



LOADS AND ENERGY
CALCULATION FOR
COMMERCIAL BUILDINGS
USING HAP v6
3D MODELING SOFTWARE

TRAINING
COURSE

WELCOME



Welcome (Newest)



Vincent Puleo
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Welcome



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Welcome



Bob Feduik, PE, LEED, AP BD&C, BEMP
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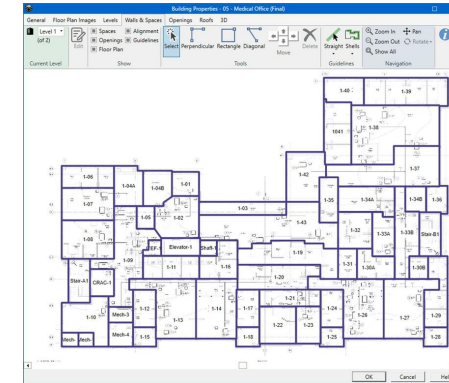
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HAP v6.0

First Step In Transformation

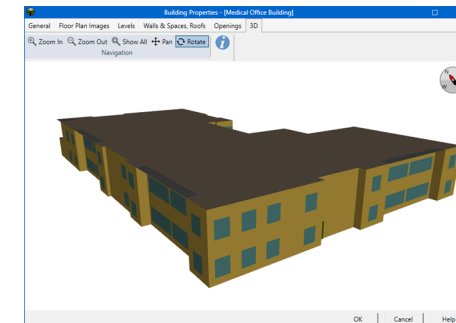
Track 1 – Streamlined Building Modeling

- Graphical input of building floor plans
- 3D visualization of building
- Streamlined room definition



Track 2 – Enhanced Calculations

- Integration with EnergyPlus™ engine
- Heat Balance Method load calculations
- More accurate representation of building physics
- Advanced system simulations

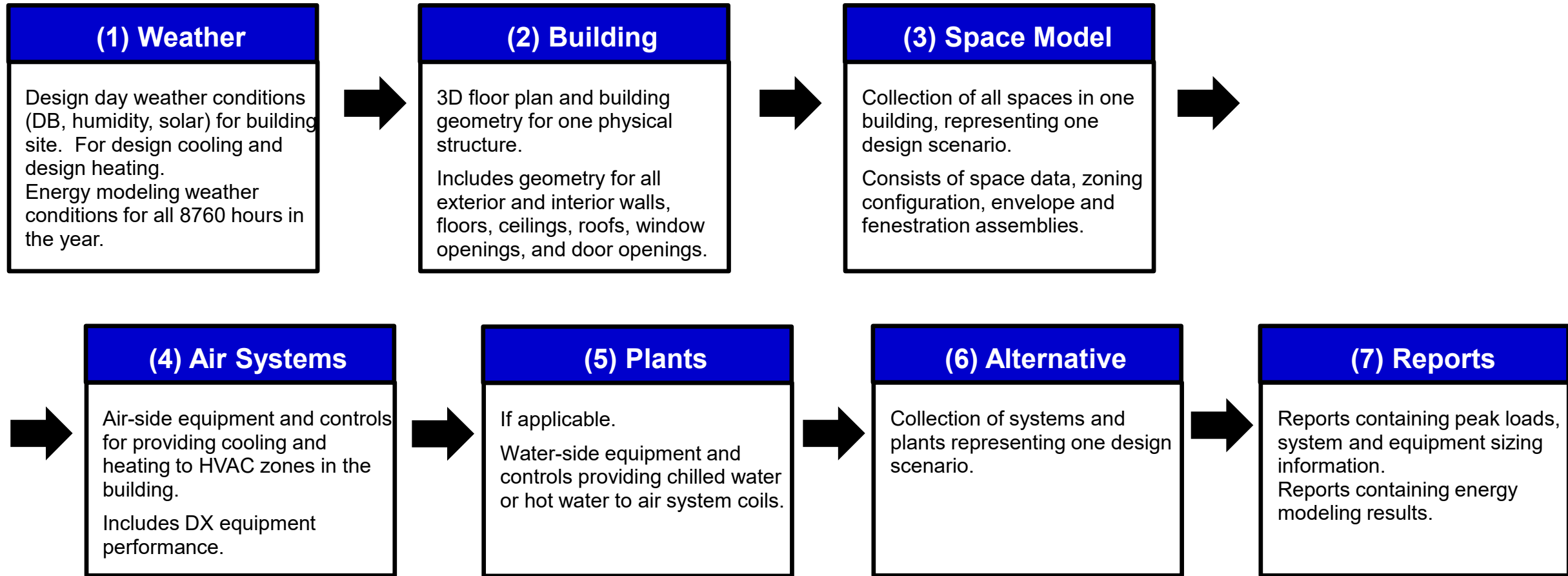


Track 3 – User Interface Features

- Other feature and productivity enhancements

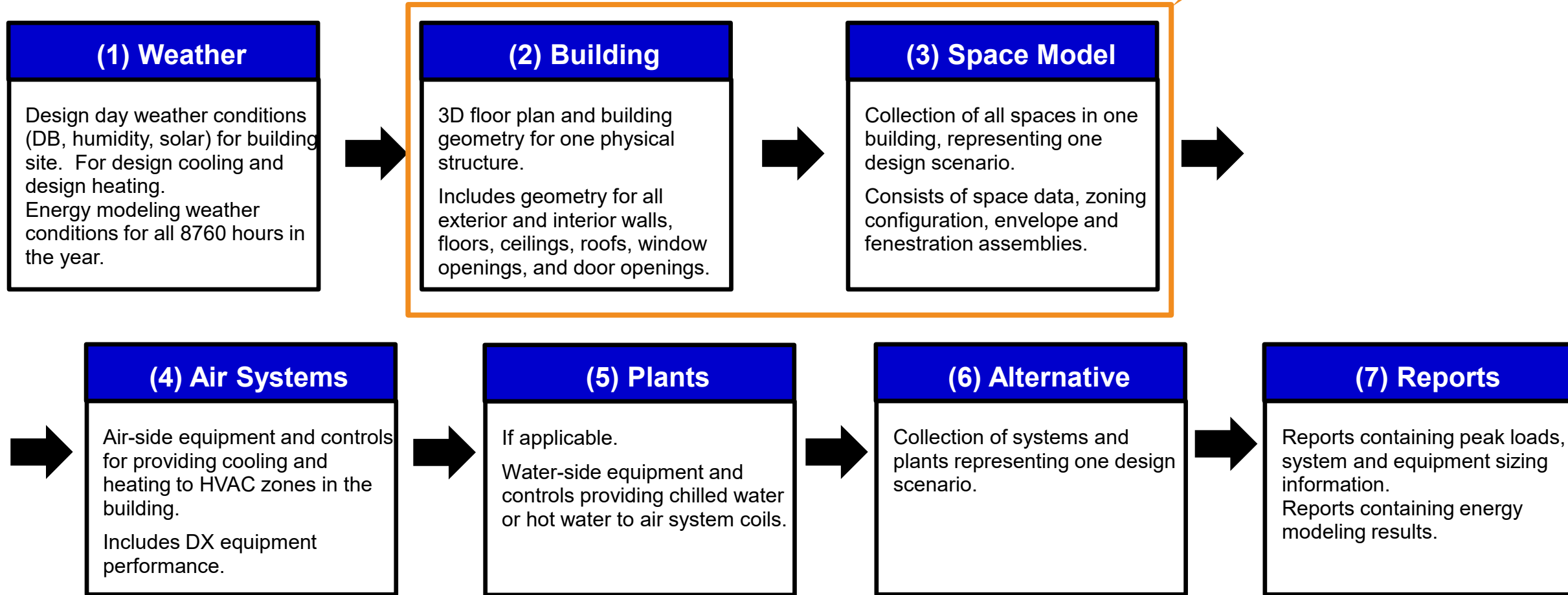


HAP 6.0 Project Workflow



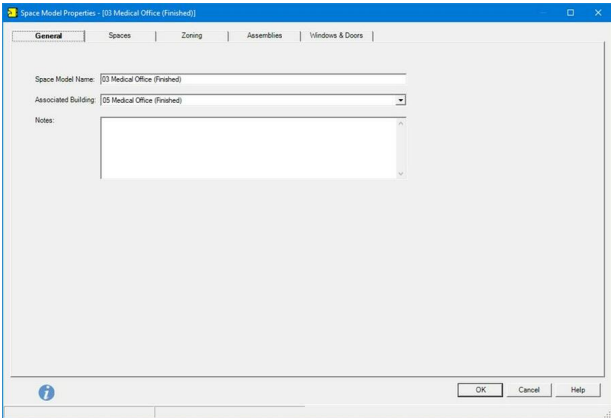
HAP 6.0 Project Workflow

Focus of
Demo



HAP 6.0 Space Model Workflow

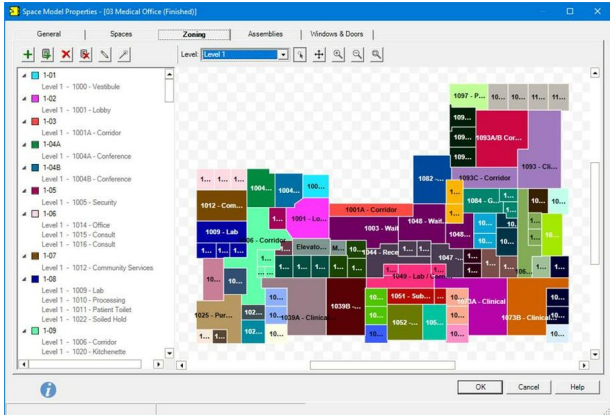
(1) Create Space Model



(2) Assign Space Types / Customize Space Data

Space	Level	Floor Area (sqm)	Space Type	ASHRAE Standard 62.1-2016 Space Usage	OA Requirement 1 Airflow Units	OA Requirement 2 Airflow Units	Direct
1000 - Vestibule	Level 1	15.3	Lobby - All Others	PUBLIC ASSEMBLY: Lobby	2.4 L/s/person	0.30 L/s/sqm	
1001 - Lobby	Level 1	40.1	Lobby - All Others	PUBLIC ASSEMBLY: Lobby	2.4 L/s/person	0.30 L/s/sqm	
1001A - Corridor	Level 1	27.4	Corridor - All Others	GENERAL ASSEMBLY: Lobby	0.0 L/s/person	0.30 L/s/sqm	
1003 - Waiting	Level 1	45.0	Lobby - All Others	PUBLIC ASSEMBLY: Lobby	2.4 L/s/person	0.30 L/s/sqm	
1004A - Conference	Level 1	25.0	Conference Room	GENERAL Conference/Meeting	2.4 L/s/person	0.30 L/s/sqm	
1004B - Conference	Level 1	22.3	Conference Room	GENERAL Conference/Meeting	2.4 L/s/person	0.30 L/s/sqm	
1005 - Security	Level 1	9.1	Office - Enclosed, Small	OFFICE Office	2.4 L/s/person	0.30 L/s/sqm	
1006 - Corridor	Level 1	57.7	Corridor - All Others	GENERAL Corridor	0.0 L/s/person	0.30 L/s/sqm	

(3) Configure HVAC Zones



(4) Assign Envelope Assemblies

Surface Type	Surface Group	Selected Assembly
Exterior Above Grade Wall	Default	Level 1 Exterior - Brick Cladding over Steel Framed Wall
Exterior Wall - Level 2		Level 2 Stucco Steel-Framed Wall - 2016 Compliant
Exterior Wall - Stairwell		Stairwell Exterior - Stucco over CMU
Interior Wall	Default	Interior Gypsum Board Wall
Interior Wall - Elevator Shaft		Elevator Shaft Interior Walls
Interior Wall - Stairwell		Stairwell Interior Walls
Roof	Default	2016 Zone 0 Insulation entirely above deck
Ceiling	Interior Ceilings	Acoustic Tile Ceiling
Floor Above Space	Interior Floors Above Space	Mass floor above space
Slab Floor On Grade	All-Grade Floors	2016 Zone 0 Slab-on-grade floor, unheated
Floor Above Ambient	Floor Above Ambient	Mass floor above ambient

(5) Assign Window and Door Assemblies

Opening Type	Tag	Width x Height, Elevation	Selected Assembly
Window	V001	1800 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V002	3048 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V003	5203 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V004	2032 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V005	2718 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V006	13205 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V007	6402 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V008	203 mm x 2489 mm, 102 mm	2016 Zone 0 Metal framing, fixed
	V009	4267 mm x 2489 mm, 102 mm	2016 Zone 0 Metal framing, fixed
	V010	3404 mm x 2489 mm, 102 mm	2016 Zone 0 Metal framing, fixed
	V011	3404 mm x 2489 mm, 102 mm	2016 Zone 0 Metal framing, fixed
	V012	3912 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V013	2388 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V014	965 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
	V015	435 mm x 1829 mm, 762 mm	2016 Zone 0 Metal framing, fixed
Door	D001	3035 mm x 2134 mm	2016 Zone 0 Glass, metal framing, entrance door
	D002	965 mm x 2134 mm	2016 Zone 0 Opaque, swinging

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 - g) [Review Completed Space Model](#)
13. **Systems, Plants, Alternatives**
 - a) [Systems, Plants, Alternatives](#)

Course Objectives



100% NEW
HAP v6

1. Define building preferences, building type, and space types for an example project utilizing 3D modeling software
2. Utilize Space Type spreadsheet functionality to modify space defaults
3. Configure design and simulation weather data for jobsite location
4. State the benefits behind heat balance calculation methodology used in 3D software
5. Create a modeled building by import, calibration, and alignment of floor plan images
6. Sketch over room boundaries to create space sizes and orientations
7. Define the wall group types for our example building
8. Visually inspect the 3D rendering of the building
9. Define and configure a Space Model
10. Describe four possible methods to zone the building
11. Review a configured air-cooled chiller fan coil system and calculate the heat balance summary
12. Calculate and interpret an unconditioned space min and max temperature



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TRANSITIONING
TRANSFORMING



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Transitioning to HAP v6



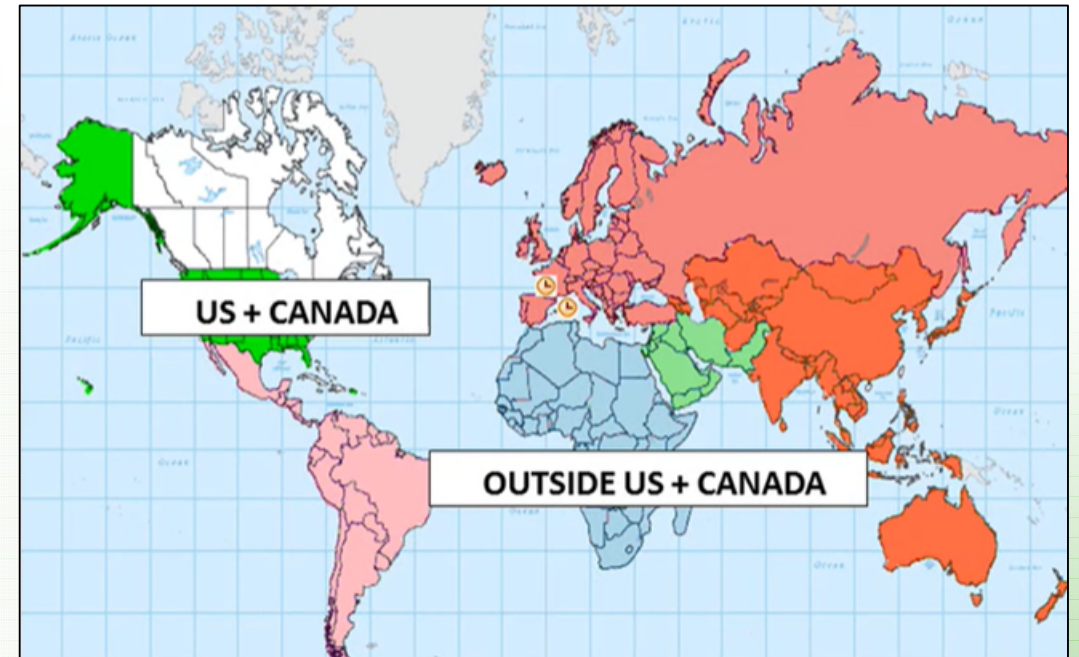
USA and Canadian users can choose to run 5.11 or the new HAP v6 or both! They will keep their current version of HAP and automatically be sent HAP v6 as part of their license agreement. Any questions email:

SOFTWARE.SYSTEMS@CARRIER.COM.

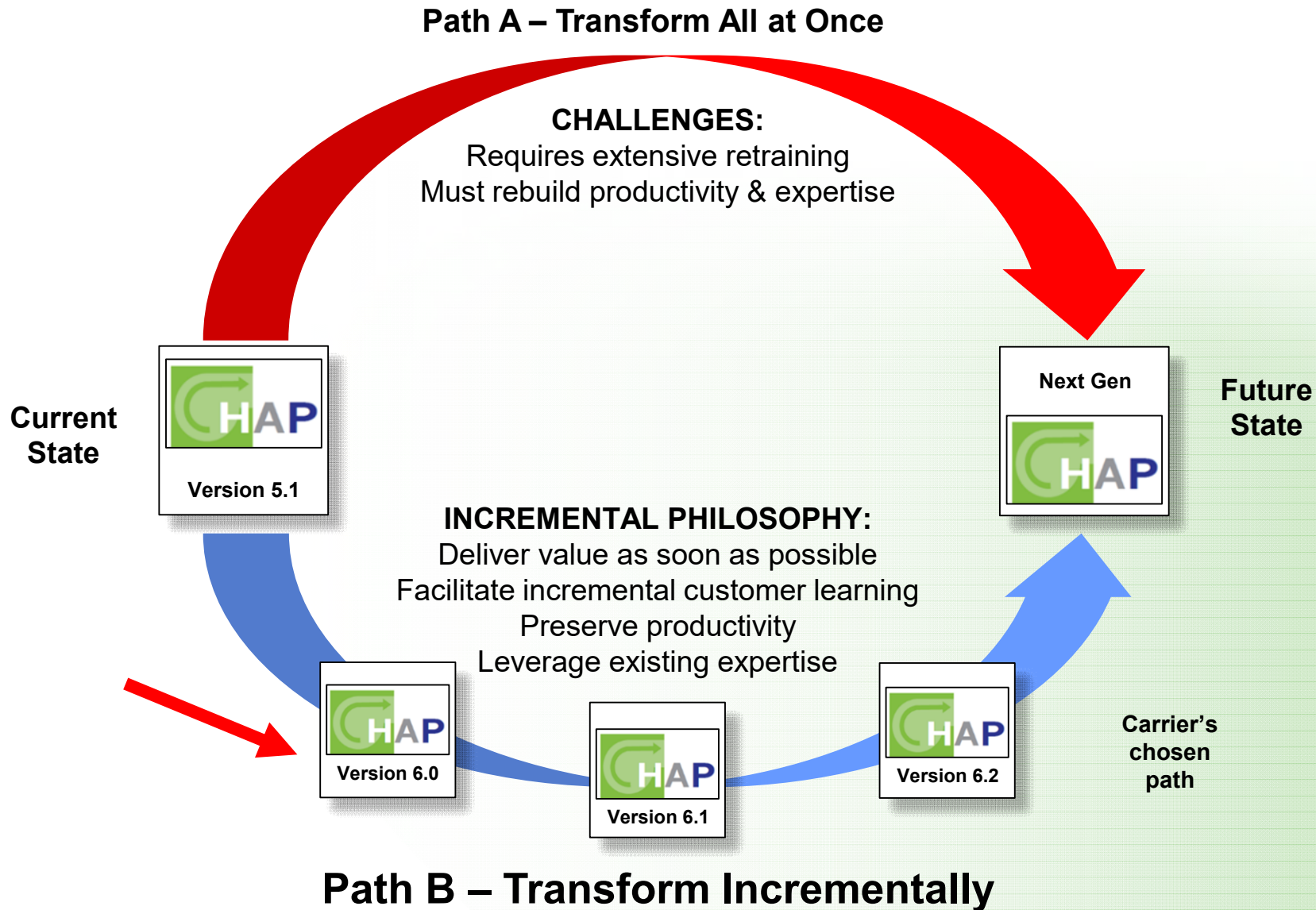
Users outside of the USA and Canada will obtain HAP v6 from their local HAP Champion. For questions email:

SOFTWARE.SYSTEMS@CARRIER.COM

and we can connect you to your Champion



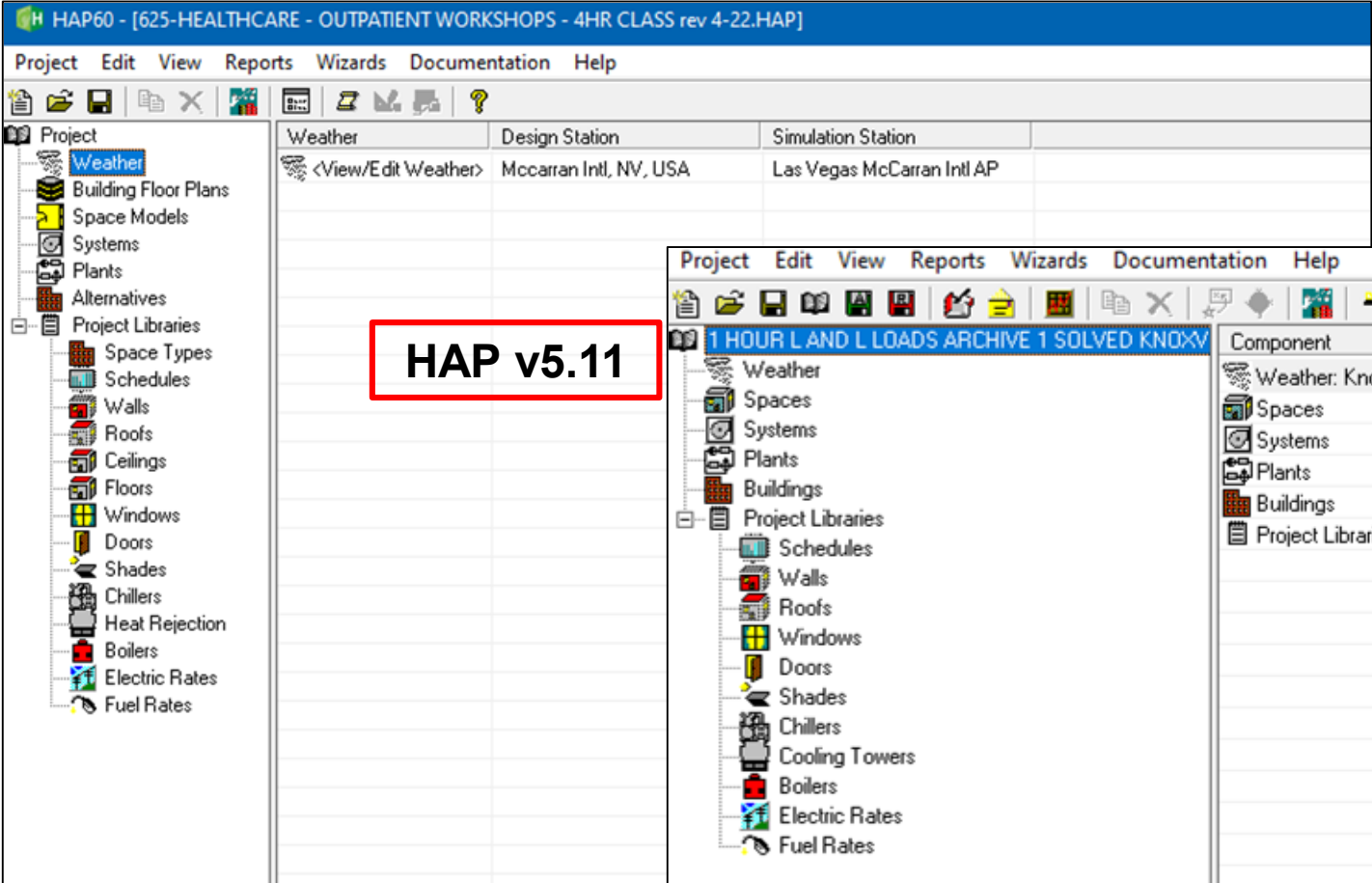
Transforming Incrementally



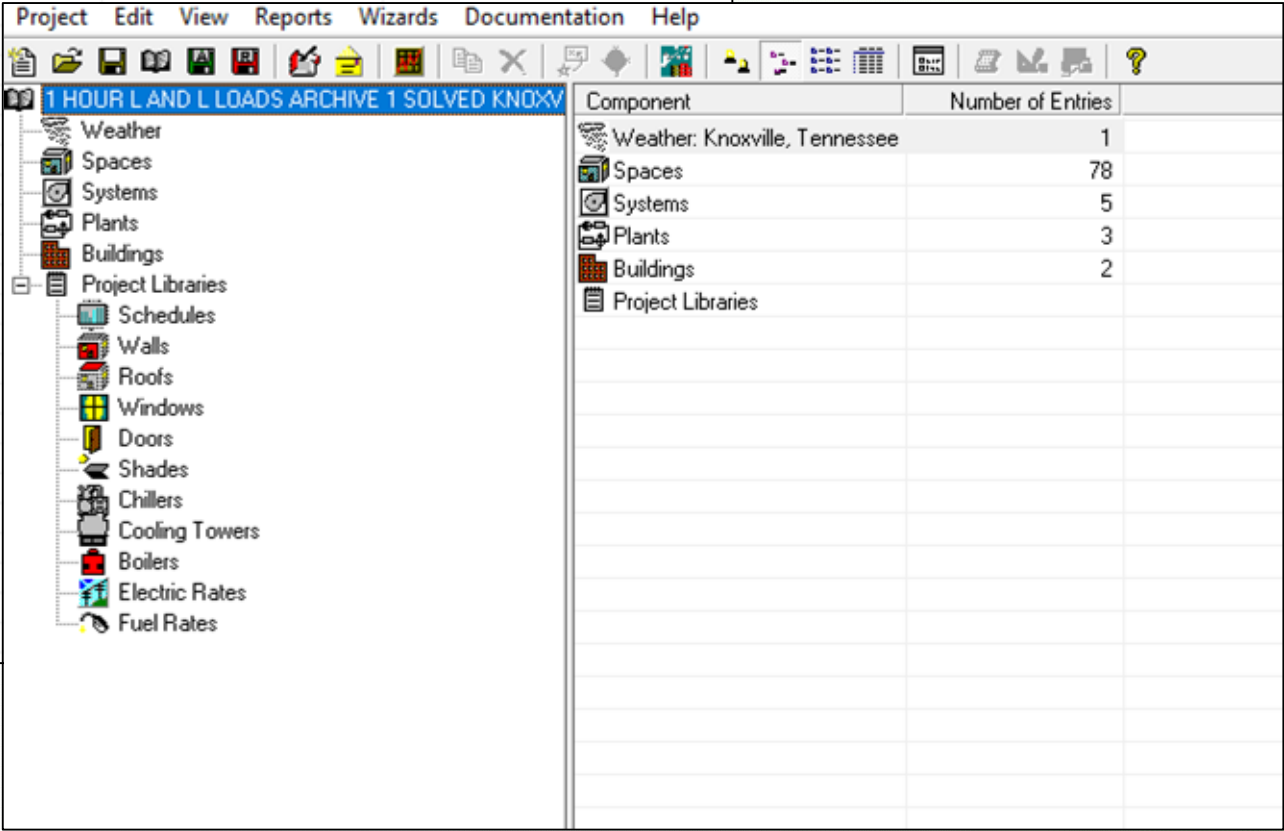
Main Building Interface HAP v6 vs HAP 5.11

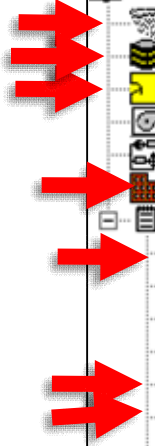


HAP v6.0



HAP v5.11







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3D MODELING SOFTWARE

CONVERTING
DATA FROM
EXISTING HAP
INTO HAP v6



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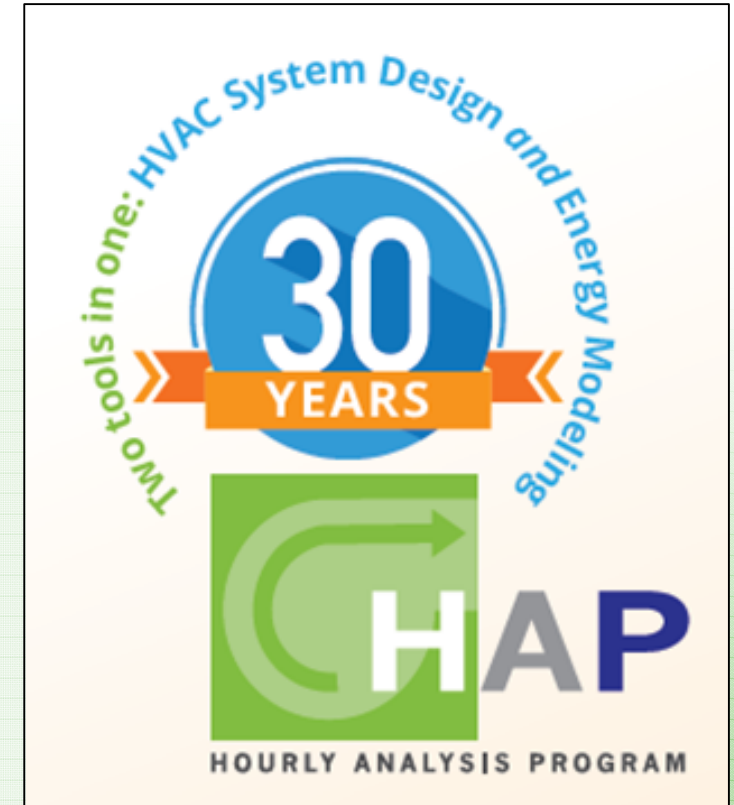
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Converting HAP v5.11 Project Data to HAP v6

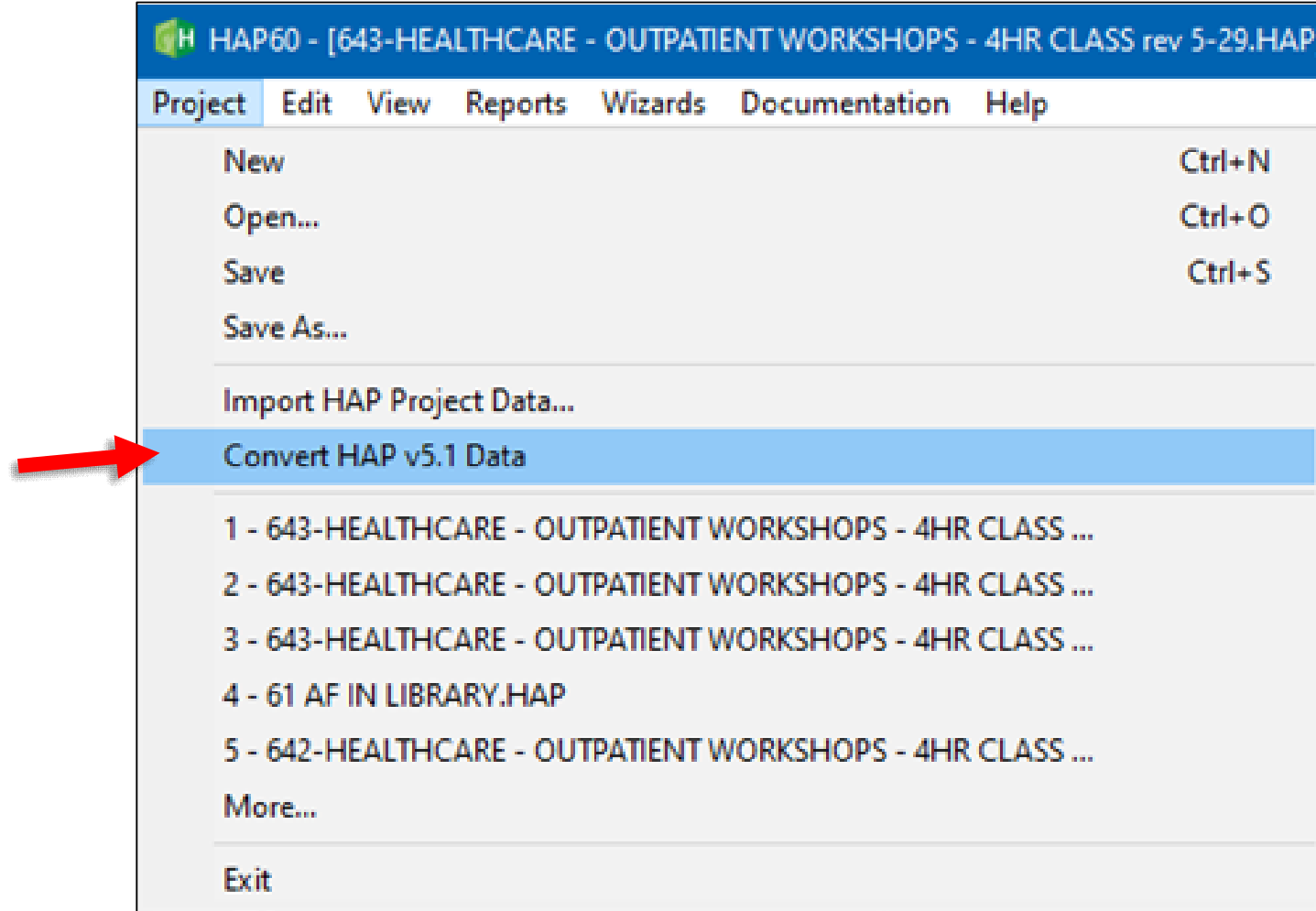


HAP 5.11 Library items can be brought forward into the new HAP v6:

- Schedules
- Wall Assemblies
- Roof Assemblies
- Window Assemblies
- Door Assemblies
- Shading Geometries
- Chillers
- Heat Rejection Equipment
- Boilers
- Electric Rates
- Fuel Rates



Conversion Process



Conversion Process



Conversion Procedure

1. Run HAP v5.1 and use the Archive option on the Project Menu to archive the projects you wish to convert.
2. Run HAP v6.x.
3. Select the New option on the Project Menu to create a new, untitled project.
4. Select the Convert HAP v5.1 Data option on the Project Menu
5. In the file open window select the HAP v5.1 archive file you wish to convert.
6. The contents of the HAP v5.1 archive file will be extracted and then converted to v6.x format. At the end of the conversion a message will appear indicating whether the conversion was successful. Important information about the data conversion can be displayed via the Help button in this message window, or via the following help topic: [About Translation of HAP 5.1 Data](#).
7. After inspecting the converted data, use the Save option on the Project Menu to save the project.



Convert HAP 5.11 Data to HAP v6

HAP60 - [untitled]

ProjectEditViewReportsWizardsDocumentationHelp

Project

Weather

Building Floor Plans

Space Models

Systems

Plants

Alternatives

Project Libraries

Space Types

Schedules

Walls

Roofs

Ceilings

Floors

Windows

Doors

Shades

Chillers

Heat Rejection

Boilers

Electric Rates

Fuel Rates

Component	Count
Weather: Chicago O'hare Intl, IL, USA	1
Buildings	none
Space Models	none
Systems	none
Plants	none
Alternatives	none

Ready

Not Applicable62.1-201690.1-20156/24/202209:20 AM

Type here to search

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045 AM
2022

Converting HAP v5.11 Project Data to HAP v6



Conversion Process

Summary of Tasks

1. We brought the project containing the library data we want to convert from earlier versions of HAP 4.x, 5.x into HAP 5.11 and made an archive of it.
2. We opened HAP v6 and chose “Convert HAP 5.1 Data” then found the archive and brought it in.



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DATA
MANAGEMENT



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Data Management



- All new project data management scheme.
- All projects are a **single, portable .HAP** file.
- Project files can be managed like other common document or spreadsheet files.
 - ▶ Save the file **wherever** you like.
 - ▶ Move the file **whenever** you like.
- No more requirement that the project be a folder of multiple files and must stay in the same location.
- Project Menu options simplified
 - ▶ The only needed options are **New, Open, Save, Delete**
 - ▶ **Archive, Retrieve, Convert options eliminated.**
- Conversion of legacy projects (HAP v5.11 and prior versions) still offered
 - ▶ But **limited to library data as we discussed**
- Revised to install to Program Files folder.
- Features added to do silent installs to support easier IT management in large companies.

Data Management - HAP v6 vs HAP 5.11



The way to think of this is there are two separate data storage scenarios

1. Single file storage versus multiple files-in-a-folder. HAP 6.0 uses single-file storage in a .hap file. HAP 5.11 does not, it stores projects the traditional way – bunch of files in a folder.
2. HAP 6.0 stores full 3D geometry for the building so the position of every space relative to every other space is known. HAP 5.11 does not store any 3D geometry. Spaces are separate things, and the position of a space relative to other spaces is not known. As a result, we can't bring over spaces from HAP 5.11 to 6.0. Only library data can come over.



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CLASS
WORKSHOPS

START-UP
PREFERENCES,
BUILDING & SPACE
TYPES



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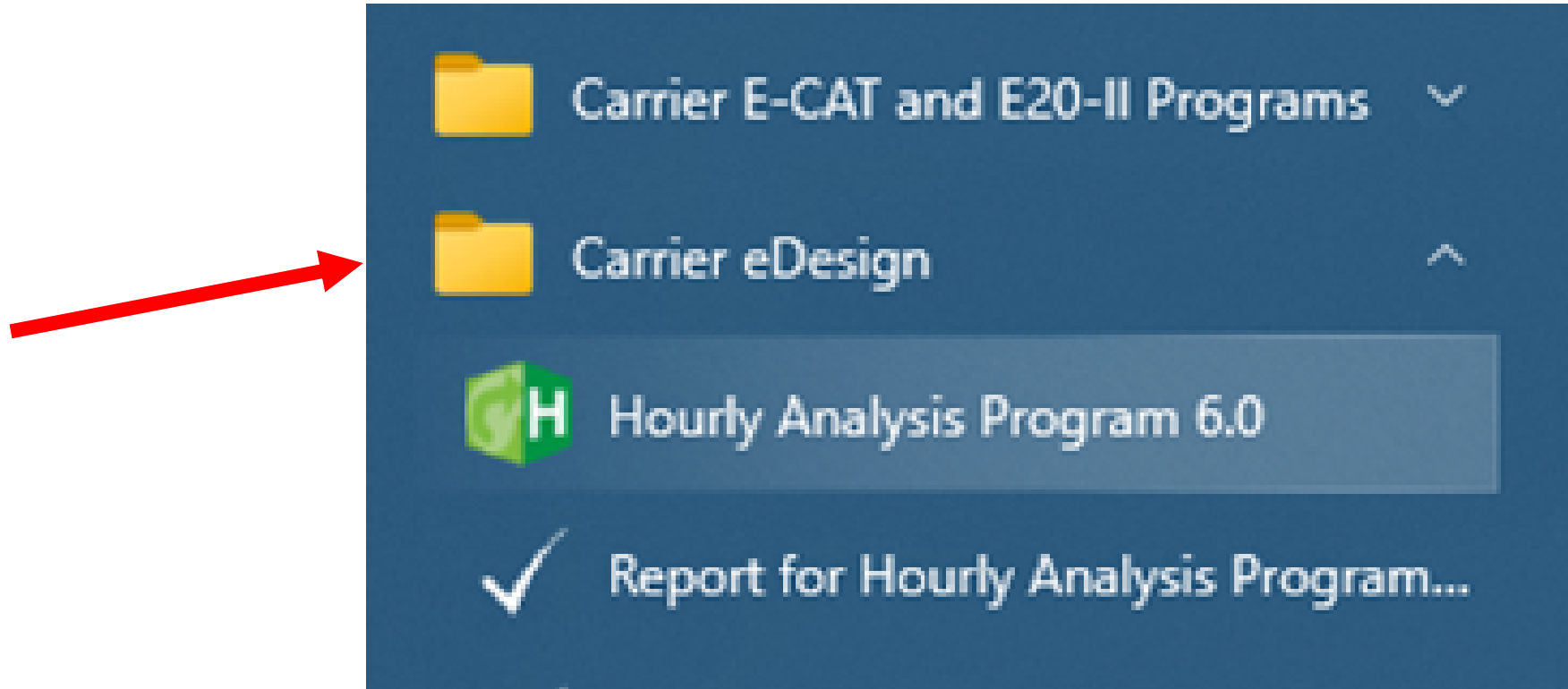
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Healthcare - Outpatient Building Example Bldg.



The example building, we will use in class is a **2-story 37,638 sq ft Healthcare-Outpatient** medical office building with **204 individual spaces/rooms**. Not all of them are conditioned. We will locate in _____ for this class. The block cooling load ranges from 80 to approximately 95 tons total.

HAP V6 Start-Up



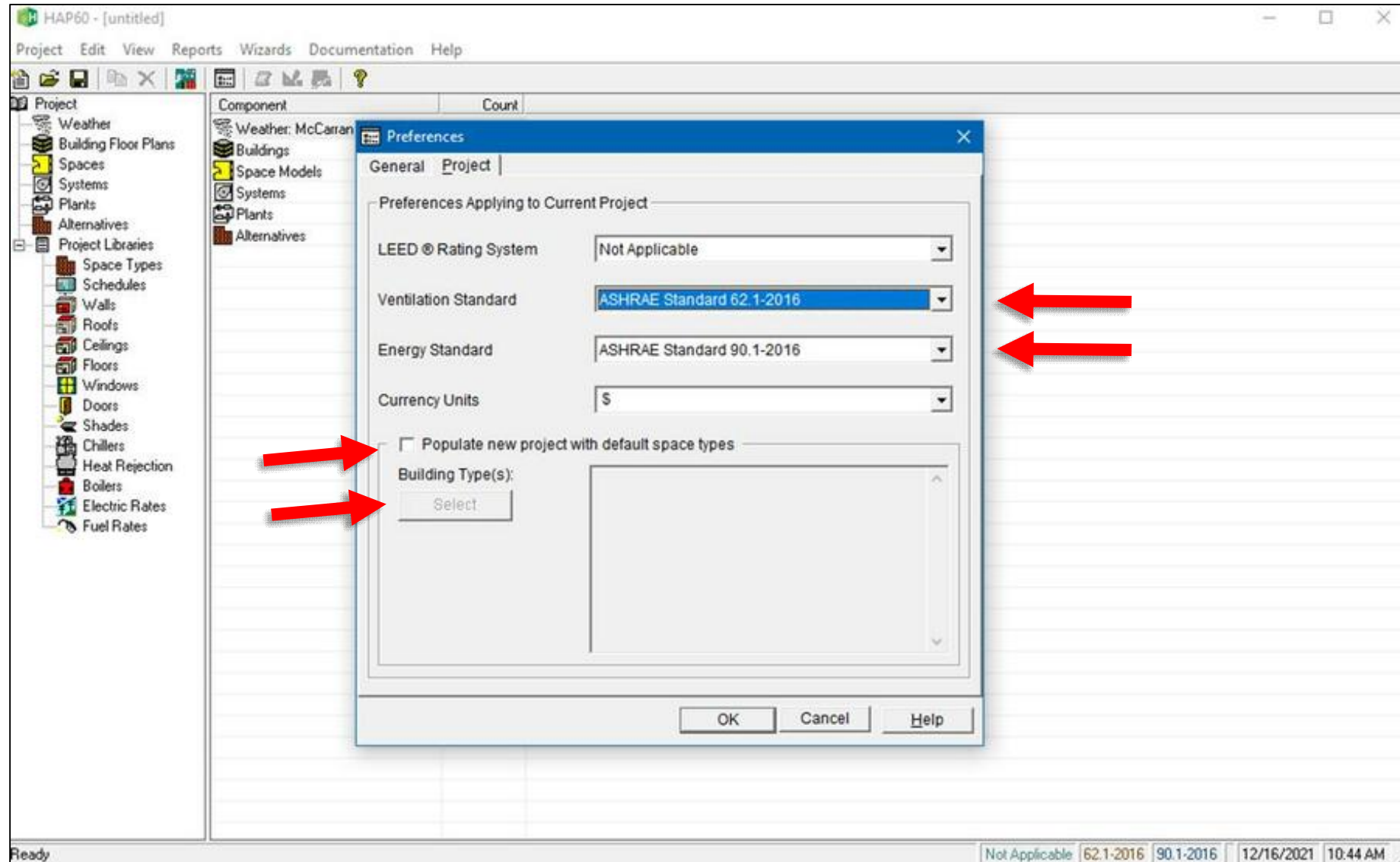
Workshop - Start-Up, Preferences, Building and Space Types



Start HAP v6 Project “New”.....OR...You can start a specific HAP project by clicking on the .HAP project file!

1. On the Project Preferences screen for your new project, select **ASHRAE 62.1 and 90.1- 2016**.
2. Check the option to **populate new project with default space types**
3. Then press the **Select Building Types** button and choose “**Healthcare - Outpatient**” as the building type.
4. Notice there are **31 possible space types** for a Healthcare-Outpatient building type.
5. Then press **OK** to proceed to create the project.
6. The program initially starts in **English** (IP) units. If you need to switch to SI **Metric units**, choose the Preferences option on the View Menu.

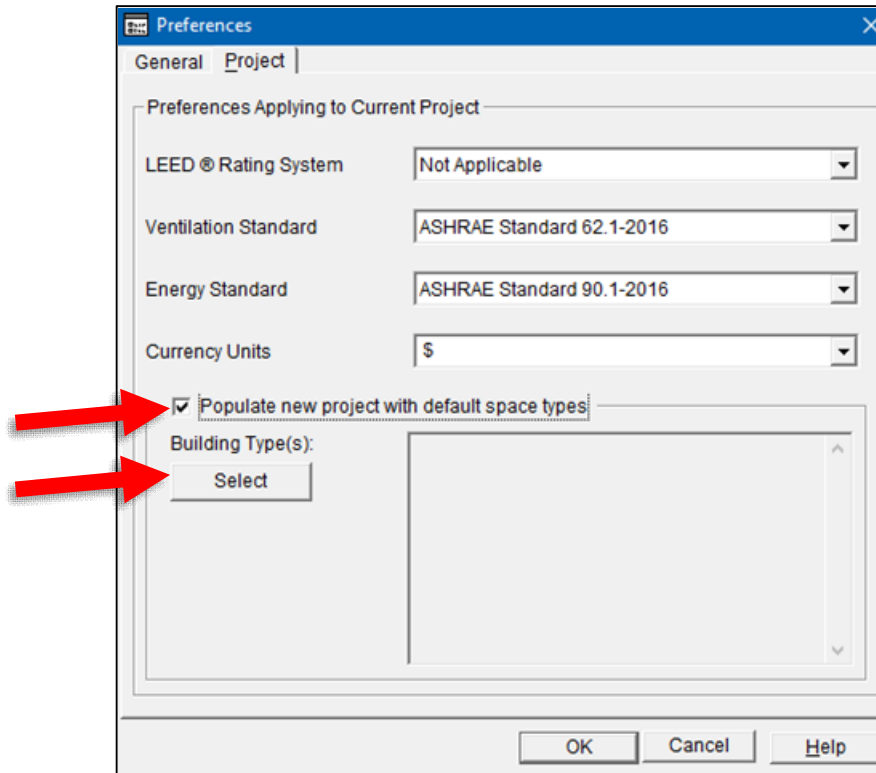
Workshop - Start-Up, Preferences, Building and Space Types



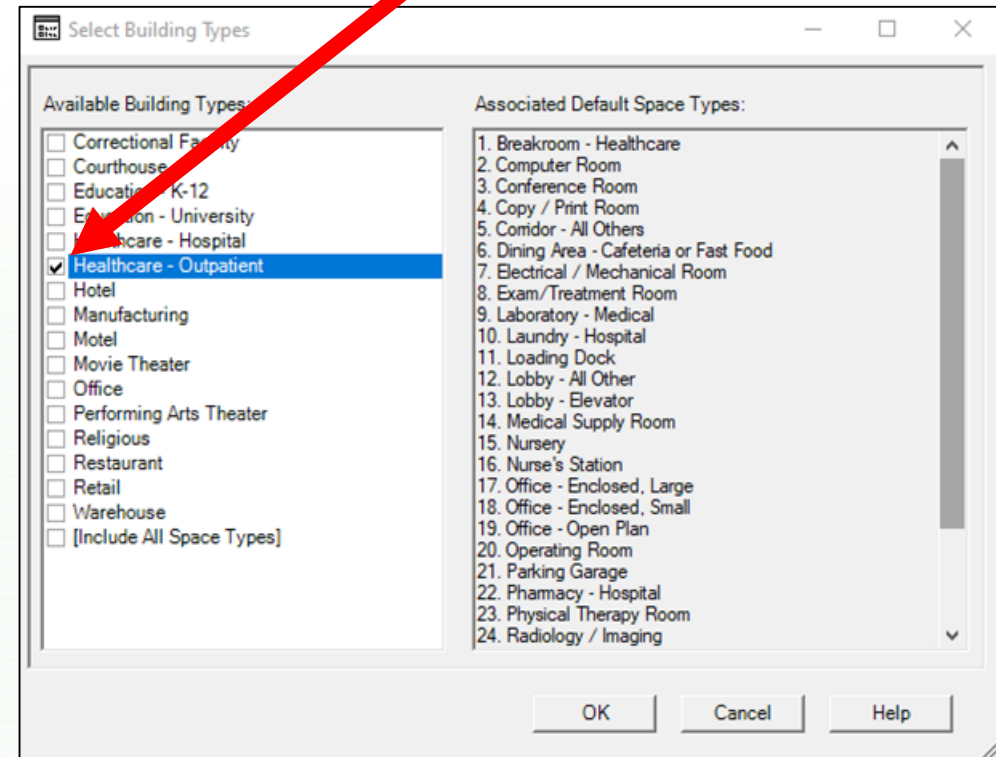
Workshop - Start-Up, Preferences, Building and Space Types



Healthcare-Outpatient



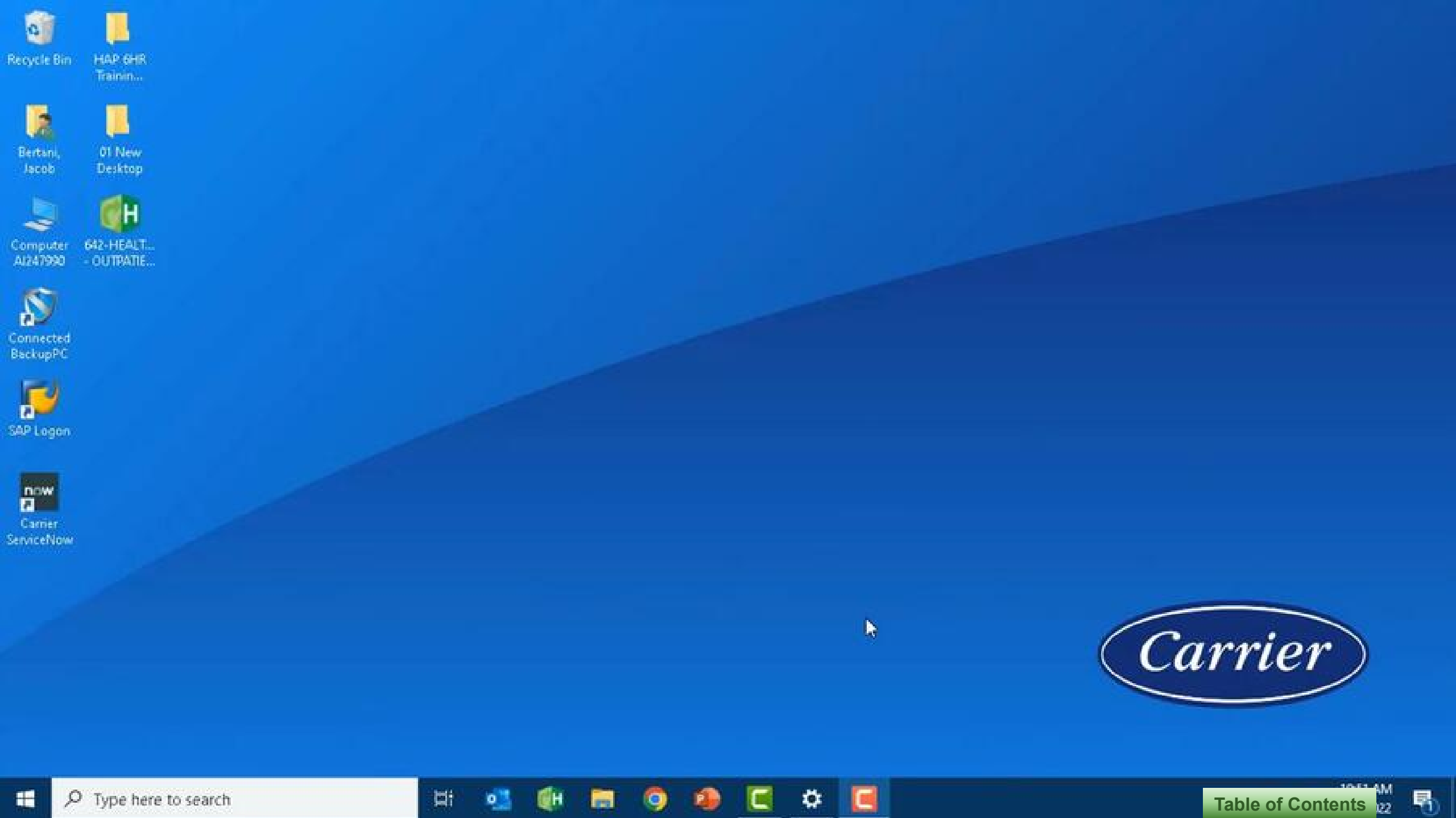
ASHRAE 62.1 and 90.1- 2016



Select Building Types button choose “**Healthcare - Outpatient**”



Startup-Preferences, Building and Space Types



Recycle Bin



HAP GHR
Trainin...



