U.S. Department of Energy
Energy Efficiency and Renewable Energy

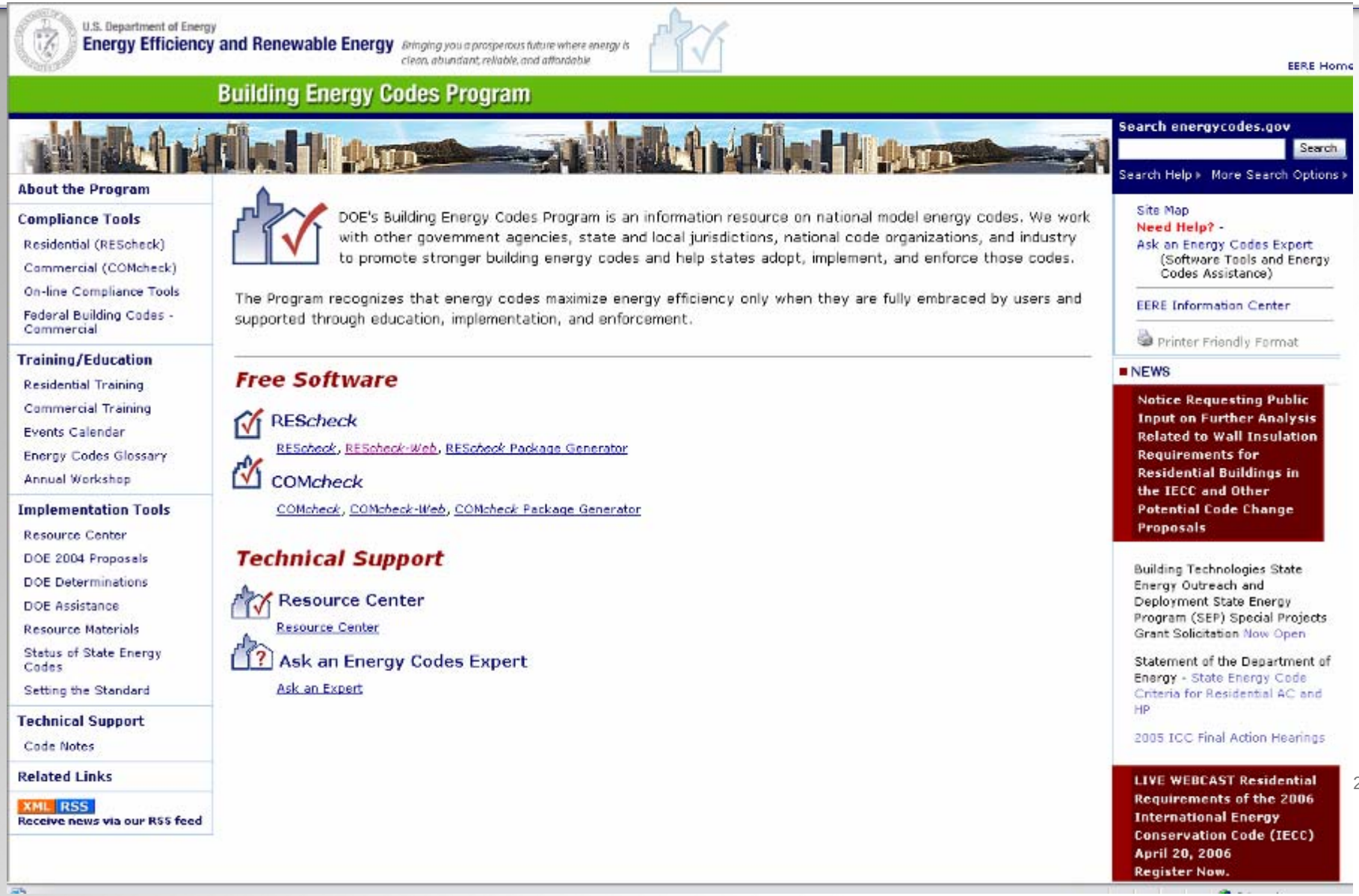
Building Energy Codes

# How to Use *COMcheck* *Energy Code Compliance Software*

U.S. Department of Energy
Building Energy Codes Program

Speakers: Pam Cole and Rosemarie Bartlett, PNNL

# www.energycodes.gov
# techsupport@becp.pnl.gov



# BECP Commercial Code Compliance Tools

## Prescriptive Approach

- Simple, fast and easy
- Generally most stringent

- Requires minimum input
- Based on climate and WWR
- Uses a prototype building

1 Printed guides on www.energycodes.gov

2 COMcheck™ Package Generator

## Trade-off Approach

Free

- Trade-off between components
- Provides design flexibility
- Requires area & U/R-factors

Windows version or Mac version

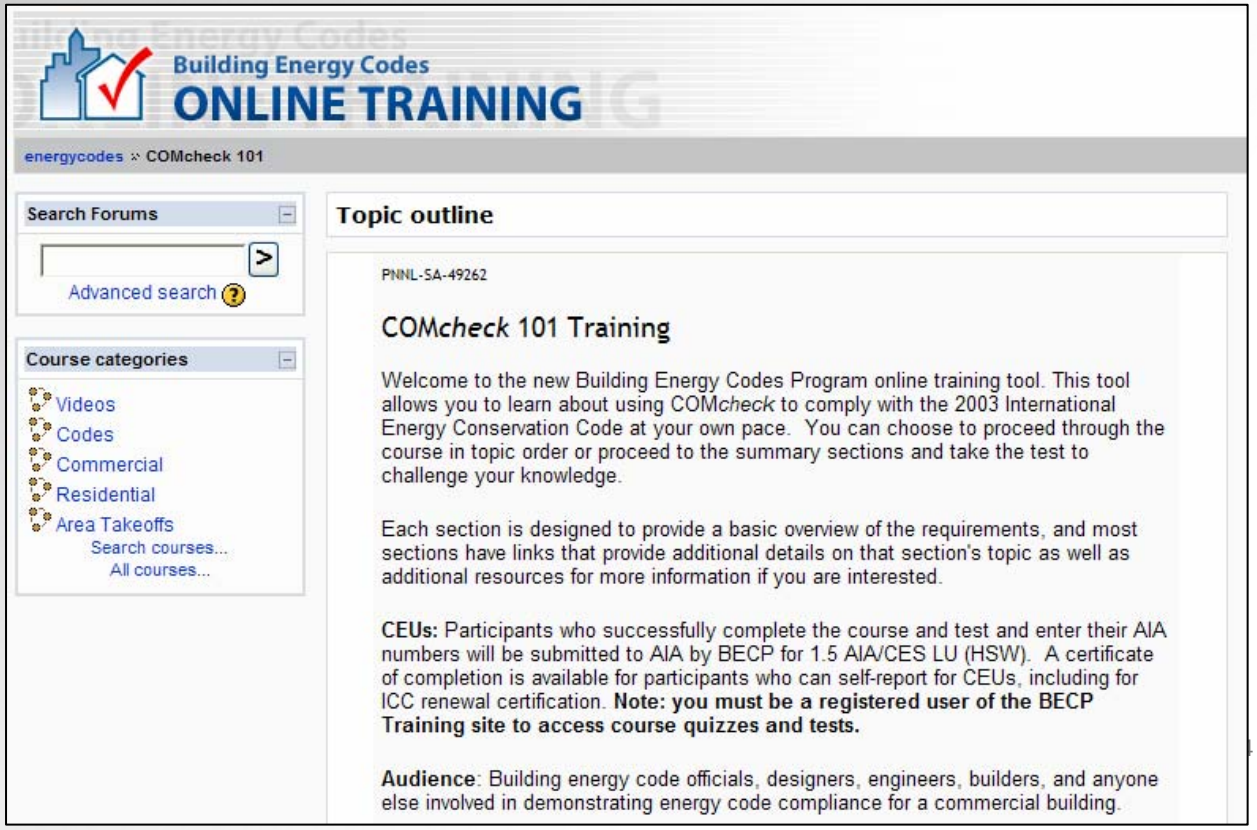
1 COMcheck™

2 COMcheck•Web™

All COM*check* tools available from www.energycodes.gov

# Training Tools

- PowerPoint presentations with faculty notes
- Case studies
- Online training
- Online videos



Building Energy Codes
RESOURCE CENTER

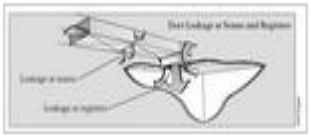
SEARCH: Graphics FOR: duct system approach HVAC » SEARCH BROWSE: Select a Topic... » GO!

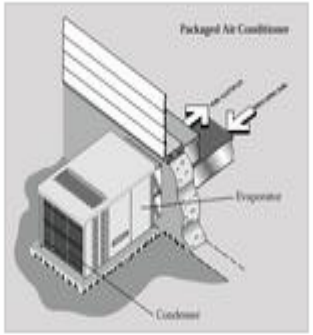
Home | About the Resource Center | Ask a Question | Advanced Search | Help

# Graphics Search Results

Keywords: *duct system approach HVAC*

Viewing: **1-9** of **92**





Printer-friendly Format

## ADDITIONAL RESOURCES

- Articles
- Online Tools
- Presentations
- Videos

# Setting the Standard Newsletter

- Register on-line to receive the latest up-to-date information on energy code related issues.

Newsletter

- http://www.energycodes.gov/news/

BUILDING ENERGY CODES PROGRAM

Setting the Standard Newsletter

U.S. Department of Energy • Office of Energy Efficiency and Renewable Energy

March 2006 Number 3

**Basements: Advantages and Disadvantages of Finishing Basements During Initial Construction of the Home**

The 2000 and 2003 Editions of the International Energy Conservation Code (IECC) require basement walls to be insulated if the basement is considered part of the heated and/or cooled living space (conditioned space). If the basement is initially designed to be unfinished, insulation is required in the basement ceiling. The 2003 IECC requires floors over unheated spaces or basement walls that define the conditioned space (Section 502.2.3.3 or 502.2.3.6) to meet the applicable overall thermal transmittance factor (U-factor) or the minimum R-value based on the prescriptive specifications on an individual component basis. In basic terms this means, if the basement is unconditioned, the floor above the basement (basement ceiling) must be insulated and meet all the requirements of the IECC for floors over an unconditioned space. If the basement is considered part of the conditioned building envelope, the basement walls must be insulated and meet all the requirements of the IECC for basement walls. The requirements in the code vary depending on location and climate conditions. Requirements in the IECC include some of the following: Insulation Installation (Section 102.4), Moisture Control (Section 502.1.1), and Caulking and Sealants (Section 502.1.4.2).

Many homes are being constructed with unfinished basements to reduce initial costs. In most cases, the homeowner eventually finishes the basement for additional living space by installing basement wall insulation. Because most basements are eventually occupied, the advantages and disadvantages of conditioning the basement should be thoroughly reviewed prior to permitting and construction.

Table 1 provides a list of advantages and disadvantages of basement wall insulation compared to basement ceiling insulation.

# When Does COM*check* Apply?

**Commercial New Construction, Alterations and Additions**

- Commercial Buildings include all buildings except
  - Single family
  - Low rise multi-family < 3 stories in height

- State Dependent
  - Not all states have the same code, some states have state-specific energy codes
  - Check to see what code is applicable in your state and if COM*check* is accepted
  - Status of State Codes
  - http://www.energycodes.gov/implement/state_codes/index.stm

# Commercial Buildings

## Building System

- Envelope
- Lighting
- Mechanical
  - HVAC
  - SWH

**Mandatory Provisions**

**(required for all compliance options)**

## Compliance Options

- Prescriptive Option
- Trade Off Option
- Total Building Performance

## Energy Code Compliance

# Components that Must Comply with the Energy Code

**Building Envelope**

- construction assembly (materials & insulation levels)
- windows, doors & skylights

**Mechanical Systems**

**Service Water Heating**

**Lighting Systems**

How do they correlate in COM*check*?
No trade-offs between systems!

# Commercial Building Envelope Requirements

- Mandatory Requirements:
  - Moisture Control
  - Air Leakage
- Climate Specific Requirements:
  - Roof
  - Above Grade Walls
  - Below Grade Walls
  - Floor
  - Slab
  - Skylights, Windows, and Doors

# What is COM*check*?

- Envelope
  - trade-off calculations are based on envelope loads only
  - defines a proposed design and a budget design
- Lighting
  - Watts/square foot  (LPDs)
- Mechanical
  - short wizard to customize a list of requirements applicable to the system identified

