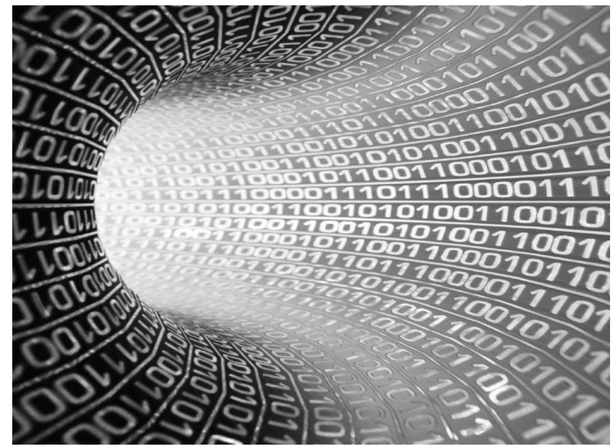
NEW CHAUTAUQUA INSTITUTE IN CHICAGO

Environmental Design Studio
Shengliang Rong
Yuntian Wan

Concept
New Chautauqua

Chautauqua (in the late 19th and early 20th centuries)
"the most American thing in America"

→



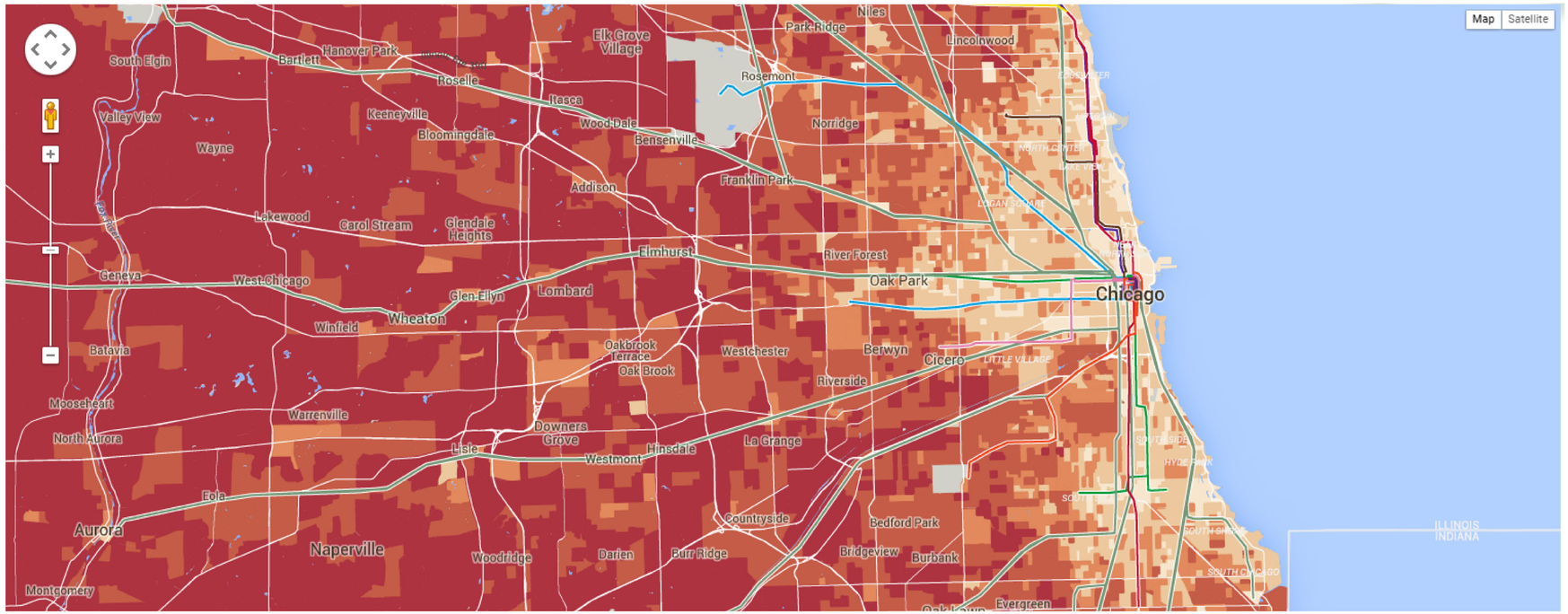
Internet and Technology
(mid-1990s and from the late 1990s and early 20th centuries)

→

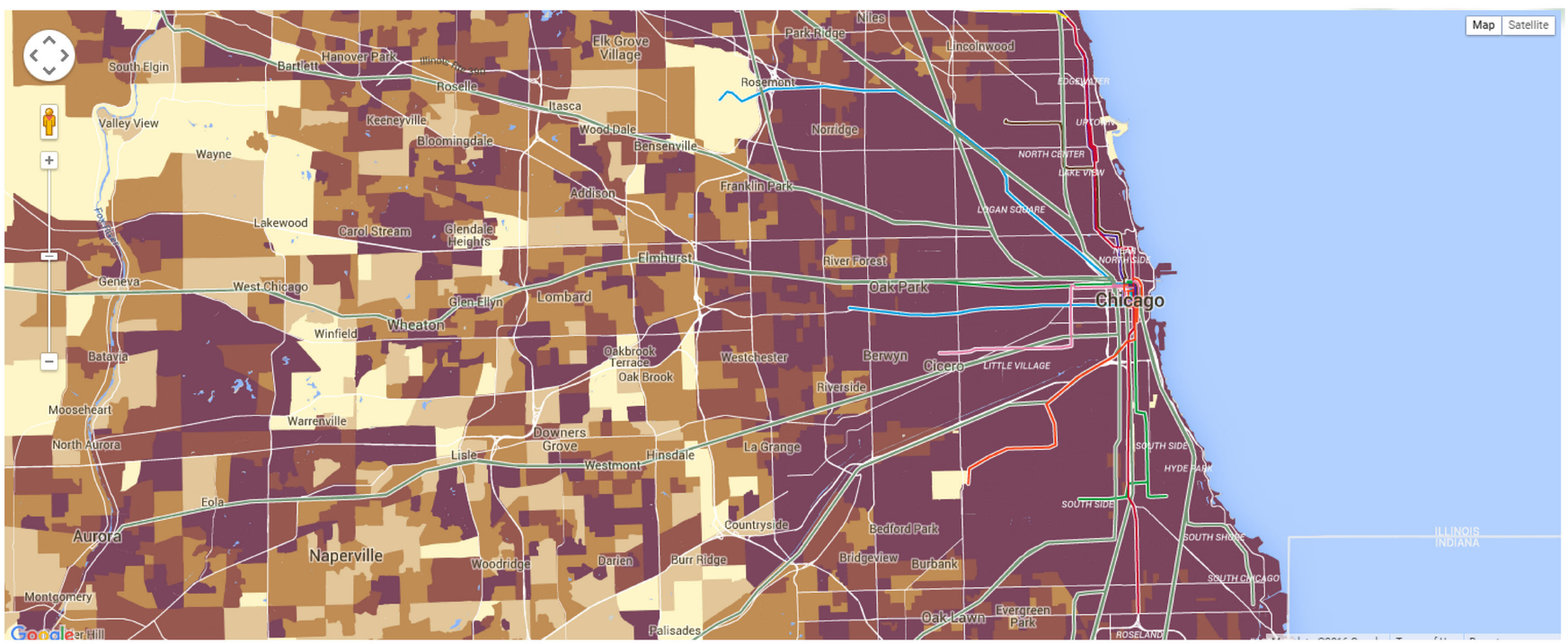
New Chautauqua (21st centery)
Sustainable Development

History and Linkages

Reverse Pattern between
GHG per Capita and Population Density



Annual GHG per Household



Residential Density

Livable Communities

This theme addresses diverse factors that together shape quality of life in terms of "livability" – what attracts people to a particular community. The following are the four sections of recommended actions:

- Achieve Greater Livability through Land Use and Planning
- Manager and Conserve Water and Energy Resources
- Expand and Improve Parks and Open Space
- Promote Sustainable Local Food

Human Capital

This theme addresses factors that determine whether our region's economy will thrive due the availability of skilled workers and a climate in which commercial creativity can flourish. This chapter includes two areas of recommended actions:

- Improve Education and Workforce Development
- Support Economic Innovation

Effiicient Governance

This theme addresses the need for increased effectiveness of governments in the region and beyond, which is important to meet residents' needs regarding accountability and transparency. The chapter on Efficient Governance includes three sections of recommended actions:

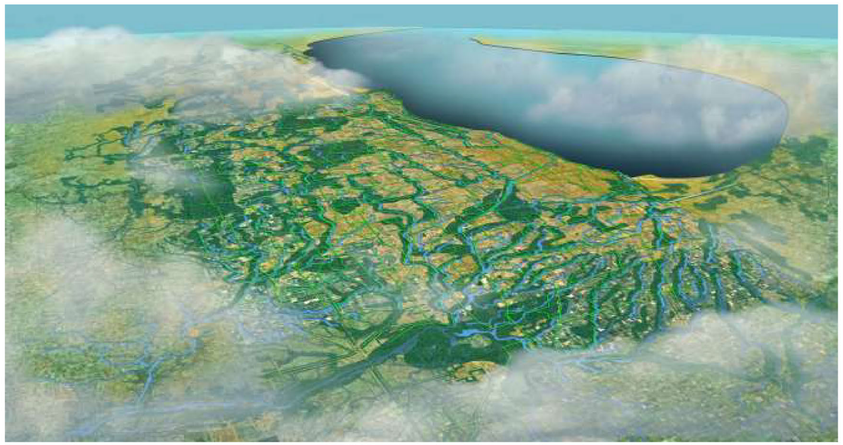
- Reform State and Local Tax Policy
- Improve Access to Information
- Pursue Coordinated Investments

Regional Mobility

This theme addresses the vitality of our region's transportation system, which is crucial for economic prosperity and overall quality of life. The chapter on Regional Mobility includes the following sections of recommended actions: (This chapter also includes descriptions of major capital projects that have been carefully selected to help achieve the GO TO 2040 Regional Vision.)

- Invest Strategically in Transportation
- Increase Commitment to Public Transit
- Create a More Efficient Freight Network

Chicago Towards 2040:
+Smart Growth
+Sustainable Growth
+Green Chicago



Conservation open space :

250,000 ACRES

TODAY

400,000 ACRES

GO TO 2040

Missions of New Chautauqua

City towards sustainable

bring knowledge to many places

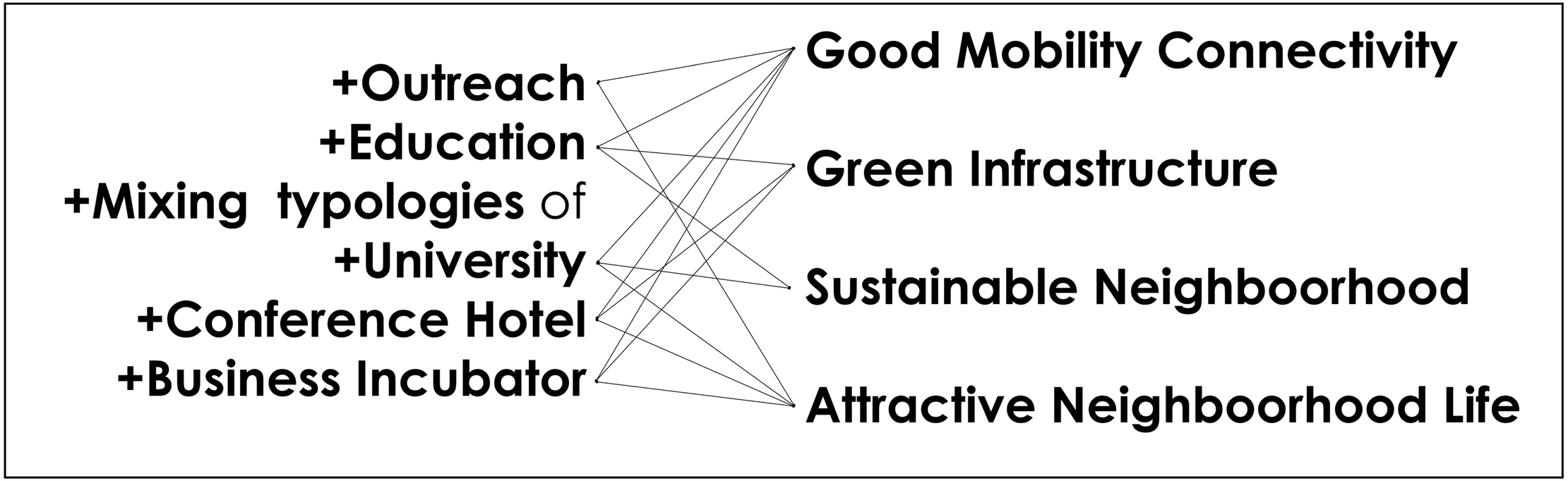
Urban Habitant

Missions of Chicago

Sustainable City

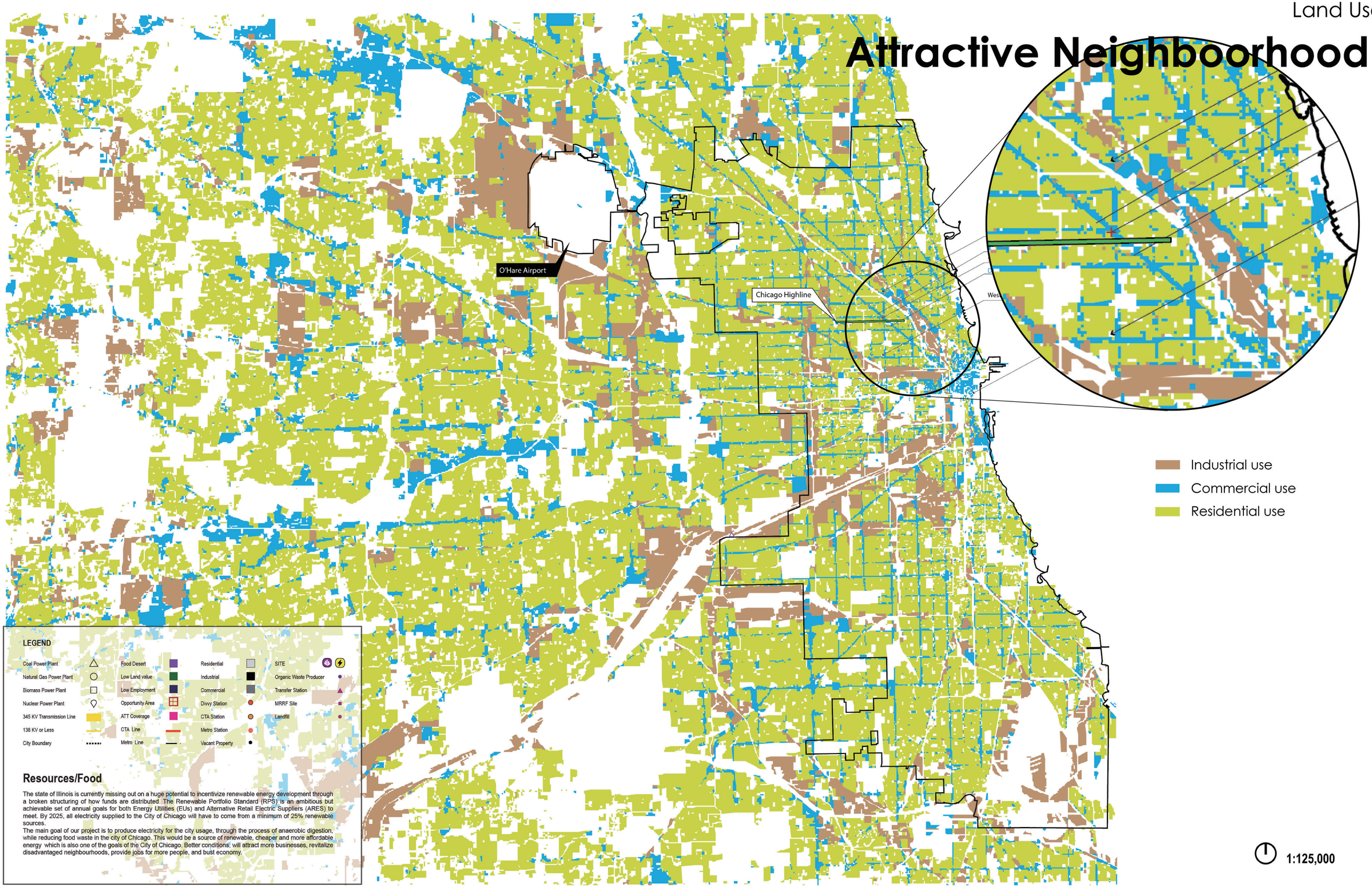
attract prople in city

repopulate urban area



Site Resources
Land Use

Attractive Neighboorhood



LEGEND

Coal Power Plant	Food Desert	Residential	SITE
Natural Gas Power Plant	Low Land value	Industrial	Organic Waste Producer
Biomass Power Plant	Low Employment	Commercial	Transfer Station
Nuclear Power Plant	Opportunity Area	Divvy Station	MRRF Site
345 KV Transmission Line	ATT Coverage	CTA Station	Landfill
138 KV or Less	CTA Line	Metro Station	
City Boundary	Metro Line	Vacant Property	

