

**Report on Updating/Strengthening Leaf-Blower Ordinance**

**City of Davis Natural Resources Commission**

**DRAFT**

## Introduction

Two-cycle, gasoline-powered leaf blowers were introduced in the United States in the 1970s. Blowers—including two-cycle gas blowers, four-cycle gas blowers, corded electric blowers, and cordless (battery-powered) electric blowers—have since become ubiquitous in gardening and landscaping. Yet blower use is controversial. Advocates note that blowers are an efficient, low-cost means of removing leaves and other debris from lawns, plant beds, walkways, and roads. Advocates further note that manual methods of debris removal (e.g., raking and sweeping) are much more time- and labor-intensive than blowing. Finally, advocates contend that while authorities may reasonably limit blower use on public property, individuals have a right to use the maintenance equipment of their choice on their own private property.

Opponents believe that the adverse impacts of blowers outweigh their benefits. Opponents argue the noise, dust and debris, and greenhouse gas (GHG) emissions generated by gas-powered blowers present clear negative externalities that government has a right and responsibility to address. Opposition to blowers has led more than 100 cities in at least 15 U.S. states to curtail blower use—including by strictly limiting when, for what purposes, and what models of blowers may be used; by banning gas blowers (but allowing electric blowers); or by banning blowers altogether.

In Davis, use of gas and electric blowers is subject to mild time-of-use and noise restrictions but is generally permitted on all public and private property. The nature of these restrictions have become a topic of heated public debate. The Natural Resources Commission (NRC) has observed—via public comments delivered both orally and in writing, discussion on the community forum NextDoor, and anecdotally—many Davis residents express both clear support for and clear opposition to continued blower use within the City.

In response to these comments, and pursuant to Goal 3 (“Pursue Environmental Sustainability”) and Goal 5 (“Ensure a Safe, Healthy, Equitable Community”) set by the Davis City Council,<sup>1</sup> the NRC has prepared the report contained herein. The report proceeds as follows. Section 1 summarizes arguments for and against blower use. Section 2 describes what other U.S. communities have done to regulate blowers. Section 3 outlines options for regulating blower use in Davis. Section 4 presents the NRC’s recommendation based on information presented in Sections 1–3. In brief, we recommend **(1) phasing in a ban on the sale and use of gas leaf blowers within City limits, and (2) allowing continued use of electric leaf blowers under more stringent restrictions.**

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<sup>1</sup> <http://documents.cityofdavis.org/Media/Default/Documents/PDF/CityCouncil/CouncilMeetings/Agendas/20190521/05J-Council-Goals-2019-2020.pdf>

## 1. Arguments for and against blower use

### 1.1 Arguments for blower use

The most vocal proponents of blower use are landscape professionals and equipment manufacturers. A 2016 position statement from the National Association of Landscape Professionals (NALP) presents the following arguments in favor of (gas and electric) blower use.<sup>2,3</sup>

- Blowers are efficient and unique tools for cleaning up small debris (e.g., leaves, grass, fertilizer granules) from lawn and landscape sites. Blowers perform functions that no other tool can handle effectively, such as cleaning areas covered by rock, gravel, bark, or mulch.
- Blowers save time and resources. According to the NALP, it takes “at least five times as long to clean a typical landscape site with a broom and rake than it does with a power leaf blower.” The NALP also points out that without blowers, people may turn to hoses as a method for rapidly clearing debris from an area. This is an important consideration for drought-stressed places like California.
- Blowers save money. The NALP states “that landscape costs (and therefore charges) would increase from 20 to 40 percent if operators must perform the same functions without a leaf blower.”
- Restricting blower use could increase reliance on unlicensed companies. Blower restrictions are rarely a top enforcement priority for local law enforcement. As such, the NALP argues that “unlicensed operators would flaunt a ban [or strict restrictions] on leaf blowers if given the chance, and consequently, they would be able to underbid...[licensed companies] contracts for lawn and landscape maintenance. Legitimate lawn and landscape contractors could go out of business and their employees would lose [sic] jobs that pay well.”
- Blowers can be used responsibly. Newer blower models are quieter than older models. All blowers can be used in ways that reduce adverse impacts. The American National Standards Institute (ANSI) provides a list of operating recommendations for blowers (Appendix III).
- Electric blowers are imperfect substitutes for gas blowers. Cord-powered electric blowers are powerful enough to substitute for gas blowers for many big jobs, but are also limited in range. Battery-powered electric blowers are more portable but less powerful and offer limited runtime.<sup>4</sup> Moreover, the most powerful electric blowers are as noisy as similarly powerful gas blowers, and noise from electric

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<sup>2</sup> <https://villagegreennj.com/wp-content/uploads/2016/05/leafblowers-position-paper-3.pdf>

<sup>3</sup> See also a [webpage](#) maintained by the California Landscape Contractors Association and 2018 [testimony](#) delivered by the Outdoor Power Equipment Institute to the Washington, D.C. City Council.

<sup>4</sup> <https://www.consumerreports.org/cro/leaf-blowers/buying-guide/index.htm>

blowers is compounded by the noise produced by a generator if electrical outlets aren't available.

- Emissions impacts of blowers are overstated and are out of regulatory scope for municipalities. The NALP concedes that gas-powered blowers can produce high levels of harmful emissions. However, the NALP points out that “[a]ctual emissions from leaf blowers are few because of the equipment’s intermittent use. For example, one year of volatile organic compound (VOC) emissions from cars compares to 21 years of emissions from portable lawn and garden projects.” The NALP also contends that because air-pollution issues are being addressed by regional, state, and federal entities, municipalities should not regulate blowers on emissions grounds.

