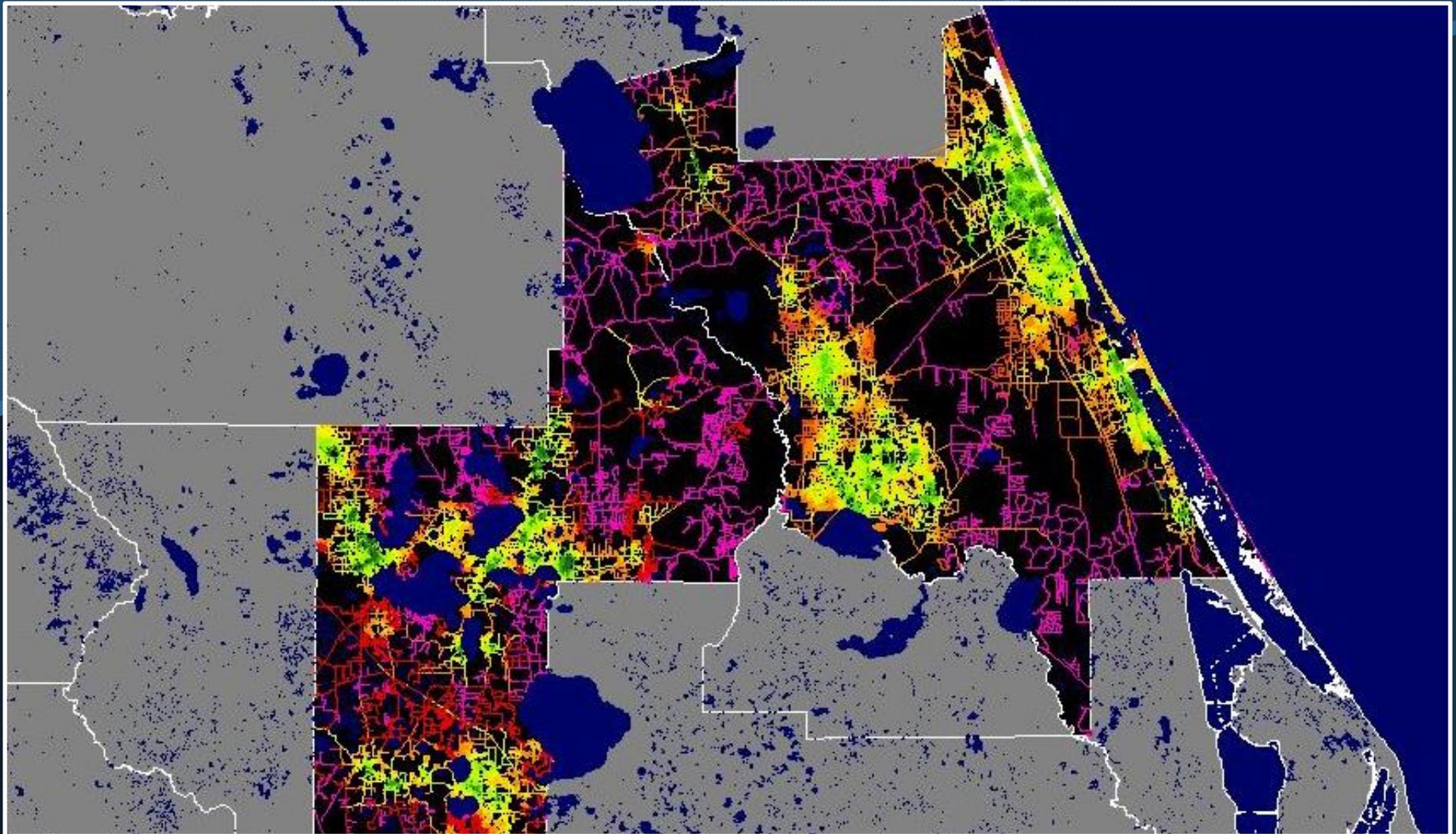


The ECFRPC Route Condition Tool

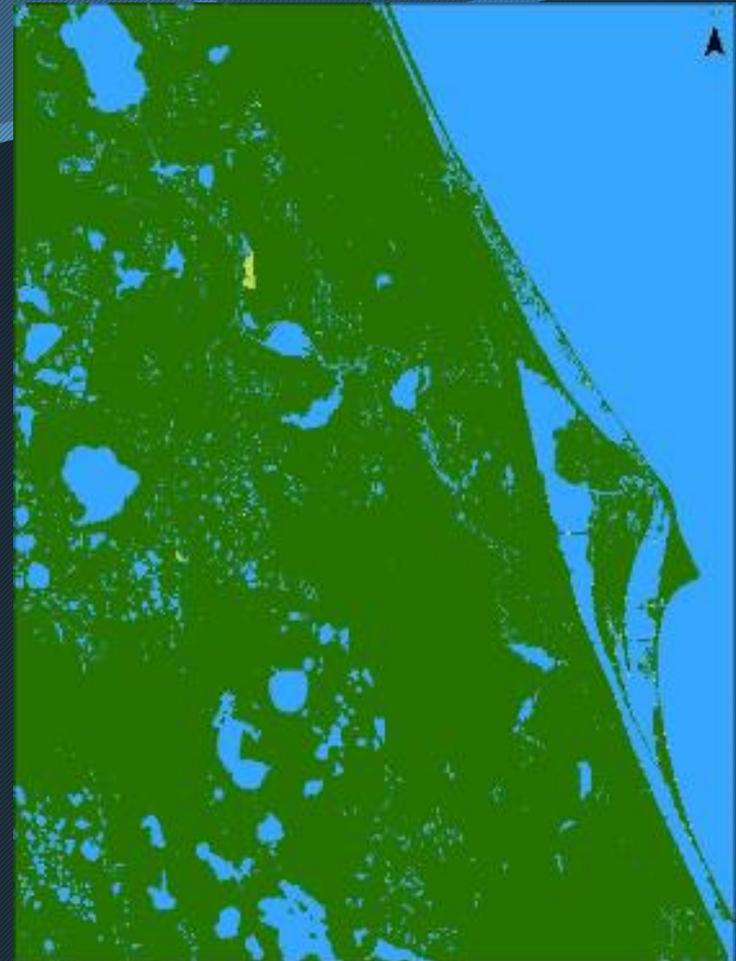
PJ Smith | ECFRPC | March 2016



Why do we need to re-look at our transportation networks?

Large metro areas, ranked by Pedestrian Danger Index

Rank	Metropolitan area	Total pedestrian deaths (2003–2012)	Annual pedestrian deaths per 100,000 (2008–2012)	Percent of people commuting by foot (2008–2012)	Pedestrian Danger Index (2008–2012)
1	Orlando-Kissimmee, FL	583	2.75	1.1	244.28
2	Tampa-St. Petersburg-Clearwater, FL	874	2.97	1.6	190.13
3	Jacksonville, FL	359	2.48	1.4	182.71
4	Miami-Fort Lauderdale-Pompano Beach, FL	1,539	2.58	1.8	145.33
5	Memphis, TN-MS-AR	239	1.72	1.3	131.26
6	Birmingham-Hoover, AL*	148	1.33	1.1	125.60
7	Houston-Sugar Land-Baytown, TX	1,034	1.70	1.4	119.64
8	Atlanta-Sandy Springs-Marietta, GA	839	1.59	1.3	119.35
9	Phoenix-Mesa-Scottsdale, AZ	840	1.86	1.6	118.64
10	Charlotte-Gastonia-Concord, NC-SC	254	1.65	1.5	111.74
11	Detroit-Warren-Livonia, MI	713	1.55	1.4	111.63
12	Dallas-Fort Worth-Arlington, TX	900	1.31	1.2	107.54
13	Las Vegas-Paradise, NV	413	1.85	1.8	102.67
14	Riverside-San Bernardino-Ontario, CA	889	1.81	1.8	102.17
15	Nashville-Davidson-Murfreesboro-Franklin, TN	210	1.25	1.2	100.79



Where did the process begin?

The development of our Safe Routes Portal included the **collection and development of data** focused on transportation safety and access for bicyclists and pedestrians.

