

FRA Inventory - Improving Data Quality

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Goals

- Recognize utility of quality data
- Promote awareness of OSM
- Showcase methods and benefits



Definitions

Highway-Rail Crossing – ...the location where one or more railroad tracks intersect with a public highway, road, street, or private roadway...

A crossing includes those tracks that lie within the same pair of warning devices.

OpenStreetMap.Org

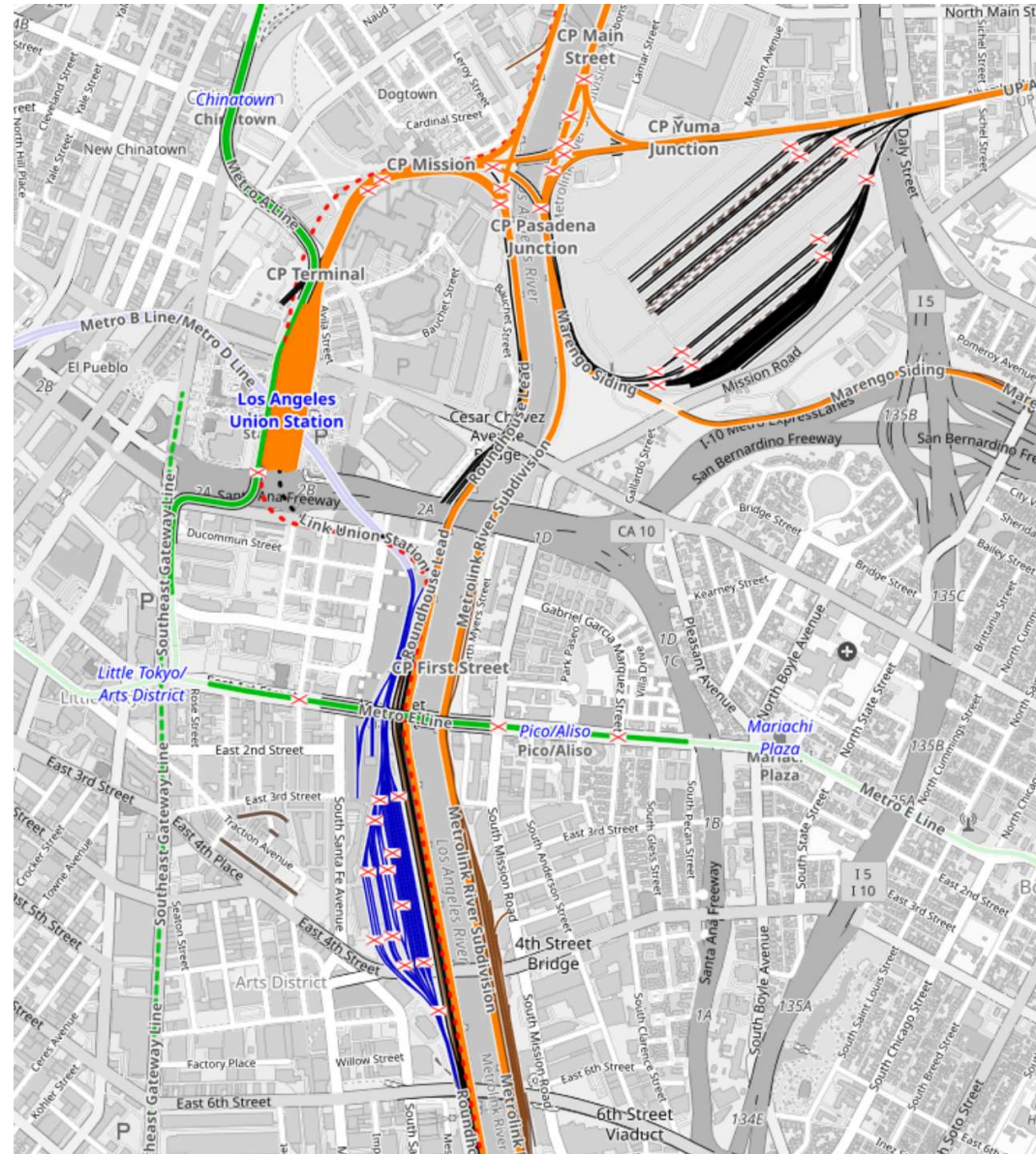
- Local Knowledge
- Community Driven
- Open Data

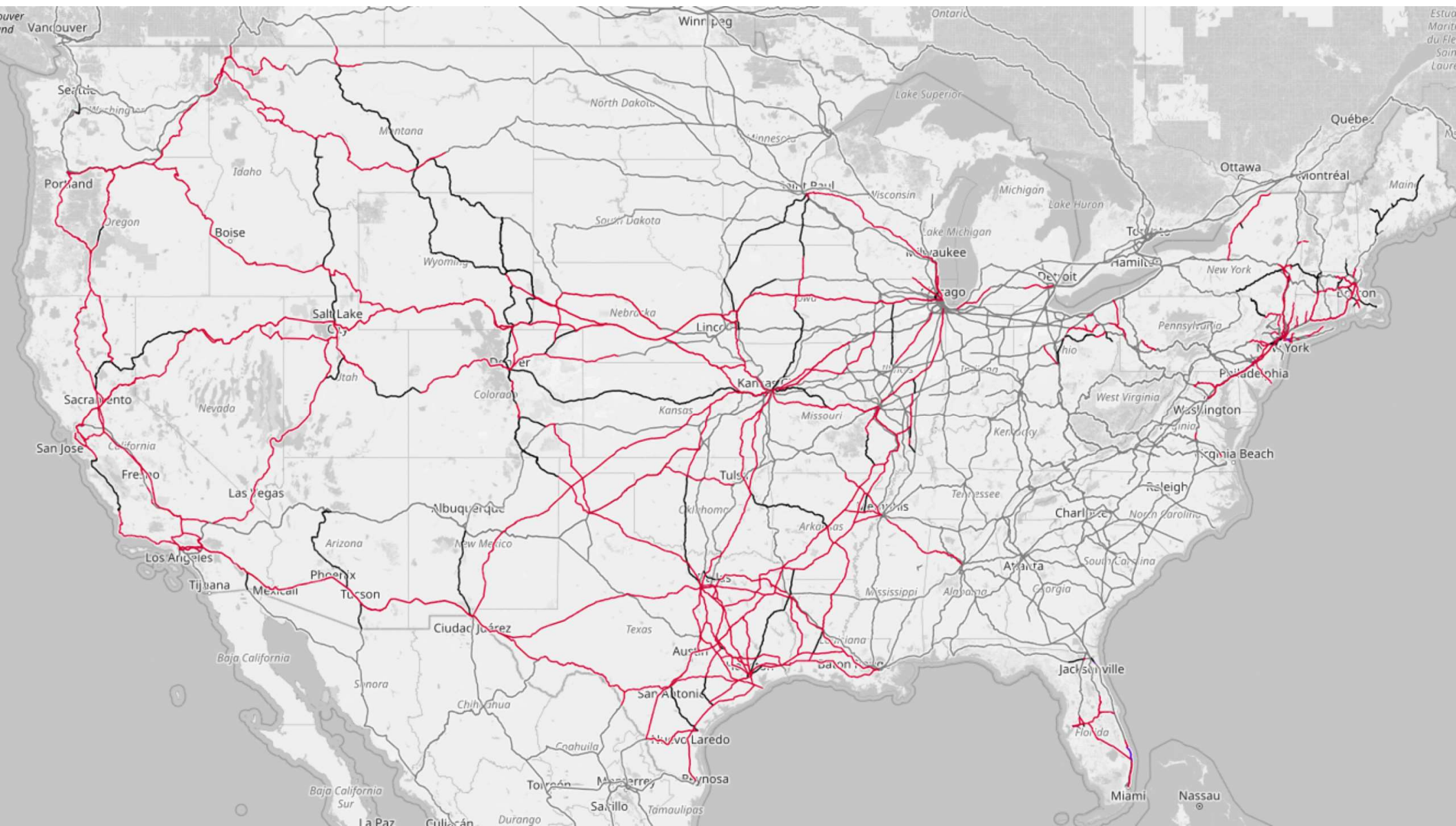


OpenStreetMap Foundation

OpenRailwayMap

- Robust tagging structure for railway infrastructure
- A subset of OpenStreetMap
- Accessible at openrailwaymap.org





What is a crossing?

Who's asking?



