Docket No. FRA-2016-0028

GRADE CROSSING WARNING TIMES ON THE DENVER RTD COMMUTER RAIL SYSTEM

Legal Memorandum to the Federal Railroad Administration

By DENVER TRANSIT PARTNERS

November 2018
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REQUESTED RELIEF

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Ex. A Wabtec, Wireless Crossing Activation System Engineering Design Statement
Ex. B RTD Waiver Request (April 7, 2016)
Ex. D FRA Waiver Letter (Nov. 2, 2016)
Ex. G FRA Letter (June 16, 2017)
Ex. H RTD Waiver Request (July 25, 2017) and DTP Grade Crossing Warning Time Measurement and Performance Criteria (July 20, 2017)
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INTRODUCTION

Denver Transit Partners (DTP) submits this legal memorandum in support of its objections to a recent notice alleging regulatory violations concerning the grade crossing warning system on the Denver Regional Transportation District’s (RTD) commuter rail network. DTP requests that FRA reject those allegations and authoritatively interpret 49 C.F.R. Part 234 or, in the alternative, modify the waiver that currently applies to the warning system’s operations.

The recent notice alleges noncompliance with Section 225. That Section provides: “A highway-rail grade crossing warning system shall be maintained to activate in accordance with the design of the warning system, but in no event shall it provide less than 20 seconds warning time for the normal operation of through trains before the grade crossing is occupied by rail traffic.”

The notice faults DTP for “excessively long” warning times. It claims that, on certain occasions, the warning system has provided too much time between the moment the warning lights start flashing and the moment the train enters the crossing. Because FRA regulations do not establish a maximum warning time, the basis for the inspectors’ determination is the waiver that currently governs warning system operations on the RTD network. The waiver provides that FRA will “not object to a warning occurring within 5 seconds before and 15 seconds after the relevant programmed warning time.” Ex. J at 2. According to FRA, warning times “outside these ranges are considered warning system malfunctions,” and a “warning time more than the maximum allowable warning time for
each crossing” could be deemed a “false activation” triggering the requirements of
Section 234.107(c) for flaggers or speed restrictions.  Ex. L at 2.

The terms of the waiver, and the inspectors’ notice, all rest on a fundamental
misapplication of FRA regulations.  As a consequence, DTP now faces the prospect of
severe fines and penalties even though its warning system is in full compliance with
Section 225.  FRA should reject the inspectors’ report, decline to find any violations
based on the recent notice, and issue an authoritative interpretation of Part 234 that
includes the following:

First, FRA should conclude that the RTD warning system fully complies with
Section 225 because it is consistently providing at least 20 seconds’ warning time and is
being “maintained to activate in accordance with [its] design.”  Contrary to FRA’s
apparent view, the RTD warning system is not designed to produce warning times within
the narrow -5/+15 window reflected in the waiver, 100 percent of the time, across the
hundreds of thousands of activations per year.  No system can perform with such
invariability.  That is because once the warning signals are activated, the system has no
control over train speed (aside from penalty braking).  If the train operator then slows the
train for safety reasons when visibility is poor, or delays the train at a station to allow a
large group of passengers to board, there is nothing the system can do:  the signals have
already activated, and motorists at a crossing will experience a longer warning time.  In
these circumstances, the warning system has not falsely activated or malfunctioned.  To
the contrary, it is performing exactly as designed.  See Ex. A (statement of system
designer Wabtec).  Like any constant warning time system, RTD’s system can improve
consistency, but it cannot guarantee the warning time experienced by drivers in every activation.

Second, FRA should make clear that an “excessively long” warning time, standing alone, is not a false activation or malfunction. Under FRA regulations, a false activation or malfunction is an activation “caused by a condition that requires correction or repair of the grade crossing warning system.” 49 C.F.R. § 234.5. “Excessively long” warning times are not necessarily caused by such a condition. Indeed, as explained above, there are a variety of factors that are not controlled by the system but can affect warning time, such as when an operator slows the train after the warning is activated—a common occurrence on a commuter line, where trains make frequent stops and are constantly accelerating and decelerating. In those situations, the system is working exactly as designed, and the “excessive” duration of the warning time arises from the actions of the train operator, not from a malfunction in the warning system.

Third, FRA should adopt a testing protocol that fairly and accurately measures the performance of grade crossing warning systems. The regional inspectors are simply observing normal operations and measuring the warning time, i.e., the time elapsed between the moment the warning lights begin flashing and the moment the train enters the crossing. This methodology is seriously flawed. Warning time is not an accurate measure of system performance, because “excessively long” warning times can and do result even when the system is performing exactly as designed. Instead, FRA should adopt as a testing protocol the approach set forth in FRA Technical Bulletin S-08-02. That standard properly tests the system in controlled conditions and isolates factors not
controllable by the system. It does not evaluate the system based on the warning times experienced by motorists; rather, it assesses the ability of the system to activate signals in accordance with the system’s design.

In the event FRA chooses not to issue an authoritative interpretation of Part 234, it should in the alternative, and at a minimum, modify the waiver that currently applies to RTD’s warning system. The waiver should be modified consistent with the three points above: it should explain that out-of-range warning times, standing alone, do not amount to Section 225 violations; it should make clear that out-of-range warning times are not necessarily “false activations” or “malfunctions”; and it should direct regional inspectors to adopt the testing protocol described in Technical Bulletin S-08-02.