Central Florida Safe Routes Portal

Google™ Custom

Funded By

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SafeRoutes Florida Safe Routes to School

www.srtsfi.org

10th JUDICIAL CIRCUIT

Decision & Policy Makers

Community Involvement

Parents

About

Noggin News

ChangeLab Solutions, Safe Routes to School National Partnership Release School District Policy Builder

Saris Cycling Group 5th Grade National Poster Contest - Deadline March 7

ECFRPC Safe Routes 105.9 Interview

Kid's Corner

Contact

What did the process lead to?

The creation of GIS Data Sets

PROXIMITY LAYERS

- Community Features
- Trail Systems
- Schools (2-mile zone)
- Bicycle Lanes
- Crash Locations
- ES School Zones
- MS School Zones
- HS School Zones
- ADA Facilities
- Transit Stops
- Crossing Guards
- Places of Interest
- Commercial Hubs
- High-Population Areas
- Areas of Special Interest

STREET LAYERS

- Road Width
- Speed Limits
- Median Width/Type
- Shoulder Width/Type
- AADT (Autos)
- AADT (Trucks)
- Sidewalks
- Number of Lanes
- Average Lane Width
- Road Name
- SIS Roadway
- Inside Shoulder Width
- Outside Shoulder Width
- Paved Shoulders
- Bicycle Lanes

But we could do more
with this data....

We saw the data that we had collected as only the roots of our
GIS capabilities. All roadway data needed to be in
ONE shapefile, as attributes

What is the Route Condition Tool?

