

TO:	CHAIR AND MEMBERS COMMUNITY AND PROTECTIVE SERVICES FOR THE MEETING ON MARCH 30, 2016
FROM:	JOHN KOBARDA FIRE CHIEF
SUBJECT:	OPEN AIR BURNING BY-LAW – AIR QUALITY & ENFORCEMENT

RECOMMENDATION

That on the recommendation of the Fire Chief and the concurrence of the Managing Director of Neighbourhood, Children and Fire Services, this report **BE RECEIVED** as information.

PREVIOUS REPORTS PERTINENT TO THIS MATTER
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- *Report to CPSC - October 30, 2006*
- *Public participation meeting at CPSC, December 11, 2006*
- *Open Air Burning By-Law - April 2, 2007*
- *Public participation meeting at CPSC, May 7, 2007*
- *Open Air Burning By-Law – Review Of 2007 Responses - March 17, 2008*
- *Open Air Burning By-Law – Review Of 2008 Responses – November 24, 2008*
- *Open Air Burning By-Law – Review Of 2009 Responses – February 25, 2010*

BACKGROUND

This report is in response to the Council Resolution from the July 28, 2015 meeting:

*“That the Civic Administration **BE REQUESTED** to report back to the Community and Protective Services Committee (CPSC) with respect to open air burning and air quality, current practices, enforcement and impacts of same, specifically as an update to the last report made to the CPSC and Council”.*

In order to address the requirements of this Resolution, this report is organized as follows:

- An overview of violations and enforcement current practice;
- An overview of complaints and types of violations since 2010; and,
- A review of air quality impacts

VIOLATIONS AND ENFORCEMENT

The London Fire Department (LFD) started enforcing Open Air Burning By-law F-7 (<http://www.london.ca/city-hall/by-laws/Documents/openburnF7.pdf>) in the spring of 2007. The new By-law includes enforcement measures like an Order to Discontinue Activity and prosecution. Also included in the By-law is a mechanism for inspection fees. The purpose of these inspection fees is to cover administrative services.

Appendix A lists the short form wording for most violations in the by-law.

When Officer’s inspect an open-air burn complaint, they use a checklist to record their findings. The By-law defines the terms “Noxious Materials” and “Nuisance” as follows:

“Noxious Materials” includes tires, plastics, rubber products, drywall, demolition waste, construction waste, paint, animal organic waste, vegetable waste, food waste, biomedical waste, tar, asphalt products, battery boxes, pressure-treated wood, creosote-treated wood, and painted wood.

“Nuisance” means excessive smoke, smell, airborne sparks or embers that is likely to disturb others, or that is likely to reduce visibility on roads in the vicinity of the Open Air Burning.