Resources/Food

The state of Illinois is currently missing out on a huge potential to incentivize renewable energy development through a broken structuring of how funds are distributed. The Renewable Portfolio Standard (RPS) is an ambitious but achievable set of annual goals for both Energy Utilities (EUs) and Alternative Retail Electric Suppliers (ARES) to meet. By 2025, all electricity supplied to the City of Chicago will have to come from a minimum of 25% renewable sources.
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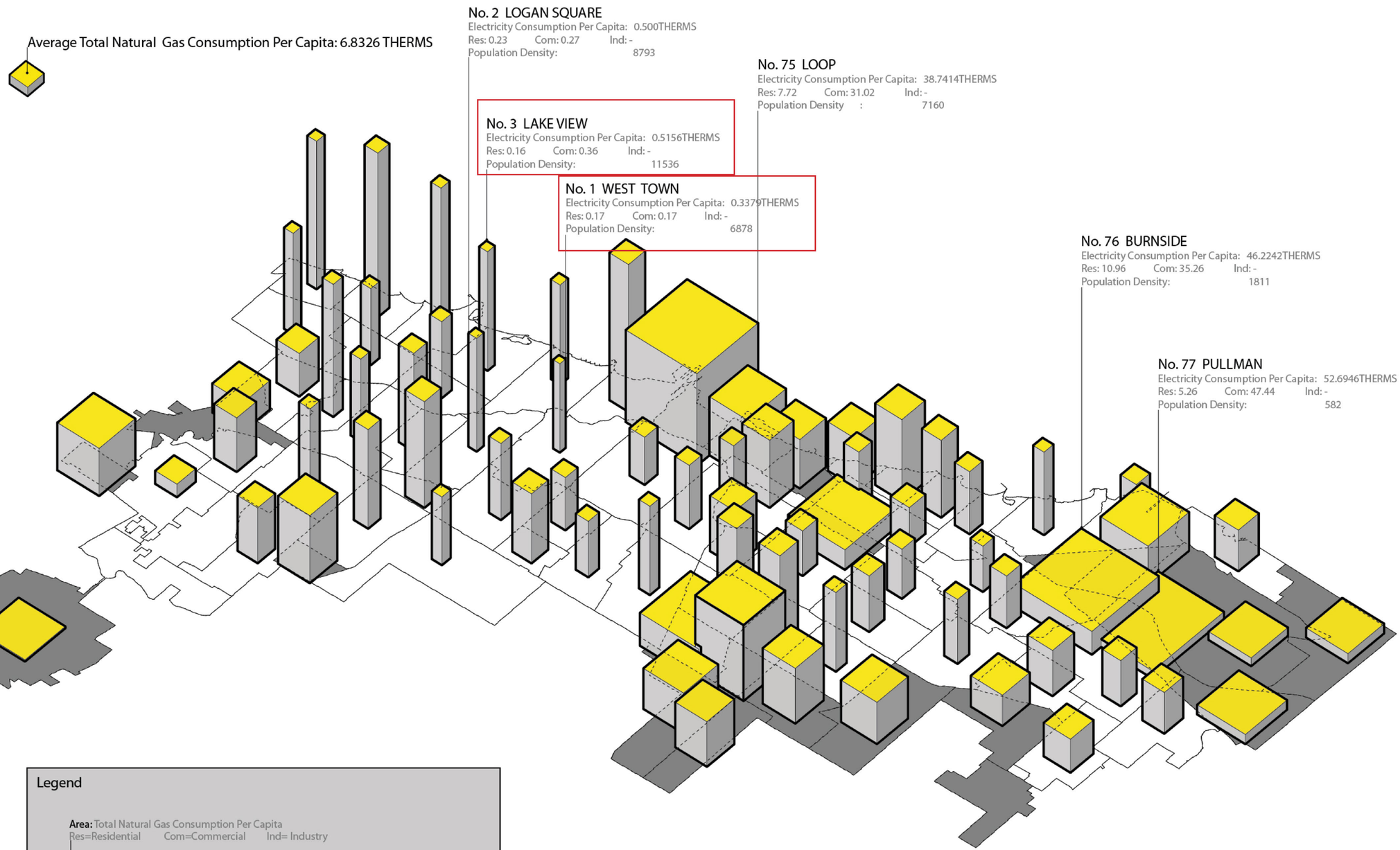
Site Resources

Energy Per Capita+Population Density

West Town
Logan Square
Lakeview
Lincoln Park
Rogers Park
West Ridge
Uptown
Lincoln Square
Irving Park
Austin
South Shore
Albany Park
South Lawndale
Portage Park
Humboldt Park
Chicago Lawn
Lower West Side
North Lawndale
North Center
Greater Grand Crossing
Belmont Cragin
Grand Boulevard
Bridgeport
Auburn Gresham
East Garfield Park
Avondale
Edgewater
Woodlawn
Englewood
South Chicago
Near West Side
New City
Chatham
Hermosa
West Englewood
Hyde Park
Roseland
Washington Park
West Garfield Park
Brighton Park
Dunning
Near North Side
Gage Park
Jefferson Park
North Park
Norwood Pa
West Pullm
East Side
Wash
Heigh
McKinley
Armour Square
Oakland
Kenwood
Morgan Park
Douglas
Forest Glen
Clearing
Beverly
Montclare
Ashburn
Garfield Ridge
Avalon Park
Mount Greenwood
West Lawn
Edison Park
South Deering
Hegewisch
Near South Side
Calumet Heights
West Elsdon
Archer Heights
Riverdale
Fuller Park
Loop
Burnside
Pullman



Legend

Area: Total Natural Gas Consumption Per Capita
Res=Residential Com=Commercial Ind= Industry

Height: Population Density (Per KM_2)

Areas Higher than Average Natural Gas Consumption Per

Site Resources

Energy Per Capita+Population Density

Sustainable Neighboorhood

West Town
Logan Square
Lakeview
Lincoln Park
Rogers Park
West Ridge
Uptown
Lincoln Square
Irving Park
Austin
South Shore
Albany Park
South Lawndale
Portage Park
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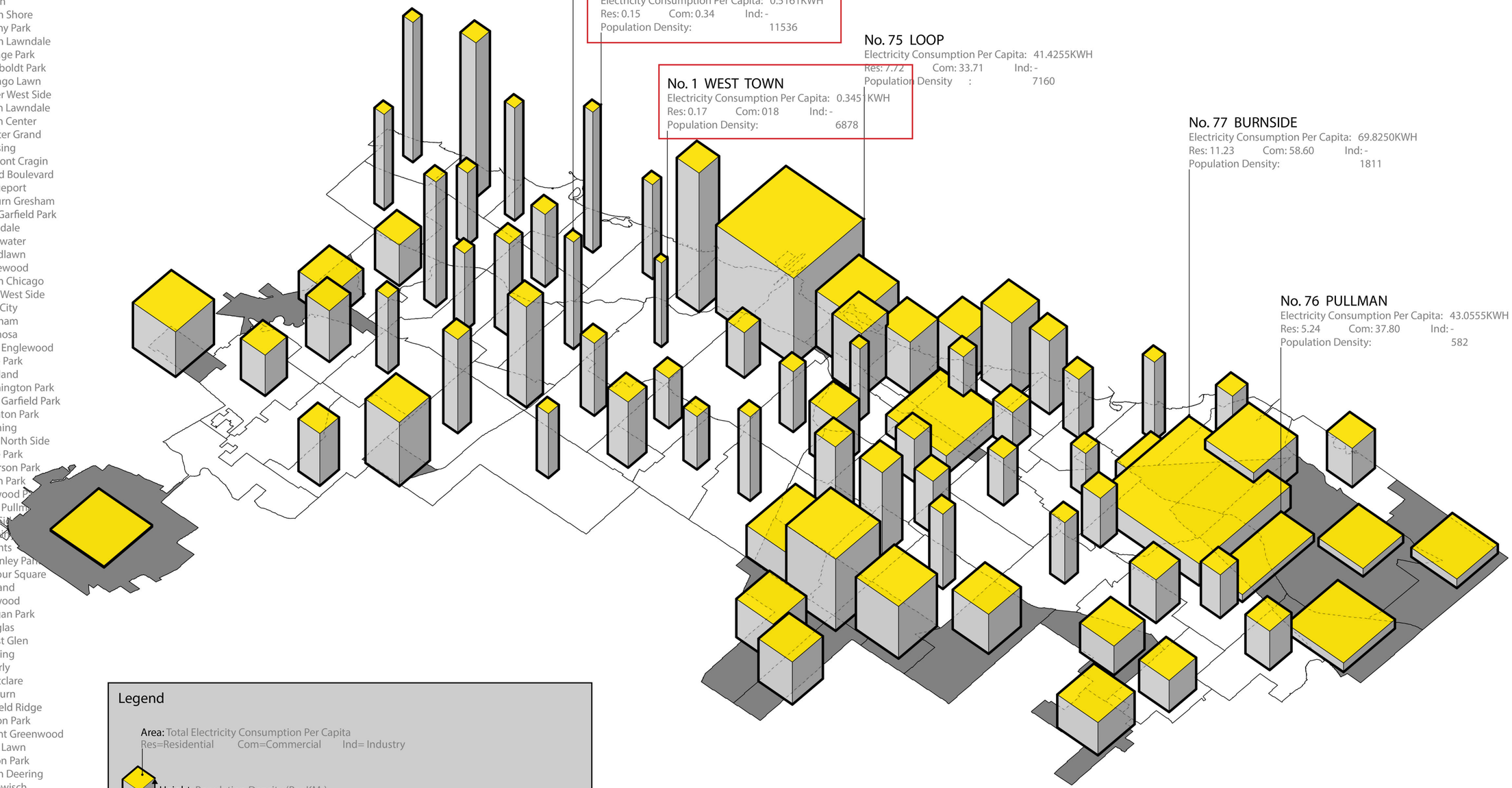
Bridgeport
Auburn Gresham
East Garfield Park
Avondale
Edgewater
Woodlawn
Englewood
South Chicago
Near West Side
New City
Chatham
Hermosa
West Englewood
Hyde Park
Roseland
Washington Park
West Garfield Park
Brighton Park
Dunning
Near North Side
Gage Park
Jefferson Park
North Park
Norwood P
West Pullm
East Sil
Wash
Heights
McKinley Pa
Armour Square
Oakland
Kenwood
Morgan Park
Douglas
Forest Glen
Clearing
Beverly
Montclare
Ashburn
Garfield Ridge
Avalon Park
Mount Greenwood
West Lawn
Edison Park
South Deering
Hegewisch
Near South Side
Calumet Heights
West Elsdon
Archer Heights
Riverdale
Fuller Park
Loop
Pullman
Burnside

Average Total Electricity Consumption Per Capita: 7.0249 KWH



Legend

Area: Total Electricity Consumption Per Capita
Res=Residential Com=Commercial Ind= Industry

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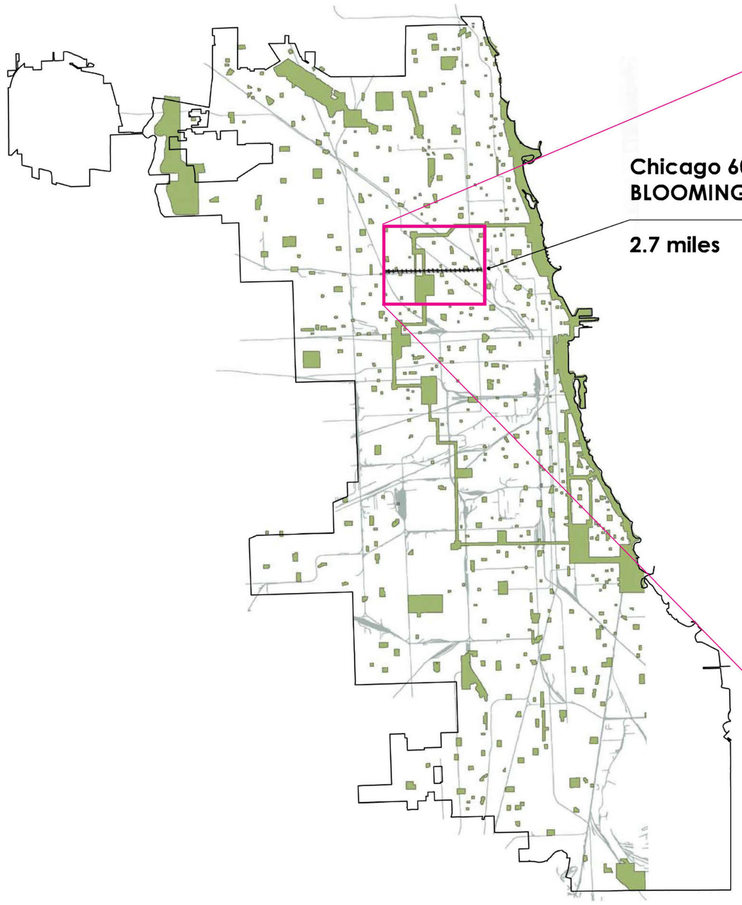
Areas Higher than Average Electricity Consumption Per Capita

