

March 29, 2019

Attention: Economic and Community Development Committee
City of Toronto
City Hall

RE: EC3.6 NOISE BY-LAW REVIEW - PROPOSED AMENDMENTS TO CHAPTER 591, NOISE

Attention: Councillor Michael Thomson, Chair and Economic and Community Development Committee Members,

Having deputed on the noise by-law before, participated in all MLS¹ Noise Working Groups and attended 3 of the 5 public consultations, I was taken aback that MLS didn't recommend infill construction and garden equipment noise mitigation or improving enforcement. I feel surveys, enforcement challenges, reports and industry feedback were used to make excuses for doing little. Noise is a health issue and should be treated like smoking, cancer SARS or AIDS; not an economic development one.

Toronto Public Health's report, **How Loud Is Too Loud, Health Impacts of Environmental Noise in Toronto** concluding noise adversely impacts public health, was ignored. The public consultations wasted taxpayer time and money, providing cover for City Hall to avoid tough regulations. The implied function of government is protecting the public first and foremost. Strong public health regulations and healthy people make Toronto a vibrant city; not generating ear-splitting harmful noise for private gain. Industry will innovate to handle regulations but people don't adapt to noise.

The US Centres for Disease Control's website states:

*"Noise exposure is the second most common cause of hearing loss. (Aging is first.) The louder a sound is and the more often a person is exposed to it, the more likely it will damage hearing. Common activities in homes and communities—such as using gas-powered lawnmowers or leaf blowers or attending a rock concert or ball game—can cause permanent hearing loss. Once hearing is gone, it's gone forever."*²

In our neighbourhood, peace and quiet are routinely shattered for half a year or more by these 90+ dB gas powered machines broadcasting toxic fumes, GHG emissions, dust and debris while blowing clippings off driveways, roads sidewalks and lawns and leaf litter from flower beds. These actions serve no useful gardening function.

Despite abundant scientific and medical research and residents' leaf blower complaints MLS accepted industry's claim that:

"banning leaf blowers could cause significant cost increases to businesses and consumers. If businesses were to rely on the physical removal of leaves (that is, raking) or less efficient leaf

¹ Municipal Licensing Services Division, City of Toronto

² <https://www.cdc.gov/media/dpk/injury-violence-safety/noise-induced-hearing-loss/hearing-loss.html>

blower models (that is, battery operated) it could increase the time and cost to complete a task.”

TransformTO’s report states:³

*“Through our investigation of strategies taken by other jurisdictions, it was discovered that the majority of other cities, who have addressed concerns related to small engine equipment use, have done so through the use of noise regulations. **We believe this is the most feasible option for the City of Toronto as well.**”*

But MLS doesn’t recommend this. Its Jurisdiction Scan omitted Vancouver’s leaf blower free zone, Beaconsfield, PQ and about 40 US cities prioritize public health by banning/restricting this equipment, most recently Washington DC. Unlike Toronto, Santa Monica has also developed and operates an effective leaf blower enforcement system. See Exhibit C

Beaconsfield Quebec’s website states⁴:

“..., leaf blowers will be allowed from October 1 to May 31. By steering their usage, the City of Beaconsfield minimizes the most important health risks and pollution problems caused by these tools while permitting them for spring cleaning and leaf pick-up in the fall.

*Both types of leaf blowers (electric and gas-powered) generate decibel levels well above the limit (55 decibels) recommended by the World Health Organization (WHO) and the **Département de santé publique de Montréal (DSP). Electric leaf blowers generate an average of 80 decibels while gas-powered leaf blowers produce up to 115 decibels. The noise levels vary between 62 to 75 decibels at a distance of 15 metres (49 feet) from a leaf blower in use.***

The blower emits air at a velocity varying between 240 to 450 kilometres per hour. The powerful and centred air jets propel particles that are up to ten times finer than the limit of 2.5 micrometres established by the WHO, beyond which they may provoke cardiovascular and respiratory diseases, and cancer. The ultrafine particles are composed of fecal matter, pollen, mould spores and various chemical substances (insecticides, herbicides, fertilizer, etc.).

*Laboratory testing has further demonstrated that gas-powered two- and four-stroke leaf blowers release high pollutant emissions into the air; depending on the pollutants in question, the emission levels may be 6.8 to 300 times higher than those caused by an 8-cylinder truck engine. **These findings show that, in terms of pollutant emissions, operating a leaf blower for 30 minutes is equivalent to driving a full-size pick-up truck for 6,255 kilometres (3,887 miles) under regular conditions. (See also Exhibit A) According to WHO and DSP, air pollution is responsible for the premature death of 4.2 million people worldwide, and of 1,500 citizens in Montréal.**”*

³ Evaluation of potential additions to TransformTO Report #1Strategies, Transform TO. Toronto Energy and Environment

⁴ <https://www.beaconsfield.ca/en/what-s-new/16436-leaf-blowers-new-regulation-to-protect-health-and-promote-sustainable-development>

Noise By-law improvements required to protect Torontonians health:

1. Treat mechanized garden equipment noise and emissions as a public health threat and ban/regulate it **in residential neighbourhoods**. This noise is currently legalized assault on everyone within earshot. Gas leaf blowers are identified as harmful noise sources by the [US Centers for Disease Control, US EPA](#) as well as the [National Landscape Industry Association](#).⁵
2. Ban/restrict leaf blowers as many US and Canadian municipalities do. That lawn and garden equipment sound remains higher than WHO outdoor daytime sound level standards of 55 dB(A), out to 800 feet from the point of operation, raises concerns regarding impact on communities.⁶ Vulnerable populations susceptible to these sounds include workers, children, the elderly, the sick, those working from home, and those working overnight shifts.⁷ As the National Association of Landscape Professionals' Instruction Guide states:
"Is our Equipment noisier than 85 dB? Yes most of it. Some of our equipment is 1,000 times noisier".⁸
3. Emulate Santa Monica CA. Its Leaf Blower Enforcement Update May 8, 2017 is a model for Toronto. Santa Monica succeeds by educating the public about gas leaf blower noise damage and alternatives, imposing higher fines, ticketing offenders and hiring adequate staff. (See Exhibit C)
4. Emulate Beaconsfield PQ's [New Regulation to Protect Health and Promote Sustainable Development](#).
5. Heed Environment Canada's data, the California Air Resources Board's and other environmental authorities' conclusions that small gas engine emissions are significant. Disregard Energy and Environment's Transform Toronto conclusions.⁹ See Exhibit A.

