



airLab

15th Annual ACCP Community Asthma Coalition Symposium
Disclosure: Catherine Baker, AIA

I have no relevant financial relationships to disclose.

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I will not be discussing off-label uses.

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 **Enterprise**SM

LANDON BONE BAKER ARCHITECTS

Landon Bone Baker Architects

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For over twenty-five years, Landon Bone Baker Architects has served a diverse clientele by bringing community-based and environmentally responsible designs to complex urban environments in the Chicago area.

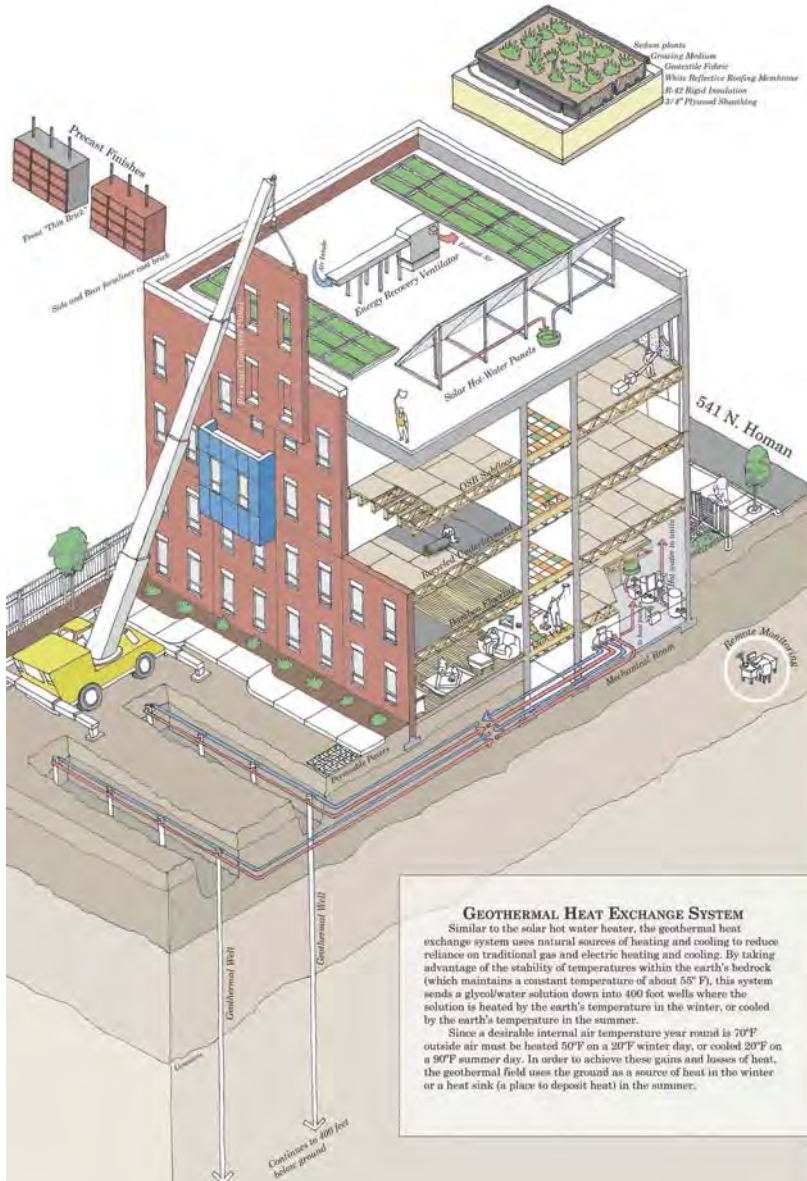
LBBA's holistic approach to architecture includes a strong commitment to community outreach and education. Participating in and leading a variety of programs and workshops has allowed the firm to build relationships with local schools and strengthen ties within the communities it serves.



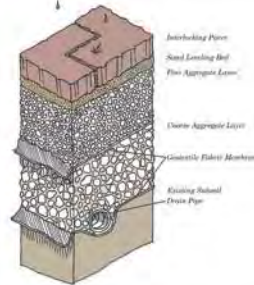
Rosa Parks Apartments

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Buildings are becoming tighter and more energy efficient...
 What are the implications?



GEOTHERMAL HEAT EXCHANGE SYSTEM
 Similar to the solar hot water heater, the geothermal heat exchange system uses natural sources of heating and cooling to reduce reliance on traditional gas and electric heating and cooling. By taking advantage of the stability of temperatures within the earth's bedrock (which maintains a constant temperature of about 55° F), this system sends a glycol/water solution down into 400 foot wells where the solution is heated by the earth's temperature in the winter, or cooled by the earth's temperature in the summer.

Since a desirable internal air temperature year round is 70° F outside air must be heated 50° F on a 20° F winter day, or cooled 20° F on a 90° F summer day. In order to achieve these gains and losses of heat, the geothermal field uses the ground as a source of heat in the winter or a heat sink (a place to deposit heat) in the summer.

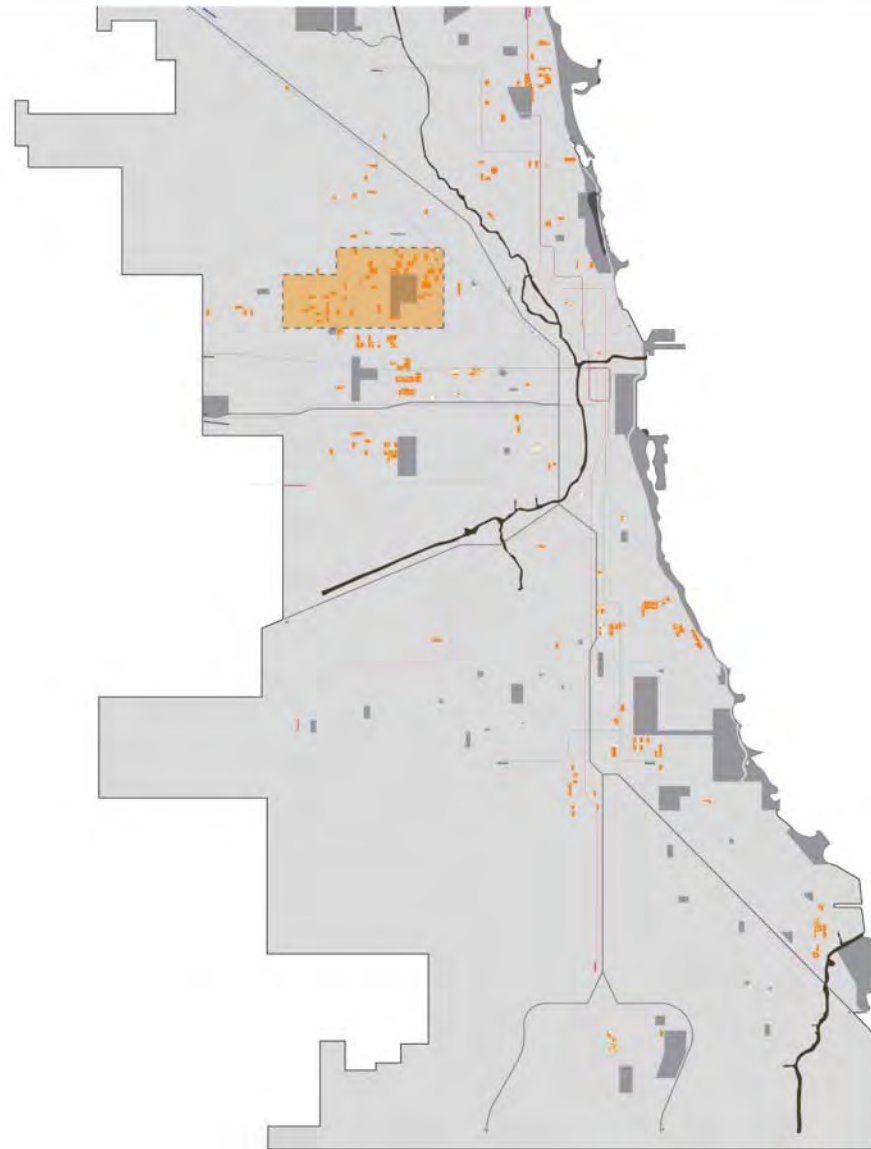
....we know HOW to build green buildings, but how do we maintain them?

