# Counting Trains: Estimating Rail Traffic on Springfield's 3rd Street Rail Corridor for Planning Purposes

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This paper was updated due to confusion about the number and type of trains that may be using Springfield's 3rd Street rail line following improvements to that corridor necessary to support high speed rail traffic. For planning purposes, the SSCRPC continues to use an estimate of 40 to 60 train trips each day, involving a mix of passenger and freight.

One of the challenges in any planning project is to come to terms with the variables that affect the subject of the planning. In reviewing the planning issues associated with additional use of Springfield's 3rd Street rail corridor, two primary variables are the number and length of the trains that will be using the corridor each day at some point in the future. Complicating the count of the number of trains using the corridor is the number of trips these trains will make each day.

## Relevance of Train Numbers and Length

The importance of the number of trains is intuitive, while considering the number of trips is less intuitive but just as important. For planning purposes a trip constitutes each movement of a train along the corridor. A passenger train running a regular round-trip daily schedule along a rail corridor may be counted as one train, but it makes two trips each day. As the number of rail trips increases, the impact on the area increases[1]. This presumption was central to the 2003 Final Environmental Impact Statement (EIS) for the Chicago-St. Louis high-speed rail project as it specified, under the assessment of the high-speed rail alternatives, the level of service that underlies that analysis: eight passenger train round trips per day[2]. The memorandum of understanding between the Illinois Department of Transportation (IDOT) and the Union Pacific (UP) Railroad makes a similar distinction: 16 high speed passenger "trains" (we assume trips), or 8 passenger trains "each way".[3] Clearly the number of trains and the trips they make must be considered in any analysis of project impact.

[1] See, for example, Simons, R.A., and Jaouhari, A.E. (2004). The effect of freight railroad tracks and train activity on residential property values, *The Appraisal Journal:* pp. 223-233;.
[2] U.S. Dept. of Transportation, et al. (2003). *Final Environmental Impact Statement: Chicago-St. Louis High-Speed Rail Project* ( FHWA-IL-EIS-99-01-F): p. S-3.
[3] IDOT. *Memorandum of Understanding Between Union Pacific Railroad and Illinois Department of Transportation for a Process Related to Further Study of a High Speed Passenger Rail (110MPH) Proposal as Identified in the Midwest High Speed Rail Initiative Between Chicago, Illinois and St. Louis, Missouri Using Portions of Union Pacific Properties and Rights of Way*: p. 2. Signed May 8 & 15, 2009.

The length of the trains is also important and only slightly less intuitive. For example, in determining traffic impacts, as the length of the trains increases, the delay at any one intersection increases and the number of intersections closed at any one time increases. The number of intersection closings due to additional rail traffic is critical to our understanding of impact, for while traffic signals at road intersections create delays, these delays are most often independent of one another. Train delays are interdependent as they close multiple crossings at the same time, making the modeling of such effects more difficult.[4]

Because planning involves an assessment of not just current but also future conditions, it is not uncommon for the analysis to provide scenarios. These scenarios are the stated assumptions under which the analysis is conducted, and most often are in "best-case/worst case", "high-end/low-end", "highly-likely/less-likely", or other terms. This is the approach that the Springfield-Sangamon County Regional Planning Commission (SSCRPC) has taken in its analysis of 3rd Street rail corridor impacts.

Coming to terms with the number (both passenger and freight) and length of trains expected to be using the corridor at given times due to line improvements accruing from the proposed high-speed rail project would be simplified if either the project proposer (the Illinois Department of Transportation - IDOT) or the involved railroad company (the Union Pacific Railroad – UP) would provide such figures. However this has not occurred, leaving the SSCRPC to estimate the number of trains for planning purposes.

To arrive at its estimate, the SSCRPC considered both the number of "trains" and number of "trips" indentified in various documents associated with the high-speed rail project. As noted previously, distinguishing between trains and trips is important as there is a difference between the two terms. For example, if six passenger trains are expected to be served by a route, and these six trains will each have one round-trip on the route each day, this creates 12 trips per day. It is the number of trips, not just the number of trains, which generates local impact. Unfortunately these terms appear to be used interchangeably in some of the documents and discussions related to the project.

The number of trains/trips as well as type of train (passenger/freight) may need to be distinguished for other reasons as well. For example, in looking at the impact of additional rail use on residential property values, the research indicates that freights have more impact than passenger. [5] In this case the number of freight trains needs to be distinguished from the number of passenger. In considering vibration impacts, passenger appears to have more impact than freight because of the higher speeds at which they operate.[6] Because of differences such as these no generic set of scenarios can be used for every analytic situation. Analytic work done by the SSCRPC will state the scenarios used for the analysis.