Other Comments:

6. Property owners can save \$ having contractors leave organic matter decompose as nutrients in flowers beds. Garden expert Mark Cullen advises: *"Over the spring months, those leaves disappear as ...worms convert them into nitrogen-rich... ..castings. Better for your garden,... less work, saves the municipality i.e. Toronto, money."*¹⁰
7. ML&S licencing, enforcement and permits comprised 0.077% of Toronto's 2017 budget. I was unable to get the noise enforcement budget but it's probably pennies per person.). Weak enforcement regs inflate health care costs for 3 levels of

⁵ [Low Frequency Noise May Account for the Intolerability of Gas Leaf Blowers](#) Jamie Banks, PhD, and Erica Walker, PhD, The Quiet Coalition, Feb 16, 2018

⁶ [Characteristics of Lawn and Garden Equipment Sound: A Community Pilot Study](#), Journal of Environmental and Toxicological Studies, 2017 Erica Walker and Jamie L Banks,

⁷ [Characteristics of Lawn and Garden Equipment Sound: A Community Pilot Study](#), p. 4

⁸ [Guide to Instruction](#), PLANET Professional Landcare Network, p.5

⁹ Environment and Climate Change Canada [Air Pollutant Emission Inventory Search \(Results\)](#) <https://pollution-waste.canada.ca/air-emission-inventory/>

¹⁰ [How Canadian gardening has evolved](#) Mark and Ben Cullen, Toronto Star, Aug. 5, 2017

government while minimizing potential penalty/fine revenues. Not a good business plan. (see below)

MLS Enforcement Budget Estimate for 2017	
Total MLS Enforcement, Licensing and Permit Budget 2017	\$8,500,000
Toronto Budget 2017	\$10,970,000,000
ML&S as a percentage of total Toronto budget	0.077%
Assumed enforcement portion (one third)	0.026%
Assumed total MLS enforcement budget	\$2,833,333
Toronto Est. population 2017	2,810,000.00
\$1/person for all MLS enforcement therefore noise enforcement just pennies/person.	

8. Since the Police and the OAGC abandoned noise by-law enforcement, ML&S must provide even stronger, credible, timely and fully funded enforcement.
9. Require contractors mitigate construction noise on sites abutting residential properties. New York City requires construction noise mitigation plans as a condition for building permits. Ban standby gas generators when Toronto Hydro is available. Abusive industrial strength construction noise must not plague neighbours so contractors can cut corners.
12. Limit unit air conditioner noise to 50 dBA maximum at lot lines abutting residential properties. Quiet units are available. Mandate acoustic abatement measures for loud units. People shouldn't suffer because builders cut corners.
13. Noise regulations must reduce dBA levels to achieve WHO recommended maximums of 40 dBA night time and 55 dBA days and evenings and safe noise levels for public health.

Toronto draws economic and social vibrancy from healthy people. It has an obligation to protect our health. Why compromise noise regulations and enforcement?

Sincerely,



Harold Smith, B. Arch, MBA, LEED AP,
Former Architect, Licensed July 23, 1973 to Dec. 31, 2015
Director Lytton Park Residents Org. Inc.
Toronto Noise Coalition member,
150 Hillhurst Blvd. Toronto, ON, M5N 1N8

cc Mayor Tory, Dr. Eileen DeVilla, Medical Officer of Health, Toronto Noise Coalition, Councilor Mike Colle, Josh Matlow, Lytton Park Residents Org. Inc., Bedford Park Residents Organization, SAHRA, Toronto Noise Coalition, FoNTRA

EXHIBIT A – REBUTTAL TO TORONTO ENERGY AND ENVIRONMENT’S POSITION THAT SMALL ENGINE POLLUTION IS TOO INSIGNIFICANT TO REGULATE.

Energy and Environment’s Transform Toronto stated that:

“total amount of emissions from small engine equipment in relation to other sources (e.g. transportation, heating equipment in buildings) is most likely very small.”

Their report: Evaluation of potential additions to TransformTO Report #1 Strategies did not supply data backing up their assertion nor did they perform any research. Please see the report excerpts below from that report with my comments in **bold black**:

“2c. Air Quality Implications of the Small Engine Equipment

“The total amount of emissions from small engine equipment in relation to other sources (e.g. transportation, heating equipment in buildings) is most likely very small.

“There is limited research on the direct impacts of the use of leaf blowers on health; the health evidence available looks at overall exposure to air or noise pollution, rather than health impacts from specific sources.”

The California Air Resources Board’s limited testing, being followed up with a more formal study, suggests that the equipment operators were exposed to at least 10 times more ultrafine particles than if they were standing beside a busy roadway.¹¹

See all of Dr. Sheela Basrur’s OC, (former Medical Officer of Health reports)¹² outlining the adverse impacts of gas powered garden equipment on health.

The Massachusetts Medical Society when referring to mechanized garden equipment, stated: “The use of these powerful engines exposes workers and bystanders to harmful sound levels, toxic and carcinogenic exhaust and ground sourced materials that can cause ... hearing damage...respiratory and cardiovascular disease, and cancer. it notes the negative impact ... on quality of life, communication and social interaction, work productivity, and psychological wellbeing”¹³

“There has been significant improvement in technology and emissions standards for modern small engine equipment (Federal emission standards are now aligned with the US EPA Phase 3).”

When price is a consideration and in the absence of regulations, lawn maintenance contractors will buy based on price; not reduced emissions and noise.

According to Michael Benjamin, California Air Resources Board, in just three years' time, the biggest single ozone polluter in the state is going to be all this gardening equipment.¹⁴

¹¹ Noisy, But That’s Not All Leaf Blowers Flagged as Prodigious Polluters -- And Possible Health Threat, Stuart Silverstein and Anna Boiko-Weyrauch, Fairwarning September 19, 2017, www.fairwarning.org/2017/09/leaf-blower

¹² Leaf Blowers and other Lawn/Garden Equipment: Noise, Air Pollution and Regulation, Dr. Sheela V. Basrur, Medical Officer of Health, Toronto, July 3, 2001,

¹³ Massachusetts Medical Society: No to noisy leaf blowers, Jamie L. Banks PhD, Silencity, May 19, 2017

¹⁴ California Weighs Tougher Emissions Rules For Gas-Powered Garden Equipment, David Gorn, NPR, Feb. 28, 2017

"2d. Recommended approach

Based on available research, not enough evidence exists to make a strong link between the use of small engine equipment and air quality and climate change concerns. Thus restricting the use of such equipment from an environmental perspective does not appear to be a justifiable approach."

a) Contradicted by the California Air Resource Board (CARB) actively pursuing new rulemaking to reduce emissions from new small off-road engines significantly below the current US EPA Phase 3 standards. They are in the early stages of the rulemaking and do not expect to go to our Board until 2020 with full benefits of the rule (80% reduction in emissions) expected by 2031. (See the enclosed email from Michael Benjamin of CARB to H. Smith, Exhibit. D) That means at least 12 more years of small engine pollution in California. In Toronto that will be even later!

b) Contradicted by Beaconsfield Quebec's website.¹⁵

c) Contradicted by Environment Canada's data (Exhibit B) and the enclosed article Journal of Environmental and Toxicological Studies¹⁶ (Exhibit E)

"MLS is currently reviewing the Noise By-law, engaging with stakeholders through surveys and public consultations, and presenting a report to the Licensing and Standards Committee in the fall of 2017. That report will evaluate the feasibility of additional regulations to govern the use of gas powered small engine equipment."