Establish a collaborative process in which we:

- Investigate and quantify the indoor air quality (IAQ) of recently constructed buildings
- Create an IAQ profile and management plan
- Gather anecdotal information through resident interviews conducted by students

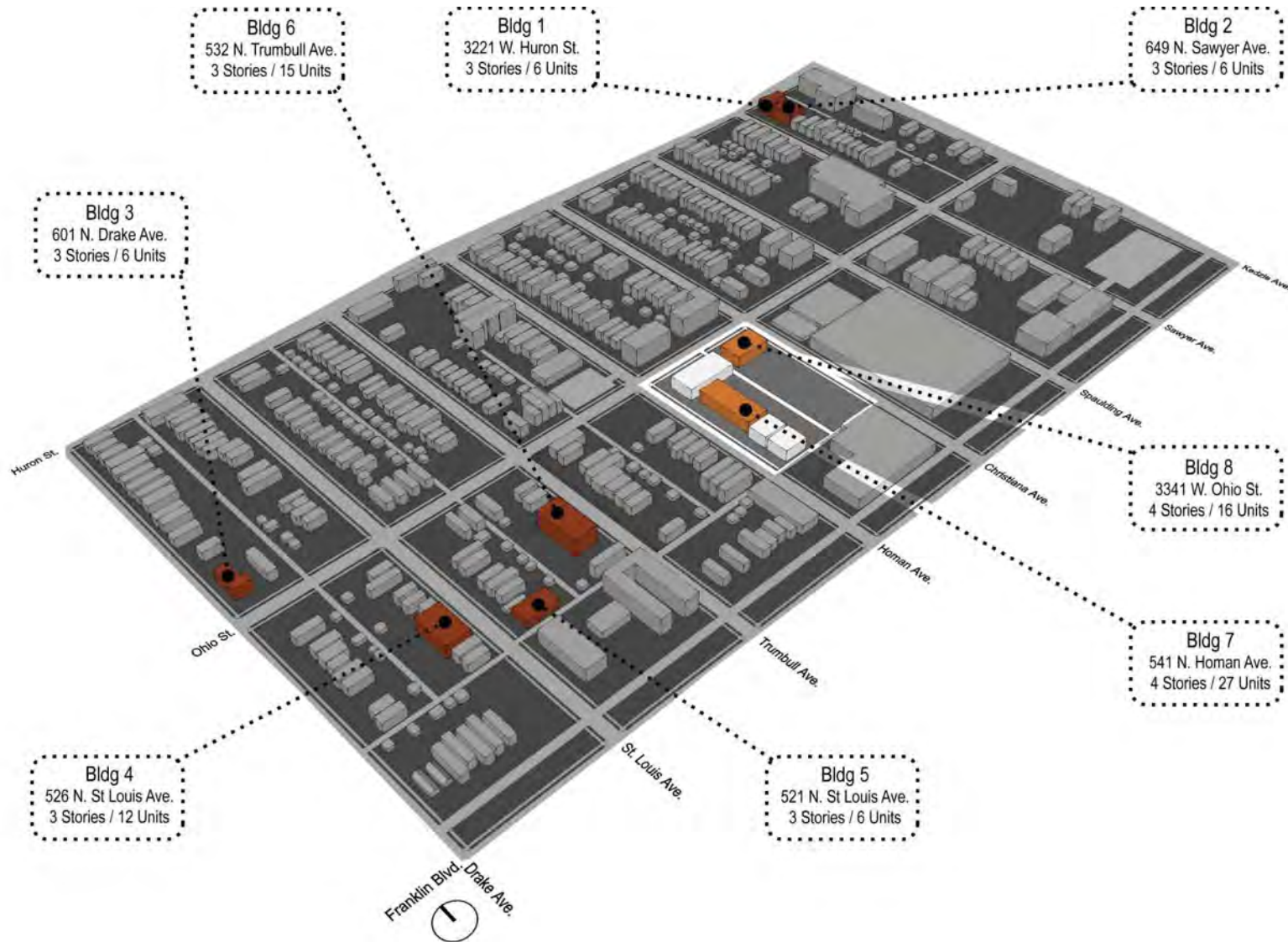
West Humboldt Park

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Rosa Parks Apartments

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HOW CLEAN IS YOUR AIR?

As many as 1 in 3
children in Humboldt
Park may have asthma
which far exceeds the
city average of 13%

Sinai Improving Community Health Survey



Asthma is the third-ranking cause for children to miss school.

Asthma is the 3rd leading cause of hospitalization among the children under the age of 15.

In 2006, 131 children under the age of 15 died from asthma.

*American Lung Association

Toxins

Elements	Synonyms and Trade Names	Definition/ Characteristics	Location/Product	Health Effects	Importance of Measuring
Temperature + Humidity		<ul style="list-style-type: none"> Measurable in the weather Can be High or Low Measured either with F° or C° "Hot" or "Cold" 	<ul style="list-style-type: none"> All organisms have a temperature Humidity relates to water and moisture in the air 	<ul style="list-style-type: none"> Warm Temperature can increase air and water pollution Fluctuations in temperature can influence your immune system 	<ul style="list-style-type: none"> More humidity in the air can influence the amount of moisture in materials and can allow for mold to grow Air quality is directly affected by Temperature and Humidity
VOCs		<ul style="list-style-type: none"> Volatile organic compounds (VOCs) VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects Emitted as gases from certain solids or liquids Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. 	<p>Household products including:</p> <ul style="list-style-type: none"> paints, paint strippers, and other solvents wood preservatives aerosol sprays cleansers and disinfectants moth repellents and air fresheners stored fuels and automotive products hobby supplies dry-cleaned clothing 	<ul style="list-style-type: none"> Eye, nose, and throat irritation headaches, loss of coordination, nausea damage to liver, kidney, and central nervous system Some organics can cause cancer in animals some are suspected or known to cause cancer in humans <p>Key signs or symptoms associated with exposure to VOCs include:</p> <ul style="list-style-type: none"> conjunctival irritation, nose and throat discomfort headache, allergic skin reaction dyspnea declines in serum cholinesterase levels nausea emesis epistaxis fatigue dizziness 	<ul style="list-style-type: none"> Are found in many household products Some VOCs can cause cancer High concentrations indoors up 10x higher than outdoors Negative health effects
NH3 (Ammonia)	<ul style="list-style-type: none"> Anhydrous ammonia Aqua ammonia Aqueous ammonia 	<ul style="list-style-type: none"> caustic hazardous 	<ul style="list-style-type: none"> Fertilizers Glass + Metals Cleaner 	<ul style="list-style-type: none"> Household exposure can lead to irritation of eyes and mucous membranes Long exposure can result in lung cancer and death 	<ul style="list-style-type: none"> When mixed with bleach (another household product) it can cause heavily poisonous gasses Such a common chemical used in cleaning products
CO2 (Carbon Dioxide)	<ul style="list-style-type: none"> Carbonic acid gas Dry ice 	<ul style="list-style-type: none"> Naturally occurring chemical compound made of 2 Oxygen and 1 Carbon Atom 	<ul style="list-style-type: none"> The Ocean Pop Rocks Candy Carbonated Soft Drinks inside houses in heavily occupied areas Blooming of household plants causes an overabundance of CO2 Space Heaters Stoves Clothes Dryers 	<ul style="list-style-type: none"> Dizziness Confusion Headaches Loss of consciousness Difficulty Breathing 	<ul style="list-style-type: none"> Occurs naturally in and around the home Can be dangerous due to causing unexpected unconsciousness
CO (Carbon Monoxide)	<ul style="list-style-type: none"> Carbon oxide Flue gas Monoxide 	<ul style="list-style-type: none"> Colorless, tasteless gas which is lighter than air Highly toxic to humans & animals in high quantities 	<ul style="list-style-type: none"> When operating a stove Internal Combustion Engines in an enclosed space 	<ul style="list-style-type: none"> fatigue chest pain impaired vision and coordination headaches dizziness confusion nausea Can cause flu-like symptoms that clear up after leaving home formation of carboxyhemoglobin in the blood angina impaired vision reduced brain function Fatal at very high concentrations 	<ul style="list-style-type: none"> Occurs naturally in and around the home Hard to accurately measure natural emissions of the gas 1500 Carbon Dioxide Poisoning occurs in America per year

Rosa Parks Building Materials



LOCATION	MATERIALS	LEED	What gases do they release?	ALTERNATIVES
Kitchen	Bamboo flooring adhesive		-Contains no solvents or water Low in VOCs -Virtually n odor -Elastomeric to allow the natural subtle movements of wood flooring	
Kitchen	Bamboo floors		Formaldehyde gas can be released when bamboo flooring is cut or sanded, making bamboo flooring risky to install. But even after installation, formaldehyde will leak into the air for years.	Cork flooring is an alternative for bamboo floors. Cork is renewable and its a natural product.
Bedroom	Carpet		Product meets California's CHPS criteria and is Green Label Plus certified.	Green label and green plus carpets indicate a real reduction in the amount of volatile organic compounds emitted.
Carpeted Areas	Carpet Adhesive		VOC free	
Bathroom	semi-gloss paint		Do not have VOCs.	
Kitchen Countertop	Laminate		Laminate counter tops present an interesting dilemma for homeowners looking to go green. In truth, there are greener options out there when it comes to counter top materials. Laminate counter tops can contain high levels of adhesives, sealers, and other sources of potentially harmful volatile organic compounds (VOCs) that get released into your indoor environment. On the other hand, laminate counter tops are a cost effective, functional, and attractive option for homeowners remodeling on a budget.	Traditional stone tile
Bathroom	Ceramic Tile (4x4)		Ceramic is the most common and easiest tile to install. Mortar and Mastic are to different types of tile, but because of the moisture resistant and the thin texture of Mortar, Mastic id often used when dealing with ceramic tile because its much stickier, therefore the tiles will not slide. There are also two other types or mortar such as, brick mortar and epoxy thin set of mortar.	
Hallway	VCT (Vinyl Composite Tile)		PCV free, no VOCs. made from 45% post-consumer recycled material. Floorscore certification.	
Basement walls	eggshell paint			Earthborn paint would be good for painting if you are looking for VOC free paint , organic paint, and varnished, water based paint. This paint is enviornmental friendly.
Kitchen Cabinets	Solid Wood			
Kitchen Backsplash	Ceramic Tile (4x4)		34.9% pre-consumer(Post-Industrial) recycled materials	
PCT tiled floors	Non-PVC Tile Pressure Sensitive Adhesive Cove Base Adhesive		Made from Vinyl acrylic polymer. Eye/Skin irritant during application.	
Bathrooms			Medical Conditions That Can Be Aggravated by Exposure:Allergies, skin and respiratory disorders. Product sensitivity. Low VOCs. THIS PRODUCT CONTAINS NO HAZARDOUS INGREDIENTS AS DEFINED BY US OSHA HAZARD COMMUNICATION STANDARD.	
Trim	eggshell paint		Safe coat trim door eggshell paint does not contain any of these toxins: formaldehyde, ammonia, aromatic hydrocarbons or compounds.	
Bathroom/ Utility Room Grout			Eye Hazards: Moderate irritation. Skin Hazards: Moderate irritation. Ingestion Hazards: Ingestion may cause gastrointestinal irritation. Inhalation Hazards: Inhalation of vapors may cause irritation in the respiratory tract.	
Interior Wood Doors & Birch Plywood Panels	Polyurethane Clear Gloss Finish & Clear Satin Finish		Low VOCs. Meets LEED Rating System.	
Stair treads sites (1-6)	carpet			Green label and green plus carpets indicate a real reduction in the amount of volatile organic compounds emitted.
Elevator walls	paint			Elevator Wall Pads : covered with tough, water resistance, vinyl-laminated fiber.

