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**Matching Existing Buildings
to Earlier Codes**

2014 BUILD SAFE | LIVE SAFE
CONFERENCE

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American Institute of Architects Continuing Education System

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



Course Description

This course will discuss the complexities for performing construction within NYC's dense urban environment. Considering that there are approximately 2,500 new buildings being constructed yearly in NYC, this potentially puts the construction site in contact with approximately 7,500 existing buildings (one existing building per each side). Much of the NYC housing stock is 19th Century unreinforced masonry and these buildings are governed by the empirical provisions of codes that were in effect at the time of the original construction.

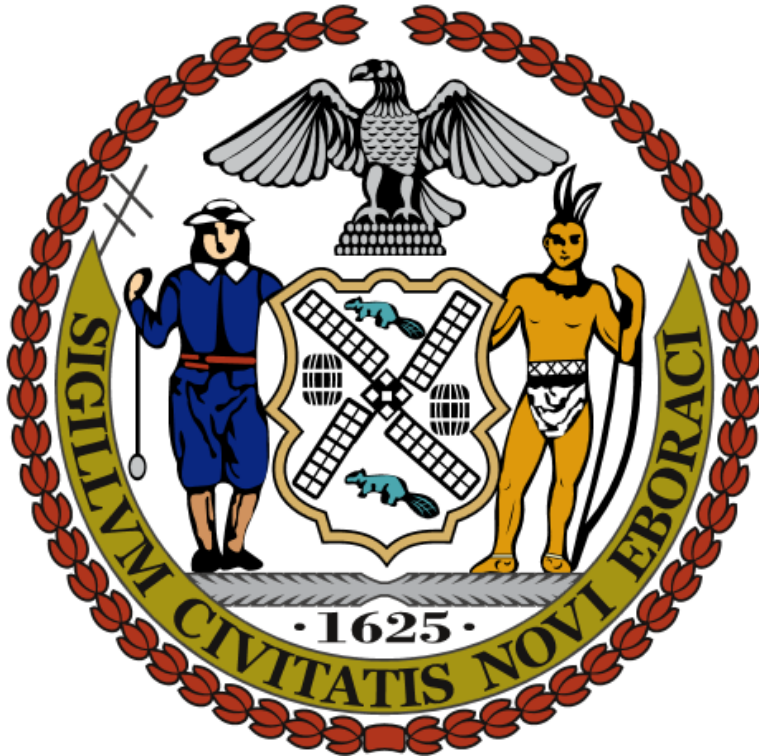
Course Description Continued

This course will give a directional review of the 1855, 1886, 1898, 1938, 1968, 2008, 2014 Building Codes and discuss technical provisions that apply to buildings of past vintages. The course will explain how one can explore the site under construction in two phases: 1) work within the property line, and 2) work required for the adjacent lot line structures.

Learning Objectives

1. Participants will learn to identify and be able to apply applicable codes to vintage construction as it interfaces with repair and new construction.
2. Participants will be able to recognize and learn techniques to analyze technical code requirements for structural stability and public safety.
3. Participants will learn and be able to implement the applicable old codes to mitigate improper construction methods.
4. Participants will learn of the features and be able to use the digital research data bases (DOB/HPD/LPC) for new development and alterations to existing development.

NYC Building Codes: Code Intent



**1766, 1855, 1899, 1938,
1968, 2008, Rules, TPPNs**

1936: C26-3.0 Purpose.

To provide standards, provisions and requirements for safe and stable design, methods of construction and sufficiency of materials in structures constructed or demolished.... and to regulate the maintenance, use and occupancy of all structures.

2008 Building Code Intent

28-101.2 Intent.

The purpose of this code is to provide reasonable minimum requirements and standards, based upon **current scientific and engineering knowledge, experience** and techniques, and the utilization of modern machinery, equipment, materials, and forms and methods of construction, for the regulation of building construction in the City of New York in the interest of public safety, health, welfare and the environment, and with due regard for building construction and maintenance costs.

Permits Required

105.2 Required.

Any owner or authorized agent who intends to construct, add to, alter, repair, move, demolish, or change the occupancy of a building or structure, or to erect, install, add to, alter, repair, remove, convert or replace any gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application for construction document approval in accordance with Chapter 1 of Title 28 of the Administrative Code and this chapter and obtain the required permit.



HILLS'S MAP OF NEW YORK, SHOWING INTRENCHMENTS. BRITISH — AMERICAN

Colonial Laws of New York, Chap. IV: 571

Jan. 1, 1766 - Every Dwelling house or Building erected of any kind, for public or private use, situate "to the Southward of Fresh Water," should "be made of Stone or Brick and Roofed with tile or slate."

