CMAP

Motorist Delay at Highway-Rail Grade Crossings

March 21, 2019

Motorist Delay at Grade Crossings

Purpose of analyses
Methodology
Results
Next Steps

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Purpose of analyses

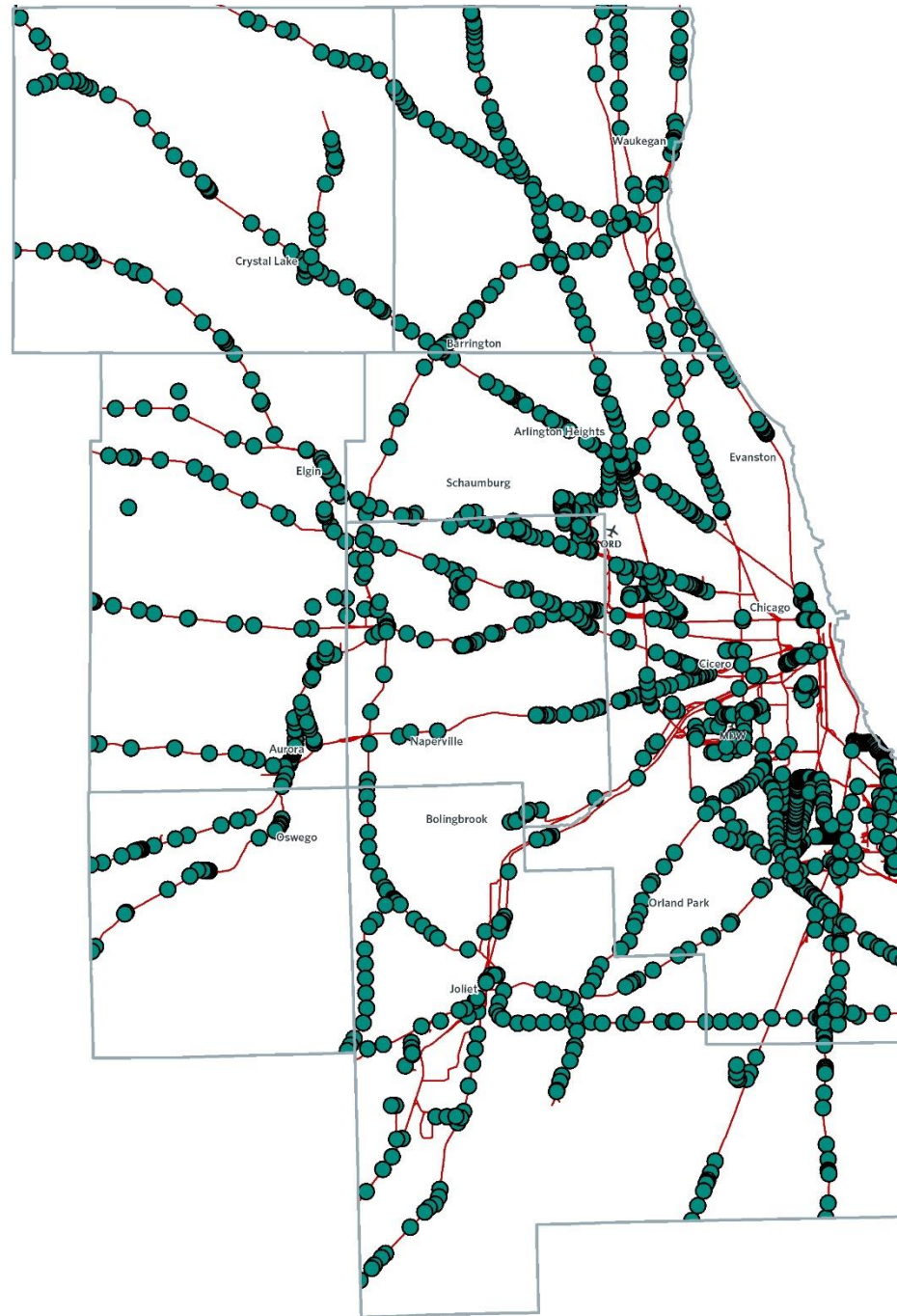# Highway-Rail Grade Crossings

⬤ Grade Crossings
— Railroads

There are nearly 1,500 highway-rail grade crossings in the 7-county Chicago region.
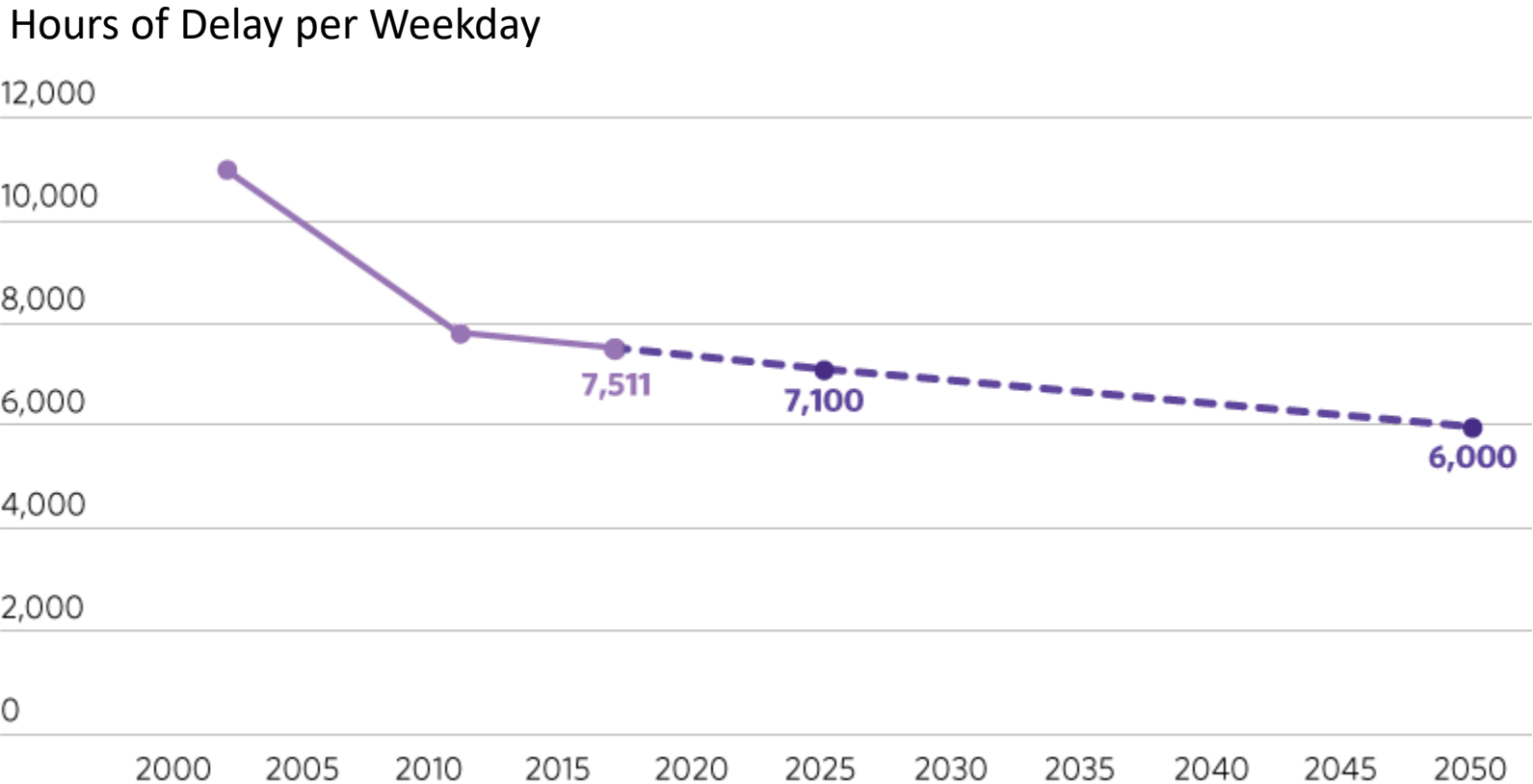
Regional Indicator

Indicator:
Motorist delay at highway-rail grade crossings

Key:

- Actual

- Target

Source: CMAP analysis of Illinois Commerce Commission data

Hours of Delay per Weekday

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How to Reduce Crossing Delay

Improve rail-system performance (speed up trains).
- CREATE Program
- Additional track (e.g., UP West Line), sidings, and crossovers
- Terminal improvements (reduce switching and dead-heads)