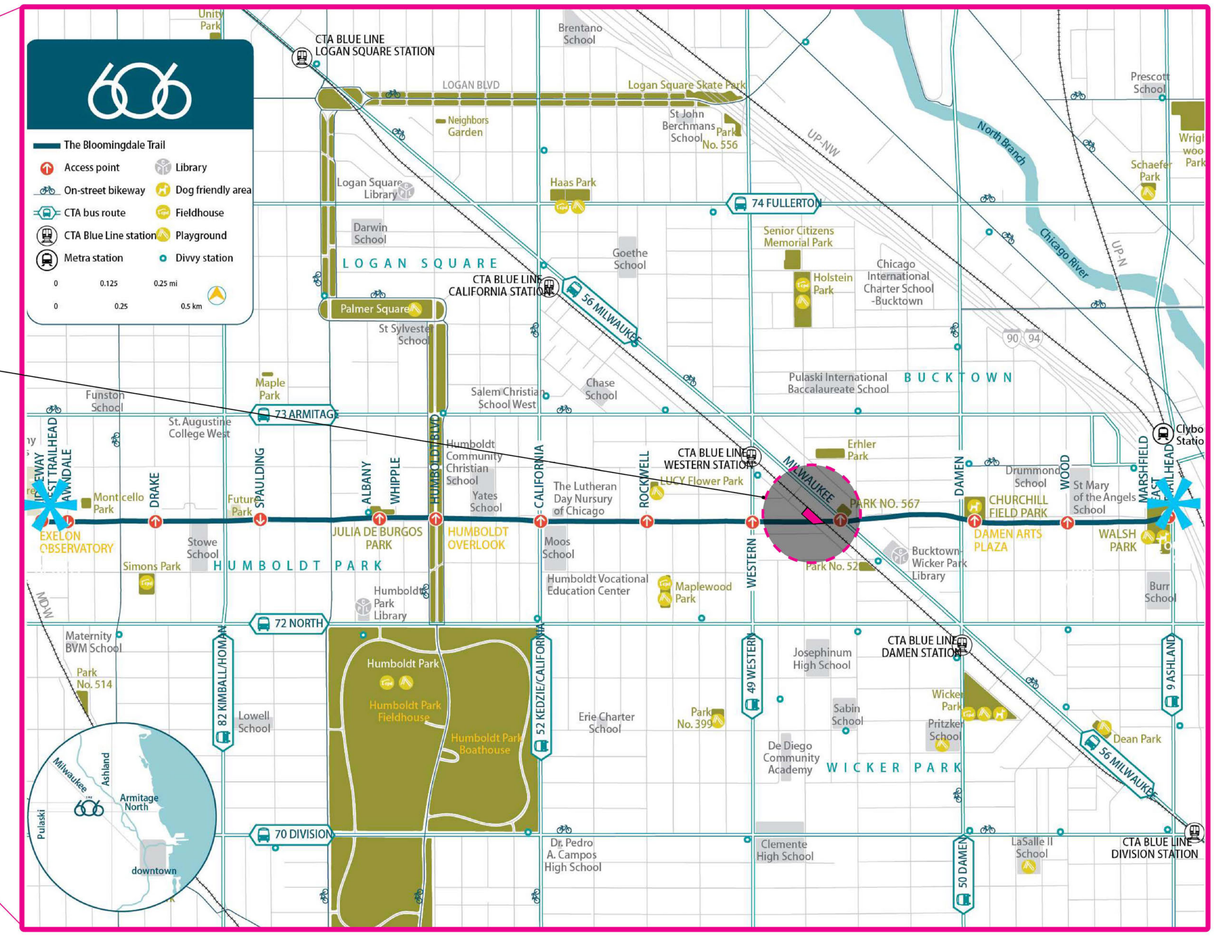
Attractive Neighboorhood



Chicago 606
BLOOMINGDALE TRAIL

2.7 miles

Site



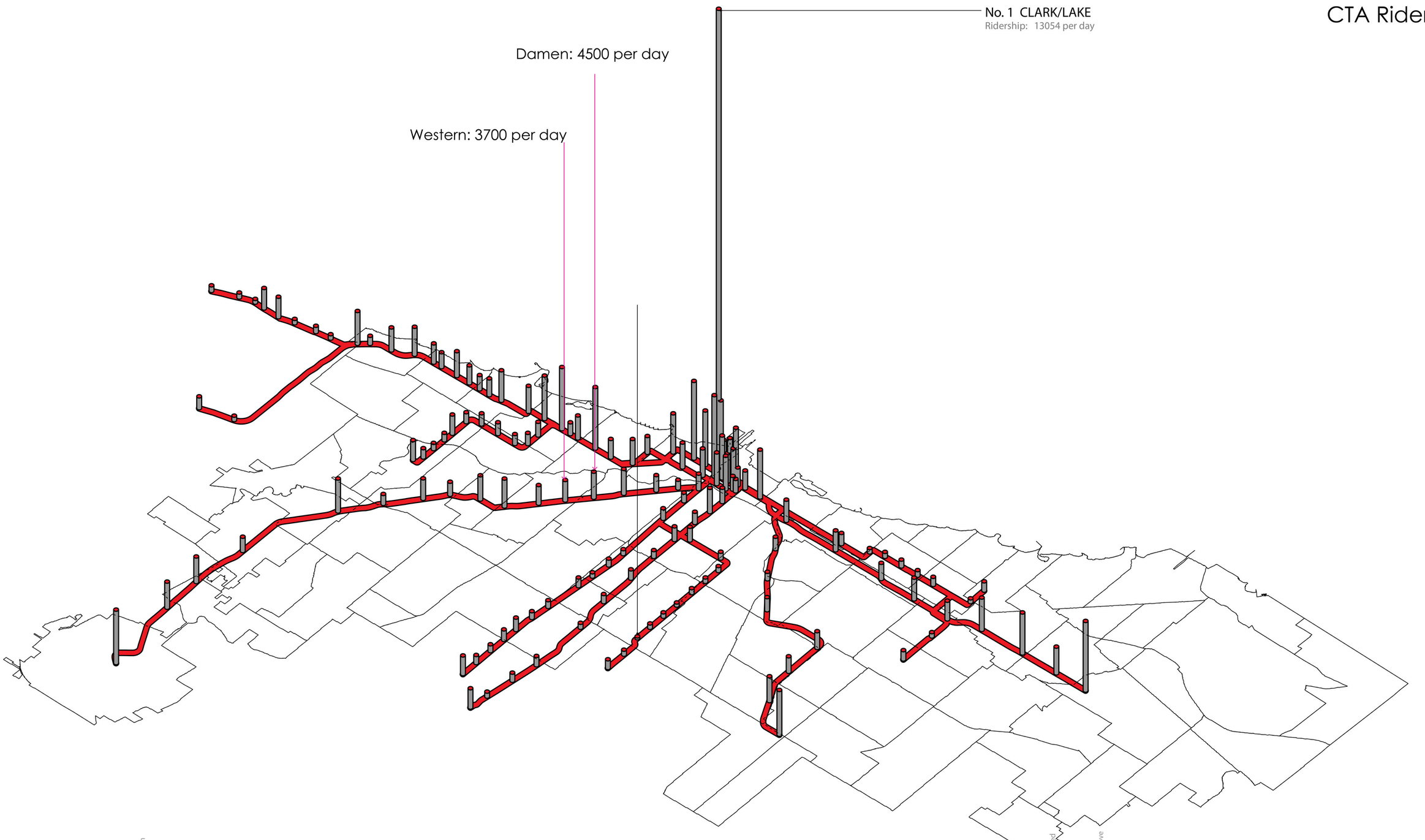
Chicago 606

- A **linear park** , to fix shortage of public space and bridging the neighboorhoods
- Stretching across 4 Chicago neighborhoods,
- **Former Bloomingdale Line** , acting as a barrier, separating neighbors on opposite sides of the street.
- Transformed into **multi-purpose** bicycle trail from **defunct** urban mega-structure
- Called "The 606" in reference to the first three digits of the **city's postal code**

Site

- On the cross of Chicago 606 & **Milwaukee Avenue** & **CTA Blue line**
- Milwaukee Avenue is one of the busiest streets for **cyclists** in Chicago
- **20 minutes** from Downtown By CTA & Bike

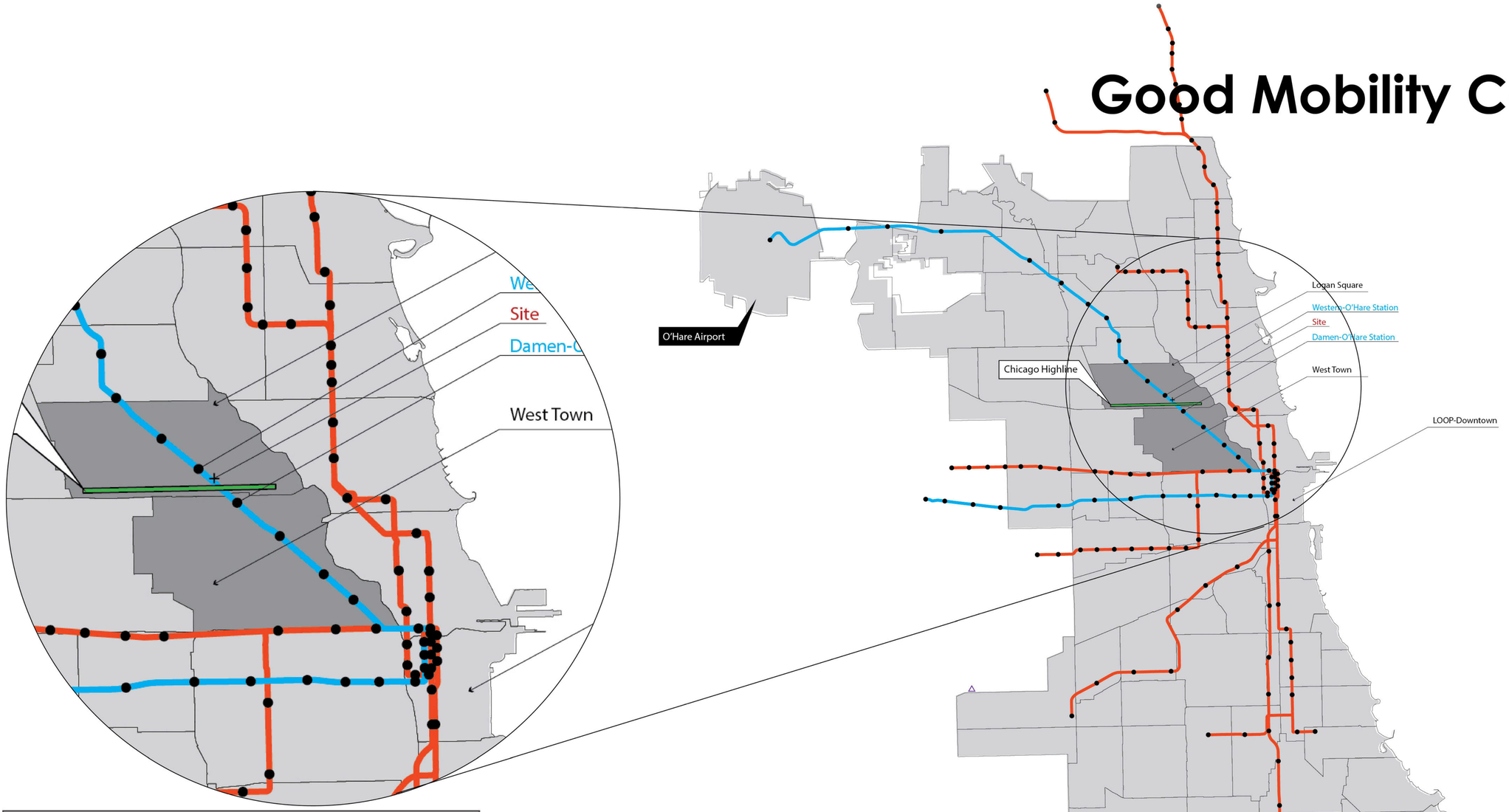
Site Resources
CTA Connection
CTA Ridership



Clark/Lake
Chicago/State
Lake/State
95th/Dan Ryan
Belmont-North Main
Fullerton
Jackson/State
Grand/State
O'Hare Airport
Roosevelt
State/Lake
Midway Airport
Addison-North Main
Washington/Dearborn
Monroe/State
79th
Clark/Division
Adams/Wabash
Jackson/Dearborn
Quincy/Wells
Randolph/Wabash
Howard
Jefferson Park
69th
Washington/Wells
Wilson
Monroe/Dearborn
Logan Square
Loyola
Merchandise Mart
Madison/Wabash
87th
Damen/Milwaukee
Sheridan
Rosemont
Cumberland
Division/Milwaukee
Pulaski-Orange
Chicago/Franklin
North/Clybourn
Bryn Mawr
Belmont-O'Hare
UIC-Halsted
Sox-35th-Dan Ryan
Diversey
Morse
Garfield-Dan Ryan
Washington/State
Cermak-Chinatown
Davis
Irving Park-O'Hare
Western/Milwaukee
Kimball
Granville
Forest Park
Western-Brown
California/Milwaukee
Armitage
Harlem-Lake
63rd-Dan Ryan
Berwyn
Harrison
Library
Western-Orange
Lawrence
Sedgwick
47th-Dan Ryan
Chicago/Milwaukee
Kedzie-Midway
Clinton-Lake
Thorndale
Argyle
Clinton-Forest Park
Harlem-O'Hare
LaSalle/Van Buren
Polk
Southport
Medical Center
35th/Archer
Addison-O'Hare
LaSalle
Halsted-Orange
Central-Lake
Wellington
Irving Park-Brown
Dempster-Skokie
35-Bronzeville-IIT
Paulina
Racine
Montrose-Brown
Ashland-Lake
Austin-Lake
Addison-Brown
Montrose-O'Hare
Damen-Brown
Kedzie-Homan-Forest Park
Kedzie-Brown
Austin-Forest Park
Ashland/63rd
Pulaski-Lake
54th/Cermak
Morgan-Lake
Grand/Milwaukee
Pulaski-Forest Park
Oak Park-Forest Park
Jarvis
Oak Park-Lake
Garfield-South Elevated
Ashland-Orange
Rockwell
Cicero-Lake
Laramie
East 63rd-Cottage Grove
Western-Forest Park
Kedzie-Lake
47th-South Elevated
18th
Ridgeland
Main
Cicero-Forest Park
Francisco
51st
Linden
Cicero-Cermak
California-Cermak
California-Lake
Damen-Cermak
Harlem-Forest Park
43rd
Central-Evanston
Western-Cermak
Dempster
Oakton-Skokie
Halsted/63rd
Pulaski-Cermak
Conservatory
South Boulevard
Central Park
Indiana
Foster
Noyes
King Drive
Kedzie-Cermak
Kostner

Site Resources
CTA Connection

Good Mobility Connectivity



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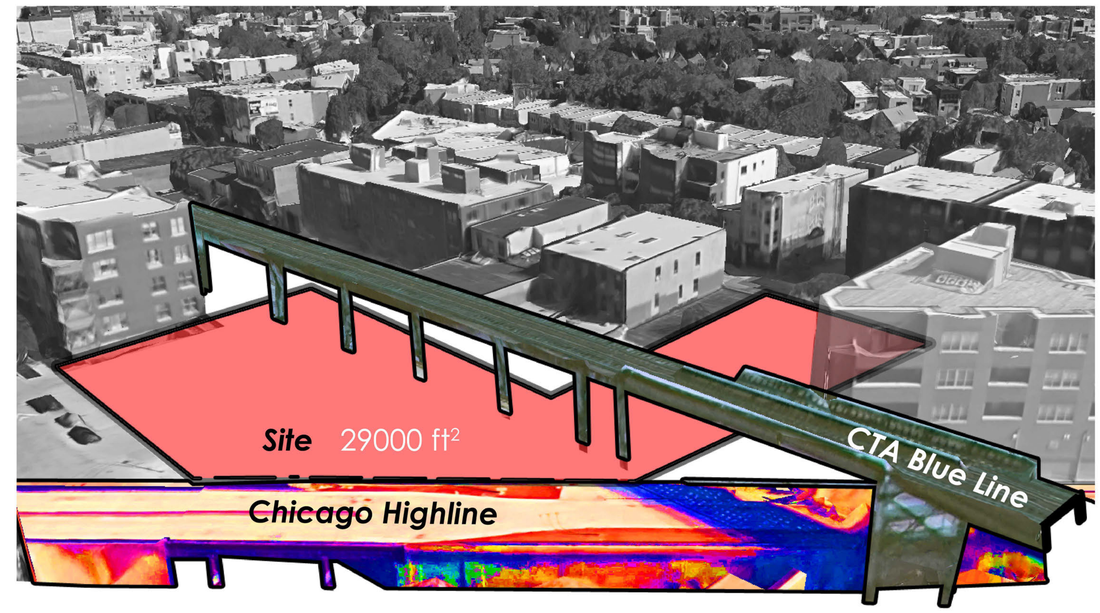
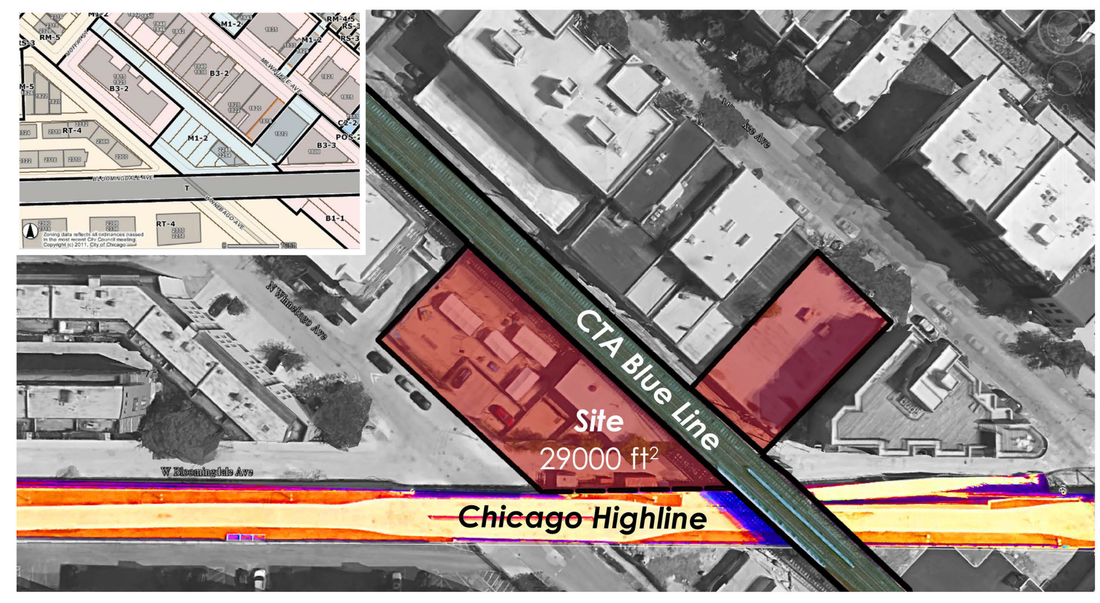
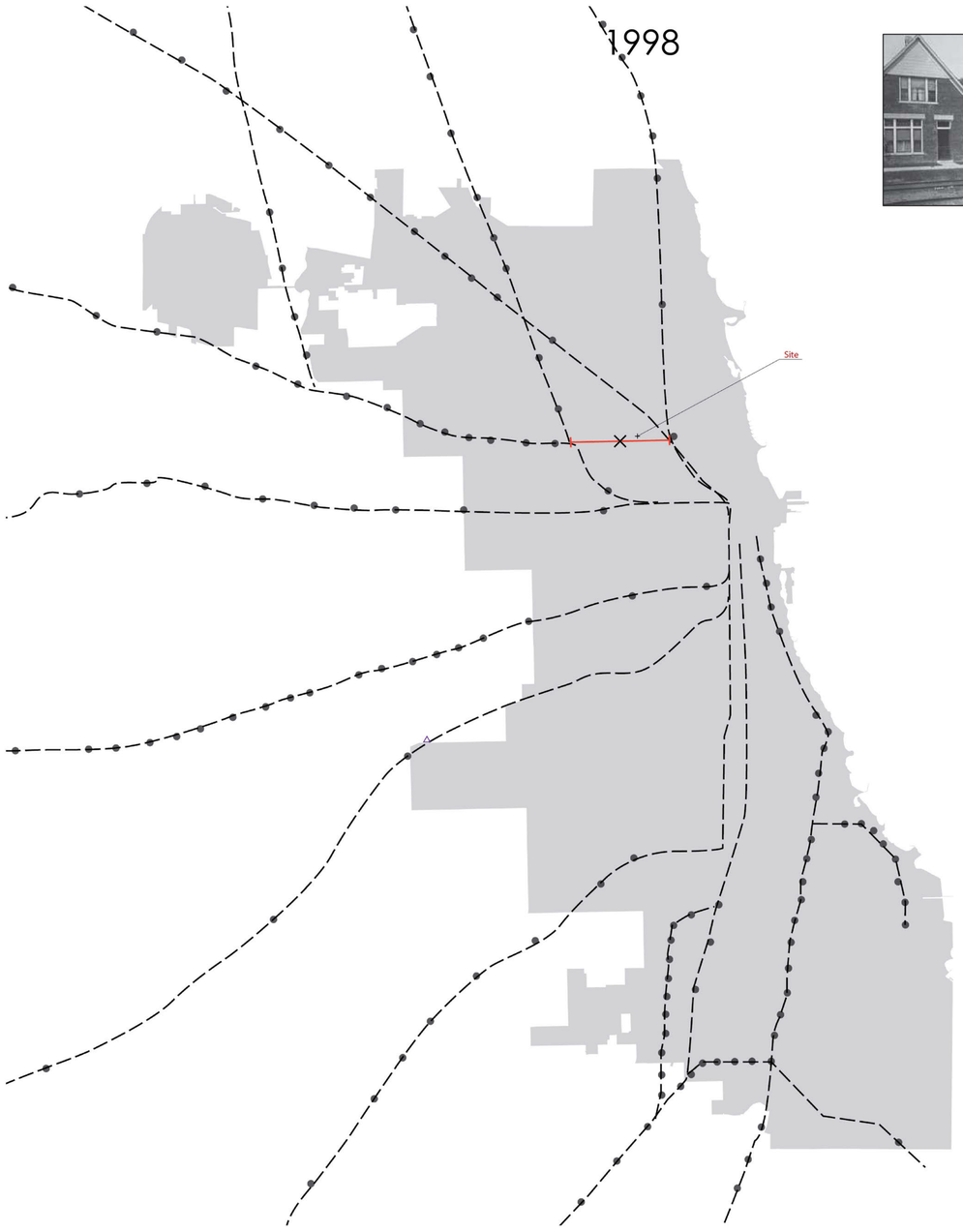
1:125,000

Space Complexity + Multiple Layer





Green Infrastructure



1872

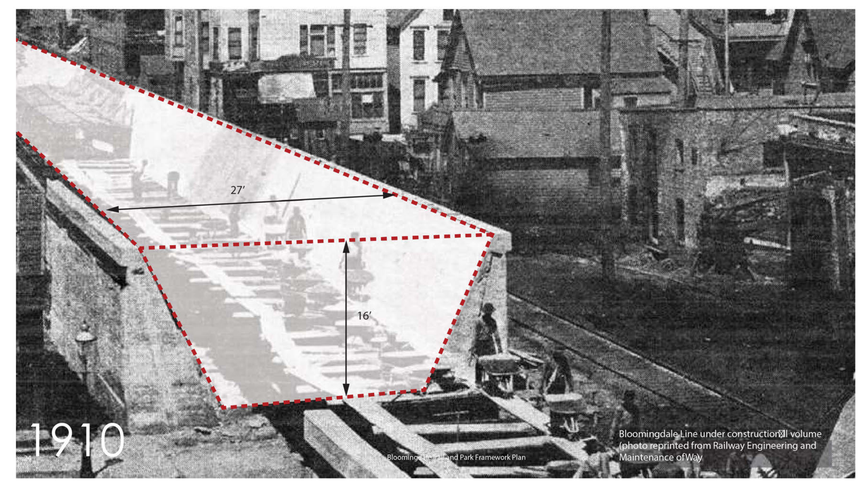
Chicago grants an easement to build railroad tracks in the roadbed of Bloomingdale Avenue.

