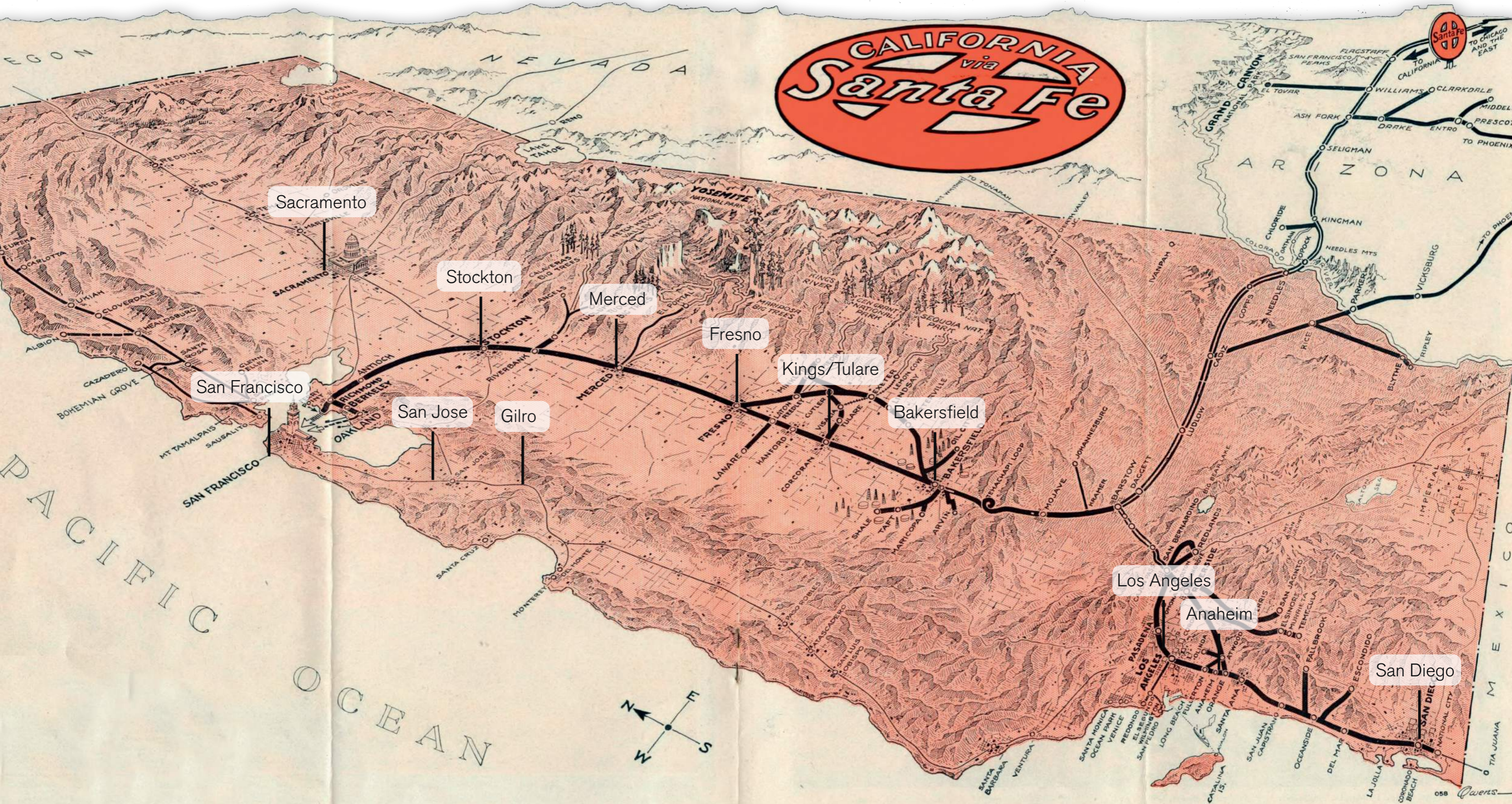


A New Network

Santa Fe Line circa 1935









Uniquely Californian



METROPOLITAIN

Abbesses

M 12 Abb

Immediately Identifiable...

**Design for flexibility and adaptation:  
Modularity**

**Design for disassembly:  
Maximize the recovery of  
materials and components**

**Choose low impact  
materials: Bio-based,  
recyclable, reusable**

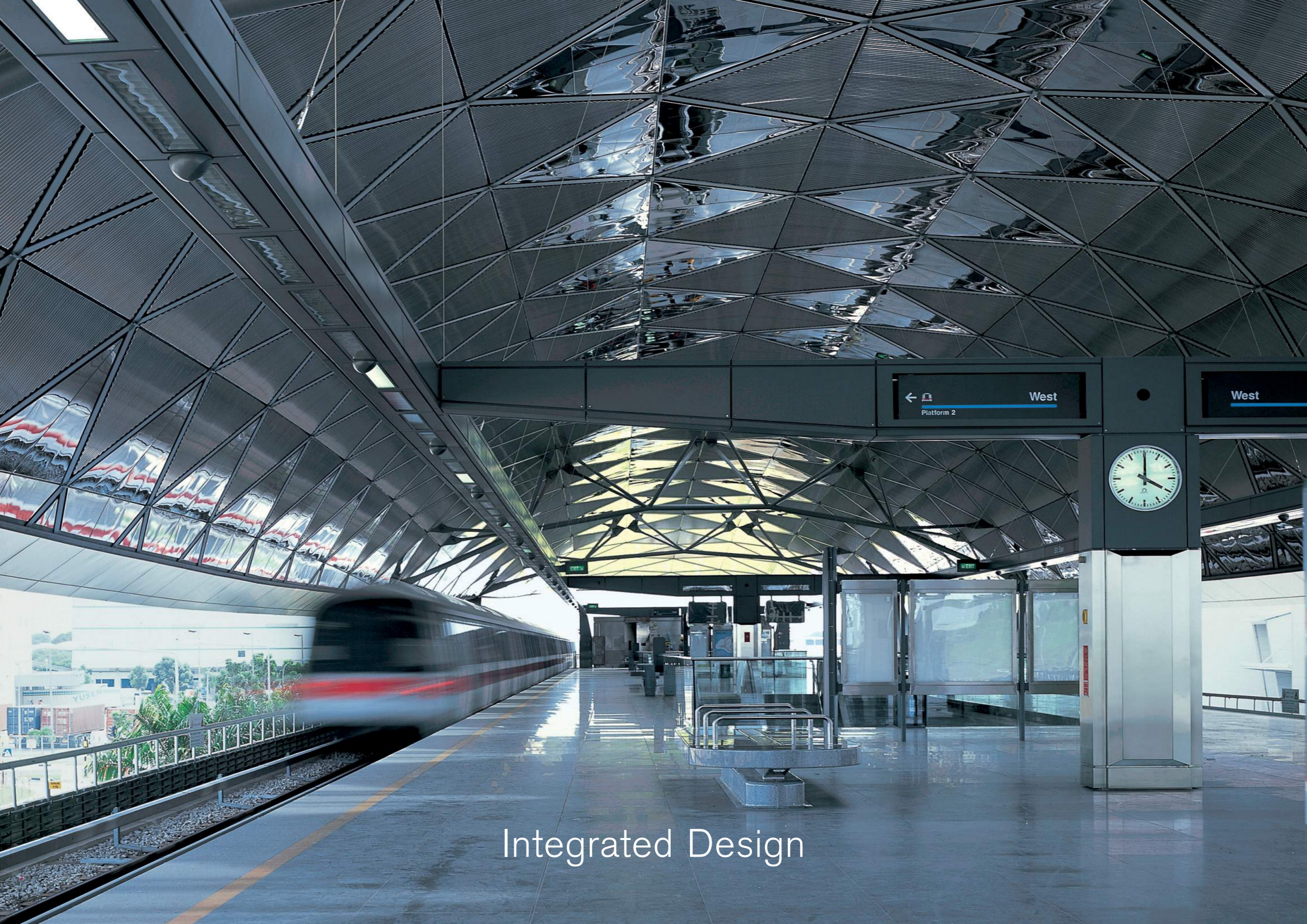
**Creating system efficiency  
and shifting to a circular  
economy**

