COUNCIL REPORT

Meeting Date:	November 20, 2023
Department:	Community Services
Report No.:	CS-2023-31
Submitted by:	Robert Lilbourne, Director of Community Services
Approved by:	Trisha McKibbin, Chief Administrative Officer
SUBJECT:	**Indoor Air Quality Report – Strathroy-Caradoc Fire Stations**

RECOMMENDATION: THAT: Council receive report CS-2023-31 titled Indoor Air Quality (IAQ) Report – Strathroy-Caradoc Fire Stations for information.

BACKGROUND:

At the July 17, 2023 meeting, the following motion was approved.

Moved by Councillor Derbyshire
Seconded by Mayor Grantham

THAT: Council requests an air quality test and report in all Fire Halls including meeting rooms, and administration offices, and further;

THAT: the air quality test be performed by an outside source and;

THAT: Council directs staff to come back with a tender.

CARRIED

Notice of Motion Councillor Derbyshire to be voted on

Staff issued the Indoor Air Quality (IAQ) tender and received 7 bids.

The IAQ testing was to consist of the following:

1. A qualified technologist under the direct supervision of a CIH/ROH shall complete the fieldwork.

2. The Municipality requires two “Top 35 VOC samples” from each Fire Hall, and one Blank, for a total of 7 Samples (note: please confirm the required number of blanks with your laboratory).

    - One sample will be collected in the **Administration Area** of each Station and one sample will be collected in the **Apparatus Bays** of each Station.
    - Ensure that each sample is run for a minimum of 2L/min for 4 hours (note: please confirm with your laboratory).
    - Include laboratory interpretation of the analytical results.

At the September 5, Council meeting the following recommendations were presented and approved.

Moved by Councillor Hipple
Seconded by Councillor Brennan

THAT: Report CS-2023-21 titled Fire Stations Indoor Air Quality (IAQ) – Testing Tender Award be received for information.

CARRIED

Moved by Councillor Pelkman
Seconded by Councillor Hipple

THAT: Council approves the awarding of the tender to EXP Services Inc. for a value of $6,537.05 including HST.

CARRIED

Fire Station Indoor Air Quality (IAQ) - Testing Tender Award - CS-2023-21

COMMENTS:
The assessment was to evaluate the presence of volatile organic compounds (VOCs) within the project area of each of the following fire stations:

- Station #1 – 23 Zimmerman Street, Strathroy, ON
- Station #2 – 688 Bowan Street, Mount Brydges, ON
- Station #3 – 21912 Melbourne Road, Melbourne, ON

In this evaluation, EXP gathered six (6) air samples and one (1) field blank from the project areas, completing the assessment on September 25, 2023. The sampling method employed was area air sampling, distinguishing it from personal air sampling, which measures worker exposure.

The focus here was on assessing the environmental concentration of VOCs in the project areas, with no personal air sampling due to the areas being generally unoccupied. While Canadian regulations lack specific limits for individual volatile organic compounds, the Ministry of the Environment,

Conservations and Parks (MECP) provides Ambient Air Quality Criteria (AAQC) for over 350 contaminants, serving as protective concentrations against adverse health and environmental effects.

EXP compared VOC concentrations with MECP's AAQC where applicable. Indoor air quality regulations for total VOCs are not standard, but historical guidelines, such as Health Canada's trigger and action levels of 1,000 µg/m3 and 5,000 µg/m3, respectively, have been used for screening assessments in office buildings.

The assessment covered administration areas and apparatus bays in three (3) fire stations in Strathroy, Mount Brydges, and Melbourne within the Municipality of Strathroy-Caradoc. Apparatus bays, housing firefighting vehicles, and equipment, often involve maintenance activities. The administration areas encompass offices, training, and break rooms.

All areas, except for Station 3's Administration area, exceeded Health Canada's trigger level but remained below the action level (1,000 to 5,000 µg/m3). Certain sections in Stations 2 and 3 surpassed MECP ambient air quality criteria for benzene and phenol. Station 1 did not exhibit elevated readings above MECP criteria during testing.

Notably, the absence of higher concentrations in individual VOCs in Station 1 may indicate the efficacy of new policies, standard operating guidelines, and decontamination equipment in reducing contamination.

Based on these findings, the following recommendations are offered for consideration in addressing the analytical results for the fire stations.

- Further investigation into the source of higher concentrations of individual VOCs within the administration areas of the fire stations, specifically phenol levels in Station #2 and benzene levels in Station #3.
- Further investigation into the source of higher concentrations of individual VOCs within the apparatus bays of the fire stations, specifically benzene levels in Station #2 and Station #3.
- Review total VOC mitigation measures based on hierarchy of controls (i.e., elimination, substitution, engineering controls, administrative controls, personal protective equipment) such as:
    a. Removal of firefighter PPE storage from within the apparatus bay and/or having a separate storage location that can be sealed from the general area.
    b. Increase general ventilation throughout the apparatus bays, specifically in areas where firefighter PPE is stored.
    c. Review the feasibility of adding an air purifying system that contains activated carbon to aid in filtration of VOCs in air.

d. Inspect the exhaust extraction systems within the fire stations to ensure contaminants from firetruck/vehicle operation are being removed as intended.

i. Perform any preventative maintenance and/or repairs on the exhaust extraction system, as identified.

e. Inspect heating and cooling systems within the fire stations to determine if VOC extraction systems can be added to existing systems.