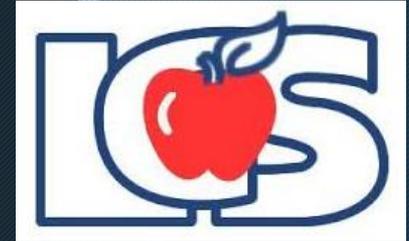
Utilizes Federal Highway Authority Roadway Safety Countermeasures and scores roadway segments on a **1-10 scale** based on five fundamental FDOT principles

1. Reduce Speed of Motor Vehicles
 2. Reduce Volume of Motor Vehicles
 3. Reduce Exposure for Pedestrians and Bicyclists
 4. Improve Access and Mobility
 5. Improve Safety
- * **Community Feature Proximity**

Technical advisory committee

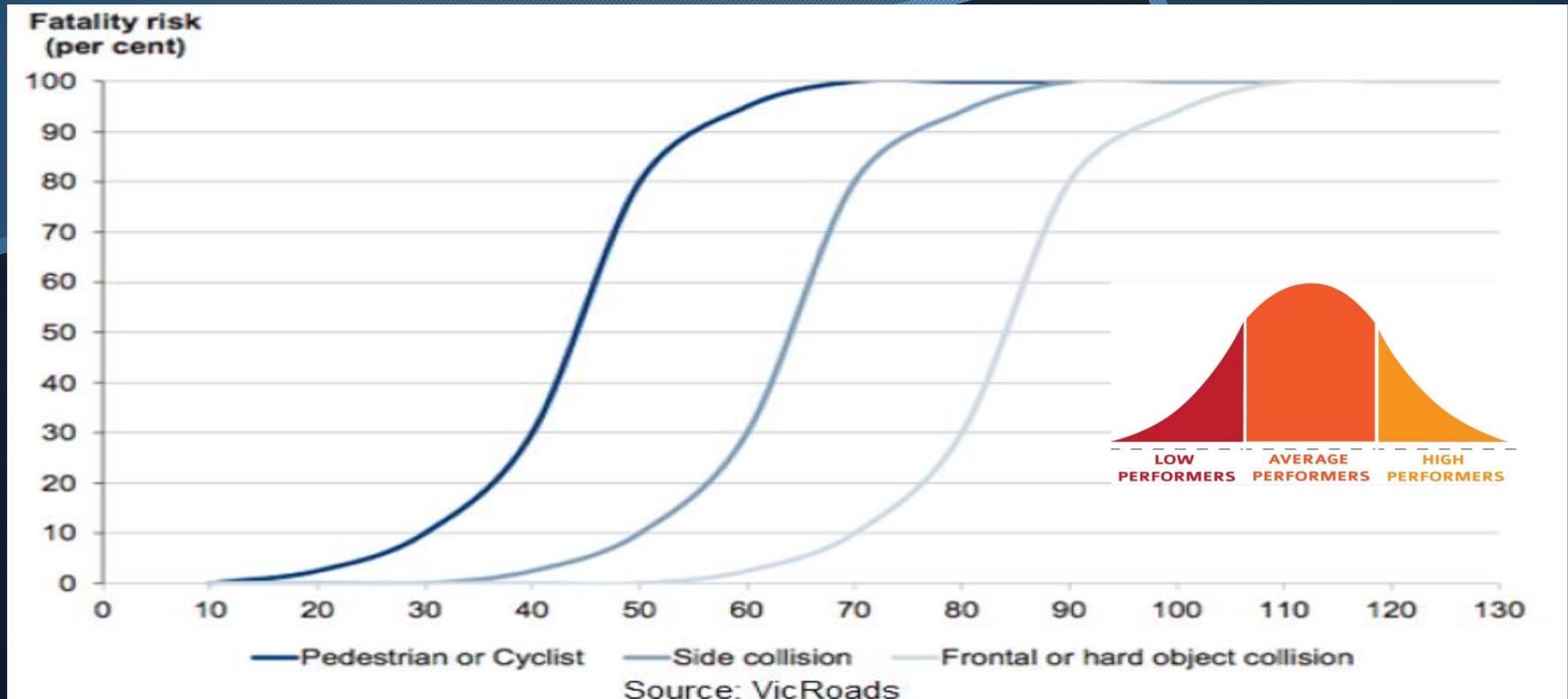
Our project team put a team of local stakeholders and technical analysts to determine how to score each roadway feature.

For example, how badly do we mark down the score for a road with a 55 mph speed limit?



What determined the scores?

The ECFRPC hosted a group of professionals to gauge the scoring (-100 to 100) on each roadway attribute, as well as the weighting of those scores, per category.



