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***Clearing the Air in Downtown Ottawa: An Open Letter to His
Worship, Mark Sutcliffe, Mayor of Ottawa***

Dear Mayor Sutcliffe,

On behalf of Friends of the Earth Canada and the Canadian Association of Physicians for the Environment (Ontario Committee), we write to draw your attention to an urgent public health hazard in downtown Ottawa – heavy truck pollution. To summarize, **the City of Ottawa’s choice to route heavy trucks through its high-density downtown core is putting lives and livelihoods at risk.** Fortunately, multiple solutions exist to solve the problem. With a new Mayor and Council, newly approved Official Plan, and new Transportation Master Plan under development, **now is the time for the City to take effective action to protect downtown Ottawans from the dangers of air pollution caused by heavy trucks.**

As you know, the City of Ottawa’s Traffic and Parking By-Lawⁱ directs heavy truck traffic through a downtown corridor covering densely populated and heavily used streets including King Edward, Waller, Rideau and Nicholas. This anomalous approach to heavy truck traffic is unsustainable and unlawful. It imposes unacceptable health risks on downtown residents and violates their constitutional rights to life, security of the person and equality. The City’s trucking by-law also violates the *Ontario Human Rights Code* as it discriminates against vulnerable members of the community, including children, elders, people receiving social assistance, and those with respiratory disabilities. The City of Ottawa is legally obligated to remedy this situation, for the following reasons:

1. Diesel Emissions from Heavy Trucks Are Dangerous to Human Health

Air pollution causes approximately 6,700 premature deaths in Ontarioⁱⁱ and more than 300 deaths in Ottawaⁱⁱⁱ every year. As Health Canada explains, “[a]ir pollution is recognized globally as a major health risk. Exposure to ambient air pollution, for example, increases the risk of

premature mortality from heart disease, stroke and lung cancer. Air pollution represents the largest environmental risk to health.”^{iv}

More specifically, traffic-related air pollution near roadways is known to cause serious health damage, especially for vulnerable people.

- Health effects that have been associated with proximity to roads include asthma onset and aggravation, cardiovascular disease, reduced lung function, impaired lung development in children, pre-term and low-birthweight infants, childhood leukemia, and premature death.^v
- Children, older adults, people with pre-existing cardiopulmonary disease, and people of low socioeconomic status are among those at higher risk for health impacts from air pollution near roadways.^{vi}
- Research findings indicate that roadways generally influence air quality within a few hundred meters downwind from the vicinity of heavily traveled roadways **or along corridors with significant trucking traffic.**^{vii}

Health Canada observes that “the total annual monetary value of the health burden [of traffic-related air pollution] was estimated at \$9.5 billion (CAD 2015), with \$9 billion being associated with premature deaths. Analysis also found that...heavy-duty vehicles (e.g., commercial trucks and buses) contributed to approximately 63% of premature deaths.^{viii} Moreover, as explained by the Canadian Association of Physicians for the Environment, “[r]ecent literature on the COVID-19 pandemic suggests that air pollution, including transportation-related air pollution, increases COVID-19 infection, transmission, and the risk of COVID-19-related mortality.”^{ix}

Within the broader mix of traffic-related air emissions, large diesel trucks are the worst offenders and older large trucks are the worst of the worst. Health Canada confirms that diesel emissions can cause (among other things) cancer, respiratory inflammation, and asthma.^x Moreover, municipalities like the City of Ottawa cannot rely on other levels of government to protect their residents because federal and provincial regulations still allow older, highly polluting diesel trucks to operate on our roads. As Health Canada explains:

Internationally, the potential health effects of Diesel Emissions exposure have long been recognized, and great effort has resulted in substantial reductions in diesel emissions, including in Canada...Some jurisdictions have undertaken additional initiatives to mitigate in-use diesel engine emissions and human exposure to them, such as inspection and maintenance programs, retrofit and scrappage programs and idling restrictions. ***However, the Canadian in-use diesel fleet is still dominated by engines pre-dating the most recent emission standards.***^{xi}

The leading Canadian study on near-road air pollution, which analyzed emissions from 200 million vehicles over approximately 400 days, describes the problem as follows:

Highly polluting diesel trucks are making a disproportionate contribution and they represent the major source of key pollutants such as nitrogen oxides and black carbon...*[E]xcessive exposure to diesel exhaust can occur near roads with a significant proportion of truck traffic.*^{xii}

The authors of this study also note that “a small portion of the trucks and cars were responsible for the majority of emissions. *Policies and programs implemented to remove this small fraction of highest emitting vehicles from populated areas could yield large benefits.*”^{xiii} Rather than removing high-polluting vehicles from populated areas, the City of Ottawa actually directs them into its most populous neighbourhood – the downtown core.

