Kruk Response

Statement of Facts

1. New Trier High School District No. 203, Winnetka Campus has recently undergone a major renovation which started in 2015 and finished in 2017.
The new buildings feature rooftop units and a dust collector in the service dock, among other mechanical equipment. There was no mechanical equipment noise on Woodland Ave prior to this major renovation.

2. Since the new buildings were completed and put into service in 2017, the District has been in violation of the State of Illinois Environmental Protection Agency Sound Emission Standards and Limitations, Sections 901.102(a) and (b).

3. After receiving multiple noise complaints in 2017 and 2018, the District confirmed the non-compliance when the noise from dust collector was measured at 124 Woodland Ave by Shiner Acoustics on 05/31/2018 and 07/25/2018, see **Exhibit 1R** (August 15, 2018 Shiner report).

Table 2. Results of Study – New Trier High School New Building – Dust Collector 124 Woodland Ave. – May 31 and July 25, 2018

Octave Band Sound Pressure Level, dB re 20 µPa

Above the Limits

	31.5	63	125	250	500	1000	2000	4000	8000	Awt
5/31/18 Dust Collector	68	70	65	62	51	44	44	43	41	57
7/25/18 Dust Collector	57	68	62	57	50	44	44	41	36	54
7/25/18 Nighttime Operation	51	57	49	48	44	40	34	29	28	46
Illinois Daytime Limit	72	71	65	57	51	45	39	34	32	55

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4. The District failed to voluntarily self disclose this non-compliance and knowingly continued to operate the non-compliant equipment. A copy of 05/31/2018 report was requested multiple times, and only disclosed in April of 2019 after escalation to the Board of Education President. At that time, affected Woodland Ave residents were unaware that 07/25/2018 testing was performed. The district failed to inform the residents of harmful, above the limits, noise levels it was generating and continued to operate the equipment daily for extended periods of time, to include 2019 summer school and after school activities.

5. PCB 2020-010 was filed in August of 2019.

6. The District installed the barrier wall in Nov 2019 in an effort to reduce the noise coming from the dust collector below allowable limits. Subsequent testing on December 13, 2019 again showed continued non-compliance, see **Exhibit 2R**(December 20, 2019 Shiner report) and again this non-compliance was not voluntarily self disclosed, until the report was included in the District's Motion for Summary Judgment on 10/12/2021 - non-compliant equipment continued to operate.

Exhibit 2R excerpt

Robbins Schwartz December 20, 2019

Table 1. Results of December 13, 2019 Environmental Noise Measurements (4:20 a.m. to 5:20 a.m.)

Octave Band Sound Pressure Level, dB re 20 µPa

	31.5	63	125	250	500	1000	2000	4000	8000	Awt
All Off 4:27 a.m. (early ambient)	51	51	48	44	44	39	26	14	14	43
1. Condensing Unit 4:29 a.m.	49	52	53	46	43	39	27	16	14	45
2. Energy Recovery Units 4:37 a.m.	51	51	50	45	44	39	22	16	18	45
3. Cafeteria Fans 4:40 a.m.	54	43	53	48	45	41	26	17	17	46
Illinois Nighttime Limit	63	61	55	47	40	35	30	25	25	44
Dust Collector above Limit										
4. Normal day equipment 4:55 a.m.	51	53	53	48	45	41	27	16	13	46
5. Fume Hoods 4:59 a.m.	50	51	53	48	44	41	27	18	18	46
6. Dust Collector 5:04 a.m.	58	65	56	56	49	44	42	36	27	52
All Off 5:16 a.m. (late ambient)	51	54	53	48	46	43	34	25	15	47
Illinois Daytime Limit	72	71	65	57	51	45	39	34	32	55

7. Since the report dated December 20, 2019, **Exhibit 2R,** the District has not presented any evidence that the dust collector was found to be operating below allowable Illinois standard limits when tested with a microphone at relevant elevation of 15-18 feet above the ground as used on December 13, 2019.

