NYC Buildings

# CLASSIFYING NYC'S HOUSING STOCK

## *CLARIFYING A DIFFICULT ISSUE*

presented by

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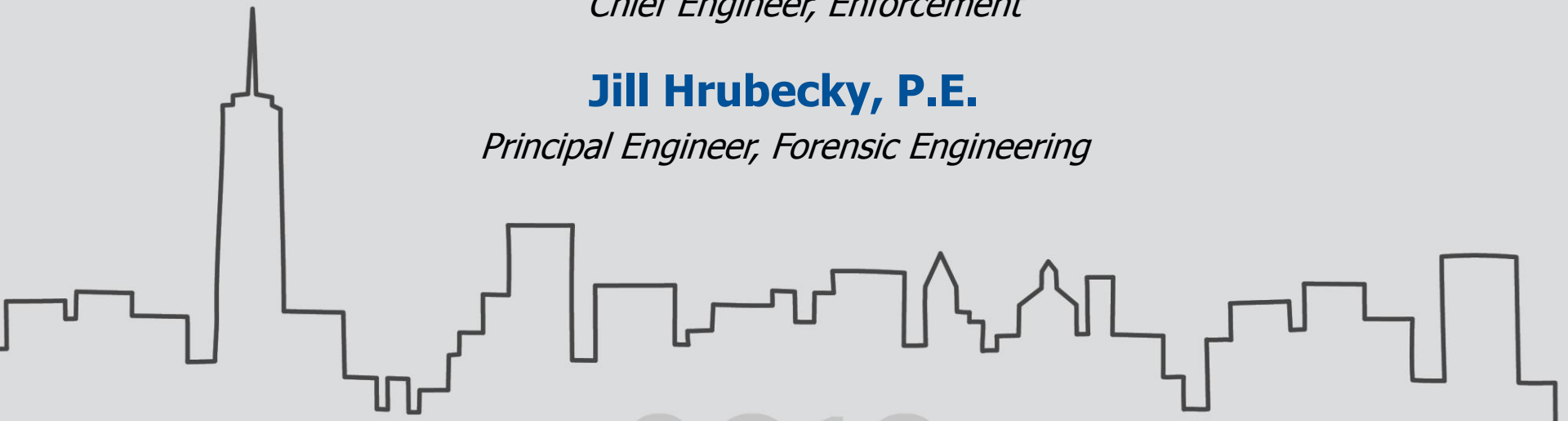

BUILD SAFE / LIVE SAFE
CONFERENCE
2010

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# COURSE DESCRIPTION

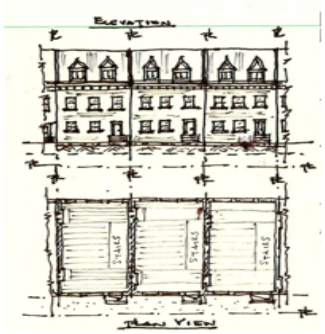
- Private or Public? Residential or Commercial? Warehouse or Manufacturing? Multiple Dwelling or Single Family? Fireproof or Non-Fireproof? Wood Framed or Masonry? Steel or Concrete? New Construction or Old Construction? Landmarked or Non-Landmarked? Depending on who's talking, these are just a few of the ways our colleagues attempt to characterize buildings they happen to be interested in or working on or researching. Does mixing up vernacular **term of art** classifications with legal definitions matter on a competently researched individual building? During this seminar participants will discuss classifications as referenced in NYC's numerous Codes helps unlock the laws and specifications. It will examine both prescriptive/performance standards, which define what is understood to be a safe and Code-compliant building.

# LEARNING OBJECTIVES

At the end of the this course, participants will be able to:

1. Participants will discuss the differences between the development and enforcement stage when characterizing a building.
2. Participants will be able to recognize the difference between vernaculars and legal definitions when it comes to building classifications.
3. Participants will learn about  prescriptive and performance code specifications and understand when and how they are used and applied.
4. Participants will be able to utilize the terms occupancy, fireproofing, structural and architectural classifications correctly when describing a building.

# THE PRODUCT (PRESCRIPTIVE)



1 or 2 Family Residence

If roof converted to flat roof: typ M/D

**Items specified in code: SAFE**

1. Cornice
2. Roof dormers
3. Wall thickness (8"/12)
4. Walls plumb straight and true and how to be constructed
4. Foundation walls
5. Continuous floor joists
6. Relieving wall from roof to foundation around stairs
7. Wall ties between joists and walls & front and rear
8. All chimneys and stairs with headers and trimmers
9. Party walls to be braced
10. *If the roof was converted to a FLAT roof*, brick party walls to be extended up.
11. Typically, building is part of a row of adjacent bldgs and braced by neighbors

**Common Maintenance Issues to be repaired:**

**UNSAFE conditions**

20. Cornice falls off
21. Stone lintels over front door and windows fall off
22. Front and rear wall brick deteriorates, delaminates or buckles – critical issue
23. Interior partitions removed – critical issue: floors fail.
24. Rotten joists from kitchens and bathrooms– critical issue: floors fail.

**Interior ALTERATION work:**

30. Removal of partitions will effect floor stability – header trimmers high risk
31. Removal of floor joists greatly impacts the stability of the walls and neighbors – require to be braced – high risk
32. Vertical enlargements impact the stability of the walls and can overload, require bracing - high risk.
33. Lowering cellar undermines original bearing walls and effect the overall stability of building and neighbors – high risk if underpinned.
34. If neighbor has been demolished previously, the interior party wall now become EXTERIOR walls and are unbraced. Masonry and mortar degrade – high risk to joist ends and wall buckling. Also, cellar walls leak and degrade impacting overall stability.

**Development of Adjacent lot**

40. Demolition of adj building requires party wall bracing and repairs
41. Tall building creates seismic joint gap and large volumes of rain onto building roof.
42. Concrete poured against wall prohibited.

**1. 1820-1877 NYC and City of Bkln Building Code**
**Prescriptive Specifications**
19th Century " Federal Era" row house
1 or 2 Family Residence or Mixed Use
*Heretofore Converted*

## What the product will be

- Architectural layouts
- Structural systems
- Original Code specs and successive agency Codes
- Fire escapes
- History of unsafe conditions
- History of alterations
- Some type of interactive GIS MAP
- Age/date of construction

# INTRODUCTION

- Various dictionaries defines the word **SAFE**, as free from threat of danger or harm or injury or risk. It is an adjective, a describing word. **Safe** is a word that gives more information about the object signified. The opposite of safe is not necessarily **unsafe**. Interestingly, the words themselves are not defined.

- The words **safe**, **safely** and **unsafe** appear approximately 3000 times in the 2014 NYC Administrative and Building Code, approximately 3100 times in the 1968 NYC Building Code, and approximately 2100 times in our 1938 Building code. The prior state and city building codes all the way back to the early 1800's refer to **safe**, **safely** and **unsafe** buildings, using the words to describe the function of the code itself.

