

Feasibility Review – Franklin Line Quiet Zone Franklin, MA

To: Michael Maglio – Town Engineer, Town of Franklin, MA
FROM: Daniel L. Murphy, Jr., PE
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Tighe & Bond was retained by the Town of Franklin to consider the feasibility of establishing a new railroad grade crossing Quiet Zone (QZ) on the Franklin MBTA commuter line where passing trains are presently required to blow their horns as they pass, in accordance with Code of Federal Regulations (CFR) Title 49, Part 222 (49 CFR 222), "Use of Locomotive Horns at Public Highway – Rail Grade Crossings". If the Town were to follow the necessary steps to establish a Quiet Zone with the Federal Railroad Administration (FRA) under Subpart C of that code, the trains would no longer be required to blow their horns.

The proposed quiet zone would include the grade crossings of the MBTA Commuter Rail Franklin line with the following public roadways (with DOT Crossing Inventory Number):

- Forge Parkway (921771W)
- Grove Street (536865M)
- Beaver Street (536863Y)
- Public Works Way (536862S)
- Fisher Street (536861K)
- Union Street (536859J)

The Massachusetts Bay Transportation Authority (MBTA) is the primary operating railroad at each of these crossings with CSX also operating on this line. Keolis, referenced herein, is under contract with the MBTA to operate the Commuter Rail Lines.

This memorandum summarizes the evaluation process to establish a potential quiet zone and resulting recommendations, estimated costs to implement necessary changes, as well as the required next steps should the Town wish to proceed.

Background

49 CFR 222 is a nationwide standard that requires locomotive horn use at public highway-rail grade crossings for safety reasons, with some exceptions for freight-specific track and slow-moving passenger trains operating on track that is not part of the general railroad system. Specifically, trains are required to blow their horns in an established pattern, typically beginning 15-20 seconds before they occupy the crossing.

As train horns can be somewhat startling and even disruptive through residential neighborhoods and business districts, 49 CFR 222 also provides a process by which public authorities/communities can request relief from the routine train horn requirement by establishing a quiet zone. Within a quiet zone, horns may still be sounded in the event of an emergency or if necessary to comply with certain other regulations or railroad rules. The bells at the crossing will still ring in conjunction with the flashing lights.

In order to qualify, a quiet zone must be at least one-half mile in length, be equipped with active grade crossing warning devices and with advance warning signs notifying drivers, cyclists, and pedestrians that horns are not sounded at the crossing.

Active grade crossing warning devices shall include:

- Flashing lights with bells
- Gates that control traffic traveling over the crossing in conformance with the Manual on Uniform Traffic Control Devices (MUTCD)
- Constant warning time devices, if reasonably practical
- Power out indicators

Establishment of a quiet zone further requires that one of the following conditions must be met:

- Supplementary Safety Measures (SSMs, as defined in 49 CFR 222 Appendix A) are installed at every public highway-rail grade crossing within the quiet zone and may include:
 - Medians or channelization devices
 - One-way streets with gates
 - Four quadrant gate systems
 - Temporary or permanent grade crossing closures
- The average Quiet Zone Risk Index (QZRI) is less than or equal to the Nationwide Significant Risk Threshold (NSRT) with or without SSMs
- The QZRI is less than or equal to the Risk Index with Horns (RIWH) with SSMs

If any of the above criteria are met, the public authority can establish the quiet zone without making formal application and gaining approval from FRA, though there is still a process by which notification is made to FRA and other stakeholders of intent and establishment of the quiet zone. To establish a quiet zone that does not meet one of the above criteria, the public authority is required to prepare a formal application for review and approval by FRA.

FRA recommends that all grade crossings in the quiet zone be reviewed by a diagnostic team consisting of representatives of the public authority, the railroad owner, the State agency responsible for crossing safety, and FRA grade crossing managers.

