



**INDOOR AIR QUALITY ASSESSMENT DURING  
CONSTRUCTION  
December, 2014**

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**WINCHESTER HIGH SCHOOL  
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**Job #: 5316**

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## 1. EXECUTIVE SUMMARY

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### BACKGROUND

Consigli retained Cashins & Associates, Inc., to perform an indoor air quality (IAQ) assessment at areas adjacent to Phase I of the project at the Winchester High School in Winchester, Massachusetts. This testing was conducted in order to determine whether various IAQ parameters were in compliance with the project's Indoor Air Quality Management Plan.

### SCOPE OF WORK

On December 19, 2014, a Senior Indoor Air Quality Consultant from Cashins & Associates performed air sampling as required by the Indoor Air Quality Management Plan developed by Cashins & Associates.

Measurements were taken for the following:

- Carbon Dioxide
- Temperature
- Relative Humidity
- Carbon Monoxide
- Volatile Organic Compounds (VOCs)
- Dust

It should be noted that readings for carbon dioxide are taken during these assessments not to measure ventilation or HVAC effectiveness, but to ensure that exhaust from combustion engines are not entering the space. Different techniques would be employed in order to assess the effectiveness of the school's ventilation system. Thus, carbon dioxide readings listed here are not to be read as an accurate measurement of the amount of fresh air bring brought into classroom spaces.

### FINDINGS

Real-time readings for CO, VOCs, and dust were all below upper limits set forth in the IAQ Management Plan.

## 2. INTRODUCTION

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Cashins & Associates, Inc. was retained by Consigli to provide professional industrial hygiene consulting services. Our scope of work consisted of measuring various basic indoor air quality parameters during construction activities at Winchester High School in Winchester, Massachusetts. This assessment took place on December 19, 2014, and focused on areas adjacent to Phase I of the project.

## 3. INDOOR AIR QUALITY PARAMETERS

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The following is a breakdown of upper limits related to indoor air quality as stipulated in section 01 81 19 of the Project Specification:

Analyte	Upper Limit
Airborne dust	150 $\mu\text{g}/\text{m}^3$ (Occupied), 500 $\mu\text{g}/\text{m}^3$ (Work Area)
Volatile Organic Compounds (VOCs)	5 ppm (5,000 ppb)
Carbon Monoxide (CO)	9 ppm

## 4. METHODOLOGIES

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A TSI Q-Track indoor air quality meter was used to measure carbon dioxide and carbon monoxide at representative locations of the school. The range of measurements obtained is reported in Table 1.

A RAE Instruments part per billion photo-ionization detector (PID) was utilized to screen the school building for the presence of TVOC. The PID is a screening tool that provides information as to total volatile organic compound loading in the space. The instrument does not provide information pertaining to which specific compounds are present in the air.

Dust concentrations were measured using a MIE pDR-1000AN passive air sampler. This real-time aerosol monitor measures both respirable and thoracic fractions, with optimal responses to particles in the 0.1-10 micron size range. The monitor was zeroed on June 19, 2014 prior to the monitoring event by using a hand-inflatable “zero air” pouch in conjunction with an inlet filter cartridge.

## 5. FINDINGS

### 5.1 Findings: Basic IAQ Parameters

We have listed in Tables 1 through 3 the results of the real-time air sampling. Three rounds of sampling were conducted at various times of the day in order to gain a more representative data set. It should be noted that these readings are taken in areas adjacent to classrooms, not inside the classrooms themselves.

**Table 1: Real-time Air Quality Readings**

<i>Location</i>	<i>CO<sub>2</sub></i> <i>(ppm)</i>	<i>CO</i> <i>(ppm)</i>	<i>TVOC</i> <i>(ppb)</i>	<i>Dust</i> <i>(µg/m<sup>3</sup>)</i>
<b>1<sup>st</sup> floor</b>				
Main office	591	<0.1	1	3
@ exit 34	530	<0.1	2	5
@ room A108	676	<0.1	11	23
Hall @ women's room	789	< 0.1	75	83
@ room B101	879	<0.1	83	80
@ Photography	877	<0.1	88	75
@ Library	763	<0.1	41	7
<b>E Wing</b>				
East entry	506	<0.1	1	1
Shop class	384	<0.1	<1	5
Band Room	411	<0.1	<1	2
Shop	462	<0.1	6	59
SW Entry	361	<0.1	<1	5
@ Men's Locker	377	<0.1	<1	<1
@ Boiler room	345	<0.1	<1	<1
<b>2<sup>nd</sup> floor</b>				
@ Room B209	708	<0.1	22	5
SW @ work activity	733	<0.1	56	2
@ Room C210	666	<0.1	32	3
@ Room C207	555	<0.1	29	2
@ Room C202	635	<0.1	32	5
@ Room C205	841	<0.1	47	4
@ Room B207	872	<0.1	86	43
@ Room B203	859	<0.1	88	46
@ Room A210	603	<0.1	31	21
@ SS Dept.	769	<0.1	89	20
@ Room A202	693	<0.1	50	12
@ A201/work activity	709	<0.1	46	2
@ A202/work activity	601	<0.1	2	1
Blue Stairwell	695	<0.1	69	53
<b>3<sup>rd</sup> Floor</b>				
Blue stairwell	679	<0.1	77	3
@ Room A301	739	<0.1	68	2
@ Science Lecture	677	<0.1	78	1
@ Room A305	530	<0.1	2	2

**Table 1: Real-time Air Quality Readings**

<i>Location</i>	<i>CO<sub>2</sub> (ppm)</i>	<i>CO (ppm)</i>	<i>TVOC (ppb)</i>	<i>Dust (µg/m<sup>3</sup>)</i>
@ Room B302	758	<0.1	40	<1
B Hall	670	<0.1	60	<1
@ Room B307	887	<0.1	34	<1
@ Room C302	1014	<0.1	49	<1
@ Room C306	827	<0.1	23	<1
C Study Area	763	<0.1	13	<1
@ Room C310	762	<0.1	18	<1
Teacher's Room	792	<0.1	73	10
SW Corner	849	<0.1	60	<1
@ Room C309	941	<0.1	39	9
Yellow stairwell	838	<0.1	50	<1

## 6. DISCUSSION

Real-time readings for CO, VOCs, and dust were all below upper limits set forth in the IAQ Management Plan.

No significant construction-related odors were detected at the time of this assessment.

Indoor air quality related to construction activities will be monitored on a regular basis by Cashins & Associates throughout this project in order to ensure that concentrations of various airborne contaminants remain at acceptable levels.

Please call if you have any questions or if we can be of further assistance.

Sincerely,  
 Cashins & Associates, Inc.



Zachary Keefe, CIE  
 Senior Indoor Air Quality Consultant