2. Ottawa’s Downtown Trucking Corridor is putting lives and livelihoods at risk

In the City of Ottawa, one of the most dangerous forms of air pollution – heavy truck emissions – is concentrated in the downtown core. Ottawa’s downtown trucking corridor cuts through the heart of a high-density neighbourhood that is home to thousands of residents, hundreds of local businesses, three homeless shelters where people congregate at street level for hours every day (resulting in prolonged street-level exposure to truck emissions), and a daycare centre with an outdoor play area just metres from the roadway. Within the high-risk zone – defined as a 250-metre radius around the trucking corridor^{xiv} – there are also multiple hotels, arts venues, a youth centre, and University buildings attracting thousands of students every day. Moreover, dispersion of vehicle emissions is impeded along Rideau and Waller, where tall buildings produce an “urban canyon” effect, trapping air pollution at ground level.^{xv} Similarly, since the trucking corridor runs through a network of downtown streets requiring multiple stops and turns, trucks stay longer in the neighbourhood, increasing exposure time compared to highway routes.

Not surprisingly, there is evidence of disproportionate levels of air pollution in the downtown core. For example, though no level of government monitors air quality within Ottawa’s downtown trucking corridor specifically, research conducted by Sierra Club of Canada and Ecology Ottawa in their “Breathe Easy” project found PM2.5 at a concentration of 22.4 µg/m³ in Ward 12 (Rideau-Vanier), nearly seven times the concentration found in Ward 11 (2.9 µg/m³).^{xvi} (The World Health Organization recommends limiting PM2.5 to a concentration of 15 µg/m³ or less, averaged over a 24-hour period.^{xvii})

After compiling data from sample points throughout the City, the Breathe Easy final report observed that:

[T]here is a substantive, positive correlation (57%, R=0.57) between the number of trucks driven within 2 kilometres of the [sites] and the average PM2.5 measurements... Finding this significant correlation is therefore suggestive that trucks are a particularly problematic source of pollution within the city. *Those living along high-volume trucking routes are therefore subject to a greater health risk than others.*^{xviii}

These results are consistent with research in Toronto and Vancouver showing elevated levels of hazardous air contaminants including black carbon, ultra-fine particles and nitrogen oxides near roadways, particularly those with heavy truck traffic.^{xix}

In summary, from a public health perspective, allowing heavy trucks in downtown Ottawa is irrational and harmful. From a legal perspective it is unconstitutional and discriminatory.

3. The City's decision to route trucks through the downtown core is unlawful

The United Nations Special Rapporteur on Human Rights and the Environment has stated unequivocally that clean air is a human right since it is “essential to life, health, dignity and well-being.”^{xx} Moreover, “[t]he foreseeable adverse effects of poor air quality on the enjoyment of human rights give rise to extensive duties of States to take immediate actions to protect against those effects.”^{xxi} Under Canadian law, government actions that lead to unsafe air pollution may violate both the *Charter of Rights and Freedoms* and statutory human rights codes.

- *Canadian Charter of Rights and Freedoms*

Section 7 of the *Charter* guarantees all Canadian the rights “to life, liberty and security of the person and the right not to be deprived thereof except in accordance with the principles of fundamental justice.” This provision protects Canadians from serious state-imposed harms and risks to physical and/or psychological health. Where the state arbitrarily authorizes hazardous levels of pollution, particularly in a vulnerable community, it violates section 7.^{xxii}

To succeed under section 7, the claimant must demonstrate a “sufficient causal connection” between the government’s conduct and the risk or harm at issue.^{xxiii} In this case, the City of Ottawa has specifically designated an authorized heavy trucking route in the downtown core. If this area was not prescribed in the City’s Traffic and Parking By-Law, heavy trucks could not operate in the area and residents would not be exposed to their emissions. The harms caused by heavy truck traffic are extremely well understood and the connection with the City’s conduct is indisputable. Moreover, the City has a mandate to manage truck traffic in a manner that protects public safety.^{xxiv} Thus, the City has arbitrarily deprived downtown residents of their section 7 rights, contrary to the principles of fundamental justice.

