

# **INDOOR AIR QUALITY**

## **SPECIFYING MATERIALS AND FINISHES FOR HEALTHY HOMES**

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# **Boston's First Affordable Health House**

Boston Public Health Commission

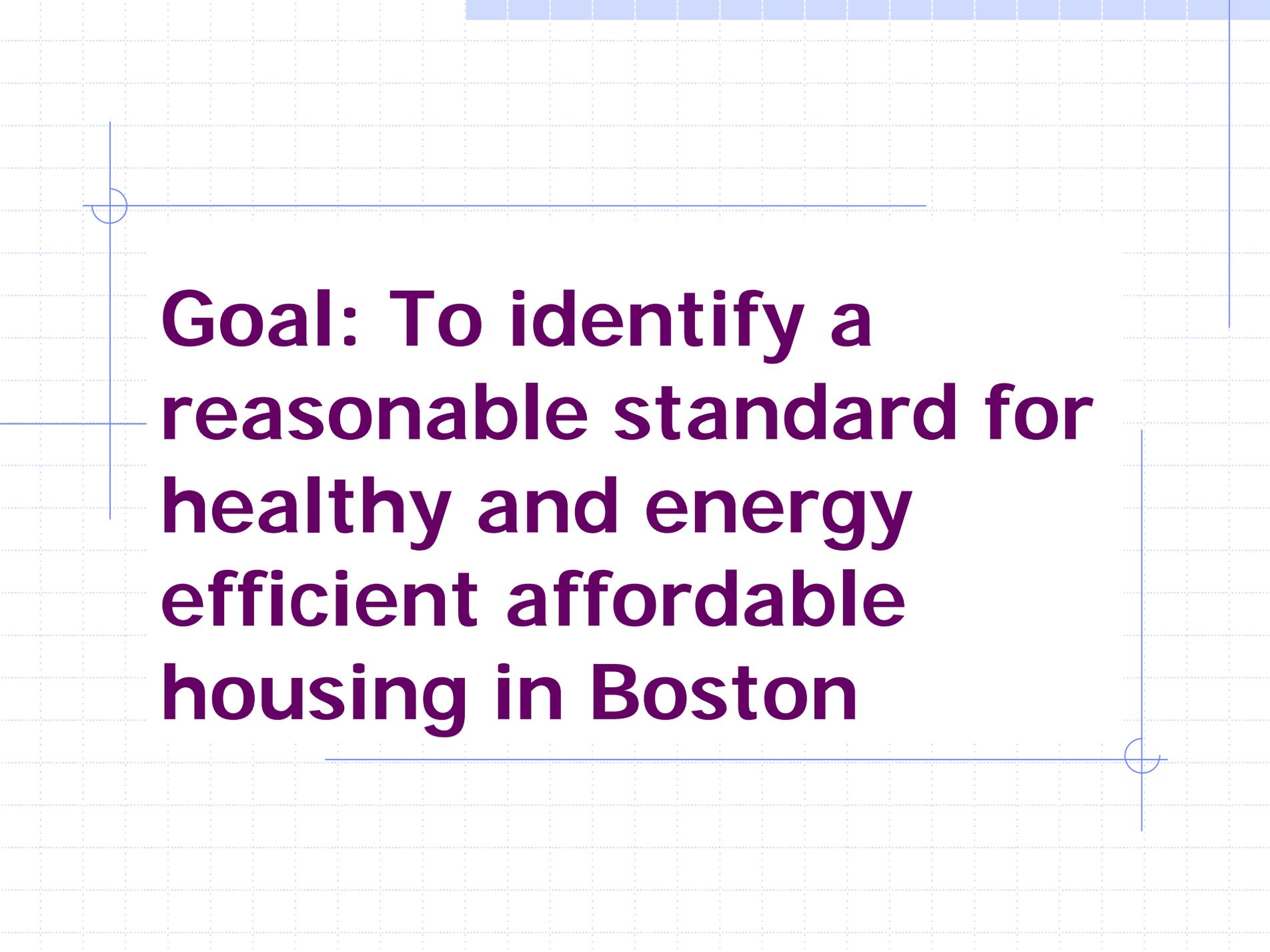
Department of Neighborhood Development

Nuestra Comunidad Development Corporation

Next Phase Studios



946 ZVA



**Goal: To identify a reasonable standard for healthy and energy efficient affordable housing in Boston**

# The Problem

## Consequences of Inadequate Housing

#1: Asthma and Respiratory Disease

#2: Injuries

#3: Lead Poisoning

#4: Homelessness

#5: Malnutrition

Not Safe at Home: How America's Housing Crisis  
Threatens the Health of Its Children

**February 1998**

Megan Sandel, M.D. and Joshua Sharfstein, M.D.

# BPHC Health Study

## 182 House Inspections

### ◆ Housing type:

- 9% live in single family homes
- 17% live in two family homes
- 44% live in three family homes
- 30% live in apt complexes

### ◆ Tenancy:

- 15% own their own home
- 85% rent (More than 1/2 the renters do so with a Section 8 voucher)

# Bugs and Rodents

◆ **2/3 of all participants reported a pest problem**

- 66% have mice only
- 10% have roaches only
- 24% have both

Note: Results are preliminary and have not been published yet.