Safety Data Sheets



	Form	F 7.3.29
	MATERIAL SAFETY DATA SHEET	
	Rev:	B
	Page:	1 of 4
	Date:	01/25/07

I. PRODUCT IDENTIFICATION

TRADE NAME (as labeled): LATICRETE® Permacolor™ Grout

CHEMICAL FAMILY: Proprietary powder

MANUFACTURER'S NAME: LATICRETE INTERNATIONAL, INC.
1 Laticrete Park, N.
Bethany, CT 06524-3423 USA

Phone number for additional information: (203) 393-0010

Date prepared or revised: 1/09 Name of preparer: S.B. Fine

II. HAZARDOUS INGREDIENTS

CHEMICAL NAMES	CAS NUMBERS	PERCENT	ACGIH TLV	OSHA PEL	OTHER (SPECIFY)
Portland cement	65997-15-1	16-20	10 mg/M3	50 mppcf	
Silica Sand	14808-60-7	60-65	N/A	0.1 mg/M3	
Calcium sulfate	7778-18-9	3-5	10 mg/m3	15 mg/m3	
Calcium hydroxide	1305-62-0	1-2	5 mg/m3	N/A	
Lithium carbonate	554-13-2	0-0.2	N/A	N/A	
Calcium Aluminate cement	065997-16-2	10-15	3 mg/m3	5 mg/m3	

N/A = Not applicable or available

III. HEALTH HAZARD INFORMATION

SYMPTOMS OF OVEREXPOSURE for each potential route of exposure. (Possible Longer Term Effects) Chronic Bronchitis, possible silicosis, or cancer if exposed to greater than permissible limits for a prolonged period of time. Exposure to more than 5 mg/m3 without protection may cause birth defects in pregnant women.

SIGNS AND SYMPTOMS OF EXPOSURE (Acute effects)

Inhaled: irritation to nose and throat, large doses may cause tremor or nausea. May cause damage to mucous membranes or respiratory tract.

Contact with skin or eyes: may cause skin irritation or burns and eye irritation or burns

Absorbed through skin: Not likely to occur

Swallowed: irritation to throat, nausea, inhalation or swallowing of large doses (over 500 mg/kg of body weight) may cause tremor or nausea

SUSPECTED CANCER AGENT?

___ NO: This product's ingredients are not found in the lists below.

YES: ___ Federal OSHA ___ NTP ___x IARC

	Form	F 7.3.29
	MATERIAL SAFETY DATA SHEET	
	Rev:	B
	Page:	2 of 4
	Date:	01/25/07

IV. FIRST AID: EMERGENCY PROCEDURES

Eye Contact: Hold eyelids apart and immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin Contact: Rinse with soap and water. If irritation persists, seek medical attention

Inhaled: Move to fresh air. If normal breathing does not resume, seek medical help

Swallowed: Seek immediate medical help.

V. FIRE AND EXPLOSION

Flash Point (method): Non-Flammable

Auto ignition temperature, °F: N/A

Flammable limits in air, volume %:

Lower (LEL) _____ Upper (UEL) _____

Fire extinguishing materials:

___x___ water spray

___x___ carbon dioxide

___ other: _____

___x___ foam

___x___ dry chemical

Special fire fighting procedures: None known.

Unusual fire and explosion hazards: None known.

VI. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill response procedures (include employee protection measures): Sweep up and return to container. Wear gloves, long sleeves, safety eye wear, and NIOSH approved dust mask.

Preparing wastes for disposal (container types, neutralization, etc.):

NOTE: Dispose of all wastes in accordance with federal, state and local regulations.

VII. Handling and Storage

Store in cool dry area.



“When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.”

— The Wingspread Conference on the **Precautionary Principle** was convened by the Science and Environmental Health Network, 1998.

What can I find here?



PRECAUTIONARY LIST

The Precautionary List includes substances commonly found in the built environment that have been classified by regulatory entities as being harmful to the health of humans and/or the environment. As such, this compilation is an ever-evolving and is updated as new data comes to light. This tool encourages users to employ the precautionary principle in the specification of building products.



ASTHMA TRIGGERS + ASTHMAGENS

This list identifies Asthmagens—substances that induce the chronic condition of asthma—commonly found in the built environment. This list is a compilation of substances that have identified human health impacts in the manufacturing, installation, and removal processes, as well as in the existing built environment. Compiled from third-party, government and academic sources, this list brings awareness on the causes of the disease and helps users make informed decisions on design and construction with respect to building products under the precautionary principle.



FLAME RETARDANTS

This list catalogs flame retardants found in the built environment. A comprehensive list providing in-depth knowledge of flame retardants, this tool is primarily informational and educational, and helps users understand not only where flame retardants are found in the built environment, but also if identified toxicity levels have a potential impact on human health. The original research was done by the Green Science Policy Institute.



NEWS, MEDIA + ADDITIONAL RESEARCH

In our ever-growing library of resources you will find a variety of materials, including a white paper on the potential human and environmental impacts of fly ash, the first on-product transparency label, a video interview on material health in healthcare design, and much more.

Asthma Triggers + Asthmagens

How do you want to search?

ALPHABETICAL	CATEGORY	DIVISIONS AND SECTIONS	ADDITIONAL RESEARCH
(2-Aminoethyl)ethanolamine 1,1'-Azobis(formamide) 1,1'-Methylenebis(4-Isocyanatobenzene) Butyl benzyl phthalate (BBP) Chlorine Chromium Compounds Colophony (or Rosin) Di(2-ethylhexyl)phthalate (DEHP) Di-n-hexylphthalate (DNHP) Di-n-octyl phthalate (DNOP) Di-n-pentyl phthalate (DNPP) Dibutyl phthalate (DBP) Diisobutyl phthalate (DIBP) Diisodecyl phthalate (DIDP) Diisooheptyl phthalate Diisononyl phthalate (DINP) Epoxy Ethanolamine (2-Aminoethanol) Ethylenediamine Formaldehyde Glutaraldehyde Hard metals Hexamethylene diisocyanate (HDI) Isocyanates	Acid Anhydrides Acrylates & Methacrylates Aldehydes Amines Aromatic Hydrocarbon Azo Compounds Fluxes Inorganic Chemicals Metal Isocyanates Organic Phthalates Plastic & Rubber Dusts Polymers	Div 03 Concrete Div 04 Masonry Div 05 Metals Div 06 Wood, Plastics, and Composites Div 07 Thermal and Moisture Protection Div 08 Openings Div 09 Finishes Div 10 Specialties Div 11 Equipment Div 12 Furnishings Div 13 Specialty Construction Div 14 Conveying Equipment Div 15 Mechanical Div 16 Electrical Div 32 Exterior Improvements Div 33 Utilities	Healthy Environments: A Compilation of Substances Linked to Asthma

Asthma Triggers and Asthmagens

(2-Aminoethyl)ethanolamine	1,1'-Azobis(formamide)	1,1'-Methylenebis(4-Isocyanatobenzene)	Butyl benzyl phthalate (BBP)
Chlorine	Chromium Compunds	Colophony (or Rosin)	Di(2-ethylhexyl)phthalate (DEHP)
Di-n-hexylphthalate (DNHP)	Di-n-octyl phthalate (DNOP)	Di-n-pentyl phthalate (DNPP)	Dibutyl phthalate (DBP)
Diisobutyl phthalate (DIBP)	Diisodecyl phthalate (DIDP)	Diisoheptyl phthalate	Diisononyl phthalate (DINP)
Epoxy	Ethanolamine (2-Aminoethanol)	Ethylenediamine	Formaldehyde
Glutaraldehyde	Hard metals	Hexamethylene diisocyanate (HDI)	Isocyanates
Isophorone diisocyanate (IPDI)	Maleic anhydride	Methacrylates	Methyl 2-cyanoacrylate
Methyl methacrylate	Methyltetrahydrophthalic anhydride	N,N-Dimethylethanolamine	Plastic dust
Polyvinyl chloride [PVC]	Styrene	Toluene	Toluene diisocyanate (TDI)
Triethylenetetramine	Urea-Formaldehyde	Wood dust	

Toluene

CAS# 108-88-3

Where is it Commonly Found?

Adhesive
Lacquers
Leather Tanning Process
Paints
Paint thinners
Rubber
Shellac
Silicone sealants
Solvents

ASTHMA TRIGGER AND / OR ASTHMAGEN?

Asthma Trigger Asthmagen

*We are following the European Union principles on asthma where the focus is on evidence that a substance has the ability to cause asthma, rather than on the existence of a specific underlying mechanism.

How is it Categorized?

