



SAWG Presentation

Traffic and Transit

June 6 and July 11, 2007 T

Land Use

July 17, 2007



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Title slide.



Content

- What we know – establishing existing conditions
- How we're using it – predicting future conditions



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The presentation will describe the transportation data collected to date and how we are using it to predict future conditions.




REPORT AND SUMMARY OF ENVIRONMENTAL REVIEW




What We Know


Establishing Existing Conditions



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The first part of the presentation focuses on how we establish existing traffic conditions.



Current Data

- Population
- Employment
- River Crossings
- Journey-to-work
- Highway network
 - Physical characteristics
 - Volumes
- Transit network
 - Routes
 - Ridership



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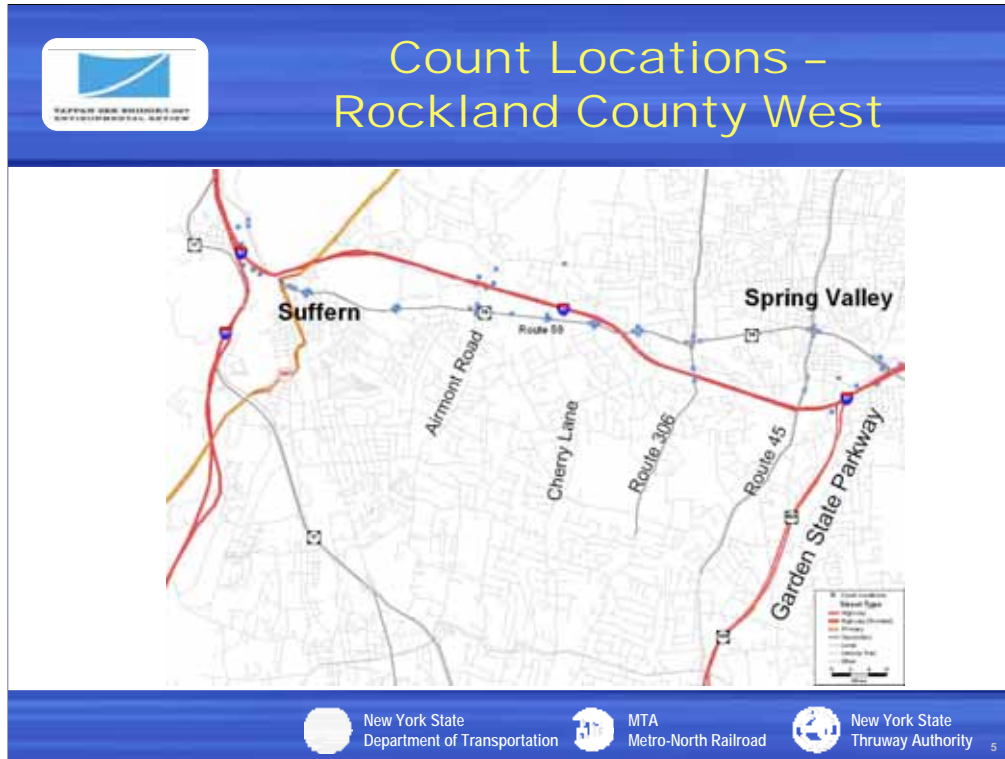
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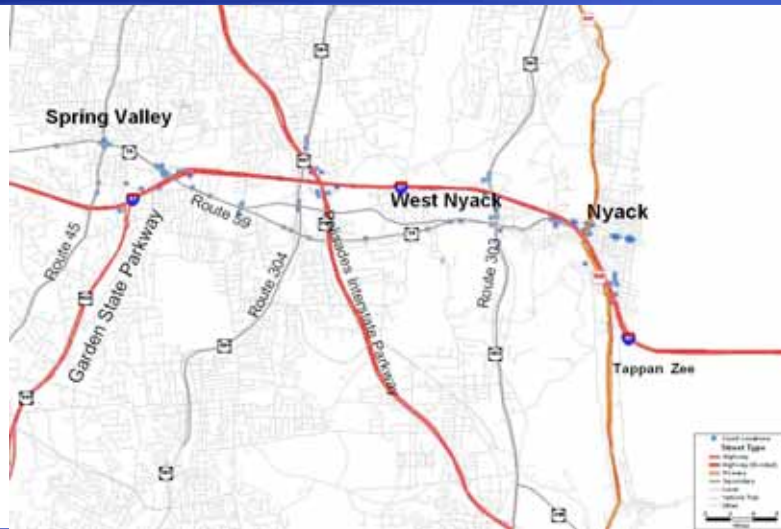
Many elements of data that go into the forecasting of future travel.



The locations where traffic counts were done in Rockland County, supplementing the counts available from other government agencies. The counts were concentrated on I-287 and Route 59.



Count Locations – Rockland County East



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The locations where traffic counts were done in Rockland County, supplementing the counts available from other government agencies. The counts were concentrated on I-287 and Route 59.