**Design for repair and  
maintenance: Minimize  
the need for new parts**

**Design for efficiency:  
Minimize volume of  
material used**

**Project Delivery: Track  
materials and components  
within assembly**





Integrated Design

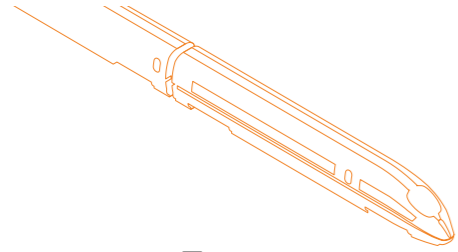


Community Space

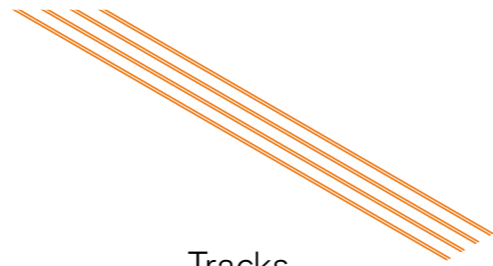


that would bring economic benefits

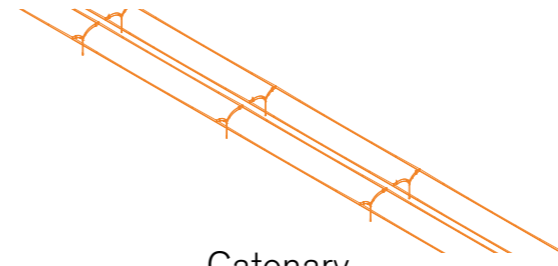
# Systemwide Components



Train



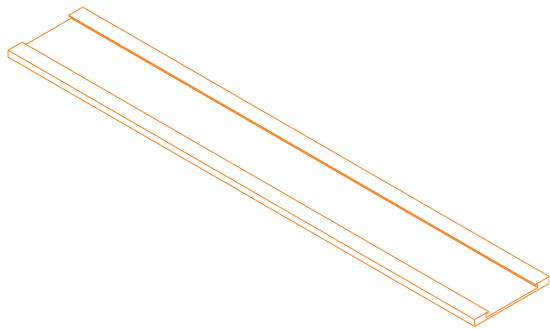
Tracks



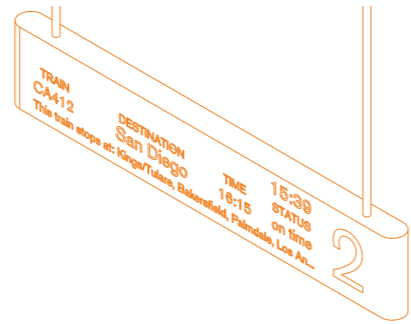
Catenary



Logo



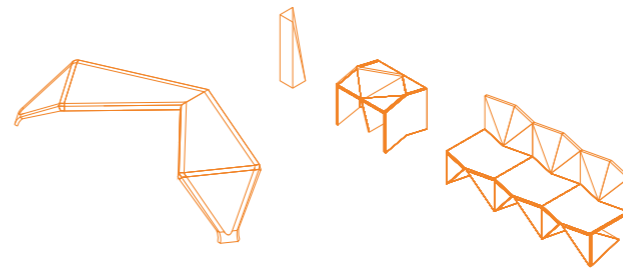
Platform



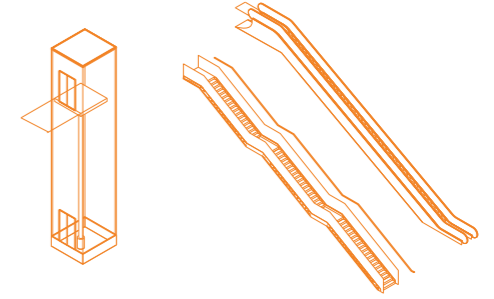
Wayfinding



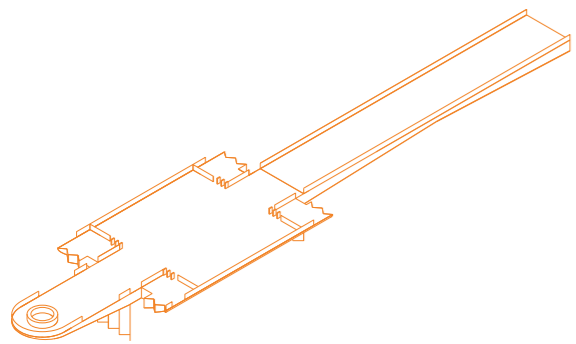
Branding



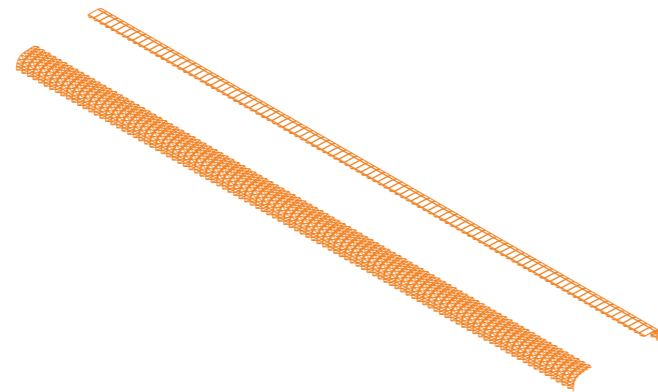
Seating



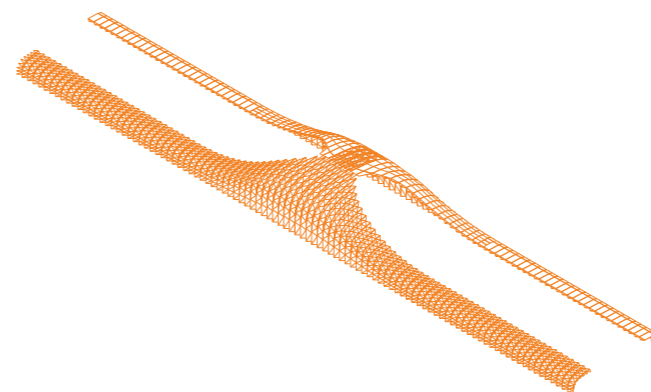
Circulation



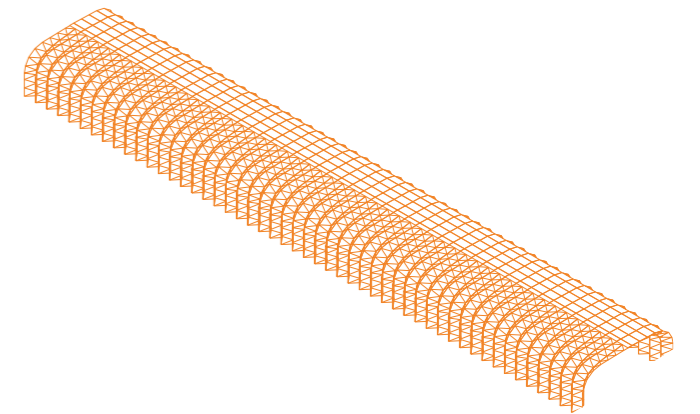
Bridge



Canopy

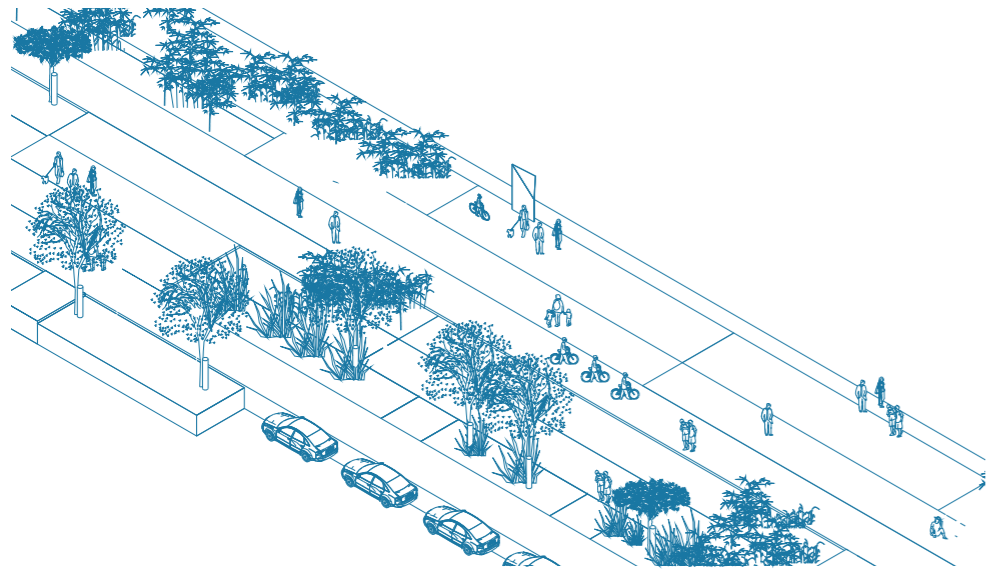


Canopy Evolution

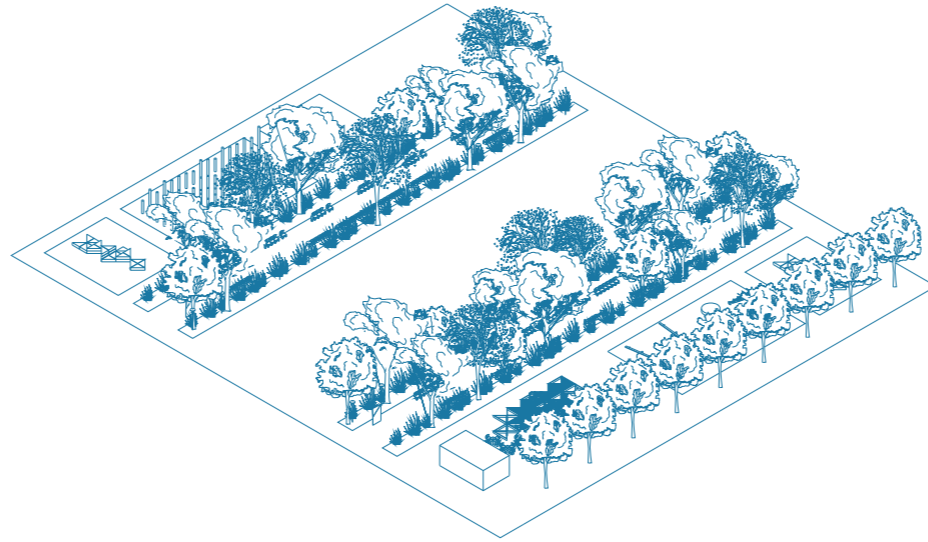


Shed

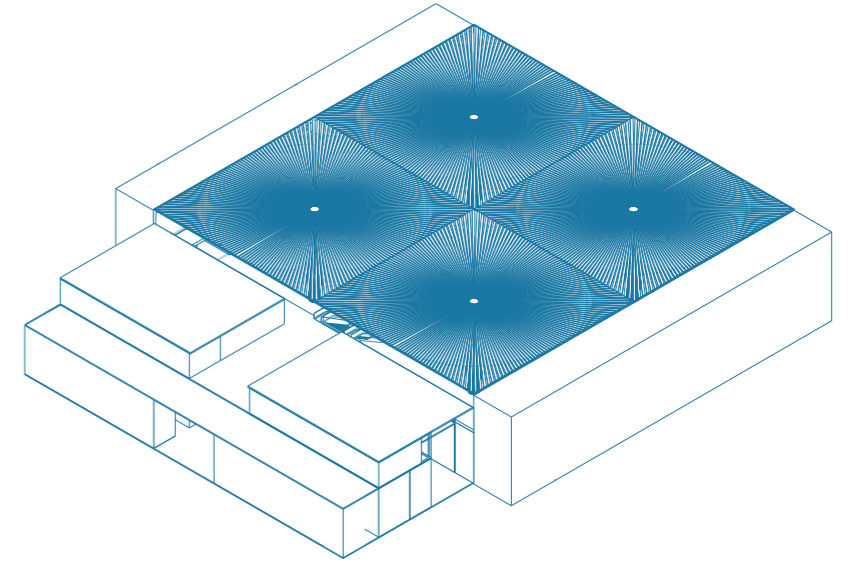
# Station Specific Components



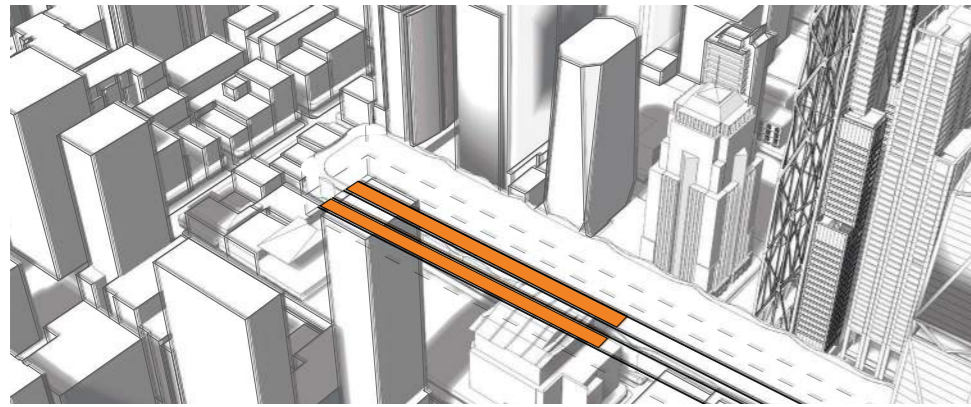
Linear Park



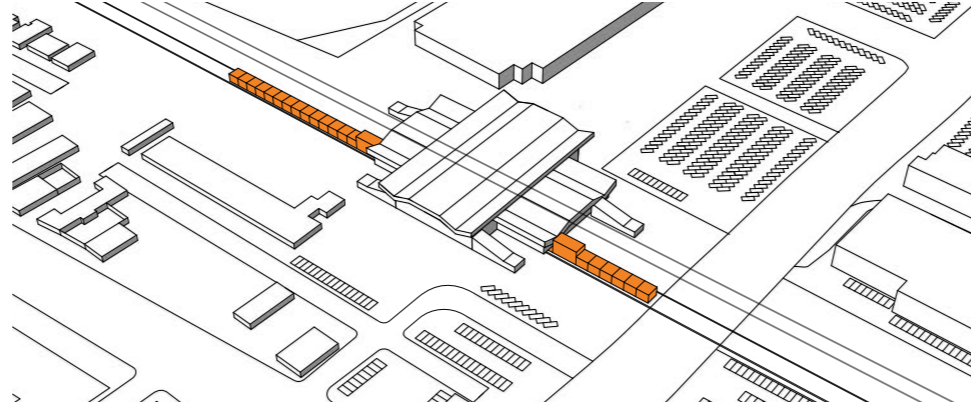
Plaza



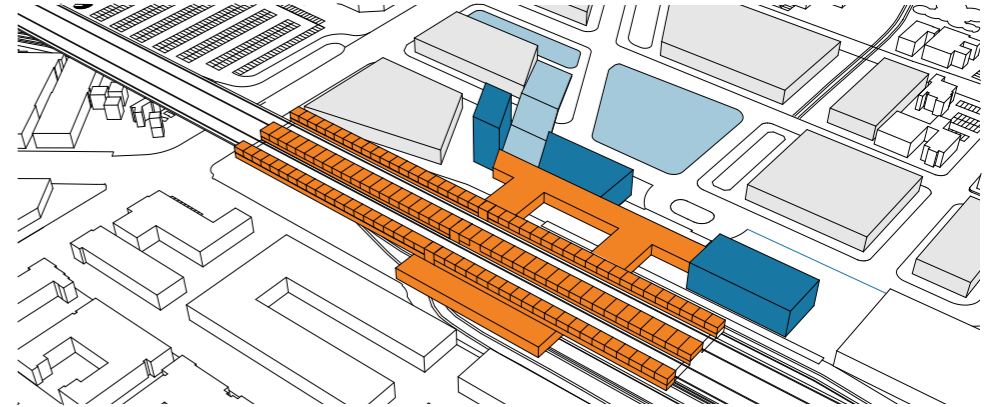
Station



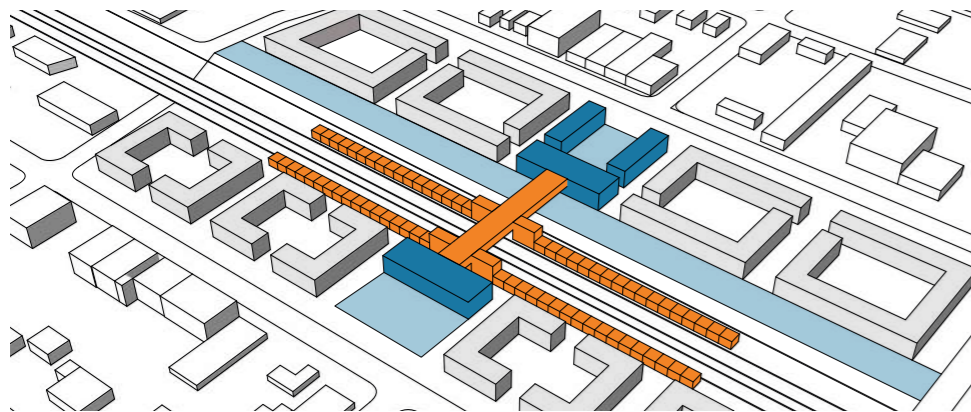
San Francisco



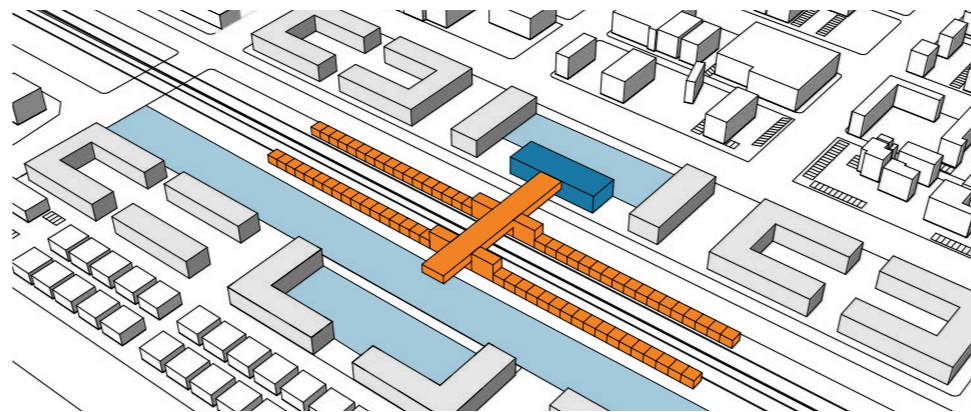
Millbrae - SFO



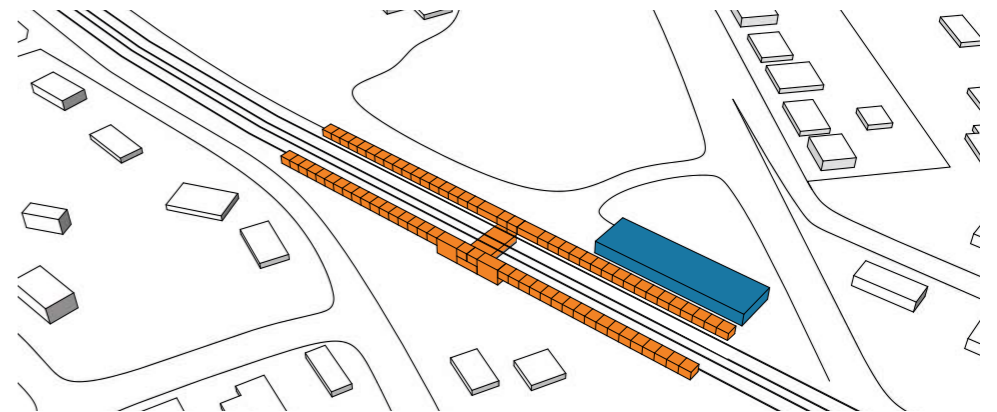
San Jose



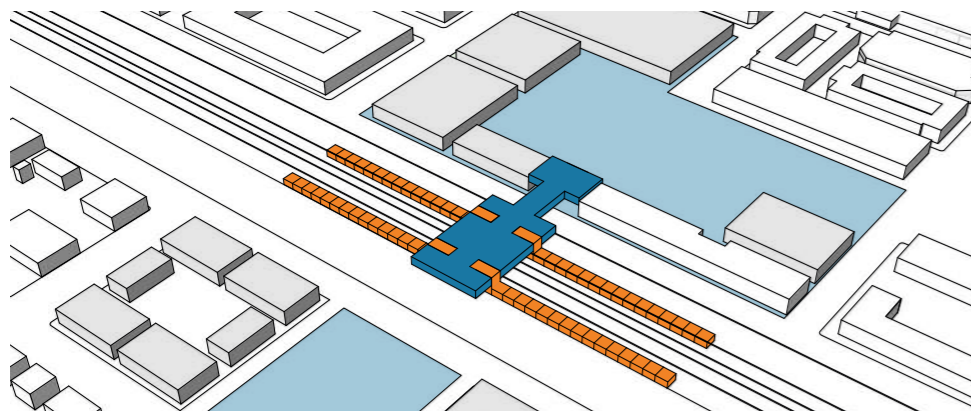
Gilroy



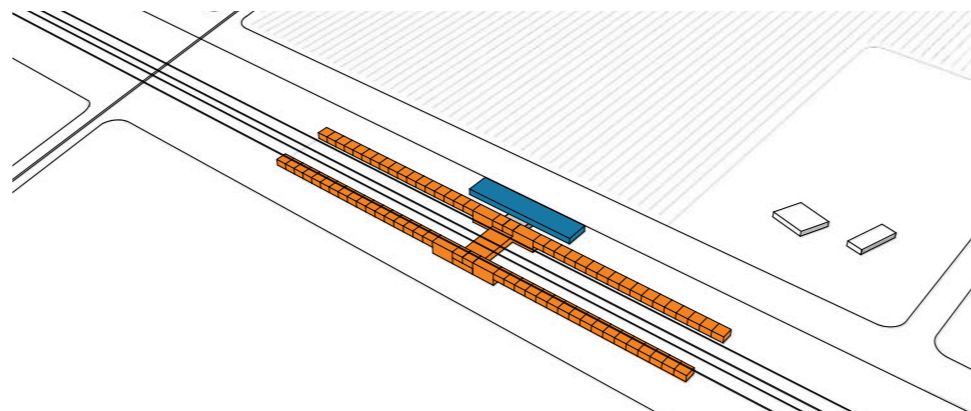
Merced



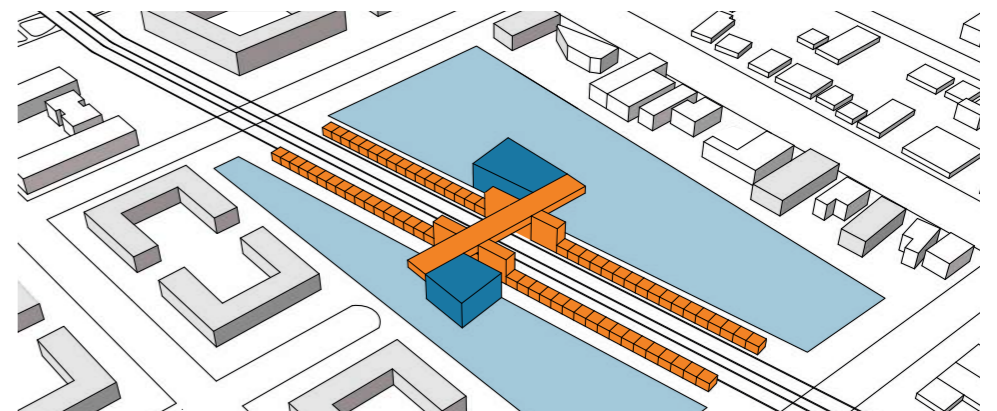
Madera



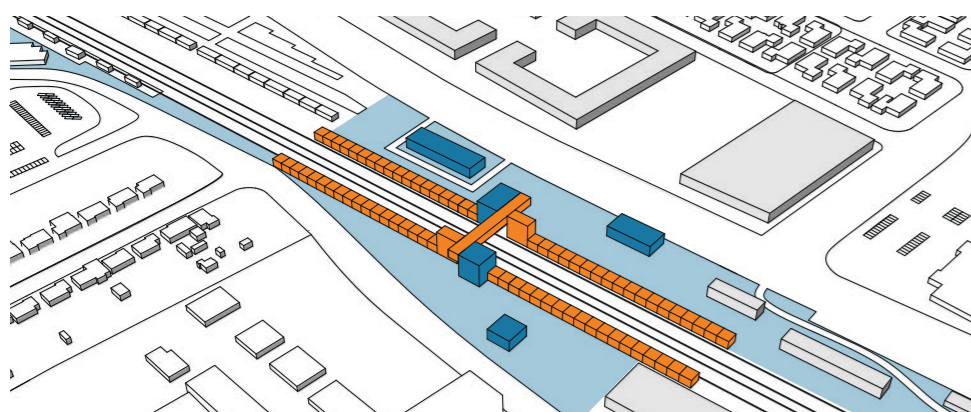
Fresno



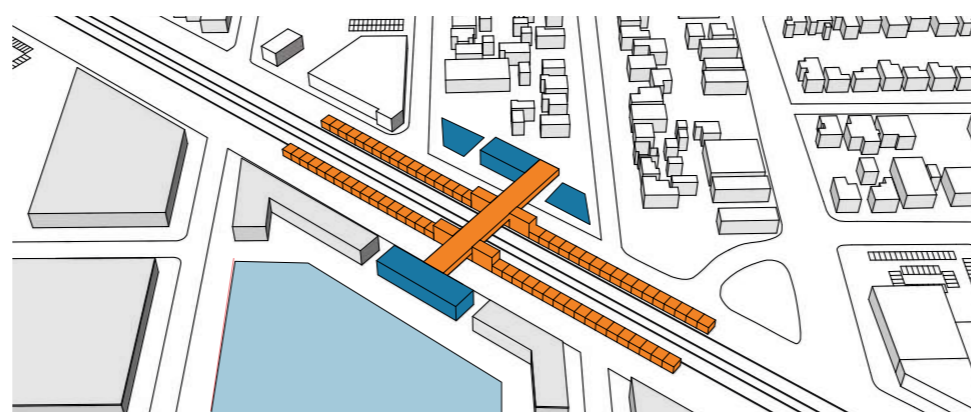
Kings Tulare



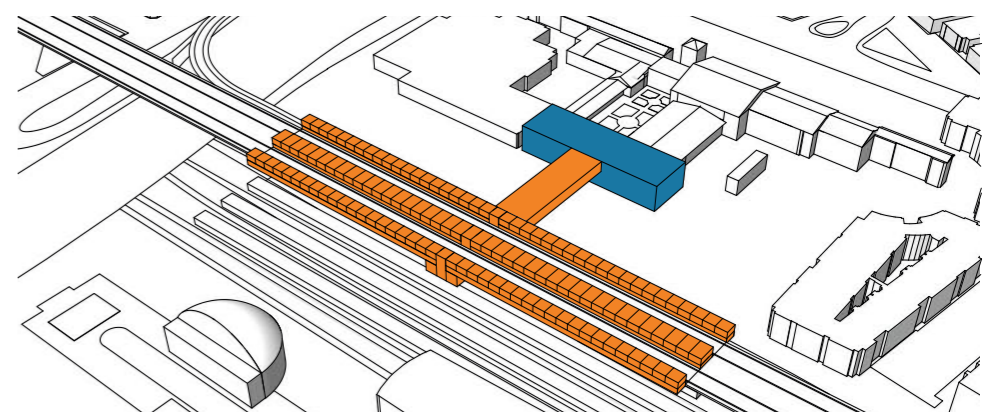
Bakersfield



Palmdale



Burbank

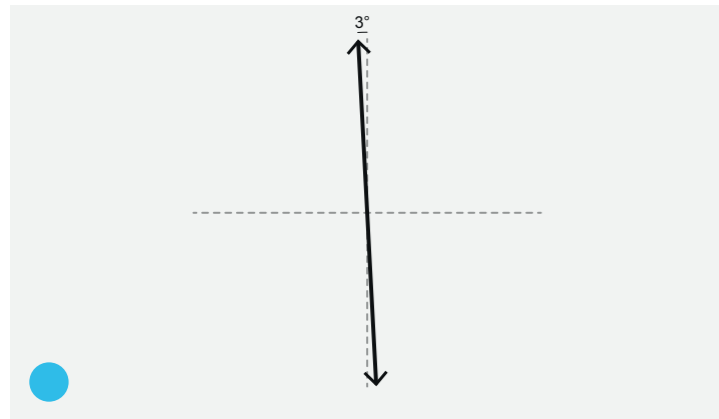


Los Angeles

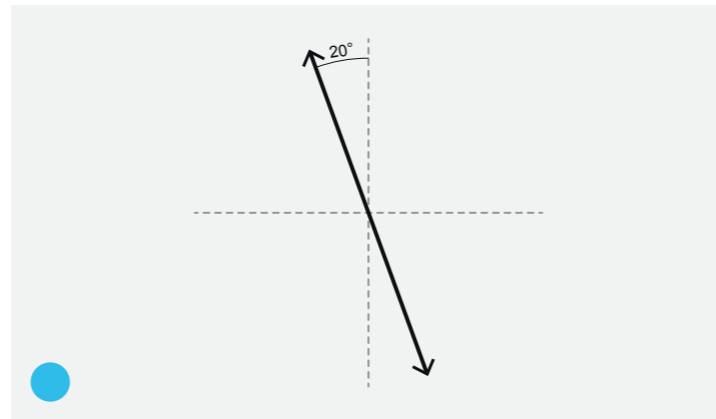
# Stations Orientations

● North-South

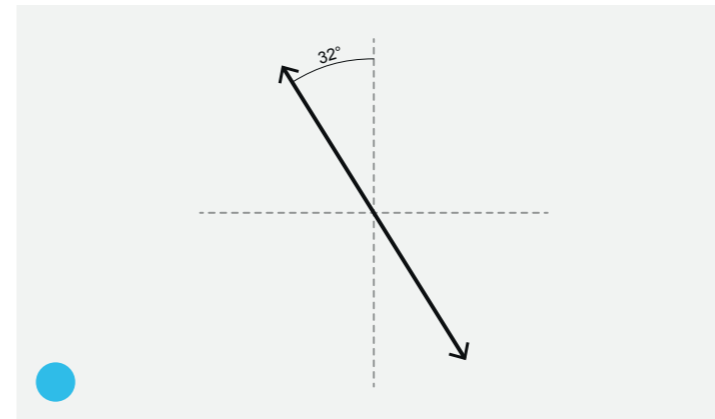
● East-West



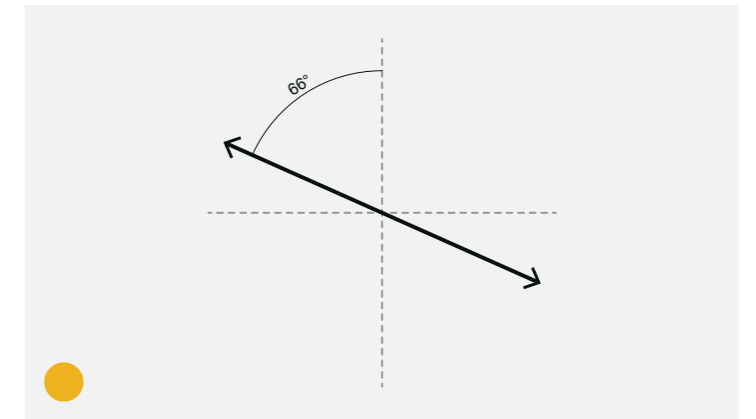
San Jose (37.3° N)



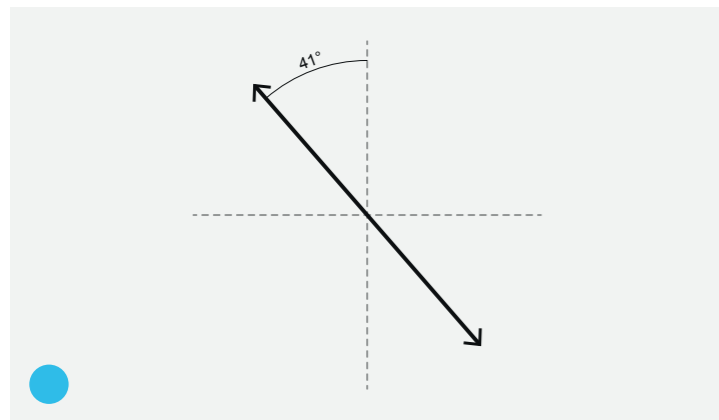
Gilroy Option 1 (37.0° N)



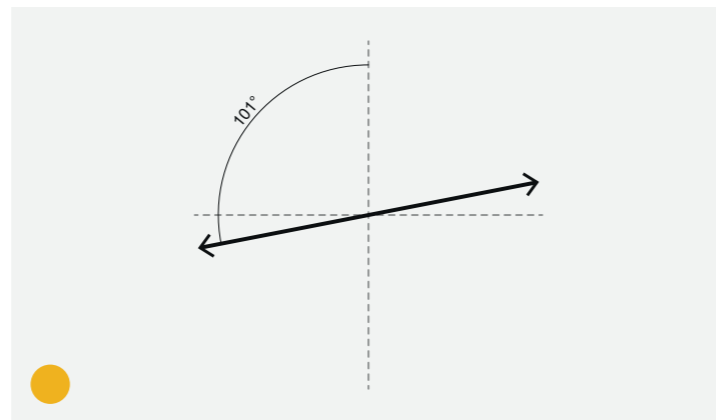
Gilroy Option 2 (37.0° N)



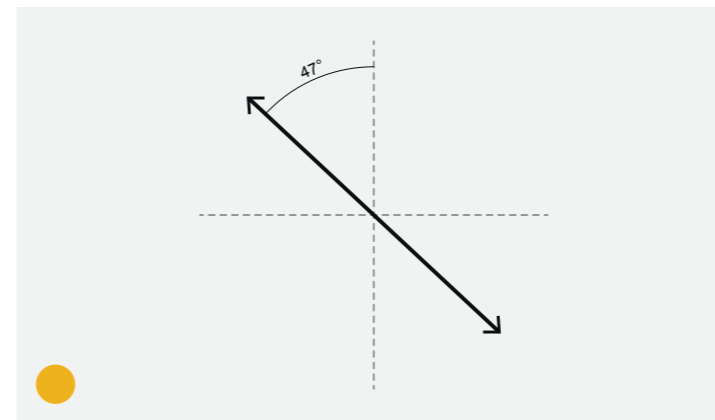
Merced



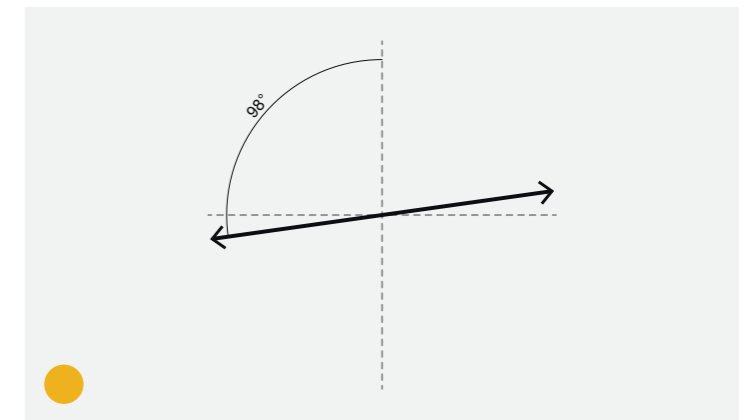
Fresno (36.7° N)



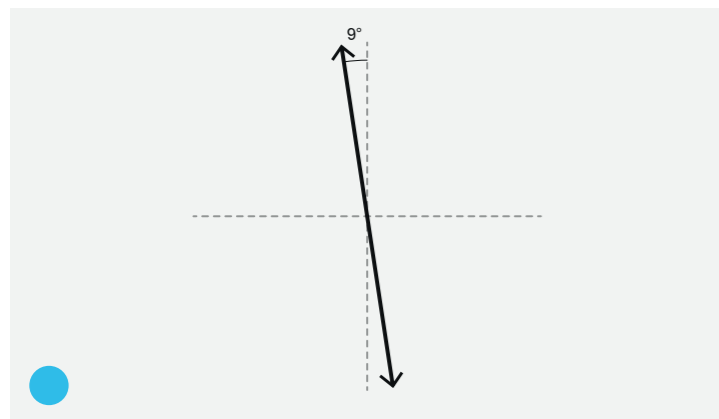
Kings / Tulare (36.3° N)



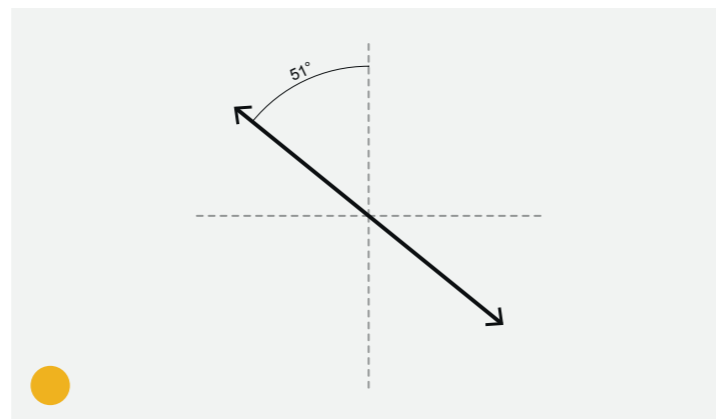
Bakersfield Option 1 (35.4° N)



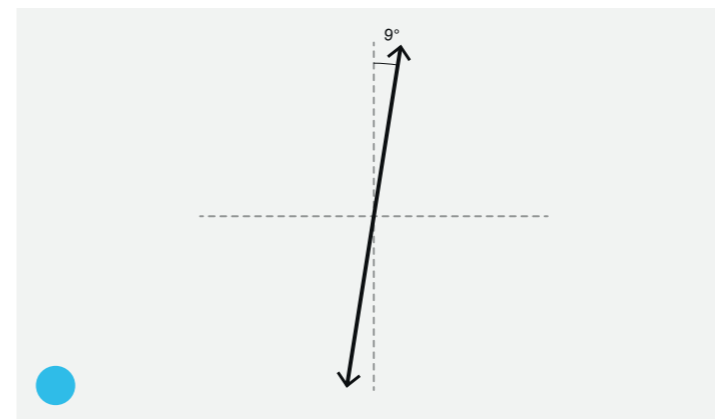
Bakersfield Option 2 (35.4° N)



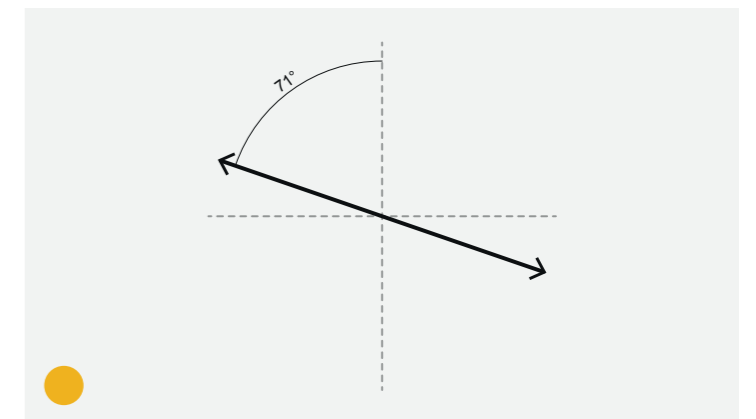
Palmdale (34.6° N)



Burbank (34.2° N)



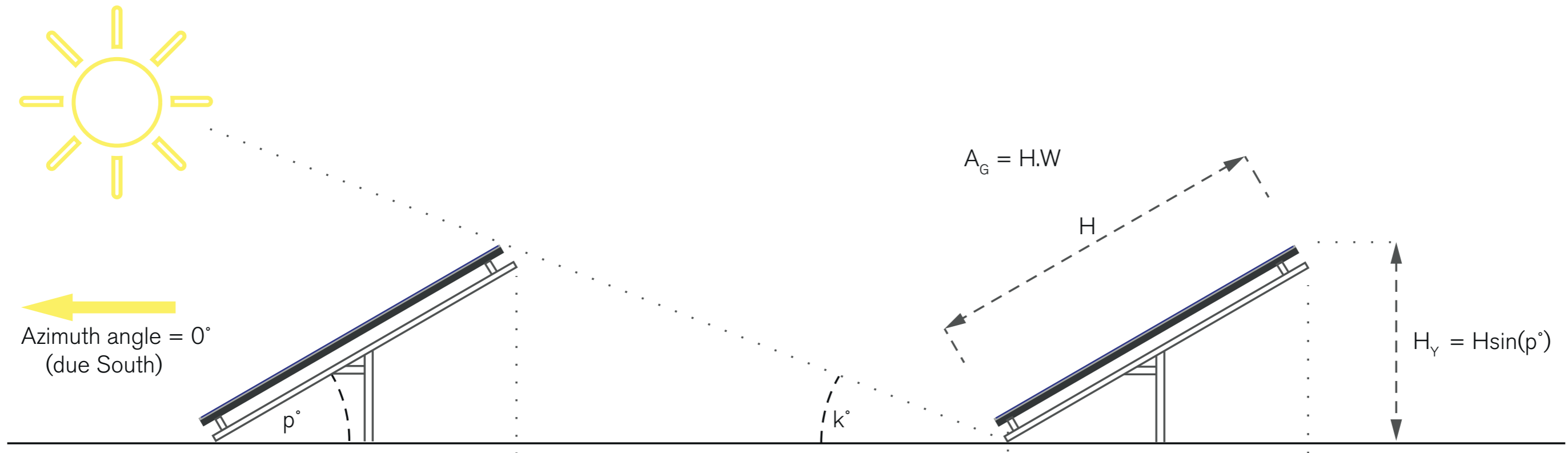
Los Angeles (34.1° N)