## 1.2 *Arguments against blower use*

Numerous medical associations,<sup>5</sup> government agencies,<sup>6</sup> and local stakeholder organizations raised concern about leaf blowers directly and/or the adverse effects that leaf blowers can have. Concerns are generally related to one of three topics: (1) noise, (2) airborne dust and debris, and (3) greenhouse gas (GHG) emissions.

### 1.2.1 Noise

The effects of sound on the ear are determined by sound characteristics such as duration, intensity, and pitch. Long-duration, high-intensity sounds are most damaging to hearing.<sup>7</sup> A 1999 report<sup>8</sup> on leaf blowers prepared by the Orange County Grand Jury is unequivocal on the harmful effects of blower noise. Per the report:

"The average blower generates noise that measures 65 to 75 dbA or more at 50 feet, and even louder at close range. Leaf blowers are often used fewer than 50 feet from non-consenting people. Neighboring homes may be occupied by home workers, retirees, day sleepers, children and the ill or disabled. The World Health Organization (WHO) recommends general outdoor noise levels of 55 dBA or less, and 45 dBA or less for sleeping. Thus, a 65-decibel leaf blower would be 100 times too loud for healthful sleep. Blower noise can, and probably does, impair the user’s hearing. A blower generates upward of 95 decibels of noise at the operator’s ear...There is an increased risk of hearing damage and deafness from repeated exposure to noise above 75 dBA. Deafness caused by noise is irreversible."

The report further notes that “[n]oise interferes with communications, sleep, and work...degrades quality of life by impairing social interaction...[and] reduces work

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<sup>5</sup> Including the [American Public Health Association](#), the [American Lung Association](#), and [Harvard Medical School](#).

<sup>6</sup> Including the [California Air Resources Board](#), the [Centers for Disease Control and Prevention](#), and the [Environmental Protection Agency](#).

<sup>7</sup> [https://www.cdc.gov/nceh/hearing\\_loss/what\\_noises\\_cause\\_hearing\\_loss.html](https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html)

<sup>8</sup> <http://www.ocgrandjury.org/pdfs/leafblow.pdf>

accuracy and creates stressful levels of frustration and aggravation.” While the Orange County report is now two decades old, its findings on noise are still relevant given that the current Davis Municipal Code permits blower noise louder than the risk thresholds identified in the report (see Section 3).

The *type* of noise produced by blowers also matters. A January 2020 survey<sup>9</sup> conducted by *National Geographic* found that blower noise was ranked as the 3<sup>rd</sup> most annoying noise by respondents. Blower noise ranked as less annoying than “buzzing insects” and “barking dogs” but more annoying than “open-mouthed chewing”, “car alarms”, “people singing really badly”, “entitled people screaming”, “knuckles cracking”, and “loud neighbors”. Certain blowers produce high-pitched whining tones that may be perceived as more annoying than other noises of similar loudness.<sup>10</sup>

Electric blowers are typically quieter than gas blowers, though not always.<sup>11</sup> Certain manufacturers, such as Echo,<sup>12</sup> have also optimized blower design to eliminate the whining noise of blowers that is perceived as particularly irritating.

### 1.2.2 Fugitive dust

Gas and electric blowers alike function by blasting air at high velocities (typically 150–280 MPH; hurricane wind speed is >117 MPH) to move leaves and other target debris from place to place.<sup>13</sup> An unintended effect can be to kick up dust containing PM2.5 and PM10 particles. PM10 particles can migrate up to 30 miles and stay in the air for hours; PM2.5 particles can migrate hundreds of miles and stay in the air for days or weeks. Exposure to such particulate matter can exacerbate health conditions including asthma, respiratory and cardiac distress, chronic obstructive pulmonary disorder (COPD), and other lung diseases.<sup>14</sup> There is also evidence suggesting that exposure to excessive levels of particulate matter exposure can contribute to clinically observable levels of anxiety.<sup>15</sup>

The health effects of exposure to PM2.5 and PM10 particles should not be dismissed. As the American Lung Association observes:<sup>16</sup>

“...short-term exposure to particle pollution can kill...Premature deaths from breathing these particles can occur on the very day that particle levels are high, or within one to two months afterward. Particle pollution does not just make people die

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<sup>9</sup> <https://www.nationalgeographic.com/magazine/2020/01/the-science-of-annoyance/>

<sup>10</sup> <https://www.consumerreports.org/cro/news/2010/06/inside-consumer-reports-test-labs-for-leaf-blowers-sound-pressure-and-sound-quality-determine-how-annoying-the-noise-can-be/index.htm>

<sup>11</sup> <https://www.sears.com/articles/lawn-garden/leaf-blowers/electric-vs-gas-leaf-blower.html>

<sup>12</sup> <https://reactual.com/home-and-garden/quietest-leaf-blower-2017.html>

<sup>13</sup> <https://ww3.arb.ca.gov/msprog/mailouts/msc0005/msc0005.pdf>

<sup>14</sup> <https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=347534#tab-3>

<sup>15</sup> <https://www.bmj.com/content/350/bmj.h1111>

<sup>16</sup> <https://www.lung.org/assets/documents/healthy-air/state-of-the-air/sota-2019-full.pdf>

a few days earlier than they might otherwise—these are deaths that would not have occurred so early if the air were cleaner. Even low levels of particles can be deadly."