Count Locations – Westchester County West



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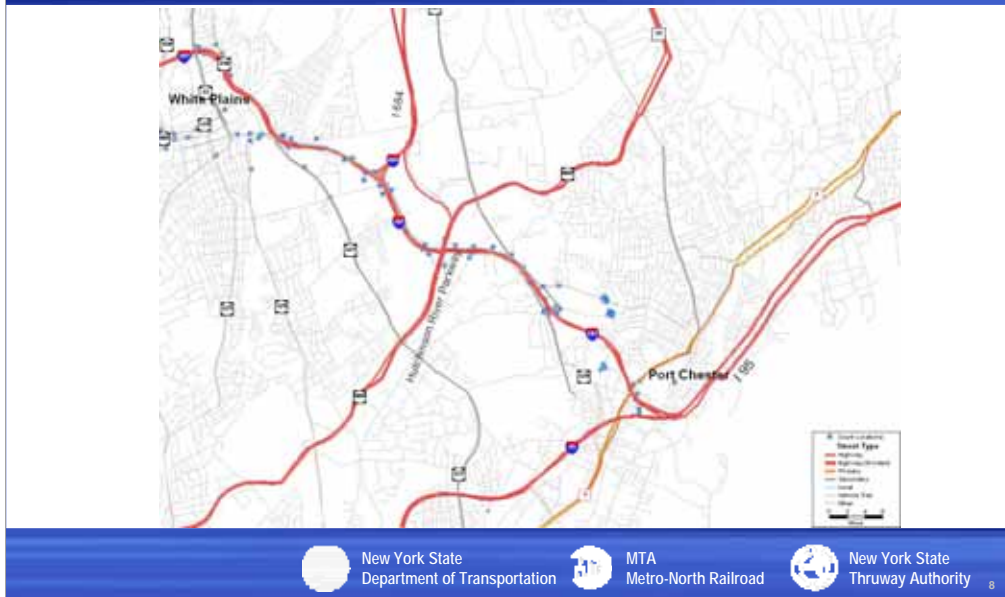
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The locations where traffic counts were done in Westchester County. The counts were concentrated on I-287, Route 119 and Route 120A.



Count Locations – Westchester County East



The locations where traffic counts were done in Westchester County. The counts were concentrated on I-287, Route 119 and Route 120A.



Surveys Conducted

- River crossing vehicle survey
 - All cars at Tappan Zee
 - EZPass at other crossings
- River crossing transit survey
- Truck survey
- Stated preference survey of transit modes



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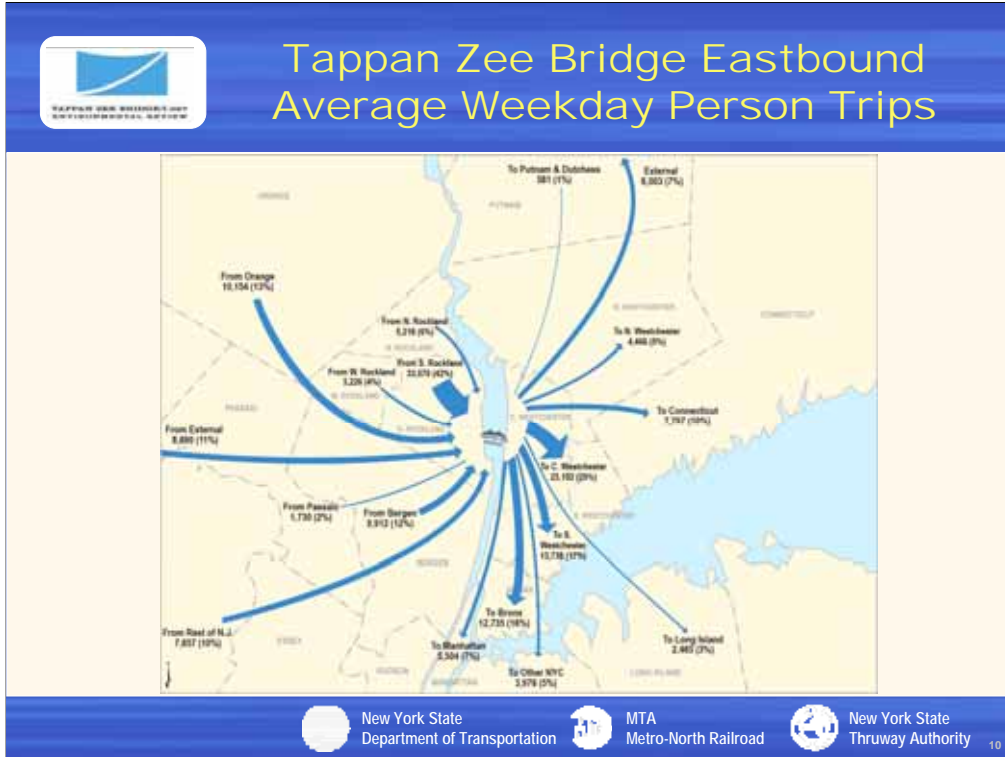