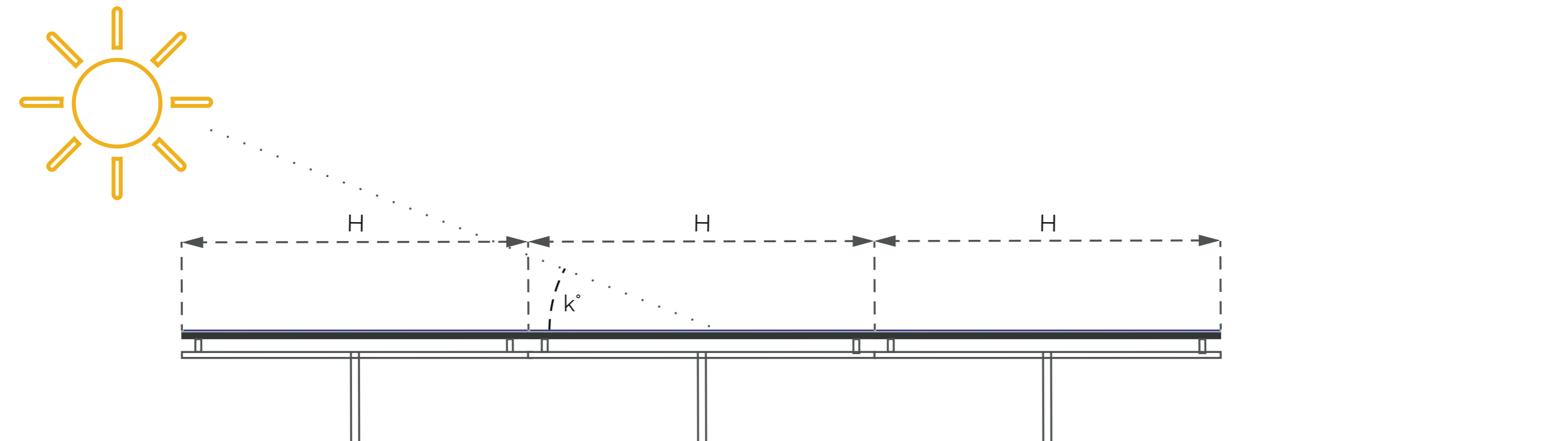
Anaheim (33.8° N)

# Spacing and Solar Calculations

Tilted PV Array



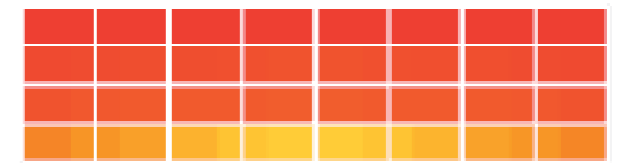
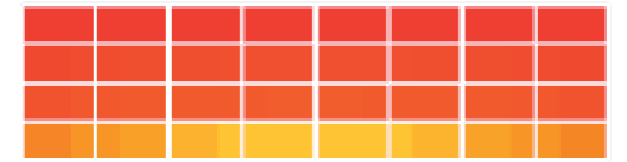
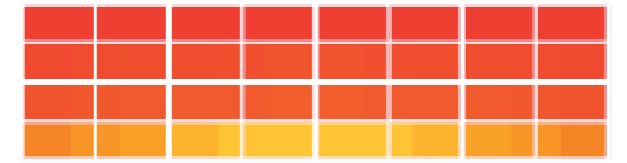
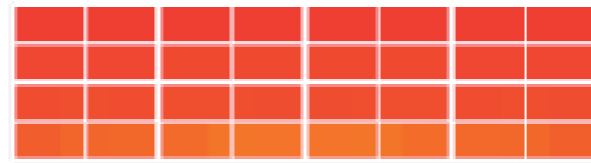
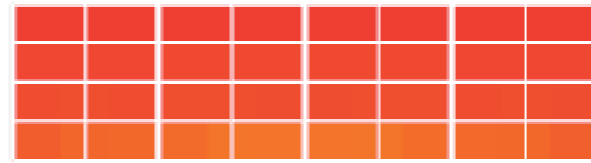
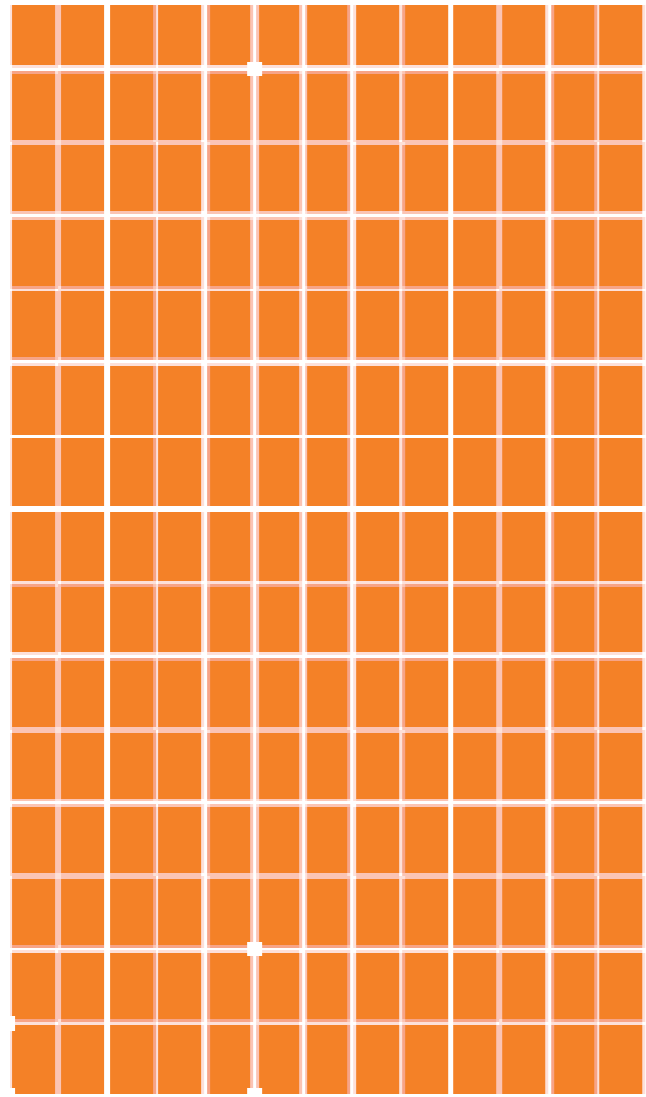
Flat PV Array



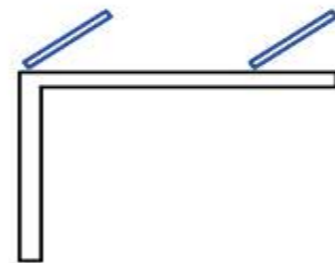


# San Jose

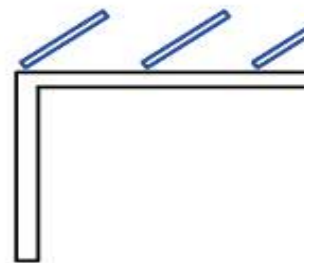
## ● Orientation and Performance Study



323590 KWh pa.



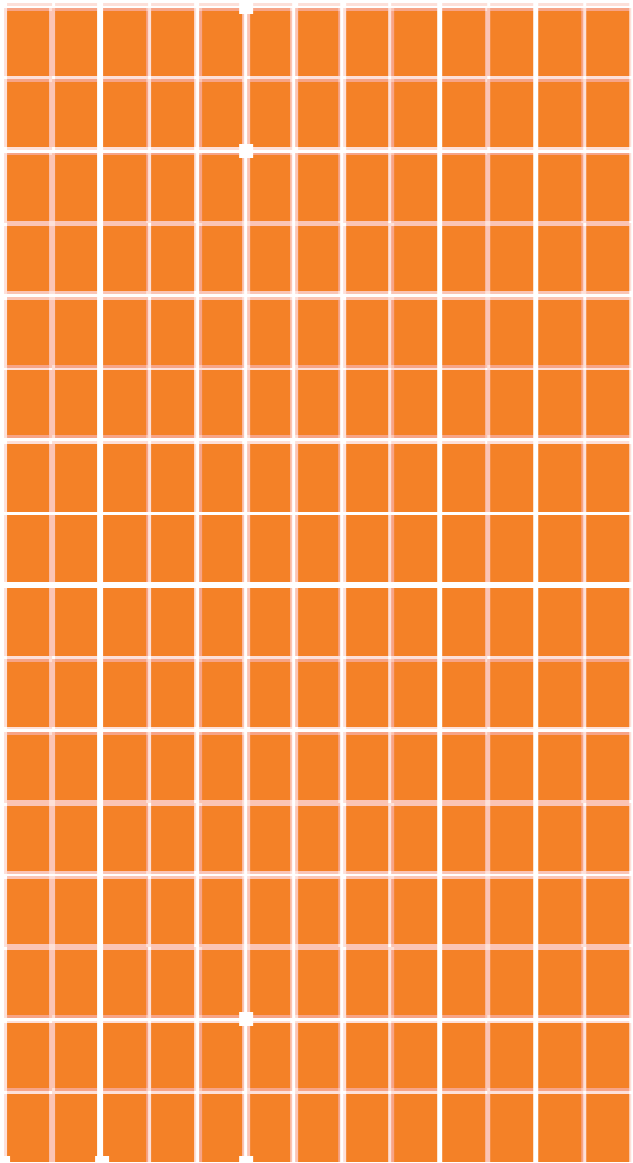
153000 KWh pa.



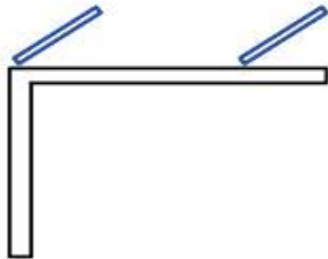
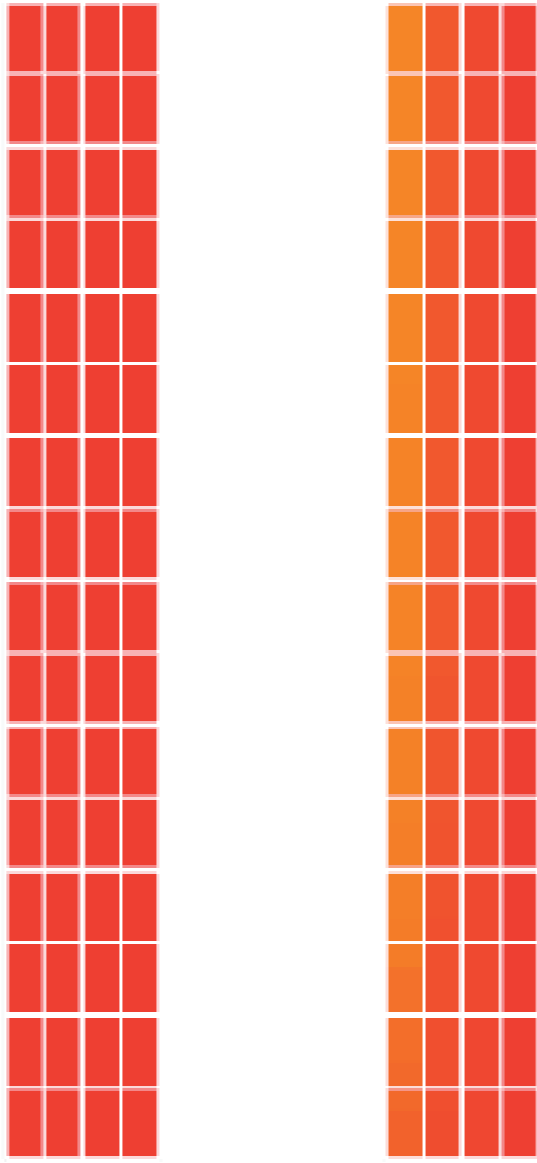
191850 KWh pa.

# Bakersfield

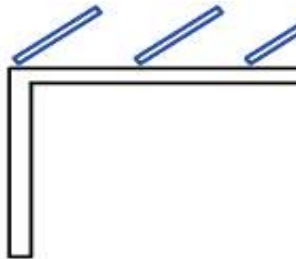
● Orientation and Performance Study



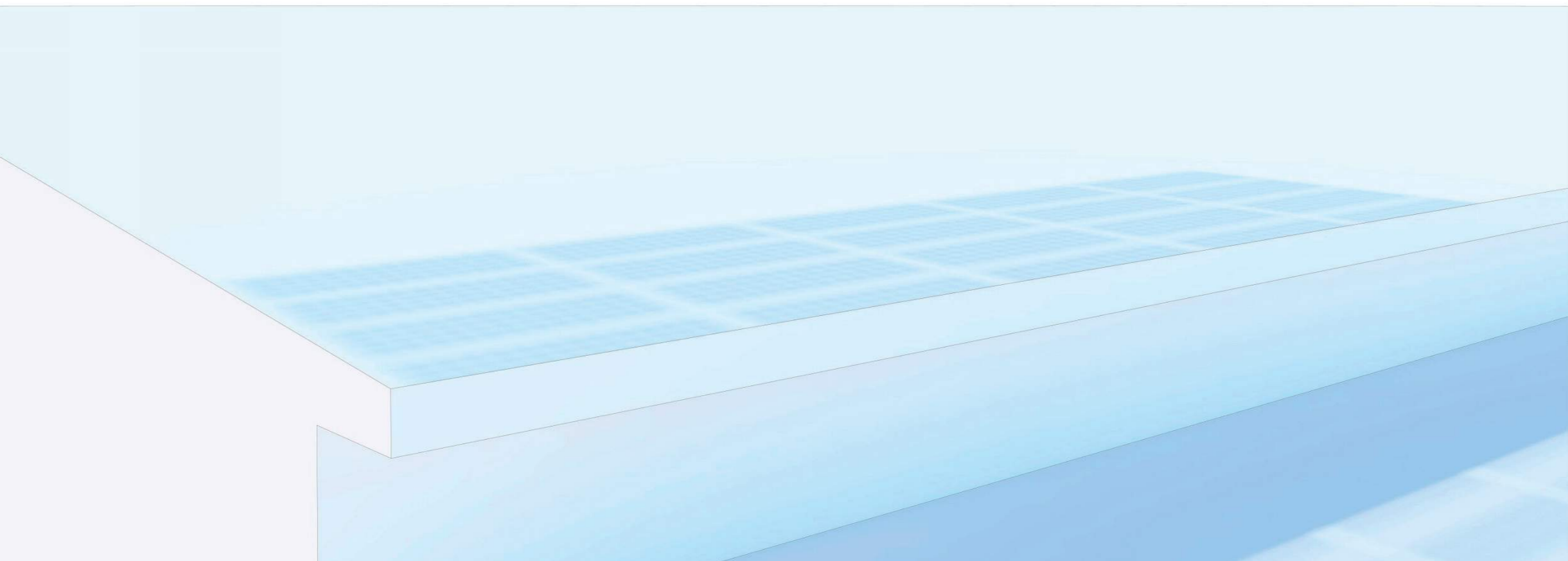
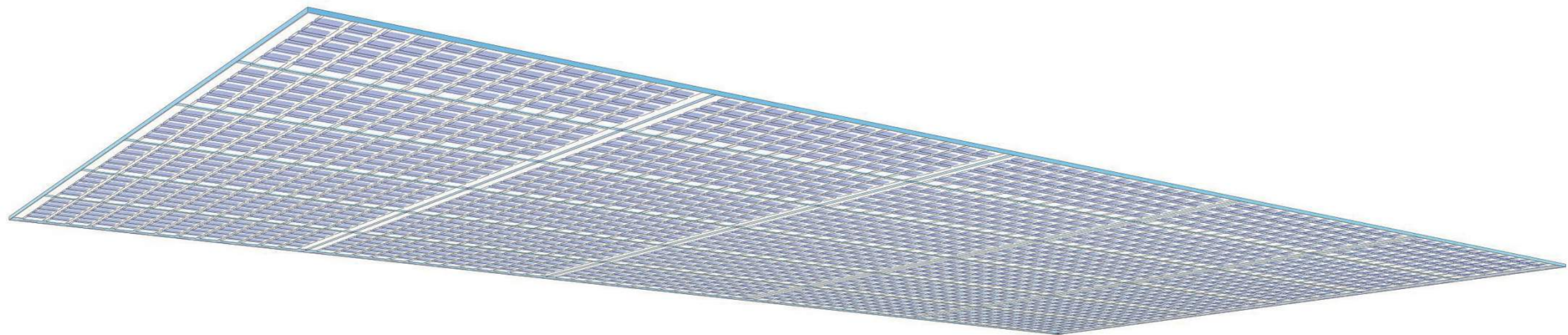
323590 KWh pa.



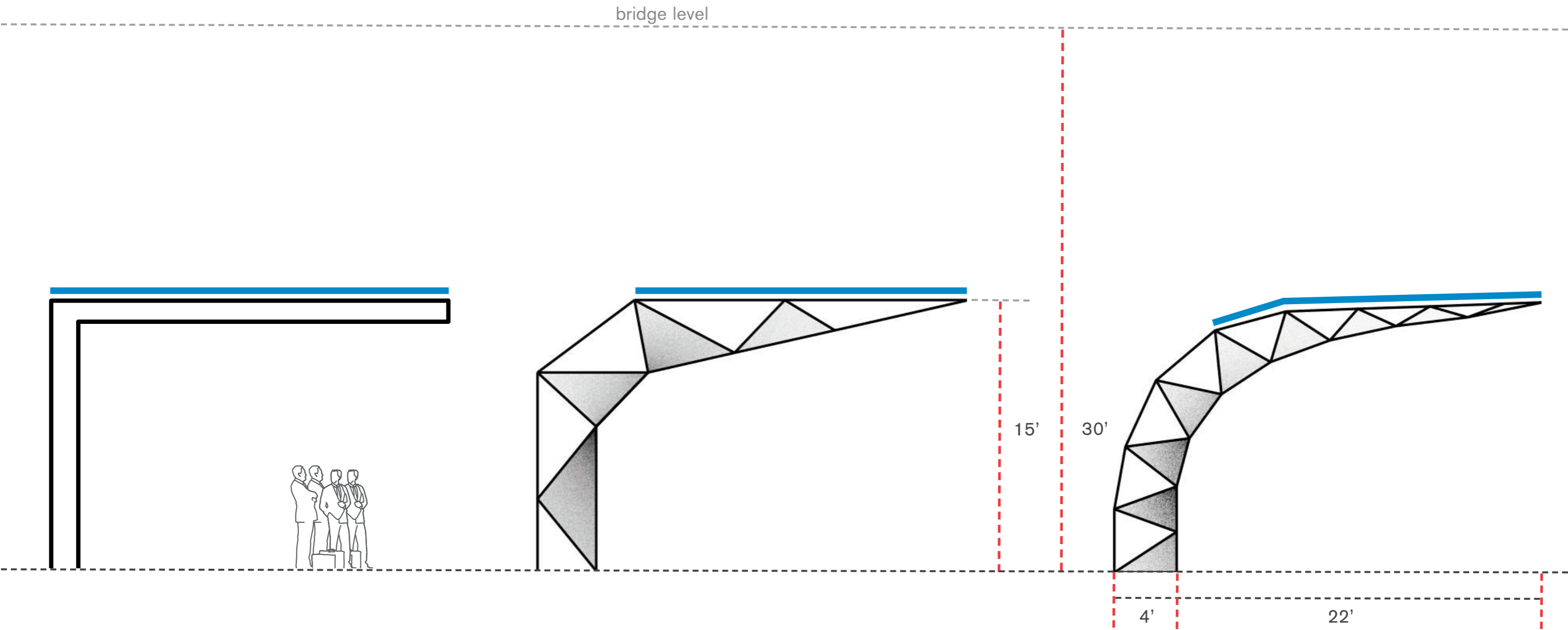
200670 KWh pa.



283120 KWh pa.



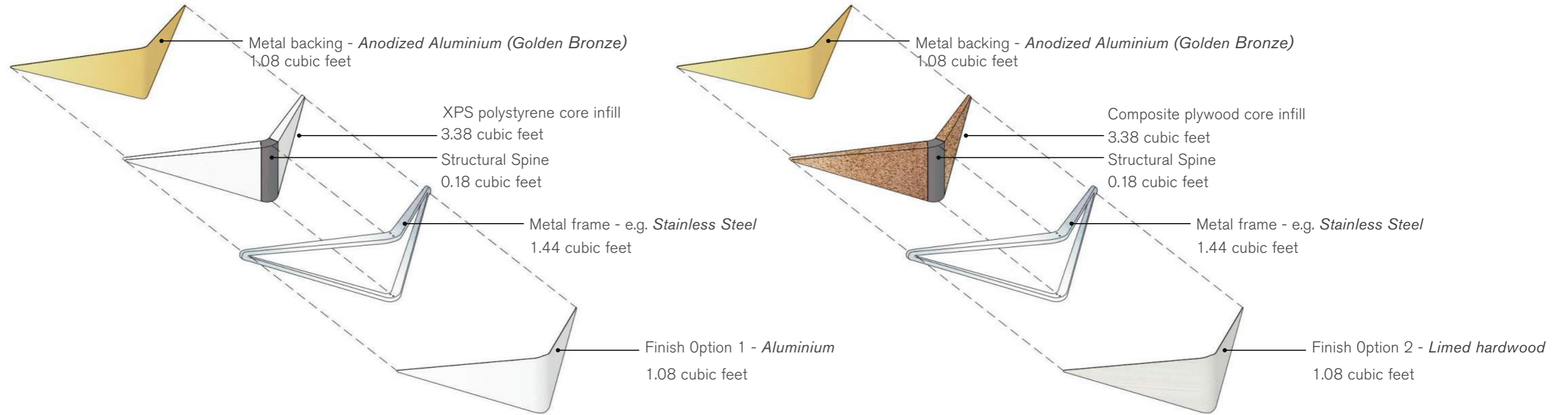
# Canopy Evolution



Most Efficient Structural Design

Streamlined Geometry and Components

# Panel Assembly - Material Selection

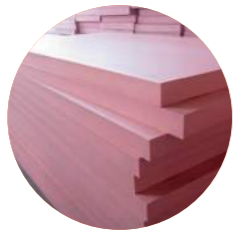


Option 1 - Aluminium front and backplate, XPS core infill, Steel frame

Option 2 - Aluminium backplate, composite plywood infill, Steel frame, Limed hardwood frontplate



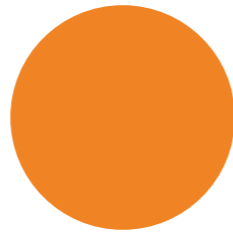
280kgCO<sub>2</sub>(eq)



105kgCO<sub>2</sub>(eq)



525kgCO<sub>2</sub>(eq)



910kgCO<sub>2</sub>(eq)



280kgCO<sub>2</sub>(eq)



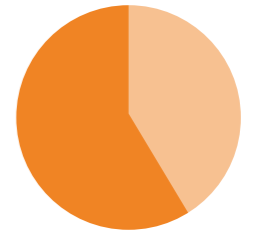
-24kgCO<sub>2</sub>(eq)



-17kgCO<sub>2</sub>(eq)



263kgCO<sub>2</sub>(eq)



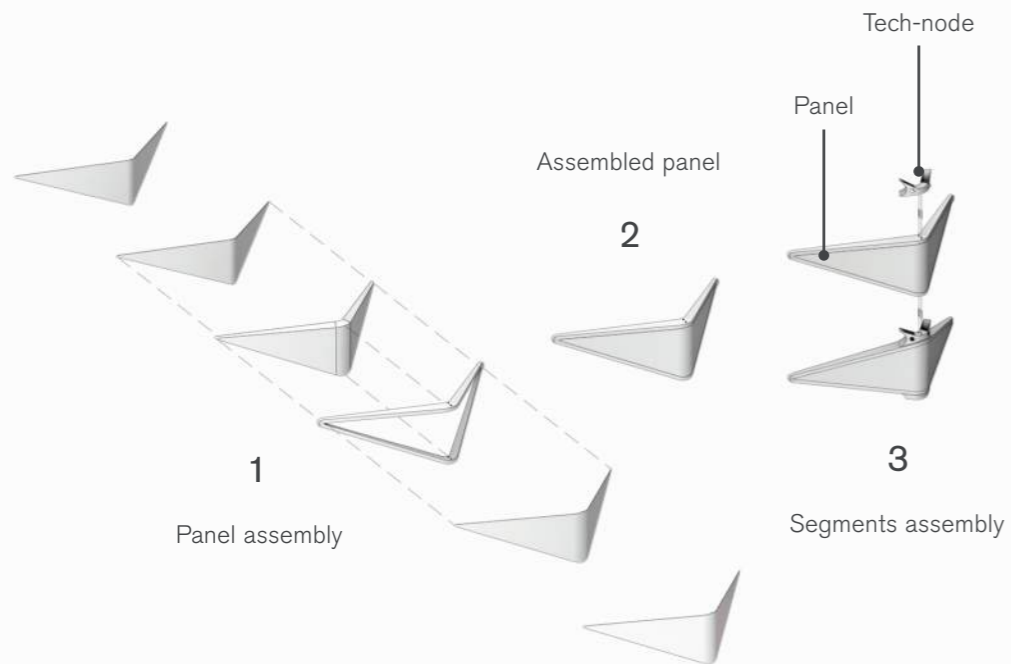
502kgCO<sub>2</sub>(eq)

