Appendix S.1 Transportation – Trip Generation

A. INTRODUCTION

This appendix provides a series technical memorandum documenting the trip generation rates, modal splits, temporal distributions and assignments to the roadway networks for all anticipated types of land uses proposed for development in the Hudson Yards area in the Future Conditions with the Proposed Action. The land uses described in the memorandum include:

- Auto Showroom;
- Church;
- Convention Center;
- Covenant House;
- Day Care Center;
- Destination Retail;
- Elementary School;
- Gas Station;
- Hotel;
- Light Industrial;
- Local Retail;
- Manufacturing;
- Mini-Storage;
- Madison Square Garden;
- Multi-Use Facility;
- Museum;
- Office;
- Post Office;
- Recreation Center;
- Residential; and
- Theater.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: September 11, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Auto Showroom Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1338

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of auto showroom trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are being developed because as a result of the proposed project, there is a potential for the displacement of the Mercedes-Benz showroom/service center located on Eleventh Avenue at West 41st Street, which is approximately 162,400 gross square feet (gsf) in size. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates
For weekdays, a daily trip generation rate of 2.63 vehicle trips per 1,000 gsf has been selected, which was based on the *West 57th Street Rezoning FEIS* (2001). Because this particular auto dealership is closed on Sundays, no weekend trip generation rates were developed.

Temporal Distributions and In/Out Splits
For the weekday AM, midday, and PM peak hours, the selected temporal distributions and in/out splits were based on the *West 57th Street Rezoning FEIS*. No trips were assumed to occur during the weekday evening because the showroom is open from 9 am – 6 pm on weekdays (the service department is open from 7 am – 6 pm on weekdays). Table 2 summarizes temporal distributions for an expanded 24-hour period on a weekday. The travel patterns for time periods outside of the weekday AM, midday, and PM peak hours were assumed.

Truck Trip Generation
The weekday truck trip generation rate (0.15 truck trips per 1,000 gsf) and temporal distributions (shown in Table 1) were based on the *West 57th Street Rezoning FSEIS*.

cc: L. Lennon
D. Fields

Table 1: Auto Showroom Land Use
Transportation Planning Assumptions

Trip Generation:	(1)
	Weekday
Daily Vehicle Trips	2.63
	per 1,000 gsf

Temporal Distribution:	(1)
AM (8-9)	12.0%
MD (12-1)	12.0%
PM (5-6)	9.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	0.0%

In/Out Splits:	(1)	
	In	**Out**
AM (8-9)	67%	33%
MD (12-1)	50%	50%
PM (5-6)	15%	85%
EVE (7-8)	50%	50%
EVE (8-9)	50%	50%
SUN (4-5)	50%	50%

Truck Trip Generation:	(1)
	Weekday
	0.15
	per 1,000 gsf

	(1)
AM (8-9)	9.6%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	0.0%

In	**Out**
50%	50%

Sources:

1. West 57th Street Rezoning FEIS, 2001, Table 11-10.

Table 2: Weekday Temporal Distributions for Auto Showroom Land Use

Time Period	Temporal Distribution[1]	In/Out Split[2]	
12:00 AM - 1:00 AM	0.0%	50%	50%
1:00 AM - 2:00 AM	0.0%	50%	50%
2:00 AM - 3:00 AM	0.0%	50%	50%
3:00 AM - 4:00 AM	0.0%	50%	50%
4:00 AM - 5:00 AM	0.0%	50%	50%
5:00 AM - 6:00 AM	0.0%	50%	50%
6:00 AM - 7:00 AM	0.0%	50%	50%
7:00 AM - 8:00 AM	7.0%	85%	15%
8:00 AM - 9:00 AM	12.0%	67%	33%
9:00 AM - 10:00 AM	9.0%	67%	33%
10:00 AM - 11:00 AM	8.0%	50%	50%
11:00 AM - 12:00 PM	9.0%	50%	50%
12:00 PM - 1:00 PM	12.0%	50%	50%
1:00 PM - 2:00 PM	9.0%	50%	50%
2:00 PM - 3:00 PM	8.0%	50%	50%
3:00 PM - 4:00 PM	8.0%	33%	67%
4:00 PM - 5:00 PM	9.0%	33%	67%
5:00 PM - 6:00 PM	9.0%	15%	85%
6:00 PM - 7:00 PM	0.0%	50%	50%
7:00 PM - 8:00 PM	0.0%	50%	50%
8:00 PM - 9:00 PM	0.0%	50%	50%
9:00 PM - 10:00 PM	0.0%	50%	50%
10:00 PM - 11:00 PM	0.0%	50%	50%
11:00 PM - 12:00 AM	0.0%	50%	50%

Notes:

1. Temporal distributions and in/out splits for AM, midday, and PM peak hours based on West 57th Street Rezoning FEIS (2001), Table 11-10.
2. Temporal distribuitons and in/out splits for remaining hours based on PB Team assumptions.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: September 26, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Church Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1363

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of church trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These assumptions are being prepared because the proposed project would result in the construction of a house of worship that would be approximately 43,000 gross square feet (gsf) in size.[1] These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a daily trip generation rate of 13.4 person trips per 1,000 gsf has been selected, which was developed from the ITE *Trip Generation Manual* (6th Edition).[2] A Sunday daily trip generation rate of 54.0 person trips per 1,000 gsf was developed from the ITE *Trip Generation Manual* using the same methodology.[3] It is important to note that no previously published EIS's were found containing trip generation rates for churches in Manhattan.

Temporal Distributions and In/Out Splits

For the weekday AM and PM peak hours, the selected temporal distributions and in/out splits are based on the ITE *Trip Generation Manual*. Because the ITE *Trip Generation Manual* does not include data outside of the weekday AM and PM peak hours, assumptions for temporal distributions and in/out splits were made for the weekday midday, weekday evening, and Sunday afternoon peak hours. These assumptions were based on a Sunday door count survey contained within the *Korean Presbyterian Church Traffic Study* (1995) and a review of mass schedules at Manhattan churches.[4] Table 2 summarizes temporal distributions and in/out splits for expanded 24-hour daily periods on a weekday and Sunday.

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[1] A church has been selected (as opposed to a synagogue or another type of house of worship) as a reasonable worst-case condition as it would typically generate the highest amount of trips on Sundays.
[2] Adapted from ITE Land Use 560, Church: 9.11 trips * 1.40 (assumed auto occupancy) / 95% (assumed auto modal share).
[3] Adapted from ITE Land Use 560, Church: 36.63 trips * 1.40 (assumed auto occupancy) / 95% (assumed auto modal share).
[4] Assumes three weekday masses (one in the morning, one at midday, and one during the evening) and four Sunday masses (two in the morning, one at midday, and one during the evening).

Table 1: Church Land Use
Transportation Planning Assumptions

Trip Generation:	(1) **Weekday**	(1) **Sunday**
Daily Person Trips	13.4	54.0
	per 1,000 gsf	

Temporal Distribution:	(1,2,3)
AM (8-9)	7.9%
MD (12-1)	14.1%
PM (5-6)	7.2%
EVE (7-8)	3.0%
EVE (8-9)	2.0%
SUN (4-5)	5.2%

In/Out Splits:	(1,2,3) **In**	**Out**
AM (8-9)	54%	46%
MD (12-1)	54%	46%
PM (5-6)	54%	46%
EVE (7-8)	50%	50%
EVE (8-9)	40%	60%
SUN (4-5)	100%	0%

Modal Splits:	(3)
Auto	4%
Taxi	9%
Bus	5%
Subway	12%
Railroad	0%
Walk	70%
	100%

Vehicle Occupancy:	(3)
Auto	1.40
Taxi	1.40

Truck Trip Generation:	(4) **Weekday**	(5) **Sunday**
	0.15	0.01
	per 1,000 gsf	

	(4,6)
AM (8-9)	9.6%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	**Out**
50%	50%

Sources:

1. ITE Trip Generation, 6th Edition, Land Use 560: Church.
   Daily trip generation rates calculated based on assumed auto occupancy of 1.4 and auto modal split of 95%.
2. Korean Presbyterian Church Traffic Study, 1995, Table 3.
3. PB Team assumption.
4. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 15.
5. Assumes 5% of weekday trip generation rates.
6. Sunday temporal distributions and in/out splits based on weekday patterns.

Table 2: Expanded 24-Hour Temporal Distributions and Modal Splits for Church Land Use

Time Period	Weekday			Sunday			Modal Splits					
	Temporal Distribution	In	Out	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
1:00 AM - 2:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
2:00 AM - 3:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
3:00 AM - 4:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
4:00 AM - 5:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
5:00 AM - 6:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
6:00 AM - 7:00 AM	2.8%	80%	20%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
7:00 AM - 8:00 AM	6.0%	70%	30%	6.0%	100%	0%	4%	9%	5%	12%	0%	70%
8:00 AM - 9:00 AM	7.9%	54%	46%	2.6%	100%	0%	4%	9%	5%	12%	0%	70%
9:00 AM - 10:00 AM	7.0%	25%	75%	21.1%	64%	36%	4%	9%	5%	12%	0%	70%
10:00 AM - 11:00 AM	3.0%	50%	50%	10.7%	60%	40%	4%	9%	5%	12%	0%	70%
11:00 AM - 12:00 PM	13.0%	70%	30%	19.3%	19%	81%	4%	9%	5%	12%	0%	70%
12:00 PM - 1:00 PM	14.1%	54%	46%	9.2%	78%	22%	4%	9%	5%	12%	0%	70%
1:00 PM - 2:00 PM	13.0%	25%	75%	9.5%	9%	91%	4%	9%	5%	12%	0%	70%
2:00 PM - 3:00 PM	3.0%	50%	50%	1.4%	0%	100%	4%	9%	5%	12%	0%	70%
3:00 PM - 4:00 PM	3.0%	50%	50%	0.5%	0%	100%	4%	9%	5%	12%	0%	70%
4:00 PM - 5:00 PM	7.0%	70%	30%	5.2%	100%	0%	4%	9%	5%	12%	0%	70%
5:00 PM - 6:00 PM	7.2%	54%	46%	4.3%	100%	0%	4%	9%	5%	12%	0%	70%
6:00 PM - 7:00 PM	8.0%	25%	75%	9.6%	4%	96%	4%	9%	5%	12%	0%	70%
7:00 PM - 8:00 PM	3.0%	50%	50%	0.7%	0%	100%	4%	9%	5%	12%	0%	70%
8:00 PM - 9:00 PM	2.0%	40%	60%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
9:00 PM - 10:00 PM	0.0%	40%	60%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
10:00 PM - 11:00 PM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%
11:00 PM - 12:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	0%	70%

Notes:

Temporal distributions and modal splits based on Korean Presbyterian Church Traffic Study (1995) and PB Team assumptions.

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Modal Splits
The selected modal split assumptions for all peak hours were assumed to be similar to those used in the Recreation Center Trip Generation Transportation Planning Assumptions Technical Memorandum. As shown in Table 2, modal splits were assumed to remain constant over the entire day.

Vehicle Occupancy
Vehicle occupancy rates of 1.40 for autos and 1.40 for taxis have been assumed, which are consistent with the vehicle occupancy rates used in the Recreation Center Trip Generation Transportation Planning Assumptions Technical Memorandum.

Truck Trip Generation
The generation of truck trips was based on the Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) for office land uses, resulting in a daily rate of 0.15 daily truck trips per 1,000 gsf (see Table 1). No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day. Sunday truck trip generation rates were assumed to be 5% of weekday rates.

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FINAL ***MEMORANDUM***

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: September 28, 2004

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Convention Center Expansion Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1622

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of Jacob K. Javits Convention Center (Convention Center) Expansion trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. The proposed expansion would approximately double the amount of existing exhibition space, increase the number of existing meeting rooms, and add new components such as a plenary hall with fixed seating. The northward expansion of the Convention Center would also provide for an additional entrance on West 42nd Street (accessed via the proposed Convention Center hotel).

Existing Attendance Patterns

The Convention Center currently hosts a wide range of events including trade shows, conventions with exhibits, consumer (public) shows, special events, meetings, and seminars. Daily attendances at these events range from upwards of 95,000 attendees for large public shows to small seminars with attendances of less than 100. Table 1 provides a listing of all events held at the Convention Center in 1999[1], ranked in order of their total daily visitation (attendees plus exhibitors.)

As shown in Table 1, public shows tend to draw the largest daily attendances; the top four attendance dates in 1999 were all weekend days associated with the New York International Auto Show (attendance on these four dates ranged from 68,202 to 95,707). The Auto Show, which is historically the largest attended show at the Convention Center, attracted approximately 525,000 visitors during a nine-day period in 1999. Other large public shows at the Convention Center in 1999 included the New York National Boat Show and the PC Expo. With the exception of these large public shows, attendance patterns at the Convention Center are dominated by combinations of trade shows (held on both weekdays and weekends) when more than one event is scheduled simultaneously. These events drew daily attendances of

[1] Annual attendance from 1999 was assumed to be a "typical" year for analysis purposes, based upon input from Convention Center management and a review of attendance patterns from 1997-2000. Attendance data after 2000 was not considered due to the events of September 11, 2001. To provide for a more conservative analysis, 1999 attendance data will be subsequently increased to account for modest growth experienced in Convention Center attendance between 1999 and 2000 (an overall increase of 6.2%); this change is reflected in Table 5.

Table 1: Ranked Daily Attendance of 1999 Convention Center Events (Annual)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#1	95,707	4/10/99	Saturday	Public	Int'l Auto Show			
#2	86,483	4/3/99	Saturday	Public	Int'l Auto Show			
#3	81,056	4/11/99	Sunday	Public	Int'l Auto Show			
#4	68,202	4/4/99	Sunday	Public	Int'l Auto Show			
#5	67,516	1/9/99	Saturday	Public	Boat Show	Fashion Boutique	Style Industrie	
#6	62,126	6/23/99	Wednesday	Public	PC Expo			
#7	60,047	6/22/99	Tuesday	Public	PC Expo			
#8	59,958	10/28/99	Thursday	Trade	Interplan/Design	Photo East Expo '99		
#9	56,724	1/31/99	Sunday	Trade	Int'l Gift Fair			
#10	52,692	10/29/99	Friday	Trade	Interplan/Design	Photo East Expo '99		
#11	51,004	4/9/99	Friday	Public	Int'l Auto Show			
#12	46,989	2/1/99	Monday	Trade	Int'l Gift Fair			
#13	43,369	8/15/99	Sunday	Trade	Int'l Gift Fair			
#14	42,985	1/10/99	Sunday	Public	Boat Show	Fashion Boutique	Style Industrie	Fashion Accessories
#15	41,075	4/8/99	Thursday	Public	Int'l Auto Show			
#16	40,577	8/16/99	Monday	Trade	Int'l Gift Fair			
#17	40,254	4/7/99	Wednesday	Public	Int'l Auto Show			
#18	39,220	2/2/99	Tuesday	Trade	Int'l Gift Fair			
#19	36,903	7/21/99	Wednesday	Public	Law Enforcement	MacWorld		
#20	36,821	1/2/99	Saturday	Public	Boat Show			
#21	36,720	8/1/99	Sunday	Trade	Style Industrie	Fashion Boutique	Fashion Acc. Expo.	JA Jewelry
#22	35,486	5/16/99	Sunday	Trade	Contemp Furniture	Italian Style	Surtex	Nat'l Stationery
#23	35,327	6/24/99	Thursday	Public	PC Expo			
#24	35,058	4/6/99	Tuesday	Public	Int'l Auto Show			
#25	32,600	5/17/99	Monday	Trade	Contemp Furniture	Italian Style	Surtex	Nat'l Stationery
#26	32,371	4/5/99	Monday	Public	Int'l Auto Show			
#27	31,701	8/17/99	Tuesday	Trade	Int'l Gift Fair			
#28	31,651	8/2/99	Monday	Trade	Style Industrie	Fashion Boutique	Fashion Acc. Expo.	JA Jewelry
#29	31,023	10/6/99	Wednesday	Public	Fall Internet World			
#30	29,767	9/25/99	Saturday	Trade	Audio Engineering	Nat'l Merchandise	Style Industrie	
#31	29,009	9/26/99	Sunday	Trade	Audio Engineering	Nat'l Merchandise	Style Industrie	
#32	28,927	7/22/99	Thursday	Public	Law Enforcement	MacWorld		
#33	28,885	10/7/99	Thursday	Public	Fall Internet World			
#34	28,884	5/25/99	Tuesday	Trade	Fashion Boutique	Medical D & M	Finance Bus. Tech.	
#35	28,582	11/17/99	Wednesday	Trade	Chemical Expo	Financial Tech Expo	In-Cosmetic USA	
#36	28,346	11/6/99	Saturday	Trade	Hotel/Motel/Rest.			
#37	27,782	5/26/99	Wednesday	Trade	Fashion Boutique	Medical D & M	Finance Bus. Tech.	
#38	27,716	11/8/99	Monday	Trade	Hotel/Motel/Rest.		Culinary Inst.	
#39	26,939	10/30/99	Saturday	Trade	Photo East Expo '99	NYS Teachers Exam		
#40	26,552	2/3/99	Wednesday	Trade	Int'l Gift Fair			
#41	26,550	11/16/99	Tuesday	Trade	Chemical Expo	Financial Tech Expo	In-Cosmetic USA	
#42	26,163	11/7/99	Sunday	Trade	Hotel/Motel/Rest.			
#43	26,141	3/7/99	Sunday	Trade	Art Expo	Int'l Beauty Show		
#44	23,190	1/11/99	Monday	Trade	Fashion Boutique	Style Industrie	Fashion Accessories	
#45	23,174	2/13/99	Saturday	Trade	Int'l Toy Fair	Variety Merchandise		
#46	22,905	5/4/99	Tuesday	Trade	Fashion Access.	On Demand Digital	Premium Incentive	
#47	22,594	9/24/99	Friday	Trade	Audio Engineering	Nat'l Merchandise	Retail Seek	
#48	22,439	5/18/99	Tuesday	Trade	Contemp Furniture	Italian Style	Surtex	Nat'l Stationery
#49	22,381	1/24/99	Sunday	Trade	Kids Fashion	JA Jewelry		
#50	22,286	8/18/99	Wednesday	Trade	Int'l Gift Fair			
#51	21,703	8/3/99	Tuesday	Trade	Style Industrie	Fashion Boutique	Fashion Acc. Expo.	JA Jewelry
#52	21,499	9/15/99	Wednesday	Trade	Comp. Telephony	POP Show		
#53	21,145	4/20/99	Tuesday	Trade	Vibe Style	Interphex		
#54	20,818	4/27/99	Tuesday	Trade	Buildings NY	Fashion Fabric	Int'net & Elec Comm	
#55	20,687	6/8/99	Tuesday	Trade	Licensing '99	HBA Global Expo		
#56	20,390	8/24/99	Tuesday	Trade	Telecom Business			
#57	20,314	3/20/99	Saturday	Trade	Int'l Vision Expo	Fashion Boutique		
#58	20,268	10/19/99	Tuesday	Trade	Fashion Boutique	Vibe Style	Kids Fashion	Off-price Spec.
#59	19,932	6/9/99	Wednesday	Trade	Licensing '99	HBA Global Expo		
#60	19,764	3/19/99	Friday	Trade	Int'l Vision Expo			
#61	19,662	11/28/99	Sunday	Trade	Greater NY Dental			
#62	19,121	11/18/99	Thursday	Trade	Chemical Expo	Financial Tech Expo	In-Cosmetic USA	Postage Stamps
#63	18,880	10/27/99	Wednesday	Trade	Interplan/Design			
#64	18,653	4/21/99	Wednesday	Trade	Interphex	Int'l Bus. Expo		
#65	18,562	2/14/99	Sunday	Trade	Int'l Toy Fair	Variety Merchandise		
#66	18,550	4/28/99	Wednesday	Trade	Buildings NY	Fashion Fabric	Int'net & Elec Comm	
#67	18,427	1/25/99	Monday	Trade	Kids Fashion	JA Jewelry		
#68	18,088	10/17/99	Sunday	Trade	Fashion Boutique	Vibe Style	Kids Fashion	
#69	18,074	1/3/99	Sunday	Public	Boat Show	Church of Christ		
#70	17,902	2/12/99	Friday	Trade	Int'l Toy Fair			
#71	17,439	2/23/99	Tuesday	Trade	NY Rest. & Food	I.T. for Wall Street	NYS Law Exam	
#72	17,348	5/5/99	Wednesday	Trade	On Demand Digital	Premium Incentive		
#73	17,088	10/8/99	Friday	Public	Fall Internet World			
#74	17,068	7/11/99	Sunday	Trade	Fancy Food			
#75	17,037	10/18/99	Monday	Trade	Fashion Boutique	Vibe Style	Kids Fashion	Off-price Spec.

Table 1: Ranked Daily Attendance of 1999 Convention Center Events (Annual)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#76	16,892	5/24/99	Monday	Trade	Fashion Boutique			
#77	16,563	7/12/99	Monday	Trade	Fancy Food			
#78	16,556	12/18/99	Saturday	Trade	Kwanzaa Holiday			
#79	16,149	7/23/99	Friday	Trade	MacWorld			
#80	15,904	5/23/99	Sunday	Trade	Fashion Boutique			
#81	15,474	3/8/99	Monday	Trade	Art Expo	Int'l Beauty Show		
#82	15,187	11/29/99	Monday	Trade	Greater NY Dental			
#83	14,818	9/27/99	Monday	Trade	Audio Engineering	Nat'l Merchandise	Style Industrie	
#84	14,766	1/16/99	Saturday	Public	Int'l Motorcycle	NYS Teachers Exam		
#85	14,759	11/30/99	Tuesday	Trade	Greater NY Dental			
#86	14,616	3/21/99	Sunday	Trade	Int'l Vision Expo	Fashion Boutique		
#87	14,470	2/20/99	Saturday	Trade	Style Industrie	Church of Christ		
#88	14,294	2/22/99	Monday	Trade	Style Industrie	NY Rest. & Food	I.T. for Wall Street	
#89	14,038	12/1/99	Wednesday	Trade	Greater NY Dental			
#90	13,981	2/21/99	Sunday	Trade	Style Industrie	NY Rest. & Food		
#91	13,959	9/1/99	Wednesday	Trade	Data Warehousing	Int'l Security Conf.		
#92	13,831	1/8/99	Friday	Public	Boat Show			
#93	13,564	12/19/99	Sunday	Trade	Kwanzaa Holiday	Church of Christ		
#94	13,291	9/14/99	Tuesday	Trade	Comp. Telephony			
#95	13,258	2/24/99	Wednesday	Trade	I.T. for Wall Street	NYS Law Exam		
#96	12,517	7/31/99	Saturday	Trade	Style Industrie	Fashion Boutique		
#97	12,404	7/13/99	Tuesday	Trade	Fancy Food			
#98	12,204	9/16/99	Thursday	Trade	Comp. Telephony	POP Show	Show Biz Expo	
#99	12,096	1/26/99	Tuesday	Trade	Kids Fashion	JA Jewelry		
#100	11,516	3/9/99	Tuesday	Trade	Int'l Beauty Show			
#101	11,216	1/12/99	Tuesday	Trade	Fashion Boutique	Fashion Accessories		
#102	10,967	6/10/99	Thursday	Trade	Licensing '99	HBA Global Expo		
#103	10,898	2/15/99	Monday	Trade	Int'l Toy Fair	Variety Merchandise		
#104	10,772	10/20/99	Wednesday	Trade	Kids Fashion	Off-price Spec.	Int'l Fashion Fabric	
#105	10,700	11/9/99	Tuesday	Trade	Hotel/Motel/Rest.			
#106	10,658	4/18/99	Sunday	Trade	Erotica	Gay & Lesbian Bus.	Vibe Style	
#107	10,446	8/31/99	Tuesday	Trade	Data Warehousing	Int'l Security Conf.		
#108	10,369	5/3/99	Monday	Trade	Style Industrie	Fashion Access.	On Demand Digital	
#109	10,176	4/22/99	Thursday	Trade	Interphex			
#110	9,873	1/17/99	Sunday	Public	Int'l Motorcycle			
#111	9,811	1/30/99	Saturday	Trade	Int'l Gift Fair			
#112	9,704	5/6/99	Thursday	Trade	On Demand Digital	Premium Incentive		
#113	9,695	1/7/99	Thursday	Public	Boat Show			
#114	9,600	3/6/99	Saturday	Trade	Art Expo	Int'l Beauty Show		
#115	9,575	1/6/99	Wednesday	Public	Boat Show			
#116	9,557	1/19/99	Tuesday	Trade	Retail Federation	Magic East		
#117	9,512	8/14/99	Saturday	Trade	Int'l Gift Fair			
#118	9,389	12/14/99	Tuesday	Trade	E-Business Expo	Bazaar & Earthweb		
#119	9,365	5/15/99	Saturday	Trade	Contemp Furniture	Italian Style		
#120	9,321	1/18/99	Monday	Trade	Retail Federation			
#121	9,284	8/4/99	Wednesday	Trade	JA Jewelry			
#122	8,972	5/27/99	Thursday	Trade	Medical D & M	Finance Bus. Tech.		
#123	8,686	4/17/99	Saturday	Trade	Erotica	Gay & Lesbian Bus.	Teachers Exam	
#124	8,651	1/5/99	Tuesday	Public	Boat Show			
#125	8,478	8/23/99	Monday	Trade	Telecom Business			
#126	8,468	5/19/99	Wednesday	Trade	Nat'l Stationery			
#127	8,130	5/2/99	Sunday	Trade	Style Industrie	Fashion Access.		
#128	7,961	12/15/99	Wednesday	Trade	E-Business Expo	Bazaar & Earthweb		
#129	7,804	8/25/99	Wednesday	Trade	Telecom Business			
#130	7,735	9/2/99	Thursday	Trade	Data Warehousing	Int'l Security Conf.		
#131	7,510	6/17/99	Thursday	Trade	TCI Commencement			
#132	7,052	8/9/99	Monday	Trade	Kids Fashion	Music Expo		
#133	7,051	2/4/99	Thursday	Trade	Int'l Gift Fair			
#134	7,015	1/4/99	Monday	Public	Boat Show			
#135	6,728	3/5/99	Friday	Trade	Art Expo			
#136	6,716	10/5/99	Tuesday	Public	Fall Internet World			
#137	6,466	7/14/99	Wednesday	Trade	Fancy Food			
#138	6,354	3/4/99	Thursday	Trade	Art Expo			
#139	6,324	4/29/99	Thursday	Trade	Fashion Fabric	Int'net & Elec Comm		
#140	6,300	2/25/99	Thursday	Trade	I.T. for Wall Street			
#141	5,824	3/14/99	Sunday	Trade	Int'l Kids Fashion			
#142	5,759	10/4/99	Monday	Trade	NY Fall Textile	Fall Internet World		
#143	5,525	3/15/99	Monday	Trade	Int'l Kids Fashion	Vinisud USA		
#144	5,510	6/27/99	Sunday	Trade	Church of Christ	Local 638 Vote		
#145	5,499	4/19/99	Monday	Trade	Vibe Style			
#146	5,353	8/19/99	Thursday	Trade	Int'l Gift Fair			
#147	5,218	8/8/99	Sunday	Trade	Kids Fashion			
#148	5,205	6/28/99	Monday	Trade	Chairman's Address			
#149	5,205	7/20/99	Tuesday	Trade	Merchandise	Law Enforcement		
#150	5,185	1/15/99	Friday	Public	Int'l Motorcycle			

Table 1: Ranked Daily Attendance of 1999 Convention Center Events (Annual)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#151	5,056	4/30/99	Friday	Trade	CUNY Job Fair			
#152	5,025	12/16/99	Thursday	Trade	E-Business Expo	Bazaar & Earthweb		
#153	4,878	8/10/99	Tuesday	Trade	Kids Fashion	Music Expo		
#154	4,745	6/5/99	Saturday	Trade	Agriflor	Financial Analyst		
#155	4,742	4/16/99	Friday	Trade	Erotica			
#156	4,477	3/16/99	Tuesday	Trade	Int'l Kids Fashion	Vinisud USA		
#157	4,410	6/3/99	Thursday	Trade	China Trade	Living Better Expo	Agriflor	
#158	4,313	10/3/99	Sunday	Trade	NY Fall Textile			
#159	4,202	10/16/99	Saturday	Trade	Fashion Boutique			
#160	4,154	12/8/99	Wednesday	Trade	Java Business	Criminal Justice		
#161	4,135	10/21/99	Thursday	Trade	Int'l Fashion Fabric			
#162	4,009	1/20/99	Wednesday	Trade	Retail Federation	Magic East		
#163	3,768	10/2/99	Saturday	Trade	NY Fall Textile			
#164	3,733	5/1/99	Saturday	Trade	Style Industrie			
#165	3,555	12/7/99	Tuesday	Trade	Java Business			
#166	3,519	9/18/99	Saturday	Trade	Show Biz Expo	Franchise Expo		
#167	3,492	2/11/99	Thursday	Trade	Int'l Toy Fair			
#168	3,432	6/4/99	Friday	Trade	Agriflor			
#169	3,290	9/17/99	Friday	Trade	Show Biz Expo	Franchise Expo		
#170	3,255	5/30/99	Sunday	Trade	Church of Christ			
#171	3,205	6/30/99	Wednesday	Trade	Bar Review			
#172	3,147	7/27/99	Tuesday	Trade	NYS Bar Exam			
#173	3,147	7/28/99	Wednesday	Trade	NYS Bar Exam			
#174	3,094	11/27/99	Saturday	Trade	Greater NY Dental			
#175	3,030	4/15/99	Thursday	Trade	Erotica			
#176	3,005	2/28/99	Sunday	Trade	Church of Christ			
#177	3,005	5/9/99	Sunday	Trade	Church of Christ			
#178	3,005	6/6/99	Sunday	Trade	Church of Christ			
#179	3,005	8/6/99	Friday	Trade	US Immig & Nat.			
#180	3,005	8/26/99	Thursday	Trade	US Immig & Nat.			
#181	3,005	11/12/99	Friday	Trade	Sylvia Browne			
#182	3,005	11/14/99	Sunday	Trade	Church of Christ			
#183	3,005	12/5/99	Sunday	Trade	Penny Harvest			
#184	2,470	7/18/99	Sunday	Trade	Merchandise			
#185	2,304	12/9/99	Thursday	Trade	Java Business	Criminal Justice		
#186	2,259	3/18/99	Thursday	Trade	Int'l Kids Fashion			
#187	2,222	10/1/99	Friday	Trade	NY Fall Textile			
#188	2,208	3/22/99	Monday	Trade	Fashion Boutique			
#189	2,094	4/26/99	Monday	Trade	Buildings NY			
#190	2,005	7/9/99	Friday	Trade	Local 638 Vote			
#191	2,005	8/5/99	Thursday	Trade	Gibbs Graduation			
#192	2,000	9/23/99	Thursday	Trade	Retail Seek			
#193	1,961	3/17/99	Wednesday	Trade	Int'l Kids Fashion			
#194	1,943	1/21/99	Thursday	Trade	Magic East			
#195	1,875	7/19/99	Monday	Trade	Merchandise			
#196	1,835	8/30/99	Monday	Trade	Data Warehousing			
#197	1,805	9/8/99	Wednesday	Trade	Sun Microsystems			
#198	1,769	2/16/99	Tuesday	Trade	Variety Merchandise			
#199	1,546	3/23/99	Tuesday	Trade	Fashion Boutique	Sero Scholarship		
#200	1,535	1/22/99	Friday	Trade	Magic East			
#201	1,505	3/25/99	Thursday	Trade	Mercedes Benz			
#202	1,475	9/9/99	Thursday	Trade	Sun Microsystems			
#203	1,405	9/20/99	Monday	Trade	Yom Kipper Services			
#204	1,385	3/12/99	Friday	Trade	Limo Transpo			
#205	1,360	11/20/99	Saturday	Trade	Postage Stamps			
#206	1,272	3/13/99	Saturday	Trade	Limo Transpo			
#207	1,078	11/19/99	Friday	Trade	Postage Stamps			
#208	1,005	4/25/99	Sunday	Trade	Childrens Museum			
#209	855	7/17/99	Saturday	Trade	NYS Teachers Exam			
#210	825	11/21/99	Sunday	Trade	Postage Stamps			
#211	788	6/2/99	Wednesday	Trade	China Trade	Living Better Expo		
#212	600	11/1/99	Monday	Trade	MCS East Meeting			
#213	505	6/1/99	Tuesday	Trade	China Trade			
#214	505	9/29/99	Wednesday	Trade	KW Training			
#215	505	12/3/99	Friday	Trade	Banker's Trust Party			
#216	495	11/2/99	Tuesday	Trade	MCS East Meeting			
#217	487	12/6/99	Monday	Trade	Java Business			
#218	405	3/24/99	Wednesday	Trade	Aging Brain			
#219	405	7/7/99	Wednesday	Trade	KW Training			
#220	380	11/23/99	Tuesday	Trade	America Sings			
#221	380	11/24/99	Wednesday	Trade	America Sings			
#222	333	9/19/99	Sunday	Trade	Franchise Expo	Yom Kippur Services		
#223	260	5/22/99	Saturday	Trade	Financial Analyst			
#224	255	1/23/99	Saturday	Trade	NY Special Olympics			
#225	255	11/4/99	Thursday	Trade	Javits Masked Ball			

Table 1: Ranked Daily Attendance of 1999 Convention Center Events (Annual)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#226	235	6/11/99	Friday	Trade	China Trade Expo			
#227	200	7/2/99	Friday	Trade	Worship Conference			
#228	200	7/3/99	Saturday	Trade	Worship Conference			
#229	155	5/11/99	Tuesday	Trade	IAEM Volley Ball			
#230	122	6/12/99	Saturday	Trade	China Trade Expo			
#231	115	7/4/99	Sunday	Trade	Worship Conference			
#232	105	6/18/99	Friday	Trade	Duane Reade			
#233	93	9/3/99	Friday	Trade	Data Warehousing			
#234	65	6/16/99	Wednesday	Trade	The View R4 to R5			
#235	45	5/21/99	Friday	Trade	Sisco Seminar			
#236	30	6/25/99	Friday	Trade	Wolmer's Meeting			
#237	0	1/1/99	Friday					
#238	0	1/13/99	Wednesday					
#239	0	1/14/99	Thursday					
#240	0	1/27/99	Wednesday					
#241	0	1/28/99	Thursday					
#242	0	1/29/99	Friday					
#243	0	2/5/99	Friday					
#244	0	2/6/99	Saturday					
#245	0	2/7/99	Sunday					
#246	0	2/8/99	Monday					
#247	0	2/9/99	Tuesday					
#248	0	2/10/99	Wednesday					
#249	0	2/17/99	Wednesday					
#250	0	2/18/99	Thursday					
#251	0	2/19/99	Friday					
#252	0	2/26/99	Friday					
#253	0	2/27/99	Saturday					
#254	0	3/1/99	Monday					
#255	0	3/2/99	Tuesday					
#256	0	3/3/99	Wednesday					
#257	0	3/10/99	Wednesday					
#258	0	3/11/99	Thursday					
#259	0	3/26/99	Friday					
#260	0	3/27/99	Saturday					
#261	0	3/28/99	Sunday					
#262	0	3/29/99	Monday					
#263	0	3/30/99	Tuesday					
#264	0	3/31/99	Wednesday					
#265	0	4/1/99	Thursday					
#266	0	4/2/99	Friday					
#267	0	4/12/99	Monday					
#268	0	4/13/99	Tuesday					
#269	0	4/14/99	Wednesday					
#270	0	4/23/99	Friday					
#271	0	4/24/99	Saturday					
#272	0	5/7/99	Friday					
#273	0	5/8/99	Saturday					
#274	0	5/10/99	Monday					
#275	0	5/12/99	Wednesday					
#276	0	5/13/99	Thursday					
#277	0	5/14/99	Friday					
#278	0	5/20/99	Thursday					
#279	0	5/28/99	Friday					
#280	0	5/29/99	Saturday					
#281	0	5/31/99	Monday					
#282	0	6/7/99	Monday					
#283	0	6/13/99	Sunday					
#284	0	6/14/99	Monday					
#285	0	6/15/99	Tuesday					
#286	0	6/19/99	Saturday					
#287	0	6/20/99	Sunday					
#288	0	6/21/99	Monday					
#289	0	6/26/99	Saturday					
#290	0	6/29/99	Tuesday					
#291	0	7/1/99	Thursday					
#292	0	7/5/99	Monday					
#293	0	7/6/99	Tuesday					
#294	0	7/8/99	Thursday					
#295	0	7/10/99	Saturday					
#296	0	7/15/99	Thursday					
#297	0	7/16/99	Friday					
#298	0	7/24/99	Saturday					
#299	0	7/25/99	Sunday					
#300	0	7/26/99	Monday					

Table 1: Ranked Daily Attendance of 1999 Convention Center Events (Annual)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#301	0	7/29/99	Thursday					
#302	0	7/30/99	Friday					
#303	0	8/7/99	Saturday					
#304	0	8/11/99	Wednesday					
#305	0	8/12/99	Thursday					
#306	0	8/13/99	Friday					
#307	0	8/20/99	Friday					
#308	0	8/21/99	Saturday					
#309	0	8/22/99	Sunday					
#310	0	8/27/99	Friday					
#311	0	8/28/99	Saturday					
#312	0	8/29/99	Sunday					
#313	0	9/4/99	Saturday					
#314	0	9/5/99	Sunday					
#315	0	9/6/99	Monday					
#316	0	9/7/99	Tuesday					
#317	0	9/10/99	Friday					
#318	0	9/11/99	Saturday					
#319	0	9/12/99	Sunday					
#320	0	9/13/99	Monday					
#321	0	9/21/99	Tuesday					
#322	0	9/22/99	Wednesday					
#323	0	9/28/99	Tuesday					
#324	0	9/30/99	Thursday					
#325	0	10/9/99	Saturday					
#326	0	10/10/99	Sunday					
#327	0	10/11/99	Monday					
#328	0	10/12/99	Tuesday					
#329	0	10/13/99	Wednesday					
#330	0	10/14/99	Thursday					
#331	0	10/15/99	Friday					
#332	0	10/22/99	Friday					
#333	0	10/23/99	Saturday					
#334	0	10/24/99	Sunday					
#335	0	10/25/99	Monday					
#336	0	10/26/99	Tuesday					
#337	0	10/31/99	Sunday					
#338	0	11/3/99	Wednesday					
#339	0	11/5/99	Friday					
#340	0	11/10/99	Wednesday					
#341	0	11/11/99	Thursday					
#342	0	11/13/99	Saturday					
#343	0	11/15/99	Monday					
#344	0	11/22/99	Monday					
#345	0	11/25/99	Thursday					
#346	0	11/26/99	Friday					
#347	0	12/2/99	Thursday					
#348	0	12/4/99	Saturday					
#349	0	12/10/99	Friday					
#350	0	12/11/99	Saturday					
#351	0	12/12/99	Sunday					
#352	0	12/13/99	Monday					
#353	0	12/17/99	Friday					
#354	0	12/20/99	Monday					
#355	0	12/21/99	Tuesday					
#356	0	12/22/99	Wednesday					
#357	0	12/23/99	Thursday					
#358	0	12/24/99	Friday					
#359	0	12/25/99	Saturday					
#360	0	12/26/99	Sunday					
#361	0	12/27/99	Monday					
#362	0	12/28/99	Tuesday					
#363	0	12/29/99	Wednesday					
#364	0	12/30/99	Thursday					
#365	0	12/31/99	Friday					

Source: Eng-Wong, Taub & Associates, 2003.