Section 15 of the *Charter* guarantees Canadians “the equal protection and equal benefit of the law without discrimination and, in particular, without discrimination based on...age or mental or physical disability.” The City’s authorization of heavy truck traffic in the downtown core disproportionately harms children, elders and people with respiratory disabilities, thus violating this provision.^{xxv}

- *Ontario Human Rights Code*

Traffic management and the protection of air quality are services provided by the City to its residents. The City limits heavy truck traffic to prescribed routes precisely because it is aware of the negative impacts such traffic can have on the places where people live, work, play and access services. In more privileged areas of the City, people are protected from heavy truck impacts. People in the downtown core – including the City’s most vulnerable residents – are denied such protection. In particular, as noted above, the City’s authorization of heavy truck traffic in the downtown core disproportionately harms children, elders, people receiving social assistance and people with respiratory disabilities. Since the City has “the planning authority to regulate, manage and plan for where and how freight activities take place”,^{xxvi} it must exercise this authority in a non-discriminatory manner.

The City of Ottawa has formally recognized the negative impacts of heavy truck traffic. Ottawa’s 2013 Transportation Master Plan includes in its vision, the intent to “protect public health and safety; Minimize the community impacts of truck and automobile traffic [and] Minimize air pollution from transportation sources.”^{xxvii} Section 7.2 of the Plan provides as follows:

The Ottawa River is spanned by five roadway bridges under federal jurisdiction. This Plan projects a substantial increase in total peak period travel demand across these bridges by 2031. A primary consideration in responding to this increase is as the provision of a new truck route, because restrictions on existing bridges have concentrated trucks on Waller Street, Rideau Street, King Edward Avenue, and the Macdonald-Cartier Bridge, leading to industry inefficiencies, public safety concerns and negative community and environmental impacts along King Edward Avenue and elsewhere in the Central Area.

Despite this formal acknowledgement, very little has been accomplished in the near-decade since the TMP was formulated. Ottawa is currently in the process of updating its Transportation Master Plan, and this update should reflect the urgent need to take effective action (beyond mere discussion) to eliminate heavy trucking in Ottawa’s downtown core. Ottawa’s new Official Plan also contains multiple provisions that could support effective action on the downtown trucking problem,^{xxviii} and these should be rapidly translated into binding by-law amendments and other on-the-ground action to improve air quality in the downtown core.

To summarize, the downtown trucking problem has long been understood in Ottawa. Successive generations of municipal leaders have recognized that heavy trucking in the downtown core poses threats to business, tourism, traffic safety, and public health. However, discussions thus far have presumed that the existing state of affairs is legally permissible. As we have demonstrated, this is a false assumption. The City of Ottawa is legally obligated to take immediate and longer-term action to protect those in the downtown core from dangerous heavy truck emissions.

4. Multiple Solutions Exist to Remedy Dangerous Air Pollution in the Downtown Core

Although the ultimate choice of solutions is up to the City of Ottawa, it must ensure that vulnerable populations in the downtown core are no longer exposed to disproportionate levels of unsafe diesel emissions from heavy trucks. A large range of solutions are available, including various combinations of the following:

- **Undertake continuous air quality monitoring in the downtown truck corridor**

As an immediate, interim response to the air pollution situation in the downtown truck corridor, the City should undertake air quality monitoring in the high-risk zone (everything within 250 metres of the relevant roadways). In particular, the City should collect air quality data outside the homeless shelters where people gather at street level every day, outside the University buildings on Waller, Rideau and King Edward and in the outdoor play area of the daycare centre on George St, near King Edward.

The data generated from this exercise would help the City to better understand the severity and extent of the problem; provide warnings to workers and residents (including street-involved populations) when air pollution reaches unsafe levels; provide protective masks where necessary; and seek federal and provincial enforcement of relevant emissions standards against non-compliant trucks in downtown Ottawa.^{xxix} Moreover, *as a rapid response to the clear and substantial health hazards posed by heavy truck traffic, the City should impose an emergency “Low Emissions Zone” when air pollution reaches dangerous levels in the downtown core.* Given that i) winter weather conditions can worsen the impacts of traffic-related pollution and ii) air quality monitoring devices are now readily available and affordable, these rapid response measures should begin in the winter of 2023.