# Canopy - Efficient Fabrication

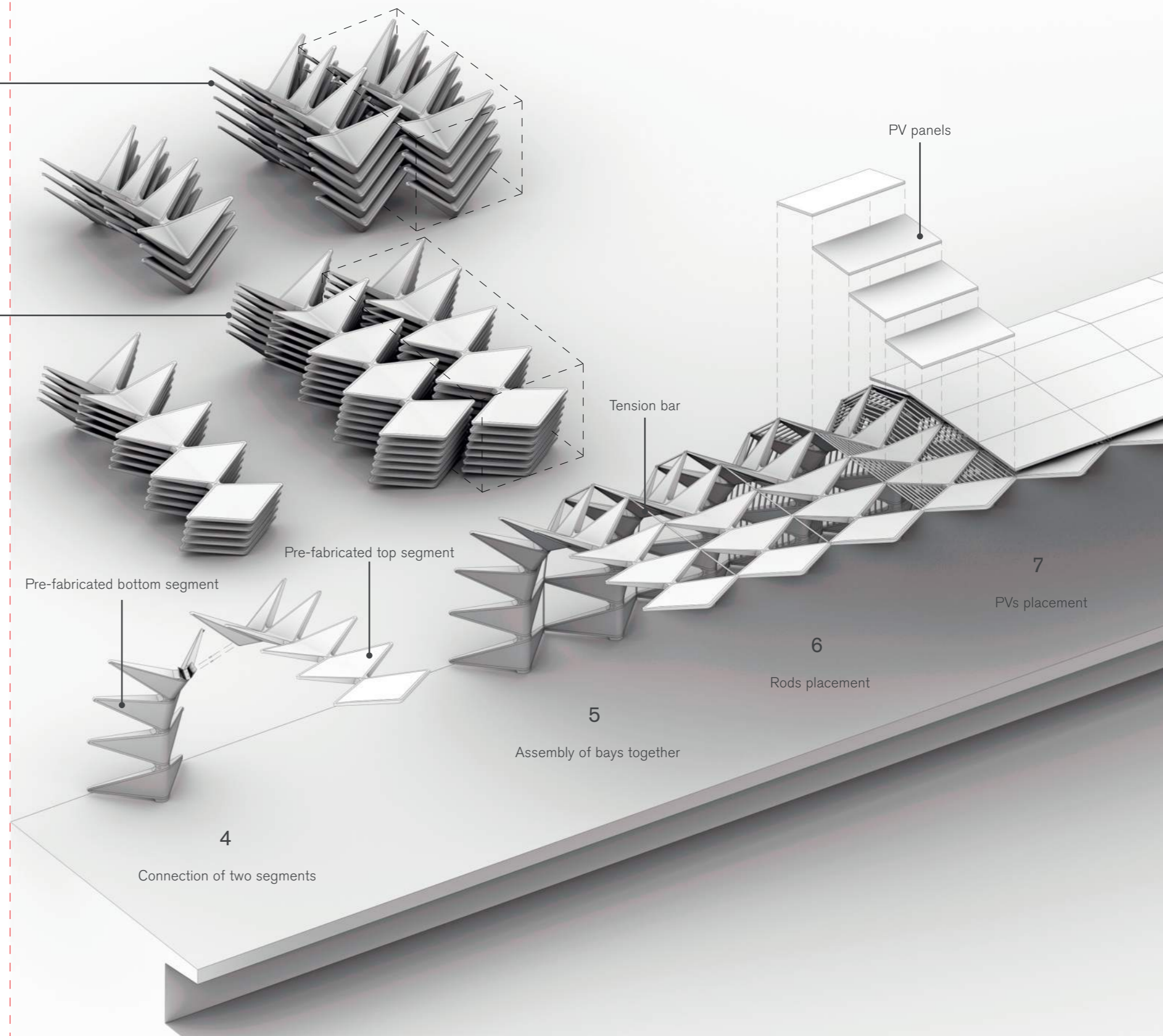
OFF-SITE

Stacks of bottom segments  
 - fitting in a standard ISO container  
Internal dimensions  
 width: 7'-8 19/32"  
 height: 7'-10 7/32" (+12" for the taller ones)  
 length: 19'-4 13/64"

Stacks of top segments  
 - fitting in a standard ISO container



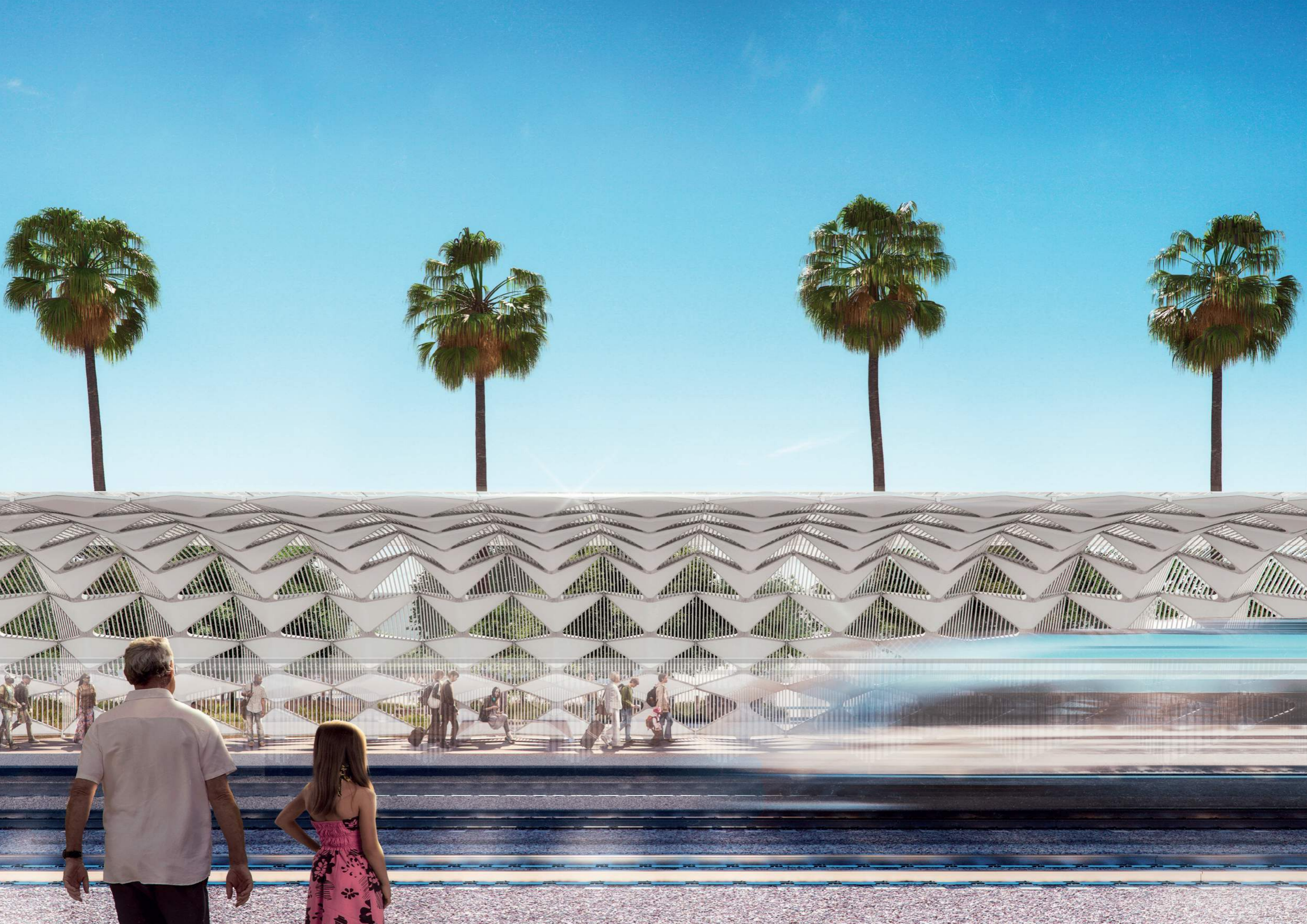
SITE







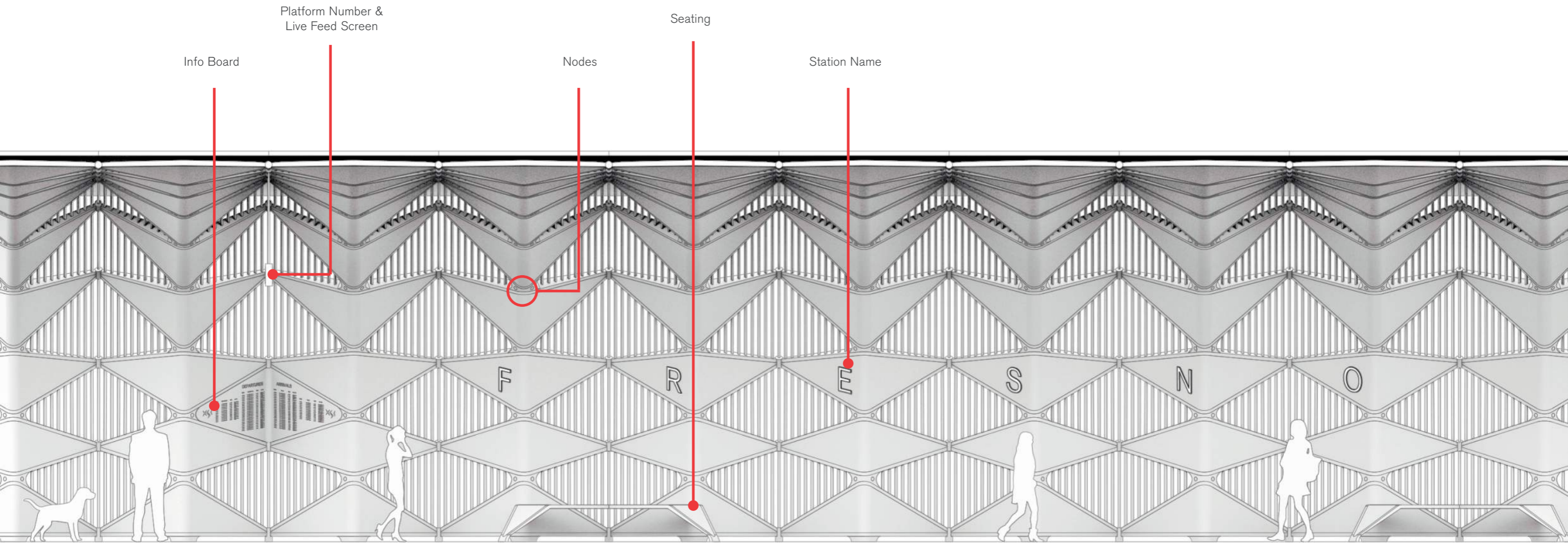






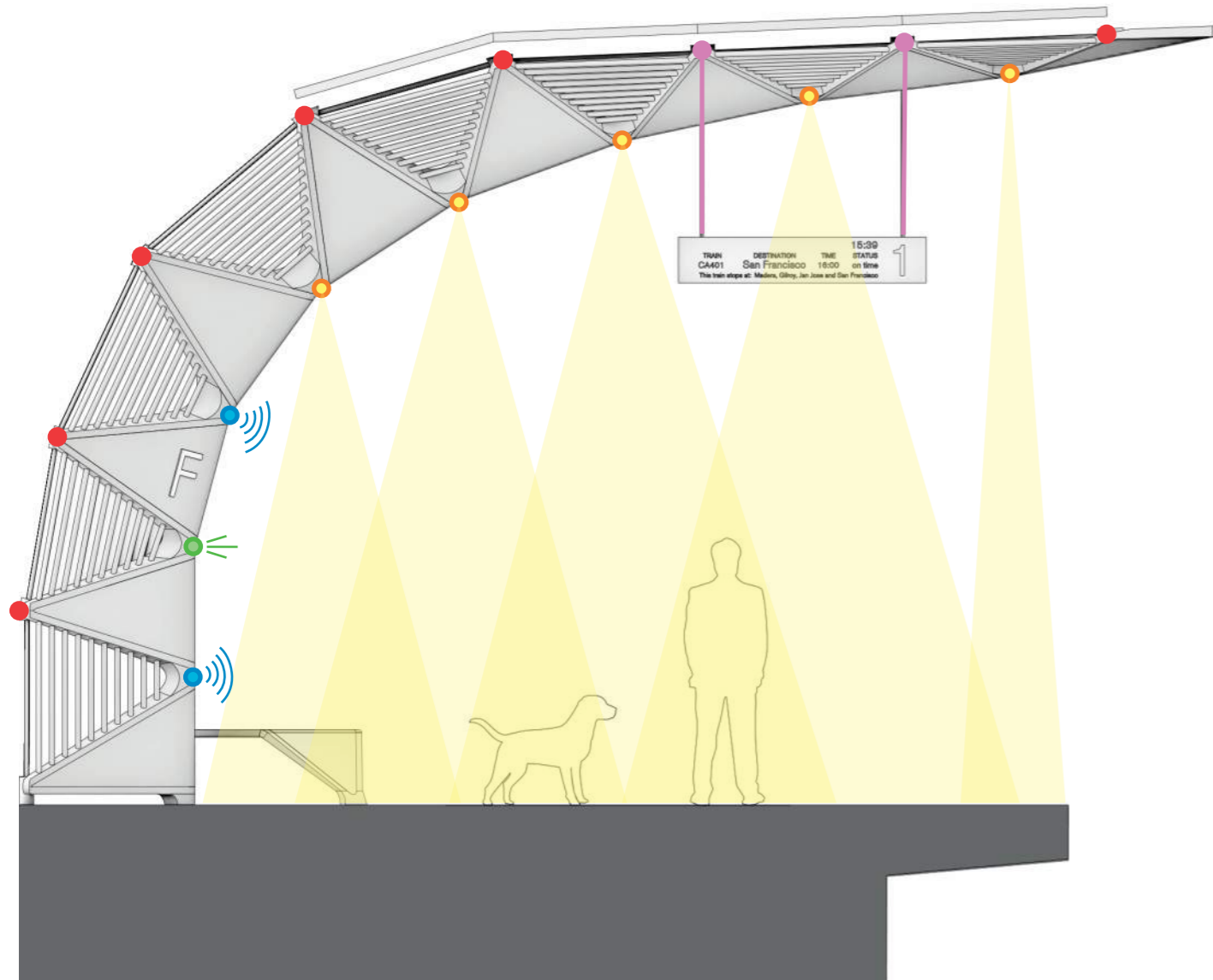


# System Integration





Elevation

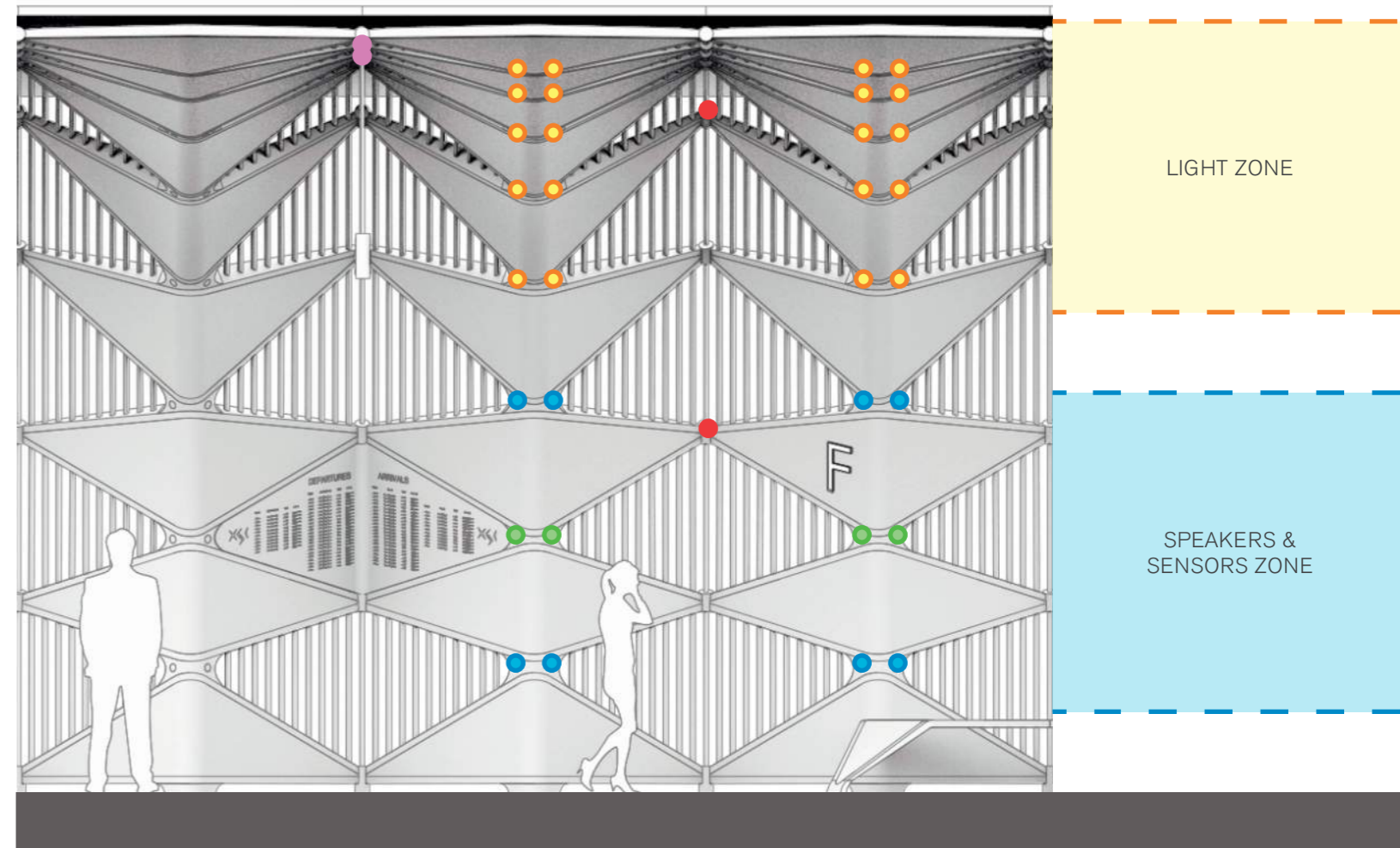
# Nodes Layout



Section




Legend

-  Connection for live feed screen
-  Connection for other elements (cameras, sensors, emergency lights, etc)



