Potential Benefits of Through-Running

- Increase throughput by eliminating crossing conflicts, which reduces dwell times
Potential Benefits of Through-Running

- Increase throughput by eliminating crossing conflicts, which reduces dwell times
- Improve regional mobility by connecting communities beyond a Central Business District to each other with one-seat rides
The PSNY Partner Agencies

Total Daily PSNY Railroad Trips
458,000

Northeast Corridor

New York Penn Station
1,300 train moves per day

Busiest passenger rail corridor in the U.S.
The PSNY Partner Agencies

Total Daily PSNY Railroad Trips
458,000

Largest commuter rail operator in the U.S.
Largest current user by ridership

MTA

41% NJ Transit
187,000

52% Long Island Rail Road
237,000

7% Amtrak
34,000

Long Island Rail Road

May 2021 Through-Running at Empire Station Complex
The PSNY Partner Agencies

Total Daily PSNY Railroad Trips
458,000

Third largest commuter rail operator in the U.S.
Largest projected future user by ridership
The PSNY Partner Agencies

Metro-North Railroad
Ridership: 40% growth overall by 2038

Daily Railroad Trips Only
458,000

Daily Trips – All Users
600,000

2019

Includes Moynihan Train Hall

Daily Trips – All Users
890,000

2038

2019

*Local office workers and others patronizing in-station retail
Ridership: 85% growth in the am peak period by 2038

AM Peak Period Railroad Trips

- 65,000 in 2019
- 120,000 in 2038
Regional Mobility: RPA Fourth Regional Plan
Through-Running Studies

Analyzing the Potential for Commuter Train Run-Through Service at New York Penn Station

August 7, 2014

Prepared by Amtrak Northeast Corridor Infrastructure Investment and Development And Amtrak Operations Research Groups
Through-Running at Empire Station Complex

1st Question:

Is it feasible to convert existing Penn Station and the Moynihan Train Hall to all, or substantially all, through-running?
Through-Running at Empire Station Complex

1st Question:
Is it feasible to convert existing Penn Station and the Moynihan Train Hall to all, or substantially all, through-running?

Conclusion:
No. There are too many physical constraints and fatal flaws, the costs would be highly disproportionate to the limited benefits and the implications for the Moynihan Train Hall would be untenable.
2\textsuperscript{nd} Question:

Would an all through-running regime at Penn Station increase throughput by enough to no longer need to expand the station?
Through-Running at Empire Station Complex

2nd Question:

Would an all through-running regime at Penn Station increase throughput by enough to no longer need to expand the station?

Conclusion:

No. The combination of keeping the existing operations in Penn Station and doing through-running in the Expansion in the future would provide greater capacity than simply converting the existing station to through-running.
Through-Running at Empire Station Complex

3rd Question:

What is the best way to achieve through-running at Empire Station Complex to support the goal of improved regional mobility?
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Conclusions:

- Reconstruct existing Penn Station so that it functions effectively on a hub-and-spoke model in the near-term and can accommodate future ridership growth; and
Through-Running at Empire Station Complex

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What is the best way to achieve through-running at Empire Station Complex to support the goal of improved regional mobility?

Conclusions:

❖ *Reconstruct existing Penn Station so that it functions effectively on a hub-and-spoke model in the near-term and can accommodate future ridership growth; and*

❖ *Construct the Expansion to support regional through-running in the future as a part of a next generation of regional integration investments*
Expansion and Integration of St. Pancras Station, London

- Expanded from 6 platform tracks to 15 platform tracks
- Terminus for Eurostar service to continental Europe via the Channel Tunnel and HS1
- Became a through station on the Thameslink regional rail line
Capacity Constraints: Tunnel capacity is maxed-out

North River (Hudson River) Tunnels (2 tracks)
(Amtrak and NJT)

East River Tunnels (4 tracks)
(Amtrak, NJT and LIRR)
Capacity Constraints: “A” interlocking; number of tracks (21)
Capacity Constraints: Average dwell times

- **Amtrak:** 22 minutes
  Baggage, commissary, boarding from one escalator

- **LIRR:** 6 minutes
  More stairs, fewer escalators

- **NJ TRANSIT:** 12 minutes
  Fewer stairs, more escalators, operational differences
Turning at the Station

Revenue to Non-Revenue (deadheading)