Reliable data on the volume and composition of blower-generated dust are scarce. A 2000 report from the California Air Resources Board (CARB) concluded that "PM10 emissions impacts from dust suspended by leaf blowers are small, but probably significant." CARB did not offer a similarly definitive statement regarding PM2.5 emissions, but provided modeling results indicating that such emissions are likely non-zero. CARB also noted that while "substances such as fecal material, fertilizers, fungal spores, pesticides, herbicides, pollen, and other biological substances have been alleged to make up the dust resuspended by leaf blower usage", little information on the composition of blower-generated dust is available. CARB did observe that such substances have been detected in paved road dust resuspended by passing traffic, and that blowers would likely be as effective as automobiles at resuspending paved road dust. A 2006 study by researchers at UC Riverside in collaboration with the San Joaquin Valley Unified Air Pollution Control District found that gas and electric blowers alike generate PM2.5 and PM10 when used on a variety of surfaces (especially concrete, asphalt, and packed dirt). PM2.5 and PM10 emissions from sweeping with a push broom were comparably high on a concrete surface (though far fewer tests were performed using a broom than were performed using blowers), but lower on asphalt. PM2.5 and PM10 emissions from raking were essentially zero.

Anecdotal evidence indicates that blower-generated dust is a nuisance for many Davis residents. Comments on the neighborhood forum NextDoor cite blower dust as a problem. Residents have delivered comment at the NRC's monthly meetings noting the adverse impacts of particulate matter from leaf blowers. On an individual basis, multiple NRC members have heard additional complaints about blower-generated dust.

### 1.2.3 Exhaust emissions

All gas blowers emit a variety of compounds that can be harmful to human and environmental health. The small, two-stroke engines that power the majority of gas blowers are characterized by especially high and harmful emissions.<sup>17</sup> Per the 2000 CARB report [emphasis added]:

"Typical two-stroke designs feed more of the fuel/oil mixture than is necessary into the combustion chamber...the incoming fuel enters the combustion chamber as the exhaust is leaving. This timing overlap of intake and exhaust port opening can result in as much as 30% of the fuel/oil mixture being exhausted unburned. Thus, exhaust emissions consist of both unburned fuel and products of incomplete combustion.

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<sup>17</sup> [https://www.researchgate.net/publication/236970011\\_Physical\\_Chemical\\_Characterization\\_of\\_emissions\\_from\\_2-Stroke\\_motorcycles\\_Comparison\\_with\\_4-stroke\\_engines/link/02e7e51a867fe38fcb000000/download](https://www.researchgate.net/publication/236970011_Physical_Chemical_Characterization_of_emissions_from_2-Stroke_motorcycles_Comparison_with_4-stroke_engines/link/02e7e51a867fe38fcb000000/download)

**The major pollutants from a two-stroke engine are, therefore, oil-based particulates, a mixture of hydrocarbons, and carbon monoxide.”**

According to CARB, operating the best-selling (two-stroke) commercial gas leaf blower for one hour emits smog-forming pollution comparable to driving a 2016 Toyota Camry about 1,100 miles.<sup>18</sup> A 2015 study conducted in collaboration with the EPA confirmed that gas blowers are an important source of volatile organic compounds (VOCs; i.e., hydrocarbons) and criteria pollutants (i.e., carbon monoxide (CO) and fine particulate matter). Gas blowers also emit small amounts of carbon dioxide (CO<sub>2</sub>), a greenhouse gas.

Hydrocarbon emissions from gas blowers include toxic air contaminants such as benzene, 1,3-butadiene, acetaldehyde, and formaldehyde. Each of these contaminants is a known or probable human carcinogen.<sup>19</sup> Hydrocarbon emissions can also combine with nitrogen oxide emissions from other sources to produce atmospheric ozone, thereby contributing to the greenhouse effect and climate change. Exposure to carbon monoxide can cause short-term symptoms including headache, nausea and vomiting, dizziness, and difficulty breathing. Long-term exposure has been linked to miscarriage, fetal damage, seizures, coma, and heart failure.<sup>20</sup> The health effects of exposure to particulate matter are discussed above.

Some gas blower models are powered by four-stroke engines (i.e., the same type of engine used in cars). These engines achieve complete combustion of fuel and therefore emit less air pollution than two-stroke engines, but are also larger and more expensive.<sup>21</sup> Electric blowers do not directly release exhaust emissions.

### 1.3 *Other environmental considerations*

The following environmental considerations are also relevant to a comprehensive assessment of leaf-blower impacts.

- **Stormwater impacts.** The U.S. Geological Survey reports that removal of leaf litter from street surfaces can decrease nutrient pollution from stormwater runoff into local water bodies.<sup>22</sup> However, this benefit is only realized if leaf litter is fully removed (i.e., collected and properly disposed of via composting or other green-waste stream). Blowers may increase nutrient pollution if blower use makes it easy to clear a lawn by blowing leaves into the street—a practice that can clog

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<sup>18</sup> <http://www.vcapcd.org/pubs/Rules/CleanAirFund/CA-Air-Resources-Board-garden-equipment-fact-sheet.pdf>

<sup>19</sup> [https://afdc.energy.gov/vehicles/emissions\\_pollutants.html](https://afdc.energy.gov/vehicles/emissions_pollutants.html)

<sup>20</sup> <https://toxtown.nlm.nih.gov/chemicals-and-contaminants/carbon-monoxide>

<sup>21</sup> [https://www.washingtonpost.com/national/health-science/how-bad-for-the-environment-are-gas-powered-leaf-blowers/2013/09/16/8eed7b9a-18bb-11e3-a628-7e6dde8f889d\\_story.html](https://www.washingtonpost.com/national/health-science/how-bad-for-the-environment-are-gas-powered-leaf-blowers/2013/09/16/8eed7b9a-18bb-11e3-a628-7e6dde8f889d_story.html)

<sup>22</sup> [https://www.usgs.gov/centers/umid-water/science/using-leaf-collection-and-street-cleaning-reduce-nutrients-urban?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects](https://www.usgs.gov/centers/umid-water/science/using-leaf-collection-and-street-cleaning-reduce-nutrients-urban?qt-science_center_objects=0#qt-science_center_objects).

storm drains as well. In other words, *removing* leaves from streets and storm drains mitigates stormwater impacts. Blowers can help in this regard. But blowers also make it easier to simply *relocate* leaves from one place to another, a practice that may actually make stormwater impacts worse.