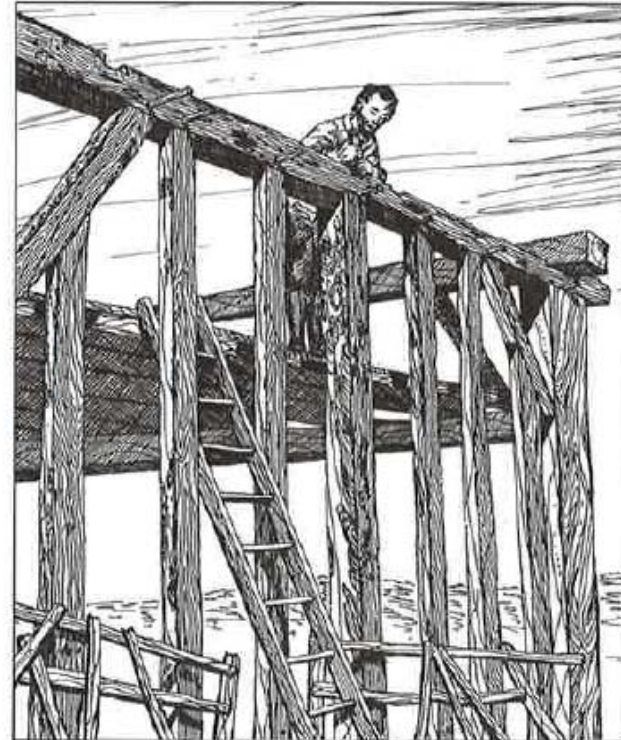
"The Iconography of Manhattan Island, 1498-1909," I.N. Phelps Stokes

Dutch Colonial House, Staten Island: 1690s



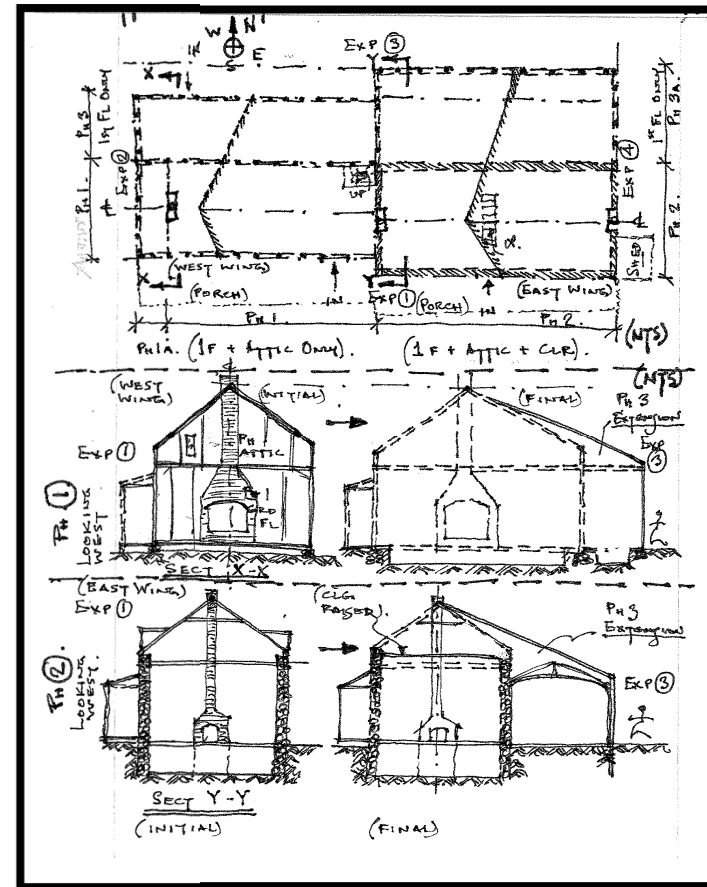
Built 1690s as a one-room Dutch Colonial.
Remodeled 1844. NYC landmarked in 1971.
A/K/A Clear Comfort in Rosebank section of Staten Island.

Dutch Colonial House, Staten Island: 1690s



Drawing by Dolores Malecki-Spivack, architect

1700s Tax Map and Site Sketch – Critical Data



Code Themes: Duty, Technical, Site Safety

Duty = law / administrative – *generally sunset*

Technical provisions – *do not sunset*

Empirical Designed vs. Engineering Design – *do not sunset*

Work during construction – *sunset*

Under Construction – governed by **permits** – *sunset*

Under Occupancy – governed by **C of Os** – *technical*

Material science issue – updating constantly

Structural stability (engineering issues – consistent)

Pre- and Post-permit: Code + Construction Themes

Duty / administrative provisions – pre- and post-permit and Certificate of Occupancy

Technical provisions:

Engineering issues – pre-permit

Construction issues – post-permit

Work during construction – generally post-permit

Design – pre-permit

Under Construction – post-permit

Under Occupancy – governed by **C of Os** – **technical**

Permit and C of O "LIFE" CYCLE

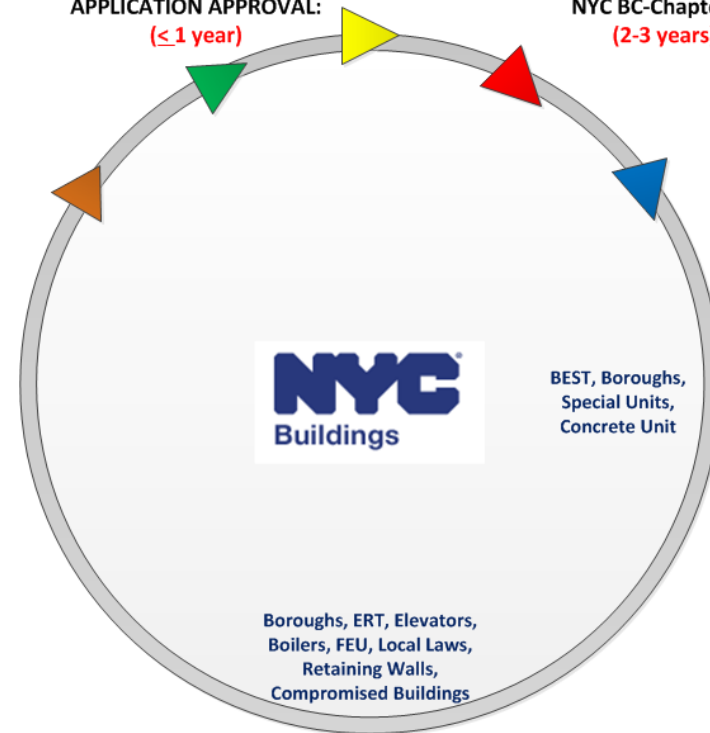
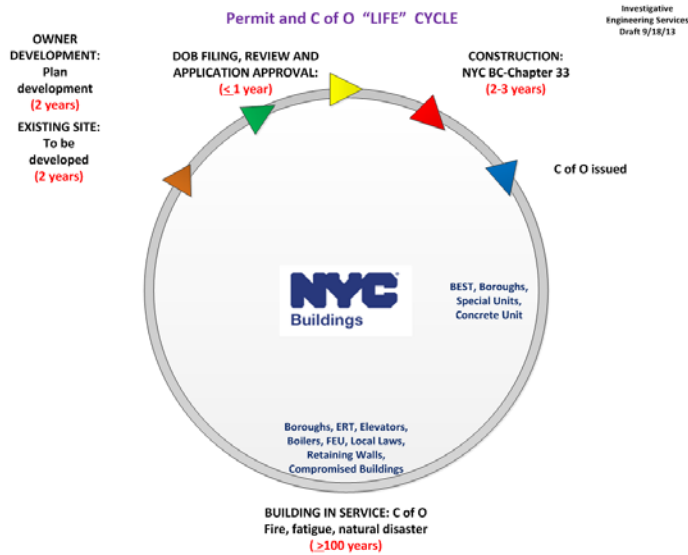
OWNER DEVELOPMENT:
Plan development
(2 years)

EXISTING SITE:
To be developed
(2 years)

DOB FILING, REVIEW AND APPLICATION APPROVAL:
(≤ 1 year)

CONSTRUCTION:
NYC BC-Chapter 33
(2-3 years)

C of O issued



Existing Buildings: They *Had* Permits, Now C of O



1920s Lofts:
“Designed” using
engineering principles

1850s Row Houses:
“Empirically” designed
(prescriptive)



2008 Code: Lawful Use of 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. The continuation of the unlawful use or occupancy of a building or structure after the effective date of this code contrary to the provisions of this code or other applicable law or rule shall be a violation of this code.

(Exceptions: Change of occupancy, large alterations, fire and life safety systems.)

Sourcing Historic Data: Public Websites

| | |
|---|--|
| Oasis oasisnyc.net | Open Accessible Space Information System (OASIS) |
| NYC DOB nyc.gov/buildings | Alterations, Certificates of Occupancy, Actions, Insurance & Violations |
| NYC HPD nyc.gov/hpd | Floor Plans & Alteration History |
| NY Public Library nypl.org | Digital Historical Maps & Photos |
| NYC DOF nyc.gov/finance | NYC Automate City Register Information Systems (ACRIS) – Ownership Information |
| Google & Bing google.com / bing.com | Maps |