Microsoft Outlook
Internet Explorer
Firefox Setup 1.0PR
ETR
Microsoft Photo Editor
Mozilla Firefox
Adobe Reader 6.0
Work_Pkg
URL's and Emails
Software Analysis
URL's
Attendee_List
Microsoft PowerPoint
Link Check
Implementati...
Microsoft Word
Desktop Stuff
COMcheck-EZ 3.0 Release 1a
Microsoft Outlook
Emails
Microsoft Excel
Articles
PhotoStudio 5
Adobe Acrobat 6.0 Professi...
Recycle Bin
COMcheck™
DOE's Building Energy Codes Program
Internet Address: www.energycodes.gov
Technical Support: techsupport@becp.pnl.gov
Energy Efficiency and Renewable Energy · U.S. Department of Energy
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Microphone
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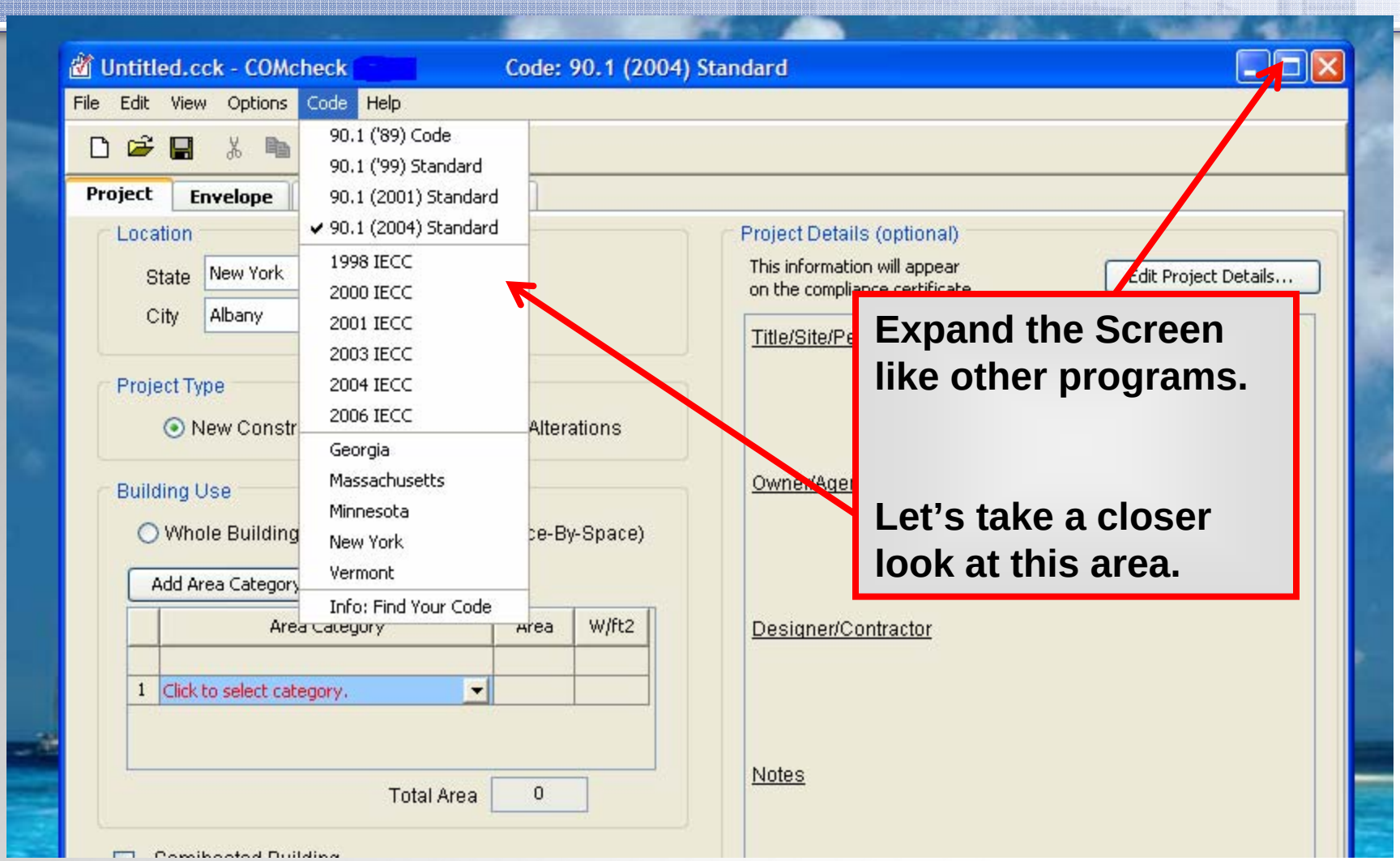
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90.1 ('99) Standard
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2000 IECC
2001 IECC
2003 IECC
2004 IECC
2006 IECC
Georgia
Massachusetts
Minnesota
New York
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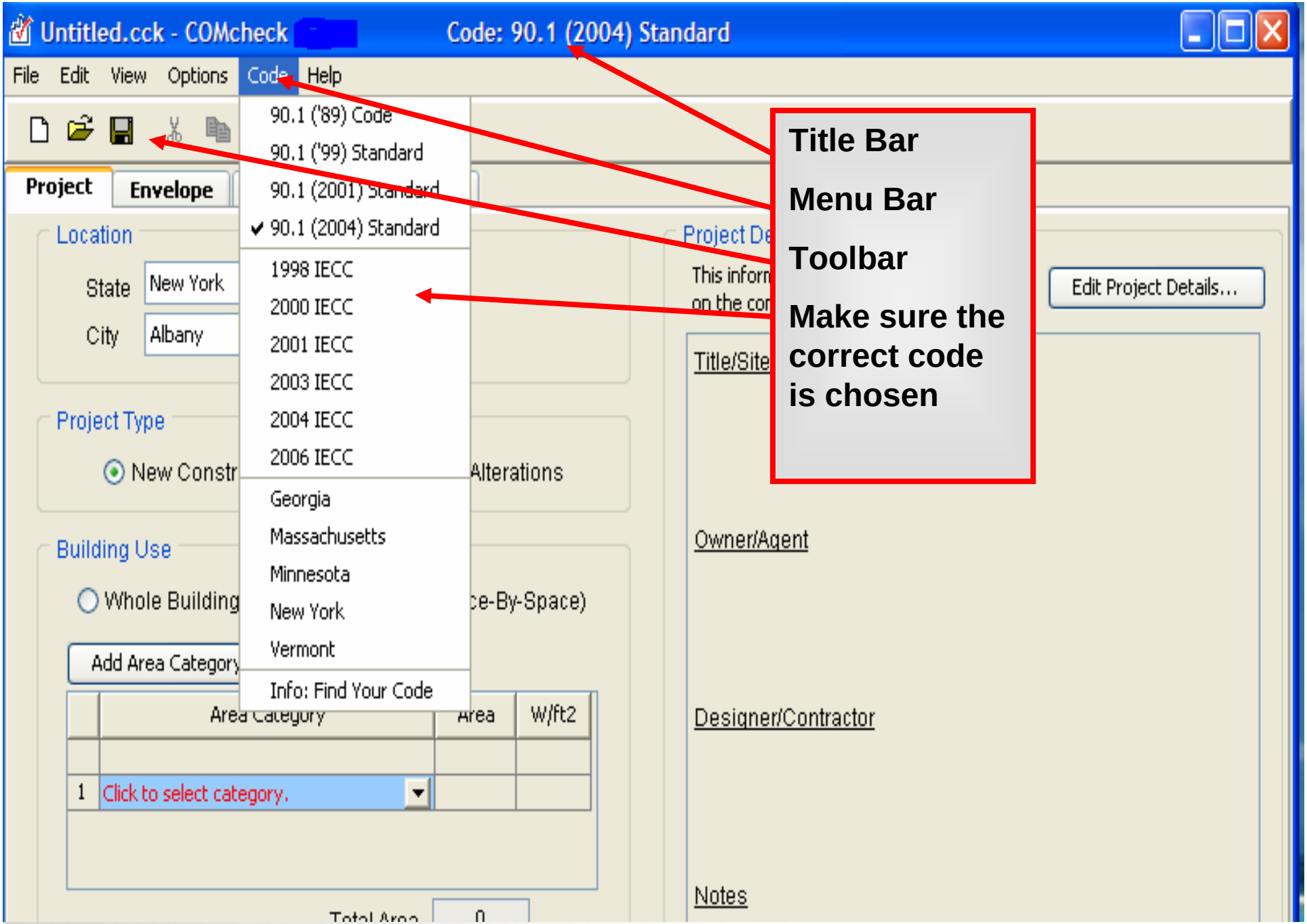
State New York
City Albany
Project Type
New Constr
Alterations
Building Use
Whole Building
ce-By-Space)
Add Area Category
Area Category
Area
W/ft2
1 Click to select category.
Total Area 0
Project Details (optional)
This information will appear
on the compliance certificate
Edit Project Details...
Title/Site/Pe
Owner/Agen
Designer/Contractor
Notes
Expand the Screen like other programs.
Let's take a closer look at this area.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2003 IECC
2004 IECC
2006 IECC
Georgia
Massachusetts
Minnesota
New York
Vermont
Info: Find Your Code
Project
Envelope
Location
State
New York
City
Albany
Project Type
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Alterations
Building Use
Whole Building
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Add Area Category
Area Category
Area
W/ft2
1
Click to select category.
Total Area
0
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Edit Project Details...
Title/Site
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Designer/Contractor
Notes
Title Bar
Menu Bar
Toolbar
Make sure the correct code is chosen

EZ-Casestudy.cck - COMcheck  Code: 90.1 (2004) Standard

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Four Main Screens

Location

State: Pennsylvania

City: Pittsburgh

Project Type

New Construction  Addition  Alterations

Building Use

Whole Building  Area Category (Space-By-Space)

Add Area Category

| | Area Category | Area | W/ft2 |
|---|---|---|---|
| 1 | Common Space Types:Office - Enclo... | 15849 | 1.1 |
| 2 | Common Space Types:Corridor/Tra... | 3838 | 0.5 |
| 3 | Common Space Types:Dining Area -... | 505 | 0.9 |
| 4 | Common Space Types:Lobby | 340 | 1.3 |

Total Area 20532

Semiheated Building
(all spaces are semiheated with no cooling)

Project Details (optional)

This information will appear on the compliance certificate.

Edit Project Details...

Title/Site/Permit
Sigma 4 Office Complex
2500 Peachtree Lane
Pittsburgh, PA
Permit #: 12550-060

Compliance Results

Owner/Agent
ABC Inc.

Designer/Contractor
L & D Architects

Notes
Existing construction major rennovation with lighting modified lighting design (existing fixtures and existing mechanical equipment)

Envelope TBD  Lighting TBD

If you can't find the building's city, choose a nearby city that has similar weather conditions.

EZ-Casestudy.cck - COMcheck  Code: 90.1 (2004) Standard

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Project Type

Location

State: Pennsylvania

City: Pittsburgh

Project Type

New Construction | Addition | Alterations

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Whole Building | Area Category (Space-By-Space)

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Notes
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Envelope TBD  Lighting TBD

If you can't find the building's city, choose a nearby city that has similar weather conditions.

Project Type

Building Use

- Whole Building
- Area Category

Basic Information

EZ-Casestudy.cck - COMcheck

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Roof | Skylight | Ext. Wall | Int. Wall | Window | Door | Basement | Floor

| | Component | Assembly | Construction Details | Gross Area | | Cavity Insulation R-Value | Continuous Insulation R-Value | U-Factor | SHGC | Projection Factor |
|---|---|---|---|---|---|---|---|---|---|---|
| | Building | | | | | | | | | |
| 1 | Roof 1 | Non-Wood Joist/Rafter/Tr... | | 20532 | ft2 | 19.0 | 8.0 | 0.040 | | |
| 2 | Exterior Wall 1 | Metal Frame, 16" o.c. | | 8172 | ft2 | 10.0 | 0.0 | 0.145 | | |
| 3 | Window 1 | Metal Frame, Double Pane | Glazing: Tin... | 998 | ft2 | | | 0.690 | 0.57 | 0.50 |
| 4 | Door 1 | Glass | Glazing: Cl... | 126 | ft2 | | | 0.920 | 0.47 | 0.00 |
| 5 | Door 2 | Opaque | | 21 | ft2 | | | 0.700 | | |
| 6 | Floor | | | | | | | | | |

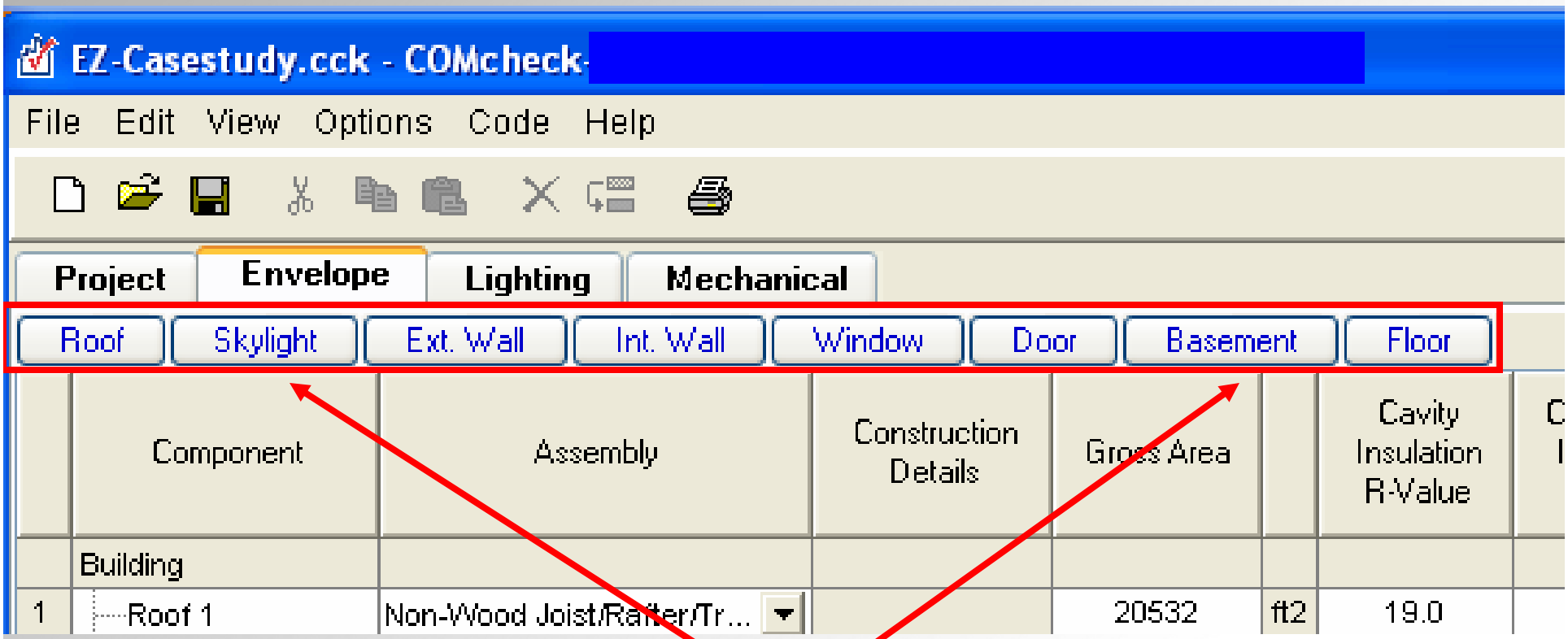
## Main Building Envelope

- Use the blue-on-white buttons at the top of the *Envelope* screen to create a list of building components present in your proposed design. Each component you select is added to the building components displayed on the *Envelope* screen.
- Gross area (or perimeter) of assembly components, cavity R-value , continuous R-value, assembly U-factor , construction details, SHGC, and/or projection factor are entered by the user.

