



How-to Guide: *Supporting Documentation*

In Compliance with 2020 New York City Energy Conservation Code

- GENERAL
- BUILDING ENVELOPE
- MECHANICAL SYSTEMS
- LIGHTING & ELECTRICAL POWER
- **OTHER REQUIREMENTS**

NOTE: In this *How-To Guide: Supporting Documentation*, selected Energy Code provisions have been generalized, summarized, rephrased, and/or highlighted. This guide is intended: 1) To provide general guidance for the job applications seeking compliance with the 2020 NYCECC; 2) Not to replace or represent the entire 2020 NYCECC and related regulations of the City of New York and the Department of Buildings; and 3) Not to provide complete compliance solutions for any particular type of job or work. Comprehensive mandates, applicability, exemptions, exceptions and options will be found in the 2020 NYCECC and related regulations of the City of New York and the Department of Buildings.

MANDATORY ADDITIONAL EFFICIENCY PACKAGE

[NOTE] In the 2020 NYCECC, this Additional Energy Efficiency requirement is mandatory provision for all new Commercial buildings regardless of the chosen Code Compliance Path (either ECC-following, or ASHRAE-following job application).

■ Seven (7) Options for New Commercial Buildings

New Commercial buildings must demonstrate compliance with **at least one of the seven options below** as an additionally required energy efficiency system. The chosen efficiency system must be clearly indicated through Energy analysis and/or EN- labeled drawings, and the construction drawings must provide detailed data to ensure implementation of the chosen system.

*C406
Appendix I*

Option 1. More Efficient HVAC Performance

*C406.2
Appendix I 12*

Option 2. Reduced Lighting Power Density

*C406.3
Appendix I 13*

Option 3. Enhanced Digital Lighting Controls

*C406.4
Appendix I 14*

Option 4. Dedicated Outdoor Air System (DOAS)

*C406.5
Appendix I 15*

Option 5. Reduced Energy Use in Service Water Heating

*C406.6
Appendix I 16*

Option 6. Enhanced Envelope Performance

*C406.7
Appendix I 17*

Option 7. Reduced Air Infiltration

*C406.8
Appendix I 18*

■ Five (5) Options for New Tenant Spaces

New tenant space must demonstrate compliance with **at least one of the five options above – Option 1 through Option 5** – as an additionally required energy efficiency system. The chosen efficiency system must be clearly indicated through Energy analysis and/or EN- labeled drawings, and the construction drawings must provide detailed data to ensure implementation of the chosen system.

*C406.1.1
Appendix I 11.2*

MANDATORY ADDITIONAL EFFICIENCY PACKAGE

Option 1.

More Efficient HVAC Performance

– Exceed the Minimum by 10%

- HVAC equipment exceed the minimum efficiency requirements of C403.3.2 [ECC] or 6.8.1 [ASHRAE] by 10%
- Equipment types that are not subject to the minimum 10% efficiency improvement are less than 10% of the total building system capacity.

To demonstrate compliance with this option:

- Provide HVAC equipment schedules specified with improved efficiency.
- Provide Energy analysis to compare proposed efficiencies against the minimum, 10%-improved efficiencies.
 - Note that the COMcheck software has capacity to auto-calculate the minimum, 10%-improved efficiency values.

