

# SAN ANTONIO SHADE STUDY ANALYSIS PRESENTATION

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ANALYSIS PRESENTATION

# SHADE STUDY MISSION STATEMENT

THE PURPOSE OF THIS STUDY IS TO AID THE CITY OF SAN ANTONIO IN DEVELOPING A MORE LIVABLE AND ENJOYABLE PEDESTRIAN ENVIRONMENT WHILE PROMOTING THE HEALTH, COMFORT, AND SUSTAINABILITY OF THE CITY AS WELL AS CELEBRATING THE NATURAL BEAUTY AND HERITAGE OF SAN ANTONIO.

TO ACCOMPLISH THIS GOAL, WE HAVE STUDIED THE EXISTING STREETScape CONDITIONS IN THE PUBLIC IMPROVEMENT DISTRICT (PID) OF SAN ANTONIO. WE THEN ANALYZED THE FACTORS THAT COME INTO PLAY WHEN IMPROVING THE URBAN ENVIRONMENT. PEDESTRIAN COMFORTABILITY AND ACTIVITY ARE VITAL TO AN ENGAGING AND ACTIVE CITY CENTER. PROVIDING ADEQUATE SHADE TO THE STREETScape IS ONE MULTI-BENEFICIAL WAY TO IMPROVE THE PEDESTRIAN EXPERIENCE. HIGH PEDESTRIAN ACTIVITY STIMULATES THE URBAN ECONOMY, CONTRIBUTES TO SAFER STREETS, AND FACILITATES INTERACTION AND EGAGEMENT BETWEEN PEOPLE, CREATING A TIGHT KNIT COMMUNITY.

THIS REPORT ATTEMPTS TO CATAGORIZE EXISTING AND PROPOSED SHADE ELEMENTS THAT CAN BE IMPLEMENTED THROUGHOUT THE PID AND SYSTEMATICALLY BRING ABOUT POSITIVE EXPERIENCES FOR ALL WHO LIVE, WORK, AND VISIT THIS WONDERFUL CITY.



# DOWNTOWN SAN ANTONIO



WHERE WOULD YOU PREFER TO WALK?

## WHAT'S WORKING

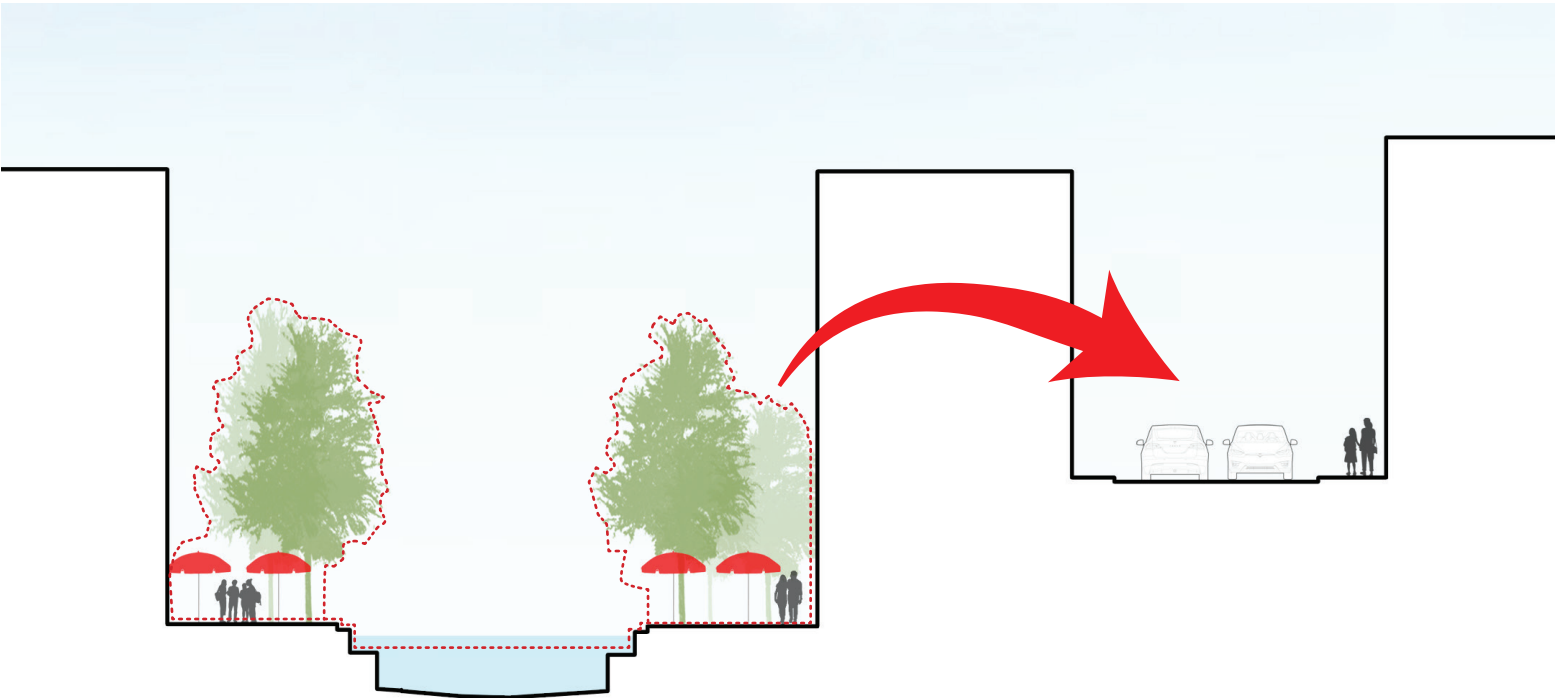
- SHADE TREES
- UMBRELLAS
- WIDE SIDEWALKS
- PEDESTRIAN ORIENTED ENVIRONMENT

## WHAT'S NOT WORKING

- LIMITED TREES
- CAR CENTRIC
- NARROW SIDEWALKS
- UNFRIENDLY PEDESTRIAN ENVIRONMENT



LET’S BRING THE SPIRIT OF THE RIVER WALK TO OUR  
DOWNTOWN STREETS!!!





LET’S BRING THE SPIRIT OF THE RIVER WALK TO OUR  
DOWNTOWN STREETS!!!





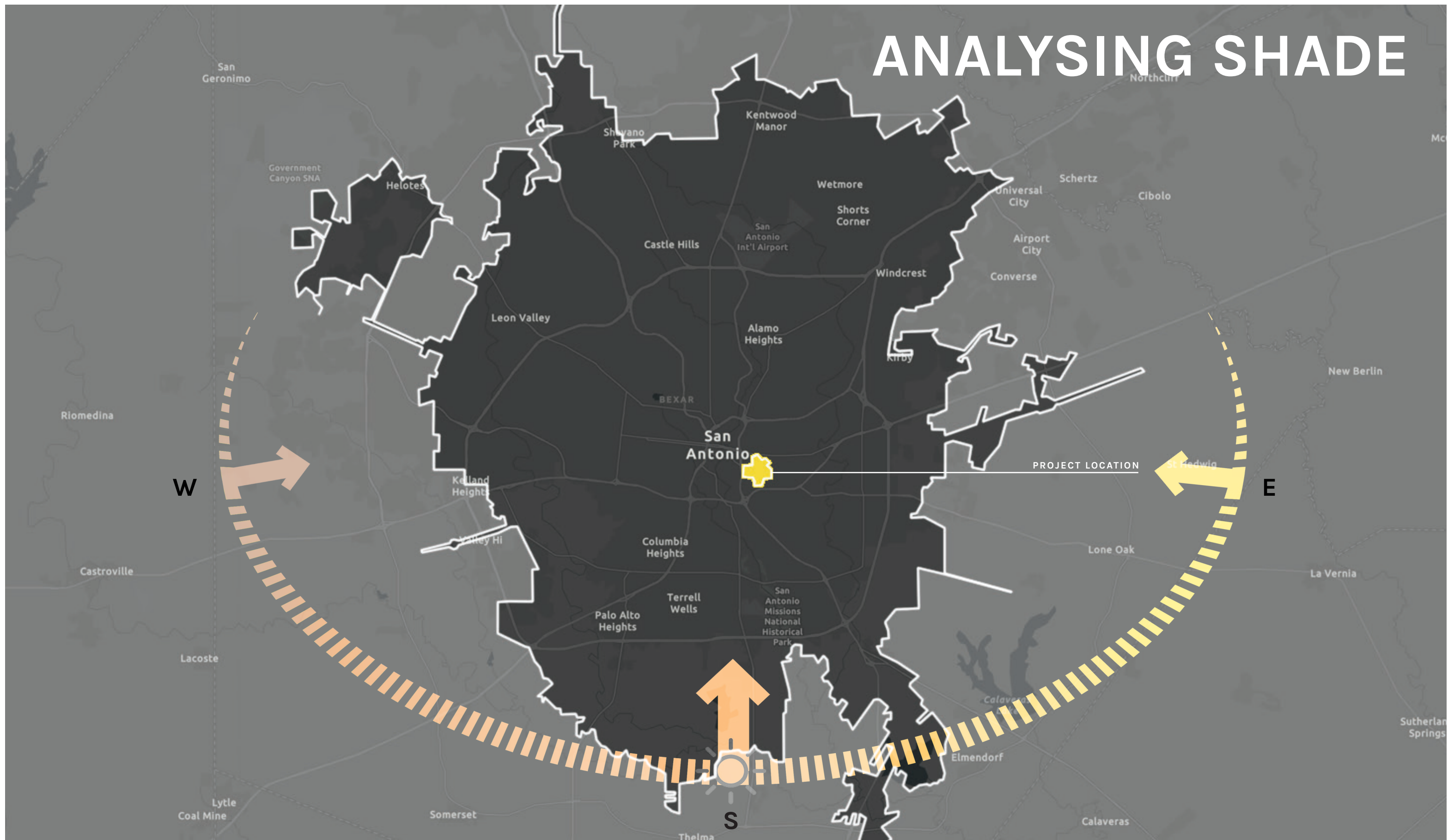
**HOW DO WE SPREAD  
THIS EXPERIENCE  
ACROSS THE CITY?**

**SHADE!**

**... AND USE WHAT'S WORKING ALONG THE RIVER**

- SHADE TREES
- UMBRELLAS
- WIDE SIDEWALKS
- PEDESTRIAN ORIENTED ENVIRONMENT

# ANALYSING SHADE









HEAT DATA - 2019

WINTER



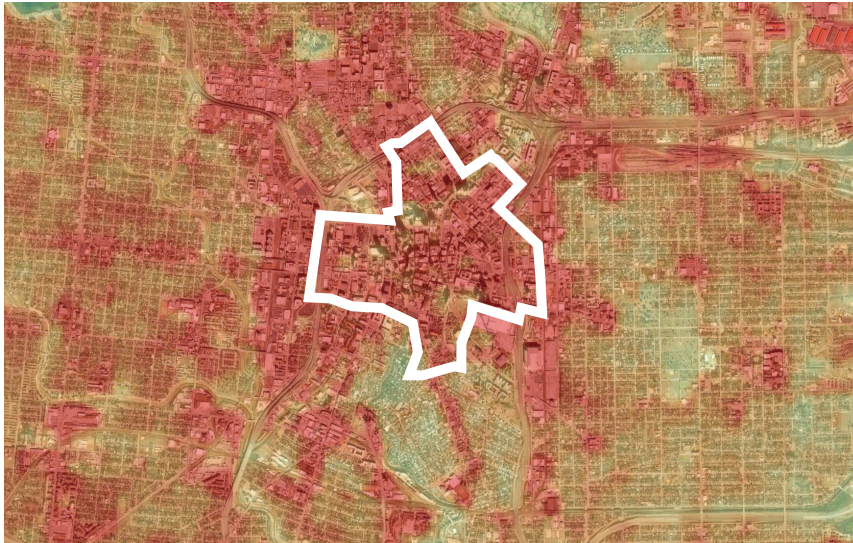
HEAT DATA - JANUARY 2019

SPRING



HEAT DATA - APRIL 2019

SUMMER



HEAT DATA - JULY 2019

FALL



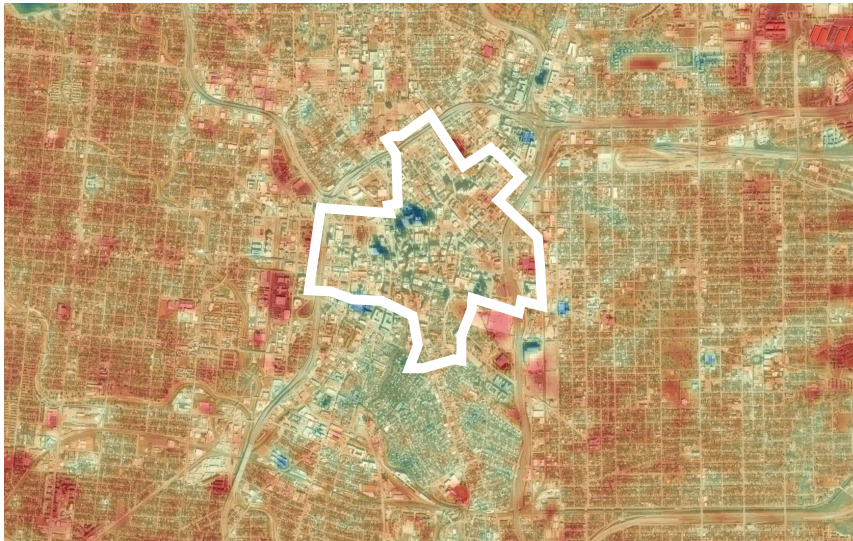
HEAT DATA - SEPTEMBER 2019

FALL

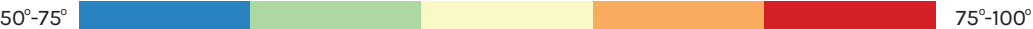


HEAT DATA - OCTOBER 2019

WINTER



HEAT DATA - DECEMBER 2019



SOURCE: [indicadores-ambientales.greenurbandata.com/UniversidadSanAntonio/](https://indicadores-ambientales.greenurbandata.com/UniversidadSanAntonio/)



