

At-Risk Pedestrians in the Right-of-Way

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Outline

- Introduction
- Perceptions and Risks
- NC Statistics
- Case Study Examples
- Resources and Potential Solutions



What We Ask of You

- Content
- Graphics
- Layout
- Case Studies/Examples

Introduction

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Objective

- Conduct outreach with community leaders to better relay rail safety issues related to pedestrians in the right-of-way while providing resources that can help “close the gap”.

Who is At-Risk?

- Anyone in the Right of Way (ROW)
- ROW?
 - Most established under General Railroad ROW Act of 1875
 - Land owned by the railroad where the tracks are constructed and trains actively run.
 - Typical ROW Width: 30' to 200'



Who is Walking in the ROW?

- Many diverse groups with single and multiple users



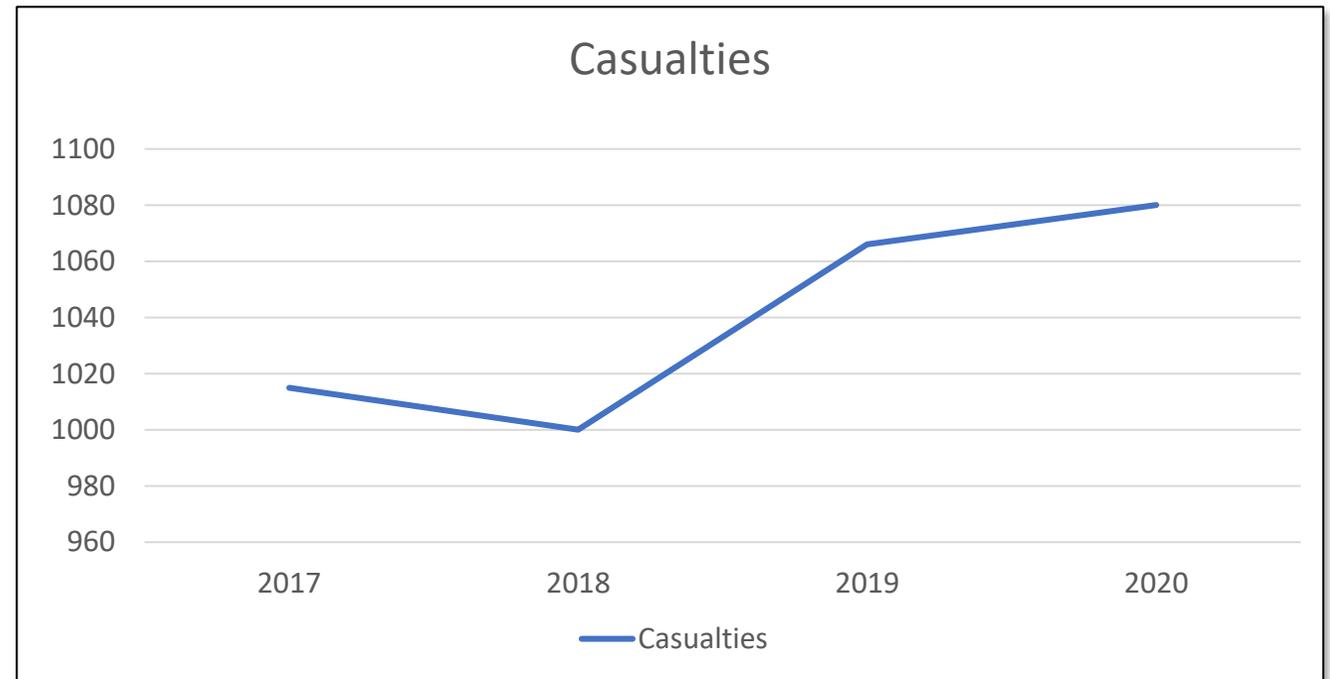
Who is Walking in the ROW?

- continued...



How many people are hurt?

- More than 1,000 reported people a year are killed or injured just by walking in the ROW.
- Likely underrepresented sample



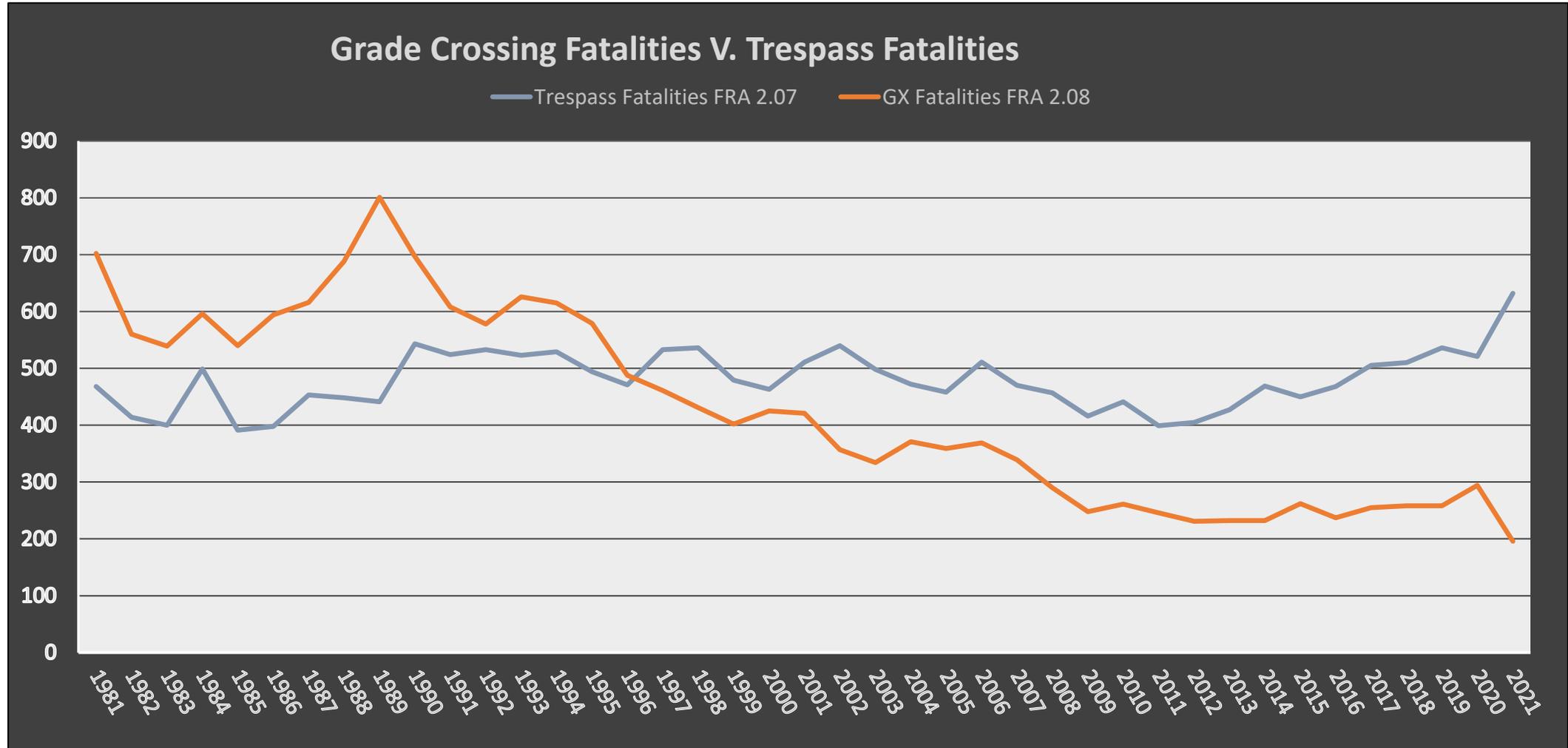
Source: FRA Counts

NCDETECT/NEMESIS Placeholder Slide



- North Carolina Disease Event Tracking and Epidemiologic Collection Tool
- National Emergency Medical Services Information System
- Goal: Use these records to evaluate F.R.A. counts of rail incidents

Fatalities by Type



Perception and Risks

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This is not a Victimless Act



Brown Line	Significant Delays
Green Line	Significant Delays
Orange Line	Significant Delays
Purple Line	Significant Delays
Pink Line	Significant Delays

The Victims Stories



Myth 1: Right-of-Way

- *Perception*
 - *“Walking across or down the railroad tracks or in the right-of-way is legal.”*
- **Truth**
 - Railroads are privately owned and cannot be used by pedestrians or any other modality.



