

# Regulatory Requirements & Constraints

Design Strategies



“Meeting the needs of the present generation without compromising the ability of future generations to meet their needs.”

***Harlem Brundtland***

# WHY ?





“Meeting the needs of the present generation without compromising the ability of future generations to meet their needs.”

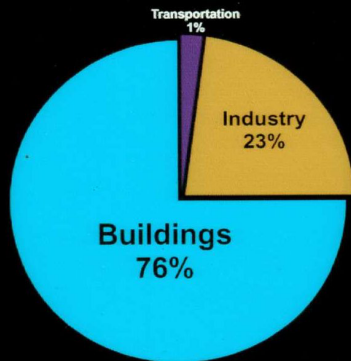
*Harlem Brundtland*

## HOW PRUDENT DO WE USE OUR FINITE MATERIALS?

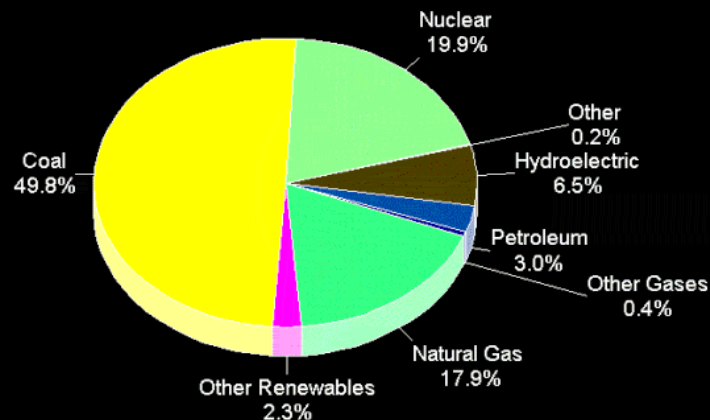
- **RESOURCES, EMISSIONS, POLLUTION**
- ORIGIN + MANUFACTURE OF BUILDING MATERIALS
- EMBODIED ENERGY
- TRANSPORTATION
- CONSTRUCTION OF THE BUILDING
- USE/MAINTENANCE OF THE BUILDING
- LIFE CYCLE ESTIMATE
- RECYCLING, REUSE OPTIONS
- DEMOLITION OF THE BUILDING

## → SUSTAINABILITY: (“MAKING CHOICES”)

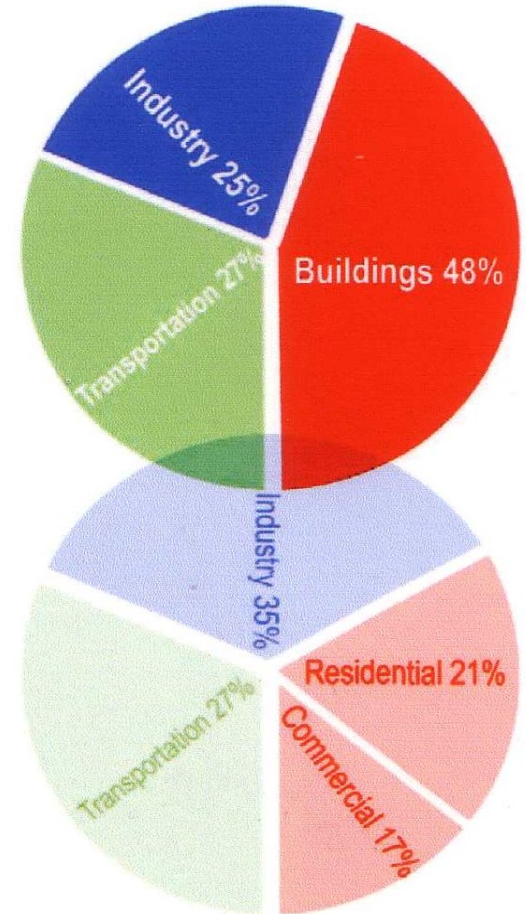
- 38 % OF PRIMARY ENERGY IS CONSUMED IN BUILDINGS.
- 48 % WOULD BE ACCOUNTED IF ENERGY USED IN PRODUCTION + TRANSPORTATION OF BUILDING MATERIALS IS INCLUDED !
- OVER THE NEXT 20 YEARS: U.S.A. WILL ADD CA.22 MIO. BUILDINGS, WHICH WILL CONSUME ENERGY: HEATING AND COOLING REQUIREMENTS ARE HIGHLY DEPENDENT ON QUALITY OF BUILDING



76% of all power plant generated electricity is used to operate buildings.



## ... ENERGY



Combining the annual energy required to operate residential, commercial, and industrial buildings along with the embodied energy of industry-produced building materials like carpet, tile, glass, and concrete exposes buildings as the largest energy consuming sector.

## → SUSTAINABILITY: RECYCLING/GARBAGE

Assuming the entire waste production to equal 100 %, one can divide it into contributing factors as follows:

- Household waste, bulk waste, trade waste approx. 12 %
- Toxic waste approx. 5 %
- Production waste approx. 35 %
- Construction waste approx. 48 %

Construction waste is nearly 50 % of the total waste, a primary target for the recycling economy.

### Mineral Building Materials

Mineral building materials such as concrete, calcareous sandstone and bricks are easily re-used. Light building materials such as aerated plaster, drywall and foam mortar can be channelled through separate cycles into the new production of these materials.

### Wood

Wood can be processed in the form of strands or used as insulation. Older, treated woods may contain contaminants (PCBs), which make re-use more difficult.

### Metals

Metals can usually be treated and re-used without any loss in quality. Coatings limit recycling options.

### Glass

Glass recycling usually consists of a long process from plate glass through cast glass to container glass, where in high-grade recycling depends upon the pollution abatement in manufacture of glass panes.

### Bituminous Materials

Rolled building material, such as tarpaper for roofing, is recyclable; coatings with a mineral base can easily be re-used as rubble or ballast. Coatings for insulating materials can only be separated out with great effort and must usually be completely disposed of.

### Insulating Materials

Polystyrene can be integrated into the recycling process as an insulant (granulates, insulating grist, new panels). Mineral-strand boards or panels for interior construction are not yet recyclable.

→ BY THE YEAR 2035,  
 $\frac{2}{3}$  OF THE BUILT ENVIRONMENT IN THE U.S. WILL BE EITHER NEW OR RENOVATED.

→ RECYCLING POTENTIAL:

- MATERIAL SEPARABILITY
- MATERIAL HOMOGENITY
- COMPOSITE SEPARABILITY
- LOW MATERIAL DIVERSITY
- MATERIAL IDENTIFICATION
- RECOVERY/REUSE/MODUL.

→ PUBLIC SECTOR MUST OFFER MASSIVE SUPPORT FOR RECYCLING, EVEN IN BORDERLINE CASES, TO AVOID ENVIRONMENTAL BURDENS IN THE FUTURE.





→ SUSTAINABILITY: LONGEVITY

3rd International Architecture Symposium, Pontresina, Switzerland 2000

Hans Kollhoff, Germany:

*“The real question is, which structures will still be around 75 years from now. Just look at the works of Jean Nouvel; in five years time they ’ll be ready for pulling down!”*

Jean Nouvel, France:

*“Whoever builds with bricks and inserts little windows must be very limited upstairs!”*



→ *THE ESSENCE :*



CREATING AN

'ARCHITECTURAL EXPERIENCE' **DEPENDS ON**

COMPLEX **KNOW-HOW**:

TECHNICAL REALIZATION COMPETENCIES, STRUCTURAL COMPOSITION AND INTEGRATION SKILLS ARE ESSENTIAL TO CREATE **GOOD DESIGN!**

# Buildings and the Environment





# Buildings and the Environment



<https://coolhunting.com/culture/ren-ris-bees-wax-sculptures/>

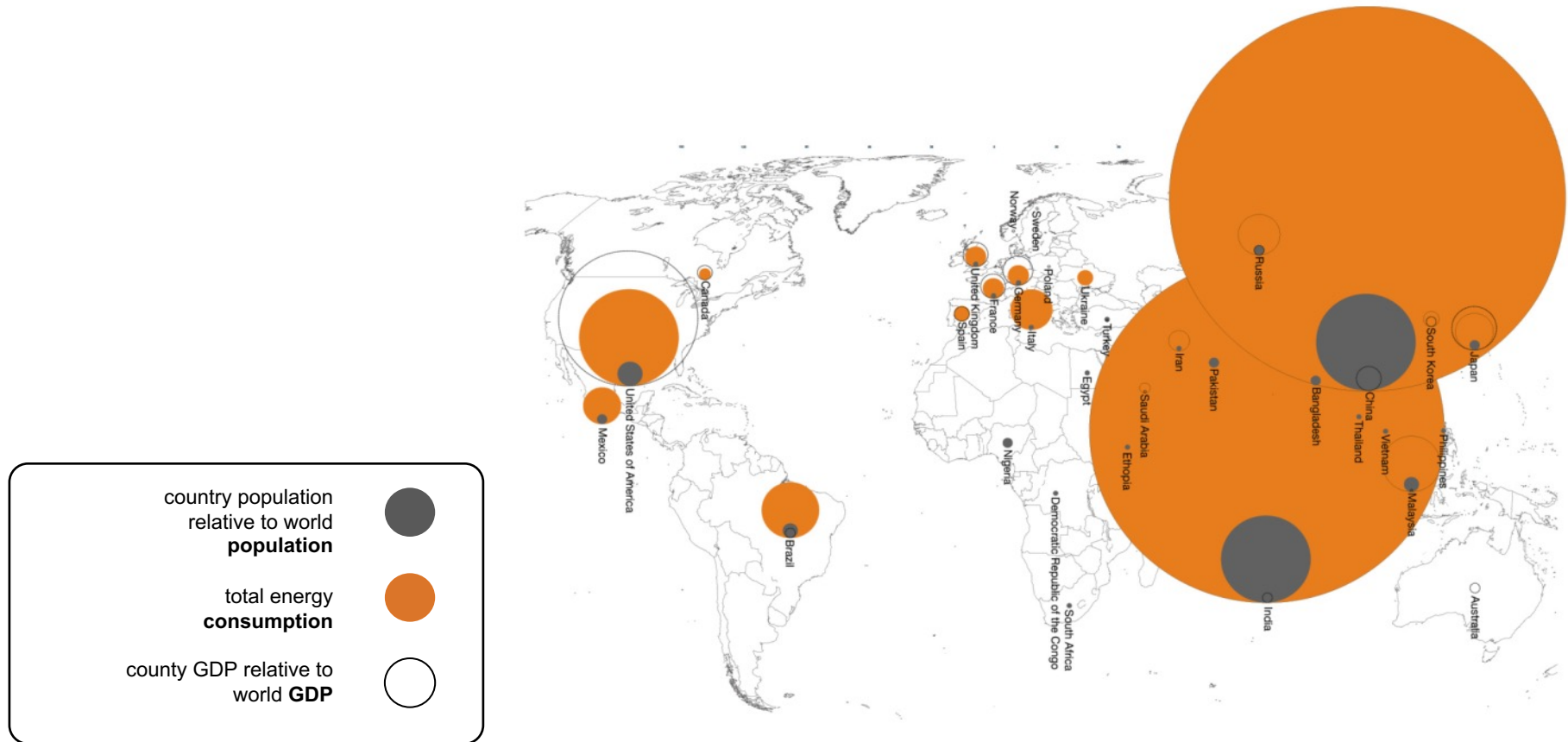
# Current Global Energy Consumption Pattern



source: International Energy Agency (IEA) Statistics Division 2006



# Projected Global Energy Consumption Pattern

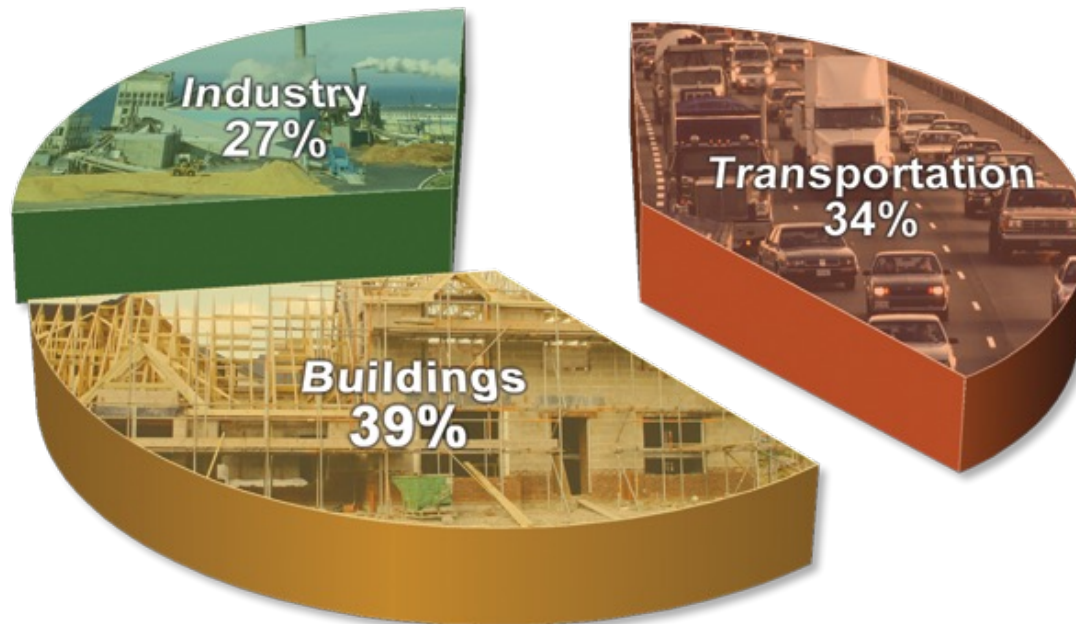


source: International Energy Agency (IEA) Statistics Division 2006

# U.S Energy Use: Buildings

- 38% of total energy use and 76 % of electricity consumption
- 30% of greenhouse gas emissions
- 30% of raw materials use
- 30% of waste output
- 12% of potable water consumption

*Source: U.S. Green Building Council*



# Sustainability

Sustainable buildings in both operation and construction must:

- *Use Less energy*
- *Consume fewer resources*
- *Cause less pollution of the air, water and soil*
- *Reduce waste*
- *Discourage wasteful land development*
- *Contribute to the protection of natural environments and ecosystems*
- *Provide healthier interiors*
- *Minimize adverse social impacts*



CPG Architects

# School of Art, Design and Media at Nanyang Technological University, Singapore



Photo: Nanyang Technological University







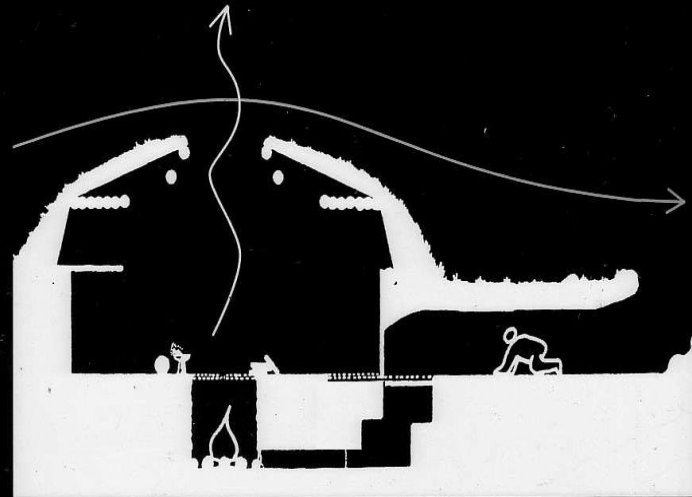
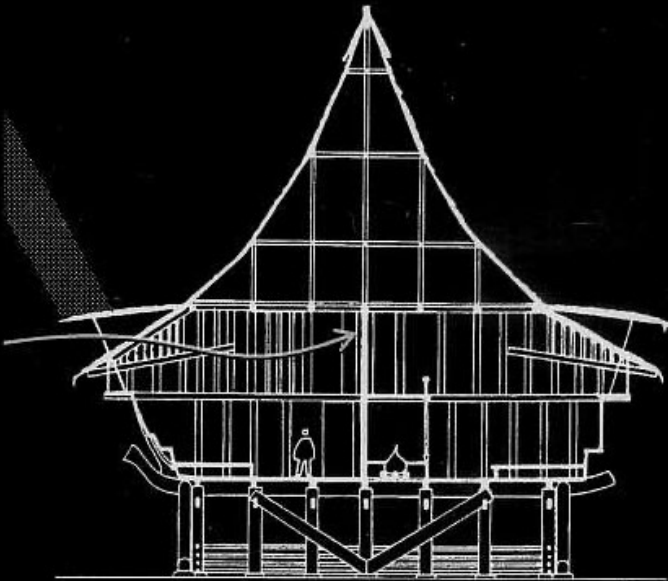
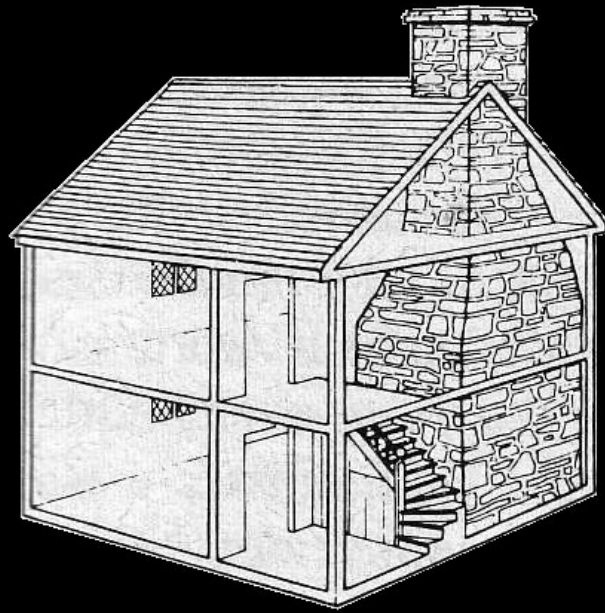
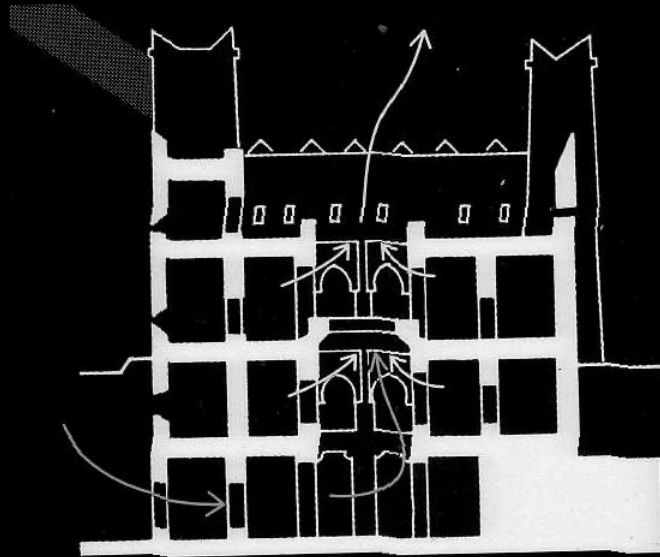


→ *EXAMPLES – VERNACULAR ARCHITECTURE:*

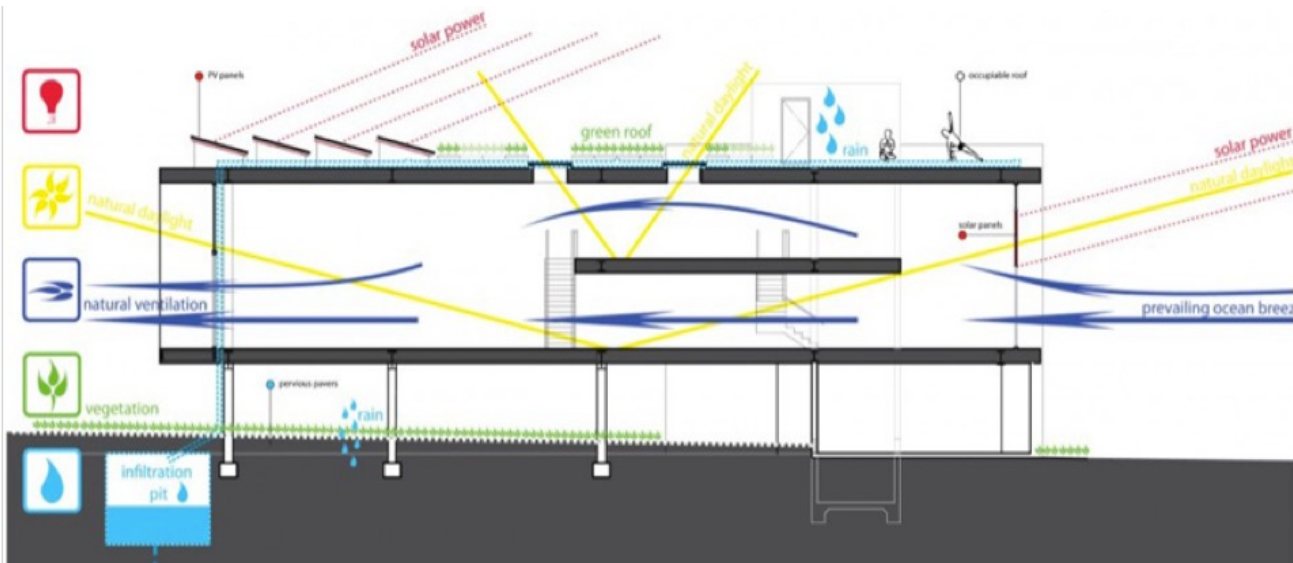
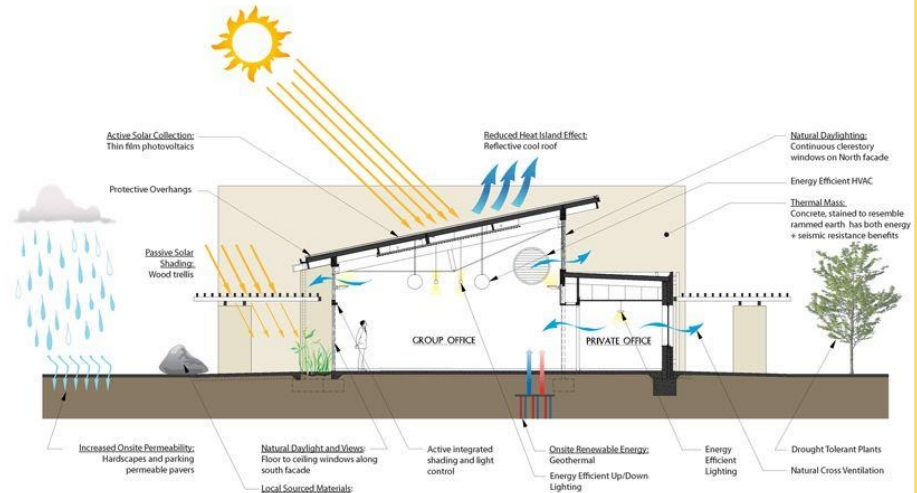
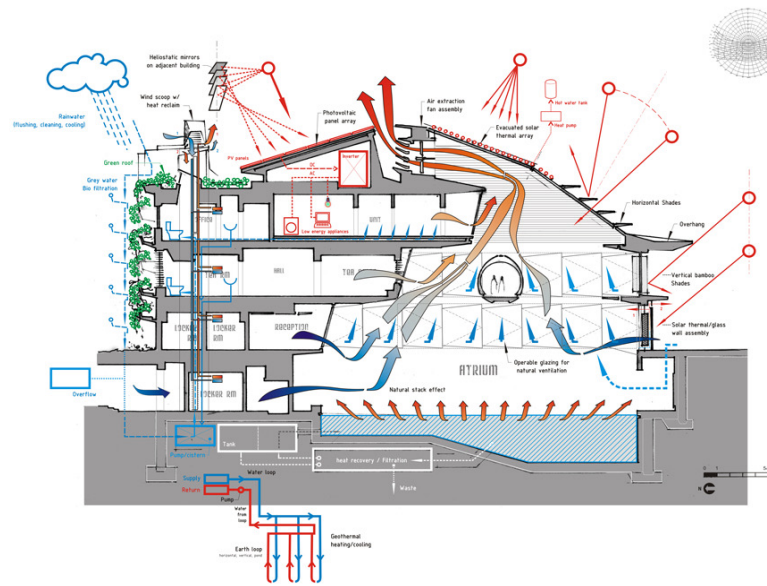




→ ADAPTATION DIAGRAMS - EXAMPLES:



# → OPERATIONAL DIAGRAMS - EXAMPLES:



|        |                              |
|--------|------------------------------|
| 69.7%  | reduced water for irrigation |
| 110.8% | increased open space         |
| 30.5%  | recycled materials           |
| 2.6%   | rapidly renewable materials  |
| 84.57% | construction waste recycled  |
| 100%   | passive ventilation          |
| 42.3%  | reduced run-off              |
| 95.6%  | treated run-off              |
| 47.3%  | water use reduction          |
| 12.5%  | renewable energy             |
| 31.4%  | energy savings               |
| 75%    | natural daylight             |
| 95%    | exterior views               |





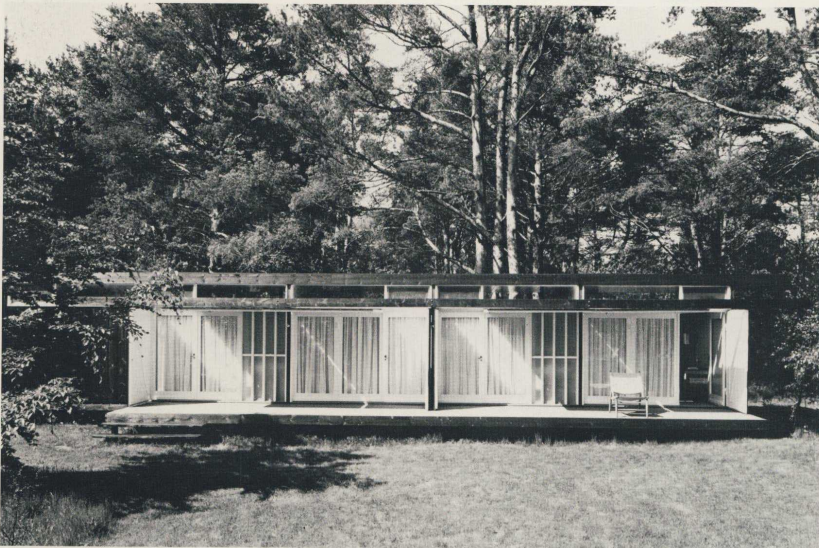
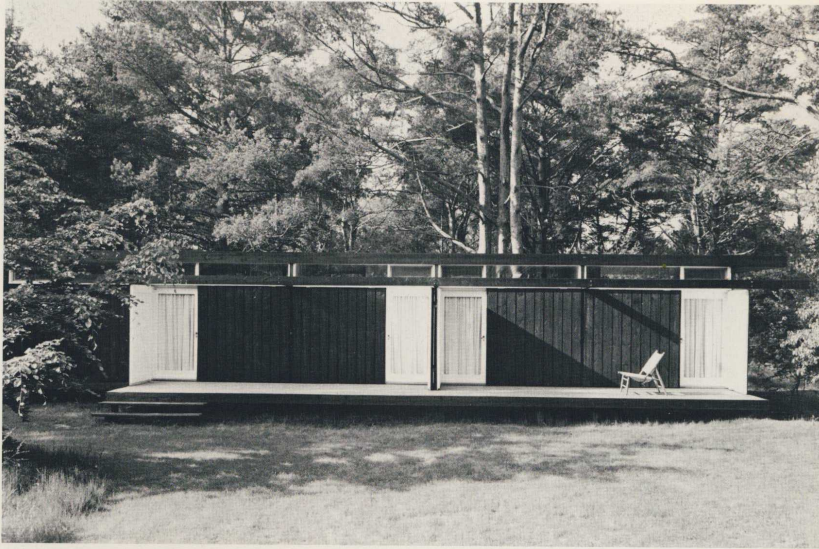




P.S.62 KATHLEEN GRIMM SCHOOL, Richmond -Net Zero Energy School, SOM



→ ADAPTATION - EXAMPLES:



Vilhelm Wohlert, Bohr House throughout the seasons, 1957



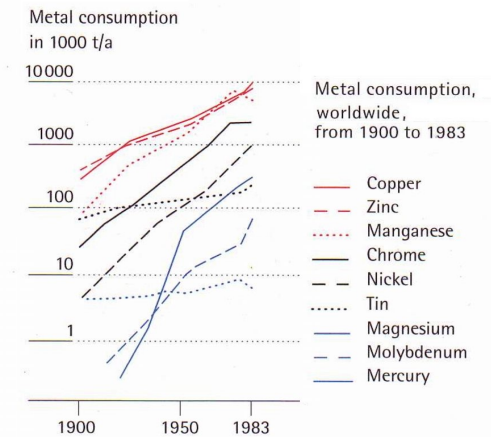
# Sustainable Building Materials

- Building sustainability requires access to information about the *environmental impacts* of the materials used in construction.
  - Extraction of non-renewable resources/recycled or rapidly renewable materials
  - Energy required to ship/produced locally
  - Material containing toxic ingredients/non toxic



# Sustainable Building Materials

i.e.: Metal production – displacement of soil



## ORE EXTRACTION : DISPLACEMENT OF SOIL

IRON ORE: 1: 15

BAUXITE: 1: 5

ZINC: 1: 27

SILVER: 1: 7,500

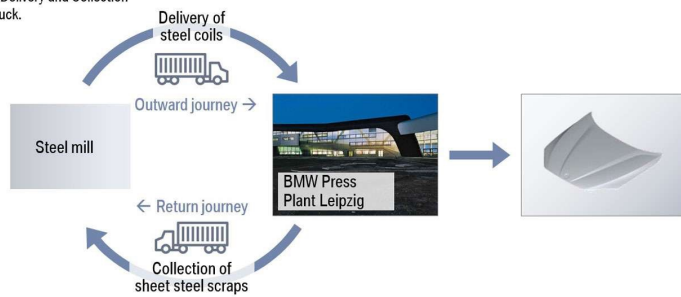
GOLD/PLATINUM: 1: 350,000



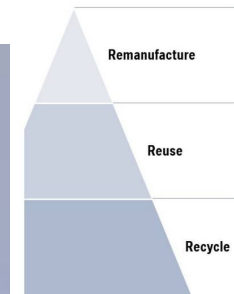


# „Closed Loop“ for sheet steel scraps (e.g. Leipzig).

Combination of Delivery and Collection with the same truck.



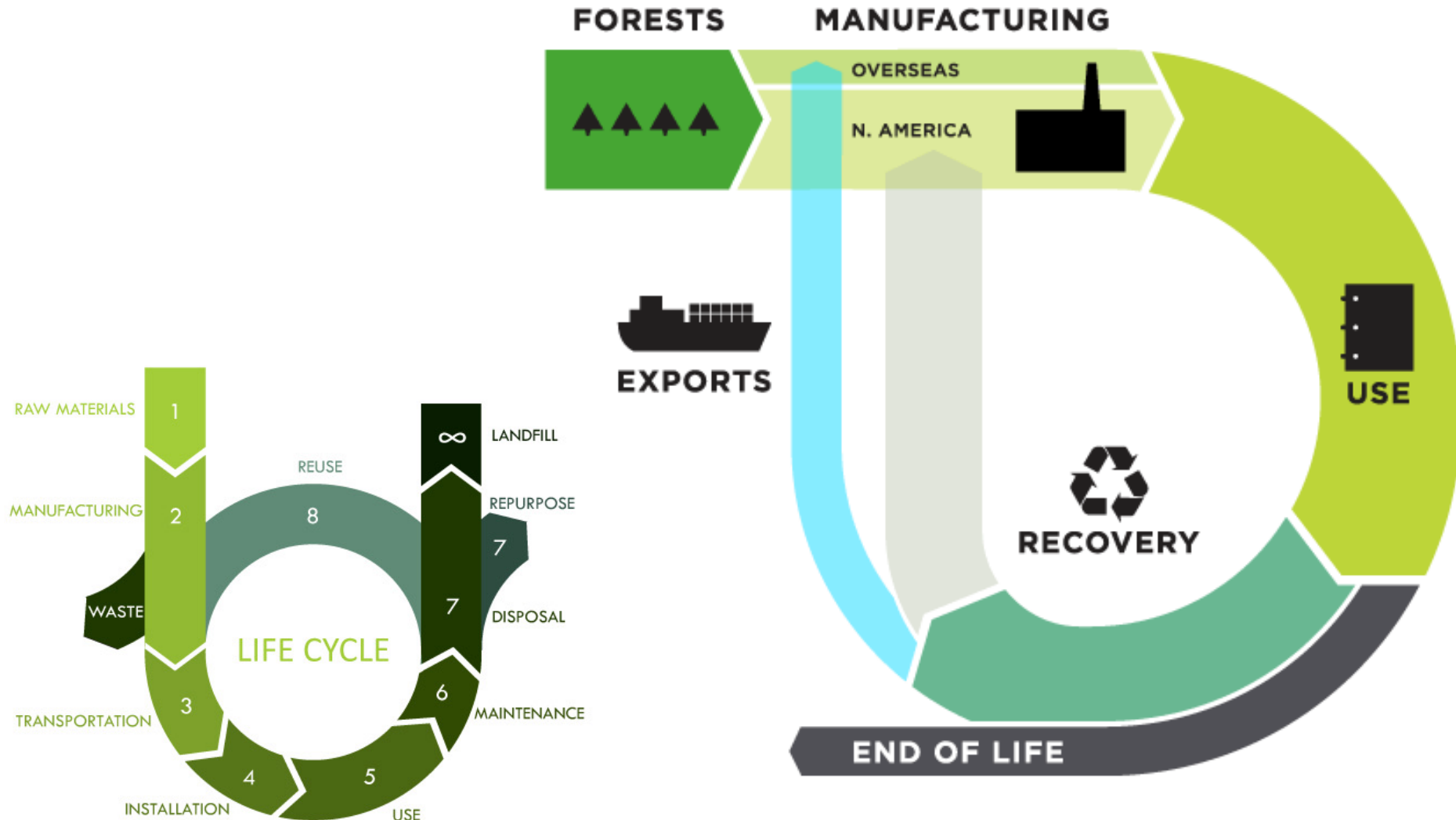
## JOINT VENTURE ENCORY (POST CONSUMER).



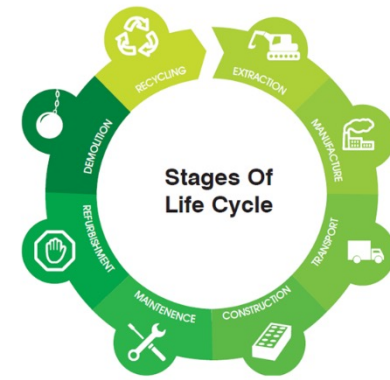
Automotive parts from dismantled vehicles in the dismantling centre are sold as replacement parts.



# The Materials Life Cycle



# Embodied Energy

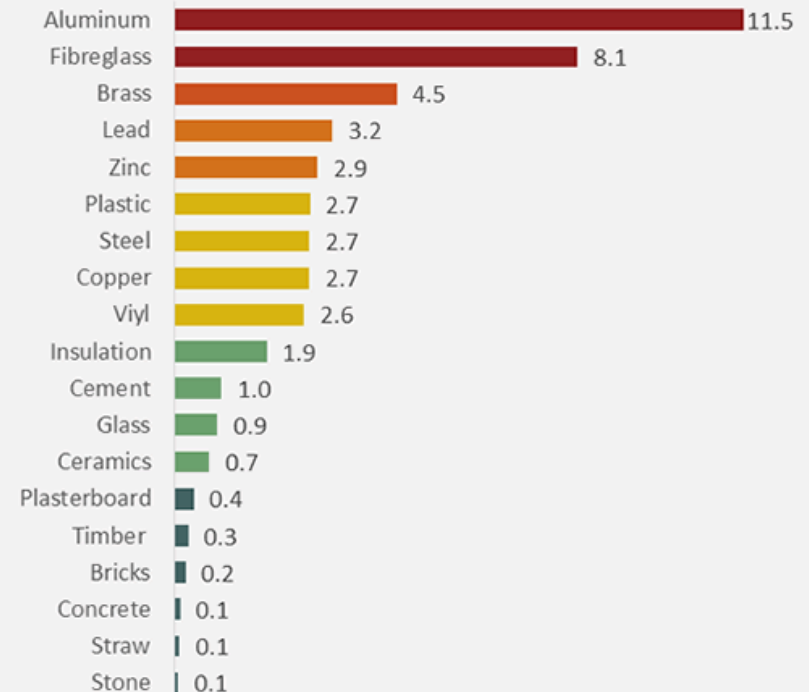


- Embodied energy = the sum of energy inputs to make a product

- Extraction of raw materials
- Transportation to a factory
- Manufacture of product / components
- Assembly of product / system
- Transportation to site / point of sale
- Installation / construction
- Maintenance
- Replacement
- Disposal / re-purposing / recycling

## The Embodied Carbon of Building Materials

All figures in kg CO<sub>2</sub>/kg of building material



Note: This figure is intended as a beginners guide. Detailed estimation involves considerable complexity for each product. Figures for metals assume virgin material.