3,379,732	**Total Attendance**
14,321	**Average Attendance**
28,205	**85th Percentile Attendance**
236	**Event Days**
129	**Dark Days (Days When No Events Are Scheduled)**

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approximately 10,000 to 30,000 attendees. It is important to note that in 1999, there were 129 dark days (days when no shows were scheduled). This was due to the inability of the Convention Center to book events back-to-back (because of move-in/move-out requirements), and the lack of demand to hold events on some holidays. The distribution of daily attendance at the Convention Center in 1999 is illustrated in Figure 1.

Based on precedent documented in several New York City-certified EIS's[2], peak attendance days are not utilized for analysis purposes, as they do not represent the most common circumstance. Instead a "design event day" condition with the 85th percentile daily attendance was identified to develop a reasonable worst-case scenario that would occur with enough frequency to warrant consideration for analysis. In 1999, the 85th percentile daily attendance was 28,205 (excluding dark days). This contrasts to the average daily attendance of 14,321.

Since daily attendance at the Convention Center is noticeably different on weekends compared to weekdays (20 of the top 50 attendance dates occurred on weekends), 1999 attendance data was further sorted by weekdays, Saturdays, and Sundays. Table 2 ranks 1999 attendance at weekday events, Table 3 ranks 1999 attendances at Saturday events, and Table 4 ranks attendance at Sunday events. As shown in Tables 2 through 4, the 85th percentile daily attendance was 26,550, 29,057, and 36,041 on weekdays, Saturdays, and Sundays, respectively. The 85th percentile daily attendance was higher on Sundays compared to Saturdays, which can be attributed to the occurrence of more combinations of trade shows that were held on Sundays (many of these shows began on Sunday and extended into the beginning of the week). Figure 2 shows the distribution of daily attendance on weekdays and Figure 3 shows the distribution of daily attendances on both Saturdays and Sundays.

Projected Attendance Patterns

The proposed expanded exhibition and meeting space at the Convention Center would be used to attract public shows with larger space requirements and to accommodate multiple, smaller-venue trade shows simultaneously. According to Convention Center management, attendance increases due to the expansion would be expected to differ between public and trade shows. Although public shows (such as the Auto Show, New York International Motorcycle Show, and PC Expo) may expand to fill the larger exhibition area, they are all expected to experience only a 15% increase in total visitation. However, the New York National Boat Show is the only public show that is neither expected to increase in size nor visitation, and instead could be coupled with a new four-day public show drawing approximately 80,000 total visitors. The proposed expansion would also afford small- and medium-sized trade shows (gift, fashion, and professional associations) the opportunity to expand their scopes, as well as to allow the Convention Center to schedule a greater number of simultaneous events. Based on the projections provided by Convention Center management, the visitation for all other shows (including trade shows) is expected to increase by 84% – approximately the same factor as the increase in floor space.

In order to project future 85th percentile attendance at the expanded Convention Center, the daily attendances at all Convention Center events held in 1999 (shown in Table 1) were

[2] -*U.S.T.A. National Tennis Center Project, Final Environmental Impact Statement,* New York City Departments of City Planning and Environmental Protection, July 23, 1993;
-*34th Street Rezoning, Final Environmental Impact Statement*, Allee King Rosen & Fleming, June 1990;
-*The Rezoning of the Block Bounded by 42nd Street, 41st Street, 11th Avenue and 12th Avenue, Final Environmental Impact Statement*, Vollmer Associates, 1989; and
-*Ninth Avenue and 31st Street Project, Final Environmental Impact Statement*, Allee King Rosen & Fleming/Vollmer Associates, December 1989.

Figure 1: 1999 Convention Center Annual Attendance

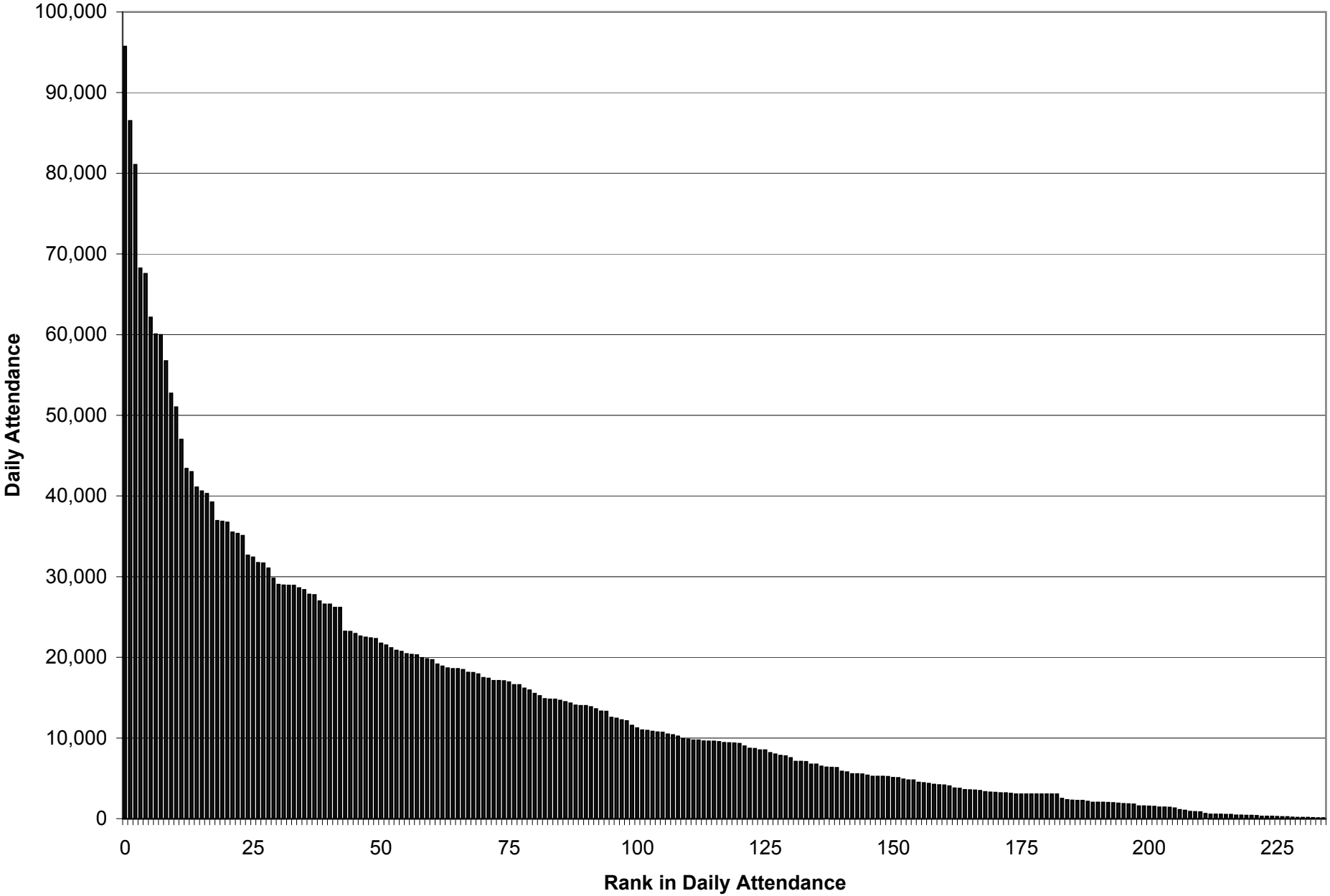


Table 2: Ranked Daily Attendance of 1999 Convention Center Events (Weekdays)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#1	62,126	6/23/99	Wednesday	Public	PC Expo			
#2	60,047	6/22/99	Tuesday	Public	PC Expo			
#3	59,958	10/28/99	Thursday	Trade	Interplan/Design	Photo East Expo '99		
#4	52,692	10/29/99	Friday	Trade	Interplan/Design	Photo East Expo '99		
#5	51,004	4/9/99	Friday	Public	Int'l Auto Show			
#6	46,989	2/1/99	Monday	Trade	Int'l Gift Fair			
#7	41,075	4/8/99	Thursday	Public	Int'l Auto Show			
#8	40,577	8/16/99	Monday	Trade	Int'l Gift Fair			
#9	40,254	4/7/99	Wednesday	Public	Int'l Auto Show			
#10	39,220	2/2/99	Tuesday	Trade	Int'l Gift Fair			
#11	36,903	7/21/99	Wednesday	Public	Law Enforcement	MacWorld		
#12	35,327	6/24/99	Thursday	Public	PC Expo			
#13	35,058	4/6/99	Tuesday	Public	Int'l Auto Show			
#14	32,600	5/17/99	Monday	Trade	Contemp Furniture	Italian Style	Surtex	Nat'l Stationery
#15	32,371	4/5/99	Monday	Public	Int'l Auto Show			
#16	31,701	8/17/99	Tuesday	Trade	Int'l Gift Fair			
#17	31,651	8/2/99	Monday	Trade	Style Industrie	Fashion Boutique	Fashion Acc. Expo.	JA Jewelry
#18	31,023	10/6/99	Wednesday	Public	Fall Internet World			
#19	28,927	7/22/99	Thursday	Public	Law Enforcement	MacWorld		
#20	28,885	10/7/99	Thursday	Public	Fall Internet World			
#21	28,884	5/25/99	Tuesday	Trade	Fashion Boutique	Medical D & M	Finance Bus. Tech.	
#22	28,582	11/17/99	Wednesday	Trade	Chemical Expo	Financial Tech Expo	In-Cosmetic USA	
#23	27,782	5/26/99	Wednesday	Trade	Fashion Boutique	Medical D & M	Finance Bus. Tech.	
#24	27,716	11/8/99	Monday	Trade	Hotel/Motel/Rest.		Culinary Inst.	
#25	26,552	2/3/99	Wednesday	Trade	Int'l Gift Fair			
#26	26,550	11/16/99	Tuesday	Trade	Chemical Expo	Financial Tech Expo	In-Cosmetic USA	
#27	23,190	1/11/99	Monday	Trade	Fashion Boutique	Style Industrie	Fashion Accessories	
#28	22,905	5/4/99	Tuesday	Trade	Fashion Access.	On Demand Digital	Premium Incentive	
#29	22,594	9/24/99	Friday	Trade	Audio Engineering	Nat'l Merchandise	Retail Seek	
#30	22,439	5/18/99	Tuesday	Trade	Contemp Furniture	Italian Style	Surtex	Nat'l Stationery
#31	22,286	8/18/99	Wednesday	Trade	Int'l Gift Fair			
#32	21,703	8/3/99	Tuesday	Trade	Style Industrie	Fashion Boutique	Fashion Acc. Expo.	JA Jewelry
#33	21,499	9/15/99	Wednesday	Trade	Comp. Telephony	POP Show		
#34	21,145	4/20/99	Tuesday	Trade	Vibe Style	Interphex		
#35	20,818	4/27/99	Tuesday	Trade	Buildings NY	Fashion Fabric	Int'net & Elec Comm	
#36	20,687	6/8/99	Tuesday	Trade	Licensing '99	HBA Global Expo		
#37	20,390	8/24/99	Tuesday	Trade	Telecom Business			
#38	20,268	10/19/99	Tuesday	Trade	Fashion Boutique	Vibe Style	Kids Fashion	Off-price Spec.
#39	19,932	6/9/99	Wednesday	Trade	Licensing '99	HBA Global Expo		
#40	19,764	3/19/99	Friday	Trade	Int'l Vision Expo			
#41	19,121	11/18/99	Thursday	Trade	Chemical Expo	Financial Tech Expo	In-Cosmetic USA	Postage Stamps
#42	18,880	10/27/99	Wednesday	Trade	Interplan/Design			
#43	18,653	4/21/99	Wednesday	Trade	Interphex	Int'l Bus. Expo		
#44	18,550	4/28/99	Wednesday	Trade	Buildings NY	Fashion Fabric	Int'net & Elec Comm	
#45	18,427	1/25/99	Monday	Trade	Kids Fashion	JA Jewelry		
#46	17,902	2/12/99	Friday	Trade	Int'l Toy Fair			
#47	17,439	2/23/99	Tuesday	Trade	NY Rest. & Food	I.T. for Wall Street	NYS Law Exam	
#48	17,348	5/5/99	Wednesday	Trade	On Demand Digital	Premium Incentive		
#49	17,088	10/8/99	Friday	Public	Fall Internet World			
#50	17,037	10/18/99	Monday	Trade	Fashion Boutique	Vibe Style	Kids Fashion	Off-price Spec.
#51	16,892	5/24/99	Monday	Trade	Fashion Boutique			
#52	16,563	7/12/99	Monday	Trade	Fancy Food			
#53	16,149	7/23/99	Friday	Trade	MacWorld			
#54	15,474	3/8/99	Monday	Trade	Art Expo	Int'l Beauty Show		
#55	15,187	11/29/99	Monday	Trade	Greater NY Dental			
#56	14,818	9/27/99	Monday	Trade	Audio Engineering	Nat'l Merchandise	Style Industrie	
#57	14,759	11/30/99	Tuesday	Trade	Greater NY Dental			
#58	14,294	2/22/99	Monday	Trade	Style Industrie	NY Rest. & Food	I.T. for Wall Street	
#59	14,038	12/1/99	Wednesday	Trade	Greater NY Dental			
#60	13,959	9/1/99	Wednesday	Trade	Data Warehousing	Int'l Security Conf.		
#61	13,831	1/8/99	Friday	Public	Boat Show			
#62	13,291	9/14/99	Tuesday	Trade	Comp. Telephony			
#63	13,258	2/24/99	Wednesday	Trade	I.T. for Wall Street	NYS Law Exam		
#64	12,404	7/13/99	Tuesday	Trade	Fancy Food			
#65	12,204	9/16/99	Thursday	Trade	Comp. Telephony	POP Show	Show Biz Expo	
#66	12,096	1/26/99	Tuesday	Trade	Kids Fashion	JA Jewelry		
#67	11,516	3/9/99	Tuesday	Trade	Int'l Beauty Show			
#68	11,216	1/12/99	Tuesday	Trade	Fashion Boutique	Fashion Accessories		
#69	10,967	6/10/99	Thursday	Trade	Licensing '99	HBA Global Expo		
#70	10,898	2/15/99	Monday	Trade	Int'l Toy Fair	Variety Merchandise		
#71	10,772	10/20/99	Wednesday	Trade	Kids Fashion	Off-price Spec.	Int'l Fashion Fabric	
#72	10,700	11/9/99	Tuesday	Trade	Hotel/Motel/Rest.			
#73	10,446	8/31/99	Tuesday	Trade	Data Warehousing	Int'l Security Conf.		
#74	10,369	5/3/99	Monday	Trade	Style Industrie	Fashion Access.	On Demand Digital	
#75	10,176	4/22/99	Thursday	Trade	Interphex			
#76	9,704	5/6/99	Thursday	Trade	On Demand Digital	Premium Incentive		
#77	9,695	1/7/99	Thursday	Public	Boat Show			
#78	9,575	1/6/99	Wednesday	Public	Boat Show			
#79	9,557	1/19/99	Tuesday	Trade	Retail Federation	Magic East		
#80	9,389	12/14/99	Tuesday	Trade	E-Business Expo	Bazaar & Earthweb		
#81	9,321	1/18/99	Monday	Trade	Retail Federation			
#82	9,284	8/4/99	Wednesday	Trade	JA Jewelry			
#83	8,972	5/27/99	Thursday	Trade	Medical D & M	Finance Bus. Tech.		
#84	8,651	1/5/99	Tuesday	Public	Boat Show			
#85	8,478	8/23/99	Monday	Trade	Telecom Business			
#86	8,468	5/19/99	Wednesday	Trade	Nat'l Stationery			
#87	7,961	12/15/99	Wednesday	Trade	E-Business Expo	Bazaar & Earthweb		
#88	7,804	8/25/99	Wednesday	Trade	Telecom Business			
#89	7,735	9/2/99	Thursday	Trade	Data Warehousing	Int'l Security Conf.		
#90	7,510	6/17/99	Thursday	Trade	TCI Commencement			
#91	7,052	8/9/99	Monday	Trade	Kids Fashion	Music Expo		
#92	7,051	2/4/99	Thursday	Trade	Int'l Gift Fair			

Table 2: Ranked Daily Attendance of 1999 Convention Center Events (Weekdays)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#93	7,015	1/4/99	Monday	Public	Boat Show			
#94	6,728	3/5/99	Friday	Trade	Art Expo			
#95	6,716	10/5/99	Tuesday	Public	Fall Internet World			
#96	6,466	7/14/99	Wednesday	Trade	Fancy Food			
#97	6,354	3/4/99	Thursday	Trade	Art Expo			
#98	6,324	4/29/99	Thursday	Trade	Fashion Fabric	Int'net & Elec Comm		
#99	6,300	2/25/99	Thursday	Trade	I.T. for Wall Street			
#100	5,759	10/4/99	Monday	Trade	NY Fall Textile	Fall Internet World		
#101	5,525	3/15/99	Monday	Trade	Int'l Kids Fashion	Vinisud USA		
#102	5,499	4/19/99	Monday	Trade	Vibe Style			
#103	5,353	8/19/99	Thursday	Trade	Int'l Gift Fair			
#104	5,205	6/28/99	Monday	Trade	Chairman's Address			
#105	5,205	7/20/99	Tuesday	Trade	Merchandise	Law Enforcement		
#106	5,185	1/15/99	Friday	Public	Int'l Motorcycle			
#107	5,056	4/30/99	Friday	Trade	CUNY Job Fair			
#108	5,025	12/16/99	Thursday	Trade	E-Business Expo	Bazaar & Earthweb		
#109	4,878	8/10/99	Tuesday	Trade	Kids Fashion	Music Expo		
#110	4,742	4/16/99	Friday	Trade	Erotica			
#111	4,477	3/16/99	Tuesday	Trade	Int'l Kids Fashion	Vinisud USA		
#112	4,410	6/3/99	Thursday	Trade	China Trade	Living Better Expo	Agriflor	
#113	4,154	12/8/99	Wednesday	Trade	Java Business	Criminal Justice		
#114	4,135	10/21/99	Thursday	Trade	Int'l Fashion Fabric			
#115	4,009	1/20/99	Wednesday	Trade	Retail Federation	Magic East		
#116	3,555	12/7/99	Tuesday	Trade	Java Business			
#117	3,492	2/11/99	Thursday	Trade	Int'l Toy Fair			
#118	3,432	6/4/99	Friday	Trade	Agriflor			
#119	3,290	9/17/99	Friday	Trade	Show Biz Expo	Franchise Expo		
#120	3,205	6/30/99	Wednesday	Trade	Bar Review			
#121	3,147	7/27/99	Tuesday	Trade	NYS Bar Exam			
#122	3,147	7/28/99	Wednesday	Trade	NYS Bar Exam			
#123	3,030	4/15/99	Thursday	Trade	Erotica			
#124	3,005	8/6/99	Friday	Trade	US Immig & Nat.			
#125	3,005	8/26/99	Thursday	Trade	US Immig & Nat.			
#126	3,005	11/12/99	Friday	Trade	Sylvia Browne			
#127	2,304	12/9/99	Thursday	Trade	Java Business	Criminal Justice		
#128	2,259	3/18/99	Thursday	Trade	Int'l Kids Fashion			
#129	2,222	10/1/99	Friday	Trade	NY Fall Textile			
#130	2,208	3/22/99	Monday	Trade	Fashion Boutique			
#131	2,094	4/26/99	Monday	Trade	Buildings NY			
#132	2,005	7/9/99	Friday	Trade	Local 638 Vote			
#133	2,005	8/5/99	Thursday	Trade	Gibbs Graduation			
#134	2,000	9/23/99	Thursday	Trade	Retail Seek			
#135	1,961	3/17/99	Wednesday	Trade	Int'l Kids Fashion			
#136	1,943	1/21/99	Thursday	Trade	Magic East			
#137	1,875	7/19/99	Monday	Trade	Merchandise			
#138	1,835	8/30/99	Monday	Trade	Data Warehousing			
#139	1,805	9/8/99	Wednesday	Trade	Sun Microsystems			
#140	1,769	2/16/99	Tuesday	Trade	Variety Merchandise			
#141	1,546	3/23/99	Tuesday	Trade	Fashion Boutique	Sero Scholarship		
#142	1,535	1/22/99	Friday	Trade	Magic East			
#143	1,505	3/25/99	Thursday	Trade	Mercedes Benz			
#144	1,475	9/9/99	Thursday	Trade	Sun Microsystems			
#145	1,405	9/20/99	Monday	Trade	Yom Kipper Services			
#146	1,385	3/12/99	Friday	Trade	Limo Transpo			
#147	1,078	11/19/99	Friday	Trade	Postage Stamps			
#148	788	6/2/99	Wednesday	Trade	China Trade	Living Better Expo		
#149	600	11/1/99	Monday	Trade	MCS East Meeting			
#150	505	6/1/99	Tuesday	Trade	China Trade			
#151	505	9/29/99	Wednesday	Trade	KW Training			
#152	505	12/3/99	Friday	Trade	Banker's Trust Party			
#153	495	11/2/99	Tuesday	Trade	MCS East Meeting			
#154	487	12/6/99	Monday	Trade	Java Business			
#155	405	3/24/99	Wednesday	Trade	Aging Brain			
#156	405	7/7/99	Wednesday	Trade	KW Training			
#157	380	11/23/99	Tuesday	Trade	America Sings			
#158	380	11/24/99	Wednesday	Trade	America Sings			
#159	255	11/4/99	Thursday	Trade	Javits Masked Ball			
#160	235	6/11/99	Friday	Trade	China Trade Expo			
#161	200	7/2/99	Friday	Trade	Worship Conference			
#162	155	5/11/99	Tuesday	Trade	IAEM Volley Ball			
#163	105	6/18/99	Friday	Trade	Duane Reade			
#164	93	9/3/99	Friday	Trade	Data Warehousing			
#165	65	6/16/99	Wednesday	Trade	The View R4 to R5			
#166	45	5/21/99	Friday	Trade	Sisco Seminar			
#167	30	6/25/99	Friday	Trade	Wolmer's Meeting			
#168	0	1/1/99	Friday					
#169	0	1/13/99	Wednesday					
#170	0	1/14/99	Thursday					
#171	0	1/27/99	Wednesday					
#172	0	1/28/99	Thursday					
#173	0	1/29/99	Friday					
#174	0	2/5/99	Friday					
#175	0	2/8/99	Monday					
#176	0	2/9/99	Tuesday					
#177	0	2/10/99	Wednesday					
#178	0	2/17/99	Wednesday					
#179	0	2/18/99	Thursday					
#180	0	2/19/99	Friday					
#181	0	2/26/99	Friday					
#182	0	3/1/99	Monday					
#183	0	3/2/99	Tuesday					
#184	0	3/3/99	Wednesday					

Table 2: Ranked Daily Attendance of 1999 Convention Center Events (Weekdays)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#185	0	3/10/99	Wednesday					
#186	0	3/11/99	Thursday					
#187	0	3/26/99	Friday					
#188	0	3/29/99	Monday					
#189	0	3/30/99	Tuesday					
#190	0	3/31/99	Wednesday					
#191	0	4/1/99	Thursday					
#192	0	4/2/99	Friday					
#193	0	4/12/99	Monday					
#194	0	4/13/99	Tuesday					
#195	0	4/14/99	Wednesday					
#196	0	4/23/99	Friday					
#197	0	5/7/99	Friday					
#198	0	5/10/99	Monday					
#199	0	5/12/99	Wednesday					
#200	0	5/13/99	Thursday					
#201	0	5/14/99	Friday					
#202	0	5/20/99	Thursday					
#203	0	5/28/99	Friday					
#204	0	5/31/99	Monday					
#205	0	6/7/99	Monday					
#206	0	6/14/99	Monday					
#207	0	6/15/99	Tuesday					
#208	0	6/21/99	Monday					
#209	0	6/29/99	Tuesday					
#210	0	7/1/99	Thursday					
#211	0	7/5/99	Monday					
#212	0	7/6/99	Tuesday					
#213	0	7/8/99	Thursday					
#214	0	7/15/99	Thursday					
#215	0	7/16/99	Friday					
#216	0	7/26/99	Monday					
#217	0	7/29/99	Thursday					
#218	0	7/30/99	Friday					
#219	0	8/11/99	Wednesday					
#220	0	8/12/99	Thursday					
#221	0	8/13/99	Friday					
#222	0	8/20/99	Friday					
#223	0	8/27/99	Friday					
#224	0	9/6/99	Monday					
#225	0	9/7/99	Tuesday					
#226	0	9/10/99	Friday					
#227	0	9/13/99	Monday					
#228	0	9/21/99	Tuesday					
#229	0	9/22/99	Wednesday					
#230	0	9/28/99	Tuesday					
#231	0	9/30/99	Thursday					
#232	0	10/11/99	Monday					
#233	0	10/12/99	Tuesday					
#234	0	10/13/99	Wednesday					
#235	0	10/14/99	Thursday					
#236	0	10/15/99	Friday					
#237	0	10/22/99	Friday					
#238	0	10/25/99	Monday					
#239	0	10/26/99	Tuesday					
#240	0	11/3/99	Wednesday					
#241	0	11/5/99	Friday					
#242	0	11/10/99	Wednesday					
#243	0	11/11/99	Thursday					
#244	0	11/15/99	Monday					
#245	0	11/22/99	Monday					
#246	0	11/25/99	Thursday					
#247	0	11/26/99	Friday					
#248	0	12/2/99	Thursday					
#249	0	12/10/99	Friday					
#250	0	12/13/99	Monday					
#251	0	12/17/99	Friday					
#252	0	12/20/99	Monday					
#253	0	12/21/99	Tuesday					
#254	0	12/22/99	Wednesday					
#255	0	12/23/99	Thursday					
#256	0	12/24/99	Friday					
#257	0	12/27/99	Monday					
#258	0	12/28/99	Tuesday					
#259	0	12/29/99	Wednesday					
#260	0	12/30/99	Thursday					
#261	0	12/31/99	Friday					

Source: Eng-Wong, Taub & Associates, 2003.

12,824	**Average Attendance**
26,550	**85th Percentile Attendance**
167	**Event Days**
94	**Dark Days (Days When No Events Are Scheduled)**

Table 3: Ranked Daily Attendance of 1999 Convention Center Events (Saturdays)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#1	95,707	4/10/99	Saturday	Public	Int'l Auto Show			
#2	86,483	4/3/99	Saturday	Public	Int'l Auto Show			
#3	67,516	1/9/99	Saturday	Public	Boat Show	Fashion Boutique	Style Industrie	
#4	36,821	1/2/99	Saturday	Public	Boat Show			
#5	29,767	9/25/99	Saturday	Trade	Audio Engineering	Nat'l Merchandise	Style Industrie	
#6	28,346	11/6/99	Saturday	Trade	Hotel/Motel/Rest.			
#7	26,939	10/30/99	Saturday	Trade	Photo East Expo '99	NYS Teachers Exam		
#8	23,174	2/13/99	Saturday	Trade	Int'l Toy Fair	Variety Merchandise		
#9	20,314	3/20/99	Saturday	Trade	Int'l Vision Expo	Fashion Boutique		
#10	16,556	12/18/99	Saturday	Trade	Kwanzaa Holiday			
#11	14,766	1/16/99	Saturday	Public	Int'l Motorcycle	NYS Teachers Exam		
#12	14,470	2/20/99	Saturday	Trade	Style Industrie	Church of Christ		
#13	12,517	7/31/99	Saturday	Trade	Style Industrie	Fashion Boutique		
#14	9,811	1/30/99	Saturday	Trade	Int'l Gift Fair			
#15	9,600	3/6/99	Saturday	Trade	Art Expo	Int'l Beauty Show		
#16	9,512	8/14/99	Saturday	Trade	Int'l Gift Fair			
#17	9,365	5/15/99	Saturday	Trade	Contemp Furniture	Italian Style		
#18	8,686	4/17/99	Saturday	Trade	Erotica	Gay & Lesbian Bus.	Teachers Exam	
#19	4,745	6/5/99	Saturday	Trade	Agriflor	Financial Analyst		
#20	4,202	10/16/99	Saturday	Trade	Fashion Boutique			
#21	3,768	10/2/99	Saturday	Trade	NY Fall Textile			
#22	3,733	5/1/99	Saturday	Trade	Style Industrie			
#23	3,519	9/18/99	Saturday	Trade	Show Biz Expo	Franchise Expo		
#24	3,094	11/27/99	Saturday	Trade	Greater NY Dental			
#25	1,360	11/20/99	Saturday	Trade	Postage Stamps			
#26	1,272	3/13/99	Saturday	Trade	Limo Transpo			
#27	855	7/17/99	Saturday	Trade	NYS Teachers Exam			
#28	260	5/22/99	Saturday	Trade	Financial Analyst			
#29	255	1/23/99	Saturday	Trade	NY Special Olympics			
#30	200	7/3/99	Saturday	Trade	Worship Conference			
#31	122	6/12/99	Saturday	Trade	China Trade Expo			
#32	0	2/6/99	Saturday					
#33	0	2/27/99	Saturday					
#34	0	3/27/99	Saturday					
#35	0	4/24/99	Saturday					
#36	0	5/8/99	Saturday					
#37	0	5/29/99	Saturday					
#38	0	6/19/99	Saturday					
#39	0	6/26/99	Saturday					
#40	0	7/10/99	Saturday					
#41	0	7/24/99	Saturday					
#42	0	8/7/99	Saturday					
#43	0	8/21/99	Saturday					
#44	0	8/28/99	Saturday					
#45	0	9/4/99	Saturday					
#46	0	9/11/99	Saturday					
#47	0	10/9/99	Saturday					
#48	0	10/23/99	Saturday					
#49	0	11/13/99	Saturday					
#50	0	12/4/99	Saturday					
#51	0	12/11/99	Saturday					
#52	0	12/25/99	Saturday					

Source: Eng-Wong, Taub & Associates, 2003.

17,669	**Average Attendance**
29,057	**85th Percentile Attendance**
31	**Event Days**
21	**Dark Days (Days When No Events Are Scheduled)**

Table 4: Ranked Daily Attendance of 1999 Convention Center Events (Sundays)

Rank	Estimated Attendance	Date	Day of Week	Show Type	Primary Event(s)			
#1	81,056	4/11/99	Sunday	Public	Int'l Auto Show			
#2	68,202	4/4/99	Sunday	Public	Int'l Auto Show			
#3	56,724	1/31/99	Sunday	Trade	Int'l Gift Fair			
#4	43,369	8/15/99	Sunday	Trade	Int'l Gift Fair			
#5	42,985	1/10/99	Sunday	Public	Boat Show	Fashion Boutique	Style Industrie	Fashion Accessories
#6	36,720	8/1/99	Sunday	Trade	Style Industrie	Fashion Boutique	Fashion Acc. Expo.	JA Jewelry
#7	35,486	5/16/99	Sunday	Trade	Contemp Furniture	Italian Style	Surtex	Nat'l Stationery
#8	29,009	9/26/99	Sunday	Trade	Audio Engineering	Nat'l Merchandise	Style Industrie	
#9	26,163	11/7/99	Sunday	Trade	Hotel/Motel/Rest.			
#10	26,141	3/7/99	Sunday	Trade	Art Expo	Int'l Beauty Show		
#11	22,381	1/24/99	Sunday	Trade	Kids Fashion	JA Jewelry		
#12	19,662	11/28/99	Sunday	Trade	Greater NY Dental			
#13	18,562	2/14/99	Sunday	Trade	Int'l Toy Fair	Variety Merchandise		
#14	18,088	10/17/99	Sunday	Trade	Fashion Boutique	Vibe Style	Kids Fashion	
#15	18,074	1/3/99	Sunday	Public	Boat Show	Church of Christ		
#16	17,068	7/11/99	Sunday	Trade	Fancy Food			
#17	15,904	5/23/99	Sunday	Trade	Fashion Boutique			
#18	14,616	3/21/99	Sunday	Trade	Int'l Vision Expo	Fashion Boutique		
#19	13,981	2/21/99	Sunday	Trade	Style Industrie	NY Rest. & Food		
#20	13,564	12/19/99	Sunday	Trade	Kwanzaa Holiday	Church of Christ		
#21	10,658	4/18/99	Sunday	Trade	Erotica	Gay & Lesbian Bus.	Vibe Style	
#22	9,873	1/17/99	Sunday	Public	Int'l Motorcycle			
#23	8,130	5/2/99	Sunday	Trade	Style Industrie	Fashion Access.		
#24	5,824	3/14/99	Sunday	Trade	Int'l Kids Fashion			
#25	5,510	6/27/99	Sunday	Trade	Church of Christ	Local 638 Vote		
#26	5,218	8/8/99	Sunday	Trade	Kids Fashion			
#27	4,313	10/3/99	Sunday	Trade	NY Fall Textile			
#28	3,255	5/30/99	Sunday	Trade	Church of Christ			
#29	3,005	2/28/99	Sunday	Trade	Church of Christ			
#30	3,005	5/9/99	Sunday	Trade	Church of Christ			
#31	3,005	6/6/99	Sunday	Trade	Church of Christ			
#32	3,005	11/14/99	Sunday	Trade	Church of Christ			
#33	3,005	12/5/99	Sunday	Trade	Penny Harvest			
#34	2,470	7/18/99	Sunday	Trade	Merchandise			
#35	1,005	4/25/99	Sunday	Trade	Childrens Museum			
#36	825	11/21/99	Sunday	Trade	Postage Stamps			
#37	333	9/19/99	Sunday	Trade	Franchise Expo	Yom Kippur Services		
#38	115	7/4/99	Sunday	Trade	Worship Conference			
#39	0	2/7/99	Sunday					
#40	0	3/28/99	Sunday					
#41	0	6/13/99	Sunday					
#42	0	6/20/99	Sunday					
#43	0	7/25/99	Sunday					
#44	0	8/22/99	Sunday					
#45	0	8/29/99	Sunday					
#46	0	9/5/99	Sunday					
#47	0	9/12/99	Sunday					
#48	0	10/10/99	Sunday					
#49	0	10/24/99	Sunday					
#50	0	10/31/99	Sunday					
#51	0	12/12/99	Sunday					
#52	0	12/26/99	Sunday					

Source: Eng-Wong, Taub & Associates, 2003.

