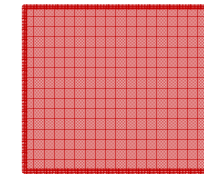


ARCHIVE & ARTIST HOUSING FOR
COLUMBUS, IN

TYLER DUNAHEE

THE SITE

66'X250' STRIP
OF LAND ON
WASHINGTON ST.
BETWEEN 6TH AND
7TH STREET.

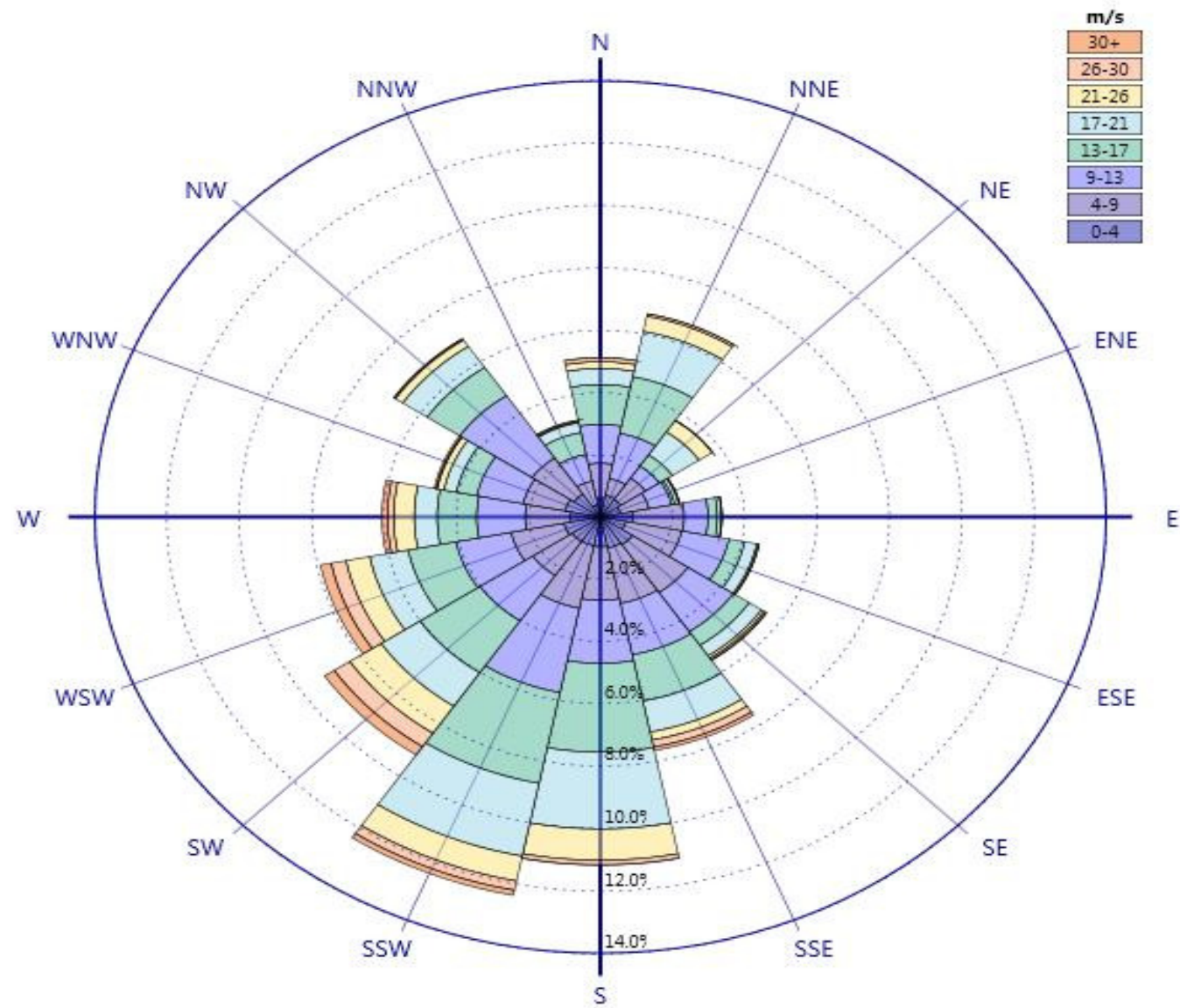


SITE

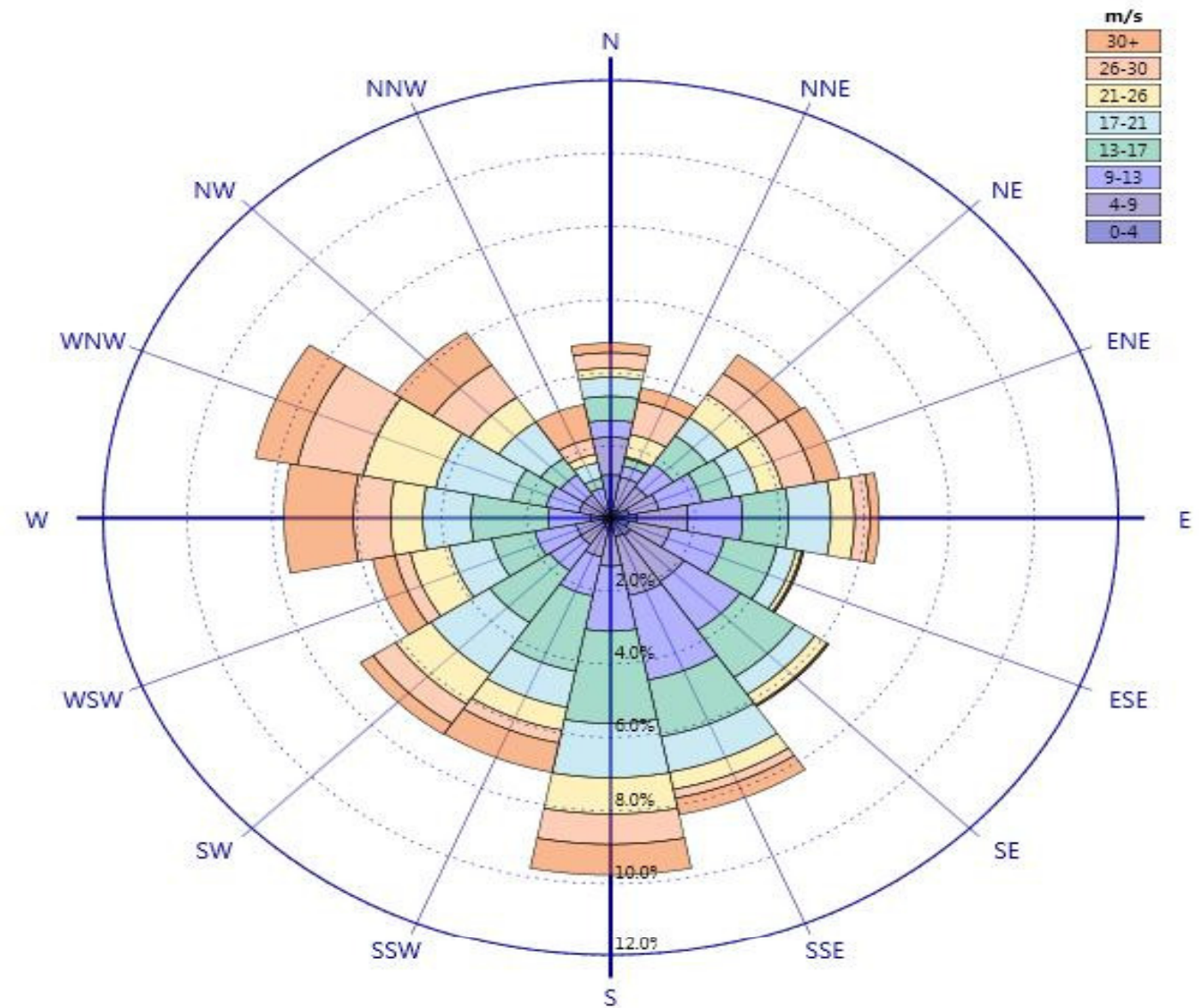
SITE PHOTOS



SITE WIND ANALYSIS

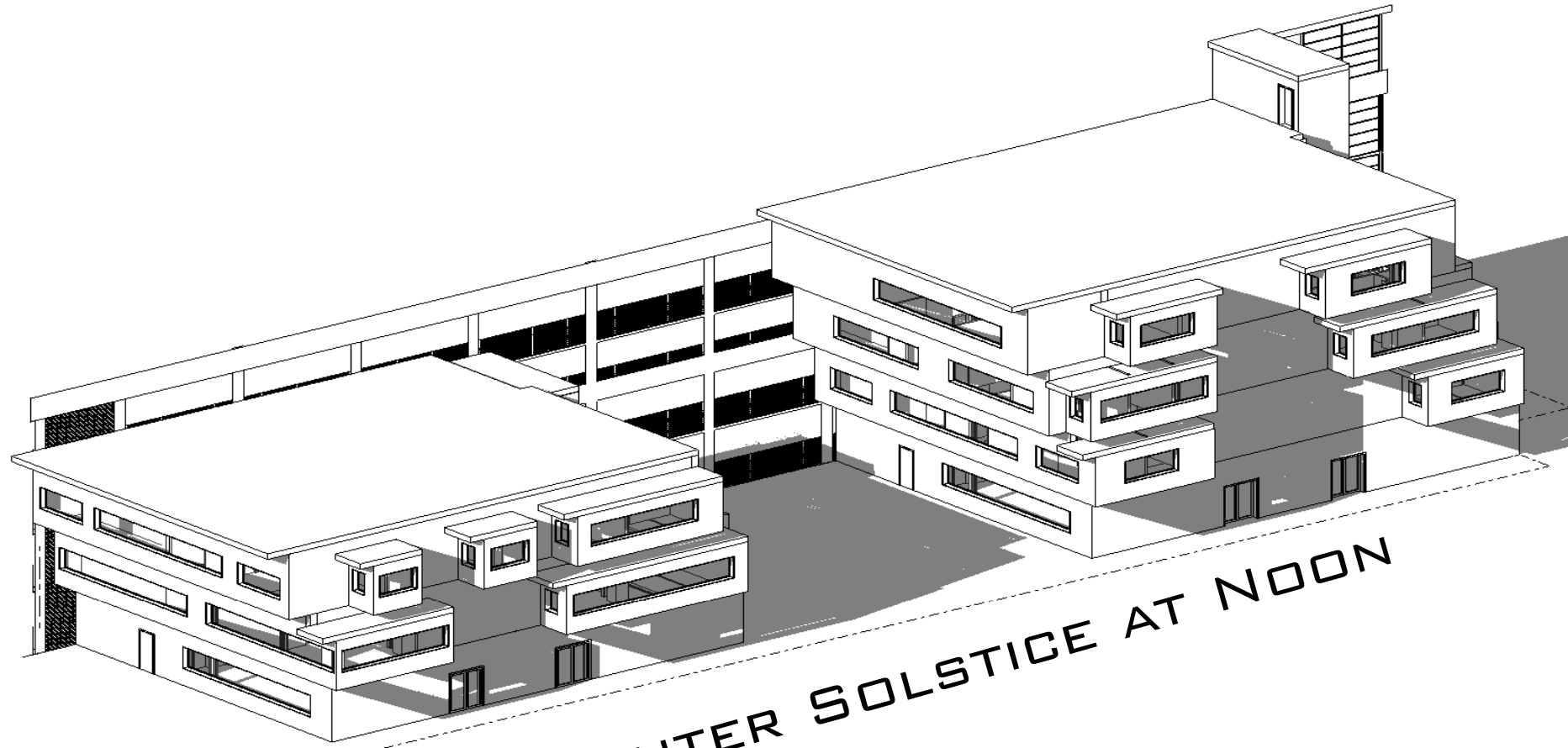


SUMMER WIND ROSE

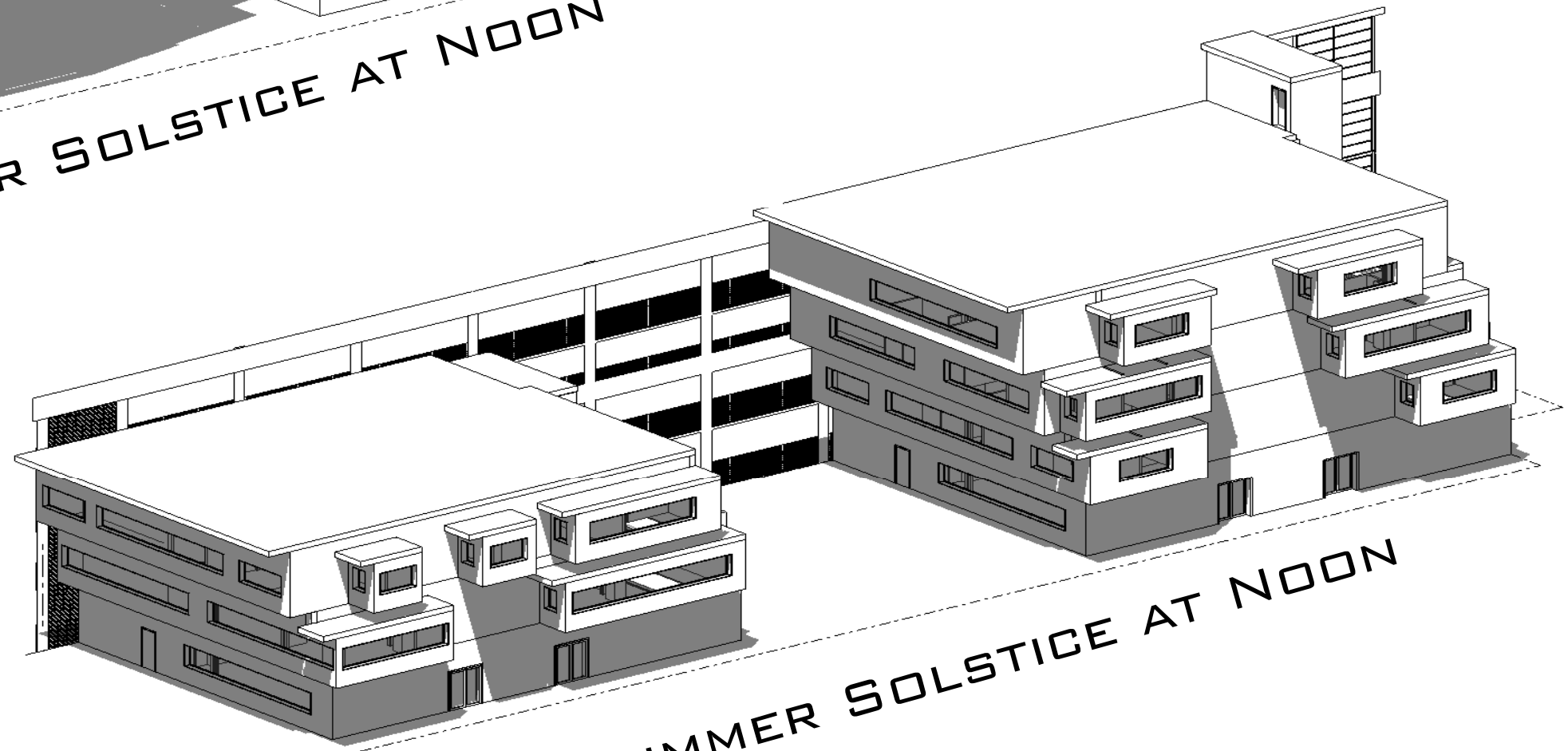


WINTER WIND ROSE

SITE SUN ANALYSIS



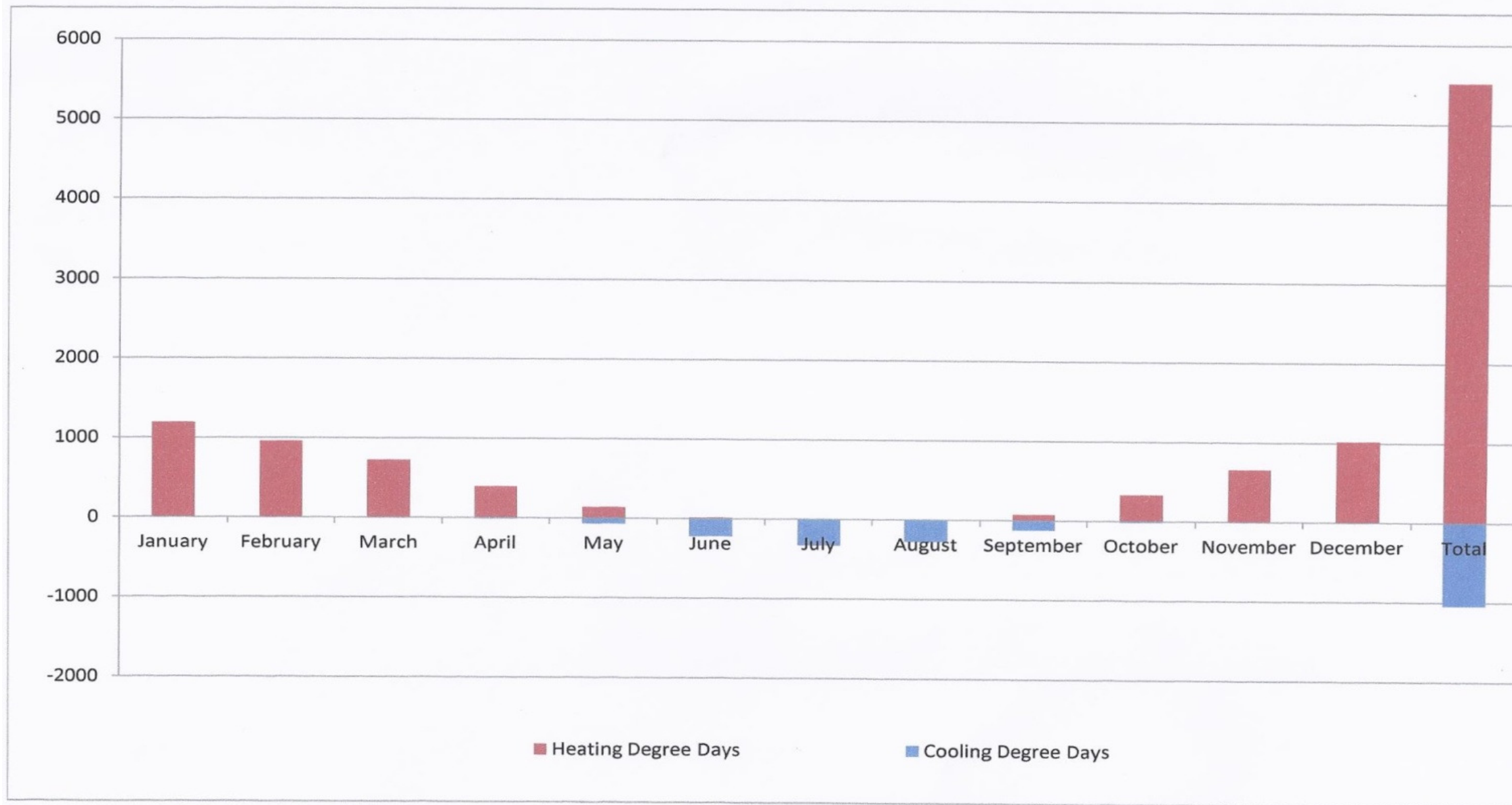
WINTER SOLSTICE AT NOON



SUMMER SOLSTICE AT NOON

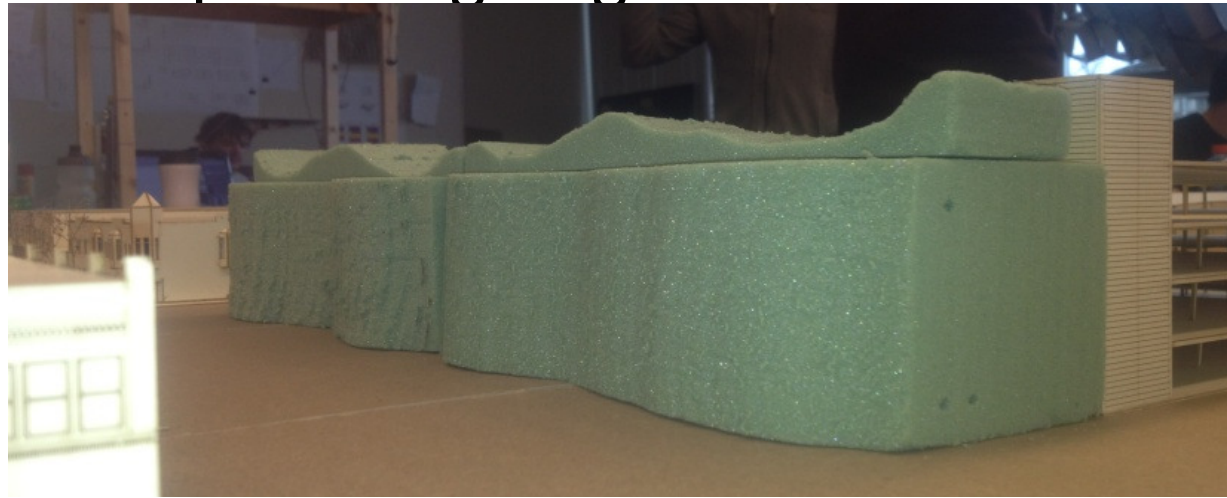
SITE WEATHER ANALYSIS

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Cooling Degree Days	0	0	-2	-10	-69	-221	-331	-272	-122	-14	-1	0	-1042
Heating Degree Days	1192	957	724	394	141	16	2	4	77	335	659	1020	5521



STUDY MODEL 1

- Didn't seem to fit the scale of the downtown area
- Overpowering single mass



STUDY MODEL 2

- Stepped structure
- Shaded south façade in the summer
- Allows solar gain in the winter.



STUDY MODEL 3

- NO LONGER STEPS ON EAST AND WEST FACADES
- PLAYING WITH USE OF SOLID AND CURTAIN WALLS



