**Port Authority of NY & NJ Passenger and Traffic Forecasting Report**

*Project Progress Report 4 – Final Recommendations & Dashboard Insights*

**Project Goal 1:** *Project the number of passengers for the bus terminal from 2025 to 2030. Port Authority will be building temporary staging facilities, and we need to know the number of people who will be using these facilities?*

From our Power BI dashboard forecasts, it's clear that both the **Midtown Bus Terminal (MBT)** and the **George Washington Bridge Bus Station (GWBBS)** will experience steady and strong growth in the number of passengers between 2025 and 2030.

* Midtown Bus Terminal (MBT) is projected to serve about 180 million passengers over six years.
  + During busy months like July and August, passenger numbers rise above 2.9 million per month.
  + Even during slower months, traffic remains strong, rarely dropping below 2.1 million.
  + This suggests that MBT is consistently busy all year and will continue to see high foot traffic.
* GWBBS, while smaller, will also handle a significant number of people around 8 million passengers from 2025 to 2030.
  + Monthly usage varies from about 90,000 to 134,000.
  + Peak usage tends to occur in summer and during holiday periods.

**Conclusion:**

Combined, both terminals are expected to serve around 188 million people over this period. With this much demand, it makes sense that the Port Authority is planning temporary staging facilities. These projections clearly show that MBT especially needs additional space and operational support to handle the ongoing high volume of passengers effectively.

**Project Goal 2:** *What are the most important factors in predicting the number of passengers for the bus terminal?*

The most important factors are a mix of time-based, weather, traffic, and historical data.

1. **Time-Based Factors**  
   Variables like **month, year, day of the week, and hour** help capture natural patterns in ridership such as weekday commuting vs. weekend travel.  
   **Holidays and special events** are especially critical, as they often cause surges in passenger volume.
2. **Weather Conditions**  
   Data like **temperature (TMAX, TMIN)**, **precipitation (PRCP, SNOW)**, and **wind speed (AWND)** significantly impact travel.  
   For example, heavy snow or rain can cause delays, reduce demand, or shift ridership to different times or terminals.
3. **Traffic and Operational Data**  
   Metrics such as **total vehicle counts,** and **bus carrier schedules** reflect the real-world capacity and congestion.  
   This helps forecast demand based on how many buses are available and how traffic might slow down operations.
4. **Historical Passenger Data**  
   They help detect **long-term growth**, **seasonal cycles**, and unexpected changes like those seen during **COVID-19**.

Together, these factors allow for accurate, data-driven forecasting that reflects real-world travel behavior and operational realities.

**Project Goal 3:** *Project the prediction results by individual carrier?*

We looked at how each bus company is expected to perform from 2025 to 2030 based on ridership forecasts. This helps the Port Authority know which carriers need more space, gates, or staff support at terminals.

* **Top Carriers** (16 - 18 million passengers each)
  + *NJ Transit, Greyhound, and Hudson Transit* are expected to carry the most passengers.
  + These carriers often handle over 250,000 passengers per month, especially in peak months like July.
* **Mid-Level Carriers** (13 - 15 million)
  + This group includes *Trans bridge, Vanessa, Rockland, and OurBus\_LD.*
  + Their traffic increases seasonally, especially in spring and summer, and shows a steady growth trend over the years.
* **Steady Carriers** (11 - 13 million):
  + Includes *Academy, Coach USA, Peterpan, Greyhound\_LD, and Spanish.*
  + These companies have consistent ridership without big fluctuations, making them reliable contributors to terminal volume.
* **Lower-Volume Carriers** (under 11 million):
  + *CJ* and *Saddle River* have fewer passengers, but still show stable month-to-month patterns.
  + These carriers may serve specific routes or smaller customer segments.

**Conclusion:**

With this information, the Port Authority can plan smarter. High-volume carriers will need more gates and boarding space, especially during busy periods. Smaller carriers might be able to share space or operate in off-peak hours to avoid crowding and make better use of available terminal capacity.

**Project Goal 4:** *What would be the busiest times for the bus terminal staging facilities (bridges) between 2025 and 2030?*

We studied the forecasted traffic for all six major *Port Authority bridge facilities*: **GWB, Lincoln Tunnel, Holland Tunnel, Goethals Bridge, Outerbridge Crossing, and Bayonne Bridge**. Here's what we found.

* **By Year:**
  + **GWB** will be the most used bridge, with *403.8 million* vehicles forecasted between 2025 and 2030, *peaking in 2029.*
  + **Lincoln Tunnel** is expected to handle *131.3 million vehicles, peaking in 2028.*
  + **Holland Tunnel** is projected to peak in *2027* with around *81.8 million vehicles.*
* **By Month:**
  + Traffic across all bridges is highest during the summer months from *May to August.*
  + *GWB* reaches over *7.7 million* vehicles in *July* alone.
  + These months align with *vacation and travel seasons*, leading to a surge in bridge usage.
* **By Week:**
  + The busiest weeks are *Weeks 3 to 5* of the month.
  + GWB hits around *60.2 million* vehicles during *Week 4*, showing just how concentrated traffic can be in certain weeks.