Bertani,
Jacob



01 New
Desktop



Computer
A1247990



642-HEALT...
- OUTPATIE...



Connected
Backup PC



SAP Logon



Carrier
ServiceNow





Summary of Tasks

1. We started a new project and told the software we wanted to populate new project with default space types.
2. We then selected a Building Type as Healthcare-Outpatient.
3. HAP produced 31 possible space types for that Building type.



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CLASS
WORKSHOPS

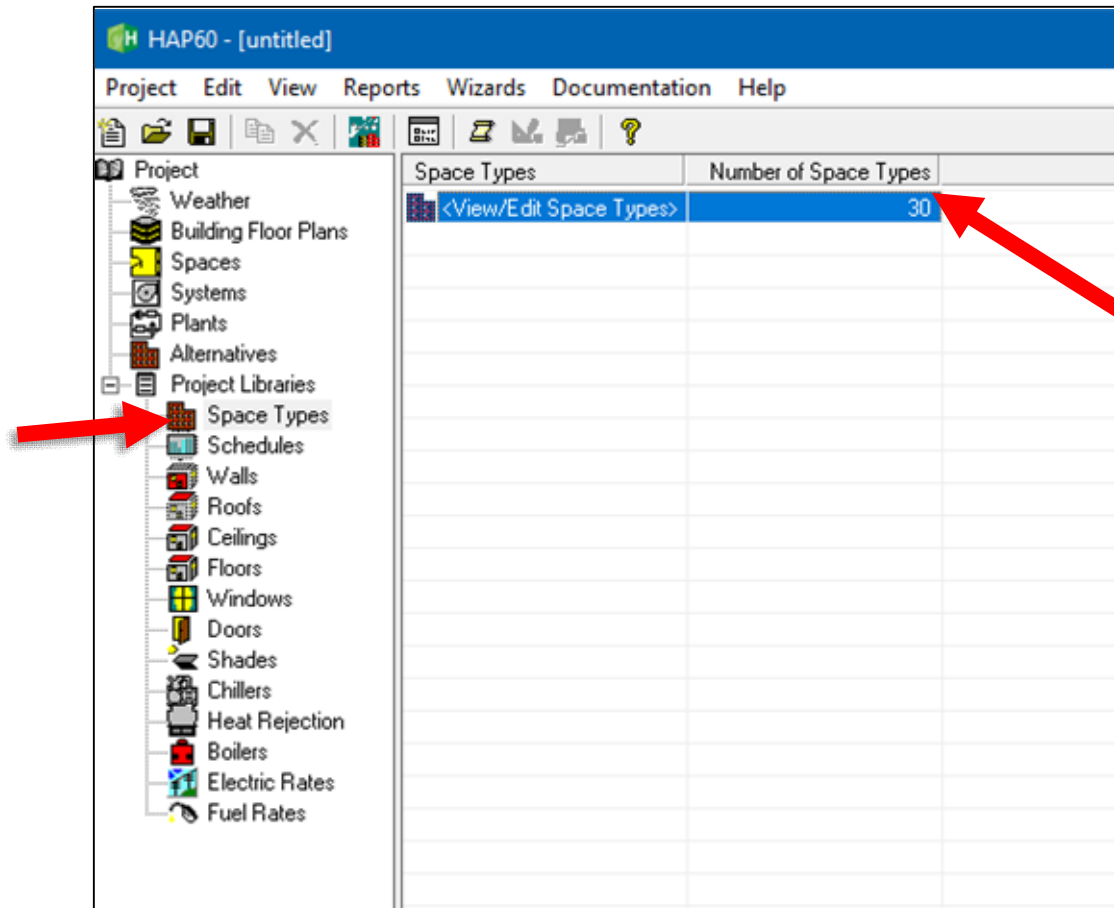
SPACE TYPE GRID



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Workshop - Space Types Grid



31 Space Types possible

1. Click on **View/Edit Space Types** opposite **Space Types in Project Libraries**. Notice 31 space types are indicated
2. The Space Types grid organizes all 31 default space types for this Healthcare-Outpatient building type
3. Review the basic functionality of the space types grid
4. The Space Types grid will be used to build the finalized Space Model.

Workshop - Space Types Grid



Space Types										
	Space Type Name	ASHRAE Standard 62.1-2016 Space	Ventilation						Overhead Lighting	
			OA Requirement 1		OA Requirement 2		Direct Exhaust		ASHRAE Standard 90.1-2016	
			Airflow	Units	Airflow	Units	Airflow	Units	Lighting Method	Space Use
1	Breakroom - Healthcare	GENERAL: Break room	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Lounge/Bre m: Healthca facility
2	Computer Room	MISCELLANEO US: Computer (not printing)	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Computer F
3	Conference Room	GENERAL: Conference/meeting	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Conference ing/Multipu Room
4	Copy / Print Room	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.50	CFM/sqft	Space by Space	Copy/Print
5	Corridor - All Others	GENERAL: Corridor	0.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Corridor: Al others
6	Dining Area - Cafeteria or Fast Food	FOOD AND BEVERAGE SERVICE: Cafeteria/fast food dining	7.5	CFM/person	0.18	CFM/sqft	0.0	CFM	Space by Space	Dining Area Cafeteria or food
7	Electrical / Mechanical Room	MISCELLANEO US: Telephone closet	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Space by Space	Electrical/M nical Room
8	Exam/Treatment Room	User Defined	2.00	ACH	0.06	CFM/sqft	0.0	CFM	Space by Space	Healthcare Facility: Exam/treat room
		FOOD AND								

Columns To Display
☒ Show All
☒ Ventilation
☒ Overhead Lighting
☒ Daylighting Control
☒ Task Lighting
☒ Electric Equipment
☒ Occupants
☒ Miscellaneous Heat Gain
☒ Infiltration

Add Default Space Types
Add New Space Type
Duplicate Space Type
Delete Space Type
Export
Clear Sort / Filters
Apply to All Space Models

OK
Cancel
Help

Columns to Display



Workshop - Space Types Grid



Most Relevant Grid Applications for Space Types

1. Filtering data by columns
2. Add Default Space Types
3. Add a New Space Type
4. Duplicate a Space Type
5. Delete Space Type



Customize Space Types Grid

Ready	Not Applicable	62.1-2016	90.1-2016	6/24/2022	10:44 AM
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Summary of Tasks

1. We generated our project space types in Preferences based on the Building type. They were positioned in the Project Library in a grid spreadsheet with ASHRAE defaults included.
2. We learned how to configure the relevant grid applications like filtering column default data and adding, duplicating, and deleting space type data.



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CLASS
WORKSHOPS

EXPORT FROM
SPACE TYPE GRID



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Workshop - Space Types Grid



Additional Grid Applications for Space Types



6. Export

7. Clear Sort/Filters

8. Apply To All Space Models



Exporting the Space Types Grid

	Space Type Name	Ventilation							Overhead Lighting					
		ASHRAE Standard 62.1-2016 Space	OA Requirement 1		OA Requirement 2		Direct Exhaust		ASHRAE Standard 90.1-2016		Power	Units	Lighting Fixture Type	S
			Airflow	Units	Airflow	Units	Airflow	Units	Lighting Method	Space Usage				
1	Breakroom - Healthcare	GENERAL: Break room	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Lounge/Breakroom: Healthcare facility	0.78	W/sqft	Fluorescent, Recessed, no Lens, Unvented	90.1 F Lights
2	Computer Room	MISCELLANEOUS: Computer (not printing)	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Computer Room	1.33	W/sqft	Fluorescent, Recessed, no Lens, Unvented	90.1 C Lights
3	Conference Room	GENERAL: Conference/meeting	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Conference/Meeting/Multipurpose Room	1.07	W/sqft	Fluorescent, Recessed, no Lens, Unvented	90.1 C Lights
4	Copy / Print Room	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.50	CFM/sqft	Space by Space	Copy/Print Room	0.56	W/sqft	Fluorescent, Recessed, no Lens, Unvented	90.1 C Lights
5	Corridor - All Others	GENERAL: Corridor	0.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Corridor: All others	0.66	W/sqft	Fluorescent, Recessed, no Lens, Unvented	90.1 C Lights
6	Dining Area - Cafeteria or Fast Food	FOOD AND BEVERAGE SERVICE: Cafeteria/fast food dining	7.5	CFM/person	0.18	CFM/sqft	0.0	CFM	Space by Space	Dining Area: Cafeteria or fast food	0.63	W/sqft	Fluorescent, Recessed, no Lens, Unvented	90.1 F Lights
7	Electrical / Mechanical Room	MISCELLANEOUS: Telephone closet	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Space by Space	Electrical/Mechanical Room	0.43	W/sqft	Fluorescent, Recessed, no Lens, Unvented	90.1 C Lights
8	Exam/Treatment Room	User Defined	2.00	ACH	0.06	CFM/sqft	0.0	CFM	Space by Space	Healthcare Facility: Exam/treatment room	1.68	W/sqft	Fluorescent, Recessed, no Lens, Unvented	90.1 F Lights
		FOOD AND BEVERAGE SERVICE: Cafeteria/fast food dining												

Columns To Display

☒ Show All ☒ Ventilation ☒ Overhead Lighting ☒ Daylighting Control ☒ Task Lighting ☒ Electric Equipment ☒ Occupants ☒ Miscellaneous Heat Gain ☒ Infiltration

Add Default Space Types

Add New Space Type

Duplicate Space Type

Delete Space Type

Export

Clear Sort / Filters

Apply to All Space Models

OK

Cancel

Help

Space Type ID



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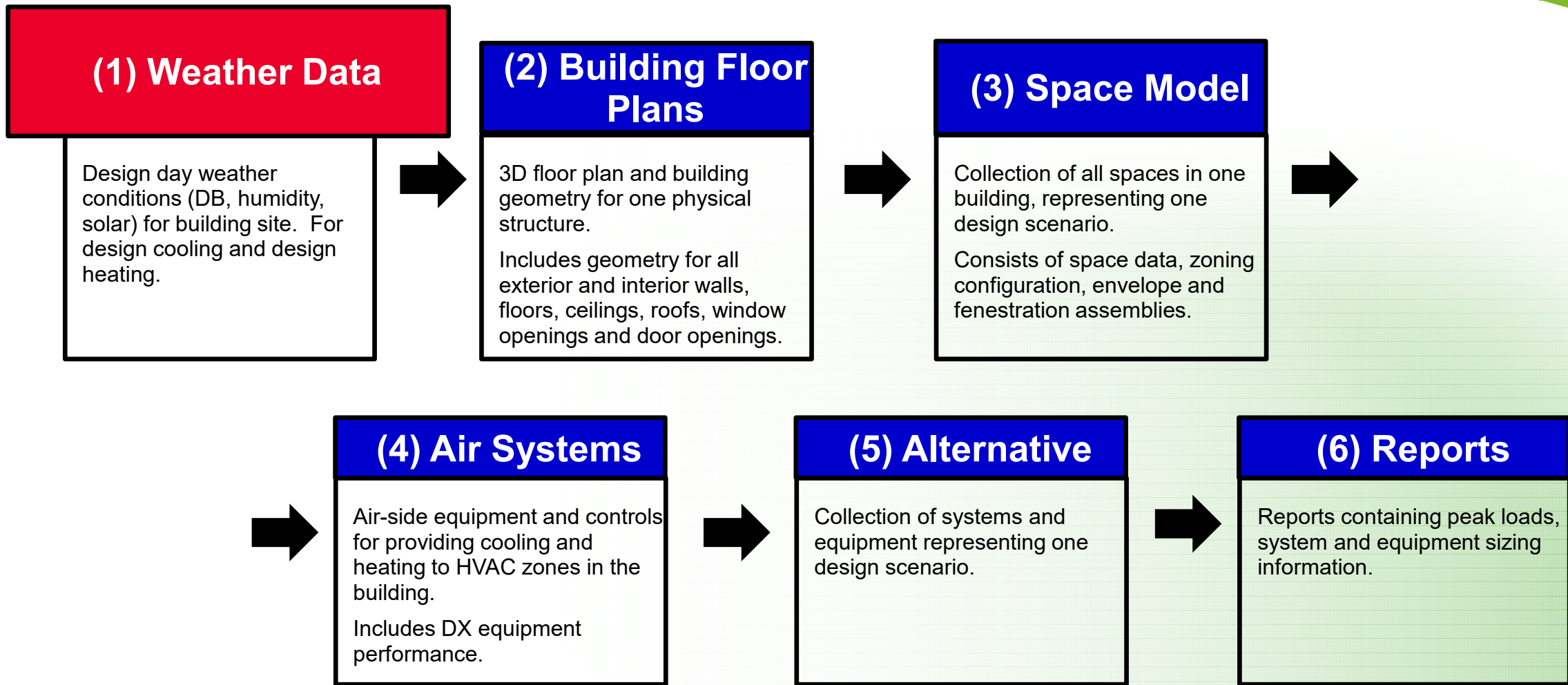
WEATHER DATA



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Workshop - Weather Data



Workshop - Weather Data



New design and simulation weather data

Design data: 2017 ASHRAE Handbook – Fundamentals

Simulation data: 2003-2017 or 2004-2018 period of record

Compare:

HAP v5.1: ~820 stations design data, ~585 stations simulation data

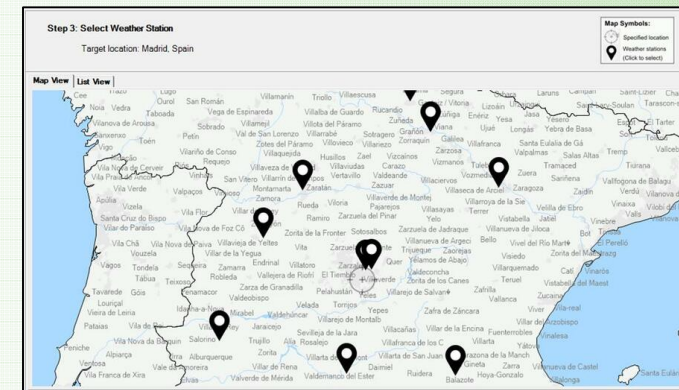
HAP v6.0: ~7400 stations design and simulation data

Changed to standard longitude sign convention (east longitude is positive)

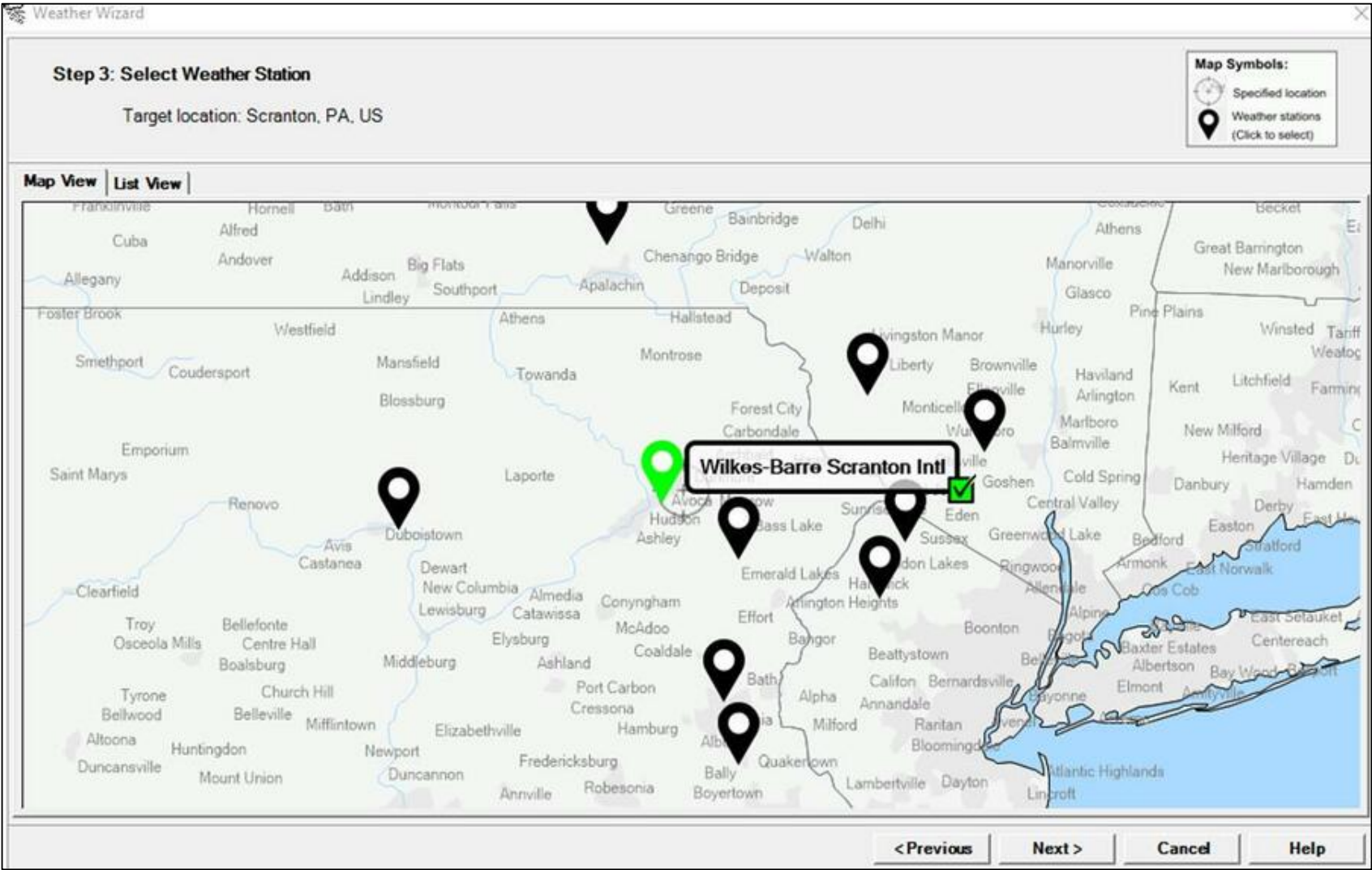


Graphical method of choosing site weather

Automatically sets both design and simulation data.



Workshop - Select Weather Station



Workshop - Weather Properties



Weather Properties - [Wilkes-Barre Scranton Intl, PA, USA]

Design Parameters | Design Temperatures | Design Solar | Simulation

Station: **Wilkes-Barre Scranton Intl, PA, USA** **Select...**

Latitude: **41.33** °N Elevation: **930.0** ft

Longitude: **-75.73** °E Climate Zone: **5A - Cool Humid**

Time Zone: **-5.0** hrs E of GMT

Data Source: ASHRAE Defaults

Summer Condition: **0.4% Cooling**

Summer Design DB: **0.4% Cooling**

Summer Coincident: **0.4% Dehumidification**

Summer Daily Range: **0.4% Dehumidification**

Outdoor Air CO2 Level: **400** ppm

Average Ground Reflectance: **0.20**

Soil Conductivity: **0.800** BTU/(hr-ft²-F)

Design Clg Calculation Months: **Jan** to **Dec**

Winter Condition: **99.6% Heating**

Winter Design DB: **4.7** °F

Winter Coincident WB: **2.8** °F

Daylight Savings Time: ☒ Yes ☐ No

DST Begins: **March** **4**

DST Ends: **Nov** **1**

OK Cancel Help

Dehumidification Weather Data



BALTIMORE BLT-WASHNGTN INT'L, MD, USA

Annual Cooling, Dehumidification, and Enthalpy Design Conditions

Hottest Month	Hottest Month DB Range	Cooling DB/MCWB						Evaporation WB/MCDB						MCWS/PCWD to 0.4% DB		
		0.4%		1%		2%		0.4%		1%		2%				
		DB	MCWB	DB	MCWB	DB	MCWB	WB	MCDB	WB	MCDB	WB	MCDB	MCWS	PCWD	
7	18.7	93.9	74.9	81.2	74.2	88.5	73.1	78.1	88.6	76.8	86.5	75.6	84.3	10.2	280	
Dehumidification DP/MCDB and HR										Enthalpy/MCDB						Hours 8 to 4 & 55/69
0.4%			1%			2%				0.4%		1%		2%		
DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB		
75.3	133.3	82.1	74.1	127.9	80.8	73.0	123.1	79.8	41.5	89.1	40.2	86.5	39.1	84.5	723	

100 Grains

Dehumidification DP/MCDB and HR								
0.4%			1%			2%		
DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB
75.3	133.3	82.1	74.1	127.9	80.8	73.0	123.1	79.8

133 Grains

Workshop - Weather Properties



Weather Properties - [Wilkes-Barre Scranton Intl, PA, USA]

Design Parameters | Design Temperatures | Design Solar | Simulation

Station: **Wilkes-Barre Scranton Intl, PA, USA** **Select...**

Latitude: **41.33** °N Elevation: **930.0** ft

Longitude: **-75.73** °E Climate Zone: **5A - Cool Humid** **Data Source: ASHRAE Defaults**

Time Zone: **-5.0** hrs E of GMT

Summer Condition: **0.4% Cooling** **User Defined**

Summer Design DB: **0.4% Cooling**

Summer Coincident: **2% Cooling**

Summer Daily Range: **0.4% Dehumidification**

Outdoor Air CO2 Level: **400** ppm

Average Ground Reflectance: **0.20**

Soil Conductivity: **0.800** BTU/(hr-ft²-F)

Design Clg Calculation Months: **Jan** to **Dec**

Winter Condition: **99.6% Heating**

Winter Design DB: **4.7** °F

Winter Coincident WB: **2.8** °F

Daylight Savings Time: ☒ Yes ☐ No

DST Begins: **March** **4**

DST Ends: **Nov** **1**

OK **Cancel** **Help**

Workshop - Weather Properties



Weather Properties - [Chicago Midway Intl, IL, USA]

Design Parameters | Design Temperatures | Design Solar | Simulation

Station: **Chicago Midway Intl, IL, USA** **Select...**

Latitude: **41.79** °N Elevation: **612.0** ft

Longitude: **-87.75** °E Climate Zone: **5A - Cool Humid**

Time Zone: **-6.0** hrs E of GMT

Data Source: ASHRAE Defaults

Summer Condition: **0.4% Cooling**

Summer Design DB: **91.9** F

Summer Coincident WB: **74.7** F

Summer Daily Range: **15.8** F

Outdoor Air CO2 Level: **400** ppm

Average Ground Reflectance: **0.20**

Soil Conductivity: **0.800** BTU/(hr ft F)

Design Clg Calculation Months: **Jan** to **Dec**

Winter Condition: **99.6% Heating**

Winter Design DB: **0.5** F

Winter Coincident WB: **-1.1** F

Daylight Savings Time: ☒ Yes ☐ No

DST Begins: **March** **4**

DST Ends: **Nov** **1**

Save As Default Weather Data **OK** **Cancel** **Help**

Workshop - Weather Data, 1. Search Options



Weather Wizard

Step 1: Search Options

Weather Wizard allows you to search for weather stations in the vicinity of the project location.

Select how you will specify the project location:

☒ Name of a local city or town

☐ Latitude / longitude



<Previous Next > Cancel Help

Workshop - Weather Wizard

A screenshot of the HAP60 software interface. The title bar reads 'HAP60 - [untitled]'. The menu bar includes 'Project', 'Edit', 'View', 'Reports', 'Wizards', 'Documentation', and 'Help'. The 'Wizards' menu is open, showing options: 'Weather Wizard', 'Building Wizard', 'Equipment Wizard', 'Utility Rate Wizard', and 'Full Wizard Session' (with a 'Ctrl+W' shortcut). The left sidebar shows a tree view with categories like 'Weather', 'Building Floor Plans', 'Spaces', 'Systems', 'Plants', 'Alternatives', 'Project Libraries', 'Space Types', 'Schedules', 'Walls', 'Roofs', and 'Ceilings'. The main workspace displays a table with the following data:

	Number of Entries
are Intl, IL, USA	1
	none
	none
	none
	none
	none
Alternatives	none

Workshop - Weather Data, 2. Select Location



Weather Wizard

Step 2: Select Location

Type in the name of any city or town near your project location. Then select the best match from the choices shown.

City / Location:

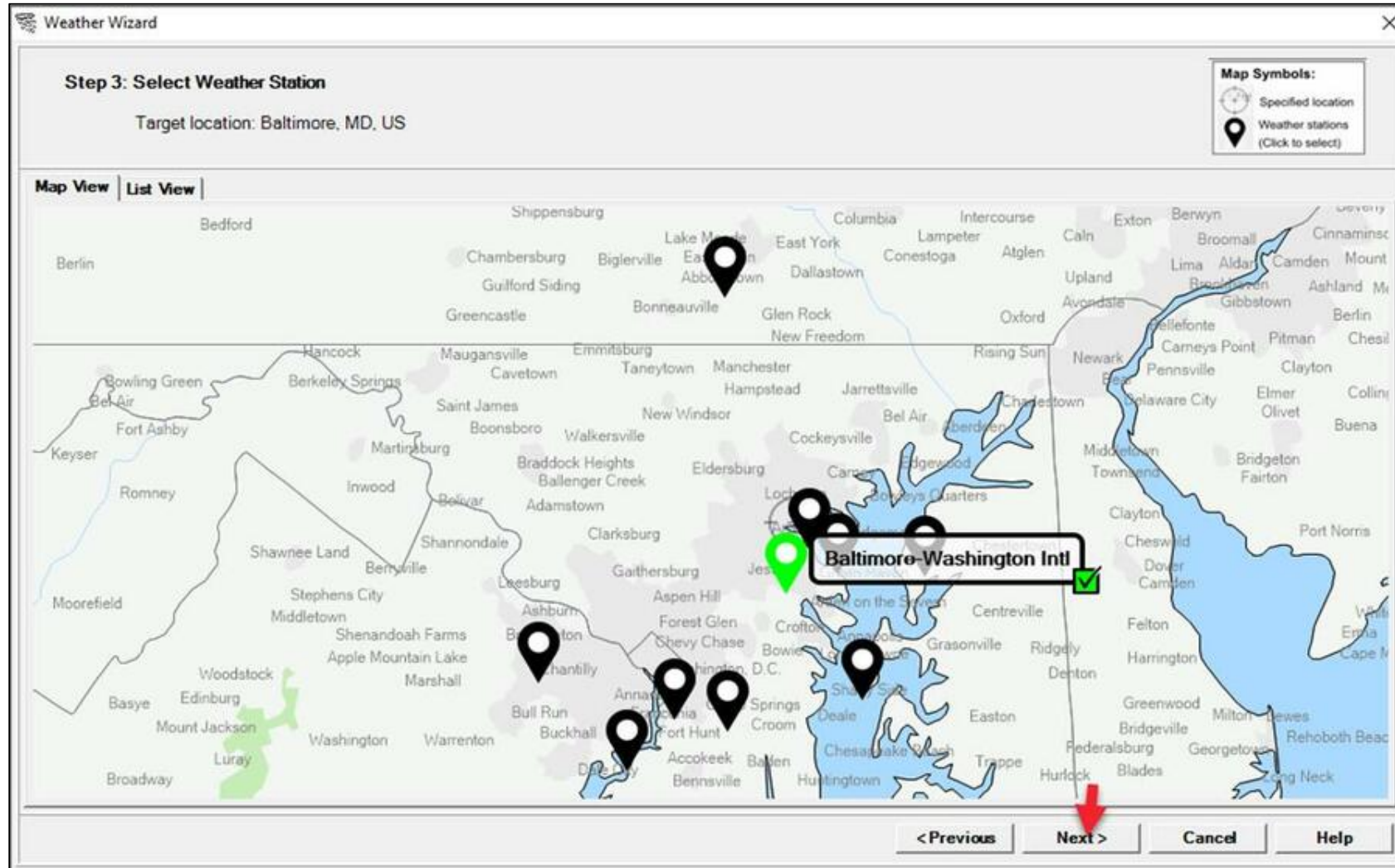
Select a location:

City	Location	Latitude (°N)	Longitude ...
Baltinava	Latvia	56.9	27.6
Bălți	Moldova	47.8	27.9
Baltiysk	Russia	54.7	19.9
Baltinglass	Ireland	52.9	-6.7
Baltimore	MD, US	39.3	-76.6
Baltimore Highlands	MD, US	39.2	-76.6
Baltimore	OH, US	39.8	-82.6
Baltic	SD, US	43.8	-96.7
Baltic	CT, US	41.6	-72.1



<Previous **Next >** Cancel Help

Workshop - Weather Data, 3. Select Weather Station



Workshop - Weather Data, 4. Confirmation



Weather Wizard

Step 4: Confirmation

Review the following selected weather station information

You have selected the following weather station:

Station Name:	Baltimore-Washington Intl
Location:	Baltimore-Washington Intl, MD, USA
Summer DB:	94.2 (°F)
Summer WB:	74.8 (°F)
Winter DB:	14.6 (°F)
Elevation:	156.0 (ft)
Climate Zone:	4A - Mixed - Humid
Latitude:	39.2 (°N)
Longitude:	-76.7 (°E)

Click Finish to use this station's weather data in your project.

<Previous **Finish** Cancel Help

Save as Default Weather Data

Weather Properties



Weather Properties - [McCarran Intl, NV, USA]

Design Parameters | Design Temperatures | Design Solar | Simulation

Station: **McCarran Intl, NV, USA** Select...

Latitude: °N Elevation: ft

Longitude: °E Climate Zone: Data Source: User Defined

Time Zone: hrs E of GMT

Summer Condition: Outdoor Air CO2 Level: ppm

Summer Design DB: Average Ground Reflectance:

Summer Coincident: Soil Conductivity: BTU/(hr ft F)

Summer Daily Range: Design Clg Calculation Months: to

Winter Condition: Daylight Savings Time: ☒ Yes ☐ No

Winter Design DB: F DST Begins:

Winter Coincident WB: F DST Ends:

Save As Default Weather Data OK Cancel Help





Select Weather Data

HAP60 - [untitled]

Project Edit View Reports Wizards Documentation Help

Project

Weather

Building Floor Plans

Space Models

Systems

Plants

Alternatives

Project Libraries

Space Types

Schedules

Walls

Roofs

Ceilings

Floors

Windows

Doors

Shades

Chillers

Heat Rejection

Boilers

Electric Rates

Fuel Rates

Component	Count
Weather: Chicago O'Hare Intl, IL, USA	1
Buildings	none
Space Models	none
Systems	none
Plants	none
Alternatives	none

Ready

Not Applicable62.1-201690.1-20166/27/202208:36 AM

Type here to search

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9:52 AM 6/27/2022

Summary of Tasks

1. We used a new graphical method of choosing the weather station by loading the (10) closest weather stations to the project site using paired design and simulation weather data.
2. We chose between comfort (design) weather data (0.4%, 1%, 2%) or dehumidification (also called dew point 0.4%, 1%, 2%) weather data for load calculation.



LOADS AND ENERGY
CALCULATION FOR
COMMERCIAL BUILDINGS
USING HAP v6
3D MODELING SOFTWARE

HEAT BALANCE
CALCULATION
METHODOLOGY



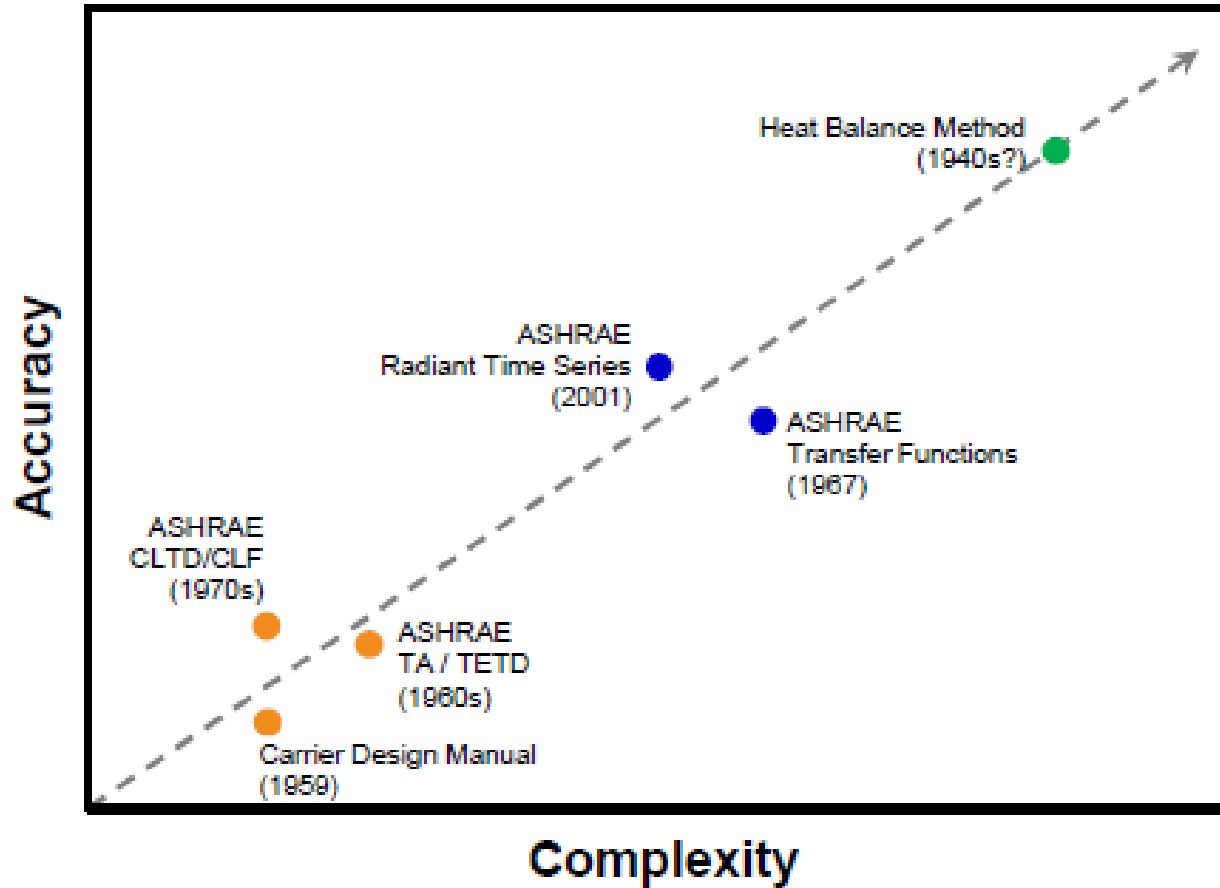
www.carrier.com/HAP

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Overview of Load Calculation Methods



Complexity vs. Accuracy



Manual Methods (Orange)

Practical for hand-calculation with pencil and paper
Simplifications reduce accuracy

Simplified Computer Methods (Blue)

Computerization allows more complexity
Delivers more accuracy
Still uses simplifications which limit accuracy

Heat Balance Method (Green)

The original load calculation method
Faithful to building physics
All other methods - simplification of Heat Balance
What is new - software implementations that make Heat Balance practical on modern desktop computers

Heat Balance Calculations



Key Details

Heat Balance Load Calculation Method:

More fundamental calculation method.

Better representation of building physics

Calculates conduction, convection, radiation heat transfer processes for every surface in every space.

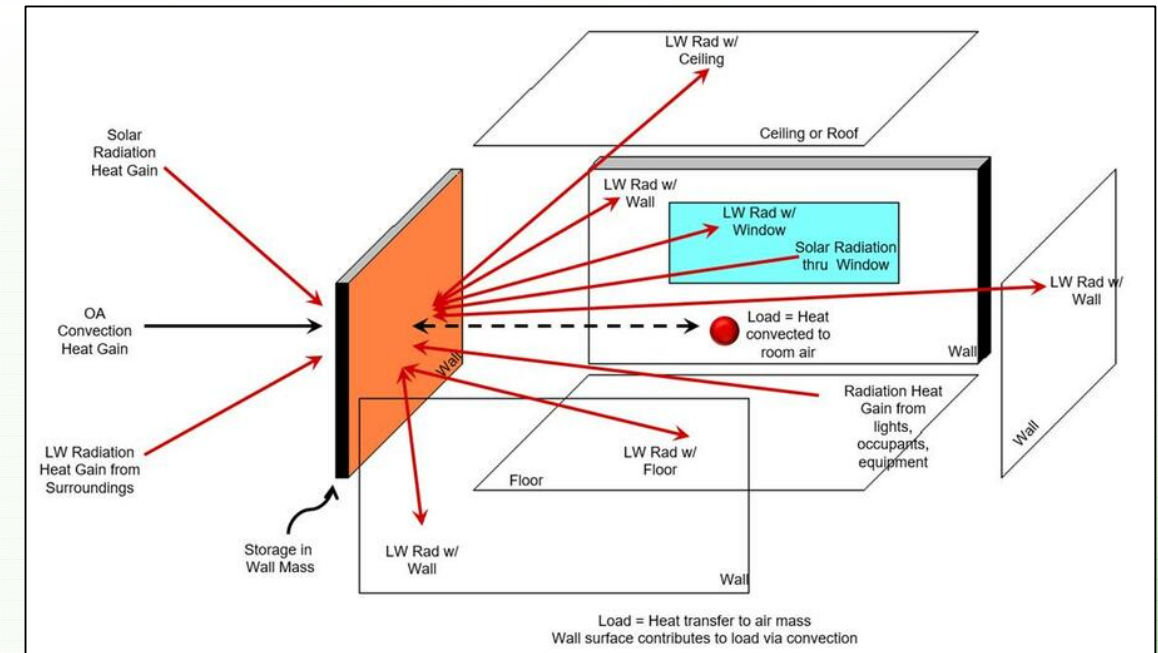
Tracks surface temperatures.

Fully adaptable to climate, schedule, and building conditions

Value:

Greater accuracy.

Model a wider range of applications

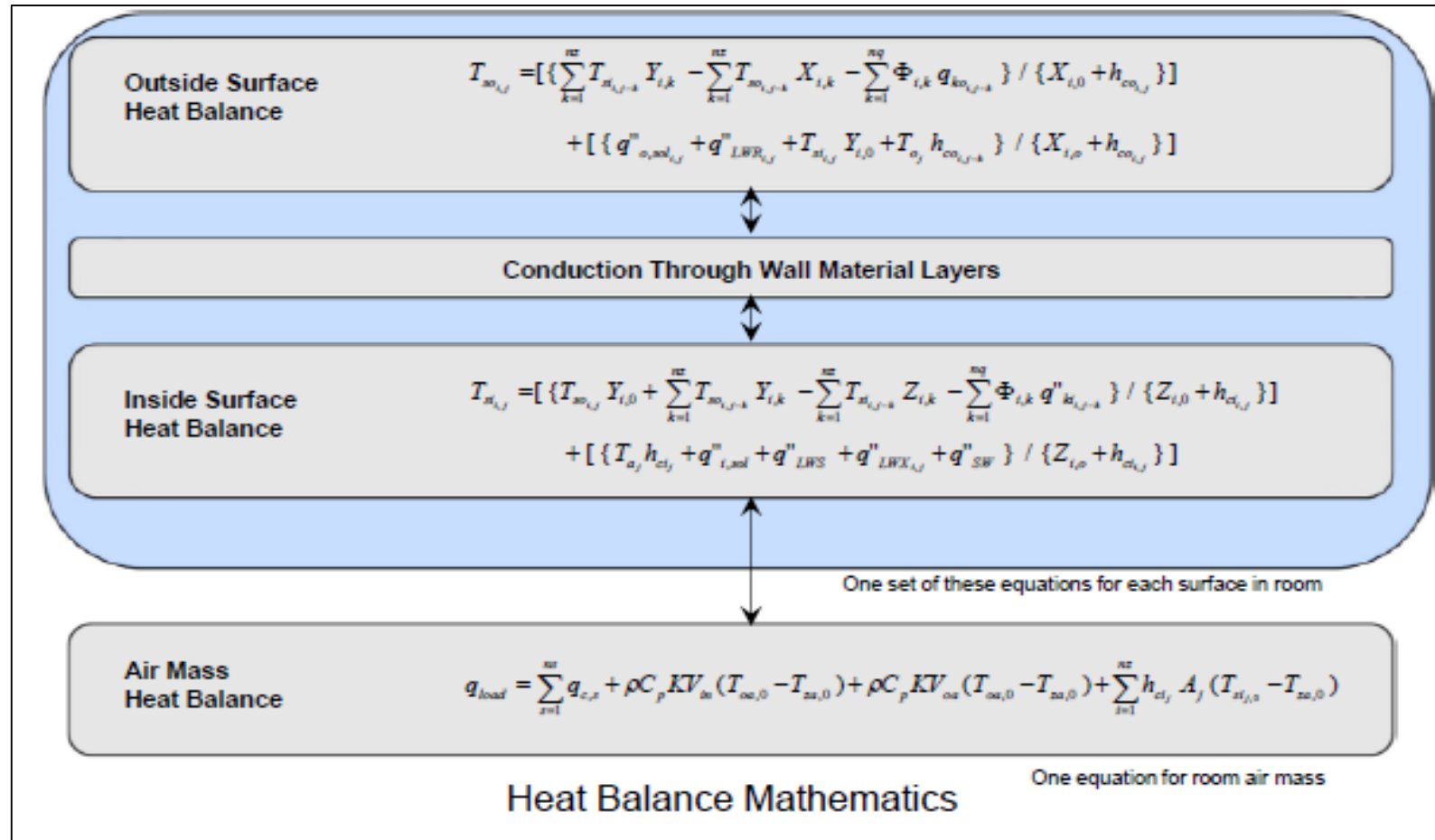


HAP v2.00 - v5.11 (1989-?) ASHRAE Transfer Function
HAP v6.00 - v ? (2021-?) Heat Balance Method

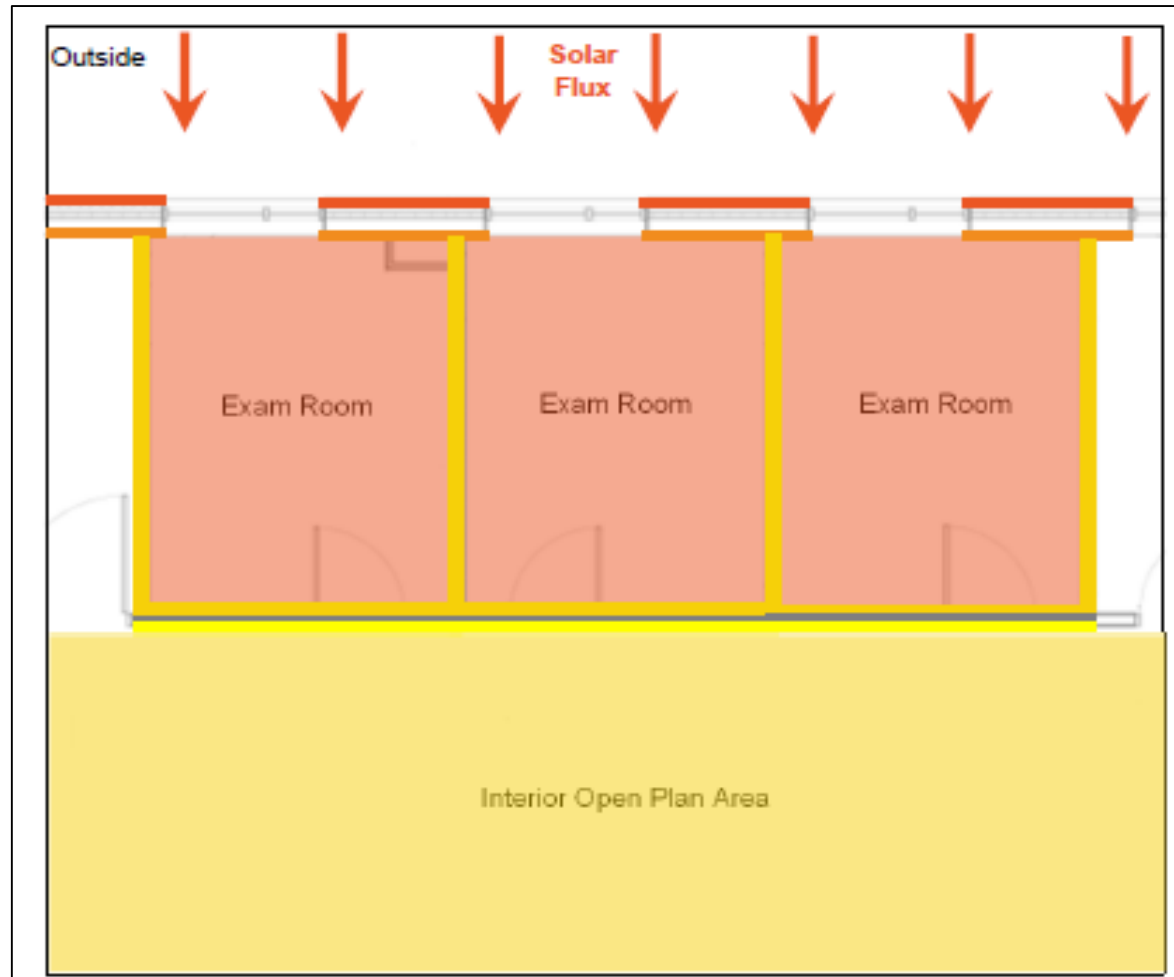
Heat Balance Principles



Putting it together – Heat Balance Equations



Heat Balance Applications



Plan View

Prior Methods

Purely interior room is only affected by internal gains
Perimeter heat gains do not affect purely interior spaces

Heat Balance

Uses building physics
All spaces are thermally interconnected
Purely interior space can be affected by perimeter heat gains



