



# BROWARD COUNTY BOARD OF RULES AND APPEALS

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**To:** Members of the Ad Hoc Energy Conservation Committee

D. Rice, P.E.      M. Charnin      T. Fallon      W. Haygood  
E. Jenison      R.A. Kamm, P.E.      B. Lomel, P.E.      J. Travers  
D. Ulmer      B. Volin      A. Zackria, CSI

**From:** Timothy G. de Carion, Chief Energy Code Compliance Officer

**Date:** August 22, 2022

**Subj:** Energy Conservation Committee to Discuss Agenda Items

The Chairman of Energy Committee, Mr. Dave Rice P.E. called for a meeting of the Energy Committee for the items listed.

## AGENDA

### Roll Call

**Approval of Minutes** – June 20, 2022

**Chairman’s Opening Remarks**

**Chief Energy Code Compliance Officer Opening Remarks**

### Regular Meeting

**Item 1: BORA Commercial Energy Guidelines** ..... 6 (Dated 08-22-2022)  
Checklist Corrections ..... 8 (Dated 08-22-2022)  
Electrical Checklist..... 16 (Dated 08-22-2022)

### General Discussion

### Schedule Next Meeting

### Adjournment

### Reference Documents for Committee Use

- 1) BORA Commercial Energy Guidelines (Page 6)

**Sunshine Law Reminder:** Advisory Board members cannot communicate with each other on a possible committee or Board topic outside of a public meeting, per State statute.

### 2022 Voting Members

#### Chair

Mr. Daniel Lavrich, P.E.,S.I., F.ASCE,  
F.SEI  
Structural Engineer

#### Vice-Chair

Mr. Stephen E. Bailey, P.E.  
Electrical Engineer

Mr. Sergio Pellecer  
Fire Service Professional  
Mr. Gregg D’Attile,  
Mechanical Contractor  
Mr. John Famularo,  
Roofing Contractor  
Mrs. Shalanda Giles Nelson,  
General Contractor  
Mr. Daniel Rourke,  
Master Plumber  
Ms. Lynn E. Wolfson,  
Representative Disabled Community  
Mr. Dennis A. Ulmer,  
Consumer Advocate  
Mr. John Sims,  
Master Electrician  
Mr. Ron Burr  
Swimming Pool Contractor  
Mr. Abbas H. Zackria, CSI  
Architect  
Mr. Robert A. Kamm, P.E.  
Mechanical Engineer

### 2022 Alternate Board Members

Mr. Steven Feller, P.E.,  
Mechanical Engineer  
Mr. Alberto Fernandez,  
General Contractor  
VACANT,  
Roofing Contractor  
Derek A. Wassink, P.E.,  
Structural Engineer  
Mr. Robert Taylor,  
Fire Service  
Mr. David Rice, P.E.,  
Electrical Engineer  
Mr. James Terry,  
Master Plumber  
Mr. David Tringo,  
Master Electrician  
Mr. Jeff Falkanger,  
Architect

#### Board Attorney

Charles M. Kramer, Esq.

#### Board Administrative Director

James DiPietro

**BORA Energy Conservation Committee –  
June 20, 2022 Meeting Minutes**



**DRAFT**

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## **MEETING OF THE ENERGY CONSERVATION COMMITTEE**

**Minutes  
June 20, 2022**

### **Call to Order:**

Chair David Rice, P.E., R.C. Engineering, Inc., called a published meeting of the Broward County Board of Rules and Appeals Energy Conservation Committee to order at 1:30 PM.

The roll was called, and the following members were present:

### **Present:**

Mike Charnin	Brian Lomel, P.E.	Bob Volin
Eric Jenison	David Rice, P.E.	Abbas Zackria, CSI
Robert Art Kamm, P.E.	John Travers	
Carlton Kirby	Dennis Ulmer	

Staff: Timothy de Carion, Chief Energy Code Compliance Officer

Chair Rice began the meeting and reminded the committee about the Florida Building Commission meetings currently being held. The subject matter of the meetings will be based on the 2023 codes. Chair Rice announced his plans of attending the Electrical TAC Committee meeting. The meeting will focus primarily on NFPA 70.

Chair Rice welcomed the guests at the meeting and shared that they will be able to join the discussion after the committee discussion concludes. He encourages guests to join the Energy Conservation Committee meetings because they serve as an additional educational tool. The enforcement of the energy code is lacking, and Chair Rice believes that it can be attributed to a lack of understanding the code.

Mr. Timothy de Carion, Broward County Board of Rules and Appeals, reminded Chair Rice that the May 16 Energy Conservation Committee meeting minutes need to be approved.

**A MOTION WAS MADE BY MR. VOLIN AND SECONDED BY MR. LOMEL TO APPROVE THE MAY 16, 2022, ENERGY CONSERVATION COMMITTEE MEETING MINUTES. THE MOTION PASSED BY UNANIMOUS VOTE.**

## **Item 1: BORA Commercial Energy Guidelines**

Mr. de Carion shared that the meeting would be primarily about the *BORA Energy Guidelines – Mechanical Checklist*. He went on to share his screen, so that the committee could see the current draft of the guidelines.

Chair Rice reminded the committee that the code cannot be changed. The checklist that Mr. de Carion is offered as suggestion or an example of what could be used.

Mr. de Carion made a note that the checklists for most of the disciplines will include a common element in the “Final Inspection” section. The item states: “Changes to insulation values or window efficiencies made during the construction process that do not match the plans and energy compliance report shall be resubmitted and approved as amended.”

Mr. R. Art Kamm, P.E., Kamm Consulting, asked Mr. de Carion what his interpretation of “available equipment options” was in reference to the *Florida Building Code, Section C403.2.2 Equipment Sizing*. Mr. de Carion said that believes that it is referring to the smallest product available from the manufacturer. Mr. Kamm suggested that if the decision was made to install spilt systems in the building, many companies don’t make anything smaller than one-and-a-half-ton split.

Mr. Eric Jenison, Total Dynamic Balance, arrived at 2:02 PM.

Mr. de Carion added that the wording would apply to the exceptions to the rule. Output capacity and the heating and cooling equipment should not be greater than the loads calculated. Mr. Kamm suggested that the heating and cooling equipment should be greater. Mr. Bob Volin, Air Design Concepts, agreed with Mr. Kamm. Mr. de Carion shared that the rule changes between residential and commercial.

Mr. Volin explained the variations in speed that a unit can be installed in. Mr. Kamm expressed that it is difficult to convince customers to spend more money on additional equipment.

Mr. Bernardo Cardenal, Rocamar Engineering, shared that to control the size of the equipment, Rawal valve can be used.

Mr. de Carion asked Mr. Kamm if it would be acceptable to add a note to Item 9 of the *BORA Energy Guidelines – Mechanical Checklist, Plan Review (General)*. The note would explain that the item does not apply to single manufacturers, only multiple manufactures. Mr. Kamm answered that after the discussion on the item, he no longer believes that a change should be made since the item is based on the code.

Chair Rice suggested that since Mr. de Carion is attending the Florida Building Commission’s TAC committee meetings, he will be able ask some of the Energy Conservation Committee’s questions.

Mr. Jenison suggested that Item 17 of the *BORA Energy Guidelines – Mechanical Checklist, Plan Review (General)* be updated to include the information about smoke control systems having the ability to override the reductions in a parking garage. Mr. de Carion said that he would look into seeing if he can include the information or add a notation referencing to the notation. He went on to review the remaining items on the mechanical checklist.

**NO MOTION.**

Mr. de Carion shared that he would like to discuss the *BORA Energy Guidelines – Electrical Checklist* at the next Energy Conservation Committee meeting.

Chair Rice opened the discussion to the public.

Mr. Omar Ganchi, JBPE Engineering, mentioned that the way that Item 9 in the *BORA Energy Guidelines – Mechanical Checklist, Plan Review (General)* is currently written makes it difficult to understand.

Mr. Kamm agreed with Mr. Ganchi, but he also affirmed that he believes that the checklist reflects the way that it is written in the code.

Chair Rice confirmed that this item will be discussed during the upcoming TAC committee meetings. Mr. de Carion responded that there is a code proposal that addresses the wording.

Mr. de Carion added that he believes that the energy code does not want designers to add safety factors and oversized equipment. Designers experience more issues with oversized equipment than with undersized equipment. Mr. de Carion shared that when units are too large, particularly in commercial spaces, the spaces rarely meet the occupancy loads that the units are designed with. In many cases, the outside air dampers are closed as well. Many scenarios involving mold issues are a result of oversized units. Mr. de Carion also mentioned that another issue is safety factors are not allowed to be included in the calculations.

Mr. Volin recalled that, it was allowed in the older code, but it has since been removed.

Chair Rice reminded the committee that the Broward BORA Energy Conservation Committee cannot change the code. Recommendations can be made, but they must remain within the confines of the energy code.

Mr. Ganchi, also asked for clarification about Item 24 of the *BORA Energy Guidelines – Mechanical Checklist, Plan Review (General)*. The item states: “Air-Handling unities shall not be allowed in **attics** of commercial buildings. Attics shall be defined as below an uninsulated roof. A minimum rood value of R-10 shall be required.”

Mr. de Carion said that the way that the code is worded, air handling units should not be allowed in attics. He went on to explain that an attic is defined as being below an uninsulated roof. Mr. de Carion also mentioned that an insulation value must be determined.

Chair Rice recommended that Mr. Ganchi continue to send his questions to Mr. de Carion after the meeting.

