3.3 Roadways

A. INTRODUCTION

This section describes the operations of the existing trans-Hudson and Manhattan roadway networks and provides the results of an analysis of the conditions under the 2030 No Build and Build Alternatives. Changes in truck, bus, auto, and taxi volumes and levels of service (LOS) for the Build Alternative are presented for these facilities, also taking into account other proposed major developments, particularly on the west side of Manhattan.

B. EXISTING CONDITIONS

NEW JERSEY

Analysis of existing traffic conditions in New Jersey has not been addressed, since the Build Alternative would not cause a significant diversion of local auto trips to commuter rail in the project area. Impacts to traffic beyond the project area are addressed in Sections 4.18 and 5.18, Indirect and Cumulative Effects.

HUDSON RIVER

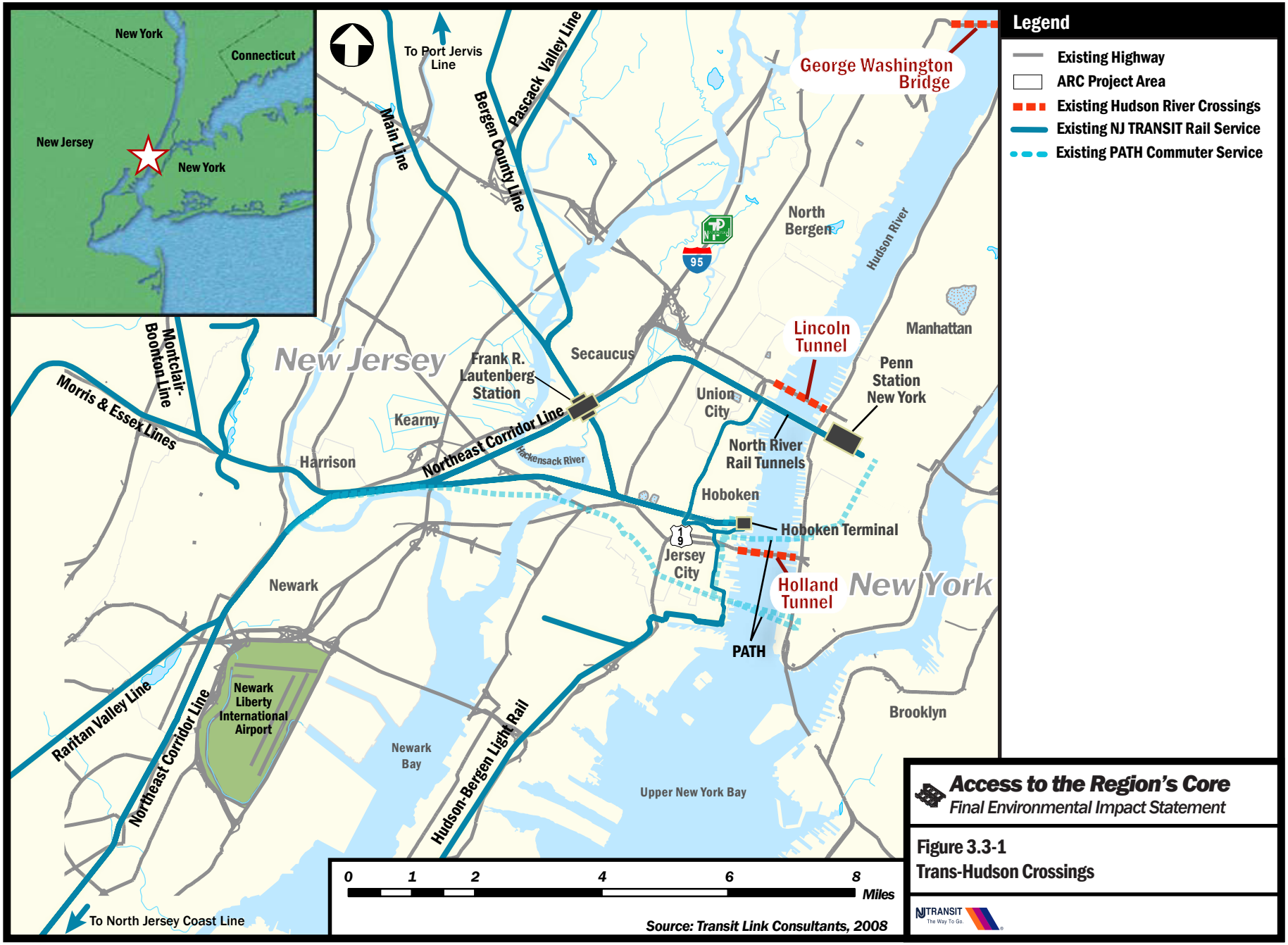
Three highway facilities link New Jersey to Manhattan: the Holland Tunnel, the Lincoln Tunnel, and the George Washington Bridge (**Figure 3.3-1**). These three facilities are owned and operated by PANYNJ. Traffic characteristics of each facility for 2000 and 2005 are summarized in **Table 3.3-1**, and described below.