# INTRODUCTION

*(continued)*

- **Building Codes** are generally Construction Codes, i.e., laws that regulate how buildings are designed and planned to be built. The laws regulate the components that are planned to be used and typically, construction operations impacting public safety. The laws cover the structural, architectural and MEP components of a new building providing a SAFE and minimum standard building.

# CODES

## 2008 and 2014 NYC Admin Code 28-301.1

**§28-301.1 Owner's responsibilities.** All buildings and all parts thereof and all other structures shall be maintained in a safe condition. All service equipment, means of egress, materials, devices, and safeguards that are required in a building by the provisions of this code, the 1968 building code or other applicable laws or rules, or that were required by law when the building was erected, altered, or repaired, shall be maintained in good working condition. Whenever persons engaged in building operations have reason to believe in the course of such operations that any building or other structure is dangerous or unsafe, such person shall forth with report such belief in writing to the department. The owner shall be responsible at all times to maintain the building and its facilities and all other structures regulated by this code in a safe and code-compliant manner and shall comply with the inspection and maintenance requirements of this chapter.

## 1968 Building Code 27-127

ARTICLE 6 MAINTENANCE

§[C26-105.1] 27-127 Maintenance requirements.- All buildings and all parts thereof shall be maintained in a safe condition. All service equipment, means of egress, devices, and safeguards that are required in a building by the provisions of this code or other applicable laws or regulations, or that were required by law when the building was erected, altered, or repaired, shall be maintained in good working order.

§[C26-105.2] 27-128 Owner responsibility.- The owner shall be responsible at all times for the safe maintenance of the building and its facilities.

# CODES

## 2014 A/C Existing Buildings

**§28-102.4 Existing buildings**. The lawful use or occupancy of any existing building or structure, including the use of any service equipment therein, may be continued unless a retroactive change is specifically required by the provisions of this code or other applicable laws or rules.

## 1968 Building Code Continuation of Lawful Use

**§[C26-102.1] 27-111 Continuation of lawful existing use.-** The lawful occupancy and use of any building, including the use of any service equipment therein, existing on the effective date of this code or thereafter constructed or installed in accordance with prior code requirements, as provided in section 27-105 of article one of this subchapter, may be continued unless a retroactive change is specifically required by the provisions of this code.

# WHO/WHAT IS SAFE

- Themes and Organization
- Public Safety/Workers Safety – (DOB covers both)
- Classification: Occupancy, Fire Rating, Structural
- Development (**D**) vs Enforcement (**E**) and Compliance (**C**)
- Pre-permit (**D**) vs Post-permit (**C**ompliance / **E**nforcement)
- Construction Codes (**D**) vs Maintenance Codes (**E**)
- Reference presentation back to IBC / 2014 NYC Administrative / Building Code ( mostly Development )
- SAFE = new vs existing, occupancy, fire rating, structural, age, code complaint, specifications (multiple items), engineering evaluations, opinions vs facts
- Complicated issue with multiple different records – no central source

# **PRIOR CODES** (LIVING DOCUMENTS)

- **1887 NYC Building Code: ...engineering text books referenced:**
  *The dimensions of each piece or combination of materials shall be ascertained by computation according to the rules given in **Trautwines Treaties for Engineers** or the treaties of other authors now or hereafter used at the United States Military Academy at West Point.. (D)*

- **1766: occupancy and material specs referenced:**
  *Every house, public or private, south of the fresh pond, should be made of stone or brick and roofed with tile or slate. (D)*

- **1813, 1815, 1822, 1827, 1829, 1830, 1834; fire resistance materials referenced**
  *Roofing: State code: Prevention against fire: SAFE material against fire. (D non combustible)*

# **PRIOR CODES** (LIVING DOCUMENTS)

*(continued)*

- **1849: Chief Engineer mentioned**

  *SAFE materials alternates to slate and also to be approved by Chief Engineer of the Fire Department .(D) 2/3 of building destroyed by fire to be demolished…(E) … Assistant Engineer for Fire Department.*

- **1860: Unsafe in title of Code**

  *An Act to provide against unsafe buildings in the city of New York.. full specification for materials and construction*

- **1862: Engineering loads provided and Superintendent of Buildings identified**

  *…every floor shall bear 75 pounds per superficial foot (D)…wood building damaged by fire to ½ value (E)…approved plans and specifications…any buildings or parts thereof ..from fire, excavation or construction that become UNSAFE or dangerous to the public (E) shall be made SAFE and secure…Superintendent of Buildings…practical architect, AIA, house carpenter, mason…damaged buildings…*

# **PRIOR CODES** (LIVING DOCUMENTS)

*(continued)*

- **1866: Occupancy, Factor of Safety, Calculations, Enforcement mentioned**

  *Shall be plumb straight and true…private building, hotel, boarding house, dwelling houses, churches, school houses, store, factory, warehouse, wooden buildings, dwelling houses with more than 6/8 families above first floor (D)…calculations for the strength of buildings (D)...dangerous to life and limb (E)...strength of materials to be used in every building's safe weight and breaking weight to be 1:3 for beams girders and 1:6 for posts and tensile members...ascertained by calculations as in Tredgold, Hodgkinson, Barlow (D)…All parts of building Unsafe buildings dangerous to life and limb to be taken down (E)*

- **1867: Plans and Specifications mentioned to be filed With the Department**

  *Prior to the alteration, erection or repair of a building in the city of new York…plans and specification to be filed with the Department prior to commencement (D)….*

# **PRIOR CODES** (LIVING DOCUMENTS)

*(continued)*

- **1868: Front and Rear tenements mentioned**
  *Front and rear tenement buildings as built on same lot to be built fireproof*

- **1871: Prescriptive building specs and Enforcement actions mentioned**
  *Churches, theatres and public buildings. Any buildings built in isolation without cross walls shall be securely braced both inside and out and on the outside, from the foundation up to 1/3 the height of the wall. Any shores shall be the same strength as the permanent building…computations per Tredgold, Hodgkinson, Barlow, ( London 1851. Strength of Materials) or used at US Army West Point…(D) …unsafe cornices to be removed and if damaged by fire more than 1/3 of extent, shall be replaced with fireproof materials. Upon unsafe notice, dangerous building to be taken down and or made safe. Department of Buildings (E)*

# SAMPLE: STRUCTURAL ENGINEERING
## AS REFERENCED IN CODES

*(J. Kirkham 1914. McGraw-Hill, NYC)*

The present volume and the succeeding one contain essentially the course which the writer has been giving for many years at the Massachusetts Institute of Technology and at Harvard University, considerably extended and brought to date. It is hoped that they will meet the needs of practicing engineers as well as of students in technical schools.

A course of four years in a technical school, in the writer's opinion, does not permit of doing more than two things, or rather, of attempting to do them, namely:

1. To train the student to think and to acquaint him with the principles governing scientific investigation.

2. To show him the elementary fundamental principles of the branches of engineering.

**2. Classification.**—Structures may be classified in various ways, as, for instance, according to material, into structures of

(*a*) wood,
(*b*) metal (steel or iron),
(*c*) natural or artificial stone (masonry), and
(*d*) combinations of material.