What's missing above? *Building Codes*

New Buildings: Dictated by Codes 1600 – 2008

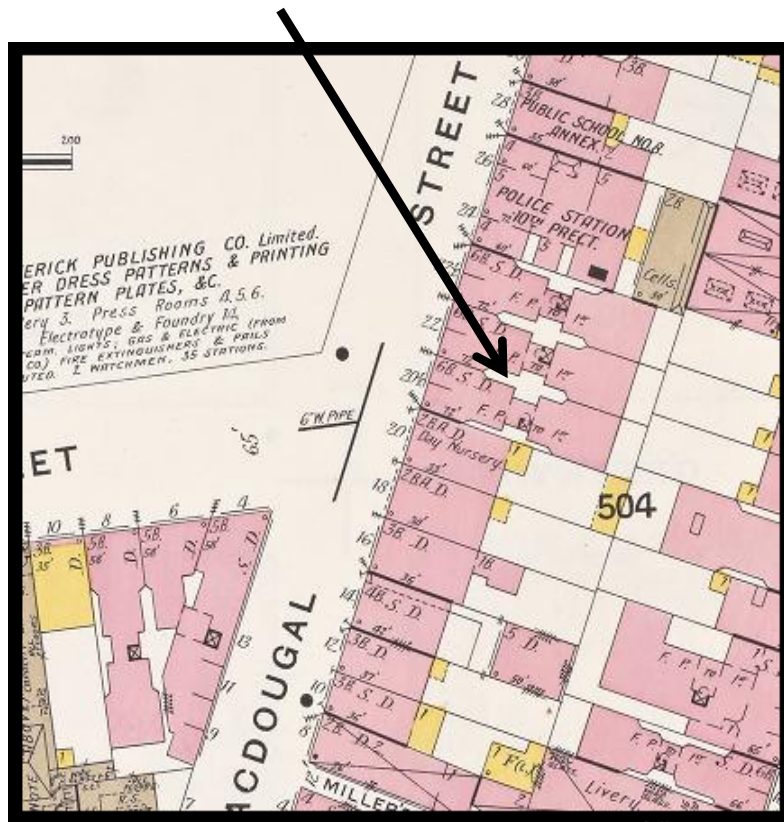


New building with existing buildings on lot lines.