Source: **Inventory of Carbon & Energy (ICE) database.**

Download: <http://www.circularecology.com/ice-database.html>



# UNHEALTHY AND TOXIC MATERIALS

## Toxins

|                                              |                                              |                                              |                                        |                                         |                                         |                   |                                           |                              |                    |                                  |
|----------------------------------------------|----------------------------------------------|----------------------------------------------|----------------------------------------|-----------------------------------------|-----------------------------------------|-------------------|-------------------------------------------|------------------------------|--------------------|----------------------------------|
| <b>C<sub>8</sub>H<sub>10</sub></b><br>xylene | <b>C<sub>7</sub>H<sub>8</sub></b><br>toluene | <b>C<sub>6</sub>H<sub>6</sub></b><br>benzene | <b>CH<sub>2</sub>O</b><br>formaldehyde | <b>CO<sub>2</sub></b><br>carbon dioxide | <b>SO<sub>2</sub></b><br>sulfur dioxide | <b>Pb</b><br>lead | <b>NO<sub>2</sub></b><br>nitrogen dioxide | <b>CO</b><br>carbon monoxide | <b>Rn</b><br>radon | <b>NH<sub>3</sub></b><br>ammonia |
|----------------------------------------------|----------------------------------------------|----------------------------------------------|----------------------------------------|-----------------------------------------|-----------------------------------------|-------------------|-------------------------------------------|------------------------------|--------------------|----------------------------------|

## Indoor Sources

|                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                                              |                                                 |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
|  |  |  |  | <b>C<sub>8</sub>H<sub>10</sub></b><br><b>C<sub>6</sub>H<sub>6</sub></b><br><b>C<sub>7</sub>H<sub>8</sub></b> | <b>CH<sub>2</sub>O</b><br><b>NH<sub>3</sub></b> |
| adhesives                                                                         | paint/thinners                                                                    | aerosols                                                                          | pressed wood                                                                      |                                                                                                              |                                                 |

|                                                                                   |                                                                         |                                   |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------|
|  | <b>C<sub>8</sub>H<sub>10</sub></b><br><b>C<sub>6</sub>H<sub>6</sub></b> | <b>C<sub>7</sub>H<sub>8</sub></b> |
| business machines                                                                 |                                                                         |                                   |

|                                                                                   |                                    |
|-----------------------------------------------------------------------------------|------------------------------------|
|  | <b>CO<sub>2</sub></b><br><b>CO</b> |
| fire                                                                              |                                    |

|                                                                                   |                       |
|-----------------------------------------------------------------------------------|-----------------------|
|  | <b>CO<sub>2</sub></b> |
| people                                                                            |                       |

|                                                                                   |  |
|-----------------------------------------------------------------------------------|--|
|  |  |
| dust                                                                              |  |

|                                                                                    |  |
|------------------------------------------------------------------------------------|--|
|  |  |
| fungus                                                                             |  |

## Outdoor Sources

|                                                             |                                                                                     |                                                                                     |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>NO<sub>2</sub></b><br><b>CO</b><br><b>CO<sub>2</sub></b> |  |  |
|                                                             | cars                                                                                | trucks                                                                              |

|                                                                          |                                                                                     |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Pb</b><br><b>CO</b><br><b>SO<sub>2</sub></b><br><b>NO<sub>2</sub></b> |  |
|                                                                          | factories                                                                           |

|                        |                                                                                     |
|------------------------|-------------------------------------------------------------------------------------|
| <b>Pb</b><br><b>CO</b> |  |
|                        | airplanes                                                                           |

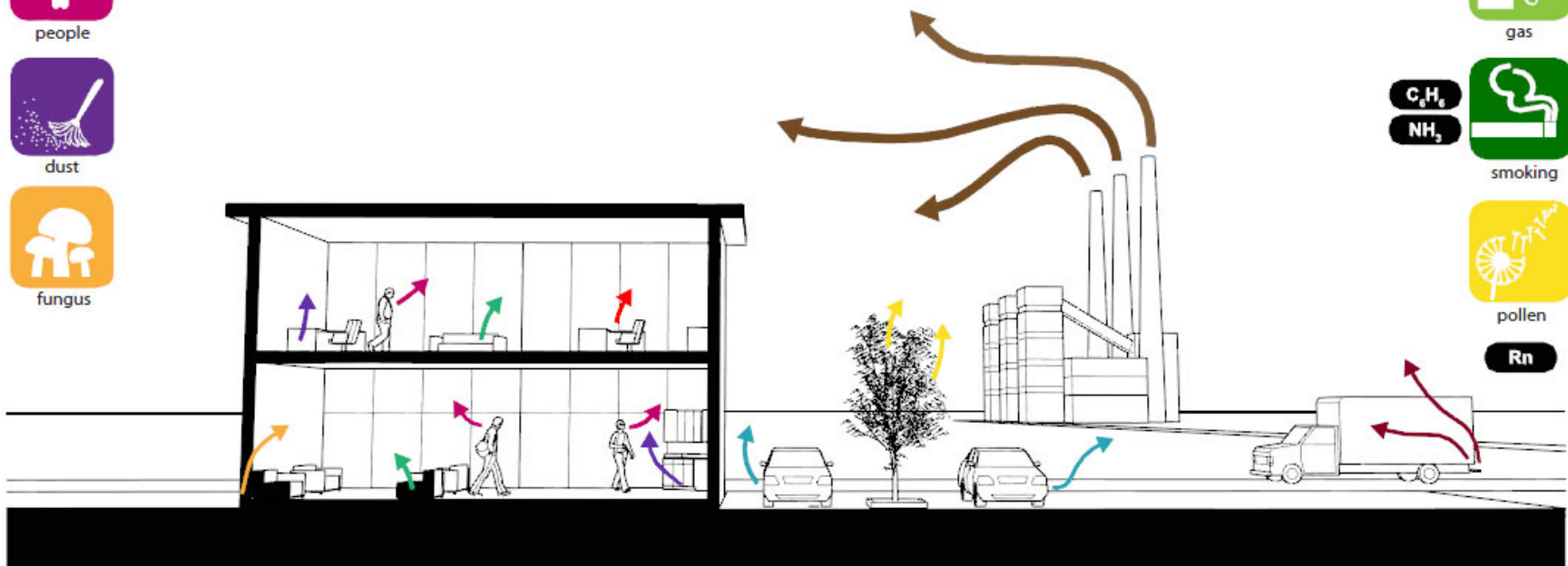
|                                   |                                                                                     |
|-----------------------------------|-------------------------------------------------------------------------------------|
| <b>C<sub>8</sub>H<sub>8</sub></b> |  |
|                                   | gas                                                                                 |

|                                                            |                                                                                     |
|------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>C<sub>8</sub>H<sub>8</sub></b><br><b>NH<sub>3</sub></b> |  |
|                                                            | smoking                                                                             |

|                                                                                       |           |
|---------------------------------------------------------------------------------------|-----------|
|  | <b>Rn</b> |
|                                                                                       | pollen    |



# Leadership in Energy and Environmental Design (LEED)

LEED®, or Leadership in Energy and Environmental Design, developed by the U.S. Green Building Council (USGBC) promotes a whole-building approach to sustainability by recognizing and rating performance in these key categories:



**Sustainable Sites:** discourages development on previously undeveloped land; seeks to minimize a building's impact on ecosystems and waterways; encourages regionally appropriate landscaping; rewards smart transportation choices; controls stormwater runoff; and promotes reduction of erosion, light pollution, heat island effect and construction-related pollution. (14 possible points)



**Water Efficiency:** encourages smarter use of water. Water reduction is typically achieved through more efficient appliances, fixtures and fittings inside and water-conscious landscaping outside. (5 possible points)



**Energy and Atmosphere:** encourages a wide variety of energy-wise strategies: energy-use monitoring; efficient design and construction; efficient appliances, systems and lighting; the use of renewable and clean sources of energy, generated on site or off site; and other innovative measures. (17 possible points)



**Materials and Resources:** encourages the selection of sustainably grown, harvested, produced and transported products and materials. It promotes waste reduction as well as reuse and recycling, and it particularly rewards the reduction of waste at a product's source. (13 possible points)



**Indoor Environmental Quality:** promotes strategies that improve indoor air as well as those that provide access to natural daylight and views and those that improve acoustics. (15 possible points)



**Innovation and Design Process:** provides bonus points for projects that use innovative technologies and strategies to improve a building's performance well beyond what is required by other LEED credits, or to account for green building considerations that are not specifically addressed elsewhere in LEED. This category also rewards projects for including a LEED Accredited Professional on the team to ensure a holistic, integrated approach to the design and construction process. (5 possible points)



## LEED Rating System

|                     |                   |
|---------------------|-------------------|
| Certified ...       | 26-32 points      |
| Silver ...          | 33-38 points      |
| Gold ...            | 39-51 points      |
| Platinum...         | 52 or more points |
| Possible points ... | 69 points         |





# LEED 2009 for New Construction and Major Renovations

## Project Checklist

Project Name

Date

### ☐ Sustainable Sites Possible Points: 26

| Y | ? | N |            |                                                                     |   |
|---|---|---|------------|---------------------------------------------------------------------|---|
| Y |   |   | Prereq 1   | Construction Activity Pollution Prevention                          |   |
| X |   |   | Credit 1   | Site Selection                                                      | 1 |
| X |   |   | Credit 2   | Development Density and Community Connectivity                      | 5 |
|   | X |   | Credit 3   | Brownfield Redevelopment                                            | 1 |
| X |   |   | Credit 4.1 | Alternative Transportation—Public Transportation Access             | 6 |
| X |   |   | Credit 4.2 | Alternative Transportation—Bicycle Storage and Changing Rooms       | 1 |
| X |   |   | Credit 4.3 | Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles | 3 |
| X |   |   | Credit 4.4 | Alternative Transportation—Parking Capacity                         | 2 |
| X |   |   | Credit 5.1 | Site Development—Protect or Restore Habitat                         | 1 |
| X |   |   | Credit 5.2 | Site Development—Maximize Open Space                                | 1 |
| X |   |   | Credit 6.1 | Stormwater Design—Quantity Control                                  | 1 |
| X |   |   | Credit 6.2 | Stormwater Design—Quality Control                                   | 1 |
| X |   |   | Credit 7.1 | Heat Island Effect—Non-roof                                         | 1 |
| X |   |   | Credit 7.2 | Heat Island Effect—Roof                                             | 1 |
| X |   |   | Credit 8   | Light Pollution Reduction                                           | 1 |

### ☐ Water Efficiency Possible Points: 10

| Y | ? | N |          |                                    |        |
|---|---|---|----------|------------------------------------|--------|
| Y |   |   | Prereq 1 | Water Use Reduction—20% Reduction  |        |
| X |   |   | Credit 1 | Water Efficient Landscaping        | 2 to 4 |
|   | X |   | Credit 2 | Innovative Wastewater Technologies | 2      |
| X |   |   | Credit 3 | Water Use Reduction                | 2 to 4 |

### ☐ Energy and Atmosphere Possible Points: 35

| Y | ? | N |          |                                                      |         |
|---|---|---|----------|------------------------------------------------------|---------|
| Y |   |   | Prereq 1 | Fundamental Commissioning of Building Energy Systems |         |
| Y |   |   | Prereq 2 | Minimum Energy Performance                           |         |
| Y |   |   | Prereq 3 | Fundamental Refrigerant Management                   |         |
| X |   |   | Credit 1 | Optimize Energy Performance                          | 1 to 19 |
| X |   |   | Credit 2 | On-Site Renewable Energy                             | 1 to 7  |
| X |   |   | Credit 3 | Enhanced Commissioning                               | 2       |
| X |   |   | Credit 4 | Enhanced Refrigerant Management                      | 2       |
| X |   |   | Credit 5 | Measurement and Verification                         | 3       |
| X |   |   | Credit 6 | Green Power                                          | 2       |

### ☐ Materials and Resources Possible Points: 14

| Y | ? | N |            |                                                                 |        |
|---|---|---|------------|-----------------------------------------------------------------|--------|
| Y |   |   | Prereq 1   | Storage and Collection of Recyclables                           |        |
|   | X |   | Credit 1.1 | Building Reuse—Maintain Existing Walls, Floors, and Roof        | 1 to 3 |
|   | X |   | Credit 1.2 | Building Reuse—Maintain 50% of Interior Non-Structural Elements | 1      |
| X |   |   | Credit 2   | Construction Waste Management                                   | 1 to 2 |
| X |   |   | Credit 3   | Materials Reuse                                                 | 1 to 2 |

### ☐ Materials and Resources, Continued

| Y | ? | N |          |                             |        |
|---|---|---|----------|-----------------------------|--------|
| X |   |   | Credit 4 | Recycled Content            | 1 to 2 |
| X |   |   | Credit 5 | Regional Materials          | 1 to 2 |
| X |   |   | Credit 6 | Rapidly Renewable Materials | 1      |
| X |   |   | Credit 7 | Certified Wood              | 1      |

### ☐ Indoor Environmental Quality Possible Points: 15

| Y | ? | N |            |                                                              |   |
|---|---|---|------------|--------------------------------------------------------------|---|
| Y |   |   | Prereq 1   | Minimum Indoor Air Quality Performance                       |   |
| Y |   |   | Prereq 2   | Environmental Tobacco Smoke (ETS) Control                    |   |
| X |   |   | Credit 1   | Outdoor Air Delivery Monitoring                              | 1 |
| X |   |   | Credit 2   | Increased Ventilation                                        | 1 |
| X |   |   | Credit 3.1 | Construction IAQ Management Plan—During Construction         | 1 |
| X |   |   | Credit 3.2 | Construction IAQ Management Plan—Before Occupancy            | 1 |
| X |   |   | Credit 4.1 | Low-Emitting Materials—Adhesives and Sealants                | 1 |
| X |   |   | Credit 4.2 | Low-Emitting Materials—Paints and Coatings                   | 1 |
| X |   |   | Credit 4.3 | Low-Emitting Materials—Flooring Systems                      | 1 |
| X |   |   | Credit 4.4 | Low-Emitting Materials—Composite Wood and Agrifiber Products | 1 |
| X |   |   | Credit 5   | Indoor Chemical and Pollutant Source Control                 | 1 |
| X |   |   | Credit 6.1 | Controllability of Systems—Lighting                          | 1 |
| X |   |   | Credit 6.2 | Controllability of Systems—Thermal Comfort                   | 1 |
| X |   |   | Credit 7.1 | Thermal Comfort—Design                                       | 1 |
|   | X |   | Credit 7.2 | Thermal Comfort—Verification                                 | 1 |
| X |   |   | Credit 8.1 | Daylight and Views—Daylight                                  | 1 |
| X |   |   | Credit 8.2 | Daylight and Views—Views                                     | 1 |

### ☐ Innovation and Design Process Possible Points: 6

| Y | ? | N |            |                                      |   |
|---|---|---|------------|--------------------------------------|---|
| X |   |   | Credit 1.1 | Innovation in Design: Specific Title | 1 |
| X |   |   | Credit 1.2 | Innovation in Design: Specific Title | 1 |
| X |   |   | Credit 1.3 | Innovation in Design: Specific Title | 1 |
|   | X |   | Credit 1.4 | Innovation in Design: Specific Title | 1 |
|   | X |   | Credit 1.5 | Innovation in Design: Specific Title | 1 |
| X |   |   | Credit 2   | LEED Accredited Professional         | 1 |

### ☐ Regional Priority Credits Possible Points: 4

| Y | ? | N |            |                                    |   |
|---|---|---|------------|------------------------------------|---|
| X |   |   | Credit 1.1 | Regional Priority: Specific Credit | 1 |
| X |   |   | Credit 1.2 | Regional Priority: Specific Credit | 1 |
|   | X |   | Credit 1.3 | Regional Priority: Specific Credit | 1 |
|   | X |   | Credit 1.4 | Regional Priority: Specific Credit | 1 |

### ☐ Total Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110



## Rating System

LEED for New Construction

LEED for Core & Shell

LEED for Schools

LEED for Healthcare\*

LEED for Retail\*

LEED for Commercial Interiors

LEED for Retail Interiors\*

LEED for Existing Buildings

LEED for Existing Schools\*

## Reference Guide

**GREEN BUILDING DESIGN  
& CONSTRUCTION**  
2009 Edition

**GREEN INTERIOR DESIGN  
& CONSTRUCTION**  
2009 Edition

**GREEN BUILDING  
OPERATIONS & MAINTENANCE**  
2009 Edition

## LEED® for Commercial Interiors

**Total Possible Points\*\* 110\***

|                                                                                     |                              |    |
|-------------------------------------------------------------------------------------|------------------------------|----|
|  | Sustainable Sites            | 21 |
|  | Water Efficiency             | 11 |
|  | Energy & Atmosphere          | 37 |
|  | Materials & Resources        | 14 |
|  | Indoor Environmental Quality | 17 |

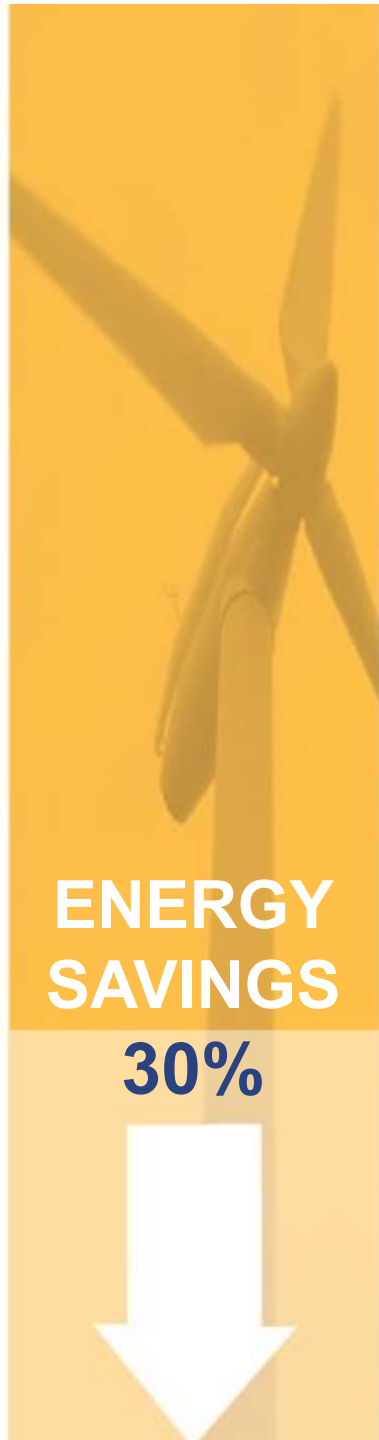
\* Out of a possible 100 points + 10 bonus points

\*\* Certified 40+ points, Silver 50+ points,  
Gold 60+ points, Platinum 80+ points

|                                                                                       |                      |   |
|---------------------------------------------------------------------------------------|----------------------|---|
|  | Innovation in Design | 6 |
|  | Regional Priority    | 4 |

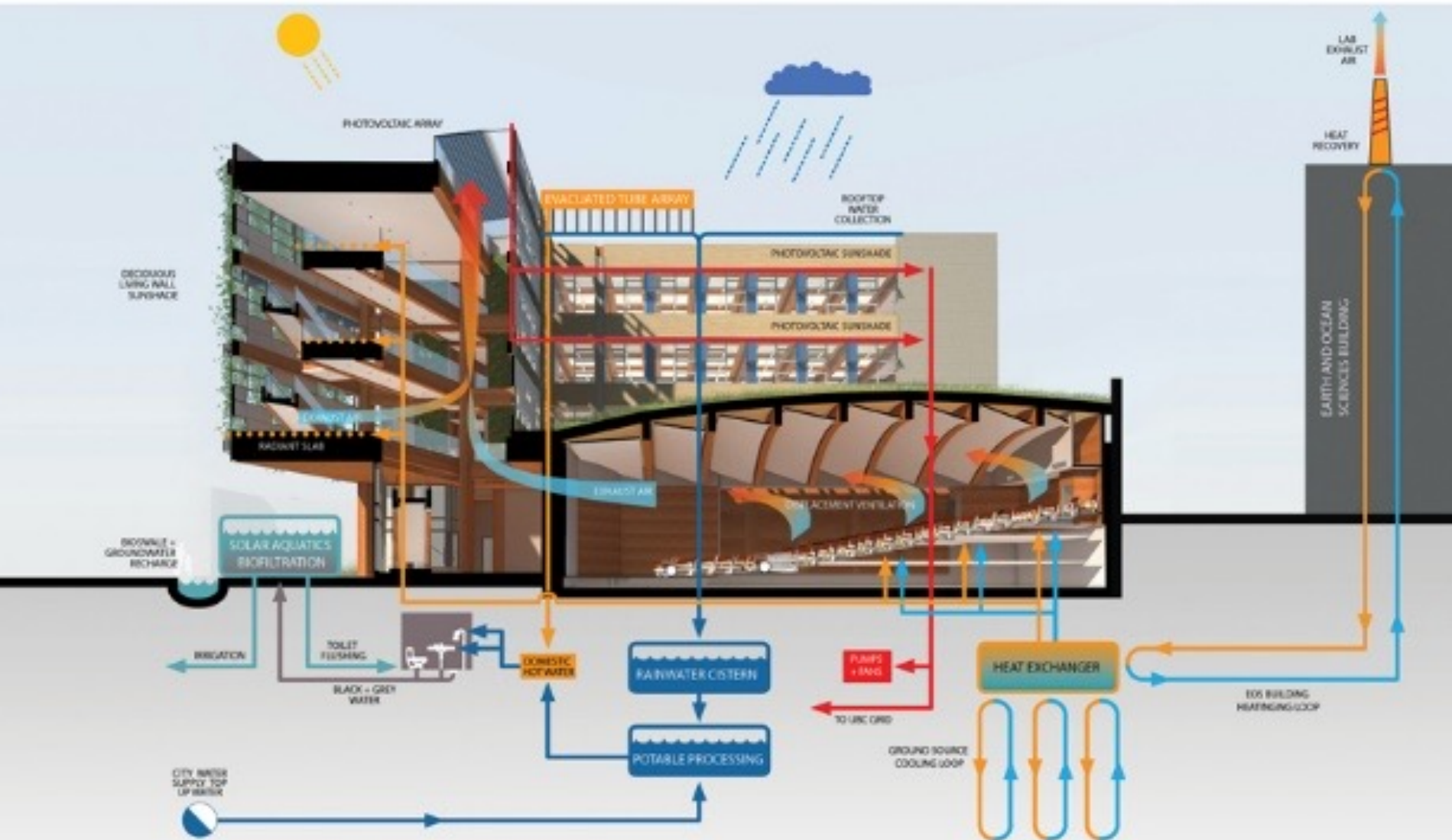


# Average Savings of Green Buildings





# The Centre for Interactive Research on Sustainability Perkins+Will

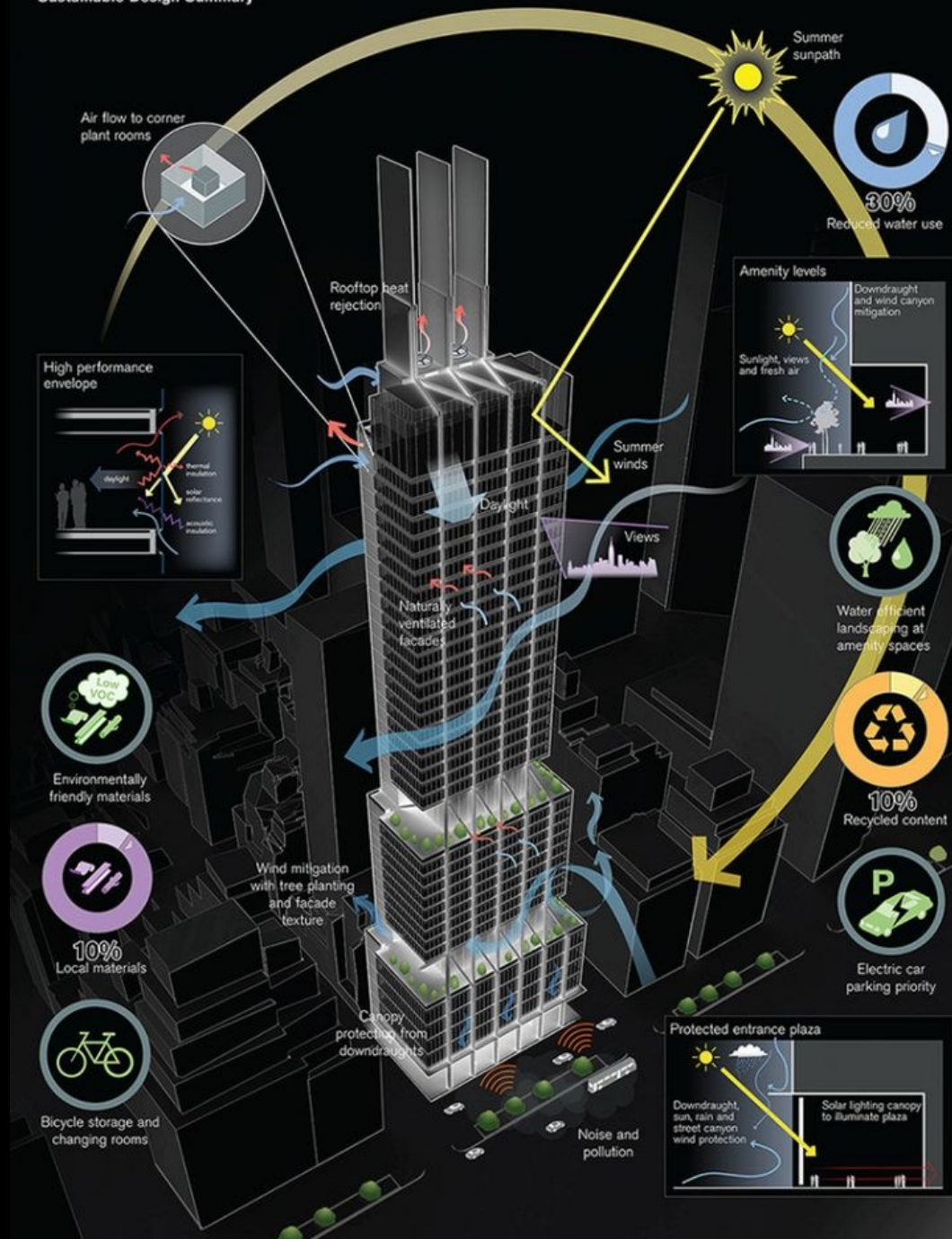




# 425 Park Avenue | Foster + Partners



## Environmental Responses and Sustainable Design Summary



# Hammurabi's Code of Laws

- If a builder builds a house for someone, and does not construct it properly, and the house which is built, falls in and kills its owner, then that builder shall be put to death. (Hammurabi's Code of Laws, ca. 1780 BC)



# Natural Catastrophes:

## Number of Climate-related Disasters Around the World (1980-2011)

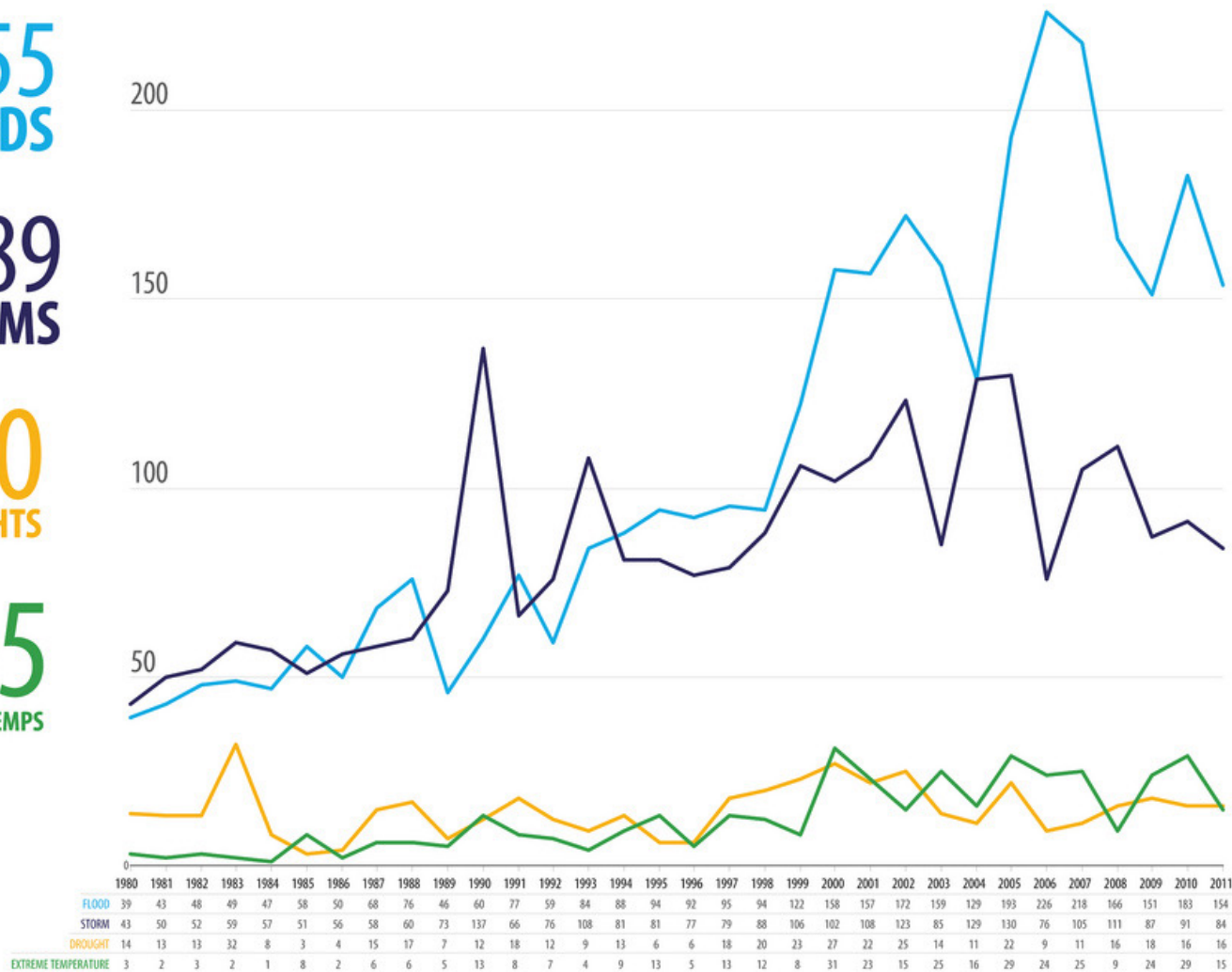
 **3455**  
FLOODS

 **2689**  
STORMS

 **470**  
DROUGHTS

 **395**  
EXTREME TEMPS

 **UNISDR**  
The United Nations Office for Disaster Risk Reduction  
<http://www.unisdr.org>  
Version: 13 June 2012  
DATA SOURCES  
EM-DAT - <http://www.emdat.be/> - The OFDA/CRED International Disaster Database; Data version: 13 June 2012 - v12.07  
Humanitarian Symbol Set (2008):  
<http://www.unisdr.org/map/guideline.php>





A designer's choices are frequently constrained by regulations intended to protect *public safety* and *welfare*

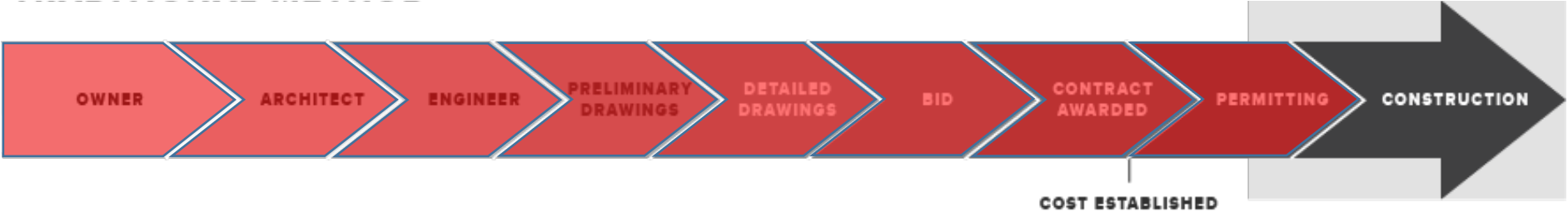
### **Building types**

- different uses
- different loads
- different spans
- different fire ratings
- different thermal needs
- different acoustical needs
- different life spans – reuse, recycle
- different context – physical, cultural, historical, economic

costs: materials, labor, environmental, social

### **Materials**

- enhance sustainability
- energy use & output
- local extraction, production, distribution, usage
- economics of material: local extraction, use, production, transportation, distribution, construction methods, maintenance, reuse



- Idea
- 

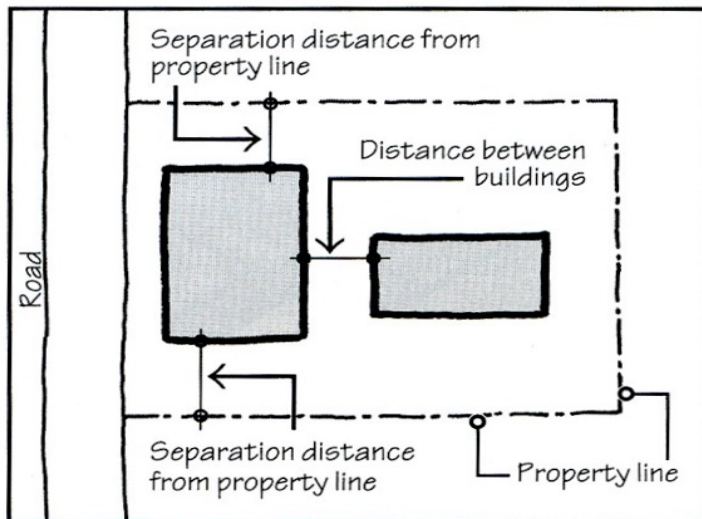


Tampering with or knowingly making a false entry in or falsely altering this permit is a crime that is punishable by a fine, imprisonment or both.

ehry

# Zoning Ordinances

- Regulate land use
  - Land coverage by buildings
  - Set back from adjacent property lines
  - parking spaces provided
  - total floor area (F.A.R.) - floor area divide by lot area
  - Height of the building
    - Bonuses due to plazas, community spaces
    - Transfer air rights
  - Districts/Use (i.e. residential, commercial, manufacturing)

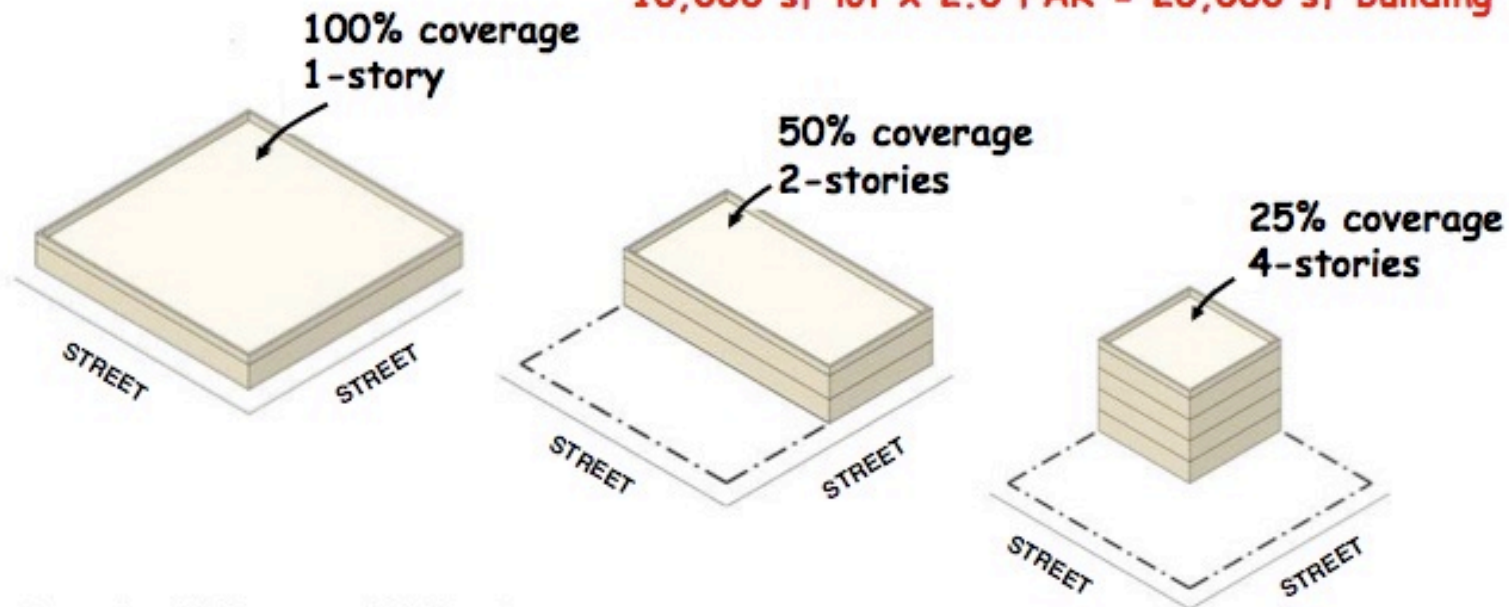




# FAR Illustrated

Every zoning district has a **floor area ratio (FAR)**.  
Multiplying the FAR by the **lot size** will give you the permitted **floor area (size)** of a building.