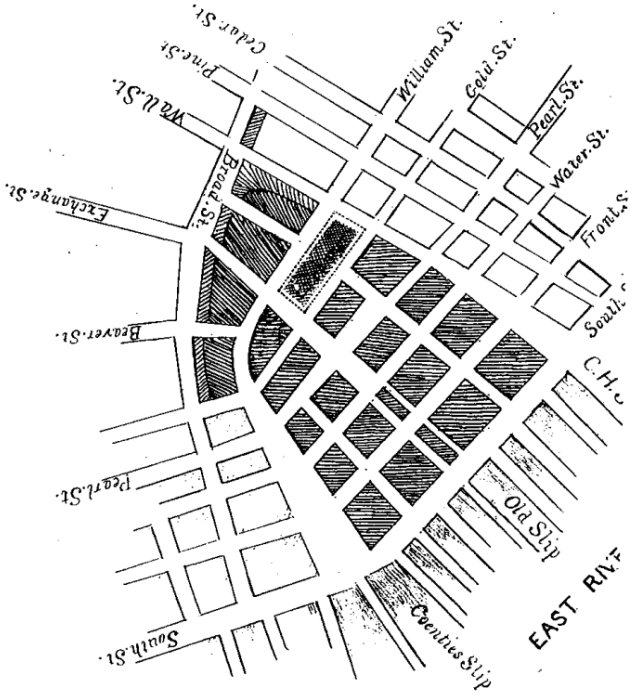
1

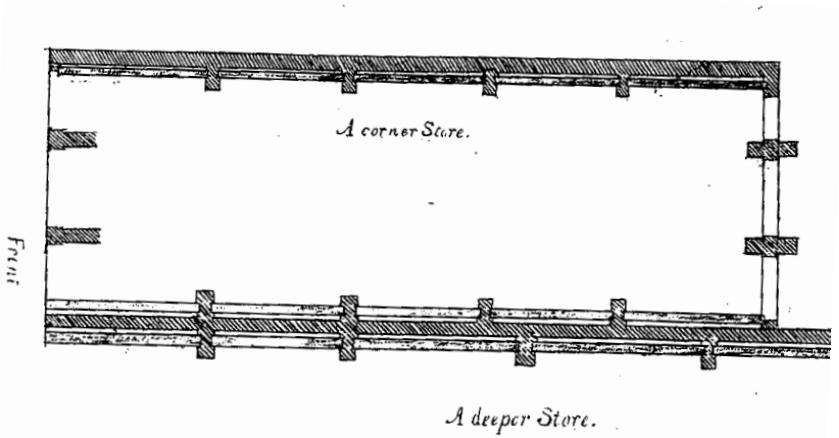
# EXAMPLE: STRUCTURAL WORK
## USUALLY CONSISTENT (PRESCRIPTIVE REQUIREMENTS)

- 1.Occupancy;  2.Fire rating;  3.Structure
- Lead Code always Construction Code: Buildings...

  **however**
- Occupancy changes frequently – different Codes
- Fire Rating changes frequently
- Structure typically stays the same

# 1845 NYC/STATE CODE
## DOUBLE 8″ PARTY WALLS



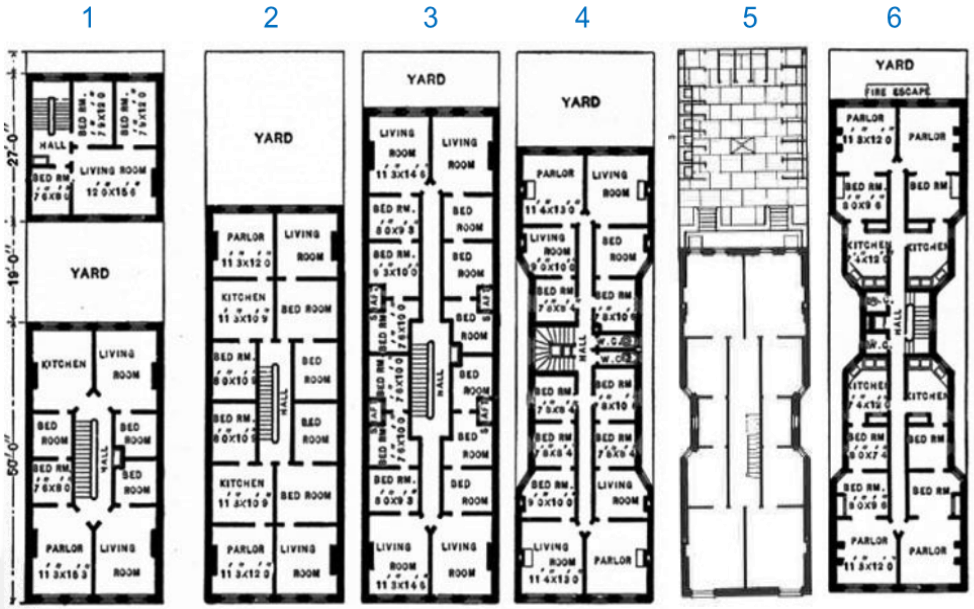

That stores must and will be built 5 and 6 stories high in the lower part of this crowded city is beyond all doubt; that they may be so built with safety is equally true, and this too in a simple, secure and equally cheap mode.

In the first place, as a *general mode*, double party-walls should be done away; 1st, because they take up more ground, than perfectly secure ones would take up, or cover; 2nd because they are weak and entirely insufficient to stand when unsupported by floors, roof, &c; 3rd, because they let the water down between them, and thereby impart dampness and great injury to the goods in both stores; 4th because there are few if any other cities that have generally adopted

