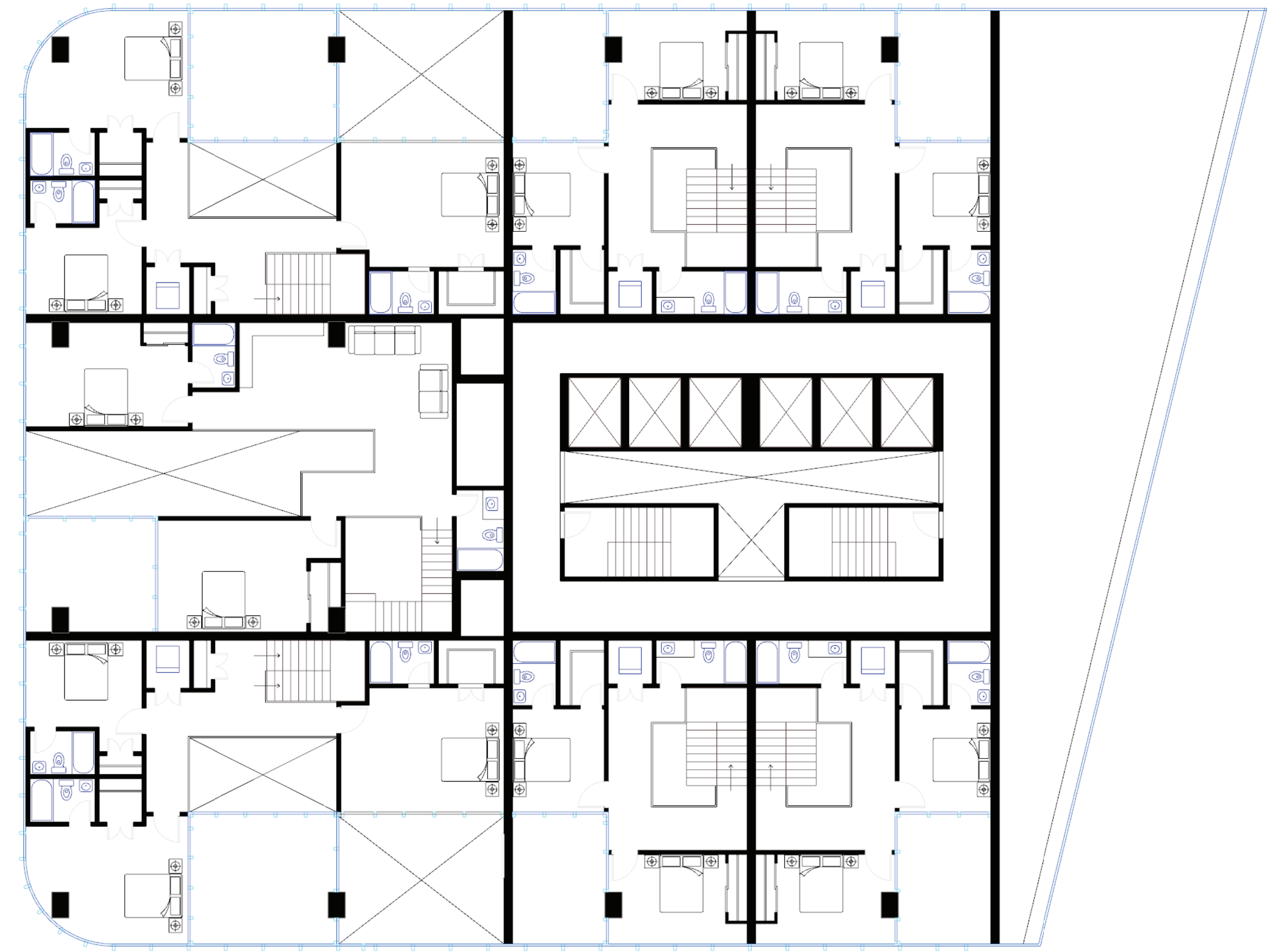
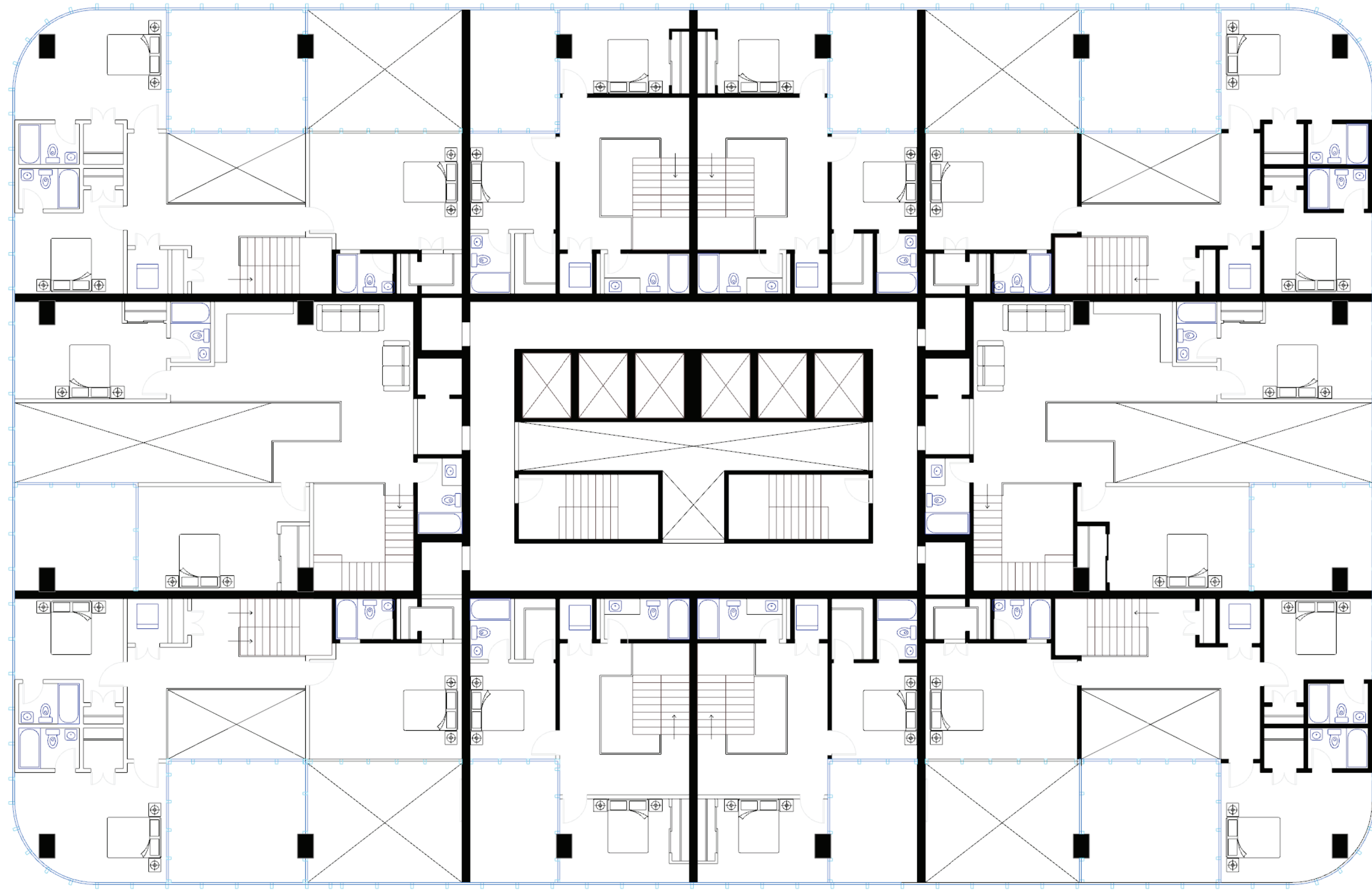
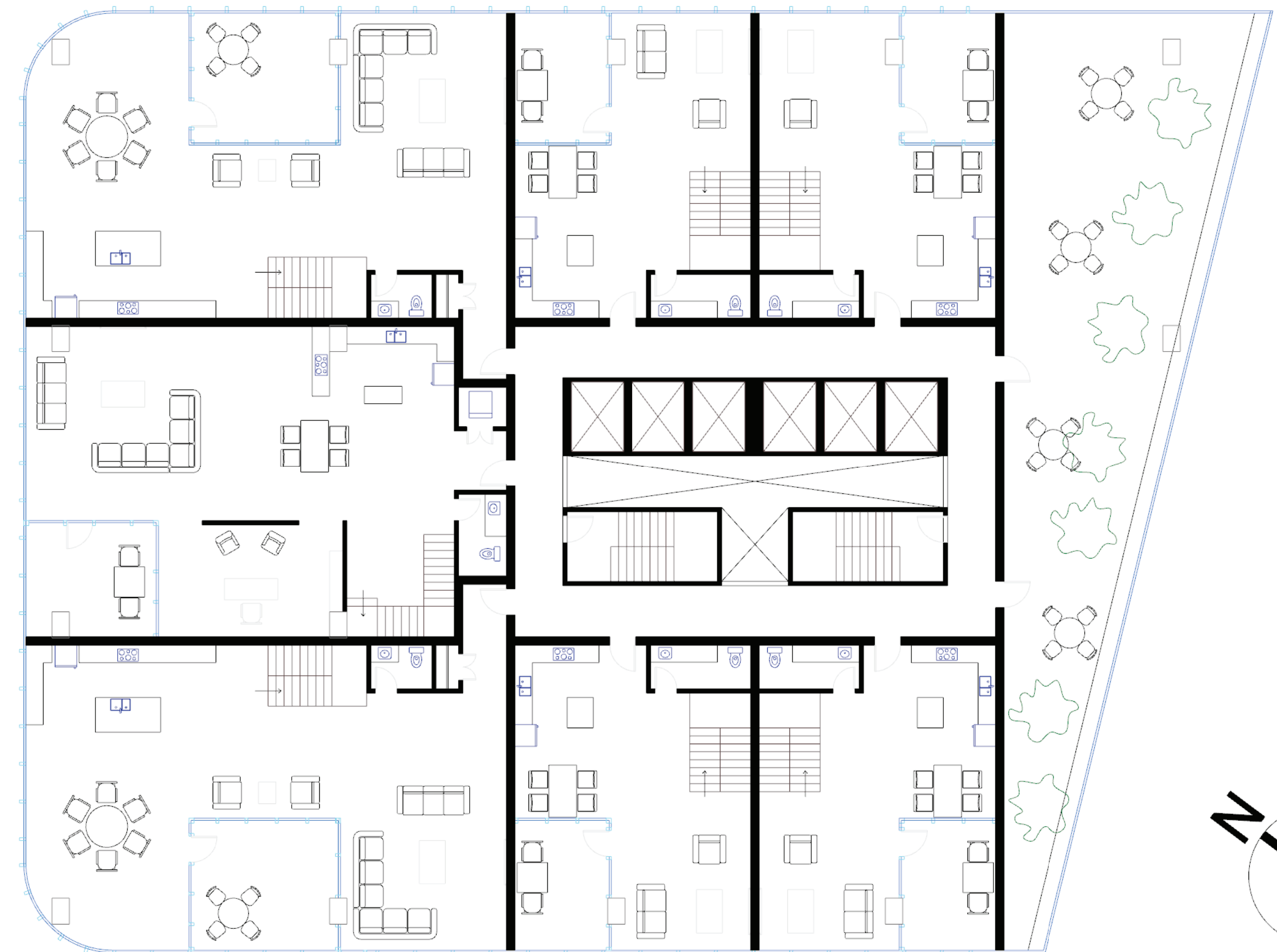
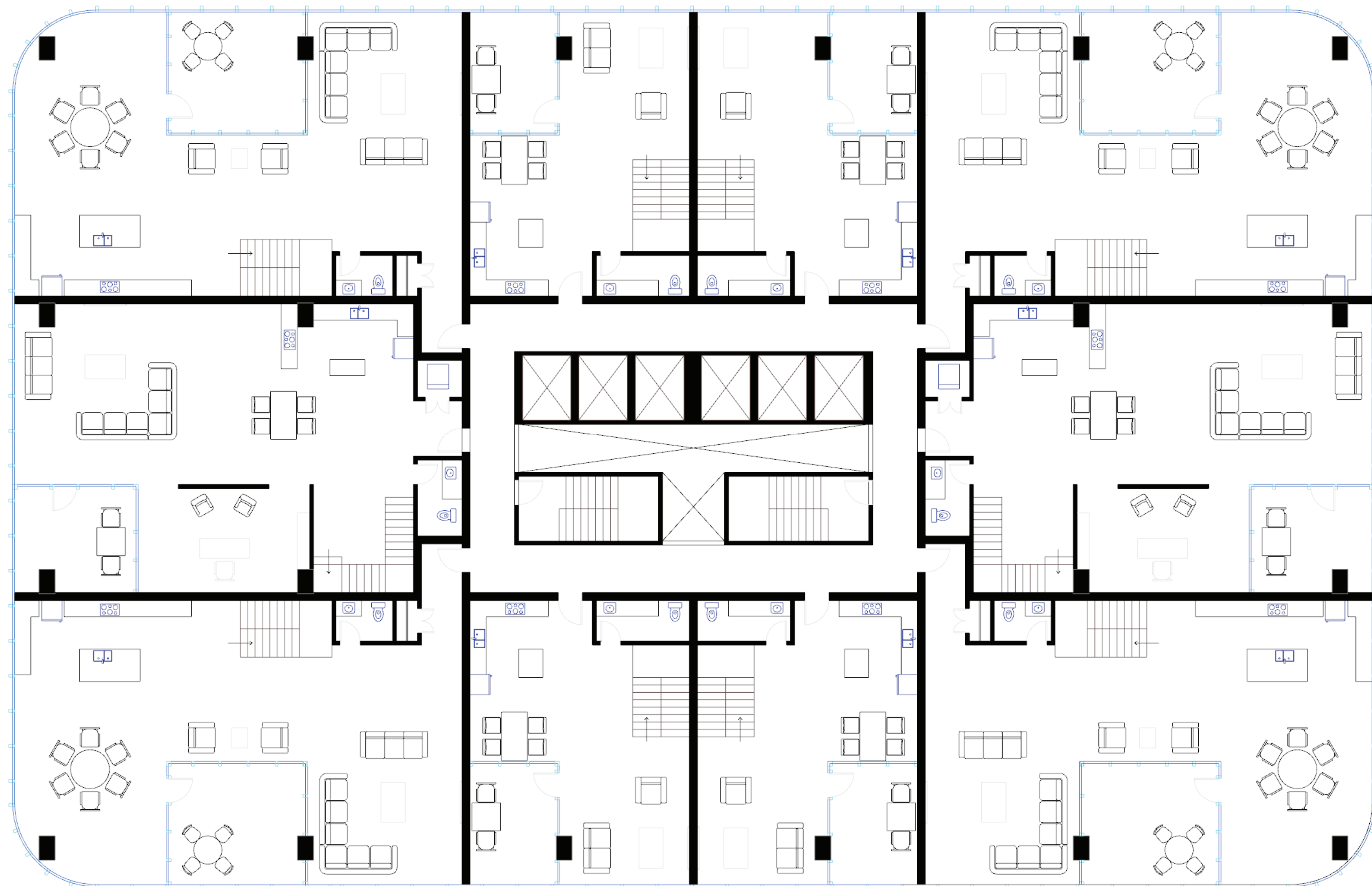