DATA COLLECTION

- LEGEND
- NO DATA
  - - - -> REFERRAL / REFERENCE
  - DATA LEAD
  - ==== DATA UTILIZED

CONTACTED RESOURCES

SAN ANTONIO RIVER AUTHORITY



BEXAR COUNTY GIS



CPS ENERGY



SAN ANTONIO WATER SERVICE



BEXAR COUNTY APPRAISAL DISTRICT



SA OFFICE OF SUSTAINABILITY



SA PUBLIC WORKS DEPARTMENT



SA OPEN SOURCE DATA



SA PARKS DEPARTMENT



SA DEVELOPMENT SERVICES DEPARTMENT



UNIVERSITY OF TEXAS AT SAN ANTONIO



GOOGLE + BING MAPS BUILDINGS: OPEN SOURCE DATA

RESOURCES OBTAINED

OPEN SOURCE LIDAR DATA

BEXAR COUNTY GIS DATA SETS

STREET + SIDEWALK GIS DATA

COSA OPEN SOURCE GIS DATA

URBAN HEAT ISLAND RESOURCE

DATA CREATED BY CLA

DATA UTILIZED

GIS PARCELS  
GIS HISTORIC SITES  
CITY ZONING

STREET WIDTHS +  
SIDEWALK LOCATIONS

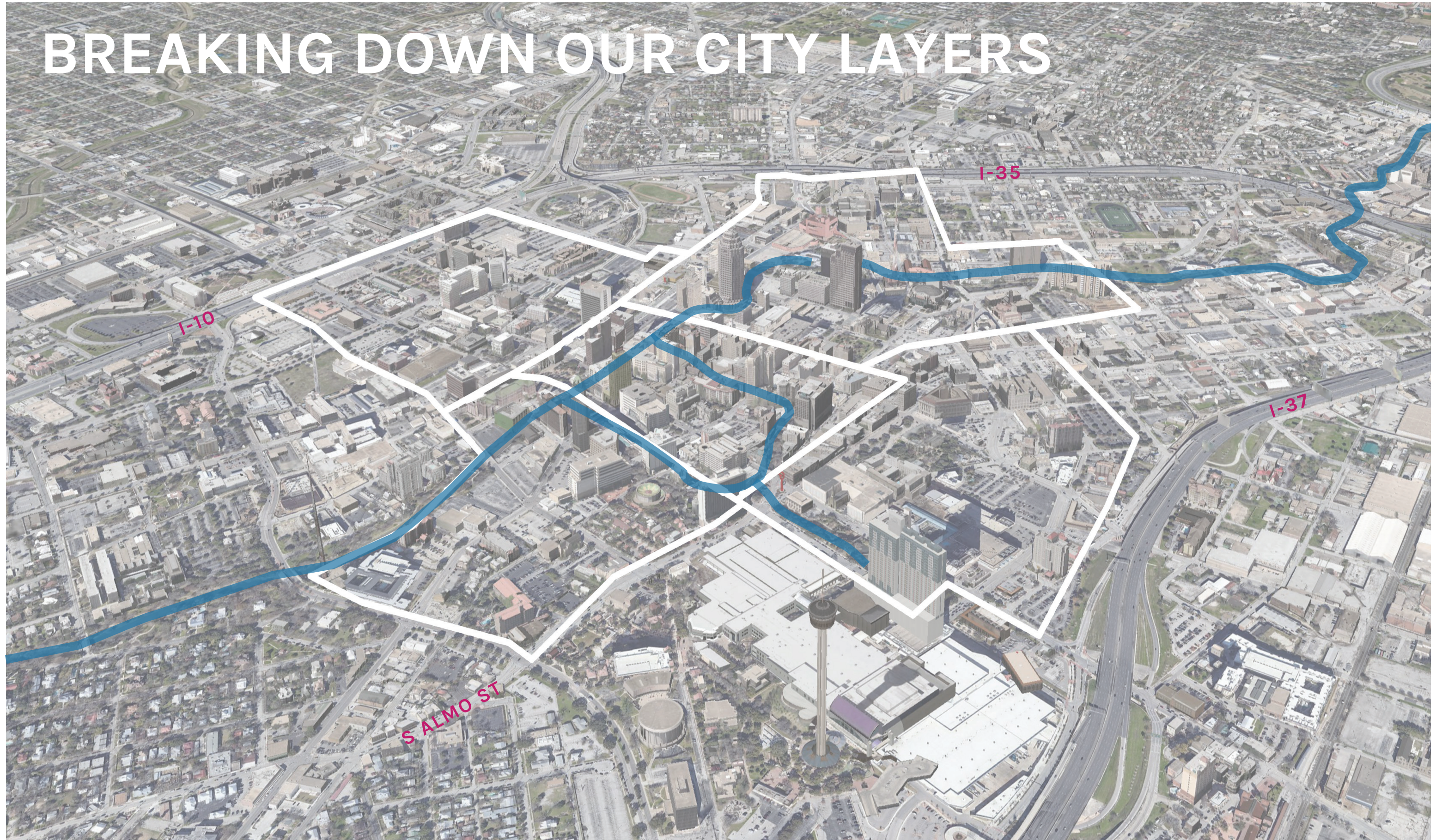
BIKE LANES  
BUILDING FOOTPRINTS  
RIVER DATA

MONTHLY AVERAGE  
HEAT INDEX

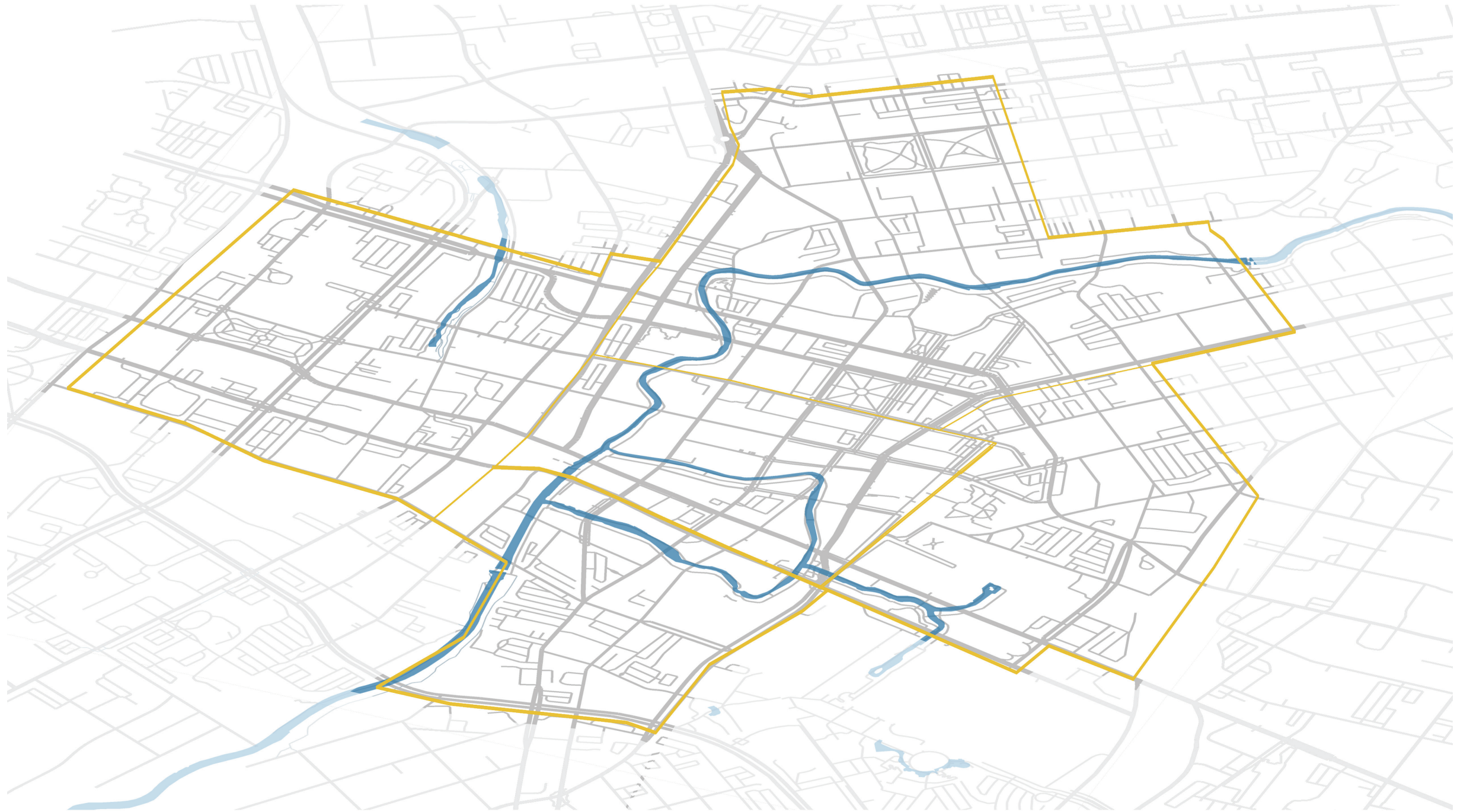
URBAN TREE COVERAGE  
3D BUILDING MASSING



# BREAKING DOWN OUR CITY LAYERS



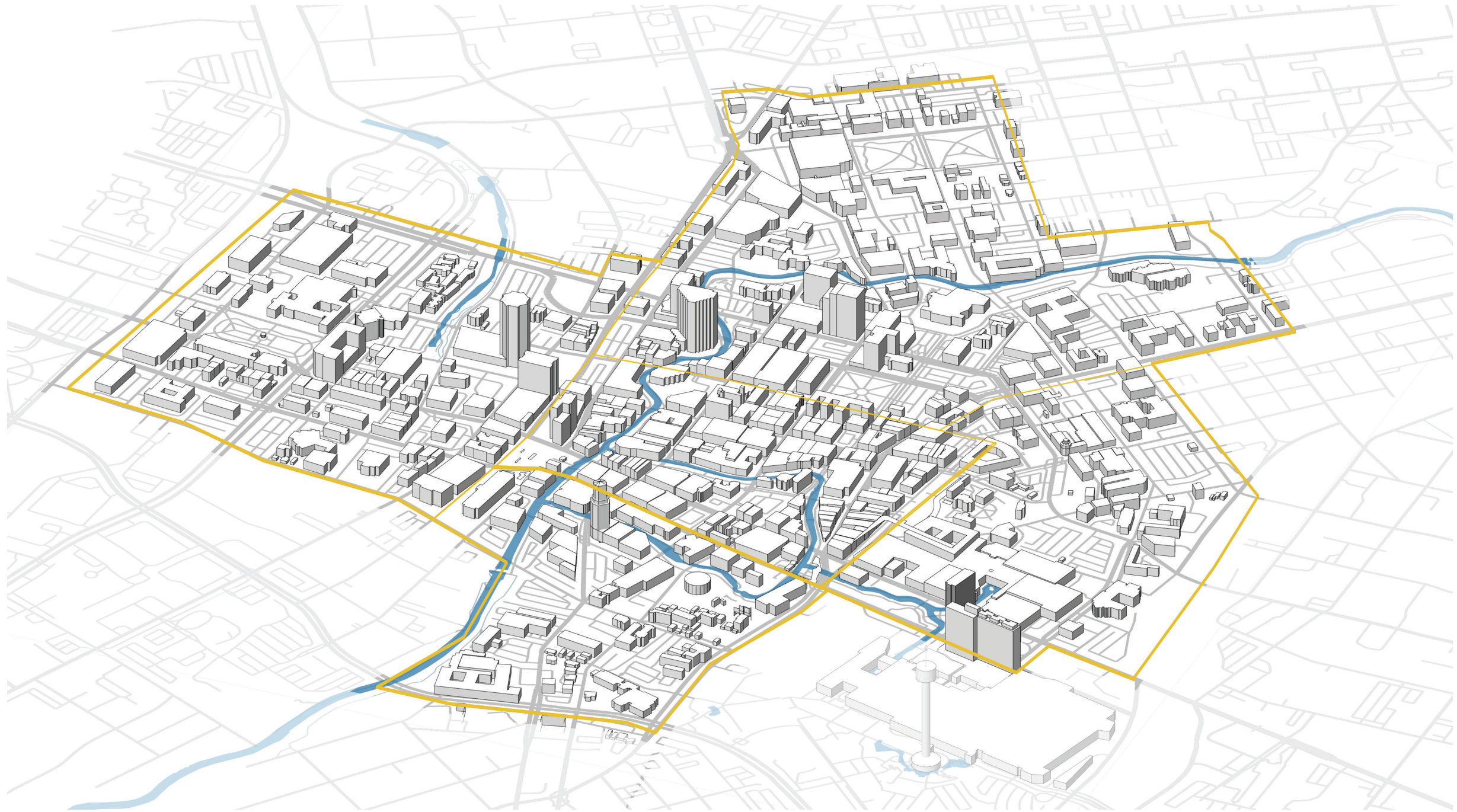




#### THE PID SITE BOUNDARY

The Virtual Model Simulation begins with Open street maps data to provide accurate context within the PID. This is imported and then Geo-located into Sketchup.