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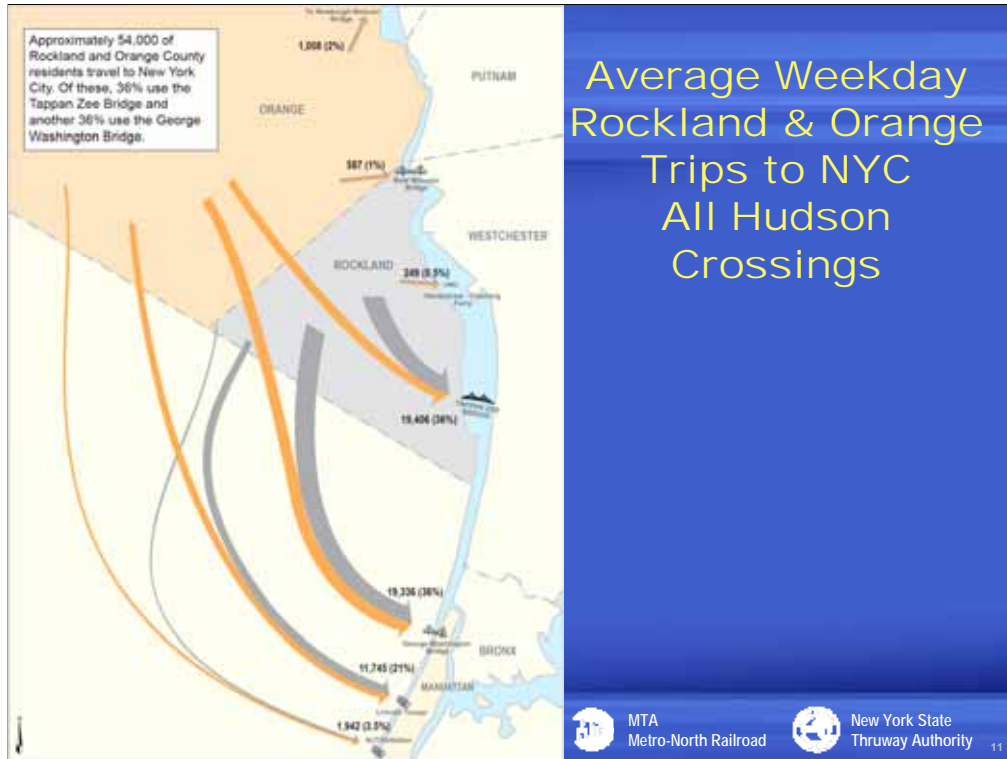


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Surveys were done to collect data on current travel. The following slides show some of the results. The transit survey included all buses crossing the river and train passengers on the Port Jervis and Pascack Valley Lines. The truck survey investigated the impact of congestion pricing tolls. The stated preference survey examined how residents and travelers in the corridor viewed alternative transit modes.



Based on a survey of automobiles passing through the Tappan Zee Bridge toll plaza, the graph shows the origins on the west side of the Hudson and the destinations on the east side.



The graph shows all Hudson River crossings to NYC for average weekday trips from Rockland & Orange Counties.



This part of the presentation focuses on how we use our data on existing conditions to predict future conditions.



Key Steps

- Identifying growth trends and other planned projects
- Develop service plans for transit options
- Run travel demand model
- Run traffic impact model



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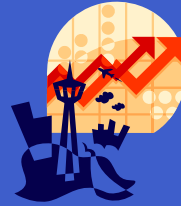
The procedure we follow is to systematically look at the variables in the future and see what impact they had on travel.



Future Forecasts

– From the MPOs

- Population
- Employment
- Capital Projects



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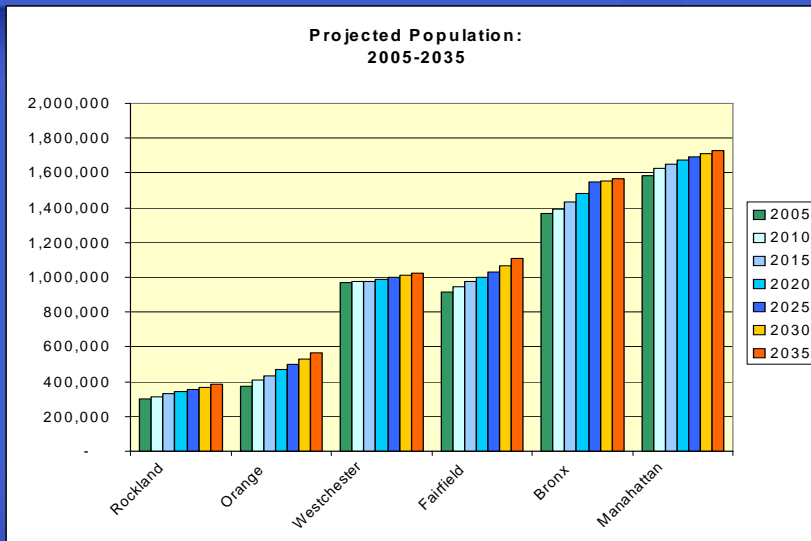
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Forecasts of population and employment are developed by the New York Metropolitan Transportation Council (NYMTC) with the cooperation of the counties it serves. Capital projects are all projects funded in the Transportation Improvement Programs adopted by the metropolitan planning organization.



Population Growth



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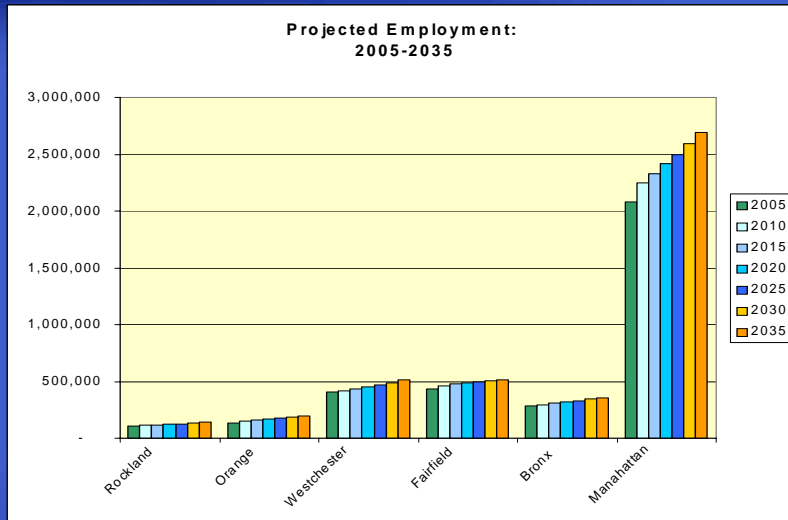
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Population forecast by five-year increments.