1910

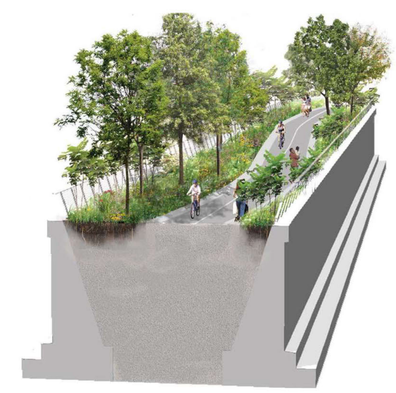
In 1910, Chicago passes an ordinance requiring that the railroad be elevated by 1914 to reduce dangers to the public from at-grade travel.

1914

The Bloomingdale Line services a bustling industrial corridor producing well-known items such as Lincoln Logs, Hammond Organs, and Schwinn Bicycles. The tracks are also used sporadically for passenger trains and the occasional circus troupe.

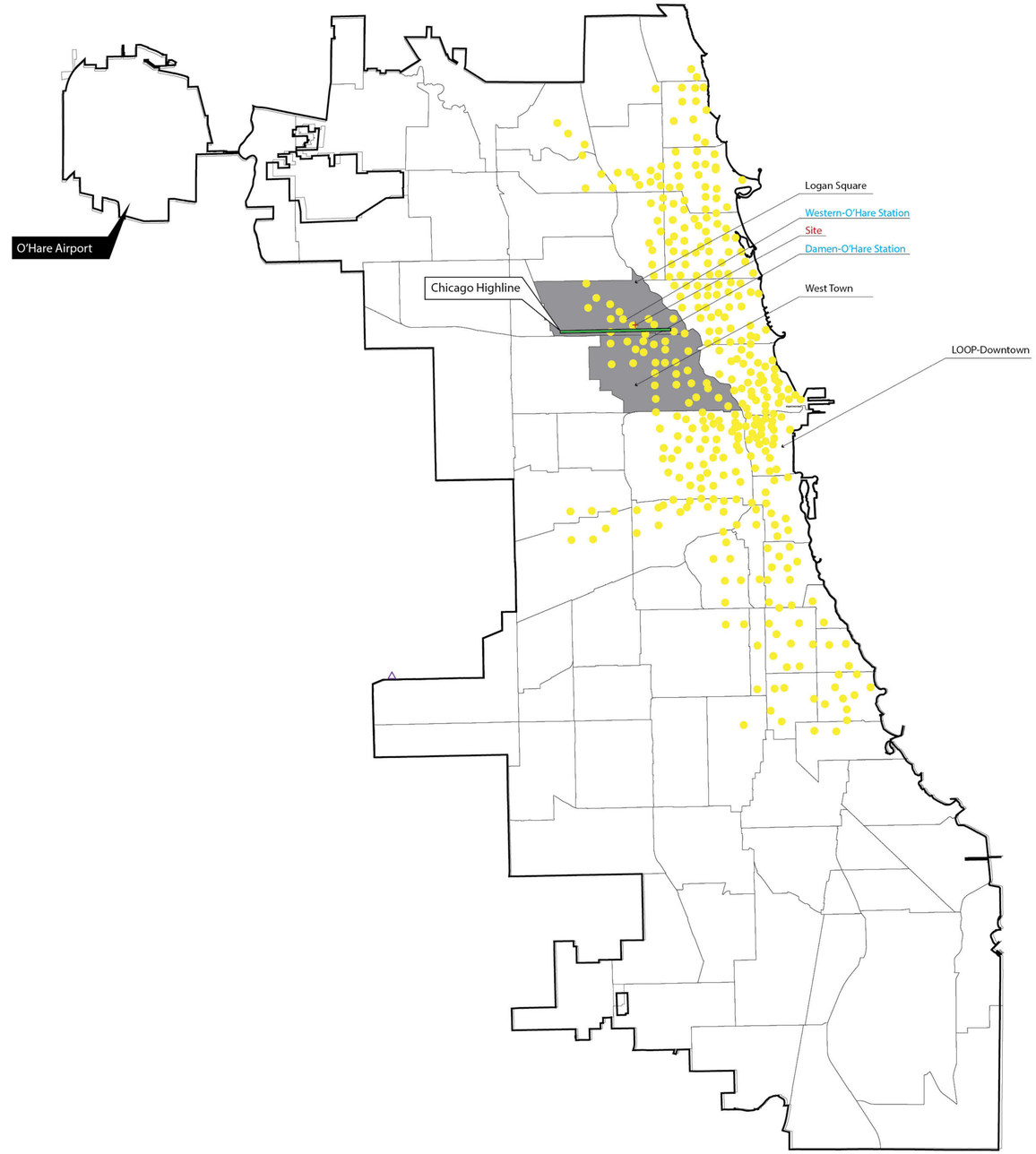


2020



Site Resources
Sharing Bike System

Good Mobility Connectivity



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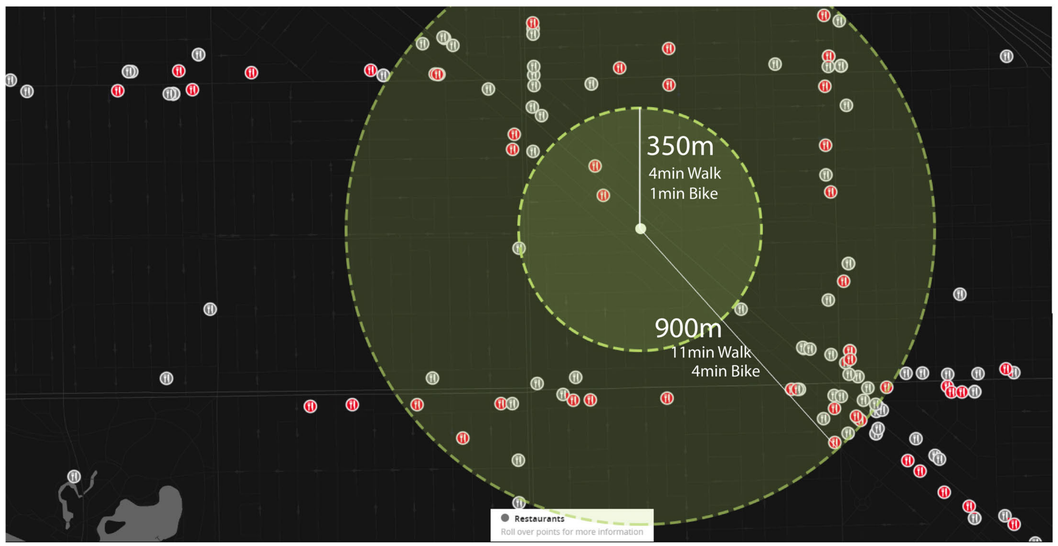
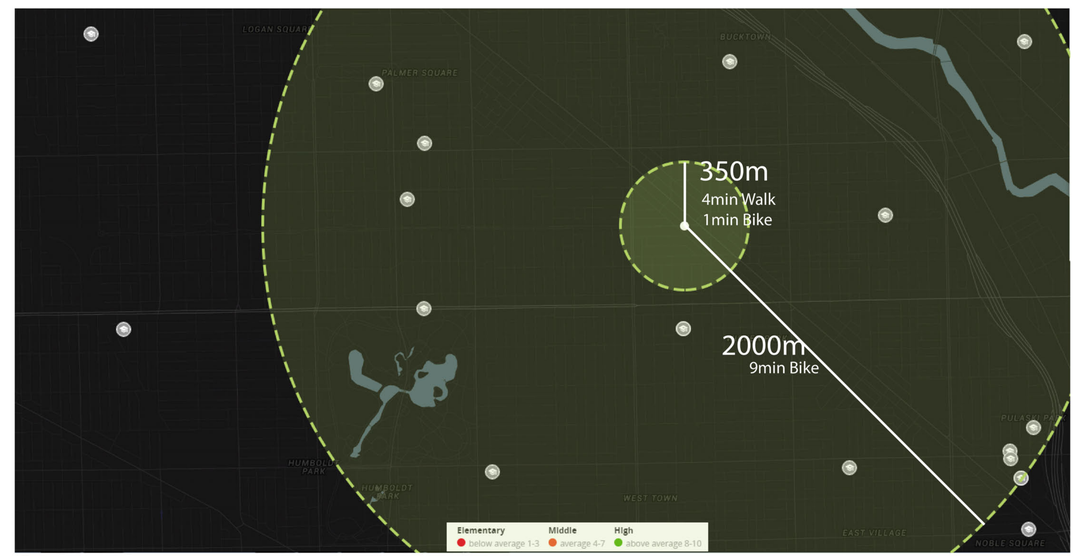
1:125,000