MLS still recommends allowing leaf blowers with unrestricted noise levels within allowable hours 365 days a year. Contrast this with the City of Santa Monica which states¹⁷:

"Beyond the noise and the annoyance, leaf blowers pose multiple health risks to the community and the operator. These devices are so inefficient they emit more pollution than a car and blow a mix of fine particles into the air we breathe. Our education-driven enforcement plan should make Santa Monica a little healthier as well as quieter," said Dean Kubani, director of the City's Office of Sustainability and the Environment. In what belies commonly held perceptions on air pollution, an individual gas powered leaf blower, those often used by professional gardeners, emit 500 times the level of hydrocarbons than a modern automobile (CA Air Resources Board). The added air pollution is significant and affects tens of thousands of healthy and vulnerable Angelinos, especially troubling asthmatics and allergy sufferers. With a muzzle velocity up to 150 miles per hour, blowers further impact our air quality by blowing fine particles of fertilizers, pesticides, and other contaminants up from the ground into the air. Noise is also a serious issue, a gas-powered blower creates up to 70 decibels of nerve-racking noise at 50 feet. Reducing noise pollution continues to be a high priority for homeowners and renters alike, especially those with small children, or individuals with home offices. Noise from blowers also scares our local wildlife, especially birds.

¹⁵ www.beaconsfield.ca/en/what-s-new/16436-leaf-blowers-new-regulation-to-protect-health-and-promote-sustainable-development

¹⁶ Characteristics of Lawn and Garden Equipment Sound: A Community Pilot Study, p. 4 Journal of Environmental and Toxicological Studies, 2017 Erica Walker and Jamie L Banks

¹⁷ New Leaf Blower Ban Enforcement Measures Take Effect This Week, City of Santa Monica, Office of Sustainability & the Environment, October 26, 2010

See enclosed Exhibit "B" Environment Canada's 2015 Air Pollutant Emission Inventory statistics. The table on page 6 indicates the total contribution VOC and CO in Ontario in 2015 due to total transportation is 1273271.4 tonnes.

VOCs from off-road gasoline/LPG/CNG vehicles and equipment contributes 50% of total transportation air pollutant emissions. CO from off-road gasoline/LPG/CNG vehicles and equipment contributes 48.5% of total transportation air pollutant emissions

In my opinion off-road engine pollution which includes gas powered lawn and garden equipment is a significant polluter.

5/11/2017

Environment and Climate Change Canada - Air Pollutant Emissions - Air Pollutant Emissions Inventory Search Results

SECTORS	SUB-SECTORS	TPM (tonnes)	PM ₁₀ (tonnes)	PM _{2.5} (tonnes)	SO _x (tonnes)	NO _x (tonnes)	VOC (tonnes)	CO (tonnes)	NH ₃ (tonnes)	Pb (kg)
Light-duty diesel trucks		3	3	3	1	178	152	2 045	4	-
Light-duty diesel vehicles		4	4	4	1	276	236	2 851	6	-
Light-duty gasoline trucks		386	386	341	262	18 122	13 246	183 106	915	-
Light-duty gasoline vehicles		377	377	333	203	13 753	14 218	154 908	990	-
Light duty LPG/NG vehicles		-	-	-	-	-	-	-	-	-
Light duty LPG/NG trucks		-	-	-	-	1	-	6	-	-
Marine Transportation		265	254	234	545	11 552	467	1 128	13	13.1
Motorcycles		7	7	7	1	202	589	3 952	12	-
Off-road diesel vehicles and equipment		3 730	3 730	3 655	35	39 965	4 783	23 038	48	-
Off-road gasoline/LPG/CNG vehicles and equipment		1 644	1 581	1 486	27	10 414	44 835	449 382	30	-
Rail Transportation		580	580	563	87	24 168	1 205	3 506	11	48.7
Tire wear and Brake Lining		3 668	3 668	479	-	-	-	-	-	-
Total Transportation		13 318	13 245	9 548	3 628	212 040	87 985	924 737	2 315	6 365.4
Agriculture										
Animals Production		9 774	2 199	435	-	-	22 640	-	65 131	-
Crop Production		211 289	53 702	21 045	-	-	-	-	11 982	-
	Fertilizer Application	1 733	849	243	-	-	-	-	11 982	-
	Harvesting	16 866	7 666	1 533	-	-	-	-	-	-
	Tillage Practices	176 410	37 046	17 641	-	-	-	-	-	-
	Wind Erosion	16 281	8 141	1 628	-	-	-	-	-	-
Fuel Use		144	120	95	964	1 263	64	429	8	8.9
Total Agriculture		221 207	56 021	21 575	964	1 263	22 703	429	77 121	8.9
Commercial/Residential/Institutional										
Cigarette Smoking		126	126	126	-	-	2	598	25	0.4
Commercial Cooking		1 101	1 069	1 050	772	11 150	581	8 517	72	80.4
Commercial and Institutional Fuel Combustion		1 101	1 069	1 050	772	11 150	581	8 517	72	80.4
Construction Fuel Combustion		31	26	23	58	417	5	81	9	0.8
Home Firewood Burning		42 632	40 370	40 306	697	4 881	56 654	295 659	439	654.3
Human		-	-	-	-	-	-	-	232	-

by the persistent illegal use of leaf blowers throughout the city. The amended ordinance

determined that those responsible for the violation would include property owners, owners and operators of landscaping companies, property management companies and leaf blower operators. The original ordinance held the operators of leaf blowers solely responsible for the violation.

In July 2013, the City's Code Enforcement Division acquired enforcement responsibilities from the Office of Sustainability and the Environment for water conservation, the ban on plastic bags and polystyrene, and the leaf blower prohibition. This report provides an overview of leaf blower enforcement efforts since Code Enforcement acquired these responsibilities. The discussion covers public outreach and education, reactive and proactive enforcement, responsible parties, Santa Monica's leaf blower cases and the leaf blower policies of other local cities.