$10,000 \text{ sf lot} \times 1.0 \text{ FAR} = 10,000 \text{ sf building}$   
 $10,000 \text{ sf lot} \times 2.0 \text{ FAR} = 20,000 \text{ sf building}$



*Images from NYC Department of City Planning*

A client has a lot in a zoning district that allows a 2.0 FAR. It is 200 feet wide by 350 deep.

- Determine **the maximum allowable floor area** that can be built on that site?
- If only **25%** of the site can be covered with the footprint of the building, how many floors will the building be?

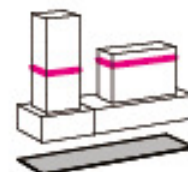
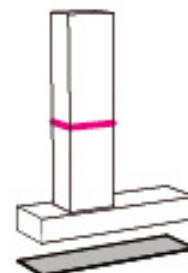
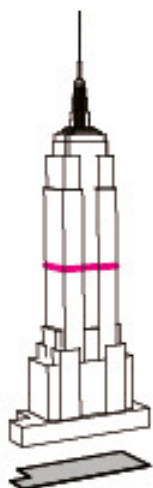
$$\text{FAR} = \frac{\text{floor area (FA)}}{\text{lot area (LA)}}$$

$$2 = \frac{\text{floor area}}{200\text{ft} \times 350\text{ft}} \\ (70.000 \text{ ft}^2)$$

$$\text{Floor area} = \mathbf{140.000\text{ft}^2}$$

$$\text{Total Lot Area} = 70.000 \text{ ft}^2 \quad \mathbf{25\% \text{ of}} \text{ Total Lot Area} = 17.500 \text{ ft}^2$$

$$\# \text{ of floors} = 140.000 \text{ ft}^2 / 17.500 \text{ ft}^2 \quad \mathbf{\# \text{ of floors} = 8}$$



Empire State

One Chase Plaza

Woolworth

Equitable

Lever House

Flatiron

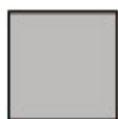
Durst Proposal 1

Durst Proposal 2

LOT SIZE



92,347 ft.<sup>2</sup>



126,443 ft.<sup>2</sup>



30,086 ft.<sup>2</sup>



49,580 ft.<sup>2</sup>



34,794 ft.<sup>2</sup>



11,944 ft.<sup>2</sup>



128,058 ft.<sup>2</sup>



128,058 ft.<sup>2</sup>

AVG.  
USABLE  
SPACE



29,987 ft.<sup>2</sup>  
32%



35,519 ft.<sup>2</sup>  
28%



7921 ft.<sup>2</sup>  
26%



41,956 ft.<sup>2</sup>  
85%



7785 ft.<sup>2</sup>  
22%



11,943 ft.<sup>2</sup>  
99%



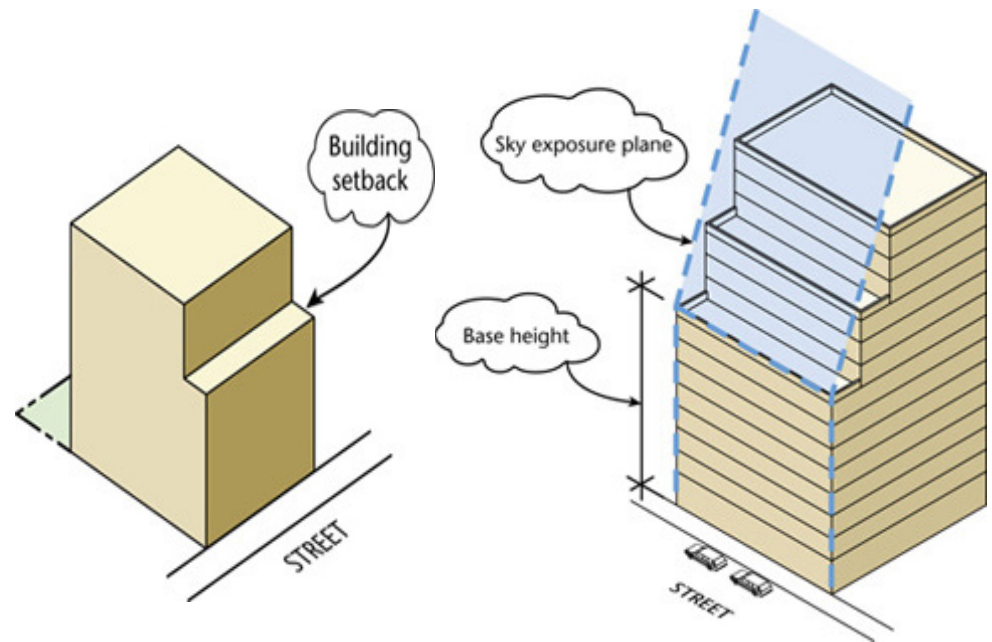
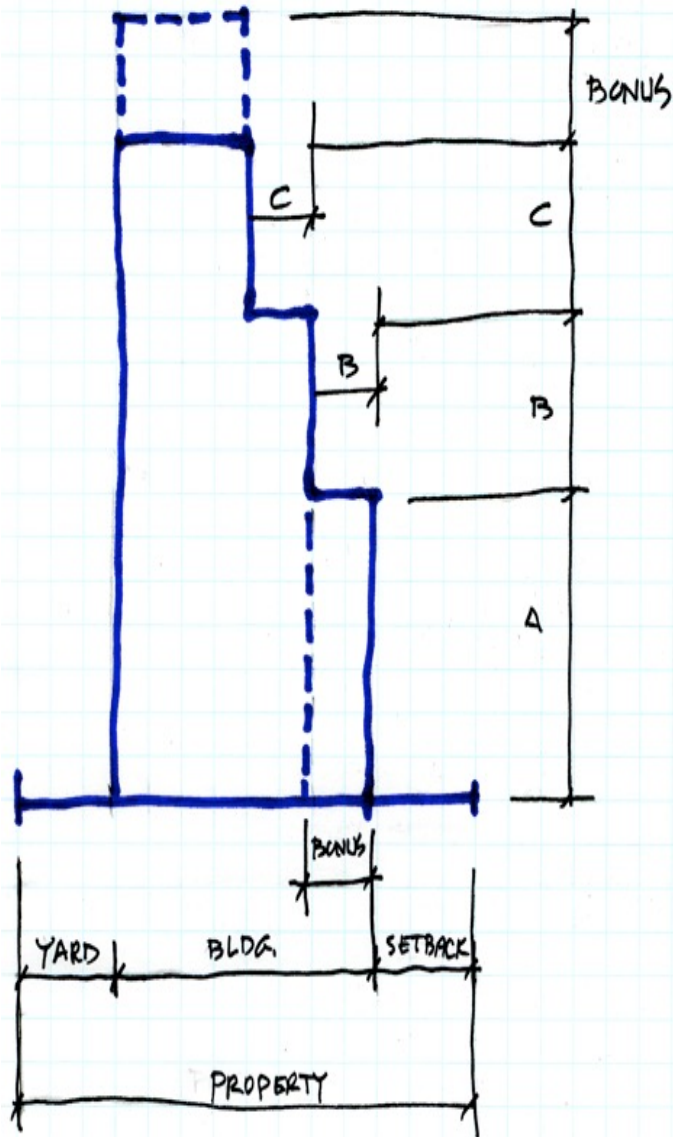
25,260 ft.<sup>2</sup>  
20%



47,134 ft.<sup>2</sup>  
37%

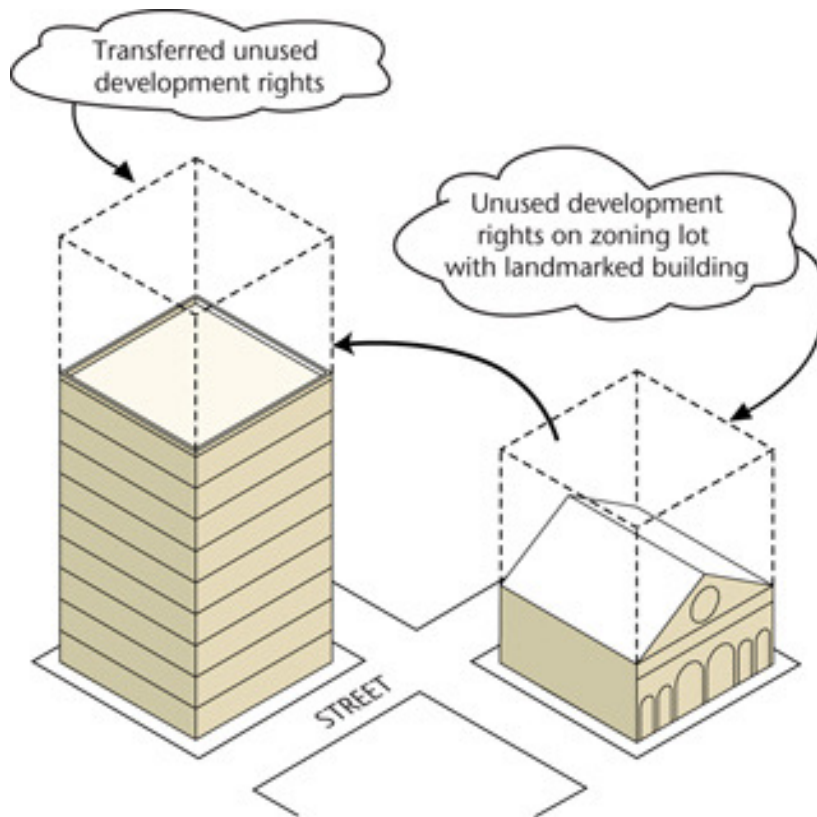


# Set backs

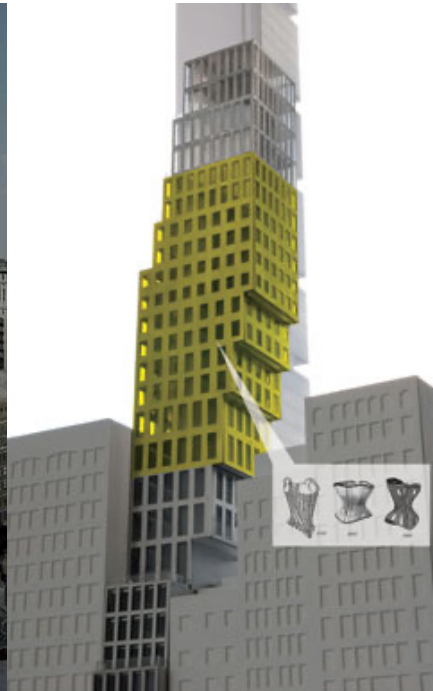


# Air rights!

**Development Rights (Air rights):** Development rights generally refer to the maximum amount of floor area permissible on a zoning lot. When the actual built floor area is less than the maximum permitted floor area, the difference is referred to as “*unused development rights*.”



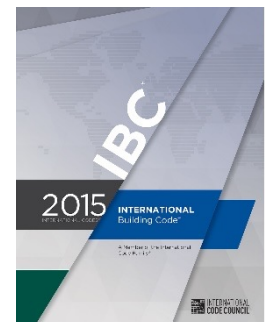






# Building Codes:

- Regulate building activity
- Building codes protect *public health and safety* by setting minimum standards for:
  - construction quality
  - structural integrity
  - durability
  - livability
  - accessibility
  - fire safety
- In the US, the *International Building Code* (IBC) is the predominant model code.



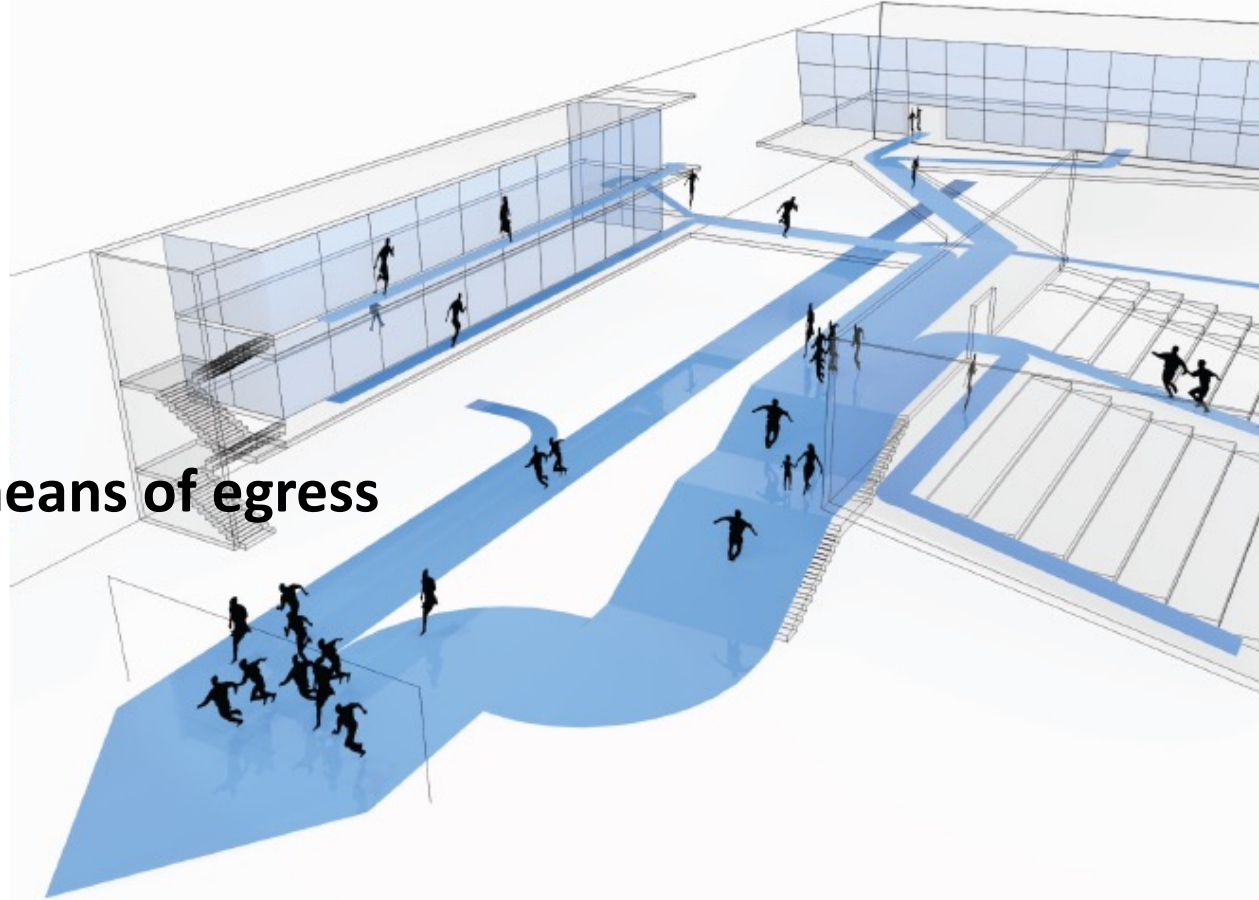
## Codes Focuses:

- Building Occupancy Classification
- Building heights and areas
- Materials/finishes
- Foundation, wall and roof construction
- Fire protection systems
- Elevators and Escalators
- Already existing structures
- Means of Egress

# Means of Egress

One important aspect to consider in any architectural design is how the building will function during **emergency scenarios** such as fires.

- a **clear**
- **continuous**
- **safe way**
- **more than one means of egress**

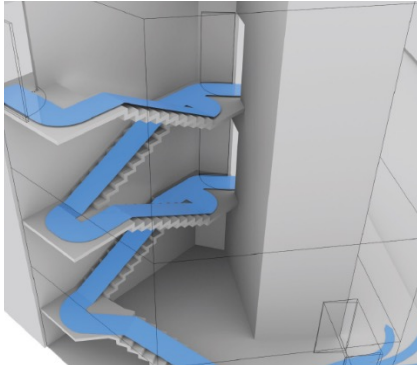


in most occupancies **no point in a floor plan** should be more than **75 feet** from an exit.





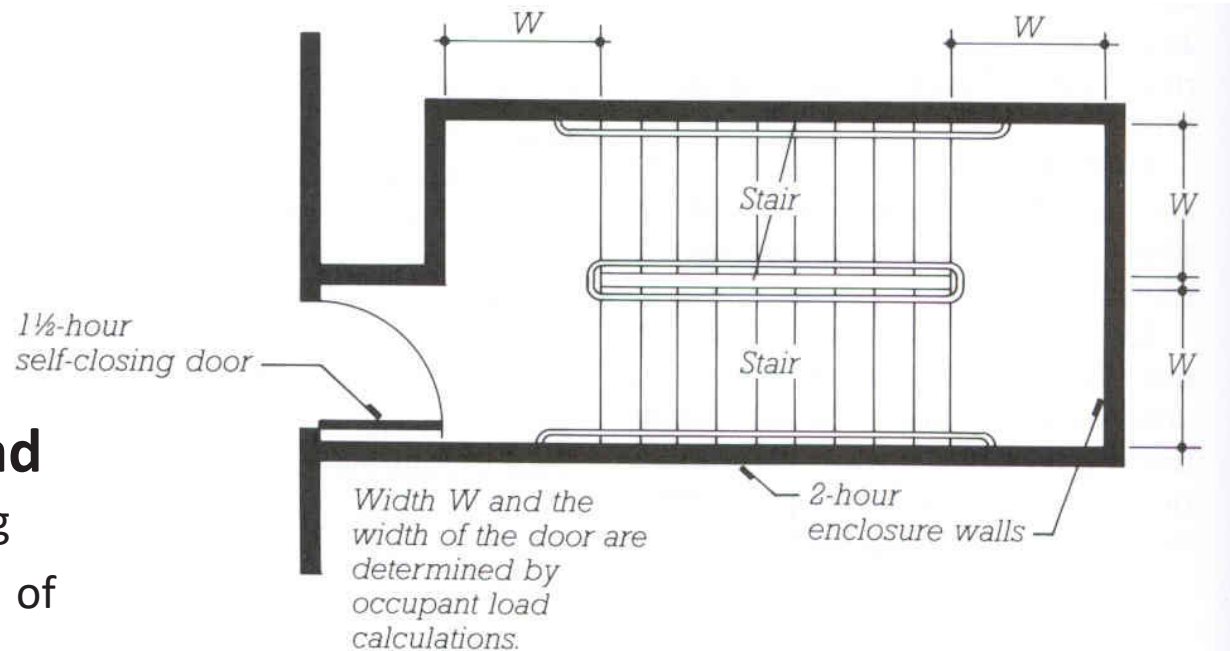
# Exit Stairway



Increasing **occupant load** frequently means increasing the **number** and/or **size** of emergency exits

every door inside the building has to open **in the direction of emergency travel**.

Exterior doors must **open outwards**, to allow people to leave the building easily.





# Occupancy Classifications

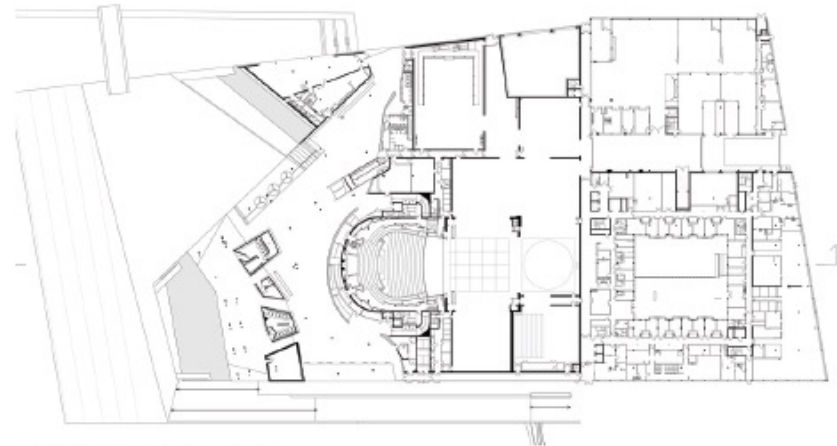
| Generally decreasing hazard → |                                                                                                                                                                      |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |                                                         |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------|
| <b>A</b><br>Assembly          | <b>A-1</b><br>Movie theatre, TV and radio stations, concert hall, etc.                                                                                               | <b>A-2</b><br>Banquet hall, restaurant, nightclub, etc.              | <b>A-3</b><br>Church, gymnasium, lecture hall, museum, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>A-4</b><br>Skating rink, swimming pool, tennis court, etc.            | <b>A-5</b><br>Stadium, grandstand, amusement park, etc. |
| <b>B</b><br>Business          | Bank, professional offices (architects, attorneys, doctors, etc.), beauty shop, fire and police stations, post office, educational institution beyond grade 12, etc. |                                                                      | A room or space used for assembly purposes by less than 50 persons and as an accessory to another occupancy is considered to belong to that occupancy. If the number of persons using that space is 50 or more, it will be considered as an assembly occupancy. For example, a lecture or classroom for less than 50 students in an educational building (Occupancy E if up to grade 12 or Occupancy B if beyond grade 12) is classified as Occupancy E or Occupancy B. A classroom for more than 50 students in the same building is classified as Occupancy A-3. |                                                                          |                                                         |
| <b>E</b><br>Educational       |                                                                                                                                                                      |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |                                                         |
| <b>F</b><br>Factory           |                                                                                                                                                                      |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |                                                         |
|                               | <b>F-1</b><br>Automobile, bicycles, bakery, clothing, furniture, etc.                                                                                                | <b>F-2</b><br>Beverages, brick and masonry, glass, gypsum, etc.      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |                                                         |
| <b>H</b><br>Hazardous         | <b>H-1</b><br>Structures with explosives, unstable chemicals, etc.                                                                                                   | <b>H-2</b><br>Structures with combustible dust, flammable gas, etc.  | <b>H-3</b><br>Structures with aerosols, flammable solids, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>H-4</b><br>Structures with toxic materials, etc.                      |                                                         |
| <b>I</b><br>Institutional     | <b>I-1</b><br>Convalescent home, assisted living center, etc.                                                                                                        | <b>I-2</b><br>Hospital, nursing home, 24-hour day care center, etc.  | <b>I-3</b><br>Prison, detention center, correction center, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>I-4</b><br>Adult care facility with at least 5 people, etc.           |                                                         |
| <b>M</b><br>Mercantile        | Department store, drugstore, market, sales room, motor vehicle service station, etc.                                                                                 |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |                                                         |
| <b>R</b><br>Residential       | <b>R-1</b><br>Hotel, motel, boarding house, etc.                                                                                                                     | <b>R-2</b><br>Apartment, dormitory, monastery, fraternity, etc.      | <b>R-3</b><br>Single-family or two-family dwelling unit, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>R-4</b><br>Assisted living for more than 5 but fewer than 16 persons. |                                                         |
| <b>S</b><br>Storage           | <b>S-1</b><br>Aircraft hangar, furniture, clothing, grain, leather, etc.                                                                                             | <b>S-2</b><br>Cement, glass, parking garage (open or enclosed), etc. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |                                                         |
| <b>U</b><br>Utility           | Agricultural building, carport, greenhouse, livestock shelter, etc.                                                                                                  |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |                                                         |



# Occupancy Classifications

## Assembly A1

- Theaters
- Movie Theaters
- Symphony and Concert Halls
- Television and Radio Studios admitting an audience

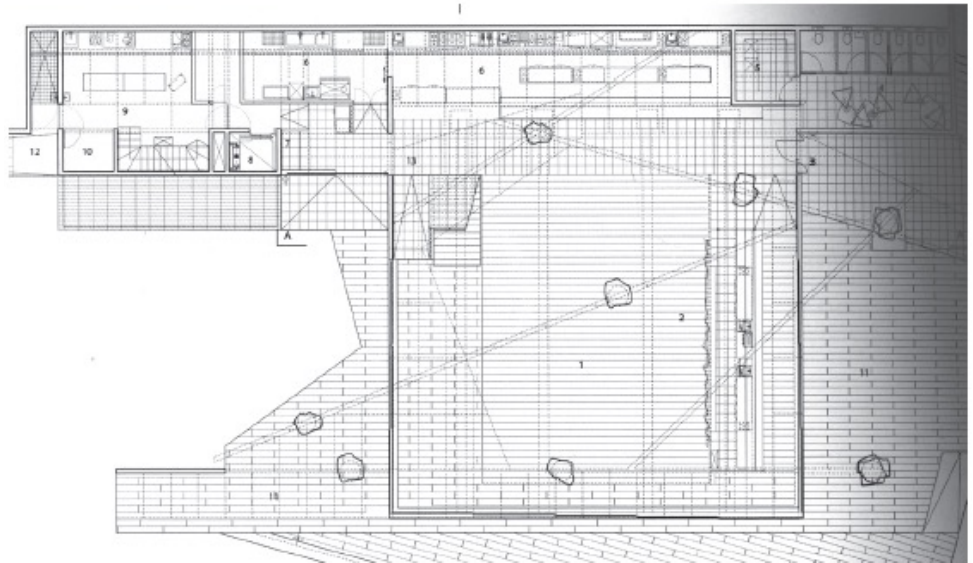


Oslo Opera House / Snohetta

Assembly uses, usually with **fixed seating**, intended for the production and viewing of the performing arts or motion pictures

# Assembly A2

- Restaurants
- Banquet Halls
- Night Clubs
- Taverns and bars

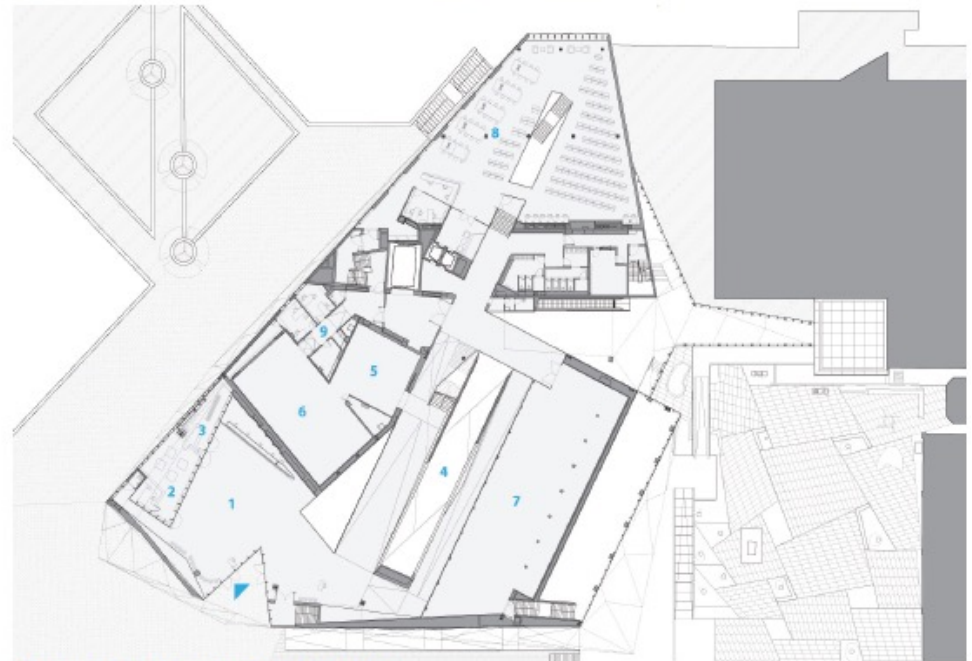


Restaurant Mestizo / Smiljan Radic

Assembly uses intended for **food and/or drink** consumption

# Assembly A3

- Amusement Arcades
- Art Galleries
- Bowling Alleys
- Community Halls
- Courtrooms
- Dance Halls
- Exhibition Halls
- Gymnasiums
- Indoor swimming pools
- Indoor tennis courts
- Lecture Halls
- Libraries
- Museums



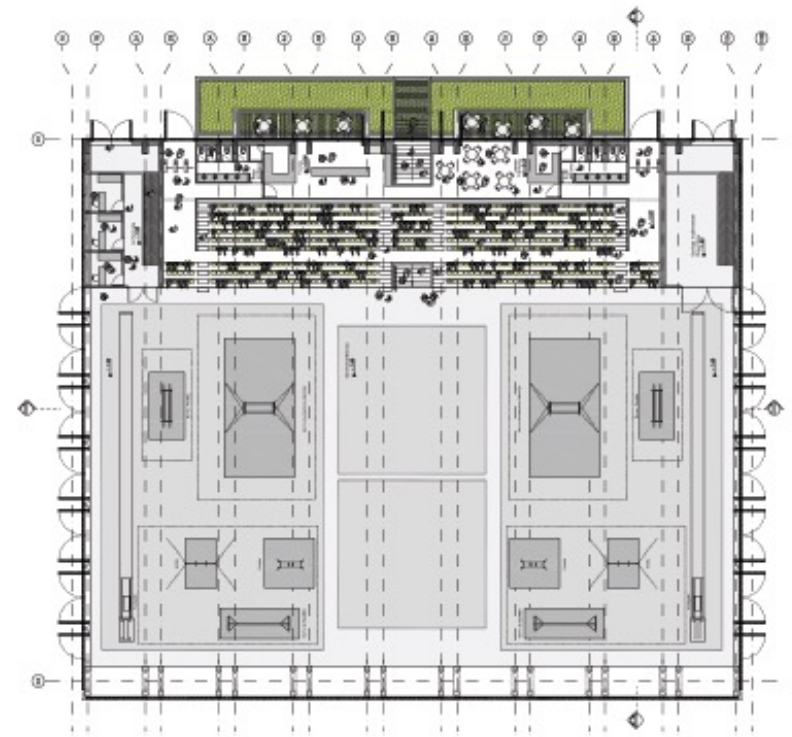
Tel Aviv Museum of Art / Preston Scott Cohen

Assembly uses intended for **worship, recreation** or **amusement** and other assembly uses



# Assembly A4

- Arenas
- Skating Rinks
- Swimming Pools
- Tennis Courts

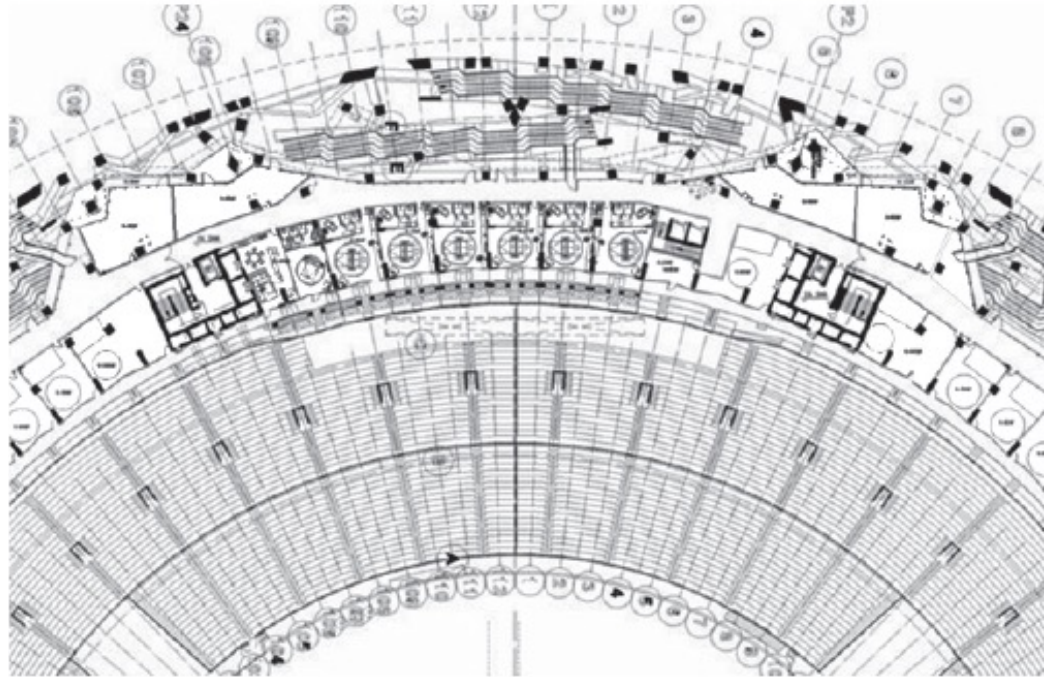


Sport Arena / Giancarlo Mazzanti and Felipe Mesa

Assembly uses intended for viewing of **indoor sporting events** and **activities** with spectator seating

# Assembly A5

- Stadiums
- Bleachers
- Amusement Park
- Structures

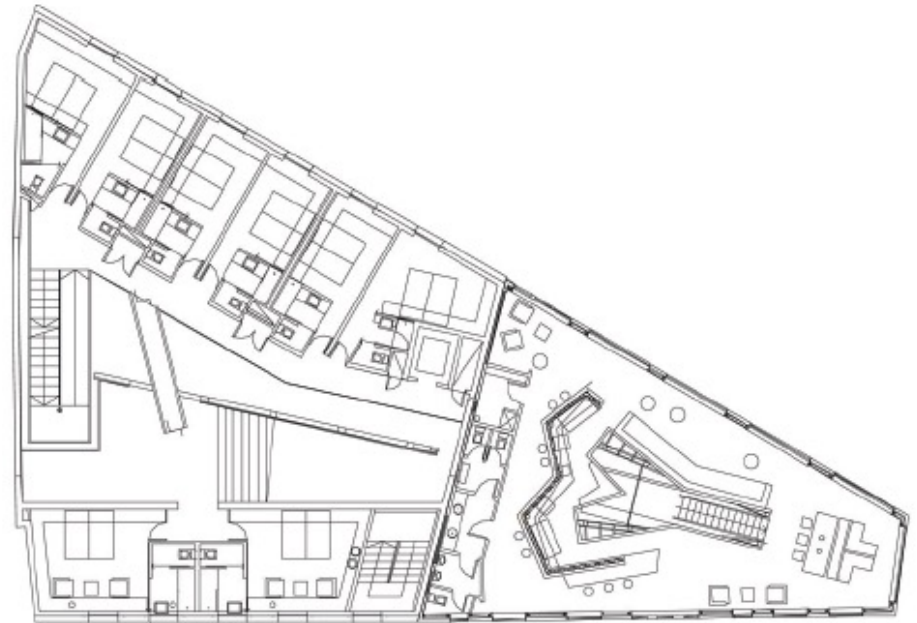


Beijing Olympic Stadium / Herzog & de Meuron + Ai Weiwei

Assembly uses intended for **participation in** or **viewing** outdoor activities

# Residential R1

- Hotels
- Motels
- Transient Boarding Houses



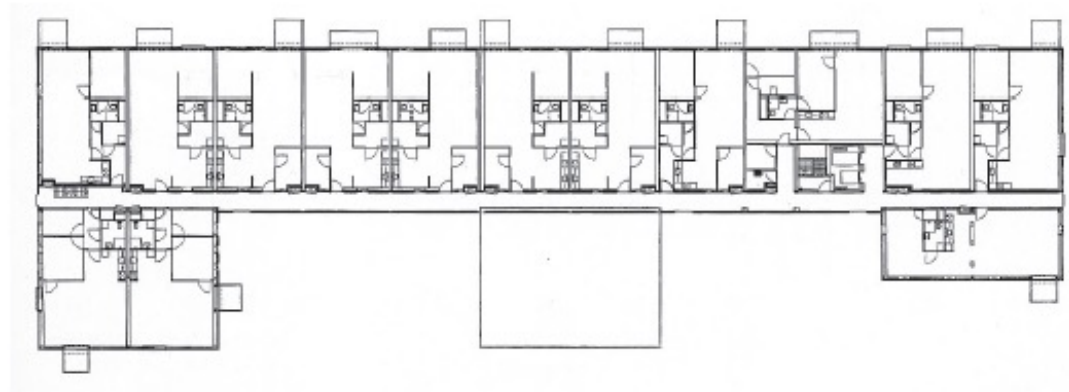
Hotel Indigo / Sebastián Irrarazaval

Residential occupancies containing **sleeping units** where the occupants are primarily **transient**



# Residential R2

- Apartments Houses
- Dormitories
- Fraternities
- Live-Work Complexes
- Convents and Monasteries
- Non-transient Hotels
- Motels and Boarding
- Houses

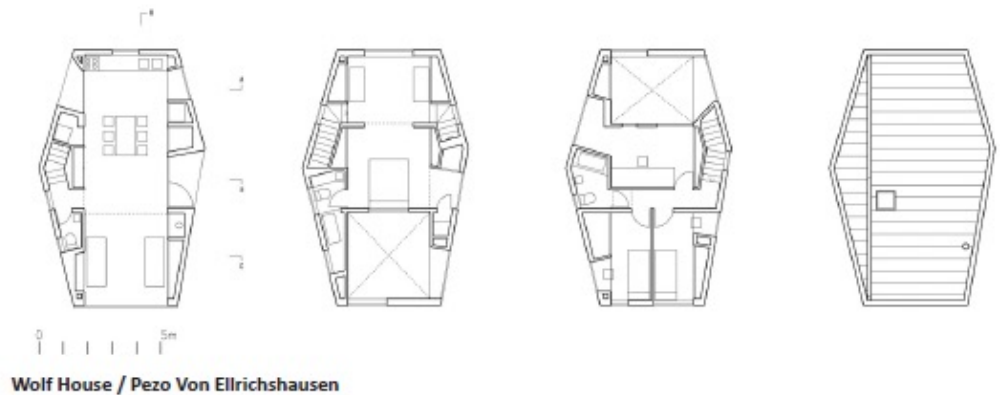


WoZoCo Apartments / MVRDV

Residential occupancies containing **sleeping units** or more than **two dwelling** units where the occupants are primarily **permanent**

# Residential R3

- One- and Two-Family Houses
- Buildings Containing One of Two Dwelling Units
- Adult Day-Care Facilities



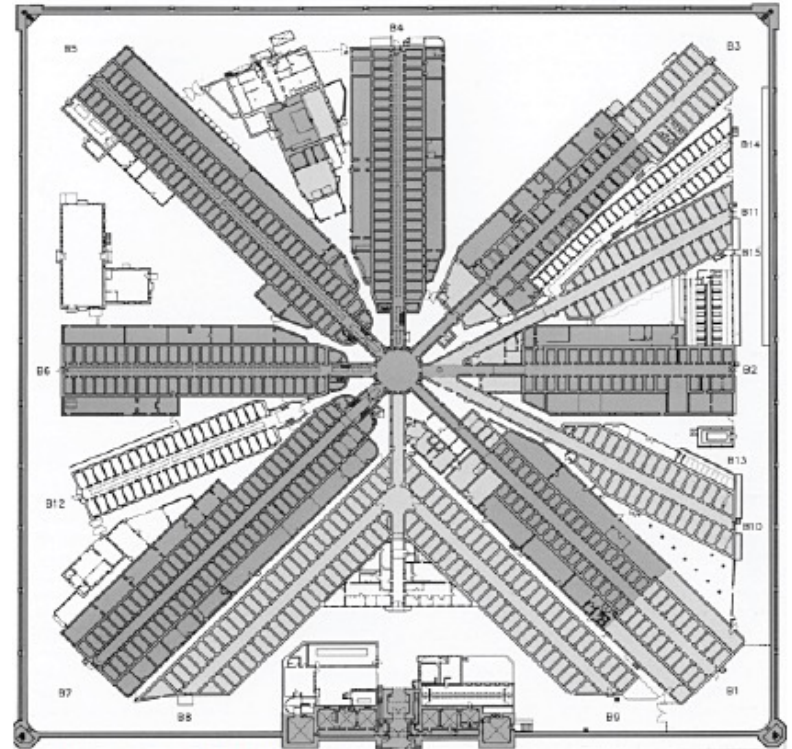
Residential occupancies where the occupants are primarily **permanent** and not classified as R-1, R-2, or Institutional.