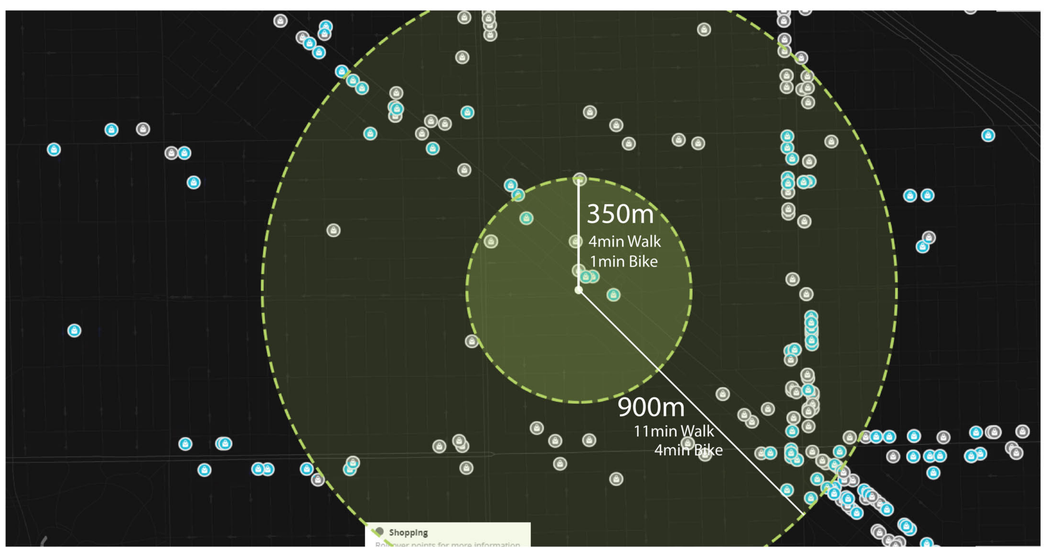
Neighborhood Infrastructure



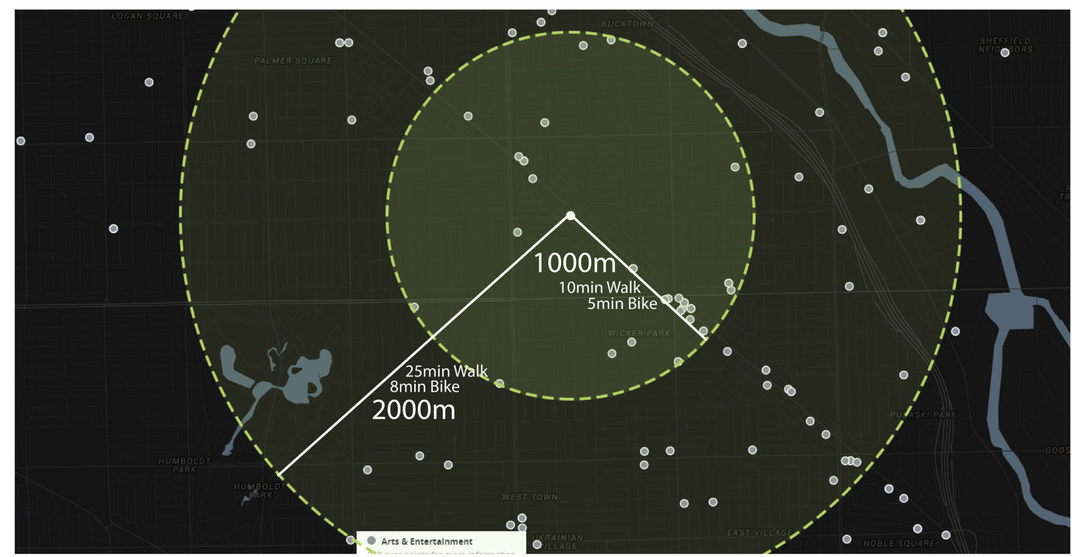
Restaurants



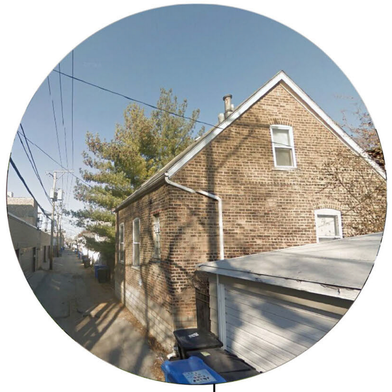
Schools

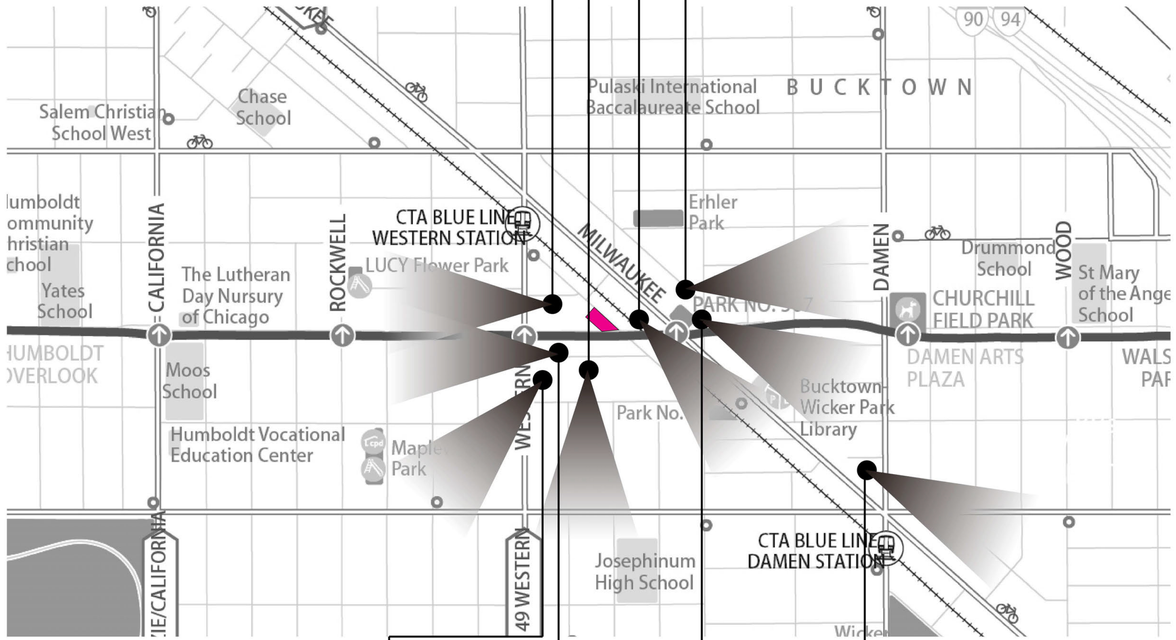


Groceries

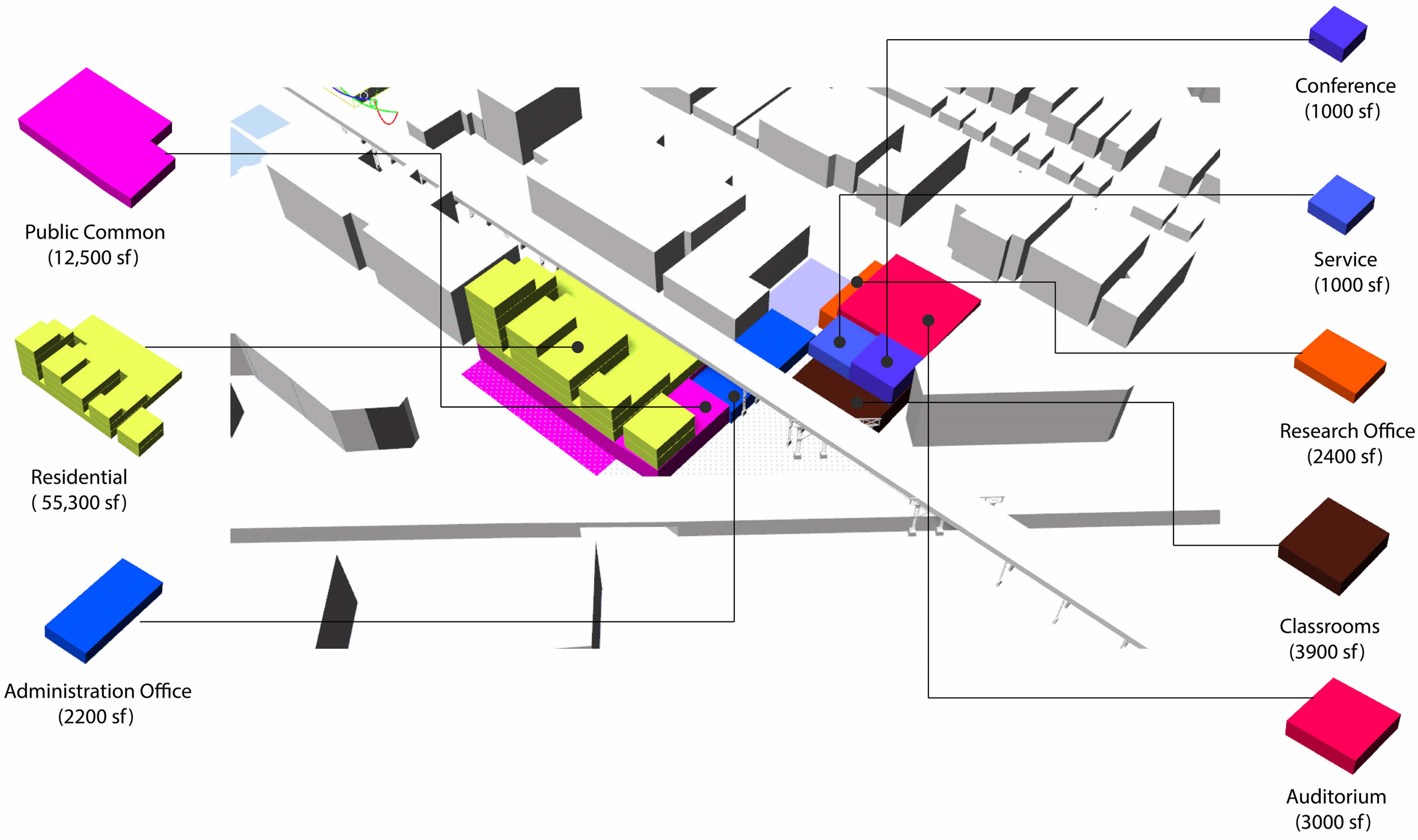


Theater and museum

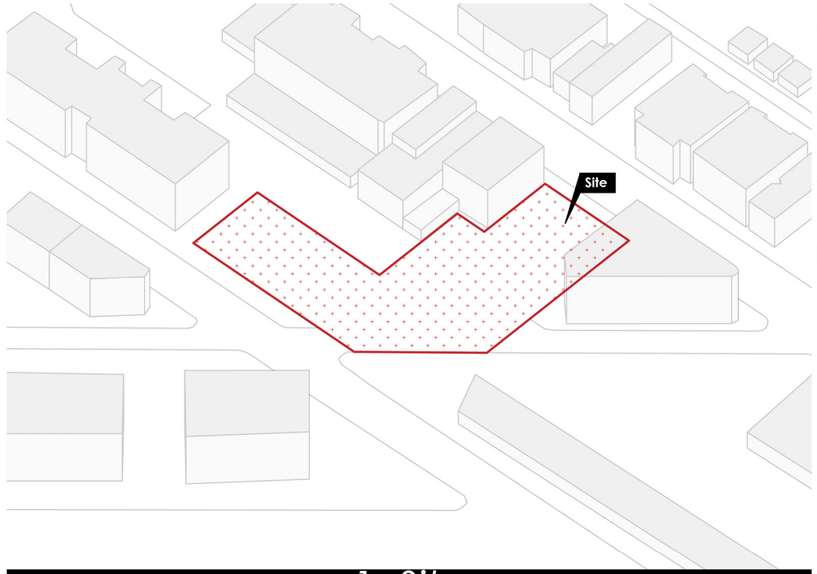



90
94
Salem Christian School West
Chase School
Pulaski International Baccalaureate School
BUCKTOWN
Erhler Park
CTA BLUE LINE WESTERN STATION
LUCY Flower Park
MILWAUKEE
The Lutheran Day Nursury of Chicago
Yates School
CALIFORNIA
ROCKWELL
DAMEN
Drummond School
WOOD
St Mary of the Ange School
CHURCHILL FIELD PARK
DAMEN ARTS PLAZA
Moos School
Humboldt Vocational Education Center
Maple Park
Park No.
Bucktown-Wicker Park Library
CTA BLUE LINE DAMEN STATION
Josephinum High School
49 WESTERN

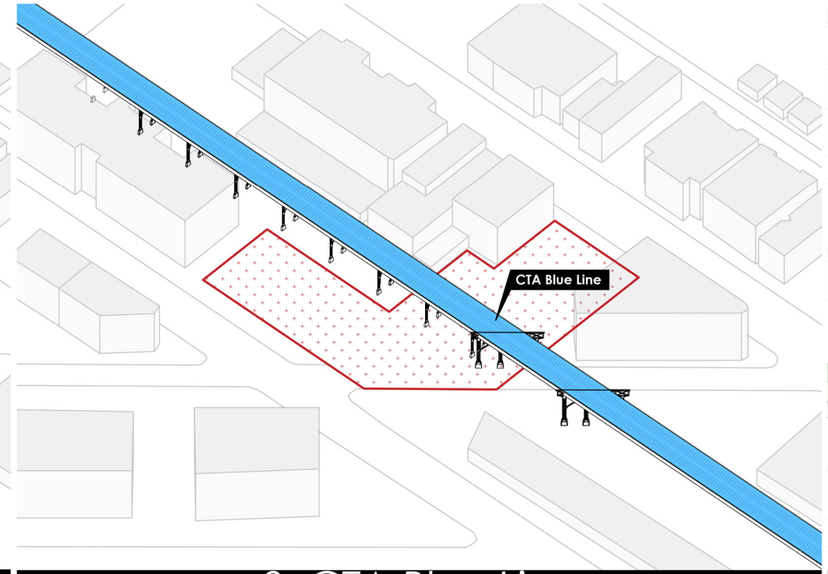
Program


Public Common
(12,500 sf)
Residential
(55,300 sf)
Administration Office
(2200 sf)
Conference
(1000 sf)
Service
(1000 sf)
Research Office
(2400 sf)
Classrooms
(3900 sf)
Auditorium
(3000 sf)

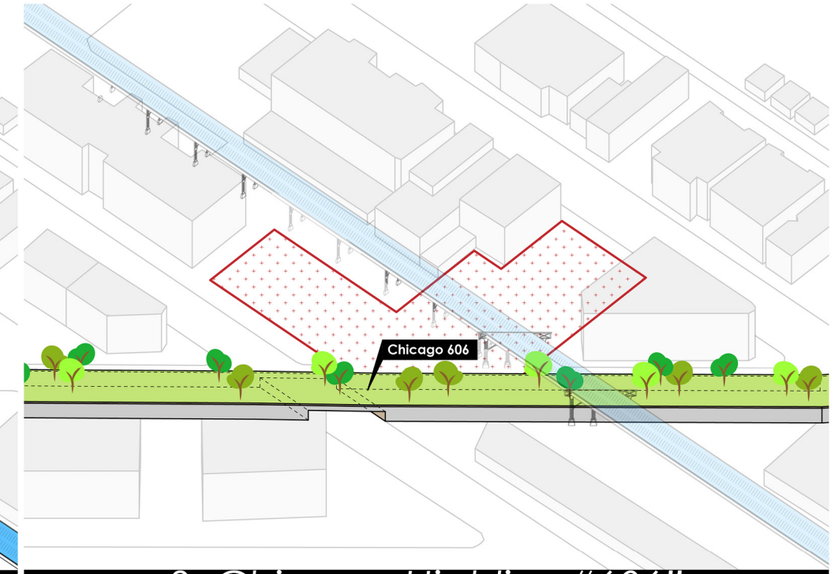
Building Volume Shaped by **URBAN FORCES**



1. Site

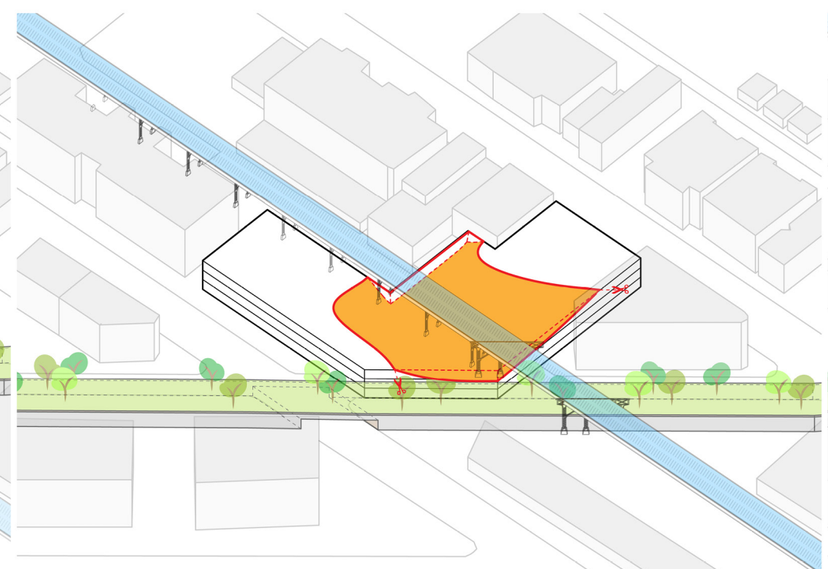


2. CTA Blue Line

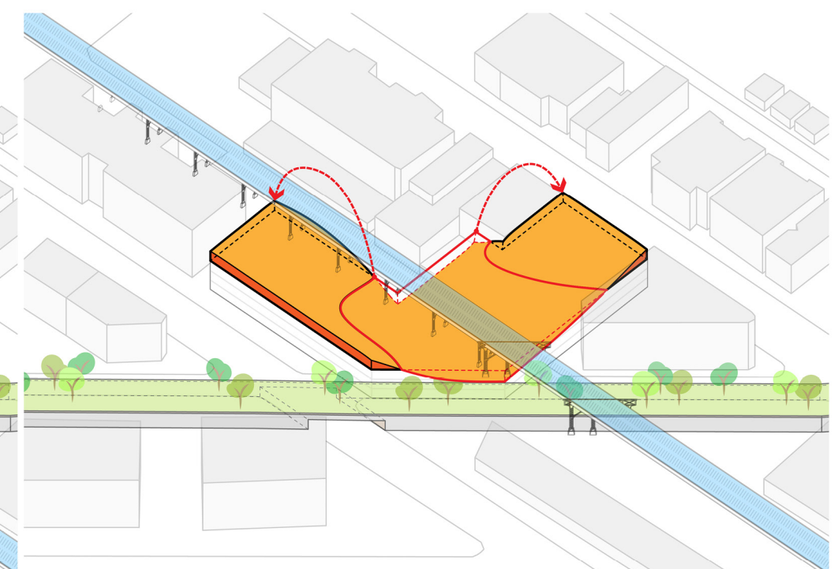


3. Chicago Highline "606"

4. Building Volume & Program

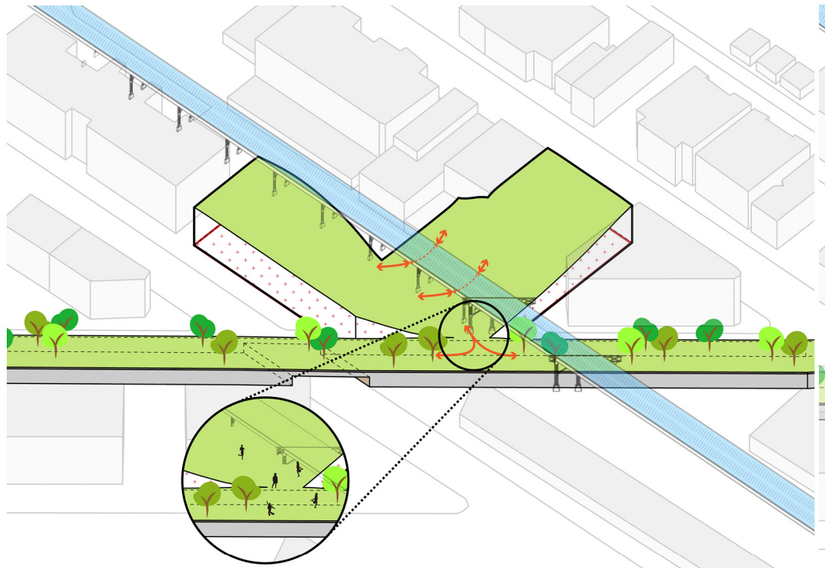


5. Step Back from Train Line

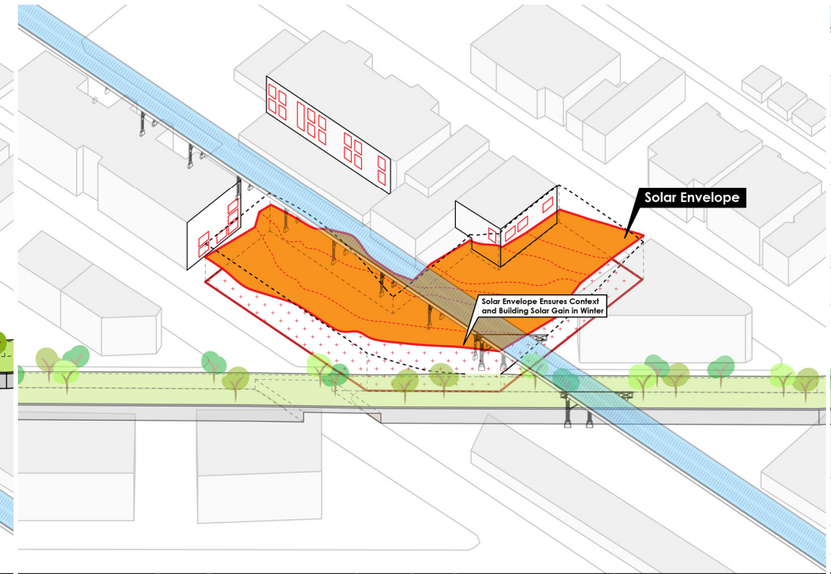


6. Create Roof Plaza Next to Highline

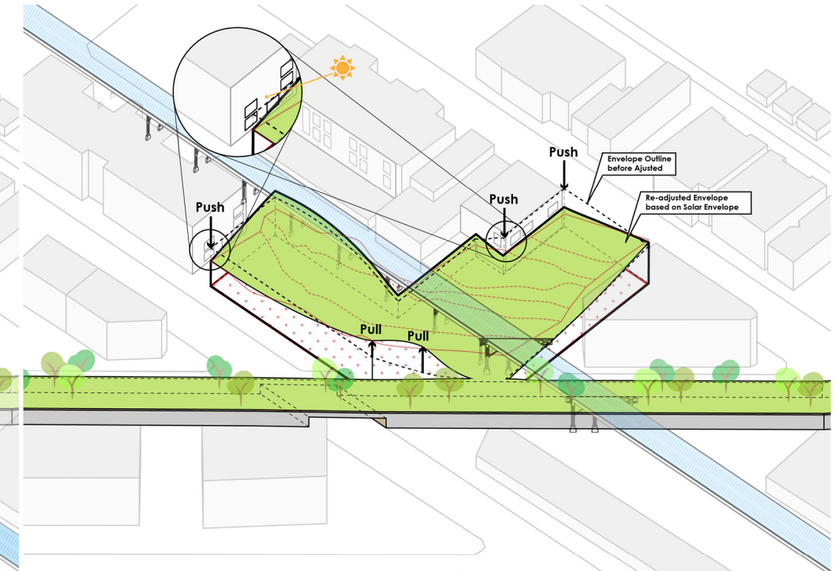
Building Volume Shaped by **URBAN FORCES**