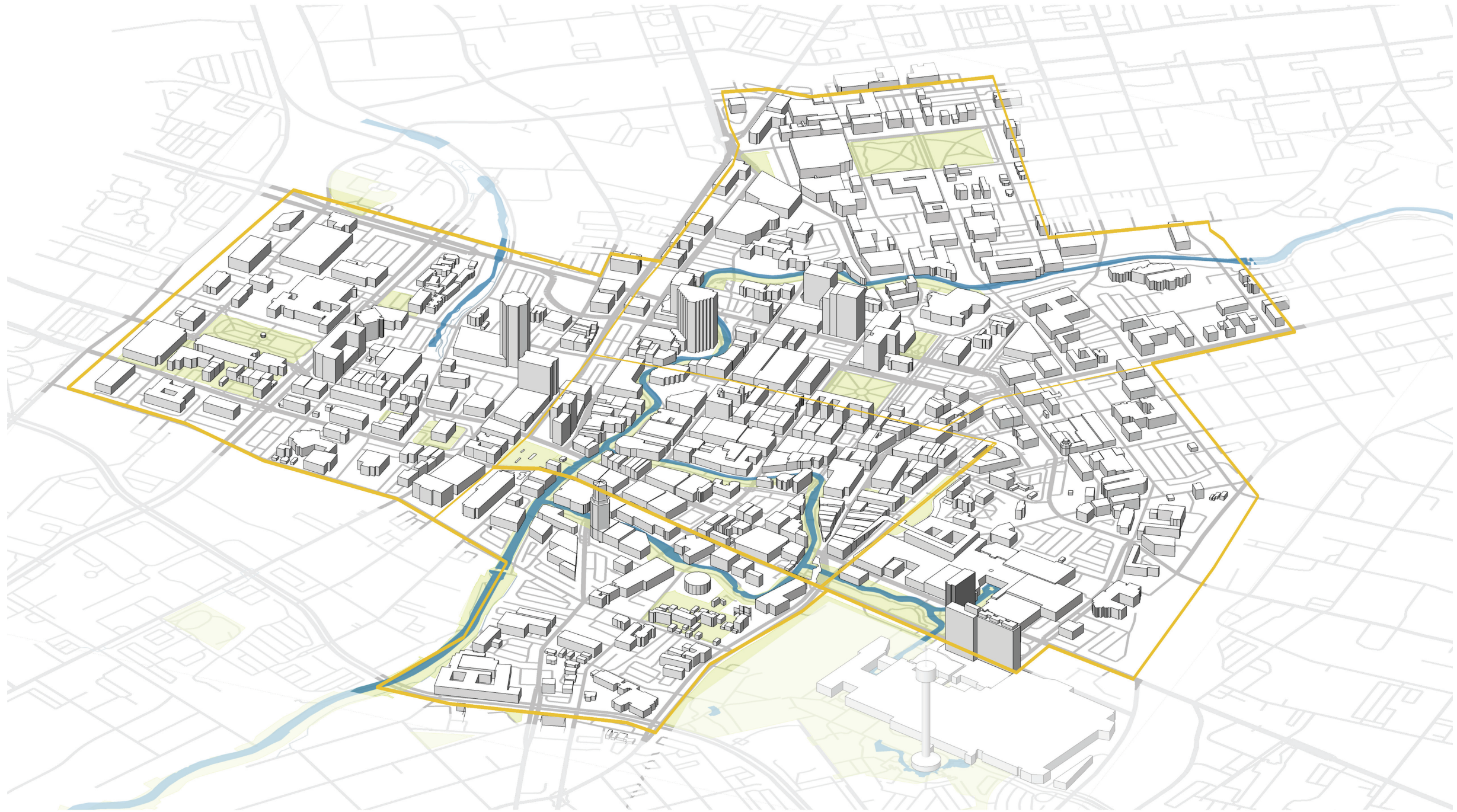




**BUILDING MASSING**  
Open Street Maps also provides a 3D  
building layer.

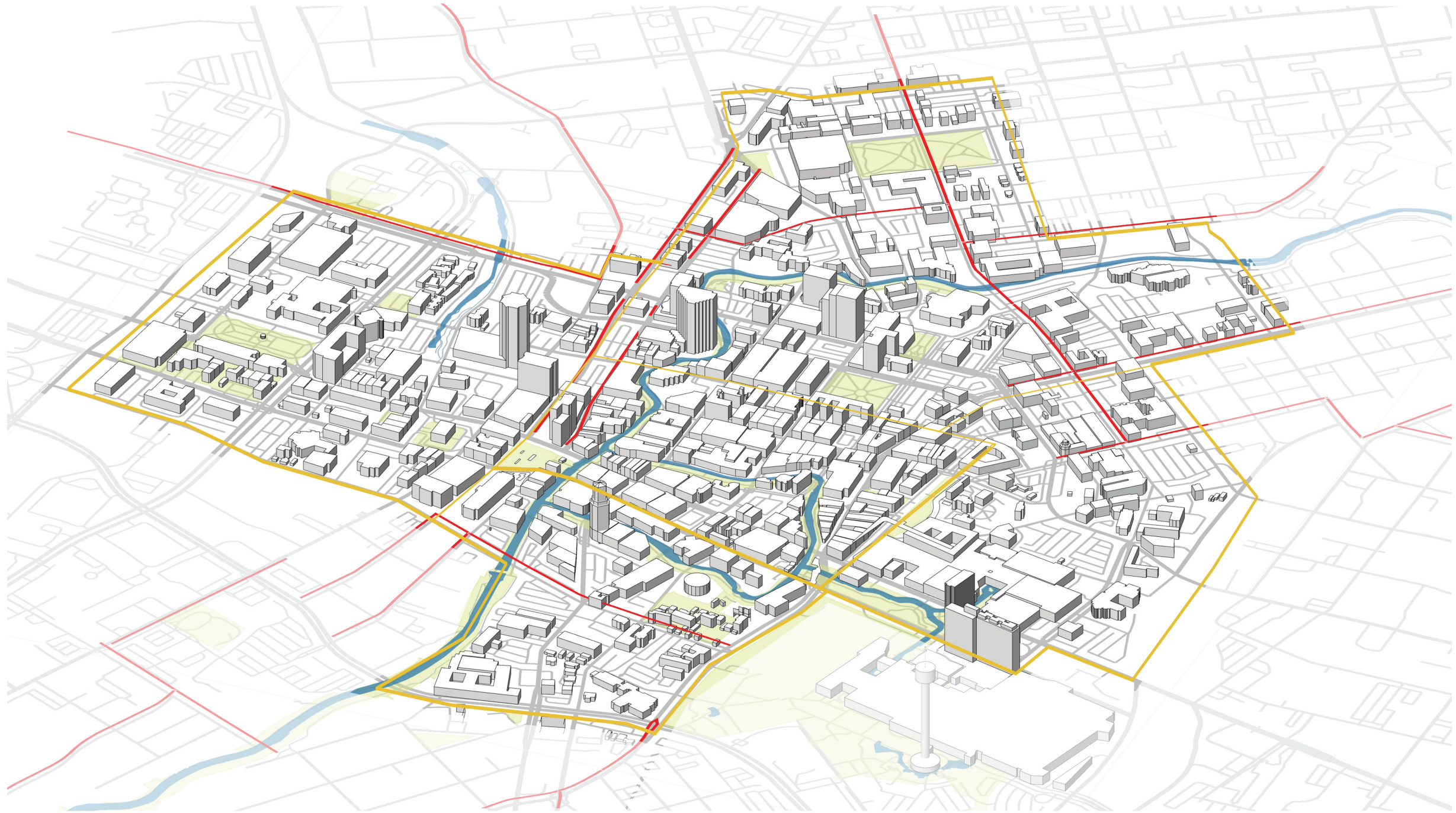
\*New buildings and buildings under construction may not be included  
in open street building model.





**PARK BOUNDARIES**  
Park boundaries supplement the  
existing environment.





#### BIKE LANES

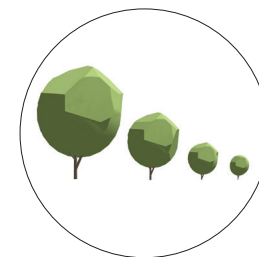
City of San Antonio Open Source Data  
provides bike lanes within San Antonio.





#### EXISTING TREES

3D canopies were traced and added to the overall model based on high resolution Bing satellite aerial imagery. An estimated 11% of the PID is covered by tree canopy.







#### EXISTING SHADE

Shadows fall from concentrated building massing and trees onto the streetscapes below utilizing real-world shadows from the geolocated latitude and longitude of San Antonio.





#### PID BOUNDARY OFFSET

The PID boundary shade study area was inset to buffer lack of 3D information outside PID boundary outline.





● Existing Above Ground Shade Trees Installed by Centro 2021-2022





● Proposed Above Ground Shade Trees Slated to Be Installed by Centro in 2024-2025





#### PRIORITIZING DOWNTOWN STREETS FOR SHADE

Based on site analysis, pedestrian and bike traffic flows, and shade mapping presented in the following slides, the streets above have been prioritized for phase 1 shading interventions.

● Proposed Tree Canopy for Phase 1 Streets





#### PRIORITIZING DOWNTOWN STREETS FOR SHADE

Based on site analysis, pedestrian and bike traffic flows, and shade mapping presented in the following slides, the streets above have been prioritized for phase 2 shading interventions.

● Proposed Tree Canopy for Phase 2 Streets





Composite Master Shade Plan Targeting 100% Shaded Streets



April

9:00AM

12:00PM

3:00PM

5:00PM

July

October

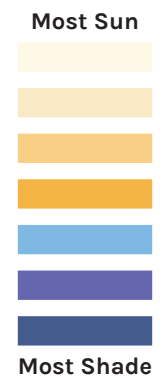
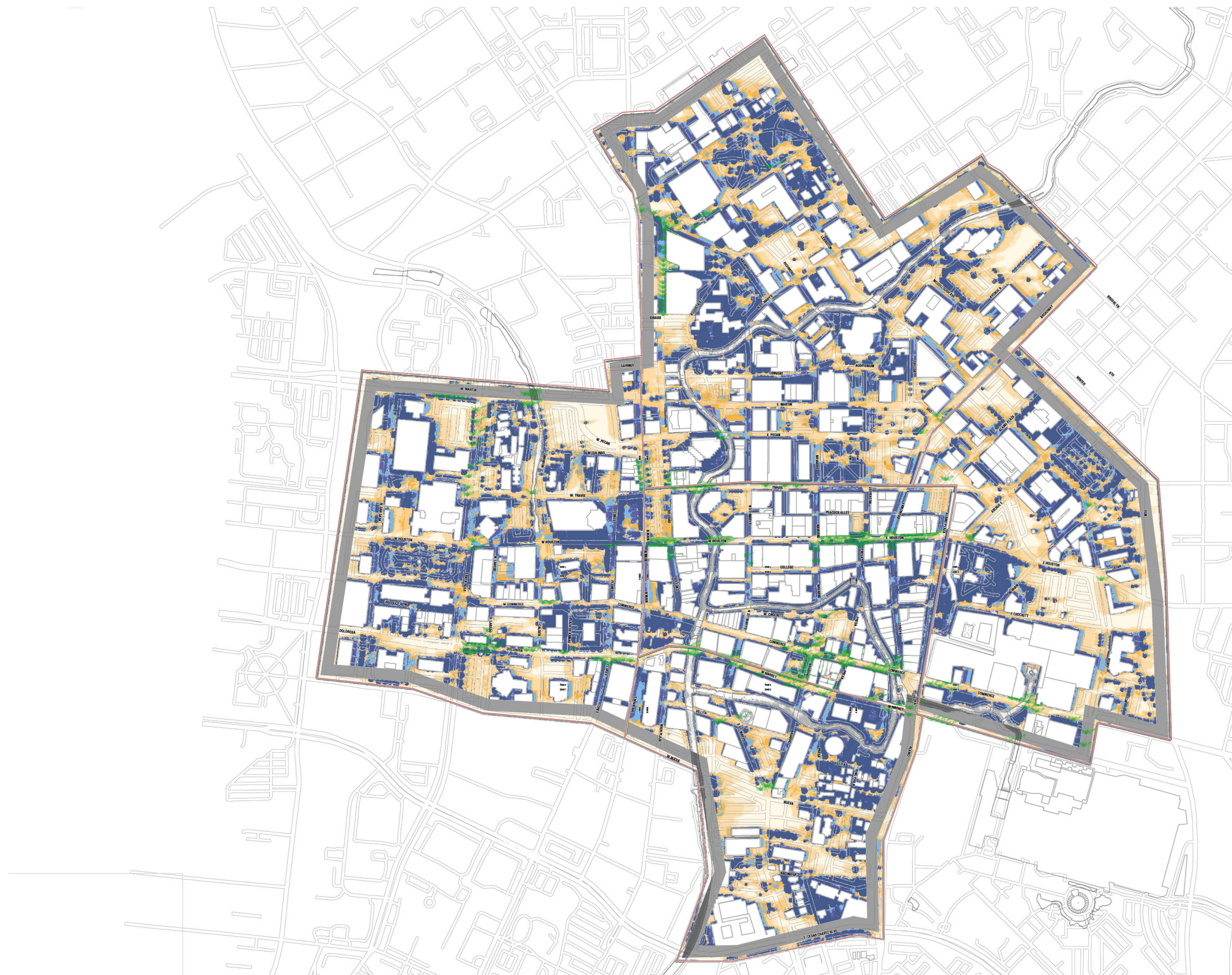
# UNDERSTANDING EXISTING SHADE PATTERNS

A composite map was constructed from a 3D massing model of downtown applying sun patterns from various times of the day and warmer times of the year (Spring, Summer, Fall) to understand where to prioritize new shade interventions.





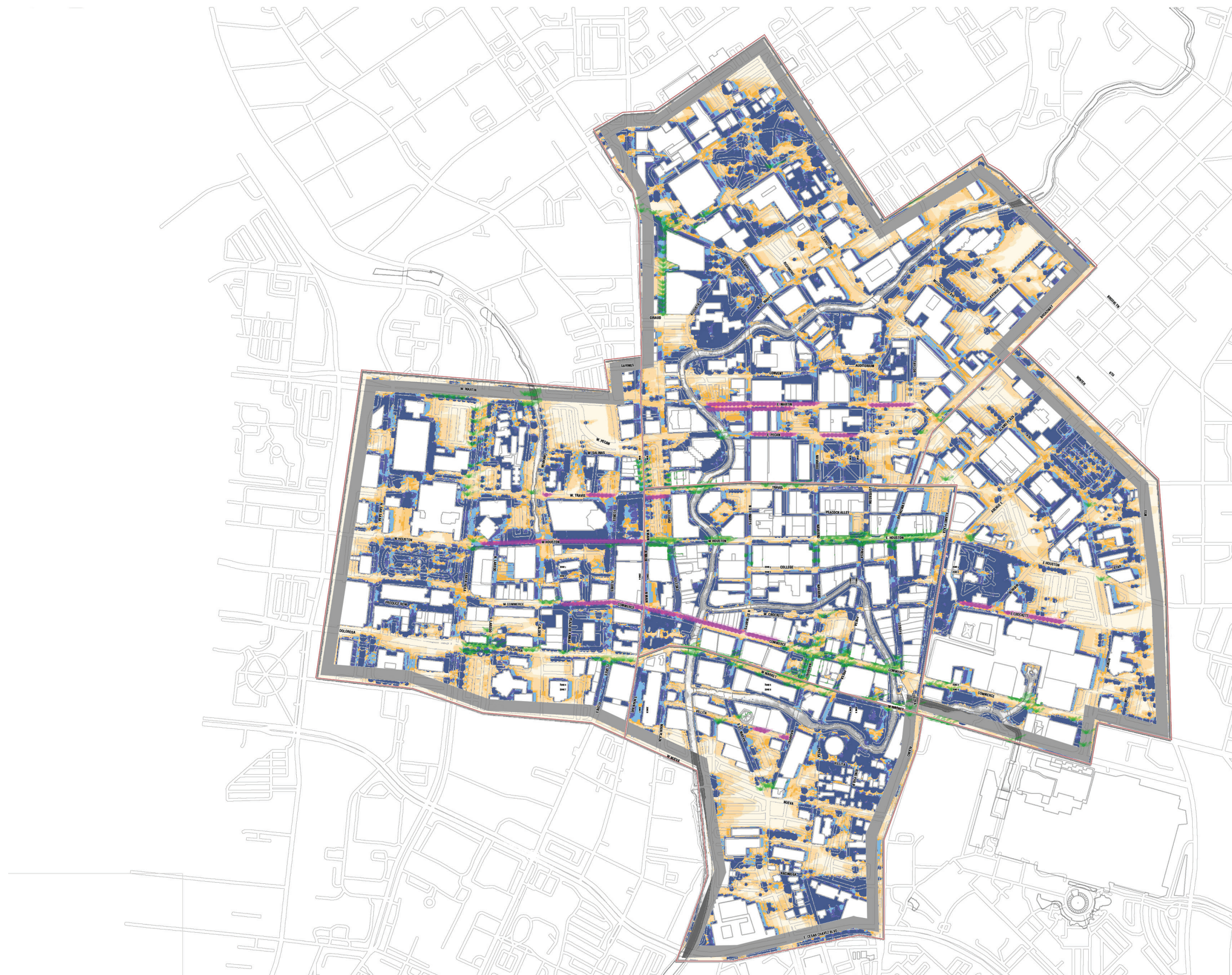




SHADE PLANTERS ADDED BY CENTRO 2021-2022







Most Sun

Most Shade

SHADE PLANTERS ADDED BY CENTRO 2021-2022



SHADE PLANTERS TO BE INSTALLED 2022-2023









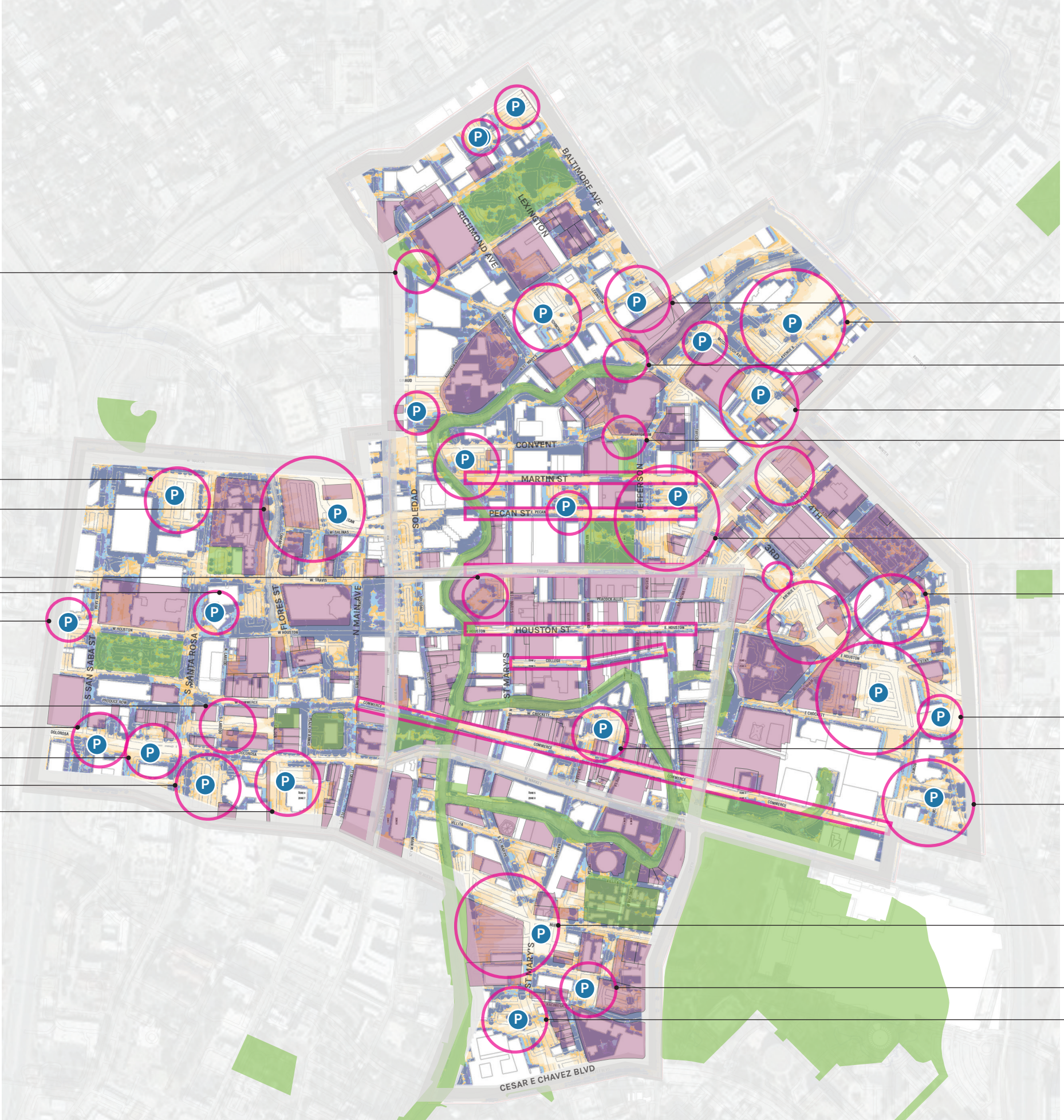
ROMANA PARK

CHILDREN'S HOSPITAL PARKING  
PARKING & CONSTRUCTION SITE

PARKING & QUIET CITY PLAZA  
RETAIL PARKING  
HEALTHCARE PARKING

RETAIL PARKING  
HOTEL PARKING  
OFFICE PARKING  
CITY OWNED PUBLIC PARKING  
RETAIL/OFFICE PARKING

**EXISTING CONDITIONS**  
The majority of clustered areas with intense sun contain public parking, some owned by the city, as well as office, retail, healthcare, and hospitality parking. Linear areas with intense sun occur mostly on the north side of west to east oriented streetscapes.



