AGENDA B:
PROJECT SCHEDULE - GANTT CHART / COORDINATION WITH TH-TDFM

Bob Donnelly
Project Status / Schedule

- See GANT Chart – Schedule / Progress
- About 30% complete, generally on schedule
- Synchronization with TH-TDFM 2010 Update – to be completed in December 2012
- Focus on
  - Extended Tier 1 Zones System (SED, GIS layer, Highway and Transit network)
  - Adoption of NJTPA NJ highway network in BPM 2G
  - Special Generators incorporation
  - Flexible zones system for model procedures
  - Evaluation of data and methods for Task 6 Highway Network Conflation and Attribution and supporting PSA2 initiative
AGENDA ITEM C, D:
UPDATE SCREENLINE TRAFFIC AND VEHICLE CLASS COUNTS

Kyle Winslow
Vehicle Classification and Traffic Counts

- **Task 3 – Update Screenline Traffic Counts**
  - Compile Available Traffic Volume Sources - completed
  - Review Sources - completed
  - Reconcile 2005 and 2010 Screenline Databases
  - Update Screenline Database

**Task 4 – Update Vehicle Classification Counts**

- Compile Available Vehicle Classification Sources
- Review and Reconcile Sources
- Update Classification Database
### Vehicle Classification and Traffic Counts

#### Vehicle Classification Files

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<th>Screenline ID</th>
<th>Direction</th>
<th>Year</th>
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<td>Y</td>
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#### Traffic Count Files

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October 25, 2012
Vehicle Classification and Traffic Counts

- Tasks 3 & 4 – Update Screenline and Classification Traffic Counts
- Continue to compile data sources - should be completed mid to late September
  - NJ Sources especially
- Develop coordinates/screenline id’s – in progress
- Create common format for traffic counts – in progress
- Develop traffic factoring program
  - Have obtained source code for TRAVEP and am working to document to adapt to BPM update
- Update Screenline/Class Databases
Screenline Volumes - NJ

- NJTPA/NJRTM-E
  - Approximately 3,500 records
  - NJDOT Traffic counts primarily from 2007 to 2009
  - ADT Only
  - No Projection System
  - Joined Spatially
  - Differences too much to effectively join
  - Manual import of major screenline volumes – approximately 100 to 125 counts
Geographic Differences

2005B vs NJRTM-E
AGENDA ITEM E:
DRAFT WORK PLAN FOR REGIONAL HIGHWAY DEVELOPMENT

Bob Donnelly
Objective: Improved functional network for modeling - Road Attributes

- Same concept of Regional Highway Network modeling
  - Coverage – 28 Counties: NY, NJ, & CT mega-region
  - Level of Modeling – Good for Major Arterials and above (but includes all Minor Arterials)

- Improve geographic / topological accuracy of highway network

- Develop the data to fully populate the BPM-specific link attributes structured in the BPM to support PLT link type estimation

- Apply with Existing BPM highway network procedures to developed more precise capacity and free flow speed values used in assignment

- Extend the set of link attributes with New items, such as Posted Speed, Grade

- Establish linkages to external road data sources for ongoing network maintenance and updates
Relation of highway network to other components of BPM

- Regional Network – support arterial + level modeling
- Internal Zone / TAZ system
- External stations
- Micro Analysis Zones (MAZs) – possible future adaptation
- Transit route coding, either
  - “All Links” layer(s) – current
  - On highway network coding – possible future
- Count data – link and screenline volumes
- Travel speeds/time – system performance data
GIS base mapping & data integration

• **Ideal:** Road Network consistent with accurate base map and linked to sources of relevant geospatial data
  - Road topology – Major highways, arterials and local streets
  - Road attributes – capacity, operations and performance related
  - Other possible
    - Jurisdictional, postal, other boundaries
    - Landmarks, places
    - Address ranges

• **Conflation** = data set fusion, including:
  - Topological congruence – nodes and lines with shape
  - Geo-spatial data joins of GIS entities
  - Transfer (tagging) of attribute data from one source to another
User Requirements / Restrictions – Questions to Consider

1. Export link and node attributes to a "road inventory data base" for checking and updating attributes?

2. Export topology and attributes to external file, for use directly or indirectly with other travel demand modeling software (e.g., Cube)?

