OVERVIEW

The New York State Department of Transportation (NYSDOT) and the Ministère des Transports du Québec (MTQ) have undertaken a coordinated pre-feasibility study of the potential for high-speed rail (HSR) service in the New York City-to-Montreal corridor. Passenger train service in the corridor is presently very limited, with one train per day in each direction and a travel time of more than 10 hours. The purpose of this joint effort was to assess the feasibility of implementing true high-speed rail service throughout the corridor.

THREE CORRIDOR SEGMENTS

The New York City-to-Montreal rail corridor includes three segments, each the subject of separate planning studies:

- **New York to Albany** – this 141-mile segment is part of the Empire Corridor, a New York-to-Buffalo HSR corridor designated by the US Federal Railroad Administration (FRA). Improving service in this section of the corridor has been addressed in a number of previous and ongoing studies and projects separate from those discussed here.

- **Albany to Rouses Point** – NYSDOT’s High-Speed Rail Pre-Feasibility Study looked specifically at this 191-mile segment between Albany and the US-Canada border at Rouses Point.

- **Rouses Point to Montreal** – MTQ’s study examined the pre-feasibility of similar HSR service along the 41-mile Canadian Pacific (CP) and 48-mile Canadian National (CN) segments between Rouses Point and Montreal.

NYSDOT is concurrently carrying out the I-87 Multimodal Corridor Study to identify improvements to all elements of the transportation network in the I-87/Autoroute 15 Corridor in New York State and at the US-Canada border. This study is identifying and assessing opportunities to improve transportation services and facilities to realize the potential for economic growth in both the corridor and the region as a whole. The HSR studies by NYSDOT and MTQ were carried out within the context of this overall corridor study.

This brochure summarizes the results of the NYSDOT and MTQ HSR studies, and offers joint recommendations on the feasibility of high-speed rail service throughout the New York City-to-Montreal corridor.

JOINT HSR FINDINGS AND RECOMMENDATIONS

- **Full HSR Service: Effective but Costly.** Full 150 MPH HSR service between New York City and Montreal could reduce rail travel time between these two cities from the present 10:15 hours to 4:05 hours. The capital costs to implement this type of service along either the CN or CP segment in Quebec would be approximately $80-110 million (US dollars), while the equivalent costs for the 191-mile Albany-to-Rouses Point portion would be approximately $4 billion. The cost of additional rolling stock is not included in either estimate.

- **Incremental Improvements in NY State and Quebec Should Be Further Investigated.** During the pre-feasibility study, some more modest improvements along the Albany-to-Montreal corridor were identified that could provide substantial travel time savings and improve reliability at considerably lower costs. The comparisons shown later in this brochure of the time savings and costs of various incremental improvements, versus Full 150 MPH service, indicate that especially in the near-term, it would be worthwhile to pursue an incremental approach to service improvements to obtain more immediate results.

- **HSR in the Corridor Has Merit.** The NYSDOT and MTQ pre-feasibility studies indicate that the development of HSR in this corridor has merit. However, given Full HSR’s multi-billion dollar cost and lengthy (10+ year) implementation time, and the corridor’s environmentally sensitive Adirondack Park location, rail passengers would be better served by incremental improvements implemented in stages. Concurrently, New York State should investigate FRA requirements for the corridor to be designated as part of the US HSR network. This would provide a basis for both MTQ and NYSDOT to develop justification for future federal funding for HSR.

- **Improvement to Customs Operations.** Both the MTQ and NYSDOT studies, and similar studies for the Boston-
Montreal corridor, identified the need to improve the operations of Customs at the border as one of the most cost-effective travel time savers. The Customs stop presently averages approximately one hour but sometimes extends to almost two hours. One potential improvement that has been identified would allow Customs operations to occur at one of the stations in Montreal, in the same manner as airline travel. Both MTQ and NYSDOT will work with the appropriate federal agencies in both nations to evaluate the feasibility.

I-87 HIGH-SPEED RAIL PRE-FEASIBILITY STUDY: ALBANY TO ROUSES POINT

NYSDOT’s I-87 High-Speed Rail Pre-Feasibility Study examined the issues and impediments associated with implementing high-speed rail service in the corridor between Albany and Rouses Point. Two different approaches were taken to consider improving the speed of rail passenger travel in that segment:

- Implementing Full HSR Service throughout the corridor, with a dedicated HSR alignment, and
- Incremental Improvements to existing service and facilities.

