

RESOLUTION CALLING FOR A PUBLIC MEETING ON PHASING OUT GAS-POWERED LEAF BLOWERS IN THE CITY OF NEW HAVEN

WHEREAS, unlimited use of leaf blowers powered by internal combustion engines (“gas-powered leaf blowers” or “GLBs”) impairs the public health, social welfare, peace, and quality of life of persons residing, studying, and working in New Haven; and

WHEREAS, gas-powered leaf blowers pose a danger to public health through high levels of noise pollution; such exposure can cause hearing loss, compounded by repeated and prolonged use; gas-powered leaf-blower noise is uniquely stressful and travels unusually far, penetrating windows and walls due to its strong low-frequency component;¹ a landscaping crew operating multiple leaf-blowers typically exceeds the WHO recommended daytime noise levels of 55dB (which is also the New Haven residential noise ordinance standard) for 800 feet in all directions, affecting large numbers of residents;² chronic exposure to high noise levels is associated with heart disease, obesity, diabetes, reproductive issues and mental health disorders, can be particularly distressing to those who suffer from mental health conditions such as PTSD, increases cortisol production (stress hormone),³ and causes stress and anxiety for household pets; and

WHEREAS, gas-powered leaf blowers pose a danger to public health through high levels of air pollution, emitting toxic pollutants at alarming levels, including ozone-forming and cancer-causing compounds; these emissions include volatile organic compounds (VOCs), nitrogen oxides (NOx), carbon monoxide (CO) and fine particulate matter (PM 2.5);⁴ these pollutants are well-known causes of serious health problems⁵ including increased respiratory symptoms,⁶ cancer,⁷ heart disease and stroke,⁸ and preterm birth, low birth weight, birth defects⁹ and asthma severity in children;¹⁰ thirty minutes use of a two-stroke gas-powered leaf blower produces the same hydrocarbon emissions as driving a Ford F-15 Raptor pick-up truck from Texas to Alaska,¹¹ while one hour’s use creates more smog-forming pollution than a 2016 Toyota Camry driving approx. 1100 miles;¹² a nationwide study at the Harvard School of Public Health showed a clear link between long-term exposure to fine particulate matter and elevated death rate from

¹ <https://quietcommunities.org/gas-leaf-blowers-low-frequency-sound-explains-broad-impact/>

² <https://sciforschenonline.org/journals/environmental-toxicological-studies/JETS-1-106.php>

³ See presentation in Appendix D by Dr. Karen Jubanyik:

<https://www.dropbox.com/s/ykgxc9jnhjuo5fg/Dr%20Jubanyik%20leafblowingjune2017.pptx?dl=0>

⁴ <https://www.epa.gov/sites/production/files/2015-09/documents/banks.pdf>

⁵ <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>

⁶ <https://www.epa.gov/ozone-pollution-and-your-patients-health/health-effects-ozone-general-population>

⁷ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1940102/pdf/ehp0115-001160.pdf>

⁸ https://www.heart.org/idc/groups/heart-public/@wcm/@adv/documents/downloadable/ucm_463344.pdf

⁹ <https://doi.org/10.1016/j.envpol.2017.03.055>

¹⁰ <https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/particle-pollution>

¹¹ <https://www.edmunds.com/about/press/leaf-blowers-emissions-dirtier-than-high-performance-pick-up-trucks-says-edmunds-insidelinecom.html>

¹² <https://ww2.arb.ca.gov/resources/fact-sheets/small-engines-california>

August 25, 2021

Covid-19;¹³ a recent study from Yale Law School showed an inequitable asthma burden in New Haven, and asthma rates are significantly higher in New Haven than in Connecticut or the nation as a whole;¹⁴ and

WHEREAS, the Covid-19 pandemic has resulted in a period of increased work and study from home, which may prompt longer term, permanent shifts in patterns of employment in New Haven; the noise and air pollution from leaf blowers is particularly disruptive to residents at home during the day, reducing their quality of life and their productivity, whether they are young children, school and college students, workers with night shifts, seniors, those on health leave, or stay at home parents, with disruption from noise and air pollution compared to “second hand smoke,”¹⁵ whereby those who do not use GLBs are unfairly subjected to noise and air pollution caused by others; and

WHEREAS, children are particularly vulnerable to environmental noise, which can affect language acquisition, reading comprehension and cognitive development, and to emissions caused by gas-powered leaf blowers, as they breathe more air per pound than adults and have less ability to detoxify environmental exposure to pollution than adults; a study co-authored by a Harvard Public School of Health scientist concluded that “the ability of GLB sound to travel long distances and penetrate walls and windows puts health and cognitive functioning of children at risk;”¹⁶ and

WHEREAS, exposure to negative impacts from GLBs is a social justice issue, whereby low-wage workers hired to operate gas-powered leaf blowers are most likely to sustain long-term hearing loss and respiratory and heart disease as a result of prolonged exposure to air and noise pollution from gas-powered leaf blowers and do not always have eye, ear, and breathing protection, as stipulated by manufacturer guides;¹⁷ and

WHEREAS, gas-powered leaf blowers result in environmental damage; they cause winds of up to 180mph,¹⁸ bringing up dust, allergens, dirt, animal feces, lead, and arsenic into the air; they damage new growth and developing flowers and disturb topsoil, which can cause the spread of soil-borne diseases; and they harm insect, small bird, and mammal populations; the use of GLBs also disrupts important leaf cover that nourishes and protects wildlife, including pollinators hibernating during winter;¹⁹ gasoline used to power GLBs can spill, thereby polluting New Haven’s waterways and drinking water; and

