



# connecting US

A thesis project looking at developing high-speed rail in the United States and the effects it would have on the environment and people.

# Why Trains?

# The Research

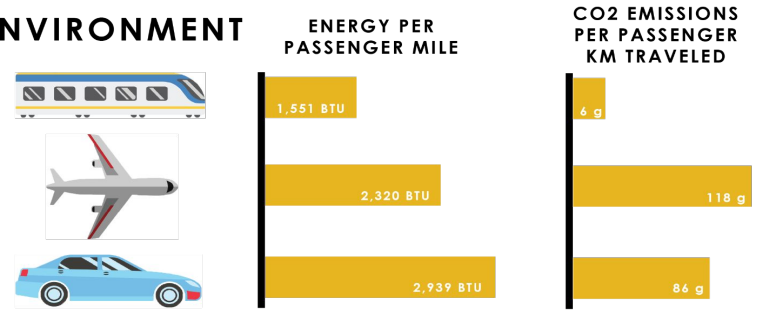
# High Speed Rail

- Emerging High Speed Rail : 90 - 110 mph
- Regional High Speed Rail : 110 - 150 mph
- Express High Speed Rail : 150 mph +
- Costly up front
- Infrastructure upgrades

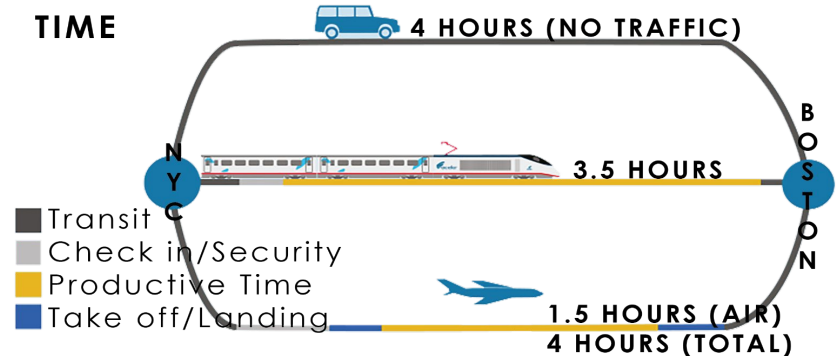
## AMENITIES



## ENVIRONMENT



## TIME





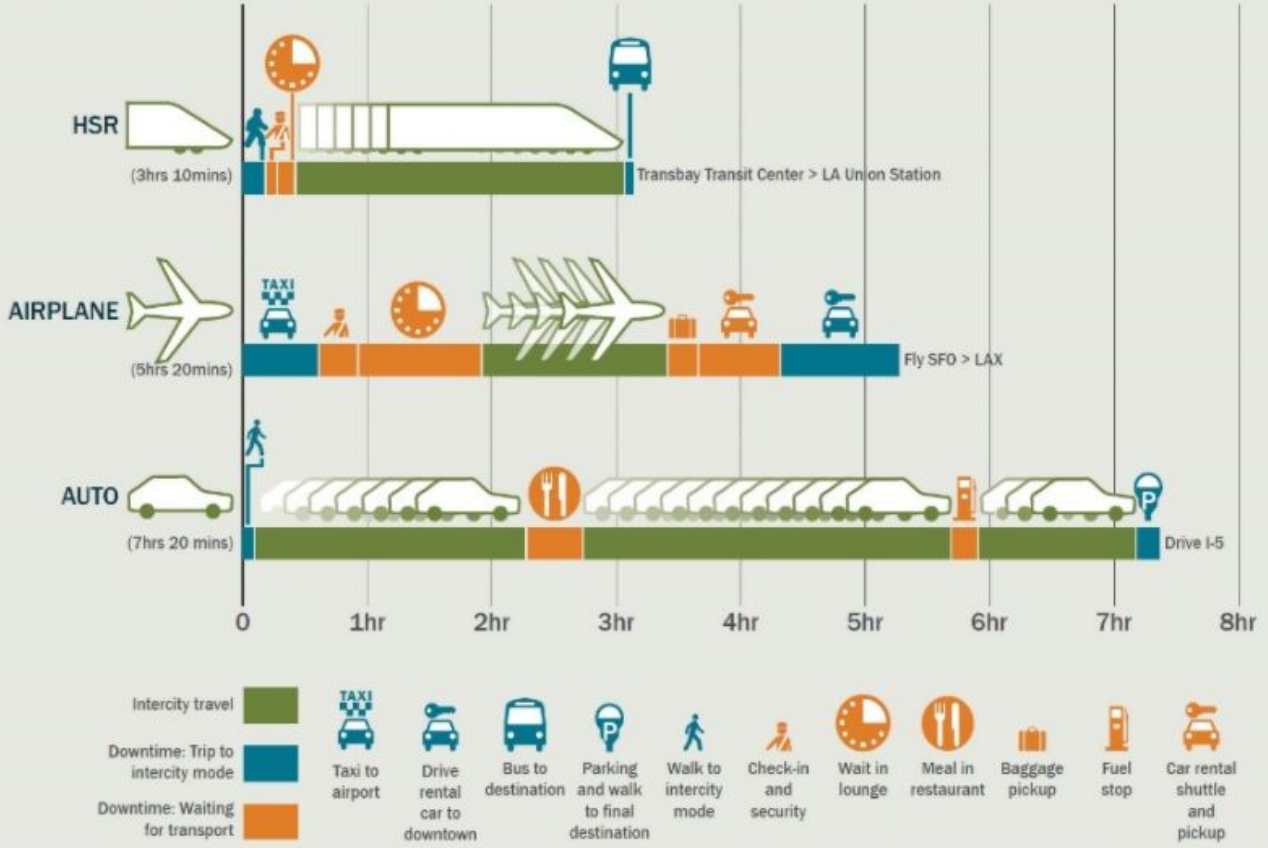
# High Speed Rail in the World

<b>Country</b>	<b>Year Started</b>	<b>Max Speed</b>	<b>Line Mileage</b>
<b>Japan</b>	1964	320	16,550 now 22,550 planned
<b>Europe</b>	1981	320	18,650 now 43,500 planned
<b>China</b>	2008	350	23,620 now 27,973 planned

# High Speed Rail in the United States

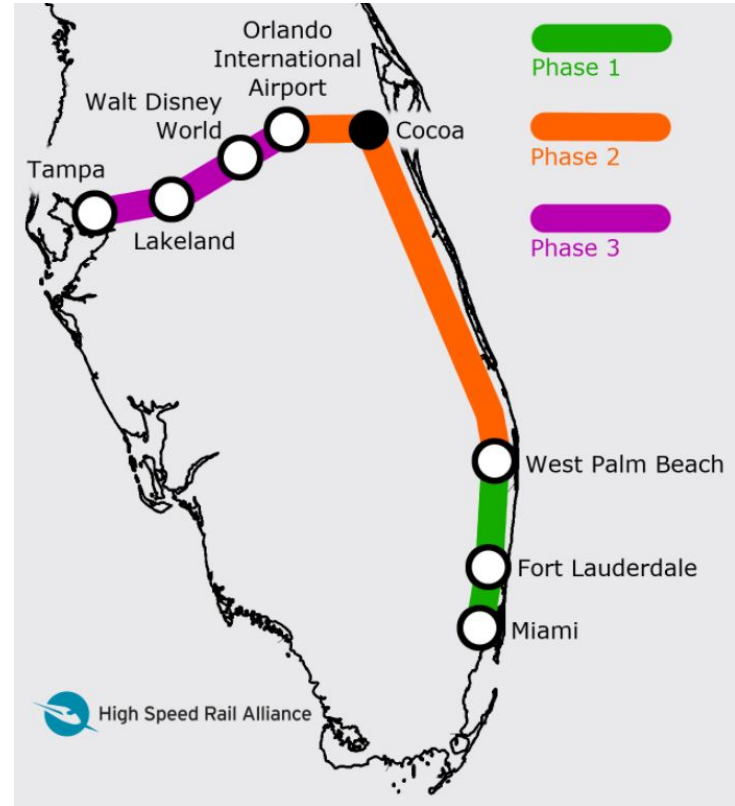
<b>Corridor</b>	<b>Mileage</b>	<b>Power</b>	<b>Top Speed (MPH)</b>	<b>Average Speed</b>	<b>Average Time</b>
L.A - San Francisco	130 Now 520 Future	Diesel-Electric	90 Now 220 Future	50	2 hr 40 m
Chicago - Detroit	304	Diesel-Electric	110	57	5 hr
Chicago - St. Louis	284	Diesel-Electric	110	53	4 hr 30 m
NYC - Albany	158	Diesel-Electric	110	56	2 hr 40 m
Philadelphia - Harrisburg	104	Electric	110	64	1 hr 45 m
Boston - NYC	230	Electric	150	62	3 hr 30 m
NYC - Washington D.C.	227	Electric	135	80	3 hr 30 m

Door-to-door travel times between downtown San Francisco and downtown Los Angeles by mode.



# Florida Brightline

- First privately-held intercity passenger rail in 40 years
- 1.5 million passengers in first two years
- Currently in Phase 1 of 3



# United States & High Speed Rail

- Strong Property Rights
- “Car Culture”
- Existing Infrastructure
- Freight company owned railways
- Positive Change
- Time savings
- Transportation Ability
- Environmental Savings



# Stations and Cities

- Economic Activity
- City within a city
- Efficient





## Defining Factors of Quality in Case Studies Analyzed

	Case Study 1	Case Study 2	Case Study 3	Case Study 4	Case Study 5	Case Study 6	Case Study 7
<b>City Integration</b>	Central Location Minimal Barrier Effect Dense Surroundings		Urban Structure		Spatial Planning		Land Availability Connectivity Protected Land
<b>Spatial Planning</b>	Diverse Amenities  Public Places & Plazas for congregation  External Station Building  Distinctive Architecture Scatter parking structures Available bike parking	Commercial Use of Real Estate  Provide public space Contribute to identity of area	Funcional Diversity  Public Space  Architecture	Diverse Use, Lower-income Uses Minimize motor vehicle occupation	Interactivity	Balance in activity distribution  Quality of Life	
<b>Functional Integration</b>	Good Intermodal Connections  Good Service  Good Pedestrian Access	Link Catchment Area & Transport Network  Support Transfer Between Modes		Walk, Cycle, Connect, Transit	Intermodality Accessibility	Internal & External Accessibility	National, Regional & Local Accessibility Urban Projects Linked to High-speed Rail
<b>Policy, Governance, Economics</b>	Public Involvement  Political Leadership Public-Private Partnerships Multi-phased Planning Land Assembly & Banking					Balance in the social distribution of effects Influence in regional economy	Tourism  Economic Development Station Area Development

# Amtrak

- 21,000 Route Miles
- Service in 46 States, Washington D.C., and 3 Canadian Provinces
- Invested \$78 million into ADA-related transportation design
- Met all annual energy, fuel, recycling, and gas emission targets
- 2019 saw a record number of trips at 32.5 million





# The Future of Amtrak

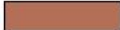

- Infrastructure plan
  - \$85 billion to modernize public transit
  - \$80 billion to expand the passenger and freight rail network
- 30 new routes
- 52 million ridership goal



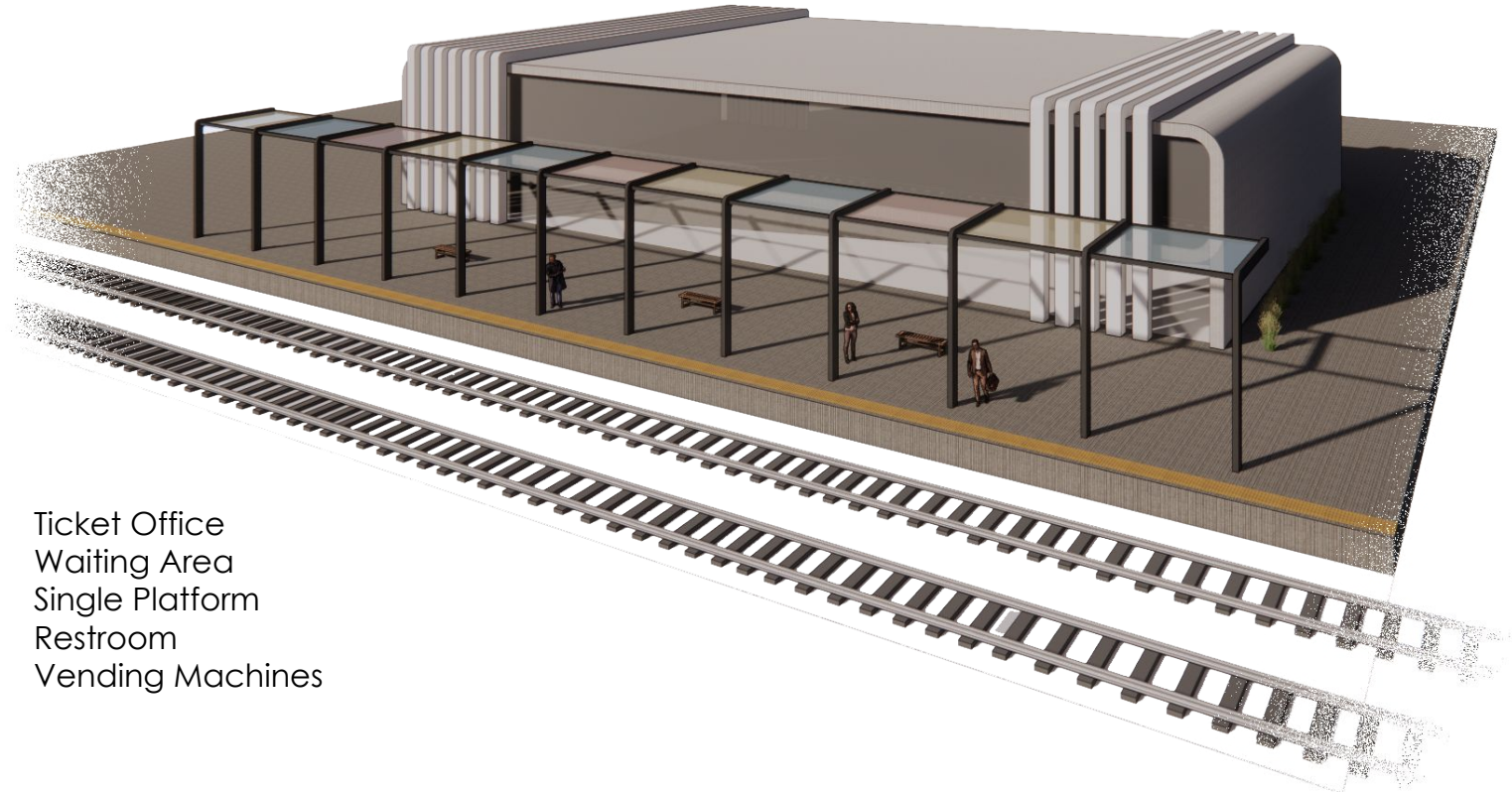
# Modularity

- Must be adaptable to many different needs/sizes
- Scalable programming
- Acts as a blueprint
- Local architects can design the exterior to suit the city's personality