[Isocyanates](#)

Divisions and Sections

[Div 06 Exterior Architectural Woodwork](#)

[Div 06 Exterior Finish Carpentry](#)

[Div 06 Interior Architectural Woodwork](#)

[Div 06 Interior Finish Carpentry](#)

[Div 06 Wood Decking](#)

[Div 06 Wood Paneling](#)

[Div 08 Flush Wood Doors](#)

[Div 08 Stile and Rail Wood Doors](#)

[Div 09 Resilient Athletic Flooring](#)

[Div 09 Staining and Transparent Finishing](#)

Material Research



LOCATIONS	MATERIALS	INFO (AS IN WHAT DO THEY OFF GAS)	ALTERNATIVES
Living Room	Leather sofas	Foam in cushions can contain semi-volatile organic compounds (SVOCs),	Semi aniline leather , it has natural top grain
Apartment	Rugs	Place for dust and allergens to collect.	
Apartment	Marijuana	distorted perception (sights, sounds, time, touch), problems with memory and learning, loss of coordination, trouble with thinking and problem-solving, increased heart rate and reduced blood pressure.	
Apartment	Incense	Releases CO, benzene, and polycyclic aromatic hydrocarbons (PAHs). PAHs can possibly cause Cancer.	
Apartment	Pets	Allergens	
Apartment	Cleaning products (air freshners)	Visual disorders, breathing problems (asthma)	Lemon Juice can be use for soap, and vinegar gets rid of odor.
Apartment	Shower Curtains	Release VOCs, Phthalates, Toluene and Ethyl benzene. toxic chemicals can affect the lungs, central nervous system, liver and kidney	Hemp Shower curtains: organic cotton or linen are not treated with form aldehyde- emitting water proof formulas like most (cloth) shower curtains are.
Apartment	Carpet (New Carpet)	Allergens	Green label and green plus carpets indicate a real reduction in the amount of volatile organic compounds emitted.
Bedroom	Blankets	Allergens	
Kitchen	Stoves	Gas leaks	Pellet stoves burn much cleaner and efficiently that they produce very little waste makes them easy to maintain and clean.
Apartment	Furniture	VOCs	
Apartment	Kerosene heaters	Release CO, CO2, Nitrogen Dioxide, and Sulfur Dioxide	propane heaters: generates more heat but must keep windows open.
Apartment	Cigarettes	Can cause Cancer. Nicotine and CO in cigarette smoke as well as 70 other small particles.	
Apartment	Toys (Play-sets) Out door (swings, playground)	The more time children play in the playground the bigger chance that their health can be at risk. (allergic reactions)	Look for toys made out of all wood, with non toxic paint and finishes and all natural untreated fibers like hemp, cotton and wool with non-toxic dyes.
Apartment	Chalk/chalkboard	Allergens	
Apartment	Detergent, Floor polish. Cleaning products for: glass, wood, metal toilets and drains.	Can be harmful to humans environment. (nausea, migraines and dizziness)	Can use Bar soap, washing soda, borax and water.
Apartment	Art supplies ex. paints	Loss of coordination, visual disorders	Use Green Seal paint contains Low VOCs
Building Materials:	Insulation, asbestos and treated wood	Can cause health threats (respiratory tract irritation)	
Apartment	Pesticides	Health effects include irritation to eye, nose, and throat; damage to central nervous system and kidney; increased risk of cancer. Symptoms may include headache, dizziness, muscular weakness, and nausea. Chronic exposure to some pesticides can result in damage to the liver, kidneys, endocrine and nervous systems. Exposure to high levels of cyclodiene pesticides, commonly associated with misapplication, has produced various symptoms, including headaches, dizziness, muscle twitching, weakness, tingling sensations, and nausea. In addition, EPA is concerned that cyclodienes might cause long-term damage to the liver and the central nervous system, as well	

Study Air Quality

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Build Sensors

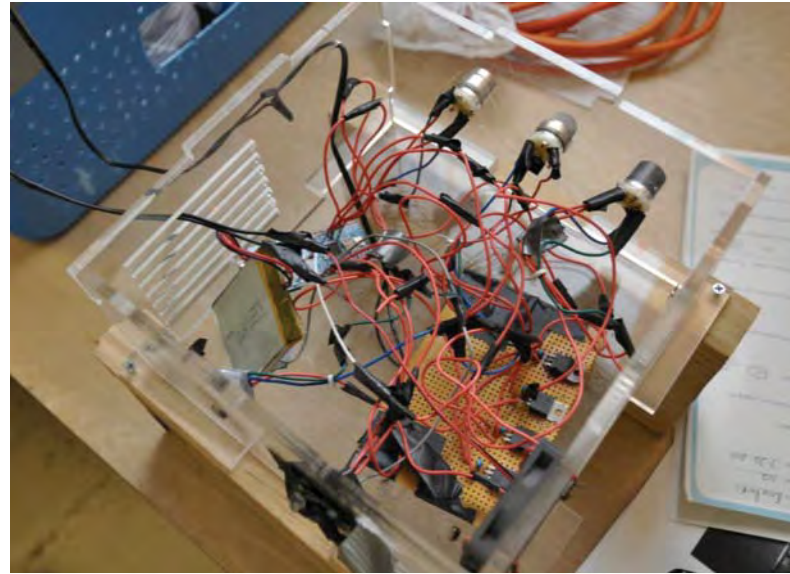
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"The Canary"

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Temperature
Humidity
CO2
Natural gas
Ozone
Solvent vapors





Unit Audit

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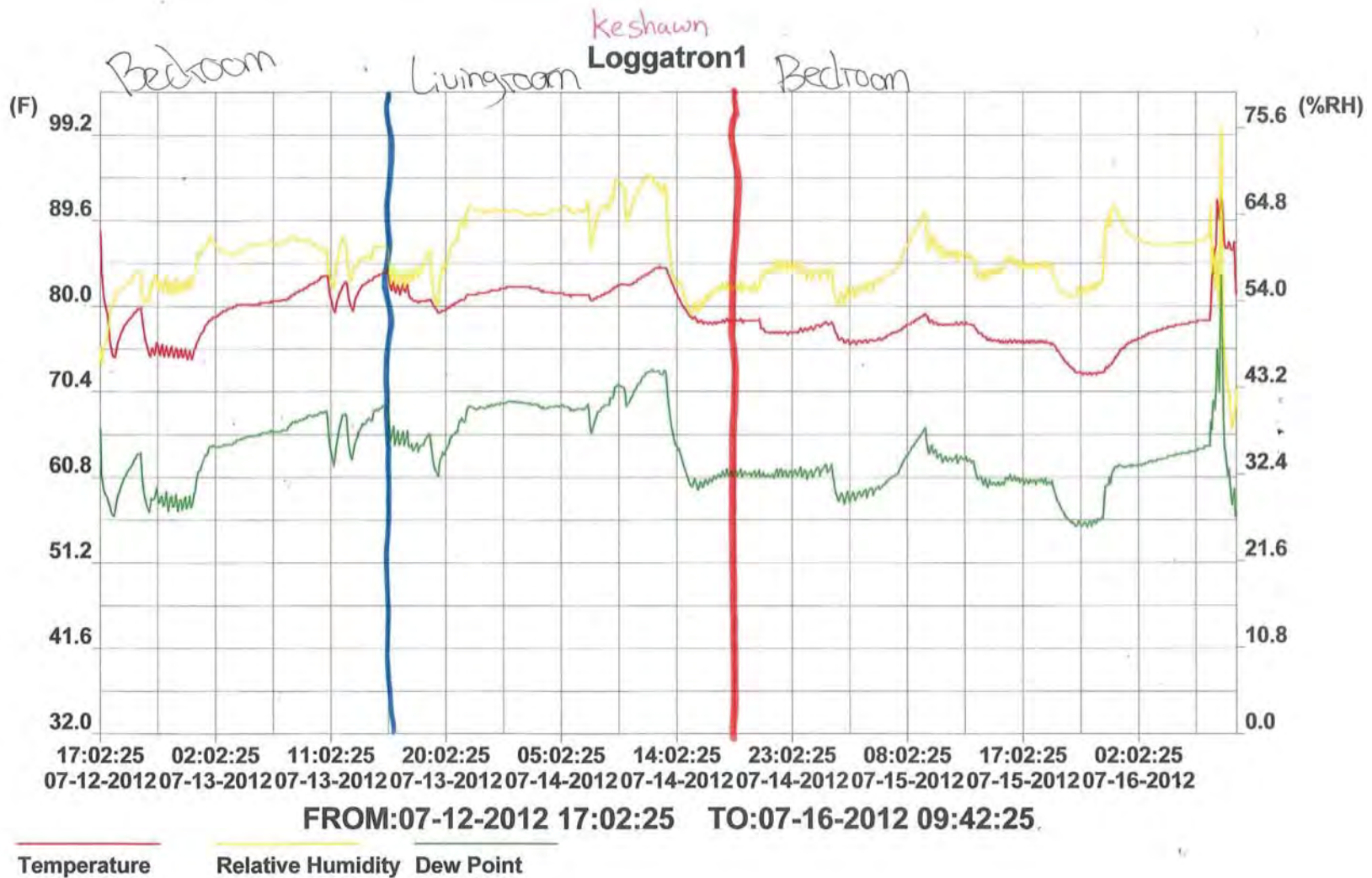
Unit Audit