- **Establish a Low Emissions Zone in the downtown core.**

The City of Ottawa could restrict trucking in the downtown core, or a larger swath of central Ottawa, to low-emitting trucks (on an emergency and ultimately permanent basis). Canada’s leading study on near-road air pollution states as its number one recommendation that governments should “reduce near-road diesel exhaust concentrations”; in particular, the researchers underlined the importance of removing highly polluting trucks from the roadway:

Targeting the most highly polluting trucks likely offers the most effective opportunity to achieve rapid reductions in diesel emissions.^{xxx}

Older trucks identified as highly polluting should be repaired, retrofitted, retired *or restricted in their operation away from neighbourhoods or facilities for vulnerable populations.* Exposure could also be reduced by constraining their operation to designated off-hour time windows.^{xxxi}

[M]unicipalities may wish to restrict trucking in some of parts of their towns or cities to low-emitting trucks.^{xxxii}

Municipalities in Europe, China and Japan – including major capital cities such as London^{xxxiii} and Paris^{xxxiv} – have established Low Emissions Zones in their downtown areas where they prohibit or impose fees for high-polluting vehicles.^{xxxv} As noted on the web-site of the Métropole de Grand Paris, “The purpose of a Low Emissions Zone is to protect populations in the most polluted, high-density areas. This concept has already been adopted by 230 European cities and has been recognised as particularly effective.”^{xxxvi} In North America, the City of Santa Monica has established a Zero Emissions Zone in a one square mile area in its downtown core and Montreal is considering adopting a Zero Emissions Zone in its own downtown.^{xxxvii} Such Low- or Zero Emissions Zones have produced “dramatic improvement in air quality, show[ing] the effectiveness of using regulatory authority and fees to encourage clean transportation choices.”^{xxxviii}

A unique advantage of the Low Emissions Zone solution is that it would limit pollution from *all* diesel trucks, whereas the current by-law only applies to trucks over four tonnes. Most importantly, Low Emissions Zones reward low-emitting vehicles and incentivize industry to replace, repair or retrofit highly polluting ones, thus reducing air pollution throughout a city, rather than simply relocating it from one neighbourhood to another. Using the same legal authority that underlies its existing Traffic and Parking By-Law, the City of Ottawa could establish a Low Emissions Zone to prevent the most highly polluting vehicles from travelling anywhere in the downtown core, or indeed anywhere within the City limits. In the alternative, it could impose a fee for high-polluting diesel trucks and invest this revenue in measures designed to improve air quality along the trucking corridor.

- **Prohibit heavy trucks in the downtown core.**

A more stringent solution to the truck pollution problem in Ottawa’s downtown core would be for the City to amend its Traffic and Parking By-Law to prohibit heavy trucks in the downtown core. This would incentivize industry to develop effective technical and logistical solutions^{xxxix} and would protect vulnerable downtown residents from the dangerous effects of heavy truck emissions.

To complement this change, the City can work with other levels of government to fund infrastructure solutions, such as an additional bridge or tunnel connecting highway 417 with highways 5 and 50. The tunnel option in particular would divert thousands of trucks and tens of thousands of cars daily from the downtown core^{xl} and – crucially – would allow for the removal (and safe disposal) of particulate pollution from vehicle emissions^{xli} making Ottawa as a whole healthier, happier and more attractive to visitors. The tunnel option has been assessed as technically feasible but would need to undergo environmental assessment to evaluate its suitability. If a new tunnel or bridge includes a dedicated transit lane serviced by electric buses, it

could also reduce private vehicle usage overall, improving air quality and helping Ottawa achieve its greenhouse gas emissions reduction goals.

- **Develop and fund a comprehensive program to improve air quality in the downtown core**

The most rational and responsible approach to regulating air quality in the downtown core is to develop and fund a comprehensive air quality program that would both limit sources of dangerous air pollution and implement mitigation measures in the downtown core and other pollution “hotspots” in the City. In addition to eliminating dangerous heavy truck emissions in populous areas, the City should:

- Consult with Ottawa Public Health and get their input into a staff report explaining the health impacts and the nature of the air quality issues along the trucking route;
- deploy its new electric buses in the downtown core to reduce bus-related diesel pollution in the area;
- prohibit diesel-powered school buses throughout the City of Ottawa;
- delay further development approvals in the downtown core until heavy truck traffic has been relocated away from the area;
- plant roadside vegetation that has been shown to reduce particulate pollution and improve air quality (particularly coniferous trees); and
- improve transit and increasing safe cycling infrastructure to reduce vehicle emissions in general.