The NYMTC forecasts currently are to 2030. Forecasts for 2035 are projections based on growth rates by zone between 2025 and 2030.



Employment Growth



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Employment forecasts were treated the same way as population forecasts. Note that employment in Westchester is growing faster than the population.



Capital Projects

- Adopted Transportation Improvement Programs (TIPs)
 - NYMTC
 - NJTPA
 - SWRPA
- Includes ARC as a project in all alternatives
- Includes ESA and 2nd Ave Subway (to 63rd St in 2015)
- Includes planned improvements on I-287 in Westchester



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The forecasts consider all approved capital projects.



Establishing Future Operating Conditions.



How the HOT Lanes Would Work

- Limited entry and exit points
 - Costs displayed in advance of entrance
- EZ-Pass only – no toll booths
- No cost for buses
- Costs for registered HOV3+ being evaluated
- Costs for SOVs and HOV2s change continuously with traffic to prevent congestion
- No HOV discount on weekends



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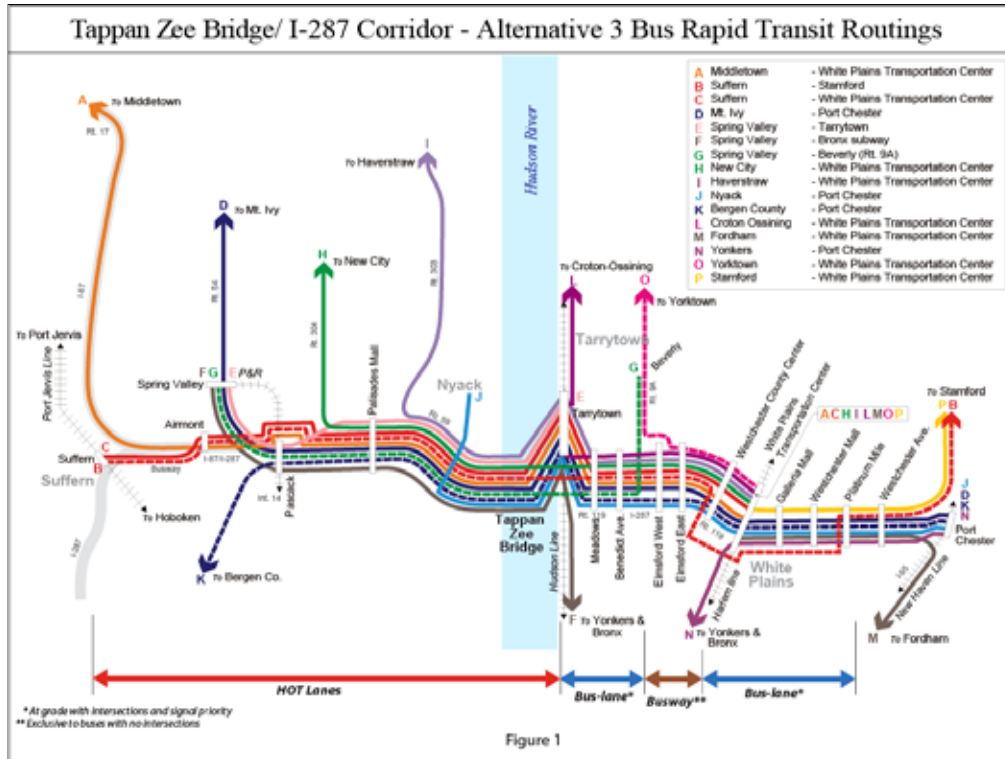
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HOT lanes are a means of fully utilizing lanes set aside for high occupancy vehicles (HOVs) by allowing other vehicles in the lanes, for a toll, limited to the number that can operate without causing problems.



This diagram shows the bus routes using the BRT facilities across the corridor, but extending, in mixed traffic, to points north and south of the corridor, including Bergen County, Stamford, Yonkers and the Bronx.



Commuter Rail Service Plans – Alternative 4A

Alternative 4A - Replacement Bridge with Full Corridor Commuter Rail to GCT, NYP, Hoboken and Stamford

| Stops | Peak | | | | | | | | | | Off-Peak - Bi-Directional | | | | | Off-Peak | |
|---------------------------|-------------------------|----|----|----|----|----|----|----|----|----|---------------------------|-------------|--------------------------------|----|----|----------|----------------|
| | Uni-Directional Service | | | | | | | | | | Bi-Directional Service | By Terminal | Reverse Peak - Uni-Directional | | | | Bi-Directional |
| | A | B* | C | B* | C | F | G | H | I | J | | | A | B* | C | G | |
| No Trains in peak hour | 1 | 1 | 1 | 1 | 2 | 4 | 4 | 2 | 3 | 3 | 15 | | | | | | |
| Peak Hour Headways | 60 | 60 | 60 | 60 | 30 | 15 | 15 | 30 | 30 | 30 | | 120 | 120 | 60 | 60 | 60 | |
| Off-Peak Headways | X | X | 90 | 90 | 30 | 30 | 30 | 60 | 40 | | | | | | | | |
| Port Jervis | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Oshtemo | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Middlesex | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Campbell Hill | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Salisbury Mills | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Harlem | • | • | • | • | • | • | | • | • | | | • | • | • | • | • | |
| Tuxedo | • | • | • | • | • | • | | • | • | | | • | • | • | • | • | |
| Starkburg | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Hillburn | • | • | • | • | • | • | | • | • | | | • | • | • | • | • | |
| Almond Road | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Exit 14/Garden State Pkwy | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Peterboro Mall | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Teppen Zoo | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Washwater Stage* | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Greenwich | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Stamford | • | • | • | • | • | | | • | • | | 4 | • | • | • | • | • | |
| Tuxedo | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Harlem (25th Street) | • | • | • | • | • | • | | • | • | | | • | • | • | • | • | |
| Grand Central | • | • | • | • | • | • | | • | • | | 10 | • | • | • | • | • | |
| Suffern | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Ramsey-Route 17 | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Saratoga | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| Hoboken | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |
| New York Penn | • | • | • | • | • | | | • | • | | | • | • | • | • | • | |

