Appendix A
Pedestrian Level of Traffic Stress (PLTS) Methodology

Appendix A: Pedestrian Level of Traffic Stress (PLTS) Methodology

Overview

The pedestrian level of traffic stress (PLTS) analysis estimates the level of comfort for people walking on a given roadway segment. The PLTS analysis identifies where "gaps" or deficiencies in a pedestrian network exist, and provides a measure of how likely pedestrians are to use the facility, based on ability and comfort level.

Alta's PLTS analysis methodology is adapted from the Oregon Department of Transportation's *Analysis Procedures Manual*[1] and is intended as a companion for bicycle level of traffic stress (BLTS). PLTS is determined by characteristics of a given roadway segment that affect a pedestrian's perception of safety and comfort including sidewalk presence and width, sidewalk buffer width and type, posted speed limit, and number of travel lanes. PLTS scores classify road segments into one of four levels of traffic stress and, while similar to BLTS scores, PLTS considers the level of attention required in addition to the user experience:

- PLTS 1 represents roadways where pedestrians of all ages and abilities would feel comfortable walking and require little attention to traffic.
- PLTS 2 represents slightly less comfortable roadways that require more attention to traffic and are suitable for children over 10, teens, and adults.
- PLTS 3 represents moderately uncomfortable roadways, where most able-bodied adults would feel uncomfortable but safe.
- PLTS 4 represents high traffic stress and would be used only by able-bodied adults with limited route choices.

The results of the PLTS analysis identifies existing areas that are low-stress for pedestrians, as well as the degree to which roadways must be improved in order to provide a comfortable experience for pedestrians of all ages and abilities. Additionally, scenario testing can be used to determine how a roadway or route's level of stress may change with improvements. The analysis is intended for use in urban areas specifically; while it can be used in rural conditions where pedestrian facilities exist, the methodology will yield a high PLTS score (greatest discomfort) where high-speed traffic is present.

Methodology

PLTS analysis is completed through an assessment of street segments using spatial data and aerial imagery. Each segment of the roadway is evaluated based on its characteristics; if multiple scores are present within a segment, the highest (most stressful) score is used as the overall segment score.

[1] Oregon Department of Transportation, Transportation Development Division Planning Section: Transportation Planning Analysis Unit. 2020. *Analysis Procedures Manual* Version 2. https://www.oregon.gov/odot/Planning/Pages/APM.aspx.

PLTS considers elements of the pedestrian environment both individually (e.g., buffer type), and in combinations that are known to influence each other (e.g., sidewalk width and pavement quality). The analysis uses the following overall guiding principles:

- The presence of a complete sidewalk serves as the foundation of the pedestrian network.
- As the sidewalk width increases and sidewalk condition improves, the level of stress of the pedestrian environment decreases.
- Buffering width is the total distance between the sidewalk and motor vehicle travel lanes. As width increases, the amount of separation between pedestrians and motor vehicles increases, and the pedestrian environment becomes less stressful.
- Buffer type describes the quality of the buffer that separates the sidewalk from the travel lanes. The presence of a buffer itself provides both actual and perceived safety benefits for the pedestrian, thus decreasing the stress of the pedestrian environment. A buffer with vertical elements is especially effective at increasing the safety of the pedestrian. Landscaping serves to enhance the pedestrian's travel experience.

Scores for each element of the pedestrian environment are assigned to each segment of the sidewalk centerline, and the worst (highest scoring) of the elements is used. If two sidewalks are present on a street, the worst (highest scoring) result is mapped to the centerline.

Figure 1 illustrates the overall PLTS scoring process. Notes on data inputs and assumptions are found in Table 1. Segment scores are assigned as shown in Table 2 through Table 5.

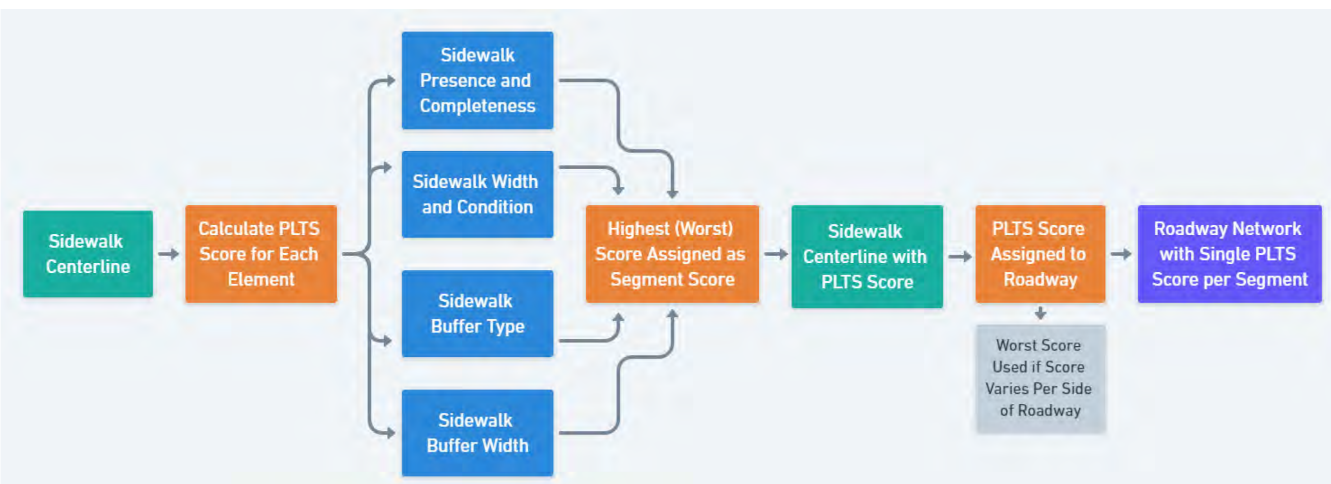


Figure 1. The Pedestrian Level of Traffic Stress Scoring Process

Table 1. Data Inputs and Assumptions

Pedestrian Element	Rationale	Data Inputs
Sidewalk Presence and Completeness (Table 2)	The presence and completeness of sidewalk facilities is the baseline for measurement. At a minimum, sidewalks should be present and complete on most roadways to facilitate pedestrian travel.	Based on OpenStreetMap (OSM) data and supplemented by manual review within study area.
Sidewalk Width and Condition (Table 3)	The width of the sidewalk can have an impact on the associated comfort level. Wider sidewalks provide greater comfort, especially on high-speed roadways. The condition of the sidewalk is primarily based on concrete quality.	Based on OSM data and supplemented by manual review within the study area.
Sidewalk Buffer Type (Table 4)	The buffer type changes the pedestrian experience as it can offer a range of perceived and actual levels of protection. High-speed roadways are considered to be less comfortable, and a more substantial buffer increases pedestrian comfort.	Based on OSM data and supplemented by manual review within the study area.
Sidewalk Buffer Width (Table 5)	Total buffering width is the summation of the width of buffer, width of parking, width of shoulder, width of curb and gutter, and width of the bike lane on the same side of the roadway as the pedestrian facility being evaluated.	Based on OSM data and supplemented by manual review within the study area.

Tables 2 through 5 specify the scoring criteria based on sidewalk presence, sidewalk width and condition, buffer type, and buffer width, in relation to the existing roadway condition (factors such as speed and number of lanes). The criteria are adapted from the Oregon Department of Transportation *Analysis Procedures Manual*. These tables are used in combination to assign an overall PLTS score; if multiple scores are present within a segment, the highest (most stressful) score is used as the overall segment score.

Table 2. Pedestrian Level of Traffic Stress Based on Sidewalk Presence and Completeness

Number of Travel Lanes	Posted or Prevailing Speed				
	≤ 25 mph		*30–35 mph*		*≥ 40 mph*
	2 Lanes	*> 2 Lanes*	*2 Lanes*	*> 2 Lanes*	*2 Lanes*
Complete Sidewalk on Both Sides[1]	LTS 1	LTS 2	LTS 2	LTS 3	LTS 3
Complete Sidewalk on One Side	LTS 2	LTS 3	LTS 3	LTS 4	LTS 4
No Sidewalk[2]	LTS 2	LTS 4	LTS 4	LTS 4	LTS 4

1. Partial sidewalk coverage on a block is not considered complete.
2. Residential (OSM Highway class local) roadways without sidewalk default to LTS 2; roadways without sidewalk default to LTS 4.

Table 3. Pedestrian Level of Traffic Stress Based on Sidewalk Width and Condition

		Sidewalk Condition[3]			
		Good	*Fair*	*Poor*	*Very Poor*
Actual/Effective Width (feet)[1,2]	< 4	LTS 4	LTS 4	LTS 4	LTS 4
	≥ 4 to < 5	LTS 3	LTS 3	LTS 3	LTS 4
	≥ 5	LTS 1	LTS 2	LTS 3	LTS 4
	≥ 6	LTS 1	LTS 1	LTS 2	LTS 3

1. Effective width is the available/usable area for the pedestrian clear of obstructions. Effective width does not include areas occupied by storefronts or curbside features.
2. For analysis purposes, a standard width of five feet was assumed for all sidewalks.
3. Sidewalk condition is assumed to be good unless other information is available.

Table 4. Pedestrian Level of Traffic Stress Based on Physical Buffer Type

Buffer Type[1]	Prevailing or Posted Speed			
	≤ 25 mph	*30 mph*	*35 mph*	*≥ 40 mph*
No Buffer (curb tight)	LTS 2[2]	LTS 3	LTS 3	LTS 4
Solid Surface	LTS 2[2]	LTS 2	LTS 2	LTS 2
Landscaped	LTS 1	LTS 2	LTS 2	LTS 2
Landscaped with Trees	LTS 1	LTS 1	LTS 1	LTS 2
Vertical	LTS 1	LTS 1	LTS 1	LTS 2

1. Combined buffer: If two or more of the buffer conditions apply, use the most appropriate (typically the lower-stress type).
2. If no centerline is present (residential street) or the street is traffic calmed (including sporadic vertical separation such as street furniture, street trees, lighting, planters, surface change, and so on), then the PLTS can be lowered by one PLTS level.

Table 5. Pedestrian Level of Traffic Stress Based on Physical Buffer Width[1]

Total Number of Travel Lanes (both directions)[3]	Total Buffering Width (feet)[2]				
	< 5	*≥ 5 to < 10*	*≥ 10 to < 15*	*≥ 15 to < 25*	*≥ 25*
≤ 2	LTS 2[4]	LTS 2	LTS 1	LTS 1	LTS 1
3	LTS 3[4]	LTS 2	LTS 2	LTS 1	LTS 1
4–5	LTS 4[5]	LTS 3	LTS 2	LTS 1	LTS 1
6 ≥	LTS 4[5]	LTS 4[5]	LTS 3	LTS 2	LTS 2

1. Source: Based on Oregon Department of Transportation *Analysis Procedures Manual*, Table 14-23.
2. Total buffering width is the summation of the width of buffer, width of parking, width of shoulder, width of curb and gutter, and width of the bike lane on the same side of the roadway as the pedestrian facility being evaluated.
3. One-way facilities are assumed to have their lanes multiplied by 2 to represent exposure to lane crossing.
4. If no centerline is present (residential street) or the street is traffic calmed (including sporadic vertical separation such as street furniture, street trees, lighting, planters, surface change, and so on), then the PLTS can be lowered by one PLTS level.
5. Sections with a substantial physical barrier/tall railing between the travel lanes and the walkway (such as might be found on a bridge) can be lowered to PLTS 3.

Appendix B
Level of Traffic Stress and OpenStreetMap Derivation Assumptions

Appendix B: Level of Traffic Stress and OpenStreetMap Derivation Assumptions

Overview

Alta uses a tiered data collection framework for level of traffic stress (LTS) analysis that derives initial analysis inputs from readily accessible data, in order to determine where additional data collection will be of the most value to meet project goals. In the case of LTS analysis, Alta derives initial base analysis inputs from OpenStreetMap (OSM) data.[1] This appendix documents how Alta develops the input variables for this analysis.

Where OSM data includes values for lanes, posted speeds, bike lanes, sidewalks, parking lanes, and one-way tags, these tags are used to populate a database for LTS inputs. Once that database is populated, Alta uses the Mekuria et al. 2012 LTS methodology to score roadway segments. This initial LTS is intended to be augmented by automated or manual review of aerial imagery, local GIS data, and/or street view data. Once the base input values have been validated, the LTS scores can be refreshed using Alta's LTS calculation scripts. This enables evaluation of new scenarios as needed in addition to standardized network analysis.

OpenStreetMap Processing

When using OSM networks for LTS analysis, there are several considerations for creating a useful network for visualization and analysis. The following sections outline how Alta processes OSM data for LTS and related network analyses.

Network Connectivity

OSM networks contain segments that are not ready for network analysis in most instances. There are various software processing packages such as the Open-Source Routing Machine and OpenTripPlanner that come with routines to prepare OSM networks for network analysis. Alta uses scripts built on the OSMnx[2] Python package to derive its geospatial networks. This package is used to ensure that extracted networks are valid and have appropriate end-to-

[1] OSM is a crowdsourced database of geographic features including administrative boundaries, street centerlines, points of interest, building footprints, physical and natural features, and other types of geographic information. OSM is one of the most prominent examples of volunteered geographic information, where community processes drive the contributions of geographic information to a shared database (2). These geographic features are tagged based on their attributes, and while community wiki pages provide guidance on which tags apply to which features, there is no centralized authority that authenticates these contributions. For example, street networks in OSM may include tags where contributors denote functional classification, number of lanes, one-way classification, speed limits, presence of sidewalks, and the type of bicycle facility that might be present on the network. While OSM is not always accurate, it has been benchmarked against comparable map data sources such as Google and found to have comparable or better accuracy for bike paths depending on the type of error (3). Multiple non-profits, academics, and practitioners have found OSM to be an acceptable base for initial derivation of LTS analysis (4,5,6,7).

[2] Boeing, G. 2017. OSMnx: New Methods for Acquiring, Constructing, Analyzing, and Visualizing Complex Street Networks. Computers, Environment and Urban Systems 65, 126-139. doi:10.1016/j.compenvurbsys.2017.05.004.

end connectivity provided by network segments. This process complies all OSM networks wherein the highway tag[3] is available and the corresponding geometry is a line. For cartographic presentations, it is often preferable to filter out features such as service roads (roads within parking lots) and footways (sidewalks drawn separately from the centerline). This is typically done to focus attention to facilities that jurisdictions and regions can reasonably improve.

Tag Processing

In many cases, OSM data includes tags for attributes such as lanes, posted speed, bicycle infrastructure, and other facility information recorded in the database. This data tends to more likely to be completed in urbanized areas globally, and on major facilities such as arterials and highways. There can be substantial variance in tag availability from location to location, but the presence of bike paths and a consistent indicator of functional classification is generally well recorded in OSM. In the case of bike lane blockage rates, Alta assumes these instances are rare unless manual review of commercial districts indicates otherwise. When tags are missing from OSM for the purposes of LTS analysis, the assumptions outlined in Table 1 are used as proxy values.

Table 1. Alta's OpenStreetMap Assumptions for Missing Inputs

Functional Class	Lanes[1,2,3]	Speed Limit[1,2,3]	Centerline Present[3]
Residential	2	25	No
Living Street	2	25	No
Unclassified	2	25	Yes
Track	2	30	Yes
Tertiary	3	30	Yes
Secondary	4	35	Yes
Primary	4	45	Yes
Trunk	6	65	Yes
Motorway	6	65	Yes
OTHER	2	25	Yes

1. Lane assumptions for one-way streets are halved to reflect an accurate per-segment assumption. In addition, all one-way streets are assumed to have medians for the purposes of LTS computations.
2. These assumptions only apply if there is no tag provided for speed limit or number of lanes.
3. These assumptions were developed based on Wasserman et al. 2019 and Harvey et al. 2019.

LTS analysis also requires an understanding of other geometric considerations, such as bicycle facility width and parking lane width (if present). Alta begins with a "benefit of the doubt" approach for these attributes, meaning that if they are present, they are assumed to be of sufficient width. Validation is recommended for detailed LTS assessments, but this is

[3] Highway Tag. Key:highway - OpenStreetMap Wiki. (n.d.). https://wiki.openstreetmap.org/wiki/Key:highway.

typically less important for less rigorous, or large-scale (e.g., county-, region-, or state-wide) LTS-based analysis. Bicycle infrastructure-related tags are processed using assumptions outlined in Table 2.

Table 2. Alta's OpenStreetMap Assumptions for Bicycle Facilities

Cycleway Tag[1]	Bicycle Facility Type	Assumed Bicycle Facility Width (Feet)	Is Protected
Shared	Bike Route/Class III	0	No
Shared_lane	Bike Route/Class III	0	No
Lane	Bike Lane/Class II	6	No
Shared_busway	Bike Lane/Class II	6	No
Opposite_lane	Bike Lane/Class II	6	No
Cycleway[2]	Bike Path/Class I	10	Yes
Path	Bike Path/Class I	10	Yes
Track	Separated Bikeway/Class IV	8	Yes
Opposite_track	Separated Bikeway/Class IV	8	Yes
Buffered_lane	Separated Bikeway/Class IV	8	Yes
OTHER	NA	0	No

1. Alta processes nondirectional cycleway tags and directional cycleway tags as part of its conversion. The final LTS score is the worst-case score based on the direction of facilities.
2. Highway tags including the tag "cycleway" are also considered to be Class I facilities.

When parking lane-related tags are processed, assumptions related to their width and rates of bike lane blockage are outlined in Table 3.

Table 3. Alta's OpenStreetMap Assumptions for Parking Facilities

Parking Lane Tag	Assumed Parking Lane Width (Feet)
Parallel	8
Marked	8
Diagonal	16
Perpendicular	20
OTHER	NA

Citations

1. Mineta Institute. Mekuria M., Furth P., Nixon H. *Low-Stress Bicycling and Network Connectivity*. 2012. https://transweb.sjsu.edu/research/Low-Stress-Bicycling-and-Network-Connectivity
2. Mocnik, F.-B., A. Mobasheri, and A. Zipf. Open-Source Data Mining Infrastructure for Exploring and Analysing OpenStreetMap. Open Geospatial Data, Software and Standards, Vol. 3, No. 1, 2018, p. 7. https://doi.org/10.1186/s40965-018-0047-6.
3. Hochmair, H. H., D. Zielstra, and P. Neis. Assessing the Completeness of Bicycle Bike Path and Lane Features in OpenStreetMap for the United States. Transactions in GIS, Vol. 19, No. 1, 2014, pp. 63–81. https://doi.org/10.1111/tgis.12081.
4. PeopleForBikes. Bicycle Network Analysis. PeopleForBikes. https://peopleforbikes.org/placesforbikes/bicycle-network-analysis/.
5. Conveyal. Better measures of Bike Accessibility. https://blog.conveyal.com/better-measures-of-bike-accessibility-d875ae5ed831
6. Wasserman D, Rixey A, Zhou X (Elynor), Levitt D, Benjamin M. Evaluating OpenStreetMap's Performance Potential for Level of Traffic Stress Analysis. Transportation Research Record. 2019;2673(4):284-294. doi:10.1177/0361198119836772
7. Mineta Institute. Chester Harvey, Kevin Fang, Daniel A. Rodriguez. Evaluating Alternative Measures of Bicycling Level of Traffic Stress Using Crowdsourced Route Satisfaction Data. 2019. https://scholarworks.sjsu.edu/mti_publications/276/

Appendix C
Transit Analysis

Appendix C: Transit Analysis

Transit analysis for the city of Kansas City, Missouri was performed in ArcGIS Pro. using KCATA gtfs data obtained from https://transitfeeds.com/p/kansas-city-area-transportation-authority/382. Analysis was performed for the following dates:

- Saturday August 5, 2017, 6am – 3pm
- Wednesday August 9, 2017, 6am – 9am
- Saturday August 6, 2017, 6am – 3pm
- Wednesday August 10, 2022, 6am – 9am

Four types of analysis were performed for each those dates, stop frequency, service area frequency, parcel service frequency, and hexagon tile service frequency. Analysis results are contained in the Analysis2017 and Analysis2022 geodatabases. All analysis was carried out in ArcGIS Pro using the Calculate Transit Service Frequency tool in the Public Transit Tools toolbox. A transit feature dataset and a network dataset were created as inputs to this tool. Both datasets were created following the pattern described in the documentation here https://pro.arcgis.com/en/pro- app/latest/help/analysis/networks/create-and-use-a-network-dataset-with-public-transit-data.htm. The transit feature dataset is created from GTFS data and a streets layer using the conversion tools in the Public Transit Tools toolbox. The network dataset was created based upon the transit feature dataset. In the creation of the transit feature dataset an attribute called RestrictPedestrians was calculated for the streets layer. All streets with a type of highway were given a value of ‘Y’ and all other streets were given a value of ‘N’. This restriction attribute prevents the network dataset from using highways as potential walking routes for pedestrians in the frequency analysis that was performed.

Stop Frequency

Counts the number of departures from a public transit stop for a given time window. Result feature classes are named with “StopFreq” prefix and contain a date and time window like “08102022_6to9” indicating the analysis was for 8/10/2022 from 6am to 9am.

Service Area Frequency

Computes a walkshed (all the areas that have a stop accessible within a specified walking distance) and counts the number of departures for a given time window. Analysis was performed for both half and quarter mile walking distances. Result feature classes are named with “ServiceAreaFreq” prefix followed by the walking distance that was used, either “HalfMi” or “QuarterMi”. Finally, there is a date and time window like “08102022_6to9” to indicate what date and time window were used for analysis.

Parcel Service Frequency

Determines the number of departures in a given time window for parcels within a specified walking distance of a public transit stop. Analysis was performed for both half and quarter mile walking distances. Result feature classes are named with "ParcelFreq" prefix followed by the walking distance that was used, either "HalfMi" or "QuarterMi". Finally, there is a date and time window like "08102022_6to9" to indicate what date and time window were used for analysis.

Hexagon Tile Service Frequency

Determines the number of departures in a given time window for hexagon tiles within a specified walking distance of a public transit stop. 5-acre tiles were used in this analysis which equates roughly to a hexagon with 290ft long sides. Analysis was performed for both half and quarter mile walking distances. Result feature classes are named with "HexFreq" prefix followed by the walking distance that was used, either "HalfMi" or "QuarterMi". Finally, there is a date and time window like "08102022_6to9" to indicate what date and time window were used for analysis.

The deliverable contains the following geodatabases:

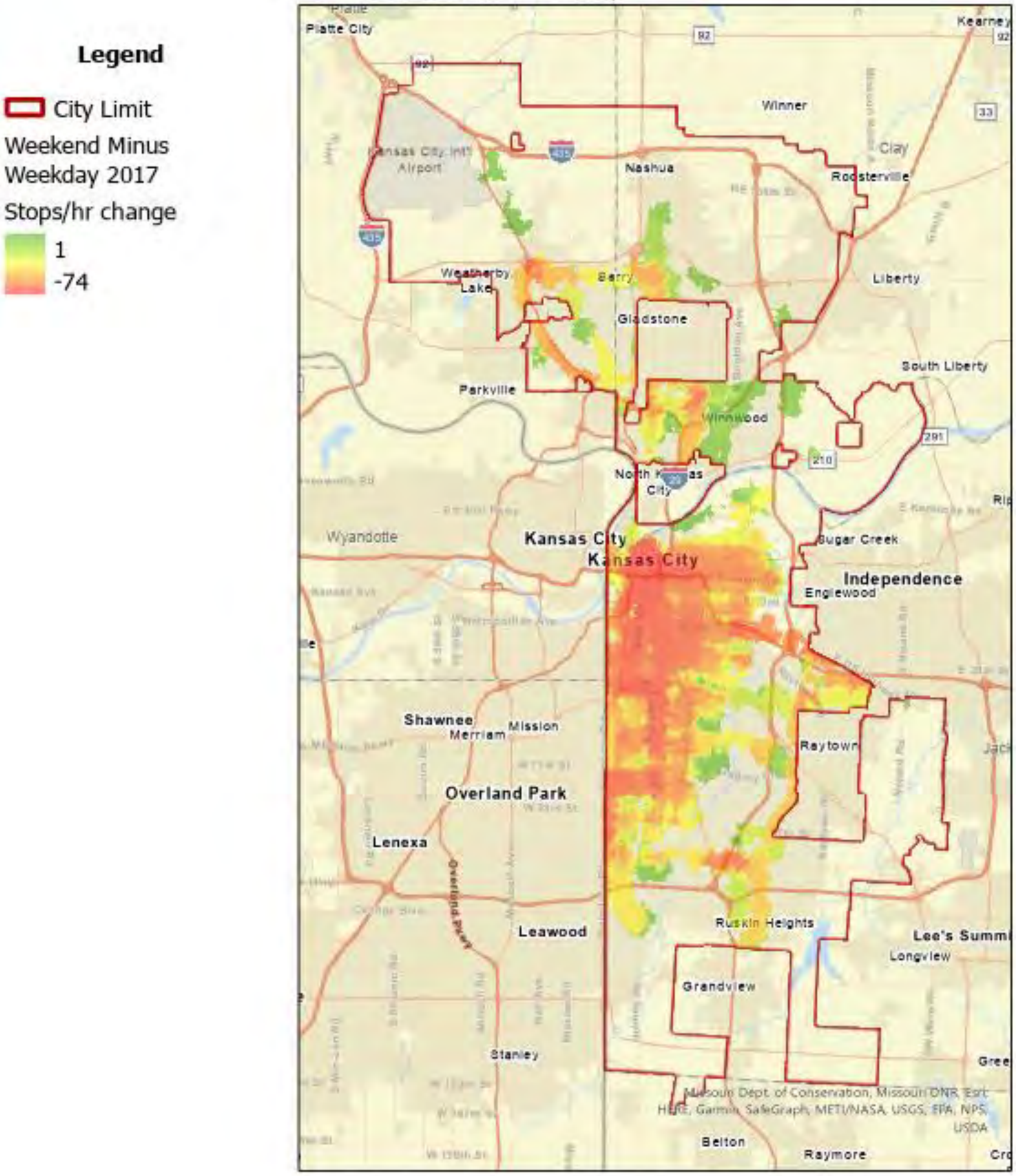
- KCMO_TransitAnalysis.gdb
    - Contains centerlines used to create network datasets, KCMO city limits, parcels, and 5- acre hexagon tessellation.
- Network_2017.gdb
    - Contains network dataset (and related features) created using 2017 gtfs data.
- Analysis2017.gdb
    - Analysis results for 2017.
- Network_2022.gdb
    - Contains network dataset (and related features) created using 2022 gtfs data.
- Analysis2022.gdb
    - Analysis results for 2022.

Weekday to Weekend Analysis

Rasters representing the number of stops per hour were created from the hexagon tile 0.5mi service frequency (stops per hour) results for 2022 and 2017. Weekday service was subtracted from weekend service to identify differences in service for weekdays vs. weekends in the same year. Negative numbers represent reduction in service for the weekend relative to the weekday. Positive numbers represent increases in service for the weekend relative to the weekday. In 2017 there was a drop-off in service when comparing weekends to weekdays, the central portion of KCMO saw the largest reduction in service. In 2022 there was some drop-off in service on the weekends but this was not as widespread as in 2017. There was a reduction in the primary downtown business area, but outside of that in the residential parts of the city, service levels saw little change.

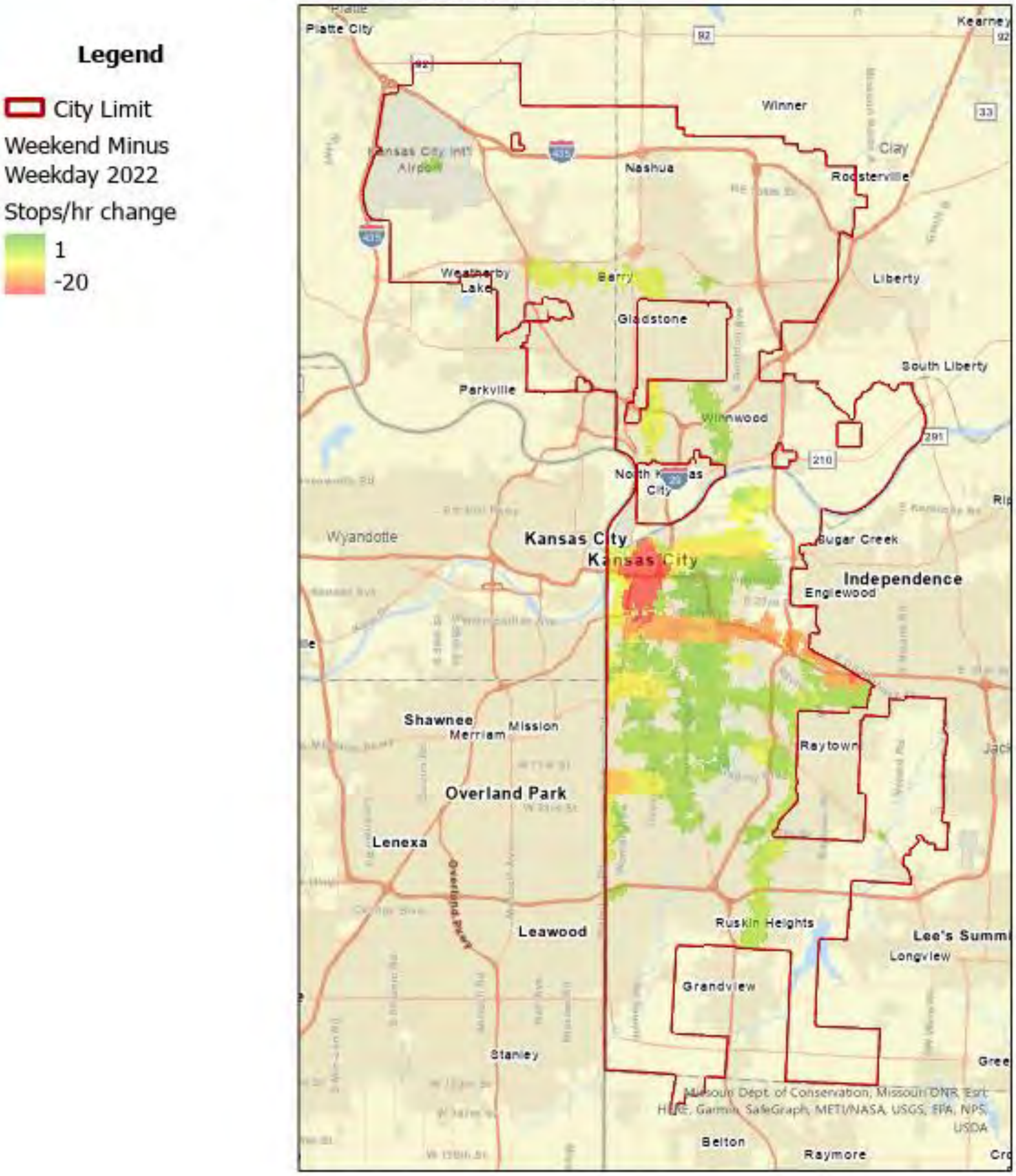
Service Level Change

2017 weekend minus weekday



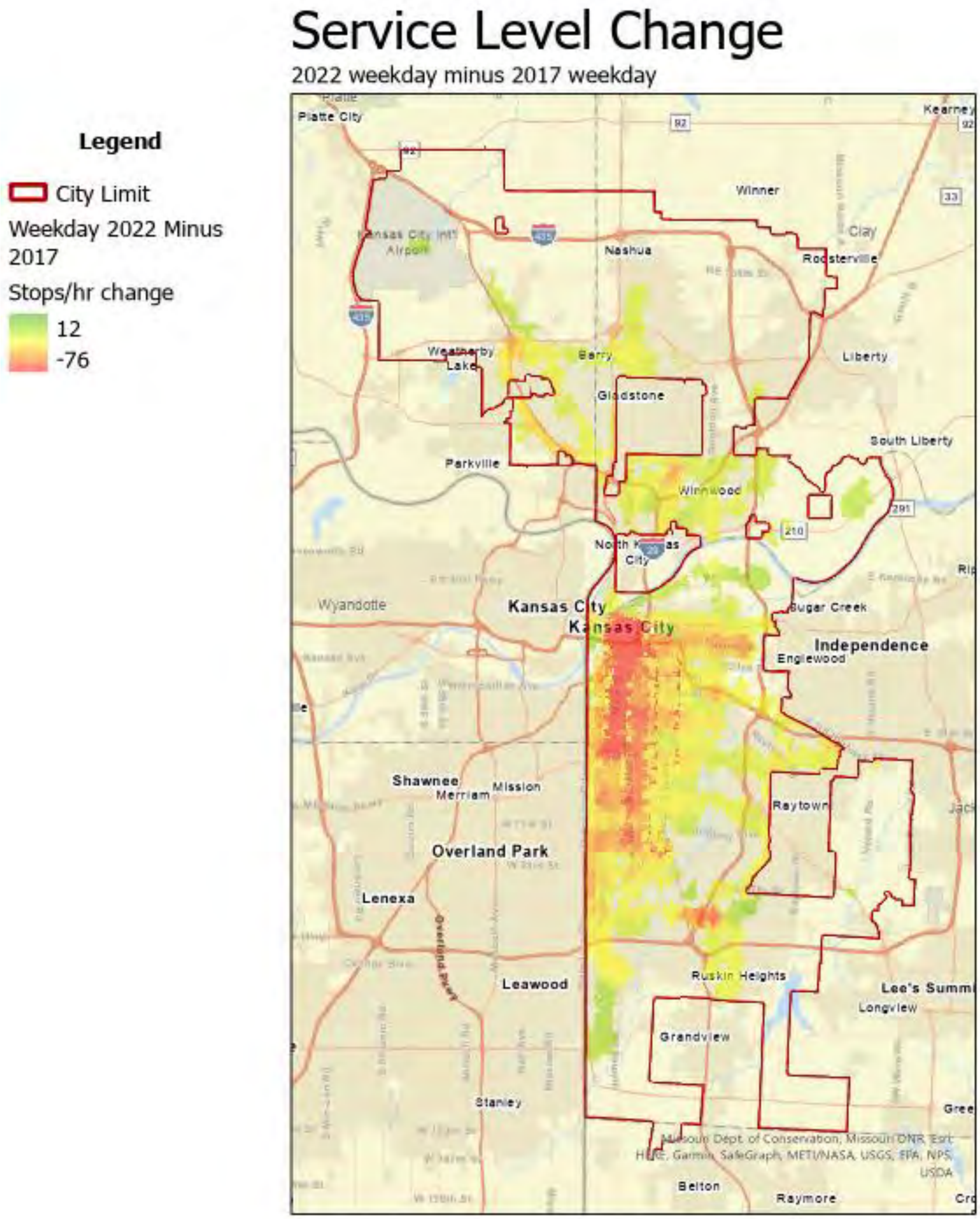
Service Level Change

2022 weekend minus weekday



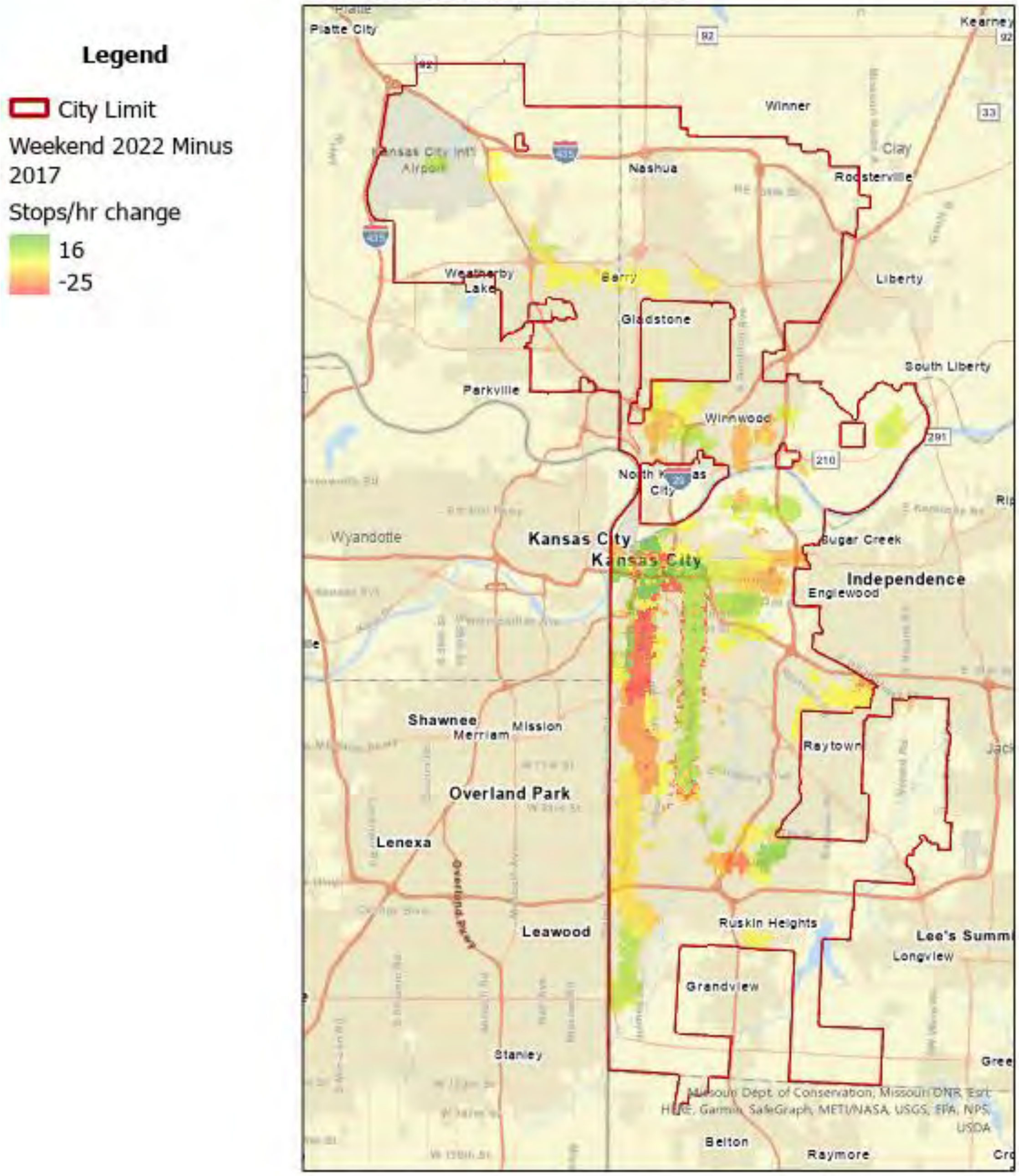
Post Pandemic Change

Rasters representing the number of stops per hour were created from the hexagon tile 0.5mi service frequency results for 2022 and 2017. 2022 weekday service was subtracted from 2017 weekday service to identify changes in weekday service post pandemic. 2022 weekend service was subtracted from 2017 weekend service to identify changes in weekend service post pandemic. Negative numbers represent reduction in the number of stops per hour, and positive numbers represent an increase in the number of stops per hour. The overall trend for weekday service level change post pandemic is a reduction in the number of stops per hour. Commercial/business areas saw the largest change in weekday service with reductions of up to 27 stops/hr. Residential areas also experienced reduced service with many areas seeing reductions of 6-8 stops/hr. The weekend change post pandemic was mixed with one north-south corridor around Main Street seeing a reduction of approximate 3 stops/hr., while another north-south corridor along Prospect Ave. saw an increase in service of around 2 stops/hr.


Service Level Change
2022 weekday minus 2017 weekday
Legend
City Limit
Weekday 2022 Minus 2017
Stops/hr change
12
-76
Platte City
Kearney
Kansas City Int'l Airport
Winner
Nashua
Clay
Roosterville
Weatherby Lake
Berry
Liberty
Gladstone
South Liberty
Parkville
Winnwood
North Kansas City
Wyandotte
Kansas City
Kansas City
Sugar Creek
Independence
Englewood
Shawnee
Merriam
Mission
Raytown
Overland Park
Lenexa
Leawood
Ruskin Heights
Lee's Summi
Longview
Grandview
Stanley
Belton
Raymore
Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA

Service Level Change

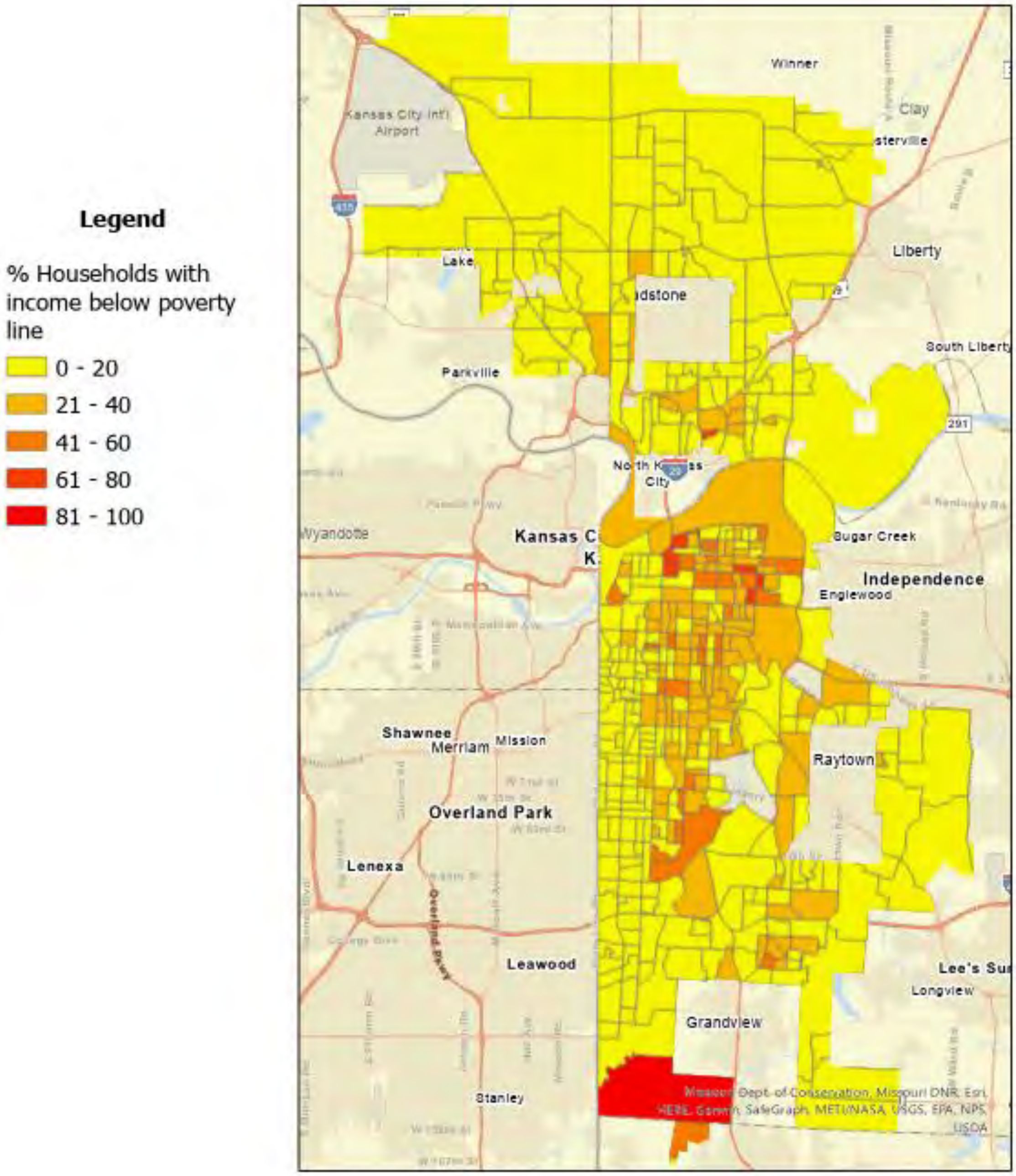
2022 weekend minus 2017 weekend



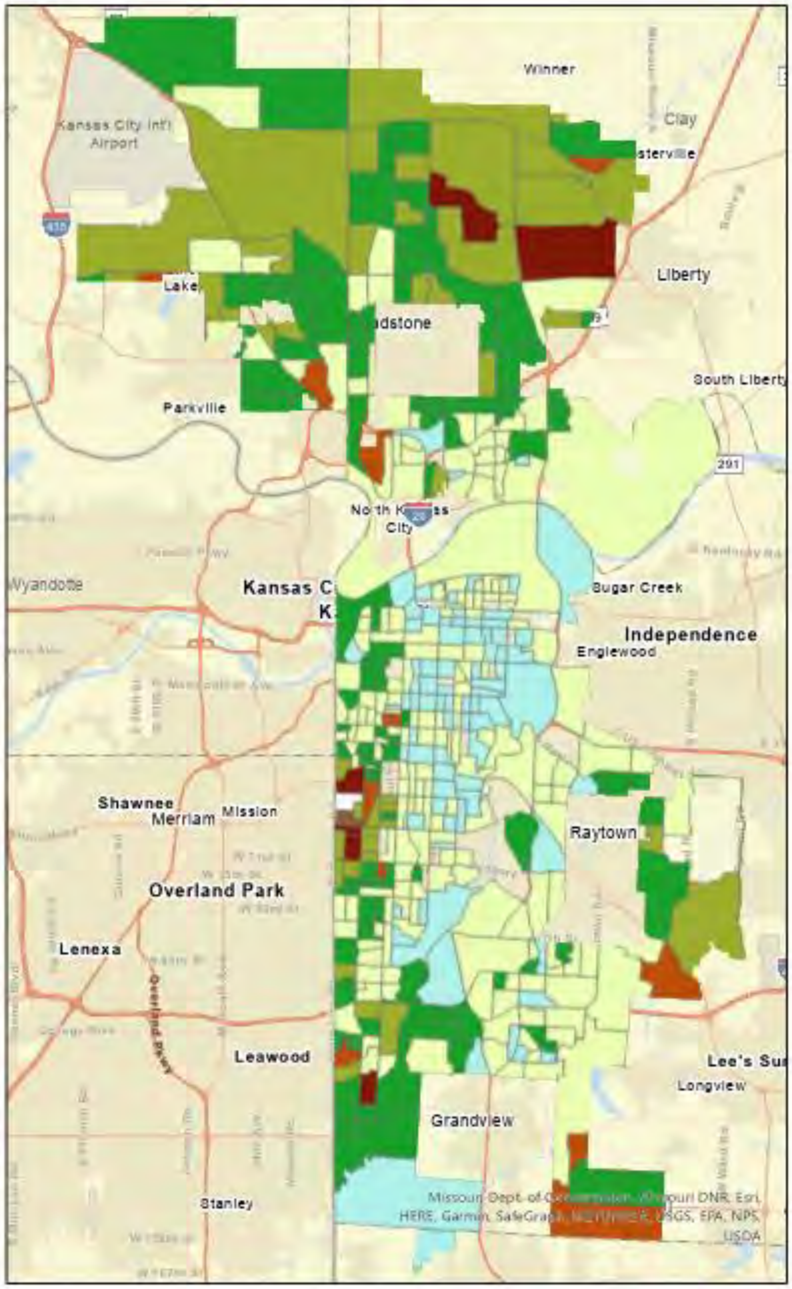
Demographics

Maps of demographics for KCMO were created for the following categories: poverty, income, age, and race. American community survey 5-year estimates for 2015-2019 was obtained from census.gov for the state of Missouri. The percentage of households with income below the poverty line was computed by dividing the number of households with income in the past 12 months below poverty level by the total number of households. Both of those fields were present in the ACS poverty table. The income map shows the median household income in the past 12 months taken from the ACS income table. The age map shows the median age taken from the ACS age and sex table. Racial data was obtained from the ACS race table. Pie charts were used to symbolize this data to try and capture the racial characteristics of the city. The city was also broken into north, central, and south regions to allow for greater granularity in the display of the pie charts. The background of the map also shows the change in weekday service levels post pandemic.

