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# City of Austin Intersection Daylighting Needs and Opportunities Analysis

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# Presenters

Joel Meyer

Acting Transportation Safety Officer

Nan Jiang, PhD, PE, PMP, RSP1

Data Science Practice Lead



# Vision Zero in Austin

- Adopted in 2015
- Based on the Safe Systems approach to traffic safety
- Where we've invested in safety we've seen positive results
  - Major intersection safety projects have seen a 29% decrease in injury + fatal crashes
  - 70% reduction in left turn crashes where protected turns have been implemented
  - 64-70% decrease in high-risk speeding for safety corridors (e.g. Barton Springs Road)
- Intersection Daylighting represents a low-cost, impactful systemic safety strategy that can potentially be implemented at scale

# What is Intersection Daylighting?

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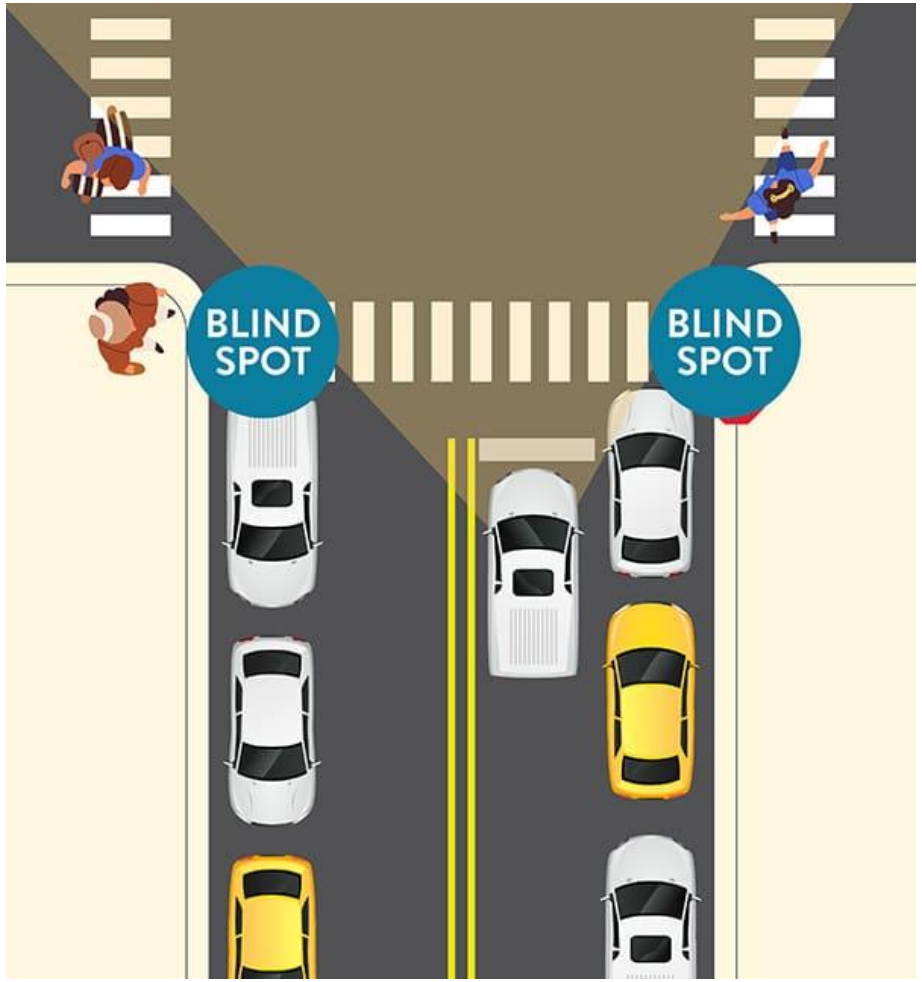
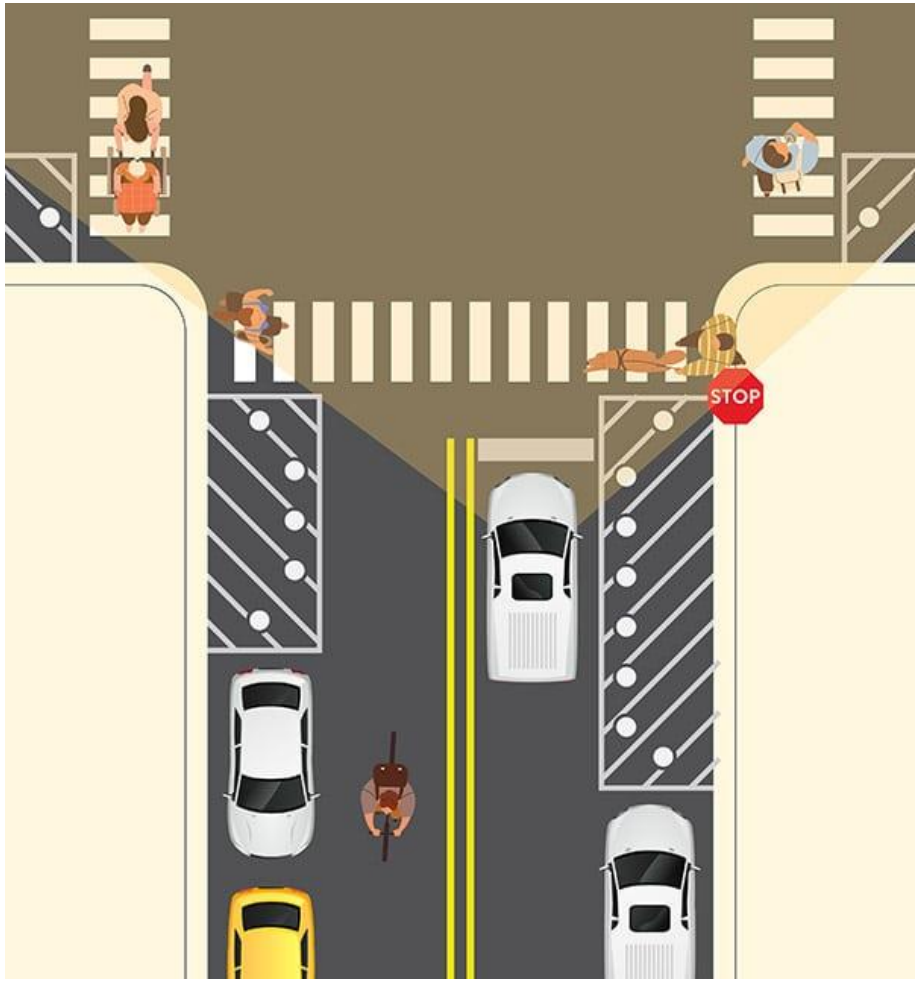