18,166	**Average Attendance**
36,041	**85th Percentile Attendance**
38	**Event Days**
14	**Dark Days (Days When No Events Are Scheduled)**

Figure 2: 1999 Convention Center Weekday Attendance

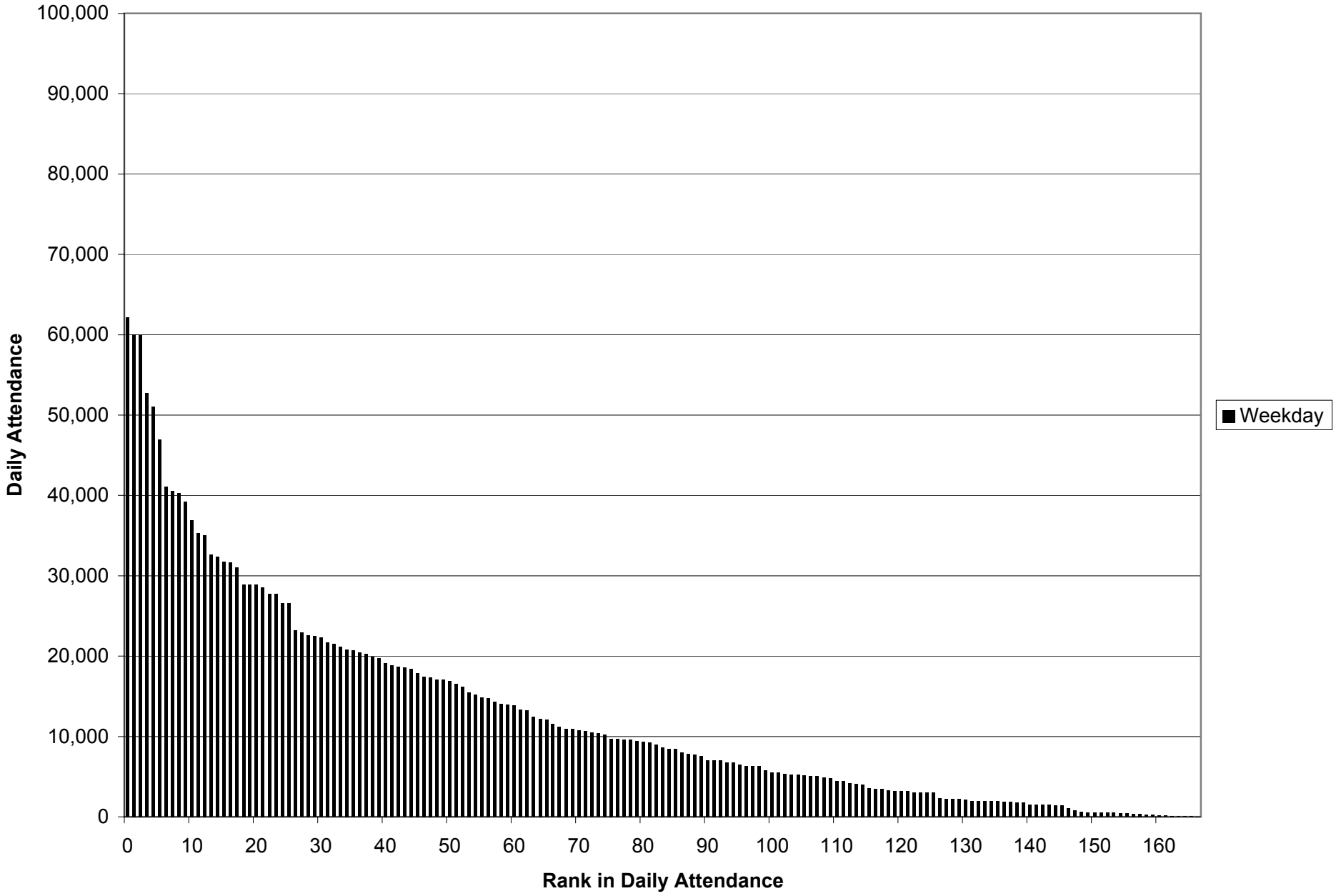
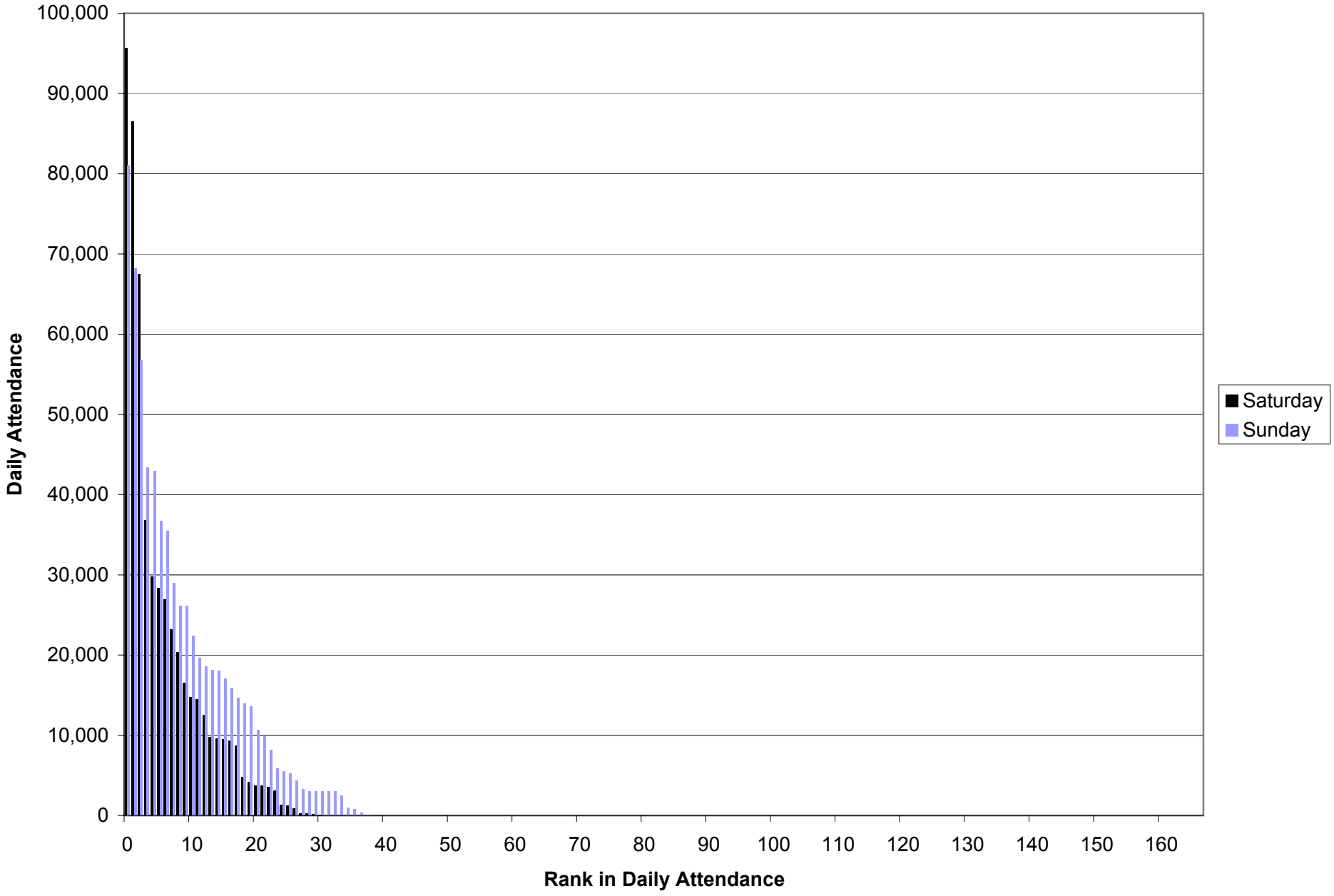


Figure 3: 1999 Convention Center Weekend Attendance



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increased by the methodologies described above (e.g. public show attendances were increased by 15% and trade show attendances were increased by 84%). This methodology is based on the current Convention Center schedule, however the expansion of the Convention Center could allow for greater flexibility in the scheduling of some future events. As an example, events could be open to the public in the existing portion of the facility, while other events could be moving in/out in the expanded portion (in essence reducing the total amount of dark days). Because dark days were not included in the calculation of current 85th percentile attendance, this methodology conservatively assumes the worst-case scenario in that the increased attendance would not be spread over a greater number of days. Table 5 provides a comparison of existing and projected 85th percentile attendance for weekdays, Saturdays, and Sundays. As shown in Table 5, a resulting 65.4% increase in overall daily visitation is expected. Figure 4 contains an overlay of the annual distribution of projected daily attendance over existing daily attendance.

Table 5: Existing and Projected 85th Percentile Daily Attendances

	Existing	Projected	Net Increase (Percent)
Weekday	28,188	43,107[1]	14,919 (+52.9%)
Saturday	30,849	56,763	25,914 (+84.0%)
Sunday	38,265	62,684	24,419 (+63.8%)
Overall	29,945	49,539	19,594 (+65.4%)

Source: Eng-Wong Taub & Associates, 2003. 1999 existing attendances were conservatively increased to account for modest growth experienced in Convention Center between 1999 and 2000 (an overall increase of 6.2%).
Notes: 1. Refer to "Analysis of Concurrent Weekday Convention Event at Multi-Use Facility" below.

For comparative purposes, attendance patterns at the Orange County Convention Center (Orlando, FL) were obtained for 1983-2002, during which time the facility underwent two major expansions (in 1989 and 1996[3]). After both expansions, the size of the exhibition and meeting areas more than doubled, while attendance increased by approximately 45 percent and 60 percent, respectively (see Table 6). Therefore, the projected 65.4% increase of annual visitation at the Javits Convention Center is comparable to the empirical trends observed at the Orange County Convention Center (e.g. overall attendance would not increase in the same proportion as the amount of new expansion space). This trend of increased attendance was also projected for the expansion of the Spokane Convention Center (Spokane, WA) in that size of the facility would be expanded from 120,600 to 293,600 square feet (an increase of 143%) but that future attendance would essentially double.[4]

Analysis of Concurrent Weekday Convention Event at Multi-Use Facility

Subsequent to the publication of the DGEIS, concurrent convention events at the expanded Convention Center and proposed Multi-Use Facility were analyzed to represent the reasonable worst-case scenario for events occurring during the Weekday AM, Midday, and PM peak hours. A weekday trade show at the Multi-Use Facility would be expected to draw an 85th percentile daily attendance of 8,625. Conversely, refinements to the program for the Convention Center expansion have reduced the size of the total expanded exhibition space by approximately 60,000 square feet. For this reason, the projected 85th percentile weekday daily attendance at the expanded Convention Center was reduced from 43,107 to 40,882, resulting in a net total weekday convention event attendance (at both the expanded Convention Center and Multi-Use

[3] Ann Fisher, Orange County Convention Center Marketing-Research, July 15, 2003.
[4] *Spokane Convention Center Expansion Transportation Impact Analysis*, The Transpo Group, January 2003.

Figure 4 - Existing and Projected Convention Center Attendance Patterns

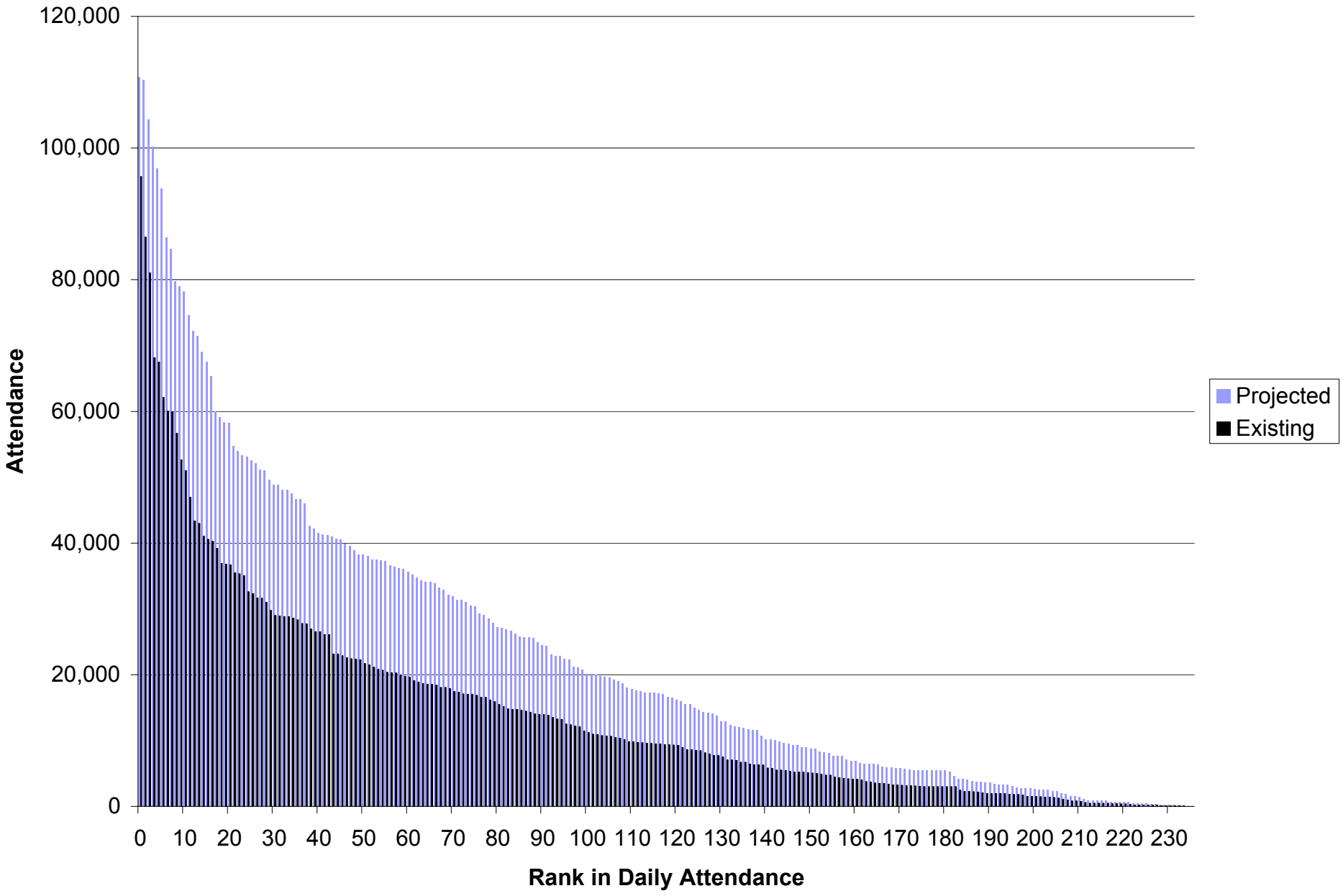

Table 6: Effects of Expansion on Attendance Patterns at Orange County Convention Center

Annual Attendance at the Orange County Convention Center (1983-2002)

Year	Conventions & Tradeshows		Consumer Shows		Banquets		Meetings		Public Ticketed Events		Totals		Average Attendance	Percent Increase	Exhibition and Meeting Area (sf)	Percent Increase
	# of Events	Attendance	# of Events	Attendance	# of Events	Attendance	# of Events	Attendance	# of Events	Attendance	# of Events	Attendance				
1983	12	55,440	6	30,704	23	11,076	58	45,763	30	199,999	**129**	**342,982**	432,946	-	177,113	-
1984	16	163,707	9	61,736	26	10,726	43	37,566	25	187,866	**119**	**461,601**				
1985	23	155,213	16	63,923	22	7,082	45	123,247	29	151,106	**135**	**500,571**				
1986	30	201,560	11	61,569	11	3,944	46	51,151	14	65,584	**112**	**383,808**				
1987	24	145,368	17	118,142	11	7,541	50	24,275	21	134,573	**123**	**429,899**				
1988	34	218,827	15	119,861	12	3,296	94	30,486	15	106,344	**170**	**478,814**				
1989	60	342,770	27	164,400	18	4,820	143	70,757	6	17,867	**254**	**600,614**	628,405	45%	417,969	136%
1990	66	376,973	16	115,555	27	15,153	125	74,198	5	14,171	**239**	**596,050**				
1991	58	314,802	14	139,240	14	6,647	107	84,272	3	24,451	**196**	**569,412**				
1992	66	425,950	12	128,557	11	7,274	80	58,871	8	36,897	**177**	**657,549**				
1993	73	396,218	11	98,367	4	3,460	67	43,010	4	27,900	**159**	**568,955**				
1994	81	499,572	13	126,007	8	5,106	84	51,539	2	23,600	**188**	**705,824**				
1995	82	485,722	15	132,840	2	4,043	68	55,901	1	21,923	**168**	**700,429**				
1996	114	848,911	10	118,171	9	3,827	107	46,770	0	0	**240**	**1,017,679**	1,003,736	60%	1,416,678	239%
1997	121	758,967	6	103,730	7	9,867	119	43,300	7	14,355	**260**	**930,219**				
1998	115	837,611	7	78,665	7	2,832	108	50,864	7	12,394	**244**	**982,366**				
1999	120	891,873	9	97,177	14	7,344	72	22,543	1	4,000	**216**	**1,022,937**				
2000	116	921,247	7	102,790	6	2,881	76	25,228	0	0	**205**	**1,052,146**				
2001	105	702,142	8	107,705	2	2,200	75	25,632	1	4,800	**191**	**842,479**				
2002	90	811,652	10	151,048	1	500	95	47,595	4	6,275	**200**	**1,017,070**				

Source: Orange County Convention Center (Orlando, FL)

Note: Attendance data from 2001 not included in 1996-2002 average.

Previous Expansions of Orange County Convention Center

Construction Phase	Completion Date	Exhibition Space (sf)	Meeting Space (sf)	Total Space (sf)
Phase #1	February 1983	147,510	29,603	177,113
Phase #2 (Expansion)	January 1989	344,790	73,179	417,969
Phase #3 (Expansion)	January 1996	728,190	213,457	941,647
Phase #4 (Expansion)	August 1996	1,095,390	313,140	1,408,530
Phase #1 Retrofit	December 1997	1,103,538	313,140	1,416,678

Source: Orange County Convention Center (Orlando, FL)

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Facility) of 49,507. The same trip generation assumptions contained within this technical memorandum were applied to a weekday convention event at the Multi-Use Facility.

Existing and Projected Convention Center Employment

Table 7 shows the number of existing and projected employees at the Convention Center. The travel demand associated with full-time workers (those working standard day shifts) will be assumed to be similar to those of other office workers in the rezoning area and will therefore be projected based on the methodologies contained within the Office Trip Generation Transportation Planning Assumptions Technical Memorandum[5]. The travel demand associated with all other Convention Center employees (mainly temporary workers) will be based on recent travel surveys completed by Convention Center event staff, which is described in more detail in the following section.

Table 7: Existing and Projected Convention Center Employees

Type	Existing	Projected	Net Increase
Full-time	150	200	50
Temporary	970	1,470	500
Contractors	107	142	35
Totals	**1,227**	**1,812**	**585**

Source: Hellmuth, Obata, and Kassabaum, 2003.

Convention Center Travel Surveys

Because existing travel pattern data for the Convention Center are limited, detailed travel surveys were conducted by Eng-Wong Taub & Associates (EWT) at a public show on Sunday, April 27, 2003 (the New York International Auto Show) and at a combination of trade shows on Tuesday, May 6, 2003 (Industry 212 incorporating Femme, Accessories the Show/MODA Manhattan, and Lightfair)[6]. The two surveys included manual door counts (to determine the overall variation of temporal distributions throughout the day) and visitor surveys (to determine trip origins and destinations, mode of travel, durations of visits, and travel patterns specific to both attendees and exhibitors). Survey forms were also completed by event staff,[7] which make up a sizeable portion of the total Convention Center employment (as shown in Table 7).

Trip Origins and Destinations

Table 8 shows the origins and destinations of Convention Center attendees, exhibitors, and event staff for both the weekend public show and weekday trade shows, which were obtained from interviews as part of the EWT surveys. As shown in Table 8, attendee departures from the weekend public show to Manhattan were substantially higher than attendee arrivals from Manhattan. This variation can be explained by the large percentage of attendees that went sightseeing or to restaurants following the event (this is illustrated by Table 9, which lists the pre- and post- event activities of Convention Center attendees, exhibitors, and event staff). In contrast, most trip destinations of exhibitors in the weekend public show were consistent with their origins. For the weekday trade shows, there were only slightly more attendees and

[5] Assuming 250 square feet of floor space per office employee.
[6] *Jacob K. Javits Convention Center Expansion Study*, Technical Memorandum Travel Surveys, Eng-Wong Taub & Associates, May 15, 2003
[7] These workers included cleaning service personnel, food service personnel, and carpenters.

exhibitors with Manhattan destinations compared
to origins, as most trips occurred between homes, hotels, and offices. It should be noted that Table 8 does not include separate origins and destinations for event staff; the arrival and departure activities of event staff listed in Table 9 are generally the same and predominantly involve trips to/from homes.

Temporal Distributions

Table 10 summarizes existing temporal distribution patterns based on the EWT surveys for both the weekend public show and the weekday trade shows. As shown in Table 10, temporal distributions for attendees, exhibitors, and event staff were obtained from interviews; overall temporal distributions for all users were obtained from door counts. The overall temporal distributions correlate well with the temporal distributions of attendees; attendees accounted for 99.3% of the total visitors (the remaining 0.7% were exbibitors) at the public show and attendees accounted for 81.4% of the total visitors (18.6% were exhibitors) at weekday trade shows[8]. The overall temporal distributions for the weekend public show and weekday trade shows are plotted in Figure 5. This figure indicates that the temporal distributions for the weekend public show tended to peak during the 3-5 PM period, while trips associated with the weekday trade shows are more evenly spread over the course of the day.

To verify that the surveyed temporal distributions were representative of typical public and trade shows at the Convention Center, the starting and ending times of all events in 1999 were reviewed. Weekday trade shows typically start at 9 AM or 10 AM and end at 4 PM, 5 PM, or 6 PM (it is not uncommon for a combination of simultaneous events to start/end at different times). Similarly, most weekend public shows start between 8 AM and 10 AM and end at 5 PM or 6 PM.

The analysis of travel demand associated with Convention Center trade shows will focus on the weekday 8-9 AM, 12-1 PM, and 5-6 PM periods. As shown in Figure 5, these time periods generally correlate with the peaks in the weekday overall temporal distributions at the Convention Center.[9] These peak periods also represent the worst-case scenario for the combined effects of incremental travel demand associated with the Convention Center and primary land use components of the adjacent Hudson Yards development (e.g. office, residential, and hotel) when applied to the existing peak periods of background traffic volumes.

For analysis purposes, projected trips to/from the Convention Center will be calculated separately for attendees, exhibitors, and event staff based on the temporal distributions obtained from the EWT interviews (also shown in Table 10). This methodology will allow for a more accurate projection of overall trips to the Convention Center because characteristics such as origin/destinations, travel modes, and average vehicle occupancy vary among the different types of visitors and employees. As a conservative measure, the sharp peak in departures of exhibitors from the weekday trade shows during the 6-7 PM period (a temporal distribution of 30.1%) will be assumed to occur during the 5-6 PM peak hour (in place of a temporal distribution of 5.4%.)

It was determined that the worst-case scenario for weekend trips would result from a combination of trips from the Convention Center and arrivals or departures from a Sunday

[8] The split between attendees and exhibitors at the surveyed events was provided by Convention Center management.

[9] The review of 1999 Convention Center event starting times indicated that a greater number of weekday trade shows begin at 10 AM compared to 9 AM. For this reason, it is logical for weekday arrivals to the Convention Center to be concentrated during the 9-10 AM period.

Table 8: Regional Origins and Destinations of Convention Center Attendees, Exhibitors, and Event Staff

WEEKEND PUBLIC SHOW

	Attendees		Exhibitors		Event Staff
Region	**Origin**	**Destination**	**Origin**	**Destination**	**Origin/Destination**
Staten Island	2.5%	1.6%	2.2%	1.7%	0.0%
Manhattan	12.5%	43.7%	48.1%	48.6%	22.2%
Bronx	6.7%	3.8%	3.8%	2.8%	24.4%
Brooklyn	15.2%	9.8%	23.5%	22.9%	22.2%
Queens	19.0%	12.2%	3.8%	5.6%	22.2%
Long Island	7.1%	4.0%	1.6%	1.7%	4.4%
Westchester and Upstate (East of Hudson)	5.8%	3.6%	1.6%	1.7%	0.0%
Rockland and Upstate (West of Hudson)	2.8%	1.9%	1.1%	1.7%	2.2%
Northern New Jersey	21.2%	14.7%	13.1%	11.7%	2.2%
Southern New Jersey	1.3%	0.8%	0.0%	1.1%	0.0%
Connecticut and New England	5.8%	4.0%	1.1%	0.6%	0.0%
Totals	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Eng-Wong Taub & Associates, 2003

WEEKDAY TRADE SHOWS

	Attendees		Exhibitors		Event Staff
Region	Origin	Destination	Origin	Destination	Origin/Destination
Staten Island	0.5%	0.0%	0.3%	0.0%	15.2%
Manhattan	60.5%	68.6%	71.4%	76.2%	9.1%
Bronx	1.0%	0.8%	0.0%	0.0%	9.1%
Brooklyn	5.1%	3.6%	1.3%	1.4%	21.2%
Queens	9.1%	8.8%	5.9%	4.8%	12.1%
Long Island	2.7%	1.5%	2.0%	1.7%	6.1%
Westchester and Upstate (East of Hudson)	2.9%	2.6%	2.3%	2.4%	3.0%
Rockland and Upstate (West of Hudson)	2.7%	1.8%	1.6%	1.7%	9.1%
Northern New Jersey	10.8%	9.0%	11.9%	8.3%	15.2%
Southern New Jersey	1.2%	0.5%	0.6%	1.0%	0.0%
Connecticut and New England	3.4%	2.8%	2.6%	2.4%	0.0%
Totals	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Eng-Wong Taub & Associates, 2003

Table 9: Pre- and Post- Event Activities of Convention Center Attendees, Exhibitors, and Event Staff

WEEKEND PUBLIC SHOW

	Attendees		Exhibitors		Event Staff	
Activity	**Arrival**	**Departure**	**Arrival**	**Departure**	**Arrival**	**Departure**
Home	95%	58%	53%	40%	96%	96%
Work	1%	1%	0%	2%	4%	4%
Hotel	1%	0%	41%	38%	0%	0%
Restaurant	0%	24%	0%	2%	0%	0%
Sightseeing	0%	8%	0%	12%	0%	0%
Other	3%	9%	5%	7%	0%	0%
Total	100%	100%	100%	100%	100%	100%

Source: Eng-Wong Taub & Associates, 2003

WEEKDAY TRADE SHOWS

	Attendees		Exhibitors		Event Staff	
Activity	**Arrival**	**Departure**	**Arrival**	**Departure**	**Arrival**	**Departure**
Home	37%	32%	24%	20%	100%	100%
Work	18%	14%	7%	9%	0%	0%
Hotel	36%	26%	61%	53%	0%	0%
Restaurant	0%	10%	0%	12%	0%	0%
Sightseeing	0%	3%	0%	1%	0%	0%
Other	7%	16%	8%	6%	0%	0%
Total	100%	100%	100%	100%	100%	100%

Source: Eng-Wong Taub & Associates, 2003

Table 10: Temporal Distributions from 2003 Convention Center Surveys

WEEKEND PUBLIC SHOW

	Person Interviews									*Manual Door Counts*		
	Attendees			**Exhibitors**			**Event Staff**			**Overall (All Users)**		
Time Period	**In**	**Out**	**Temporal Distribution**	**In**	**Out**	**Temporal Distribution**	**In**	**Out**	**Temporal Distribution**	**In**	**Out**	**Temporal Distribution**
12:00 AM - 1:00 AM				0%	100%	0.3%	0%	100%	9.5%			
1:00 AM - 2:00 AM												
2:00 AM - 3:00 AM												
3:00 AM - 4:00 AM												
4:00 AM - 5:00 AM				0%	100%	0.3%						
5:00 AM - 6:00 AM				100%	0%	0.5%	100%	0%	3.2%			
6:00 AM - 7:00 AM				100%	0%	2.2%	100%	0%	16.0%			
7:00 AM - 8:00 AM				98%	2%	14.7%	100%	0%	10.6%			
8:00 AM - 9:00 AM				100%	0%	11.7%	100%	0%	6.4%	75%	25%	0.1%
9:00 AM - 10:00 AM	100%	0%	0.8%	97%	3%	21.2%	100%	0%	3.2%	91%	9%	1.3%
10:00 AM - 11:00 AM	98%	2%	7.8%	66%	34%	0.8%	100%	0%	1.1%	96%	4%	3.8%
11:00 AM - 12:00 PM	81%	19%	8.7%	0%	100%	0.3%	47%	53%	2.3%	86%	14%	5.6%
12:00 PM - 1:00 PM	68%	32%	8.6%	0%	100%	0.3%				71%	29%	8.9%
1:00 PM - 2:00 PM	57%	43%	9.0%	0%	100%	0.3%				64%	36%	12.0%
2:00 PM - 3:00 PM	45%	55%	11.5%	0%	100%	1.1%	18%	82%	5.8%	52%	48%	13.1%
3:00 PM - 4:00 PM	48%	52%	12.2%	0%	100%	1.9%	44%	56%	17.0%	50%	50%	14.4%
4:00 PM - 5:00 PM	52%	48%	13.2%	0%	100%	1.9%	0%	100%	11.9%	41%	59%	13.8%
5:00 PM - 6:00 PM	36%	64%	13.0%	0%	100%	12.5%	0%	100%	1.2%	31%	69%	12.0%
6:00 PM - 7:00 PM	5%	95%	15.2%	0%	100%	5.8%	0%	100%	9.5%	14%	86%	10.4%
7:00 PM - 8:00 PM				0%	100%	8.9%				5%	95%	4.6%
8:00 PM - 9:00 PM				0%	100%	6.1%	0%	100%	1.2%			
9:00 PM - 10:00 PM				0%	100%	2.8%						
10:00 PM - 11:00 PM				0%	100%	2.8%						
11:00 PM - 12:00 AM				0%	100%	3.6%	0%	100%	1.2%			
Totals			**100.0%**			**100.0%**			**100.0%**			**100.0%**

Source: Eng-Wong Taub & Associates (2003)

WEEKDAY TRADE SHOWS

	Person Interviews									*Manual Door Counts*		
	Attendees			**Exhibitors**			**Event Staff**			**Overall (All Users)**		
Time Period	**In**	**Out**	**Temporal Distribution**	**In**	**Out**	**Temporal Distribution**	**In**	**Out**	**Temporal Distribution**	**In**	**Out**	**Temporal Distribution**
12:00 AM - 1:00 AM				100%	0%	0.2%						
1:00 AM - 2:00 AM							0%	100%	22.7%			
2:00 AM - 3:00 AM												
3:00 AM - 4:00 AM												
4:00 AM - 5:00 AM												
5:00 AM - 6:00 AM												
6:00 AM - 7:00 AM				100%	0%	4.0%	100%	0%	1.5%			
7:00 AM - 8:00 AM	100%	0%	1.0%	100%	0%	11.6%				91%	9%	0.7%
8:00 AM - 9:00 AM	100%	0%	5.5%	96%	4%	18.7%				95%	5%	6.3%
9:00 AM - 10:00 AM	100%	0%	8.3%	94%	6%	5.3%				91%	9%	10.5%
10:00 AM - 11:00 AM	97%	3%	13.4%	83%	17%	7.6%				84%	16%	8.3%
11:00 AM - 12:00 PM	93%	7%	6.9%	89%	11%	2.9%				72%	28%	7.7%
12:00 PM - 1:00 PM	73%	27%	7.1%	66%	34%	1.5%				55%	45%	9.1%
1:00 PM - 2:00 PM	54%	46%	4.9%	49%	51%	1.0%	100%	0%	4.5%	53%	47%	9.5%
2:00 PM - 3:00 PM	44%	56%	9.3%	33%	67%	1.0%	100%	0%	1.5%	46%	54%	9.5%
3:00 PM - 4:00 PM	20%	80%	7.7%	17%	83%	3.8%	100%	0%	25.8%	37%	63%	8.8%
4:00 PM - 5:00 PM	16%	84%	10.7%	5%	95%	3.1%	100%	0%	9.1%	32%	68%	9.2%
5:00 PM - 6:00 PM	3%	97%	12.7%	0%	100%	5.4%	83%	17%	9.1%	15%	85%	10.5%
6:00 PM - 7:00 PM	1%	99%	11.7%	0%	100%	30.1%				5%	95%	9.9%
7:00 PM - 8:00 PM	0%	100%	0.6%	0%	100%	2.5%						
8:00 PM - 9:00 PM	0%	100%	0.1%	0%	100%	1.2%						
9:00 PM - 10:00 PM				0%	100%	0.3%	0%	100%	10.6%			
10:00 PM - 11:00 PM							0%	100%	12.1%			
11:00 PM - 12:00 AM							0%	100%	3.0%			
Totals			**100.0%**			**100.0%**			**100.0%**			**100.0%**

Source: Eng-Wong Taub & Associates (2003)

afternoon football game at the proposed adjacent multi-use facility. The four peak periods generated by the proposed multi-use facility would be:

- 12-1 PM (arrivals associated with a 1 PM football game);
- 3-4 PM (arrivals associated with the 4 PM football game);
- 4-5 PM (departures associated with a 1 PM football game); and
- 7-8 PM (departures associated with a 4 PM football game).

As evidenced in Figure 5, the 12-1 PM and 7-8 PM time periods would not constitute the worst-case scenarios given the significantly lower temporal distributions of Convention Center trips during these time periods compared its 3-4 PM peak hour. According to travel forecast projections for the multi-use facility, that post-game departures would be substantially more peaked than pre-game arrivals; there would be approximately 9,000 more total person trips during the 4-5 PM period compared to the 3-4 PM period.[10] Although the overall door counts at the Convention Center showed a slightly higher temporal distribution of trips from 3-4 PM (14.4%) compared to 4-5 PM (13.8%), a preliminary trip generation analysis of incremental travel demand calculated separately for attendees, exhibitors, and event staff (using the data from Tables 5, 7, and 10) shows that there would be approximately 400 more total person trips during the 4-5 PM period compared to the 3-4 PM period. Therefore, since both the proposed Convention Center expansion and the proposed multi-use facility would generate a greater amount of trips during the 4-5 PM period compared to the 3-4 PM period, the 4-5 PM period has been selected as the worst-case scenario for analysis.