8. Moreover, the District also refused to test the noise in front of other Woodland Ave residents whose homes are in much closer proximity to the dust collector and who requested the required testing to be done. The District and Mr. Florey were fully aware of the need to be compliant in front of those homes. However, multiple requests to perform the required tests were ignored in a display of disregard for safety and compliance.

9. Contrary to Mr. Florey's claims that the rooftop equipment was within compliance as of August 23, 2019 when the complaint was filed with the State of Illinois Pollution Control Board, the rooftop cafeteria fans still operate above the Illinois Nighttime Limit, see **Exhibit 2R** (December 20, 2019 Shiner report)"Cafeteria fans run from approximately 4:30 a.m. to 9:30 a.m." as per same report**,** therefore, cafeteria fans are subject to, and exceed Nighttime Limits, see **Exhibit 2R.** This non-compliance was also not voluntarily self disclosed, until the report was included in the District's Motion for Summary Judgment on 10/12/2021.

10. A meeting with the District was requested on 01/30/2020 to discuss the ongoing noise issues. On 02/04/2021, Mr Florey stated:" *I've had discussions with the District and they have agree to meet with you to discuss your suggested additional sound reduction work and/or operational changes. The District is also hiring a mechanical engineer to review the sounds emitted from the dust collector and other equipment to see if there are any other steps that can be taken to further reduce the sounds from this equipment*." The meeting was scheduled and held at the New Trier High School, on 03/01/2021, with Mr. Florey, the Districts' representatives - Mr. Conway, and Mr. Linke, and the Kruks present. In the meeting, the District admitted that additional work is needed on the dust collector and the rooftop units, but refused to provide any updates. The District also refused to provide copies of all sound measuring reports and surveys that were requested.

11. Mr. Florey has also made another claim that "Kruk has made various generalized claims regarding noise, including unspecified claims regarding the back up generator and trash compactors, but presented no evidence in support of any of these allegations"
Therefore, the following specific video clips are presented as evidence:

- Back up generator - runs for 20 mins - every Friday - **Exhibit V3**
- Trash compactors - at 2:19 am - loud activity in service dock nightly - **Exhibit V2**
- Trash compactors picked up and dropped multiple times during the day - **Exhibit V1**
- Ground level grate basement fans at 5:20 am - **Exhibit V4**

Argument

The District's motion for summary judgment must be denied because the pleadings, admissions on file, together with the affidavits, show that there is a genuine issue as to material facts discussed here.
The District has not proven the dust collector compliance at relevant elevation of 15 -18 feet above the ground to be measured at 124 Woodland Ave. and at neighboring homes located at even closer proximity to the noise generating equipment.
Marginal measurements below the limit of less than 3 percent of the limit value are unacceptable and require future periodic retests as part of continuous surveillance.
In the previously undisclosed December 20, 2019 report submitted within the motion for summary judgment, the District revealed that rooftop cafeteria fans are non-compliant with the Illinois Nighttime Limits.

As it pertains to the dust collector:

After two years of running the non-compliant equipment the District installed the barrier wall in Nov 2019 in an effort to reduce the noise coming from the dust collector below allowable limits. Subsequent testing on December 13, 2019 showed continued non-compliance, see **Exhibit 2R**(December 20, 2019 Shiner report)

Robbins Schwartz December 20, 2019

Table 1. Results of December 13, 2019 Environmental Noise Measurements (4:20 a.m. to 5:20 a.m.)