Myth 2: Event Types

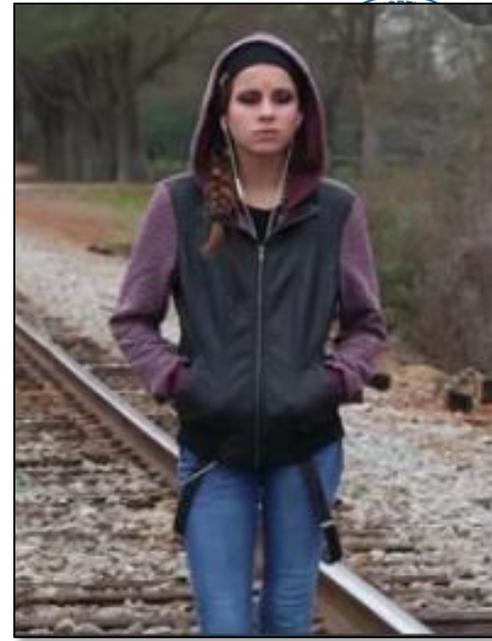
- *Perception*
 - *“Most casualties on the tracks are from homeless camps or suicide attempts!”*
- **Truth**
 - All kinds of people use rail lines for various reasons. Most just want to get somewhere using the quickest route.

Myth 2: Event Types, cont.

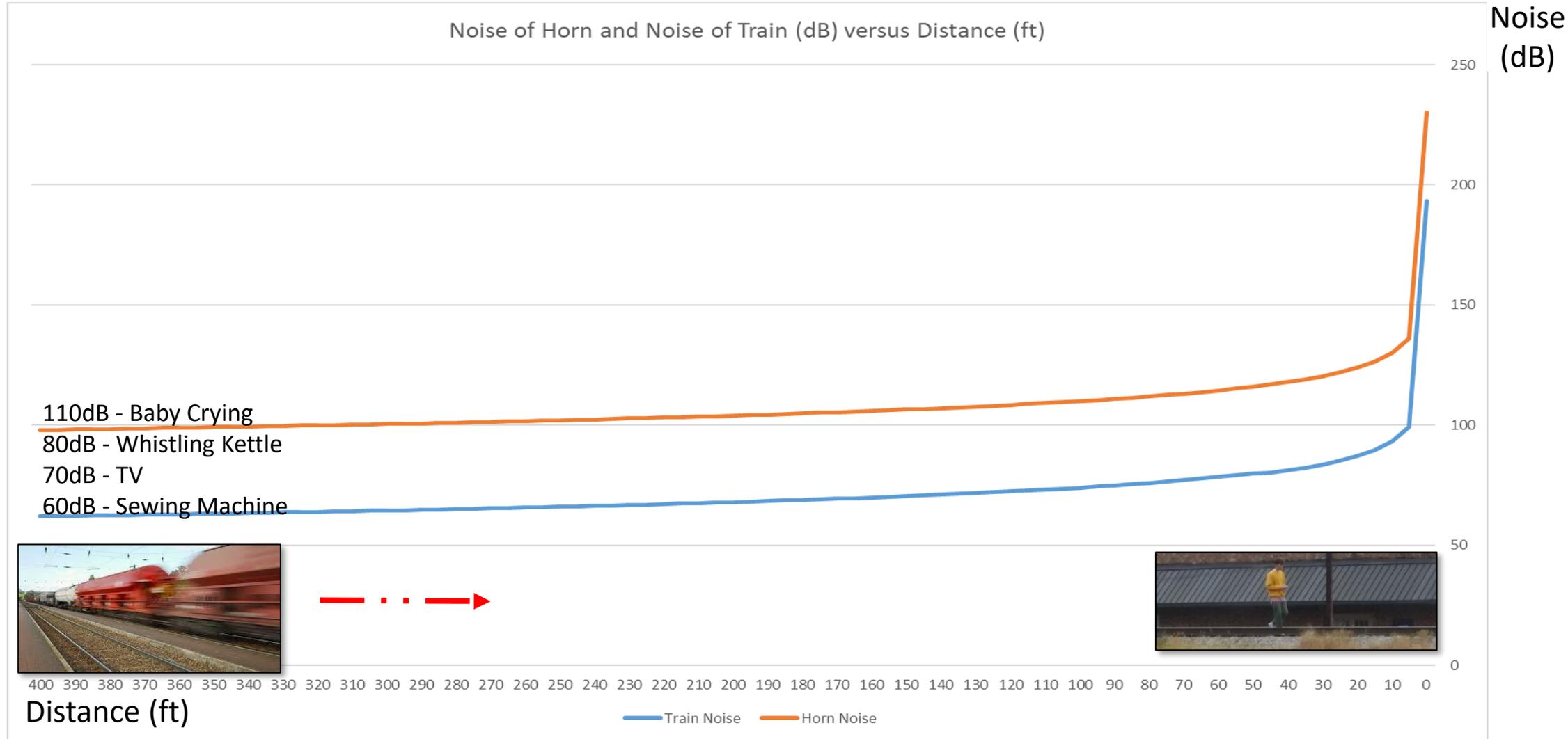
- Approximately 25% of pedestrians on the tracks are actually living on or around the rail ROW.
- Only 15-25% of pedestrian fatalities are related to suicide attempts
- Currently unknown how many non-fatal strikes take place.

Myth 3: Train Noise

- *Perception*
 - *“Trains are loud! You should have PLENTY of time to get out of the way!”*
- **Truth**
 - By the time a pedestrian hears an oncoming train, it may already be too late.



Myth 3: Train Noise, cont.



Video: Train Noise w/ Earbuds



Myth 4: Reaction Time

- *Perception*
 - *“If I hear or see a train, there is PLENTY of time to get out of the way!”*
- **Truth**
 - You may not actually see the train until it is too late!
 - Perception times ≈ 1.0 sec.
 - Reaction times ≈ 1.0 sec.
 - Walking speeds ≈ 4 fps ≈ 1.1 sec.
 - 3+ seconds needed to perceive, react, and get out of path

Myth 5: Train Speeds



- *Perception*
 - *“Trains are not that fast, there is PLENTY of time to get out of the way by the time I see it!”*
- **Truth**
 - Trains can legally go as fast as 79mph in some areas!
 - Trains can take more than a mile to stop.