STUDY MODEL 4

- “NODULES” ON EAST FAÇADE TO BRING SUNLIGHT INTO ADDITIONAL INHABITED SPACES
- INCREASE SOLAR GAIN IN WINTER



ENERGY ANALYSIS

Building Performance Factors

Location:	Columbus, IN, USA
Weather Station:	39774
Outdoor Temperature:	Max: 91°F/Min: -16°F
Floor Area:	33,060 sf
Exterior Wall Area:	23,304 sf
Average Lighting Power:	1.01 W / ft ²
People:	107 people
Exterior Window Ratio:	0.30
Electrical Cost:	\$0.09 / kWh
Fuel Cost:	\$0.78 / Therm

Energy Use Intensity

Electricity EUI:	13 kWh / sf / yr
Fuel EUI:	2 kBtu / sf / yr
Total EUI:	45 kBtu / sf / yr

Life Cycle Energy Use/Cost

Life Cycle Electricity Use:	12,624,165 kWh
Life Cycle Fuel Use:	16,678 Therms
Life Cycle Energy Cost:	\$506,817

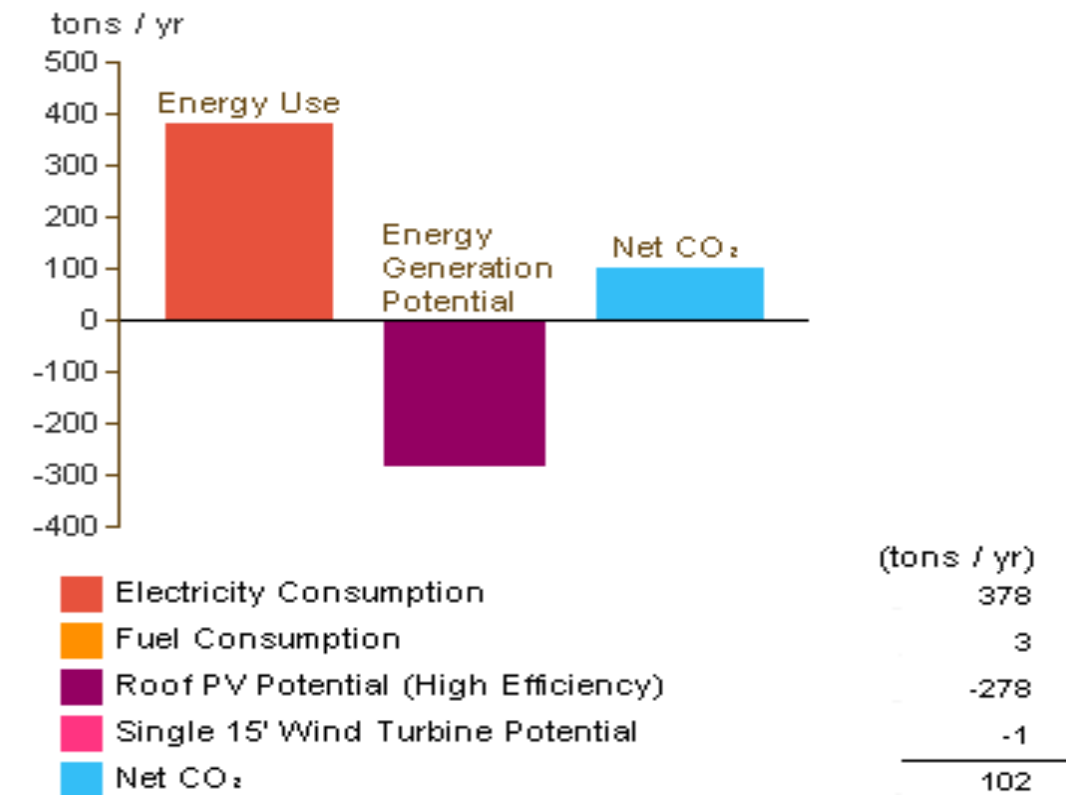
*30-year life and 6.1% discount rate for costs

Renewable Energy Potential

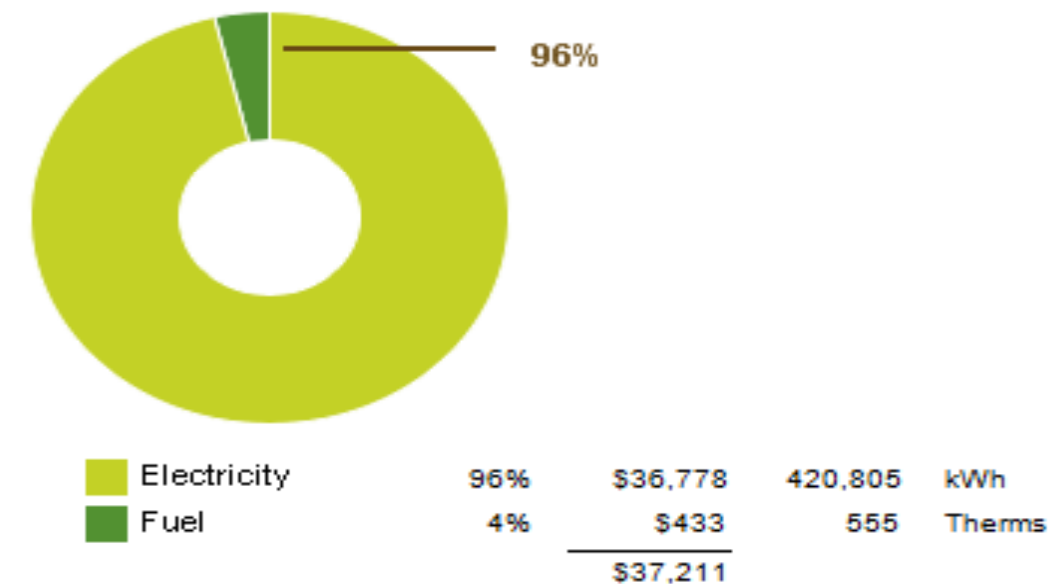
Roof Mounted PV System (Low efficiency):	103,175 kWh / yr
Roof Mounted PV System (Medium efficiency):	206,350 kWh / yr
Roof Mounted PV System (High efficiency):	309,525 kWh / yr
Single 15' Wind Turbine Potential:	1,947 kWh / yr