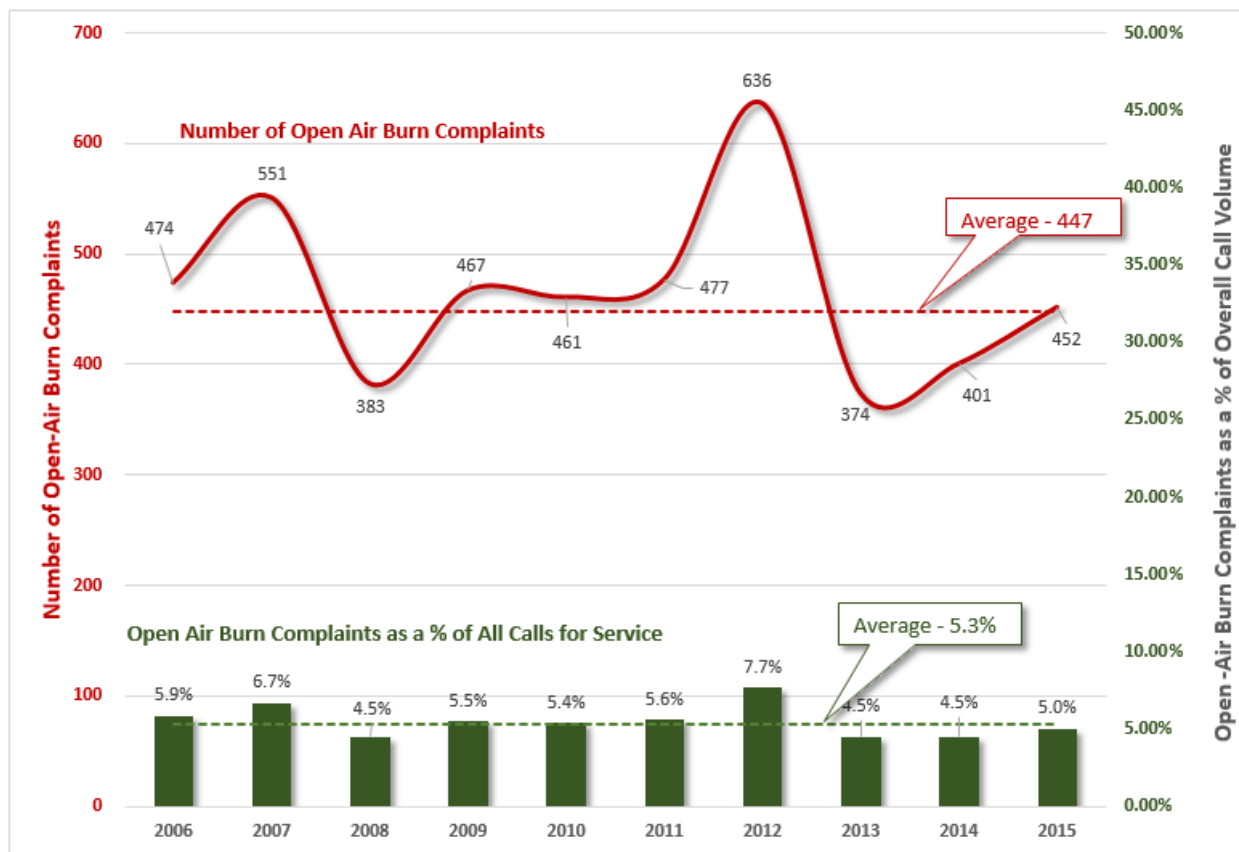
Year over Year Statistical Comparisons

Number of Complaints / Percentage of LFD Call Volume

The first part of this review looked to see if a trend could be identified with respect to the number of complaints received. Figure 1 below shows the open-air burning complaint activity over the last 10 years. The number of complaints received annually (solid red line) vary a great deal throughout the period with no specific trend emerging. However, with the exception of 2012, the chart shows that the number of complaints staying within a range of +/- 100 of the average of 447. Of interest, in 2009 the LFD predicted it would on average respond to approximately 473 complaints annually.

The second part of the review sought to determine if open-air burn complaints might be increasing the overall LFD call volume. The bar graph at the bottom of Figure 1 shows complaint calls averaging about 5.30% of the overall call volume. With the exception of two years (2007 and 2012), the percentage ranges between 4.5% and 5.9%. As was the case in the first part of the review, no specific trend emerges.

Figure 1: Historical Responses to Open Air Burning Complaints 2006 – 2015



In review, it is difficult to explain the fluctuations in the number of complaint calls over the study period. Nonetheless, the number of complaints investigated have remained *relatively constant* using both the number and percentage measures.

Complaints

Table 1 compares the average number of complaints received and investigated by the LFD from 2010 – 2014 against the 2015 results. It also summarizes the findings of those inspections. Looking only at the number of complaints received, the figures show that the number of complaints received dropped from 470 to 452, which represents a 3.83% reduction.

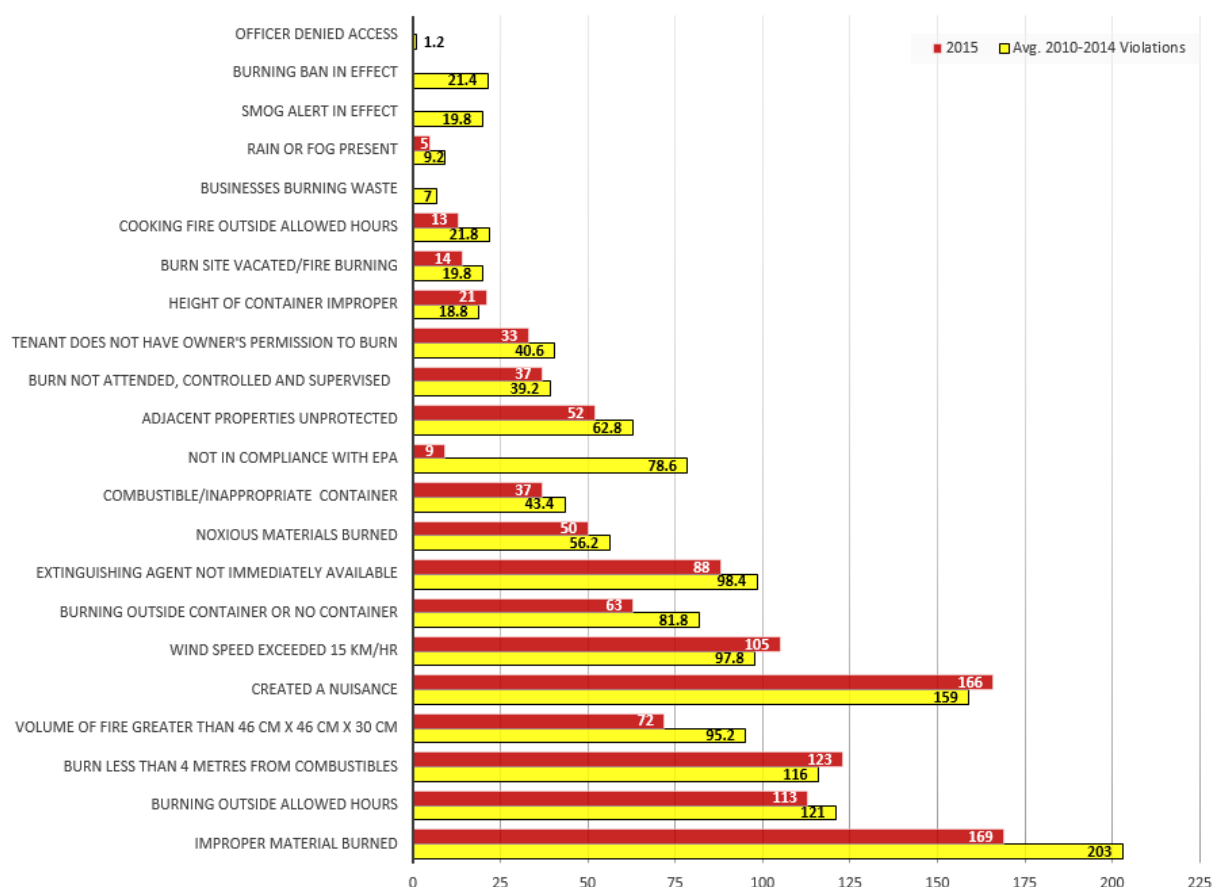
Table 1: Comparison of Open Air Burning Complaints – 2010 to 2014 Avg. vs. 2015