Percentage of occupied hours where illuminance is at least 28 footcandles, measured at 2.79 feet above the floor plate.

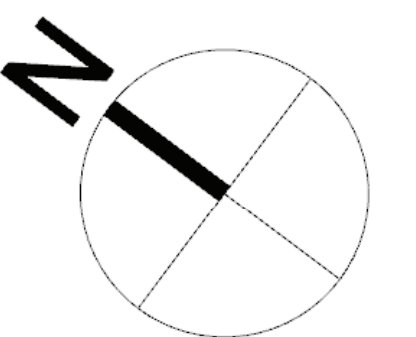
0% 25% 50% 75% 100%



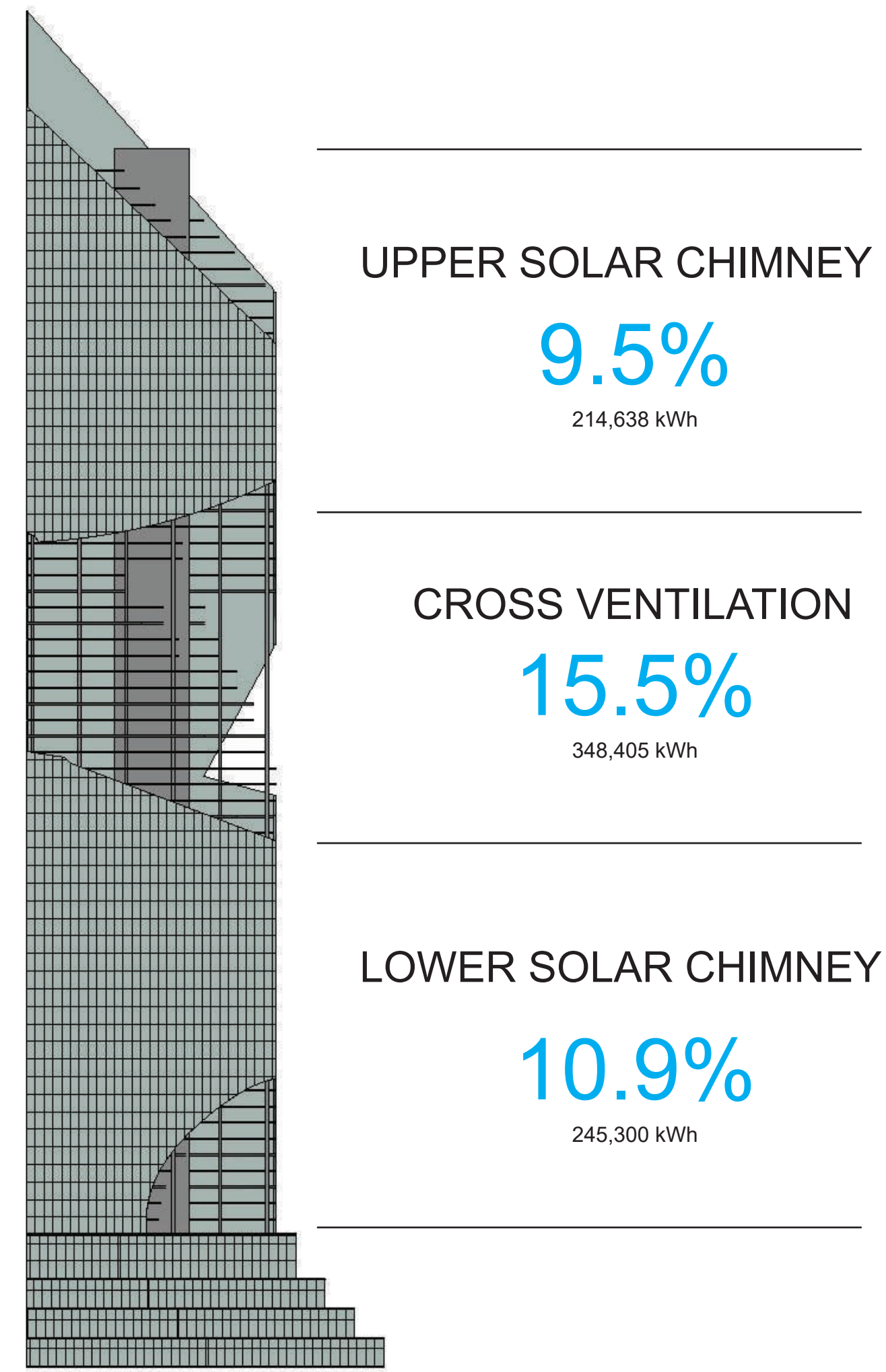
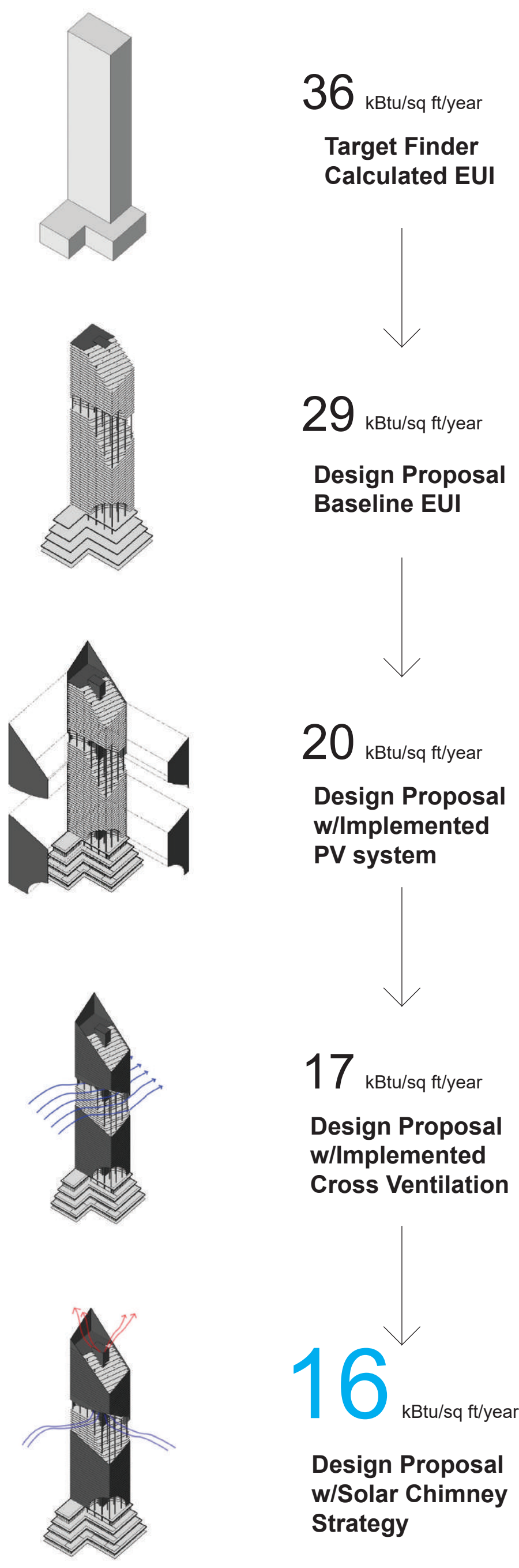
2nd floor of units