The use of continuous air quality monitoring, recommended above, will support the City in evaluating and improving its plan by reference to air quality benchmarks established by Ottawa Public Health in consultation with provincial, federal and international expert bodies.

Conclusion

This Open Letter has focused on the serious and proven health hazards posed by air emissions from heavy truck traffic in downtown Ottawa. As you know, downtown trucking also causes noise pollution and poses a risk of traffic accidents (including fatalities). Pollutants in truck emissions have also been shown to induce aggressive behaviour and increase the incidence of violent crime.^{xliii} Re-thinking transport in the downtown core could thus have huge benefits for public health, business, tourism, and civic welfare. Moreover, it is an ecological and legal imperative. In an era of climate change, it also gives Ottawa the opportunity to take leadership as Canadian governments at all levels transition to low-carbon, sustainable approaches to transport.

Cities around the world have used their regulatory powers and policies to drive change in the transportation sector, reducing greenhouse gas emissions and improving air quality in the process. As former Mayor of Toronto, David Miller has written: “Because these changes make

cities cleaner, healthier and better places to live, they have proved to be popular and enduring, even though initially controversial.”^{xliii}

To conclude, the challenge is great but so is the opportunity. Congratulations on assuming leadership in our nation’s capital. We would welcome the opportunity to meet with you and your staff to discuss the many possible solutions to Ottawa’s downtown truck pollution problem. We look forward to working with you over the coming years to improve public health and ecological sustainability in our city.



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ⁱ City of Ottawa Traffic and Parking Bylaw (No. 2017-301), section 53(1).

ⁱⁱ Health Canada, *Health Impacts of Air Pollution in Canada: Estimates of Morbidity and Premature Mortality Outcomes* (2019) at 15.

ⁱⁱⁱ Health Canada, *Health Impacts of Air Pollution in Canada: Estimates of Morbidity and Premature Mortality Outcomes – 2021 Report* <https://www.canada.ca/en/health-canada/services/publications/healthy-living/2021-health-effects-indoor-air-pollution.html#a3.3> Appendix D.

^{iv} *Ibid* at 5.

^v United States Environmental Protection Agency, “Near Roadway Air Pollution and Health: Frequently Asked Questions” on-line https://www.epa.gov/sites/default/files/2015-11/documents/420f14044_0.pdf

^{vi} *Ibid* at 3.

^{vii} *Ibid* at 2.

^{viii} Health Canada, *Health Burdens of Traffic-Related Air Pollution in Canada* https://publications.gc.ca/collections/collection_2022/sc-hc/H144-91-2022-eng.pdf at 3.

^{ix} Canadian Association of Physicians for the Environment, *Mobilizing Evidence: Activating Change on Traffic Related Air Pollution (TRAP) Health Impacts* (2022) <https://cape.ca/wp-content/uploads/2022/05/CAPE-TRAP-2022-2.pdf> at 4.