- **Transportation impacts.** It is plausible that the air-quality impacts of blower use may make walking, biking, and other alternatives to car-based travel less attractive. We were unable to identify any studies that rigorously examined impacts of blower use on transportation.
- **Equity impacts.** No group of people has greater exposure to the adverse impacts of leaf blowers than the landscapers and groundskeepers who use blowers on a regular basis. Given that these workers are disproportionately low-income and Hispanic,<sup>23</sup> environmental-justice concerns may arise when workers have no direct control over what equipment they use—e.g., if they work for a company that directs them to use gas-powered blowers because gas-powered blowers are cheaper. Stricter blower regulations may help alleviate such concerns.

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<sup>23</sup> <https://datausa.io/profile/soc/grounds-maintenance-workers#demographics>.



## 2. What other jurisdictions have done

More than 100 cities in at least 15 states (plus Washington, DC) have passed laws restricting or banning the use of leaf blowers. About two-thirds of these cities are located in California. The large majority of cities with leaf-blower regulations—including Davis—simply limit what times of day or year blowers can be used, and/or the maximum decibel levels that blowers can emit. Other cities ban gas-powered blowers but permit electric blowers, while a small number ban blowers altogether. A list of cities that limit or ban leaf blowers is contained in Appendix IV, and a summary table is below.<sup>24</sup>

Leaf-blower regulation in the United States				
	Complete gas blower ban	Seasonal gas blower ban	Noise and/or time of day restrictions	Complete gas and electric blower ban
Number of identified cities with each policy	33	9	87	5

Cities typically impose small fines—on the order of several hundred dollars—for each violation of a leaf-blower law. In Palm Springs, offenders must pay \$100 for a first violation, \$200 for a second, and \$500 for a third. In Encinitas, violators first receive a warning notice. After the warning notice, violators receive a fine of \$100 for the first violation, \$200 for the second violation, and \$1,000 for each violation thereafter.<sup>25</sup> Santa Monica imposes a \$500 fine for each offense.<sup>26</sup> In Washington, D.C., violations are subject to fines not to exceed \$500.<sup>27</sup>

Local government agencies have offered incentives to ease the impacts of blower bans. The South Coast Air Quality Management District provides district residents with “a rebate of up to \$250 with the purchase of a cordless, battery-electric lawn mower”, provided that an “operable, gasoline powered lawn mower” is scrapped in exchange. The District also finances an additional 25% discount on the purchase of “commercial electric leaf blowers, string and hedge trimmers, lawn mowers and chainsaws” to eligible participants, including “commercial gardeners and landscapers, local governments, school districts, colleges, and non-profits.” The District prioritizes funding for the commercial discount to environmental justice or disadvantaged communities,

<sup>24</sup> We were not able to identify any comprehensive trackers of leaf-blower laws in the United States. Data in the summary table on this page and in the Appendix comes from a list maintained by HD Supply Facilities Maintenance ([https://hdsupplysolutions.com/s/leaf\\_blower\\_noise\\_regulation](https://hdsupplysolutions.com/s/leaf_blower_noise_regulation)). This list, while informative, is likely incomplete. In the course of preparing this report, we came across multiple municipalities with leaf-blower laws that were not included in the HD Supply list. Some articles suggest that the number of cities that ban or restrict leaf blowers totals more than 400.

<sup>25</sup> <https://encinitasca.gov/Portals/0/City%20Documents/Documents/City%20Manager/Leaf%20Blower%20Ordinance/ATTACHMENT%201%20EXHIBIT%201%20-%20CHAPTER%2011.28%20-%20Leaf%20Blower.pdf?ver=2020-03-13-170053-570>

<sup>26</sup> <https://www.desertsun.com/story/news/local/2019/07/23/despite-rise-gas-leaf-blower-complaints-few-citations-issued/1806497001/>

<sup>27</sup> <http://chairmanmendelson.com/wp-content/uploads/2018/10/B22-234-Leaf-Blower-Regulation-Amendment-Act-of-2018-CIRCULATION-PACKET.pdf>

and also requires that participants scrap “an equivalent operable gasoline or diesel piece of lawn or garden equipment” to qualify for the discount. Encinitas, a city approximately the same size as Davis, accompanied its ban on gas blowers with a city-funded rebate program that allows residents and business owners to turn in gas blowers in exchange for credit on new electric blowers.<sup>28</sup>

The push to phase out gas blowers is gaining traction at the state level as well. Illinois lawmakers recently introduced<sup>29</sup> legislation that would ban the sale and use of gas blowers statewide. A proposed statewide ban on the use of two-cycle gas blowers in Oregon died in the legislature last year, but Oregon lawmakers have indicated openness to reconsidering such a ban in the future.<sup>30</sup> CARB has already begun ratcheting down allowable emissions for gas-powered lawn equipment, with an eye towards ultimately ending the sale of such equipment.<sup>31</sup>

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<sup>28</sup> <https://www.nbcsandiego.com/news/local/encinitas-leaf-blower-ban-goes-into-effect/2233563/>

<sup>29</sup> <https://newschannel20.com/news/local/gas-powered-leaf-blowers-may-be-a-thing-of-the-past-in-illinois>

<sup>30</sup> <https://www.oregonlive.com/politics/2019/06/leaf-blower-ban-though-dead-generates-plenty-of-debate-at-capitol.html>

<sup>31</sup> <https://www.sfchronicle.com/business/article/California-s-latest-pollution-push-Banning-14951305.php#>

### 3. Options for regulating leaf-blower use in Davis

The NRC has identified four regulatory options the City could pursue with regard to leaf blower use in Davis.