NOTES: In addition to the direct service to each terminal, customers will have additional service to each terminal via transfers at
 *Harrison, Hillburn, Exit 14 and Palisades Mall Stations
 Reverse peak and off peak Bergen Line and Main Line trains will terminate at Hillburn instead of Suffern.
 *Woodchester Station Stops include: Elmwood, White Plains, Woodchester Mall, Corporate Pk Dr, Rocker Post Road, Post Office
 ** Additional trains in 2030 and 2050, using the Trans Hudson Express tunnel. They will not operate in 2015.

Service Branch:
 • Hoboken/New York Penn
 • Grand Central Terminal
 • Cross-Corridor

This diagram illustrates stop pattern and frequency of service for existing and proposed services. Green columns are rail services down the western shore to Hoboken and Penn Station, orange columns are services from Rockland and Orange Counties to Grand Central, and blue columns are cross-corridor service from Port Jervis and Hillburn to White Plains and Stamford.



Commuter Rail Service Plans – Alternative 4B and 4C

Alternatives 4B and 4C - Replacement Bridge with Commuter Rail - GCT, NYP and Hoboken

| Stops | Peak | | | | | | | By Terminal | Off-Peak - Bi-Directional | | | |
|---------------------------|-------------------------|----|----|----|----|----|----|-------------|--------------------------------|-----|----|----|
| | Uni-Directional Service | | | | | | | | Reverse Peak - Uni-Directional | | | |
| | A | B* | C | CP | E | F | G | | A | B* | E | G |
| No Trains in peak hour | 1 | 1 | 1 | 1 | 2 | 4 | 4 | 14 | | | | |
| Peak Hour Headlines | 60 | 60 | 60 | 60 | 30 | 15 | 15 | | | | | |
| Shoulder Peak Headlines | X | X | 60 | 60 | 30 | 30 | 30 | | | | | |
| Off-Peak Headlines | | | | | | | | | 100 | 100 | 60 | 60 |
| Port Jervis | • | • | • | • | • | • | • | | • | • | • | • |
| Clawville | • | • | • | • | • | • | • | | • | • | • | • |
| Madison | • | • | • | • | • | • | • | | • | • | • | • |
| Campbell Hall | • | • | • | • | • | • | • | | • | • | • | • |
| Sunbury Mills | • | • | • | • | • | • | • | | • | • | • | • |
| Hartman | • | • | • | • | • | • | • | | • | • | • | • |
| Tuxedo | • | • | • | • | • | • | • | | • | • | • | • |
| Stoutsville | • | • | • | • | • | • | • | | • | • | • | • |
| Wilbur | • | • | • | • | • | • | • | | • | • | • | • |
| Almond Road | • | • | • | • | • | • | • | | • | • | • | • |
| Exit 14/Garden State Pkwy | • | • | • | • | • | • | • | | • | • | • | • |
| Patterson Mall | • | • | • | • | • | • | • | | • | • | • | • |
| Tappan Zee | • | • | • | • | • | • | • | | • | • | • | • |
| Yonkers | • | • | • | • | • | • | • | | • | • | • | • |
| Hastern 125th Street | • | • | • | • | • | • | • | | • | • | • | • |
| Grand Central | • | • | • | • | • | • | • | 10 | • | • | • | • |
| Suffern | • | • | • | • | • | • | • | | • | • | • | • |
| Ramapo Route 17 | • | • | • | • | • | • | • | | • | • | • | • |
| Secaucus | • | • | • | • | • | • | • | | • | • | • | • |
| Hoboken | • | • | • | • | • | • | • | 2 | • | • | • | • |
| New York Penn | • | • | • | • | • | • | • | 3 | • | • | • | • |

NOTES: In addition to the direct service to each terminal, customers will have additional service to each terminal via transfers at Hartman or the new Millburn Stations.
 * Reverse peak and off peak Bergen Line and Main Line trains will terminate at Millburn instead of Suffern.
 * Additional trains in 2020 and 2021, using the Trips Hudson Express tunnel. They will not operate in 2019.



The same diagrams are shown for Alternatives 4B and 4C, without cross-corridor rail service. Note that all trains crossing the river would stop at the proposed Tappan Zee Station.