ACS 2019 Poverty



ACS 2019 Income



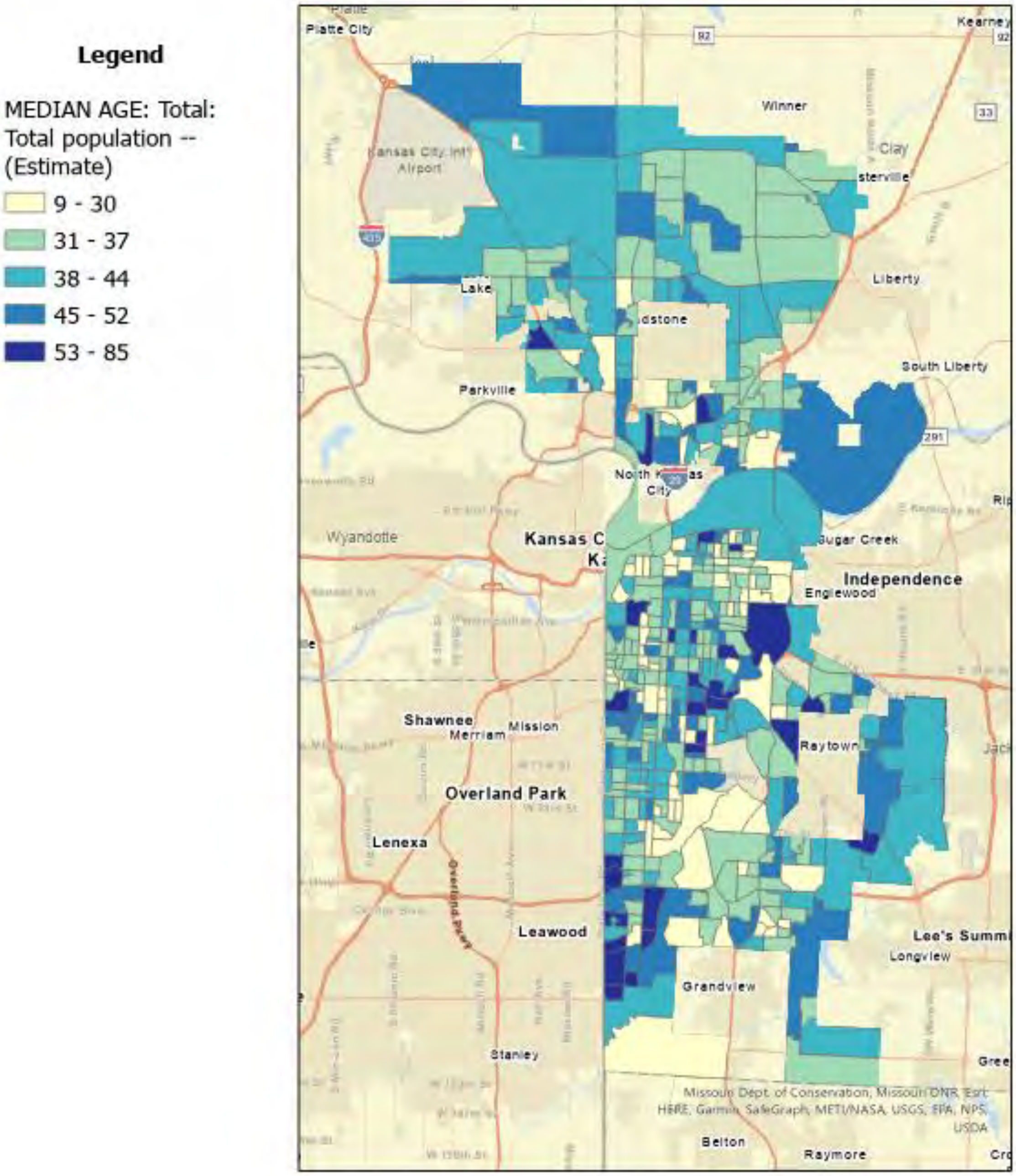
Legend

ACS 2019 Income

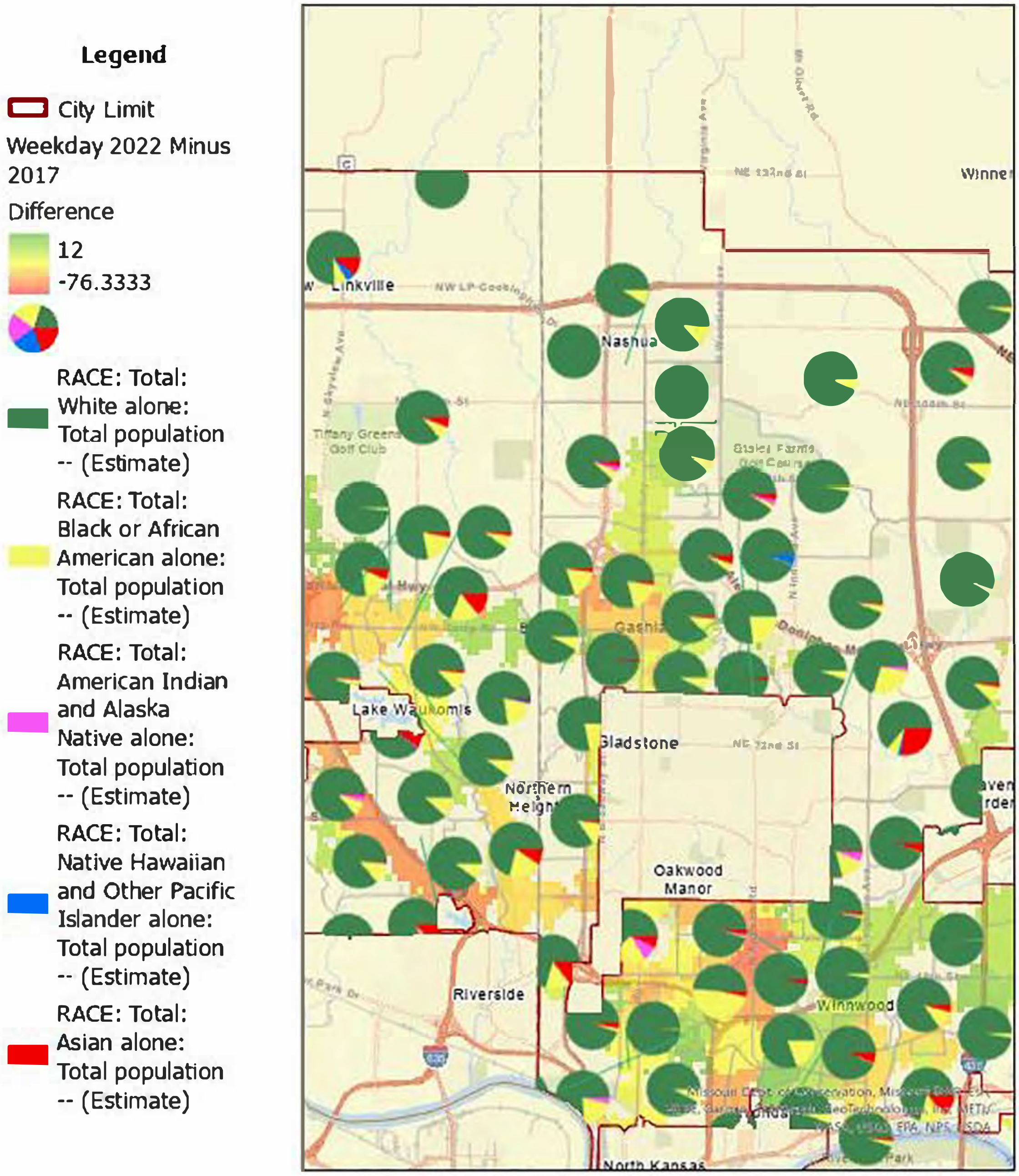
MEDIAN HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2019 INFLATION-ADJUSTED DOLLARS): Median household income in the past 12 months (in 2019 inflation-adjusted dollars): Households -- (Estimate)

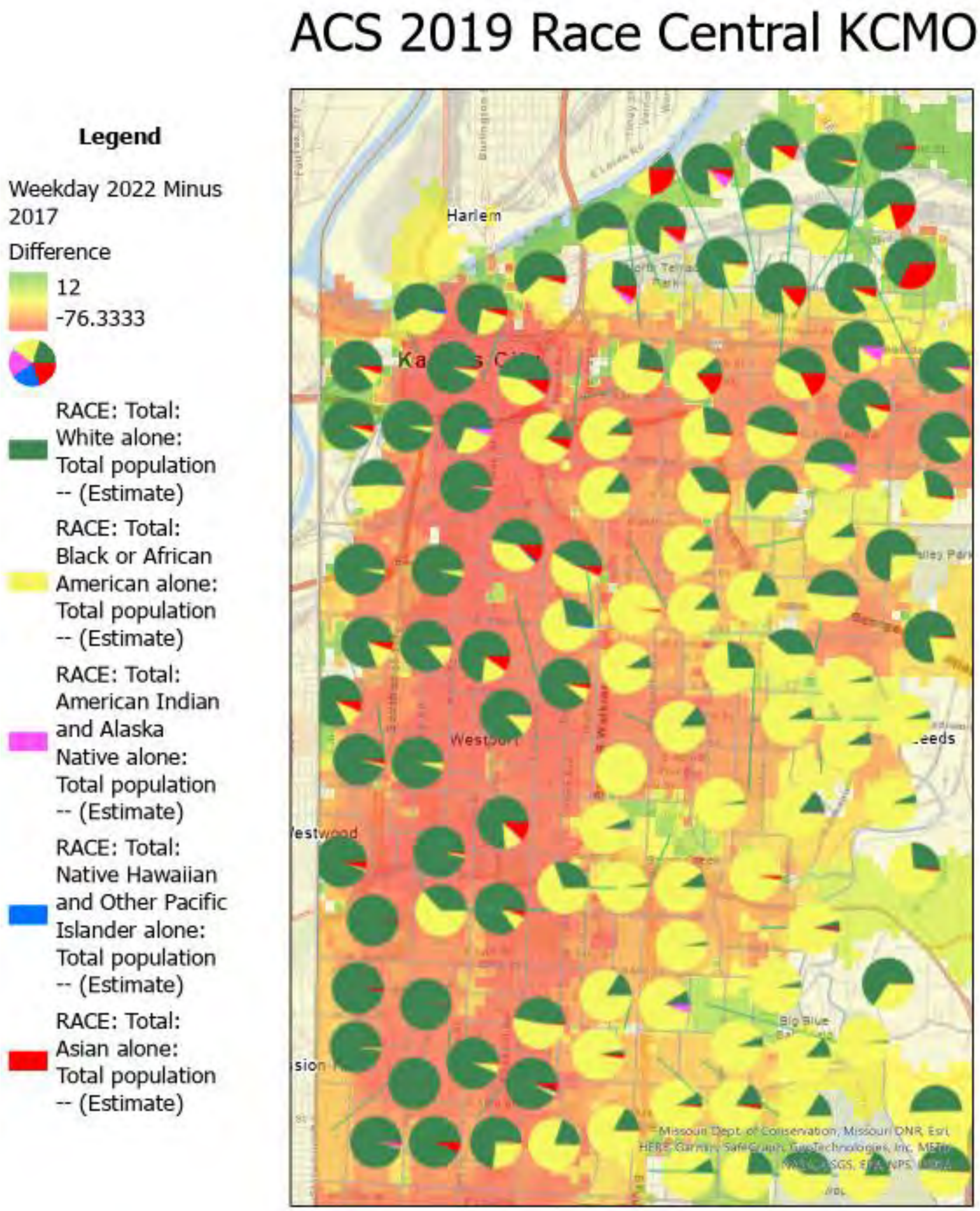
- 7313 - 30000
- 30001 - 60000
- 60001 - 90000
- 90001 - 120000
- 120001 - 150000
- 150001 - 180000
- 180001 - 210000
- 210001 - 240000
- 240001 - 270000

ACS 2019 Age

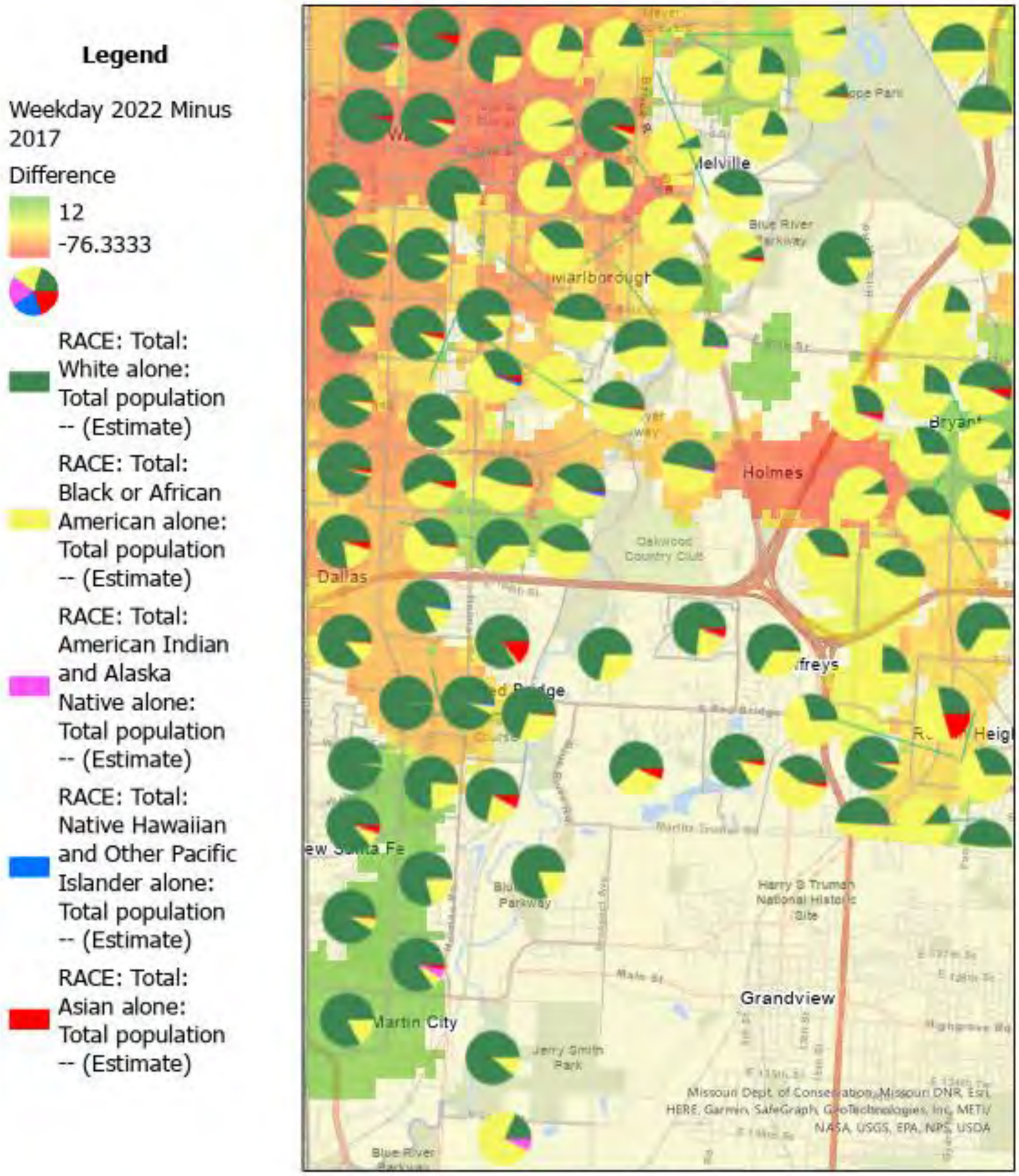

Legend
MEDIAN AGE: Total: Total population -- (Estimate)
9 - 30
31 - 37
38 - 44
45 - 52
53 - 85
Platte City
Kearney
Kansas City Int'l Airport
Winner
Clay
Liberty
South Liberty
Parkville
North Kansas City
Wyandotte
Sugar Creek
Independence
Englewood
Shawnee
Merriam
Mission
Raytown
Overland Park
Lenexa
Leawood
Lee's Summ
Longview
Grandview
Stanley
Belton
Raymore
Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA

ACS 2019 Race North KCMO




ACS 2019 Race Central KCMO
Legend
Weekday 2022 Minus 2017
Difference
12
-76.3333
RACE: Total: White alone: Total population -- (Estimate)
RACE: Total: Black or African American alone: Total population -- (Estimate)
RACE: Total: American Indian and Alaska Native alone: Total population -- (Estimate)
RACE: Total: Native Hawaiian and Other Pacific Islander alone: Total population -- (Estimate)
RACE: Total: Asian alone: Total population -- (Estimate)
Harlem

ACS 2019 Race South KCMO



Appendix D
Bicycle and Pedestrian Crash Technical Report

Appendix D: Bicycle and Pedestrian Crash Technical Report

Introduction

As a part of its commitment to improve safety for all modes of transportation throughout the City, the City of Kansas City, Missouri started a study to look at specifically bicycle and pedestrian safety. The study team looked at each of the City's six council districts independently to provide summaries of crash history and severity of the incident. The scope of the study evaluated data from 2010-2019 and summarized relevant bicycle and pedestrian incident data. The 2010-2019 data provides information on the overall trends in the region over time. The sidewalk prioritization scoring uses the most recent six years of data (2017-22). From these datasets, maps and exhibits were produced showing the locations with high incident density and severity of bicycle and pedestrian collisions. From this data, improvements to the bicycle and pedestrian network can be prioritized in a way to address the locations with highest incident density first, and help the City develop a plan for future infrastructure improvements.

Source of Data

The existing crash data was obtained from the City of Kansas City, Missouri's Public Works department. The provided crash data contained several key sets of data, including but not limited to, Council District, crash date, crash severity, time of day, location, speed limit, presence of sidewalks, weather conditions, roadway classification and speed limits. Figure 1 shows the City of Kansas City, Missouri city limits, and Council District boundaries.

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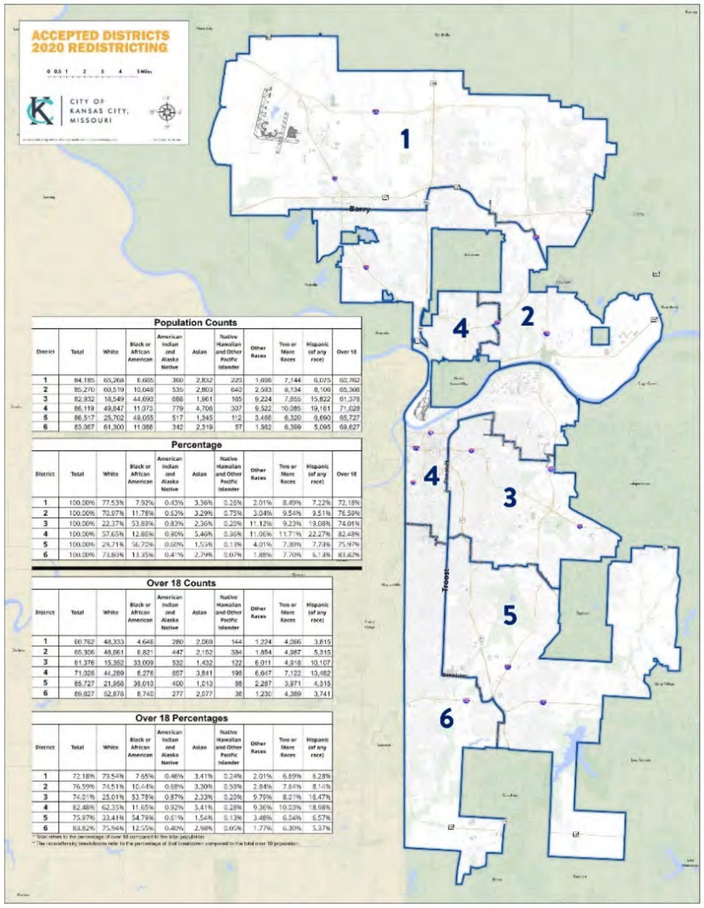

Figure 1: Kansas City Missouri's Council Districts

Council District 1

Council District 1 has a population of 84,185. Council District 1 ranked 5th and 6th for bicycle and pedestrian collisions, respectively. Council District 1 is a less dense suburban area with primarily single-family homes. Council District 1 had three roadways with a notable number of bicycle collisions and six roadways with a notable number of pedestrian collisions.

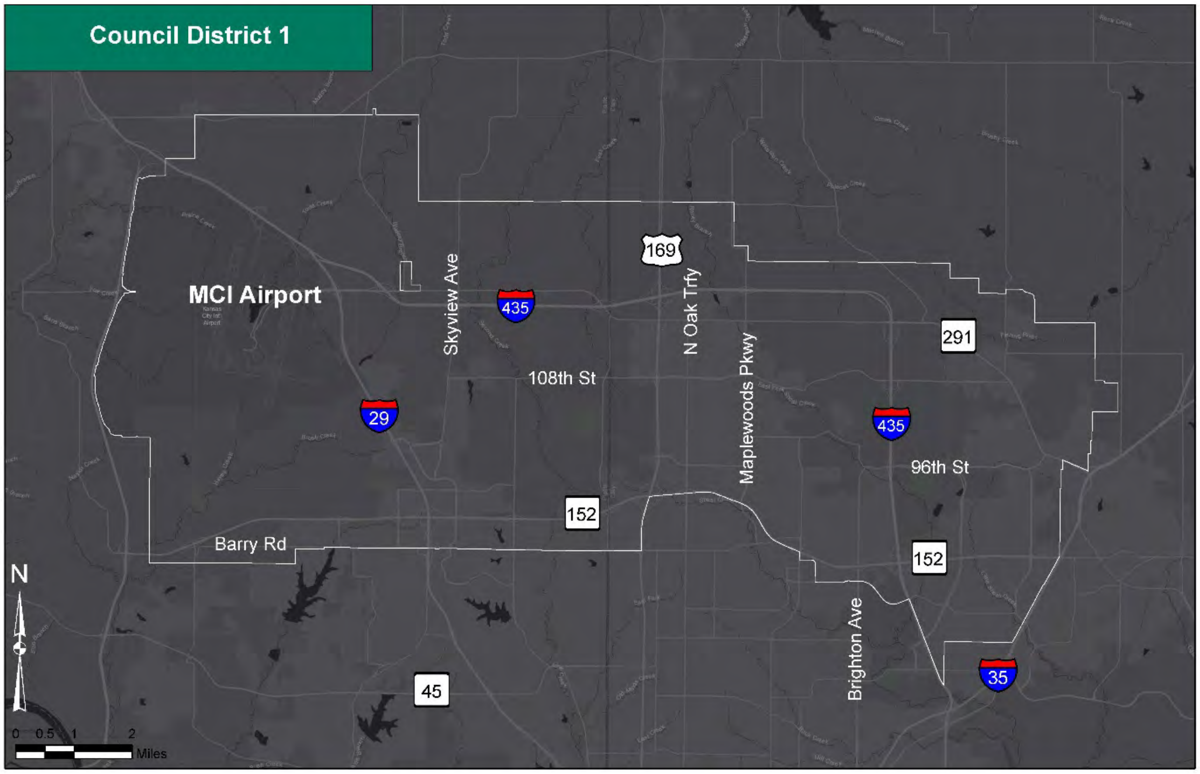

Figure 2: Council District 1 Boundaries

District 1 had 32 bicycle collisions which included 5 property damage only, 22 suspected minor and 5 suspected serious. The streets within District 1 that experience the highest number of bicycle collisions are North Oak Trafficway, Barry Road and Missouri Route 152. **Table 1** shows the bicycle collision summary for the roadways with the highest number of collisions for Council District 1. **Table 2** summarizes the total bicycle collisions for Council District 1. **Figure 3** shows the location of bicycles crashes in Council District 1.

Table 1 – Bicycle Collisions – Council District 1 by Roadway and Severity (2010-2019)

Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
North Oak Trafficway	0	1	1	0
Barry Road	0	2	0	0
Missouri Route 152	0	0	2	0

Table 2 – Bicycle Collisions – Council District 1 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	5
Suspected Minor Injury	22
Suspected Serious Injury	5
Fatality	0
Total	32

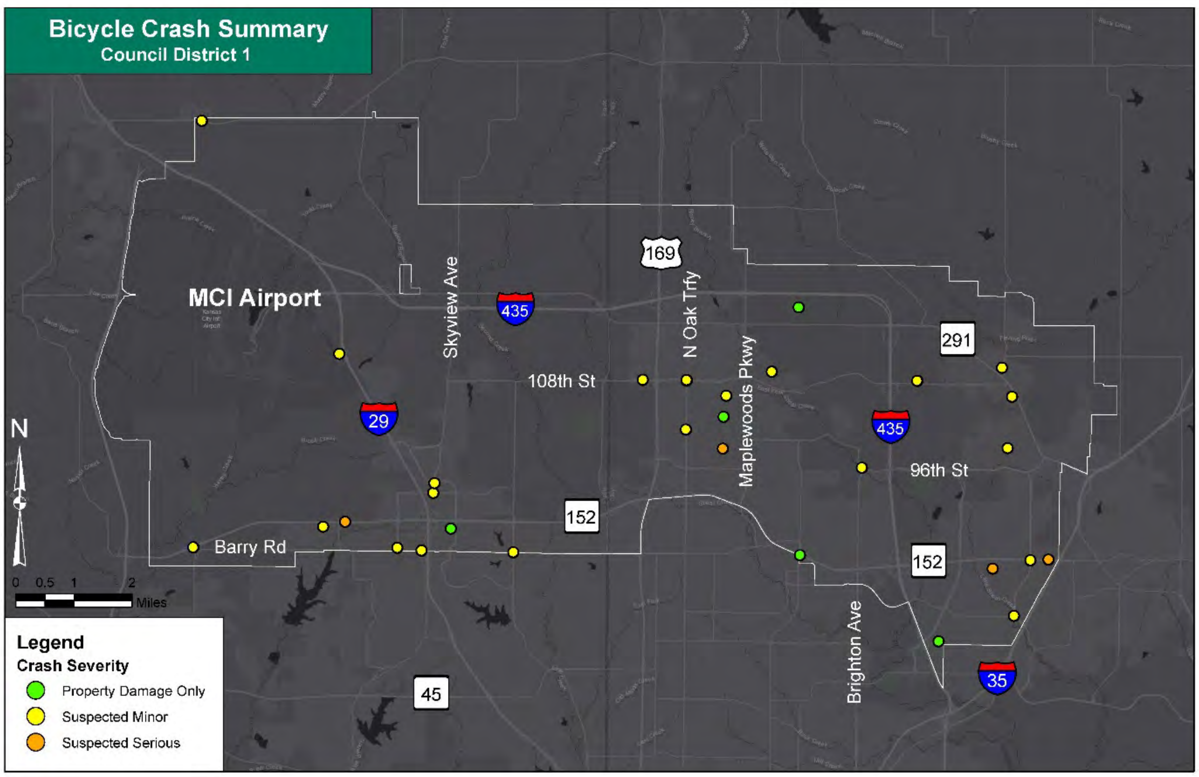

Figure 3: Council District 1 Bicycle Crash Summary

Council District 1 had 85 pedestrian collisions which included 11 property damage only, 51 suspected minor, 12 suspected major and 11 fatal pedestrian collisions. The streets within District 1 that experience the highest number of pedestrian collisions are 86th St, Prairie View Rd, Rome Circle, I-29, I-435 and MO-152. **Table 3** shows the pedestrian collision summary for the roadways with the highest number of collisions for Council District 1. **Table 2** summarizes the total pedestrian collisions for Council District 1.

Table 3 – Pedestrian Collisions – Council District 1 by Roadway and Severity (2010-2019)				
Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
86th Street	0	4	0	0
Prairie View Road	1	7	0	0
Rome Circle	2	5	2	0
Interstate 29	0	1	2	6
Interstate 435	0	1	1	2
Missouri Route 152	1	1	1	2

Table 4 – Pedestrian Collisions – Council District 1 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	11
Suspected Minor Injury	51
Suspected Serious Injury	12
Fatality	11
Total	85

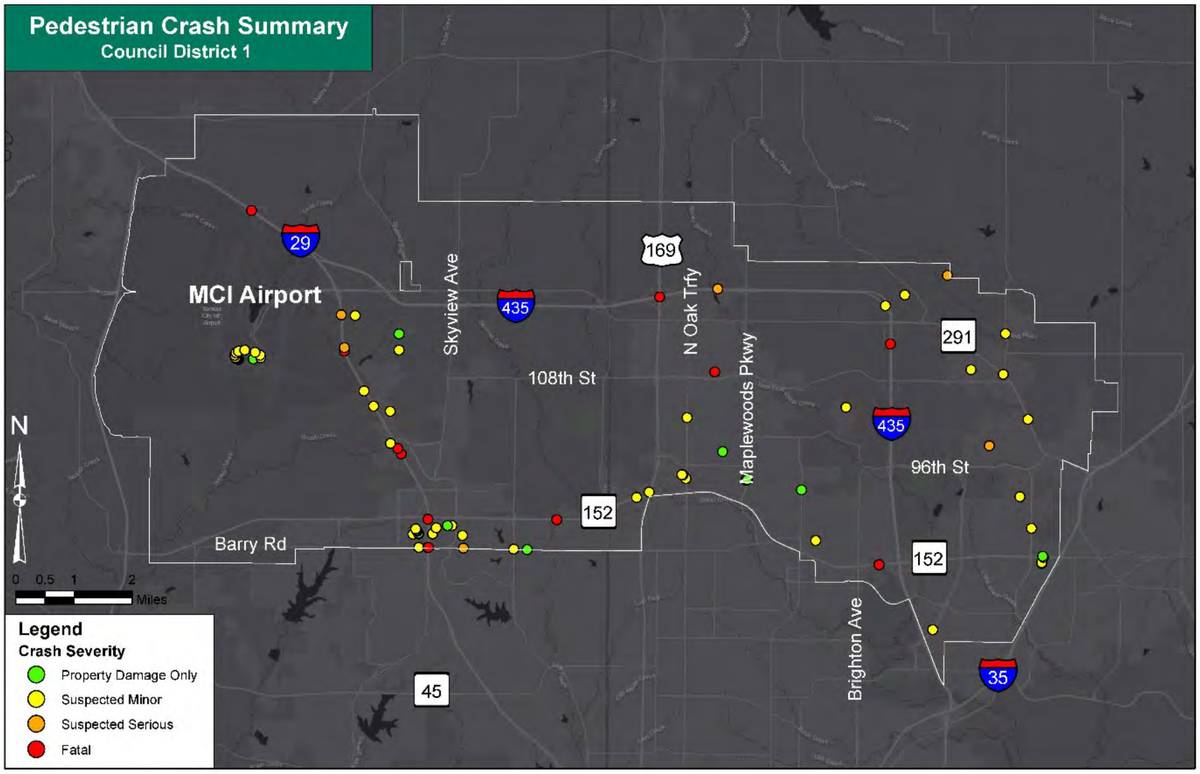

Figure 4: Council District 1 Pedestrian Crash Summary

Council District 2

Council District 2 has a population of 85,270. Council District 2 ranked 6th and 5th for bicycle and pedestrian collisions, respectively. Council District 2 is a medium dense residential area with primarily single-family homes. Council District 2 had one roadway with a notable number of bicycle collisions and five roadways with a notable number of with pedestrian collisions.

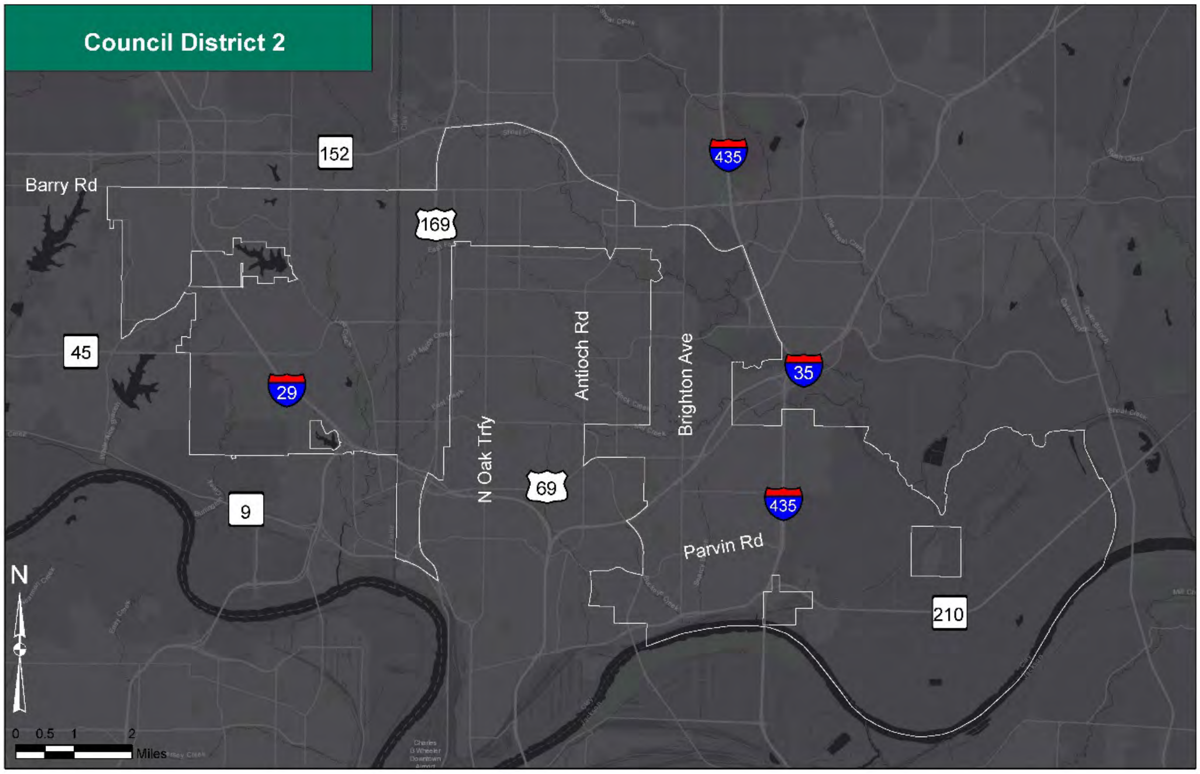

Figure 5: Council District 2 Boundaries

District 2 had 27 bicycle collisions which included 2 property damage only, 19 suspected minor, 5 suspected serious and 1 fatal. The street within District 2 that experiences the highest number of bicycle collisions is Vivion Road. **Table 5** shows the bicycle collision summary for the roadways with the highest number of collisions for Council District 2. **Table 6** summarizes the total bicycle collisions for Council District 2.

Table 5 – Bicycle Collisions – Council District 2 by Roadway and Severity (2010-2019)

Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
Vivion Road	0	4	1	0

Table 6 – Bicycle Collisions – Council District 2 by Severity (2010-2019)

Type of Collision	Number of Collisions

Table 6 – Bicycle Collisions – Council District 2 by Severity (2010-2019)	
Property Damage Only	2
Suspected Minor Injury	19
Suspected Serious Injury	5
Fatality	1
Total	27

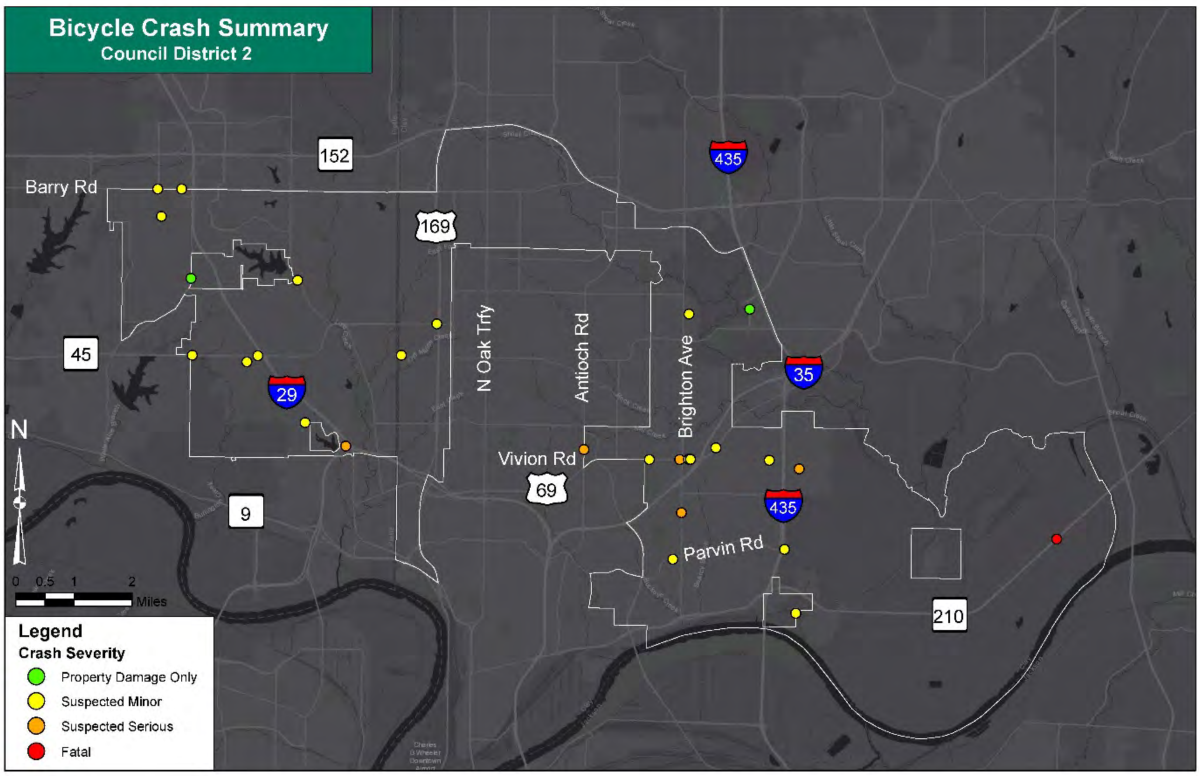

Figure 6: Council District 2 Bicycle Crash Summary

District 2 had 115 pedestrian collisions which included 11 property damage only, 66 suspected minor, 24 suspected major and 14 fatal pedestrian collisions. The streets within District 2 that experience the highest number of pedestrian collisions are Brighton Avenue, Parvin Road, Vivion Road, Interstate 29 and Missouri Route -210. **Table 7** shows the pedestrian collision summary for the roadways with the highest number of collisions for Council District 2. **Table 8** summarizes the total pedestrian collisions for Council District 2.

Table 7 – Pedestrian Collisions – Council District 2 by Roadway and Severity (2010-2019)				
Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
Brighton Avenue	0	3	3	0
Parvin Road	0	4	1	0
Vivion Road	1	7	1	0
Interstate 29	0	1	2	5
Missouri Route 210	1	4	0	1

Table 8 – Pedestrian Collisions – Council District 2 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	11
Suspected Minor Injury	66
Suspected Serious Injury	24
Fatality	14
Total	115

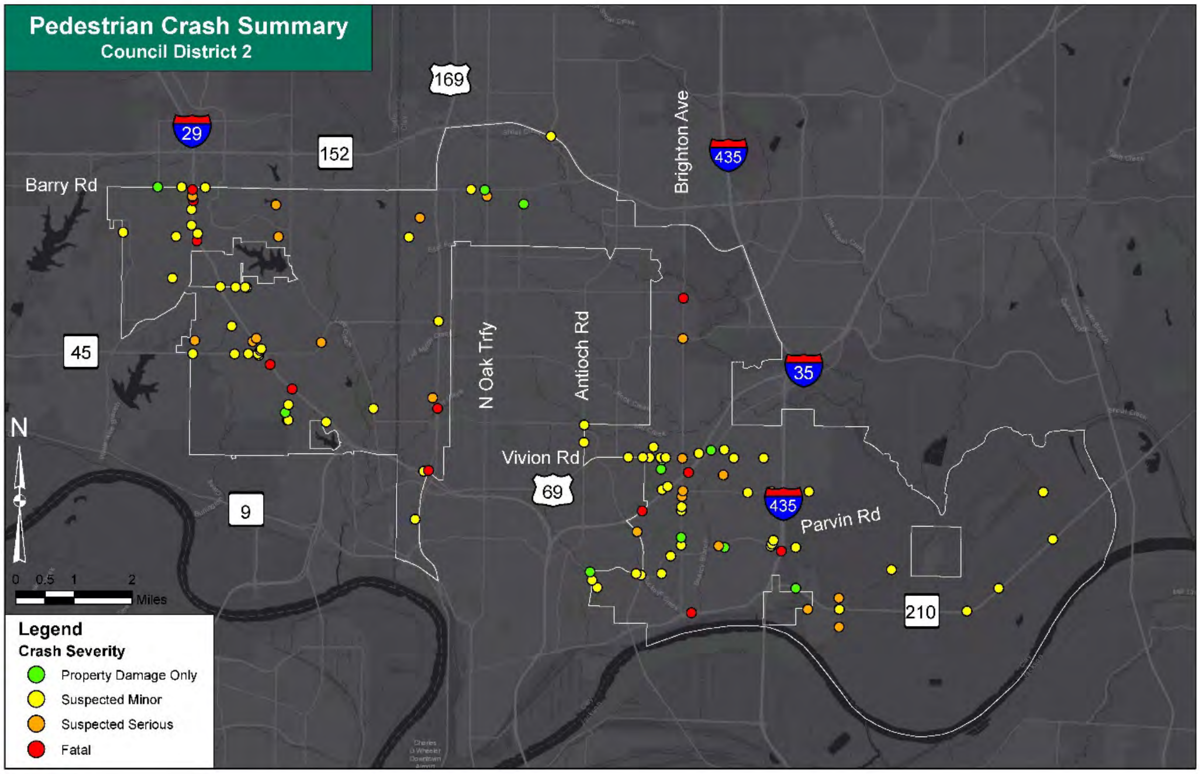

Figure 7: Council District 2 - Pedestrian Crash Summary

Council District 3

Council District 3 has a population of 82,932. Council District 3 ranked 2nd and 2nd for bicycle and pedestrian collisions, respectively. Council District 3 is a denser residential area close to the urban downtown core. Council District 3 had seven roadways with notable bicycle collisions and 21 roadways with notable pedestrian collisions.

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Figure 8: Council District 3 Boundary

District 3 had 131 bicycle collisions which included 11 property damage only, 104 suspected minor, 13 suspected serious and three fatal bicycle collisions. The streets within District 3 that experience the highest number of bicycle collisions are Truman Road, Independence Avenue, Hardesty Avenue, The Paseo, Indiana Avenue, 39th Street and 31st Street. **Table 9** shows the bicycle collision summary for the roadways with the highest number of collisions for Council District 3. **Table 10** summarizes the total bicycle collisions for Council District 3.