Discussion

Santa Monica Municipal Code 4.08.270 states:

No person shall operate any leaf blower within the city.

The Code defines a leaf blower as "any motorized tool (gas, electric, or battery-powered) used to propel fallen leaves, grass clippings or debris for removal." Alternatives to leaf blowers include push brooms, rakes, manual leaf sweeping machines and leaf vacuums. Hosing down surfaces to remove leaves or debris is also prohibited.

Public Outreach and Education

OSE provides educational information about the City's leaf blower restrictions on its website (www.sustainablesm.org/leafblower) that includes:

- a summary of the ordinance with a link to the municipal code;
- information on alternatives to motorized leaf blowers;
- information for reporting leaf blower violations;
- downloadable flyers that property owners can provide to their gardeners to help educate them about the ordinance; and

- information about the environmental, noise and health impacts of leaf blowers. In addition to the educational information posted on the OSE website, Code Enforcement officers distribute door hangers (**Attachment B**) to residences throughout the city in areas where alleged violations are reported.

Enforcement Process

Leaf blower cases are distributed amongst the Code Enforcement officers who are responsible for patrolling six geographical areas in the city and for enforcing all violations of the municipal code in their respective areas.

Reactive Enforcement

About 85% of leaf blower cases originate from complaints. Leaf blower complaints are submitted via the Government Outreach (GO) electronic reporting system, and via telephone and e-mail. When a complaint is received by Code Enforcement staff, a case is opened and assigned to the officer who patrols the area in which the reported violation is located.

When reporting the use of a leaf blower, the concerned party is asked to provide the time, date, and place that the violation occurred. This information is necessary because the activity is transitory in nature so, in order to collect the evidence required to prove a violation, the officer may need to make several site inspections to observe the violation. Evidence, such as photographs submitted by the concerned party, are not sufficient to initiate enforcement action. The officer must personally observe the violation in order to take enforcement action.

Once a violation is observed by the officer, the officer will issue an administrative citation to the operator of the leaf blower. The current fine for operating a leaf blower in the city is \$500. The officer will also check to ensure the operator or landscaping company has a business license to operate in Santa Monica and include this violation in the administrative citation if they do not. The current fine for operating a business without the proper City license is \$500.

Proactive Enforcement

Proactive enforcement is conducted during the course of the officer's daily patrol of his/her assigned area. The officer must personally observe the violation, at which point the officer will immediately issue an administrative citation to the operator. Proactive cases comprise about 15% of leaf blower cases.

Responsible Parties

Although the 2010 amendment to the leaf blower ordinance assigned responsibility to property owners, property management companies, and landscaping companies, as well as operators, current practice by Code Enforcement staff in most cases is to cite the individual that the officer observes operating the leaf blower. The primary reasons for this practice are as follows:

- SMMC 4.07.270(a)(2) states that no owner of real property shall allow the operation of a motorized leaf blower on the property. Therefore, Code Enforcement staff must first acquire evidence showing that the property owner is aware that the violation is occurring on their property prior to taking any enforcement action against the property owner.
- The property owner may not reside at the property and may have little to no control over the actions of the gardener contracted to service the property.
- The activity is transitory in nature and it typically requires multiple visits by the officer before a violation can be confirmed. If the officer is then required to make contact with a responsible person (who may not be onsite at the time of the investigation) to give them notice of the regulation as the code requires, staff resources would need to increase before an enforcement action could occur. Code Enforcement does not currently have the resources required to issue warnings to the responsible party prior to issuing a citation.

In August 2015, a property owner was issued an administrative citation after a gardener was observed operating a leaf blower on a property in Santa Monica. The property owner appealed the citation. The hearing officer ruled in favor of the property owner (**Attachment C**), stating that "there was no evidence that the property owner knew that a motorized leaf blower was being used at the property or allowed its usage." This decision affirmed that the assigned officer must obtain evidence proving that the

property owner is aware that the violation is occurring prior to taking enforcement action against the property owner.

When citations are issued to operators of leaf blowers, informational door hangers are secured to the front door of the property. This serves to alert the resident of the property that a motorized leaf blower is being used on the property in violation of the law.

Recurring Violations

If the responsible party fails to cease use of the motorized leaf blower, the officer may issue up to three administrative citations before referring the case to the City Attorney's Office for possible prosecution. To date, no individual or company has been prosecuted for this offense.

Leaf Blower Violations 2014-2016

The table below shows the number of leaf blower cases in each of the past three years. After an uptick in the number of cases from 2014 to 2015, Code Enforcement staff saw a 12% decrease in leaf blower cases in 2016. This decrease is believed to be due to the change in the enforcement policy to the current practice of issuing fewer warnings. During this period, cases remained open an average of three weeks before being closed because the violation was either abated due to enforcement action or unfounded. Over 500 cases were closed after enforcement action was taken and the violation was not found to have recurred.

	Total # of Cases	% Reactive	Total # of Citations
2014	1002	91%	53
2015	1272	82%	254
2016	1118	82%	206

Current Caseload

About 77% of Code Enforcement cases are cases that pertain to substandard conditions that may require the relocation of tenants, as well as work without permit,

early morning construction and various noise violations. The remaining 23% of cases are alleged leaf blower violations.

As of March 31, 2017, there have been 163 leaf blower cases opened since the beginning of the year. At about 50 per month, the current rate is about half of what the division has investigated monthly over the past three years, possibly due to the unusually high rainfall experienced in the area during these months.

Included with this report is a map (**Attachment D**) of current open leaf blower cases in Santa Monica.

Closing Cases

In cases where the leaf blower violation is reported but not confirmed by enforcement staff after three site inspections, the case is closed as unfounded. In cases where the leaf blower violation is confirmed and enforcement action taken, the case is closed when at least two subsequent site inspections have been conducted with no additional violation found. If a violation recurs at the same property after a case is closed, a new case is opened and investigated.

Of the 163 total cases opened in the first quarter of 2017, 78 have been closed. Of the closed cases, 70 were closed because a violation could not be verified, and 8 of the cases were closed after the violation was abated through enforcement action. The remaining 85 cases remain under investigation.

Other Cities' Leaf Blower Policies

Staff reviewed the leaf blower policies of five local cities: Culver City, West Hollywood, Pasadena, Malibu and Los Angeles. Four of the five cities prohibit gas-powered leaf blowers but allow electric or battery-powered blowers. Three of the cities permit the use of leaf blowers during restricted daytime hours. Culver City, Los Angeles and Pasadena join Santa Monica in taking enforcement action primarily against the individual operating the leaf blower, and Santa Monica's administrative fine amount of \$500 for the first violation is considerably higher than the five cities surveyed.