Description	2010 - 2014 Average		2015	
	Number	Percentage of All Complaints	Number	Percentage of All Complaints
Open air burning complaints – No violations	114	24.26%	150	33.19%
Open air burning complaints – Violations noted	356	75.74%	302	66.81%
Total	470		452	

Concerning the number of complaints, a complaint does not always mean the open-air burn is in violation of the By-law. Simply, the complaints only represent the number of open-air burn fires the Department is aware of through the complaint process and that the Department investigates. It is also important to note that an open-air burn found to be non-complaint may be as a result of one violation or several violations.

Table 1 summarizes the average number of complaints the LFD received between 2010 and 2014 and compares the results against the 2015 data. The summary shows that the number of open-air burn complaints with violations dropped from 356 to 302. This represents a 15.2% reduction. With respect to the number of open-air burns found to be compliant with the By-law, the results improved from a five (5) year average of 114 to 150 in 2015. The latter represents a 31.6% improvement.

Figure 2: Number of Violations by Category - 2010-2014 Avg. vs. 2015



Categories of Non-Compliance

In past years, Council requested details about the types of violations found during inspections. Council also asked if trends or patterns were emerging. Figure 2 shows the frequency of each violation found in 2015 and compares those results to the five (5) year averages. The previous reports, as well as this one, continues to show that the “*burning of materials other than commercially produced charcoal briquettes or clean dry seasoned wood*” (noted in the reports as “improper materials”) remains the number one violation. That being said, the frequency that this violation was found in 2015 decreased to 169 from the 2010-2014 average of 203 (16.8% reduction). “*Failing to ensure Open Air Burning does not create nuisance*” (shown in the Figures as “nuisance”) remained the second most frequent violation. This category saw an increase in 2015 to 166 from the five (5) year average of 159 (4.4%).

It is worthy to note that the data cited above speaks to the frequency a violation is found. Officers in fact may find multiple violations during an inspection. Based on frequency of occurrence, Figure 3 shows that the same violations remain in the top six (6) although their ranking may have changed through the study period. The far right column also shows how the 2015 ranking changed from the five (5) year average.

Figure 3: Ranking Top 6 Violations

Violation Summarized	2015	2010 – 2014 Average	Ranking Change from 5 Yr. Average
Burning unapproved materials	1	1	→ 0
Nuisance	2	2	→ 0
Burning within 4 metres of combustible materials	3	4	↑ 1
Burning outside permitted hours	4	3	↓ -1
Wind speed exceeds 15 km/hour	5	6	↑ 1
Failure to have effective extinguishing agent of sufficient size and with the capability	6	5	↓ -1

As identified earlier, the By-law defines the terms “Noxious Materials”. Burning noxious materials is of concern because unknown chemicals may be entering the atmosphere. That being said, through the study period the number of these violations reduced from 56 to 50.

The burning of materials other than commercially produced charcoal briquettes or clean dry seasoned wood (shown as “improper materials” in charts) is also of concern. This category ranges from burning damp wood to brush and construction materials. Burning damp wood is an issue because it could contribute to a nuisance. The latter combustibles might be simply residents avoiding taking the materials to the proper facilities. Within the City, there are programs in place to accept such materials for disposal and recycling.