Arriving

Departing To Yard or Origin

Train

Platform
Turning at the Station

Revenue to Non-Revenue (deadheading)

Arriving

Departing

To Yard or Origin

Revenue to Revenue

Arriving

Departing

Train

Platform
Turning at the Station: Crossing conflicts

Revenue to Non-Revenue (deadheading)

Arriving

Departing To Yard or Origin

Train

Platform

Revenue to Revenue

Arriving

Departing

Train

Platform
Through-Running: Eliminating crossing conflicts

Revenue to Non-Revenue (deadheading)

Arriving

Departing To Yard or Origin

Train

Platform

Turning

Arriving

Departing

Train

Platform

Revenue to Revenue
Through-Running: Eliminating crossing conflicts

- **Revenue to Non-Revenue (deadheading)**
- **Revenue to Non-Revenue (drop-and-go)**
- **Revenue to Revenue**
- **Turning**

Arriving

- Train
  - Platform

Departing

- Train
  - Platform

To Yard or Origin

- Train
  - Platform

Non-Revenue (deadheading)

- Revenue
  - To Non-Revenue

Non-Revenue (drop-and-go)

- Revenue
  - To Non-Revenue

Revenue

- To Revenue
  - From Revenue
Through-Running: Eliminating crossing conflicts

**Revenue to Non-Revenue (deadheading)**

<table>
<thead>
<tr>
<th>Arriving</th>
<th>Departing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Train</td>
<td>Platform</td>
</tr>
<tr>
<td>To Yard or Origin</td>
<td>Train</td>
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</tbody>
</table>

**Revenue to Non-Revenue (drop-and-go)**

<table>
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<tr>
<th>Arriving</th>
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</thead>
<tbody>
<tr>
<td>Train</td>
<td>Platform</td>
</tr>
<tr>
<td></td>
<td>Train</td>
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</table>

**Turning**

<table>
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<tr>
<th>Arriving</th>
<th>Departing</th>
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</thead>
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<tr>
<td>Train</td>
<td>Platform</td>
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<tr>
<td></td>
<td>Train</td>
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</tbody>
</table>

**Through-Running**

<table>
<thead>
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<th>Departing</th>
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</thead>
<tbody>
<tr>
<td>Train</td>
<td>Platform</td>
</tr>
<tr>
<td></td>
<td>Train</td>
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</tbody>
</table>

How much more throughput can we get by making these conversions at Penn Station?
# Hybrid Operation at Penn Station

<table>
<thead>
<tr>
<th>Operator</th>
<th>Type of Service</th>
<th>AM Peak Trains</th>
<th>PM Peak Trains</th>
<th>Peak Periods Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIRR</td>
<td>Run Through Turn</td>
<td>36</td>
<td>35</td>
<td>153</td>
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<tr>
<td></td>
<td></td>
<td>28</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>NJT</td>
<td>Run Through Turn</td>
<td>21</td>
<td>19</td>
<td>115</td>
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<tr>
<td></td>
<td></td>
<td>39</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Amtrak</td>
<td>Run Through Turn</td>
<td>28</td>
<td>31</td>
<td>59</td>
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<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>Run Through Turn</td>
<td>85</td>
<td>85</td>
<td>170</td>
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<tr>
<td></td>
<td></td>
<td>67</td>
<td>90</td>
<td>157</td>
</tr>
</tbody>
</table>
Revenue-to-Non-Revenue Service: Yard capacity is maxed-out

West Side Yard (LIRR)  Sunnyside Yard (Amtrak and NJT)
Revenue-to-Revenue Through-Running: Regional integration
Revenue-to-Revenue Through-Running: Regional integration

What would it take to implement all revenue-to-revenue through-running at Penn Station?
Platforms: Too narrow to board and alight riders simultaneously
Platforms: Crowded even without simultaneous boarding and alighting
Amtrak estimated in their 2014 study that converting drop-and-go trains to revenue-to-revenue through-running would decrease peak-period throughput by up to 17%.
Existing Track Assignments

Moynihan Train Hall

Penn Station

Tracks 17 – 21 LIRR Exclusively

Tracks 13 – 16 LIRR Peak Hours Only

Tracks 5 – 16 Amtrak

Tracks 5 – 12 NJT Peak Hours Only

Tracks 1 – 4 NJT Exclusively
Tracks 17 - 21 are not candidates for through-running
Which Tracks Can Support Through-Running?