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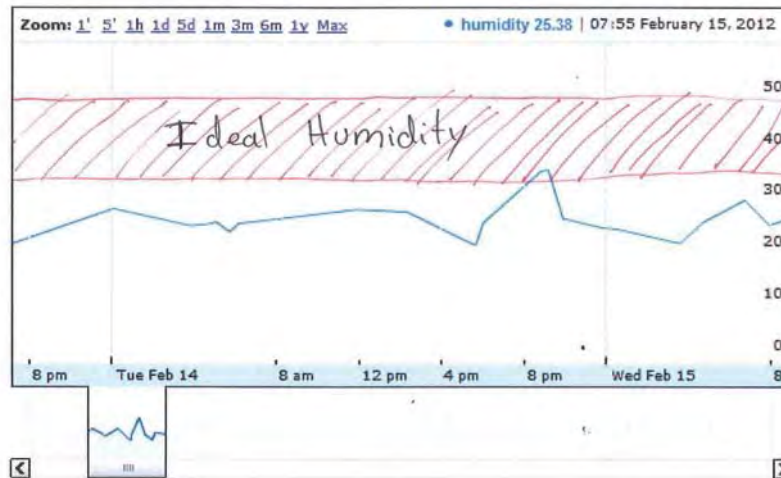
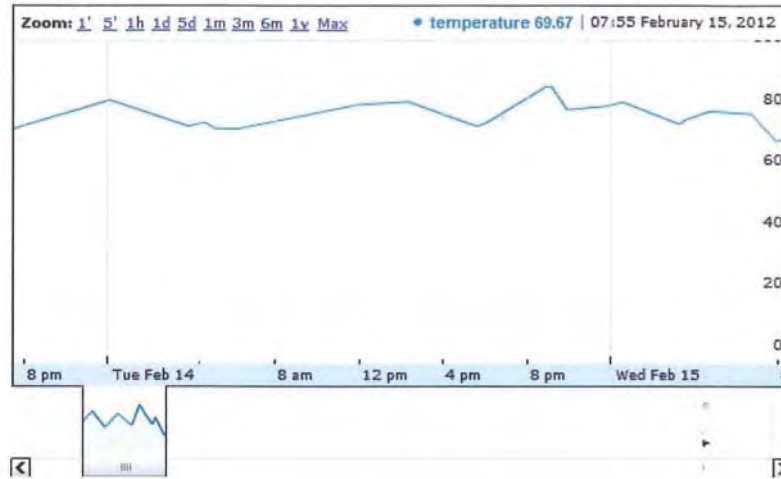
Data Collection

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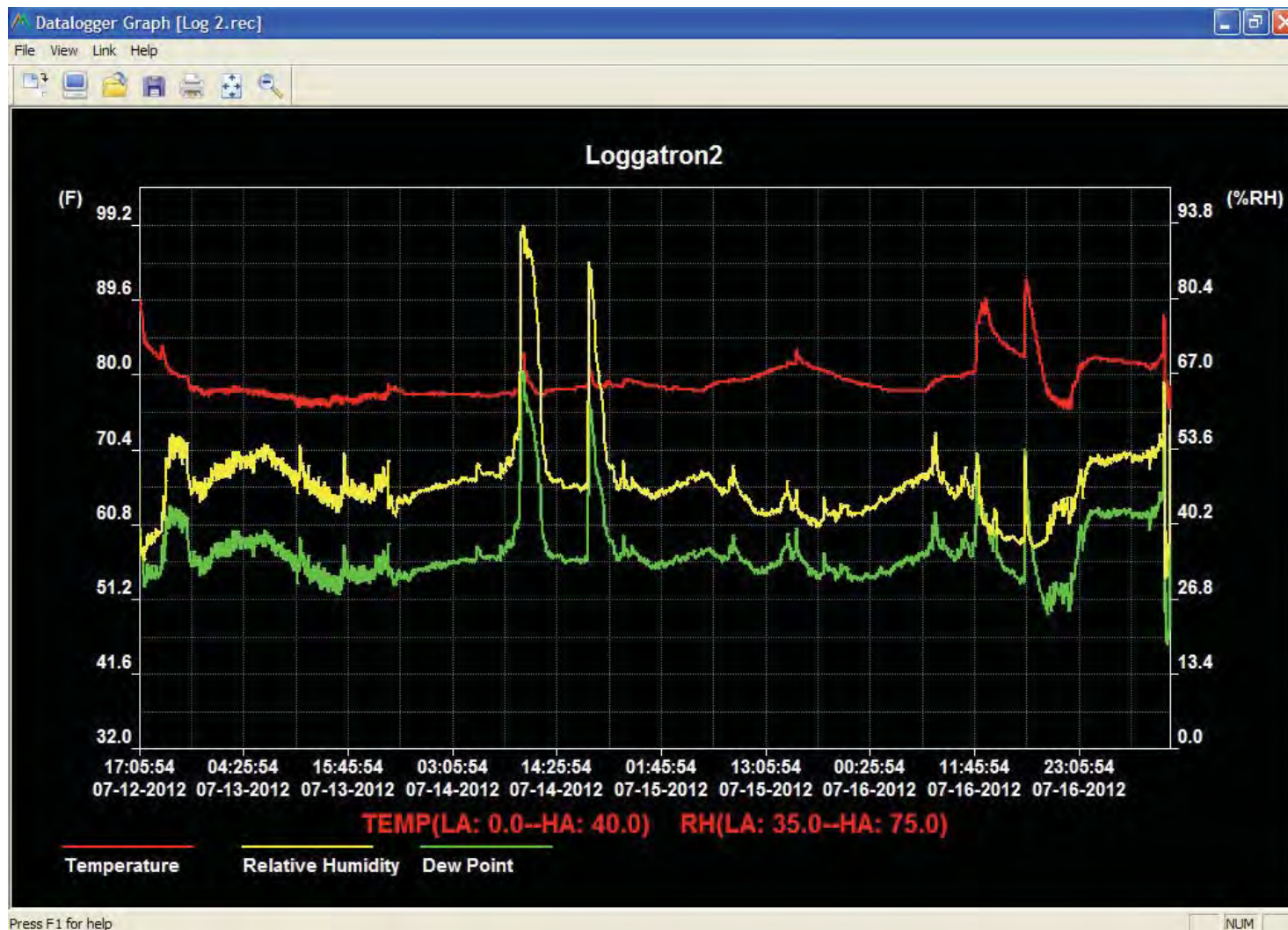
541 N. Homan February 14, 2012

