

Report For
Indoor Air Quality Study and Asbestos Testing
AT THE
Greater Lowell Technical High School
Tyngsborough, MA

Study Date:
August 27, 2014

Project# 214 273.00

STUDY CONDUCTED BY:

UNIVERSAL ENVIRONMENTAL CONSULTANTS
12 Brewster Road
Framingham, Massachusetts



August 31, 2014

Mr. Mike Williams
Knight, Bagge and Anderson, Inc
6 Thirteenth Street
Charlestown Navy Yard
Charlestown, MA 02129

Reference: Indoor Air Quality Study and Asbestos Testing
Greater Lowell Technical High School, Tyngsborough, MA

Dear Mr. Williams:

Thank you for the opportunity for Universal Environmental Consultants (UEC) to provide professional services.

Enclosed please find the report for Indoor Air Quality Study and Asbestos Testing at the Greater Lowell Technical High School conducted on Wednesday, August 27, 2014.

Please do not hesitate to call should you have any questions.

Very truly yours,

Universal Environmental Consultants

A handwritten signature in black ink, appearing to read "Ammar M. Dieb", is written over a horizontal line.

Ammar M. Dieb
President

UEC:\214 273\IAQreport.DOC

Enclosure

1.0 Scope:

UEC was contracted to perform an Indoor Air Quality Study and Asbestos Testing at limited locations within the Greater Lowell Technical High School, Tyngsborough, MA. Testing was performed during the on-going renovation and demolition project at the school.

Testing was performed on Wednesday, August 27, 2014.

2.0 Methodology:

Air testing was conducted for the following. The sample length at each test location was 2 minutes.

- Total Volatile Organic Compounds (**TVOCs**).
- Carbon Dioxide (**CO₂**), Carbon monoxide (**CO**), Temperature (**°F**) and Relative Humidity (**RH %**).
- **PM** (Particulate matter) - **PM₁₀** (particles less than 10 micrometers in diameter) and **PM_{2.5}** (particles less than 2.5 micrometers in diameter).¹
- Asbestos Wipe.

Testing for **TVOCs** referenced to isobutylene was performed using a Rae Systems ppbRae3000 Photo-Ionization Detector (PID) model PGM7340 equipped with a 10.6 eV lamp (S/N 594-903008). This is a state of the art instrument capable of detecting total **TVOCs** in the parts per billion (ppb) range. The instrument is a direct reading monitor and provided sampling readings at 1 second intervals over the duration of each test. The instrument was calibrated prior to testing and is serviced annually by the manufacturer or an independent vendor.

TVOCs are a broad class of chemicals with diverse applications which are frequently emitted by new carpets, furniture, pressboards, varnishes, adhesives and high gloss finishes. Other common products which may emit **TVOCs** include paints, paint strippers, other solvents, wood preservatives, aerosol sprays, cleansers, disinfectants, moth repellents, air fresheners, stored chemicals and fuels, automotive products, hobby supplies, and dry-cleaned clothing. Elevated levels of **TVOCs** are a common IAQ problem, especially in newly constructed buildings.

Carbon Dioxide (**CO₂**), Carbon monoxide (**CO**), Temperature (**°F**) and Relative Humidity (**RH %**) were measured using a TSI Corporation Q-Trak 7575 (S/N 7575X1337003) with a 982 probe (S/N P13350004). The instrument is a direct reading monitor that utilizes infrared technology to measure **CO₂** and an electro-chemical cell to measure **CO** and provided sampling readings at 1 second intervals over the duration of each test. The instrument was calibrated prior to testing and is serviced annually by the manufacturer or an independent vendor.

CO₂ is a useful measure of ventilation effectiveness in spaces occupied by people (i.e. verification that sufficient fresh air is being introduced into the occupied space being tested). Indoor **CO** levels were measured comparatively with outside levels to verify whether sources such as boiler and vehicle exhausts were causing elevated indoor **CO** levels. **CO₂** and **CO** were measured in parts per million (ppm). Temperature and relative humidity readings were taken to verify indoor levels were within ASHRAE² comfort ranges.

Airborne particulate matter (**PM**) levels for **PM₁₀** and **PM_{2.5}** were tested using a TSI Corporation DustTrak DRX 8534 handheld aerosol monitor (S/N 8534124302). This is a state of the art instrument capable of simultaneously detecting **PM₁₀** and **PM_{2.5}** in the microgram per cubic meter ($\mu\text{g}/\text{m}^3$) range. The instrument is a direct reading monitor

¹ **Fine particles (PM_{2.5})** - Particles less than 2.5 micrometers in diameter are called "fine" particles. Sources of fine particles include all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes. **Coarse particles** - Particles between 2.5 and 10 micrometers in diameter are referred to as "coarse." Sources of coarse particles include crushing or grinding operations, and dust stirred up by vehicles traveling on roads.