- LEGEND
- CULTURALLY SIGNIFICANT SITES
  - OPEN SPACE
  - PID EXTENT
  - CLUSTERED AREA WITH INTENSE SUN - 90% PARKING LOTS
  - LINEAR AREA WITH INTENSE SUN
  - UNCATEGORIZED PARKING

CITY OWNED PARKING  
RETAIL PARKING

OFFICE PARKING

RESIDENTIAL & PUBLIC PARKING  
VETERANS MEMORIAL PARK &  
TOBIN CENTER FOR ARTS

HOSPITALITY PARKING

HOSPITALITY PARKING

HOSPITALITY PARKING  
PARKING

PARKING

CITY OWNED PARKING

CITY OWNED PARKING  
HOSPITALITY PARKING

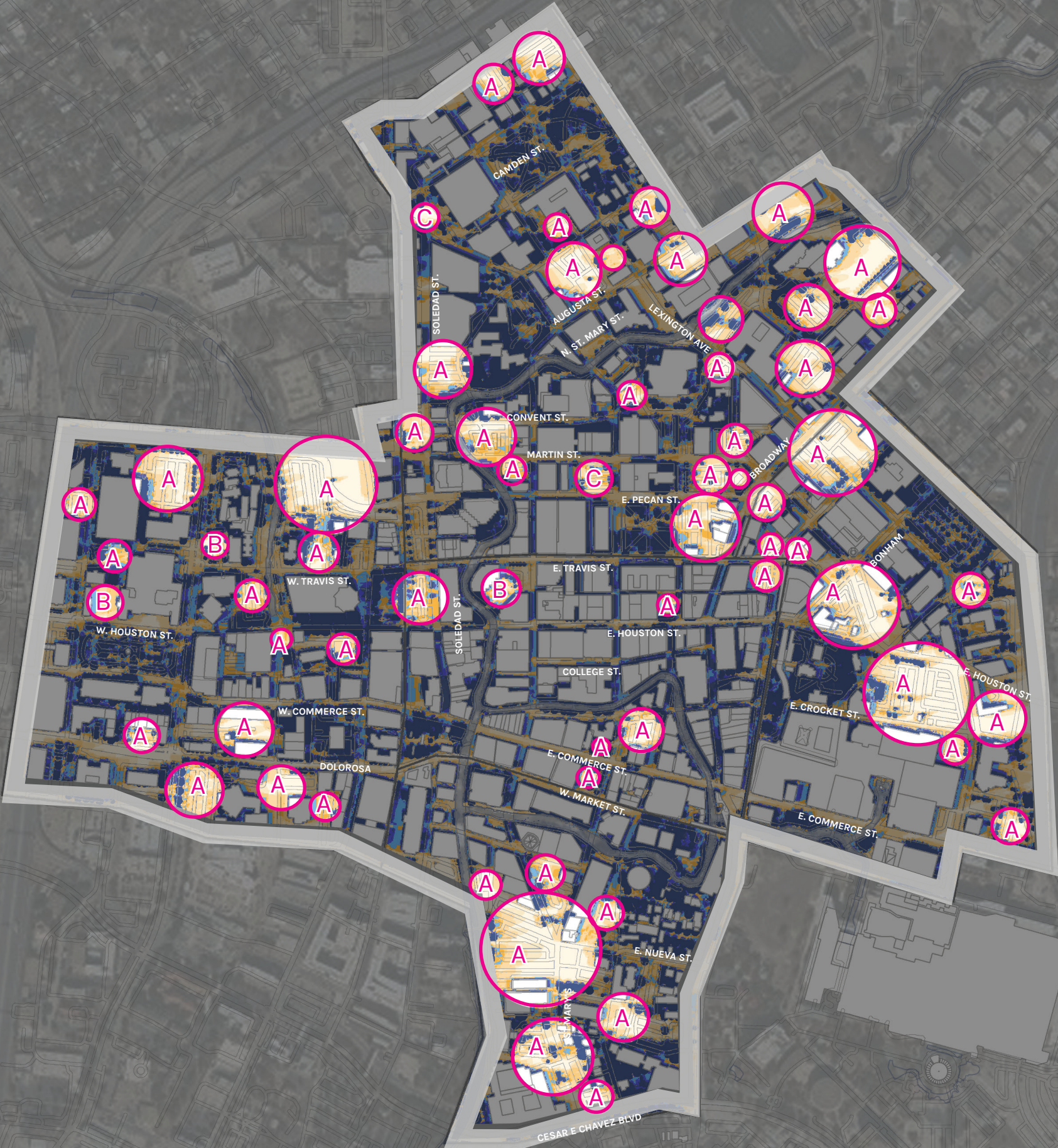


CLUSTER AREAS AVERAGING  
INTENSE SUN

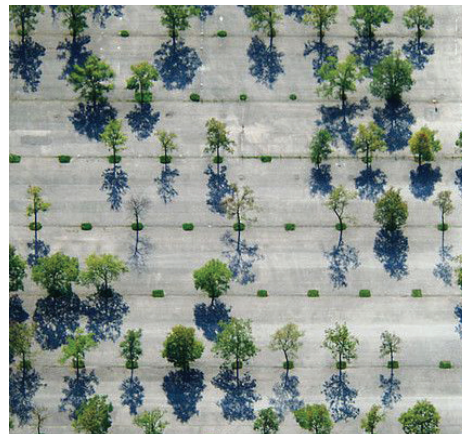
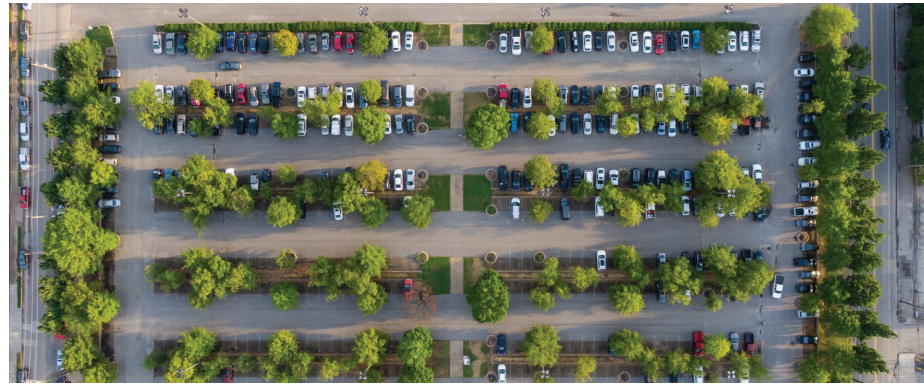
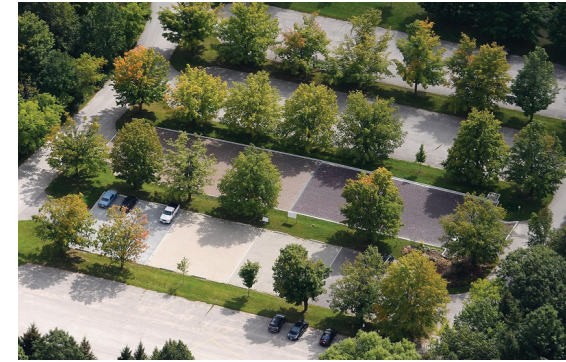
ZONE A - PARKING 90% PARKING

ZONE B - PLAZA / COURTYARD - 7%

ZONE C - OPEN SPACE - 3%

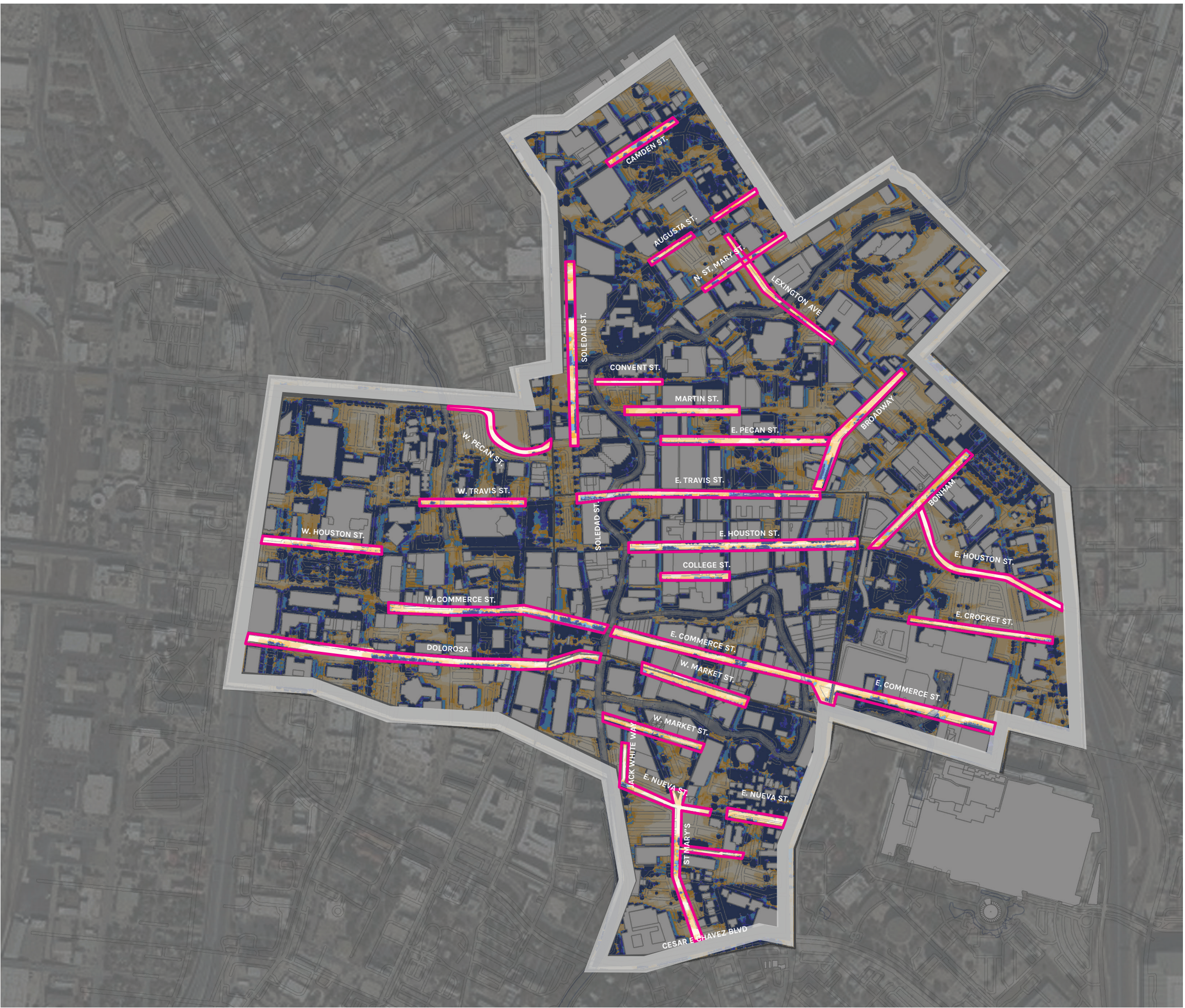






# SHADE CLUSTER INSPIRATION

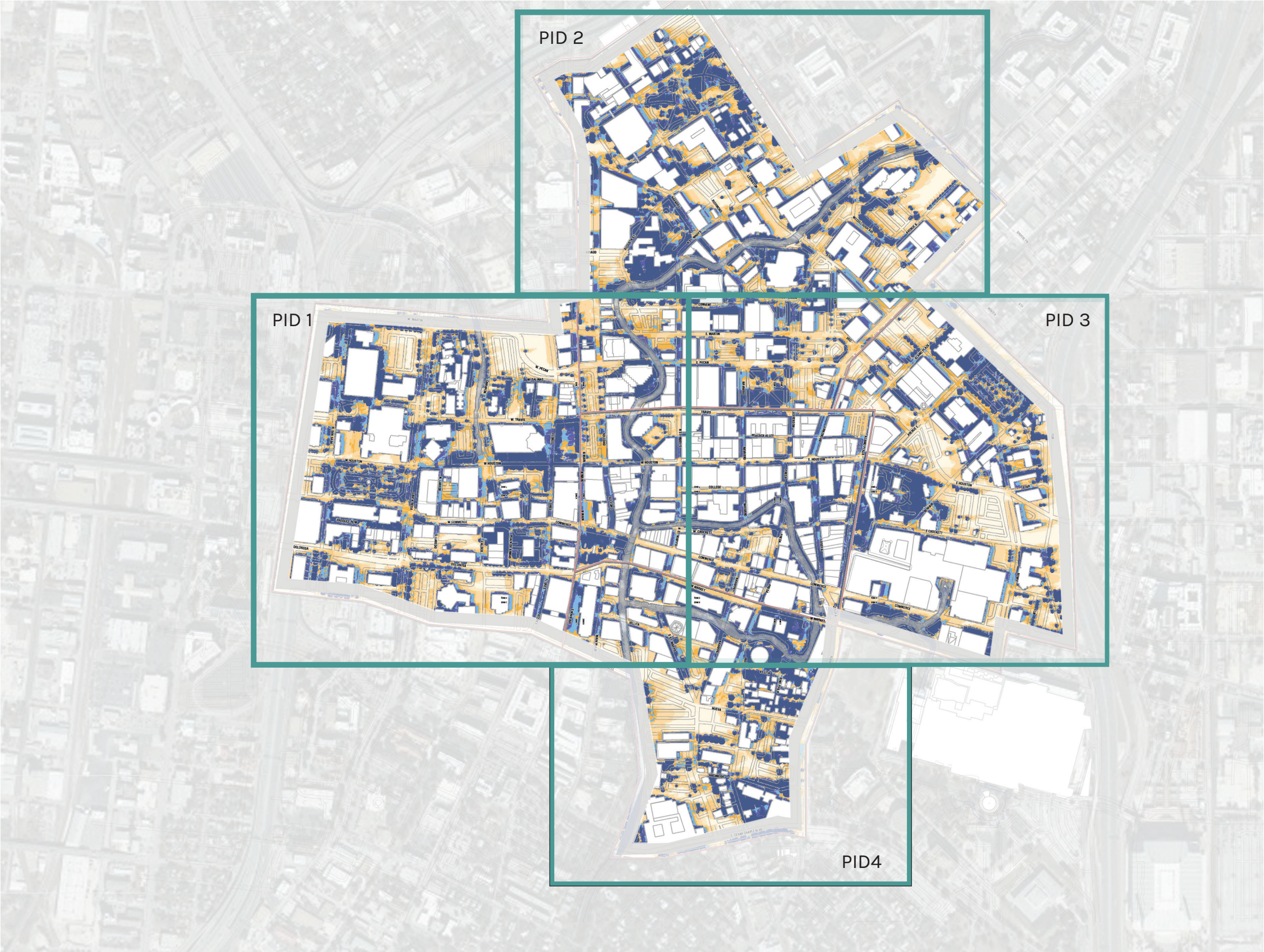




LINEAR AREAS    AVERAGING INTENSE SUN

STREET NAME	APPROX. LINEAR FOOTAGE	APPROX. STREET TREE COUNT AT 25' ON CENTER
CONVENT	1167 LF	47
MARTIN	1350 LF	54
EAST PECAN	1942 LF	78
BROADWAY	1696 LF	68
BOHAM	1355 LF	54
CROCKETT	1348 LF	54
EAST HOUSTON	1658 LF	66
COMMERCE	4855 LF	194
TRAVIS	3258 LF	130
COLLEGE	1083 LF	43
WEST HOUSTON	940 LF	38
DOLOROSA	2346 LF	94
WEST MARKET	3445 LF	138
EAST NUEVA	910 LF	36
SOLEDAD	1015 LF	41
LEXINGTON	1330 LF	53
N. ST. MARY'S	1834 LF	74
CAMDEN	1570 LF	63
AUGUSTA	1630 LF	65