1st floor of units

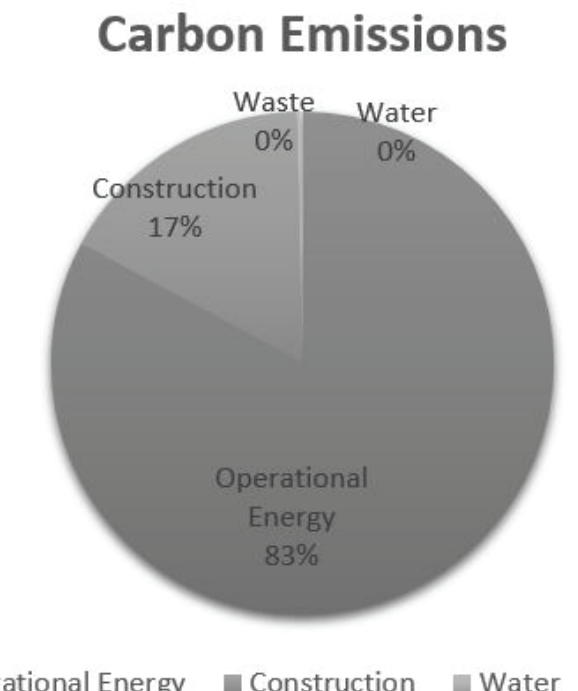


SCALE: 3/16" = 1'-0"



ENERGY REDUCTION

OPERATIONAL ENERGY	5,684,634 lbs CO2e/yr
CONSTRUCTION	1,149,923 lbs CO2e/yr
WATER	16,144 lbs CO2e/yr
WASTE	8,000 lbs CO2e/yr



SEQUESTERED CO2 (PVs) 2,171,646 lbs CO2e/yr

CUI: CARBON USE INTENSITY 2.9 lbs CO2e / sq ft / yr

CARBON FOOTPRINT

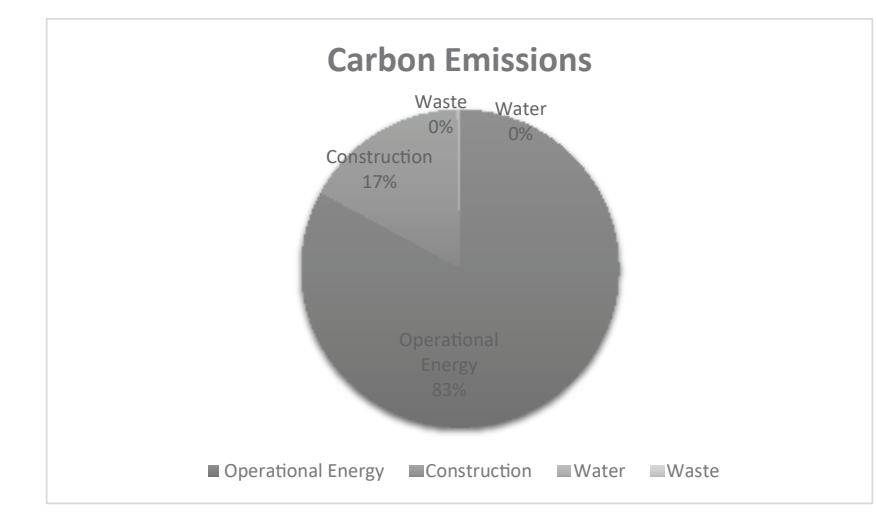
To Calculate the Carbon Footprint of the Building

City For LADWP Territory Data Taken from Power Profiler

Building Area (m2) 116,485.0 m2

Yearly Values	Conversion Factor	lbs CO2e/yr
1. Operational Energy:		
Use the following values from the energy modeling program		
Total Electricity	9,133,363 kWhr	per kWhr 0.62 lbs/kWhr
Total Fuel	262,886 kWhr	per kWhr 0.083492847 lbs/kWhr
EUI	81 kWhr/m2 year	
EUI	25 kBtu/sq ft year	
Operational Energy		5,684,634 lbs CO2e/yr
		2,578,065.4 kgs CO2e/yr
2. Construction:		
Build Carbon Neutral Provides an Easy way to calculate Embodied Emissions		
	38,070 metric tonnes	lbs per metric tonne 2205.0
		life expectancy of the building. Default is average in the USA 73.0
Construction		83,944,350 lbs CO2e
Per Year		1,149,923 lbs CO2e/yr
		38,070,000.0 kgs CO2e/yr
3. Water:		
CO2e factor per Million Gallons: 1,331 lbs of CO2		
	12,129,315 gallons of water	per gallon of water 0.001331
Water		16,144 lbs CO2e/yr
		7,321.6 kgs CO2e/yr
4. Waste:		
EPA WARM Model or		
	8,000	
Waste		8,000 lbs CO2e/yr
		3,628.1 kgs CO2e/yr
total		6,858,701 lbs CO2e / yr
total		3,110,521.9 kgs CO2e/yr
total		3,111 metric tonnes CO2e / yr
total		1,410,907.9 kgs CO2e/yr
total		27 kgs CO2e / m2 yr
total		5.47 lbs CO2e/sqft-yr
Renewable Energy		
Total Energy Generated on Site kWhr	3,502,655	per kWhr 0.62
Total kWhr/m2/yr:	30	
		2,171,646 lbs CO2 sequestered on site by renewable system

Tbe = Oe + Ce + We + Wa - Rs
 O >= Tbe
 Where
 Tbe total building emissions
 Oe operation emissions (energy)
 Ce construction emissions
 We water emissions
 Wa waste emissions
 Rs renewable strategies



ZERO NET CARBON

The numbers below are for 2030 Architecture's definition of Zero Net Carbon

total energy used	9,396,249	kWhr
total renewable energy generated	3,502,655	kWhr
annual energy balance	5,893,594	kWhr
EUI	51	kWhr/m2 year
EUI	16	kBtu/sq ft year
TOTAL CARBON	3,654,028	lbs CO2e / yr
TOTAL CARBON	1,657,441	kgs CO2e / yr
CUI: CARBON USE INTENSITY	14.2	kgs CO2e/m2-yr
CUI: CARBON USE INTENSITY	2.9	lbs CO2e/sf yr

CARBON NEUTRAL

The numbers below are for carbon emissions after renewables and should be zero or better to be carbon neutral

	4,687,055	lbs CO2e-yr
	2,126,011	kgs CO2e-yr
	2,126	metric tonnes CO2e-yr
CUI: CARBON USE INTENSITY	40.2	kgs CO2e/m2-yr
CUI: CARBON USE INTENSITY	8.2	lbs CO2e/sf yr

emissions after renewables
 emissions after renewables
 emissions after renewables
 emissions after renewables

Useful Information

- For Site**
 - Size of the lot sq ft
 - Area that is covered with vegetation
 - Number of trees planted
- For Construction**
 - Material or Descrip Area Sq Ft
 - Foundations and Footings
 - Columns and Beams
 - Intermediate Floors
 - Exterior Walls
 - Interior Walls
 - Windows
 - Roofs
- For Energy**
 - Electricity use per year
 - Gas Use per year
 - Electricity produced by renewables per year
- For Water**
 - Water use per year
- For Waste**
 - lbs of trash per year
 - percentage of trash that is recycled
 - if we have this by categories it would be even better: aluminum, plastic, glass, paper

Data

median life of a building in the USA is 73 yrs
 20.32 lbs of waste = 1 lb of CO2e
 california 0.33 kg CO2e per kWh
 A mixed hardwood accumulates 0.01 t C (carbon) per year for 20 years
 1 kilowatthour = 3,412 Btu
 Burning Gas According to the EIA
 Per million BTUs of Natural Gas 117 lbs of CO2
<https://www.eia.gov/tools/faqs/faq.cfm?id=73&i=11>