TABLE 3.3-1: TRAFFIC CHARACTERISTICS AT TRANS-HUDSON CROSSINGS: 2000 AND 2005

Crossing	Average Weekday Traffic				Peak Hour Volume			
	Eastbound		Westbound		Eastbound AM		Westbound PM	
	2000	2005	2000	2005	2000	2005	2000	2005
Holland Tunnel	49,500	46,970	51,700	49,990	2,960	3,230	3,200	2,960
Lincoln Tunnel	62,600	61,460	67,200	64,990	5,400	5,170	5,500	4,990
George Washington Bridge	153,500	147,860	160,000	156,440	12,130	11,170	12,170	11,460
TOTAL	**265,600**	**256,290**	**278,900**	**271,420**	**20,490**	**19,570**	**20,870**	**19,410**

Source: NYMTC Hub-bound Report for 2000 and PANYNJ, 2005

The three facilities combined carried more than 540,000 vehicles on a typical weekday in 2000 and nearly 530,000 vehicles in 2005. This decline likely reflects reduced commutation as a result of the events of September 11, 2001. Volume routinely exceeds nominal capacity during peak hours at each of the subject crossings, resulting in congestion and delay. As shown in **Table 3.3-1,** eastbound morning and westbound afternoon peak hour traffic volumes were roughly equal at 20,490 eastbound and 20,870 westbound vehicles in each peak hour. More recent PANYNJ data for October, 2005 indicate a total eastbound peak hour volume of 19,570 vehicles or about five percent less than the 2000 data set. Westbound peak hour volumes were about seven percent less in 2005 compared to 2000 (19,410 vs. 20,870).


New York
Connecticut
New Jersey
New York
To Port Jervis Line
Main Line
Bergen County Line
Pascack Valley Line
George Washington Bridge
North Bergen
Hudson River
95
Manhattan
Lincoln Tunnel
Penn Station New York
Union City
North River Rail Tunnels
Hoboken
Hoboken Terminal
Jersey City
Holland Tunnel
New York
PATH
Brooklyn
New Jersey
Frank R. Lautenberg Station
Secaucus
Kearny
Harrison
Northeast Corridor Line
Hackensack River
Montclair-Boonton Line
Morris & Essex Lines
Newark
Newark Liberty International Airport
Raritan Valley Line
Northeast Corridor Line
Newark Bay
Hudson-Bergen Light Rail
Upper New York Bay
To North Jersey Coast Line
0 1 2 4 6 8
Miles
Source: Transit Link Consultants, 2008
Legend
Existing Highway
ARC Project Area
Existing Hudson River Crossings
Existing NJ TRANSIT Rail Service
Existing PATH Commuter Service
Access to the Region's Core
Final Environmental Impact Statement
Figure 3.3-1
Trans-Hudson Crossings
NJTRANSIT
The Way To Go.

About 17,800 (87 percent) of the 20,490 peak-hour vehicles were autos in 2000, while in 2005, autos accounted for 89 percent of eastbound peak hour traffic. Directional equivalency, however, does not occur over the course of a typical day. Instead, westbound average weekday traffic (AWDT) at each crossing exceeded its eastbound counterpart by five percent in 2000 and six percent in 2005. Theoretically, the demand for eastbound and westbound crossings should be the same over the course of a typical weekday. It is likely that the difference between PANYNJ and MTA Bridges and Tunnels toll collection (eastbound at PANYNJ facilities, westbound at the MTA Bridges and Tunnels' Verrazano Narrows Bridge) contributed to this imbalance.

HOLLAND TUNNEL

This tunnel consists of two tubes, each with two traffic lanes. The north tube serves westbound traffic and the south tube serves eastbound traffic. In 2000, the Holland Tunnel accommodated an AWDT of 49,500 vehicles (some 64,000 persons) eastbound and 51,700 vehicles (some 72,900 persons) westbound. AWDT volumes in 2005 were five percent and three percent less than year 2000 in the eastbound and westbound directions, respectively. The eastbound AM peak hour volume in 2005 of 3,230 vehicles was nine percent higher than its 2000 counterpart. In the AM peak travel period (7:00 AM – 10:00 AM) in 2000, 15,553 inbound person trips were completed in 8,400 vehicles (2,950 vehicles in the AM peak hour). In the PM peak period (4:00 PM – 7:00 PM), 14,902 persons were carried westbound in 8,500 vehicles (3,180 vehicles in the PM peak hour). Vehicle occupancy data for 2005 are not yet available.