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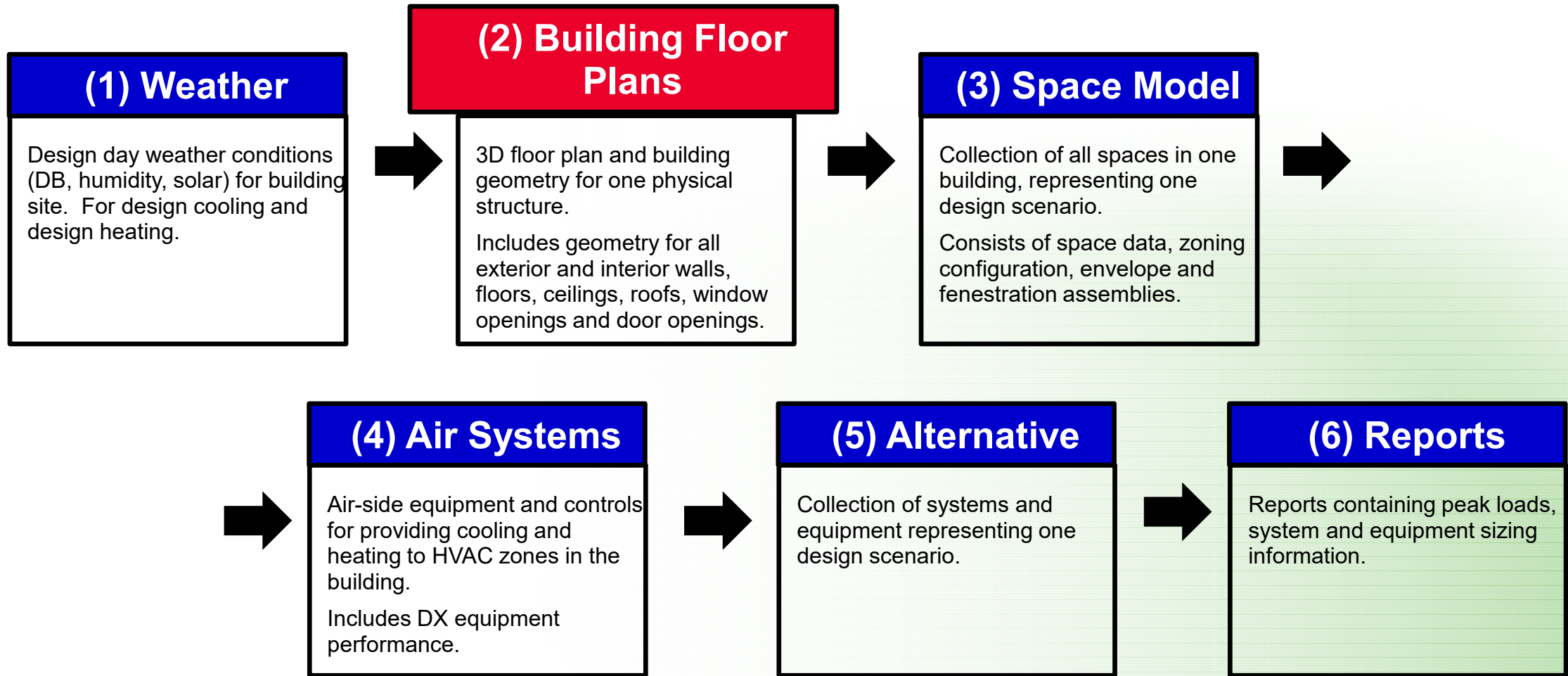
BUILDING FLOOR
PLANS



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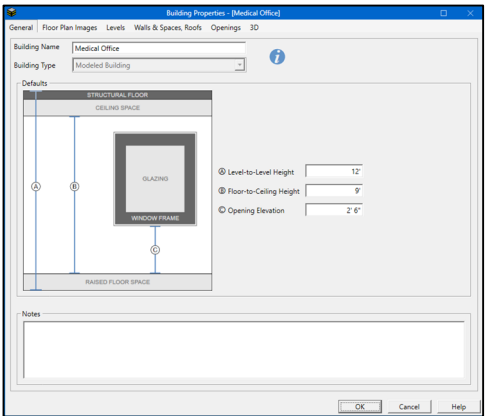
Building Floor Plans



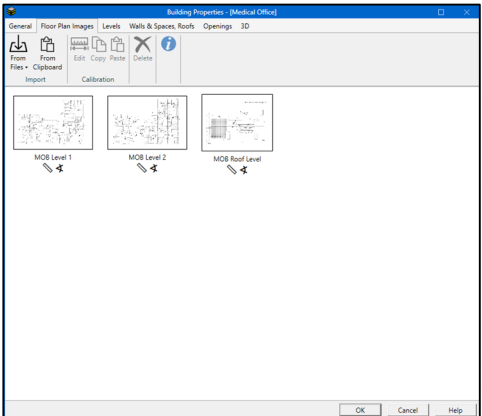
Building Floor Plans - Workflow



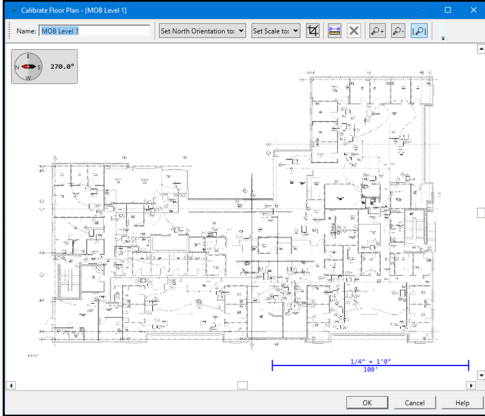
(1) Create Building



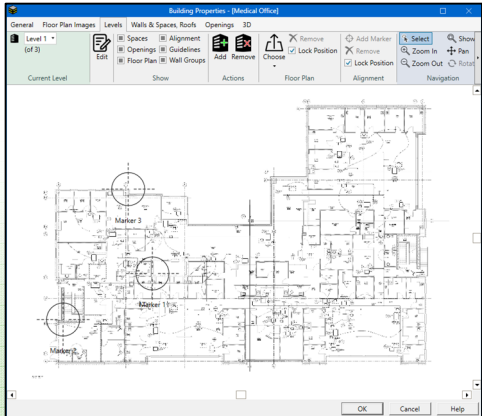
(2) Import Floor Plan Images



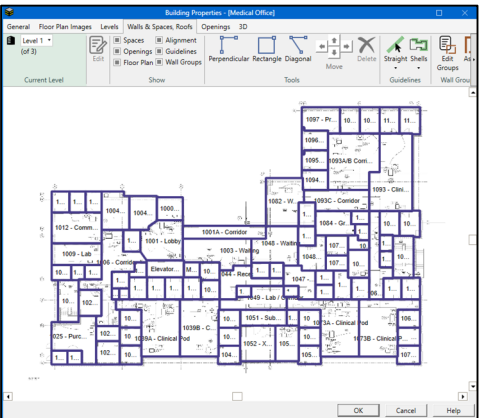
(3) Calibrate: Scale and Orient



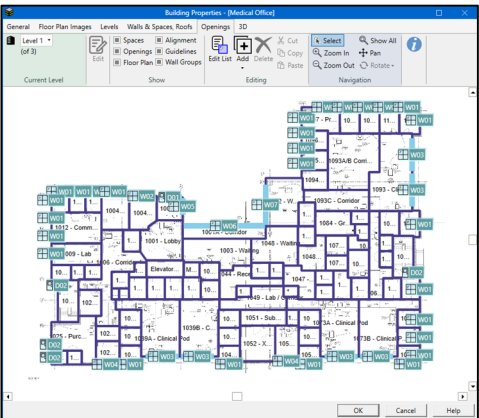
(4) Create Levels



(5) Sketch Over Room Boundaries

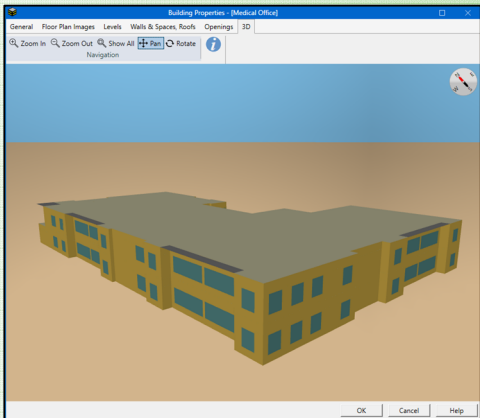


(6) Insert Window + Door Openings



(7) Render in 3D

For visualization and checking





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CREATE BUILDING



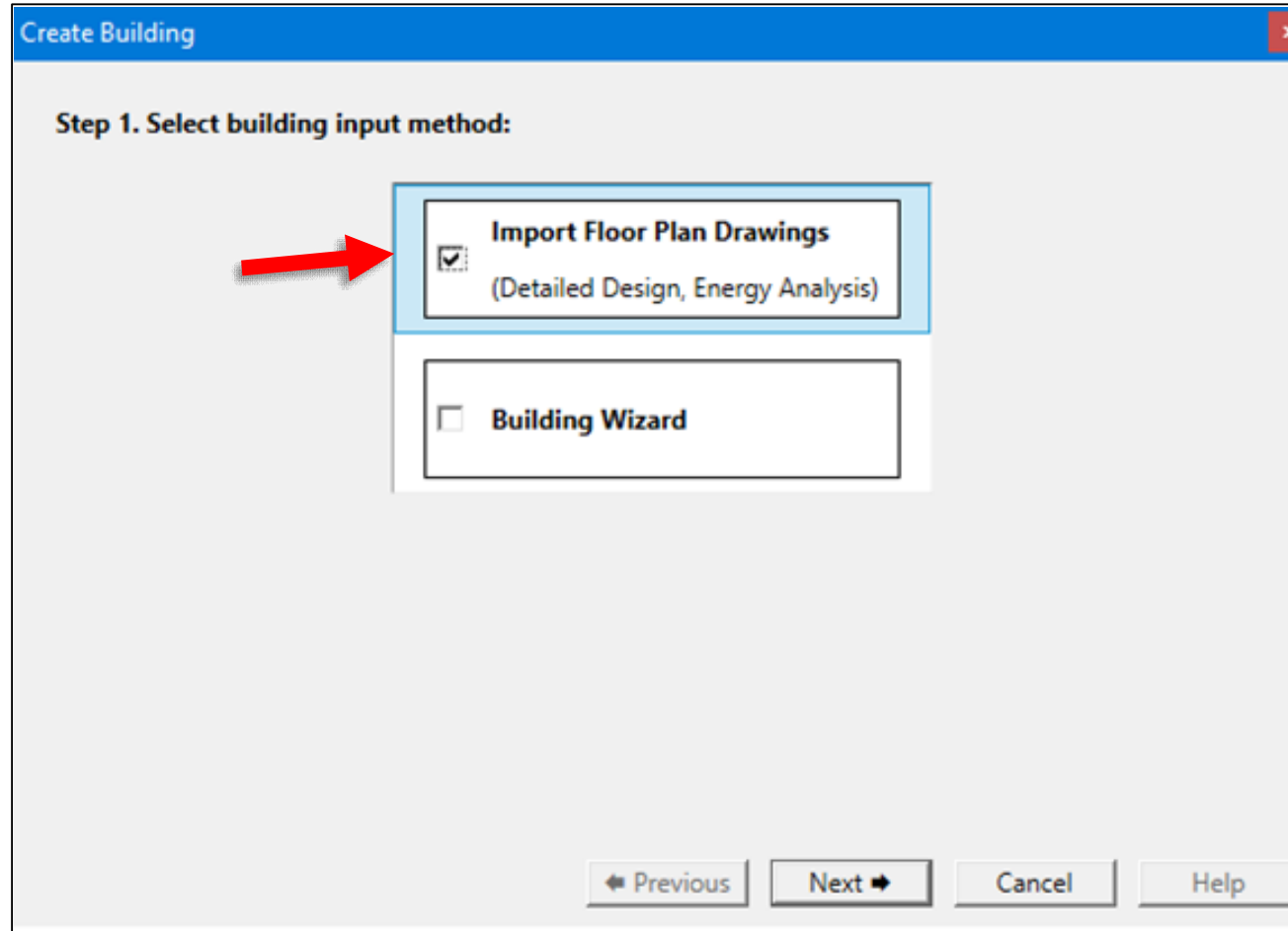
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Workshop - Building Floor Plans Create Building



Select Building Input Method



The image shows a software dialog box titled "Create Building". Inside, it says "Step 1. Select building input method:". There are two options: "Import Floor Plan Drawings (Detailed Design, Energy Analysis)" which is selected with a checked checkbox and highlighted by a blue border and a red arrow, and "Building Wizard" which is not selected. At the bottom, there are four buttons: "Previous", "Next", "Cancel", and "Help".

Create Building

Step 1. Select building input method:

☒ Import Floor Plan Drawings
(Detailed Design, Energy Analysis)

☐ Building Wizard

◀ Previous Next ▶ Cancel Help

Workshop - Building Floor Plans Create Building



Building Type and Levels

Create Building

Step 2. Building Type and Levels:

Modeled Building

☐ Single Level
(at/above grade)

☒ Multiple Levels
(at/above grade) : **2**

☐ Other/Custom

We have 2 “stacked” levels for our Healthcare Outpatient building

Previous Next Cancel Help

Workshop - Building Floor Plans Create Building

Building Grade



Create Building

Step 3. Building Grade
Note: grade is assumed to be flat and level around the building's perimeter.

Grade and Basement Options:

- ☒ At Grade
- ☐ Single Basement Level
- ☐ Multiple Basement Levels :
- ☐ All Levels Above Grade :

◀ Previous Next ▶ Cancel Help

Workshop - Building Floor Plans Create Building



Confirmation

Create Building

Step 4. Confirmation

Building Input Method:	Import Floor Plan Drawings
Building Type:	Modeled Building, Multiple Levels
Grade Option:	At Grade

← Previous Finish Cancel Help

Workshop - Building Floor Plans Create Building



General Tab

Building Properties - 01- Medical OfficeCLASS IMAGES WORKSHOP

General

Floor Plan Images

Levels

Walls & Spaces

Openings

Roofs

3D

Name

01- Medical OfficeCLASS IMAGES WORKSHOP

Building Type

Modeled Building

Defaults

STRUCTURAL FLOOR

CEILING SPACE

GLAZING

WINDOW FRAME

RAISED FLOOR SPACE

A

B

C

Ⓐ Level-to-Level Height

12'

Ⓑ Floor-to-Ceiling Height

9'

Ⓒ Opening Elevation

2' 6"

Notes

IV	When running in English (IP) Units	When running in SI Units
Level to Level Height	12'	3700 mm
Floor to Ceiling Height	9'	2750 mm
Window Opening Elevation	2'6"	750 mm

Enter these values



Create Modeled Building in Building Floor Plans

Ready	Not Applicable	62.1-2016	90.1-2016	6/27/2022	01:37 PM
-------	----------------	-----------	-----------	-----------	----------



Summary of Tasks

1. We selected the building input method as import of drawings.
2. We chose the building type, number of levels, and grade.
3. We defined default vertical dimensions that will be automatically applied to all new levels.

Building Floor Plans - Pre-Loaded Workshops



Please Shut down HAP v6 you have been running

Find your .hap project file (below) provided for this class and double click to open it in HAP v6



HEALTHCARE – OUTPATIENT WORKSHOPS

Building Floor Plans: Pre-Loaded Workshops



Building Floor Plans

Site or Building	Building Type	Gross Floor Area	Above Grade Levels	Below Grade Levels
<New default Building>				
<Configure Site>				
01 Medical Office CLASS IMPORT IMAGES WORKSHOP	Modeled Building	0.0	3	0
02 Medical Office CLASS IMPORT IMAGES DONE	Modeled Building	0.0	3	0
03 Medical Office CLASS LEVELS WORKSHOP	Modeled Building	0.0	3	0
04 Medical Office CLASS LEVELS DONE	Modeled Building	0.0	3	0
05 Medical Office CLASS PERIMETER SKETCH WORKSHOP	Modeled Building	0.0	3	0
06 Medical Office CLASS PERIMETER SKETCH DONE	Modeled Building	18853.2	3	0
07 Medical Office CLASS SPACE SKETCH WORKSHOP	Modeled Building	18853.2	3	0
08 Medical Office CLASS SPACE SKETCH DONE	Modeled Building	18853.2	3	0
09 Medical Office CLASS 2ND FLOOR GUIDELINE WORKSHOP	Modeled Building	18853.2	3	0
10 Medical Office CLASS 2ND FLOOR GUIDELINE DONE	Modeled Building	18853.2	3	0
11 Medical Office CLASS WALL GROUPS WORKSHOP	Modeled Building	18853.2	3	0
12 Medical Office CLASS WALL GROUPS DONE	Modeled Building	37638.0	3	0
13 Medical Office CLASS AIR WALLS WORKSHOP	Modeled Building	37638.0	3	0
14 Medical Office CLASS AIR WALLS DONE	Modeled Building	37638.0	3	0
15 Medical Office CLASS ROOF WORKSHOP	Modeled Building	37638.0	3	0
16 Medical Office CLASS ROOF DONE	Modeled Building	37638.0	3	0
17 Medical Office CLASS OPENINGS WORKSHOP	Modeled Building	37638.0	3	0
18 Medical Office CLASS OPENINGS DONE	Modeled Building	37638.0	3	0
19 Medical Office CLASS FINISHED	Modeled Building	37638.0	3	0

Configure site (not in HAP 6.0, will be HAP v6.1)

BUILDING FLOOR PLANS WORKSHOPS



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01-02 IMPORT FLOOR
PLAN IMAGES



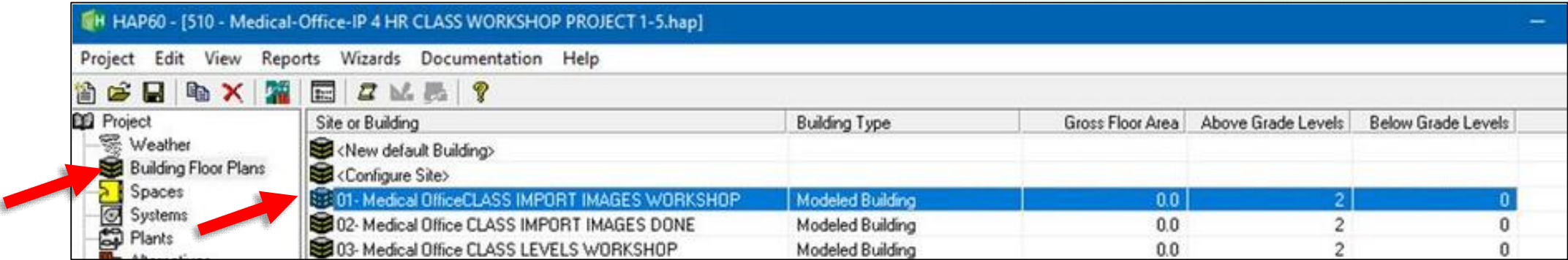
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Pre-Loaded Workshops - Building Floor Plans



In your HAP project click to open
01 CLASS IMPORT IMAGES WORKSHOP
as shown here



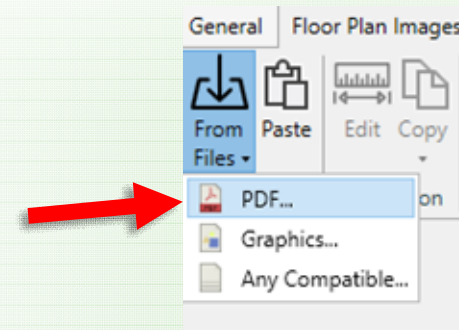
Workshops - Building Floor Plans Images Tab



Import Your Floor Plan Images

Tasks:

1. Go to the **Floor Plan Images** tab
2. Select the “**From Files**” option in the **Floor Plan Images** section of the ribbon. Choose “**PDF**” on the menu.



3. Navigate to the combined architectural floor plan image saved previously **select this PDF file**

 **MedicalOffice-Floor-Plans-rev2022-04-12**

4. Click **Finish** in the **Choose Images to Import** window.
5. Click the blue Info button to review the purpose and key tasks for this tab.

HAP v6 File Types

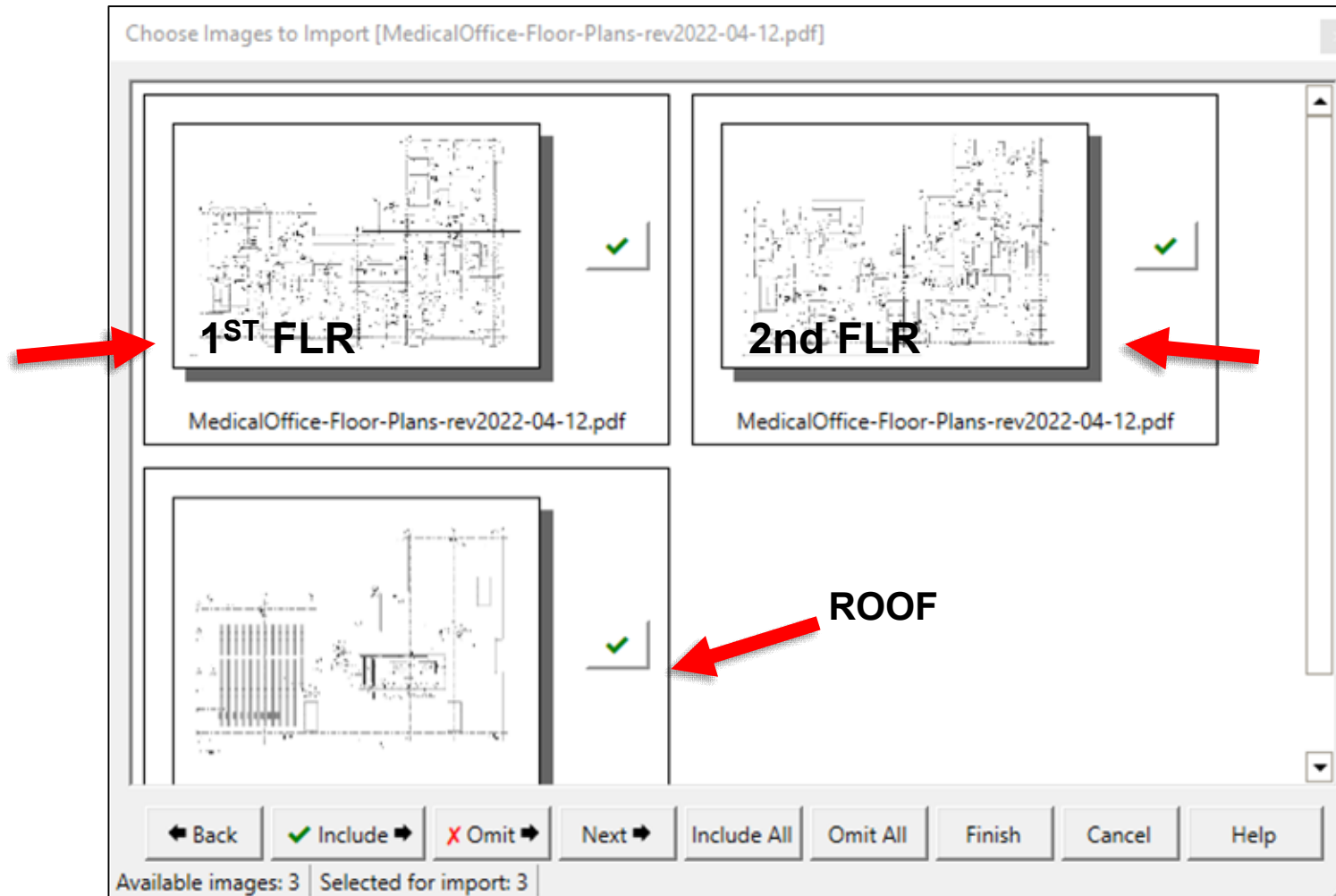


- **PDF documents**
- BMP image files
- GIF image files
- JPEG image files
- PNG image files
- TIFF image files

Workshops - Building Floor Plans Images Tab



Import Floor Plan Images



Workshops - Building Floor Plans Images Tab



Calibration (Scale and Orientation) of Images

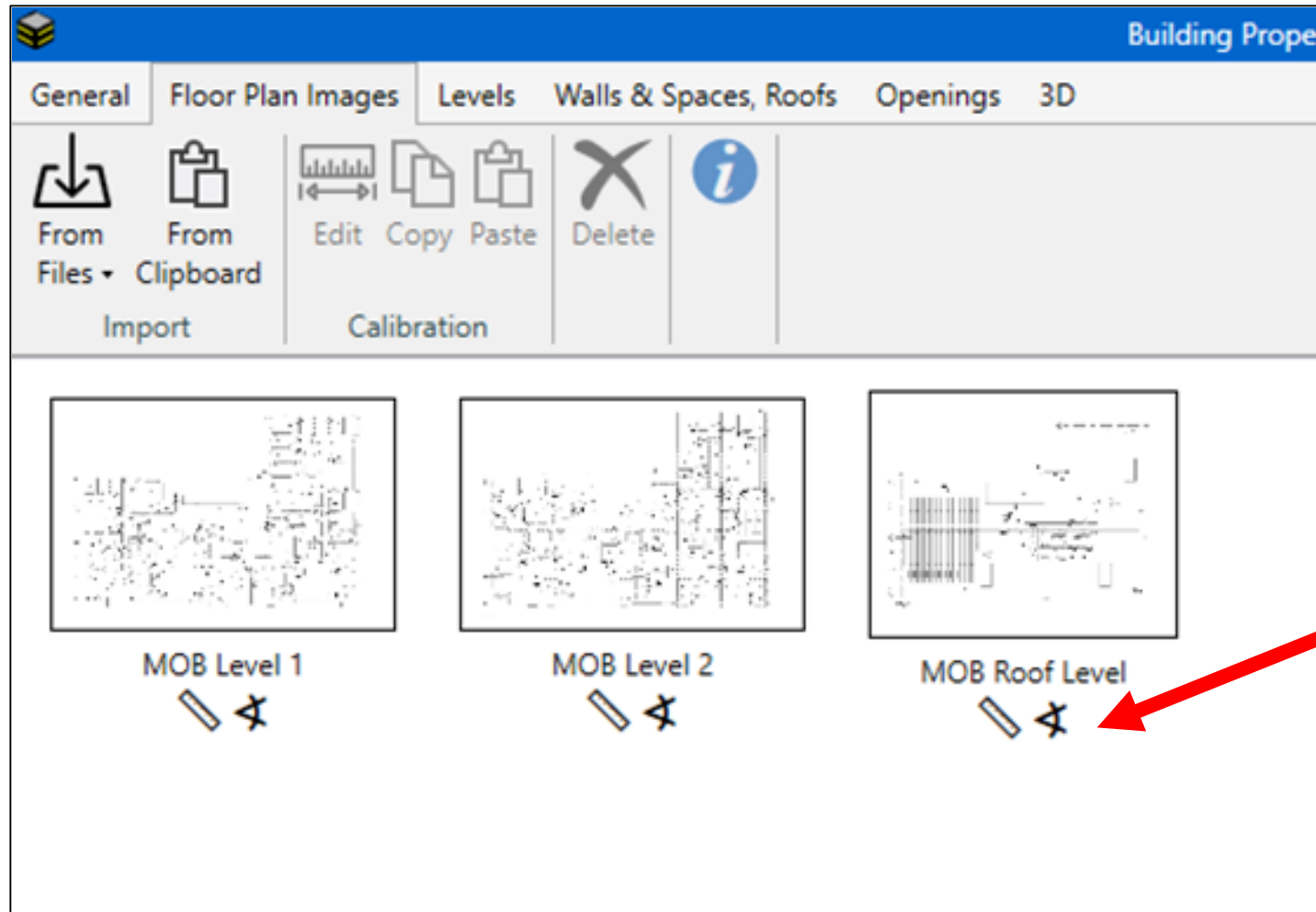
Tasks:

1. Still on the **Floor Plan Images tab**, in the working area of the tab left click the first-floor image to **highlight** it.
2. In the **Calibration** section of the tool ribbon, click the **Edit** option.
3. In the Calibration window, **click and read the blue Info button** to review the purpose and key tasks for this screen.
4. Click the “**Set North Orientation to:**” button and choose “**Left**” from the option list.
5. Then click the “**Set Scale to:**” button and choose **1/4” = 1’** from the option list.
6. Then press **OK**.
7. Back on the **Floor Plan Images** tab, **click the second-floor image** to highlight it.
8. In the Calibrate section of the tool ribbon, click the **Copy** option and choose the **first-floor** drawing to copy its calibration to the second-floor drawing.

Workshops - Building Floor Plans Images Tab



Import Floor Plan Images Calibrated REVIEW 02 CLASS IMPORT IMAGES DONE



Indicates scale and orientation has been set



Import and Calibrate Floor Plan Images


From Files • Import


From Clipboard


Edit


Copy


Paste


Delete


Info

No floor plans have been added to this building. Press Info button for guidance.

Workshops - Building Floor Plans Images Tab



Calibrate (Scale and Orientation) of Images

Summary of Tasks

1. We imported floor plan and roof images into HAP.
2. We calibrated the images by setting the scale and the orientation.



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03-04 LEVELS



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Workshops - Building Floor Plans Levels Tab



Go to Levels Tab, Create the First Level

Open 03 CLASS LEVELS WORKSHOP

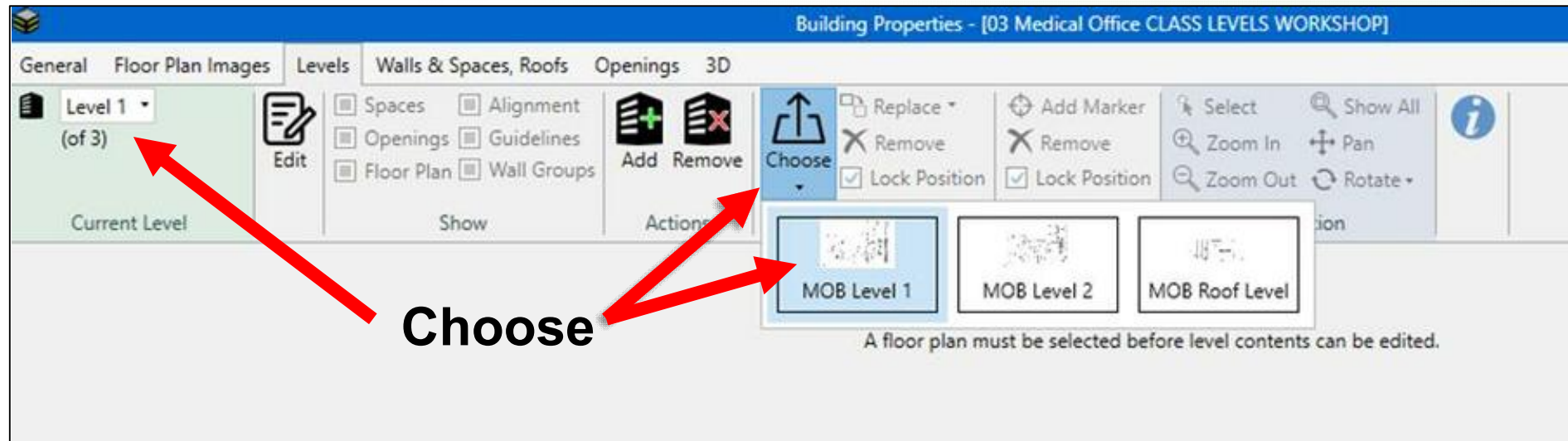
Project	Site or Building	Building Type	Gross Floor Area	Above Grade Levels	Below Grade Levels
Weather	<New default Building>				
Building Floor Plans	<Configure Site>				
Spaces	01- Medical OfficeCLASS IMPORT IMAGES WORKSHOP	Modeled Building	0.0	2	0
Systems	02- Medical Office CLASS IMPORT IMAGES DONE	Modeled Building	0.0	2	0
Plants	03- Medical Office CLASS LEVELS WORKSHOP	Modeled Building	0.0	2	0
Alternatives	04 - Medical Office CLASS LEVELS DONE	Modeled Building	0.0	2	0
Project Libraries					

Workshops - Building Floor Plans Levels Tab



Choose the First Level

IN THE LEVELS TAB CHOOSE THE MOB Level 1 pdf image first.



Workshops - Building Floor Plans Levels Tab



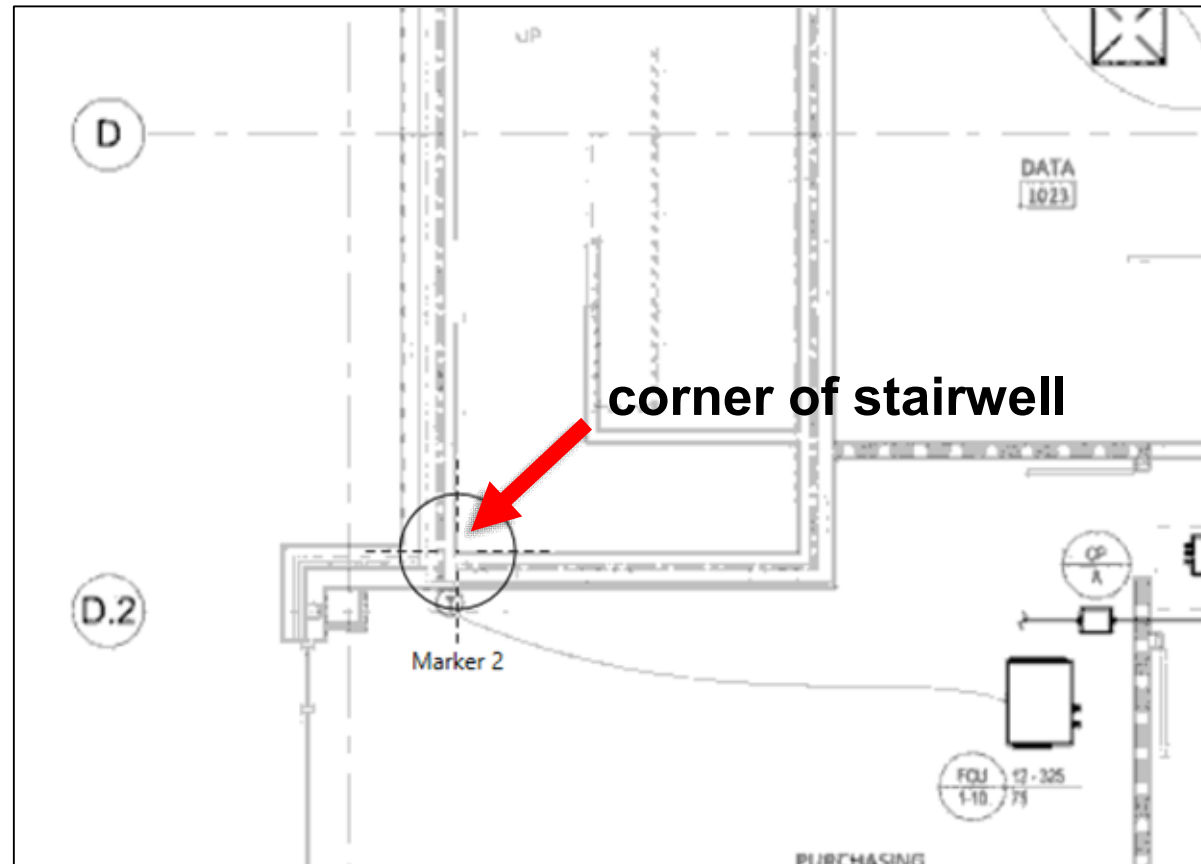
First Alignment Marker in Corner of Elevator Shaft



Workshops - Building Floor Plans Levels Tab



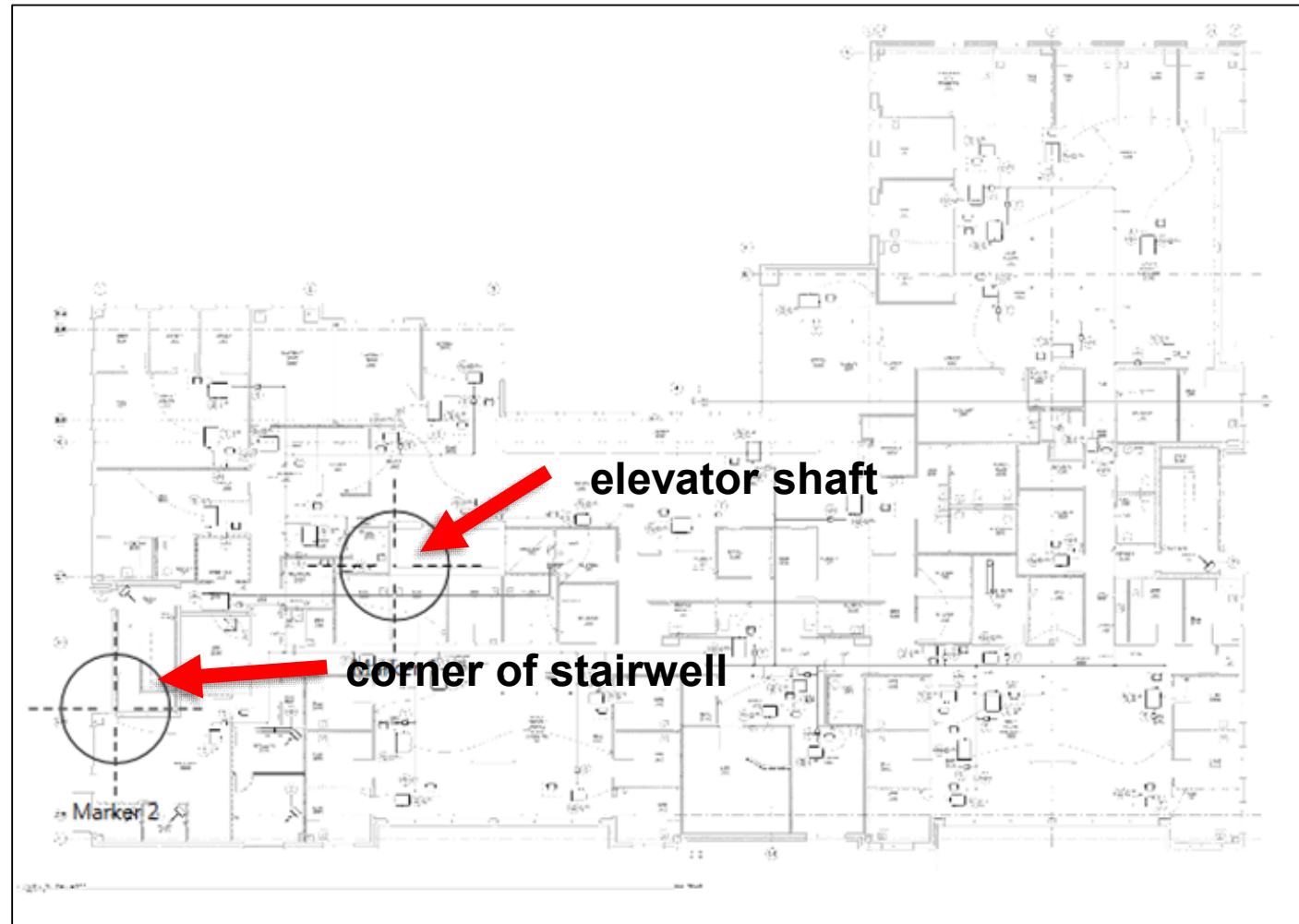
Second Alignment Marker First Floor in Corner of Stairwell



Workshops - Building Floor Plans Levels Tab



Final Alignment Markers for First Level

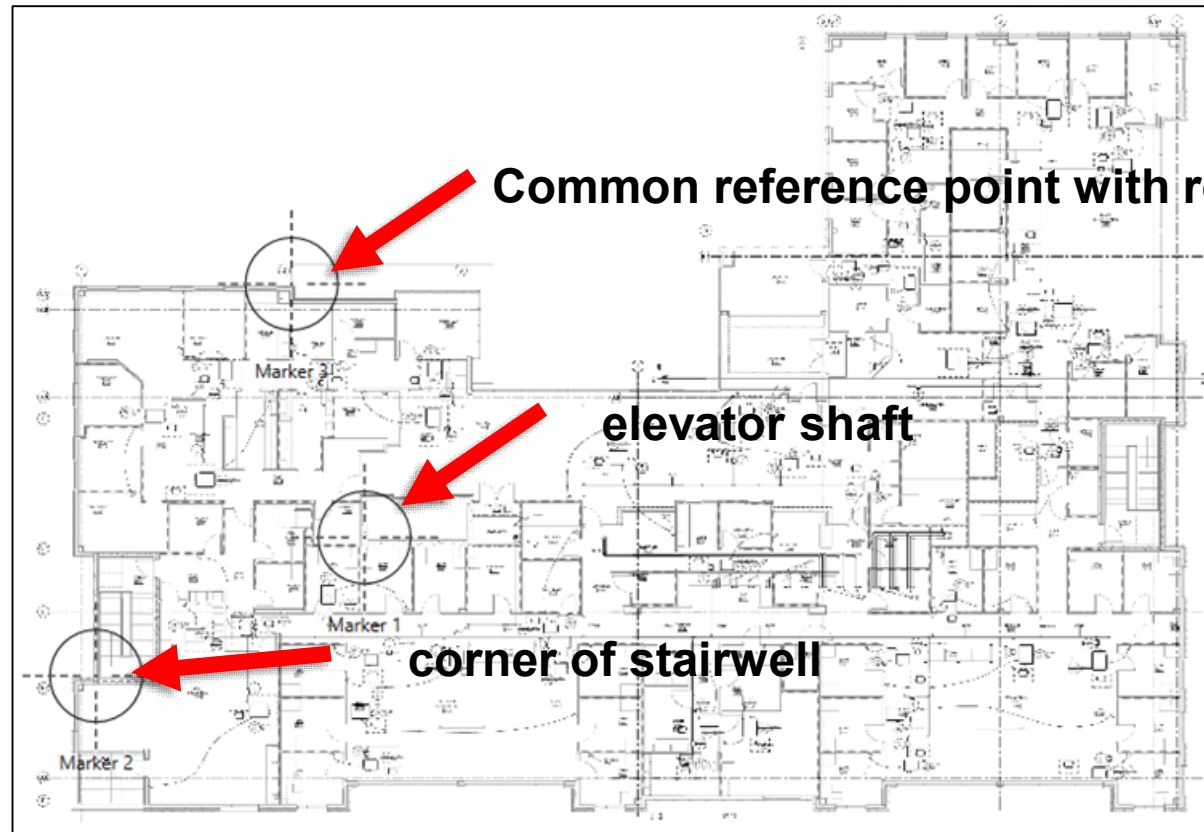


Workshops - Building Floor Plans Levels Tab



Final Alignment Markers for Second Level

Review **04 CLASS LEVELS DONE**
IN YOUR PROJECT

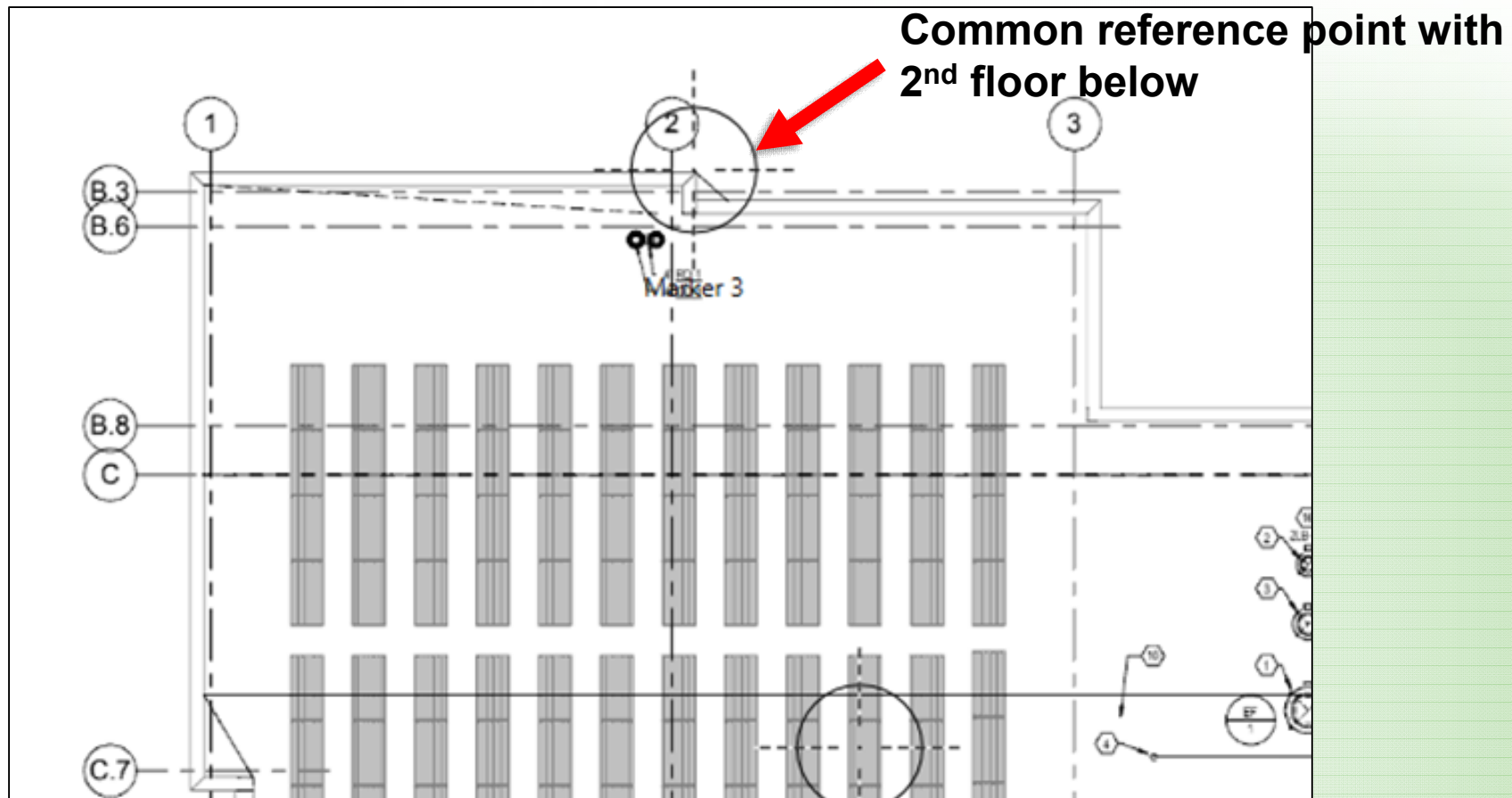


Workshops - Building Floor Plans Levels Tab



Final Alignment Marker for Roof

Review **04 CLASS LEVELS DONE**
IN YOUR PROJECT

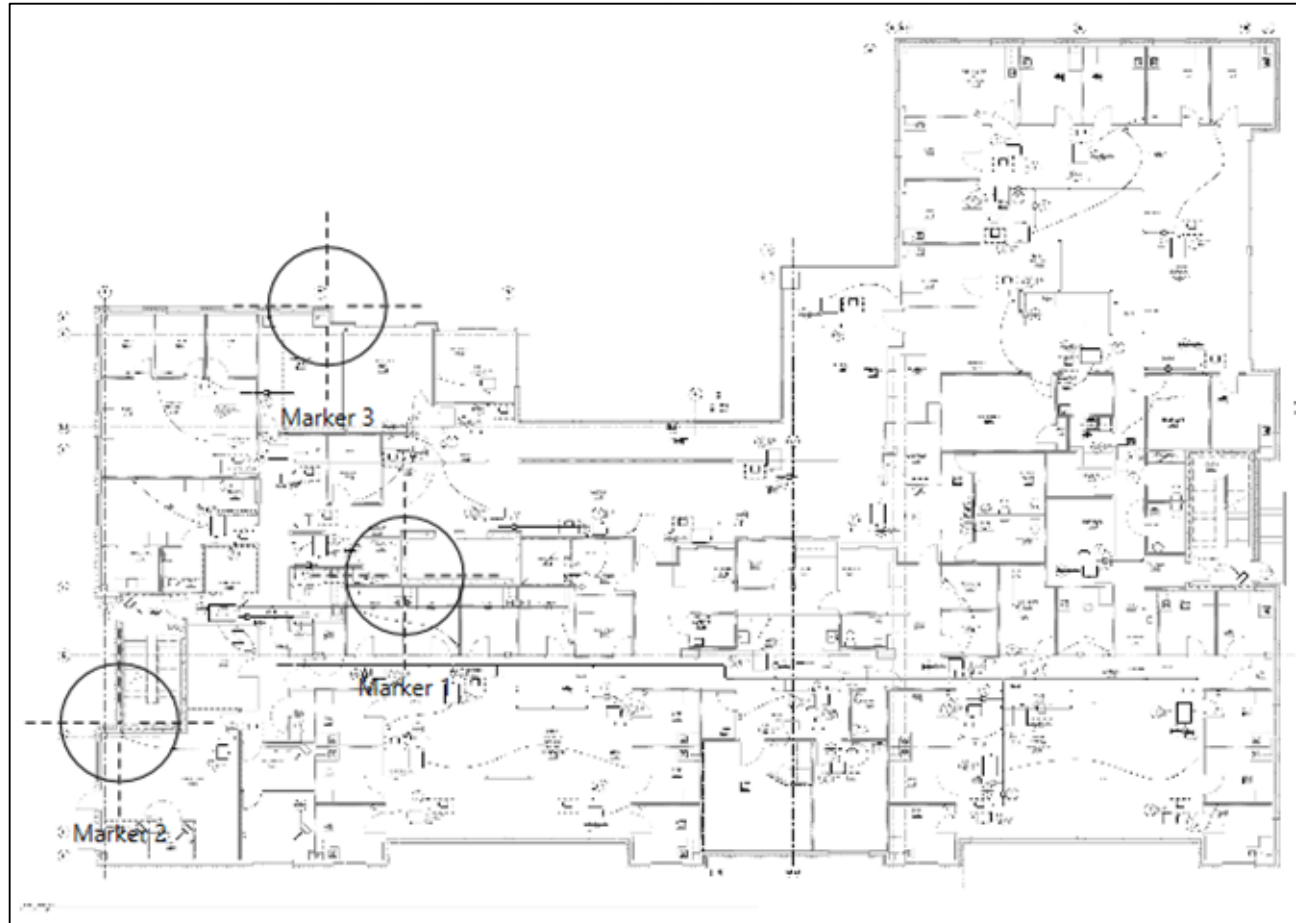


Workshops - Building Floor Plans Levels Tab



Discussion: The Need for Alignment

Review **04 CLASS LEVELS DONE**
IN YOUR PROJECT





Select and Align Floor Levels

General Floor Plan Images Levels Walls & Spaces, Roofs Openings 3D

Level 1 (of 3)
Current Level

Edit

Spaces

Openings

Floor Plan

Alignment

Guidelines

Wall Groups

Show

Add Remove

Choose

Remove Lock Position

Remove Lock Position

Floor Plan

Add Marker

Remove

Lock Position

Select

Zoom In

Zoom Out

Show All

Pan

Rotate

Navigation

i

A floor plan must be selected before level contents can be edited.