WHEREAS, quieter and more environmentally responsible alternatives to gas-powered leaf blowers are readily available; leading manufacturers now offer commercial-grade battery or cord electric tools that

¹³ <https://www.nytimes.com/2020/04/07/climate/air-pollution-coronavirus-covid.html>

¹⁴ <https://law.yale.edu/ghjp/projects/local-health-justice/intervening-against-inequitable-asthma-burden-new-haven>

¹⁵ [https://asa.scitation.org/doi/abs/10.1121/1.5136828#:~:text=Ambient%20noise%20is%20%E2%80%9Cthe%20new%20secondhand%20smoke.%E2%80%9D%20Like%20secondhand,problem%20for%20millions%20of%20Americans.&text=Specific%20evidence%2Dbased%20noise%20exposure,\(8\)%20disrupts%20sleep](https://asa.scitation.org/doi/abs/10.1121/1.5136828#:~:text=Ambient%20noise%20is%20%E2%80%9Cthe%20new%20secondhand%20smoke.%E2%80%9D%20Like%20secondhand,problem%20for%20millions%20of%20Americans.&text=Specific%20evidence%2Dbased%20noise%20exposure,(8)%20disrupts%20sleep)

¹⁶ https://quietcommunities.org/wp-content/uploads/2020/09/Reprints_GLB-sound-and-children-poster_CEHN-040617.pdf

¹⁷ https://www.echo-usa.com/getattachment/f44e3018-5220-459d-92cb-6bf526dc7ee9/pb250lnes111226_031413.pdf

¹⁸ Dr. Jubanyik’s presentation, 2017:

<https://www.dropbox.com/s/ykgxc9inhjuo5fg/Dr%20Jubanyik%20leafblowingjune2017.pptx?dl=0>

¹⁹ <https://static1.squarespace.com/static/5f33497a46c0d267181d4928/t/5f7313778f12fd4b48ef60c9/1601377143853/Neighbor+to+Neighbor+%28Sep+2020%29.pdf>

August 25, 2021

compete with their gas counterparts on power, longevity, and price at a fraction of the operating costs,²⁰ while rakes, brooms, and mulching are appropriate alternatives for smaller leaf and grass management tasks; electrical tools are quieter, their sound reaches shorter distances, and they do not emit toxic pollutants into the local environment; mulching fallen leaves and grass clippings offers benefits for lawns, gardens, insects, birds and other wildlife;²¹ and

WHEREAS, concerns about economic drawbacks as a result of phasing out gas-powered leaf blowers are unfounded; tests carried out in Los Angeles CA, New London County CT, and Greenwich CT showed that raking took a comparable amount of time to using gas-powered leaf blowers per ½ acre,²² and that in six communities where gas-powered leaf blowers were banned, there was no subsequent increase in costs for lawn care to consumers; when Claremont, CA stopped using gas-powered leaf blowers on city property in 1990, labor hours for grounds crew members did not increase;²³ and

WHEREAS, more and more municipalities are limiting and/or phasing out gas-powered leaf blowers in the northeastern US, including Greenwich and Ridgefield in Connecticut, Tarrytown, Yonkers, Hastings, Rye, Dobbs Ferry, Westchester and Larchmont in New York, Burlington in Vermont, Cambridge, Brookline and Arlington in Massachusetts, and Washington D.C., recognizing the need to protect their constituents' as well as local workers' health and quality of life; and

WHEREAS, in 2019 New Haven declared that we face an existential climate emergency that threatens our city, region, state, nation, human civilization, and the natural world, and in 2021 the Board of Alders City Services and Environmental Policy Committee advanced a proposal to have city government convert all its buildings and vehicles to electric power; and phasing out gas-powered leaf blowers would be part of a broader effort by the City of New Haven to protect the local and regional environment;

THEREFORE BE IT RESOLVED THAT to benefit the health of New Haven residents, workers, students and visitors, domestic animals, wildlife and the local environment, the Board of Alders of the City of New Haven will hold a public meeting to hear residents' concerns about the use of gas-powered leaf blowers and discuss phasing out the use of gas-powered leaf blowers in the city of New Haven as soon as is practicable, while allowing a reasonable transition period for local landscapers and residents.

Glossary

gas-powered leaf blowers: leaf blowers that use a mixture of gasoline and oil to power an internal combustion engine

dB (decibels): a measure of loudness. The current maximum residential daytime level allowed in New Haven is 55dB.

²⁰ <https://www.landscapemanagement.net/charged-up-the-future-of-battery-powered-equipment/>

²¹ https://www.canr.msu.edu/uploads/files/Mulch_fallen_leavesRS.pdf

²² LA: <https://www.nonoise.org/quietnet/cqs/leafblow.htm#grandma>, New London County: <https://www.theday.com/article/20131115/media0102/131119764/1070/fpcaltest> and <https://www.theday.com/article/20131115/INTERACT010102/131119799>, Greenwich: <https://www.nonoise.org/quietnet/cqs/leafblow.htm>,

²³ <https://www.nonoise.org/quietnet/cqs/leafblow.htm#history> and Dr. Jubanyik's presentation: <https://www.dropbox.com/s/ykgxc9jnhjuo5fg/Dr%20Jubanyik%20leafblowingjune2017.pptx?dl=0>

August 25, 2021

Particulate matter (PM): mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope. PMs are harmful as they can enter the lungs and the respiratory system and cause irritation as well as long term health effects associated with lung and heart disease.