3. Could the developed regional network be used base for DTA or micro-simulation?
   - a) with TransCAD or TransModeler
   - b) other package (e.g. VISIM)

4. Sub-Area detailing, selection of "local and collector" not in the Regional network to incorporate

5. Will we be able to apply some of our network algorithms (MAZ or other network related data extraction)?

6. Can we publish pictures of the network on the Web

7. Does any "derived "network that we create using the NavTeq data have the same licensing restrictions

8. Can other GIS packages such as ArcGis or vendor unities be used to help us in the network development task?
## GIS Data Bases for BPM Highway Development

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NYBPM Highway Network
Base Mapping and Development of Link Attributes

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Work Plan – Approach Summarized

• Three Stages – incremental improvement, to have networks and working model available at the end of each
  • Stage 1: NYBPM 2010 = TH-TDFM 2010 November 2012
  • Stage 2: NYBPM 2010 April 2013
  • Stage 3: NYBPM 2012(?) December 2013 ?

• Focus on NY 12 Counties, using unrestricted public data

• Establish formal relationship to NJ and CT models and network information
  • NJTPA
  • ConnDOT

• Resources to implement

• BPM 2010 Update: Task 6 Highway , Task 13 Procedures
  • PSA2-11-25: GIS/ Highway Attributes
  • Other: Task Orders to be determined
Work Plan – Approach Summarized

- Three Stages – incremental improvement, to have networks and working model available at the end of each
- **Stage 1: NYBPM 2010 = TH-TDFM 2010**
  - NJTPA highway network integrated with BPM 2G for NJ highway network and transit All Links
  - November 2012
- **Stage 2: NYBPM 2010**
  - Conflated NY 12 network (to NYS Full Streets), Attributed with Priority 1 attributes (mostly from Road Inventory), re-aligned TAZ boundaries, Future Year network building methods, and networks Updated for forecasting
  - April 2013
- **Stage 3: NYBPM 2012(?)**
  - Refinements to Conflation, further Attribution of links and intersections with Priority 2 attributes, enhanced PLT capacity /free flow process, Migration of Transit RTS coding to new All Links (Full Streets), methods for updating NJTPA and CT network updates
AGENDA ITEM F:
BPM-3G: APPLICATIONS DEVELOPMENT AND TESTING

Yuri Teleshevsky
NYBPM-3G Development

Task 1 reference. Trail: N; Task: 13.1

- Development of Tier 1.1 Zone System
- Development of processing Special Generators (SG) in NYBPM
- Modification of NYBPM GIS elements
  - All GIS layers based on Tier 1.1 TAZ zone system
  - Special Generators are incorporated in GIS Layers
- Modification of NYBPM input data files
  - SED and others
NYBPM-3G Development (Cont.1)

Task 1 reference. Trail: N; Task: 13.1

- Development of Tier 1.1 Zone System involves:
  - Adding Tier 1 zone details used in TH-TDFM 2005 (done)
  - Split selected TAZs in Manhattan (develop)
  - Aggregation of selected TAZ in New Jersey (develop)
  - Incorporating new SG zones representing air passengers (done)

- Updated GIS Model elements
  - TAZ Geographic Layer – add/split polygons
  - Highway and Transit GIS Link Layers
    - Add Centroids and Connectors according to additional TAZs
    - Reconfigure Centroids and Connectors to match TAZ borders
  - Incorporate additional Special Generators zones
NYBPM-3G Development (Cont.2)

Task 1 reference. Trail: N; Task: 13.1

• Special Generators Processing in NYBPM-3G
  • Implement SG processing employed in TH-TDFM 2005
  • Enhancements to SG processing in NYBPM-3G
    • Include transit Drive Access trips to PNR into Highway assignment
    • Add SG’s representing exclusively airport air passengers
## Special Generators in NYBPM

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<th>TAZ Tier</th>
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<td>605</td>
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<td></td>
<td>x</td>
<td>x</td>
<td>3590  JFK Cargo Terminal</td>
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<td>x</td>
<td>3814  JFK Arriving/Departing Passengers</td>
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<td>LGA</td>
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<td>407</td>
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**Color Key:** New added SG zone
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**TRUCK TERMINALS**
JFK Airport Special Generator
LGA Airport Special Generator
EWR Airport Special Generator
NYBPM-3G Testing

• Tests of Processing Special Generators
  • started based on NYBPM-2G Tier 0 system;
  • will continue with Tier 1.1 TAZ system developed.

• Testing of Updated Tier 1.1 Geographic layers and Input data files
  • System-wide: involves all tasks/functions of the Model;
  • Part of the on-going testing of “FlexZone” functionality;
  • Tests conducted on a by-Task basis.
NYBPM-3G Testing (Cont.)