Summary of Tasks

1. We chose which imported image applies to each floor level and the roof.
2. We aligned the 2nd floor level with the first floor, and the roof level with the 2nd floor using markers.
3. We discussed why alignment is often required as it relates to the source of the image file.



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05-06 SKETCHOVER
PERIMETER SPACES



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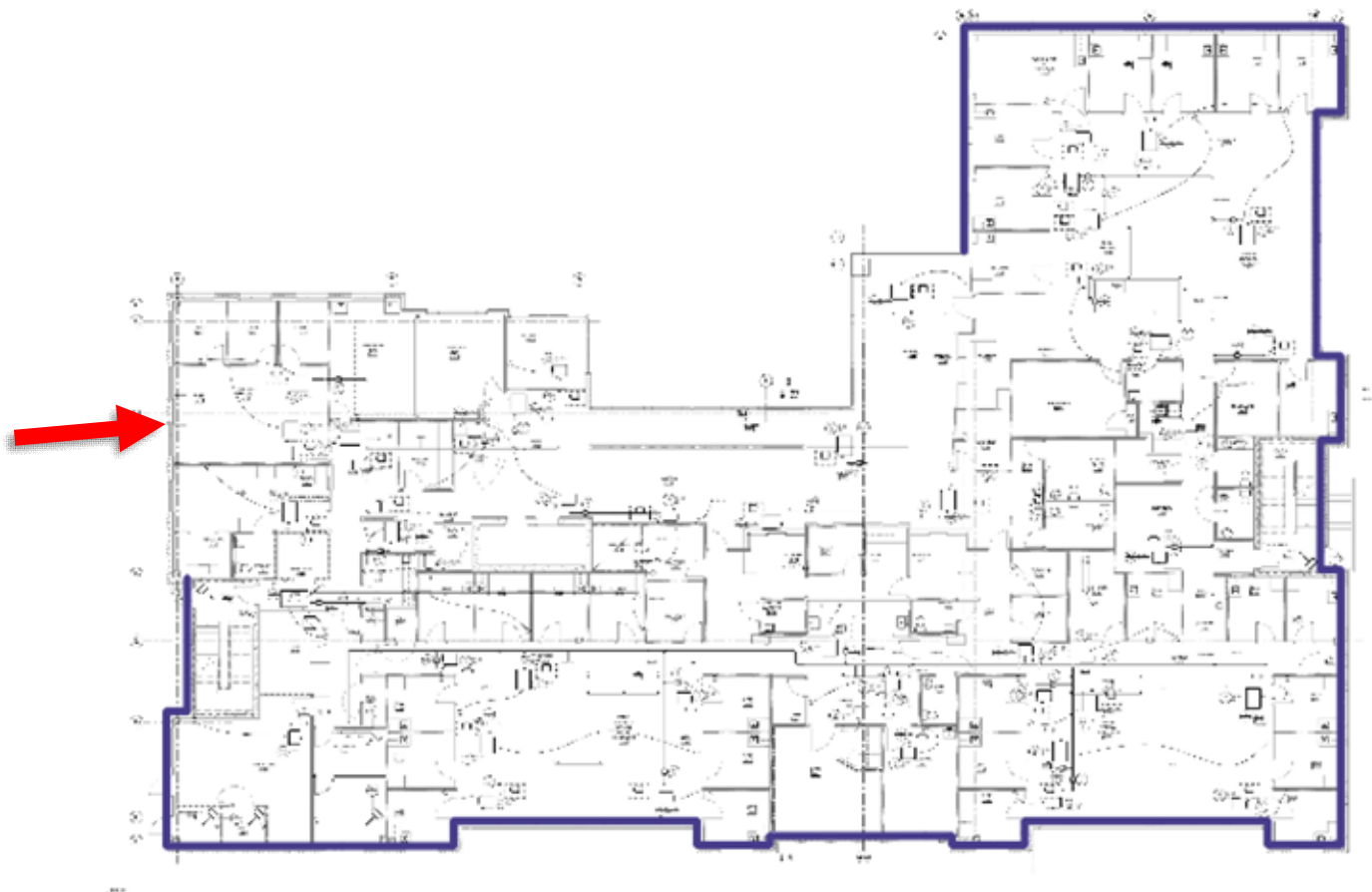
Table of Contents

Workshops - Building Floor Plans; Walls, Spaces and Roof



Sketch Over

First floor with sketch over of perimeter walls not completed



Workshops - Building Floor Plans; Walls, Spaces and Roof



Sketch Over the Perimeter Boundary Wall

Open 05 CLASS PERIMETER SKETCH WORKSHOP

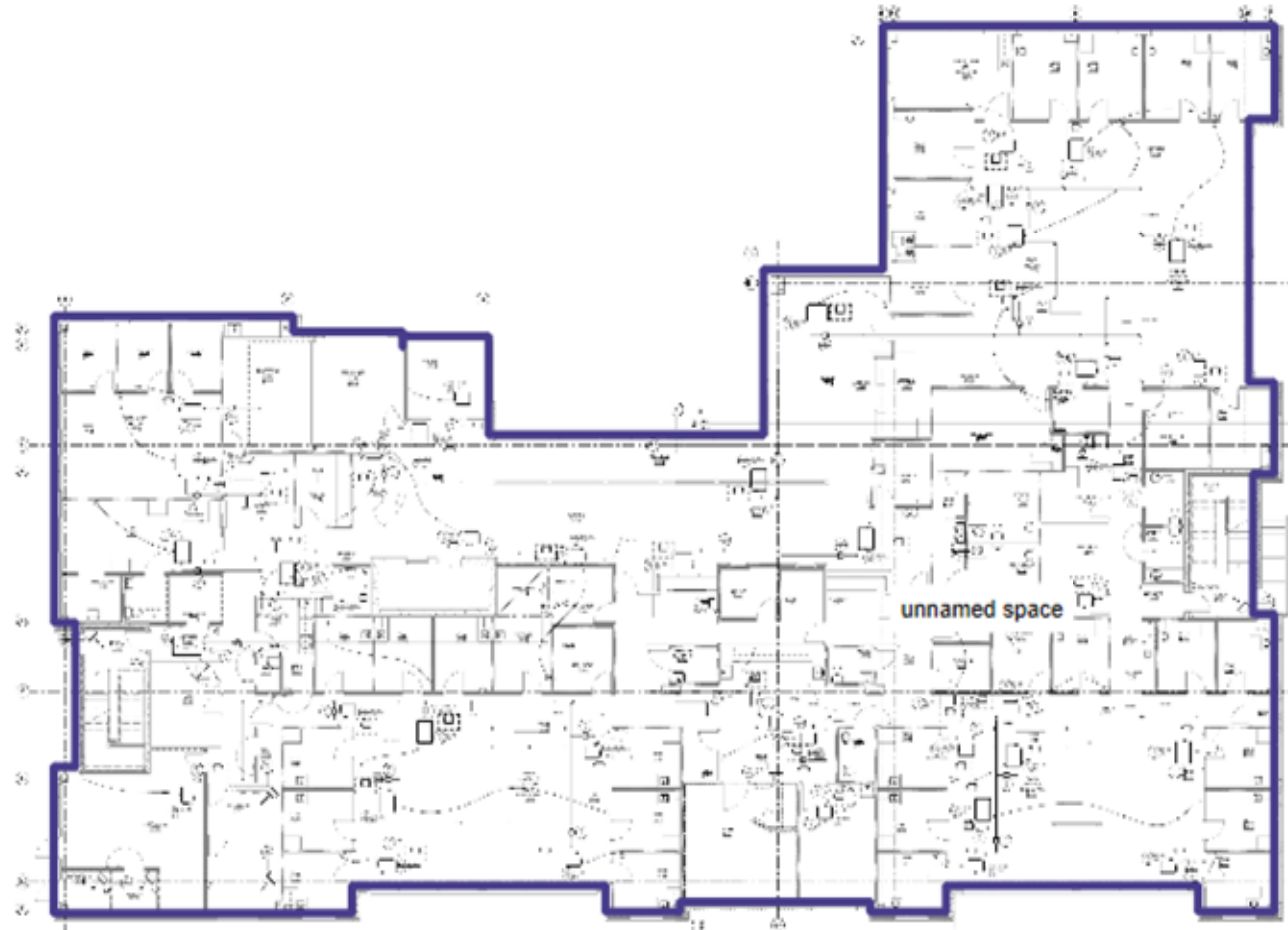
03 Medical Office CLASS LEVELS WORKSHOP	Modeled Building	0.0	
04 Medical Office CLASS LEVELS DONE	Modeled Building	0.0	
05 Medical Office CLASS PERIMETER SKETCH WORKSHOP	Modeled Building	0.0	
06 Medical Office CLASS PERIMETER SKETCH DONE	Modeled Building	18853.2	
07 Medical Office CLASS SPACE SKETCH WORKSHOP	Modeled Building	18853.2	

Workshops - Building Floor Plans; Walls, Spaces and Roof



Sketch Over the Perimeter First Concept

We will use this popular strategy: **First sketch over the perimeter of the level to outline the floor as a single space.** Then subdivide the floor plan into individual spaces. See notes page for discussion



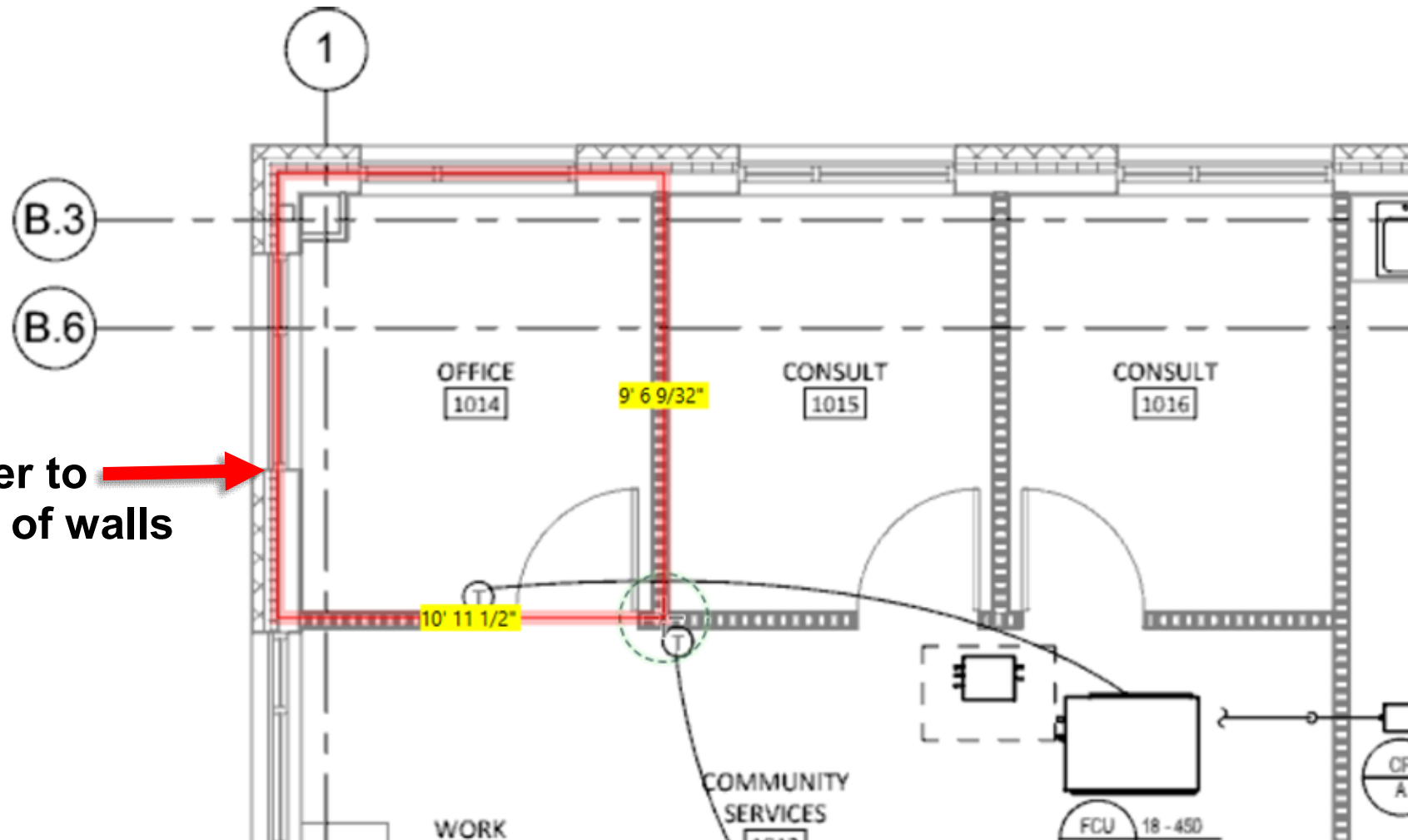
First floor shown

Workshops - Building Floor Plans; Walls, Spaces and Roof



Sketch to the Centerlines of the Walls!

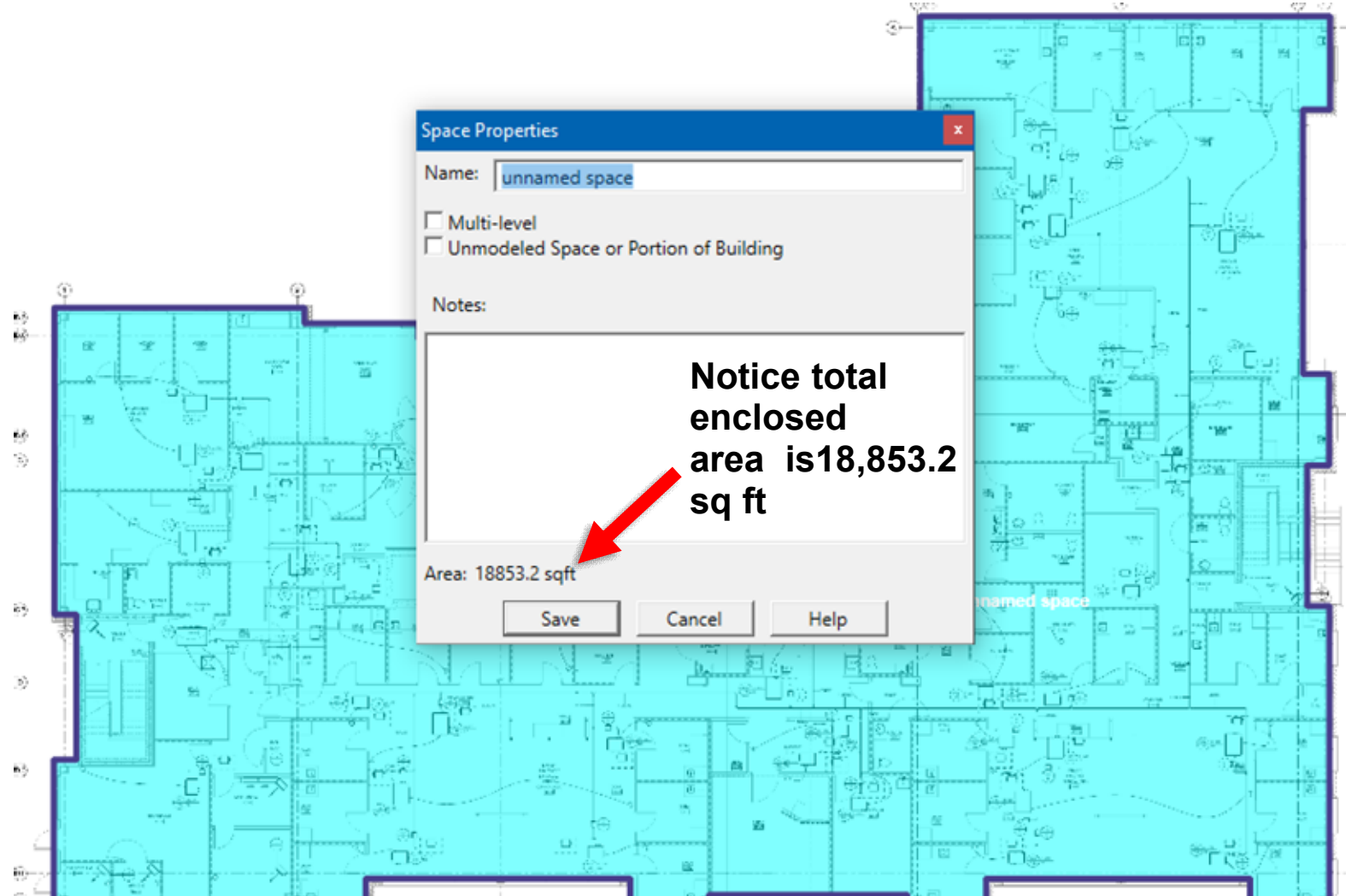
Sketch over to
Centerline of walls



Workshops - Building Floor Plans; Walls, Spaces and Roof



Sketch Over Perimeter - Naming the Space





Sketch Over Perimeter Exterior Walls

General Floor Plan Images Levels Walls & Spaces, Roofs Openings 3D

Level 1 (of 3)

Edit

Spaces

Openings

Floor Plan

Alignment

Guidelines

Wall Groups

Show

Perpendicular

Rectangle

Diagonal

Move

Delete

Tools

Straight

Shells

Guidelines

Edit Groups

Assign

Wall Groups

Select

Zoom In

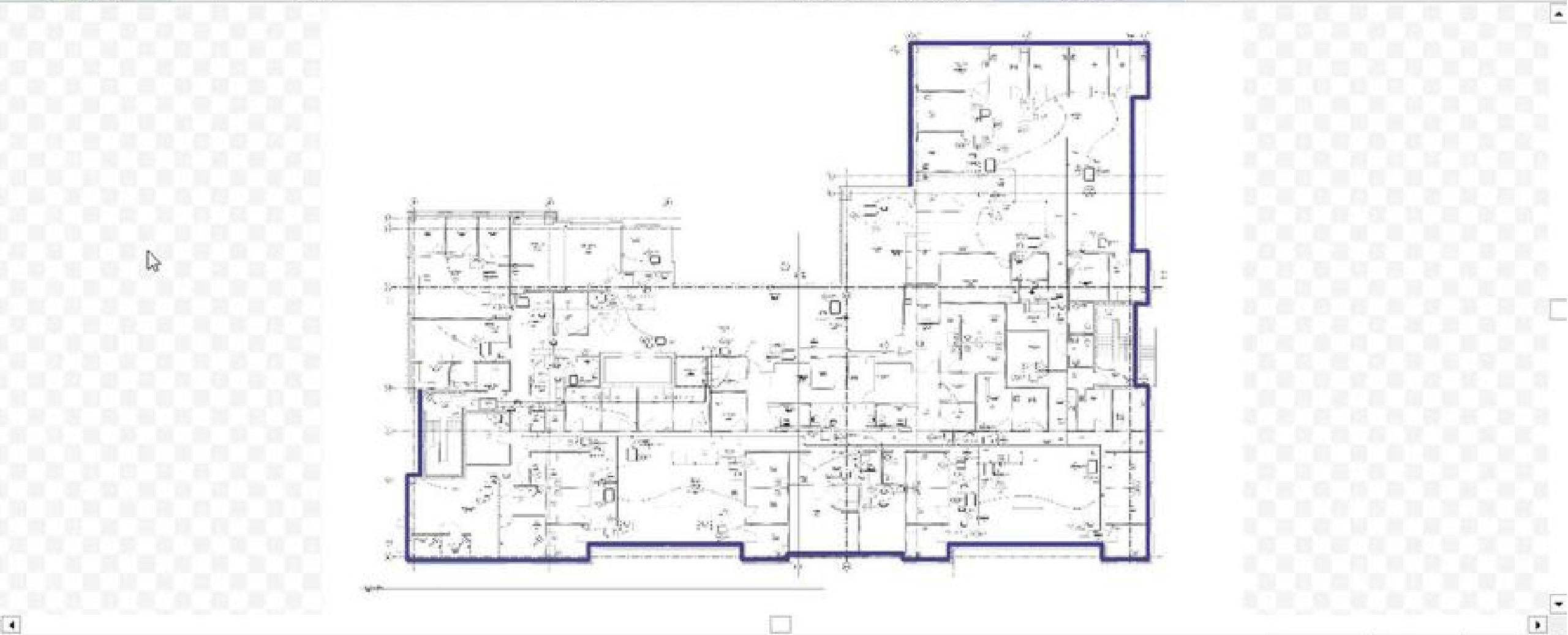
Zoom Out

Show All

Pan

Rotate

Navigation



OK Cancel Help



Summary of Tasks

1. We sketched over the perimeter portion of the first floor that was done using the centerline of the walls.
2. We learned how to use the perpendicular, rectangle, and diagonal tool.
3. We learned how to name a space.



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07-08 SKETCHOVER
INTERIOR SPACES



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Workshops - Building Floor Plans; Walls, Spaces and Roof



Sketch Over Interior Spaces

- a. Use the **Rectangle, Perpendicular, and Diagonal drawing tools as needed** to subdivide the floor into spaces. In order to reduce effort, consider sketching over HVAC zones rather than the individual spaces in the zones.
- b. After HVAC spaces that need sketching over have been completed, go to **Select mode** using the **Navigation section** of the tool ribbon. With the mouse cursor, point at a space we **completed in class** and double-click. That opens the **Space Properties** window where you can **define the space name**.

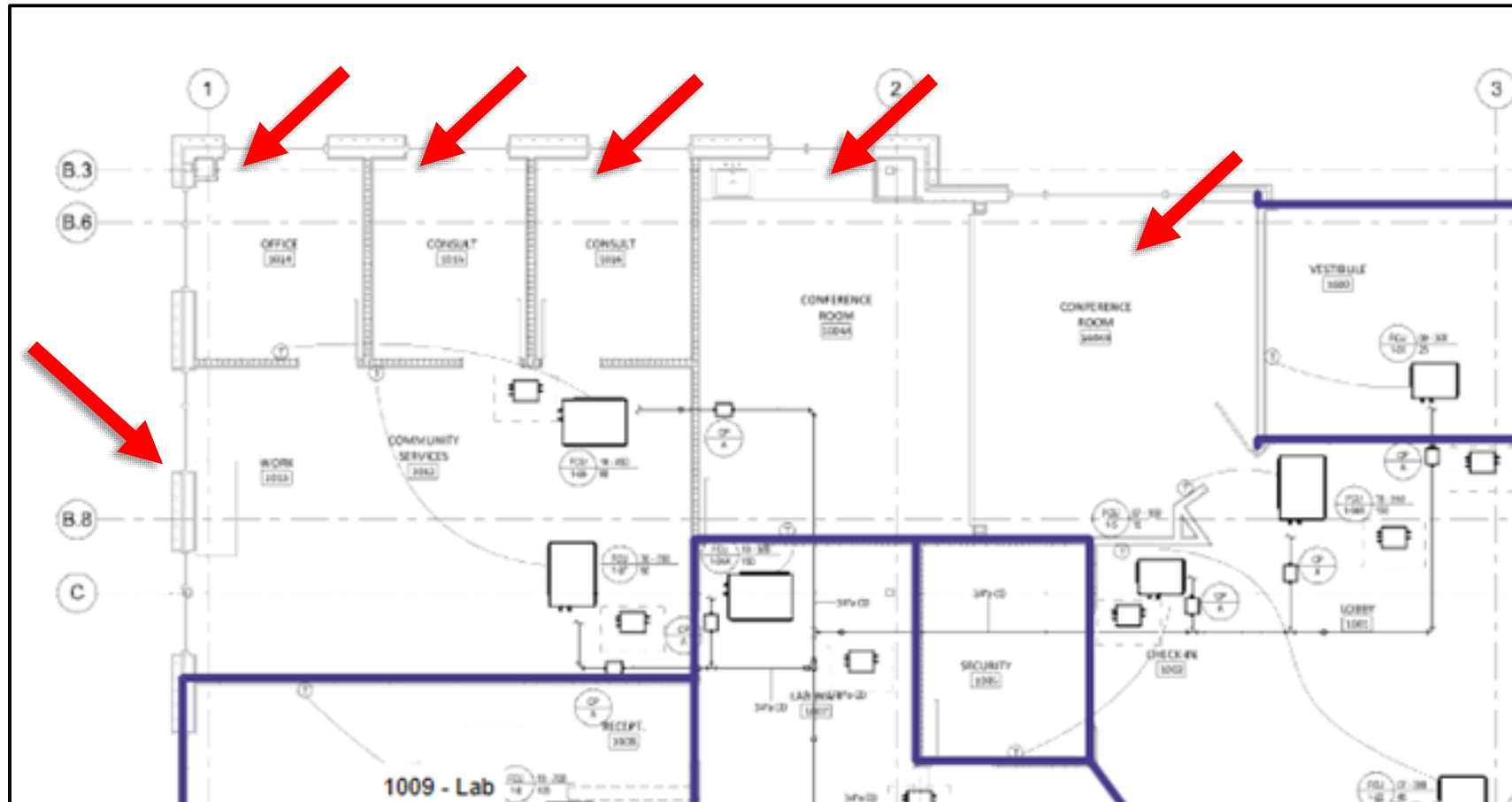
Open 07 CLASS SPACES SKETCH WORKSHOP

 06 Medical Office CLASS PERIMETER SKETCH DONE	Modeled Building	18853.2	
 07 Medical Office CLASS SPACE SKETCH WORKSHOP	Modeled Building	18853.2	
 08 Medical Office CLASS SPACE SKETCH DONE	Modeled Building	18853.2	

Workshops - Building Floor Plans; Walls, Spaces and Roof



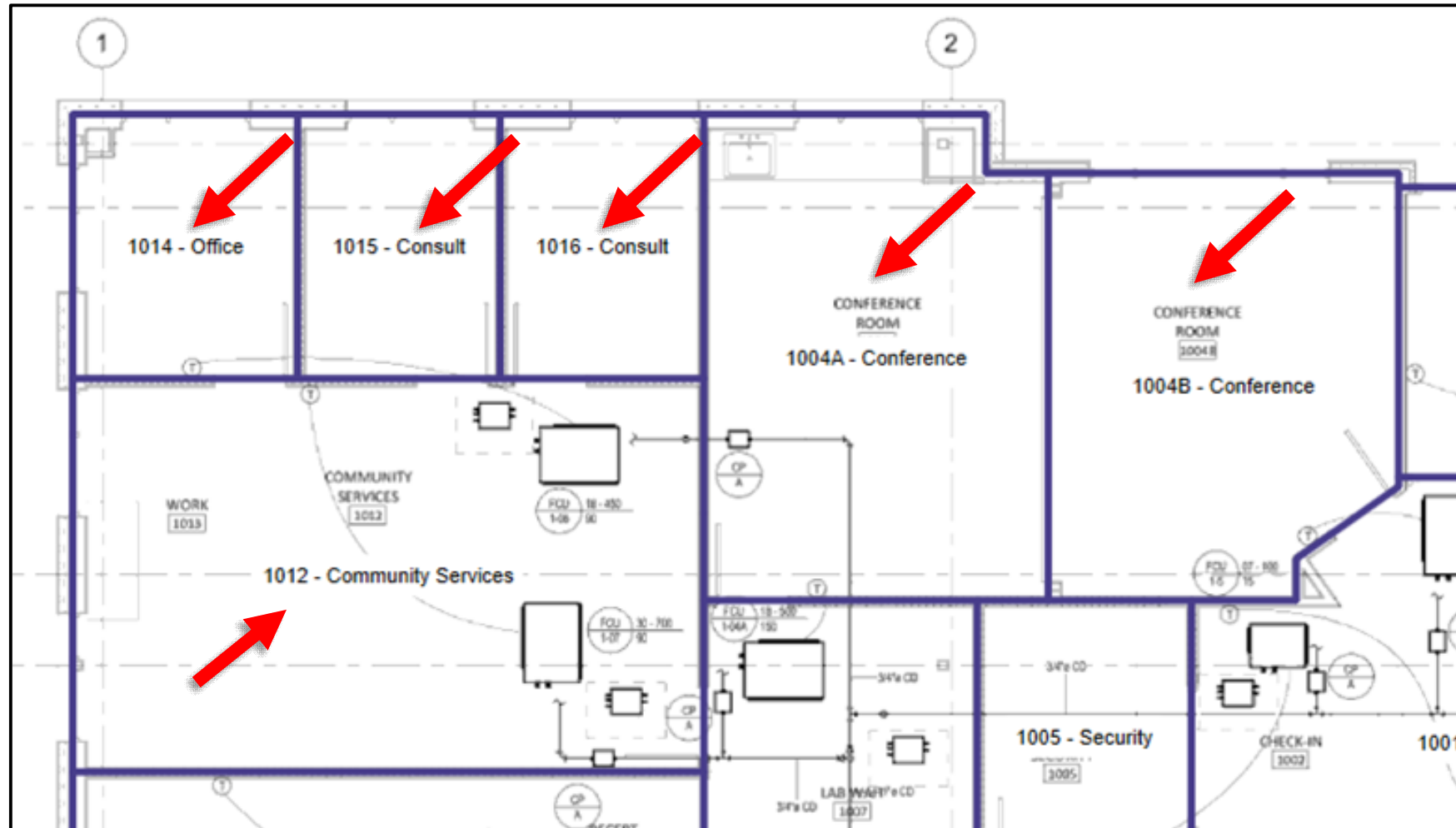
Sketch Over these First Floor Spaces that are not Finished



Workshops - Building Floor Plans; Walls, Spaces and Roof

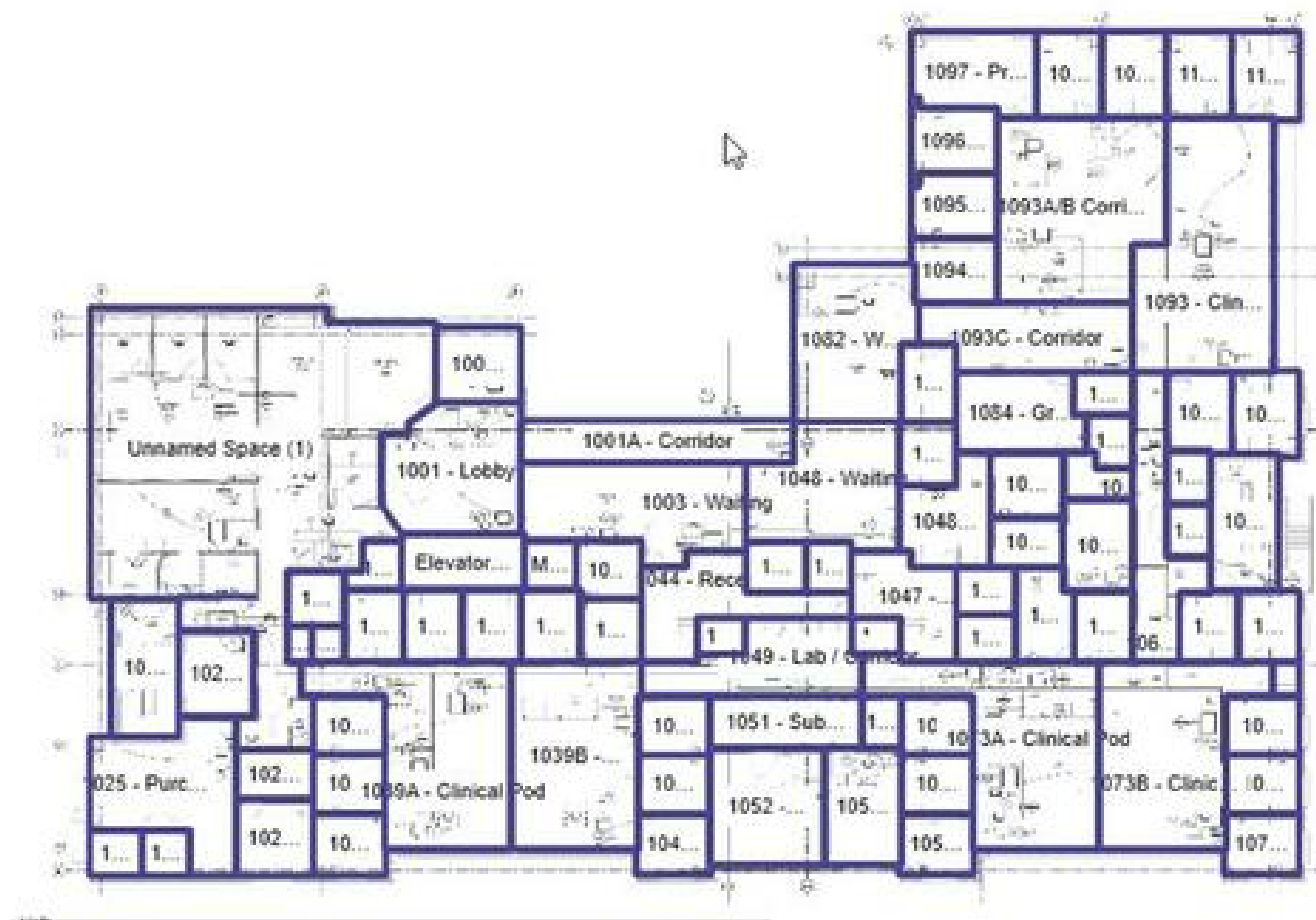


Name the Spaces We Sketched Over...Use the Names on the Spaces





Sketch Over Interior Spaces





Summary of Tasks

1. We sketched over 6 of the first-floor spaces choosing the centerline of the walls.
2. We discussed the value of good space naming.
3. When 1st floor is completed, we would similarly sketch over the 2nd floor starting with the perimeter. But before we do the 2nd floor....there's an additional feature called shell guideline. We will cover that as a separate topic.



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09-10 SHELL GUIDELINE



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Workshops - Building Floor Plans; Walls, Spaces and Roof



Sketch Over Level 2 Perimeter Using Guidelines - Shells

There is a feature used for multiple floor buildings to line up the perimeter of the upper floor with the sketched over perimeter of the lower (first) floor. It uses the **Guidelines** section of the tool ribbon and the **Shell** option.

Open 09 CLASS 2ND FLOOR GUIDELINE WORKSHOP

 07 Medical Office CLASS SPACE SKETCH WORKSHOP	Modeled Building	18853.2
 08 Medical Office CLASS SPACE SKETCH DONE	Modeled Building	18853.2
 09 Medical Office CLASS 2ND FLOOR GUIDELINE WORKSHOP	Modeled Building	18853.2
 10 Medical Office CLASS 2ND FLOOR GUIDELINE DONE	Modeled Building	18853.2

Then in the Current Level section of the tool ribbon, **choose Level 2.**

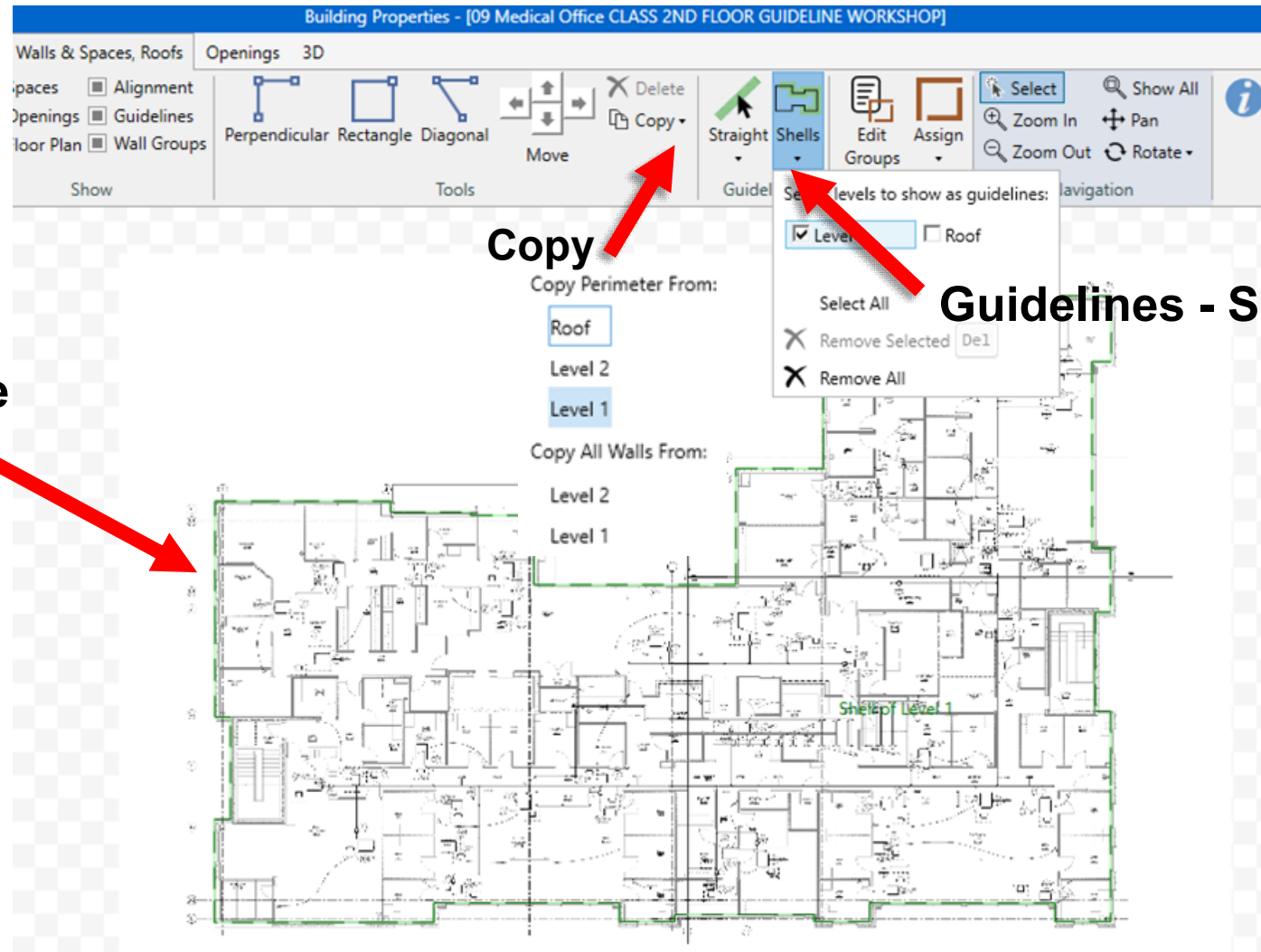
Workshops - Building Floor Plans; Walls, Spaces and Roof



Sketch Over Level 2 Perimeter Using Guidelines - Shells

2nd Floor Plan

2nd Floor Plan with the green “guideline” of the first floor under it

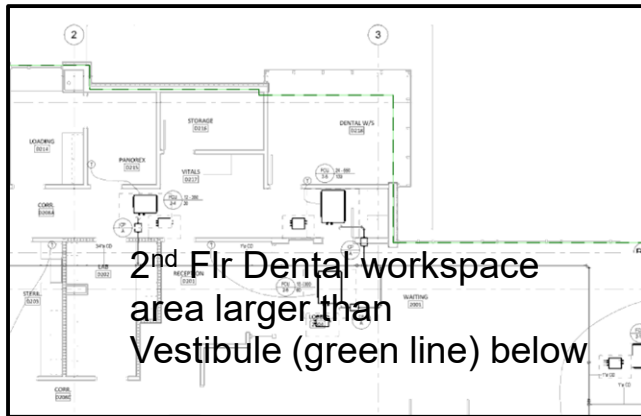


Guidelines - Shells

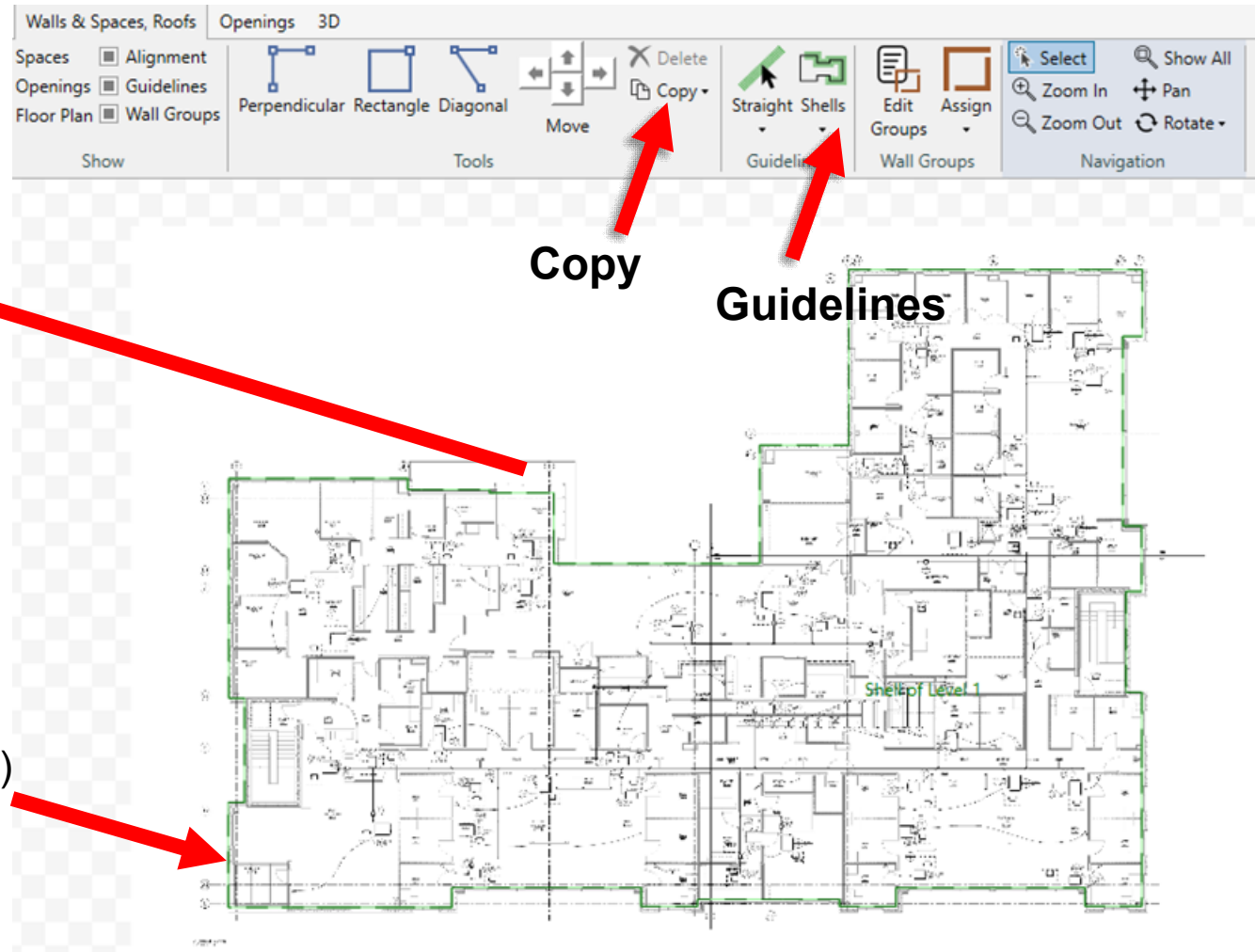
Workshops - Building Floor Plans; Walls, Spaces and Roof



Sketch Over Level 2 Perimeter by First Selecting Guidelines - Shells



Another difference
2nd Flr Staff Deck (porch)
above first floor green
outline line below



Workshops - Building Floor Plans; Walls, Spaces and Roof



Q & A on Guideline Shell(see speaker notes)



Stacked Building Levels

Workshops - Building Floor Plans; Walls, Spaces and Roof



Q & A on Guideline Shell(see speaker notes)



Stacked Building Levels



Project Shell Guideline

General Floor Plan Images Levels Walls & Spaces, Roofs Openings 3D

Level 1 (of 3)

Edit

Spaces

Alignement

Openings

Guidelines

Floor Plan

Wall Groups

Show

Perpendicular

Rectangle

Diagonal

Move

Delete

Tools

Straight

Shells

Guidelines

Edit

Assign

Wall Groups

Select

Zoom In

Zoom Out

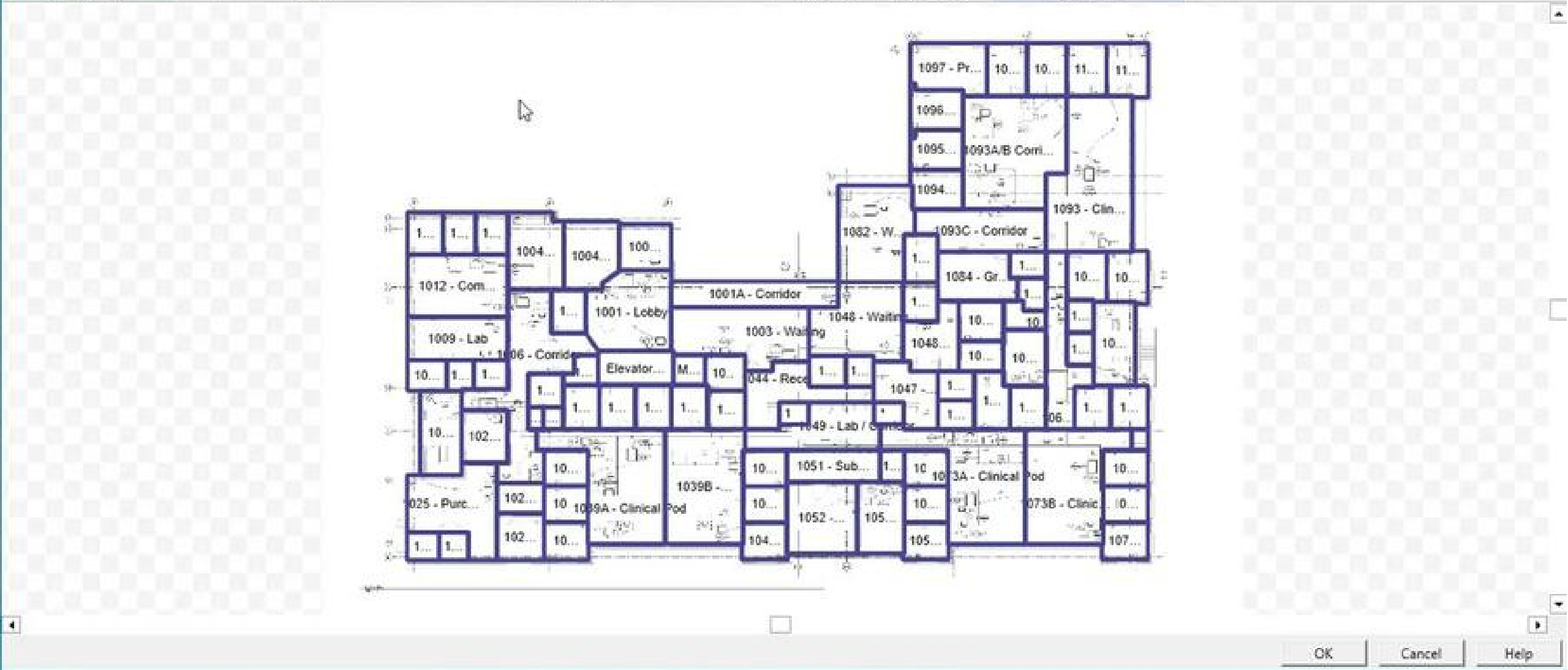
Show All

Pan

Rotate

Navigation

i



Workshops - Building Floor Plans; Walls, Spaces and Roof



Guideline Shell

Summary of Tasks

1. We used the shell guideline of the 1st floor perimeter to create a guideline for the 2nd floor.
2. A shell guideline is snappable, so we used this guideline for sketching over the 2nd floor perimeter.
3. Then we finished sketching over 2nd floor spaces and naming them.



What's the sequence so far?

1. Import and calibrate floor plans (Floor Plan Images tab).
2. Choose which image is 1st, 2nd, Roof level (Levels tab).
3. Line up the floors with markers (Levels tab).
4. Sketch the perimeter of the first floor (Walls & Spaces & Roof tab).
5. Sketch the inside spaces of the first floor .
6. Name the first-floor spaces.
7. Sketch the perimeter of the 2nd floor by asking for a shell guideline of the first floor and snapping to it.
8. Sketch over and name the 2nd floor spaces.