Octave Band Sound Pressure Level, dB re 20 µPa

	31.5	63	125	250	500	1000	2000	4000	8000	Awt
All Off 4:27 a.m. (early ambient)	51	51	48	44	44	39	26	14	14	43
1. Condensing Unit 4:29 a.m.	49	52	53	46	43	39	27	16	14	45
2. Energy Recovery Units 4:37 a.m.	51	51	50	45	44	39	22	16	18	45
3. Cafeteria Fans 4:40 a.m.	54	43	53	48	45	41	26	17	17	46
Illinois Nighttime Limit	63	61	55	47	40	35	30	25	25	44
Dust Collector above Limit										
4. Normal day equipment 4:55 a.m.	51	53	53	48	45	41	27	16	13	46
5. Fume Hoods 4:59 a.m.	50	51	53	48	44	41	27	18	18	46
6. Dust Collector 5:04 a.m.	58	65	56	56	49	44	42	36	27	52
All Off 5:16 a.m. (late ambient)	51	54	53	48	46	43	34	25	15	47
Illinois Daytime Limit	72	71	65	57	51	45	39	34	32	55

1. Sound levels must be tested at relevant elevation.

It is important to note, that in order to accurately measure the noise and the noise impact, the testing was performed with the microphone elevated to a hight of 15 to 18 feet “to simulate the noise heard at the second floor of residences” since the dust collector motor is elevated more than 10 feet above the ground, see **Exhibit 1R** and **Exhibit 2R.**
This protocol to test with microphone positioned at 15 to 18 feet above the ground is critical in measuring the true impact of the noise heard at 2 story + homes across the street. Therefore as such, it was established as a benchmark for testing and a must to measure the true impact of the noise. The houses on Woodland Ave are also elevated several feet from the street level.

Exhibit 1R excerpt

The following instrumentation was used on both dates:

- Norsonic 140 integrating sound level meter/real time analyzer
- Nor 1225 1/2 inch condenser microphone
- Nor preamplifier 1209/13239
- Nor 1251 Sound Calibrator
- Tripod, extension cable, windscreen

Rooftop Mechanical Equipment

On May 31, 2018, we used a fiberglass mast attached to a heavy duty tripod to elevate the microphone to a height of 18 feet above ground level in order to simulate noise heard at the second floor of residences. Conditions were dry on the night of Thursday, May 31, 2018 with no precipitation. Roadways were dry. The temperature remained constant at 71° F and the wind was calm. As the study progressed, noise from traffic and birds increased.

Since noise from fans and other rooftop mechanical sources is steady-state (does not vary with time), we conducted a series of 20 second-long readings under various equipment operating conditions in order to determine the energy average sound level (Leq). We conducted measurements when transportation noise was at its lowest. Readings were initially taken with equipment in normal nighttime operation and then then with all equipment briefly shut off. For reporting purposes, we chose the 20 second reading with the lowest overall sound level. In this way, the chosen reading was least influenced by transportation noise. It should be noted that readings taken with New Trier equipment operating also include contribution from transportation noise sources.

Exhibit 2R excerpt

On the early morning of Friday, December 13, 2019, we returned to the school to conduct additional acoustical testing. The purpose of this testing was to reduce interference due to traffic noise and document property line sound levels due to New Trier rooftop and loading dock mechanical equipment operated during the nighttime and daytime hours. Previous dust collector readings were conducted on November 15, 2019, July 12, 2019, July 25, 2015 and May 31, 2018.

Acoustical Measurements

We again conducted sound level readings at the west edge of the public sidewalk at the north property line of 124 Woodland Ave. on Friday, December 13, 2019 between 4:20 a.m. and 5:20 a.m. This time was chosen to be a period when car traffic would be at a minimum.

We used the following instrumentation for these measurements:

- Norsonic 140 integrating sound level meter/real time analyzer
- Norr 1225 1/2 inch condenser microphone
- Norr 1209 preamplifier
- Nor 1251 Sound Calibrator
- Windscreen

A fiberglass mast was used to elevate the microphone to a height of 15 feet above ground level in order to simulate noise heard at the second floor of the 124 Woodland Avenue residence. Conditions were dry with no precipitation. Roadways were dry. The temperature decreased from 37° F to 36° F during the measurements. The wind was WSW at 6-7 mph. Traffic noise from the Edens Expressway, 2 miles to the west was audible. As the study progressed, noise from local and expressway traffic increased.