Appendix A

Facts, figures and resource summaries:

[Gas-powered leaf blower fact sheet](#) (Quiet Montclair)

[Health Hazards of Leaf Blowers](#) (Quiet Communities)

[Health Hazards of Leaf Blowers during Covid-19 pandemic](#) (Quiet Communities)

[Guidance from NY State](#) (NY.gov)

[Dr Jubanyik's presentation from 2017](#)

[Larchmont Environmental Committee Report \(2020\)](#)

[Scarsdale GLB report \(2020\)](#)

[Testimony from Maplewood NJ Committeewoman Nancy Adams](#)

[Comparison of Gas and Battery Electric Equipment study \(2018\)](#)

[Burlington, VT phase-out of gas-powered leaf blowers \(2021\)](#)

[A list of commercial and residential "zero-emission cordless leaf blowers \(California Air Resource Board\)](#)

August 25, 2021

Appendix B

a) Testimony from physicians:

August 18, 2021

Dear New Haven representatives,

We are physicians residing in New Haven, faculty of Yale and Practicing at Yale New Haven Hospital, we have expertise in emergency, respiratory and environmental medicine. Below we outline the dangers of gasoline-powered leaf blowers (GLBs) to communities around the country, many of which have decided on partial or full bans, based on the risk/benefit ratios showing multiple health and environmental hazards. Growing dependence on GLBs for cleanup and routine landscape maintenance in Connecticut is contributing to a public health emergency. The main argument of the landscaping industry is that they need these powerful, polluting, noisy machines to do their job. The truth is that, in spring and summer, there are few leaves to be blown. Grass clippings are actually good for the grass, and those that fall on patios and sidewalks can be taken care of with brooms, rakes, or left as is. Cities and towns in NY, NJ, CA and most recently, Washington DC and Burlington, Vermont have restricted or banned GLBs without any cost increases to homeowners. Much of California has had GLB bans going back as far as the 1970s, when GLBs became popular. Some state medical societies, including New York and Massachusetts, have submitted position statements against GLBs, due to their multiple harmful health effects, and are lobbying to engage the American Medical Association (AMA) at the national level as well.

The major health and environmental hazards of gas leaf blowers are: 1) Noise pollution, 2) Exhaust pollution (out of the back end), 3) Fine particulate pollution (out of the front end), 4) Environmental degradation, including water pollution and animal habitat destruction. Social justice concerns, in terms of protecting low-paid workers from noise and air pollution, must also be important considerations in the equation.

Noise from gas-powered leaf blowers can range from 95–115 decibels at the ear of the operator. Anything over 85 decibels can permanently injure a person’s hearing in as little as two hours. Even at 50 feet, GLB noise is typically rated at 65-75 decibels. These levels are orders of magnitude – because decibels are on a logarithmic scale. An increase of 10 decibels is perceived by humans as twice as loud, so that the difference between 50 and 60 decibels is that we hear the noise as twice as loud. The noise from GLB is beyond that deemed safe by WHO, CDC, OSHA and NIOSH for workers and the public¹. In many neighborhoods, even the quietest GLB will affect 23 homes at greater than 55 decibels, whereas many louder GLBs will impact as many as 91 homes with a noise that can be heard at greater than 55 decibels. The common practice of using multiple GLBs at the same time is particularly toxic.

The EPA recommends that sound levels be kept to less than 45 decibels indoors and less than 55 decibels outdoors in order to prevent interference with normal speech and relaxation. The definition of noise is “unwanted or disturbing sound” that interferes with normal activities such as sleeping, conversation, or disrupts or diminishes one’s quality of life.

Noise is more than just an annoyance; exposure to high levels of noise can cause countless adverse health effects. These include stress-related illnesses including impaired immune systems, high blood

August 25, 2021

pressure, learning and communication disabilities, speech interference, tinnitus (ringing in the ears), hearing loss, sleep disruption, impaired child development as well as lost productivity.

There is even evidence that excess noise in the environment above 60 decibels can contribute to coronary artery disease, which leads to heart attacks. The EPA states that “noise degrades quality of life by impairing communication and social interaction; reducing the accuracy of work, particularly complex tasks; and creating stressful levels of frustration and aggravation that last even when the noise has ceased.”^{ii,iii} Even moderate noise levels can increase anxiety, decrease the incidence of helping behavior, and increase the rise of hostile behavior in experimental subjects. GLB noise is particularly toxic, as its low frequency component travels through walls and windows and can travel long distances. The effects of noise particularly impact children, seniors and those with neurological conditions, including autism and veterans and others with Post-traumatic Stress Disorder (PTSD).

During the pandemic, many more people have been affected by the noise from GLBs than ever before. People are working from home, teaching from home and learning from home. As a front-line worker, we know that front-line workers do not want kudos from the public – they want to rest between shifts. If the community expects nurses, doctors, paramedics, fire, police, and all of the other front-line workers to be awake and ready to take care of people no matter what time they have an emergency, that can only happen if these essential workers can sleep during the day. GLBs anywhere in a neighborhood emit a grating, low frequency sound that makes sleep impossible. There is no question that the high levels of noise disturb most household pets as well.

Exhaust pollutants (“Back-end pollutants”) released by GLBs include volatile organic compounds (VOCs). These are HAPS: Hazardous Air Pollutants (defined by the US EPA as pollutants that cause or may cause cancer) Gas leaf blowers are primarily 2-stroke engines which have no emissions controls, are inefficient at burning fuel, and are highly polluting. In one hour, they create the same amount of hydrocarbon pollution as driving a F-150 pickup from Connecticut to Texas^{iv}. They have an air jet velocity of 150–280 mph, much higher than hurricane strength winds. Growing evidence implicates the 2-stroke engine in particular in increased risks of early death, heart attack, stroke, congestive heart failure, asthma, chronic obstructive pulmonary disease, cancer^{v,vi,vii,viii,ix}, and other serious health conditions.