Scoring Categories

Category D: Improve Access and Mobility

Scoring Attribute	Total Weight	Scoring (Raw Scores -100 to 100)							
		Both Sides	One Side	None (Urban)	None (Rural)				
Sidewalks	22.5%	100	40	-100	0				
Traffic Signals	20.0%	Wi 0.10 Mi	Wi 0.25 Mi	Wi 0.50 Mi	Wi 1.00 Mi	Not wi 1 Mi	No Data		
Paved Shoulders	15.0%	Yes (2)	Yes (1)	None	No Data				
Prox. ADA Infrastructure	12.5% (0%)	Wi 0.25 Mi	Wi 0.50 Mi	n/wi 0.5 Mi	No Data				
AADT	10.0%	< 5000	5000-10000	10001-20000	20001-30000	30001-40000	40001-50000	> 50000	No Data
Prox. to Transit Stops	10.0%	wi 0.25 Mi	wi 0.50 Mi	o/s o.5 mi					
Lighting	10.0%	Yes	No	No Data					

Table



CUMULATIVE

TRANSIT_ST	CROSS_GRD	TRAFF_SIG	MEDIAN_TP	LIGHTING	CROSSWALKS	A	B	C	D	E	F	G	H	J	K	L	N	P	S1	S2	S3	S4	S5	SCORE	REAL_SCORE
Outside 0.50 Miles	Outside 0.50 Miles	Outside 1.00 Miles	Paved	Data Not Available	No Data	-10	10	-2	0	10	60	-2	40	100	50	10	0	40	-34	86	64.7	28	44.	37.85	6
Outside 0.50 Miles	Outside 0.50 Miles	Within 1.00 Miles	None	Data Not Available	No Data	-10	10	10	0	30	20	-2	-10	100	0	10	0	-10	-31.75	39.5	0	-4.5	-5	-0.35	2
Outside 0.50 Miles	Outside 0.50 Miles	Within 0.25 Miles	None	Data Not Available	No Data	-10	10	70	0	30	20	-2	-10	100	0	10	0	0	-27.25	39.5	0	30	25	13.45	3
Outside 0.50 Miles	Outside 0.50 Miles	Outside 0.50 Miles	Paved	Data Not Available	No Data	-10	10	40	0	30	20	-2	-10	100	50	-2	0	0	-29.5	39.5	8.75	6	32.	11.45	3
Outside 0.50 Miles	Outside 0.50 Miles	Within 0.10 Miles	Paved	Data Not Available	No Data	-10	10	10	0	65	60	-2	-10	100	50	-2	0	0	-25	66.75	8.75	21.5	32.	20.9	4
Outside 0.50 Miles	Outside 0.50 Miles	Outside 0.50 Miles	Paved	Data Not Available	No Data	-75	10	40	0	65	20	-2	-10	100	50	0	0	-10	-14.5	58.75	8.75	-10	2.5	9.1	2
Outside 0.50 Miles	Outside 0.50 Miles	Within 0.10 Miles	Paved	Data Not Available	No Data	-10	10	10	0	65	20	-2	-10	100	50	0	0	0	-25	58.75	8.75	24.5	32.	19.9	3
Outside 0.50 Miles	Outside 0.50 Miles	Outside 1.00 Miles	None	Data Not Available	No Data	-10	10	-2	0	10	60	-2	-10	100	0	0	0	0	-34	86	0	4	25	16.2	3
Outside 0.50 Miles	Outside 0.50 Miles	Outside 1.00 Miles	None	Data Not Available	No Data	-10	10	-2	0	10	60	-2	-10	100	0	0	0	0	-34	86	0	4	25	16.2	3
Outside 0.50 Miles	Outside 0.50 Miles	Outside 1.00 Miles	Paved	Data Not Available	No Data	-10	10	10	0	30	20	-2	-10	100	50	0	0	0	-15	86	6.15	4	25	13.5	3
Outside 0.50 Miles	Outside 0.50 Miles	Outside 1.00 Miles	None	Data Not Available	No Data	-10	10	-2	0	30	20	-2	-10	100	0	10	0	-10	-34	39.5	0	-10.5	-5	-2	1
Outside 0.50 Miles	Outside 0.50 Miles	Within 0.50 Miles	None	Data Not Available	No Data	-10	10	10	0	30	20	-2	-10	100	0	0	0	-10	-28	39.5	0	-10.5	-5	-2	1
Outside 0.50 Miles	Outside 0.50 Miles	Within 0.25 Miles	None	Data Not Available	No Data	-10	10	70	0	30	20	-2	-10	100	0	0	0	-10	-27.25	39.5	0	-7.5	-5	-0.05	2
Outside 0.50 Miles	Outside 0.50 Miles	Outside 1.00 Miles	Paved	Data Not Available	No Data	-75	10	-2	0	10	10	-2	-10	100	50	0	0	0	-19	94	8.75	4	32.	24.05	4
Outside 0.50 Miles	Outside 0.50 Miles	Outside 1.00 Miles	Paved	Data Not Available	No Data	-10	10	-2	0	30	20	-2	-10	100	50	-2	0	-10	-34	39.5	8.75	-28.5	2.5	-2.35	1
Outside 0.50 Miles	Outside 0.50 Miles	Outside 0.25 Miles	Paved	Data Not Available	No Data	-10	10	70	0	30	20	-2	-10	100	50	0	0	-10	-27.25	39.5	8.75	-7.5	2.5	3.2	2
Outside 0.50 Miles	Outside 0.50 Miles	Within 0.50 Miles	None	Data Not Available	No Data	-75	10	40	0	30	-2	-2	-10	100	0	10	0	-10	-14.5	31.5	0	1.5	-5	2.7	2
Outside 0.50 Miles	Outside 0.50 Miles	Outside 0.50 Miles	None	Data Not Available	No Data	70	10	40	0	10	60	-2	40	100	0	0	0	40	72.5	86	56	25	37	55.3	8
Outside 0.50 Miles	Outside 0.50 Miles	Within 1.00 Miles	None	Data Not Available	No Data	10	10	10	0	10	60	-2	40	100	0	0	0	40	34.25	86	56	19	37	46.45	7
Outside 0.50 Miles	Outside 0.50 Miles	Within 1.00 Miles	Turn Lane	Data Not Available	No Data	-75	10	10	0	30	-2	-2	-10	100	-10	-2	0	-10	-16.75	31.5	-17.5	-22.5	-20	-9.05	1
Outside 0.50 Miles	Outside 0.50 Miles	Within 0.25 Miles	Paved	Data Not Available	No Data	70	10	70	0	10	60	-2	-10	100	50	0	0	-10	74.75	86	8.75	-0.5	2.5	34.3	5