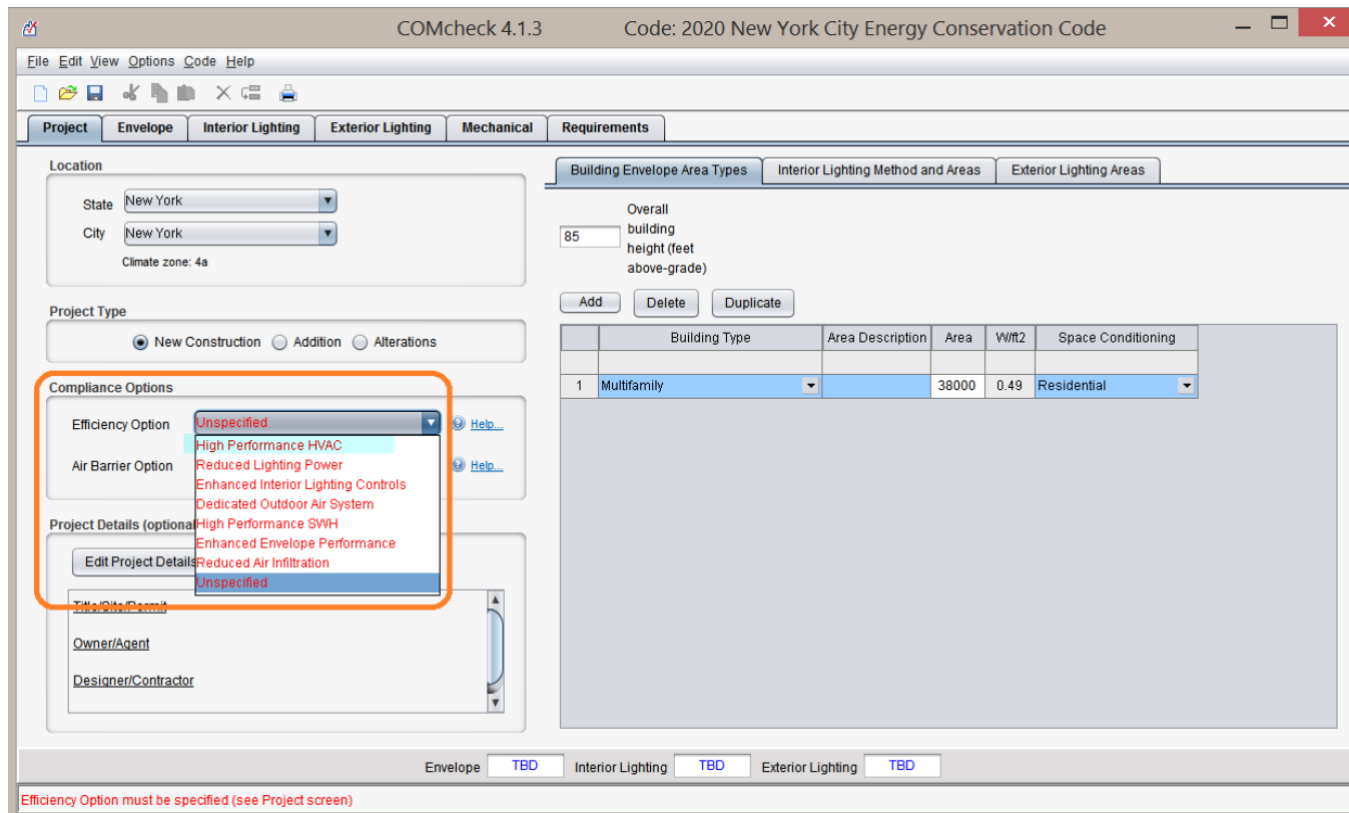


Figure OR-2.
COMcheck Program Screenshot
- Project tab showing Additional Efficiency Options

MANDATORY ADDITIONAL EFFICIENCY PACKAGE

Option 2.

Reduced Lighting Power Density (LPD)

– Total LPD < 90% of the Allowed Maximum

- Total interior lighting power < 90% the total allowed by the Building Area Method in C405.3.2.1[ECC] or 9.5.1 [ASHRAE]
- Total interior lighting power < 90% the total allowed by the Space-by-Space Method in C405.3.2.2[ECC] or 9.6.1 [ASHRAE]

To demonstrate compliance with this option:

- Provide lighting fixture schedules complete with fixture wattages and fixture counts.
- Provide Energy analysis to compare the calculated proposed LPD against the reduced maximum (90%) LPD.
 - Note that the COMcheck software has capacity to auto-calculate the reduced maximum LPD values.

C406.3
Appendix I I3

Option 3.

Enhanced Digital Lighting Controls

– Advanced Control Operation of Interior Lighting

- Controls including Continuous dimming of luminaires and Tighter zone controls
- Digital control systems including Reconfigurable controls and Load shedding
- Submittal of lighting controls Sequence of Operations, and thorough implementation of functional testing

To demonstrate compliance with this option:

- Provide lighting plans with individual control locations and control zone boundaries.
- Provide lighting controls narratives that specify the required controls space-by-space in detail.
- A Sequence of Operations for the digital control systems shall be submitted to the DOB upon request.