Workers, children, seniors, and people with chronic illness are at greatest risk. Gasoline lawn and garden equipment accounts for 5%–10% of total US emissions of carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and small particulate matter^x. These are considered “Criteria Pollutants” (harmful to public health and the environment)^{xi,xii} Even low-level exposures have been associated with respiratory and central nervous system effects. GLB pollutants such as hydrocarbon vapors, nitrogen oxides, and carbon monoxide react in the presence of heat and sunlight to form ground-level ozone, the major component of smog, and a known respiratory irritant and risk factor for cardiovascular disease.^{xiii} A recent report predicts that in a few years, if not already, the worst single ozone polluter in California will be gas garden equipment.^{xiv}

Fine particulate matter PM_{2.5} (front-end pollutants from GLBs) are under 2.5 microns, easily assimilated in the lungs, have been linked to all-cause premature death, myocardial infarctions, anxiety, strokes, CHF, and respiratory disease – including asthma attacks - and can increase the severity of chronic lung disease in the elderly. A recent study implicates particulates and exhaust pollutants of the type released by GLBs in an increased risk of dementia.^{xv} Two-stroke engines account for the vast majority of PM_{2.5} in landscape maintenance.^{xvi,xvii,xviii,xix} PM_{2.5} may contain animal fecal matter, fertilizers, pesticides, herbicides, allergens (fungal spores, pollen), diesel soot, brake dust, rubber tire particles, and/or heavy

August 25, 2021

metals or other toxins (e.g. arsenic, chromium, lead, mercury). One hour of GLB use can blow up to 5 pounds of particulate matter into the air, and this particulate matter can be suspended up to 5-7 days. A recent Harvard study published in *Science* found that communities with high air pollution levels from PM_{2.5} experienced significantly higher rates of covid death, even after controlling for other variables^{xx}.

Environmental degradation is another way that GLBs impact a community. The high velocity air jets of leaf blowers – 150-280 mph – can destroy nests and small animal habitats; desiccate pollen, sap, and other natural plant substances; and injure or destroy birds, small mammals, and beneficial insects. High chronic noise levels decrease biodiversity in affected areas. ^{xxi,xxii} GLBs damage plants, remove beneficial topsoil and mulch, desiccate and compact soil, diminish plant health and contribute to the spread of invasives. This increases dependence on use of fertilizers, herbicides and pesticides, all of which can be blown into storm drains and pollute water supplies.

A final word concerns social justice issues. Many of the landscapers who do the actual work are low-paid hourly workers, without adequate health insurance or a say in their working conditions. They are exposed to extremely high levels of noise and air pollution, including carcinogens, increasing their risk of losing their hearing, developing pulmonary diseases, or cancers. More than 200 cities and towns across the United States have enacted legislation to restrict or eliminate GPLB. New Haven should be next.

Sincerely,



Ada Fenick, MD
Associate Professor, Pediatrics
Yale School of Medicine



Karen Jubanyik MD
Associate Professor
Yale University School of Medicine



Naftali Kaminski MD
Professor of Medicine
Chief of Pulmonary, Critical Care and Sleep Medicine
Yale University School of Medicine

ⁱ Fink D. 2017. What Is a Safe Noise Level for the Public? *AmJPH* January 2017: Vol. 107, No. 1, pp. 44-45.
<http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2016.303527>

August 25, 2021

- ⁱⁱ <http://www.epa.gov/clean-air-act-overview/title-iv-noise-pollution>
- ⁱⁱⁱ American Public Health Association; Noise Pollution Policy Statement <http://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/16/12/50/environmental-noise-pollution-control>
- ^{iv} <https://www.edmunds.com/about/press/leaf-blowers-emissions-dirtier-than-high-performance-pick-up-trucks-says-edmunds-insidelinecom.html>
- ^v Brook R.D., et al.; Expert Panel on Population and Prevention Science of the American Heart Association. Air pollution and cardiovascular disease: a statement for healthcare professionals from the Expert Panel on Population and Prevention Science of the American Heart Association. *Circulation*. 2004;109:2655–2671.
- ^{vi} Li S, Williams G, Jalaludin B, et al. Panel studies of air pollution on children's lung function and respiratory symptoms: a literature review. *J Asthma*. 2012 Nov;49(9):895-910.
- ^{vii} Mustafic H, Jabre P, Caussin C, et al. Main Air Pollutants and Myocardial Infarction. A Systematic Review and Meta-analysis. *JAMA*. 2012;307:713-721.
- ^{viii} Rice MB, Ljungman PL, Wilker EH, et al. Short-term exposure to air pollution and lung function in the Framingham Heart Study. *Am J Respir Crit Care Med*. 2013 Dec 1;188(11):1351-7.
- ^{ix} California EPA Air Resources Board: “A Report to the California Legislature on the Potential Health and Environmental Impacts of Leaf Blowers” Feb. 2000 <http://www.arb.ca.gov/msprog/mailouts/msc0005/msc0005.pdf>
- ^x Michaels H, US EPA. NONROAD Overview presented at the 2012 International Emission Inventory Conference, 2012. *US EPA 2005 data in Volckens J, Olson DA, Hays MD. Atmospheric Environment* 2008;42:1239-48.
- ^{xi} Regulated by National Ambient Air Quality Standards established by the EPA. See <http://www.epa.gov/air/criteria.html>
- ^{xii} Volckens J, Olson DA, Hays MD. “Carbonaceous Species Emitted from Handheld Two-Stroke Engines,” *Atmospheric Environment* 2008;42:1239-1248.
- ^{xiii} <http://www3.epa.gov/ozonepollution/health.html>
- ^{xiv} California Air Resources Board Study http://www.kqed.org/news/story/2017/02/28/227727/california_weighs_tougher_emissions_rules_for_gaspowered_garden?source=npr&category=u.s.
- ^{xv} <http://www.medscape.com/viewarticle/874069>
- ^{xvi} US EPA 2012 study: *Provisional Assessment of Recent Studies on Health Effects of Particulate Matter Exposure*, EPA/600/R-12/056F, December 2012.
- ^{xvii} Banks J. and McConnell J. National Lawn and Garden Equipment Emissions; presented at EPA’s 2015 International Emissions Inventory Conference, San Diego, CA April 16, 2015
- ^{xviii} American Lung Association: State of the Air 2015 http://www.stateoftheair.org/2015/assets/ALA_State_of_the_Air_2015.pdf
- ^{xx} Wu, X., Nethery, R. C., Sabath, M. B., Braun, D. and Dominici, F., 2020. Air Pollution and Covid-19 Mortality in the United States: Strengths and limitations of an ecological regression analysis. *Science advances*, 6(45), p.eabd4049.
- ^{xxi} file:///C:/Users/lucy/Downloads/10048_NO0235_PublishedReport.pdf
- ^{xxii} Barber, JR, Crooks, KR, Fristrup, KM 2010. The costs of chronic noise exposure for terrestrial organisms. *Trends in EcologyEvolution*,25(3),180https://www.nps.gov/subjects/sound/upload/Wildlife_AnnotatedBiblio_Aug2011.pdf