RAW VALUES → **CONVERTS TO SCORES**

We score each roadway segment quality as a table attribute (example: speed limit) on a -100 to 100 scale. See the next slide as an example.

Scoring Details (Methodology)



East Central Florida Regional Planning Council
Safe Routes Portal
Route Condition Analysis Tool
Methodology Report – Volume D

2014



Roadway Width (total travel lane width, outside edge to outside edge including median)

The maximum score for roadway width in the Route Condition Analysis is set on a "neighborhood scale", which includes all neighborhood roads and a 37-foot width threshold. The 37-foot width threshold was chosen as a number to represent a roadway with two ten-foot travel lanes and room for two 7.5-foot parallel parking lanes on each side of the road. This number would also include yield streets, two-lane roads with medians, and specific case studies within the East Central Florida region. One case study utilized for the 37-foot threshold was Park Avenue, located in Winter Park, Florida, which is 37-feet wide and is among the most-walkable roads in the region. From the 37-foot threshold, scoring generally decreases for each roadway segment as 5 to 15 feet are added to the total roadway width. As total roadway width becomes larger, the increments between scoring also become larger.

Number of Lanes

The Route Condition Analysis allows for roadways to achieve their "best possible score" by isolating scoring variables separately. Therefore, the team utilized the four-lane threshold as the basis between a positive-scoring roadway and a negative-scoring roadway. While many four-lane roadways are unsafe for pedestrians, the roadway conditions (such as sidewalks, medians, or pedestrian refuge areas) can allow for these roadways to manage pedestrian and automobile traffic simultaneously. One to two-lane roads achieved the maximum score, while three lane roads and four lane roads represent the other two positive-scoring categories. However, once a roadway becomes five lanes wide (or wider), the possibility for turn lanes and other pedestrian-obstructive infrastructure becomes more common.

Traffic Signal

Traffic signals utilized a proximity parameter, with the one-mile buffer as the divider between positive and negative-scoring roadway networks. The justification behind this is that cars without a traffic signal within a one-minute drive (one mile at 60 miles per hour) tend to drive faster due to the absence of traffic obstacles on the roadway. Scoring breakdowns go to the half-mile, quarter-mile and tenth-of-a-mile proximities.

Annual Average Daily Traffic

According to the Bike Way Design Guide (http://bikeplan.org/BikewayDesignGuide_DRAFT.pdf), published by Cross County Connection based off of recommendations from FHWA's Proven Safety Countermeasures, roadways with less than 20,000 annual average daily traffic (AADT) counts are the best candidates for multi-modal usage. Since roadways below the 20,000 AADT threshold can hold infrastructure including bicycle lanes and other non-automotive features, roadways with AADT counts below the 20,000 threshold will be scored in the positive range within the Route Condition Analysis, as a major goal of the project is to identify roadways that can implement bicycle and pedestrian-oriented infrastructure. From the 20,000 threshold, scoring thresholds will range from 5,000 to 10,000 daily trips between categories, as roadways in the region reach or exceed 100,000 and others do not exceed 5,000.