Table 9 – Bicycle Collisions – Council District 3 by Roadway and Severity (2010-2019)

Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
Truman Road	2	4	1	0
Independence Avenue	0	5	0	0
Hardesty Avenue	0	4	1	0

Table 9 – Bicycle Collisions – Council District 3 by Roadway and Severity (2010-2019)				
The Paseo	0	3	1	0
Indiana Avenue	1	1	1	1
39th Street	0	5	0	0
31st Street	0	4	0	0

Table 10 – Bicycle Collisions – Council District 3 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	11
Suspected Minor Injury	104
Suspected Serious Injury	13
Fatality	3
Total	131

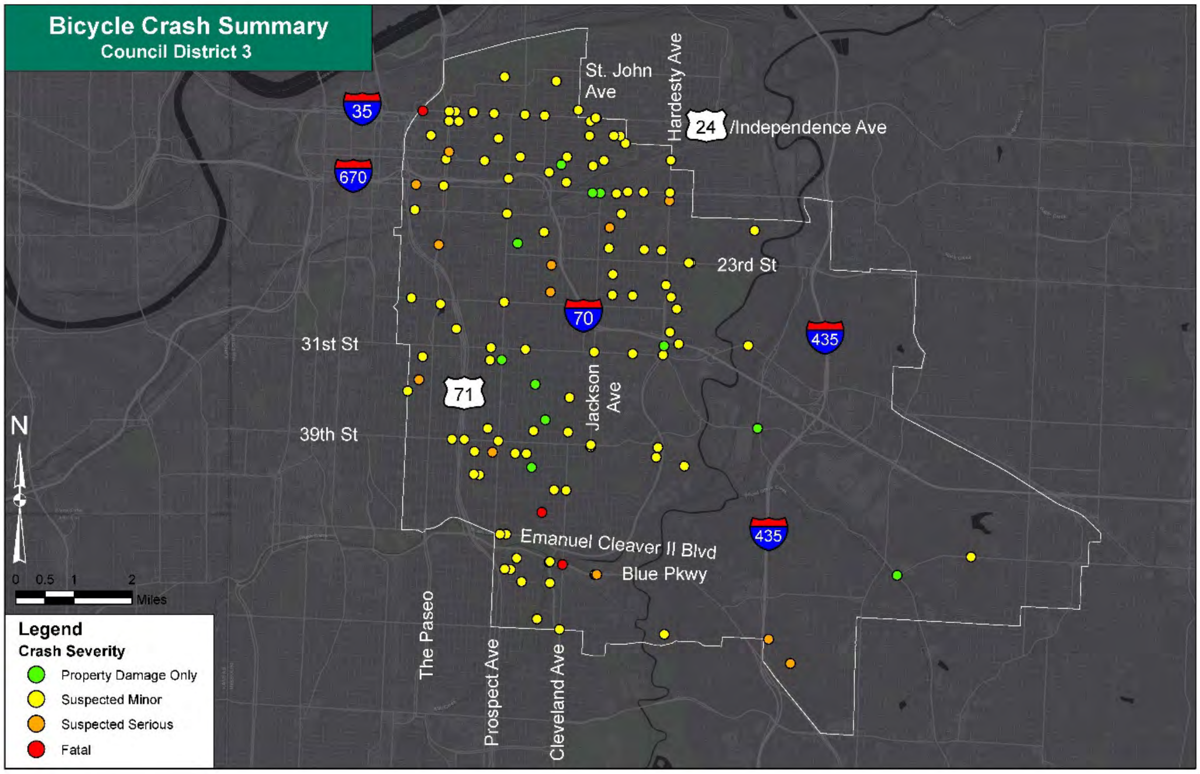

Figure 9: District 3 Bicycle Crash Summary

Council District 3 had 598 pedestrian collisions during the analysis period which included 52 property damage only, 416 suspected minor, 97 suspected major and 33 fatal pedestrian collisions. The streets within District 3 that experience the highest number of pedestrian collisions are 12th Street, 23rd Street, 27th Street, 31st Street, 35th Street, 39th Street, Benton Boulevard, Blue Ridge Boulevard, Brooklyn Avenue, Cleveland Avenue, Emmanuel Cleaver Boulevard, Independence Avenue, Indiana Avenue, Jackson Avenue, Linwood Avenue, Prospect Avenue, Troost Avenue, Truman Road, Van Brunt Boulevard, Interstate 70 and US-71. **Table 11** shows the pedestrian collision summary for the roadways with the highest number of collisions for Council District 3. **Table 12** summarizes the total bicycle collisions for Council District 3.

Table 11 – Pedestrian Collisions – Council District 3 by Roadway and Severity (2010-2019)

Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
12th Street	3	11	1	0

Table 11 – Pedestrian Collisions – Council District 3 by Roadway and Severity (2010-2019)

23rd Street	2	4	1	1
27th Street	1	4	3	0
31st Street	0	20	6	0
39th Street	1	15	0	0
Blue Ridge Boulevard	1	8	1	0
Cleveland Avenue	0	6	3	0
Emmanuel Cleaver Boulevard	0	5	2	0
Independence Avenue	4	26	12	4
Indiana Avenue	1	9	0	0
Jackson Avenue	1	9	1	0
Linwood Avenue	2	11	5	1
Prospect Avenue	1	30	7	3
Truman Road	4	15	3	1
Van Brunt Boulevard	1	9	2	1
Interstate 70	0	6	1	6
United States Route 71	1	0	1	5

Table 12 – Pedestrian Collisions – Council District 3 by Severity (2010-2019)

Type of Collision	Number of Collisions
Property Damage Only	52
Suspected Minor Injury	416
Suspected Serious Injury	97
Fatality	33
Total	598

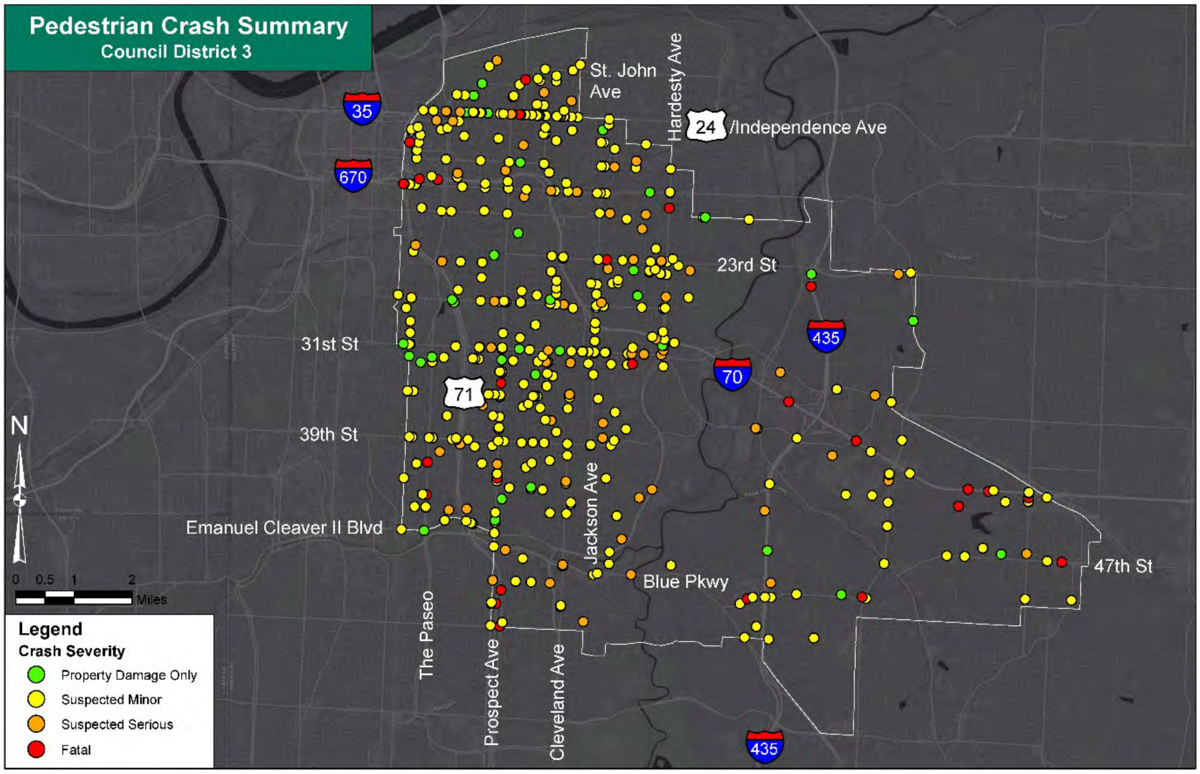

Figure 10: District 3 Pedestrian Crash Summary

Council District 4

Council District 4 has a population of 86,119. Council District 4 ranked 1st and 1st for bicycle and pedestrian collisions, respectively. Council District 4 is a denser urban downtown core. Council District 4 had six roadways with notable bicycle collisions and 25 roadways with notable pedestrian collisions.

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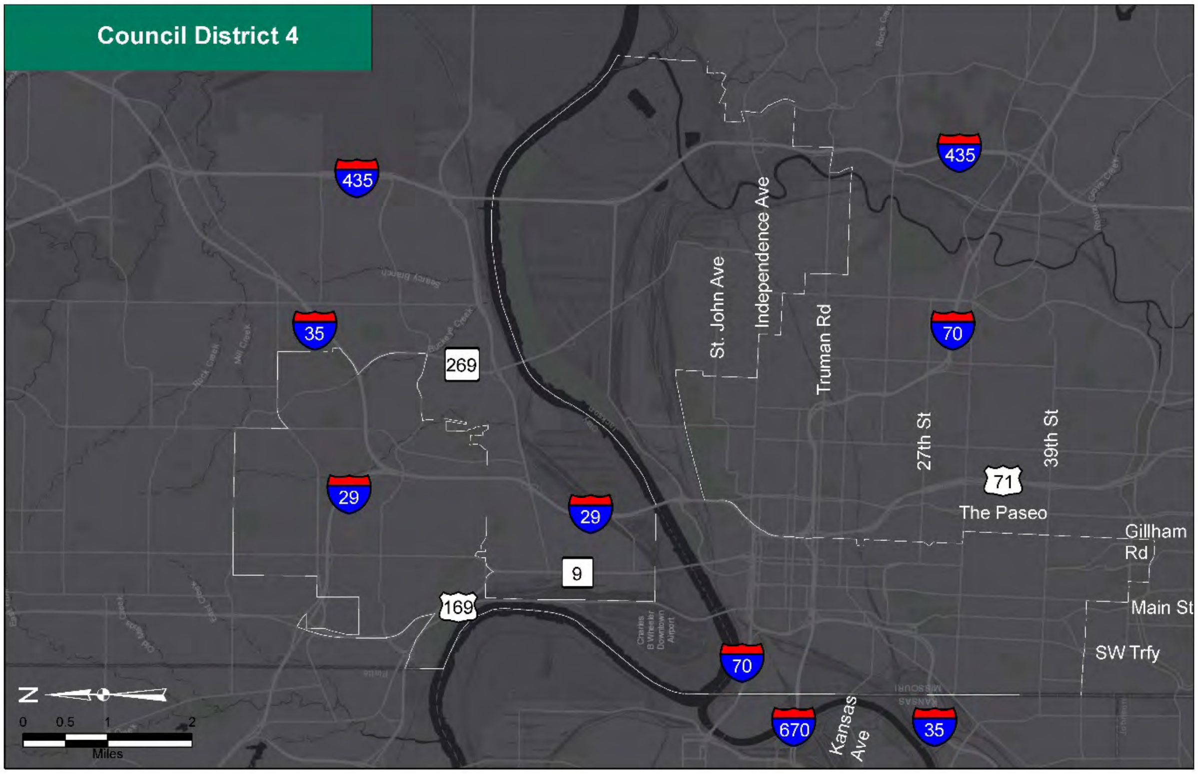

Figure 11: District 4 Boundary

District 4 had 169 bicycle collisions which included 30 property damage only, 125 suspected minor, 12 suspected major and two fatal bicycle collisions. The streets within District 4 that experience the highest number of bicycle collisions are Main Street, Broadway Boulevard, 39th Street, Westport Road, Gillham Road and Independence Avenue. **Table 13** shows the bicycle collision summary for the roadways with the highest number of collisions for Council District 4. **Table 14** summarizes the total bicycle collisions for Council District 4.

Table 13 – Bicycle Collisions – Council District 4 by Roadway and Severity (2010-2019)				
Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
12th Street	3	11	1	0
23rd Street	2	4	1	1
27th Street	1	4	3	0

Table 13 – Bicycle Collisions – Council District 4 by Roadway and Severity (2010-2019)				
31st Street	0	20	6	0
39th Street	1	15	0	0
Blue Ridge Boulevard	1	8	1	0

Table 14 – Bicycle Collisions – Council District 4 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	30
Suspected Minor Injury	125
Suspected Serious Injury	12
Fatality	2
Total	169

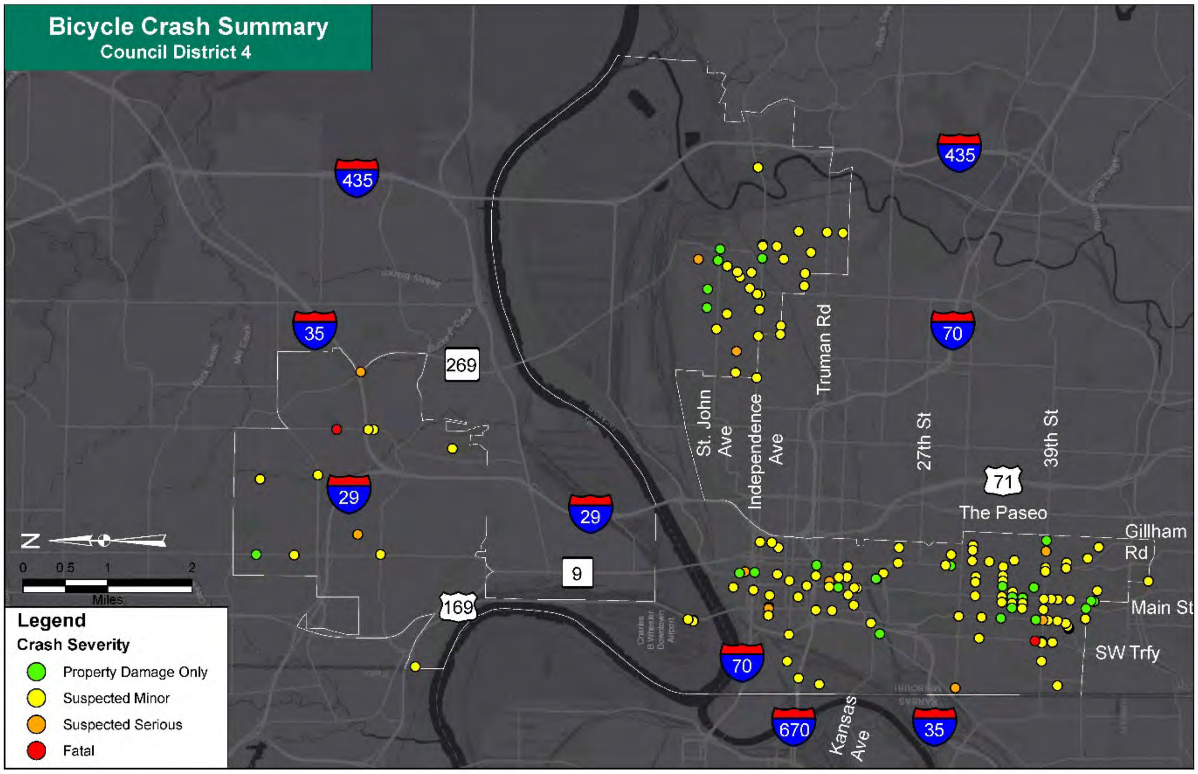

Figure 12: District 4 Bicycle Crash Summary

Figure 13: District 4 Bicycle Crash Locations Enlarged

District 4 had 668 pedestrian collisions which included 76 property damage only, 461 suspected minor, 107 suspected major and 24 fatal pedestrian collisions. The streets within District 4 that experience the highest number of pedestrians are 10th St, 11th St, 12th St, 13th St, 31st St, 39th St, Broadway Blvd, Front St, Gillham Rd, Grand Blvd, Hardesty Ave, Independence Ave, Linwood Blvd, Main St, Truman Rd, Van Brunt Blvd, Walnut St, Westport Rd, I-35, I-435, I-670, US-169. **Table 15** shows the pedestrian collision summary for the roadways with the highest number of collisions for Council District 4. **Table 16** summarizes the total pedestrian collisions for Council District 4.

Table 15 – Pedestrian Collisions – Council District 4 by Roadway and Severity (2010-2019)				
Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
10th Street	1	12	1	0
11th Street	1	11	3	2
12th Street	3	16	1	0

Table 15 – Pedestrian Collisions – Council District 4 by Roadway and Severity (2010-2019)				
13th Street	0	8	1	0
31st Street	3	5	2	1
39th Street	3	31	7	0
Broadway Boulevard	6	32	16	0
Front Street	5	1	1	0
Gillham Road	1	9	1	0
Grand Boulevard	4	10	1	0
Hardesty Avenue	1	3	4	1
Independence Avenue	3	32	8	2
Linwood Boulevard	1	8	3	0
Main Street	3	27	5	2
Truman Road	2	8	2	0
Van Brunt Boulevard	7	0	0	1
Walnut Street	3	11	1	0
Westport Road	8	11	1	0
Interstate 35	1	6	2	3
Interstate 435	0	1	1	3
Interstate 670	0	1	1	3
United States Route 169	0	1	6	1

Table 16 – Pedestrian Collisions – Council District 4 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	76
Suspected Minor Injury	461
Suspected Serious Injury	107
Fatality	24
Total	668

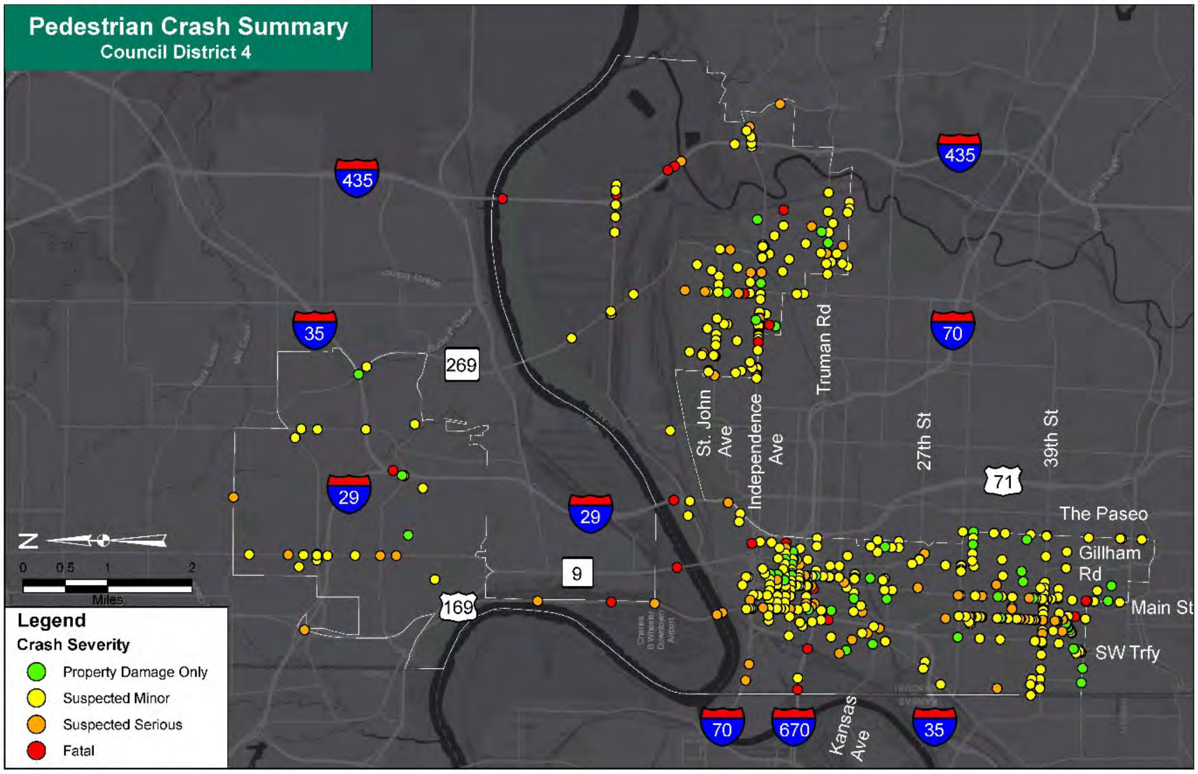

Figure 14: District 4 Pedestrian Crash Summary

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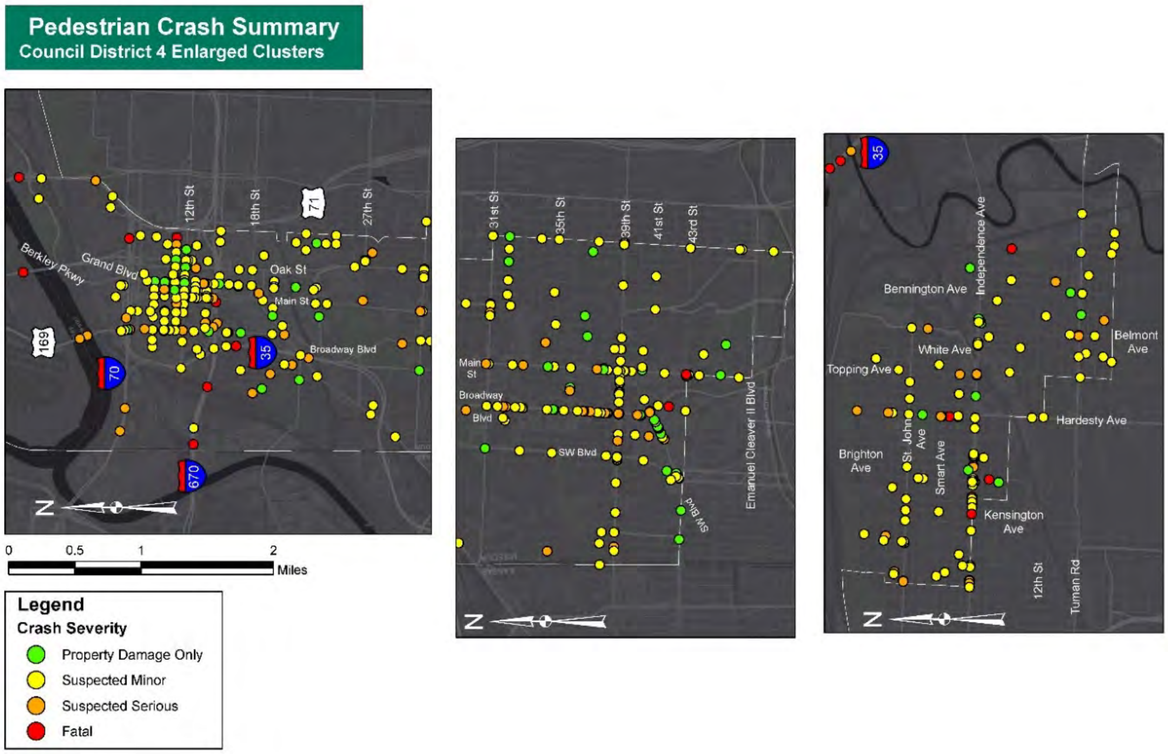


Figure 15: District 4 High Incident Locations Enlarged

Council District 5

Council District 5 has a population of 86,517. Council District 5 ranked 3rd and 3rd for bicycle and pedestrian collisions, respectively. Council District 5 is a medium dense residential area close to the urban downtown core. Council District 5 had five roadways with notable bicycle collision and 12 roadways with notable pedestrian collisions.

Figure 16: District 5 Boundary

District 5 had 85 bicycle collisions which included 19 property damage only, 56 suspected minor, 8 suspected serious and 2 fatal bicycle collisions. The streets within District 5 that experience the highest number of bicycle collisions are 63rd Street, Longview Road, Meyer Road, The Paseo and Prospect Avenue. The bicycle collision severity for 63rd Street includes one property damage only, four suspected minor and one suspected serious. The bicycle collision severity for Longview Road includes two property damage only and two suspected minor. The bicycle collision severity for Meyer Road includes three suspected minor and one suspected serious. The bicycle collision severity for The Paseo includes one property damage only, three suspected minor and one suspected serious. The bicycle collision severity for Prospect Avenue includes one property damage only and five suspected minor. **Table 17** shows the bicycle collision summary for the roadways with the highest number of collisions for Council District 5. **Table 18** summarizes the total bicycle collisions for Council District 5.

Table 17 – Bicycle Collisions – Council District 5 by Roadway and Severity (2010-2019)				
Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
63rd Street	1	4	1	0
Longview Road	2	2	0	0
Meyer Road	0	3	1	0
The Paseo	1	3	1	0
Prospect Avenue	1	5	0	0

Table 18 – Bicycle Collisions – Council District 5 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	19
Suspected Minor Injury	56
Suspected Serious Injury	8
Fatality	2
Total	85

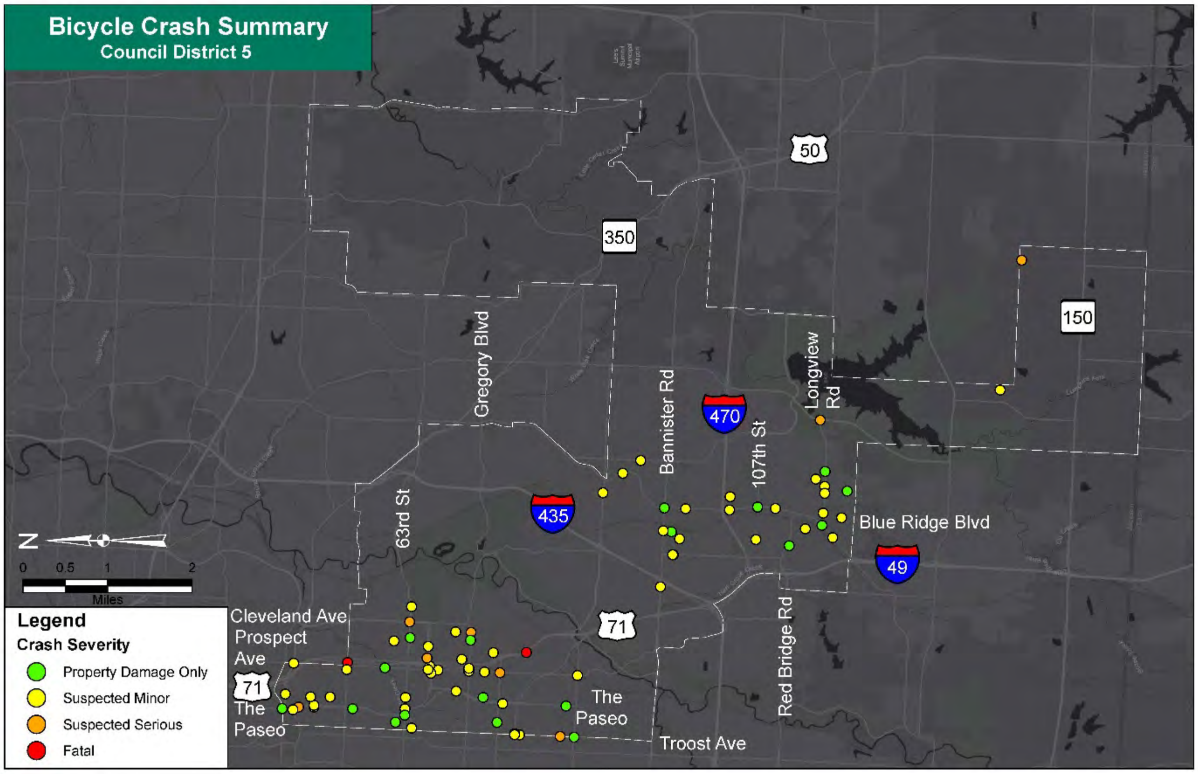


Figure 17: District 5 Bicycle Crash Summary

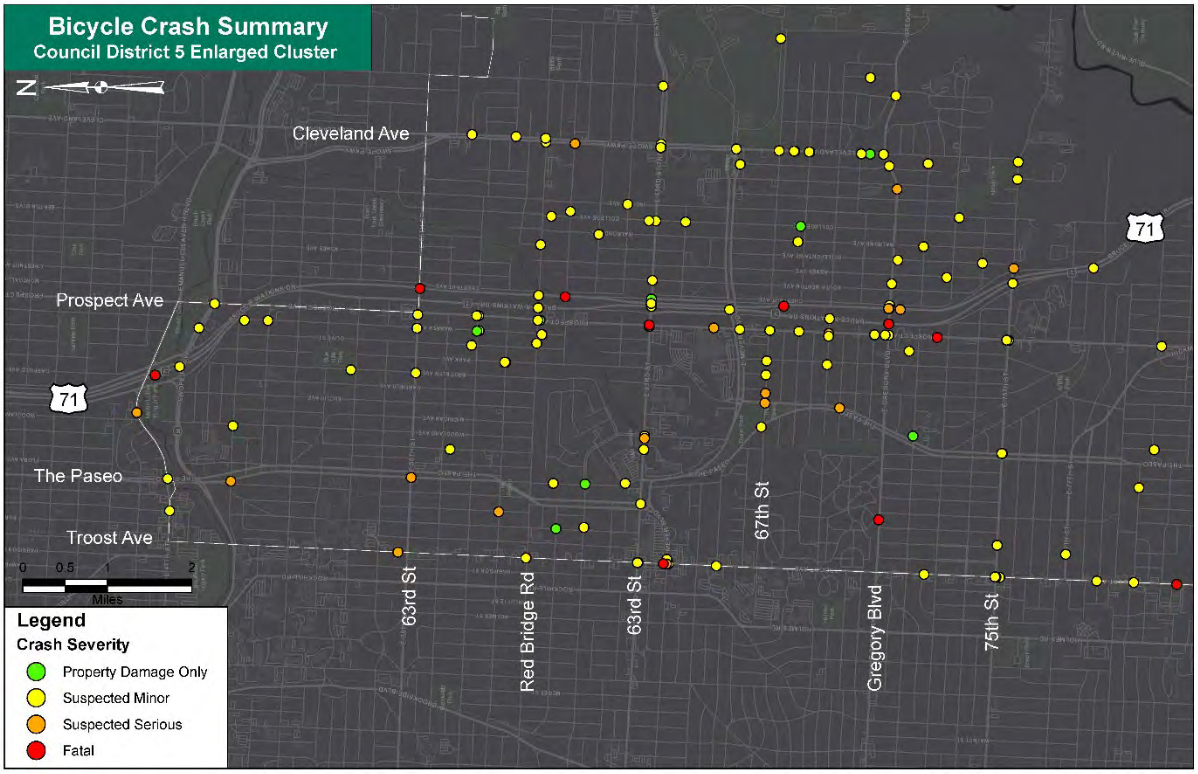


Figure 18: District 5 Bicycle Crash Cluster Enlarged

District 5 had 313 pedestrian collisions which included 18 property damage only, 220 suspected minor, 45 suspected major and 30 fatal pedestrian collisions. The streets within District 5 that experience the highest number of pedestrian collisions are 59th Street, 63rd Street, 75th Street, Bannister Road, Blue Ridge Boulevard, Cleveland Avenue, Gregory Boulevard, Prospect Avenue, Swope Parkway, Troost Avenue, Interstate 435 and US-71. **Table 19** shows the pedestrian collision summary for the roadways with the highest number of collisions for Council District 5. **Table 20** summarizes the total pedestrian collisions for Council District 5.

Table 19 – Pedestrian Collisions – Council District 5 by Roadway and Severity (2010-2019)				
Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
59th Street	0	4	1	0
63rd Street	2	16	1	0
75th Street	0	6	1	0
Bannister Road	0	9	2	1

Table 19 – Pedestrian Collisions – Council District 5 by Roadway and Severity (2010-2019)				
Blue Ridge Boulevard	2	11	3	2
Cleveland Avenue	1	4	0	2
Gregory Boulevard	1	10	2	1
Prospect Avenue	2	10	3	2
Swope Parkway	5	1	0	1
Troost Avenue	1	11	1	2
Interstate 435	2	1	0	3
United States Route 71	1	14	1	6

Table 20 – Pedestrian Collisions – Council District 5 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	18
Suspected Minor Injury	220
Suspected Serious Injury	45
Fatality	30
Total	313

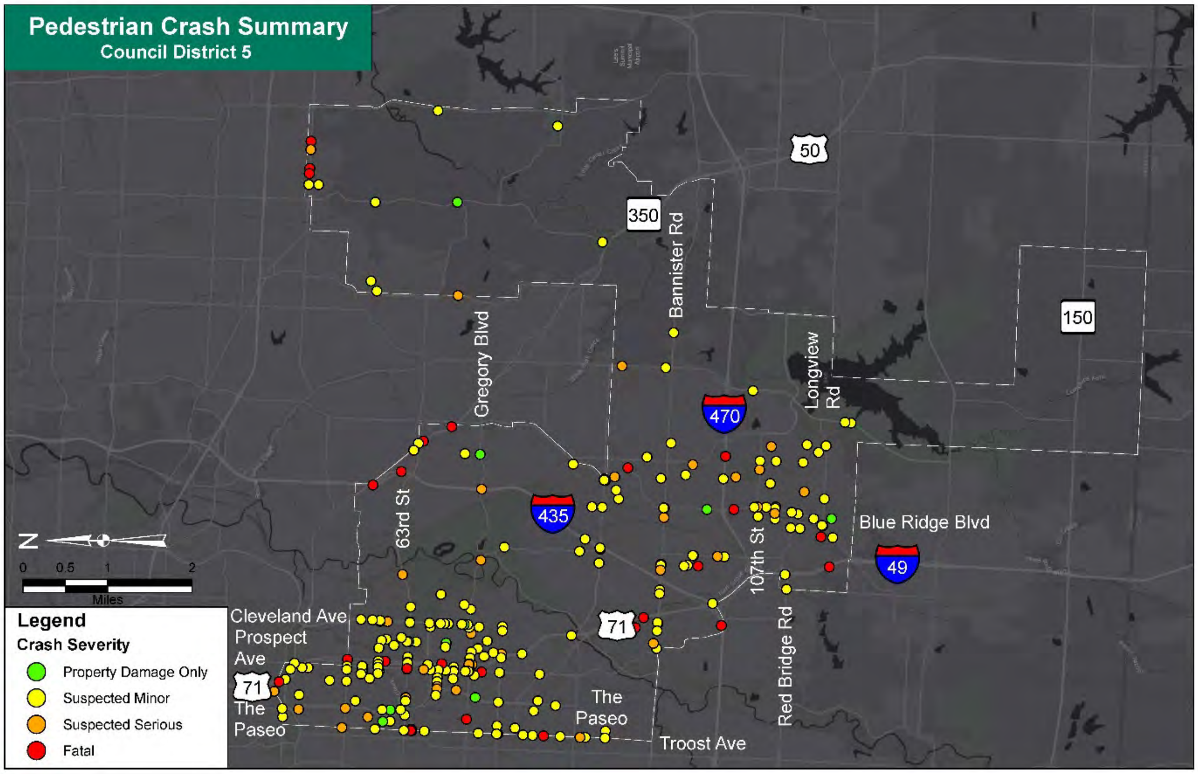


Figure 19: District 5 Pedestrian Crash Summary

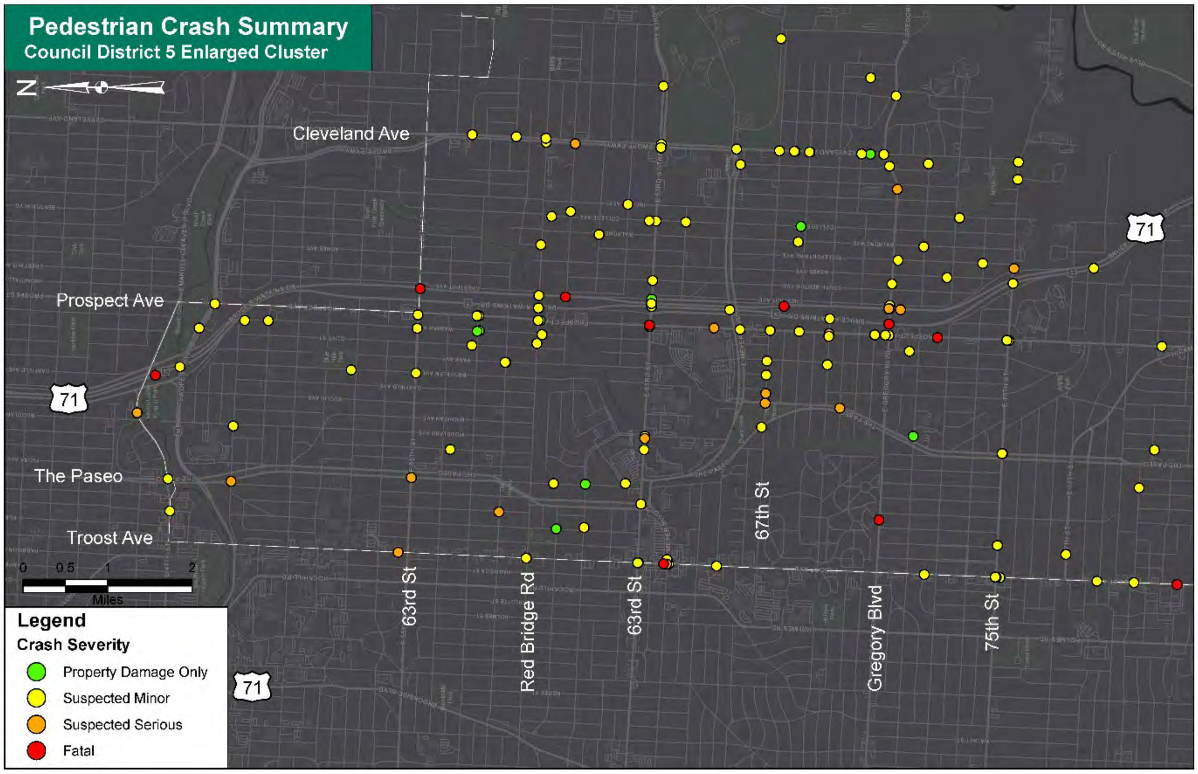


Figure 20: District 5 Pedestrian Crash Location Enlarged

Council District 6

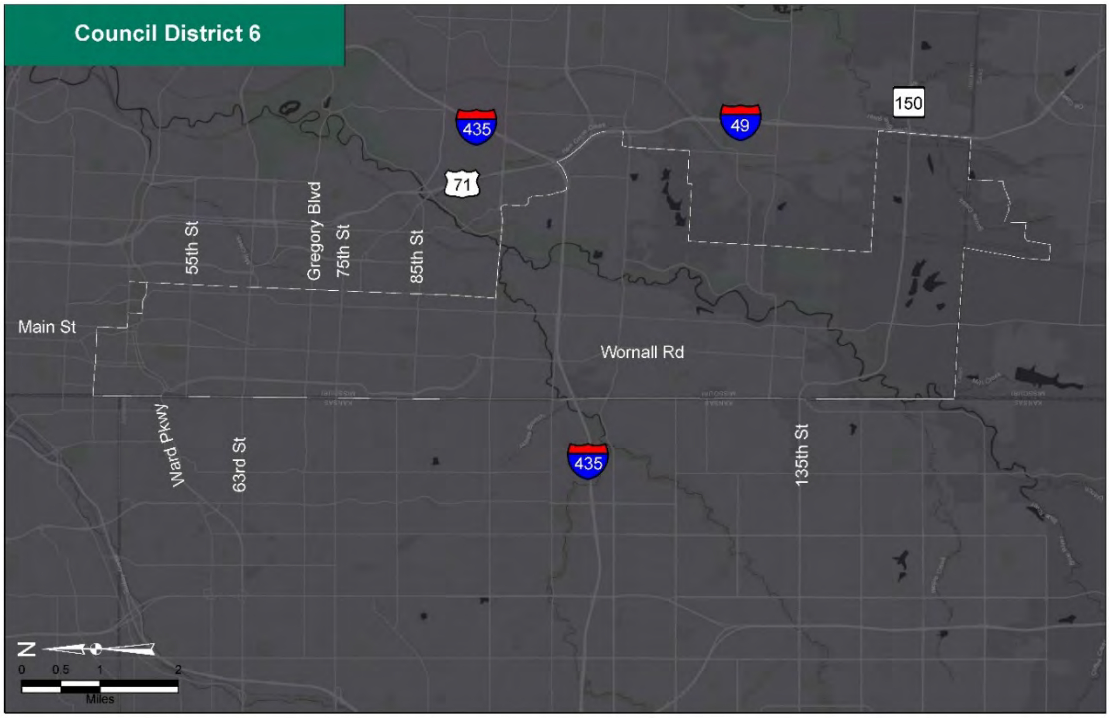


Figure 21: Council District 6 Boundary

Council District 6 has a population of 83,067. Council District 6 ranked 4th and 4th for bicycle and pedestrian collisions, respectively. Council District 6 is a mixed use area with primarily urban shopping plaza and single-family homes. Council District 6 had four roadways with notable bicycle collisions and eight roadways with notable pedestrian collisions.

District 6 had 69 bicycle collisions which included 18 property damage only, 45 suspected minor and 6 suspected serious. The streets within District 6 that experience the highest number of bicycle collisions are Brookside Boulevard, Holmes Road, Oak Street and Wornall Road. **Table 21** shows the bicycle collision summary for the roadways with the highest number of collisions for Council District 6. **Table 22** summarizes the total bicycle collisions for Council District 6.