a. When it became apparent that the ultimate fix - the barrier wall failed to reduce the noise below the limits and compliance was out of reach, the District's solution to the problem was to deviate from previously established testing protocols by placing the microphone at an irrelevant elevation of 4.5 to 5 feet above the ground (instead of the needed 15 to 18 feet above the ground) in an attempt to show marginal compliance(to produce a sound report with noise levels just minimally below the limits).
see **Exhibit 3R**(June 24, 2020 Shiner report)

Exhibit 3R excerpt

Measurements

The measurements were taken on the public sidewalk at the northeast corner of the property line of 124 Woodland Ave. on Thursday, June 18, 2020 starting at about 4:00 p.m. We used a Norsonic 140 integrating sound level meter and real time analyzer to conduct the measurements. The microphone was positioned at about 5 feet above ground level. Conditions were a temperature 87°F, relative humidity 26 to 27%, and calm to light wind speed.

The sound level meter and calibrator carry current laboratory calibration. Field calibration was performed prior to and following the measurements, and there was a 0.2 dB difference in the calibration level.

Background sound level readings were conducted at the beginning of the study, with the meter paused for transient events such as passing vehicles, aircraft overflights, trains, and pedestrians.

Table 1. June 18, 2020 Sound Measurements

2 decibels below the limit of 71 - measured with microphone at 5 feet instead of 15 to 18 feet above the ground

	Sound Pressure Level, dB re 20 µPa									
	Octave Bands									Awt
	31.5	63	125	250	500	1000	2000	4000	8000	
All daytime equipment as measured	60	69	61	51	44	41	35	30	23	50
All equipment off (background sound)	55	57	51	45	41	41	35	28	22	45
All daytime equipment (corrected for background sound)	58	69	61	50	42	ind	ind	ind	ind	48
Illinois daytime limit	72	71	65	57	51	45	39	34	32	55
Exceedance	0	0	0	0	0	0	0	0	0	n/a

Note: 'ind' indicates that equipment noise and background noise were within three dB and were therefore indistinguishable

b. It is the burden of the District to prove that the dust collector operates below allowable limits measured at relevant elevation of 15 to 18 feet above the ground “to simulate the noise heard at second floor of residences”. The District has not yet provided proof the that they are in compliance with Illinois noise limits at the relevant elevation.
The report showing marginal compliance achieved using microphone positioned at 5 feet above the ground is not a proof of compliance at the relevant elevation of 15 to 18 feet above the ground.

2. Sound levels will be higher at properties closer to the noise source.

a. Other properties along Woodland Ave are in closer proximity to the dust collector, and therefore, they are exposed to higher levels of noise by virtue of proximity. Per the District’s lawyer’s orders, the testing was to be limited to only one location, intentionally omitting the residents’ houses closest to the source of the noise.

The District has been taking on the position that they will only test at Kruk property because Kruk is the only source of complaint.