The relationships of hourly volumes at the Holland Tunnel are:

- Between 6:00 AM and 8:00 AM, volumes were found to be consistently the same—over 2,900 vehicles per hour (i.e., 1,450 vehicles per hour per lane, the maximum eastbound lane capacity for this tunnel, according to PANYNJ).
- The highest volume hour in the eastbound direction is 6:00 AM to 7:00 AM, with 2,960 vehicles in 2000 and 3,230 vehicles in 2005. This increase is likely attributed to the restriction of commercial vehicles in the tunnel instituted post-9/11, which had the effect of increasing vehicle throughput.
- Eastbound delay at the Holland Tunnel during the AM peak period in 2004 was observed to range from a maximum of 10 minutes per vehicle during the peak hour to a minimum of three minutes in the hour ending at 7:00 AM. Delay data for 2005 is not yet available. In 2000, volumes were found to decrease marginally from 8:00 AM to 10:00 AM, averaging about 2,750 vehicles per hour, or 1,350 vehicles per hour per lane. Volumes in 2005 also decreased marginally during this period, averaging 2,470 vehicles.
- The hourly volume between 10:00 AM and 11:00 AM was 2,650 vehicles in 2000 and 2,430 vehicles in 2005. Some passengers travel during this time, outside of the AM peak, because the level of service in the peak is constrained by available capacity and demand.
- Peak spreading is also demonstrated during the five-hour period from 3:00 PM to 8:00 PM, which includes the PM peak period. In 2000, hourly volumes at the tunnel ranged between 2,800 and 3,180 vehicles during the five-hour period which approaches the westbound per lane capacity of the tunnel of 1,600 vehicles per hour per lane. In 2005, PM peak period westbound volumes ranged from 2,710 vehicles per hour to 2,960 vehicles per hour during the five-hour period. These volumes are slightly lower than in 2000.

The New York Metropolitan Transportation Council (NYMTC) Hub-bound Report for 2000 provides information about vehicle occupancy for inbound and outbound trips, summarized in **Table 3.3-2**. Data currently available from 1999 indicates an average daily vehicle occupancy (for autos) of 1.64 persons per vehicle. PANYNJ data from 2004 confirms this value, with an AM peak period occupancy rate of 1.58.

TABLE 3.3-2: HOLLAND TUNNEL – VEHICLE OCCUPANCY RATES: EXISTING (2000)

Time Period	Autos-Taxis and Commercial Vehicles		Buses		
	Veh.	Pass.	Veh.	Pass.	Pass./Veh.
EASTBOUND					
24 Hour	49,100	55,180	349	8,747	25.10
AM Peak Period	8,250	9,159	136	6,394	47.01
AM Peak Hour	2,930	3,374	26	369	14.20
WESTBOUND					
24 Hour	51,300	66,845	347	6,060	17.46
PM Peak Period	8,400	12,302	92	2,600	28.26
PM Peak Hour	3,150	4,407	25	356	14.24

Source: NYMTC Hub-bound Report for 2000

LINCOLN TUNNEL

During morning peak periods on weekdays, this tunnel is operated with four lanes eastbound and two lanes westbound. During the midday period, the tunnel operates with three lanes in each direction. In the afternoon peak period, four lanes are assigned westbound, with two lanes eastbound.

During the AM peak period, one of the four eastbound traffic lanes and both westbound lanes accommodate buses from the XBL, as well as other traffic, typically passenger cars, from the toll plaza. Local buses (i.e., those using the Local Bus Lane) share the remaining three lanes with other vehicles.

Relationships of hourly volumes at the Lincoln Tunnel are:

- In 2000, the tunnel accommodated an AWDT of 62,500 vehicles (232,931 persons) eastbound and 67,200 vehicles (213,162 persons) westbound. AWDT in 2005 was 61,460 eastbound and 64,990 westbound or about two percent and three percent less, respectively, than year 2000 volumes. Vehicle occupancy data for 2005 is not yet available. In the AM peak travel period (7:00 AM – 10:00 AM), 101,195 persons were carried in 14,850 inbound vehicles (5,360 vehicles in the peak hour) in the year 2000. In 2005, the 7:00 AM to 10:00 AM period saw 13,830 vehicles, which is about seven percent lower than in 2000.
- In the PM peak period, (4:00 PM – 7:00 PM) 74,670 persons were carried in 15,700 outbound vehicles (5,550 vehicles in the peak hour) in the year 2000. In 2005, 14,674 vehicles were accommodated westbound during this same three-hour period, or seven percent fewer vehicles than in 2000.
- Over 900 buses were carried in a single hour and 2,200 in the three-hour period between 7:00 AM and 10:00 AM in 2000 and 2005.
- Besides buses, about 4,500 autos, taxis, trucks, and passenger vans per hour were accommodated from 6:00 AM – 8:00 AM and 4,300 per hour from 8:00 AM – 10:00 AM in 2000. In 2005, traffic amounted to 4,740 vehicles from 6:00 AM – 7:00 AM, 4,070 vehicles from 7:00 AM – 8:00 AM, 3530 vehicles from 8:00 AM – 9:00 PM, and 3,610 vehicles from 9:00 AM – 10:00 AM.
- Eastbound delay during the AM peak period at the Lincoln Tunnel in 2004 was observed to range from 20.5 minutes per vehicle in the hour ending at 9:00 AM, to 11 minutes in the hour ending at 10:00 AM. Delay in the hour from 6:00 AM to 7:00 AM was observed to be one minute.