# PEARL STREET, NYC
## DOUBLE 8” PARTY WALLS

***Exact conditions noted in 1845 Code***

# TYPICAL STRUCTURAL/ARCHITECTURAL LAYOUTS
## PRESCRIPTIVE TENEMENTS



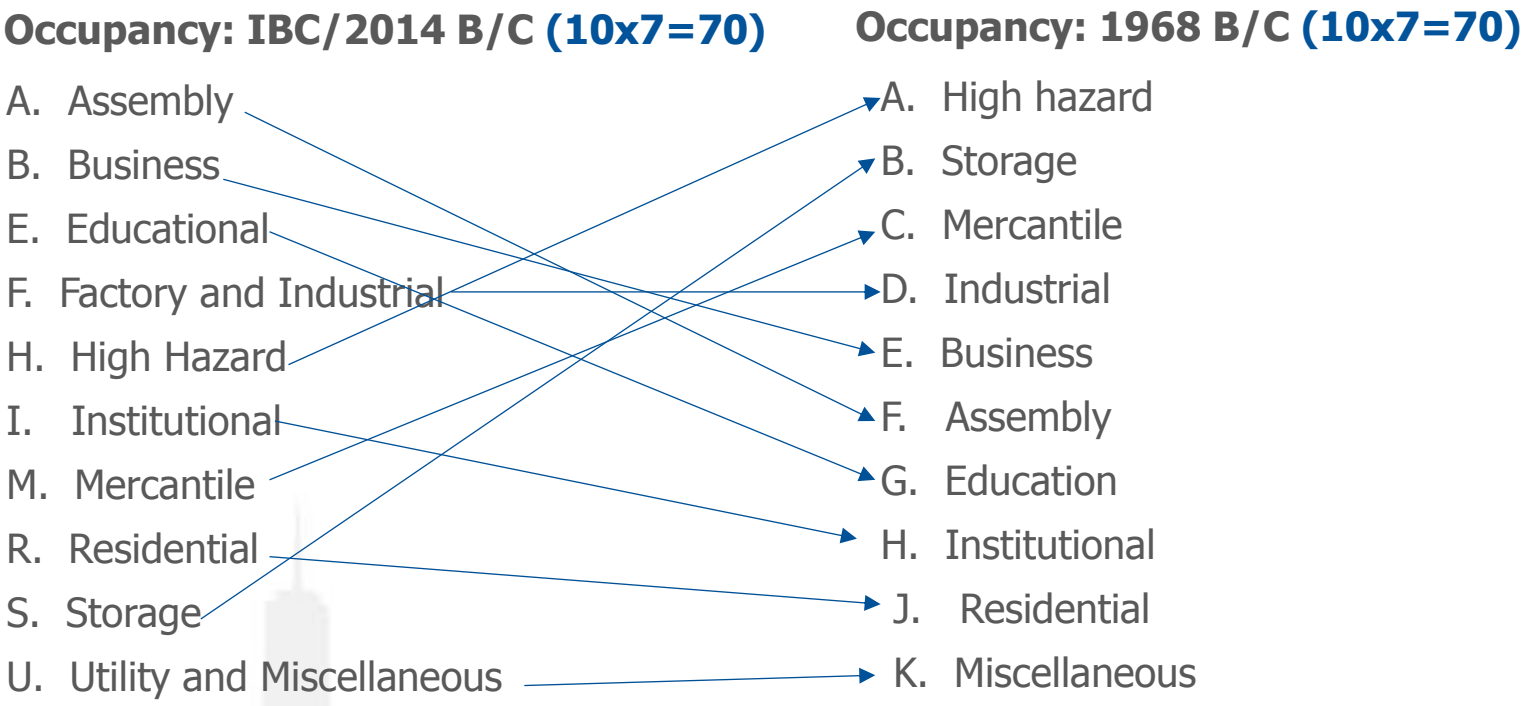

1. Two buildings on one lot (pre-1879)
2. “Railroad flats” (pre-1879) – named because the rooms were organized like cars on a train
3. “Railroad flats” with TINY light and air shafts (pre-1879)
4. Dumbbell tenements (introduced in 1879) – larger light and air shafts
5. Tenement with privies in rear yard (circa 1879)
6. Dumbbell tenement (post-1879) – fire escapes at rear; larger light and air shafts

# CLASSIFYING PRIOR CODE BUILDINGS

**Why is it so hard to classify Prior Code buildings?**

- Each time a new code printed – titles, chapter numbers, occupancy /fire rating and construction classifications were relocated and changed.
- Big changes between
  2014 -> 1968 -> 1938 -> 1916 -> 1899 -> 1879
- Need a translation key
- Lead code is Buildings (State/City), then MDL, then Zoning, then Housing Maintenance Code then Landmarks…

# CLASSIFYING PRIOR CODE BUILDINGS
## TRANSLATION KEY



# CLASSIFYING PRIOR CODE BUILDINGS
## TRANSLATION KEY

| **Occupancy: 1938 (5x10=50)** | **Occupancy Class'n: 1916 (5x10=50)** |
|---|---|
| Public Buildings | Public Buildings |
| Residence Buildings | Residence Buildings |
| Commercial Buildings **?** | Business Buildings **?** |
| Doubtful Occupancy | Doubtful Occupancy |
| Mixed Occupancy | Mixed Occupancy |

# CLASSIFYING PRIOR CODE BUILDINGS

## 1. DOF Occupancy Class'n (late 1800s – current. 28 x 10 = 280 )

- A – Single Family
- B – Two Family
- C – Three Family +
- D – Elevator Building
- E – Warehouses
- F – Factory
- G – Garage
- H – Hotels
- I – Hospitals
- J – Theatre
- K – Retail
- L – Loft
- M – Churches
- N – Detention Centers
- O – Office
- P – Concert Halls
- Q – Parks
- R – Condos
- S – Mixed Use
- T – Airports
- U – Utility
- V – Municipal
- W – School
- Y – PD, Municipal
- Z – Miscellaneous/Foreign

# CLASSIFYING PRIOR CODE BUILDINGS

**2. Classes of Construction: 1916**

- Fireproof
- Non-fireproof
- Frame

**3. Classes of Construction: 1938**

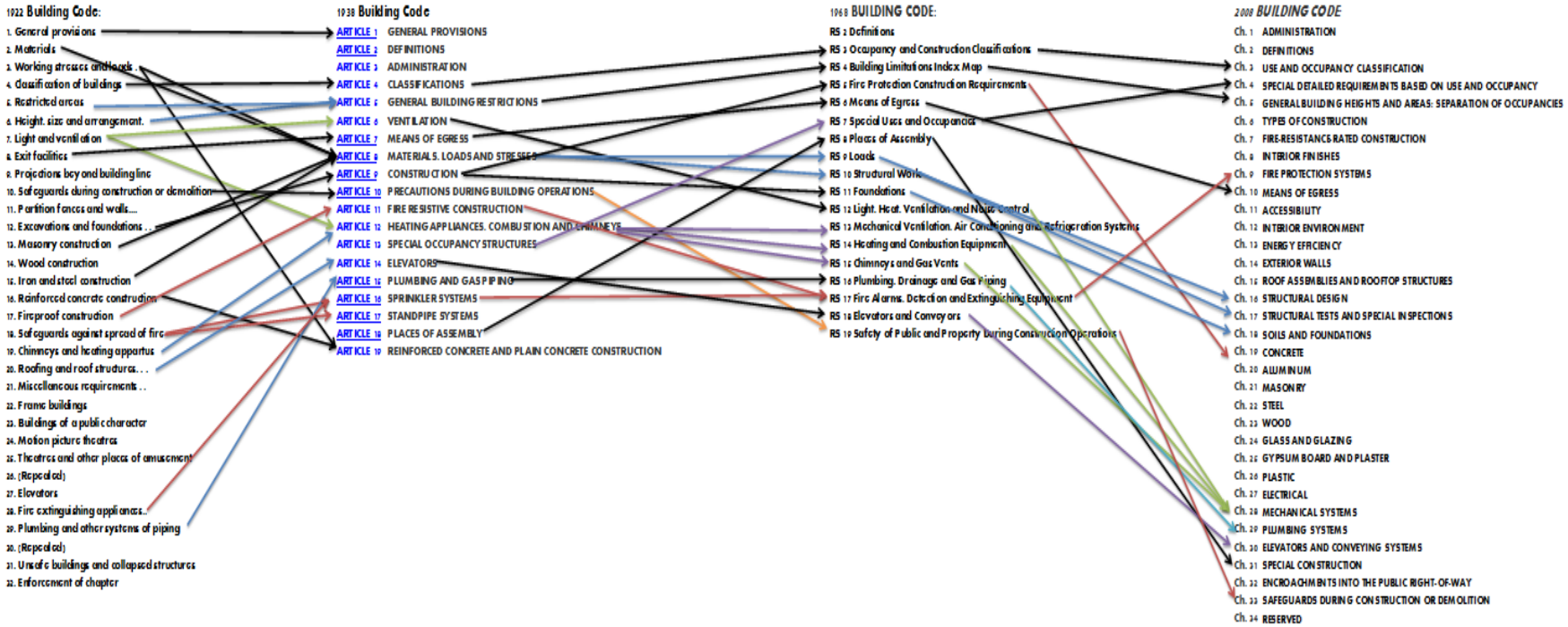
- Class 1 - Fireproof
- Class 2 - Fire protected
- Class 3 - Non-fireproof structures
- Class 4 - Wood framed structures
- Class 5 - Metal or fireproofed wood structures
- Class 6 - Heavy timber construction
- Mixed construction

