Evolving Austin

How Custom GIS Tools Enhance Pedestrian Crossing Program Decision making

June 17, 2025

Presenters

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CITY OF AUSTIN FOUNDED 1839 | TRANSPORTATION PUBLIC WORKS

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Data Science Practice Lead

TOOLE DESIGN

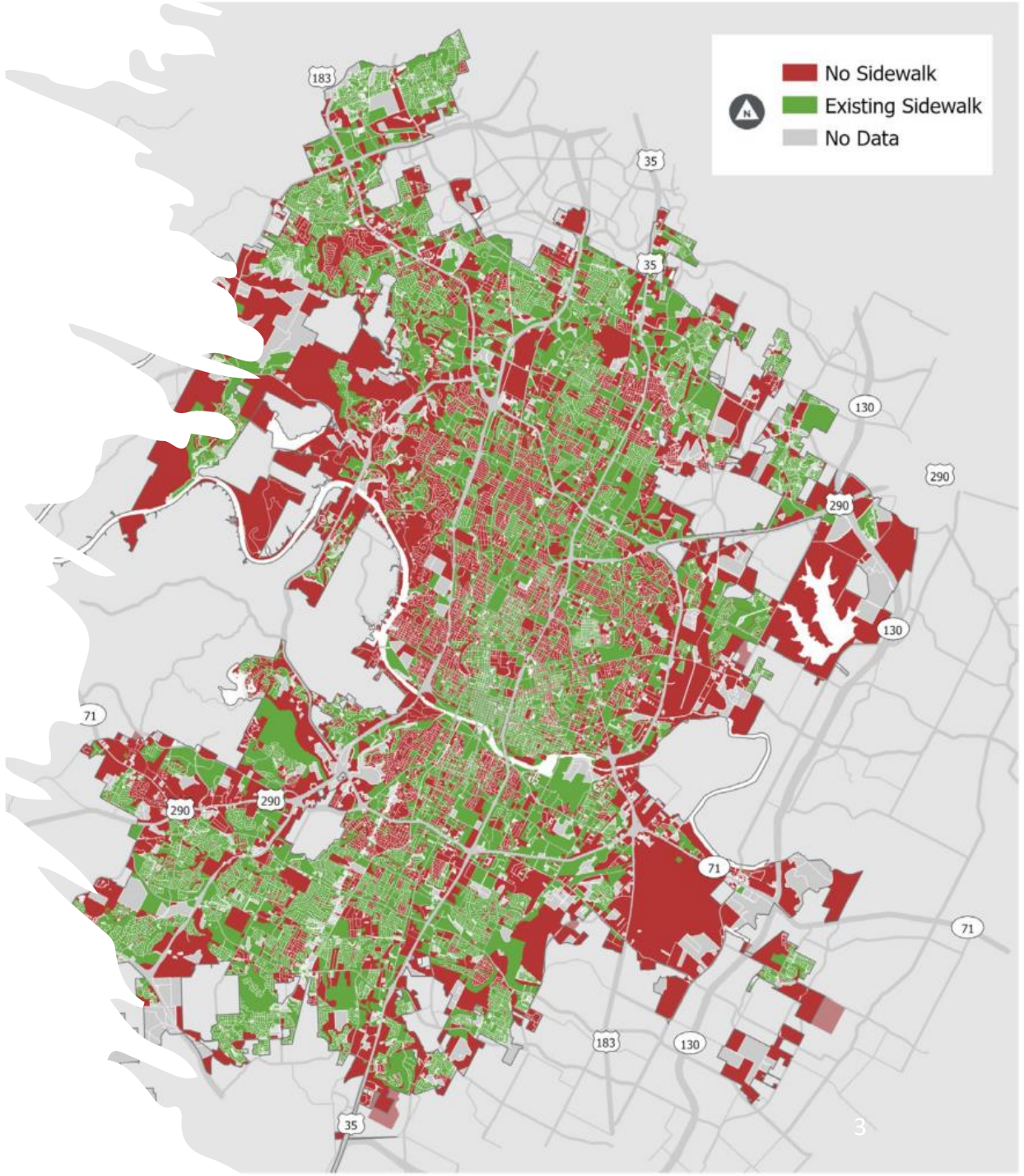
Today's Topics

01 Overview of City of Austin Mobility Goals

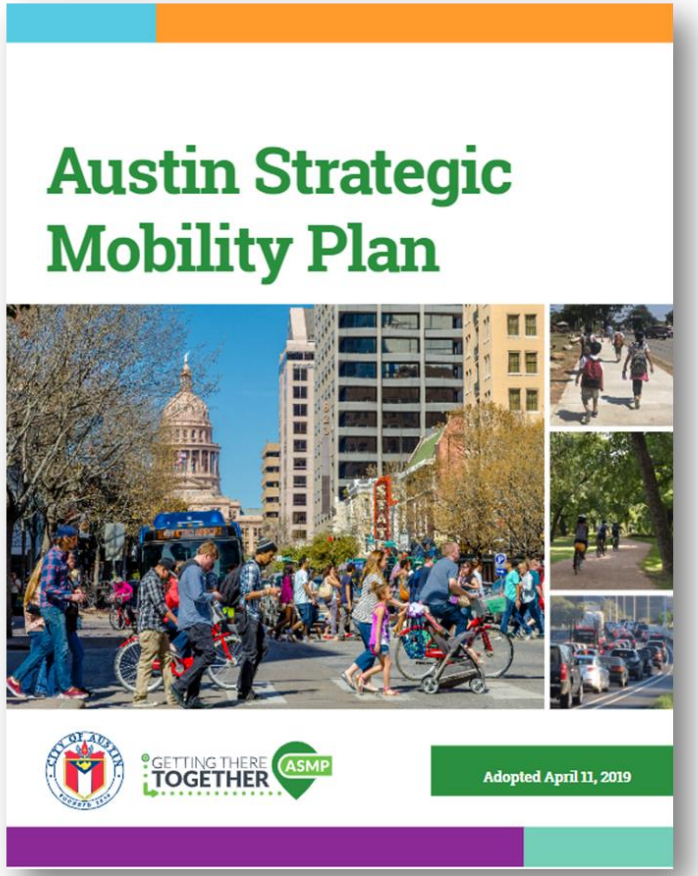
02 Custom GIS Tools

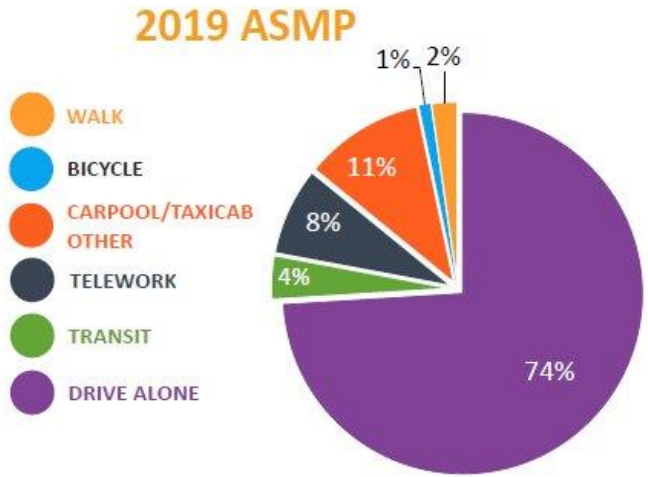
03 Case Study - Pedestrian Crossing Program

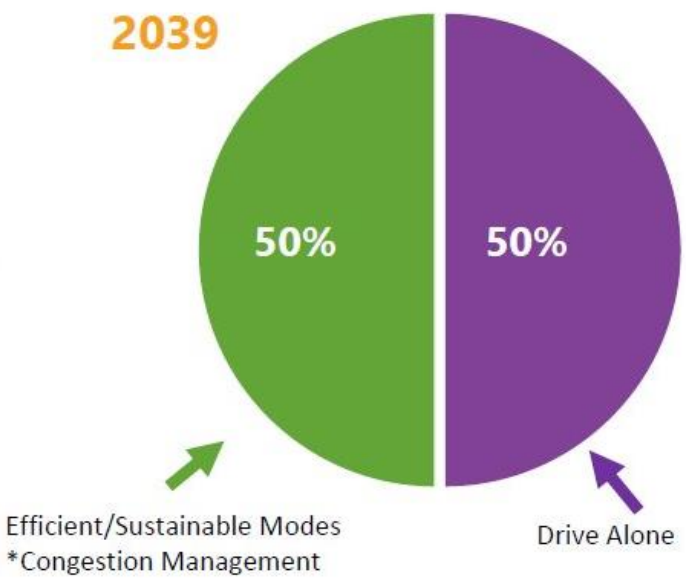
04 Project implementation and next steps