Mapping of Open Burn Complaints with Violations

Figure 3 shows locations within the City where the LFD inspected open-air burn fires with one or more violations in 2015. As noted earlier, the LFD investigated 452 complaints in 2015 and found 302 to be in non-compliance with the By-law. Within the group of 302 non-complaint fires, 246 had multiple infractions.

Figure 3: Locations of 2015 Open-Air Burns w/ Violations

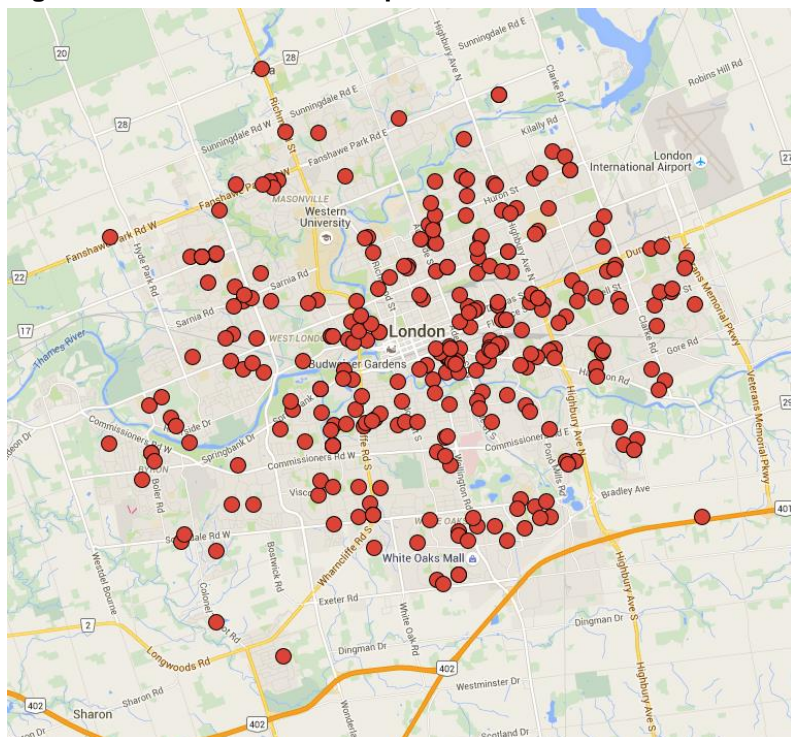


Figure 4: Clustering of 2015 Open-Air Burn Violations

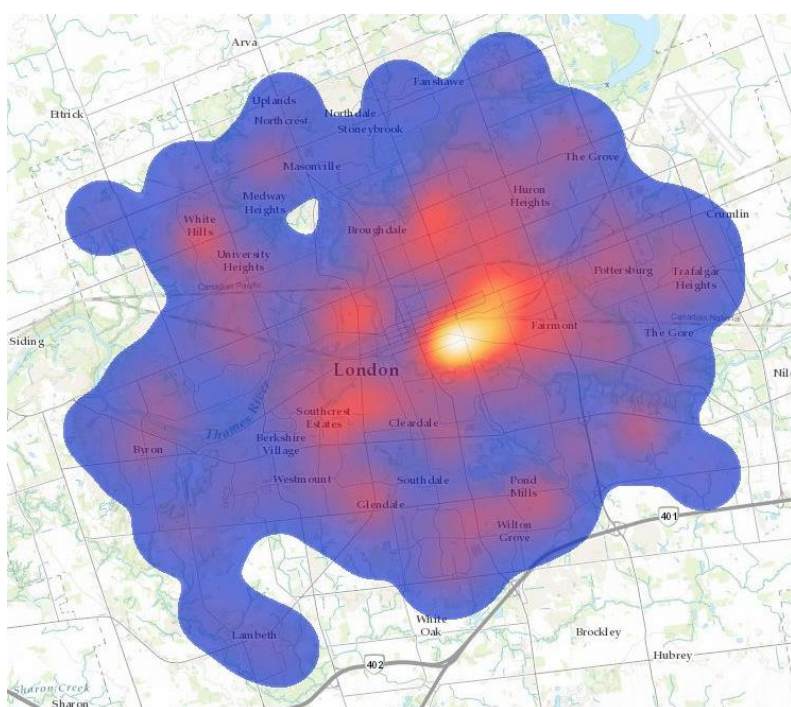


Figure 4 maps the inspected open-air burn complaints using an another method analysis. Using a clustering technique, the LFD is now able to identify “hot” spots within the City. The white area in the Core represents the greatest clustering of non-compliant open-air burn fires - blue areas show the least. The analysis shows the greatest number of open-air burn fires with violations occurring in an area around Adelaide St. N. and Hamilton Rd. The reddish orange areas shown elsewhere on the map signify other areas of clustering within the City but to a lesser degree.