² ASHRAE = American Society of Heating, Refrigeration and Air-conditioning Engineers.

and provided sampling readings at 1 second intervals over the duration of each test. The instrument was zeroed prior to testing and is serviced annually by the manufacturer or an independent vendor.

Real time **PM** Measurement is a useful comparative measure of indoor and outdoor dust levels as well as identifying indoor sources of **PM**.

Testing for asbestos was performed by collecting wipe sampling from various surfaces. Wipe samples were analyzed by a Massachusetts licensed laboratory EMSL, Woburn, MA using the standard Polarized Light Microscopy (PLM) in accordance with the EPA standard.

Refer to the attached samples results and floor plans.

3.0 Results:

The ppbRAE 3000 monitor was used to measure *TVOCs* in $\mu\text{g}/\text{m}^3$.

TEMPERATURE, RELATIVE HUMIDITY, CARBON MONOXIDE, CARBON DIOXIDE & TOTAL VOLATILE ORGANIC COMPOUNDS by PID and DUST

Location	W	D	#	Temperature (°F)	Humidity %RH	CO (ppm)	CO ₂ (ppm)	TVOCs ($\mu\text{g}/\text{m}^3$)	PM 10 (mg/m^3)	PM 2.5 (mg/m^3)
Outside	-	-	-	92.7	47.4	0	413	0	0.021	0.011
Location X1	-	-	7	78.4	51.7	0	954	457	0.037	0.009
Room 1407	-	O	5	78.6	60.7	0	970	549	0.098	0.017
Room 1503	-	O	2	79.9	55.9	0	1036	552	0.098	0.017
Room 1445	-	C	0	75.6	61.2	0	1064	747	0.043	0.010
Room 1460	C	C	0	77.6	70.8	0	602	246	0.034	0.015
Location X2	-	-	6	74.9	59.5	0	860	685	0.042	0.009
Location X3	C	C	7	76.1	60.0	0	873	586	0.031	0.008
Location X4	-	-	0	75.0	55.7	0	663	372	0.011	0.004
Location X7	C	C	3	73.1	50.9	0	814	736	0.011	0.004
Gymnasium East	C	C	0	84.3	55.3	0	715	1550	0.024	0.009
Gymnasium West	C	C	0	84.3	55.5	0	604	1313	0.018	0.009
Location X8	-	O	0	72.6	59.1	0	600	296	0.004	0.003
Location X9	-	O	0	73.4	58.7	0	611	232	0.003	0.003
Location X6	-	O	0	75.3	61.2	0	754	333	0.039	0.009
Location X5	-	-	5	74.9	61.2	0	786	276	0.062	0.011
Location X10	-	-	0	74.6	63.8	0	639	207	0.020	0.008
Location X11	-	-	0	77.4	63.6	0	862	197	0.025	0.009
Location X12	-	C	3	76.2	53.6	0	854	637	0.018	0.004
Location X13	-	-	3	79.5	57.1	0	733	289	0.021	0.007
Room 3160	C	C	7	78.3	50.3	0	588	340	0.120	0.018

ASBESTOS WIPE SAMPLING

Location	Result
Location X1 on Light	None Detected
Room 1407 on Teacher's Desk	None Detected
Room 1407 on Top of Chalkboard Ledge	None Detected
Room 1407 on Top of Refrigerator	None Detected
Room 1503 on Smart Board Ledge	None Detected
Room 1503 on Shelve	None Detected
Room 1503 on Round Table	None Detected
Room 1445 on Picture Frame	None Detected
Room 1445 on Wood Edge Ledge	None Detected

Room 1445 on Pipe Wall Display	None Detected
Room 1460 on Paint Can	None Detected
Room 1460 Block Ledge	Chrysotile
Room 1460 Flammable Closet Shelf	None Detected
Room 1460 on Tool Closet Ledge	None Detected
Location X2 on Window Ledge	Chrysotile
Location X2 on Thermostat Cover	None Detected
Location X3 on Light	None Detected
Location X4 on Fire Pull Station Cover	None Detected
Location X7 on Railing	Chrysotile
Location X8 on Defibrillator	None Detected
Location X9 on Filing Cabinet	None Detected
Location X6 on Block Ledge	None Detected
Location X5 on Locker	None Detected
Location X10 on Fire Connection Box	None Detected
Location X11 on Ceiling Grid	None Detected
Location X12 on Block Ledge	Chrysotile
Location X12 on Bookcase	Chrysotile
Location X13 on Light	None Detected
Room 3160 on Block Ledge	None Detected
Room 3160 on Window Sill	None Detected
Room 3160 on Desk Top	None Detected

Legend:

W: Windows; D; Doors; # Number of Occupants (e.g. 25 Occupants = 25); O = Open; C = Closed;

mg/m³ - milligrams per cubic meter;

µg/m³ - micrograms per cubic meter;

ppm - parts per million;

ppb - parts per billion;

ND - Not Detected;

CO OSHA PEL is 30 ppm and ACGIH TLV is 25 ppm;

CO₂ - OSHA PEL is 5000 ppm, Mass DOH Guideline is 800 ppm;

TVOC – UEC suggested guideline of 100 ppb; Seifert "Target Guideline Value" of 0.3 mg/m³

Chrysotile: Most common type of asbestos fibers.