Average vehicle occupancy rates for inbound and outbound travel are provided in **Table 3.3-3**. Partial data available from 1999 indicates an average daily vehicle occupancy (for autos) of 1.68 persons per vehicle.

TABLE 3.3-3: LINCOLN TUNNEL – EASTBOUND VEHICLE OCCUPANCY RATES: EXISTING (2000)

Time Period	Eastbound				
	Autos-Taxis and Commercial Vehicles		Buses		
	Veh.	Pass.	Veh.	Pass.	Pass./Veh.
24 Hour	56,300	107,300	6,243	125,631	20.12
AM Peak Period	12,600	29,239	2,237	71,956	32.16
AM Peak Hour	4,530	9,774	827	27,578	33.35

Source: NYMTC Hub-bound Report for 2000

GEORGE WASHINGTON BRIDGE

This bridge, with seven travel lanes in each direction, accommodated an AWDT of 153,500 vehicles eastbound and approximately 160,000 vehicles westbound in 2000. In 2005, the bridge accommodated an AWDT of 147,860 vehicles eastbound and approximately 156,440 vehicles westbound. Relationships of hourly volumes at the George Washington Bridge are:

- The eastbound volume during the AM peak travel period was 32,463 vehicles in year 2000. In 2005, 30,980 vehicles were accommodated.
- In the PM peak period, the westbound volume was 35,560 vehicles in year 2000. In 2005, 33,290 vehicles were accommodated.
- During the AM peak hour (8:00 AM – 9:00 AM), the bridge accommodated 12,131 and 9,238 vehicles eastbound in 2000 and 2005, respectively, compared with the nominal capacity of 11,800 vph assigned by PANYNJ.
- A total of 12,166 vehicles traveled westbound during the PM peak hour (5:00 PM – 6:00 PM) in year 2000. A total of 11,460 vehicles traveled westbound during that same hour in year 2005.

Eastbound delay during the AM peak period in 2004 was estimated to range from a maximum of 10 minutes per vehicle at the Upper Level Toll Plaza during the hour ending at 8:00 AM, to a minimum of about two minutes at the Palisades Parkway Plaza in the hour ending at 7:00 AM (PANYNJ Skycomp, Inc. *Draft, 2004 Annual Report of Interstate Toll Delay* – Delays cited are the average of Spring and Fall observations).

NEW YORK

The area of the street network selected for analysis consists of 63 intersections, and includes intersections most likely to be used by new taxi trips resulting from the Build Alternative. It extends from Tenth Avenue to the west, Sixth Avenue/Broadway to the east, West 39th Street to the north and West 28th Street to the south, as shown on **Figure 3.3-A in Appendix 3.3**. The street system follows the typical Manhattan grid of alternating northbound and southbound one-way avenues and alternating one-way eastbound and westbound cross streets. Exceptions to this grid system include Broadway, which traverses the area diagonally and runs in a southeast direction, and West 34th Street, which is a two-way crosstown street. The area also includes several ingress and egress roadways associated with the Lincoln Tunnel.

Balanced existing traffic network volumes, traffic signal timing and street geometrics, as reported in and used for the Final Generic Environmental Impact Statement (FGEIS) for the proposed No. 7 Subway Extension and Hudson Yards Rezoning and Development Program, formed the basis of the existing conditions representation.

Traffic operations for existing conditions were analyzed using Highway Capacity Manual 2000 (HCM) procedures, as per City Environmental Quality Review (CEQR) Technical Guidelines. Traffic operations are generally described by "Level of Service" (LOS) measures. LOS describes the quality of traffic flow and is defined as a measure describing operational conditions on a given freeway, arterial, or intersection. LOS is a function of Delay (the amount of time a vehicle must wait to travel through an intersection) and Volume/Capacity or V/C Ratio (the number of vehicles that travel through an intersection compared to that intersection's capacity). LOS measures are reported using letter designations from A to F. LOS A represents the best operating condition (free traffic flow), and LOS F designates the worst operating condition for both signalized and unsignalized intersections. A facility operating at LOS A through mid-D (less than 45.0 seconds of delay) is considered to be operating at an acceptable condition, while a facility operating at LOS mid-D (45.0 seconds of delay or more), E, or F is considered to be operating at a deficient LOS. For this traffic analysis, each intersection was evaluated by overall intersection, by each approach (northbound, southbound, eastbound, and westbound) to the intersection, and by movement along each approach (through, left turn, right turn, and de facto turn, if a lane is not exclusively designated for turns).

Existing traffic operations in the project area generally exhibit LOS D or better during the AM and PM peak hour, with some exceptions for certain specific lane groups (such as for left turns) and overall approaches to certain intersections. That is, traffic operations in the project area generally acceptable during peak periods with the exception of a limited number of turning movements which can become blocked by pedestrians. Specifically, nine signalized intersections experience congestion (LOS E or F, or a V/C ratio greater than 0.90) in the AM peak hour and PM peak hours.