The current state of affairs is untenable. For more than two years, DTP has provided passenger rail service to millions of Denver-area residents. Its safety record is strong and the RTD commuter rail’s 97.3% on-time performance ranks among the best of any commuter line in the nation. DTP operates with greater warning-time consistency than any comparable railroad, and the warning times experienced by motorists when an RTD train is crossing are equal to, or even less than, the times they experience when a freight railroad is using the same crossing. DTP is committed to safe and efficient operations that fully comply with FRA regulations, and its warning system is working exactly as designed. Yet regional inspectors are attempting to enforce a mistaken
regulatory interpretation that will impose devastating costs and burdens on DTP, threatening the operational and economic viability of RTD’s commuter rail service.¹

**LEGAL STANDARDS**

The legal requirements governing the performance of grade crossing warning systems are set forth in Part 234.

**49 C.F.R. § 234.225** provides that:

A highway-rail grade crossing warning system shall be maintained to activate in accordance with the design of the warning system, but in no event shall it provide less than 20 seconds warning time for the normal operation of through trains before the grade crossing is occupied by rail traffic.

**49 C.F.R. § 234.107** provides that:

Upon receipt of a credible report of a false activation, a railroad having maintenance responsibility for the highway-rail grade crossing warning system shall promptly initiate efforts to warn highway users and railroad employees at the crossing by taking the following actions: (a) Prior to a train’s arrival at the crossing, notify the train crew of the report of false activation and notify any other railroads operating over the crossing; (b) Notify the law enforcement agency having jurisdiction over the crossing, or railroad police capable of responding and controlling vehicular traffic; and (c) Provide for alternative means of actively warning highway users of approaching trains.

The regulation then specifies various options for the required alternative warnings in the event of a credible report of a warning system malfunction. If there is an “appropriately equipped flagger” for each direction, or there is a traffic or law enforcement officer present at the crossing, trains can proceed at normal speed. **49 C.F.R. § 234.107(c)(1).**

¹ DTP understands that RTD has also received notices from FRA inspectors alleging regulatory violations concerning the grade crossing warning system. For the reasons stated herein, DTP also objects to the alleged regulatory violations sent separately to RTD.
Otherwise, the train must reduce speed to 15 mph (a reduction from the system’s 79-mph maximum authorized speed) (id. § 234.107(c)(2)); or the train must fully stop, have a crew member flag the crossing, and then reboard. See id. § 234.107 (allowing use of procedures set out in 49 C.F.R. § 234.105).

The regulations define a “[w]arning system malfunction” as “an activation failure, a partial activation, or a false activation of a highway-rail grade crossing warning system.” 49 C.F.R. § 234.5. And they define a “[f]alse activation” as “the activation of a highway-rail grade crossing warning system caused by a condition that requires correction or repair of the grade crossing warning system. (This failure indicates to the motorist that it is not safe to cross the railroad tracks when, in fact, it is safe to do so.)” Id.

**BACKGROUND**

The Denver Regional Transportation District (RTD) commuter rail system is a central part of a multibillion-dollar expansion of the area’s public transportation system known as the Eagle Project. In 2010, RTD entered into an innovative, public-private partnership with Denver Transit Partners (DTP) to construct and operate three new commuter rail lines through the Eagle Project. The $2.3 billion initiative, known as Eagle P3, relies on a combination of public funds and investments from DTP, which has a 34-year contract to design, build, and operate the commuter lines.

The lines at issue here are the A Line, the B Line, and the G Line. The A Line is a 22.8-mile electric commuter rail corridor running from Denver’s Union Station to Denver International Airport, passing through the growing and populous areas of east Denver and
Aurora. Commuters are served at the six intermediate stations by thousands of parking spaces, and the line connects to numerous other rail and bus options. Scheduled trip time for the full length of the corridor is 37 minutes, with 15-minute headways from early morning through the late evening, and 30-minute headways at other times. Service runs approximately 22 hours a day.

The B Line currently provides service on a six-mile line between Union Station and Westminster Station, which anchors a transit-oriented, mixed-use redevelopment area near Westminster’s historic core and provides connections to additional transit lines. The current service operates every 30 minutes during peak hours.

The G Line is expected to open in the near future. It will run 11.2 miles between Union Station and Wheat Ridge, in the northwest suburbs, and serve six intermediate stations. Trains will run every 15 minutes from the morning through evening rush hour, with 30 minute headways in the early morning and at night. The stations on the G Line will provide more 2,200 parking spaces, and the service is expected to be heavily used by commuters as an alternative to I-70.

Since revenue service began on April 22, 2016, the RTD’s commuter rail system has safely carried more than 15 million passengers. It has recorded 97.3% on-time performance thus far in 2018. It is the best-performing of all RTD transit lines of any mode and its on-time performance ranks among the best of any commuter system in the nation. Moreover, the RTD’s commuter rail system has already generated substantial economic benefits. Among other things, it has spurred the development of a 385-acre

The A Line has 11 highway grade crossings, 10 of which are also used by separate but parallel Union Pacific tracks that occupy the same right-of-way. The B Line has only one grade crossing. The G Line will have 16 grade crossings.