Sidewalks

Sidewalks were a fairly straightforward roadway feature to score, with three options for scoring: 1) No Sidewalks, 2) Sidewalk on one side, and 3) Sidewalk on both sides. However,

since sidewalks are context-specific, the project team chose to classify "Rural" and "Urban" roadways based on the "Roadway Classification" system adopted by Lake County in 2009. Scoring for roadways with sidewalks on both sides will achieve the maximum score, while roadways with a sidewalk on one side will achieve a positive score; however, for roadways with no sidewalks, the project team scored roadways based on whether they were classified as "Rural" or "Urban". For rural roadways with no sidewalks, a neutral score of '0' will be given. However, for urban roadways with no sidewalks present, the maximum negative (or minimum) score will be given to the roadway.

Medians

Data received for medians had three categories: Grass Medians, Paved Medians, and Turn Lanes. Grass medians were scored the highest, as they have the highest degree of visibility to automobiles and can provide a good pedestrian refuge, while paved medians were scored highly due to their ability to create a refuge area for pedestrians. Turn lanes (or "Slide Lanes") that allow for travel were included in the dataset provided by FDOT, and has a negative score since these areas do not provide adequate pedestrian safety features. Also, this information is not factored into the "Number of Lanes" data provided by FDOT. Finally, roadways with no medians will receive a neutral score of '0' for this category.

Paved Shoulders

The presence of paved shoulders on roadways offers refuge for bicyclists. For this scoring category, roadway segments with paved shoulders on both sides received the maximum score, roadways without shoulders received 0 points (neutral), while roadways with paved shoulders on one side received a negative score due to the fact that a paved shoulder on the wrong (or dangerous) side of a roadway could require a pedestrian to put themselves into a dangerous or life-threatening situation.

Lighting

Lighting scores in the Route Condition Analysis are based off of a 200-foot proximity, with roadway segments within 200-feet of light poles receiving the maximum score of 100. Roadway segments not within 200 feet of light poles were given a score of 0 (neutral) due to the fact that lighting data was not available countywide. The 200 foot proximity was derived from an average light pole height of 30 feet, alongside the application of the "4 Times Rule" applied in many jurisdictions (20 feet multiplied by 4 equals 200 feet).

Crossing Guards

Scoring for crossing guard proximity was based a quarter-mile and a half-mile radius from the crossing guard. Roadways not within a half-mile of crossing guards were given a neutral score of 0, as the absence of crossing guards does not necessarily represent a negative roadway feature.