Before Daylighting




After Daylighting

Source: https://www.cityoflancasterpa.gov/blog/vision-zero-what-is-intersection-daylighting/

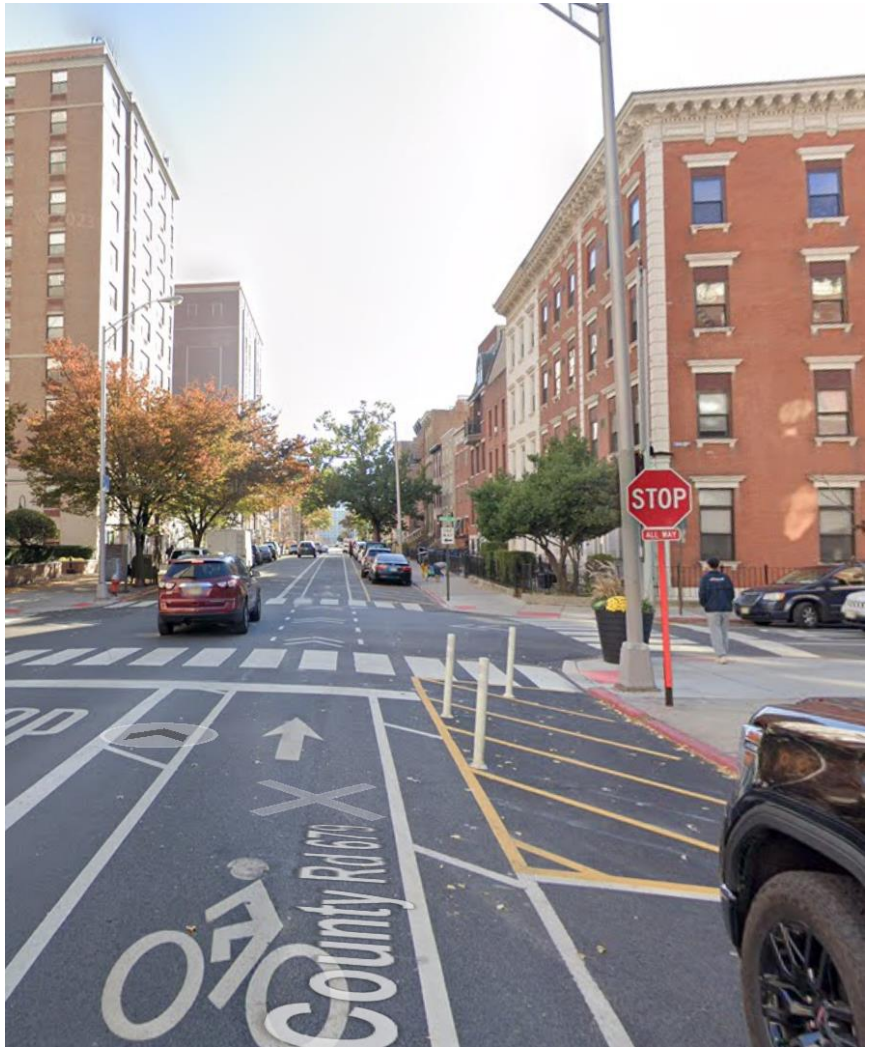
# Why Intersection Daylighting?