Each grade crossing uses four-quadrant gates—the most effective and advanced gate configuration—in addition to flashing lights and other components, such as median barriers. The gates and warning lights can be activated in two ways: a unique, advanced wireless methodology and conventional track circuit technology. (An independent system monitors freight train movement on the parallel Union Pacific or BNSF tracks, but activates the same warning devices.)

**RTD’s Grade Crossing Warning System Technology**

The RTD grade crossing warning system has two integrated parts: an underlying Conventional Track Warning System (CTWS) and a Wireless Crossing Activation System (WCAS). The CTWS uses a track circuit that traverses thousands of feet of track on approach to the crossing. When the train arrives at the beginning of the approach circuit, the warning cycle begins. The length of the approach track circuit is calculated so that a train traveling at the Maximum Authorized Speed (MAS) for the entire length of the circuit will arrive at the crossing no fewer than 20 seconds after the warning lights

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2 Crossings at York/Josephine, Quebec, Sable/Chambers, and 60th Avenue employ a three-gate design because of physical constraints at the crossing sites and/or one-way traffic flows, enhanced by medians that operate as a physical barrier to vehicles driving around lowered entrance gates and across the tracks.
begin to flash. For the CTWS, the expected warning time is:

\[
\text{Expected warning time (seconds)} + \text{preemption time} = \frac{\text{Length of the Approach Circuit (feet)}}{\text{MAS (feet per second)}}.
\]

The actual warning time, however, depends on the speed of the train. If the train travels more slowly than the MAS, the warning time will be longer than the expected warning time. If the train stops on the approach circuit, either for a station stop or for any other reason, the warning time will be extended by the amount of time the train is stationary, in addition to the time added by deceleration and acceleration below the MAS. This is typical of the rail industry and electrified railroads in particular.

The WCAS is an overlay to the CTWS. Unlike the CTWS, the WCAS can adjust the warning time dynamically as a train approaches the crossing, up to the point that the crossing must be activated. The WCAS can delay the activation of a crossing if a train is travelling slowly, or if it stops at a station on approach to the crossing. The WCAS works through wireless communication between the train and the crossing; it leverages the train-speed data and train-position data contained within the Positive Train Control system to predict when the train will arrive at the crossing. The WCAS uses this prediction to instruct the lights when to begin to flash so as to provide consistent warning times that never fall below 20 seconds. The train sends the message to activate the crossing warning devices in accordance with the programmed warning time (PWT)—that is, when the system predicts the train is PWT seconds away from the crossing. If, after the flashers are activated, the train does not progress toward the crossing as predicted due to human operator decisions and train handling, the actual warning time experienced by
highway users will differ from the PWT. No system can account for all possible variations, such as the possibility that a train might stop unexpectedly after activation, in which case the warning will extend indefinitely.

The following diagrams illustrate the components of the CTWS and WCAS:
The Waivers And Recent Inspection Report

The Initial Waivers. In April 2016, revenue service was about to begin on the A Line. The WCAS was functional, but not yet approved for service by FRA. On April 7, 2016, RTD requested a short-term waiver to allow service to begin with the wireless system installed but not operational. Ex. B. FRA granted the waiver on April 19, 2016.

The WCAS soon became operational with FRA approval, but shortly thereafter FRA inspectors expressed concern with long warning times. Accordingly, while DTP worked to decrease the frequency of long warning times, it sought and received a series of waivers allowing it to continue to use the system without fear of fines or penalties based on the questions inspectors had raised. See Exs. C–F (Oct. 14, 2016, Nov. 2, 2016, Feb. 1, 2017, and Apr. 27, 2017 waiver extension letters). Among the conditions for the waivers was the presence of flaggers at each crossing during all operating hours, as well as continued efforts to make the wireless system more reliable. Ex. E (Feb. 1, 2017 letter).

FRA’s June 16, 2017 Letter. In the summer of 2017, FRA wrote that “RTD’s grade crossing activation design is unique and does not provide a consistent warning time that FRA has typically observed on other grade crossing activation systems.” Ex. G at 1. FRA did not, however, provide any examples of the warning times it typically observes. The agency acknowledged that “FRA regulations do not prohibit the use of grade crossing activation circuits that provide wide variations in warning times as long as the system is operating as designed and the minimum warning time is not less than 20 seconds.” Id. It stated that “FRA accepts RTD’s design” and “expects RTD to propose a
set of criteria for each crossing that will be evaluated, and if approved by FRA, used in a field review process by FRA and the Colorado Public Utility Commission to determine whether a crossing is successfully meeting RTD’s designed warning time” for “both wireless and conventional activations.” Id. FRA also emphasized that it “looks forward to working with you to develop testing criteria that take into consideration trains using wireless activation, track circuits, or both, to activate a crossing.” Id. at 2. In response, RTD submitted a DTP document entitled Grade Crossing Warning Time Measurement and Performance Criteria. Ex. H.

