

Highway-Rail Grade Crossing Review

*Prepared by CTC, Inc., for
Metro-North Railroad*

July 28, 2016

Tuxedo Park, NY
East Village Road
DOT # 263501F, MP 37.30
Port Jervis Line

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Prepared by:

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1.0 General Information

During the week of February 22, 2016 a joint field inspection was conducted of the highway-rail grade crossing (DOT# 263501F) on the Port Jervis Line located in Tuxedo Park, New York. Representatives from Metro-North Railroad (Railroad), New York Department of Transportation (NYSDOT), and CTC, Inc. (CTC) were present.

CTC has analyzed the above referenced highway-rail grade crossing at the request of the Railroad. The inspection has been summarized in this report, which includes site specific characteristics, observations, and data analysis. This report also includes recommendations for improvements that may be required by the MUTCD and/or general industry practices.

In accordance with the 2009 MUTCD Chapter 8C, Section 8C.09

The Railroad acknowledges that its actions are limited to those permitted under the MUTCD and/or applicable regulatory agency and that the decision to implement any of the recommendations contained in this report rests solely with the Agency.

2.0 Site Characteristics

East Village Road is a two-lane roadway (one lane in each direction) over the crossing approaching the non-signalized intersection at State Route 17.

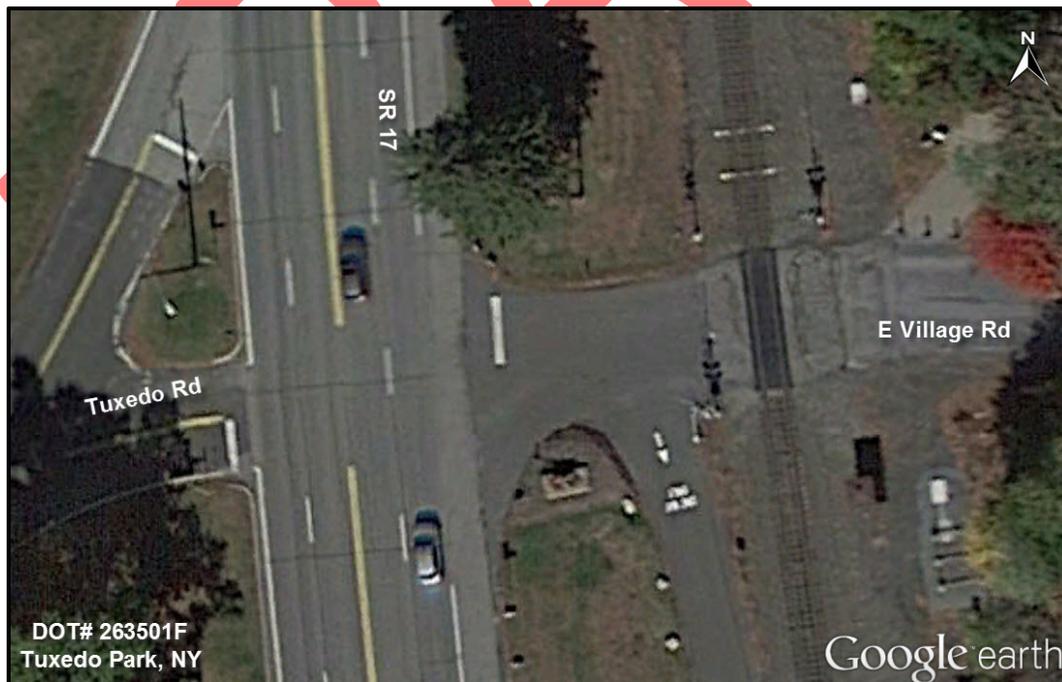


Figure 1 – DOT # 263501F; East Village Road at State Route 17

The Railroad operates on one main line track. The railroad active warning system at the crossing consists of railroad flashing-light signals and automatic gates for vehicular traffic in both directions. An additional pair of railroad flashing-light signals is located in the northwest corner of the crossing that face northbound traffic on State Route 17. There is one electro-mechanical bell present. The audible warning bell terminates when the gates reach the horizontal position.

The Tuxedo Station Stop is located approximately 500 feet south of the crossing and is within the railroad circuit approach limits. New York, Susquehanna & Western Railway also shares the use of this crossing operating on Metro-North Railroad tracks.



Figure 2 - Westbound and Eastbound View of Crossing

3.0 Site Analysis

3.1 Roadway

The roadway surface approaching and departing the tracks is in poor condition with depressions, cracking and edge raveling. Motorists traversed the crossing at a reduced speed due to the abrupt height changes. Scarring of the pavement from vehicles is visible.



Figure 3 - Roadway Surface

Traffic lane widths over the crossing are as narrow as 15 feet with virtually no shoulder over the tracks. The measured grade approaching the crossing is an average of 5.5%.