Existing Modal Splits

Separate modal splits will be utilized to forecast travel demand associated with Convention Center attendees, exhibitors, and event staff, akin to the method that will be used for temporal distributions. The EWT surveys included separate arrival and departure modal splits due to the tendency for people to arrive by one mode of travel and leave by another. Tables 11 and 12 show existing arrival/departure modal splits by region for the weekend public show and the weekday trade shows, respectively. These tables also include the weighted average modal splits, which were calculated by applying the respective origins and destinations (listed in Table 8) to the regional modal splits. Although slight differences in modal splits were observed for arrivals and departures (such as an increase in departures by the walk mode and a decrease in departures by the taxi mode), the variations in the weighted average modal splits for arrivals and departures are primarily a function of the increased amount of Manhattan destinations compared to origins. It should be noted that separate arrival and departure modal splits by region were not included for event staff because they were nearly identical. Based on the results of the EWT travel surveys, the traffic assignments for auto trips will include the following percentages of passengers being dropped off adjacent to the Convention Center:

- 4% of auto trips for attendees at the weekend public show;
- 2% of auto trips for exhibitors at the weekend public show; and
- 6% of auto trips for both attendees and exhibitors at the weekday trade shows.

Projected Modal Splits with the No. 7 Subway Extension

The existing modal splits obtained from the EWT surveys will be utilized to project incremental travel demand in the 2010 condition with only the Convention Center expansion. In order to forecast future travel patterns for the 2010 condition with the proposed action (which includes the No. 7 subway extension), several assumptions were made to reflect the increased access to transit services. It is anticipated that 34% of both the existing auto and taxi users would shift to

[10] This projection was included as part of the Multi-Use Facility Transportation Planning Assumptions Technical Memorandum (October 10, 2003).

Figure 5: Overall Temporal Distributions of Arrivals/Departures to Convention Center

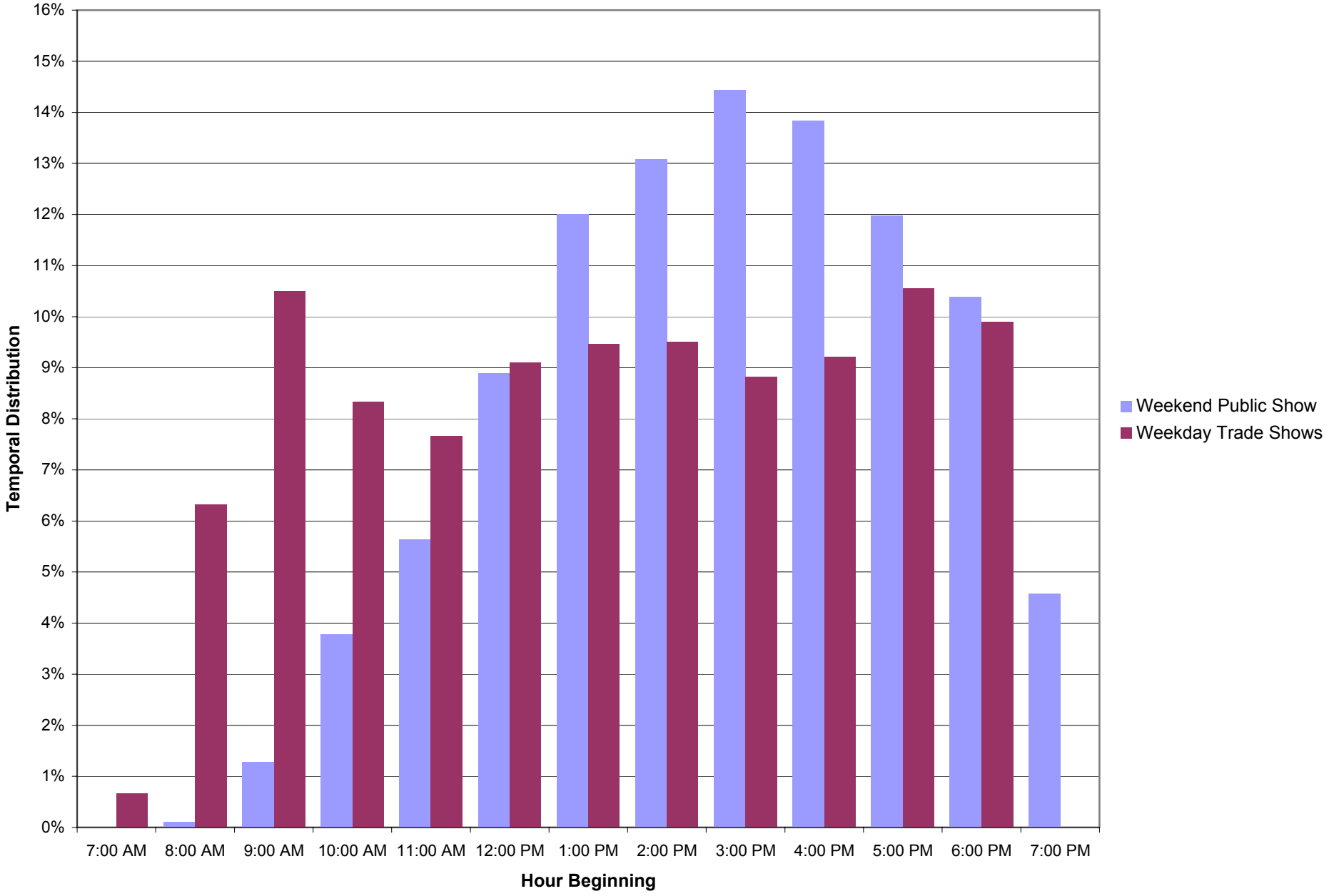

Table 11: 2003 Existing Convention Center Modal Splits for Weekend Public Show

PART A: ATTENDEE ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	64.7%									29.4%	-			5.9%			**100.0%**
Manhattan	27.4%	26.2%								20.2%	-	3.6%		1.2%		21.4%	**100.0%**
Brooklyn	41.2%	2.0%								52.9%	-	3.9%					**100.0%**
Bronx	60.0%									40.0%	-						**100.0%**
Queens	51.6%	0.8%			0.8%	10.2%				33.6%	-	2.3%		0.8%			**100.0%**
Long Island	52.1%					47.9%					-						**100.0%**
Westchester and Upstate (East of Hudson)	65.9%						34.1%				-						**100.0%**
Rockland and Upstate (West of Hudson)	69.2%	7.7%		7.7%				15.4%			-						**100.0%**
Northern New Jersey	59.2%	2.1%		1.4%				12.7%	15.5%		-		4.2%		4.9%		**100.0%**
Southern New Jersey	44.4%							33.3%	22.2%		-						**100.0%**
Connecticut and New England	60.5%	2.3%					32.6%	4.7%			-						**100.0%**
Weighted Average	**52.9%**	**4.3%**	**0.0%**	**0.5%**	**0.1%**	**5.3%**	**3.9%**	**3.8%**	**3.6%**	**19.3%**	**-**	**1.2%**	**0.9%**	**0.4%**	**1.0%**	**2.7%**	**100.0%**

PART B: ATTENDEE DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	80.0%									10.0%	-			10.0%			**100.0%**
Manhattan	28.0%	12.2%								11.0%	-	0.8%		0.4%		47.6%	**100.0%**
Brooklyn	45.2%	1.6%								51.6%	-	1.6%					**100.0%**
Bronx	66.7%									33.3%	-						**100.0%**
Queens	49.4%	2.6%				11.7%				33.8%	-	2.6%					**100.0%**
Long Island	53.8%					46.2%					-						**100.0%**
Westchester and Upstate (East of Hudson)	66.7%						33.3%				-						**100.0%**
Rockland and Upstate (West of Hudson)	80.0%			10.0%				10.0%			-						**100.0%**
Northern New Jersey	54.3%	2.2%		2.2%	3.3%			12.0%	16.3%		-		2.2%		7.6%		**100.0%**
Southern New Jersey	40.0%							40.0%	20.0%		-						**100.0%**
Connecticut and New England	67.9%						28.6%	3.6%			-						**100.0%**
Weighted Average	**44.8%**	**6.0%**	**0.0%**	**0.5%**	**0.5%**	**3.2%**	**2.3%**	**2.4%**	**2.6%**	**14.3%**	**-**	**0.7%**	**0.3%**	**0.3%**	**1.1%**	**20.8%**	**100.0%**

PART C: EXHIBITOR ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	100.0%										-						**100.0%**
Manhattan	3.4%	61.4%								9.1%	-					26.1%	**100.0%**
Brooklyn	30.2%		55.8%							11.6%	-	2.3%					**100.0%**
Bronx	28.6%									28.6%	-	28.6%		14.3%			**100.0%**
Queens	42.9%	14.3%								14.3%	-	28.6%					**100.0%**
Long Island	33.3%					66.7%					-						**100.0%**
Westchester and Upstate (East of Hudson)	75.0%						25.0%				-						**100.0%**
Rockland and Upstate (West of Hudson)	100.0%										-						**100.0%**
Northern New Jersey	62.5%			4.2%				4.2%	8.3%		-				20.8%		**100.0%**
Southern New Jersey	100.0%										-						**100.0%**
Connecticut and New England	100.0%										-						**100.0%**
Weighted Average	**25.5%**	**30.1%**	**2.1%**	**0.5%**	**0.0%**	**1.1%**	**0.4%**	**0.5%**	**1.1%**	**12.1%**	**-**	**7.9%**	**0.0%**	**3.4%**	**2.7%**	**12.6%**	**100.0%**

PART D: EXHIBITOR DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	100.0%										-						**100.0%**
Manhattan		54.0%								9.2%	-	2.3%				34.5%	**100.0%**
Brooklyn	26.8%		58.5%							12.2%	-	2.4%					**100.0%**
Bronx	20.0%									20.0%	-	40.0%		20.0%			**100.0%**
Queens	60.0%	20.0%				10.0%					-	10.0%					**100.0%**
Long Island	33.3%					66.7%					-						**100.0%**
Westchester and Upstate (East of Hudson)	75.0%						25.0%				-						**100.0%**
Rockland and Upstate (West of Hudson)	100.0%										-						**100.0%**
Northern New Jersey	66.7%							4.8%	9.5%		-				19.0%		**100.0%**
Southern New Jersey	50.0%			50.0%							-						**100.0%**
Connecticut and New England	100.0%										-						**100.0%**
Weighted Average	**22.8%**	**27.4%**	**1.6%**	**0.6%**	**0.0%**	**1.7%**	**0.4%**	**0.6%**	**1.1%**	**9.4%**	**-**	**10.9%**	**0.0%**	**4.6%**	**2.2%**	**16.8%**	**100.0%**

PART E: EVENT STAFF ARRIVAL/DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	100.0%										-						**100.0%**
Manhattan										42.9%	-	50.0%		7.1%			**100.0%**
Brooklyn	10.0%									30.0%	-	60.0%					**100.0%**
Bronx	55.6%										-	44.4%					**100.0%**
Queens	10.0%					20.0%				20.0%	-	50.0%					**100.0%**
Long Island						100.0%					-						**100.0%**
Westchester and Upstate (East of Hudson)	100.0%										-						**100.0%**
Rockland and Upstate (West of Hudson)	100.0%										-						**100.0%**
Northern New Jersey											-				100.0%		**100.0%**
Southern New Jersey	100.0%										-						**100.0%**
Connecticut and New England	100.0%										-						**100.0%**
Weighted Average	**19.2%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**8.9%**	**0.0%**	**0.0%**	**0.0%**	**21.3%**	**-**	**46.8%**	**0.0%**	**1.6%**	**2.2%**	**0.0%**	**100.0%**

Source: Eng-Wong Taub & Associates, 2003

Table 12: 2003 Existing Convention Center Modal Splits for Weekday Trade Shows

PART A: ATTENDEE ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island	100.0%										-						100.0%
Manhattan	2.0%	51.8%		0.8%	11.3%				0.4%	7.3%	-	4.0%		7.3%		15.0%	100.0%
Brooklyn	28.6%	4.8%								42.9%	-	23.8%					100.0%
Bronx							25.0%			25.0%	-	50.0%					100.0%
Queens	21.2%	21.2%				21.2%				27.3%	-	9.1%					100.0%
Long Island	36.4%	9.1%			9.1%	45.5%					-						100.0%
Westchester and Upstate (East of Hudson)	58.3%						41.7%				-						100.0%
Rockland and Upstate (West of Hudson)	40.0%	10.0%	10.0%					30.0%	10.0%		-						100.0%
Northern New Jersey	40.9%	9.1%	2.3%	2.3%				9.1%	20.5%		-		9.1%		6.8%		100.0%
Southern New Jersey	60.0%							20.0%			-				20.0%		100.0%
Connecticut and New England	47.6%			19.0%			19.0%	14.3%			-						100.0%
Weighted Average	**14.5%**	**34.8%**	**0.5%**	**1.4%**	**7.1%**	**3.1%**	**3.2%**	**2.5%**	**2.7%**	**8.6%**	**-**	**6.1%**	**1.0%**	**4.4%**	**1.0%**	**9.1%**	**100.0%**

PART B: ATTENDEE DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island	100.0%										-						100.0%
Manhattan	4.5%	47.3%		0.8%	15.9%				0.4%	4.2%	-	3.0%		4.9%		18.9%	100.0%
Brooklyn	21.4%	7.1%								42.9%	-	28.6%					100.0%
Bronx							33.3%				-	66.7%					100.0%
Queens	18.8%	21.9%				12.5%				31.3%	-	12.5%		3.1%			100.0%
Long Island	37.5%				12.5%	50.0%					-						100.0%
Westchester and Upstate (East of Hudson)	70.0%						30.0%				-						100.0%
Rockland and Upstate (West of Hudson)	40.0%		20.0%					40.0%			-						100.0%
Northern New Jersey	40.0%		2.9%	2.9%	2.9%			17.1%	28.6%		-		2.9%		2.9%		100.0%
Southern New Jersey	100.0%										-						100.0%
Connecticut and New England	50.0%			22.2%			16.7%	11.1%			-						100.0%
Weighted Average	**13.6%**	**34.4%**	**0.6%**	**1.4%**	**11.4%**	**1.9%**	**2.4%**	**2.6%**	**2.8%**	**5.9%**	**-**	**5.8%**	**0.3%**	**3.6%**	**0.3%**	**13.0%**	**100.0%**

PART C: EXHIBITOR ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island					100.0%						-						100.0%
Manhattan	3.2%	63.0%			16.2%				0.5%	3.7%	-	0.5%		0.9%		12.0%	100.0%
Brooklyn	25.0%									75.0%	-						100.0%
Bronx	100.0%										-						100.0%
Queens	11.8%	47.1%			5.9%					17.6%	-			11.8%		5.9%	100.0%
Long Island						83.3%					-	16.7%					100.0%
Westchester and Upstate (East of Hudson)	57.1%						42.9%				-						100.0%
Rockland and Upstate (West of Hudson)	50.0%							50.0%			-						100.0%
Northern New Jersey	35.1%	16.2%			2.7%			10.8%	21.6%		-		2.7%		10.8%		100.0%
Southern New Jersey	50.0%							50.0%			-						100.0%
Connecticut and New England	60.0%						30.0%	10.0%			-						100.0%
Weighted Average	**12.5%**	**49.7%**	**0.0%**	**0.0%**	**12.6%**	**1.6%**	**1.8%**	**2.7%**	**2.9%**	**3.7%**	**-**	**0.7%**	**0.3%**	**1.4%**	**1.3%**	**8.9%**	**100.0%**

PART D: EXHIBITOR DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island					100.0%						-						100.0%
Manhattan	7.7%	50.0%			20.5%					1.8%	-			2.7%		17.3%	100.0%
Brooklyn	25.0%									75.0%	-						100.0%
Bronx	100.0%										-						100.0%
Queens	15.4%	53.8%				7.7%				15.4%	-			7.7%			100.0%
Long Island	20.0%					80.0%					-						100.0%
Westchester and Upstate (East of Hudson)	57.1%						42.9%				-						100.0%
Rockland and Upstate (West of Hudson)	20.0%			20.0%	20.0%			40.0%			-						100.0%
Northern New Jersey	37.5%	8.3%			4.2%			16.7%	16.7%		-		4.2%		12.5%		100.0%
Southern New Jersey	33.3%							33.3%	33.3%		-						100.0%
Connecticut and New England	37.5%						50.0%	12.5%			-						100.0%
Weighted Average	**14.4%**	**41.4%**	**0.0%**	**0.3%**	**16.3%**	**1.8%**	**2.2%**	**2.7%**	**1.7%**	**2.1%**	**-**	**0.0%**	**0.3%**	**2.4%**	**1.0%**	**13.2%**	**100.0%**

PART E: EVENT STAFF ARRIVAL/DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island	20.0%									40.0%	-	40.0%					100.0%
Manhattan										66.7%	-					33.3%	100.0%
Brooklyn	28.6%									14.3%	-	57.1%					100.0%
Bronx										33.3%	-	33.3%		33.3%			100.0%
Queens	25.0%					25.0%				50.0%	-						100.0%
Long Island	50.0%					50.0%					-						100.0%
Westchester and Upstate (East of Hudson)	100.0%										-						100.0%
Rockland and Upstate (West of Hudson)	100.0%										-						100.0%
Northern New Jersey	60.0%										-				40.0%		100.0%
Southern New Jersey	100.0%										-						100.0%
Connecticut and New England	100.0%										-						100.0%
Weighted Average	**32.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**6.1%**	**0.0%**	**0.0%**	**0.0%**	**26.6%**	**-**	**18.3%**	**0.0%**	**7.1%**	**6.1%**	**3.0%**	**100.0%**

Source: Eng-Wong Taub & Associates, 2003

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the extended No. 7 subway line[11]. This primary assumption is based on the ratio of auto modal splits from 1990 US Census reverse journey-to-work data in the Convention Center and Hudson Yards Development area (16.3%) compared to the Midtown Manhattan area (10.7%)[12]. It was also assumed that other types of existing transit trips destined for the Convention Center would be diverted to the No. 7 subway extension, including all Metro-North riders (which would switch to the No. 7 line at Grand Central Terminal), approximately half of the subway riders (which would switch to the No. 7 line at the Times Square, Fifth Avenue, and Grand Central stations), and approximately half of bus riders (including subway riders that currently transfer to the M34 or M42 buses). Tables 13 and 14 show projected 2010 arrival/departure modal splits by region with the No. 7 subway extension for the weekend public show and the weekday trade shows, respectively.

Because the LIRR East Side Access project is not expected to be completed until 2012, it will not be included as part of the 2010 analyses. Without LIRR access to Grand Central Terminal, it is assumed that all LIRR riders would continue to travel to/from Penn Station. However, for the 2025 condition with the proposed action (including the No. 7 subway extension), it is assumed that a portion of LIRR riders that currently use Penn Station would instead travel to Grand Central Terminal and utilize the No. 7 subway extension for direct access to the Convention Center. For the weekend public show, it is assumed that approximately 50% of LIRR riders would utilize the No. 7 line; for the weekday trade shows, it is assumed that approximately 40% of LIRR riders would utilize the No. 7 line[13]. Tables 15 and 16 show projected 2025 arrival/departure modal splits by region with both the No. 7 subway extension and LIRR East Side Access project, for the weekend public show and weekday trade shows, respectively.

Vehicle Occupancy

Table 17 shows the vehicle occupancies that will be utilized for attendees, exhibitors, and event staff for the weekend public show and weekday trade shows. The vehicle occupancies in Table 17 are based on the results of the EWT surveys.

Truck Trip Generation and Marshalling

The proposed Convention Center expansion would generate additional truck trips and require added space for truck marshalling. As part of the expansion, a new marshalling facility is proposed to be constructed in the area of the existing marshalling yard, on the block bounded by Eleventh Avenue, Route 9A (Twelfth Avenue), West 33rd Street, and West 34th Street. Arriving trucks would enter the marshalling facility from Route 9A, where they would be processed, security screened, and directed to a specific waiting space or available loading dock. Trucks would proceed from the marshalling facility to the two levels of loading docks via an underground tunnel that would run beneath Eleventh Avenue and West 41st Street. This particular truck circulation pattern would be entirely contained within the marshalling facility and would not utilize local streets. Some trucks would also be able to utilize the existing truck queuing lane along Route 9A between West 34th and West 39th Streets, from which they could enter both levels of loading docks via an entrance on West 41st Street. All departing trucks

[11] As an example, taxi usage from Metro-North riders at Grand Central Terminal and visitors from Midtown Manhattan hotels would be expected to decrease.

[12] This methodology was agreed to at the July 17, 2003 transportation committee meeting and was also used to project future modal splits with the extended No. 7 subway line in the Office Trip Generation Transportation Planning Assumptions Technical Memorandum. The Midtown Manhattan area is defined as the area bordered by 59th Street on the north, 23rd Street on the south, Third Avenue on the east, and Eighth Avenue on the west; reverse journey-to-work data was computed for the 7:30-9:30 AM period.

[13] Assumptions for LIRR diversions are based on the projected LIRR operating plan with the East Side Access project, which was discussed during the September 11, 2003 transportation committee meeting.

Table 13: 2010 Projected Convention Center Modal Splits for Weekend Public Show

PART A: ATTENDEE ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	42.7%									14.7%	39.6%			2.9%			**100.0%**
Manhattan	18.1%	17.3%								10.1%	30.7%	1.8%		0.6%		21.4%	**100.0%**
Brooklyn	27.2%	1.3%								26.5%	43.1%	2.0%					**100.0%**
Bronx	39.6%									20.0%	40.4%						**100.0%**
Queens	34.0%	0.5%			0.8%	10.2%				16.8%	36.2%	1.2%		0.4%			**100.0%**
Long Island	34.4%					47.9%					17.7%						**100.0%**
Westchester and Upstate (East of Hudson)	43.5%										56.5%						**100.0%**
Rockland and Upstate (West of Hudson)	45.7%	5.1%		7.7%				15.4%			26.2%						**100.0%**
Northern New Jersey	39.0%	1.4%		1.4%				12.7%	15.5%		20.8%		4.2%		4.9%		**100.0%**
Southern New Jersey	29.3%							33.3%	22.2%		15.1%						**100.0%**
Connecticut and New England	39.9%	1.5%						4.7%			53.9%						**100.0%**
Weighted Average	**34.9%**	**2.9%**	**0.0%**	**0.5%**	**0.1%**	**5.3%**	**0.0%**	**3.8%**	**3.6%**	**9.6%**	**33.7%**	**0.6%**	**0.9%**	**0.2%**	**1.0%**	**2.7%**	**100.0%**

PART B: ATTENDEE DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	52.8%									5.0%	37.2%			5.0%			**100.0%**
Manhattan	18.4%	8.1%								5.5%	19.8%	0.4%		0.2%		47.6%	**100.0%**
Brooklyn	29.8%	1.1%								25.8%	42.5%	0.8%					**100.0%**
Bronx	44.0%									16.7%	39.3%						**100.0%**
Queens	32.6%	1.7%				11.7%				16.9%	35.8%	1.3%					**100.0%**
Long Island	35.5%					46.2%					18.3%						**100.0%**
Westchester and Upstate (East of Hudson)	44.0%										56.0%						**100.0%**
Rockland and Upstate (West of Hudson)	52.8%			10.0%				10.0%			27.2%						**100.0%**
Northern New Jersey	35.9%	1.4%		2.2%	3.3%			12.0%	16.3%		19.2%		2.2%		7.6%		**100.0%**
Southern New Jersey	26.4%							40.0%	20.0%		13.6%						**100.0%**
Connecticut and New England	44.8%							3.6%			51.6%						**100.0%**
Weighted Average	**29.6%**	**4.0%**	**0.0%**	**0.5%**	**0.5%**	**3.2%**	**0.0%**	**2.4%**	**2.6%**	**7.2%**	**27.3%**	**0.4%**	**0.3%**	**0.2%**	**1.1%**	**20.8%**	**100.0%**

PART C: EXHIBITOR ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	66.0%										34.0%						**100.0%**
Manhattan	2.3%	40.5%								4.5%	26.6%					26.1%	**100.0%**
Brooklyn	20.0%		55.8%							5.8%	17.3%	1.2%					**100.0%**
Bronx	18.9%									14.3%	45.4%	14.3%		7.1%			**100.0%**
Queens	28.3%	9.4%								7.1%	40.9%	14.3%					**100.0%**
Long Island	22.0%					66.7%					11.3%						**100.0%**
Westchester and Upstate (East of Hudson)	49.5%										50.5%						**100.0%**
Rockland and Upstate (West of Hudson)	66.0%										34.0%						**100.0%**
Northern New Jersey	41.3%			4.2%				4.2%	8.3%		21.3%				20.8%		**100.0%**
Southern New Jersey	66.0%										34.0%						**100.0%**
Connecticut and New England	66.0%										34.0%						**100.0%**
Weighted Average	**16.8%**	**19.8%**	**2.1%**	**0.5%**	**0.0%**	**1.1%**	**0.0%**	**0.5%**	**1.1%**	**6.0%**	**31.0%**	**3.9%**	**0.0%**	**1.7%**	**2.7%**	**12.6%**	**100.0%**

PART D: EXHIBITOR DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	66.0%										34.0%						**100.0%**
Manhattan		35.7%								4.6%	24.1%	1.1%				34.5%	**100.0%**
Brooklyn	17.7%		58.5%							6.1%	16.4%	1.2%					**100.0%**
Bronx	13.2%									10.0%	46.8%	20.0%		10.0%			**100.0%**
Queens	39.6%	13.2%				10.0%					32.2%	5.0%					**100.0%**
Long Island	22.0%					66.7%					11.3%						**100.0%**
Westchester and Upstate (East of Hudson)	49.5%										50.5%						**100.0%**
Rockland and Upstate (West of Hudson)	66.0%										34.0%						**100.0%**
Northern New Jersey	44.0%							4.8%	9.5%		22.7%				19.0%		**100.0%**
Southern New Jersey	33.0%			50.0%							17.0%						**100.0%**
Connecticut and New England	66.0%										34.0%						**100.0%**
Weighted Average	**15.0%**	**18.1%**	**1.6%**	**0.6%**	**0.0%**	**1.7%**	**0.0%**	**0.6%**	**1.1%**	**4.7%**	**29.9%**	**5.5%**	**0.0%**	**2.3%**	**2.2%**	**16.8%**	**100.0%**

PART E: EVENT STAFF ARRIVAL/DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	66.0%										34.0%						**100.0%**
Manhattan										21.4%	50.0%	25.0%		3.6%			**100.0%**
Brooklyn	6.6%									15.0%	48.4%	30.0%					**100.0%**
Bronx	36.7%										41.1%	22.2%					**100.0%**
Queens	6.6%					20.0%				10.0%	38.4%	25.0%					**100.0%**
Long Island						100.0%											**100.0%**
Westchester and Upstate (East of Hudson)	66.0%										34.0%						**100.0%**
Rockland and Upstate (West of Hudson)	66.0%										34.0%						**100.0%**
Northern New Jersey															100.0%		**100.0%**
Southern New Jersey	66.0%										34.0%						**100.0%**
Connecticut and New England	66.0%										34.0%						**100.0%**
Weighted Average	**12.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**8.9%**	**0.0%**	**0.0%**	**0.0%**	**10.7%**	**41.4%**	**23.4%**	**0.0%**	**0.8%**	**2.2%**	**0.0%**	**100.0%**

Notes: Projections based on Eng-Wong Taub & Associates surveys

Table 14: 2010 Projected Convention Center Modal Splits for Weekday Trade Shows

PART A: ATTENDEE ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	66.0%										34.0%						**100.0%**
Manhattan	1.3%	34.2%		0.8%	11.3%				0.4%	3.6%	26.2%	1.6%		5.5%		15.0%	**100.0%**
Brooklyn	18.9%	3.1%								21.4%	47.0%	9.5%					**100.0%**
Bronx										12.5%	67.5%	20.0%					**100.0%**
Queens	14.0%	14.0%				21.2%				13.6%	33.5%	3.6%					**100.0%**
Long Island	24.0%	6.0%			9.1%	45.5%					15.5%						**100.0%**
Westchester and Upstate (East of Hudson)	38.5%										61.5%						**100.0%**
Rockland and Upstate (West of Hudson)	26.4%	6.6%	10.0%					30.0%	10.0%		17.0%						**100.0%**
Northern New Jersey	27.0%	6.0%	2.3%	2.3%				9.1%	20.5%		17.0%		9.1%		6.8%		**100.0%**
Southern New Jersey	39.6%							20.0%			20.4%				20.0%		**100.0%**
Connecticut and New England	31.4%			19.0%				14.3%			35.2%						**100.0%**
Weighted Average	**9.6%**	**23.0%**	**0.5%**	**1.4%**	**7.1%**	**3.1%**	**0.0%**	**2.5%**	**2.7%**	**4.3%**	**29.0%**	**2.4%**	**1.0%**	**3.3%**	**1.0%**	**9.1%**	**100.0%**

PART B: ATTENDEE DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	66.0%										34.0%						**100.0%**
Manhattan	3.0%	31.3%		0.8%	15.9%				0.4%	2.1%	22.8%	1.2%		3.7%		18.9%	**100.0%**
Brooklyn	14.1%	4.7%								21.4%	48.3%	11.4%					**100.0%**
Bronx											73.3%	26.7%					**100.0%**
Queens	12.4%	14.4%				12.5%				15.6%	37.7%	5.0%		2.3%			**100.0%**
Long Island	24.8%				12.5%	50.0%					12.8%						**100.0%**
Westchester and Upstate (East of Hudson)	46.2%										53.8%						**100.0%**
Rockland and Upstate (West of Hudson)	26.4%		20.0%					40.0%			13.6%						**100.0%**
Northern New Jersey	26.4%		2.9%	2.9%	2.9%			17.1%	28.6%		13.6%		2.9%		2.9%		**100.0%**
Southern New Jersey	66.0%										34.0%						**100.0%**
Connecticut and New England	33.0%			22.2%				11.1%			33.7%						**100.0%**
Weighted Average	**9.0%**	**22.7%**	**0.6%**	**1.4%**	**11.4%**	**1.9%**	**0.0%**	**2.6%**	**2.8%**	**3.0%**	**26.1%**	**2.3%**	**0.3%**	**2.7%**	**0.3%**	**13.0%**	**100.0%**

PART C: EXHIBITOR ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island					100.0%												**100.0%**
Manhattan	2.1%	41.6%			16.2%				0.5%	1.9%	24.8%	0.2%		0.7%		12.0%	**100.0%**
Brooklyn	16.5%									37.5%	46.0%						**100.0%**
Bronx	66.0%										34.0%						**100.0%**
Queens	7.8%	31.1%			5.9%					8.8%	31.8%			8.8%		5.9%	**100.0%**
Long Island						83.3%						16.7%					**100.0%**
Westchester and Upstate (East of Hudson)	37.7%										62.3%						**100.0%**
Rockland and Upstate (West of Hudson)	33.0%							50.0%			17.0%						**100.0%**
Northern New Jersey	23.2%	10.7%			2.7%			10.8%	21.6%		17.5%		2.7%		10.8%		**100.0%**
Southern New Jersey	33.0%							50.0%			17.0%						**100.0%**
Connecticut and New England	39.6%							10.0%			50.4%						**100.0%**
Weighted Average	**8.3%**	**32.8%**	**0.0%**	**0.0%**	**12.6%**	**1.6%**	**0.0%**	**2.7%**	**2.9%**	**1.8%**	**25.3%**	**0.5%**	**0.3%**	**1.0%**	**1.3%**	**8.9%**	**100.0%**

PART D: EXHIBITOR DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island					100.0%												**100.0%**
Manhattan	5.1%	33.0%			20.5%					0.9%	21.2%			2.0%		17.3%	**100.0%**
Brooklyn	16.5%									37.5%	46.0%						**100.0%**
Bronx	66.0%										34.0%						**100.0%**
Queens	10.2%	35.5%				7.7%				7.7%	33.2%			5.8%			**100.0%**
Long Island	13.2%					80.0%					6.8%						**100.0%**
Westchester and Upstate (East of Hudson)	37.7%										62.3%						**100.0%**
Rockland and Upstate (West of Hudson)	13.2%			20.0%	20.0%			40.0%			6.8%						**100.0%**
Northern New Jersey	24.8%	5.5%			4.2%			16.7%	16.7%		15.6%		4.2%		12.5%		**100.0%**
Southern New Jersey	22.0%							33.3%	33.3%		11.3%						**100.0%**
Connecticut and New England	24.8%							12.5%			62.8%						**100.0%**
Weighted Average	**9.5%**	**27.3%**	**0.0%**	**0.3%**	**16.3%**	**1.8%**	**0.0%**	**2.7%**	**1.7%**	**1.1%**	**22.9%**	**0.0%**	**0.3%**	**1.8%**	**1.0%**	**13.2%**	**100.0%**

PART E: EVENT STAFF ARRIVAL/DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	13.2%									20.0%	46.8%	20.0%					**100.0%**
Manhattan										33.3%	33.3%					33.3%	**100.0%**
Brooklyn	18.9%									7.1%	45.4%	28.6%					**100.0%**
Bronx										16.7%	41.7%	16.7%		25.0%			**100.0%**
Queens	16.5%					25.0%				25.0%	33.5%						**100.0%**
Long Island	33.0%					50.0%					17.0%						**100.0%**
Westchester and Upstate (East of Hudson)	66.0%										34.0%						**100.0%**
Rockland and Upstate (West of Hudson)	66.0%										34.0%						**100.0%**
Northern New Jersey	39.6%										20.4%				40.0%		**100.0%**
Southern New Jersey	66.0%										34.0%						**100.0%**
Connecticut and New England	66.0%										34.0%						**100.0%**
Weighted Average	**21.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**6.1%**	**0.0%**	**0.0%**	**0.0%**	**13.3%**	**35.4%**	**9.2%**	**0.0%**	**5.3%**	**6.1%**	**3.0%**	**100.0%**

Notes: Projections based on Eng-Wong Taub & Associates surveys

Table 15: 2025 Projected Convention Center Modal Splits for Weekend Public Show

PART A: ATTENDEE ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	42.7%									14.7%	39.6%			2.9%			**100.0%**
Manhattan	18.1%	17.3%								10.1%	30.7%	1.8%		0.6%		21.4%	**100.0%**
Brooklyn	27.2%	1.3%								26.5%	43.1%	2.0%					**100.0%**
Bronx	39.6%									20.0%	40.4%						**100.0%**
Queens	34.0%	0.5%			0.8%	5.1%				16.8%	41.2%	1.2%		0.4%			**100.0%**
Long Island	34.4%					24.0%					41.7%						**100.0%**
Westchester and Upstate (East of Hudson)	43.5%										56.5%						**100.0%**
Rockland and Upstate (West of Hudson)	45.7%	5.1%		7.7%				15.4%			26.2%						**100.0%**
Northern New Jersey	39.0%	1.4%		1.4%				12.7%	15.5%		20.8%		4.2%		4.9%		**100.0%**
Southern New Jersey	29.3%							33.3%	22.2%		15.1%						**100.0%**
Connecticut and New England	39.9%	1.5%						4.7%			53.9%						**100.0%**
Weighted Average	**34.9%**	**2.9%**	**0.0%**	**0.5%**	**0.1%**	**2.7%**	**0.0%**	**3.8%**	**3.6%**	**9.6%**	**36.4%**	**0.6%**	**0.9%**	**0.2%**	**1.0%**	**2.7%**	**100.0%**

PART B: ATTENDEE DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	52.8%									5.0%	37.2%			5.0%			**100.0%**
Manhattan	18.4%	8.1%								5.5%	19.8%	0.4%		0.2%		47.6%	**100.0%**
Brooklyn	29.8%	1.1%								25.8%	42.5%	0.8%					**100.0%**
Bronx	44.0%									16.7%	39.3%						**100.0%**
Queens	32.6%	1.7%				5.8%				16.9%	41.7%	1.3%					**100.0%**
Long Island	35.5%					23.1%					41.4%						**100.0%**
Westchester and Upstate (East of Hudson)	44.0%										56.0%						**100.0%**
Rockland and Upstate (West of Hudson)	52.8%			10.0%				10.0%			27.2%						**100.0%**
Northern New Jersey	35.9%	1.4%		2.2%	3.3%			12.0%	16.3%		19.2%		2.2%		7.6%		**100.0%**
Southern New Jersey	26.4%							40.0%	20.0%		13.6%						**100.0%**
Connecticut and New England	44.8%							3.6%			51.6%						**100.0%**
Weighted Average	**29.6%**	**4.0%**	**0.0%**	**0.5%**	**0.5%**	**1.6%**	**0.0%**	**2.4%**	**2.6%**	**7.2%**	**28.9%**	**0.4%**	**0.3%**	**0.2%**	**1.1%**	**20.8%**	**100.0%**