RTD’s September 8, 2017 Request. On September 8, 2017, RTD wrote to request a waiver or policy statement to guide FRA inspectors. Ex. I. RTD noted that, according to Region 6, “FRA has historically applied” Section 225 by looking to whether there was a “significant difference” between the actual warning time and the programmed warning time. Id. at 1. Following the submission of actual operating data showing a high degree of consistency, RTD asked FRA to make clear that warning times occurring between “5 seconds before and 15 seconds after” the state-approved programmed warning time are not “significant difference[s].” Id. The request referenced an unpublished 10% standard that the Region had in an earlier letter stated would apply. DTP did not see any technical basis for a 10% standard, but understood that inspectors were to follow a detailed technical bulletin that assured proper testing. The -5/+15 second standard proposed by DTP also assumed that inspectors would follow the technical bulletin and conduct proper tests that eliminated operational variations.
September 28, 2017 FRA Letter. FRA responded by granting a five-year waiver. It stated that “FRA does not object to a warning occurring within 5 seconds before and 15 seconds after the relevant programmed warning time.” Ex. J at 2. FRA explained that, in its view, drivers “should experience warning times near or equal to industry standards, or the programmed warning times established by” the state regulators. Id. at 3. With regard to conventional activations, FRA stated that “in normal day-to-day train operations, FRA expects the CTWS to provide warning times at no more than the upper limits of the design of the WCAS.” Id. at 3. Finally, the letter set out a procedure for relief from the flagging requirement of the earlier waivers. Id. at 2. The letter did not contain any reference to a proper testing procedure to adjust for operational variations.

April 3, 2018 FRA Clarification. On April 3, 2018, FRA issued a letter “clarify[ing] the requirements and conditions” set forth in its September 28, 2017 waiver letter. Ex. L at 1. Among other things, the clarification stated that the +15 seconds metric would be the “maximum allowable warning time” under both the WCAS and the CTWS. Id. It then concluded that warning times “outside [the specified range] are considered warning system malfunctions,” and that a “warning time more than the maximum allowable warning time for each crossing” set forth in an attached table was a “false activation” triggering the requirements of Section 234.107(c) for flaggers or speed restrictions. Id. at 2.

FRA Approval of End of Flagging. In granting the 2017 waiver, FRA permitted the removal of flaggers—but only if allowed by the CPUC. Over the course of the summer of 2018, the CPUC approved the end of the permanent flagging operations on
the A Line, and FRA then gave its approval as well. See June 18, 2018, June 25, 2018, and July 17, 2018 FRA letters.

Recent Inspection Report. In August, a Region 6 inspector provided a list to RTD of multiple instances in which the warning time was purportedly “not in accordance with the design of the warning system” because the system activated more than the PWT plus 15 seconds before the train reached the crossing. These alleged violations were formally issued to DTP on October 10, 2018. Ex. M.

DISCUSSION

I. The RTD’s Commuter Rail Warning System Fully Complies With Section 225.

Section 225 does not, by its own terms, impose a maximum warning time. Rather, it requires only that a grade crossing warning system provide a minimum of 20 seconds’ warning before the train enters the crossing and that the system “be maintained to activate in accordance with [its] design.” In this case, RTD’s warning system consistently provides a minimum of 20 seconds’ warning before trains enter a crossing. Thus, the only possible way the warning system could be deemed noncompliant with Section 225 is if DTP or RTD were not “maintain[ing] the system[s] to activate in accordance with [their] design.” As shown below, RTD’s warning system—including both its conventional and wireless components—is being maintained to activate in accordance with its design.
A. Section 225 Does Not Impose A Maximum Warning Time, But Only Requires Maintenance To Activate In Accordance With Design.

Neither Congress nor FRA has ever required grade crossing warning systems to be designed in a way that establishes a maximum permissible warning time—that is, the amount of time that elapses between the moment the warning lights begin flashing and the train enters the crossing.

Congress authorized FRA to “prescribe regulations and issue orders to ensure the safe maintenance, inspection, and testing of signal systems and devices at railroad highway grade crossings.” 49 U.S.C. § 20134(b). FRA invoked its authority under this statute in promulgating Section 225:

A highway-rail grade crossing warning system shall be maintained to activate in accordance with the design of the warning system, but in no event shall it provide less than 20 seconds warning time for the normal operation of through trains before the grade crossing is occupied by rail traffic.

49 C.F.R. § 234.225.

FRA’s decision to include in the regulation a minimum warning time, but not a maximum, underscores that the agency’s choice not to impose a maximum warning time was a deliberate omission. Had FRA wished to establish a maximum time, it could easily have done so. But it elected not to.

The apparent reason that FRA chose not to establish a maximum warning time is that it wanted to mirror the standard set forth in the Federal Highway Administration’s Manual on Uniform Traffic Control Devices (MUTCD). As FRA explained in proposing its warning signal regulation, a 20-second minimum was “consistent with the
requirements of the MUTCD.” Grade Crossing Signal System Safety, 59 Fed. Reg. 3051, 3058–59 (Jan. 20, 1994). But because the MUTCD did not impose a maximum warning
time, FRA’s regulation did not impose a maximum warning time either.