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- ^x Health Canada, *Human Health Risk Assessment for Diesel Exhaust – Summary* <https://www.canada.ca/en/health-canada/services/publications/healthy-living/human-health-risk-assessment-diesel-exhaust-summary.html>
- ^{xi} *Ibid.*
- ^{xii} Southern Ontario Centre for Atmospheric Aerosol Research – University of Toronto, *Near-Road Air Pollution Pilot Study – Final Report* (2019) Abstract <https://tspace.library.utoronto.ca/handle/1807/96917>; full report: <https://tspace.library.utoronto.ca/bitstream/1807/96917/4/Near%20Road%20Study%20Report.pdf>.
- ^{xiii} *Ibid* at 2 (emphasis added).
- ^{xiv} *Ibid* at 19.
- ^{xv} Mead, “Urban Issues: Canyons up the Pollution Ante” (2008) 7 *Environmental Health Perspectives* 116.
- ^{xvi} Sierra Club of Canada, *Preliminary Report on Breathe Easy Ottawa Project* (2021), https://www.sierraclub.ca/sites/default/files/hmk_-_breathe_easy_preliminary_report.pdf.
- ^{xvii} See World Health Organization, “Ambient (Outdoor) Air Pollution”, [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health) The WHO’s recommended annual average concentration of PM_{2.5} is 8 µg/ m³ or less. *Ibid.*
- ^{xviii} Ecology Ottawa, *Breathe Easy 2020 Report* https://assets.nationbuilder.com/ecologyottawa/pages/6222/attachments/original/1665595442/Breathe_Easy_report_2020-compressed.pdf?1665595442
- ^{xix} See Southern Ontario Centre for Atmospheric Aerosol Research – University of Toronto, *Near-Road Air Pollution Pilot Study – Final Report* <https://tspace.library.utoronto.ca/bitstream/1807/96917/4/Near%20Road%20Study%20Report.pdf> (2019) at 120-123.
- ^{xx} “Issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment: Report of the Special Rapporteur” (8 January 2019) A/HRC/40/55 at para 44.
- ^{xxi} *Ibid* at para 57.
- ^{xxii} See generally Lynda M Collins, “An Ecologically Literate Reading of the *Canadian Charter of Rights and Freedoms*” (2009) 26 *Windsor Rev of Legal and Social Issues* 7.
- ^{xxiii} *Canada (Attorney General) v. Bedford* 2013 SCC 72.
- ^{xxiv} City of Ottawa Transportation Master Plan, Exhibit 1.3 “Transportation Vision”, Element 4
- ^{xxv} See Nathalie J. Chalifour, “Environmental Discrimination and the *Charter’s* Equality Guarantee: the Case of Drinking Water for First Nations Living on Reserves” (2013) 43 *RGD* 183.
- ^{xxvi} Pembina Institute, *Building Health Cities in the Doorstep-Delivery Era: Sustainable Urban Freight Solutions from Around the World* <https://www.pembina.org/reports/2021-06-17-nactourbanfreightreport.pdf> at 5.
- ^{xxvii} City of Ottawa Transportation Master Plan, Exhibit 1.3 “Transportation Vision”, Element 4.
- ^{xxviii} See Ottawa Official Plan, section 4.1.6 in which Ottawa’s Official Plan commits it to: work with other levels of governments to investigate additional options for crossing the Ottawa River, “with the intent of creating new transit links and *relocating the interprovincial truck travel away from the Downtown Core*”; “Explore mitigation measures for interprovincial truck travel through the Downtown Core...”; “prioritize the comfort of the most vulnerable street users” where truck routes are located on urban streets, and “Reduce the impacts of large delivery vehicles on streets and intersections including consideration for changes to truck routes, vehicle size permission, design standards and time of day restrictions”.
- ^{xxix} For an example of municipal air quality monitoring and disclosure, see <https://www.cleanaairsarniaandarea.com/>
- ^{xxx} Southern Ontario Centre for Atmospheric Aerosol Research – University of Toronto, *Near-Road Air Pollution Pilot Study – Summary Report* at 14.
- ^{xxxi} *Ibid.*
- ^{xxxii} *Ibid* at 15.

^{xxxiii} London’s Ultra-Low Emissions Zone has now expanded to an area 18 times the size of central London and protects more than 3 million people from the health hazards of highly polluting vehicles. See <https://www.london.gov.uk/programmes-and-strategies/environment-and-climate-change/pollution-and-air-quality/mayors-ultra-low-emission-zone-london>.

^{xxxiv} Métropole de Grand Paris, “Metropolitan Low Emissions Zones” <https://www.metropolegrandparis.fr/en/ZFE>.

^{xxxv} Pembina Institute, *Building Healthy Cities in the Doorstep-Delivery Era* at 14-16.

^{xxxvi} See <https://www.metropolegrandparis.fr/en/ZFE>.

^{xxxvii} *Ibid* at 15; Stéphane Blais, “Montreal ponders ‘zero emissions zone’ in city centre”, *Montreal Gazette* (19 April 2022).

^{xxxviii} David Miller, *Solved: How the World’s Great Cities are Fixing the Climate Crisis* (2020: University of Toronto Press) at 119.

^{xxxix} See eg United States Environmental Protection Agency, “Drayage Truck Best Practices to Improve Air Quality” <https://www.epa.gov/ports-initiative/drayage-truck-best-practices-improve-air-quality>; Natural Resources Defense Council, *Cleaning Up Today’s Dirty Diesels: Retrofitting and Replacing Heavy Duty Vehicles in the Coming Decade* <https://www.nrdc.org/sites/default/files/retrofit.pdf>.

^{xl} See City of Ottawa, “Downtown truck tunnel” <https://ottawa.ca/en/parking-roads-and-travel/transportation-planning/completed-projects/downtown-ottawa-truck-tunnel>.