b) May 18, 2020: from the proposal to Ban Leaf Blowers in Larchmont, NY – testimony from Amy Brown, MD, MBE:

“Thank you very much for this opportunity to engage the community about the health and well-being of our children and how we can collectively protect them from environmental threats. Seldom will you find an environmental pediatrician who begins their dialogue without the old adage, children are not just little adults. Children are more susceptible to environmental exposures due to their size, their behavior, their baseline physiology and vulnerabilities of their development. From a respiratory perspective, children take in more air per minute, breathing faster than their adult counterparts – translating to the ability to bring in a larger burden of environmental toxins to their lungs than adult counterparts. Children’s innate and adaptive mechanisms for detoxifying environmental exposures are more immature. And physiological differences in airway structure and function can allow greater doses of pollutants to be delivered into airways, predisposing children to airway inflammation and obstruction.

This evening we are discussing gas powered leaf blowers and their detrimental health effects on children. As has been previously mentioned, Gas-powered leaf blowers are responsible for both distributing PM 2.5 and creating ground level ozone. Let’s start out by discussing PM 2.5—pathogenic small particles that are able to penetrate deep down into our airways and deposit on the gas exchanging terminal units of our lungs, the alveolar space. The smaller the particle size the greater the impact on human health. These small particles are able to overcome the initial defense mechanisms of the upper airways, such as filtration at the nose, and overwhelm the detoxification and immune system of the smaller, more delicate portion of the lower airways and an area where oxygen and carbon dioxide exchange takes place, termed the alveoli. PM 2.5 increases free radical peroxidation and the aerosol itself is composed of its own free radicals, other organic compounds and heavy metals (such as iron, copper, zinc) – all of which are capable of producing massive cellular damage. The antioxidant system in our lungs has to work in overdrive to prevent oxidative stress. Newborn babies and young children are born with immature antioxidant defenses making them more vulnerable to the toxic effects. This in turn damages DNA and has lifetime epigenetic consequences, meaning these environmental changes alter the DNA that children will pass along to their children.

It is well known that elevated air particle pollutants, in particular PM 2.5, are directly associated with more serious symptoms of respiratory tract diseases, cause of measurable decline in lung function and raised morbidity and mortality of cardiopulmonary diseases. Asthma, one of the most common pediatric diseases, is closely linked to environmental triggers and exposures and extremely adversely affected by PM 2.5 levels. Long-term exposure to PM 2.5 significantly increased the mortality of lung cancers – lung cancer survival years have been demonstrated to have an inverse relationship with PM 2.5 levels.

Particulates also factor in COVID-19 outcomes. Studies examining an association of morbidity and mortality from Harvard have shown that a small increase in long-term exposure to PM 2.5 leads to a large increase in COVID-19 mortality. This study highlights the crucial importance of continuing to enforce existing air pollution regulations to protect human health both during and after the COVID-19 crisis.

Switching gears briefly, another potent player in air pollution is ground level ozone. Also noted earlier, gas powered leaf blower emissions contribute to ground level ozone formation. Ozone is a potent lung irritant and is produced in the lower portion of the atmosphere from precursor molecules emitted by fossil fuel combustion. It is well established that ozone is a potent oxidizer and highly toxic to the epithelial cells of the entire respiratory tract. Ground level ozone levels have been correlated with increased pediatric asthma rates in a multitude of studies.

August 25, 2021

Optimizing our health at the time of the COVID pandemic is key. When patients have asked me what they can do, I like to highlight what I call “modifiable risk factors” for disease severity, a majority of these being a close look at our environment to promote optimal health and safety. On a larger scale this applies to climate change and the need to urgently reduce the toxin burden in air pollution for the health of our population, our children and our children’s children.”