Task 1 reference. Trail: N; Task: 13.1

- Testing of Updated Tier 1.1 Geographic layers and Input data files
  - NYBPM Tasks that have been tested for Tier 1 zone system:
    - “Build Scenario Network”;
    - “Build Time Period Highway Networks”;
    - “Highway Assignment and Skims”;
    - “Trucks and Externals”
AGENDA ITEM G:
SPECIAL GENERATORS - AIRPORTS AND INTER-MODAL (TRUCK) FACILITIES

Renee Alsup
Motivation

• Originally developed to capture important Trans-Hudson traffic
• Some ports have more detailed forecasts available than what comes from the Truck & Externals model
• Air passenger trips are not included in the current BPM 2G model
Data - Current Set of Special Generators

• Airport Passengers:
  • JFK, LGA, EWR, SWF
  • From RASD survey (2005) and forecasts based on PANYNJ Airport Capacity Study and PA enplanement forecasts

• Truck Facilities with Data:
  • Port Newark, Port Elizabeth, Port Jersey, EWR Cargo, Howland Hook

• Truck Facilities without Data:
  • MOBTY, JFK Cargo, South Brooklyn Marine, Red Hook
  • Placeholders in case data becomes available
Methodology - Mode Distribution

- Airport Auto Trips (SOV, HOV2, HOV3+, Taxi)
  - RASD survey modes are drop-off, park, rental car, taxi, limo/car service
  - RASD survey party size is used to determine SOV vs. HOV
  - SOV – park and rental car for party size of 1
  - HOV2 – drop-off for party size of 1 and park or rental car for party size of 2
  - HOV3+ - drop-off for party size >1 and park or rental car for party size > 2
  - Taxi – taxi and limo or car service
- Freight/Cargo trips all map to Truck mode
Methodology – Trip Tables

• Special Generator trips added to existing trip tables
• Some freight zones have additional trips from Trucks & Externals procedures
• We will update inputs for Trucks & Externals where needed for Special Generator Zones
Status

• Truck Trips
  • Current data set can be used pending confirmation from PANYNJ that forecasts and OD-survey results are most recent and accurate

• Airports
  • Still in the process of developing methodology to generate input tables
  • RASD survey is only for departing passengers, so additional processing is required to estimate arriving trips
AGENDA ITEM H:
DRIVE-ACCESS TRANSIT - INCORPORATION IN HIGHWAY ASSIGNMENT

Renee Alsup
Motivation

- Model currently includes transit drive-access trips, but the driving portion is not assigned to the highway network
- Done in previous TH-TDFM model but only for 2 specific PNR stations
- Transit procedures have been updated to make this process more clear
Data

• Transit skims include parking skim for AM and MD with node that Drive-access trip parked at
• Using the number of drive access trips at each OD pair and the node where they parked, we get trips from the origins to the parking node
Methodology

• First combine parking matrix and trip tables into one matrix
• Export the matrix with fields for parking node and drive-to-transit or drive-to-commuter rail trips
• Select only records with a parking node and a trip and import the data into a new matrix (other selection criteria can also be applied)
• **Tag all parking nodes with the TAZ based on the TAZ GIS layer**
• Convert the parking node index into a TAZ index
Methodology (Continued)

- Split trips into 80% SOV and 20% HOV2
- HOV2 trips are assumed to be KNR, so mirrored trip is also added (return from drop-off)
- Add those trip tables to the AM (or MD) highway trip tables
- Transpose the trip tables and add them to the PM (or NT) highway trip tables
- Important assumptions:
  - Parking nodes are mapped to a TAZ, so the trip goes to the centroid instead of the actual parking node
  - Mode split is 80% SOV and 20% HOV2
  - Drop-off trips are HOV2 on the trip there and the return trip
  - All AM trips happen in reverse in the PM period and all MD trips happen in reverse in the NT period
Status

• A preliminary version of the code has been written and tested
• Still trying to develop additional selection criteria for which trips to be included
  • Drive trip length (> 1 mile)
  • Capacity of the parking node
  • Distance of the parking node from the centroid
AGENDA ITEM I:
TH-TDFM: SURVEY-BASED TRANSIT ASSIGNMENT CALIBRATION (NJ)
AECOM – Jeff Roux
AGENDA ITEM I:
TH-TDFM: SURVEY-BASED TRANSIT ASSIGNMENT CALIBRATION (NJ)