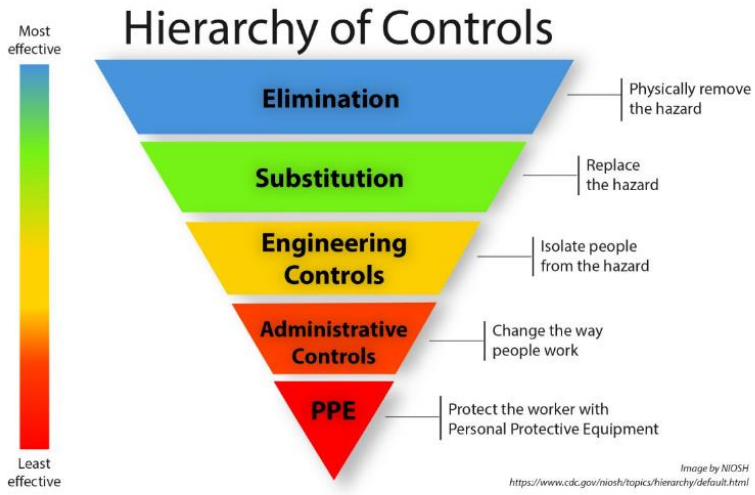
f. Inspect the floor drains within the apparatus bays of all fire stations to ensure proper function and verify sewage gases are not entering the area.

g. Administrative controls with respect to monitoring, access and training.

- In the event of a major fire, conduct air sampling to assess the VOC concentrations pre- and post-decontamination activities of firefighters' PPE.

- Conduct further indoor air quality assessment for common parameters (temperature, relative humidity, carbon dioxide, carbon monoxide, inhalable particulate, etc.) to assess if there are any other air contaminants of concern within the fire stations.

Staff have initiated a thorough examination of the highlighted concerns and are actively investigating solutions, utilizing the hierarchy of controls outlined in the accompanying image.



For more information on the Hierarchy of Controls and a definition of each level, click on the link from the Canadian Centre for Occupational Health and Safety. CCOHS: Hazard and Risk - Hierarchy of Controls

Prior to receiving the IAQ report the Fire Chief presented a report detailing the health and safety concerns of the firefighters. That report identified similar concerns around the bunker gear (PPE) storage on the apparatus bay floors and ventilation of the stations. Click on the link to see the report. Health & Safety Cause & Concern - FIRE-2023-05

Based on the report from the Fire Chief and Council's subsequent approvals, work has already started to address those concerns of the firefighters at the same time starting to address some of the recommendations in the IAQ report.

Below are the recommendations identified above with the current status along with what level of control is being utilized if applicable.

Recommendation	Status	Control
Further investigation into the source of higher concentrations of individual VOCs within the administration areas of the fire stations, specifically phenol levels in Station #2 and benzene levels in Station #3	Investigation has started focusing on ventilation and exhaust extraction	Not Applicable at this time
Further investigation into the source of higher concentrations of individual VOCs within the apparatus bays of the fire stations, specifically benzene levels in Station #2 and Station #3.	Investigation has started focusing on ventilation and exhaust extraction	Not Applicable at this time
Review total VOC mitigation measures based on hierarchy of controls (i.e., elimination, substitution, engineering controls, administrative controls, personal protective equipment) such as:		
a. Removal of firefighter PPE storage from within the apparatus bay and/or having a separate storage location that can be sealed from the general area.	Currently working on the design and costing associated with this recommendation in all 3 stations	Engineering
B. Increase general ventilation throughout the apparatus bays, specifically in areas where firefighter PPE is stored.	Currently working on the design and costing associated with this recommendation in all 3 stations	Engineering
C. Review the feasibility of adding an air purifying system that contains activated carbon to aid in filtration of VOCs in air.	Reviewing costing and feasibility of this addition in all 3 stations	Engineering
d. Inspect the exhaust extraction systems within the fire stations to ensure contaminants from firetruck/vehicle operation are being removed as intended. i. Perform any preventative maintenance and/or repairs on the exhaust extraction system, as identified.	Currently working on inspection of systems at all 3 stations	Administrative
e. Inspect heating and cooling systems within the fire stations to determine if VOC extraction systems can be added to existing systems.	Currently working on inspection of systems at all 3 stations	Engineering
f. Inspect the floor drains within the apparatus bays of all fire stations to ensure proper function and verify sewage gases are not entering the area.	Inspection to occur in all 3 stations repairs to follow if required	Administrative

g. Administrative controls with respect to monitoring, access and training.	This is ongoing with new and revised SOG for handling, storage, and cleaning of contaminated gear	Administrative
In the event of a major fire, conduct air sampling to assess the VOC concentrations pre- and post-decontamination activities of firefighters' PPE.	To be determined upon major fire and the above measure put in place	Not Applicable
Conduct further indoor air quality assessment for common parameters (temperature, relative humidity, carbon dioxide, carbon monoxide, inhalable particulate, etc.) to assess if there are any other air contaminants of concern within the fire stations.	To be determined	Not Applicable

All three stations share concerns about indoor air quality (IAQ). However, Station 1's proactive measures, including new policies, standard operating guidelines, and decontamination equipment, have successfully minimized higher concentrations of individual VOCs.

The Municipality is dedicated to ensuring a safe and healthy work environment, actively addressing IAQ concerns. After completing investigations, making necessary repairs, and implementing new measures, the staff will request additional IAQ testing to assess overall success.

CONSULTATION:
Brent Smith, Fire Chief
Trisha McKibbin, CAO
Ali Ismail, CRSP, CIH – EXP Certified Industrial Hygienist

FINANCIAL IMPLICATIONS:
Not Applicable

STRATEGIC PLAN ALIGNMENT:
This matter is in accord with the following strategic priorities:

Local Infrastructure: Households and businesses in Strathroy-Caradoc are supported by reliable, financially responsible and well-maintained infrastructure networks.

ATTACHMENTS:
Strathroy-Caradoc Fire Stations VOC Air Sampling Report