Tracks 1 - 4 are stub tracks
Tracks 1 – 4 Cannot Pass Under the 6th Avenue Subway
Which Tracks Can Support Through-Running?

Central zone could support through-running
Existing Configuration: 11 platforms; 21 tracks

No through-running

Potential through-running zone
6 platforms; 12 tracks

20 feet (average)

No through-running
Widened Platforms: Eliminate one track at each of 6 platforms

Based on a configuration proposed by ReThinkNYC
**Widened Platforms:** Eliminate one track at each of 6 platforms

Based on a configuration proposed by ReThinkNYC
Widened Platforms: Eliminate one track at each of 6 platforms

Existing peak periods throughput on these 12 tracks: 12/21 x 327 = -187 trains (assuming equal use of all tracks)

Maximum capacity of 6 through-running tracks: 6 x 7.5 x 4 = +180 trains (assuming an average dwell time of 8 minutes)

Net loss: 180 – 187 = -7 trains

% gain: -7/327 = -2%

Not an appreciable improvement
Widening the Platforms: Moving tracks and platforms

5 widened platforms with 10 through-tracks
Widening the Platforms: Moving tracks and platforms

Existing peak periods throughput on these 12 tracks: 12/21 x 327 = -187 trains
(assuming equal use of all tracks)

Maximum capacity of 10 through-running tracks: 10 x 7.5 x 4 = 300 trains
(assuming an average dwell time of 8 minutes)

Net gain: 300 – 187 = +113 trains

% gain: 113 / 327 = +35%

A more appreciable improvement, but still not enough
Impacts to Buildings Above

EXISTING TRACKS – 21 TOTAL

MOYNIHAN STATION

MSG

2 PENN PLAZA
Moynihan Train Hall Would Have to be Re-built
The West End Concourse Too
Through-Running at Empire Station Complex

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May 2021
Through-Running at Empire Station Complex

Paris Regional Rail Network (RER)
Paris Regional Rail Network (RER)
Regional Railroad Network
Revenue-to-Revenue Through-Running: Regional integration

Census counts of how many people in counties outside of Manhattan commute to the other counties outside Manhattan.

Source: STREETSBLOG NYC 2018
Regional Through-Running: Unbalanced demand
Revenue-to-Revenue Through-Running

Market
- Compatibility of passenger demand, service levels, and maximum train lengths between branches on opposite sides of Penn Station

Operations
- Labor agreements
- Train crew availability and training
- Institutional and governance framework

Network Infrastructure
- Track capacity on trunk lines
- Traction power infrastructure
- Signaling system and PTC
- Rolling stock interoperability
- Storage yard and maintenance facility capacity

Tunnels

Penn Station
- Platform lengths and heights
Gateway is Coming

- The Empire Station Complex is the NYC anchor of the Gateway Program
Through-Running at Empire Station Complex

3rd Question:

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Conclusions:

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- Construct the Expansion to support regional through-running in the future as a part of a next generation of regional integration investments
Empire Penn Expansion

A Status Report
Empire Penn Expansion - Alternatives Analysis

- Introduce the Project
- Identify Project’s draft purpose, needs, goals, and objectives
- Identify a preliminary list of Project alternatives
- Describe a process to evaluate alternatives
- Present the initial evaluation of alternatives
- Recommend next steps
Expansion Project Goals

- Provide increased capacity for Amtrak, NJ TRANSIT and MTA at the station complex to accommodate future growth in travel demand
- Maximize operational flexibility within the station complex to manage daily rail operations, service disruptions, and emergency situations
- Integrate the expansion with existing Penn Station and Moynihan Train Hall
- Accommodate increased through-running in the future
Alternatives Evaluation Process

Step 1
Consistency with NEC FUTURE Purpose and Goals

Step 2
Consistency with Expansion Project Purpose and Goals

Step 3
Comparison of benefits and detriments during NEPA
Preliminary List of Alternatives

<table>
<thead>
<tr>
<th>No Build Alternative</th>
<th>Other Modes Alternative</th>
<th>Other Stations Alternative</th>
<th>Through-Running Service Alternative</th>
</tr>
</thead>
</table>

Station Expansion Alternatives

- Under Penn Station Expansion
- Northern Penn Station Expansion
- Southern Penn Station Expansion
Through-Running at Empire Station Complex

ESD Community Advisory Committee Working Group Briefing
May 18th, 2021