*PV efficiencies are assumed to be 5%, 10% and 15% for low, medium and high efficiency systems

Annual Carbon Emissions

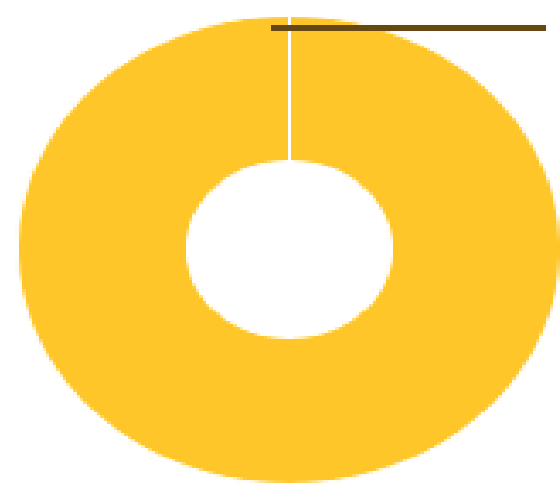


Annual Energy Use/Cost



ENERGY ANALYSIS

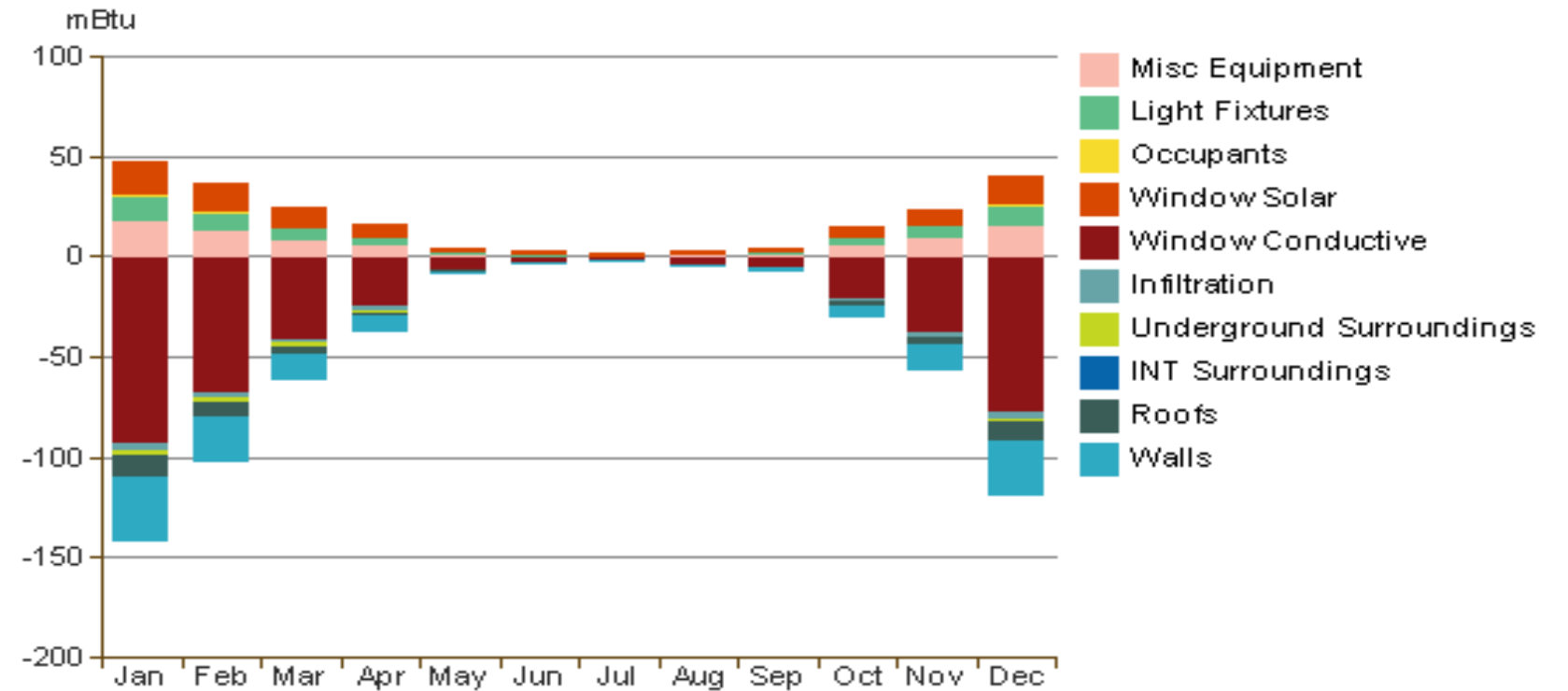
Energy Use: Fuel



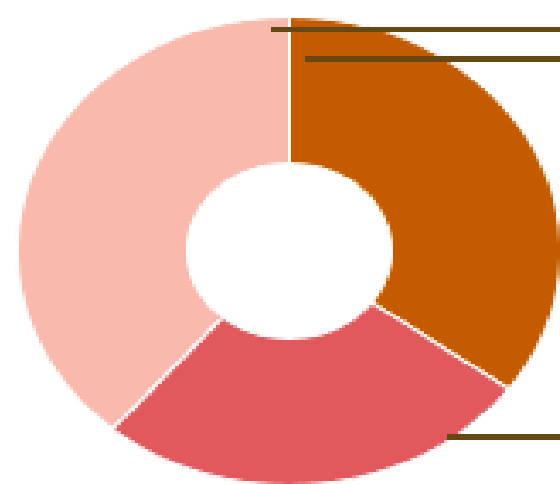
100%

			(Therms)
HVAC	0%	\$0	0
Domestic Hot Water	100%	\$432	555
		\$432	555

Monthly Heating Load



Energy Use: Electricity



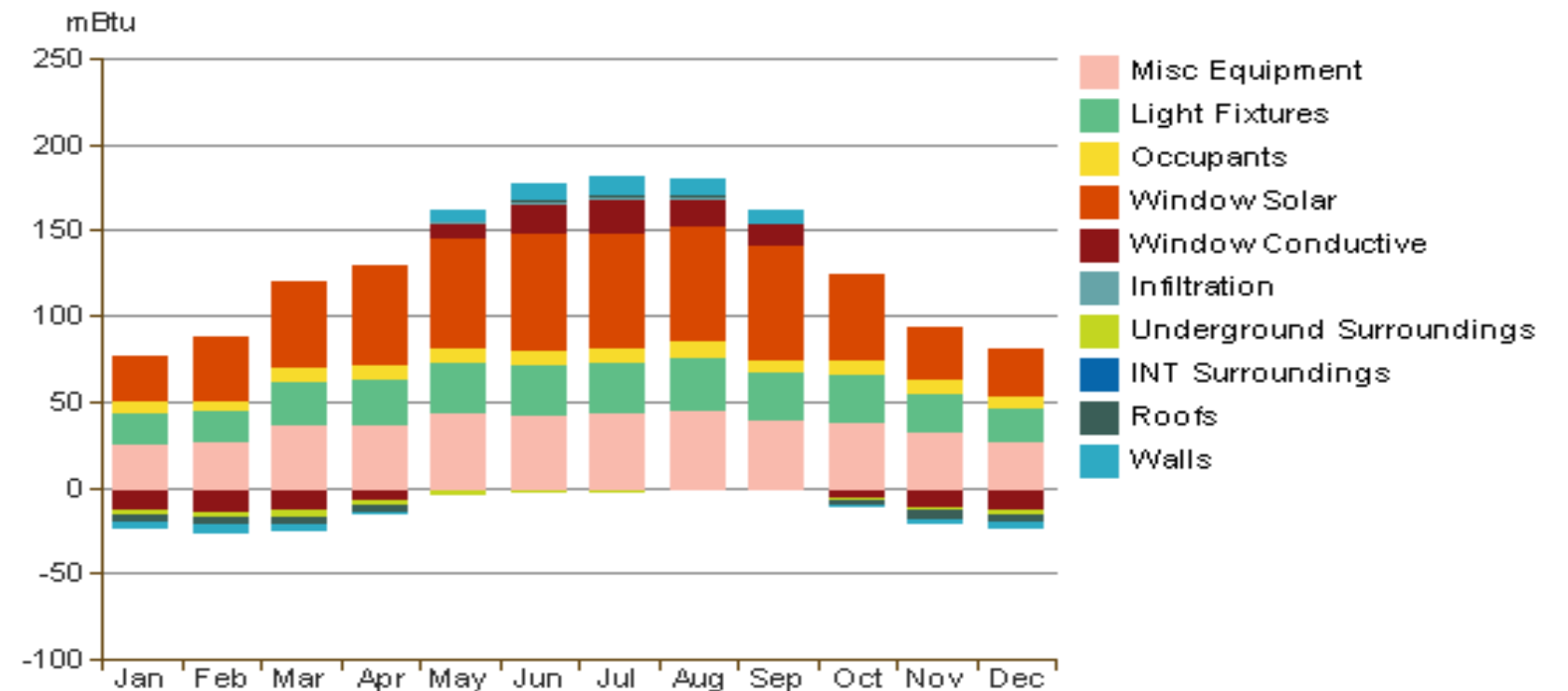
39%

35%

26%

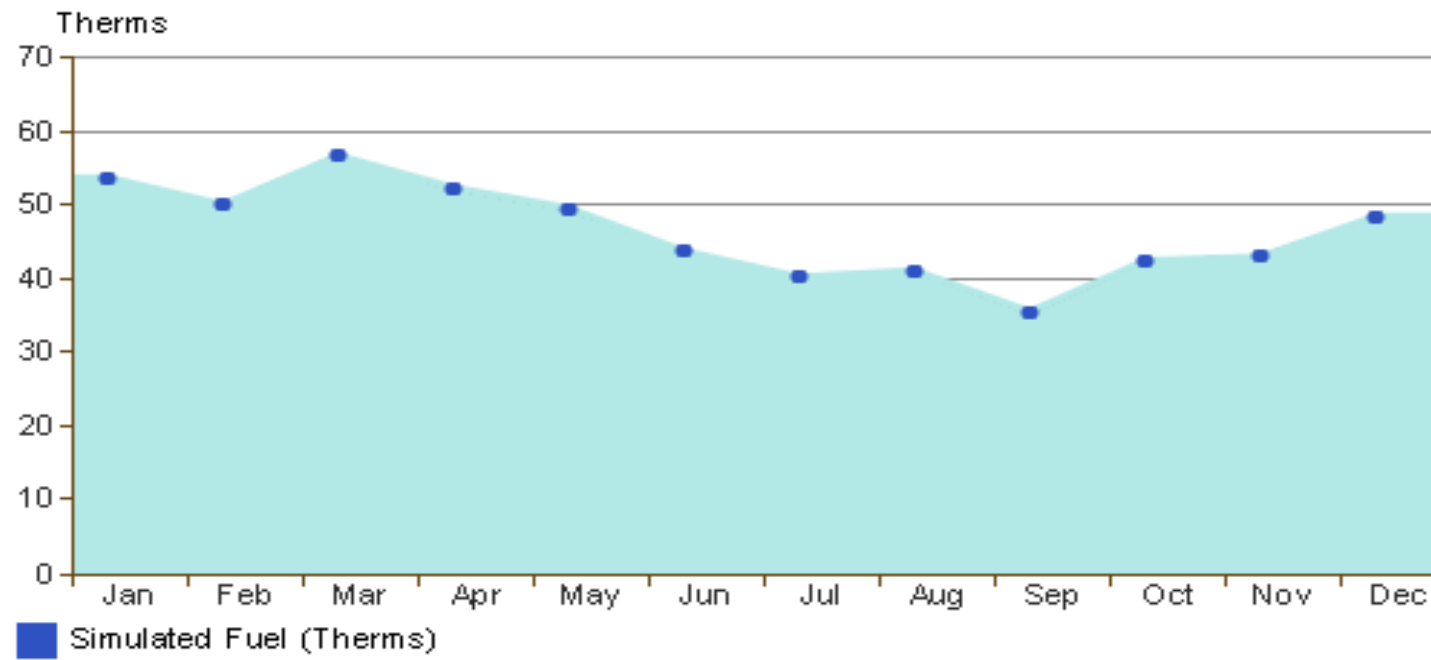
			(kWh)
HVAC	35%	\$12,754	145,928
Lighting	26%	\$9,529	109,033
Misc Equipment	39%	\$14,105	161,392
		\$36,388	416,353