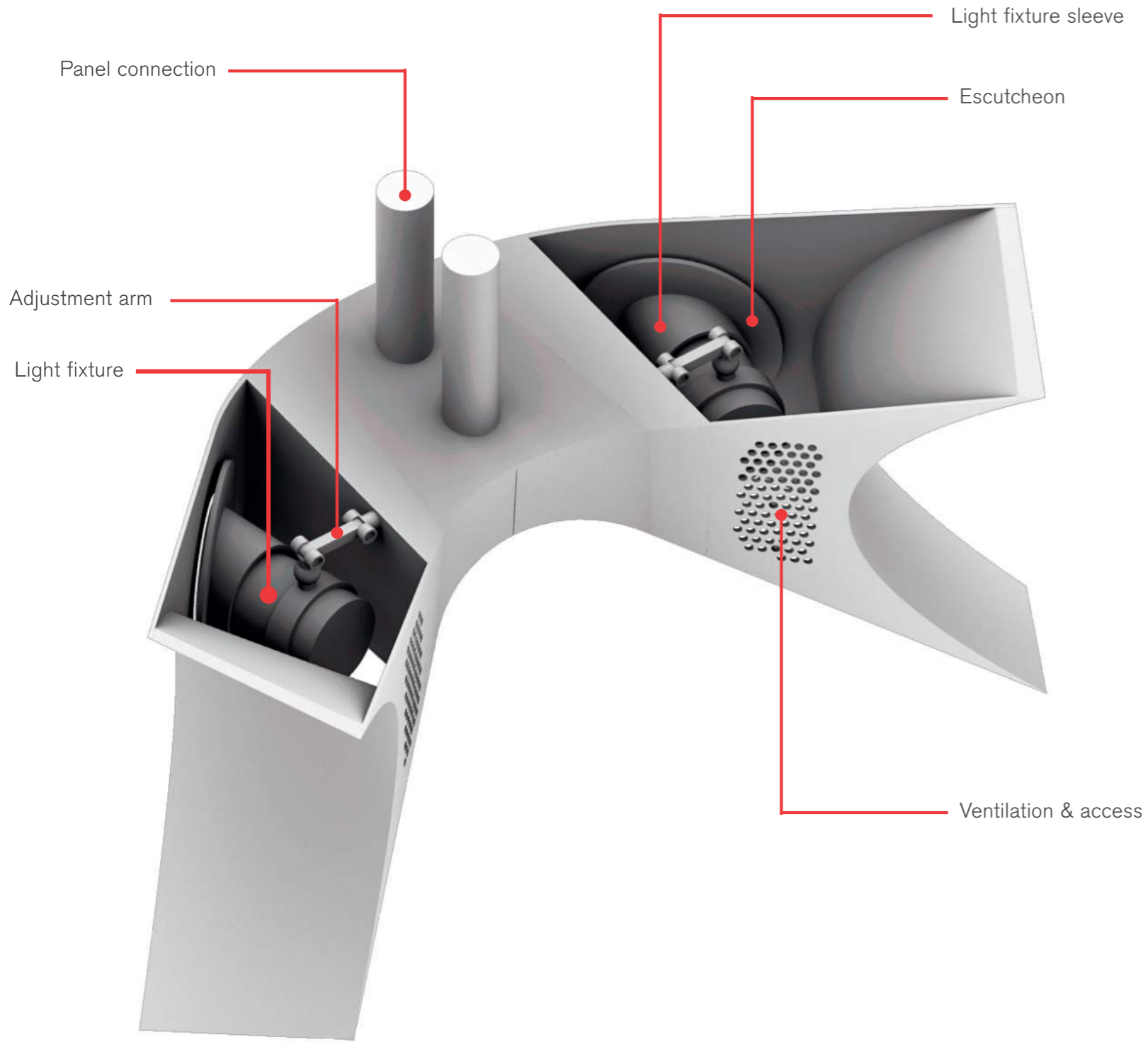
Elevation

Legend

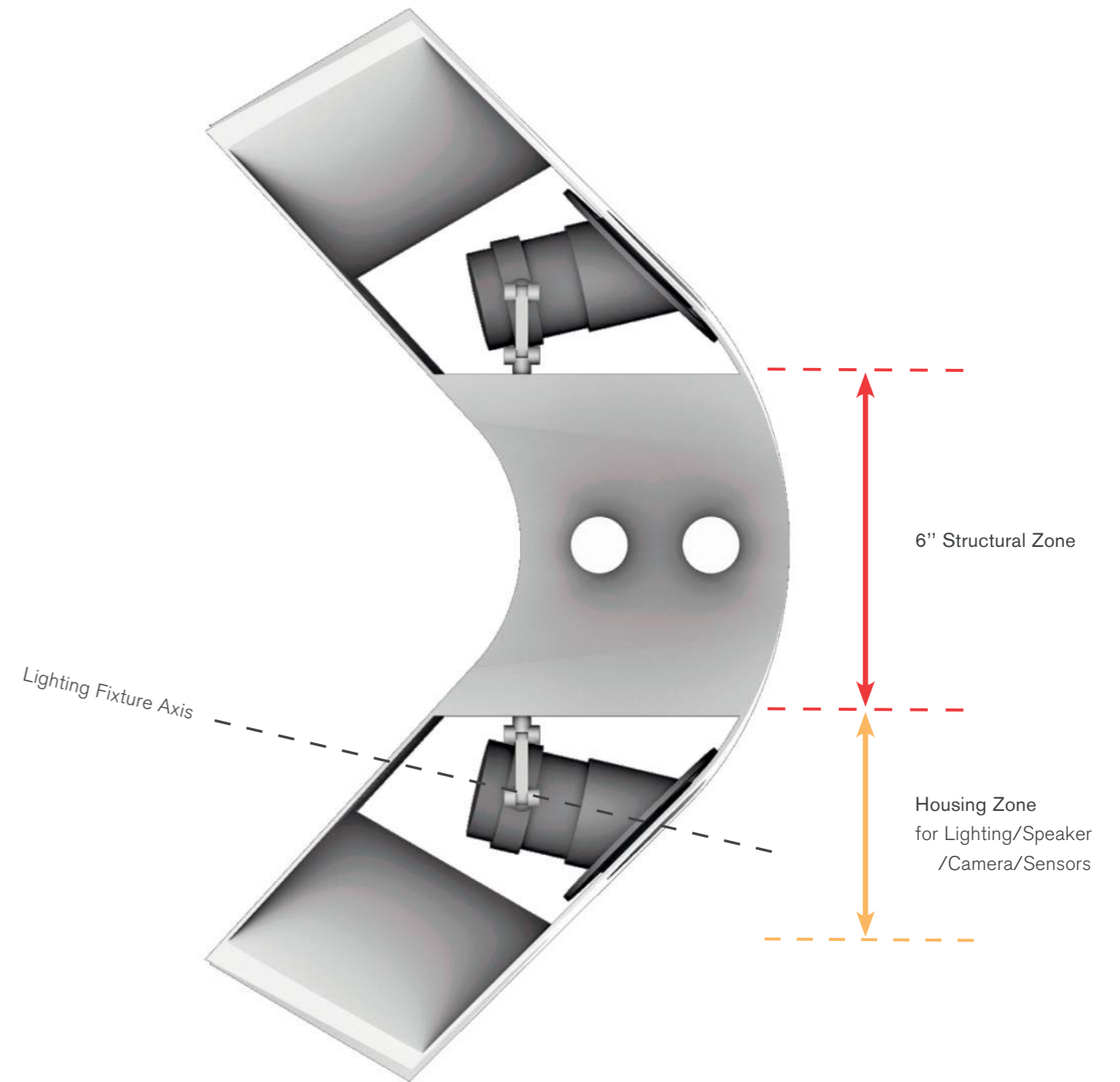
-  Light
-  Speaker
-  Sensor

# Nodes Integration

## Lighting



Axonometric - Back



Plan



F

R

E

S

N

O





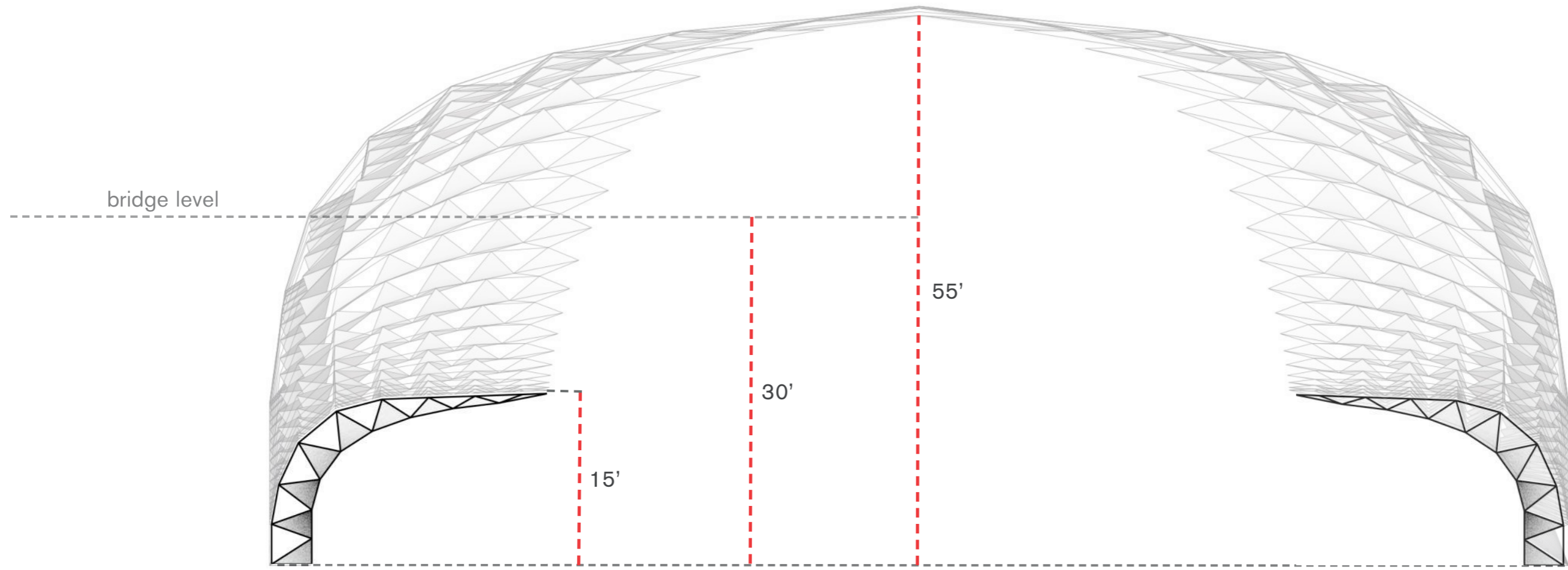
### DEPARTURES

TRAIN	DEPARTURE	TIME	STATION
CA282	Sacramento	06:10	✓
CA211	Sacramento	07:10	✓
CA281	Sacramento	08:10	✓
CA280	Sacramento	09:10	✓
CA279	Sacramento	10:10	✓
CA278	Sacramento	11:10	✓
CA277	Sacramento	12:10	✓
CA276	Sacramento	13:10	✓
CA275	Sacramento	14:10	✓
CA274	Sacramento	15:10	✓
CA273	Sacramento	16:10	✓
CA272	Sacramento	17:10	✓
CA271	Sacramento	18:10	✓
CA270	Sacramento	19:10	✓
CA269	Sacramento	20:10	✓
CA268	Sacramento	21:10	✓

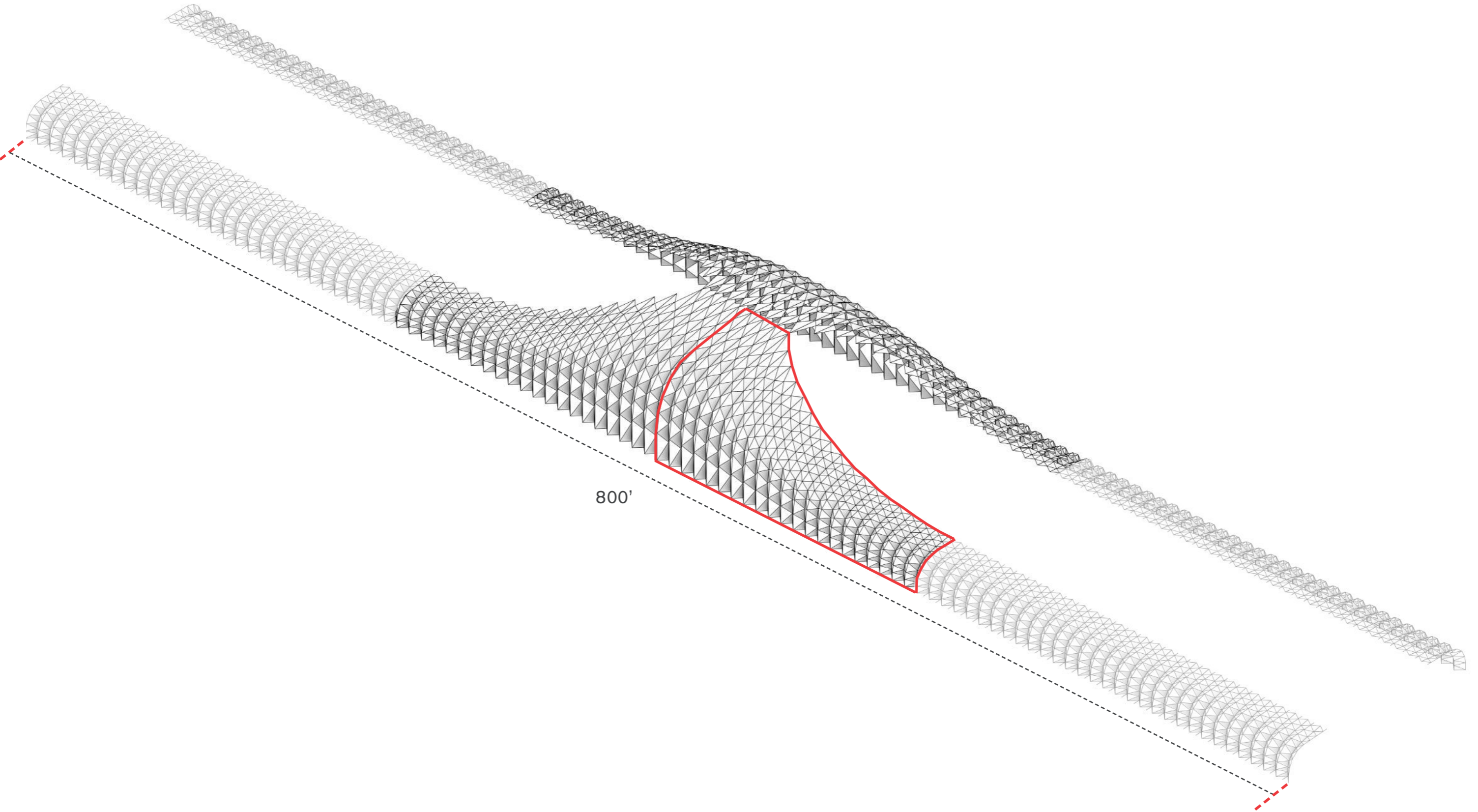
### ARRIVALS

TRAIN	FROM	TIME	STATION
CA282	San Francisco	06:10	✓
CA211	San Francisco	07:10	✓
CA281	San Francisco	08:10	✓
CA280	San Francisco	09:10	✓
CA279	San Francisco	10:10	✓
CA278	San Francisco	11:10	✓
CA277	San Francisco	12:10	✓
CA276	San Francisco	13:10	✓
CA275	San Francisco	14:10	✓
CA274	San Francisco	15:10	✓
CA273	San Francisco	16:10	✓
CA272	San Francisco	17:10	✓
CA271	San Francisco	18:10	✓
CA270	San Francisco	19:10	✓
CA269	San Francisco	20:10	✓
CA268	San Francisco	21:10	✓

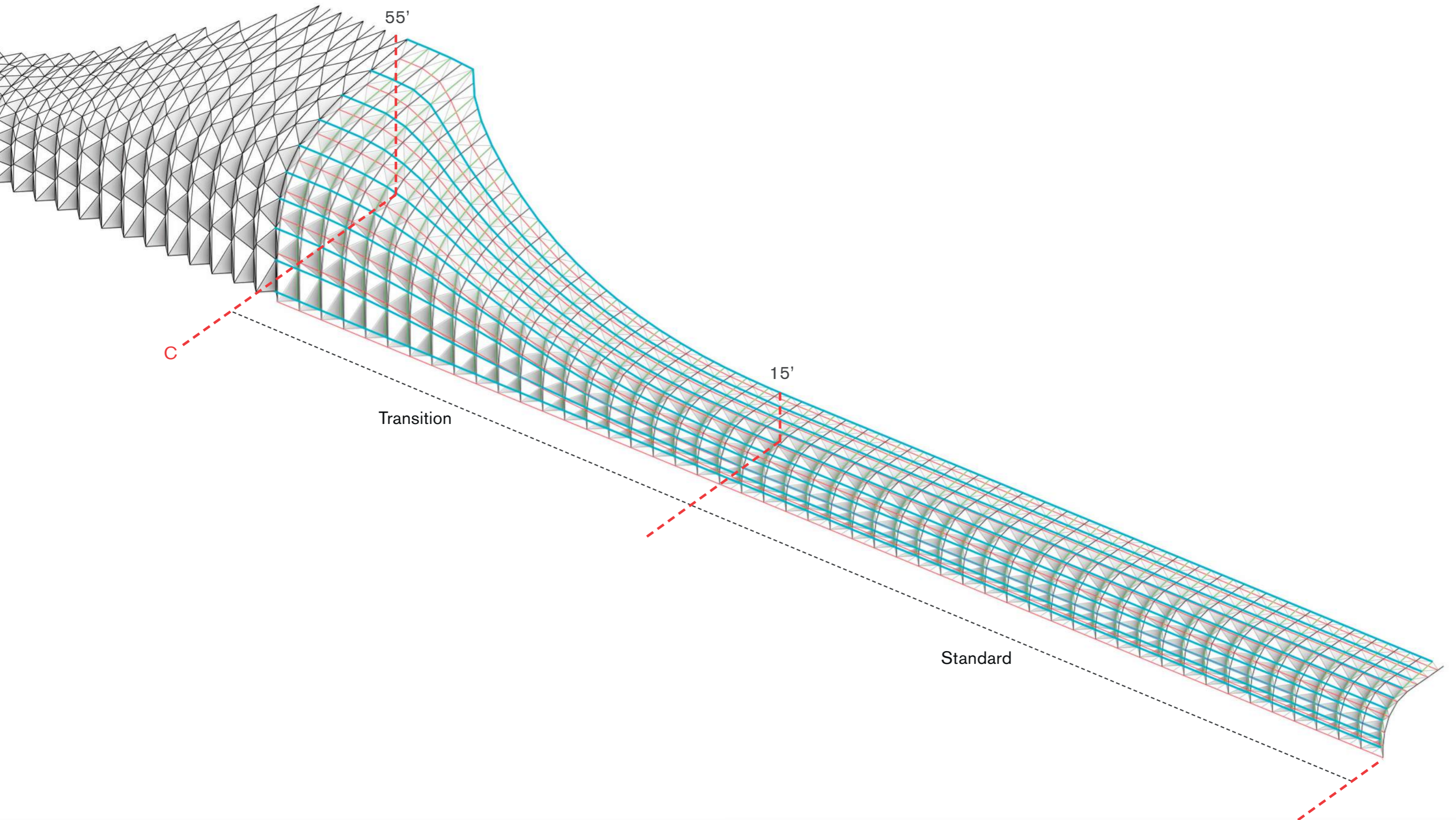
# Hybrid

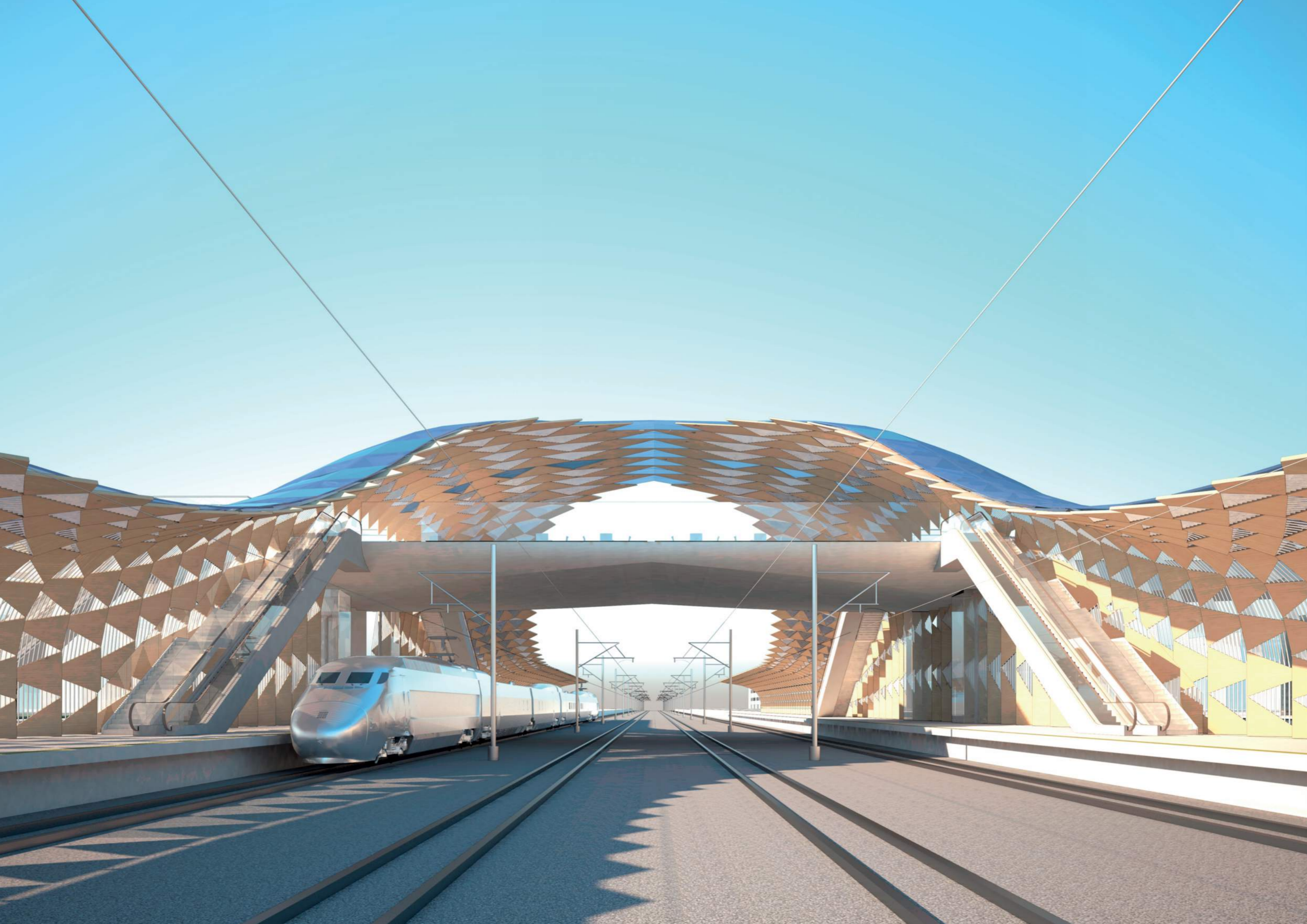


# Hybrid Transition Segment



# Hybrid Geometry Generation







Puerta de Atocha, Madrid

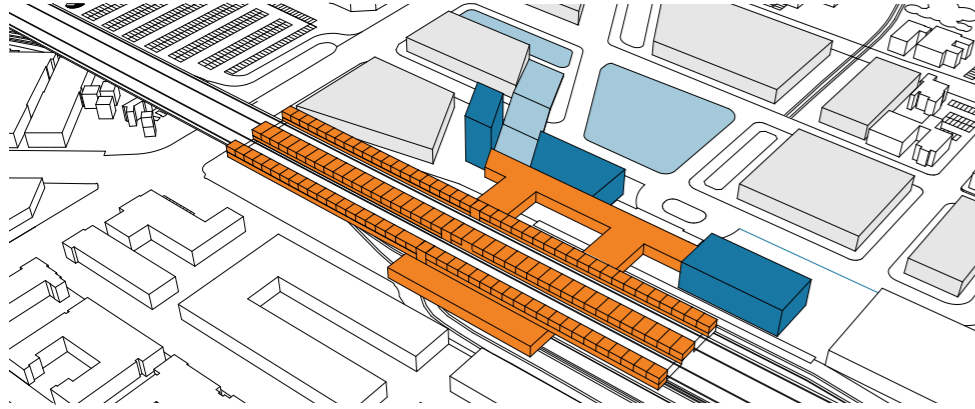






# Passive and Active Energy Systems

Coastal - San Jose



50-70% solar shading

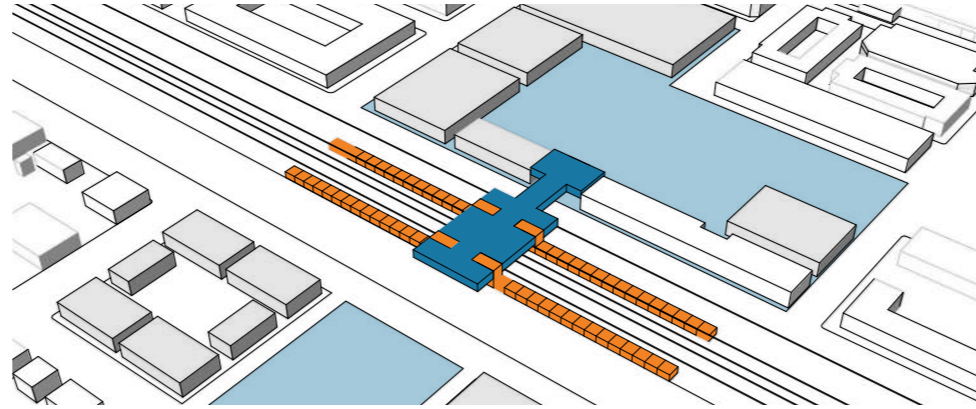
High Solar Reflectivity

0-25% evaporative cooling

20-50% wind blocked

30%-50% free area for air movement

Central - Fresno



Full Shading Outside

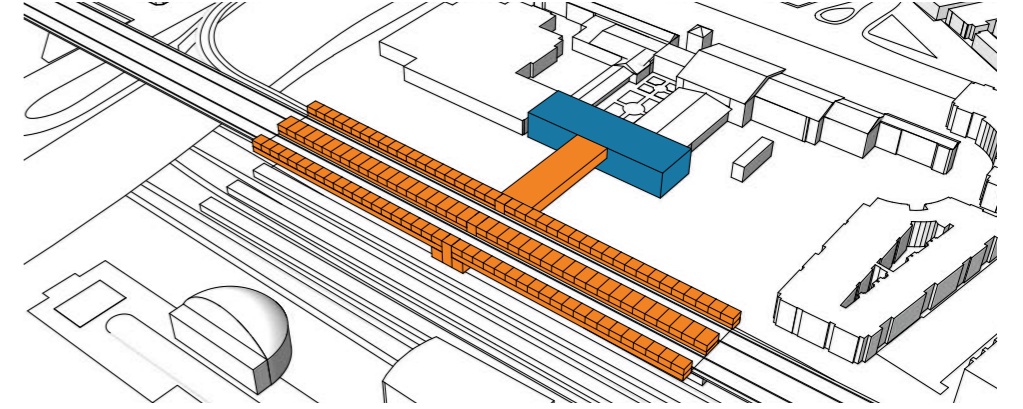
Lower Solar Reflectivity for fully outside spaces