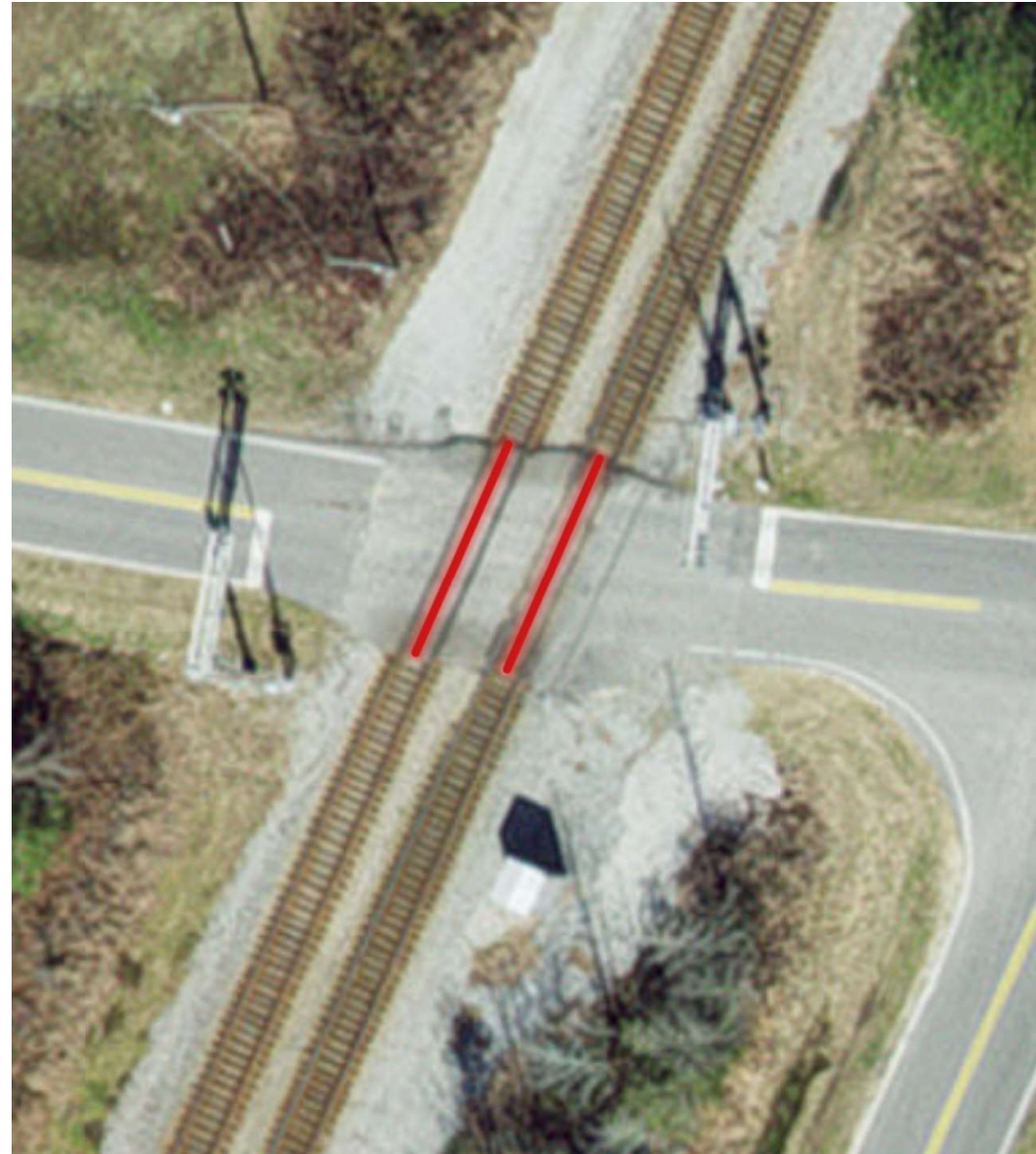
Crossing Inventory

- Single point
- No dimensions



PTC

- Start and end point
- One per track



OpenStreetMap

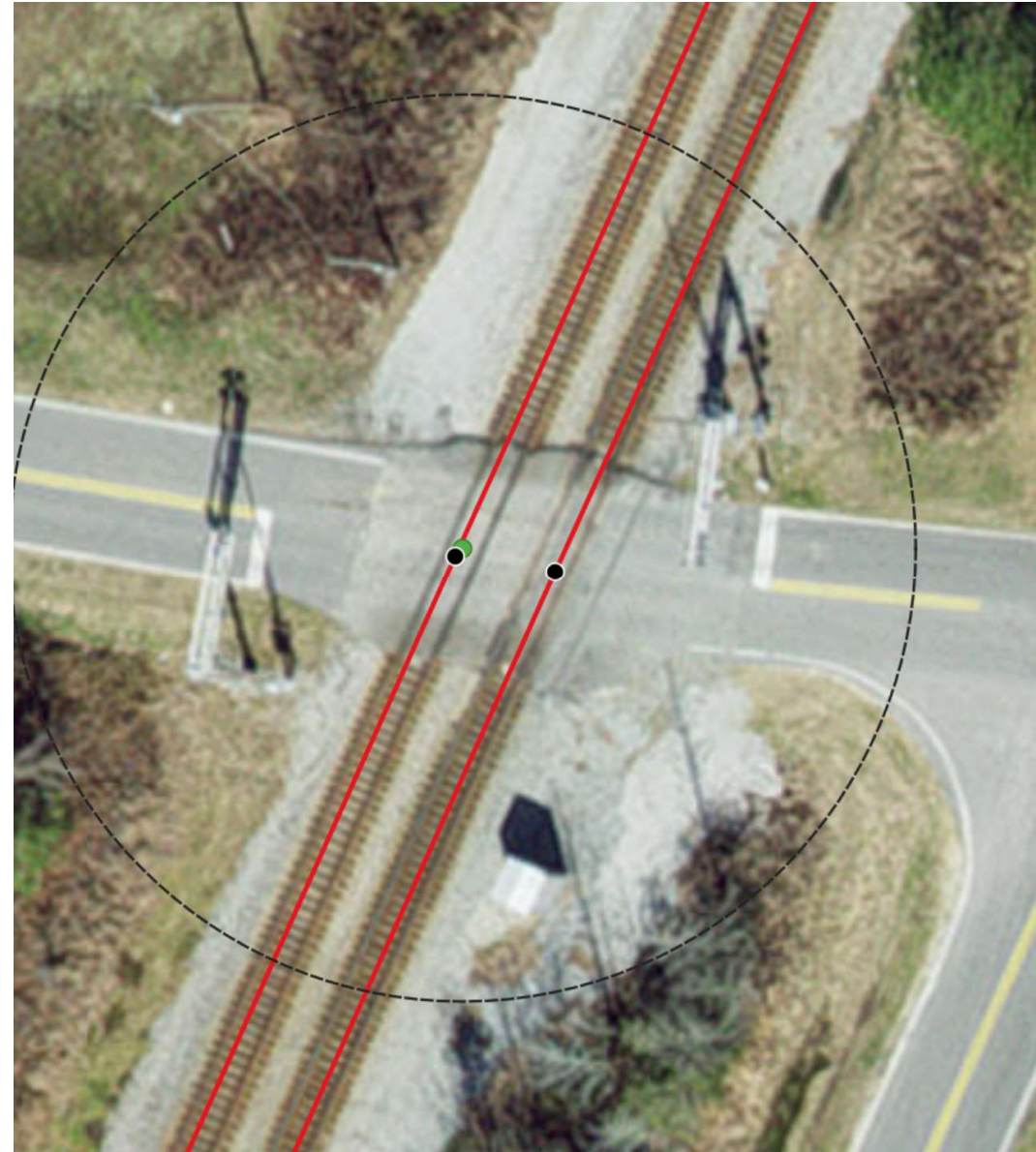
- Shared node between a railway and roadway
- Node is tagged
`railway=level_crossing`
- One node for every track/road



What can we do?

- Compare FRA data* with OSM data
- Find matches with 25m search radius

* Filtered for Open, Public, At-grade



What do we get?

- 55k Unmatched FRA Crossings
- 74k Unmatched OSM Crossings



How to get started?

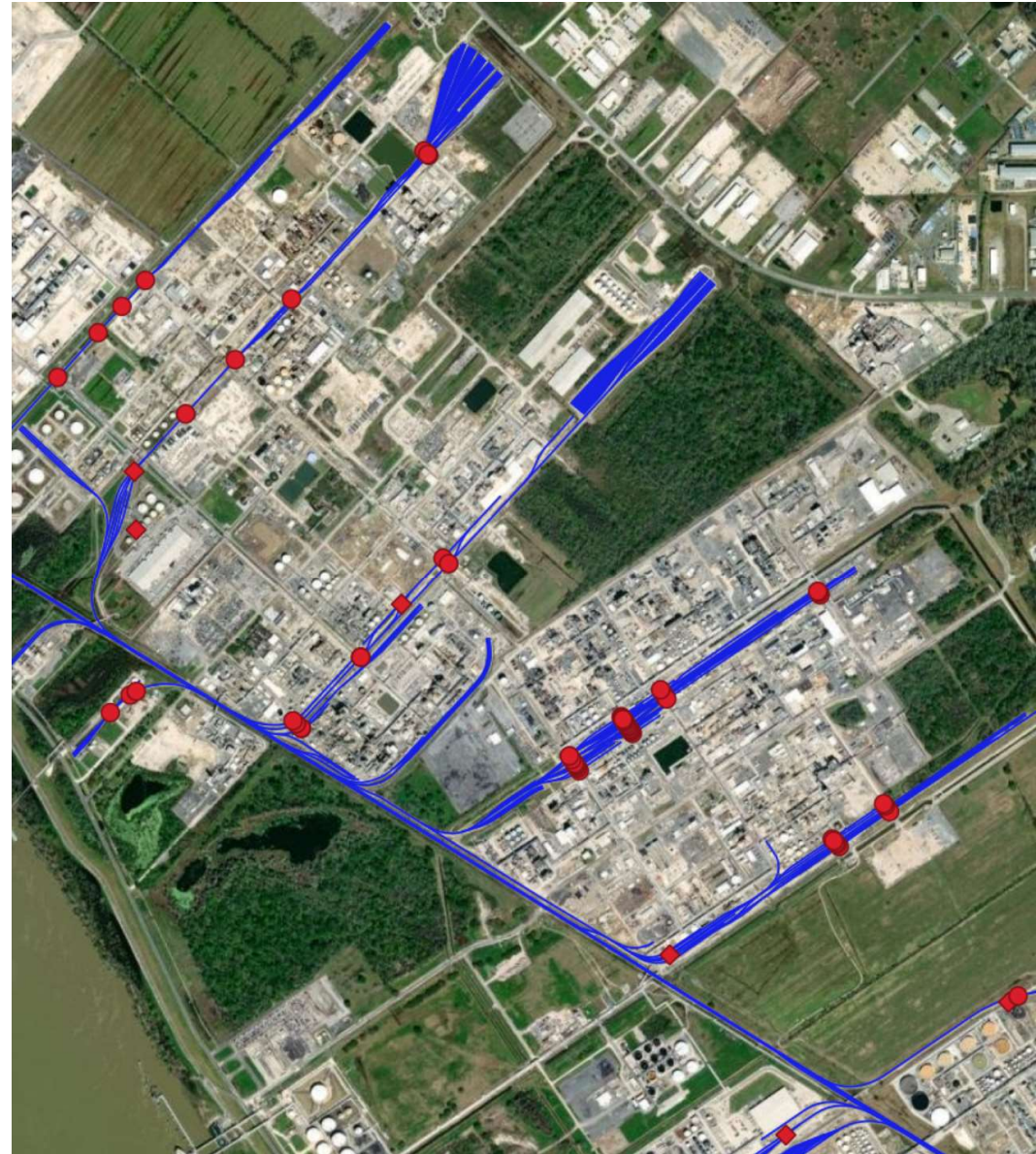
One bite at a time

- Creative filtering
- Select an area of interest
- A lot less intimidating on a State or Railroad scale



Industrial Crossings

- Crossings located within a private facility only need 1 number.