0	lbs of CO2 per BTU of Gas
0	lbs of CO2 per kBtu of Gas
0	lbs of CO2 per kWhr of Gas

another source

12	lbs per 100000 btus
0	lbs per btu
0	lbs per kbtu

116,999 Pounds of CO2 per million Btu

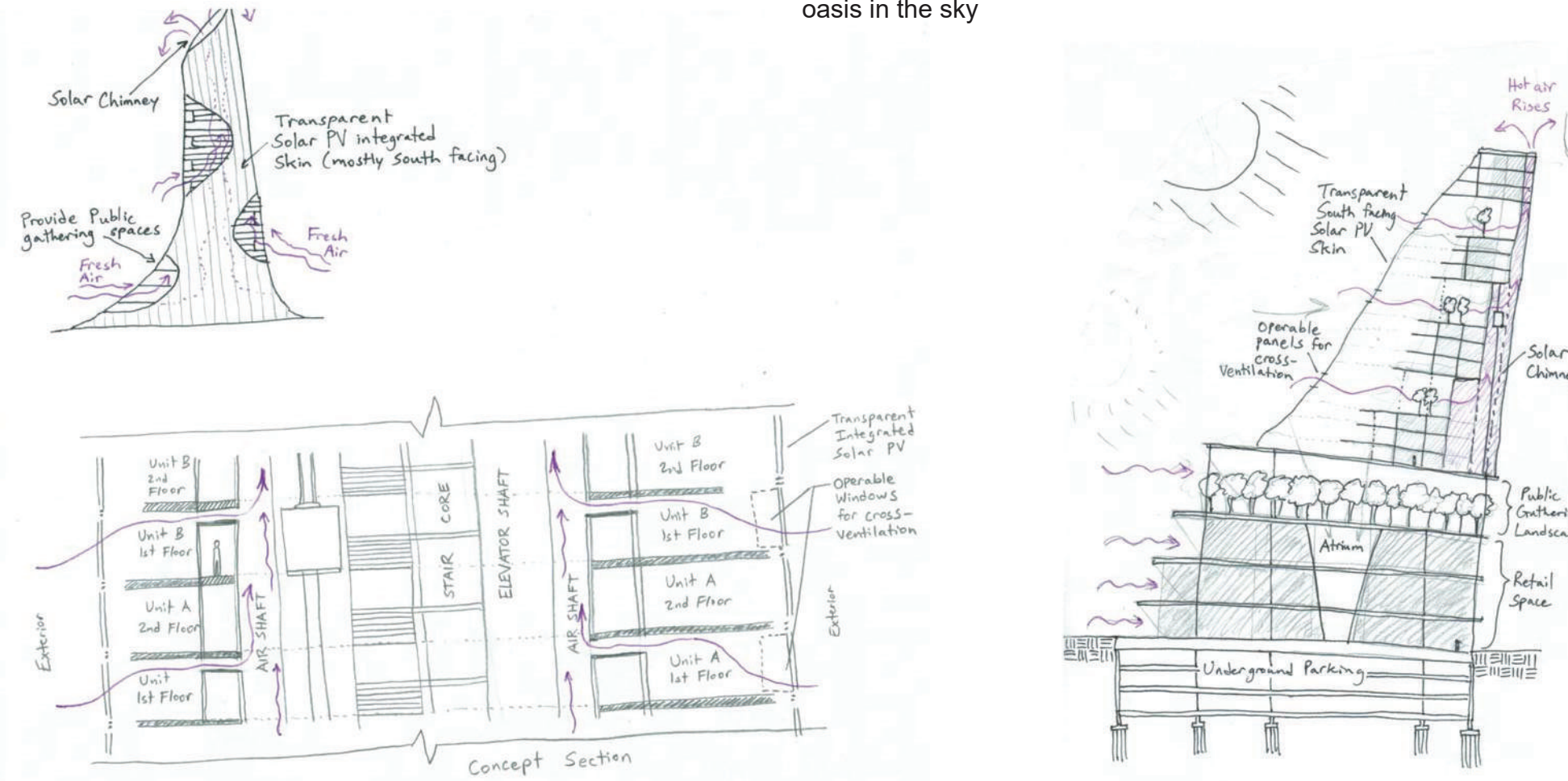
GAS EIA
 DEFRA

For gas it is: 0.42 lbs of CO2 per kWh or 11.93 lbs of CO2 per Therm
 For gas it is: 0.184070 kgCO2 per kWh
 0.083492847

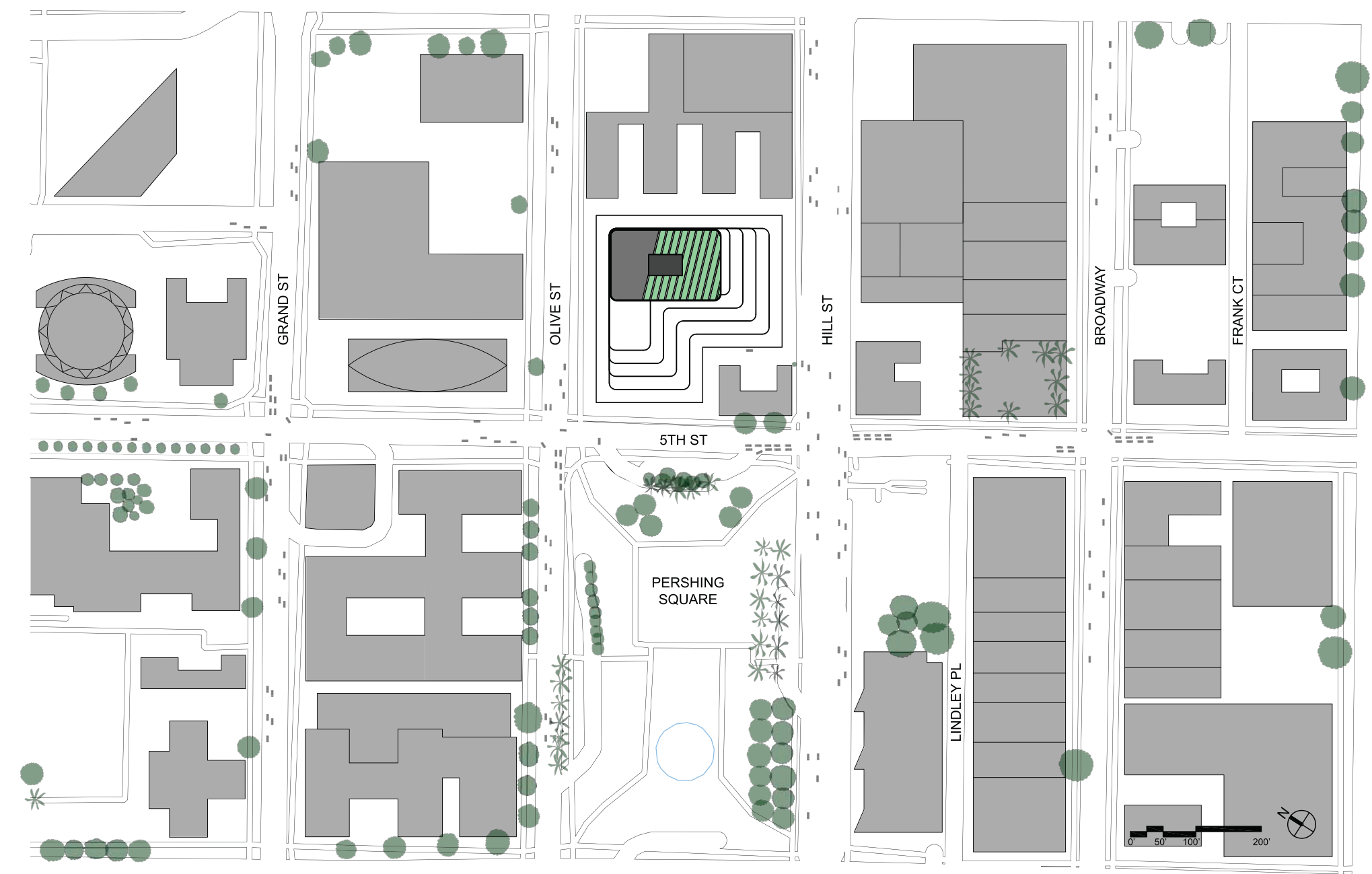
This website provides equivalencies for calculations
<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

Sky Gardens

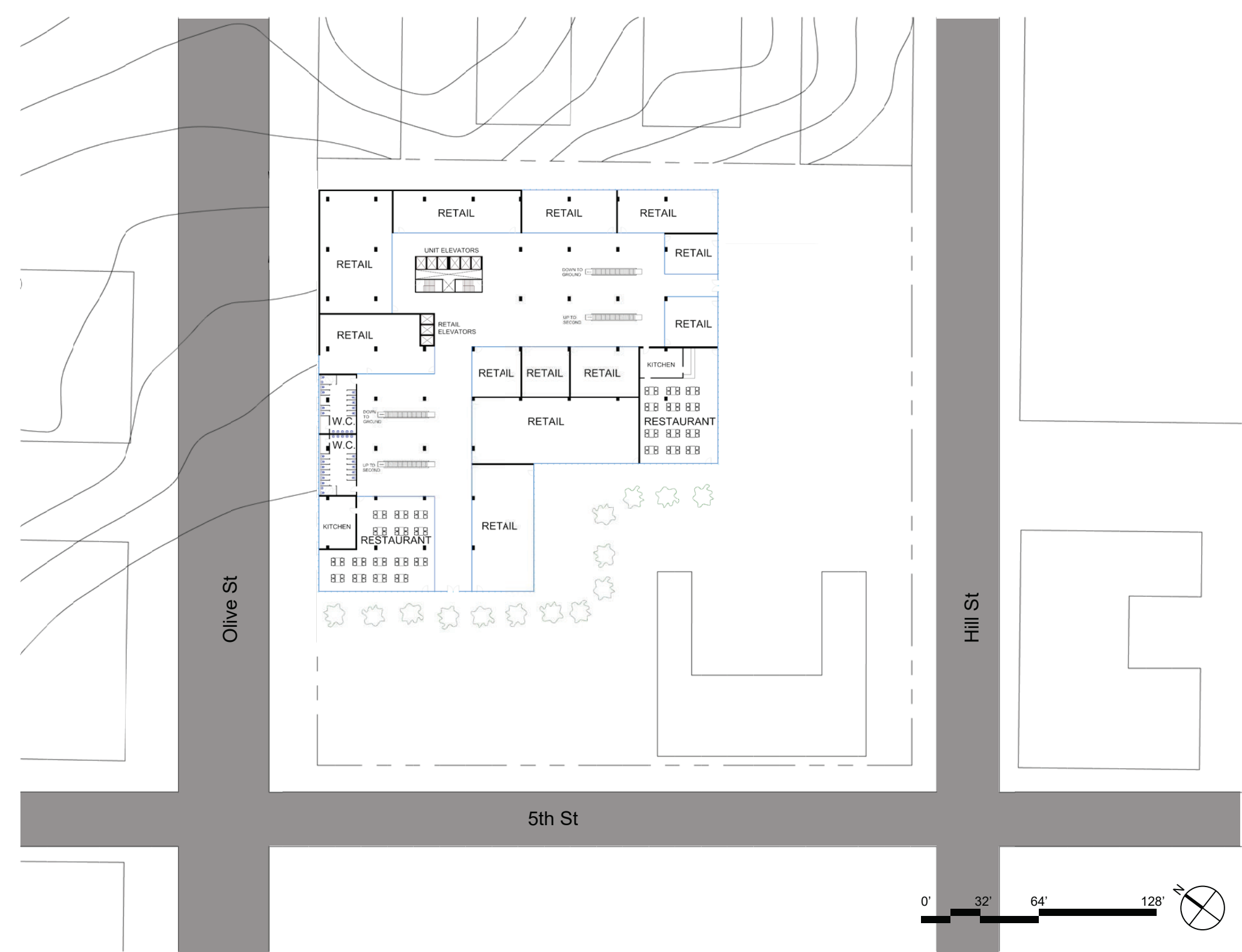
The Sky Gardens Projects originated from providing the city of Los Angeles with open landscape spaces and energy sustainable residential tower providing natural ventilation to its residents. The early concepts involved the use of a solar chimney, open patio spaces, maximizing solar daylight, transparent south facing solar photovoltaic skin, and operable panels that support cross ventilation and the solar chimney. After further analysis, the project developed into a tri-partite sustainable structure in which each part implemented a different strategy. The upper and lower portions of the tower focus on the use of a solar chimney to offset overall energy usage and reduce building cooling loads, while the central portion concentrated on cross ventilation and providing green space. It also offers three levels of retail and restaurant spaces and a large open landscape for use by residents and the public as an escape from the pollution created from the urban sprawl of downtown Los Angeles. By taking advantage of the large surface area inherent in the design, the tower's skin integrates an operable transparent solar PV panel system and that provides energy, cooling, and an elegant facade design. Sky Gardens - an oasis in the sky