C406.4
Appendix I I4

MANDATORY ADDITIONAL EFFICIENCY PACKAGE

Option 4.

Dedicated Outdoor Air System (DOAS)

C406.5
Appendix I 15

– 100% Outdoor Air Ventilation System with Energy Recovery

- Independent ventilation system is specified for each individual occupied space to provide 100% outdoor air. For the list of systems subject to this option, see C406.5 [ECC], or I5 [ASHRAE].
- The ventilation system is equipped with energy recovery system.
- The system includes controls that automatically reset the supply-air temperature in response to building loads or OA temperatures.

To demonstrate compliance with this option:

- Provide HVAC equipment schedules that specify DOAS+ERV for all applicable systems.

Option 5.

Reduced Energy Use in Service Water Heating (SWH)

C406.6
Appendix I 16

– Waste Heat Recovery, or On-site Renewable Energy Systems to Reduce SWH Energy

- Minimum **60 %** of the building's annual hot water requirements, or
- **100 %** of the building's annual hot water requirements, with Condenser heat recovery system are provided by
 - a) Waste heat recovery from service hot water, heat-recovery chillers, building equipment, or process equipment, and/or
 - b) On-site renewable energy water-heating systems
- This option is applicable to the following occupancy groups:
 - Group R-1: Boarding houses, hotel or motels
 - Group R-2: Buildings with residential occupancies
 - Group A-2: Restaurants and banquet halls or buildings containing food preparation areas
 - Group A-3: Health clubs and spas
 - Group I-2: Hospitals, psychiatric hospitals and nursing homes
 - Group F: Laundries

To demonstrate compliance with this option:

- Provide mechanical/plumbing drawings that specify in detail Waste heat recovery system and/or On-site renewable energy water-heating systems
- Provide summary calculation of the building's annual hot water requirements, and % of hot water supplied by this option.

MANDATORY ADDITIONAL EFFICIENCY PACKAGE

Option 6.

Enhanced Envelope Performance

– Minimum 15% Improvement

- The proposed building thermal envelope performance demonstrates a minimum 15 percent improvement compared to the code-prescriptive building envelope.

To demonstrate compliance with this option:

- Provide drawings that document entire building envelope assemblies and their thermal values – e.g. Opaque assemblies schedule and details (roof, walls, floors, etc.), Fenestration schedules (windows and doors)
- Provide Energy analysis to compare the proposed building envelope thermal values against the 15 %-improved envelope values.
 - Note that the COMcheck software has capacity to auto-calculate the 15 %-improved envelope thermal values.

C406.7
Appendix I 17

Option 7.

Reduced Air Infiltration

– Maximum 0.25 cfm/sf Air Leakage @ 75 Pascals

- Air Leakage Testing conducted in accordance with ASTM E779 or ASTM E1827 shall verify that the air leakage rate of the whole building does not exceed 0.25 cfm/sf at a pressure differential of 75 Pascals.
- The testing report including the building data (e.g., envelope surface area, floor area, etc.) and the test results shall be submitted to the building owner.

To demonstrate compliance with this option:

- Provide on drawings statement to direct air leakage testing, and specify detailed requirements
- The testing report shall be submitted to the DOB upon request.

C406.8
Appendix I 18

PERMANENT CERTIFICATE

- Residential Buildings and Group R-3 Commercial Buildings are required to have the Permanent Energy Efficiency Certificate posted inside the building.
- The Builder or Other Approved Party must complete and post the Certificate.

1 RCNY §5000-01(g)(4)
R401.3
C401.2.1

Required Data Contents in the Certificate

- **R-values in Opaque assemblies** and other components – insulation in ceiling/roofs, walls, floor/foundation components, and ducts outside the conditioned spaces
- **U-factors and SHGC values of Fenestration** – windows and doors
- **Air Leakage Testing results**
- **Mechanical equipment Types and Efficiencies** - HVAC and Service water heating equipment

Location of the Permanent Certificate

- Drawings must specify that the Certificate shall be posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building prior to final inspections of the application.
- When specifying to post the Certificate near or on the electrical distribution panel, drawings must also instruct that the Certificate must be readily visible (at eye level and in plain sight), and yet must not obstruct the visibility of the other Code-required labels (e.g., circuit directory label, service disconnect label, etc.).