	Large	Medium	Caretaker	Shelter
Projected Annual Ridership	Greater than 400,000	100,000 to 400,000	20,000 to 100,000	Less than 20,000
<b>Route Service Type</b>				
High Speed Rail	Typical Characteristics	Typical Characteristics	Service Possible	Service Possible
Corridor Service	Typical Characteristics	Typical Characteristics	Service Possible	Service Possible
Long Distance Service	Typical Characteristics	Typical Characteristics	Typical Characteristics	Service Possible
<b>Station Location Environment</b>				
High Density	Typical Characteristics	Service Possible	Service Possible	Service Possible
Medium Density	Service Possible	Typical Characteristics	Service Possible	Service Possible
Low Density	Service Possible	Service Possible	Service Possible	Service Possible
<b>Multi-Modal Services</b>				
Full Range (Metro/Light Rail)	Typical Characteristics	Service Possible	Service Possible	Service Possible
Basic (Bus)	Service Possible	Typical Characteristics	Service Possible	Service Possible
Minimal (Taxi/car)	Service Possible	Service Possible	Typical Characteristics	Typical Characteristics
<b>Customer Service Staffing Level</b>				
Fully Staffed, Management Present	Typical Characteristics	Service Possible	Service Possible	Service Possible
Basic Staff for Ticketing, Baggage, Operations	Service Possible	Typical Characteristics	Service Possible	Service Possible
Caretaker, No Passenger Assistance	Service Possible	Service Possible	Typical Characteristics	Service Possible
Unstaffed	Service Possible	Service Possible	Service Possible	Typical Characteristics
<b>Baggage Services</b>				
Checked Baggage/Red Cap/ Package Express	Typical Characteristics	Service Possible	Service Possible	Service Possible
Checked Baggage/Agent Assistance	Service Possible	Typical Characteristics	Service Possible	Service Possible
None	Service Possible	Service Possible	Typical Characteristics	Typical Characteristics
<b>Station Configuration</b>				
Side Platforms	Typical Characteristics	Typical Characteristics	Typical Characteristics	Typical Characteristics
Vertical Circulation Platforms	Typical Characteristics	Typical Characteristics	Service Possible	Service Possible
Terminal Services	Typical Characteristics	Service Possible	Service Possible	Service Possible

Typical Characteristics   
 Service Possible 

# Example Shelter Station

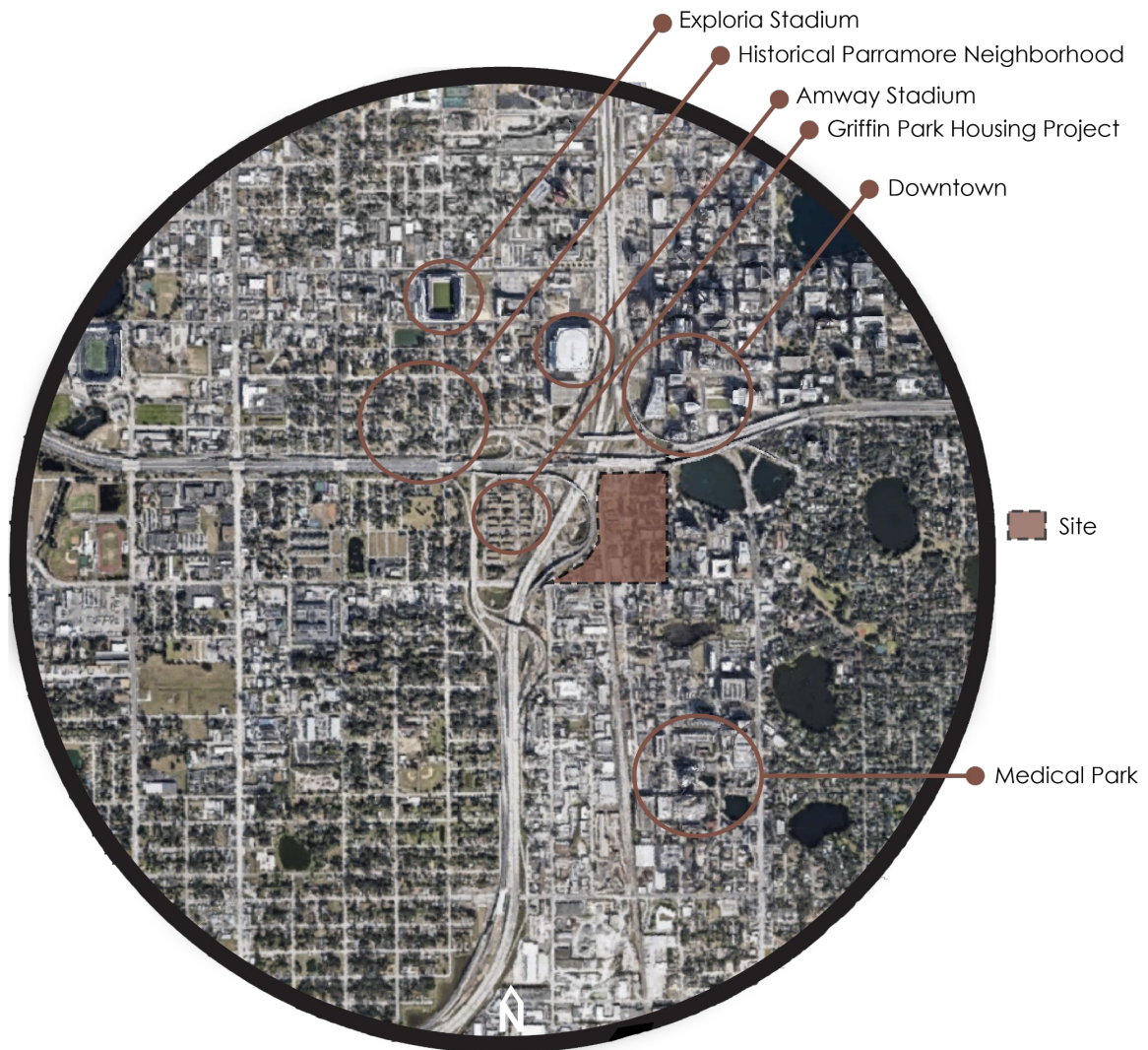


- Ticket Office
- Waiting Area
- Single Platform
- Restroom
- Vending Machines

**The Site**

# Orlando, Florida

- Population of 285,705 People
- Urban Population of 2,134,411 People
- 2% growth rate each year
- Orlando Sunrail
  - Public Transportation





# Site Analysis



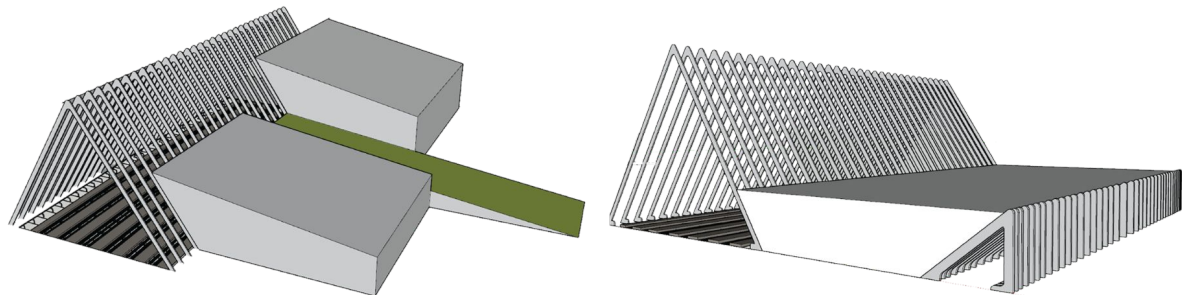
# **The Design Development**

# Goals of the Project

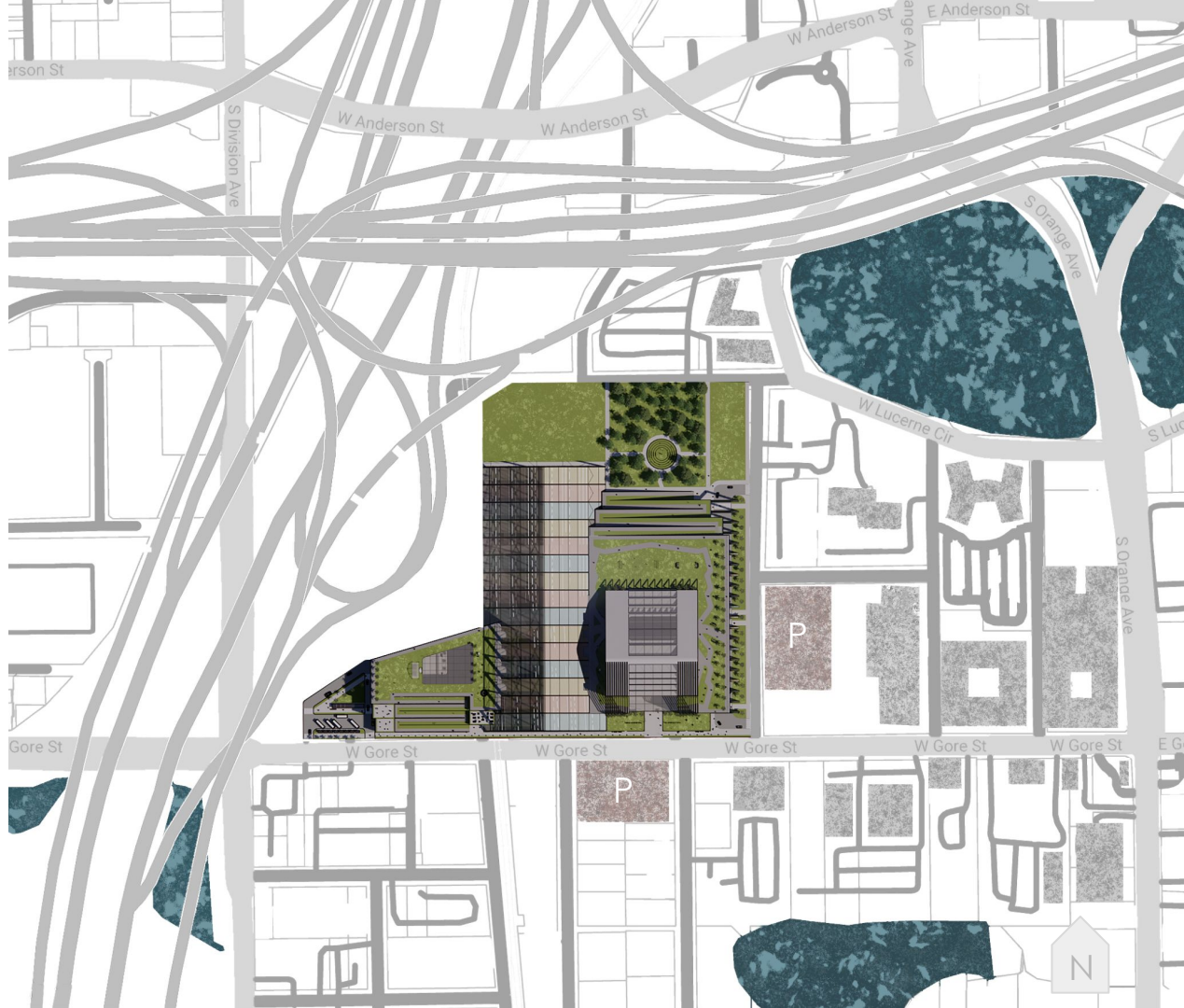
- Improve ease of travel throughout the United States while promoting the reduction of carbon emissions
- Encourage exploration of places, people and cultures
- Prove that the relationship between traveling and understanding different cultures and social economic areas is positive
- Be more than just a node where people come and go