4.0 Observations and Interpretation of Results:

Temperature and Relative Humidity (T & RH):

The outside temperature and relative humidity were approximately 92.7°F and 47.40%. Massachusetts Department of Public Health (MDPH) recommends that indoor air temperatures be maintained in a range of 70 - 78 °F and 40 to 60 % for indoor air relative humidity in order to provide for the comfort of building occupants.

The interior temperature and relative humidity were 72.6 – 84.3 °F and 50.3 – 70.8 % during the test period. Interior temperature tests were mostly within the MDPH recommended temperature range of 70 - 78 °F. Interior relative humidity test were also mostly within the MDPH recommended relative humidity range of 40 to 60 %.

Most of the HVAC system was not running during testing, which will affect **T** and **RH** readings.

TVOCs:

TVOC tests on this day were mostly higher than the Seifert "Target Guideline Value" of 300- $\mu\text{g}/\text{m}^3$ (0.3 mg/m^3). The Seifert Target Guideline Value (reference #3 and #8 below) is a widely recognized **TVOCs** guideline for pollutant levels based on Seifert's personal judgment, rather than on toxicological data, for long term exposure. Seifert proposed that 1 week after completion of construction or renovation **TVOC** concentration of 50 times higher be acceptable (i.e. 15 mg/m^3) and after 6 weeks, 10 times higher be acceptable (i.e. 3 mg/m^3). **TVOCs** test levels were between 0.197 and 1.550 mg/m^3 , mostly higher than the Seifert target guideline of 0.3 mg/m^3 however much lower than the 1-week and 6-week post-construction/renovation acceptable limits of 15 mg/m^3 and 3 mg/m^3 .

Neither OSHA (Occupational Safety and Health Administration) nor ACGIH (American Conference of Governmental Industrial Hygienists) promulgates exposure standards for **TVOCs** that relate to protection of the general population as opposed to industrial occupational standards. Both have limits on individual VOCs but they relate to industrial occupational standard.

The testing conducted was of short duration and did not assess representative full-day occupancy levels. Measurements were made using a real-time, portable **TVOC** monitor referenced to isobutylene and not by sample collection for individual VOC analysis by gas chromatography technique and evaluation based on Seifert's chemical classes.

Mølhave of Denmark reported at INDOOR AIR '90 (reference #8 below) on low levels of indoor air VOCs and human health. Bearg summarized Mølhave's findings as follows.

Table 4.5 Tentative Dose-Response Relationship for Discomfort Resulting from Exposure to Solvent-Like VOCs

Total concentration (mg/m^3)	Irritation and discomfort	Exposure
< 0.20	No irritation or discomfort	The comfort range
0.20 - 3.0	Irritation and discomfort possible if other exposures interact	The multifactorial exposure range
3.0 – 25	Exposure effect and probable headache possible if other exposures interact	The discomfort range
> 25	Additional neurotoxic effects other than headache may occur	The toxic range

TVOCs test levels were between 0.197 and 1.550 mg/m^3 .

Bearg points out that the overlap between Seifert's and Mølhave's recommendations could be interpreted as a consensus on recommendations for guideline values.

Carbon Monoxide:

No **CO** levels were detected during testing.

Carbon Dioxide:

CO₂ levels were mostly lower than acceptable range. For comparative purposes, fresh outdoor air has approximately 400 ppm of **CO₂**. All areas were well below the OSHA/NIOSH limit of 5000 ppm and mostly lower than the MDPH guideline of 800 ppm for publicly occupied buildings. MDPH recommends an optimal level of below 600 ppm. Exposure to high levels of **CO₂** for prolonged periods could cause building occupants to become lethargic and generally uncomfortable. **CO₂** levels will rise over the course of the day especially in those areas which have a high occupancy. **CO₂** at these levels are a comfort as opposed to a health issue. Most of the HVAC system was not running during testing, which will affect **CO₂** readings.

Airborne Particulate Matter:

PM₁₀ and **PM_{2.5}** tests were well below the OSHA PNOR (Particulates Not Otherwise Regulated) PEL of 5 mg/m³ 8-hour TWA, and ACGIH respirable PNOS TLV of 3 mg/m³ 8-hour TWA. The testing conducted was for 2-minute sample periods and not for 8-hour TWA, nevertheless, these agency limits are used for reference.

Asbestos:

During the survey of the school Asbestos Containing Materials (ACM) was found at throughout the school including transite wall panels, joint compound on walls, textured ceiling plaster, electrical wires and other building materials. As part of the renovation and demolition project at the school various types of ACM that might be disturbed will be removed by the Massachusetts licensed asbestos abatement contractor. Not all ACM in the building are scheduled to be removed.

