eSim2022 BTAP Workshop Exercise Instructions

Chris Kirney

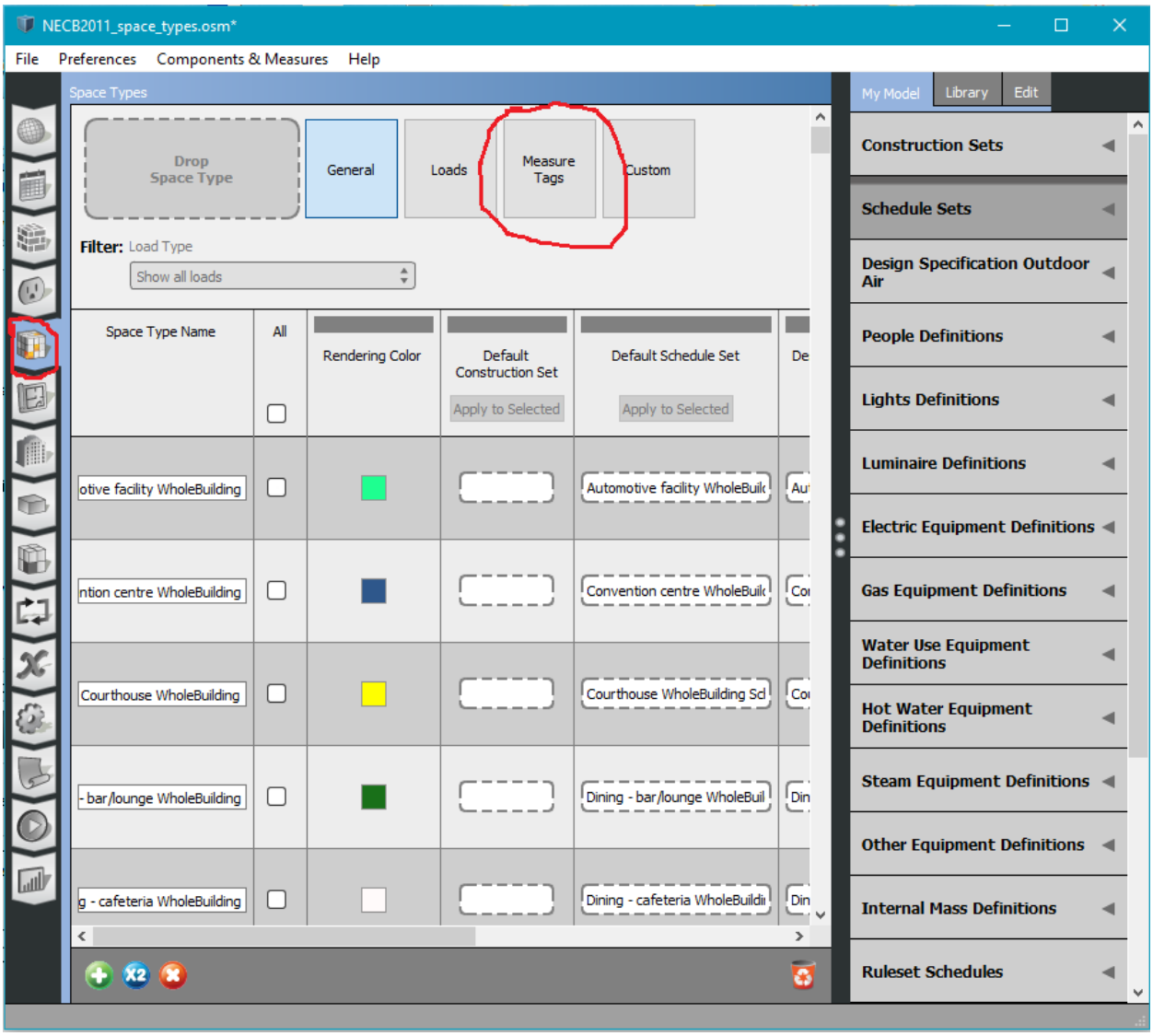
2022-06-15

Exercise 1:

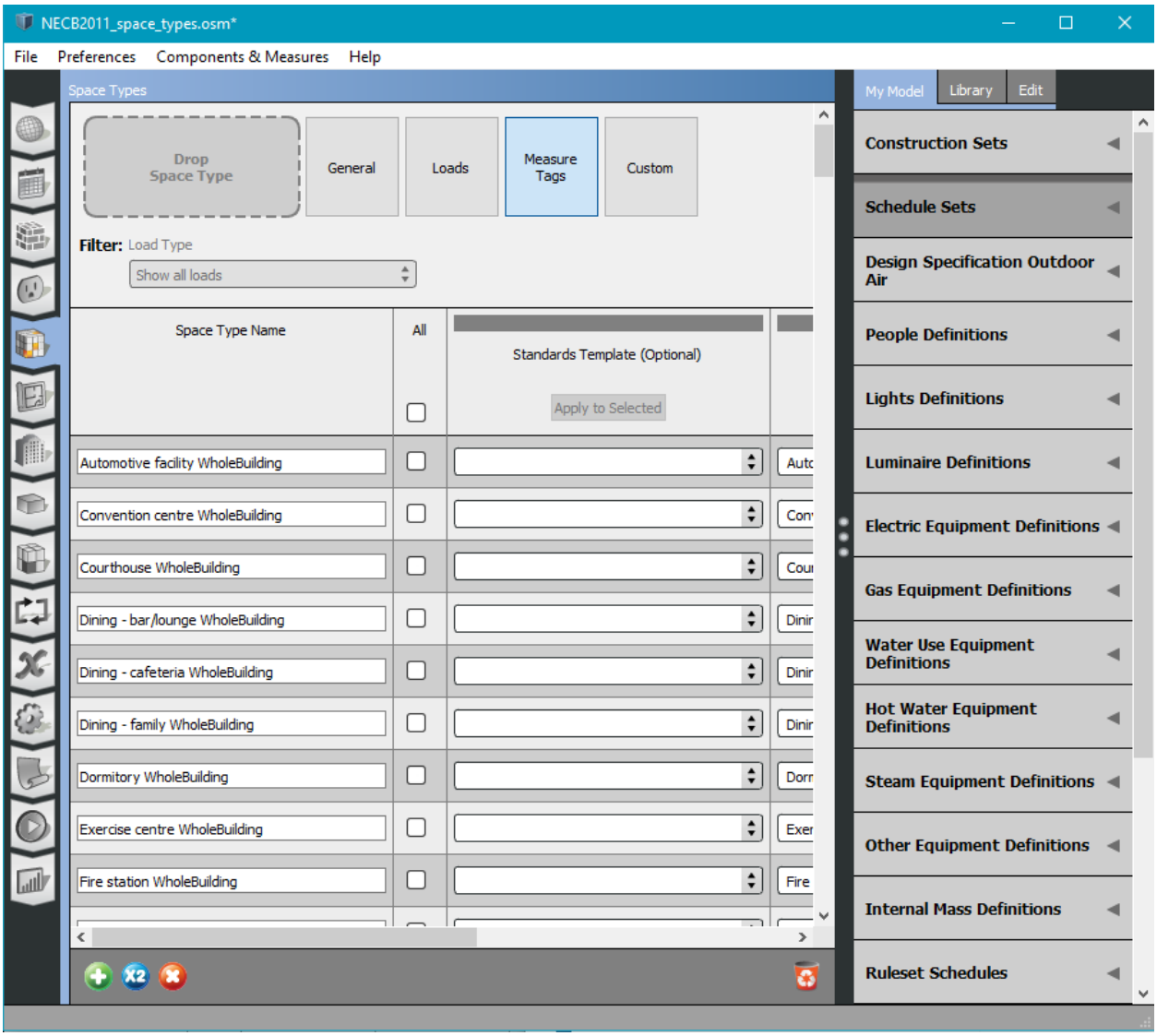
If you don't like any of the stock building types available in BTAP, you can use your own OpenStudio model by using the following steps. Creating geometries is beyond the scope of this exercise but there are many tutorials online that can help guide you. This exercise assumes that you have an OpenStudio 3.2.1 (or previous) file containing the geometry of the building you want to model. The surfaces and sub-surfaces in this model should all be correctly defined and matched appropriately. The building stories should be correctly defined and each space should be assigned a building story. The 'Standards Number of Stories' and 'Standards Number of Above Ground Stories' (in the facilities tab) should also be correctly defined. Finally, the model should be not have anything else in it (no constructions, thermal zones, schedules, loads, HVAC, service hot water, etc.)

In this exercise we will modify an OpenStudio file with just a geometry to be used with BTAP.