#### 3.1. Option 1: Take no additional action

The City could choose to leave existing blower restrictions in place, without taking additional action. Option 1 **would not impose any burden on stakeholders**, but would also **do nothing to address complaints** of adverse blower impacts in Davis.

Per Section 24.02.040(b) of the Davis Municipal Code, the City currently permits the use of both gas and electric leaf blowers between the hours of 7:00 AM and 7:00 PM on Mondays through Fridays, and between the hours of 8:00 AM and 8:00 PM on Saturdays and Sundays. Blower use is subject to the following noise restrictions:

- (1) No individual blower may produce a noise level exceeding 83 dBA at a distance of 25 feet.
- (2) No individual powered blower may produce a noise level exceeding 70 dBA at a distance of 50 feet. On a single-family residential property, this restriction does not apply if a blower is operated for less than 10 minutes per occurrence.
- (3) The noise level at any point outside of the property plane may not exceed 86 dBA.
- (4) No powered blower may be operated within a 100-foot radius of another blower simultaneously.

#### 3.2 Option 2: Implement more stringent use restrictions on all blowers

The City could choose to implement more stringent use restrictions on gas and electric blowers, without fully banning either. **Option 2 could mitigate—but not eliminate—the biggest problems with blower use:** noise, airborne dust and debris, and exhaust emissions. This option would impose a **small financial burden** on stakeholders who would need to purchase new blower models to achieve compliance. Option 2 would also impose **small to moderate additional burdens** on stakeholders depending on the stringency of the restrictions (e.g., the narrower the time windows that blowers are permitted, the greater the burden on those who rely on blowers for various tasks). Enforcing certain use restrictions (e.g., noise restrictions) would likely be challenging, whereas enforcement of other use restrictions (e.g., prohibiting blower use on weekends and holidays) would be easier.

### 3.2.1 Restrictions on noise

More stringent use restrictions would be most effective at addressing noise concerns. Multiple municipalities (e.g., Atherton<sup>32</sup> and San Clemente<sup>33</sup>) mandate that no individual blower may produce a noise level exceeding 65 dBA at a distance of 50 feet: i.e., five dBA less than permitted under the current Davis Municipal Code. Because the decibel scale is logarithmic, decreasing a noise by five dBA equates to approximately halving the sound energy contained in that noise. Most human speech falls around 60 dBA, with louder speech falling around 65 dBA. Establishing a 65 dBA noise limit would put blower noise in the range that people typically hear inside a crowded room.

Other municipalities also limit the times of day that blowers may be used to a narrower window than is permitted under the current Davis Municipal Code. Atherton, for instance, limits blower use to between 8:00 AM and 6:00 PM Mondays through Fridays, 10:00 AM and 5:00 PM on Saturday, and 10:00 AM and 3:00 PM on Sunday. Comments expressed by Davis residents (e.g., on NextDoor) note that blower use in the early morning is particularly disruptive. Limiting blower use to between the hours of 9:00 AM and 7:00 PM on Mondays through Fridays and between the hours of 10:00 AM and 8:00 PM on Saturdays and Sundays would help address this concern. The City could also consider limiting blower use to certain days and/or seasons (i.e., the fall and winter) so that blower noise is less of a constant problem.

### 3.2.2 Restrictions on airborne dust and debris

All blowers will by nature generate some amount of airborne dust and debris. As CARB observes, blowers are “designed to move relatively large materials, which requires enough force to also blow up dust particles.”<sup>34</sup> Limitations on blower use are therefore more likely to mitigate dust and debris than limitations on blower design. For instance, the City could:

- Prohibit blower use on weekends and holidays (when people are more likely to be recreating outside).
- Prohibit blower use within a certain radius of playgrounds and other high-traffic public spaces.
- Develop and promote codes of conduct for responsible blower operation.

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<sup>32</sup> <https://www.ci.atherton.ca.us/DocumentCenter/View/6230/Item-21>

<sup>33</sup> <https://www.san-clemente.org/Home/ShowDocument?id=53287>

<sup>34</sup> <https://ww3.arb.ca.gov/msprog/mailouts/msc0005/msc0005.pdf>

### 3.2.3 Restrictions on exhaust emissions

If the City continues to allow both gas and electric blowers, it could still consider banning gas blowers powered by two-stroke engines but permitting those powered by four-stroke engines. As noted in Section 1.2, four-stroke blowers are heavier than two-stroke blowers but considerably more efficient and environmentally friendly.

Limiting the times of year during which blowers may be operated would limit the amount of GHGs that blowers produce annually. Limiting the times of day or week during which blowers may be operated will likely be a less effective strategy, as operators may simply concentrate blower use into a narrower window.

### *3.3 Option 3: Phase out/ban only gas blowers*

The City could phase out gas blowers entirely while permitting electric blowers. **This approach would eliminate blower exhaust emissions and would mitigate blower-related noise** (since, as stated in Section 1, electric blowers are quieter on average than gas blowers). **This approach would have less of an effect on blower-related dust and debris.** The City could address the dust and debris problem—and further mitigate blower-related noise—by coupling a gas blower ban with additional use restrictions (i.e., Option 2).

