1045	101 W 56th Street	D	47	55	9	49	6	3		3		3				\$ 150,000
1046	101 W 56th Street	D	49	56	7	51	5	3		3		3				\$ 150,000
1047	101 W 56th Street	D	54	58	5	54	4	3		3						
1048-E1	101 W 56th Street	D	41	47	6	42	5	1								
1048-E2	101 W 56th Street	D	43	49	6	45	4	1								
1048-E3	101 W 56th Street	D	46	51	5	47	4	1		1						
1048-M1	101 W 56th Street	D	43	48	6	44	5	1								
1048-M2	101 W 56th Street	D	45	50	5	46	4	1								
1048-M3	101 W 56th Street	D	48	52	4	49	4	1		1						
1048-W1	101 W 56th Street	D	44	50	6	46	4	1								
1048-W2	101 W 56th Street	D	46	51	6	48	4	1		1						
1048-W3	101 W 56th Street	D	49	54	4	50	4	1		1						
1049	159 W 57th St	B	65	70	5	64	6	2	2	2	2	2		2		\$ 100,000
1050	161 W 57th St	B	65	70	5	65	6	2	2	2	2	2		2		\$ 100,000
1051	163 W 57th St	B	66	71	5	65	6	2	2	2	2	2		2		\$ 100,000
340	190 W 54th Street	B	64	66	1	65	1	1	1	1	1					
341	190 W 54th Street	B	65	66	1	65	1	1	1	1	1					
345	190 W 54th Street	B	64	65	2	64	1	1	1							
349	190 W 54th Street	B	64	65	2	64	1	1	1							