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11-12 WALL GROUPS



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Workshops - Building Floor Plans; Walls, Spaces and Roof



WALL GROUPS



Notice the 2nd floor is a different wall construction than the 1st floor

Workshops - Building Floor Plans; Walls, Spaces and Roof



Create Wall Groups

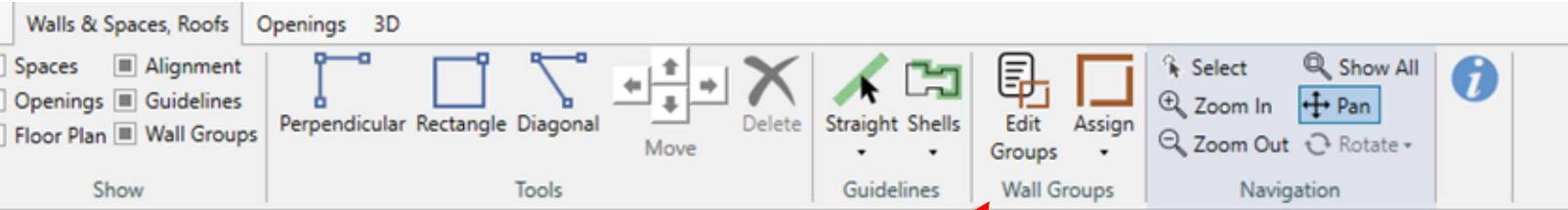
Open 11 CLASS WALL GROUPS WORKSHOP

I09 Medical Office CLASS 2ND FLOOR GUIDELINE WORKSHOP	Modeled Building	18853.2
I10 Medical Office CLASS 2ND FLOOR GUIDELINE DONE	Modeled Building	18853.2
I11 Medical Office CLASS WALL GROUPS WORKSHOP	Modeled Building	37638.0
I12 Medical Office CLASS WALL GROUPS DONE	Modeled Building	37638.0
I13 Medical Office CLASS AIR WALLS WORKSHOP	Modeled Building	37638.0

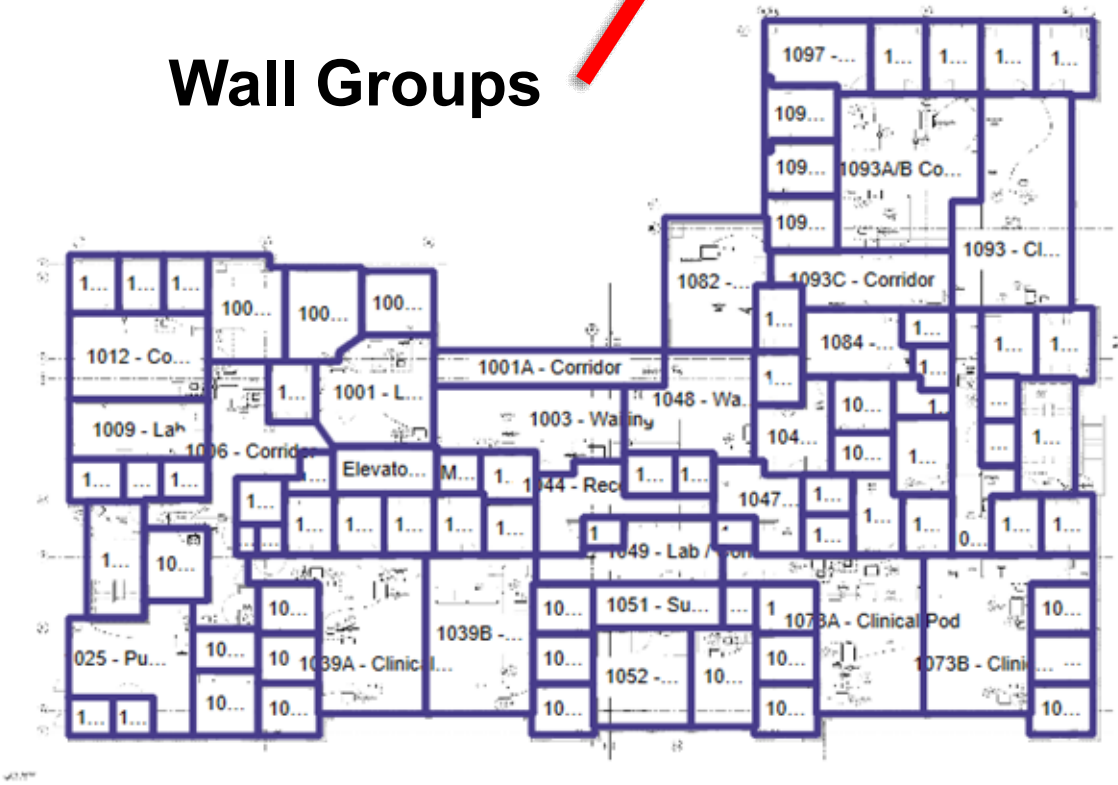
Creating Wall Surface Groups

1. First finish your sketch-over of the floor plans for all levels in the building.
2. On the Walls & Spaces tab select the "Edit Groups" option in the Wall Groups section of the tool ribbon. The Edit Wall Groups window will appear.

Workshops - Building Floor Plans; Walls, Spaces and Roof



Wall Groups



Workshops - Building Floor Plans; Walls, Spaces and Roof



Wall Groups

**Default
wall
groups**

A screenshot of the 'Edit Wall Groups' dialog box. The 'Groups' list on the left contains 'Default' and 'Air Walls'. A red arrow points to the 'Default' group. The 'Details' section on the right shows 'Name: Default' and an empty 'Notes' text area. At the bottom are 'Add', 'Remove', 'Close', and 'Help' buttons.

Edit Wall Groups

Groups

- ☒ Default
- ☐ Air Walls

Details

Name:

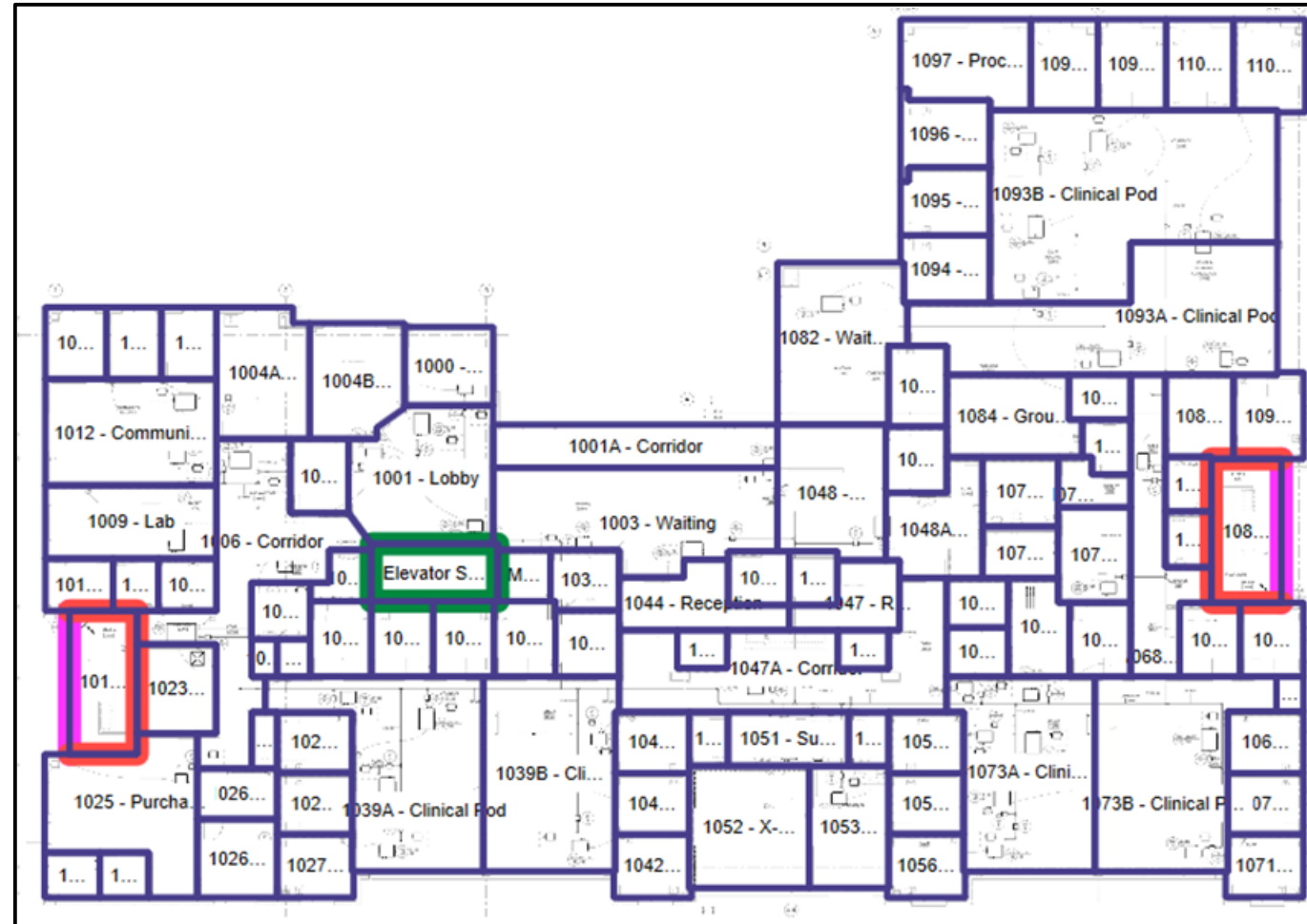
Notes:

Workshops - Building Floor Plans; Walls, Spaces and Roof



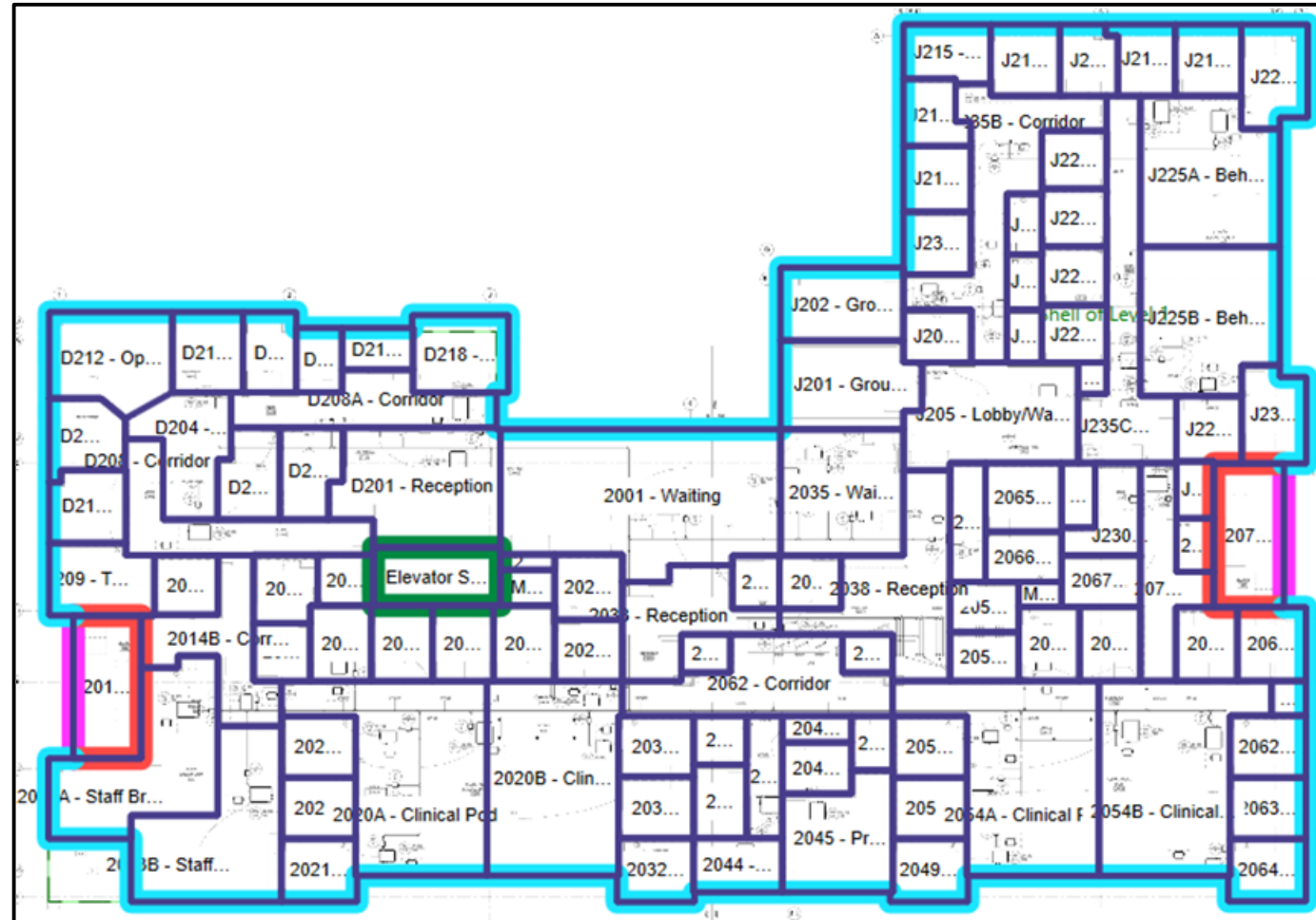
The 'Edit Wall Groups' dialog box is shown. It has a blue title bar with the text 'Edit Wall Groups' and a close button (X). The dialog is divided into two main sections: 'Groups' on the left and 'Details' on the right. The 'Groups' section contains a list of wall groups with corresponding color swatches: 'Default' (grey), 'Air Walls' (dark grey), 'Exterior Wall - Level 2' (cyan), 'Exterior Wall - Stairwells' (magenta), 'Interior Wall - Elevator Shaft' (green), and 'Interior Wall - Stairwell' (red). Below the list are 'Add' and 'Remove' buttons. The 'Details' section has a 'Name' field containing 'Air Walls' and a 'Notes' text area. At the bottom right of the dialog are 'Close' and 'Help' buttons.

Four additional wall Groups for our project



Groups

- Default
- Air Walls
- Exterior Wall - Level 2
- Exterior Wall - Stairwells
- Interior Wall - Elevator Shaft
- Interior Wall - Stairwell





Create and Assign Wall Groups

General Floor Plan Images Levels Walls & Spaces, Roofs Openings 3D

Level 1 (of 3)

Edit

Spaces

Alignment

Openings

Guidelines

Floor Plan

Wall Groups

Show

Perpendicular

Rectangle

Diagonal

Move

Delete

Straight

Shells

Guidelines

Edit Groups

Assign

Wall Groups

Select

Zoom In

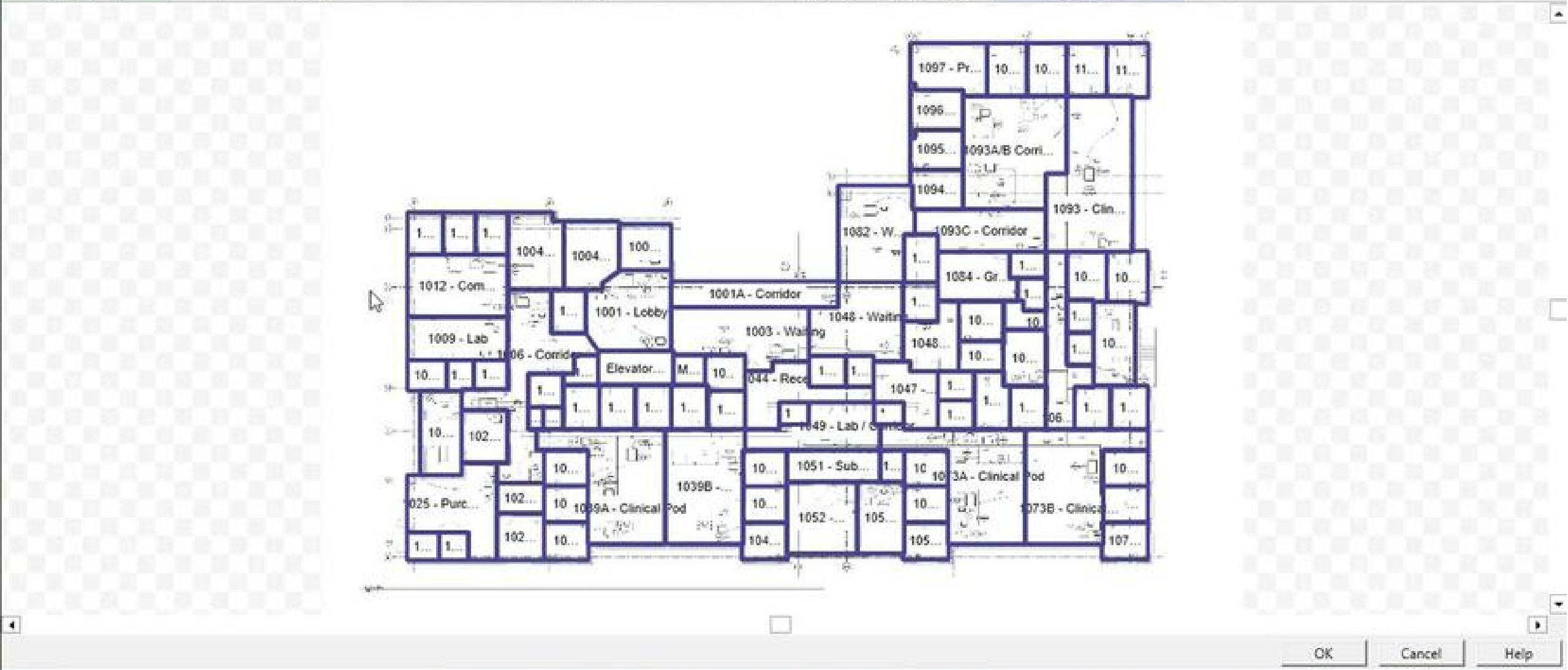
Zoom Out

Show All

Pan

Rotate

Navigation



Workshops - Building Floor Plans; Walls, Spaces and Roof



Wall Groups

Summary of Tasks

1. We used the **Edit Wall Groups** window to create all wall groups for our building.
2. Once a wall surface group is created, with different colors we can indicate where they exist on the floor plan with the **Assign feature**.



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13-14 AIR WALLS



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Workshops - Building Floor Plans; Walls, Spaces and Roof



Air Walls

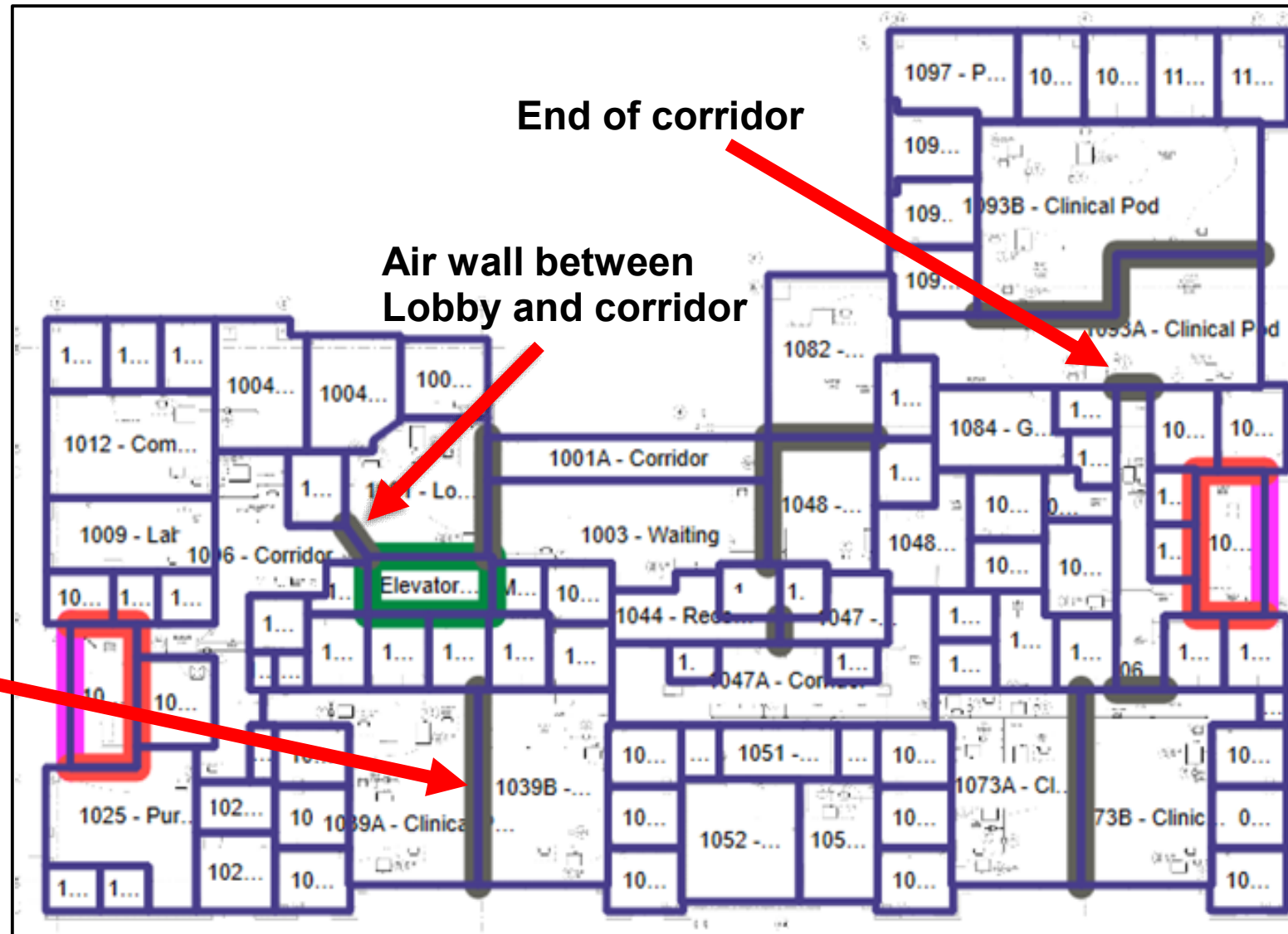
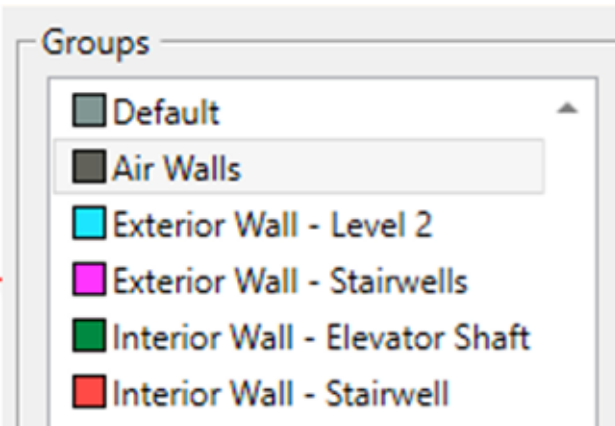
Open 13 CLASS AIR WALLS WORKSHOP

 12 Medical Office CLASS WALL GROUPS DONE	Modeled Building	37638.0
 13 Medical Office CLASS AIR WALLS WORKSHOP	Modeled Building	37638.0
 14 Medical Office CLASS AIR WALLS DONE	Modeled Building	37638.0

Creating Air Walls

1. First finish your sketch-over of the floor plans for all levels in the building.
2. On the Walls & Spaces tab select the Assign option in the Wall Groups section of the tool ribbon. A pop-up panel will appear showing the list of default and additional wall groups, each with a color code. **Select the black "Air Wall" group.**

Workshops - Building Floor Plans; Walls, Spaces and Roof



End of corridor

Air wall between
Lobby and corridor

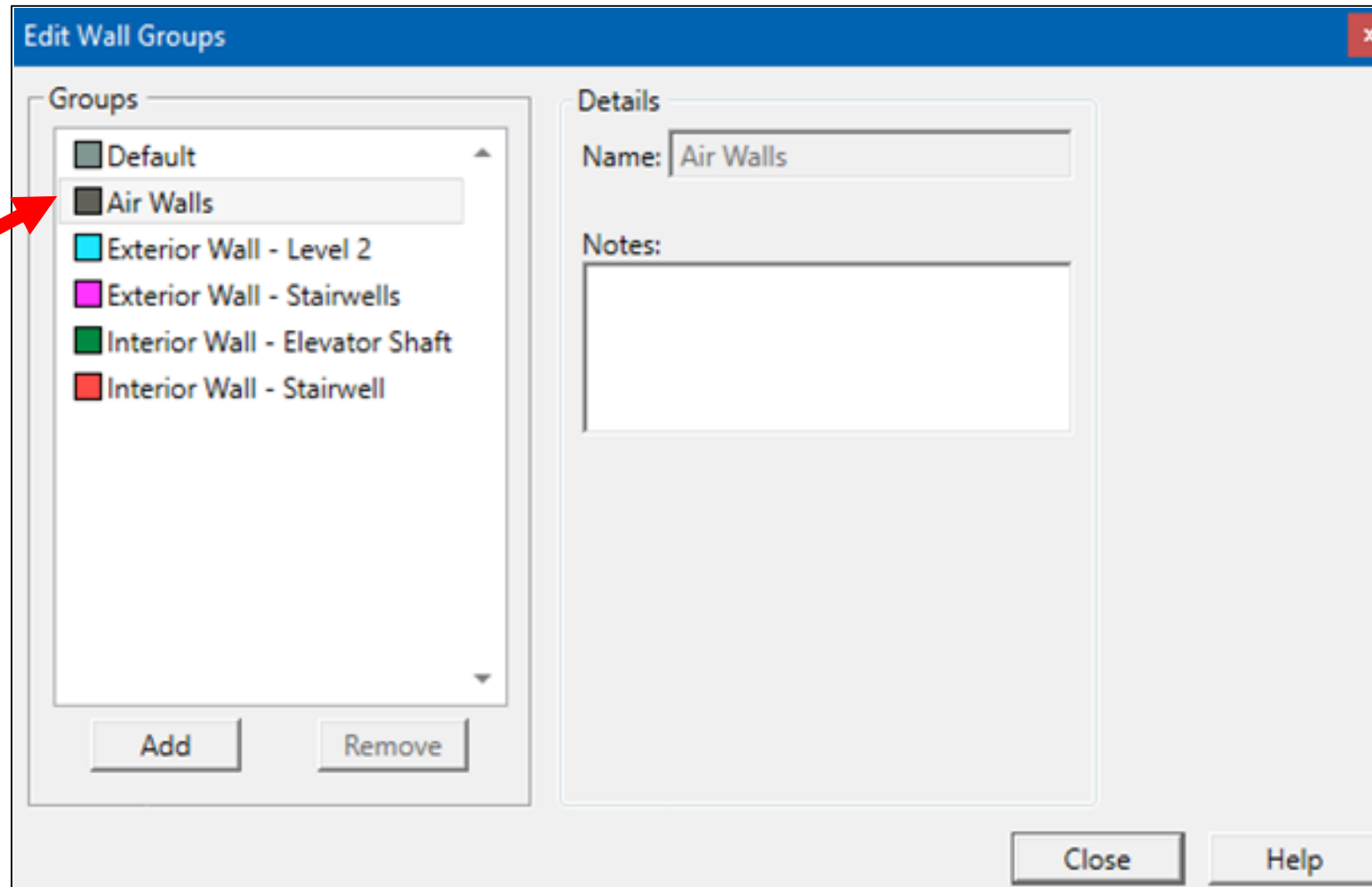
Air wall between
the large Open Plan
Clinic space divided
into 2 zones

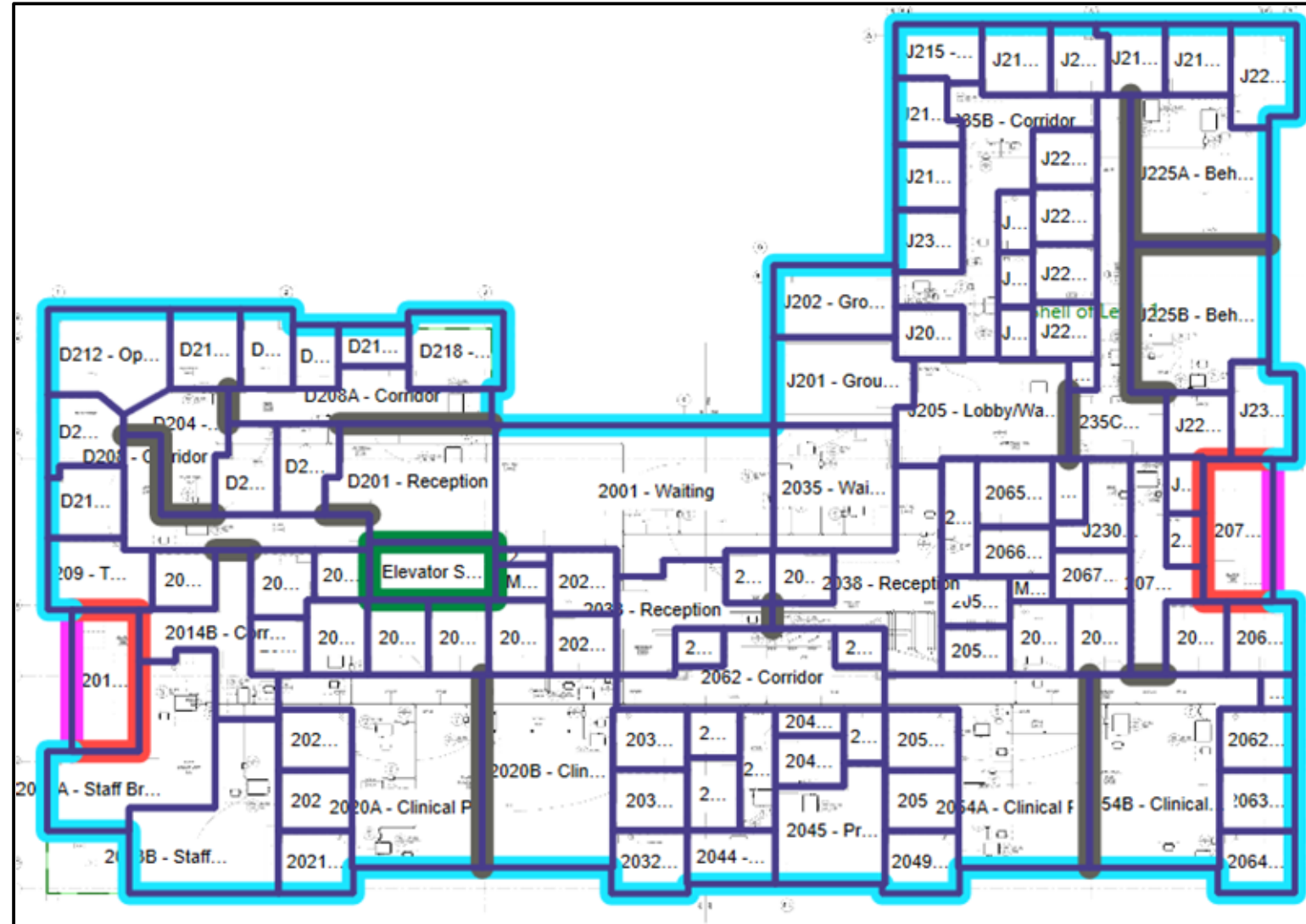
Workshops - Building Floor Plans; Walls, Spaces and Roof



Air Walls

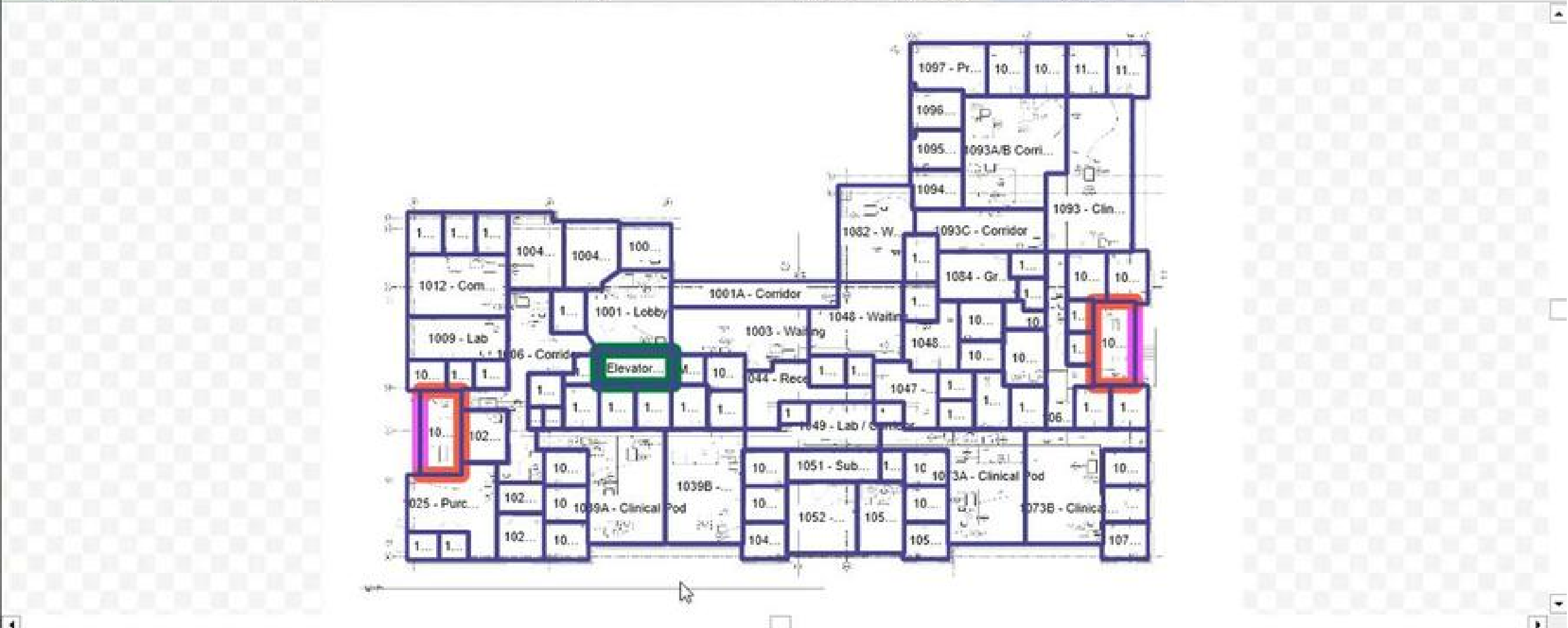
Air Walls







Assign Air Walls



Workshops - Building Floor Plans; Walls, Spaces and Roof



Air Walls

Summary of Tasks

1. Edit Wall Groups indicates air walls are one of the default wall groups. Its color is charcoal black.
2. Position where air walls exist with your mouse on each floor plan with the **Assign feature**.



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15-16 ROOF



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Workshops - Building Floor Plans; Walls, Spaces and Roof



This screen was done previously during Creating a BuildingBuilding Type and Levels

The image shows a software dialog box titled "Create Building" with a close button (X) in the top right corner. The main heading inside is "Step 2. Building Type and Levels:". Below this, there is a section labeled "Modeled Building" containing three radio button options: "Single Level (at/above grade)", "Multiple Levels (at/above grade) :", and "Other/Custom". The "Multiple Levels" option is selected. To the right of this option is a small numeric spinner control showing the value "2". A red arrow points from the text "We have 2 'stacked' levels for our Healthcare Outpatient building" to the spinner. At the bottom of the dialog, there are four buttons: "Previous" (with a left arrow), "Next" (with a right arrow), "Cancel", and "Help".

We have 2 “stacked” levels for our Healthcare Outpatient building

Workshops - Building Floor Plans; Walls, Spaces and Roof



Basic Concepts Roofs

Roofs are a special kind of level

There are 2 kinds of levels: Occupiable level, and roof level.

You create a roof level and place it above an occupiable level

You sketch the perimeter of the roof surface or define boundaries for sections of roof.

When do you have to define a Roof Level in HAP?

Roof level must be explicitly defined by you if:

- Roof doesn't exactly follow perimeter of occupiable level below it (i.e. overhangs), and/or
- Roof is sloped, and/or
- Roof has skylights

Otherwise, you can omit the roof level. HAP will automatically supply a flat generic roof.

Workshops - Building Floor Plans; Walls, Spaces and Roof



Open 15 CLASS ROOF WORKSHOP

 14 Medical Office CLASS AIR WALLS DONE	Modeled Building	37638.0
 15 Medical Office CLASS ROOF WORKSHOP	Modeled Building	37638.0
 16 Medical Office CLASS ROOF DONE	Modeled Building	37638.0

Workshops - Building Floor Plans; Walls, Spaces and Roof



Applications - Flat Roof

Strategy

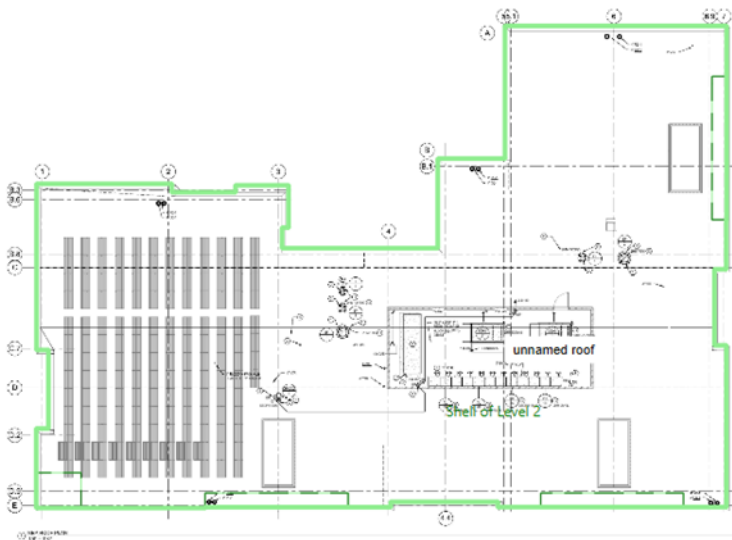
- Create a single roof section

Sketch-Over

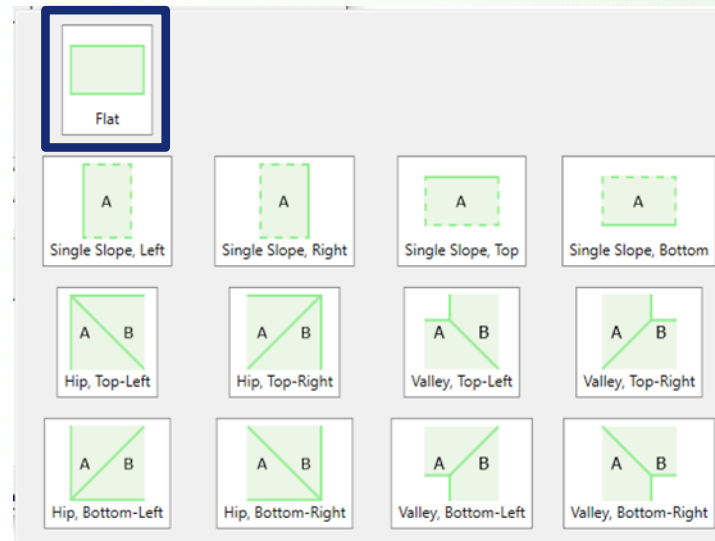
- Sketch the perimeter of the roof plan

Roof Shape

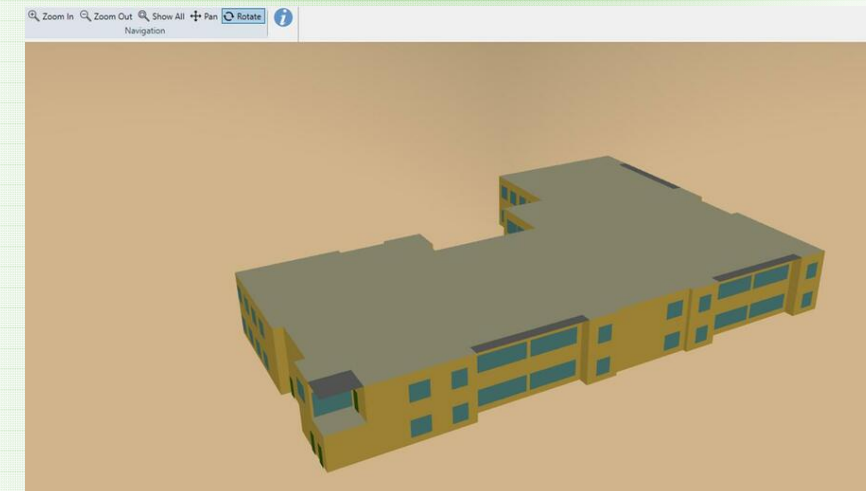
- Flat



Sketch Over



Roof Shape Menu

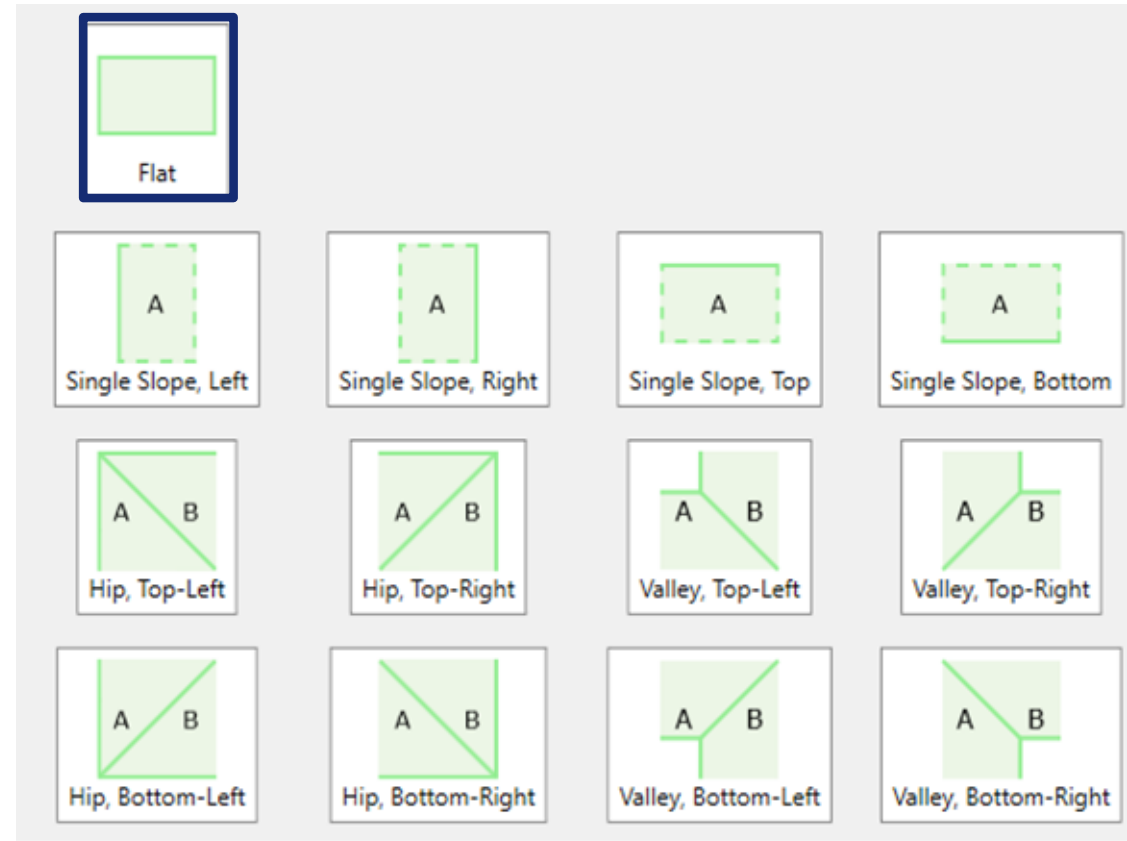


3D Rendering

Workshops - Building Floor Plans; Walls, Spaces and Roof



Applications - Flat Roof

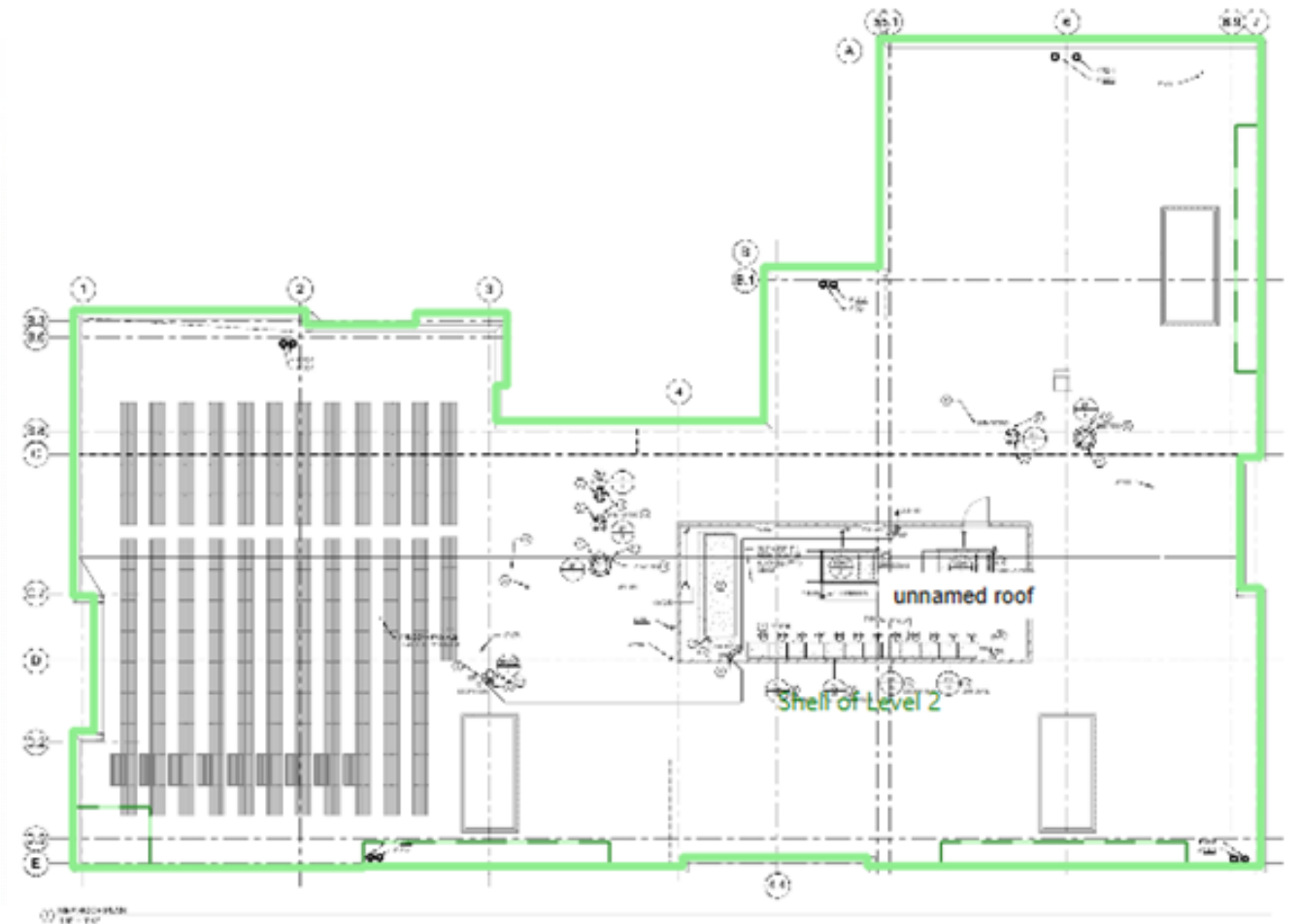


Roof Shape Menu

Workshops - Building Floor Plans; Walls, Spaces and Roof



Finished - Flat Roof





Define Roof Perimeter

General Floor Plan Images Levels Walls & Spaces, Roofs Openings 3D

Level 1 (of 3)

Edit

Spaces Alignment
Openings Guidelines
Floor Plan Wall Groups

Show

Tools

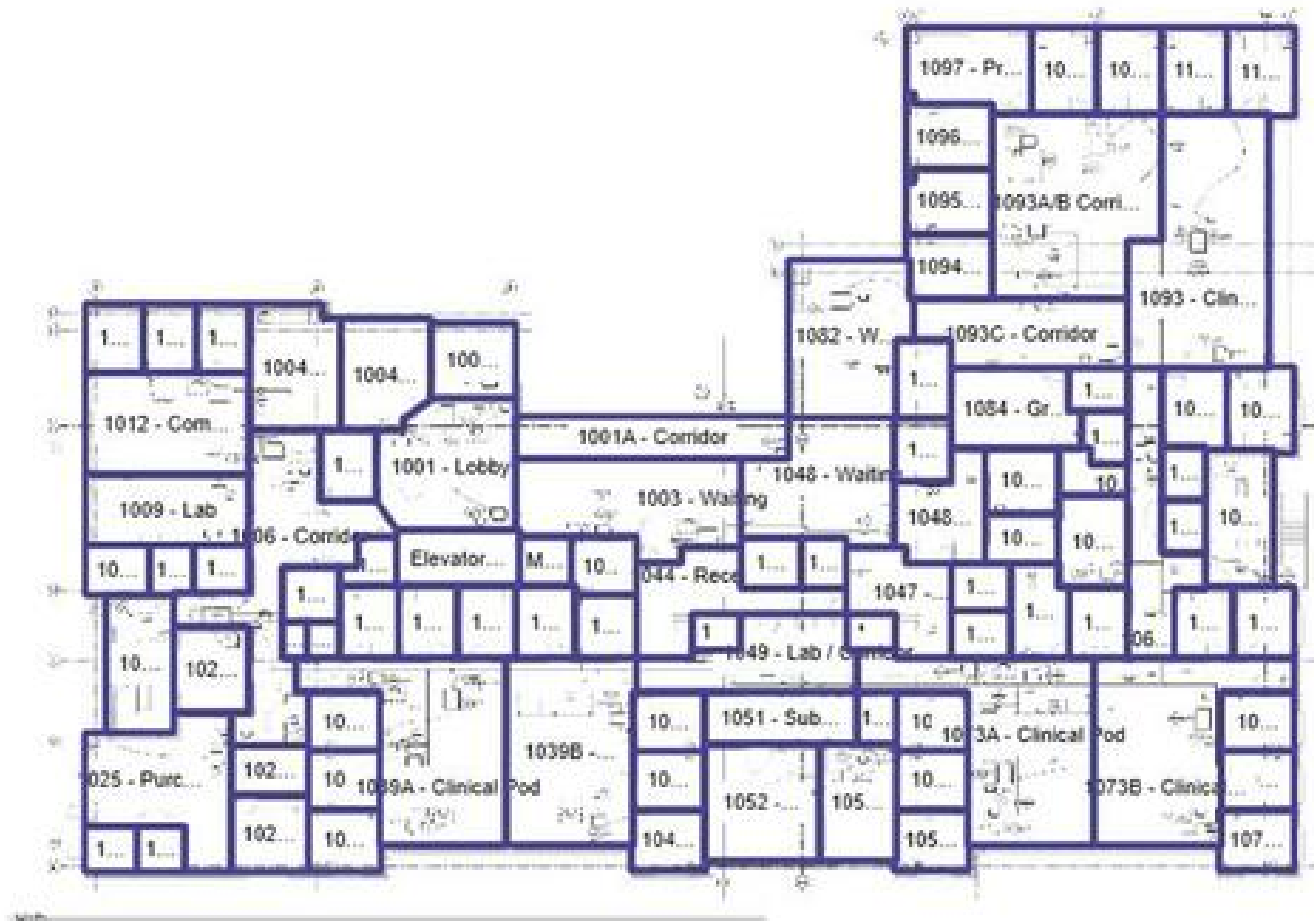
Perpendicular Rectangle Diagonal Move Delete

Guidelines

Wall Groups

Select Show All
Zoom In Pan
Zoom Out Rotate

Navigation



Workshops - Building Floor Plans; Walls, Spaces and Roof



Roof

Summary of Tasks

1. Select the roof level in the Current Level section.
2. Use the shell guideline to accurately sketch over the roof image previously imported.
3. Describe the roof as flat in the roof shape menu.