Additions & Alterations Job Applications

For Additions and Alterations applications affecting information on the *existing Permanent Certificate*, drawings must specify that the existing Certificate shall be updated and re-installed.

Permanent Energy Efficiency Certificate

Insulation Rating				
Ceiling/Roof	Attic	R-50 cavity		
	Vaulted	R-50 cavity		
Walls	Framed wall (wood frame)	R-6 continuous + R-21 cavity		
	Mass wall	n/a		
	Basement	R-15 continuous		
	Crawl Space	n/a		
Floors	Over unconditioned space	R-30 cavity		
	Slab Edge	R-12 continuous	4 ft deep	
Ducts outside	Attic	R-10		
Conditioned space	Other	R-8		
Fenestration Rating				
Window	U-Factor (NFRC)	U-0.25	SHGC (NFRC)	0.36

Figure OR-6.a. **Sample Permanent Energy Efficiency Certificate (partial view)**
[Click [here](#) for the full view of a Sample certificate and a Sample suggested form]

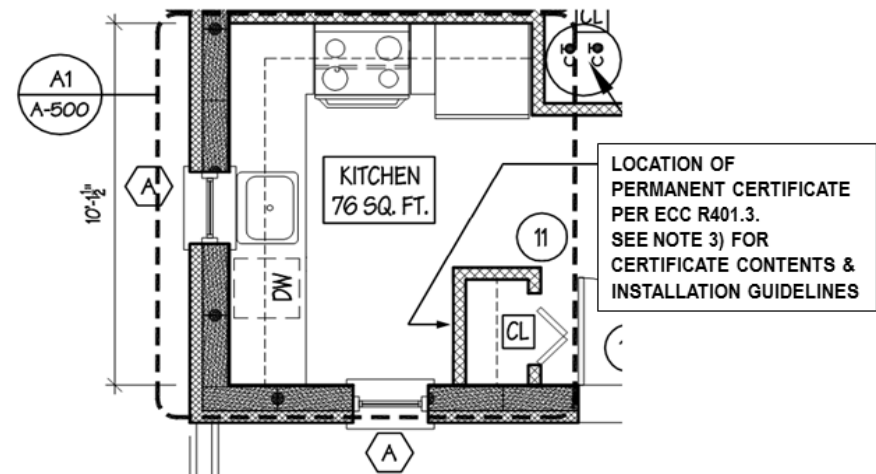


Figure OR-6.b. **Sample Plan Drawing indicating Certificate Requirement**

ELECTRICAL VEHICLE SERVICE READY

R404.3

■ This Requirement Applies to

- One or Two-family dwellings with Parking area
- Low-rise Multi-family buildings with Parking area
- Townhouses with Parking area

■ For Each Dwelling Unit, provide:

- 208/240V 40-amp outlet, or
- Panel capacity and conduit for the future installation of such an outlet adjacent to the parking area.

■ For Residential occupancies with Common Parking Area, provide:

- Panel capacity and conduit for the future installation of 208/240V 40-amp outlets for 5 percent of the total parking spaces, but not less than one outlet, or
- 208/240V 40-amp outlets for 5 percent of the total parking spaces, but not less than one outlet.



Figure OR-7.
Electrical Outlet Ready for Electrical Vehicle Service
Source: basc.pnnl.gov/images

ENERGY RATING INDEX (ERI) – COMPLIANCE ALTERNATIVE FOR RESIDENTIAL BUILDINGS

ERI is a score-based rating system which alternatively determines Energy Code compliance of a new residential building based on its energy performance. It allows applicants to approach the Energy Code with the same flexibility of the Simulated Performance Alternative (Section R405), yet it uses energy modeling and in-field inspection to confirm that results are achieved.

ERI ‘Reference Design’ vs. ‘Rated Design’

The ERI *Reference Design*, representing ERI score of 100, means the building design meets the minimum requirements of the 2006 IECC. For the *Rated Design* of a newly proposed residential building to demonstrate compliance with the 2020 NYCECC, the ERI analysis on the building must result in the **ERI score of 50 or less** (for Climate Zone 4). A residential building that achieves the rated ERI score of 50 is 50% more energy efficient than the *Reference Design* building, which meets the 2006 IECC (ERI score of 100).