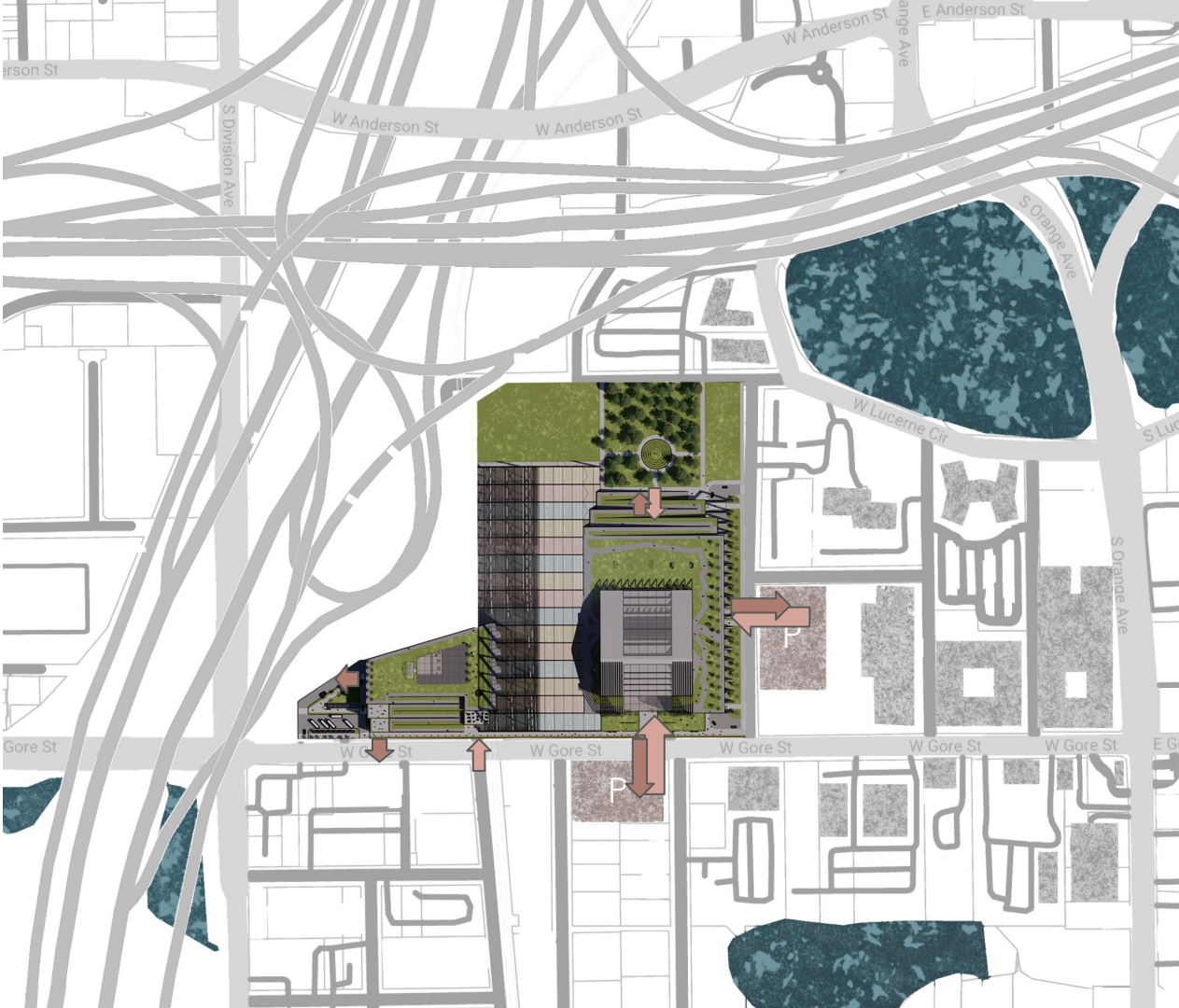
Design  
Development



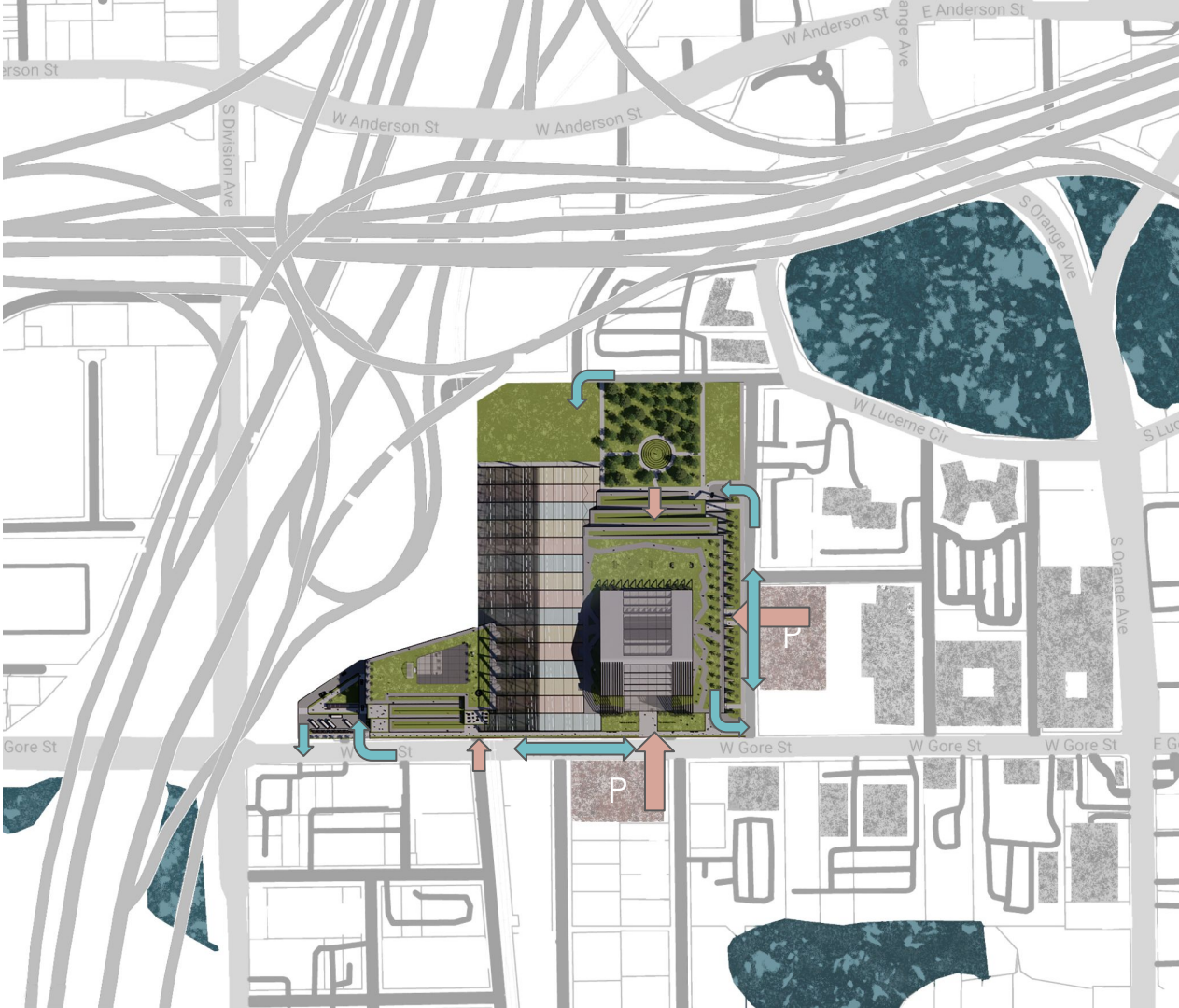
# The Station



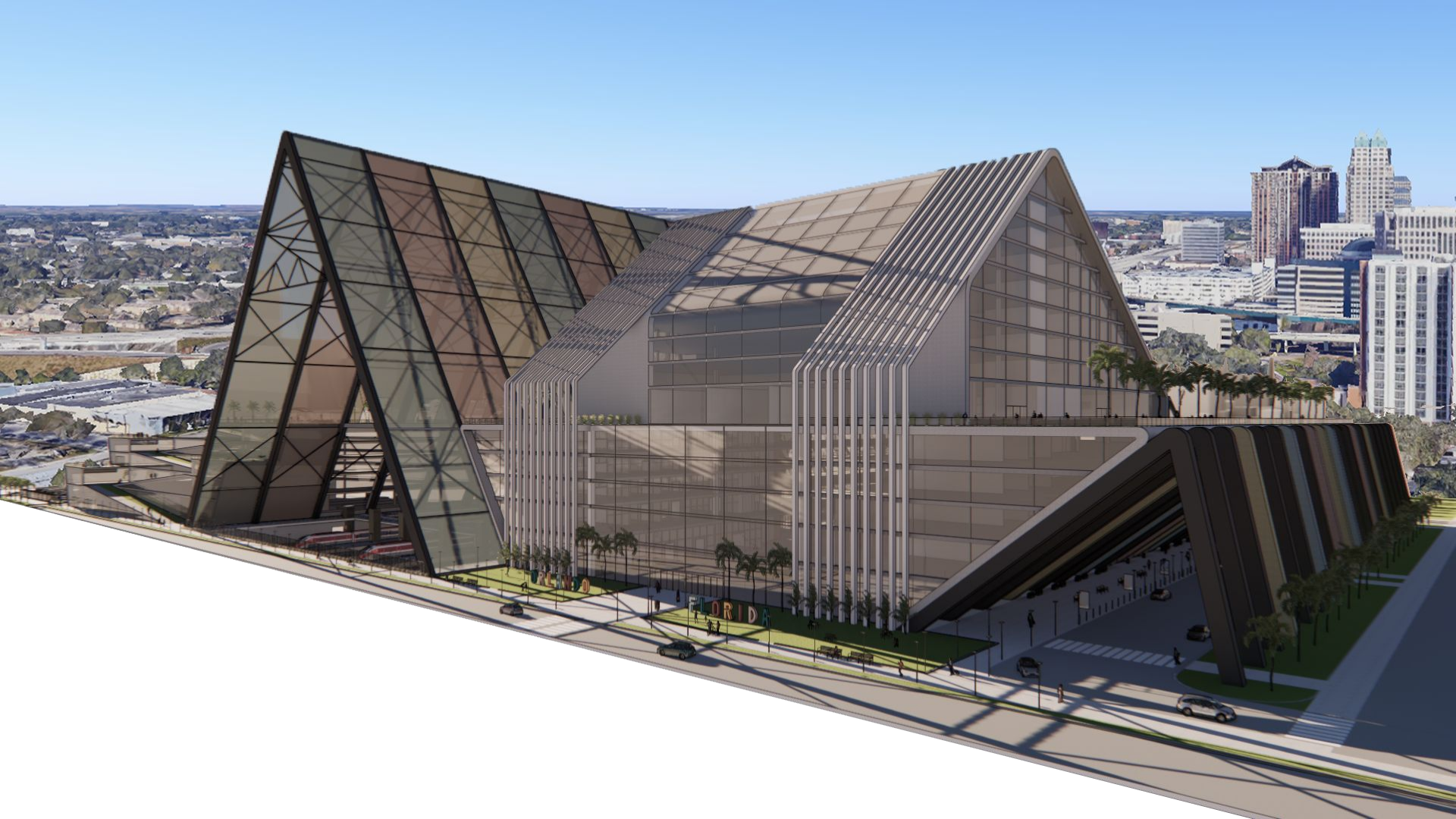
# Entrances and Exits



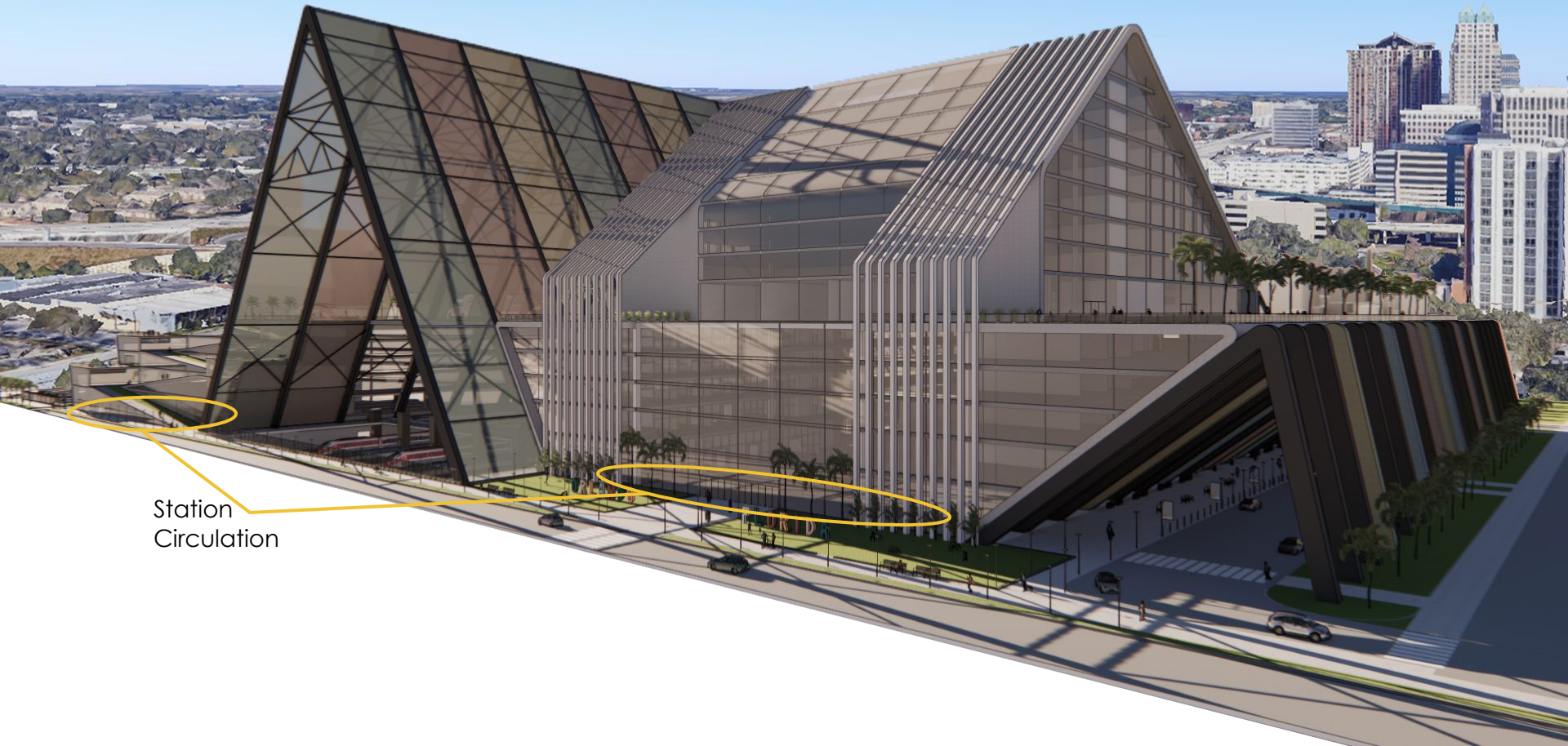
Auto  
Circulation







# Program



Station  
Circulation

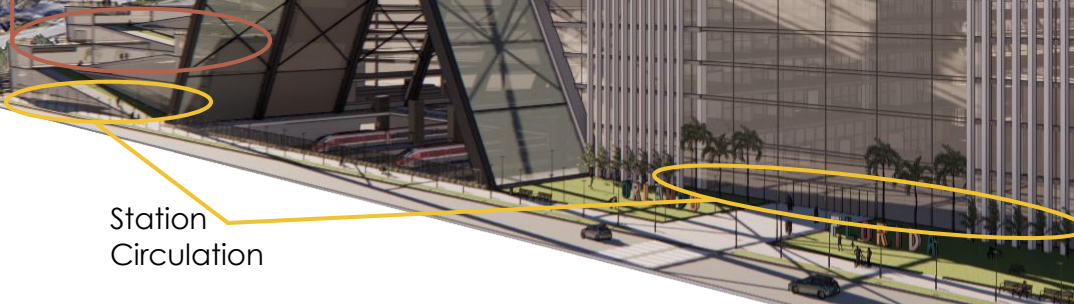


# Program

Office Space



Station  
Circulation





# Program

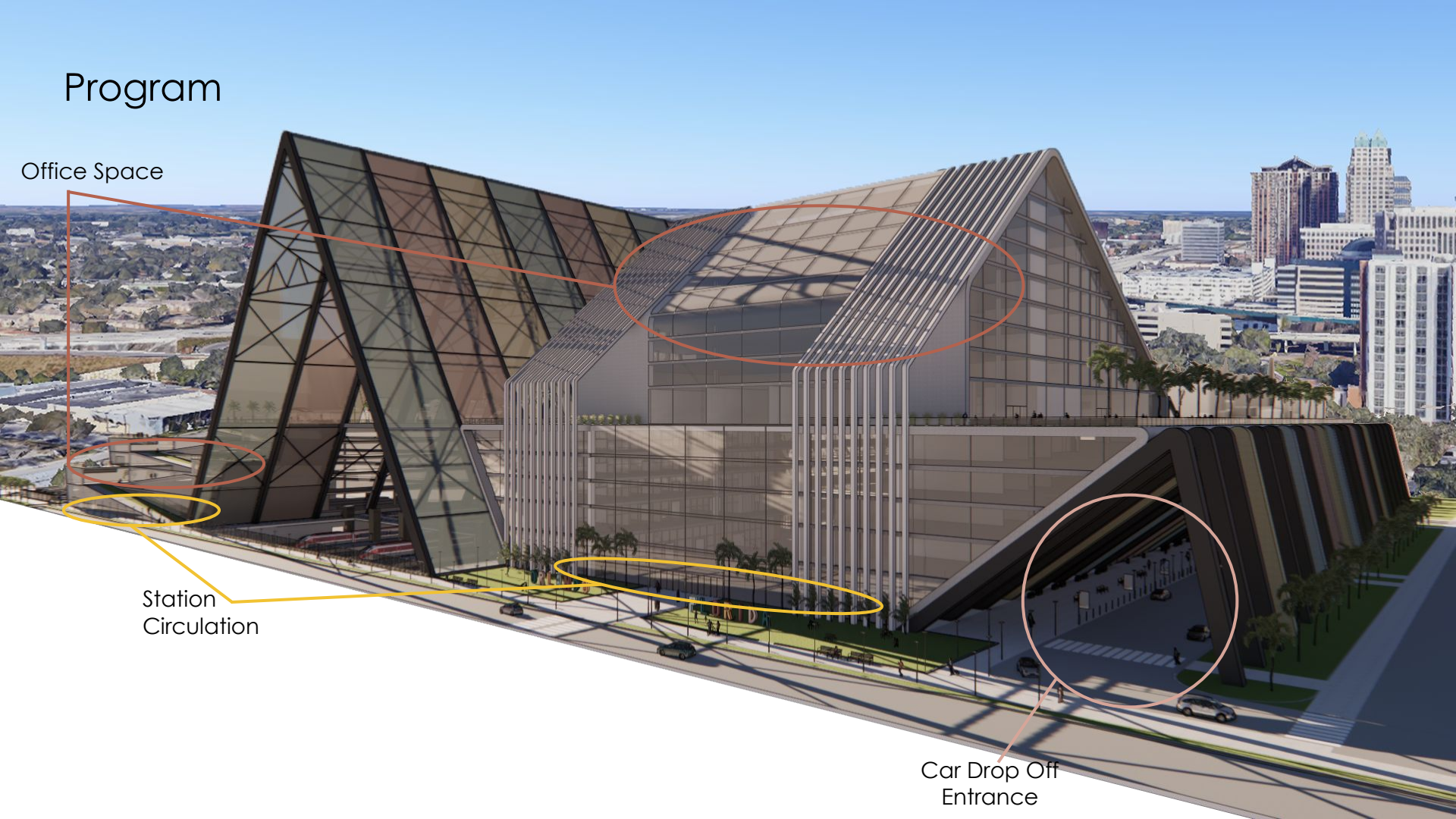
Office Space



Station  
Circulation



Car Drop Off  
Entrance

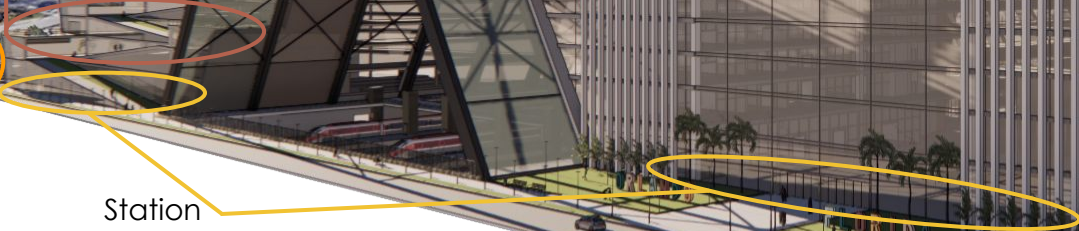


# Program

Office Space



Station  
Circulation



Transportation  
Hub



Car Drop Off  
Entrance





# Program

Office Space