The final version of the regulation instead adopted the 20-second minimum—and
added the requirement that the warning system must be “maintained to activate in
50086, 50099 (Sept. 30, 1994). The maintenance requirement was added at the
suggestion of a labor/management group, which “recommended that [the regulation] refer
to a maintenance, rather than a design requirement.” Id. FRA agreed, but noted that
“while drafting this section in terms of maintenance requirements may be appropriate,
there remains a need to maintain a minimum activation standard for warning systems.”
Id. (emphasis added). Thus it maintained the 20-second minimum without any mention
of “a need to maintain a [maximum] activation standard,” and added the requirement that
the system simply be maintained to activate in accordance with its design.3

3 The establishment of a minimum warning time is consistent with the establishment of
a MAS for the applicable section of track. Assuming the train is not speeding in
excess of the MAS, it is easy to calibrate crossing activation equipment to ensure a
20-second minimum. By contrast, establishing a maximum would effectively require
that the FRA set a minimum speed limit for the train, which would negate the duty of
the train operator to control speed according to circumstances. Once crossings
activate, with the intent that traffic receive a warning equal to the programmed
warning time, train operators remain free to approach the crossing at a slower rate
than assumed, whether stopping longer at stations in the activation zone, or otherwise
proceeding in a safe and controlled manner according to conditions. Prohibiting
warning time variation would mean the elimination of human operators or crossings.
In sum, Section 225’s regulatory history conclusively establishes that FRA chose to mandate a minimum warning time—but not a maximum warning time. Interpreting Section 225 as requiring a maximum warning time would be directly contrary to the agency’s intent when it promulgated the regulation—and would not be entitled to deference. See Canyon Fuel Co., LLC v. Sec’y of Labor, 894 F.3d 1279, 1291 (10th Cir. 2018) (no deference to agency interpretation when an agency’s “current interpretation runs counter to the intent at the time of the regulation’s promulgation”) (quoting Gonzales v. Oregon, 546 U.S. 243, 258 (2006) (internal quotation marks omitted)).

B. The RTD’s Warning System Is Being Maintained To Activate In Accordance With Its Design.

The grade crossing warning system on the RTD’s commuter rail system is being “maintained to activate in accordance with [its] design.” Thus, there is no basis for finding a violation of Section 225.

The CPUC recently analyzed the system’s performance and concluded that it is “operating in a correct and safe manner in accordance with the approved design and operational parameters,” both in wireless and conventional mode. That determination was based on extensive proceedings and a thoroughly documented record. See 2018 WL 3497321 (Colo. PUC July 13, 2018) (Quebec Street crossing); 2018 WL 3241378 (Colo. PUC June 27, 2018) (Ulster Street crossing); 2018 WL 3241387 (Colo. PUC June 27,

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4 Even if FRA has the statutory authority to set a maximum warning time, it plainly has not exercised that authority. The appropriate way to do so would be through formal, notice-and-comment rulemaking procedures, rather than through correspondence with an individual railroad, so as to allow all railroads and other stakeholders to participate.

FRA inspectors have faulted the operation of the RTD’s warning system because, in the agency’s view, there are too many warning times that exceed the PWT+15 seconds metric described in the waiver and clarification letter. But the fact that a small percentage of the warning times arising from hundreds of daily activations exceed this range does not constitute a Section 225 violation. To be sure, it may mean that the waiver parameters are not satisfied, but to constitute a violation of Section 225, there must be a failure to maintain the system to activate consistent with its design.

As shown below, and as described in more detail in the statement of system designer Wabtec (attached as Ex. A), the warning system is being maintained to activate in accordance with its design. The system is designed to activate the warning cycle at a particular time to provide the PWT; it is not designed to provide a maximum warning time. Indeed, it could not be designed to provide a maximum warning time, because warning time depends on factors outside the control of the warning system, such as an individual operator’s decision to slow the train after the warning cycle has begun.
1. **The CTWS Is Being Maintained To Activate In Accordance With Its Design.**

The RTD warning system is integrated. The wireless system is responsible for approximately 97 percent of activations; the conventional system for approximately 3 percent. Regional inspectors have recently alleged Section 225 violations arising from instances where the warning times following CTWS activations were outside the -5/+15 window.

These notices reflect a fundamental misunderstanding of the CTWS’s design. Conventional grade crossing warning systems are simply not designed to limit warning time, but only to ensure that warning devices activate at least 20 seconds before the train arrives at the crossing. Like all conventional systems, the CTWS is designed so that the train will trigger activation of the crossing at least 20 seconds before arriving at the crossing if it travels at the MAS for the entire length of the approach. The CTWS is **not** designed to adjust the warning time after the warning signals have been activated. The CTWS cannot account for trains that, for whatever reason, move more slowly after reaching the approach circuit.

Thus, like all conventional systems, the CTWS will result in warning times longer than 20 seconds when a train operates at less than MAS from the moment the circuit is activated until the train reaches the crossing. That is inherent in, and in fact is a **requirement** of its design. As the Transportation Research Board explained in 2017:

Simple motion-sensitive presence detection has to activate the grade crossing warning devices and preemption at the traffic signal based on an assumed travel speed. In order to be conservative, the circuit length is
constructed based on the fastest train so that there is enough time to meet [minimum warning time] requirements. That means that if there is a situation where a track circuit has been constructed to provide 20 seconds of warning time for a train traveling at 60 mph, the slowest train traveling at 30 mph may arrive at the crossing 20 seconds after it was predicted to arrive; however, this variability could be significantly greater.