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[4] Wheeland, L. , et al. (2009). *Preliminary Report of Impacts on Travel Associated With Increased Freight Traffic on the 3rd Street Rail Corridor*, p.3. Springfield-Sangamon County Regional Planning Commission: Springfield, IL.

[5] Simons and Jaouhari. Op cit.

[6] U.S. Department of Transportation. Op cit., p. 2-19.

## Arriving at Train Number Scenarios

The 2003 EIS, mentioned above, only speaks to eight passenger train trips, while the memorandum of understanding (MOU) between the UP and IDOT speaks to "16 High Speed passenger trains (8 each way) plus a pair of Texas Eagle trains", for a total of 18-20 trips depending upon whether of not the two Texas Eagle trains will be involved in daily round-trips.[7] However, this same memorandum notes that since UP is currently constructing an intermodal (rail/truck) transfer facility four miles south of Joilet on this route, it "intends to increase intermodal and other train volume" on the route.[8] The MOU does not provide an estimate of this increase. It is clear that the route is intended to increase rail traffic beyond the current amount plus the additional daily 16 high-speed passenger train trips and two Texas Eagle trains. Our expectation is that this increase will be from freight traffic given the stated relationship to the Joilet facility.

To establish high and low rail traffic scenarios useful in analysis, the SSCRPC began with comments made in December of 2008. At that time the SSCRPC was informed that the UP was interested in increasing rail traffic on the corridor using the current single-track, and that inclusive of current traffic, this could amount to 40 to 60 rail trips per day. This appeared to indicate a significant increase, in that a study conducted in 2005 had indicated an average UP-line rail use of only 8-9 trains per day.[9] Representatives of the UP subsequently reported to the Springfield Area Transportation Study (SATS) that it would only increase train traffic if economic conditions changed, and subsequently reported to the press that it had filed plans with the Illinois Commerce Commission (ICC) to triple the number of trains and increase speeds on the 3rd Street corridor subject to track and crossing upgrades. This was reported as increasing traffic to 15 trains per day on this single track.[10] It was unclear if this increase represented 15 trains or 15 trips. It is important to note that this increase would be available just with the capacity offered by only the single track line currently available to UP. The addition of another track, as called for in the current high-speed rail plan, would provide additional capacity for both passenger and freight.

In looking for a set of scenarios to plan toward, the SSCRPC selected a 40-trip minimum for planning purposes since: (a) UP plans were already in place for 15 trains per day using only one track, without clearly distinguishing between the number of trains and trips, leading us to believe that an additional track could provide capacity for an additional 15 trips; (b) the MOU between IDOT and UP would call for an additional 16 trains (or possibly 18-20 depending upon the Texas Flyer), again without clearly distinguishing the number of trips; and, (c) the MOU indicated that the UP was

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[7] IDOT. *Memorandum of Understanding Between Union Pacific Railroad and Illinois Department of Transportation for a Process Related to Further Study of a High Speed Passenger Rail (110MPH) Proposal as Identified in the Midwest High Speed Rail Initiative Between Chicago, Illinois and St. Louis, Missouri Using Portions of Union Pacific Properties and Rights of Way*: p. 2. Signed May 8 & 15, 2009.
[8] Ibid: p. 1.
[9] Hanson Professional Services, Inc. (2005). *Feasibility Study: Springfield Railroad Consolidation*: p. 2-1. Springfield, IL.
[10] Landis, T. (Dec. 3, 2008). More trains, higher speeds planned for third st. tracks, *Springfield State Journal-Register:* pp. 1&8. Springfield, IL.

interested in "increased intermodal and other train volume" because of its new Joilet intermodal facility.

The 15 trains in the existing plan, plus an additional 16 trips due to high-speed rail (as per the MOU), plus the two Texas Flyer trains (assuming one trip each), would generate 33 trips per day themselves. It seemed reasonable for planning purposes to assume that the Joilet intermodal facility in conjunction with new double tracks between St. Louis and Chicago could reasonably result in an increase in freight traffic at least equal to the existing number of trains (15) planned for the existing single track. This would equal 48 trips per day made up of existing and new trains, passenger as well as freight. Therefore the SSCRPC selected 40 new train trips per day as the low-end base scenario for planning purposes. This number was ultimately validated by the UP in a letter from its representative to local officials, saying, "…we currently have about 15 trains per day operating in the 3rd Street corridor, and this number will increase to about 40 trains per day after our line is upgraded to high speed rail standards."[11]

However, we continue to believe that this number most likely understates the number of trains that will be using the corridor in the out-years. The 40 train-trip per-day estimate minus the 18 passenger trains associated with the high speed rail proposal as per the MOU would leave only 22 trips per day. Since 15 of these trips are suggested by UP as existing, the supposition is that once both the additional track is in and the UP's Joilet facility is complete, there will only be 7 additional freight trips per day (40-trip estimate, minus 18 new passenger, minus 15 existing Amtrak and freight, equals 7 new freight) serving that facility from the St. Louis to Chicago line. We believe that the additional new track could minimally provide the same capacity as the current one (15 trips per-day) for additional freight.