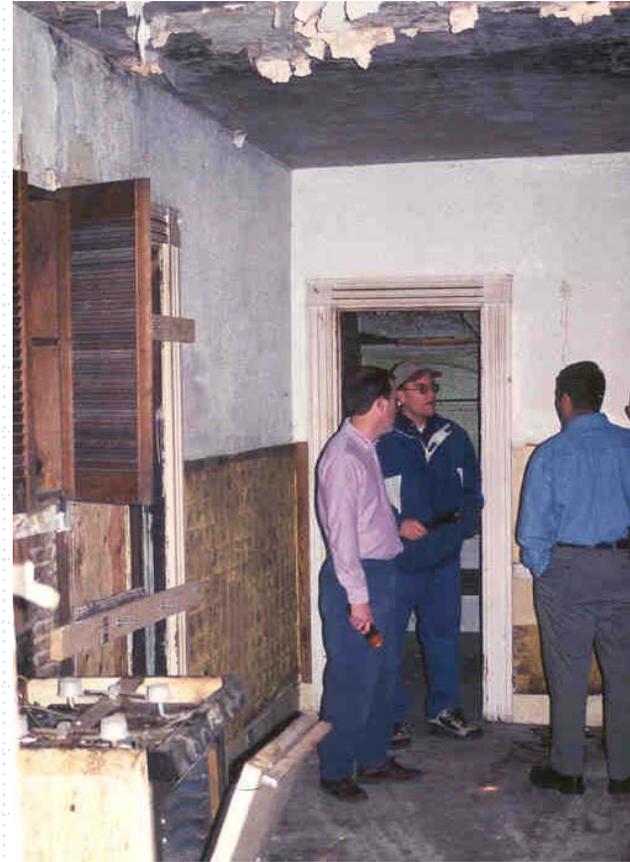
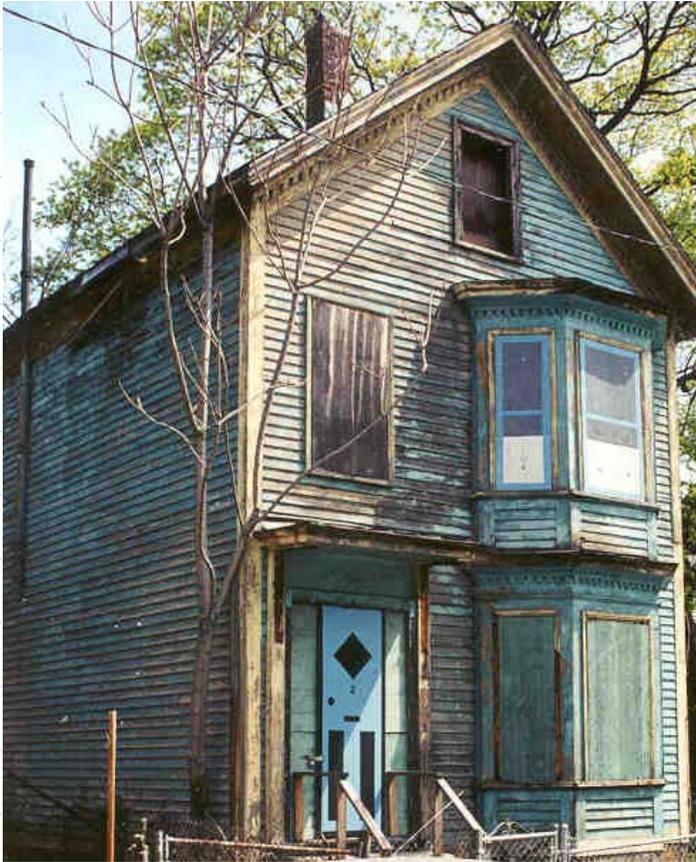
# Mold and Moisture

- ◆ 30% of homes have some evidence of current or past water damage
  - Most of it minor
  - Nearly all cases occurred in the basement or bathroom
- ◆ 17% of homes have visible mold
  - Most of it minor
  - Nearly all cases occurred in the basement or bathroom

# Lead and Dust

- ◆ "We encountered no serious lead issues"
- ◆ 67% of all units have wall to wall carpeting in at least one bedroom
- ◆ 42% of all units have wall to wall carpeting in one or more asthmatic's bedrooms