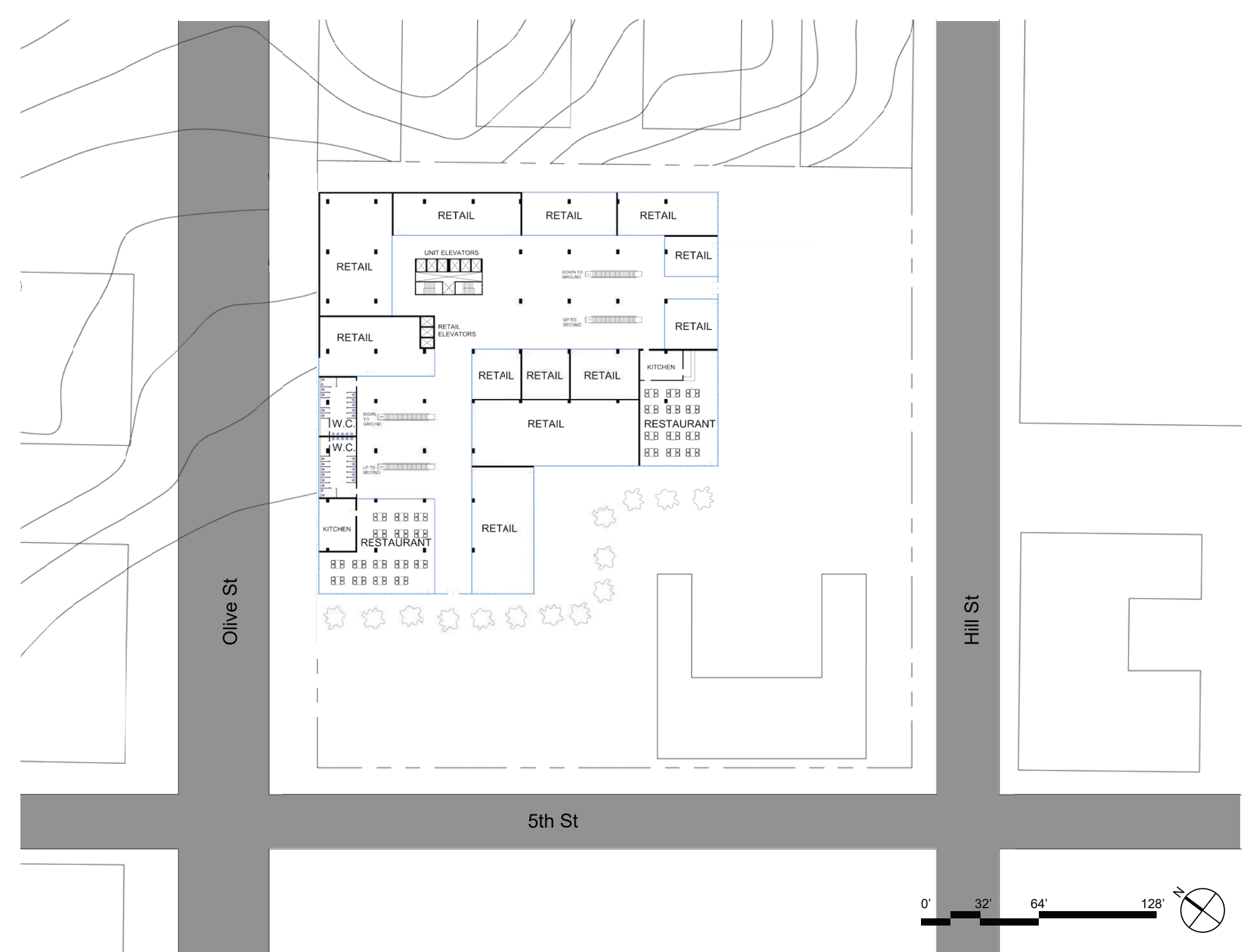
CONCEPT SKETCHES



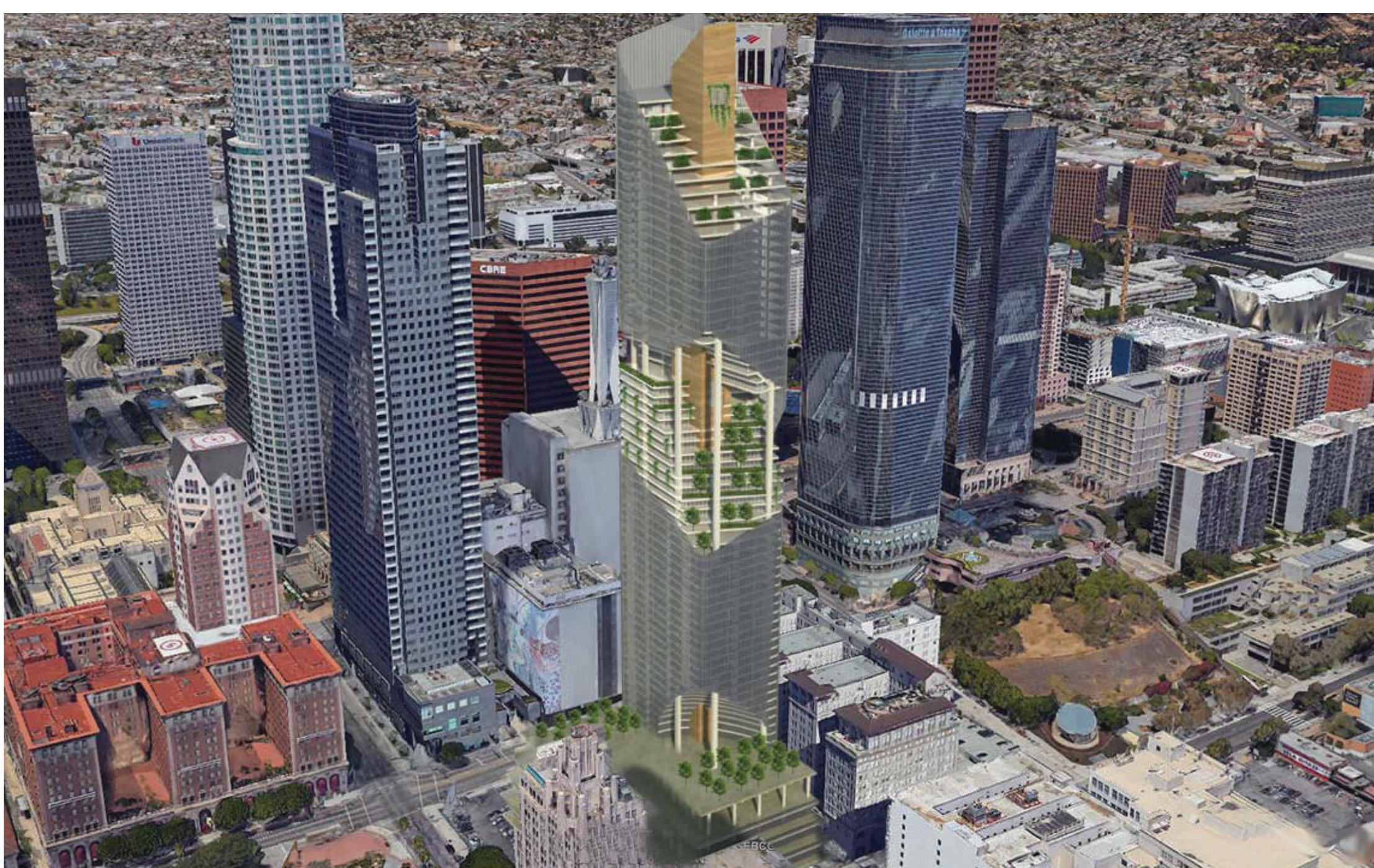
SITE PLAN SCALE: 1" = 200'

