

Full-Size Trains for the Interborough Express

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Could full-size, modern R211 subway cars fit on the proposed Interborough Express (IBX) transit line? The answer could be YES. The MTA should try harder to make that happen.



R211 Railcars²

Most persons who have commented on the type of railcar to be used on the proposed Interborough Express (IBX) transit line preferred subway-type railcars. Few comments have favored the Light Rail mode, which has been selected by the MTA.³ Therefore, there is continuing interest in what types of railcars could be used on the IBX line.

In earlier articles, I have pointed out that the smaller NYC Transit A Division (numbered lines) and PATH railcars are not too wide to be used on the IBX line.⁴ Now, my further review of PEL Report documents released by the MTA⁵ suggests that—assuming that the East New York Tunnel is actually at least 14-feet wide—the new, larger capacity R211 cars, used on NYC

¹ © John Pegram, 2024.

² Photo from [https://en.wikipedia.org/wiki/R211_\(New_York_City_Subway_car\)#/media/File:R211A_A_Train_@_Inwood-207th_Street_July_7th_2023.jpg](https://en.wikipedia.org/wiki/R211_(New_York_City_Subway_car)#/media/File:R211A_A_Train_@_Inwood-207th_Street_July_7th_2023.jpg).

³ See <https://bqrail.substack.com/p/light-rail-not-preferred-for-the> and <https://bqrail.substack.com/p/more-opposition-to-light-rail-for>.

⁴ See <https://bqrail.substack.com/p/interborough-express-a-dialog-with>.

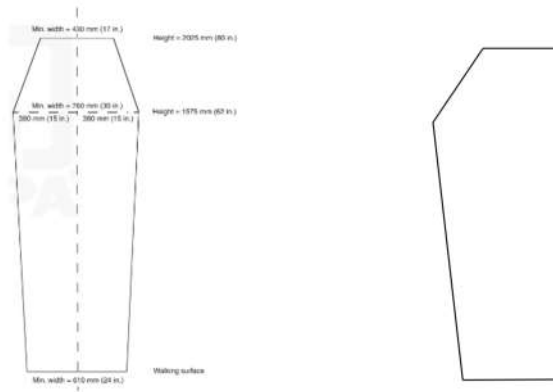
⁵ Appendix 1.4 to the MTA's IBX Planning & Environmental Linkages Study (PEL Report), available at <https://new.mta.info/document/114891>.

Transit B Division (lettered lines), are not too wide to be used. The MTA should reconsider its choice of railcar type and offer riders full-size trains on the IBX line.

In summary, the 14-foot-wide tubes of the East New York Tunnel and the required walkway for emergency exiting from a train in the tunnel are the principal train width limitations on the proposed IBX line. R211 railcars are 10 feet wide and the required walkway is 2-feet wide (24 inches). Therefore, there would appear to be more than enough tunnel width to permit use of R211 cars. However, that is too simplistic. As discussed below, there are more constraints, but I suggest that they can be satisfied.

Required Walkway & Walkway Clearance Envelope

The fire safety rules (NFPA 130) for tunnels not only require a 24-inch wide walkway at the train floor level, but also require a 30-inch wide clearance between a stationary (static) train and the tunnel wall at 62-inches above the walkway, and a 17-inch wide clearance at 80-inches above the walkway.⁶ A non-binding annex to those rules⁷ suggests the symmetric clearance envelope at the left below⁸ and that is the envelope used in the MTA’s IBX studies. But the rule itself does not require that particular clearance envelope. It appears that the envelope at the right below also would satisfy the rule.



MTA’s Walkway Clearance Envelope

Suggested Walkway Clearance Envelope

⁶ National Fire Protection Association, NFPA 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems*, § 6.3.2.1, available for viewing at <https://link.nfpa.org/free-access/publications/130/2023>