Austin Strategic Mobility Plan







Austin Strategic Mobility Plan
Overarching Goal

50% walk, bike, take transit, or any other non-drive-alone mode to work **by 2039**

- **4% Walk** (2% today)
- **5% Bicycle** (1% today)
- **16% Transit** (4% today)

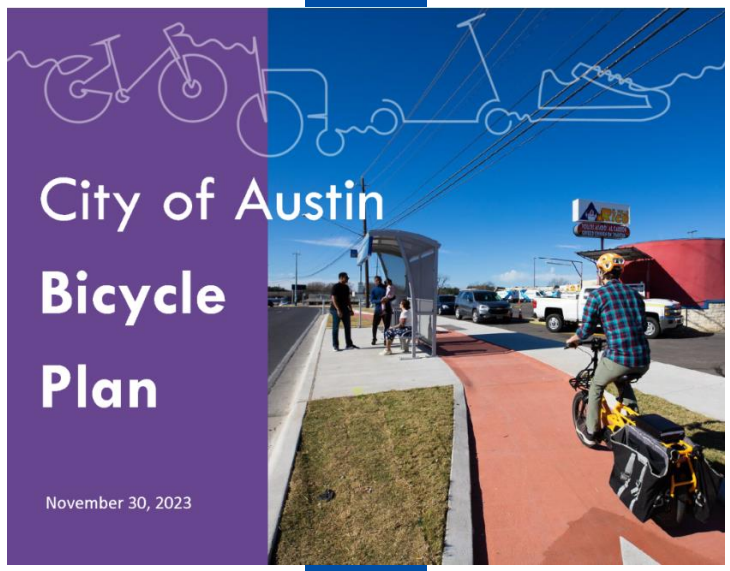
2020 BOND PROGRAMS

$80M	SIDEWALKS	$80M	URBAN TRAILS	$40M	BIKEWAYS	$20M	SAFE ROUTES TO SCHOOL
$19M	LOCAL TRANSIT ENHANCEMENT	$65M	VISION ZERO / SAFETY	$53M	SUBSTANDARD STREETS	$1M	NEIGHBORHOOD PARTNERING PROGRAM
$102M	LARGE CAPITAL DELIVERY	BARTON SPRINGS ROAD BRIDGE	CONGRESS URBAN DESIGN INITIATIVE	LONGHORN DAM BICYCLE AND PEDESTRIAN BRIDGE	SOUTH PLEASANT VALLEY ROAD	CORRIDOR PLACEMAKING	

2023 APA-TX Chapter Award Winner

TOOLE DESIGN

atx Walk Bike Roll
Urban Trails | Sidewalks | Bikeways Plans



How useful and connected is the system?

What projects will create the most impact?

Challenges and Parameters

- Finer grained (parcel versus TAZ)
- Available dataset limitations
- Measuring equity
- Functionality over time

A Suite of GIS Tools

14 custom GIS tools for the City to use now and long into the future

- Visualize spatial patterns and relationships
- Facilitate informed decision-making
- Optimize resource allocation
- Mitigate risks
- Prioritize infrastructure projects
- Engage communities in a transparent and inclusive process

" The suite of GIS tools will save weeks of staff time annually, while enabling us to make better and faster pedestrian infrastructure decisions."

--- John Eastman, City of Austin Sidewalk and Urban Trails Division Manager

Analytical Tools (ArcGIS Pro Python)

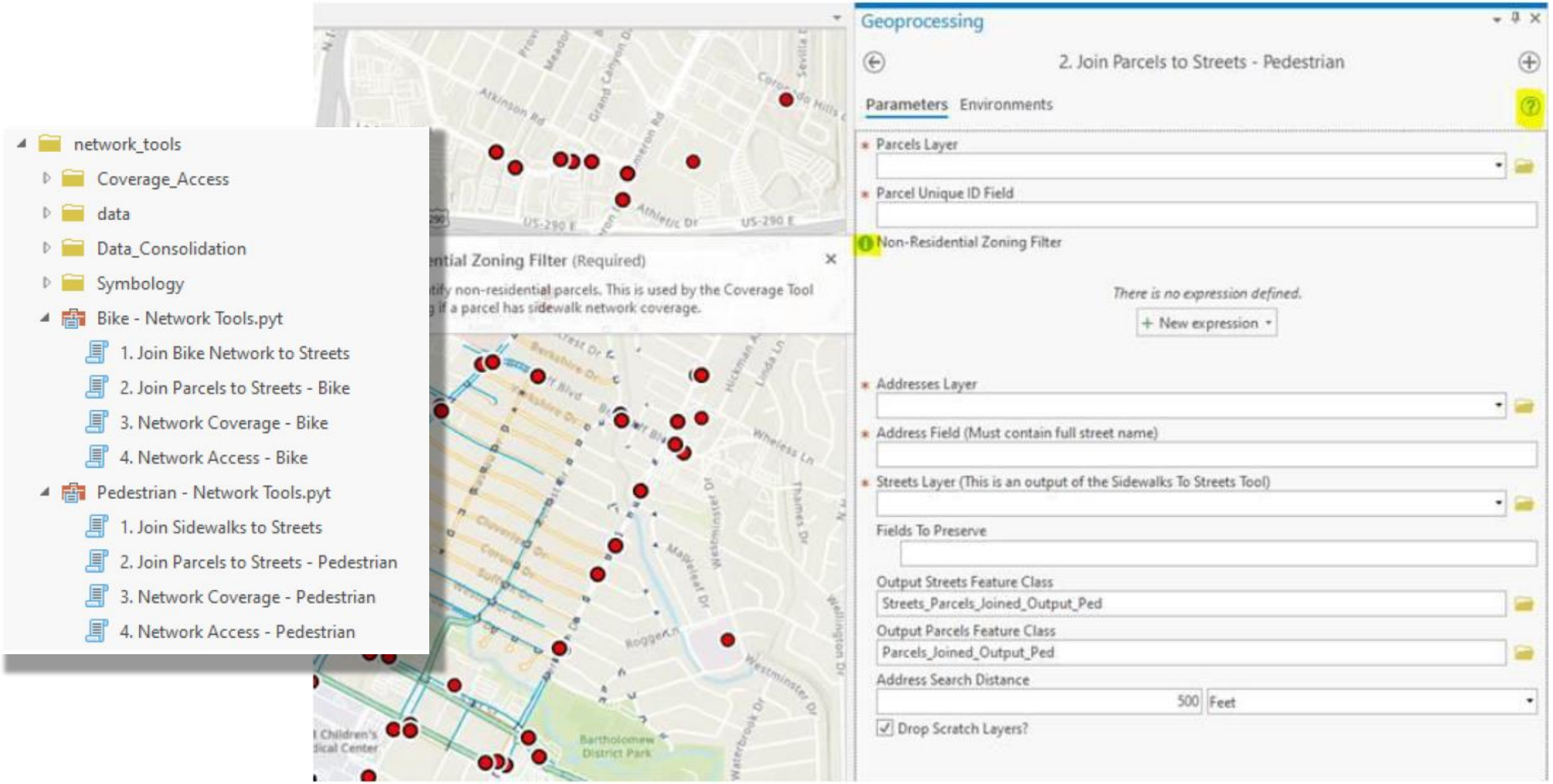
Network Tools

- Join active transportation network data to street data*
- Join parcels to street data*
- Network coverage*
- Network access*