Industrial Crossings

- Areas tagged
`landuse=industrial`
- Remove OSM crossings within the facilities
- 50k Unmatched OSM Crossings remain



Making sense of it

- Sort Crossings into 3 categories
- In GCIS/In OSM
- In GCIS/Not OSM
- Not GCIS/In OSM

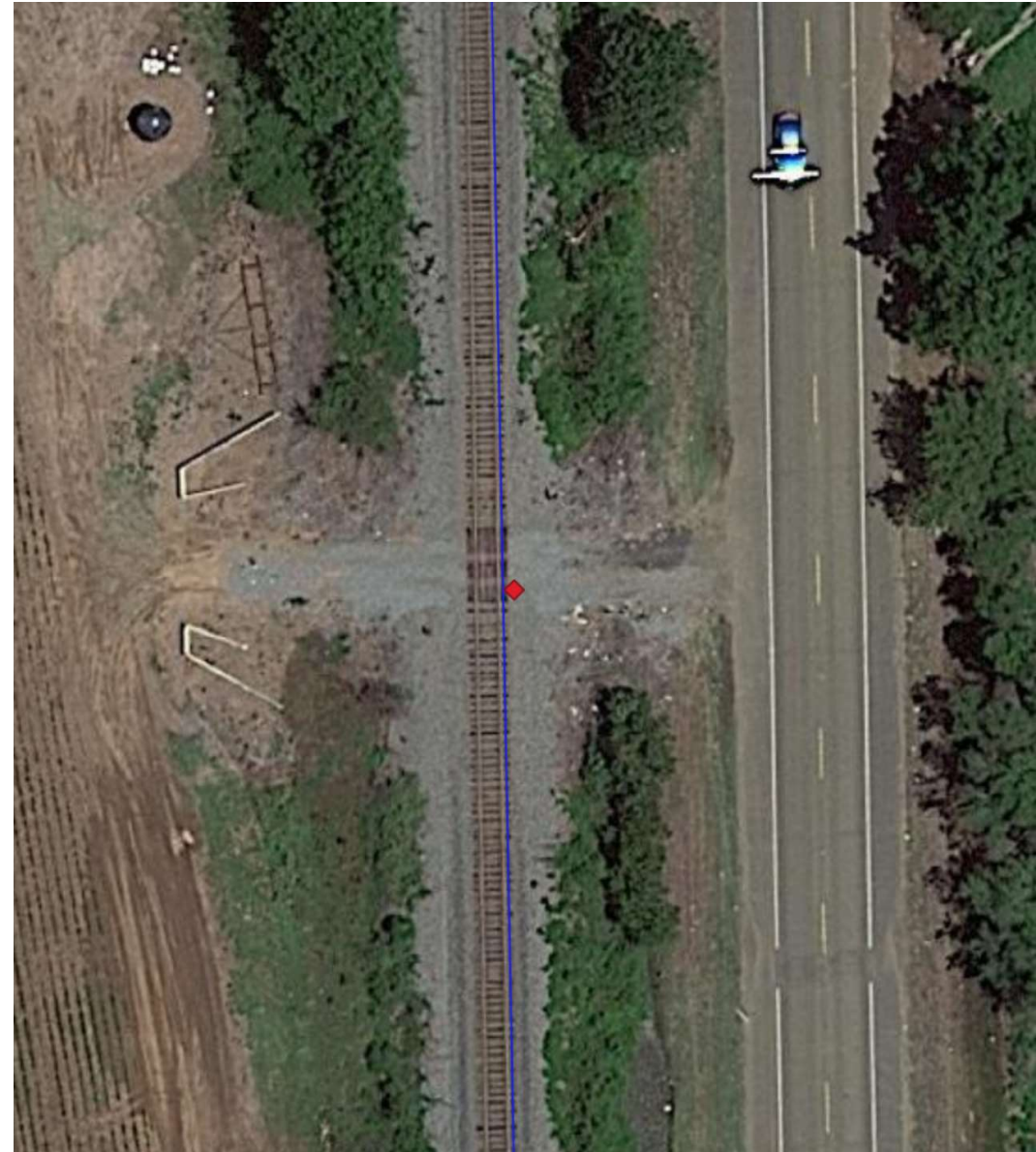
Breaking it down

- Look at things 1 line at a time
- Example 1: Class 1 in PTC territory
- Example 2: A shortline

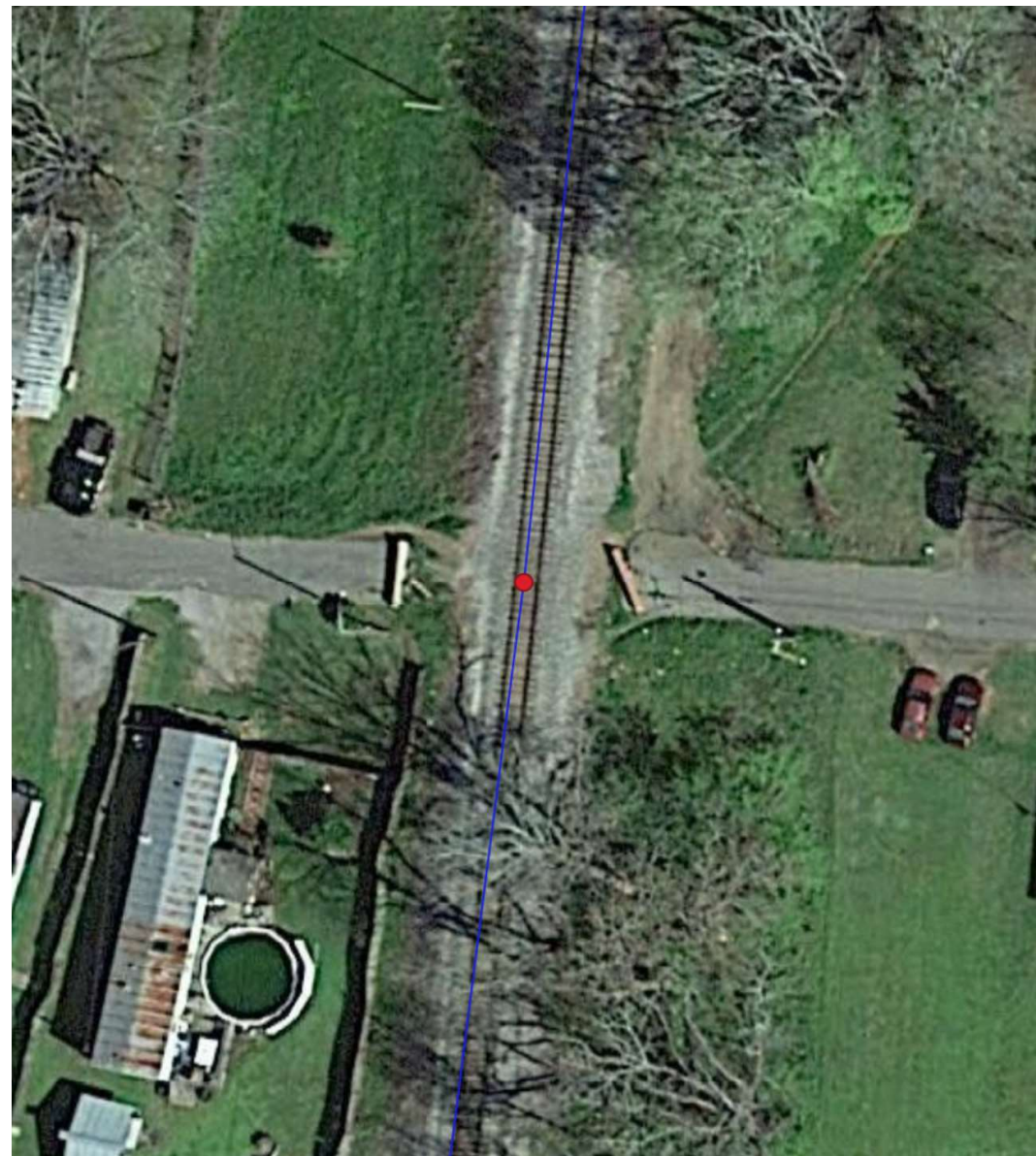
Class 1 - PTC

	In FRA	Not in FRA
In OSM	119/142	11
Not in OSM	51	?