3.2 Vehicular Traffic / Business Access

During the review, the following operations were observed by CTC or reported by on-site representatives:

- Possible restriping of State Route 17 and installation of a traffic signal at the intersection with East Village Road to include re-alignments of Tuxedo Road on the west.
- The westbound left turn in to the station stop parking could potentially cause queuing over the tracks, although this was not observed as we were not present during peak times
- Tractor-trailers and propane vehicles frequently cross the tracks here. Due to the steep approach grades and the fact that some vehicles have mandatory stops at the crossing, travel speed over the crossing for these trucks is extremely low. Representatives also indicated that northbound tractor-trailers turning right to go east on East Village Road make very wide turns and often block the westbound vehicles causing back-ups on the tracks.
- To the east of the crossing there is a fuel truck depot, an athletic complex and residential housing.

3.3 Pedestrians

Currently there are no pedestrian treatments or sidewalks at the crossing. Pedestrians must cross the roadway and grade crossing to reach the station platform from the remote parking lot located on the north side of the roadway. The remote parking lot exits via a pedestrian stairway at the edge of the roadway on the north side which no further pedestrian designated pathway to access the station.



Figure 4 - Pedestrian Crossing

3.4 Station Stop

Trains approaching, slowing and stopping at Tuxedo Station activate the warning devices at the grade crossing. As a result, long warning times much greater than the designed warning time of 30 seconds were observed. The vehicular traffic and pedestrians associated with the station stop cause congestion and queuing of vehicles at the crossing.

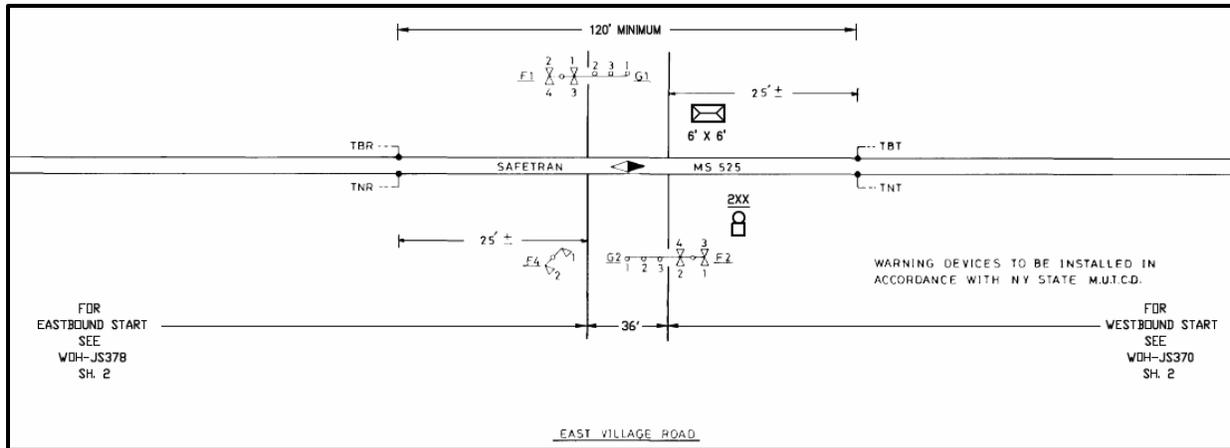


Figure 5 - Circuit Plans

3.5 Signage

“DO NOT STOP ON TRACKS” signs (R8-8) are visible to motorists approaching the intersection and crossing from all approaches. Only one grade crossing warning sign (W10-1) is currently installed for westbound traffic.



Figure 6 - Do Not Stop on Tracks sign

3.6 Pavement Markings

It appears from Google Earth imagery that some pavement markings were installed at one time. However, no evidence was found in the field inspection of previous markings.



Figure 7 - Pavement Markings

4.0 Railroad Warning System Operations

The current railroad warning system is a motion detection track circuit. Detection and activation of warning devices occur as soon as the train enters the circuit. Excessive warning times exist when trains approach and stop at the Tuxedo Station.



Figure 8 – View of Tracks

5.0 Recommendations

After a detailed review of the data collected during the on-site visit, CTC proposes the following recommendations for the Agency, NYSDOT and Railroad's consideration to improve the operation at the highway-rail grade crossing:

5.1 Roadway

- **Evaluate the roadway/sidewalk at the crossing to determine if the sidewalk widths can be expanded to better accommodate pedestrians traveling over the crossing.** As part of the crossing surface replacement, sidewalk areas need to be adjusted to provide for a level walkway over the tracks to the greatest degree possible. Widening the sidewalk over the crossing is recommended.
- **Evaluate the roadway surface to address the uneven road / track condition.** Repaving of the roadway should be considered and improvement of the roadway grade approaching the crossing, if feasible.
- **Implement tubular markers along edge of pavement to help guide motorists over the crossing and prevent turns onto the railroad right-of-way.**