Mr. Pete Quintela, Miami-Dade County, said that Item 24 of the *BORA Energy Guidelines – Mechanical Checklist, Plan Review (General)*, has been written the same way in the code for a very long time and he doesn’t see a need to change it. Mr. Quintela recommends using a fixed damper to control the volume of air, followed by a shut-off damper.

Chair Rice instructed Mr. de Carion to provide the code sections that were referenced for the next committee meeting.

**A MOTION WAS MADE BY MR. LOMEL AND SECONDED BY MR. VOLIN TO ADJOURN THE JUNE 20, 2022, ENERGY CONSERVATION COMMITTEE MEETING. THE MOTION PASSED BY UNANIMOUS VOTE.**

Chair Rice announced that he would like to schedule another Energy Conservation Committee Meeting in four weeks.

**Adjournment**

Having no further business to go before the Committee, the meeting adjourned at 3:34 PM.

# **Item 1: BORA Commercial Energy Guidelines**

# BORA Commercial Energy Guidelines

## Broward County Board of Rules and Appeals

### Energy Conservation Seventh Edition (2020)



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FBC Seventh Edition (2020),  
Effective xxxxxxxxxxxxxxxxxxxx  
For Energy Conservation  
Committee approval  
Draft #4-Aug 22, 2022



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## Overview

To obtain uniform energy code enforcement in commercial buildings in Broward County, the Energy Conservation Committee has developed guidelines to aid jurisdictions in determining which discipline specific code official enforces certain sections of the 2020 Florida Building Code Energy Conservation.

The following code sections regarding enforcement duties are as stated:

### **R103.3 & C103.3 Examination of documents.**

*The code official shall examine or cause to be examined the accompanying construction documents and shall ascertain whether the construction indicated and described is in accordance with the requirements of this code and other pertinent laws or ordinances.*

### **R103.3.1 & C103.3.1 Approval of construction documents.**

*When the code official issues a permit where construction documents are required, the construction documents shall be endorsed in writing and stamped "Reviewed for Code Compliance."*

### **R104.1 & C104.1 General**

*Construction or work for which a permit is required shall be subject to inspection by the code official or his or her designated agent, and such construction or work shall remain accessible and exposed for inspection purposes until approved.*

### **Basis for the Guidelines:**

The Florida Building Code Seventh Edition (2020) Energy Conservation for new and existing buildings has designated that the code official is responsible for both the construction document approval and construction inspection approval.

Unfortunately, the Florida Building Code Energy Conservation administrative chapters do not designate which discipline-specific code official will review compliance documents and building plans and inspect specific items for code compliance found in the Energy Conservation Code.

The "building official" or "code official" for energy code purposes shall be defined as: "The officer or other designated authority having jurisdiction charged with the administration and enforcement of this standard or a duly authorized representative."

Broward County is unique in that we have individual certified plan review and inspection personnel for each discipline and that a multi-discipline code official is not the norm. Subsequently, uniformity has been lacking in the enforcement of the energy code which created confusion by code officials over which specific disciplines will enforce certain provisions of the code.

This guide can be used as a tool for the Building Official to determine which discipline-specific code official will review and inspect specific sections of the Energy Code for code compliance to address those issues. This guide shall not prevent any certified code official from issuing a correction notice for any Energy Code deficiency found in another discipline if they notify the Chief inspector of that discipline of the correction notice.

*This is a minimum checklist. The local AHJ may have additional checklist items.*

## Building Code Administrators Checklist

<u>Plan Review</u>	<u>Code Section</u>
<input type="checkbox"/> 1. The <u>building official or his or her designated agent</u> shall verify that the building envelope, HVAC, Service Water Heating, Power, Lighting, and other equipment shown on the plans have been reviewed for energy code compliance and match the energy compliance report. The <u>building official or his or her designated agent</u> shall sign the code compliance report stating that the plans have been reviewed for all disciplines and the plans will be inspected according to the FBCEC. The building department may use " <b>Appendix A</b> " as a compliance tool.	C103.3 C103.3.1 CH-1 107.3 C101.5.1 *4.2.2 FS 553.908
<input type="checkbox"/> 2. The <u>building official shall ascertain</u> the commercial energy compliance pathway chosen by the designer and the energy credits taken upon application for permit. The " <b>BORA Energy Compliance Pathway Form</b> " found in " <b>Worksheet A</b> " shall be used for compliance to show all options taken.	C401.2 *4.2.1.1 C101.5.1 C103.2
<input type="checkbox"/> 3. The <u>building official shall provide</u> all plan reviewers access to " <b>ASHRAE Standard 90.1-2016</b> " if the designer chooses the ASHRAE 90.1 pathway for code compliance.	C401.2 #1

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<u>Certificate of Occupancy</u>	<u>Code Section</u>
<input type="checkbox"/> 1. Buildings which require commissioning according to section C408.2 shall not be considered <u>acceptable for final inspection</u> pursuant to Section C104.3 until the code official has received a letter of transmittal from the building owner acknowledging that the building owner or owner's authorized agent has received the preliminary commissioning report." The code official may require a review of the preliminary commissioning report before final inspection to identify deficiencies found during testing that violate the code. Form " <b>Appendix E</b> " " <b>Commissioning Compliance Checklist</b> " may be used as a cover page to insure a complete "Preliminary Commissioning Report"	C408.2.4 *4.2.5 *4.2.5.1 C408.2.4.1 C408.2.4.2 CH-1 110.3.7.2
<input type="checkbox"/> 2. <u>Construction documents shall specify</u> that documents required by Section C408 be provided to the building owner or owner's authorized agent within 90 days of the date of receipt of the certificate of occupancy.	C408.3.2 C408.2.5 *6.7 & *9.7

## BORA Structural Checklist

<u>Plan Review (Administrative, All Pathways)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. The designer of record shall specify the compliance pathways using <b>“Worksheet A”</b> . All compliance options shall be shown.	C103.2 *4.2.1
<input type="checkbox"/> 2. Existing buildings shall be classified as exempt, except those buildings defined as <b>“renovated buildings”</b> , in which the total work exceeds 30% of the value of structure. Buildings which have a change of occupancy type or unconditioned buildings to which comfort cooling is added are not exempt. Buildings specified in Sections C101.4.2.1 thru C101.4.2.4 are exempt.	C101.4.2 *4.2.1.3 *4.4.1.5
<input type="checkbox"/> 3. An existing building or portion thereof shall not be altered to become less energy efficient.	EBC701.2
<input type="checkbox"/> 4. The complete energy compliance report (Energy Calcs) shall be provided. Forms generated from specific computer software approved by the Florida Building Commission shall show <b>“Pass”</b>	C101.5.1 *4.2.2
<input type="checkbox"/> 5. The <b>“code official”</b> shall have the authority to approve a permit for part of the entire energy conservation system ( <b>such as a shell permit</b> ). Adequate information and detailed statements listing all code requirements must be submitted with this permit. The permit holder shall proceed at their own risk without assurance that the permit to complete will be granted. All spaces inside buildings shall be considered as <b>“conditioned space”</b> at time of construction regardless of equipment installed unless approved by building official.	C103.3.3 *4.2.2  *5.1.2.3
<input type="checkbox"/> 6. The <b>“design professional”</b> responsible for the design of the building <b>“thermal envelope”</b> shall certify compliance with the code by signing the energy code compliance form.	C103.1.1.1.2 *4.1.2
<input type="checkbox"/> 7. The plans shall show in detail all the pertinent energy data and features of the building including but not limited to:	C103.2 *4.2.2.1
<input type="checkbox"/> a) Insulation materials and their R-values. <b>(S-1)</b>	*5.4.1
<input type="checkbox"/> b) Fenestration U-factor, solar heat gain coefficient, (SHGC) and visible transmittance (VT) shall be shown. <b>“Appendix B”</b> may be used for compliance. <b>(S-2)</b>	*5.4.2
<input type="checkbox"/> c) Air leakage sealing details.	*5.4.3
<hr/>	
<u>Plan Review (Mandatory, All Pathways)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. The entire building <b>“thermal envelope”</b> shall be designed and constructed with a continuous air barrier and shall be <u>clearly identified</u> on the construction documents.	C402.5.1 *5.4.3
<input type="checkbox"/> 2. The U-factor, SHGC, VT, and air leakage rate for all manufactured fenestration products shall be determined by an accredited, independent laboratory and certified and labeled by the manufacturer or given default values in the tables. <b>(S-2) “See Appendix C”</b>	C303.1.3 *5.4.2
<input type="checkbox"/> 3. Roof insulation (as part of the envelope) shall not be located on a suspended ceiling with removable ceiling panels. (Insulation installed for sound and not part of envelope is allowed.)	C402.2.3 *5.8.1.8
<input type="checkbox"/> 4. Where unsealed or vented cavities occur over conditioned spaces, the ceiling shall be considered the pressure envelope of the building. Ceilings with drywall may be an air barrier but dropped acoustical tile ceilings (T-bar) may not. (See air barrier definition)	C402.5.9 C202 *5.4.3
<input type="checkbox"/> 5. Blown or loose fill insulation shall not be used in attic roof ( <b>ceiling slope</b> ) spaces in slopes greater than three in twelve. Baffling of eave vents are required to deflect incoming air.	*5.8.1.3 *5.8.1.4
<input type="checkbox"/> 6. Weatherseals shall be installed on all loading dock/cargo doors for separating conditioned space from unconditioned space. <b>“See Table C402.5.2”</b>	C402.5.4 C402.5.6 *5.4.3