PART C: EXHIBITOR ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	66.0%										34.0%						**100.0%**
Manhattan	2.3%	40.5%								4.5%	26.6%					26.1%	**100.0%**
Brooklyn	20.0%		55.8%							5.8%	17.3%	1.2%					**100.0%**
Bronx	18.9%									14.3%	45.4%	14.3%		7.1%			**100.0%**
Queens	28.3%	9.4%								7.1%	40.9%	14.3%					**100.0%**
Long Island	22.0%					33.3%					44.7%						**100.0%**
Westchester and Upstate (East of Hudson)	49.5%										50.5%						**100.0%**
Rockland and Upstate (West of Hudson)	66.0%										34.0%						**100.0%**
Northern New Jersey	41.3%			4.2%				4.2%	8.3%		21.3%				20.8%		**100.0%**
Southern New Jersey	66.0%										34.0%						**100.0%**
Connecticut and New England	66.0%										34.0%						**100.0%**
Weighted Average	**16.8%**	**19.8%**	**2.1%**	**0.5%**	**0.0%**	**0.5%**	**0.0%**	**0.5%**	**1.1%**	**6.0%**	**31.5%**	**3.9%**	**0.0%**	**1.7%**	**2.7%**	**12.6%**	**100.0%**

PART D: EXHIBITOR DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	66.0%										34.0%						**100.0%**
Manhattan		35.7%								4.6%	24.1%	1.1%				34.5%	**100.0%**
Brooklyn	17.7%		58.5%							6.1%	16.4%	1.2%					**100.0%**
Bronx	13.2%									10.0%	46.8%	20.0%		10.0%			**100.0%**
Queens	39.6%	13.2%				5.0%					37.2%	5.0%					**100.0%**
Long Island	22.0%					33.3%					44.7%						**100.0%**
Westchester and Upstate (East of Hudson)	49.5%										50.5%						**100.0%**
Rockland and Upstate (West of Hudson)	66.0%										34.0%						**100.0%**
Northern New Jersey	44.0%							4.8%	9.5%		22.7%				19.0%		**100.0%**
Southern New Jersey	33.0%			50.0%							17.0%						**100.0%**
Connecticut and New England	66.0%										34.0%						**100.0%**
Weighted Average	**15.0%**	**18.1%**	**1.6%**	**0.6%**	**0.0%**	**0.8%**	**0.0%**	**0.6%**	**1.1%**	**4.7%**	**30.8%**	**5.5%**	**0.0%**	**2.3%**	**2.2%**	**16.8%**	**100.0%**

PART E: EVENT STAFF ARRIVAL/DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	*TOTAL BY REGION*
Staten Island	66.0%										34.0%						**100.0%**
Manhattan										21.4%	50.0%	25.0%		3.6%			**100.0%**
Brooklyn	6.6%									15.0%	48.4%	30.0%					**100.0%**
Bronx	36.7%										41.1%	22.2%					**100.0%**
Queens	6.6%					10.0%				10.0%	48.4%	25.0%					**100.0%**
Long Island						50.0%					50.0%						**100.0%**
Westchester and Upstate (East of Hudson)	66.0%										34.0%						**100.0%**
Rockland and Upstate (West of Hudson)	66.0%										34.0%						**100.0%**
Northern New Jersey															100.0%		**100.0%**
Southern New Jersey	66.0%										34.0%						**100.0%**
Connecticut and New England	66.0%										34.0%						**100.0%**
Weighted Average	**12.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.4%**	**0.0%**	**0.0%**	**0.0%**	**10.7%**	**45.8%**	**23.4%**	**0.0%**	**0.8%**	**2.2%**	**0.0%**	**100.0%**

Notes: Projections based on Eng-Wong Taub & Associates surveys

Table 16: 2025 Convention Center Modal Splits for Weekday Trade Shows

PART A: ATTENDEE ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island	66.0%										34.0%						100.0%
Manhattan	1.3%	34.2%		0.8%	11.3%				0.4%	3.6%	26.2%	1.6%		5.5%		15.0%	100.0%
Brooklyn	18.9%	3.1%								21.4%	47.0%	9.5%					100.0%
Bronx										12.5%	67.5%	20.0%					100.0%
Queens	14.0%	14.0%				12.7%				13.6%	42.0%	3.6%					100.0%
Long Island	24.0%	6.0%			9.1%	27.3%					33.6%						100.0%
Westchester and Upstate (East of Hudson)	38.5%										61.5%						100.0%
Rockland and Upstate (West of Hudson)	26.4%	6.6%	10.0%					30.0%	10.0%		17.0%						100.0%
Northern New Jersey	27.0%	6.0%	2.3%	2.3%				9.1%	20.5%		17.0%		9.1%		6.8%		100.0%
Southern New Jersey	39.6%							20.0%			20.4%				20.0%		100.0%
Connecticut and New England	31.4%			19.0%				14.3%			35.2%						100.0%
Weighted Average	**9.6%**	**23.0%**	**0.5%**	**1.4%**	**7.1%**	**1.9%**	**0.0%**	**2.5%**	**2.7%**	**4.3%**	**30.2%**	**2.4%**	**1.0%**	**3.3%**	**1.0%**	**9.1%**	**100.0%**

PART B: ATTENDEE DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island	66.0%										34.0%						100.0%
Manhattan	3.0%	31.3%		0.8%	15.9%				0.4%	2.1%	22.8%	1.2%		3.7%		18.9%	100.0%
Brooklyn	14.1%	4.7%								21.4%	48.3%	11.4%					100.0%
Bronx											73.3%	26.7%					100.0%
Queens	12.4%	14.4%				7.5%				15.6%	42.7%	5.0%		2.3%			100.0%
Long Island	24.8%				12.5%	30.0%					32.8%						100.0%
Westchester and Upstate (East of Hudson)	46.2%										53.8%						100.0%
Rockland and Upstate (West of Hudson)	26.4%		20.0%					40.0%			13.6%						100.0%
Northern New Jersey	26.4%		2.9%	2.9%	2.9%			17.1%	28.6%		13.6%		2.9%		2.9%		100.0%
Southern New Jersey	66.0%										34.0%						100.0%
Connecticut and New England	33.0%			22.2%				11.1%			33.7%						100.0%
Weighted Average	**9.0%**	**22.7%**	**0.6%**	**1.4%**	**11.4%**	**1.1%**	**0.0%**	**2.6%**	**2.8%**	**3.0%**	**26.9%**	**2.3%**	**0.3%**	**2.7%**	**0.3%**	**13.0%**	**100.0%**

PART C: EXHIBITOR ARRIVAL MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island					100.0%												100.0%
Manhattan	2.1%	41.6%			16.2%				0.5%	1.9%	24.8%	0.2%		0.7%		12.0%	100.0%
Brooklyn	16.5%									37.5%	46.0%						100.0%
Bronx	66.0%										34.0%						100.0%
Queens	7.8%	31.1%			5.9%					8.8%	31.8%			8.8%		5.9%	100.0%
Long Island						50.0%					33.3%	16.7%					100.0%
Westchester and Upstate (East of Hudson)	37.7%										62.3%						100.0%
Rockland and Upstate (West of Hudson)	33.0%							50.0%			17.0%						100.0%
Northern New Jersey	23.2%	10.7%			2.7%			10.8%	21.6%		17.5%		2.7%		10.8%		100.0%
Southern New Jersey	33.0%							50.0%			17.0%						100.0%
Connecticut and New England	39.6%							10.0%			50.4%						100.0%
Weighted Average	**8.3%**	**32.8%**	**0.0%**	**0.0%**	**12.6%**	**1.0%**	**0.0%**	**2.7%**	**2.9%**	**1.8%**	**25.9%**	**0.5%**	**0.3%**	**1.0%**	**1.3%**	**8.9%**	**100.0%**

PART D: EXHIBITOR DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island					100.0%												100.0%
Manhattan	5.1%	33.0%			20.5%					0.9%	21.2%			2.0%		17.3%	100.0%
Brooklyn	16.5%									37.5%	46.0%						100.0%
Bronx	66.0%										34.0%						100.0%
Queens	10.2%	35.5%				4.6%				7.7%	36.2%			5.8%			100.0%
Long Island	13.2%					48.0%					38.8%						100.0%
Westchester and Upstate (East of Hudson)	37.7%										62.3%						100.0%
Rockland and Upstate (West of Hudson)	13.2%			20.0%	20.0%			40.0%			6.8%						100.0%
Northern New Jersey	24.8%	5.5%			4.2%			16.7%	16.7%		15.6%		4.2%		12.5%		100.0%
Southern New Jersey	22.0%							33.3%	33.3%		11.3%						100.0%
Connecticut and New England	24.8%							12.5%			62.8%						100.0%
Weighted Average	**9.5%**	**27.3%**	**0.0%**	**0.3%**	**16.3%**	**1.1%**	**0.0%**	**2.7%**	**1.7%**	**1.1%**	**23.6%**	**0.0%**	**0.3%**	**1.8%**	**1.0%**	**13.2%**	**100.0%**

PART E: EVENT STAFF ARRIVAL/DEPARTURE MODAL SPLITS

Trip Region	Auto	Taxi	Commuter Van	Charter Bus	Shuttle Bus	LIRR	Metro-North Railroad	NJ Transit Rail/Amtrak	NY Waterway Ferries	Subway (Other Lines)	Subway (No. 7 Extension)	Subway (Transfer to Bus)	PATH	NYCT Bus	NJ Transit Bus	Walk	TOTAL BY REGION
Staten Island	13.2%									20.0%	46.8%	20.0%					100.0%
Manhattan										33.3%	33.3%					33.3%	100.0%
Brooklyn	18.9%									7.1%	45.4%	28.6%					100.0%
Bronx										16.7%	41.7%	16.7%		25.0%			100.0%
Queens	16.5%					15.0%				25.0%	58.5%						100.0%
Long Island	33.0%					30.0%					67.0%						100.0%
Westchester and Upstate (East of Hudson)	66.0%										34.0%						100.0%
Rockland and Upstate (West of Hudson)	66.0%										34.0%						100.0%
Northern New Jersey	39.6%										20.4%				40.0%		100.0%
Southern New Jersey	66.0%										34.0%						100.0%
Connecticut and New England	66.0%										34.0%						100.0%
Weighted Average	**21.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**3.5%**	**0.0%**	**0.0%**	**0.0%**	**12.8%**	**40.0%**	**8.8%**	**0.0%**	**5.1%**	**5.8%**	**2.9%**	**100.0%**

Notes: Projections based on Eng-Wong Taub & Associates surveys

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would use the existing truck dock exit located on West 34th Street between Eleventh Avenue and Route 9A.

The expanded marshalling facility is proposed to accommodate a total of 194 trucks; the underground approach to the loading docks could also provide space for an additional 70 trucks. This design is expected to accommodate the demand associated with the peak utilization period. Convention Center management has indicated that the heaviest existing truck demands are associated with the New York International Gift Fair,[14] which can attract up to 600 vehicles total (150 tractor trailers, 200 single body trucks, and 250 personally owned vehicles/trucks). The average demand for this trade show involves approximately 400 vehicles spread over a three-day period. However, the major activity days associated with truck arrivals and departures occur on the pre-event setup days and post-event breakdown days (these are typically dark days) and would not generally coincide with event days (days on which shows are open to the public, which are being analyzed for traffic in the DGEIS). To provide for a conservative estimate, based on these truck demands and a review of truck shipping requirements at recent trade shows (including the International Fancy Food & Confections Show and the Variety Merchandise Show), the traffic analyses will conservatively include an increase of 150 daily truck deliveries. This level of truck demand is also assumed to include other types of deliveries (e.g. food, beverages, and other types of materials). The temporal distribution of these trips will be based on surveys documented in the *Coliseum Redevelopment FSEIS* (1997) and shown in Table 18. These temporal distributions correspond with the schedule of the existing Convention Center marshalling yard, which typically operates from 8 AM – 5 PM.

Table 17: Vehicle Occupancies

Weekend Public Show		
	Auto	**Taxi**
Attendees	3.0	2.6
Exhibitors	1.7	2.5
Event Staff	1.3	-
Weekday Trade Shows		
	Auto	**Taxi**
Attendees	1.7	1.8
Exhibitors	1.8	2.4
Event Staff	1.2	-

Source: Eng-Wong Taub & Associates, 2003.

Table 18: Projected Distribution of Truck Deliveries to the Convention Center

Analyzed Peak Hour	**Percent of Daily Deliveries**
Weekday AM (8-9 AM)	7.9%
Weekday MD (12-1 PM)	14.7%
Weekday PM (5-6 PM)	1.1%
Weekday EVE (7-8 PM)	0.0%
Weekday EVE (8-9 PM)	0.0%
Sunday PM (4-5 PM)	1.1%

Source: Coliseum Redevelopment FSEIS, 1997, Table 12-15.

[14] The New York International Gift Fair is currently too large to be entirely accommodated by the existing Convention Center and is concurrently held at the Show Piers at the New York City Passenger Ship Terminal.

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Convention Center Hotel

Trips associated with the 1,500-room hotel proposed as part of the Convention Center expansion will be calculated separately based on methodologies contained within the Hotel Trip Generation Transportation Planning Assumptions Technical Memorandum (August 7, 2003). As indicated in these assumptions, 2.0 daily trips per room will be assumed to be linked walk trips between the hotel and the Convention Center, which would be linked by a direct internal pedestrian connection.

Retail Space within the Convention Center

Travel demand associated with new retail space (proposed as part of the Convention Center expansion) that would be accessible via West 34th Street, West 42nd Street, or Eleventh Avenue will be forecasted using the methodologies provided within the Local Retail Trip Generation Transportation Planning Assumptions Technical Memorandum (August 7, 2003). All other new retail space within the Convention Center will be assumed to be utilized only by internal visitors; for this reason no additional trips will be forecasted for these retail components.

cc: L. Lennon
D. Fields

PB Team

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 7, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Covenant House Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1209

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of trip generation rates for a Covenant House for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are being developed because as a result of the proposed project, there is a potential for the displacement of the Covenant House located on West 41st Street at the corner of Tenth Avenue. This particular facility includes approximately 79,000 gross square feet (gsf) of crisis shelter space (used as transitional housing containing 283 beds), 16,000 gsf of associated health clinic space, and 32,000 gsf of office/administration space.

The office/administrative component of the Covenant House was assumed to have the same trip generation characteristics as those summarized in the Office Trip Generation Transportation Planning Assumptions Technical Memorandum. Therefore, this memorandum only contains trip generation assumptions for the crisis center/health clinic component of the Covenant House. The rates for the crisis center/health clinic component are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

The crisis center provides transitional housing for the homeless and essentially functions as a residential land use. The daily trip generation rate for this type of facility was assumed to be 4.75 trips per bed (resident), similar to that of a college dormitory[1]. This rate was also conservatively assumed to account for the activities of the small, one-floor health clinic.

Temporal Distributions and In/Out Splits

Temporal distributions and in/out splits for the crisis shelter were developed based on discussions with the Covenant House, using residential distributions from the *Regent Tower EAS* (2000) as a guide. According to the Covenant House, morning departures typically peak during the 7-8 am period (after breakfast is served) and there is a 9:30 pm curfew for nearly all occupants in returning to the facility. For this reason, no trips were assumed to occur during the

[1] *Hudson Square Rezoning DEIS*, 2002, Table XIII-6.

Table 1: Covenant House
(Crisis Center/Health Clinic Components)
Transportation Planning Assumptions

Trip Generation:	(1) Weekday		(2) Sunday
Daily Person Trips	4.75		4.20
		per bed	

Temporal Distribution:		(3,4)
AM (8-9)		7%
MD (12-1)		3%
PM (5-6)		10%
EVE (7-8)		9%
EVE (8-9)		8%
SUN (4-5)		9%

In/Out Splits:		(5)	
	In		**Out**
AM (8-9)	15%		85%
MD (12-1)	50%		50%
PM (5-6)	70%		30%
EVE (7-8)	65%		35%
EVE (8-9)	65%		35%
SUN (4-5)	70%		30%

Modal Splits:		(1)
Auto		2%
Taxi		1%
Bus		1%
Subway		2%
Railroad		0%
Walk		94%
		100%

Vehicle Occupancy:		(1)
Auto		1.50
Taxi		1.50

Truck Trip Generation:	(1,6) Weekday		(7) Sunday
	0.06		0.00
		per bed	

		(1,4,6)
AM (8-9)		12.2%
MD (12-1)		8.7%
PM (5-6)		1.0%
EVE (7-8)		0.0%
EVE (8-9)		0.0%
SUN (4-5)		2.0%

	In	**Out**
	50%	50%

Sources:

1. Hudson Square Rezoning DEIS, 2002, Table XIII-6.
2. Based on ratio between Sunday and weekday rates for ITE Land Use 220: Apartment.
3. PB Team assumptions based on discussions with Covenant House, July 2003.
4. Sunday temporal distributions and in/out splits based on weekday patterns.
5. Regent Tower EAS, 2000, Attachment D.
6. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, assuming 2.0 residents per dwelling unit.
7. Assumes 5% of weekday trip generation rates.

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10 pm – 5 am overnight period[2]. Temporal distributions and in/out splits for a 24-hour period are provided in Table 2.

Modal Splits
Modal splits at the crisis center were assumed to be similar to those at a college dormitory (having a relatively low auto modal share) and were based on the *Hudson Square Rezoning DEIS*. As shown in Table 2, these modal splits were assumed to remain constant over the entire day.

Vehicle Occupancy
Vehicle occupancy rates of 1.50 for autos and 1.50 for taxis have been selected, which are consistent with those used for a college dormitory in the *Hudson Square Rezoning DEIS*.

Truck Trip Generation
The truck trip generation rates and temporal distributions were assumed to be similar to those used in the Residential Trip Generation Transportation Planning Assumptions Technical Memorandum and include a weekday truck trip generation rate of 0.06 trips per bed[3]. Sunday truck trip generation rates were assumed to be 5% of weekday rates.

cc: L. Lennon
D. Fields

[2] The facility is open 24 hours for admittances, but the relative proportion of daily trips occurring during the overnight period is assumed to be negligible.
[3] .03 trips per dwelling unit * 2 (assumed number of residents per dwelling unit)

Table 2: Expanded 24-Hour Temporal Distributions and Modal Splits for Covenant House (Crisis Center/Health Clinic Components)

Time Period	Weekday/Sunday[1,2]			Modal Splits[3]				
	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Walk
12:00 AM - 1:00 AM	0.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
1:00 AM - 2:00 AM	0.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
2:00 AM - 3:00 AM	0.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
3:00 AM - 4:00 AM	0.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
4:00 AM - 5:00 AM	0.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
5:00 AM - 6:00 AM	2.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
6:00 AM - 7:00 AM	2.0%	15.0%	85.0%	2.0%	1.0%	1.0%	2.0%	94.0%
7:00 AM - 8:00 AM	10.0%	15.0%	85.0%	2.0%	1.0%	1.0%	2.0%	94.0%
8:00 AM - 9:00 AM	7.0%	15.0%	85.0%	2.0%	1.0%	1.0%	2.0%	94.0%
9:00 AM - 10:00 AM	5.0%	22.5%	77.5%	2.0%	1.0%	1.0%	2.0%	94.0%
10:00 AM - 11:00 AM	5.0%	40.0%	60.0%	2.0%	1.0%	1.0%	2.0%	94.0%
11:00 AM - 12:00 PM	4.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
12:00 PM - 1:00 PM	3.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
1:00 PM - 2:00 PM	3.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
2:00 PM - 3:00 PM	4.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
3:00 PM - 4:00 PM	7.0%	60.0%	40.0%	2.0%	1.0%	1.0%	2.0%	94.0%
4:00 PM - 5:00 PM	9.0%	70.0%	30.0%	2.0%	1.0%	1.0%	2.0%	94.0%
5:00 PM - 6:00 PM	10.0%	70.0%	30.0%	2.0%	1.0%	1.0%	2.0%	94.0%
6:00 PM - 7:00 PM	10.0%	70.0%	30.0%	2.0%	1.0%	1.0%	2.0%	94.0%
7:00 PM - 8:00 PM	9.0%	65.0%	35.0%	2.0%	1.0%	1.0%	2.0%	94.0%
8:00 PM - 9:00 PM	8.0%	65.0%	35.0%	2.0%	1.0%	1.0%	2.0%	94.0%
9:00 PM - 10:00 PM	2.0%	25.0%	75.0%	2.0%	1.0%	1.0%	2.0%	94.0%
10:00 PM - 11:00 PM	0.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%
11:00 PM - 12:00 AM	0.0%	50.0%	50.0%	2.0%	1.0%	1.0%	2.0%	94.0%

Notes:

1. Weekday distributions based on PB Team discussions with Covenant House, July 2003.
2. In/out splits based on residential component of Regent Tower EAS, 2000, Attachment D.
3. Modal splits based on dormitory component of Hudson Square Rezoning DEIS, 2002, Table XIII-6.

PB Team

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: September 11, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Day Care Center Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1339

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of day care center trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a daily trip generation rate of 138 person trips per 1,000 gross square feet (gsf) of development has been selected, which was developed from the ITE *Trip Generation Manual* (6th Edition)[1]. A Sunday daily trip generation rate of 10 person trips per 1,000 gsf was developed from the ITE *Trip Generation Manual* using the same methodology[2]. It is important to note that no previously published EIS's were found containing trip generation rates for day care center facilities in Manhattan.

As shown in Table 1, a 76 percent credit[3] for pass-by and diverted-link trips was subsequently applied to the daily vehicle trip generation rates, yielding a net daily trip generation rate of 33 persons per 1,000 gsf and a net Sunday trip generation rate of 2 persons per 1,000 gsf.

Temporal Distributions and In/Out Splits

Daily temporal distributions were based on a 12-hour survey of day center traffic[3] and in/out splits were based on the ITE *Trip Generation Manual*. Temporal distributions and in/out splits are shown for the peak hours in Table 1 and for an expanded 24-hour daily period in Table 2. As shown in Table 2, temporal distributions and in/out splits are assumed to be the same on a weekday and Sunday. It is important to note that relatively little directional distribution is exhibited due to the fact that adults are required to accompany children to and from day care centers.

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[1] Adapted from ITE Land Use 565, Day Care Center: 79.26 trips * 1.65 (assumed auto occupancy) / 95% (assumed auto modal share).
[2] Adapted from ITE Land Use 565, Day Care Center: 5.83 trips * 1.65 (assumed auto occupancy) / 95% (assumed auto modal share).
[3] ITE *1990 Compendium of Technical Papers*, "Trip Generation of Day Care Centers," p. 360.

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Modal Splits

Modal splits were adapted for a day care center based on those contained within the *Hudson River Park FEIS* (1998) for a cultural land use and include a 30% taxi share. These rates were selected to reflect a hesitation on the part of adults to bring small children on public transportation.

Vehicle Occupancy

Vehicle occupancy rates of 1.65 for autos and 1.40 for taxis have been assumed, which are typical of Midtown Manhattan for office and residential developments according to the *CEQR Technical Manual*. These rates are assumed to be appropriate because most auto trips would include those by employees and primary trips (excluding pass-by and diverted-link trips) made by adults dropping off or picking up children.

Truck Trip Generation

A weekday truck trip generation rate of 0.07 truck trips per 1,000 gsf was selected based on the *Hudson River Park FEIS* for a cultural land use. The Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) was used in the selection of temporal distributions (shown in Table 1) and were based on an office land use. No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day. Sunday truck trip generation rates were assumed to be 5% of weekday rates and based on weekday patterns.

cc: L. Lennon
D. Fields

Table 1: Day Care Center Land Use
Transportation Planning Assumptions

Trip Generation:

	(1,2) Weekday	Sunday
Total Daily Person Trips	138	10
Net Daily Person Trips	33	2
	per 1,000 gsf	

Temporal Distribution:

	(3,4)
AM (8-9)	16%
MD (12-1)	5%
PM (5-6)	19%
EVE (7-8)	0%
EVE (8-9)	0%
SUN (4-5)	12%

In/Out Splits:

	(4,5,6) In	Out
AM (8-9)	53%	47%
MD (12-1)	50%	50%
PM (5-6)	47%	53%
EVE (7-8)	50%	50%
EVE (8-9)	50%	50%
SUN (4-5)	47%	53%

Modal Splits:

	(6)
Auto	10%
Taxi	30%
Bus	10%
Subway	20%
Walk	30%
	100%

Vehicle Occupancy:

	(6)
Auto	1.65
Taxi	1.40

Truck Trip Generation:

	(7) Weekday	(8) Sunday
	0.07	0.00
	per 1,000 gsf	

	(4,9)
AM (8-9)	9.6%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	Out
50%	50%

Sources:

1. ITE Trip Generation, 6th Edition, Land Use 565: Day Care Center
   Daily trip generation rates based on an assumed auto occupancy of 1.65 and an auto modal split of 95%.
2. Pass-by and diverted-link trips assumed to be 76% based on ITE 1990 Compendium of Technical Papers, "Trip Generation of Day Care Centers," p. 360.
3. Weekday temporal distributions based on: ITE 1990 Compendium of Technical Papers, "Trip Generation of Day Care Centers."
4. Sunday temporal distributions and in/out splits based on weekday patterns.
5. In/out splits for weekday AM and PM peak hours based on ITE Land Use 565: Day Care Center.
6. PB Team assumption.
7. Hudson River Park FEIS, 1998, Table 11-25 (Cultural Land Use).
8. Assumes 5% of weekday trip generation rates.
9. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 15.

Table 2: Daily Temporal Distributions and Modal Splits for Day Care Center Land Use

Time Period	Weekday/Sunday			Modal Splits[4]				
	Temporal Distribution[1]	In[2,3]	Out[2,3]	Auto	Taxi	Bus	Subway	Walk
12:00 AM - 1:00 AM	0%	50%	50%	10%	30%	10%	20%	30%
1:00 AM - 2:00 AM	0%	50%	50%	10%	30%	10%	20%	30%
2:00 AM - 3:00 AM	0%	50%	50%	10%	30%	10%	20%	30%
3:00 AM - 4:00 AM	0%	50%	50%	10%	30%	10%	20%	30%
4:00 AM - 5:00 AM	0%	50%	50%	10%	30%	10%	20%	30%
5:00 AM - 6:00 AM	0%	50%	50%	10%	30%	10%	20%	30%
6:00 AM - 7:00 AM	3%	53%	47%	10%	30%	10%	20%	30%
7:00 AM - 8:00 AM	16%	53%	47%	10%	30%	10%	20%	30%
8:00 AM - 9:00 AM	16%	53%	47%	10%	30%	10%	20%	30%
9:00 AM - 10:00 AM	8%	53%	47%	10%	30%	10%	20%	30%
10:00 AM - 11:00 AM	2%	50%	50%	10%	30%	10%	20%	30%
11:00 AM - 12:00 PM	4%	50%	50%	10%	30%	10%	20%	30%
12:00 PM - 1:00 PM	5%	50%	50%	10%	30%	10%	20%	30%
1:00 PM - 2:00 PM	3%	50%	50%	10%	30%	10%	20%	30%
2:00 PM - 3:00 PM	4%	50%	50%	10%	30%	10%	20%	30%
3:00 PM - 4:00 PM	6%	47%	53%	10%	30%	10%	20%	30%
4:00 PM - 5:00 PM	12%	47%	53%	10%	30%	10%	20%	30%
5:00 PM - 6:00 PM	19%	47%	53%	10%	30%	10%	20%	30%
6:00 PM - 7:00 PM	2%	47%	53%	10%	30%	10%	20%	30%
7:00 PM - 8:00 PM	0%	50%	50%	10%	30%	10%	20%	30%
8:00 PM - 9:00 PM	0%	50%	50%	10%	30%	10%	20%	30%
9:00 PM - 10:00 PM	0%	50%	50%	10%	30%	10%	20%	30%
10:00 PM - 11:00 PM	0%	50%	50%	10%	30%	10%	20%	30%
11:00 PM - 12:00 AM	0%	50%	50%	10%	30%	10%	20%	30%

Notes:

1. Temporal distributions based on ITE 1990 Compendium of Technical Papers, "Trip Generation of Day Care Centers," p. 360.
2. In/out splits for AM and PM peak hours based on ITE Land Use 565: Day Care Center.
3. In/out splits for other hours based on PB Team assumptions.
4. Modal splits adapted from Hudson River Park FEIS, 1998, Table 11-25 (Cultural Land Use).

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amadi, NYC Department of City Planning

FROM: E. Metzger

DATE: November 17, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Destination Retail Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1842

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of destination retail[1] trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are being developed to account for destination retail proposed in the No Action condition as part of the Special West Chelsea District Rezoning Proposal. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a total daily trip generation rate of 159 person trips per 1,000 gross square feet (gsf) of development has been selected based on the *Proposed Sale of Con Edison First Avenue Properties to FSM East River Associates LLC DGEIS* (2002). This rate was found to be the most conservative compared to several EIS's for destination retail in Manhattan.[2]

A review of previously published EIS's did not find a Sunday daily trip generation rate for destination retail space in Manhattan. For this reason, a Sunday trip generation rate 191 person trips per 1,000 gsf was developed based on the ratio of the Sunday to weekday daily trip generation rates in the Local Retail Trip Generation Transportation Planning Assumptions Technical Memorandum (August 7, 2003).

As shown in Table 1, a 25 percent credit for linked trips was subsequently applied to the total daily trip generation rates, yielding in a net weekday daily trip generation rate of 119 person trips per 1,000 gsf and a net Sunday daily trip generation rate of 143 person trips per 1,000 gsf. The assumption of 25 percent linked trips to retail uses is consistent with the *CEQR Technical Manual*.

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[1] A retail use that draws users from outside of the immediate area (opposed to local retail).
[2] *Coliseum Redevelopment FEIS,* 1997: 105.2 weekday person trips per 1,000 gsf.
River Center FEIS, 1999: 131 weekday person trips per 1,000 gsf.

Table 1: Destination Retail Land Use
Transportation Planning Assumptions

Trip Generation:	(1,2) **Weekday**	(2,3) **Sunday**
Total Daily Person Trips	159	191
Net Daily Person Trips	119	143
	per 1,000 gsf	

Temporal Distribution:	(4)
AM (8-9)	0.0%
MD (12-1)	9.5%
PM (5-6)	9.8%
EVE (7-8)	8.4%
EVE (8-9)	6.8%
SUN (4-5)	13.9%

In/Out Splits:	(4) **In**	**Out**
AM (8-9)	50%	50%
MD (12-1)	55%	45%
PM (5-6)	48%	52%
EVE (7-8)	55%	45%
EVE (8-9)	42%	58%
SUN (4-5)	37%	63%

Modal Splits:	(1)
Auto	9%
Taxi	4%
Bus	8%
Subway	20%
Railroad	0%
Walk	59%
	100%

Vehicle Occupancy:	(1)
Auto	2.00
Taxi	2.00

Truck Trip Generation:	(5) **Weekday**	(6) **Sunday**
	0.35	0.02
	per 1,000 gsf	

	(5,7,8)
AM (8-9)	7.7%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	**Out**
50%	50%

Sources:

1. Proposed Sale of Con Edison First Avenue Properties to FSM East River Associates LLC DGEIS, 2002, Table 12-7.
2. Net trips assume 25% linked trips as per CEQR Technical Manual, 3O-23.
3. Based on ratio between Sunday and weekday rates in Local Retail Trip Generation Transportation Planning Assumptions Technical Memorandum (August 7, 2003).
4. Weekday and Sunday temporal distributions and in/out splits based on hourly variations for ITE Land Use 820: Shopping Center.
5. Coliseum Redevelopment FSEIS, 1997, Table 12-15.
6. Assumes 5% of weekday trip generation rates.
7. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 19.
8. Sunday truck temporal distributions and in/out splits based on weekday patterns.

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Temporal Distributions and In/Out Splits

Temporal distributions and in/out splits for all peak hours were developed based on the weekday and Sunday hourly variations of shopping center traffic in the ITE *Trip Generation Manual (*6th Edition).[3] Table 2 summarizes temporal distributions and in/out splits for an expanded 24-hour period, which were also based on the ITE *Trip Generation Manual*.

Modal Splits

The selected modal split assumptions for all peak hours were based on the *Proposed Sale of Con Edison First Avenue Properties to FSM East River Associates LLC DGEIS*. This modal split information was derived from a survey at the Kips Bay Plaza retail complex on Second Avenue between East 30th and East 32nd Streets. As shown in Table 3, modal splits were assumed to remain constant over the entire day.

Vehicle Occupancy

Vehicle occupancy rates of 2.00 for both autos and taxis have been selected based on the *Proposed Sale of Con Edison First Avenue Properties to FSM East River Associates LLC DGEIS*. These rates are also consistent with other EIS's for destination retail in Manhattan (see citations above).

Truck Trip Generation

The generation of truck trips was based on the Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) for retail land uses, resulting in a daily rate 0.35 weekday truck trips per 1,000 gsf (see Table 1). No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day. Sunday truck trip generation rates were assumed to be 5% of weekday rates.

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[3] These were based on the hourly variation of traffic at shopping centers over 300,000 square feet of gross leasable area. Although the ITE *Trip Generation Manual* includes hourly variations in shopping center traffic under 100,000 square feet gross leasable area, this data does not include Sunday patterns.

Table 2: Daily Temporal Distributions and Modal Splits for Destination Retail Land Use

Time Period	Weekday[1]			Sunday[1]			Modal Splits[2]					
	Temporal Distribution	In	Out	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
1:00 AM - 2:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
2:00 AM - 3:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
3:00 AM - 4:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
4:00 AM - 5:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
5:00 AM - 6:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
6:00 AM - 7:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
7:00 AM - 8:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
8:00 AM - 9:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
9:00 AM - 10:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
10:00 AM - 11:00 AM	6.1%	67%	33%	2.7%	67%	33%	9%	4%	8%	20%	0%	59%
11:00 AM - 12:00 PM	7.9%	62%	38%	6.7%	73%	27%	9%	4%	8%	20%	0%	59%
12:00 PM - 1:00 PM	9.5%	55%	45%	11.3%	71%	29%	9%	4%	8%	20%	0%	59%
1:00 PM - 2:00 PM	9.3%	52%	48%	14.7%	61%	39%	9%	4%	8%	20%	0%	59%
2:00 PM - 3:00 PM	9.1%	49%	51%	16.1%	53%	47%	9%	4%	8%	20%	0%	59%
3:00 PM - 4:00 PM	9.1%	48%	52%	15.7%	46%	54%	9%	4%	8%	20%	0%	59%
4:00 PM - 5:00 PM	9.5%	49%	51%	13.9%	37%	63%	9%	4%	8%	20%	0%	59%
5:00 PM - 6:00 PM	9.8%	48%	52%	11.1%	26%	74%	9%	4%	8%	20%	0%	59%
6:00 PM - 7:00 PM	8.5%	50%	50%	4.3%	26%	74%	9%	4%	8%	20%	0%	59%
7:00 PM - 8:00 PM	8.4%	55%	45%	1.7%	40%	60%	9%	4%	8%	20%	0%	59%
8:00 PM - 9:00 PM	6.8%	42%	58%	1.0%	42%	58%	9%	4%	8%	20%	0%	59%
9:00 PM - 10:00 PM	6.0%	17%	83%	0.8%	40%	60%	9%	4%	8%	20%	0%	59%
10:00 PM - 11:00 PM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%
11:00 PM - 12:00 AM	0.0%	50%	50%	0.0%	50%	50%	9%	4%	8%	20%	0%	59%

Notes:

1. Weekday and Sunday distributions based on hourly variations for ITE Land Use 820: Shopping Center.
2. Modal splits based on Proposed Sale of Con Edison First Avenue Properties to FSM East River Associates LLC DGEIS, 2002, Table 12-7.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: September 11, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Elementary School Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1361

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of elementary school trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These assumptions are being prepared because the proposed project would result in the construction of an elementary school that would be approximately 56,800 gross square feet (gsf) in size. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

It was assumed that a proposed school of this size would contain approximately 500 students based on a discussion with the New York City School Construction Authority (NYCSCA)[1]. According to the New York City Department of Education, the average attendance rate in Community School District (CSD) 2 in 2002-03 was 94.1 percent for elementary schools. Therefore, on a given school day approximately 471 students would attend. It was also assumed that approximately 60 staff (including faculty, administration, and support personnel) would be required at a school of this size based on discussions with five similar schools in CSD 2[2]. It was assumed that each student would generate 3.6 daily trips (including trips made by adults accompanying children to/from school[3]) and that each staff member would generate 2.0 daily trips.