**Two versions of each: biking-oriented and walking-oriented*

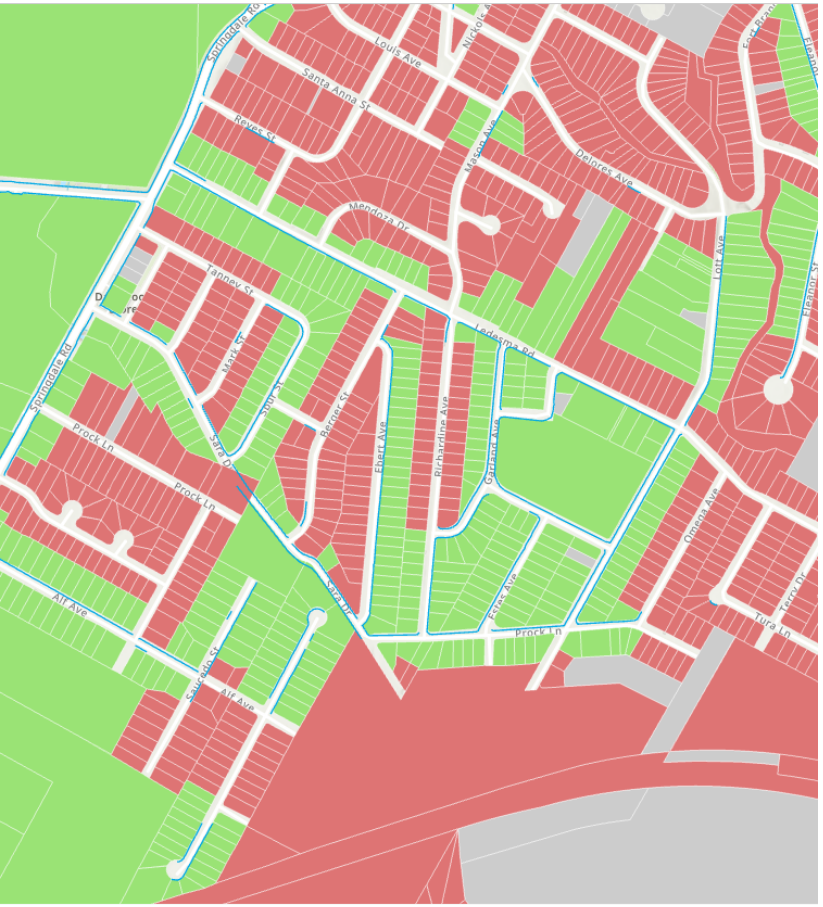
Prioritization Tools

- Sidewalk segments
- Crossing gaps
  - Identify the gaps
  - Prioritize the gaps
- Urban trail segments
- Bikeway segments


network_tools
Coverage_Access
data
Data_Consolidation
Symbology
Bike - Network Tools.pyt
1. Join Bike Network to Streets
2. Join Parcels to Streets - Bike
3. Network Coverage - Bike
4. Network Access - Bike
Pedestrian - Network Tools.pyt
1. Join Sidewalks to Streets
2. Join Parcels to Streets - Pedestrian
3. Network Coverage - Pedestrian
4. Network Access - Pedestrian
ntial Zoning Filter (Required)
tify non-residential parcels. This is used by the Coverage Tool
g if a parcel has sidewalk network coverage.
Geoprocessing
2. Join Parcels to Streets - Pedestrian
Parameters
Environments
Parcels Layer
Parcel Unique ID Field
Non-Residential Zoning Filter
There is no expression defined.
New expression
Addresses Layer
Address Field (Must contain full street name)
Streets Layer (This is an output of the Sidewalks To Streets Tool)
Fields To Preserve
Output Streets Feature Class
Streets_Parcels_Joined_Output_Ped
Output Parcels Feature Class
Parcels_Joined_Output_Ped
Address Search Distance
500
Feet
Drop Scratch Layers?