AIR QUALITY AND IMPACTS

City of London

Local Air Quality Impacts of Backyard Fire Pits

Submitted by Jamie Skimming, Manager, Air Quality, Environmental Programs, City of London

Environment Canada estimates (2008 data) that “residential fuel wood combustion” (primarily fireplaces and wood stoves in houses) is the top local source of fine particulate matter emissions in London. Table on the next page shows the top six local sources, provides some perspective on the estimated contribution of local sources of fine particulate matter.

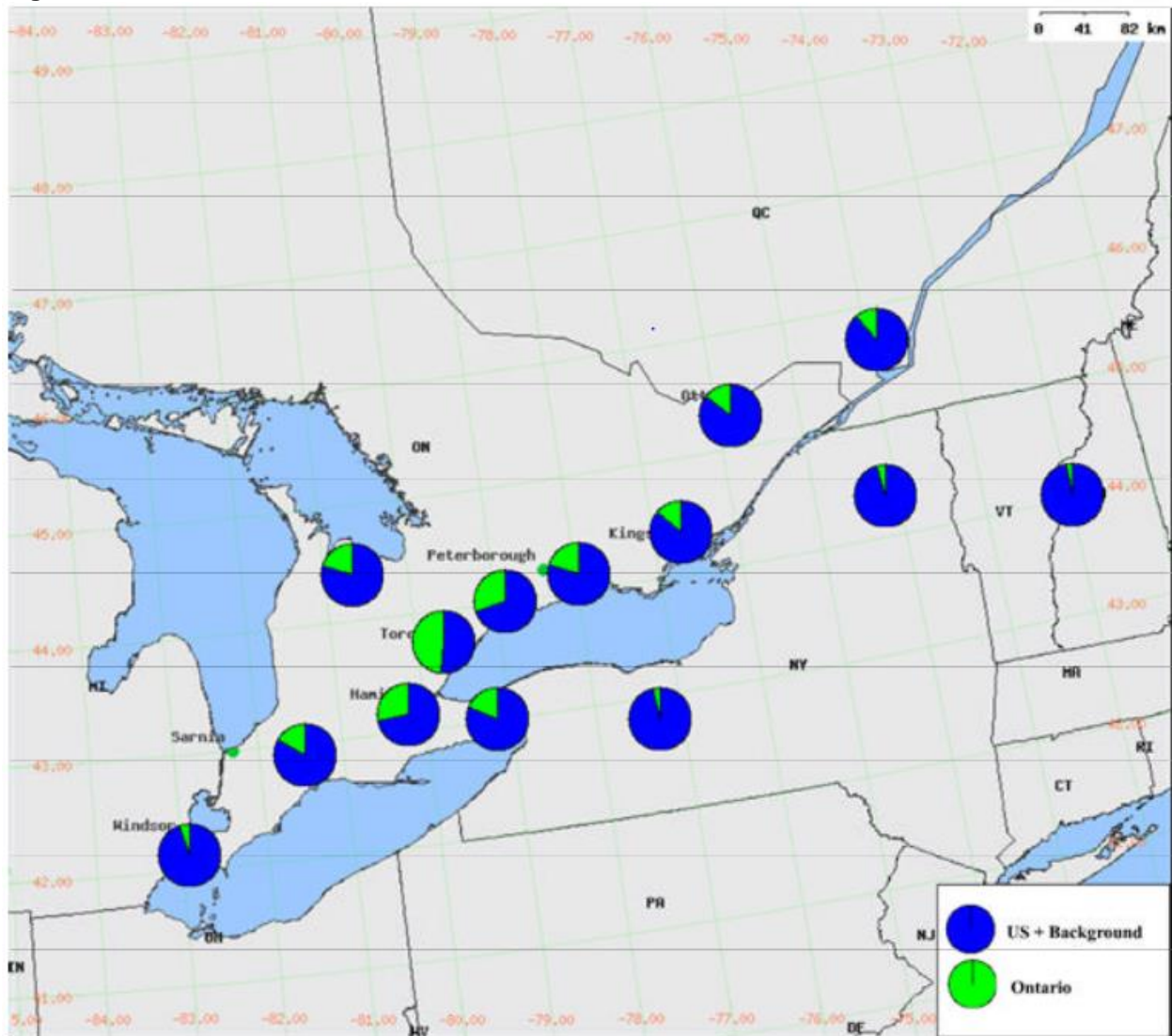
Table 2: Top Six Local Sources of Fine Particulate

Description	Fine Particulate Matter less than 2.5 µm - PM _{2.5} (tonnes/year)
Residential Fuel Wood Combustion	760
Construction Operations	724
Dust from Paved Roads	269
Off-road use of diesel	123
Foundries	116
Meat Cooking	111