RTD’s regulatory submissions emphasized that the CTWS will have longer warning times than the WCAS under some common operational scenarios. For example, RTD’s April 7, 2016 waiver request stated that when the CTWS is responsible for activating the warning systems, there may be “extended crossing warning and gate-down times, due to station stops or long approach times.” Ex. B at 1. Similarly, the *Measurement and Performance Criteria* document identified specific scenarios in which, if the CTWS were controlling the warnings, extended warning times (that is, times beyond those projected under the WCAS) might result. For example, the document explains that if PTC cuts out for a given train and the “[t]rain proceeds using conventional approach track circuits,” the “[r]esult” is “[p]ossible extended warning time expected,” including when there is a “station stop on the approach or other operational anomaly.” Ex. H at 11. The document also describes a “Dispatcher Hold” scenario that leads to reliance on the CTWS, and thus creates the “[p]otential for extended warning times.” *Id.* at 14. In these and other similar circumstances, the gates will remain down until the train reaches and clears the crossing—and the CTWS has worked exactly as
designed. In fact, in many cases, the “delay” is for safety reasons, such as poor visibility, rain, the presence of a trespasser on the tracks, and the like.

None of these scenarios were theoretical. Given the nature of the service—including many stations in close proximity to one another—these scenarios were expected to arise. FRA was aware of all of this, as it was fully engaged throughout the design process. The longer warning time under these scenarios is part and parcel of the way the CTWS is designed and does not constitute a violation of Section 225.

FRA has asserted that it “expects the CTWS to provide warning times at no more than the upper limits of the design of the WCAS.” Ex. J at 3. But it has never explained why it would be appropriate to measure CTWS performance based on a time window developed for the WCAS. Indeed, FRA’s approach defies the plain language of its own regulation. Section 225 requires that a system be maintained to activate in accordance with its own design—not the design of a different system.

2. The WCAS Is Being Maintained To Activate In Accordance With Its Design.

As the CPUC determined, the warning system on the A Line is “overall activating approximately 91% of the time within a range of -5/+15 seconds around the programmed warning time,” and “the system is working relatively consistently.” 2018 WL 2085793 ¶ 98 (Colo. PUC Apr. 25, 2018). This performance level is even stronger when the CTWS activations are removed from the mix. By any measure, the WCAS is working as designed.
The WCAS was not designed to produce actual warning times as experienced by highway users within the -5/+15 window with 100% accuracy across tens of thousands of activations a year. Achieving that feat is scientifically impossible. No system can account for every act by an operator under changing conditions, and no system can control train movement (aside from penalty brake application) when a train slows or stops after the gates are down and the warning lights are flashing. See FHWA, *Railroad-Highway Grade Crossing Handbook* at 129 (2007) (noting that even in a constant warning time system “changes in train speed will change train arrival time at the crossing and, correspondingly, reduce (or increase) the elapsed warning time at the crossing”). As RTD has documented, real-world warning times at the same crossing can and do vary dramatically on systems throughout the nation. See Ex. K (CPUC testimony of Aaron Marx and supporting video narration and spreadsheets). This is a widely understood aspect of warning system design, and the unavoidable variability explains why, to DTP’s knowledge, there has never been a prior enforcement action finding a violation of Section 225 based on “excessive” warning times.

The performance of the WCAS is consistent with—and in many cases better than—the performance of other railroads’ warning systems. Notably, on the same crossings, RTD’s warning times are more consistent than Union Pacific’s, as the graph below demonstrates (full-size copy at Ex. N), yet there is no suggestion that Union Pacific’s warning system is not being maintained to activate in accordance with its design. It would be arbitrary, capricious, and unfairly discriminatory, to hold DTP and RTD to a higher standard than any other railroad.
FRA’s approach to RTD performance is inconsistent with how the agency has historically tested for compliance with Section 225. As FRA explained in Technical Bulletin S-08-02, where it cited the *Grade Crossing Signal System Safety Technical Manual*, compliance is measured by using an actual train run “at (or very near) the maximum authorized speed,” or a simulation based on the maximum authorized speed. Bulletin at 2-3. Here, however, FRA is measuring compliance based on train runs at variable speeds without adjusting for those operational variations. “Agencies are under an obligation to follow their own regulations, procedures, and precedents, or provide a rational explanation for their departures.” *Big Horn Coal Co. v. Temple*, 793 F.2d 1165, 1169 (10th Cir. 1986) (quoting *Nat’l Conservative Political Action Comm. v. FEC*, 626 F.2d 953, 959 (D.C. Cir. 1979)). For that reason, “[a]n unexplained inconsistency in agency policy is a reason for holding an interpretation to be an arbitrary and capricious change from agency practice.” *Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2126 (2016) (internal quotation marks omitted). FRA has never explained why it has
apparently chosen to abandon its longtime approach to testing for Section 225 compliance in assessing the performance of the RTD’s grade crossing warning system.

II. The RTD’s Warning System Is Not “Falsely Activating” Or “Malfunctioning” When Actual Warning Times Are Outside The Range Described In The Waiver.