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17-18 OPENINGS



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Workshops - Building Floor Plans Openings Tab



Insert Windows and Door in Openings

Open 17 CLASS OPENINGS WORKSHOP

 16 Medical Office CLASS ROOF DONE	Modeled Building	37638.0
 17 Medical Office CLASS OPENINGS WORKSHOP	Modeled Building	37638.0
 18 Medical Office CLASS OPENINGS DONE	Modeled Building	37638.0

Tasks:

1. Go to the **Openings tab**.
2. Click the blue Info button to review the purpose and key tasks for this tab.
3. In the **Current Level section** of the tool ribbon, **choose the desired level to place windows and doors**.
4. **Insert the windows for level 1 in the spaces we sketched over.**
5. Use the **Windows “Add Single” then Doors “Add Single”** option in the tool ribbon to create new window and door opening tags and then **position them in the exterior façade** of those 6 spaces we sketched over.. Press F1 for help or view the training videos for detailed instruction on procedures for creating and positioning openings.
 - a) In most cases there will be multiple instances of a certain window size being used in the building. Therefore, you can create and place it in an opening and then use the **Copy and Paste** features to rapidly make and place **additional copies** of the same window in additional openings. Or you can use the **Add Another** feature for this purpose.

Workshops - Building Floor Plans Openings Tab



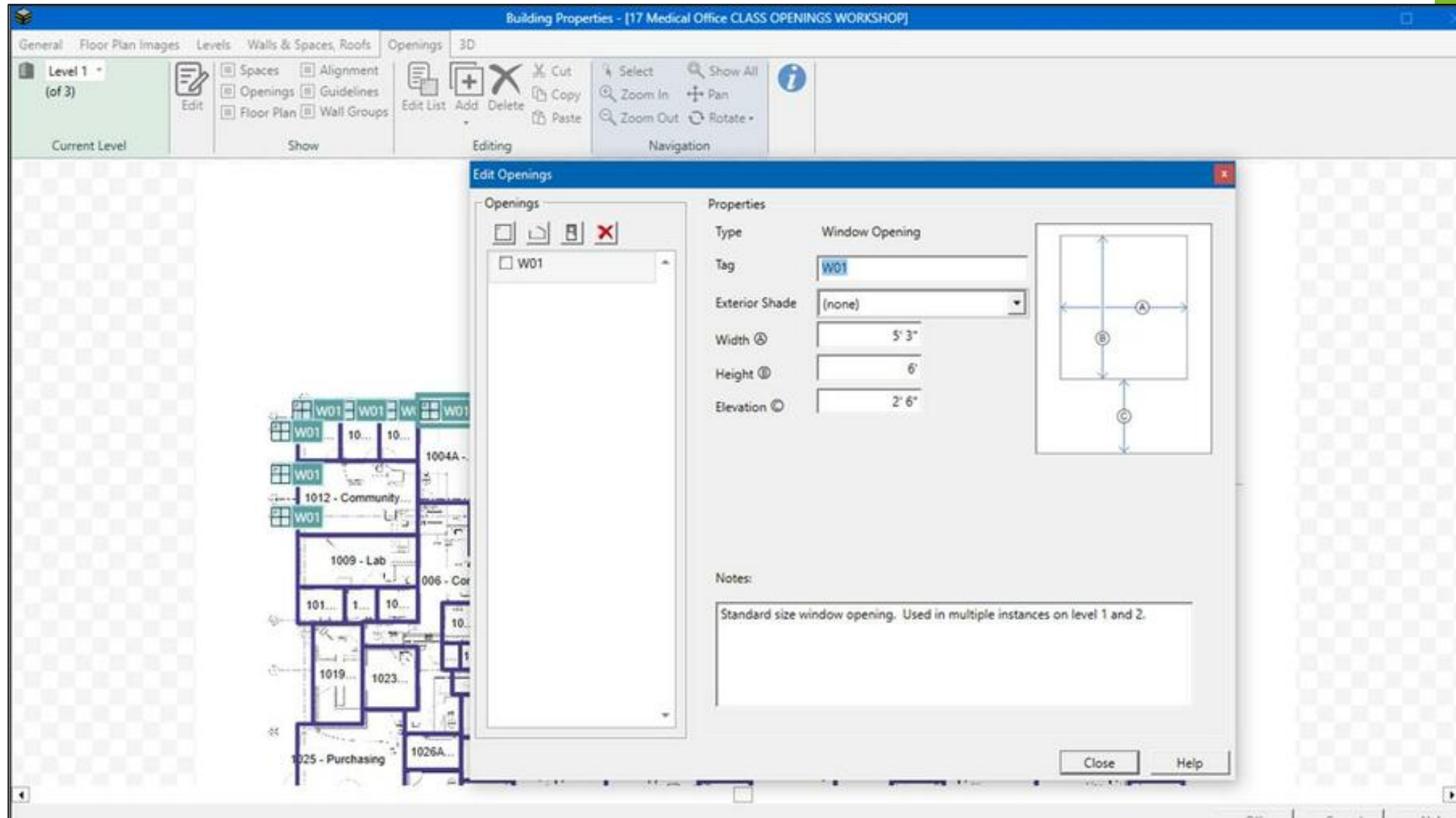
Insert Windows and Doors

Schedule of Window and Door Openings

Tag	Type	English Units (feet-inches)			SI Metric Units (mm)			Description
		Opening Width	Opening Height	Opening Elevation	Opening Width	Opening Height	Opening Elevation	
W01	Window	5'4	6'	2'6"	1626	1800	750	Standard window opening, both levels, all exposures.
W02	Window	10'4"	6'	2'6"	3150	1800	750	Large window in 1004B Conference
W03	Window	17'11"	6'	2'6"	5486	1800	750	Long windows by clinical pod waiting areas, west and south.
W04	Window	6'10"	6'	2'6"	2083	1800	750	Larger window. North and west sides.
W05	Window	9'2"	6'	2'6"	2789	1800	750	Side window on entrance vestibule
W06	Window	45'1"	6'	2'6"	13746	1800	750	East facing window on front waiting area, level 1 and 2
W07	Window	22'4"	6'	2'6"	6797	1800	750	North facing window on front waiting area, level 1
08	Window	10"	8'2"	4"	244	2500	100	2nd level dental work space, slim window north and west
W09	Window	14'9'	8'2"	4"	4496	2500	100	2nd level dental work space, east window
W10	Window	11'10"	8'2"	4"	3603	2500	100	2nd level dental work space, south window
W11	Window	11'8"	8'2"	4"	3551	1800	100	2nd level porch window
W12	Window	13'10"	6'	2'6"	4218	1800	750	North facing window, waiting area, level 2, split part 1
W13	Window	8'2"	6'	2'6"	2485	1800	750	North facing window, waiting area, level 2, split part 2
W14	Window	3'5-5/16"	6'	2'6"	1050	1800	750	Standard window split, part 1. Where interior wall splits an opening.
W15	Window	1'10-11/16"	6'	2'6"	550	1800	750	Standard window split, part 2. Paired with W14.
D01	Door	12'10"	7'	na	3812	2200	na	Main entry door, east side of building
D02	Door	3'4"	7'	na	1016	2200	na	Standard door. Fire door. Mech Space door. Porch door.

Use just these for workshop

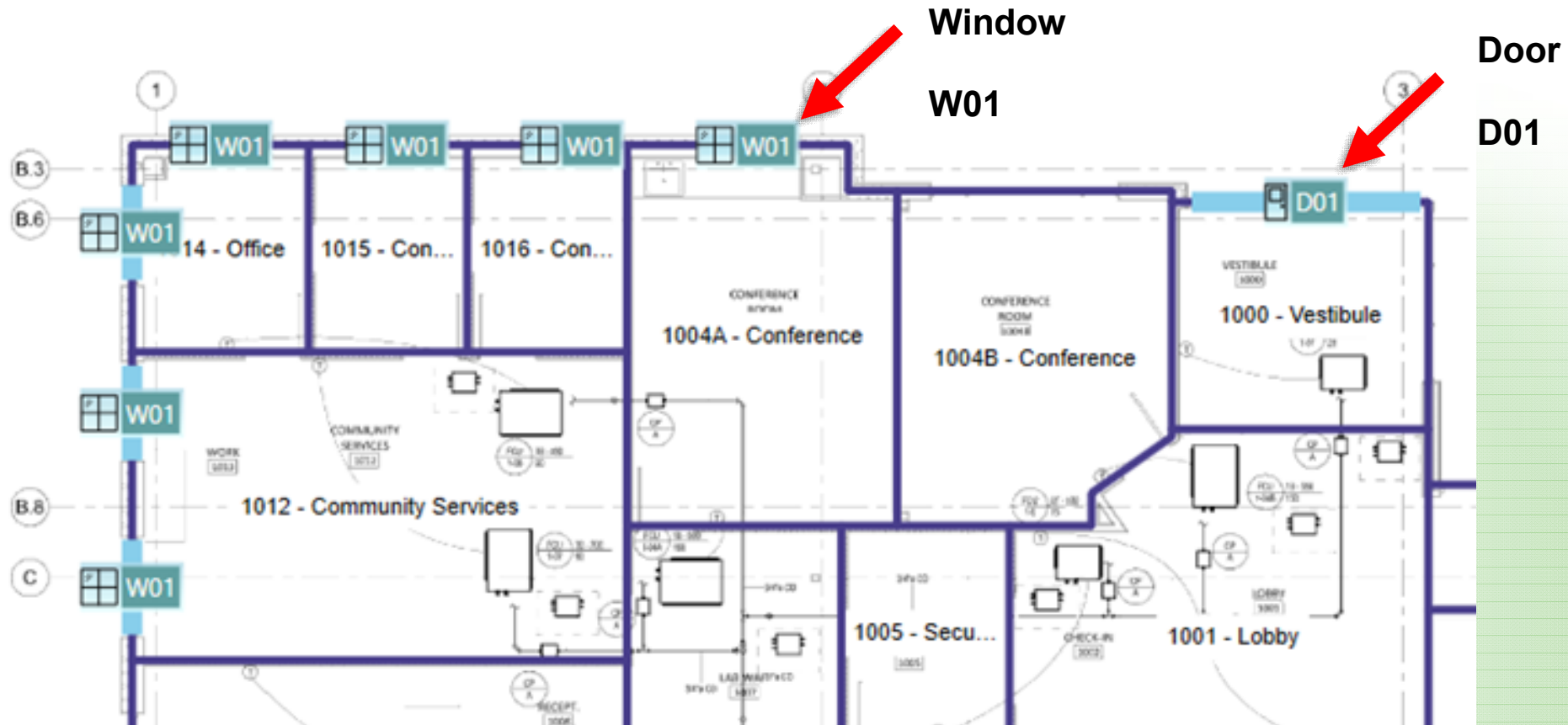
Workshops - Building Floor Plans Openings Tab



Workshops - Building Floor Plans Openings Tab



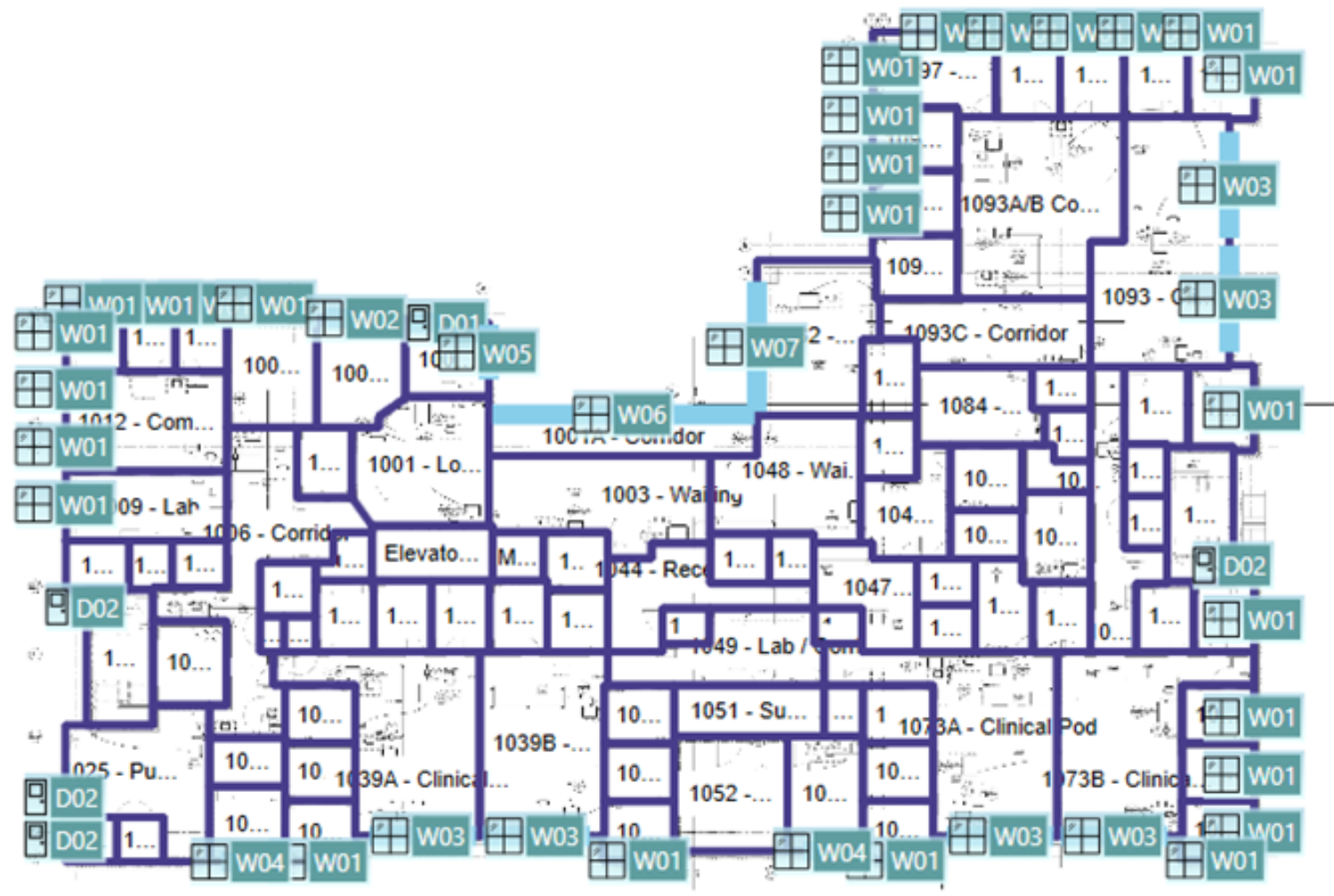
Insert these Windows and Door in Openings for Workshop



Workshops - Building Floor Plans Openings Tab



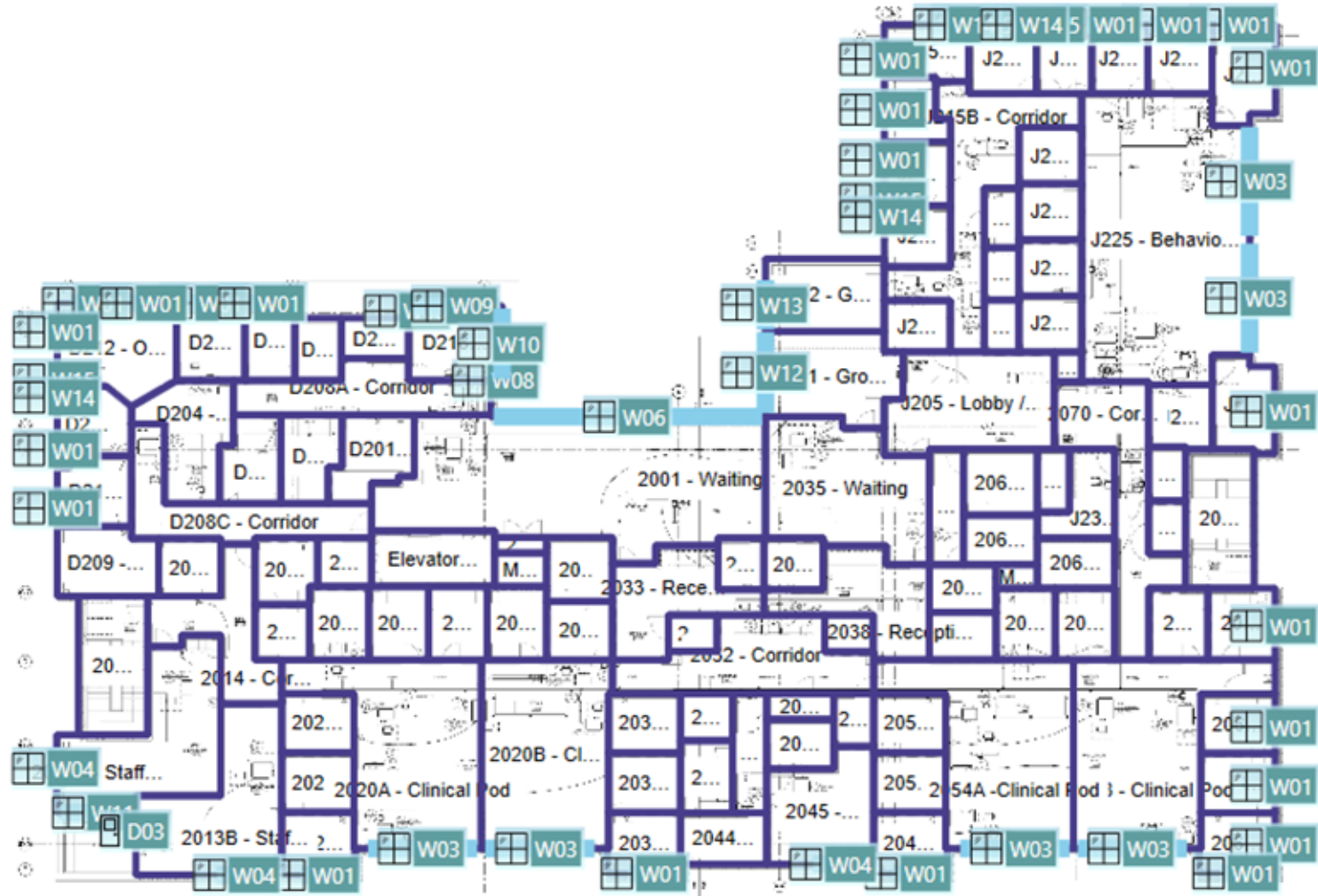
Window and Door Finished 1st Level



Workshops - Building Floor Plans Openings Tab



Window and Door Finished 2nd Level





Create and Assign Window and Door Openings

General Floor Plan Images Levels Walls & Spaces, Roofs Openings 3D

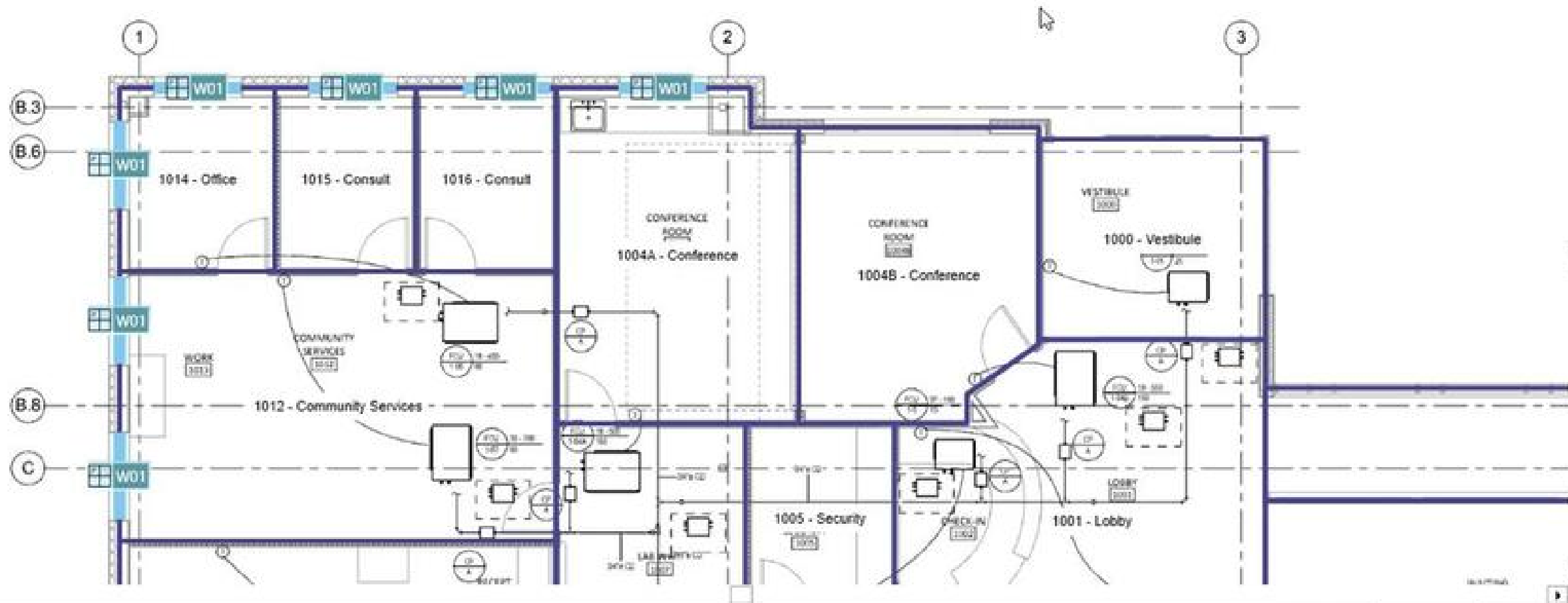
Level 1 (of 3)
Current Level

Edit
Edit List Add Delete Copy Paste

Show
Spaces Alignment
Openings Guidelines
Floor Plan Wall Groups

Editing
Cut
Copy
Paste

Navigation
Select
Show All
Zoom In
Pan
Zoom Out
Rotate





Summary of Tasks

1. Use the Windows “Add Single” then Doors “Add Single” option in the tool ribbon to create new window and door opening tags.
2. Then specify the opening dimensions on the Window Opening Properties or Door Opening Properties.
3. Position the tags in the exterior façade of the 6 spaces we sketched over.



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BUILDING FLOOR PLANS

19 3D RENDERING



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Workshops - Building Floor Plans 3D Tab



Open 19 CLASS FINISHED (use for 3D)

 17 Medical Office CLASS OPENINGS WORKSHOP	Modeled Building	37638.0	
 18 Medical Office CLASS OPENINGS DONE	Modeled Building	37638.0	
 19 Medical Office CLASS FINISHED	Modeled Building	37638.0	

Tasks:

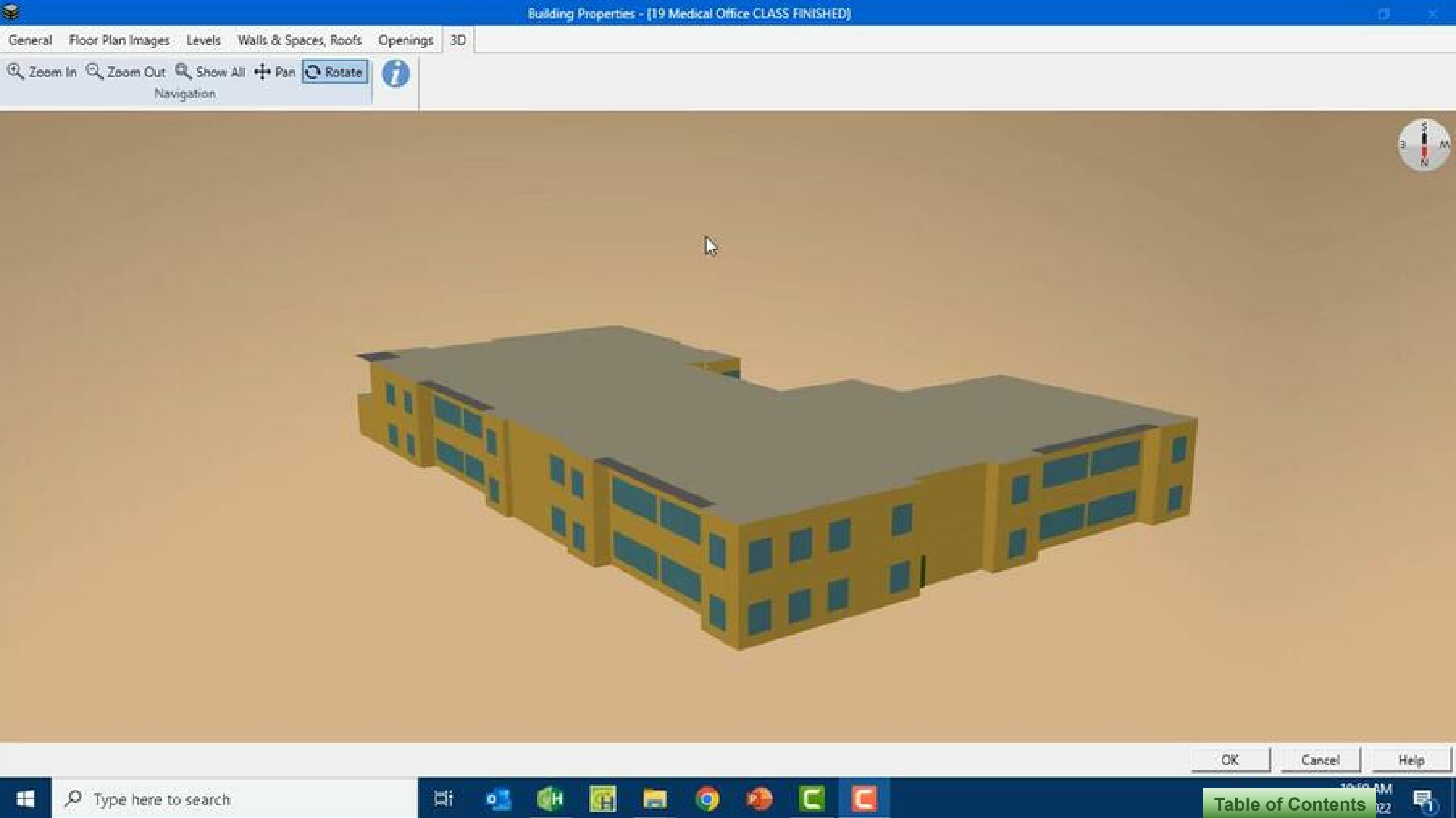
1. Go to the **3D tab**.
2. Click the blue Info button to review the purpose and key tasks for this tab.
3. Use the **mouse to zoom and rotate the image**.
4. **Inspect the exterior wall surfaces** to verify they are aligned vertically. If not aligned you will see a thin white line between levels, or in more extreme misalignment cases a stair-step appearance where the levels join.
5. **Inspect window and door openings** to verify they are correctly placed, and none are missing.

Workshops - Building Floor Plans 3D Tab





Review 3D Rendering



Workshops - Building Floor Plans 3D Tab



3D Rendering

Summary of Tasks

1. Go to the 3D tab.
2. Use the mouse to zoom and rotate the image.
3. Inspect the exterior wall surfaces to verify they are aligned vertically.
4. Inspect window and door openings to verify they are correctly placed, and none are missing.
5. Inspect roof features like parapets and overhangs and verify their correct placement.



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SPACE MODELS

INTRODUCE SPACE
MODEL



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Workshops - Space Model Definition

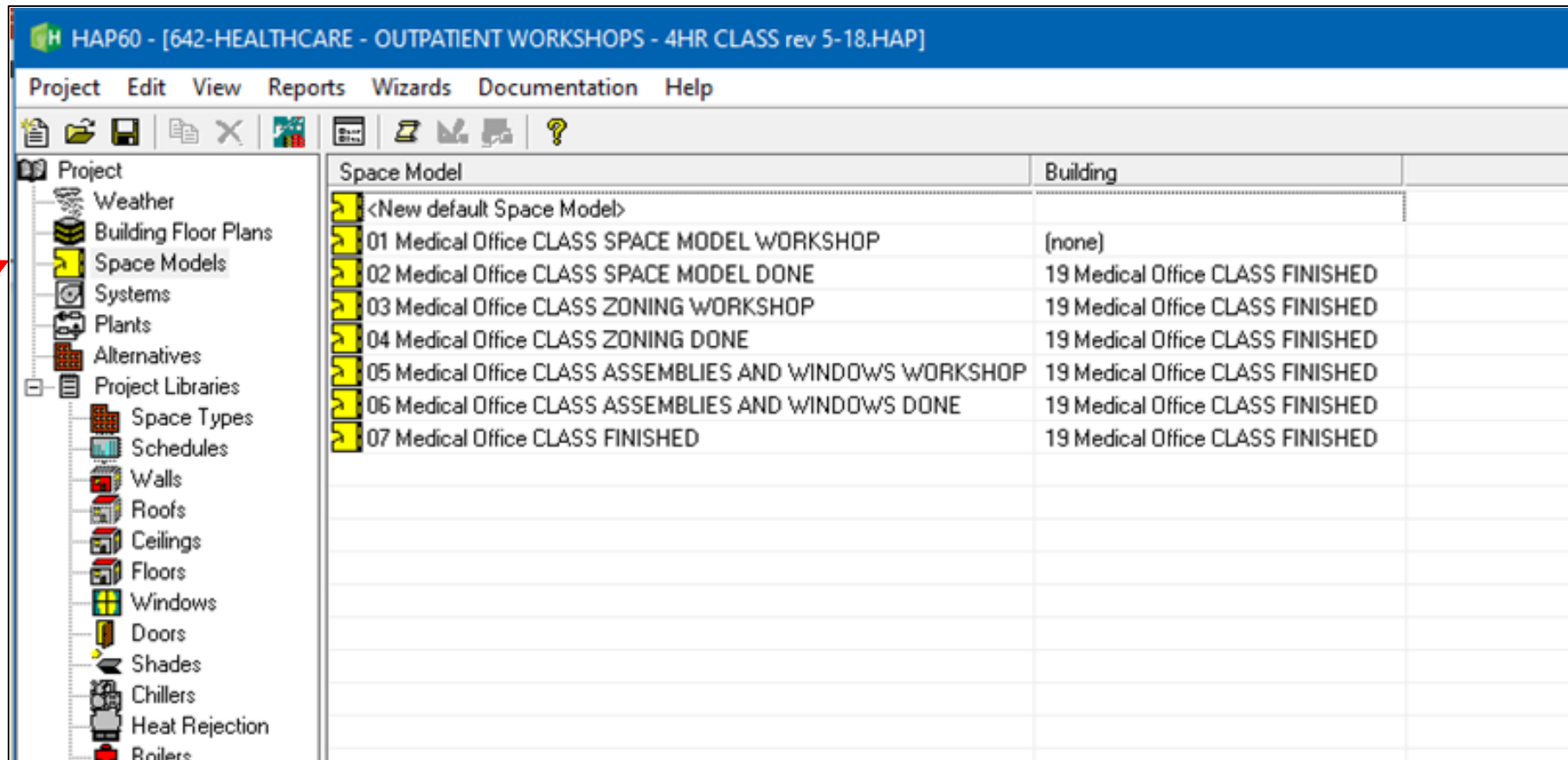


Space Model: Space Model is the total collection of conditioned and unconditioned spaces that comprises one whole **modeled building**. A space model is comprised of all the **spaces, zoning configuration, and assembly assignments (envelope and fenestration)** for exterior and interior construction of the entire building. The space model encompasses all floors of the entire building alternative.

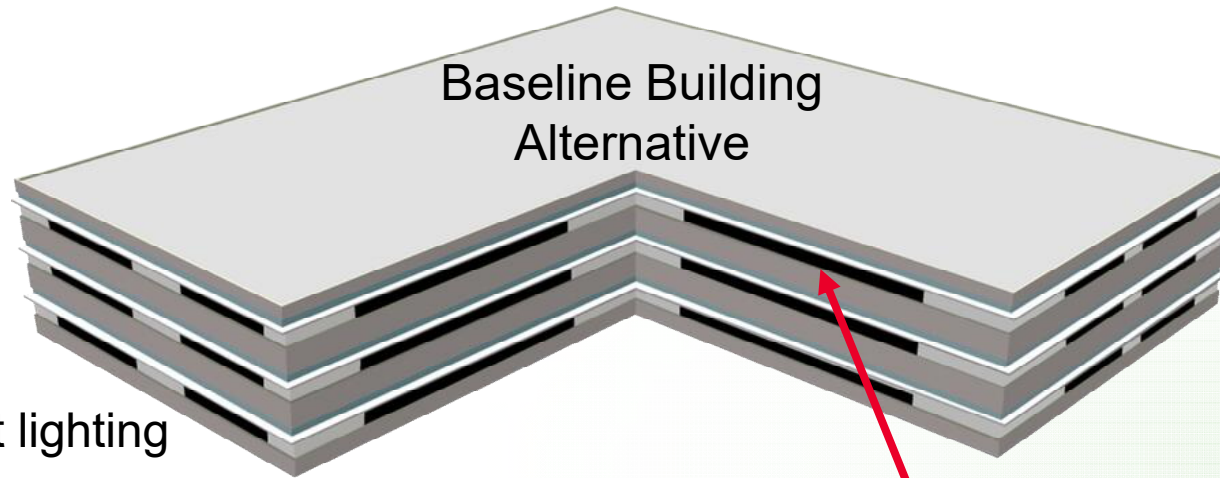
Workshops - Space Models



Space Models on the main user interface

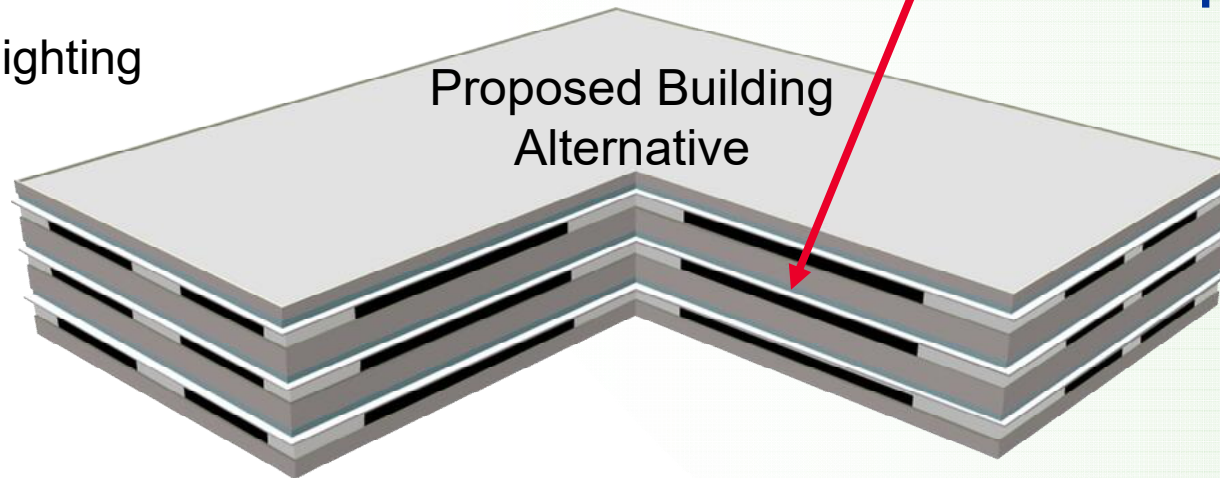


Space Model Example - Baseline vs Proposed



Baseline Building
Standard window construction
Baseline Space Model

0.82 watts/sq ft lighting
Baseline



Windows same location and orientation for Baseline and Proposed Buildings

Proposed Building
Upgraded windows
Proposed Space Model

0.4 watts/sq ft lighting
Proposed



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SPACE MODELS
GENERAL TAB



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Workshops - Space Models - General Tab



Step 1 - Create Space Model

Tasks

Highlight Space Models in the left navigation tree.

Open 01 CLASS SPACE MODEL START WORKSHOP

General Tab:

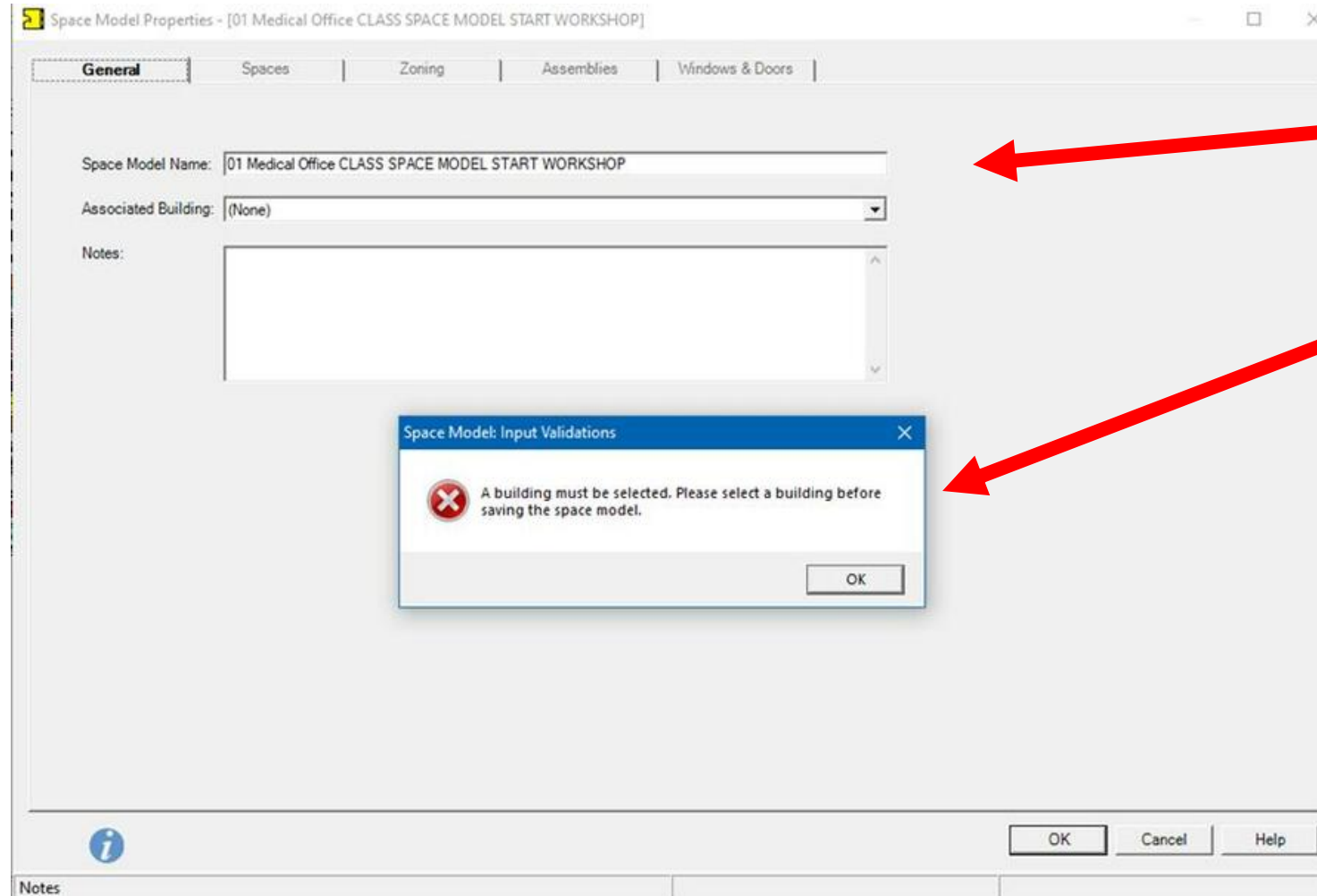
Space Model	Building
<New default Space Model>	
01 Medical Office CLASS SPACE MODEL START WORKSHOP	19 Medical Office CLASS FINISHED
02 Medical Office CLASS SPACE MODEL SPACES TAB DONE	19 Medical Office CLASS FINISHED

1. On the General tab click the blue Info button to review the workflow for creating space models
2. The workshop assigned a name to the Space Model **01 Medical Office CLASS SPACE MODEL START WORKSHOP**
3. We will link the space model workshop to the **19 CLASS FINISHED** Building we previously created.

Workshops - Space Models - General Tab



Linking a first Space Model Workshop to a Building



**Start with
01 CLASS SPACE
MODEL WORKSHOP**

**You need to link the
space model name to
the Class Finished
Building from Building
Floor Plans. If you
don't you will get this
message**

Workshops - Space Models - General Tab



Step 1 - Link 01 CLASS SPACE MODEL START to our CLASS FINISHED

The screenshot shows the 'Space Model Properties' dialog box for the workshop '01 Medical Office CLASS SPACE MODEL START WORKSHOP'. The 'General' tab is selected. The 'Space Model Name' field contains the workshop name. The 'Associated Building' dropdown menu is set to '19 Medical Office CLASS FINISHED'. The 'Notes' field is empty. Red arrows point from the workshop name to the 'Spaces', 'Zoning', 'Assemblies', and 'Windows & Doors' tabs, and from the building name to the 'Associated Building' dropdown.

Space Model Properties - [01 Medical Office CLASS SPACE MODEL START WORKSHOP]

General | Spaces | Zoning | Assemblies | Windows & Doors

Space Model Name: 01 Medical Office CLASS SPACE MODEL START WORKSHOP

Associated Building: 19 Medical Office CLASS FINISHED

Notes:

01 CLASS SPACE MODEL START WORKSHOP

Linked to 19 CLASS FINISHED Building (from Building Floor Plans)

ONCE LINKED:

Spaces Tab
Zoning Tab
Assemblies Tab
Windows & Doors Tab
become active



Create a Space Model



Project	Space Model	Building	
Weather	New default Space Model		
Building Floor Plans	01 Medical Office CLASS SPACE MODEL WORKSHOP	(none)	
Space Models	02 Medical Office CLASS SPACE MODEL DONE	19 Medical Office CLA...	
Systems	03 Medical Office CLASS ZONING WORKSHOP	19 Medical Office CLA...	
Plants	04 Medical Office CLASS ZONING DONE	19 Medical Office CLA...	
Alternatives	05 Medical Office CLASS WALLS + OPENINGS WORKSHOP	19 Medical Office CLA...	
Project Libraries	06 Medical Office CLASS WALLS + OPENINGS DONE	19 Medical Office CLA...	
Space Types	07 Medical Office CLASS FINISHED	19 Medical Office CLA...	
Schedules			
Walls			
Roofs			
Ceilings			
Floors			
Windows			
Doors			
Shades			
Chillers			
Heat Rejection			
Boilers			
Electric Rates			
Fuel Rates			



Summary of Tasks

1. We identified a space model by name, linked the class finished [building](#) with the space model, and added any [reference notes](#).