Station Circulation



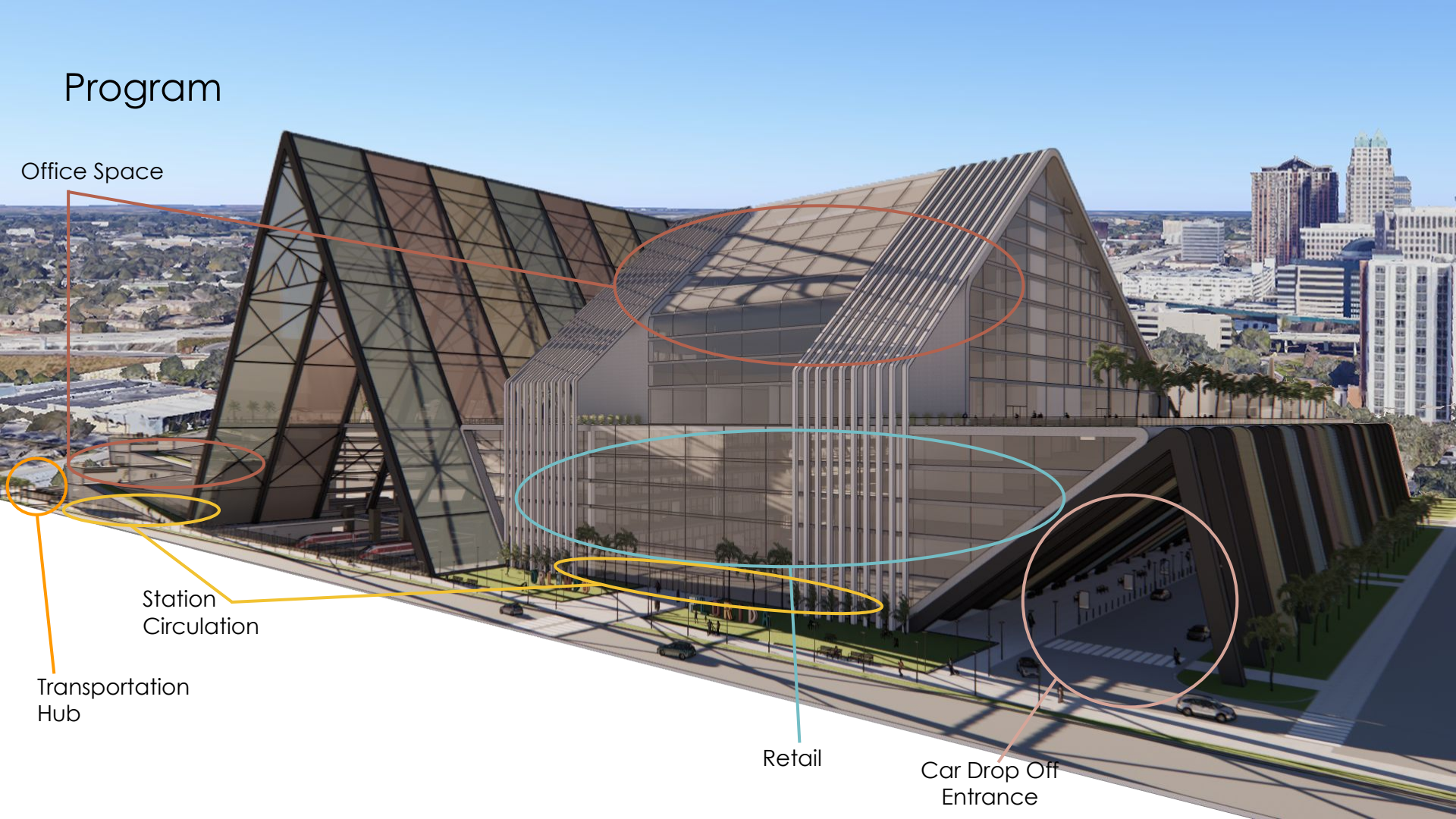
Transportation Hub



Retail



Car Drop Off Entrance



# Program

Office Space



Station Circulation

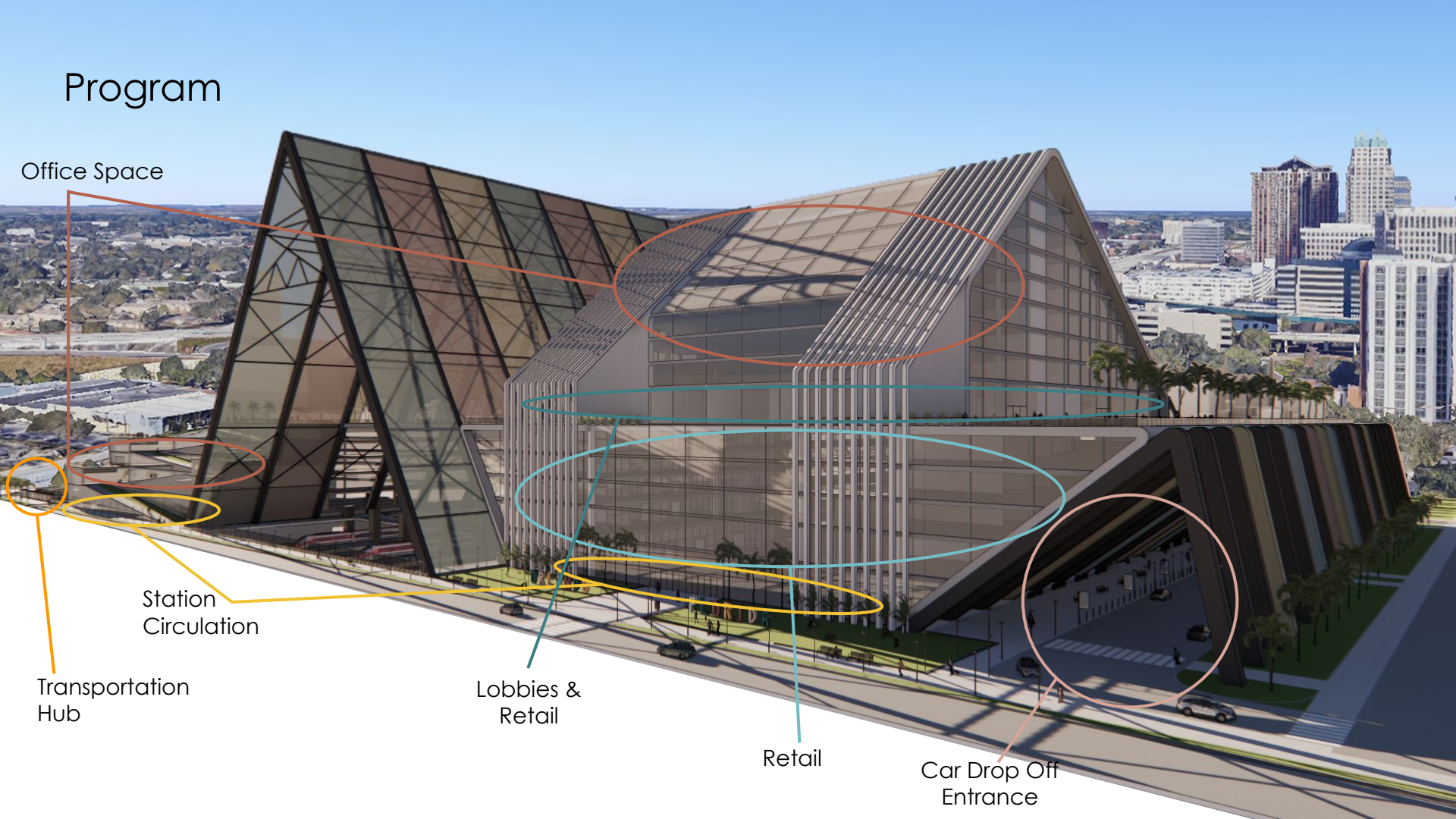


Transportation Hub

Lobbies & Retail

Retail

Car Drop Off Entrance





# Program

Office Space

Hotel

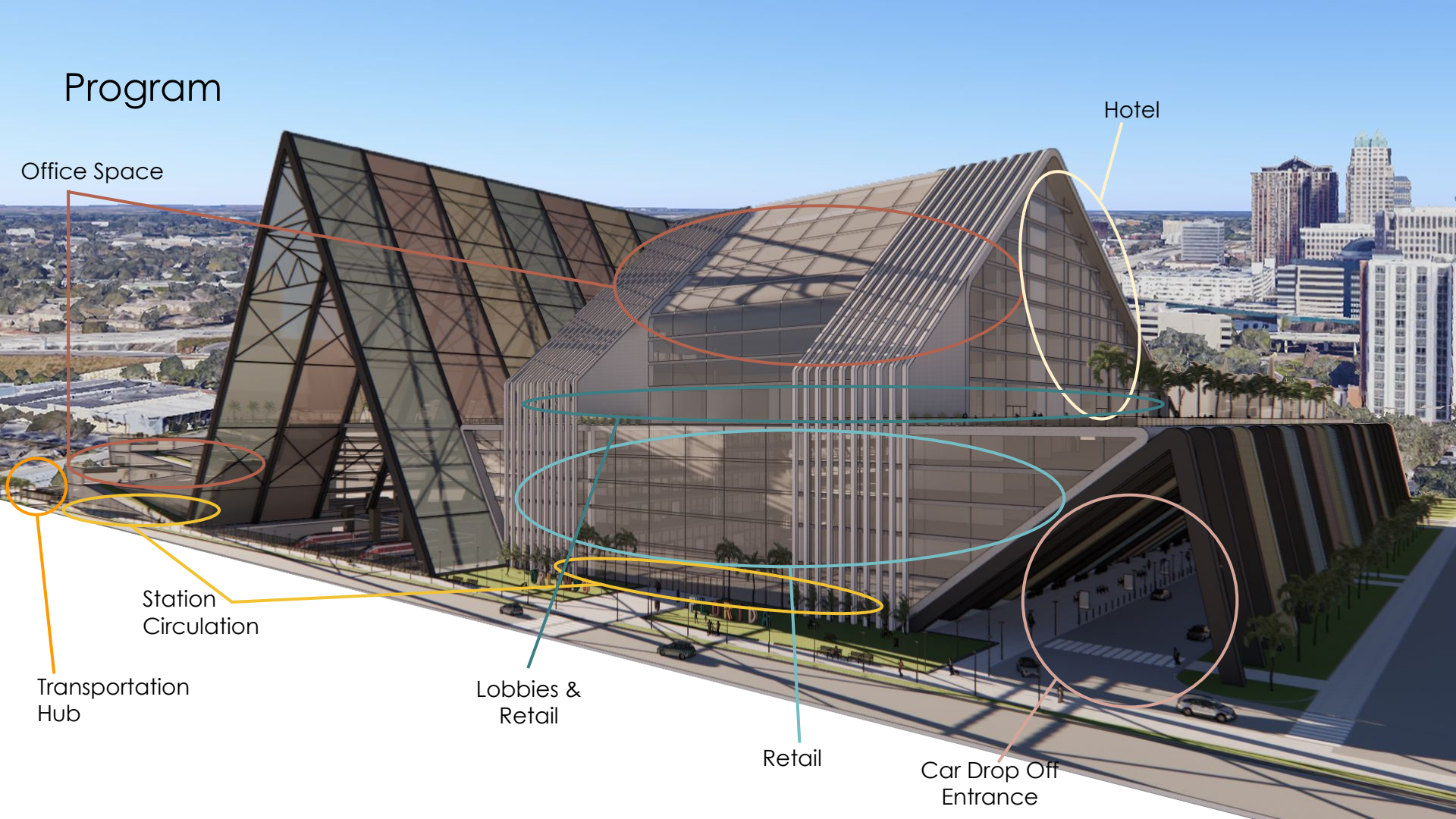
Station  
Circulation

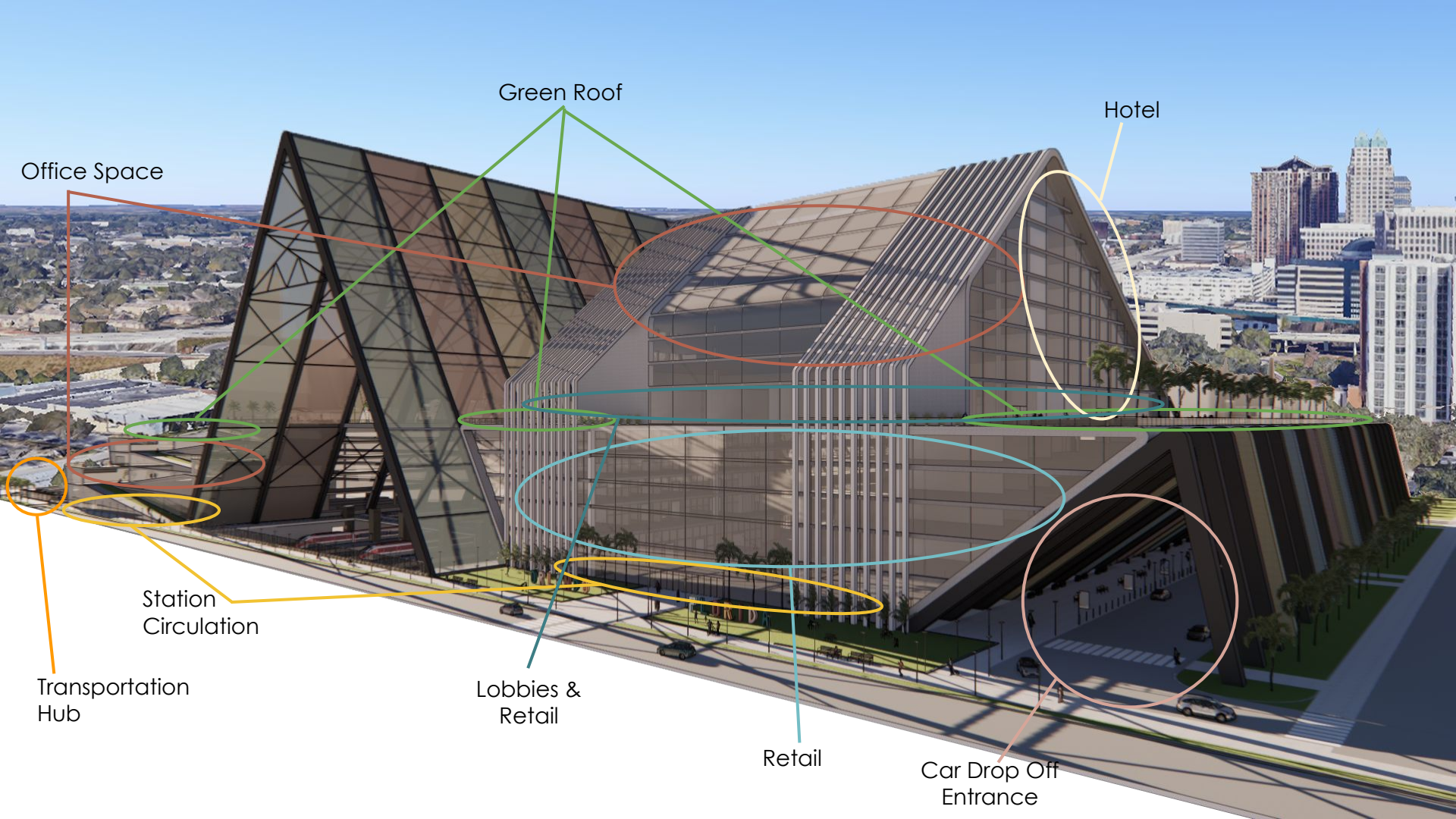
Transportation  
Hub

Lobbies &  
Retail

Retail

Car Drop Off  
Entrance





Green Roof

Hotel

Office Space

Station  
Circulation

Transportation  
Hub

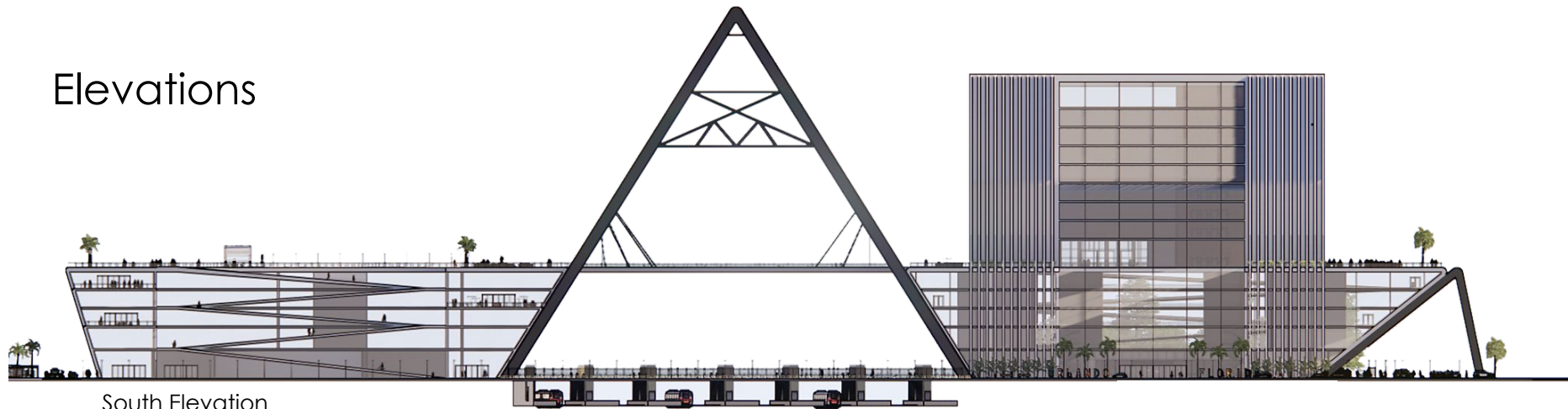
Lobbies &  
Retail

Retail