Train Speed (mph)	Distance (ft. in 3 secs)
20	88
30	132
40	176
50	220
60	264
70	308
80	352

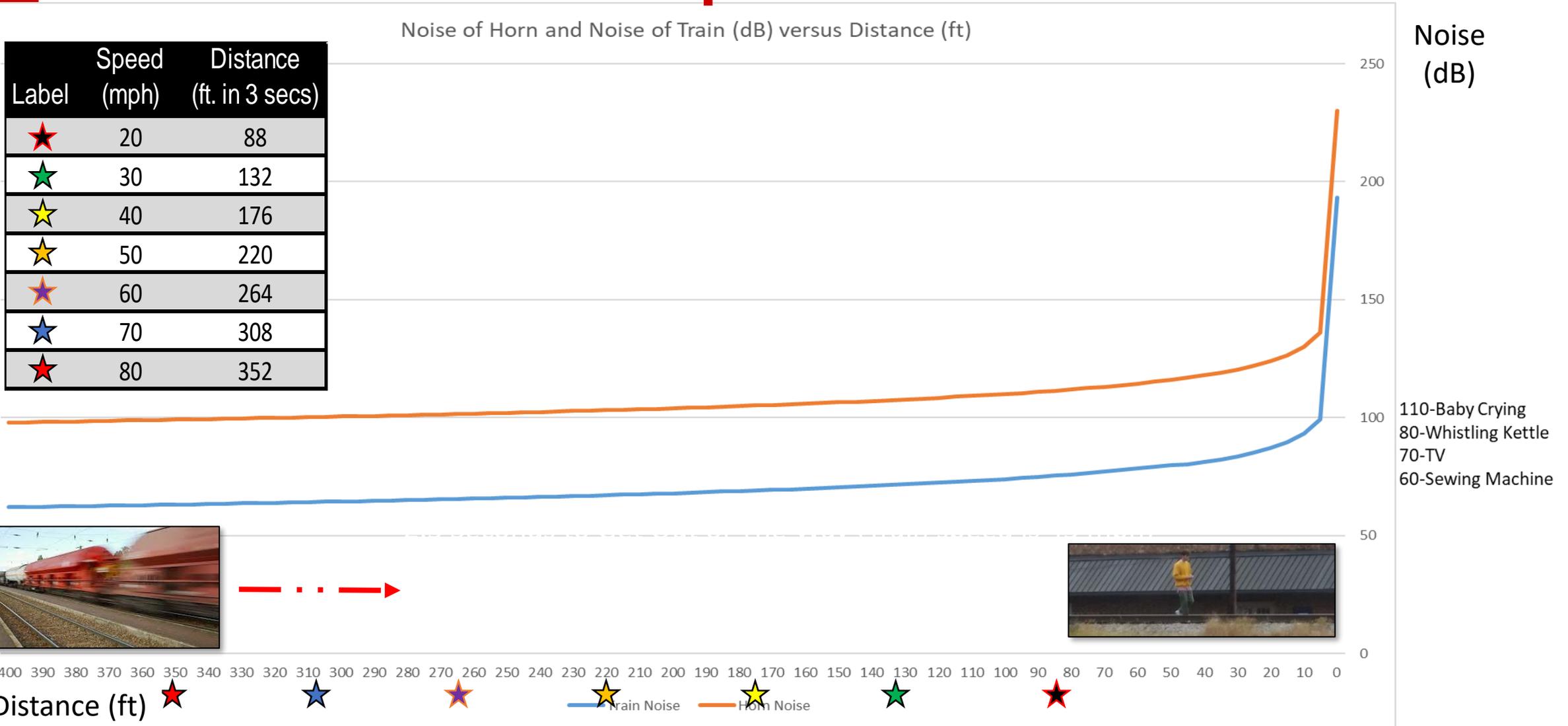


What do all these *perceptions* mean?

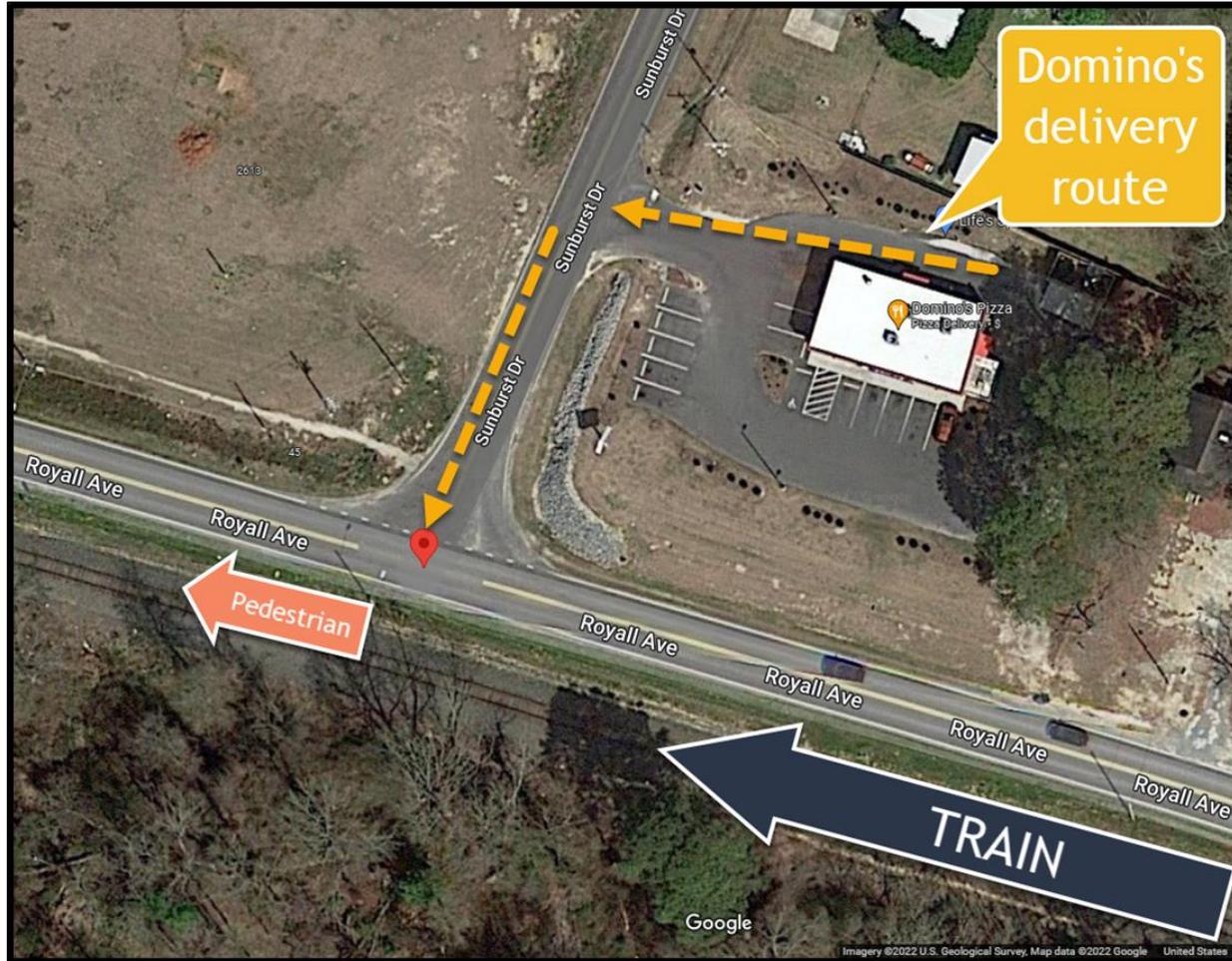
Train Noise vs. Perception/Reaction

Noise of Horn and Noise of Train (dB) versus Distance (ft)

Label	Speed (mph)	Distance (ft. in 3 secs)
★	20	88
★	30	132
★	40	176
★	50	220
★	60	264
★	70	308
★	80	352



Case Study Example



30 December 2021, 8:57 PM

Weather 64.9°F, Dew point 63°F, Visibility 800'

Train crew: “[the victim]... appeared out of the fog.”