Table 21 – Bicycle Collisions – Council District 6 by Roadway and Severity (2010-2019)

Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
Brookside Boulevard	2	5	1	0

Table 21 – Bicycle Collisions – Council District 6 by Roadway and Severity (2010-2019)				
Holmes Road	2	2	0	0
Oak Street	1	3	0	0
Wornall Road	2	5	0	0

Table 22 – Bicycle Collisions – Council District 6 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	18
Suspected Minor Injury	45
Suspected Serious Injury	6
Fatality	0
Total	69

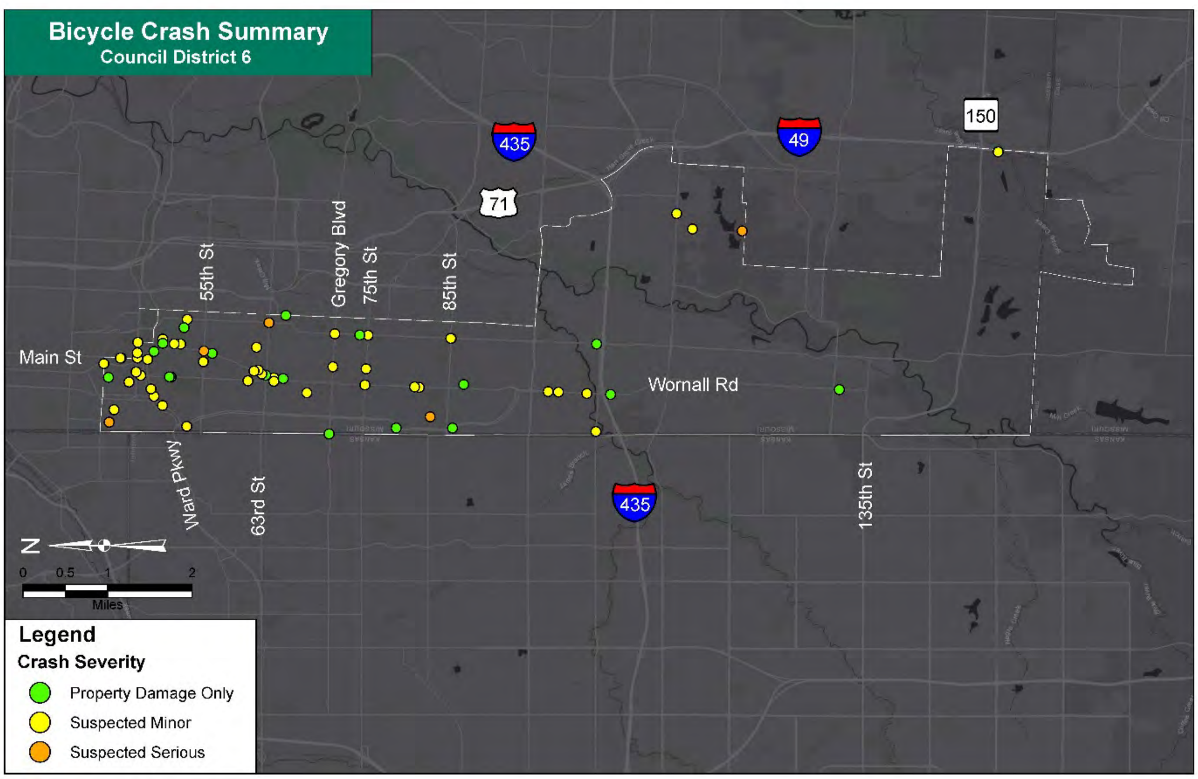


Figure 22: District 6 Bicycle Crash Summary

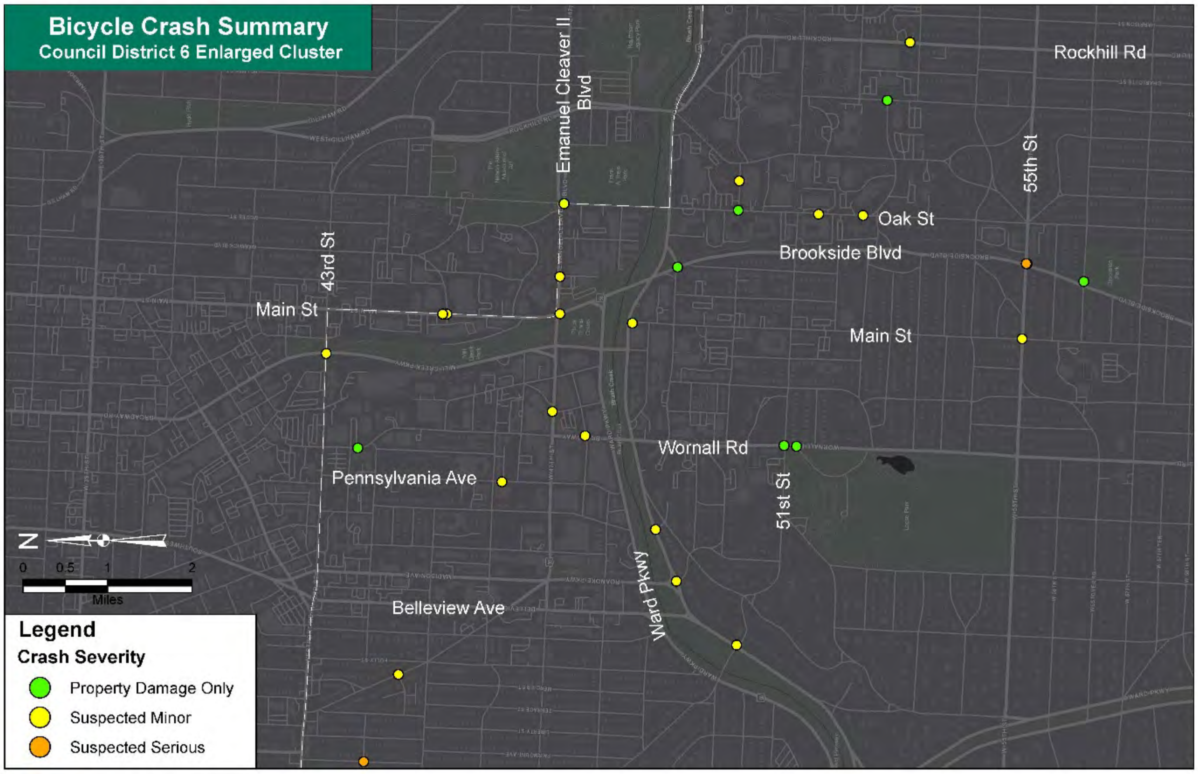


Figure 23: District 6 Bicycle Crash Area Enlarged

District 6 had 258 pedestrian collisions which included 31 property damage only, 180 suspected minor, 34 suspected major and 13 fatal pedestrian collisions. The streets within District 6 that experience the highest number of pedestrian collisions are 47th Street, 63rd Street, Holmes Road, Main Street, Troost Avenue, Ward Parkway, Wornall Road and Interstate 435. **Table 23** shows the pedestrian collision summary for the roadways with the highest number of collisions for Council District 6. **Table 24** summarizes the total pedestrian collisions for Council District 6.

Table 23 – Pedestrian Collisions – Council District 6 by Roadway and Severity (2010-2019)				
Roadway	Collision Type			
	Property Damage Only	Suspected Minor	Suspected Serious	Fatal
47th Street	3	16	3	0
63rd Street	1	5	1	0
Holmes Road	0	10	2	0

Table 23 – Pedestrian Collisions – Council District 6 by Roadway and Severity (2010-2019)				
Main Street	1	7	1	0
Troost Avenue	17	1	0	4
Ward Parkway	2	10	1	0
Wornall Road	2	12	3	1
Interstate 435	2	5	0	3

Table 24 – Pedestrian Collisions – Council District 6 by Severity (2010-2019)	
Type of Collision	Number of Collisions
Property Damage Only	31
Suspected Minor Injury	180
Suspected Serious Injury	34
Fatality	13
Total	258

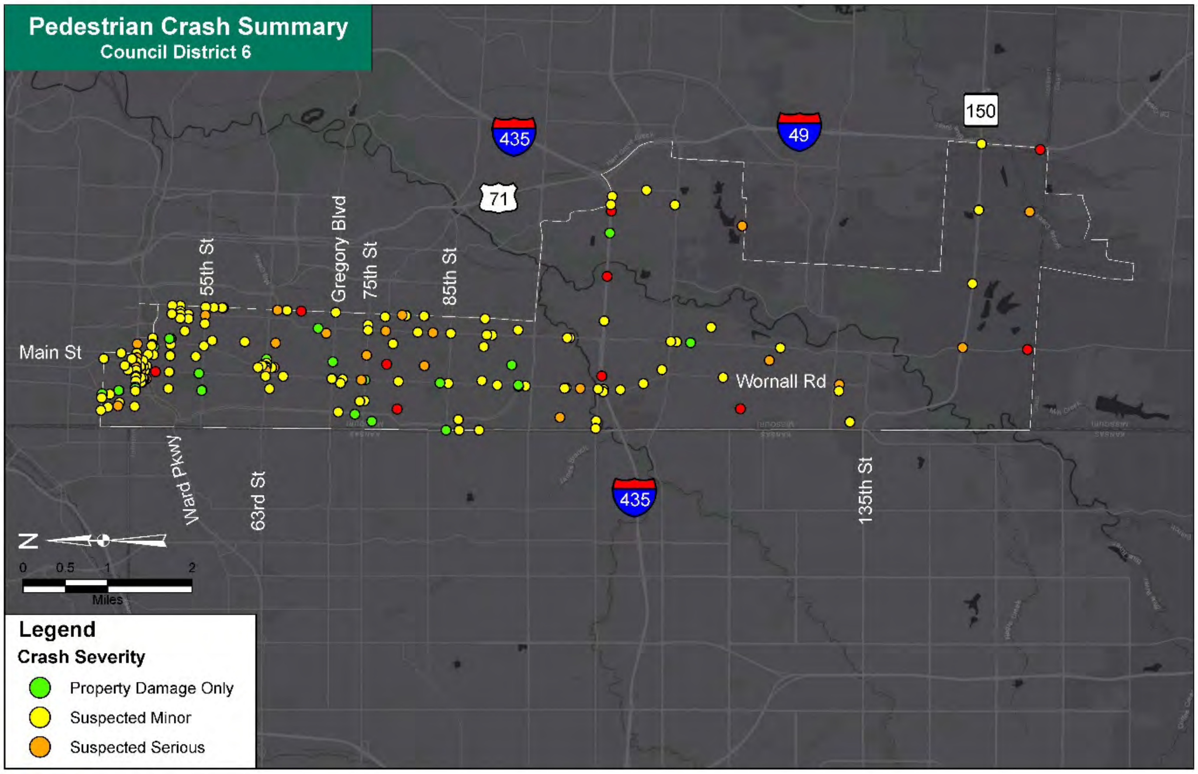


Figure 24: District 6 Pedestrian Crash Summary

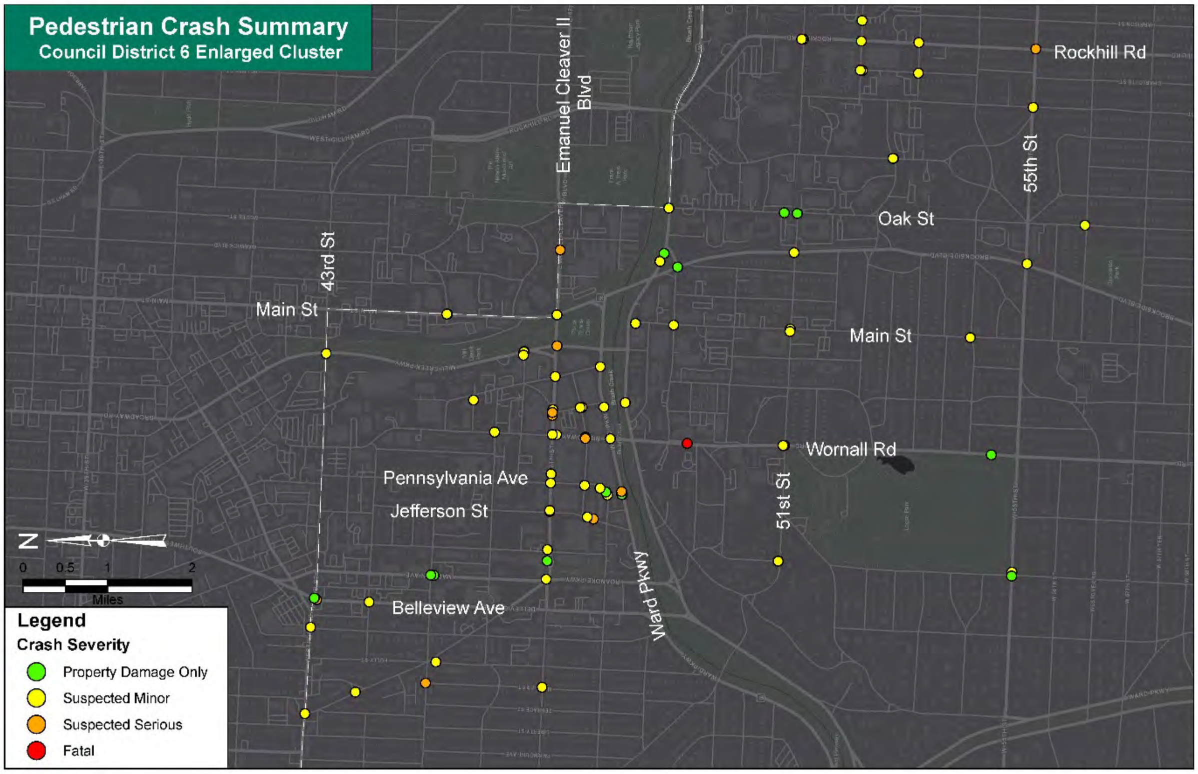


Figure 25: District 6 Pedestrian Crashes Enlarged Area

Summary of All City-Wide Data

City-Wide Bicycle Crash Analysis

From 2010-2019 there were a total of 616 bicycle collisions in the city limits. There are several other factors that this study analyzed, which includes Council District, year, month of year, time of day, lighting conditions, intersections, and crash severity.

For the analysis of total collisions by year, the dataset showed peaks in 2015 and 2017 with a gradual increase from 2010-2019. It should also be noted that 2019 had a notable drop off in bicycle collisions. The significant decrease in bicycle collisions experienced in 2019 was about half of what was to be expected based on the prior nine years.

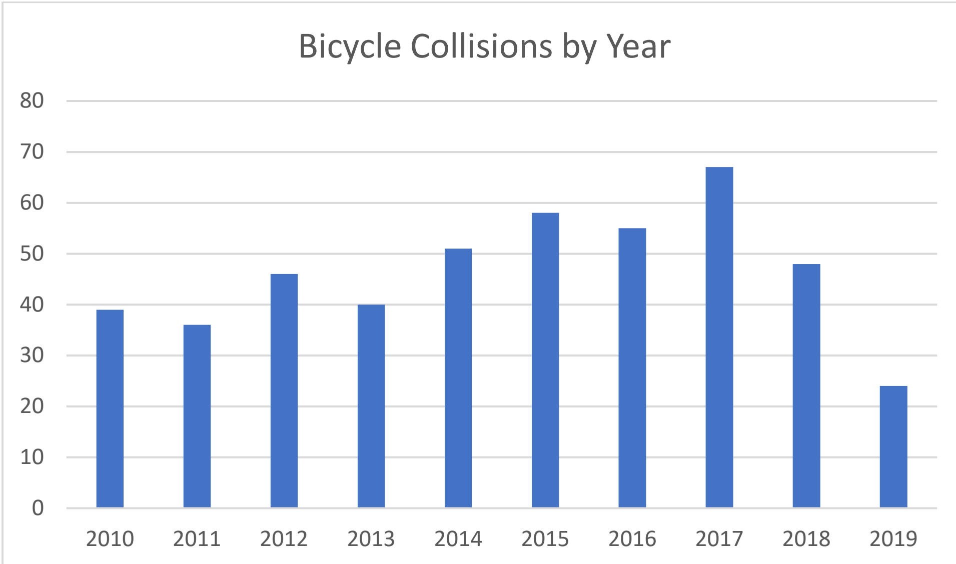


Figure 26: Bicycle Collisions by Year

Bicycle collisions based on the month of the year, showed the highest collisions occurring during the summer months of May, June and July as ambient air temperatures rise to their highest and the lowest bicycle collisions occurred during the winter months December, January, and February as the weather is typically too cold for most people to utilize bicycles. The months between the highest and lowest bicycle collisions throughout the year showed gradual increases and decreases between peaks, respectively.

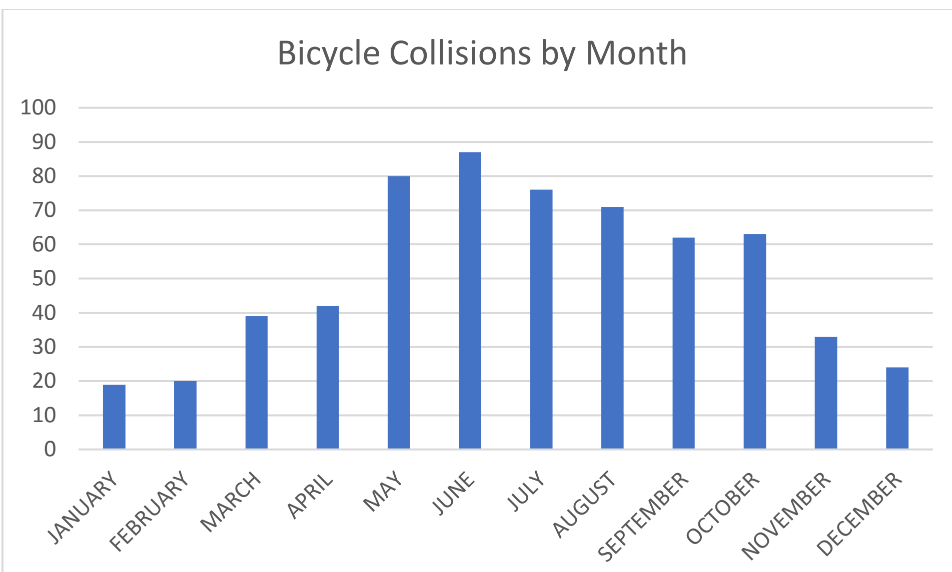


Figure 27: Bicycle Collisions by Month

For the time-of-day collisions, the dataset showed spikes during the AM/PM peak flow rates and spiked around the lunch hour. The highest occurrence of bicycle collisions during the PM peak flow was from 3PM to 7PM. This would be consistent with how vehicular volumes peak throughout the day, with the highest occurrence of collisions happening during the PM peak window.

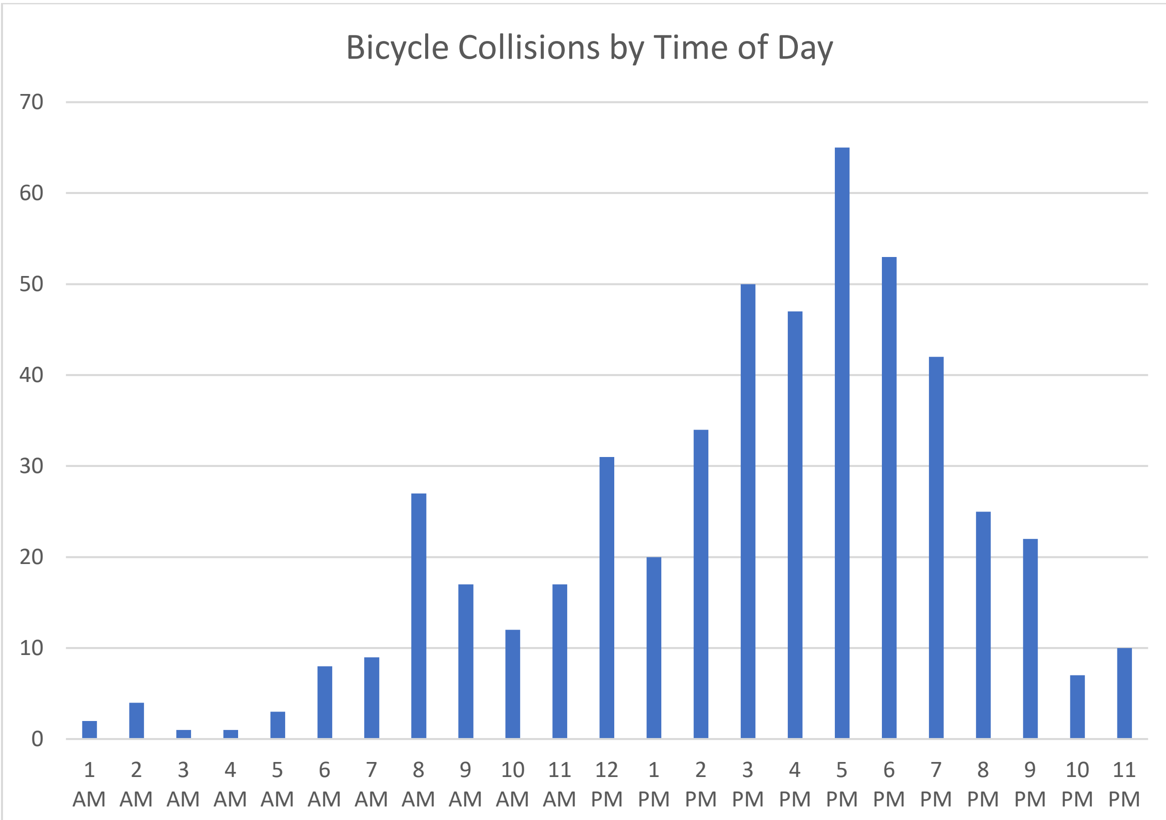


Figure 28: Bicycle Collisions by Time of Day

Lighting conditions could be a major influencer for the bicycle collisions. However, the dataset showed 81% of collisions occurred during the daylight, followed by 17% in the dark with street lighting, 1% in the dark without street lighting and the remaining 1% was split between dark with unknown street lighting and unknown conditions.

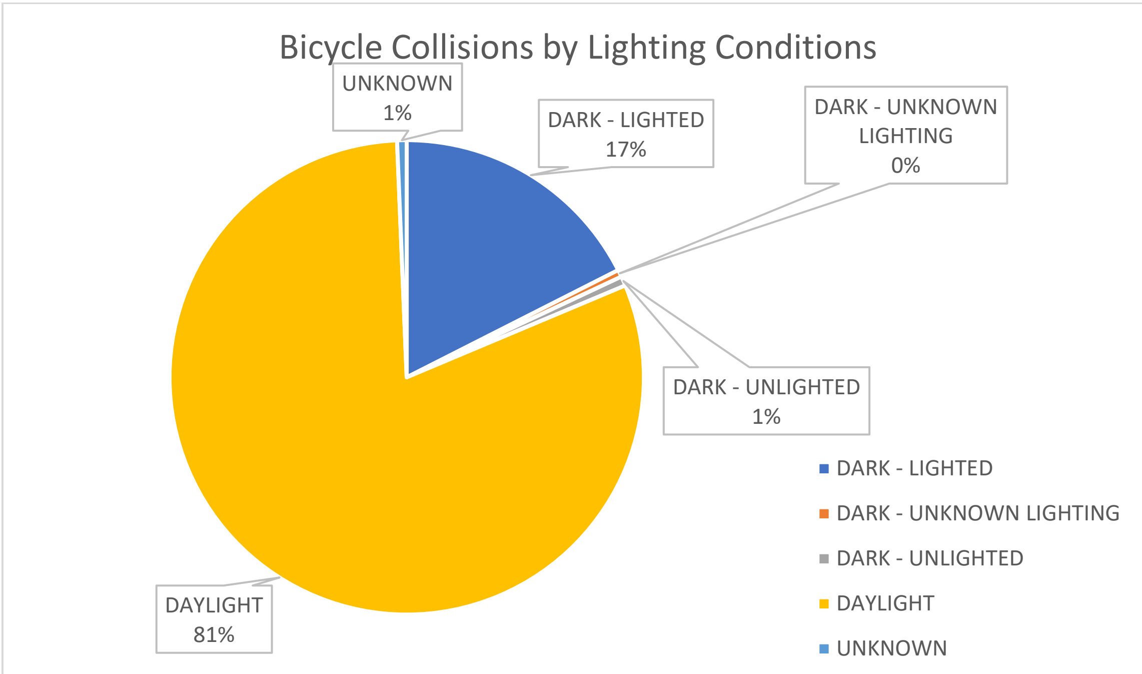


Figure 29: Bicycle Collisions By Lighting Conditions

Bicycle collisions at intersections remained steady with a little more variation than collisions by year but showed a significant decrease in collisions in 2019.

alta

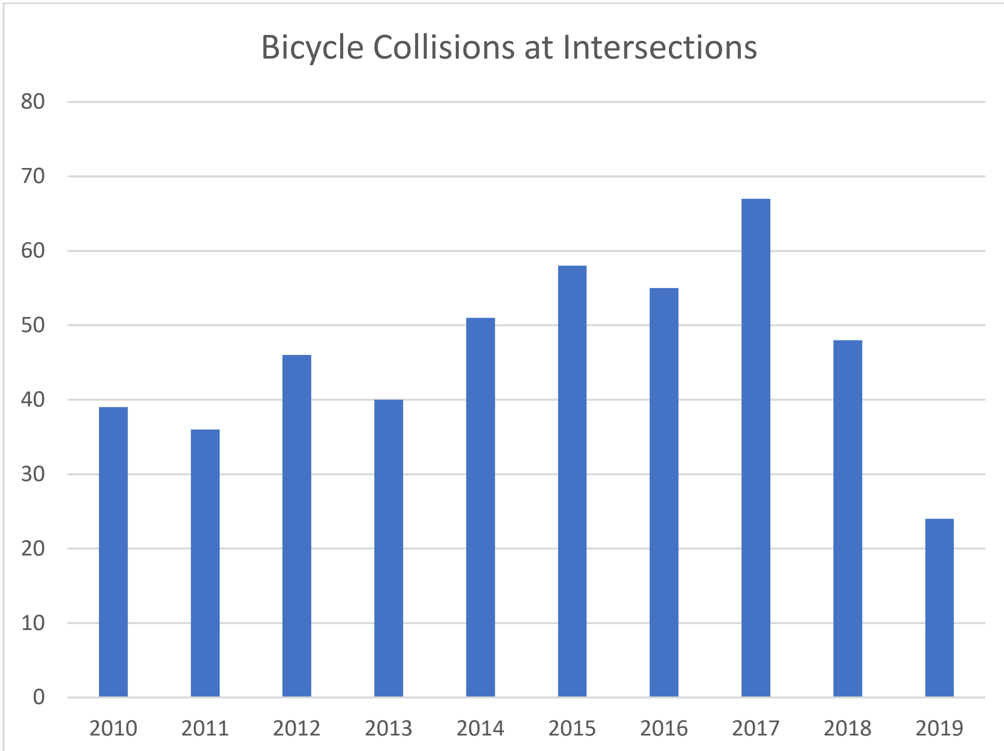


Figure 30: Bicycle collisions at intersections

Table 25 – Bicycle Collisions – Council District Total (2010-2019)	
Council District	Number of Collisions
1	32
2	27
3	131
4	169
5	85
6	69
Total	513

Other criteria that were analyzed included bicycle crashes based on roadway classifications, crash severity by roadway classification, and bicycle collisions by speed limit of the traveling roadway.

Bicycle Collisions vs Roadway Functional Classification

Most bicycle incidents occurred on Arterial and Residential roadways. The roadway functional classification data depicts higher bicycle incidents on arterial roadways due to the nature higher volume of vehicle traffic on arterials roadways. The roadway functional classification data also shows there is higher bicycle incidents on residential roadways due to the higher volume of bicycle traffic around residential roadways.

Bicycle Crash Severity vs Roadway Functional Classification

Looking more in depth at the bicycle crash severity for the roadway functional classification, the data shows that most incidents were suspected minor followed by property damage only, suspected serious and fatal. The functional classification data depicts what would be expected for crash severity since most bicycle incidents occur at arterials and residential roadways.

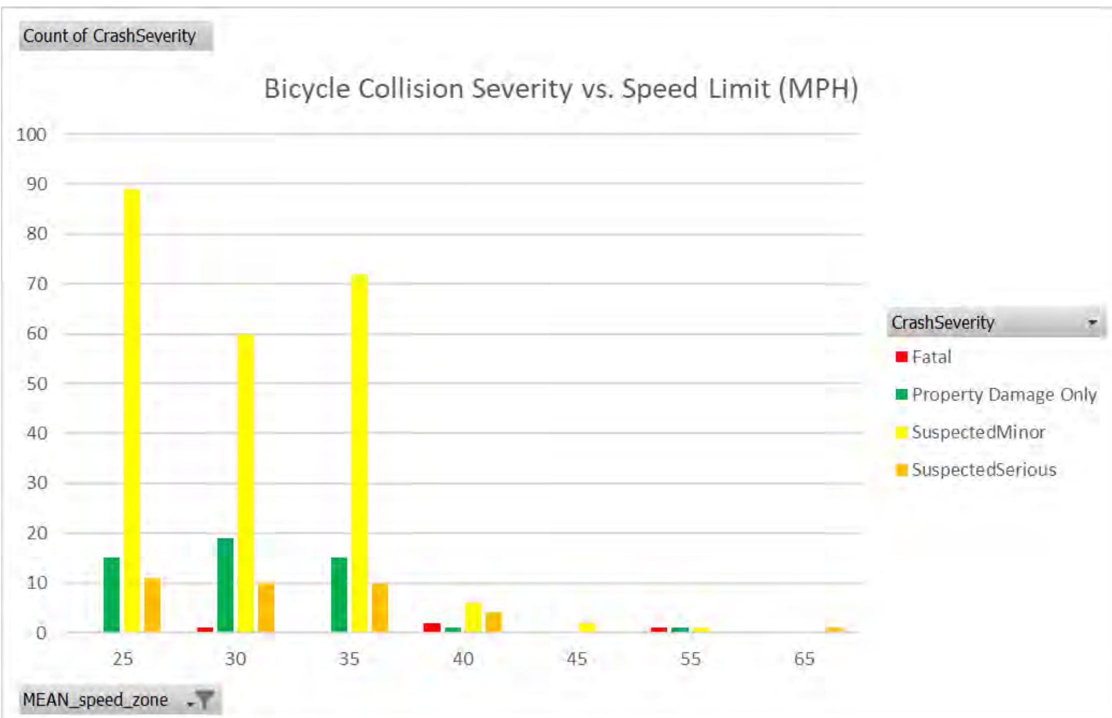


Figure 31: Bicycle Crash Severity vs. Roadway Classification

Bicycle Collisions vs Speed Limit

Most of the bicycle incidents occurred at 25, 30 and 35 MPH. The least number of bicycle incidents occurred from highest to lowest are 40, 55, 45 and 65 MPH. Bicycle incidents against the roadway speed limit coveys that most of the bicycle incidents occurred at arterial and residential speeds, as to be expected. The data shows that most of the incidents are at non-highway speeds but the speeds are high enough to cause suspected minor damage and property damage only primarily.

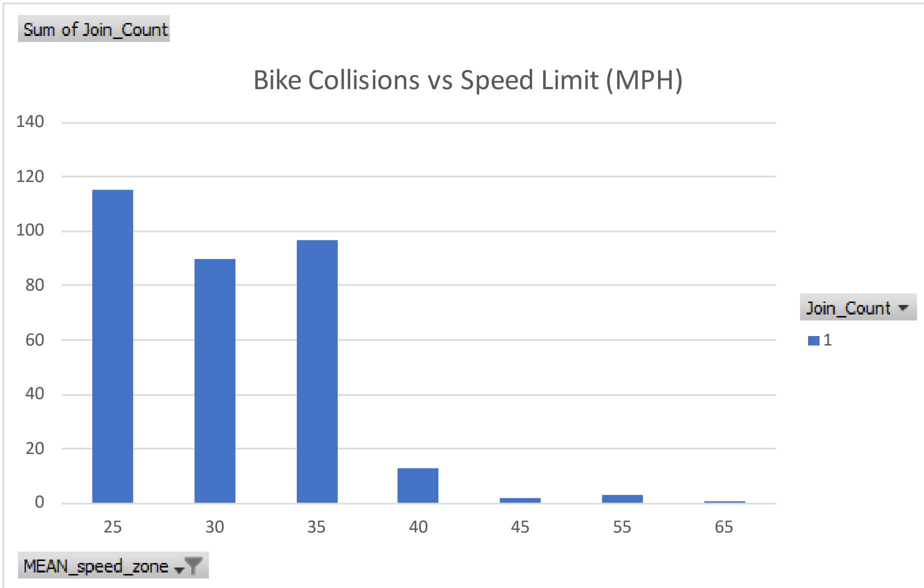


Figure 32: Bicycle Collisions vs. Roadway Speed Limit

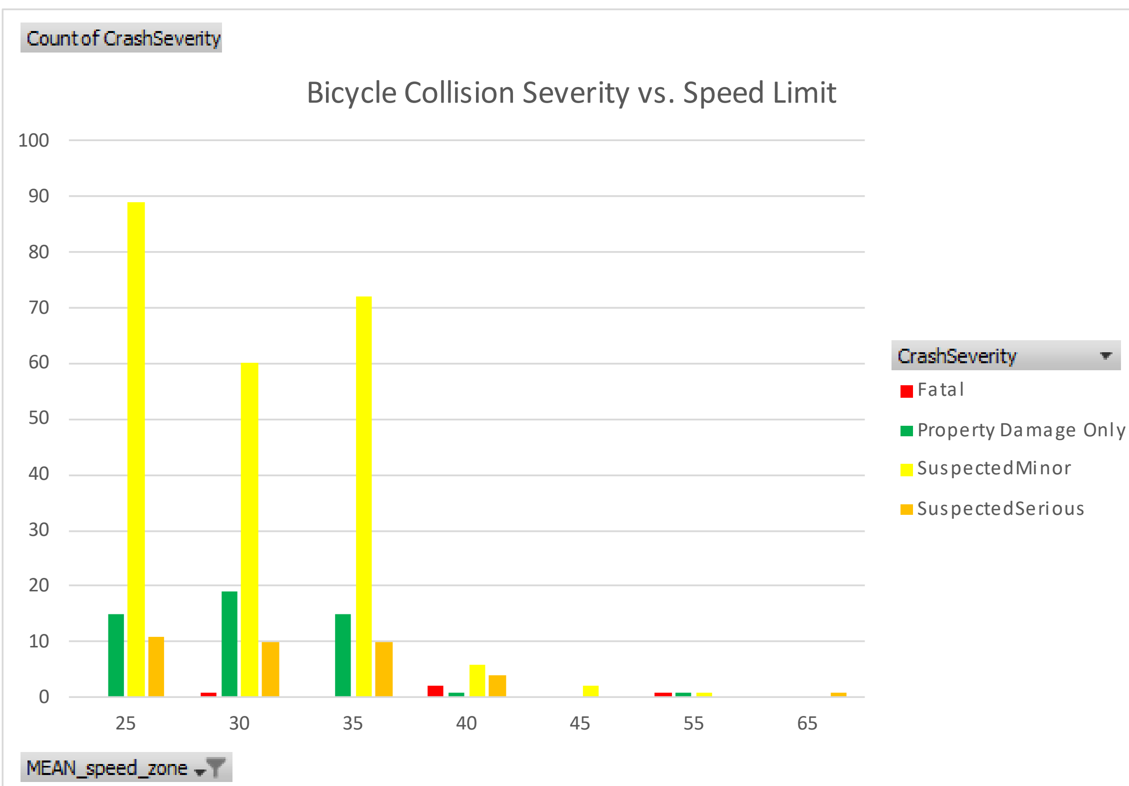


Figure 33: Bicycle Severity vs. Speed Limit

Bicycle Collision vs Presence of Sidewalk

Most of the Bicycle incidents looking at sidewalk presence occurs from 0%-20% followed by 40%-60%, 60%-80%, 80%-100%, 20%-40%. The presence of sidewalk data can be explained by bicycle incidents occurring where additional sidewalk infrastructure is needed. Where there is a higher sidewalk presence there is also a higher probability of bicycles using the sidewalk showing a move equitable number of incidents split between sidewalk presence between 20%-100%.

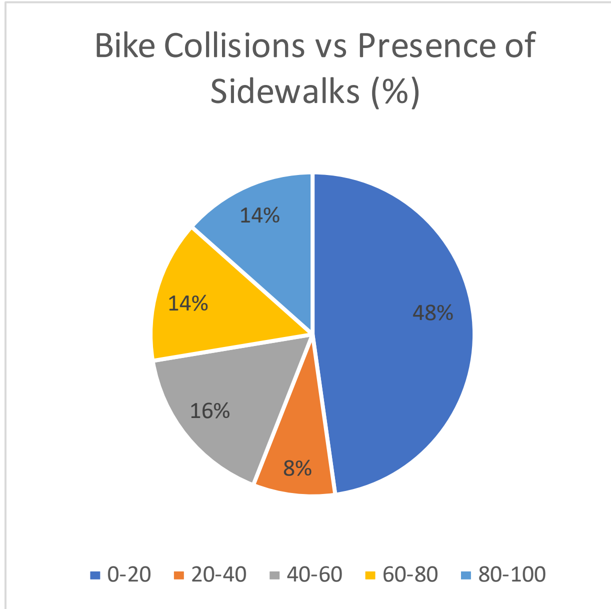


Figure 34: Bicycle Collisions vs. Prescence of Sidewalks

City-Wide Pedestrian Crash Analysis

From 2010-2019 there were a total of 2,037 pedestrian collisions. Pedestrian collisions were categorically evaluated against Council District, year, month of year, time of day, lighting conditions, intersections, and crash severity.

For by year collisions, the dataset showed peaks in 2016 and 2018 with a gradual increase from 2010-2019. It should also be noted that 2019 had a remarkable drop off in pedestrian collisions.

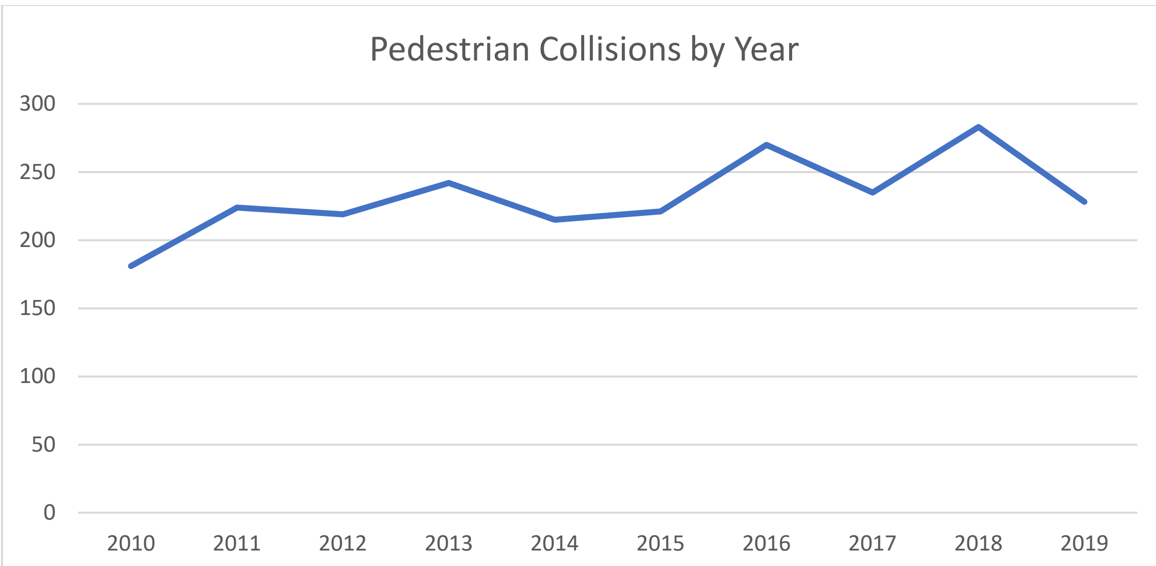


Figure 35: Pedestrian Collisions by Year

For the time-of-day collisions, the dataset showed spikes during the AM/PM peak flow rates and spiked around the lunch hour. The highest occurrence of pedestrian collisions during the PM peak flow was from 2PM to 7PM. Similar to bicycles, this correlates to higher number of vehicular traffic in the PM peak periods.

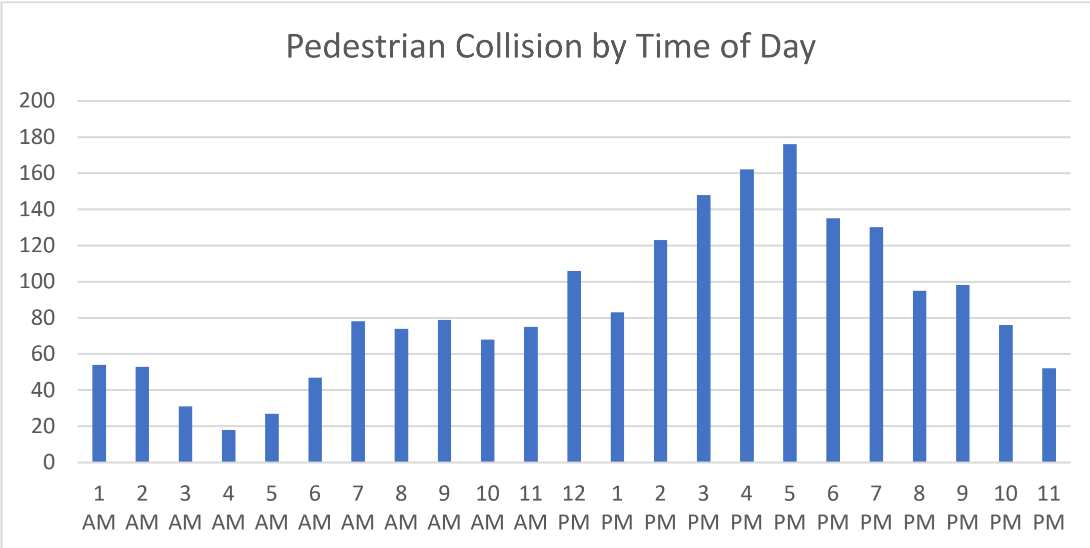


Figure 36: Pedestrian Collisions by Time of Day

Pedestrian collisions for the month of year in the dataset showed the highest collisions occurring during the December but remained consistent throughout the months of May to December. The data produced a mean 193 pedestrian collisions per month and a standard deviation of 14 collisions. Pedestrian collisions based on the year in the dataset showed the highest collisions occurring during 2018, but then decreased for 2019.

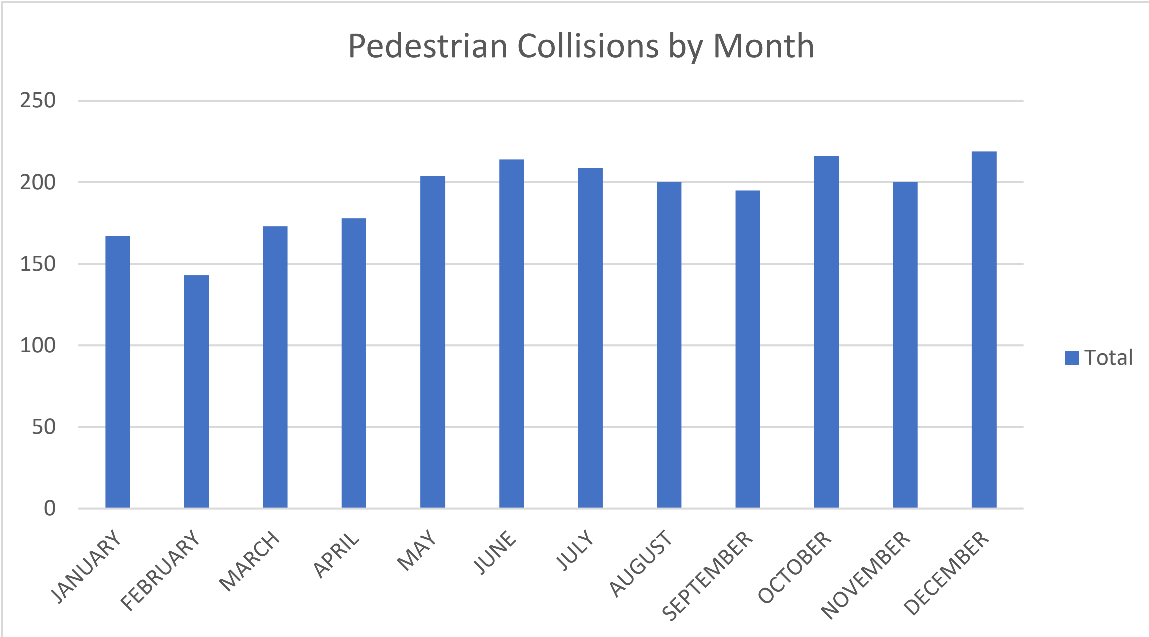


Figure 37: Pedestrian Collisions by Month

For lighting conditions, the dataset showed 64% of collisions occurred during the daylight, followed by 30% in the dark with street lighting, 4% in the dark without street lighting and the remaining 2% was split between dark with unknown street lighting and unknown conditions.

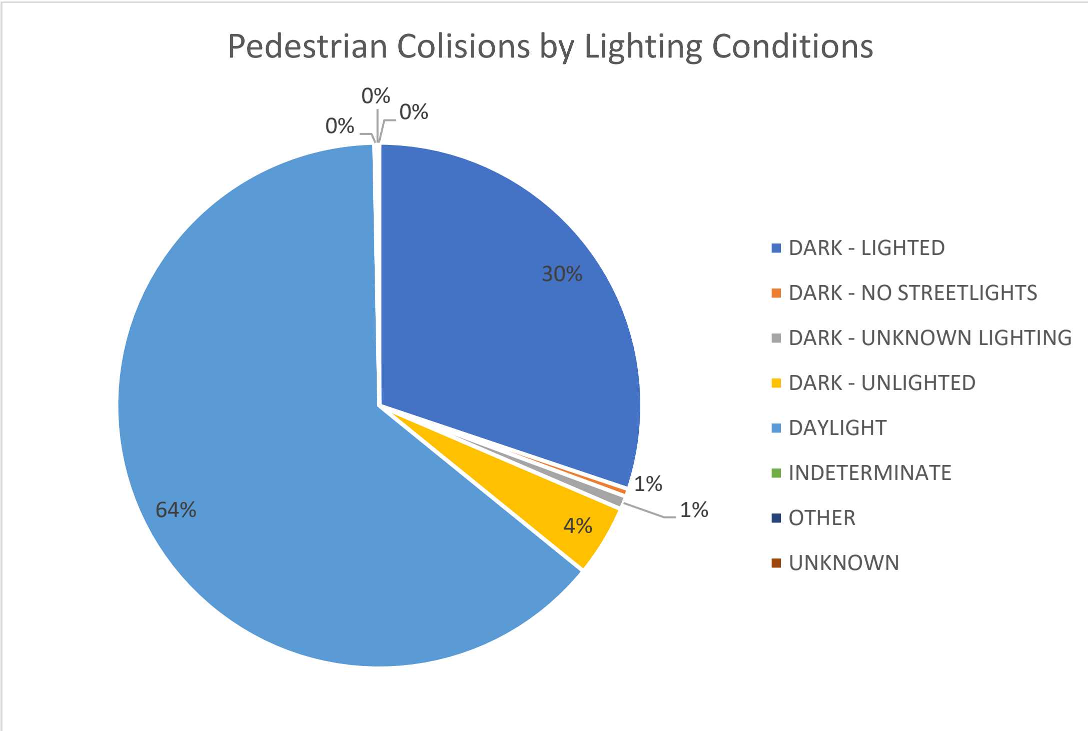


Figure 38: Pedestrian Collisions by Lighting Conditions

Pedestrian collisions at intersections occur at a mean of 165 collisions per year with a standard deviation of 13 pedestrian collisions.