Consolidate problematic crossings

Reroute highway traffic to better-performing crossings

Grade separations

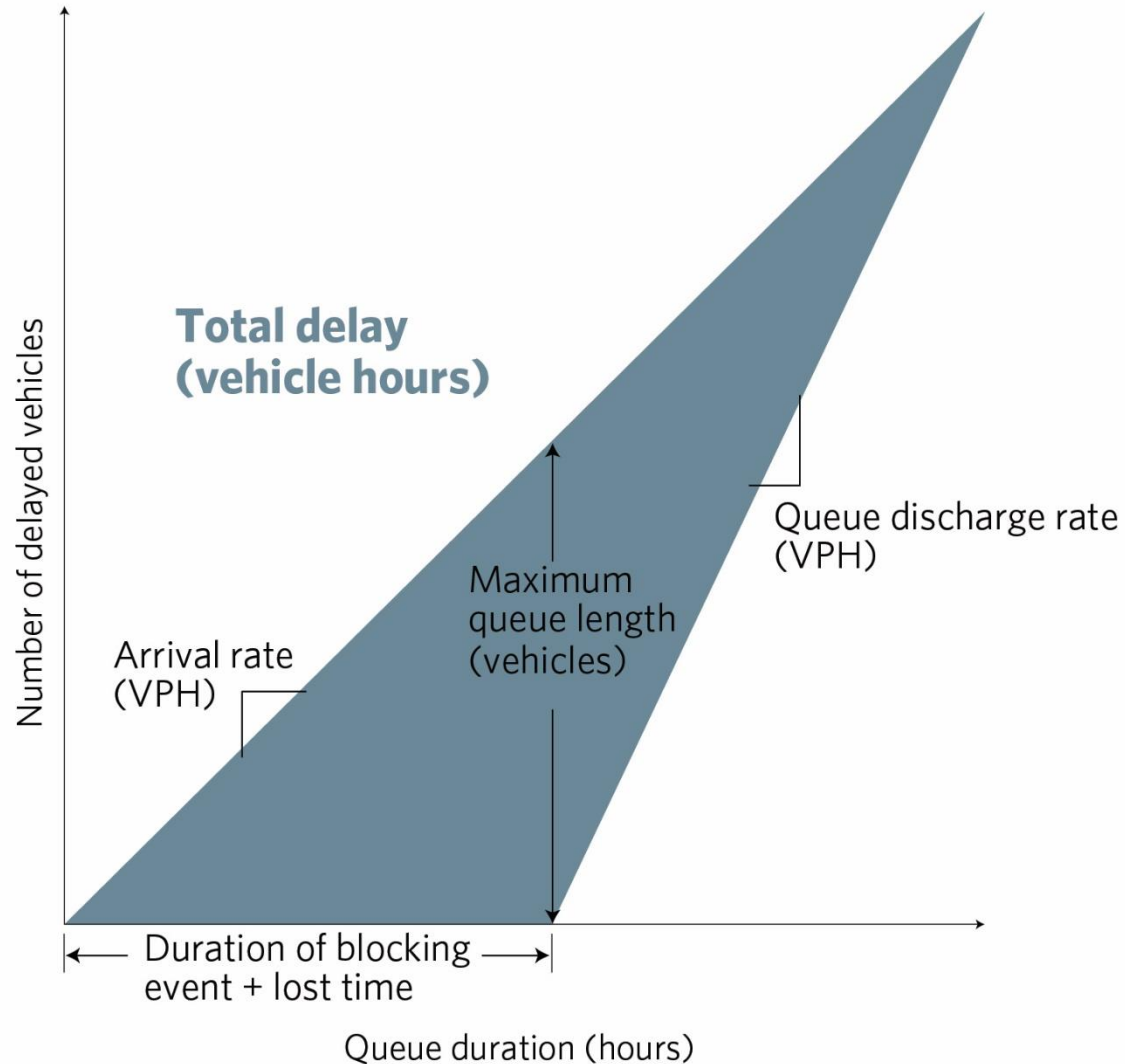CMAP

Grade Separation Prioritization

Based on:
- **estimate of crossing delay**
- estimate of crash risk
- truck exposure
- transit impact
- initial analysis of likely impacts
- status of project development

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Methodology

Estimating grade crossing delay

Note: VPH means "vehicles per hour."

Source: Chicago Metropolitan Agency for Planning analysis of Okitsu, Louie, and Lo, "Simulation-Free Railroad Grade Crossing Delay Analyses," 2010.