Full High-Speed Rail Service – Albany to Rouses Point

This option identified the improvements needed to achieve a sustained speed of 150 MPH between Albany and Rouses Point, on a new high-speed railway alignment. This alignment would be exclusively for passenger trains, while the existing route would be used primarily as a freight artery, with some local passenger service possible as well.

The existing alignment has frequent and closely-spaced curves, which are required to travel through the area’s very hilly terrain. Providing sustained 150 MPH service requires construction of an almost entirely new alignment, including the replacement of several stations and the construction of a number of long bridges and several tunnels to provide the generally flat alignment that HSR operations require. The existing alignment would be retained to access the Albany-Rensselaer station, and the new alignment would reconnect with the existing alignment at Rouses Point. Existing stations in Schenectady, Saratoga Springs, Fort Edwards, Westport, and Rouses Point would also be retained under the new alignment. The trains on this HSR alignment would have a tilt-body capability (like the Bombardier’s “JetTrain” equipment). Speeds higher than 150 MPH would require electrification; however, the study did not consider electrified service due to the high additional cost of electrifying the alignment. A Northway alignment was also analyzed but was determined to be unfeasible.

Time Savings, Required Costs & Additional Riders.

Under Full 150 MPH HSR service, time savings would be significant – close to 3 hours off the present 4:35-hour travel time between Albany and Rouses Point, and approximately 1 additional hour in time savings than the most comprehensive Incremental Improvement scenarios discussed below. The capital costs for full HSR service would be approximately $4 billion, with annual operating and maintenance costs of roughly $65 million. A very preliminary estimate approximated ridership in the NYC-Montreal market at 500,000 to 700,000 passengers under the Full HSR scenarios, assuming HSR service is implemented in both New York State and Quebec. The preliminary estimates were based upon ridership gains identified in previous studies.

Incremental Improvements To Existing Service

This element of the study identified the incremental improvements needed to reach maximum authorized speeds of 79 MPH, 90 MPH, 110 MPH, and 125 MPH (the present level is 70 MPH, and the actual average speed is well below that). To attain these speeds would require varying levels of improvement to the existing single-track alignment – the former Delaware & Hudson Railway (D&H) section between Albany and Rouses Point, now a part of the CP Railway system. Nineteen scenarios were considered, and the following factors were varied:

- reducing the number of stops between Albany and Rouses Point (presently there are 9 stops);
- utilizing tilt-train equipment or other new technologies;
- increasing “superelevation” and permitted “underbalance” on existing track;
- increasing the Maximum Authorized Speed;
- upgrading signal systems and track crossing controls required for high-speed service;
- adding sidings – important for a single-track alignment; and
- upgrading key track segments that are now a source of delay.

Superelevation refers to the “banking” of curved sections of track to counteract centrifugal force. Higher speeds on a curved section require greater levels of superelevation.

Underbalance is a measure of an adequate level of superelevation for optimal conditions. Because passenger and freight trains have different optimal levels, less than optimal levels are permitted by regulatory agencies, which limits passengers trains from traveling their maximum speed.
would also utilize the same rail equipment presently used by Amtrak, to approximately 2 hours for more extensive improvements to tracks, signals, and sidings, the use of new “tilt train” rail cars, and the elimination of existing stops between Albany and Rouses Point.

Capital costs for the MU scenario were approximately $20 million, the moderate improvement scenarios would cost approximately $40 million, and the more extensive improvement options ranged from $130 to $270 million. Annual maintenance costs under these scenarios would be roughly $15 to 30 million. The preliminary ridership projections, based upon previous studies, estimated 25,000 new riders in the corridor annually under the MU scenario, 75,000 to 100,000 new riders annually with moderate improvements, and 100,000 to 175,000 new riders annually under the more extensive Incremental Improvement scenarios, above the present level of 90,000 riders.

**COST EFFECTIVENESS: INCREMENTAL IMPROVEMENTS VS. FULL HSR**

The higher ridership estimate under the Full HSR scenarios reflects the faster travel times that service would provide. However, in terms of the capital cost required to produce those time savings, and the required costs per additional rider, the Incremental Improvement scenarios are more cost-effective than the Full HSR scenarios. As indicated in the chart on the last page of this brochure, the costs per minute saved are considerably lower under the Incremental Improvement approaches than for the Full 150 MPH HSR plan.