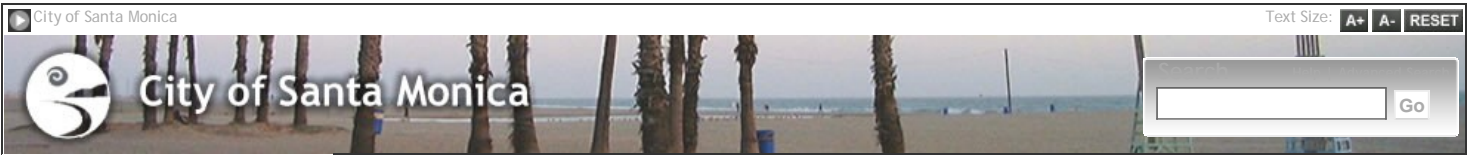
City	Type of Leaf Blower Prohibition	Penalty	Responsible Party
Culver City	Gas-powered leaf blowers prohibited during restricted (night time/early morning) hours. Permit required.	\$100- \$500	Operator
Los Angeles	Gas-powered leaf blowers prohibited	\$100	Operator and Individual who contracted services of the Operator
Malibu	Gas-powered leaf blowers prohibited	None; warning letters issued	Property owner
Pasadena	All leaf blowers prohibited during restricted (night time/early morning) hours; no more than 15 minutes per hour per parcel	\$106, escalates	Operator only
West Hollywood	Gas-powered leaf blowers prohibited only; Electric blowers have restricted hours	\$150 - \$550	Property owner

Summary

Code Enforcement Officers conduct both reactive and proactive investigations of leaf blower cases, which make up about 23% of all Code Enforcement cases.

Current practice is to take enforcement action against the individual who is observed operating the leaf blower. Enforcement action against property owners or residents is less frequent due to the statutory requirement to prove a person other than the operator was aware of the prohibition yet allowed the operator to proceed with using the leaf blower.

Staff has seen a decrease in leaf blower cases since the enforcement policy was changed to the current practice of issuing fewer warnings. In the three years since the Code Enforcement Division acquired enforcement responsibility for the City's law prohibiting motorized leaf blowers, staff has investigated more than 3500 cases and abated over 500 of those cases through enforcement action.



City Hall
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Council Strategic Goals

New Leaf Blower Ban Enforcement Measures Take Effect This Week

FOR IMMEDIATE RELEASE
 October 26, 2010
 Contact:
 Kim O'Cain
 City of Santa Monica, Office of Sustainability & the Environment
 310.458.8459

Beginning this Thursday, October 28, enforcement of Santa Monica's recently updated motorized leaf blower restrictions will be taken over by the City's Office of Sustainability and the Environment (OSE). Originally banned in the early 1990s, motorized leaf blower restrictions were difficult and costly to enforce due to the requirement that the violation be directly observed by a sworn police officer. In order to improve enforcement, Santa Monica's City Council adopted changes to the ordinance to allow OSE staff to issue administrative citations to leaf blower operators, landscaping companies, property owners and/or property managers. OSE's bilingual inspectors will initially focus on public education about the ordinance and about alternatives to using motorized leaf blowers for removing debris from landscapes quickly and economically.

"Beyond the noise and the annoyance, leaf blowers pose multiple health risks to the community and the operator. These devices are so inefficient they emit more pollution than a car and blow a mix of fine particles into the air we breathe. Our education-driven enforcement plan should make Santa Monica a little healthier as well as quieter," said Dean Kubani, director of the City's Office of Sustainability and the Environment.

In what belies commonly held perceptions on air pollution, an individual gas powered leaf blower, those often used by professional gardeners, emit 500 times the level of hydrocarbons than a modern automobile (CA Air Resources Board). The added air pollution is significant and affects tens of thousands of healthy and vulnerable Angelinos, especially troubling asthmatics and allergy sufferers. With a muzzle velocity up to 150 miles per hour, blowers further impact our air quality by blowing fine particles of fertilizers, pesticides, and other contaminants up from the ground into the air. Noise is also a serious issue, a gas-powered blower creates up to 70 decibels of nerve-racking noise at 50 feet. Reducing noise pollution continues to be a high priority for homeowners and renters alike, especially those with small children, or individuals with home offices. Noise from blowers also scares our local wildlife, especially birds.

The Alternatives - Use alternatives like push brooms, rakes, and manual leaf sweeping machines. Leaf vacuums may be an option for larger properties. Hosing surfaces is prohibited.

The Law - No person shall operate any motorized leaf blower within the city (SMMC 4.08.270). A leaf blower is defined as any motorized tool (gas, electric, battery powered) used to propel fallen leaves, grass clippings and debris for removal. Infractions may be punishable by substantial fines to property owners, property management companies, landscape companies and/or individual operators.

Reporting Leaf Blower Use - To report violations please provide an address, date and time of the violation. Staff will promptly follow-up with reported violations in addition to being out in the community educating gardeners and property owners.

Reporting Options:
 GO System: www.smgov.net/go
 Email: code_compliance@smgov.net
 Telephone: (310) 458-4984
 Website: www.sustainablesm.org/leafblower

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Harold Smith

From: Benjamin, Michael@ARB <michael.benjamin@arb.ca.gov>
Sent: Thursday, May 11, 2017 2:00 PM
To: Harold Smith
Cc: [REDACTED]; Dilbeck, Christopher@ARB; MacPherson, Angus@ARB; Miguel, Mike@ARB
Subject: RE: ITEM PE19.4 - TransformTO: Climate Action for a Healthy, Equitable and Prosperous Toronto - Report 2 - The Pathway to a Low Carbon Future

Harold,

Thank you for sharing your concerns and the report about the use of leaf blowers in Toronto. I will forward the information to Christopher Dilbeck, our agency expert on small off-road engines, who will review and provide feedback on what you have provided. As we discussed by phone, the California Air Resource Board (CARB) is actively pursuing new rulemaking that will reduce emissions from new small off-road engines significantly below the current US EPA Phase 3 standards. We are in the early stages of the rulemaking and do not expect to go to our Board until 2020 with full benefits of the rule (80% reduction in emissions) expected by 2031. I should note that CARB does not ban the use of leaf blowers or other equipment but we establish emission standards for new equipment. It is up to local cities in California to decide if they want an outright ban on leafblowers – some have done this or required the use of quieter electric equipment. More information about CARB’s rulemaking activities in this area is available on our website here <https://www.arb.ca.gov/msprog/offroad/sore/sore.htm>. Also, on that website is a report we developed for the California legislature on leafblowers back in 2000 <https://www.arb.ca.gov/msprog/mailouts/msc0005/msc0005.pdf>

Please feel free to follow up directly with Christopher (cc’ed here) if you have any additional questions. He will be in touch with you.