Option 3 is **likely to impose a financial burden** on stakeholders who would have to purchase new electric blowers to substitute for gas blowers. The financial burden could be mitigated through a city-funded rebate program. This option is also **likely to impose a moderate additional burden on commercial and city landscapers.** Cord-powered electric blowers are powerful enough to substitute for gas blowers for many big jobs, but are also limited in range. Battery-powered electric blowers are more portable but less powerful and offer limited runtime.<sup>35</sup> Enforcement would be relatively easy, as it is relatively easy to distinguish between gas-powered and electric blowers.

Other jurisdictions provide examples of how and at what pace to feasibly phase out gas blowers. In Washington, D.C., a resolution to ban gas blowers was passed in early December 2018 and goes into effect on January 1, 2022.<sup>36</sup> Such a long phase-out timeline is likely unnecessary for a small jurisdiction like Davis, but is useful as an upper bound. In Encinitas, a ban on gas-powered blowers was passed in August 2019. The ban went into effect for city operations in September 2019, for businesses in December 2019, and for residents in January 2020. This relatively quick timeline was facilitated by a city-funded rebate program (see Section 2.) that allowed residents and business

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<sup>35</sup> <https://www.consumerreports.org/cro/leaf-blowers/buying-guide/index.htm>

<sup>36</sup> <https://dcist.com/story/18/12/04/d-c-council-strikes-death-blow-to-gas-powered-leaf-blowers/>

owners to turn in gas-powered blowers in exchange for credit on new electric blowers.<sup>37</sup> If the City were to offer a similar rebate program, phasing out gas blowers on a ~6-month timeline would likely be possible. However, the City would be well advised to (1) further assess blower use in Davis and (2) solicit stakeholder feedback before setting a phase-out timeline.

### 3.4 Option 4: Phase out/ban all blowers

The City could phase out both gas and electric blowers entirely. Option 4 **would eliminate all adverse blower impacts. Enforcement would also be relatively easy**, given that the enforcement question would be binary (i.e., “is someone using a leaf blower or not?”). However, Option 4 may **impose considerable burdens on stakeholders**. As discussed in Section 1.1, raking and sweeping takes considerably more time—and hence requires considerably more in labor costs—than blowing. Raking and sweeping may also be an imperfect substitute for blowing in certain circumstances.

As noted in Section 2, few communities have banned blowers altogether. Those that have (e.g., Laguna Beach, Del Mar) did so in the early 1990s, before high-performance electric blowers or low-noise gas-powered blowers were commercially available. The City would hence be largely on its own when it came to determining an appropriate timeline for enacting a complete blower ban, and the importance of engaging stakeholders on setting a timeline would be amplified. If the City were to proceed with a complete blower ban, it should consider making exceptions to the ban under special circumstances, such as for emergency property maintenance and certain public works projects.<sup>38</sup> The City should also accompany a blower ban with educational campaigns that decrease consumer demand for leaf removal for aesthetic reasons.

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<sup>37</sup> <https://www.nbcsandiego.com/news/local/encinitas-leaf-blower-ban-goes-into-effect/2233563/>

<sup>38</sup> [http://qcode.us/codes/lagunabeach/view.php?topic=7-7\\_25-7\\_25\\_070&frames=on](http://qcode.us/codes/lagunabeach/view.php?topic=7-7_25-7_25_070&frames=on)

## 4. NRC recommendations

Based on the information presented above, the NRC recommends that the City of Davis **(1) phase in a ban on the sale and use of gas leaf blowers within City limits, and (2) allow continued use of electric leaf blowers under more stringent restrictions.** The rationale for each of these recommendations is presented below. Appendix XX contains draft language for updating the relevant section of the Davis Municipal Code based on these recommendations.

### 4.1 *Recommendation 1: Ban gas blowers*

The evidence of the adverse human and environmental effects of blower exhaust emissions is compelling. The NRC can envision scenarios in which these adverse effects are outweighed by the labor and cost savings that powerful gas blowers enable. For instance, we understand the value of gas blowers for landscaping large properties where few passersby are present and where blower operators are equipped with adequate personal protective equipment (PPE).

Such is not the case in Davis, where blowers are used primarily for relatively small properties and are frequently operated near public walkways, parks, playgrounds, and other public spaces. Permitting continued use of gas blowers in Davis imposes intermittent—but very real—safety and health risks on users of these spaces. We also note that availability of safe and healthy public spaces is especially important for lower income and otherwise disadvantaged persons who may lack access to private recreation and transportation alternatives. Permitting continued use of gas blowers in Davis therefore runs counter to Goal 5 (“Ensure a Safe, Healthy, Equitable Community”) set by the Davis City Council.

Gas blowers also contribute to climate change, both through direct emission of greenhouse gases such as CO<sub>2</sub> and through emission of hydrocarbons that can combine with nitrogen oxides from other sources to form atmospheric ozone. We acknowledge that the contributions of gas blowers within Davis comprise a relatively small share of the City’s overall carbon footprint. But given that high-quality emission-free electric blowers are commercially available, and that the City has committed to taking “maximum efforts to implement carbon reduction actions”<sup>39</sup>, the City can and should move to cut the amount of GHG emissions from blowers in Davis from “small” to “zero”. Such action would also be consistent with Goal 3 (“Pursue Environmental Sustainability”) set by the Davis City Council.

Per Section 1.2, we understand that electric blowers are not a perfect substitute for gas blowers. Indeed, it is because of the substantial time and cost savings that blowers

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<sup>39</sup> <https://www.cooldavis.org/2019/05/15/climate-emergency-resolution-city-of-davis-adopted-march-5-2019/>

provide that the NRC is stopping short of recommending a ban on gas and electric blowers altogether. But we do not believe the need for gas blowers in Davis outweighs their adverse effects. Blowers are mostly used in Davis for small projects (where battery-powered electric blowers would suffice) and/or near buildings (where exterior electrical outlets are likely to be available to support more powerful corded electric blowers). We believe it is feasible to use a combination of electric blowers and manual methods for the limited number of larger projects where electric blowers alone are not enough.

