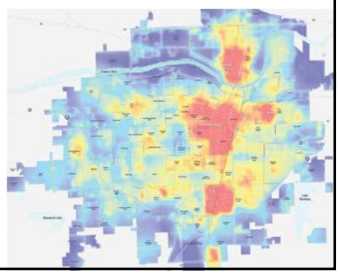

# Advancing Accessibility Through Advanced Asset Management

## 2016 Pedestrian Master Plan Goals

- A Complete Pedestrian Network
- Maintained Sidewalks
- Safety and Comfort
- A Culture of Walking
- Priority Projects



## Purpose and Vision of Update

- Enhance/Expand Previous Plans
- Sidewalk Condition Inventory
- Objective Data-Driven Methods
- Actionable
- Transparent
- Community-Driven
- Comprehensive Scoring System
- Powerful AI Tools

TOPEKA
PEDESTRIAN
MASTER PLAN
Summer 2025

## Project Partners

WASHBURN UNIVERSITY

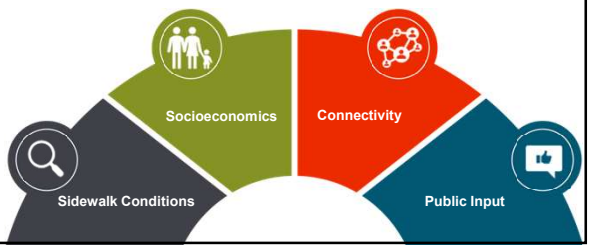
TIGER EYE ENGINEERING

mTPO

MERGE MIDWEST ENGINEERING

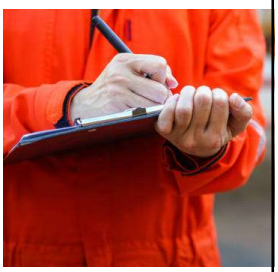
## Roadmap for Success

**Project Prioritization**




## The Challenge of Data Collection

- Inventory 700 Miles of Sidewalk
- Perform Condition Assessment
- Log the Data into ArcGIS
- Don't Break the Bank
- Avoid Human Bias During Collection



## Advanced Machine Learning/Analytics

- Streamlined Data Collection Process
- Powerful and Consistent Pavement Evaluation Procedures
- Advanced Machine Learning
- Data Analytics and Visualization

TIGER EYE ENGINEERING

## Data Collection Equipment

**Equipment**
- E-bikes
- Bike trailer w/ equipment
- GoPro camera
- 360-degree camera

**Team**
- Washburn University Students
- Route Planning
- Two Teams of Two Plus One Rover

## In the Field

**Benefits**
- High-Resolution Video
- AI Machine-Learning Algorithm Image Analysis
- Inventory Audit/Review

**Challenges**
- Equipment Failures
- Flat Tires
- Students Following Instructions
- Punch List/Redos

## Benefits of AI Assessment

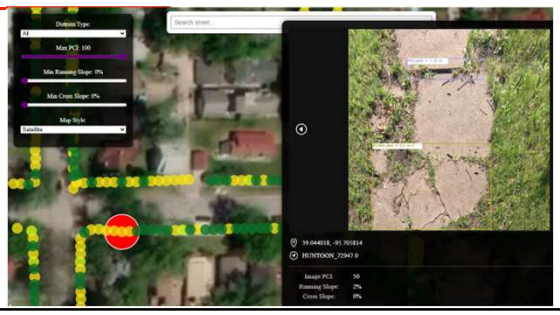
**The Software Identified:**

- Cracking
- Spalling
- Divided Slabs
- Corner Breaks
- Alligator Cracking
- Brick Sidewalks


## Video Conversion & Analysis

- Convert video to .jpg images
- 400,000+ images analyzed
- Representing 10' segments
- Compliance checks
- PCI scores