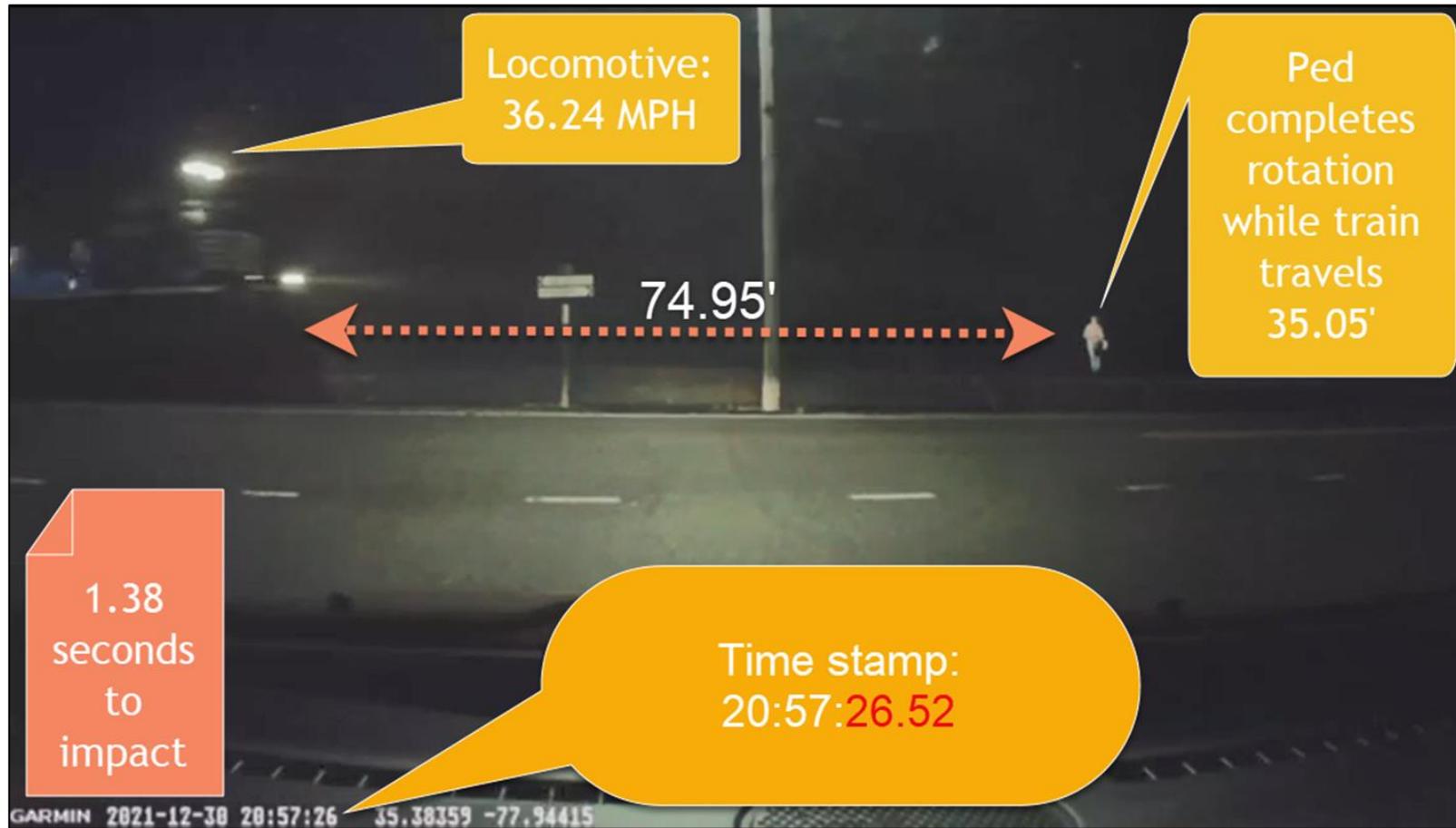
Witness: “[Conductor]... was sounding the horn.”

Locomotive (GE-AC 4400 CW) width-9’11”

Rail gauge (width) – 4’ 8½”

Train horn- 96 -110 dB(A) at 100’

Case Study Example....cont.



Case Study Example....cont.