- Crossing in GCIS
- Missing in OSM
- Private Farm Crossing



- Crossing in OSM
- "missing" in GCIS
- Crossing is closed



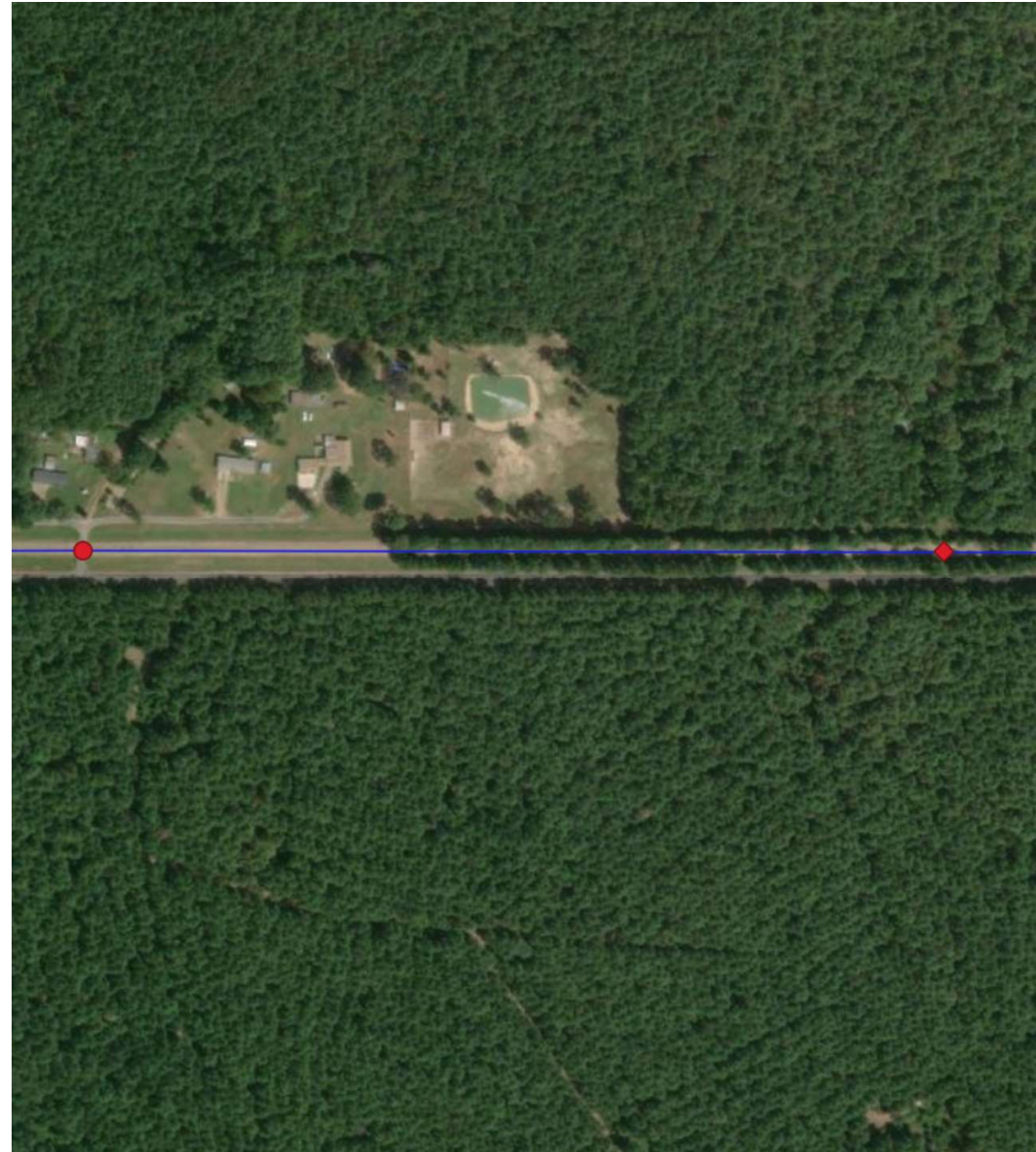
Shortline Summary

	In FRA	Not in FRA
In OSM	154/173	28
Not in OSM	36	?

- Crossing in GCIS and OSM
- FRA Crossing is mislocated
~50m



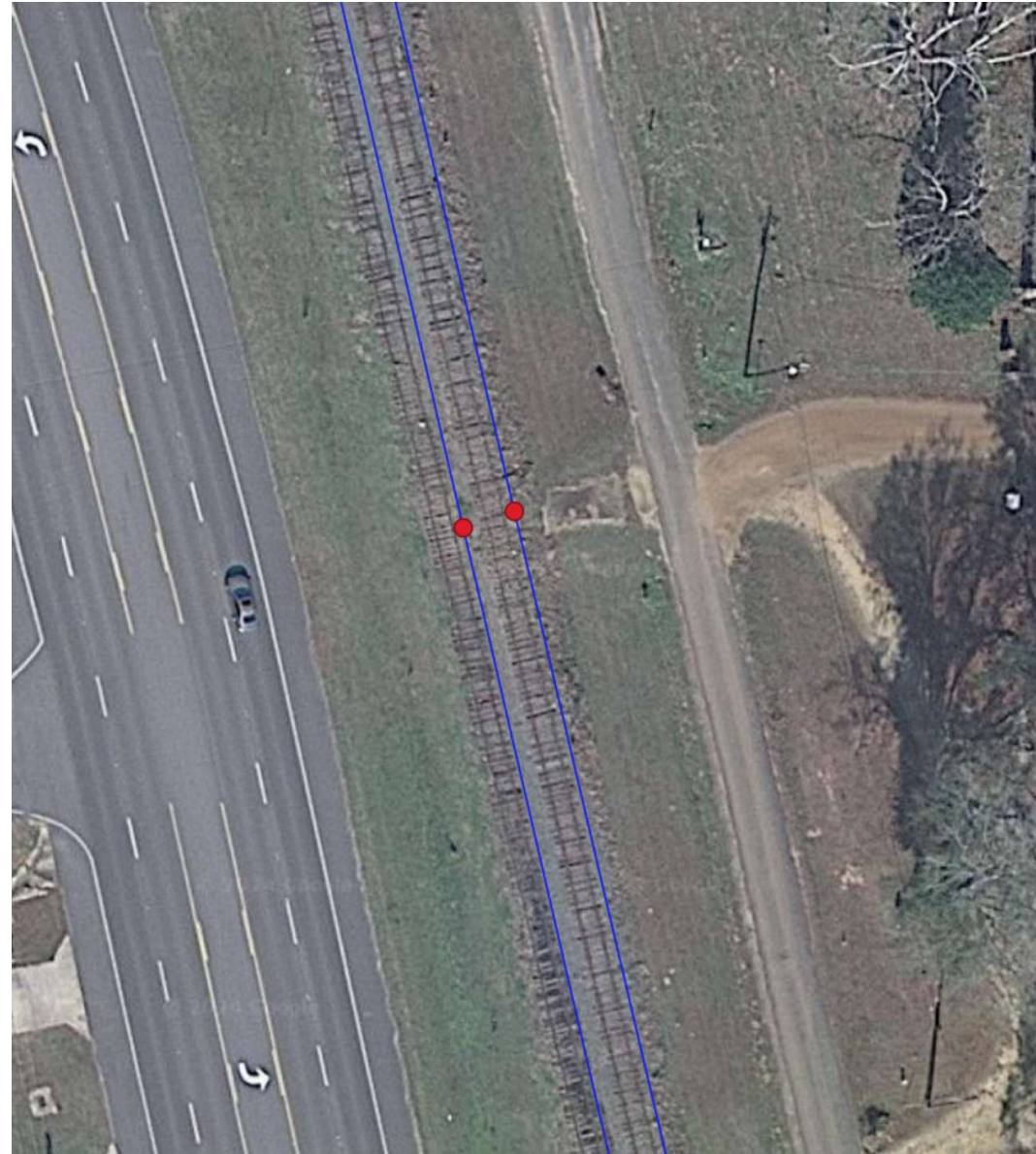
- Crossing in GCIS and OSM
- FRA Crossing is mislocated
~500m



- Crossing in GCIS
- OSM track tagged
railway=disused
- No crossings tagged on the
disused section
- GCIS shows track as open w/2
trains per day