^{xli} See eg, CETU, *The treatment of air in road tunnels: state of the art studies and works* (2016)

https://www.cetu.developpement-durable.gouv.fr/IMG/pdf/cetu_di_traitement_de_l_air-en-19_07_2017.pdf.

^{xlii} Anthony Heyes & Soodeh Saberian, (2015) “Air Pollution Causes Violent Crime”

<https://socialsciences.uottawa.ca/science-economique/sites/sciencessociales.uottawa.ca.science-economique/files/1514e.pdf>.

^{xliii} Miller, *Solved* at 133.

APPENDIX A – KEY SOURCES

1. **Canadian Association of Physicians for the Environment, *Mobilizing Evidence: Activating Change on Traffic Related Air Pollution (TRAP) Health Impacts (2022)*** <https://cape.ca/wp-content/uploads/2022/05/CAPE-TRAP-2022-2.pdf>

This report provides a summary of scientific evidence of the adverse health effects of traffic-related air pollution including what causes it, illnesses associated with it, who is most vulnerable to it, and ways to prevent and protect people from it.

Key Findings:

- Adverse human health effects include respiratory illnesses, asthma, allergy-related illnesses, cardiovascular-related illnesses, neurological-related illnesses, pregnancy-related complications, cancer, toxicity-related illnesses, diabetes and obesity-related illnesses, skin-related illnesses, and mental health-related illnesses.
- Low-income and racialized people often experience disproportionately high TRAP exposure risks.
- Evidence suggests that air pollution, notably particulate matter pollution, contributes to a greater rate of COVID-19 infection and transmission through its ability to act as a transport vector for the virus

Summary of Recommendations:

- Adopt pollution prevention and control policies – Measures that address fuel content and vehicle-type requirements, restrictions on idling, low emissions zones, and the use of public transit and electric vehicles can reduce TRAP-related emissions
- Increase active transport – Increasing active transport is of particular interest from a health care perspective because of the potential three-fold impact on health: reducing TRAP-related emissions leads to associated illness and disease reductions, improves the health of individuals navigating their community in a physically active manner, and contributes to the offset of climate-related illness.
- Ventilation adaptations – Home, building, and car ventilation systems play a significant role in infiltrating TRAP from outdoor sources into indoor spaces and, thus, exposure to TRAP.
- Increase urban greenspace and vegetation

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- Individual level actions – Personal protective equipment, including personal respiratory filter masks and commercial face masks, is a simple and cost-effective intervention for reducing individual TRAP exposure-related health risks.
2. **Health Canada, *Health Impacts of Air Pollution in Canada: Estimates of Morbidity and Premature Mortality Outcomes – 2021 Report*** <https://www.canada.ca/en/health-canada/services/publications/healthy-living/2021-health-effects-indoor-air-pollution.html#a3.3>

The Report draws on the most recent data and scientific knowledge to provide comprehensive and up-to-date estimates of morbidity and mortality outcomes in Canada related to ambient levels of PM_{2.5}, ozone and NO₂.

key findings:

- Air pollution is the fifth leading mortality risk in the world and was responsible for 8.7% of deaths globally in 2017.
- Health Canada estimates that above-background air pollution, including air pollution from human sources in North America, contributes to 15,300 premature deaths per year in Canada.
- National morbidity or nonfatal health outcomes include 2.7 million asthma symptom days and 35 million acute respiratory symptom days per year, with the total economic cost of all health impacts attributable to air pollution for the year being \$120 billion (2016 CAD). This is equivalent to approximately 6% of Canada's 2016 real gross domestic product.

3. **Health Canada, *Health Burdens of Traffic-Related Air Pollution in Canada*, (February 2022), online:** https://publications.gc.ca/collections/collection_2022/sc-hc/H144-91-2022-eng.pdf

This Health Canada Report presents modelled estimates of population health impacts and socio-economic costs associated with exposure to TRAP in Canada for the year 2015, specifically the contribution from Canadian on-road vehicle emissions. The report is intended to inform Canadian authorities on the air quality and health impacts associated with on-road vehicle activity.