## BORA Structural Checklist

### Plan Review (Prescriptive Method Pathway Option)

	<u>Code Section</u>
<input type="checkbox"/> 1. <b>“Cool Roofs”</b> Low-sloped roofs directly above cooled conditioned spaces in Climate Zones 1a shall have a minimum three-year solar reflectance of .55 and thermal emittance of 0.75 or a three-year solar-reflectance index ( <b>SRI</b> ) of 64.	C402.3 *5.5.3.1.1
<input type="checkbox"/> 2. The maximum <b>U-factor</b> and solar heat gain coefficient ( <b>SHGC</b> ) for fenestration shall be as specified in Table C402.4. The Projection Factors ( <b>Overhangs</b> ) shall be calculated.	C402.4 *Table 5.5-1
<input type="checkbox"/> 3. The vertical fenestration area shall not be greater than 30% of the gross above grade wall area. Vertical fenestration may be increased to 40% per requirements of C402.4.1.1	C402.4.1 *5.5.4.2
<input type="checkbox"/> 4. <b>Maximum</b> skylight areas shall be 3% of the gross roof area and can increase to 6% when daylight responsive controls are provided in daylight zones that are under skylights that comply with C405.2.3.1	C402.4.1 C402.4.1.2. *5.5.4.2.2
<input type="checkbox"/> 5. <b>Minimum</b> skylight areas shall apply to specified conditioned and unconditioned spaces greater than 2500 sq. ft. when ceiling heights are greater than 15ft. (See exceptions)	C402.4.2 *5.5.4.2.
<input type="checkbox"/> 6. Skylight curbs shall be insulated to the level of roofs with insulation above deck or R-5 except when tested per NFRC 100	C402.2.2 *5.5.3.1
<input type="checkbox"/> 7. The minimum <b>“R-Value”</b> of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table C402.1.3	C402.2.2 *5.5.3.1
<input type="checkbox"/> 8. Opaque doors shall meet the thermal requirements specified in the tables.	*5.5.3.6 or C402.4.5

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### Plan Review (Performance Method Pathway Option)

	<u>Code Section</u>
<input type="checkbox"/> 1. The <b>“input data report”</b> from the approved software shall be generated simultaneously with the compliance report to verify each entry into the software.	C407.4.2.2 *4.2.2
<input type="checkbox"/> 2. The roof or ceiling that functions as the thermal envelope shall be insulated to at least R-10. Multifamily Residential roof/ceilings shall be insulated to a minimum R-19, space permitting.	C407.2.1
<input type="checkbox"/> 3. Building types and thermal blocks shall be accurately identified on the compliance report and shall not be combined unless they share the same features. The code official shall be permitted to require thermal zone diagrams consisting of floor plans showing each zone.	C407.5.2 C407.4.2.1

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### Rough Inspection (Mandatory, All Pathways)

	<u>Code Section</u>
<input type="checkbox"/> 1. Insulation shall be installed to manufacturers recommendations in a manner as to achieve the rated R-value. Insulation shall be labeled with R-value or a certificate providing R-value.	C303.2 *5.8.1.2
<input type="checkbox"/> 2. A label shall be affixed to the window showing the tested U-Value, SHGC, and VT. Products lacking such a label shall be given the default values in Tables C303.1.3. Installed vertical fenestration values shall be consistent with the specifications submitted with the plans. ( <b>S-1</b> )	C104.2.2 C303.1.3 *5.9.1.4
<input type="checkbox"/> 3. The entire building thermal envelope shall be constructed with a continuous air barrier. Penetrations in the thermal envelope shall be sealed in an approved manner.	C402.5.1 *5.9.1

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### Final Inspection (Mandatory All Pathways)

	<u>Code Section</u>
<input type="checkbox"/> 1. The building envelope components and assemblies shall be inspected for air leakage. When testing is specified, an independent third party shall test air leakage to $\geq 0.40$ cfm/ft <sup>2</sup> .	C402.5 *5.4.3.1.3
<input type="checkbox"/> 2. Changes to insulation values or window efficiencies made during the construction process that do not match the plans and energy compliance report shall be resubmitted and approved as amended.	C103.4

## BORA Mechanical Checklist

<u>Plan Review (Administrative All Pathways)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. The designer of record shall specify the compliance pathways using <b>“Worksheet A”</b> . All compliance options shall be shown.	C103.2 *4.2.1
<input type="checkbox"/> 2. Existing buildings shall be classified as exempt, except those buildings defined as <b>“renovated buildings”</b> , in which the total work exceeds 30% of the value of structure. Buildings which have a change of occupancy type or unconditioned buildings to which comfort cooling is added are not exempt. Buildings specified in Sections C101.4.2.1 thru C101.4.2.4 are exempt.	C101.4.2 *4.2.1.3 *4.1.1.5
<input type="checkbox"/> 3. An existing building or portion thereof shall not be altered to become less energy efficient.	EBC701.2
<input type="checkbox"/> 4. The complete energy compliance report (Energy Calcs) shall be provided. Forms generated from specific computer software approved by the Florida Building Commission shall show <b>“Pass”</b> .	C101.5.1 *4.2.2
<input type="checkbox"/> 5. The <b>“code official”</b> shall have the authority to approve a permit for part of the entire energy conservation system ( <b>such as a shell permit</b> ). Adequate information and detailed statements listing all code requirements must be submitted with this permit. The permit holder shall proceed at their own risk without assurance that the permit to complete will be granted. All spaces inside buildings shall be considered as <b>“conditioned space”</b> at time of construction regardless of equipment installed unless approved by building official.	C103.3.3 *4.2.2 *5.1.2.3
<input type="checkbox"/> 6. The <b>“design professional”</b> responsible under Florida law for the design of mechanical systems shall certify compliance with the code by signing the energy code compliance form.	C103.1.1.1.2
<input type="checkbox"/> 7. The plans shall show in detail all the pertinent energy data and features of the mechanical systems and equipment. Details shall include but not limited to:	C103.2 *4.2.2.1 *4.2.2.2
<input type="checkbox"/> Mechanical system design criteria	
<input type="checkbox"/> Mechanical system and equipment types, sizes, and efficiencies	
<input type="checkbox"/> Economizer description	
<input type="checkbox"/> Equipment and system controls	
<input type="checkbox"/> Fan motor horsepower (hp) and controls	
<input type="checkbox"/> Duct sealing, duct and pipe insulation and location	

<u>Plan Review (Mandatory, All Pathways)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. Design heating and cooling loads shall be in accordance with ANSI/ASHRAE/ACCA Std. 183 or ACCA Manual N or an approved equivalent and shall be attached to the compliance form. A signed and sealed summary sheet designed by a registered engineer may be submitted in lieu of the complete calculation but must show the required information.	C403.2.1 *6.4.2.1
<input type="checkbox"/> 2. The output capacity of the cooling and heating equipment shall not be greater than the loads calculated. Equipment selected shall be as small as possible within available equipment options. Stand-by/Backup equipment and duplicate sequenced load systems are exempt from this section. <b>“ASHRAE 90-1 has no requirements for equipment selection.”</b>	C403.2.2 *ASHRAE N/R
<input type="checkbox"/> 3. HVAC equipment shall meet the minimum efficiency requirements and shall be verified through certification by an approved program or equivalent. <b>(AHRI)</b>	C403.2.3 *6.4.1
<input type="checkbox"/> 4. Cooling towers shall meet the minimum performance requirements in Tables C403.2.3 (8)	*6.5.5.3
<input type="checkbox"/> 5. Refrigeration systems shall meet the minimum performance requirements.	C403.2.14
<input type="checkbox"/> 6. Specific HVAC <b>“system controls”</b> shall be provided for temperature, setpoint overlap, off hour controls, shutoff dampers, fan control, economizers, VAV systems.	C403.2.4 *6.4.3