Monthly Cooling Load

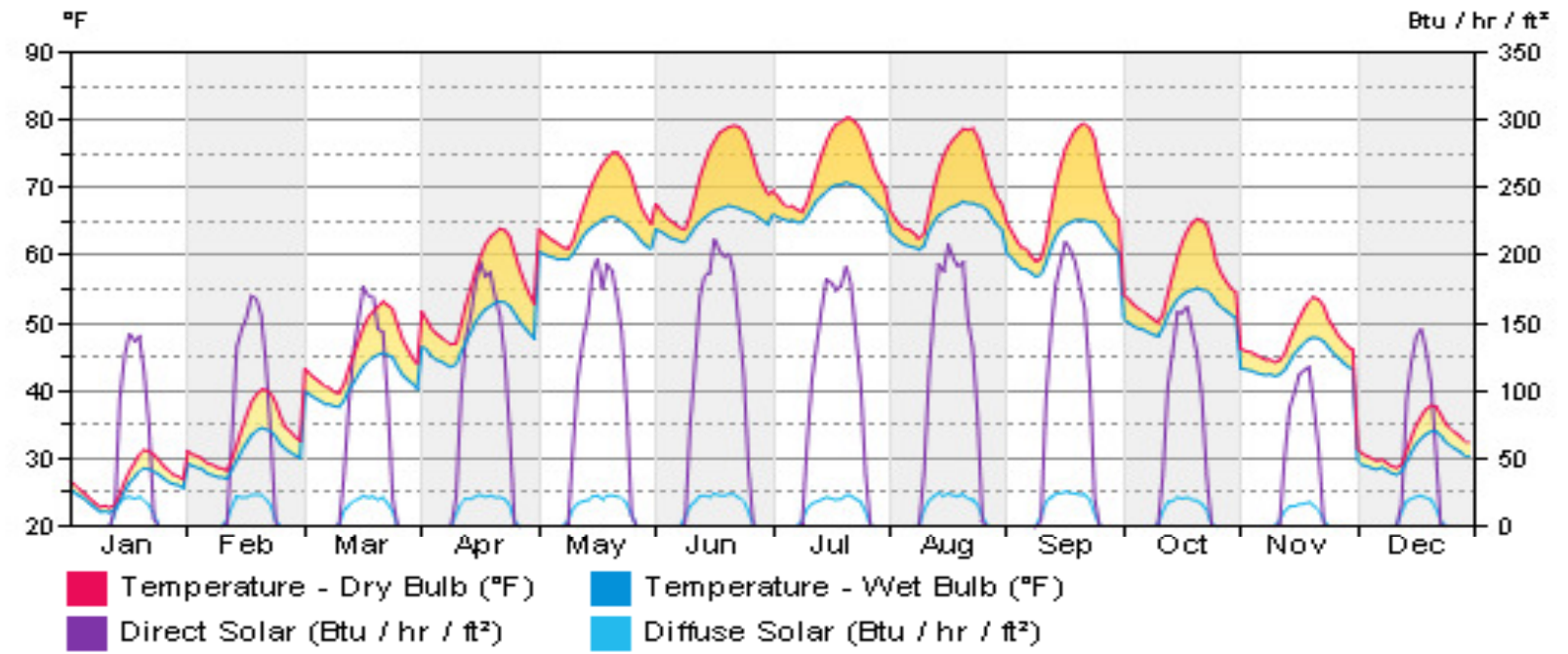


ENERGY ANALYSIS

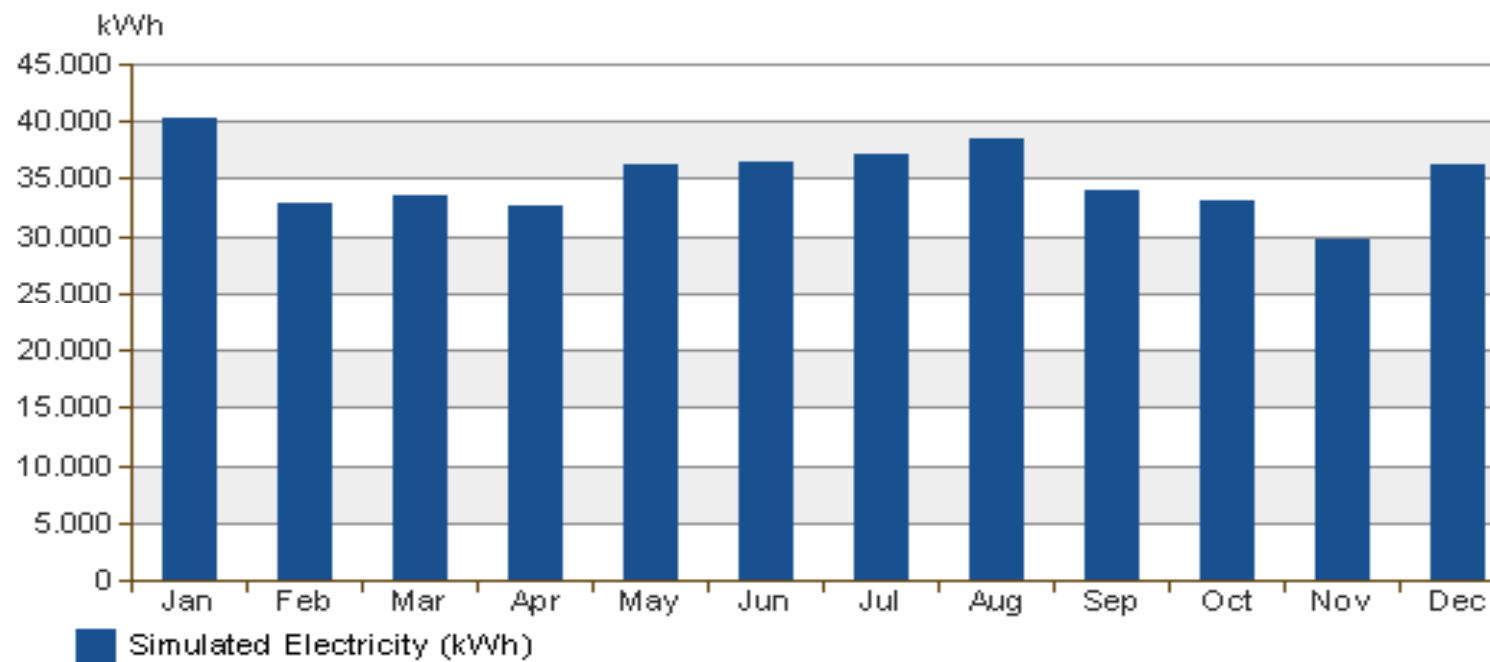
Monthly Fuel Consumption



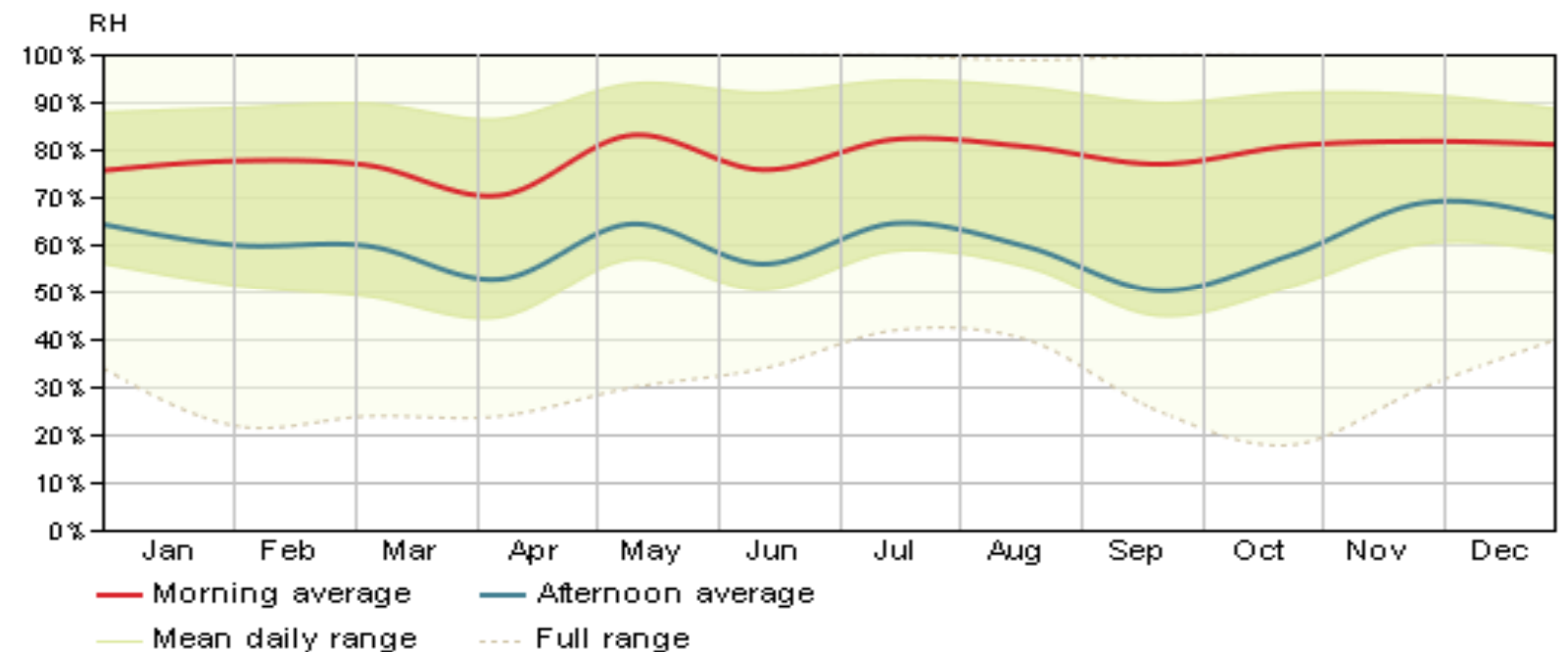
Diurnal Weather Averages



Monthly Electricity Consumption



Humidity



SOLAR PRODUCTION

- SOLAR PRODUCTION
- 1) 778 - 5'x10' SOLAR PANELS = 38,900 SF OF PANELS
- 2) 9 WATTS/SF X 38,900SF = 350.1 KW
- 3) 5 HOURS OUTPUT/DAY X 350.1 KW X 365 DAYS/YEAR = 638,932KW/YEAR
- ONLY 420,600KW/YEAR USED
- OVER 638,000KW PRODUCED
- SURPLUS OF ABOUT 218,000 KW PER YEAR

PROGRAMMING

- NORTH BUILDING

- 1ST LEVEL

- GALLERY – 2520 SF
 - RESTROOMS – 276 SF
 - ARCHIVE STORAGE – 1119 SF
 - ARCHIVE OFFICE – 199 SF
 - STAIRS – 268 SF

- 2ND LEVEL

- ARCHIVE STORAGE – 971 SF
 - MECH. – 152
 - STAIRS – 268
 - CORRIDOR – 723 SF
 - OPEN TO 1ST FLOOR – 1237 SF
 - ARTIST HOUSING 1BD – 611 SF
 - ARTIST HOUSING 1 BD – 717 SF

- NORTH BUILDING CON'T

- 3RD LEVEL

- GALLERY/CORRIDOR – 1400 SF
 - STAIRS – 268 SF
 - MECHANICAL – 300 SF
 - ARTIST HOUSING 1BD – 547 SF
 - ARTIST HOUSING 2BD – 771 SF
 - ARTIST HOUSING 2BD – 753 SF
 - ARTIST HOUSING 2BD – 747 SF
 - STAIRS – 268 SF

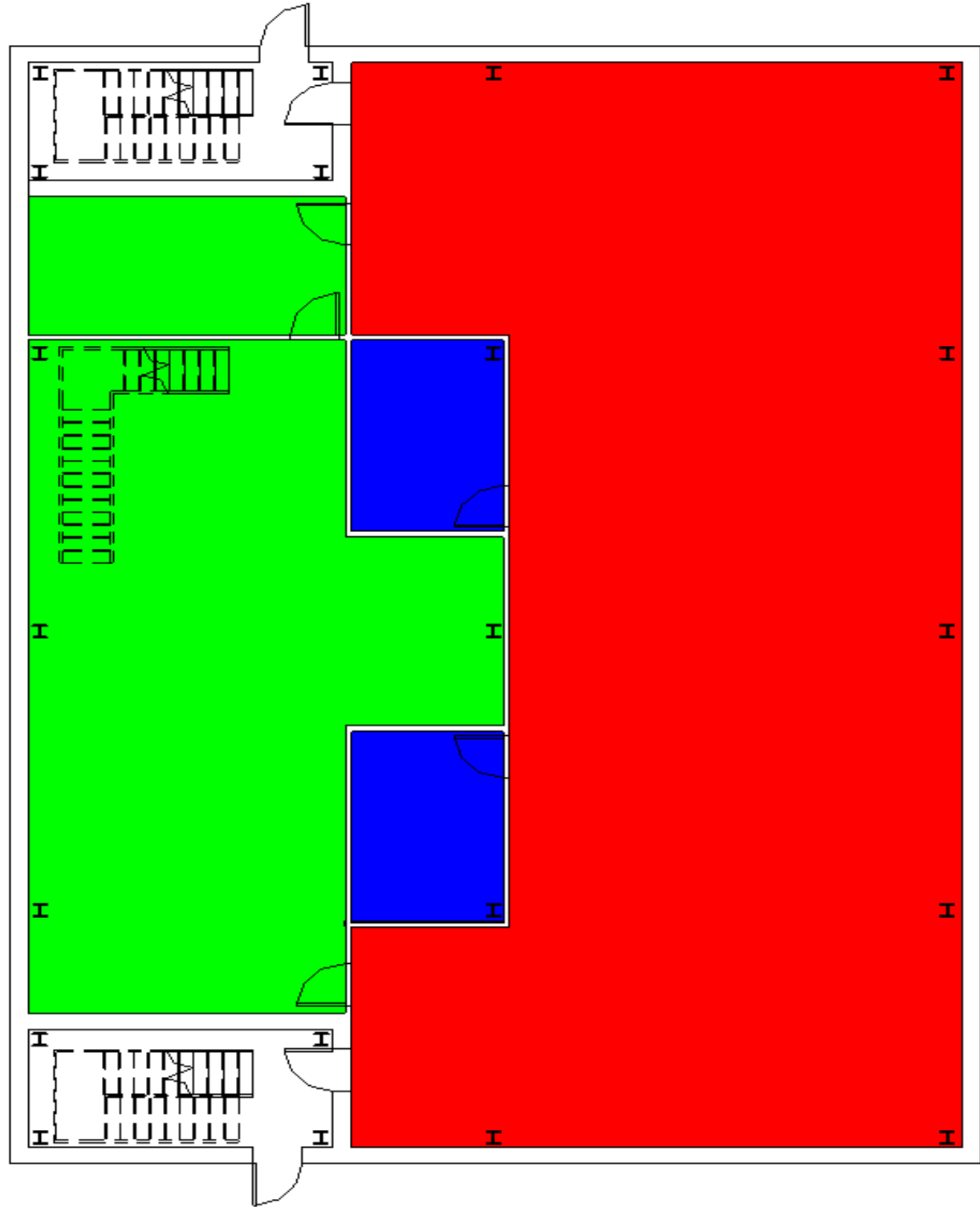
- 4TH LEVEL

- MECHANICAL – 219 SF
 - STAIRS – 268 SF
 - CORRIDOR – 723 SF
 - ARTIST SUITE 2 BD – 1664 SF
 - ARTIST SUITE 2 BD – 1711 SF