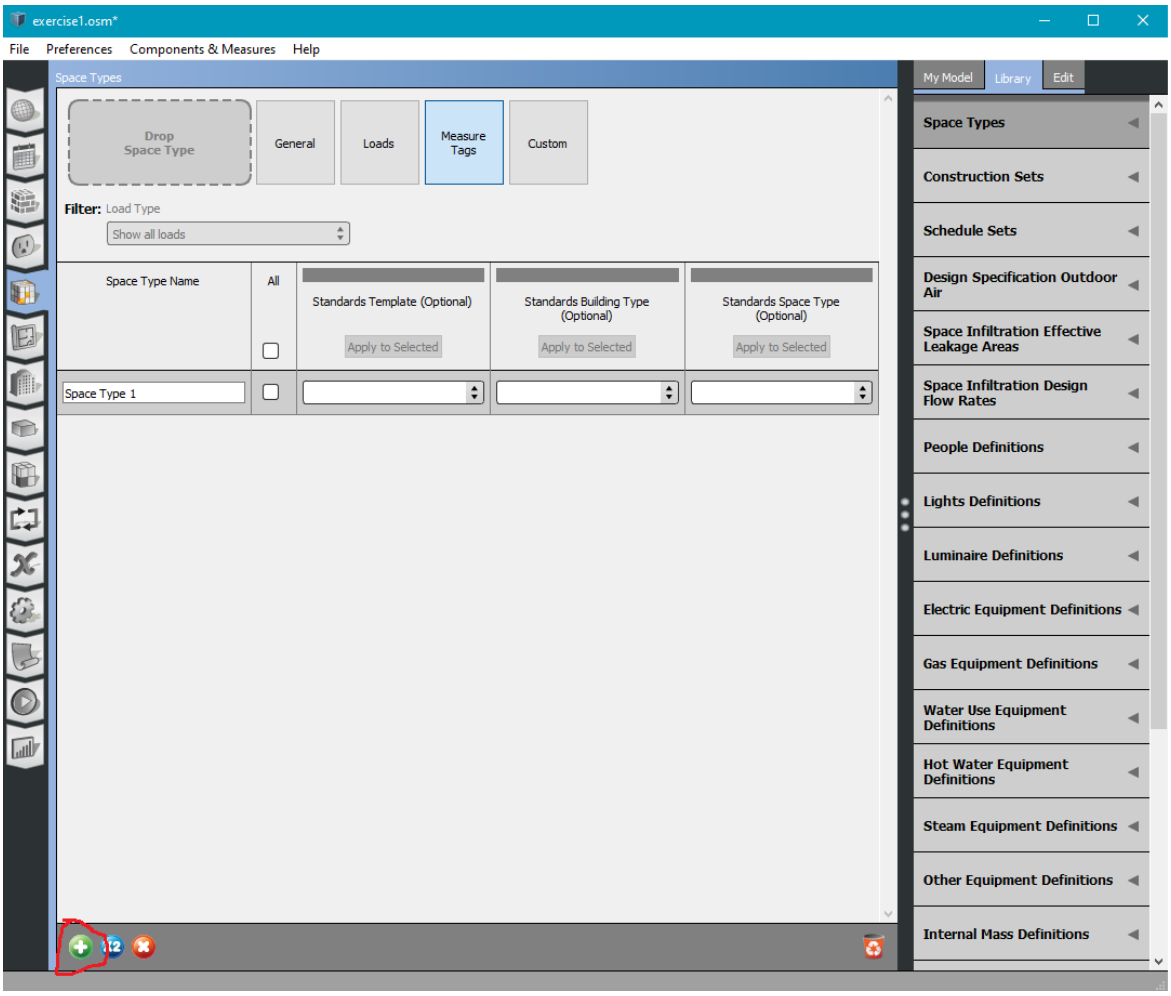
1. In the OpenStudioApp open the '/btap_batch/esim2022/resources/space_type_libary/NECB2011_space_types.osm' file (File>>Open>> btap_batch/esim2022/resources/space_type_libary/NECB2011_space_types.osm).
2. When asked if you want to save changes select 'Discard'.
3. On the left side of the OpenStudioApp window select the 'Space Types' menu and then select the 'Measure Tags' tab (see below)



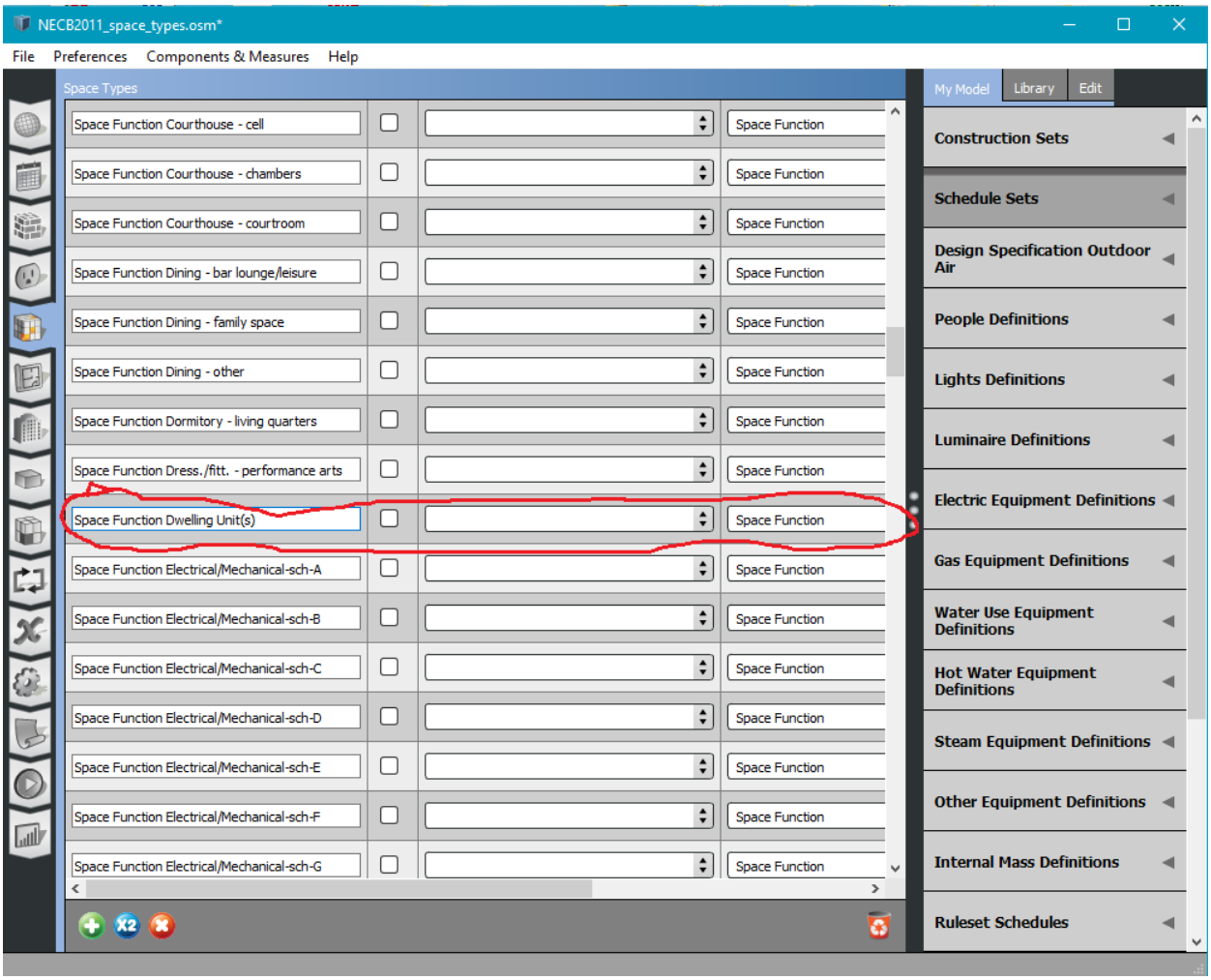
4. The screen may take a little while to open. When it does it should look like the following:



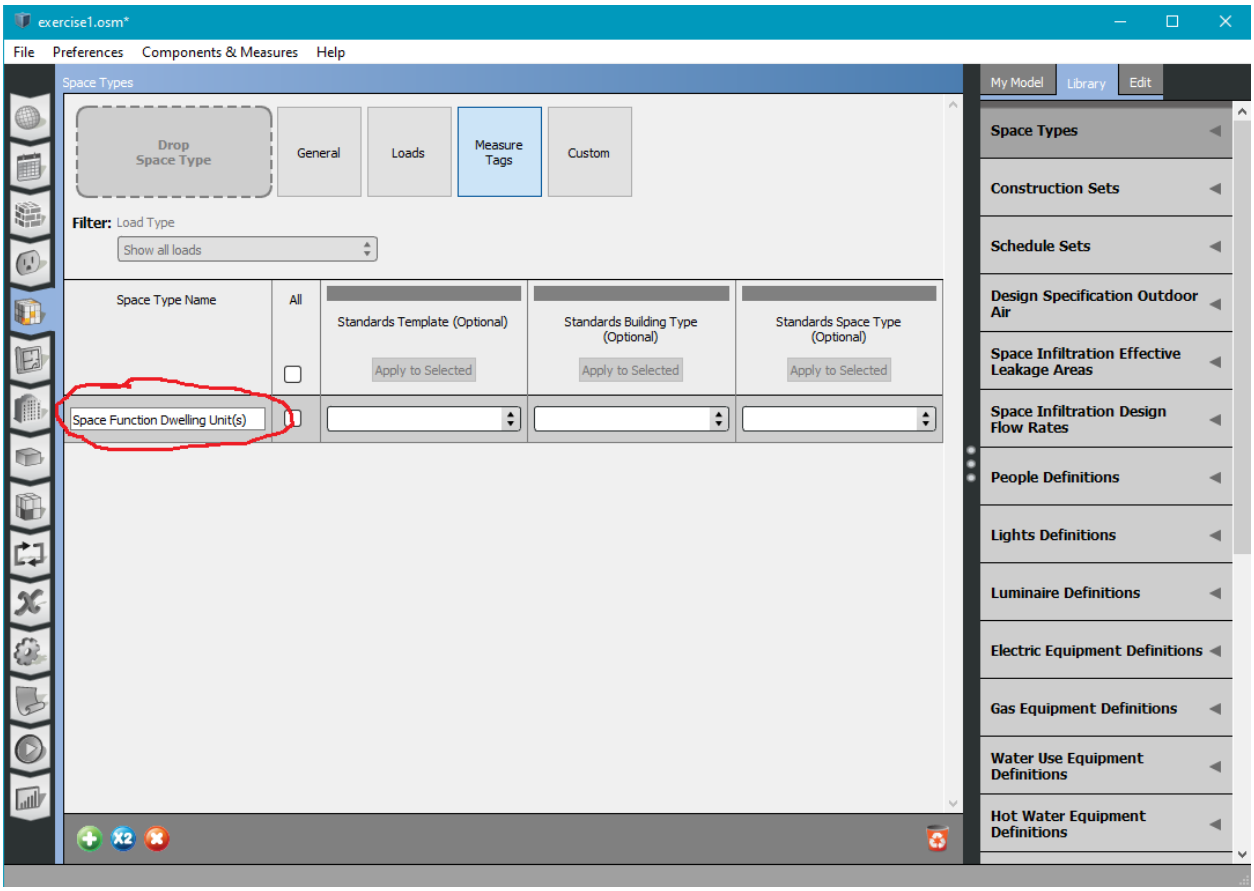
5. This screen shows all of the available NECB 2011 space types in BTAP. There are two types: 'WholeBuilding' and 'Space Function'. The 'WholeBuilding' space types are intended to be used for an entire model. However, they are not fully implemented in BTAP yet so please do not use them. The 'Space Function' space types are intended to be used to define how individual spaces in a model are used. We will be using 'Space Function' space types for the remainder of this exercise.
6. Open a new instance of the OpenStudioApp and open the '/btap_batch/esim2022/exercise1.osm' file (File>>Open>>btap_batch/esim2022/exercise1.osm).
7. In the 'exercise1.osm' file go to the 'Measure Tags' tab in the 'Space Types' menu.
8. We will now add the space types we want to use in the 'exercise1.osm' file. To start, in the 'exercise1.osm' file click the little green + at the bottom of the screen to add a new space type (see below):