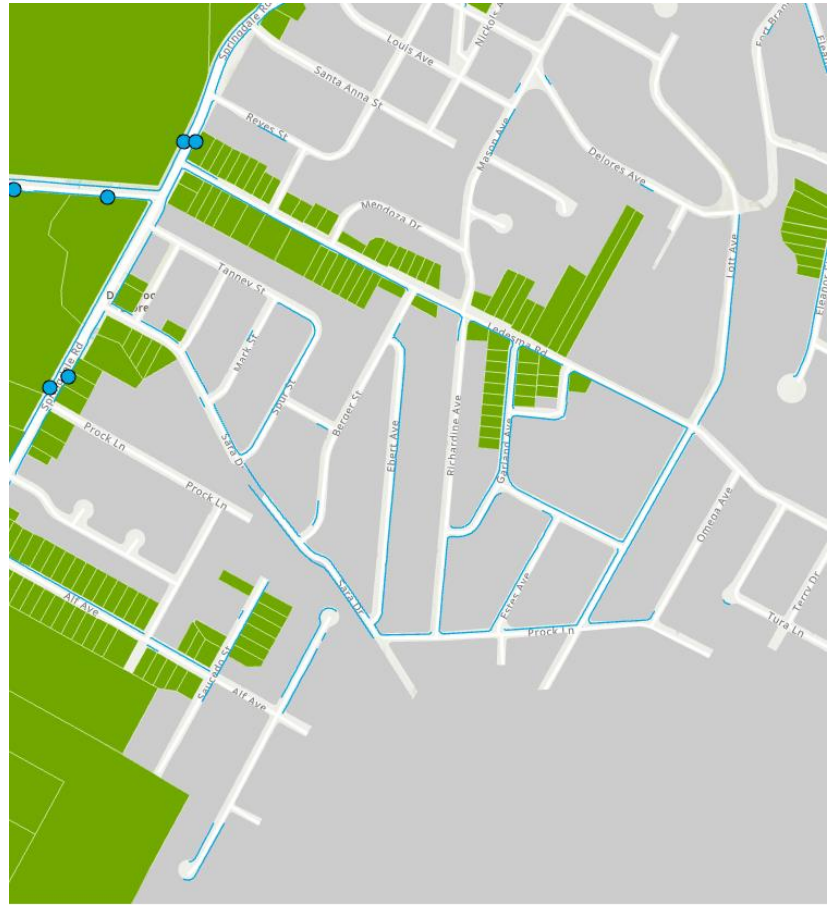
Network Tools

Sidewalk Coverage



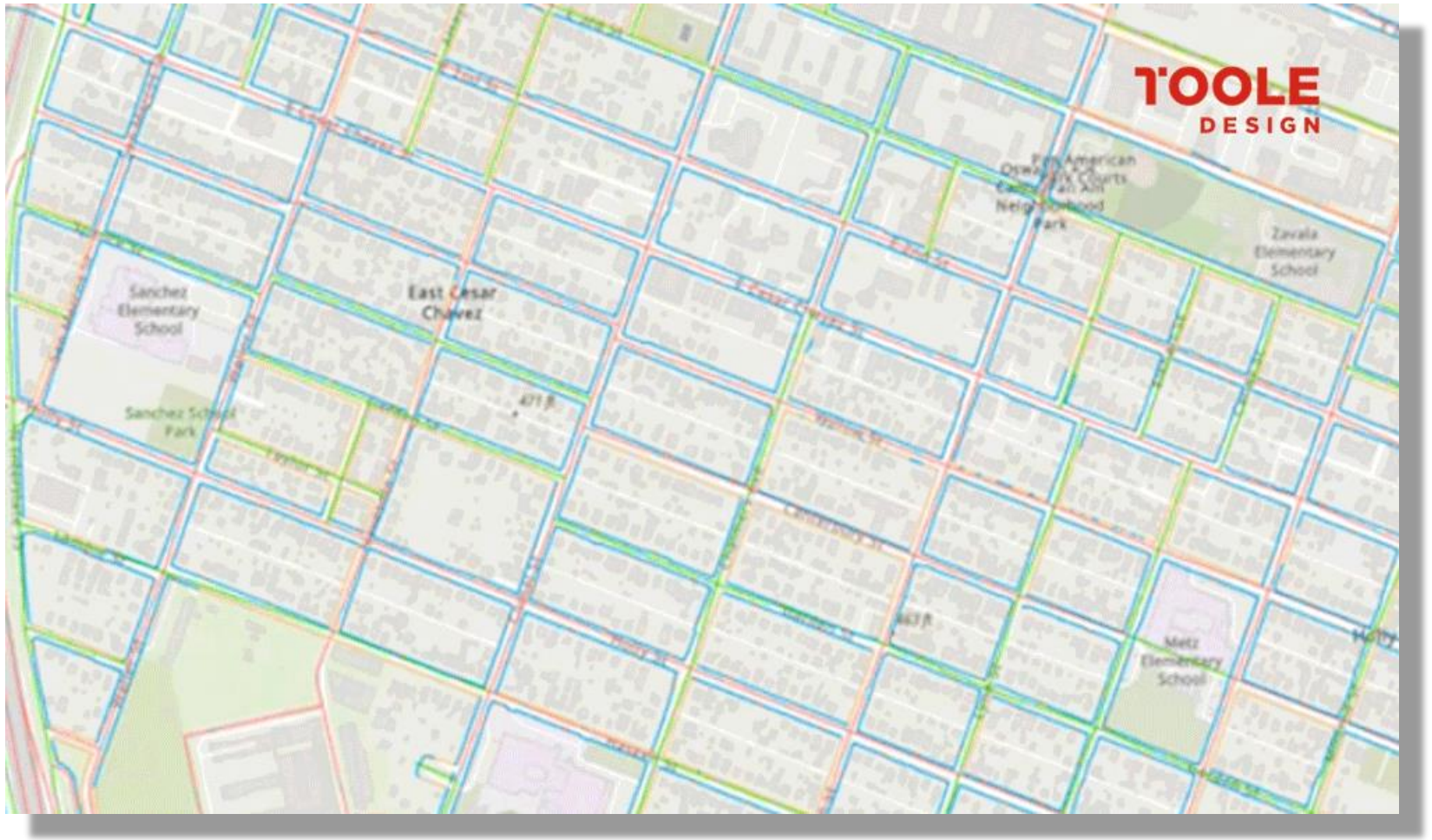
Access to Schools

Access to Transit Stops

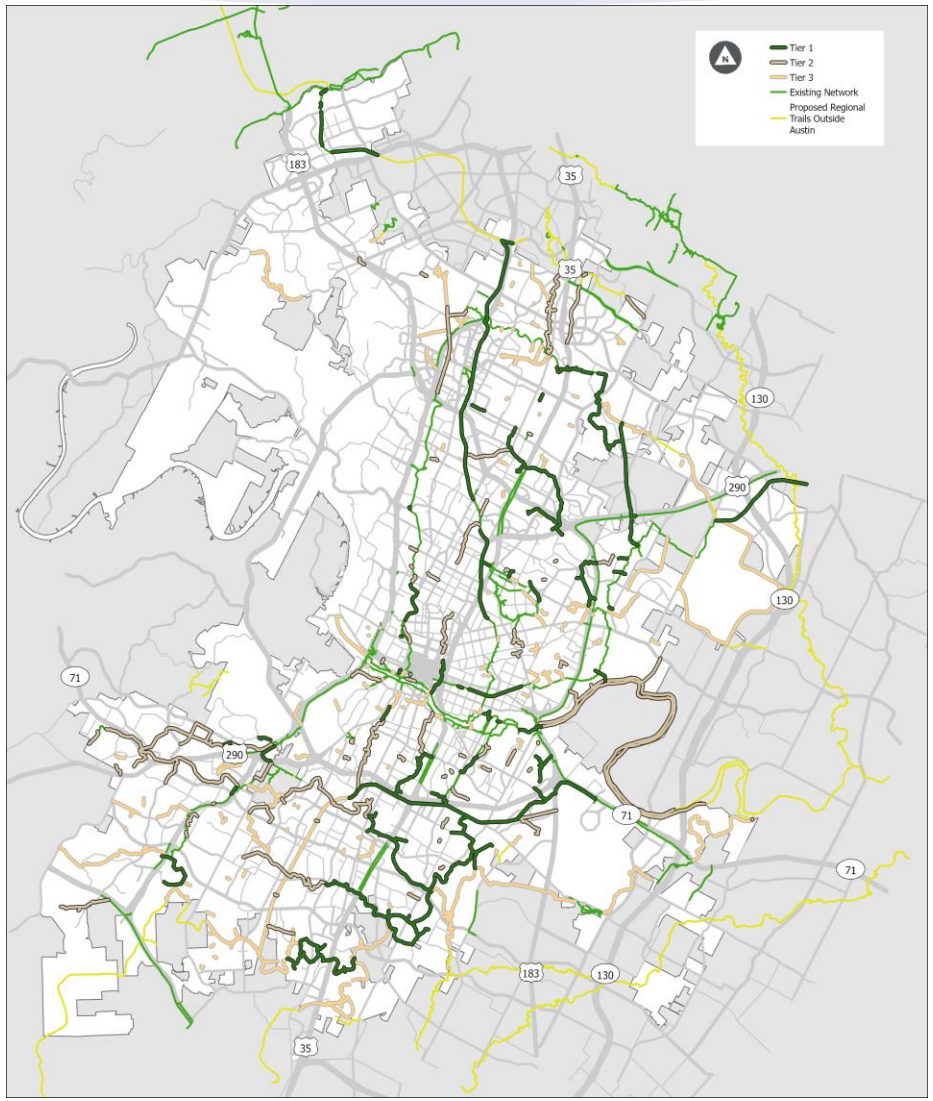


Coverage and Access Tools

This tool identifies areas where sidewalks are absent and turns the nearby parcels red to indicate inaccessibility to schools.



Prioritization Tools



Geoprocessing

Prioritization - Urban Trails

Parameters Environments

Urban Trails Layer

urban_trails_consolidated - Poposed clipped (excluding sidepaths)

Select Project ID Field

Prioritization_Project_Name

Output Layer

Prioritization_Urban_Trails_test

Base Weights

'Households with no vehicle access' weight	0
'Proximity to affordable housing' weight	5
'Proximity to key destinations' weight	20
'Barriers crossed' weight	20
'Serves a park deficient neighborhood' weight	5
'Connects affordable housing to parks' weight	0
'Health indicator' weight	0
'Connections to existing urban trails' weight	10
'Proximity to transit stops' weight	20
'Proximity to lower wage jobs' weight	0
'Proximity to dense job centers' weight	0
'Proximity to citywide destinations' weight	0
'Prioritizes BIPOC residents' weight	10
'Prioritizes low income households' weight	10
'Proximity to a water body' weight	0
'Proximity to a parks and trails' weight	0