- Crossing in OSM
- Track is visibly removed



Key Ideas

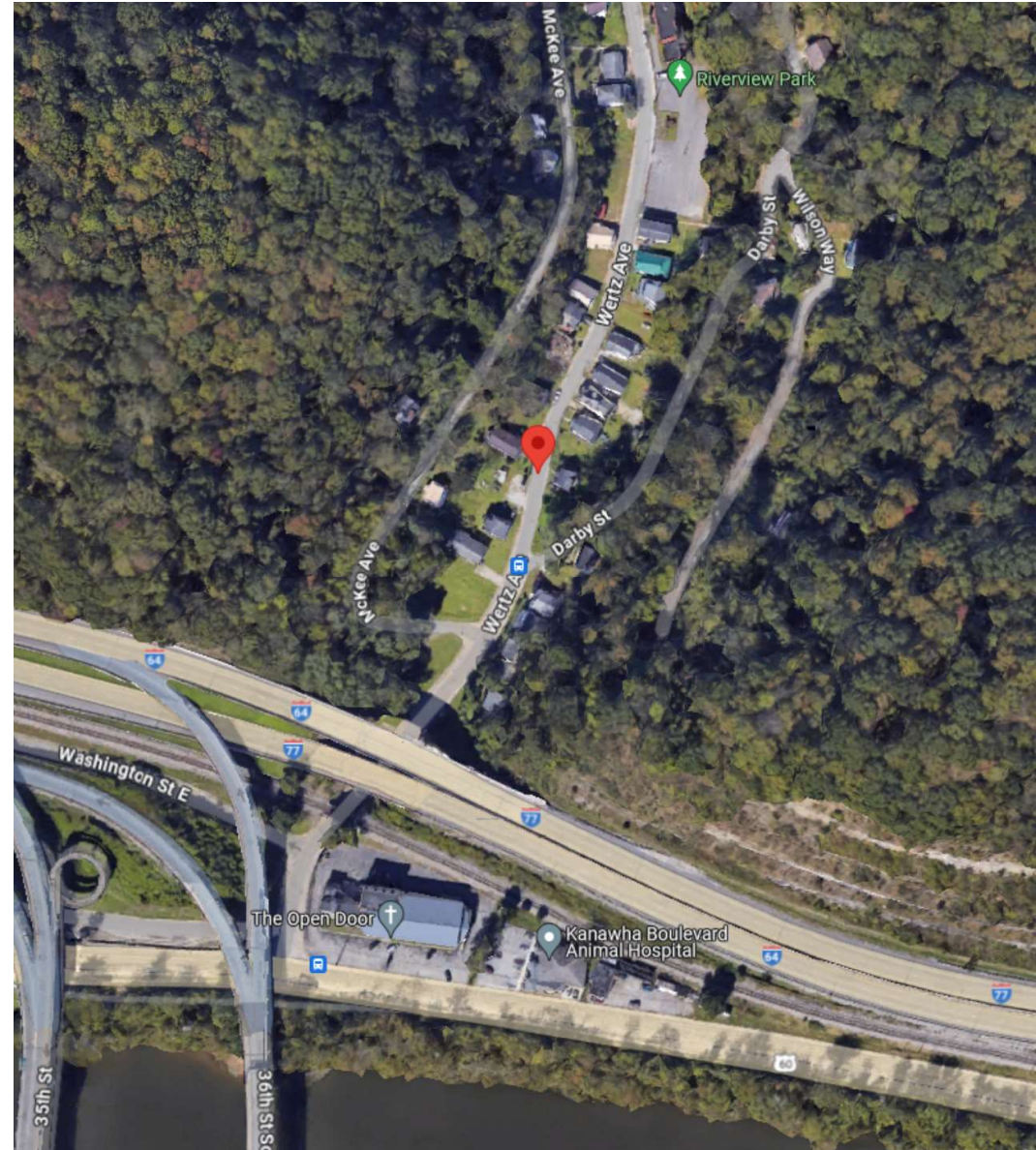
- Good sources available for systematic QC
- Accurate location in GCIS links network to attributes
- Accurate attributes support high utility analyses

Network Analysis for Crossing Closure

- Using OSM network for navigation
- Calculate impact of crossing closure
- Locals are always impacted, but who is local?

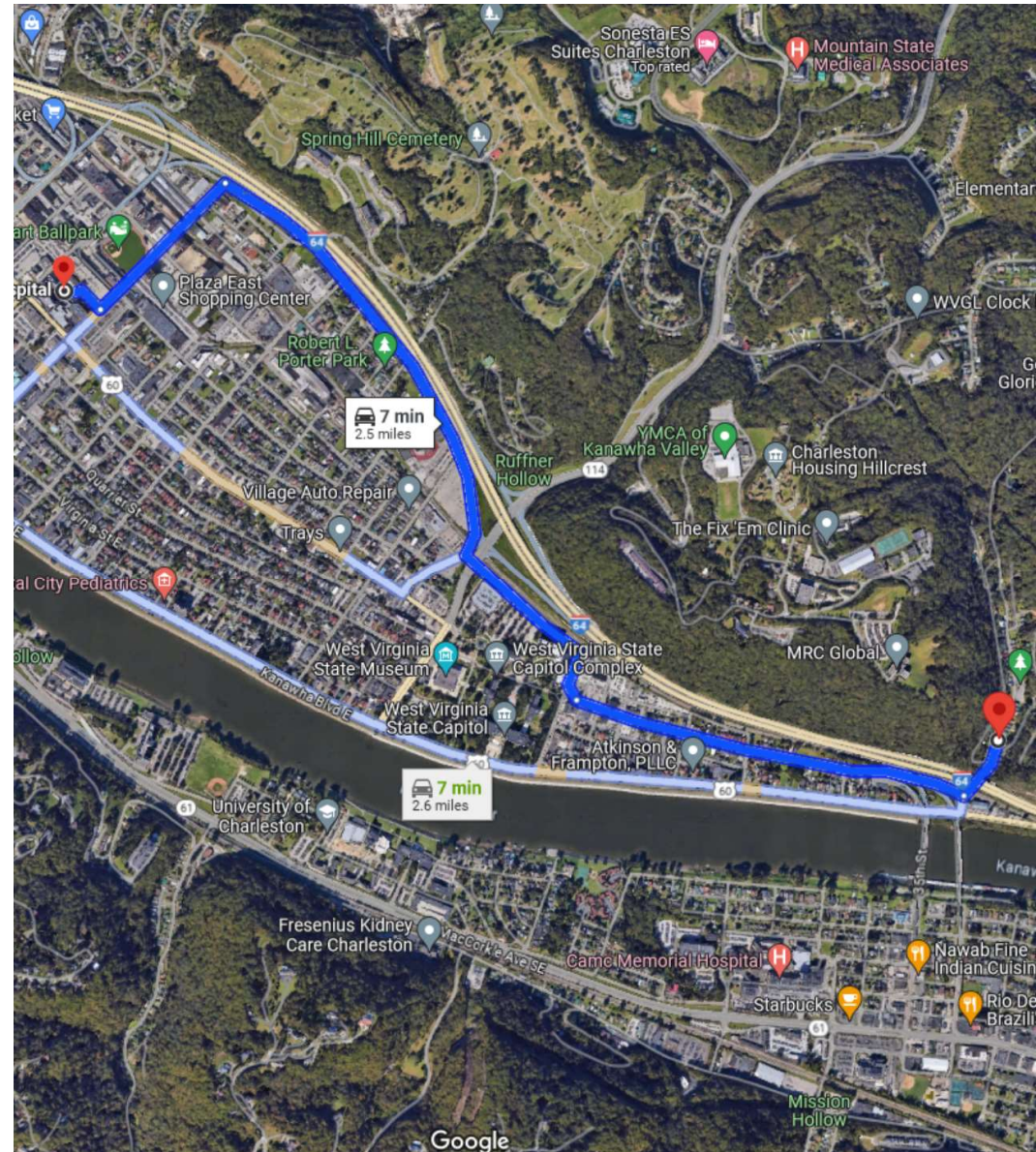
Wertz Ave, Charleston WV

- Railroad separates residential area from most of town
- Mountainous terrain makes alternative routes much longer
- Crossing is Grade Separated but we'll be pretending it's At Grade for this scenario



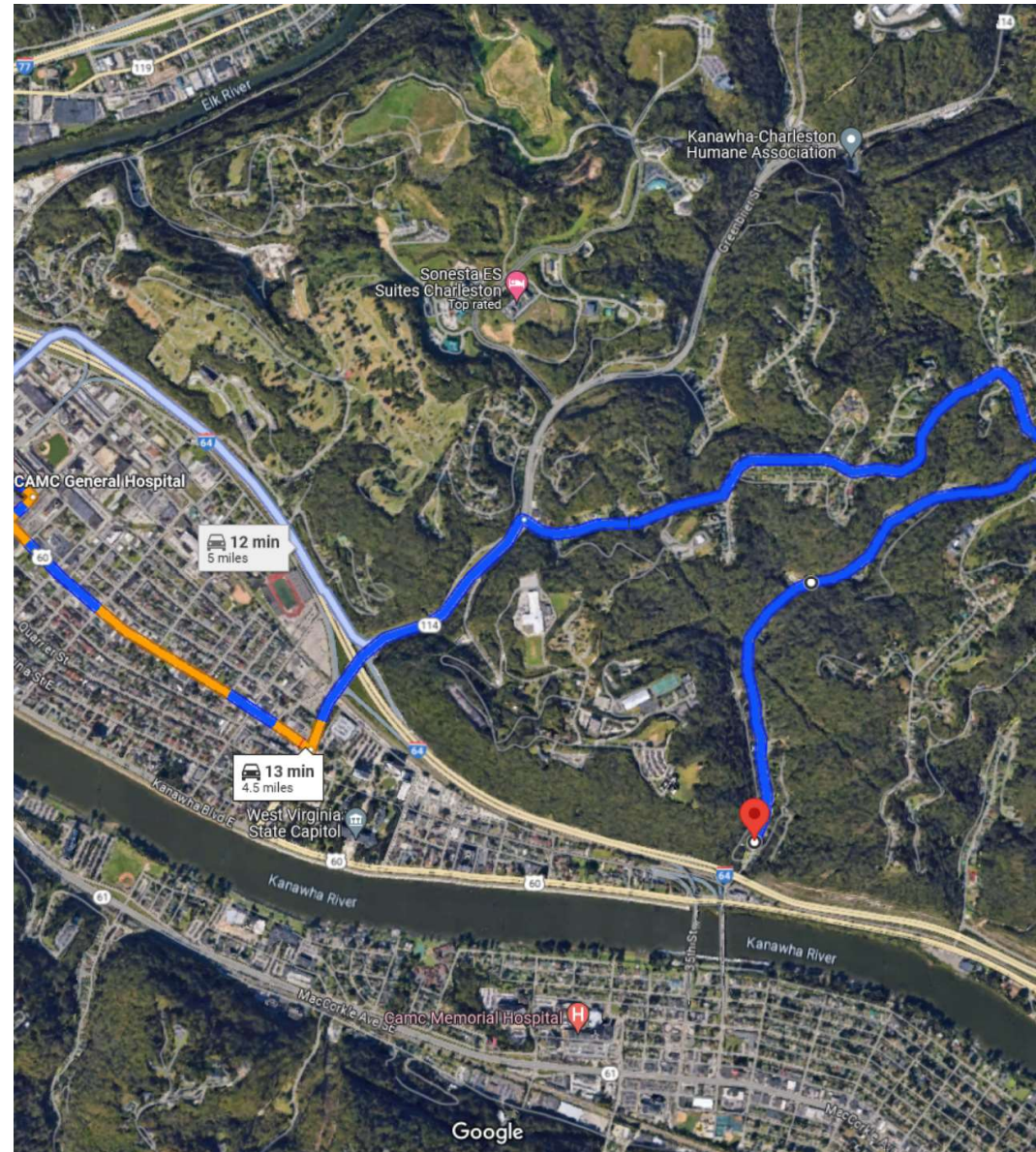
Route to Hospital

- Hospital is centrally located and is a good stand in for many trips
- A 7 min drive according to Google