Dr. Amy Brown, MD, MBE

Pediatric Pulmonologist, Boston Children’s Health Physicians

Attending Physician in Pediatric Pulmonology, Maria Fareri Children’s Hospital

Assistant Professor of Pediatrics, New York Medical College

NYS Health Scholar, Children’s Environmental Health Center of the Hudson Valley

August 25, 2021

Appendix C

Letter from local landscaper MowGreen:



August 19, 2021

Re: Support for restricting/eliminating Gas Leaf Blowers - EAC New Haven Initiative

Greetings,

MowGreen supports the initiative referenced above to discuss eliminating gas leaf blowers (GLBs).

Gas leaf blowers are known to cause significant health problems for workers and others in the area due to high levels of air and noise pollution, while electric leaf blowers are zero emission and produce far less noise (below the threshold of hearing damage and nervous system disruption). The noise is bad enough to damage hearing and raise blood pressure in humans at properties where in use, as well as adjacent properties.

Loud and highly polluting gas powered lawn care device use should be restricted.

Hundreds of new laws have emerged at the municipal level across the country in recent years restricting the use of GLB's based on carefully weighed evidence. New York state is now considering one. The fact that electric blowers are so much quieter and zero emission makes them a superior alternative for tasks with efficiency targets demanding such tools. People have a right to peace and quiet in their own homes, and the noise levels and pollution levels from GLBs used in adjacent properties victimizes them. Gas leaf blowers have a low frequency that penetrates buildings. Quieter electric leaf blowers do not. Anti-smoking laws in public places appear to parallel GLB regulation.

There may be some gas leaf blowers that have mufflers that aren't as loud as the worst of them, and some workers may be more prudent with how much throttle they apply, which can help reduce but not eliminate public detriments. The noise, even if slightly reduced, is still a nuisance.

There may be some service providers who will be inconvenienced and challenged to budget money to replace their GLBs with electric ones. Some service providers may be induced to raise prices slightly. Differences should be minor due to affordability of suitable electric unit replacements.

Gas leaf blowers should be banned due to the amount of public detriments they represent, especially considering that equally capable and priced electric units are available. Unless one believes that land owners' and service providers' rights to pollute pre-empt the rights of bystanders to be free of the extreme pollution and noise, then support for GLB bans should be unanimous. Unless one thinks GLB bans will substantially increase costs of land care services or impair the work, then support should follow. Our prices are at market or within 10-20% while we use all electric tools.

With 50% quieter electric blowers running at 950CFM (Cubic Feet per Minute--more than most backpack GLB's), with batteries that last 30 to 60 minutes available now, professional level electric tools are affordable (in the \$1,200 range) and capable. In our practice 650cfm hand-helds with 20 minute batteries usually suffice, and those cost around \$300 complete with a battery and charger. We believe

August 25, 2021

two stroke particulate air pollution, vibration, spillage, and noise is unconscionable and use all electric blowers! For that matter we use all electric tools, no gas, for trimming, hedging, sawing, edging, mowing, pruning, aerating, spraying, and dethatching too, and we care for 50 to 60 acres weekly as professional landscapers.

MowGreen serves customers in New Haven, Westport, Rye, Larchmont (planning to 2022) and Bedford/Katonah New York where similar ordinances have been or are under consideration to be implemented.

Using no gas blowers in our practice, being all electric, has helped our business grow 30% annually for 8 years straight - with happier customers and healthier workers.

Please feel free to call or email me with any questions.

Best Regards,



Dan Delventhal, Founder, MowGreen LLC



About MowGreen:

Tending the ave. lawn with gas emits tons of green house gases per year; like a car driving 12,000 miles, as gas lawn gear is 20 times more polluting per gallon than in a car. Lawn Care is over 5% of US air pollution. MowGreen cuts grass without gas. Over 600 metric tons of air pollution are avoided annually - over 6,000 acres mowed without gas, avoiding 7 MILLION auto-mile equivalent emissions since 2006. MowGreen® is a carbon neutral company, focused on sustainable lawn care technologies and services. Clean & Serene, No GasolineSM.

Values: Reduction, Ecology, Ethics, Life sustaining, & Respect, Effectiveness, Efficiency, Lasting value (REEL).

Mission: Get the Gas off the Grass, More Food Growing, Less Lawn Mowing, No Invasives, Let's Plant Natives.

Vision: National Network of locally managed and centrally supported eco-friendly gardening & lawn care.

Appendix D

Testimony from New Haven residents:

I'm a native New Havener but lived elsewhere for years until 2006, when I moved back here with my then 8-month-old son. We had been living in New York City -- not the quietest location! -- but getting a baby to nap in New Haven proved next to impossible with landscaping crews in our neighborhood operating multiple leaf blowers at a time.

In fact, I got so fed up with the noise pollution generated by leaf blowing equipment that I set up a landscaping business of my own, figuring there had to be a better, quieter, cleaner way to take care of people's landscaping needs. Using only manual and electric equipment, I found eager customers and built a solid business, and while I'm no longer a landscaper myself, many of those homeowners and landlords are still loyal customers of the business I established.

While my initial concern with gas-powered leaf blowers was primarily as a fed-up resident (and desperate mother!), I have since come to recognize the very real, very human health and environmental threats posed by such equipment. I now live in Fair Haven, where many of the landscapers who work around town are my neighbors, and who suffer the most from the hearing loss, cardiopulmonary diseases, and other conditions associated with gas-powered leaf blowers. These workers are often people of color who face a host of socioeconomic challenges; the health risks of leaf blowers add to that burden and exacerbate existing problems such as New Haven's high rate of childhood asthma.