25-50% evaporative cooling

No wind blocked

either fully outside or enclosed spaces

Inland - Los Angeles



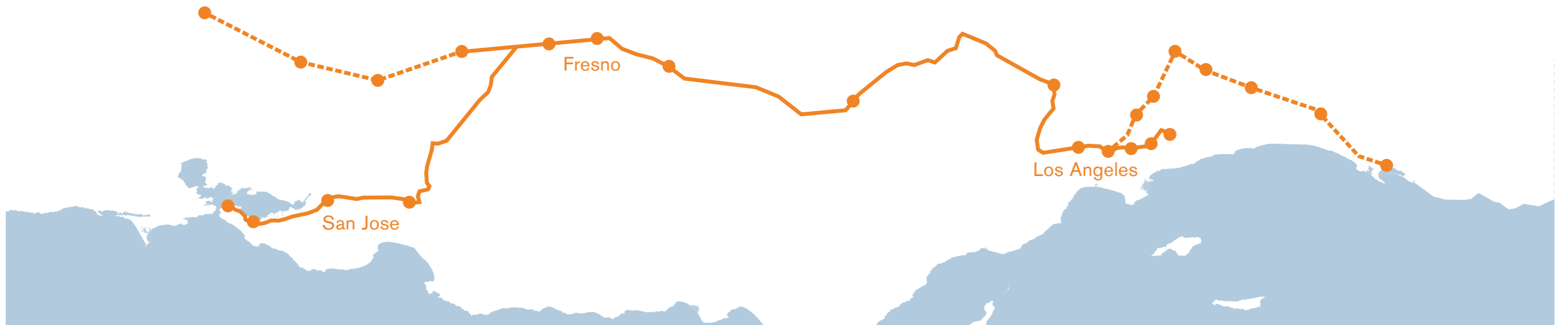
50-70% solar shading

Medium Solar Reflectivity

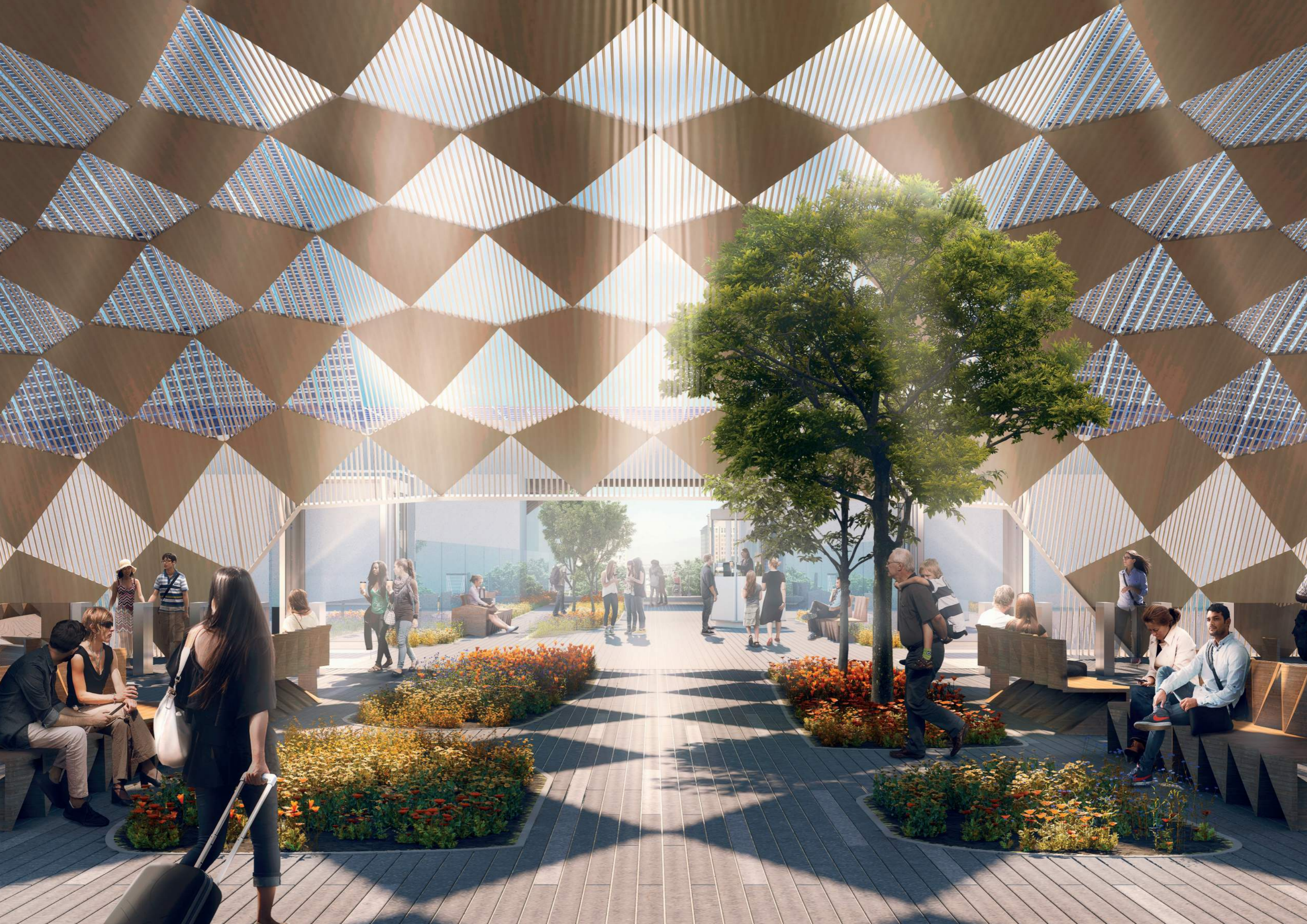
25-50% evaporative cooling

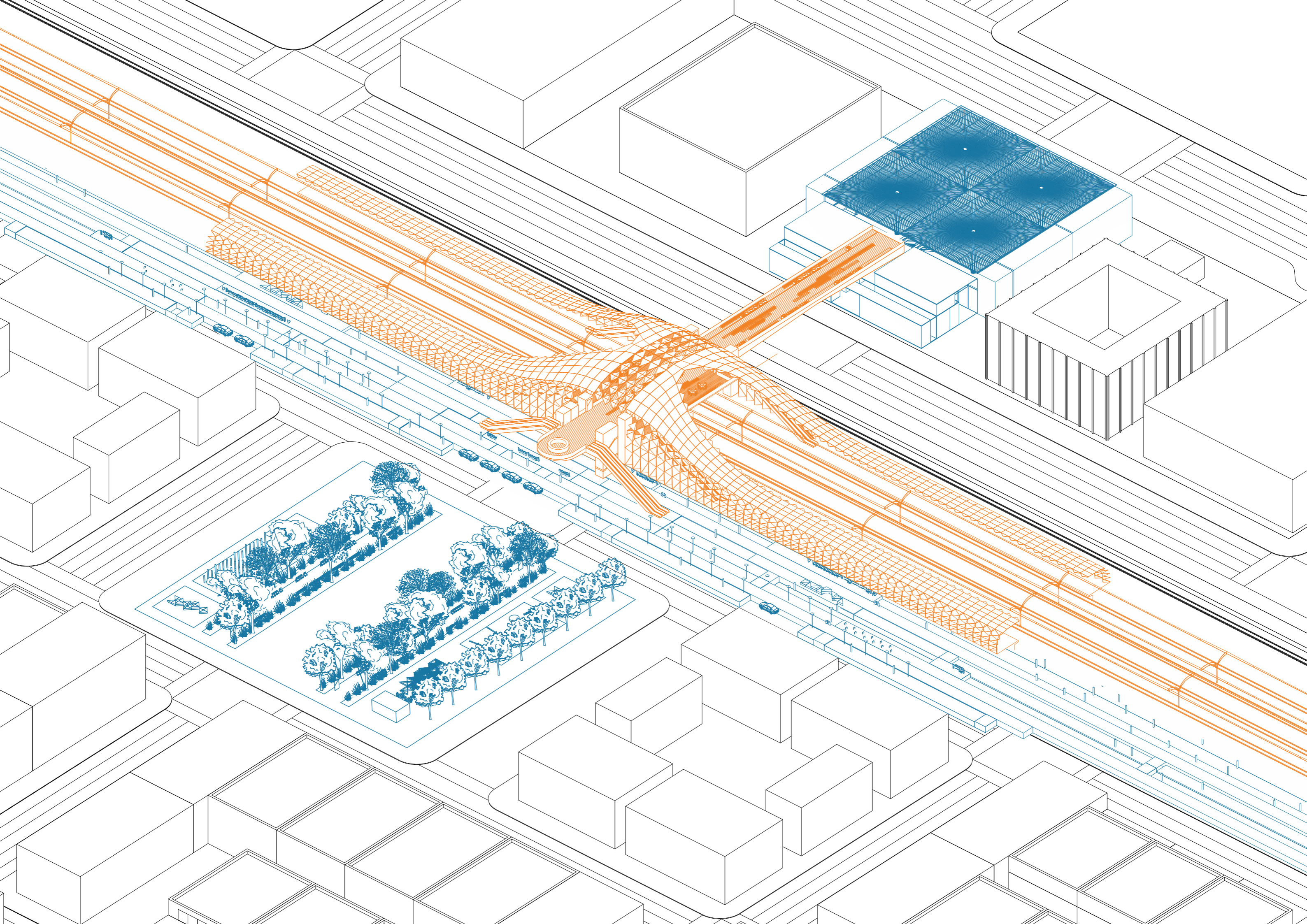
No wind blocked

75-100% free area for air movement









- Locally unique design and functions
- Community hubs
- Flexible public space
- Naturally ventilated and lit
- Multimodal centers
- Bridges and connectors across tracks
- Local landscape and green spaces
- Sustainable local materials





Los Angeles



Palmdale



Bakersfield



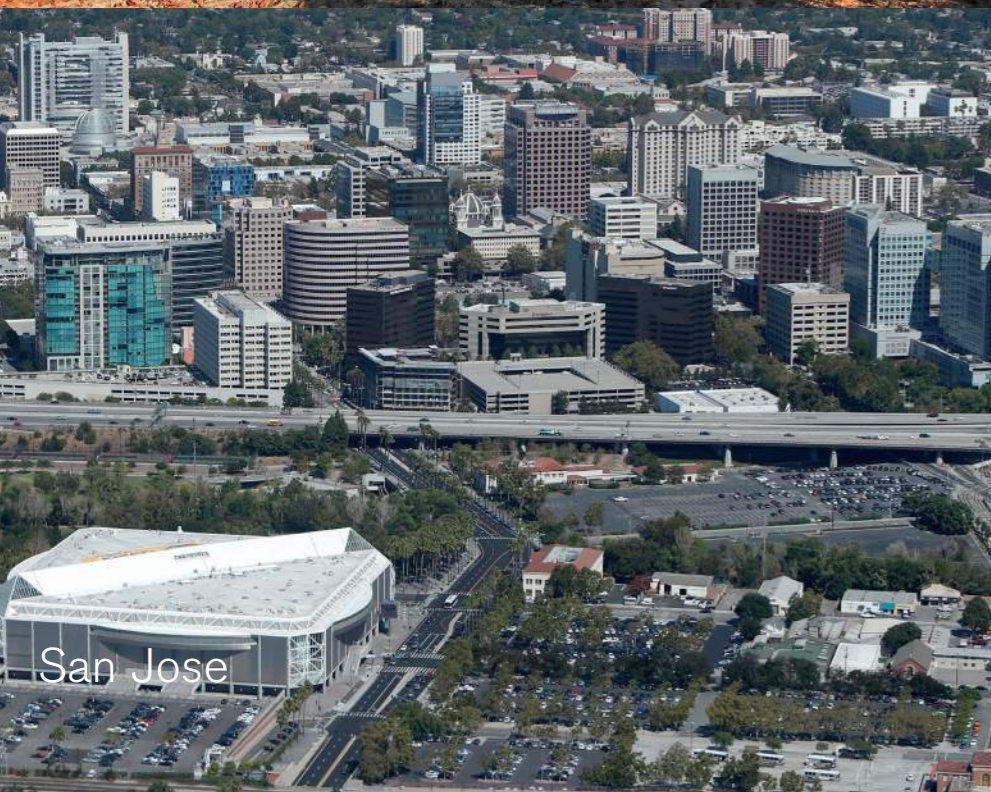
Kings Tulare



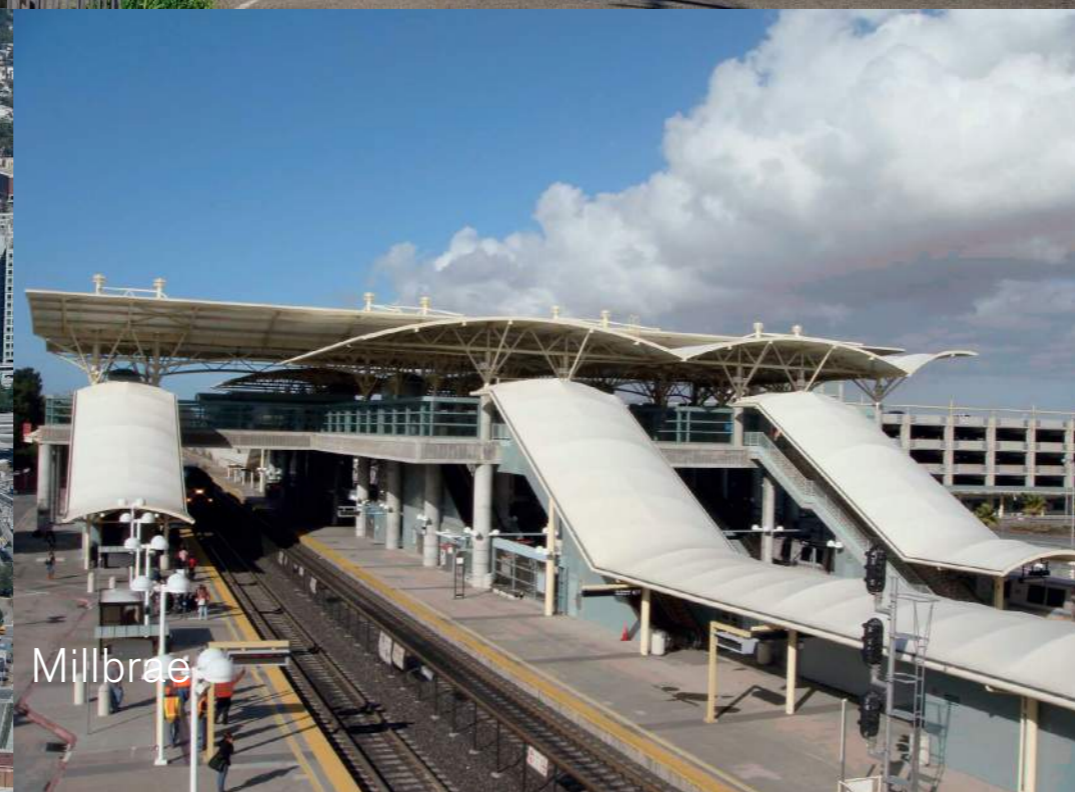
Fresno



Merced



San Jose



Millbrae



San Francisco

# Landscape Vision California Linear Park

An 800-mile-long performance-driven landscape expression of California ecologies with connections to regional trails and open spaces.



**1** Coastal Evergreen Forest Linear Park



**3** Oak Woodlands Savanna Linear Park



**5** Joshua Tree Woodland Linear Park

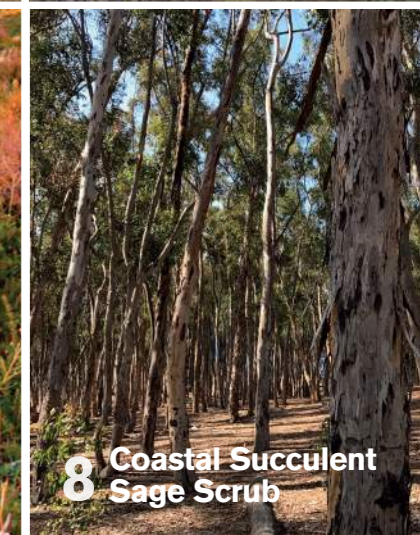
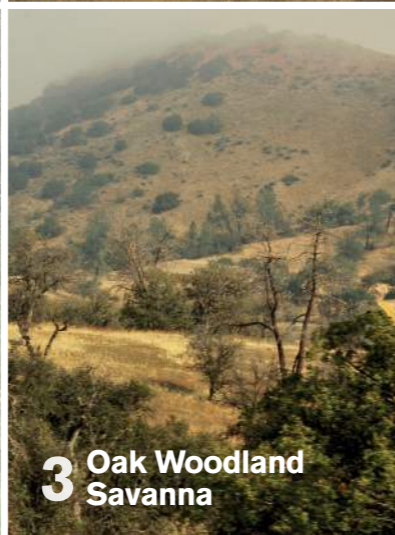
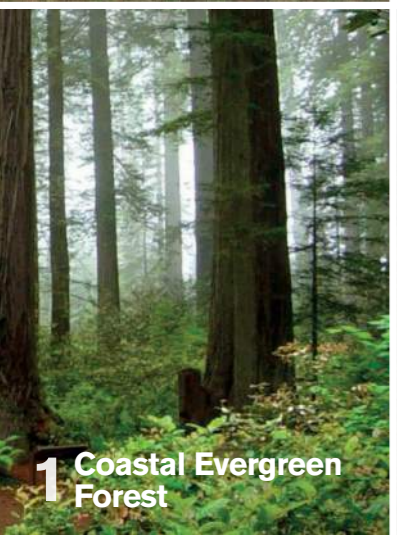


Station Linear Park



# Landscape Vision

## California Landscape Regions



**1** Coastal Evergreen Forest

**2** Canyon Chaparral

**3** Oak Woodland Savanna

**4** Inland Scrubland and Grassy Marshes

**5** Joshua Tree Woodland

**6** Coastal Scrub and Chaparral

**7** Riparian Woodland and Annual Grassland

**8** Coastal Succulent Sage Scrub

# Station Area Opportunities



← **Increased Density  
Towards Station**

**Mixed Land  
Uses**

**Multi-Modal  
Connectivity**

**Regional  
Economic Hub**

**Strong Sense  
of Place**

**Compact,  
Connected &  
Walkable**

Station Area View



# Light Touch, Big Impact



**Resilience & Social Sustainability:**  
Station as a Public Hub

**District Infrastructure:**  
Energy Storage

**Powered by the Sun:**  
100% renewable energy

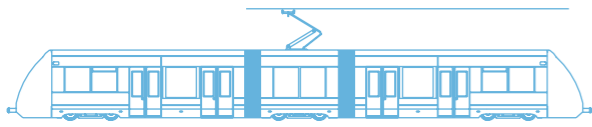
**Climate Responsive:**  
Architecture maximizes natural lighting, ventilation, cooling & heating

**Drought-Tolerant:**  
Water conservation, rainwater capture & reuse

**Healthy and Low-Impact:**  
Materials selection to emphasize reduced embodied carbon, long-term durability & elimination of toxins

# Towards High-Speed Rail Oriented Development

Transit-Oriented Development supports attractive neighborhoods but its economic benefits are limited by the reach of the local transit system.



## TOD

Compact

Dense

Mixed-Use

Walkable

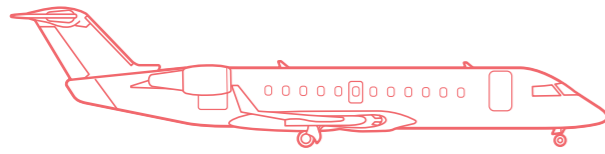
Engaging

Resilient



# Towards High-Speed Rail Oriented Development

Airports are powerful economic generators - but their regional scale attracts sprawling, auto-dependent development surrounding them.



## AEROD

**Hotel /  
Convention**

**Regional  
Connectivity**

**Business  
Travelers**

**Manufacturing/  
Distribution**

**City  
Gateway**



# Towards High-Speed Rail Oriented Development

High Speed Rail Oriented Development combines the best features of traditional Transit-Oriented Development and Airport-oriented development.