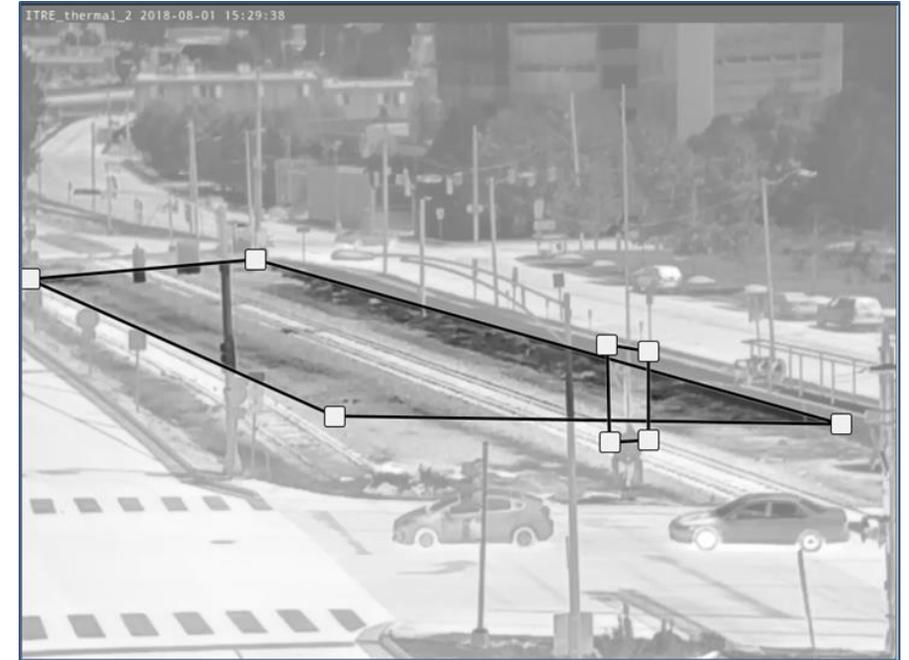
** Used w/ permission*

North Carolina Statistics

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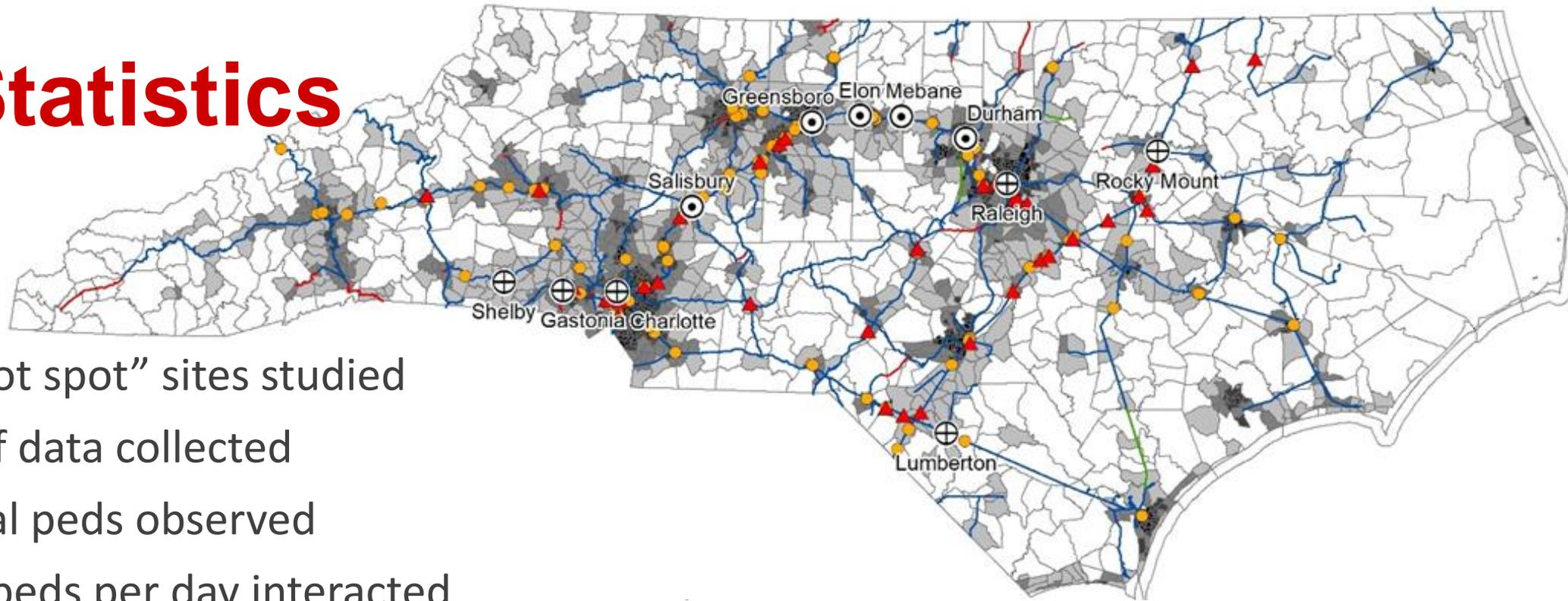
What's the true scope of the Issue?

- From 2018 to 2020, the Institute of Transportation Research and Education (ITRE) placed cameras in areas where pedestrians were suspected to cross the rails in North Carolina Communities
- 680 Days of Data were collected

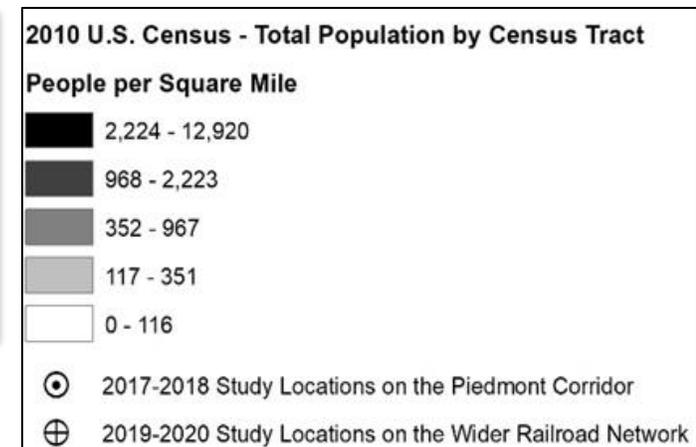
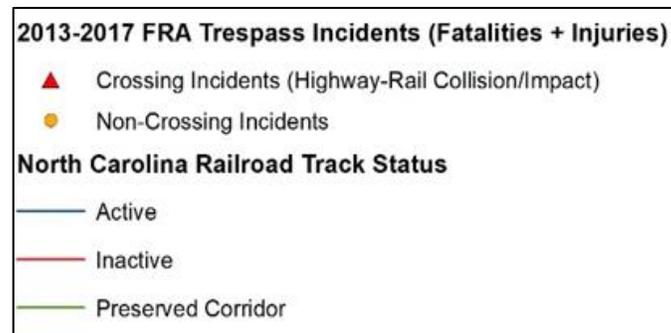


Detection Zone b/w Parking Deck and DPAC (Durham, NC)

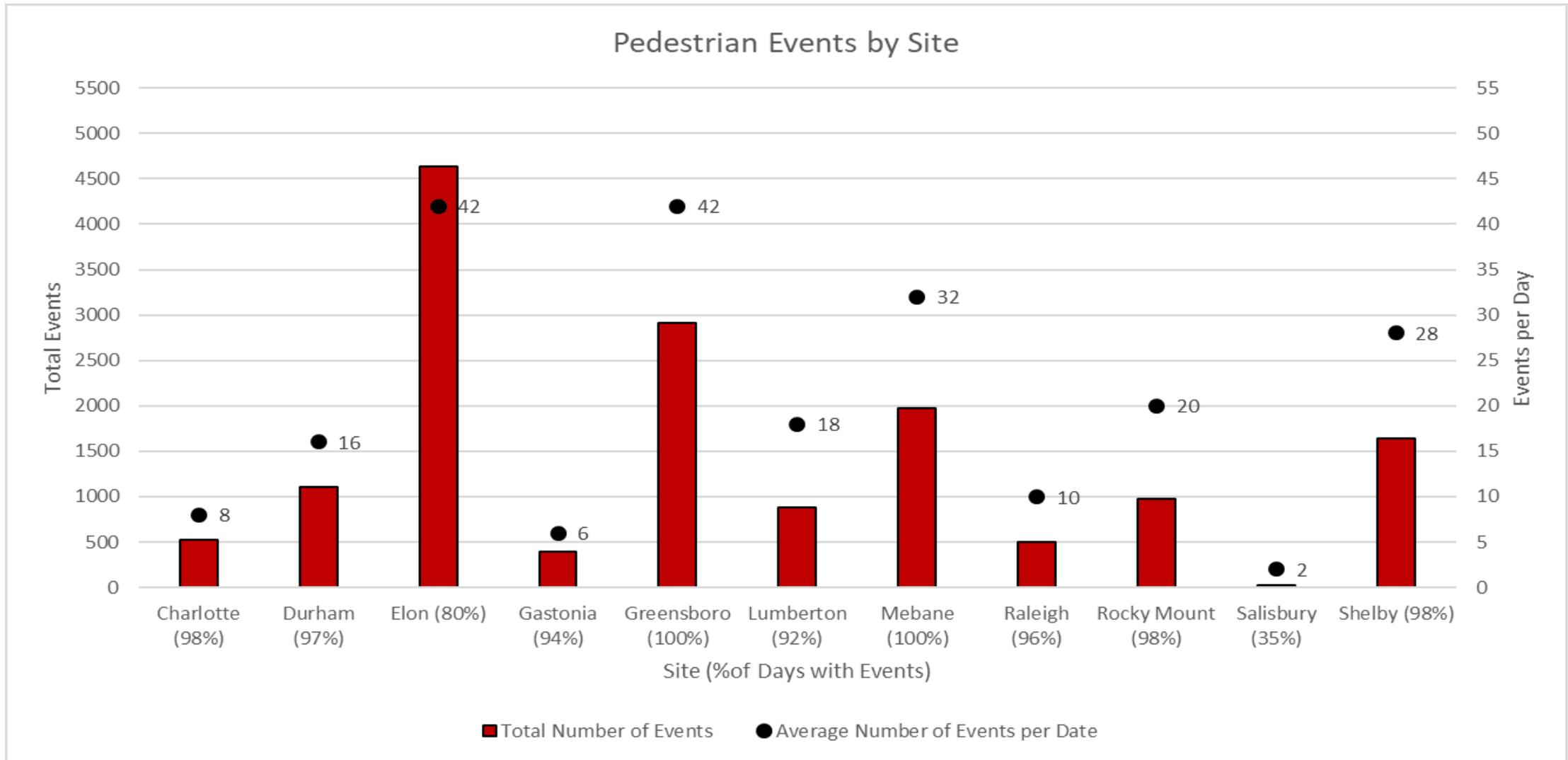
NC Statistics



- 11 total “hot spot” sites studied
- 680 days of data collected
- 15,570 total peds observed
- Avg. of 23 peds per day interacted with the Right of Way
- Median time for peds in the path of a train = 3 secs
- 100 near miss Interactions
- 65% single ped. events