R406.3
R406.4

For Compliance Through ERI Approach, Drawings Must Indicate:

- 1) Mandatory provisions for Residential buildings (Section R401 thru Section R404) and Section R403.5.3 are met.
- 2) The building thermal envelope meets the 2011 NYCECC prescriptive requirements (Table 402.1.1 or Section 402.1.3 of the 2011 NYCECC). However, if on-site renewable energy is included in the calculation of the ERI score, the building thermal envelope is to meet the 2016 NYCECC prescriptive requirements (Table R402.1.2 or Table R402.1.4)
- 3) Verification of compliance is required to be completed by an approved third party.
- 4) Documentation is required regarding: a) Compliance software tools, b) Compliance report, and c) Other additional documentation that may be required to submit to the Department.
- 5) Calculation software tools, where used, meet the requirements on: a) Minimum capabilities, b) Specific approval, and c) Input values.

R406.2
R406.4
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For job applications opting for this compliance path, on PW1-Section 10, ‘Energy Modeling (EN1)’ should be marked as chosen Energy Analysis method.

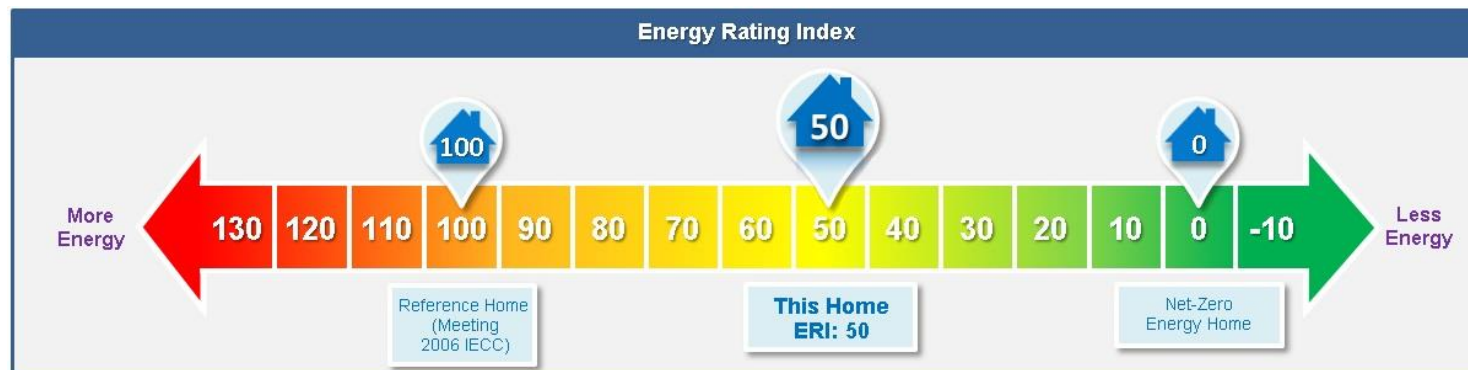


Figure OR-8. Sample Energy Rating Index Label

SYSTEM COMMISSIONING

■ Specify Total Proposed Heating and Cooling Capacity

- For ALL Commercial building job applications including New buildings, Additions, and Alterations
Total Heating Equipment Capacity (in Btu/h) being Installed, or
Total Heating Equipment Capacity (in Btu/h) Serving the Alteration space
and
Total Cooling Equipment Capacity (in Btu/h) being Installed, or
Total Cooling Equipment Capacity (in Btu/h) Serving the Alteration space
Must be clearly calculated and documented on an EN- labeled sheet.

