

CASE STUDY

# Balancing Clean Air, Energy Efficiency, and Occupant Health

How GDI Ainsworth's tracer particle testing helped CBRE and Infrastructure Ontario optimize indoor air quality at the Orillia Courthouse.



## Project Details

### Location

Ontario, Canada

### Number of Buildings

Multiple government facilities within a 260-acre campus

### System Implemented

Tracer particle testing using ASHRAE Standard 241-2023 methodology to measure clean airflow delivery, air change rates, and ventilation effectiveness

### Project Goal

Validate and optimize indoor air quality to support occupant health, ASHRAE 241 compliance, and energy efficiency

## Impact at a Glance

- ✓ Conducted 17 clean airflow tests using accredited tracer aerosol decay methodology
- ✓ Identified **97%** average excess VECAi, highlighting significant over-ventilation opportunities
- ✓ Enabled fast, data-driven recommendations to reduce HVAC energy use while maintaining occupant health
- ✓ Supported compliance with ASHRAE Standard 241 – Control of Infectious Aerosols

## Challenge

The COVID-19 pandemic underscored the critical role of indoor air quality in occupant health, safety, and well-being.

For large, government-managed facilities like the Orillia Courthouse, balancing clean airflow with energy efficiency posed a challenge.

Without precise measurement, buildings risked either under-ventilation—compromising health—or over-ventilation—driving unnecessary energy use and emissions.

## Methodology

Deployed accredited technicians to conduct tracer aerosol decay testing

Applied ASHRAE Standard 241-2023 normative methodology

Measured clean airflow delivery within the breathing zone

Calculated clean air delivery metrics (ECAi, VECAi) and effective air change rates (eACH)

Identified zones with excess or insufficient clean airflow

Analyzed results onsite to enable immediate recommendations

## Solution

✓ Performed run-fast, accurate clean airflow rate testing across occupied spaces and conducted 17 tracer particle tests to assess ventilation effectiveness

✓ Quantified clean air delivery and air change rates at the zone level

✓ Identified over-ventilated areas suitable for airflow reduction

✓ Flagged under-ventilated spaces requiring adjustment for compliance and wellness

✓ Enabled optimization of ventilation based on current occupancy levels

✓ Supported energy savings, decarbonization goals, and occupant health simultaneously

## The Ripple Effect

✓ Reduced HVAC energy consumption by addressing over-ventilated areas

✓ Improved confidence in indoor air quality performance for occupants and operators

✓ Enabled data-driven decision-making aligned with evolving IAQ standards

✓ Established a scalable approach to managing infectious aerosol risk and wildfire smoke exposure