# The House - Before

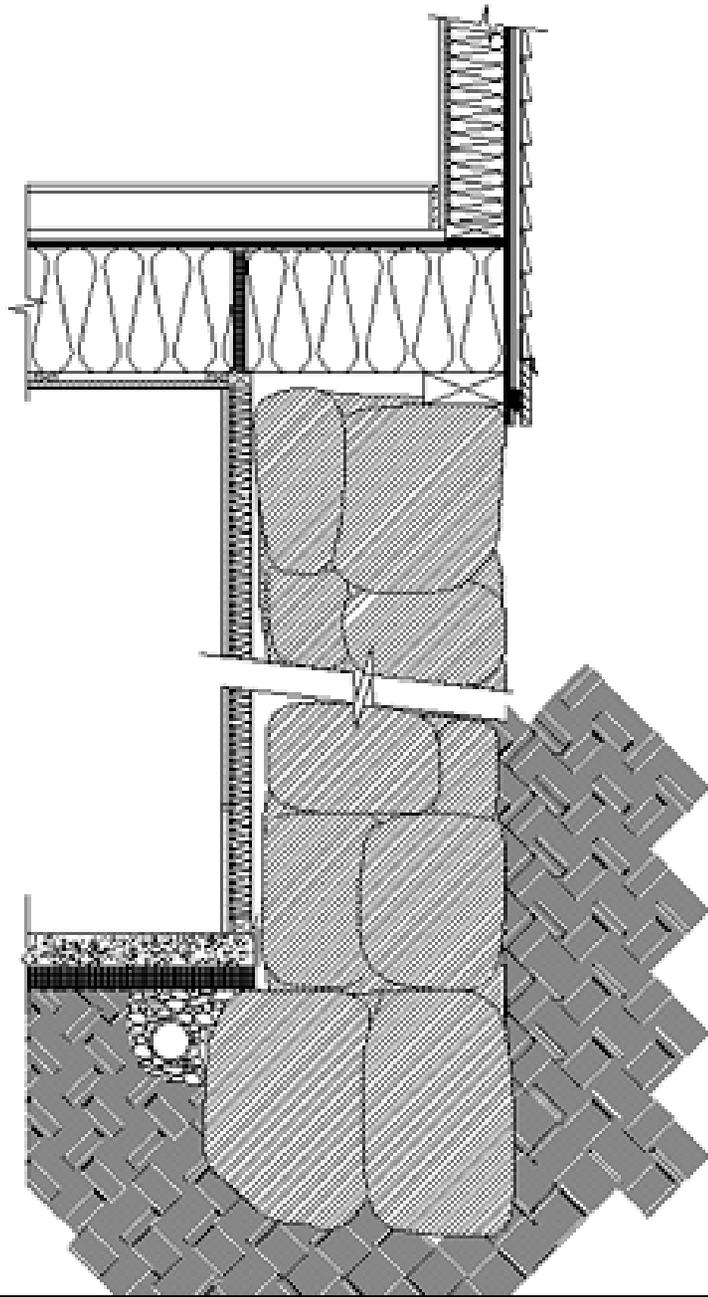


# The House – After



# Priority #1: Control Moisture

- ◆ **Roof** - New asphalt, gutters & downspouts
- ◆ **Windows** - Pan flashing
- ◆ **Basement/Foundation** - French drain, insulate walls
- ◆ **Insulation/Vapor and Air Control** - Install Icynene spray insulation

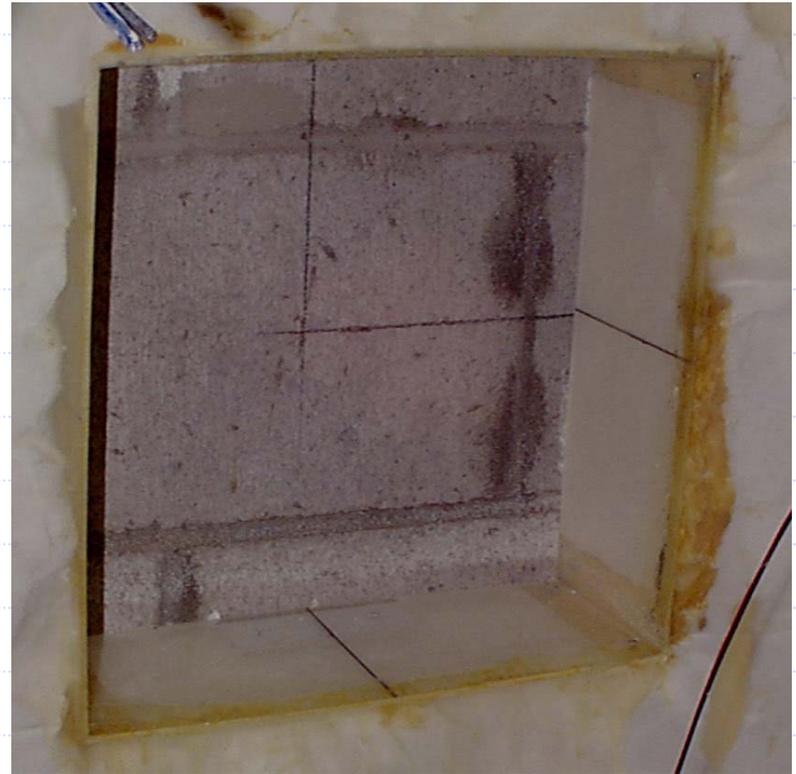


# Icynene Report - 03/03/2004



<http://www.buildingfoundation.umn.edu/Icynene/>

# Icynene Report - 03/03/2004



# Priority #2: Control Dust, Bugs, and Rodents

- ◆ No Wall to Wall carpeting. Mix of wood, vinyl composition tile, and natural linoleum
- ◆ Increase storage space
- ◆ Seal holes and add mesh
- ◆ Provide HEPA filter vacuum cleaner





# Priority #3: Maintain Comfort and Provide Fresh Air

## ◆ Heating

- Sealed-combustion boiler
- Fin-tube radiators

## ◆ Cooling

- Window air conditioners

## ◆ Ventilation

- High quality kitchen and bath fans
- No filtration and no dehumidification
- Gas Stove (at resident's request)



WARNING



Save the Earth. Save the Money.