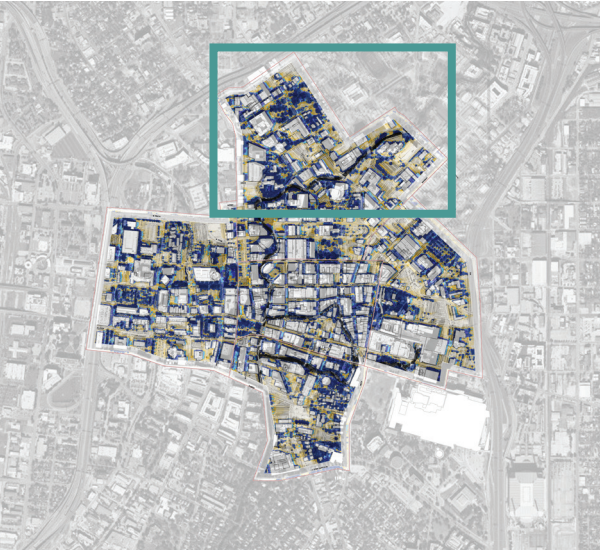
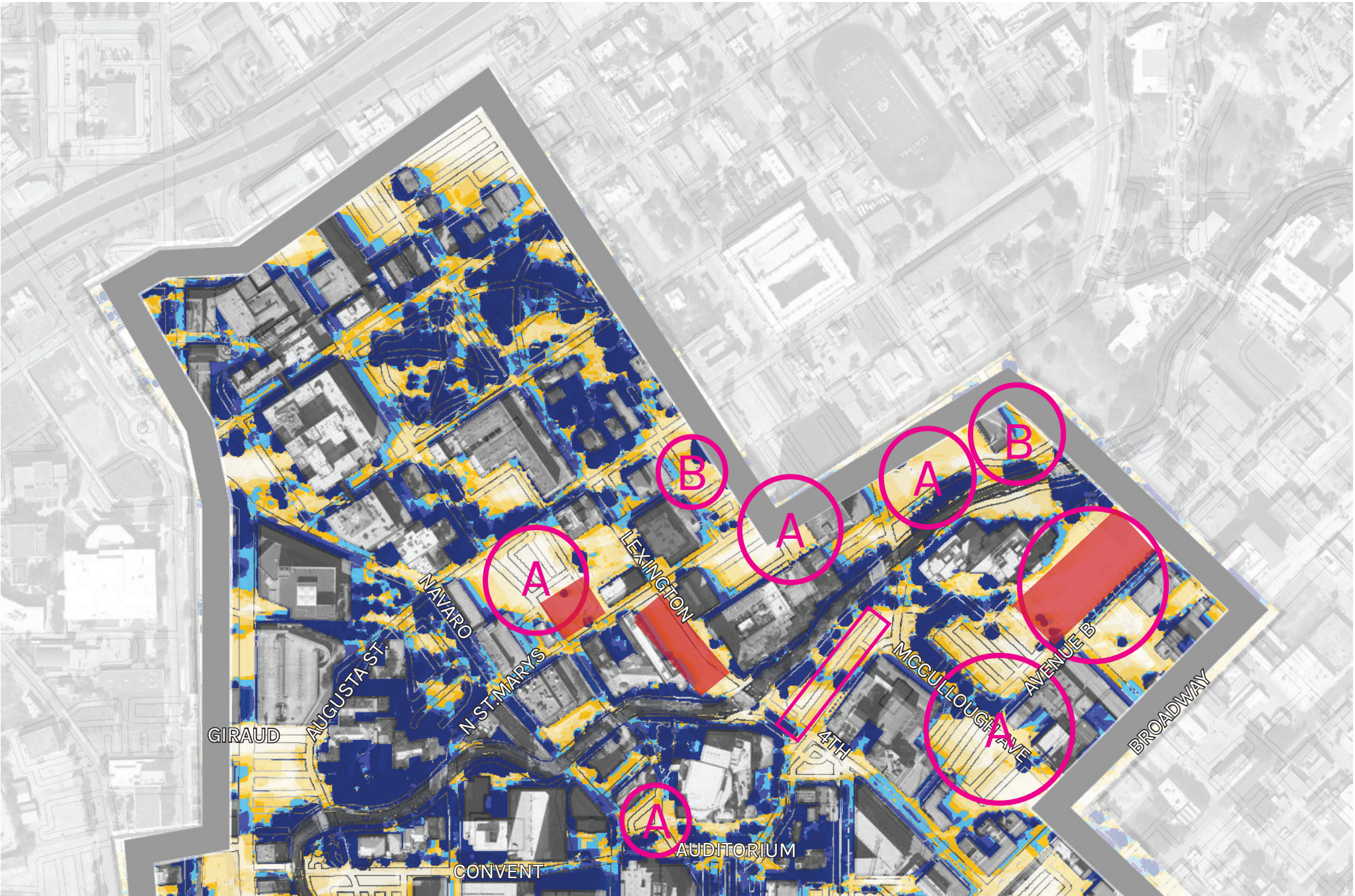




AREAS AVERAGING INTENSE SUN

- CLUSTERED: ZONE A - PARKING LOTS  
ZONE B - PLAZAS / COURTYARDS  
ZONE C - OPEN SPACE
- LINEAR AREAS
- SITES OF RECENT/PROPOSED DEVELOPMENT  
IMPACTING SHADE ANALYSIS

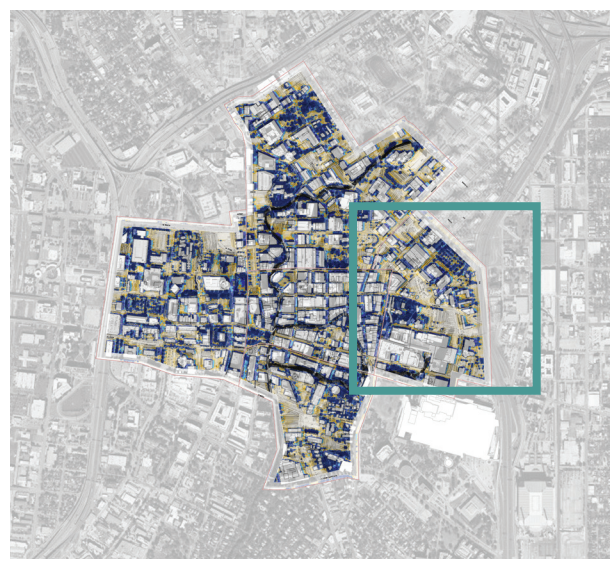




AREAS AVERAGING INTENSE SUN

- CLUSTERED: ZONE A - PARKING LOTS  
ZONE B - PLAZAS / COURTYARDS  
ZONE C - OPEN SPACE
- LINEAR AREAS
- SITES OF RECENT/PROPOSED DEVELOPMENT  
IMPACTING SHADE ANALYSIS








### AREAS AVERAGING INTENSE SUN

- CLUSTERED: ZONE A - PARKING LOTS  
ZONE B - PLAZAS / COURTYARDS  
ZONE C - OPEN SPACE
- ▭ LINEAR AREAS
- SITES OF RECENT/PROPOSED DEVELOPMENT  
IMPACTING SHADE ANALYSIS

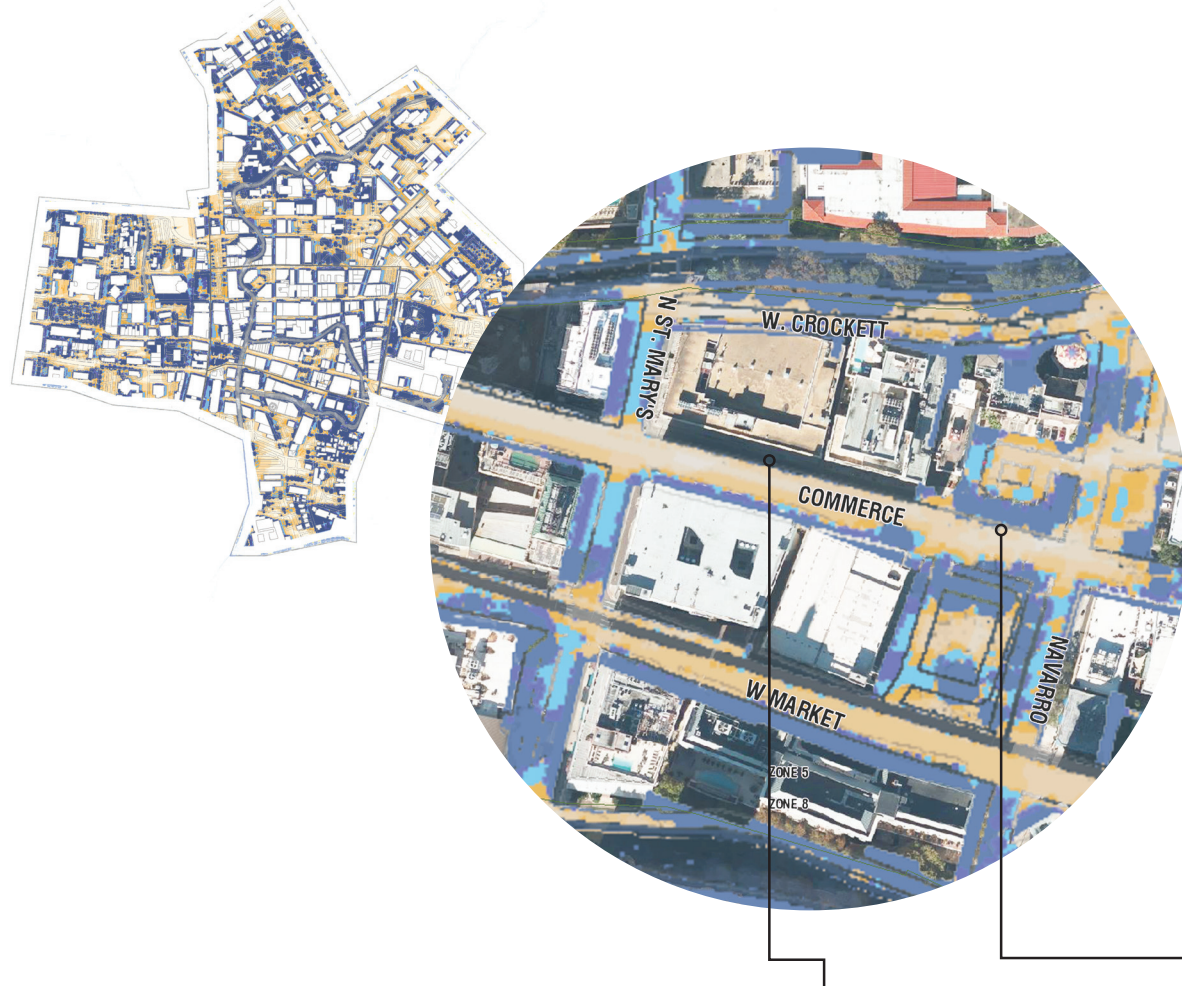




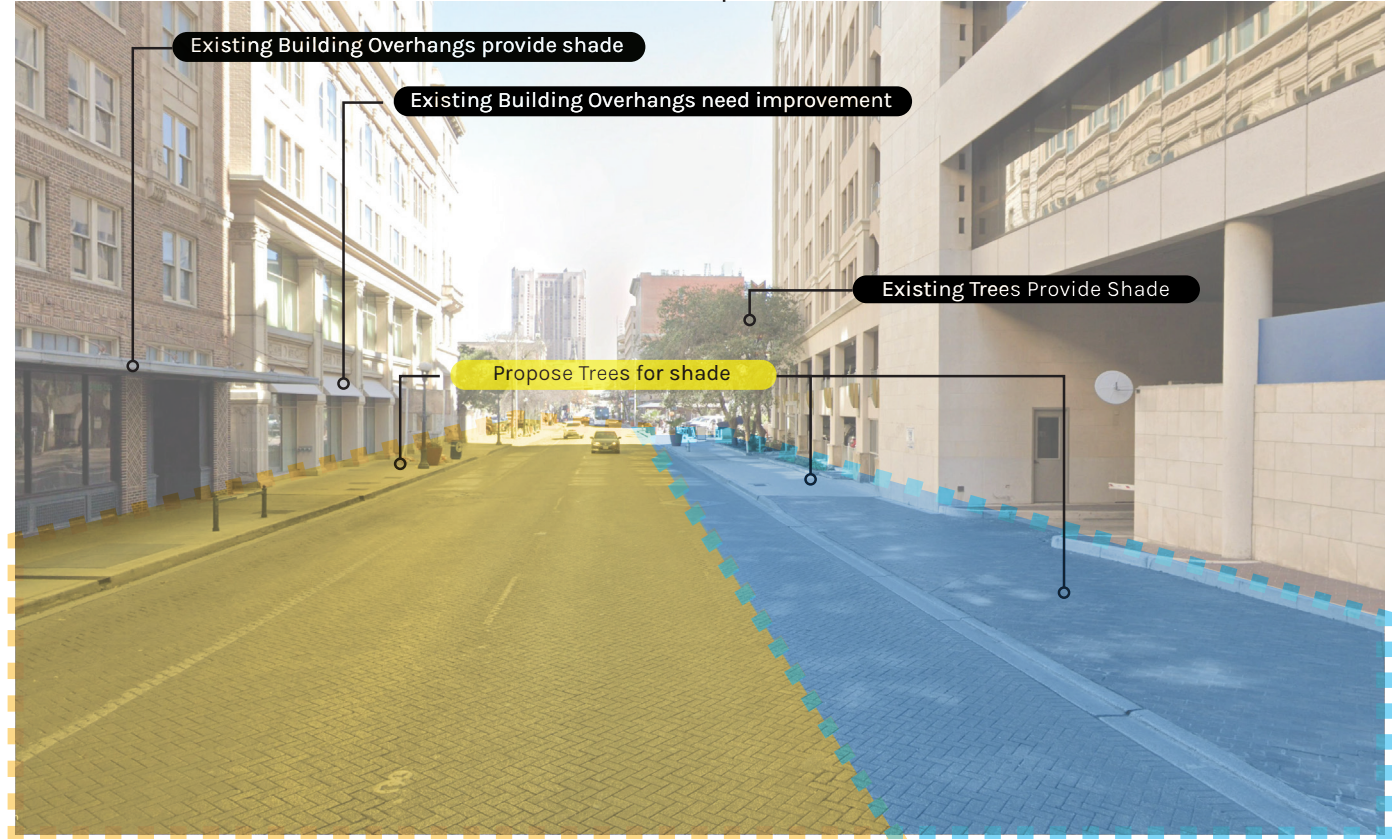
AREAS AVERAGING INTENSE SUN

- 
 CLUSTERED: ZONE A - PARKING LOTS  
 ZONE B - PLAZAS / COURTYARDS  
 ZONE C - OPEN SPACE
- 
 LINEAR AREAS
- 
 SITES OF RECENT/PROPOSED DEVELOPMENT  
 IMPACTING SHADE ANALYSIS





Commerce Street was Identified as an intervention area as the northern side of streetscapes typically receive most of the direct sunlight.



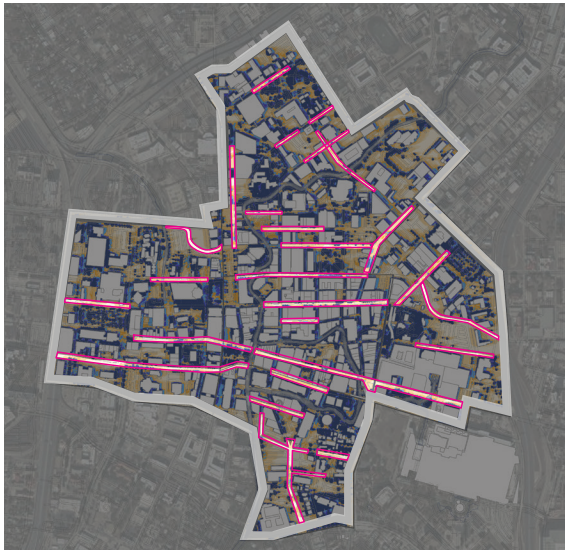
The north sides of Commerce street experience significant sunlight

The south sides of Commerce Street receive more shading as the sunlight is blocked by building massing.