Alternate Scenario 1 Weights

Alternate Scenario 2 Weights

Alternate Scenario 3 Weights

Alternate Scenario 4 Weights

Alternate Scenario 5 Weights

Run

TOOLE DESIGN

Sidewalk Prioritization

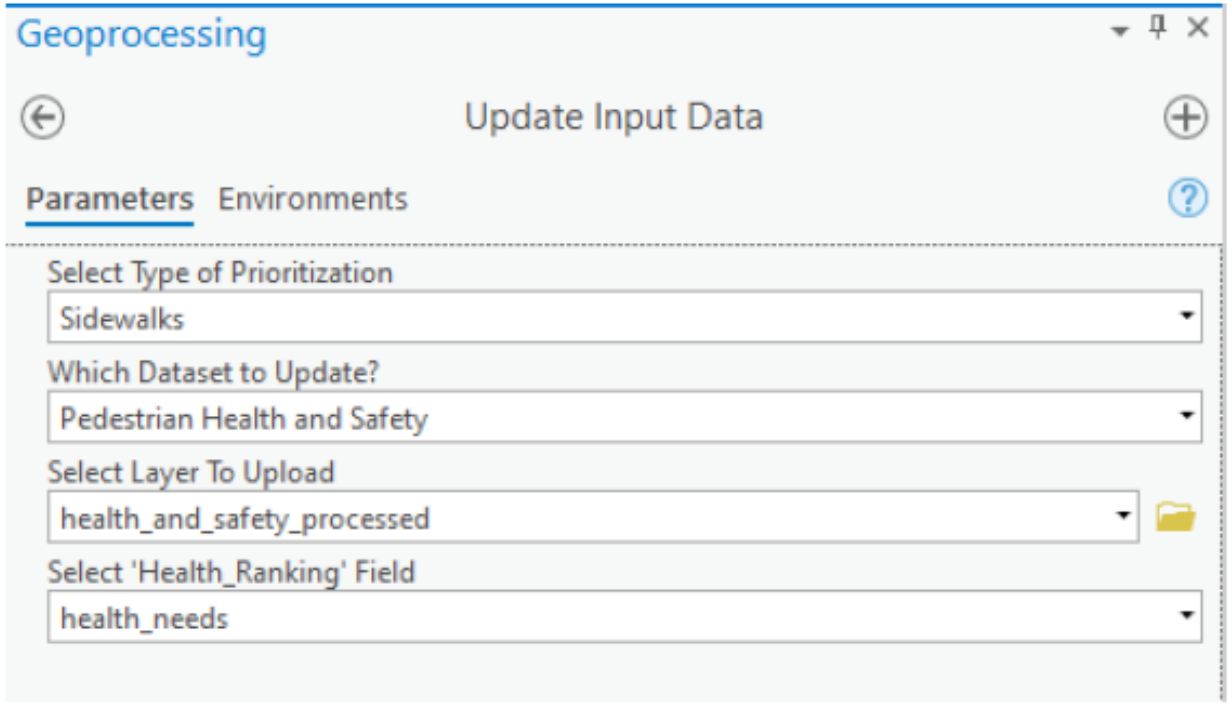
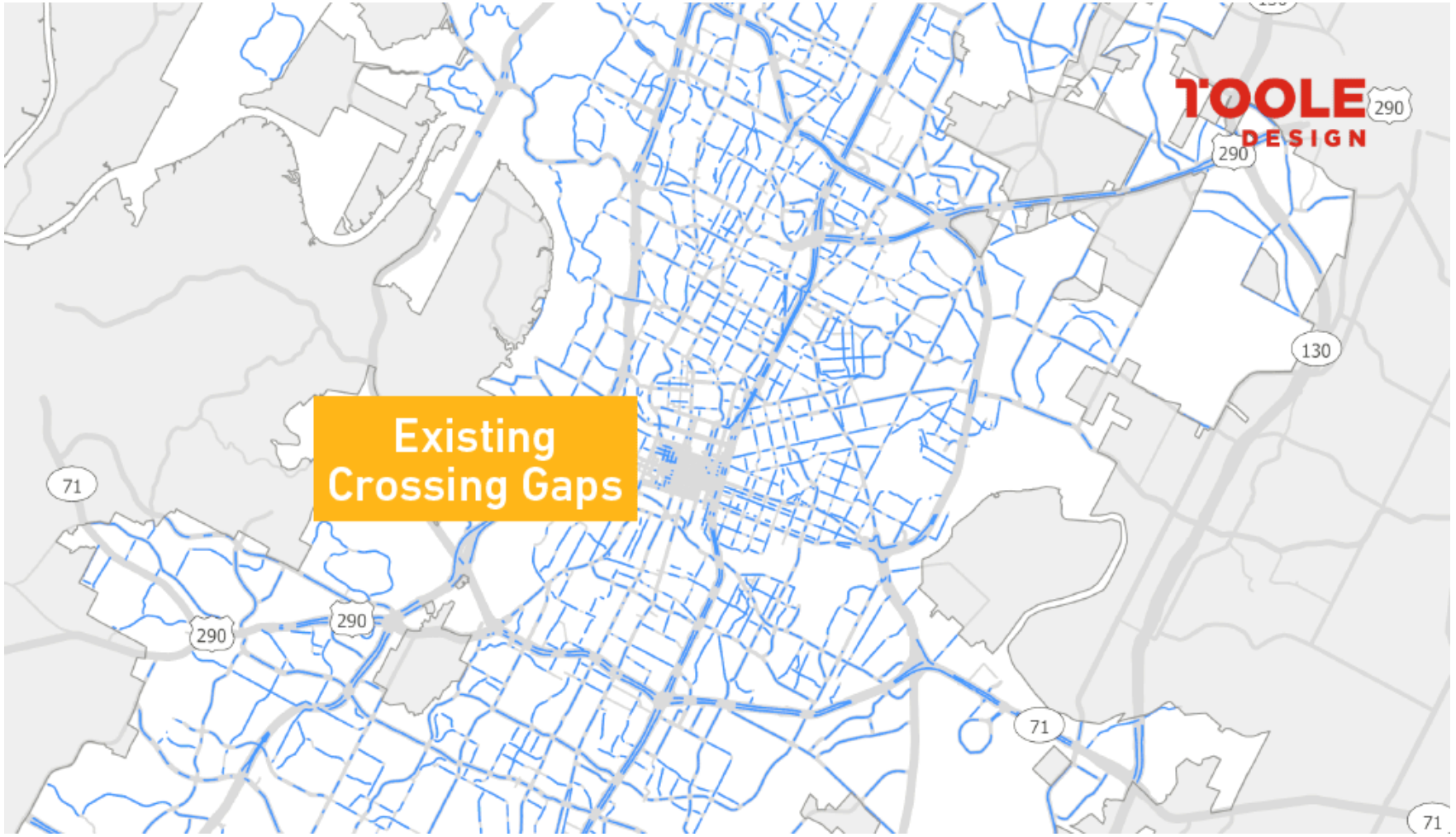


Figure F.2 – Pedestrian Attractors Score (PAS) Scoring Matrix

Score Range: 0 – 100 Base Score Weight: 56%				
Element	**Criteria**	**Data Source**	**Points**	
Proximity to Attractors Weight 45% (max 100 pts)	Multiply Possible Points by number of attractors within specific radius of:		**1/8 Mile**	**1/4 Mile**
	State or Local Government Offices	COA Parcels Data (Land Use Code 630) and COA Building Footprints layer	10x	5x
	Commuter Rail Stations	Open Streets Map	10x	5x
	Public or Private Schools	Open Streets Map	10x	5x
	Transit Stops (Rail and Bus) (Max of 50 pts)	Cap Metro	9x	4.5x
	Grocery Stores (Supermarkets, Bakeries, Convenience Stores, Butchers, General Stores, Green Grocers)	Open Streets Map	9x	4.5x
	Places of Public Accommodation (Police and fire stations, post offices, libraries, community centers, arts centers, museums, attractions, parks, playgrounds, sports centers, healthcare facilities)	Open Streets Map	8x	4x
	Places Older Adults Frequent (Community centers, nursing homes, pharmacy, healthcare facilities)	Open Streets Map	8x	4x
	Employers with > 500 Employees	LEHD; US Census Bureau	8x	4x
	Income Restricted Affordable House Secured though City and Federal Programs for every 25 units	COA Affordable Housing Inventory	7x	3.5x
	Public Parking Facilities	Open Streets Map	5x	2.5x
	Religious Institutions	Open Streets Map	5x	2.5x
Residential Population Weight 25%	Total population residing within 1/2-mile radius of proposed project?	US Census Bureau		
	a) Population >/= 8,000		100	
	b) Population >/= 4,000 and < 8,000		75	
	c) Population >/= 1,000 and < 4,000		50	
	d) Population >/= 500 and < 500		25	
	e) Population < 500		0	
Element	**Criteria**		**Yes**	**No**
Median Household Income Weight 5%	Within a census tract at or below Median Household Income	US Census Bureau	100	0
Existing Facilities on Street Weight 10%	For Level 2, 3, and 4 streets and Level 1 streets in commercial areas (defined in Section 2.4 of the Transportation Criteria Manual), are there complete sidewalks on both sides of the street?	COA Street Centerline Data	0	100
	For Level 1 residential streets, is there an existing complete sidewalk on either side of the street?	COA Street Centerline Data	0	100
Requests Weight 10%	Was the project requested by ADA Task Force?		75	0
	Was the project requested by a citizen through 311?		25	0
Core Transit Corridors Weight 2.5%	Is the sidewalk within a 1/4 mile of a Core Transit Corridor?	Cap Metro	100	0
Bicycle Lanes Weight 2.5%	Are there bike lanes on both sides of the street?	Austin Transportation Department	100	0