Water Heating System Warranty  
Warranty for Boiler

NO OILY RAGS  
This area is for the storage of oil-free rags only. No oily rags are allowed.

BOILER  
LAMB

VENTING







# Cost Estimates for Upgrades

## ◆ Target Cost

- \$5,000 - \$10,000 net cost increase for the proposed health and energy upgrades

## ◆ Actual cost

- Closer to \$15,000 including architectural fees, mostly in the insulation and drainage system for the basement



# **Maverick Gardens Hope VI Mid-Rise Development**

Boston Housing Authority

Trinity Development Corporation

ICON Architects



**Goal: To identify a reasonable standard for healthy and energy efficient public housing in Boston**





# HPHI Health Study

## 250 House Surveys

### ◆ Housing type

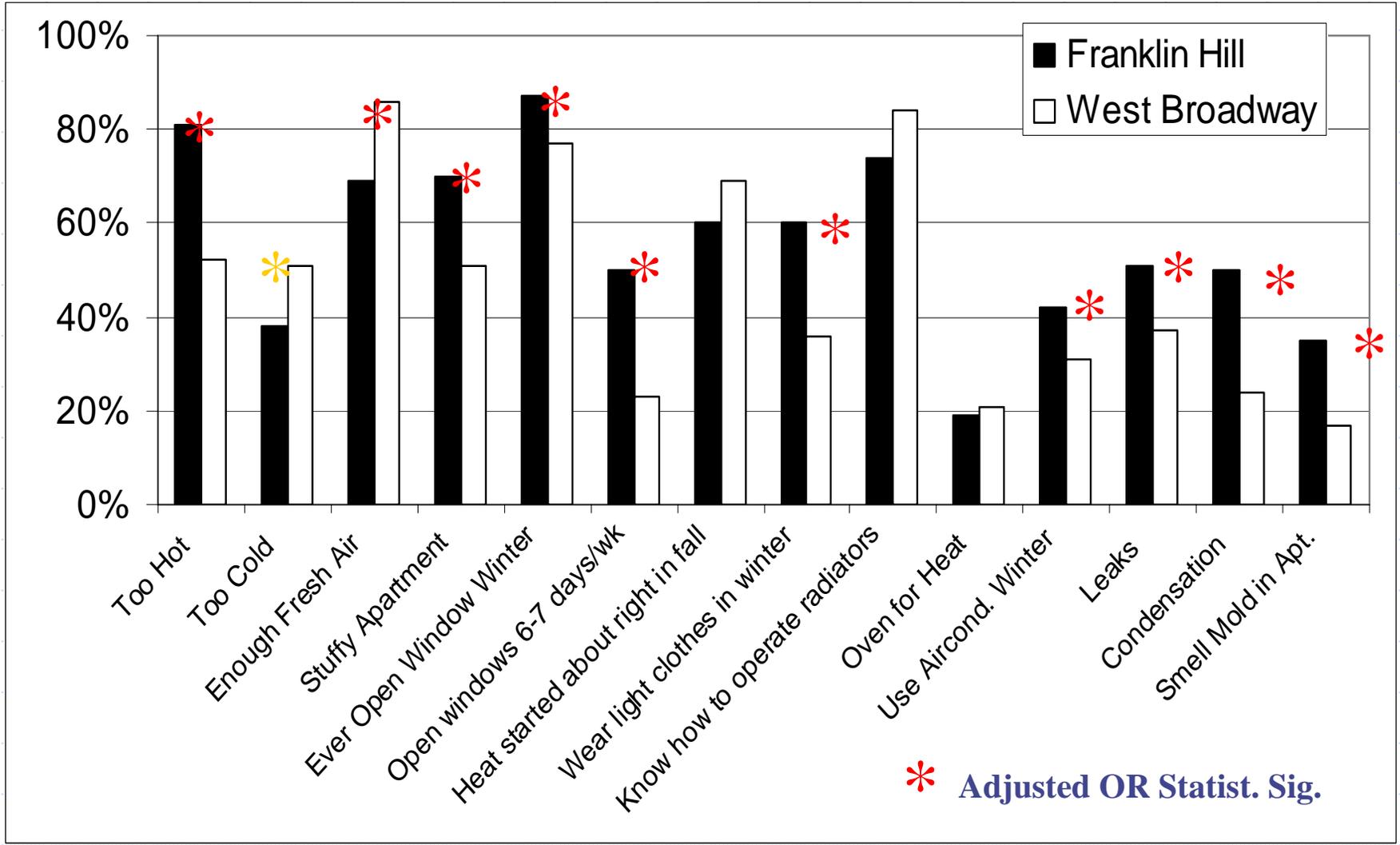
- 100% live in three story walk up public housing