Zuidasdok Station Amsterdam

**Hotel /  
Convention**

**Regional  
Connectivity**

**Business  
Travelers**

**Manufacturing/  
Distribution**

**City  
Gateway**

**Compact**

**Dense**

**Mixed-Use**

**Walkable**

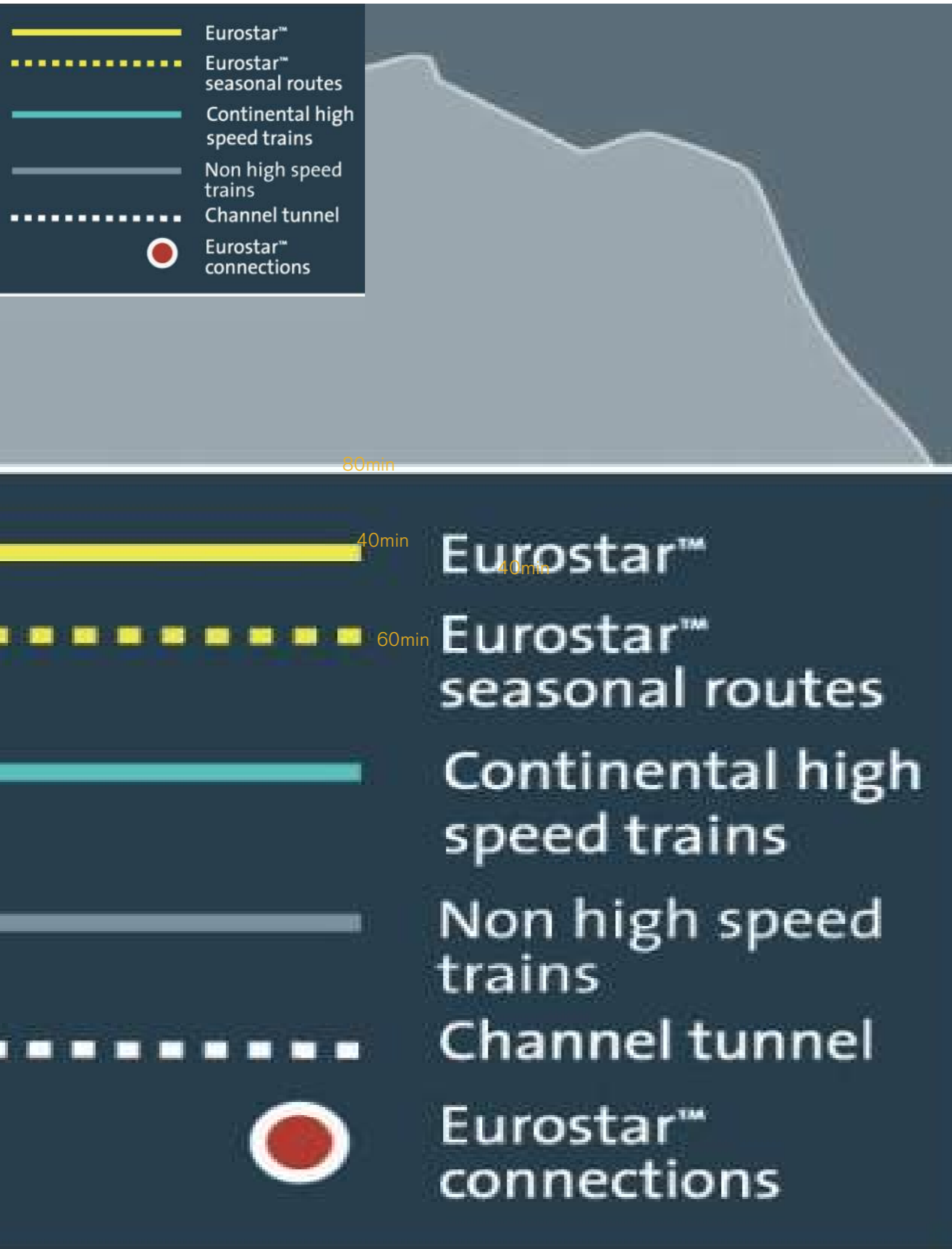
**Engaging**

**Resilient**



# High-Speed Rail Oriented Development

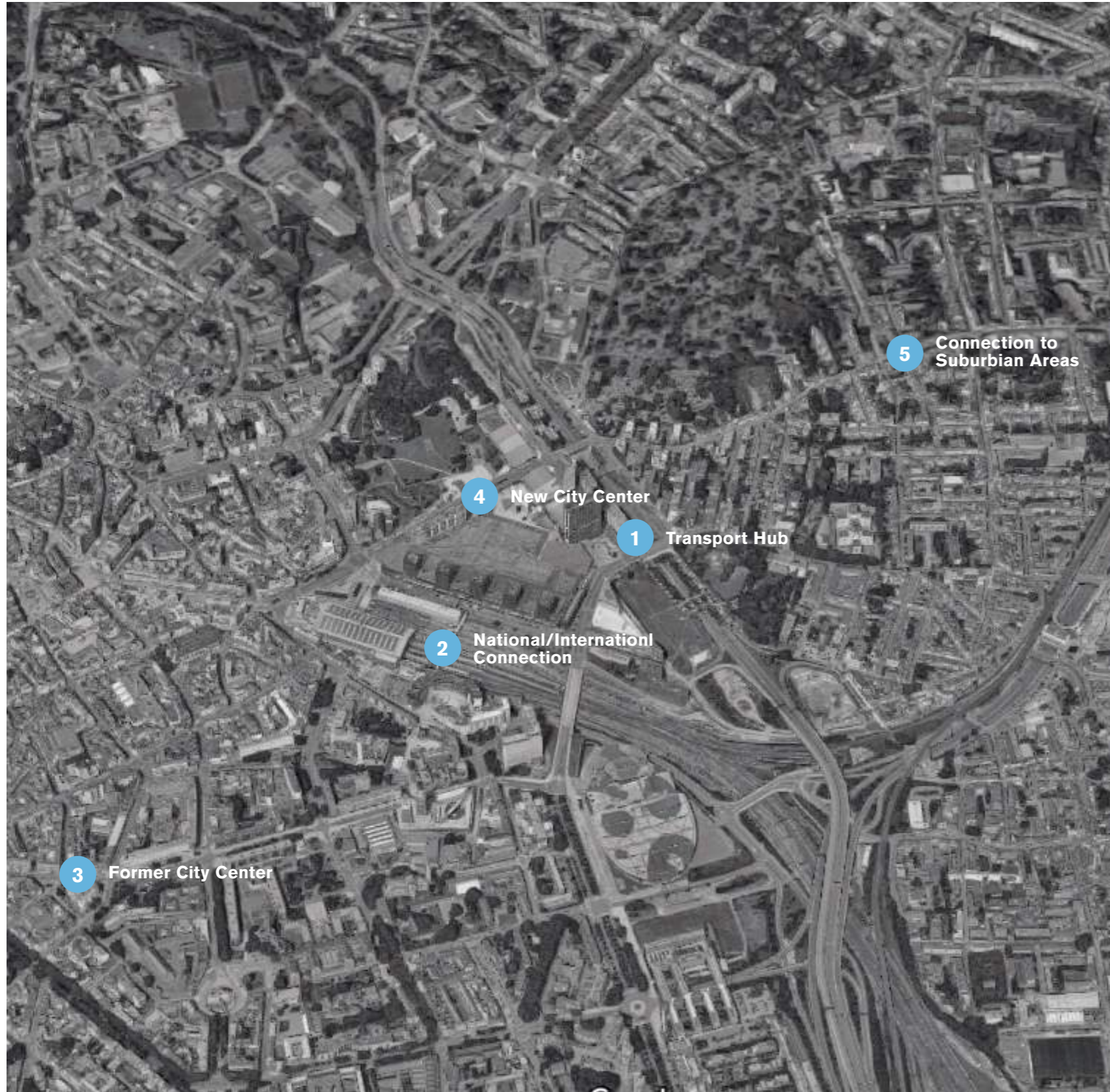
Lille Precedent 1994 | 120 Hectares



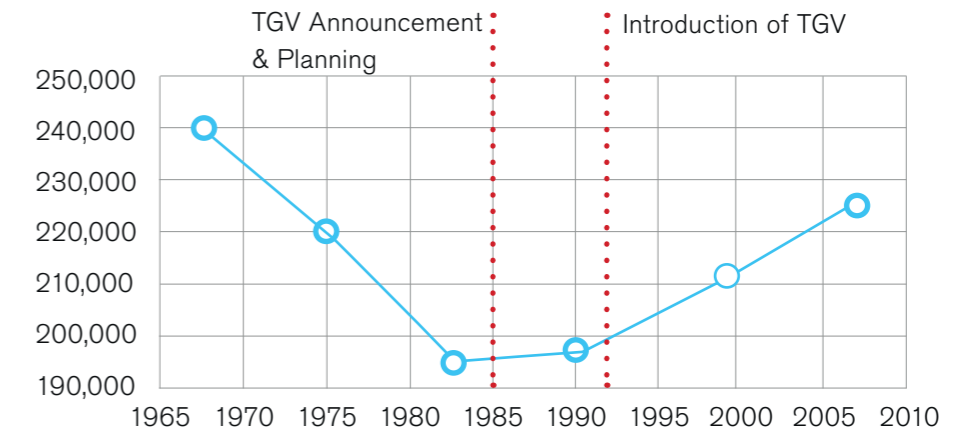
# High-Speed Rail Oriented Development

Lille Precedent

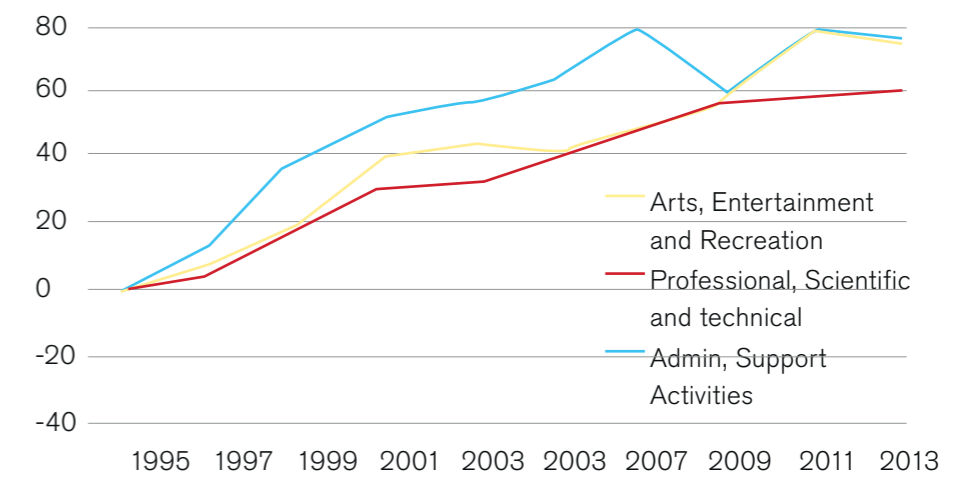
## Economics



### Lille's Population Trend (1968-2007)



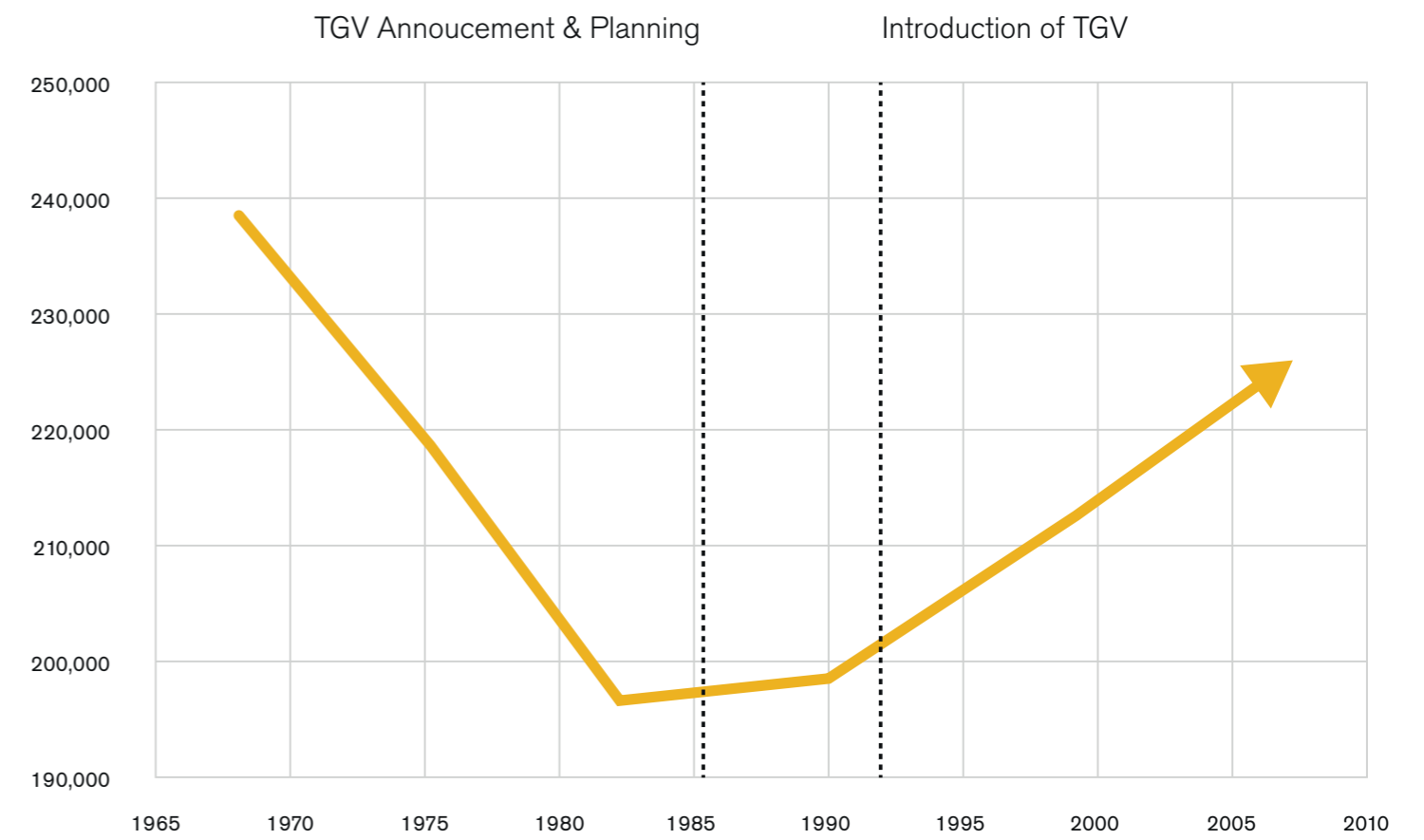
### Lille Employment Gains (1995 = 0)



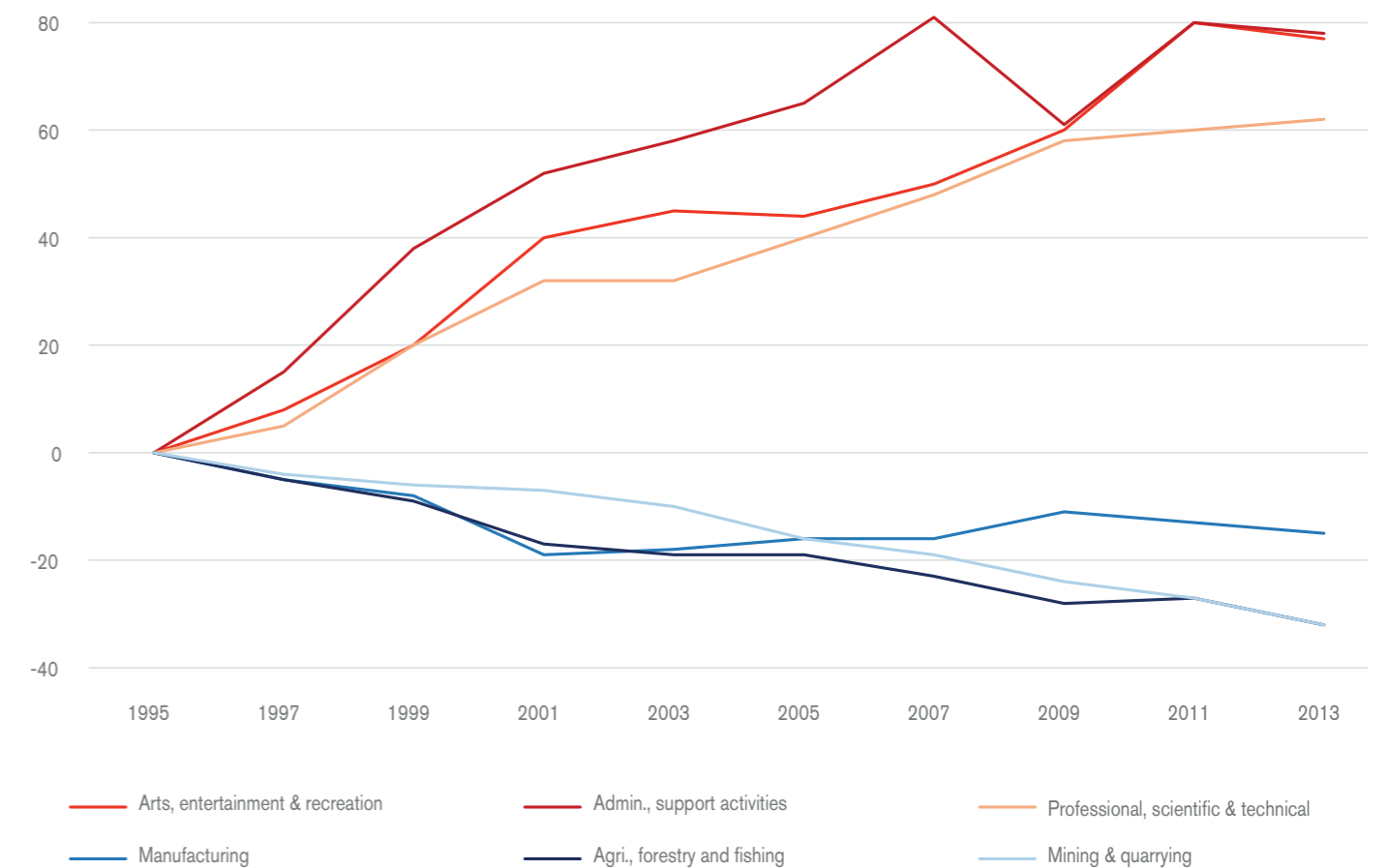
- 1 **15th Largest European Metropolis**
- 2 **Total Workforce: 900,000**
- 3 **15 Head Offices of Multinational Companies**
- 4 **80 Head Offices of Companies**  
with more than 500 employees
- 5 **100 Million Consumers within a 380km Radius**



## Lille's Growing Population



## Lille's Quality of Jobs



High-Speed Rail Oriented Development  
Multi-Modal Connectivity, Den Haag Centraal Station



High-Speed Rail Oriented Development  
Multi-Modal Connectivity, Arnhem Station



High-Speed Rail Oriented Development  
Commercial and Services, St Pancras, London



High-Speed Rail Oriented Development  
San Jose | Diridon Opportunities: Google Village Proposal



High-Speed Rail Oriented Development  
HSR to complement Key Regional Initiatives: LA 2028





# Regional Structure and HSR

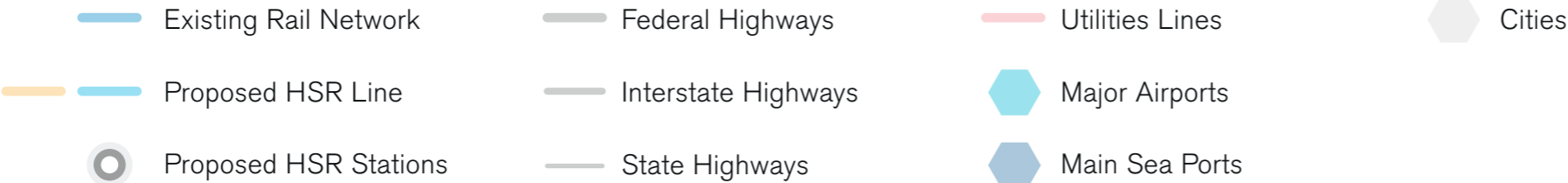
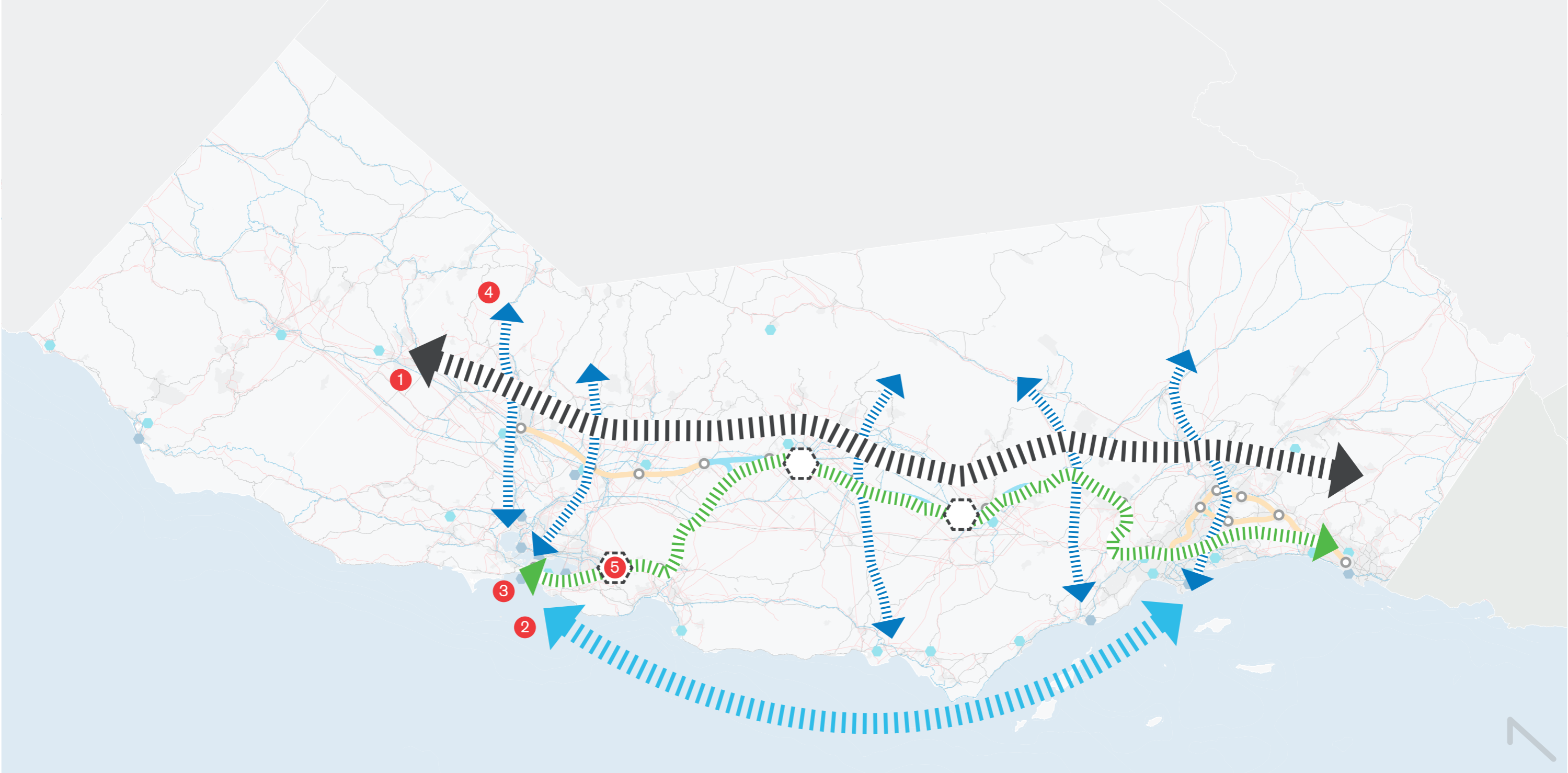


- Proposed HSR Phase 1
- Proposed HSR Phase 2
- Proposed HSR Stations
- Northern Region
- Central Region
- Southern Region

# Infrastructure + Transportation Networks

## HSR Opportunities

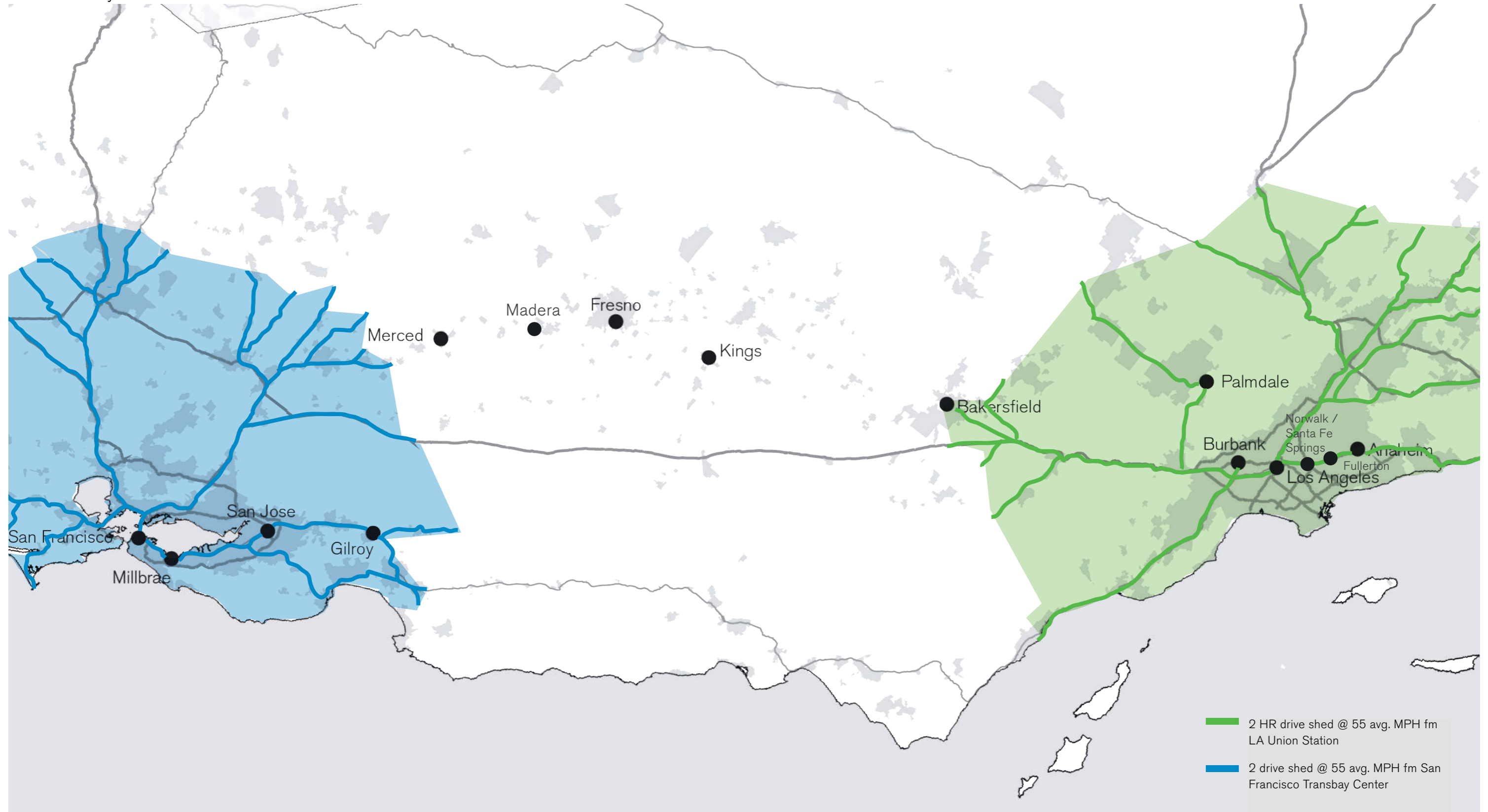
- 1 HSR as the armature for future development
- 2 Divert air travel to rail; SF-LA largest short haul airmarket in the US (LA-Las Vegas comes second)
- 3 Clear most congested metropolitan traffic and highways in the US
- 4 Encourage E - W link + development corridors
- 5 Forsee and plan for future distribution systems



# Infrastructure + Transportation Networks

Benefits to Station & Non-Station Cities

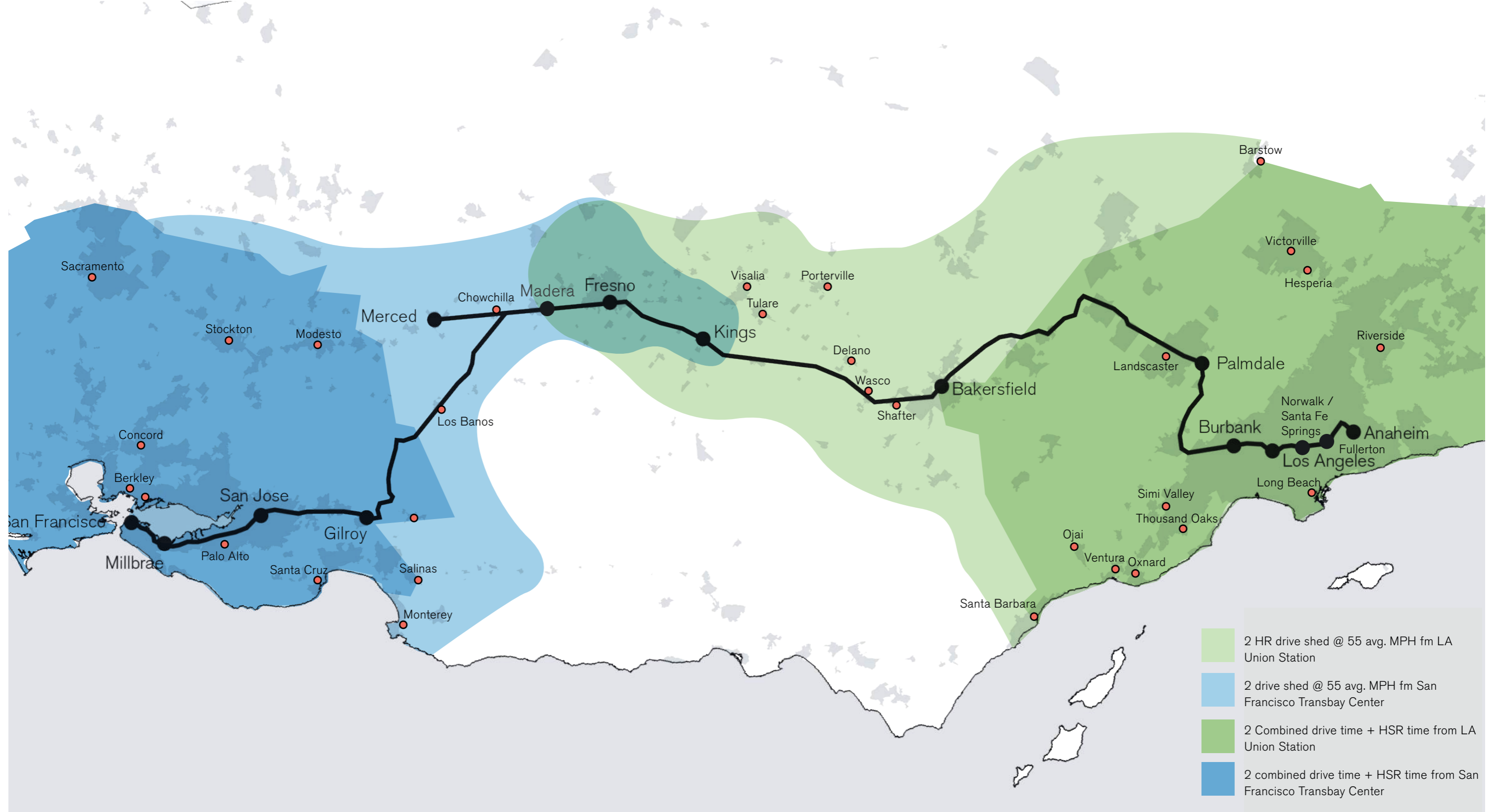
2 Hours travel catchment area - by car:  
Central Valley cities remain isolated



# Infrastructure + Transportation Networks

## Benefits to Station & Non-Station Cities

2 Hours travel catchment area - by car and extended by HSR Service  
Central Valley cities now connected



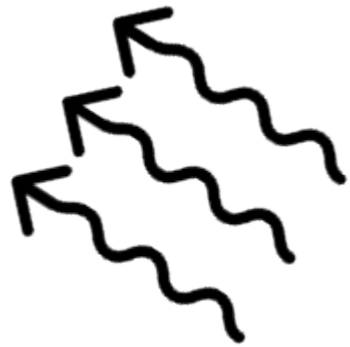
# Sustainable Development

Net Zero Energy Balance

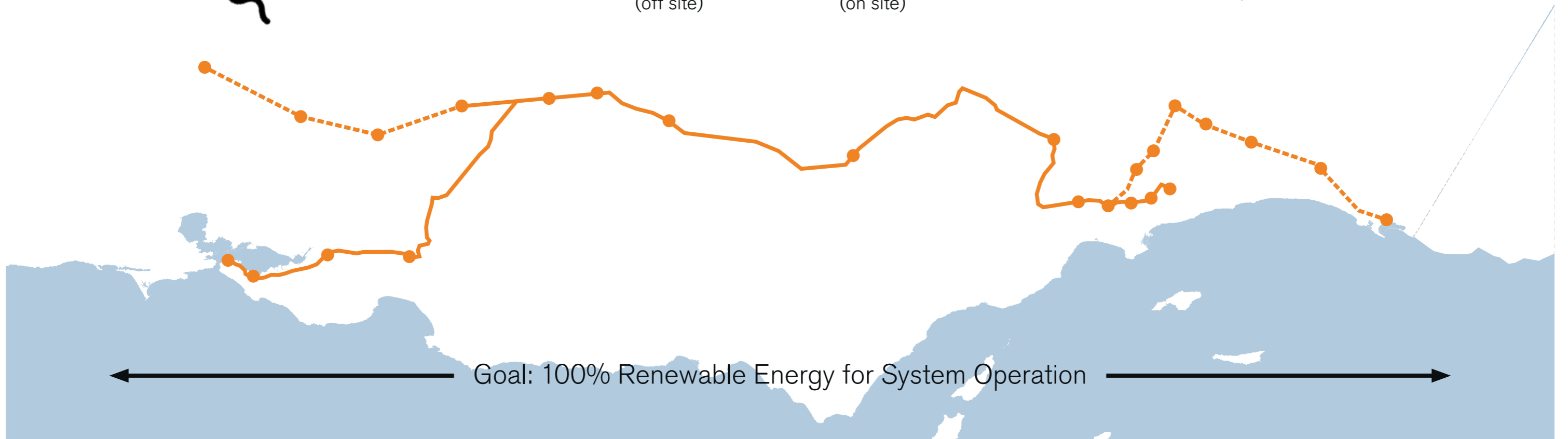
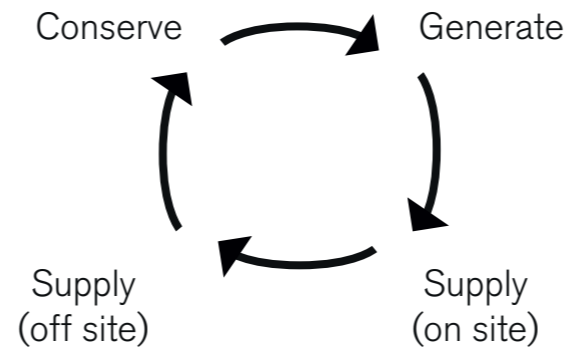
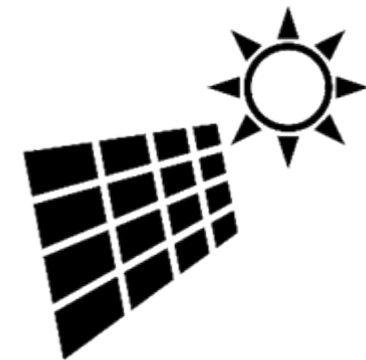
Climate-Responsive Architecture +  
High Efficiency Mechanical Systems  
Reduce HVAC + Lighting Demand