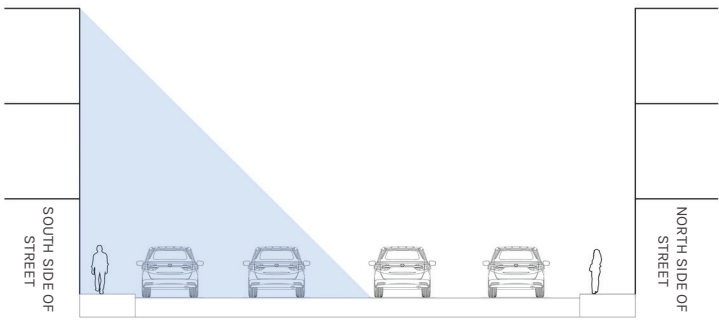


Lack of buildings increase sun exposure

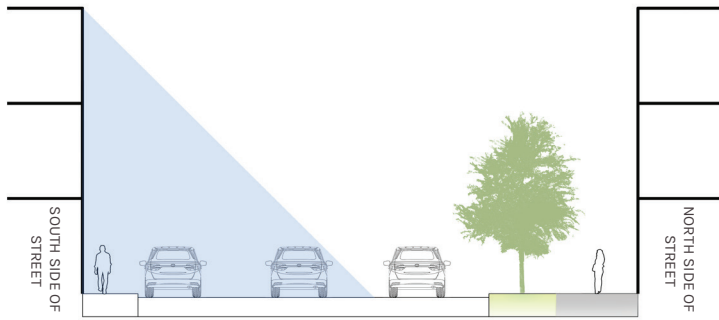




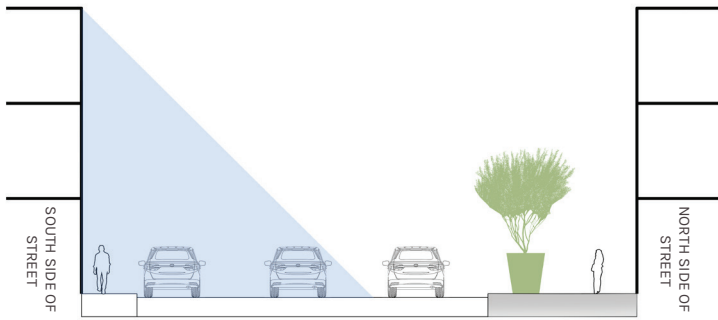
# LINEAR SHADE INSPIRATION



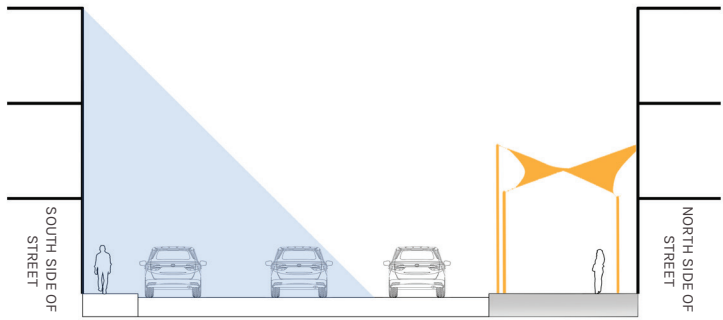
EXISTING



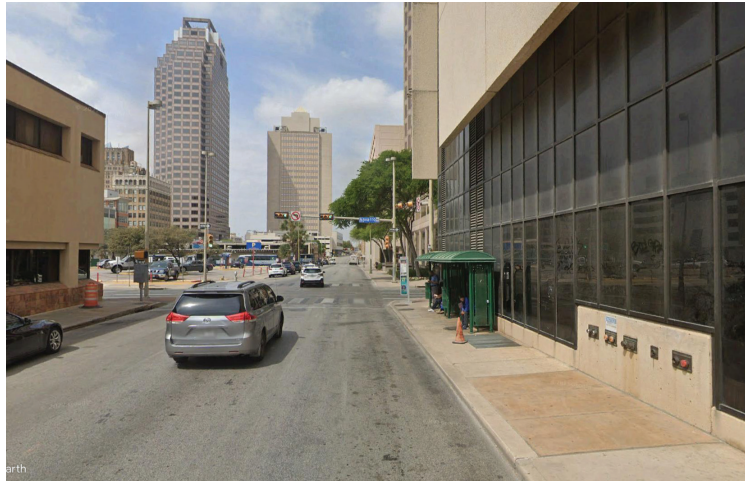
1: IN-GROUND TREE



2: ABOVE GROUND TREE

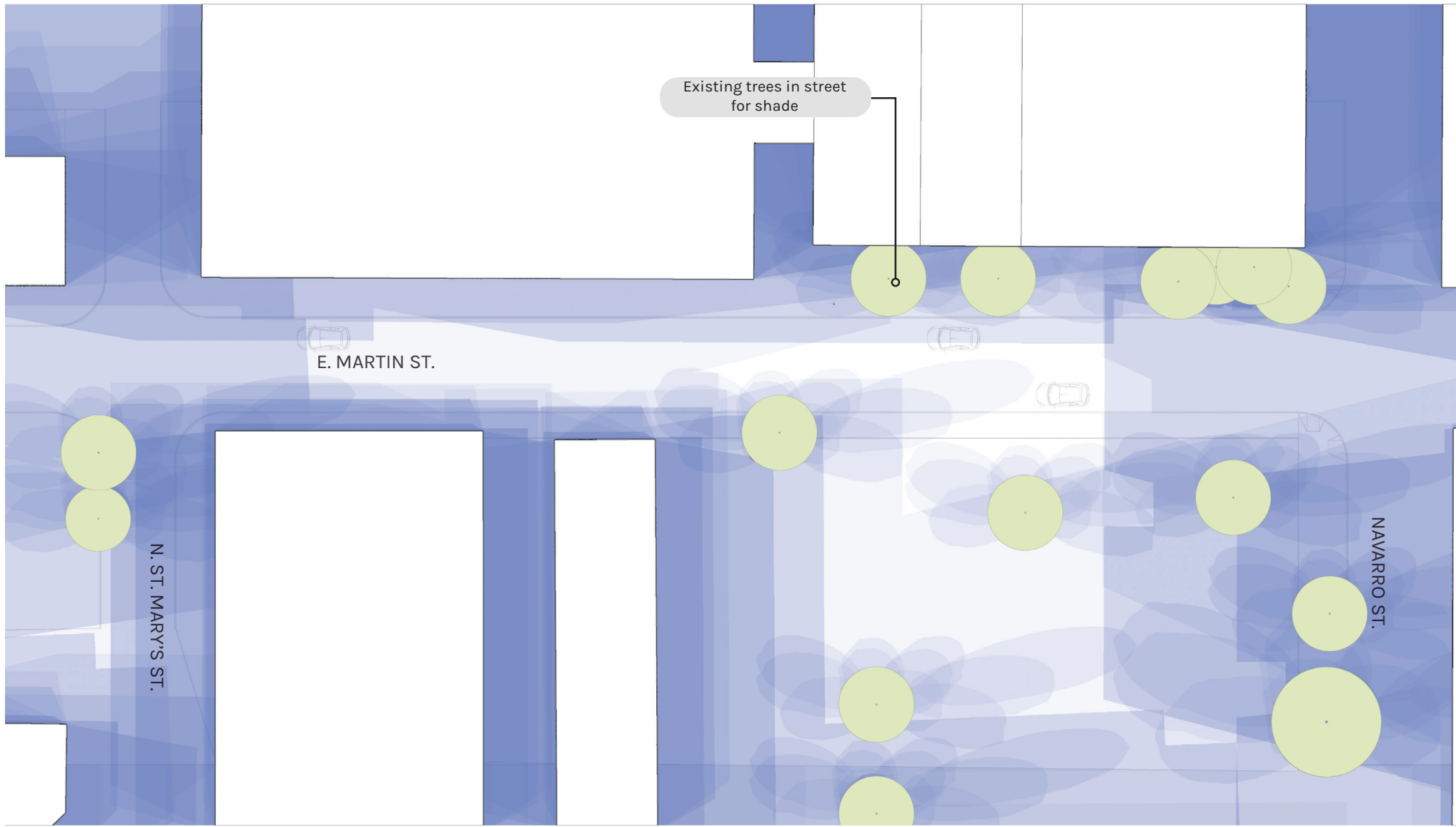
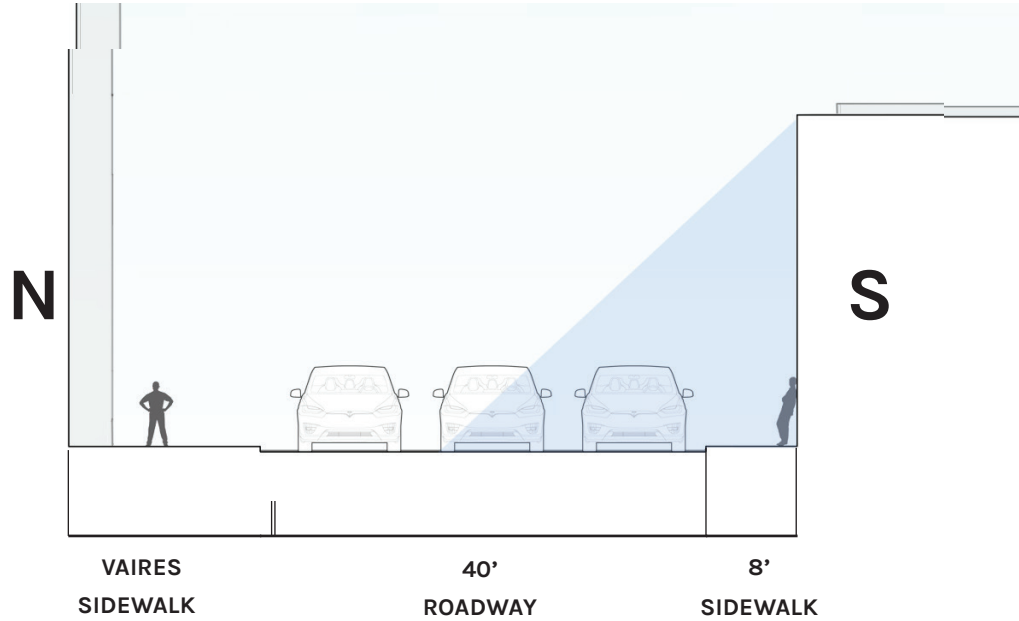


3: SHADE CANOPY

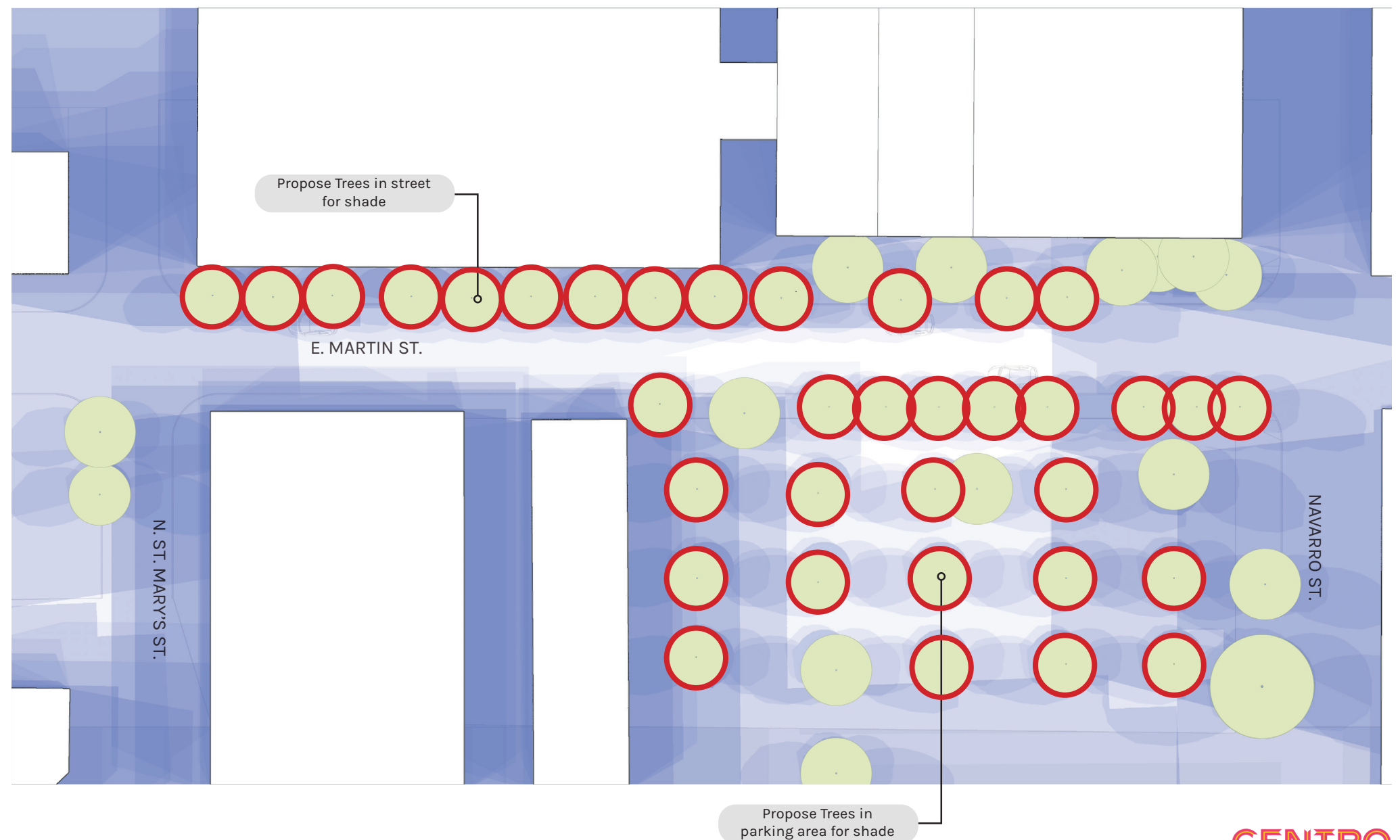
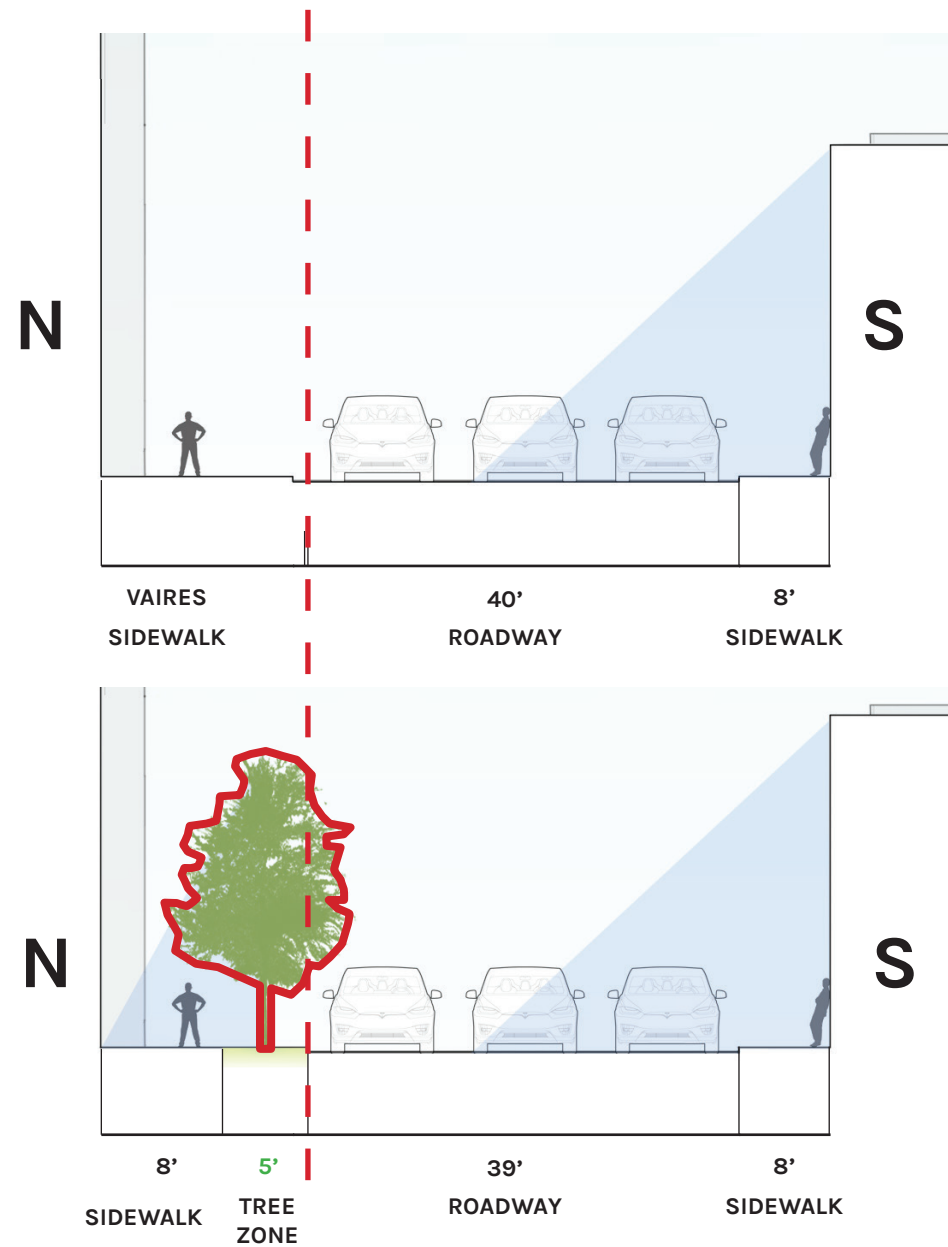