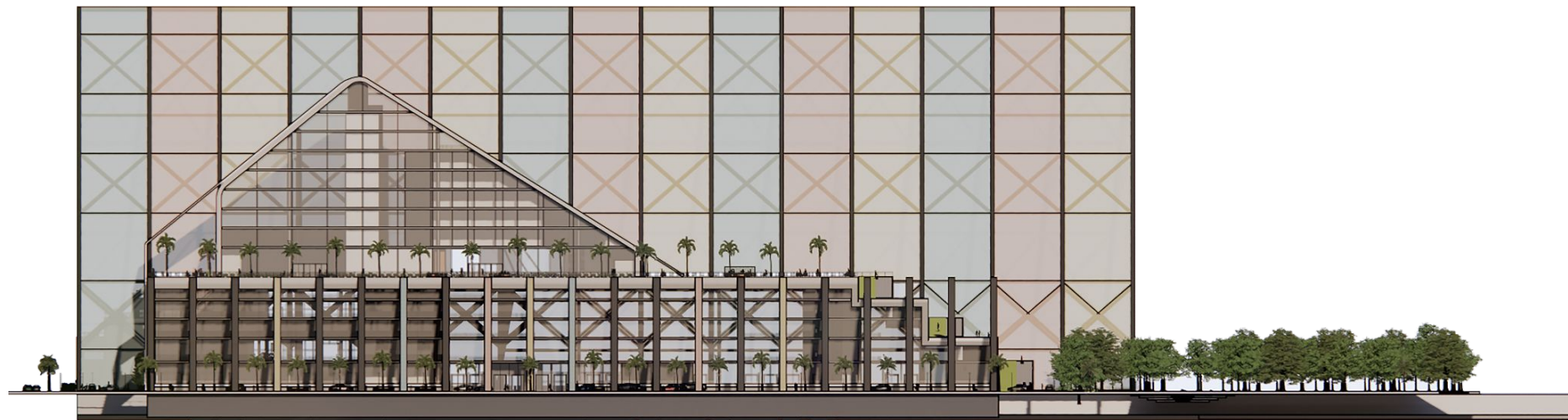
Car Drop Off  
Entrance



# Elevations

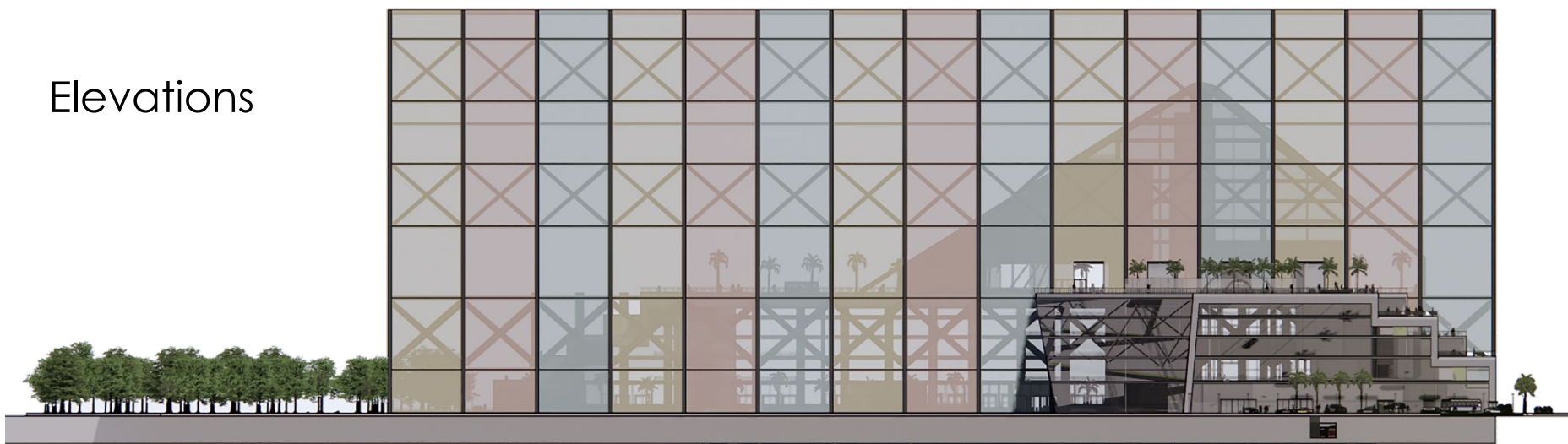


South Elevation

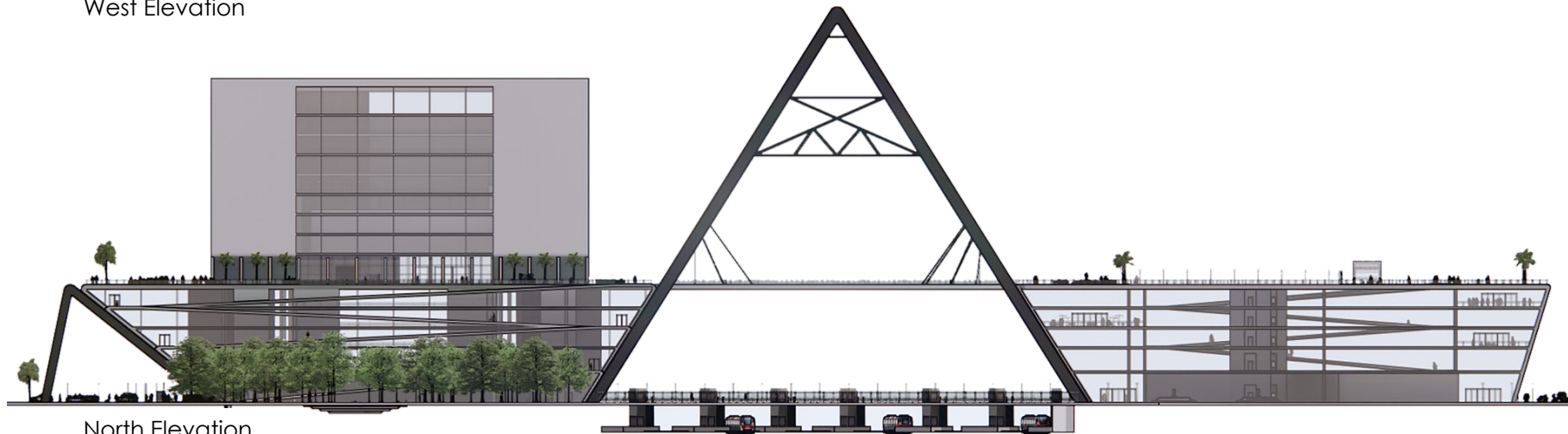


West Elevation

# Elevations



West Elevation



North Elevation

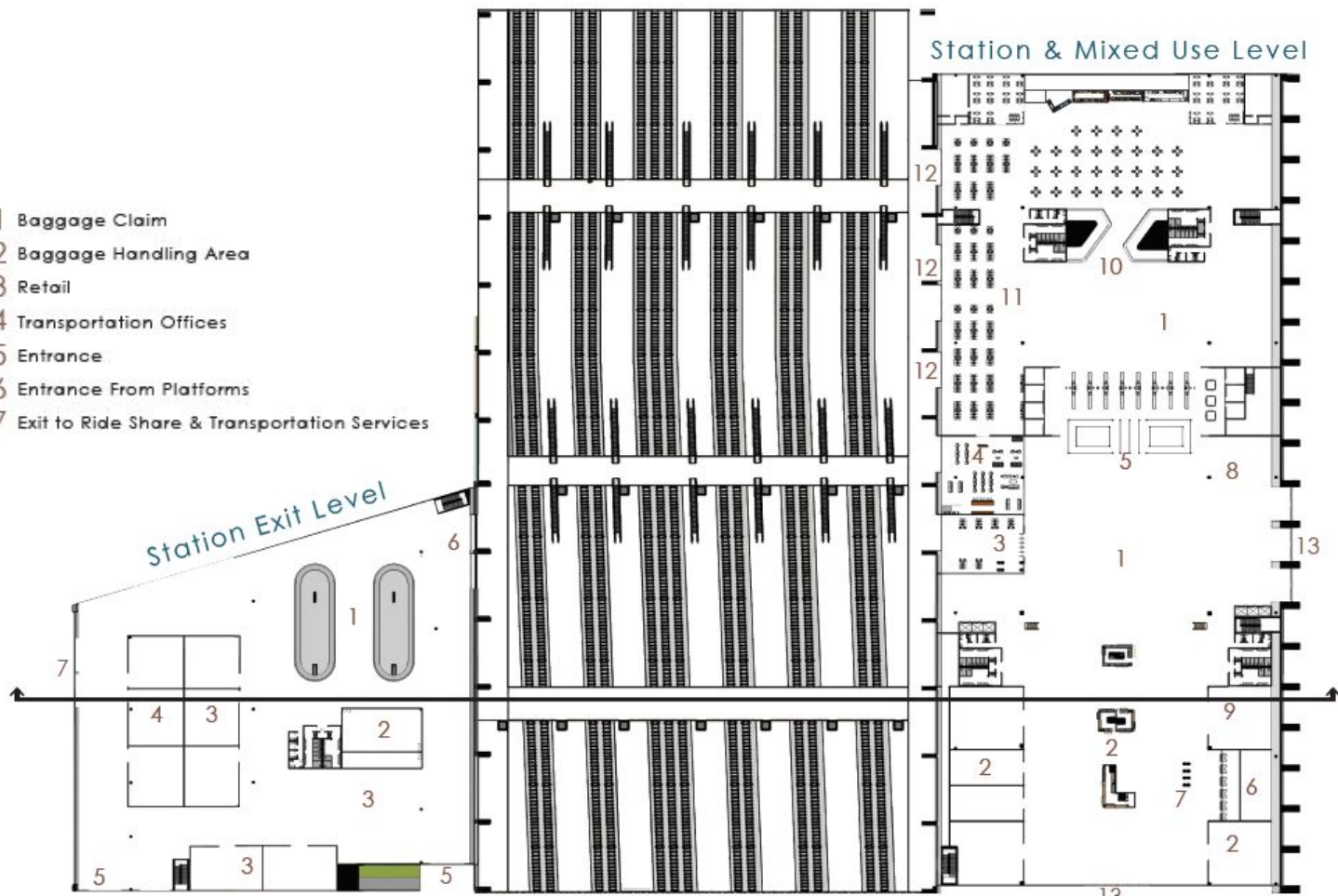


# Floor Plans

- 1 Baggage Claim
- 2 Baggage Handling Area
- 3 Retail
- 4 Transportation Offices
- 5 Entrance
- 6 Entrance From Platforms
- 7 Exit to Ride Share & Transportation Services

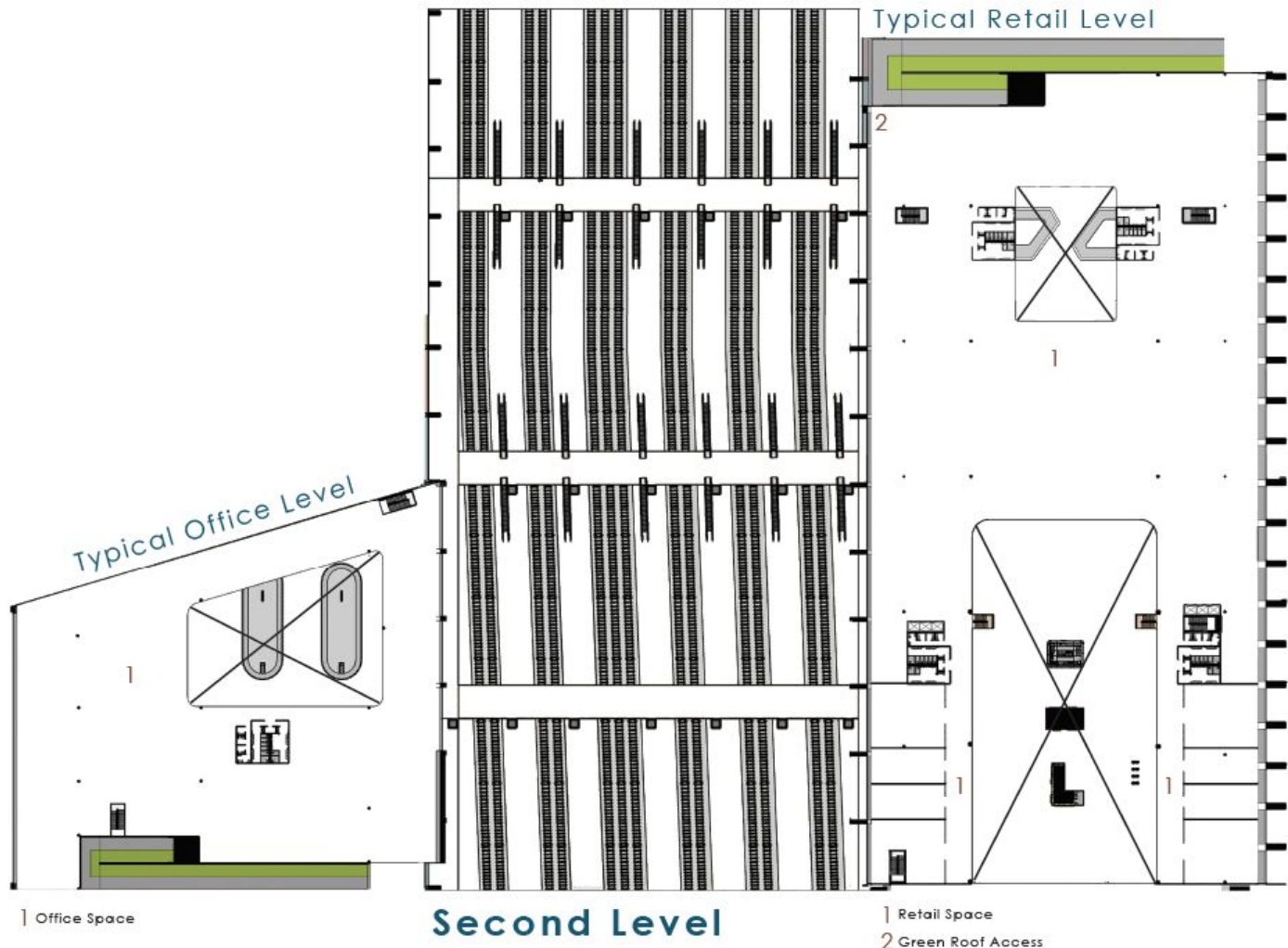
## Station & Mixed Use Level

- 1 Waiting Area
- 2 Retail
- 3 SunRail Waiting Area
- 4 First Class Waiting Area
- 5 Security
- 6 Ticket and Baggage Desks
- 7 E-Ticket Kiosks