**4. Fire-resistive Rating. 1968 Combustible/Non-combustible Classes**

- Class I - Non combustible
- Class II - Combustible

# TECHNICAL
# TRANSLATION KEY - 1899, 1916, 1938, 1968, 2008

## BC 1922, 1938, 1968, 2008



# BUILDING POPULATIONS

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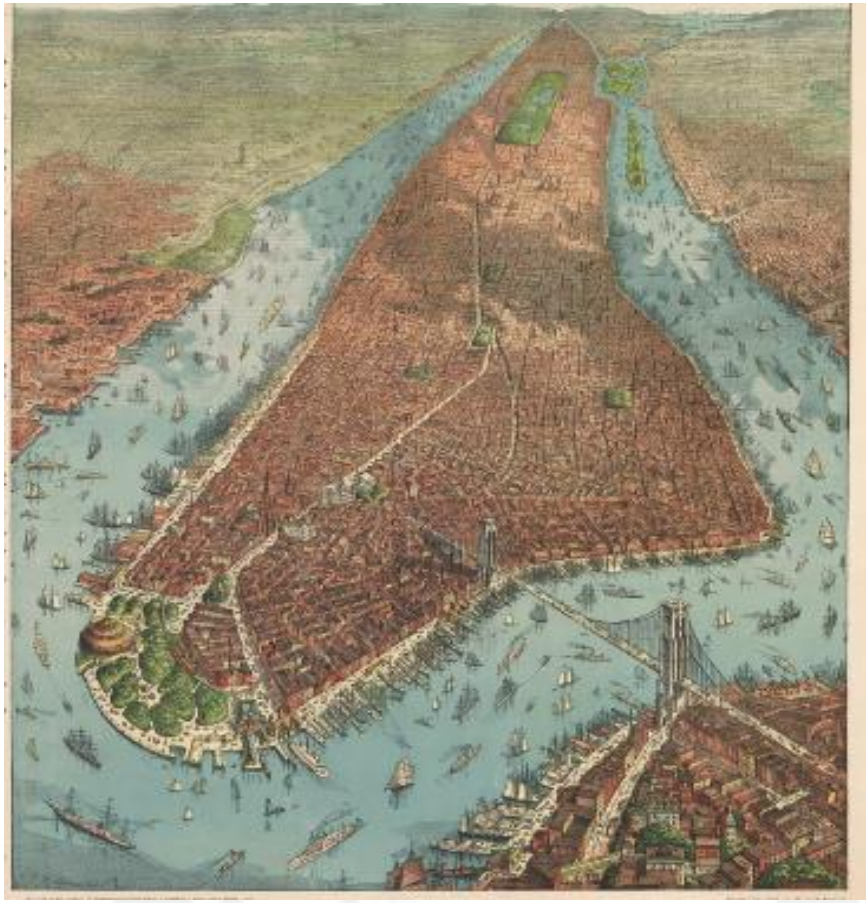
*1728 Development of NYC*
*Stone 1871*



*1890 NYC + Brooklyn: +/- 1/3M*
*Bachmann's birds eye view NYC*

# BUILDING POPULATIONS
## FINDING INFORMATION ON LARGE SCALE: D, C, E

- **1.2M unique Building Identification Numbers (BINS)**
  - The BIN number were assigned to each and every building lot in New York
    late 1980s: NYC DOB and City Planning

- **Digital Tracking Classifications** (not recorded)
  - 19th Century (≈): Really **one design** type brick and wood buildings – applies to hundreds of thousands of standing and occupied building. Simple occupancy -> simple fire rating -> and simple structural. Commissioners Plan of 1812: dense urban environment for most of Manhattan and Brooklyn
  - 20th Century: start of individually designed >7 stories, custom structures.

# BUILDING POPULATIONS
## FINDING INFORMATION ON LARGE SCALE: D, C, E

- **Classifications: Two (2) stable groups with large numbers: 1 & 2-family, Multiple Dwellings**
  - 1 to 2-family, free standing - mostly stay the same and unaltered since built
  - 3-family/MD/OLT, < 6 stories - mostly stay the same and unaltered since built
  - Mixed use w apartments < 6 stories - commercial ground floor risky
  - Early 20th century steel framed apartments and mid century R/C apartments (stable)
  - maintenance/enforcement issues (structural/fire rating issues)

- **Classifications: Unstable pop's: Change in occupancy -> fire and structural**
  - factories, manufacturing, lofts, hotels, 19th century offices, houses of worship
  - demolitions, partial demolitions, restructuring
  - large development component, compliance, enforcement, maintenance