Best regards,
Michael

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From: Harold Smith [mailto:harbersmith@sympatico.ca]
Sent: Thursday, May 11, 2017 10:46 AM
To: Benjamin, Michael@ARB
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Subject: ITEM PE19.4 - TransformTO: Climate Action for a Healthy, Equitable and Prosperous Toronto - Report 2 - The Pathway to a Low Carbon Future

Hi Michael,

Thank you for taking time to speak with me about California’s initiatives in regulating small engine greenhouse gas emissions. I am enclosing Toronto’s Environment & Energy Department report **PE19.4 Attachment C Attachment C: Evaluation of potential additions to TransformTO Report #1 Strategies** which states:

Characteristics of Lawn and Garden Equipment Sound: A Community Pilot Study

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Abstract

More than 11 million gas powered leaf blowers (GLB) operate in the US. Most are powered by inefficient 2-stroke engines. The noise is intolerable to some and many communities have enacted ordinances restricting their use. This pilot study aimed to characterize the low, medium, and high frequency sound components from commercial grade GLBs over distance, evaluate the adequacy of the A-weighted decibel (dB [A]) to describe this sound, and discuss the impact of GLB sound in a community setting. In a field experiment with 2 leaf blowers and a hose vacuum, the time averaged A-weighted dB(A) (LAEQ) and un-weighted dB (LEQ) metrics, and low, mid, and high frequency GLB sound components were evaluated at intervals out to 800 feet from point of operation (centroid). Sound levels at 50 feet for each GLB were consistent with manufacturer ratings. The sound from the 2 GLBs and hose vacuum exceeded 100 decibels for both LEQ and LAEQ at the centroid. At all distance intervals, LEQ was 11.2-12.5 decibels higher compared with LAEQ. With the exception of the high frequency dB, all sound metrics emitted from this equipment were found to exceed WHO outdoor daytime standards (55 dB) up to 800 feet away from the centroid. The dominance of the low frequency component over distance indicates that a dB-based metric is a more appropriate descriptor of this sound compared with a dB(A)-based metric. The loudness of GLB sound at point of operation is especially concerning for the auditory and non-auditory health of workers and others regularly exposed in close proximity. The ability of this sound - in particular its lower frequency components - to travel over long distances suggests that GLB sound has a wide ranging impact on surrounding communities and raises concerns over its adverse health impacts.

Keywords: Noise; Lawn and garden equipment; Leaf blower; Community; Low frequency; Occupational health; Health effects

Introduction

It is a common, yet flawed, assumption that noise (defined as unwanted sound) is an opportunity cost associated with technological advancement. This misconception holds especially true in the lawn and garden industry where, today, fuel-powered equipment is used to perform nearly all tasks once done manually. A commonly used piece of equipment in landscape maintenance is the commercial grade gas-powered leaf blower (GLB). Most GLBs used in the United States are powered with inefficient 2-stroke engines, housed in lightweight metal that offers little sound insulation, and run at three times the speed of an automobile engine (9000 rpm) producing a loud, monotonous sound [1]. Many people have described the sound as intolerable.

In 2011, it was estimated that more than 11 million GLBs were in operation in the United States [2,3]. GLBs are used to perform tasks ranging from leaf, dust and debris removal to gutter cleaning and snow removal around neighborhoods, schools, hospitals, and public spaces. Commercial-grade machines account for the majority of leaf blower activity [2]. According to manufacturer reports, the sound pressure levels of these machines exceed 95 A-weighted decibels (dB[A]) at the ear of the operator and typically 65-80 dB(A) at 50 feet. Comparing these levels to daytime sound standards set by the World Health Organization (WHO)-these levels are upwards of 15 dB(A) higher than the recommended 55 dB(A) [4]. Given its high sound level and frequent use in residential neighborhoods, schools, health care facilities, parks and other public spaces, it is not surprising that the GLB has come under attack.

Adverse health effects from sound include auditory effects such as hearing loss and tinnitus, and non auditory effects such as reduced cognitive performance and mental health, sleep disruption, ischemic heart disease, myocardial infarction, and hypertension [5]. Low frequency sound components are considered to have more severe adverse health effects compared with higher frequency components [6,7]. Adverse effects from sources of sound with low frequency components may occur at levels below 30 dB(A) [4]. Lower decibel standards are recommended for sources with low frequency components compared with other sources [4].

Aside from dB(A) ratings reported by manufacturers, little is known about the character of GLB sound or its propagation into the environment. Finnish researchers found low frequency and tonal components in tests of several GLB models sound [8]. These factors in combination with the ability of low frequency sound to travel long distances and penetrate building walls [6], may explain the intolerability of this sound source to people in the community.

Given that the A-weighting system de-emphasizes frequencies below 500 Hz, a dB(A) may not adequately represent GLB sound and its potential impacts. The goals of this pilot study were to: 1) characterize the sound of a typical combination of leaf blowers used in commonly in lawn and garden maintenance over distance; 2) evaluate the adequacy of the dB(A) as a representative metric of that sound; and 3) discuss the impacts this equipment may have on surrounding communities. A field experiment measured sound at intervals out to 800 feet using A-weighted and other sound metrics.

Materials and Methods

Area of study

Field work was carried out on April 29, 2015, between the hours of 8 am and 11 am at the Department of Public Works (DPW) in Lincoln, MA, a suburb located approximately 20 miles from the City of Boston. Lincoln has a population of 6,500 and occupies a land area of 15 square miles. The study area's starting point (distance 0, the "centroid") was in the DPW parking lot and extended out to a radius of 800 feet (Figure 1). The 800 feet radius was delineated into concentric circles 50, 100, 200, 400, and 800 feet from the centroid.

Within the 800 feet radius were single and multifamily dwellings, as well as commercial and municipal properties. Light road, train, and aircraft traffic offered little to no competing sound.