# Institutional I3

- Jails
- Prisons
- Reformatories
- Correctional, Detention and Prerelease Centers

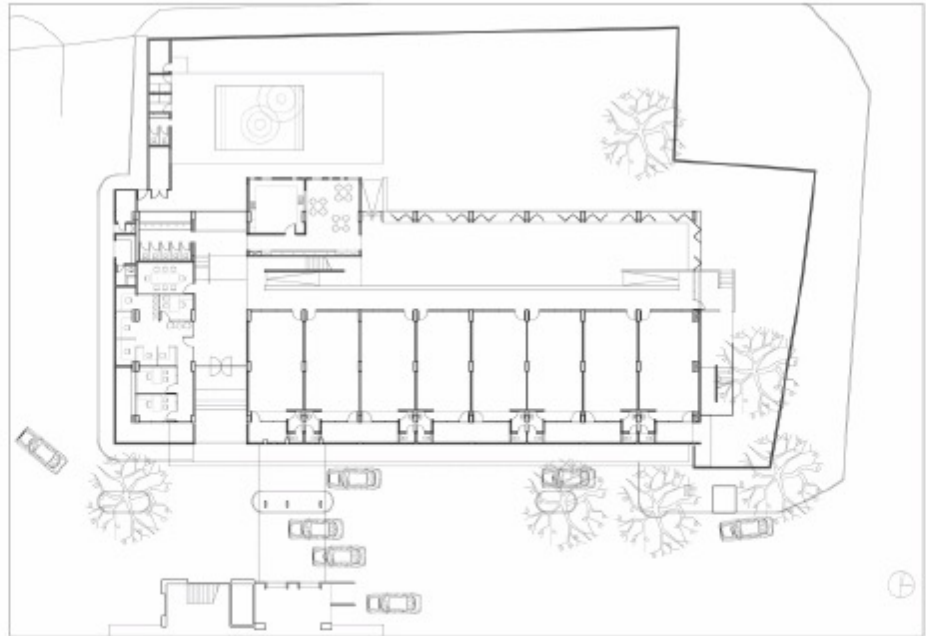


Eastern State Penitentiary / John Haviland

Buildings inhabited by more than 5 persons who are under  
**restraint** or **security**

# Educational E

- Elementary
- Schools
- Secondary Schools
- High Schools



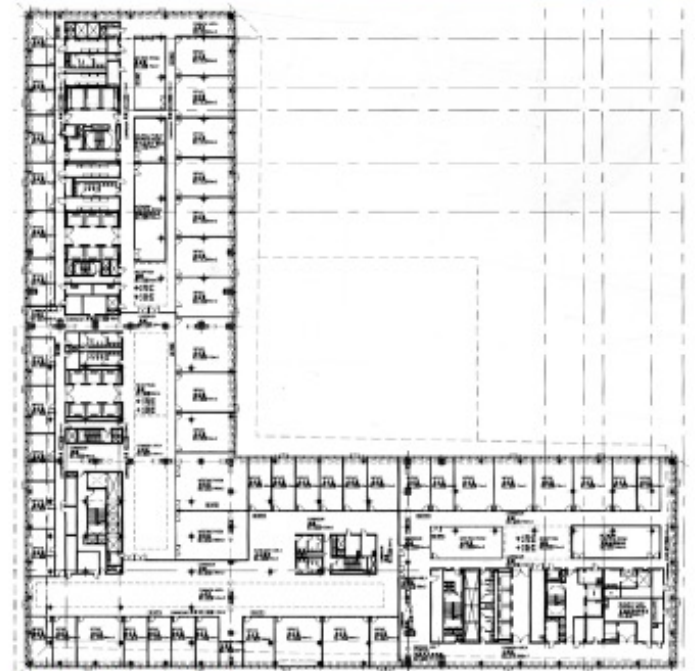
Adolfo Ibañez

/ José Cruz

Buildings used by 6 or more persons at any one time for **educational purposes** through the **12th** grade

# Business B

- Office Towers
- Banks
- Barber and Beauty Shops
- Car Washes
- Civil Administration
- Laboratories
- Outpatient Clinic and
- Care Facilities
- Printshops



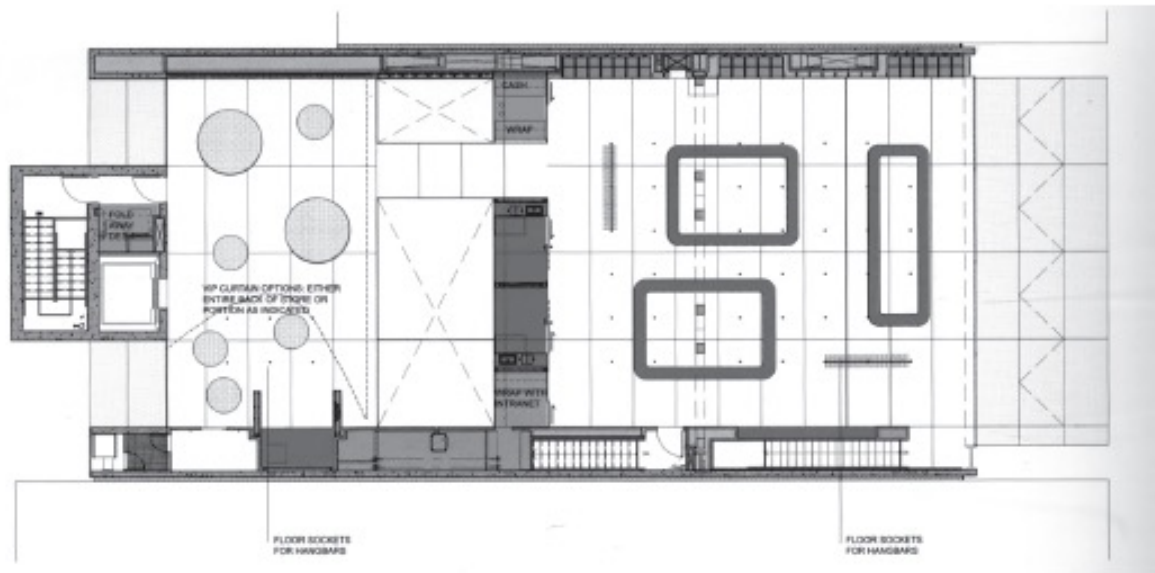
CCTV Headquarters/ OMA

Buildings used for **office, professional,** or **service-type** transactions, including storage of records and accounts



# Mercantile M

- Retail Stores
- Department Stores



PRADA Los Angeles / OMA

Buildings used for the **display** and **sale of merchandise**, involving stocks of goods and merchandise incidental to such purposes and accessible to the public

# Construction Types

- Each Type has an “A” and a “B” sub-category
- “A” has increased fire protection requirements

## COMBUSTIBLE

TYPE V  
WOOD FRAME



TYPE IV  
HEAVY TIMBER



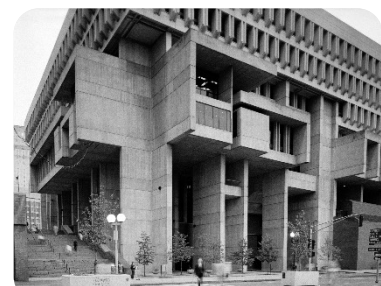
TYPE III  
ORDINARY



TYPE II  
NON-COMBUSTIBLE



TYPE I  
FIRE RESISTIVE





# IBC: Construction Type, Occupancy Group, Fire Ratings

**TABLE 503**  
**ALLOWABLE HEIGHT AND BUILDING AREAS**  
Height limitations shown as stories and feet above grade plane.  
Area limitations as determined by the definition of "Area, building," per floor.

| GROUP            |   | TYPE OF CONSTRUCTION |        |         |        |          |        |         |        |        |
|------------------|---|----------------------|--------|---------|--------|----------|--------|---------|--------|--------|
|                  |   | TYPE I               |        | TYPE II |        | TYPE III |        | TYPE IV | TYPE V |        |
|                  |   | A                    | B      | A       | B      | A        | B      | HT      | A      | B      |
| HGT(feet)        |   |                      |        |         |        |          |        |         |        |        |
| Hgt(S)           |   | UL                   | 160    | 65      | 55     | 65       | 55     | 65      | 50     | 40     |
| A-1              | S | UL                   | 5      | 3       | 2      | 3        | 2      | 3       | 2      | 1      |
|                  | A | UL                   | UL     | 15,500  | 8,500  | 14,000   | 8,500  | 15,000  | 11,500 | 5,500  |
| A-2              | S | UL                   | 11     | 3       | 2      | 3        | 2      | 3       | 2      | 1      |
|                  | A | UL                   | UL     | 15,500  | 9,500  | 14,000   | 9,500  | 15,000  | 11,500 | 6,000  |
| A-3              | S | UL                   | 11     | 3       | 2      | 3        | 2      | 3       | 2      | 1      |
|                  | A | UL                   | UL     | 15,500  | 9,500  | 14,000   | 9,500  | 15,000  | 11,500 | 6,000  |
| A-4              | S | UL                   | 11     | 3       | 2      | 3        | 2      | 3       | 2      | 1      |
|                  | A | UL                   | UL     | 15,500  | 9,500  | 14,000   | 9,500  | 15,000  | 11,500 | 6,000  |
| A-5              | S | UL                   | UL     | UL      | UL     | UL       | UL     | UL      | UL     | UL     |
|                  | A | UL                   | UL     | UL      | UL     | UL       | UL     | UL      | UL     | UL     |
| B                | S | UL                   | 11     | 5       | 4      | 5        | 4      | 5       | 3      | 2      |
|                  | A | UL                   | UL     | 37,500  | 23,000 | 28,500   | 19,000 | 36,000  | 18,000 | 9,000  |
| E                | S | UL                   | 5      | 3       | 2      | 3        | 2      | 3       | 1      | 1      |
|                  | A | UL                   | UL     | 26,500  | 14,500 | 23,500   | 14,500 | 25,500  | 18,500 | 9,500  |
| F-1              | S | UL                   | 11     | 4       | 2      | 3        | 2      | 4       | 2      | 1      |
|                  | A | UL                   | UL     | 25,000  | 15,500 | 19,000   | 12,000 | 33,500  | 14,000 | 8,500  |
| F-2              | S | UL                   | 11     | 5       | 3      | 4        | 3      | 5       | 3      | 2      |
|                  | A | UL                   | UL     | 37,500  | 23,000 | 28,500   | 18,000 | 50,500  | 21,000 | 13,000 |
| H-1              | S | 1                    | 1      | 1       | 1      | 1        | 1      | 1       | 1      | NP     |
|                  | A | 21,000               | 16,500 | 11,000  | 7,000  | 9,500    | 7,000  | 10,500  | 7,500  | NP     |
| H-2              | S | 3                    | 2      | 1       | 2      | 1        | 2      | 1       | 2      | 1      |
|                  | A | 21,000               | 16,500 | 11,000  | 7,000  | 9,500    | 7,000  | 10,500  | 7,500  | 3,000  |
| H-3              | S | UL                   | 6      | 4       | 2      | 4        | 2      | 4       | 2      | 1      |
|                  | A | UL                   | 60,000 | 26,500  | 14,000 | 17,500   | 13,000 | 25,500  | 10,000 | 5,000  |
| H-4              | S | UL                   | 7      | 5       | 3      | 5        | 3      | 5       | 3      | 2      |
|                  | A | UL                   | UL     | 37,500  | 17,500 | 28,500   | 17,500 | 36,000  | 18,000 | 6,500  |
| H-5              | S | 3                    | 3      | 3       | 3      | 3        | 3      | 3       | 3      | 2      |
|                  | A | UL                   | UL     | 37,500  | 23,000 | 28,500   | 19,000 | 36,000  | 18,000 | 9,000  |
| I-1              | S | UL                   | 9      | 4       | 3      | 4        | 3      | 4       | 3      | 2      |
|                  | A | UL                   | 55,000 | 19,000  | 10,000 | 16,500   | 10,000 | 18,000  | 10,500 | 4,500  |
| I-2              | S | UL                   | 4      | 2       | 1      | 1        | Np     | 1       | 1      | NP     |
|                  | A | UL                   | UL     | 15,000  | 11,000 | 12,000   | Np     | 12,000  | 9,500  | NP     |
| I-3              | S | UL                   | 4      | 2       | 1      | 2        | 1      | 2       | 2      | 1      |
|                  | A | UL                   | UL     | 15,000  | 11,000 | 10,500   | 7,500  | 12,000  | 7,500  | 5,000  |
| I-4              | S | UL                   | 5      | 3       | 2      | 3        | 2      | 3       | 1      | 1      |
|                  | A | UL                   | 60,500 | 26,500  | 13,000 | 23,500   | 13,000 | 25,500  | 18,500 | 9,000  |
| M                | S | UL                   | 11     | 4       | 4      | 4        | 4      | 4       | 3      | 1      |
|                  | A | UL                   | UL     | 21,500  | 12,500 | 18,500   | 12,500 | 20,500  | 14,000 | 9,000  |
| R-1              | S | UL                   | 11     | 4       | 4      | 4        | 4      | 4       | 3      | 2      |
|                  | A | UL                   | UL     | 24,000  | 16,000 | 24,000   | 16,000 | 20,500  | 12,000 | 7,000  |
| R-2 <sup>a</sup> | S | UL                   | 11     | 4       | 4      | 4        | 4      | 4       | 3      | 2      |
|                  | A | UL                   | UL     | 24,000  | 16,000 | 24,000   | 16,000 | 20,500  | 12,000 | 7,000  |
| R-3 <sup>a</sup> | S | UL                   | 11     | 4       | 4      | 4        | 4      | 4       | 3      | 3      |
|                  | A | UL                   | UL     | UL      | UL     | UL       | UL     | UL      | UL     | UL     |
| R-4              | S | UL                   | 11     | 4       | 4      | 4        | 4      | 4       | 3      | 2      |
|                  | A | UL                   | UL     | 24,000  | 16,000 | 24,000   | 16,000 | 20,500  | 12,000 | 7,000  |
| S-1              | S | UL                   | 11     | 4       | 3      | 3        | 3      | 4       | 3      | 1      |
|                  | A | UL                   | 48,000 | 26,000  | 17,500 | 26,000   | 17,500 | 25,500  | 14,000 | 9,000  |
| S-2              | S | UL                   | 11     | 5       | 4      | 4        | 4      | 5       | 4      | 2      |
|                  | A | UL                   | 79,000 | 39,000  | 26,000 | 39,000   | 26,000 | 38,500  | 21,000 | 13,500 |
| U                | S | UL                   | 5      | 4       | 2      | 3        | 2      | 4       | 2      | 1      |
|                  | A | UL                   | 35,500 | 19,000  | 8,500  | 14,000   | 8,500  | 18,000  | 9,000  | 5,500  |

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m<sup>2</sup>.

UL = Unlimited

a. As applicable in Section 101.2.

**TABLE 601**  
**FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)**

| BUILDING ELEMENT                                                     | TYPE I             |                | TYPE II        |   | TYPE III       |   | TYPE IV | TYPE V         |   |
|----------------------------------------------------------------------|--------------------|----------------|----------------|---|----------------|---|---------|----------------|---|
|                                                                      | A                  | B              | A <sup>d</sup> | B | A              | B | HT      | A <sup>d</sup> | B |
| Structural frame <sup>a</sup><br>Including columns, girders, trusses | 3 <sup>b</sup>     | 2 <sup>b</sup> | 1              | 0 | 1              | 0 | HT      | 1              | 0 |
| Bearing walls                                                        |                    |                |                |   |                |   |         |                |   |
| Exterior <sup>d</sup>                                                | 3                  | 2              | 1              | 0 | 2              | 2 | 2       | 1              | 0 |
| Interior                                                             | 3 <sup>b</sup>     | 2 <sup>b</sup> | 1              | 0 | 1              | 0 | 1/HT    | 1              | 0 |
| Nonbearing walls and partitions                                      |                    |                |                |   |                |   |         |                |   |
| Exterior                                                             |                    |                |                |   |                |   |         |                |   |
| Interior <sup>d</sup>                                                |                    |                |                |   |                |   |         |                |   |
|                                                                      |                    |                |                |   |                |   |         |                |   |
| Floor construction<br>Including supporting beams and joists          | 2                  | 2              | 1              | 0 | 1              | 0 | HT      | 1              | 0 |
| Roof construction<br>Including supporting beams and joists           | 1 1/2 <sup>e</sup> | 1 <sup>c</sup> | 1 <sup>c</sup> | 0 | 1 <sup>c</sup> | 0 | HT      | 1 <sup>c</sup> | 0 |

For SI: 1 foot = 304.8 mm.

- The structural frame shall be considered to be the columns and the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads. The members of floor or roof panels which have no connection to the columns shall be considered secondary members and not a part of the structural frame.
- Roof supports: Fire-resistance ratings of structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
1. Except in Factory-Industrial (F-1), Hazardous (H), Mercantile (M) and Moderate-Hazard Storage (S-1) occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.
  - In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.
  - In Type I and Type II construction, fire-retardant-treated wood shall be allowed in buildings not over two stories including girders and trusses as part of the roof construction.
- An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.
- For interior nonbearing partitions in Type IV construction, also see Section 602.4.6.
- Not less than the fire-resistance rating based on fire separation distance (see Table 602).

**TABLE 602**  
**FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE<sup>a</sup>**

| FIRE SEPARATION DISTANCE (feet) | TYPE OF CONSTRUCTION | GROUP H | GROUP F-1, M, S-1 | GROUP A, B, E, F-2, I, R <sup>b</sup> , S-2, U |
|---------------------------------|----------------------|---------|-------------------|------------------------------------------------|
| < 5 <sup>c</sup>                | All                  | 3       | 2                 | 1                                              |
| ≥ 5                             | IA                   | 3       | 2                 | 1                                              |
| < 10                            | Others               | 2       | 1                 | 1                                              |
| ≥ 10                            | IA, IB               | 2       | 1                 | 1                                              |
| < 30                            | IIB, VB              | 1       | 0                 | 0                                              |
|                                 | Others               | 1       | 1                 | 1                                              |
| ≥ 30                            | All                  | 0       | 0                 | 0                                              |

For SI: 1 foot = 304.8 mm.

a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.

b. Group R-3 and Group U when used as accessory to Group R-3, as applicable in Section 101.2 shall not be required to have a fire-resistance rating where fire separation distance is 3 feet or more.

c. See Section 503.2 for party walls.



**FIRE SPRINKLER  
PROTECTED**

**At 48 seconds, the fire sprinkler cover plate drops**

**FIRE SPRINKLER  
PROTECTED**

**At 60 seconds the fire sprinkler head activates**

FIRE SPRINKLER  
PROTECTED

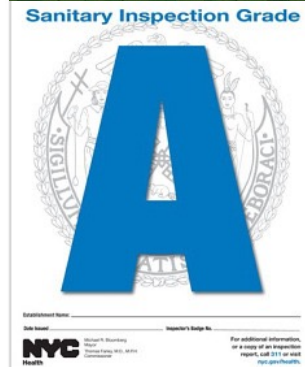
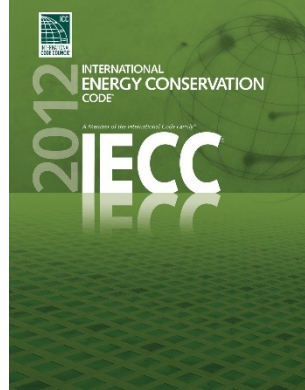
**At 2 minutes, 20 seconds flashover occurs**

Platform Fire Sprinkler Demonstration 3-15



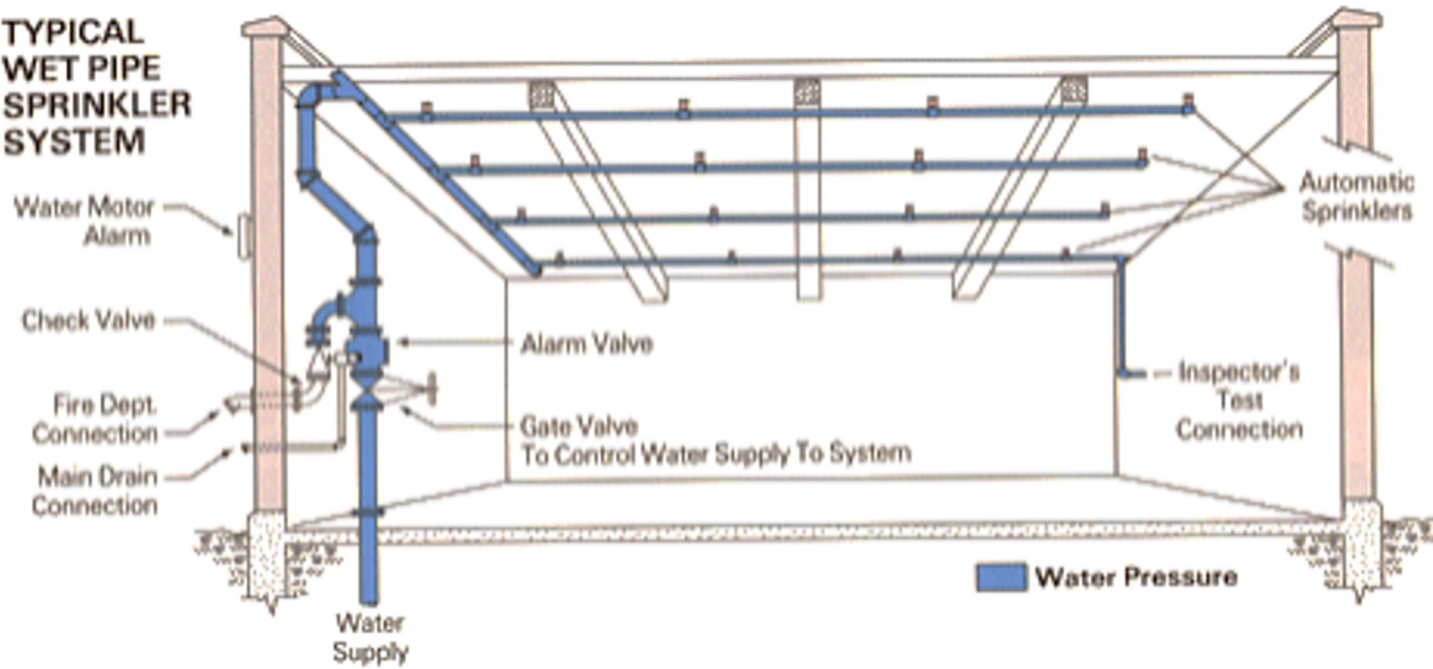
# Codes

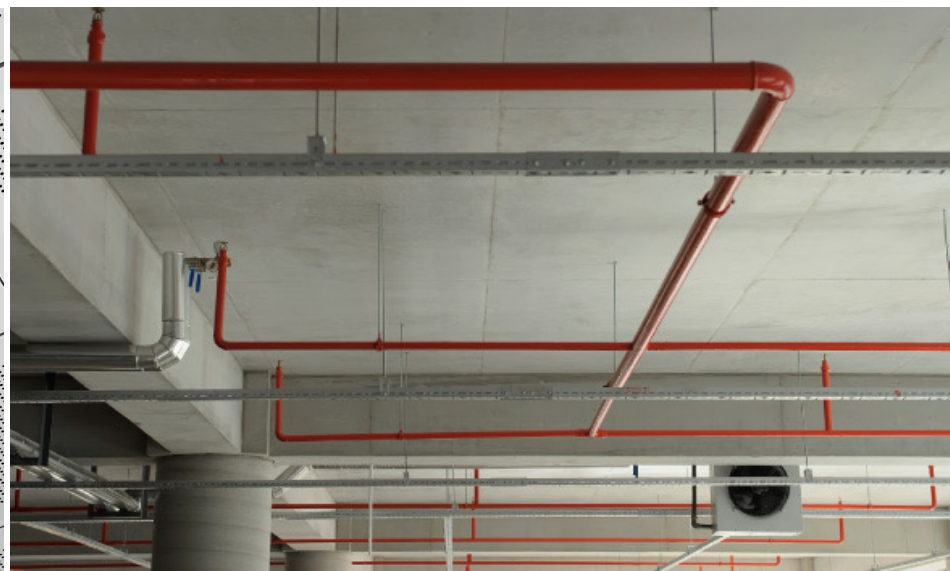
- **Energy Codes** (*standards for energy efficiency*)
  - Windows, heating and cooling systems, enclosing walls and roofs
- **Health Codes** (*sanitation in public facilities*)
  - Swimming pools, food service operations, schools and health care facilities
- **Fire Codes**
  - Egress pathways, fire protection systems, emergency power and other
- **Electrical and Mechanical Codes**
  - Electrical, plumbing, heating and cooling





### TYPICAL WET PIPE SPRINKLER SYSTEM





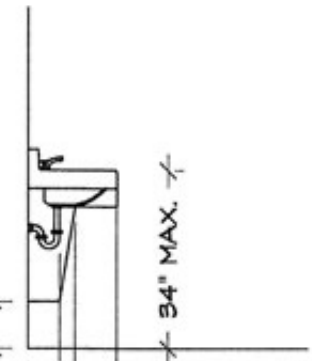
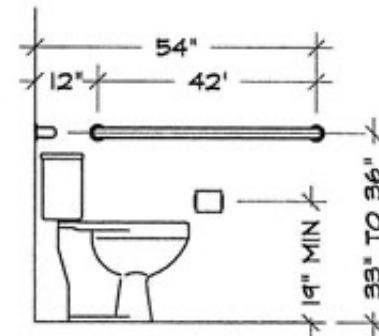
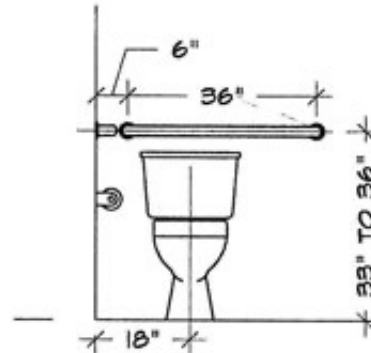
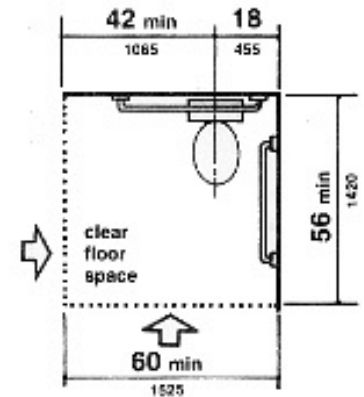
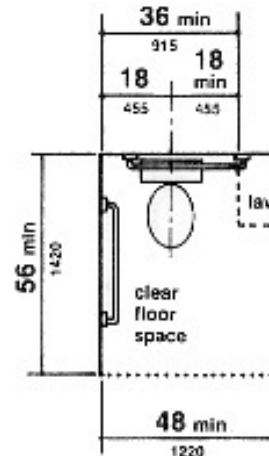
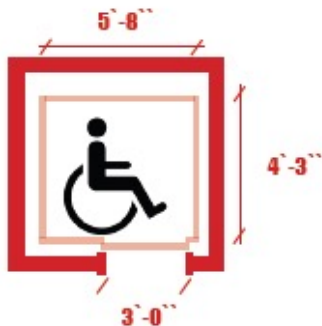




# DA Standards for Accessible Design

Buildings have to be accessible to

**every** occupant



6" MAX.  
TOE CLEARANCE

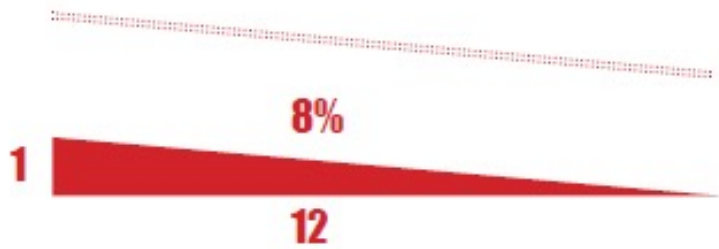
8" MIN.  
KNEE CLEARANCE



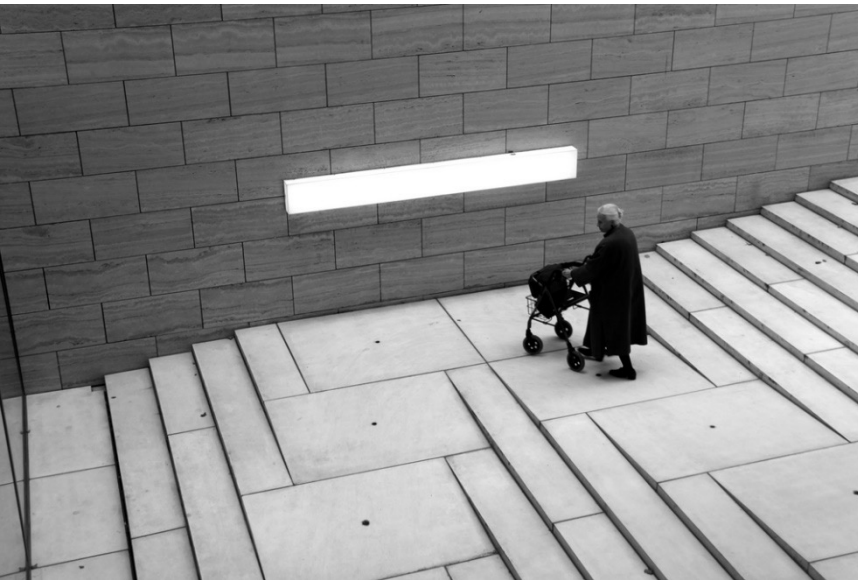
People in wheelchairs need **more space** for maneuvering than people walking



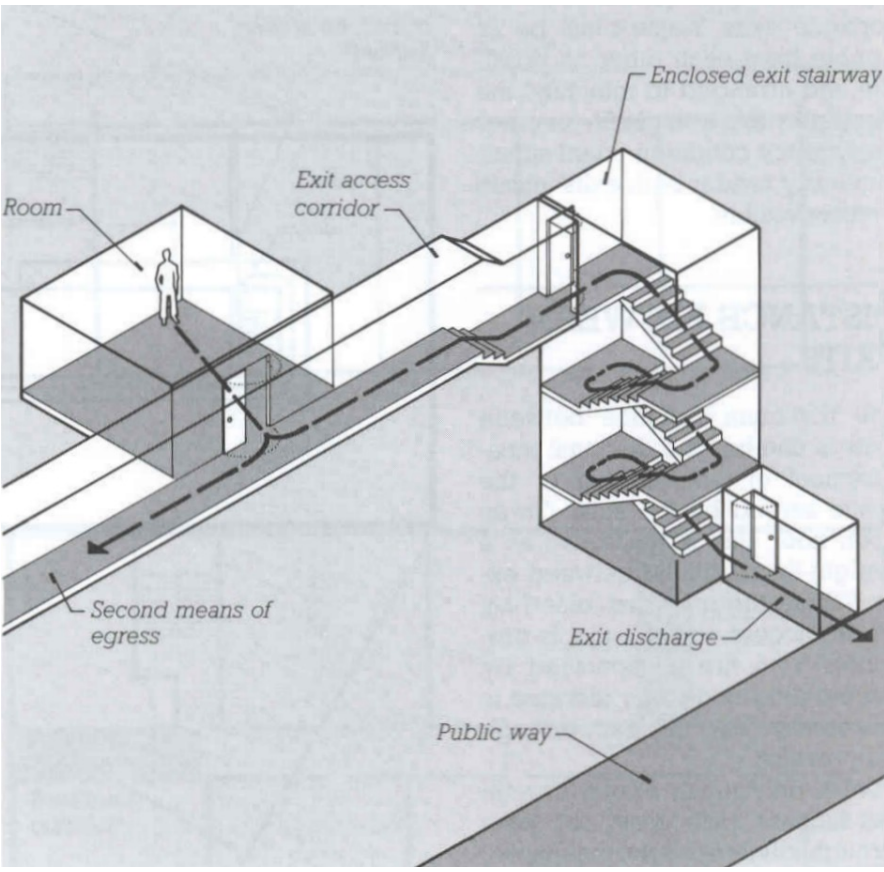
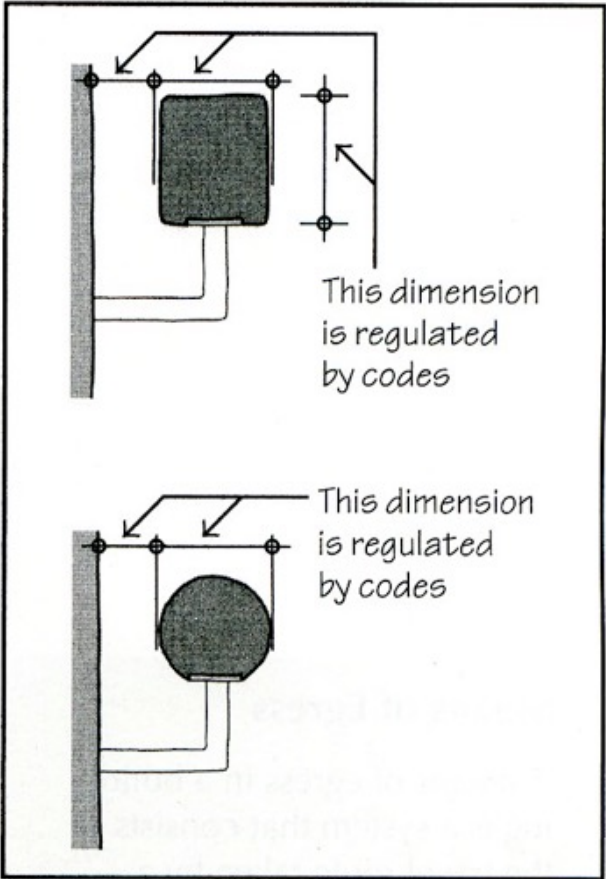
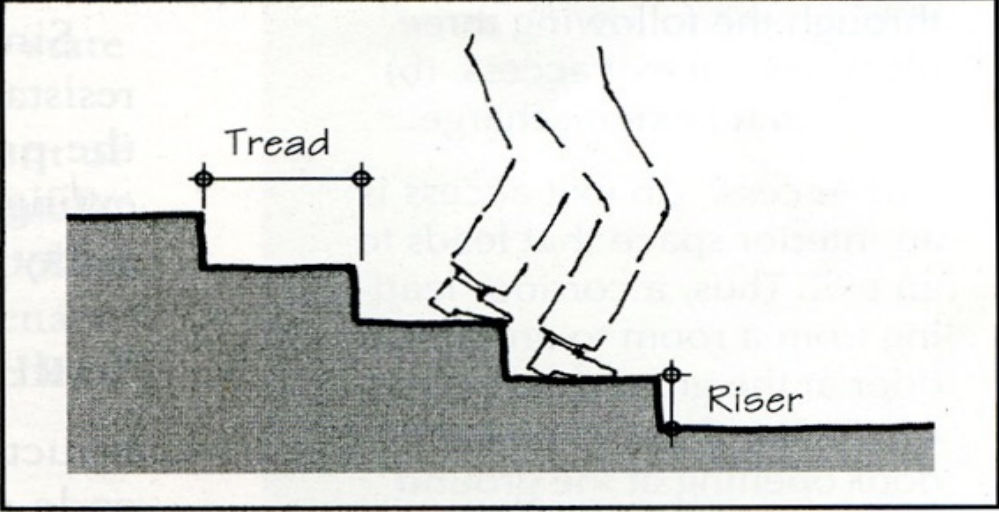
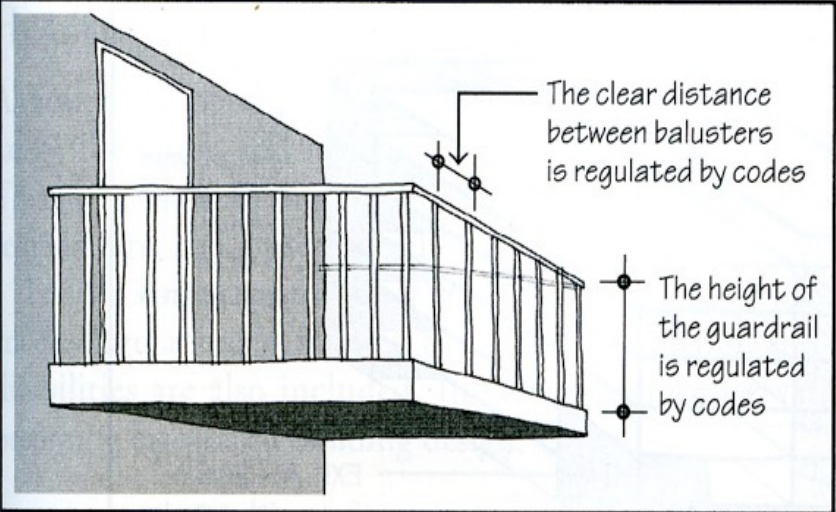