Wipe samples results indicated that asbestos "Chrysotile" was found at five (5) locations as follows:

- Room 1460: On top of block wall ledge;
- Location X2: On top of window ledge;
- Location X7: On top of railing;
- Location X12: On top of window ledge;
- Location X12: On top of bookcase.

Asbestos is a set of six (6) naturally occurring silicate fibers with Chrysotile being the most common type of asbestos used in building materials.

The Environmental Protection Agency (EPA) does not recognize wipe sampling as a method to determine if an asbestos abatement project has been performed and completed or if asbestos is present. The presence of asbestos in the wipe sample might consist of a single asbestos fiber. EPA considers a material to be asbestos if a sample was found to contain more than 1-% asbestos.

EPA requires that a visual inspection is performed to insure that there are no visible ACM and then aggressive clearance air sampling is performed to determine if levels are below EPA limit. EPA requires clearance air sampling to be lower than 0.010 fibers/cubic centimeters (f/cc) using Phase Contrast Microscopy (PCM) in accordance with NIOSH Method 7400 which all areas where ACM was removed were well below the EPA limit.

PCM analysis is a technique used for determinations of airborne particulate aerosols like dust characterizations and enumeration of airborne asbestos fibers. An air sample for PCM analysis is collected on a filter medium which is dissolved during sample preparation so that the collected particulate can then be viewed under the microscope. PCM is often used for analysis of samples for airborne asbestos fibers. The sample is collected on a mixed cellulose ester membrane (MCEM) filter with a 0.8 mm (micron) pore size. MCEM filter is then cleared with a chemical solution and the collected fibers are counted under the 400X magnification. **All fibers** (regardless of the type) longer

than 5 mm, wider than 0.25 mm and of aspect ratio of 3:1 or greater are enumerated. The airborne fiber concentration is obtained from the microscopic count and air sampling data. Therefore all fibers that meet the counting criteria are counted as asbestos fibers.

Housekeeping:

Housekeeping was assessed as "fair" overall. No problem areas were noted on this day. Housekeeping is a relevant factor in terms of air quality as poor housekeeping could lead to microbial amplification and generally poor air quality.

5.0 Conclusions:

CO₂ levels were mostly lower than recommended level. It is recommended that the HVAC system be turned-on and continuously checked to ensure that the system is introducing sufficient volumes of fresh air to all occupied areas of the school.

TVOC levels were mostly higher than the Seifert guideline of 0.3 mg/m³. The source appears to have been the on-going construction activities in the construction areas. It is recommended that improved and increased fresh air is introduced into the occupied areas of the school. **TVOC** will dissipate with time.

6.0 Limitations and Conditions:

This report has been completed based on visual and physical observations made and information available at the time of the site visits. This report is intended to be used as a summary of available information on existing conditions with conclusions based on a reasonable and knowledgeable review of evidence found in accordance with normally accepted industry standards, state and federal protocols, and within the scope and budget established by the client. Any additional data obtained by further review must be reviewed by UEC and the conclusions presented herein may be modified accordingly.

This report and attachments, prepared for the exclusive use of Owner for use in an environmental evaluation of the subject site, are an integral part of the inspections and opinions should not be formulated without reading the report in its entirety. No part of this report may be altered, used, copied or relied upon without prior written permission from UEC, except that this report may be conveyed in its entirety to parties associated with Owner for this subject study.

REFERENCES:

1. ACGIH, Threshold Limit values and Biological Exposure Indices, 2007.
2. AIHA, 2700 Prospect Ave., Fairfax, VA. IAQ Paper #130 June 23, 1999.
3. Seifert, B. Regulation Indoor Air. In: Indoor Air '90, Proceedings of the 5th International Conference on Indoor Air Quality and Climate, Volume V, p. 35. Toronto 1990.
4. American Society of Heating, Refrigeration and Air-conditioning Engineers' ANSI/ASHRAE 55-1992 "**Thermal Environmental Conditions for Human Occupancy.**"
5. BOCA, 1993. The BOCA National Mechanical Code 1993 8th edition Building Officials and Code Administrators International., Inc., Country Club Hills, Ill
6. SBBRS, 1997. Mechanical Ventilation, State Board of Building Regulations and Standards Code of Massachusetts Regulations 780 CMR 1209.0
7. Field Guide for the Determination of Biological Contaminants in Environmental Samples. (2005)
8. Bearg, David W. Indoor Air Quality and HVAC Systems. (1993). Pages 76, 77 and others.