PROGRAMMING

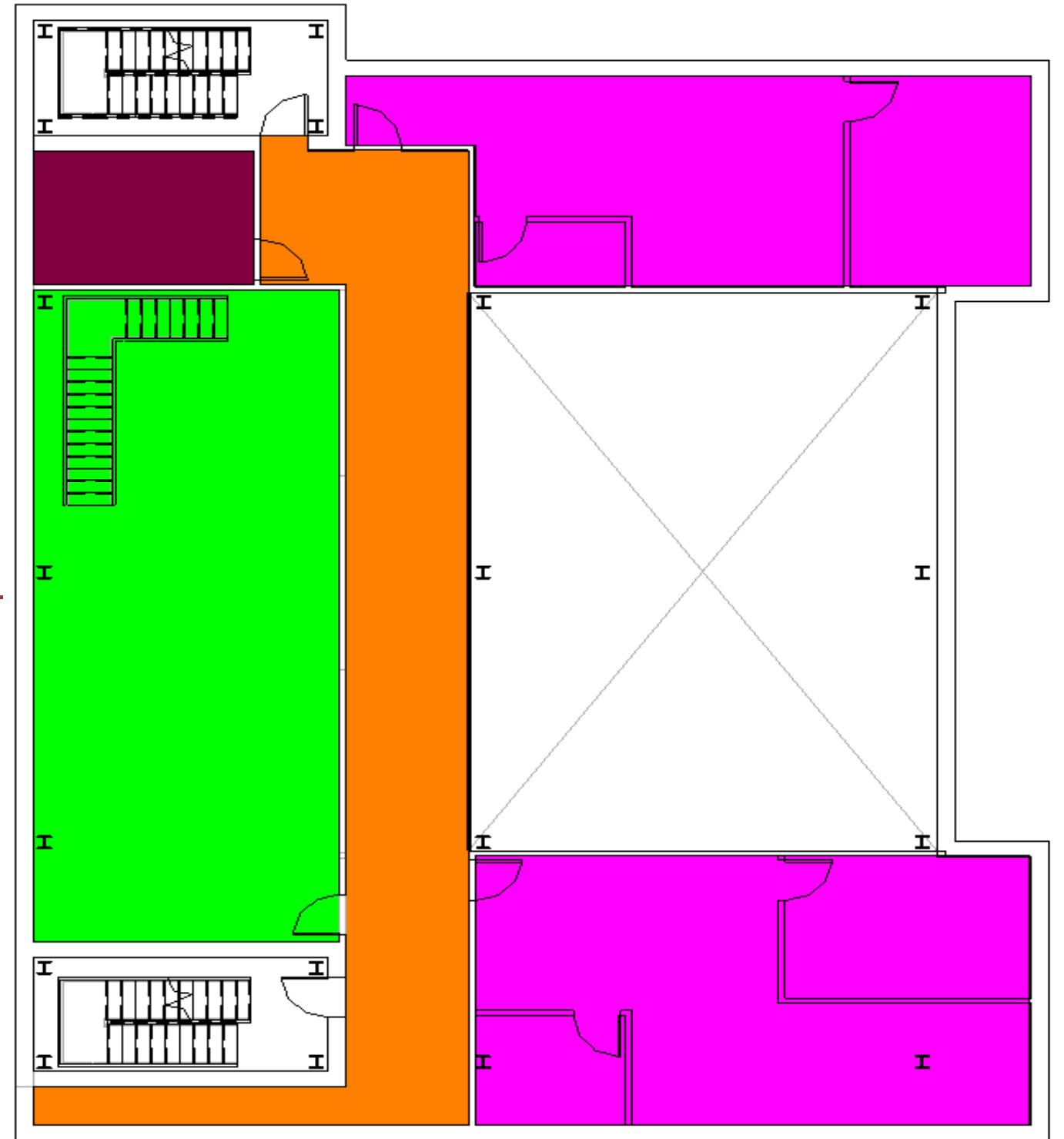
- SOUTH BUILDING
 - 1ST LEVEL
 - GALLERY – 3307 SF
 - RESTROOMS – 624 SF
 - STAIRS – 268 SF
 - 2ND LEVEL
 - COMMUNAL WORK/LIVE – 3183 SF
 - ARTIST STUDIO 1BD – 547 SF
 - ARTIST STUDIO 1BD – 534 SF
 - MECHANICAL – 76 SF
 - STAIRS – 268 SF
 - 3RD LEVEL
 - ARTIST STUDIO 1BD – 551 SF
 - ARTIST STUDIO 1BD – 622 SF
 - ARTIST STUDIO 1BD – 614 SF
 - ARTIST STUDIO 1BD – 550 SF
 - ARTIST STUDIO 1BD – 533 SF
 - ARTIST STUDIO 1BD – 547 SF
 - MECHANICAL – 76 SF
 - STAIRS – 268 SF

FLOOR PLANS (NORTH BUILDING)



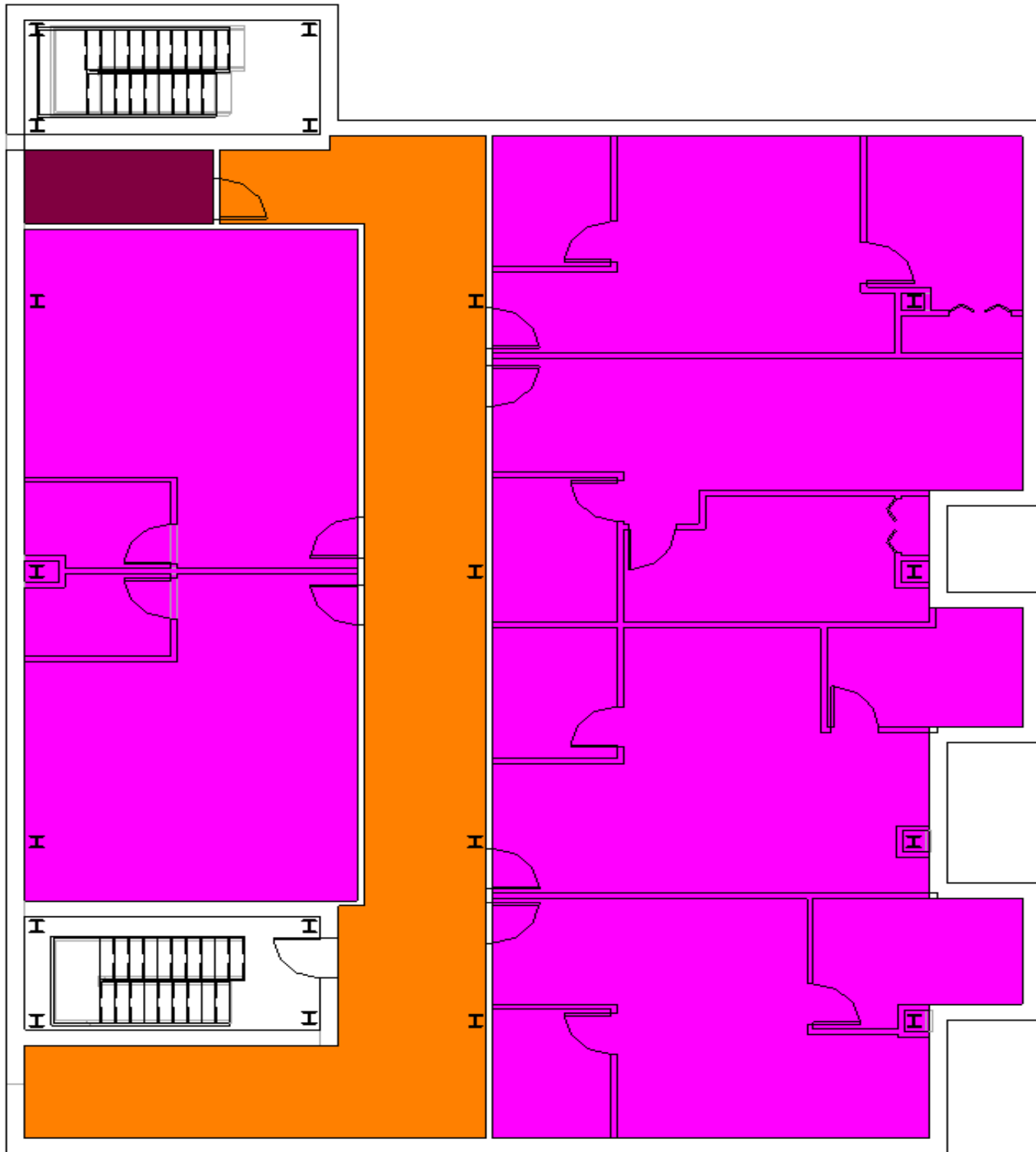
1ST FLOOR

GALLERY
ARCHIVE
RESTROOMS
CORRIDOR
HOUSING
MECHANICAL



2ND FLOOR

FLOOR PLANS (NORTH BUILDING)