**Conclusion:**

These patterns help the Port Authority decide when to schedule more staff, open extra lanes, or perform maintenance. If they know when traffic is going to be highest, they can plan to avoid delays and keep things running smoothly.

**Project Goal 5:** *How does current (2025) usage compare to 2019, the last year before COVID?*

We compared the total number of vehicles in 2025 with pre-COVID 2019 levels to see how the bridges are recovering.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Bridge** | **2019 Traffic** | **2025 Forecast** | |  | | --- | |  |   **Changes** |
| George Washington | |  | | --- | |  |  |  | | --- | | 40 million | | 51 million | Recovered and grown |
| Lincoln Tunnel | |  | | --- | |  |  |  | | --- | | 19 million | | |  | | --- | |  |  |  | | --- | | 19 million | | Same as 2019 |
| Goethals Bridge | 18 million | |  | | --- | |  |  |  | | --- | | 17 million | | Slight decrease |
| Holland Tunnel | 16 million | 14 million | Still behind 2019 |
| Bayonne Bridge | |  | | --- | |  |  |  | | --- | | 3 million | | 4 million | Clear improvement |

* GWB and Bayonne have not only recovered but are doing better than they were in 2019.
* Lincoln Tunnel has stabilized, showing that traffic is back to normal.
* Holland Tunnel still lags, suggesting commuters might be using alternate routes or still adjusting post-COVID.
* Goethals is slightly behind but could catch up with time.

**Conclusion:**

This comparison helps the Port Authority understand which locations need extra support to bounce back and where traffic is already growing beyond pre-COVID levels. With this knowledge, they can focus investments and planning efforts in the right places.

*Recommendations to the Port Authority of NY & NJ*

Based on the patterns, forecasts, and insights we discovered through our Power BI dashboard analysis, we’ve written clear recommendations for how the Port Authority can better plan and operate from 2025 to 2030.

**Q1. What are the critical factors to which they need to pay attention?**

The most important thing the Port Authority should focus on is timing.  
Our data shows that the busiest periods happen every year during the summer months (May to August) and during the day between 11 AM to 5 PM. During these times, traffic across all bridges and passenger counts at bus terminals like MBT and GWBBS are at their highest.

It’s also important to pay attention to which carriers are handling the most passengers. Carriers like NJ Transit, Greyhound, and Hudson Transit consistently move more people than smaller carriers. These patterns must guide planning.

**Q2. What can they do to improve their operations?**

Here are a few easy-to-follow steps the Port Authority can take to make things better.

* Schedule more staff during busy months and midday hours to avoid long wait times and confusion at the terminals.
* Set up temporary staging areas, especially at the Midtown Bus Terminal (MBT), to handle overflow crowds.
* Work closely with the major bus carriers to coordinate timing and reduce congestion.
* Give bigger carriers more space, gates, and resources, and allow smaller carriers to share or rotate limited space.

By making operations flexible and data-driven, the Port Authority can handle crowding better and improve the travel experience for passengers.

**Q3. What additional data should they collect in the future?**

To make better decisions moving forward, the Port Authority should collect more real-time data instead of only relying on historical trends.

* Real-time vehicle counts and passenger boarding numbers
* Data about weather conditions, which affect travel patterns
* A calendar of special events (like sports games or concerts)
* Holiday schedules and school closings, which affect commuting

Collecting and using this kind of live data will allow the Port Authority to make faster and more accurate decisions when demand suddenly increases.

**Q4. Any exogenous factors that make sense to incorporate in their analyses?**

Yes, several outside factors can affect how many people use the terminals and bridges.

* Urban development near facilities may increase usage
* Gas prices or inflation may reduce how often people travel
* Remote work trends may permanently change commuting patterns
* Environmental laws could reduce or change how commercial vehicles use the roads

These outside influences are not always predictable, but they matter a lot. Factoring them into long-term planning will help avoid surprises and prepare for changes.

**Q5. Any other recommendations you think they will be of value to the company, include them here?**

Here are a few final suggestions.

* Improve communication across departments: Share forecasting insights and traffic alerts with bus companies, maintenance teams, and toll booth operators so everyone works together in real time.
* Monitor differences in post-COVID recovery, some facilities (like GWB and Bayonne) have surpassed 2019 traffic, while others (like Holland Tunnel) haven’t yet. Understanding why will help make smarter decisions about resource allocation.
* Use forecasting tools to prepare for the future: Data models are already showing which bridges and terminals will get busiest in coming years. Use these insights to guide investments and upgrades before problems arise.