LEED

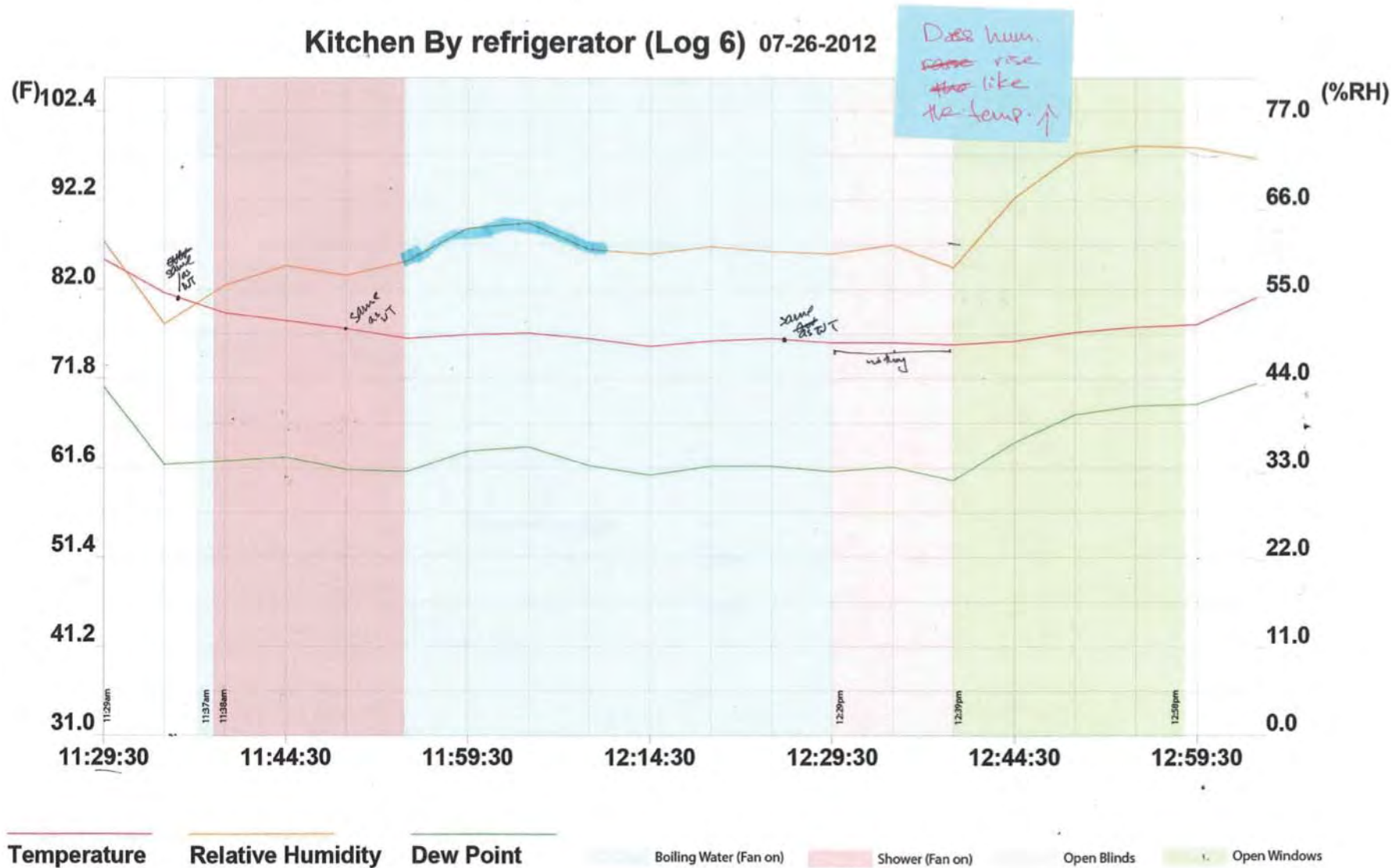


Data Visualization

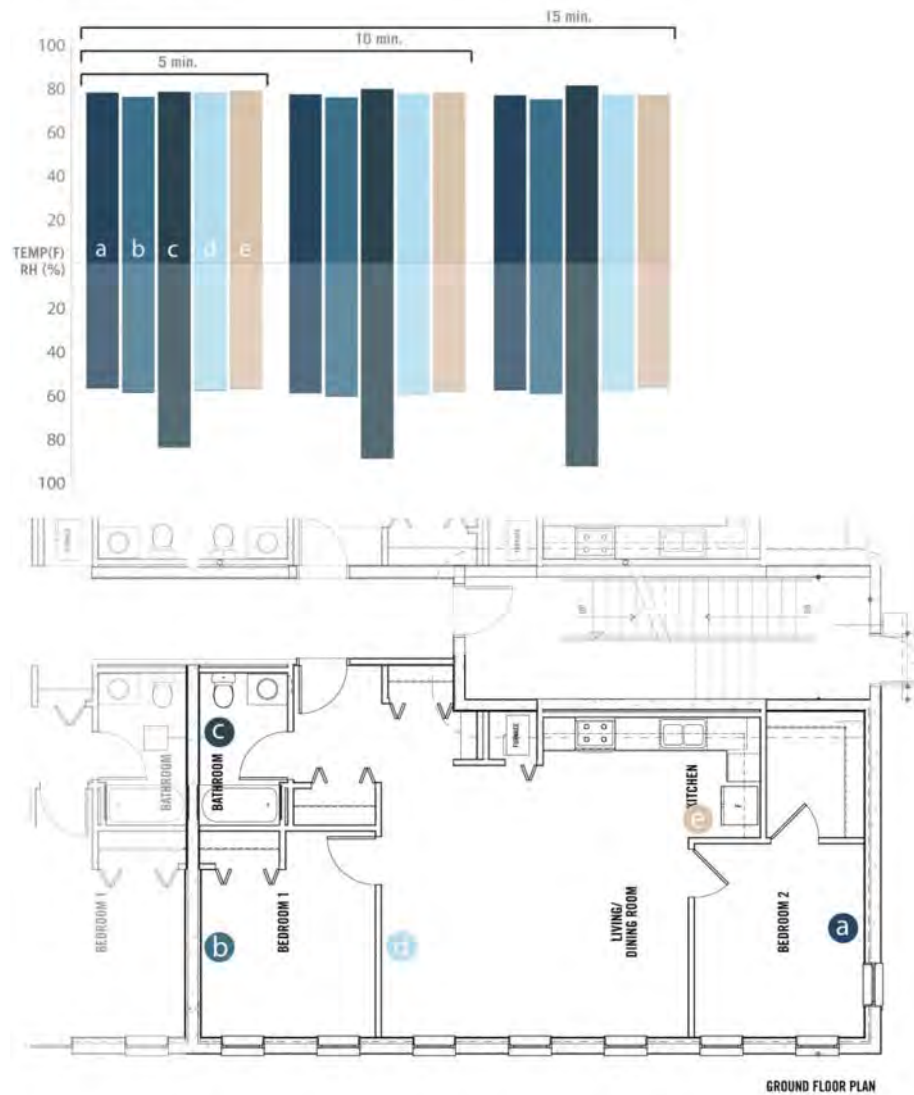
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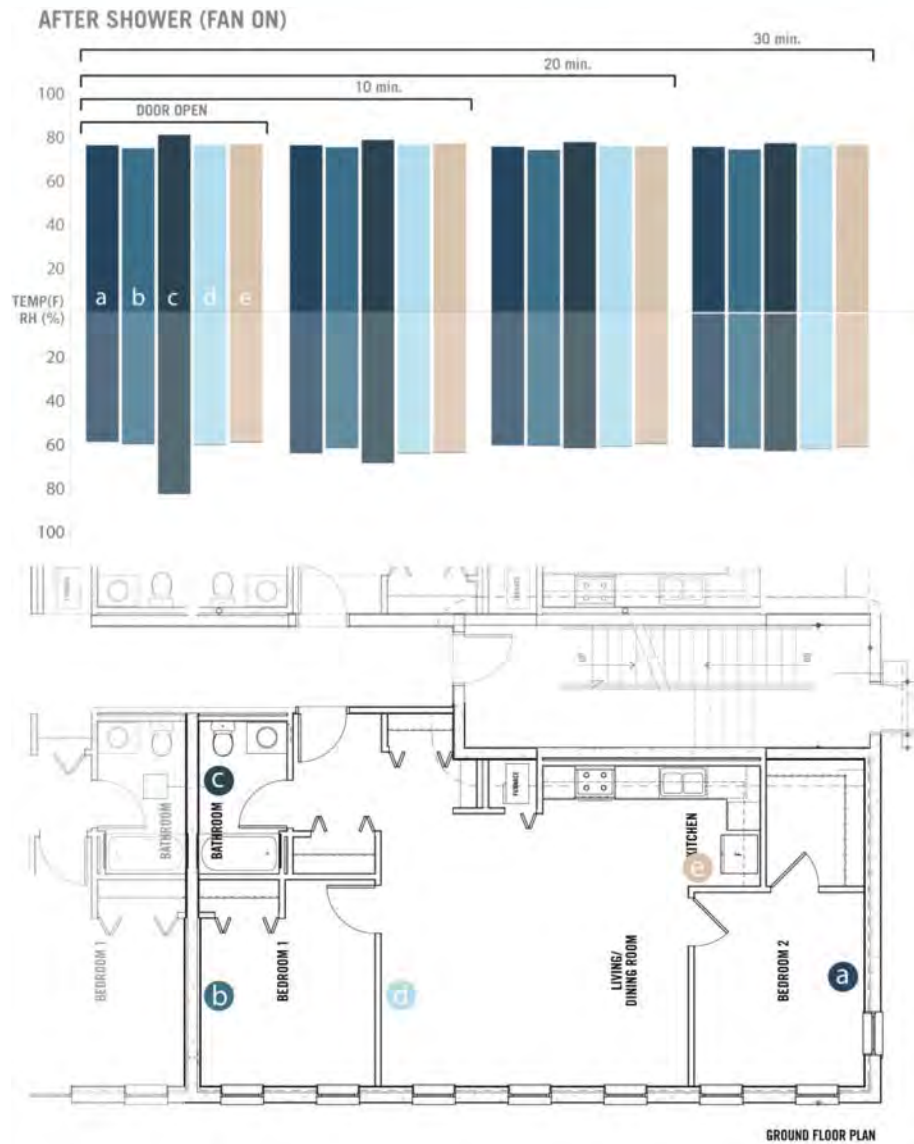
Kitchen By refrigerator (Log 6) 07-26-2012

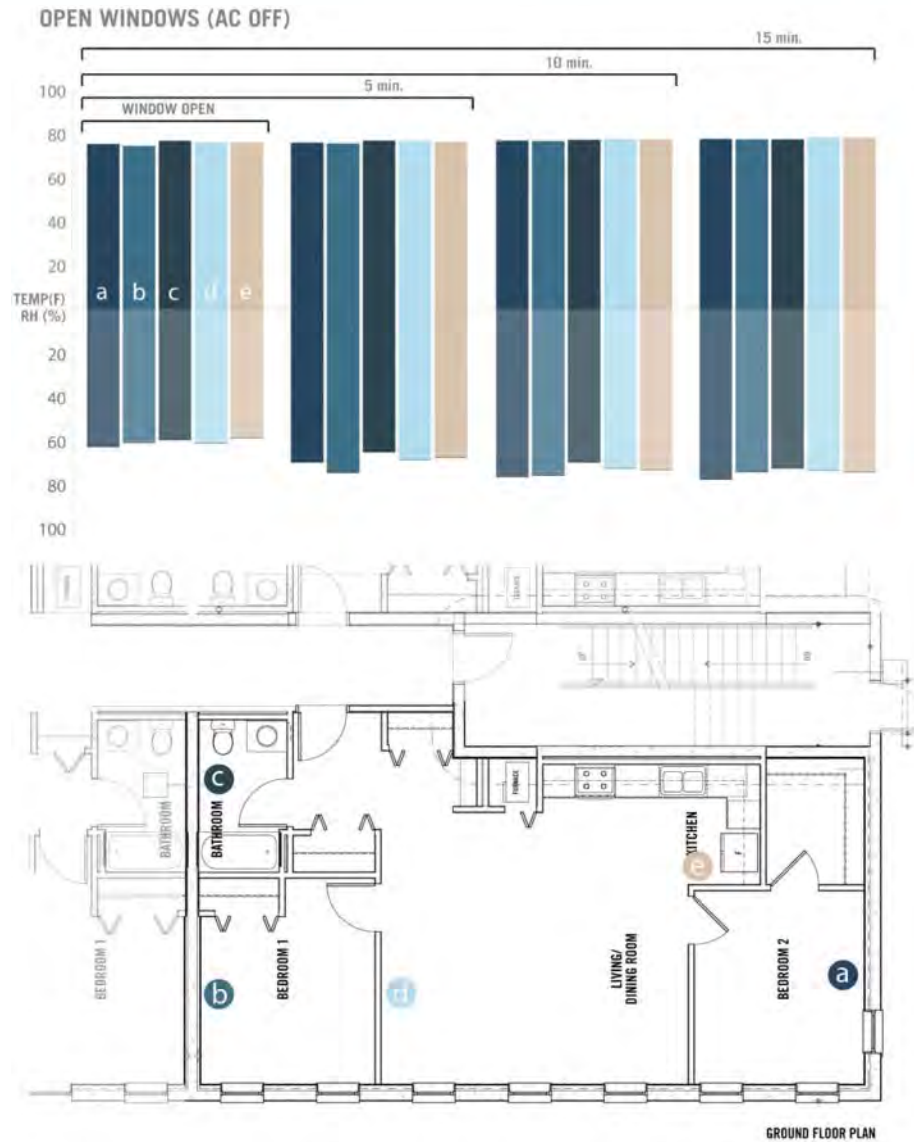


SHOWER (FAN ON)