7. Roof Plaza Connect to Highline

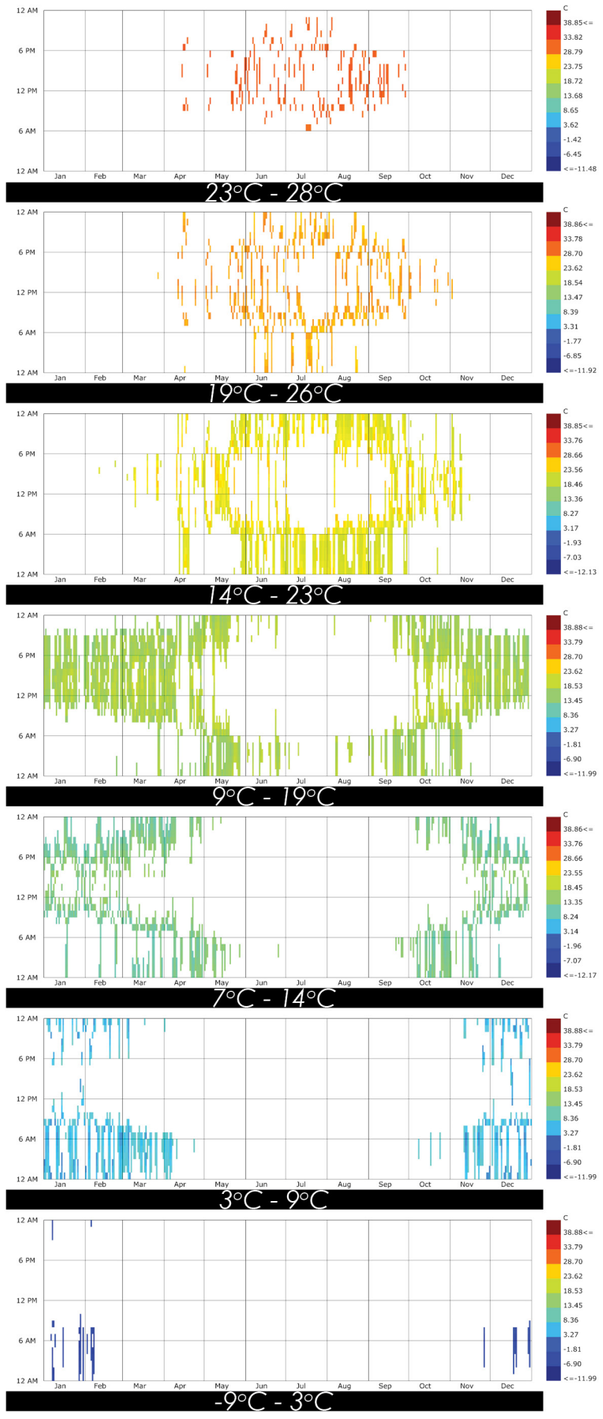


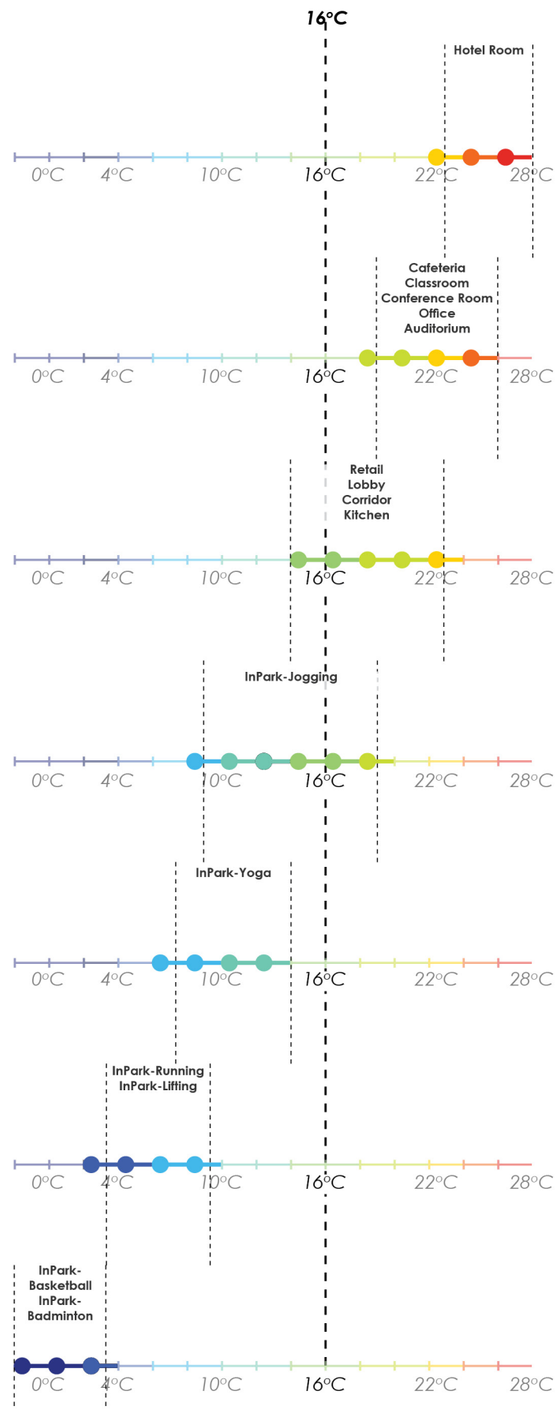
8. Generate Solar Envelope

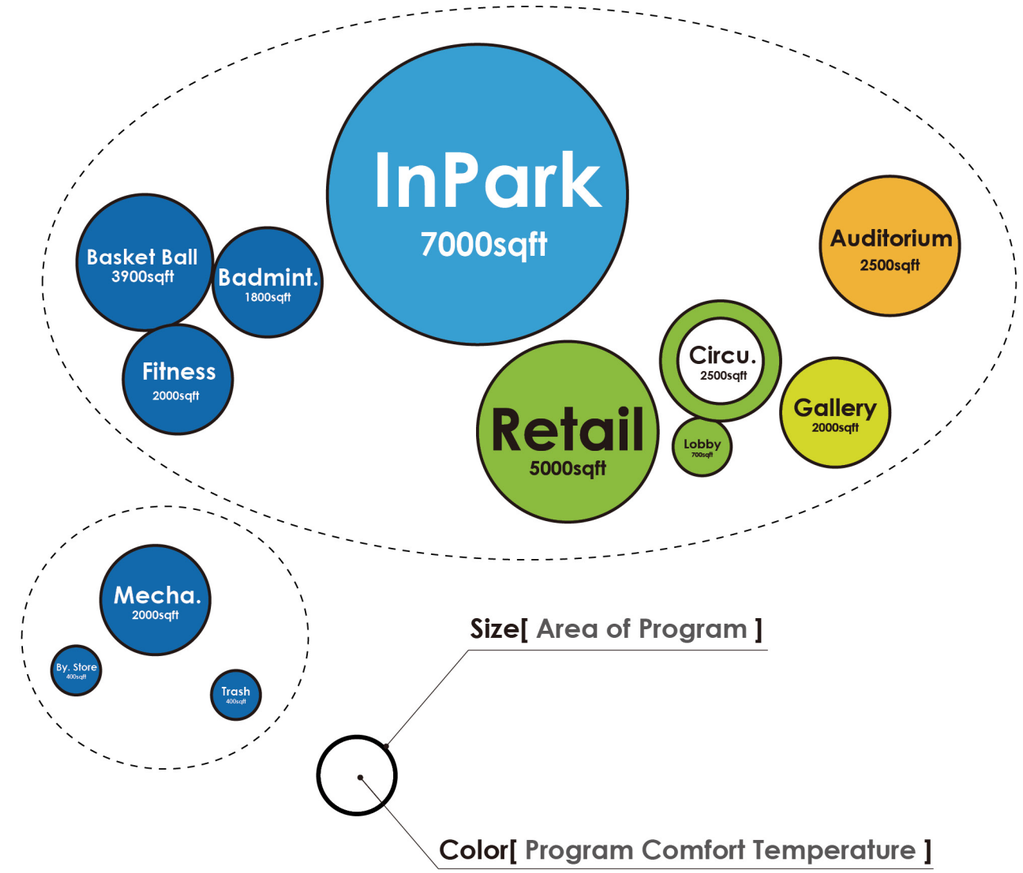


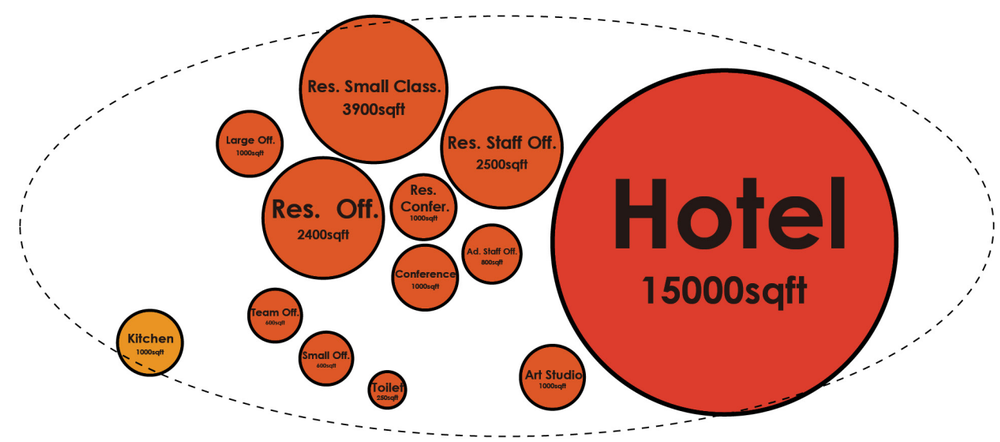
9. Volume Ensures Winter Solar Access

Comfort Temperature Study for Different Program

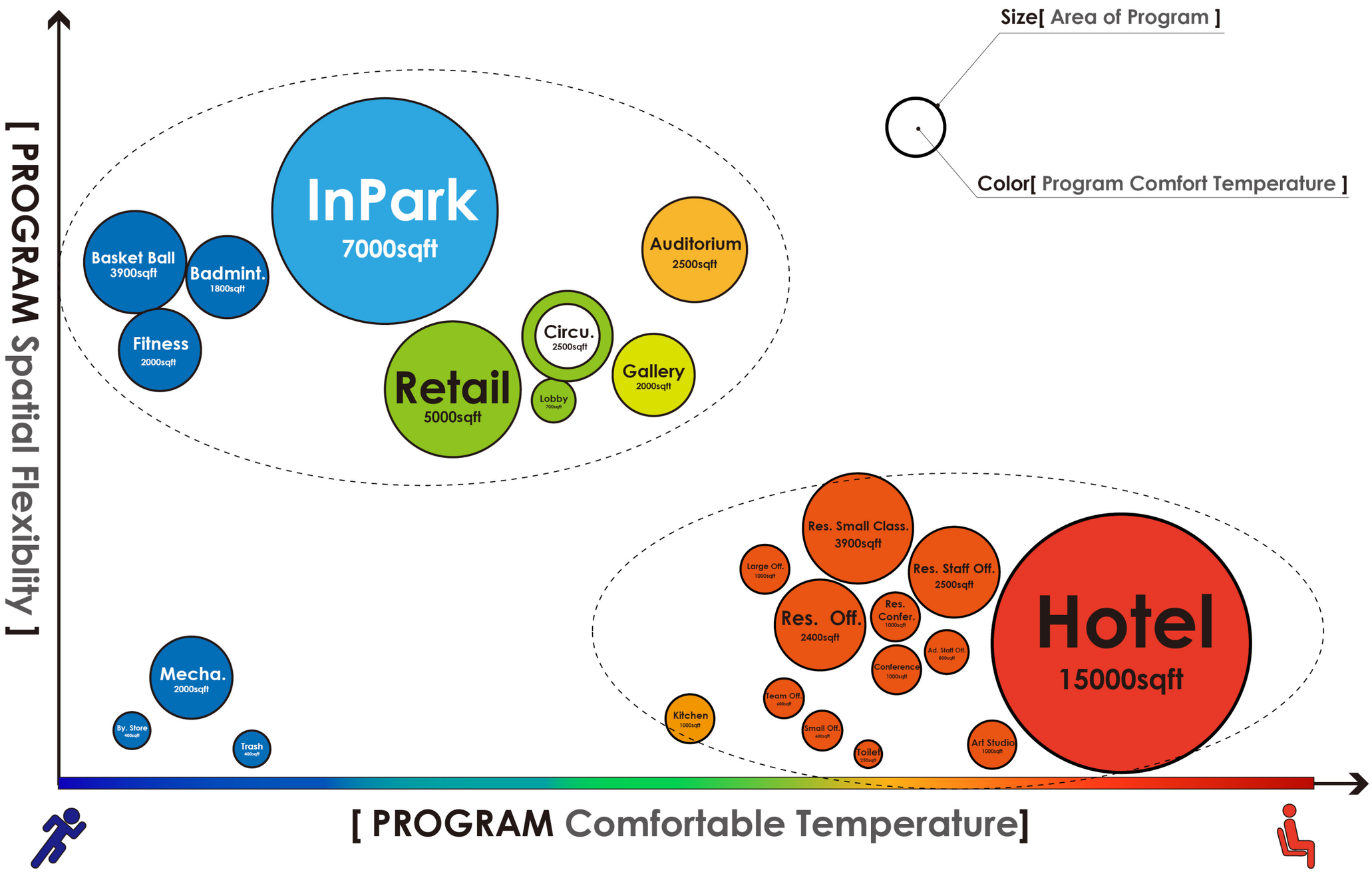




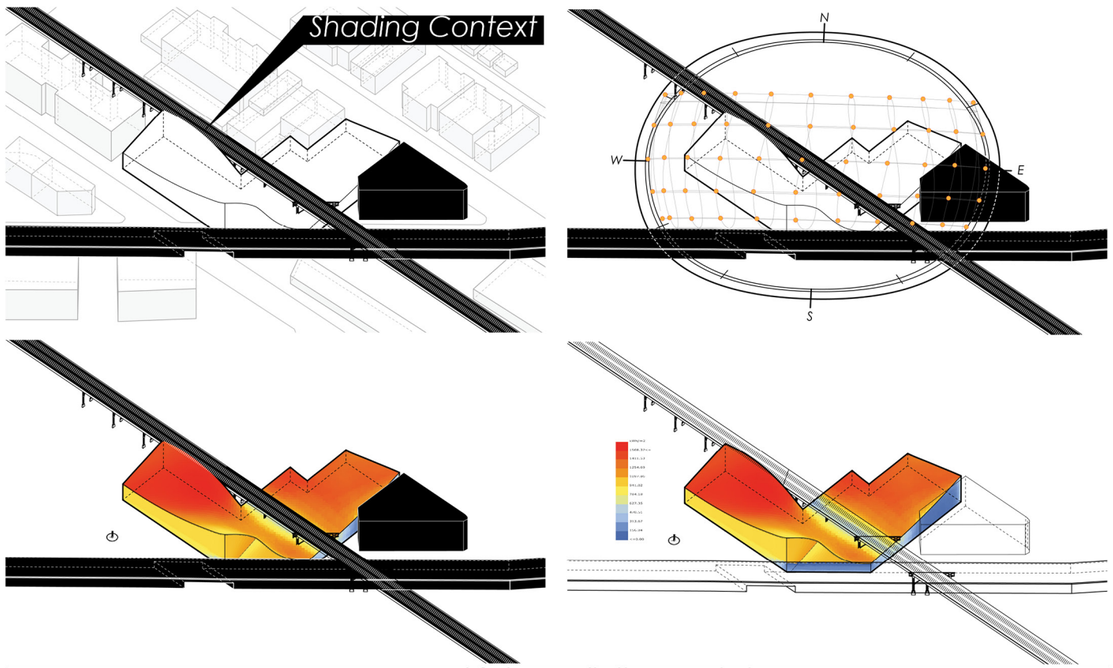




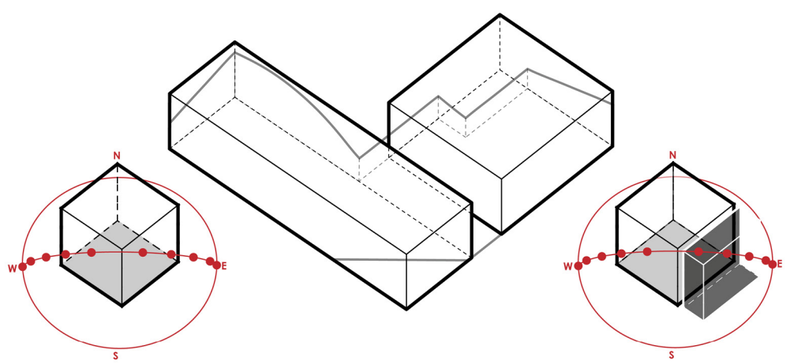
Comfort Temperature Study for Different Program