- 8 Info Desk
- 9 Customer Service
- 10 Food Court
- 11 Waiting Area
- 12 Exit to Platforms
- 13 Entrance



## Ground Level

25' 50' 100'



Typical Retail Level

Typical Office Level

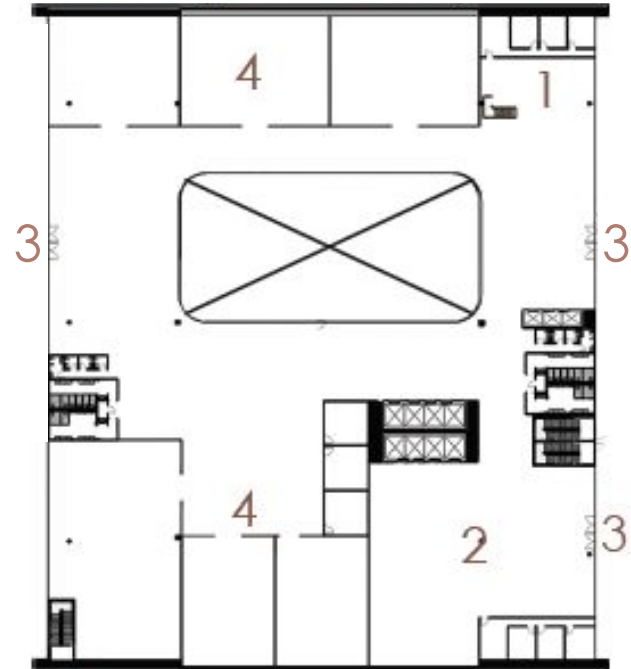
## Second Level

1 Office Space

1 Retail Space

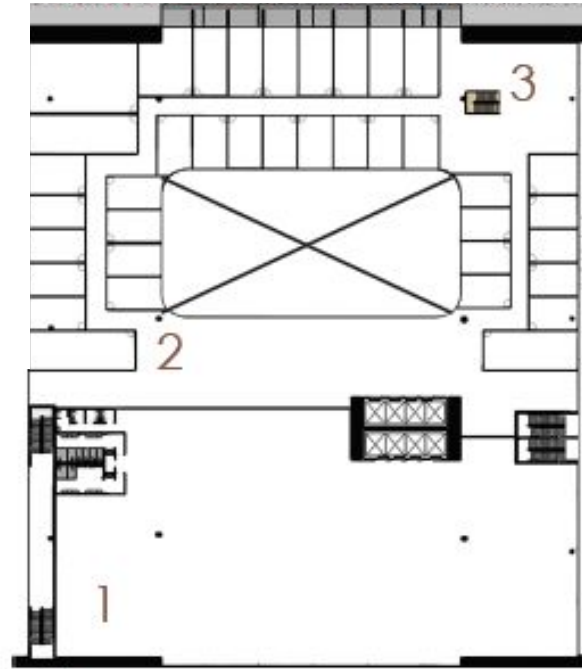
2 Green Roof Access

Tower Level 1



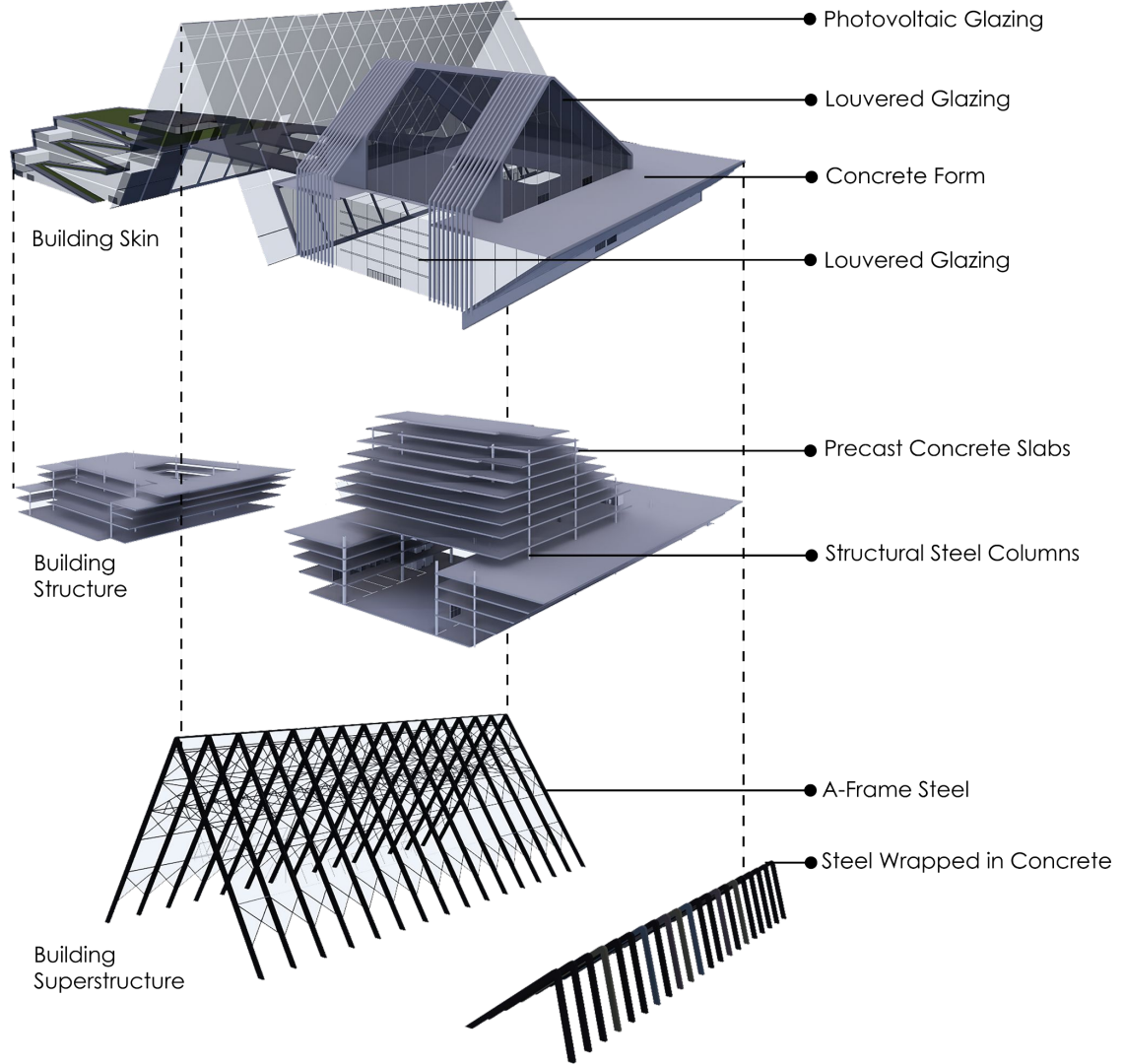
- 1 Hotel Lobby
- 2 Business Lobby
- 3 Entrance
- 4 Retail

Typical Hotel & Office Floor

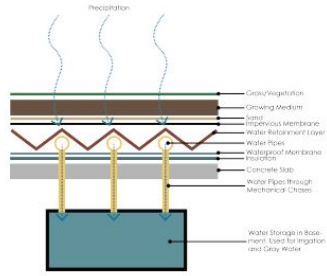


- 1 Office Space
- 2 Hotel
- 3 Cafe Space

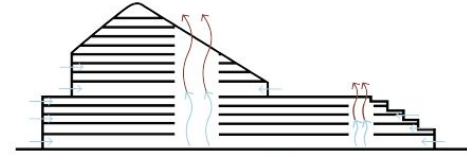
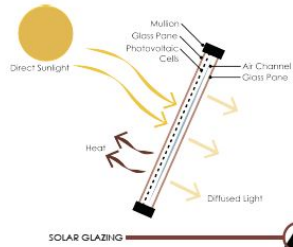
# Structure