Envelope +22% Lighting -10%

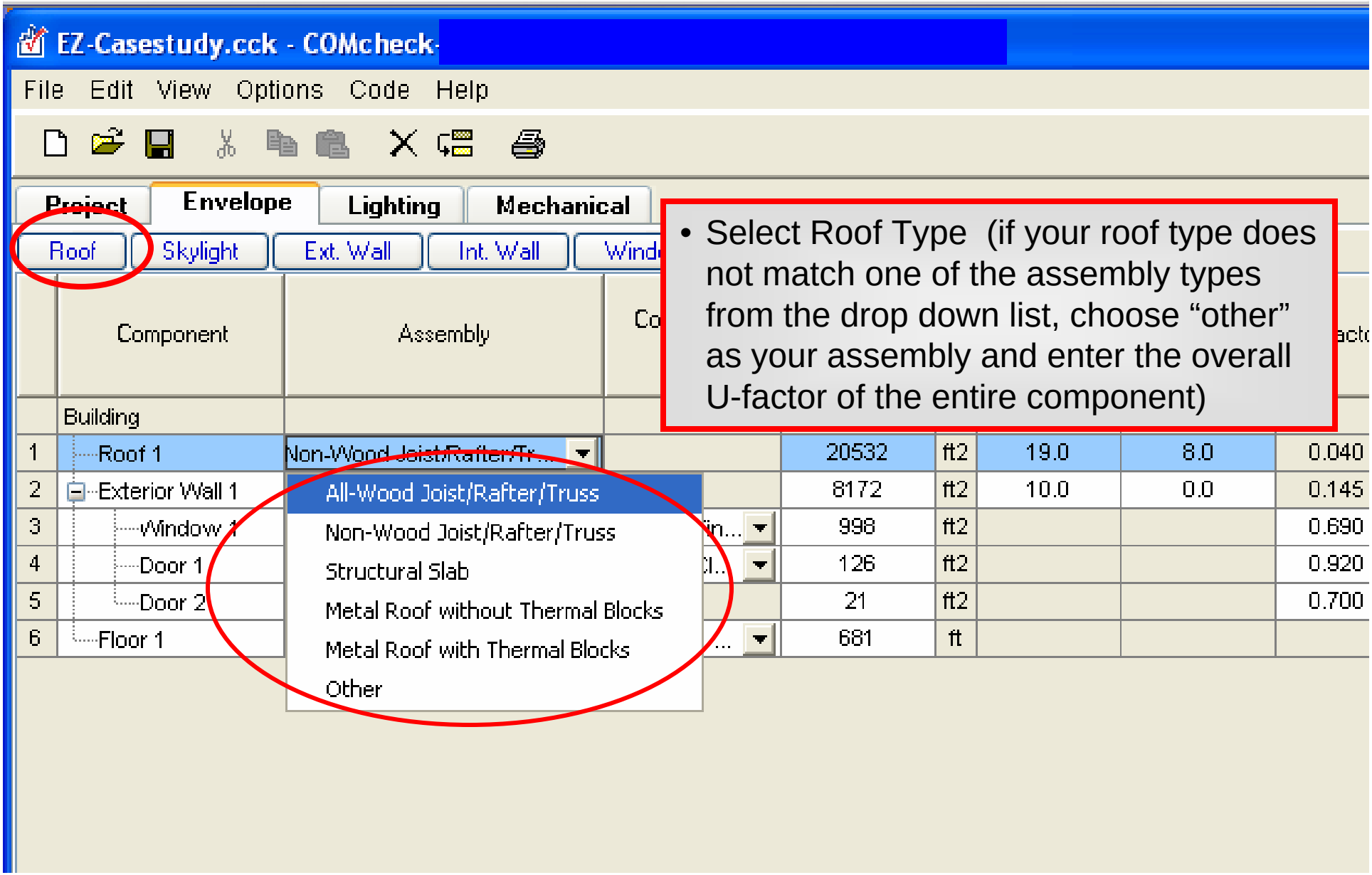
Ready

# Envelope Screen




Building Components are added by clicking on these.

# Envelope Assembly Types




- Select Roof Type (if your roof type does not match one of the assembly types from the drop down list, choose “other” as your assembly and enter the overall U-factor of the entire component)

# Interior Lighting Compliance

**Mandatory Requirements**

- Controls
- Switching

**and**

**Interior Lighting Power Requirements**

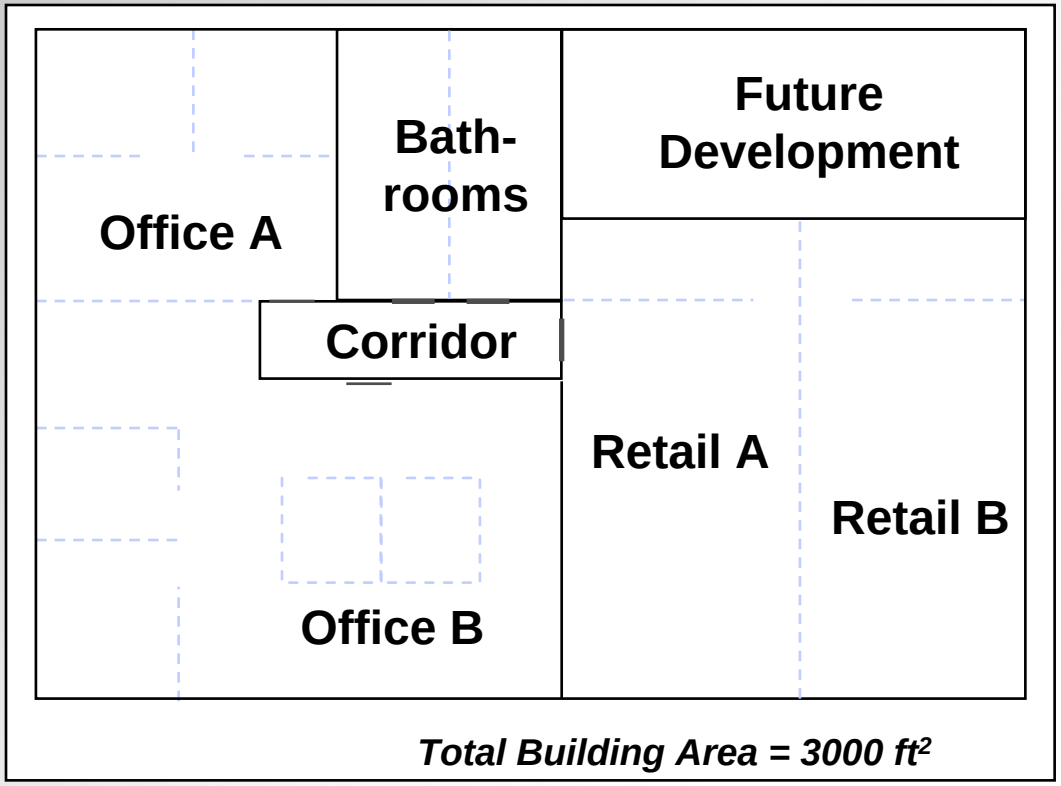
**The building complies if its total connected power is no greater than the interior lighting power allowance**

**Total Connected Power** **<** **Interior Lighting Power Allowance**

- Entire Building
- Partial Building

# Lighting Using Space-by-Space

| | |
|---|---|
| Office A: | 400 $ft^2$ |
| Office B: | 850 $ft^2$ |
| Bathrooms: | 350 $ft^2$ |
| Corridor: | 50 $ft^2$ |
| Retail A: | 500 $ft^2$ |
| Retail B: | 500 $ft^2$ |
| Future: | 350 $ft^2$ |



# Building Uses and Lighting

EZ-Casestudy 2.cck - COMcheck

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

**Location**

State: Pennsylvania

City: Pittsburgh

**Project Type**

(•) New Construction ( ) Addition

**Building Use**

( ) Whole Building (•) Area Category (Space-By-Space)

Add Area Category

| | Area Category | Area | W/ft2 |
|---|---|---|---|
| 1 | Lobby - Other | 15849 | 1.3 |
| 2 | Office | 3338 | 1.1 |
| 3 | Classroom/Lecture Hall | 505 | 1.4 |
| 4 | Office | 340 | 1.1 |
| 5 | Exercise Center | 500 | 0.9 |

Total Area 20532

EZ-Casestudy 2.cck - COMcheck

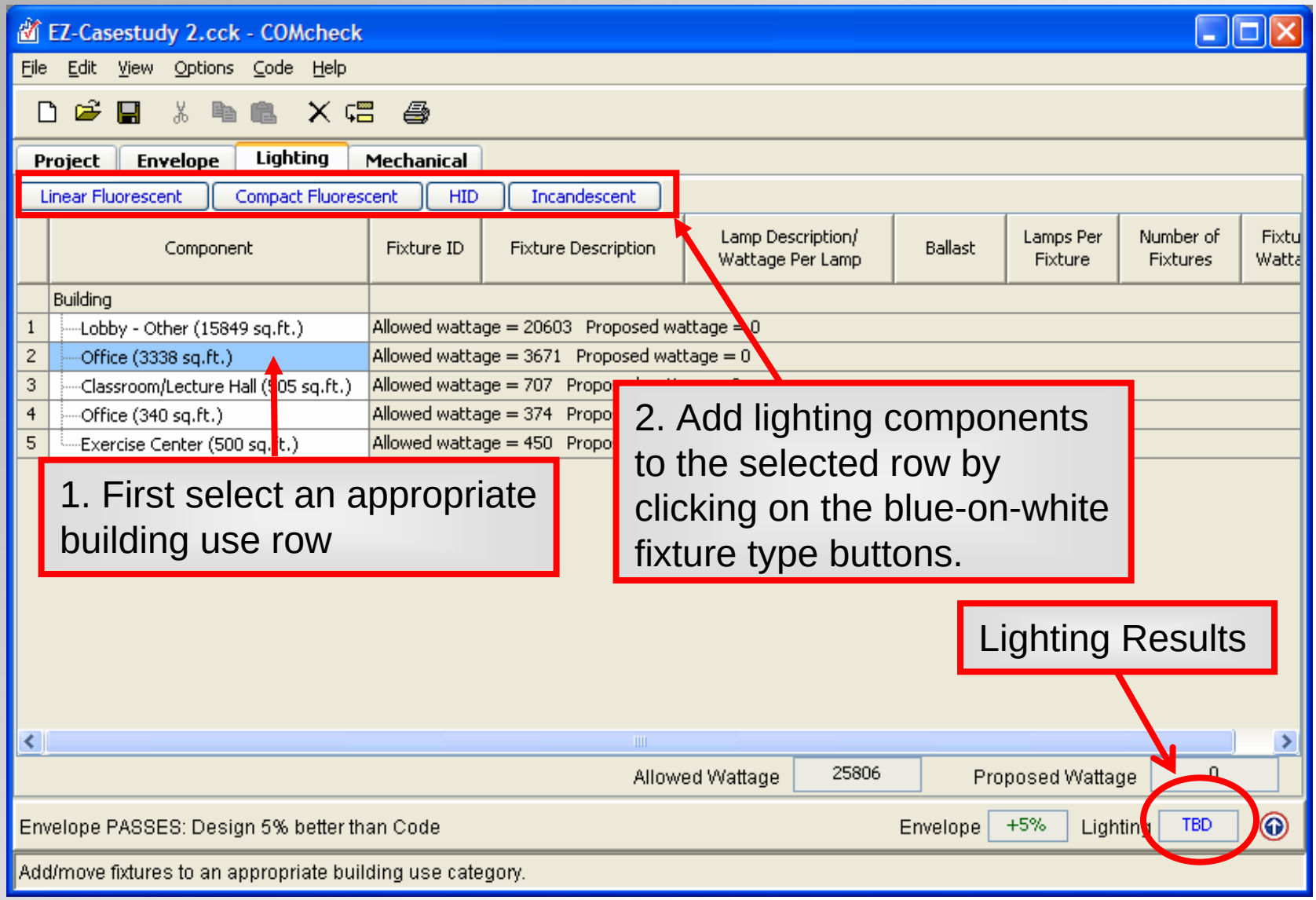
File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Linear Fluorescent | Compact Fluorescent | HID | Incandescent

| | Component | Fixture ID | Fixture Description | Lamp Watta |
|---|---|---|---|---|
| | Building | | | |
| 1 | Lobby - Other (15849 sq.ft.) | Allowed wattage = 20603 | Proposed wattage = 0 | |
| 2 | Office (3338 sq.ft.) | Allowed wattage = 3671 | Proposed wattage = 0 | |
| 3 | Classroom/Lecture Hall (505 sq.f | Allowed wattage = 707 | Proposed wattage = 0 | |
| 4 | Office (340 sq.ft.) | Allowed wattage = 374 | Proposed wattage = 0 | |
| 5 | Exercise Center (500 sq.ft.) | Allowed wattage = 450 | Proposed wattage = 0 | |

# Adding Lighting



EZ-Casestudy 2.cck - COMcheck

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Linear Fluorescent | Compact Fluorescent | HID | Incandescent

| | Component | Fixture ID | Fixture Description | Lamp Description/ Wattage Per Lamp | Ballast | Lamps Per Fixture | Number of Fixtures | Fixtu Watta |
|---|---|---|---|---|---|---|---|---|
| | Building | | | | | | | |
| 1 | Lobby - Other (15849 sq.ft.) | Allowed wattage = 20603 Proposed wattage = 0 | | | | | | |
| 2 | Office (3338 sq.ft.) | Invalid number of fixtures | | | | | | |
| 3 | Linear Fluorescent 1 | | | Click here to select l... | | | 0 | 0 |
| 4 | Classroom/Lecture Hall (505 sq.ft.) | Allowed wattage = 707 Proposed watta | | | | | | |
| 5 | Office (340 sq.ft.) | Allowed wattage = 374 Proposed watta | | | | | | |
| 6 | Exercise Center (500 sq.ft.) | Allowed wattage = 450 Proposed watta | | | | | | |