AECOM – Jeff Roux
Big Picture

• BPM 2G Represents significant step forward in transit procedures – GUI, native TC procedures, speed, efficiency.
• Conversion of FORTRAN based transit procedures to native TransCAD
  • 2G conversion focused on mechanics
  • TH-TDFM is currently focused on validation
• Strong emphasis on accurate networks and constructing high-quality transit paths
• Assigning regional on-board surveys iteratively to validate path-building and assignment routines
  • Identifies where network changes required
  • Identifies where path-building/assignment parameter changes required
Progress to Date

• TH-TDFM Network Development
  • Fixing lingering 2G network issues (Uptown PATH & EWR AirTrain)
  • Instilling discipline to PABT bus coding
  • Cross-references PABT bus inventories from PANYNJ
  • Intermodal connections at key NJ facilities
  • Calibration of PNR procedures
  • Attributes (fares, capacities, **bus travel times**)

• Survey Based Assignments w/NYMTCLC 2G & TH-TDFM, yielding changes:
  • Network improvements
  • Accessibility improvements
  • Path-building changes
TH-TDFM Network Improvements

- PABT Refinements
- Uptown PATH
- Secaucus Junction
- Newark Penn
  - Rail – PATH
  - Rail/PATH – Newark LRT
- Hoboken
  - Rail – PATH/Ferry
  - Rail – Hudson-Bergen LRT
PABT Refinements

Before Adjustment

Bus Entrance/Exit Links

Terminal Layout

Eastbound Routes

After Adjustment
Uptown PATH

Original 2G

Refined TH-TDFM
Secaucus Transfer Links
Newark Penn Station
PATH Station Entrance/Transfer Link
Newark Penn Station
Newark City Subway Station Entrance/Transfer Link
Hoboken Terminal - PATH Station Entrance/Transfer Link
Hoboken
Hudson-Bergen LRT-Path Transfer Link
Accessibility Improvements

PNR Procedures:

- New procedures required extensive work to validate:
  - Expanded capture breadth in new procedures to account for distance changes between “network based” drive access connector and airline distances (old FOTRAN procedures)
  - NJ PNR connections were “manual” in prior BPM (from NJTDFM), now generated automatically. Parameter adjustments required to capture long-drive access trips in NJ (i.e. Route 9 corridor)
- Restrict zone centroid to parking by transit skim network:
  - Drive-to-Rail: Parking occur at commuter rail lots
  - Drive-to-Other Transit: Parking at non-commuter rail lots
- Significantly improved validation of path-building and assignment performance for commuter rail
Multi-Class Pathfinder Assignment

- Prior BPM performed separate assignments by transit class (DC, WC, WT and DT)
  - Rail trips forced to use rail
  - Other transit trips forced to use other transit
- New procedures performs one assignment of all classes simultaneously:
  - The Good: Congestion impacts considered across all modes
  - What is Different: The mode choice module can assign a trip to commuter rail while transit assignment may never involve commuter rail. May pose application challenges...
  - The challenge: Tune module to replicate today’s behavior
  - Our findings to date: Requires an increased emphasis on network quality control (Biggies are bus travel times & capacities)
Transit Path-Building Parameters

- Expanded Maximum Walk Access/Egress distances
  - 2G conversion = 25 min.
  - TH-TDFM = 35 min.
  Used survey data, particularly commuter rail-to-ultimate trip end walk distances in Manhattan to set parameter.

- Refined commuter rail mode-to-mode transfer penalties (consistent w/TC 4.8)
  - Extensive market research by MVA and RSG for MTA & NJ TRANSIT
  - 2G Conversion:
    - Commuter Rail Paths:
      - Commuter Rail to Other Transit = 3.0 min.
      - Other transit to other transit = 1.0 min.
  - TH-TDFM Validation:
    - Commuter Rail Paths:
      - Commuter Rail to Other Transit = 4.7 min.
      - Other transit to other transit = 4.7 min.
Survey Assignments

Surveys Used:
2002 PANYNJ Interstate Bus Survey
2005 NJT On-Board Rail Survey
2007 PATH On-Board Rail Survey
2007 NJ Hudson-Bergen LRT Survey
1998 PANYNJ Ferry Survey (scaled to 2005)
Late 1990’s NJT Local Bus Surveys (scaled to 2005)
2007 Metro-North On-Board OD Survey
2006 LIRR On-Board OD Survey
2008 MTA RTFM Estimates of East of Hudson Subway/Bus Trips

Construct a complete 6-10 AM transit trip table to feed assignment of TH-TDFM
# 6-10 AM Survey Assignments – NJT Rail (Bergen County & M&E)