As a mother, neighbor, and former landscaper, I believe we should work for a healthier, environmentally friendly solution that also supports our small businesses. Viable, cost-effective alternatives to gas-powered leaf blowers exist and can actually boost landscapers' business while at the same time safeguarding the health and environment of all New Haveners.

- Natalie Coe, Fair Haven, New Haven

I have lived in New Haven's Westville neighborhood for 11 years now. Westville is a beautiful and friendly neighborhood but, with the leaf blowers, it is also a very noisy neighborhood. Others have provided abundant testimony on the harm of leaf blowers on human hearing and health and their many forms of destruction to the environment and to nonhuman animals. I will speak to their ruination of the quality of human life. They are loud, jarring, and obnoxious. From mid-Spring through late-Fall rarely a day goes by without the sound of leaf blowers. I hear them from far away, especially when lawn companies run 2-4 at a time. I often see workers randomly running their leaf blowers for no reason at all—they are just blowing them into the air. They run them to blow away even a few of the minutest particles. When I walk by them, I am forced to breathe in the fumes and toxic chemicals they spew into the air. I also ride my bicycle through New Haven, and I see them being used on tiny patches of grass throughout the city. I hear them in my own house, even with all the windows closed. If I want to escape the noise, I have to retreat to a windowless room in the basement, and even there I can hear them. Leaf blowers are, in short, a plague. I have come to thank the neighbors who remove grass and leaves from their lawns with rakes and who sweep the grass clippings off their walkways with brooms—both of which take only a little more time and barely little more effort. I strongly support the elimination of all leaf blowers, but above all, gas-powered leaf blowers.

- Jeanne Dubino, Westville, New Haven, Connecticut

August 25, 2021

I moved to New Haven in the summer of 2020 and throughout the fall, spring, and summer have found leaf blowers in my neighborhood and near my workplace to be a constant disruption to my work. The noise is loud and has made teaching and participating in conference calls from home difficult. In particular, the sound of gas-driven leaf blowers can be heard indoors and with the windows shut. On several occasions I have had headaches from the noise. I also hear leaf-blowers from my office, suggesting that this problem will outlast the pandemic and the rise in the number of people working from home. I would support any measure by the city to limit the use of the gas-driven leaf blowers. While the noise of the leaf-blowers is a primary concern for comfortable living and working, they are also health hazards and harmful to the environment.

- Elizabeth Knott, Westville, New Haven

I have lived in the Fair Haven neighborhood of New Haven for over two years. This is a diverse and vibrant neighborhood with a lovely river community and many beautiful historic houses. The parks and playgrounds, beautiful architecture and river views invite outdoor activities and long walks. However, the neighborhood struggles with noise and pollution. Traffic is one factor to this problem. Leaf-blowers are another significant and, in my opinion, unnecessary contributor to the noise and pollution of the community. In the summer and fall months, it is almost impossible to be on playgrounds or go for walks because of leaf-blowers, whirling up dust, emitting pollution and making so much noise it's hard to have a normal conversation. When they start the leaf-blowers, I always end up bringing the kids home from the playground, because we simply can't enjoy ourselves outside. The problem has been so much worse this last year because with children in remote school, they spend so much time on a chair in front of a screen. They need to get out and move and play every day. The noise from the leaf-blowers has also made it hard to have virtual classes and online meetings. The landscaping companies usually use two (or more) leaf-blowers at a time and even with closed windows, the noise is a disruption.

- Agnete Lassen, Fair Haven, New Haven

We care for six hens and a garden in which we grow vegetables and cultivate butterfly attracting plants. Our property is bracketed on all sides by seven close neighbors, all of whom are fine people whom we know and enjoy. Each of them now employ garden service crews that show up regularly on almost every day of the week. Every one of these garden services also employ gas powered leaf blowers that create a constant din of loud noise and also blow dust all over our collective properties and the busy streets that abut them.

Once the Covid virus lockdown took place in 2020, my wife and I began spending a great deal of time in our home and decided to cancel our garden service. I now mow our large backyard and side lawns with a hand mower and also use two battery powered edge and hedge trimmers to keep our other plants, hedges, and trees well pruned. Hand rakes are also favorite tools. We hope that commercial landscaping crews, even if they don't pick up rakes, switch to increasingly available and quieter electric- and battery-powered leaf blowers and other garden equipment. We fully support this effort to ban the use of gas powered leaf blowers in New Haven.

Yours,

- Jock Reynolds and Suzanne Hellmuth, East Rock, New Haven

August 25, 2021

I moved to New Haven last summer and struggled to work from home during the following fall and spring because of the pervasive noise and air pollution from frequent use of leaf blowers in the vicinity of my home. Even with all the windows closed, I was breathing in fumes coming in from the outside, and the noise was so disruptive that I was not able to participate in a Zoom presentation. I could only imagine how noisy and polluting the experience was for the leaf blower operators, or for those with health conditions, the very young and the elderly. Further research showed that economically competitive electric and manual alternatives are widely available, as are more sustainable practices such as mulching, and allowing some leaf ground cover to protect our ecosystems over winter. I also learned that leaf blowers were initially designed to spray various substances and were not intended for residential leaf collection until the 1970s, and that because they use such an outmoded type of a two-stroke engine, even 30 minutes of their use produces more toxic air pollution (including particulate matter, carbon monoxide, carbon monoxide and VOCs) than driving a pick-up truck over thousands of miles. At the same time, stressful noise emissions have been linked to hearing loss, heart disease and other chronic health conditions. While they may only seem like a nuisance, gas-powered leaf blowers are a dangerous public health and environmental threat, and as with second hand cigarette smoke, there is no way to protect those who are on the receiving end of the noise and pollution emitted by the gas-powered leaf blowers, other than restricting the use of the blowers themselves. I would support any action by the city to encourage a move away towards quieter and more sustainable landscaping practices, especially since New Haven has declared a climate emergency in 2019, and since so much is being done to support a move towards electric vehicles. Over a hundred municipalities across the US have banned or limited gas-powered leaf blowers because of the above concerns, most recently, Washington D.C., Larchmont, NY and Burlington, VT. I hope New Haven will follow their example in order to protect both the city residents' health and the local environment.