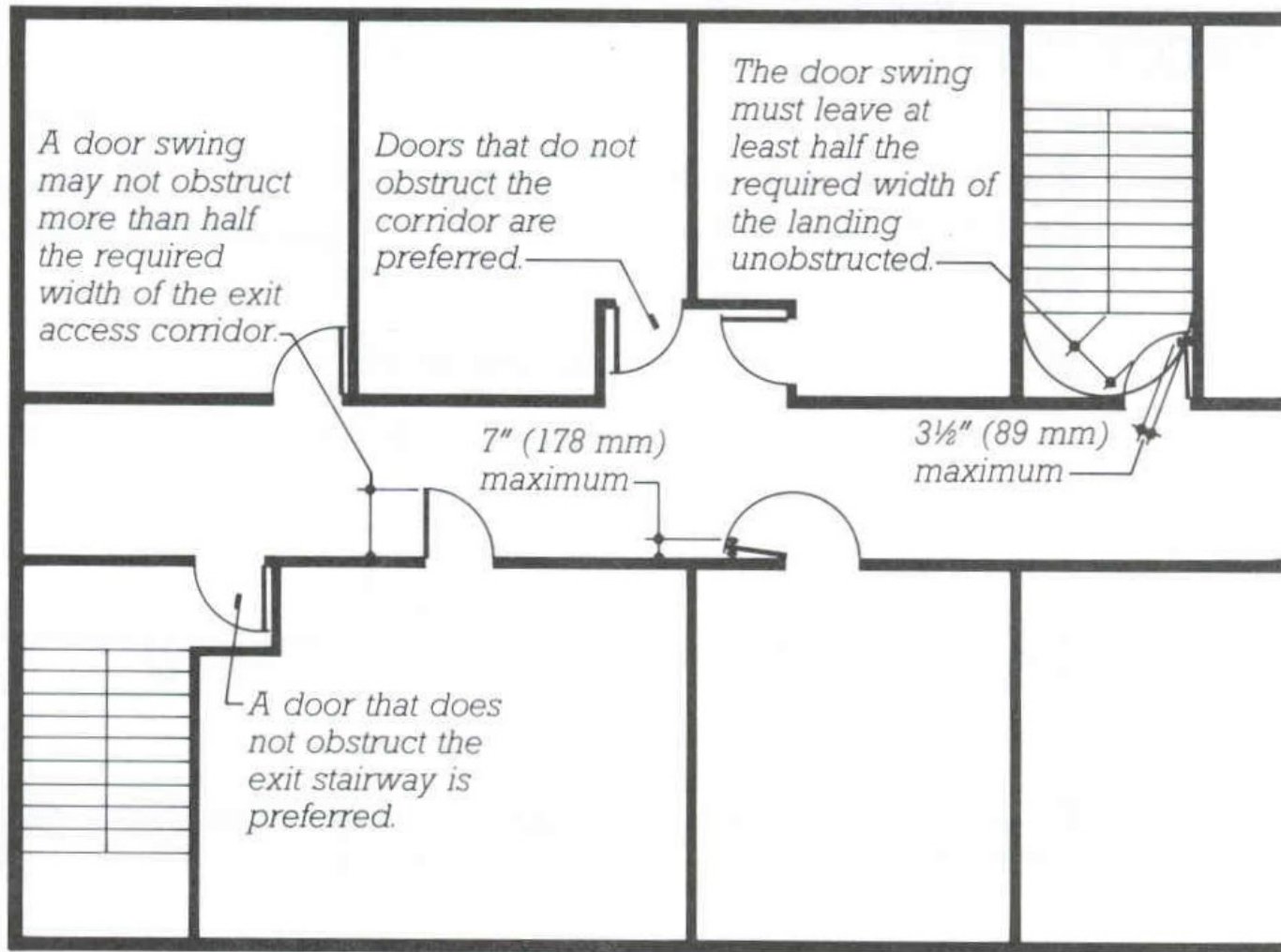
**1:12 slope** is the **maximum** for wheelchair-accessible ramps, and a **3-foot minimum** clearance is required



M Museum, Leuven, Belgium  
Stephane Beel Architects



# Doors





## TYPICAL PARTICIPANTS IN THE CONSTRUCTION PROCESS

### CLIENT

Individual  
Group  
Institution  
Government  
Business

### DESIGN TEAM

Architect  
Engineers:  
Civil  
Structural  
Mechanical  
Plumbing  
Electrical

Consultants:  
Landscape  
Special Equipment  
Lighting & Acoustics  
Energy  
Psychology  
Zoning & Code

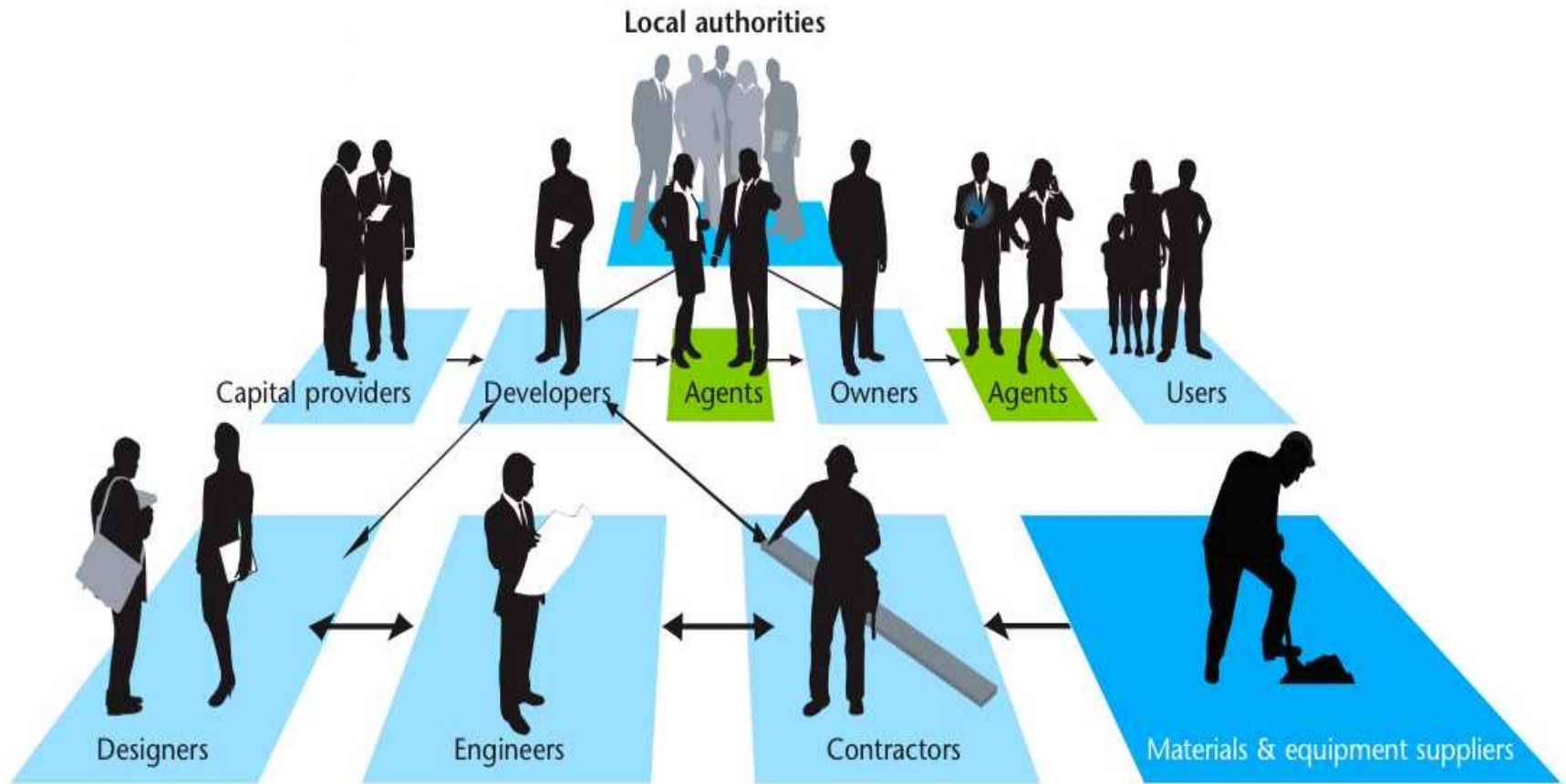
### BUILDING TEAM

Construction Manager  
General Contractor  
Contractor  
Subcontractors:  
Carpenters  
Plumbers  
Masons  
Concrete  
Steel  
HVAC  
Manufacturers  
Suppliers



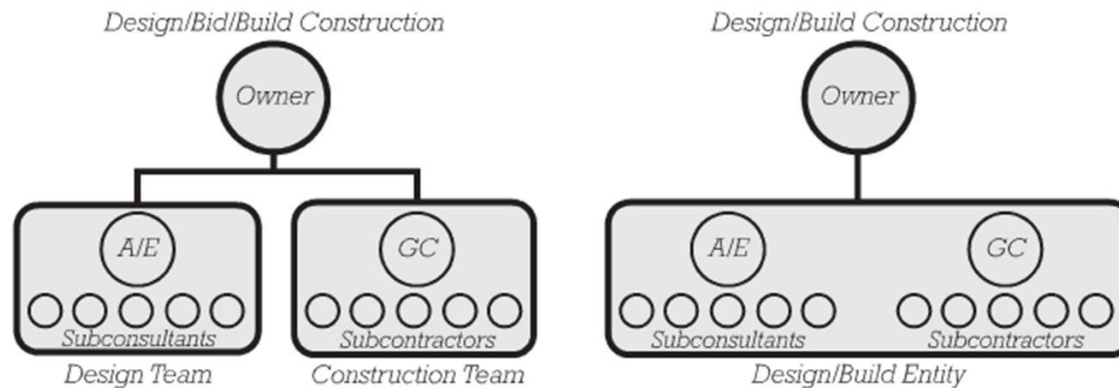
### REGULATORY AGENCIES

# Building Team / “Value Chain”



The complex value chain

# Construction Project Delivery Methods



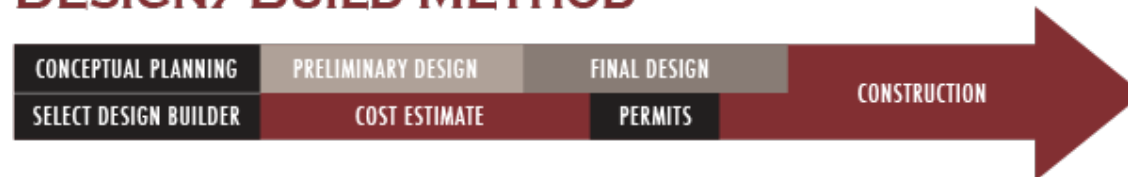
**FIGURE 1.8**

In design/bid/build project delivery, the owner contracts separately with the architect/engineer (A/E) design team and the construction general contractor (GC). In a design/build project, the owner contracts with a single organizational entity that provides both design and construction services.

## TRADITIONAL METHOD



## DESIGN/BUILD METHOD

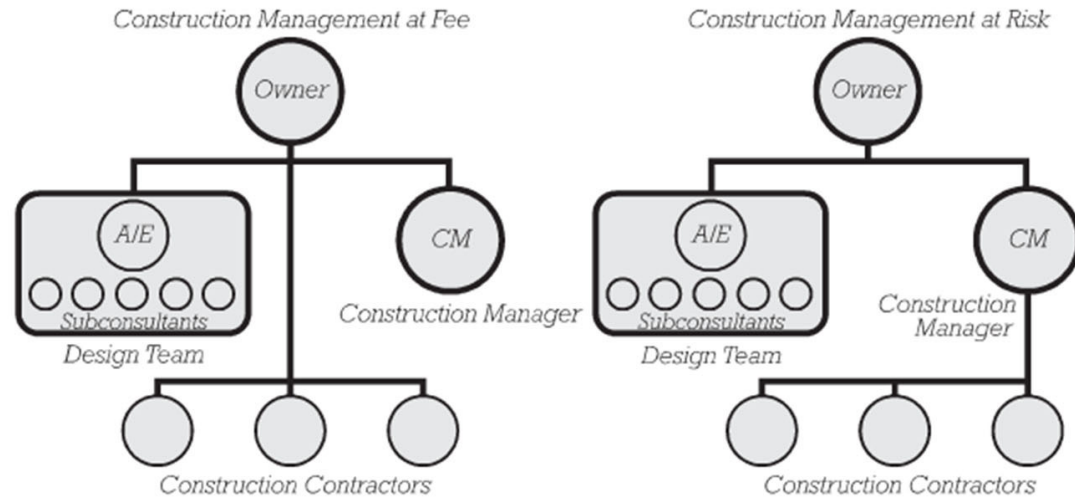




# Construction Project Delivery Methods

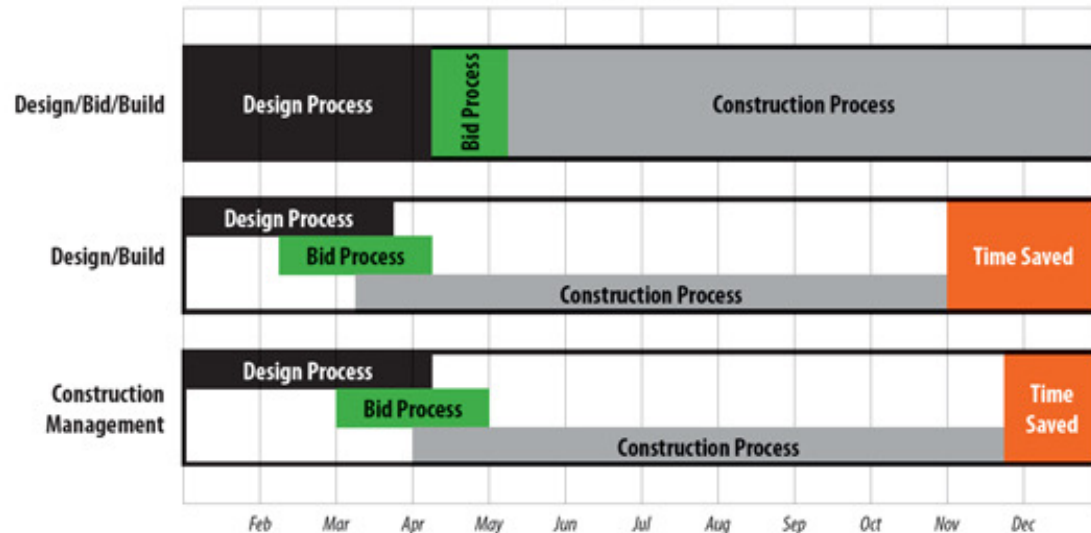
**FIGURE 1.9**

In its traditional role, a construction manager (CM) *at fee* provides project management services to the owner and assists the owner in contracting directly for construction services with one or more construction entities. A CM *at fee* is not directly responsible for the construction work itself. A CM *at risk* acts more like a general contractor and takes on greater responsibility for construction quality, schedule, and costs. In either case, the A/E design team also contracts separately with the owner.

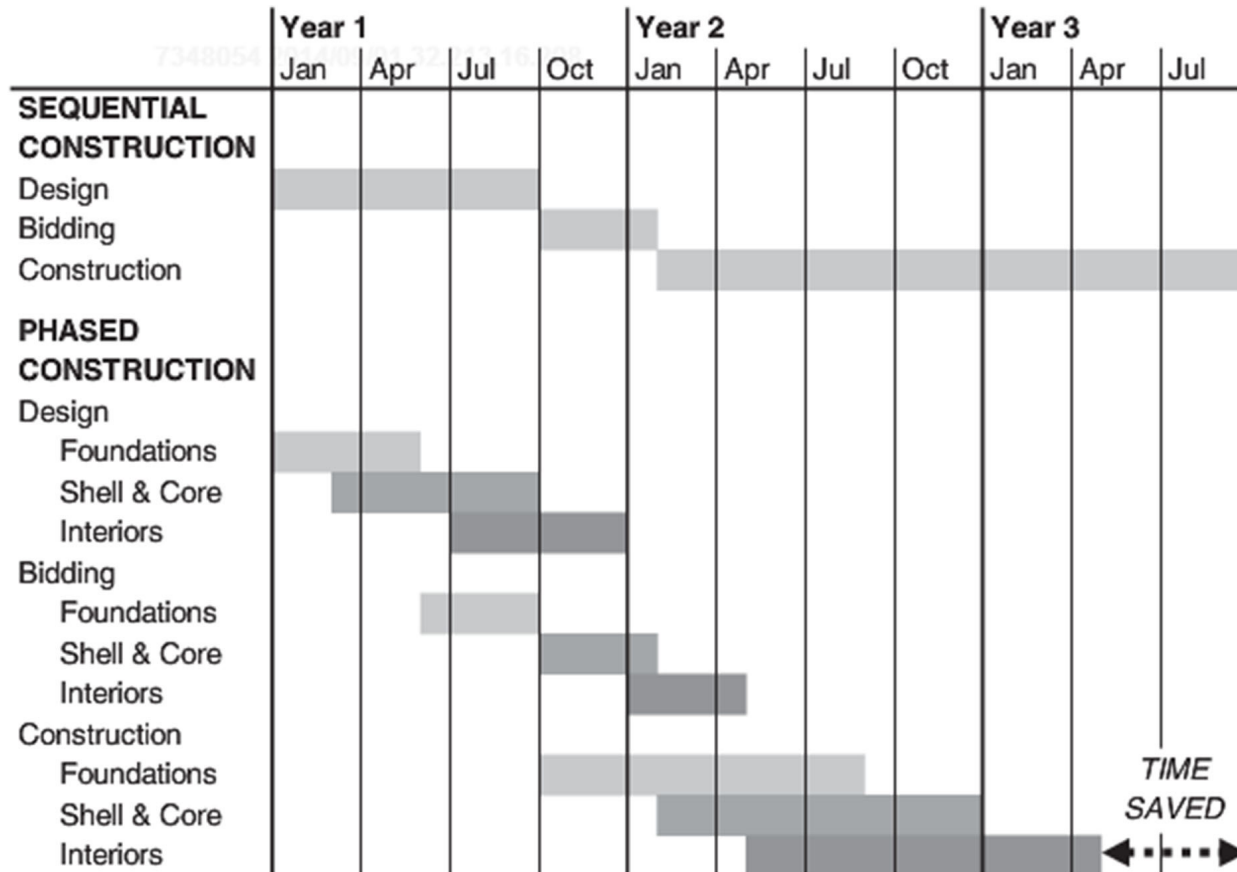


## Delivery Method Comparison

(sample 12-month program)



# Construction Scheduling – Gantt Chart



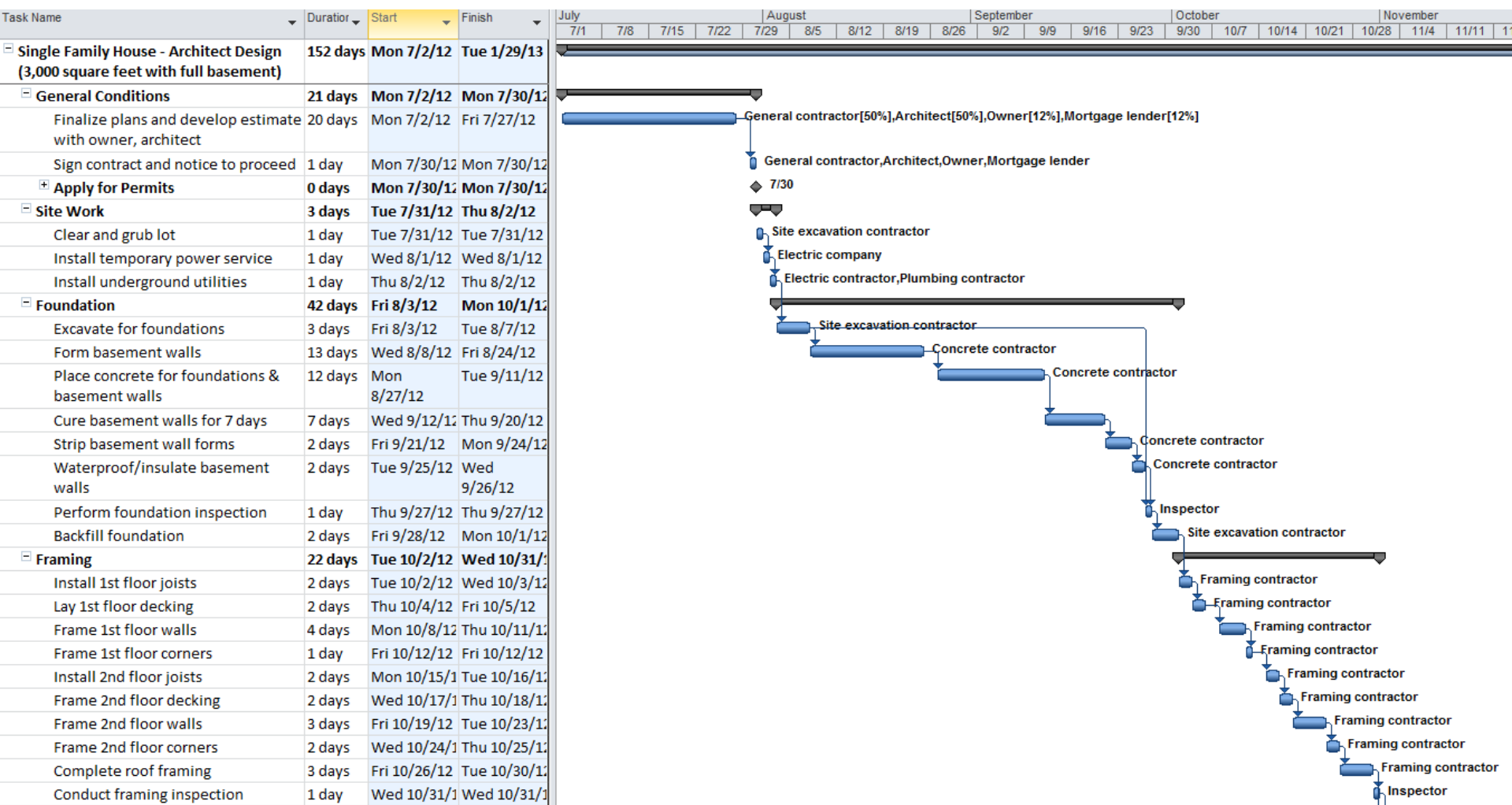
**FIGURE 1.10**

In sequential construction, construction does not begin until design is complete.

In phased construction, design and construction activities overlap, with the goal of reducing the overall time required to complete a project.

# Gantt Chart

Overall picture of a project schedule

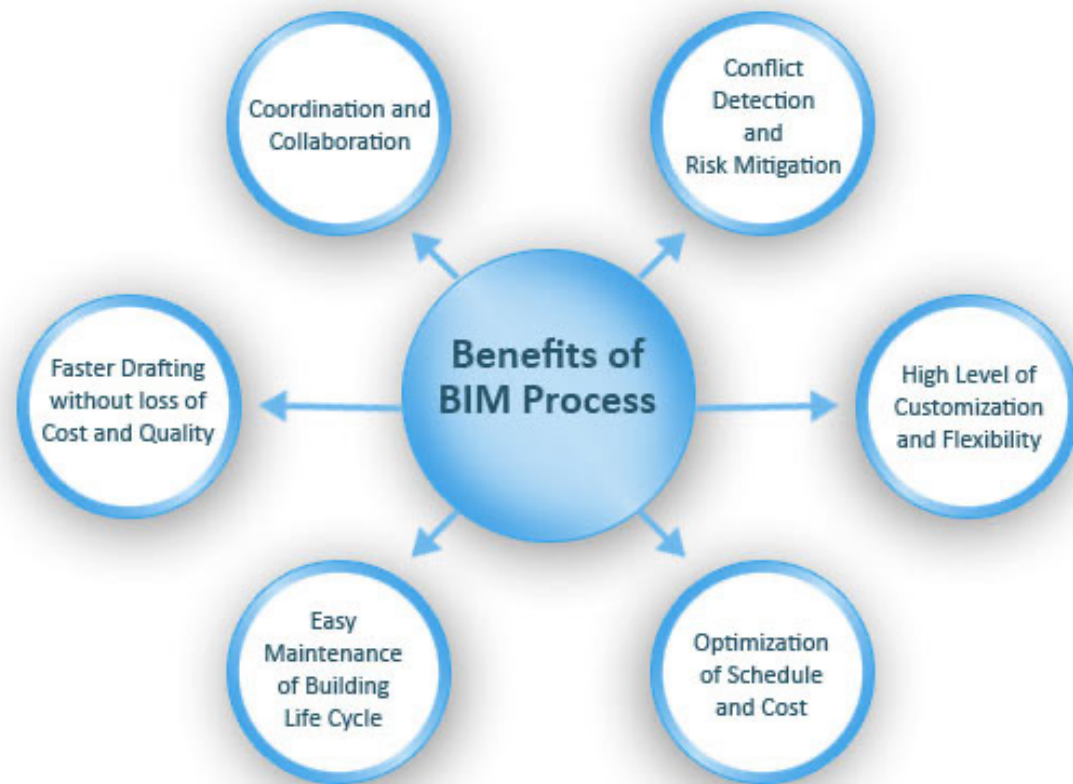




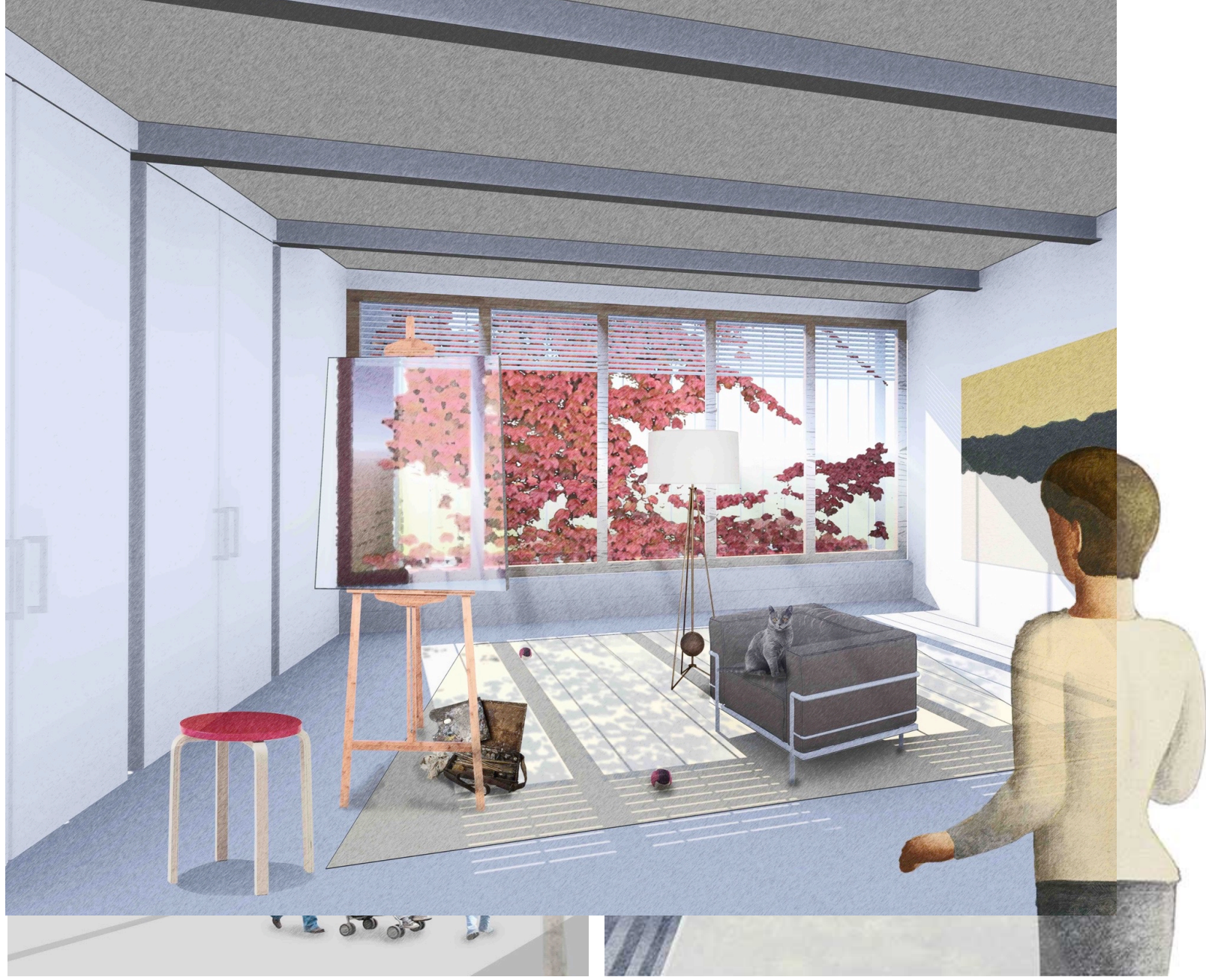
# Collaboration among team members

## Building Information Modeling (BIM)

*The computerized, three-dimensional modeling of building systems*



# 108 W 123<sup>RD</sup> STREET: IN PRACTICE









## 1 GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NEW YORK STATE BUILDING CODE, FIRE DEPARTMENT RULES AND REGULATIONS, UTILITY COMPANY REQUIREMENTS, AND THE BEST TRADE PRACTICES.
2. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FILE ALL REQUIRED INSURANCE CERTIFICATES WITH THE DEPARTMENT OF BUILDINGS, OBTAIN ALL REQUIRED PERMITS, AND PAY ALL FEES REQUIRED BY THE GOVERNING AGENCIES.
3. MINOR DETAILS, NOT USUALLY SHOWN OR SPECIFIED, BUT REQUIRED FOR PROPER CONSTRUCTION OF ANY PART OF THE WORK SHALL BE INCLUDED AS IF THEY WERE INDICATED IN THE DRAWINGS.
4. THE CONTRACTOR SHALL COORDINATE ALL WORK PROCEDURES WITH THE STIPULATIONS OF LOCAL AUTHORITIES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL CONDITIONS AND MATERIALS WITHIN THE PROPOSED CONSTRUCTION AREA. THE CONTRACTORS SHALL DESIGN AND INSTALL ADEQUATE SHORING AND BRACING FOR ALL STRUCTURAL OR REMOVAL TASKS. THE CONTRACTOR SHALL HAVE SOLE RESPONSIBILITY FOR ANY DAMAGE OR INJURIES CAUSE BY OR DURING THE EXECUTION OF THE WORK.
6. THE CONTRACTOR SHALL LAY OUT HIS OWN WORK, AND SHALL PROVIDE ALL DIMENSIONS REQUIRED FOR OTHER TRADES: PLUMBING, ELECTRICALS, ETC.
7. PLUMBING WORK SHALL BE PERFORMED BY PERSONS LICENSED IN THEIR TRADES, WHO SHALL ARRANGE FOR AND OBTAIN THROUGH THE DEPARTMENT OF BUILDINGS ALL REQUIRED PERMITS, INSPECTIONS AND REQUIRED SIGN-OFFS.
8. ELECTRICAL WORK SHALL BE PERFORMED BY PERSONS LICENSED IN THEIR TRADES, WHO SHALL ARRANGE FOR AND OBTAIN THROUGH THE BUREAU OF ELECTRICAL CONTROL ALL REQUIRED PERMITS, INSPECTIONS AND REQUIRED SIGN-OFFS.
9. THE CONTRACTOR SHALL DO ALL CUTTING, PATCHING, REPAIRING AS REQUIRED TO PERFORM ALL OF THE WORK INDICATED ON THE DRAWINGS, AND ALL OTHER WORK THAT MAY BE REQUIRED TO COMPLETE THE JOB.
10. ALL PIPING AND WIRING SHALL BE REMOVED TO A POINT OF CONCEALMENT AND SHALL BE PROPERLY CAPPED OR PLUGGED.
11. NO WORK SHALL BE DONE BEYOND THE BUILDING LINE WITHOUT APPROVAL OF THE DEPARTMENT OF HIGHWAYS.
12. ALL EXITS SHALL BE KEPT READILY ACCESSIBLE AND UNOBSTRUCTED AT ALL TIMES.
13. ALL MATERIALS, ASSEMBLIES, FORMS AND METHODS OF CONSTRUCTION AND SERVICE EQUIPMENT SHALL COMPLY WITH THE REQUIREMENT OF SECTION 27-130.
14. THE CONTRACTOR UPON COMPLETION OF THE WORK, SHALL APPLY AND ARRANGE FOR DEPARTMENT OF BUILDINGS INSPECTIONS AND SIGN-OFFS REQUIRED.
15. DIMENSIONS ARE FROM FACE-OF-FINISH TO FACE-OF-FINISH, U.O.N.
16. WOOD AND OTHER COMBUSTIBLE MATERIAL MAY BE USED IN THE CONSTRUCTION OF THE INTERIOR FINISH ONLY IN ACCORDANCE WITH C26-667.0.
17. ALL NEW INTERIOR SURFACES TO BE PAINTED. SURFACE MUST BE SUITABLE PREPARED, CAREFULLY SPOCKLED, SKIMMED SMOOTH, OIL AND DUST FREE.