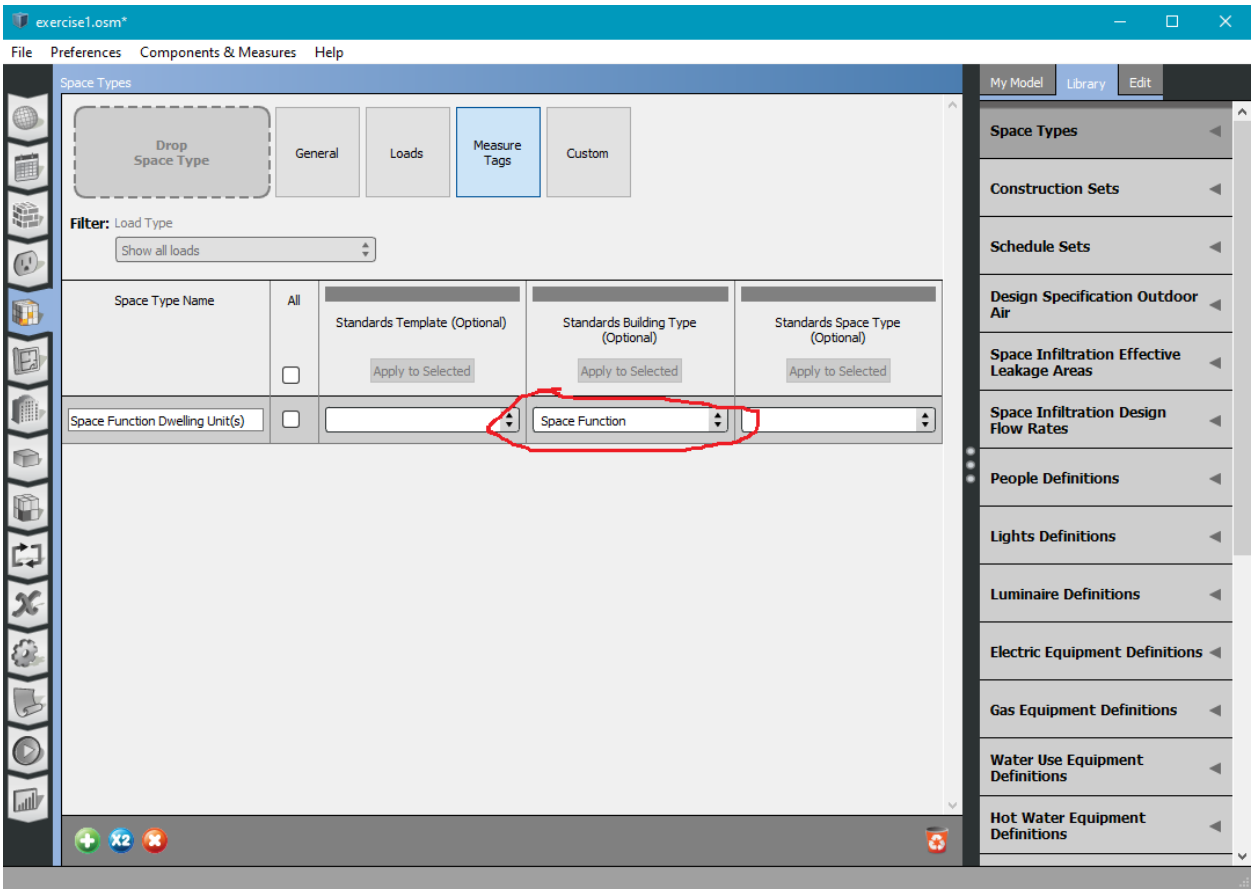
9. Go back to the 'NECB2011_space_types.osm' file and look for 'Space Function Dwelling Unit(s)' in the 'Space Type Name' column (see below):



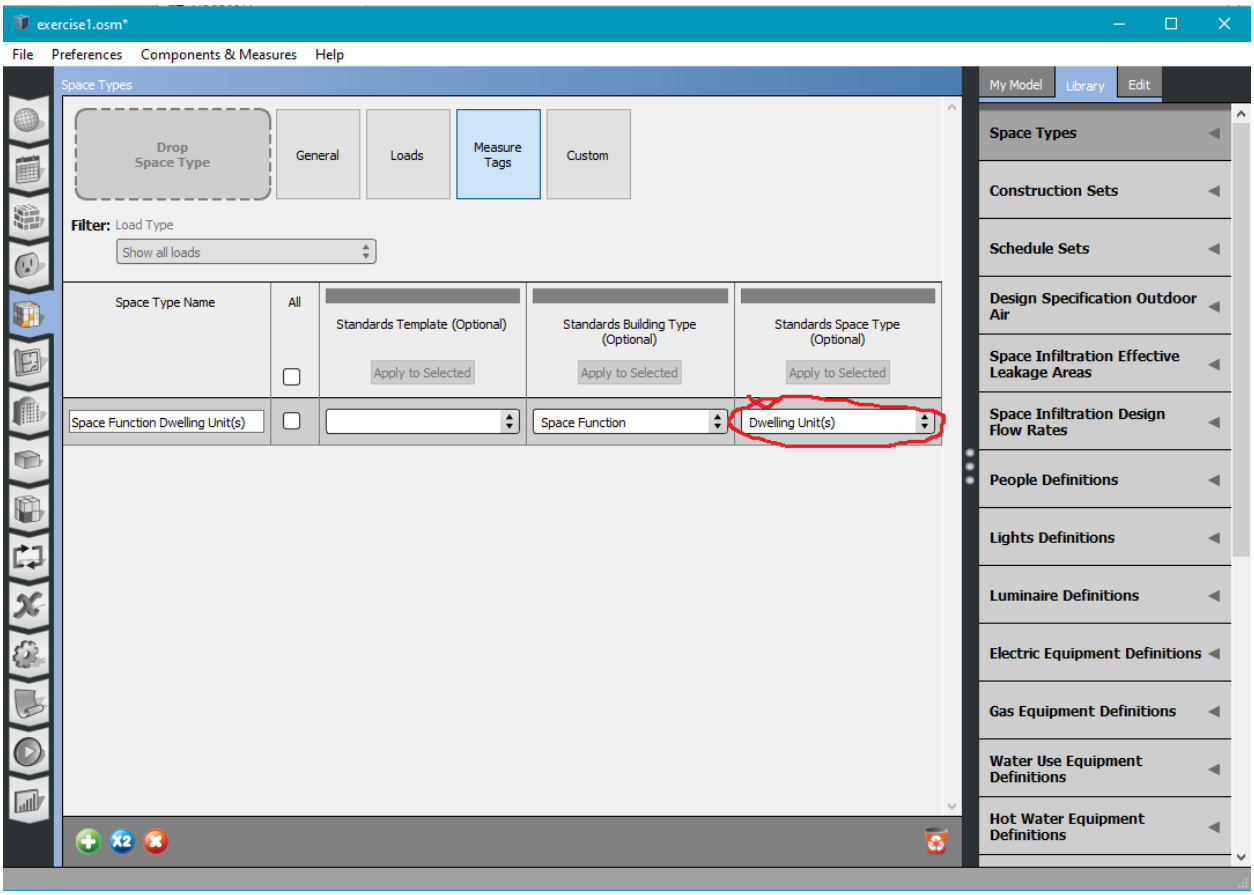
10. Copy the ‘Space Function Dwelling Unit(s)’ name and then switch to the ‘exercise1.osm’. Replace ‘Space Type 1’ under the ‘Space Type Name’ column with ‘Space Function Dwelling Units(s)’ (see below):