### ◆ Tenancy

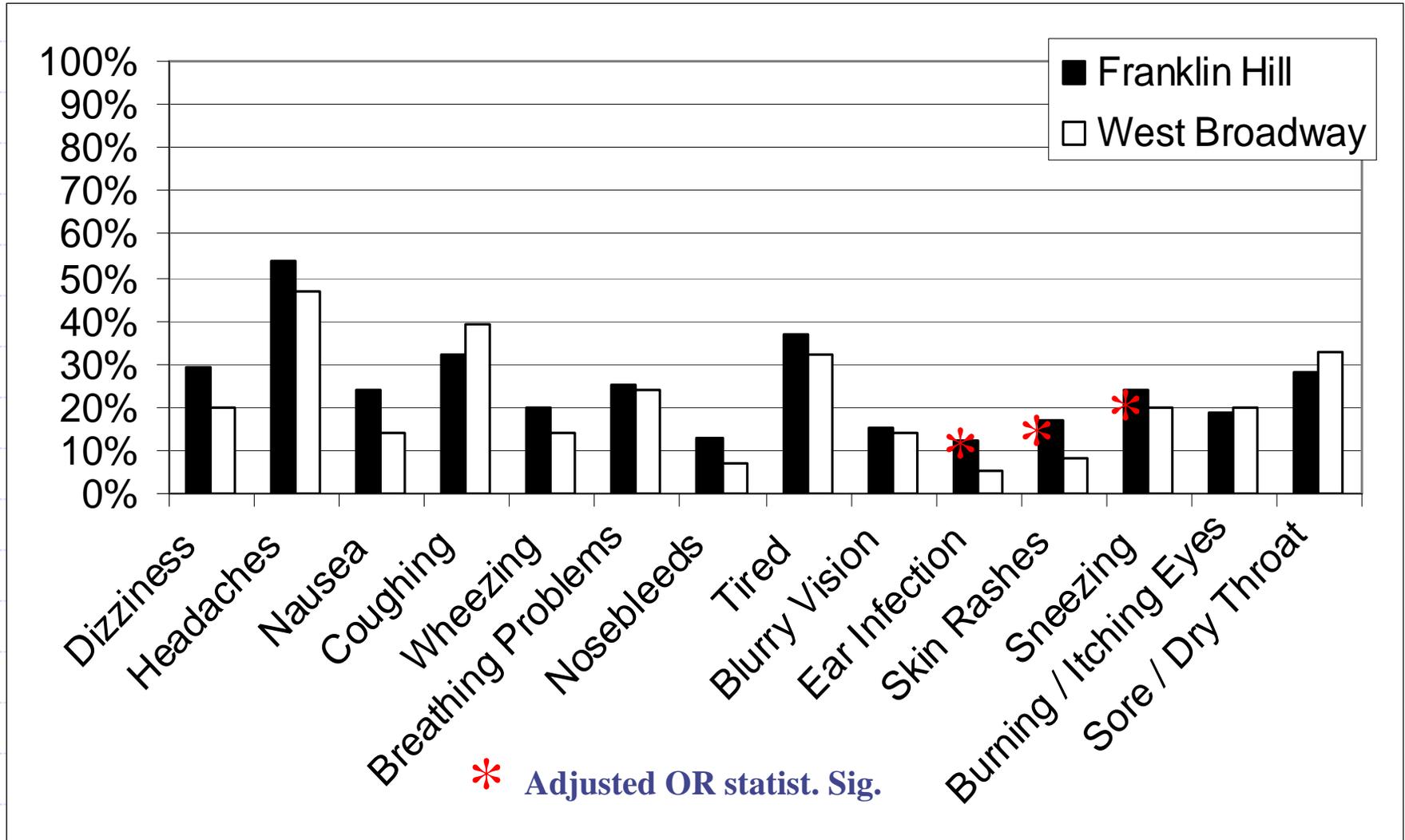
- 100% rent (100% Public assisted housing)