# TRANSLATION KEY
## DOF TO 1968/2008 BUILDING CODE

| 2 | DOF Building Classification mapped to '68/'08/'14 NYC BC Classification mapped to IBC Classifications | | =< 1968 BC | 2008-2014 BC | Primary Structural Frame | BINs |
|---|---|---|---|---|---|---|
| 3 | A0 | CAPE COD | J-3 | R-3 | I,II,III,V | 5972 |
| 4 | A1 | TWO STORIES - DETACHED SM OR MID | J-3 | R-3 | I,II,III,V | 99630 |
| 5 | A2 | ONE STORY - PERMANENT LIVING QUARTER | J-3 | R-3 | I,II,III,V | 35692 |
| 6 | A3 | LARGE SUBURBAN RESIDENCE | J-3 | R-3 | I,II,III,V | 4920 |
| 7 | A4 | CITY RESIDENCE ONE FAMILY | J-3 | R-3 | I,II,III,V | 3770 |
| 8 | A5 | ONE FAMILY ATTACHED OR SEMI-DETACHED | J-3 | R-3 | I,II,III,V | 74093 |
| 9 | A6 | SUMMER COTTAGE | J-3 | R-3 | I,II,III,V | 610 |
| 10 | A7 | MANSION TYPE OR TOWN HOUSE | J-3 | R-3 | I,II,III,V | 344 |
| 11 | A8 | BUNGALOW COLONY - COOPERATIVELY OWNED LAND | J-3 | R-3 | I,II,III,V | 28 |
| 12 | A9 | MISCELLANEOUS ONE FAMILY | J-3 | R-3 | I,II,III,V | 20213 |
| 13 | | | | | | |
| 14 | B1 | TWO FAMILY BRICK | J-3 | R-3 | I,II,III,V | 67810 |
| 15 | B2 | TWO FAMILY FRAME | J-3 | R-3 | I,II,III,V | 61605 |
| 16 | B3 | TWO FAMILY CONVERTED FROM ONE FAMILY | J-3 | R-3 | I,II,III,V | 49475 |
| 17 | B9 | MISCELLANEOUS TWO FAMILY | J-3 | R-3 | I,II,III,V | 21041 |
| 18 | | | | | | |
| 19 | C0 | THREE FAMILIES | J-2' | R-2 | I,II,III,V | 57362 |
| 20 | C1 | OVER SIX FAMILIES WITHOUT STORES | J-2' | R-2 | I,II,III,V | 12386 |
| 21 | C2 | FIVE TO SIX FAMILIES | J-2' | R-2 | I,II,III,V | 9828 |
| 22 | C3 | FOUR FAMILIES | J-2' | R-2 | I,II,III,V | 12641 |
| 23 | C4 | OLD LAW TENEMENT | J-3 | R-3 | I,II,III,V | 2964 |
| 24 | C5 | CONVERTED DWELLINGS OR ROOMING HOUSE | | | | 2532 |

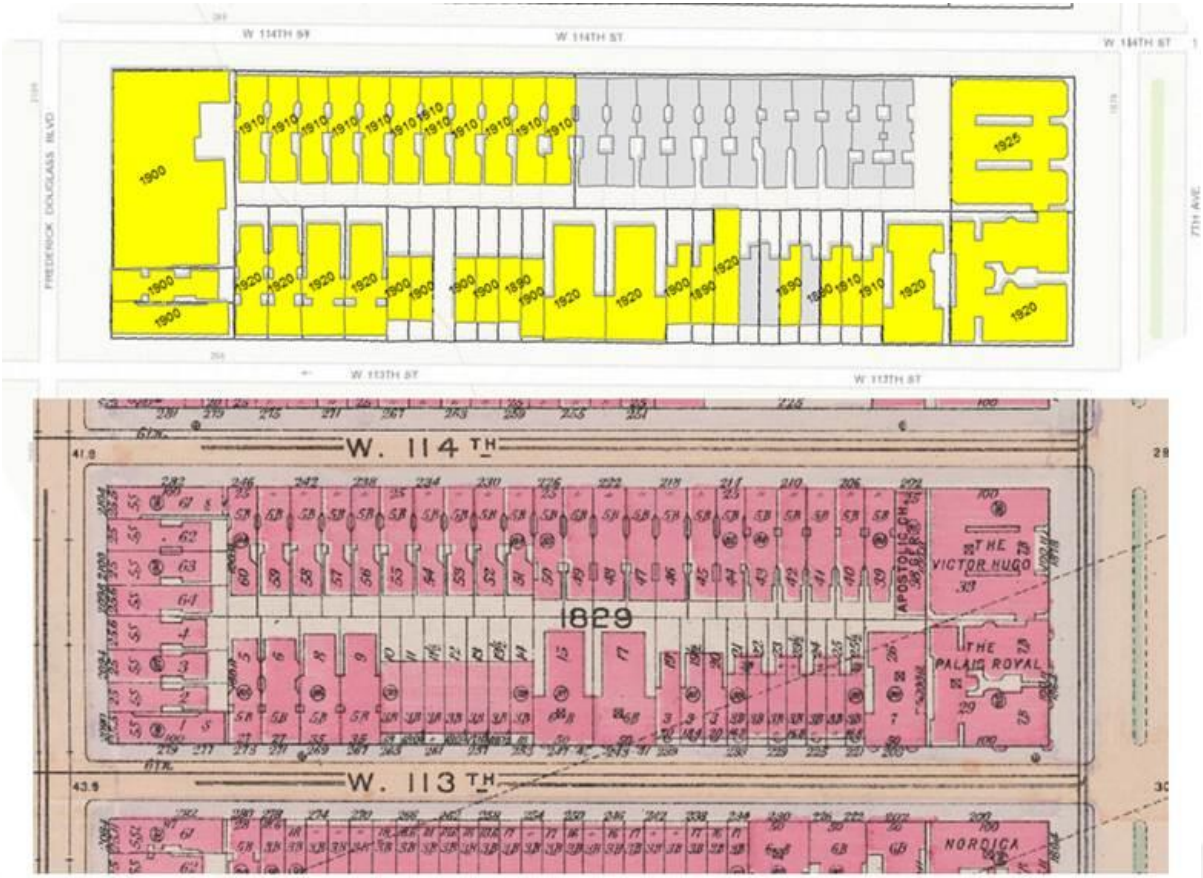
# SEPARATE 1.2M BINS ≈ 1.1M BUILDINGS (≈ 10% MOE )

- Separate 1 and 2 fam. homes ≈680K BINS ( known and lower risk ) (Add separate 2nd BIN on lot for garages ≈ 170K BINS )
- **Separate HPD properties ≈175K - ( BINS, mixed 3 to 6 stories, > 7 stories )**
- Remnant ≈ 100 K mixed BINS commercial, institutional, educational, office
- Post 1916 B/C new buildings typically have more than 4 BINS

Some know sub-group populations:

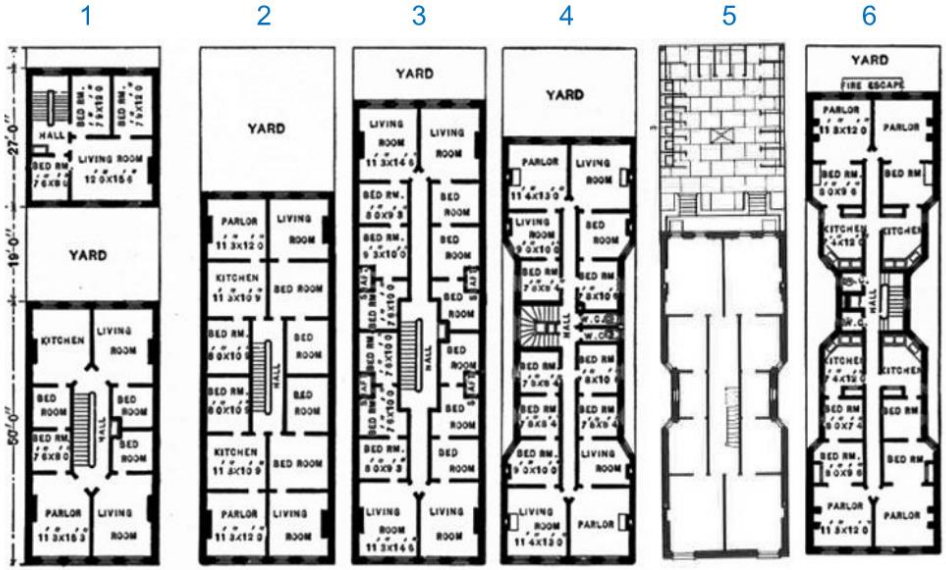
- Buildings over 6 stories – 14.5K
- Landmarks ≈ 38K
- Some special large co-op lots such as Breezy Point ≈ 3.5K
- 17.5K+ mid 1800's timber framed mixed use and OLT.