1 RCNY §5000-01(g)(5)(iii)

- *Total Heating Equipment Capacity' calculations must include the 'Service Water Heating' equipment capacity.*

■ Specify Whether System Commissioning is Required

- Drawings must clearly state *whether or not* System Commissioning is required.
- System Commissioning is *not required* for:
 - Mechanical systems of **Total Heating** capacity Installed, or Serving the Alteration Space < **600 k Btu/h**
 - Mechanical systems of **Total Cooling** capacity Installed, or Serving the Alteration Space < **480 k Btu/h**
 - **Renewable Energy** systems of Total generating capacity < **25 kW**

1 RCNY §5000-01(g)(5)(iii)
C408.2
6.7.2.3

■ Areas Where Commissioning is Required

- For systems for which Commissioning is required, drawings should clearly identify specifications of each Commissioning-required system with detailed information on the equipment/fixture schedules and complete narratives including controls notes.
- Commissioning-required systems, at a minimum, include the following:

C408.2
C408.3
6.7.2.3
9.7.3

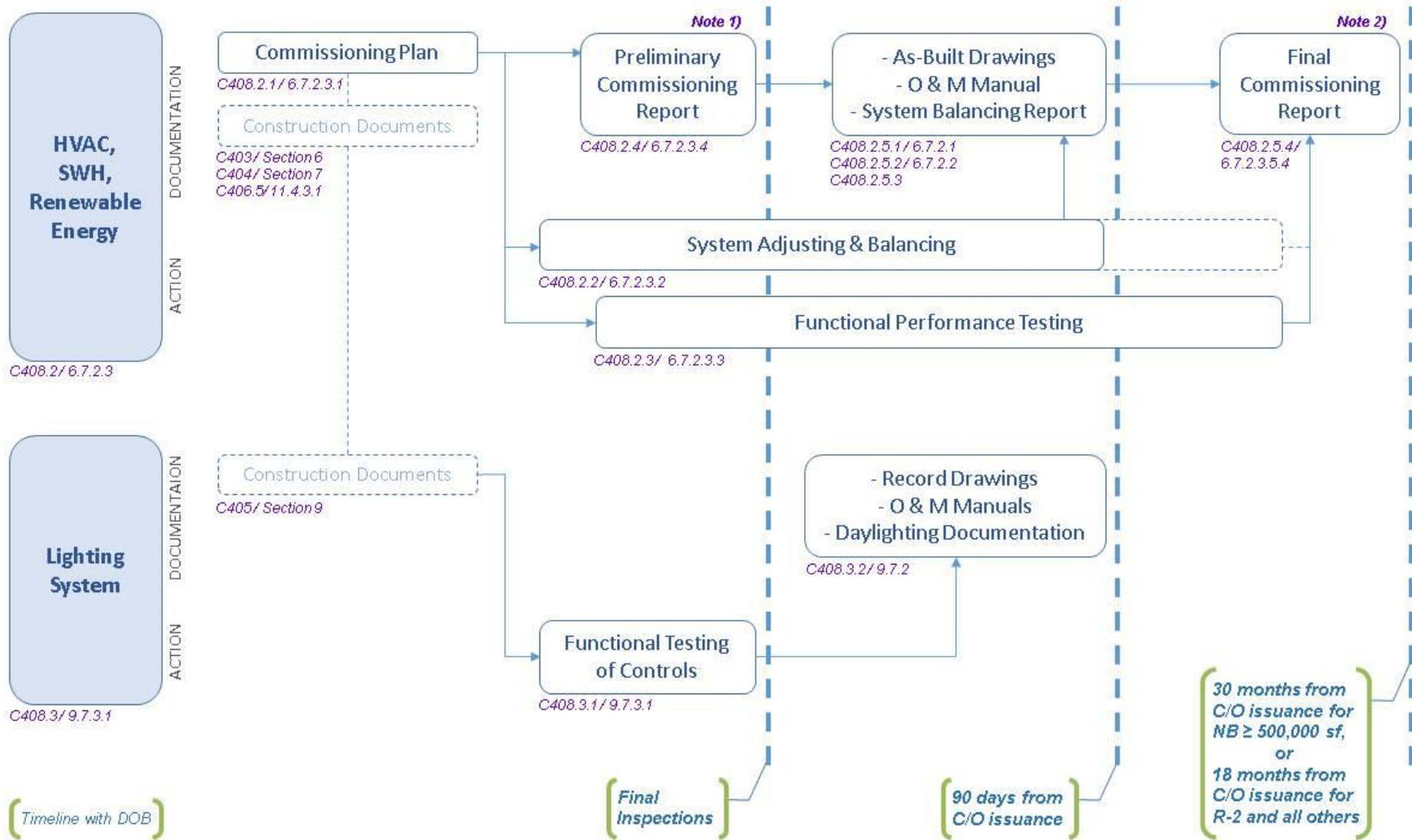
Mechanical Systems

- 1) Heating, cooling, air handling and distribution, ventilation and exhaust systems;
- 2) Energy recovery systems;
- 3) Manual or automatic controls;
- 4) Plumbing systems;
- 5) Service water heating systems;
- 6) Refrigeration systems;
- 7) Renewable energy and energy storage systems; and
- 8) Other systems/equipment/components supporting HVAC and affecting energy use.