We also recognize that replacing gas blowers with electric blowers may impose a financial burden on homeowners, commercial landscapers, and other blower users. **We therefore recommend that the City explore the possibility of a city-funded rebate program, in which gas blowers can be exchanged for comparable electric blowers at below-market cost.** Such a program could be modeled on the programs already in place in cities like Encinitas and regions like the South Coast Air Quality Management District (Section 2).

If such a rebate program was established, we believe it would be reasonable for the City to phase in a gas blower ban over six months. Otherwise, we recommend extending the phase-in period to a year. We additionally recommend enforcing the ban with an increasingly stringent fine scheme identical to the scheme used in Encinitas: a warning for a first violation, a \$100 fine for a second violation, a \$200 fine for a third violation, and a \$1,000 fine for each violation thereafter. However, we believe that City staff should engage stakeholders (i.e., through roundtable discussions and/or public fora) for feedback before finalizing phase-in timeline and penalties.

#### *4.2 Recommendation 2: Establish more stringent use restrictions*

Per Section 3, a gas blower ban would eliminate blower exhaust emissions and mitigate blower noise, but would have less of an effect on blower-related dust and debris. To address this issue, and to further mitigate blower noise, we recommend that the City increase the stringency of blower use restrictions.

At a minimum, we recommend:

- (1) lowering the 70 dBA at 50 feet noise limit established in Section 24.02.040(b)(2) of the Davis Municipal Code to 65 dBA, and
- (2) narrowing the windows allowed for blower operation established in Section 24.02.040(b) of the Davis Municipal Code to between the hours of 9:00 AM and 7:00 PM on Mondays through Fridays and between the hours of 10:00 AM and 8:00 PM on Saturdays and Sundays.



These restrictions are in line with restrictions in many other California jurisdictions but still provide plenty of freedom for reasonable blower use.

We also urge the City to consider banning blower use altogether during summer months, i.e., May through September. This is for several reasons:

- Few leaves fall during the summer, hence need for blowers is less urgent.
- More people recreate outside during the summer, hence adverse impacts of blowers are experienced by greater numbers.
- Little to no rain falls during the summer to moisten soil and wash away debris, hence blowers are more likely to kick up dust.

We believe that increasing the stringency of noise and time-of-day restrictions can and should be done as quickly as possible while still giving reasonable time for stakeholders to learn about the updated regulations and make adjustments. A ~3-month implementation timeframe seems appropriate, though we again recommend engaging with stakeholders before timeline finalization. We recommend implementing a seasonal ban beginning in 2021, in order to give stakeholders sufficient time to prepare.

## APPENDICES

### Appendix I. Draft language for updating the Davis Municipal Code

Use of leaf blowers within Davis is governed by Section 24.02.040(b) of the Davis Municipal Code. We recommend updating the code as follows (updates shown in red):

(b) Construction and landscape maintenance equipment. Notwithstanding any other provision of this chapter, between the hours of ~~7:00~~ 9:00 a.m. and 7:00 p.m. on Mondays through Fridays, and between the hours of ~~8:00~~ 10:00 a.m. and 8:00 p.m. on Saturdays and Sundays, construction, alteration, repair or maintenance activities which are authorized by valid city permit or business license, or carried out by employees of contractors of the city shall be allowed if they meet at least one of the following noise limitations:

(1) No individual piece of equipment shall produce a noise level exceeding eighty-three dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty feet from the equipment as possible.

(2) The noise level at any point outside of the property plane of the project shall not exceed eighty-six dBA.

(3) The provisions of subdivisions (1) and (2) of this subsection shall not be applicable to impact tools and equipment; provided, that such impact tools and equipment shall have intake and exhaust mufflers recommended by manufacturers thereof and approved by the director of public works as best accomplishing maximum noise attenuation, and that pavement breakers and jackhammers shall also be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers thereof and approved by the director of public works as best accomplishing maximum noise attenuation. In the absence of manufacturer's recommendations, the director of public works may prescribe such means of accomplishing maximum noise attenuation as he or she may determine to be in the public interest.

Construction projects located more than two hundred feet from existing homes may request a special use permit to begin work at 6:00 a.m. on weekdays from June 15th until September 1st. No percussion type tools (such as ramsets or jackhammers) can be used before 7:00 a.m. The permit shall be revoked if any noise complaint is received by the police department.

(4) No individual powered blower shall produce a noise level exceeding ~~seventy~~ sixty-five dBA measured at a distance of fifty feet.

- (5) No powered blower shall be operated within one hundred feet radius of another powered blower simultaneously.
  - (6) On single-family residential property, the seventy dBA at fifty feet restriction shall not apply if operated for less than ten minutes per occurrence.
- (c) Prohibition of gas-powered blowers.
- (1) The use or operation of any powered blower running on a combustion or gasoline engine shall be prohibited.
  - (2) All City Facilities, City-managed concessions, City-sponsored or co-sponsored events, City permitted events and all franchisees, City Contractors, and vendors doing business with the City shall be prohibited from using or operating any powered blower running on a combustion or gasoline engine.
  - (3) Powered blowers running on line current (electricity) or by battery may be used in the City subject to the provisions of Section 24.02.040(b) of this Code.
- (d) Seasonal prohibition of powered blowers. The use or operation of any powered blower from May 1 until September 30 of any year shall be generally prohibited. Operators may apply for a special use permit to use a powered blower during this time, subject to the provisions of Sections 24.02.040(b) and (c) of this Code.