## BORA Mechanical Checklist

### Plan Review (Mandatory), All Pathways cont.)

	<u>Code Section</u>
<input type="checkbox"/> 7. AMCA-500D tested, labeled, and approved motorized or gravity shutoff dampers shall be provided on outdoor air intakes and exhaust openings.	C403.2.4.3 *6.4.3.4.2
<input type="checkbox"/> 8. Group R-1 ( <b>Hotels</b> ) having over 50 Guest rooms shall have controls (such as a card key system) to control temperature and ventilation in unoccupied rooms.	C403.2.4.8 *6.4.3.3.5
<input type="checkbox"/> 9. " <b>Demand control ventilation</b> " (DCV) (such as "Carbon Dioxide" monitors) are required in spaces over 500 sq./ft. and an average occupancy of 25 or greater per 1000 sq./ft. of floor area. See system requirements and exceptions.	C403.2.6.1 *6.4.3.8
<input type="checkbox"/> 10. Enclosed automobile parking garages shall have detection controls (such as carbon monoxide detectors) to reduce ventilation to at least 50% capacity or intermittently operate fans 20% of the occupied time. <b>Detection controls and alarms shall override reductions.</b> Exhaust systems under 25,500 cfm and power ratios exceeding 1125 cfm/hp are exempt.	C403.2.6.2 *6.4.3.4.5
<input type="checkbox"/> 11. Where the total of all kitchen hoods exhaust is greater than 5,000 cfm, each hood shall be a factory built commercial exhaust hood listed in accordance with UL 710. One make-up air requirement option (like DCV) shall be selected. See exceptions.	C403.2.8 *6.5.7.2.2 *6.5.7.2.3
<input type="checkbox"/> 12. Total building envelope pressurization shall be either neutral or positive to prevent excess infiltration of latent load. Kitchen hood exhaust shall be sized to prevent excessive depressurization. <b>An "air balance schedule" totaling all airflow is needed to show compliance.</b>	C408.2.2.1 *6.5.7 *6.7.2.3.1
<input type="checkbox"/> 13. Duct insulation shall meet the minimum R-Value.	C403.2.9.1 *6.4.4.1.2;
<input type="checkbox"/> 14. Cavities of a building shall not be used as a return air " <b>plenum</b> " unless the roof deck is insulated to a minimum of R-19. Roof insulation values shall be verified by the designer.	C403.2.9.4 Table *6.8.2a
<input type="checkbox"/> 15. Space shall be provided adjacent to all mechanical components that form the air distribution system including air handling units. ( <i>a minimum of (4) four inches is sufficient</i> ).	C403.2.9.3.3 *N/R
<input type="checkbox"/> 16. Ductwork shall be sized and designed with engineering standards. Sizing shall be room by room based on loads, static pressure, length, and friction loss. " <b>Manual-D</b> " or Equiv.	C403.2.9.5
<input type="checkbox"/> 17. Air-Handling units shall not be allowed in attics as defined in commercial buildings. Air handlers must be located within the thermal envelope of the building and cannot be located immediately below an uninsulated roof. ( <b>M-1</b> )	C403.2.9.6 *N/R
<input type="checkbox"/> 18. Heating and Cooling piping shall be insulated with values listed in Table C403.2.10 except where listed in this code section.	C403.2.10 *6.4.4.1.3
<input type="checkbox"/> 19. Construction documents shall require that a written test and balance report be provided to the owner or his representative for conditioned buildings with a total area exceeding 5,000 sq./ft. Buildings with cooling systems of 65,000 btu's or less per system are exempt using Florida Building Code Energy Conservation. (See building definition) ( <b>M-2</b> )	C408.2.2 *6.7.2.3.1
<input type="checkbox"/> 20. Construction documents shall clearly indicate provisions for commissioning and completion when the total cooling equipment capacity exceeds 480,000 btu's ( <b>40 tons</b> ). The HVAC units for dwelling units or sleeping units are to be excluded from total btu's. ASHRAE 90.1 require buildings greater than 50,000 sq./ft. provide commissioning.	C408.2 *6.7.2.4

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### Plan Review (Prescriptive Pathway Option)

	<u>Code Section</u>
<input type="checkbox"/> 1. The " <b>input data report</b> " from the approved software shall be generated simultaneously with the compliance report to verify each entry into the software.	C407.4.2.2 *4.2.2
<input type="checkbox"/> 2. When the option of more efficient HVAC equipment is selected, the equipment shall exceed the efficiency requirements by (10%) ten percent.	C406.2

## BORA Mechanical Checklist

### Plan Review (Performance Method Pathway Option)

- |   | <u>Code Section</u>  |
|---|----------------------|
| <input type="checkbox"/> 1. The <b>“input data report”</b> from the approved software shall be generated simultaneously with the compliance report to verify each entry into the software and match the plan. | C407.4.2.2<br>*4.2.2 |

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### Rough Inspection (Mandatory, All Pathways)

- |  | <u>Code Section</u>                        |
|--|--|
| <input type="checkbox"/> 1. Duct insulation shall meet the minimum R-Value specified. (See exceptions). *6.4.4.1.2;  | C403.2.9.1.1                               |
| <input type="checkbox"/> 2. All ducts and building cavities that are part of the air distribution system shall be sealed.  | C403.2.9.3                                 |
| <input type="checkbox"/> 3. All air distribution system components shall be mechanically fastened to secure the sections in addition to a seal. A clinching strap used on flex duct systems is not a sealing method.   | C403.2.9.3.1<br>C403.2.9.3.6               |
| <input type="checkbox"/> 4. Duct insulation shall be protected from damage and shall be sealed. Additional insulation shall be provided when the minimum insulation is insufficient to prevent condensation. <b>(M-3)</b>  | C403.2.9.1                                 |
| <input type="checkbox"/> 5. Terminal fittings (such as boot cans) and intermediate fittings shall be sealed with an approved closure system to provide an air barrier. Closure systems shall use manufacturers instructions or industry installation standards where more restrictive.     | C403.2.9.3<br>C403.2.9.3.2<br>C403.2.9.3.4 |
| <input type="checkbox"/> 6. High-pressure duct systems designed to operate at pressures greater than 3-inch water gauge (4-inch water gauge pressure class) shall be tested for leakage per Table C403.2.9.2.  | C403.2.9.2<br>*6.4.4.2.2                   |
| <input type="checkbox"/> 7. Piping insulation shall be installed as specified according to manufactures instructions.  | C303.2                                     |
| <input type="checkbox"/> 8. Air distribution systems and hydronic systems shall have means to balance air and water systems to NEBB, AABC or equivalent standards. Buildings with cooling systems of of 65,000 btu’s or less per system are exempt. (See building definition) <b>(M-2)</b> | C408.2.2.1<br>C408.2.2.2<br>*6.7.2.3       |

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### Final Inspection (Mandatory All Pathways)

- |   | <u>Code Section</u>                |
|---|------------------------------------|
| <input type="checkbox"/> 1. The code official shall be permitted to require that a copy of the preliminary commissioning report be reviewed by a code official. The <b>“Itemization of Deficiencies”</b> found during testing shall be included in the report and corrective measures used or proposed.   | C408.2.4.<br>C408.2.4.2<br>*6.7.1  |
| <input type="checkbox"/> 2. Air distribution systems shall be tested, adjusted, and balanced by a licensed engineer or a company or individual holding a current certification from a recognized testing and balancing agency. Hydronic systems shall be balanced for pumps (>5 HP). Buildings with cooling systems of 15 tons or less per system may be tested by the mechanical contractor. | C408.2.2<br>C408.2.2.2<br>*6.7.2.3 |
| <input type="checkbox"/> 3. Air distribution systems shall be tested, adjusted, and balanced for buildings exceeding 5000 sq/ft. and be at least within 10% or less as specified by the designer of record. Buildings with cooling capacities of 65,000btu/h or less “per system” are exempt.   | C408.2.2.1<br>*6.7.2.3             |
| <input type="checkbox"/> 4. Access to air balancing dampers and hydronic balancing/flow valves shall be provided.   | M306.1                             |
| <input type="checkbox"/> 5. Equipment model numbers and efficiency ratings of HVAC equipment shall be verified thru certification under an approved certification program. <b>(AHRI)</b>  | C403.2.3<br>*6.4.1                 |
| <input type="checkbox"/> 6. Motorized or gravity shutoff dampers shall be installed on outdoor air intakes and exhaust openings. Dampers shall close when system or space is not in use. <b>(M-4)</b>   | *C403.2.4.3<br>*6.4.3.4.2          |
| <input type="checkbox"/> 7. Mechanical closets/equipment rooms shall be sealed. All penetrations shall be sealed with an approved closure system. Wall and ceiling passageways shall be framed and sealed.  | Table C403.2.9.2<br>*6.4.4.2       |
| <input type="checkbox"/> 8. Insulation exposed to weather shall be protected from damage by sunlight, moisture, maintenance and wind. Adhesive tape shall not be used on pipe insulation. *6.4.4.1  | C403.2.9.1.2<br>C403.2.10.1        |
| <input type="checkbox"/> 9. Refrigeration systems, commercial refrigerator/freezers, and walk-in coolers/freezers, shall meet the performance requirements in Tables C403.2.14.1(1) thru C403.2.12.2(3)   | C403.2.14                          |
| <input type="checkbox"/> 10. Changes to specified equipment made during the construction process that do not match the plans and energy compliance report shall be resubmitted and approved as amended.   | C103.4                             |



## BORA Electrical Checklist

<u>Plan Review (Administrative All Pathways)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. The designer of record shall specify the compliance pathways using <b>“Worksheet A”</b> . All compliance options shall be shown.	C103.2 *4.2.1
<input type="checkbox"/> 2. Existing buildings shall be classified as exempt, except those buildings defined as <b>“renovated buildings”</b> , in which the total work exceeds 30% of the value of structure. Buildings which have a change of occupancy type or unconditioned buildings to which comfort cooling is added are not exempt. Buildings specified in Sections C101.4.2.1 thru C101.4.2.4 are exempt.	C101.4.2 *4.2.1.3 *4.1.1.5
<input type="checkbox"/> 3. An existing building or portion thereof shall not be altered to become less energy efficient.	EBC701.2
<input type="checkbox"/> 4. The complete energy compliance report (Energy Calcs) shall be provided. Forms generated from specific computer software approved by the Florida Building Commission shall show <b>“Pass”</b> for the electrical power, lighting controls, interior lighting, and exterior lighting.	C101.5.1 *4.2.2
<input type="checkbox"/> 5. The <b>“code official”</b> shall have the authority to approve a permit for part of the entire energy conservation system ( <b>such as a shell permit</b> ). Adequate information and detailed statements listing all code requirements must be submitted with this permit. The permit holder shall proceed at their own risk without assurance that the permit to complete will be granted. All spaces inside buildings shall be considered as <b>“conditioned space”</b> at time of construction regardless of equipment installed unless approved by building official.	C103.3.3 *4.2.2 *5.1.2.3
<input type="checkbox"/> 6. The <b>“design professional”</b> responsible under Florida law for the design of the electrical, power lighting controls, interior lighting, and exterior lighting, shall certify compliance with the code by signing the energy code compliance form.	C103.1.1.1.2
<input type="checkbox"/> 8. The plans shall show in detail all the pertinent energy data and features of the electrical systems and equipment. Details shall include but not limited to:	C103.2 *4.2.2.1 *4.2.2.2
<input type="checkbox"/> Lighting fixture schedule with wattage and control narrative.	
<input type="checkbox"/> Locations of daylight zones on floor plans. <b>(E-5)</b>	