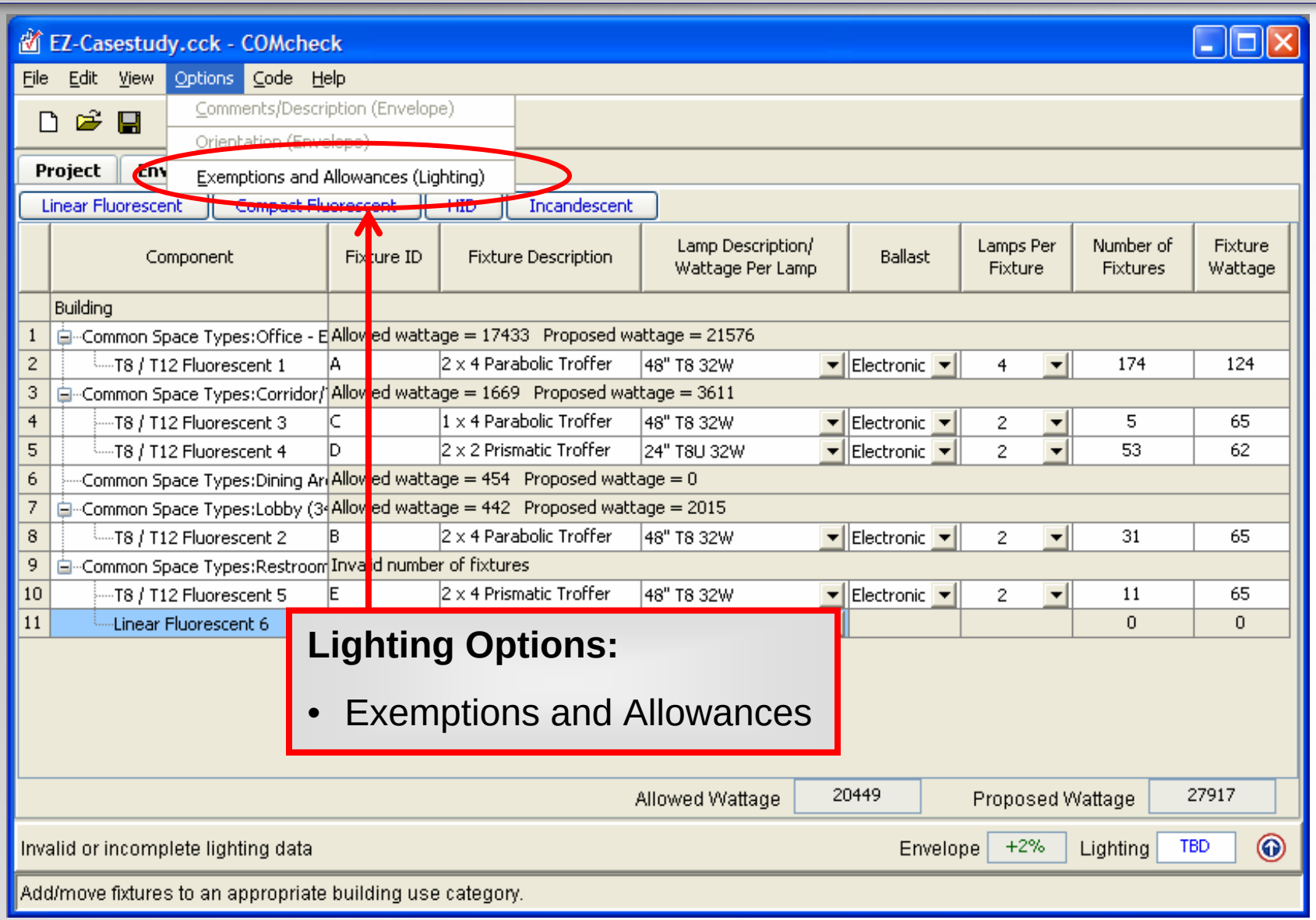
22" T5 14W
24" T8 17W
24" T8U 32W
24" T12U 40W
24" T12U ES 34W
36" T8 25W
36" T12 30W
36" T12 ES 25W
46" T5 28W
46" T5 54W
48" T8 25W (Super T8)
48" T8 28W (Super T8)
48" T8 30W (Super T8)
48" T8 32W (Super T8)
48" T8 32W
48" T12 40W

Allowe | Proposed Wattage 0

Invalid or incomplete lighting data | velope +5% | Lighting TBD

Add/move fixtures to an appropriate building use category.

# Lighting Options




| | Component | Fixture ID | Fixture Description | Lamp Description/ Wattage Per Lamp | Ballast | Lamps Per Fixture | Number of Fixtures | Fixture Wattage |
|---|---|---|---|---|---|---|---|---|
| | Building | | | | | | | |
| 1 | Common Space Types:Office - E | Allowed wattage = 17433 Proposed wattage = 21576 | | | | | | |
| 2 | T8 / T12 Fluorescent 1 | A | 2 x 4 Parabolic Troffer | 48" T8 32W | Electronic | 4 | 174 | 124 |
| 3 | Common Space Types:Corridor/ | Allowed wattage = 1669 Proposed wattage = 3611 | | | | | | |
| 4 | T8 / T12 Fluorescent 3 | C | 1 x 4 Parabolic Troffer | 48" T8 32W | Electronic | 2 | 5 | 65 |
| 5 | T8 / T12 Fluorescent 4 | D | 2 x 2 Prismatic Troffer | 24" T8U 32W | Electronic | 2 | 53 | 62 |
| 6 | Common Space Types:Dining Ar | Allowed wattage = 454 Proposed wattage = 0 | | | | | | |
| 7 | Common Space Types:Lobby (3 | Allowed wattage = 442 Proposed wattage = 2015 | | | | | | |
| 8 | T8 / T12 Fluorescent 2 | B | 2 x 4 Parabolic Troffer | 48" T8 32W | Electronic | 2 | 31 | 65 |
| 9 | Common Space Types:Restroom | Invalid number of fixtures | | | | | | |
| 10 | T8 / T12 Fluorescent 5 | E | 2 x 4 Prismatic Troffer | 48" T8 32W | Electronic | 2 | 11 | 65 |
| 11 | Linear Fluorescent 6 | | | | | | 0 | 0 |

**Lighting Options:**

- Exemptions and Allowances

- COMcheck

Code Help

Lighting | Mechanical

Compact Fluorescent | HID | Incandescent

| | Fixture ID | Fixture Description | Lamp Description/ Wattage Per Lamp | Ballast | Lamps Per Fixture | Number of Fixtures | Fixture Wattage | Exemption Allowance |
|---|---|---|---|---|---|---|---|---|
| 9 sq.ft.) | Allowed wattage = 20603 Proposed wattage = 21576 | | | | | | | |
| scent 1 | A | 2 x 4 Parabolic Troffer | 48" T8 32W | Electronic | 4 | 174 | 124 | None |
| | Allowed wattage = 3671 Proposed wattage = 3611 | | | | | | | |
| scent 3 | C | 1 x 4 Parabolic Troffer | 48" T8 32W | Electronic | 2 | 5 | 65 | None |
| scent 4 | D | 2 x 2 Prismatic Troffer | 24" T8U 32W | Electronic | 2 | 53 | 62 | None |
| Hall (505 sq.f | Allowed wattage = 707 Proposed wattage = 0 | | | | | | | |
| | Allowed wattage = 374 Proposed wattage = 2015 | | | | | | | |
| scent 2 | B | 2 x 4 Parabolic Troffer | 48" T8 32W | Electronic | 2 | 31 | 65 | None |
| 0 sq.ft.) | Allowed wattage = 450 Proposed wattage = 715 | | | | | | | |
| scent 5 | E | 2 x 4 Prismatic Troffer | 48" T8 32W | Electronic | 2 | 11 | 65 | None |

None
Exemption
Allowance

Special Medical/Dental/Research
Professional Sports Arena Playing Field
Gallery/Museum/Monument Exhibits
Lighting in Residential Dwelling Units
Emergency Lighting (Automatic Control)

Allowed Wattage 25806 Proposed Wattage 27917

% worse than Code Envelope +5% Lighting -8%

appropriate building use category.

# Mechanical

EZ-Casestudy.cck - COMcheck-

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

HVAC System | Plant | Water Heating

| | Component | Quantity | Equipment Capacity | Fuel Type/ Heat Source | Condenser Type | System Details |
|---|---|---|---|---|---|---|
| | Building | | | | | |
| 1 | Water Heating 1 | 2 | | | | Click here... |
| 2 | HVAC System 4 | 1 | | | | |
| 3 | Rooftop Packaged Heat Pu | | Select... | | Select... | |
| 4 | HVAC System 1 | 1 | | | | |
| 5 | Rooftop Packaged Heat Pu | | <65 kBtu/h | | Air-Cooled | |
| 6 | HVAC System 2 | 7 | | | | |
| 7 | Rooftop Packaged Heat Pu | | <65 kBtu/h | | Air-Cooled | |
| 8 | HVAC System 3 | 2 | | | | |
| 9 | Rooftop Packaged Heat Pu | | >=90 - <135 k... | | Air-Cooled | Air Economizer |

The Mechanical section generates a customized list of mandatory requirements applicable to the mechanical components you identify.

Envelope TBD Lighting -10%

Use the View Menu to display Requirements.

EZ-Casestudy.cck - COMcheck

File Edit View Options Code Help

Project | Envelo

HVAC System

| | Compone |
|---|---|
| | Building |
| 1 | Water Heating 1 |
| 2 | HVAC System 4 |
| 3 | Rooftop Pac |
| 4 | HVAC System 1 |
| 5 | Rooftop Pac |
| 6 | HVAC System 2 |
| 7 | Rooftop Pac |
| 8 | HVAC System 3 |
| 9 | Rooftop Pac |

## HVAC System

HVAC Equipment Type:

Heating Equipment Type:

- None
- Central Furnace
- Duct Furnace
- Hydronic or Steam Coil
- Heat Pump
  - Packaged Terminal ...
- Radiant Heater
- Unit Heater
- Other

Cooling Equipment Type:

- None
- Field-Assembled DX System
- Hydronic Coil
- Packaged Terminal DX Unit
- Rooftop Package DX Unit
- Split DX System
- Other

Zoning Category:

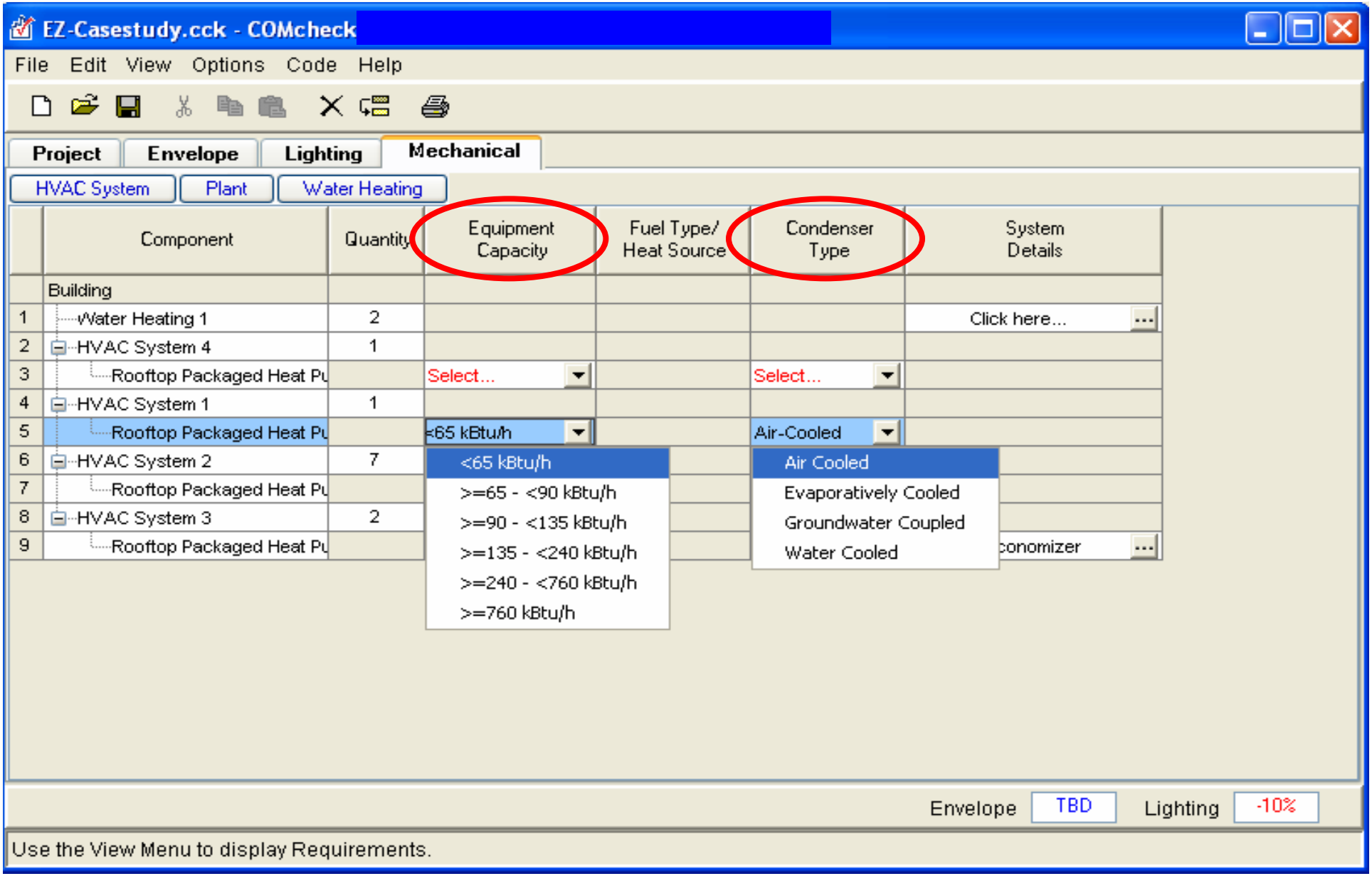
- Single Zone — Perimeter System
- Multiple Zone — Perimeter System

Help | OK | Cancel

Envelope TBD | Lighting -10%

Use the View Menu to display Requirements.