Findings





Questionnaire

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airLab ID# 006 Development *Bickerdike-Rosa Parks*
Unit # (Optional) _____ Date *7/27/11*

1. How many people live in your apartment or unit? *3*

2. On average how much time do you spend in your home in a day, including sleep?
12 Hours

3. When you are awake, which room do you spend the most time in? Rate each room 1 to 3, 1 being the room you spend the most time, 3 being the room you spend the least time.
1 Bedroom *2* Kitchen *3* Living Room

4. Have you attended any of the "Green" workshops that Bickerdike has offered? YES NO

5. How often do you use cleaning products in your apartment? (circle one)
Twice a week Once a week Once a Month
Less than Once a Month Other

6. Was the Bickerdike laminated Quick Reference Guide for "Green" Maintenance useful when cleaning your apartment? YES NO NOT USED

7. Do you recycle? YES NO

8. Do you have any indoor plants? YES NO

9. Other than what is provided, do you use any additional equipment to heat or cool your unit? (circle all that apply)
Space Heater Fan
Humidifier Other

10. When and why do you open the windows in your apartment? *To avoid turning on the AC when possible to cool off the apartment on hot days.*

11. When you are home, can you smell what your neighbors are cooking? YES NO

12. Are you or anyone in your household affected by any respiratory problems such as asthma or bronchitis?
YES NO

13. Would you choose to live in a smoke-free building (no smoking in the apartments or common areas)?
YES NO

14. How clean do you think the air in your neighborhood is on a scale of 1 to 10, 1 being the least clean and 10 being the most clean? (circle one)
1 least Clean 1 2 3 4 5 6 7 8 9 10 Most Clean

THANK YOU!



LONDON BONE BAKER ARCHITECTS
734 N. Milwaukee Avenue
Chicago, IL 60642



HOW CLEAN IS OUR AIR?



AirLab is a team of 5 highschool students and 3 college level mentors, now young Chicago civic leaders, whose mission is to research and collect data on the indoor air quality (IAQ) at the Rosa Parks Apartments in the West Humboldt Park Community. Our program goals are to educate communities, organizations, and city leaders to make better decisions about how they can improve the health, well-being and efficiency of their neighborhood through awareness and good design.

Indoor air quality is an issue throughout many neighborhoods in Chicago and especially in Humboldt Park, where childhood asthma rates are some of the highest in the city. The Sinai Improving Community Health Survey has found that as many as **1 in 3** children in Humboldt Park may have **asthma** which far exceeds the city average of 13%.

airlab.londonbonebaker.com

Landon Bone Baker Architects and Bickerdike Redevelopment Corporation have partnered to facilitate airLab. The program is partially funded through an Enterprise Green Community grant and Chicago Public Schools' 2011 Youth Ready Chicago.

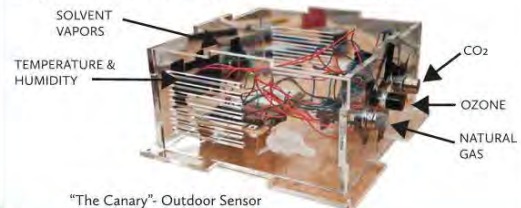




During the 6 week workshop, the airLab team was able to gather research and insightful data to help us create several tools that will analyze the indoor air quality.

By researching various types of chemicals and pollutants that are associated with building materials (ie insulation, drywall, ceramic tile, flooring, paints, and varnishes) and products we bring into the home (ie curtains, appliances, furniture, and cleaning products) we were able to identify which harmful compounds, particles, and gases need to be monitored inside the home (see chart on right). Some of these chemicals and pollutants contribute to asthma and/or other respiratory problems. Knowing what needed to be monitored, we created individual sensor units that record chemicals and toxins in the air and generate data on the air quality. The sensor units are installed at the Rosa Parks Apartments. One of the two indoor sensors is installed in a LEED (Leadership in Energy & Environmental Design) GOLD certified building while the other is installed in a non-LEED certified building. For comparison we created a third outdoor sensor unit which monitor the outdoor air quality.

The data collected by the sensors will be posted daily through easy to read graphs on the airLab website and will be monitored for 1 full year to allow us to analyze a complete annual cycle.



"The Canary"- Outdoor Sensor

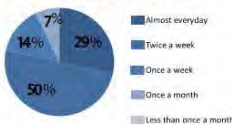
Why Does Indoor Air Quality Matter?

On average how much time (hours) do you spend in your home in a day, including sleep?



These charts indicate that tenants spend a significant amount of time in their houses.

How often do you use cleaning products?



What Will Our Sensors Monitor?

Elements	Definition
Temperature/ Humidity	Temperature is the degree or intensity of heat present in a substance or object. Humidity is a quantity representing the amount of water vapor in the atmosphere or a gas. <i>More humidity in the air can influence the amount of moisture in materials and can allow for mold to grow.</i>
CO ₂ (Carbon Dioxide)	Naturally occurring chemical compound made of 2 Oxygen and 1 Carbon Atom. Can be found in dry ice. <i>Can be dangerous and cause unexpected unconsciousness.</i>
Natural Gas	A naturally occurring gas consisting of Methane (CH ₄). <i>Indoor natural gas increased asthma and respiratory illness.</i>
O ₃ (Ozone)	Variation of oxygen molecule. Major Component of air pollution in high traffic areas. <i>Can cause irritate skin, nose, possible hearing damage with prolonged exposure.</i>
CO (Carbon Monoxide)	An odorless very poisonous gas that is a product of incomplete combustion of carbon. <i>Highly toxic to humans & animals in high quantities.</i>
NH ₃ (Ammonia)	Ammonia is a compound of nitrogen and hydrogen with the formula NH ₃ . <i>Household exposures can lead to irritation of eyes and mucous membranes. Long exposure can result in lung cancer and death.</i>
iso-butane	iso-Butane is an isomer of butane. Butane is a flammable hydrocarbon gas that is a constituent of petroleum and is used in bottled form as a fuel. Like aerosol spray cans. <i>Inhalation of butane can cause euphoria, drowsiness, dizziness, diarrhea, nausea, aphasia, cardiac arrhythmia, temporary memory loss and frostbite, which can result in death from asphyxiation and ventricular fibrillation.</i>
Methane	A greenhouse gas that remains in the atmosphere for approx. 9-15 yrs and also affects the degradation of the ozone layer. It is a gas created by anaerobic decomposition of organic compounds and is used primarily as fuel to make heat and light. <i>A colorless, colorless, non-poisonous gas can be extremely flammable and can cause asphyxiation with concentrated exposure.</i>
Hydrogen	A nonmetallic univalent element that is normally a colorless and odorless highly flammable diatomic gas. Can be found in hydrogen balloons, stars, and coal mines. <i>Can cause headaches, drowsiness and unconsciousness.</i>
Ethanol	Also called ethyl alcohol, is the intoxicating agent in fermented and distilled liquors; used pure or denatured as a solvent or in rocket fuel and medicines and colognes and cleaning solutions. <i>Liver damage as a long term effect of Ethanol.</i>
Toluene	A colorless flammable liquid obtained from petroleum or coal tar; used as a solvent for gums and lacquers and in high-octane fuels. In homes, toluene may be found in paint thinners, paint brush cleaners, nail polish, glues, inks and stain removers. Toluene is also found in car exhaust and the smoke from cigarettes. <i>Exposure to toluene may cause liver, kidney and brain damage. It is also a reproductive toxin which can damage a developing fetus.</i>
Xylene	When pure, xylene is a clear, colorless liquid with a sweet odor. It burns readily. Xylene is obtained from crude petroleum and is used widely in many products such as paints, glues, and pesticides. It is found in small amounts in gasoline. <i>Short- and long-term exposure to high concentrations of xylene can also cause a number of effects on the nervous system, such as headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance.</i>

Tips + Resources

- Instead of buying cleaning products, make your own. Here's one easy recipe:
All-Purpose Cleaner
1 Teaspoon of washing soda
1 dab of liquid soap
2 cups of hot water.
Mix well and it is ready for use.
- Use a shower curtain! Shower curtains help control moisture and avoid mold. However most shower curtains contain more than 100 VOCs (Volatile Organic Compound). Choose PEVA Shower curtains, or EnviroCurtain, or Hemp Shower Curtains.
- Indoor plants can act as a natural filter and will promote healthier air.
- Air fresheners can cause visual disorders and breathing problems (such as asthma). Choose more natural fresheners like plants, potpourri, and herbal mists.
- Cars create a large portion of air pollution in urban areas; a great way to minimize this is to use public transit, walk or ride your bike when possible.