**SHADING STRATEGIES**  
Typical solutions are proposed for the sides of existing streets receiving the most sunlight.

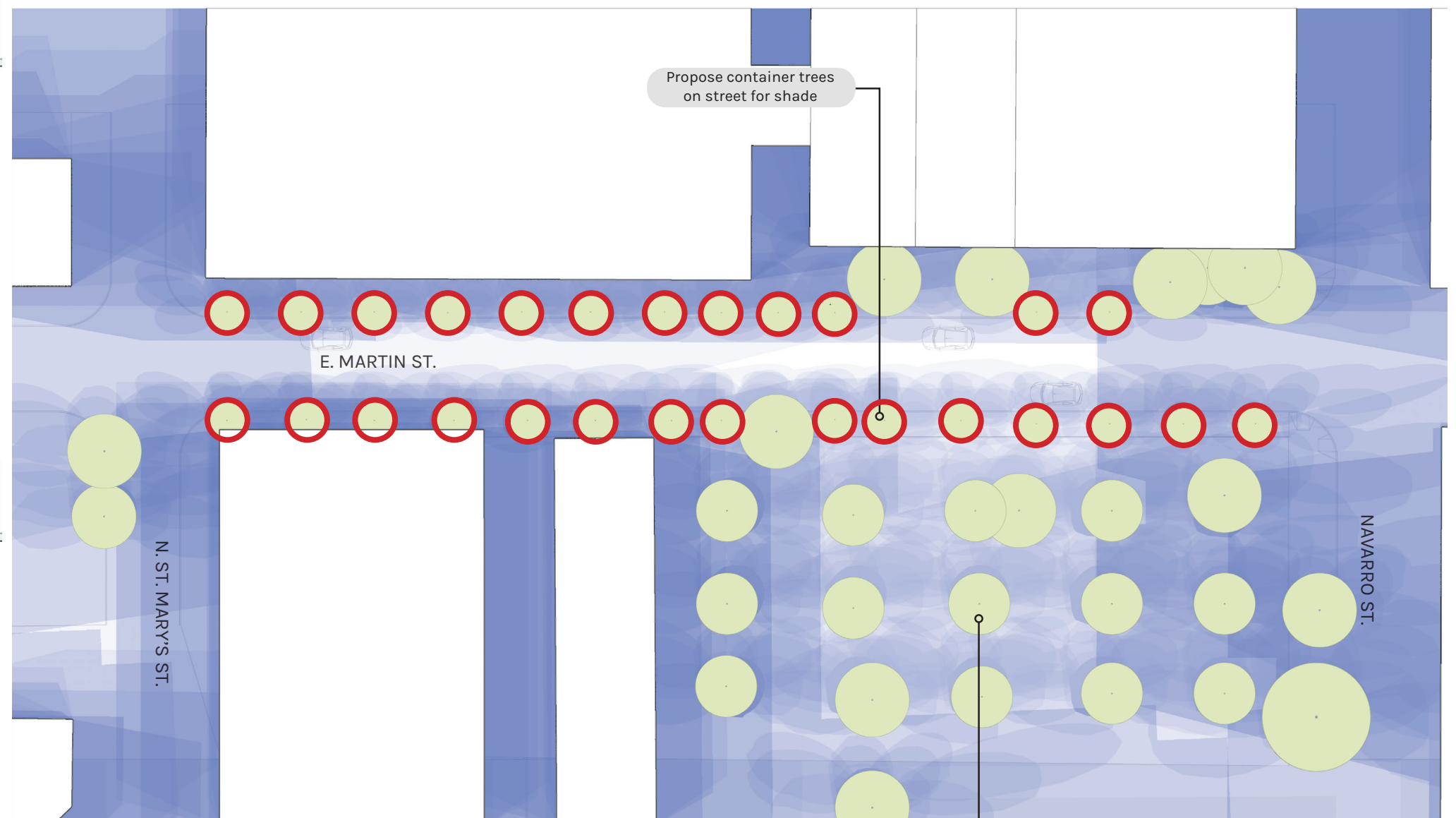
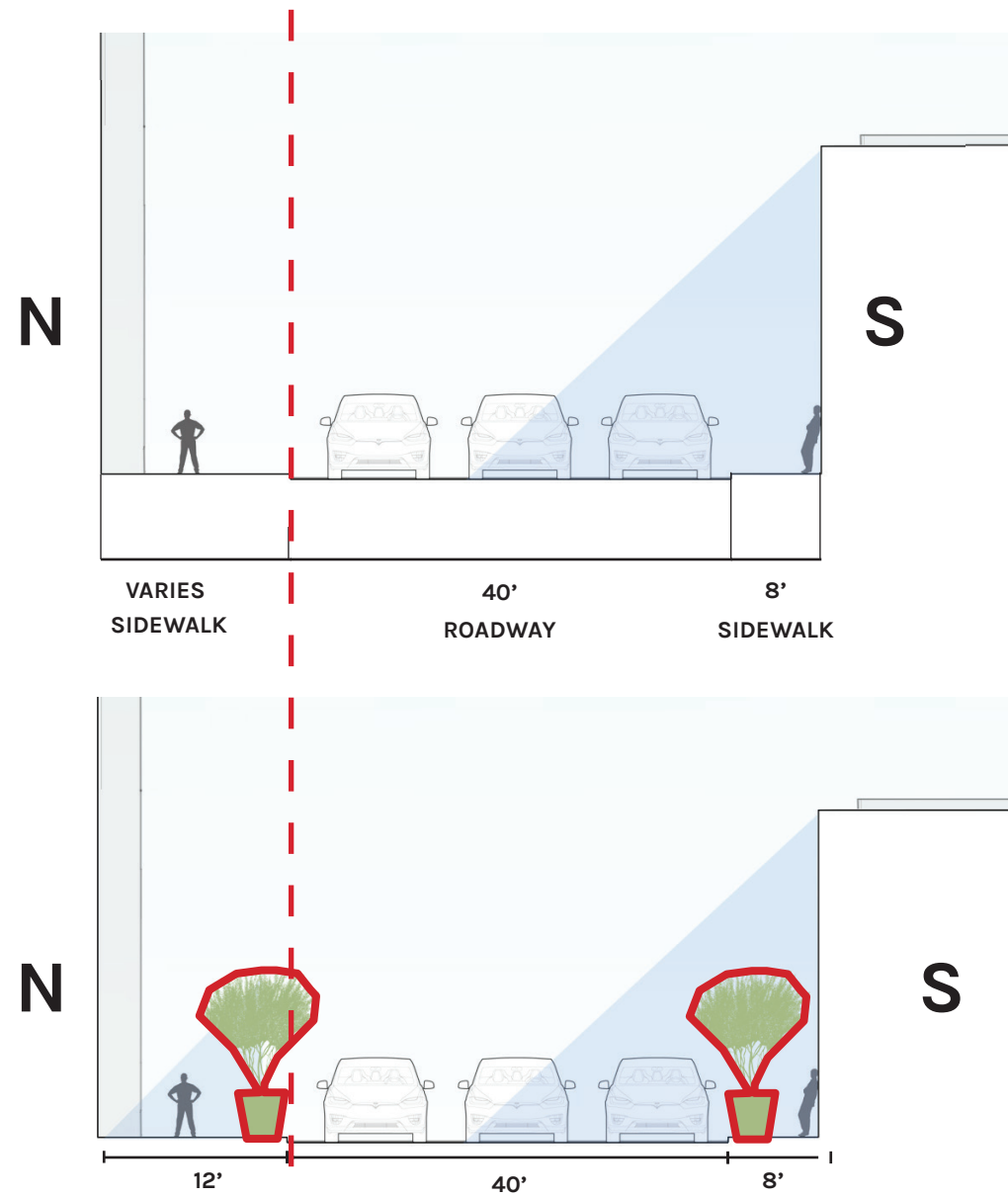




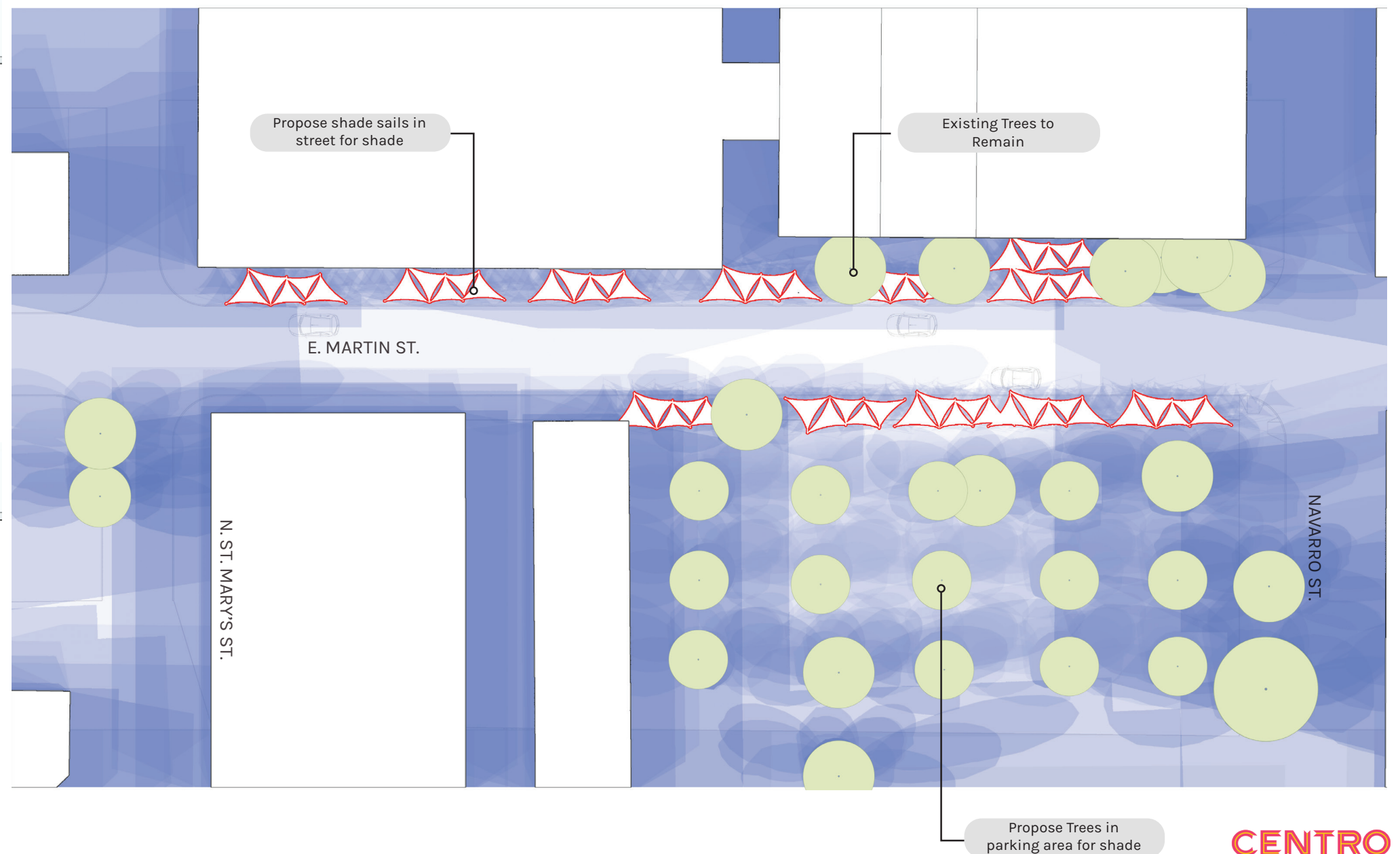
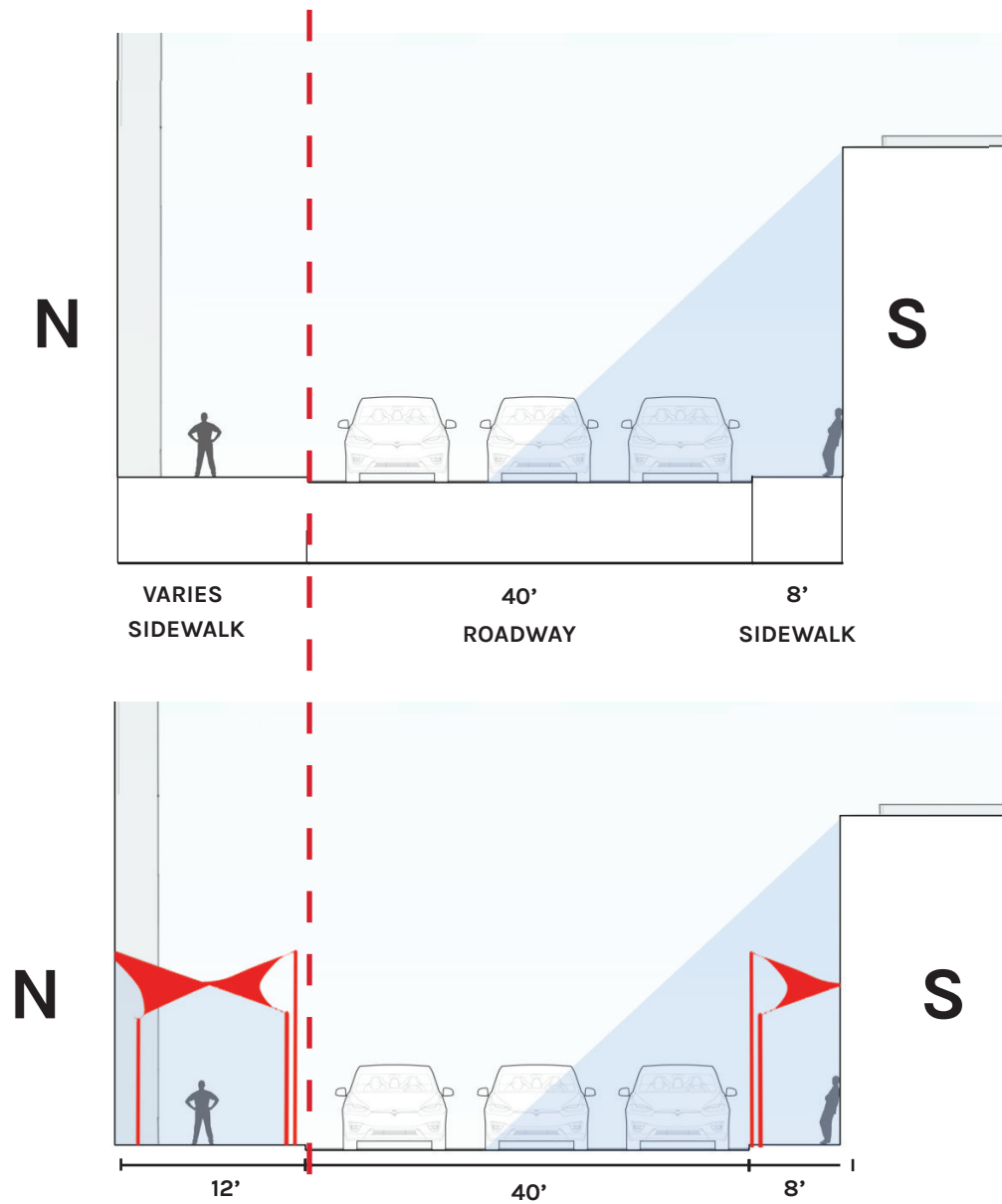