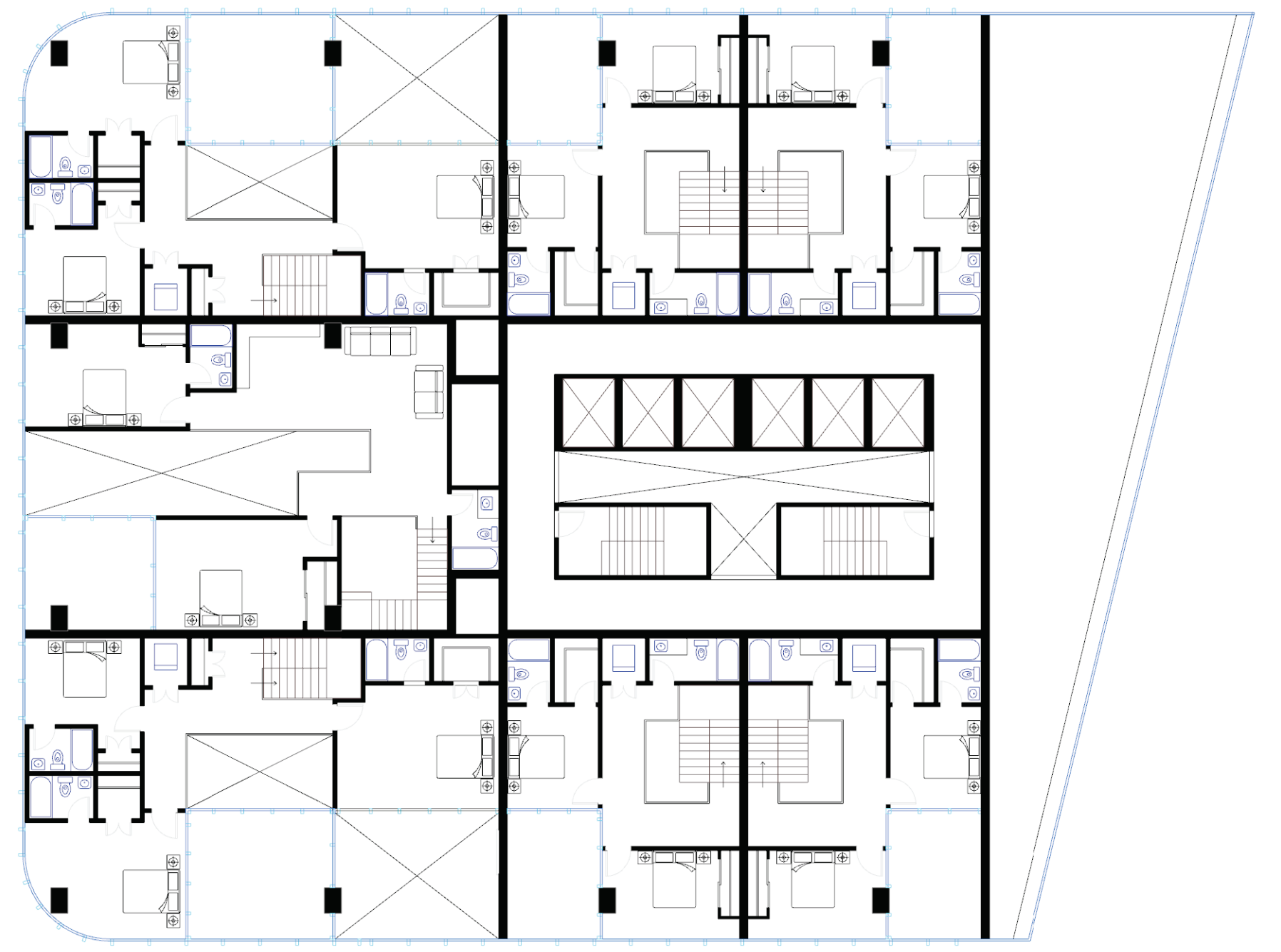
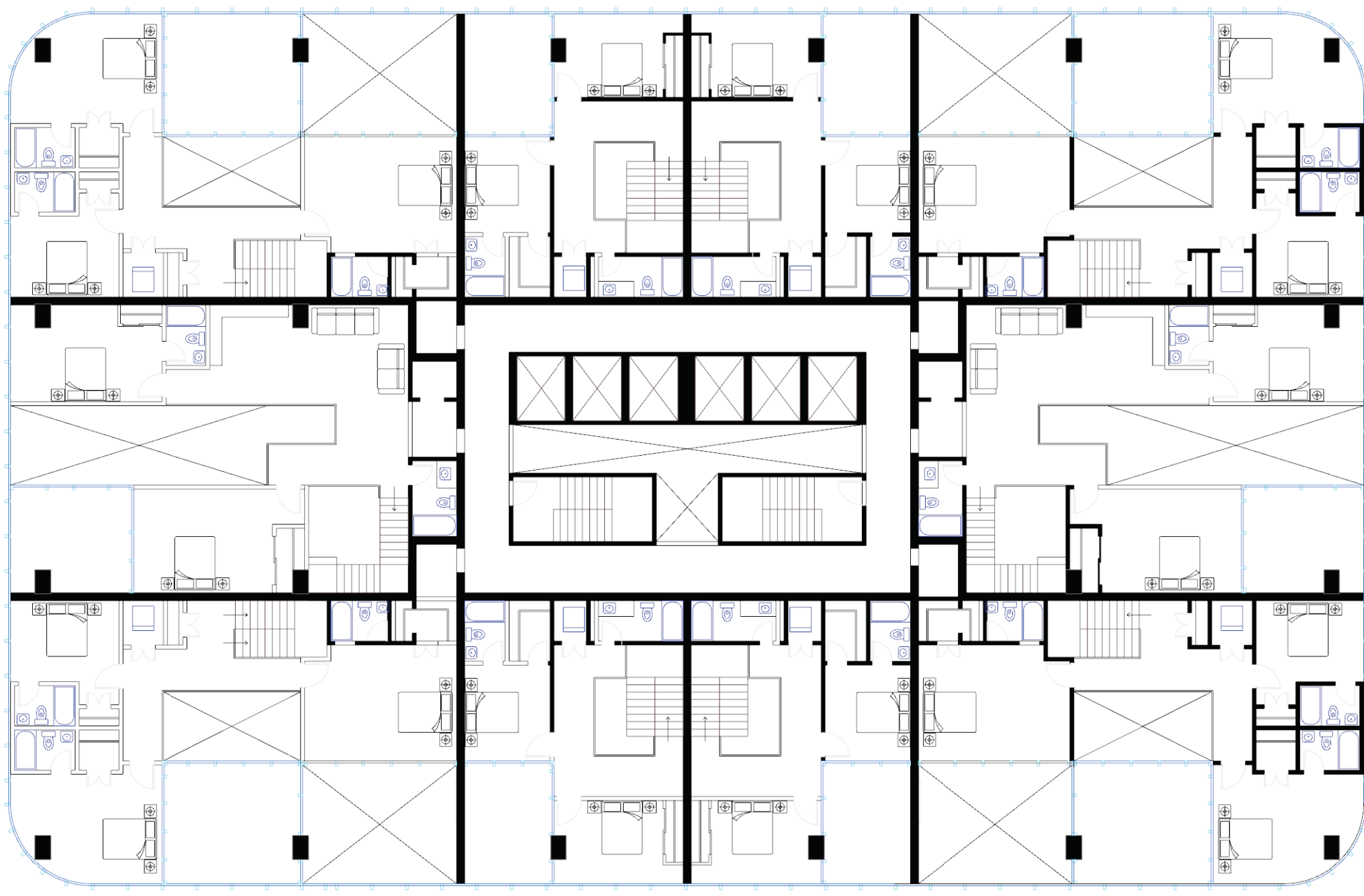


SECOND FLOOR RETAIL SCALE: 1/64" = 1' - 0"

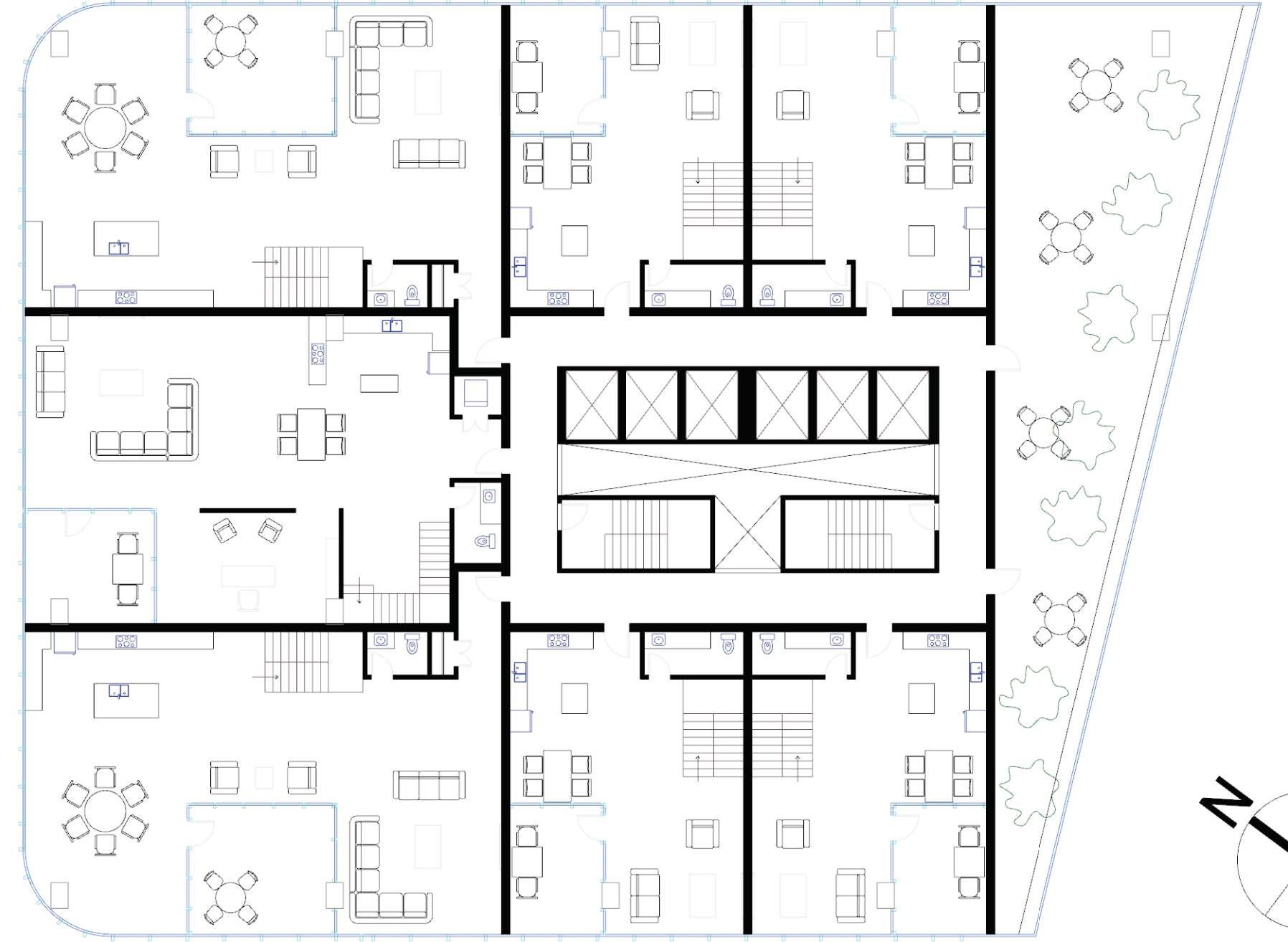
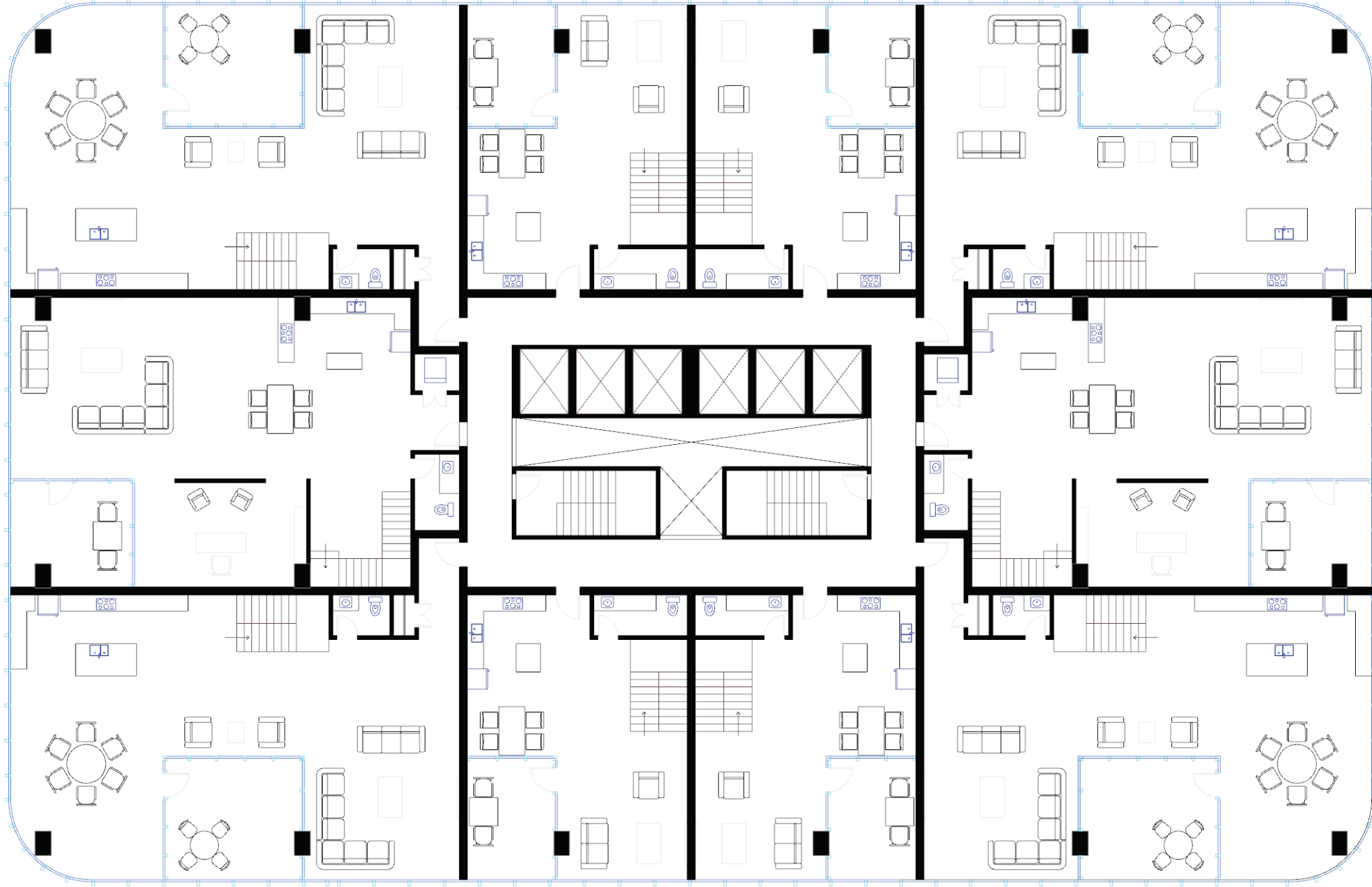