Building Environmental Strategy Shaped by **CLIMATE FORCES**

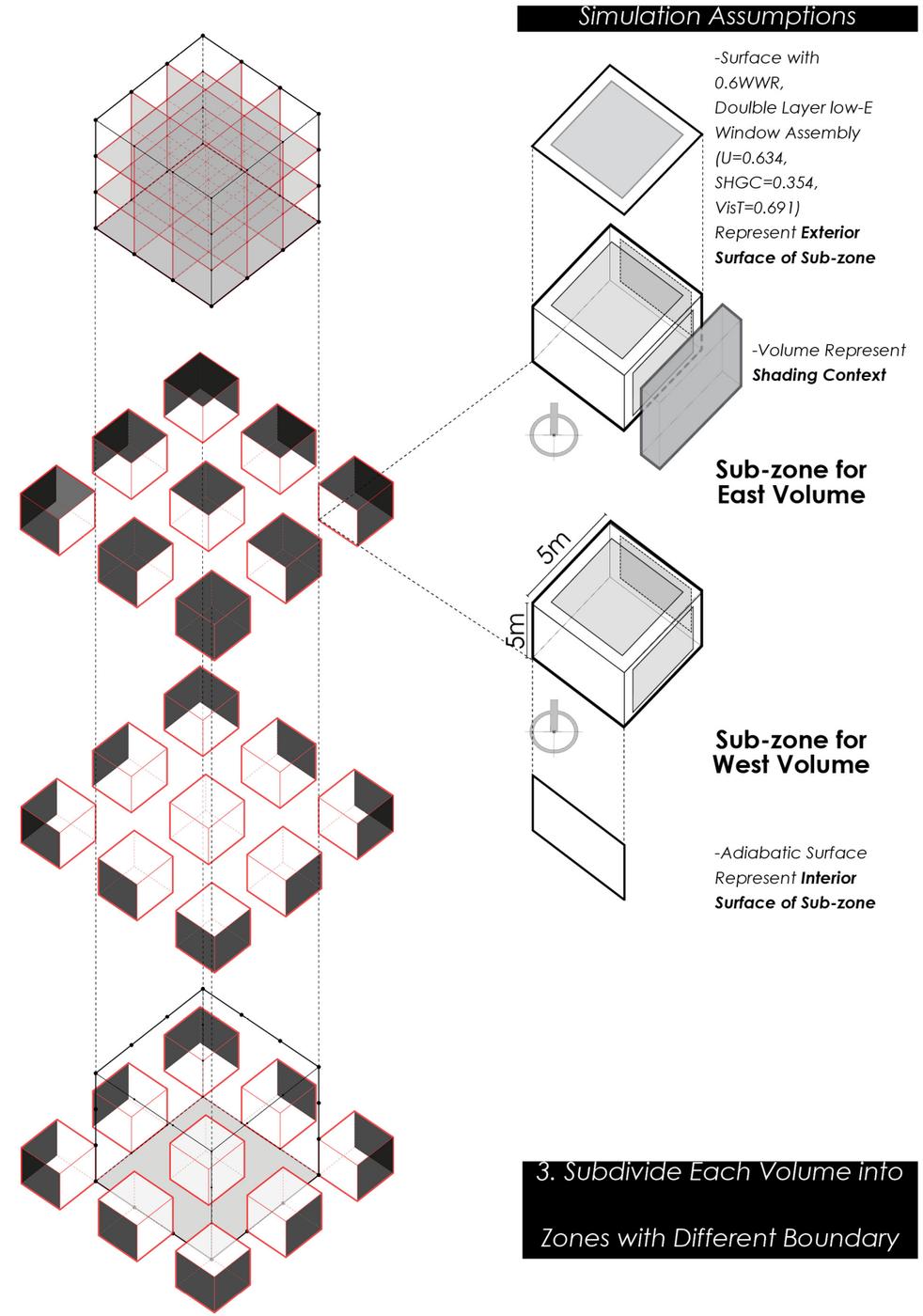


1. Annual Solar Radiation Analysis



West Volume *East Volume*

2. Divide Building Volume Based on Climatic Boundary Condition

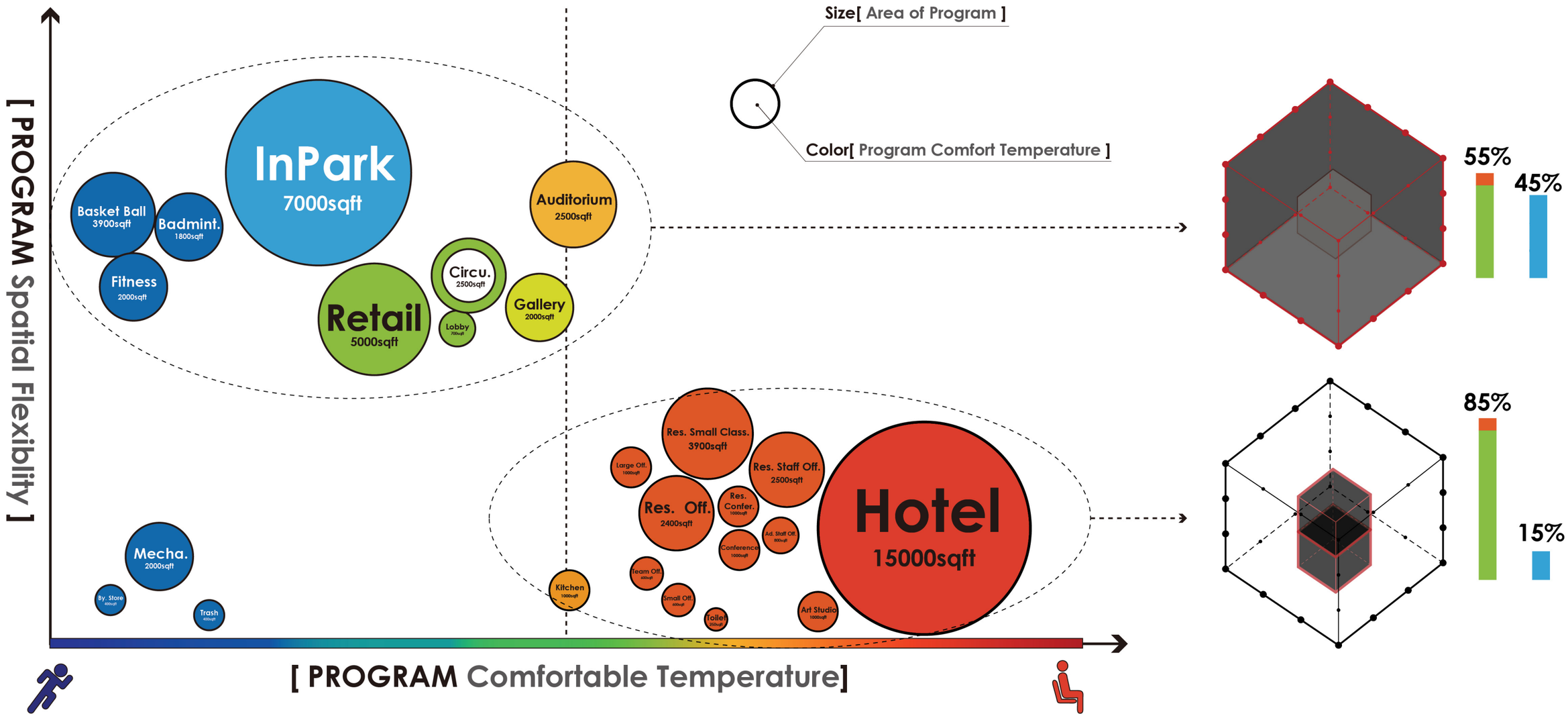


3. Subdivide Each Volume into Zones with Different Boundary

Sub-zone Annual Temperature Study

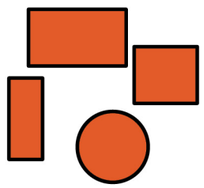
Building Environmental Strategy Shaped by **CLIMATE FORCES**

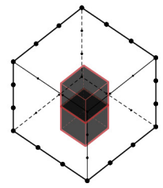
Program Arrangement Concept

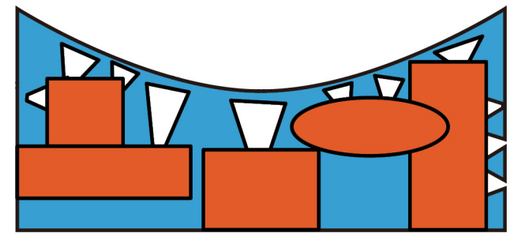


Program Arrangement Concept

"Fruit"





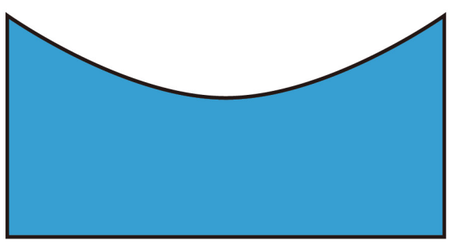


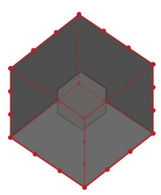
+

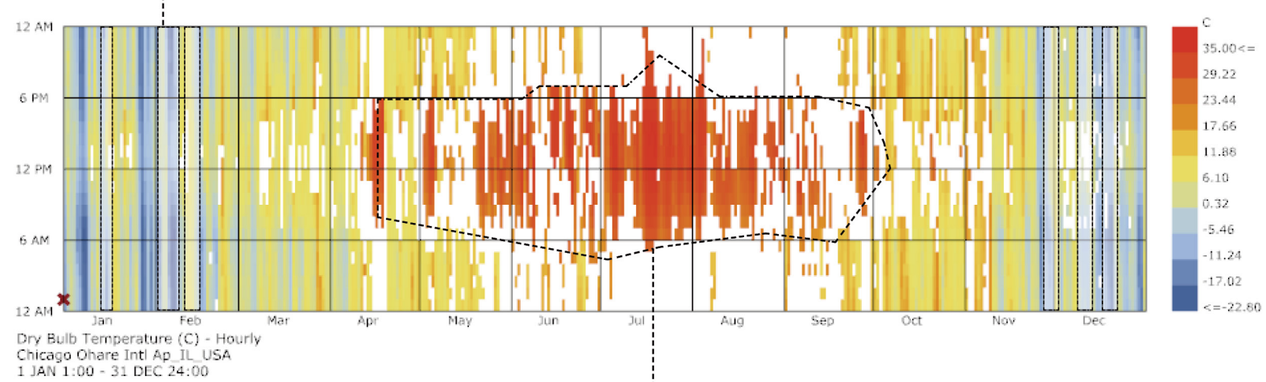
"Piercing"

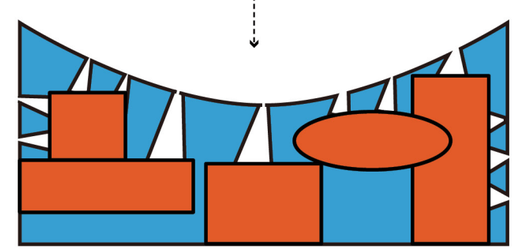
+

"Jello"