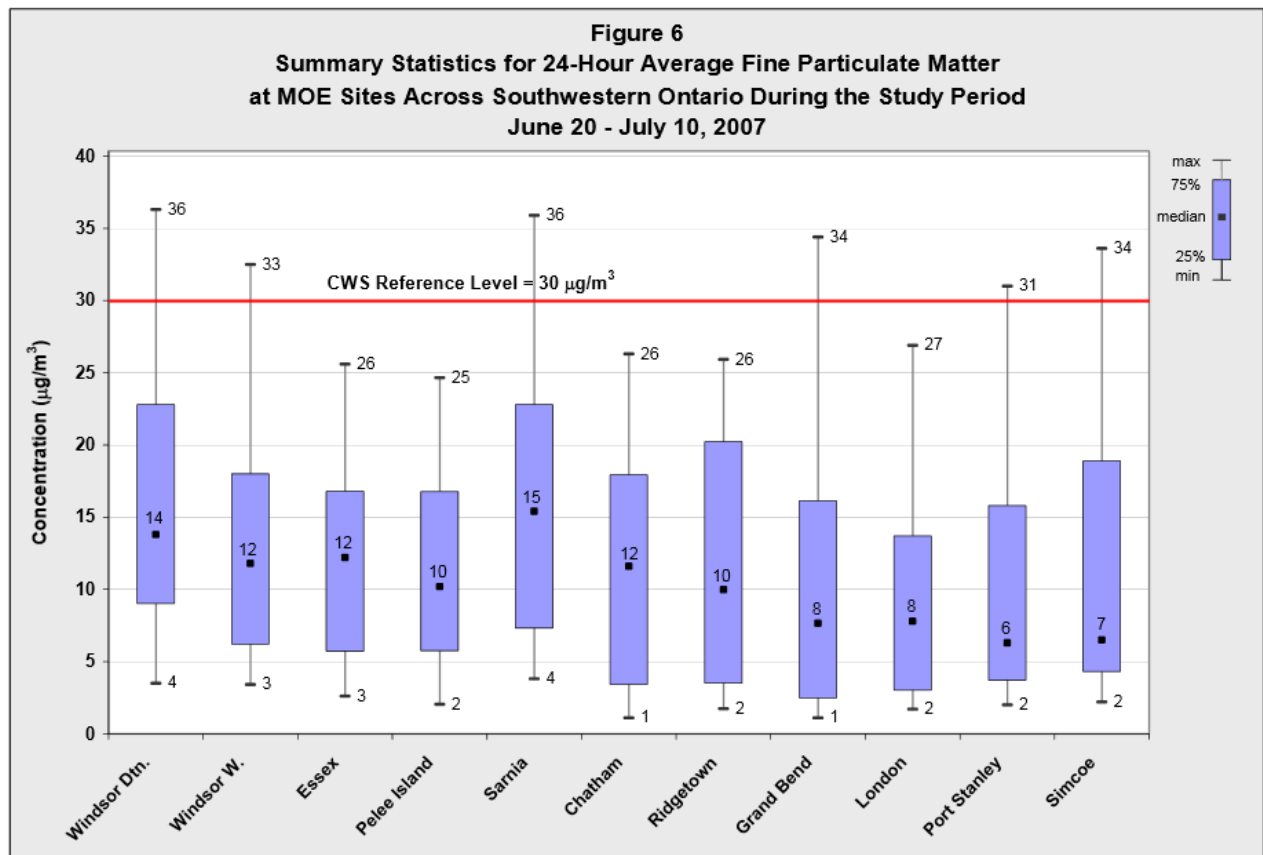
Source: Environment Canada Criteria Air Contaminants Inventory (2008 data)

However, it is important to note that the fine particulate matter in London’s airshed is primarily from upwind sources in the United States, as reported by the Ontario Ministry of the Environment and Climate Change.

Figure 5



Source: Transboundary Air Pollution in Ontario, June 2005, Ontario Ministry of the Environment and Climate Change



Source: Ontario Ministry of the Environment Border Air Quality Study – An Ambient Air Quality Overview for Southwestern Ontario (Summer 2007)

Additional information from the Ontario Ministry of the Environment and Climate Change shows that London's ambient levels of fine particulate matter tend to be lower than other Southwestern Ontario locations, particularly those close to the US-Canada border.

Based on the Ministry's air quality monitoring station data, London has not had an exceedance of the fine particulate matter air quality standard since 2008, when it was exceeded for one day that year.

Given the information above, it is not likely that backyard fire pits are having a significant impact on London's overall air quality.

Middlesex London Health Unit

In preparing this report, City of London representatives contacted the Middlesex London Health Unit (MLHU). In response to the request, the MLHU created and provided a document located in Appendix B.