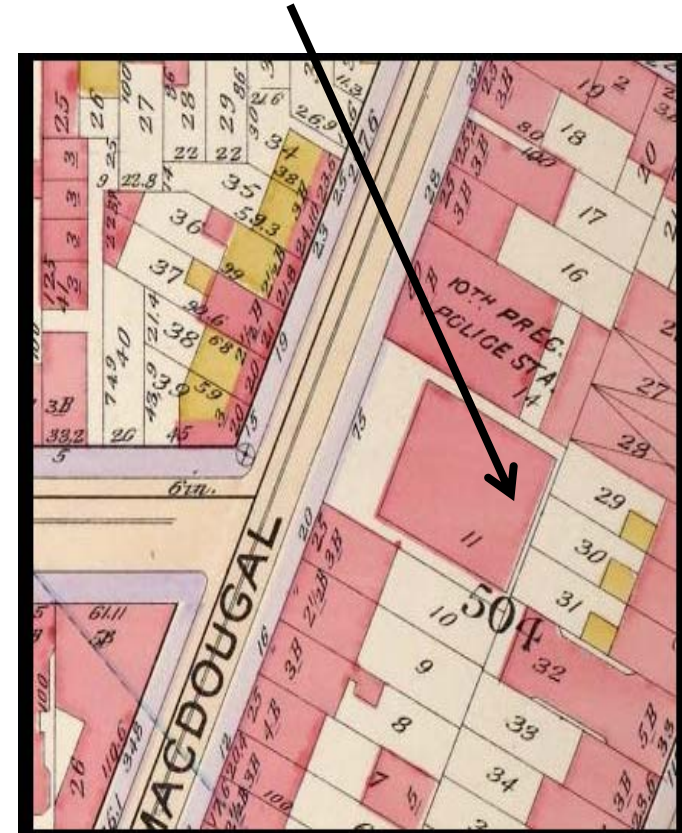


Tax Maps – Same Site: Recycling NBs

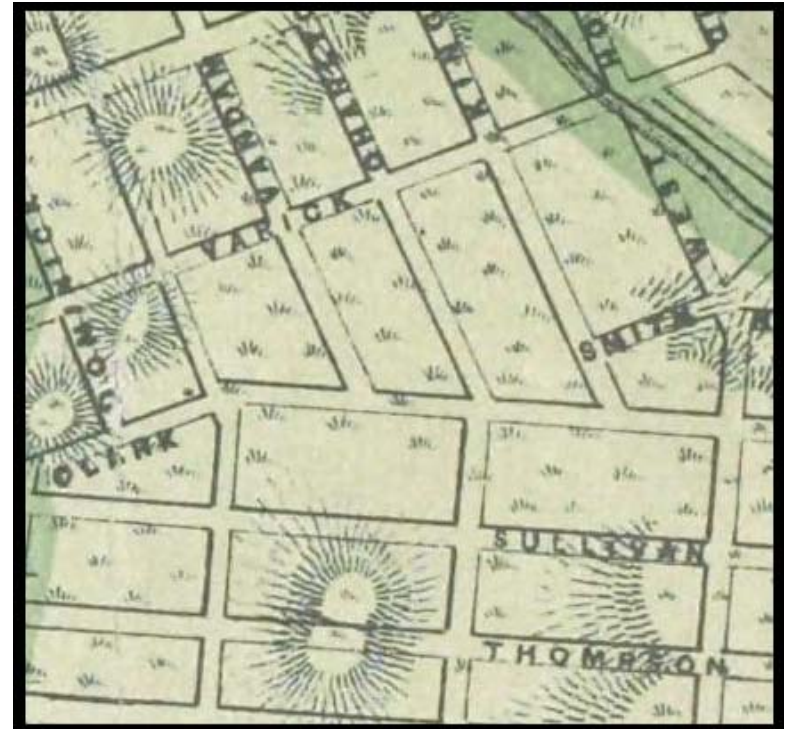
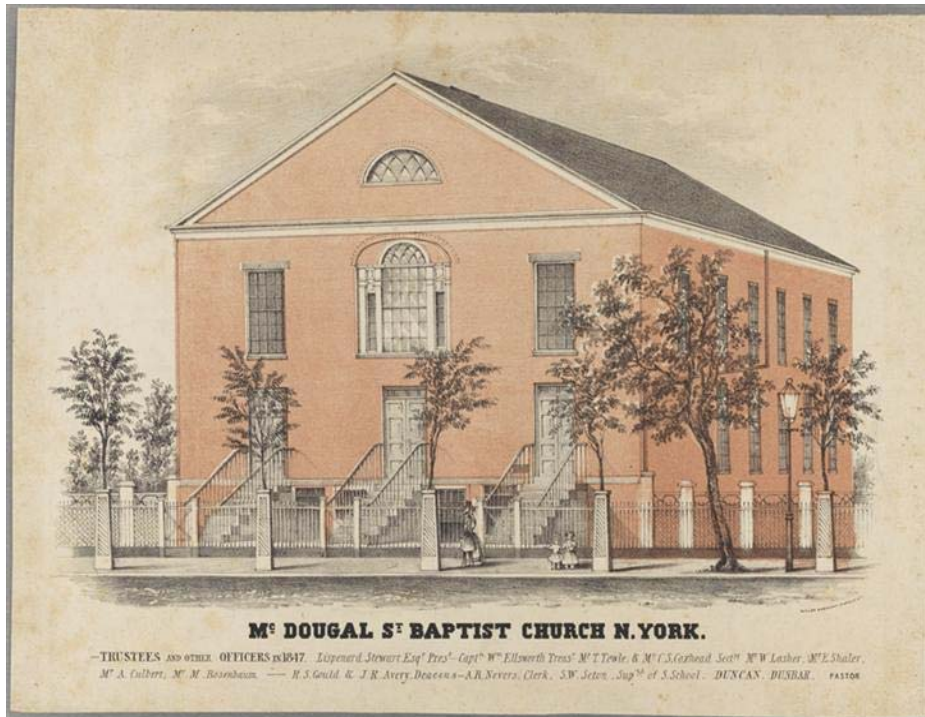
“New Building” in 1898



“New Building” in 1840s



Look for Data on Site



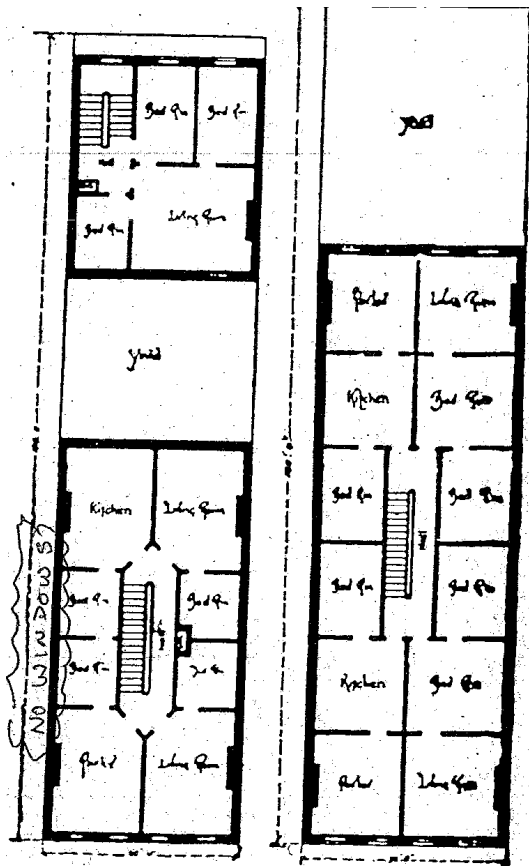
1886 Code: Drawings and Specifications Required— Submitting Drawings Was Optional

§ 35. All plans and specifications for the erection, construction, alteration or repair of any building or part of a building in the city of New York, may, at the option of the owner, before execution thereof, be submitted for examination and approval to the department for the survey and inspection of buildings in the city of New York; and it shall be the duty of the superintendent of buildings, under said department, to examine the same without delay, and when found or made to conform to the requirements