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<u>Plan Review (Mandatory, All Pathways)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. Recessed luminaires installed in the building thermal envelope shall be the following: <input type="checkbox"/> IC Rated <input type="checkbox"/> Labeled air leakage ≤2 cfm/1.57psf. <input type="checkbox"/> Sealed with gasket/caulk	C402.5.8 *5.8.1.6
<input type="checkbox"/> 2. The lighting for dwelling units in multifamily buildings shall comply with residential energy code Section R404.1. (See the percentage and efficacy requirement options).	C405.1 *9.4.4
<input type="checkbox"/> 3. The total connected exterior lighting power shall not exceed the calculated lighting power allowance. All exterior lighting listed on the <b>“input data report”</b> shall match the plans.	C405.4 *9.4.2
<input type="checkbox"/> 4. In buildings having individual dwelling units, provisions shall be made to determine the electrical energy consumed by each tenant by separately metering individual dwelling units.	C405.5.2 CH-1 110.3.7
<input type="checkbox"/> 5. Conductors for feeders and branch circuits combined shall be sized for a maximum of 5% voltage drop total.	C405.5.3 *8.4.1
<input type="checkbox"/> 6. Low voltage dry type distribution transformers shall meet the minimum efficiency requirements in Table C405.6. See the list of transformers that are exempt.	C405.6 *8.4.4
<input type="checkbox"/> 7. Construction documents shall require that the building owner shall receive a single line drawing of the building electrical system and floor plans indicating the area served by the distribution system within 30 days of approval of the building for occupancy.	C405.5.4.1 *8.7.1
<input type="checkbox"/> 8. Construction documents shall require that an operating and maintenance manual be provided to the building owner. These are not required to be given to building department.	C405.5.4.2 *8.7.2

## BORA Electrical Checklist

<u>Plan Review (Prescriptive Method Pathway)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. Interior lighting power must not be greater than the calculated allowance using either the building area method or the space-by-space method. All interior lighting listed on the <b>“input data report”</b> shall match the plans.	C405.3 C405.3.2 *9.2.2
<input type="checkbox"/> 2. When the option: <b>“reduced lighting power density”</b> is selected, the lighting power shall be reduced by at least 10% of the calculated allowance in C405.3.2.	C406.1 #2 C406.3
<input type="checkbox"/> 3. When the option: <b>“enhanced digital lighting controls”</b> is selected, the interior lighting in the building shall be located, scheduled, and operated in accordance with Section C405.2.2.	C406.1 #3 C406.4

<u>Plan Review (Performance Method Pathway)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. The <b>“input data report”</b> from the approved software shall be generated simultaneously with the compliance report to verify each entry into the software and match the plans.	C407.4.2.2 *4.2.2

<u>Mandatory Lighting Controls (Florida Energy Code, Prescriptive and Performance )</u>	<u>Code Section</u>
<input type="checkbox"/> 1. Designer of record shall indicate the lighting control option selected in C405.2. <b>“Energy Compliance Pathway Form” (“Worksheet A”)</b> may be used. See areas exempt from controls. <input type="checkbox"/> Specified Lighting controls <b>OR</b> <input type="checkbox"/> Luminaire Level Lighting Controls ( <b>LLLC</b> )	C405.2
<input type="checkbox"/> 2. The following rooms <b>shall have</b> occupancy sensors installed: <input type="checkbox"/> Lecture/Classrooms, <input type="checkbox"/> Conference/Meeting, <input type="checkbox"/> Copy/Print, <input type="checkbox"/> Lounges/Break, <input type="checkbox"/> Enclosed offices, <input type="checkbox"/> Open plan offices, <input type="checkbox"/> Restrooms, <input type="checkbox"/> Storage, <input type="checkbox"/> Locker, <input type="checkbox"/> Other totally enclosed spaces less than 300 sq/ft, <input type="checkbox"/> Warehouse storage	C405.2.1
<input type="checkbox"/> 3. Required occupancy sensors shall comply with the following functions: <b>(E-1)</b> <input type="checkbox"/> Automatically turn the lights off within 20 minutes after leaving space. <span style="float: right;">C405.2.1.1</span> <input type="checkbox"/> Shall be “manual on” <b>OR</b> <input type="checkbox"/> Automatically turn on lighting to not more than 50% <span style="float: right;">C405.2.1.1-1</span> <b>Note:</b> Full automatic on shall be permitted for the following spaces: Public corridors, Stairways, restrooms, primary entrance areas, lobbies, and safety/dangerous areas. <span style="float: right;">C405.2.1.1-2</span> <input type="checkbox"/> Shall have a “manual off” control located with ready access to occupants. <span style="float: right;">C405.2.1.1-3</span>	
<input type="checkbox"/> 4. Warehouses shall be provided with <b>“occupant sensors”</b> in each aisleways and separately in open areas and the sensor control shall reduce the lighting power by at least 50 % when unoccupied. <span style="float: right;">C405.2.1.1</span> <span style="float: right;">C405.2.1.2</span>	
<input type="checkbox"/> 5. Open plan office areas greater than 300 sq/ft. shall comply with the following: <b>(E-2)</b> <span style="float: right;">C405.2.1.3</span> <input type="checkbox"/> Separate <b>“control zones”</b> not greater than 600 sq/ft. <input type="checkbox"/> Controls shall automatically turn off <b>“general lighting”</b> in all control zones within 20 minutes after all occupants have left space. <input type="checkbox"/> Each control zone shall reduce <b>“general lighting”</b> power by ≥80% within 20 minutes after all occupants have left space <b>OR</b> <input type="checkbox"/> Completely <b>shut-off</b> control zone lights. <input type="checkbox"/> Be configured such that <b>any</b> daylight responsive controls will activate open plan office space <b>“general lighting”</b> . <b>OR</b> <input type="checkbox"/> <b>“Control zone”</b> general lighting when detected.	
<input type="checkbox"/> 6. Each area <b>not provided</b> with occupancy sensor controls mentioned in C405.2.1 shall be provided with <b>“time switch controls”</b> and <b>“manual controls”</b> to provide light reduction. <span style="float: right;">C405.2.2</span> <b>Except:</b> Time switch controls are not required for the following areas: <b>(E-3)</b> Patient care areas, Safety and Security areas, Areas needed for continuous lighting, and Shop and Laboratory classroom areas.	
<input type="checkbox"/> 7. Time switch controls shall have the following: <input type="checkbox"/> 7-day clock <input type="checkbox"/> 7-day types <span style="float: right;">C405.2.2.1</span> <input type="checkbox"/> Holiday mode <input type="checkbox"/> 10hr.backup power. <input type="checkbox"/> Override switch <b>(See exceptions)</b>	

## BORA Electrical Checklist

<b><u>Mandatory Lighting Controls (Florida Energy Code, Prescriptive and Performance )</u></b>	<b><u>Code Section</u></b>
<input type="checkbox"/> 8. Light reduction controls are required in spaces without occupancy sensors and controlled by <b>“time switch controls”</b> . Spaces required to have <b>“light reduction controls”</b> such as two level/bi-level switching shall have a manual switch to reduce the lighting to at least fifty percent (50%) by an approved method in this section except light reduction controls are <b><u>not required</u></b> in daylight zones with <b>“Daylight Responsive Controls”</b>	C405.2.2.1 C405.2.2.2
<input type="checkbox"/> 9. Where spaces have a manual lighting control, <b>“light reduction controls”</b> are <b><u>not required</u></b> for the following conditions: <b>(E-4)</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Spaces with one luminaire &lt;100 watts</li> <li><input type="checkbox"/> Spaces that use &lt;0.6 watts per sq/ft.</li> <li><input type="checkbox"/> Corridors, lobbies, electrical rooms and/or mechanical rooms.</li> </ul> <b>Note:</b> Daylight zones with daylight responsive controls (DRS) are also exempt.	C405.2.2.1  C405.2.2.2
<input type="checkbox"/> 10. <b>“Daylight responsive controls”</b> shall be provided for the electric lighting <u>within</u> the daylight zones shown on the plan when the total lighting in that zone exceeds 150 watts: <b>(E-5)</b>	C405.2.3
<input type="checkbox"/> 11. <b>“Daylight responsive controls”</b> shall <b>not</b> be required for the electric lighting in: <ul style="list-style-type: none"> <li><input type="checkbox"/> Patient care areas,</li> <li><input type="checkbox"/> Specific application lighting (display, accent, task)</li> <li><input type="checkbox"/> Sidelit zones on first floor of Group A-2 and M occupancies.</li> <li><input type="checkbox"/> When the total lighting power is not greater than the calculated lighting power allowance (LPA) using Equation 4-8.</li> </ul>	C405.2.3
<input type="checkbox"/> 12. Specific application lighting shall have an occupancy sensor <b>or</b> time switch controls for: <ul style="list-style-type: none"> <li><input type="checkbox"/> Display/Accent,</li> <li><input type="checkbox"/> Display cases,</li> <li><input type="checkbox"/> Task,</li> <li><input type="checkbox"/> Lighting for sale</li> </ul>	C405.2.4
<input type="checkbox"/> 13. Sleeping units in hotels shall have a control device <b>(such as card key system)</b> to turn off lights and switched receptacles within 20 minutes after all occupants have left.	C405.2.4
<input type="checkbox"/> 14. Exterior lighting shall have daylight shutoff controls. Exterior building decorative façade and landscape lighting shall shutoff one hour after closing and turn on no earlier than one hour before business opening. Time switch controls shall have specific required features.	C405.2.6
<hr/>	
<b><u>Mandatory Lighting Controls (ASHRAE 90.1 Option Only)</u></b> Controls are to be implemented as dictated by Table 9.6.1 and shown on the plans. <b>(E-6)</b>	*9.4.1
<hr/>	
<b><u>Rough Inspection (Mandatory, All Pathways)</u></b>	<b><u>Code Section</u></b>
<input type="checkbox"/> 1. Installed lighting systems, components, controls, and meters shall be verified to be in compliance with the energy code and shall match the approved plans.	C104.2.5 *4.2.4
<input type="checkbox"/> 2. Recessed lighting fixtures shall not be installed to affect the insulation. <b>(See Exceptions)</b> Air barriers shall be maintained and sealed for installed lighting, electrical or communication boxes, electrical conduits, and cables when they penetrate the thermal envelope.	*5.8.1.6 C402.5.1 *5.4.3
<hr/>	
<b><u>Final Inspection (Mandatory, All Pathways)</u></b>	<b><u>Code Section</u></b>
<input type="checkbox"/> 1. Air barriers shall be maintained in the thermal envelope when raceways or cables penetrate the thermal envelope of the building.	C402.5.1 *5.4.3
<input type="checkbox"/> 2. Before final inspection, the registered design professional shall provide evidence that <b>“automatic lighting control systems”</b> have been tested, working, and in accordance with the plans and manufacturer’s instructions. <b>(E-7)</b>	C408.3 *9.4.3
<input type="checkbox"/> 3. Occupant sensor controls, time switch controls, and daylight sensor controls, shall be tested in accordance with the required procedures listed in C408.3.1.1 thru C408.3.1.3. The report shall include the results and contain a list of the disposition of deficiencies found. <b>(E-7)</b>	C408.3.1 *9.4.3 CH-1 110.3.7.2
<input type="checkbox"/> 4.. Changes to specified equipment made during the construction process that do not match the plans and energy compliance report shall be resubmitted and approved as amended.	C103.4