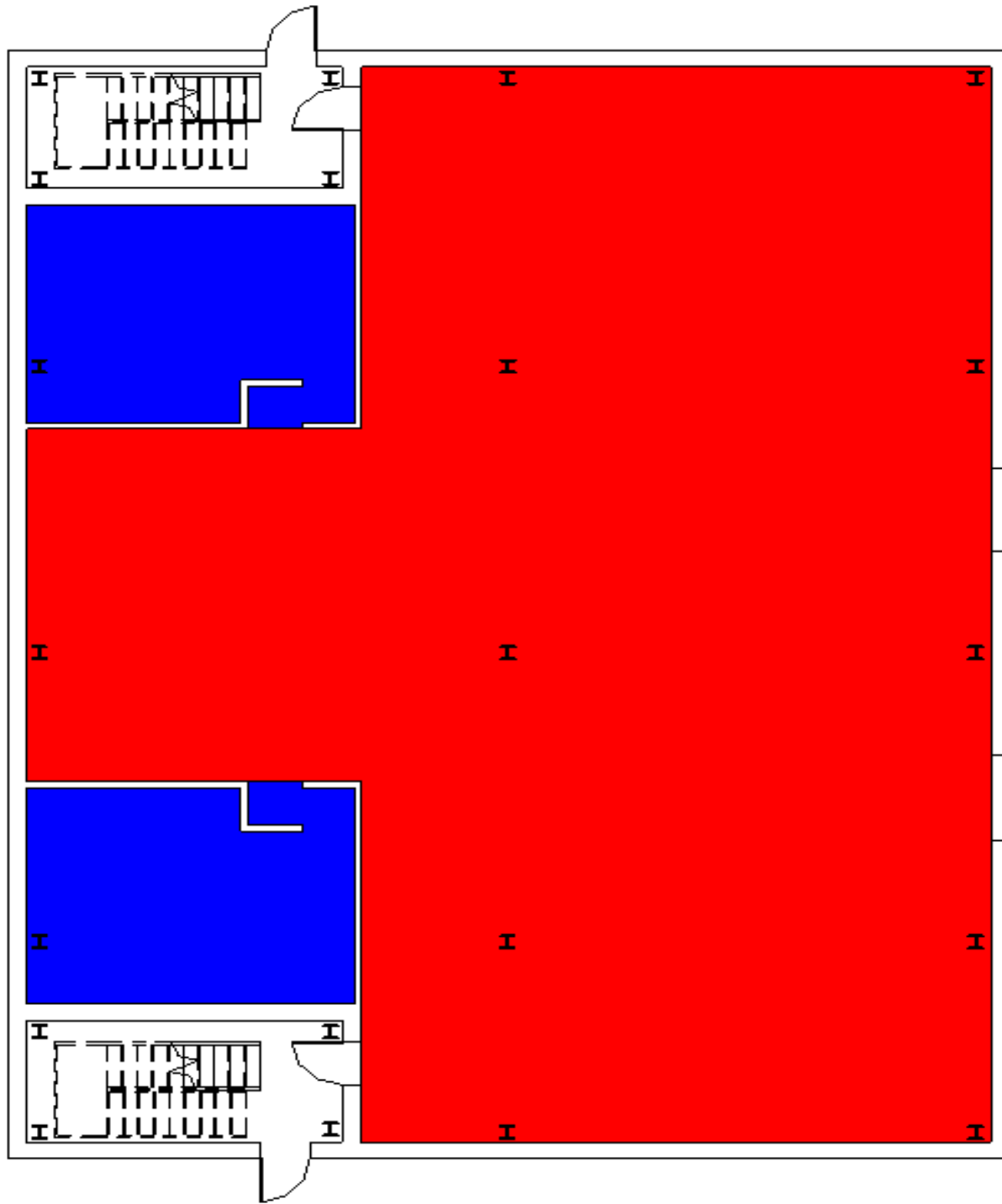
3RD FLOOR

GALLERY
ARCHIVE
RESTROOMS
CORRIDOR
HOUSING
MECHANICAL



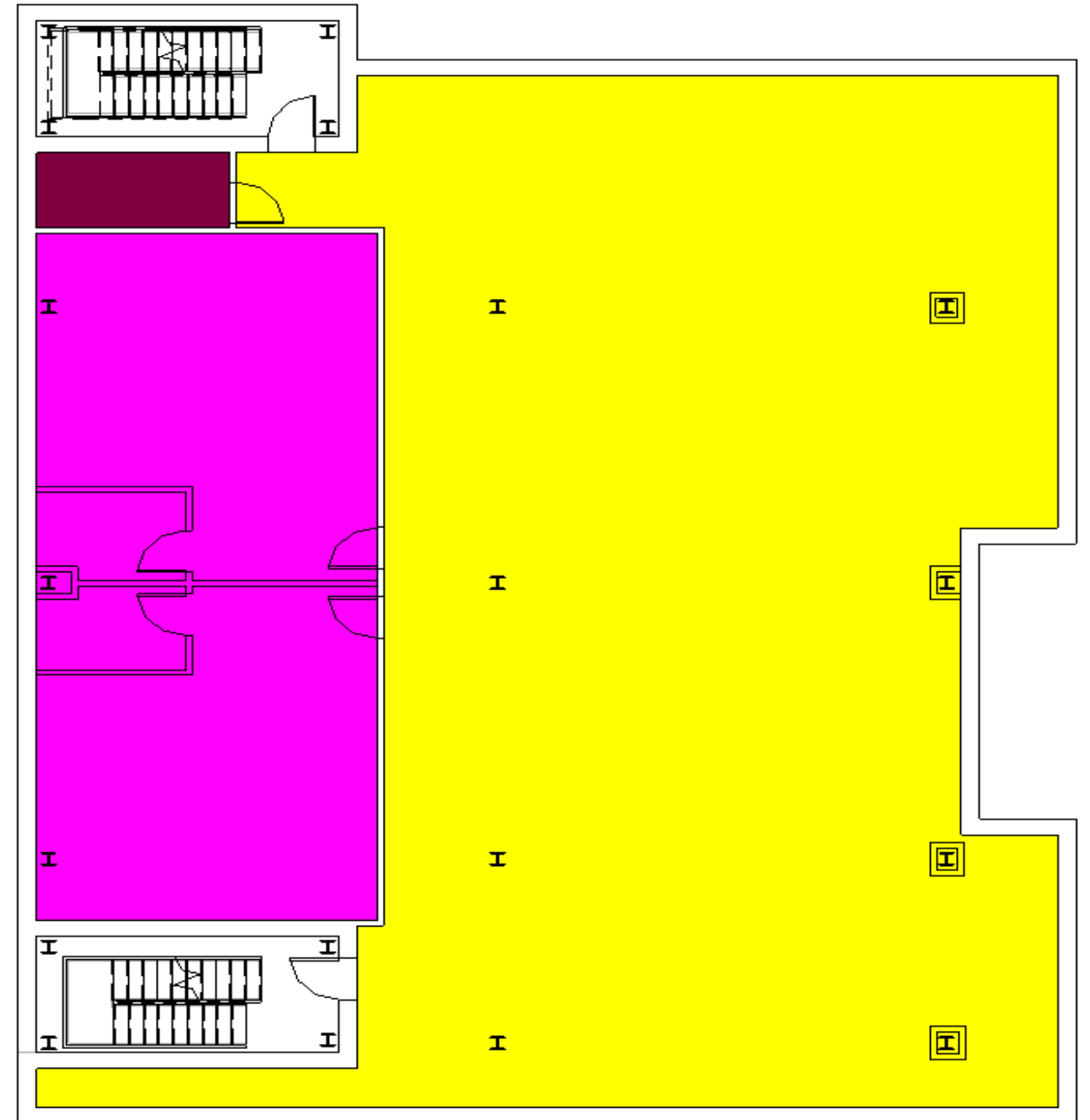
4TH FLOOR

FLOOR PLANS (SOUTH BUILDING)



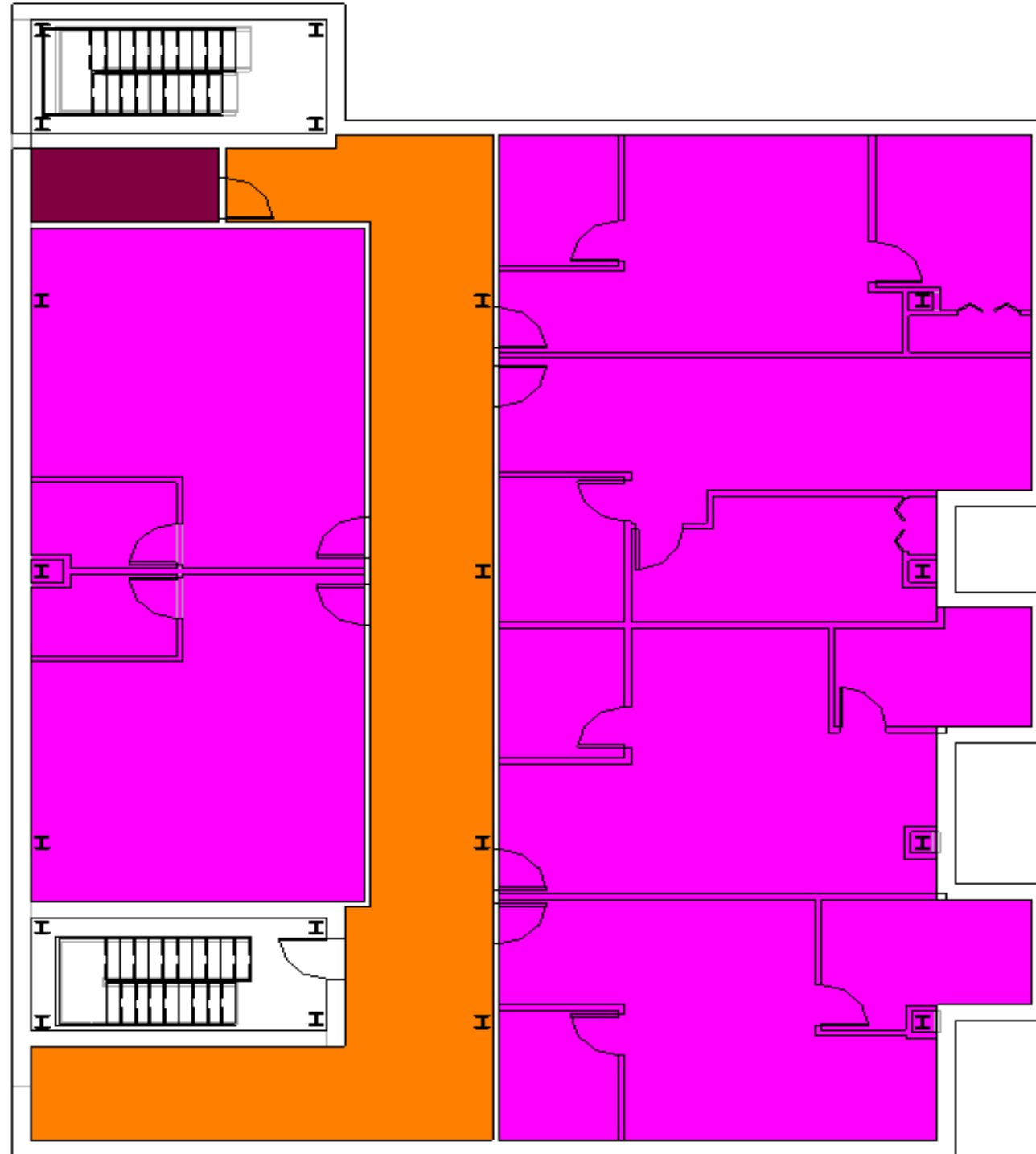
1ST FLOOR

- GALLERY
- ARCHIVE
- RESTROOMS
- CORRIDOR
- HOUSING
- MECHANICAL
- LIVE/WORK



2ND FLOOR

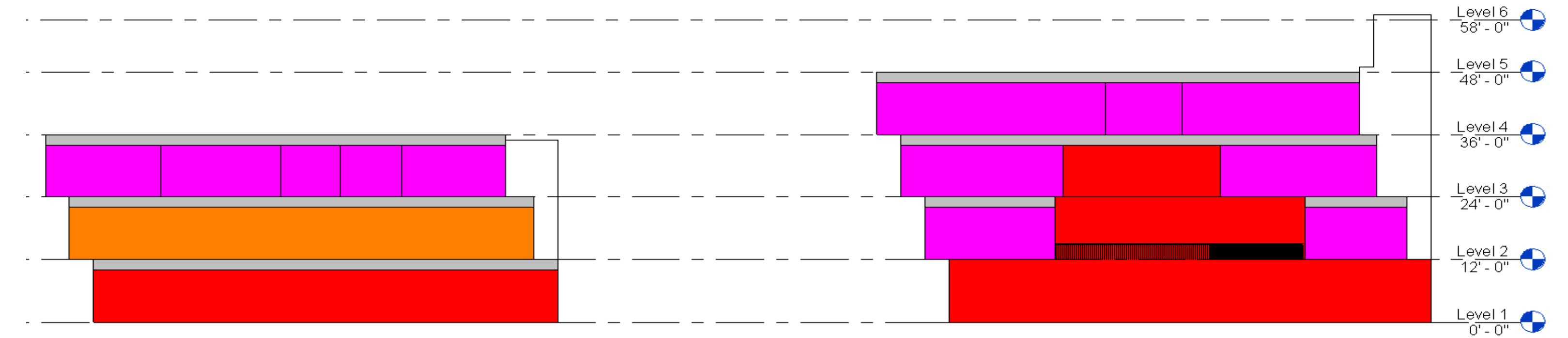
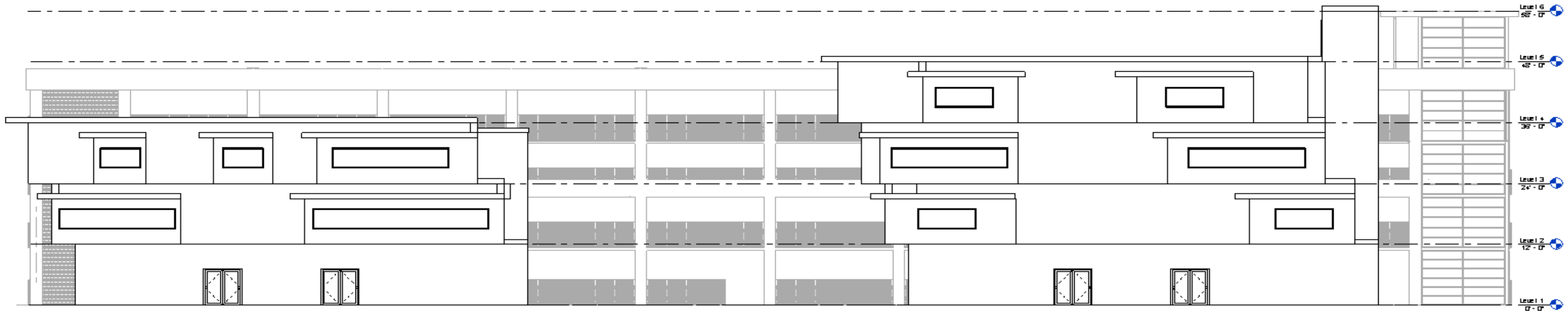
FLOOR PLANS (SOUTH BUILDING)