Light Rail Service Plan Alternative 4B

Tarrytown - Port Chester LRT Service Plan

| | |
|------------------------|------------|
| Length | 13.8 miles |
| Running Time | 28 minutes |
| Peak Hour Headways | 10 Minutes |
| Shoulder-Peak Headways | 10 Minutes |
| Off peak Headways | 15 Minutes |



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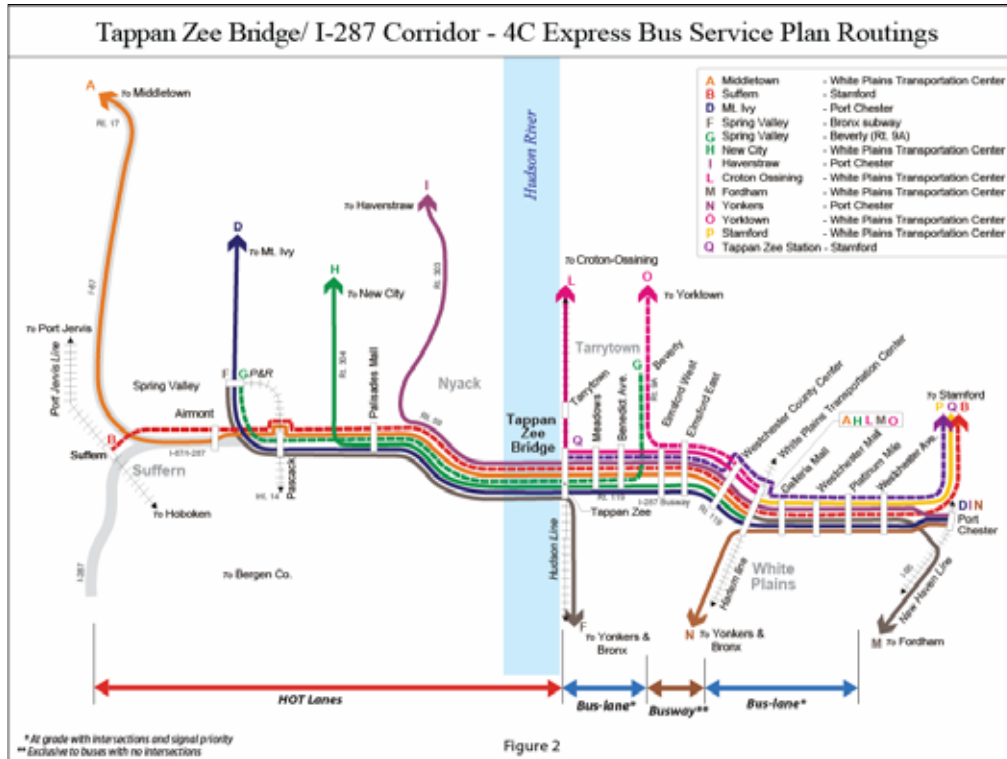
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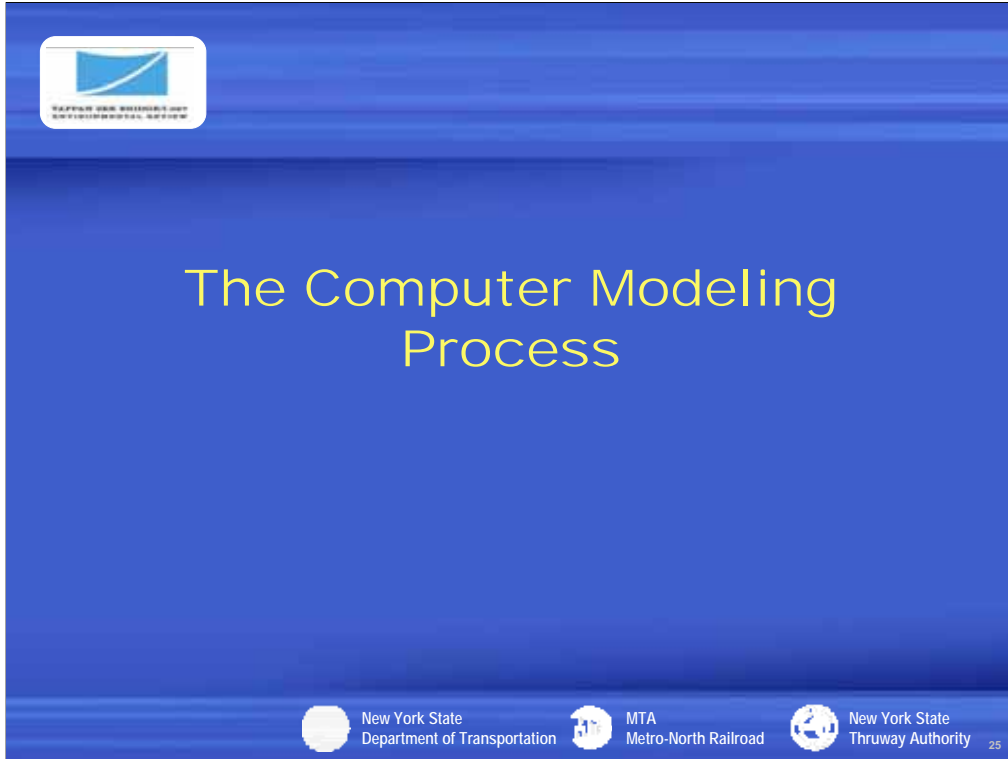
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The service plan for light rail is simple, with one route stopping at all stops.



The bus route diagram for Alternative 4C, where fewer routes serve Rockland County due to the rail service to the Hudson Line.



The Computer Modeling Process.



The BPM Model

- We're using the NYMTC Best Practice Model to forecast future travel
 - Covers 28 counties and is the adopted model for the region
 - Has several elements and is a state-of-the-art urban travel model
 - Splits trips between highway and transit



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The basic travel forecasting model being used is the state-of-the-art Best Practice Model (BPM), a model developed especially for the New York metropolitan area.



What BPM Does

- BPM begins with population, employment and networks
- First it determines how many trips will be made in each zone
- Then it determines, simultaneously, where those trips will go, and what mode they will use
- Then it assigns those trips to highways, train routes, buses and subways.