Intersection daylighting improves safety at intersections:

- Restricting parking near intersections can **reduce pedestrian crashes** by 30% (FHWA)
- **Reduces blind spots** and gives drivers, pedestrians, and cyclists a **better view** of the intersection
- Provides **more time to respond** to other approaching road users
- **Slow turning vehicles** so they're more likely to see and yield to pedestrians in the crosswalk

Source: https://www.thomasbardenett.com/blog/2022/6/30/lets-talk-about-intersections

# Examples - Hoboken, NJ




Source: https://www.bloomberg.com/news/features/2023-11-28/the-case-for-daylighting-the-cheap-traffic-safety-fix-that-cities-need

# Examples – Seattle, WA



# Examples - Baltimore, NY

Source: https://www.strongtowns.org/journal/2023/6/27/tactical-urbanism-in-baltimore-yields-safer-streets-inspiring-art

# Examples – New York, NY

Daylighting intersections for increased visibility also opens up space for bike racks, curb extensions, and bioswales that diversify the use of the curb space.

Sources: https://www.nyc.gov/office-of-the-mayor/news/914-23/mayor-adams-launches-new-effort-make-thousands-nyc-intersections-safer-of-broad-new; https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/visibility-sight-distance/

# Literature and State of Practice Review

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## Existing Daylighting Programs

- **Initiatives in Other Cities**
  - City of Hoboken, NJ
  - City of San Francisco, CA
  - City of Lancaster, PA
  - City of Baltimore, GA
  - City of Orlando, FL
  - New York City, NY
- **Initiative in the City of Austin**
  - Vision Zero

## State of Practice

- **Design Guidance**
  - NACTO (2013) Urban Street Design Guide
  - Portland Bureau of Transportation (2018) Vision Clearance Guidelines
  - Hoboken Street Design Guide
- **Different Treatments and Materials Used**
- **Intersection Prioritization**
- **Safety Results**
- **Maintenance Considerations**
- **Measurable Goals and Performance Measures**

# Literature Review Findings

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- Traditional intersection daylighting treatments have been **proven effective** in enhancing safety. They are low-cost, require minimal time for implementation, and entail straightforward maintenance. Additionally, they typically involve minimal approval or permitting processes.
- **Permanent treatments**, such as curb extensions, **are** considered **more effective** solutions for improving intersectional safety due to their durability, minimal maintenance requirements, and proven safety benefits.
- Cities commonly prioritize intersections based on the **High Injury Network (HIN)** and their **proximity to schools**, recognizing the importance of targeting areas with higher risk.
- Aligning daylighting efforts with Vision Zero goals and **adhering to state and local regulations** can facilitate the successful implementation of daylighting projects, ensuring consistency and compliance with safety standards.
- Collecting detailed **data** to support the measurement and tracking of **performance metrics** is crucial for evaluating the effectiveness of intersection daylighting.

# Peer City Interview Findings

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## Participants

- City of Orlando
- San Francisco Municipal Transportation Agency (SFMTA)
- New York City Department of Transportation (NYCDOT)

## Peer City Interview Findings

- To maximize safety benefits, daylighting initiatives should be **integrated with broader safety improvements** across intersections.
- Intersection prioritization often centers on High Injury Networks (HIN), areas with high rates of bike and pedestrian crashes, angle crashes, and proximity to critical community locations like schools, parks, and senior living facilities.
- **Utilizing readily available and low-cost materials** is essential for effectively maintaining daylighting initiatives and managing associated maintenance costs.
- **Utilizing quick-build techniques** allows cities to test temporary improvements before committing to permanent changes.
- **Identifying funding** for long-term maintenance and upkeep of daylighting projects is important.
- Where possible, it is recommended to **incorporate intersection safety improvements into broader urban plans** like Orlando's Downtown Master Plan example.

# Systemic Daylighting Needs Analysis

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## Data Consolidation and Processing

- **Identify intersection crashes**
  - Crash flagged as intersection-related and within 200 feet of an intersection.
  - Crash location is within 100 feet of a signalized intersection or 50 feet of an unsignalized intersection, and the closest street segment to the intersection must be part of that intersection. This ensures that crashes on grade-separated streets get assigned to intersections properly.
- **Subset crashes that can be addressed by daylighting – "Potential Sightline Crashes"**
  - Any crashes flagged with Vulnerable Road User (VRU) involvement
  - Any collision description that has "ONE MOTOR VEHICLE" that also involves a VRU (to exclude single-vehicle crashes):
    - ONE MOTOR VEHICLE - GOING STRAIGHT
    - ONE MOTOR VEHICLE - TURNING LEFT
    - ONE MOTOR VEHICLE - TURNING RIGHT
  - Certain ANGLE crashes at non-signalized intersections only (to exclude red light running):
    - ANGLE - BOTH GOING STRAIGHT
    - ANGLE - ONE STRAIGHT-ONE LEFT TURN
    - ANGLE - BOTH LEFT TURN (can be at any control type)
    - ANGLE - ONE STRAIGHT-ONE RIGHT TURN (can be at any control type)