5.2 Vehicular Traffic / Business Access

- **Consider the installation of a traffic signal at the intersection of East Village Road and State Highway 17 to provide a track clearance movement for the tracks. Due to the steep grades approaching the crossing, a pre-signal should also be installed. Reconfiguration and realignment of the entrance to Tuxedo Road may be required along with State Highway 17 re-striping. A conceptual design is shown in the figure below.**

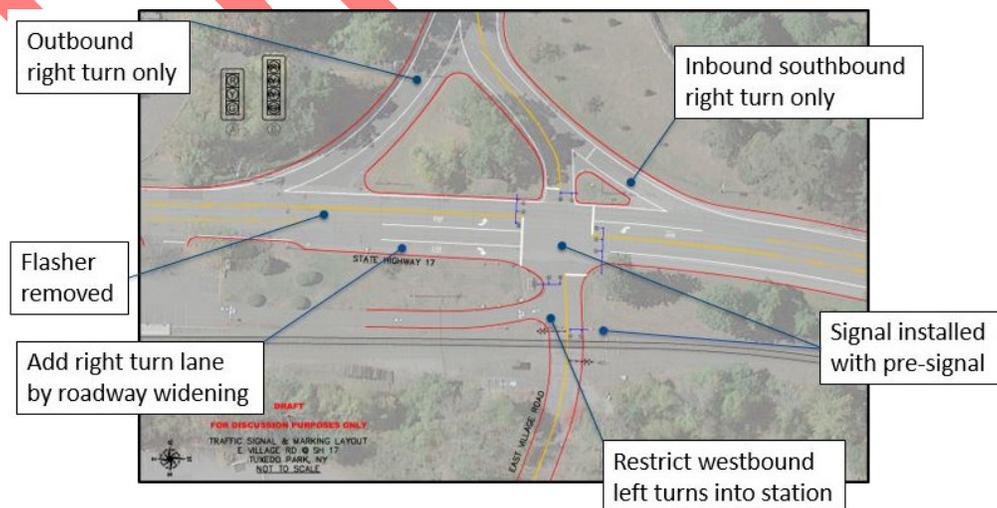


Figure 9 - Traffic Signal and Restriping

5.3 Signage

- Review installation of low ground clearance warning sign (W10-5) for eastbound East Village Road and modify for proper installation height in accordance with the MUTCD.
- Consider installation of intersection advance warning signs (W10-2) for northbound and southbound State Route 17 in accordance with the MUTCD Chapter 8, Section 8b.06.
- Replace the existing “DO NOT STOP ON TRACKS” signs (R8-8) with New York Standard “STATE LAW - DO NOT STOP ON TRACKS” signs (NYR 9-5) and locate the new signs downstream of the tracks for each approach for improved visibility. Vehicles may extend over the tracks based on the existing operation and the installation of these signs provides additional emphasis to alert road users not to stop on the tracks (Refer to the MUTCD, Chapter 8B, Section 8B.09).

5.4 Pavement Markings

- Re-install or refresh the railroad pavement markings in advance of the highway-rail crossing. The railroad crossing pavement marking symbol, lane lines, and stop line should be installed in accordance with MUTCD Chapter 8, Section 8B.27. The advance railroad warning signs may need to be relocated based on the placement of the railroad pavement marking symbols.
- Install edge lines and double yellow centerline through the crossing to help guide motorists over the tracks.

5.5 Pedestrians

- Convene a diagnostic team consisting of knowledgeable representatives of parties of interest in a highway-rail grade crossing to further evaluate the pedestrian treatments at the crossing and make appropriate modifications. At a minimum, the following should be considered:
 - Consider installation of a sidewalk and ADA accessible pedestrian ramp on the north side of East Village Road and connect with a crosswalk at the intersection of State Route 17. Fencing will be needed to force pedestrian to use the provided pathway and not meander across the roadway. A designated path could then be provided from the southeast corner of the intersection at State Route 17 to the station as shown in figure 10 below.
 - Implement a pedestrian emergency exit route behind the gates to allow pedestrians to escape the tracks without resorting to entering the traveled roadway or lifting the gate. The existing sidewalks and location of automatic gates leave pedestrians stranded

between the lowered gates within the minimum track clearance distance. This forces pedestrians to enter the roadway and walk around, lift the gate or walk under the lowered gate. Proposed new language for the next edition of MUTCD recommends that sidewalks be relocated behind the roadway gates. Fencing and pedestrian gates are then used to control pedestrian access while still allowing for an escape route to prevent stranding pedestrians between lowered gates.