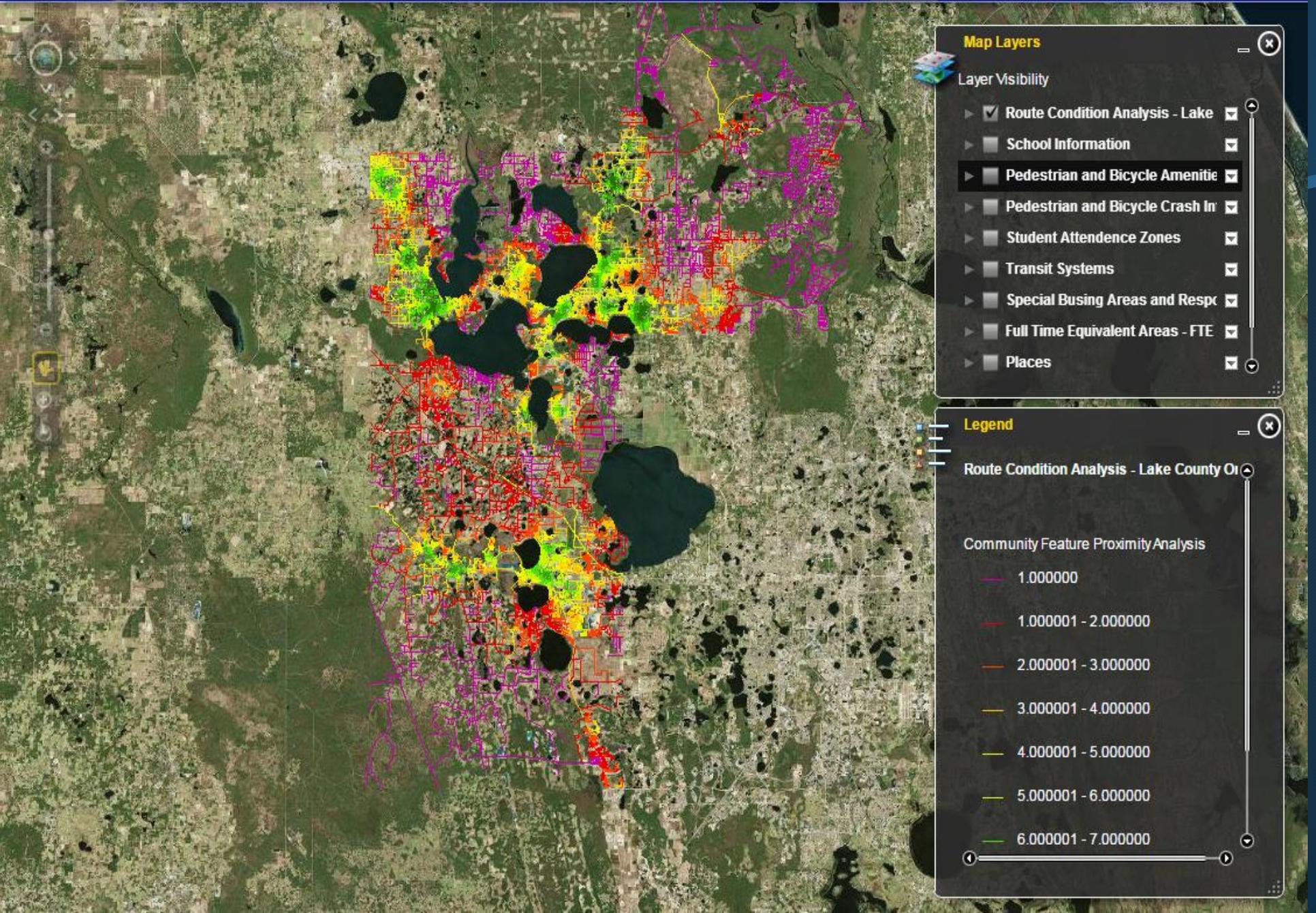
Transit Stop Proximity

Scoring for transit stop proximity was based off of the distance equivalent to 3 and 10-minute walks, or respectively, a quarter-mile and a half-mile radius from the transit stop. Roadways outside of these proximities were given a slightly negative score due to their limited ability to function as a multi-modal roadway.

The Methodology Report details the scoring decision-making process



SRTS Route Condition Interactive Map



Map Layers

Layer Visibility

- Route Condition Analysis - Lake
- School Information
- Pedestrian and Bicycle Amenitie
- Pedestrian and Bicycle Crash In
- Student Attendance Zones
- Transit Systems
- Special Busing Areas and Respc
- Full Time Equivalent Areas - FTE
- Places

Legend

Route Condition Analysis - Lake County Or

Community Feature Proximity Analysis

- 1.000000
- 1.000001 - 2.000000
- 2.000001 - 3.000000
- 3.000001 - 4.000000
- 4.000001 - 5.000000
- 5.000001 - 6.000000
- 6.000001 - 7.000000

The End Product: Uses

- School site attendance zone analysis
- Hazardous Walking Conditions Identification (Lake County Schools)

STEP 3: FIND NEW HAZARDOUS CONDITIONS (BELOW)

C1 C1A: Select [INSERTSCRIPT]
C1A: Insert 'C1A' in "C1" IF Selected
C1B: Select "SPEED" < 30
C1B: Insert 'C1B' in "C1" IF Selected

C1X1: Create Fields "C1X1AQA" and "C1X1BQA" and "C1X2QA"
C1X1: Query ("SPEED" > 30 AND "SPEED" < 50) AND "C1" <> 'C1A' AND "C1" <> 'C1B'
C1X1: Select "PAVED_SHLD" = 'Both Sides'
C1X1: Insert 'PS' in "C1X1AQA" IF Selected
C1X1: Select "SIDEWALK" = 'Both Sides'
C1X1: Insert 'SW' in "C1X1BQA" IF Selected
C1X1: Select "C1X1AQA" = 'PS' OR "C1X1BQA" = 'SW'
C1X1: Insert 'QA BUFFER' in "C1X2QA" IF Selected
C1X1: Select "SIDEWALK" = 'One Side' OR "PAVED_SHLD" = 'One Side' OR "C1" = ""
C1X1: Insert 'QA BUFFER' in "C1X2QA" IF Selected
C1X2: Select "C1X2QA" = 'QA BUFFER'
C1X2: Overlay Aerial and Earth for Ground QA (Uncurbed Only; 4 foot surface with 3 foot buffer required)
C1X2: Insert 'C1X' in "C1" IF Ground QA Failure

C1Y1: Create Fields "C1Y1AQA" and "C1Y1BQA" and "C1Y2QA"
C1Y1: Query "SPEED" >= 50 AND "C1" <> 'C1A' AND "C1" <> 'C1B' AND "C1" <> 'C1X'
C1Y1: Select "PAVED_SHLD" = 'Both Sides'
C1Y1: Insert 'PS' in "C1Y1AQA" IF Selected