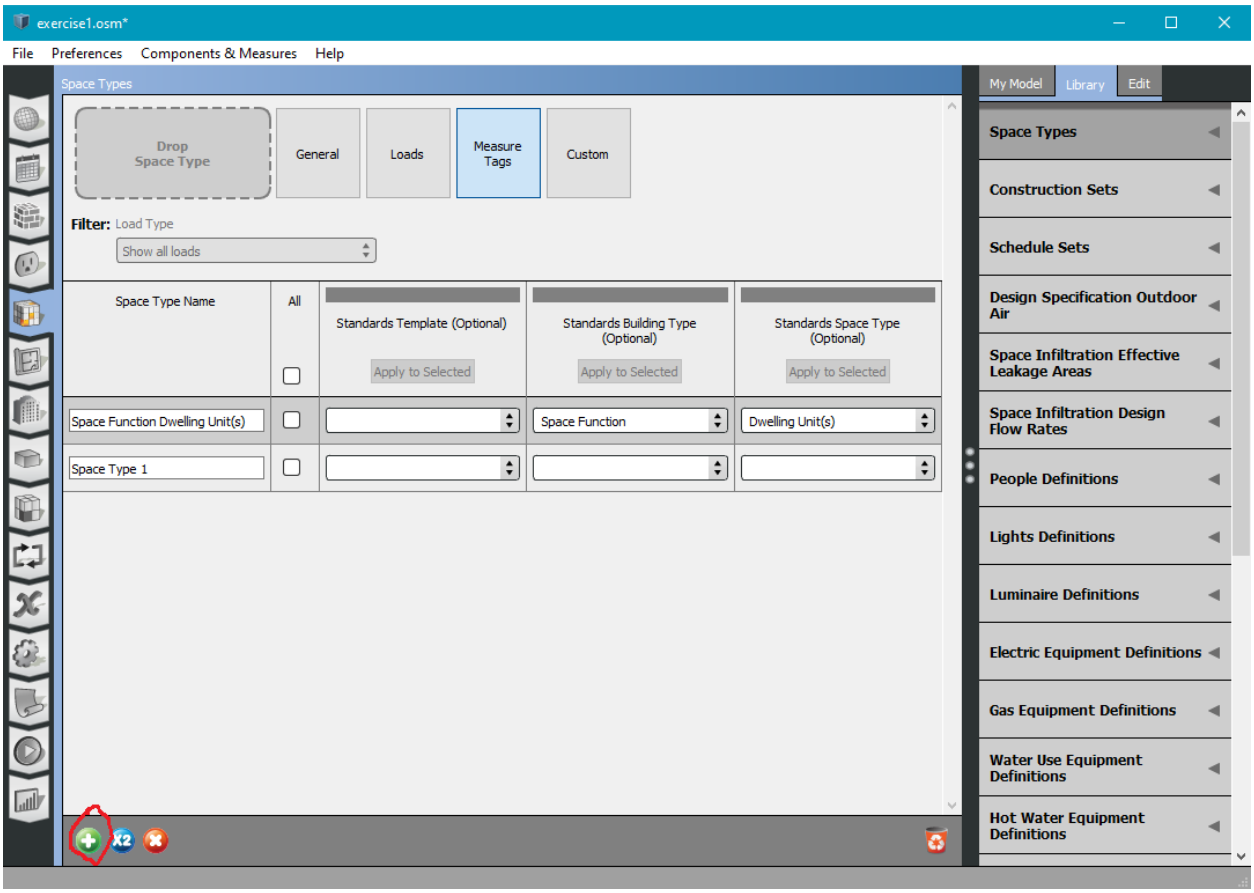
11. In the ‘exercise1.osm’ file type ‘Space Function’ in the empty box in the ‘Standard Building Type (Optional)’ column of the ‘Space Function Dwelling Units(s)’ row (see below):



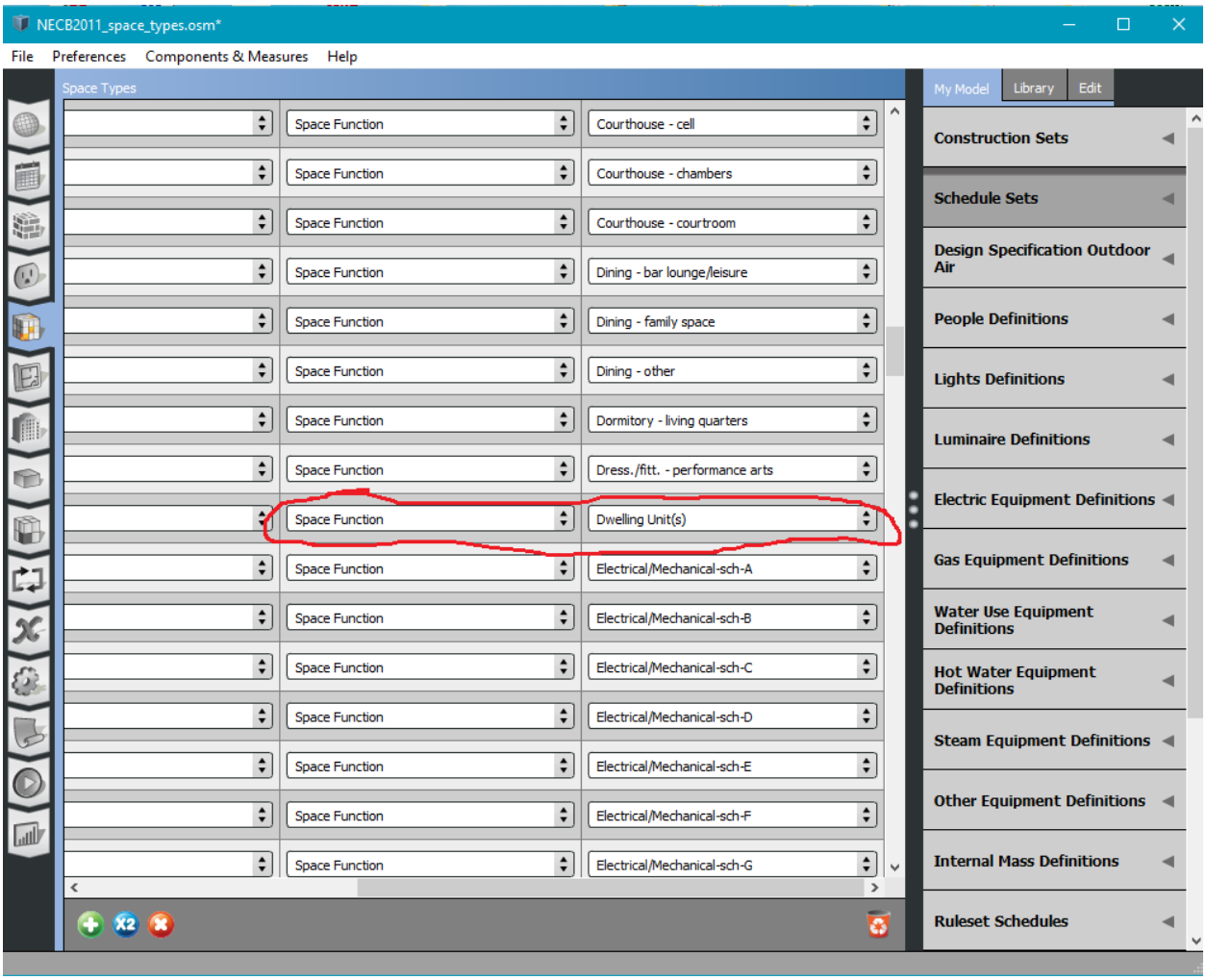
12. Add ‘Dwelling Units(s) in the empty box of the ‘Standards Space Type (Optional)’ column of the ‘Space Function Dwelling Unit(s) row (see below):



13. When you are done Add another space type by clicking on the little green '+' (see below):



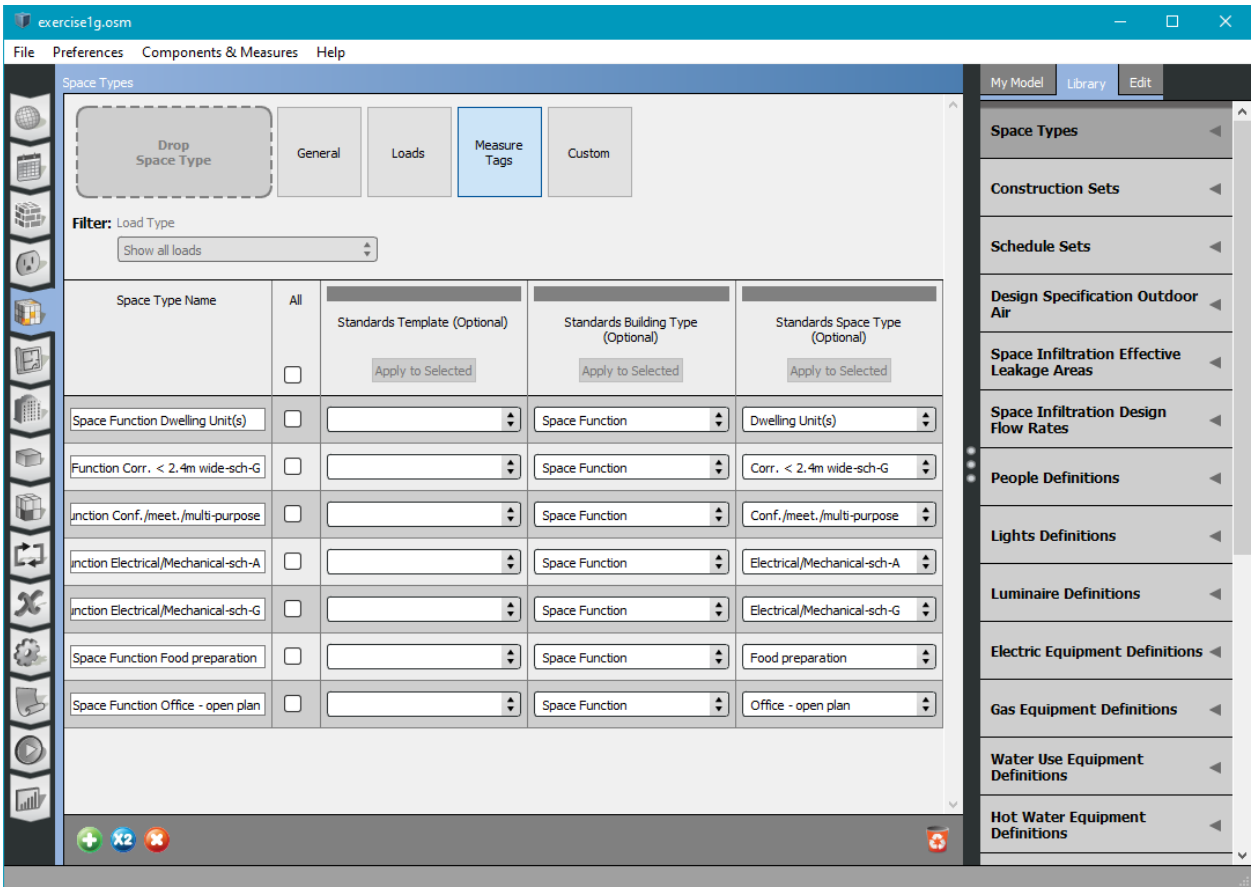
14. Save the modified ‘exercise1.osm’ file with a new name (File>>Save As>>exercise1a.osm).
15. Note that we added the first part of the space type name (‘Space Function’) in the ‘Standards Building Type (Optional)’ column.
16. Also note that we added the second part of the space type name (‘Dwelling Units(s)’) in the ‘Standards Space Type (Optional)’ column.
17. If you go back to the ‘NECB2011_space_types.osm’ file you will notice that, for ‘Space Function Dwelling Unit(s)’, the same information is in the ‘Standards Building Type (Optional’) and ‘Standards Space Type (Optional’ columns (see below):



