



Chicago Metropolitan Agency for Planning

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MEMORANDUM

To: CMAP Freight Committee
From: CMAP Staff
Date: November 2015
Re: Proposed Methodology for Highway-Rail Grade Crossing Analysis

CMAP's FY2016 work plan includes a "Freight Deficiency Analysis," which will provide a general coverage of freight bottlenecks and other deficiencies in the region. A component of this analysis will be a study of highway-rail grade crossings, expected to be completed in spring 2016. This analysis is an important first step toward the future evaluation and prioritization of projects as part of the regional freight plan. Staff is interested in the Committee's input on research methodologies for this project.

Limitations of past analysis

Staff has conducted high-level analysis into this topic before. Crossing delay was included as one of the small number of performance measures in CMAP's [mobility data visualization](#) website launched last winter. Staff followed up this analysis with a more detailed [Policy Update](#) on the subject, presented to the Freight Committee in March 2015. Both the mobility data visualization and the Policy Update rely on the Illinois Commerce Commission's (ICC) 2011 estimates of average motorist delay at highway-rail grade crossings. According to the ICC's [2011 report](#), average delay is highly concentrated among few grade crossings in the region. Out of roughly 1,500 crossings included in the report, the top 100 represented over 60 percent of the total delay.

While the ICC's data file provides a good foundation for an analysis of grade crossings in the region, but it has several shortcomings:

- The file considers average delay at crossings. As such, it does not account for excessive delay, which can be a substantial concern in some areas. Unfortunately, CMAP has no comprehensive source of data for excessive delay at rail crossings in the region. These

averages also do not account for variation in highway and rail volumes by time of day or day of week, two factors that affect actual experience of delay.

- The file provides limited context on the environment in which the delay occurs. Other factors, such as safety, adjacent land uses, and interactions among crossings, could also be considered. CMAP has numerous spatial datasets that could be used to provide some of this context.
- The file provides no estimate of delay unrelated to grade-down conditions at rail crossings (called “non-occurrence” delay). The rough surfaces and inadequate geometric conditions of some crossings reduce travel speeds for vehicles, even when trains are not present. A new methodology could be developed to include this delay.

Proposed methodological improvements

The above are not meant to be criticisms of the ICC file. In fact, it is helpful to have a single methodology consistently applied across the region, as the ICC has done. Rather, the idea is to improve upon the available datasets in the following ways:

- *Supplement the ICC’s motorist delay estimate with other variables.* Motorist delay is one key variable in evaluating highway-rail grade crossings for potential improvements. Staff believes that it is important to supplement motorist delay with other priorities, such as safety and impact on transit performance, and is interested in the Freight Committee’s input on these potential categories. The following list suggests potential topics:
 - Safety
 - Crash rates
 - Impact on emergency responders
 - Land use impacts
 - Proximity to sensitive land uses (e.g., hospitals, parks)
 - Access to manufacturing and freight districts (e.g., designated and preferred truck routes, NHS mainline and intermodal connectors)
 - Community impacts
 - Impact on disadvantaged communities
 - Designated Quiet Zones
 - Quality of nearby crossings and connectivity of road and bike/ped networks
 - Impact on transit operations (e.g., CTA and Pace bus routes affected)
 - Interaction with rail operations (e.g., proximity to major yards or junctions)
 - Overlap with planned improvements (e.g., CREATE, TIP or STIP)
- *Improve upon or supplement the ICC’s motorist delay estimate with new methodologies.* A more detailed model would lead to an improved estimate of grade crossing delay:
 - Staff [research](#) suggests that employing a traffic engineering approach to estimate motorist delay may be much more accurate for crossings with substantial highway and train volumes. The delay of one ten-minute train is substantially greater than that of five two-minute trains. This would entail estimating delay for each gate-down occurrence, using traffic volumes for that particular time.

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- Both highway and rail traffic volumes vary by time of day and day of week. This variation is not currently included in estimates of average motorist delay at rail crossings, but could be gathered for specific crossings.
- *Account for non-occurrence delay.* The physical characteristics of some crossings may be source of delay, even when trains are not present. The policy implication is that smaller-scale improvements, such as smoother crossings or additional highway lanes, could substantially reduce delay at far lower costs than a highway-rail grade separation.

Recognizing resource limitations, staff proposes that most of the data collection and analysis be focused on a relatively small subset of grade crossings in the region with the highest traffic volumes and largest number of trains (e.g., thresholds of 7,500 AADT and 10 trains per day). General reference data can be collected for a larger number of crossings. Together, these improvements would allow a more comprehensive analysis, and thus prioritization of projects, in the regional freight plan.