West 34th Street is a key travel corridor and designated local truck route with local bus service. Turns are prohibited at key intersections along West 34th Street in the project area. Traffic operations along the West 34th Street corridor are characterized by intermittent periods of congestion (LOS E) during peak commuting hours, and throughout the day. Traffic operations on West 34th Street are influenced by Lincoln Tunnel traffic, tour bus operations and truck deliveries to retail establishments along West 34th Street. A critical bottleneck is the intersection of West 34th Street with Broadway and Sixth Avenue (Herald Square). At this non-standard intersection, southbound Broadway exhibits congested LOS, and northbound Sixth Avenue approaches capacity. Certain cross streets also exhibit congested LOS and/or traffic levels approaching capacity, including West 34th Street at Dyer and Tenth Avenues. (See **Tables 3.3-C and Table 3.3-D in Appendix 3.3.**)

C. FUTURE NO BUILD CONDITIONS

NEW JERSEY

Analysis of No Build traffic conditions has not been specifically addressed, since it is not expected that the Build Alternative would cause a significant diversion of auto trips to commuter rail along local roadways in the project area. Impacts to traffic beyond the project area are addressed in Sections 4.18 and 5.18, Indirect and Cumulative Effects.

HUDSON RIVER

Transportation forecasts by NJ TRANSIT predict a 19.7 percent increase in person trips by auto, and a corresponding 23.9 percent increase in total automobiles at the three trans-Hudson crossings by 2030 (**Table 3.3-4**). This forecast includes trips via the Holland and Lincoln Tunnels, the George Washington Bridge, and the Verrazano Narrows Bridge for travel from Staten Island to Manhattan. Specifically, daily automobile traffic (vehicles) across the Hudson River would increase from 359,500 in 2000 to 445,400 trips by 2030. Since the existing facilities operate virtually at capacity during peak hours, it is projected

that the travel delays at the portals will increase and the duration of the peak period will extend as drivers change their departure times to avoid the worst delays.

TABLE 3.3-4: AVERAGE WEEKDAY TRANS-HUDSON LINKED TRIPS BY AUTO MODE: NO BUILD

	Year 2000 Base	Year 2030 No Build	Percent Increase In Trips
Total Auto Person trips (people)	519,500	622,000	19.7%
Total Auto trips (vehicles)	359,500	445,400	23.9%

Source: NJ TRANSIT Forecast, 2007

The NJ TRANSIT forecasting model used for the ARC project includes travel from Rockland and Orange Counties in New York State, and New Jersey counties to New York City, including riders who use the Metro-North Hudson rail line. It reflects county-level population and employment control totals consistent with models maintained by local Metropolitan Planning Organizations (e.g., NYMTC, NJTPA) and PANYNJ, but includes a more robust characterization of the NJ TRANSIT network and generates a more refined commuter forecast.

The forecasts for auto travel do not include auto traffic between these counties and Westchester County in New York, Connecticut, or other points east and north of New York City. The forecasts also do not include through traffic from beyond the region that is using the New York State Thruway and the Tappan Zee Bridge. The forecasting model includes a portion of the traffic on the Tappan Zee Bridge, and bridges further north. The forecast did not include any additional trans-Hudson road capacity planned for the Tappan Zee Bridge or that would be afforded with a new Express Bus Lane (XBL) lane through the Holland Tunnel. The same condition applies to the Verrazano Narrows Bridge, where auto traffic between Staten Island to Brooklyn/Queens and Long Island is not included. Any future forecasts shown for these crossings would be misleading because of the exclusion of the majority of the traffic. The crossings presented in the FEIS have a majority or significant amount of traffic included in the forecasting model, and cover crossings where the impact of the project can be appropriately assessed.

Observations of existing peak period traffic at the Holland and Lincoln Tunnels indicate that the approaches to these facilities operate at capacity during the AM and PM peak hours. The situation is similar at the George Washington Bridge, where both the AM and PM peak hour volumes exceed nominal capacity of the approaches to the bridge. Based on these statistics, capacity is not available at the three trans-Hudson crossings to support a 23.9 percent increase in auto commutation to New York City during traditional peak travel periods. As indicated above, little possibility for significant growth in peak hour trans-Hudson auto travel would exist.

As shown in **Table 3.3-5**, this 23.9 percent growth in vehicular traffic demand at the crossings would result in about 2,300 autos added to the existing portal queues in the AM peak hour, and 2,700 autos in the PM peak hour under worst-case conditions. More typically, many of those experiencing these congested conditions and delays, would shift to the previous or next hour, or to off-peak travel periods. Further, some of the forecasted peak hour auto-driver trips would, instead, be made as auto-passenger trips, resulting in increased average vehicle occupancy. Moreover, some auto trips could be completed via other routes (e.g., Verrazano Narrows Bridge).