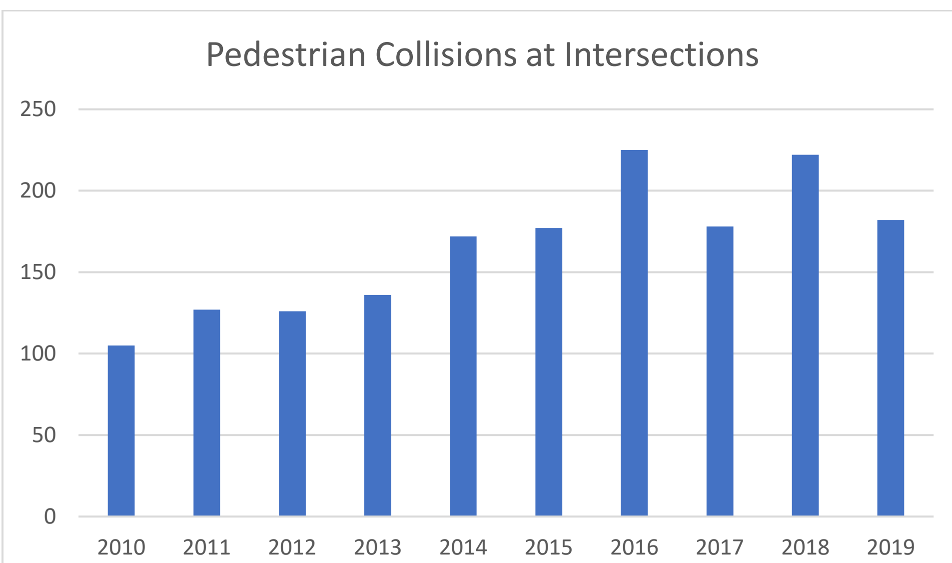


Figure 39: Pedestrian Collisions at Intersections

Table 26 – Pedestrian Collisions – Council District Total (2010-2019)	
Council District	Number of Collisions
1	85
2	115
3	598
4	668
5	313
6	258
Total	2037

Pedestrian Collisions vs Roadway Functional Classification

Most pedestrian incidents occurred on Arterial and Residential roadways. The roadway functional classification data depicts higher pedestrian incidents on arterial roadways due to the nature higher volume of vehicle traffic on arterials roadways. The roadway functional classification data also shows there is higher pedestrian incidents on residential roadways due to the higher volume of pedestrian traffic around residential roadways.

Pedestrian Crash Severity vs Roadway Functional Classification

Looking more in depth at the pedestrian crash severity for the roadway functional classification, the data shows that most incidents were suspected minor followed by suspected serious, property damage only and fatal. The functional classification data depicts what would be expected for pedestrian crash severity since most incidents occur at arterials and residential roadways.

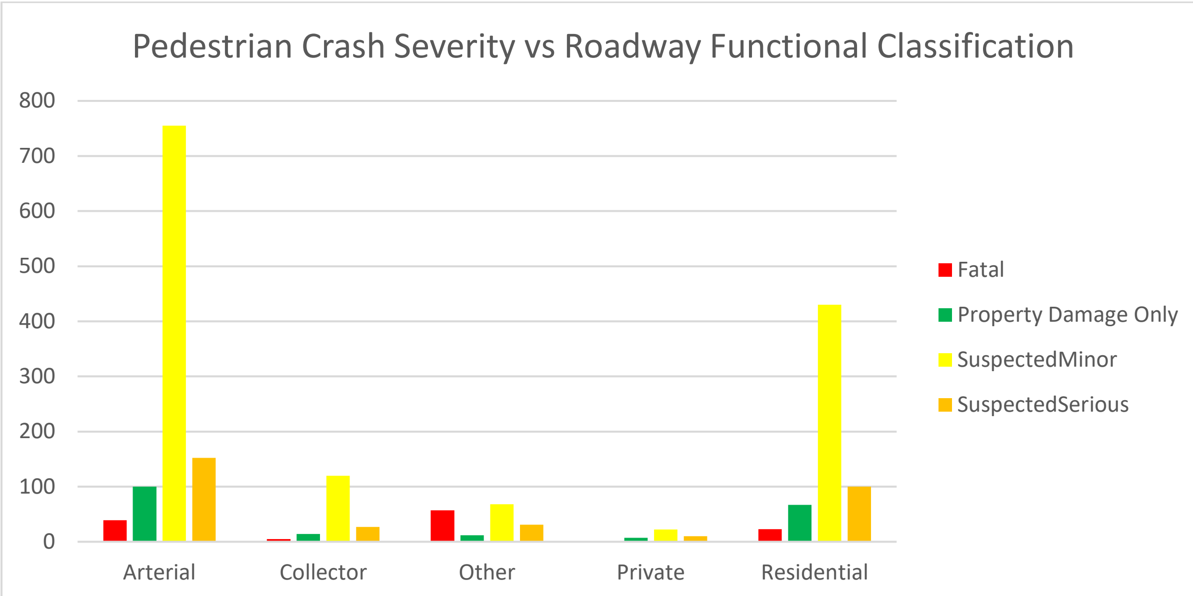


Figure 40: Pedestrian Crash Severity vs. Roadway Classification

Pedestrian Collisions vs Speed Limit

Most of the pedestrian incidents occurred at 25, 30 and 35 MPH. The least number of pedestrian incidents occurred from highest to lowest are 40, 45, 65, 55, 50, 70 and 60 MPH. Pedestrian incidents against the roadway speed limit coveys that most of the incidents occurred at arterial and residential speeds, as to be expected. The data shows that most of the pedestrian incidents are at non-highway speeds but the speeds are high enough to cause suspected minor damage and suspected serious damage primarily. The data also shows that there is a higher percentage of crashes that involve fatalities as speeds increase to 35 miles per hour. At speeds higher than 35 miles per hour, the total number of crashes drop dramatically, likely because of the roadway type being a higher classification and potentially providing sidewalks, crosswalks, etc… However, at higher speeds, the percentage of crashes that involve more severe crashes are higher.

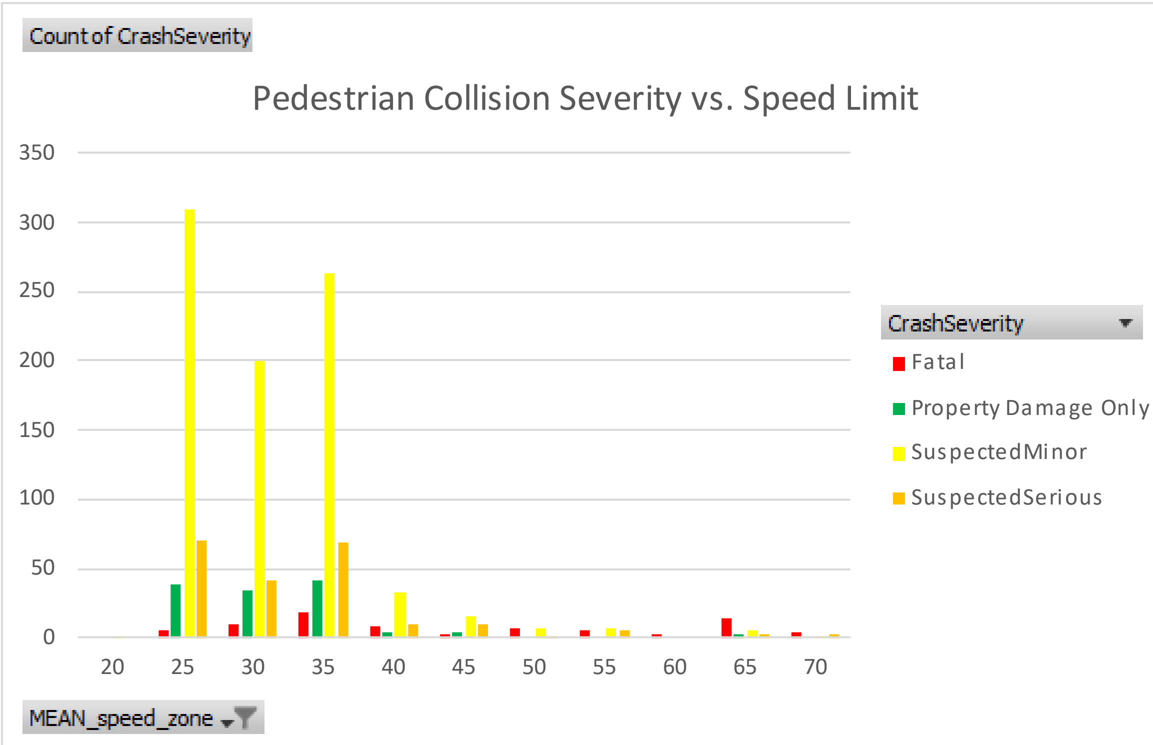


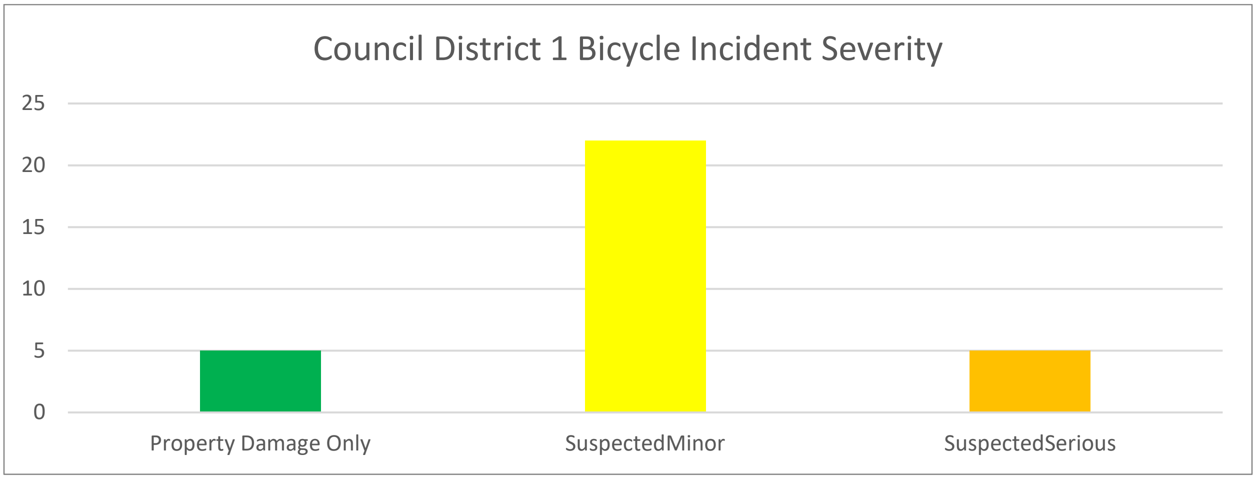
Figure 41: Pedestrian Collision Severity vs. Speed Limit

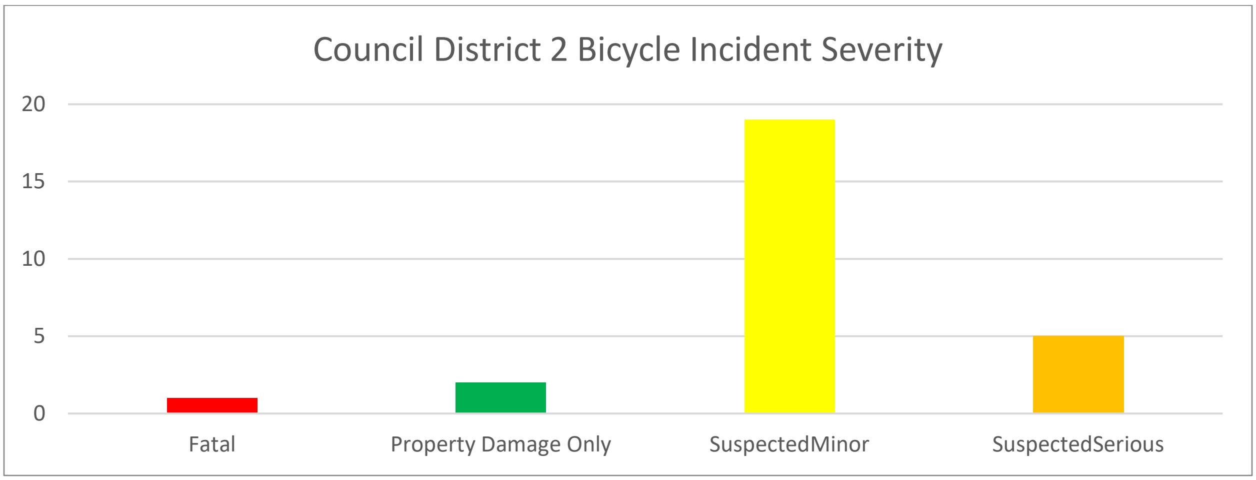
Pedestrian Collision vs Presence of Sidewalk

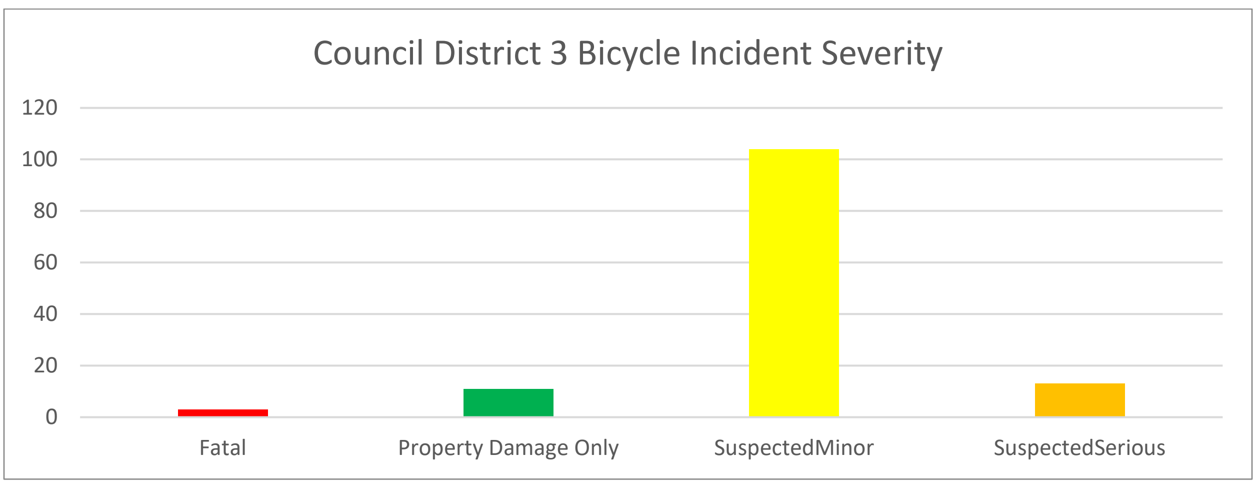
Most of the pedestrian incidents looking at sidewalk presence occurs from 80%-100% followed by 0%-20%, 60%-80%, 40%-60%, 20%-40%. The presence of sidewalk data can be explained by pedestrian incidents occurring where there are higher volumes of pedestrians using the infrastructure due to higher sidewalk presence. The data also shows pedestrian incidents occur at the second highest rate in the 0-20% sidewalk presence range due to the additional sidewalk infrastructure is needed in those areas.

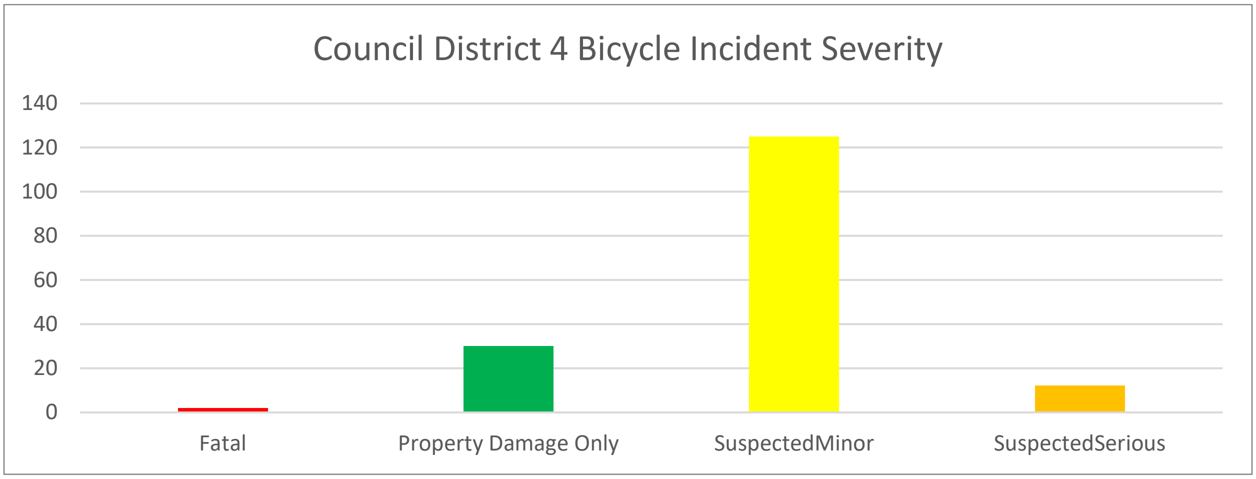
Attachments

Bicycle and Pedestrian Crash Maps

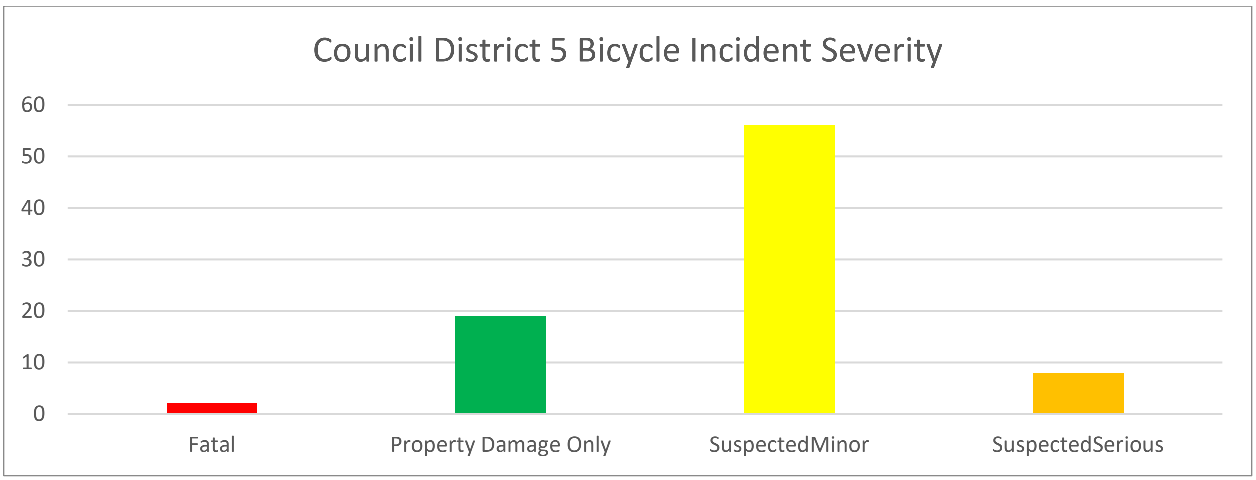

Council District 1 Bicycle Incident Severity
25
20
15
10
5
0
Property Damage Only
SuspectedMinor
SuspectedSerious


Council District 2 Bicycle Incident Severity
20
15
10
5
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

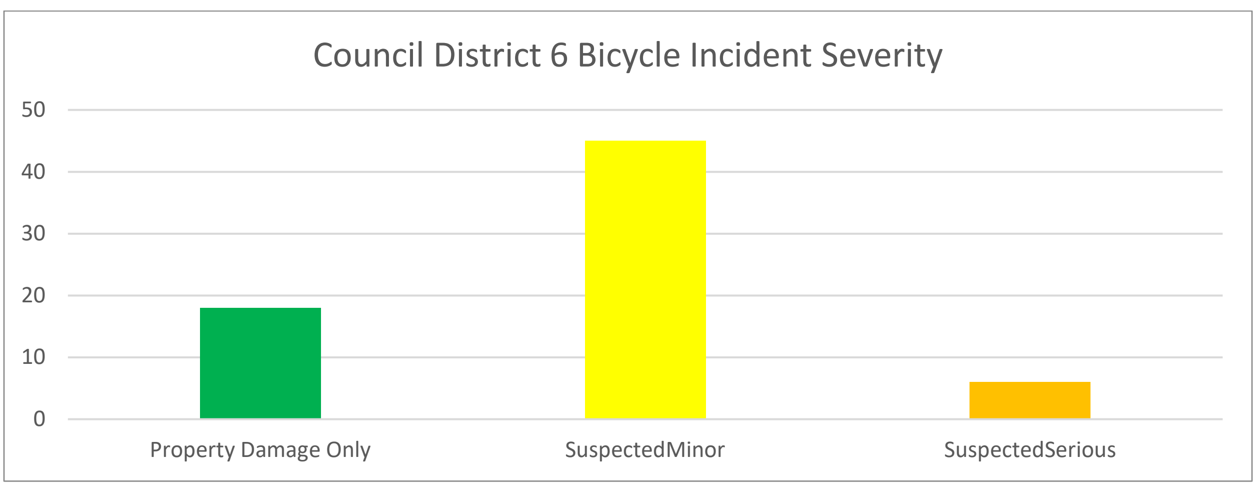

Council District 3 Bicycle Incident Severity
120
100
80
60
40
20
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious



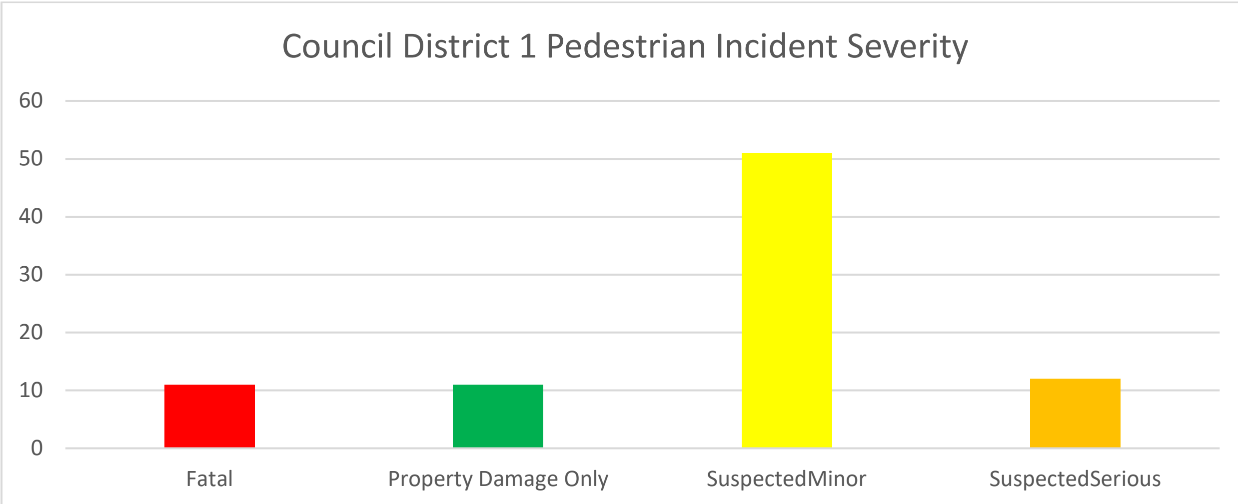
Council District 4 Bicycle Incident Severity
140
120
100
80
60
40
20
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

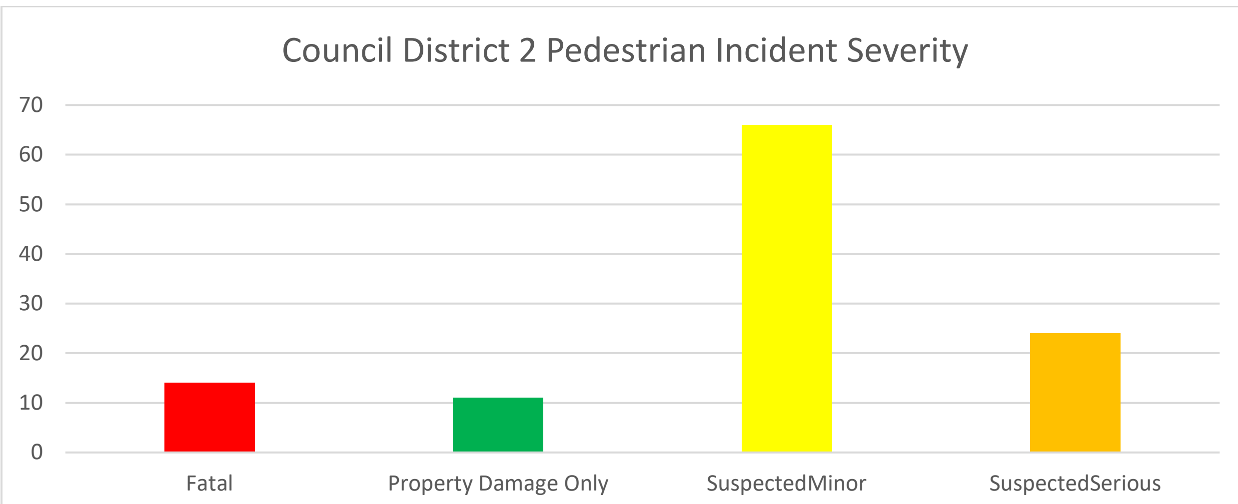


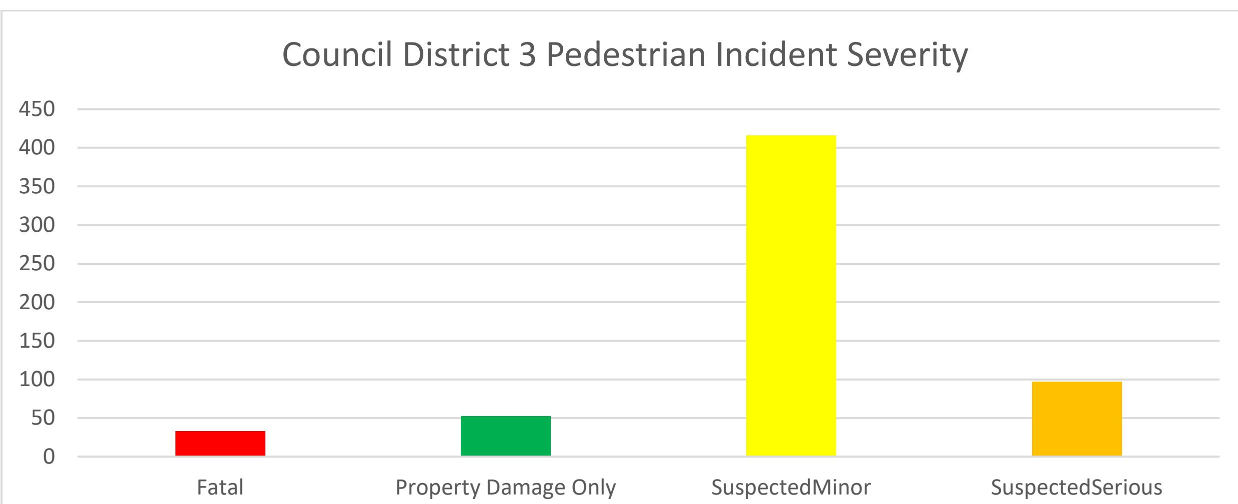
Council District 5 Bicycle Incident Severity
60
50
40
30
20
10
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

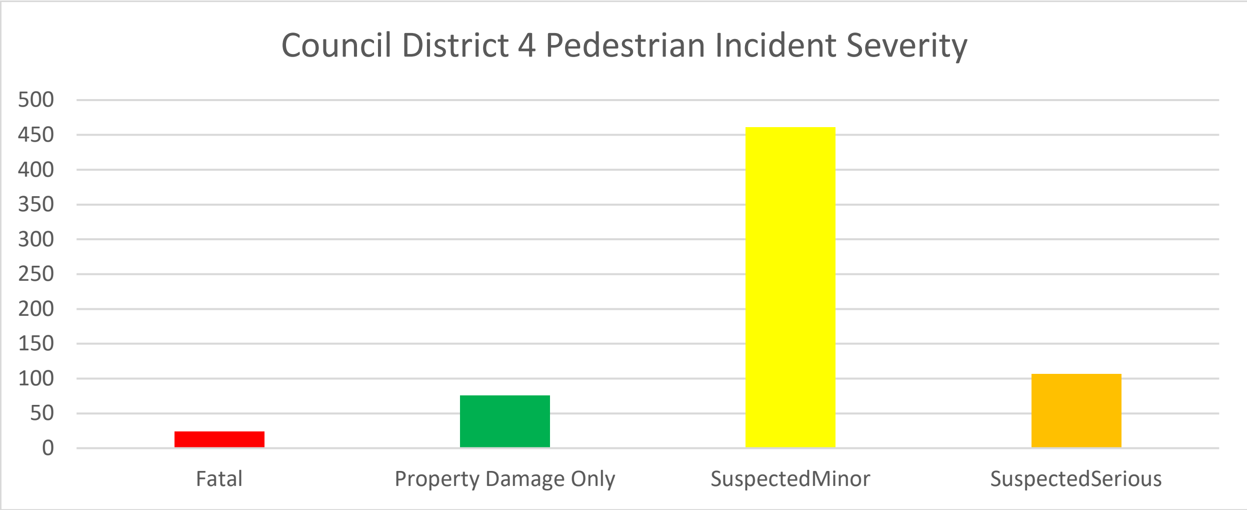


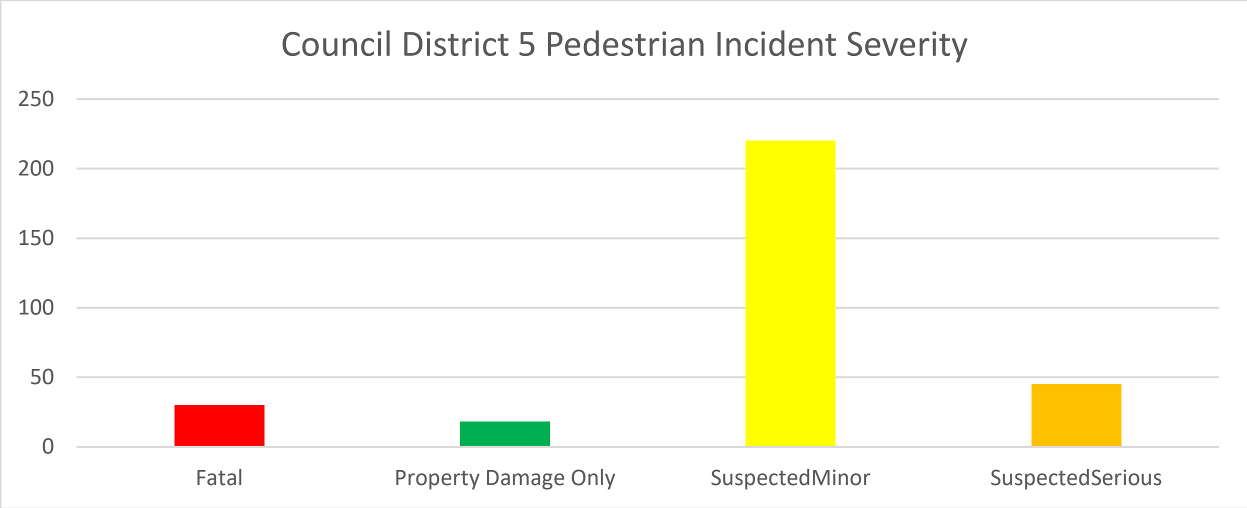
Council District 6 Bicycle Incident Severity
50
40
30
20
10
0
Property Damage Only
SuspectedMinor
SuspectedSerious

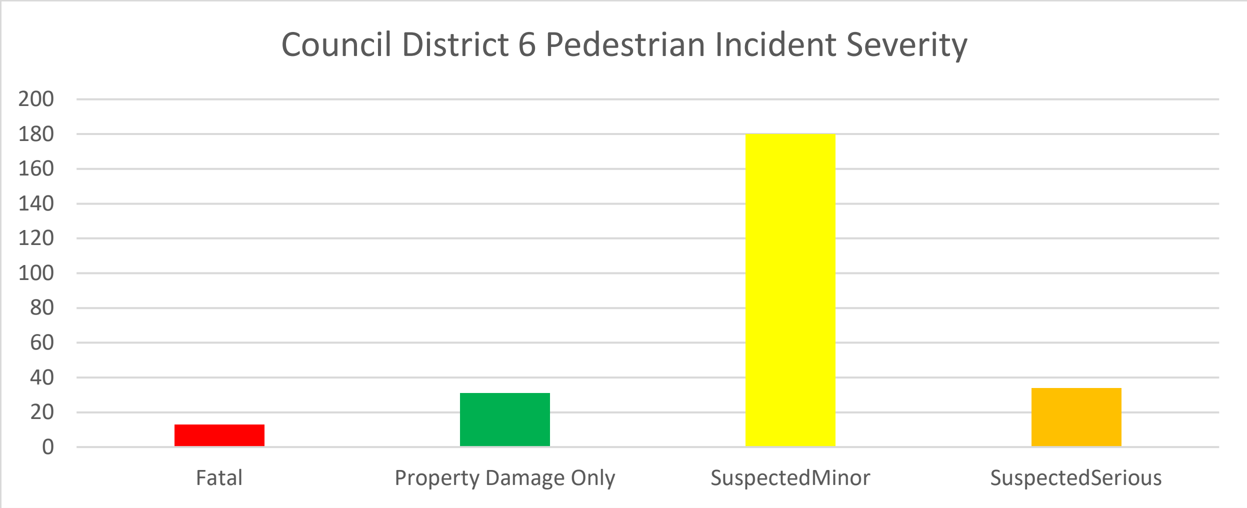

Council District 1 Pedestrian Incident Severity
60
50
40
30
20
10
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

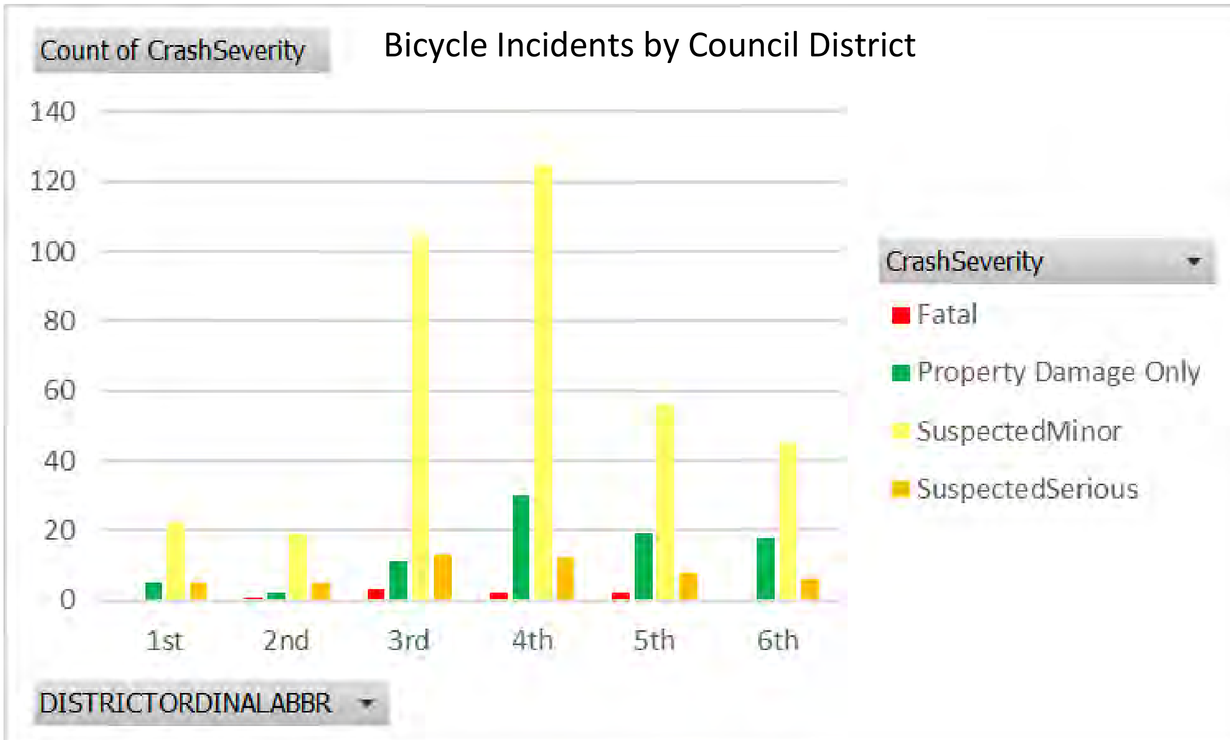

Council District 2 Pedestrian Incident Severity
70
60
50
40
30
20
10
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

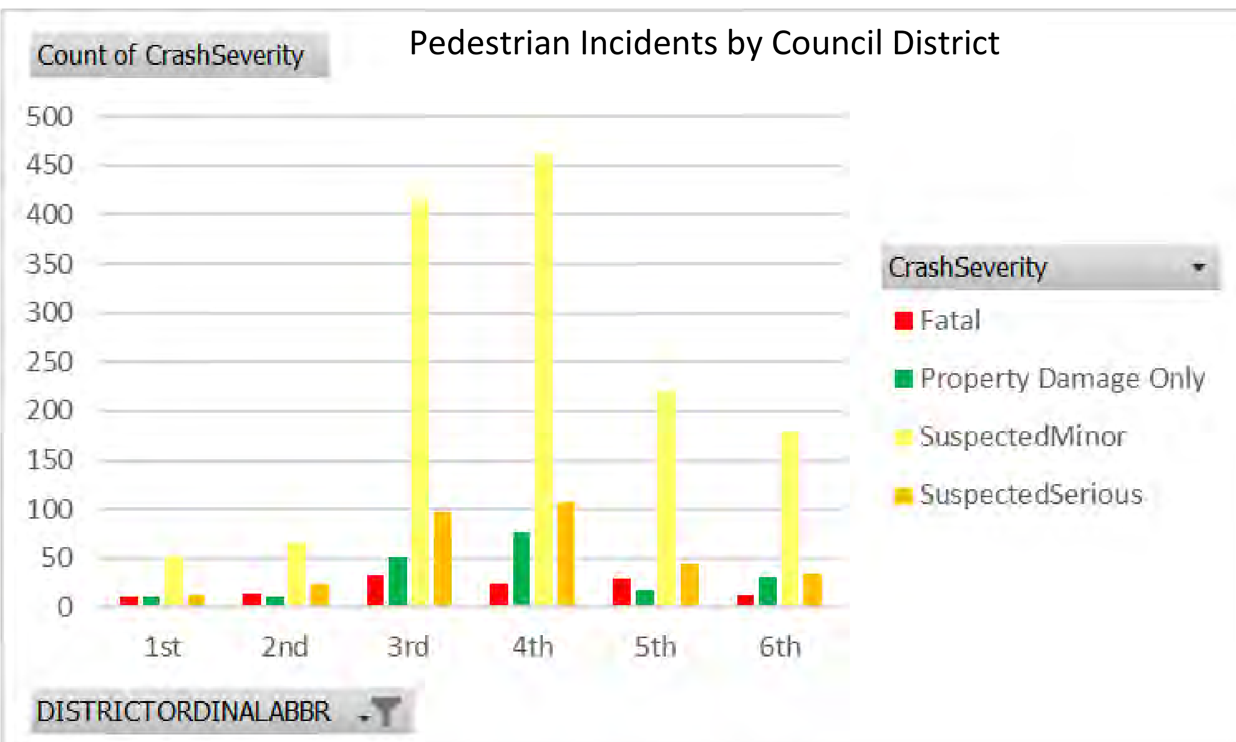

Council District 3 Pedestrian Incident Severity
450
400
350
300
250
200
150
100
50
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

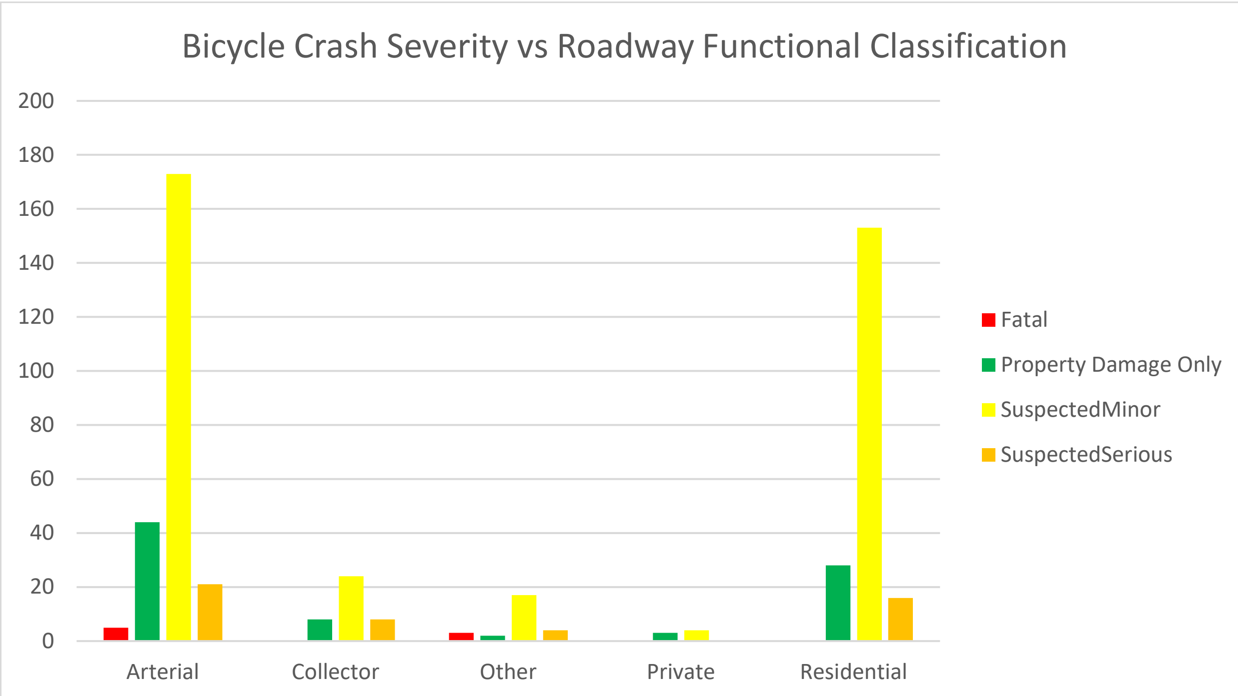

Council District 4 Pedestrian Incident Severity
500
450
400
350
300
250
200
150
100
50
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

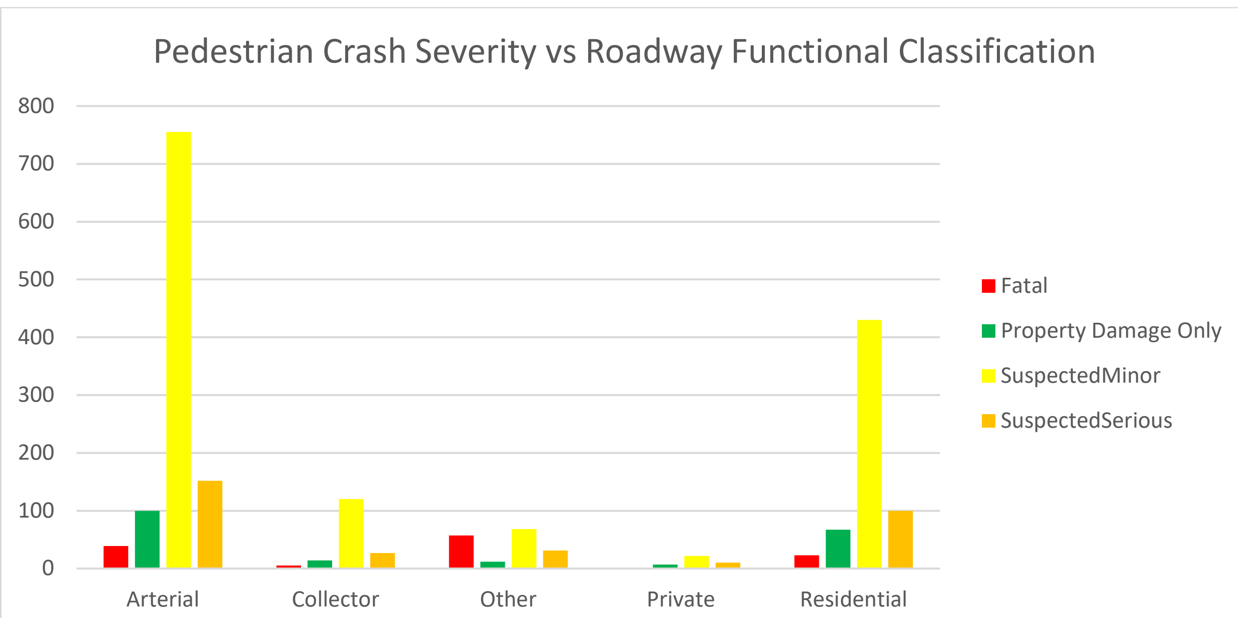

Council District 5 Pedestrian Incident Severity
250
200
150
100
50
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