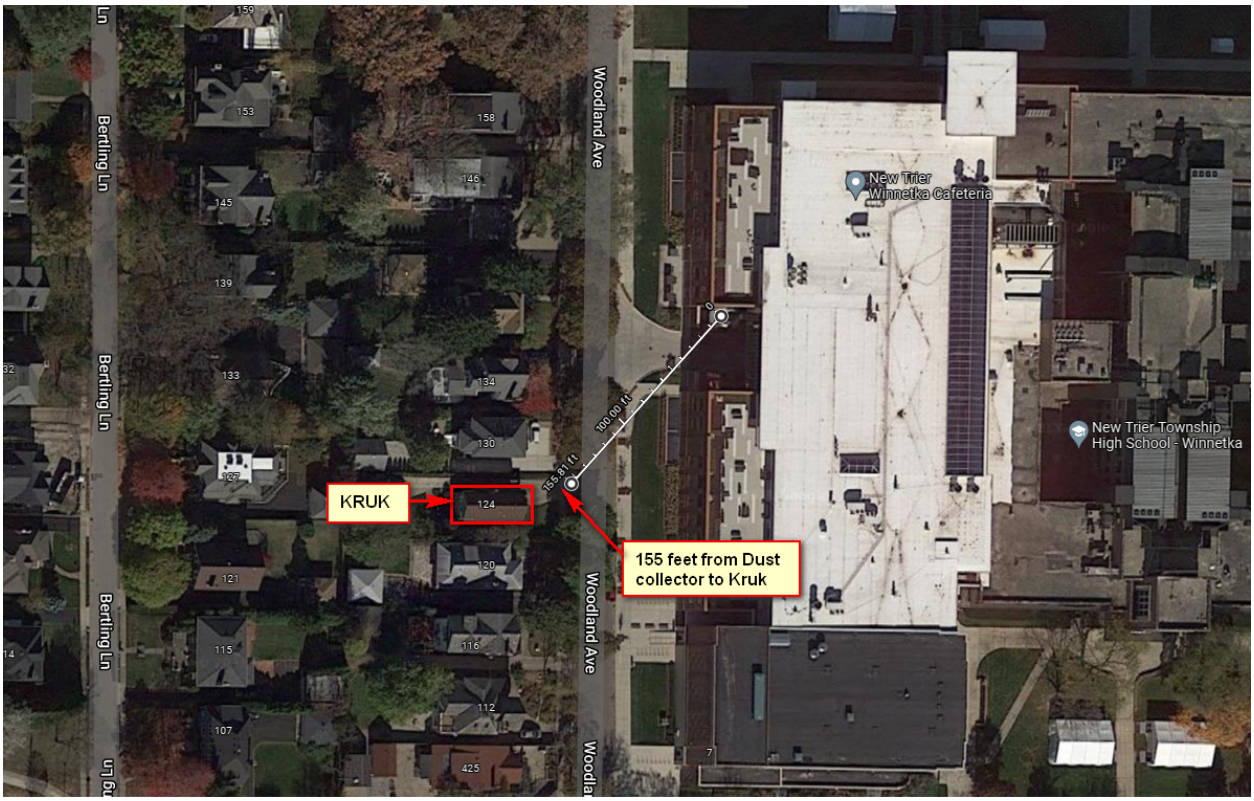
The District disregarded multiple requests to test the noise in front of other homes closer to the dust collector, at all affected locations and relevant elevation to address the noise in good faith. As a result, other neighbors, as mentioned above, residing at locations closer to the noise source stepped forward and were added to the complaint, see **Exhibit 4R**(Amendment to PCB 2020-010)

It is critical to include other residents whose properties are located closer to the dust collector to ensure compliance all around. All neighbors are entitled to be protected by EPA Laws and Regulations.