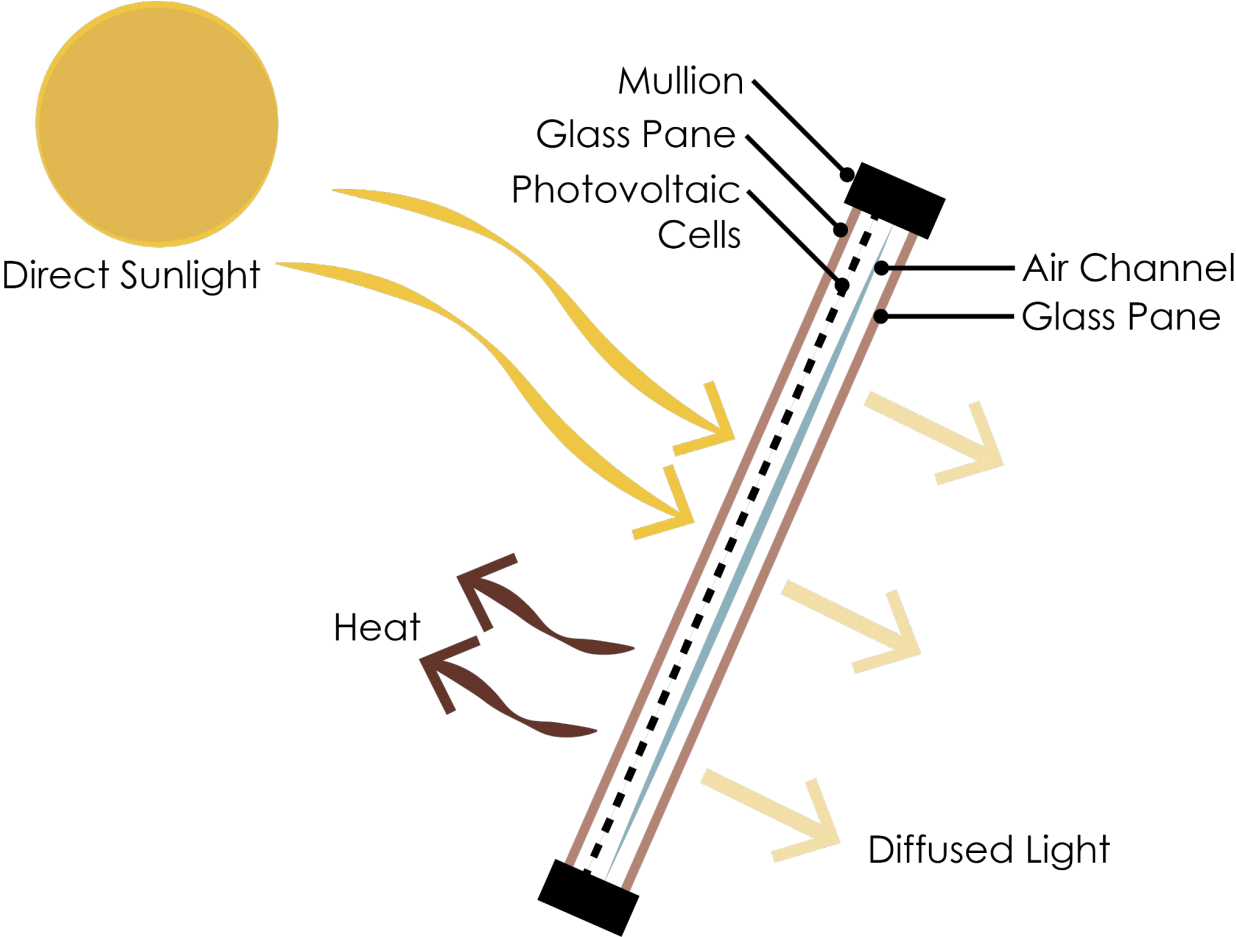
# Section



GREEN ROOF WITH WATER RECYCLING

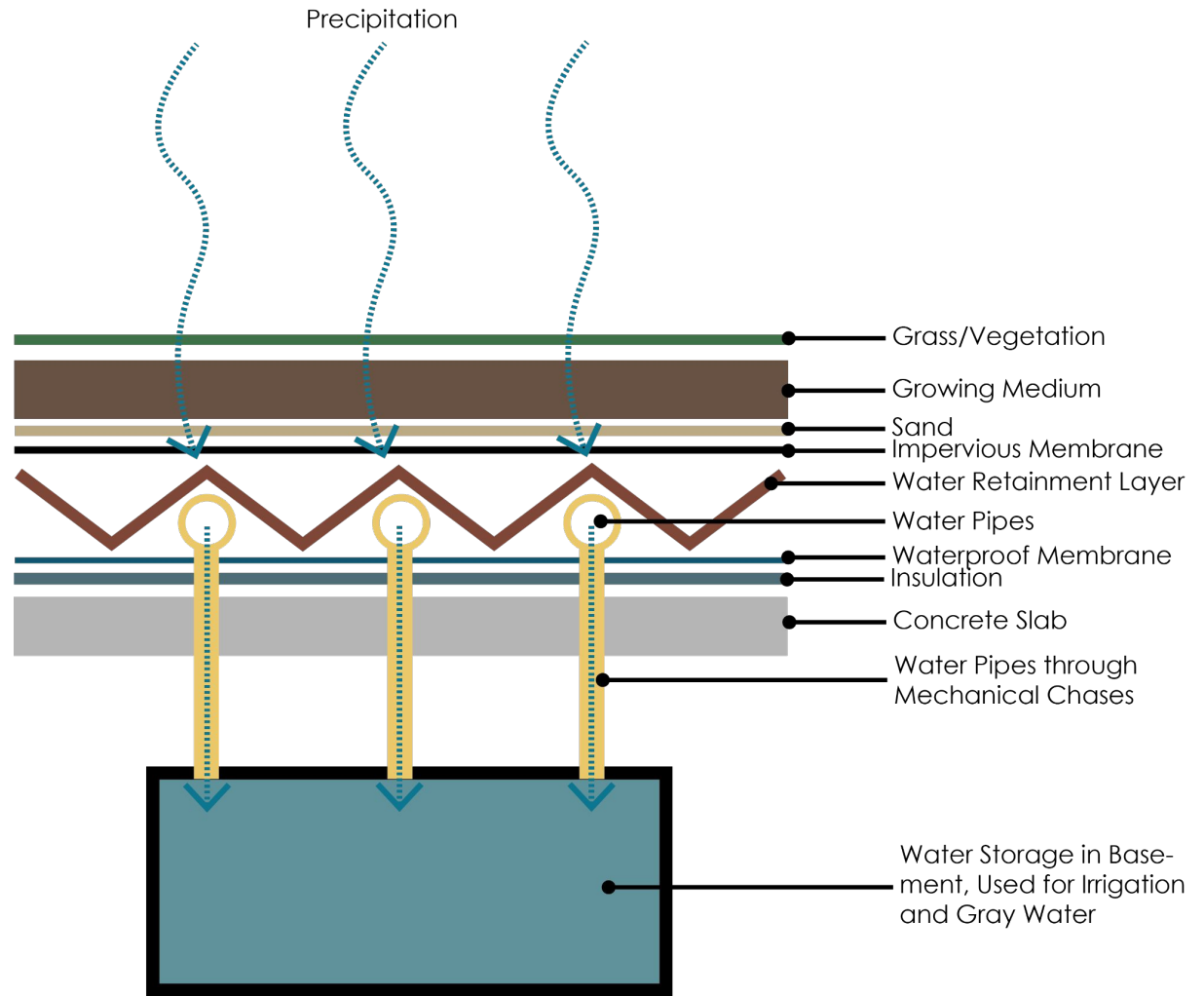


# Photovoltaic Glass Detail

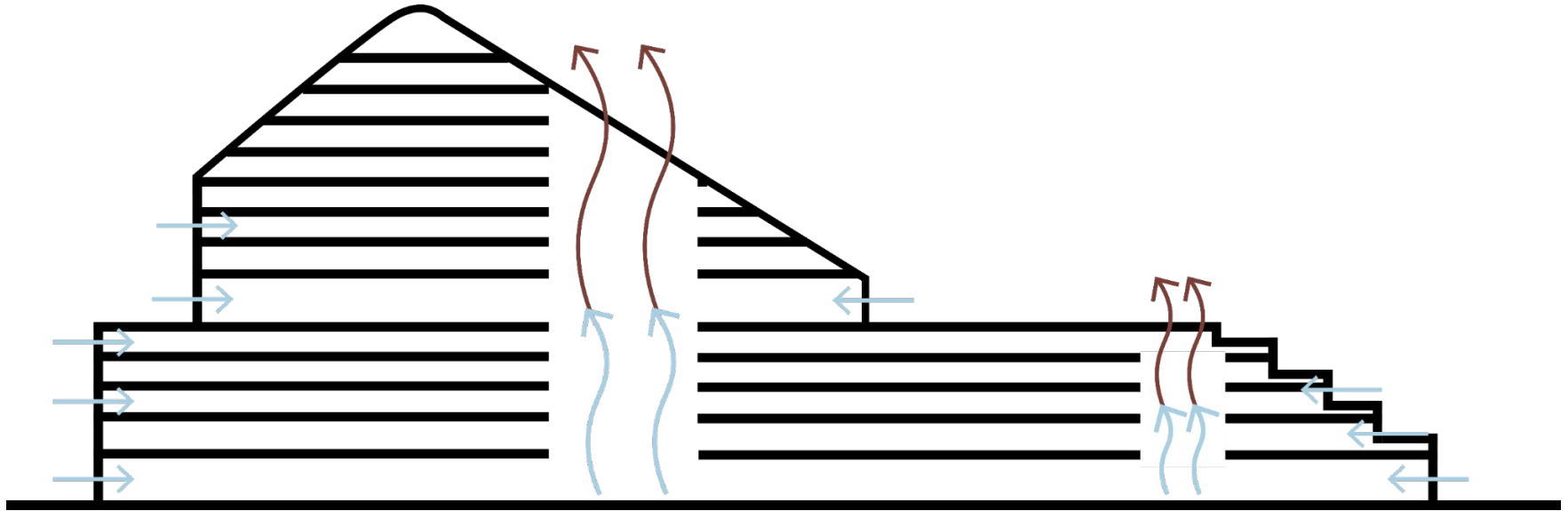




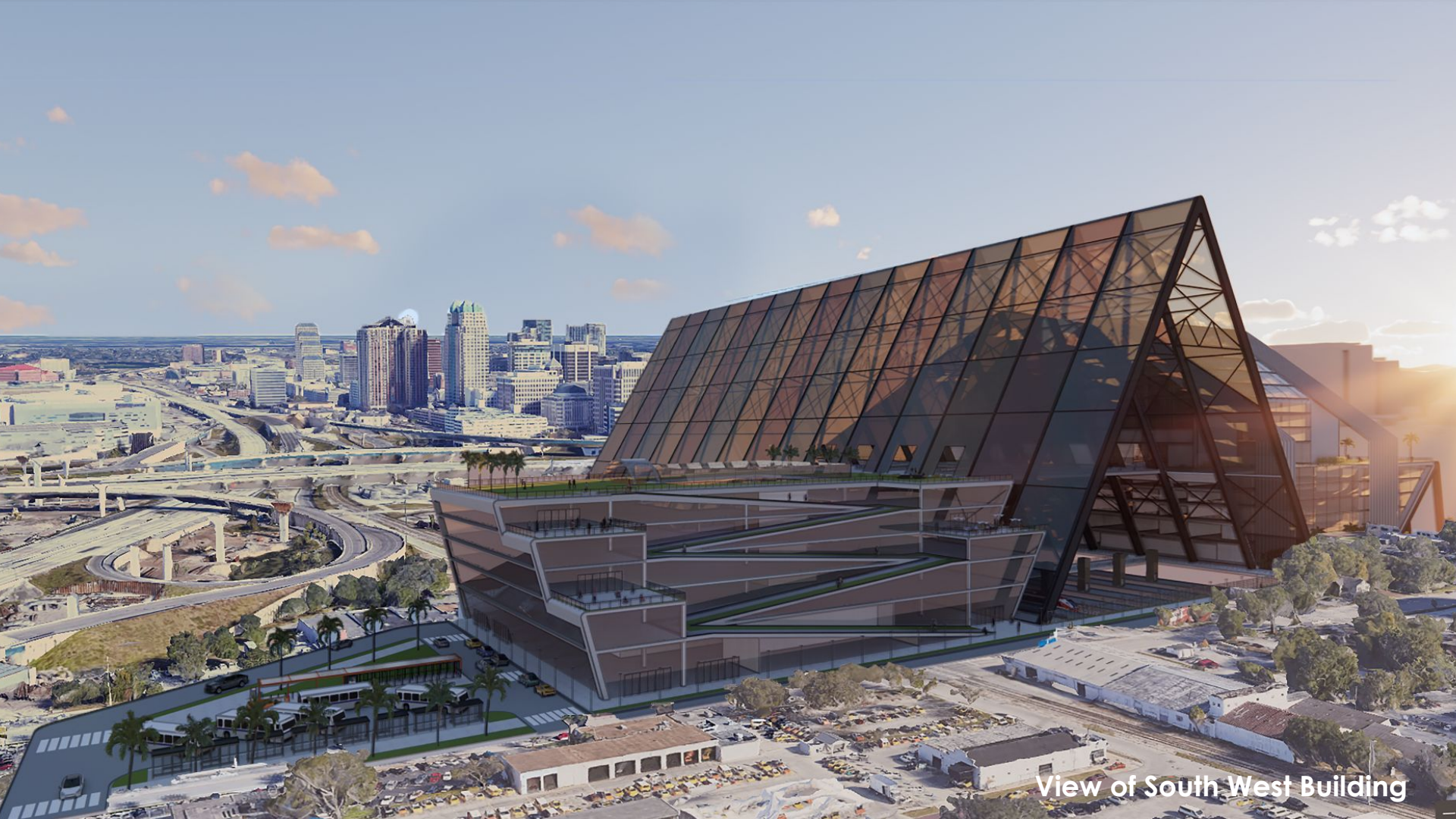
# Green Roof Detail



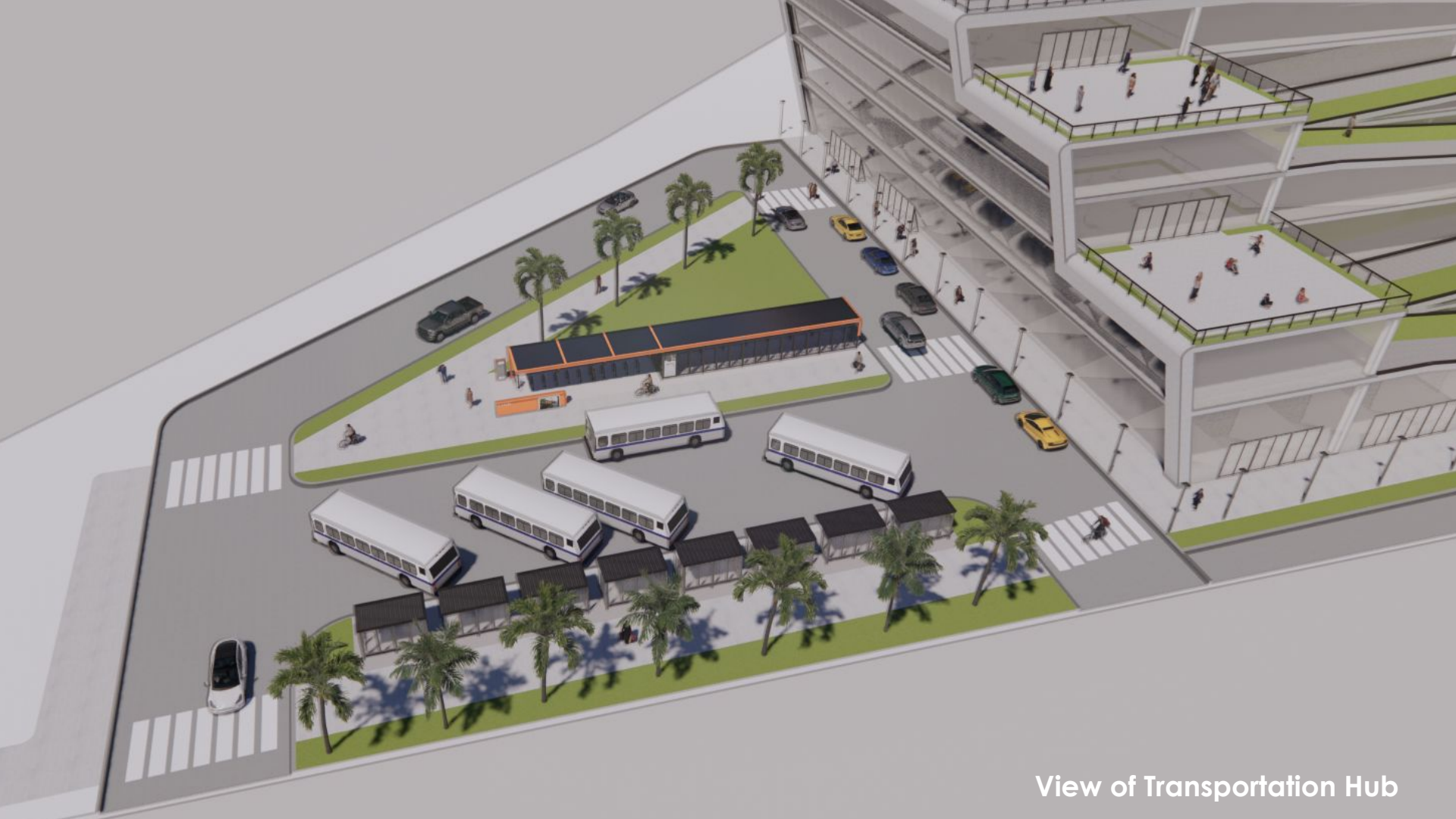
# Open-Air Ventilation



**Renders**



View of South West Building



View of Transportation Hub





View of East Main Entrance



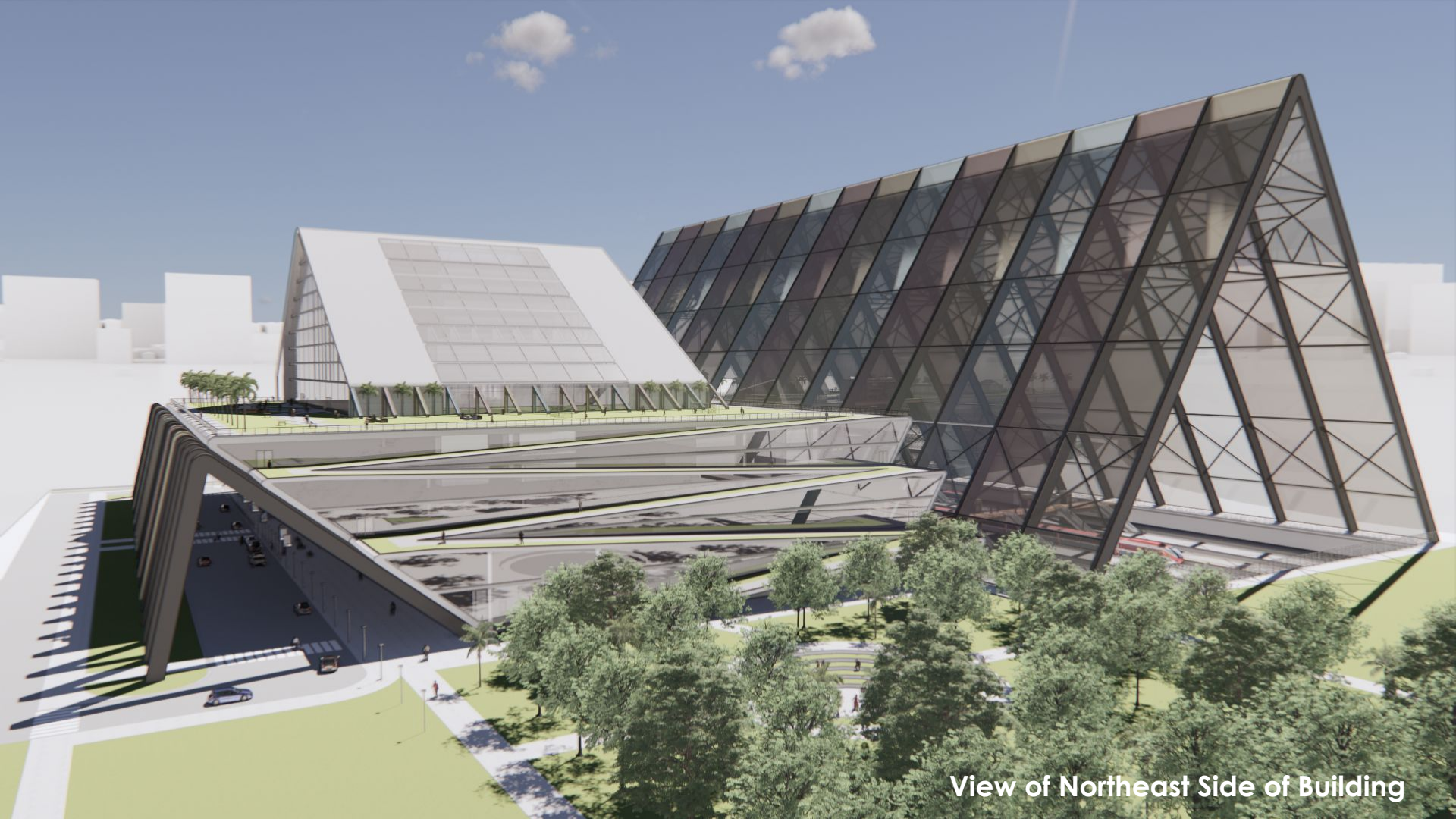
View of Main Atrium





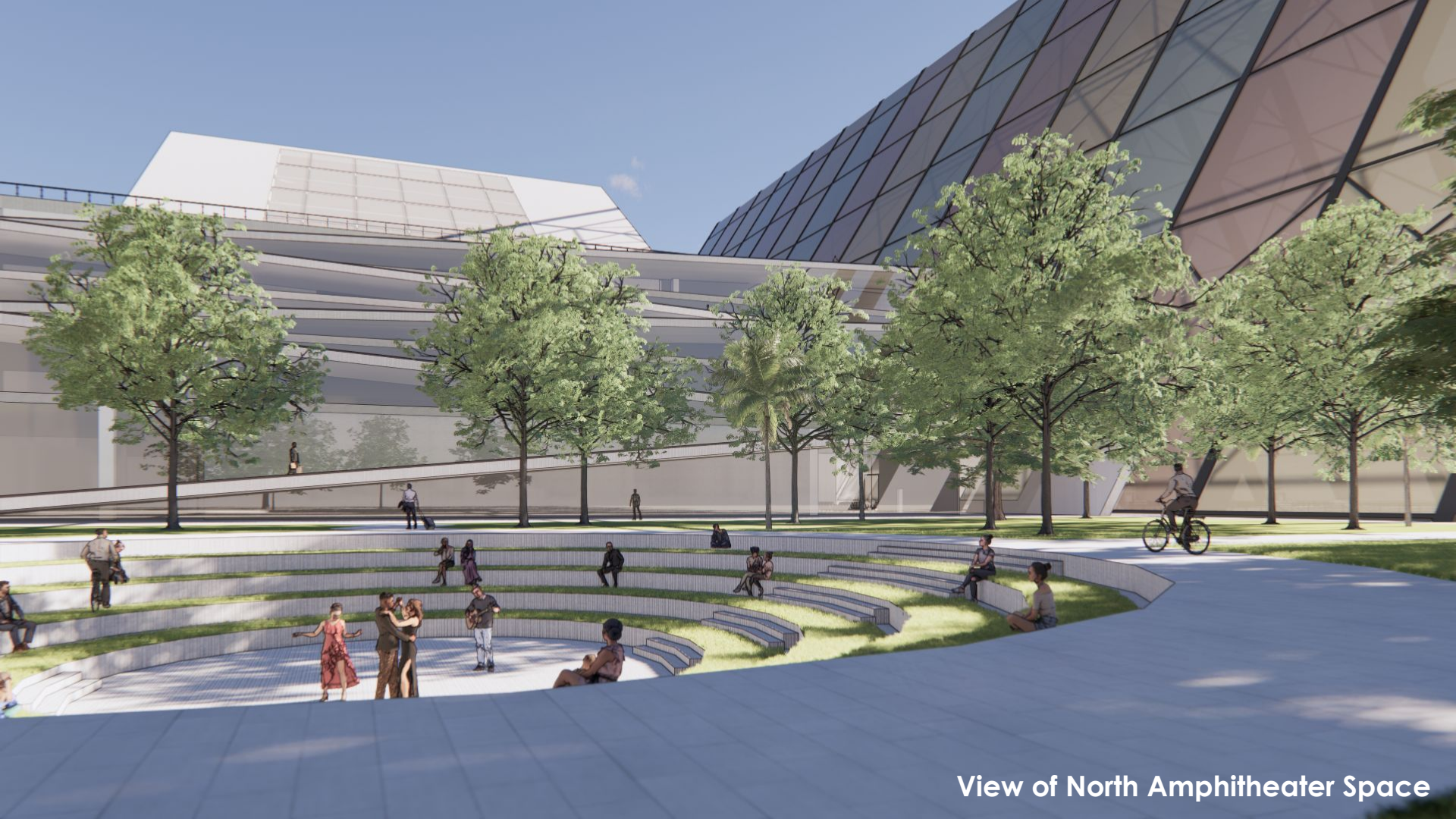
View from Platforms





View of Northeast Side of Building





View of North Amphitheater Space





View of South Entrance at Dusk

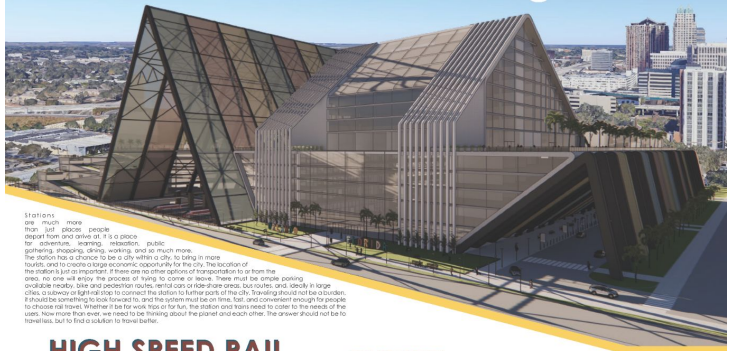


Video



**thank you**

# connecting US



Stations are much more people magnet than any other of its a place for people to meet, to socialize, to gather, to shop, to work, to study, to wait, to relax, to be seen, to be heard, to be part of something. The station has a chance to be a city within a city, to bring in more tourists, and to create a large economic opportunity for the city. The location of the station is as important as there are other aspects of transportation to be from the area, no one will enjoy the process of having to come or leave. There must be complete parking facilities, bike area, pedestrian routes, rental cars or other street access, bus routes, and bicycle racks. A station is not just a building to connect the station's further side of the city. Traveling