# Systemic Daylighting Needs Analysis

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## Data Consolidation and Processing

- **Subset intersections that have on-street parking**
  - The presence of on-street parking was determined based on the following features:
    - “Parking zones” GIS data provided by the City of Austin
    - ‘Cross section’ field of the roadway network GIS data provided by the City of Austin
    - Presence of ‘no parking’ signs along roadways, based on City’s sign asset data
  - For roads with availability of parking that could not be determined by the above features, the following assumptions were made:
    - Service and frontage roads do not allow on-street parking
    - Roadways within 200 feet of parcels with single family, mobile homes, undeveloped, or agricultural land use codes were assumed to have low parking occupancy
    - Roadways within 200 feet of parcels with multifamily housing, commercial, mixed use, office, hospital, government services, educational, meeting and assembly, cultural services, parks, or transportation facilities land use codes were assumed to have high parking occupancy

# Systemic Daylighting Needs Analysis

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## Identify Systemic Screening Factors

- Functional Class  Combination
- Highest Lane Count
- Maximum Speed
- Maximum AADT
- AADT Ratio
- High Pedestrian Trip Potential
- Austin Equity Analysis Zone (EAZ) Vulnerability
- Off Street Leg
- Turn Lanes
- Traffic Control
- Protected Bike Intersection
- Street Lighting Presence
- Near Transit Stop
- Near Education Center
- Near Park
- Sidewalks Present
- Driveways Present
- Intersection Traffic Calming
- Segment Traffic Calming

# Systemic Daylighting Needs Analysis

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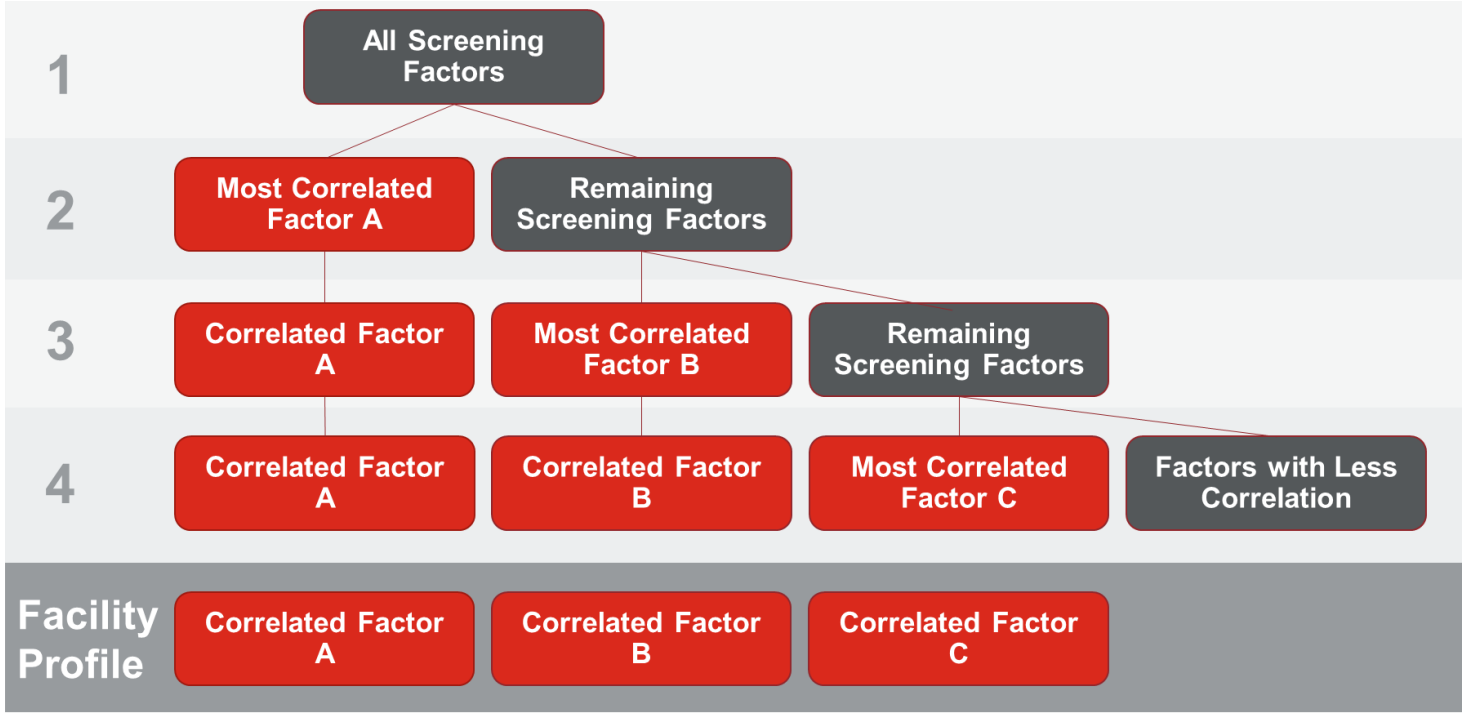
## Systemic Screening Process

A decision tree machine learning algorithm screens all factors recursively to identify the most correlated factor and continues until a set of factors is identified as a facility profile.