- GALLERY
- ARCHIVE
- RESTROOMS
- CORRIDOR
- HOUSING
- MECHANICAL

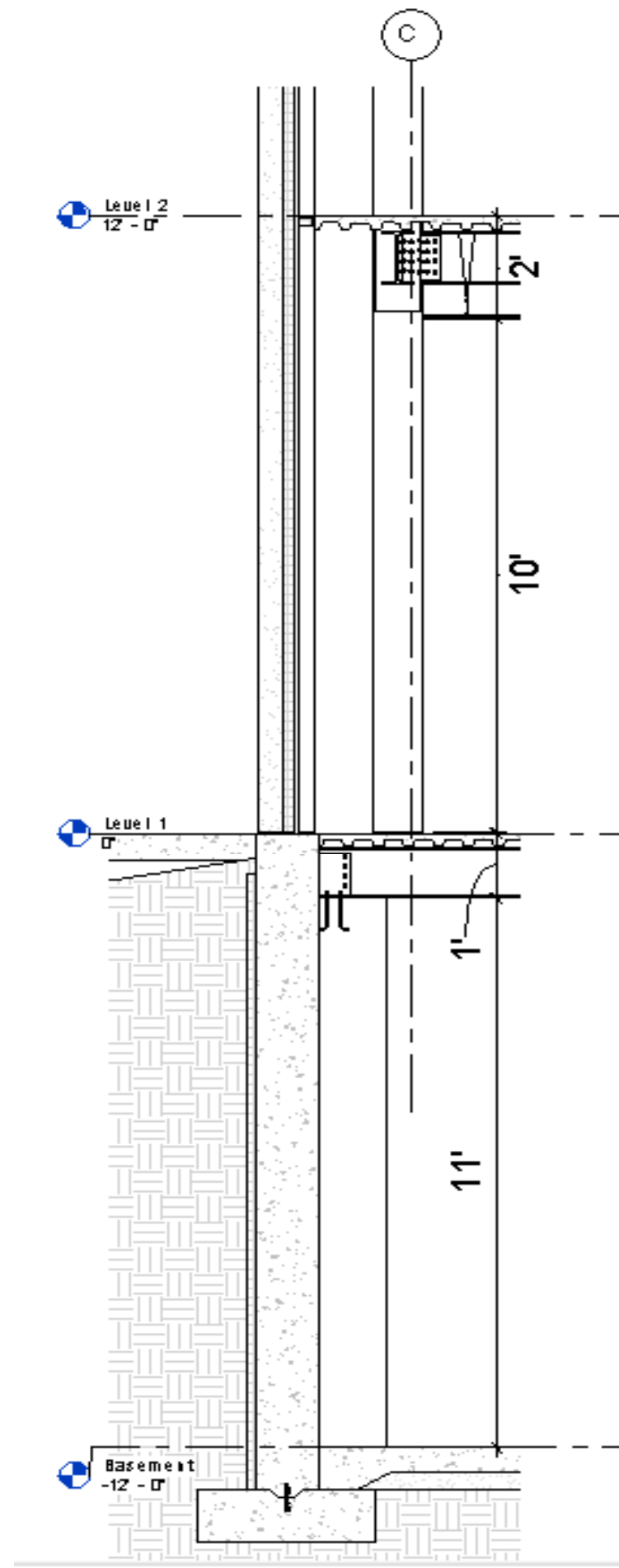
3RD FLOOR

EAST ELEVATION/SECTION

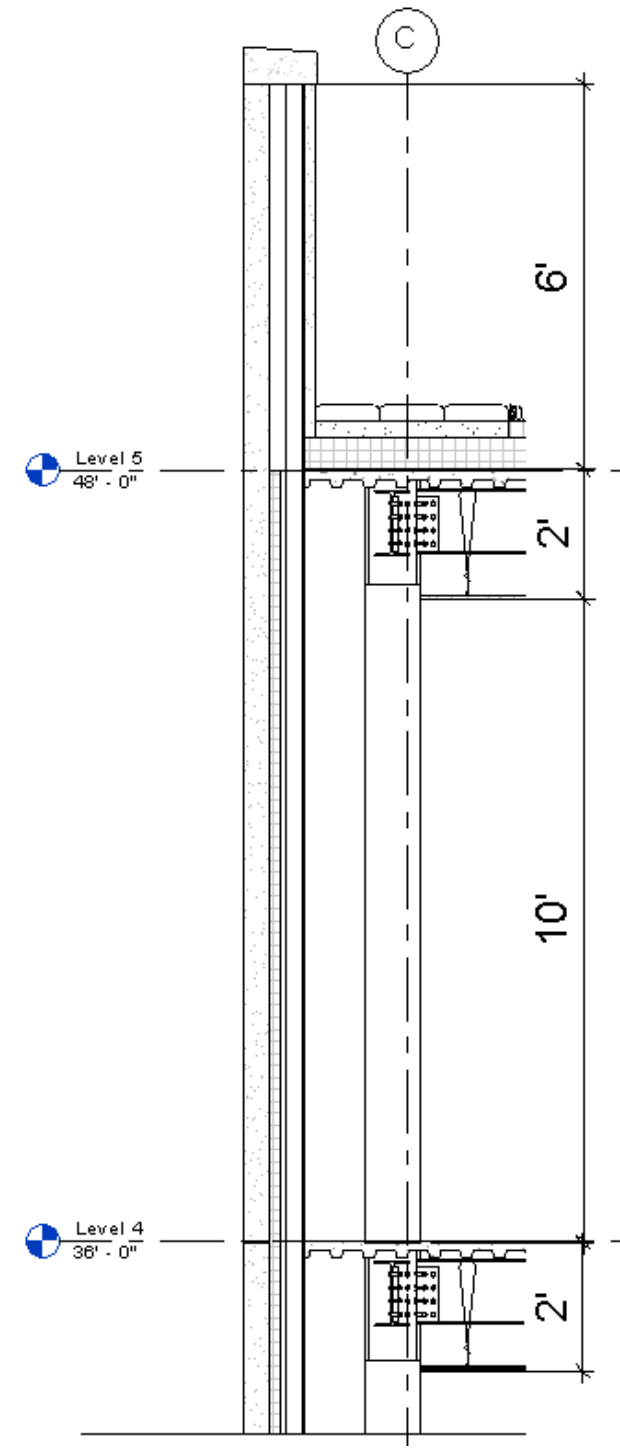


KEY: GALLERY ARCHIVE RESTROOMS CORRIDOR HOUSING MECHANICAL

WALL SECTIONS



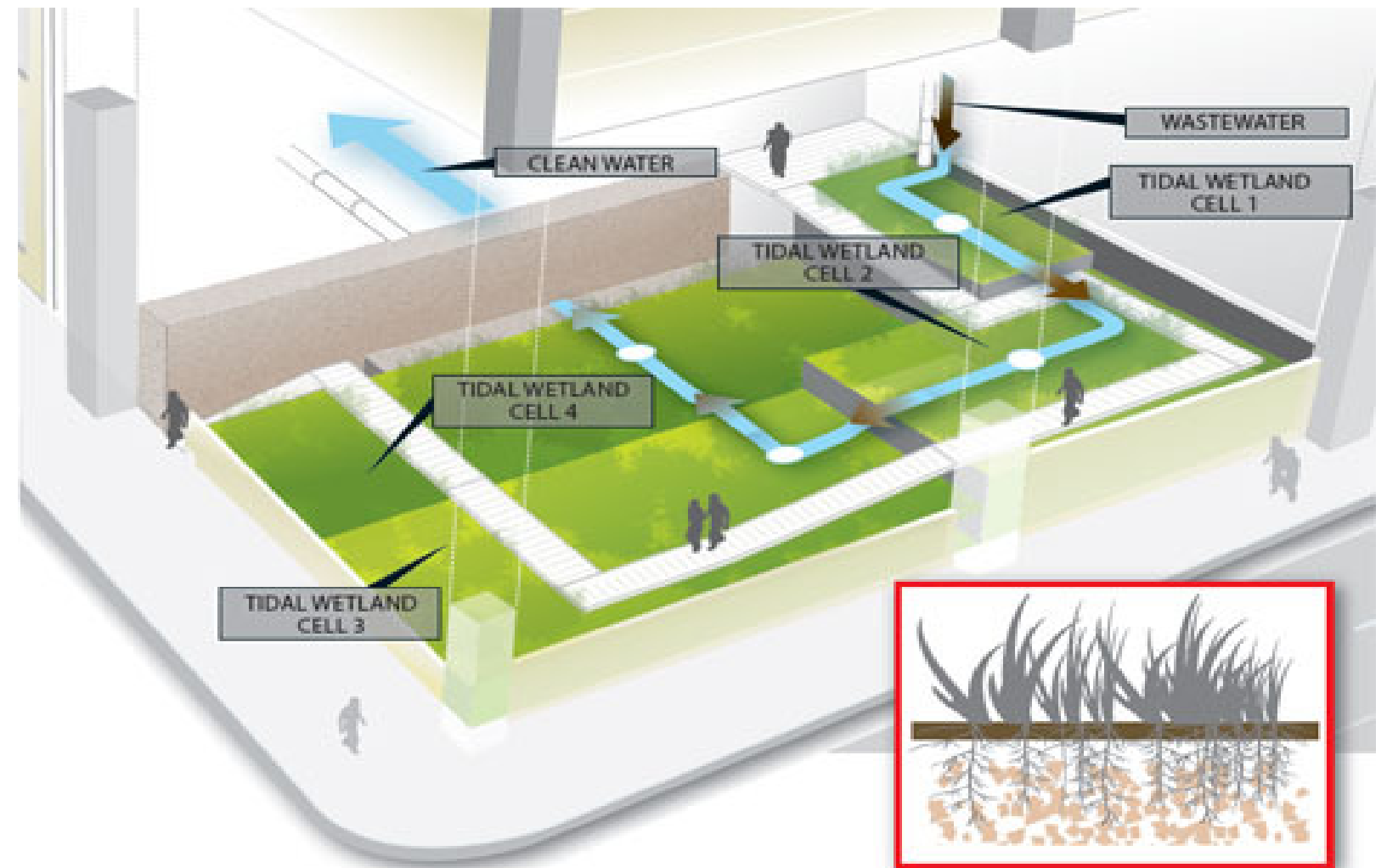
At Base



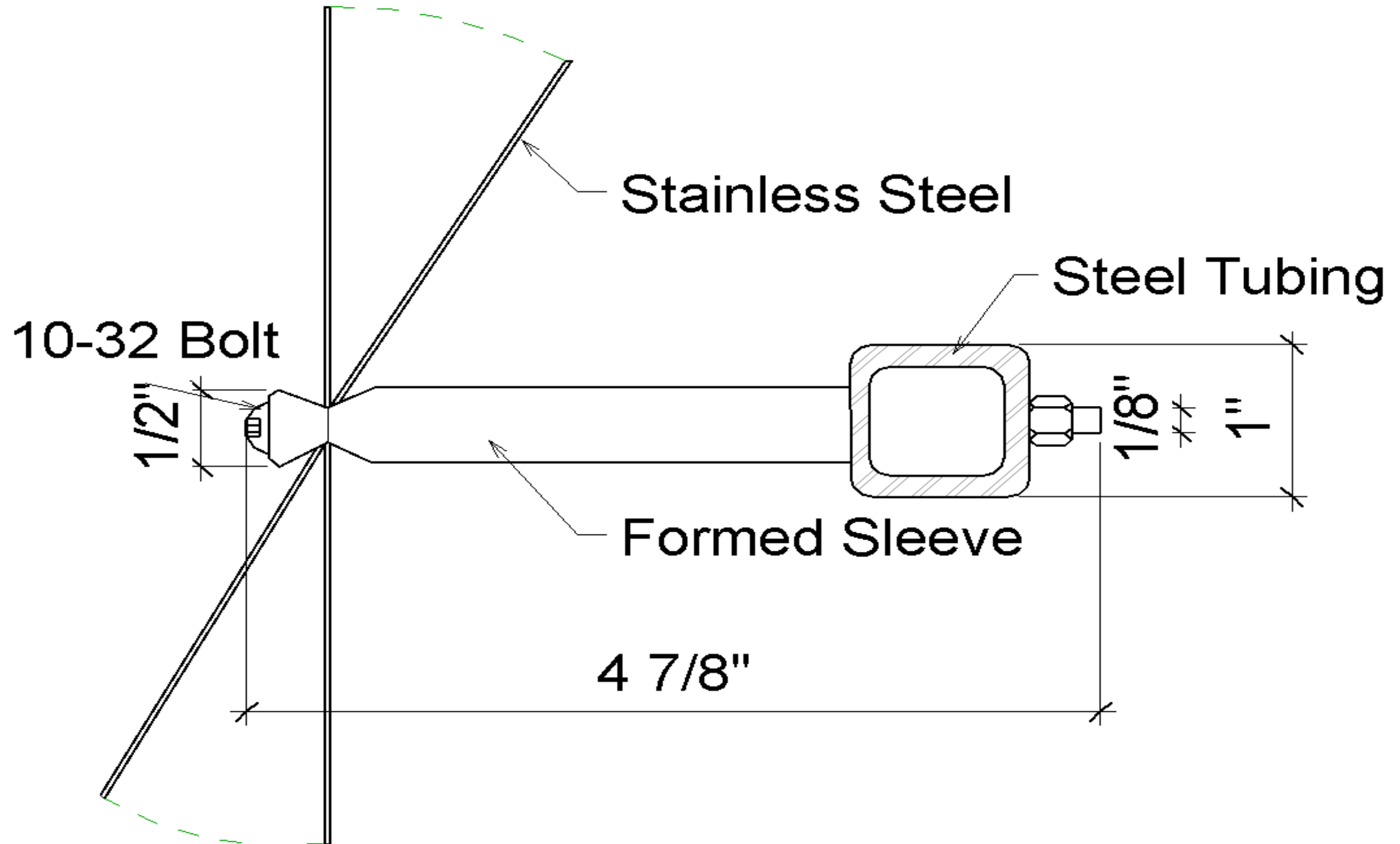
At Roof

COURTYARD

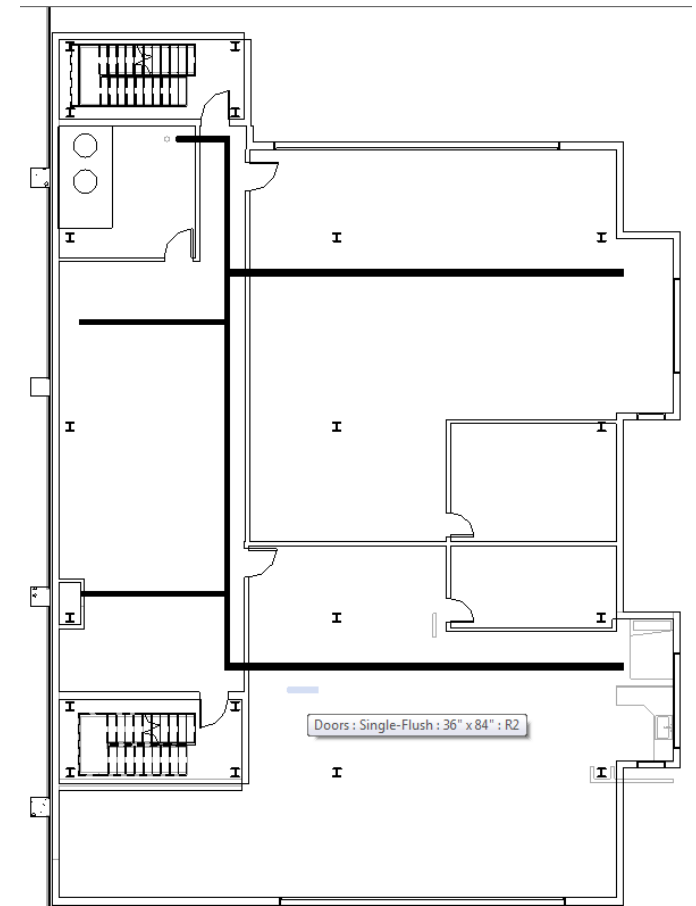
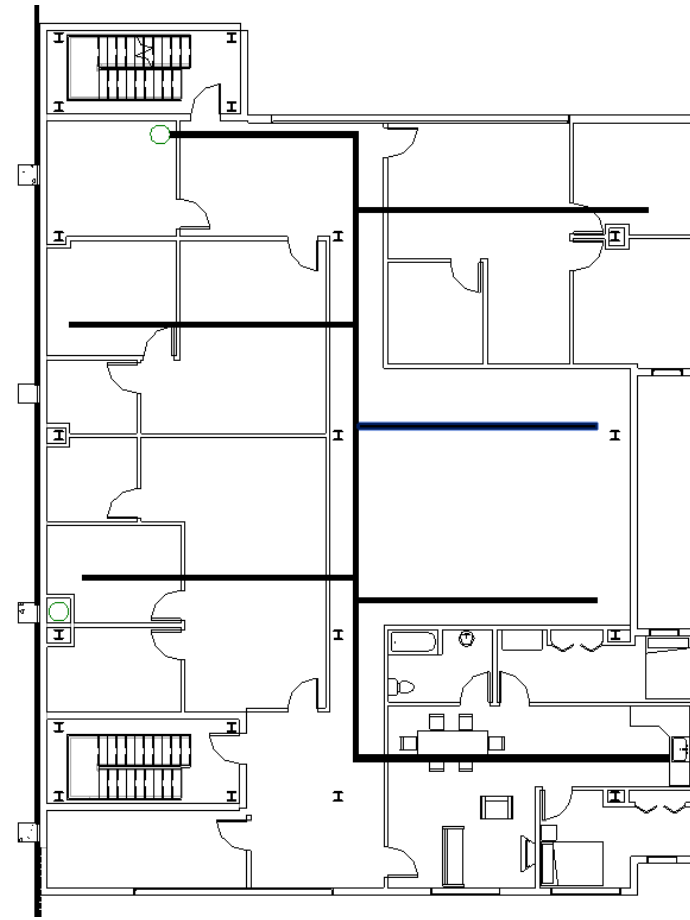
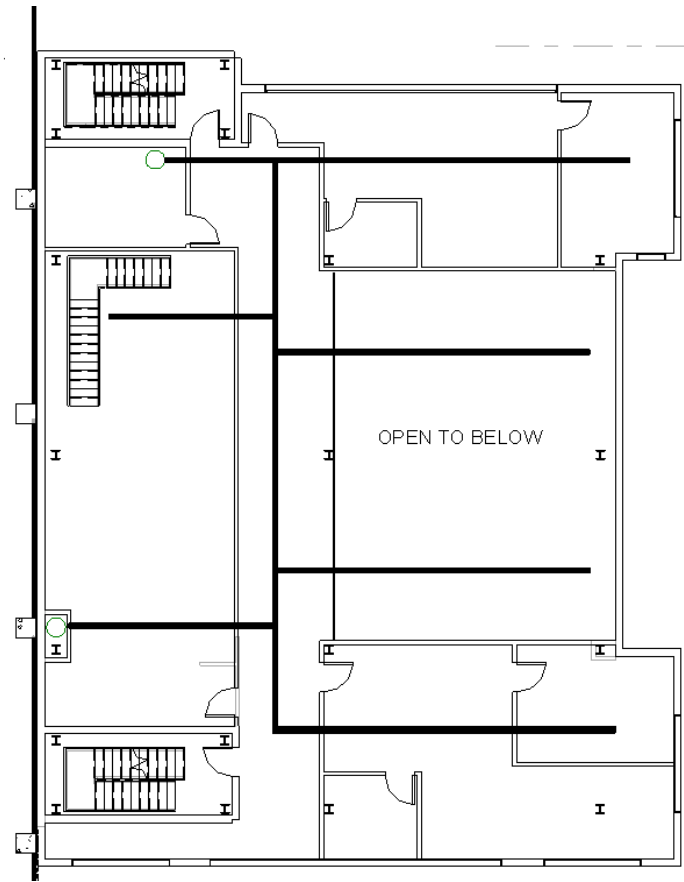