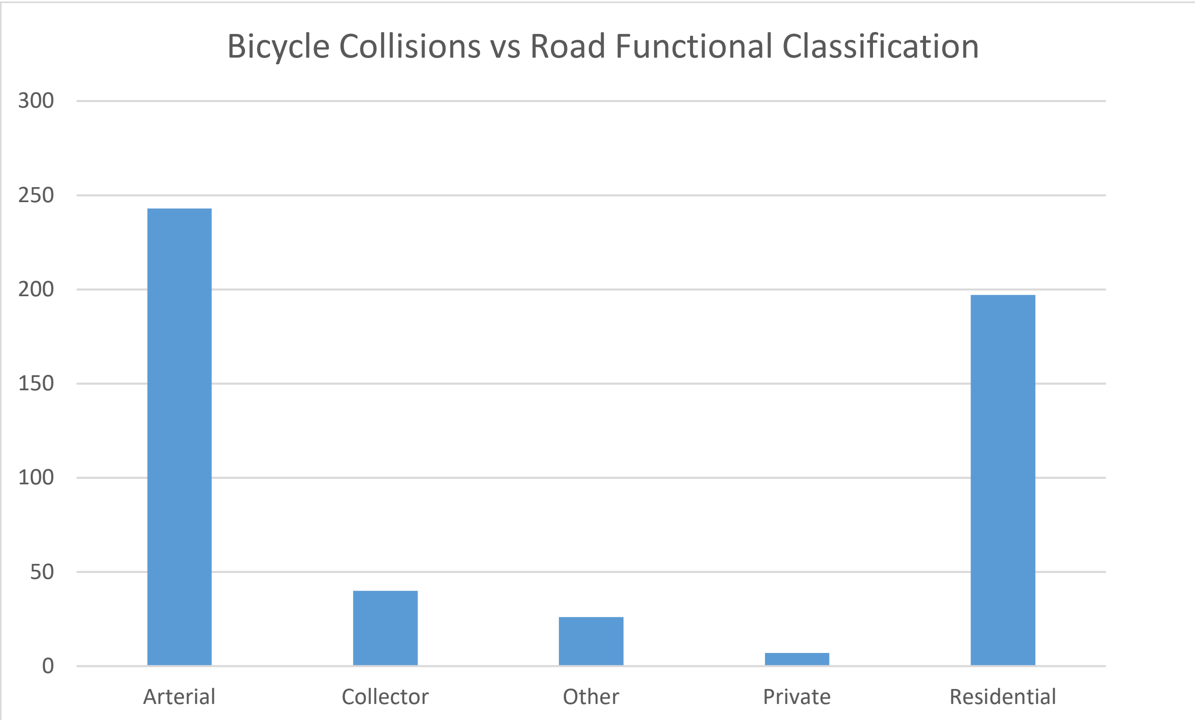

Council District 6 Pedestrian Incident Severity
200
180
160
140
120
100
80
60
40
20
0
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

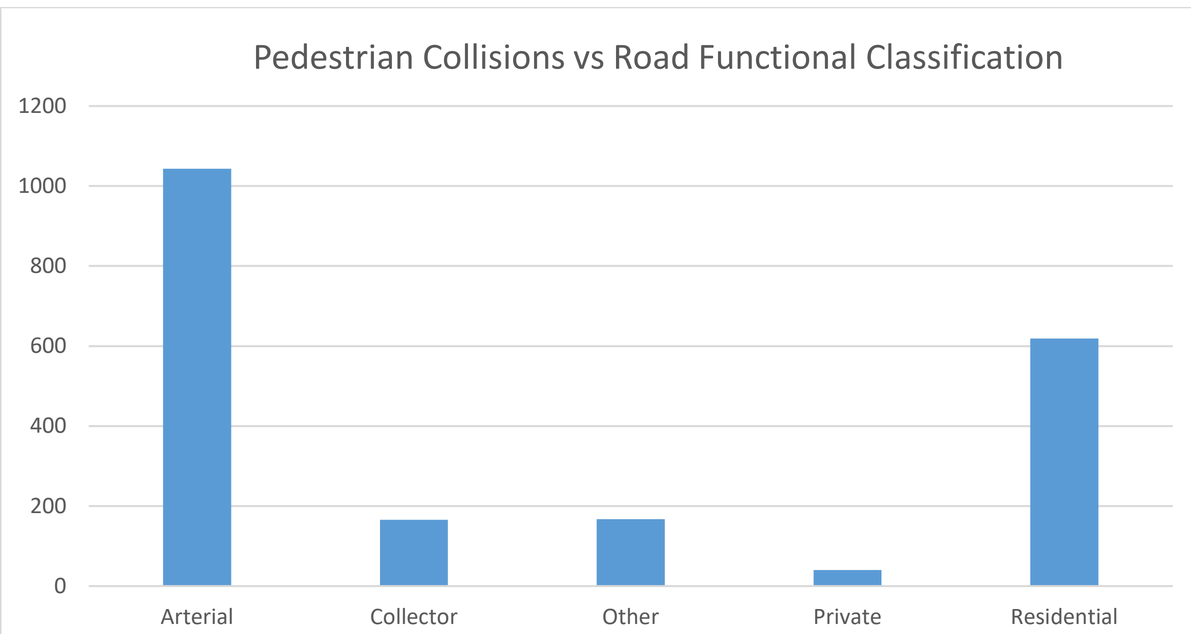

Count of CrashSeverity
Bicycle Incidents by Council District
140
120
100
80
60
40
20
0
1st
2nd
3rd
4th
5th
6th
DISTRICTORDINALABBR
CrashSeverity
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

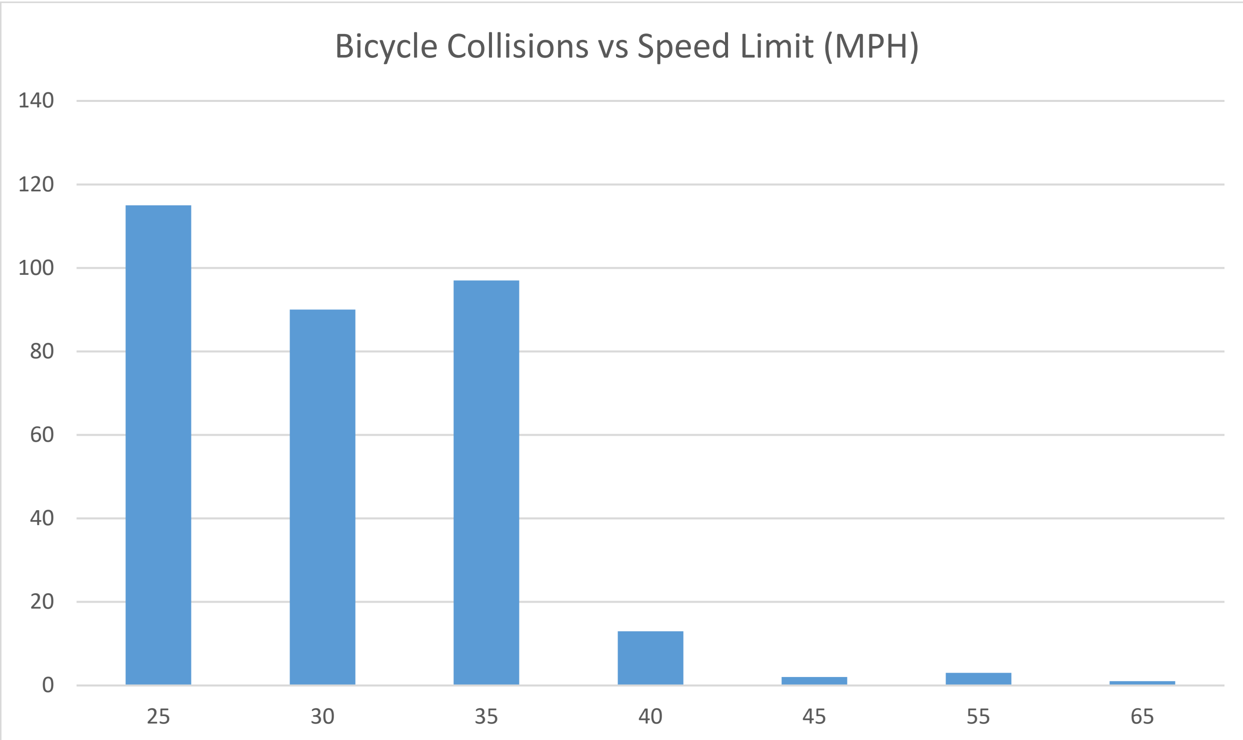

Count of CrashSeverity
Pedestrian Incidents by Council District
500
450
400
350
300
250
200
150
100
50
0
1st
2nd
3rd
4th
5th
6th
DISTRICTORDINALABBR
CrashSeverity
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

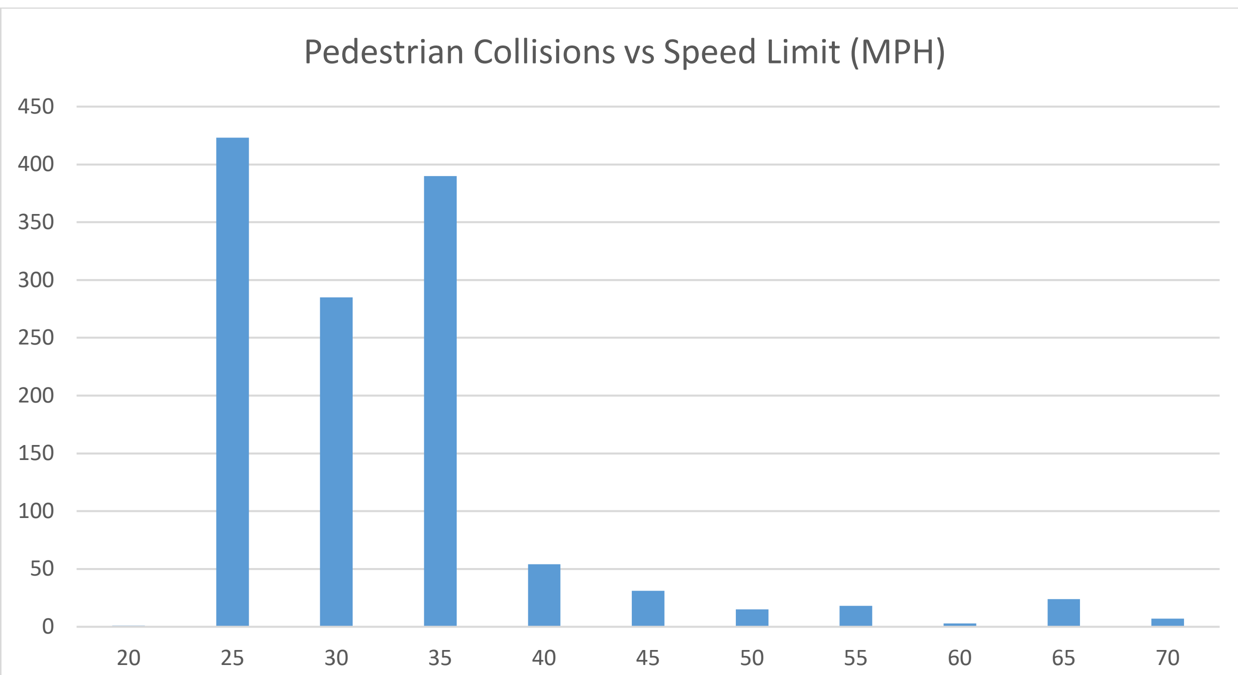

Bicycle Crash Severity vs Roadway Functional Classification
200
180
160
140
120
100
80
60
40
20
0
Arterial
Collector
Other
Private
Residential
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

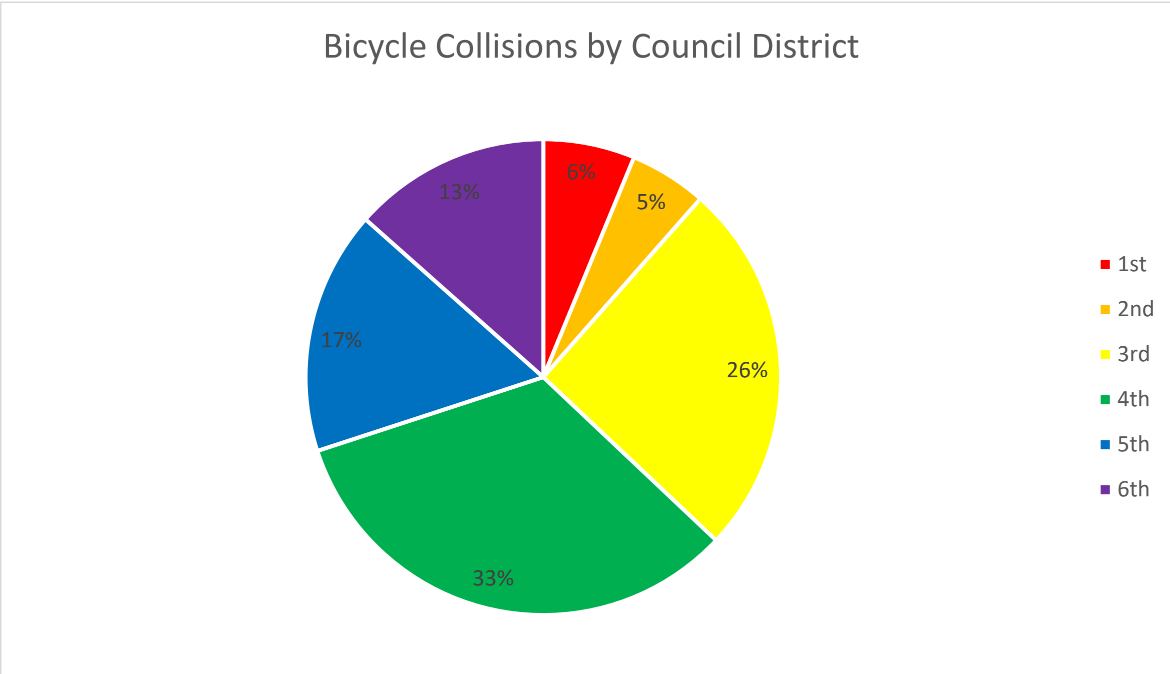

Pedestrian Crash Severity vs Roadway Functional Classification
800
700
600
500
400
300
200
100
0
Arterial
Collector
Other
Private
Residential
Fatal
Property Damage Only
SuspectedMinor
SuspectedSerious

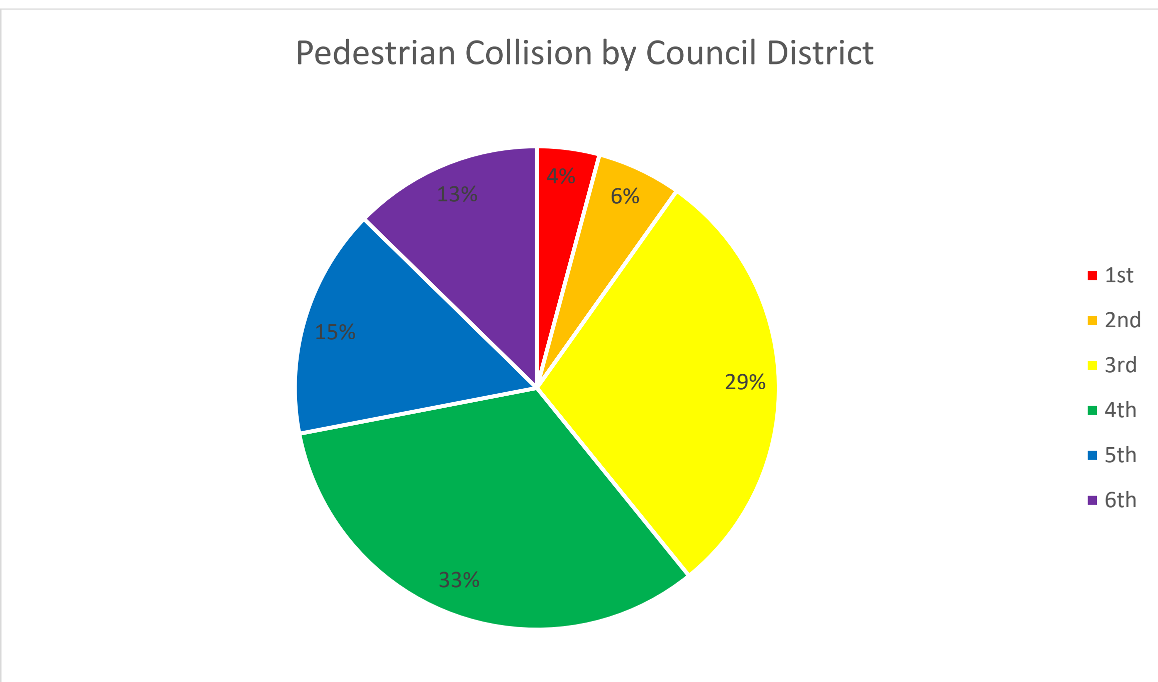

Bicycle Collisions vs Road Functional Classification
300
250
200
150
100
50
0
Arterial
Collector
Other
Private
Residential

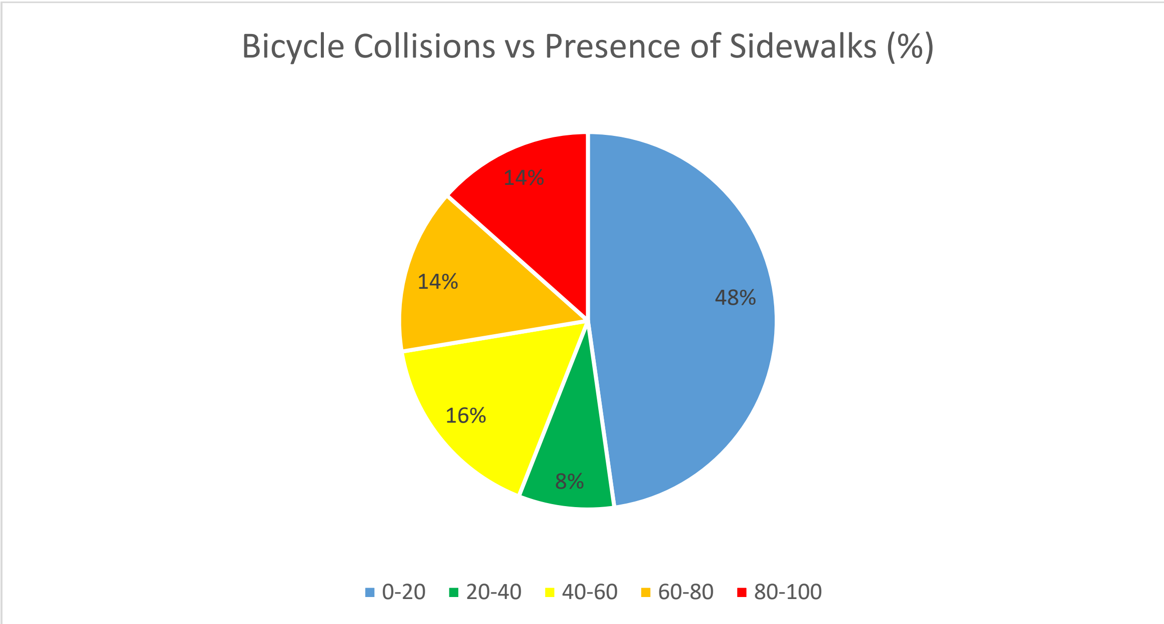

Pedestrian Collisions vs Road Functional Classification
1200
1000
800
600
400
200
0
Arterial
Collector
Other
Private
Residential

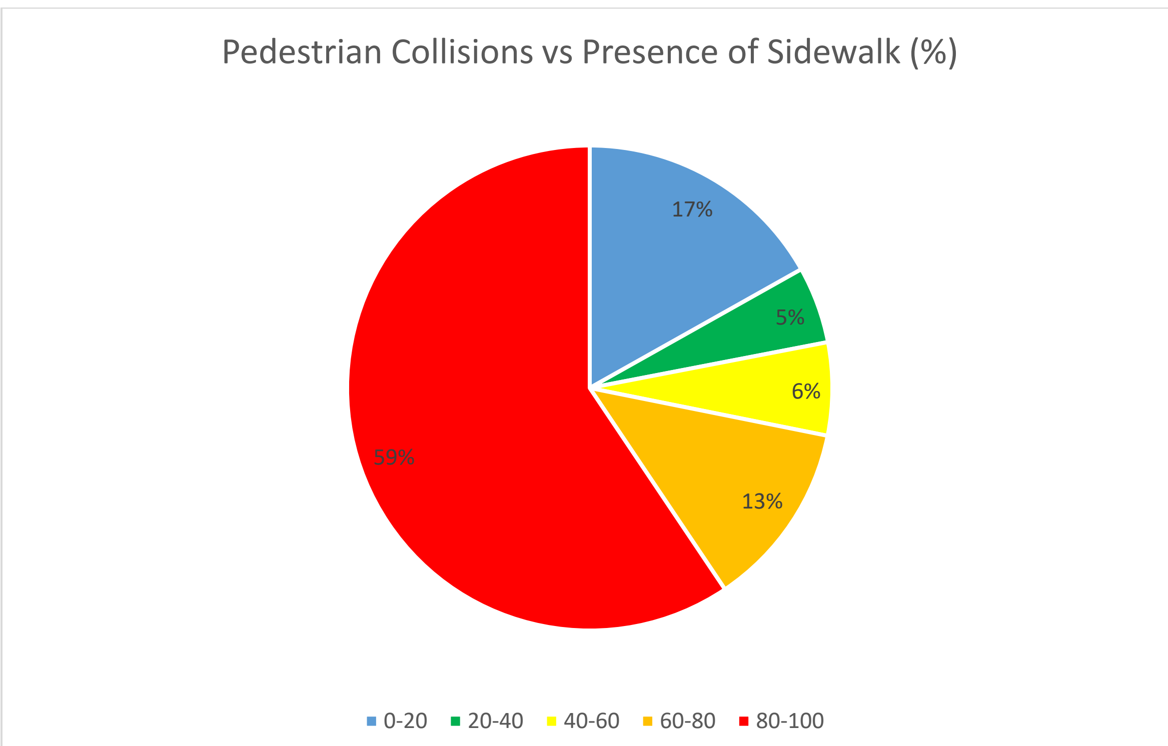

Bicycle Collisions vs Speed Limit (MPH)
140
120
100
80
60
40
20
0
25
30
35
40
45
55
65


Pedestrian Collisions vs Speed Limit (MPH)
450
400
350
300
250
200
150
100
50
0
20
25
30
35
40
45
50
55
60
65
70


Bicycle Collisions by Council District
6%
5%
26%
33%
17%
13%
1st
2nd
3rd
4th
5th
6th


Pedestrian Collision by Council District
4%
6%
29%
33%
15%
13%
1st
2nd
3rd
4th
5th
6th


Bicycle Collisions vs Presence of Sidewalks (%)
48%
8%
16%
14%
14%
0-20
20-40
40-60
60-80
80-100


Pedestrian Collisions vs Presence of Sidewalk (%)
17%
5%
6%
13%
59%
0-20
20-40
40-60
60-80
80-100

Appendix E
Counter Location Placement Methodology

Appendix E: Counter Location Placement Methodology

This memo outlines the process of selecting 25 differing counter locations to be used to inform post-pandemic travel patterns and levels of demand.

Process

When placing counters with the intention of ultimately using the data for a statistical regression analysis, it is crucial to do so in a representative way. In essence, this means that each locator location should give insight into not only that location but similar locations throughout the city. Following literature derived best practices[1], the analysis went about creating grouping bins for each roadway in Kansas City, MO. The categories for these bins can be found below:

- Urban Typology: Urban, Suburban, Ex-Urban (Details below)
- Number of Lanes: 1-2, 3-4, >4
- Pedestrian Facility: Present, Not Present

Once every roadway in Kansas City, MO was grouped into their appropriate bins, numbers were estimated for each category of roadway, with a category being defined as a combination of bins. For example, one category would be roadways which are urban, with one to two lanes, and a present pedestrian facility. Once these numbers were calculated, a random number generator with the bounds of 0 to the given number of a category was computed, and this random number was then taken to select a roadway.

Once a roadway was selected, a qualitative review on the surroundings was conducted taking into consideration various activity generators, as well as planning judgement. These activity generators are defined below:

- Supermarkets, Major Sports Venues, Medical Facilities
- Tourism Amenities (Hotel, Motel, Museum, Zoo)
- General Amenities (Bar, Café, Fast-Food, Pub, Restaurant)

Once the qualitative review was conducted the final counter location was assigned.

Constructing the Urban Typologies

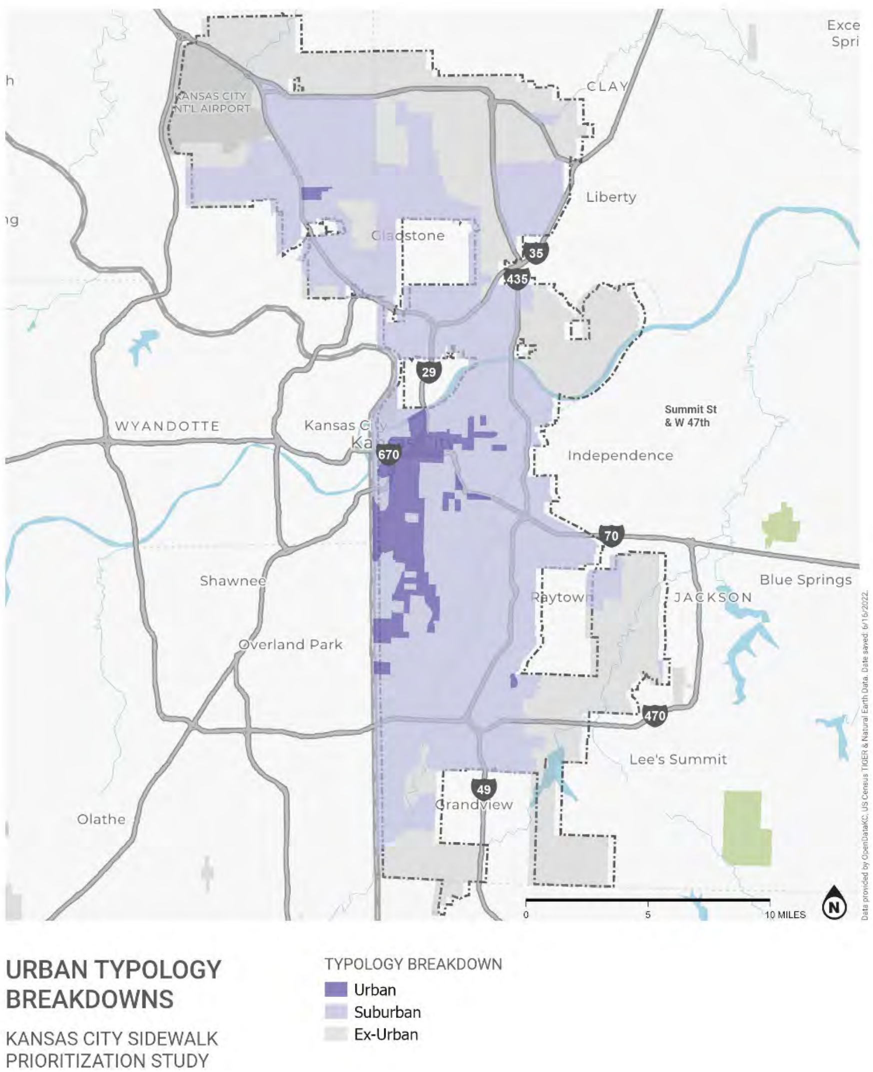
Constructing the urban typological bins employed the use of the EPA Smart Location Database. The percentile ranks of the following metrics were taken, and then summed using a weight of 0.25 for each category:

- Gross population density (people/acre) on unprotected land
- Gross employment density (jobs/acre) on unprotected land

[1] Dylan, Johnstone, Krista, Nordback, and Michael Lowry. "Collecting Network-wide Bicycle and Pedestrian Data: A Guidebook for When and Where to Count." Washington State Department of Transportation Research Report. Sept. 2017, pp. 16-19, https://www.wsdot.wa.gov/research/reports/fullreports/875-1.pdf

- Total road network density
- Aggregate frequency of transit service per capita

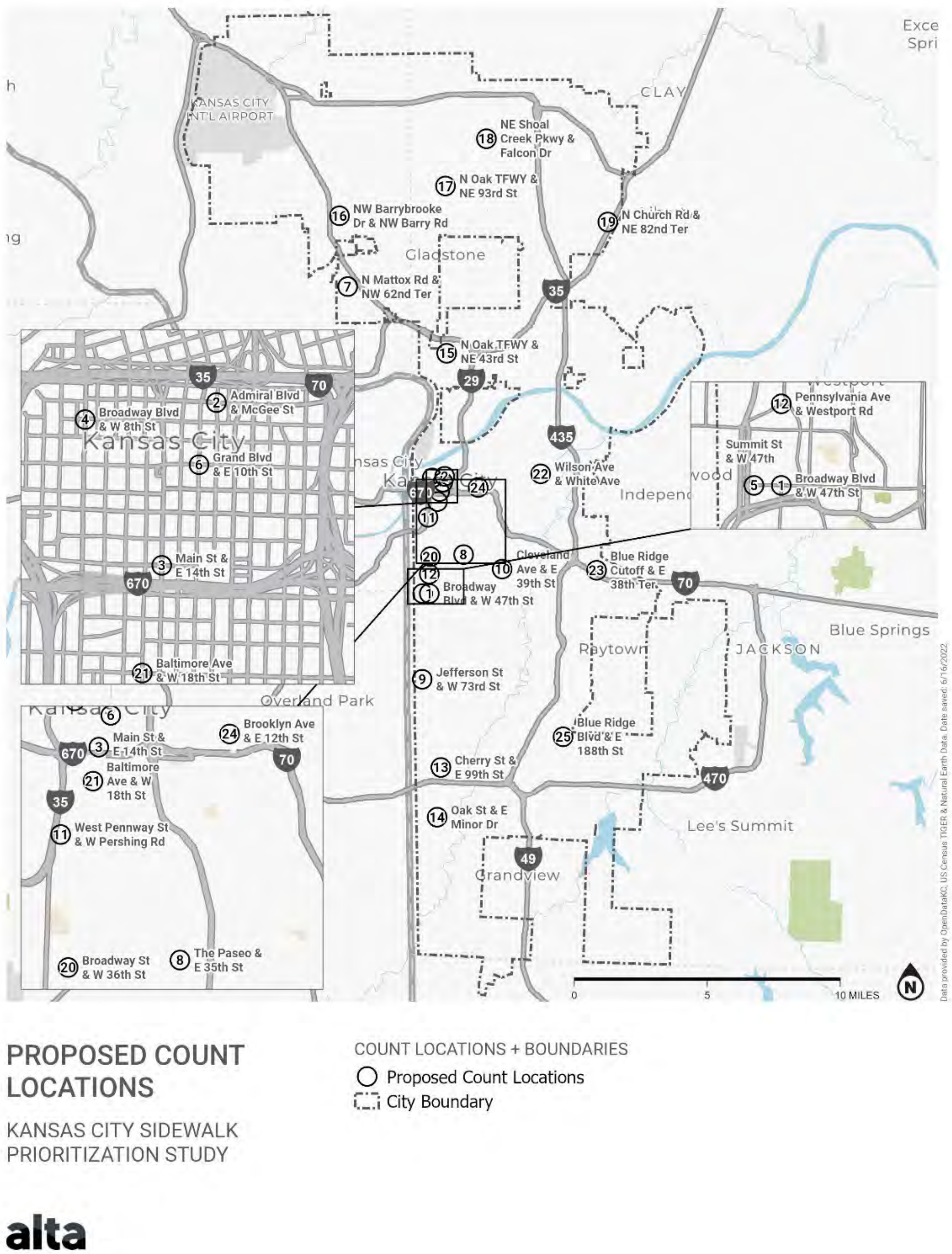
With the combined rank computed, an evaluation of the distribution was taken, both via a statistical process and ground truthing, and breaks between the categories of urban, suburban and ex-urban were established. This is a quick response approach to build a general characterization of the built context for the purposes of spreading counts to areas with different land use and built environment characteristics.



Results

The area below identifies the count locations identified for this analysis in **Figure 1**. A table is also in the following page.

Figure 1. Proposed Count Locations



Counter Locations	
Number	Intersection
1	Broadway Blvd & W 47th St
2	Admiral Blvd & McGee St
3	Main St & E 14th St
4	Broadway Blvd & W 8th St
5	Summit St & W 47th St
6	Grand Blvd & E 10th St
7	N Mattox Rd & NW 62nd Ter
8	The Paseo & E 35th St
9	Jefferson St & W 73rd St
10	Cleveland Ave & E 39th St
11	West Pennway St & W Pershing Rd
12	Pennsylvania Ave & Westport Rd
13	Cherry St & E 99th St
14	Oak St & E Minor Dr
15	N Oak TFWY & NE 43rd St
16	NW Barrybrooke Dr & NW Barry Rd
17	N Oak TFWY & NE 93rd St
18	NE Shoal Creek Pkwy & Falcon Dr
19	N Church Rd & NE 82nd Ter
20	Broadway St & W 36th St
21	Baltimore Ave & W 18th St
22	Wilson Ave & White Ave
23	Blue Ridge Cutoff & E 38th Ter
24	Brooklyn Ave & E 12th St
25	Blue Ridge Blvd & E 188th St

Appendix F

Route Directness Index (RDI) Scores

Appendix F: Route Directness Index (RDI) Scores

Overview

Alta conducted a route directness index (RDI) analysis as a component of the total analysis for the Kansas City Pedestrian Prioritization Plan. This analysis communicates how many times further a pedestrian traveling along the transportation network must travel to reach a destination, compared to the as-the-crow-flies distance to the same destination. The Alta team ran this analysis on five different destination types: parks, transit stops, grocery stores, schools, and entertainment locations. This appendix provides maps, as well as identifying the top ten worst connected locations in terms of RDI, for each of these five destination types.

Formula and Description of Attributes

Formula

$$RDI = \frac{Network\ Distance}{As - The - Crow - Flies\ Distance}$$

Description of Attributes

The following section details the assumptions regarding how destinations were determined:

- **Schools:** Both public and private schools were sourced from the Homeland Infrastructure Foundation-Level Data.
- **Parks:** Were selected from OpenStreetMap (OSM) data.
- **Grocery Stores:** Were selected from OpenStreetMap (OSM) data.
- **Transit Stops:** Data was sourced from the city of Kansas City.
- **Entertainment Locations:** Were selected from OpenStreetMap (OSM) data. These were defined as: cinema (movie theater), community center, planetarium, nightclub, theater, social center, conference center, arts center, fast food, food court, restaurant, cafe, bar, pub, aquarium, attraction, museum, theme park & zoo.

RDI Figures

Figure 1 through **Figure 5** display the calculated RDI scores in Kansas City for each destination type.

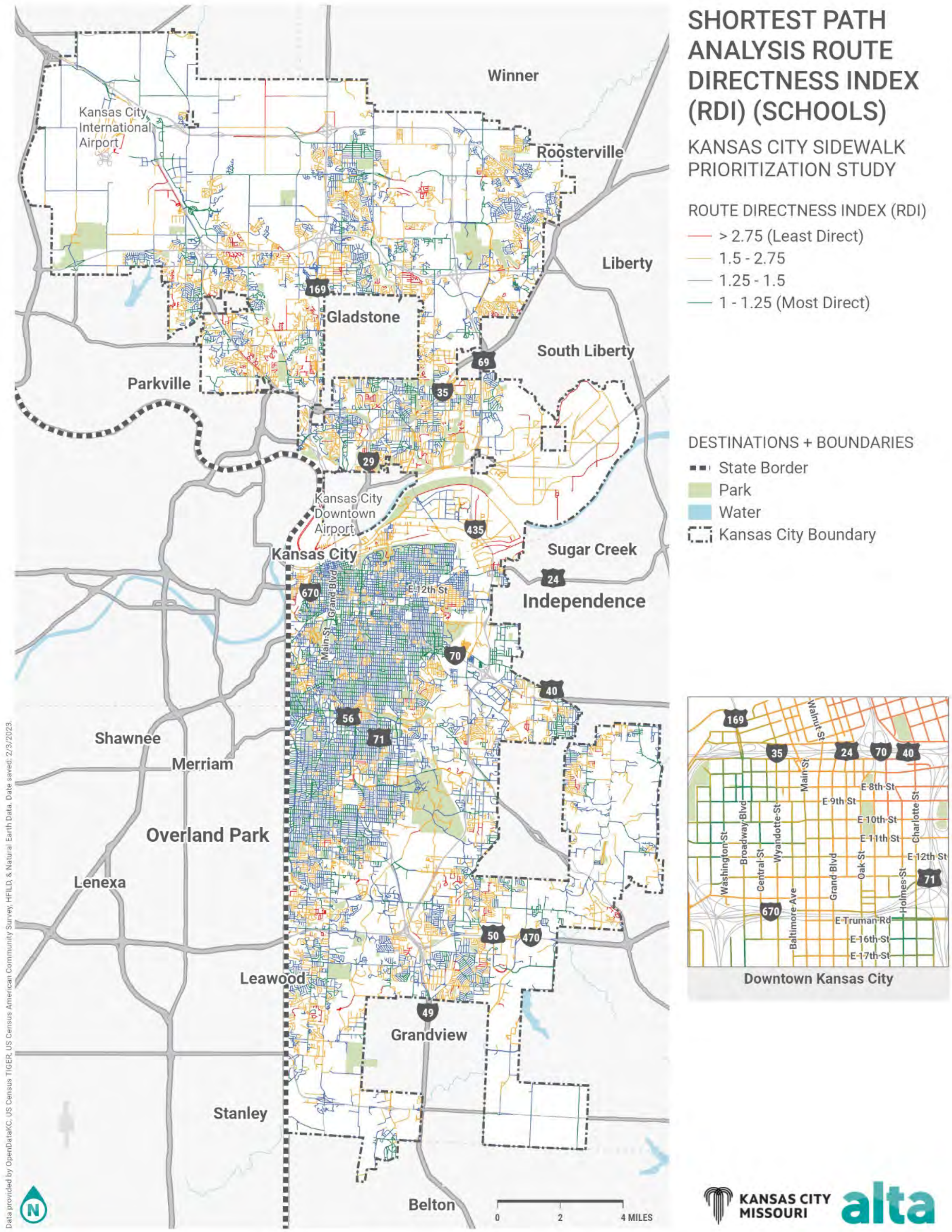


Figure 1. Schools RDI Score

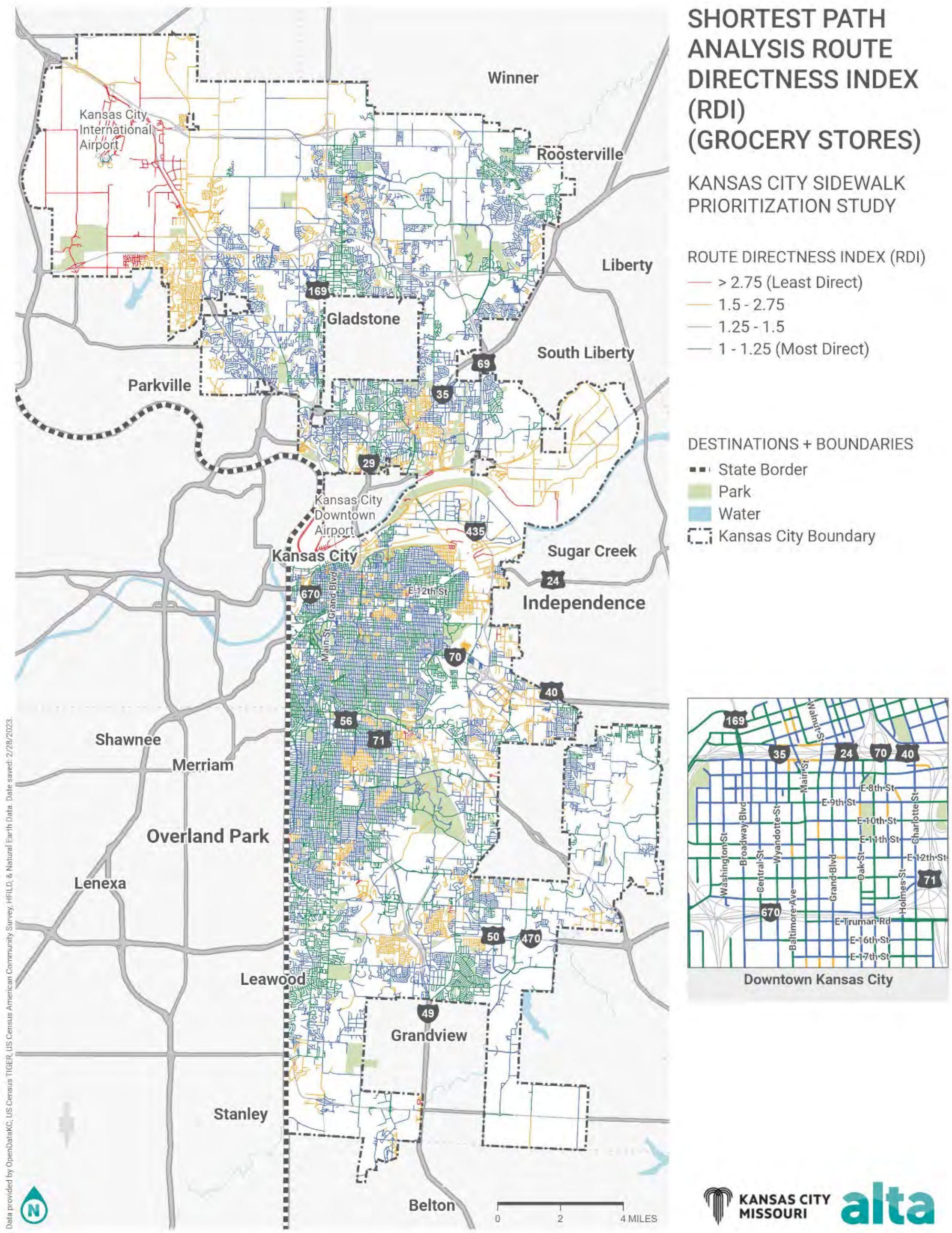


Figure 2. Grocery Stores RDI Score

alta

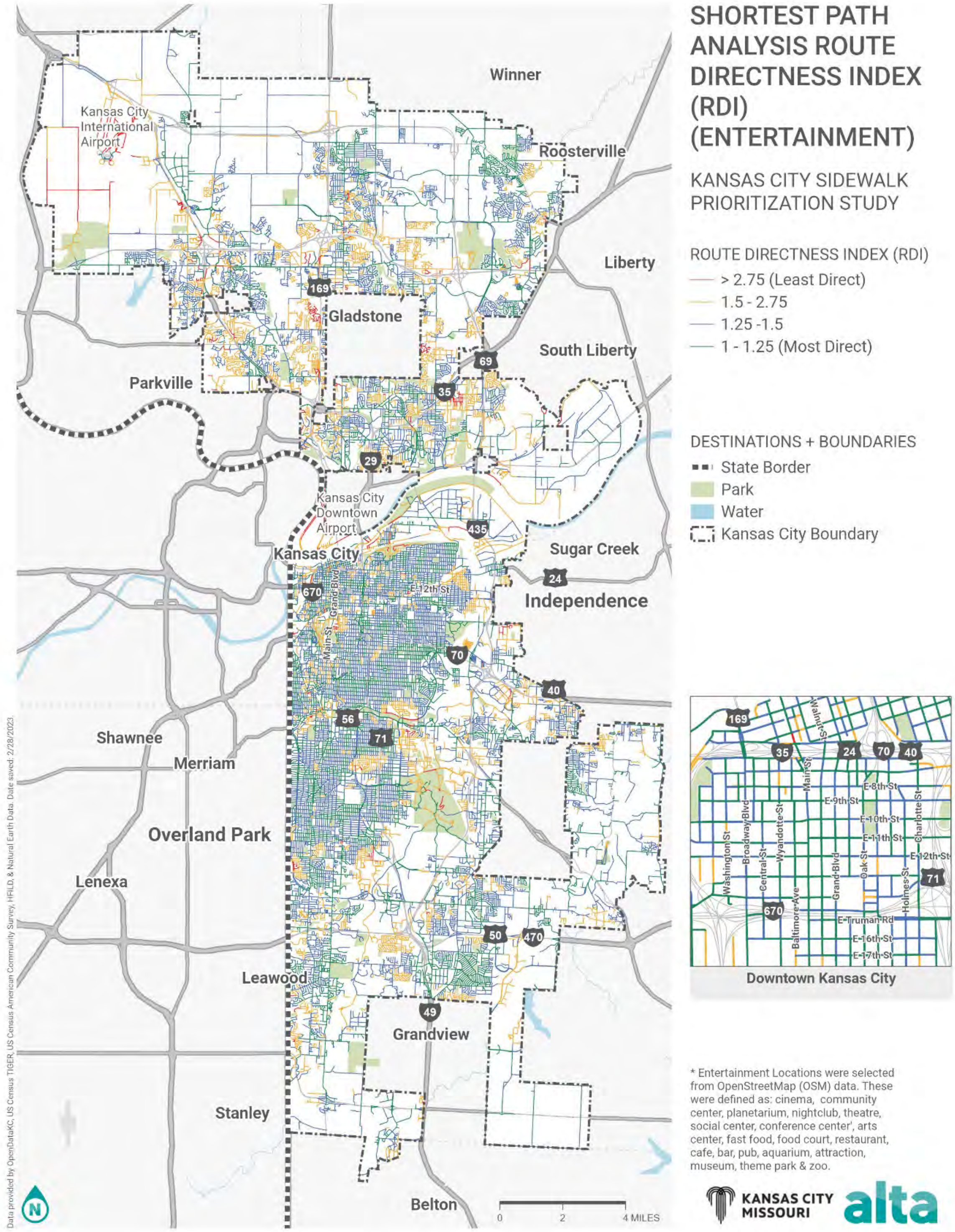


Figure 3. Entertainment Locations RDI Score

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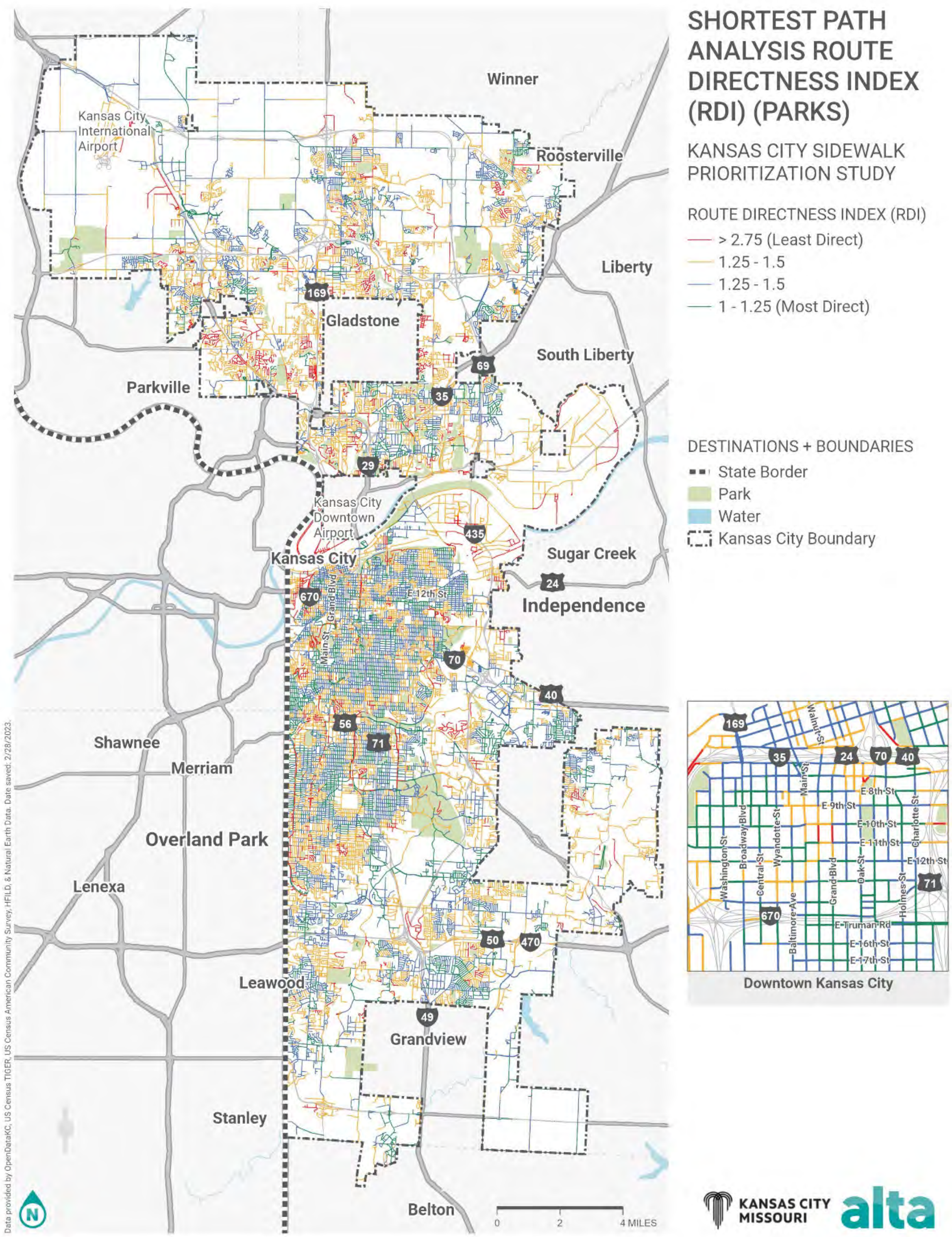