GROUND FLOOR RETAIL SCALE: 1/64" = 1' - 0"



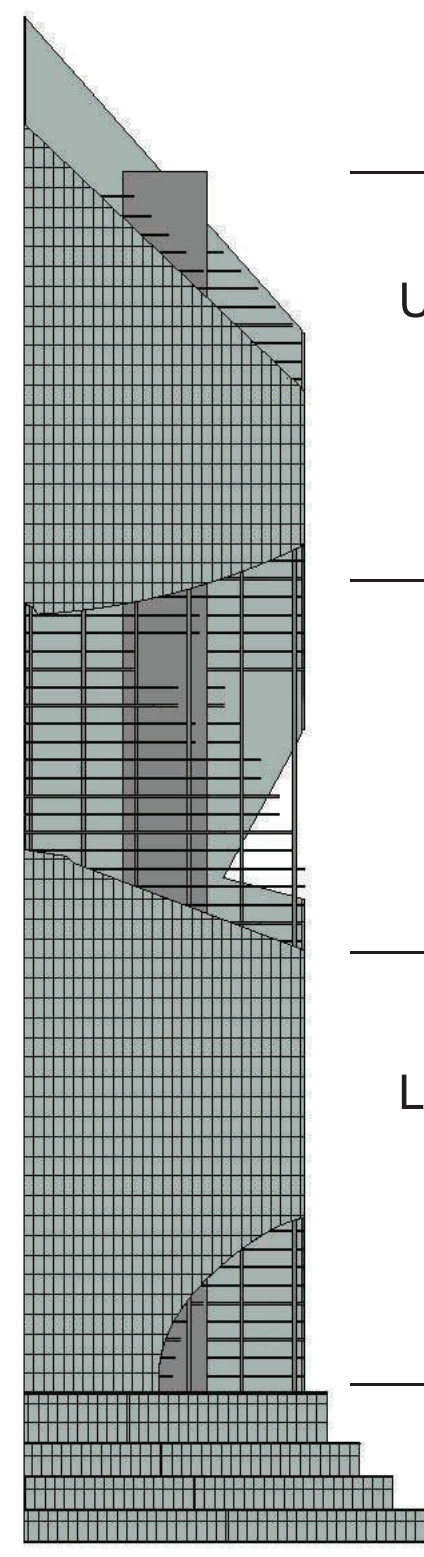
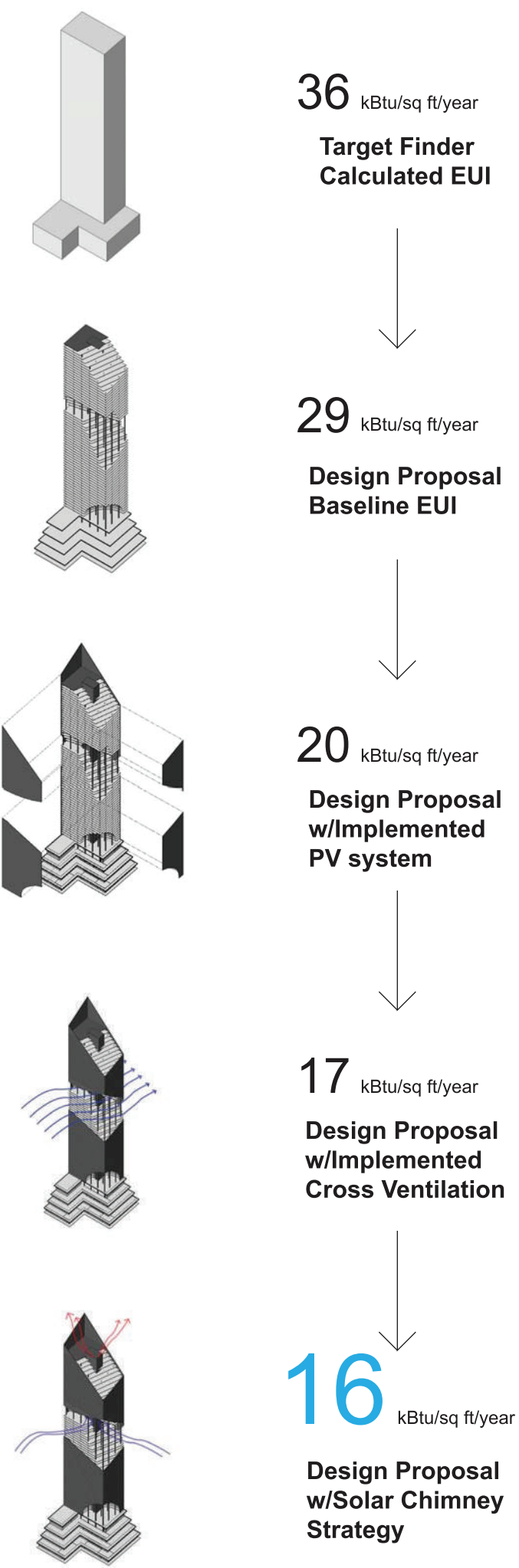


2nd floor of units



1st floor of units

TYPICAL FLOOR PLANS SCALE: 1/16" = 1' - 0"