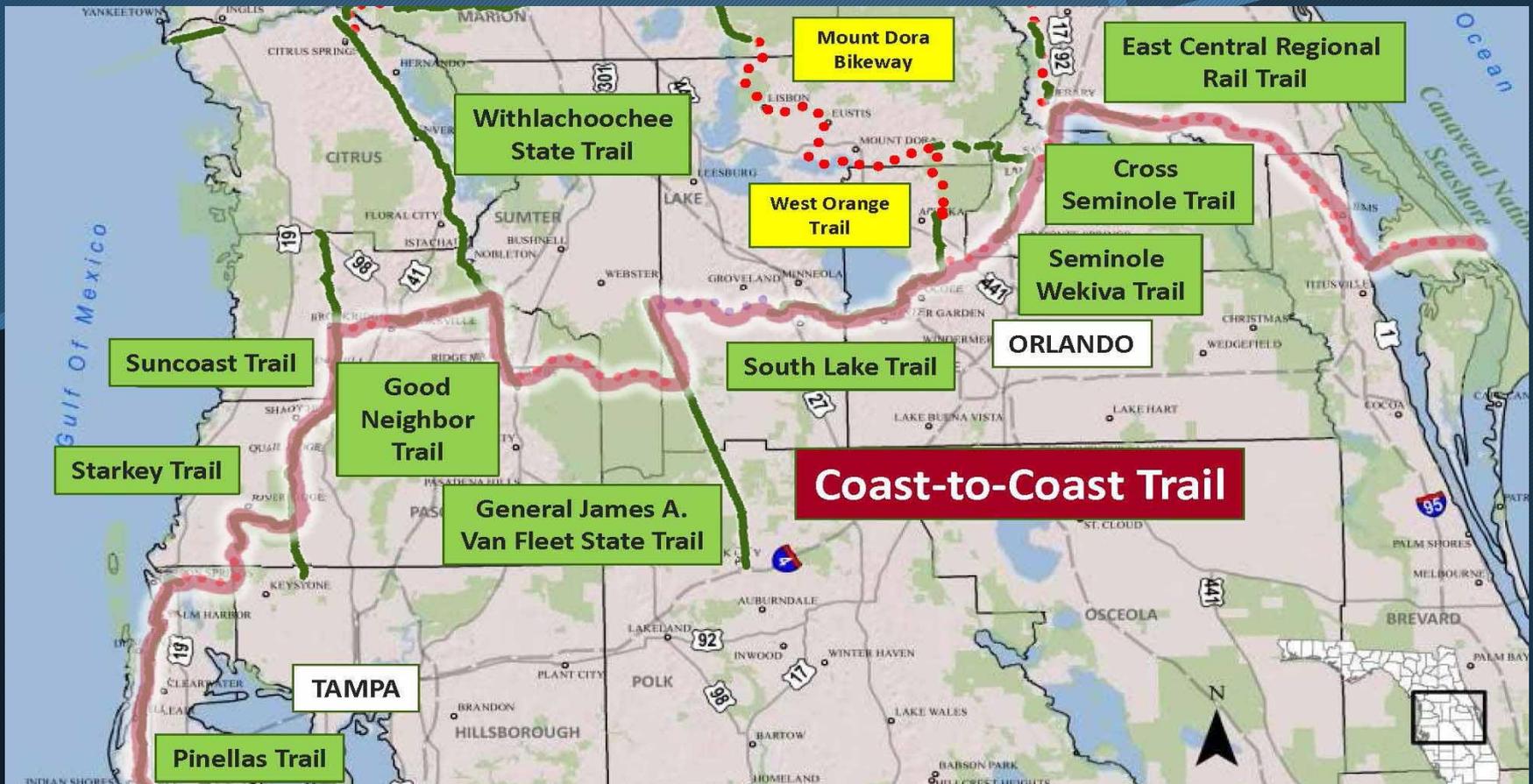
The End Product: Uses

- Crash overlay and variable correlation based on roadway scoring. This allows for statistical analysis for roadway improvement needs

Score	# Crashes	% Crashes	Cumulative % of Crashes	Bottom Percentile of Score	CRASH INCIDENCE
1	4	2.04%	2.04%	0.23%	8.873114463
2	37	18.88%	20.92%	3.01%	6.949623703
3	27	13.78%	34.69%	5.45%	6.365849092
4	12	6.12%	40.82%	8.77%	4.654085123
5	8	4.08%	44.90%	12.32%	3.644314869
6	21	10.71%	55.61%	15.33%	3.627674162
7	20	10.20%	65.82%	45.65%	1.441759617
8	33	16.84%	82.65%	84.52%	0.977911278
9	14	7.14%	89.80%	92.01%	0.975936511
10	20	10.20%	100.00%	100% (96.51 mean)	0.9651

The End Product: Uses

- Coast to Coast Trail --- Identification of secondary routes to trails and connection options.



The End Product: Uses

- **Prioritization of transit and infrastructure projects**
 - Corridor studies & master planning
 - Bird's eye view for key decision makers



PROXIMITY SCORE

Depicts usage of roadway based on the proximity of community assets and places of interest

ROADWAY SCORE

Determines the effectiveness of the roadway (on a 1-10 scale) based on PEDSAFE criteria.

Thank You!

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