Lawn and garden equipment

Two backpack leaf blowers (EBZ8050 (machine "A"), and either the EB7000 (machine "B") or the EBZ8001 (machine "C") (Husqvarna Corporation, Stockholm, Sweden)) and one hose vacuum (machine "D"; Scag Giant-Vac, Mayville, WI) owned and operated by the DPW were used in this pilot study. Relevant specifications on these machines are detailed in Table 1. Sound from this equipment was measured as follows: (1) At 0 and 50 feet, each individual machine (A-D) was tested to compare observed sound levels to those reported by the manufacturer; (2). At 0, 50, 100, 200, 400, and 800 feet, a combination of three machines-two

Table 1: Summary of GLBs Used

Code	Engine Power	Max Air Flow (CFM)	Max air speed (MPH)
A	72 cc	685	201
B	62 cc	529	200
C	72 cc	685	201

CC: cubic centimeters; CFM: cubic feet per minute; GLB: Gas powered leaf blower; MPH: miles per hour

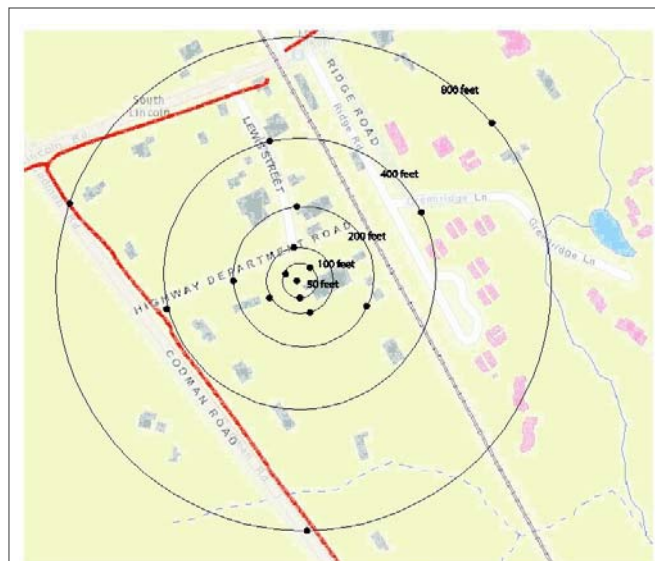


Figure 1: The 800 feet radius was delineated into concentric circles 50, 100, 200, 400, and 800 feet from the centroid

backpack leaf blowers (machines A at all distances and B (at distance 0 and 50) or C (at other distances) and the hose vacuum (machine D) were run simultaneously. This combination of equipment used commonly in today's landscape maintenance practices. Beyond the centroid, for the combination scenario only, three measurements were taken at each distance. Machine C was used at distance intervals ≥ 100 feet because of a malfunction with machine B. Machine operators were asked to start the machines, bring them quickly from idle to full throttle, and remain at full throttle for 30-45 seconds.

Sound and site condition measurement

An Optimus Red Octave Band Analyzer CR-162C (North Yorkshire, UK) was used to record sound pressure levels. Meteorological conditions (temperature, wind speed, relative humidity) were gathered using a Kestrel 3500 Weather Meter/Digital Psychrometer (Birmingham, MI, USA). Sound measurements were recorded for one minute. Efforts were made to avoid measuring the equipment sound in the presence of interfering sounds from trains, road traffic, aircraft, and emergency services. Measurements were repeated in the event of such interfering sounds.

Sound metrics

The LAEQ and LEQ represent, respectively, the average dB(A) and dB sound pressures over the measurement period. For measurements at each interval distance, the LAEQ and LEQ were obtained directly from octave band analyzer. Low, medium, and high frequency sound metrics were calculated by summing the decibels across the following bands: low frequency (<250 Hz), medium frequency (250<Hz <2000), and high frequency (<2000 Hz). A background LAEQ was also measured at all distances to reflect the sound level when machines were not in operation.

Data Analysis

For each distance (50, 100, 200, 400, 800 feet), the mean, standard deviation, and range were calculated taking the average of the three sound measurements at that distance. All analyses were conducted using SAS (version 9.4; SAS Institute Inc., Cary, N.C.).

Results

Table 2 compares the observed sound levels at 50 feet to manufacturer rated sound levels at this same distance. Observed sound levels measured 77.6 - 80 dB(A) and were generally consistent with those reported by the manufacturers. At the centroid, the sound from the individual machines ranged from 85 - 101 dB(A) and 92-104 dB.

Descriptive statistics for sound emitted for the combination of machines at each distance are presented in Table 3. For all metrics, the highest sound levels occurred at the point of operation and decreased with distance. The difference between the LEQ and LAEQ range from 11.2-12.5 decibels at all distances. With the exception of the high frequency component, all sound metrics remain above recommended WHO outdoor daytime levels of 55 dB out to 800 feet. Low and mid-frequency were the dominant sound frequencies at all distances. Figure 2 displays the propagation of these frequencies out to 800 feet. Mid and low frequency sound levels dropped sharply within 100 feet from the centroid, while low frequency sound levels decreased more gradually over distance. At 800 feet compared to

Code	Manufacturer Rated Sound Level (dB[A] at 50')	Observed Sound Level (dB[A] at 50')
A	77	77.6
B	73	79
C	77	79
D	NA	80.6

Table 3: Sound Metrics for Two Leaf Blowers and a Hose Vacuum By Distance (dB)*

Distance (in feet)	Machine Combination Tested	Sound Metric	Mean (SD)	Range**
0	A+B+D	Background dB(A)	64.2	
		LEQ dB	106.4	
		LAEQ dB(A)	102.4	
		Low Frequency dB	102.4	
		Mid Frequency dB	103.6	
		High Frequency dB	95.7	
50	A+B+D	Background dB(A)	59.7	
		LEQ dB	97.6 (7.1)	87.3 - 101.3
		LAEQ dB(A)	85.5 (7.6)	74.0 - 88.5
		Low Frequency dB	97.6 (7.1)	87.2 - 101.2
		Mid Frequency dB	82.5 (7.2)	71.6 - 84.6
		High Frequency dB	74.7 (6.7)	64.6 - 77.5
100	A+C+D	Background dB(A)	49.7	
		LEQ dB	94.3 (5.5)	86.7 - 97.6
		LAEQ dB(A)	82.8 (7.0)	72.3 - 85.4
		Low Frequency dB	94.3 (5.4)	86.7 - 97.4
		Mid Frequency dB	80.1 (9.4)	65.5 - 82.1
		High Frequency dB	72.4 (10.4)	56.1 - 74.5
200	A+C+D	Background dB(A)	47.6	
		LEQ dB	85.2 (7.6)	72.9 - 87.9
		LAEQ dB(A)	72.9 (8.3)	60.5 - 77.0
		Low Frequency dB	84.0 (7.5)	72.6 - 87.6
		Mid Frequency dB	71.2 (9.2)	57.9 - 76.2
		High Frequency dB	61.3 (8.4)	48.5 - 61.1
400	A+C+D	Background dB(A)	58.3	
		LEQ dB	75.8 (1.1)	74.3 - 76.5
		LAEQ dB(A)	63.3 (2.2)	60.5 - 64.9
		Low Frequency dB	75.4 (1.0)	74.3 - 76.3
		Mid Frequency dB	60.4 (3.7)	55.3 - 62.1
		High Frequency dB	54.6 (6.3)	47.1 - 58.7
800	A+C+D	Background dB(A)	54.7	
		LEQ	68.5 (2.6)	67.7 - 70.6
		LAEQ dB(A)	57.3 (5.0)	50.7 - 60.6
		Low Frequency dB	67.9 (2.3)	65.6 - 70.5
		Mid Frequency dB	55.9 (7.3)	44.9 - 59.5
		High Frequency dB	50.4 (7.2)	39.7 - 54.0
*LAEQ is in dB(A); ** Range: the minimum and maximum values obtained over 3 recordings at each distance interval				
LF: Low frequency (<250 Hz); MF: medium frequency (250<Hz<2000 Hz); HF: high frequency (<2000 Hz)				