<http://www.hsph.harvard.edu/hphi/>

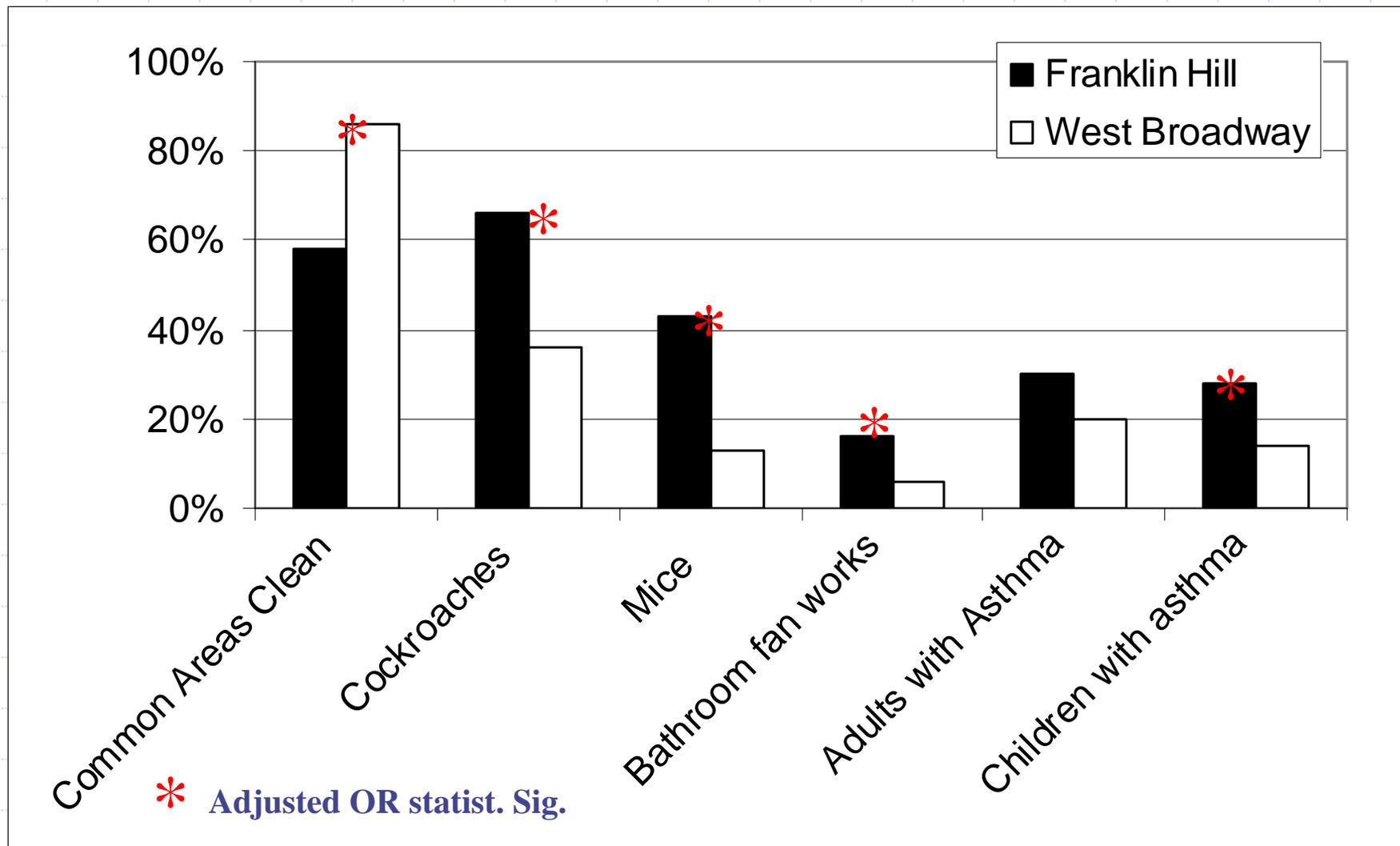
# Survey Analysis: Environment



# Survey Analysis: Health



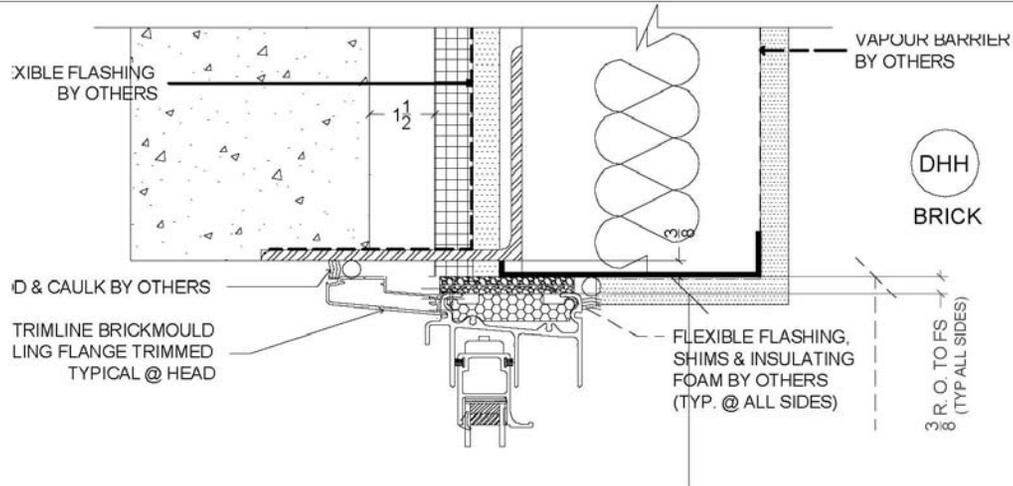
# Survey Analysis: Environment and Health





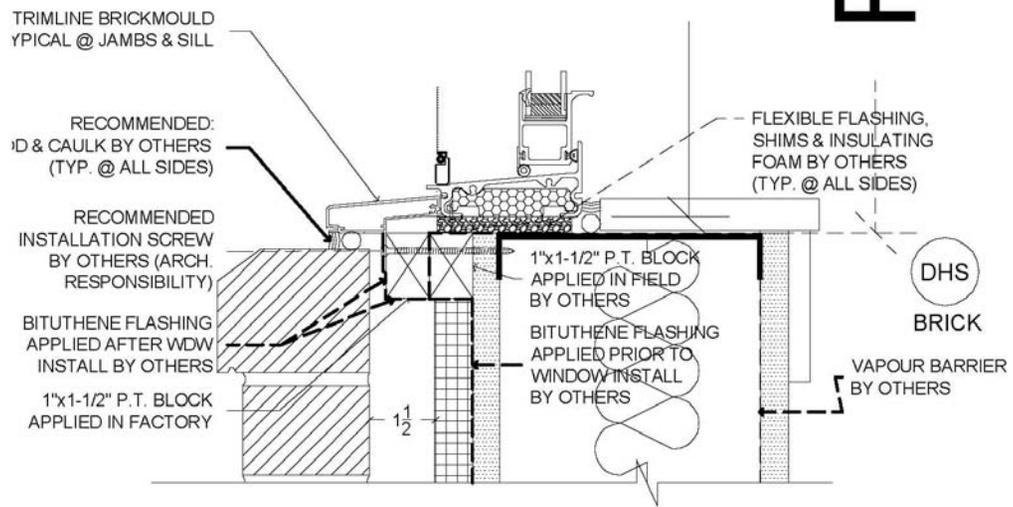
# Priority #1: Control Moisture

- ◆ **Windows** – Install Pan flashing
- ◆ **Underground Garage** – Install crushed stone, vapor barrier, and insulation
- ◆ **Vapor and Air Control** - Isolate apartments from corridors