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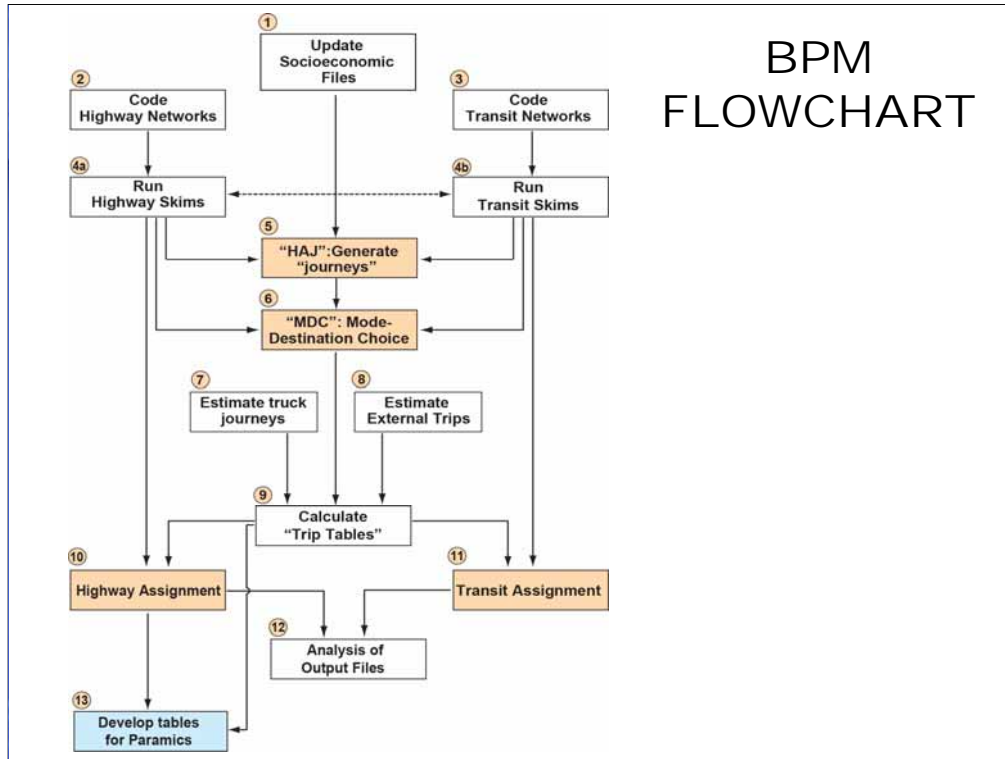
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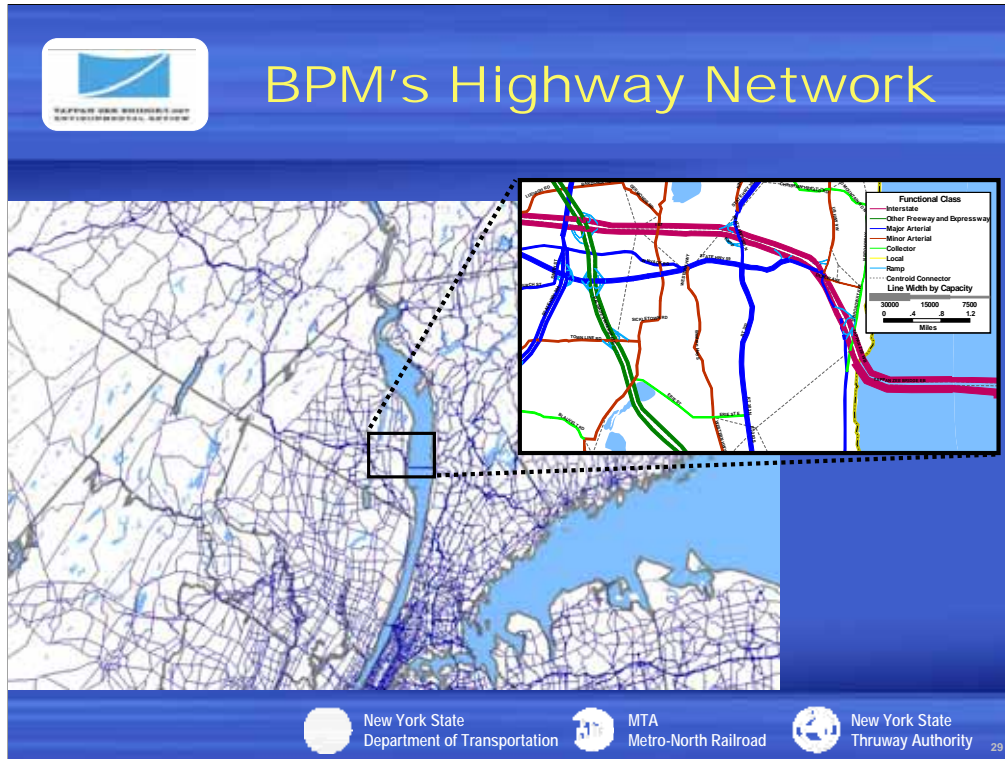
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BPM takes socio-economic data and uses it to forecast future travel and determine its mode and route.



The sequence of computer programs that make up the Best Practice Model



An illustration of the level of detail in the BPM highway network which includes all freeways (red) parkways (green) and most major arterials and collector routes (blue) but not all streets.



BPM's Transit Network



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This illustration shows the level of detail of the transit network, which includes all commuter rail lines (red), express bus routes (yellow), and local bus routes (green).