Plans and specifications to be made

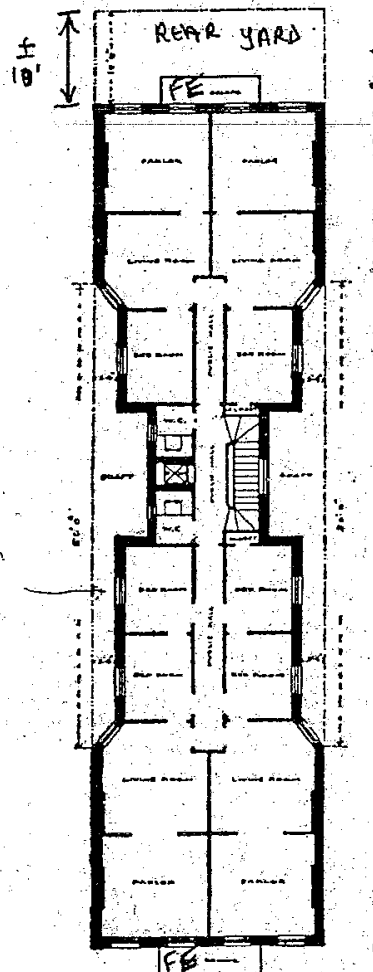
In 1886, **drawings and specifications** were optional. *Why?*
Many building designs were *prescriptive*.

Codes: Empirical/Prescriptive – Old Law Tenements



No. 3.— Two buildings on a lot 25x100.

No. 4.— Type of tenement-house without light or ventilation, except in outer rooms.



14

WAREHOUSE WALLS.

(For buildings other than Dwellings, except Churches, Theatres and School-houses.)

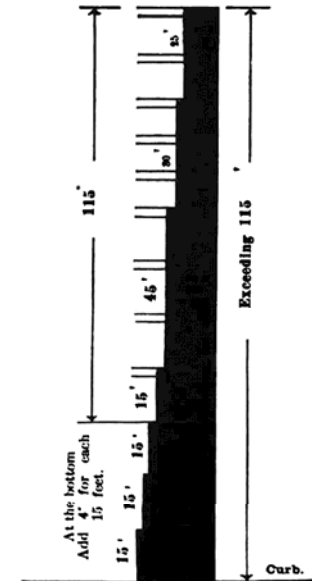
Party and sidewalls have the same thickness.

Front and rear walls and inside bearing walls may be four inches less in thickness.

(If the building be in width more than 25 feet clear span between walls, or more than 100 feet in depth, walls must be made thicker.)

(Fire-proof Building.)

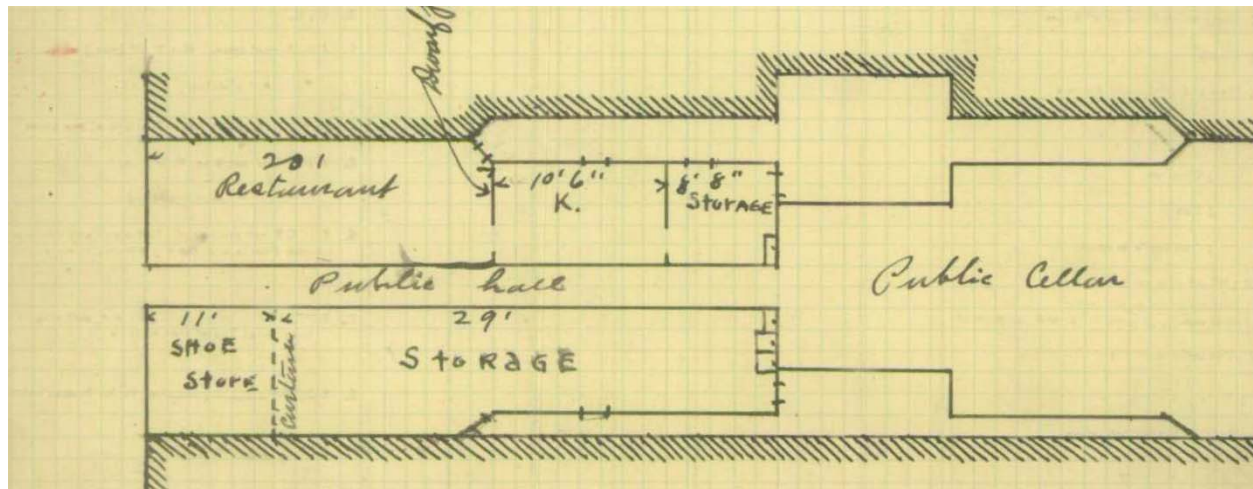
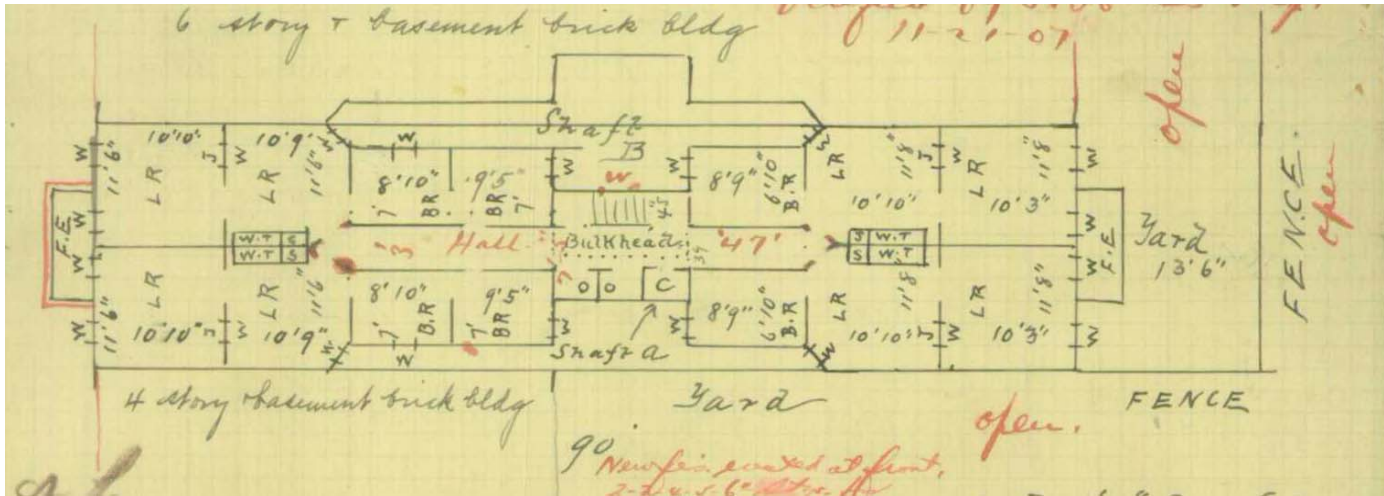
No. 15.