### FIRE SAFETY:

1. ALL BUILDING MATERIALS WHICH ARE STORED AT THE SITE OR ANY AREA OF THE BUILDING ARE TO BE STORED IN A LOCKED AREA. ACCESS TO THE AREA TO BE CONTROLLED BY THE OWNER, OR THE CONTRACTOR.
2. ALL FLAMMABLE MATERIALS TO BE KEPT TIGHTLY SEALED IN THEIR RESPECTIVE MANUFACTURERS' CONTAINERS. SUCH MATERIAL ARE TO BE KEPT AWAY FROM HEAT.
3. ALL FLAMMABLE MATERIALS TO BE USED AND STORED IN AN ADEQUATELY VENTILATED SPACE.
4. ALL ELECTRICAL POWER TO BE SHUT OFF WHERE THERE ARE EXPOSED CONDUITS.
5. ALL ELECTRICAL POWER IN THE CONSTRUCTION AREA TO BE SHUT OFF AFTER WORKING HOURS.

### SMOKE/CARBON MONOXIDE DETECTING DEVICES

1. SMOKE/CARBON MONOXIDE DETECTORS OR DEVICES SHALL BE INSTALLED IN ORDINANCE WITH THE HOUSING MAINTENANCE CODE, MULTIPLE DWELLING LAW NEW YORK CITY BUILDING CODE, THE NEW YORK CITY ELECTRICAL CODE AND L17-04.
2. SMOKE DETECTORS AND CARBON MONOXIDE DETECTORS MAY BE COMBINED PROVIDING THE DEVICES COMPLY WITH THE PROVISIONS OF TITLE 27 OF THE ADMINISTRATIVE CODE OF THE CITY OF NEW YORK AND ANY APPLICABLE RULES PROMULGATED THEREUNDER.
3. EACH SMOKE/CARBON MONOXIDE DETECTOR SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE STANDARD 17-12 OF THE NEW YORK CITY BUILDING CODE.
4. EACH SMOKE/ CARBON MONOXIDE DETECTOR SHALL BE INSTALLED OUTSIDE OF EACH SLEEPING ROOM IN THE IMMEDIATE VICINITY OR WITHIN 10'-0" OF THE ENTRANCE TO A SLEEPING ROOM.
5. EACH SMOKE/CARBON MONOXIDE DETECTOR SHALL BE OF A TYPE THAT ALLOWS FOR READILY TESTING OF SUCH DEVICE.
6. DUPLEX UNITS SHALL HAVE A DEVICE LOCATED ON EACH LEVEL IF ONLY ONE MEANS OF EGRESS IS PROVIDED FROM EACH LEVEL.
7. CEILING MOUNTED DEVICES SHALL BE A MINIMUM DISTANCE OF 4" FROM ANY WALL.
8. WALL MOUNTED DEVICES SHALL BE A MINIMUM OF 4" TO A MAXIMUM OF 12" FROM THE CEILING.
9. EACH DWELLING UNIT SHALL BE EQUIPPED WITH AN APPROVED TYPE SMOKE/CARBON MONOXIDE DETECTOR RECEIVING PRIMARY POWER FROM THE BUILDING WIRING WITH NO SWITCHES IN THE CIRCUIT OTHER THAN THE OVER CURRENT DEVICE PROTECTING THE BRANCH CIRCUITS AS PER NEW YORK CITY BUILDING CODE SEC-27-980.

## 2 GENERAL NOTES CONTINUED:

10. EXISTING BUILDINGS THAT ARE NOT EQUIPPED WITH HARDWIRED CONNECTIONS SHALL BE SUPPLIED WITH BATTERY OPERATED DEVICES.
  11. SUCH SMOKE/CARBON MONOXIDE DETECTOR MUST BE EITHER THE IONIZATION CHAMBER TYPE OR THE PHOTOELECTRIC DETECTOR TYPE AS PER NEW YORK CITY BUILDING CODE SEC. 27-981, (D).
  12. A "CERTIFICATE OF SATISFACTORY INSTALLATION FOR SMOKE/CARBON MONOXIDE DETECTORS" MUST BE FILLED WITH THE DIVISION OF CODE ENFORCEMENT H.P.D., 10 DAYS AFTER INSTALLATION.
  13. WRITTEN INFORMATION OF TESTING AND MAINTENANCE OF THE DEVICES SHALL BE PROVIDED TO THE DWELLING UNIT OWNER.
- ITEMS SUBJECT TO SPECIAL INSPECTION**
- STRUCTURAL STEEL - WELDING (BC 1704.3.1)
  - STRUCTURAL STEEL - DETAILS (BC 1704.3.2)
  - STRUCTURAL STEEL - HIGH STRENGTH BOLTING (BC 1704.3.3)
  - CONCRETE - CAST-IN-PLACE (BC 1704.4)
  - MASONRY (BC 1704.5)
  - SUBGRADE INSPECTION (BC 1704.7.1)
  - SUBSURFACE INVESTIGATIONS (BORING / TEST PITS) (TR4) (BC 1704.7.4)
  - EXCAVATIONS-SHEETING,SHORING,AND BRACING (BC 1704.20.2)
  - FIRE-RESISTANT PENETRATIONS AND JOINTS (BC 1704.27)
  - CONCRETE DESIGN MIX (TR3) (BC 1905.3)
  - CONCRETE SAMPLING AND TESTING (TR2) (BC 1905.6)
  - CONCRETE SAMPLING AND TESTING (TR2) (BC 1913.10)
- ITEMS SUBJECT TO PROGRESS/ENERGY INSPECTION**
- FOOTING AND FOUNDATION (BC 1103.3.1)
  - ENERGY CODE COMPLIANCE INSPECTIONS (TR8) (BC 1103.3.5)
  - FIRE-RESISTANCE RATED CONSTRUCTION (BC 1103.3.4)

## 3 FIRE RATING INFORMATION:

### FIRE RESISTANCE RATING REQUIREMENTS- BUILDING ELEMENT

#### TYPE II-A CONSTRUCTION FOR BUILDING ELEMENTS- PER TABLE (601)

| BUILDING ELEMENT                                         | HR RATING | PROPOSED  |
|----------------------------------------------------------|-----------|-----------|
| STRUCTURAL FRAME- INCLUDING COLUMNS, GIRDERS, TRUSSES    | 1         | 1         |
| BEARING WALLS - EXTERIOR                                 | 1         | 1         |
| BEARING WALLS - INTERIOR                                 | 1         | 1         |
| NON-BEARING WALLS & PARTITIONS - EXTERIOR                | TABLE 602 | TABLE 602 |
| NON-BEARING WALLS & PARTITIONS - INTERIOR                | 0         | 0         |
| FLOOR CONSTRUCTION - INCLUDING SUPPORTING BEAMS & JOISTS | 1         | 1         |
| ROOF CONSTRUCTION - INCLUDING SUPPORTING BEAMS & JOISTS  | 1         | 1         |

### FIRE RESISTANCE RATING REQUIREMENTS

#### TYPE II-A CONST. DET. WALLS (TABLE 602)

| FIRE SEPARATION DISTANCE (FT) HR RATING |   |
|-----------------------------------------|---|
| <5                                      | 1 |
| ≥ 5 BUT < 10                            | 1 |
| ≥ 10 BUT < 30                           | 1 |
| ≥ 30                                    | 0 |

### GENERAL HEIGHT AND AREA LIMITATIONS

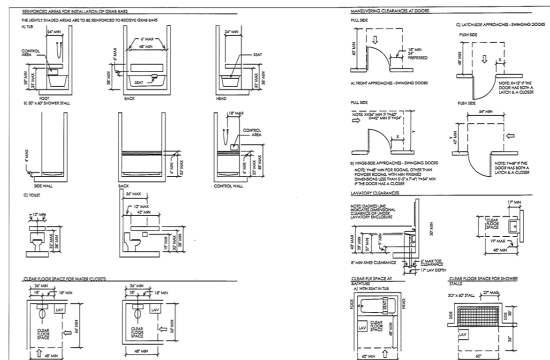
#### ALLOWABLE HEIGHT / STORIES - TABLE (503)

| GROUP | HGT (FEET) | TYPE II | A  | B  |
|-------|------------|---------|----|----|
|       | HGT (S)    |         | 65 | 65 |
| R-2   | 5          | A       | 6  | NP |
|       | UL         | NP      |    |    |

## 4 SYMBOLS:

| GENERAL SYMBOLS                 |                            |
|---------------------------------|----------------------------|
| INTERIOR ELEVATION              | INTERIOR ELEVATION         |
| BUILDING SECTION                | BUILDING SECTION           |
| DETAIL BUBBLE                   | DETAIL BUBBLE              |
| DRAWING NUMBERS, TITLES         | DRAWING NUMBERS, TITLES    |
| CENTER LINES                    | CENTER LINES               |
| RCP SYMBOLS                     |                            |
| NEW SWITCH                      | SPRINKLER HEAD             |
| NEW OUTLET                      | FLOOR LIGHT                |
| CARBON MONOXIDE/ SMOKE DETECTOR | RECESSED INCAND. DOWNLIGHT |
| PENDANT                         | AUTOMATED SWITCH LIGHTING  |
| DIMMER SWITCH                   | AUTOMATED TIME SWITCH      |

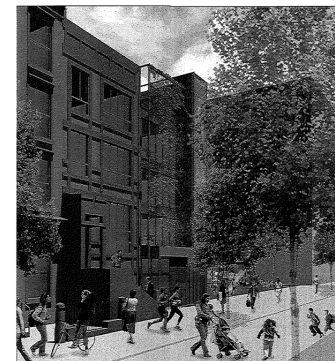
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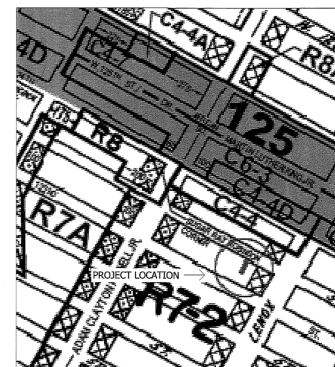
## 6 TABLE OF CONTENTS:

| T-001.00  | TABLE OF CONTENTS, GENERAL                                  |  | SCHEMATIC DIAGRAM                                 |
|-----------|-------------------------------------------------------------|--|---------------------------------------------------|
|           | NOTES                                                       |  | SPECIFICATION                                     |
| Z-000.00  | SITE PLANS W/ / ROOF, SITE SURVEY                           |  | P-101.00 PLANS: FIRST FLOOR AND CELLAR            |
| Z-001.00  | ZONING ANALYSIS CHART, HEIGHT/ SETBACK DIAGRAMS             |  | P-102.00 PLANS: SECOND AND THIRD FLOOR            |
| A-101.00  | PLAN: 1 <sup>ST</sup> FLOOR + CELLAR                        |  | P-103.00 PLANS: FOURTH FLOOR + ROOF (LOWER LEVEL) |
| A-102.00  | PLAN: 2 <sup>ND</sup> FLOOR + 3 <sup>RD</sup> FLOOR         |  | P-104.00 EQUIPMENT SCHEDULE AND SCHEMATIC DESIGN  |
| A-103.00  | PLAN: 4 <sup>TH</sup> FLOOR + ROOF GARDEN                   |  | S-000.00 NOTES                                    |
| A-104.00  | PLAN: ROOF (UPPER LEVEL)                                    |  | S-100.00 BASEMENT & FIRST FLOOR PLANS             |
| A-111.00  | RCP: 1 <sup>ST</sup> FLOOR + CELLAR                         |  | S-101.00 SECOND AND THIRD FLOOR PLANS             |
| A-112.00  | RCP: 2 <sup>ND</sup> FLOOR + 3 <sup>RD</sup> FLOOR          |  | S-102.00 FOURTH AND LOW ROOF                      |
| A-113.00  | RCP: 4 <sup>TH</sup> FLOOR + ROOF GARDEN                    |  | S-103.00 ROOF FRAMING PLAN                        |
| A-121.00  | EGRESS PLAN                                                 |  | S-200.00 GRIDLINE 1: SECTION                      |
| A-201.00  | LONGITUDINAL SECTION: STAIR                                 |  | S-201.00 GRIDLINE 2: SECTION                      |
| A-202.00  | LONGITUDINAL SECTION: LOFT                                  |  | S-202.00 GRIDLINE 3: SECTION                      |
| A-203.00  | ELEVATION NORTH + LATERAL SECTION BEHIND                    |  | S-203.00 NORTH FACADE                             |
| A-204.00  | ELEVATION SOUTH + LATERAL SECTION @ 2 <sup>ND</sup> LANDING |  | S-204.00 MOMENT FRAME ELEVATIONS                  |
| A-301.00  | INT. ELEV: 1ST FL. LOFTSPACE                                |  | S-300.00 STEEL DETAILS                            |
| A-302.00  | INT. ELEV: 1ST FL. TYP. ROOMS                               |  | S-301.00 METAL DECK DETAILS                       |
| A-303.00  | INT. ELEV: 2ND/3RD FL. LOFTSPACE                            |  | S-400.00 MASONRY DETAILS                          |
| A-304.00  | INT. ELEV: 2ND/3RD FL. TYP. ROOMS                           |  | S-500.00 FOUNDATION DETAILS                       |
| A-305.00  | INT. ELEV: 4TH FL. LOFTSPACE                                |  | S-501.00 BASE PLATE DETAILS AND SCHEDULES         |
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| A-502.00  | WALL SECTION: SOUTH + NORTH FACADE (STAIR)                  |  |                                                   |
| A-601.00  | WALL SCHEDULE                                               |  |                                                   |
| A-602.00  | WINDOW SCHEDULE                                             |  |                                                   |
| EN-101.00 | ENERGY COMPLIANCE CERTIFICATIONS                            |  |                                                   |
| EN-102.00 | GENERAL NOTES AND AREA DIAGRAM                              |  |                                                   |
| EN-103.00 | EXTERIOR WALL AND ROOF TYPES                                |  |                                                   |
| M-101.00  | PLANS: FIRST FLOOR AND CELLAR                               |  |                                                   |
| M-102.00  | PLANS: SECOND AND THIRD FLOOR                               |  |                                                   |
| M-103.00  | PLANS: FOURTH FLOOR AND ROOF (LOWER LEVEL)                  |  |                                                   |
| M-104.00  | EQUIPMENT SCHEDULE AND                                      |  |                                                   |

## 7 STREET VIEW:



## 8 ZONING MAP



## 9 PROJECT INFORMATION:

4 UNIT DWELLING ON CURRENTLY EMPTY LOT, 20.08'x100.92'  
 LOT # : 139  
 BLOCK # : 1907  
 ADDRESS: 108 W 123rd STREET, NY 10027  
 AV. CURB LEVEL (NAVD83): -26.61'  
 (@ PROPERTY LINE / BACK OF WALK: 26.71' (NW) + 26.51' (NE) = -26.61')

## 10 ZONING ANALYSIS OVERVIEW:

PROPERTY: 108 WEST 123RD ST  
 ZONING DESIGNATION: R7-2  
 LANDMARK: L-LANDMARK  
 CONSTRUCTION CLASSIFICATION: TYPE IIA  
 OCCUPANCY CLASSIFICATION: R-2  
 USE DISTRICT/AREA: RESIDENTIAL  
 LOT AREA: 2,027 SF. (20.08 FT. X 100.92 FT.)  
 HEIGHT FACTOR: 4  
 MAX ALLOWABLE FAR: 2.38  
 PROPOSED FLOOR AREA: 4,627.6 SF.  
 REQUIRED REAR YARD-30'  
 PROPOSED OVERALL HEIGHT-49'-4 1/2"  
 INITIAL SETBACK DISTANCE-60'  
 STREET TREES: 1 TREE

THIS PROJECT IS NOT IN FLOOD ZONE

## 108 W 123 ST.

ALTERATION TYPE 1:  
 NEW CONSTRUCTION/FAMILY RESIDENCE

DATE: \_\_\_\_\_ SUBJECT: \_\_\_\_\_

DRAWN:  
 LYNETTE WEDDER/CHRISTIAN VOLUNMAN  
 100 LA SALLE STREET #6C  
 NEW YORK, NY 10027  
 TEL: (212) 686-0180  
 EMAIL: VOLUNMAN@AARDVARCHITECTURE.COM

DESIGNED BY:  
 CHRISTIAN VOLUNMAN, RA  
 LICENSE NUMBER: 033333  
 ISSUE DATE: 04/02/2015

BUSINESS NAME:  
 aardvarchitecture  
 100 LA SALLE ST #6C NEW YORK 10027  
 (212) 686-0774 / aardvarch@me.com



LOT NO.: 001

DRAWN BY: CV

CHECKED: CV

DATE: 04/06/2015

DEPARTMENT OF BUILDING PLANS SET

TITLE:

TABLE OF CONTENTS, NOTES, PLOT PLAN

SCALE: 5/16" = 1'-0"

PLANNING:

T-000.00

PAGE: 01 OF 51

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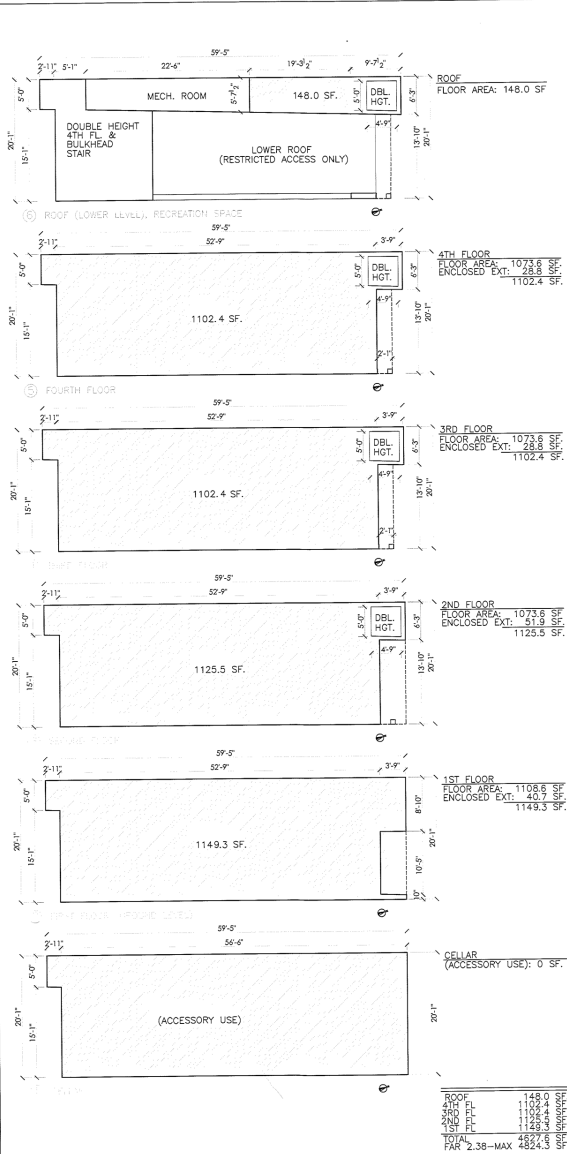
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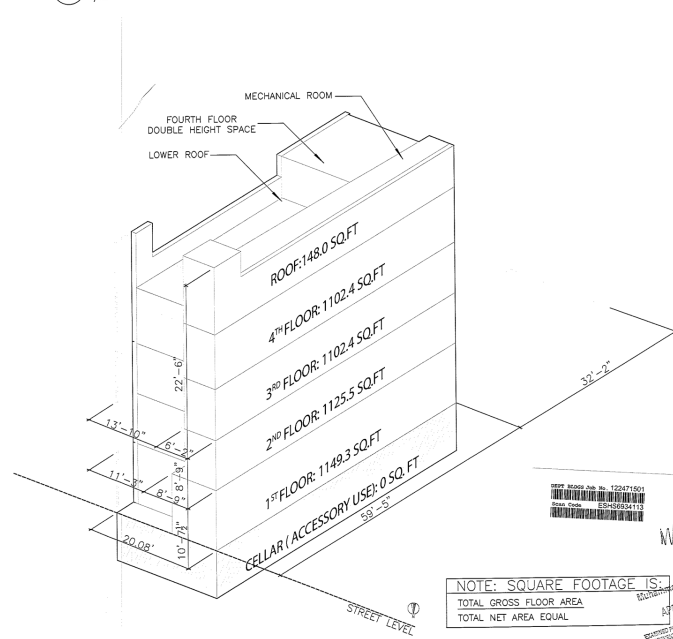
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# ZONING CALCULATIONS

|                                                           |                                            |                                             |  |
|-----------------------------------------------------------|--------------------------------------------|---------------------------------------------|--|
| <b>I. GEOGRAPHICAL DATA</b>                               |                                            |                                             |  |
| ADDRESS :                                                 | 108 WEST 123RD ST                          |                                             |  |
| BLOCK :                                                   | 1307                                       |                                             |  |
| LOT :                                                     | 139                                        |                                             |  |
| ZONING DISTRICT :                                         | R7-2                                       |                                             |  |
| MAP NO. :                                                 | 6A                                         |                                             |  |
| LOT AREA :                                                | 2,027 SF (20.08'X100.92')                  |                                             |  |
| <b>II. PROPOSED FLOOR AREA</b>                            |                                            |                                             |  |
| FLOOR :                                                   | AREA                                       |                                             |  |
| CELLAR                                                    | 0 SF (BER ZR 12-10)                        |                                             |  |
| 1ST FLOOR                                                 | 1,149.3 SF                                 |                                             |  |
| 2ND FLOOR                                                 | 1,125.5 SF                                 |                                             |  |
| 3RD FLOOR                                                 | 1,102.4 SF                                 |                                             |  |
| 4TH FLOOR                                                 | 1,102.4 SF                                 |                                             |  |
| ROOF                                                      | 148.0 SF                                   |                                             |  |
| TOTAL FLOOR AREA                                          | 4,627.6 SF                                 |                                             |  |
| <b>III. PROPOSED USES</b>                                 |                                            |                                             |  |
| FLOOR :                                                   | USE GROUP:                                 |                                             |  |
| CELLAR                                                    | STORAGE AND UTILITIES/ACCESSORY USE        |                                             |  |
| 1ST FLOOR                                                 | 1 DWELLING UNIT                            |                                             |  |
| 2ND FLOOR                                                 | 1 DWELLING UNIT                            |                                             |  |
| 3RD FLOOR                                                 | 1 DWELLING UNIT                            |                                             |  |
| 4TH FLOOR                                                 | 1 DWELLING UNIT                            |                                             |  |
| LOWER ROOF                                                | RESTRICTED ACCESS ONLY                     |                                             |  |
| TOTAL USES                                                | 4 DWELLING UNITS                           |                                             |  |
| <b>IV. STREET TREES AND LANDSCAPING</b>                   |                                            |                                             |  |
| ZONING REGULATION :                                       | MAX. PERMITTED MIN. REQUIRED               | PROPOSED                                    |  |
| STREET TREE PLANTING (ZR 23-03, ZR 26-41)                 | 1 TREE (20.08' LF/25=1)                    | 1 TREE                                      |  |
| <b>V. BULK REGULATIONS</b>                                |                                            |                                             |  |
| ZONING REGULATION                                         | MAX. PERMITTED MIN. REQUIRED               | PROPOSED                                    |  |
| RESIDENTIAL FAR: MAX (ZR 23-142)                          | 2.38                                       | 2.28 (4,627.6 / 2,027)                      |  |
| RESIDENTIAL FLOOR AREA: PROVIDED HF=4                     | 4,824.26 SF (2.38 X 2,027 SF)              | 4,627.6 SF                                  |  |
| OPEN SPACE RATIO: MAX                                     | 17.0                                       | 17.0                                        |  |
| OPEN SPACE: PROVIDED                                      | 806 SF (17 X 4,743.6 SF)                   | 874.7 SF (SEE SITE PLAN)                    |  |
| <b>VI. DENSITY REGULATIONS</b>                            |                                            |                                             |  |
| ZONING REGULATION                                         | MAX. PERMITTED MIN. REQUIRED               | PROPOSED                                    |  |
| DENSITY FACTOR (ZR 23-22)                                 | 680                                        | NA                                          |  |
| FLOOR AREA FOR DENSITY PURPOSES (ZR 23-22)                | 6,972 SF (3.44 X 2,027 SF)                 | 4,627.6 SF                                  |  |
| MAX. NUMBER OF DWELLING UNITS (6,972/88 SF / 680)         | 10 DWELLING UNITS                          | 4 DWELLING UNITS                            |  |
| <b>VII. LOT AREA AND LOT WIDTH</b>                        |                                            |                                             |  |
| ZONING REGULATION                                         | MAX. PERMITTED MIN. REQUIRED               | PROPOSED                                    |  |
| LOT AREA (ZR 23-32)                                       | 1,700 SF                                   | 2,027 SF $\approx$ 1,700 SF                 |  |
| RESIDENTIAL SIDE YARDS (ZR 23-32)                         | 18'                                        | 20.08' > 18'                                |  |
| <b>VIII. YARD REGULATIONS</b>                             |                                            |                                             |  |
| ZONING REGULATION                                         | MAX. PERMITTED MIN. REQUIRED               | PROPOSED                                    |  |
| FRONT YARD (ZR 23-45)                                     | NOT REQUIRED                               | 0'                                          |  |
| SIDE YARD (ZR 23-46)                                      | 0' OR 8' MINIMUM                           | 0'                                          |  |
| REAR YARD (ZR 23-47)                                      | 30'                                        | 32.2'                                       |  |
| <b>IX. HEIGHT AND SETBACK REGULATIONS</b>                 |                                            |                                             |  |
| SKY EXPOSURE PLANE REGULATION (ZR 23-60)                  | MAX. PERMITTED MIN. REQUIRED               | PROPOSED                                    |  |
| HEIGHTS ABOVE STREET LINE WITHIN INITIAL SETBACK DISTANCE | 60' (OR 6 STORIES WHICHEVER IS LESS)       | 49'-4 1/2" (MAXIMUM HEIGHT OF NEW BUILDING) |  |
| RATIO OF VERTICAL TO HORIZONTAL DISTANCE                  | ON T3 1 (ON NARROW STREET)                 | NA (DRAWING 01-2001)                        |  |
| <b>X. PARKING REGULATIONS</b>                             |                                            |                                             |  |
| ZONING REGULATION                                         | MAX. PERMITTED MIN. REQUIRED               | PROPOSED                                    |  |
| RESIDENTIAL PARKING SPACES REQUIRED (ZR 25-242)           | 0 SPACES (LOT AREA IS LESS THAN 10,000 SF) | 0 SPACES                                    |  |
| RESIDENTIAL ENCLOSED BICYCLE PARKING SPACES (ZR 25-811)   | (UP TO 1 FOR EVERY 2 DWELLING UNITS)       | 1 SPACE                                     |  |
| <b>HEIGHT FACTOR CALCULATION</b>                          |                                            |                                             |  |
| FLOOR AREA OF BLDG. = 4,627.6 SF.                         |                                            |                                             |  |
| LOT AREA OF BLDG. = 1,149.3 SF.                           |                                            |                                             |  |
|                                                           | 4.03 OR 4                                  |                                             |  |



03 ALTERNATE HEIGHT AND SETBACK DIAGRAM PER (ZR 23-632) - NARROW STREET  
1-001 3/32"x11'-0"



NOTE: SQUARE FOOTAGE IS:  
TOTAL GROSS FLOOR AREA  
TOTAL NET AREA EQUAL

108 W 123 ST.

ALTERNATION TYPE 1:  
NEW CONSTRUCTION/FAMILY RESIDENCE  
DATE: SUBMIT:

OWNER:  
LYNETTE WOODS/CHRISTIAN VOLMANN  
100 LA SALLE STREET #6C  
NEW YORK, N.Y. 10027  
TEL: (212) 686-2185  
EMAIL: CYCULAMANN@CITYCOUNTY.EDU

DESIGNER:  
CHRISTIAN VOLMANN, RA  
LICENSE NUMBER: 033333  
ISSUED DATE: 04/03/2019



LOT NO.: 001  
DRAWN BY: CV  
CHECKED: CV  
DATE: 04/03/2019

DEPARTMENT OF BUILDING  
PLUMB SET  
TITLE:  
ZONING CHARTS,  
CALCS, DEDUCTIONS  
& SECTIONS

SCALE: N.T.S.  
Z- 001.00

PAGE: 02

01 Zoning Calculations  
1-001 NOT TO SCALE

02 FLOOR AREA DIAGRAMS  
1-001 3/32"x11'-0"

04 ZONING AXONOMETRIC  
1-001 NOT TO SCALE

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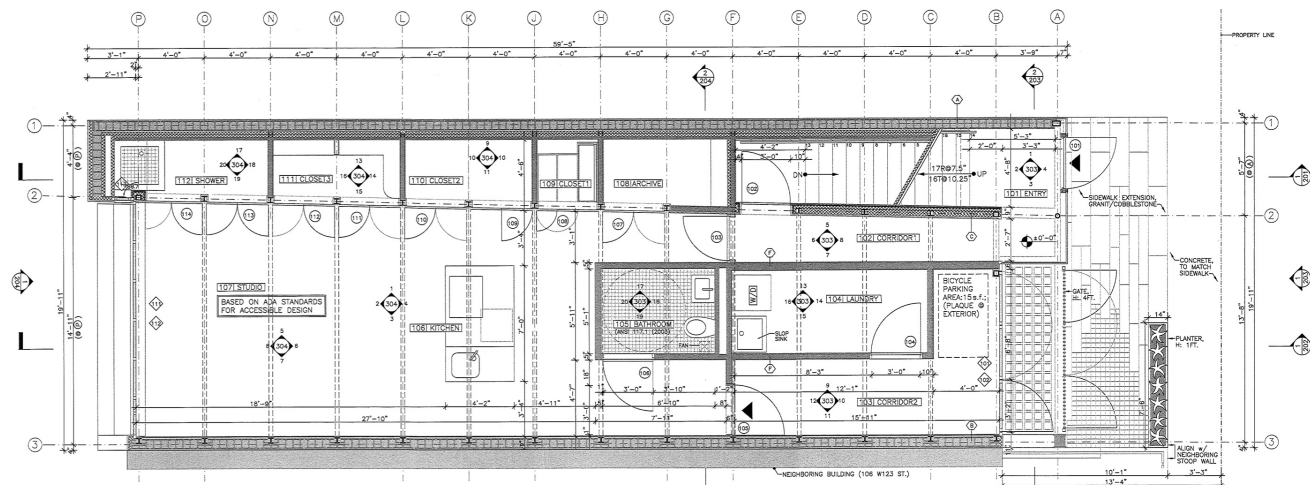
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1 2 3 4 5 6 7

**SQUARE FOOTAGE FIRST FLOOR:**

|                 |                 |
|-----------------|-----------------|
| 101 ENTRY       | 35 S.F.         |
| 102 CORRIDOR1   | 44 S.F.         |
| 103 CORRIDOR2   | 66 S.F.         |
| 104 LAUNDRY     | 80 S.F.         |
| 105 BATHROOM    | 80 S.F.         |
| 106 KITCHEN     | 216 S.F.        |
| 107 STUDIO      | 228 S.F.        |
| 108 ARCHIVE     | 30 S.F.         |
| 109 CLOSET1     | 28 S.F.         |
| 110 CLOSET2     | 29 S.F.         |
| 111 CLOSET3     | 34 S.F.         |
| 112 ADD. SHOWER | 34 S.F.         |
| <b>TOTAL</b>    | <b>850 S.F.</b> |

**LIGHT + AIR, FIRST FLOOR:**  
STUDIO + KITCHEN (106+107): 442 S.F.  
GLAZED: 143 S.F.  
OPENABLE: 135 S.F.  
AIR: (135/442) = 30%  
LIGHT: (143/442) = 33%

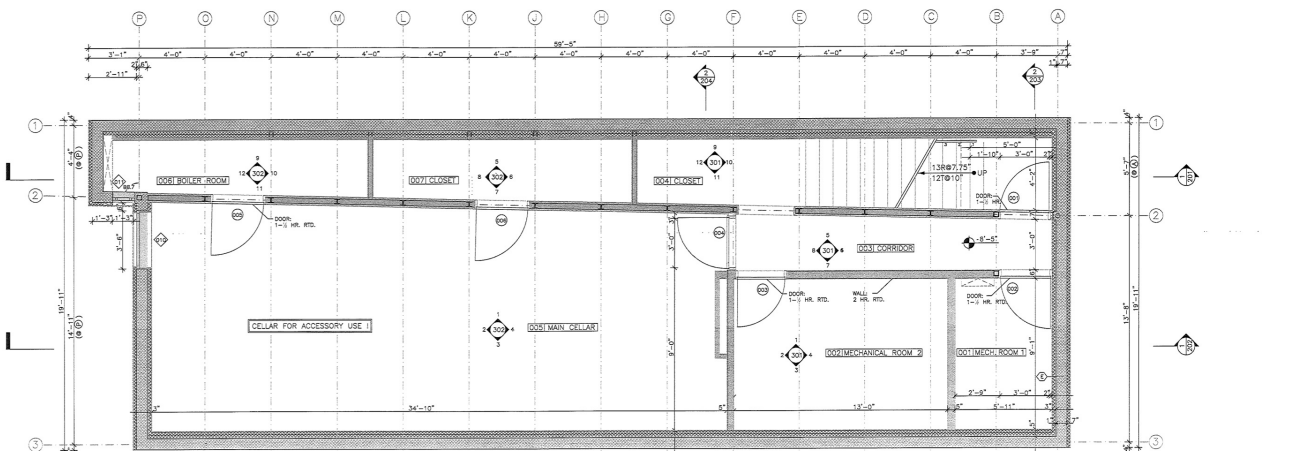


1 PLAN: FIRST FLOOR (GROUND LEVEL)  
SCALE: 5/16" = 1'-0"

**SQUARE FOOTAGE CELLAR:**

|                  |                 |
|------------------|-----------------|
| 001 MECH. ROOM 1 | 53 S.F.         |
| 002 MECH. ROOM 2 | 131 S.F.        |
| 003 CORRIDOR     | 80 S.F.         |
| 004 CLOSET       | 53 S.F.         |
| 005 MAIN CELLAR  | 466 S.F.        |
| 006 BOILER ROOM  | 56 S.F.         |
| 007 CLOSET       | 50 S.F.         |
| <b>TOTAL</b>     | <b>859 S.F.</b> |

**LIGHT + AIR, CELLAR:**  
LAUNDRY STORAGE (005): 466 S.F.  
GLAZED: 3 S.F.  
OPENABLE: 3 S.F.  
AIR: (3/466) = 6%



1 PLAN: CELLAR  
SCALE: 5/16" = 1'-0"

108 W 123 ST.

ALTERNATION TYPE 1:  
NEW CONSTRUCTION/FAMILY RESIDENCE  
DATE: SUBJECT:

OWNER:  
LYNETTE WOODS/CHRISTIAN VOLMAN  
100 LA SALLE STREET #6C  
NEW YORK, N.Y. 10027  
TEL: (212) 695-0180  
EMAIL: CYCLOMAN@COMCAST.NET

ARCHITECT:  
CHRISTIAN VOLMAN, RA  
LICENSE NUMBER: 033333  
ISSUE DATE: 04/05/2015  
BUSINESS NAME:  
sardvarchitecture  
100 LA SALLE ST.#6C NEW YORK 10027  
20170368.0774/sardvarch@aol.com



LOT NO.: 001  
DRAWN BY: CV  
CHECKED BY: CV  
DATE: 04/05/2015

DEPARTMENT OF BUILDING  
PLUMB SET  
TITLE:  
PLANS:  
FIRST FLOOR  
+ CELLAR

PLANNED:  
A-101.00  
PAGE: 04 OF 51





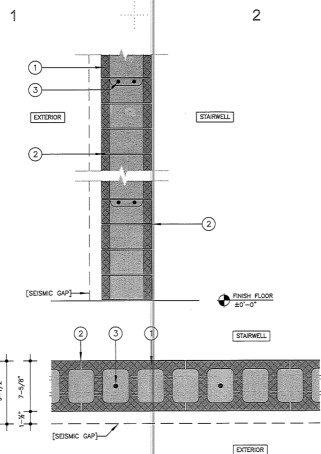
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A. CONCRETE WALL, 2 HOUR ASSEMBLY - AS PER TABLE 101.2 OF THE NEW YORK BUILDING CODE

1. CONCRETE WALL, 2 HOUR ASSEMBLY - AS PER TABLE 101.2 OF THE NEW YORK BUILDING CODE

2. CONCRETE WALL, 2 HOUR ASSEMBLY - AS PER TABLE 101.2 OF THE NEW YORK BUILDING CODE

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4. CONCRETE WALL, 2 HOUR ASSEMBLY - AS PER TABLE 101.2 OF THE NEW YORK BUILDING CODE