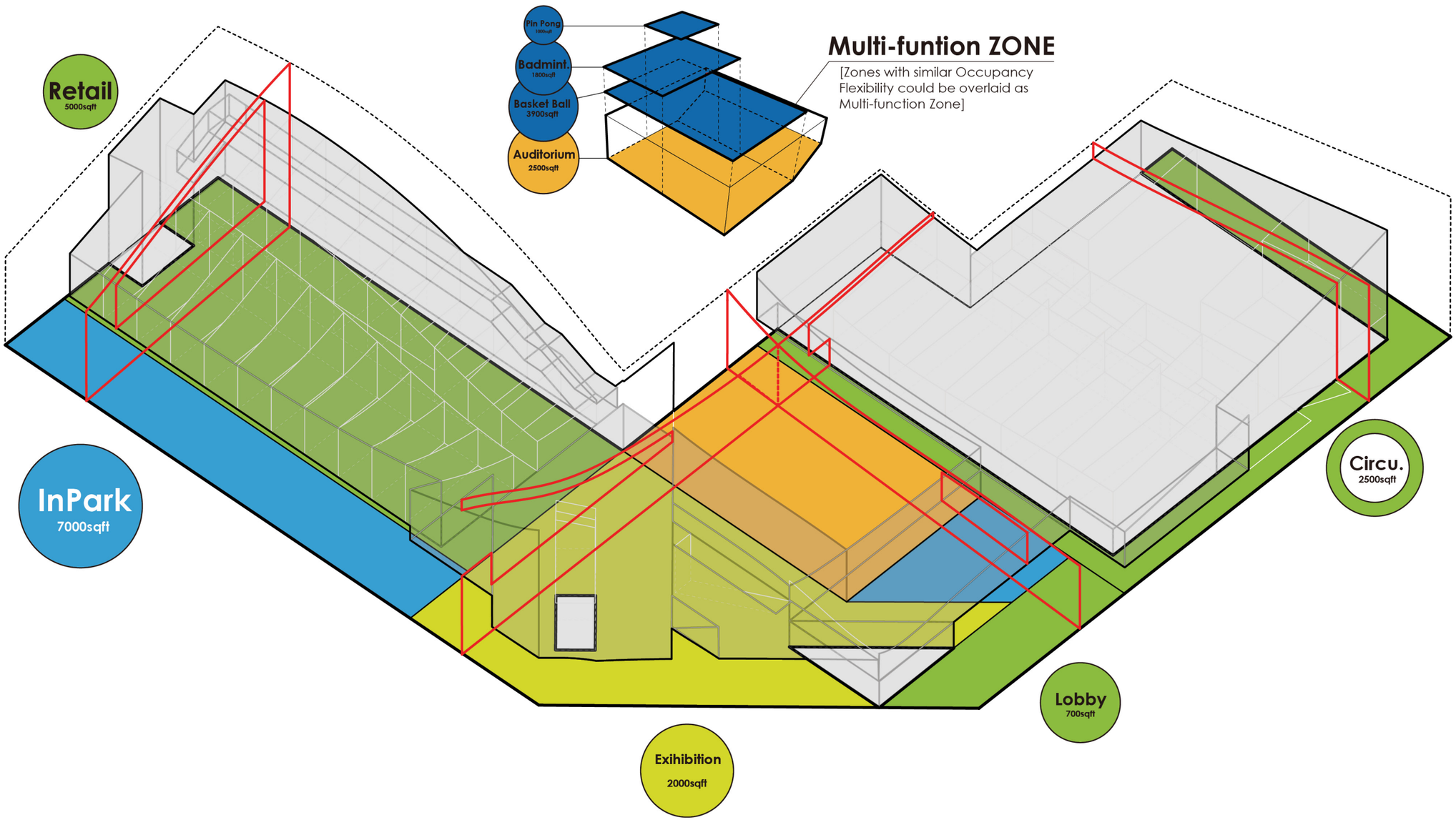




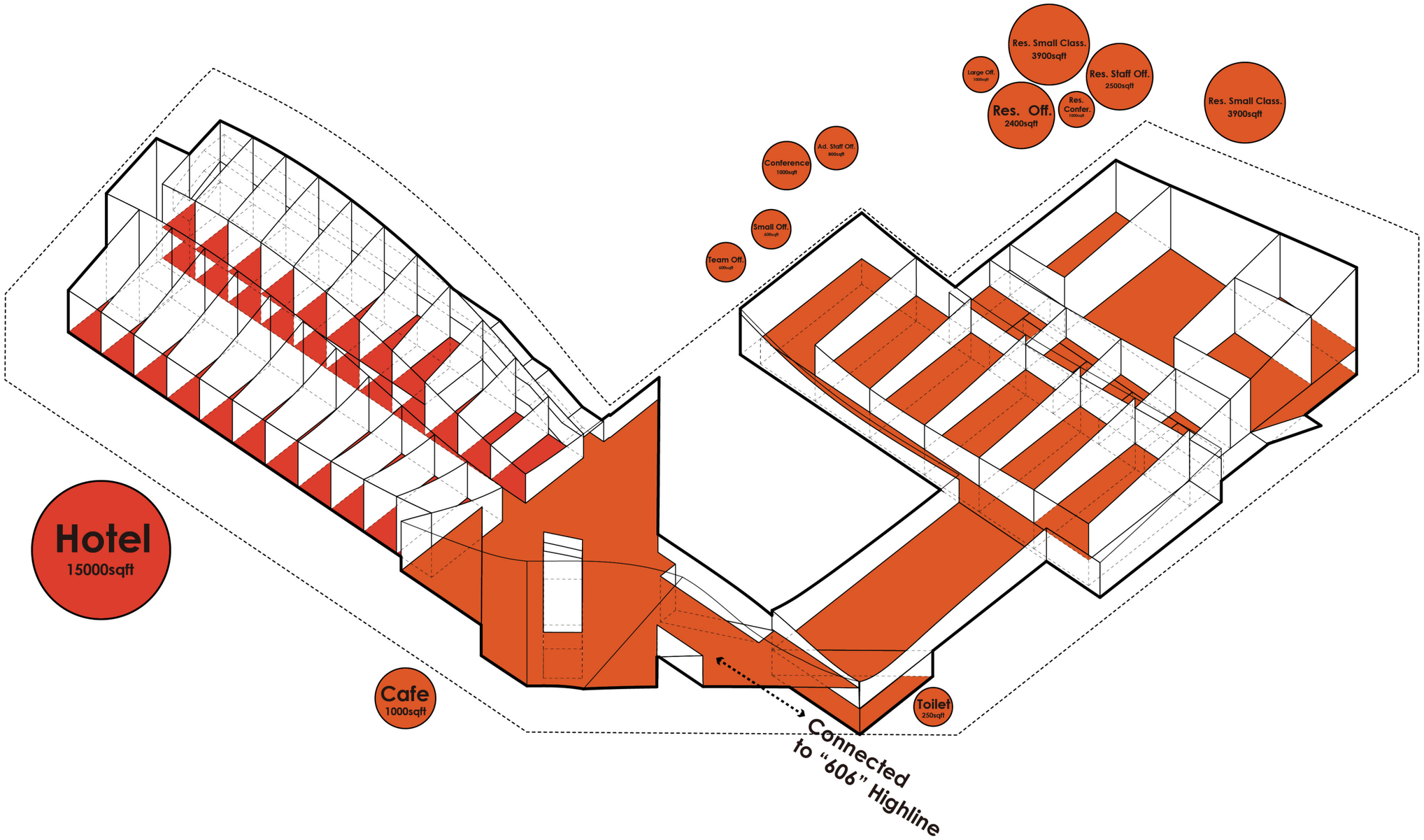




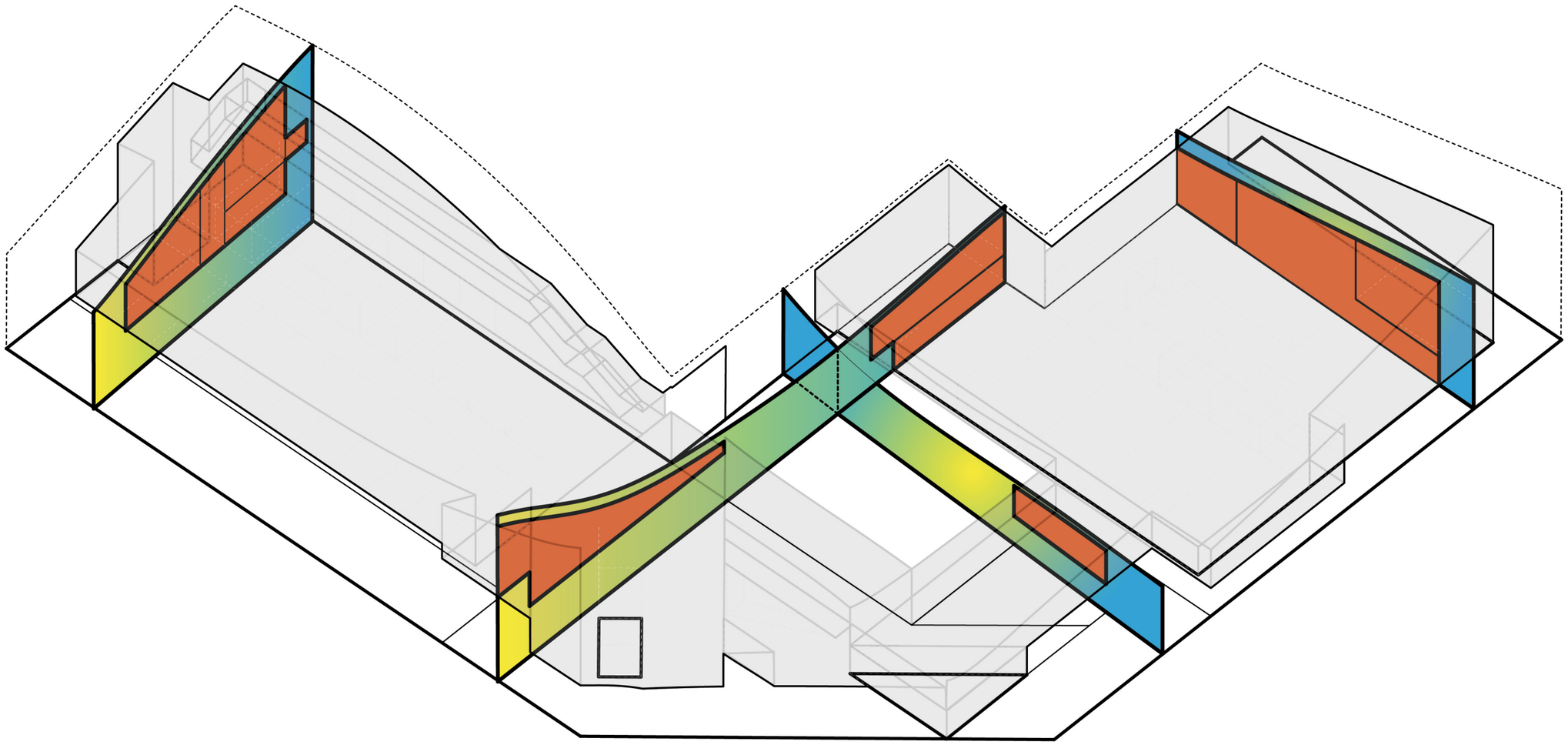
“Jello” - Buffer Space



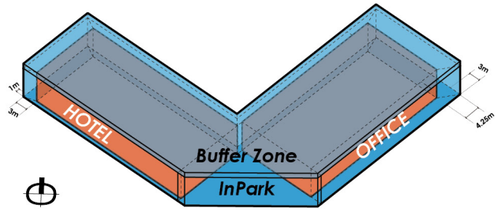
“Fruit”


Hotel
15000sqft
Cafe
1000sqft
Toilet
250sqft
Connected
to “606” Highline
Team Off.
600sqft
Small Off.
600sqft
Conference
1000sqft
Ad. Staff Off.
800sqft
Large Off.
1000sqft
Res. Small Class.
3900sqft
Res. Off.
2400sqft
Res.
Confer.
1000sqft
Res. Staff Off.
2500sqft
Res. Small Class.
3900sqft

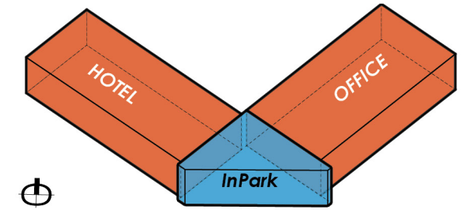
“Fruit” in “Jello” Section



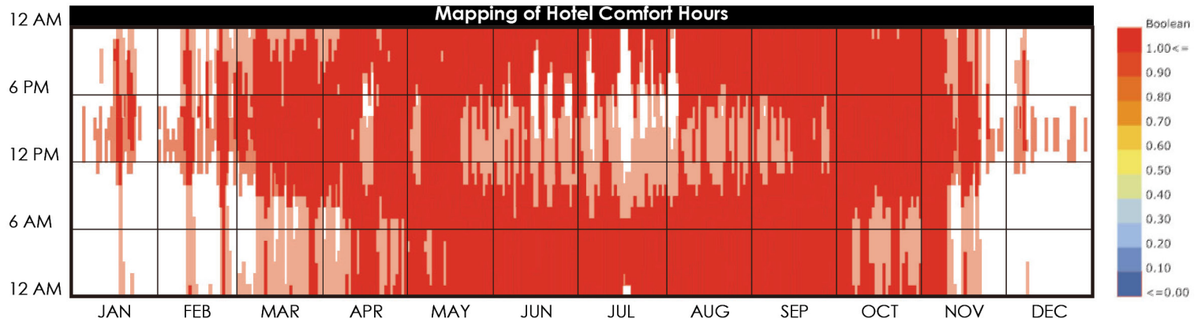
Benifit of “Fruit” in “Jello” -Comparison between Buffer Zone Senario and No Buffer Zone Senario



Senario with Buffer Zone



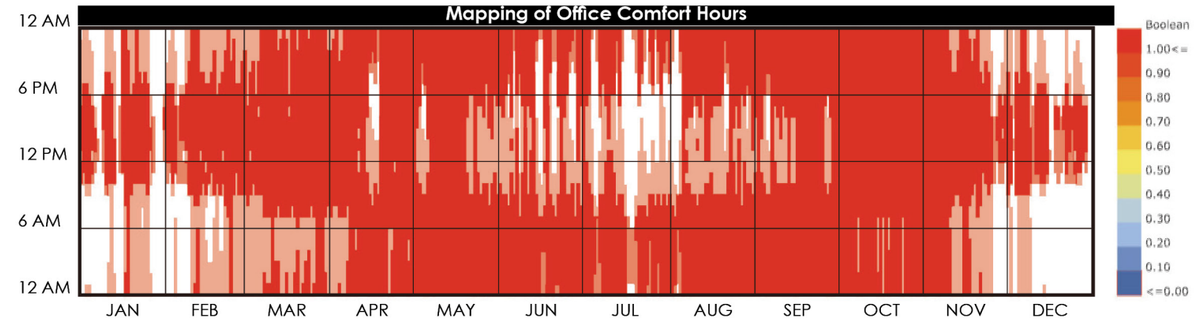
Senario without Buffer Zone



Front Layer: Senario without Buffer Zone_58%Comfort

Back Layer: Senario with Buffer Zone_73%Comfort

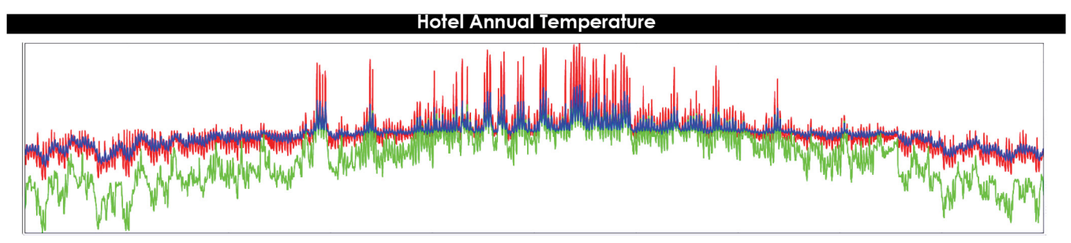
Senario with Buffer Zone provide **more Comfort Hour** than Senario without Buffer Zone



Front Layer: Senario without Buffer Zone_65%Comfort

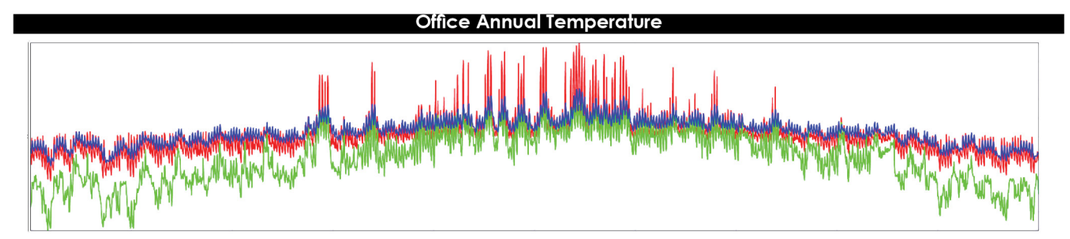
Back Layer: Senario with Buffer Zone_85%Comfort

Senario with Buffer Zone provide more Comfort Hour than **Senario without Buffer Zone**



Senario with Buffer Zone **Senario without Buffer Zone** **Outside Temperature**

Senario With Buffer Zone Provide **Smaller Temperature Swing.**



Senario with Buffer Zone **Senario without Buffer Zone** **Outside Temperature**

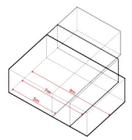
Senario With Buffer Zone Provide **Smaller Temperature Swing.**

Explore Optimal Parameters for Office Space Daylighting & Adaptive Comfort

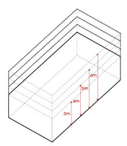
- Run daylighting and comfort simulation of different **Input Parameter** combinations,
- **Visualize all results** in "DesignExplorer",
- Select result with best adaptive comfort as potential **Optimal Result,**
- Use input parameter of Optimal Results as **guidance for next step design**.

Input Parameters

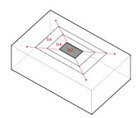
Floor Area= 50 sqm,
***Depth** from 5m to 9m*



Floor Area= 50 sqm,
***Height** from 3m to 6m*



Floor Area= 50 sqm,
***SSR** from 0.2m to 0.6m,*
SSR=Skylight to Roof Ratio



Output Values

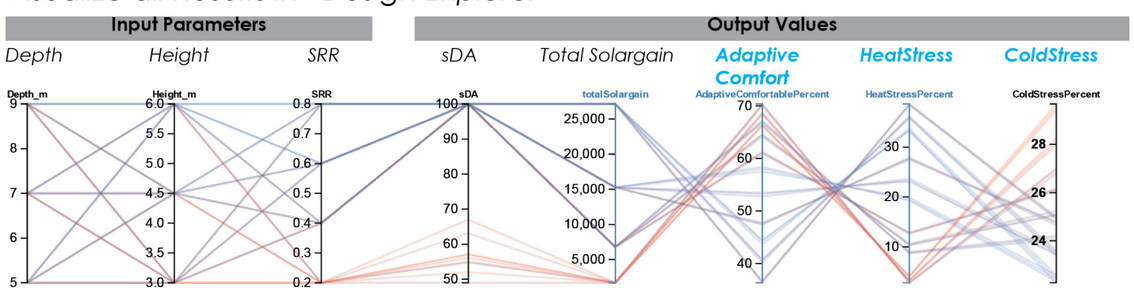
sDA
Spatial Daylight Autonomy (sDA) describes how much of a space receives sufficient daylight. Specifically, it describes the percentage of floor area that receives at least 300 lux for at least 50% of the annual occupied hours.

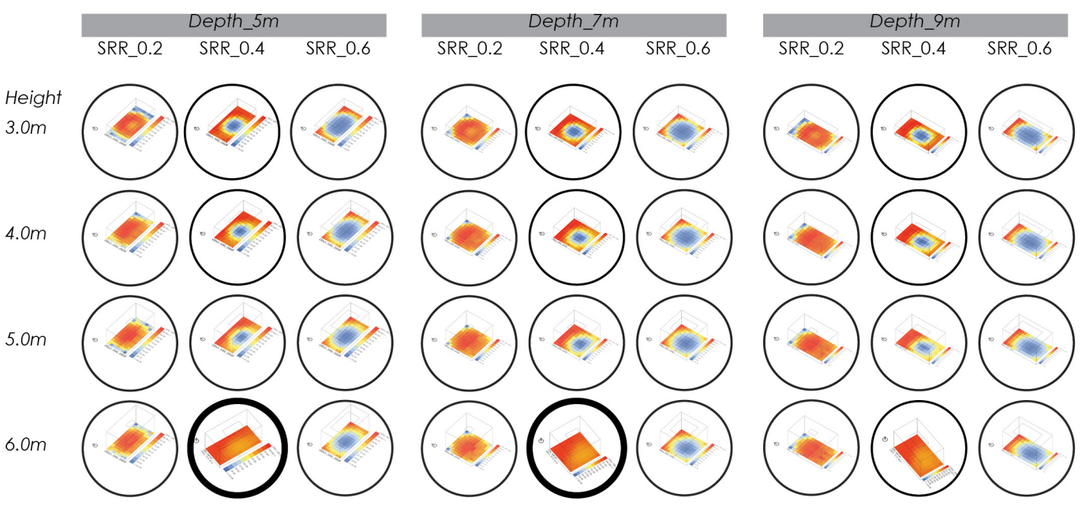
Total Solargain
Solar radiation energy received over one year.

Adaptive Comfort Percentage
Without HVAC System, how many percentage of time a indoor space is comfortable.

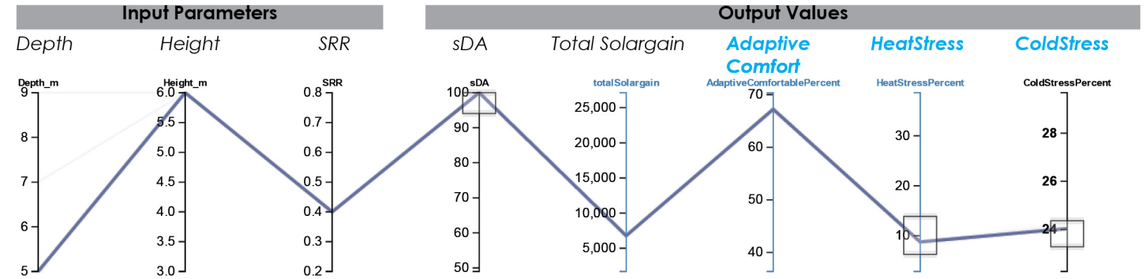
UDLI
Percentage of time during the occupancy hours that the test point receive 100lux-2000lux

Visualize all Results in "Design Explorer"





Select Optimal Results



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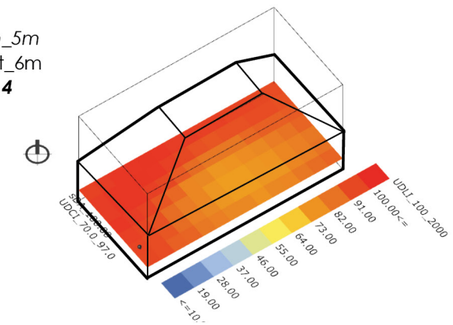
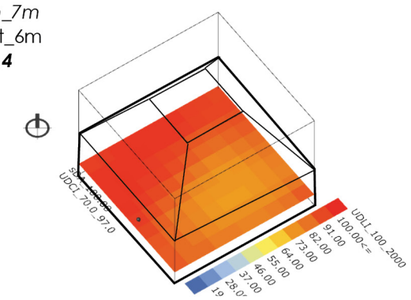
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