The total heights cannot be increased. The intermediate heights cannot be varied, the various thicknesses being to the tier of beams nearest thereto.

As many stories as desired may be placed within the given total heights

Actual Floor Plans: Comparable to Prescriptive



1886 Code: Required Fire Cuts, 75 PSF Live Load

brick or mason work between the ends of the same. In all buildings where the floor beams are of wood, the end of the beams resting on the wall shall be cut to the bevel of three inches. In every building already erected or hereafter to be built, the floors shall be of sufficient strength to bear the weight to be imposed upon them, exclusive of the weight of the material used in their construction. And all timbers or beams used in any building,

§ 25. In all buildings, every floor shall be of sufficient strength, ~~floor~~ in all its parts, to bear safely upon every superficial foot of its surface, seventy-five pounds; and if used as a place of public assembly, one hundred and twenty pounds; and if used as a store, factory; warehouse, or for any other manufacturing or commercial purpose, from one hundred and fifty to five hundred pounds and upwards; the weight in each class of these buildings being deter-

1851 Code: Relieving Wall

however, that in case said floors, or any of them, shall throughout their whole extent, be supported upon iron beams or girders, of proper size and strength, resting upon the lateral walls of such store or store-house, and distant from each other not more than fifteen feet, then such store or store-house may be so built and erected as that in the story or stories beneath such floor so supported, the lateral walls may be distant from each other, or from any partition wall of brick or stone, or any intermediate support of brick, stone, or iron, as hereinbefore required, a distance of more than thirty, but not more than forty feet.

2008 BC Chapter 16 Structural Design – Duty

1604.1 General.

Building, structures and parts thereof shall be designed and constructed in accordance with strength design, load and resistance factor design, allowable stress design, empirical design or conventional construction methods, as permitted by the applicable material chapters.

1604.4 Analysis.

Load effects on structural members. Shall be determined by methods of structural analysis that takes into account equilibrium, general stability, geometric compatibility and short and long term material properties. Any system or method of construction to be used shall be based on a rational analysis in accordance with well established principles of mechanics. Such analysis shall result in a system that provides a complete load path from origin to their load resisting elements.

New 2014 Code Provisions: Underpinning and Support of Adjacent Property

SECTION BC 1814 UNDERPINNING AND SUPPORT OF ADJACENT PROPERTY

1814.1 General. Where the protection and/or support of a structure or property adjacent to an excavation is required, an engineer shall prepare a preconstruction report summarizing the condition of the structure or property. The preconstruction report shall be prepared based on an examination of the structure or property, the review of available documents and, if necessary, the excavation of test pits. The engineer shall determine the requirements for underpinning or other protection and prepare site and structure-specific plans, including details and sequence of work for submission to the commissioner. Such protection may be provided by underpinning, sheeting, and bracing, or by other means acceptable to the commissioner.