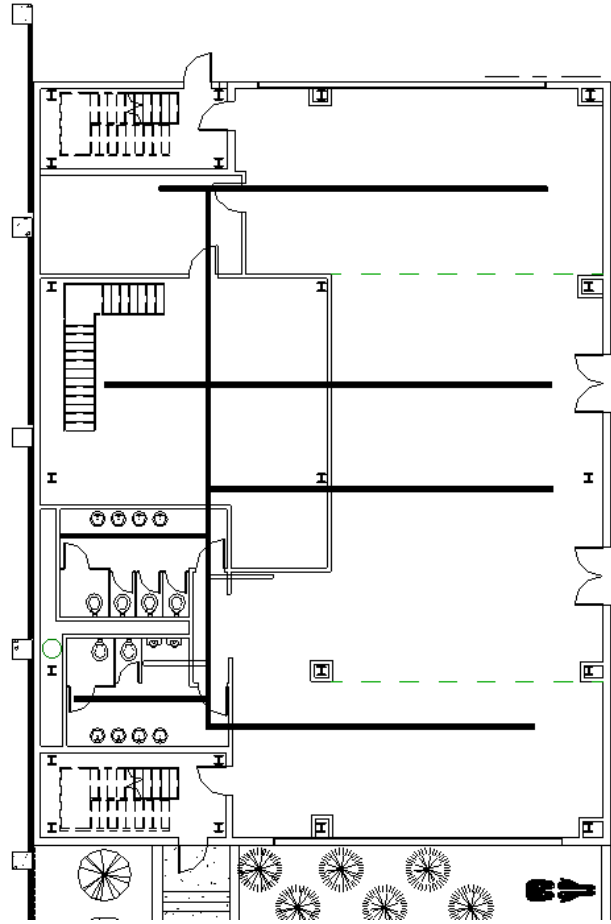
- “LIVING MACHINE” –
RECYCLES WASTE
WATER FOR REUSE
– USES LESS THAN
ONE KW/HR PER 3.5
SQ. METER
- PUBLIC GREEN SPACE
FOR GATHERING
- ACCESSIBLE FROM
PARKING GARAGE



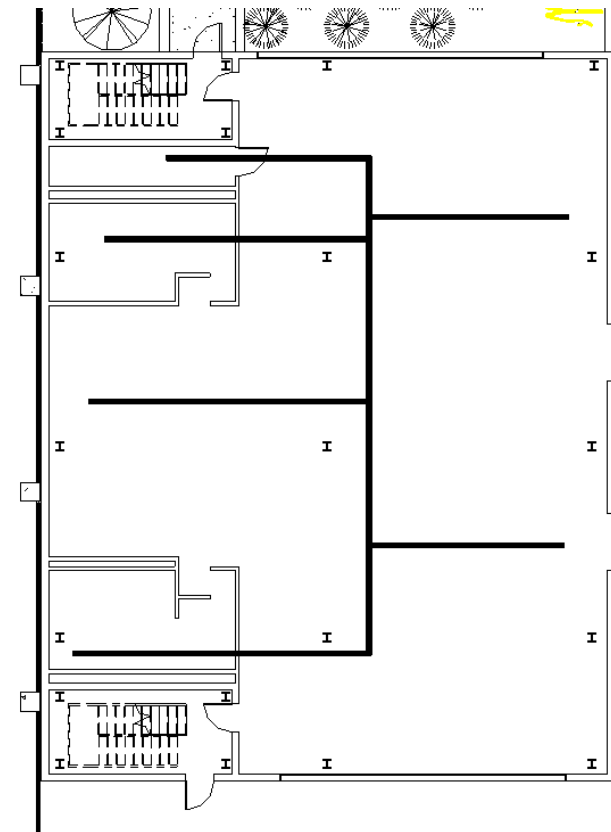
PARKING GARAGE FAÇADE DETAIL



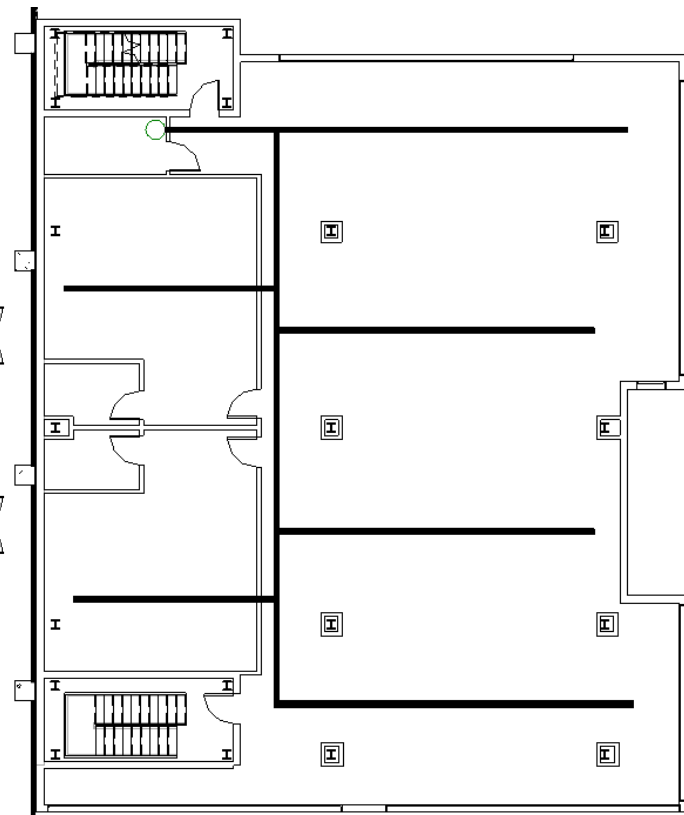
HVAC



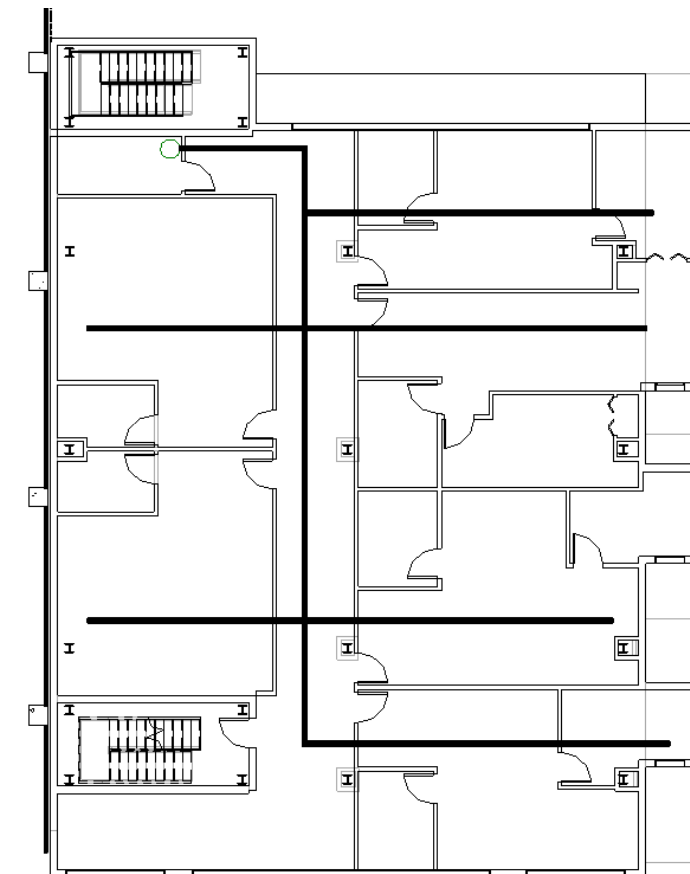
LEVEL 4



LEVEL 1

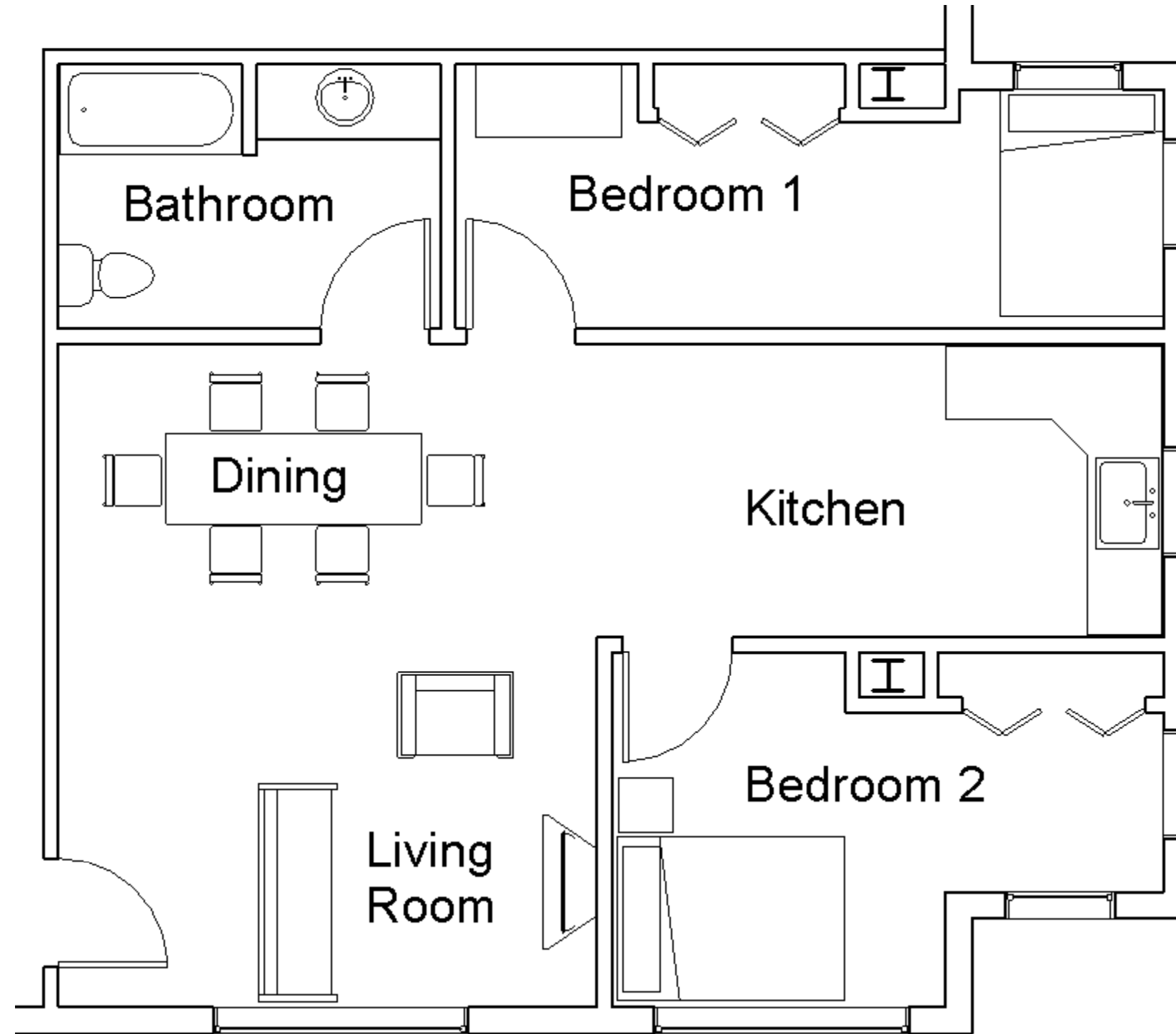


LEVEL 2



LEVEL 3

FLOOR PLAN OF APARTMENT



RENDERINGS



RENDERINGS