Diagnostic Site Review and Determinations

A Diagnostic Site Review was held Thursday, June 29, 2023, with representatives from Franklin DPW and Police/Fire, FRA, MBTA, Keolis, and MassDOT. After a briefing by Tighe & Bond at the DPW facility, the diagnostic team visited each of the six locations to look at the sites, assess the existing conditions and make an assessment as to the appropriate action. The default consideration going into the site assessment was to upgrade the existing two-quadrant gates to four-quadrant gates at all six locations, so part of the intent of the diagnostic was to confirm that this proposed Supplemental Safety Measure would be effective.

In addition to the site-specific recommendations that were made, the following general recommendations will apply to each of the locations under consideration:

- Installation of the four-quadrant gate system or other SSM and establishment of the quiet zone shall be preceded by an engineering review of the warning and regulatory signage and pavement markings to confirm compliance with the Manual on Uniform Traffic Control Devices (MUTCD) and update/refreshing of the same as necessary.

- Switching the Train Detection system from Motion Detection (as noted on the Crossing Inventory Form) to Constant Warning Time. Keolis noted that the capability of doing so is present in the existing system.
- Upgrading the railroad flashing lights to 12" LEDs, and reviewing/updating traffic signal timing and coordination at signalized locations.
- MBTA operating rules for installation of four-quadrant gate systems also require installation of vehicle detection within the gate envelope and emergency stop indications. This will require a full redesign of the railroad signal system and will likely require hardware upgrades.
- All railroad signs and equipment should be reviewed for proper sight lines. Some signs or equipment may be obscured by utility poles or other signs/equipment.

Forge Parkway (921771W)

The railroad runs at a skew across Forge Parkway, which is median divided at the crossing and has a two-quadrant gate system with bells and flashers and a raised median. The median extends more than 100' from the gate arm in both directions.

A 100 ft median on each approach to a grade crossing (GX) is an approved SSM for establishment of a quiet zone; however, two quadrant gates are a minimum requirement for all Public GXs in a QZ, and according to 49 CFR Part 222, Appendix A, "the gap between the lowered gate and the curb... must be one foot or less." The gate on the north approach would have to be relocated further north by about 20 feet to meet that requirement.

On the south approach, the gate may need to be rotated slightly or the curb extended to meet the one-foot gap requirement.

Curbing may need to be reset to become non-traversable.

Determination: Existing median is an approved SSM. Some relocation and adjustment of the gates or median as described above may be required to meet QZ criteria.

Grove Street (536865M)

The railroad runs at a skew across two lanes of undivided roadway. There is a two-quadrant gate system with bells and flashers in place. Installation of a four-quadrant gate system would be an appropriate measure at this location.

The location of and/or rotation of the existing gates would need to be considered for proper alignment within the updated four-quadrant system. The existing gates and foundations would likely need to be reset, since the exit highway gate of a 4 quad gate system cannot also be used as a Pedestrian gate.

Determination: Upgrade to four-quadrant gate system as SSM

Beaver Street (536863Y)

This crossing consists of two-quadrant gates with bells and flashers. There is an existing sidewalk along the south side of Beaver Street at the crossing. Installation of a four-quadrant gate system would be appropriate at this location.

Proper accommodation/protection of pedestrians would be required.

Determination: Upgrade to four-quadrant gate system as SSM

Public Works Way (536862S)

This crossing, providing access to the department of Public Works facilities, consists of two-quadrant gates with bells and flashers. Upgrade to a four-quadrant gate system would be appropriate at this location.

Determination: Upgrade to four-quadrant gate system as SSM

Fisher Street (536861K)

This crossing consists of two-quadrant gates with bells and flashers. Installation of a four-quadrant gate system would be appropriate at this location.

Determination: Upgrade to four-quadrant gate system as SSM

Union Street (536859J)

The MBTA Commuter Rail Franklin Line over Union Street, with an MBTA industrial line (used by CSX) just south (approximately 100' apart, track center to track center) of the Commuter Rail Line. (see Figure 1)



Figure 1 - Two highway-rail grade crossings; MBTA Commuter Rail and an MBTA Industrial line operated by CSX cross Union Street in close proximity to one another

The Franklin Line crossing has a two-quadrant gate system with bells and flashers, with pedestrian gates covering both approaches of the sidewalks on either side of the street. There is also a gate across a commercial driveway on the west side of the street, between the two rail lines, that activates with the crossing gates.