## BORA Plumbing Checklist

<u>Plan Review (Administrative All Pathways)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. Existing buildings shall be classified as exempt, except those buildings defined as <b>“renovated buildings”</b> , in which the total work exceeds 30% of the value of structure. Buildings which have a change of occupancy type or unconditioned buildings to which comfort cooling is added are not exempt. Buildings specified in Sections C101.4.2.1 thru C101.4.2.4 are exempt.	C101.4.2 *4.2.1.3 *4.1.1.5
<input type="checkbox"/> 2. An existing building or portion thereof shall not be altered to become less energy efficient.	EBC701.2
<input type="checkbox"/> 3. The complete energy compliance report (Energy Calcs) shall be provided. Forms generated from specific computer software approved by the Florida Building Commission shall show <b>“Pass”</b> for the <b>“Service Water Heating Systems”</b>	C101.5.1 *4.2.2
<input type="checkbox"/> 4. The <b>“input data report”</b> from the approved software shall be generated simultaneously with the compliance report to verify each service water heating entry into the software.	C407.4.2.2 *4.2.2
<input type="checkbox"/> 5. The <b>“code official”</b> shall have the authority to approve a permit for part of the entire energy conservation system ( <b>such as a shell permit</b> ). Adequate information and detailed statements listing all code requirements must be submitted with this permit. The permit holder shall proceed at their own risk without assurance that the permit to complete will be granted.	C103.3.3 *4.2.2
<input type="checkbox"/> 6. The <b>“design professional”</b> responsible under Florida law for the design of the service water heating shall certify compliance with the code by signing the energy code compliance form.	C103.1.1.1.2
<input type="checkbox"/> 7. The plans shall show in detail all the pertinent energy data and features of the service water heating systems and equipment. Details shall include but not limited to:	C103.2 *7.7
<input type="checkbox"/> Equipment and system controls	
<input type="checkbox"/> Service water heating system and equipment types, sizes, and efficiencies	C404.2

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<u>Plan Review (Mandatory, All Pathways)</u>	<u>Code Section</u>
<input type="checkbox"/> 1. All supply and return recirculating hot water piping shall be insulated with the required thickness found in Table C403.2.10. The first 8 feet of branch piping shall be insulated.	C404.4 *7.4.3
<input type="checkbox"/> 2. Heated water supply piping shall be limited in length or water volume according to Table C404.5.1. When maximum lengths differ from plumbing code, the more stringent applies.	C404.5 CH#1-102.1
<input type="checkbox"/> 3. <b>“Circulating Hot Water Systems”</b> shall have <b>“accessible”</b> controls, sensors, and pump. Manual controls shall be <b>“readily accessible”</b> without requiring removal of any obstruction.	C404.6
<input type="checkbox"/> 4. Controls for <b>“Circulating Hot Water Systems”</b>	
<input type="checkbox"/> 5.	
<input type="checkbox"/> 6.,	

# WORKSHEET A

## BORA ENERGY COMPLIANCE PATHWAY FORM

FECC-C101.5.1

PROJECT ADDRESS \_\_\_\_\_

PERMIT NUMBER \_\_\_\_\_

**TYPE OF CONST.**  NEW CONST.  \*ADDITION  \*RENOVATED BLDG.  \*CHANGE OF OCCUPANCY

*\*Additions, alterations, repairs, and changes in occupancy to existing buildings shall comply with Chapter 5*

### Florida Energy Conservation Code Compliance Options

Select One pathway below:

- |   | <u>Code Section</u>    |
|---|------------------------|
| <input type="checkbox"/> <b>Option 1) <u>ANSI/ASHRAE/IESNA 90.1</u></b> excluding Section *9.4.1(g), *8.4.2, & *8.4.3 (2016 Version)  | C401.2                 |
| <input type="checkbox"/> <b>Option 2) <u>Prescriptive Method</u></b> complying with Sections C402 thru C406 & C408.<br>Tenant spaces shall also comply with C406.1.1  | C401.2 #1<br>C401.2 #2 |
| <input type="checkbox"/> <b>Option 3) <u>Performance Method</u></b> complying with Section C407 and the mandatory provisions listed in C407.2 including C402.5, C403.2, C404, C405.2, C405.4, C405.5, and C408. | C401.2 #3              |

### Option #1 ANSI/ASHRAE/IESNA 90.1 (2016 Version)

Select One pathway below:

- |  | <u>Code Section</u>    |
|--|------------------------|
| <input type="checkbox"/> <b>1) *<u>Prescriptive Method</u></b> complying with Section 5 thru Section 9   | *4.2.1                 |
| <input type="checkbox"/> <b>2) <u>Energy Cost Budget Method</u></b> complying with Section 11  | *4.2.1.1a<br>*4.2.1.1b |
| <input type="checkbox"/> <b>3) <u>Performance Rating Method</u></b> complying with Appendix G  | *4.2.1.1c              |
| <b>*Envelope Path</b> <input type="checkbox"/> <b>1) <u>Prescriptive Building Envelope Option</u></b> <input type="checkbox"/> <b>2) <u>Building Envelope Trade-Off Option</u></b> | *5.2.1 a or b          |

### Option #2 Prescriptive Method

Select One from each section below:

- |  | <u>Code Section</u> |
|--|---------------------|
| <b><u>Envelope</u></b> Select One  | C402.1 #1           |
| <input type="checkbox"/> <b>1. <u>Insulation Component R-Value method.</u></b> (Table C402.1.3)  | C402.1.3            |
| <input type="checkbox"/> <b>2. <u>Assembly U-Factor, C-Factor, or F factor-based method</u></b> (Table C402.1.4)   | C402.1.4            |
| <input type="checkbox"/> <b>3. <u>Component performance alternative</u></b> in lieu of Table C402.1.4 above.   | C402.1.5            |
| <b><u>Mandatory Lighting Controls</u></b> Select One   | C405.2              |
| <input type="checkbox"/> <b>1. <u>Lighting Controls</u></b> per C405.2.1 through C405.2.6  | C405.2 #1           |
| <input type="checkbox"/> <b>2. <u>Luminaire Level Lighting Controls</u></b> and compliance with C405.2.1; C405.2.4 and C405.2.5  | C405.2 #2           |
| <b><u>Interior Power Lighting Allowance</u></b> Select One   | C405.3.2            |
| <input type="checkbox"/> <b>1. <u>Building Area Method</u></b> per C405.3.2.1 <input type="checkbox"/> <b>2. <u>Space by Space Method</u></b> per C405.3.2.2   | C405.4.2            |
| <b><u>Exterior Lighting Zone Area Type</u></b> Select One  | C405.4.2            |
| <input type="checkbox"/> <b>#1 Park &amp; Rural</b> <input type="checkbox"/> <b>#2 Residential</b> <input type="checkbox"/> <b>#3 Other than 1, 2, 4</b> <input type="checkbox"/> <b>#4 High Activity Commercial</b> | C406.1              |
| <b><u>Efficiency Package</u></b> Select One  | C406.1              |
| <input type="checkbox"/> More efficient HVAC performance   | C406.2              |
| <input type="checkbox"/> Reduced lighting power density  | C406.3              |
| <input type="checkbox"/> Enhanced digital lighting controls  | C406.4              |
| <input type="checkbox"/> Onsite renewable energy   | C406.5              |
| <input type="checkbox"/> Dedicated outdoor air system  | C406.6              |
| <input type="checkbox"/> Reduced energy use in service water heating   | C406.7              |