Observed Peds in Rail ROW by Location



Time-of-Day

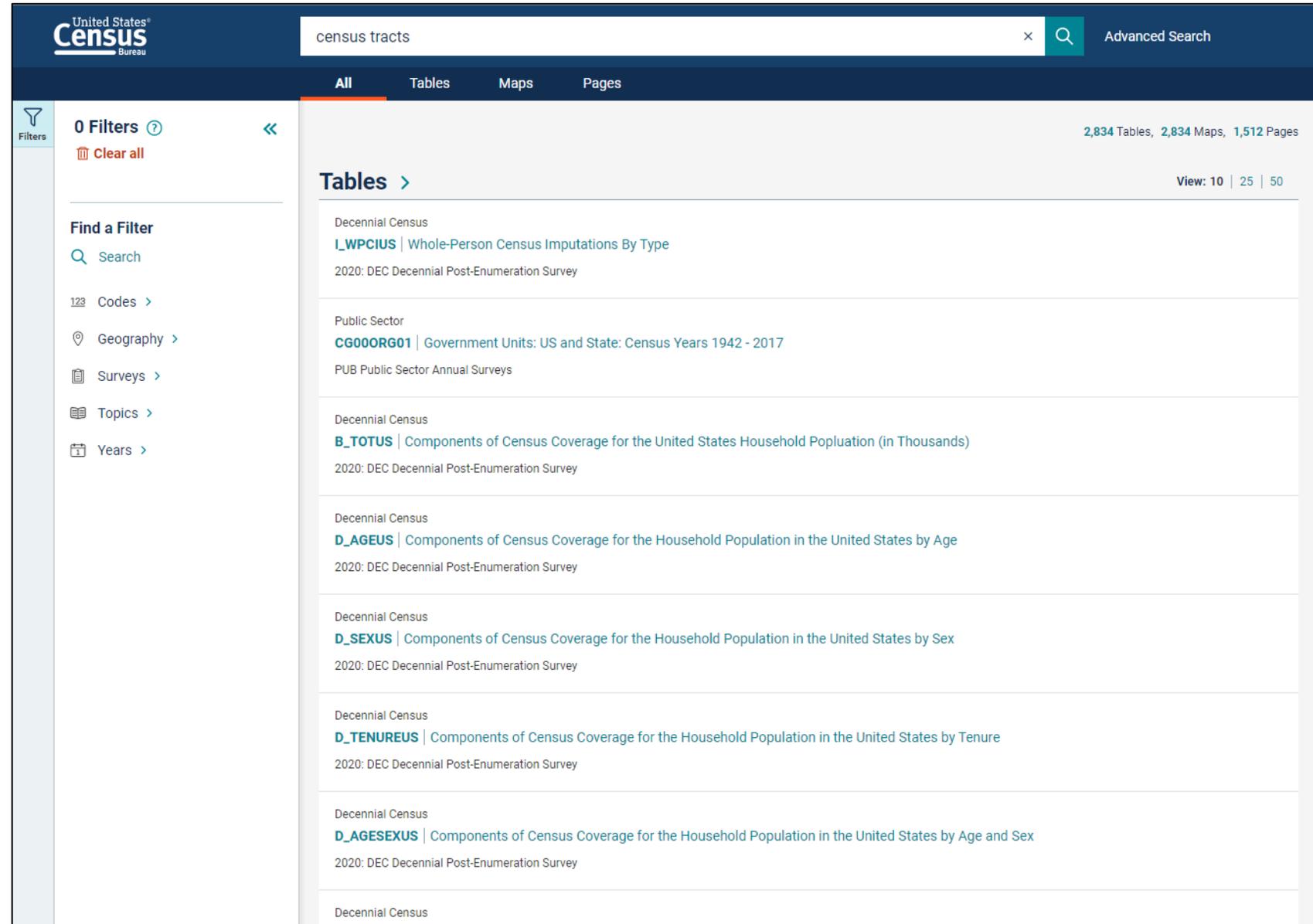
Site				
	6:00-11:00	11:00-4:00	4:00-9:00	
Charlotte	26%	31%	35%	8%
Durham	22%	38%	27%	13%
Elon	8%	18%	25%	48%
Gastonia	29%	35%	20%	15%
Greensboro	31%	29%	24%	16%
Lumberton	37%	33%	19%	11%
Mebane	24%	37%	32%	7%
Raleigh	21%	47%	26%	6%
Rocky Mount	23%	32%	29%	15%
Salisbury	11%	39%	25%	25%
Shelby	22%	28%	37%	13%

Estimating the Problem

- $EAD = 55.84(PNV) + 63.03(BDLIH) - 26.69(BDR) + 7.05(BDSS) + 20.98$
 - EAD – Estimated Average Daily Events (pedestrians/day)
 - PNV – Percent w/ No Vehicle that Walk to Work
 - BDLIH – Business Density in Low Income Housing (per 1,000 people)
 - BDR – Business Density (Retail Food, Grocers, Convenience) (per 1,000 people)
 - BDSS – Business Density (Social Services) (per 1,000 people)
- This model has been shown to be within 6.3 events of the average observed during the study

Estimating the Problem

- Census data is used in the model
 - data.census.gov
- Census tracts within 1-mile



The screenshot shows the United States Census Bureau website interface. At the top, there is a search bar with the text 'census tracts' and a search icon. To the right of the search bar is an 'Advanced Search' link. Below the search bar, there are navigation tabs for 'All', 'Tables', 'Maps', and 'Pages'. The 'All' tab is currently selected. On the left side, there is a 'Filters' section with '0 Filters' and a 'Clear all' button. Below this is a 'Find a Filter' section with a search bar and several filter categories: 'Codes', 'Geography', 'Surveys', 'Topics', and 'Years'. The main content area displays a list of tables under the heading 'Tables'. The first table is 'Decennial Census' with the identifier 'L_WPCIUS' and the title 'Whole-Person Census Imputations By Type'. The second table is 'Public Sector' with the identifier 'CG000RG01' and the title 'Government Units: US and State: Census Years 1942 - 2017'. The third table is 'Decennial Census' with the identifier 'B_TOTUS' and the title 'Components of Census Coverage for the United States Household Population (in Thousands)'. The fourth table is 'Decennial Census' with the identifier 'D_AGEUS' and the title 'Components of Census Coverage for the Household Population in the United States by Age'. The fifth table is 'Decennial Census' with the identifier 'D_SEXUS' and the title 'Components of Census Coverage for the Household Population in the United States by Sex'. The sixth table is 'Decennial Census' with the identifier 'D_TENUREUS' and the title 'Components of Census Coverage for the Household Population in the United States by Tenure'. The seventh table is 'Decennial Census' with the identifier 'D_AGESEXUS' and the title 'Components of Census Coverage for the Household Population in the United States by Age and Sex'. The eighth table is 'Decennial Census' with no identifier and no title. The top right corner of the page shows '2,834 Tables, 2,834 Maps, 1,512 Pages' and a 'View: 10 | 25 | 50' dropdown menu.