# RESEARCH TOOLS
## TAX MAPS



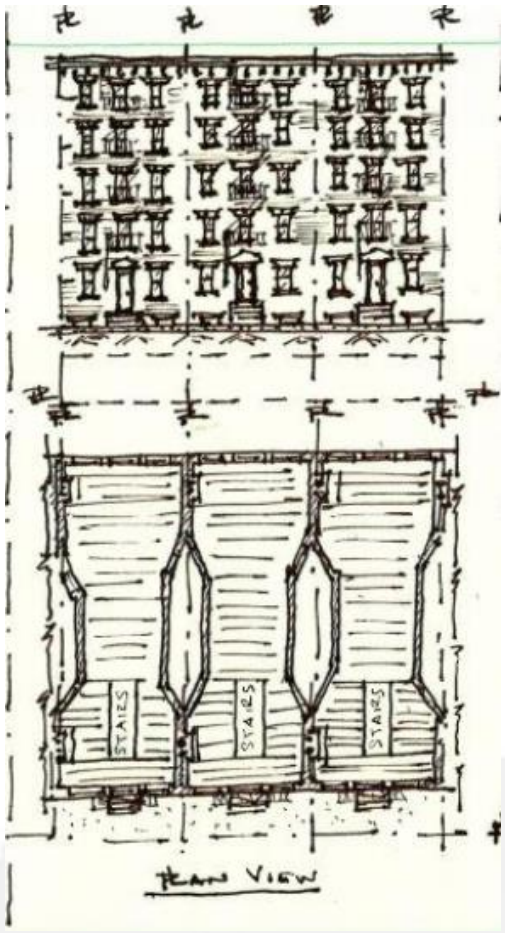

**Tax Maps** - another research tool pre-1900s merged with age – very fine grain *(accurate but laborious manual task)*

# OLD LAW TENEMENT
## LAYOUTS < 1901




**Items specified in code: SAFE**

1. Cornice
2. Wall thickness (12”)
4. Walls plumb straight and true and how to be constructed
4. Foundation walls
5. Continuous floor joists
6. Relieving walls from roof to foundation & around stairs
7. Wall ties between joists and walls & front and rear



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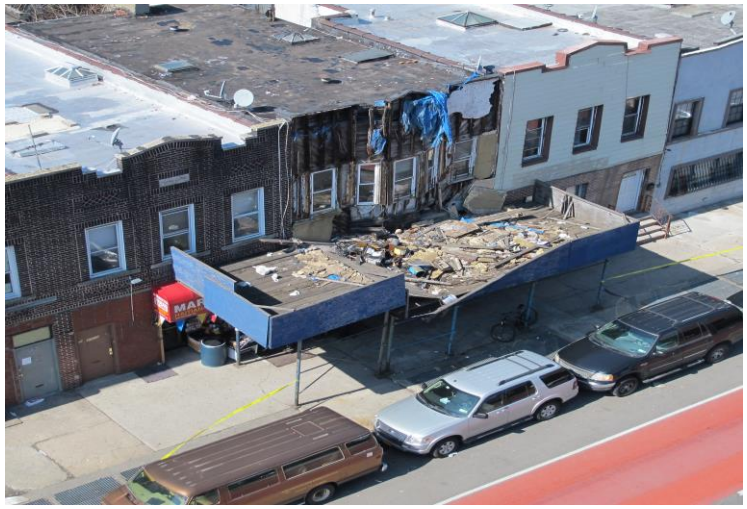
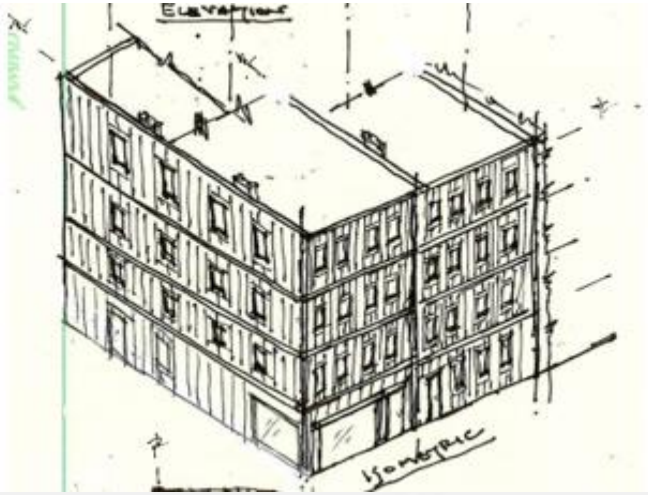
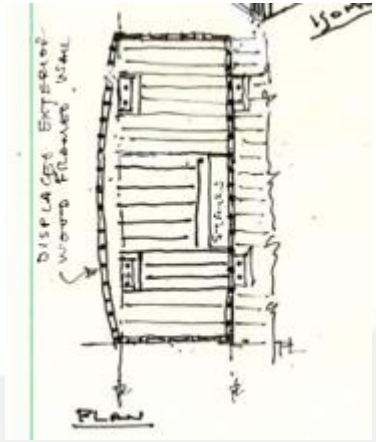