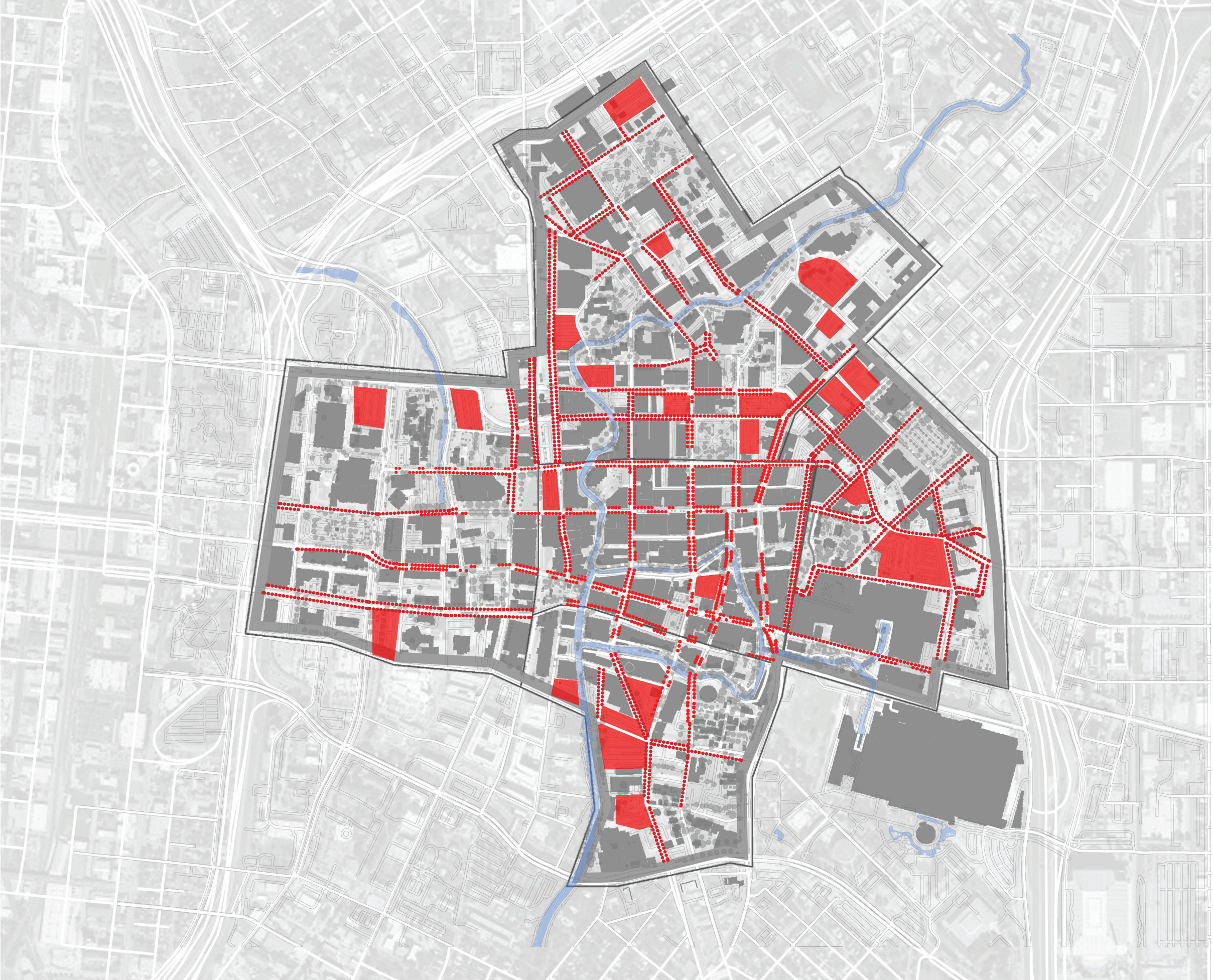






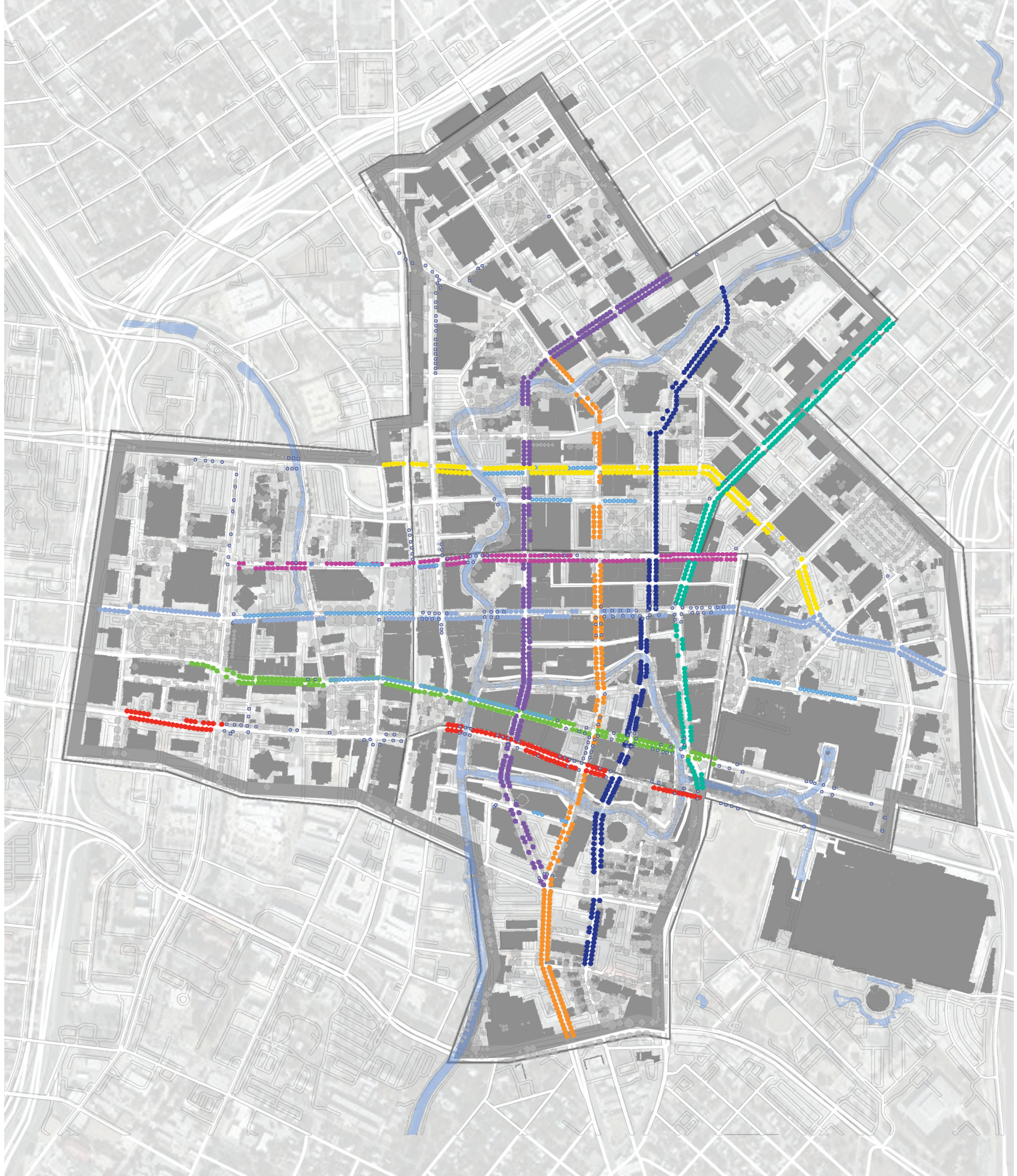






- LEGEND**
- ..... PROPOSED SHADE TREE LOCATIONS
  - FOCUS PARKING LOT SITES





LEGEND



E. MARTIN  
Live Oak  
*Quercus virginiana*  
QUANTITY: 155  
●●●●●●●●●●



ST. MARY'S  
Monterrey Oak  
*Quercus polymorpha*  
QUANTITY: 285  
●●●●●●●●●●



TRAVIS  
Chinquapin Oak  
*Quercus muehlenbergii*  
QUANTITY: 156  
●●●●●●●●●●



PRESA / JEFFERSON  
Red Oak  
*Quercus buckleyi*  
QUANTITY: 398  
●●●●●●●●●●



HOUSTON  
Texas Sabal  
*Sabal mexicana*  
QUANTITY: 624  
●●●●●●●●●●



NAVARRO  
Bald Cypress  
*Taxodium distichum*  
QUANTITY: 198  
●●●●●●●●●●



COMMERCE  
Mexican Sycamore  
*Platanus mexicana*  
QUANTITY: 194  
●●●●●●●●●●



LOSOYA / BROADWAY  
DOLOROSA / MARKET  
Cedar Elm  
*Ulmus crassifolia*  
QUANTITY: 207  
●●●●●●●●●●  
QUANTITY: 116  
●●●●●●●●●●

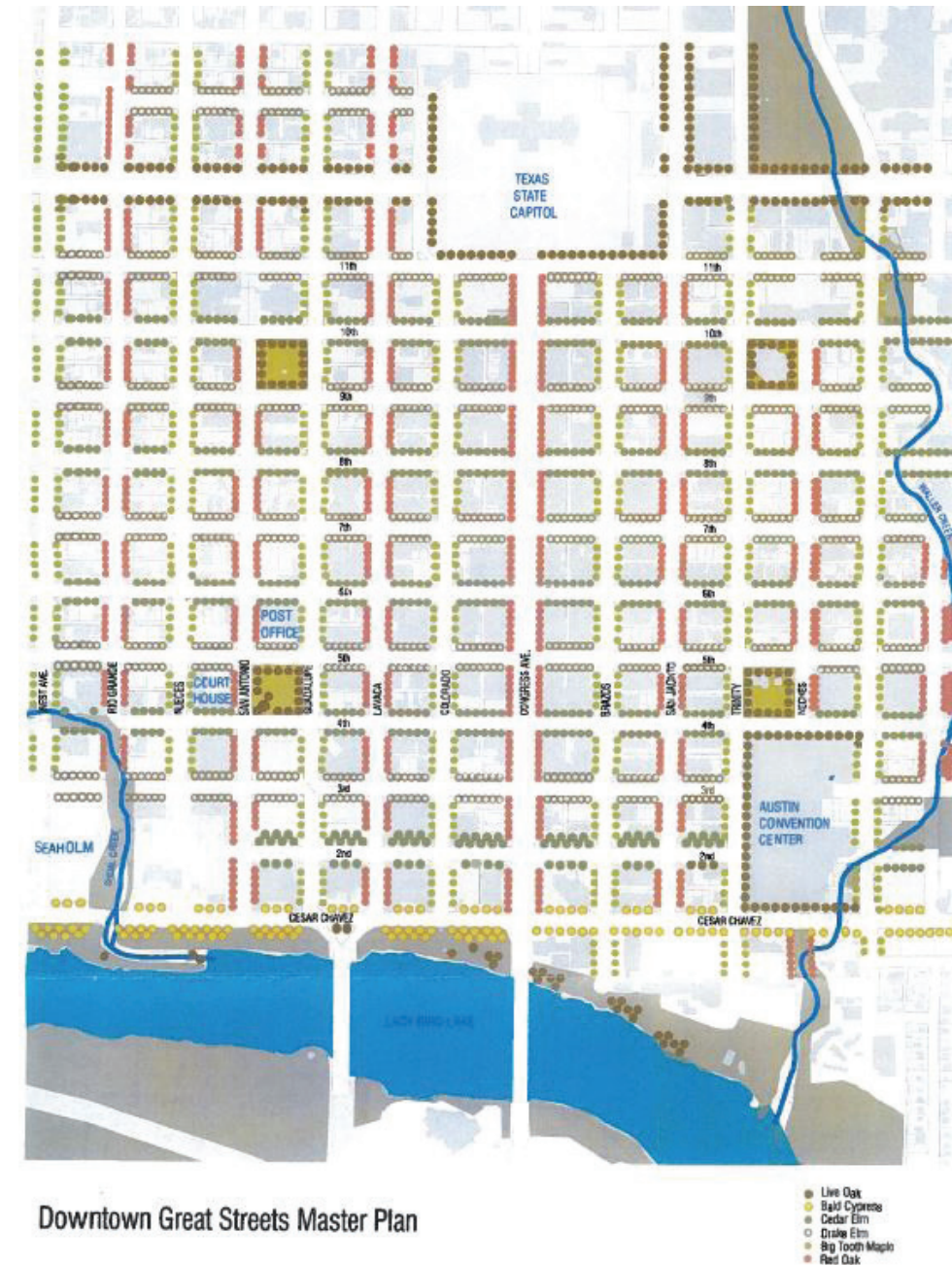
- EXISTING CENTRO PLANTERS
- PROPOSED CENTRO PLANTERS - 200



# IMPLEMENTING CHANGE AT A CITY LEVEL

## POTENTIAL CITY POLICY RECOMMENDATIONS FOR SHADIER STREETS

- REQUIRE INITIAL SUN / SHADE STUDIES (EXISTING AND PROPOSED) FOR ALL NEW COMMERCIAL BUILDING PROJECTS IN THE PID.
- REQUIRE A MINIMUM WIDTH FOR PEDESTRIAN AREAS ON NEWLY DEVELOPED STREETSCAPES
- REQUIRE STREET TREE SPECIES FOR ALL NEW DEVELOPMENTS. TREE SPACING SHOULD BE INCLUDED AT 22'-25' ON CENTER.
- IMPLEMENT AN APPROVED STREET TREE SPECIES LIST THAT PRIORITIZES SHADE
- IN THE EVENT OF A TREE NOT BEING FEASIBLE, NEW BUILDINGS MUST PROVIDE SHADE AWNINGS OR AN APPROVED STRUCTURE IN THE ARCHITECTURAL DESIGN



Downtown Great Streets Master Plan

CITY OF AUSTIN GREAT STREETS PROGRAM DIAGRAM



# PRIORITY AREA CHECKLIST

## IMMEDIATE OPPORTUNITIES WITHIN THE PID

1. REPLACE EMPTY TREE WELLS - UTILIZE EXISTING INFRASTRUCTURE FOR STREET SCAPE IMPROVEMENTS
2. EAST/WEST STREETS - THE SUNNIEST STREETS ON AVERAGE. TARGET EAST / WEST STREETS FOR LARGER IMPACT ON STREET COMFORTABILITY
3. OPEN PARKING LOTS - OPEN PARKING LOTS COUNT TOWARD MUCH OF THE UN-SHADED OPEN AREAS OF THE CITY. TARGETING THESE AREAS WITH SHADING INTERVENTIONS WOULD LOWER THE AVERAGE SURFACE TEMPERATURES AND WOULD BE A FACTOR IN REDUCING THE HEAT ISLAND EFFECT.



# LET'S CREATE AN EQUITABLE STREETScape THROUGH SHADE!