# Systemic Daylighting Needs Analysis

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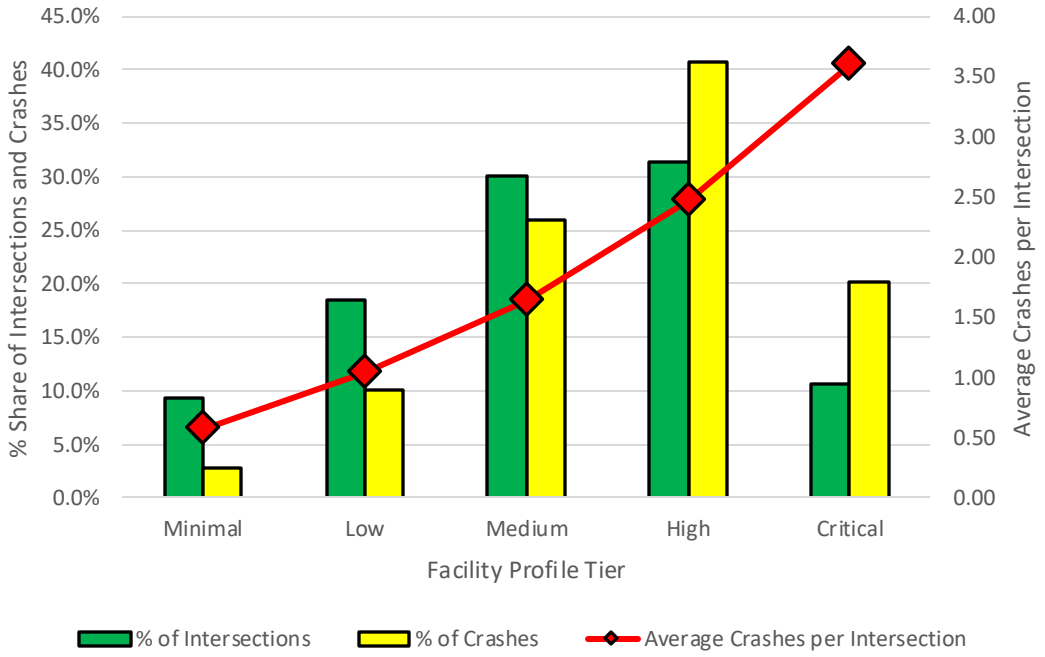
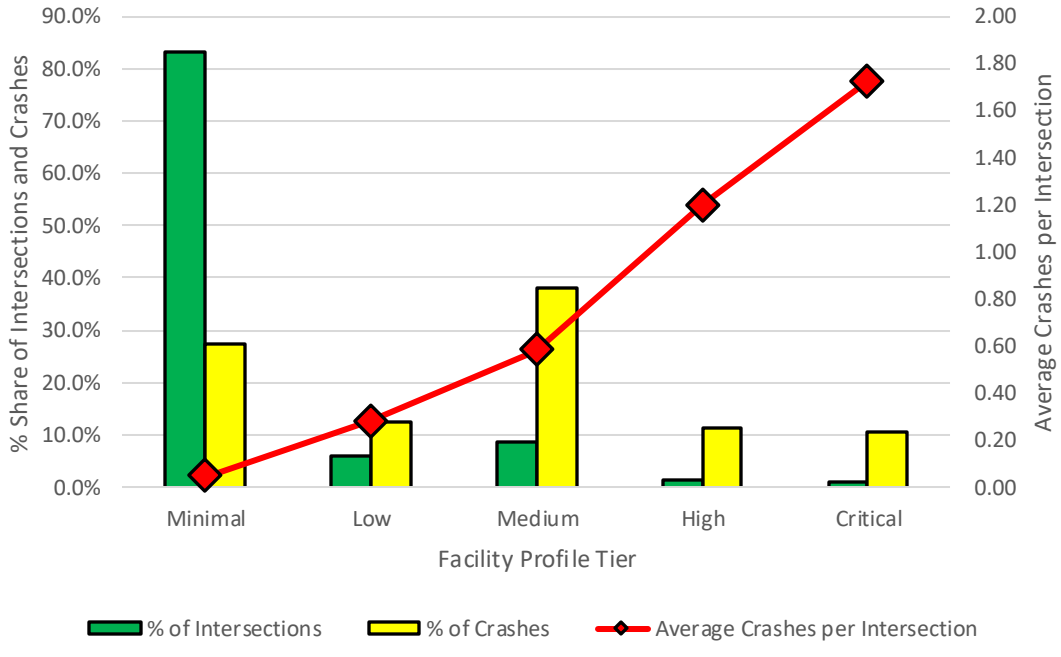
## Systemic Screening Results




