

FRA therefore is requiring that the following conditions be met.

a. Opposing traffic lanes on both highway approaches to the crossing must be separated by either: (1) Medians bounded by non-traversable curbs or (2) channelization devices.

b. Medians or channelization devices must extend at least 100 feet from the gate arm, or if there is an intersection within 100 feet of the gate, the median or channelization device must extend at least 60 feet from the gate arm.

Driveways for private, residential properties (up to four units) are not considered intersections in calculating the required median length.

c. Intersections of two or more streets, or a street and an alley, that are within 60 feet of the gate arm must be closed or relocated. Driveways for private, residential properties (up to four units) within 60 feet of the gate arm are not considered to be intersections under this part and need not be closed. However, consideration should be given to taking steps to ensure that motorists exiting the driveways are not able to move against the flow of traffic to circumvent the purpose of the median and drive around lowered gates. This may be accomplished by the posting of "no left turn" signs or other means of notification. For the purpose of this part, driveways accessing commercial properties are considered to be intersections and are not allowed. It should be noted that if a public authority cannot comply with this 60 feet requirement, it may apply to FRA for a quiet zone under § 222.39(b), "Public authority application to FRA." During the comment period FRA was made aware of many circumstances in which roadways parallel to the tracks would not physically accommodate a 60 feet median. It was always FRA's intent to allow public authorities to apply to FRA for consideration of SSMs that do not fully comply with the provisions of Appendix A. There should be many circumstances in which medians or traffic channelization of less than 60 feet in length may sufficiently reduce risk in order to permit the creation of a quiet zone. FRA will review such applications and give them due consideration.

d. Crossing warning systems must be activated by use of constant warning time devices unless existing conditions at the crossing would prevent the proper operation of the constant warning time devices. FRA has been made aware that constant warning devices may not work properly under certain circumstances such as in electrified territory. If conditions exist that would not allow constant warning time systems to work as intended, other appropriate types of

control circuitry may be used. Constant warning time devices are not required to be added to existing warning systems in Pre-Rule Quiet Zones. However, if warning systems in Pre-Rule Quiet Zones are upgraded, or new warning systems are installed, constant warning time devices are required.

e. Crossing warning systems must be equipped with power-out indicators. Power-out indicators are not required to be added to existing warning systems in Pre-Rule Quiet Zones. However, if warning systems in Pre-Rule Quiet Zones are upgraded, or new warning systems are installed, power-out indicators are required.

f. The gap between the lowered gate and the curb or channelization device must be one foot or less, measured horizontally across the road from the end of the lowered gate to the curb or channelization device or to a point over the curb edge or channelization device. The gate and the curb top or channelization device do not have to be at the same elevation.

g. "Break-away" channelization devices must be frequently monitored to replace broken elements.

*Effectiveness:*

FRA estimates that channelization devices have an effectiveness of .75 and medians with non-traversable curbs with or without channelization devices have an effectiveness of .80. The installation of traffic channelization devices as part of North Carolina's "Sealed Corridor" demonstration project provides empirical data upon which to base an effectiveness rate. Traffic channelization devices were installed at the Sugar Creek Road crossing in Charlotte, NC. Prior to the traffic channelization devices being installed, the Norfolk Southern Corporation and NCDOT counted the number of motorists going around the crossing gates for twenty weeks. This data established a baseline traffic violation rate. The number of violations were then counted after installation of the channelization devices. Comparing the number of violations before and after the grade crossing treatment showed that violations decreased by 77 percent. As in the NPRM, FRA discounts this rate slightly for the novelty effect that may occur immediately following installation of the treatment and to account for the added safety benefit of the horn which was sounding during the study. FRA therefore assigns an effectiveness rate of 75 percent for traffic channelization devices. FRA reasons that medians with non-traversable curbs present a greater deterrence, and estimates their effectiveness rate at 80 percent. This

reasoning is supported by data collected in Spokane County, WA where non-traversable medians reduced violations at the University Road crossing by 92 percent. The unusual physical and operating characteristics of the crossing are sufficiently different from an average crossing that FRA believes that the effectiveness rate in this study should be discounted when determining an effectiveness rate for a national rule.

#### 4. One Way Street With Gates

This installation consists of one way streets with gates installed so that all approaching highway lanes are completely blocked. FRA is requiring that the following conditions are met.

a. Gate arms on the approach side of the crossing should extend across the road to within one foot of the far edge of the pavement. If a gate is used on each side of the road, the gap between the ends of the gates when both are in the lowered, or down, position should be no more than two feet.

b. If only one gate is used, the edge of the road opposite the gate mechanism must be configured with a non-traversable curb extending at least 100 feet.

c. Crossing warning systems must be activated by use of constant warning time devices unless existing conditions at the crossing would prevent the proper operation of the constant warning time devices. FRA has been made aware that constant warning devices may not work properly under certain circumstance such as in electrified territory. If conditions exist that would not allow constant warning time systems to work as intended, other appropriate types of control circuitry may be used. Constant warning time devices are not required to be added to existing warning systems in Pre-Rule Quiet Zones. However, if warning systems in Pre-Rule Quiet Zones are upgraded, or new warning systems are installed, constant warning time devices are required.

d. Crossing warning systems must be equipped with power-out indicators. Constant warning time devices are not required to be added to existing warning systems in Pre-Rule Quiet Zones. However, if warning systems in Pre-Rule Quiet Zones are upgraded, or new warning systems are installed, constant warning time devices are required.

*Effectiveness:* FRA does not have an empirical data source for an effectiveness rate for one way streets with gates. FRA reasons that as this SSM will fully block approach lanes to the highway rail crossing, it's effectiveness should be similar to other measures that physically prevent a motorist from entering a crossing when