- Pavla Rosenstein, Prospect Hill, New Haven

I think that New Haven should follow the lead of other cities and towns and explore the possibility of phasing out or sharply limiting gas-powered leaf blowers. Gas-powered leaf blowers are hazardous to human health and highly disruptive to quality of life. New Haven struggles with poor air quality and childhood asthma, and it's well-documented that the motors used by leaf blowers are highly polluting. Noise also is a significant factor for quality of life and New Haven can strive to be a quieter city. A single leaf blower can be heard for blocks in all directions, disrupting work and recreation and setting people on edge. In my neighborhood, leaf blowers are used weekly by landscaping companies employed by non-residential landlords. When the leaf blowers are operating, we have to stop conversations, go inside, and wait out the disruption. The workers typically do not wear ear protection, meaning that they are exposed to noise levels that quite likely will lead to hearing loss. The commercial landscaping companies are being allowed to pollute and disrupt the entire neighborhood for free, while everyone else bears the cost. Battery powered and plug-in alternatives increasingly exist that are safer for workers and better for community residents.

- Paul Sabin, Linden Street, New Haven

I have lived in the Westville section of New Haven for seventeen years now, and what first drew me to this area and led my wife and me to buy a house here is the incredibly walking-friendly atmosphere of

August 25, 2021

the whole neighborhood. Go out any evening, and you will see people strolling on the sidewalks, often accompanied by children and dogs. We've had two generations of dogs here, and they thrive in our neighborhood thanks to the room on the sidewalks for pedestrians with four paws as well as for their two-footed companions.

During the day, though, walking the dogs becomes more hazardous as we have to swing from one side of the road to the other to avoid pesticide applications and, compounding this toxic scourge, men with very loud gas-powered leaf blowers knocking the poison into the air for us and our dogs to breathe in and making it impossible to enjoy a peaceful walk through a beautiful neighborhood. The noise and smell of exhaust are terrible, and since so many of us have been working from home the last eighteen months, it's nearly impossible to escape the noise pollution from spring to fall when we go outside for a break.

The noise put out by these gas-powered leaf blowers distresses people, pets, birds, and other animals. Let's try to take these machines out of the lawncare repertoire.

- Andrew Smyth, 80 Cleveland Rd, New Haven, CT 06515

Dear Environmental Advisory Council Members,

In our City, there are no shortage of gas engines damaging our lungs and ears. The dirt bikes, quads, and motorcycles come to mind, not to mention the honking and revving of cars. For most of these, there aren't clear, simple solutions. However, gas powered lawn care equipment is something we can address. People using gas powered leaf blowers aren't being loud to show off or out of a desire for attention. They aren't intentionally polluting like the smokestacks on the big trucks of out-of-towners. They are using gas powered leaf blowers because it's the norm.

It is impressive that we can make affordable gas engines that can be strapped on the back or held in the hand. Unfortunately, just because it's convenient, doesn't mean it's the right thing to do. Using an electric leaf blower, or oftentimes a rake, will take the same amount of time or slightly longer. And for those who say it will take them longer, such is life. Sometimes, we as a society have to regulate dangerous things for the health and benefit of everyone, even if it means a little inconvenience. This is true of both the individuals and the companies using gas leaf blowers. The individuals need a nudge, and the companies need a push. The cost to get yard work done might go up a bit, but if that's the case then we should be happy we've been getting a discounted rate for so long.

The gas powered leaf blowers don't just ruin every spring/summer/fall day by making it impossible to work, have a conversation, or hear birds, they also damage ears and harm lungs. This is a quality of life issue, but also a health and equity issue. It's not wealthy people being hired at minimum wage to blow the leaves, and the folks being hired don't have much of a say in the matter, because right now the economics are dictated by speed and price.

Thank you for your consideration.

- Lior Trestman, 396 Orange St, New Haven CT

August 25, 2021

I work from home and am acutely aware of which day of the week a certain landscaping company tends our downhill neighbor's yard because of the exceedingly loud noise made by the gas-powered leaf blowers the crew uses even in summer, not a time when leaves have collected on the ground. I've learned to close all the doors and windows when leaf blowers are in use; even so it can be difficult to have a phone conversation, let alone concentrate on work. The impact of the noise on the leaf blower operators must be considerable, even with ear protection. Nearly every day I walk with my dog through the neighborhood, normally a very pleasant experience. However, it is unpleasant and stressful when landscaping crews are using gas-powered leaf blowers on or near the sidewalk, often two at a time. The noise itself is stressful, and the dust and debris stirred up and blown around by the leaf blowers as well as the fumes from the machines is breathed in not just by the workers and passing pedestrians but also by neighbors, children, and pets, with potentially harmful effects to health. Given that quieter and less damaging alternatives are available, I hope that the city of New Haven will take steps to ban the use of gas-powered leaf blowers.

- Mary Woolsey, Prospect Hill, New Haven