**NOTE:**  
 1/2 SCREEN TYPICAL  
 FOR ALL WINDOWS.  
 PROVIDE SEPARATELY.

**FS**  
**R.O.**



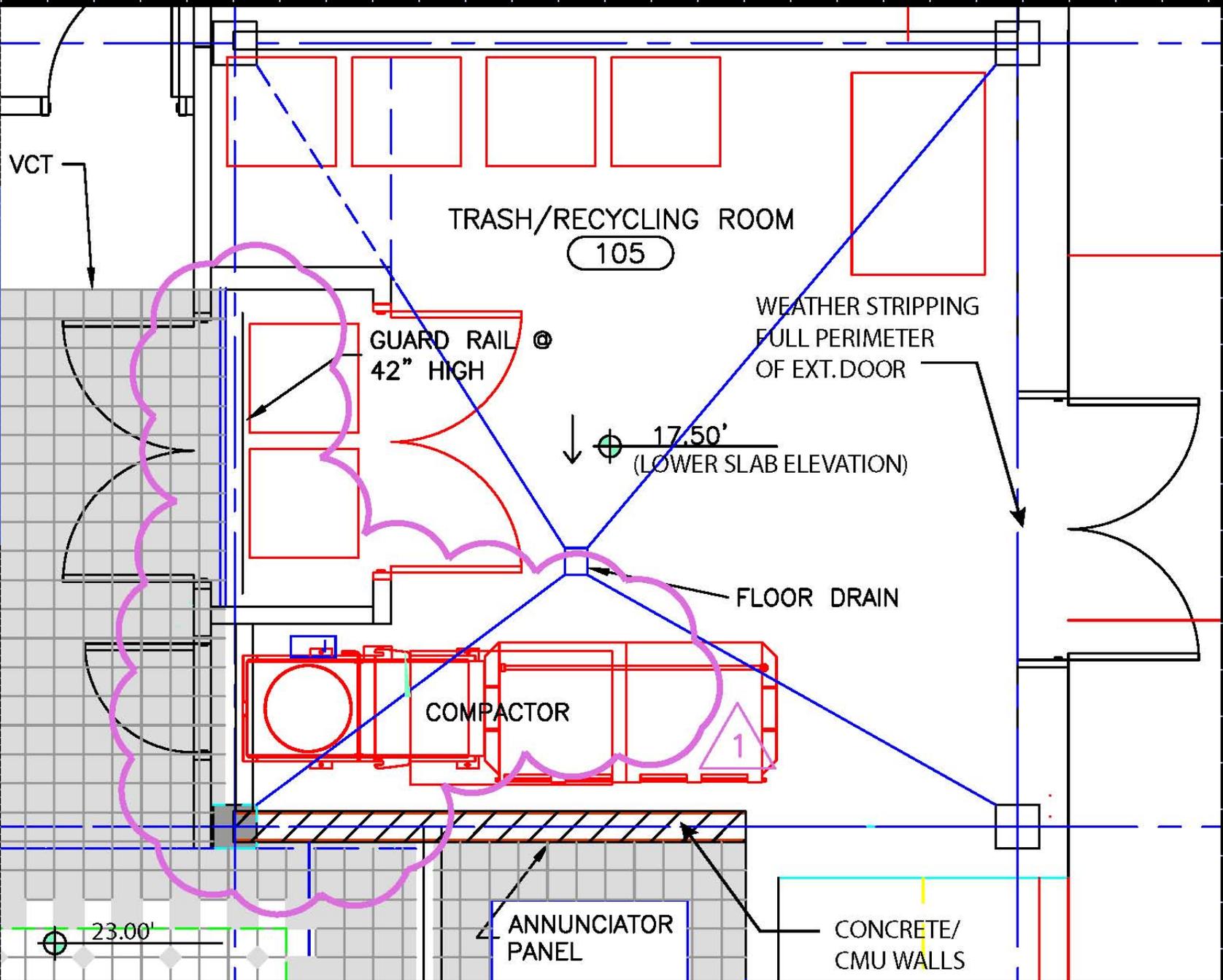
REF: NTG 16F TITLE: MAVERICK - PHASE 1: ONE MIDRISE BLDG MR-B-A902 REVISED WALL DETAILS