Temporal Distributions and In/Out Splits

School hours at Manhattan elementary schools typically run between 8:20 am and 2:40 pm or 8:20 am and 2:55 pm. Since students usually arrive and wait in the school yard between 8:00 and 8:20 am, it was conservatively assumed that all student arrivals would occur during the 8-9 am period. Of these trips, 22% were estimated as being outbound (accounting for trips made by adults accompanying children). Based on the trip generation assumptions provided in the *Queens Vocational High School Addition Environmental Assessment Form and Supplemental*

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[1] Assumes 110 to 120 gsf per student.
[2] Based on discussions with elementary schools having enrollments between 400 and 600 students (P.S. 3, P.S. 33, P.S. 40, P.S. 126, and P.S. 183).
[3] For walk trips, adults were assumed to accompany an average of 2 children to school.

Table 1: Elementary School Land Use
Transportation Planning Assumptions

	STUDENTS		STAFF	
Trip Generation:	(1,2)		(1)	
	Weekday		**Weekday**	
Daily Person Trips	3.6		2.0	
	per student		per employee	
Temporal Distribution:	(1,3,4)		(1,3)	
AM (8-9)	50.0%		5.0%	
MD (12-1)	0.0%		0.0%	
PM (5-6)	2.5%		2.5%	
EVE (7-8)	0.0%		0.0%	
EVE (8-9)	0.0%		0.0%	
In/Out Splits:	(1,2)		(1)	
	In	**Out**	**In**	**Out**
AM (8-9)	78%	22%	100%	0%
MD (12-1)	50%	50%	50%	50%
PM (5-6)	22%	78%	0%	100%
EVE (7-8)	50%	50%	50%	50%
EVE (8-9)	50%	50%	50%	50%
Modal Splits:	(1,5,6)		(7)	
Auto	5.0%		10.7%	
Taxi			2.9%	
Bus	25.0%		16.0%	
Subway	-		47.5%	
Railroad	-		17.0%	
Walk	70.0%		5.9%	
	100.0%		100.0%	
Vehicle Occupancy:	(8)		(1,8)	
Auto	2.50		1.65	
Taxi	2.50		1.40	

Truck Trip Generation:	(5)	
	Weekday	
	0.03	
	per student	
	(9)	
AM (8-9)	9.6%	
MD (12-1)	11.0%	
PM (5-6)	1.0%	
EVE (7-8)	0.0%	
EVE (8-9)	0.0%	
	In	**Out**
	50%	50%

Sources:

1. PB Team assumption.
2. Includes adults accompanying children to/from school.
3. Queens Vocational High School Addition Environmental Assessment Form and Supplemental Environmental Studies, 2002, Table 10.
4. 5 percent of students conservatively assumed to depart school during 5-6 pm period due to after-school activities.
5. I.S. 137Q Environmental Assessment Form and Supplemental Report, 2000.
6. Auto/taxi trips would both involve drop-offs/pick-ups; bus trips would involve school buses/other transit.
7. 1990 US Census Reverse Journey-to-Work Data for Tracts between 23rd and 59th Streets, Third and Eighth Avenues.
8. Includes an accompanying adult.
9. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 15.

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Environmental Studies (2002) and a review of the
Battery Park City SEIS Transportation Analyses Backup (1986), it was assumed that 70 percent of staff arrivals would occur during the 7-8 am period (before students arrive) and that 15 percent of staff would arrive during the 8-9 am period.

Since student departures from schools tend to be concentrated within a peak 15-minute period; it was arbitrarily assumed that school would end at 2:40 pm and that these trips would fall within the 2-3 pm period. As a conservative estimate, it was assumed that 90 percent of students would depart immediately after school and the remaining students would stay for after-school activities (with some departing during the 5-6 pm period). It was assumed that 80 percent of the staff would depart the school in the 3-4 pm period and that the remaining employees would depart shortly thereafter. Table 2 and 3 summarize temporal distributions for an expanded 24-hour period for students and staff, respectively.

Modal Splits
Modal splits for student trips were based on the assumptions contained within the *I.S. 137Q Environmental Assessment Form and Supplemental Report* (2000) and include a 70 percent walk modal split. Auto and taxi trips would be similar in nature because they would both involve drop-offs or pick-ups. Elementary school children are generally eligible to take school buses in Manhattan if they live more than half a mile from the school.

For staff members, modal splits were based on 1990 US Census reverse journey-to-work data for the 7:30-9:30 am period for the Midtown Manhattan area (defined as the area bordered by 59th Street on the north, 23rd Street on the south, Third Avenue on the east, and Eighth Avenue on the west). These modal splits are listed in Table 1 and have been summarized for the auto, taxi, bus, subway, railroad, and walk modes. As shown in Tables 2 and 3, modal splits were assumed to remain constant for both students and staff over the entire day.

Vehicle Occupancy
For student trips, a vehicle occupancy rate of 2.5 was selected (including an accompanying adult), based on the *Queens Vocational High School Addition Environmental Assessment Form and Supplemental Environmental Studies*. For staff trips, vehicle occupancy rates of 1.65 for autos and 1.40 for taxis have been assumed, which are typical of Midtown Manhattan for office and developments according to the *CEQR Technical Manual*.

Truck Trip Generation
As shown in Table 1, a daily truck trip generation rate of 0.03 daily truck trips per student has been selected. This rate was developed by using NYCSCA estimates contained within the *I.S. 137Q Environmental Assessment Form and Supplemental Report*, which assume one food service delivery per day for approximately every 160 students, one fuel delivery and one sanitation pickup per day for approximately every 650 students, and one miscellaneous truck trip (such as for special equipment or UPS deliveries) for every 125 students. The temporal distribution of truck trips was based on the Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) for office land uses. No truck trips were assumed to occur during the weekday evening and Sunday afternoon peak hours.

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Table 2: Expanded Weekday 24-Hour Temporal Distributions and Modal Splits for Elementary School Land Use (Students)

Time Period	Temporal Distribution	In	Out	Modal Splits		
				Auto/Taxi	School Bus/Transit	Walk
12:00 AM - 1:00 AM	0.0%	50%	50%	5%	25%	70%
1:00 AM - 2:00 AM	0.0%	50%	50%	5%	25%	70%
2:00 AM - 3:00 AM	0.0%	50%	50%	5%	25%	70%
3:00 AM - 4:00 AM	0.0%	50%	50%	5%	25%	70%
4:00 AM - 5:00 AM	0.0%	50%	50%	5%	25%	70%
5:00 AM - 6:00 AM	0.0%	50%	50%	5%	25%	70%
6:00 AM - 7:00 AM	0.0%	50%	50%	5%	25%	70%
7:00 AM - 8:00 AM	0.0%	50%	50%	5%	25%	70%
8:00 AM - 9:00 AM	50.0%	78%	22%	5%	25%	70%
9:00 AM - 10:00 AM	0.0%	50%	50%	5%	25%	70%
10:00 AM - 11:00 AM	0.0%	50%	50%	5%	25%	70%
11:00 AM - 12:00 PM	0.0%	50%	50%	5%	25%	70%
12:00 PM - 1:00 PM	0.0%	50%	50%	5%	25%	70%
1:00 PM - 2:00 PM	0.0%	50%	50%	5%	25%	70%
2:00 PM - 3:00 PM	45.0%	22%	78%	5%	25%	70%
3:00 PM - 4:00 PM	0.0%	50%	50%	5%	25%	70%
4:00 PM - 5:00 PM	2.5%	22%	78%	5%	25%	70%
5:00 PM - 6:00 PM	2.5%	22%	78%	5%	25%	70%
6:00 PM - 7:00 PM	0.0%	50%	50%	5%	25%	70%
7:00 PM - 8:00 PM	0.0%	50%	50%	5%	25%	70%
8:00 PM - 9:00 PM	0.0%	50%	50%	5%	25%	70%
9:00 PM - 10:00 PM	0.0%	50%	50%	5%	25%	70%
10:00 PM - 11:00 PM	0.0%	50%	50%	5%	25%	70%
11:00 PM - 12:00 AM	0.0%	50%	50%	5%	25%	70%

Notes:

1. Temporal distributions and in/out splits based on PB Team assumptions and observations at PS 116M (includes accompanying adults).
2. Modal splits based on I.S. 137Q Environmental Assessment Form and Supplemental Report, 2000.

Table 3: Expanded Weekday 24-Hour Temporal Distributions and Modal Splits for Elementary School Land Use (Staff)

Time Period	Temporal Distribution	In	Out	Modal Splits					
				Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50%	50%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
1:00 AM - 2:00 AM	0.0%	50%	50%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
2:00 AM - 3:00 AM	0.0%	50%	50%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
3:00 AM - 4:00 AM	0.0%	50%	50%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
4:00 AM - 5:00 AM	0.0%	50%	50%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
5:00 AM - 6:00 AM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
6:00 AM - 7:00 AM	7.5%	100%	0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
7:00 AM - 8:00 AM	35.0%	100%	0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
8:00 AM - 9:00 AM	7.5%	100%	0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
9:00 AM - 10:00 AM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
10:00 AM - 11:00 AM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
11:00 AM - 12:00 PM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
12:00 PM - 1:00 PM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
1:00 PM - 2:00 PM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
2:00 PM - 3:00 PM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
3:00 PM - 4:00 PM	40.0%	0%	100%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
4:00 PM - 5:00 PM	7.5%	0%	100%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
5:00 PM - 6:00 PM	2.5%	0%	100%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
6:00 PM - 7:00 PM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
7:00 PM - 8:00 PM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
8:00 PM - 9:00 PM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
9:00 PM - 10:00 PM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
10:00 PM - 11:00 PM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
11:00 PM - 12:00 AM	0.0%	50%	50%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%

Notes:

1. Temporal distributions and in/out splits based on Queens Vocational High School Addition Environmental Assessment Form and Supplemental Environmental Studies, 2002.
2. Modal splits based on 1990 US Census Reverse Journey-to-Work Data for Tracts between 23rd and 59th Streets, Third and Eighth Avenues.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 27, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Gas Station Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1331

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of gas station trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Vehicle Trip Generation Rates

A daily trip generation rate of 169 vehicles per fueling position was developed for gas stations without convenience stores based on the ITE *Trip Generation Manual* (6th Edition). Similarly, a daily trip generation rate of 163 vehicles per fueling position was developed for gas stations with convenience stores. Because the ITE *Trip Generation Manual* does not include trip generation rates gas stations on weekends, Sunday trip generation rates were assumed to be the same as those on weekdays.

As shown in Table 1, a 45 percent credit[1] for linked trips was subsequently applied to the daily vehicle trip generation rates, yielding a net daily trip generation rate of 93 vehicles per fueling position for gas stations without convenience stores and 90 vehicles per fueling station for gas stations with convenience stores.

Temporal Distributions and In/Out Splits

Daily temporal distributions for the AM and PM peak hours were based on the ITE *Trip Generation Manual* and expanded for a 24-hour period (refer to Table 2) based on the temporal distribution of existing screenline traffic volumes on West 34th Street.

In/out splits were assumed to be equal because vehicles spend a short amount of time on site and a previous study[2] showed little variation between the proportion of inbound and outbound trips.

---

[1] *ITE Trip Generation Handbook* (1998).
[2] *ITE Journal*, "Trip Generation Studies of Gas/Convenience Stores," January 1991.

Table 1: Gas Station Land Use
Transportation Planning Assumptions

Trip Generation:

(Without Convenience Store)	(1,2) Weekday/Sunday
Total Daily Vehicle Trips	169
Net Daily Vehicle Trips	93
	per fueling position

(With Convenience Store)	(2,3) Weekday/Sunday
Total Daily Vehicle Trips	163
Net Daily Vehicle Trips	90
	per fueling position

Temporal Distribution:

	(4,5)
AM (8-9)	6.2%
MD (12-1)	5.5%
PM (5-6)	8.2%
EVE (7-8)	5.2%
EVE (8-9)	4.6%
SUN (4-5)	6.7%

In/Out Splits:

	(6) In	Out
AM (8-9)	50%	50%
MD (12-1)	50%	50%
PM (5-6)	50%	50%
EVE (7-8)	50%	50%
EVE (8-9)	50%	50%
SUN (4-5)	50%	50%

Truck Trip Generation:

(7) Weekday	(8) Sunday
0.35	0.02
per 1,000 gsf retail	

	(7)
AM (8-9)	7.7%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	Out
50%	50%

Sources:

1. ITE Trip Generation, 6th Edition, Land Use 844: Gasoline/Service Station.
2. Pass-by trips assumed to be 45% based on ITE Trip Generation Handbook (1998).
3. ITE Trip Generation, 6th Edition, Land Use 845: Gasoline/Service Station with Convenience Market.
4. PB Team assumptions based on screenline traffic volumes.
5. Sunday temporal distributions and in/out splits based on weekday patterns.
6. ITE Journal, "Trip Generation Studies of Gas/Convenience Stores," January 1991.
7. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 19.
6. Assumes 5% of weekday trip generation rates.

Table 2: Daily Temporal Distributions and Modal Splits for Gas Station Land Use

Time Period	Weekday/Sunday		
	Temporal Distribution[1]	In/Out Split[2]	
12:00 AM - 1:00 AM	2.0%	50%	50%
1:00 AM - 2:00 AM	1.0%	50%	50%
2:00 AM - 3:00 AM	0.5%	50%	50%
3:00 AM - 4:00 AM	0.5%	50%	50%
4:00 AM - 5:00 AM	0.5%	50%	50%
5:00 AM - 6:00 AM	1.5%	50%	50%
6:00 AM - 7:00 AM	3.0%	50%	50%
7:00 AM - 8:00 AM	5.2%	50%	50%
8:00 AM - 9:00 AM	6.2%	50%	50%
9:00 AM - 10:00 AM	5.8%	50%	50%
10:00 AM - 11:00 AM	5.5%	50%	50%
11:00 AM - 12:00 PM	5.2%	50%	50%
12:00 PM - 1:00 PM	5.5%	50%	50%
1:00 PM - 2:00 PM	5.2%	50%	50%
2:00 PM - 3:00 PM	5.5%	50%	50%
3:00 PM - 4:00 PM	5.5%	50%	50%
4:00 PM - 5:00 PM	6.7%	50%	50%
5:00 PM - 6:00 PM	8.2%	50%	50%
6:00 PM - 7:00 PM	6.5%	50%	50%
7:00 PM - 8:00 PM	5.2%	50%	50%
8:00 PM - 9:00 PM	4.6%	50%	50%
9:00 PM - 10:00 PM	4.2%	50%	50%
10:00 PM - 11:00 PM	3.5%	50%	50%
11:00 PM - 12:00 AM	2.5%	50%	50%

Notes:

1. Temporal distributions based on ITE Trip Generation Manual (6th Edition) and 24-hour screenline traffic volumes on West 34th Street.
2. In/out splits based on ITE Journal, "Trip Generation Studies of Gas/Convenience Stores," January 1991.

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Truck Trip Generation

The generation of truck trips associated with fuel deliveries is assumed to be negligible (approximately one tractor trailer trip per week). For gas stations with convenience stores, the generation of truck trips was based on the Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) for retail land uses, resulting in a daily rate of 0.35 daily truck trips per 1,000 gsf retail space (see Table 1). No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day. Sunday truck trip generation rates were assumed to be 5% of weekday rates.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 7, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Hotel Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1116

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of hotel trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a daily trip generation rate of 9.4 person trips per room has been selected, which is consistent with the *CEQR Technical Manual* and several EIS's for hotels in Manhattan[1].

Because transportation impact analyses for hotels are not typically performed outside of the weekday peak hours, there are limited sources of information available for developing a Sunday daily trip generation rate. Although the ITE *Trip Generation Manual* (6th Edition) is not typically used to develop rates for projects in New York City, it includes separate daily trip generation rates for weekdays, Saturdays, and Sundays. The ITE *Trip Generation Manual* can be used to develop a trip generation rate specific to a Manhattan hotel by applying its ratio between Sunday and weekday rates to the standard weekday rate used for a hotel in Manhattan (yielding a Sunday daily trip generation rate of 6.8 person trips per room). A review of previously published EIS's did not find a Sunday trip generation rate for a Manhattan hotel. The *Coliseum Redevelopment FSEIS* included an analysis of a Saturday midday peak hour and used a Saturday daily trip generation rate of 7.4 person trips per room.

Table 2 compares trip generation rates from the *Coliseum Redevelopment FSEIS* and rates developed using ratios between weekend and weekday rates from the ITE *Trip Generation Manual*. In order to utilize a consistent methodology for development of Sunday trip generation ratios for all applicable land uses (e.g. office, residential, etc.), it is recommended to use the ratios from the ITE *Trip Generation Manual*. Additionally, the rates in the ITE *Trip Generation Manual* are based on surveys at a number of locations.

---

[1] *42nd Street Development Project: General Project Plan Amendment FSEIS,* 1994.
Coliseum Redevelopment FSEIS, 1997.

Table 1: Hotel Land Use
Transportation Planning Assumptions

Trip Generation:

	(1) Weekday	(2) Sunday
Daily Person Trips*	9.4	6.8
	per room	

Temporal Distribution:

	(1,3,4)
AM (8-9)	7.5%
MD (12-1)	14.4%
PM (5-6)	12.8%
EVE (7-8)	9.5%
EVE (8-9)	3.8%
SUN (4-5)	7.7%

In/Out Splits:

	(1,3,4) In	Out
AM (8-9)	39%	61%
MD (12-1)	54%	46%
PM (5-6)	65%	35%
EVE (7-8)	56%	44%
EVE (8-9)	56%	44%
SUN (4-5)	55%	45%

Modal Splits:

	(1) AM, PM, EVE, SUN PM	MIDDAY
Auto	9.1%	8.1%
Taxi	17.5%	14.9%
Bus	3.1%	3.2%
Subway	24.2%	12.8%
Railroad	0.0%	0.0%
Walk	46.1%	61.0%
	100.0%	100.0%

Vehicle Occupancy:

	(1)
Auto	1.40
Taxi	1.80

Truck Trip Generation:

	(5) Weekday	(6) Sunday
	0.06	0.00
	per room	

	(1,4,5)
AM (8-9)	12.2%
MD (12-1)	8.7%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	2.0%

In	Out
50%	50%

Sources:

1. Coliseum Redevelopment FSEIS, 1997, Table 12-15.
2. Based on ratio between Sunday and weekday rates for ITE Land Use 310: Hotel.
3. 42nd Street Development Project: General Plan Amendment FSEIS, 1994, Tables II.1-28 - II.1-29.
4. Sunday temporal distributions and in/out splits based on weekday patterns.
5. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 16.
6. Assumes 5% of weekday trip generation rates.

Notes:

*For proposed hotels adjacent to the Jacob K. Javits Convention Center, some trips are assumed to be linked between the sites. For these hotels, 2.0 daily trips per room are assumed to be linked walk trips between the hotel and convention center, based on the methodology used in the Coliseum Redevelopment FSEIS.

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Table 2: Comparison of Daily Trip Generation Rates (person trips per room)

Source of Rates	Weekday	Saturday	Sunday
Developed Using Ratios from the ITE *Trip Generation Manual*	9.4[1]	9.4[2]	6.8[3]
Coliseum Redevelopment FSEIS	9.4[1]	7.4	not analyzed

Notes:
1) Standard weekday daily trip generation rate for a Manhattan hotel.
2) 9.4 trips * 0.995 (ratio of Saturday to weekday trips for ITE Land Use 310: Hotel).
3) 9.4 trips * 0.723 (ratio of Sunday to weekday trips for ITE Land Use 310: Hotel).

As noted in Table 1, for proposed hotels adjacent to the Jacob K. Javits Convention Center, some trips are assumed to be linked between these sites. For these hotels, 2.0 daily trips per room are assumed to be linked walk trips between the hotel and convention center, based on the methodology used in the *Coliseum Redevelopment FSEIS*.

Temporal Distributions and In/Out Splits
For the weekday AM, midday, and PM peak hours, the selected temporal distributions and in/out splits shown in Table 1 are consistent with the rates outlined in the *CEQR Technical Manual* and other EIS's for hotels in Manhattan (see citations above).

Limited information is available for temporal distributions and in/out splits of hotel trips outside of the normal weekday AM, midday, and PM peak hours; the temporal distributions for the weekday 7-8 pm period were obtained from the *42nd Street Development Project: General Plan Amendment FSEIS*. The weekday 8-9 pm period was assumed to have 40% of the temporal distribution and the same in/out modal splits of the weekday 7-8 pm period. The temporal distribution for the Sunday 4-5 pm period was assumed to be approximately 60% of the weekday 5-6 pm peak hour. It should be noted that the temporal distribution selected for the Sunday 4-5 pm period (7.7%) is similar to the temporal distribution for the Saturday midday (1-2 pm) period that was used in the *Coliseum Redevelopment FSEIS* (7.5%).

Table 3 summarizes temporal distributions and in/out splits for an expanded 24-hour period. The patterns for time periods outside of the analyzed peak hours were assumed based on a review of door counts from a weekday 8 am – 6 pm survey at the Vista Hotel in Lower Manhattan contained within the *Special Convention Center District and Convention Center Hotel Development FEIS* (1989). Due to the established consistent times of check-in and check-out, the temporal distributions on a Sunday were assumed to be the same as on a weekday.

Modal Splits
The selected modal split assumptions were based on the *Coliseum Redevelopment FSEIS*. As shown in Table 3, the modal splits utilized for the weekday AM, PM, evening, and Saturday afternoon peak hours were assumed for the midnight – 11 am and 2 pm – midnight periods and the modal splits utilized for the weekday midday peak hour were assumed for the 11 am – 2 pm period.

Vehicle Occupancy
Vehicle occupancy rates of 1.40 for autos and 1.80 for taxis have been selected, based on the *Coliseum Redevelopment FEIS*.

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Truck Trip Generation

The Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) was used in the selection of a weekday truck trip generation rate (0.06 truck trips per 1,000 gsf) and temporal distributions (shown in Table 1). No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day.

Because a limited amount of information is available for the generation of truck trips on Sundays, it is proposed that Sunday truck trip generation rates be assumed to be 5% of weekday rates and based on weekday patterns. These are the same methodologies that were used in the *Coliseum Redevelopment FSEIS*.

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Table 3: Daily Temporal Distributions and Modal Splits for Hotel Land Use

Time Period	Weekday/Sunday[1]			Modal Splits[2]					
	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50.0%	50.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
1:00 AM - 2:00 AM	0.0%	50.0%	50.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
2:00 AM - 3:00 AM	0.0%	50.0%	50.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
3:00 AM - 4:00 AM	0.0%	50.0%	50.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
4:00 AM - 5:00 AM	0.0%	50.0%	50.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
5:00 AM - 6:00 AM	0.0%	50.0%	50.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
6:00 AM - 7:00 AM	2.0%	15.0%	85.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
7:00 AM - 8:00 AM	4.1%	20.0%	80.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
8:00 AM - 9:00 AM	7.5%	39.0%	61.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
9:00 AM - 10:00 AM	6.0%	40.0%	60.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
10:00 AM - 11:00 AM	5.0%	45.0%	55.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
11:00 AM - 12:00 PM	5.0%	50.0%	50.0%	8.1%	14.9%	3.2%	12.8%	0.0%	61.0%
12:00 PM - 1:00 PM	14.4%	54.0%	46.0%	8.1%	14.9%	3.2%	12.8%	0.0%	61.0%
1:00 PM - 2:00 PM	5.0%	45.0%	55.0%	8.1%	14.9%	3.2%	12.8%	0.0%	61.0%
2:00 PM - 3:00 PM	4.0%	40.0%	60.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
3:00 PM - 4:00 PM	4.0%	45.0%	55.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
4:00 PM - 5:00 PM	7.7%	55.0%	45.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
5:00 PM - 6:00 PM	12.8%	65.0%	35.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
6:00 PM - 7:00 PM	7.0%	60.0%	40.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
7:00 PM - 8:00 PM	9.5%	56.0%	44.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
8:00 PM - 9:00 PM	3.8%	56.0%	44.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
9:00 PM - 10:00 PM	1.4%	56.0%	44.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
10:00 PM - 11:00 PM	0.6%	56.0%	44.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%
11:00 PM - 12:00 AM	0.2%	56.0%	44.0%	9.1%	17.5%	3.1%	24.2%	0.0%	46.1%

Notes:

1. Distributions based on Coliseum Redevelopment FSEIS, 1997, Table 12-15, 42nd Street Development Project: General Plan Amendment FSEIS, 1994, Tables II.1-28 - II.1-29, and Convention Center Hotel Development FEIS, 1989, Table B-6.
2. Modal splits based on Coliseum Redevelopment FEIS.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 7, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Light Industrial Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1068

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of light industrial trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a daily trip generation rate of 11.5 person trips per 1,000 gross square feet (gsf) of development has been selected, which was based on the *Hudson Square Rezoning DEIS* (2002). Although the *ITE Trip Generation Manua*l (6th Edition) is not typically used to develop rates for projects in New York City, it includes separate daily trip generation rates for weekdays, Saturdays, and Sundays. By applying the ratio between Sunday and weekday rates from the ITE *Trip Generation Manual* (6th Edition) to this rate, a Sunday daily trip generation rate of 1.1 person trips per 1,000 gsf of development can be developed[1]. It is important to note that because transportation impact analyses for light industrial facilities are not typically performed outside of the weekday peak hours, there are limited sources of information available for developing a Sunday daily trip generation rate. Consequently, no previously published EIS's were found containing weekend trip generation rates for light industrial uses.

Temporal Distributions and In/Out Splits

For the weekday AM, midday, and PM peak hours, the selected temporal distributions and in/out splits are based on the *Hudson Square Rezoning DEIS*. Because no other data is available outside of these peak hours, assumptions for temporal distributions and in/out splits were made for the weekday evening and Sunday afternoon peak hours. These assumptions were based on a review of travel patterns at Manhattan office buildings. The temporal distribution for the weekday 7-8 pm peak hour was assumed to be approximately 5% of the weekday 5-6 pm peak hour. For the weekday 8-9 pm peak hour, the temporal distribution was assumed to be 2% of the weekday 5-6 pm peak hour. The temporal distribution for the Sunday 4-5 pm peak hour was assumed to be approximately 60% of the weekday 5-6 pm peak hour.

[1] 11.5 trips * 0.098 (ratio of Sunday to weekday trips for ITE Land Use 110: General Light Industrial).

Table 1: Light Industrial Land Use
Transportation Planning Assumptions

Trip Generation:

	(1) Weekday	(2) Sunday
Daily Person Trips	11.5	1.1

per 1,000 gsf

Temporal Distribution:

	(1,3,4)
AM (8-9)	13.0%
MD (12-1)	10.0%
PM (5-6)	14.0%
EVE (7-8)	0.7%
EVE (8-9)	0.3%
SUN (4-5)	8.4%

In/Out Splits: (1,3,4)

	In	Out
AM (8-9)	88%	12%
MD (12-1)	50%	50%
PM (5-6)	12%	88%
EVE (7-8)	20%	80%
EVE (8-9)	20%	80%
SUN (4-5)	15%	85%

Modal Splits:

	Hudson Yards Area with No. 7 Subway Extension		Hudson Yards Area without No. 7 Subway Extension	
	(5) AM, PM, EVE, SUN PM	(1) MIDDAY	(6) AM, PM, EVE, SUN PM	(1) MIDDAY
Auto	10.7%	2%	16.3%	2%
Taxi	2.9%	3%	1.9%	3%
Bus	16.0%	6%	14.3%	6%
Subway	47.5%	6%	50.9%	6%
Railroad	17.0%	0%	11.3%	0%
Walk	5.9%	83%	5.3%	83%
	100.0%	100%	100.0%	100%

Vehicle Occupancy:

	(7)
Auto	1.65
Taxi	1.40

Truck Trip Generation:

	(1) Weekday	(8) Sunday
	0.52	0.03

per 1,000 gsf

	(1,4,9)
AM (8-9)	14.0%
MD (12-1)	8.6%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	Out
50%	50%

Sources:

1. Hudson Square Rezoning DEIS, 2002, Table XIII-6.
2. Based on ratio between Sunday and weekday rates for ITE Land Use 110: General Light Industrial.
3. Weekday evening temporal distributions and in/out splits based on PB Team assumptions.
4. Sunday temporal distributions and in/out splits assumed to be based on weekday patterns.
5. 1990 US Census Reverse Journey-to-Work Data for Tracts between 23rd and 59th Streets, Third and Eighth Avenues.
6. 1990 US Census Reverse Journey-to-Work Data for Tracts 99, 103, 111, 115, 117, 129.
7. PB Team assumption.
8. Assumes 5% of weekday trip generation rates.
9. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 18.

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Table 2 summarizes temporal distributions and in/out splits for an expanded 24-hour period. The patterns for time periods outside of the analyzed peak hours were assumed, using the temporal distributions for office buildings in *Urban Space for Pedestrians* as a guide.

Modal Splits

The methodology used to determine modal splits for light industrial uses is the same that is used for office uses. As was generally agreed at the May 21, 2003 Travel Demand Forecasting Working Group meeting, 1990 US Census reverse journey-to-work data for the 7:30-9:30 am period for the Midtown Manhattan area (defined as the area bordered by 59th Street on the north, 23rd Street on the south, Third Avenue on the east, and Eighth Avenue on the west) will be used to forecast modal splits for office land uses in the future Build condition with the Hudson Yards Development (and the No. 7 subway line). These modal splits are listed in Table 1 and have been summarized for the auto, taxi, bus, subway, railroad, and walk modes. These modal splits will be utilized for the weekday AM, PM, evening, and Saturday afternoon peak hours. A separate set of modal split assumptions has been included for the weekday midday peak hour and is based on the *Hudson Square Rezoning DEIS*.

Existing census data were also tabulated for the Hudson Yards Development area for comparative purposes. As shown in Table 1, the major differences are that the Midtown Manhattan area has lower auto modal splits and higher commuter rail modal splits compared to the existing Hudson Yards Development area.

As shown in Table 2, the modal splits utilized for the weekday AM, PM, evening, and Saturday afternoon peak hours were assumed for the midnight – 11 am and 2 pm – midnight periods and the modal splits utilized for the weekday midday peak hour were assumed for the 11 am – 2 pm period.

Vehicle Occupancy

Vehicle occupancy rates of 1.65 for autos and 1.40 for taxis have been selected, which are the same occupancies that were selected for the office land use.

Truck Trip Generation

The selected weekday truck trip generation rate and temporal distributions (shown in Table 1) were based on the *Hudson Square Rezoning DEIS* and the Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981). No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day.

Because a limited amount of information is available for the generation of truck trips on Sundays, it is proposed that Sunday truck trip generation rates be assumed to be 5% of weekday rates and based on weekday patterns. These are the same methodologies that were used in the *Coliseum Redevelopment FSEIS* (1997).

cc: L. Lennon
D. Fields

Table 2: Daily Temporal Distributions and Modal Splits for Light Industrial Land Use

Time Period	Weekday/Sunday[1]			Modal Splits[2,3]					
	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
1:00 AM - 2:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
2:00 AM - 3:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
3:00 AM - 4:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
4:00 AM - 5:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
5:00 AM - 6:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
6:00 AM - 7:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
7:00 AM - 8:00 AM	2.1%	85.0%	15.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
8:00 AM - 9:00 AM	13.0%	88.0%	12.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
9:00 AM - 10:00 AM	12.0%	85.0%	15.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
10:00 AM - 11:00 AM	5.5%	80.0%	20.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
11:00 AM - 12:00 PM	6.5%	55.0%	45.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
12:00 PM - 1:00 PM	10.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
1:00 PM - 2:00 PM	10.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
2:00 PM - 3:00 PM	8.0%	40.0%	60.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
3:00 PM - 4:00 PM	6.0%	30.0%	70.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
4:00 PM - 5:00 PM	8.4%	15.0%	85.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
5:00 PM - 6:00 PM	14.0%	12.0%	88.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
6:00 PM - 7:00 PM	3.5%	15.0%	85.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
7:00 PM - 8:00 PM	0.7%	20.0%	80.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
8:00 PM - 9:00 PM	0.3%	20.0%	80.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
9:00 PM - 10:00 PM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
10:00 PM - 11:00 PM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
11:00 PM - 12:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%

Notes:

1. Distributions based on ITE Land Use 110: General Light Industrial and Pushkarev & Zupan, "Urban Space for Pedestrians," 1975, Table 2.7.
2. Morning and afternoon modal splits based on 1990 US Census Reverse Journey-to-Work data for Tracts 99, 103, 111, 115, 117, 129.
3. Midday modal splits based on Hudson Square Rezoning DEIS, 2002, Table XIII-6.

PB Team

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 7, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Local Retail Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1021

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of local retail trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a total daily trip generation rate of 205 person trips per 1,000 gross square feet (gsf) of development has been selected[1], which is consistent with the *CEQR Technical Manual* and several EIS's for local retail in Manhattan[2].

Three previously published EIS's were found to include daily trip generation rates for local retail land uses on weekends; the *Hudson River Park FEIS* included weekday and Sunday daily trip generation rates and both the *Chelsea Piers FEIS* and the *Coliseum Redevelopment FSEIS* included weekday and Saturday daily trip generation rates. All three of these EIS's used the same daily trip generation rate for a weekday as on a Saturday or Sunday (based on the *Riverside South FEIS* (1991); these rates are believed to be assumptions). However, *Urban Space for Pedestrians* provides different daily trip generation rates for a weekday (205 person trips per 1,000 gsf) and a Saturday (488 person trips per 1,000 gsf), which are based on surveys in Manhattan.

Although the ITE *Trip Generation Manual* (6th Edition) is not typically used to develop rates for projects in New York City, it includes separate daily trip generation rates for weekdays, Saturdays, and Sundays. The ITE *Trip Generation Manual* can be used to develop a trip generation rate specific to Manhattan local retail by applying its ratio between Sunday and Saturday rates to the Saturday rate for local retail in Manhattan in *Urban Space for Pedestrians* (yielding a Sunday daily trip generation rate of 246 person trips per 1,000 gsf).

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[1] This rate is based on Pushkarev and Zupan's *Urban Space for Pedestrians* (1975) and does not include linked trips.
[2] *Chelsea Piers FEIS*, 1993.
Coliseum Redevelopment FEIS, 1997.
Hudson River Park FEIS, 1998.
River Center FEIS, 1999.