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<thead>
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6-10 AM Survey Assignments – NJT Rail (RVL, NJCL, NEC and Terminals)

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<td>NYBPM 2G 8/29/12</td>
<td>TH-TDFM 10/24/12</td>
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<tr>
<td>NJT Commuter Rail</td>
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<td>3,603</td>
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# 6-10 AM Survey Assignments –PATH

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<th>Node</th>
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<th>Counts</th>
<th>Version 1 - 08/29/12</th>
<th>TH Version2 - 10/24/12</th>
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<td>Base Year Survey Assignment</td>
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<td>Est. AM Peak</td>
<td>NYMTC 2G 8/29/12</td>
<td>TH-TDFM 10/24/12</td>
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**PATH**

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<tr>
<th>Node</th>
<th>Station</th>
<th>Counts</th>
<th>Version 1 - 08/29/12</th>
<th>TH Version2 - 10/24/12</th>
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<td>Base Year Survey Assignment</td>
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<td>Est. AM Peak</td>
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### 33rd St Line

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<td>33rd St</td>
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<td>23rd St</td>
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<td>9th St</td>
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<td>Christopher St</td>
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**WTC**

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**New Jersey**

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<td>Hoboken</td>
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<td>Pavonia/Newport</td>
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**TOTAL PATH**

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<table>
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<tr>
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<th>10/24/12</th>
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<tbody>
<tr>
<td>TOTAL PATH</td>
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### 6-10 AM Survey Assignments – LIRR & MNR

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<td>Base Year Survey Assignment</td>
<td>Base Year Survey Assignment</td>
</tr>
<tr>
<td></td>
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<td>Est. AM Peak</td>
<td>NYMTC 2G 8/29/12</td>
<td>TH-TDFM 10/24/12</td>
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<td>(2000 for CTZ offs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>LIRR CITY TERMINAL ZONE</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3000</td>
<td>New York-Penn Station</td>
<td>5,965 85,526 91,491</td>
<td>2,491 63,893 66,384</td>
<td>3,811 72,348 76,159</td>
</tr>
<tr>
<td>3807</td>
<td>New York-GCT</td>
<td>0</td>
<td>0 4,103 4,103</td>
<td>0 3,974 3,974</td>
</tr>
<tr>
<td>3002</td>
<td>Hunterspoint Ave</td>
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<td>0 188 188</td>
<td>0 155 155</td>
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<tr>
<td>3001</td>
<td>Long Island City</td>
<td>0 79 79</td>
<td>0 2,330 4,152 6,481</td>
<td>2,610 4,298 6,908</td>
</tr>
<tr>
<td>3091</td>
<td>Flatbush Ave</td>
<td>4,143 10,593 14,736</td>
<td>1,261 7,703 8,963</td>
<td>1,775 7,734 9,508</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>10,108 99,607 109,715</td>
<td>3,752 75,886 79,638</td>
<td>5,585 84,211 89,796</td>
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<tr>
<td><strong>METRO-NORTH MANHATTAN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3500</td>
<td>125th St</td>
<td>142 2,514 2,656</td>
<td>2,330 4,152 6,481</td>
<td>2,610 4,298 6,908</td>
</tr>
<tr>
<td>3201</td>
<td>125th St</td>
<td>0 70,632 70,632</td>
<td>2,307 60,776 63,083</td>
<td>2,890 64,963 67,854</td>
</tr>
<tr>
<td>3200</td>
<td>NYC-Grand Central</td>
<td>0 70,632 70,632</td>
<td>2,307 60,776 63,083</td>
<td>2,890 64,963 67,854</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>142 73,146 73,288</td>
<td>4,637 64,928 69,564</td>
<td>5,500 69,261 74,761</td>
</tr>
</tbody>
</table>
Where we are/Next Steps

- NJ Commuter rail path-building very good:
  - Able to generate valid skim for 95+% of surveyed trips (we started at 60%)
  - Survey assignments while not perfect are much improved
- Trans-Hudson bus travel times need revision (underway)
  - Our general assessment – bus times to Manhattan are 10-20 min too fast depending on corridor
  - We need to modify how bus travel times are calculated
  - Especially important in multi-class assignment – bus times starting too fast means it’s “too easy” to push folks off rail because we’re not starting with accurate bus impedances
- Expand NJ network/path-building validation to bus, ferry, LRT and PATH.
AGENDA ITEM J,K:
OTHER DISCUSSION
NEXT STEPS / NEXT MEETING