TABLE 3.3-5: UNCONSTRAINED TRAFFIC DEMAND AT TRANS-HUDSON CROSSINGS*: NO BUILD (2030)

Crossing	Eastbound, AM Peak Hour				Westbound, PM Peak Hour			
	Demand (vph)	Capacity (vph)	Demand Not Accommodated	V/C	Demand (vph)	Capacity (vph)	Demand Not Accommodated	V/C
Holland Tunnel	3,250	2,800	450	1.16	3,510	2,800	710	1.25
Lincoln Tunnel	5,930	5,600	330	1.06	6,040	5,600	440	1.08
GWB	13,320	11,800	1,520	1.13	13,360	11,800	1,560	1.13
TOTAL	**22,500**	**20,200**	**2,300**	**NA**	**22,910**	**20,200**	**2,710**	**NA**

Source: NJ TRANSIT, 2007

* Computed by applying a growth factor of 1.098 to year 2000 volumes shown in Table 3.3-1

As indicated above, little possibility for significant peak hour growth in trans-Hudson auto travel exists. Therefore, peak hour queues and delay at the trans-Hudson crossings would increase, further spreading of the peak period would occur, and the demand for trans-Hudson travel at PANYNJ facilities would be curtailed through car-pooling or use of alternate river crossings. Some demand would likely be accommodated via modes other than automobile (e.g., ferry) by 2030.

As noted earlier, during morning peak periods on weekdays, the Lincoln Tunnel is operated with four lanes eastbound and two lanes westbound. During the midday period, the tunnel operates with three lanes in each direction. In the afternoon peak period, four lanes are assigned westbound, with two lanes eastbound. Congestion at the New Jersey portal is manifested by queues at the toll plaza and along the approach helix. In New York, PANYNJ and New York City police actively manage traffic operations with occasional street closures, turn prohibitions and lane reversals on Tenth Avenue.

NEW YORK

The 2030 traffic volume network used for the No Build Alternative was based on the *No. 7 Subway Extension – Hudson Yards Rezoning and Development Program FGEIS* (Mitigated Build Alternative S as adopted by the New York City Council) 2025 traffic forecast. The 2030 traffic volumes were projected by adding a general background growth of 0.5 percent per year (2025 to 2030), as specified for Manhattan in the *CEQR Technical Manual*. This growth reflects traffic to be generated by developments outside the project area expected to be completed by 2030. Traffic volumes projected to be generated by Hudson Yards Rezoning development sites were also updated to reflect the current development program. The projected 2030 No Build traffic volumes also include additional bus volumes and taxis included in the Hudson Yards Alternative S mitigation plan. Traffic signal timings, parking restrictions and other traffic regulations incorporated in the Hudson Yards mitigation plan for alternatives were also assumed for the No Build Alternative.

In the 2030 No Build condition, signalized intersections experiencing congestion (LOS E or F, or a V/C ratio greater than 0.90) would total 27 in the AM peak hour (compared to nine under existing conditions) and 44 in the PM peak hour (compared to nine under existing conditions). Results of the analysis of 2030 No Build traffic conditions are provided in **Tables 3.3-E and 3.3-F in Appendix 3.3**.

NYCDOT proposes to implement Bus Rapid Transit (BRT) improvements along West 34th Street, including the provision of dedicated curb bus lanes, during the summer/fall in 2008. Under the current proposal, West 34th Street would change from a six-lane roadway with three lanes in each direction, to a five-lane roadway with two general purpose westbound lanes and one general purpose eastbound lane, as

well as the two curb bus lanes. NYCDOT forecasts improvements to both bus and traffic operations under this plan. An "after" study will be conducted in the fall of 2008 to understand the effects this change would have on traffic circulation in this area. NJ TRANSIT and PANYNJ would assess the impacts of the BRT on the Build Alternative at that time.

D. LONG-TERM IMPACTS OF THE BUILD ALTERNATIVE

NEW JERSEY

Analysis of existing and future traffic conditions has not been addressed, since it is not expected that the Build Alternative would cause a significant diversion from auto trips along local routes to commuter rail in the project area. Impacts to traffic beyond the project area are addressed in Sections 4.18 and 5.18, Indirect and Cumulative Effects. As a result, no significant local traffic impacts would occur from Secaucus to the Hudson River, and no mitigation would be required.

HUDSON RIVER

NJ TRANSIT travel forecast models predict that, with the Build Alternative, daily demand for trans-Hudson auto (vehicle) trips would decrease by 4.9 percent (31,500 person-trips in 22,000 autos) by 2030, compared to No Build conditions, as shown in **Table 3.3-6.** With the Build Alternative, the peak hour vehicular demand that could not be accommodated at the three trans-Hudson crossings (Lincoln and Holland Tunnels and George Washington Bridge) also would be reduced, compared to No Build conditions. In the AM peak hour, demand not accommodated during the peak hour would be reduced by 1,100 vehicles, from 2,300 vehicles in the No Build condition as shown in **Table 3.3-5** to 1,200 vehicles as shown in **Table 3.3-7**. In the PM peak hour, demand not accommodated in the peak hour would be reduced by 1130 vehicles (from 2710 vehicles in the No Build condition to 1580 vehicles in the Build condition). The result would be improved V/C and congestion relief at each of the three trans-Hudson crossings.