Figure 4. Parks RDI Score

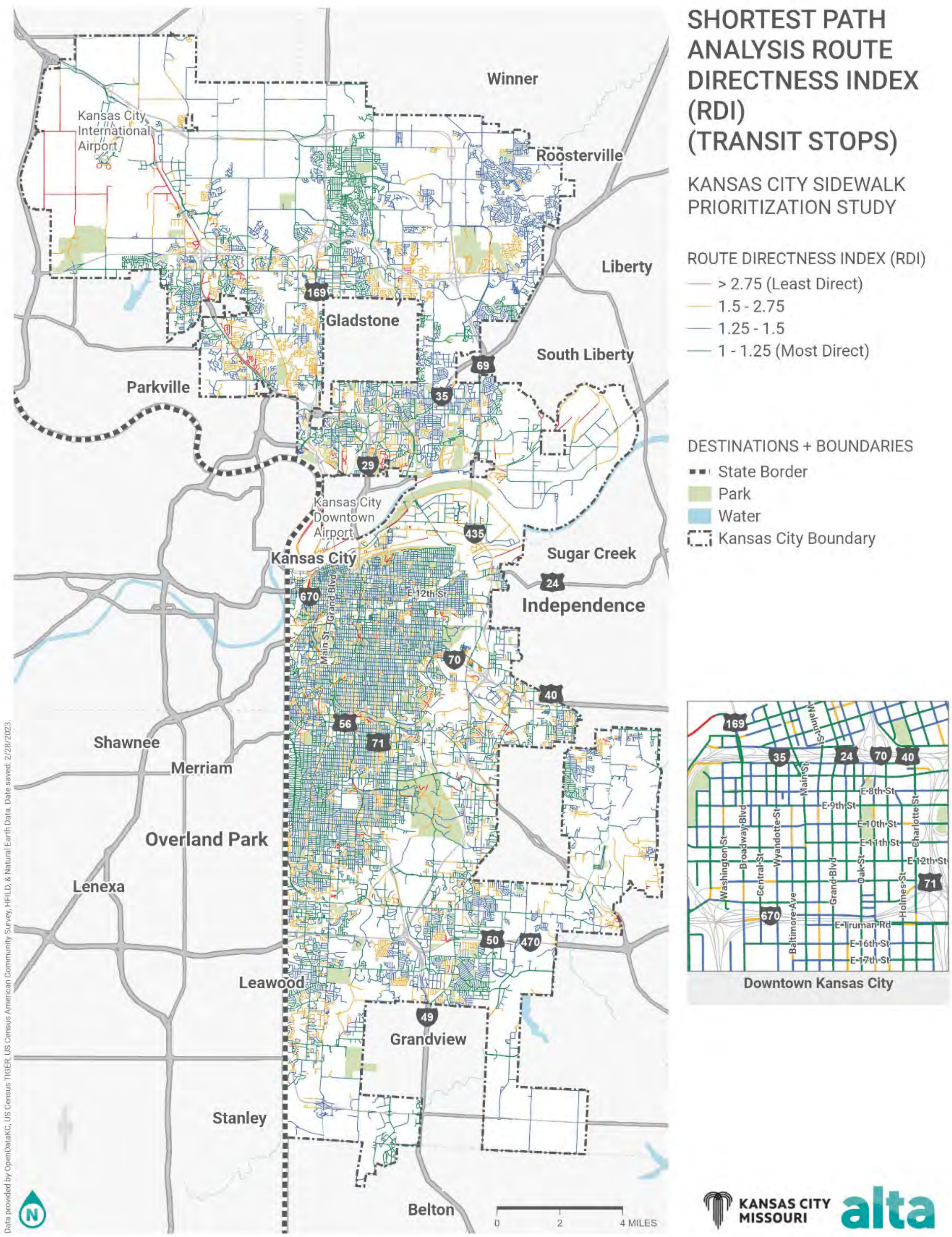


Figure 5. Transit Stops RDI Score

Data Tables

An average RDI score was attributed to each destination by taking the average of segments that fell within a one-mile buffer. The following data tables demonstrate the 20 worst locations in terms of RDI connectivity.

Table 1. Worst Connected Schools According to RDI Score

School Name	Address	Average RDI Score	RDI Rank
Fairmount Elementary	120 N Cedar Ave	3.48	1
Bell Prairie Elementary	3000 NE 108th St	2.9	2
Hazel Grove Elementary	2001 NW Blue Pkwy	2.54	3
Lutheran High School of Kansas City	12411 Wornhall Rd	2.33	4
Clay-Platte Montessori School	5901 NW Waukomis Dr	2.12	5
Southeast Elementary	5704 N Northwood Rd	2.09	7
Hopewell Elementary	6801 Line Creek Parkway	2.09	7
Linden West Elementary	7333 N Wyandotte St	2.07	8
Pleasant Valley Early Childhood	6800 Sobbie Rd	2.06	10
Garden Elementary	8804 Hwy 45 NW	2.06	10

Table 2. Worst Connected Transit Stations According to RDI Score

Transit Station Name	Average RDI Score	RDI Rank
On Paseo at Rachel Morado 77th NB	9.44	1
On Burlington at E 16th Ave Southbound	8.06	2
On Burlington at E 18th Ave Southbound Farside	7.7	3
On Burlington at 14th Ave Southbound	6.07	4
On Burlington at 12th Ave Southbound	5.83	5
On Bogota Cir at Brasillia Ave KCI Edgemor	4.72	6
On Swift at E 10th Ave Southbound	4.38	7
On State Line at 82nd Sprint Northbound	3.92	8
On Prairieview at Tower NB	3.38	9
On Blue Ridge Cut Off at Fast Stop Southbound	3.33	10

Table 3. Worst Connected Parks According to RDI Score

Park Name	Average RDI Score	RDI Rank
Brush Creek Greenway	12.34	1
Davis Park	5.14	2
William Henry Harrison Park	4.32	3
Columbus Square Park	3.58	4
Ilus W. Davis Park	3.56	5
Northwood Park	3.53	6
Hidden Hollow Park	3.37	7
Gillham Park	2.77	8
Hobby Hill Park	2.73	9
Quindaro Park	2.65	10

Top Ten with Visual Map Aids

Because a name of an entertainment location or grocery store does not carry the same spatial information as a school or a park for example, the Alta team decided to demonstrate the top ten points via maps for grocery stores and entertainment locations. The following includes data tables accompanied by maps:

Table 4. Worst Connected Grocery Stores According to RDI Score

Grocery Store Name	Average RDI Score	RDI Rank
Corollo's Gourmet Grocery & Deli	2.81	1
Phillips 66 Mini Mart	2.74	2
GasMart	2.55	3
Target	2.40	4
SunFresh	2.38	5
Pour Boys	2.09	6
Price Chopper	2.05	7
Fisca Gas Station Mini Mart	1.95	8
Phillips 66 Mini Mart	1.93	9
Metro Thriftway	1.83	10

*As the grocery store tag was applied to the OSM data, non-traditional grocery stores are also included in the analysis.

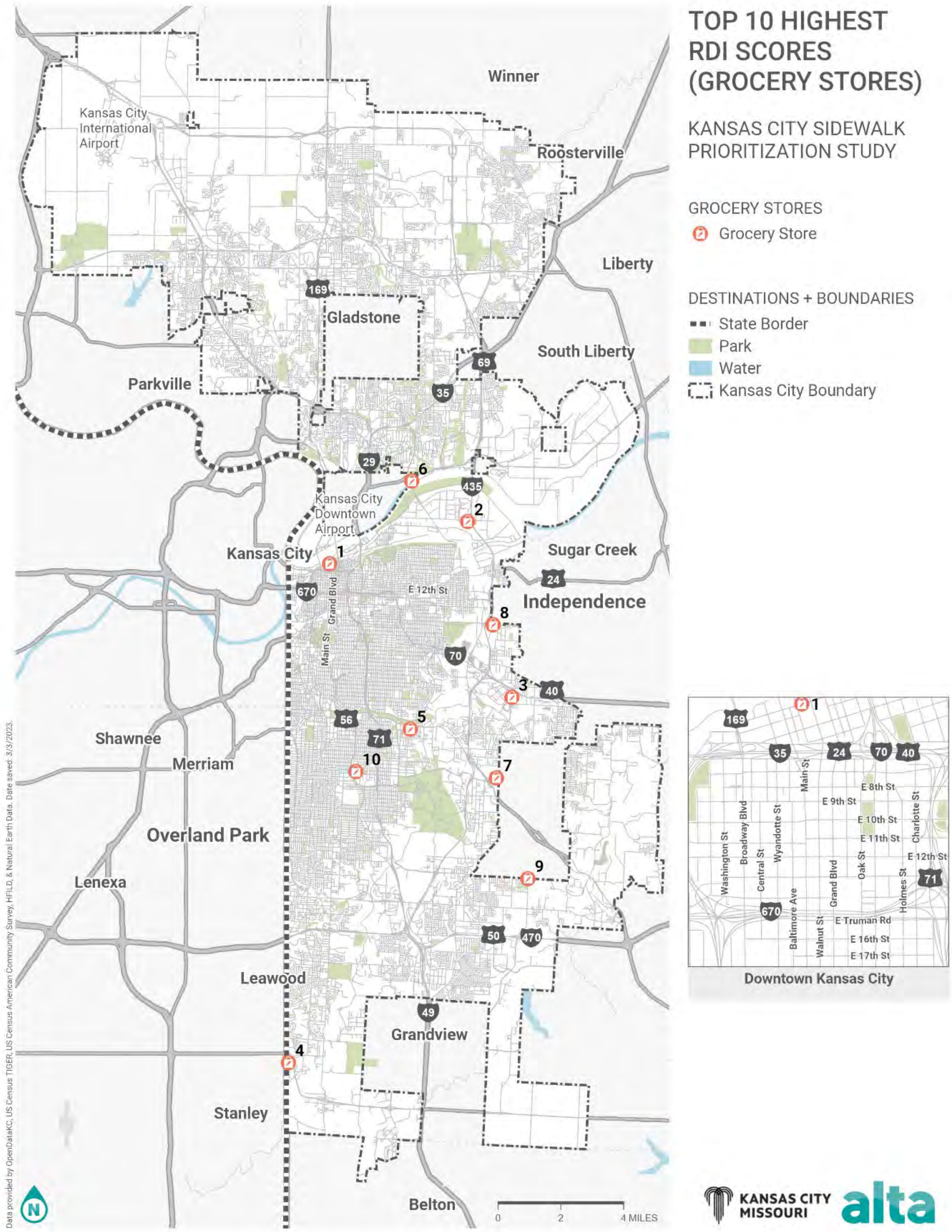


Figure 6. Worst Connected Grocery Stores According to RDI Score

Table 5. Worst Connected Entertainment Locations According to RDI Score

Entertainment Location Name	Average RDI Score	RDI Rank
Malay Café	15.32	1
Ixtapa Mexican Cuisine	7.96	2
54th Street Grill and Bar	6.85	3
Starbucks	3.34	4
Elephant Watering Hole	3.15	5
Bally’s Casino	2.74	6
Dominic’s Casual Italian	2.50	7
Chipotle	2.31	8
Atkins-Johnson Farm & Museum	2.29	9
Side Pockets Billiards and Sports Bar	2.25	10

alta

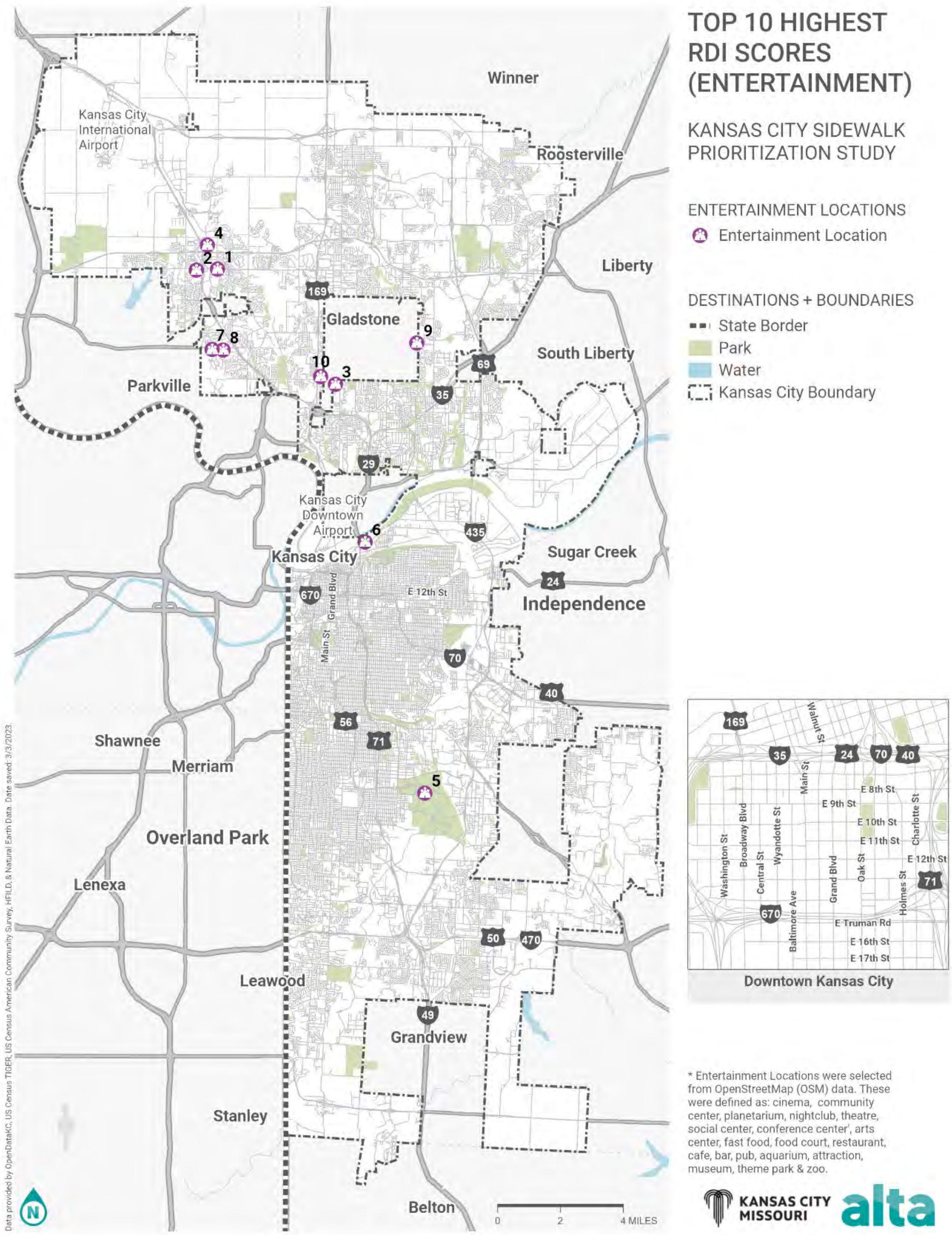


Figure 7. Worst Connected Entertainment Locations According to RDI Score

Appendix G

Maintaining Sidewalk Prioritization Data

MEMORANDUM

To: Kansas City MO

From: Alta Planning + Design

Date: 10/18/23

Re: On-Going Sidewalk Prioritization Data Management

Maintaining Sidewalk Prioritization Data

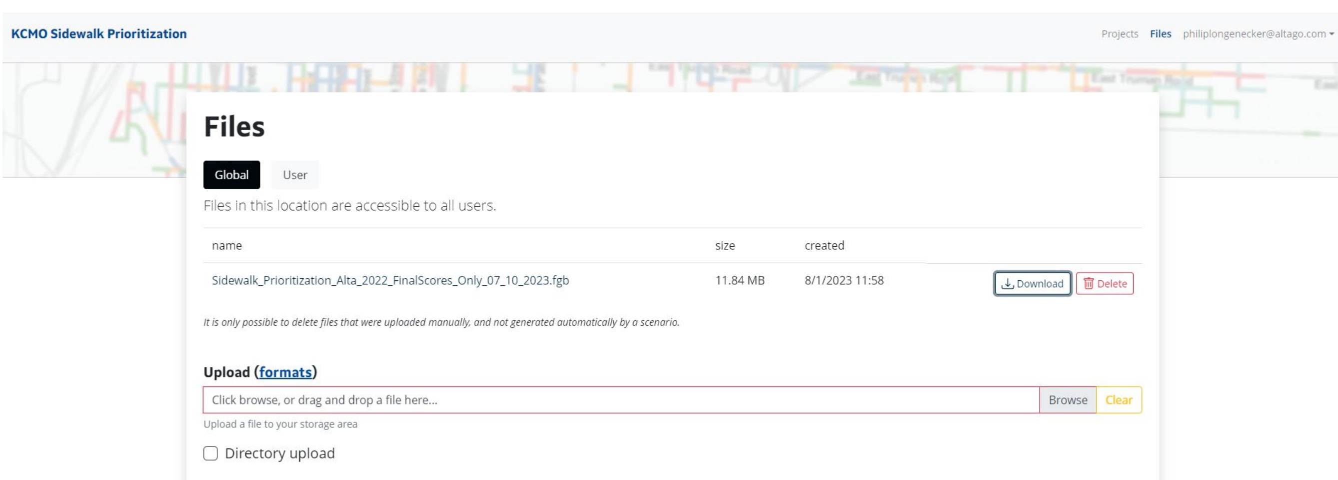
The sidewalk prioritization analysis and complementary web tool allow for dynamic evaluation of sidewalk installation and maintenance priorities. As Kansas City makes progress on constructing new and improving current sidewalks throughout the city, updating and maintaining the data is critical for tracking the evolving existing conditions. Maintaining an up-to-date database allows the web tool to recalculate top priority segments as projects are checked off the list.

This document describes the steps required to update the sidewalk prioritization data and re-upload the new data to the web tool. Additionally, it contains information on each of the fields in the prioritization dataset, including data type, description, and its role in the analysis. It does not include information on recalculating the results of the underlying analyses discussed in the Sidewalk Prioritization Technical Analysis Memorandum, such as equity, demand, access & connectivity, and safety component scores.

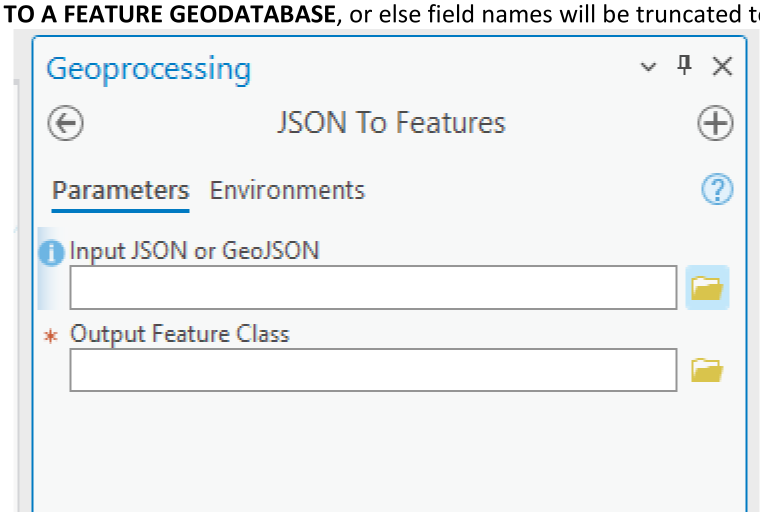
Updating Data

The following steps describe the process for making edits to the sidewalk prioritization data in ArcGIS Pro and exporting for use in the web tool.

1. Start by downloading the data that the tool is currently running on. This can be found by clicking on **Files** in the top right hand corner of the tool.



2. Next, click download and select either the geojson format or the geopackage format. Both can be opened in ArcGIS Pro. For geojsons, use the "Json to Features" tool in ArcGIS' geoprocessing pane and save the output to the folder of your choosing. This is the recommended way to load the data into ArcGIS because in this step you can rename the output file to a simple name with the date appended to the end so you can tell when the data was updated. **BE SURE TO WRITE THE OUTPUT TO A FEATURE GEODATABASE**, or else field names will be truncated to 10 characters.



3. Now add the new feature class to the map and select the segments to be updated. Open the attribute table end edit the desired fields (see below). Next, you can reupload the data as a shapefile, or export it to a geojson and upload that.
4. Once the data has been updated, you can upload it back into the tool in the same Files tab. The upload widget can handle many file types, including geojsons or shapefiles. For shapefiles, you may need to have it saved outside of a geodatabase to upload:

Updating Data

Use the following guidance to update street segments.

If a sidewalk was built:

- Update SidewalkSides
- Replace construction cost with Zero (0).
- Update sidewalk condition score (1 = worst, 4 = best)
- Update

If a sidewalk was maintained:

- Replace maintenance cost with Zero (0).
- Update sidewalk condition score (1 = worst, 4 = best)

Table 1. Data Dictionary for the Kansas City Sidewalk Prioritization data layer[1]

Field	Data Type	Description	How to Update
OBJECTID	Long	Unique ID for each line segment	Do not update
SidewalkID	Long	Unique ID for each street segment, which are made up of multiple line segments.	Do not update
Street	text	Street name	Type in text
FromStreet	text	Start street	Type in text
ToStreet	text	End street	Type in text
District	Long	District number	Do not update
Sidewalk_Sides	Long	Number of sidewalks on line segment. 0, 1 or 2 meaning none, one side, or both sides.	Type in number
Equity_Score	Double	Special analysis index score. See technical memo for details.	Do not update
Safety_Score	Double	Special analysis index score. See technical memo for details.	Do not update
Demand_Score	Double	Special analysis index score. See technical memo for details.	Do not update
Access_Score	Double	Special analysis index score. See technical memo for details.	Do not update
PublicSupport_Score	Double	Special analysis index score. See technical memo for details.	Do not update
SidewalkCondition_Score	Double	An overall condition score was assessed by three weighted criteria: vertical displacement, cracks, and condition.	Type in number
Baseline_Prioritization_Score	Double	Density of supportive public comments (weighted by up votes if available) was sampled to the study network.	Do not update
Maintenance_Cost	Double	Cost to rebuild or maintain segment	Enter 0 when project is completed
Construction_Cost	Double	Cost to construct segment	Enter 0 when project is completed

[1] For more information on the final scoring, see pages 41-44 of the technical analysis memo.

Field	Data Type	Description	How to Update
Total_Cost	Double	Total cost of maintaining and constructing the sidewalks along this segment.	Always update if the Maintenance Cost and Construction Cost have been updated. This is the sum of the Maintenance Cost and the Construction Cost. *See below for additional instructions on field calculator.
Shape_Length	Double	Length in feet	Do Not Update unless geometry was changed (new roadway).
Prioritization_SCR	Double	Raw prioritization score	Do not update
Prioritization_SCR_GRP_PCT_SCR	Double	Grouped percent ranking of the prioritization score by district	Do not update
Cumulative_Cost	Double	Cost over time	Do not update
Year_Built	Double	Year sidewalk was constructed or maintained	Type in number
Year_Display	Double	Same year as above	Type in number

*Calculations using field calculator:

1. Ensure that only the segments you wish to modify are selected. The field calculator will only calculate for selected rows. If no rows are selected, field calculator will apply the calculation to all rows.

2. Right click the Total_Cost field and select Calculate Field.

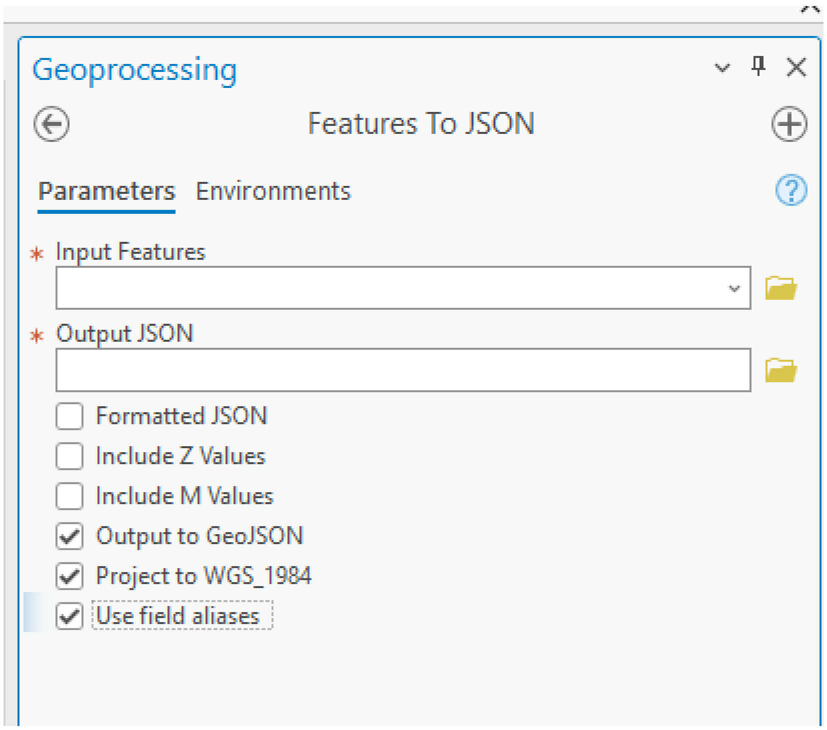
3. In the dialogue box above the Code Block, type **!Maintenance_Cost! + !Construction_Cost!**

4. Click OK.

Reuploading Data

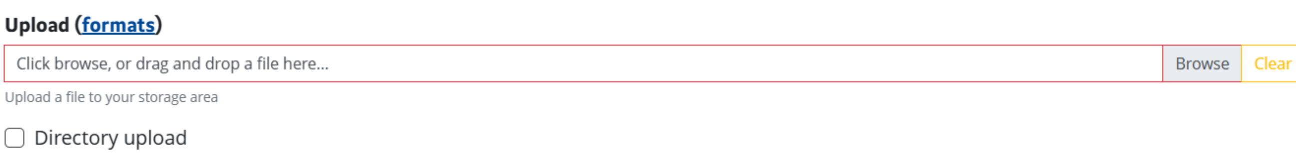
Once you've updated the data in ArcPro, you are ready to reupload the data into the webtool.

1. Use the Features to JSON tool to convert your updated layer to a geojson.



2. Be sure to check the boxes shown above.

3. Next, upload the resulting .geojson file into the tool using the upload data link on the **Files** page.



Note that if you would prefer to export the updated layer to shapefile, this is a multifile format and you'll need to upload it by checking the Directory upload box and uploading the folder that the shapefile is in.

Appendix H

Sidewalk Projects for Disconnected Destinations Methodology

MEMORANDUM

To: City of Kansas City

From: Alta Planning + Design

Date: 08/07/2023

Re: Task 6: Kansas City MO Sidewalk Project Identification

Identifying Sidewalk Projects for Disconnected Destinations

Methodology

This methodology describes the assumptions and process Alta will use to identify sidewalk projects in each council district in Kansas City. The task will result in a proposed sidewalk project for each of the top 10 *least-connected* destinations (as measured by the route directness index (RDI) across 5 destination types and 6 council districts. In total, 300 projects will be identified (1*10*5*6).

APRX: N:\Shared\PROJECTS\2021\00-2021-177 Kansas City, MO Sidewalk Prioritization\GIS\Projects\00-2021-177 Kansas City, MO Sidewalk Prioritization.aprx

Assumptions:

1. A sidewalk project may encompass multiple spatially separated sidewalk segments.
2. Sidewalk projects are only identified on public right-of-way.
3. The segments in each sidewalk project will be approximately 1 mi in total length (segment lengths were rounded to nearest 10th mile to aid counting).
4. If destinations are close to one another, the recommended sidewalk projects may overlap. Sidewalk project segments that serve multiple destinations would be identified if they contain multiple tagged destination names.
5. Segments closer to destinations are prioritized, with sidewalk projects only identified up to 1 mile away from the destination.
6. Use lts_rdi_rank for destination ranks.
7. Note Clusters.

Steps:

1. **Add fields** as follows.
   a. **School Name**
   b. **Park Name**
   c. **Bus Stop Name**
   d. **Grocery Name**
   e. **Entertainment Name**
   f. **Construction (values = number of sides)**
   g. **Maintenance (values = number of sides)**
   h. **Notes**
2. **Assess the data.** Study the relationship between the destination point (for parks, the entrance point) and the sidewalk network. Use google earth and the following data fields, symbolized from green to red, in this order:
   a. Lts_*_rdi (*What segments are least connected?)*

b. Walk_LTS_Score_Alta *(What segments are scoring PLTS3 and 4?)*
c. presence_sidewalk *(Where are the gaps?)*
d. sidewalk_condition *(What segments need to be redone?)*

3. **Identify projects and edit segment attributes: (layer: RNO_BatchProximity_Snapped_ProjectID)** Each identified project will be added to the center line layer. All sidewalk segments for a given destination will share the destination name. Some segments may have multiple destination name columns filled out if they serve multiple destinations.
    a. Start as close to the destination as possible, then work outward toward the 1mi buffer boundary.
    b. Choose sidewalk projects by prioritizing segments in the following order:
        i. Segments closer to the destination.
        ii. Filling small gaps on the existing sidewalk network.
        iii. Filling large gaps on the existing sidewalk network.
        iv. Maintenance of small segments on the existing sidewalk network.
        v. Maintenance of long segments on the existing sidewalk network.
    c. Label the segments so that you can see their decimal length in Miles (to the nearest tenth)
    d. Symbolize the New Sidewalks Layer based on the destination name so that you can easily tell where the new or modified segments are.
    e. Keep track of the running total length of new or modified segments and keep adding segments until the total reaches 1 mile.
4. **Fill in** the attribute table. Destination names, Construction or Maintenance, Route Ahead and Route Back

Quick Start:

1. Know which destination type you're working on: Schools, Parks, Transit Stops, Grocery Stores, Entertainment
2. Make sure the definition query for the destination is set for a single district.
3. Sort the destination attribute table by the lts_rdi_rank field
4. Highlight the top ranked destination in the district, right click and zoom to it.
5. Identify nearby street segments that could use new or updated sidewalks.
6. Fill in the appropriate fields in the attribute table of the streets layer: route back (start street), route ahead (end street), destination name (ex: Name of School), construction (1 or 2), maintenance (1 or 2)

Notes on Data Caveats and Assumptions Made:

Destination data is different for each destination. Some destinations, like schools, have very robust and well documented GIS data. Others, such as entertainment venues, required more in depth research using Google Maps to ensure data quality.

General:

- Some destinations outside of KC were ranked because the network extended beyond city limits. The analysis excludes these destinations.

Schools:

- Easier to reach 1 mile of sidewalk in the suburbs. In the urban core, we need to look further for sidewalk gaps, more often maintenance is needed.

- D5
  - HAZEL GROVE ELEM. Outside city limits
  - SMITH-HALE MIDDLE incorrect address, school might be closed
- D4
  - FAITH CHRISTIAN ACADEMY – Closed
  - FRONTIER SCHL OF INNOVATION-M – school is surrounded by industrial buildings and isolated by highways. Going to skip as there are not residentials within a mile of the school.
  - NORTH KANSAS CITY HIGH – outside of city limits
  - One of the st patricks school is outside of city limits
  - HIGHLANDS ACADEMY may have changed its name to Kansas City Girls Academy
  - SYNERGY CHILDREN'S CENTER - Incorrect address, extend on GIS does not match the address in the attribute field (1441 NE ENGLEWOOD RD). 4512 NE Antioch Rd, Kansas City, MO 64117 This is the address that matches the extent on GIS. Also this is not a school but some kind of service provider. Going to skip for now.
  - **Was only able to complete 9 schools - I skipped others due to school closures, outside of district 4, not matching up.**
- D3 skipped
  - Faxon Elementary address inconsistent
    - GIS: 1320 E 32ND TERR in attribute field but point on Wayne Ave/E 35th St
    - Gmaps address: 1320 E 32 Terrace, Kansas City, MO 64109
  - Garfield Elementary – complete sidewalk network around school
  - B W Sheperd School – Complete sidewalk network around school
  - One of the Lakewood ES is outside the city limits
  - LAUREL HILLS ELEM. - outside city limits

Transit Stops:

- Bus stop names were used, not the stop ID.
- For District 1's top Transit stops, many of them are within the airport terminals.
- Many in the top ranks are clusters along N Ambassador Dr. For these transit stops, a note was included, saying 'transit stop cluster'.
- Transit stops outside of respective District boundaries were skipped.
- District 1:
  - Only a portion of N Ambassador Dr between NW 107th Ter and NW 110th St has sidewalk, GIS layer indicates it has sidewalks on both sides.
  - For transit stops along N Ambassador Dr (near the airport) that were clustered along the road, a note was included, saying 'transit stop cluster'
  - NW Skyview Rd between N Ambassador Dr and NW Old Tiffany Springs Rd has sidewalk on both sides
- District 2
  - Sidewalk presence layer is not always accurate
  - NE Great Midwest Dr between NE Parvin Rd and NE 38th St only has sidewalks just south of NE Parvin Rd
  - ON NE 41ST BETWEEN PLEASANT AND NORFLEET WB, ON NORFLEET AT NE 41ST SB: There are no bus stops at these locations. Google Maps doesn't show any transit stop at the locations shown on GIS. To confirm, the Kansas City's transit map was checked for bus 210. These 2 stops were skipped. It appears that some of bus 210's stops were relocated. See route for bus 210: https://ridekc.org/assets/uploads/route-maps/210mwk.png
  - ON CHOUTEAU AT RIVERBOAT DR NB: Outside of District 2 boundary. Was skipped.
  - ON PRAIRIEVIEW AT TOWER NB: Outside of District 2 boundary. Was skipped.
  - COURTESY ON PRAIRIEVIEW AT NORTHWOOD NB: Was skipped. There is only one bus stop and it was included for sidewalk opportunities (ON PRAIRIE VIEW AT NORTHWOOD SB).

- ON NORFLEET AT NE 41ST SB: There is no bus stop here. Google Maps doesn't show any transit stop at the location shown on GIS. To confirm, the Kansas City's transit map was checked for bus 210 (see map above). It appears that bus 210's stop was relocated to Norfleet at 40th St. This stop was skipped.
    - Bus stop lts_rdi_rank #21: outside of District 2 boundary. Was skipped.
    - ON PLEASANT AT NE 41ST NB: There is no bus stop here. Google Maps doesn't show any transit stop at the location shown on GIS. This stop was skipped.
    - ON PRAIRIE VIEW AT AMORET NB: Was skipped. There is only one bus stop and it was included for sidewalk opportunities (ON PRAIRIE VIEW AT AMORET SB).
- District 3:
    - ON BLUE RIDGE CUT OFF AT 49TH SOUTHBOUND: No bus stop here. Was skipped.
    - ON N OAK AT 50TH SOUTHBOUND: Outside of District 3 boundary. Was skipped.
    - Bus stop lts_rdi_rank #43: Outside of District 3 boundary. Was skipped.
    - Bus stop lts_rdi_rank #46: Outside of District 3 boundary. Was skipped.
    - ON NORTHERN AT 10700 NORTHBOUND: E 42nd St, and E43rd St only have sidewalk on one side.
    - ON 40 HWY AT 10684 40 HWY EB: Outside of District 3 boundary. Was skipped.
- District 4:
    - top 5 ranked transit stops were outside the District boundary and were skipped.
    - ON BURLINGTON AT E 16TH AVE SOUTHBOUND: Outside of District 4 boundary. Was skipped.
    - ON BURLINGTON AT E 18TH AVE SOUTHBOUND FARSIDE: Outside of District 4 boundary. Was skipped.
    - ON BURLINGTON AT 12TH AVE SOUTHBOUND: Outside of District 4 boundary. Was skipped.
    - ON BURLINGTON AT 14TH AVE SOUTHBOUND: Outside of District 4 boundary. Was skipped.
    - ON SWIFT AT E 10TH AVE SOUTHBOUND: Outside of District 4 boundary. Was skipped.
    - ON CLEAVER II BLVD AT 1525 E CLEAVER II BLVD EB: Outside of District 4 boundary. Was skipped.
    - ON CEDAR AT KENTUCKY NB: Outside of District 4 boundary. Was skipped.
    - DUMMY 12TH ST I-35 NB ON RAMP: No bus stop was found here on Google Maps. It is on a highway on-ramp.
    - N Oak Trafficway has sidewalks on both sides
    - ON PERSHING AT BROADWAY EASTBOUND: sidewalk layer is inaccurate. Broadway Blvd and W 25th St do not run the length indicated on GIS. IRS building is there. West Pennway (called Broadway Blvd on Google Maps) has no sidewalks.
- District 5:
    - ON PASEO AT RACHEL MORADO 77TH NB: From Google Streetview it appears that Rachel Morado Dr. is closed off for vehicle traffic and has been pedestrianised. Sidewalk presence layer is not accurate. E 77th Ter has sidewalk on both sides.
    - ON BLUE RIDGE CUT OFF AT 6524 BLUE RIDGE CUTOFF SB: Outside of District 5 boundary. Was skipped.
    - UNITY VILLAGE: Outside of District 5 boundary. Was skipped.
    - ON BLUE RIDGE CUTOFF AT 6412 BLUE RIDGE CUTOFF SB: Outside of District 5 boundary. Was skipped.
- District 6:
    - ON 103RD AT 1120 W 103RD STREET WESTBOUND: Washington St has sidewalks on both sides
    - ON STATE LN AT 103RD TERRACE NORTHBOUND: Outside of District 6 boundary. Was skipped.
    - ON NICHOLS PKWY AT 4418 NICHOLS PKWY SOUTHBOUND: Bus stop permanently closed. Was skipped.

Grocery Stores:

- Same issue with District 1. All at airport.
- None in district 2. Found one which in categorized in District 3.

- Some are unnamed.
- District 3:
  - Rank 3 is a gas station.
  - rank 10 festival foods is in district 2.
  - rank 12 named family mini market.
- District 4;
  - Rank 7 named minit mart.
  - Rank 12 price chopper is in district 3.
  - Rank 36 Burritos "To Go" is outside the district boundary.
  - Rank X-Press Mart is in district 5.
  - Rank 41 S&R Deli & Grocery is in district 5.
  - Rank 46 is not The Sundry and no grocery store around, skipped.
- District 5:
  - Rank 15 no name, named M & Amzar Inc
  - Rank 50 Price Chopper, wrong location, no grocery around, skipped.
  - Rank 58 Target and Rank 66 Hy-Vee are outside the district boundary.
  - Only identified 6 grocery stores. Should consider adding the two that are mislabeled in district 4.
- District 6:
  - Rank 5, 27, 39, 67 no name and outside the district boundary.
  - Rank 45 Save-A-Lot Permanently closed.
  - Only identified 6 grocery stores.

Entertainment venues

- Includes restaurants, bars, cafes, casino, social centres.
- Some are highly clustered.
- Naming convention for the RNO Batch Proximity attribute table: [Entertainment destination's name] rank # [insert rank number] because there are destinations with the same names but different lts_rdi_ranks within the same District.
- Entertainment destinations indicated as permanently closed on Google Maps were skipped.
- Entertainment venues outside of respective District boundaries were skipped.
- Some entertainment destinations have the same ranking within a District.
- District 1:
  - Top 4 destinations are all at the airport and according to Google Maps, they are permanently closed. These were all skipped.
  - Panda Express lts_rdi_rank #15: Many private residential pockets that have sidewalks within the comopunds, but not to get in. For these, the entrance stubs were included.
  - Many entertainment destinations are highly clustered, and so where segments were selected for one destination, the other ones were skipped as the sidewalk network is otherwise built out, or there is very few residential areas nearby.
  - Subway lts_rdi_rank #25: It is a Walmart there. Was skipped.
  - Rainbow Restaurant lts_rd_rank #34: Outside of District 1 boundary. Was skipped.
  - The Big Biscuit lts_rdi_rank #35: Segments for another nearby entertainment destination (Panda Express) were selected. Was skipped.
  - Noodles & Company lts_rdi_rank # 56: Segments for other nearby entertainment destinations (Crumbl Cookies, Seva Cuisine of India) were selected. Was skipped.
  - Moon Light Japanese Steakhouse & Sush lts_rdi_rank #58: Permanently closed. Was skipped.
  - Jose Pepper's lts_rdi_rank #78: Location is incorrect. There is no restaurant there. Was skipped.
  - Draftcade lts_rdi_rank #78: Complete sidewalk network. Was skipped.

- Kam Sheng lts_rdi_rank ##87: Complete sidewalk network. Was skipped.
- Corner Café lts_rdi_rank #90: Complete sidewalk network. Was skipped.
- Improv Comedy Club & Dinner Theater lts_rdi_rank #111: Complete sidewalk network. Was skipped.
- Jason's Deli lts_rdi_rank #120: Segments for another nearby entertainment destination (Starbucks) were selected. Was skipped.
- Chipotle lts_rdi_rank #127: Segments for another nearby entertainment destination (Panda Express) was selected. Was skipped.
- Panchero's lts_rdi_rank #127: Segments for another nearby entertainment destination (Panda Express) was selected. Was skipped.
- Hereford House lts_rdi_rank #132: Complete sidewalk network (note: GIS layer is not up-to-date). Was skipped.
- Top of the Crown Grill lts_rdi_rank #148: Permanently closed. Was skipped.
- Firehouse Subs lts_rdi_rank #160: Segments for another nearby entertainment destination (Starbucks) were selected. Was skipped.
- Moonlight Sushi lts_rdi_rank #185: Segments for other nearby entertainment destinations (Crumbl Cookies, Seva Cuisine of India) were selected. Was skipped.
- Domino's lts_rdi_rank #208: Segments for another nearby entertainment destination (Jimmy John's) were selected. Was skipped.
- Taco Bell lts_rdi_rank #216: Segments for another nearby entertainment destination (CJimmy John's) were selected. Was skipped.
- Masabi Japanese Sushi Bar & Grill lts_rdi_rank #234: Complete sidewalk network. Was skipped.
- Subway lts_rdi_rank #234: Complete sidewalk network and part of a cluster. Was skipped.
- White Horse Pub lts_rdi_rank #234: This place is no longer there. It is a Captain's Sports Lounge now. Was included.