Crossing Gap Tool



A high stress crossing near transit stops indicates a corridor gap

Crossing Gap Prioritization

Geoprocessing

Crossing Gaps Identification Tool

Parameters Environments

Output Directory Location
Gaps_Outputs

Road Network
ASMP Streets

Street Level Designation
street_level

Street Name
name

Foreign Key ID Linking Roads to Crossings
asmp_id

Priority Transit Expression

Load Save Remove

SQL

Where priority_network contains the transit

Or priority_network contains the Transit

Add Clause

Pedestrian Crossings
Crossings - LTS

Low Stress Crossing Filter Expression

Load Save Remove

SQL

Where plts_final includes the 1,2

Or signal_type includes the PHB,TRAFFIC

Or crossing_treatments contains the Refuge Island

And lanes is less than 2

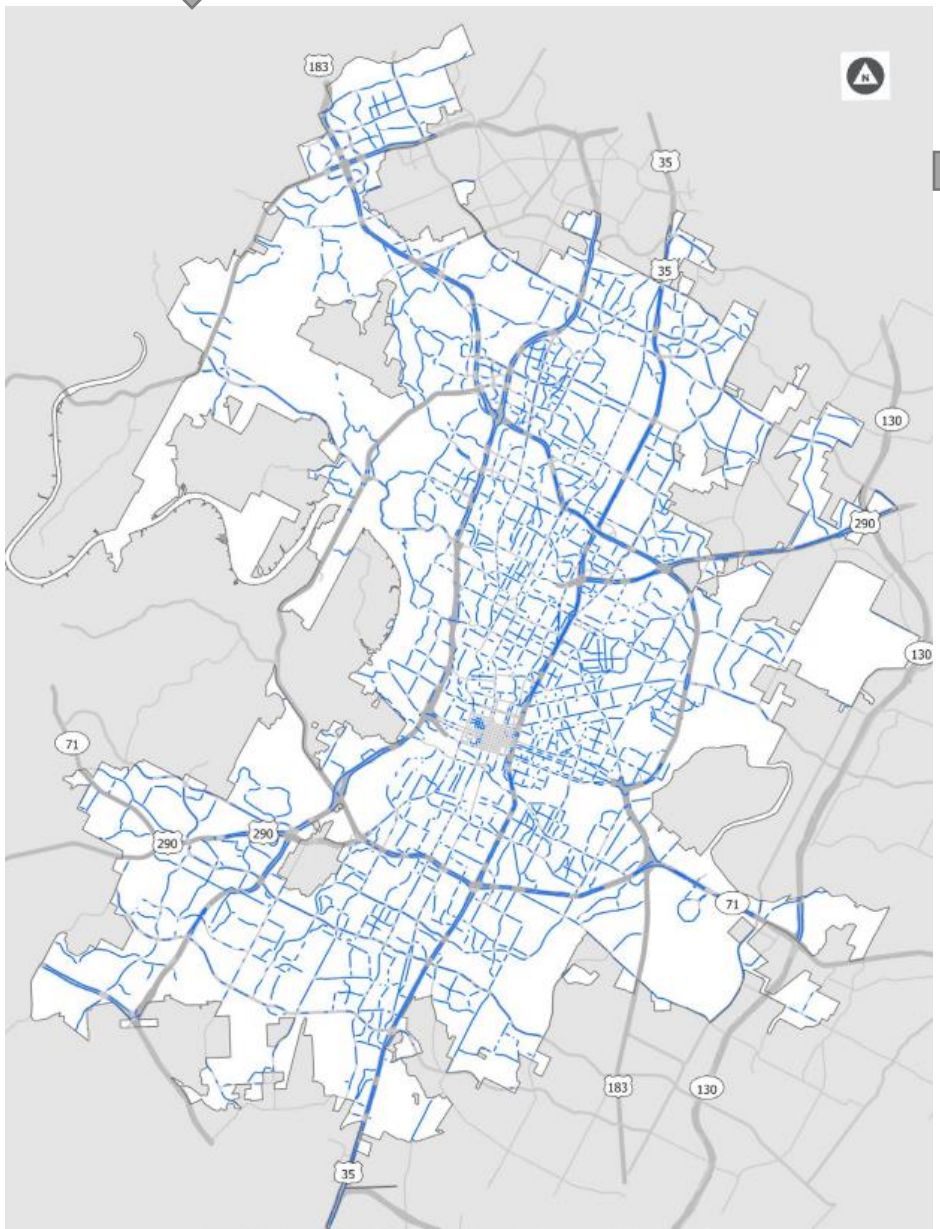
Or lanes_assumed is less th 2

Add Clause

Foreign Key ID Linking Crossings to Roads
asmp_id

Transit Stops
transit_stops_2020

Run



Geoprocessing

Prioritization - Crossing Gaps

Parameters Environments

Crossing Gaps Layer
Corridors

Select Unique ID Field
unique_id

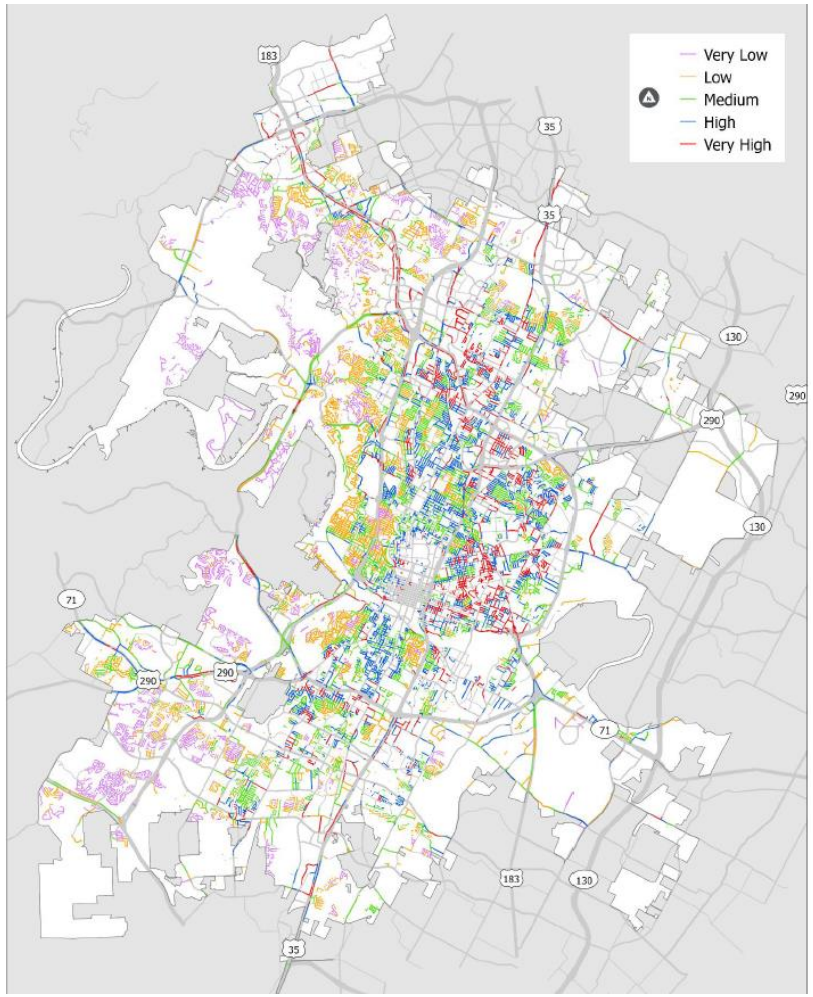
Output Layer
Prioritization_Crossing_Gaps_Output

Prioritization Weights

Mode Shift Weight	20
Safety Weight (Street lanes and speed)	15
Safety Weight (Pedestrian HIN)	10
Equity Weight (Pedestrian Health)	15
Equity Weight (Affordable Housing)	15
Network Connectivity Weight	10
Requests Weight	15

Run

Outputs & Utility



- Identify **gaps and needs**
- Evaluate and compare **investment scenarios**
- Measure the **impact of investments**
- Make **equitable decisions** coordinated between the separate programs

61% of properties are on streets with existing sidewalks*

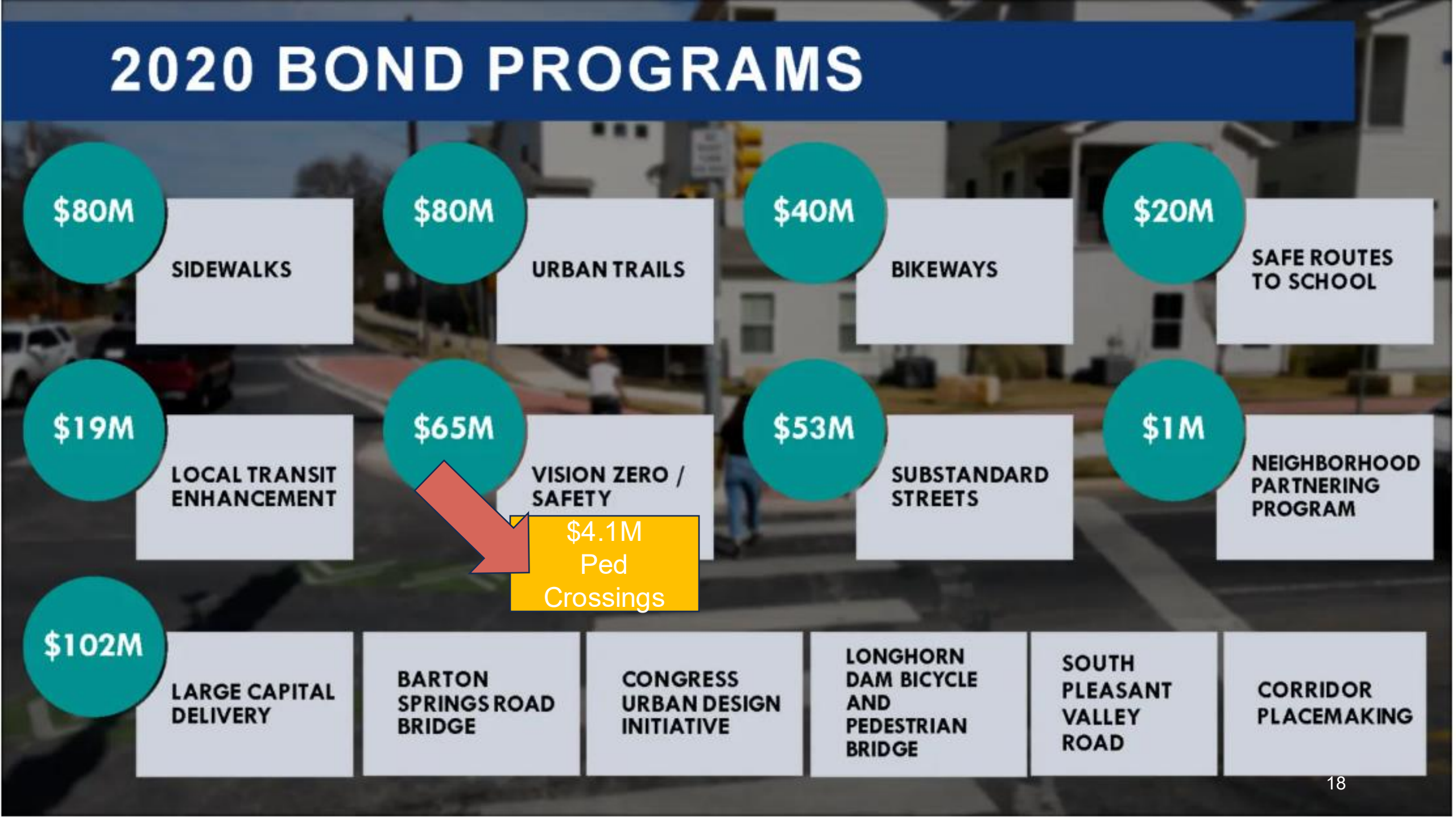
51% of properties are connected by sidewalks to schools**