TABLE 3.3-6: AVERAGE WEEKDAY TRANS-HUDSON LINKED TRIPS BY AUTO MODE: BUILD (2030)

	No Build	Build Alternative	Build Alternative Minus No Build	Percent Difference
Total Auto Person trips (people)	622,000	590,500	-31,500	-5.1%
Total Auto trips (vehicles)	445,400	423,400	-22,000	-4.9%

Source: NJ TRANSIT Forecast 2007

TABLE 3.3-7: UNCONSTRAINED TRAFFIC DEMAND AT TRANS-HUDSON CROSSINGS*: BUILD (2030)

	Eastbound, AM Peak Hour				Westbound, PM Peak Hour			
Crossing	Demand (vph)	Capacity (vph)	Demand Not Accom-modated	V/C	Demand (vph)	Capacity (vph)	Demand Not Accom-modated	V/C
Holland Tunnel	3,090	2,800	290	1.10	3,340	2,800	540	1.19
Lincoln Tunnel	5,640	5,600	40	1.01	5,740	5,600	140	1.03
GWB	12,670	11,800	870	1.07	12,700	11,800	900	1.08
TOTAL	**21,400**	**20,200**	**1,200**	**NA**	**21,780**	**20,200**	**1,580**	**NA**

Source: NJ TRANSIT, 2007.

* Computed by applying a 4.9% reduction to 2030 No Build volumes shown in **Table 3.3-5.**

Since the Build Alternative would result in a positive diversion in trans-Hudson trips from autos to rail and buses, no mitigation would be required.

NEW YORK

INCREMENTAL VEHICLE TRIPS ON STREET NETWORK

The additional Build Alternative rail passengers, almost entirely inbound in the morning, would continue to their destinations in Manhattan primarily by walking or public transportation. Some passengers would take taxis or be picked up by private autos, which would attract additional traffic into the PSNY area. Since work trips predominate during the weekday AM and PM peak hours, the share of passengers picked up or dropped off by private auto would be negligible. Similarly during the PM peak hour, the Build Alternative would provide the capability for additional train service from New York, and the reverse of the morning pattern would occur.

As illustrated in **Table 3.3-8**, the Build Alternative would generate 346 AM peak hour and 294 PM peak hour additional taxi person trips (or 247 and 211 taxi vehicle trips) to the combined existing PSNY and NYPSE (the PM peak hour is estimated to be equivalent to 85 percent of the reverse of the AM peak hour). A redistribution of taxi trips from PSNY would occur in the peak flow direction because of new access/egress afforded by NYPSE. **Figure 3.3-B in Appendix 3.3** shows the incremental taxi and bus trips expected from operation of the Build Alternative. A new taxi stand is proposed on the west side of Seventh Avenue south of West 34th Street.

TABLE 3.3-8: PROJECTED INCREMENTAL TAXI TRIP GENERATION: BUILD (2030)

Condition	AM Peak Hour			PM Peak Hour		
	Person Trips by Taxi					
	Peak Direction (AM from Station; PM to Station)	**Reverse Direction** (AM to Station; PM from Station)		**Peak Direction** (AM from Station; PM to Station)	**Reverse Direction** (AM to Station; PM from Station)	
No Build	685	22		582	19	
Build Alternative NYPSE	429	18		365	15	
Build Alternative Existing PSNY	588	18		500	16	
TOTAL Additional Build Alternative Trips	332	14	**346**	282	12	**294**
Location	Incremental Vehicle Trips (Unbalanced Taxi Trips)					
	Peak Direction	**Reverse Direction**		**Peak Direction**	**Reverse Direction**	
Existing PSNY (Reassigned)	-69	-3		-59	-2	
NYPSE	306	13		260	11	
TOTAL Net Taxi Trips	237	10	**247**	202	9	**211**

Source: Transit Link Consultants, 2008.

TRAFFIC IMPACTS ON STREET NETWORK

The development of the Hudson Yards would attract a supply of taxis to the project area. Many of these taxis would be available to serve NYPSE passengers. For example, during the AM peak hour, taxis dropping off employees at Hudson Yards office buildings would be available to pick up passengers at NYPSE. Specifically, the Hudson Yards is projected to generate a net surplus of approximately 840 taxis

during the AM peak hour that would be available to pick up NYPSE passengers after they drop off their passengers at Hudson Yards destinations. Similarly, many taxis dropping off passengers at NYPSE during the PM peak hour will then pick up passengers at Hudson Yards buildings. The distribution of taxi pick ups and drop offs between NYPSE entrances and their origins/destinations was based on NJ TRANSIT ridership forecasts.

In both peak hours, between 60 and 70 taxis were reassigned from PSNY to NYPSE to reflect the reduced demand at PSNY under the Build Alternative. Reassigned taxi trips were shifted from drop off and pick up locations on Seventh and Eighth Avenues south of West 33rd Street adjacent to PSNY to drop off and pick up locations on Sixth Avenue/Broadway, Seventh and Eighth Avenues at West 34th Street adjacent to NYPSE entrances.

