Number 7 Subway Line Extension

Project Background
No. 7 Project Context
Existing Hudson Yards Area
PURPOSE: Existing Primary Land Use
TRANSPORTATION

- Existing service
Proposed Action

- Proposed Rezoning
- Open Space Network
- No. 7 Subway Extension
- Convention Center Expansion
- Multi-Use Facility
- DSNY / NYPD Tow Pound Facility
Jacob Javits Convention Center Expansion
Proposed Multi-Use Facility
No. 7 Proposed Alignment

- 10th Avenue Station
- 34th Street Station
PUBLIC ACTIONS:

- Expand transportation
Alternative Alignments
Future Development - 2025

- **2010 Analysis Year**
  - First full year of operation for the No. 7 Line
  - Completion of the Multi-Use Facility
  - Completion of Convention Center expansion
  - Portion of development within rezoning area completed

- **2025 Analysis Year**
  - Commercial: 24.3M SF
  - Residential: 13.4M SF
  - Hotel: 1.0M SF
  - Retail: 1.0M SF
  - Theater: 0.1M SF
  - Community Facility: 0.7M SF

- **Total Development**: 40.5M SF
$ Funding $

- Hudson Yard Infrastructure Corp (HYIC)
  - Issue Bonds
    - No. 7 Extension
    - Open Space & Future Development Sites
    - New Street & Park System

- Financing Vehicle
  - PILOTS (Payment in lieu of taxes)
  - Property Taxes on New Residential Development
  - Bonds Payments by Developers – Zoning Based District Improvement Fund
  - Sale or Lease of publicly owned parcels
Number 7 Subway Line Extension

Project Scope
Project Key Plan

Site A

Site J

Plaza Entrance

34th Street Station

Northern Entrance

Site P

Site M

Tenth Ave. Station

Station Entrance

Site L
Number 7

Shaft & Laydown Areas:
- Site A
- Site P
- Site K

Construction Access & Laydown Areas:
- Site J
- Site L
Site A Shaft and Adit

Eleventh Avenue

Existing Utilities (Typ)

Soil

Rock

Adit

Metropolitan Transportation Authority

HYDC

PB Team
Lining Options

Pre-Cast Segmental Lining

Cast-in-Place Lining
TBM Performance Requirements

- Tunnel ID = minimum 19 feet 6 inches + construction tolerances
- 650 ft minimum horizontal radius
- Full-face hard rock TBM with capability to negotiate short reaches of mixed face and possible soft ground conditions.
- Capable of negotiating very strong & very/extremely abrasive rock (Manhattan Schist & Pegmatites)
- Option to utilize:
  - pre-cast segmental lining systems- both to be watertight undrained systems.
  - Gripper, Shield or Double-shield type TBMs
TBM Performance Requirements cont’d

- Equipped with:
  - provisions for drilling probe holes and grout holes.
  - 17 inch or larger disc cutters
- Back-loaded cutter mountings
- Automated guidance system
- New or refurbished TBM’s
CHALLENGES

- Ground Modifications
  - Low rock (Mixed Face) at 27th Street along TBM path
  - Tenth Avenue – Underground Stream bed
- Close proximity of existing structures:
  - Amtrak North River tunnels
  - Amtrak Access tunnel (Empire Line)
  - Lincoln Tunnels
  - Port Authority (Below Bus Terminal)
- Schedule
Profile and Rock Line - 2

- Top of Ground
- Approximate Rock Line
- Amtrak North Access Tunnel
- 11th Avenue Viaduct
- 34th St.
- 38th St.
- Lincoln Tunnels
- #1, #2, #3
- 20'
- Future Tenth Avenue Station
- Future 34th Street Station
- Jacob Javits Convention Center
- No. 7 Tunnel

MTA Metropolitan Transportation Authority
HYDC Hudson Yards Development Corporation
PB Team
Profile and Rock Line - 3

- Approximate Rock Line
- Top of Ground
- Port Authority Bus Terminal
- No. 7 Tunnel
- Tenth Avenue
- Ninth Avenue
- TBM LIMIT
- Future Tenth Avenue Station
- Port Authority Bus Terminal

Metropolitan Transportation Authority
Port Authority Bus Ramp
Tail Track Configuration Near Existing Times Square Station
Existing IND Eighth Avenue Station
Existing IND Eighth Avenue Station

Eighth Avenue Station Looking North
Number 7 Subway Line Extension

Stations
34th Street Station
Final Design Configuration

COMPOSITE PLAN – Street Level

Future Western Entrance by others
Station
Rearranged Facilities w/in Site J & LIRR requested easement
34th Street Entrance (reduced to 6 escalators)
Vehicular road maintained

35th Street Entrance (relocated North Entrance)
Parking Below
Parking access ramps
Service Access below via 38th Street or Marshalling Yards

Site K
Amtrak ROW below

Service/ Vent stack
Relocated Systems Facilities below 11th Ave viaduct

MTA Metropolitan Transportation Authority

HYDC Hudson Yards Development Corporation

PB Team
34th Street Entrance
Plaza Entrance
34th Street Entrance
Street Level Plan
34th Street Entrance
Section looking North
34th Street Entrance
View at Upper Mezzanine
34th Street Station
Cavern Rendering
34th Street Station
Canopy Entrance – Upper Mezzanine
Number 7 Subway Line Extension

Tenth Avenue Station
Tenth Avenue Station
Section at 42nd Street Entrance
Number 7 Subway Line Extension

Coordination
Proximity to Adjacent Subsurface Structures

- No. 7 Subway
- Hudson North River Tunnels (Amtrak & NJ Transit)
- Lincoln Tunnel Tubes (1, 2, 3)
- Hudson North Access Tunnel (Empire Line)
34th Street Station Coordination Tool
34th Street Station Coordination Tool
34th Street Station Coordination Tool
34th Street Station Coordination Tool
Number 7 Subway Line Extension

Vibration & Settlement Criteria
Proposed Criteria

- The blasting vibration design criterion will be a mean vibration level of 2 in/sec, with no vibration level to exceed 4 in/sec at the Port Authority Bus Terminal and Bus Ramp.
- Threshold settlement of type A structures shall not exceed 3/8 –inch.
- Threshold angular distortion of type A structures shall not exceed 1:500.
Number 7 Subway Line Extension

Contract Packages

D200 - Excavation of Running Tunnels and 34th Street Station Caverns

D300 - 34th Street Station Liner and Sites A, J and P Construction

D305 - 34th Street Station and Sites A, J, and P Finishes

D310 - Tenth Avenue Station Shell, Tunnels and Sites L and M Construction

D315 - Tenth Avenue Station Finishes - Deferred

D400 - Track Signals and Systems Installation
No. 7
Schedule

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<th>Year</th>
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<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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No. 7 Construction Summary

- Site A
- 34th Street Station
- 10th Avenue Station
- Jacob Javits Expansion
- ARC
- NYCDEP 3rd Water Tunnel

MTA Metropolitan Transportation Authority

PB Team
# Projected Award Schedule

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<th>Construction Package Description</th>
<th>Type</th>
<th>Projected Award Date</th>
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<tr>
<td>Consultant Construction Manager</td>
<td>RFP</td>
<td>Aug 06</td>
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<tr>
<td>Excavation of Running Tunnels and Station Caverns</td>
<td>IFB</td>
<td>Nov 06</td>
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<td>Tenth Avenue Station Shell Construction</td>
<td>IFB</td>
<td>Jan 07</td>
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<td>34th Street Station Construction</td>
<td>IFB</td>
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<tr>
<td>Track Signal and Systems Installation</td>
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Questions ?

No. 7 Subway Line Extension