**Appendix II. Partial list of cities that limit or ban leaf blowers**

<b>Partial list of cities that limit or ban leaf blowers</b>					
State	City	Complete gas blower ban	Seasonal gas blower ban	Noise and/or time of day restrictions	Complete gas and electric blower ban
CA	Albany			✓	
CA	Alhambra			✓	
CA	Arcadia			✓	
CA	Artesia			✓	
CA	Belvedere	✓			
CA	Berkeley	✓			
CA	Beverly Hills	✓			
CA	Burbank			✓	
CA	Burlingame			✓	
CA	Calexico			✓	
CA	Capitola			✓	
CA	Carmel	✓			
CA	Cerritos			✓	
CA	Claremont	✓			
CA	Corona Del Mar			✓	
CA	Costa Mesa			✓	
CA	Culver City			✓	
CA	Cypress			✓	

CA	Dana Point			✓	
CA	Davis			✓	
CA	Del Mar				✓
CA	Downey			✓	
CA	El Segundo			✓	
CA	Emeryville			✓	
CA	Foster City			✓	
CA	Fountain Valley			✓	
CA	Gardena			✓	
CA	Glendale			✓	
CA	Hawaiian Gardens			✓	
CA	Hermosa Beach				✓
CA	Huntington Beach			✓	
CA	Indian Wells	✓			
CA	Indio			✓	
CA	Irvine			✓	
CA	La Canada Flintridge			✓	
CA	Laguna Beach				✓
CA	Lawndale	✓			
CA	Lomita			✓	
CA	Long Beach			✓	

CA	Los Altos	✓			
CA	Los Angeles			✓	
CA	Los Gatos	✓			
CA	Malibu	✓			
CA	Manhattan Beach				✓
CA	Manteca			✓	
CA	Mill Valley	✓			
CA	Monrovia			✓	
CA	Monterey Park			✓	
CA	Newport Beach	✓			
CA	North Hempstead			✓	
CA	Norwalk			✓	
CA	Ojai	✓			
CA	Orange			✓	
CA	Orinda			✓	
CA	Palm Desert			✓	
CA	Palm Springs	✓			
CA	Palo Alto	✓			
CA	Palos Verdes Estates			✓	
CA	Pasadena			✓	
CA	Piedmont	✓			

CA	Portola Valley			✓	
CA	Redondo Beach			✓	
CA	Richmond			✓	
CA	Rohnert Park			✓	
CA	Rolling Hills Estates			✓	
CA	Sacramento			✓	
CA	San Anselmo			✓	
CA	San Diego			✓	
CA	San Dimas			✓	
CA	San Fernando			✓	
CA	San Marino			✓	
CA	Santa Barbara	✓			
CA	Santa Clara			✓	
CA	Santa Fe Springs			✓	
CA	Santa Monica				✓
CA	Saratoga			✓	
CA	Sebastopol			✓	
CA	Sierra Madre			✓	
CA	Solana Beach	✓			
CA	Sonoma			✓	
CA	St. Helena			✓	

CA	Sunnyvale			✓	
CA	Tiburon	✓			
CA	West Hollywood	✓			
CO	Aspen			✓	
CO	Carbondale			✓	
CO	Westminster			✓	
CT	Greenwich			✓	
CT	Ridgefield			✓	
Washington, DC		✓			
FL	Palm Beach			✓	
IL	Arlington		✓		
IL	Evanston		✓		
IL	Glencoe		✓		
IL	Highland Park		✓		
IL	Lincolnwood		✓		
IL	Wilmette		✓		
IL	Winnetka		✓		
MD	Montgomery			✓	
MA	Brookline		✓		
MA	Cambridge			✓	
MA	Longport			✓	



MI	Blackman Township			✓	
MI	Cassopolis			✓	
MI	Kalamazoo			✓	
MI	Oakland			✓	
MI	Richland			✓	
MI	Roseville			✓	
NH	Portsmouth			✓	
NJ	Princeton			✓	
NJ	Township of Montclair		✓		
NY	Ardsey			✓	
NY	Atlantic Beach			✓	
NY	Beacon			✓	
NY	Bronxville	✓			
NY	Dobbs Ferry	✓			
NY	Flower Hill			✓	
NY	Great Neck Estates			✓	
NY	Greenberg	✓			
NY	Huntington	✓			
NY	Larchmont			✓	
NY	New Rochelle	✓			
NY	Oyster Bay	✓			

NY	Russell Gardens			✓	
NY	Sleepy Hollow	✓			
NY	Tarrytown	✓			
NY	Thomaston Village	✓			
NY	Village of Tuckahoe	✓			
NY	White Planes	✓			
NY	Yonkers	✓			
NC	Chapel Hill			✓	
OR	Portland			✓	
TX	Houston			✓	
WA	Seattle			✓	

### **Appendix III. ANSI guidelines for leaf blower operation**

- Operate power equipment only at reasonable hours--not early in the morning or late at night when people might be disturbed. Comply with times listed in local ordinances.
- To reduce sound levels, limit the number of pieces of equipment used at any one time.
- Operate blowers at the lowest possible engine speed to do the job.
- Use rakes and brooms to loosen debris before blowing.
- In dusty conditions, slightly dampen surfaces or use mister attachment when water is available.
- Conserve water by using blowers instead of hoses for many lawn and garden applications, including areas such as gutters, screens, patios, grills, porches, and gardens.
- Avoid blowing debris towards people, pets, open windows, or cars when using unit.
- Use the full blower nozzle extension when blowing.
- After using blowers and other equipment, CLEAN UP! Dispose of debris in trash receptacles.