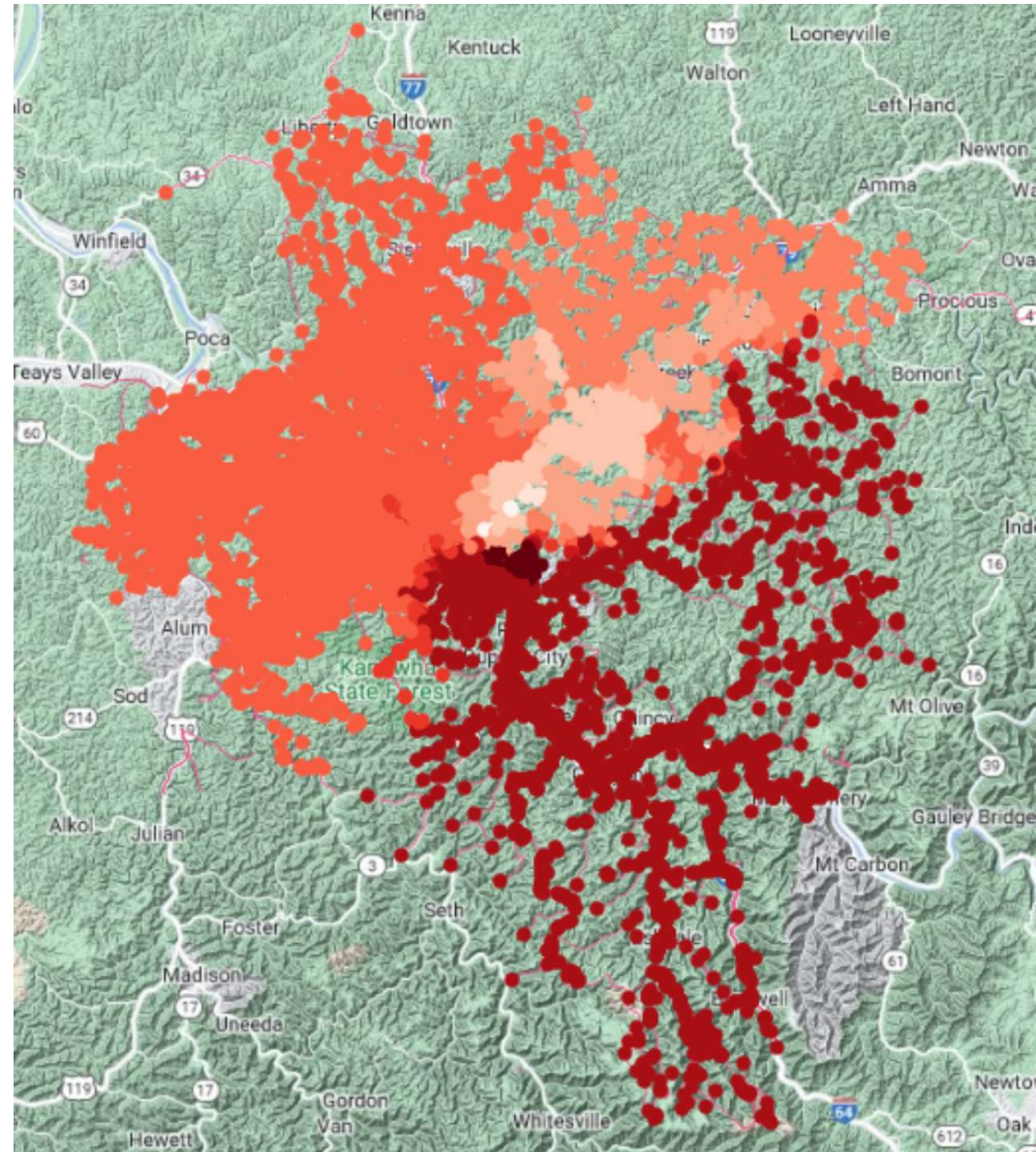
Block/Close Crossing

- Nearly doubles the the drive time



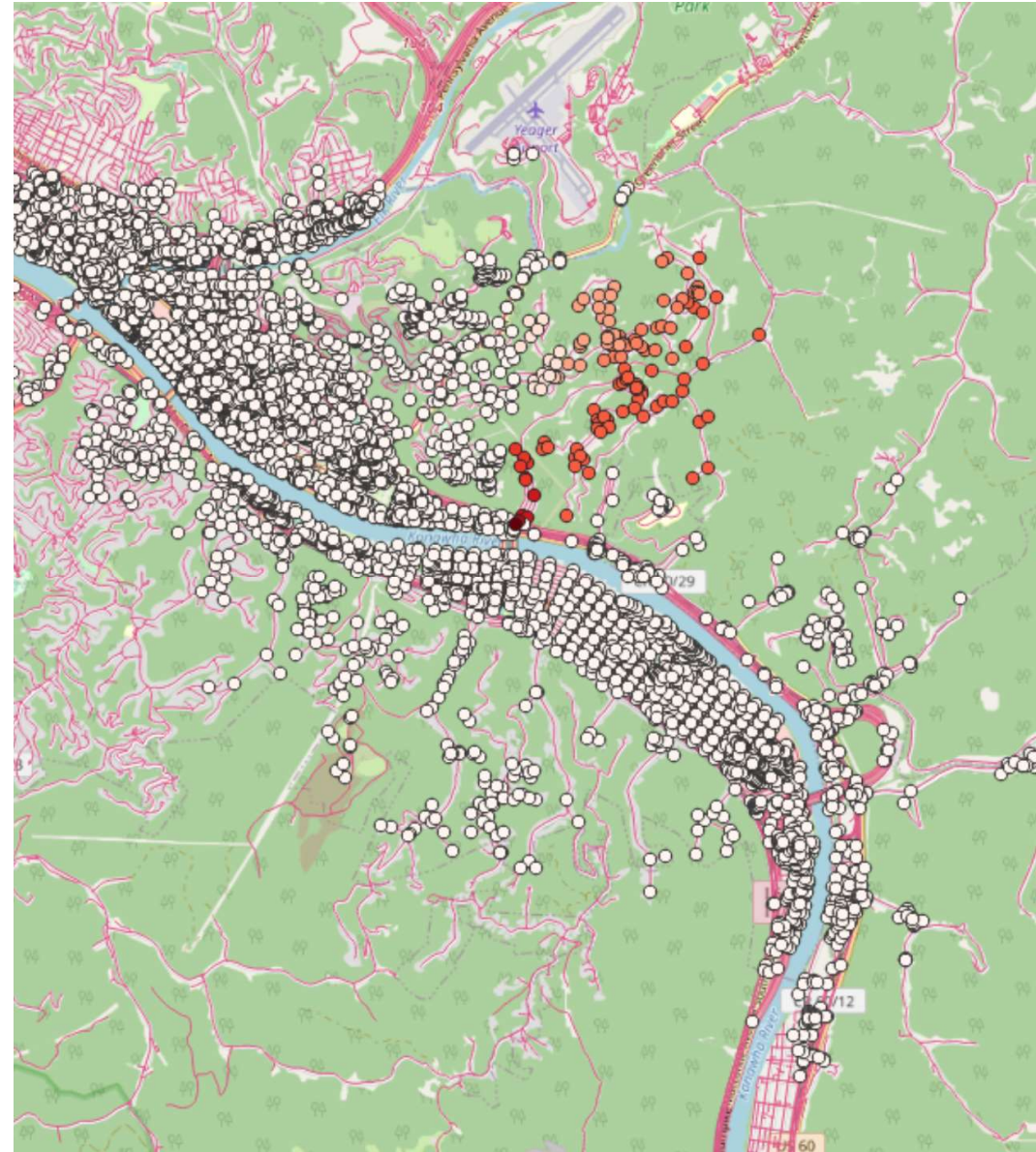
Worst Case Travel Times

- Not all locations are impacted equally
- Impact most felt in the south east direction