**MTQ STUDY OF HIGH SPEED RAIL SERVICE IN QUEBEC**

MTQ’s HSR study had a similar goal – to make an initial assessment of the feasibility of implementing HSR in the Montreal to New York City (and Boston) market. Working in consultation with NYSDOT, MTQ focused solely on the portion of the segment between Montreal and the US-Canada border at Rouses Point. The study looked at a range of improvements for two separate alignments within Quebec (see figure):

- **The 48-mile CN alignment**, on which Amtrak’s Adirondack Service presently travels to Gare Centrale (Central Station) in Montreal. Gare Centrale also hosts VIA Rail service, commuter trains and provides a direct link to the local subway.
- **The 41-mile CP Rail alignment** connects to the Lucien-L’Allier Station and hosts commuter rail operations and provides a direct link to the local subway.

Travel time from the US-Canada border to Montreal is almost two hours, including one additional stop on the periphery of Montreal before arriving at Central Station. This excludes a one hour stop at the border for Customs.

**Improvement Scenarios.** Like NYSDOT, MTQ evaluated the feasibility of both full HSR service and various incremental improvement scenarios. Full HSR service was considered under three operating scenarios – 200, 240 and 300 km/hr (roughly 125, 150 and 186 MPH). As with the NYSDOT study’s Full HSR scenarios, implementing that type of service would require some divergence from the existing alignment. The figure indicates the approximate areas where a 150 MPH HSR alignment would have to depart from the existing CP and CN alignments. As the existing alignments in Quebec are flat and straight compared to the CP alignment between Albany and Rouses Point, few departures from the existing alignments would be required to achieve HSR speeds.

Incremental upgrades to key track segments, similar to those considered by NYSDOT, were not evaluated in Quebec for any improvements less than 125 MPH (200 km/hr), as the Quebec segments comprise less than fifteen percent of the corridor length and are in relatively good condition.

**Time Savings, Required Costs and Additional Riders.**

Under existing operations, trains cross at Rouses Point, stop at the border for Customs and at St. Lambert on the outskirts of Montreal before arriving at Central Station. Under these conditions, it takes trains approximately two hours to travel from the US-Canada border to Central Station, excluding one hour for Customs operations. MTQ’s study projects that the travel time could be reduced to approximately 30-35 minutes, assuming $25-35 million worth of improvements to provide 125 MPH (200 km/hr) service along the CP or CN alignment, with no Customs stop between Montreal and Rouses Point.
The estimate does not include the cost for rail crossing improvements or modifications at the terminal stations to enable Customs operations.

The capital costs for 150 MPH HSR service along the CP or CN alignment were estimated at $80-110 million, or roughly $1.9-2.3 million per alignment mile. This compares with $21 million per mile for 150 MPH HSR service on the 191-mile segment from Albany to Rouses Point, which reflects the relatively flat and straight alignment in Quebec, with minimal required diverges from the existing alignment.

As discussed above, preliminary projections indicate that the New York City-to-Montreal ridership would range from 25,000 to 550,000 passengers, depending on the combination of improvements selected for the various segments of the corridor.

**OVERALL COST-EFFECTIVENESS OF INCREMENTAL IMPROVEMENTS: ALBANY TO MONTREAL**

The options described above for the Montreal-to-Rouses Point and Albany-to-Rouses Point segments of the corridor would require a wide range of capital investment. However, in terms of the investment required to reduce travel time and attract new riders, the incremental improvements could be considerably more cost-effective when compared against full 150 MPH HSR service. The figure above shows differences in travel times along various segments of the corridor under existing, incremental, and 150 MPH HSR conditions.

Therefore, NYSDOT and MTQ have mutually agreed that neither government will pursue 150 MPH HSR service in the corridor at this time, and will instead further investigate incremental improvements to the existing alignments and more efficient Customs operations as a near-term means of saving travel time and increasing reliability. In Quebec, additional consideration would be needed to determine if the CP or CN alignment would provide the most efficient service between Rouses Point and Montreal. Likewise, NYSDOT would pursue implementation of its $20 million Maintenance Upgrade scenario and will pursue an increase in the permitted underbalance, which together would lead to a time savings of roughly 45 minutes. Both governments will partner with the appropriate federal agencies to determine the feasibility and logistics of moving Customs operations away from the border, potentially saving an hour of travel time.