# Mechanical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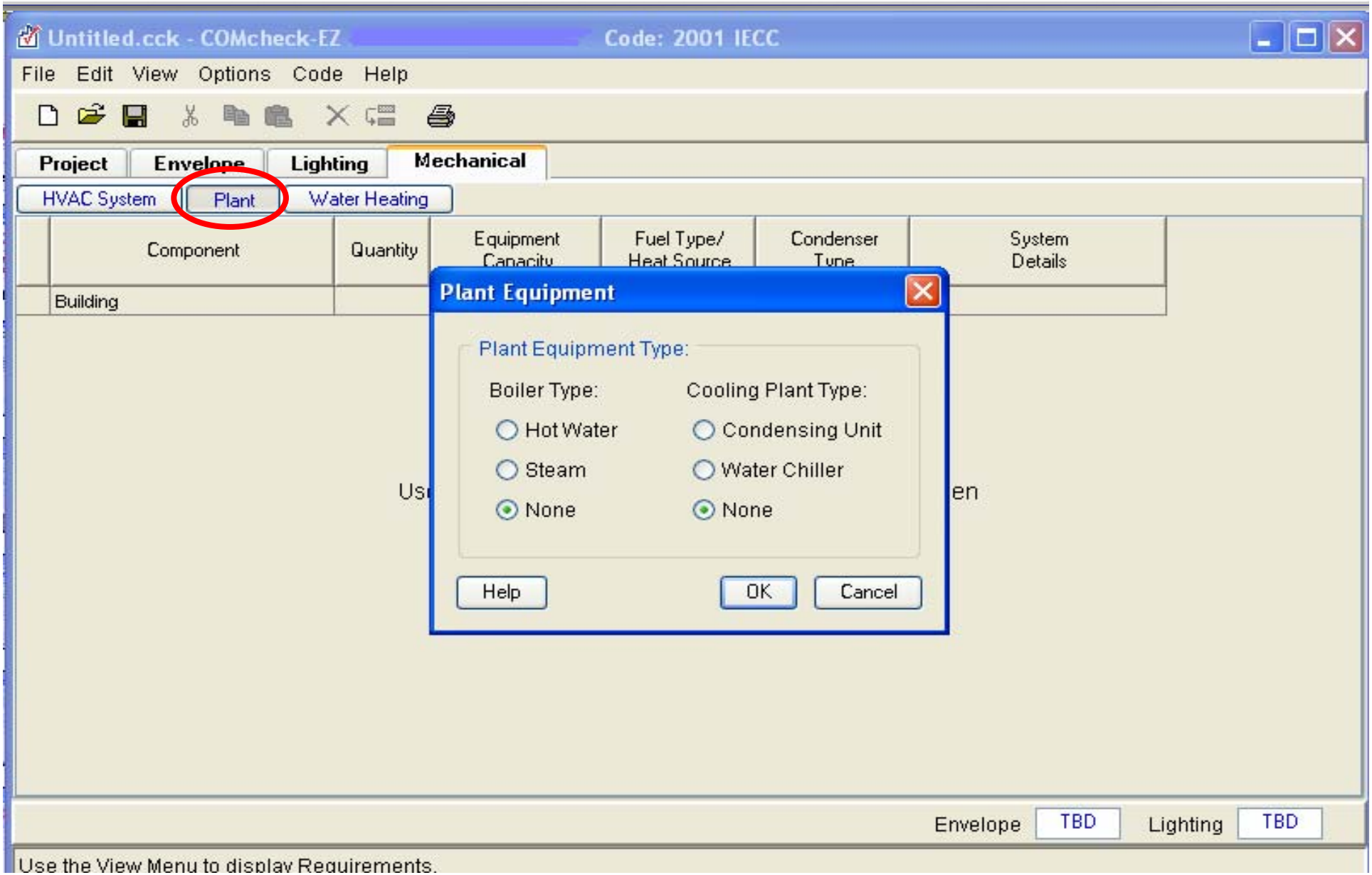
File Edit View Options Code Help
Project
Envelope
Lighting
Mechanical
HVAC System
Plant
Water Heating
Component
Quantity
Equipment Capacity
Fuel Type/ Heat Source
Condenser Type
System Details
Building
1 Water Heating 1 2 Click here...
2 HVAC System 4 1
3 Rooftop Packaged Heat Pu Select... Select...
4 HVAC System 1 1
5 Rooftop Packaged Heat Pu <65 kBtu/h Air-Cooled
6 HVAC System 2 7
7 Rooftop Packaged Heat Pu
8 HVAC System 3 2
9 Rooftop Packaged Heat Pu
<65 kBtu/h
>=65 - <90 kBtu/h
>=90 - <135 kBtu/h
>=135 - <240 kBtu/h
>=240 - <760 kBtu/h
>=760 kBtu/h
Air Cooled
Evaporatively Cooled
Groundwater Coupled
Water Cooled
Envelope TBD
Lighting -10%
Use the View Menu to display Requirements.

# Mechanical


Untitled.cck - COMcheck-EZ
Code: 2001 IECC
File Edit View Options Code Help
Project
Envelope
Lighting
Mechanical
HVAC System
Plant
Water Heating
Component
Quantity
Equipment Capacity
Fuel Type/ Heat Source
Condenser Type
System Details
Building
Plant Equipment
Plant Equipment Type:
Boiler Type:
Hot Water
Steam
None
Cooling Plant Type:
Condensing Unit
Water Chiller
None
Help
OK
Cancel
Envelope
TBD
Lighting
TBD
Use the View Menu to display Requirements.

EZ-Casestudy.cck - COMcheck-EZ  Code: 2001 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

HVAC System | Plant | Water Heating

| | Component | Quantity | Equipment Capacity | Fuel Type/ Heat Source | Condenser Type | System Details |
|---|---|---|---|---|---|---|
| | Building | | | | | |
| 1 | Water Heating 1 | 2 | | | | Click here... |
| 2 | HVAC System 4 | 1 | | | | |
| 3 | Rooftop Packaged Heat Pu | | Sele | | | |
| 4 | HVAC System 1 | 1 | | | | |
| 5 | Rooftop Packaged Heat Pu | | <65 | | | |
| 6 | HVAC System 2 | 7 | | | | |
| 7 | Rooftop Packaged Heat Pu | | <65 | | | |
| 8 | HVAC System 3 | 2 | | | | |
| 9 | Rooftop Packaged Heat Pu | | >=90 - <135 k... | | Air-Cooled | Air Economizer ... |

**Service Water Heating Details**

- [ ] System Has a Circulation Pump
- [ ] Heat Trace Tape Installed in the System

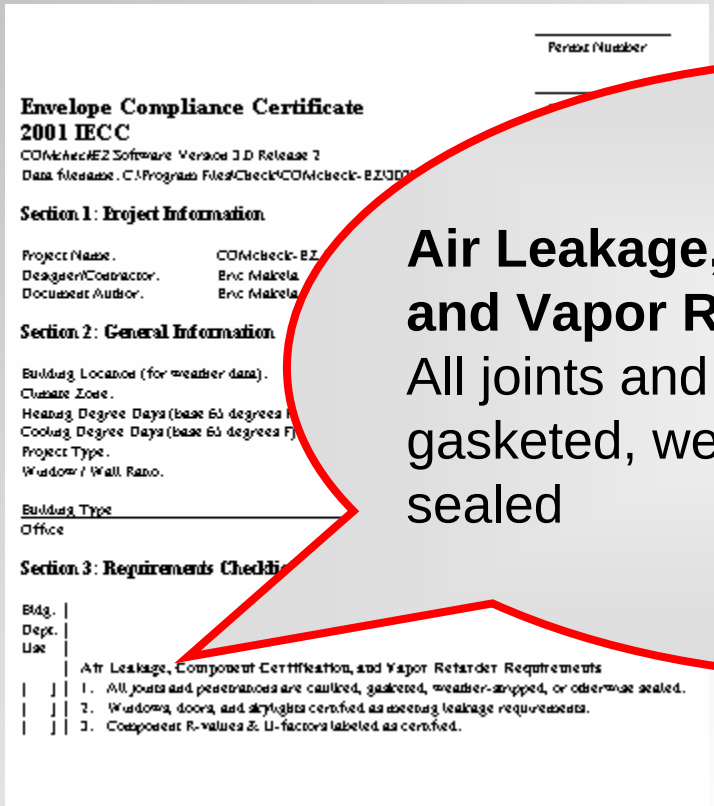
Help | OK | Cancel

Envelope TBD  Lighting -10%

Use the View Menu to display Requirements.

# Mandatory Requirements in COM*check* Software

- Requirements Checklist generated automatically based on input
  - applicable code
  - building location


Permit Number

**Envelope Compliance Certificate**
**2001 IECC**
COMcheckEZ Software Version 3.0 Release 2
Data filename: C:\Program Files\Check\COMcheck-EZ\3D

**Section 1: Project Information**

Project Name: COMcheck-EZ
Designer/Contractor: Eric Makela
Document Author: Eric Makela

**Section 2: General Information**

Building Location (for weather data):
Climate Zone:
Heating Degree Days (base 65 degrees F)
Cooling Degree Days (base 65 degrees F)
Project Type:
Window / Wall Ratio:

Building Type
Office

**Section 3: Requirements Checklist**

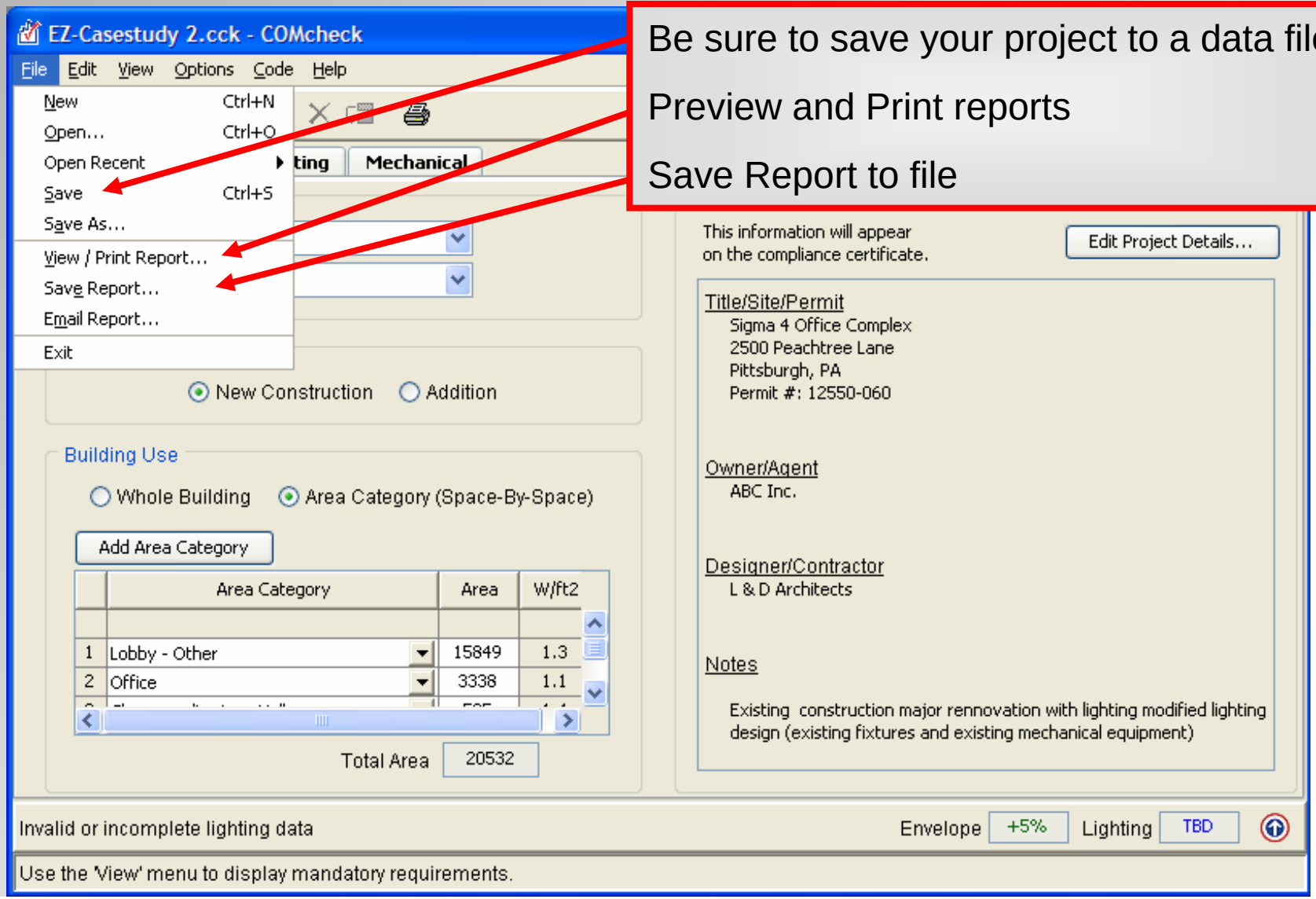
Bldg. | Dept. | Use |
| Air Leakage, Component Certification, and Vapor Retarder Requirements
| | | 1. All joints and penetrations are caulked, gasketed, weather-stripped, or otherwise sealed.
| | | 2. Windows, doors, and skylights certified as meeting leakage requirements.
| | | 3. Component R-values & U-factors labeled as certified.