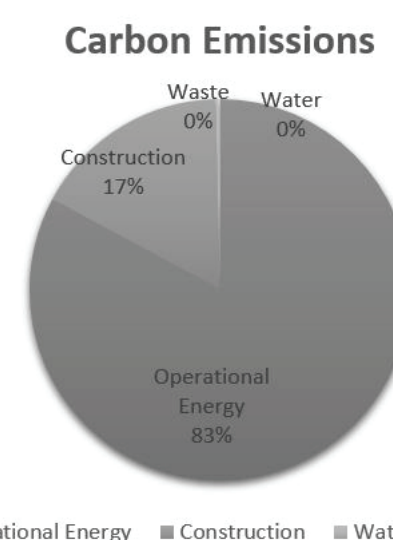
ENERGY REDUCTION

UPPER SOLAR CHIMNEY
9.5%
214,638 kWh

CROSS VENTILATION
15.5%
348,405 kWh

LOWER SOLAR CHIMNEY
10.9%
245,300 kWh

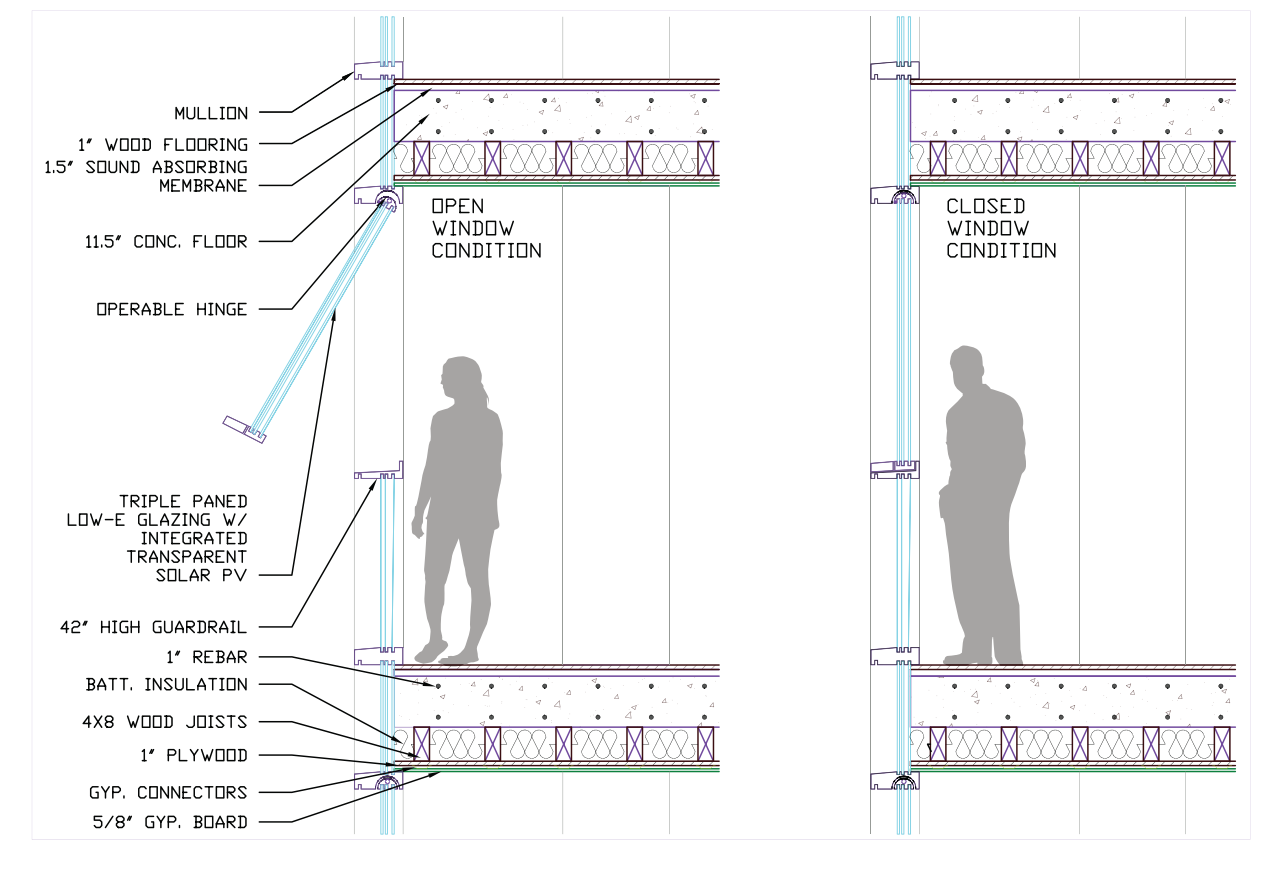
OPERATIONAL ENERGY	5,684,634 lbs CO2e/yr
CONSTRUCTION	1,149,923 lbs CO2e/yr
WATER	16,144 lbs CO2e/yr
WASTE	8,000 lbs CO2e/yr



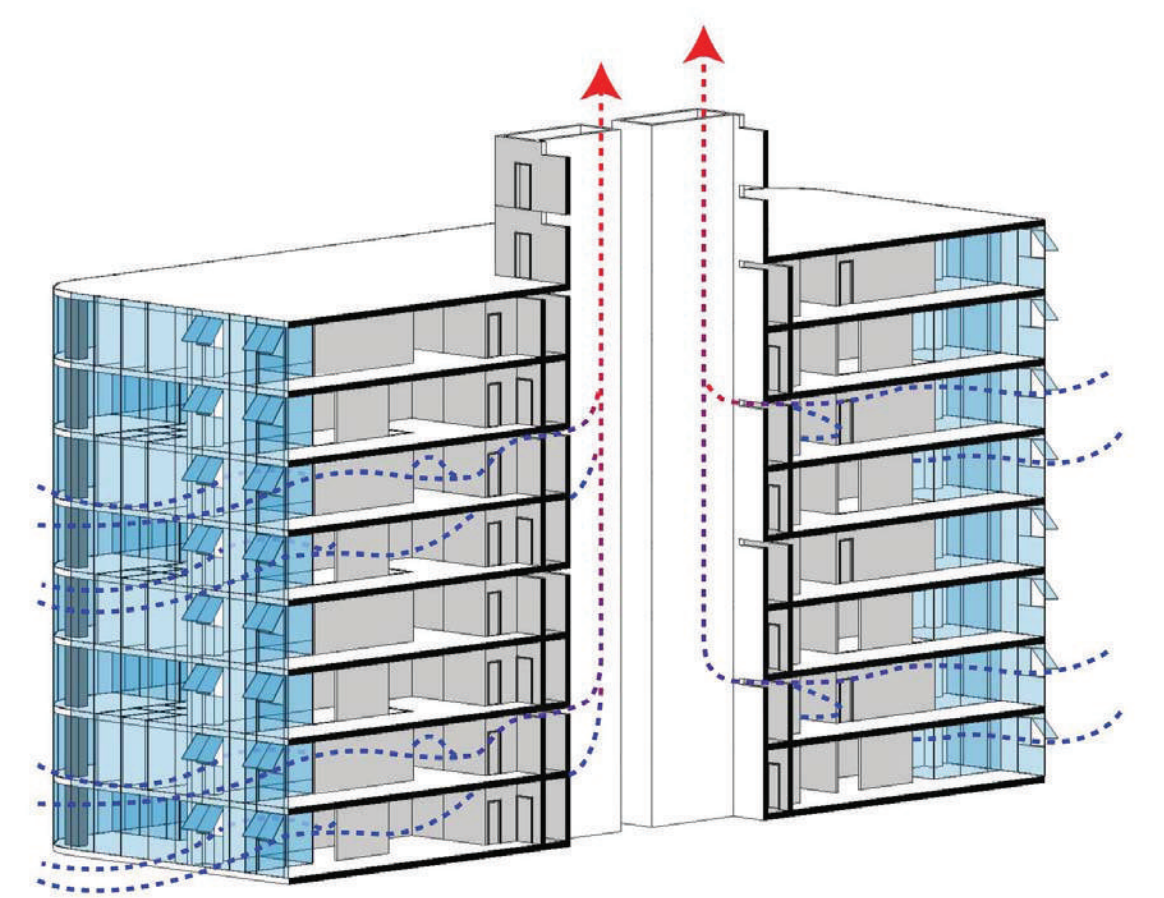
SEQUESTERED CO2 (PVs) 2,171,646 lbs CO2e/yr

CUI: CARBON USE INTENSITY 2.9 lbs CO2e / sq ft / yr

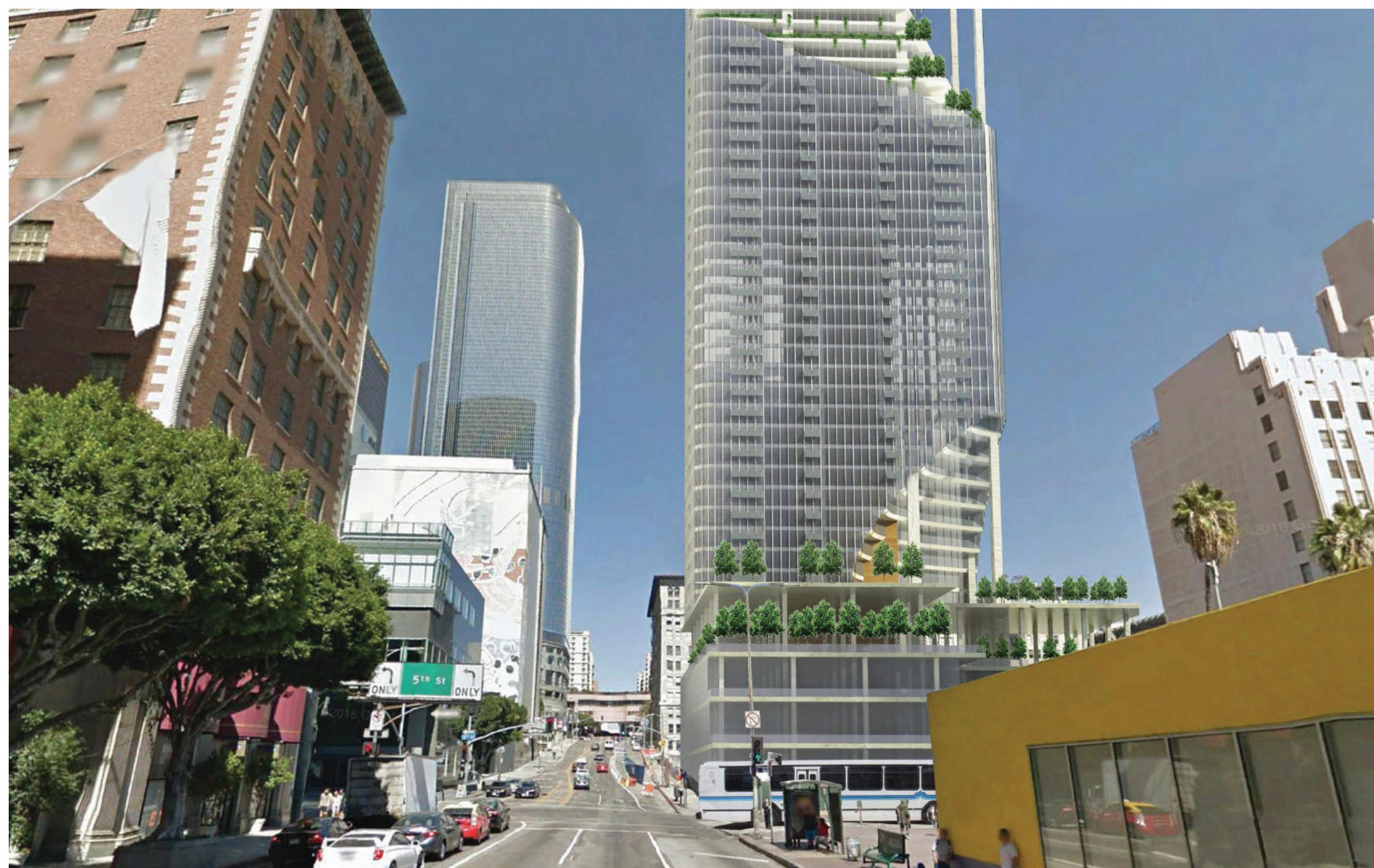
CARBON FOOTPRINT



WINDOW DETAIL



SUSTAINABLE STRATEGIES



SOLAR DIAGRAM