In its waiver letters, FRA has stated that a “grade crossing warning system providing an excessively long warning time … is considered a false activation.” Ex. L at 2. Similarly, it has stated that warning times “outside [the -5/+15] range[ ] are considered warning system malfunctions.” Id. These statements are incorrect as a matter of law and, if this interpretation were enforced, it would threaten the continued viability of the RTD’s commuter rail system in light of the remedial measures that false activations and malfunctions require. DTP should not be required to operate under the specter of fines for occurrences that cannot be controlled by any warning system.


FRA has defined “false activation” as “the activation of a highway-rail grade crossing warning system caused by a condition that requires correction or repair of the grade crossing warning system.” 49 C.F.R. § 234.5. A false activation is a “warning system malfunction.” See id. (“Warning system malfunction or warning system malfunction at a highway-rail grade crossing means an activation failure, a partial activation, or a false activation of a highway-rail grade crossing warning system.”). When a railroad receives a credible report of a false activation, it must promptly take
remedial measures, including providing “alternative means of actively warning highway
users of approaching trains.” 49 C.F.R. § 234.107. These alternative means can include
speed reductions or arranging for flaggers at the crossing. See id.

Under a straightforward application of the regulations, an “excessively long”
warning time is not a false activation or malfunction unless it is caused by a condition
that requires “correction” or “repair” of the warning system. As explained above, when
the CTWS activations result in warning times outside the buffer window, that does not
mean the system is failing to work in accordance with its design, or that there is a
problem that needs to be corrected or repaired. To the contrary, the system is performing
exactly as designed. Like other conventional systems across the country that do not have
constant-warning-time functionality, the CTWS activates on the assumption that a train
will proceed at the maximum allowed speed after triggering the detection system in order
to assure the 20-second minimum will always be met. There is nothing that needs to be
fixed.

The same holds true for the WCAS component. Any failure to produce warning
times within the prescribed range is due to ordinary operating factors. No constant
warning system, no matter how sophisticated, can account in all situations for the myriad
of human factors and happenstance, such as a large group of commuters taking an
inordinately long time to board a train, or a delay for safety reasons that occurs after the
gates come down. The WCAS is not designed to delay activations in such circumstances
because the signals have already been activated based on a prediction that is only valid if
conditions do not change. For that reason, a warning time outside the prescribed range is
not a false activation or malfunction warranting correction or repair. That is simply not how the system was designed.


FRA’s regulations addressing false activations and malfunctions are aimed at ensuring safety, but deeming outside-the-range activations to be false activations will not promote public safety. Rather, the severe economic and operational consequences—in the form of speed restrictions or flagmen—would jeopardize the economic viability of providing continued commuter rail service to Denver-area residents.

1. The CPUC Found That Outside-The-Range Warning Times Do Not Present A Safety Risk.

The CPUC has determined that the “excessively long” warning times on the A Line do not raise safety concerns. The CPUC reached that conclusion in April 2018, based on extensive “testimony and evidence, including the bell curve graphs and the underlying raw data,” and a hearing before an Administrative Law Judge. 2018 WL 2085793 ¶ 106. The Commission explained that even if “excessive” warning time can be a safety issue for other crossings, the additional protections in use on the A Line eliminate those concerns here.

The Commission acknowledged the concerns about whether drivers might attempt to cross the tracks in the event they became frustrated by an excessively long warning. But the Commission explained that, “[a]s to when a warning becomes ‘excessive,’ the
evidence in the record is based on a single study with limited applicability, and is not compelling. The evidence shows that, in the event a driver becomes frustrated with the warning time, the A-Line and G-Line crossings are equipped with four-quadrant gates and other improvements to prevent” unsafe crossing of the tracks. 2018 WL 2085793 ¶ 105.

In fact, to confirm its conclusion, the Commission demanded additional data about the warning system’s performance at each individual crossing prior to approving the release of flaggers. 2018 WL 2085793 ¶ 120. After reviewing this additional data, the Commission concluded that the A Line’s warning system—conventional and wireless activations alike—was “operating in a correct and safe manner in accordance with the approved design and operational parameters.” See 2018 WL 3497321 (Colo. PUC July 13, 2018); supra page 17.

2. The Remedial Measures Required By False Activations And Malfunctions Would Have Devastating Consequences For The Continued Operation Of The RTD’s Commuter Rail System.

If FRA were to enforce its interpretation that out-of-range activations are “false activations” and “malfunctions” without a credible report, continued operation of the RTD’s commuter rail service would not be sustainable. The required remedial measures—speed restrictions or flaggers—would be devastating. In the case of speed restrictions, it would depress ridership by substantially lengthening commutes, eliminating the main reason commuters prefer the train to driving. A permanent slow order—requiring trains to operate below 15 mph through each crossing, see 49 C.F.R.
§ 234.107(c)(2)—would slow the system to a near crawl. This would lead to cascading delays and a substantial decrease in on-time performance and reliability.