**Air Leakage, Component Certification, and Vapor Retarder Requirements:**
All joints and penetrations are caulked, gasketed, weather-stripped, or otherwise sealed

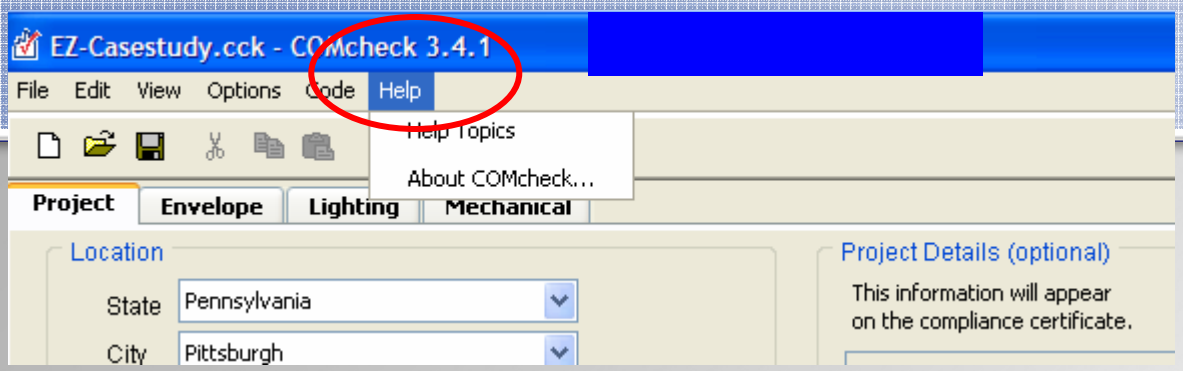
Be sure to save your project to a data file

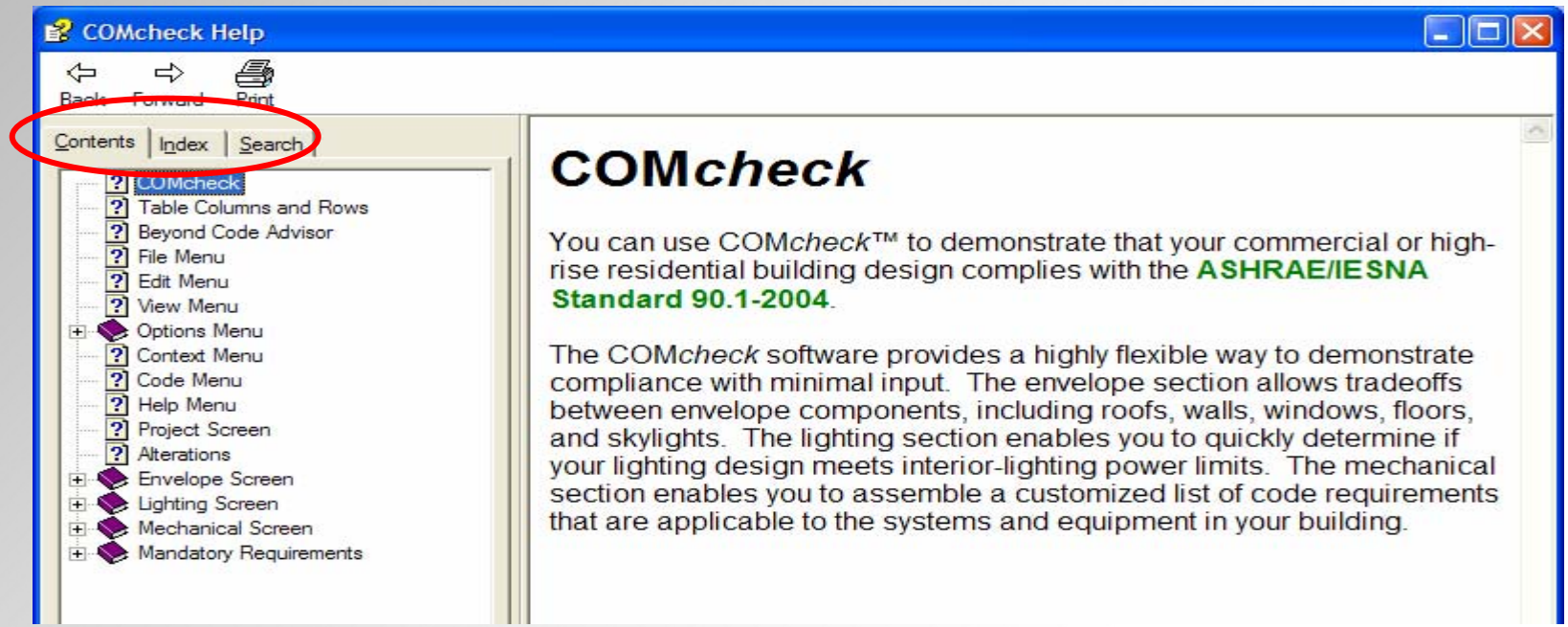
Preview and Print reports

Save Report to file

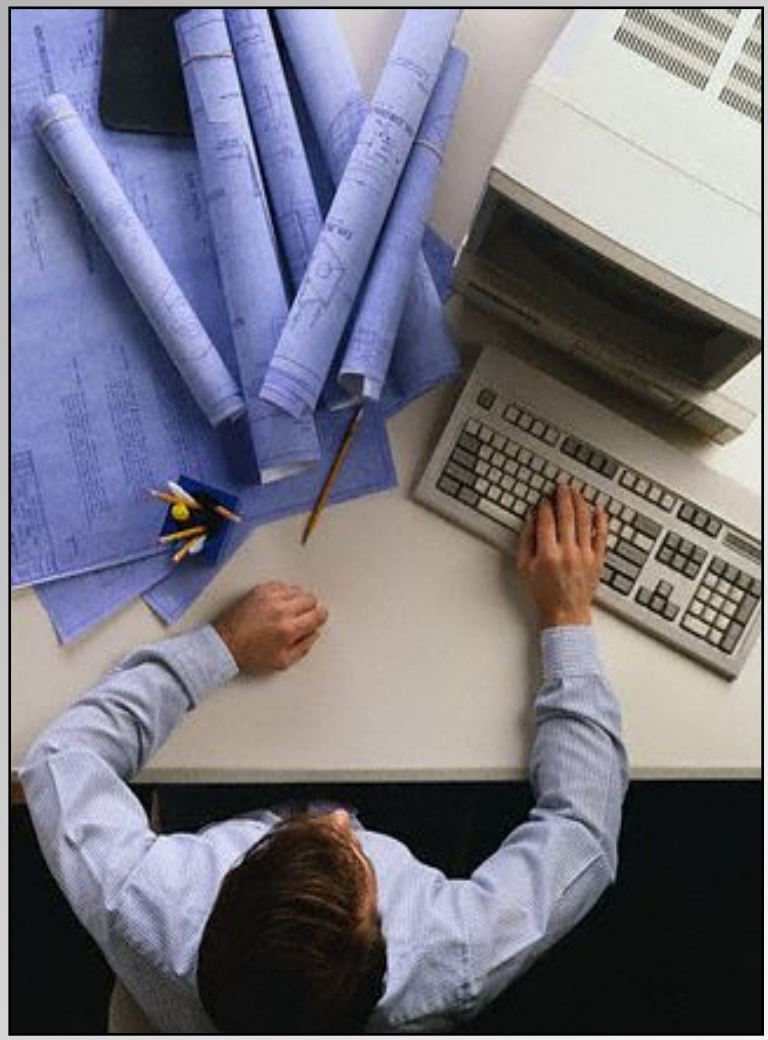


# Need Help?


EZ-Casestudy.cck - COMcheck 3.4.1
File
Edit
View
Options
Code
Help
Help Topics
About COMcheck...
Project
Envelope
Lighting
Mechanical
Location
State
Pennsylvania
City
Pittsburgh
Project Details (optional)
This information will appear on the compliance certificate.

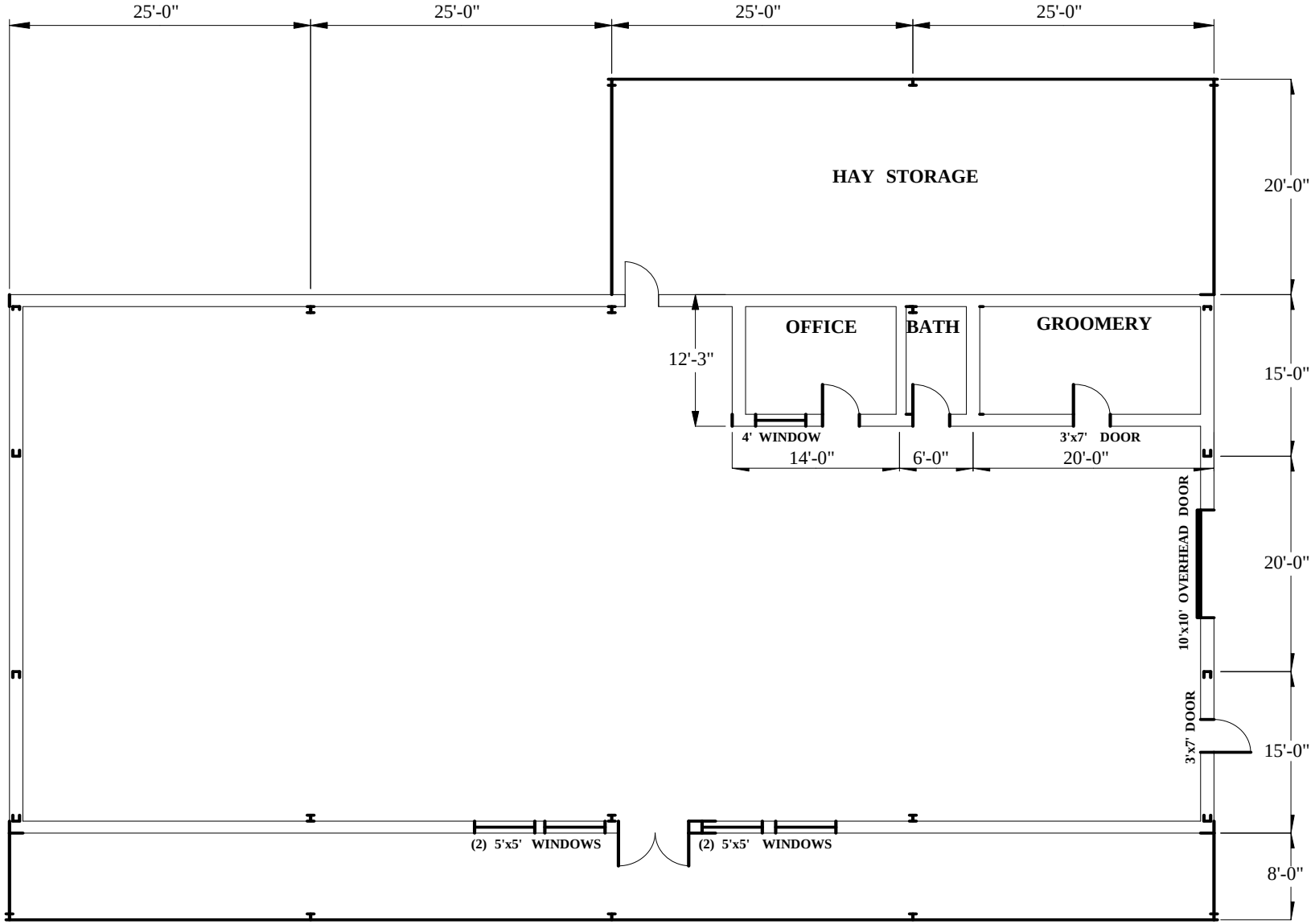

COMcheck Help
Back
Forward
Print
Contents
Index
Search
COMcheck
Table Columns and Rows
Beyond Code Advisor
File Menu
Edit Menu
View Menu
Options Menu
Context Menu
Code Menu
Help Menu
Project Screen
Alterations
Envelope Screen
Lighting Screen
Mechanical Screen
Mandatory Requirements
COMcheck
You can use COMcheck™ to demonstrate that your commercial or high-rise residential building design complies with the ASHRAE/IESNA Standard 90.1-2004.
The COMcheck software provides a highly flexible way to demonstrate compliance with minimal input. The envelope section allows tradeoffs between envelope components, including roofs, walls, windows, floors, and skylights. The lighting section enables you to quickly determine if your lighting design meets interior-lighting power limits. The mechanical section enables you to assemble a customized list of code requirements that are applicable to the systems and equipment in your building.