The UP further notes in their letter that "a passenger train consumes 2-3 times the capacity of a freight train".[12] If this is true, and for planning purposes we might assume it is, an increase of 16 passenger trips on the corridor (the number of trips indicated in the MOU) or 12 passenger trips (the number currently being used publically by IDOT, and different from that agreed to in the MOU) would have the same capacity effects as 48 or 36 new freight trips, respectively. This would seem to indicate that the SSCRPC's use of 40-60 new train trips per day is useful for planning purposes.

The upper end of the scenario was selected based upon presumed capacity of the double-tracked line from St. Louis to Chicago. Through conversations with ICC staff, engineers who had studied the railroad corridor, and others familiar with the industry, we were given corridor capacity figures of between 70 and 80 trains per day. The SSCRPC ultimately chose the more conservative 60-trains per day for its upper-end scenario, as even if the new two line system could support additional capacity, it was unlikely on the near term (2014-2018).

[11] Correspondence from Mr. John H. Rebensdorf, VP Network Planning and Operations, Union Pacific Railroad, to Hon. Timothy J. Davlin, Mayor of Springfield, Hon. Andy Van Meter, Chairman, Sangamon County Board, and Mr. Milton R. Sees, Capital Infrastructure Group, LLC. August 7, 2009, p. 1.
[12] Ibid, p. 2.

The SSCRPC believed that the 40 to 60 train scenarios were appropriate and useful from the outset and has found no additional information to change this view.

## Arriving at Train Length Scenarios

As noted above, in considering train traffic impacts the length of the trains is very important. The SSCRPC came to its length scenarios – 4,500 to 6,000 ft – through direct observation.

Of course it is not possible to measure a random sample of trains as they move through the city. This is also not information readily available from the railroads. However it was possible to come up with a reasonable approach to determine train length for analytic purposes.

To determine the approximate length of time a train might block a crossing, the SSCRPC conducted multiple timing counts on Springfield's 10th Street rail corridor. The 10th Street rail corridor was selected for this analysis because trains currently run at about 40 mph on this corridor; the anticipated speed that they will operate on the 3rd Street corridor following improvements for high-speed rail. As part of this timing, the SSCRPC counted railroad cars to get timing per car. The counting of the cars allowed for a general estimate of train length based upon an average car length of 60 ft. The reader should understand that this length does not include length of the locomotive engine or engines.

It appeared from our analysis that trains of between 75 cars and 100 cars were within two standard deviations of the mean: in simple terms, the vast majority of trains operating on the 10th Street corridor fell between these car lengths. Using 60 ft as the average car length, this would indicated trains of 4,500 to 6,000 feet. These lengths were adopted as the length scenarios for our analysis.

We have been informed by staff of the ICC that these lengths are conservative, and that an upper limit of 7,000 ft might be more appropriate. We believe that this may be true, and may largely result from our not including the locomotive engines as part of the train length. Additionally we have been informed that the railroads are experimenting with 10,000 ft and 12,000 ft trains.

Given that a portion of the trains involved in our analysis are passenger trains, which tend to be shorter than freight trains, we currently believe that the more conservative 4,500 to 6,000 ft train length is more appropriate to our analysis. Additional attention will be given to appropriate train length as we continue our work.

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The Springfield-Sangamon County Regional Planning Commission (SCRPC) serves as the joint planning body for Sangamon County and the City of Springfield, as well as the Metropolitan Planning Organization for transportation planning in the region.

The Commission has 17 members including representatives from the Sangamon County Board, Springfield City Council, special units of government, and six appointed citizens from the city and county. The Executive Director is appointed by the Executive Board of the Commission.

The Commission works with other public and semi-public agencies throughout the area to promote orderly growth and redevelopment, and assists other Sangamon County communities with their planning needs. Through its professional staff, the SSCRPC provides overall planning services related to land use, housing, recreation, transportation, economics, environment, and special projects. It also houses the Sangamon County Department of Zoning and Building Safety which oversees zoning, building permits and code, and liquor licensing for the County.

The Commission prepares area-wide planning documents and assists the County, cities, and villages, as well as special districts, with planning activities. The staff reviews all proposed subdivisions and makes recommendations on all Springfield and Sangamon County zoning and variance requests. The agency serves as the county's Plat Officer, Floodplain Administrator, Census coordinator, and local A-95 review clearinghouse to process and review all federally funded applications for the county. The agency also maintains existing base maps, census tract maps, township and zoning maps and the road name map for the county.

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