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Estimate of Crossing Delay

CMAP has used ICC estimates, which are based on:
 - number of trains per day (Metra, Amtrak, and freight

 - speed of trains (based on timetable speeds)

 - proximity to yards and transit stations

 - AADT

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Known Issues

- Neither trains nor highway traffic are distributed evenly throughout the day

- Delay extends beyond the time the gate comes up

- Trains are not traveling at timetable speeds

- Delay occurs without the presence of trains (James Powell)

- Delay is compounded, the longer the gate is closed

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Data Collection

- Duration of gate-down interval

- Duration of queue clearance interval

- Number of vehicles queued

- Saturation flow rates (less useful than hoped)

- 8-hour data collection periods

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Highway-Rail Grade Crossings

● Grade Crossings
● Data Collection Sites
— Railroads

Sources: ICC, FRA, CMAP

Data was collected over two summers at 40 sites, primarily by summer interns.

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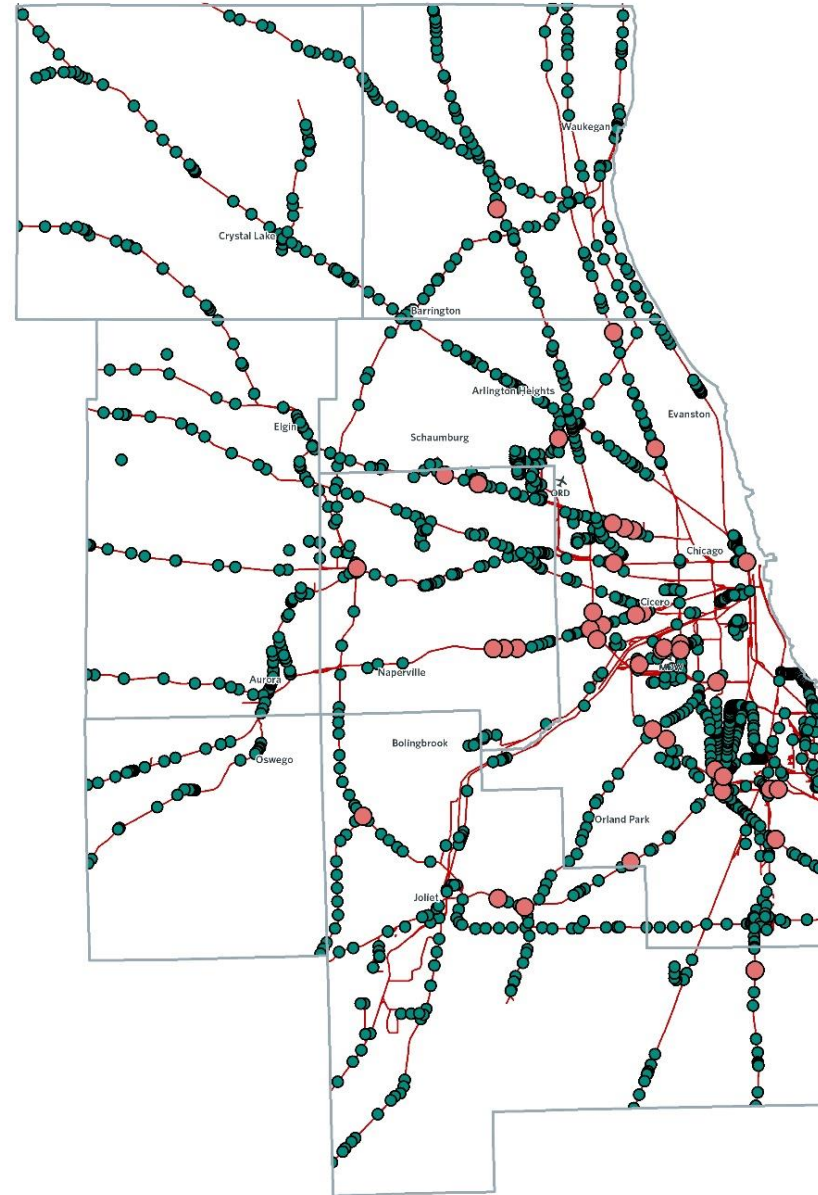
Analysis

- Delay by time of day, with traffic and trains distributed throughout the day

- Based on average delay and AADT (conservative for an estimate of weekday delay)

- Adjusted estimated number of daily freight trains where field data wasn't close to prior estimates. This had a big impact (most of the adjustments were down).

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Results

Crossings 174973G, 260541T - Washington St. UP/CN (West Chicago)
Gate-Down and Queue-Clearance Durations by Type (Minutes, 2017)

Freight trains are slower than expected.

Queue-clearance times are substantial.