The Critical and High tiers intersections carry about 60% of potential sightline crashes but represent only about 40% of the studied **signalized intersections**




The Critical and High tiers intersections carry about 22% of potential sightline crashes but represent only about 2% of the studied **unsignalized intersections**

# Systemic Daylighting Needs Analysis

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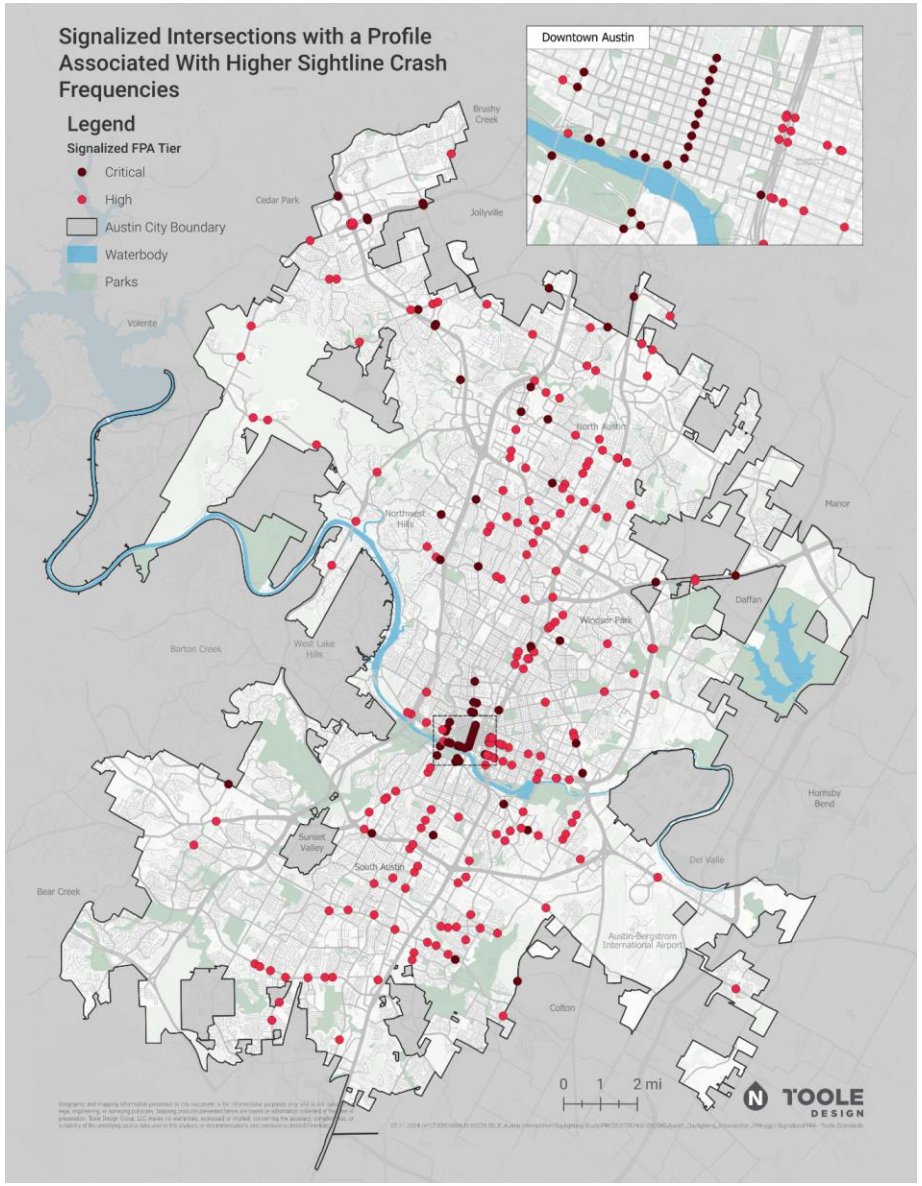