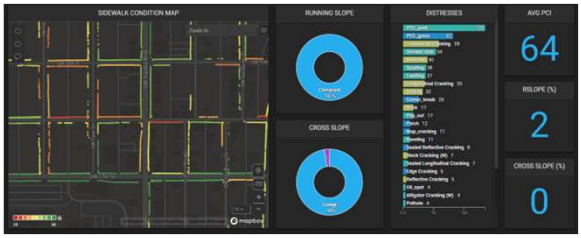

## Visualization Tools



## Interactive Data Visualization

- Heat Maps
- Distress Type Filters
- Categorized Preferences


## Interactive Data Visualization




## Interactive Data Visualization

## Interactive Data Visualization


## Five-Point Rating Scale

**5 – "Very Poor" Highest Repair Concern**
(PCI < 20)

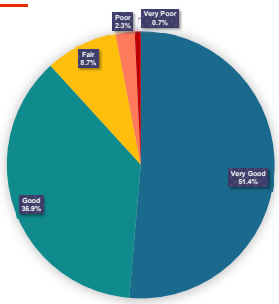
**4 – "Poor" Second Highest Concern**
(20 ≤ PCI < 40)

**3 – "Fair" Growing Repair Concern**
(40 ≤ PCI < 60)

**2 – "Good" Low Repair Concern**
(60 ≤ PCI < 80)

**1 – "Very Good" No Repair Concerns**
(PCI ≥ 80)

## Sidewalk Condition Assessment



## Pedestrian Needs Assessment

- Pairwise Comparison Exercise
- Probable Origins and Destinations
- Distance Evaluation of Every Sidewalk Segment to Destination Type

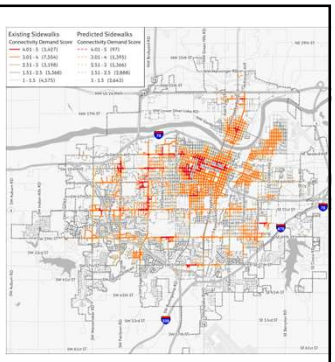
**Probable Origins and Destinations**

- Attractions
- Community Spaces
- Government and Health Care
- Grocery
- Office/Commercial
- High-Density Residential
- Worship/Religious
- Shopping
- Schools/Child Care
- Transit
- Parks/Recreational

## Pedestrian Needs Assessment

Predicted and Existing Sidewalk Network

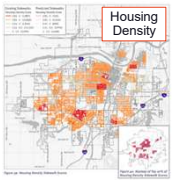
- Closest Facility Network Analysis
- Scored Based on Distance from Sidewalk Segment to Destination
- Scored 1-5
  - 5 = Most Connected
  - 1 = Least Connected

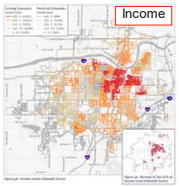


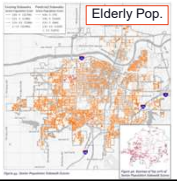
## Socioeconomic Factors

- Needs-Based Analysis
- US Census and American Community Survey Data
- Normalized to Topeka's Demographics

## Socioeconomics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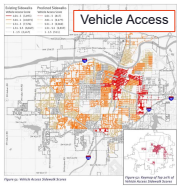
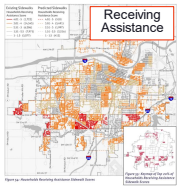
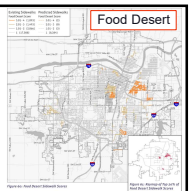
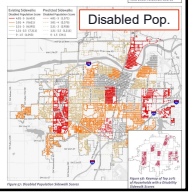


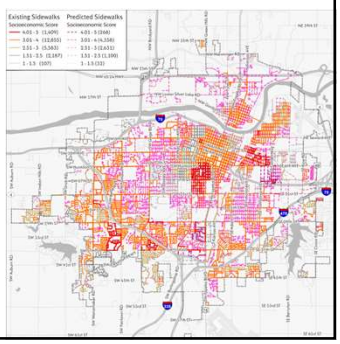




## Socioeconomics Results

- Aggregate Score (1-5)
  - Higher Scores = Greater Need
- Contextualizes Priorities