131403707

CHAIN OF CUSTODY

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Framingham, MA 01702
Tel: (508) 628-5486 - Fax: (508) 628-5488
adieb@uec-env.com

PLM @ 8/28/14
24-hour TAT

Town/City: Troy, MA Building Name: GLTHS

Sample	Result	Description of Material	Sample Location
1		PLM dust wipe	Location X1 on light
2			1407 Teachers desk
3			1407 top of chalkboard ledge
4			1407 top of Refrigerator
5			1503 on smartboard ledge
6			1503 on shelving
7			1503 Round table
8			1445 Picture frame
9			1445 on wood edge ledge
10			1445 Pipe wall display
11			1460 Paint can
12			1460 Block ledge
13			1460 Flammable closet shelf
14			1460 Tool closet ledge
15			Location X2 window ledge
16			Location X2 thermostat cover
17			Location X3 Light
18			Location X4 Fire pull station cover
19			Location X7 Railing
20		PLM Dust wipe	Location X8 Defibrillator

Reported By: Jason Bero Date: 8-27-14

Due Date: _____

Received By: _____ Date: _____

RECEIVED
AUG 28 2014
DROPPED

131403707

CHAIN OF CUSTODY

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 adieb@uec-env.com

PLM
 24-hour TAT

Town/City: Tyngboro, MA Building Name: GLTHS

Sample	Result	Description of Material	Sample Location
21		PLM dust wipe	Location X9 Filing cabinet
22			Location X6 Block Ledge
23			Location X5 Locker
24			Location X10 Fire connection Box
25			Location X11 ceiling grid
26			Location X12 Block Ledge
27			Location X12 Bookcase
28			Location X13 Light
29			3160 Block ledge
30			3160 window sill
31		PLM dust wipe	3160 Desktop

Reported By: Jason Beane Date: 8-27-14 Due Date: _____

Received By: _____ Date: _____

RECEIVED
 AUG 28 2014
 11 1820



EMSL Analytical, Inc.

7 Constitution Way, Suite 107, Woburn, MA 01801
Phone/Fax: (781) 933-8411 / (781) 933-8412
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EMSL Order: 131403707
CustomerID: UEC63
CustomerPO:
ProjectID:

Attn: **Jason Becotte**
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

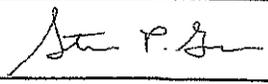
Phone: (508) 628-5486
Fax: (508) 628-5488
Received: 08/28/14 8:30 AM
Analysis Date: 8/28/2014
Collected: 8/27/2014

Project: GLTHS; Tyngsboro, MA

Test Report: Asbestos Analysis via Polarized Light Microscopy, Qualitative

Sample	Description	Appearance	Result	Notes
1 131403707-0001	Location x1 on Light - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
2 131403707-0002	1407 Teacher's Desk - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
3 131403707-0003	1407 Top of Chalkboard Ledge - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
4 131403707-0004	1407 Top of Refrigerator - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
5 131403707-0005	1503 on Smartboard Ledge - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
6 131403707-0006	1503 on Shelving - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
7 131403707-0007	1503 Round Table - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
8 131403707-0008	1445 Picture Frame - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
9 131403707-0009	1445 on Wood Edge Ledge - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	

Analyst(s)
Fievel Lam (31)


Steve Grise, Laboratory Manager
or other approved signatory

EMSL recommends that soil samples reported as "ND" be tested by the EPA Screening Method/Qualitative. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. The above test must not be used by the client to claim product endorsement by NVLAP nor any agency of the United States Government. Unless otherwise noted, the results in this report have not been blank corrected. Samples received in good condition unless otherwise noted.
Samples analyzed by EMSL Analytical, Inc. Woburn, MA



EMSL Analytical, Inc.

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<http://www.EMSL.com> bostonlab@emsl.com

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Attn: **Jason Becotte**
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

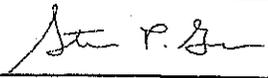
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Project: GLTHS; Tyngsboro, MA

Test Report: Asbestos Analysis via Polarized Light Microscopy, Qualitative

Sample	Description	Appearance	Result	Notes
10 131403707-0010	1445 Pipe Wall Display - PLM Dust Wipe	Various Non-Fibrous Homogeneous	None Detected	
11 131403707-0011	1460 Paint Can - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
12 131403707-0012	1460 Block Ledge - PLM Dust Wipe	White Non-Fibrous Homogeneous	Chrysotile	
13 131403707-0013	1460 Flammable Closet Shelf - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
14 131403707-0014	1460 Tool Closet Ledge - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
15 131403707-0015	Location x2 Window Ledge - PLM Dust Wipe	White Non-Fibrous Homogeneous	Chrysotile	
16 131403707-0016	Location x2 Thermostat Cover - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
17 131403707-0017	Location x3 Light - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
18 131403707-0018	Location x4 Fire Pull Station Cover - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	

Analyst(s)
Fievel Lam (31)


Steve Grise, Laboratory Manager
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. Woburn, MA



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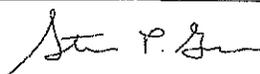
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Project: **GLTHS; Tyngsboro, MA**