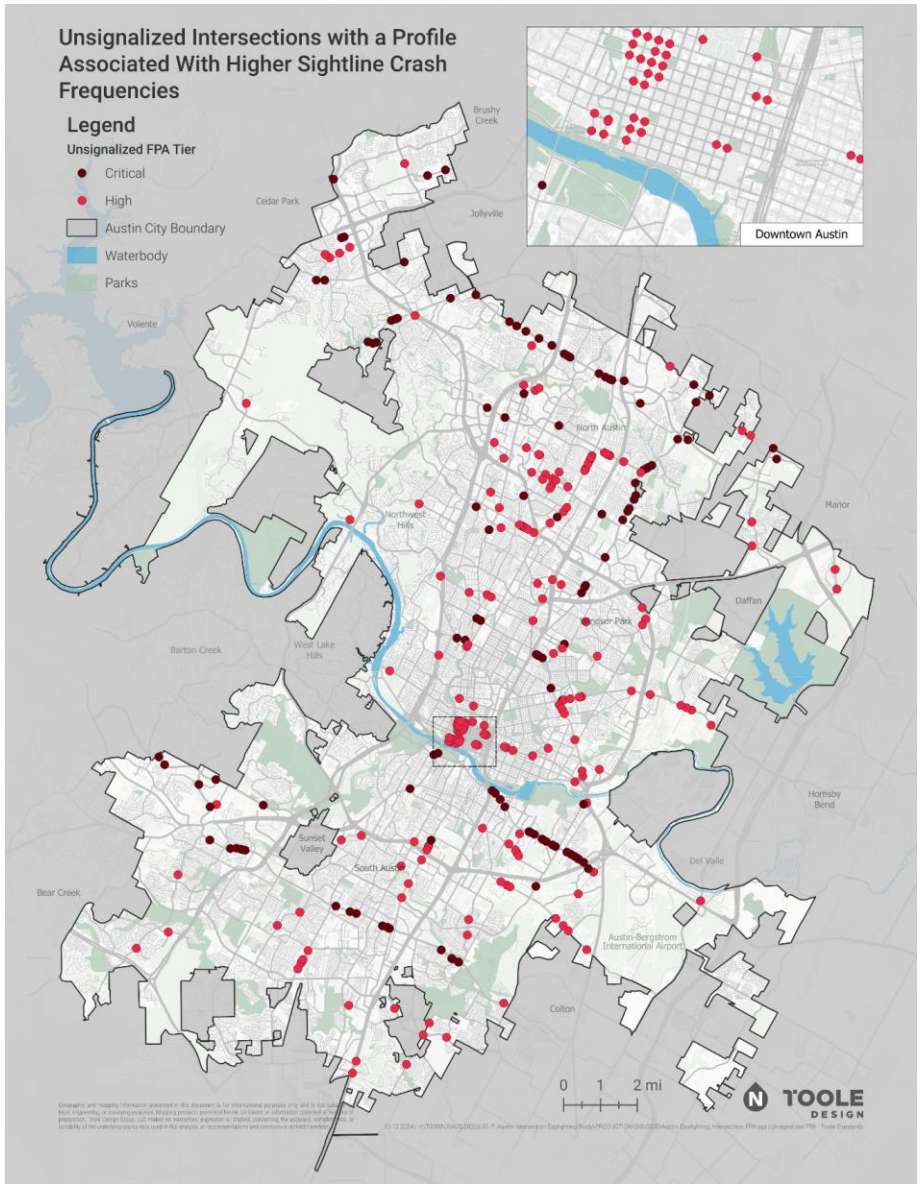

# Intersection Prioritization

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| Category | Metric | Description | Weight | Score |
|---|---|---|---|---|
| **Crash History** | Overlap with HIN | Located along the City's HIN | 20% | 5 pts – If the intersection is on Ped HIN<br>3 pts – if the intersection is on the overall HIN<br>0 pts – not on HIN |
| | Crash Severity | Number of KSI "potential sightline crashes" | 10% | 5 pts – 3 KSI crashes<br>3 pts – 2 KSI crashes<br>1 pts – 1 KSI crashes |
| | Systemic Crash Risk | Risk level from the systemic safety analysis | 5% | 5 pts - Critical<br>3 pts - High |
| **Intersection Characteristics** | Connecting bike/ped facilities | Intersections with a shared-use path/trail or protected bike lane approach | 15% | 5 pts - Yes<br>0 pts - No |
| | Intersection Control Type | Signalized vs four-way vs two-way controlled | 15% | 5 pts – signalized intersections<br>3 pts – 2-way stop controlled intersection |
| | Intersection geometry | Intersections with more than 4 legs or skewed angles | 10% | 5 pts – with more than 4 legs or skewed angles larger than 60 degrees<br>3 pts – with skewed angles larger than 45 degrees<br>1 pts – with skewed angles larger than 30 degrees |
| **Land Use Context** | High Pedestrian Trip Potential | Whether there is a high trip potential at the intersection based on the "walk trip potential" analysis from Austin Walk Bike Roll. | 25% | 5 pts - Yes<br>0 pts - No |
| | | Total | 100% | |

# Manual Verification

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## Prioritization Score ≥ 50; Total Reviewed: 205

- Location for Daylighting — 66
  - Improve sight lines, improve existing no parking/daylighting
- Location for Other Safety Improvement + Daylighting — 62
  - Locations with unobstructed sight lines, low parking volumes, low pedestrian volumes, and driveways near intersections
- No Improvements — 77
  - Existing daylighting, intersections with no parking lanes