DISCUSSION

Since the By-law was introduced, the LFD has taken an educational approach to open-air burning. On the first visit, information is provided to the offender at the scene, as well as later through the mail. During and following the second visit information is provided again but the owner is also charged an inspection fee. On a third offense, an inspection fee is charged and an Order to Discontinue Activity is issued.

In review of the current practice and impacts, it is believed the enforcement process can be strengthened. The LFD will continue to include an educational component following inspections; however, the Department is considering several options, including issuing an Order to Discontinue Activity to the owner on the first occurrence where Officer finds the burning of improper materials and/or noxious materials, as well charging an inspection fee. Another option is to issue an Order to Discontinue Activity in all situations where a violation is found during a second inspection. The individuals are adequately warned and

provided information based on the findings of the first inspection. These changes do not restrict the Fire Chief and/or the LFD from taking other actions as permitted in the By-law.

ACKNOWLEDGEMENTS

We wish to acknowledge Mr. Jaime Skimming, Manager - Air Quality, Environmental Programs, for his contribution to the section entitled Air Quality and Impacts, City of London, as well as representatives of the Middlesex London Health Unit for their information found in Air Quality and Impacts, Middlesex London Health Unit located in Appendix B.

SUMMARY

The LFD responded to 452 open-air burning complaints in 2015. This represents a decrease from the five (5) year average of 470. The data also shows that the number of open-air burn complaints with violations dropped from a five (5) year average of 356 to 302 in 2015 (15.2% reduction). At the same time, the number of open-air burns found to be in compliance increased from a 2010-2014 average of 114 to 150 in 2015 (31.6% improvement). Finally, the number of open-air burn complaints investigated in 2015 represented 5.0% of the overall call volume. This was slightly less than the 10-year median of 5.45%.

The LFD is considering several options with respect to the enforcement approach. One option includes immediately issuing an Order to Discontinue Activity and charging an inspection fee where an individual is found to be burning materials other than “commercially produced charcoal briquettes or clean dry seasoned wood” or “noxious materials”. Another option is to issue an Order to Discontinue Activity on the second offense. Currently, this action is taken on the third offense. Despite possible changes to the enforcement approach, the LFD will continue to include an educational component following the inspections.

Looking at whether open-air burns impact air quality within the City of London, Mr. Skimming provided information from several government sources. He concluded, “it is not likely that backyard fire pits are having a significant impact on London’s overall air quality”.

In preparing this report, representatives of the City of London contacted the Middlesex London Health Unit (MLHU). The MLHU prepared and provided the document contained in Appendix B of this report.

RECOMMENDED BY:	REVIEWED AND CONCURRED BY:
JOHN KOBARDA FIRE CHIEF	LYNNE LIVINGSTONE MANAGING DIRECTOR, NEIGHBOURHOOD, CHILDREN & FIRE SERVICES

Appendix A

Provincial Offences Act – Part I
City of London By-law F-7 ^a

Provision Creating or Defining Offence	Short Form Wording
2.1	set unauthorized Open Air Burning
2.1	maintain unauthorized Open Air Burning
2.1	permit to be set unauthorized Open Air Burning
2.1	permit to be maintained unauthorized Open Air Burning
3.1(2)(a)	fail to conduct Open Air Burning in Outdoor Fire Container between 4:00 p.m. and midnight
3.1(2)(b)	fail to use Outdoor Fire Container constructed from non-combustible material
3.1(2)(c)	burn in Outdoor Fire Container volume of combustible material greater than 46 cm wide by 46 cm long by 30 cm high
3.1(2)(d)	fail to contain fire in Outdoor Fire Container at all times
3.1(2)(e)	fail to locate Outdoor Fire Container at least 4 m from (<u>building / structure / property line / tree / hedge / fence / roadway / overhead wire / combustible article</u>)
3.1(2)(f)	fail to locate Outdoor Fire Container on non-combustible surface extending beyond unit
3.2(2)(a)	fail to conduct Open Air Burning for Cooking Fire between 11:00 a.m. and midnight
3.3(2)(b)	fail to produce Open Air Burning Permit
3.3(2)(c)	fail to conduct Open Air Burning with Permit between 8:00 a.m. and 8:00 p.m.
3.3(2)(d)	fail to use non-combustible container for Open Air Burning with Permit
3.3(2)(d)	fail to contain fire within non-combustible container for Open Air Burning with Permit
3.3(2)(e)	have fire larger than 1 m in length by 1m in width by 1 m in height for Open Air Burning with Permit
3.3(2)(f)	fail to locate Open Air Burning at least 50 m from (<u>building / structure / property line / tree / hedge / fence / roadway / overhead wire / combustible article</u>)
3.3(2)(g)	fail to locate Open Air Burning with Permit at least 5 m from combustible ground cover
3.4 (a)	fail to allow Officer to inspect (<u>location / proposed location</u>) of Open Air Burning
3.4(b)	fail to have legal title to property where Open Air Burning
3.4(b)	fail to obtain prior written consent of legal property owners where Open Air Burning
3.4(c)	fail to burn commercially produced charcoal briquettes or clean dry seasoned wood
3.4(d)	burn Noxious Materials
3.4(e)	fail to have extinguishing agent immediately available for use
3.4(f)	fail to attend Open Air Burning at all times
3.4(f)	fail to control Open Air Burning at all times
3.4(f)	fail to supervise Open Air Burning at all times
3.4(g)	fail to completely extinguish Open Air Burning before site is vacated
3.4(h)	conduct Open Air Burning with wind speed in excess 15 km/h
3.4(i)	conduct Open Air Burning when (<u>rainy / foggy</u>)
3.4(j)	conduct Open Air Burning during a smog alert
3.4(m)	fail to ensure Open Air Burning does not create nuisance
4.1(2)(a)	fail to notify London Fire Services (<u>prior to / at conclusion of</u>) agricultural operation Open Air Burning
4.1(2)(c)	have fire larger than 2 m in length by 2 m in width by 2 m in height for agricultural operation Open Air Burning
4.1(2)(d)	fail to locate agricultural operation Open Air Burning at least 50 m from (<u>building / structure / property line / tree / hedge / fence / roadway / overhead wire / combustible article</u>)
9.2	contravene conditions of a Permit
9.3	contravene conditions of (<u>setting / maintaining</u>) Open Air Burning
9.4	contravene Order to Discontinue Activity
9.5	contravene Order to Extinguish