Test Report: Asbestos Analysis via Polarized Light Microscopy, Qualitative

Sample	Description	Appearance	Result	Notes
19 131403707-0019	Location x7 Railing - PLM Dust Wipe	White Non-Fibrous Homogeneous	Chrysotile	
20 131403707-0020	Location x8 Defibulator - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
21 131403707-0021	Location x9 Filing Cabinet - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
22 131403707-0022	Location x6 Block Ledge - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
23 131403707-0023	Location x5 Locker - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
24 131403707-0024	Location x10 Fire Connection Box - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
25 131403707-0025	Location x11 Ceiling Grid - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
26 131403707-0026	Location x12 Block Ledge - PLM Dust Wipe	White Non-Fibrous Homogeneous	Chrysotile	
27 131403707-0027	Location x12 Bookcase - PLM Dust Wipe	White Non-Fibrous Homogeneous	Chrysotile	

Analyst(s)
Flevel Lam (31)


Steve Grise, Laboratory Manager
or other approved signatory

EMSL recommends that soil samples reported as "ND" be tested by the EPA Screening Method/Qualitative. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. The above test must not be used by the client to claim product endorsement by NVLAP nor any agency of the United States Government. Unless otherwise noted, the results in this report have not been blank corrected. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Woburn, MA



EMSL Analytical, Inc.

7 Constitution Way, Suite 107, Woburn, MA 01801
Phone/Fax: (781) 933-8411 / (781) 933-8412
<http://www.EMSL.com> bostonlab@emsl.com

EMSL Order: 131403707
CustomerID: UEC63
CustomerPO:
ProjectID:

Attn: **Jason Becotte**
Universal Environmental Consultants
12 Brewster Road
Framingham, MA 01702

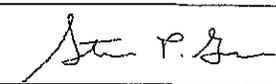
Phone: (508) 628-5486
Fax: (508) 628-5488
Received: 08/28/14 8:30 AM
Analysis Date: 8/28/2014
Collected: 8/27/2014

Project: GLTHS; Tyngsboro, MA

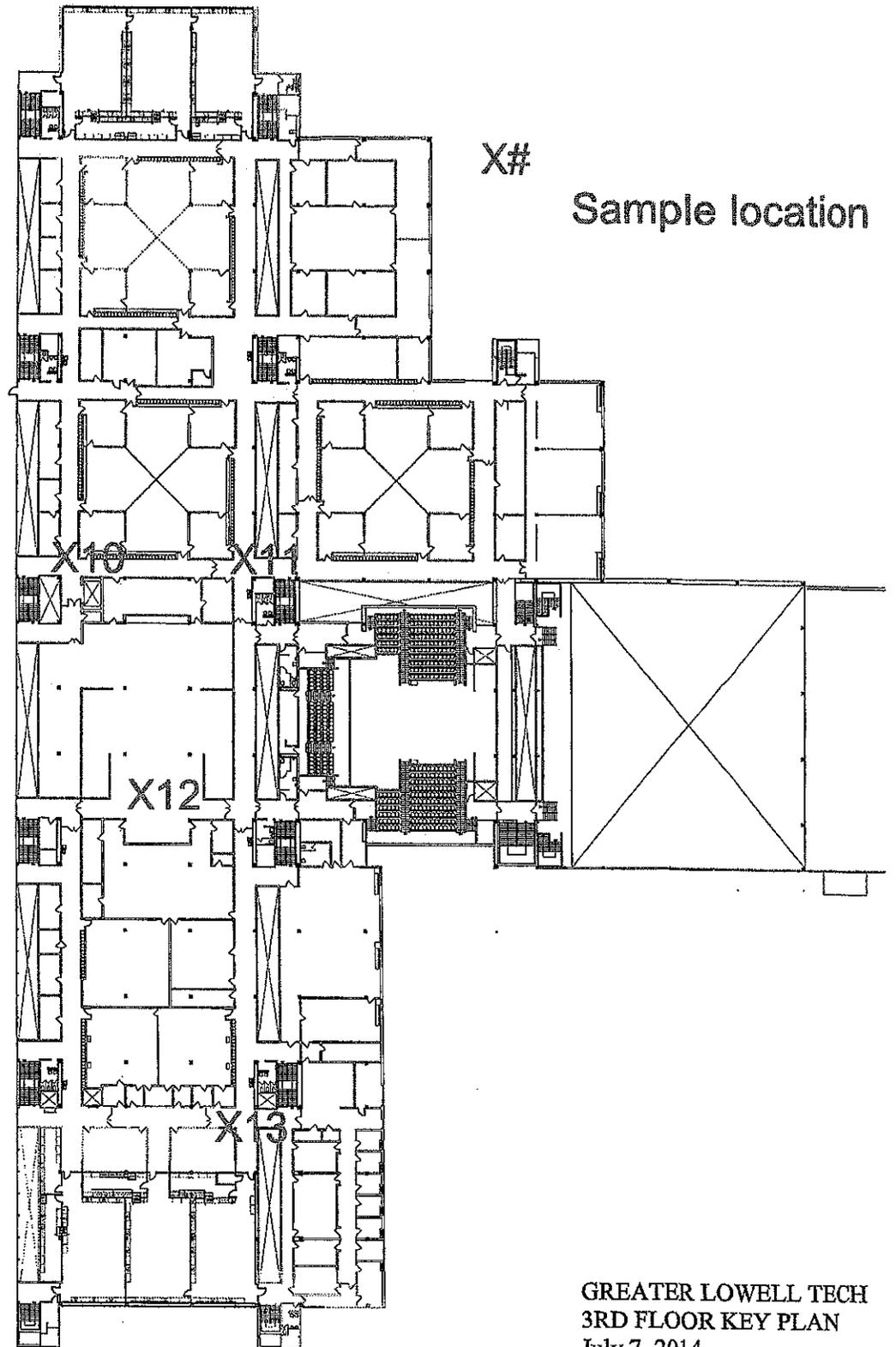
Test Report: Asbestos Analysis via Polarized Light Microscopy, Qualitative