Table 1: Local Retail Land Use
Transportation Planning Assumptions

Trip Generation:	(1,2)	(2,3,4)
	Weekday	**Sunday**
Total Daily Person Trips	205	246
Net Daily Person Trips	154	185
	per 1,000 gsf	

Temporal Distribution:	(1,3,5)
AM (8-9)	3.1%
MD (12-1)	19.0%
PM (5-6)	9.6%
EVE (7-8)	3.0%
EVE (8-9)	1.1%
SUN (4-5)	13.9%

In/Out Splits:	(1)	
	In	**Out**
AM (8-9)	50%	50%
MD (12-1)	50%	50%
PM (5-6)	50%	50%
EVE (7-8)	50%	50%
EVE (8-9)	50%	50%
SUN (4-5)	50%	50%

Modal Splits:	(1)
Auto	2%
Taxi	3%
Bus	6%
Subway	6%
Railroad	0%
Walk	83%
	100%

Vehicle Occupancy:	(1)
Auto	1.65
Taxi	1.40

Truck Trip Generation:	(1)	(6)
	Weekday	**Sunday**
	0.35	0.02
	per 1,000 gsf	

	(1,7,8)
AM (8-9)	7.7%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

	In	**Out**
	50%	50%

Sources:

1. Coliseum Redevelopment FSEIS, 1997, Table 12-15.
2. Net trips assume 25% linked trips as per CEQR Technical Manual, 3O-23.
3. Pushkarev & Zupan, "Urban Space for Pedestrians," 1975, Tables 2.4 and 2.7.
4. Based Saturday daily trip generation rate of 488 person trips per 1,000 gsf from Urban Space for Pedestrians and ratio between Sunday and Saturday rates for ITE Land Use 820: Shopping Center.
5. Sunday temporal distribution based on Sunday hourly variation for ITE Land Use 820: Shopping Center.
6. Assumes 5% of weekday trip generation rates.
7. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 19.
8. Sunday truck temporal distributions and in/out splits based on weekday patterns.

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Table 2 compares daily trip generation rates developed from the ITE *Trip Generation Manual*, those found in previously published EIS's, and *Urban Space for Pedestrians*. As shown in Table 2, the ITE *Trip Generation Manual* and *Urban Space for Pedestrians* both indicate a variation in retail usage between weekdays and weekends based on surveys. Therefore, using the same daily trip generation rates for weekdays and Sundays (as was done in previous EIS's) is not recommended. In order to utilize a consistent methodology for development of Sunday trip generation ratios for all applicable land uses (e.g. residential, office, etc.), it is recommended to use the ratios from the ITE *Trip Generation Manual*, which are based on surveys at a number of locations.

As shown in Table 1, a 25 percent credit for linked trips was subsequently applied to the total daily trip generation rates, yielding in a net weekday daily trip generation rate of 154 person trips per 1,000 gsf and a net Sunday daily trip generation rate of 185 person trips per 1,000 gsf. The assumption of 25 percent linked trips to retail uses is consistent with the *CEQR Technical Manual*.

Table 2: Comparison of Daily Trip Generation Rates for Local Retail Uses (person trips per 1,000 gsf of local retail space)

Source of Rates	Weekday	Saturday	Sunday
Chelsea Piers FEIS	103[1]	103[1]	n/a
Coliseum Redevelopment FSEIS	205[2]	205	n/a
Hudson River Park FEIS	103[1]	n/a	103[1]
Urban Space for Pedestrians	205[2]	488	n/a
Developed Using Ratios from the ITE *Trip Generation Manual*	205[2]	488[3]	246[4]

Notes:
1) Accounts for 50% linked trips.
2) Standard weekday daily trip generation rate for Manhattan boutique retail.
3) Uses Saturday daily trip generation rate from *Urban Space for Pedestrians*, Table 2.4.
4) 488 trips * 0.505 (ratio of Sunday to Saturday trips for ITE Land Use 820: Shopping Center).

Temporal Distributions and In/Out Splits

For the weekday AM, midday, and PM peak hours, the selected temporal distributions and in/out splits shown in Table 1 are consistent with the rates from the *Coliseum Redevelopment FSEIS*. Temporal distributions for the weekday 7-8 pm and 8-9 pm peak hours were based on *Urban Space for Pedestrians*. The temporal distribution and in/out splits for the Sunday afternoon peak hour (4-5 pm) have been based on the Sunday hourly variation of shopping center traffic in the ITE *Trip Generation Manual*[3]. The in/out splits for the weekday evening and Sunday afternoon peak hours were assumed to be the same as the weekday AM, midday, and PM peak hours.

Table 3 summarizes temporal distributions and in/out splits for expanded 24-hour periods on a weekday and a Sunday; weekday patterns were based on *Urban Space for Pedestrians* and Sunday patterns were based on the Sunday hourly variation of shopping center traffic in the ITE *Trip Generation Manual.*

[3] These were based on the hourly variation of traffic at shopping centers over 300,000 square feet of gross leasable area. Although the ITE *Trip Generation Manual* includes hourly variations in shopping center traffic under 100,000 square feet gross leasable area, this data does not include Sunday patterns.

Table 3: Daily Temporal Distributions and Modal Splits for Local Retail Land Use

Time Period	Weekday[1]			Sunday[2]			Modal Splits[3]					
	Temporal Distribution	In	Out	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
1:00 AM - 2:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
2:00 AM - 3:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
3:00 AM - 4:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
4:00 AM - 5:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
5:00 AM - 6:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
6:00 AM - 7:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
7:00 AM - 8:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
8:00 AM - 9:00 AM	3.1%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
9:00 AM - 10:00 AM	3.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
10:00 AM - 11:00 AM	4.1%	50.0%	50.0%	2.7%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
11:00 AM - 12:00 PM	7.2%	50.0%	50.0%	6.7%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
12:00 PM - 1:00 PM	19.0%	50.0%	50.0%	11.3%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
1:00 PM - 2:00 PM	18.8%	50.0%	50.0%	14.8%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
2:00 PM - 3:00 PM	10.7%	50.0%	50.0%	16.1%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
3:00 PM - 4:00 PM	6.8%	50.0%	50.0%	15.7%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
4:00 PM - 5:00 PM	6.7%	50.0%	50.0%	13.9%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
5:00 PM - 6:00 PM	9.6%	50.0%	50.0%	11.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
6:00 PM - 7:00 PM	6.9%	50.0%	50.0%	4.3%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
7:00 PM - 8:00 PM	3.0%	50.0%	50.0%	1.7%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
8:00 PM - 9:00 PM	1.1%	50.0%	50.0%	1.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
9:00 PM - 10:00 PM	0.0%	50.0%	50.0%	0.8%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
10:00 PM - 11:00 PM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
11:00 PM - 12:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%

Notes:

1. Weekday distributions based on Pushkarev & Zupan, "Urban Space for Pedestrians," 1975, Table 2.7.
2. Sunday temporal distribution based on Sunday hourly variation for ITE Land Use 820: Shopping Center.
3. Modal splits based on Coliseum Redevelopment FSEIS, 1997, Table 12-15.

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Modal Splits

The selected modal split assumptions for all peak hours were based on the *Coliseum Redevelopment FSEIS* and include an 83% walk share. As shown in Table 3, modal splits were assumed to remain constant over the entire day.

Vehicle Occupancy

Vehicle occupancy rates of 1.65 for autos and 1.40 for taxis have been selected, which are consistent with other EIS's for local retail in Manhattan (see citations above). Although the *Hudson River Park FEIS* used auto and taxi vehicle occupancies of 2.00, these higher vehicle occupancies are more typical of destination retail than local retail land uses.

Truck Trip Generation

The Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) was used in the selection of a weekday truck trip generation rate (0.35 truck trips per 1,000 gsf) and temporal distributions (shown in Table 1). No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day.

Because a limited amount of information is available for the generation of truck trips on Sundays, it is proposed that Sunday truck trip generation rates be assumed to be 5% of weekday rates and based on weekday patterns. These are the same methodologies that were used in the *Coliseum Redevelopment FSEIS*.

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D. Fields

PB Team

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 7, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Manufacturing Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1069

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of manufacturing trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a daily trip generation rate of 5.0 person trips per 1,000 gross square feet (gsf) of development has been selected, which was developed from the ITE *Trip Generation Manual* (6th Edition)[1]. A Sunday daily trip generation rate of 0.8 person trips per 1,000 gsf was developed from the ITE *Trip Generation Manual* using the same methodology[2]. It is important to note that no previously published EIS's were found containing trip generation rates for manufacturing land uses in Manhattan.

Temporal Distributions and In/Out Splits

For the weekday AM and PM peak hours, the selected temporal distributions and in/out splits are based on the ITE *Trip Generation Manual*. Because the ITE *Trip Generation Manual* does not include data outside of the weekday AM and PM peak hours, assumptions for temporal distributions and in/out splits were made for the weekday midday, weekday evening and Sunday afternoon peak hours. These assumptions were based on a review of travel patterns at Manhattan office buildings. The temporal distribution for the weekday 7-8 pm peak hour was assumed to be approximately 5% of the weekday 5-6 pm peak hour. For the weekday 8-9 pm peak hour, the temporal distribution was assumed to be 2% of the weekday 5-6 pm peak hour. The temporal distribution for the Sunday 4-5 pm peak hour was assumed to be approximately 60% of the weekday 5-6 pm peak hour.

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[1] Adapted from ITE Land Use 140, Manufacturing: 3.82 trips * 1.25 (assumed auto occupancy) / 95% (assumed auto modal share).

[2] Adapted from ITE Land Use 140, Manufacturing: 0.62 trips * 1.25 (assumed auto occupancy) / 95% (assumed auto modal share).

Table 1: Manufacturing Land Use
Transportation Planning Assumptions

Trip Generation:

	(1) Weekday	(1) Sunday
Daily Person Trips	5.0	0.8

per 1,000 gsf

Temporal Distribution:

	(1,2,3)
AM (8-9)	19.0%
MD (12-1)	13.0%
PM (5-6)	19.0%
EVE (7-8)	1.0%
EVE (8-9)	0.4%
SUN (4-5)	11.4%

In/Out Splits:

	(1,2,3) In	Out
AM (8-9)	77%	23%
MD (12-1)	50%	50%
PM (5-6)	36%	64%
EVE (7-8)	20%	80%
EVE (8-9)	20%	80%
SUN (4-5)	36%	64%

Modal Splits:

	Hudson Yards Area with No. 7 Subway Extension		Hudson Yards Area without No. 7 Subway Extension	
	(4) AM, PM, EVE, SUN PM	(5) MIDDAY	(6) AM, PM, EVE, SUN PM	(5) MIDDAY
Auto	10.7%	2%	16.3%	2%
Taxi	2.9%	3%	1.9%	3%
Bus	16.0%	6%	14.3%	6%
Subway	47.5%	6%	50.9%	6%
Railroad	17.0%	0%	11.3%	0%
Walk	5.9%	83%	5.3%	83%
	100.0%	100%	100.0%	100%

Vehicle Occupancy:

	(5)
Auto	1.65
Taxi	1.40

Truck Trip Generation:

	(5) Weekday	(7) Sunday
	0.52	0.03

per 1,000 gsf

	(3,8)
AM (8-9)	14.0%
MD (12-1)	8.6%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	Out
50%	50%

Sources:

1. ITE Trip Generation, 6th Edition, Land Use 140: Manufacturing.
   Daily trip generation rates calculated based on auto occupancy of 1.25 and auto modal split of 95%.
2. Weekday midday and evening temporal distributions and in/out splits based on PB Team assumptions.
3. Sunday temporal distributions and in/out splits assumed to be based on weekday patterns.
4. 1990 US Census Reverse Journey-to-Work Data for Tracts between 23rd and 59th Streets, Third and Eighth Avenues.
5. PB Team assumption.
6. 1990 US Census Reverse Journey-to-Work Data for Tracts 99, 103, 111, 115, 117, 129.
7. Assumes 5% of weekday trip generation rates.
8. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 18.

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Table 2 summarizes temporal distributions for an
expanded 24-hour period. The patterns for time periods outside of the analyzed peak hours were assumed, using the temporal distributions for office buildings in *Urban Space for Pedestrians* as a guide.

Modal Splits
The methodology used to determine modal splits for manufacturing uses is the same that is used for office uses. As was generally agreed at the May 21, 2003 Travel Demand Forecasting Working Group meeting, 1990 US Census reverse journey-to-work data for the 7:30-9:30 am period for the Midtown Manhattan area (defined as the area bordered by 59th Street on the north, 23rd Street on the south, Third Avenue on the east, and Eighth Avenue on the west) will be used to forecast modal splits for office land uses in the future Build condition with the Hudson Yards Development (and the No. 7 subway line). These modal splits are listed in Table 1 and have been summarized for the auto, taxi, bus, subway, railroad, and walk modes. These modal splits will be utilized for the weekday AM, PM, evening, and Saturday afternoon peak hours. A separate set of modal split assumptions has been included for the weekday midday peak hour and is based on the *Hudson Square Rezoning DEIS* (2002).

Existing census data were also tabulated for the Hudson Yards Development area for comparative purposes. As shown in Table 1, the major differences are that the Midtown Manhattan area has lower auto modal splits and higher commuter rail modal splits compared to the existing Hudson Yards Development area.

As shown in Table 2, the modal splits utilized for the weekday AM, PM, evening, and Saturday afternoon peak hours were assumed for the midnight – 11 am and 2 pm – midnight periods and the modal splits utilized for the weekday midday peak hour were assumed for the 11 am – 2 pm period.

Vehicle Occupancy
Vehicle occupancy rates of 1.65 for autos and 1.40 for taxis have been selected, which are the same occupancies that were selected for the office land use.

Truck Trip Generation
The selected weekday truck trip generation rate and temporal distributions (shown in Table 1) were based on the *Hudson Square Rezoning DEIS* (for light industrial uses) and the Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) for light industrial/warehousing land uses. No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day.

Because a limited amount of information is available for the generation of truck trips on Sundays, it is proposed that Sunday truck trip generation rates be assumed to be 5% of weekday rates and based on weekday patterns. These are the same methodologies that were used in the *Coliseum Redevelopment FSEIS* (1997).

cc: L. Lennon
D. Fields

Table 2: Daily Temporal Distributions and Modal Splits for Manufacturing Land Use

Time Period	Weekday/Sunday[1]			Modal Splits[2,3]					
	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
1:00 AM - 2:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
2:00 AM - 3:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
3:00 AM - 4:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
4:00 AM - 5:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
5:00 AM - 6:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
6:00 AM - 7:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
7:00 AM - 8:00 AM	1.5%	60.0%	40.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
8:00 AM - 9:00 AM	19.0%	77.0%	23.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
9:00 AM - 10:00 AM	10.0%	60.0%	40.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
10:00 AM - 11:00 AM	2.0%	55.0%	45.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
11:00 AM - 12:00 PM	4.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
12:00 PM - 1:00 PM	13.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
1:00 PM - 2:00 PM	9.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
2:00 PM - 3:00 PM	4.0%	45.0%	55.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
3:00 PM - 4:00 PM	2.0%	40.0%	60.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
4:00 PM - 5:00 PM	11.4%	36.0%	64.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
5:00 PM - 6:00 PM	19.0%	36.0%	64.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
6:00 PM - 7:00 PM	3.7%	15.0%	85.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
7:00 PM - 8:00 PM	1.0%	20.0%	80.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
8:00 PM - 9:00 PM	0.4%	20.0%	80.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
9:00 PM - 10:00 PM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
10:00 PM - 11:00 PM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
11:00 PM - 12:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%

Notes:

1. Distributions based on ITE Land Use 140: Manufacturing and Pushkarev & Zupan, "Urban Space for Pedestrians," 1975, Table 2.7.
2. Morning and afternoon modal splits based on 1990 US Census Reverse Journey-to-Work data for Tracts 99, 103, 111, 115, 117, 129.
3. Midday modal splits based on Hudson Square Rezoning DEIS, 2002, Table XIII-6.

PB Team

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 29, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Mini-Storage Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1340

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of mini-storage trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are being developed because as a result of the proposed project, there is a potential for the displacement of the American Self-Storage facility on Tenth Avenue, which is approximately 209,600 gross square feet (gsf) in size. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a daily trip generation rate of 4.97 person trips per 1,000 gross square feet (gsf) has been selected, which was based on the *West 57th Street Rezoning FEIS* (2001). By applying the ratio between Sunday and weekday rates from the ITE *Trip Generation Manual* (6th Edition) to this rate, a Sunday daily trip generation rate of 3.54 person trips per 1,000 gsf can be developed[1]. It is important to note that because transportation impact analyses for mini-storage facilities are not typically performed outside of the weekday peak hours, there are limited sources of information available for developing a Sunday daily trip generation rate. Consequently, no previously published EIS's were found containing weekend trip generation rates for mini-storage land uses.

Temporal Distributions and In/Out Splits

For the weekday AM, midday, and PM peak hours, the selected temporal distributions were based on the *West 57th Street Rezoning FEIS* and in/out splits were assumed to be equal[2]. No trips were assumed to occur during the weekday evening and Sunday afternoon peak hours because the mini-storage facility is open from 8 am – 7 pm on weekdays and from 9 am – 4 pm on Sundays. Table 2 summarizes temporal distributions for an expanded 24-hour period on a weekday and Sunday. The travel patterns for time periods outside of the weekday AM, midday, and PM peak hours were assumed.

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[1] 4.97 trips * 0.712 (ratio of Sunday to weekday trips for ITE Land Use 151: Mini-Warehouse).
[2] The in/out splits from the *West 57th Street Rezoning FEIS* were not utilized because they would result in a negative accumulation of vehicles during the midday period.

Table 1: Mini-Storage Land Use
Transportation Planning Assumptions

Trip Generation:

	(1) Weekday	(2) Sunday
Total Daily Person Trips	4.97	3.54
	per 1,000 gsf	

Temporal Distribution:

	(1)
AM (8-9)	10.7%
MD (12-1)	11.0%
PM (5-6)	11.2%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	0.0%

In/Out Splits:

	(3) In	Out
AM (8-9)	50%	50%
MD (12-1)	50%	50%
PM (5-6)	50%	50%
EVE (7-8)	50%	50%
EVE (8-9)	50%	50%
SUN (4-5)	50%	50%

Modal Splits:

	(1)
Auto	95%
Taxi	0%
Bus	0%
Subway	0%
Walk	5%
	100%

Vehicle Occupancy:

	(1)
Auto	2.00
Taxi	-

Sources:

1. West 57th Street Rezoning FEIS, 2001, Table 11-10.
2. Based on ratio between Sunday and weekday rates for ITE Land Use 151: Mini-Warehouse.
3. In/out splits assumed to be equal based on PB Team assumptions.

Table 2: Expanded 24-Hour Temporal Distributions and Modal Splits for Mini-Storage Land Use

Time Period	Weekday			Sunday			Modal Splits[4]	
	Temporal Distribution[1,2]	In/Out Splits[3]		Temporal Distribution[2]	In/Out Splits[3]			
		In	Out		In	Out	Auto	Walk
12:00 AM - 1:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
1:00 AM - 2:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
2:00 AM - 3:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
3:00 AM - 4:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
4:00 AM - 5:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
5:00 AM - 6:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
6:00 AM - 7:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
7:00 AM - 8:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
8:00 AM - 9:00 AM	10.7%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
9:00 AM - 10:00 AM	9.0%	50.0%	50.0%	14.0%	50.0%	50.0%	95.0%	5.0%
10:00 AM - 11:00 AM	9.0%	50.0%	50.0%	14.0%	50.0%	50.0%	95.0%	5.0%
11:00 AM - 12:00 PM	9.0%	50.0%	50.0%	14.0%	50.0%	50.0%	95.0%	5.0%
12:00 PM - 1:00 PM	11.0%	50.0%	50.0%	15.0%	50.0%	50.0%	95.0%	5.0%
1:00 PM - 2:00 PM	9.0%	50.0%	50.0%	15.0%	50.0%	50.0%	95.0%	5.0%
2:00 PM - 3:00 PM	8.0%	50.0%	50.0%	14.0%	50.0%	50.0%	95.0%	5.0%
3:00 PM - 4:00 PM	8.0%	50.0%	50.0%	14.0%	50.0%	50.0%	95.0%	5.0%
4:00 PM - 5:00 PM	9.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
5:00 PM - 6:00 PM	11.2%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
6:00 PM - 7:00 PM	6.1%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
7:00 PM - 8:00 PM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
8:00 PM - 9:00 PM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
9:00 PM - 10:00 PM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
10:00 PM - 11:00 PM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%
11:00 PM - 12:00 AM	0.0%	50.0%	50.0%	0.0%	50.0%	50.0%	95.0%	5.0%

Notes:

1. Temporal distributions for AM, midday, and PM peak hours based on West 57th Street Rezoning FEIS, 2001, Table 11-10.
2. Temporal distributions for other hours based on PB Team assumptions.
3. All in/out splits assumed to be equal.
4. Modal splits based on West 57th Street Rezoning FEIS, 2001, Table 11-10.

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Modal Splits
A 95% auto modal split and 5% walk modal split was selected, based on the *West 57th Street Rezoning FEIS*. As shown in Table 2, modal splits were assumed to remain constant over the entire day.

Vehicle Occupancy
A vehicle occupancy rate of 2.00 for autos was selected, based on the *West 57th Street Rezoning FEIS*.

Truck Trip Generation
Similar to the *West 57th Street Rezoning FSEIS*, no daily truck trip generation rates have been included for the mini-storage facility.

cc: L. Lennon
D. Fields

PB Team

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FINAL *MEMORANDUM*

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: November 11, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Madison Square Garden Relocation and Expansion Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1689

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for a potential relocation and expansion of Madison Square Garden (MSG) in the traffic, parking, transit, and pedestrian analyses of the DGEIS. Under the proposed action, MSG – currently located on the western portion of the block bounded by West 31st Street, West 33rd Street, Seventh Avenue, and Eighth Avenue – would move approximately one and a half blocks to the west (to the eastern portion of the block bounded by West 31st Street, West 33rd Street, Ninth Avenue, and Tenth Avenue). Regardless of its future location[1], the DGEIS will also assume that the overall seating capacity of MSG would be increased.[2]

Background

MSG is the home of three sports franchises: the New York Rangers (NHL hockey), New York Knicks (NBA basketball), and New York Liberty (WNBA basketball). Its 19,500-seat[3] arena serves as a venue for a number of other events including concerts, college basketball games, and the circus. MSG also includes a theater that can accommodate up to 5,600 spectators, which currently hosts concerts, boxing, family shows, and annual events such as the NBA and NFL drafts. A 36,000 square foot expo center is located adjacent to the arena and is used for trade shows, consumer fairs, and also provides additional storage space for certain events held on the arena floor.

A comprehensive list of all events held at MSG in 2002 (including events held in the arena, theater, and expo center) is provided in Table 1. For clarity, dark days (days when no events were scheduled), including days reserved for loading, unloading, and storage activities are designated by shading. As shown in Table 1, MSG's peak period throughout the year generally coincides with the New York Rangers' and New York Knicks' seasons during the late fall, winter, and early spring. In 2002, a total of 266 arena events were held on 224 days (there were 30 days on which multiple events were held; nearly half of these days involved circus

[1] An alternative to the proposed action includes MSG remaining at its present location.
[2] The NYCDCP Hudson Yards Development Scenarios indicate that the arena seating capacity of MSG would increase from 19,500 to 23,000.
[3] Actual attendance capacity varies by event (see Table 5).

Table 1: 2002 Madison Square Garden Events

		ARENA		THEATER (includes lobby)		EXPO CENTER	
Date	Day of Week	Event	Start Time	Event	Start Time	Event	Start Time
1/1/02	Tuesday						
1/2/02	Wednesday			Load-Out			
1/3/02	Thursday	NBA Basketball: Knicks vs. Dallas	7:30 PM	Load-Out			
1/4/02	Friday			Load-Out			
1/5/02	Saturday	College Basketball: St. John's vs. West Virginia NBA Basketball: Knicks vs. Boston	2:00 PM 7:30 PM	Load-Out			
1/6/02	Sunday	Load-In					
1/7/02	Monday	Wrestling: WWF RAW	7:45 PM	Restoration			
1/8/02	Tuesday	Wrestling: WWF Smackdown	7:30 PM	Restoration			
1/9/02	Wednesday	NHL Hockey: Rangers vs. Los Angeles	8:00 PM	Restoration			
1/10/02	Thursday			Restoration			
1/11/02	Friday			Restoration			
1/12/02	Saturday	NBA Basketball: Knicks vs. Milwaukee	7:30 PM				
1/13/02	Sunday						
1/14/02	Monday	NHL Hockey: Rangers vs. Columbus	7:00 PM				
1/15/02	Tuesday						
1/16/02	Wednesday			Comedy: David Brenner (lobby)	8:00 PM	Load-In	
1/17/02	Thursday			Comedy: David Brenner (lobby)	8:00 PM	Load-In	
1/18/02	Friday			Comedy: David Brenner (lobby) Comedy: David Brenner (lobby)	8:00 PM 10:30 PM	Burlington Coat Sale	9:00 AM
1/19/02	Saturday	Ice Show: Super Skate	7:00 PM	Comedy: David Brenner (lobby) Comedy: David Brenner (lobby)	8:00 PM 10:30 PM	Burlington Coat Sale	9:00 AM
1/20/02	Sunday	College Basketball: St. John's vs. Villanova	2:00 PM	Comedy You Can't Refuse (lobby) Comedy You Can't Refuse (lobby)	7:00 PM 10:00 PM	Burlington Coat Sale	11:00 AM
1/21/02	Monday	NBA Basketball: Knicks vs. Charlotte	1:00 PM			Burlington Coat Sale	9:00 AM
1/22/02	Tuesday					Load-Out	
1/23/02	Wednesday	NHL Hockey: Rangers vs. Boston	7:00 PM				
1/24/02	Thursday	NBA Basketball: Knicks vs. Phoenix	7:30 PM				
1/25/02	Friday	Rangers Skating Party	9:00 AM	Load-In		Rangers Skating Party	9:00 AM
1/26/02	Saturday	NHL Hockey: Rangers vs. Washington College Basketball: St. John's vs. Providence	1:00 PM 9:00 PM	Boxing: Mosley vs. Forrest	7:00 PM		
1/27/02	Sunday	Rangers Skating Party	9:00 AM			Rangers Skating Party	9:00 AM
1/28/02	Monday	NHL Hockey: Rangers vs. Tampa Bay	7:00 PM			Track Storage	
1/29/02	Tuesday	NBA Basketball: Knicks vs. Philadelphia	7:30 PM	Awards: Archer	6:30 PM	Track Storage	
1/30/02	Wednesday	NHL Hockey: Rangers vs. NY Islanders	7:00 PM			Track Storage	
1/31/02	Thursday	Load-In				Track Storage	
2/1/02	Friday	Millrose Games	5:00 PM	Comedy: Class Clowns (lobby) Comedy: Class Clowns (lobby)	8:00 PM 11:00 PM	Warmup Area	N/A
2/2/02	Saturday	Colgate Track	11:00 AM			Warmup Area & Carnival	N/A
2/3/02	Sunday	NBA Basketball: Knicks vs. Miami	12:00 PM				
2/4/02	Monday	Ice Maintenance					
2/5/02	Tuesday	NBA Basketball: Knicks vs. LA Clippers	7:30 PM	Load-In		Load-In	
2/6/02	Wednesday					Dog Show Setup	
2/7/02	Thursday	NBA Basketball: Knicks vs. Atlanta	7:30 PM	Family Show: Sesame Street	10:30 AM	Dog Show Setup	
2/8/02	Friday	Dream Game Harlem Globetrotters	12:00 PM 7:00 PM	Family Show: Sesame Street Family Show: Sesame Street	10:30 AM 2:00 PM	Dog Show Benching	
2/9/02	Saturday	College Basketball: St. John's vs. Connecticut	7:00 PM	Family Show: Sesame Street Family Show: Sesame Street Family Show: Sesame Street	10:30 AM 2:00 PM 5:30 PM	Dog Show Benching	
2/10/02	Sunday	NHL Hockey: Rangers vs. Pittsburgh	1:00 PM	Family Show: Sesame Street Family Show: Sesame Street Family Show: Sesame Street	10:30 AM 2:00 PM 5:30 PM	Dog Show Benching	
2/11/02	Monday	Dog Show	8:00 AM	Family Show: Sesame Street Family Show: Sesame Street	10:00 AM 2:00 PM	Dog Show Benching	
2/12/02	Tuesday	Dog Show	8:00 AM	Storage		Dog Show Benching	
2/13/02	Wednesday	NBA Basketball: Knicks vs. Toronto	7:30 PM	Family Show: Sesame Street	10:30 AM	Load-Out	
2/14/02	Thursday	Concert: Luis Miguel	8:00 PM	Family Show: Sesame Street	10:30 AM		
2/15/02	Friday	NBA Basketball: Knicks vs. Detroit	7:30 PM	Family Show: Sesame Street	10:30 AM		
2/16/02	Saturday	Concert: Concierto Del Amor	8:00 PM	Family Show: Sesame Street Family Show: Sesame Street Family Show: Sesame Street	10:30 AM 2:00 PM 5:30 PM		
2/17/02	Sunday	NBA Basketball: Knicks vs. Utah	7:00 PM	Family Show: Sesame Street Family Show: Sesame Street Family Show: Sesame Street	10:30 AM 2:00 PM 5:30 PM		
2/18/02	Monday	College Basketball: St. John's vs. Boston College	7:00 PM	Family Show: Sesame Street Family Show: Sesame Street	10:30 AM 2:00 PM		
2/19/02	Tuesday	Maintenance					
2/20/02	Wednesday	Maintenance					
2/21/02	Thursday	Maintenance					
2/22/02	Friday	Concert: Crosby, Stills, Nash & Young	8:00 PM				
2/23/02	Saturday	Concert: Crosby, Stills, Nash & Young	8:00 PM				
2/24/02	Sunday	NBA Basketball: Knicks vs. LA Lakers	12:00 PM				
2/25/02	Monday	Ice Maintenance				Load-In	
2/26/02	Tuesday	NHL Hockey: Rangers vs. New Jersey	7:00 PM			NYS Bar Exam	9:00 AM
2/27/02	Wednesday	College Basketball: St. John's vs. Notre Dame	7:30 PM			NYS Bar Exam	9:00 AM
2/28/02	Thursday	NHL Hockey: Rangers vs. Ottawa	7:00 PM				
3/1/02	Friday	NBA Basketball: Knicks vs. Seattle	7:30 PM			Load-In	
3/2/02	Saturday	NHL Hockey: Rangers vs. Philadelphia NYPD vs. FDNY	3:00 PM 8:00 PM			Teachers' Exam	8:30 AM
3/3/02	Sunday	NBA Basketball: Knicks vs. San Antonio	3:00 PM			Knicks Kids' Day	1:00 PM
3/4/02	Monday	NHL Hockey: Rangers vs. Calgary	7:00 PM			Load-In	
3/5/02	Tuesday	NBA Basketball: Knicks vs. Milwaukee	7:30 PM			Press	
3/6/02	Wednesday	College Basketball: Big East Doubleheader College Basketball: Big East Doubleheader	12:00 PM 7:00 PM			Press	
3/7/02	Thursday	College Basketball: Big East Doubleheader College Basketball: Big East Doubleheader	12:00 PM 7:00 PM			Press	
3/8/02	Friday	College Basketball: Big East Doubleheader	7:00 PM	Concert: Beres Hammond	8:00 PM	Press	
3/9/02	Saturday	College Basketball: Big East Championship	8:00 PM			Press	
3/10/02	Sunday						
3/11/02	Monday	NHL Hockey: Rangers vs. Montreal	7:30 PM				
3/12/02	Tuesday	NBA Basketball: Knicks vs. Philadelphia	7:30 PM				
3/13/02	Wednesday	NHL Hockey: Rangers vs. Boston	8:00 PM				
3/14/02	Thursday	NBA Basketball: Knicks vs. Sacramento	7:30 PM				
3/15/02	Friday	Concert: Billy Joel & Elton John	7:30 PM				
3/16/02	Saturday	PSAL PSAL NBA Basketball: Knicks vs. Cleveland	11:00 AM 1:00 PM 7:30 PM				
3/17/02	Sunday	NHL Hockey: Rangers vs. Detroit	3:00 PM				

Table 1: 2002 Madison Square Garden Events

		ARENA		THEATER (includes lobby)		EXPO CENTER	
Date	Day of Week	Event	Start Time	Event	Start Time	Event	Start Time
3/18/02	Monday					Circus Stabling	
3/19/02	Tuesday	NHL Hockey: Rangers vs. Vancouver	7:00 PM			Circus Stabling	
3/20/02	Wednesday					Circus Stabling	
3/21/02	Thursday	Circus: Ringling Brothers and Barnum & Bailey	7:30 PM			Circus Stabling	
3/22/02	Friday	Circus: Ringling Brothers and Barnum & Bailey NHL Hockey: Rangers vs. Atlanta	10:30 AM 7:00 PM	AFT Mayor's Circus	N/A	Circus Stabling	
3/23/02	Saturday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM	Concert: El Vacilon	8:00 PM	Circus Stabling	
3/24/02	Sunday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM			Circus Stabling	
3/25/02	Monday	Circus: Ringling Brothers and Barnum & Bailey NBA Basketball: Knicks vs. Denver	10:30 AM 7:30 PM			Circus Stabling	
3/26/02	Tuesday	College Basketball: NIT Doubleheader	7:00 PM			Circus Stabling	
3/27/02	Wednesday	Graduation: NYPD NHL Hockey: Rangers vs. Philadelpia	11:00 AM 8:00 PM			Circus Stabling	
3/28/02	Thursday	College Basketball: NIT Doubleheader	6:30 PM			Circus Stabling	
3/29/02	Friday	Circus: Ringling Brothers and Barnum & Bailey NBA Basketball: Knicks vs. Minnesota	12:00 PM 7:30 PM			Circus Stabling	
3/30/02	Saturday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM	Comedy: Garden Competition (lobby) Comedy: Garden Competition (lobby)	8:00 PM 10:30 PM	Circus Stabling	
3/31/02	Sunday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM			Circus Stabling	
4/1/02	Monday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM	Concert: Hot 97	8:00 PM	Circus Stabling	
4/2/02	Tuesday	Circus: Ringling Brothers and Barnum & Bailey NBA Basketball: Knicks vs. Charlotte	12:00 PM 8:00 PM	Load-In		Circus Stabling	
4/3/02	Wednesday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	12:00 PM 7:30 PM	Press Conference	12:00 PM	Circus Stabling	
4/4/02	Thursday	Basketball: McDonald's Games Basketball: McDonald's Games	5:00 PM 8:00 PM			Circus Stabling	
4/5/02	Friday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM			Circus Stabling	
4/6/02	Saturday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM			Circus Stabling	
4/7/02	Sunday	Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey Circus: Ringling Brothers and Barnum & Bailey	11:00 AM 3:00 PM 7:30 PM			Circus Stabling	
4/8/02	Monday	NHL Hockey: Rangers vs. Pittsburgh	7:00 PM			Clean	
4/9/02	Tuesday	Dream Game NBA Basketball: Knicks vs. Orlando	1:00 PM 7:30 PM	Comedy: KISS-FM (lobby)	8:00 PM	Clean	
4/10/02	Wednesday	NHL Hockey: Rangers vs. Toronto	7:00 PM	Load-In		Clean	
4/11/02	Thursday	NBA Basketball: Knicks vs. Chicago	7:30 PM	Boxing: Golden Gloves	7:30 PM	Clean	
4/12/02	Friday	Concert: Luis Miguel	8:00 PM	Boxing: Golden Gloves	7:30 PM		
4/13/02	Saturday	Ice Show: Target Stars on Ice	8:00 PM	Load-In			
4/14/02	Sunday			Load-In			
4/15/02	Monday			Load-In			
4/16/02	Tuesday			Load-In			
4/17/02	Wednesday	NBA Basketball: Knicks vs. New Jersey	7:30 PM	Meeting: Coca-Cola Shareholders	9:30 AM		
4/18/02	Thursday			Load-In			
4/19/02	Friday			Load-In			
4/20/02	Saturday	Concert: Hola New York	8:00 PM	NFL Draft	12:00 PM		
4/21/02	Sunday			NFL Draft	12:00 PM		
4/22/02	Monday					Load-In	
4/23/02	Tuesday			Comedy: KISS-FM (lobby)	8:00 PM	Job Fair	11:00 AM
4/24/02	Wednesday					Load-In	
4/25/02	Thursday					Destinations Showcase	12:00 PM
4/26/02	Friday	Concert: Paul McCartney	8:00 PM	Load-In			
4/27/02	Saturday	Concert: Paul McCartney	8:00 PM	CPR Seminar (lobby) Boxing: McCline vs. Briggs	9:00 AM 6:30 PM		
4/28/02	Sunday						
4/29/02	Monday			Liberty Media Day	10:00 AM		
4/30/02	Tuesday						
5/1/02	Wednesday			Religious: Bountiful Blessings	7:00 PM		
5/2/02	Thursday			Religious: Bountiful Blessings Religious: Bountiful Blessings	11:00 AM 7:00 PM	Load-In	
5/3/02	Friday			Religious: Bountiful Blessings Religious: Bountiful Blessings	11:00 AM 7:00 PM	Load-In	
5/4/02	Saturday					Storage	
5/5/02	Sunday					Off-Price Sale	9:00 AM
5/6/02	Monday					Off-Price Sale	9:00 AM
5/7/02	Tuesday			Comedy: KISS-FM (lobby)	8:00 PM	Off-Price Sale	9:00 AM
5/8/02	Wednesday			Load-In		Load-Out	
5/9/02	Thursday			Meeting: Regional Coke	10:00 AM		
5/10/02	Friday	Concert: Kid Rock	8:00 PM	Load-In		Set-Up	
5/11/02	Saturday			Load-In		Teachers' Exam	8:30 AM
5/12/02	Sunday			Load-In			
5/13/02	Monday			Load-In			
5/14/02	Tuesday			Load-In			
5/15/02	Wednesday			Load-In			
5/16/02	Thursday	Set-Up		UPN Event	10:30 AM	Set-Up	
5/17/02	Friday	Emmys Dinner	5:30 PM	Awards: Daytime Emmys	9:00 PM	Emmys Dinner	5:30 PM
5/18/02	Saturday	WNBA Basketball: Liberty vs. Houston (preseason)	4:00 PM	Load-Out		Local 3 Elections	6:00 AM
5/19/02	Sunday						
5/20/02	Monday	Liberty Open Practice	7:00 PM	Graduation: NYU Law	10:30 AM	Court Repair	
5/21/02	Tuesday			Comedy: KISS-FM (lobby)	8:00 PM	Court Repair	
5/22/02	Wednesday			Graduation: New School	3:00 PM	Court Repair	
5/23/02	Thursday			Graduation: Yeshiva	11:00 AM	Court Repair	
5/24/02	Friday			Graduation: College of Dentistry	10:30 AM	Court Repair	
5/25/02	Saturday	Concert: Latin Show	8:00 PM	Comedy: Eddie Griffin	8:00 PM	Court Repair	
5/26/02	Sunday	Religious: Yogeshwar	3:00 PM	Religious: Yogeshwar	N/A	Court Repair	
5/27/02	Monday					Court Repair	