^a Ontario Court of Justice. (2007, October 31). Provincial Offences Act. *City of London By-law F-7 Open Air Burning By-law*. London, Ontario, Canada.

Appendix B



Wood Smoke Health Effects

Wood burning in both urban and rural areas will generate smoke that contains more than 200 chemicals and compound groups, including fine particles. Wood burning can cause a wide range of health impacts from irritation of the eyes and respiratory tract, to more serious health conditions such as asthma, bronchitis, and, reduced lung function. Children, the elderly, and people with lung disease tend to be the most vulnerable.

The most common hazardous chemical substances identified in wood smoke include:

Particulate Matter (PM): includes aerosols, smoke, fumes, dust, ash, and pollen of different diameters. Fine particulate matter (PM_{2.5}) are known as respirable particles that can penetrate deep into the respiratory system and can vary depending on place, season, and weather conditions.

Carbon Monoxide (CO): can reduce the blood's ability to supply oxygen to body tissue. When inhaled at high levels, CO can cause fatigue, headaches, dizziness, nausea, and confusion. At very high levels with little ventilation CO can lead to unconsciousness.

Volatile Organic Compounds (VOCs): are chemicals that easily become gases at room temperature and can cause respiratory irritation.

Polycyclic Aromatic Hydrocarbons (PAHs): are chemicals produced from uncontrolled burning of carbon-containing materials. Prolonged exposure to PAHs is believed to pose a cancer risk.

Outdoor Wood Burning:

Exposure and Health Risk

The weather conditions in Middlesex-London play an important part in the consideration of exposure and health risks to wood smoke inhalation. The Air Quality Health Index (AQHI) is used as a measure of air pollution to determine those populations at risk who may need to modify outdoor activities.

Typically over the summer months Middlesex-London has an AQHI ranging from 3-4 (low-moderate risk). Low to moderate risk advises vulnerable populations to consider reducing strenuous activities, while the general population is not required to modify activities unless symptoms are present such as coughing and sore throat irritation.

At Risk and Vulnerable Populations

Vulnerable groups are those with asthma, cardiovascular, or lung disease. Those at risk include children and the elderly who are considered to be the most sensitive to the effects of fine particulate matter. Adverse health effects have been associated with both short periods (such as a day) and longer exposure periods (a year or more) of PM_{2.5} exposures.

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Health Prevention Measures

Public health strategies to prevent wood smoke related health issues include: using clean dry wood, burning smaller pieces of wood, and avoid wood burning on days that air pollution levels are high. Do not burn painted, treated, or wet wood and do not burn garbage of any kind.

If symptoms are experienced, it is recommended to limit outdoor wood burning, stay indoors with central air conditioning, replace your furnace / central air HEPA filters every 3 months, and eliminate indoor air pollution such as tobacco smoke.

References:

Environment Canada (2006). Model municipal By-law for regulating woodburning appliances. Her Majesty the Queen in Right of Canada. Retrieved from: <http://www.ec.gc.ca/residential-residentiel/default.asp?lang=En&xml=56B111EF-130F-48D8-AE87-85954E4B6FA7>

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The Lung Association, Alberta & NWT (2015). Learn about air pollution: fire pit burning. Retrieved from: <https://www.ab.lung.ca/your-health/prevent-lung-disease/learn-about-air-pollution/fire-pit-burning>