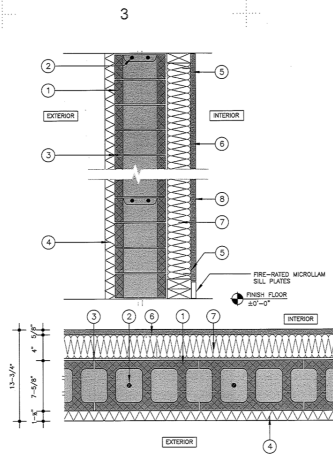
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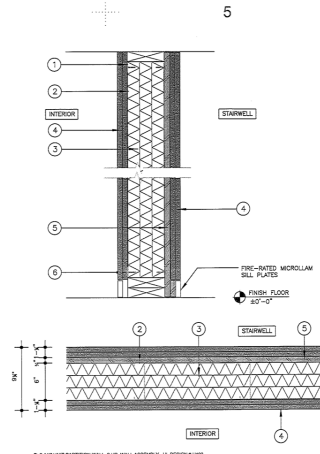
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B. CONCRETE WALL, 2 HOUR ASSEMBLY - AS PER TABLE 101.2 OF THE NEW YORK BUILDING CODE

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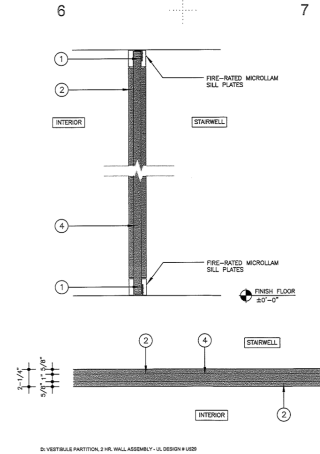
6. CONCRETE WALL, 2 HOUR ASSEMBLY - AS PER TABLE 101.2 OF THE NEW YORK BUILDING CODE

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C. CONCRETE WALL, 2 HOUR ASSEMBLY - AS PER TABLE 101.2 OF THE NEW YORK BUILDING CODE

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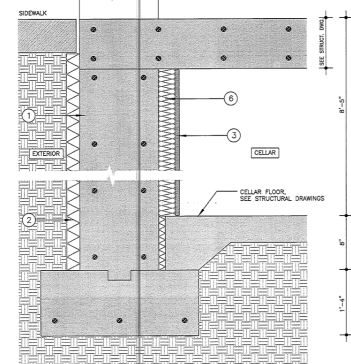
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CONCRETE WALL (WEST)  
2 HOUR ASSEMBLY  
SCALE: 1-1/2" = 1'-0"

CONCRETE WALL (EAST)  
2 HOUR ASSEMBLY  
SCALE: 1-1/2" = 1'-0"

UNIT PARTITION WALL  
2 HOUR ASSEMBLY  
SCALE: 1-1/2" = 1'-0"

VESTIBULE PARTITION WALL  
2 HOUR ASSEMBLY  
SCALE: 1-1/2" = 1'-0"



A. CONCRETE WALL, 2 HOUR ASSEMBLY - AS PER TABLE 101.2 OF THE NEW YORK BUILDING CODE

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CONCRETE FOUNDATION WALL  
2 HOUR ASSEMBLY  
SCALE: 1-1/2" = 1'-0"

STANDARD INTERIOR PARTITION  
1.5 x 3 HOUR ASSEMBLY  
SCALE: 1-1/2" = 1'-0"

BATH PARTITION WALL  
1 HOUR ASSEMBLY, OR NON-RATED ASSEMBLY  
SCALE: 1-1/2" = 1'-0"

108 W I23 ST.

ALTERATION TYPE 1:  
NEW CONSTRUCTION/FAMILY RESIDENCE

DATE: SUBMIT

JINER  
LYNETTE WIGDER/CHRISTIAN VOLKMAN  
100 LA SALLE STREET #10  
NEW YORK, NY 10027  
TEL: (212) 686.0180  
WWW: VOLKMANWIGDER.COM/EDU

ARCHITECT  
CHRISTIAN VOLKMAN, RA  
LICENSE NUMBER: 033333  
ISSUE DATE: 04/09/2018

DESIGNED BY  
architect  
100 LA SALLE ST #10 NEW YORK 10027  
TEL: (212) 686.0180



LOT NO.: 001  
DRAWN BY: CV  
CHECKED: CV  
DATE: 04/09/2018

DEPARTMENT OF BUILDING  
PLUMB SET

TITLE  
WALL  
SCHEDULE

APR 07 2017

SCALE: 1-1/2" = 1'-0"

FILE NO.: A-601.00

PAGE: 23 OF 51







108 W 123 ST.

108 WEST 123rd STREET NEW YORK, NY 10027

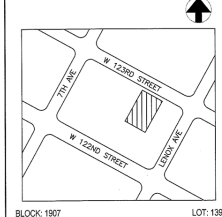
**aardvarchitecture**

100 LA SALLE ST.#6C NEW YORK 10027  
Ph. (917)388.0774 aardvarchi@aol.com

**RLM Engineering, PLLC**

1 HEWITT SQUARE, SUITE # 203  
EAST NORTHPORT, NY 11731  
Tel: 516-541-9710 Web: www.rlmengineering.com

KEY PLAN:



BLOCK: 1907 LOT: 139

| NO. | DESCRIPTION | DATE |
|-----|-------------|------|
|     |             |      |
|     |             |      |
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PROJECT:  
108 WEST 123RD STREET

DRAWING TITLE:  
CELLAR AND FIRST FLOOR PLANS

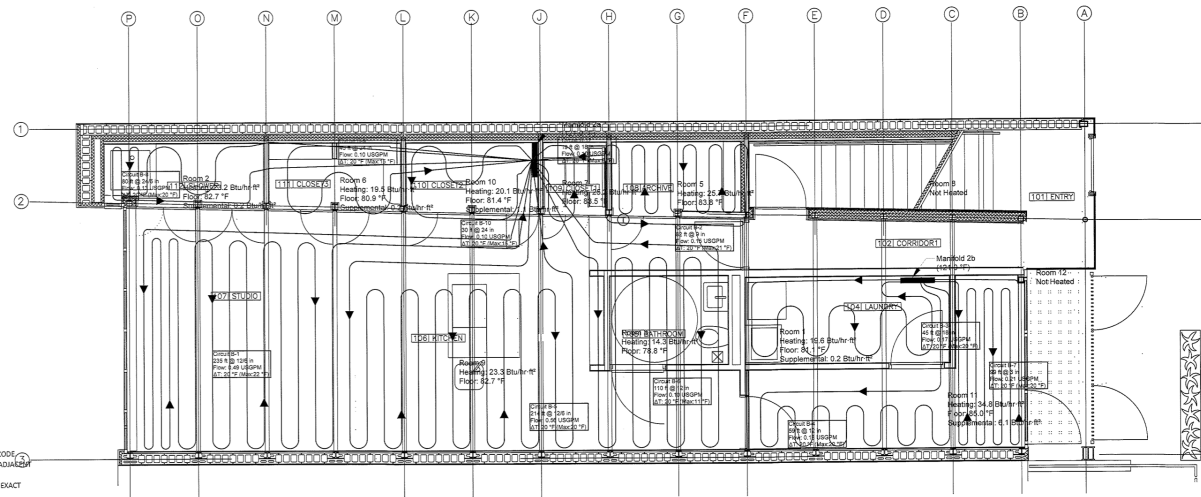
DATE: NOVEMBER 1, 2016  
SCALE: AS NOTED  
PROJECT NO.: 108-16-001  
DESIGNED BY: RLM  
DRAWN BY: CSK  
REVIEWED BY: RLM

STAMP: DRAWING NO.: M101.00  
PAGES: 28 OF X

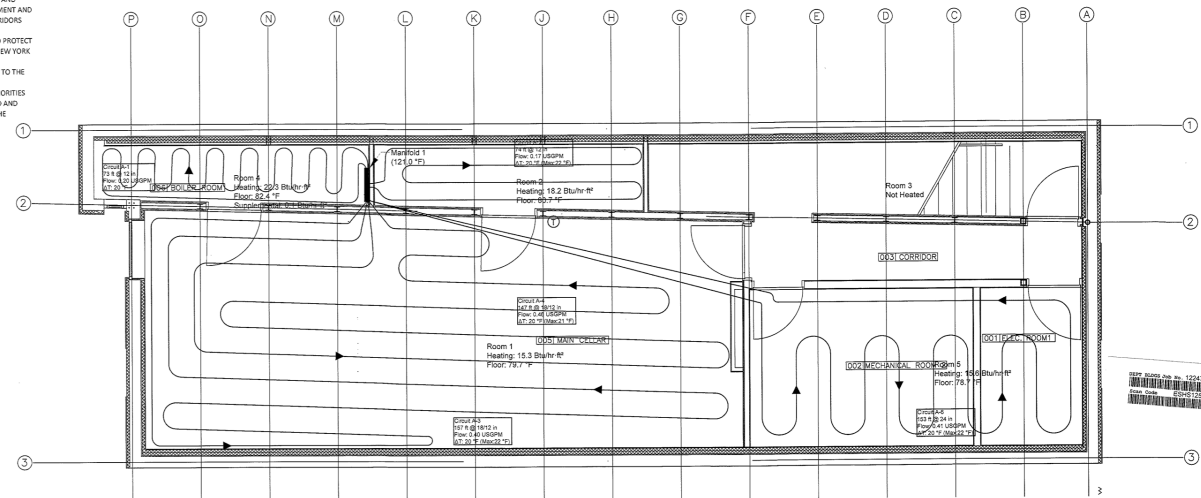
- NOTES:
- RADIANT TUBING SHALL BE 1/2" PEX.
  - FINAL RADIANT TUBING LAYOUT AND LOCATION OF DISTRIBUTION MANIFOLD SHALL BE BASED ON PROJECT CONDITIONS.
  - RADIANT TUBING SHALL BE LOCATED AT A MAX. DEPTH OF 2" IN THE CONCRETE.
  - CONTRACTOR SHALL SUBMIT FINAL RADIANT TUBING DESIGN PRIOR TO COMMENCING INSTALLATION.
  - SINGLE THERMIST THERMOSTAT SHALL BE LOCATED ON EACH FLOOR TO CONTROL RADIANT HEAT. EXCEPT FOURTH FLOOR SHALL USE A THERMIST THERMOSTAT.

MECHANICAL GENERAL NOTES:

- ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE NEW YORK CITY BUILDING CODE.
- CONTRACTOR SHALL PROPERLY SHORE, BRACE AND MAKE SAFE ALL FLOORS, WALLS AND ADJACENT PROPERTY AS THE JOB REQUIRES.
- CONTRACTOR SHALL BE RESPONSIBLE TO DETERMINE THE EXACT FIELD DIMENSIONS AND EXACT LOCATIONS OF EQUIPMENT, DUCTWORK, PIPING, ETC. AS SHOWN ON THE PLANS.
- CONTRACTOR SHALL OBTAIN ALL PERMITS AS REQUIRED AND PAY FOR SAME PRIOR TO THE START OF THE WORK.
- WHERE REQUIRED, PENETRATIONS SHALL BE FIRE-STOPPED TO MAINTAIN THE FIRE RATING OF THE ASSEMBLY, IN ACCORDANCE WITH ASTM E 814-97.
- THE CONTRACTOR SHALL VERIFY CONDITIONS AT THE SITE, VERIFY ALL DIMENSIONS, AND NOTIFY THE ENGINEER OF USUAL CONDITIONS IN WRITING PRIOR TO THE START OF WORK.
- CONTRACTOR SHALL BE RESPONSIBLE FOR TRANSPORTING ALL EQUIPMENT TO THE JOB SITE, INCLUDING RIGGING, FIELD MEASUREMENTS FOR RIGGING, REMOVAL, ETC.
- COORDINATE WITH OWNER AND OTHER TRADES THE TIME AND DAY WHEN EQUIPMENT AND MATERIALS MAY BE TRANSPORTED THROUGH THE BUILDING AND AREA OF WORK. EQUIPMENT AND MATERIAL SHALL BE IN SECTIONS OR SIZES SUITABLE FOR TRANSPORTING THROUGH CORRIDORS AND TRAFFIC AREAS. CONTRACTOR IS TO COORDINATE MAXIMUM MATERIAL SIZE.
- COORDINATE WITH THE OWNER AND MAKE ANY NECESSARY TEMPORARY PROVISIONS TO PROTECT PASSAGEWAYS, ACCESS AND MAINTAIN THE MEANS OF EGRESS IN ACCORDANCE WITH NEW YORK CITY CODE.
- ALTERATIONS TO BUILDING STRUCTURE INCLUDING BOLTING, OR WELDING CONNECTION TO THE BUILDING STEEL SHALL BE APPROVED BY THE OWNER'S STRUCTURAL ENGINEER.
- ALL PERMITS, CHARGES, FEES, ETC., INCLUDING THOSE OF THE UTILITY COMPANIES, AUTHORITIES NECESSARY FOR THE PROSECUTION AND COMPLETION OF THE WORK SHALL BE OBTAINED AND DISCHARGED UNDER THE WORK OF THIS SECTION WITHOUT ANY ADDITIONAL COST TO THE OWNER.



PLAN: FIRST FLOOR (GROUND LEVEL)  
SCALE: 5/16" = 1'-0"



PLAN: CELLAR  
SCALE: 5/16" = 1'-0"

| HOT WATER HEATING BOILER SCHEDULE |              |                       |            |       |          |        |        |            |         |       |                   |      |                   |            |       |     |               |                   |         |
|-----------------------------------|--------------|-----------------------|------------|-------|----------|--------|--------|------------|---------|-------|-------------------|------|-------------------|------------|-------|-----|---------------|-------------------|---------|
| MARK                              | LOCATO       | SYSTEM AND/OR SERVICE | TYPE       | FLUID | FLOW GPM | EWT °F | LWT °F | OUTPUT MBH | MAX MBH | % EFF | NATURAL GAS IN WG | FUEL | RELIEF VALVE PSIG | ELECTRICAL |       |     | Manufacture   | Model             | REMARKS |
|                                   |              |                       |            |       |          |        |        |            |         |       |                   |      |                   | VOLT       | PHASE | AMP |               |                   |         |
| BLR-1                             | Roof Mech Rm | Heating System        | CONDENSING | NG    | 8.7      | 105    | 125    | 99         | 110     | 96    | 13                | NG   | 30                | 120        | 1     | 15  | Triangle Tube | Prestige Solo 110 | ----    |
| BLR-2                             | Roof Mech Rm | Heating System        | CONDENSING | NG    | 8.7      | 105    | 125    | 99         | 110     | 96    | 13                | NG   | 30                | 120        | 1     | 15  | Triangle Tube | Prestige Solo 110 |         |

Notes:

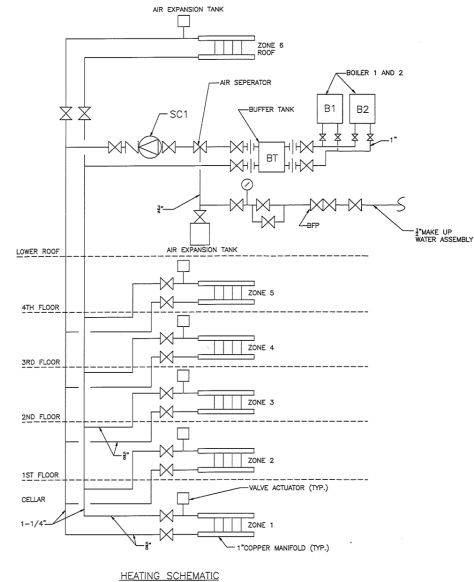
- Main boiler circulation pump is factory packaged by the specified boiler manufacture.
- External low water cut off device shall be supplied and installed per manufactures requirement
- Boiler high temperature limit shall be installed set to 140F max supply temperature.
- Condensate neutralization filter shall be supplied and installed per manufactures requirements.
- Boilers shall be installed with the manufactures recommended clearances
- 3" PVC combustion air pipe shall be installed directly from each boiler to termination point above roof
- 3" CPVC vent pipe shall be connected to each boiler and terminate above roof level per NYC Code requirements
- Boiler pressure relief valve shall be piped downward terminating 6" above floor drain connection.

|      |                   |                             |      | PUMP SCHEDULE |                   |            |              |  |         |       |      |       |      |            |                  |             |               |                            |
|------|-------------------|-----------------------------|------|---------------|-------------------|------------|--------------|--|---------|-------|------|-------|------|------------|------------------|-------------|---------------|----------------------------|
| MARK | LOCATIO<br>N      | SYSTEM<br>AND/OR<br>SERVICE | TYPE | FLUID         | CIRCULATING FLUID |            |              |  | SP. GR. | Watts | Amps | PHASE | VOLT | MAX<br>RPM | SPEED<br>CONTROL | Manufacture | Model         | REMARKS                    |
|      |                   |                             |      |               | FLOW<br>GPM       | HEAD<br>FT | TEMPER<br>°F |  |         |       |      |       |      |            |                  |             |               |                            |
| SC-1 | Roof Mech<br>Room | Heating<br>System           | CENT | Hot Water     | 14                | 25         | 140          |  | 1       | 178   | 1.61 | 1     | 115  | 1750       | Variable         | Grundfos    | Magna3 32-100 | Stainless Steel<br>Housing |
|      |                   |                             |      |               |                   |            |              |  |         |       |      |       |      |            |                  |             |               |                            |

| EXHAUST FAN SCHEDULE |          |                                |                       |              |     |      |       |       |        |                  |                   |     |      |       |      |      |             |       |         |               |
|----------------------|----------|--------------------------------|-----------------------|--------------|-----|------|-------|-------|--------|------------------|-------------------|-----|------|-------|------|------|-------------|-------|---------|---------------|
| MARK                 | LOCATIO  | AREA AND/OR BLDG               | SYSTEM AND/OR SERVICE | AIR FLOW CFM | TSP | FAN  |       |       |        | MOTOR ELECTRICAL |                   |     |      |       |      |      | Manufacture | Model | REMARKS |               |
|                      |          |                                |                       |              |     | TYPE | WHEEL | CLASS | DRIVE  | FAN MAX RPM      | NOMINAL POWER BHP | HP  | AMPS | PHASE | VOLT | RPM  |             |       |         | SPEED CONTROL |
| EF                   | Bathroom | 505, 408, 306 Bathroom, 405 WC | TOILET EXHAUST        | 50           | 4.3 | N/A  | N/A   | N/A   | Direct | N/A              | N/A               | N/A | 0.1  | 1     | 120  | 1750 | CONSTANT    | Braun | XBS0    | Ceiling Mount |

|             |                |                     |         |        | HEATING SYSTEM BUFFER TANK SCHEDULE |                      |             |             |          |         |
|-------------|----------------|---------------------|---------|--------|-------------------------------------|----------------------|-------------|-------------|----------|---------|
| MARK        | LOCATION       | TYPE                | Working |        | INITIAL PRESSURE IN TANK            | MAX WORKING PRESSURE | TANK VOLUME | Manufacture | Model    | REMARKS |
|             |                |                     | MIN °F  | MAX °F |                                     |                      |             |             |          |         |
| BUFFER TANK | Roof Mech Room | Buffer Storage Tank | -40     | 190    | 20                                  | 150                  | 25          | Thermopoon  | NAS20025 | -----   |

| BOILER SYSTEM THERMAL EXPANSION TANK SCHEDULE |           |                              |        |     |                                |                           |                |                         |             |          |         |
|-----------------------------------------------|-----------|------------------------------|--------|-----|--------------------------------|---------------------------|----------------|-------------------------|-------------|----------|---------|
| MARK                                          | LOCATION  | TYPE                         | SYSTEM |     | INITIAL<br>PRESSURE IN<br>TANK | MAX OPERATING<br>PRESSURE | TANK<br>VOLUME | PIPE<br>SIZE TO<br>TANK | Manufacture | Model    | REMARKS |
|                                               |           |                              | MIN    | MAX |                                |                           |                |                         |             |          |         |
|                                               |           |                              | °F     | °F  |                                |                           |                |                         |             |          |         |
| EXP-1                                         | Roof Mech | Thermal<br>Expansion<br>Tank | 60     | 150 | 20                             | 40                        | 23             | 1                       | TACO        | CA90-125 | .....   |



NOTES:

- RADIANT HEAT ZONE MANIFOLD SHALL INCLUDE THE FOLLOWING:
  - CONTROL VALVE WITH ACTUATOR
  - THERMOSTAT LOCATED IN SPACE
  - BALANCING/SHUT OFF VALVES FOR EACH RADIANT HEAT LOOP
  - SHUT OFF VALVES
- HEATING PIPES SHALL BE INSULATED PER NYC ENERGY CODE.
- SC-1 - HEATING SYSTEM CIRCULATION PUMP VARIABLE SPEED DRIVE SHALL BE SET TO DELIVER @ MAXIMUM OF 14 GPM.

| Heating System Summary   |                |                  |
|--------------------------|----------------|------------------|
| Load Calculation Method: | ASHRAE STD 183 |                  |
| Design Location:         | NY, NY         |                  |
| Outdoor Temperature:     | 13.6           | F                |
| Total Heated Floor Area  | 4082           | sqft             |
| Zone Heating Summary     |                |                  |
| Zone #                   | Location       | Heat Load (BTUH) |
| Zone #1                  | Cellar         | 17,614           |
| Zone #2                  | 1st Floor      | 23,865           |
| Zone #3                  | 2nd Floor      | 22,818           |
| Zone #4                  | 3rd Floor      | 27,001           |
| Zone #5                  | 4th Floor      | 31,037           |
| Total Heating Load       |                | 122,335          |

EQUIPMENT IS SIZED IN ACCORDANCE WITH ASHRAE/ACCA 183 PROCEDURES

108 W 123 ST.

108 WEST 123RD STREET NEW YORK, NY 10027

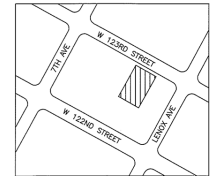
aardvarchitecture

100 LA SALLE ST, #60 NEW YORK 10027  
Ph. (917)388.0774 aardvarchi@aol.com

RLM Engineering, PLLC

1 HEWITT SQUARE, SUITE #203  
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Tel: 516-941-6710 Web: www.rlmengineering.com

KEY PLAN





108 W 123 ST.

108 WEST 123rd STREET NEW YORK, NY 10027

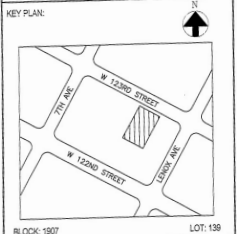
**aardvarchitecture**

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Ph. (917)388.0774 aardvarchi@aol.com

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KEY PLAN:



NO. DESCRIPTION DATE

REVISIONS:

PROJECT

108 WEST 123RD STREET

DRAWING TITLE:

CELLAR AND FIRST FLOOR

PLANS

DATE: NOVEMBER 1, 2016

SCALE: AS NOTED

PROJECT NO.

DESIGNED BY: RLM

DRAWN BY: CSK

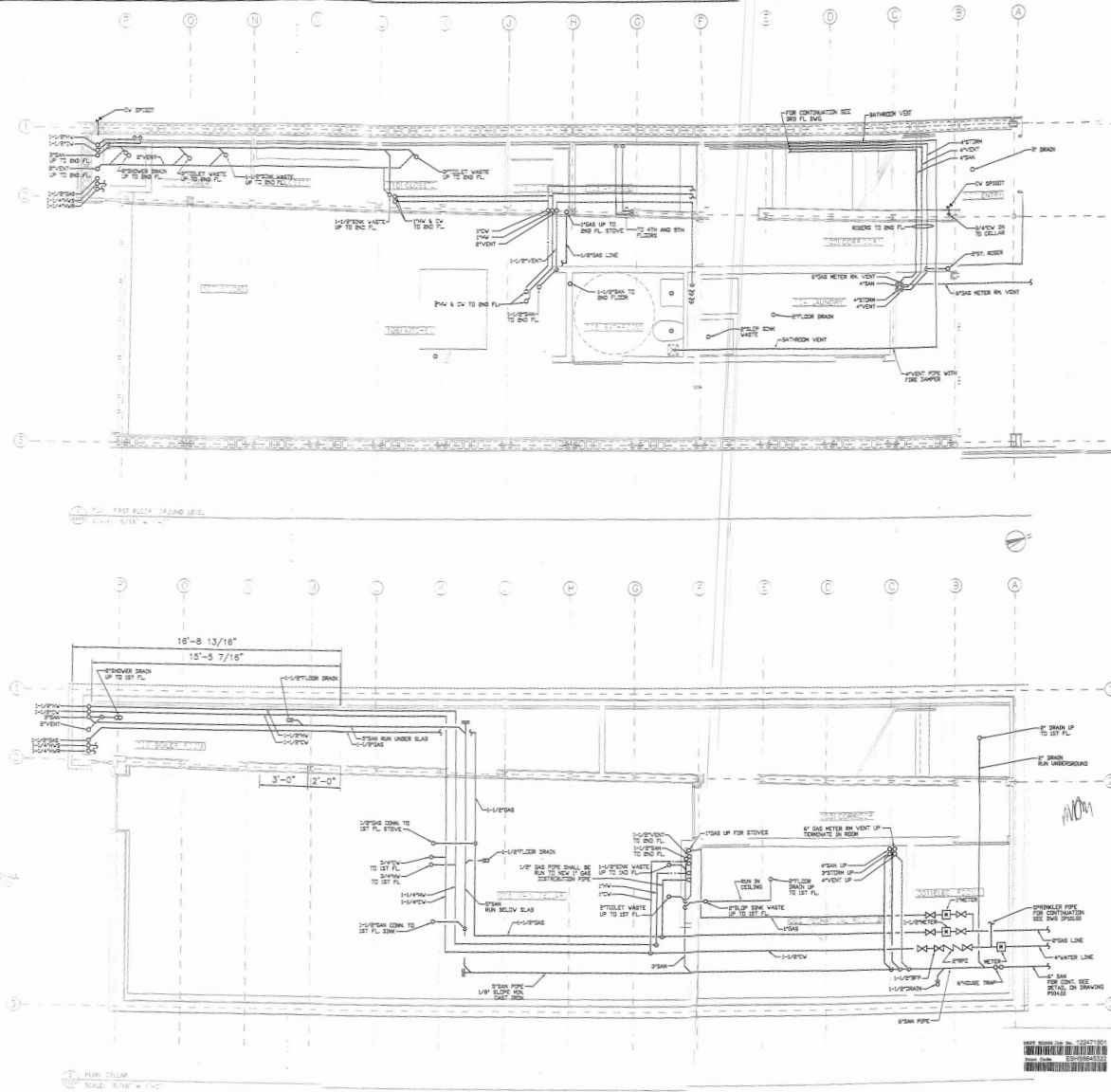
REVIEWED BY: RLM

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PAGE: 2 OF 2

P101.00

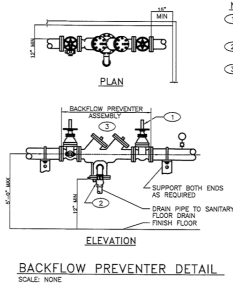
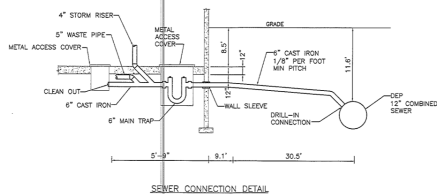
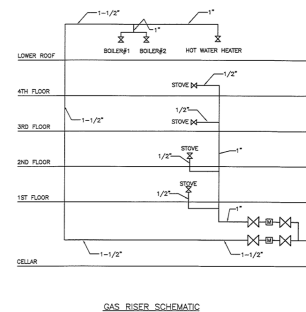
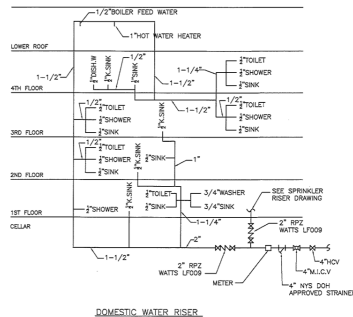
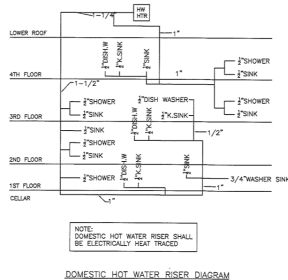
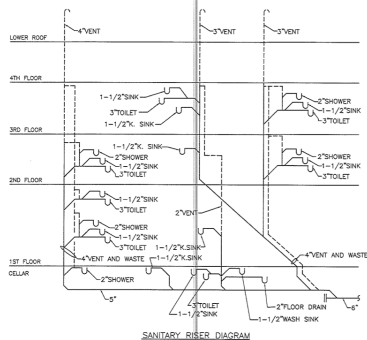
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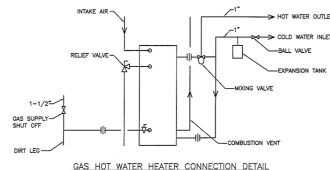
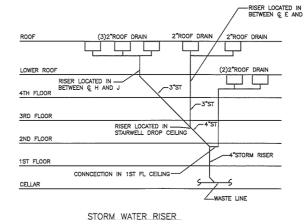
**BUILDING DEPARTMENT PLUMBING NOTES**

THE PLUMBING SYSTEM (SANITARY, WASTE, VENT, WATER DISTRIBUTION AND GAS) AND ALL ASSOCIATED EQUIPMENT WILL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE FULL REQUIREMENTS OF THE NEW YORK CITY 2014 PLUMBING CODE.

1. THE SANITARY SYSTEM SHALL BE PROVIDED IN FULL ACCORDANCE WITH THE GENERAL PROVISIONS OF SECTION PC301.
2. THE MATERIALS USED IN THE PLUMBING SYSTEM WILL BE PROVIDED IN FULL ACCORDANCE WITH SECTION PC302 AND PC303.
3. EQUIPMENT HOOK-UP AND THE JOINING WILL BE FULL COMPLIANCE WITH SECTIONS PC305 AND PC306.
4. THE INSTALLATION OF FIXTURES WILL BE IN FULL ACCORDANCE WITH PC CHAPTER 4.
5. TRAPS FOR FIXTURES AND DRAIN LINES WILL BE PROVIDED AND CLEANOUTS INSTALLED IN FULL COMPLIANCE WITH SECTIONS PC402, PC408 AND PC CHAPTER 10.
6. VERTICAL AND HORIZONTAL PIPING WILL BE HUNG AND SUPPORTED AS DIRECTED IN SPECIFICATIONS AND WITH THE FULL COMPLIANCE WITH SECTION PC308.
7. THE WATER SUPPLY SYSTEMS OF THE SUBJECT BUILDING SHALL BE INSTALLED AND MAINTAINED IN FULL COMPLIANCE WITH PC CHAPTER 6.
8. THE SANITARY DRAINAGE SYSTEM WILL BE USED AND INSTALLED IN FULL COMPLIANCE WITH PC CHAPTER 7.
9. THE VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM OF THE SUBJECT BUILDING WILL BE INSTALLED IN FULL COMPLIANCE WITH SECTION PC302 AND PC CHAPTER 8.
10. THE STORM DRAINAGE SYSTEM AND PIPING WILL BE INSTALLED IN FULL COMPLIANCE WITH CHAPTER 11.
11. GAS PIPING AND EQUIPMENT WILL BE INSTALLED IN FULL COMPLIANCE WITH THE NEW YORK CITY FUEL GAS CODE.
12. ALL TRENCHING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC306.
13. RAY PROOFING SHALL BE IN ACCORDANCE WITH SECTION PC304.
14. TEMPORARY TOILET FACILITIES SHALL BE PROVIDED FOR WORKMANS PER SECTION PC312.



- NOTES:**
- 1 PROVIDE ADEQUATE CLEARANCE ABOVE UNIT FOR OPERATION OF VALVES OR UNIT REPAIR.
  - 2 AIR GAP FITTING FURNISHED WITH BACKFLOW PREVENTER.
  - 3 BYPASS PIPING AROUND BFP IS PROHIBITED.



- NOTES:**
- INSTALL PER MANUFACTURER REQUIREMENTS.
  - VENTING VALVE HOT WATER OUTLET SHALL BE SET AT 120°F OUTLET TEMPERATURE.
  - VENTING REQUIREMENTS AND REQUIREMENTS.
  - VENTING REQUIRED FOR COMBUSTION AIR VENT.
  - VENTING REQUIREMENTS.

| GAS FIRED DOMESTIC WATER HEATER SCHEDULE |                |                       |                      |                              |                                      |                           |             |                     |               |       |       |      |                              |
|------------------------------------------|----------------|-----------------------|----------------------|------------------------------|--------------------------------------|---------------------------|-------------|---------------------|---------------|-------|-------|------|------------------------------|
| MARK                                     | LOCATION       | SYSTEM AND/OR SERVICE | STORAGE CAPACITY GAL | RECOVERY @ 100°F RISE GAL/HR | TIME TO RECOVER @ 100°F RISE MINUTES | RELIEF VALVE SETTING PSIG | FUEL TYPE   | INLET PRESSURE PSIG | FLOW RATE GPM | VOLTS | PHASE | AMPS | REMARKS                      |
| WH-1                                     | Roof/Mech Room | DOMESTIC HOT WATER    | 60                   | 138                          | 25                                   | 100                       | NATURAL GAS | 14                  | 120           | 120   | 1     | 15   | UP TO 90% AC SHR 1074-122 M3 |

**NOTES:**

- Condensate Drain neutralizing kit required, please per manufacturer recommendation
- 4" Vent Outlet CPVC terminates above roof
- 3" PVC Combustion Air Inlet terminating above roof

108 W 123 ST.

108 WEST 123rd STREET NEW YORK, NY 10027

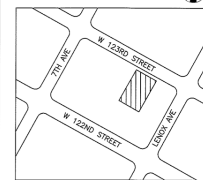
**aardvarchitecture**

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Ph. (917)388.0774 aardvarchi@aol.com

**RLM Engineering, PLLC**

1 HEWITT SQUARE, SUITE # 203  
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Tel: 516-941-6710 Web: www.rlmengineering.com

KEY PLAN:



BLOCK 1907 LOT 139

NO. DESCRIPTION DATE

REVISIONS:

PROJECT

108 WEST 123RD STREET

DRAWING TITLE:  
EQUIPMENT SCHEDULE AND  
SCHEMATIC DIAGRAM

Prepared by: RLM

DATE: APR 07 2017

SCALE: AS NOTED

PROJECT NO.: RLM

DESIGNED BY: RLM

DRAWN BY: CSK

REVIEWED BY: RLM

STAMP: RLM ENGINEERING, PLLC

DRAWING NO.: P104.00

PAGE(S): 35 OF X



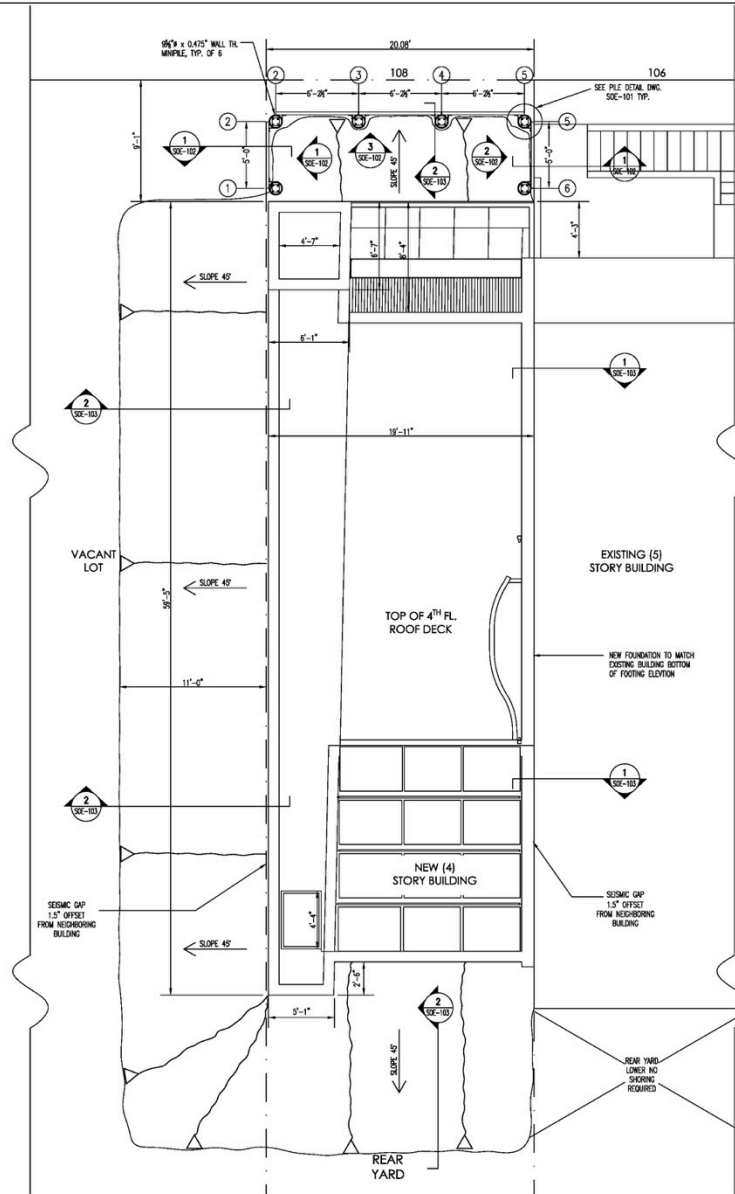


TO THE BEST OF MY KNOWLEDGE, BELIEF, AND PROFESSIONAL JUDGMENT, THIS APPLICATION IS IN COMPLIANCE WITH THE EDCOYS 2014

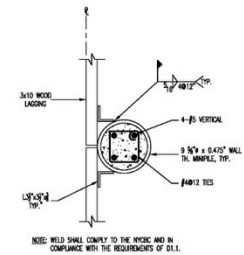
| ENERGY TABLE                                                                   |                        |                                  |
|--------------------------------------------------------------------------------|------------------------|----------------------------------|
| WORK TYPE INCLUDING NEW AND/OR REPLACEMENT                                     | PROPOSED DESIGN VALUES | CODE PRESCRIBED VALUE AND SYSTEM |
| SEWER, WINDING, DOORS, STAIRWAYS, ELEVATORS                                    | NA OR NO CHANGE        |                                  |
| INTERIOR PARTITIONS BETWEEN UNCONDITIONED CORRIDORS AND CONDITIONED APARTMENTS | NA OR NO CHANGE        |                                  |
| PIPING INSULATION                                                              | NA OR NO CHANGE        |                                  |
| INTERIOR LIGHTING                                                              | NA OR NO CHANGE        |                                  |
| EXTERIOR LIGHTING                                                              | NA OR NO CHANGE        |                                  |
| BOLLERS/HEATING FURNACES                                                       | NA OR NO CHANGE        |                                  |
| HVAC SYSTEMS                                                                   | NA OR NO CHANGE        |                                  |
| STEEL DRAINAGE                                                                 | NA OR NO CHANGE        |                                  |

- A SURVEY MONITORING SYSTEM CONSISTING OF CONTROL POINTS ON WALLS OF ALL ADJACENT BUILDS, SHALL BE INSTALLED TO MONITOR MOVEMENTS ON A WEEKLY BASIS AS UNDERPINNING IS PROCEEDING. STRUCTURAL ENGINEERING SYSTEMS, PLLC SHALL BE NOTIFIED IMMEDIATELY OF ANY STRUCTURE WORKS.
- OWNER TO OBTAIN A PRECONSTRUCTION SURVEY OF ADJACENT PROPERTIES.
- A PERMIT SHALL BE OBTAINED FROM DOT FOR SIDEWALK CLOSURE TO INSTALL SOLDIER PILES OR ANY INTRUSION PAST PROPERTY LINE.
- CONTRACTOR IS RESPONSIBLE TO VERIFY AND PROTECT ANY AND ALL UTILITIES PRIOR TO ANY UNDERPINNING AND/OR SHORING BEFORE WORK IS PERFORMED.
- VIBRATION MONITORING SYSTEM TO BE PLACED AND MONITORED DURING SHORING OPERATIONS. MAXIMUM SOIL PARTICLE VELOCITY SHALL BE 0.2 INCHES PER SECOND FOR RESIDENTIAL BUILDS AND 0.5 INCHES PER SECOND ON COMMERCIAL OR MIXED RESIDENTIAL BUILDS.