“Engineered” Buildings Versus 19th Century *Empirical* Design

1. Code notes a defined load path – *not “defined”*
2. Code requires rational analysis – *not “rational”*
3. Code requires equilibrium –
equilibrium dependent on neighbor
4. Code requires general stability –
generally, stability dependent on neighbor
5. Code requires geometric compatibility – *new building term*
6. Code requires lateral force resisting system – *undefined*
7. Code requires anchorage of roofs and floors –
anchorage of joists to walls specified

“Engineered” Buildings Versus 19th Century *Empirical Design* Continued

8. Code requires structural drawings that show sizes, sections and relative locations for structural members – *drawings elective*
9. Code requires minimum wind loads resisting system – *wind load not defined*
10. Code does not specifically define bracing – *existing buildings were governed by bracing*
11. Code requires a seismic design and separation – *seismic wasn't a consideration*
12. Alternate load path and key element defined – *generally had this*
13. Structural Integrity (prescriptive requirements) – *new engineering concept; requires continuity and ties*
14. Peer review: Code can require complete load path.

2008 + 2014 Code: Updated Controlled Inspections – Duty

1704.20.1.1 Construction operations influencing adjacent structures.

Where construction operations have the potential to affect structurally the condition or occupancy of the subject structure and/or an adjacent structure, the structural stability of the such structures shall be subject to special inspections in accordance with Sections 1704.20.6 through 1704.20.10.

1814.1.1 Underpinning and Bracing – Duty

1814.1.1 Underpinning and bracing.

Where underpinning is used for the support of adjacent structures, the piers, wall piles or footings shall be installed in such manner so as to prevent the lateral or vertical displacement of the adjacent structure, to prevent deterioration of the foundations or other effects that would disrupt the adjacent structure. The sequence of installation and the requirements for sheeting, preloading, wedging with steel wedges, jacking or dry packing shall be identified in the design.

Jumping to 2008 BC Chapter 33: Site Safety – Duty

3301.1.1 Responsibility for safety.

Nothing in this chapter shall be construed to relieve persons engaged in construction or demolition operations from complying with other applicable provisions of law, nor is it intended to alter or diminish any obligation otherwise imposed by law on the owner, construction manager, general contractor, contractors, material men, registered design professionals, or other party involved in a construction or demolition project to engage in sound design and engineering, safe construction or demolition practices, including but not limited to debris removal, and to act in a reasonable and responsible manner to maintain a safe construction or demolition site.

2008 BC Chapter 33: 3309.8 Adjoining Walls – Duty

3309.8 Adjoining walls.

When any construction or demolition operation exposes or breaches an adjoining wall, including load-bearing and non-load-bearing walls as well as party walls and non-party walls, the person causing the construction or demolition operation shall, at his or her own expense, perform the following:

1. Maintain the structural integrity of such walls, have a registered design professional investigate the stability and condition of the wall, and take all necessary steps to protect such wall.

1855 NY State Building Code: Duty

1855.—CHAPTER VI.

AN ACT respecting Excavations in the Cities of New York and Brooklyn.—Passed January 24, 1855.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SEC. 1. That whenever excavations, hereafter commenced for building or other purposes on any lot or piece of land in the city and county of New York and the city of Brooklyn, shall be intended to be carried to the depth of more than ten feet below the curb, and there shall be any party or other wall, wholly or partly on adjoining land, and standing upon or near the boundary lines of such lot, the person causing such excavations to be made, if afforded the necessary license to enter on the adjoining land, and not otherwise, shall, at all times, from the commencement until the completion of such excavations, at his own expense, preserve such wall from injury, and so support the same by a proper foundation that it shall remain as stable as before such excavations were commenced.

SEC. 2. This act shall take effect immediately.

1882 Building Code: Citation, Part A

Depth of Ex-
cavations.

§ 474. (As amended by Section 3, Chapter 566, Laws of 1887.)—
Whenever excavations for building or other purposes, on any lot or piece of land in the city of New York, shall be intended to be carried to the depth of more than ten feet below the curb, at a place where there is any party or other wall wholly or partly on adjoining land and standing upon or near the boundary lines of such lot, the person causing such excavations to be made, if afforded the necessary license to enter on the adjoining land, and not otherwise, shall at all

Existing Code-Compliant Buildings



1968 Building Code Citation

§[C26-103.3] 27-117 Alterations under thirty percent of building value.- Except as otherwise provided for in sections 27-120 and 27-121 of this article, if the cost of making alterations in any twelve month period shall be under thirty percent of the value of the building, those portions of the building altered may, at the option of the owner, be altered in accordance with the requirements of this code, or altered in compliance with the applicable laws in existence prior to December sixth, nineteen hundred sixty-eight, provided the general safety and public welfare are not thereby endangered.

1855 Code: 50% Damage for Buildings

**Repairing
wooden
buildings.**

§ 32. Every wooden building or frame building with a brick front, or any other front, situated in the said city, south of the said line, which may hereafter be damaged by fire or otherwise to any amount not greater than one-half the value thereof, at the time of such damage may be repaired or rebuilt; but if such damage shall amount to more than one-half of such value thereof, exclusive of the value of the foundation, then such building shall not be repaired or rebuilt but shall be taken down.

Questions?

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

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