# COM*check* Software Case Studies



# Red Mountain Feed & Irrigation

# •Red Mountain Feed & Irrigation Floor Plan

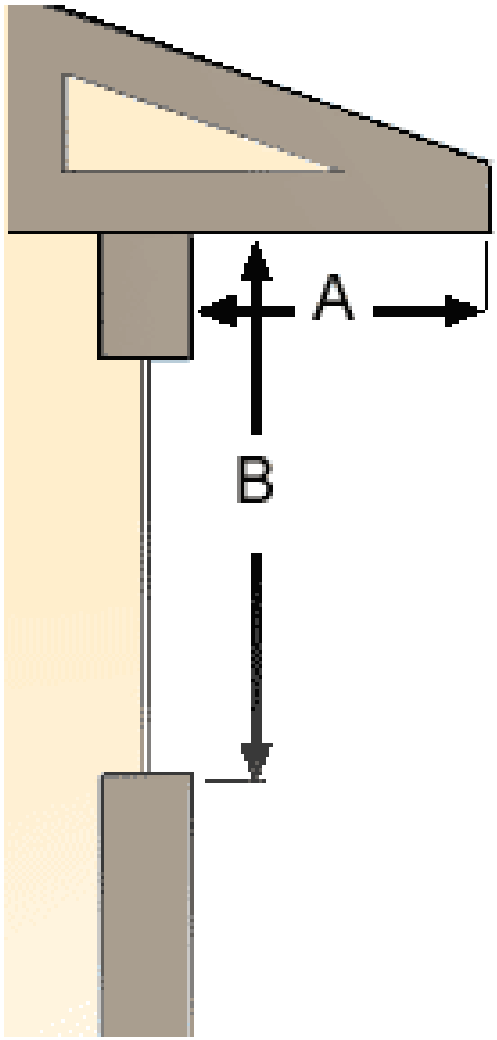


# Spaces

Inside Office/Bathroom

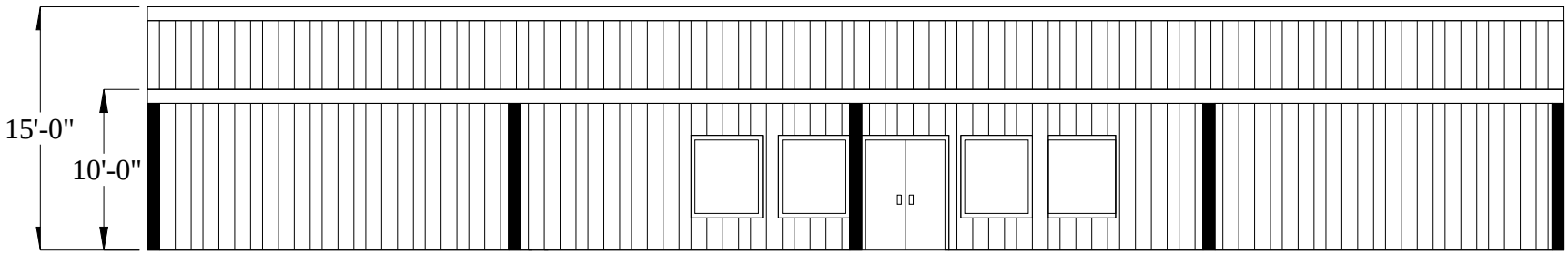
Storage

Overhang/Projection Factor (PF)



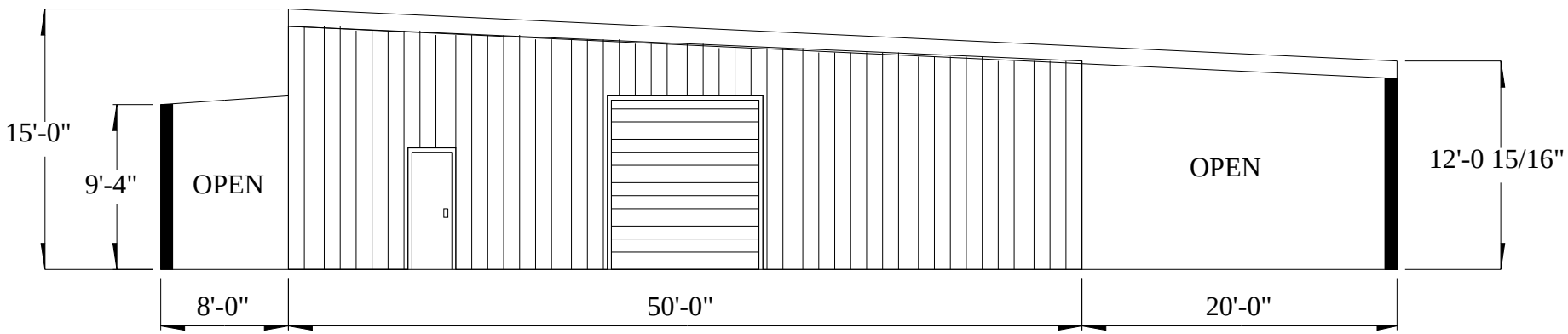

**PF= A/B**

**PF=0.5**

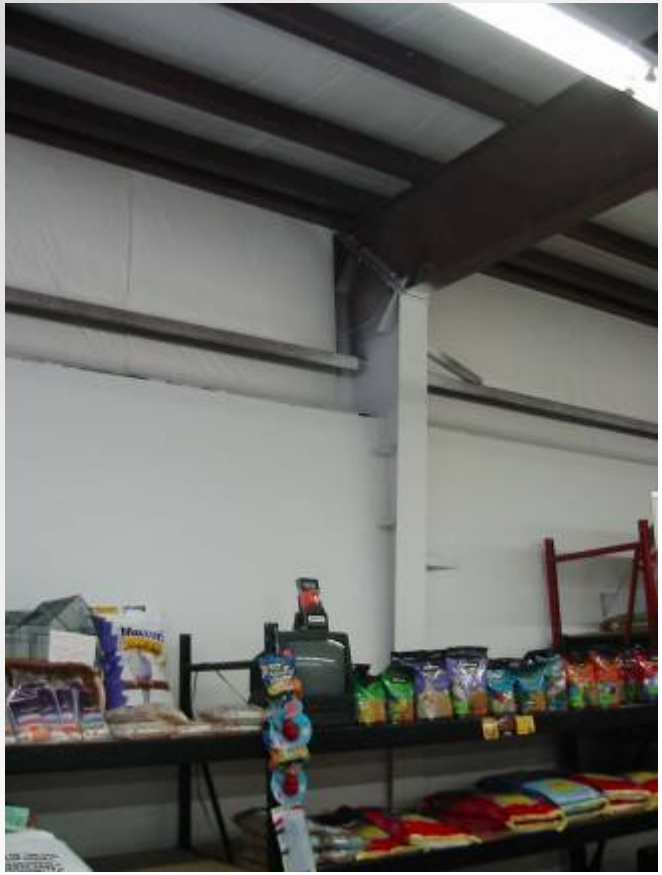



**Exterior Walls**: 3,954 sq.ft.

- 10' High: R10 between girt & metal wall + 2x4 R11 metal studs, 0.071 u-factor, heat capacity=1 (2,176 sq. ft.)
- 5' High: R10 between girt & metal wall (928 sq. ft.)



# Walls



## •Red Mountain Feed Building Envelope

**Roof:** 5,000 sq.ft. Metal w/1" Styrofoam thermal block, R-13 Insulation

**Exterior Walls**: 6,397 sq.ft.

**Windows:** 144 sq.ft. Metal Frame, double pane, tinted, U-factor .75, SHGC .88, PF .33

Glass Doors: 42 sq. ft., Metal Frame, U-factor .92, SHGC .87, PF, .33

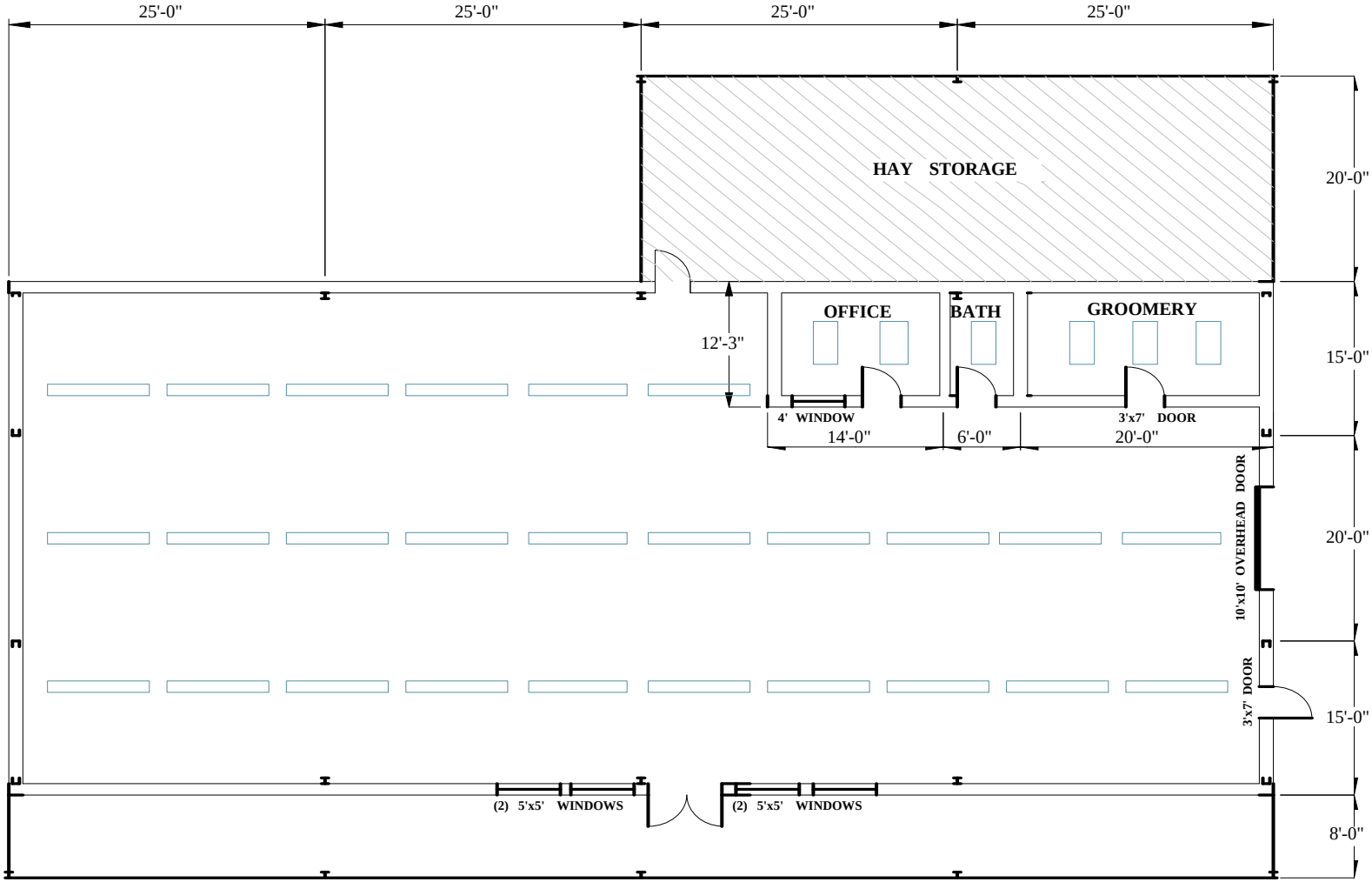
Window/Wall Ratio = 2.9%

**Doors**: 100 sq. ft. Overhead Metal, U-value .60, other metal-42', u-value 1.20

**Floor:** 5000sq.ft./300 linear feet, unheated slab on grade, R10 2' vertical

# Lighting

# •Red Mountain Feed Lighting Plan



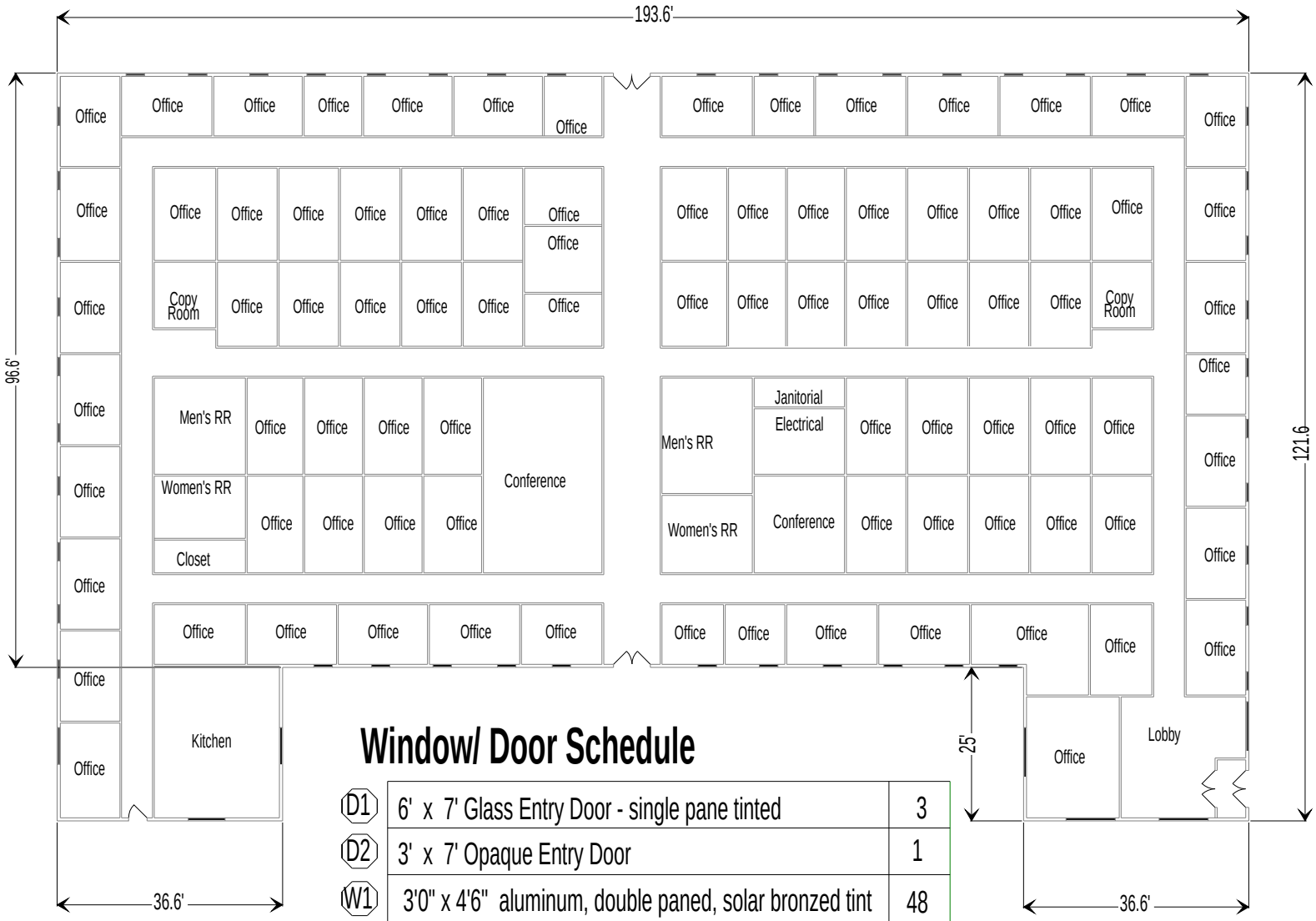

Lighting Schedule
8' Industrial Fluorescent, 2 F96T12 Slimline Lamps & Energy Saving Magnetic Ballast
43 Fixtures, 173 watts/fixture
2'x4" Troffer 2 F32T8 lamps and GEB, 6 Fixtures, 59 watts/fixture

# Heating System

Pellet Stove

Unit Heater

# •Sigma 4 Bldg. Floor Plan




## Window/ Door Schedule

| | | |
|---|---|---|
| D1 | 6' x 7' Glass Entry Door - single pane tinted | 3 |
| D2 | 3' x 7' Opaque Entry Door | 1 |
| W1 | 3'0" x 4'6" aluminum, double paned, solar bronzed tint | 48 |
| W2 | 8'0" x 7'0" aluminum, double paned, solar bronzed tint | 4 |
| W3 | 6'0" x 7'0" aluminum, double paned, solar bronzed tint | 3 |

## •Sigma 4 Bldg.
## Building Envelope

**Roof:** 20,532 sq.ft. Wood truss R-38 Insulation

**Exterior Walls**: 8172 sq.ft. 2 X 4 Metal Frame at 16" O.C., R-15 Insulation

Walls Perimeter = 681 ln. ft.