Modes Used

Transit

- Drive to Commuter Rail
- Walk to Commuter Rail
- Drive to other transit [bus, subway, light rail, ferry]
- Walk to other transit

Auto

- Single-occupant vehicle
- Two-occupant vehicle
- Three plus-occupant vehicle

Taxi

Truck

- Light truck
- Heavy truck

Other Commercial Vehicles



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BPM has four transit modes, three auto modes, taxi and three commercial vehicle modes.



Calibrate BPM

- Recalibrate BPM for 2005
 - Based on Census Journey-to-Work and Surveys
 - Adjust fares, tolls and operating costs to reflect 2005
 - Adjust constants to get the trips to/from/within the corridor to come out close to the counts
 - Further adjustments to get transit share closer to counts



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Before we applied BPM to future conditions, we calibrated it for 2005 based on existing count and travel data.



Run the Alternatives and their Options

- Alternative 1 - No Build
- Alternative 2 - Bridge Rehabilitation
- Alternative 3 – Full Corridor BRT
- Alternative 4A – Full Corridor CRT Hillburn-Port Chester/Hudson Line
- Alternative 4B - CRT Hillburn-Hudson Line with LRT in Westchester
- Alternative 4C - CRT Hillburn-Hudson Line with BRT in Westchester



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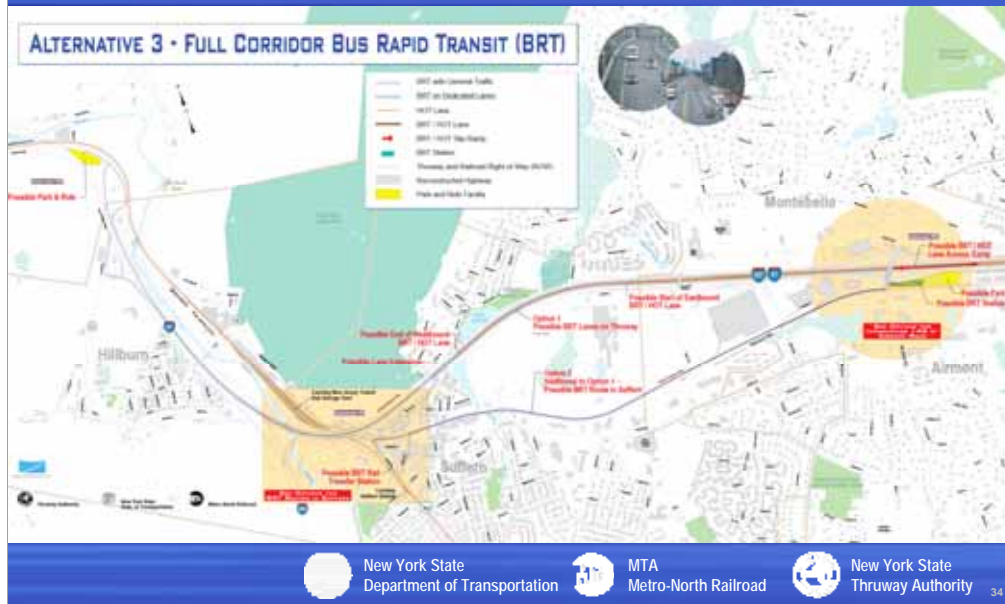
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We're using it to test six alternatives and some options within each alternative.



Examples of Options



An example of an option being evaluated with BPM, showing the possible BRT route from Suffern to Airmont Road using the Piermont right-of-way as an exclusive busway.



The Paramics Model

- We're using Paramics to forecast and analyze future traffic
 - Used for the corridor, divided between Rockland and Westchester County
 - Uses trip tables [travel forecasts between zones] from BPM
 - Can analyze interchanges, intersections, HOT lanes, climbing lanes and traffic/transit interface
 - Produces Levels of Service for roadway segments and interchanges/intersections



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While BPM forecasts travel, by all modes, we use Paramics to analyze traffic on the roadways, based on forecasts from BPM.



Levels of Service

- Measure of congestion – from A to F
 - A - is free-flow traffic
 - C - is Stable flow
 - F - is Forced or breakdown flow



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Traffic is measured using levels of service – a standardized method developed by the Federal Highway Administration.



Calibrate Paramics

- **Calibrate Paramics to Counts**
 - Adjust the model and trip table to match the counts on I-287 and the major arterials
 - Add zones and network links as necessary to allow detailed analysis, especially at potential station locations and new facilities



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Like BPM, we have to calibrate the Paramics model to current conditions before applying it in the future.



Example of Paramics

- Interchange 11 – Route 59 in Nyack
- Needs reconstruction with HOT Lanes and/or climbing lane
- Possibilities for improving traffic flow and eliminating conflicts



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As an example, we are using Paramics to analyze the impact of a reconfigured interchange at Interchange 11 in Nyack.



Examples of Options

OPTIONS FOR INTERCHANGE 11 AT NYACK

Option 1



Option 1 would maintain the existing layout. Mountview Avenue would be relocated west to provide acceptable grades and clearance.

Option 2



Option 2 would provide a direct connection between the Thruway and Route 99. Mountview Avenue to be relocated west or relocated north.

Option 3



Option 3 would provide a direct connection between the Thruway and Route 9W. Mountview Avenue to be relocated west or relocated north.



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An example of options being evaluated using Paramics, showing alternative interchange configurations at Interchange 11 in Nyack.



SAWG Land Use Meetings

1. Land Use and Zoning in the Study Area
2. Transportation Data and Forecasting
3. Transportation Oriented Development
4. Acquisitions and Relocations
5. Neighborhood/Town Focused
Discussions of Potential Land Use
Impacts



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A listing of possible topics to be presented in future meetings.