# Example Location for Daylighting


- Enforce existing No Parking areas
- Shorten crosswalk
- Improve visibility for pedestrians and vehicles

Improve existing daylighting

# Example Location for Daylighting


- Improve sight lines blocked by existing fence
- Shorten crosswalk
- Improve visibility for pedestrians and vehicles

Improve sight lines

# Example Location for Other Safety Improvement



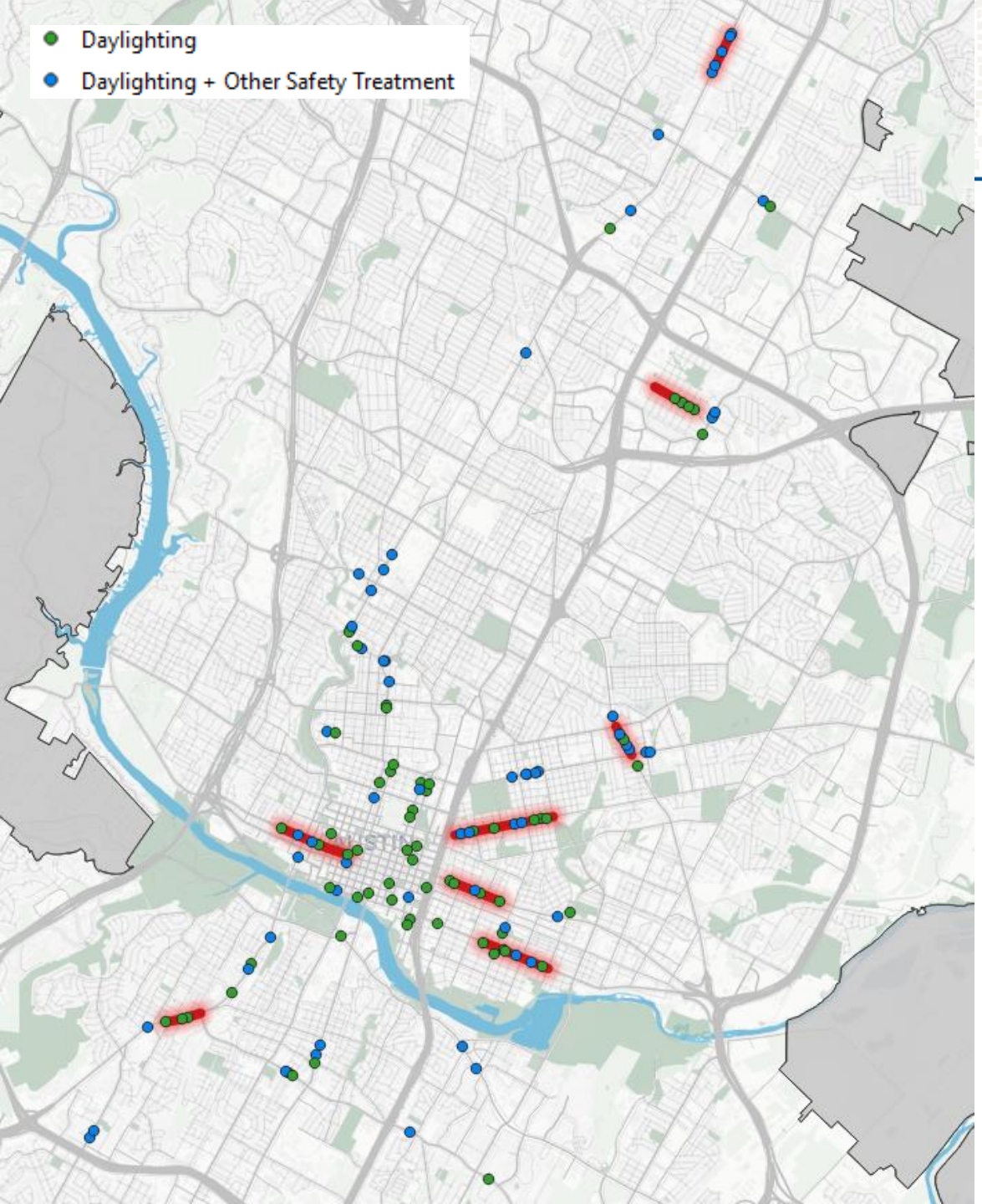

Driveways near intersection

- Daylighting will not work due to existing driveways
- Other safety improvements should be considered to improve safety for pedestrian crossing without blocking driveways

# Daylighting Not Recommended


Daylighting exists


No parking lanes on all intersection legs

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# Implementation Considerations

- Other planned projects
- Clusters of intersections
- Coordination with other agencies such as TxDOT, Cap Metro
- Maintenance considerations
- Evaluation

# QUESTIONS?

Joel Meyer: Joel.Meyer@austintexas.gov
Nan Jiang: njiang@tooledesign.com