Sample	Description	Appearance	Result	Notes
28 131403707-0028	Location x13 Light - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
29 131403707-0029	3160 Block Ledge - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
30 131403707-0030	3160 Window Sill - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	
31 131403707-0031	3160 Desktop - PLM Dust Wipe	White Non-Fibrous Homogeneous	None Detected	

Analyst(s)
Fievel Lam (31)

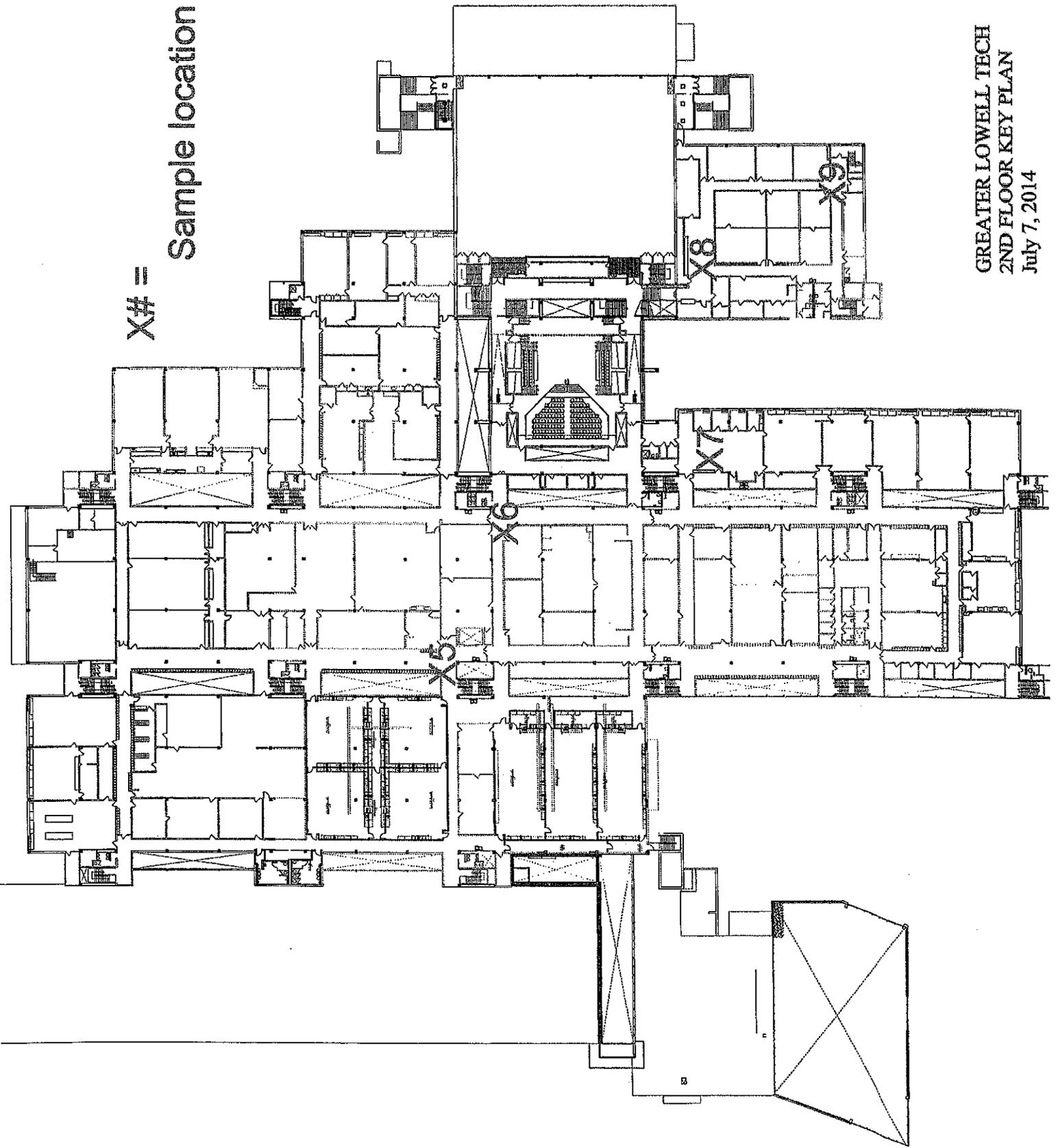

Steve Grise, Laboratory Manager
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Samples analyzed by EMSL Analytical, Inc. Woburn, MA