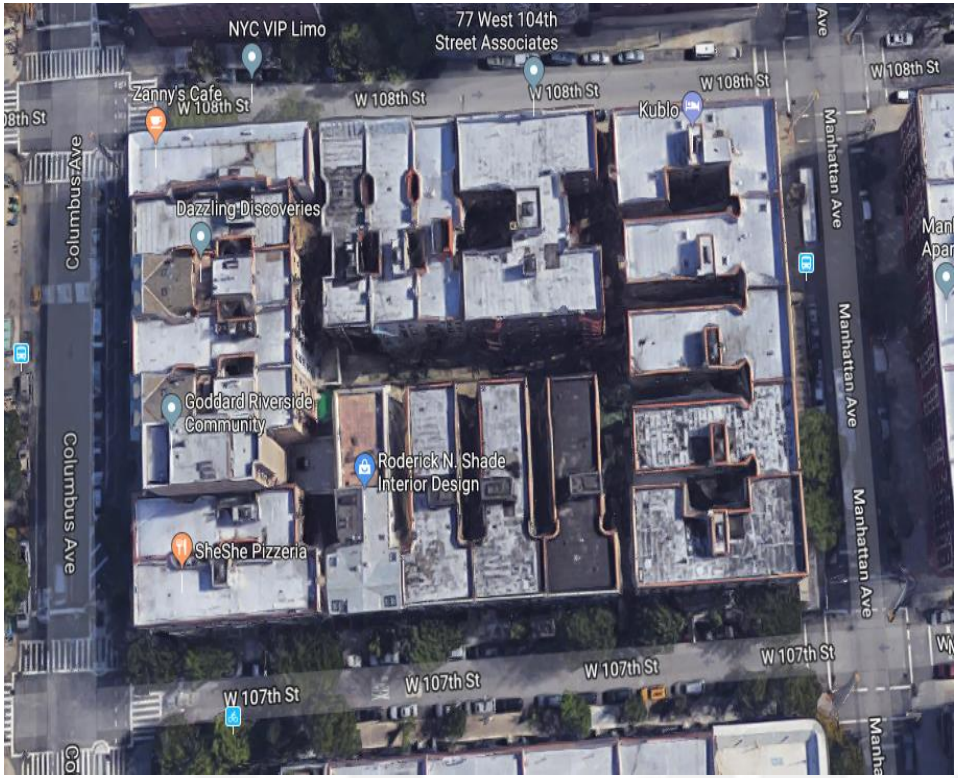
**Items specified in code: SAFE**

1. Cornice
2. Wall studs w brick infill ( Noggin Walls)
3. Walls plumb straight and true: Platform / ballon and how constructed
4. Foundation walls (18")
5. Continuous floor joists
6. Relieving wall from roof to foundation around stairs
7. Stud wall ties between joists and stud walls & front and rear: wood studs
8. All chimneys and stairs with headers and trimmers
9. Party walls to be braced

# DOF CLASS 'A'
## ONE FAMILY HOME

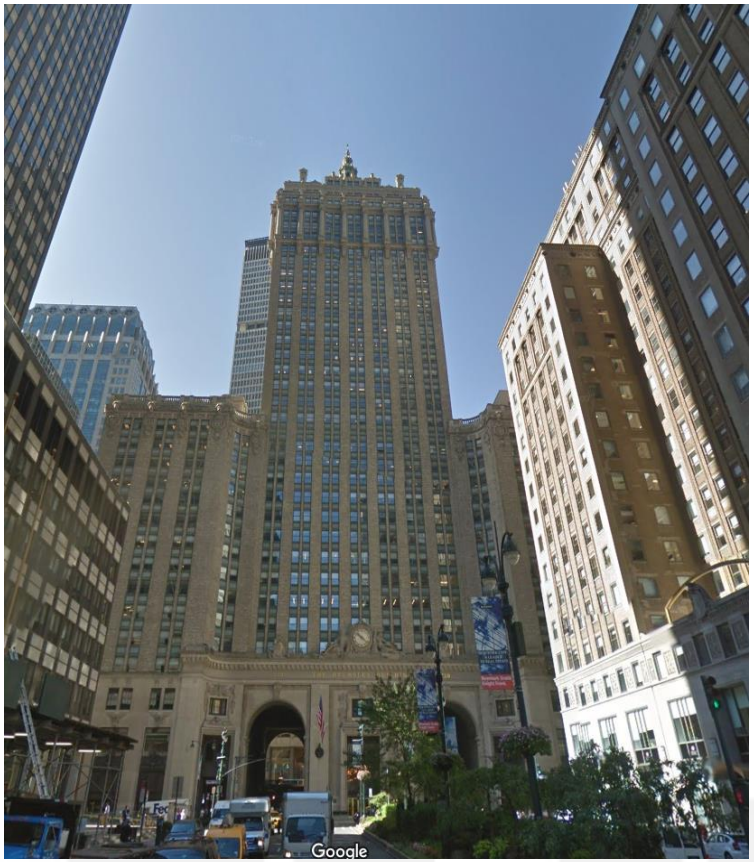
# DOF CLASS 'B'
## TWO FAMILY HOME

# DOF CLASS ‘C’
## THREE + FAMILY




# DOF CLASS 'D' – ELEVATOR CONVERSION
## SEMI-FIREPROOF/APARTMENT


# DOF CLASS 'O'
## OFFICE

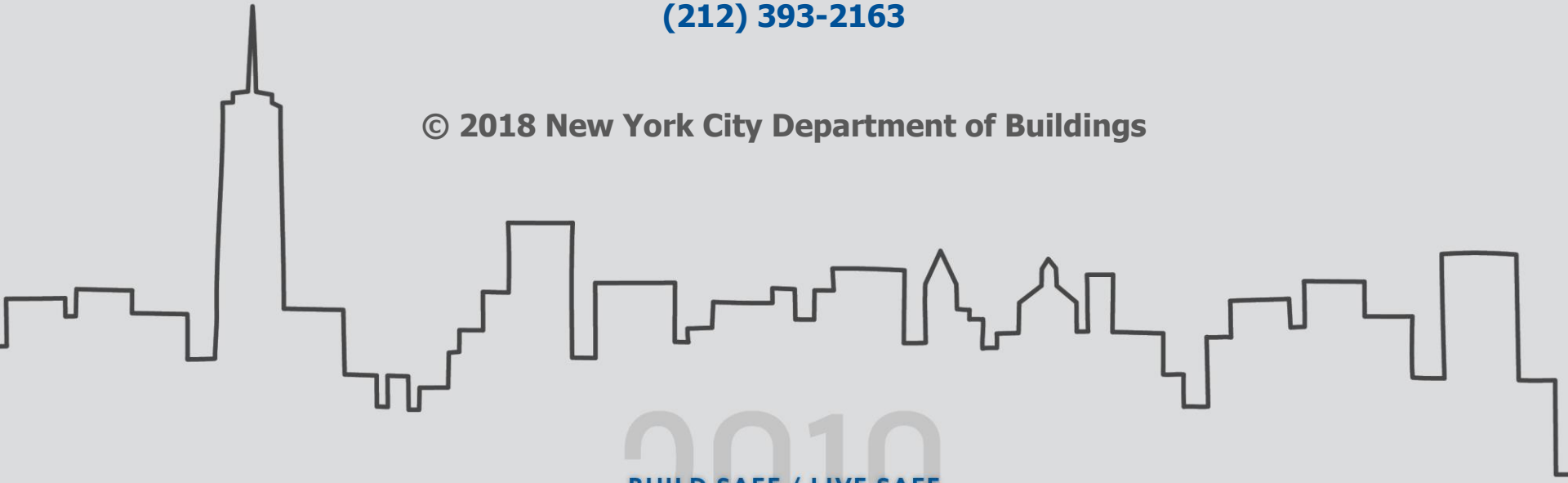



**This concludes the**
**American Institute of Architects**
**Continuing Education Systems Course.**

**NYC Department of Buildings Contact for AIA:**

**Melanie Guzman**
**Melaguzman@buildings.nyc.gov**
**(212) 393-2163**





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