### Option #3 Performance Method $\phi$

**Mandatory Lighting Controls** Select One

- |   | <u>Code Section</u>    |
|---|------------------------|
| <input type="checkbox"/> <b>1. <u>Lighting Controls</u></b> per C405.2.1 through C405.2.6                                       | C405.2                 |
| <input type="checkbox"/> <b>2. <u>Luminaire Level Lighting Controls</u></b> and compliance with C405.2.1; C405.2.4 and C405.2.5 | C405.2 #1<br>C405.2 #2 |
| <b><u>Optional Credits</u></b>  | C407.5.2.4             |
| <input type="checkbox"/> Vegetative Roofs   | C407.5.2.4.1           |
| <input type="checkbox"/> Enthalpy Recovery Ventilation  | C407.5.2.4.2           |

$\phi$  *The building energy cost shall be equal to or less than 85% of the standard reference design of the building.*

DESIGN PROFESSIONAL NAME \_\_\_\_\_

SIGNATURE \_\_\_\_\_



## APPENDIX A

### COMMERCIAL ENERGY CODE COMPLIANCE REVIEW FORM

PERMIT # \_\_\_\_\_ ADDRESS \_\_\_\_\_

*A review of the plans and specifications covered by this compliance report indicates compliance with the \_\_\_\_\_ Florida Energy Conservation Code.*

<u>DISCIPLINE</u>	<u>NAME</u>	<u>SIGNATURE</u>	<u>DATE</u>
STRUCTURAL			
MECHANICAL			
PLUMBING			
ELECTRICAL			

## APPENDIX B

### Commercial Fenestration Product Rating Submittal Form

*In accordance with the Florida Energy Conservation Code C303.1.3, this form can be used as a tool for the submittal process to document the proposed energy product rating for windows, doors, and skylights.*

**Recommended for Review:**

- Copy of the approved input report from the Energy Calculations showing each fenestration design rating (U-value, SHGC and VT) for all fenestration in the entire building.
- A list of the NFRC “Certified Product Directory” number of each window showing the U-Value, SHGC and VT on the attached form. These numbers may be found on the NFRC website:  
<https://search.nfrc.org/search/searchDefault.aspx>

**Notes:**

- *Products not listed in the NFRC directory shall be tested by an accredited, independent laboratory in accordance with FBCEC C303.1.3. Products not tested and lacking certification and labeling shall be assigned a default rating from the energy tables.*
- *Products submitted that do not match the approved Energy Calculations shall require a revised energy compliance report or window submittal per FBCEC C103.4*

<u>Window #</u>	<u>*NFRC Directory Number</u>	<u>Description</u>	<u>U-Value</u>	<u>SHGC</u>	<u>VT</u>
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

<u>Window #</u>	<u>*NFRC Directory Number</u>	<u>Description</u>	<u>U-Value</u>	<u>SHGC</u>	<u>VT</u>
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
31					
33					
34					
35					
36					
37					
38					

\*Products not certified by NFRC must submit **“Thermal Simulation Report”** or use **“Default Table”** below.



## APPENDIX C

**TABLE C303.1.3(1)**  
**DEFAULT GLAZED FENESTRATION U-FACTORS**

<u>FRAME TYPE</u>	<u>SINGLE PANE</u>	<u>DOUBLE PANE</u>	<u>SKYLIGHT</u>	
			<u>SINGLE</u>	<u>DOUBLE</u>
<u>Metal</u>	<u>1.20</u>	<u>0.80</u>	<u>2.00</u>	<u>1.30</u>
<u>Metal with Thermal Break</u>	<u>1.10</u>	<u>0.65</u>	<u>1.90</u>	<u>1.10</u>
<u>Nonmetal or Metal Clad</u>	<u>0.95</u>	<u>0.55</u>	<u>1.75</u>	<u>1.05</u>
<u>Glazed Block</u>	<u>0.60</u>			

**TABLE C303.1.3.(2)**  
**DEFAULT OPAQUE DOOR U-FACTORS**

<u>DOOR TYPE</u>	<u>U-FACTOR</u>
<u>Uninsulated Metal</u>	<u>1.20</u>
<u>Insulated Metal (Rolling)</u>	<u>0.90</u>
<u>Insulated Metal (Other)</u>	<u>0.60</u>
<u>Wood (Other)</u>	<u>0.50</u>
<u>Insulated, nonmetal edge, max 45% glazing. Any glazing double pane</u>	<u>0.35</u>

**TABLE C303.1.3 (3)**  
**DEFAULT WINDOW, GLASS DOOR, AND  
SKYLIGHT SHGC AND VT**


	<u>SINGLE GLAZED</u>		<u>DOUBLE GLAZED</u>		<u>GLAZED BLOCK</u>
	<u>CLEAR</u>	<u>TINTED</u>	<u>CLEAR</u>	<u>TINTED</u>	
<u>SHGC</u>	<u>0.8</u>	<u>0.7</u>	<u>0.7</u>	<u>0.6</u>	<u>0.6</u>
<u>VT</u>	<u>0.6</u>	<u>0.3</u>	<u>0.6</u>	<u>0.3</u>	<u>0.6</u>

# Appendix D

## STRUCTURAL NOTES

**S-1** The plans shall be specific as to what that type and R-value of insulation is to be installed. It is unacceptable to have comments on the plan details that indicate: “see energy calculations”. Baffles are required for blown-in insulation to keep the vents from becoming blocked upon installation and drift.

**S-2** Windows are required to be tested for energy efficiency. U-factors shall be determined in accordance with NFRC 100. The VT (Visual Transmittance) and the SHGC (Solar Heat Gain Coefficient) and they shall be determined in accordance with NFRC 200. Testing is required to be done by an accredited independent laboratory and then labeled and certified by the manufacturer. The code does require certification by an independent agency. The code also does not require certification by NFRC. Some manufactures have chosen to “Self-Certify” their product after testing by an accredited independent laboratory. These products are not certified by NFRC and will not be listed in the NFRC’s “Certified Products Directory.” Products not certified by NFRC will need to provide a “Thermal Simulation Report” from an accredited independent laboratory. Testing values from the “Simulated Data” shall match the label on the product in accordance with Florida Building Code Energy Conservation C303.1.3.

		<b>World's Best Window Co.</b> Series "2000" Casement Vinyl Clad Wood Frame Double Glazing • Argon Fill • Low E XYZ-X-1-00001-00001	
<b>ENERGY PERFORMANCE RATINGS</b>			
U-Factor (U.S. / I-P)		Solar Heat Gain Coefficient	
<b>0.35</b>		<b>0.32</b>	
<b>ADDITIONAL PERFORMANCE RATINGS</b>			
Visible Transmittance		Air Leakage (U.S. / I-P)	
<b>0.51</b>		<b>≤ 0.3</b>	
Condensation Resistance			
<b>51</b>		<b>—</b>	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. <a href="http://www.nfrc.org">www.nfrc.org</a></small>			

## MECHANICAL NOTES

**M-1** The air inside the attic can reach temperatures to over 150 degrees, far hotter than it gets outdoors. Air handler cabinets are normally insulated with R-4.2 insulation which are below the minimum requirements for ductwork located outdoors. Condensation problems are common on air handlers due to South Florida humidity. Locating the air handlers outside of the thermal envelope wastes energy and are prohibited by this section. The minimum envelope roof/ceiling insulation using the performance method of compliance is R-19 for multifamily buildings and R-10 for all other commercial buildings. The minimum roof/ceiling insulation using the Prescriptive method of compliance requires R-20ci for roof insulation in Climate zone 1a.

## MECHANICAL NOTES CONT.

**M-2** A building containing multiple tenants and occupancy types with fire walls between them may be considered multiple buildings for energy code analysis during phased construction. If each tenant has its own air conditioning system, and are divided by fire walls, that tenant may be considered one building and have its own energy compliance report. Each building or tenant may be evaluated separately for energy code compliance. For example, an individual tenant in a shopping/strip mall exceeding 5000 sq/ft shall be required to have a test and balance report of the air distribution system unless that tenant has units 65,000 or less. This requirement does not exempt systems from balancing requirements if requested by the designer of record.

**M-3** Outside air ducts passing thru conditioned space have the potential to sweat and condensate inside the duct due to humid conditions in Florida. The design professional should be made aware of this potential problem to prevent moisture damage to ceilings.

**M-4** Failure to install and test operation of the outside air and exhaust shut-off dampers can increase the latent load of the building, increase energy use, and effect comfort in conditioned spaces. Dampers are not required for ventilation or exhaust of unconditioned spaces or Type 1 kitchen hood exhausts.

## ELECTRICAL NOTES:

**E-1** Occupant sensors save energy by turning the lights off. Occupancy sensors that turn the lights off are commonly referred to as vacancy sensors. In addition to turning the lights off, they shall have a manual switch to turn the lights off. Turning the lights on automatically to full power **never** saves energy because many times it is not needed. Turning lights on to full power automatically **is not allowed** unless permitted for areas required for safety or security like corridors, stairways, restrooms, entrances, and lobbies. If the designer decides to turn the lights on automatically with an occupancy sensor, this lighting shall come on to only **50% power** or less.