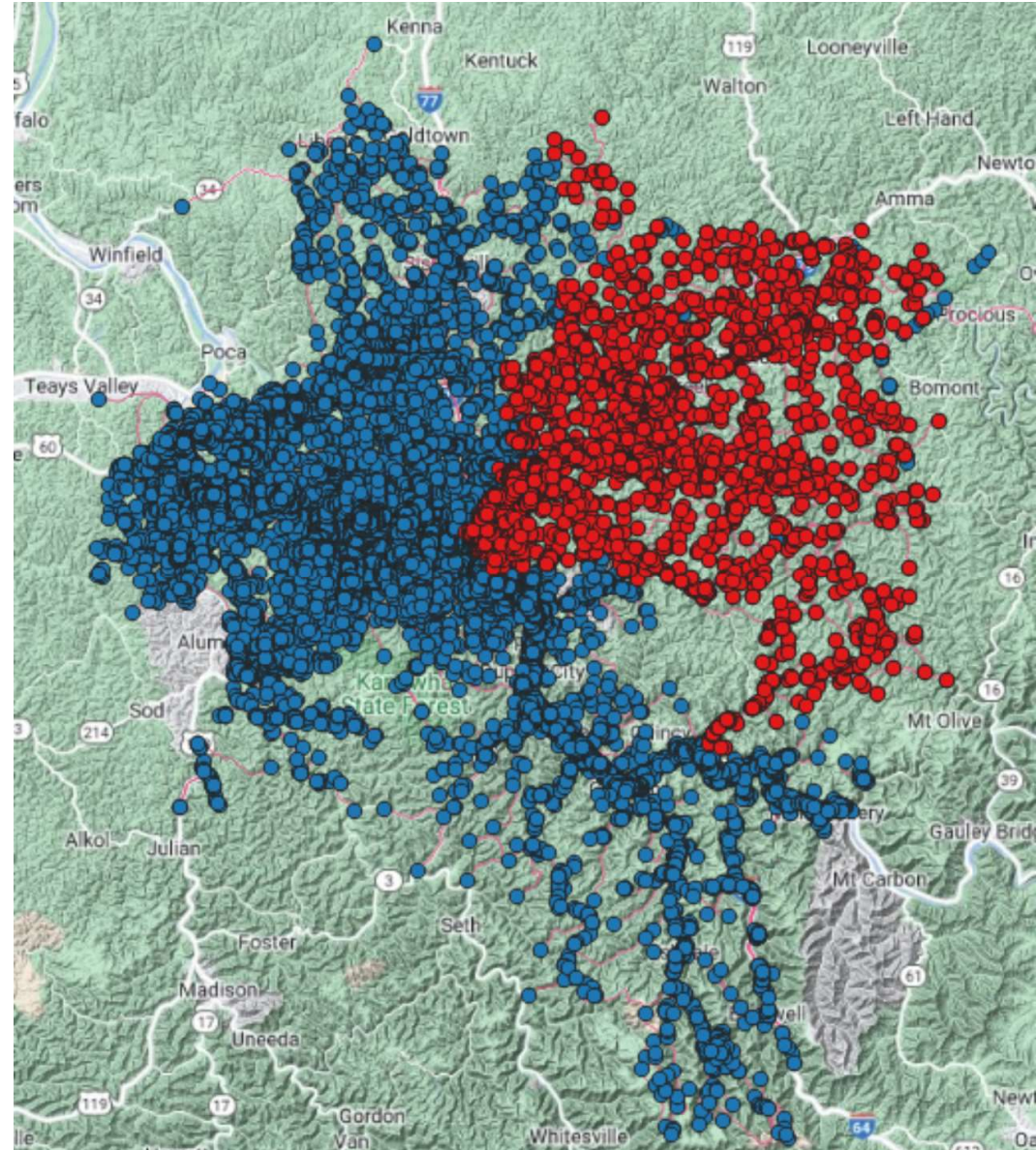
Everyone else

- Not everyone needs to use the crossing
- Assume everyone wants to go everywhere only once
- Accumulate delay over every trip and visualize at the origin



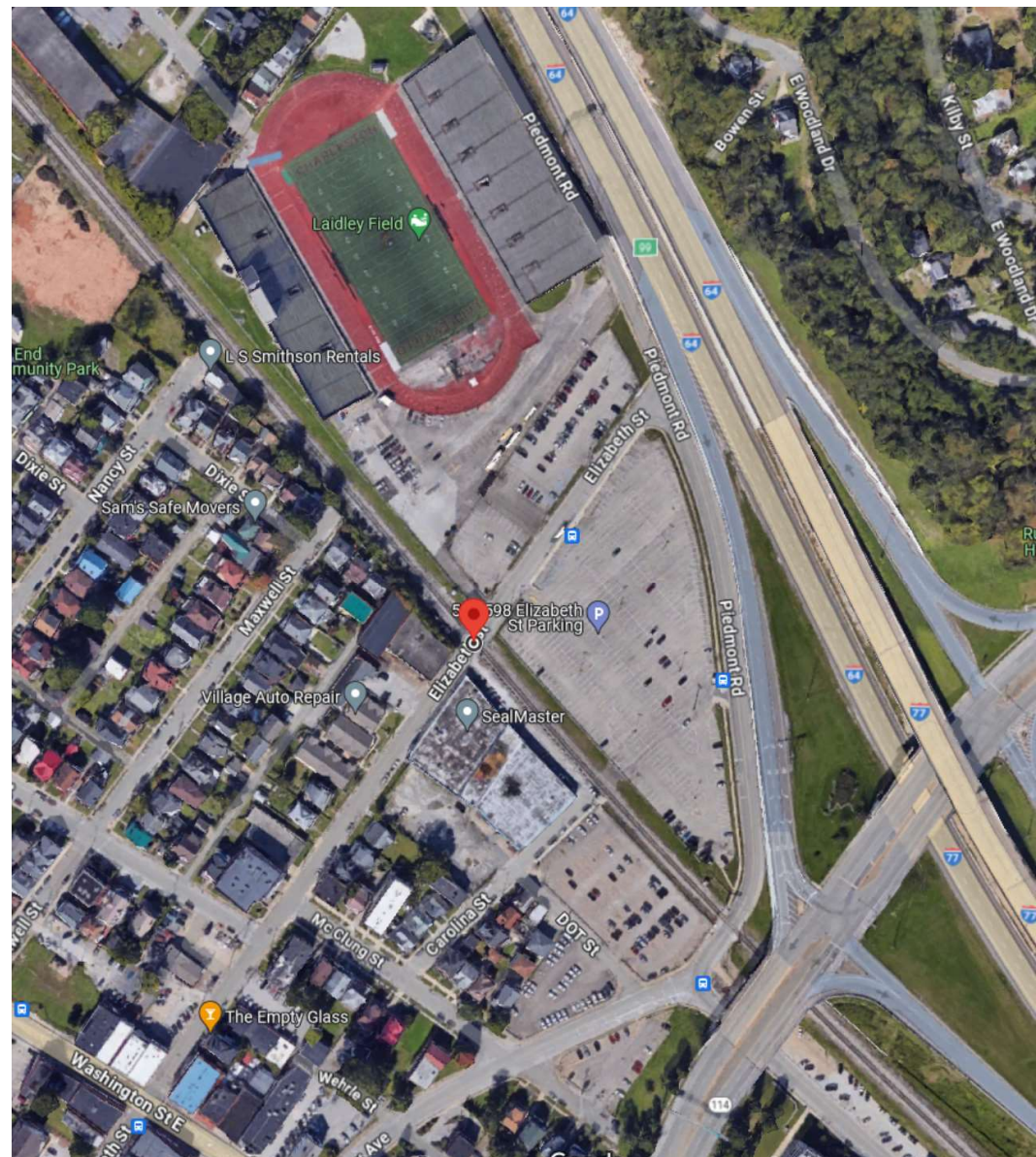
Who uses the crossing?

- Network is split into 2 sides
- If your origin and destination are the same color, there is 0% chance you'll need to use the crossing
- If they are different colors, there is a chance (even if it's low)