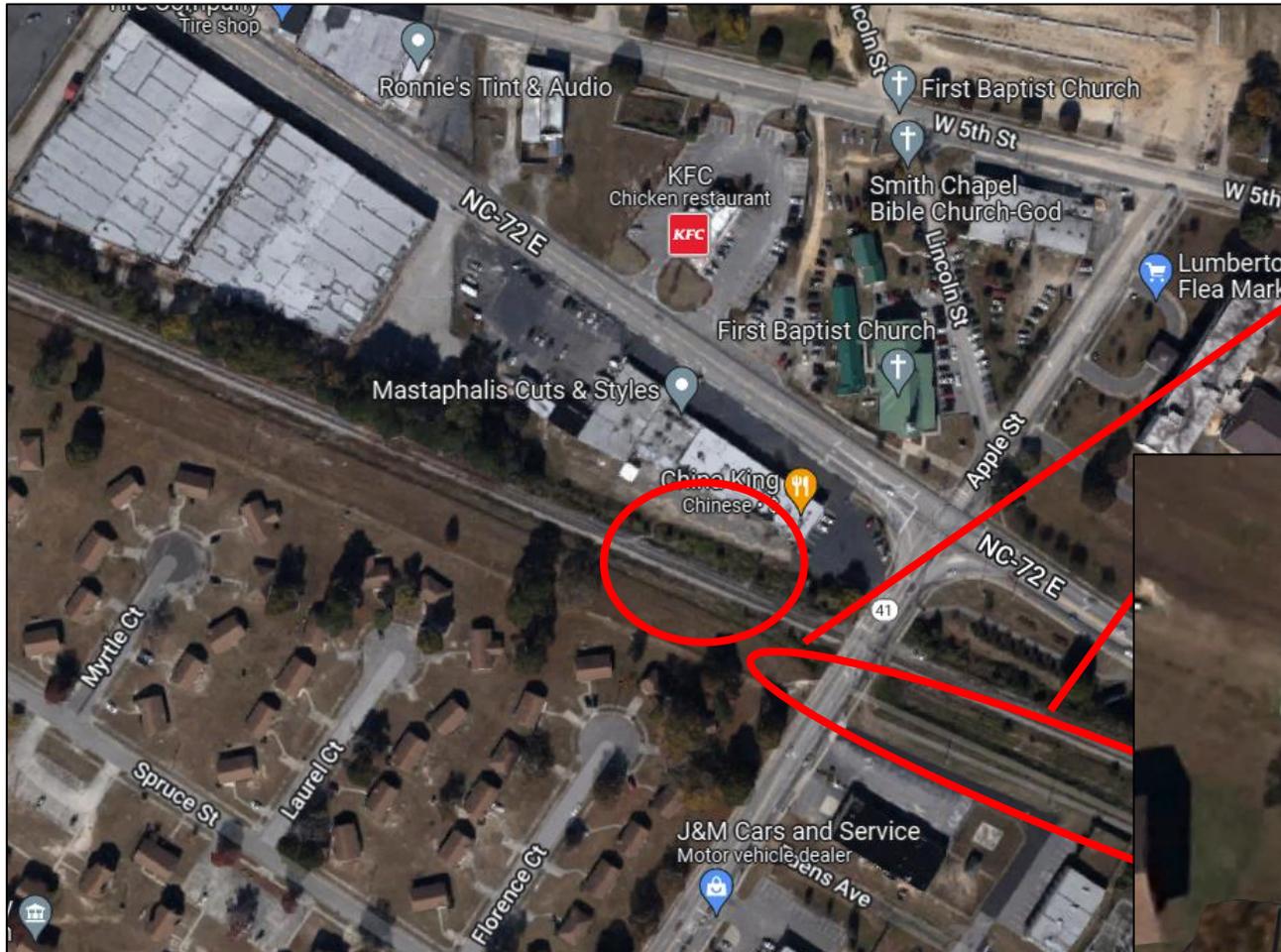
Case Study Examples

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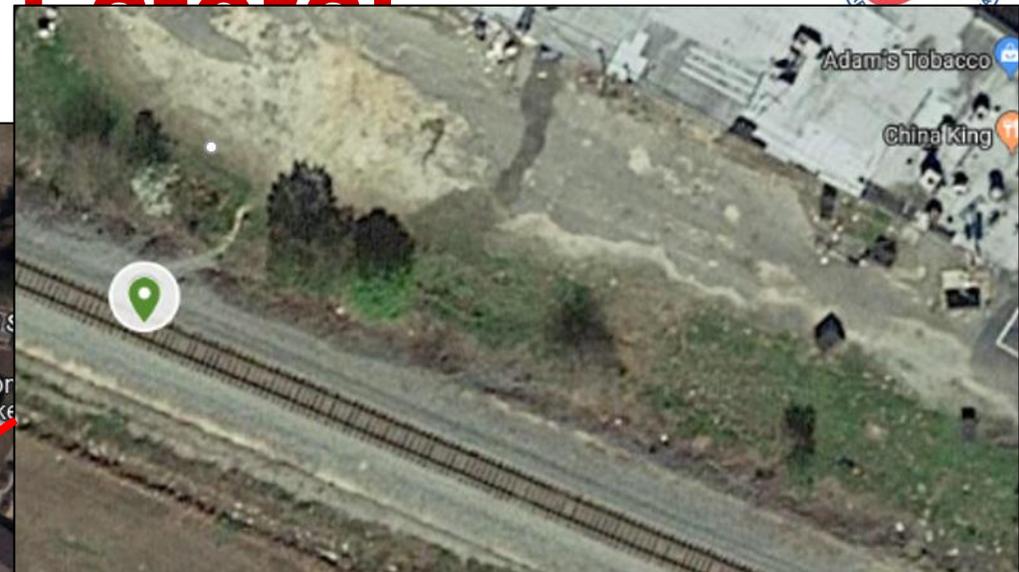
Why do People Take the Risk?

- It's the *shortest route* between origin and destination
- It is the *easiest route* for alternative modes such as walking.
- Perceived low risk
- Examples are not hard to find!