**Windows:** 998 sq.ft. Metal Frame, double pane, tinted, U-value .69, SHGC-Value .57, P.F. .50

Window/Wall Ratio = 12%

**Glass Doors**: 126 sq. ft. Clear Glazing, U-value .92, SHGC-Value .47

**Metal Door**: 21 s.f. U-value .70

**Floor:** 20,532 sq. ft./681 linear feet, unheated slab on grade, no insulation

2 Storage Water Heaters, Electric, 80 gal. capacity

**Activity Areas**

**Office:** 15,849 sq.ft.

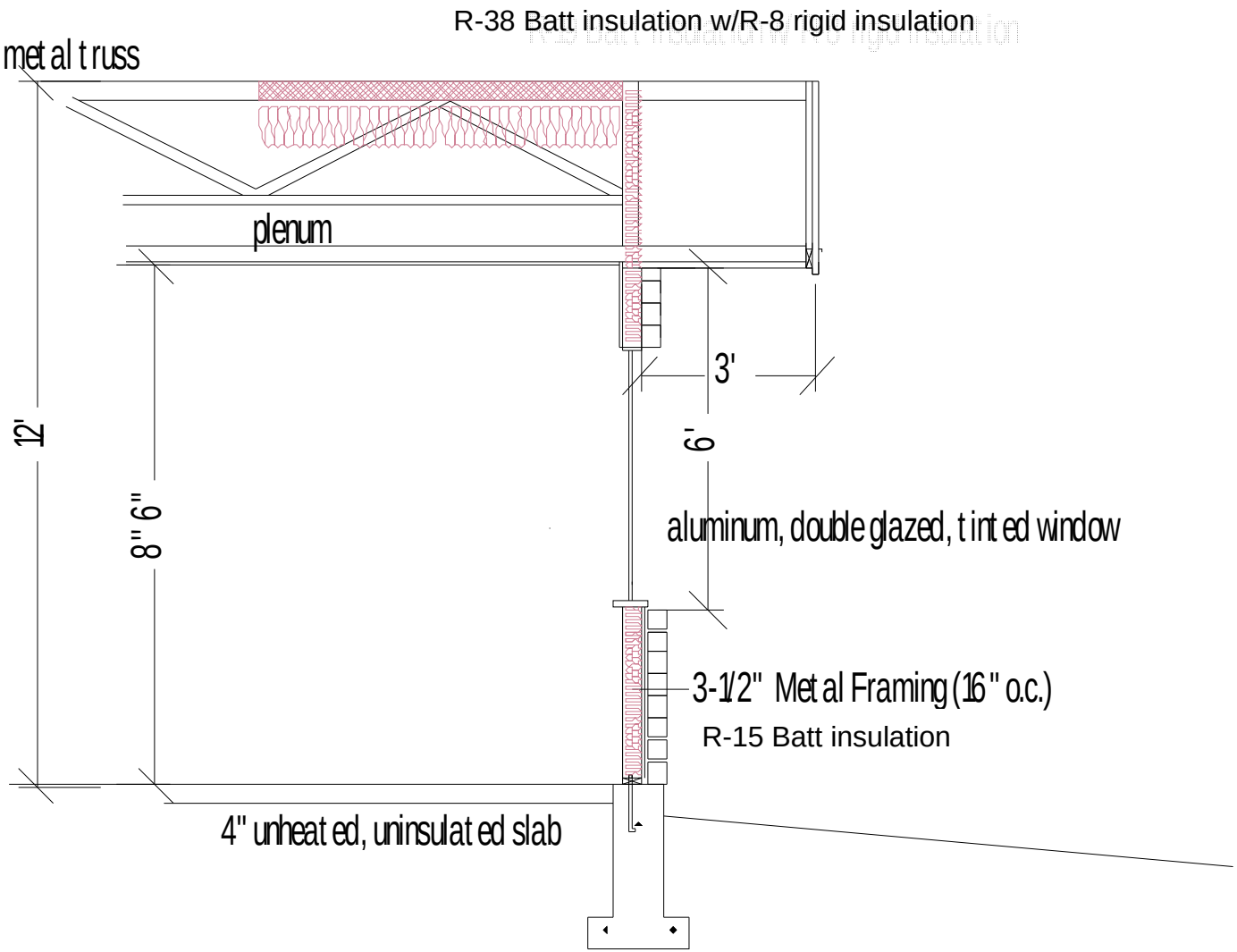
**Halls/Corridors/Transitions:** 3338 sq.ft.

**Restrooms:** 500 sq.ft.

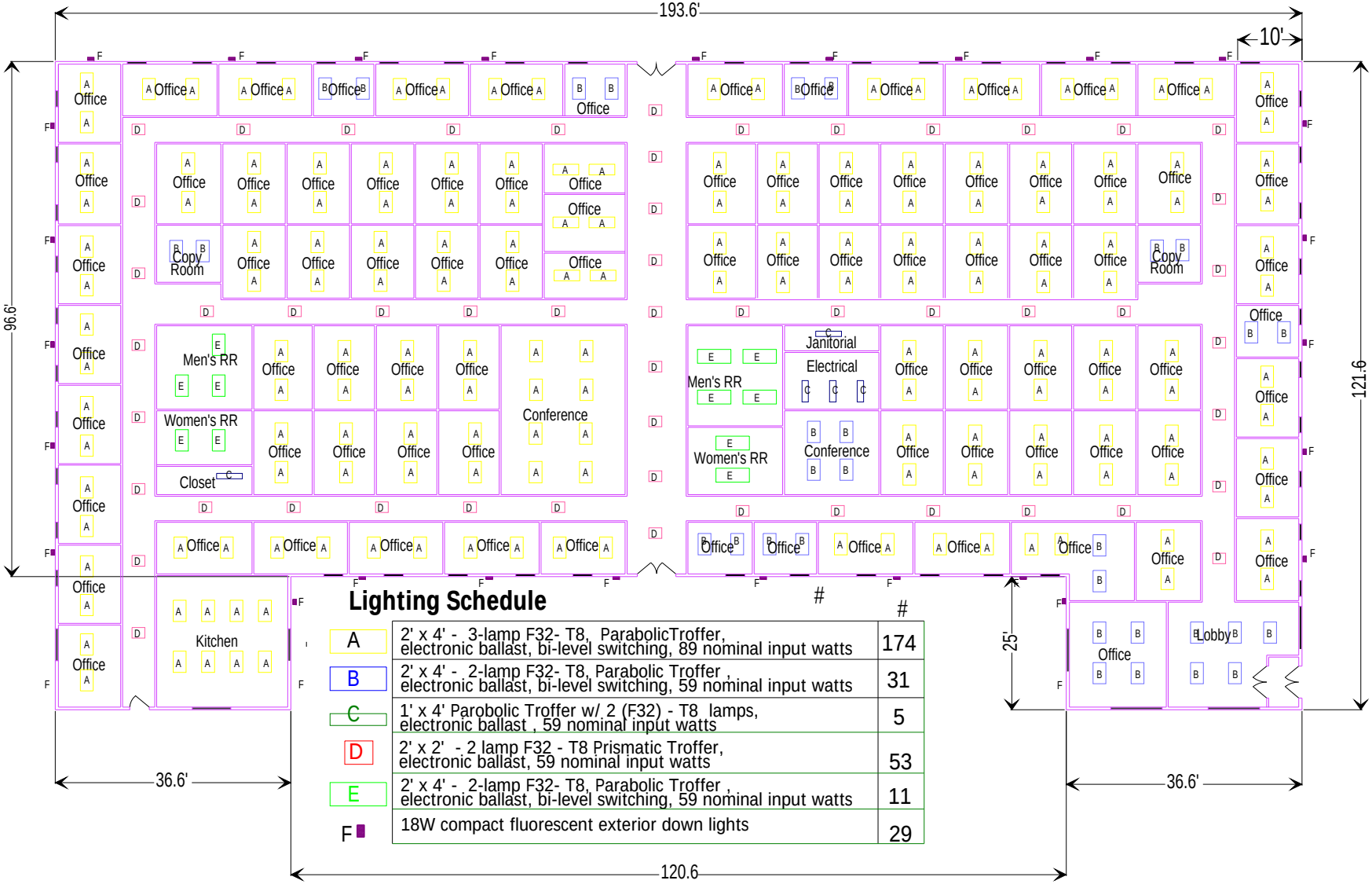
**Kitchen:** 505 sq.ft.

**Lobby:** 340 sq.ft.

# Building Section



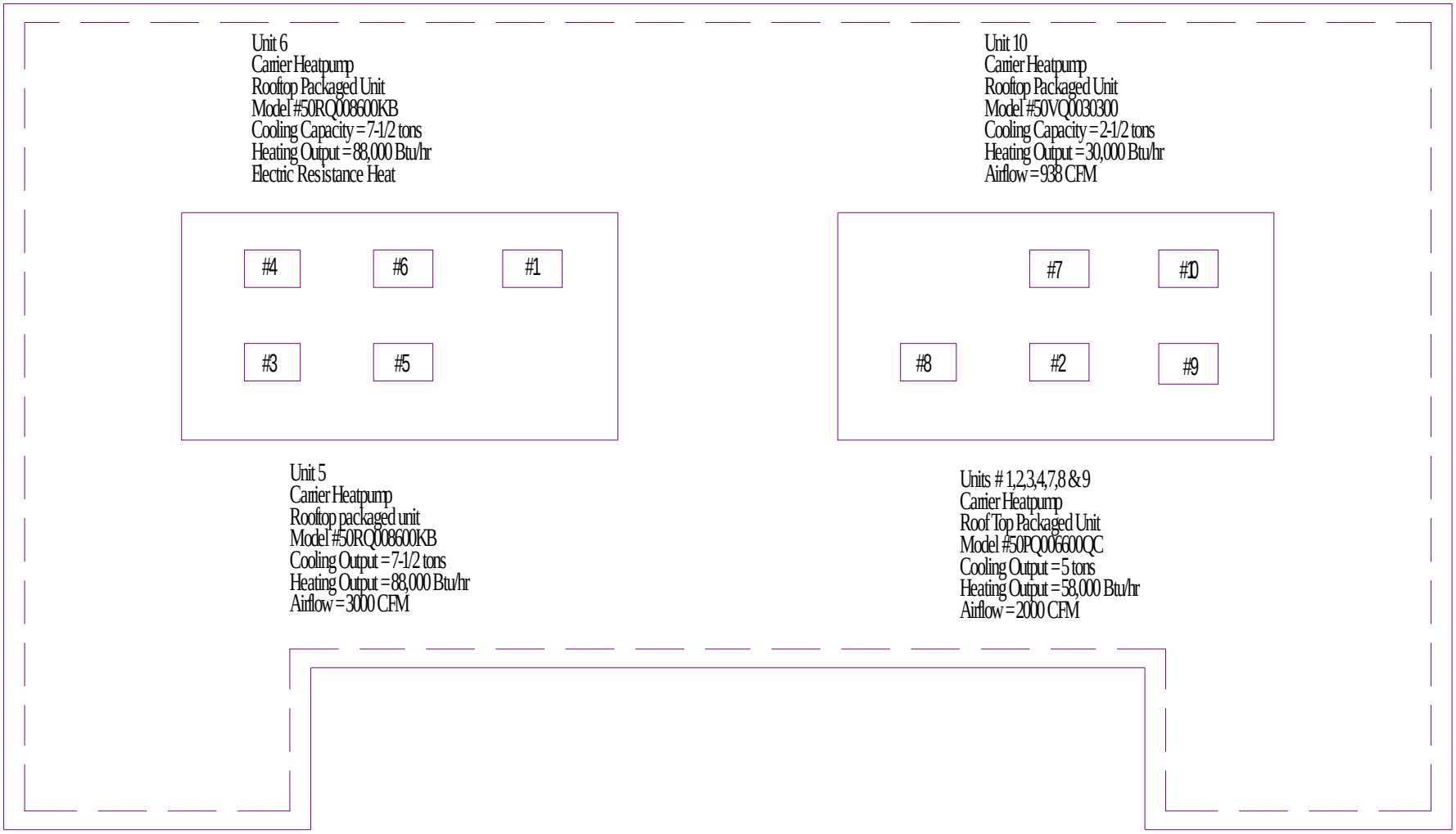
# •Sigma 4 Bldg.
# Lighting Plan – Existing Lighting




## Lighting Schedule

| | | # |
|---|---|---|
| A | 2' x 4' - 3-lamp F32- T8, ParabolicTroffer, electronic ballast, bi-level switching, 89 nominal input watts | 174 |
| B | 2' x 4' - 2-lamp F32- T8, Parabolic Troffer , electronic ballast, bi-level switching, 59 nominal input watts | 31 |
| C | 1' x 4' Parobolic Troffer w/ 2 (F32) - T8 lamps, electronic ballast , 59 nominal input watts | 5 |
| D | 2' x 2' - 2 lamp F32 - T8 Prismatic Troffer, electronic ballast, 59 nominal input watts | 53 |
| E | 2' x 4' - 2-lamp F32- T8, Parabolic Troffer , electronic ballast, bi-level switching, 59 nominal input watts | 11 |
| F | 18W compact fluorescent exterior down lights | 29 |

# •Sigma 4 Bldg. Mechanical Plan



# Questions/Comments

- Help Desk – on-line electronic form

http://www.energycodes.gov/support/helpdesk.php

- Email

Techsupport@becp.pnl.gov



PNNL-SA-56177