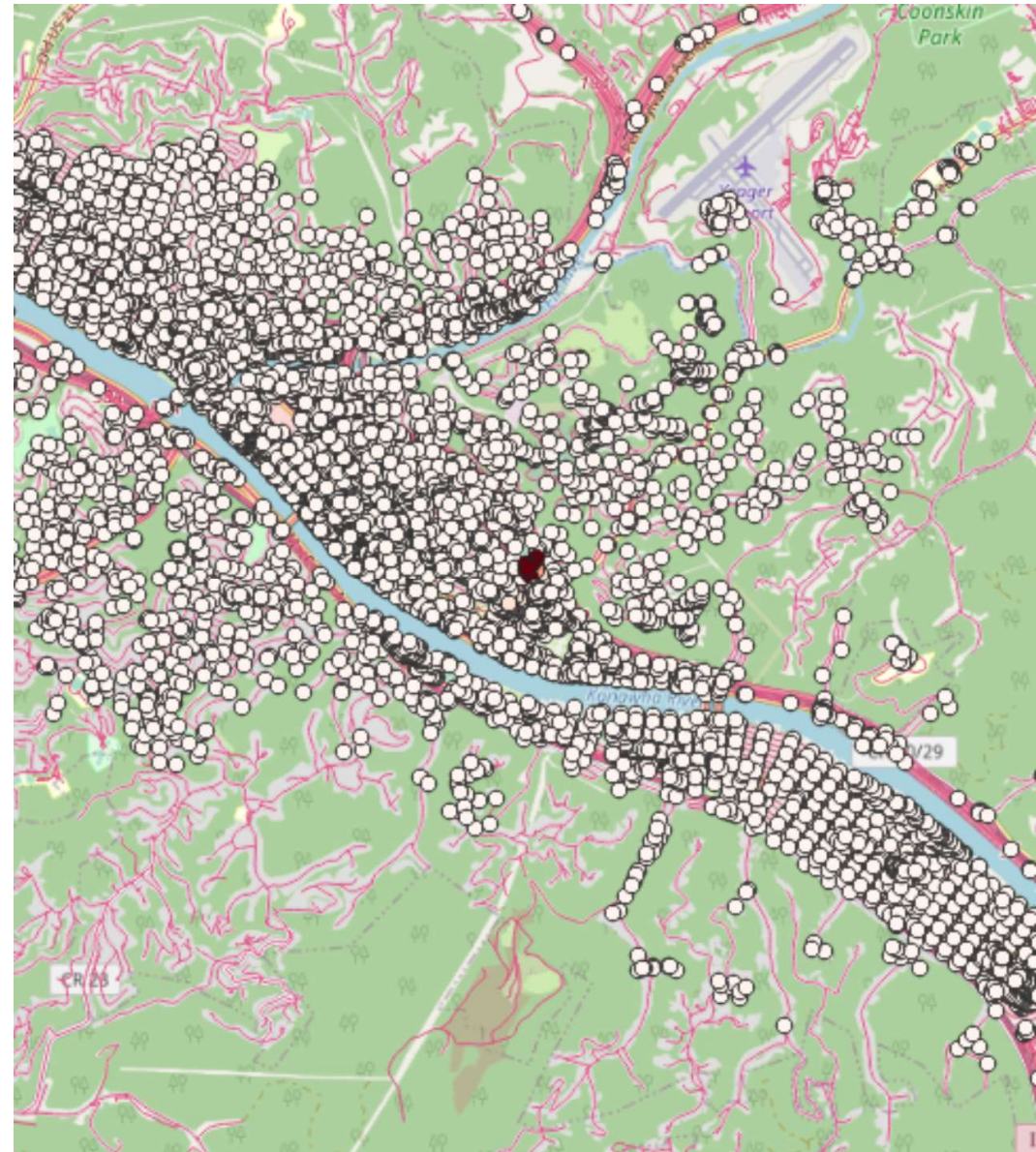
Elizabeth St, Charleston WV

- Local Road
- Arterial roads direct traffic over southeastern crossing
- Most traffic drives past crossing, not over it



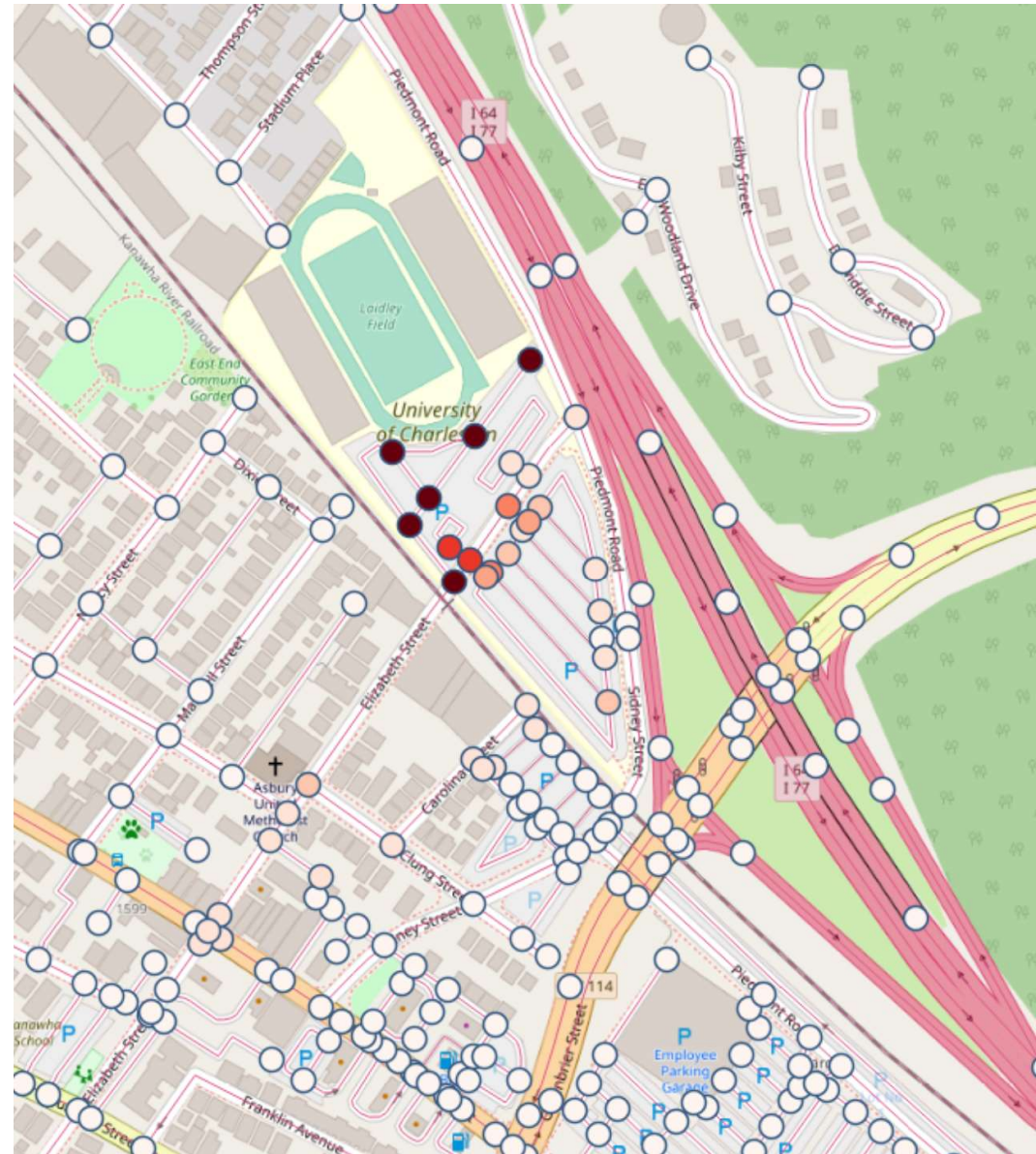
Impact of closure

- Most areas appear to not be impacted



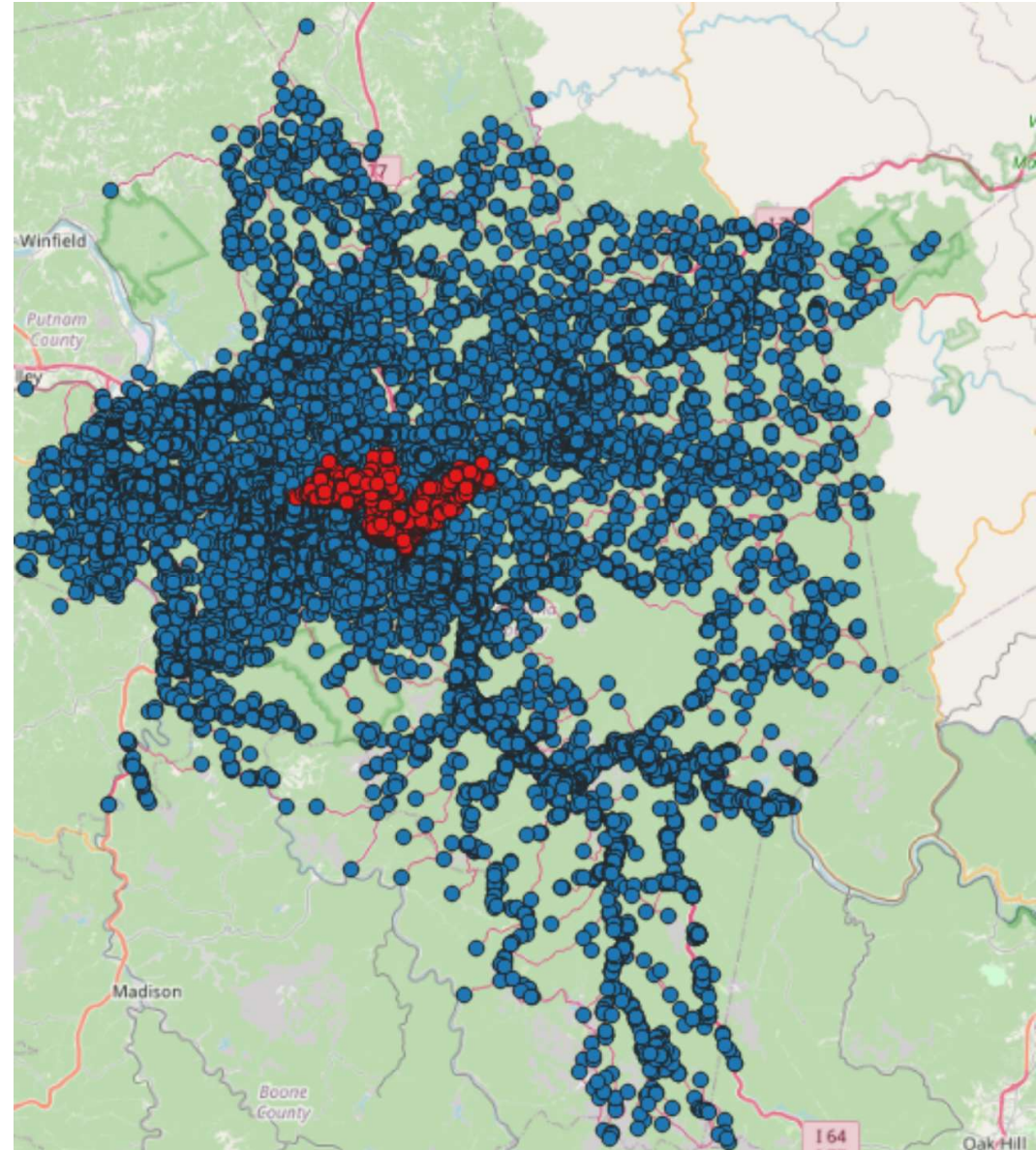
Local impact

- Impact appears localized to the nearby stadium



Picking sides

- Usefulness is very local
- Impact of nearby interstate directs inbound traffic over southeastern crossing



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