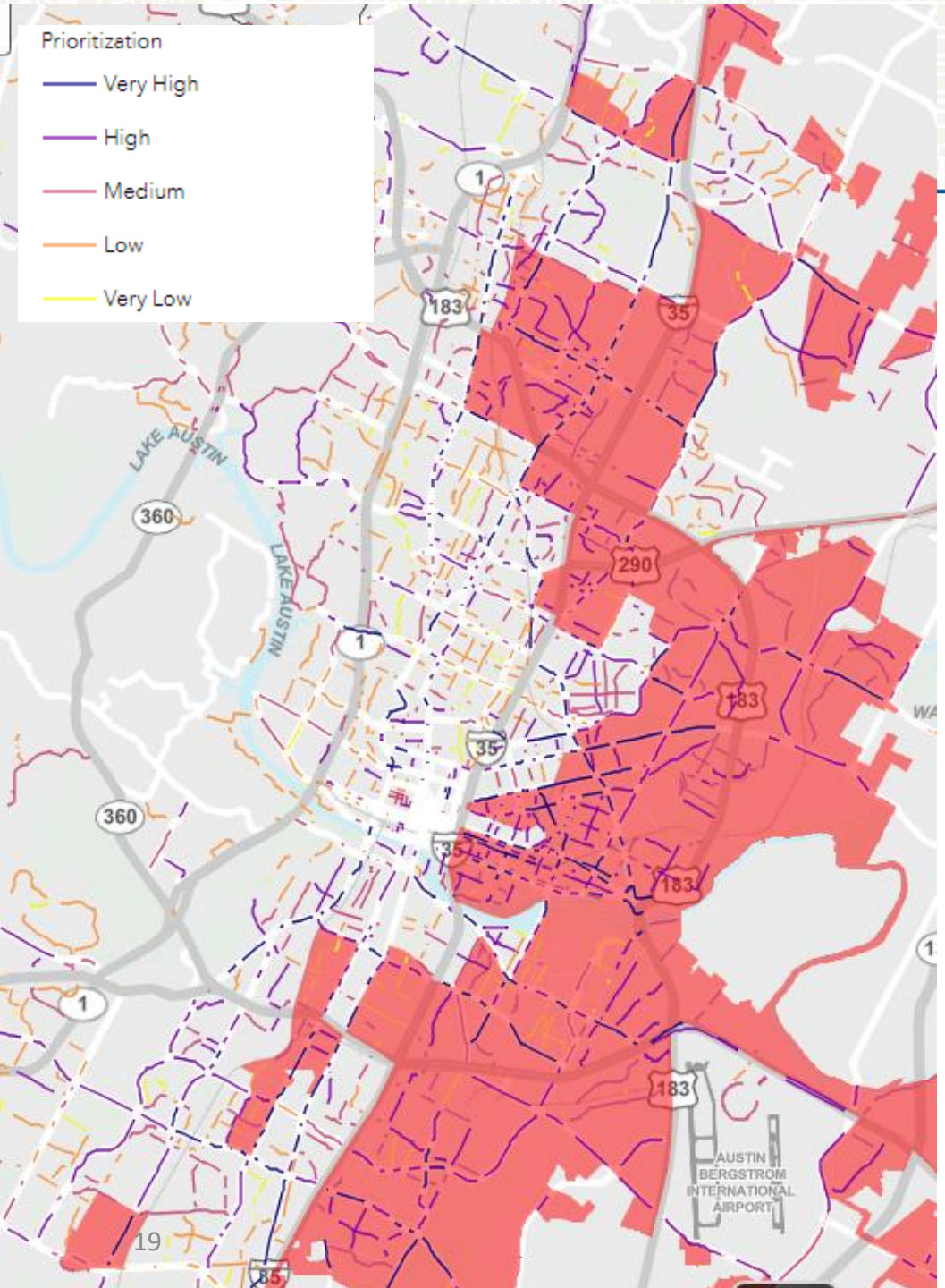
35% of properties are connected by sidewalks to transit**

20% of properties are connected by sidewalks to groceries and other food sources**

	# of Gaps	Gap Total Length (mi.)	Mileage of Level 2/3/4 Streets	Gap %
Citywide	1,986	607	1,040	58%
In Focus EAZs	698	222	348	64%

2020 BOND PROGRAMS





Pedestrian Crossing Program Overview

- Sidewalks, Crossings, and Shared Streets Plan (adopted Nov. 2023)

ELIMINATE 50%

of *Very High* and *High*-priority crossing gaps within Priority Equity Analysis Zones (EAZ)[2], along the Pedestrian High Injury Network (HIN), and/or within 1/4 mile of all identified schools, public transit stops and stations, and parks **by 2033** *

*Calls for funding at $14M a year to reach this goal.

- Walk/Bike/Roll process began in November 2020
- 1 FTE created in FY23 Budget - Position filled in June 2023
- Unique position with overlapping priorities amongst multiple programs

What we heard about prioritizing crossings

When asked to where safe crossings were needed most, community members scored the following location types from 1 to 5, with 1 being least important and 5 being most important.

- *Streets with a history of serious or fatal pedestrian crashes* topped the list with an average score of 4.7.
- *Near K-12 schools* ranked second with an average score of 4.5
- *Near transit/bus stops and on busy streets with many cars or cars moving quickly* tied for third with average scores of 4.3.
- *Improved connections across major barriers such as highways, railroads and creeks* received a 4.2
- *Near neighborhood commercial districts* rounded out the list with an average score of 3.9.

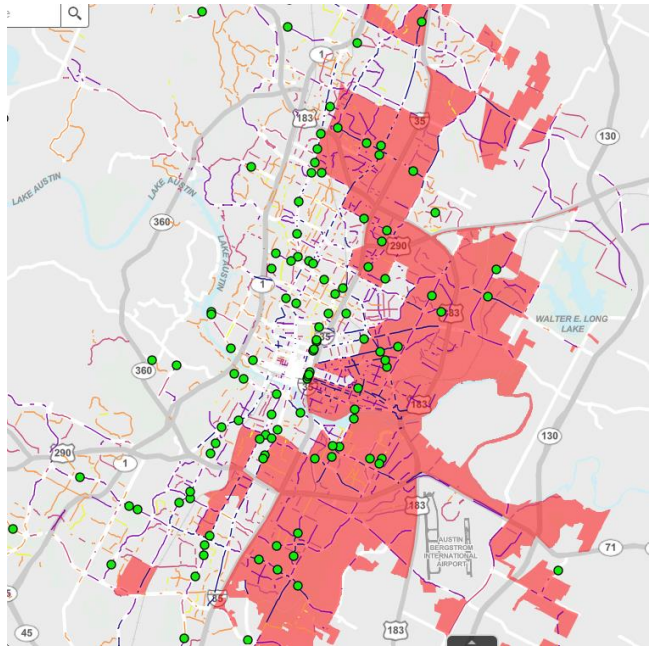
Prioritization Factors and Weights

Figure 3-11 Crossing Gap Prioritization Factors and Weights

Factor	Variable (Data Set)	Weight
Equity[3]	Proximity to Affordable Housing (within 1/8 or 1/4 mile) Pedestrian Health and Safety Status (health needs per ZIP code, based on factors such as crime statistics, obesity, diabetes, heart disease, and respiratory disease)	30%
Safety	Overlaps the Pedestrian High Injury Network Number of Lanes & Posted Speed Limit (more points awarded for more lanes and faster speeds)	25%
Demand/Trip Potential	Pedestrian Trip Potential (Inputs include: population, employment, college campuses, transit stops, parks, K-12 schools, and commercial activity)	20%
Requests	Was the project requested by ADA Task Force? Was the project requested by a resident through 311, a Council office, or ATX Walk Bike Roll public input process?	15%
Network Connectivity	For arterials (Level 4) and collector (Level 3 and 2) streets, are there complete sidewalks on both sides of the street?	10%
	Total	**100%**