Lighting Control Systems

- 1) Occupant sensor controls;
- 2) Time-switch controls; and
- 3) Daylight responsive controls.

SYSTEM COMMISSIONING



Note 1) Upon the owner's receipt of the Preliminary Commissioning Report, the owner (owner's authorized agent) shall send a letter acknowledging the receipt to DOB at cx@buildings.nyc.gov.

Note 2) Upon completion of the final commissioning procedures, the owner (owner's authorized agent) shall send the Final Commissioning Report to DOB at cx@buildings.nyc.gov. Click [here](#) for more information in the FAQ under DOB Energy Code website.

Figure OR-10. System Commissioning Work Flow

CHANGES TO EXISTING BUILDINGS

■ Compliance

- Job applications of **additions, alterations, repairs or relocation of existing buildings/structures, or changes of occupancy to existing buildings** must demonstrate compliance with the NYCECC and other governing NYC Codes that are effective as of the job application filing date.
- Job applications following ECC must comply with:
 - 1) Section R502/Section C502 for **Additions**
 - 2) Section R503/Section C503 for **Alterations**
 - 3) Section R504/Section C504 for **Repairs**
 - 4) Section R505/Section C505 for **Changes of Occupancy or Use**
- Job applications following ASHRAE must comply with:
 - 1) Provisions of Sections 5, 6, 7, 8, 9 and 10 **or** Section 11 **or** Appendix G for **Additions**
 - 2) Provisions of Sections 5, 6, 7, 8, 9 and 10 **or** Section 11 **or** Appendix G for **Alterations**
 - 3) Provisions of Sections 5, 6, 7, 8, 9 and 10 for **Repairs** and **Changes of Occupancy or Use**

R501.4
C501.4

4.2.1.2
4.2.1.3

■ Clear Scope of Work

- Construction drawings must clearly define the proposed scope of work in the existing buildings by:
 - 1) Written descriptions of all proposed changes to the existing buildings, and
 - 2) Graphical delineations of the proposed work on drawings to separate the areas affected by ‘additions, alterations, repairs, relocations, or changes of C/O’ from the areas of ‘existing-to-remain.’

1 RCNY §5000-01(g)

■ Alterations vs. Additions on ‘Historic Building’

- Repair, restoration, and **Alteration work of**, and change of occupancy to **‘Historic Building’ are exempt** from the ECC compliance requirements.
 - 1) The ECC exemption for ‘Historic Building’ is limited to the National or New York State historic building and does *not* apply to New York City-designated historic building. For the complete definition of ‘Historic Building,’ refer to Section [R202](#) or [C202](#).
 - 2) Job applications declaring exemptions of ECC compliance for the reason of ‘Historic Building’ must provide on an EN- labeled drawing:
 - Professional Statement declaring exemption and the basis for exemption
 - Documentation obtained from the New York State Historic Preservation Office’s online tool called [the New York State Cultural Resource Information System \(CRIS*\)](#) clearly indicating that the subject building is listed as, or is eligible for listing as a historic building, or a contributing building to a historic district in the NY State or National Register of Historic Places
 - * If CRIS data for a specific building within the National Register of Historic Places is inconclusive, more information may be found by contacting [the National Park Service National Register Database](#).
- **‘Additions to ‘Historic Building’ are not exempt**, and thus the ‘Added’ portion to the Historic Building must demonstrate compliance with the ECC according to provisions under Section R502 or Section C502.