- District 2:
  - Malay Café: Permanently closed. Was skipped.
  - Crepe KC: Was not found at that location. Was skipped.
  - Subway rank #43: Outside of District 2 boundary. Was skipped.
  - Smitty's Diner rank #52: Outside of District 2 boundary. Was skipped.
  - Champion Burritos To Go rank #72: Outside of District 2 boundary. Was skipped.
  - Atkins-Johnson Farm & Museum rank #78: Outside of District 2 boundary. Was skipped.
  -
- District 3:
  - Splitlog Coffee Co. Rank #24: Now called Core Coffee & Eatery. Was included.
  - P. Moore & Moore BBQ rank #46: Not at this location. Was skipped.
  - Mesob Pikliz rank #123: Not found at this location. Was skipped.
  - Paddy O'Quigley's Pub & Grille rank #198: It's a Taco Bell now. Was included.
  - Green River Chinese & Vietnamese rank #234: Part of a cluster. Very close to Gates Bar B.Q. (rank #123) for which sidewalk segments have already been included. Was skipped.
  - Peachtree Cafeteria rank #238: Part of a cluster. Very close to Gates Bar B.Q. (rank #123) for which sidewalk segments have already been included. Was skipped.
- District 4:
  - Chicken N Pickle rank #7: Outside of District 4 boundary. Was skipped.
  - The American rank #12: Temporarily closed. Was skipped.
  - ProteinHouse rank #12: Part of a cluster where sidewalks are well built-out. Was skipped.
  - Ollie's Local rank #14: Permanently closed. Was skipped.
  - Asia rank #19: Outside of District 4 boundary. Was skipped.

- Bistro 303 rank #26: Part of a cluster where sidewalks are well built-out. Was skipped.
- Hawg Jaw Que & Brew rank #27: Outside of District 4 boundary. Was skipped.
- Subway rank #28: Outside of District 4 boundary. Was skipped.
- Unidentified entertainment with lts_rdi_rank #29: It is Bally's Casino.
- Denny's rank #40: In very industrial area. Was included.
- Attitude rank # 41: Not found at this location. Was skipped.

- District 5:
  - Donkeys rank #17: On Kansas City Zoo property. Was included. Segments were selected outside of the zoo so people can walk there.
  - Black Mangabeys rank #20: On Kansas City Zoo property. Was included. Segments were selected outside of the zoo so people can walk there.
  - Top 7 destinations are all within the Kansas City Zoo property. Only the first 3 were included for sidewalk segments, the others were skipped and moved on to the next destination.
  - McDonald's rank #132: Location is incorrect, there is no McDonald's there. Was skipped.
  - Gusto coffee Bistro rank #148: Outside of District 5 boundary. Was skipped.
  - Baboon rank #148: On Kansas City Zoo property. Part of a cluster. Was skipped.
  - The big Biscuit rank #149: Outside of District 5 boundary. Was skipped.
  - Otters rank #155: On Kansas City Zoo property. Part of a cluster. Was skipped.
  - Rhinoceros Hornbill: On Kansas City Zoo property. Trails lead there. Was skipped.
  - Sarpino's Pizza rank #202: Outside of District 5 boundary. Was skipped.
  - Black-footed Cats rank #202: On Kansas City Zoo property. Part of a cluster. Was skipped.
  - Chimpanzee Viewpoint rank #202: On Kansas City Zoo property. Part of a cluster. Was skipped.
  - Honey Baked Ham rank #238: Outside of District 5 boundary. Was skipped.
  - Funhouse Pizza & Pub rank #241: Outside of District 5 boundary. Was skipped.
  - 54th Street Bar & Grill rank #292: Outside of District 5 boundary. Was skipped.
  - Ça Va rank #300: Outside of District 5 boundary. Was skipped.
  - Elephants rank #300: On Kansas City Zoo property. Part of a cluster. Was skipped.
  - Cupini's rank #314: Outside of District 5 boundary. Was skipped.
  - Sheep rank #357: On Kansas City Zoo property. Part of a cluster. Was skipped.
  - Rudy's Tenampa Taqueria rank #370: Outside of District 5 boundary. Was skipped.
  - Krispy Krunchy Chicken rank #378: It is a Food Express now. Was included.
- District 6:
  - The Melting Pot rank #44: Part of a cluster. Very close to the Granfalloon (rank #34) for which sidewalk segments have already been included. Was skipped.
  - Seasons 52 rank #45: Part of a cluster. Segments for another nearby entertainment destination were selected. Was skipped.
  - Fogo de Chao rank #52: Part of a cluster. Segments for another nearby entertainment destination were selected. Was skipped.
  - Plaza III rank #72: Not found at this location. Was skipped.
  - t.Loft rank #80: Permanently closed. Was skipped.
  - Panera Bread rank #89: Part of a cluster. Segments for another nearby entertainment destination were selected. Was skipped.
  - The Capital Grille rank #94: Part of a cluster. Segments for another nearby entertainment destination were selected. Was skipped.
  - Potbelly rank #94: Part of a cluster. Segments for another nearby entertainment destination were selected. Was skipped.

- Kona Grill rank #101: Part of a cluster. Segments for another nearby entertainment destination were selected. Was skipped.
- Sonic rank #106: Outside of District 6 boundary. Was skipped.
- Bo Lings rank #109: Part of a cluster. Segments for another nearby entertainment destination were selected. Was skipped.
- Goodcents rank #120: GoogleMaps does not indicate there is a location of this place here. Was included though because the sidewalk network is not well built out in the area.
- Subway rank #127: Temporarily closed. Was skipped.
- Rye rank #136: Called Rye plaza. Close to cluster. Sidewalk network is well built out, and remaining segments were already added under other entertainment destinations. Was skipped.
- Cooper's Hawk rank #155: Close to cluster. Sidewalk network is well built out, and remaining segments were already added under other entertainment destinations. Was skipped.

Parks:

- General observation: sidewalk presence layer is not always up-to-date.
- Surrounding streets of some parks in urban areas had sidewalks on both sides, in these cases, segments a bit further were selected.
- Parks outside of respective district boundaries were skipped.
- For parks bounded by a highway on at least one side: segments on arterials were selected so people can reach the park.
- Some areas designated as parks appeared on Google Maps as a wooded area not a park where people can walk. For example: District 2 – Big Shoal Heritage Area, Unidentified park with lts_rdi_rank #19, Kirby Creek Park
- Many 'parks' are just landscaped medians. These were all skipped.
- District 1:
    - Barry Road Park: Several unselectable roads north and south of the park
    - Northview Trail: Arterial north of the park has sidewalk on 1 side. The other side is uninhabited land.
    - Unidentified park with lts_rdi_rank #3: Was skipped as it has sidewalks all around it.
    - Unidentified park with lts_rdi_rank #5: Outside of District 1 boundary. Was skipped.
    - Wildberry Park: Bounded by highway on the north. All surrounding streets have sidewalks. Segments to the NE were selected as sidewalk candidates.
    - Rocky Point Park: Outside of District 1 boundary. Was skipped.
    - Martha LaFite Thompson Nature Sanctuary: Outside of District 1 boundary. Was skipped.
    - Fox Hill Park: Segments are included under Fox Hill Park with lts_rdi_rank #13
    - Platte Purchase Park: Sidewalk candidates were selected south of the park so residents can reach it
    - Northwyck Park: Outside of District 1 boundary. Was skipped.
    - Tiffany Springs Park: Bounded by highway on the south. Segments were selected so people can reach via the arterials
    - Bridge Point Park: Outside of District 1 boundary. Was skipped.
    - Green Hills Park: Outside of District 1 boundary. Was skipped.
    - Arthur's Hill Park: Outside of District 1 boundary. Was skipped.
    - North Saint Clair Park: Outside of District 1 boundary. Was skipped.
    - Hodge Park: Bounded by highway to the east. Segments on the south were selected
    - Tiffany Hills Park: Segments SW were selected as nearby residential streets have sidewalks
    - Qualridge Park: NE 108th St between Booth Ave and Hunter Dr does not have sidewalks (based on Google Maps), although layer says it does. It is a bike lane. This segment was included as candidate.
- District 2:
    - Northwood Park: Was skipped. It looks like a wooded area not a park where people walk

  - Morgan Tract Park: Some segments selected are indicated in the table as private access roads
  - Hidden Hollow Park: Outside of District 2 boundary. Was skipped.
  - Linden Square: Outside of District 2 boundary. Was skipped.
  - Line Creek Meadows Park: Outside of District 2 boundary. Was skipped.
  - Flora Park: Outside of District 2 boundary. Was skipped.
- Hobby Hill Park: Was included as part of the park is within District 2. From Google Maps streetview it appears that there is no park entrance off N Main St, so that street was not included as a sidewalk candidate segment.
  - Quindaro Park: Outside of District 2 boundary. Was skipped.
  - Golden Oaks Park: Outside of District 2 boundary. Was skipped.
  - Oak Grove Park: On the border of District 2 boundary. Was included.
  - Big Shoal Heritage Area: Though it is bordering District 2 on the east side, it does not appear to be a park where one can walk.
  - Trail of Heroes Memorial Park: Segments were large and quickly added up to 1 mile
  - Waterworks Park: Outside of District 2 boundary. Was skipped.
  - Amber Meadows HOA Park: Outside of District 2 boundary. Was skipped.
  - Unidentified park with lts_rdi_rank #19: Was skipped. From Google Maps it appears to be a wooded area not a park where people walk.
  - Meadowbrook Park: Outside of District 2 boundary. Was skipped.
  - Thompson Park: Outside of District 2 boundary. Was skipped.
  - Kirby Creek Park: From Google Maps it appears to be a wooded area not a park people walk in. The park adjacent to it, Bridge Point Park, may be a better park as it has trails.
- District 3:
  - Martin Luther King Jr. Park: Just outside the border of District 3. Was included.
  - Ilus W. Davis Park: Outside of District 3 boundary. Was skipped.
  - Unidentified park with lts_rdi_rank #3: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #4: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #6: It is a landscaped median. Was skipped.
  - Mulkey Square Park: Outside of District 3 boundary. Was skipped.
  - The Concourse: No sidewalk was flagged for Anderson Ave, due east and west of Gladstone Blvd as utility poles are in the way and the buffer does not appear to be wide enough to accommodate a sidewalk.
  - Unidentified park with lts_rdi_rank #8: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #11: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #13: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #24: It is a landscaped median. Was skipped.
  - Blue Valley Park: Oakley Ave between E26th and E25th St has sidewalk on both sides.
  - Blue Valley Recreation Center Park: E 17th St between Hardesty Ave and Oakley Ave has sidewalk on both sides
  - Winnwood Park: Outside of District 3 boundary. Was skipped.
- District 4:
  - Unidentified park with lts_rdi_rank #1: It is a landscaped median. Was skipped.
  - Davis Park: Outside of District 4 boundary. Was skipped.
  - Unidentified park with lts_rdi_rank #3: Outside of District 4 boundary. Was skipped.
  - Willaim Henry Harrison Park: Outside of District 4 boundary. Was skipped.
  - Barney Allis Park: W 16 th St between Main St and Baltimore Ave has sidewalks on both sides. W 8th St between Main St and Baltimore Ave is an overpass with sidewalk on one side. Park is surrounded by highways. Locus St between E20th and E19th St has sidewalk on both sides

- Unidentified park with lts_rdi_rank #7: It is a landscaped median. Was skipped.
- Unidentified park with lts_rdi_rank #9: Outside of District 4 boundary. Was skipped.
- Charles Long Park: Outside of District 4 boundary. Was skipped.
- Unidentified park with lts_rdi_rank #18: Outside of District 4 boundary. Was skipped.
- Anita B. Gorman Park: There is sidewalk on one side of the outdoor mall north of the park
- Belvidere Park: Outside of District 4 boundary. Was skipped.
- Unidentified park with lts_rdi_rank #22: Outside of District 4 boundary. Was skipped.
- Waggin' Trails Dog Park: Outside of District 4 boundary. Was skipped.
- Eisenhower Park: Outside of District 4 boundary. Was skipped.

- District 5:
  - Unidentified park with lts_rdi_rank #1: It is a landscaped median. Was skipped.
  - Little Blue Valley Park: Park is nowhere near residential areas. Most segments are far to walk to the park and 1 mile added up very quickly, not providing sidewalk to many.
  - Timber Valley Park: Appears to be a large wooded area. Not sure if one can walk around in it.
  - Unidentified park with lts_rdi_rank #5: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #7: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #8: It is a landscaped median. Was skipped.
  - Daniel Morgan Boone Park: Brooklyn Ave south of the park has sidewalk on one side.
  - Unidentified park with lts_rdi_rank #15: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #16: It is a landscaped median. Was skipped.
  - Lakewood Development Park: Outside of District 5 boundary. Was skipped.
  - Unidentified park with lts_rdi_rank #18: Named 'Marlborough Green Space' on Google Maps. E 82nd St has sidewalk on one side. Under Park name field, the name was left blank (i.e. <Null>).
  - Unidentified park with lts_rdi_rank #24: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #28: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #31: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #32: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #33: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #35: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #48: It is a landscaped median. Was skipped.
- District 6 had many parks with no names. Some were landscaped medians, and consequently skipped. Some had the Harry Wiggins Trolley Track Trail run through it. These parks were included and under the 'Park name' in the Batch Proximity Edit attribute table, it says 'Unnamed park....and with the corresponding lts_rdi_rank #.
  - Unidentified park with lts_rdi_rank #1: It is a landscaped median, by the Brush Creek and just outside of District 6 boundary. Was skipped.
  - Unidentified park with lts_rdi_rank #2: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #3: Volker Blvd is called Dr. Martin Luther King Jr. Blvd on Google Maps. E 51st St between Rockhill Rd and Troost Ave has sidewalk on both sides
  - Unidentified park with lts_rdi_rank #4: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #5: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #6: It is a landscaped median. Was skipped.
  - Unidentified park with lts_rdi_rank #7: It is a landscaped median. Was skipped.
  - Kenneth Road Soccer Complex: Very separated from everything, distances are too large to walk. Sum of segments is appr. 2 miles.
  - Unidentified park with lts_rdi_rank #11: Holmes St between E 51st St and E 52nd St has sidewalk on one side.
  - Unidentified park with lts_rdi_rank #13: Harry Wiggins Trolley Track Trail runs through it.

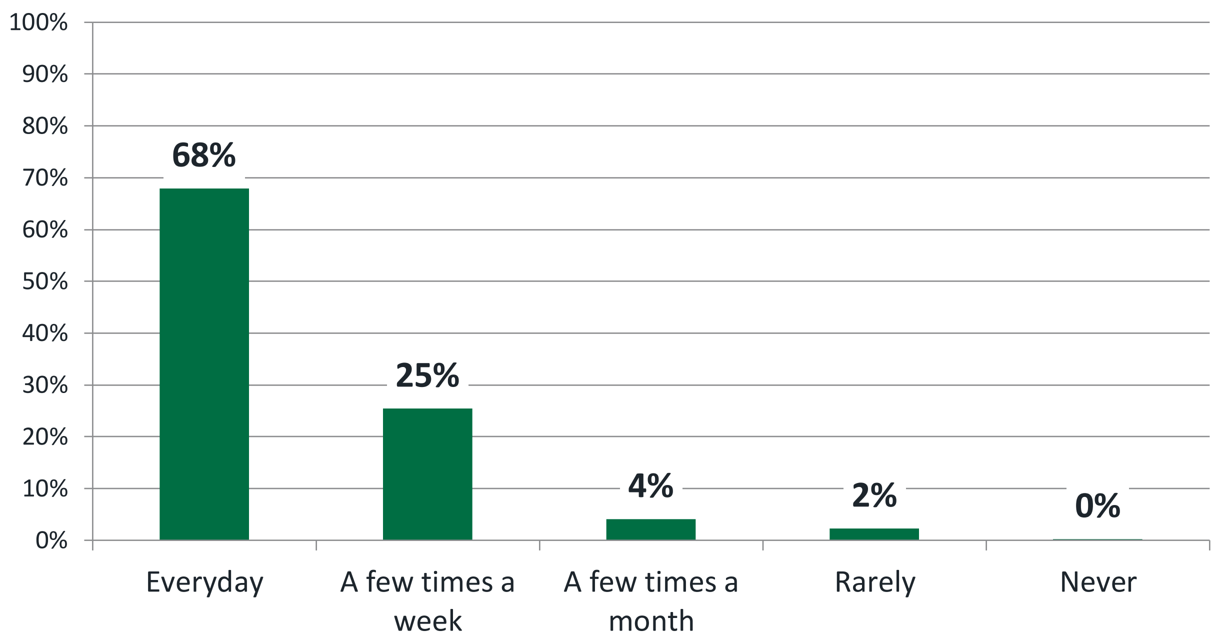
- Unidentified park with lts_rdi_rank #14: Harry Wiggins Trolley Track Trail runs through it.
- Unidentified park with lts_rdi_rank #15: Was skipped as it is a landscaped corner and just outside of District 6 boundary.
- Unidentified park with lts_rdi_rank #16: Unnamed park by Brush Creek.
- Unidentified park with lts_rdi_rank #17: Harry Wiggins Trolley Track Trail runs through it
- Unidentified park with lts_rdi_rank #18: Harry Wiggins Trolley Track Trail runs through it.
- Unidentified park with lts_rdi_rank #19: It is a landscaped median. Was skipped.
- Unidentified park with lts_rdi_rank #21: Has benches, was included.
- Unidentified park with lts_rdi_rank #22: Unnamed park by Brush Creek.
- Unidentified park with lts_rdi_rank #24: It is a landscaped median. Was skipped.

Appendix I

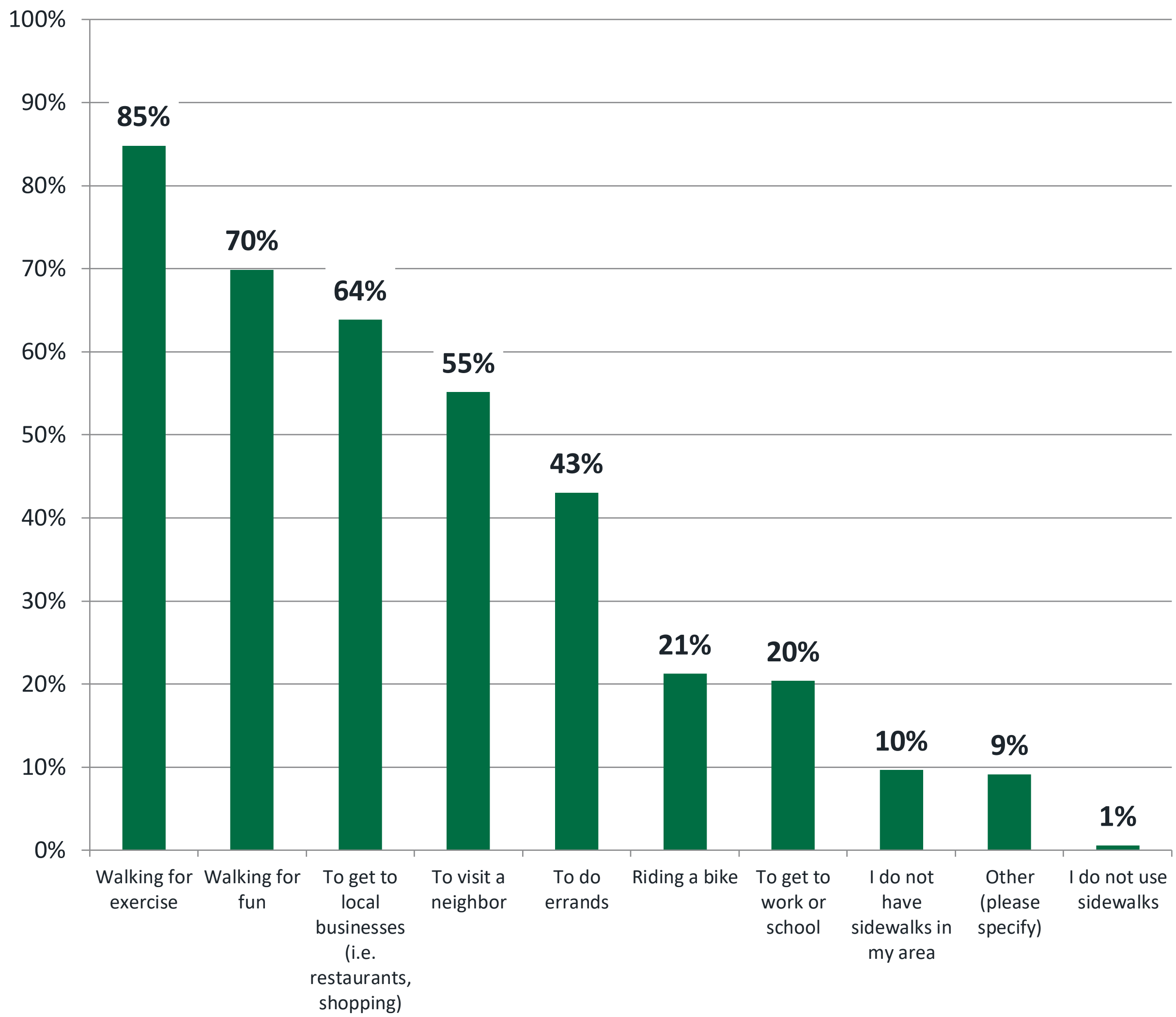
Kansas City Sidewalks Survey Report

Community Survey Results

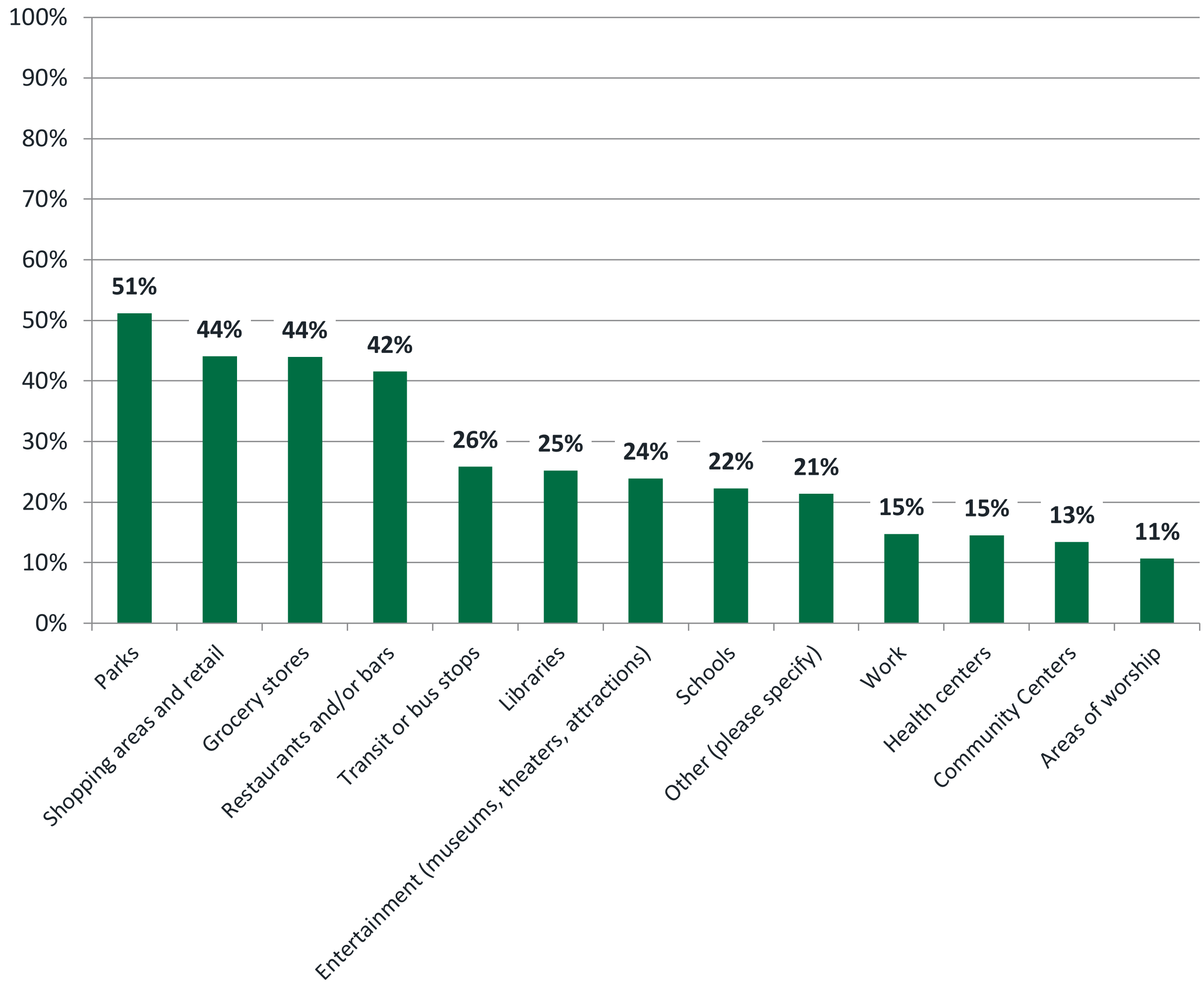
1. How Often do you walk in KCMO?



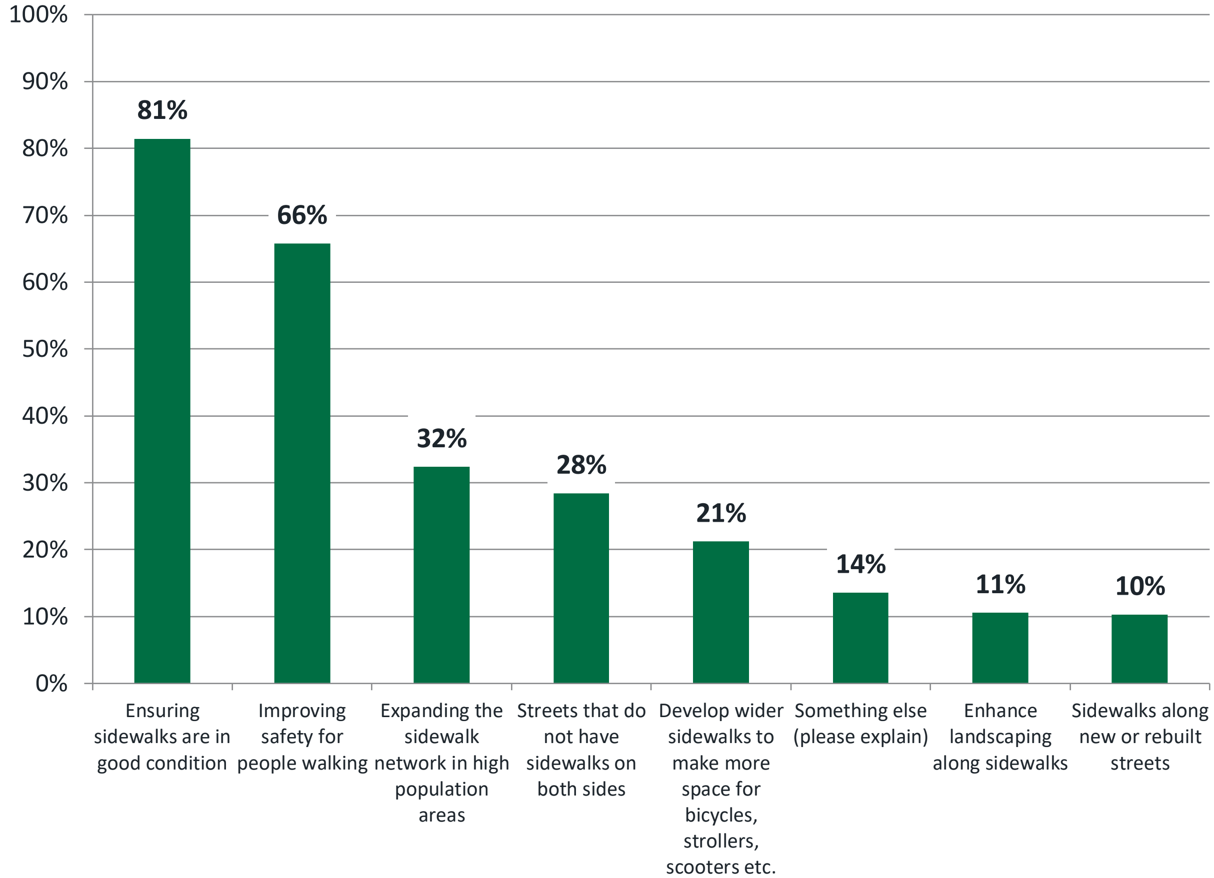
2. **How do you use sidewalks currently?**



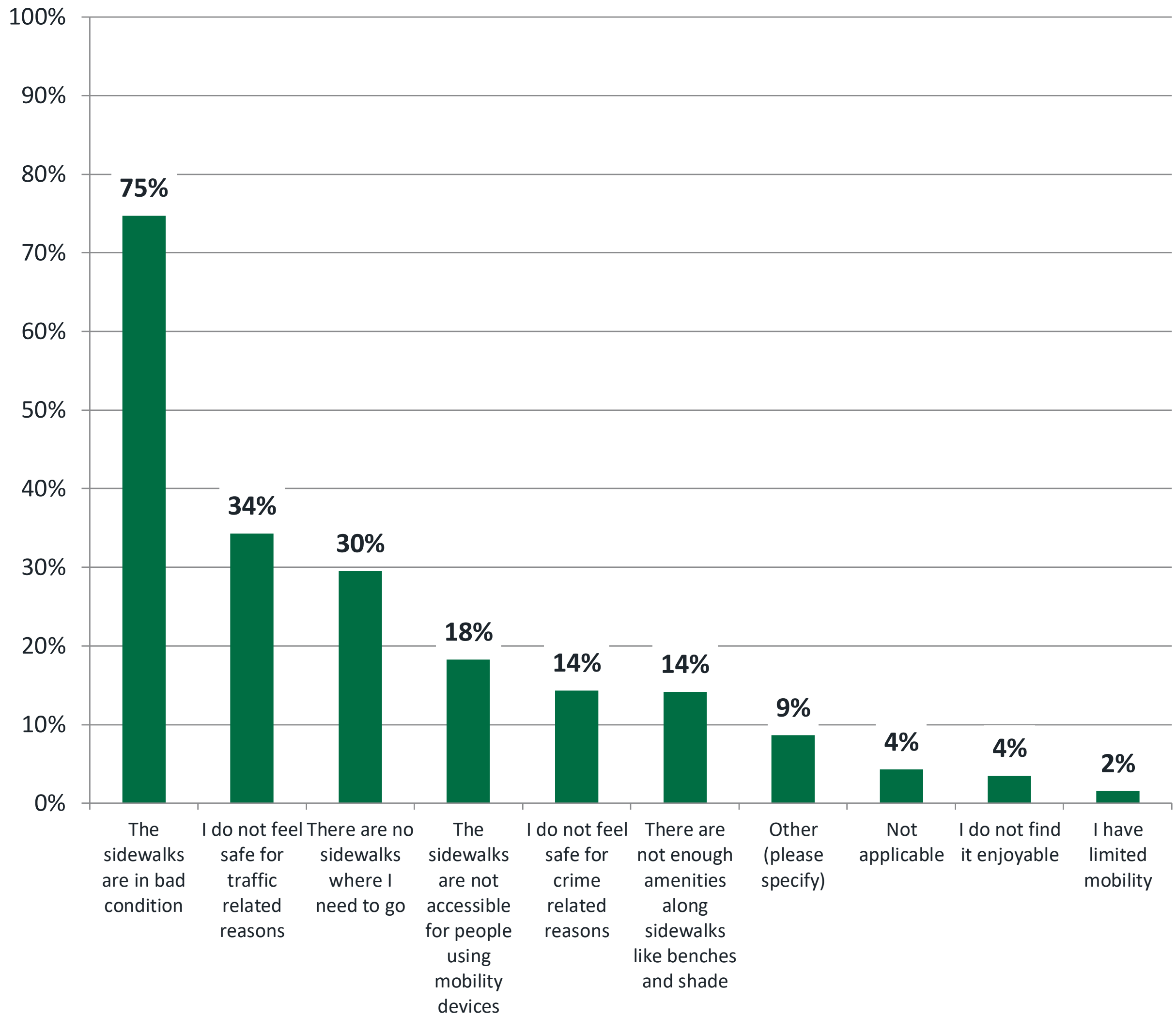
3. **Where would you like to be able to walk to that is currently a challenge?**



4. What are your top priorities for sidewalks in KCMO?

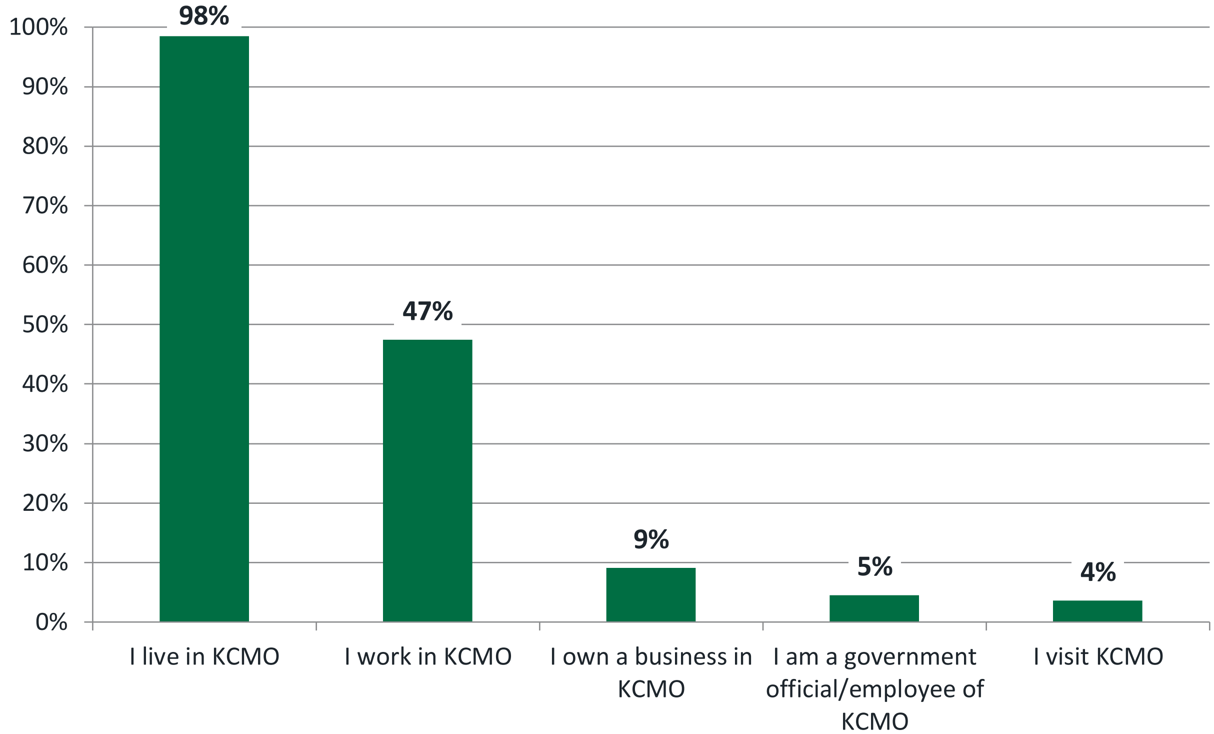


5. **What currently makes you avoid using sidewalks in KCMO?**

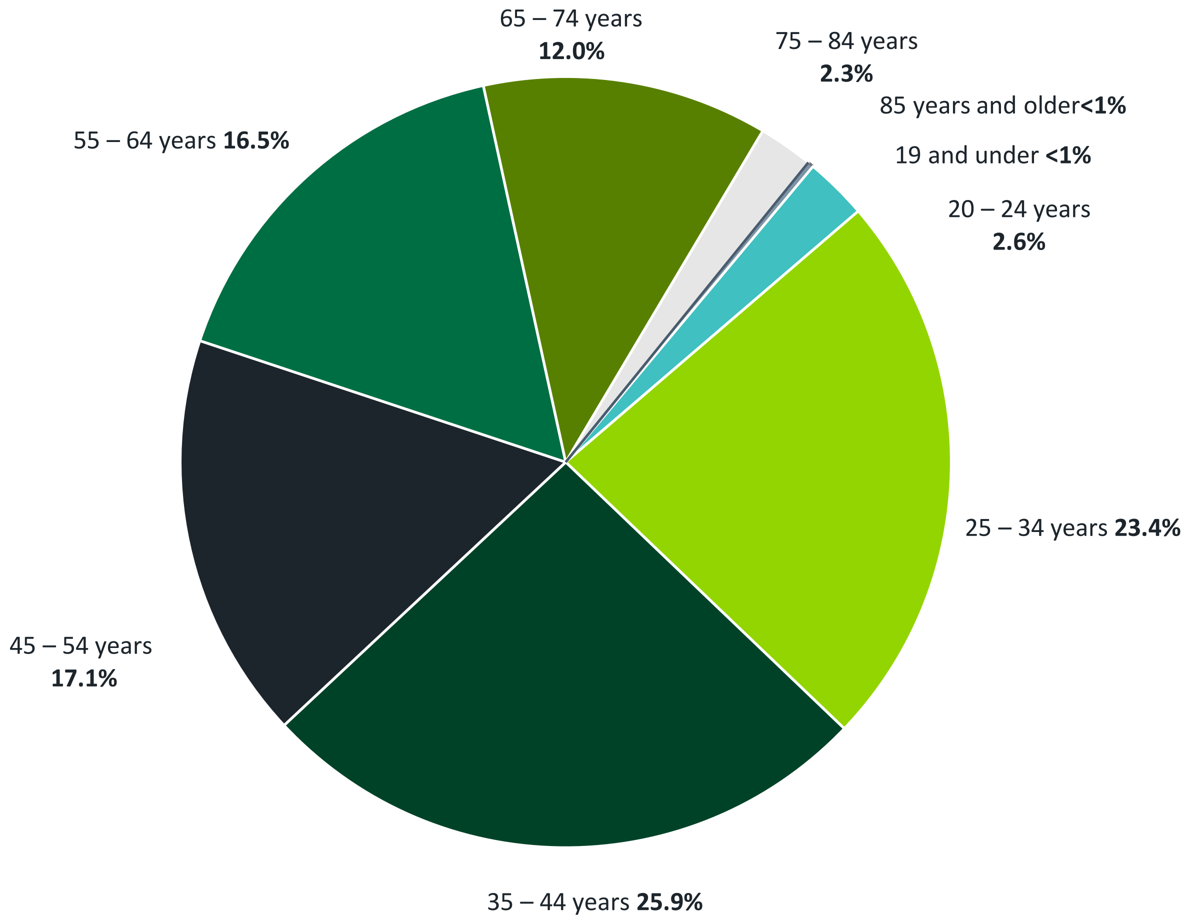


Demographics

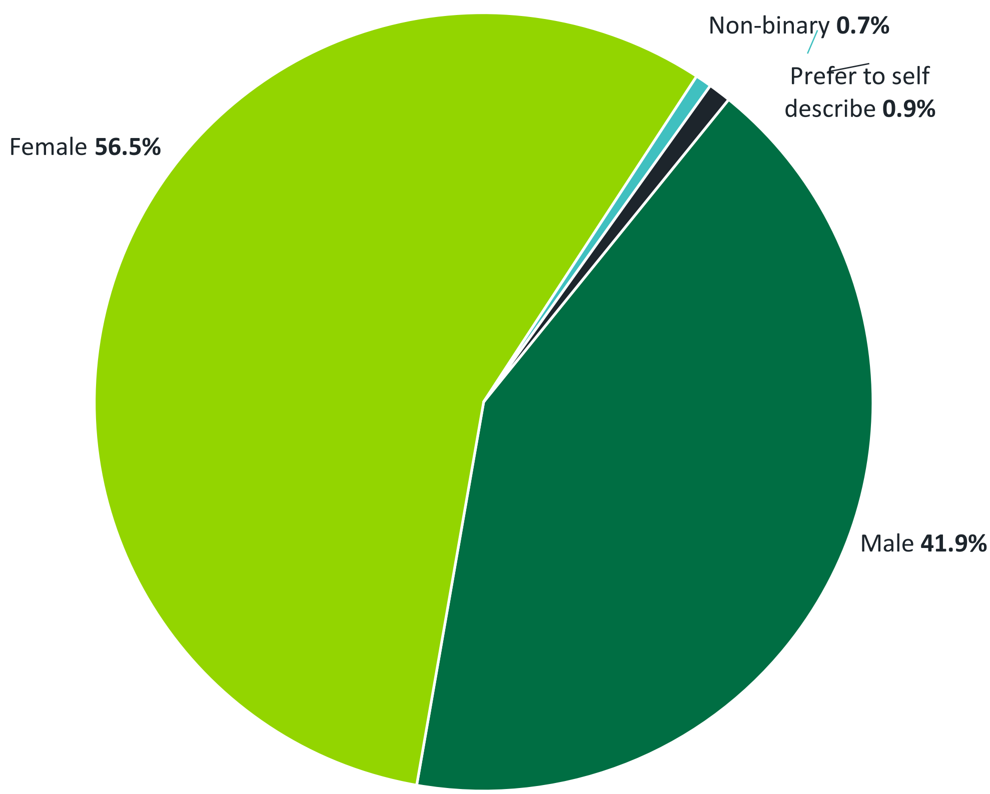
6. What is your role in the KCMO community?



7. What is your age?


65 – 74 years **12.0%**
75 – 84 years **2.3%**
85 years and older **<1%**
19 and under **<1%**
20 – 24 years **2.6%**
25 – 34 years **23.4%**
35 – 44 years **25.9%**
45 – 54 years **17.1%**
55 – 64 years **16.5%**

8. How would you describe yourself?



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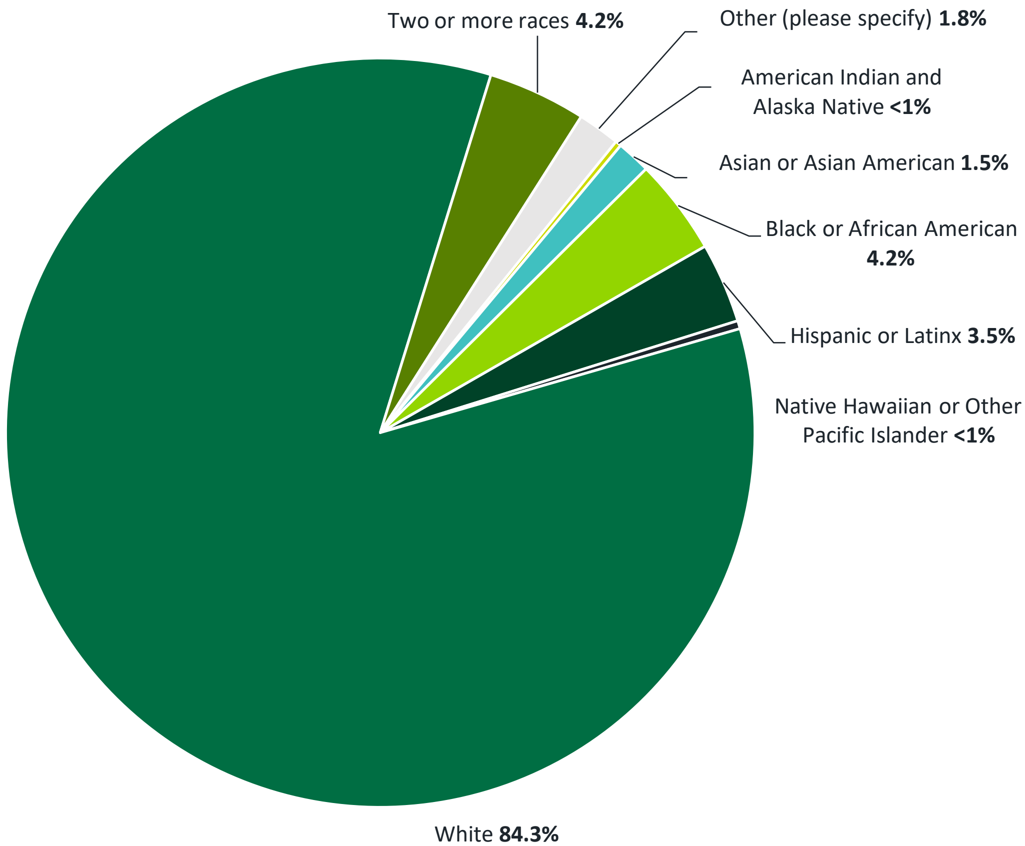
9. How would you describe your race or ethnicity?



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10. What is your combined household income?