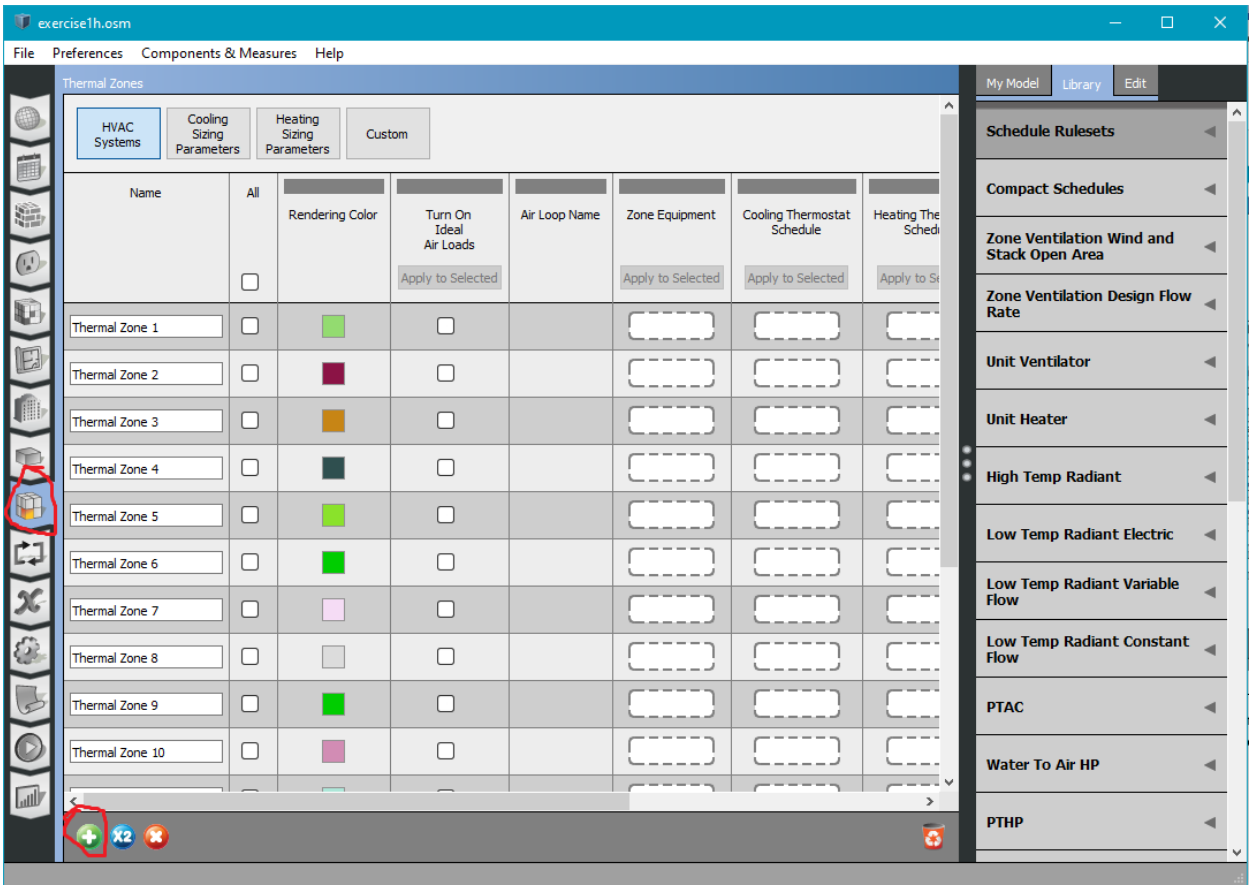
18. It is VERY IMPORTANT that what you added in the 'Standards Building Type (Optional)' and 'Standards Space Type (Optional)' columns of the 'exercise1.osm' file match what you found in the same columns in the 'NECB_space_types.osm' file. Make sure that the cases match and that there are no leading or trailing spaces. The reason for this is that BTAP will look for these names in its space type database to get the space type information.
19. Repeat steps 9 through 14 for the following 6 space types:

Space Type Name	Standards Building Type	Standards Space Type
Space Function Corr. < 2.4m wide-sch-G	Space Function	Corr. < 2.4m wide-sch-G
Space Function Conf./meet./multi-purpose	Space Function	Conf./meet./multi-purpose
Space Function Electrical/Mechanical-sch-A	Space Function	Electrical/Mechanical-sch-A
Space Function Electrical/Mechanical-sch-G	Space Function	Electrical/Mechanical-sch-G
Space Function Food preparation	Space Function	Food preparation
Space Function Office - open plan	Space Function	Office - open plan

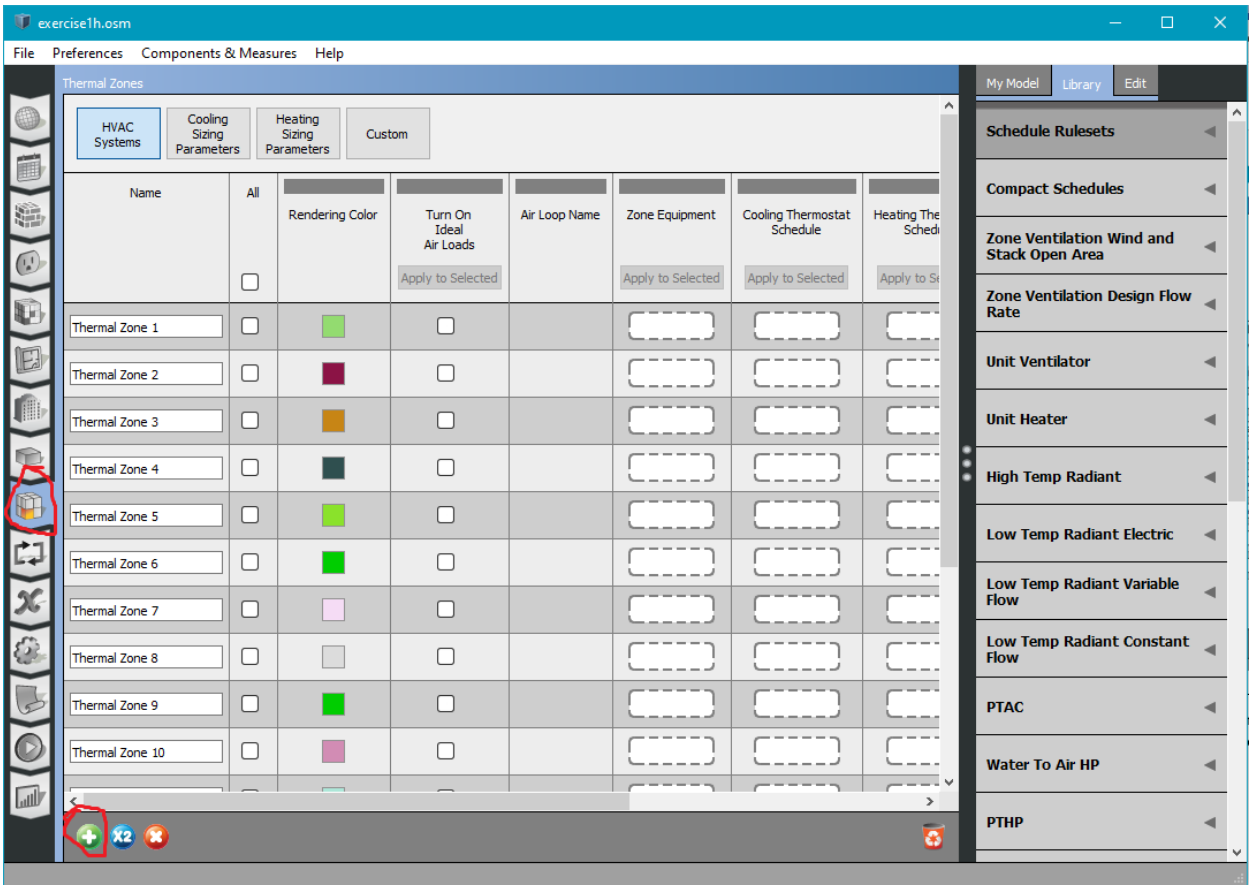
20. By the end, you should see something like the following:



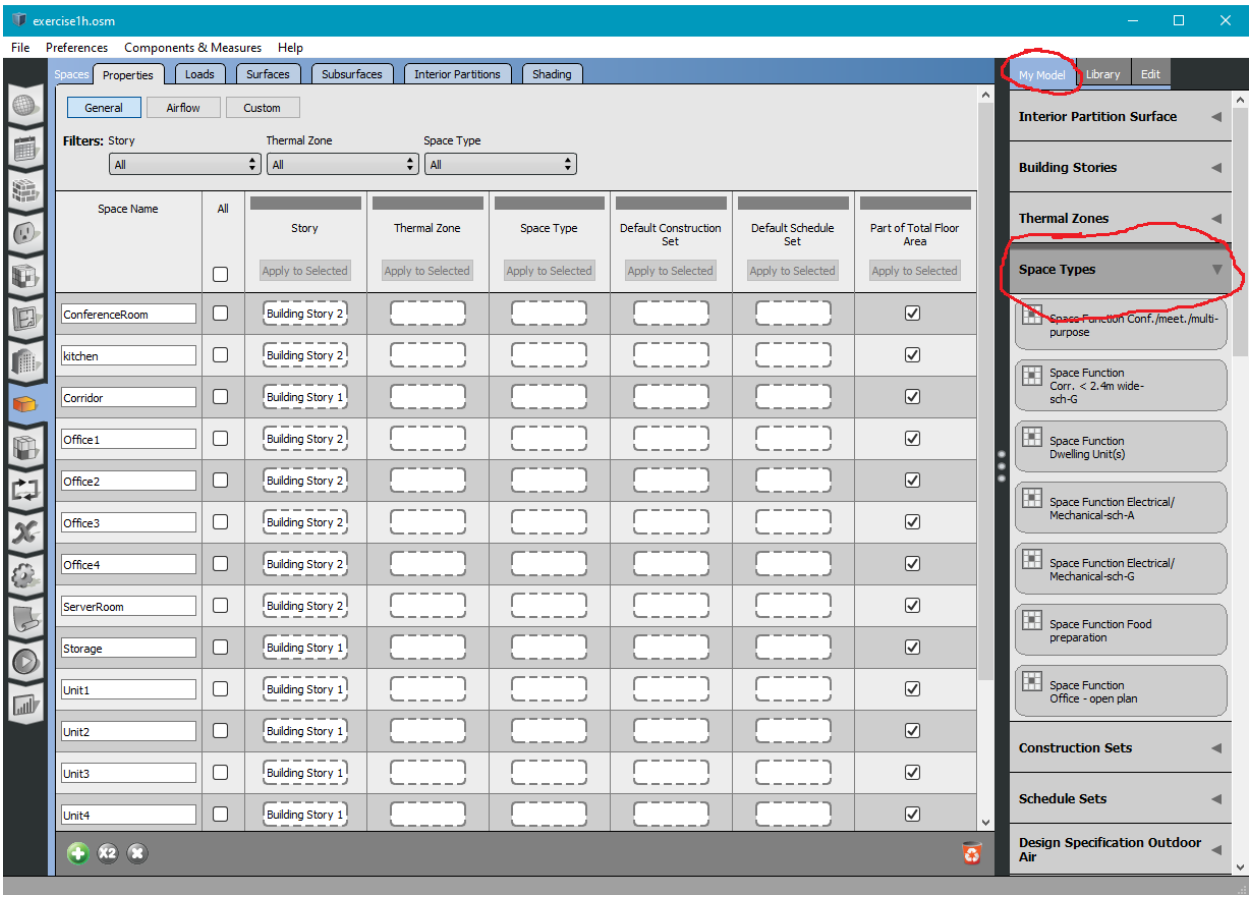
21. BTAP requires that every space has a thermal zone associated with it. These end of getting replaced later on however, initially they are necessary. In the exercise file click on the 'Thermal Zones' menu on the left. There are 17 spaces in the file so click the green + button until there are 17 thermal zones (see below):



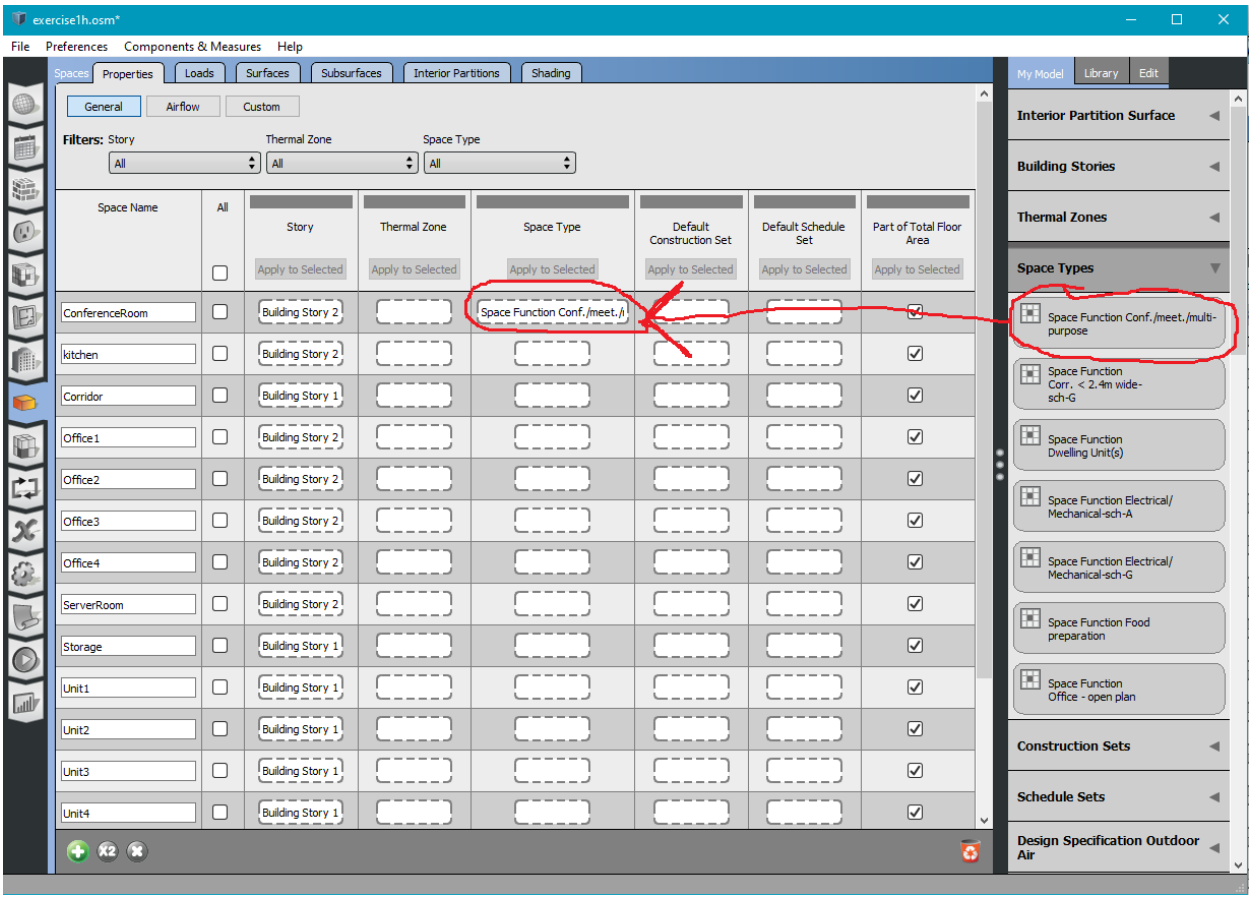
22. Save the file under a new name again (I'll use 'exercise1h.osm').
23. Select the 'Spaces' menu on the left (see below):



24. Now we have to assign each space a thermal zone and a space type. To do this click on the 'My Model' tab on the left hand side of the screen and click on 'Space Types' (see below):