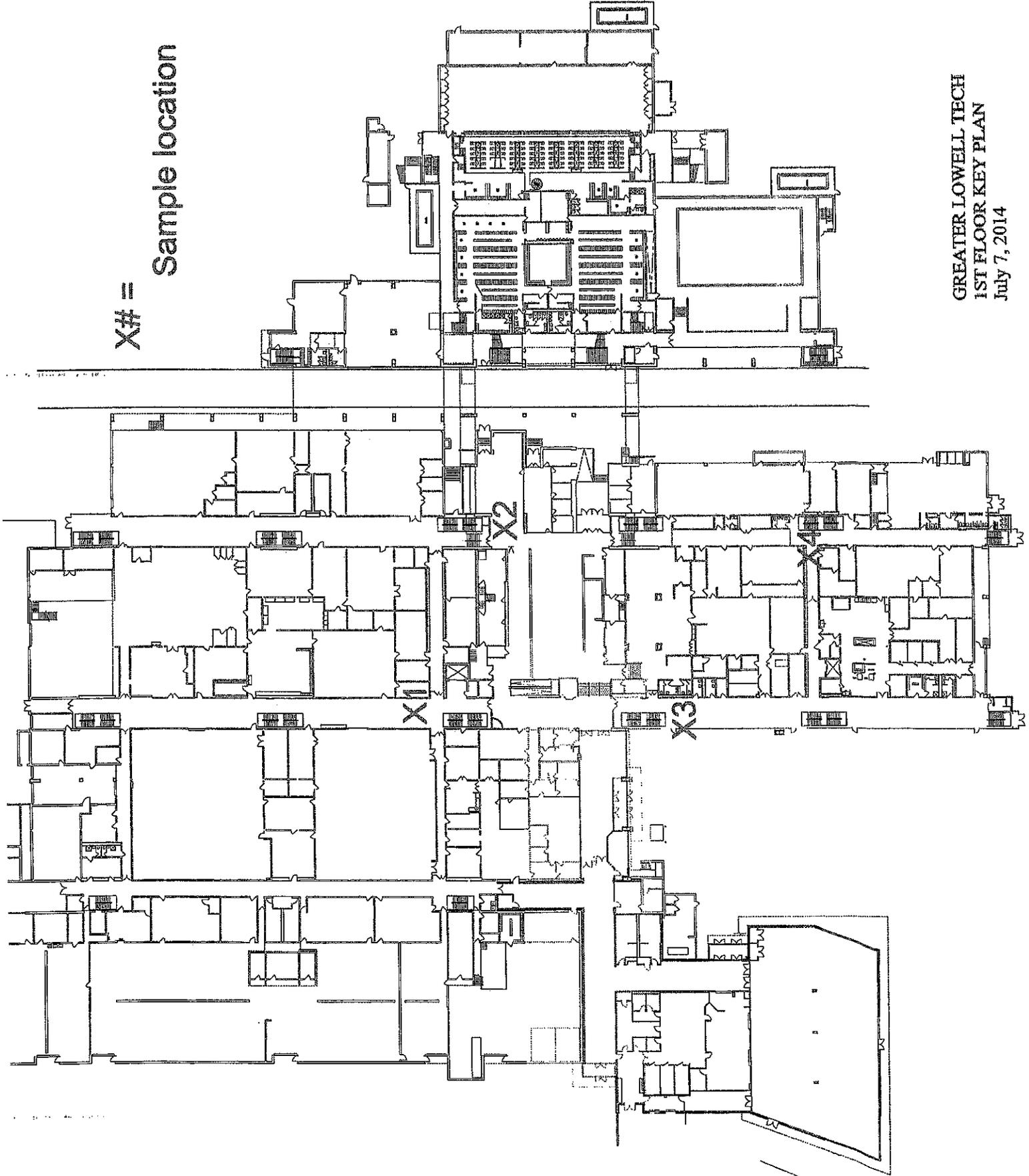
GREATER LOWELL TECH
3RD FLOOR KEY PLAN
July 7, 2014

X# =
Sample location



GREATER LOWELL TECH
2ND FLOOR KEY PLAN
July 7, 2014

X# = Sample location



GREATER LOWELL TECH
1ST FLOOR KEY PLAN
July 7, 2014

8.