The industrial line crossing has bells and flashers, but no gates, as this is a slow-speed line. An approaching train on the industrial rail approaches and waits for traffic to stop before crossing Union Street.

When a train approaches on either line, the equipment at both crossings activates.

(It was noted during the diagnostic review that both crossings are identified under the one Grade Crossing ID noted above. Subsequently FRA has assigned the industrial crossing a new ID 980897N. Both systems will continue to activate together.)

The Franklin Line Quiet Zone, if implemented, will include only the Franklin Line crossing, and will not include the now independent industrial crossing. According to consultation with FRA, the train on the Industrial track does not need to sound the horn for 15 to 20 seconds on the approach to the Industrial GX because they are required to stop before occupying the GX and not proceed over the GX until the flashing lights are activated for 20 seconds and the vehicle traffic has stopped. Then as they start over the GX they start the horn cadence but are only required to sound the horn until they occupy the GX.

Trains on the industrial line will continue to be required to sound their horn as described above, unless a separate Quiet Zone consisting of that one crossing is established, if it were to meet all necessary criteria.

The recommendation is that a four-quadrant gate system for the MBTA Commuter Rail crossing would be appropriate.

Determination: Upgrade to four-quadrant gate system as SSM

Opinion of Probable Construction Cost

In order to provide the Town with an order of magnitude opinion of probable construction cost, we reached out to MBTA Engineering Division who provided an estimate of approximately \$1.3 Million (2024 dollars) as an approximate average cost for design and construction to upgrade from a two-quad gate system to a four-quad gate system, install crossing envelope detection and upgrade the railroad signals.

The MBTA noted that in some situations there could be some site-specific safety measures that may increase that cost. A 10% contingency has been carried below for that reason.

The Town would be responsible for all costs associated with design and construction of any improvements required to implement the QZ.

Grade Crossing	Work Description	Estimated Cost
Forge Parkway	Relocate gate, adjust gate and/or median	\$500,000
Grove Street	Upgrade to 4-quad gate	\$1,300,000
Beaver Street	Upgrade to 4-quad gate	\$1,300,000
Public Works Way	Upgrade to 4-quad gate	\$1,300,000
Fisher Street	Upgrade to 4-quad gate	\$1,300,000
Union Street	Upgrade to 4-quad gate	\$1,300,000
	Subtotal:	\$7,000,000
	10% Contingency	\$700,000
	Total:	\$7,700,000

Since the Forge Parkway grade crossing has medians that meet the requirement of a SSM, cost will be less than a full upgrade, but relocation of one gate and adjustment to another, or extension of the median may be required. Rail signal equipment upgrades may also be required.

Next steps

If the Town wishes to move forward with this project and pursue establishment of a Public Authority Designation quiet zone under 49 CFR 222, the next steps as outlined in subsections 222.39 and 222.43 would be:

- The Town would provide written notice of its intent to create a New Quiet Zone, by certified mail, return receipt requested to MBTA/Keolis, CSX, MassDOT, FRA, and any others required; the Notice of Intent would be followed by a 60-day comment period.
- In collaboration with MBTA/Keolis and FRA, the Town would design and install any SSMs and improvements to the rail signal system.

The Town would provide written notice of the establishment of a Quiet Zone by certified mail, return receipt requested to MBTA/Keolis and CSX, Franklin Police Department, MassDOT, FRA's Associate Administrator of Safety, and any others required; said notice shall include updated Grade Crossing Inventory Forms reflecting modifications made, as well as other documentation required by subsection 222.43(d). The Notice of Establishment shall provide 21 days notice before implementation.

Once the quiet zone is established, the Public Authority (Town of Franklin) will be required to reaffirm the quiet zone every 4½ to 5 years by providing updated National Grade Crossing Inventory Forms for each grade crossing confirming that all measures and controls are in place and providing updated Annualized Average Daily Traffic (AADT) counts.

Attachments:

Grade Crossing Inventory Reports

Diagnostic Meeting Notes

Traffic Counts

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