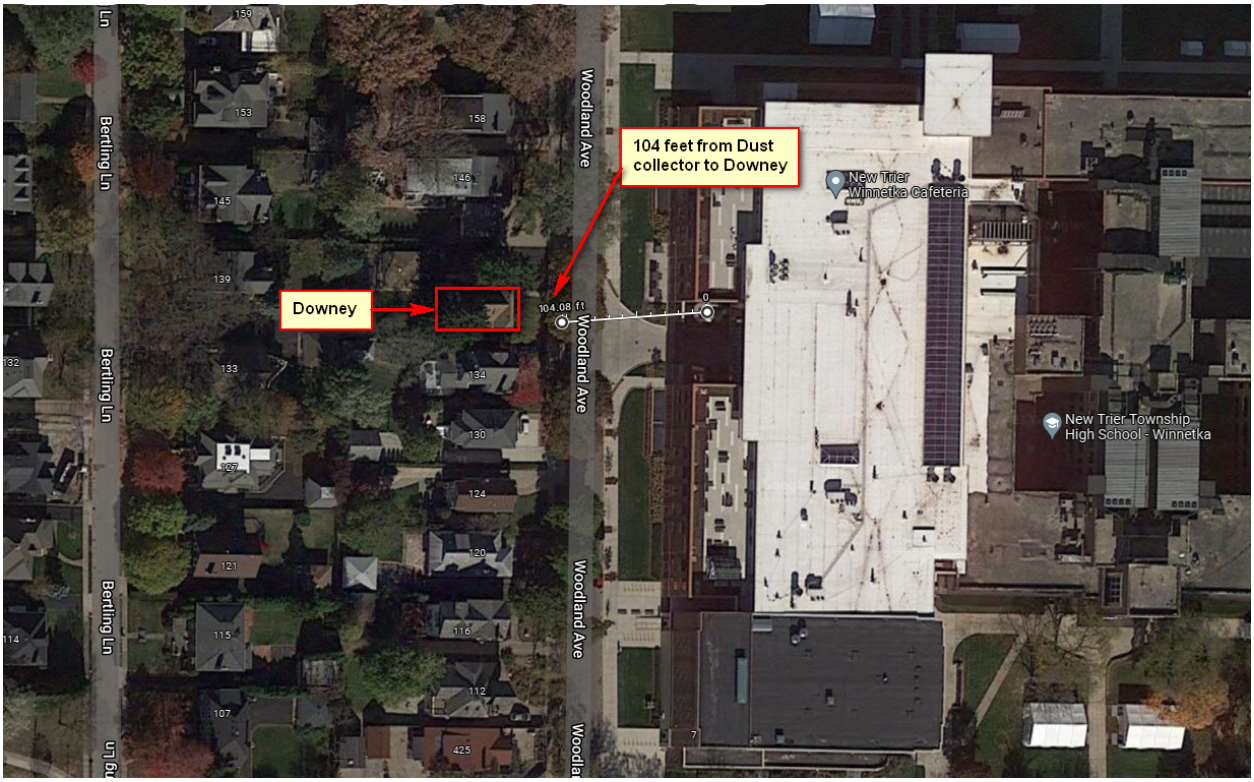
b. It is the burden of the District to prove that they are compliant at Walsh and Downey properties in addition to Kruk property, as added to PCB 2020-010. Both Walsh and Downey residences are located closer to the dust collector.
Its is also the logical, ethical, and above all safe thing to do.

Below google maps show the distance from dust collector to Kruk property is 155 feet.
The distance from dust collector to Downey property is 104 feet.

Google maps indicating the distance from dust collector to Kruk property -155 feet



Google maps indicating the distance from dust collector to Downey property at 138 Woodland Ave - 104 feet



c. Suffice to say, the sound levels will be higher 104 feet away from the dust collector as compared to 155 feet away. Furthermore, using a scientific method, namely, Inverse Square Law, sound levels can be estimated according to distance. For example, even with microphone positioned at 5 feet above the ground, the projected decibel levels at Downey property exceed the noise limit, see below. Naturally, decibel levels will be higher when using microphone at relevant elevation.

Estimating Sound Levels With the Inverse Square Law

In the real world, the inverse square law is always an idealization because it assumes exactly equal sound propagation in all directions. If there are reflective surfaces in the sound field, then reflected sounds will add to the directed sound and you will get more sound at a field location than the inverse square law predicts. If there are barriers between the source and the point of measurement, you may get less than the inverse square law predicts. Nevertheless, the inverse square law is the logical first estimate of the sound you would get at a distant point in a reasonably open area.