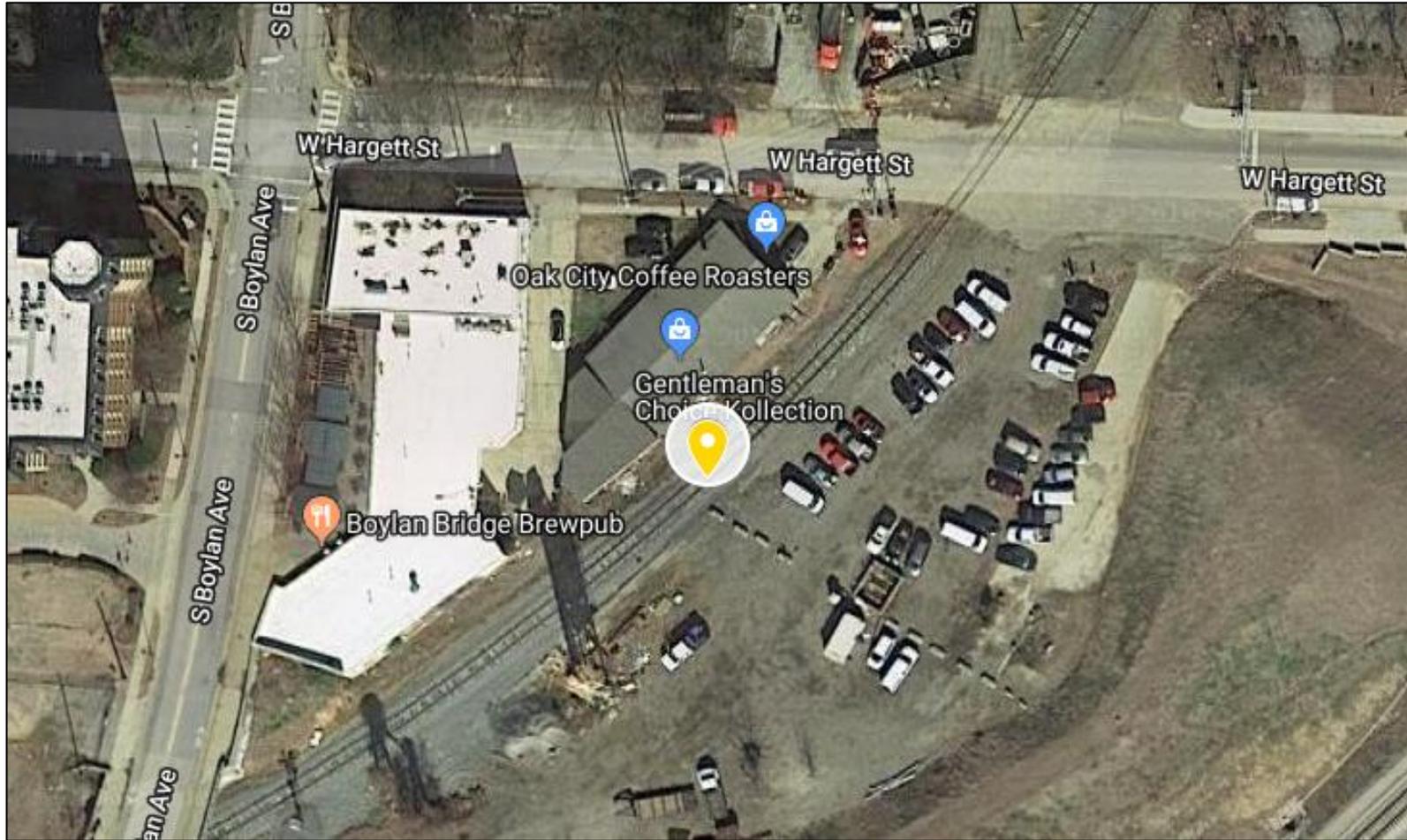
Example_Crossing and Lateral



Lumberton, NC



Example_Crossing (Poor Planning)



Downtown Raleigh, NC

Example_Crossing Location (NCSU)



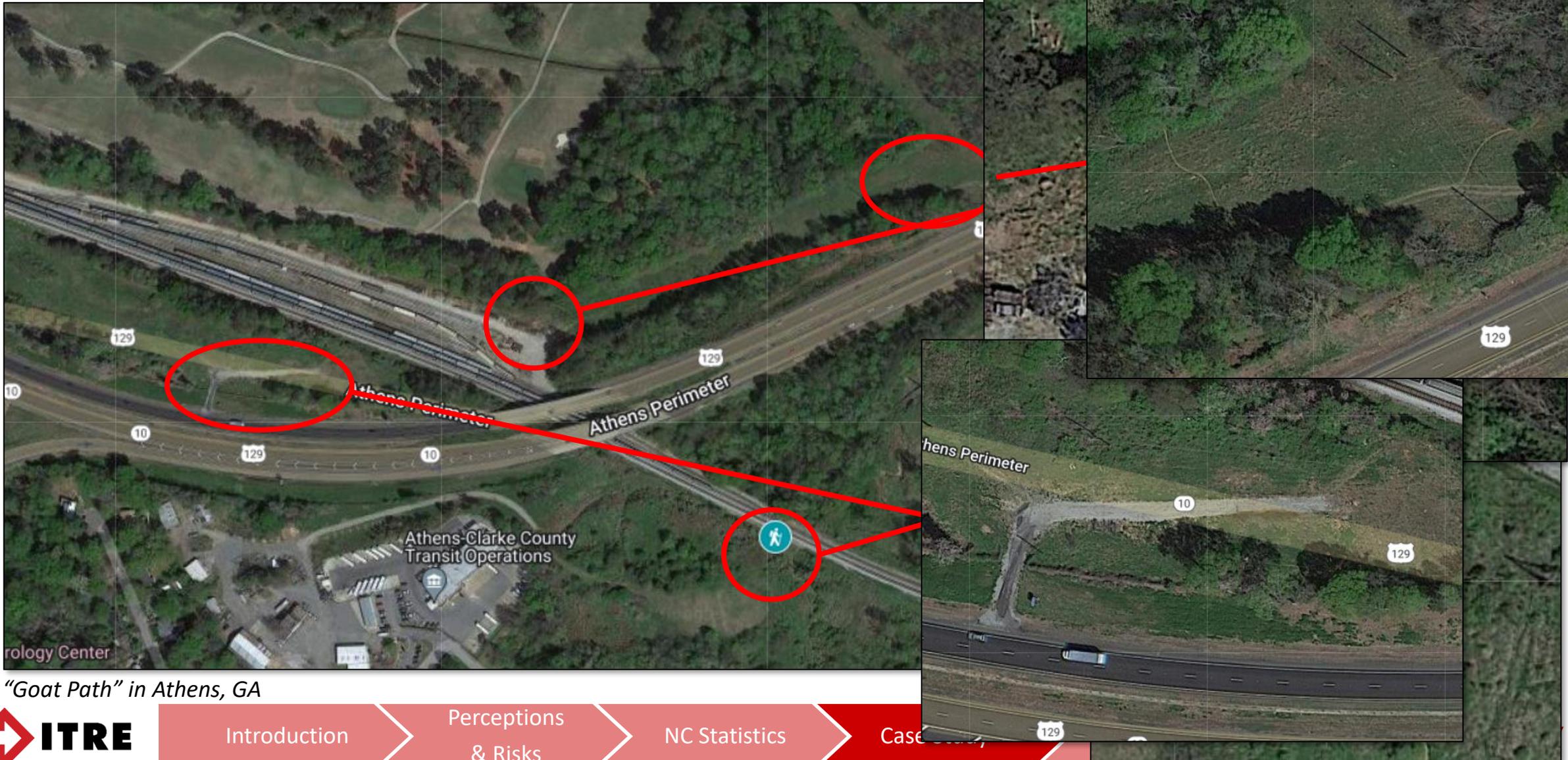
"Goat Path" near NC State Campus (Raleigh, NC)



How many expected events/day at NCSU?

- Using Model on Slide 32
- From census data:
- PNV: 27% (near a university, student workers captured)
- BDLIH(per 1000 people): 0.0246
- BDR (per 1000 people): 0.003462
- BDSS(per 1000 people): 0.003191
- EAD: 38 per day.

Example_Recreational Location



"Goat Path" in Athens, GA



Community Slide Placeholder

This slide is meant to showcase an area around or near the community holding the meeting/training. It will change depending if the community is in Greensboro, Elon, Charlotte, Star, etc...

Activity

- Using Google Maps Satellite data, find a railroad in your community. Scroll along the Right of Way until you find a goat path like in the previous slide.
- How long did it take?
- How would you use the number or pedestrian events at that site?

Resources

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What Can Be Done?

- Be involved in future planning efforts (zoning and construction, highways, rail, etc.)
- Contact NCDOT, rail owners, adjacent property owners, law enforcement
- Consider treatments
 - Fencing not a blanket solution
 - May be other possible treatments
- Education
- “Eduforcement” campaigns



Pedestrians Climbing Newly Installed Fence (Elon, NC)

Further Resources

- Operation Lifesaver - <https://oli.org/>
 - Operation Lifesaver in NC - <https://community.oli.org/state/nc#about>
- Rail Trespass Prevention F.R.A. - <https://railroads.dot.gov/highway-rail-crossing-and-trespasser-programs/trespassing-prevention/trespass-prevention>
- Be Rail Safe - <http://berailsafe.org/>



Acknowledgements

- NCDOT
- FRA
- Operation Lifesaver
- BeRailSafe

Errata