**E-2** Open plan office spaces greater than 300 sq/ft. shall be divided into zones not greater than 600 sq./ft. Each of the 600 sq./ft. zones shall be controlled seperately. Each zone shall have a occupancy sensor to either reduce the lighting power to 80% within 20 minutes after everyone has left that zone or shut the lighting off entirely for that zone. In addition, all lights shall be configured to shut off all lighting when everyone has left the entire general lighting area. Daylight reponsive controls shall only be activated when occupancy in an area is detected. **(See Drawing E-2)**

## ELECTRICAL NOTES CONT:

**E-3** *“Time switch controls”* **are not** a substitute for the required occupancy sensors. Time switch controls are to have certain code required components and features in both code compliance pathways. Individual override switches are to be limited to 5000 sq/ft. and 20,000 sq/ft. for malls, auditoriums, sales areas, manufacturing, and sports arenas. It is important to remember that the energy code requires shutoff and does not require turn-on. That is best left to the occupants to turn on the lights when they enter the building.

**E-4** Manual controls for lighting are required to be in a location for *“ready access”* in C405.2.5. The control is to be in the same area as the lights they control. This is because the occupant can see if the lights go off or on. The only exception is where the designer provides identification of the manual control and an indicator of the status of the lights.

**E-5** The designer of record is required to show the exact locations of the daylight zones. **(See Drawing E-5)** Sidelit zones are created by fenestrations in exterior walls and Toplit zones are created by skylights in the roof fenestrations. Areas are calculated by using the height, length, and width of the fenestration. These areas are needed to be shown on the lighting plan to see which fixtures might be affected. Fixture wattage is required to determine if *“Daylight Responsive Controls” (DRS)* are required. Daylight responsive controls are only required where there is at least 150 watts of lighting to be controlled in sidelit or toplit zones.

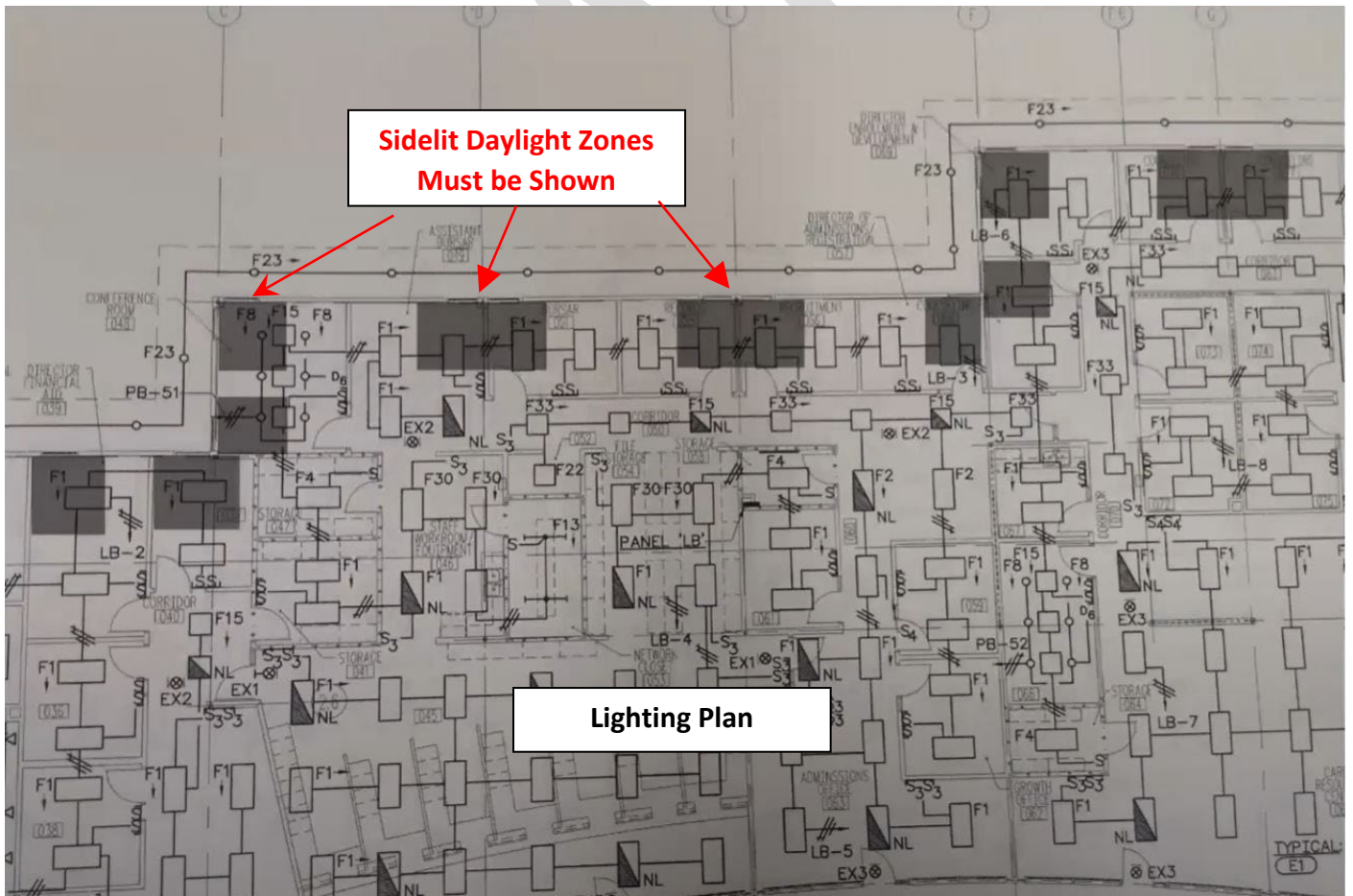
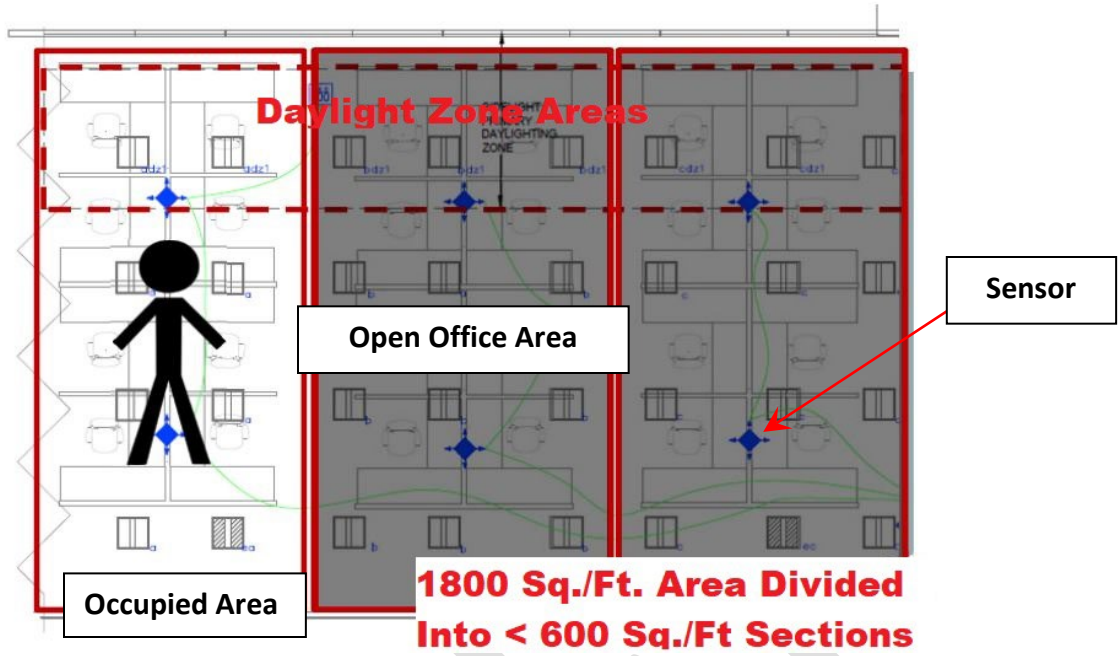
**E-6** ASHREA-90.1 has nine lighting control methods. They are listed in Table 9.6.1. The required lighting control is based on *“Space Type”* and designers’ preference. The table has a list of the required and optional controls. ASHRAE 90.1 allows the designer greater flexibility to choose the desired lighting controls specific to the application.

Lighting control options:

- a)** Local control, **b)** Restricted to manual on, **c)** Restricted to partial automatic on,
- d)** Bilevel lighting control, **e)** Automatic daylight responsive controls for sidelighting,
- f)** Automatic daylight responsive controls for toplighting, **g)** Automatic partial off,
- h)** Automatic full off, **i)** Scheduled shutoff.

**E-7** Functional performance testing of *“automatic lighting control systems”* is necessary to ensure they function as designed and operate in the intended manner. The code requires the owner to receive documentation of testing. The code official can obtain a copy of this documentation upon request. ASHREA-90.1 requires the testing to be done by a third party not associated with the design.

**Drawing E-2**



**Drawing E-5**

DRAFT

# Appendix E

## COMMISSIONING COMPLIANCE CHECKLIST

Project Information: \_\_\_\_\_ Project Name: \_\_\_\_\_

Project Address: \_\_\_\_\_

Commissioning Authority: \_\_\_\_\_

### Commissioning Plan (Section C408.2.1)

- Commissioning Plan was used during construction and includes all items required by Section C408.2.1
- Systems Adjusting and Balancing has been completed.
- HVAC Equipment Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- HVAC Controls Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- Economizer Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- Lighting Controls Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- Service Water Heating System Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: \_\_\_\_\_
- Manual, record documents and training have been completed or scheduled
- Preliminary Commissioning Report submitted to owner and included "Itemization of Deficiencies Not Corrected"

I hereby certify that the commissioning provider has provided me with evidence of mechanical, service water heating and lighting systems commissioning in accordance with the 2020 FBCEC.

Signature of Building Owner or Owner's Representative \_\_\_\_\_ Date \_\_\_\_\_