$$\frac{I_2}{I_1} = \left[\frac{d_1}{d_2}\right]^2$$

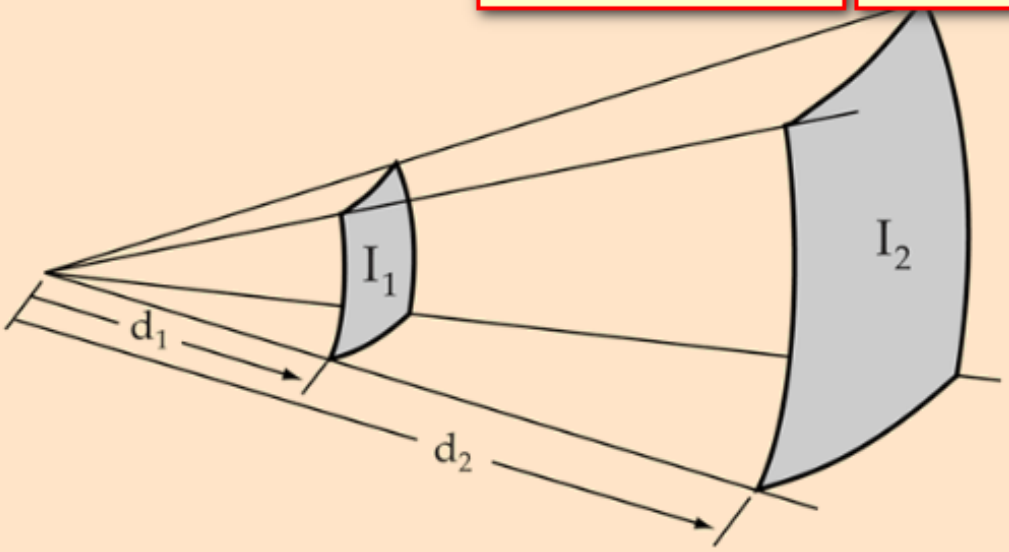
If you measure a sound level I_1 = 72.46596 dB
at distance
d_1 = 31.6992 m = 104 ft
then at distance
d_2 = 47.244 m = 155 ft
the inverse square law predicts a sound level
I_2 = 69 dB

Estimated decibel level at Downey property above the limit of 71

Distance to dust collector from Downey property

Distance to dust collector from Kruk property

Decibel level at Kruk property as reported



You can explore numerically to confirm that doubling the distance drops the intensity by about 6 dB and that 10 times the distance drops the intensity by 20 dB.

Auditorium acoustics

3. Sound levels get higher over time.

a. The dust collector was also tested by Shiner on 07/25/2018 and 07/12/2019. The results showed that the noise from the dust collector has increased when tested on 07/12/2019, almost a year later as compared to 07/25/2018, see **Exhibit 11R** (Shiner report 11/18/2019) It is an indication that this equipment has and will become louder with time. In fact, it got louder by 3 dB in 31.5 Hz band and 5 decibels in the 63 Hz band - 73 vs. 68 in less than a year time span.
As a reminder the District is hoping to dismiss the case based on a reading of 69 vs.71 dB limit in the 63 Hz band.

Table 1. Results of Study – New Trier High School New Building – Dust Collector
124 Woodland Ave. – Previous Measurements

Octave Band Sound Pressure Level, dB re 20 µPa

	31.5	63	125	250	500	1000	2000	4000	8000	Awt
5/31/18 Dust Collector	68	70	65	62	51	44	44	43	41	57
7/25/18 Dust Collector	57	68	62	57	50	44	44	41	36	54
7/12/19 Dust Collector	60	73	63	59	49	43	43	39	34	56
11/15/19 Dust Collector	**59**	**65**	**58**	**55**	**47**	**41**	**39**	**33**	**26**	**50**
Illinois Daytime Limit	72	71	65	57	51	45	39	34	32	55

Dust collector gets louder approximately a year later as compared to 2018 values above

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b. Therefore, unless significant compliance is attained in all octave bands during testing at relevant elevation and at all properties affected, marginal measurement below the limit of less than 3 percent of the limit value would be unacceptable and require periodic future retests as part of required continuous surveillance.