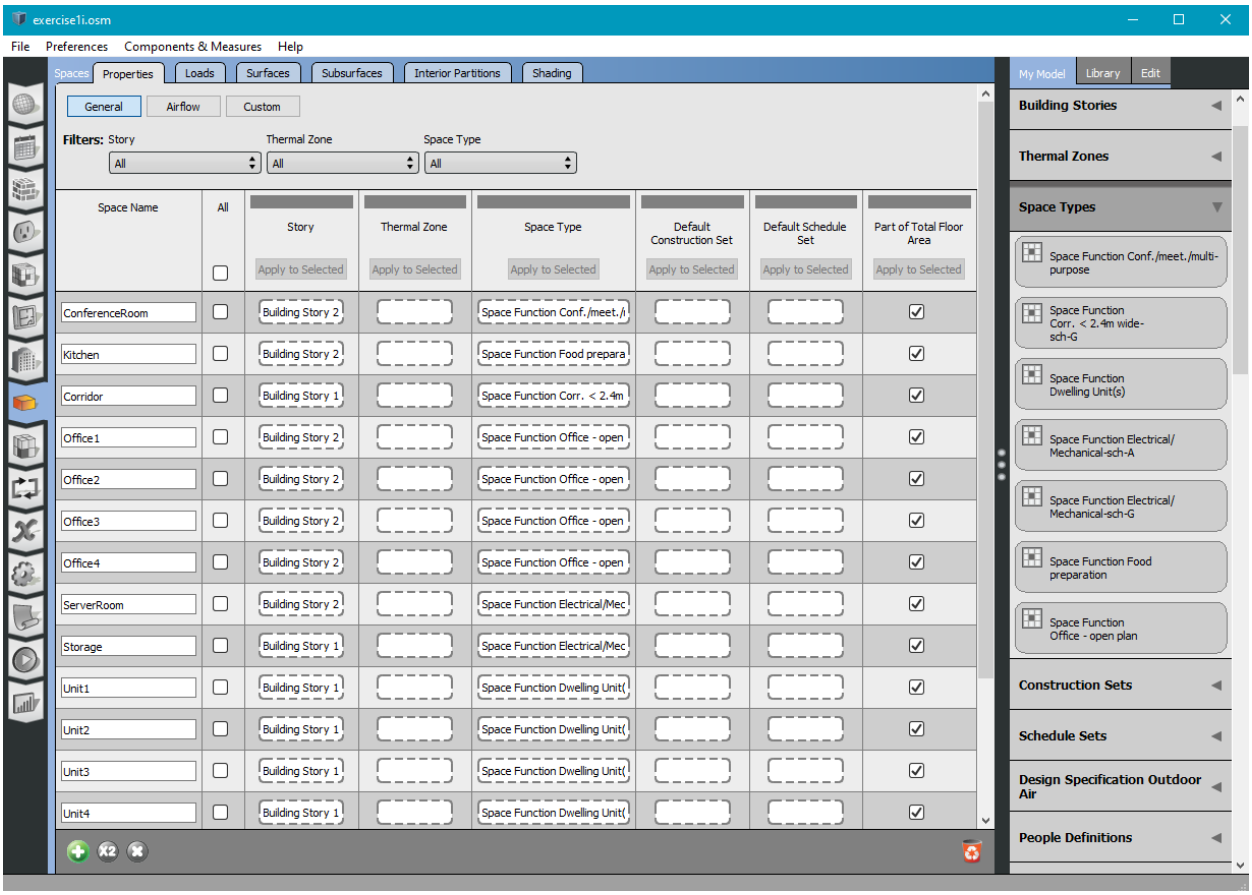
25. Look for the ‘Space Function Conf./meet./multi-purpose’ space type in the ‘Space Types’ drop-down menu then drag and drop it in the ‘Space Type’ Column spot for the ‘ConferenceRoom’ space (see below):



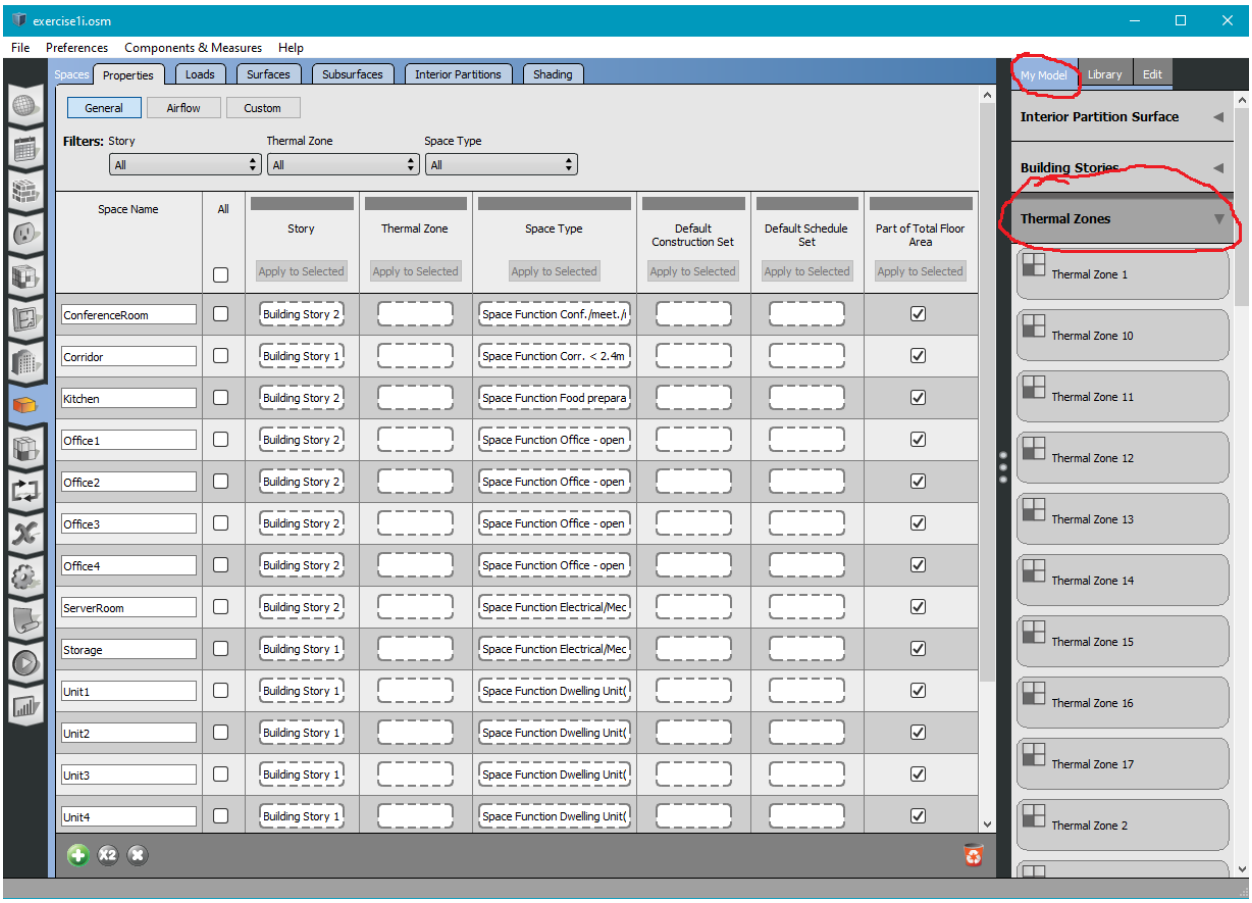
26. Repeat step 25 only assigning the space types to the spaces in the following table:

Space Name	Space Type
Kitchen	Food preparation
Corridor	Corr. < 2.4m wide-sch-G
Office1	Office - open plan
Office2	Office - open plan
Office3	Office - open plan
Office4	Office - open plan
ServerRoom	Electrical/Mechanical-sch-A
Storage	Electrical/Mechanical-sch-G
Unit1	Dwelling Unit(s)
Unit2	Dwelling Unit(s)
Unit3	Dwelling Unit(s)
Unit4	Dwelling Unit(s)
Unit5	Dwelling Unit(s)
Unit6	Dwelling Unit(s)
Unit7	Dwelling Unit(s)
Unit8	Dwelling Unit(s)

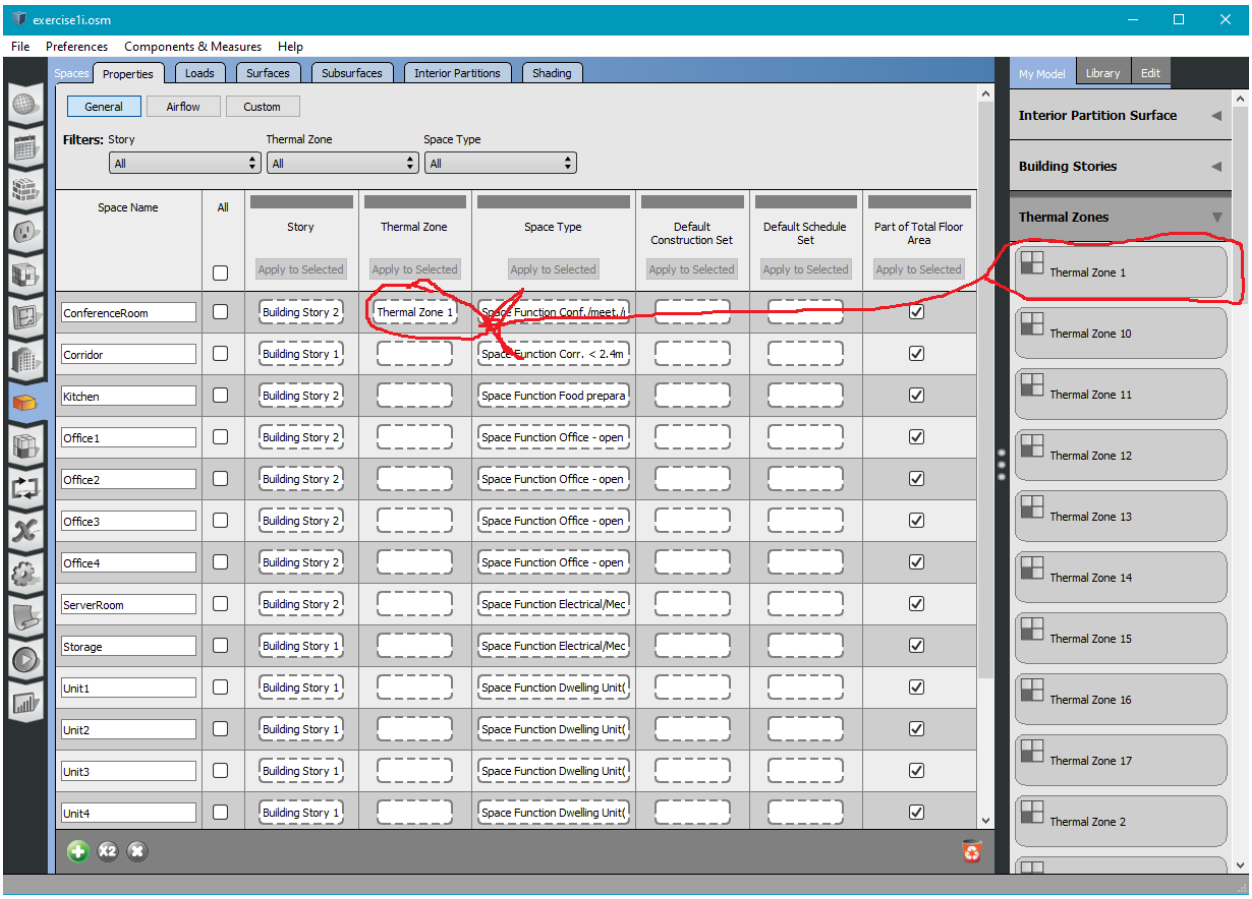
27. At the end you should see the following:



28. Now it is time to assign thermal zones. Under the 'My Model' heading (on the right side of the window) select the 'Thermal Zones' drop-down menu (see below):



29. Find ‘Thermal Zone 1’ and drag and drop it in the ‘Thermal Zone’ column spot in the ‘ConferenceRoom’ space (see below):

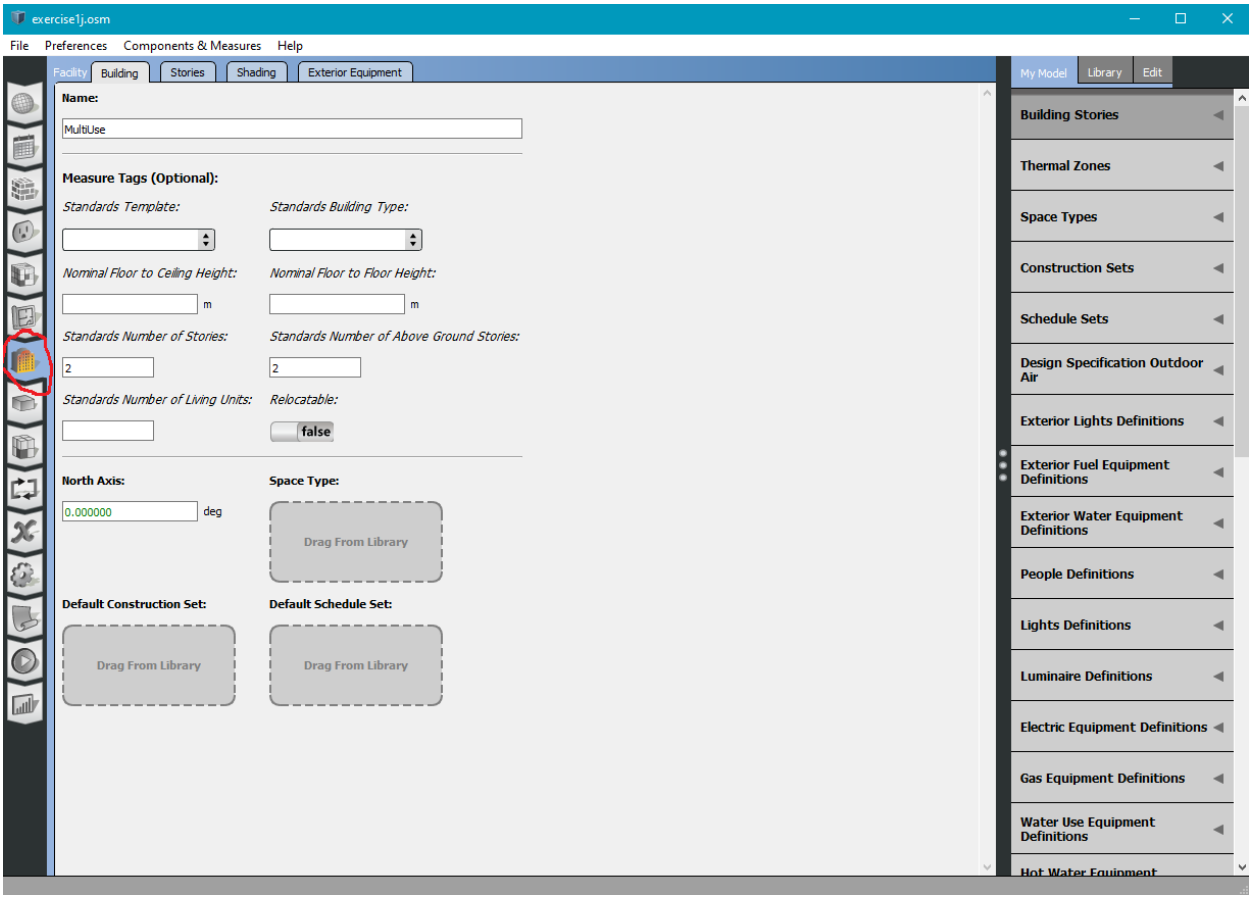


30. Repeat step 29 assigning the thermal zones to the spaces in the table below:

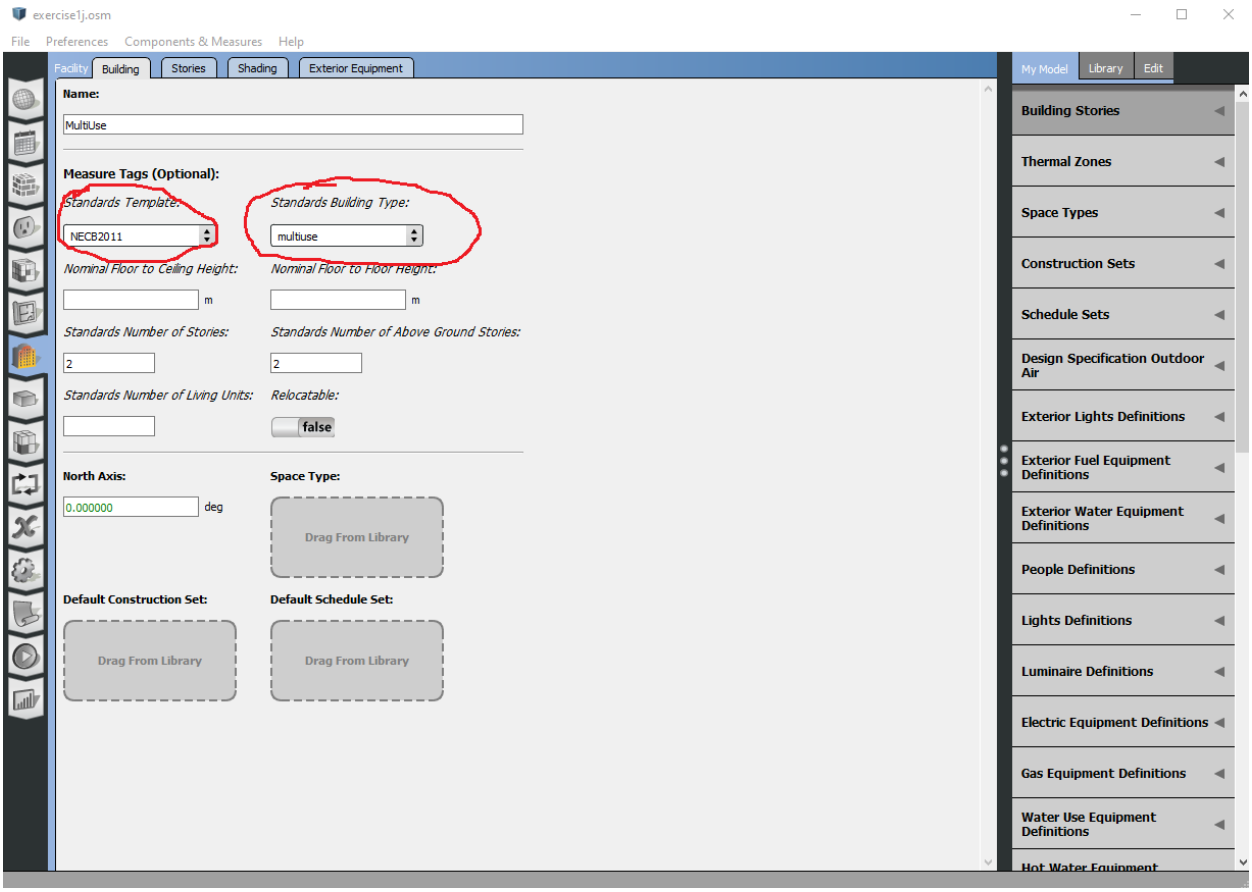
Space Name	Thermal Zone
Corridor	Thermal Zone 2
Kitchen	Thermal Zone 3
Office1	Thermal Zone 4
Office2	Thermal Zone 5
Office3	Thermal Zone 6
Office4	Thermal Zone 7
ServerRoom	Thermal Zone 8
Storage	Thermal Zone 9
Unit1	Thermal Zone 10
Unit2	Thermal Zone 11
Unit3	Thermal Zone 12
Unit4	Thermal Zone 13
Unit5	Thermal Zone 14
Unit6	Thermal Zone 15
Unit7	Thermal Zone 16
Unit8	Thermal Zone 17

31. It is a good idea to save the file again with a new name now (I'll use 'exercise1j.osm')

32. Now select the ‘Facilities’ menu on the left hand side of the Window (see below):



33. In the menu under ‘Standards Template:’ select ‘NECB2011’. In the menu under ‘Standards Building Type:’ type ‘multiuse’ (see below):



34. These aren't really used but the current code requires it (this will likely be changed in future versions of BTAP.
35. Save the file again with a new name (I'll use 'exercise1k.osm').
36. Congratulations! You now have a new geometry file that can be used with BTAP.
37. The next step is to use btap_batch to create NECB compliant reference buildings using this new geometry file.