For More Information

Good Guide: Comparing Your Products
<http://www.goodguide.com/>
Book: "Naturally Clean Home" 101 Safe and Easy Herbal Formulas for Nontoxic cleansers
US Dept of Health & Human Services Household Products Database
<http://hpd.nlm.nih.gov/index.htm>
US Environmental Protection Agency
<http://www.epa.gov/>
American Lung Association
<http://www.stateoftheair.org/>
Landon Bone Baker Architects
<http://landonbonebaker.com>
Bickerdike Redevelopment Corporation
<http://www.bickerdike.org/>

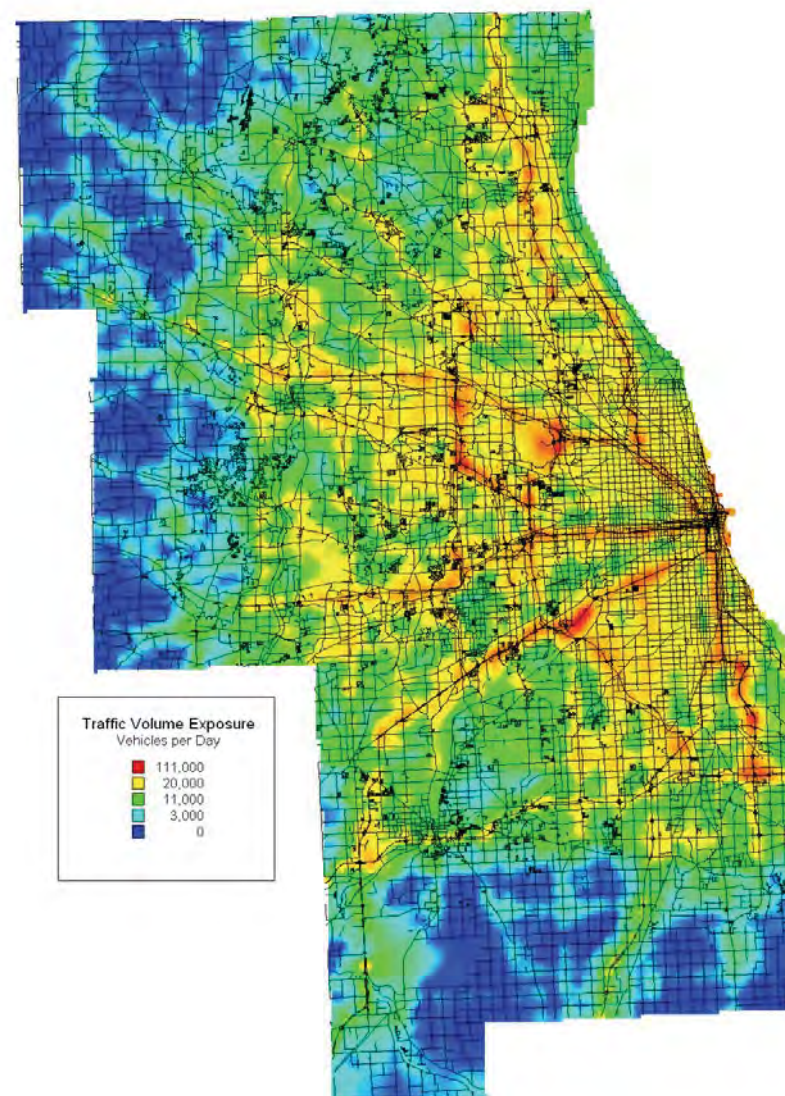
Health Risks from Living Near Busy Roads

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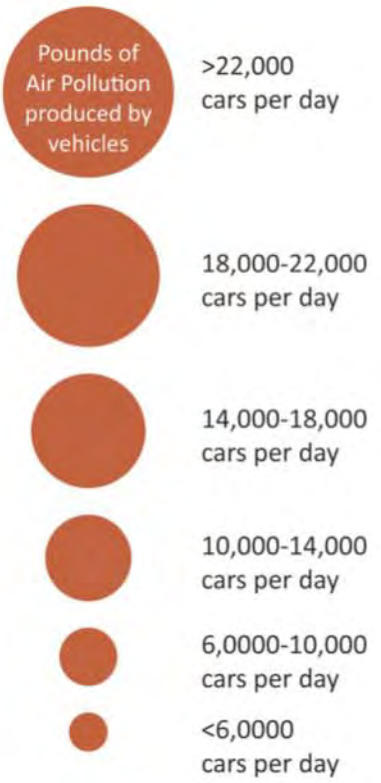
Exposure at distances of up to 300 meters to traffic volumes of at least 10,000 average daily vehicles provides significant risk of increased morbidity and mortality

- Within 50 meters of 10,000 average daily vehicles live 1.13 million persons or 14 percent of the region's population
- Within 100 meters reside 2.12 million persons or 26 percent of the regional population
- Within 200 meters reside 3.77 million persons or 47 percent of the regional population
- Within 300 meters reside 5.01 million persons or **63 percent** of the regional population, respectively

Synthesis of Discussion on Infrastructure, Policy and Planning Workshop
 on Traffic, Health and Infrastructure Planning
 February 1-3, 2004, Baltimore, MD
 Scott Bernstein, Center for Neighborhood Technology



Rosa Parks Neighborhood Traffic Data



In Cook County, there are just 16 federal reference monitors for 958 square miles or a density of one monitor per every 60 square miles.

Homan is located at the intersection of two busy streets, with over 10,000 cars per day that generate over 6,000,000 lbs of pollution per day...

- **MERV-8 filters are not sufficient to capture the sub-micron particles generated by street traffic**
- **A typical residential furnace cannot accommodate a MERV-13 filter**
- **MERV-13 or electrostatic filters could cost an additional \$1,000 per unit**

Minimum Efficiency Reporting Value (MERV)

- **MERV is a measurement scale to rate the effectiveness of air filters. The scale “represents a quantum leap in the precision and accuracy of air-cleaner ratings” and allows for improved health, reduced cost, and energy efficiency in HVAC design.**

MERV Ratings by Particle Size

MERV	Min. Particle Size	Typical Controlled Contaminant	Typical Application
1-4	> 10.0 μm	Pollen, dust mites, cockroach debris, sanding dust, spray paint dust, textile fibers, carpet fibers	Residential window AC units
5-8	10.0–3.0 μm	Mold, spores, dust mite debris, cat and dog dander, hair spray, fabric protector, dusting aids, pudding mix	Better residential, general commercial, industrial workspaces
9-12	3.0–1.0 μm	Legionella, Humidifier dust, Lead dust, Milled flour, Auto emission particulates, Nebulizer droplets	Superior residential, better commercial, hospital laboratories
13-16	1.0–0.3 μm	Bacteria, droplet nuclei (sneeze), cooking oil, most smoke and insecticide dust, most face powder, most paint pigments	Hospital & general surgery
17-20	< 0.3 μm	Virus, carbon dust, sea salt, smoke	Electronics & pharmaceutical manufacturing cleanroom

In the Field

airlab

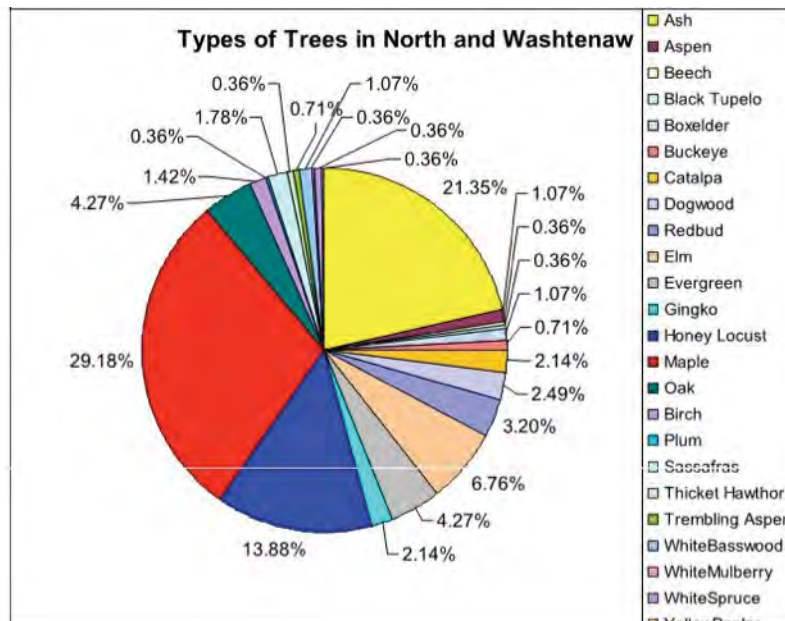


How much can one tree do?

In one year... a 24" diameter maple tree:

- Will reduce atmospheric carbon by 1,035 lbs
- Will intercept 2,679 gallons of storm water runoff
- Provides overall benefits of \$233 per year

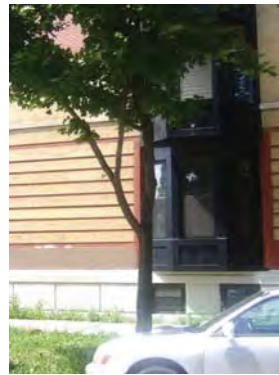
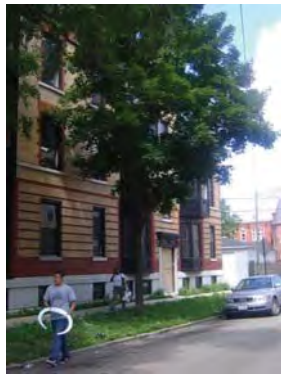
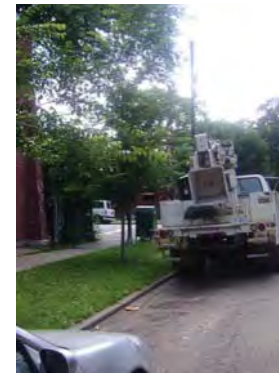
Info courtesy of Davey Tree Expert Co.



TREE DIVERSITY
21% Ash
29% Maple

In the Field

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Healthy Communities

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