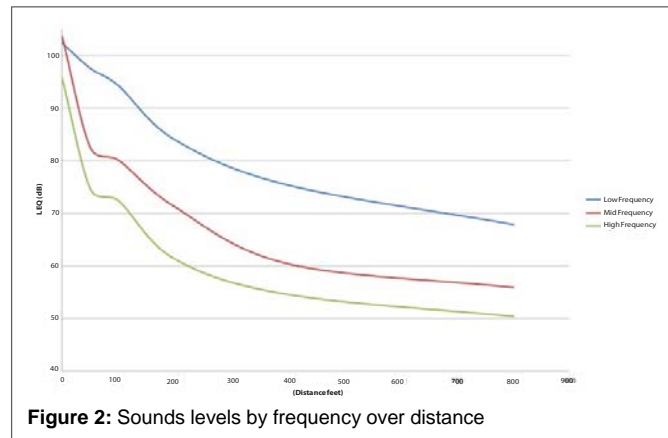


Figure 2: Sounds levels by frequency over distance

the centroid, the decrease in sound pressure was 45 dB(A) for LAEQ, 45 dB for the high frequency component, 51 dB for the mid frequency component, and 35 dB for the low frequency component.

Discussion

Our results show that according to the most commonly used dB(A)-based metrics, lawn and garden equipment sounds were higher than the WHO’s community outdoor daytime sound standards up to 800 feet away from the centroid. When moving beyond the LAEQ to consider the full frequency profile of this type of sound, low frequency sound dominated at all distances and at very high decibels, consistent with results previously reported [8].

The finding that lawn and garden equipment sound remains higher than WHO outdoor daytime sound level standards of 55 dB(A), out to 800 feet from the point of operation, raises concerns regarding impact on communities. First, in this pilot study, we only considered the impact of a single typical lawn and garden maintenance operation. The reality is that within a given community, several operations may be occurring simultaneously and continue over prolonged periods of time-intensifying the harmful effects of these sound sources. Second, the area encompassed by a 1600-foot diameter circle (800-foot radius) is large. In a densely populated community, people who work from home, people who work night shifts, children, the retired, the elderly, and the sick may be exposed to high level low frequency sound in their homes, apartment complexes, and businesses. Additionally, this area may include people in schools, hospitals, daycare centers, and retirement homes for whom WHO daytime sound standards are 39 dB(A) or less [9]. In addition to the loudness of the sound emitted from these machines, the dominance of low frequency sound is concerning because of the ability of this sound to travel over long distances, penetrate construction walls and negatively impact health, productivity, and/or quality of life. According to previous studies, low-frequency sound is a common cause of annoyance and other stress-induced adverse [4,6,7]. Even at levels deemed to be non-harmful by the WHO, studies have shown that sources containing low frequency components gave rise to a multitude of complaints [6,9]. Beyond annoyance, low frequency sound is associated with acute changes in stress and cardiovascular responses such as: changes in blood pressure, heart rate variability, cortisol and amylase secretion and sleep disturbance [6]. Chronically, the continuous stimulation of these stress and cardiovascular responses can lead to hypertension, myocardial infarction, arteriosclerosis, ischemic heart disease, and stroke [5]. Regular exposure to GLB sound is likely to have negative effects on the auditory and non-auditory health of workers and others in close proximity.

The use of a dB(A)-based metric to represent sources of sound with strong low frequency components has been widely criticized [4,6,7,10]. The results of this pilot study suggest that A-weighted sound metrics are not adequate for representing the impact of sound from GLBs. Because low frequency sound travels extended distances with very little energy loss [6] and is known to penetrate construction walls [8] it is important for manufacturer ratings to include a frequency breakdown of the sound from their equipment and at distances beyond 50 feet. In addition, it is important for policy makers to understand the impact this type of sound may have on surrounding communities

To our knowledge, this is the first study to characterize landscape maintenance equipment sound over distance and in a community setting. The results provide a better understanding of the nature of the sound emitted from GLBs, and will be useful in informing regulatory and abatement policies within communities. However, there are several limitations to this pilot study which should be considered. Sound was only measured from a small number of machines at a single location over a short amount of time. In actual settings, many machines may operate on multiple properties within a neighborhood over the course of a day. Another limitation is that the study only measured ambient outdoor lawn and garden sound levels which may not reflect the sound levels experienced in indoor environments such as homes, offices, and schools. Additionally, our results are only descriptive and did not take into account sound propagation (attenuation or exacerbation due to physical or natural impedance) directly. Lastly, although the frequency spectrum augments our understanding of the nature of GLB sound beyond that offered by dB(A)-based metrics, the use of psychoacoustic metrics should be considered to help us to better understand the subjective human response to this type of sound [11].

Additional studies are needed to tackle these limitations. In particular, larger, more robust studies are needed to further investigate the interaction between factors such as prevalence and duration of use, time of day, location of exposure, distance from the source, sound propagation, and human response to better understand the impact of this sound on communities.

Conclusions

The results of this study indicate that landscape maintenance sound produced by GLBs may travel over long distances in a community at levels known to increase the risk of adverse health effects. Vulnerable populations include workers, children, the elderly, the sick, those who work from home, and those who work overnight shifts. A-weighted decibel metrics do not adequately characterize GLB sound and its potential impact on a

community. Because of the prevalent use of this type of equipment, it is important for health professionals and policy makers to understand the impact this type of sound may have on surrounding communities.

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Conflicts of Interest

The authors declare no conflict of interests.

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