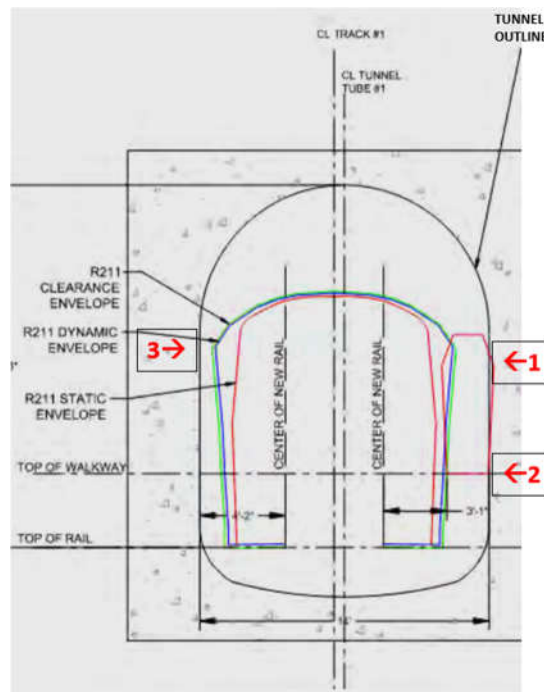
⁷ *Id.*, Annex A, p.1.

⁸ *Id.*, Annex A, Fig. A.6.3.2.1.

(When considering tunnel walkways, the MTA should also consider arranging for a central tube between two tubes with transit tracks, as suggested in my article about a Broadway Junction station in the East New York Tunnel,⁹ with an exit route in the central tube).

Train Clearance Envelopes

The outline of overall dimensions of a stationary vehicle is referred to as the Vehicle Static Envelope. But that envelope would not provide sufficient space for a moving train in a tunnel. There must be sufficient clearance in the tunnel to permit moving trains to sway a bit from side to side. For each type of train car there is a specified Vehicle Dynamic Envelope to account for such motion. Then, an inch or two is added in specifying a Vehicle Clearance Envelope. The train track in a tunnel must be arranged so that the Vehicle Clearance Envelope would not touch the walls on either side, and so that there is sufficient space for the walkway and required walkway clearances from a stationary train (as indicated by the Static Clearance Envelope).



Portion of Figure 11

⁹ <https://bqrrail.substack.com/p/there-should-be-a-broadway-junction>. Most of the tunnel is straight; however, there is a curve in the northern section. Therefore, an allowance for that curve must be considered for any type of railcar. Changes to accommodate that curve would be easier with two transit tubes either side of a tube not used for tracks.

The drawing above is a portion of Figure 11 from the MTA’s PEL Report Appendix 1.4, which is part of the MTA consultants’ East New York Tunnel “space-proofing” study for an R211 NYC Transit B Division railcar. I have added the red arrows and numerals 1-3.

Note that the Walkway Clearance Envelope (in red) at the numeral 1 protrudes into the tunnel wall by about 3½-inches (assuming the drawing is to scale). That is the reason why the MTA consultants concluded that the R211 and similar width railcars could not be used on the IBX line.¹⁰ But also note that the Walkway Clearance Envelope is spaced from the R211 Dynamic Envelope (also in red) by about 6-inches. There is no inherent reason why one clearance envelope needs to be spaced from another. By definition, a clearance envelope includes all of the necessary spacing. For example, a PEL Report drawing shows that the R211 Clearance Envelope already includes an additional two inches on each side beyond the R211 Dynamic Envelope outline.¹¹

The reason why the Walkway Clearance Envelope is placed there appears to be that the walkway itself must clear the R211 Clearance Envelope at the place indicated by numeral 2. If my suggested Walkway Clearance Envelope shown above is used, it would be entirely within the tunnel.

The MTA consultants’ drawing also provides what appears to be unnecessary approximately 7-inches of excess space between the tunnel wall and the R211 Clearance Envelope on the opposite side of the tunnel from the walkway, indicated by numeral 3. The reason for this excess space is unexplained in the report.¹² Reduction or elimination of that space—by moving the tracks toward that wall—would be another way in which the Walkway Clearance Envelope could be placed entirely the tunnel wall.

¹⁰ PEL Report, Appendix 1.4, p. 14/33.

¹¹ *Id.* at p. 13/33, Figure 10.

¹² A possible reason is that the spacing of the track from the wall was to allow for a bench or curb at the base of the wall. *See id.* That appears to be unnecessary in the East New York Tunnel.

Conclusion

The MTA should reconsider its selection of Light Rail for the IBX line and try harder to find a way to operate full size, subway-type trains there.

This article expresses the personal views of the author and does not express the views of his employer, or any client or organization. The author has degrees in law and physics, and has taken several engineering courses. After five years of work as an engineer, he has practiced law primarily in the field of patents for over 50 years, dealing with a wide variety of technologies. He is a life-long railfan and user of public transportation in the United States, Europe and Japan.