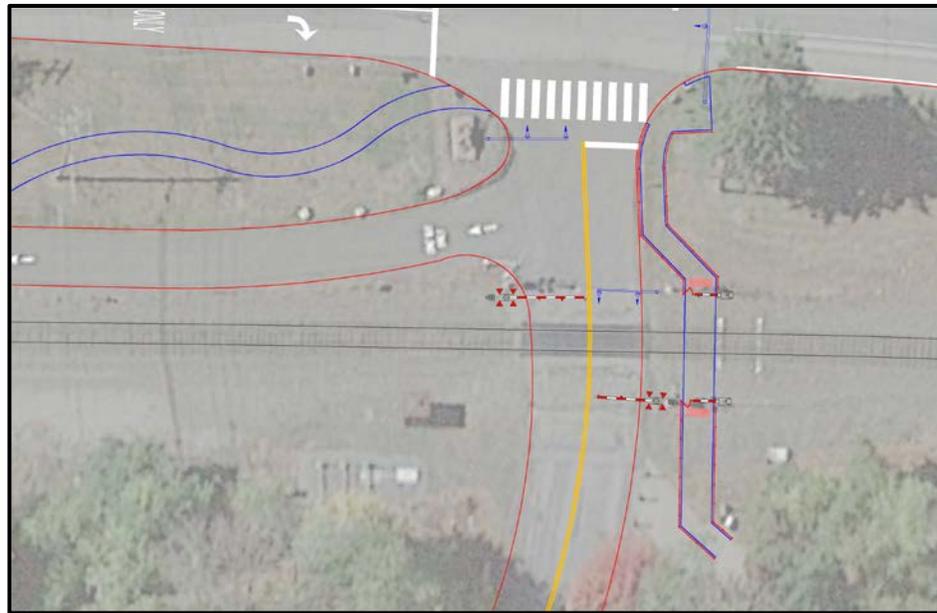


Figure 10 - Pedestrian Gates and Sidewalks

5.6 Railroad Warning Devices

- **Evaluate the gate bell operation.** The pedestrian bell terminates when the gate reaches the horizontal position. To provide additional warning for pedestrians, bicyclists and/or other non-motorized road users consideration should be given to allowing the pedestrian bells or other audible warning devices to remain active for the duration of the crossing activation. See AREMA C&S Manual Part 3.1.15.D.5

5.7 Circuitry and Warning Time

- **If a traffic signal is installed, update the railroad equipment, circuitry, and active warning devices to accommodate the requested preemption interconnect and timing at the Agency's request.** Upgrade existing equipment to provide advance preemption and interconnection to the traffic signal system. Also a thorough review of operating practices, maximum authorized speed and any civil speed restrictions in effect should be conducted to better understand the nature of the longer warning times. Because of the nearby station stop, longer warning times may be unavoidable.

6.0 Conclusion

In addition to the operational improvements and recommendations in this report, the Railroad, Agency and NYSDOT should assemble a diagnostic team to review thoroughly and analyze all elements pertaining to the highway-rail grade crossing. The points covered in this report provide an initial road map for items of note that the diagnostic team should consider, as well as, any other safety-sensitive and operational specifics to enhance the overall operation. Once the diagnostic team determines the recommended modifications, an action plan should be developed to implement the improvements.

DRAFT

APPENDIX A – References

CTC utilized the following supporting documents and recommended operational practices in evaluating the railroad operation and roadway design:

- AREMA (2016). *Manual for Communications and Signals (C&S Manual)*. Landover, MD: American Railway Engineering and Maintenance-of-Way Association (AREMA).
- AASHTO (2011). *A Policy on Geometric Design of Highways and Streets, 2011*. American Association of State Highway and Transportation Officials (AASHTO).
- AASHTO (2011). *Roadside Design Guide, 2011*. American Association of State Highway and Transportation Officials (AASHTO).
- FHWA (2009). *Manual on Uniform Traffic Control Devices (MUTCD)*. Federal Highway Administration (FHWA).
- FHWA (2007). *Railroad-Highway Grade Crossing Handbook - Revised Second Edition*. Federal Highway Administration (FHWA).
- FRA (July 25, 2012). Technical Bulletin S-12-0, *Guidance Regarding the Appropriate Processes for the Inspection of Highway-Rail Grade Crossing Warning System Pre-emption Interconnections with Highway Traffic Signals*. Federal Railroad Administration (FRA).
- ITE (2006). *Preemption of Traffic Signals Near Railroad Crossings, An ITE Recommended Practice*. Washington, DC: Institute of Transportation Engineers (ITE).
- NTSB (2003). *Collision Between Metrolink Train 210 and Ford Crew Cab, Stake Bed Truck at Highway-Rail Grade Crossing in Burbank, California, on January 6, 2003, Highway Accident Report NTSB/HAR-03/04*. Washington, DC: National Transportation Safety Board (NTSB).
- NYSDOT (2011). *New York State Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition)*. New York State Department of Transportation (NYSDOT).
- NYSDOT (2015). *New York Highway Design Manual*. New York State Department of Transportation (NYSDOT).