At this crossing, ICC-estimated average gate-down times were 1:00 for Metra trains and 2:24 for freight trains.

■ Freight Gate-Down Duration   ■ Freight Queue-Clearance Duration   ■ Metra Gate-Down Duration   ■ Metra Queue Clearance Duration

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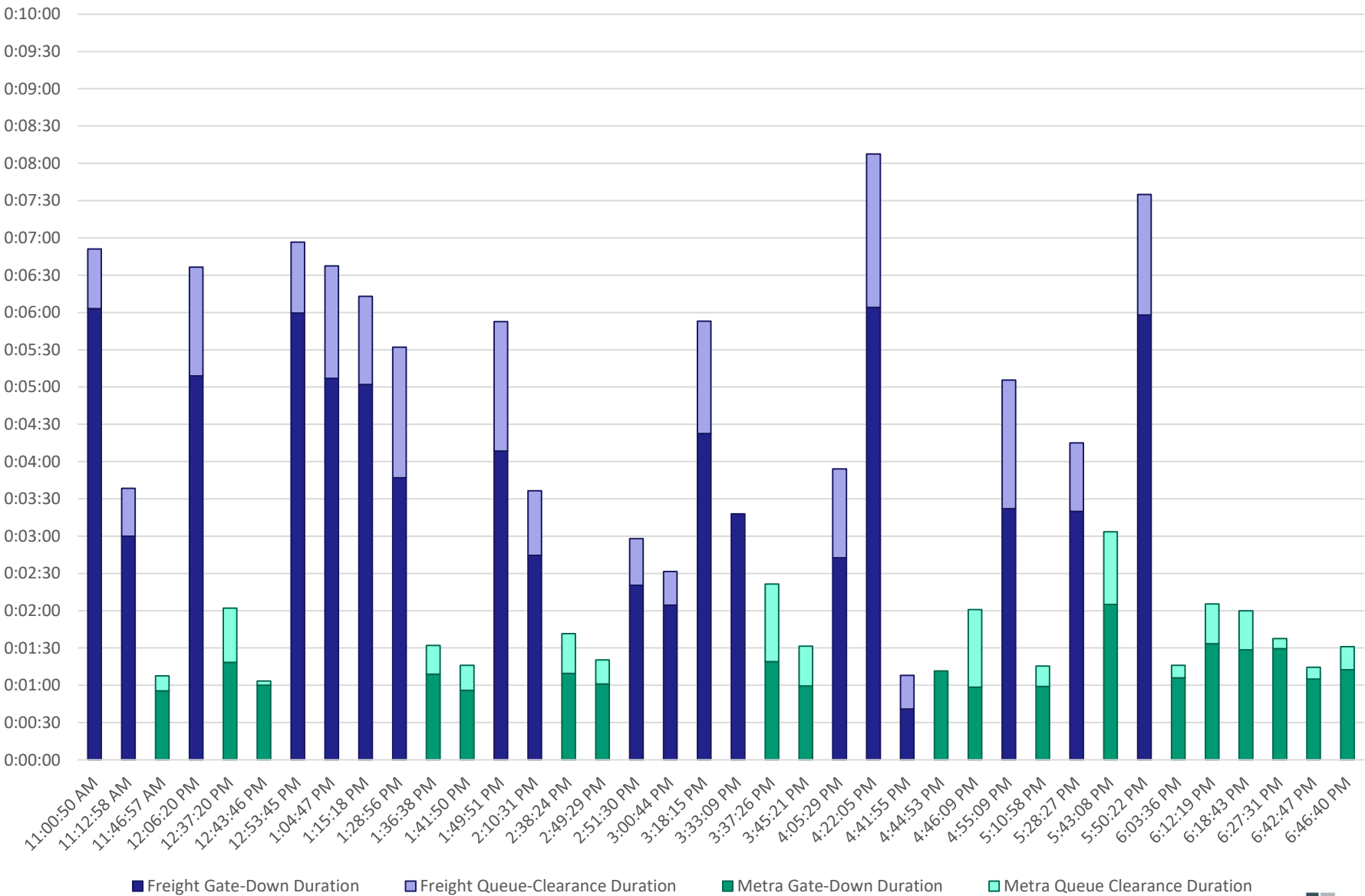
Daily Grade Crossing Delay: Comparison of New Results to Old Results, by Crossing
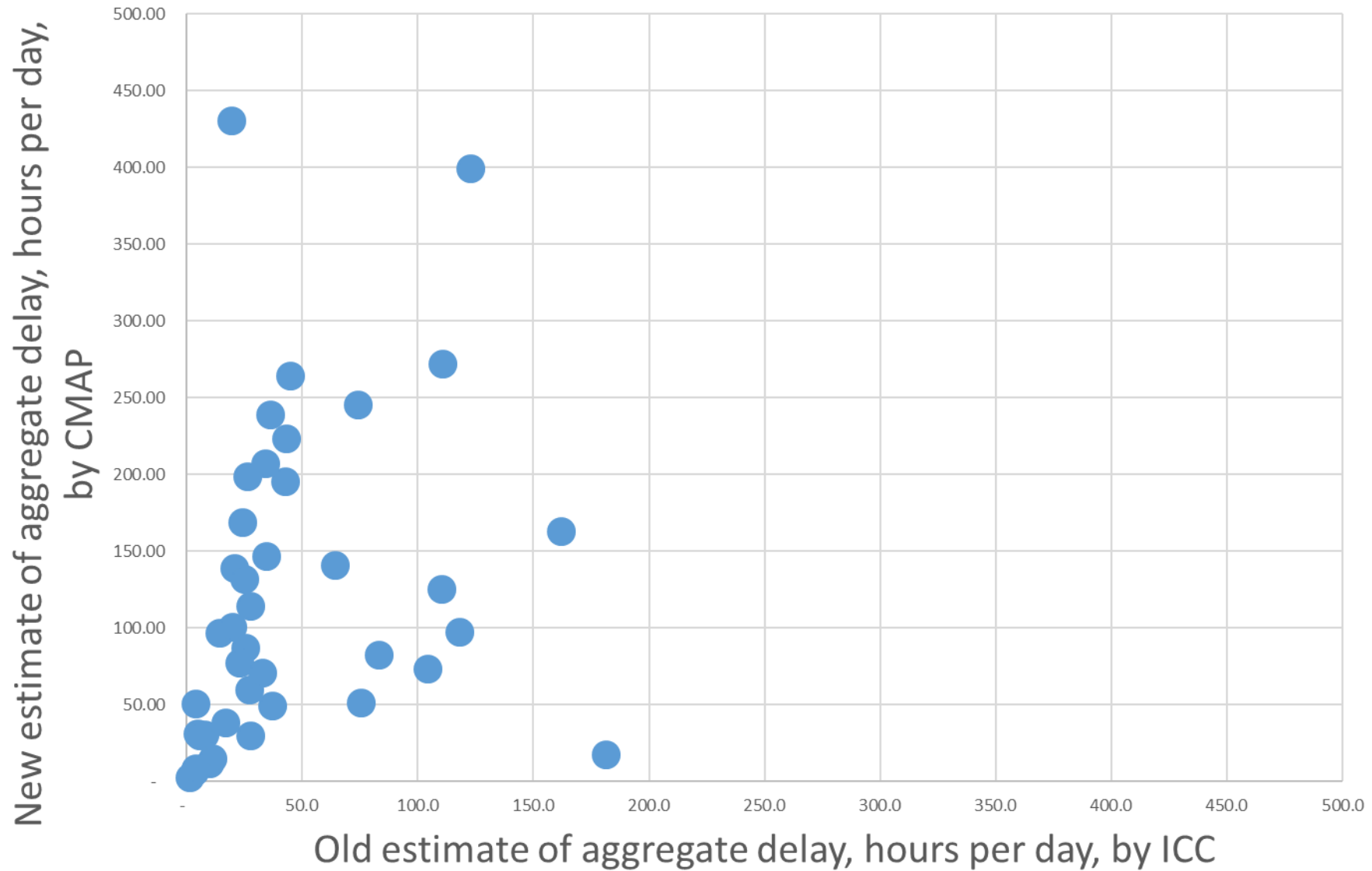
Results: Motorist Delay per Crossing

Average of Old Estimates of Delay

46 hours per weekday

Range 2 - 182

Average of New Estimates of Delay

120 hours per weekday

Range 2 - 430

Percent Change

↑160%

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Next Steps

- Generalize using queue discharge rates from the study sample.

- Consult stakeholders regarding the estimated number of daily freight trains. This has a big impact on the estimates, and still needs to be improved.

- Investigate automated data collection
  - Array of Things pilot
  - Event recorders for non-interconnected railroad cabinets
  - Positive train control data

- Use truck probe GPS data to estimate non-occurrence delay.

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