should be a pleasure. It should be something to look forward to, and the system must be on time, fast and convenient enough for people to choose not to travel. Further plans for work hubs or for fun, the station can be made to cater to the needs of the user. Now more than ever we need to be thinking about the planet and each other. The answer should not be to travel less but to find a solution to travel better.

## HIGH SPEED RAIL

### AMENITIES



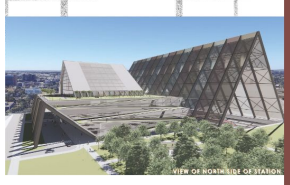
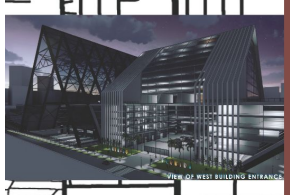
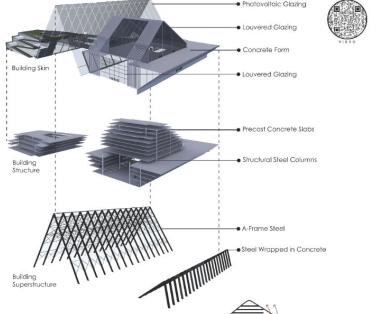
### ENVIRONMENT



### TIME



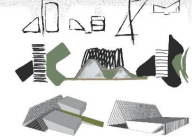
### THE STRUCTURE



### THE SITE

The main site of the design project will be an urban neighborhood hub in the heart of the city. Urban areas provide a lot of opportunity for many different kinds of energy impact and economic activity. With a decreased population of 250,000 people, Chicago can use some city planning to grow the city's population to 1 million and has a central location between many large cities.

### Design Development



### Modular Design

Material	Quantity	Unit
Concrete	1000	m³
Steel	500	kg
Glass	200	m²
Insulation	50	m³
Roofing	100	m²
Interior Finishes	100	m²
Lighting	100	units
Electrical	100	units
Plumbing	100	units
HVAC	100	units
Structural Steel	100	kg
Concrete	100	m³
Steel	100	kg
Glass	100	m²
Insulation	100	m³
Roofing	100	m²
Interior Finishes	100	m²
Lighting	100	units
Electrical	100	units
Plumbing	100	units
HVAC	100	units

### FLOOR PLANS