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SPACE MODELS

SPACES GRID



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Workshops - Space Models - Spaces Tab



Spaces Grid is now ready for customization as required

**3 new columns
were added**

Space name

Level

Floor area

**204 rows each
one a space from
sketch over**

Space Model Properties - [Medical Office Building CLASS DEFAULT SPACE MODEL WORKSHOP]

General

Spaces

Zoning

Assemblies

Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Ventilation					Direct A
					ASHRAE Standard 62.1-2016 Space	OA Requirement 1		OA Requirement 2		
						Airflow	Units	Airflow	Units	
1	1000 - Waiting	Level 1	183.8	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
2	1001 - Lobby	Level 1	485.4	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
3	1001A - Corridor	Level 1	324.9	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
4	1003 - Waiting	Level 1	676.3	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
5	1004A - Conference	Level 1	317.5	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
6	1004B - Conference	Level 1	274.6	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
7	1005 - Security	Level 1	113.7	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
8	1006 - Corridor	Level 1	658.2	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	

Columns To Display

☒ Show All

☒ Ventilation

☒ Overhead Lighting

☒ Daylighting Control

☒ Task Lighting

☒ Electric Equipment

☒ Occupants

☒ Miscellaneous Heat Gain

☒ Infiltration

Export

Clear Sort and Filter

Reapply Space Types to Spaces

i

OK

Cancel

Help

**31 Space Type
dropdowns
from
Healthcare-
Outpatient
(needs
assignments
for each of our
204 spaces)**

Workshops - Space Models - Spaces Tab



We will discuss and demo the features of the Spaces Grid in this order:

1. Organization of the Spaces Grid
2. Entering Data
3. Display Features
4. Input Feature Copy-Paste
5. Action Buttons

Workshops - Space Models - Spaces Tab



Spaces Grid

One row
per space

Nine
column
groups

Space Model Properties - [01 Medical Office CLASS SPACE MODEL WORKSHOP]

General

Spaces

Zoning

Assemblies

Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Ventilation					Direct Exhaust
					ASHRAE Standard 62.1-2016 Space Usage	OA Requirement 1		OA Requirement 2		
						Airflow	Units	Airflow	Units	
1	1000 - Vestibule	Level 1	163.8	Lobby - All Other	PUBLIC ASSEMBLY: Lobby	5.0	CFM/person	0.06	CFM/sqft	
2	1001 - Lobby	Level 1	431.7	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
3	1001A - Corridor	Level 1	294.5	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
4	1003 - Waiting	Level 1	493.0	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
5	1004A - Conference	Level 1	286.6	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
6	1004B - Conference	Level 1	242.3	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
7	1005 - Security	Level 1	102.1	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
8	1006 - Corridor	Level 1	621.9	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	

Columns To Display

☒ Show All ☒ Ventilation ☒ Overhead Lighting ☒ Daylighting Control ☒ Task Lighting ☒ Electric Equipment ☒ Occupants ☒ Miscellaneous Heat Gain ☒ Infiltration

Export

Clear Sort and Filter

Reapply Space Types to Spaces

OK

Cancel

Help

Space

Workshops - Space Models - Spaces Tab



Spaces Grid

“Display Only”
Columns

Space Model Properties - [02 Medical Office CLASS SPACE MOD]

General Spaces Zoning			
	Space	Level	Floor Area (sqft)
1	1000 - Vestibule	Level 1	163.8
2	1001 - Lobby	Level 1	431.7
3	1001A - Corridor	Level 1	294.5
4	1003 - Waiting	Level 1	493.0
5	1004A - Conference	Level 1	286.6
6	1004B - Conference	Level 1	242.3
7	1005 - Security	Level 1	102.1
8	1006 - Corridor	Level 1	621.9

Columns To Display

☒ Show All ☒ Ventilation ☒ Overhead Lighting ☒ Daylighting Control

Space Model Name

- 
1. Space name
 2. Level
 3. Floor area

Workshops - Space Models - Spaces Tab



Spaces Grid

Space Model Properties - [01 Medical Office CLASS SPACE MODEL WORKSHOP]

GeneralSpacesZoningAssembliesWindows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Ventilation					Direct Exhaust
					ASHRAE Standard 62.1-2016 Space Usage	OA Requirement 1		OA Requirement 2		
						Airflow	Units	Airflow	Units	
1	1000 - Vestibule	Level 1	163.8	Lobby - All Other	PUBLIC EMPLOY Lobby	5.0	CFM/person	0.06	CFM/sqft	
2	1001 - Lobby	Level 1	431.7	Lobby - All Other		0.0	CFM/person	0.00	CFM/sqft	
3	1001A - Corridor	Level 1	294.5	Medical Supply Room		0.0	CFM/person	0.00	CFM/sqft	
4	1003 - Waiting	Level 1	493.0	Nursery		0.0	CFM/person	0.00	CFM/sqft	
5	1004A - Conference	Level 1	286.6	Nurse's Station		0.0	CFM/person	0.00	CFM/sqft	
6	1004B - Conference	Level 1	242.3	Office - Enclosed, Large		0.0	CFM/person	0.00	CFM/sqft	
7	1005 - Security	Level 1	102.1	Office - Enclosed, Small		0.0	CFM/person	0.00	CFM/sqft	
8	1006 - Corridor	Level 1	621.9	Office - Open Plan		0.0	CFM/person	0.00	CFM/sqft	
				Operating Room		0.0	CFM/person	0.00	CFM/sqft	
				Parking Garage		0.0	CFM/person	0.00	CFM/sqft	
				Pharmacy - Hospital		0.0	CFM/person	0.00	CFM/sqft	
				Physical Therapy Room		0.0	CFM/person	0.00	CFM/sqft	
				Radiology / Imaging						
				Recovery Room						
				Restroom						
				Lighting						
				Equipment						
				Occupants						
				Miscellaneous Heat Gain						
				Infiltration						

Columns To Display

☒ Show All☒ Ventilation☒ Overhead Lighting☒ Daylighting Control☒ Lighting☒ Equipment☒ Occupants☒ Miscellaneous Heat Gain☒ Infiltration

ExportClear Sort and Filter

Reapply Space Types to Spaces

OKCancelHelp

Space Type

31 space types available in each drop down



Spaces Grid

2. Entering Data

- a) Option 1: entering data manually, cell by cell for a row, then next row
- b) Option 2: is using Space Types to default most or all the spaces, then customize where needed

Workshops - Space Models - Spaces Tab



Spaces Grid

Space Model Properties - [01 Medical Office CLASS SPACE MODEL WORKSHOP]

General

Spaces

Zoning

Assemblies

Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Ventilation					Direct
					ASHRAE Standard 62.1- 2016 Space	OA Requirement 1		OA Requirement 2		
						Airflow	Units	Airflow	Units	
1	1000 - Vestibule	Level 1	163.8	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
2	1001 - Lobby	Level 1	431.7	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
3	1001A - Corridor	Level 1	294.5	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
4	1003 - Waiting	Level 1	493.0	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
5	1004A - Conference	Level 1	286.6	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
6	1004B - Conference	Level 1	242.3	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
7	1005 - Security	Level 1	102.1	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
8	1006 - Corridor	Level 1	621.9	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	

Columns To Display

☒ Show All

☒ Ventilation

☒ Overhead Lighting

☒ Daylighting Control

☒ Task Lighting

☒ Electric Equipment

☒ Occupants

☒ Miscellaneous Heat Gain

☒ Infiltration

Export

Clear Sort and Filter

Reapply Space Types to Spaces

i

OK

Cancel

Help

Level

Manual Entry

Workshops - Space Models - Spaces Tab



Spaces Grid

Space Model Properties - [01 Medical Office CLASS SPACE MODEL WORKSHOP]

GeneralSpacesZoningAssembliesWindows & Doors

	Space	Level	Floor Area (sqft)	Space Type	ASHRAE Standard 62.1- 2016 Space	Ventilation				Direct A
						OA Requirement 1		OA Requirement 2		
						Airflow	Units	Airflow	Units	
1	1000 - Vestibule	Level 1	163.8	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
2	1001 - Lobby	Level 1	431.7	Lobby - All Other	PUBLIC ASSEMBLY: Lobby	5.0	CFM/person	0.06	CFM/sqft	
3	1001A - Corridor	Level 1	294.5	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
4	1003 - Waiting	Level 1	493.0	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
5	1004A - Conference	Level 1	286.6	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
6	1004B - Conference	Level 1	242.3	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
7	1005 - Security	Level 1	102.1	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	
8	1006 - Corridor	Level 1	621.9	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	

Columns To Display

☒ Show All

☒ Ventilation

☒ Overhead Lighting

☒ Daylighting Control

☒ Task Lighting

☒ Electric Equipment

☒ Occupants

☒ Miscellaneous Heat Gain

☒ Infiltration

Export

Clear Sort and Filter

Reapply Space Types to Spaces

i

OK

Cancel

Help

Space

Defaulted Data



Review Spaces Grid Organization

General

Spaces

Zoning

Assemblies

Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Ventilation						Overhead Lighting		
					ASHRAE Standard 62.1- 2016 Space	OA Requirement 1		OA Requirement 2		Direct Exhaust		ASHRAE Standard 90.1-2016	
						Airflow	Units	Airflow	Units	Airflow	Units	Lighting Method	Space Usage
1	1000 - Vestibule	Level 1	163.8	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Building Area	User Defined
2	1001 - Lobby	Level 1	431.7	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Building Area	User Defined
3	1001A - Corridor	Level 1	294.5	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Building Area	User Defined
4	1003 - Waiting	Level 1	493.0	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Building Area	User Defined
5	1004A - Conference	Level 1	286.6	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Building Area	User Defined
6	1004B - Conference	Level 1	242.3	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Building Area	User Defined
7	1005 - Security	Level 1	102.1	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Building Area	User Defined
8	1006 - Corridor	Level 1	621.9	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Building Area	User Defined
9	1006 - Data	Level 1	57.7	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft	0.0	CFM	Building Area	User Defined

Columns To Display

☒ Show All
 ☒ Ventilation
 ☒ Overhead Lighting
 ☒ Daylighting Control
 ☒ Task Lighting
 ☒ Electric Equipment
 ☒ Occupants
 ☒ Miscellaneous Heat Gain
 ☒ Infiltration

Export

Clear Sort and Filter

Reapply Space Types to Spaces

OK

Cancel

Help

Space ID



3. Display Features

- a) Filtering by Column, typical application
- b) Filtering by Row, typical application
- c) Row sort order options

List of all Spaces and their Space Types



Space Name	Space Type	Occupants
1-01	Vestibule	0
1-02	Lobby – All Others	1
1-03	Corridor – All Others	0
1-04A	Conference Room	18
1-04B	Conference Room	18
1-05	Office – Enclosed, Small	1
1-06	Office – Enclosed, Small	10
1-07	Office – Open Plan	6
1-08	Laboratory – Medical	4
1-09	Corridor – All Others	6
1-10	Office – Open Plan	3
1-11	Exam/Treatment Room	9
1-12	Exam/Treatment Room	6
1-13	Lobby – All Other	6
1-14	Lobby – All Other	4
1-15	Exam/Treatment Room	3
1-16	Exam/Treatment Room	11
1-17	Exam/Treatment Room	6
1-18	Exam/Treatment Room	3
1-19	Corridor – All Others	8
1-20	Laboratory - Medical	2

Space Name	Space Type	Occupants
1-21	Corridor – All Others	4
1-22	Radiology / Imaging	2
1-23	Exam/Treatment Room	4
1-24	Exam/Treatment Room	6
1-25	Exam/Treatment Room	3
1-26	Lobby – All Other	6
1-27	Lobby – All Other	4
1-28	Exam/Treatment Room	3
1-29	Exam/Treatment Room	3
1-30A	Exam/Treatment Room	7
1-30B	Exam/Treatment Room	3
1-31	Office – Enclosed, Small	4
1-32	Restroom	0
1-33A	Electrical / Mechanical Room	0
1-33B	Corridor – All Others	2
1-34A	Conference Room	12
1-34B	Conference Room	4
1-35	Office – Enclosed Small	5
1-36	Exam/Treatment Room	3
1-37	Lobby – All Other	4
1-38	Lobby – All Other	8

Space Name	Space Type	Occupants
1-39	Exam/Treatment Room	12
1-40	Exam/Treatment Room	3
1-41	Exam/Treatment Room	9
1-42	Lobby – All Other	14
1-43	Lobby – All Other	36
CRAC-1	Computer Room	0
Elevator Shaft	None. Uncoonditioned	0
ITEF-1	Computer Room	0
MECH-1	Electrical / Mechanical Room	0
MECH-2	Electrical / Mechanical Room	0
MECH-3	Electrical / Mechanical Room	0
MECH-4	Electrical / Mechanical Room	0
Mech Shaft 1	None. Unconditioned	0
Stair A1	Stairwell	0
Stair B1	Stairwell	0

List of all Spaces and their Space Types



Space Name	Space Type	Occupants
2-01	Exam/Treatment Room	7
2-02	Exam/Treatment Room	9
2-03	Laboratory – Medical	4
2-04	Radiology / Imaging	0
2-05	Exam/Treatment Room	2
2-06	Lobby – All Others	2
2-07	Corridor – All Others	0
2-08	Lobby – All Others	30
2-09	Breakroom – Healthcare	12
2-10	Breakroom – Healthcare	12
2-11	Exam/Treatment Room	12
2-12	Exam/Treatment Room	6
2-13	Lobby – All Others	6
2-14	Exam/Treatment Room	3
2-15	Lobby – All Others	4
2-16	Exam/Treatment Room	6
2-17	Office – Enclosed, Small	8
2-18	Corridor – All Others	2
2-19	Corridor – All Others	2
2-20	Exam/Treatment Room	3
2-21	Exam/Treatment Room	4

Space Name	Space Type	Occupants
2-22	Exam/Treatment Room	6
2-23	Exam/Treatment Room	3
2-24	Lobby – All Others	6
2-25	Lobby – All Others	4
2-26	Exam/Treatment Room	3
2-27	Exam/Treatment Room	3
2-28	Exam/Treatment Room	9
2-29	Office - Enclosed, Small	7
2-30	Lobby – All Others	5
2-31	Restroom	0
2-32	Corridor – All Others	0
2-33	Office – Enclosed, Small	3
2-34	Lobby – All Others	6
2-35	Lobby – All Others	11
2-36	Exam/Treatment Room	3
2-37	Exam/Treatment Room	12
2-38	Exam/Treatment Room	3
2-39	Exam/Treatment Room	9
2-40	Corridor – All Other	0
2-41	Office – Enclosed, Small	12
2-42	Corridor – All Other	3

Space Name	Space Type	Occupants
2-43	Lobby – All Others	13
2-44	Conference Room	12
2-45	Conference Room	12
2-46	Lobby – All Others	16
2047-Data	Computer Room	0
Elevator Shaft 2	None. Unconditioned	0
Hatch-1	None. Unconditioned	0
J211-Data	Computer Room	0
Mech Shaft-2	None. Unconditioned	0
Mech Shaft-3	None. Unconditioned	0
Stair A2	Stairwell	0
Stair B2	Stairwell	0

Workshops: Space Models - Spaces Tab



Best Practice

These 5 space names appear over and over such that they comprise a majority of space types in our example building.

1. Office
2. Lobby
3. Corridor
4. Conference
5. Exam

Because the Healthcare-Outpatient building is a project where the spaces were ***well-named*** (from the floor plan drawing), we can **filter** on the **space name** to efficiently group spaces with the same name then link them to the **correct space type**. **This should save lots of time and effort versus assigning each space name to a space type one by one.** Also, this approach will show the value of using good naming practice for the spaces in Building inputs.

Workshops: Space Models - Spaces Tab



Suggested first step: Filter by Space Name

The pop up will appear with Space names to filter

Space Model Properties - [01 Medical Office CLASS SPACE MODEL WORKSHOP]

General | **Spaces** | Zoning | Assemblies | Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Ventilation				
					ASHRAE Standard 62.1-2016 Space Usage	OA Requirement 1		OA Requirement 2	
					Airflow	Units	Airflow	Units	
1	(Select All)								
	1000 - Vestibule								
2	1001 - Lobby								
	1001A - Corridor								
	1003 - Waiting								
3	1004A - Conference								
	1004B - Conference								
4	1005 - Security								
	B Text Filter								
5	1004A - Conference	Level 1	286.6	(None)	User Defined	0.0 CFM/person		0.00 CFM/sqft	
6	1004B - Conference	Level 1	242.3	(None)	User Defined	0.0 CFM/person		0.00 CFM/sqft	
7	1005 - Security	Level 1	102.1	(None)	User Defined	0.0 CFM/person		0.00 CFM/sqft	
8	1006 - Corridor	Level 1	621.9	(None)	User Defined	0.0 CFM/person		0.00 CFM/sqft	

Columns To Display: ☒ Show All ☒ Ventilation ☒ Overhead Lighting ☒ Daylighting Control ☒ Task Lighting ☒ Electric Equipment ☒ Occupants ☒ Miscellaneous Heat Gain ☒ Infiltration

Export Clear Sort and Filter

Reapply Space Types to Spaces

OK Cancel Help

Hover the cursor over the Space heading, click the down arrow

Workshops: Space Models - Spaces Tab



Filter Space name for all “Office”

Filtering for office spaces

Space Model Properties - [01 Medical Office CLASS SPACE MODEL WORKSHOP]

General Spaces Zoning Assemblies Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	ASHRAE Standard 62.1-2016 Space Usage	Ventilation					
						OA Requirement 1		OA Requirement 2		Direct Exhau	
						Airflow	Units	Airflow	Units	A	
1	Show rows where the value					FOOD AND BEVERAGE SERVICE: Kitchen (cooking)	7.5	CFM/person	0.12	CFM/sqft	
2	Contains					User Defined	0.0	CFM/person	0.00	CFM/sqft	
3	And Or					User Defined	0.0	CFM/person	0.00	CFM/sqft	
4	(Not Set)					User Defined	0.0	CFM/person	0.00	CFM/sqft	
5	Value Filter					User Defined	0.0	CFM/person	0.00	CFM/sqft	
6	J231 - Staff Toilet	Level 2	50.3	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft		
7	J230 - Storage	Level 2	122.8	(None)	User Defined	0.0	CFM/person	0.00	CFM/sqft		

Apply Clear Cancel

Workshops: Space Models - Spaces Tab



Filter for Office Space Type

Two office space types are shown, enclosed small and enclosed large

Space Model Properties - [02 Medical Office CLASS SPACE MODEL DONE]

General Spaces Zoning Assemblies Windows & Doors									
	Space	Level	Floor Area (sqft)	Space Type ✓	ASHRAE Standard 62.1-2016 Space	Ventilation			
						OA Requirement 1		OA Requirement 2	
						Airflow	Units	Airflow	Units
7	1005 - Security	Level 1	105.1	Office - Enclosed, Small	OFFICE: Office space	5.0	CFM/person	0.06	C
14	1010 - Office	Level 1	102.5	Office - Enclosed, Small	OFFICE: Office space	5.0	CFM/person	0.06	C
15	1015 - Consult	Level 1	93.6	Office - Enclosed, Small	OFFICE: Office space	5.0	CFM/person	0.06	C
16	1016 - Consult	Level 1	92.7	Office - Enclosed, Small	OFFICE: Office space	5.0	CFM/person	0.06	C
23	1025 - Purchasing	Level 1	435.2	Office - Enclosed, Large	OFFICE: Office space	5.0	CFM/person	0.06	C
36	1036 - Fin. Screen	Level 1	96.5	Office - Enclosed, Small	OFFICE: Office space	5.0	CFM/person	0.06	C
44	1045 - Supervisor Office	Level 1	78.0	Office - Enclosed, Small	OFFICE: Office space	5.0	CFM/person	0.06	C
58	1059 - Fin. Screen	Level 1	72.1	Office - Enclosed, Small	OFFICE: Office space	5.0	CFM/person	0.06	C

Columns To Display

☒ Show All	☒ Ventilation	☒ Overhead Lighting	☒ Daylighting Control	☒ Task Lighting	☒ Electric Equipment	☒ Occupants	☒ Miscellaneous Heat Gain	☒ Infiltration	Export
									Reapply

Workshops: Space Models - Spaces Tab



Changing Lighting Power

Space Model Properties - [02 Medical Office CLASS SPACE MODEL DONE]

General Spaces Zoning Assemblies Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Overhead Lighting					
					ASHRAE Standard 90.1-2016	Power	Units	Lighting Fixture Type	Sc	
					Lighting Method	Space Usage				
7	1005 - Security	Level 1	102.1	Office - Enclosed, Small	Space by Space	User Defined	0.46	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
14	1014 - Office	Level 1	102.5	Office - Enclosed, Small	Space by Space	Office: Enclosed and <= 250 ft2	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
15	1015 - Consult	Level 1	93.6	Office - Enclosed, Small	Space by Space	Office: Enclosed and <= 250 ft2	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
16	1016 - Consult	Level 1	92.7	Office - Enclosed, Small	Space by Space	Office: Enclosed and <= 250 ft2	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
23	1025 - Purchasing	Level 1	435.2	Office - Enclosed, Large	Space by Space	Office: Enclosed and >250 ft2	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
36	1036 - Fin. Screen	Level 1	96.5	Office - Enclosed, Small	Space by Space	Office: Enclosed and <= 250 ft2	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
44	1045 - Supervisor Office	Level 1	78.0	Office - Enclosed, Small	Space by Space	Office: Enclosed and <= 250 ft2	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
58	1059 - Fin. Screen	Level 1	72.1	Office - Enclosed, Small	Space by Space	Office: Enclosed and <= 250 ft2	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/

Columns To Display

☐ Show All ☐ Ventilation ☒ Overhead Lighting ☐ Daylighting Control ☐ Task Lighting ☐ Electric Equipment ☐ Occupants ☐ Miscellaneous Heat Gain ☐ Infiltration

Export Clear Sort and Filter

Reapply Space Types to Spaces

OK Cancel Help

Overhead Lighting Power Min: 0.00 W/sqft Max: 1,000.00 W/sqft

User define the space usage column

Now change the power value to 0.46W/sq ft

Workshops: Space Models - Spaces Tab



Changing Lighting Power

Space Model Properties - [02 Medical Office CLASS SPACE MODEL DONE]

GeneralSpacesZoningAssembliesWindows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Overhead Lighting					
					ASHRAE Standard 90.1-2016		Power	Units	Lighting Fixture Type	Sc
					Lighting Method	Space Usage				
7	1005 - Security	Level 1	102.1	Office - Enclosed, Small	Space by Space	User Defined	0.46	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
14	1014 - Office	Level 1	102.5	Office - Enclosed, Small	Space by Space	User Defined			Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
15	1015 - Consult	Level 1	58.6	Office - Enclosed, Small	Space by Space	User Defined			Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
16	1016 - Consult	Level 1	58.7	Office - Enclosed, Small	Space by Space	User Defined	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
19	1021 - EVS	Level 1	22.5	Storage Room - Small	Space by Space	User Defined	0.97	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
20	1022 - Soiled Hold	Level 1	67.6	Storage Room - Small	Space by Space	User Defined	0.97	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
23	1025 - Purchasing	Level 1	435.2	Office - Enclosed, Large	Space by Space	User Defined	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
30	1030 - Storage	Level 1	29.7	Storage Room - Small	Space by Space	User Defined	0.97	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
36	1036 - Fin. Screen	Level 1	96.5	Office - Enclosed, Small	Space by Space	User Defined	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/

Columns To Display

Show All

Ventilation

Overhead Lighting

Daylighting Control

Task Lighting

Electric Equipment

Occupants

Miscellaneous Heat Gain

Infiltration

ExportClear Sort and Filter

Reapply Space Types to Spaces

OKCancelHelp

Overhead Lighting PowerMin: 0.00 W/sqftMax: 1,000.00 W/sqft

User define entire space usage column

User define entire space usage column

Copy Ctrl+C Paste Ctrl+V

Copy then paste the lighting power value for the entire column to 0.46W/sq ft

Workshops: Space Models - Spaces Tab



Removing a Filter

Space Model Properties - [02 Medical Office CLASS SPACE MODEL DONE]

General Spaces Zoning Assemblies Windows & Doors									
	Space	Level	Floor Area (sqft)	Space Type	Ventilation				
					ASHRAE Standard 62.1- Level 1 Space	OA Requirement 1		OA Requirement 2	
						Airflow	Units	Airflow	Units
1	1000 - Vestibule	Level 1	163.8	(Select All)				0.06	CFM/sqft
2	1001 - Lobby	Level 1	431.7	(None)				0.06	CFM/sqft
3	1001A - Corridor	Level 1	294.5	Breakroom - Healthcare				0.06	CFM/sqft
4	1003 - Waiting	Level 1	493.0	Computer Room				0.06	CFM/sqft
5	1004A - Conference	Level 1	286.6	Conference Room				0.06	CFM/sqft
6	1004B - Conference	Level 1	242.3	Corridor - All Others				0.06	CFM/sqft
7	1005 - Security	Level 1	102.1	Electrical / Mechanical Room				0.06	CFM/sqft
				Exam/Treatment Room				0.06	CFM/sqft
				B Text Filter					
					GENERAL: Conference/meeting	5.0	CFM/person	0.06	CFM/sqft
					GENERAL: Conference/meeting	5.0	CFM/person	0.06	CFM/sqft
					OFFICE: Office space	5.0	CFM/person	0.06	CFM/sqft

The pop up will appear with Space Types to filter

Hover the cursor over the Space Type heading, click the down arrow

Clear

Workshops - Space Models - Spaces Tab



Columns to Display



Columns To Display

☒ Show All ☒ Ventilation ☒ Overhead Lighting ☒ Daylighting Control ☒ Task Lighting ☒ Electric Equipment ☒ Occupants ☒ Miscellaneous Heat Gain ☒ Infiltration

[Add New Space Type](#) [Duplicate Selected Space Type](#) [Delete Selected Space Type](#) [Export](#) [Clear Sort and Filter](#) [Apply to All Space Models](#)

Workshops - Space Models - Spaces Tab



Filters by Columns

Space Model Properties - [02 Medical Office CLASS SPACE MODEL DONE]

General

Spaces

Zoning

Assemblies

Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Overhead Lighting					Sc
					ASHRAE Standard 90.1-2016		Power	Units	Lighting Fixture Type	
					Lighting Method	Space Usage				
1	1000 - Vestibule	Level 1	163.8	Lobby - All Other	Space by Space	Lobby: All others	1.00	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
2	1001 - Lobby	Level 1	431.7	Lobby - All Other	Space by Space	Lobby: All others	1.00	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
3	1001A - Corridor	Level 1	294.5	Corridor - All Others	Space by Space	Corridor: All others	0.66	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
4	1003 - Waiting	Level 1	493.0	Lobby - All Other	Space by Space	Lobby: All others	1.00	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
5	1004A - Conference	Level 1	286.6	Conference Room	Space by Space	Conference/Meeting/Multipurpose Room	1.07	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
6	1004B - Conference	Level 1	242.3	Conference Room	Space by Space	Conference/Meeting/Multipurpose Room	1.07	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
7	1005 - Security	Level 1	102.1	Office - Enclosed, Small	Space by Space	Office: Enclosed and <= 250 ft2	0.93	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/
8	1006 - Corridor	Level 1	621.9	Corridor - All Others	Space by Space	Corridor: All others	0.66	W/sqft	Fluorescent: Recessed, no Lens, Unvented	90.1 O Lights/

Columns To Display

☐ Show All

☐ Ventilation

☒ Overhead Lighting

☐ Daylighting Control

☐ Task Lighting

☐ Electric Equipment

☐ Occupants

☐ Miscellaneous Heat Gain

☐ Infiltration

Export

Clear Sort and Filter

Reapply Space Types to Spaces

OK

Cancel

Help

Space Model Name

Overhead Lighting

Overhead Lighting Only

Scroll bar almost entire width of display

Workshops - Space Models - Spaces Tab



Display Filters

It's important to understand how “display filters” work.

Display filters modify what you see or don't see. They don't exclude the data.

For example, in the *Columns to Display* filter, if you uncheck Electric Equipment, that hides the electric equipment heat gain data. It doesn't erase the electric equipment heat gain data in the grid.

If you want to exclude all electric heat gains from your analysis, you would have to zero out the heat gains. That can be done using the copy/paste features.

Workshops: Space Models - Spaces Tab



Row Sort

Ascending Floor Area

Space Model Properties - [02 Medical Office CLASS SPACE MODEL DONE]				
General Spaces Zoning Assemblies				
	Space	Level	Floor Area (sqft)	Space Type
1	2001A - Elevator Controls	Level 2	20.3	(None)
2	J228 - Roof Hatch	Level 2	20.4	(None)
3	1021 - EVS	Level 1	22.5	Storage Room - Small
4	Mech Shaft - 2B	Level 2	24.3	(None)
5	1030 - Storage	Level 1	29.7	Storage Room - Small
6	2047 - Data	Level 2	43.6	Computer Room
7	Mech Shaft - 2A	Level 2	43.7	(None)
8	1043 - Patient	Level 1	44.4	Restroom

Columns To Display

☒ Show All ☒ Ventilation ☒ Overhead Lighting ☒ Daylighting Control ☒ Task Lighting ☒

Space Model Name

Getting Larger



Descending Floor Area

Space Model Properties - [02 Medical Office CLASS SPACE MODEL DONE]				
General Spaces Zoning Assemblies				
	Space	Level	Floor Area (sqft)	Space Type
1	J225 - Behavioral Health Workspace	Level 2	1,169.8	Lobby - All Other
2	2001 - Waiting	Level 2	1,156.0	Lobby - All Other
3	1093 - Clinical Pod	Level 1	808.3	Lobby - All Other
4	1093A/B Corridor	Level 1	751.4	Corridor - All Others
5	1073A - Clinical Pod	Level 1	710.1	Lobby - All Other
6	1039A - Clinical Pod	Level 1	678.1	Lobby - All Other
7	1073B - Clinical Pod	Level 1	672.1	Lobby - All Other
8	2054B - Clinical Pod	Level 2	670.6	Lobby - All Other

Columns To Display

☒ Show All ☒ Ventilation ☒ Overhead Lighting ☒ Daylighting Control ☒ Task Lighting ☒

Space Model Name

Getting Smaller



Workshops: Space Models - Spaces Tab



Zero Out and Copy Paste

Space Model Properties - [02 Medical Office CLASS SPACE MODEL DONE]

General Spaces Zoning Assemblies Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Electric Equipment		
					Power	Units	Schedule
1	1000 - Vestibule	Level 1	163.8	Lobby - All Other	0.00	W/sqft	90.1 Office Lights/Elec
2	1001 - Lobby	Level 1	431.7	Lobby - All Other	0.00	W/sqft	90.1 Office Lights/Elec
3	1001A - Corridor	Level 1	294.5	Corridor - All Others	0.00	W/sqft	90.1 Office Lights/Elec
4	1003 - Waiting	Level 1	493.0	Lobby - All Other	0.00	W/sqft	90.1 Office Lights/Elec
5	1004A - Conference	Level 1	286.6	Conference Room	0.00	W/sqft	90.1 Office Lights/Elec
6	1004B - Conference	Level 1	242.3	Conference Room	0.00	W/sqft	90.1 Office Lights/Elec
7	1005 - Security	Level 1	102.1	Office - Enclosed, Small	0.00	W/sqft	90.1 Office Lights/Elec
8	1006 - Corridor	Level 1	621.9	Corridor - All Others	0.00	W/sqft	(None)
9	1006 - Data	Level 1	57.7	Computer Room	0.00	W/sqft	90.1 Office Lights/Elec
10	1009 - Lab	Level 1	297.8	Laboratory - Medical	0.00	W/sqft	90.1 Health Lights/Elec
11	1010 - Processing	Level 1	81.7	Laboratory - Medical	0.00	W/sqft	90.1 Health Lights/Elec
12	1011 - Patient Toilet	Level 1	54.9	Restroom	0.00	W/sqft	90.1 Office Lights/Elec
13	1012 - Community	Level 1	424.3	Conference	0.00	W/sqft	90.1 Office Lights/Elec

Columns To Display: ☐ Show All ☐ Ventilation ☐ Overhead Lighting ☐ Daylighting Control ☐ Task Lighting ☒ Electric Equipment ☐ Occupants ☐ Miscellaneous Heat Gain ☐ Infiltration

Export Clear Sort and Filter Reapply Space Types to Spaces

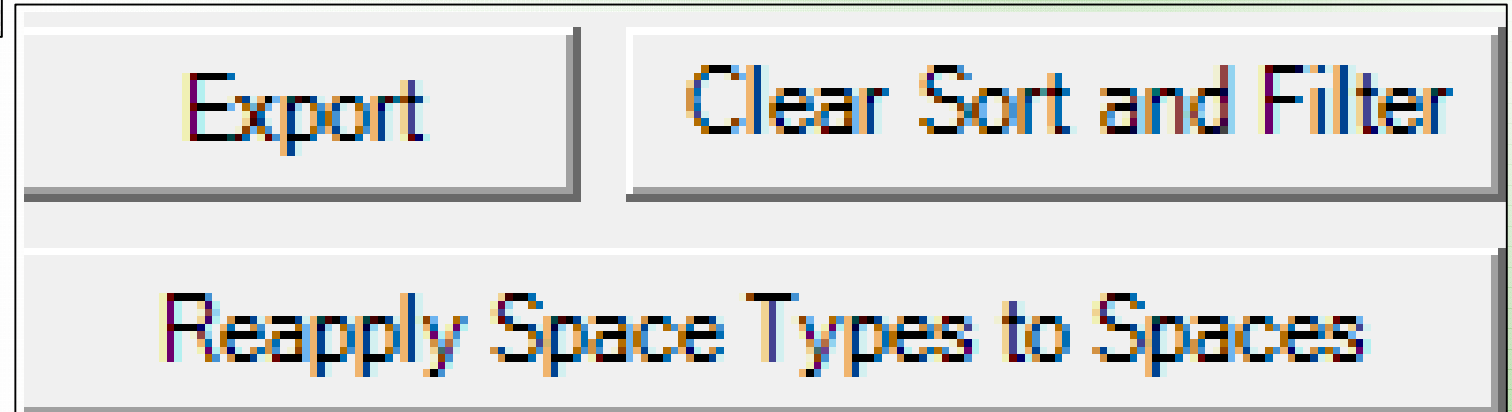
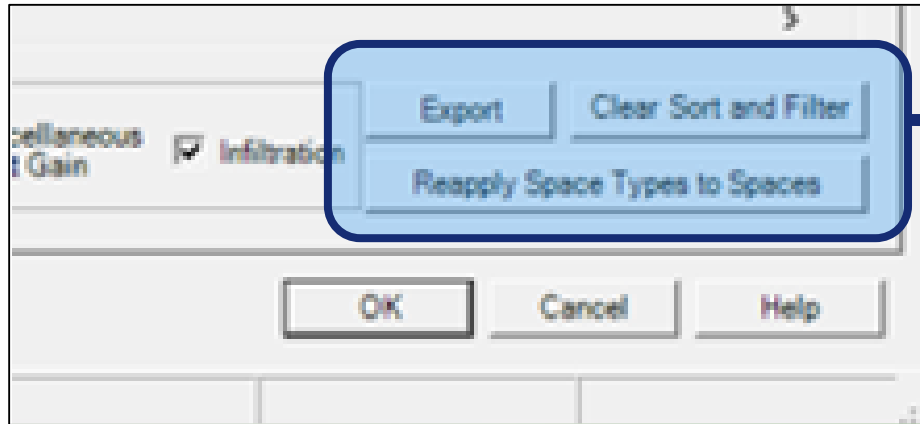
OK Cancel Help

Electric Equipment Power Min: 0.00 W/sqft Max: 1,000.00 W/sqft

Pop up menu lets you copy any zero value cell (corridors)

Highlight then paste zero into all cells

Space Model - Spaces Grid, Action Buttons



Space Model - Spaces Grid, Export



Space Model Properties - [02 Medical Office CLASS SPACE MODEL DONE]

General Spaces Zoning Assemblies Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	ASHRAE Standard 62.1-2016 Space	Ventilation				Direct A
						OA Requirement 1		OA Requirement 2		
						Airflow	Units	Airflow	Units	
1	1000 - Vestibule	Level 1	163.8	Lobby - All Other	PUBLIC ASSEMBLY: Lobby	5.0	CFM/person	0.06	CFM/sqft	
2	1001 - Lobby				PUBLIC ASSEMBLY			0.06	CFM/sqft	
3	1001A - Corridor							0.06	CFM/sqft	
4	1003 - Waiting							0.06	CFM/sqft	
5	1004A - Conference							0.06	CFM/sqft	
6	1004B - Conference							0.06	CFM/sqft	
7	1005 - Security							0.06	CFM/sqft	
8	1006 - Corridor							0.06	CFM/sqft	

Columns To Display: ☒ Show All ☒ Ventilation

Save As dialog box: File name: 02 Medical Office CLASS SPACE MODEL DONE, Save as type: Excel (*.xlsx)

Buttons: Export, Clear Sort and Filter, Reapply Space Types to Spaces, Save, Cancel, OK, Cancel, Help

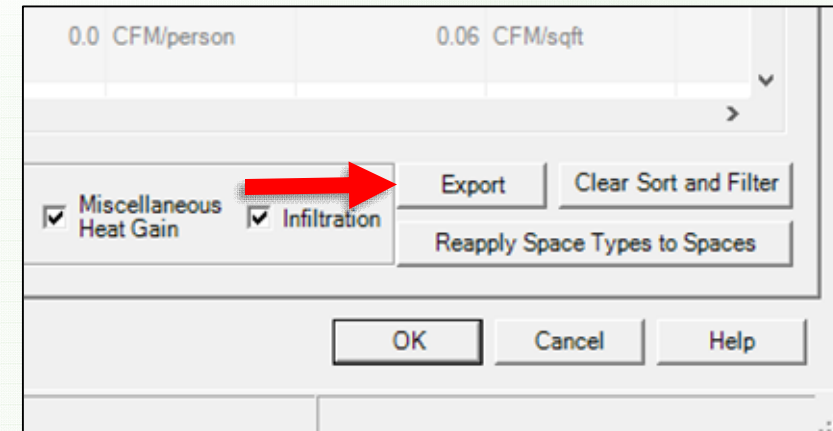


Creating Your Own List of Space Names



Creating your own List External to HAP of Space Names for Space Model Planning

1. Complete the sketch over of the Building.
2. Start a new Space Model and link your building
3. Go to the Spaces tab.
4. Press the Export button **in the lower right** of the **Space Model**.



5. That will save the whole grid to an XLSX file which you can name and place in a folder of your choosing.

Creating Your Own List of Space Names



Creating your own List of Space Names for Space Grid Configuration

6. In Excel delete all the columns you don't want. As a suggestion leave the Space Name, Level, Floor Area, Space Type, and Occupant's columns and delete rest.
7. Use this Excel sheet to strategize about which space types to use and to add a list of occupants.

Additionally....if desired:

8. Copy the cells from the Space Type column and paste into the Spaces grid in HAP. As long as you kept the order of spaces the same (no sort or deletions or additions), that will put all the space types into the grid, and automatically default the rest of the grid columns based on the designated space types. Key detail is you have to type the space type name exactly in Excel.
9. Then copy the columns from the Occupants and Units columns together and paste into the spaces grid to override the default occupants and units that got defaulted in #7.



Configure Final Spaces Grid

General Spaces Zoning Assemblies Windows & Doors

	Space	Level	Floor Area (sqft)	Space Type	Ventilation						Overhead Lighting		
					ASHRAE Standard 62.1- 2016 Space	OA Requirement 1		OA Requirement 2		Direct Exhaust		ASHRAE Standard 90.1-2016	
						Airflow	Units	Airflow	Units	Airflow	Units	Lighting Method	Space Usage
1	1000 - Vestibule	Level 1	163.8	Lobby - All Other	PUBLIC ASSEMBLY: Lobby	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Lobby: All others
2	1001 - Lobby	Level 1	431.7	Lobby - All Other	PUBLIC ASSEMBLY: Lobby	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Lobby: All others
3	1001A - Corridor	Level 1	294.5	Corridor - All Others	GENERAL: Corridor	0.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Corridor: All others
4	1003 - Waiting	Level 1	493.0	Lobby - All Other	PUBLIC ASSEMBLY: Lobby	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Lobby: All others
5	1004A - Conference	Level 1	288.6	Conference Room	GENERAL: Conference/meeting	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Conference/Meeting/Multipurpose Room
6	1004B - Conference	Level 1	242.3	Conference Room	GENERAL: Conference/meeting	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Conference/Meeting/Multipurpose Room
7	1005 - Security	Level 1	102.1	Office - Enclosed, Small	OFFICE: Office space	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Office: Enclosed and <= 250 ft2
8	1006 - Corridor	Level 1	621.9	Corridor - All Others	GENERAL: Corridor	0.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Corridor: All others
9	1006 - Data	Level 1	57.7	Computer Room	MISCELLANEOUS: Computer (not printing)	5.0	CFM/person	0.06	CFM/sqft	0.0	CFM	Space by Space	Computer Room

Columns To Display

☒ Show All ☒ Ventilation ☒ Overhead Lighting ☒ Daylighting Control ☒ Task Lighting ☒ Electric Equipment ☒ Occupants ☒ Miscellaneous Heat Gain ☒ Infiltration

Export Clear Sort and Filter

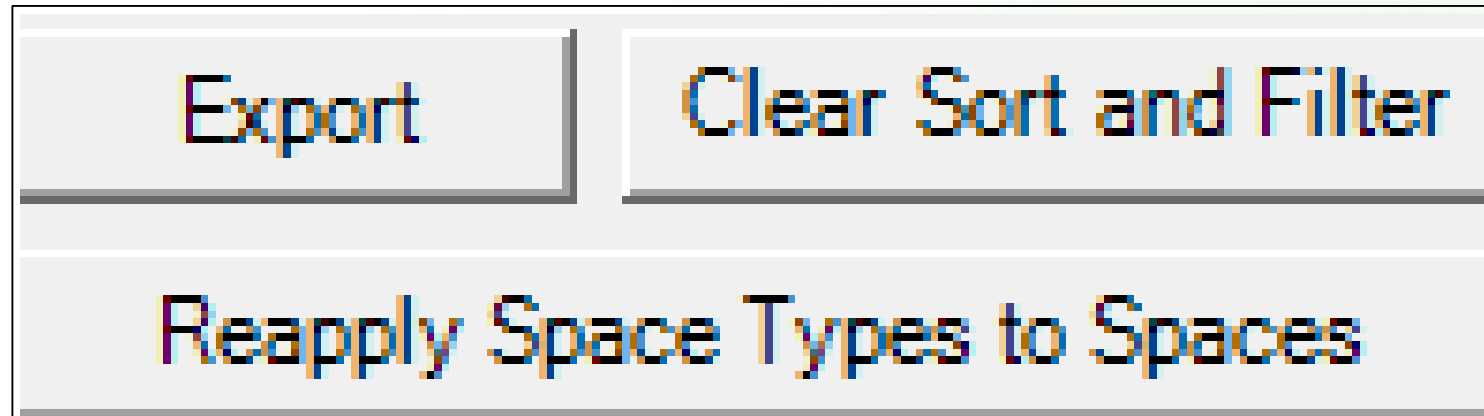
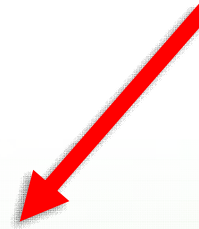
Reapply Space Types to Spaces



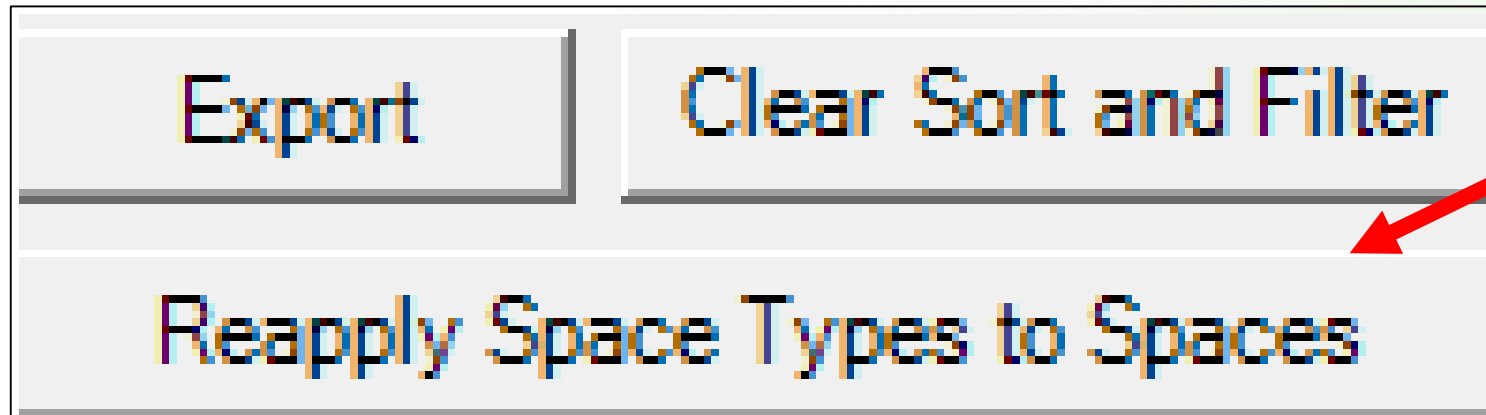
OK Cancel Help

Space ID

Space Model - Spaces Grid, Clear Sort and Filter



Space Model - Spaces Grid, Reapply Space Types



Space Model - Spaces Grid, Importing



If space data was assembled in a spreadsheet external to the HAP grid, here are key details for copying and pasting the data into the spaces grid.

- a. You can only paste data from an external source into columns of the space grid containing numeric data
- b. When multiple consecutive columns in the spaces grid contain numeric values, you can paste data from an external source into those multiple columns all at one time
- c. It is critical the row order of spaces in your source spreadsheet exactly matches the row order of spaces in the spaces grid
- d. It is critical the column order of numeric columns is the same as the column order in the spaces grid
- e. Because of these requirements, you cannot paste the contents of an entire spreadsheet into the spaces grid all in one operation. Instead, you will need to copy individual columns or blocks of columns in several separate steps to fully populate numeric columns of the spaces grid

Space Model - Spaces Grid Features



Summary of Tasks

We discussed and demonstrated the features of the Spaces Grid including:

1. Organization of the Spaces Grid
2. Entering Data
3. Display Features
4. Input Features Copy-Paste
5. Action Buttons



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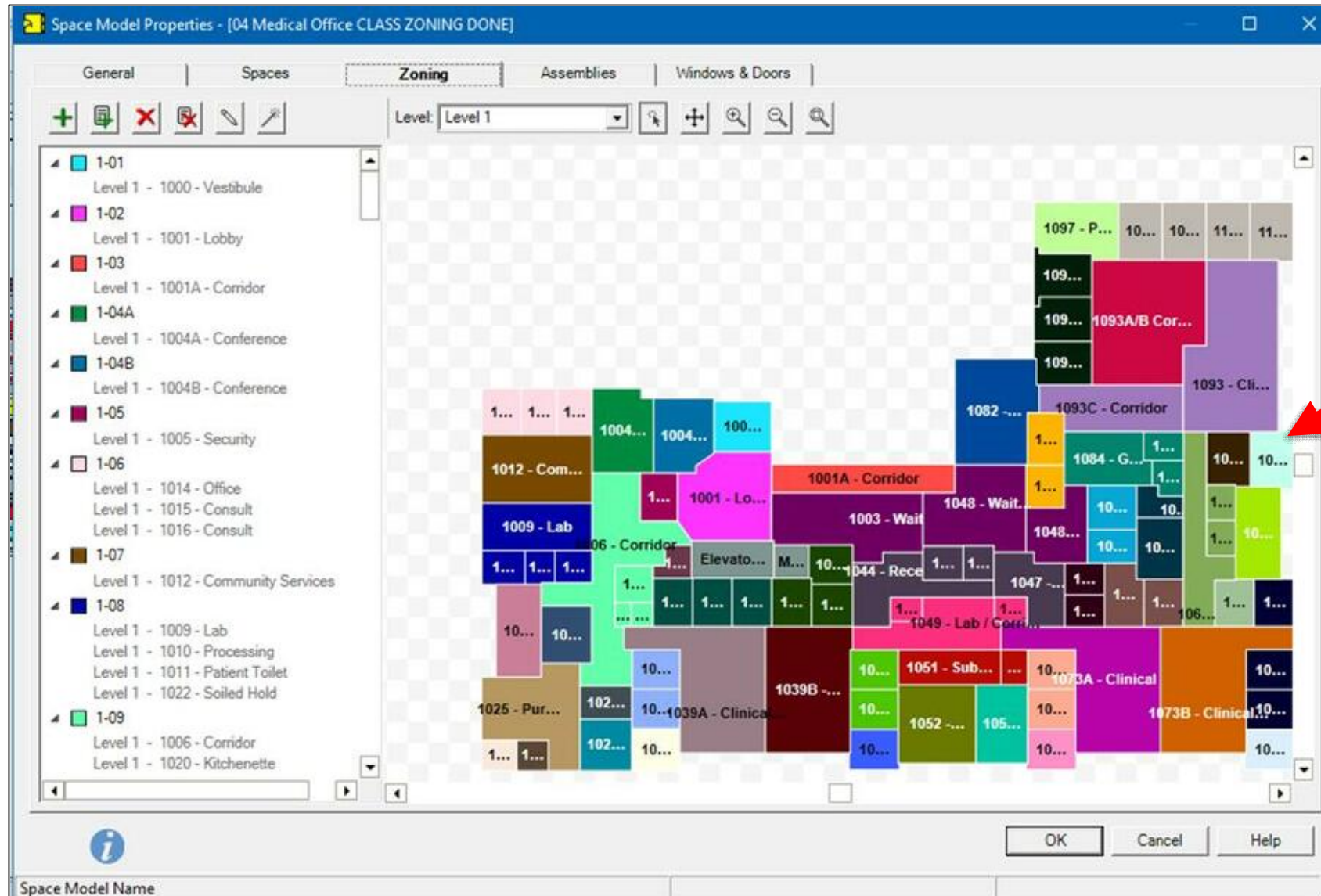
CLASS
WORKSHOPS
ZONING TAB



www.carrier.com/HAP

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Workshops - Space Models Zoning Tab



Single
space
zones and
multiple
space
zones

Workshops - Space Models Zoning Tab



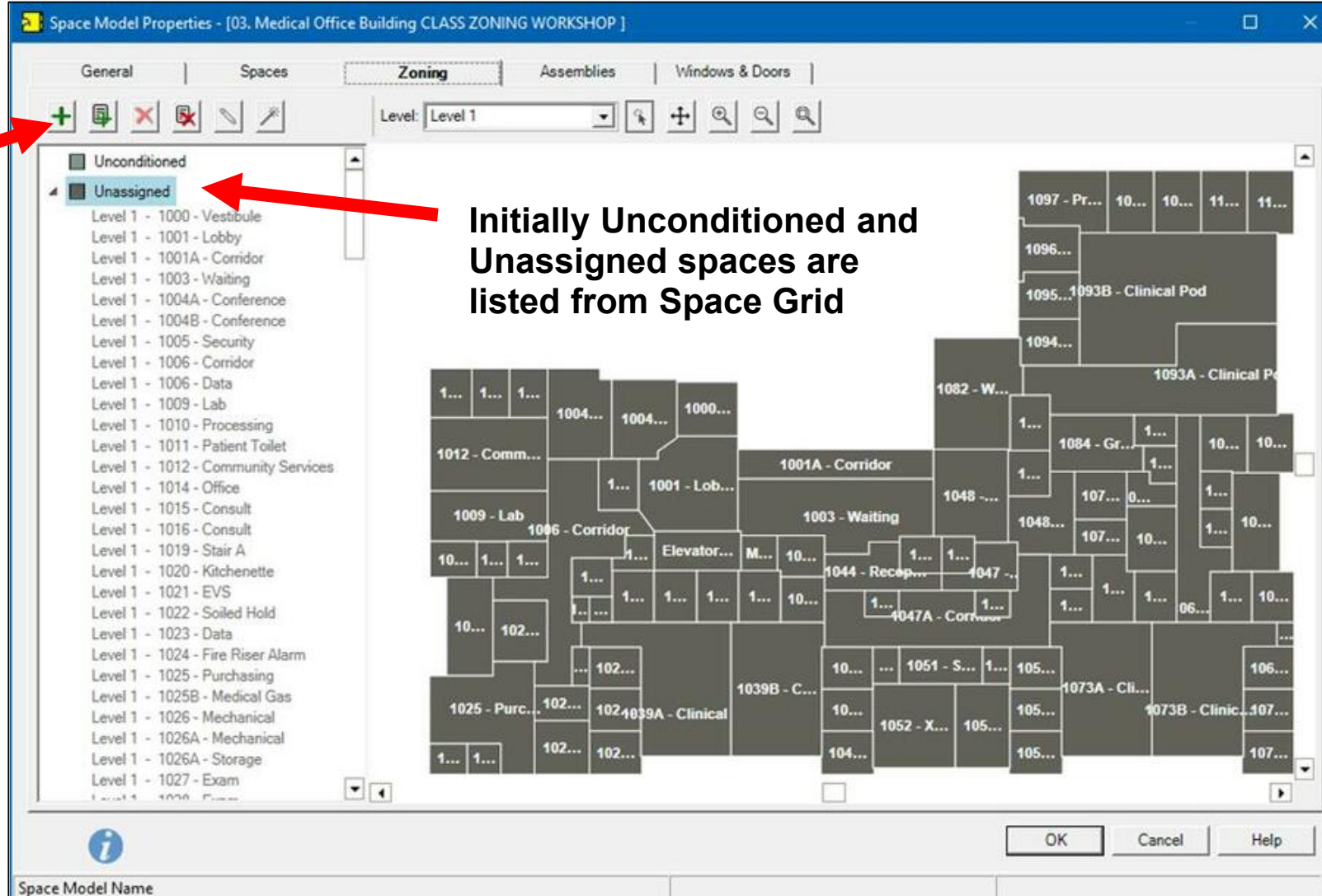
Open 03 CLASS ZONING WORKSHOP

Space Model	Building
<New default Space Model>	
01 Medical Office CLASS SPACE MODEL WORKSHOP	(none)
02 Medical Office CLASS SPACE MODEL DONE	19 Medical Office CLASS FINISHED
03 Medical Office CLASS ZONING WORKSHOP	19 Medical Office CLASS FINISHED
04 Medical Office CLASS ZONING DONE	19 Medical Office CLASS FINISHED