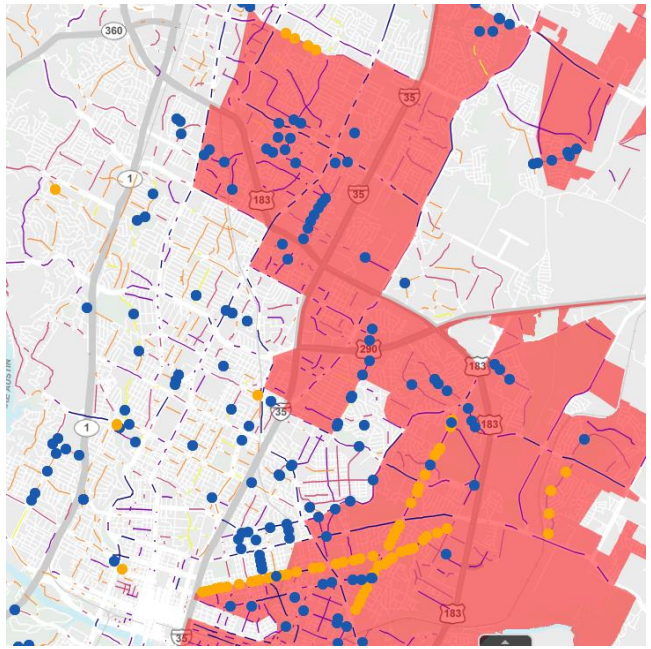
Data, Data, and More Data!

TRANSPORTATION PUBLIC WORKS



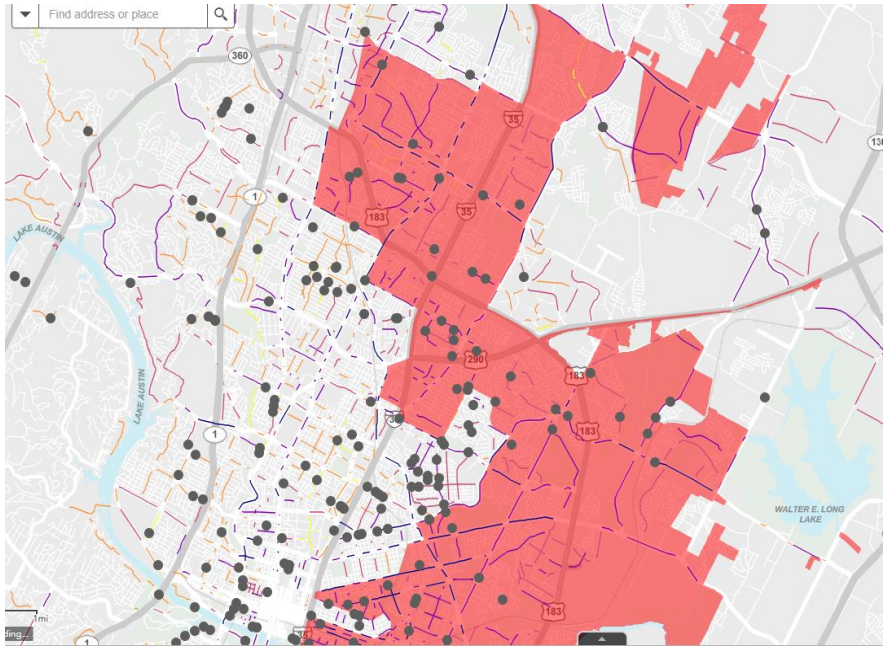
Active PHBs

Activated Pedestrian Hybrid Beacons



Completed or in Construction

All protection types – flex posts, concrete islands, etc.



Ped Crossing Opportunities

Customer Service Requests (3-1-1 Calls)

Leveraging Funds with Partnerships

TRANSPORTATION PUBLIC WORKS

Funding Partners Include:

- Street and Bridge Operations
- Sidewalks Program
- Vision Zero
- Speed Management
- Signals
- Bikeways Program
- Transit Enhancement Program (TEP)
- Safe Routes to School (SRTS) Program
- External Agencies, such as TxDOT

A pedestrian crossing on Bluebonnet Lane, constructed in partnership with the Safe Routes to School Program.

Lessons Learned | Opportunities for Improvement

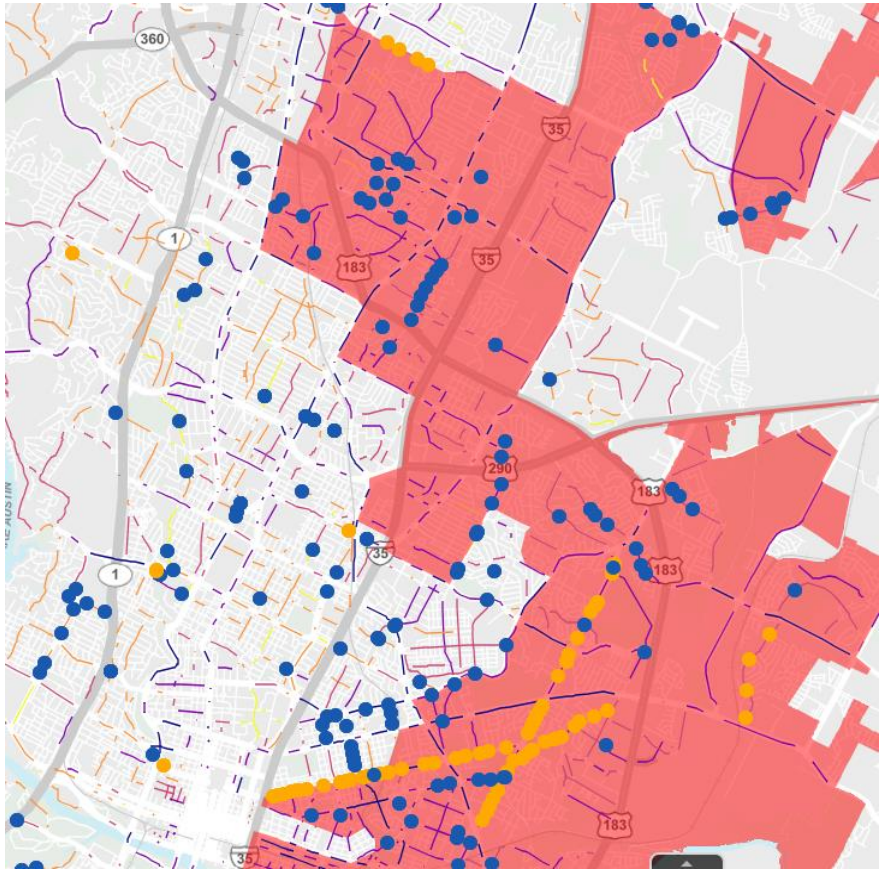
TRANSPORTATION PUBLIC WORKS

- **Partner buy-in is key** - Scoping and partnerships needed early for project delivery process
  - Who has interest in the project area and willing to cost-share?
- **Cross-Agency Coordination** - Identify key Jurisdictional boundaries for regular coordination
  - TxDOT ROW jurisdiction
- **Dedicate funding for signal improvements**
  - Identify resource capacity for signal studies in-house and contractual per year;
  - Determine funding levels per year

New sidewalks with pedestrian crossings along Chestnut Avenue made possible through coordination among the Bikeways, Sidewalks and Pedestrian Crossing programs.

Big Picture | Next Steps

- Data quality is important - document existing data and backlog of completed projects
- Develop a project intake and internal review process with key partners
  - Identify roles and responsibilities internally for a new program and buy-in to the process
- Develop reporting metrics
- Recalibration of the crossing gap tool as projects are completed



Map of completed or in-construction pedestrian crossings representing most but not all built crossings, pending data entry of unmapped locations.

Project Examples

Jones Road

Jones Road – A concrete crossing island at Pack Saddle Pass, serving a senior center in South Austin.

46th-47th St Neighborhood Bikeways

At Red River St. and 46th St. – paint and post crossing island installed with a neighborhood bikeway project in Central Austin.

Thank you!

Q & A

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