## Community Engagement

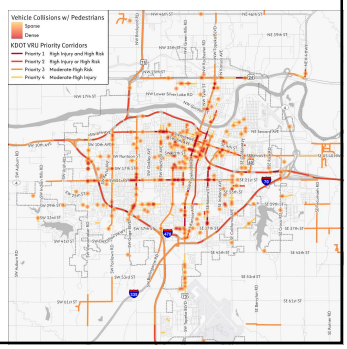
- Two Public Meetings
- ArcGIS StoryMap
- Pin-a-Comment Map
- Public Survey

**Takeaways**

- Factors Influencing Sidewalk Use
- Common Barriers

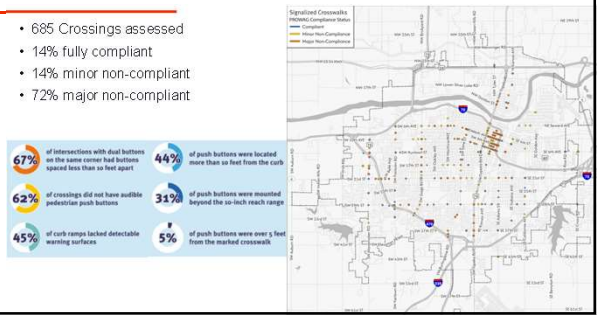

## Pedestrian Safety

- Pedestrian crash density
- Correlates to
  - Sidewalk condition
  - Pedestrian crossing safety
  - Pinch points in the network



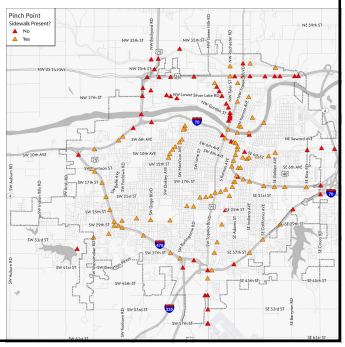

## Roadway Crossing Analysis

- 685 Crossings assessed
- 14% fully compliant
- 14% minor non-compliant
- 72% major non-compliant



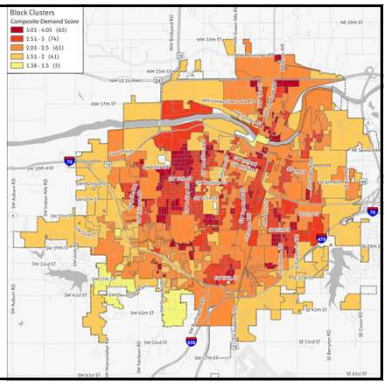
## Pinch Points

- Identified 133

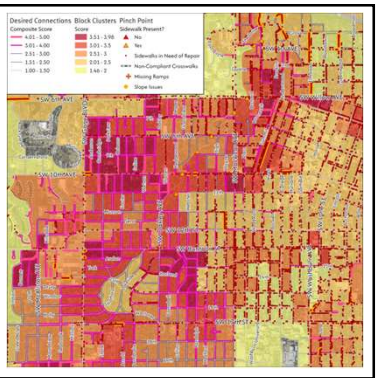



## Results

- Multi-Variate Cluster Analysis
- Identified approx. 32,000 Potential Sidewalk Projects
- Grouped Projects ($100-$600k)

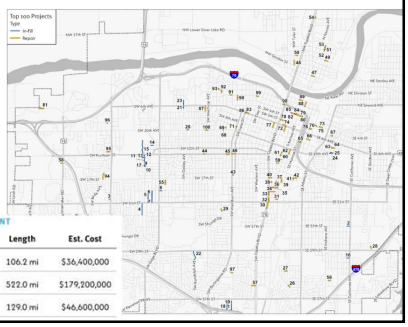



## Neighborhood Example



## Aggregated & Weighted Score Results

- Blended results
- Repair projects
  - PCI <40 (very poor)
- Infill projects



SIDEWALK NEEDS ASSESSMENT

| | Length | Est. Cost |
|---|---|---|
| Medium & High Priority Infill | 106.2 mi | $36,400,000 |
| Low Priority Infill | 522.0 mi | $179,200,000 |
| Proposed Sidewalk Repairs | 129.0 mi | $46,600,000 |


## Questions?

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