<b>accurate dorwin</b> GLASS * WINDOWS * DOORS	1535 SEEL AVE WINNIPEG, MB R3T 1C6 PH: 1.888.982.4640 FAX: 1.204.982.8383 e-mail: info@accuratedorwin.com web: www.accuratedorwin.com	NOTES: ALL VIEWS EXTERIOR, UNLESS NOTED ALL DIMENSIONS IN FORMAT: INCHES [mm] REFER TO CONTRACT ARCHITECTURAL DRAWINGS FOR FINAL PRODUCT INSTALLATION INSTRUCTIONS & DETAILS
	DRAWN BY: ajf    CHK BY: mjf    DATE: 2004.01.16    SCALE: NTS    DWG. NO.: D1	



# Priority #2: Control Dust, Bugs, and Rodents

- ◆ Identify “no carpet/ no smoking” pilot apartments
- ◆ Establish Pest Management boundaries
- ◆ Seal holes, add mesh, and add boric acid powder in walls during construction
- ◆ Compartmentalize apartments
- ◆ Install sink garbage disposals



# Priority #3: Maintain Comfort and Provide Fresh Air

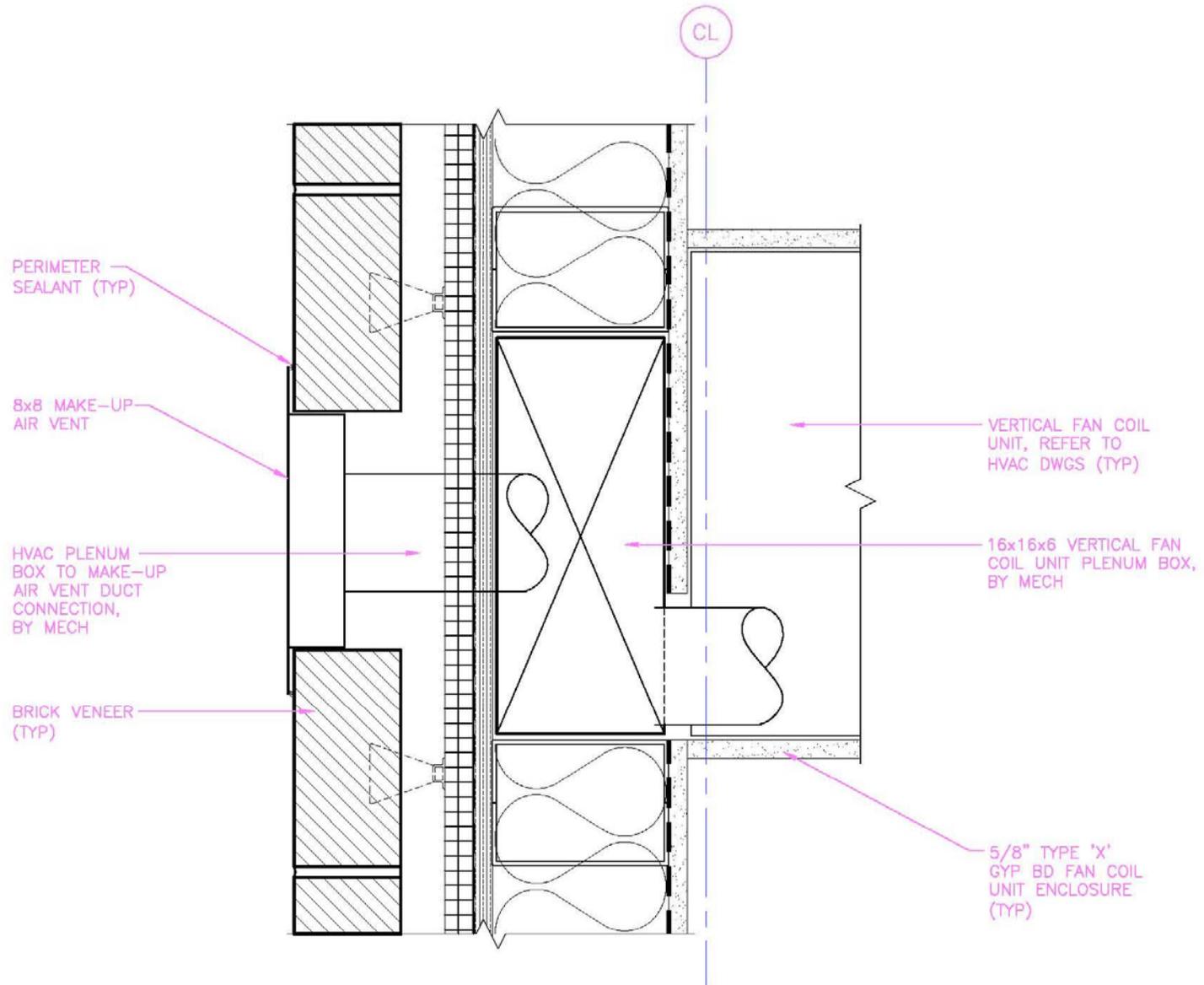
## ◆ Heating/ Cooling

- Gas absorption boiler/ chiller
- Whalen 2-pipe fan coils with free cooling

## ◆ Ventilation

- Central kitchen and bath exhaust
- Dedicated apartment supply air
- Isolate apartments from corridors
- Electric stoves





4 AIR INTAKE @ FAN COIL UNIT  
 3" = 1'-0"

# Cost Estimates for Upgrades

◆ **Target Cost** - No or minimal cost increase – we'll see.....