1 LOCATION PLAN  
SCALE: 1/4"=1'-0"



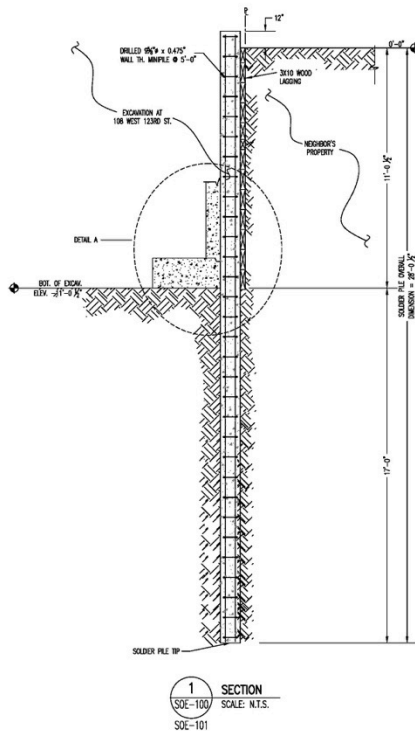
LEGEND  
⊙ INDICATES 9 5/8" MINIPILES



PILE DETAIL  
SCALE: N.T.S.

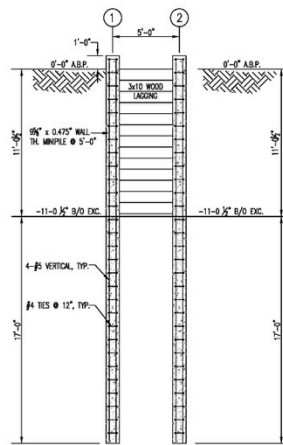
Job #: 16-32

|                 |  |                                      |  |
|-----------------|--|--------------------------------------|--|
| REVISIONS:      |  | STRUCTURAL ENGINEER:                 |  |
|                 |  | STRUCTURAL ENGINEERING SYSTEMS, PLLC |  |
|                 |  | 214-41 42ND AVENUE, SUITE 2B         |  |
|                 |  | BAYSIDE, N.Y. 11361                  |  |
|                 |  | TEL: (718) 224-7161                  |  |
|                 |  | FAX: (718) 224-7185                  |  |
|                 |  | PROJECT:                             |  |
|                 |  | 108 WEST 123RD ST., NEW YORK, NY     |  |
| SEAL:           |  | TITLE:                               |  |
|                 |  | LOCATION PLAN                        |  |
| Drawn By: ECK   |  | Checked By: JOSEPH GILINO            |  |
| Scale: AS SHOWN |  | SDE-101.00                           |  |
|                 |  | Date: 01.06.17                       |  |
|                 |  | Dwg. No.: 2 OF 4                     |  |
|                 |  | Sheets                               |  |

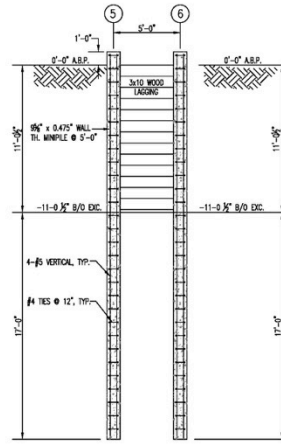


#### SHORING NOTES:

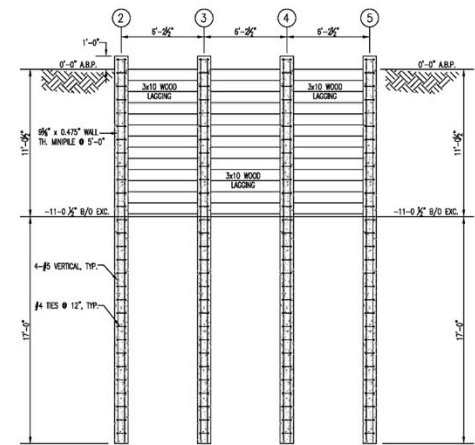
1. ALL WOOD LAGGING SHALL BE FULL SIZE SAWN LUMBER.
2. ALL WOOD LAGGING SHALL HAVE AN ALLOWABLE BENDING STRESS,  $F_b=1250$  PSI MIN.
3. ALL SHORING SHALL BE VIBRATED OR DRILLED INTO PLACE. NO PILE DRIVING IS PERMITTED.
4. ALL STEEL SOLDIER PILES SHALL HAVE A YIELD STRESS,  $F_y=50$ ksi ASTM A992 STEEL.
5. SHORING TO BE PERFORMED PER DETAILS ON DRAWING SOE-103.00.
6. CONTRACTOR TO NOTIFY ENGINEER 48 HOURS IN ADVANCE PRIOR TO COMMENCING SHORING OPERATIONS.



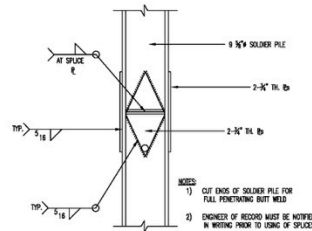
1 SHORING ELEVATION  
SOE-100 SCALE: N.T.S.  
SOE-101



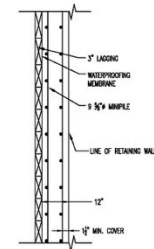
2 SHORING ELEVATION  
SOE-100 SCALE: N.T.S.  
SOE-101



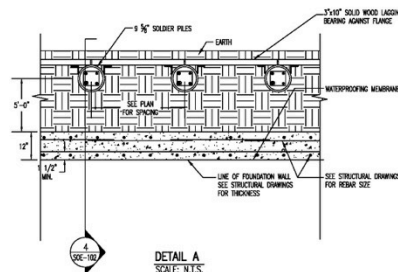
3 SHORING ELEVATION  
SOE-100 SCALE: N.T.S.  
SOE-101



SOLDIER PILE SPLICE DETAIL

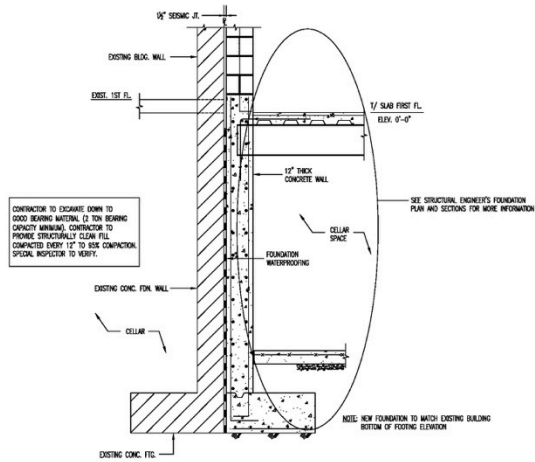


4 SECTION  
SOE-100 SCALE: N.T.S.

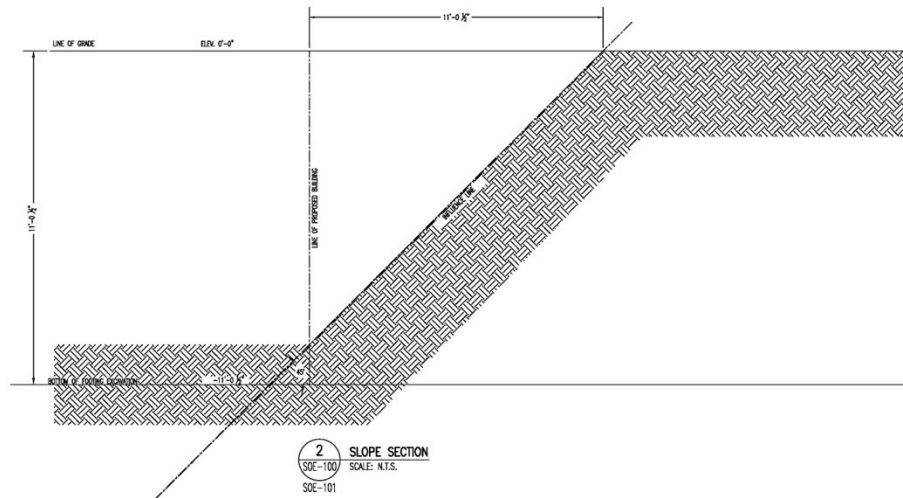


DETAIL A  
SCALE: N.T.S.

|                                      |               |
|--------------------------------------|---------------|
| Job #: 16-32                         |               |
| REVISIONS:                           |               |
| STRUCTURAL ENGINEER:                 |               |
| STRUCTURAL ENGINEERING SYSTEMS, PLLC |               |
| 214-41 42ND AVENUE, SUITE 2B         |               |
| BAYSIDE, N.Y. 11361                  |               |
| TEL: (718) 224-7161                  |               |
| FAX: (718) 224-7185                  |               |
| PROJECT:                             |               |
| 108 WEST 123RD ST., NEW YORK, NY     |               |
| TITLE:                               |               |
| ELEVATIONS, SECTIONS AND DETAILS     |               |
| Drawn By:                            | Checked By:   |
| EGK                                  | JOSEPH GILINO |
| Scale:                               | Date:         |
| AS SHOWN                             | 01.06.17      |
| Dwg. No.:                            | 3 OF 4        |
| SOE-102.00                           | Sheets        |



1 SECTION  
SDE-100 SCALE: N.T.S.  
SDE-101

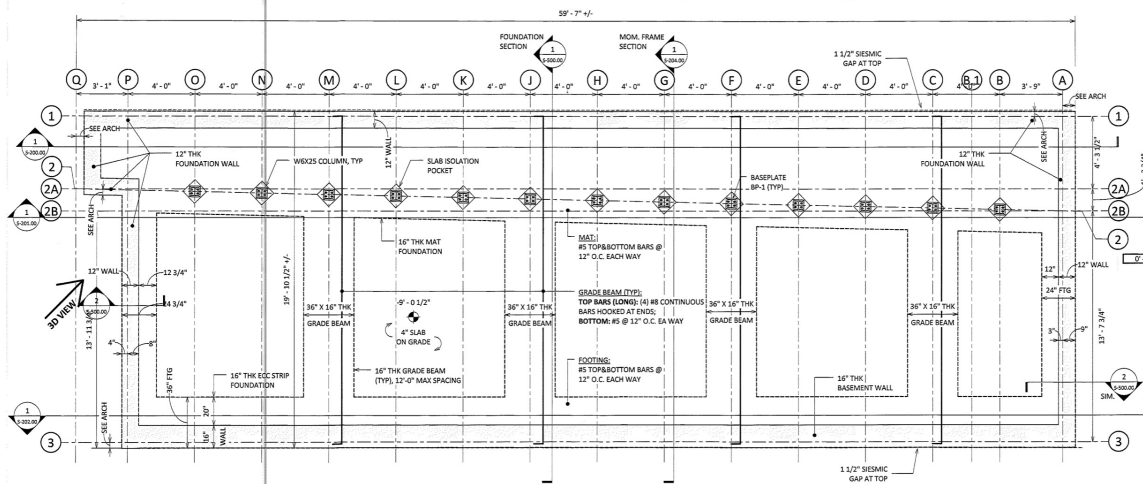


2 SLOPE SECTION  
SDE-100 SCALE: N.T.S.  
SDE-101

Job #: 16-32

|            |               |                                      |        |
|------------|---------------|--------------------------------------|--------|
| REVISIONS: |               | STRUCTURAL ENGINEER:                 |        |
|            |               | STRUCTURAL ENGINEERING SYSTEMS, PLLC |        |
|            |               | 214-41 42ND AVENUE, SUITE 2B         |        |
|            |               | BAYSIDE, N.Y. 11361                  |        |
|            |               | TEL: (718) 224-7161                  |        |
|            |               | FAX: (718) 224-7185                  |        |
|            |               | PROJECT:                             |        |
|            |               | 108 WEST 123RD ST., NEW YORK, NY     |        |
| SEAL:      |               | TITLE:                               |        |
|            |               | SECTIONS                             |        |
| Drawn By:  | Checked By:   | SDE-103.00                           | 4      |
| EGK        | JOSEPH GULINO |                                      | OF 4   |
| Scale:     | Date:         | Dwg. No.:                            | Sheets |
| AS SHOWN   | 01.06.17      |                                      |        |





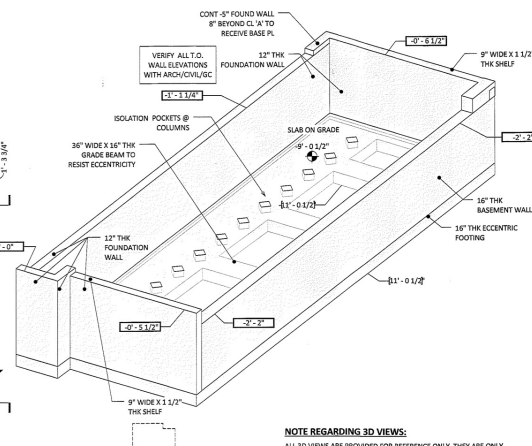
**FOUNDATION PLAN** \*PLANS NOT INTENDED TO BE SCALED

5/16" = 1'-0"

**FOUNDATION NOTES**

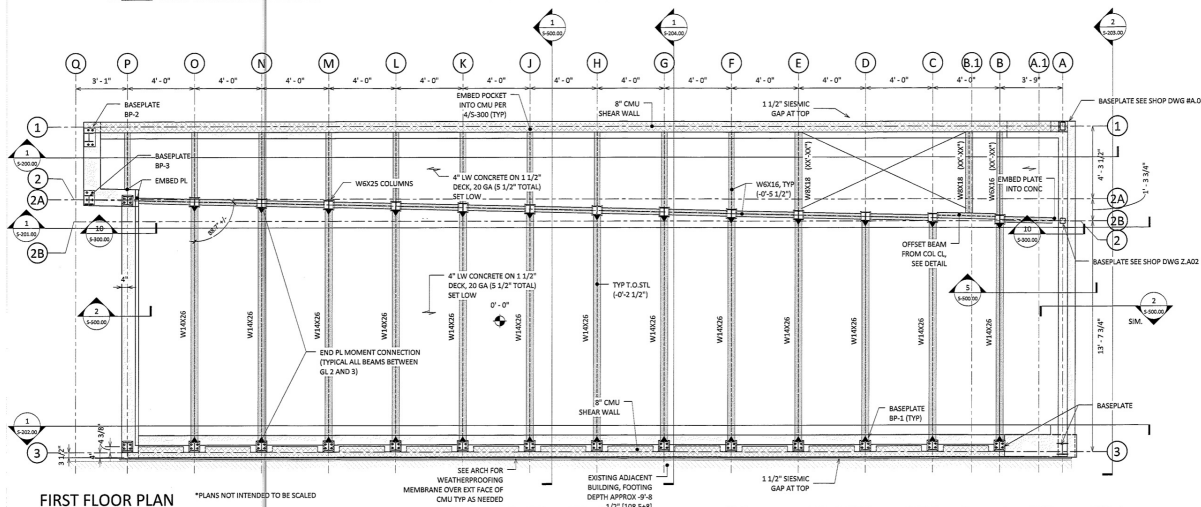
1. PROVIDE CONCRETE SLAB-ON-GRADE AS SHOWN ON PLAN, OR A MINIMUM OF 4" THICK WITH #4s. W/DRAWN 0 WELDED WIRE FABRIC SET 1 1/2" BELOW THE TO OF THE SLAB AND A CONCRETE STRENGTH OF 4,000 PSI, U.O.N. TOP OF SLAB IS AT ELEVATION 9'-0" BELOW FIRST FLOOR (U.O.N.)
2. [XX-XX] DENOTES TOP OF FOUNDATION WALL ELEVATION
3. [XX-XX] DENOTES BOTTOM OF FOOTING ELEVATION
4. [XX-XX] DENOTES TOP OF PIER ELEVATION
5. "STEP" DENOTES FOOTING STEP. SEE TYPICAL FOUNDATION DETAILS

**AXON - FOUNDATION**



**NOTE REGARDING 3D VIEWS:**

ALL 3D VIEWS ARE PROVIDED FOR REFERENCE ONLY. THEY ARE ONLY MEANT TO HELP ILLUSTRATE THE STRUCTURAL DESIGN INTENT.



**FIRST FLOOR PLAN**

5/16" = 1'-0"

**PLAN NOTES**

1. TOP OF SLAB ON GRADE SHALL BE AT ELEVATION 9'-0" (U.O.N.) TOP OF SLAB IS AT ELEVATION 9'-0". T.O. STL IS 2 1/2" BELOW T.O. SLAB (ELEV 9'-2 1/2") U.O.N. BEAMS INDICATED AS (XX-XX) OR (XX-XX) ARE ELEVATIONS ABOVE/BELOW TOP OF SLAB.
2. [XX-XX] DENOTES COLUMN ABOVE PLAN AT LOCATION
3. [XX-XX] DENOTES COLUMN BELOW PLAN AT LOCATION
4. [XX-XX] DENOTES TOP OF FLOOR ELEVATION
5. [XX-XX] DENOTES MOMENT CONNECTION
6. ALL STEEL BEAMS SHOWN ARE COMPOSITE AND REQUIRE 1 STUD PER FOOT MINIMUM, U.O.N. BY TYPICAL DETAILS.
7. ALL STEEL BEAMS HAVE DECK SUPPORT ANGLES.

**Structures Workshop, Inc.**  
18 Imperial Place  
Courtyard Building  
Providence, RI 02903  
401-383-8988 (T), 401-351-8788 (F)  
www.structuresworkshop.com

Stamp:



NO. ISSUE DATE  
10/7/2016

By: EAN/EID

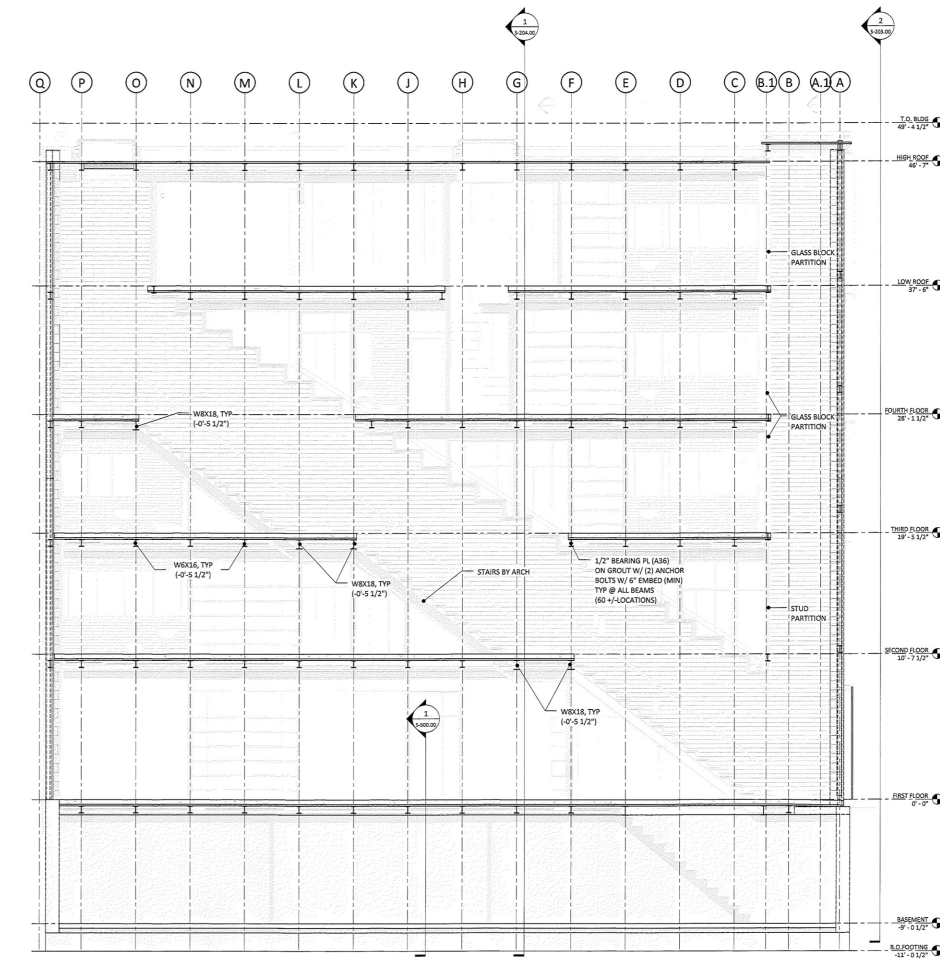
Project: WIDDER/VOLKMAN  
RESIDENCE

108 W 123RD ST  
NEW YORK, NY 10027

Sheet Name:  
**BASEMENT AND  
FIRST FLOOR  
PLANS**



SHEET:  
**S-100.00**



**1 GRIDLINE 1 - STAIRWAY SECTION**  
1/4" = 1'-0"

Stamp:



|     |       |           |
|-----|-------|-----------|
| NO. | ISSUE | DATE      |
|     |       | 10/7/2016 |

By:  
EAN/EJD

Project:  
WIDDER/VOLKMANN  
RESIDENCE

108 W 123RD ST  
NEW YORK, NY 10027

Sheet Name:  
**GRIDLINE 1  
SECTION**

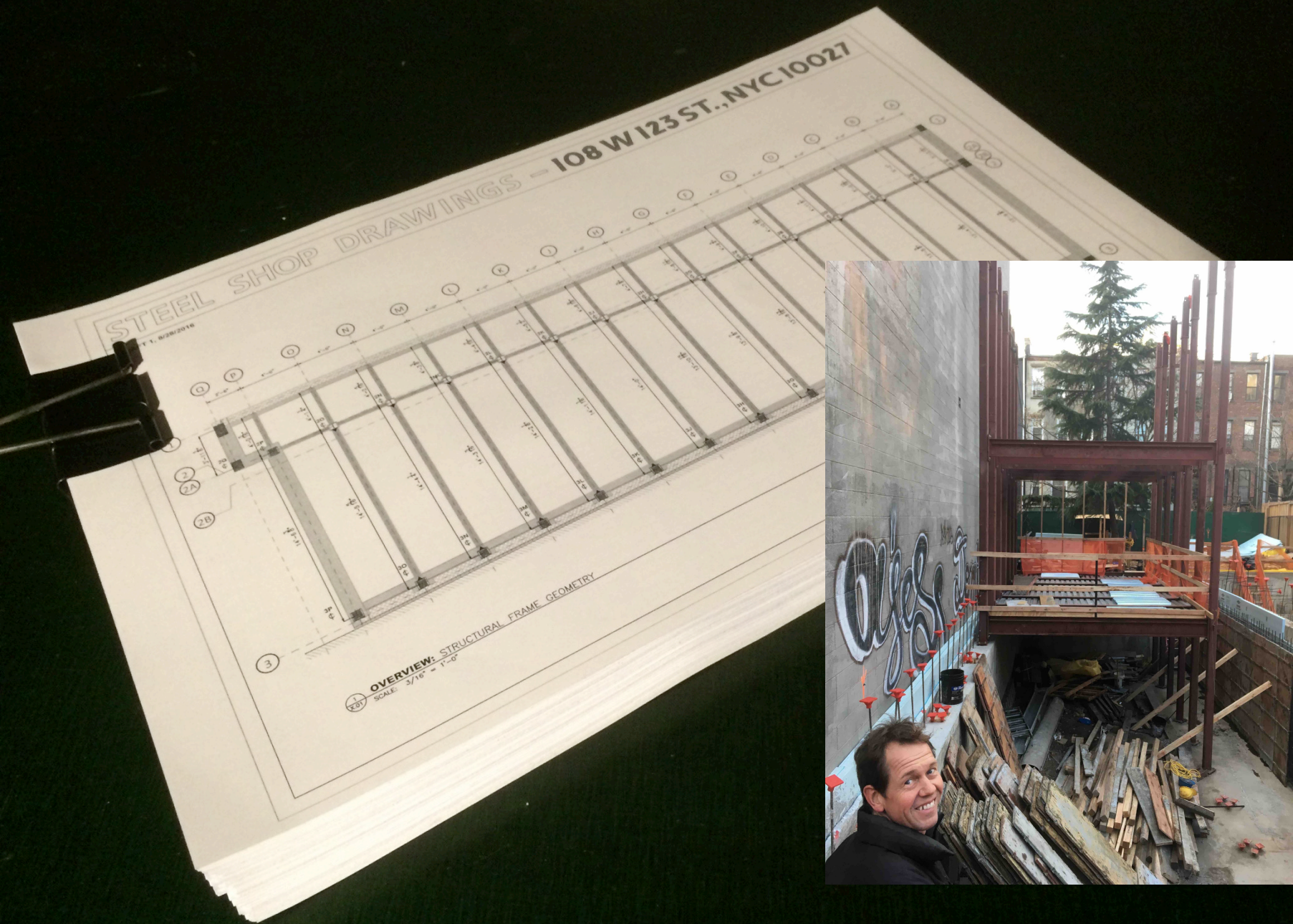
APR 07 2007

SHEET:  
S-200.00





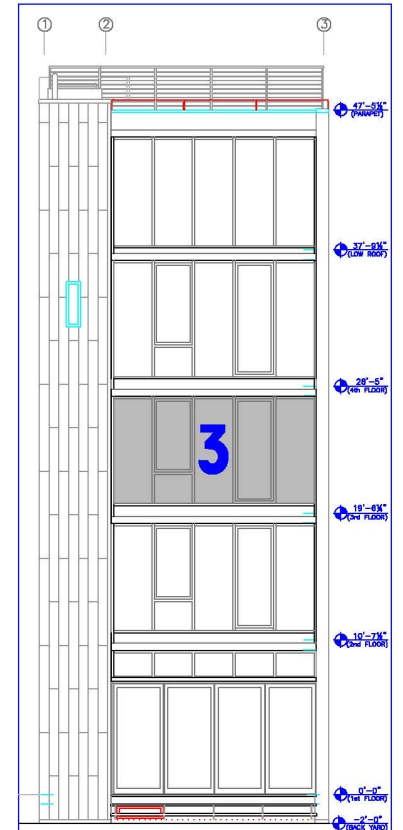
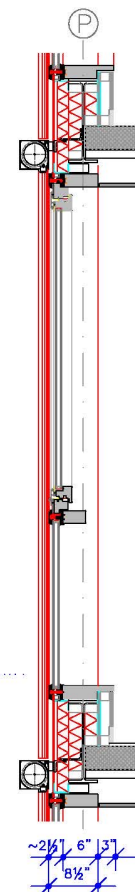




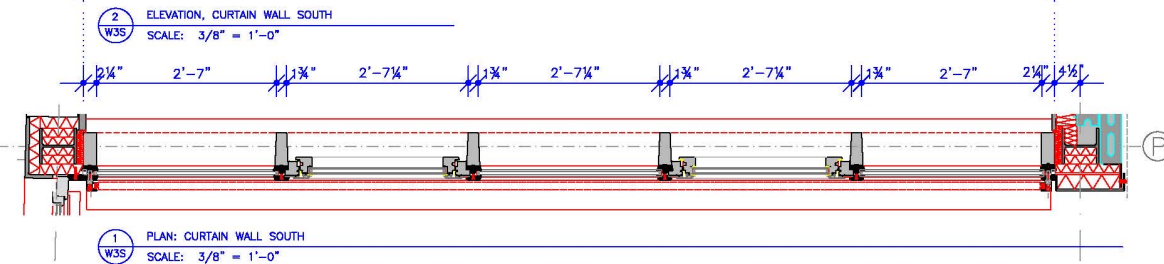


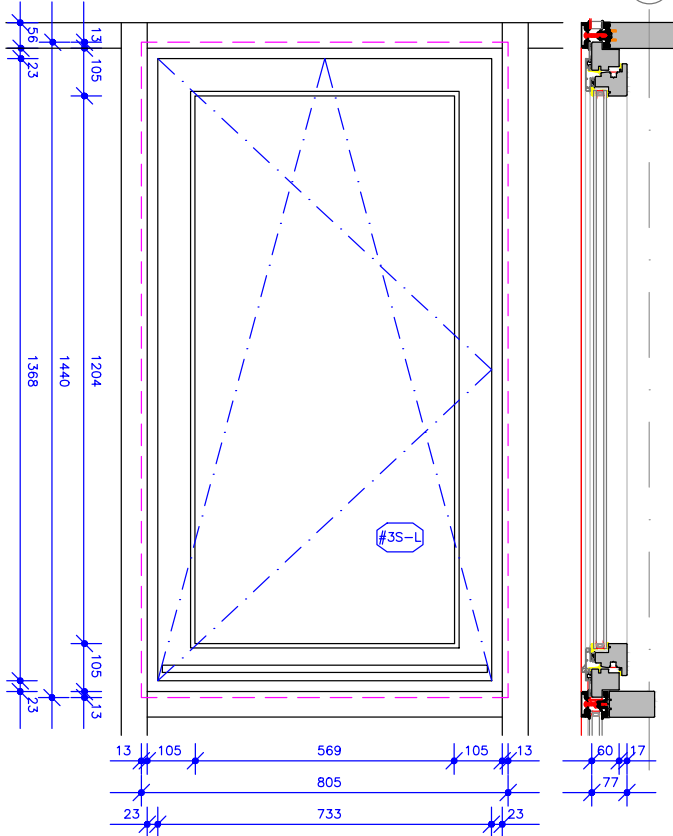




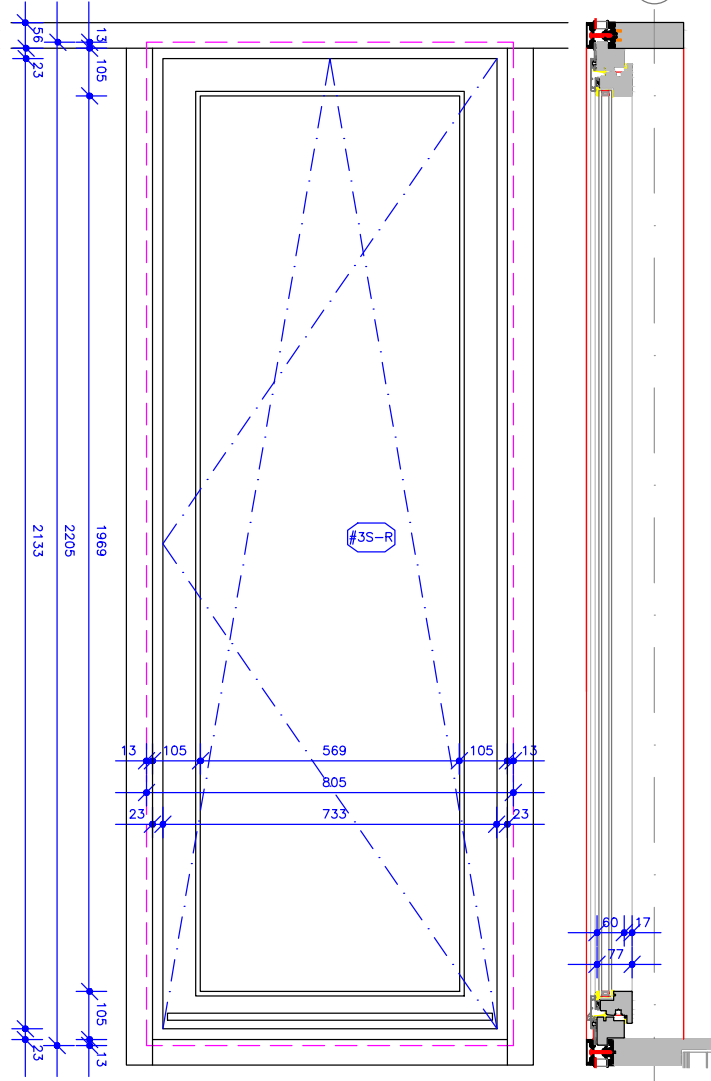


100 LA SALLE STREET #6C NEW YORK NY 10027  
 ☎/✉ (212)666.0180/666.0186 aardvarchi@aol.com

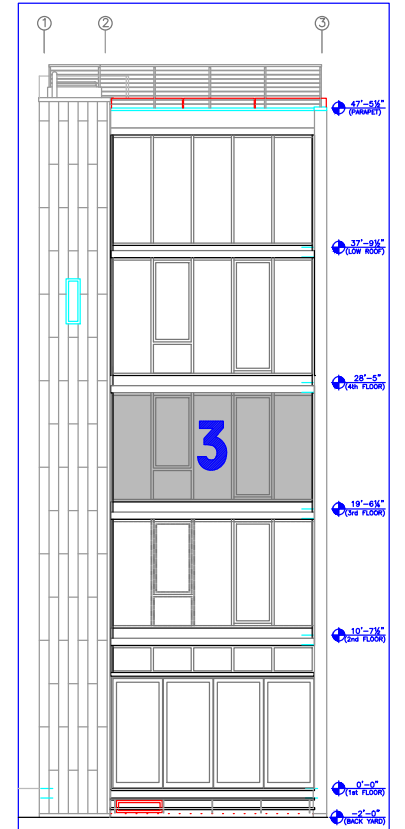




8  
W3S ELEVATION + SECTION: OPERABLE WINDOW (IN MM)  
SCALE: 3/4" = 1'-0"



8  
W3S ELEVATION + SECTION: OPERABLE WINDOW (IN MM)  
SCALE: 3/4" = 1'-0"



| WINDOWS - DRAFT 3 |                                                                                                                        |
|-------------------|------------------------------------------------------------------------------------------------------------------------|
| TITLE:            | WINDOW WALL SOUTH: CURTAIN WALL 3rd FL.                                                                                |
| SCALE:            | 3/4"=1'-0"                                                                                                             |
| DWG.#:            | #W3Sc                                                                                                                  |
| DATE:             | 01/22/16                                                                                                               |
| ADDRESS:          | <b>108 W 123 ST., NYC 10027</b>                                                                                        |
| DESIGN:           | <b>aardvarchitecture P.C.</b><br>100 LA SALLE STREET #6C NEW YORK NY 10027<br>212 666.0180/666.0186 aardvarchi@aol.com |