Key findings:

- TRAP was associated with over 1,200 premature deaths in Canada in 2015, of which heavy-duty vehicles (e.g., commercial trucks and buses) contributed to approximately 63% of premature deaths.
- Non-fatal health outcomes included 2.7 million acute respiratory symptom days, 1.1 million restricted activity days and 210,000 asthma symptom days per year.
- The total annual monetary value of the health burden was estimated at \$9.5 billion

4. **Health Canada, *Human Health Risk Assessment for Diesel Exhaust – Summary*, (April 6, 2022), online: <https://www.canada.ca/en/health-canada/services/publications/healthy-living/human-health-risk-assessment-diesel-exhaust-summary.html>**

This report summarizes the findings from a comprehensive review and analysis of the potential adverse health effects associated with diesel fuel use in Canada. The assessment includes a review of diesel fuels, engines and emissions, a review of exposure to diesel exhaust, an evaluation of the health effects associated with diesel exhaust exposure, as well as a quantitative analysis of the population health impacts associated with the contribution of diesel exhaust to criteria air contaminant concentrations in Canada.

Key findings:

- Diesel exhaust is carcinogenic in humans and is specifically associated with the development of lung cancer.
- Diesel exhaust may be implicated in the development of cancer of the bladder in humans, but further research is required to allow definitive conclusions to be drawn.
- The evidence supports a causal relationship between acute exposure to diesel exhaust at relatively high concentrations and effects on the respiratory system, including increases in airway resistance and respiratory inflammation.
- The evidence reviewed is suggestive of a causal relationship between diesel exhaust and 1) adverse cardiovascular outcomes following chronic exposure, 2) adverse reproductive and developmental effects and 3) central nervous system effects following acute exposure to diesel exhaust.
- Sensitive subpopulations, such as the elderly, children and asthmatics, can be at greater risk of adverse respiratory effects due to diesel exhaust exposure
- Overall, it is concluded that diesel exhaust is associated with significant population health impacts in Canada and efforts should continue to further reduce emissions of and human exposures to diesel exhaust.
- On-road and off-road diesel emissions result in significant and substantial population health impacts and societal costs in Canada via the contribution of diesel emissions to ambient concentrations of criteria air contaminants.
- Diesel emissions are also associated with significant numbers of acute respiratory symptom days, restricted activity days, asthma symptom days, hospital admissions, emergency room visits, child acute bronchitis episodes and adult chronic bronchitis cases across Canada.

5. **Southern Ontario Centre for Atmospheric Aerosol Research – University of Toronto, *Near-Road Air Pollution Pilot Study – Summary Report* (2019)**

This Near-road Air Pollution Pilot Study establishes methodologies for ongoing monitoring of pollution levels across Canada and has identified four areas of significant concern for Canadian health: trucks in cities, wind and winter, local urban traffic, and the hidden pollution of brake and tire wear.

Key findings:

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- Nearly one-third of Canadians live within 250 metres of a major road and are thus exposed to traffic emissions.
 - Canadians are buying trucks at a much higher rate than passenger cars.
 - Vehicle emissions are the dominant roadside polluter.
 - Large trucks contribute disproportionately to emissions.
 - Canada's winters can increase concentrations. (Colder winter temperatures increased near-road concentrations of nitrogen oxides, these concentrations were up to four times higher in cold conditions than in mild conditions on weekdays at the highway site.)

Summary of Recommendations:

- 1) Reduce near-road diesel exhaust concentrations
- 2) Investigate non-tailpipe emissions
- 3) Create national traffic-related air pollution monitoring network

6. **World Health Organization, “Ambient (Outdoor) Air Pollution” (September 22, 2021), online: [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)**

Key Findings:

- Air pollution is one of the greatest environmental risks to health. By reducing air pollution levels, countries can reduce the burden of disease from stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma.
- The lower the levels of air pollution, the better the cardiovascular and respiratory health of the population will be, both long- and short-term.
- The WHO Air Quality Guidelines: Global Update 2021 provide an assessment of health effects of air pollution and thresholds for health-harmful pollution levels.
- In 2019, 99% of the world population was living in places where the WHO air quality guidelines levels were not met.
- Ambient (outdoor air pollution) in both cities and rural areas was estimated to cause 4.2 million premature deaths worldwide in 2016.
- Some 91% of those premature deaths occurred in low- and middle-income countries, and the greatest number in the WHO South-East Asia and Western Pacific regions.
- Policies and investments supporting cleaner transport, energy-efficient homes, power generation, industry and better municipal waste management would reduce key sources of outdoor air pollution.
- In addition to outdoor air pollution, indoor smoke is a serious health risk for some 2.4 billion people who cook and heat their homes with biomass, kerosene fuels and coal.