GO TO ZONING TAB

Workshops - Space Models Zoning Tab

Configuring HVAC Zones

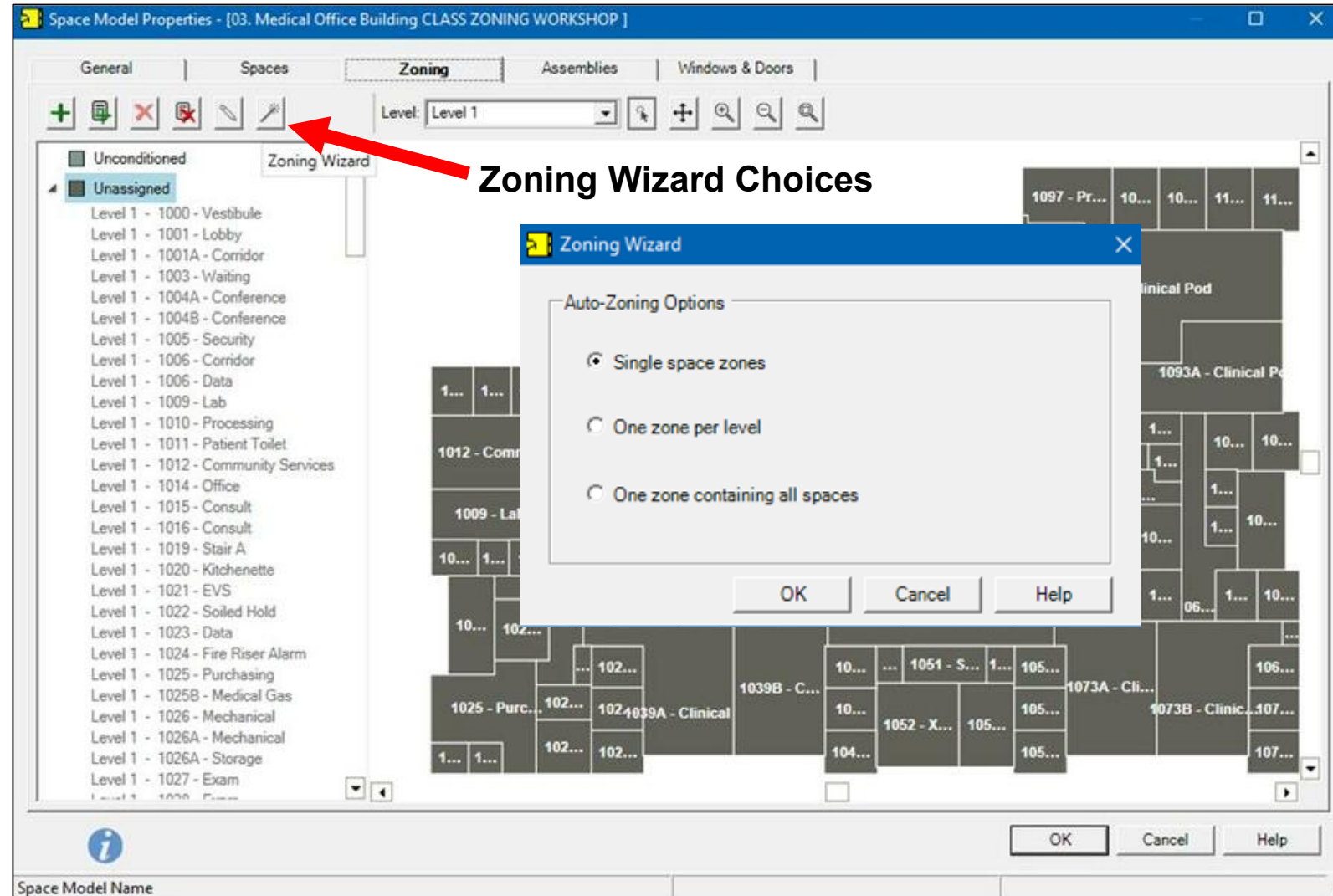


Toolbar for creating, naming, and deleting zones

Initially Unconditioned and Unassigned spaces are listed from Space Grid

Workshops - Space Models Zoning Tab

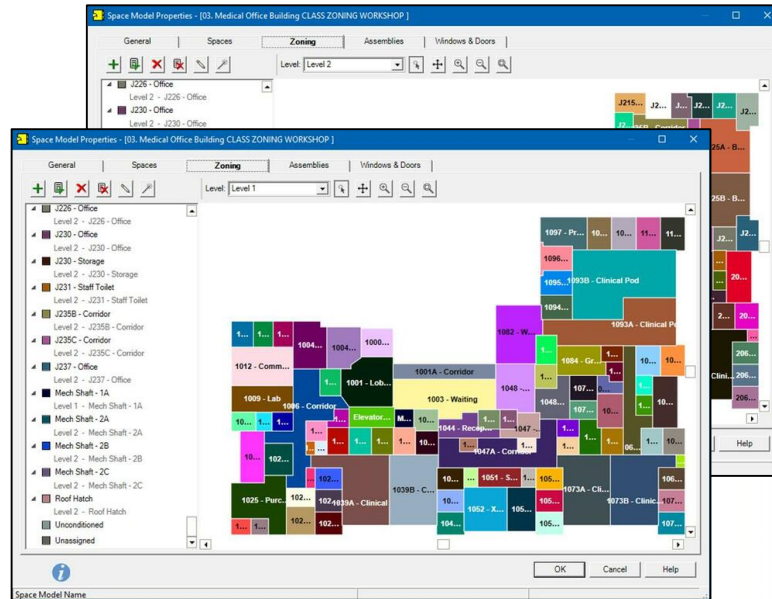
Auto Zoning Choices



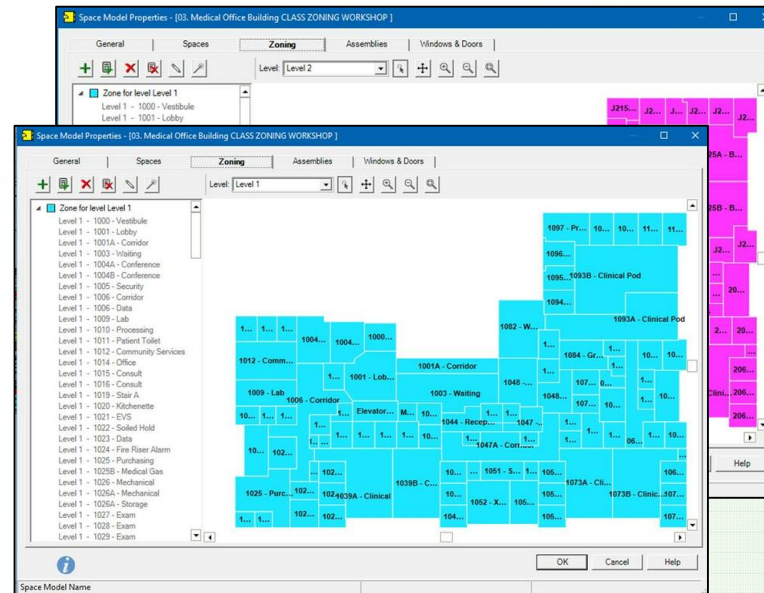
Workshops - Space Models Zoning Tab



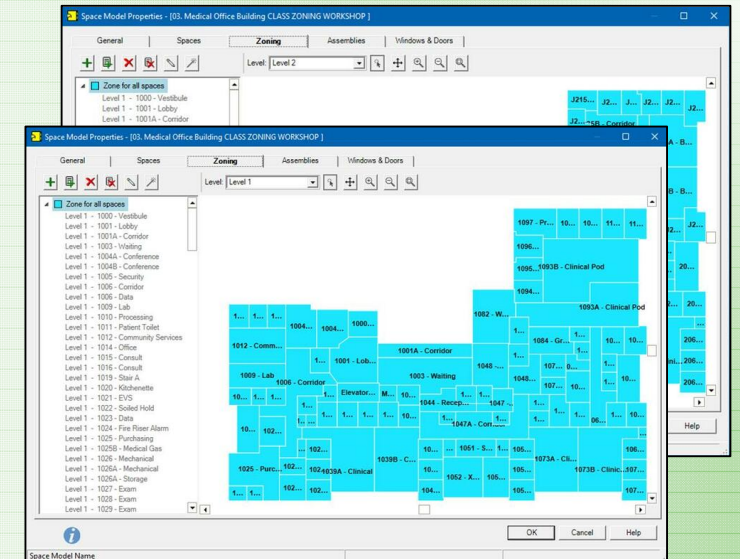
Auto Zoning (Zoning Wizard) Results



Single space zones



One Zone per level



One zone containing all spaces

Workshops - Space Models Zoning Tab



Configure these First 10 HVAC Zones

- ▲  **1-01**
Level 1 - 1000 - Vestibule
- ▲  **1-02**
Level 1 - 1001 - Lobby
- ▲  **1-03**
Level 1 - 1001A - Corridor
- ▲  **1-04A**
Level 1 - 1004A - Conference
- ▲  **1-04B**
Level 1 - 1004B - Conference
- ▲  **1-05**
Level 1 - 1005 - Security

- ▲  **1-06**
Level 1 - 1014 - Office
Level 1 - 1015 - Consult
Level 1 - 1016 - Consult
- ▲  **1-07**
Level 1 - 1012 - Community Services
- ▲  **1-08**
Level 1 - 1009 - Lab
Level 1 - 1010 - Processing
Level 1 - 1011 - Patient Toilet
Level 1 - 1022 - Soiled Hold
- ▲  **1-09**
Level 1 - 1006 - Corridor
Level 1 - 1020 - Kitchenette
Level 1 - 1021 - EVS

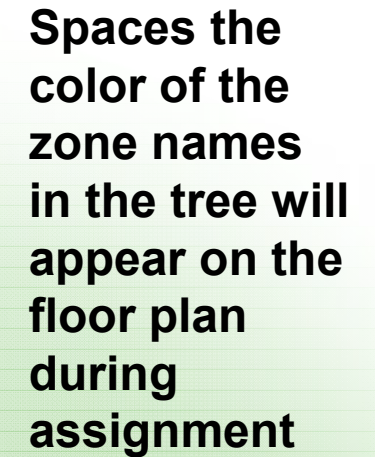
Create a new zone

Create multiple new zones

Enter zone names, say OK



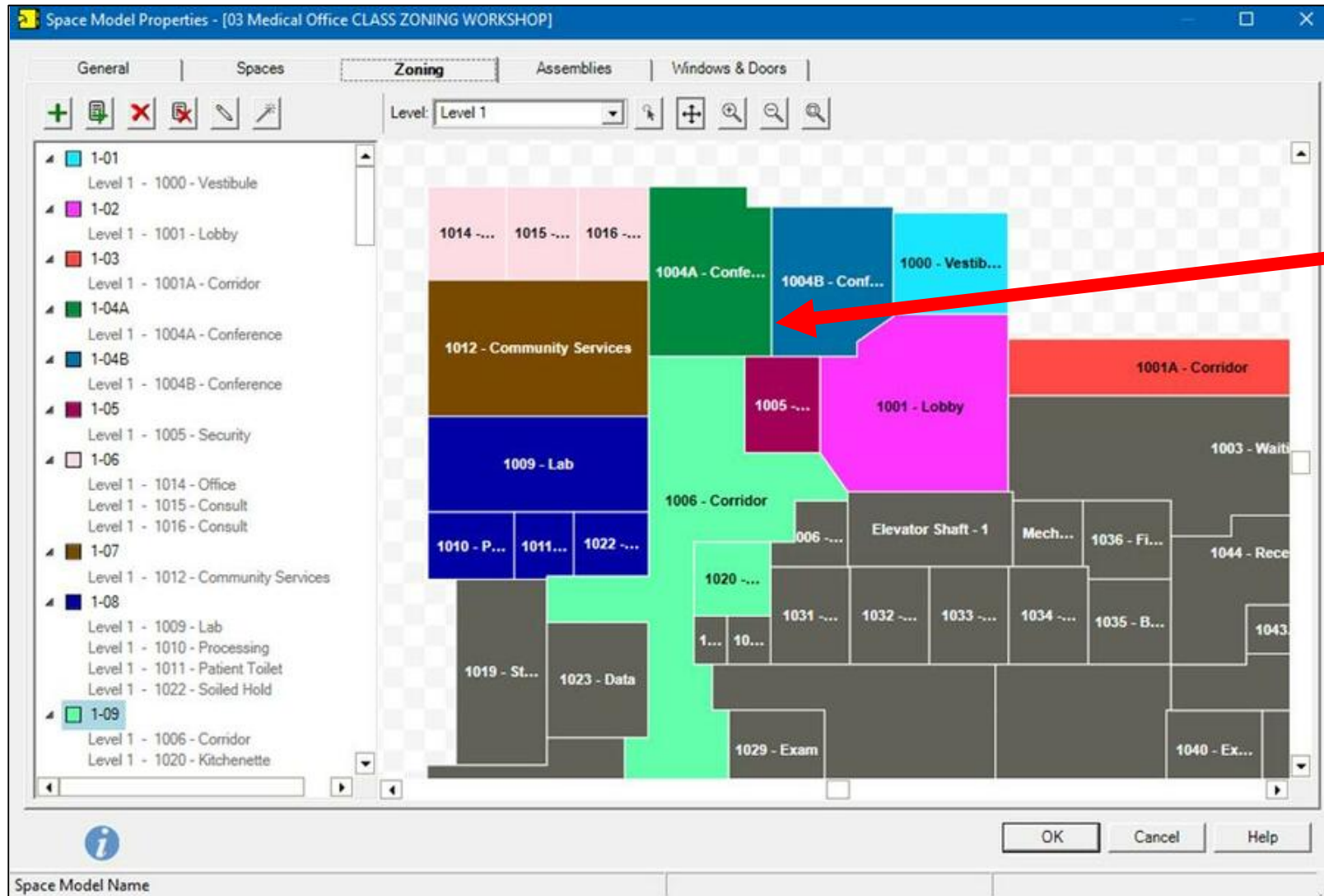
Configure HVAC Zones



Workshops - Space Models Zoning Tab

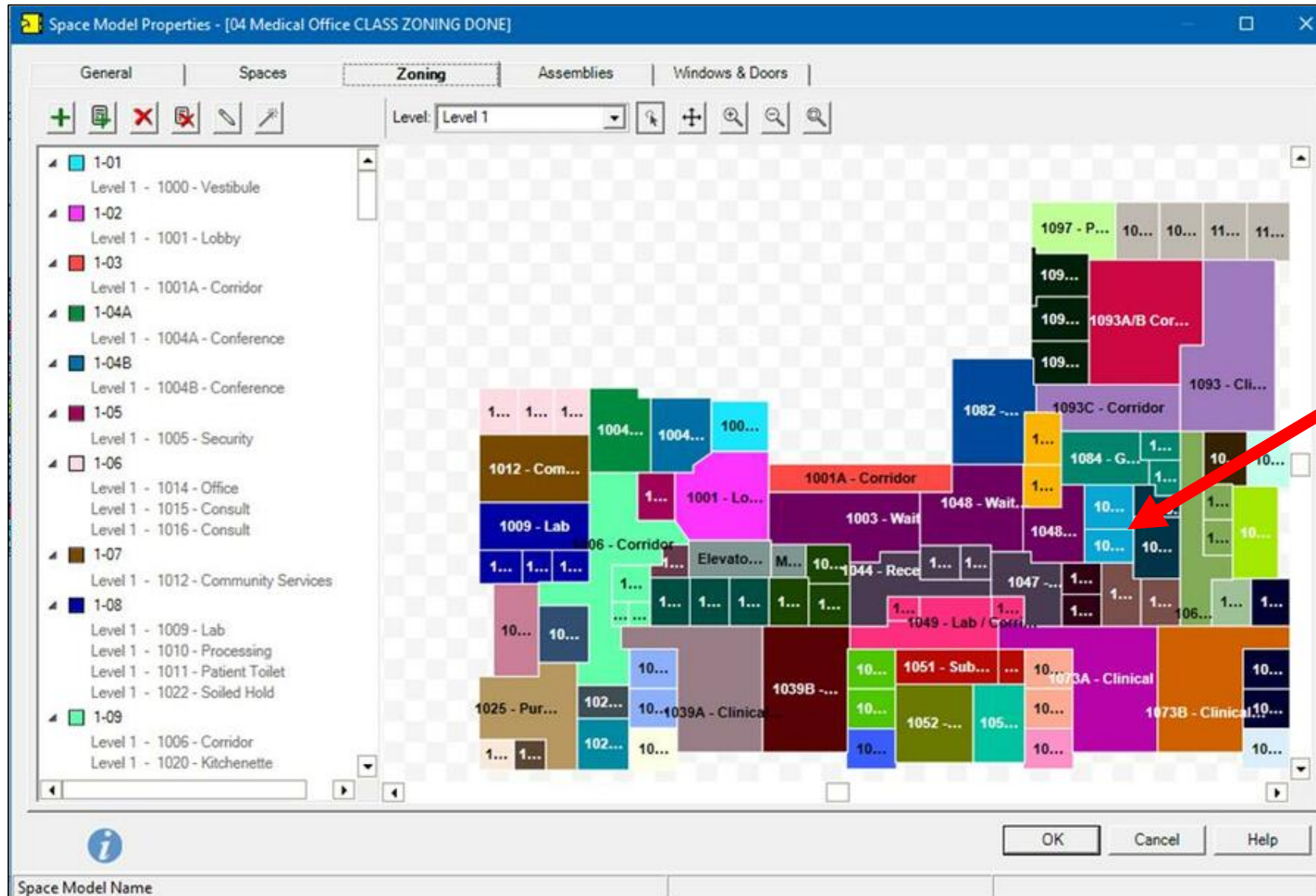


Configure 10 HVAC Zones Workshop Done



Use Pan mode to enlarge areas of the building for assigning to zones

Workshops - Space Models Zoning Tab



Use Pan mode to enlarge areas of the building for assigning to zones



Zone the Building

General | Spaces | **Zoning** | Assemblies | Windows & Doors

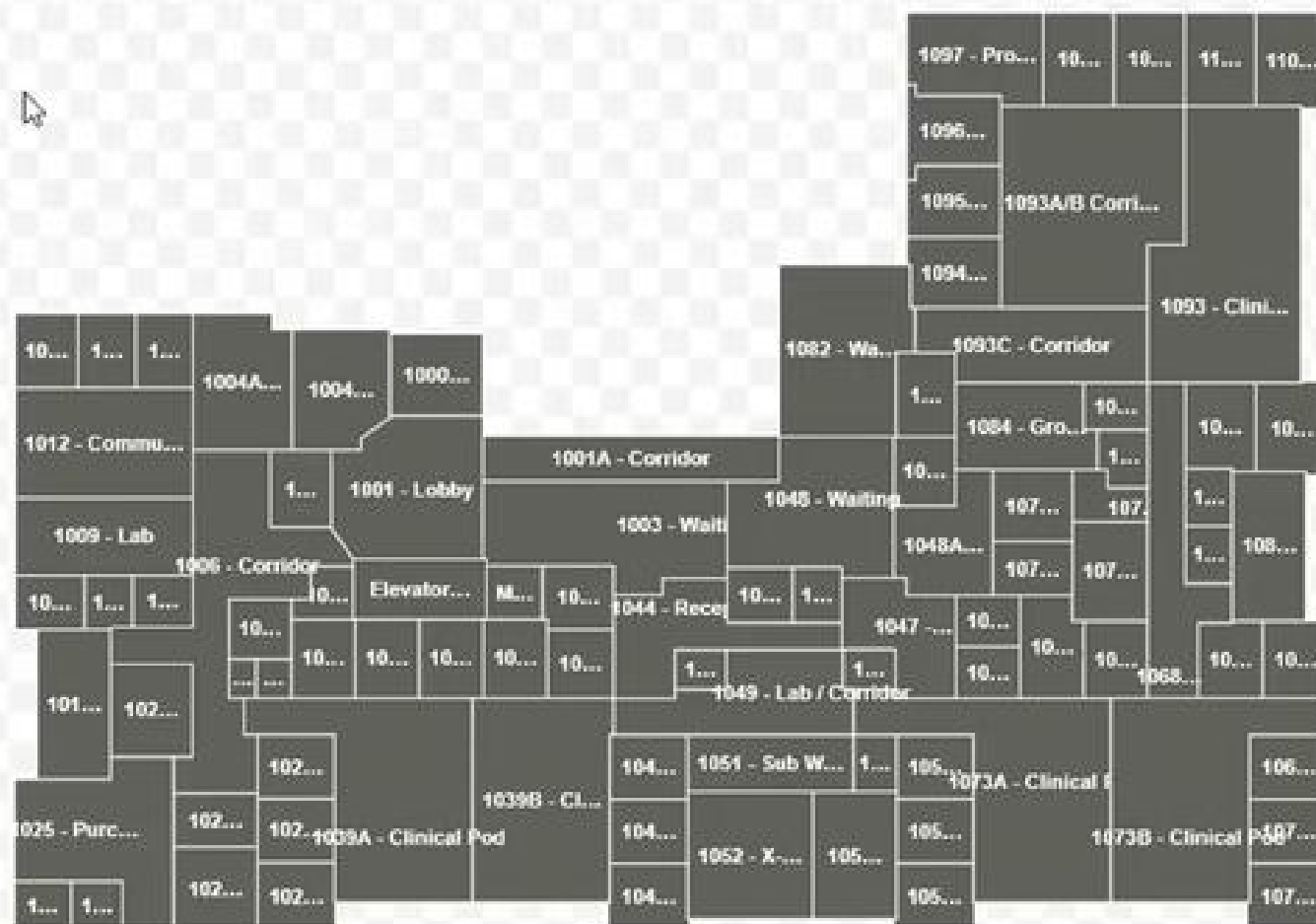


Level: Level 1

☒ Unconditioned

☒ Unassigned

- Level 1 - 1000 - Vestibule
- Level 1 - 1001 - Lobby
- Level 1 - 1001A - Corridor
- Level 1 - 1003 - Waiting
- Level 1 - 1004A - Conference
- Level 1 - 1004B - Conference
- Level 1 - 1005 - Security
- Level 1 - 1006 - Corridor
- Level 1 - 1006 - Data
- Level 1 - 1009 - Lab
- Level 1 - 1010 - Processing
- Level 1 - 1011 - Patient Toilet
- Level 1 - 1012 - Community Services
- Level 1 - 1014 - Office
- Level 1 - 1015 - Consult
- Level 1 - 1016 - Consult
- Level 1 - 1019 - Stair A
- Level 1 - 1020 - Kitchenette
- Level 1 - 1021 - EVS
- Level 1 - 1022 - Soiled Hold
- Level 1 - 1023 - Data
- Level 1 - 1024 - Fire Riser Room
- Level 1 - 1025 - Purchasing
- Level 1 - 1025B - Med Gas
- Level 1 - 1026A - Mechanical
- Level 1 - 1026B - Mechanical
- Level 1 - 1027 - Exam
- Level 1 - 1028 - Exam
- Level 1 - 1029 - Exam
- Level 1 - 1030 - Storage



OK

Cancel

Help

Overhead Lighting Power

Min: 0.00 W/sqft

Max: 1,000.00 W/sqft



Summary of Tasks

1. Utilize the Zoning Wizard to auto zone spaces into zones by any of three options
2. List your zone names for custom zoning option which creates multiple new zones that assigns both single and multiple spaces into zones



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ASSEMBLIES TAB



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Workshops - Space Models Assemblies Tab



Assign Envelope Assemblies

Space Model Properties - [05 Medical Office CLASS ASSEMBLIES AND WINDOWS WORKSHOP]

General | Spaces | Zoning | **Assemblies** | Windows & Doors

Surface Type	Surface Group	Selected Assembly
☒ Exterior Above Grade Wall	Default	(None)
	Exterior Wall - Level 2	(None)
	Exterior Wall - Stairwells	(None)
☒ Interior Wall	Default	(None)
	Interior Wall - Elevator Shaft	(None)
	Interior Wall - Stairwell	(None)
☒ Roof	Default	(None)
☒ Ceiling	Interior Ceilings	(None)
☒ Floor Above Space	Interior Floors Above Space	(None)
☒ Slab Floor On Grade	At-Grade Floors	(None)
☒ Floor Above Ambient	Floor Above Ambient	(None)

Selected Assembly

OK Cancel Help

Workshops - Space Models Assemblies Tab



Assign Envelope Assemblies

Space Model Properties - [05 Medical Office CLASS ASSEMBLIES AND WINDOWS WORKSHOP]

General | Spaces | Zoning | **Assemblies** | Windows & Doors

Surface Type	Surface Group	Selected Assembly
Exterior Above Grade Wall		
	Default	Level 1 Exterior - Brick Cladding over Steel-Framed Wall
	Exterior Wall - Level 2	Level 2 Stucco Steel-Framed Wall - 2016 Compliant
	Exterior Wall - Stairwells	Stairwell Exterior - Stucco over CMU
Interior Wall		
	Default	Interior Gypsum Board Wall
	Interior Wall - Elevator Shaft	Elevator Shaft Interior Walls
	Interior Wall - Stairwell	Stairwell Interior Walls
Roof		
	Default	2016 Zone 2 Insulation entirely above deck
Ceiling		
	Interior Ceilings	Acoustic Tile Ceiling
Floor Above Space		
	Interior Floors Above Space	Mass floor above space
Slab Floor On Grade		
	At-Grade Floors	2016 Zone 2 Slab-on-grade floor, unheated
Floor Above Ambient		
	Floor Above Ambient	(None)

OK Cancel Help

Selected Assembly



Create and Assign Surface Assemblies

General | Spaces | Zoning | **Assemblies** | Windows & Doors

Surface Type	Surface Group	Selected Assembly
[-] Exterior Above Grade Wall		
	Default	(None)
	Exterior Wall - Level 2	(None)
	Exterior Wall - Stairwells	(None)
[-] Interior Wall		
	Default	(None)
	Interior Wall - Elevator Shaft	(None)
	Interior Wall - Stairwell	(None)
[-] Roof		
	Default	(None)
[-] Ceiling		
	Interior Ceilings	(None)
[-] Floor Above Space		
	Interior Floors Above Space	(None)
[-] Slab Floor On Grade		
	At-Grade Floors	(None)
[-] Floor Above Ambient		
	Floor Above Ambient	(None)



OK

Cancel

Help

Surface ID



Summary of Tasks

1. We assigned assemblies by opening the drop-down list and selecting an existing assembly from the project library
2. An alternate approach would be to Create New Assembly on the fly and automatically assign it to the space model



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WINDOWS AND DOORS TAB



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Workshops - Space Models Windows and Doors



Assign Windows and Doors

Window and door assemblies can be created simultaneously with assigning assemblies. Use the “Create New Assembly” option to do this. Or those construction assemblies could have been created prior to creating the Space Model by using items in the Libraries section of the navigation panel on the main window.

Tasks:

1. Click the blue Info button to review the purpose and key tasks for this tab.
2. Assign an assembly to each opening type listed in the table.

Workshops - Space Models Windows and Doors



Assign Windows and Doors

Space Model Properties - [05 Medical Office CLASS ASSEMBLIES AND WINDOWS WORKSHOP]

General | Spaces | Zoning | Assemblies | **Windows & Doors**

Opening Type	Tag	Width x Height, Elevation	Selected Assembly
Window			
	W01	5' 3" x 6' , 2' 6"	(None)
	W02	10' x 6' , 2' 6"	(None)
	W03	17' 4" x 6' , 2' 6"	<Create New Assembly>
	W04	6' 8" x 6' , 2' 6"	2016 Zone 2 Metal framing, fixed
	W05	8' 11" x 6' , 2' 6"	(None)
	W06	42' 8" x 6' , 2' 6"	(None)
	W07	21' 2" x 6' , 2' 6"	(None)
	W08	8" x 8' 2" , 4"	(None)
	W09	14' x 8' 2" , 4"	(None)
	W10	11' 2" x 8' 2" , 4"	(None)
	W11	11' 4" x 8' 2" , 4"	(None)
	W12	12' 10" x 6' , 2' 6"	(None)
	W13	7' 10" x 6' , 2' 6"	(None)
	W14	3' 2" x 6' , 2' 6"	(None)
	W15	1' 7 1/2" x 6' , 2' 6"	(None)
Door			
	D01	12' 7" x 7'	(None)
	D02	3' 2" x 7'	(None)

OK Cancel Help

Selected Assembly

Workshops - Space Models Windows and Doors



Assign Windows and Doors

Space Model Properties - [06 Medical Office CLASS ASSEMBLIES AND WINDOWS DONE]

General | Spaces | Zoning | Assemblies | **Windows & Doors**

Opening Type	Tag	Width x Height, Elevation	Selected Assembly
Window			
	W01	5' 3" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W02	10' x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W03	17' 4" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W04	6' 8" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W05	8' 11" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W06	42' 8" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W07	21' 2" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W08	8" x 8' 2", 4"	2016 Zone 2 Metal framing, fixed
	W09	14' x 8' 2", 4"	2016 Zone 2 Metal framing, fixed
	W10	11' 2" x 8' 2", 4"	2016 Zone 2 Metal framing, fixed
	W11	11' 4" x 8' 2", 4"	2016 Zone 2 Metal framing, fixed
	W12	12' 10" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W13	7' 10" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W14	3' 2" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
	W15	1' 7 1/2" x 6', 2' 6"	2016 Zone 2 Metal framing, fixed
Door			
	D01	12' 7" x 7'	2016 Zone 2 Glass, metal framing, entrance door
	D02	3' 2" x 7'	2016 Zone 2 Opaque, swinging

Opening ID

OK Cancel Help



Create and Assign Windows and Doors

General

Spaces

Zoning

Assemblies

Windows & Doors

Opening Type	Tag	Width x Height, Elevation	Selected Assembly
Window			
	W01	5'3" x 6', 2'6"	(None)
	W02	10' x 6', 2'6"	(None)
	W03	17'4" x 6', 2'6"	(None)
	W04	6'8" x 6', 2'6"	(None)
	W05	8'11" x 6', 2'6"	(None)
	W06	42'8" x 6', 2'6"	(None)
	W07	21'2" x 6', 2'6"	(None)
	W08	8" x 8'2", 4"	(None)
	W09	14' x 8'2", 4"	(None)
	W10	11'2" x 8'2", 4"	(None)
	W11	11'4" x 8'2", 4"	(None)
	W12	12'10" x 6', 2'6"	(None)
	W13	7'10" x 6', 2'6"	(None)
	W14	3'2" x 6', 2'6"	(None)
	W15	1'7 1/2" x 6', 2'6"	(None)
Door			
	D01	12'7" x 7'	(None)
	D02	3'2" x 7'	(None)
	D03	3'2" x 7'	(None)



OK

Cancel

Help

Opening ID



Type here to search



Table of Contents

4:33 PM

12/22





Summary of Tasks

1. We assigned windows and doors by opening the drop-down list and selecting an existing assembly from the project library
2. An alternate approach would be to Create New Windows and doors on the fly and automatically assign it to the space model



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FINISHED SPACE MODEL



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Workshops - Space Model Completed

Linking the Completed Space Model to our CLASS FINISHED Building



Space Model Properties - [07 Medical Office CLASS FINISHED]

General | Spaces | Zoning | Assemblies | Windows & Doors

Space Model Name: 07 Medical Office CLASS FINISHED

Associated Building: 19 Medical Office CLASS FINISHED

Notes:

We use 07 CLASS FINISHED Space Model

Linked it to the 19 CLASS FINISHED Building (from Building Floor Plans)

Summary of Tasks

1. We completed the Space Model
2. We linked the finished space model to the finished Building from Building Floor Plans



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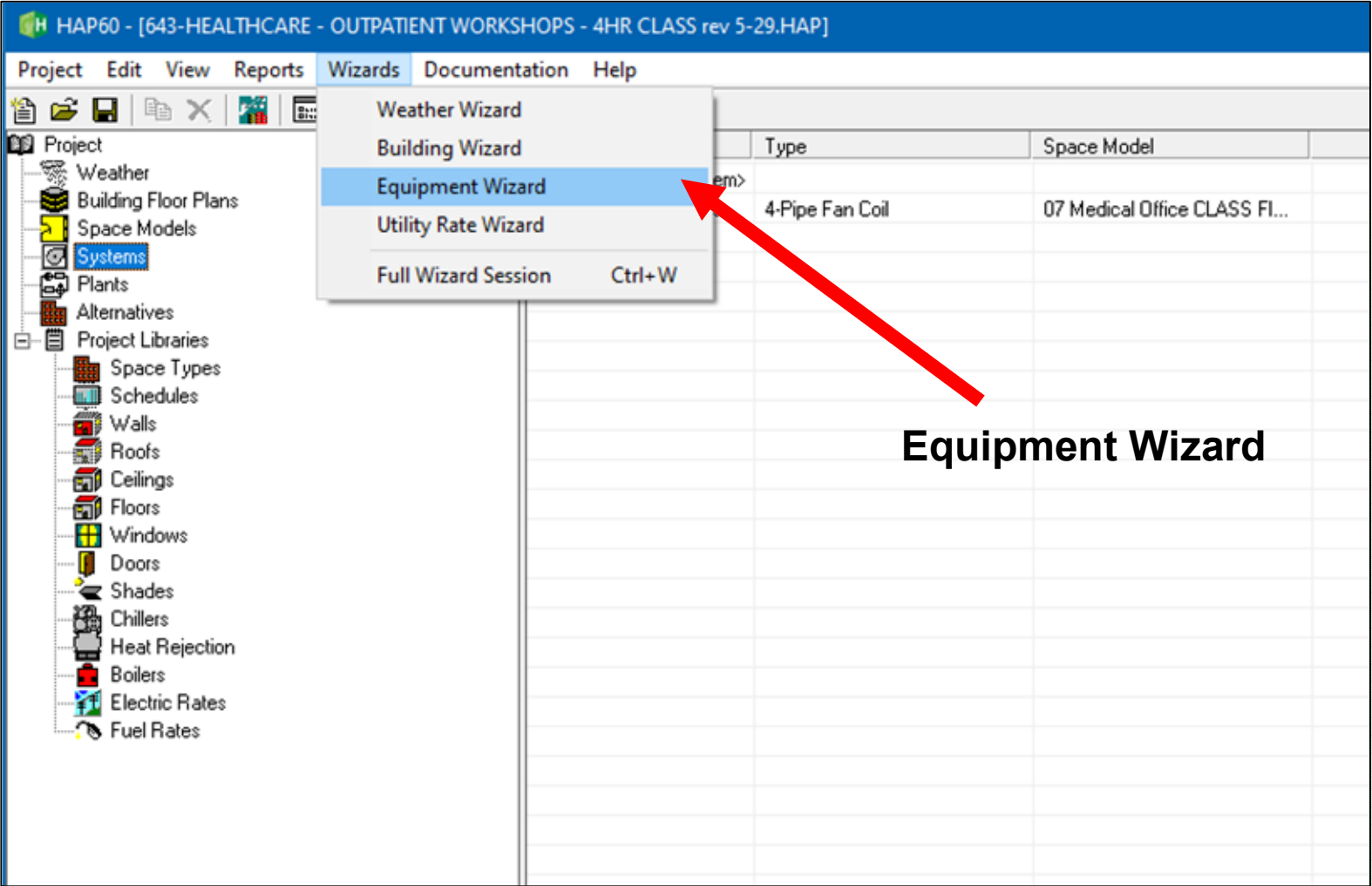
SYSTEMS, PLANTS,
ALTERNATIVES



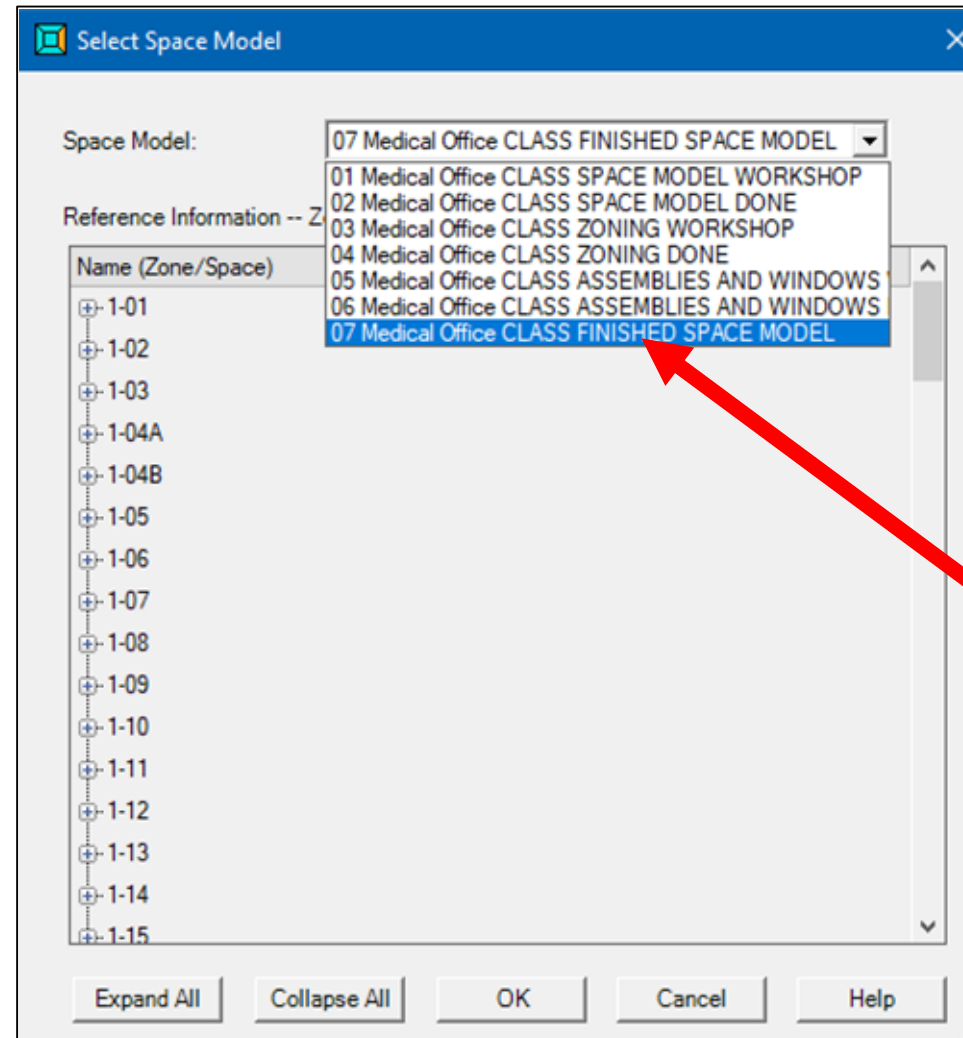
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Using Equipment Wizard to Configure an Alternative

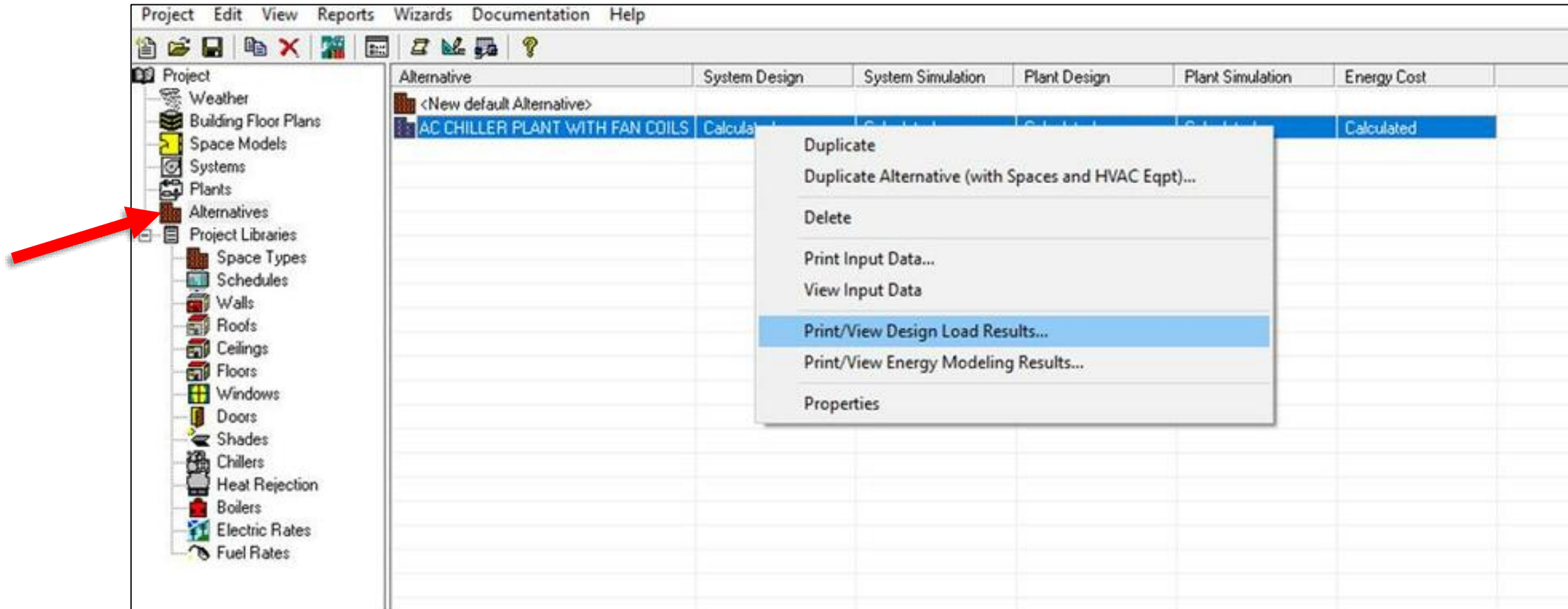


Assigning Finished Space Model to the Air System



**Select the Finished
Space Model**

Calculate All Reports at the Alternatives Level



The logo for HAP v6 is a green 3D cube. On the left face, there is a white circular arrow icon. The letters 'HAP' are displayed on the front face in white, and 'v6' is displayed below them in yellow.

Air System Heat Balance Summary



Air System Heat Balance Summary for AC Chiller Fan Coils

Project: 707-HEALTHCARE - OUTPATIENT WORKSHOPS - 4HR CLASS r...

Prepared by: Carrier

Table 1. System Loads

	DESIGN COOLING - AUGUST 16:00			DESIGN HEATING		
	OA DB / WB 108.5 F / 67.5 F			OA DB / WB 31.7 F / 26.5 F		
COMPONENT LOADS	Details	Sensible [BTU/hr]	Latent [BTU/hr]	Details	Sensible [BTU/hr]	Latent [BTU/hr]
Zone Conditioning	-	636208	-9955	-	172598	0
Plenum Load	-	0	0	-	0	0
Exhaust Fan Load	5564 CFM	0	-	5564 CFM	0	-
Ventilation Fan Load	6037 CFM	167900	-53437	6037 CFM	192945	0
Ventilation Fan Load	6037 CFM	15661	-	6037 CFM	-15661	-
Zone Fan Coil Fans Load	-	6889	-	-	-4615	-
>> Total System Loads	-	828655	-63392	-	345267	0
Cooling Coil	-	125187	0	-	0	0
Heating Coil	-	0	-	-	109421	-
Terminal Unit Cooling	-	645096	41892	-	0	0
Terminal Unit Heating	-	0	-	-	167989	-
>> Total Conditioning	-	770283	41892	-	277416	0
Key:	Positive values are cooling loads Negative values are heating loads			Positive values are heating loads Negative values are cooling loads		

Table 2. Zone Heat Balance Loads

	DESIGN COOLING - AUGUST 16:00			DESIGN HEATING		
	OA DB / WB 108.5 F / 67.5 F			OA DB / WB 31.7 F / 26.5 F		
Zone Heat Balance Component	Details	Sensible [BTU/hr]	Latent [BTU/hr]	Details	Sensible [BTU/hr]	Latent [BTU/hr]
Exterior Wall Convection	6738 sqft	34408	-	6738 sqft	17321	-
Roof Convection	0 sqft	0	-	0 sqft	0	-
Window Convection	4324 sqft	61648	-	4324 sqft	36795	-
Skylight Convection	0 sqft	0	-	0 sqft	0	-
Door Convection	199 sqft	2328	-	199 sqft	1886	-
Floor Convection	37062 sqft	89990	-	37062 sqft	36655	-
Interior Wall Convection	77633 sqft	114016	-	77633 sqft	28795	-
Ceiling Convection	37066 sqft	139666	-	37066 sqft	39073	-
Overhead Lighting Convection	79642 W	40219	-	0 W	0	-
Task Lighting Convection	0 W	0	-	0 W	0	-
Electric Equipment Convection	49115 W	125690	-	0 W	0	-
People Convection	422	31007	86267	0	0	0
Infiltration	0 CFM	0	0	0 CFM	0	0
Miscellaneous Equipment	-	0	0	-	0	0
DOAS Ventilation	6037 CFM	0	-	6037 CFM	0	-
Air Internal Energy Change	-	0	-	-	0	-
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	638973	86267	-	160505	0
Key:	Positive values are cooling loads Negative values are heating loads			Positive values are heating loads Negative values are cooling loads		

Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.

Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.

Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.

Zone Heat Balance “Convection” Notes



Zone Heat Balance Component	Details	Sensible [BTU/hr]	Latent [BTU/hr]	Details	Sensible [BTU/hr]	Latent [BTU/hr]
Exterior Wall Convection	8738 sqft	34408	-	8738 sqft	17321	
Roof Convection	0 sqft	0	-	0 sqft	0	
Window Convection	4324 sqft	61648	-	4324 sqft	36795	
Skylight Convection	0 sqft	0	-	0 sqft	0	
Door Convection	199 sqft	2328	-	199 sqft	1866	
Floor Convection	37062 sqft	89990	-	37062 sqft	36655	
Interior Wall Convection	77633 sqft	114016	-	77633 sqft	28795	
Ceiling Convection	37066 sqft	139666	-	37066 sqft	39073	
Overhead Lighting Convection	79642 W	40219	-	0 W	0	
Task Lighting Convection	0 W	0	-	0 W	0	
Electric Equipment Convection	49115 W	125690	-	0 W	0	
People Convection	422	31007	86267	0	0	
Infiltration	0 CFM	0	0	0 CFM	0	
Miscellaneous Equipment	-	0	0	-	0	
DOAS Ventilation	6037 CFM	0	-	6037 CFM	0	
Air Internal Energy Change	-	0		-	0	
Safety Factor	0% / 0%	0	0	0%	0	
>> Total Zone Loads	-	638973	86267	-	160505	
Key:	Positive values are cooling loads Negative values are heating loads			Positive values are heating loads Negative values are cooling loads		
Note 1: Surface convection line items show the combined effects of conductive heat gain to the surface and radiative heat gains absorbed at the surface which are then convected to room air.						
Note 2: Lighting, equipment, and people line items include only the direct convective heat gain from the heat source to the room air. The radiative portion of the heat gain is first absorbed by surfaces in the room and then later convected from the surface to the air. Therefore the effect of the radiative portion of the heat gain is found in the surface convection line items.						
Note 3: Solar heat gain is absorbed by surfaces in the room, re-radiated to other surfaces, and finally convected from the surfaces to room air. Therefore, the effect of solar heat gain is found in the surface convection line items.						

Energy Modeling Reports



Energy Modeling Report Options

Alternative Reports (0) | Plant Reports (0) | **System Reports (1)**

System Selections:

Alternative	System
AC CHILLER PLANT W	AC Chiller Fan Coils

Reports

	Table	Graph	CSV	Time Specification
Monthly Simulation Results	☐	☐	☐	Unconditioned Space Peak Temps
Daily Simulation Results	☐	☐	☐	
Hourly Simulation Results	☐	☐	☐	
Zone Temperature Report	☐	☐	☐	
Uncond. Space Peak Temps.	☒	☐	☐	

Graph Specifications:

☐ Precool Coil Load (kBTU)
☐ Preheat Coil Load (kBTU)
☐ Terminal Cooling Coil Load (kBTU)
☐ Terminal Heating Coil Load (kBTU)
☐ Ventilation Fan (kWh)
☐ Terminal Fan (kWh)
☐ Air-to-Air Energy Recovery (kWh)
☐ Lighting (kWh)
☐ Electric Equipment (kWh)

Select up to 3 data items for the graph. All must have the same units of measure

Note: Graph options are only available when a single system has been selected.

Clear All Selections

☐ Return to Report Selection After Printing/Viewing

Print

Preview

Cancel

Help

Unconditioned Space Peak Temps Report



Unconditioned Space Peak Temperatures for AC CHILLER PLANT WITH FAN COILS
Project: 707-HEALTHCARE - OUTPATIENT WORKSHOPS - 4HR CLASS r...
Prepared by: Carrier 2:09 PM

1. Return Air Plenums
None

2. Unconditioned Spaces

Space Name	Level	Maximum Temperature		Minimum Temperature	
		(F)	Date & Time	(F)	Date & Time
Elevator Shaft - 1	Level 1	96.9	Aug 25, 15:00	68.5	Jan 01, 05:00
Mech Shaft - 1A	Level 1	78.8	Aug 25, 17:00	67.7	Jan 01, 08:00
J228 - Roof Hatch	Level 2	80.0	Jul 10, 01:00	64.8	Jan 01, 08:00
Mech Shaft - 2C	Level 2	80.4	Jul 09, 23:00	64.3	Jan 01, 08:00
Mech Shaft - 2B	Level 2	79.9	Jul 10, 02:00	64.9	Jan 01, 08:00
Elevator Shaft - 2	Level 2	96.7	Jun 30, 15:00	65.8	Jan 01, 05:00
2001A - Elevator Controls	Level 2	80.5	Jun 30, 17:00	64.9	Jan 01, 08:00
Mech Shaft - 2A	Level 2	80.9	Jun 30, 17:00	65.1	Jan 01, 08:00

3. Non-Circulating Ceiling Spaces

Ceiling Space	Level	Maximum Temperature		Minimum Temperature	
		(F)	Date & Time	(F)	Date & Time
CeilingSpace_1	Level 1	80.8	Jul 03, 14:00	66.6	Jan 01, 07:00
CeilingSpace_2	Level 2	90.5	Jun 29, 14:00	58.4	Jan 01, 07:00

4. Non-Circulating Raised Floor Spaces
None

5. Non-Circulating Attic Spaces
None



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