In the case of flaggers, the initial train causing the “false activation” would have to stop when reaching the crossing; the train crew would then flag the crossing and reboard before the train could start up again—a process that would take at least four minutes per train. Flaggers would be needed at every crossing until a systemwide issue could be ruled out. Each successive train (with 15-minute headways) would have to do the same thing until ground-based flaggers could reach the crossings. All of this would quickly lead to huge backups and massive delays, resulting in widespread commuter frustration (drivers and train passengers alike) and decreased ridership. Hiring permanent flaggers for each crossing during all hours of operation (approximately 22 hours a day) would cost millions of dollars per month and would not be economically possible. See 2018 WL 2085793, at *28 (Apr. 25, 2018) (statement by CPUC Commissioner Koncilja that prior requirements for indefinite flagging resulted in “substantial costs which are ultimately borne by the taxpayers,” and “delay[ed]” “economic development”).

If out-of-range warning times are deemed false activations or malfunctions, the operational and economic consequences would quickly become unmanageable, as the “remedial measures” would effectively become permanent mandates. That is because Section 234.103 requires the remedial measures to continue “[u]ntil repair or correction of the warning system is completed.” But that could never happen because there would be nothing to “repair or correct[ ].” The warning system is operating exactly as designed.
III. FRA Should Adopt A Fair And Accurate Protocol For Testing Warning System Performance.

   The methodology that regional inspectors are using to evaluate the performance of RTD’s warning system is seriously flawed. FRA should adopt the approach described in FRA Technical Bulletin S-08-02 as a fair and accurate testing protocol for grade crossing warning systems.

   A. The Inspectors’ Current Approach To Warning System Performance Is Misguided.

   Region 6 inspectors are evaluating the performance of RTD’s warning system by observing trains in live operations in the field, or by identifying trains that have run with PTC cut out—and then reviewing stored CCTV footage of those trains. The inspectors record the time elapsed from the moment the lights begin to flash to the moment the train arrives at the crossing. This amount of time is the warning time. If the warning time is longer than PWT plus 15 seconds, the inspector concludes that the “crossing warning time is not in accordance with the design of the warning time system.”

   This methodology is illustrated by Larry Stubrud’s Inspection Report #73, dated August 16, 2018. It states

   CROSSING WARNING TIME NOT IN ACCORDANCE WITH THE DESIGN OF THE WARNING SYSTEM. (OBSERVED CAR 4014 WITH PTC CUT OUT AND WITH WARNING TIME OF 4:37 AT HAVANA STREET AT 11:12:55.

   The inspection report then recommends a violation of Section 225.
In fact, in this and similar cases, the warning system was functioning precisely as designed. PTC was cut out in this instance. With PTC cut out, it was not possible to establish a wireless session required for activation using the WCAS. In the absence of the WCAS, a conventional activation took place, consistent with the system’s design. Since the train was traveling well below the Maximum Authorized Speed necessary to provide the minimum required warning of 20 seconds, the warning time was elongated.

Section 225 requires that warning systems be “maintained to activate in accordance with [their] design,” yet DTP’s maintenance program can only address the mechanical, electrical, and electronic functioning of the system. FRA inspectors should do the same. Instead, the inspections focused on the warning time after activation, which is entirely a function of factors outside the control of the system, and therefore is neither a fair nor accurate measure of system performance.


FRA should adopt and issue a testing protocol for assessing the performance of grade crossing warning systems. Specifically, FRA should use the test described in Technical Bulletin S-08-02 (Ex. O).

As the Bulletin makes clear, the “maintained to activate in accordance with design” requirement of Section 225 looks to whether there is “a significant difference” between “the actual warning time provided during testing” and the “prescribed warning time.” Bulletin at 3. “Prescribed warning time” is defined as “the length of time from the moment that properly operating warning devices begin to provide their intended warning
(e.g., the flashing lights begin to flash) until an approaching train operating at maximum authorized speed enters the crossing.” Id. at 1.

The most suitable method of running this test is by using “an electronic device that accurately determines warning time,” based on a train movement that “must be at or very near the maximum authorized speed for the route approaching and through the crossing.” Bulletin at 3 (quoting Grade Crossing Signal System Safety Technical Manual). If testing were conducted using an actual train movement, it still “must be at (or very near) the maximum authorized speed for the route approaching and through the crossing.” Id. at 2.

Formally adopting a test protocol for evaluating Section 225 compliance will provide a uniform standard that ensures all railroads are treated equally and fairly. It will avoid the disparities and unfairness that inevitably result when regional inspectors apply differing tests and methodologies.

Regardless of the precise test protocol FRA follows or may adopt, DTP will continue monitoring actual warning times, and will analyze trends in the percentage of warning times that fall between -5 and +15 seconds of the programmed warning time for each crossing. DTP will investigate and repair any mechanical, electrical or electronic defect found to contribute to a significant increase in that percentage.

REQUESTED RELIEF

DTP requests that FRA reject the regional inspectors’ allegations of a regulatory violation and conclude that there is no basis for finding a violation of Section 225.

DTP also requests that FRA issue an authoritative interpretation of Part 234 providing that (1) Section 225 does not require a maximum warning time; (2) instances of
“excessively long” warning times are not “false activations” or “malfunctions” absent a credible report; and (3) FRA should adopt Technical Bulletin S-08-02 as a testing protocol for evaluating the performance of grade crossing warning systems.

In the alternative, DTP requests that the existing waiver be amended consistent with the three points above.

Respectfully submitted.

DENVER TRANSIT PARTNERS

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