As it pertains to roof top cafeteria fans:

1. a. Roof top cafeteria fans still operate above the the Illinois Nighttime limit, see **Exhibit 2R** (December 20, 2019 Shiner report)“Cafeteria fans run from approximately 4:30 a.m. to 9:30 a.m.” as per same report**,** therefore cafeteria fans are subject to and exceed Nighttime Limits, see **Exhibit 2R.**

b. It is the burden of the District to prove that the cafeteria fans operate below the Nighttime limits. The District has been unable to provide evidence the that they are in compliance with Illinois noise limits when it comes to operating cafeteria fans.

Mr. Florey claims that “the rooftop equipment was within compliance of Illinois standards” and yet presents a report within his motion for Summary Judgment that clearly indicates that the rooftop cafeteria fans exceed the Illinois nighttime limits.

c. Moreover, he presents no further evidence that the cafeteria fans are within compliance of Illinois standards.

Exhibit 2R excerpt

The following mechanical equipment was measured:

- dock condensing unit,
- rooftop energy recovery units (ERU's),
- rooftop cafeteria fans (with normally operating nighttime equipment),
- normally operating daytime equipment,
- fume hoods (with normally operating daytime equipment) and
- dust collector (with normally operating daytime equipment).

1. Dock Condensing Unit – This condensing unit periodically cycles on during the day and night. Although audible, we found the condensing unit to be in substantial compliance with the Illinois nighttime regulation limits. Sound levels in the 500 and 1000 Hz bands exceeded the Illinois limits but were at or below the early morning measured ambient.

2. Energy Recovery Units (ERU's) – Energy recovery units operate continuously during the night. Sound levels in the 500 and 1000 Hz bands exceeded the Illinois limits but were at or below the early morning measured ambient. We believe that these units are in compliance with the Illinois limits.

3. Cafeteria Fans (with ERU's operating) – Cafeteria fans run from approximately 4:30 a.m. to 9:30 a.m. when there is cooking in the kitchen. Sound levels measured at 4:40 a.m. in the 500 and 1000 Hz bands exceeded the Illinois nighttime limits but were below the late morning ambient.

Exhibit 2R excerpt

Robbins Schwartz December 20, 2019

Table 1. Results of December 13, 2019 Environmental Noise Measurements (4:20 a.m. to 5:20 a.m.)

Octave Band Sound Pressure Level, dB re 20 µPa

Cafeteria Fans above Limit

	31.5	63	125	250	500	1000	2000	4000	8000	Awt
All Off 4:27 a.m. (early ambient)	51	51	48	44	44	39	26	14	14	43
1. Condensing Unit 4:29 a.m.	49	52	53	46	43	39	27	16	14	45
2. Energy Recovery Units 4:37 a.m.	51	51	50	45	44	39	22	16	18	45
3. Cafeteria Fans 4:40 a.m.	54	43	53	48	45	41	26	17	17	46
Illinois Nighttime Limit	63	61	55	47	40	35	30	25	25	44
4. Normal day equipment 4:55 a.m.	51	53	53	48	45	41	27	16	13	46
5. Fume Hoods 4:59 a.m.	50	51	53	48	44	41	27	18	18	46
6. Dust Collector 5:04 a.m.	58	65	56	56	49	44	42	36	27	52
All Off 5:16 a.m. (late ambient)	51	54	53	48	46	43	34	25	15	47
Illinois Daytime Limit	72	71	65	57	51	45	39	34	32	55

Conclusion

Heather Walsh, Cris Downey, Marek Kruk and other affected residents together with their families respectfully request that Pollution Control Board continues to enforce the EPA noise rules and regulations that are put in place to protect the public and subsequently enter judgment in favor of Marek Kruk and Woodland avenue residents.
The District must be directed to take whatever steps are necessary to bring the noise levels below the limits at relevant elevation and in front of all affected Woodland Avenue residents. The District should also be required to test noise levels periodically to ensure compliance moving forward.

Thank you,

Marek Kruk
On behalf of
Heather Walsh
and Cris Downey