One new taxi stand is proposed for implementation by NYCDOT on the west side of Seventh Avenue between West 33rd and West 34th Streets with the Build Alternative. It would be associated with the corresponding proposed NYPSE station entrance at the southwest corner of Seventh Avenue and West 34th Street. Incremental taxi trips were assigned to this location, and to other proposed new station entrances, evaluated as part of the traffic circulation assessment.

As shown in Section 3.1, the Build Alternative would require the addition of three NYCT buses on the M16/M34 line during peak traffic hours. These additional buses were included in the Build Alternative volumes (each bus was considered the equivalent of two passenger cars, as per the *CEQR Technical Manual* guidelines). Discussions with NYCDOT and NYCT regarding mitigation of roadway impacts and additional bus requirements have begun, and would continue through design phases. The reader is referred to Section 3.1 for additional information on the M16/M34.

In addition, all taxis operating in New York City will be hybrid vehicles in 2030.

Results of the traffic analysis for the Build Alternative are summarized in **Tables 3.3-E and 3.3-F in Appendix 3.3**, for the AM and PM peak hours, respectively. Comparison with the No Build condition identified five intersections with significant traffic impacts during the AM peak hour, based upon *CEQR Technical Manual* guidelines:

- Eighth Avenue at West 30th Street
- Eighth Avenue at West 34th Street
- Eighth Avenue at West 38th Street
- Ninth Avenue at West 34th Street
- Sixth Avenue/Broadway at West 34th Street – Herald Square

Seven intersections were identified with significant traffic impacts during the PM peak hour:

- Tenth Avenue at West 31st Street
- Tenth Avenue at West 33rd Street
- Lincoln Tunnel Expressway at West 31st Street
- Ninth Avenue at West 37th Street
- Eighth Avenue at West 33rd Street
- Eighth Avenue at West 29th Street
- Sixth Avenue/Broadway at West 34th Street – Herald Square

Herald Square is impacted during both the AM and PM peak hours.

E. MITIGATION

- NJ TRANSIT, in consultation with NYCDOT, has identified traffic mitigation measures, and will work with NYCDOT to implement them. Significant adverse traffic impacts will be mitigated by traffic signal timing changes (i.e., reallocating "green time" among approaches to better match intersection approach capacity to traffic demand) and a curb use regulation change to clear the curb lane and increase intersection approach capacity. These mitigation measures, summarized by intersection in **Table 3.3.9**, have been approved by NYCDOT, however the final mitigation measures are subject to revision based on changing traffic patterns and consultation with NYCDOT. A NYCDOT concurrence letter is included in Appendix 3.3. Absent the changes described in **Table 3.3-9,** the project would result in additional unmitigated significant adverse traffic impacts. (See **Table 3.3-E and Table 3.3-F in Appendix 3.3** for the delay and Level of Service with mitigation for the AM and PM peaks, respectively.)

TABLE 3.3-9: TRAFFIC MITIGATION SUMMARY – NEW YORK

Intersection	Mitigation Measure
AM Peak Hour	
8th Avenue @ 30th Street	Shift 2 seconds green time from 8th Avenue NB phase to the 30th Street EB phase.
8th Avenue @ 34th Street	Reduce 8th Avenue NB green time by 2 seconds, and increase the green times for the West 34th Street concurrent EB-WB phase and the EB lagging phase by 1 second each.
8th Avenue @ 38th Street	Shift 2 seconds green time from the 30th Street EB phase to the 8th Avenue NB phase.
9th Avenue @ 34th Street	Shift 1 second green time from the 34th Street WB lagging phase to the 9th Avenue SB phase.
PM Peak Hour	
8th Avenue @ 29th Street	Curb use regulation change - prohibit parking on the south side of 29th Street.
8th Avenue @ 33rd Street	Shift 1 second green time from the 33rd Street WB phase to the 8th Avenue NB phase.
9th Avenue @ 37th Street	Shift 1 second green time from the 9th Avenue SB phase to the 37th Street WB phase.
10th Avenue @ 31st Street	Shift 1 second green time from the 10th Avenue NB phase to the 31st Street WB phase (right turn only).
Lincoln Tunnel Expressway @ 31st Street	Shift 1 second green time from the LTE NB-SB phase to the 31st Street WB phase.

Source: Transit Link Consultants, 2008.

- Herald Square (Sixth Avenue/Broadway at West 34th Street) and the intersection of Tenth Avenue and West 33rd Street cannot be mitigated through the implementation of practical mitigation measures. Significant adverse traffic impacts would remain at these intersections.
  - The impact at Herald Square cannot be mitigated by traffic signal timing/phasing changes, vehicular turn restrictions, or modifications to curb use regulations in either the AM or PM peak hour due to the adverse effects on conflicting intersection approaches and a lack of available space for additional travel lanes.
  - The intersection of Tenth Avenue at West 33rd Street cannot be fully mitigated by traffic signal timing/phasing changes, vehicular turn restrictions, or modifications to curb use regulations in the PM peak hour. It is not feasible to increase intersection capacity through roadway widening at this location.