R501.6
C501.6

CHANGES TO EXISTING BUILDINGS

A. Additions

- In general, *altered* portions that resulted from the proposed 'addition' in the existing building or building system are subject to the ECC requirements for *new* buildings.
- Specifically, *Residential* buildings must demonstrate compliance by: 1) Prescriptive compliance option per Section R502.1.1, or 2) Simulated Performance Alternative (Existing plus addition compliance) option per Section R502.1.2.
- Specifically, *Commercial* buildings must demonstrate compliance by: 1) Prescriptive compliance option per Section C502.2, or 2) satisfying Appendix CA (ASHRAE 90.1) applicable sections.
- Compliance of the 'addition' must be demonstrated by showing that:
 - 1) The 'addition' portion alone complies with the ECC prescriptively; or
 - 2) The existing building and the 'addition' combined, as a single building, comply with the ECC through the performance path; or
 - 3) For Residential buildings, the existing building with the 'addition' uses no more energy than the existing building prior to the 'addition.'

R502
C502

B. Alterations

- In general, *altered* portions that resulted from the proposed 'alteration' in the existing building or building system are subject to the ECC requirements for *new* buildings.
- The following alterations, provided that the energy use of the building after the 'alteration' is not increased, need *not* comply with the requirements for *new* buildings:
 - 1) Storm windows installed over existing fenestration
 - 2) Surface-applied window film installed on existing single-pane fenestration assemblies reducing solar heat gain
 - 3) Existing ceiling, wall or floor cavities exposed during construction, provided that cavities are completely filled with insulation
 - 4) Construction where the existing roof, wall or floor cavity is not exposed
 - 5) Roof recover
 - 6) Re-roofing of roofs without insulation in the cavity, providing new insulation either above or below the exposed sheathing (Residential buildings only)
 - 7) Alterations that replace less than 10 % of the luminaires in a space (*commercial buildings only*)
 - 8) Air barriers are not required for roof recover and roof replacement unless the entire existing building envelope is in the work scope of alterations, renovations or repairs (*commercial buildings only*)
- Compliance requirements for 'alterations' in *Residential* buildings
 - 1) Replacement fenestration: Section R503.1.1.1
 - 2) Heating and cooling systems: Section R503.1.2
 - 3) Service hot water systems: Section R503.1.3
 - 4) Lighting: Section R503.1.4

R503
C503

CHANGES TO EXISTING BUILDINGS

B. Alterations *(continued from the previous page)*

- Compliance requirements for 'alterations' in *Commercial* buildings
 - 1) Building Envelope: Section C503.3
 - 2) Heating and cooling systems: Section C503.4
 - 3) Service hot water systems: Section C503.5
 - 4) Lighting systems: Section C503.6
- Alterations in Commercial buildings complying with Appendix CA (ASHRAE 90.1) need *not* comply with Section C503.
- Any areas converted from non-conditioned or low-energy space to conditioned space must demonstrate compliance according to Section R503 or Section C503.

R503
C503

C. Repairs

- While building maintenance and repairs must be conducted in compliance with relevant New York City Codes, work on damaged/non-damaged building components justified by the required repair/maintenance in the existing building are considered as 'repairs' work, and are *not* subject to the requirements for Alterations in Section R503/Section C503.
- The following are considered 'repairs':
 - 1) Glass-only replacements in fenestration
 - 2) Roof repairs
 - 3) Replacement of the bulb and/or ballast within the existing luminaires in a space, without increasing the installed interior lighting power
 - 4) Replacement of existing doors that separate conditioned space from the exterior, without removing the existing vestibule (Commercial buildings only)
 - 5) Air barriers are not required for roof repair unless the entire existing building envelope is in the work scope of alterations, renovations or repairs (Commercial buildings only)
- Repairs in Commercial buildings complying with Appendix CA (ASHRAE 90.1) need *not* comply with Section C504.

R504
C504

D. Change of Occupancy or Use

- Buildings/spaces seeking a *Change in Occupancy or Use* that would result in an *increase in energy use* – in demand for either fossil fuel or electrical energy – must meet the ECC requirements applicable to the new occupancy/use.
- *Residential* buildings/spaces may demonstrate compliance with this section (Section R505) by the *Simulated Performance Alternative* method (Section R405) proving that the annual energy cost of the proposed design is no more than 110% of the annual energy cost of the standard reference design.
- Spaces in *Commercial* buildings undergoing a change in use must comply with interior lighting power requirements (Section C405.4) for the new use.

R505
C505