Excess Energy Transferred  
to Surrounding Communities



Distributed Solar Across  
the Network of Stations



# Sustainable Development

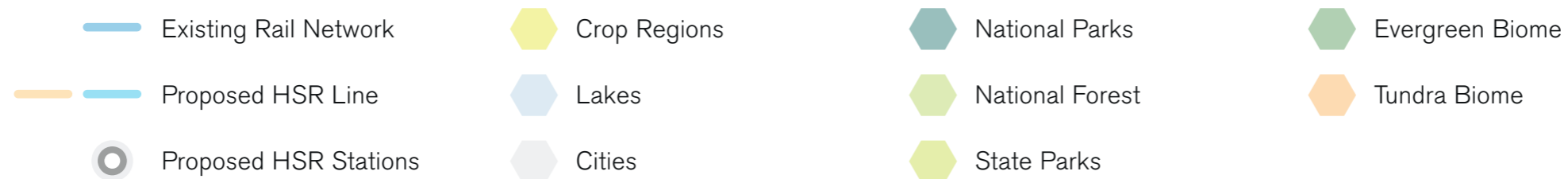
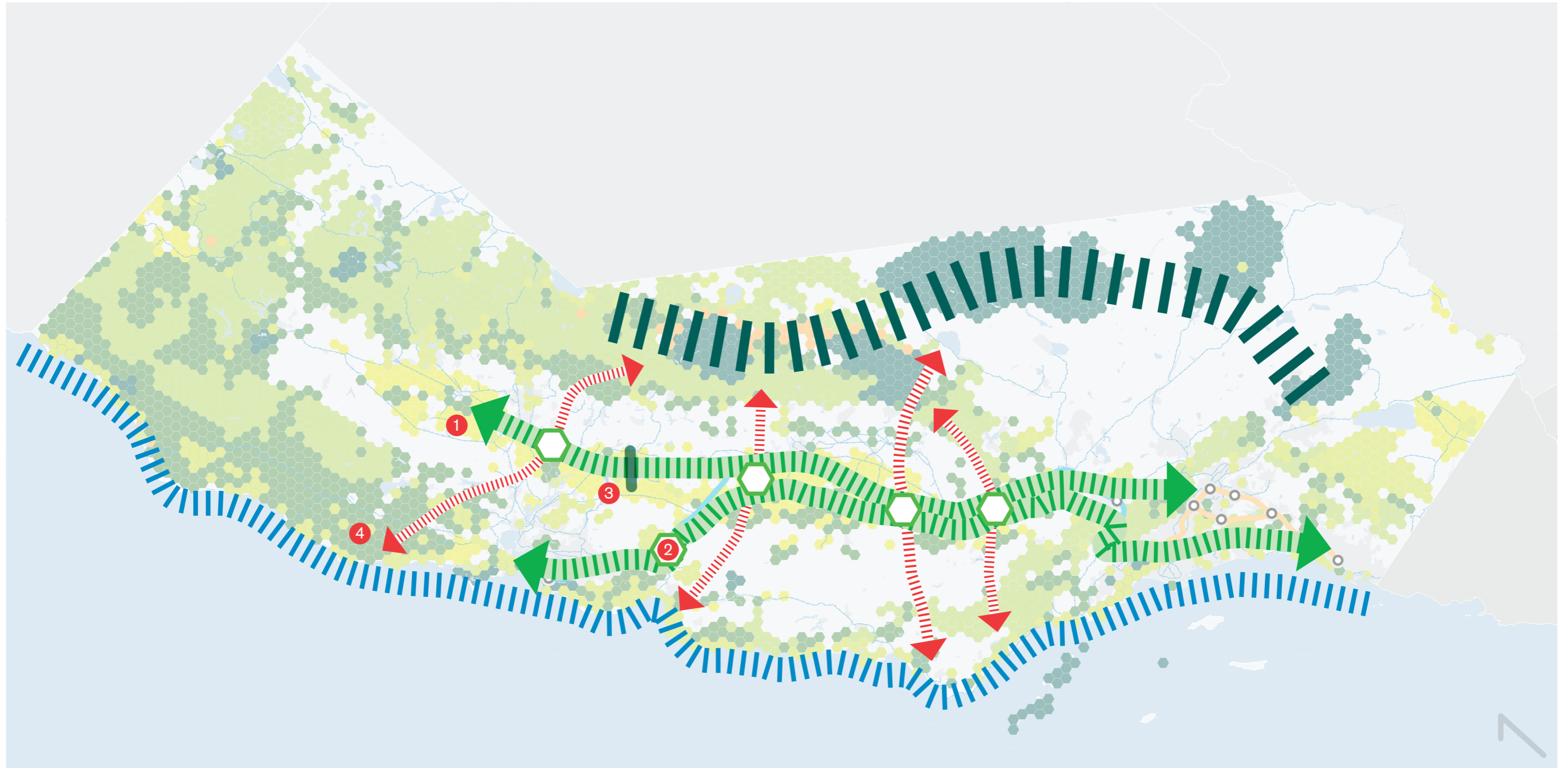
## Passive & Active Energy Systems: A Strategic Approach



# Green Networks

## HSR Opportunities

- 1 Discover California's unique diverse landscape regions; re-introduce Central Valley landscapes
- 2 HSR as California Park development: network of pocket developments adjacent to unique landscape; HSR as a tourism agency
- 3 Help preserve, restore, create wildlife/habitat; provide "ecoducts" wherever possible
- 4 Connect California Park with State/National Parks along the Coast, and State/National Park in the Mountains



# Culture + Tourism Networks

HSR maximizes Tourism Opportunities by:  
 1) Shortening the distances between attractions  
 2) Creating new routes/connections/destinations

● Fun Seeker Attractions

### Tour 1

1. Alcatraz Island
2. Academy of Sciences
3. Tech Museum of Innovation
4. Computer History Museum
5. Gilroy Gardens
6. Monterey Bay Aquarium
7. Monterey Village

### Tour 2

8. State Mining Museum
9. Yosemite National Park
10. John Muir Trail
11. Wassama Round House State Historic Park
12. Fresno Chaffee Zoo

### Tour 3

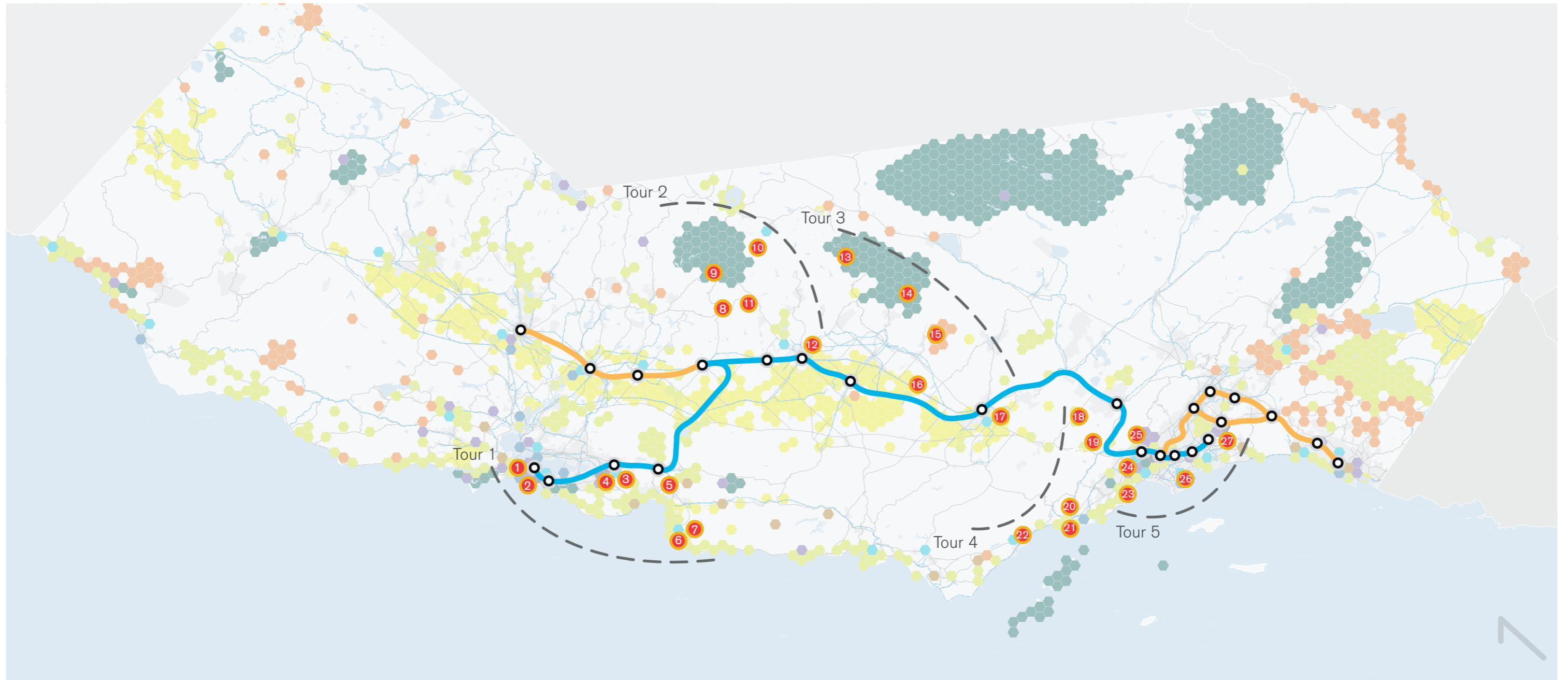
13. Kings Canyon National Park
14. Sequoia National Park
15. Indian Reservation Tour
16. Colonel Allensworth State Historic Park
17. Bakersfield Crystal Palace and Museum

### Tour 4

18. Arthur Ripley Desert Woodland SP
19. Universal Studios
20. Santa Paula Mission
21. Mandalay Beach
22. Santa Barbara Mission

### Tour 5

23. Santa Monica Pier
24. La Brea Tar Pits
25. Hollywood
26. LA Aquarium, Queen Mary
27. Disneyland





# Culture + Tourism Networks

HSR maximizes Tourism Opportunities by:

- 1) Shortening the distances between attractions
- 2) Creating new routes/connections/destinations

● Rest Seeker+"Locavores" Attractions

Tour 1

1. Healdsburg / Calistoga
2. Poin Reyes National Park
3. De Young Museum + Golden Gate Park
4. Stanford University Campus

Tour 2

5. Kirigin Cellars Winery
6. Pinnacles National Park
7. Mission San Carlos de Borromeo de Carmelo
8. Carmel by the Sea + 17 Miles Drive Area

Tour 3

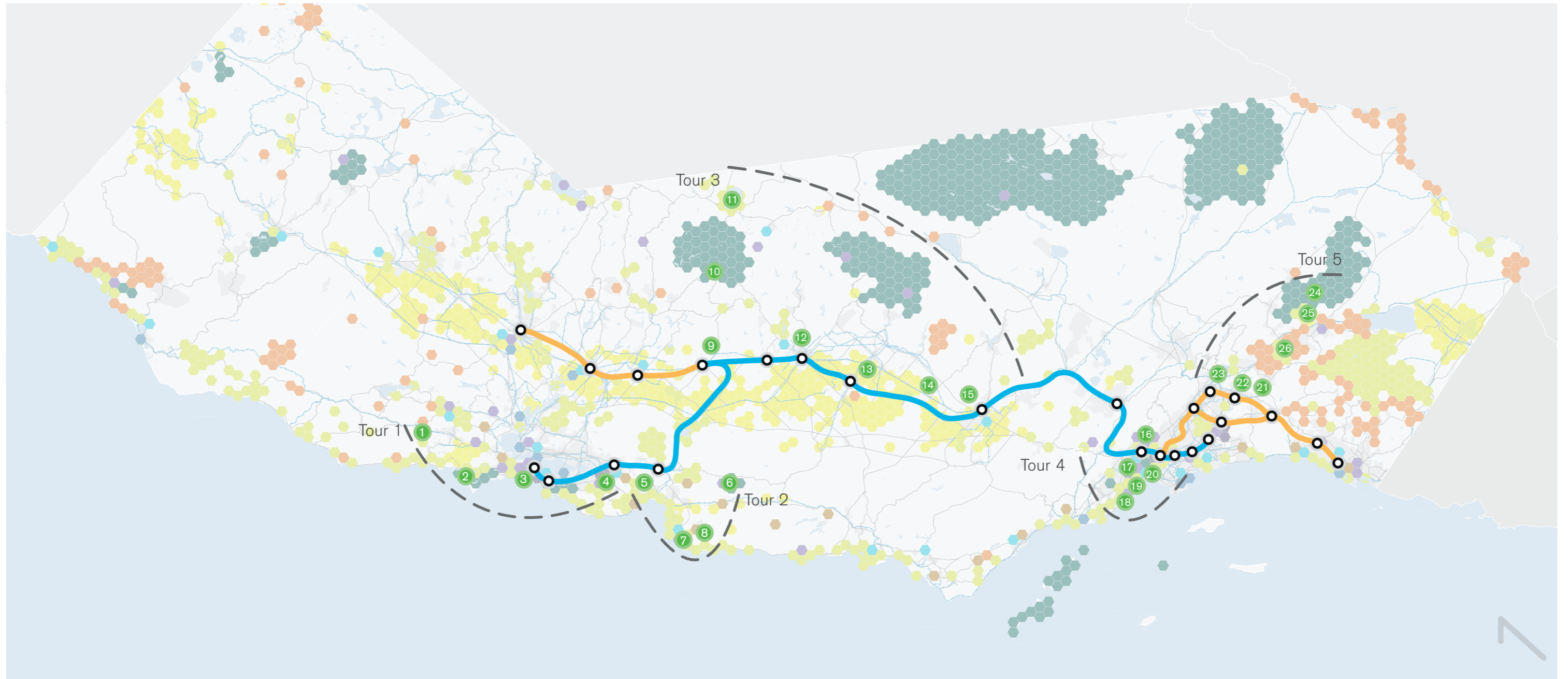
9. Vista Ranch and Sellars
10. Yosemite National Park
11. Mono Lake Tufa State N R
12. Fresno Fulton Street
13. Naylor's Organic Farms stay
14. Kern National Wild Life
15. Murray Family Farms

Tour 4

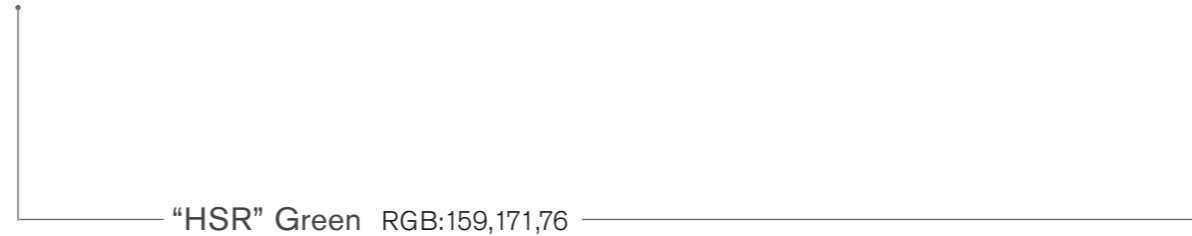
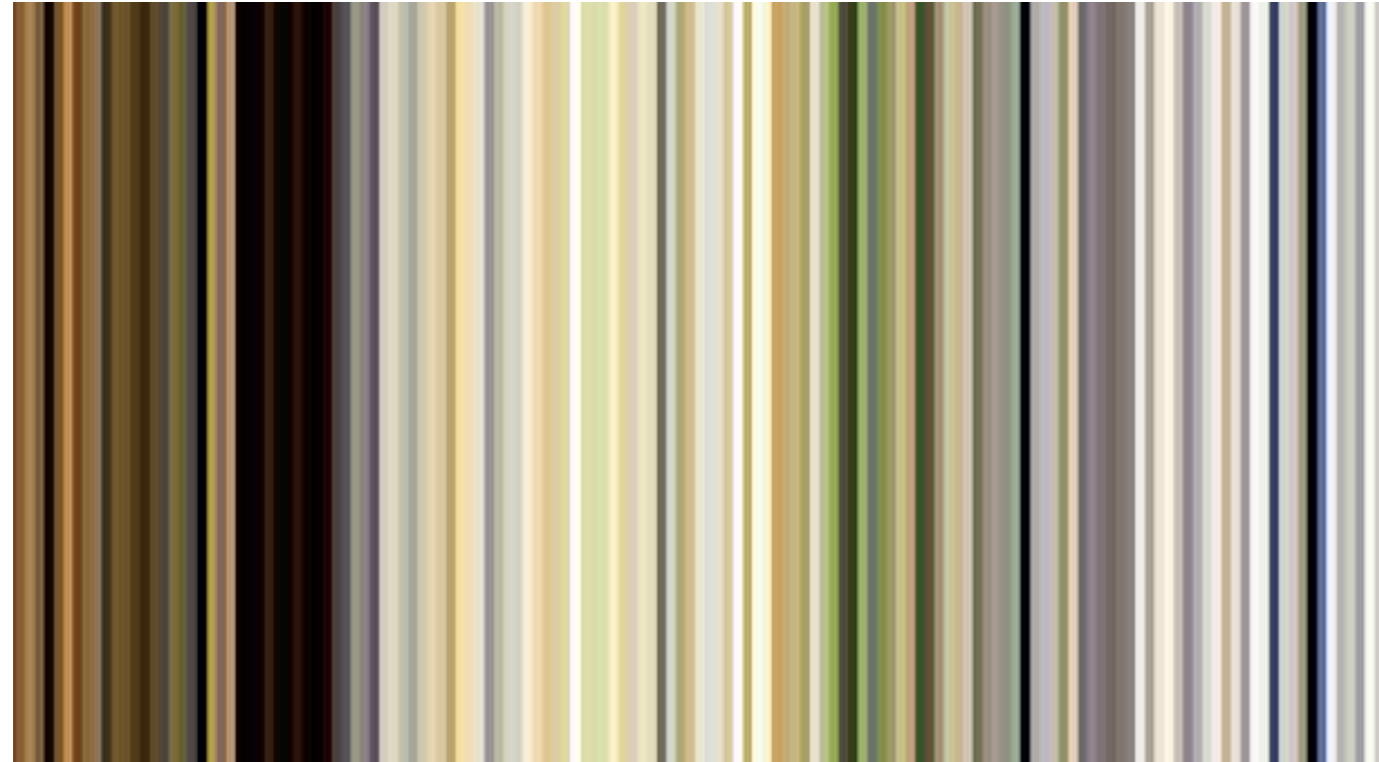
16. Griffith Park + Observatory
17. Getty Center
18. Getty Villa
19. Self Realization Fellowship
20. Venice Canal Historic District

Tour 5

21. The Ark of Cytrus, UC Riverside
22. Tio's Tacos Food and Folk Art
23. Unofficial McDonald's Museum
24. Joshua Tree National Park
25. Coachella Valley Preserve
26. Palm Springs



# Proposed Colors

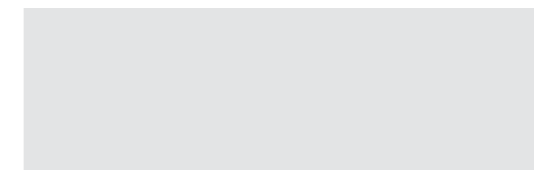


"HSR" Green RGB:159,171,76



Light Gray RGB:111, 110, 110

CHSR



Light Gray RGB:176, 177, 177

CHSR

# Ticketing



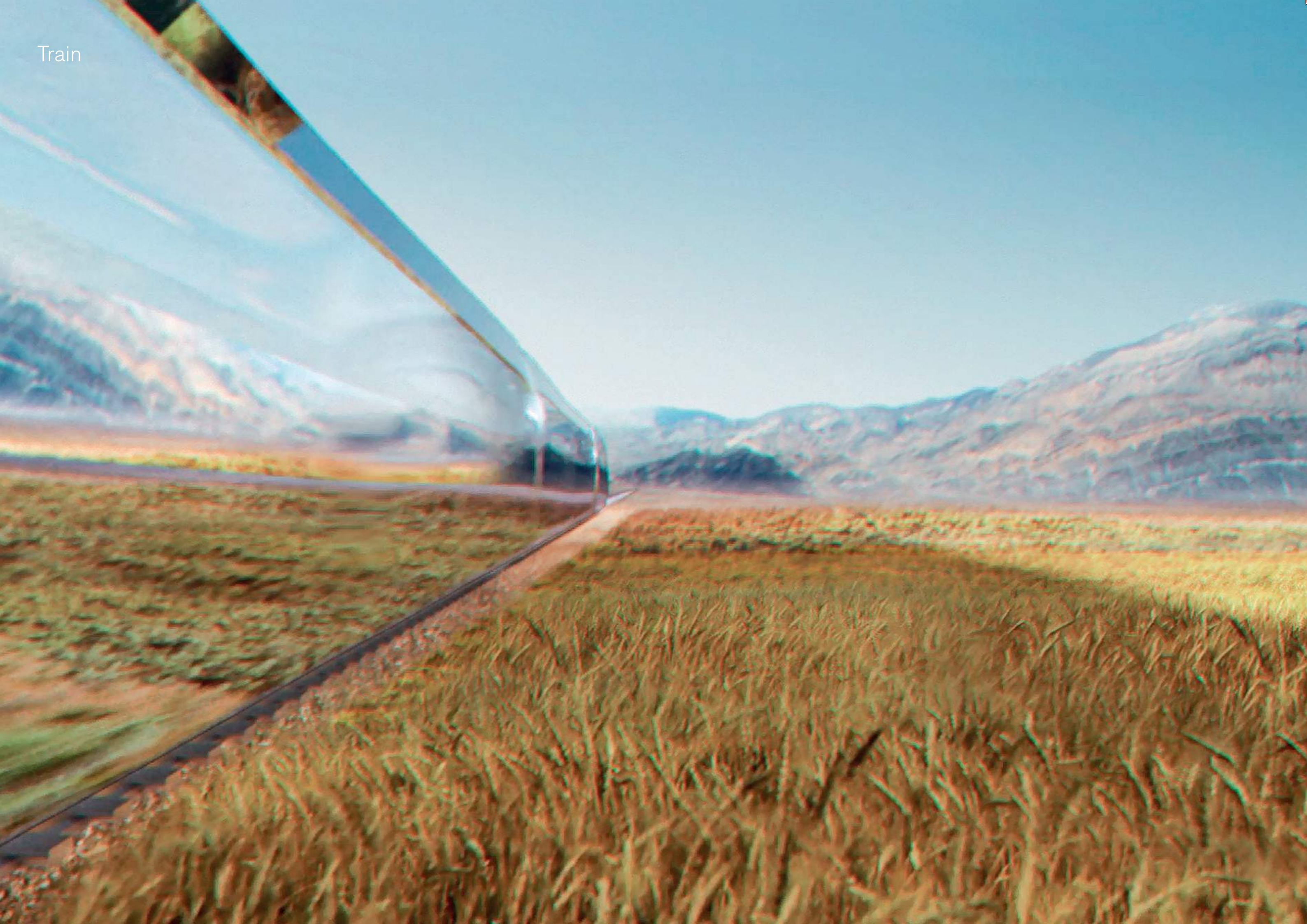
Accessories



Uniform



Train



Train