Table 1: 2002 Madison Square Garden Events

		ARENA		THEATER (includes lobby)		EXPO CENTER	
Date	Day of Week	Event	Start Time	Event	Start Time	Event	Start Time
5/28/02	Tuesday	Concert: Dave Mathews	7:30 PM			Court Repair	
5/29/02	Wednesday	Concert: Dave Mathews	7:30 PM	Graduation: Baruch Graduation: Baruch	11:00 AM 3:30 PM	Court Repair	
5/30/02	Thursday	Graduation: John Jay	10:30 AM			Court Repair	
5/31/02	Friday	Concert: Blink 182 & Green Day	7:30 PM	Graduation: BMCC	11:30 AM	Court Repair	
6/1/02	Saturday					Court Repair	
6/2/02	Sunday	WNBA Basketball: Liberty vs. Miami	12:00 PM			Court Repair	
6/3/02	Monday			Graduation: NYC Tech	1:00 PM	Court Repair	
6/4/02	Tuesday			Meeting (lobby)	10:00 AM	Court Repair	
6/5/02	Wednesday	WNBA Basketball: Liberty vs. Detroit	7:30 PM			Court Repair	
6/6/02	Thursday					Court Repair	
6/7/02	Friday					Court Repair	
6/8/02	Saturday			Comedy: Chuck Nice Comedy: Chuck Nice	8:00 PM 10:30 PM	Court Repair	
6/9/02	Sunday					Court Repair	
6/10/02	Monday					Court Repair	
6/11/02	Tuesday			Meeting: Port Authority	10:00 AM	Court Repair	
6/12/02	Wednesday					Court Repair	
6/13/02	Thursday	Concert: Andrea Bocelli	8:00 PM	Comedy: Grrl Genius Night (lobby)	8:00 PM	Court Repair	
6/14/02	Friday			Comedy Forum (lobby)	N/A	Court Repair	
6/15/02	Saturday					Court Repair	
6/16/02	Sunday	WNBA Basketball: Liberty vs. Charlotte	2:00 PM			Court Repair	
6/17/02	Monday	Dream Game	5:00 PM			Court Repair	
6/18/02	Tuesday	WNBA Basketball: Liberty vs. Orlando	7:30 PM			Court Repair	
6/19/02	Wednesday			Dinner (lobby)	5:30 PM	Court Repair	
6/20/02	Thursday			Graduation: Edward R. Murrow	6:30 PM	Court Repair	
6/21/02	Friday	Concert: Incubus	8:00 PM			Court Repair	
6/22/02	Saturday	Concert: Latin Concert	8:00 PM			Court Repair	
6/23/02	Sunday					Court Repair	
6/24/02	Monday	Concert: Korn	8:00 PM	Load-In		Court Repair	
6/25/02	Tuesday	WNBA Basketball: Liberty vs. Indiana	7:30 PM	Load-In		Court Repair	
6/26/02	Wednesday	Concert: Cher	8:00 PM	NBA Draft	7:00 PM	Court Repair	
6/27/02	Thursday	Concert: Cher	8:00 PM	Graduation (lobby)	11:00 AM	Load-In	
6/28/02	Friday	WNBA Basketball: Liberty vs. Cleveland	7:30 PM			Comic & Fantasy Expo	3:00 PM
6/29/02	Saturday	Wrestling: WWE RAW	8:00 PM			Comic & Fantasy Expo	10:00 AM
6/30/02	Sunday	WNBA Basketball: Liberty vs. Portland	4:00 PM			Comic & Fantasy Expo	10:00 AM
7/1/02	Monday	Film Shoot	12:00 PM	Film Shoot	8:00 AM	Load-Out	
7/2/02	Tuesday						
7/3/02	Wednesday						
7/4/02	Thursday						
7/5/02	Friday						
7/6/02	Saturday						
7/7/02	Sunday						
7/8/02	Monday	WNBA Basketball: Liberty vs. Phoenix	7:30 PM	Load-In			
7/9/02	Tuesday			Load-In			
7/10/02	Wednesday			Load-In			
7/11/02	Thursday			N/A	9:45 AM		
7/12/02	Friday	Concert: Marc Anthony	7:30 PM			Load-In	
7/13/02	Saturday			Tampax Tour	1:00 PM	Tour Exhibit	3:00 PM
7/14/02	Sunday			Concert: Chayanne	8:00 PM		
7/15/02	Monday						
7/16/02	Tuesday						
7/17/02	Wednesday						
7/18/02	Thursday	WNBA Basketball: Liberty vs. Los Angeles	8:00 PM	Blood Drive (lobby)	9:00 AM		
7/19/02	Friday						
7/20/02	Saturday	Concert: PA Colombia	7:30 PM			Teachers' Exam	8:30 AM
7/21/02	Sunday						
7/22/02	Monday	Dream Game WNBA Basketball: Liberty vs. Cleveland	1:00 PM 7:30 PM				
7/23/02	Tuesday	Load-In				Load-In	
7/24/02	Wednesday	Load-In				Load-In	
7/25/02	Thursday	Religious: Creflo Dollar Religious: Creflo Dollar Religious: Creflo Dollar	9:30 AM 2:00 PM 7:00 PM			Religious: Creflo Dollar	N/A
7/26/02	Friday	Religious: Creflo Dollar Religious: Creflo Dollar Religious: Creflo Dollar	9:30 AM 2:00 PM 7:00 PM			Religious: Creflo Dollar	N/A
7/27/02	Saturday	Religious: Creflo Dollar Religious: Creflo Dollar Religious: Creflo Dollar	9:30 AM 2:00 PM 7:00 PM			Religious: Creflo Dollar	N/A
7/28/02	Sunday	WNBA Basketball: Liberty vs. Houston	2:00 PM				
7/29/02	Monday	Dream Games Dream Games Dream Games	1:00 PM 6:00 PM 8:00 PM				
7/30/02	Tuesday	Liberty Open Practice	7:00 PM			Storage	
7/31/02	Wednesday	Concert: The Who	7:30 PM	Comedy: Garden Competition (lobby)	8:00 PM	Storage	
8/1/02	Thursday	Concert: The Who	7:30 PM			Storage	
8/2/02	Friday	WNBA Basketball: Liberty vs. Miami	7:30 PM	Comedy: Garden Competition (lobby)	8:00 PM	Storage	
8/3/02	Saturday	Concert: The Who	7:30 PM			Storage	
8/4/02	Sunday	Concert: The Who	7:30 PM			Storage	
8/5/02	Monday						
8/6/02	Tuesday	WNBA Basketball: Liberty vs. Minnesota	7:30 PM				
8/7/02	Wednesday	Concert: Lil Bow Wow	7:30 PM				
8/8/02	Thursday	WNBA Basketball: Liberty vs. Washington	7:30 PM				
8/9/02	Friday						
8/10/02	Saturday			Wedding Expo	11:00 AM		
8/11/02	Sunday	WNBA Basketball: Liberty vs. Charlotte	4:00 PM				
8/12/02	Monday	Concert: Bruce Springsteen	7:30 PM			Storage	
8/13/02	Tuesday	Knicks City Dancer Auditions	N/A	Comedy: Garden Competition (lobby)	8:00 PM		
8/14/02	Wednesday	Knicks City Dancer Auditions	N/A	Comedy: Garden Competition (lobby)	8:00 PM		
8/15/02	Thursday						
8/16/02	Friday					Avon Launch	N/A
8/17/02	Saturday						
8/18/02	Sunday	WNBA Basketball: Liberty vs. Indiana (playoffs)	12:00 PM				
8/19/02	Monday						
8/20/02	Tuesday	WNBA Basketball: Liberty vs. Indiana (playoffs)	8:00 PM				
8/21/02	Wednesday						
8/22/02	Thursday			Teacher's Seminar	9:00 AM	Teacher's Exhibits	12:00 PM

Table 1: 2002 Madison Square Garden Events

		ARENA		THEATER (includes lobby)		EXPO CENTER	
Date	Day of Week	Event	Start Time	Event	Start Time	Event	Start Time
8/23/02	Friday						
8/24/02	Saturday	WNBA Basketball: Liberty vs. Washington (playoffs)	8:00 PM				
8/25/02	Sunday	WNBA Basketball: Liberty vs. Washington (playoffs)	7:00 PM				
8/26/02	Monday	Wrestling: WWE RAW	7:45 PM				
8/27/02	Tuesday						
8/28/02	Wednesday						
8/29/02	Thursday	WNBA Basketball: Liberty vs. Los Angeles (playoffs)	7:30 PM				
8/30/02	Friday			Concert: Carribean Concert	7:00 PM		
8/31/02	Saturday						
9/1/02	Sunday						
9/2/02	Monday						
9/3/02	Tuesday						
9/4/02	Wednesday						
9/5/02	Thursday						
9/6/02	Friday						
9/7/02	Saturday	Concert: Salsa Fest	8:00 PM				
9/8/02	Sunday						
9/9/02	Monday					Load-In	
9/10/02	Tuesday	Load-In				Job Fair	11:00 AM
9/11/02	Wednesday	Day of Hope and Healing	7:00 PM			Holding Area	
9/12/02	Thursday						
9/13/02	Friday			Load-In		Set-up	
9/14/02	Saturday			Religious: 7th Day Adventists	9:30 AM	Religious: Adventists' Luncheon	1:30 PM
9/15/02	Sunday	Ice Maintenance					
9/16/02	Monday	Ice Maintenance					
9/17/02	Tuesday	Basketball: Wheelchair Basketball Classic	7:00 PM				
9/18/02	Wednesday	Ice Maintenance					
9/19/02	Thursday	Load-In		Season Opener (lobby)	5:30 PM		
9/20/02	Friday	Ice Show: Stars, Stripes & Skates	8:00 PM			Load-In	
9/21/02	Saturday	Concert: Viva Mexico	7:30 PM			Fannie Mae Home Fair	10:00 AM
9/22/02	Sunday	NHL Hockey: Rangers vs. Philadelphia (preseason)	5:00 PM				
9/23/02	Monday	Concert: Billy Joel & Elton John	7:30 PM				
9/24/02	Tuesday	NHL Hockey: Rangers vs. New Jersey (preseason)	7:00 PM	Graduation: LaGuardia	10:30 AM		
9/25/02	Wednesday	Load-In				Storage	
9/26/02	Thursday	Concert: Rolling Stones	8:00 PM			Storage	
9/27/02	Friday	Concert: Enrique Iglesias	8:00 PM			Load-In	
9/28/02	Saturday			Comedy: Vacilon 69	8:00 PM		
9/29/02	Sunday	NHL Hockey: Rangers vs. Boston (preseason)	5:00 PM				
9/30/02	Monday			Load-In			
10/1/02	Tuesday			Concert: One Night With Light	8:00 PM		
10/2/02	Wednesday						
10/3/02	Thursday						
10/4/02	Friday						
10/5/02	Saturday	Concert: Marc Anthony & Carlos Vives	8:00 PM				
10/6/02	Sunday	Concert: Radio Jesus	3:00 PM				
10/7/02	Monday	Set-Up					
10/8/02	Tuesday	Concert: Music to My Ears	7:30 PM			Storage	
10/9/02	Wednesday	Set-Up		Employee Dinner (lobby)	5:30 PM		
10/10/02	Thursday	NBA Basketball: Knicks vs. San Antonio (preseason)	7:30 PM			Load-In	
10/11/02	Friday	NHL Hockey: Rangers vs. Montreal	7:00 PM			Load-In	
10/12/02	Saturday	FDNY Memorial NBA Basketball: Knicks vs. Phoenix (preseason)	10:00 AM 7:30 PM	Bar Mitzvah (lobby)	8:00 PM	Load-In	
10/13/02	Sunday	Girl Scouts' Anniversary	2:00 PM			Off-Price Sale	9:00 AM
10/14/02	Monday					Off-Price Sale	9:00 AM
10/15/02	Tuesday	NHL Hockey: Rangers vs. Toronto	7:00 PM			Off-Price Sale	9:00 AM
10/16/02	Wednesday			Comedy: Garden Competition (lobby)	8:00 PM	Load-Out	
10/17/02	Thursday	Concert: Cher	8:00 PM	Comedy: Garden Competition (lobby)	8:00 PM	Storage	
10/18/02	Friday	Concert: Cher	8:00 PM	Comedy: Dave Chappelle	8:00 PM	Storage	
10/19/02	Saturday	NHL Hockey: Rangers vs. Nashville	7:00 PM	Concert: Rock & Roll Revival	7:30 PM		
10/20/02	Sunday	Concert: Vicente & Alejandro Fernandez	7:00 PM	Bar Mitzvah (lobby)	12:00 PM		
10/21/02	Monday	NHL Hockey: Rangers vs. Tampa Bay	7:00 PM				
10/22/02	Tuesday	NBA Basketball: Knicks vs. Utah (preseason)	7:30 PM	Learning Annex	6:30 PM		
10/23/02	Wednesday	NHL Hockey: Rangers vs. Washington	7:00 PM	Big East Media Day (lobby)	9:30 AM		
10/24/02	Thursday	Concert: Rush	8:00 PM	Awards: AFB (lobby)	5:30 PM		
10/25/02	Friday	NHL Hockey: Rangers vs. Los Angeles	7:00 PM	Religious: Church of Christ	7:00 PM		
10/26/02	Saturday			Religious: Church of Christ Religious: Church of Christ Religious: Church of Christ	9:00 AM 2:00 PM 7:00 PM		
10/27/02	Sunday	Religious: Church of Christ	3:00 PM				
10/28/02	Monday	NHL Hockey: Rangers vs. Phoenix	7:00 PM	Concert: Mana	8:00 PM		
10/29/02	Tuesday						
10/30/02	Wednesday						
10/31/02	Thursday						
11/1/02	Friday			Concert: Hopeville Tour	8:00 PM		
11/2/02	Saturday	NBA Basketball: Knicks vs. Boston	7:30 PM	Comedy: J. Anthony Brown	7:30 PM		
11/3/02	Sunday	NHL Hockey: Rangers vs. St. Louis	5:00 PM				
11/4/02	Monday	NBA Basketball: Knicks vs. Milwaukee	7:30 PM				
11/5/02	Tuesday	NHL Hockey: Rangers vs. Edmonton	7:00 PM				
11/6/02	Wednesday	NBA Basketball: Knicks vs. Sacramento	7:00 PM	Comedy: Garden Competition (lobby)	8:00 PM		
11/7/02	Thursday	NHL Hockey: Rangers vs. Calgary	7:00 PM	Load-In			
11/8/02	Friday	Basketball: St. John's vs. Harlem Globetrotters	7:30 PM	Comedy: Garden Competition (lobby)	8:00 PM		
11/9/02	Saturday	Concert: Hispanos Unidos	8:00 PM	Comedy: Garden Competition (lobby)	8:00 PM		
11/10/02	Sunday	NBA Basketball: Knicks vs. New Orleans	4:00 PM	Load-In			
11/11/02	Monday	Concert: Bob Dylan	8:00 PM	Load-In		Storage	
11/12/02	Tuesday	NBA Basketball: Knicks vs. Utah	7:30 PM	Load-In		Storage	
11/13/02	Wednesday	Concert: Bob Dylan	8:00 PM	Load-In		Storage	
11/14/02	Thursday	College Basketball: AT&T Doubleheader	7:00 PM	Load-In			
11/15/02	Friday	College Basketball: AT&T Doubleheader	6:30 PM	Load-In			
11/16/02	Saturday	NBA Basketball: Knicks vs. Philadelphia	1:00 PM	Comedy: Garden Competition (lobby)	9:00 PM	Storage	
11/17/02	Sunday	Wrestling: WWE Survivor Series	7:45 PM	Load-In		Storage	
11/18/02	Monday	NBA Basketball: Knicks vs. Detroit	7:30 PM	Load-In			
11/19/02	Tuesday	NHL Hockey: Rangers vs. Anaheim	7:00 PM	Load-In			
11/20/02	Wednesday	Concert: Shakira	9:00 PM	Load-In		Storage	
11/21/02	Thursday	Concert: Peter Gabriel	8:00 PM	Comedy: Garden Competition (lobby)	8:00 PM	Storage	
11/22/02	Friday			Load-In			
11/23/02	Saturday	NHL Hockey: Rangers vs. NY Islanders	1:00 PM	Rehearsal			

Table 1: 2002 Madison Square Garden Events

		ARENA		THEATER (includes lobby)		EXPO CENTER	
Date	Day of Week	Event	Start Time	Event	Start Time	Event	Start Time
11/24/02	Sunday	NBA Basketball: Knicks vs. Minnesota	7:00 PM	Rehearsal			
11/25/02	Monday	NHL Hockey: Rangers vs. Carolina	7:00 PM	Rehearsal			
11/26/02	Tuesday	Concert: The Other Ones	7:30 PM	Rehearsal		Storage	
11/27/02	Wednesday	College Basketball: NIT Doubleheader	7:00 PM	Rehearsal			
11/28/02	Thursday						
11/29/02	Friday	College Basketball: NIT Doubleheader	6:30 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	1:00 PM 5:00 PM 8:00 PM		
11/30/02	Saturday	NBA Basketball: Knicks vs. New Orleans	1:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM 8:00 PM		
12/1/02	Sunday	NHL Hockey: Rangers vs. Tampa Bay	1:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM		
12/2/02	Monday	NBA Basketball: Knicks vs. Cleveland	7:30 PM				
12/3/02	Tuesday	NHL Hockey: Rangers vs. Columbus	7:00 PM				
12/4/02	Wednesday	NBA Basketball: Knicks vs. Orlando	7:30 PM	Musical: A Christmas Carol Musical: A Christmas Carol	2:00 PM 7:30 PM		
12/5/02	Thursday	Concert: Guns & Roses	7:30 PM	Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 7:30 PM	Storage	
12/6/02	Friday	NHL Hockey: Rangers vs. Buffalo	7:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 5:00 PM 8:00 PM	Load-In	
12/7/02	Saturday	College Basketball Tripleheader	12:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM 8:00 PM	Teachers' Exam	8:30 AM
12/8/02	Sunday	NHL Hockey: Rangers vs. Boston	1:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM		
12/9/02	Monday	Concert: KISS-FM R&B Jam	7:00 PM			Storage	
12/10/02	Tuesday	NBA Basketball: Knicks vs. Seattle	7:30 PM				
12/11/02	Wednesday	NHL Hockey: Rangers vs. Chicago	8:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol	2:00 PM 7:30 PM	Storage	
12/12/02	Thursday	Concert: Z-100 Jingle Ball	7:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 7:30 PM	Storage	
12/13/02	Friday	Concert: Tom Petty	7:30 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 5:00 PM 8:00 PM	Storage	
12/14/02	Saturday	College Basketball Doubleheader NBA Basketball: Knicks vs. Boston	12:00 PM 7:30 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM 8:00 PM		
12/15/02	Sunday			Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM		
12/16/02	Monday	NHL Hockey: Rangers vs. San Jose	7:00 PM				
12/17/02	Tuesday	NBA Basketball: Knicks vs. New Jersey	7:30 PM				
12/18/02	Wednesday	Concert: WKTU's Miracle on 34th Street	7:30 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 7:30 PM	Storage	
12/19/02	Thursday	NHL Hockey: Rangers vs. Montreal	7:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 7:30 PM		
12/20/02	Friday	Concert: Dave Mathews	7:30 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 5:00 PM 8:00 PM	Storage	
12/21/02	Saturday	Concert: Dave Mathews	7:30 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM 8:00 PM	Storage	
12/22/02	Sunday	NBA Basketball: Knicks vs. Miami	7:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM		
12/23/02	Monday	NHL Hockey: Rangers vs. New Jersey	7:00 PM			Set-Up	
12/24/02	Tuesday					Set-Up	
12/25/02	Wednesday			Musical: A Christmas Carol	2:00 PM	Day of Giving Dinner	2:00 PM
12/26/02	Thursday	NHL Hockey: Rangers vs. Pittsburgh	7:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol	2:00 PM 5:00 PM		
12/27/02	Friday	College Basketball: Holiday Festival Doubleheader	6:30 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM		
12/28/02	Saturday	College Basketball: Holiday Festival Doubleheader	3:00 PM	Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	2:00 PM 5:00 PM 8:00 PM		
12/29/02	Sunday			Musical: A Christmas Carol Musical: A Christmas Carol Musical: A Christmas Carol	11:00 AM 2:00 PM 5:00 PM		
12/30/02	Monday	NBA Basketball: Knicks vs. San Antonio	7:30 PM				
12/31/02	Tuesday	Concert: Phish	8:00 PM			Storage	

Source: Madison Square Garden, 2003.

Color Key:

Dark Day (includes loading, unloading, and/or storage activities)

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performances). Over the course of the year, 141 dark days occurred at the arena (109 on weekdays, 13 on Saturdays, and 19 on Sundays).

Table 1 also illustrates the pattern in the scheduling of events held at the theater and expo center. Out of the 177 events held at the theater in 2002, 83 involved performances of "Sesame Street Live" and "A Christmas Carol", two productions that primarily occurred during the months of February and December, respectively. Multiple performances of these shows (typically three) were usually held on the same day. For this reason, there were only 120 days on which events where scheduled (there were 39 days on which multiple events were held – 22 of these involved performances of "A Christmas Carol"). Over the course of the year, there were 245 days on which there was no event at the theater (178 of the dark days were on weekdays, 27 were on Saturdays, and 40 were on Sundays). As shown in Table 1, when compared to the arena and theater, there were relatively few public events held at the expo center over the course of the entire year (there were only 38 days with events).

Arena events in 2002 were tabulated by event type based on the schedule shown in Table 1 and additionally sorted by weekdays, Saturdays, and Sundays. Table 2 shows that the majority of weekday events involve basketball games, hockey games, concerts, and circus performances; the pattern of events on Sundays is more pronounced and primarily involves basketball and hockey games. Most of the weekend concerts tended to occur on Saturdays.[4]

Table 2: Distribution of 2002 MSG Arena Events

Event Type	Weekday	Saturday	Sunday	Total
Basketball (College)	13	7	1	**21**
Basketball (NBA)	29	8	7	**44**
Basketball (Other)	5	0	0	**5**
Basketball (WNBA)	12	2	7	**21**
Circus	14	9	9	**32**
Concert	38	13	3	**54**
Dog Show	2	0	0	**2**
Graduation	2	0	0	**2**
Ice Show	1	2	0	**3**
Hockey (NHL)	32	4	7	**43**
Other	15	4	2	**21**
Religious	6	3	2	**11**
Track	1	1	0	**2**
Wrestling	3	1	1	**5**
Totals	**173**	**54**	**39**	**266**

Source: Madison Square Garden, 2003.

Table 3 provides a similar tabulation of 2002 events held in the theater, which is also sorted by weekdays, Saturdays, and Sundays. This table indicates that nearly half of all theater events involved performances of "Sesame Street Live" (categorized as a family show) or "A Christmas Carol" (categorized as a musical). Although there were a significant amount of comedy events (34), many of these were competitions that took place in the theater lobby (which has a smaller seating capacity of approximately 500-600). A review of Table 3 shows that there were substantially fewer events at the theater on Sundays (26) compared to Saturdays (49) and that approximately 80% of the Sunday events involved performances of the family show or musical.

[4] Although there were a total of 9 Sunday circus performances, these occurred over a period of 3 Sundays (multiple shows were held on each date).

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Table 3: Distribution of 2002 MSG Theater Events

Event Type	Weekday	Saturday	Sunday	Total
Awards	3	0	0	**3**
Boxing	2	2	0	**4**
Comedy	22	10	2	**34**
Concert	5	3	1	**9**
Draft	1	1	1	**3**
Family Show	10	6	6	**22**
Graduation	11	0	0	**11**
Meeting	4	0	0	**4**
Musical	27	19	15	**61**
Other	12	4	0	**16**
Religious	5	4	1	**10**
Totals	**102**	**49**	**26**	**177**

Source: Madison Square Garden, 2003.

Table 4 shows the distribution of arena and theater events that were held on the same day at MSG in 2002 and compares their differences in start times. Events with overlapping arrival periods were assumed to include all events with differences in start times of less than one hour. As shown in Table 4, there were overlaps on slightly less than half of the weekdays when events were held at the two venues. A review of these events indicates that approximately half of these overlaps involve events in the theater lobby. As shown in Table 4, there were no overlapping events on Sundays since all events had differences in start times of one hour or greater.

Table 4: Relationship between 2002 Arena and Theater Events Held On Same Day

	Difference in Start Times				Total
Day of Week	**Same**	**½ Hour**	**1 Hour**	**> 1 Hour**	**Events**
Weekday	10	10	7	25	**52**
Saturday	3	6	5	6	**20**
Sunday	0	0	3	4	**7**
Totals	**13**	**16**	**15**	**35**	**79**

Source: Madison Square Garden, 2003.

Existing Attendance Patterns

Table 5 presents detailed data about the major types of arena events (concerts, NBA basketball, WNBA basketball, college basketball, NHL hockey, and the circus). This table includes typical event durations, attendance capacities, and existing 85th percentile attendances.[5] Although both the New York Knicks and New York Rangers currently tend to sell out many of their games, the Knicks games have the highest 85th percentile attendance out of all events. As shown in Table 5, the 85th percentile attendances at WNBA basketball games and circus performances are significantly lower compared to the other major events; for this reason a WNBA basketball game or circus performance would not be expected to constitute the reasonable worst-case scenario for the analysis of transportation-related impacts. According to Madison Square Garden management, although concert attendance varies, a significant

[5] 85th percentile attendances will be used to develop a reasonable worst-case scenario that would occur with enough frequency to warrant consideration for analysis.

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number of concerts sell out every year.
Therefore, the events that have the highest 85th percentile attendances involve NBA basketball games, concerts, and NHL hockey games.

Table 5: Existing Arena Capacity and Approximate Duration of Events

Event Type	Typical Duration[1]	Attendance Capacity[2]	85th Percentile Attendances		
			Overall	Weekday	Weekend
Concert	3+ hours	20,629	17,977	18,301	16,476
NBA Basketball	2 ½ hours	20,024	19,023[3]		
WNBA Basketball	2 hours	20,024	11,605	11,221	12,126
College Basketball	2 hours	20,024	16,012	14,389	16,167
NHL Hockey	2 ¾ hours	18,295	17,380[3]		
Circus	2 ½ hours	18,295	13,687	13,686	13,062

Sources: Madison Square Garden and Sam Schwartz LLC, 2003.
Notes: (1) Listed durations are minimum times and do not include overtime or unexpected delays. (2) Includes seats and suites. (3) Most of these events are sold out; Sam Schwartz LLC estimates indicate that actual attendances range between 95% and 100% of capacity.

Travel Surveys

To establish the existing travel patterns of MSG attendees, travel surveys conducted by Vollmer Associates in the fall of 1987 were utilized.[6] These surveys included interviews to determine modes of travel specific to the origins of attendees at the following three weeknight events:

- Cars Concert (Thursday, October 29, 1987 @ 8:00 pm);
- New York Knicks vs. Boston Celtics (Monday, November 9, 1987 @ 7:30 pm); and
- New York Rangers vs. New Jersey Devils (Tuesday, November 10, 1987 @ 7:30 pm).

Additional surveys at MSG were conducted by Sam Schwartz LLC in the spring of 2003.[7] These surveys were used to determine temporal distributions, vehicle occupancies, and to approximate variations in travel patterns between a weekday and a Sunday sports event. Events that were surveyed included:

- New York Knicks vs. Milwaukee Bucks (Sunday, March 16, 2003 @ 7:00 pm);
- New York Knicks vs. Toronto Raptors (Monday, March 24, 2003 @ 7:30 pm);
- New York Knicks vs. New Jersey Nets (Friday, March 28, 2003 @ 8:00 pm);
- New York Rangers vs. Pittsburgh Penguins (Wednesday, March 26, 2003 @ 7:30 pm);
- New York Rangers vs. New Jersey Devils (Friday, April 4, 2003 @ 7:30 pm); and
- Red Hot Chili Peppers Concert (Tuesday, May 20, 2003 @ 8:00 pm).

Trip Origins

A comparison of trip origins from the three weeknight events surveyed (concert, Rangers game, and Knicks game) is presented in Table 6. The table also includes an average distribution of origins for the weeknight sports events and a projected distribution of origins for Sunday sports events. As shown in the table, the percentage of Manhattan origins is highest for the weeknight sports events; this variation is likely attributed to the large percentage of attendees that go to these types of MSG events directly from work in Manhattan.

[6] *Technical Memorandum A-4*, Madison Square Garden Attendance Profile, Vollmer Associates, 1987.
[7] *Madison Square Garden Modal Split Analysis*, Sam Schwartz LLC, August 26, 2003.

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Table 6: Trip Origins of MSG Attendees

Region	Weeknight Concert	Weeknight Rangers Game	Weeknight Knicks Game	Weeknight Sports Average	Sunday Sports Event[1]
Staten Island	2.7%	1.7%	1.6%	1.6%	0.5%
Manhattan	20.8%	34.8%	38.8%	36.8%	30.3%
Brooklyn	11.6%	7.2%	8.2%	7.7%	9.8%
Bronx	4.6%	2.6%	3.7%	3.2%	2.3%
Queens	14.0%	8.3%	11.8%	10.1%	11.6%
Long Island	15.4%	13.2%	9.0%	11.1%	12.7%
Westchester	14.2%	5.7%	4.6%	5.1%	7.1%
Rockland	0.8%	1.1%	7.4%	4.3%	4.3%
New Jersey	13.9%	22.1%	9.6%	15.7%	17.0%
Connecticut	1.9%	3.2%	5.4%	4.3%	4.3%

Sources: Vollmer Associates, 1987.
Notes: (1) Estimated based on weeknight sports average using Sam Schwartz LLC surveys. (2) Sum of origins do not total 100% due to rounding.

Existing and Projected Modal Splits

In order to develop trip assignments specific for each mode of travel, modal splits expanded to a regional basis will be utilized. Table 7 shows modal splits by region for a weeknight concert, a weeknight sports event, and a Sunday sports event. The table also includes the weighted average modal splits, which were calculated by applying the respective trip origins (listed in Table 6) to the regional modal splits. The results show that overall auto usage is consistent for weeknight events (31.7% for the concert and 33.7% for the sports events) and is higher (48.4%) for a Sunday sports event. In contrast, overall transit usage is highest for a weeknight concert (51.8%) and lowest for a Sunday sports event (34.8%).

In order to account for a potential relocation of Madison Square Garden to a location one and a half blocks west of its existing location, auto and taxi modal splits were increased by 7.5% and 5%, respectively, to account for a reduced access to transit services. This is similar to the methodology that was used to develop modal split assumptions for sports events at the proposed nearby multi-use facility based the existing MSG travel surveys[8]. The resulting modal splits are shown in Table 8. It is anticipated that given the existing and projected location of MSG, the existing and projected modal splits would be affected by neither the No. 7 subway extension nor the LIRR East Side Access project.

Temporal Distributions

Table 9 shows the results of the temporal distributions obtained from the MSG door counts. Based on the results of these surveys, it will be assumed that approximately 75% percent of arrivals to sports events[9] and 50% of arrivals to concerts would occur during the peak hour. Compared to sports events, the temporal distributions of concert events tend to exhibit less pronounced peaking characteristics because there are usually opening acts before the headliner band and a significant amount of attendees typically arrive after the concert begins.

[8] It was assumed that arena events at the proposed multi-use facility location would have increases in auto and taxi splits of 15% and 10%, respectively. Since MSG would be relocated to a site approximately halfway between Penn Station and the proposed multi-use facility, the increases in auto/taxi modal splits were assumed to 50% of what was assumed for the proposed multi-use facility.

[9] To provide for a conservative analysis, data from the March 16, 2003 and March 28, 2003 New York Knicks games were excluded due to their lower peak hour temporal distributions.

Table 7: Existing Arrival Modal Splits By Region
(Without MSG Relocation)

WEEKNIGHT CONCERT

Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	*TOTAL BY REGION*
Staten Island	72%	10%	0%	0%	0%	18%	0%	0%	0%	100%
Manhattan	12%	28%	1%	21%	4%	34%	0%	0%	0%	100%
Brooklyn	44%	3%	1%	0%	0%	52%	0%	0%	0%	100%
Bronx	46%	9%	0%	3%	3%	39%	0%	0%	0%	100%
Queens	49%	1%	2%	1%	0%	37%	10%	0%	0%	100%
Long Island	22%	2%	2%	0%	0%	2%	72%	0%	0%	100%
Westchester	18%	8%	0%	8%	60%	6%	0%	0%	0%	100%
Rockland	83%	0%	0%	0%	17%	0%	0%	0%	0%	100%
New Jersey	42%	1%	1%	2%	1%	2%	0%	35%	16%	100%
Connecticut	39%	5%	0%	34%	0%	22%	0%	0%	0%	100%
Weighted Average	**31.7%**	**8.7%**	**1.1%**	**6.7%**	**9.8%**	**22.4%**	**12.5%**	**4.9%**	**2.2%**	**100.0%**

WEEKNIGHT SPORTS EVENT

Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	*TOTAL BY REGION*
Staten Island	80%	4%	6%	0%	2%	10%	0%	0%	0%	100%
Manhattan	13%	17%	4%	24%	2%	42%	0%	0%	0%	100%
Brooklyn	58%	1%	0%	0%	1%	41%	0%	0%	0%	100%
Bronx	48%	2%	0%	0%	4%	47%	0%	0%	0%	100%
Queens	42%	3%	1%	1%	1%	45%	9%	0%	0%	100%
Long Island	25%	0%	1%	1%	0%	4%	70%	0%	0%	100%
Westchester	52%	7%	0%	9%	19%	14%	0%	0%	0%	100%
Rockland	46%	0%	0%	5%	50%	0%	0%	0%	0%	100%
New Jersey	54%	3%	0%	2%	5%	2%	1%	25%	9%	100%
Connecticut	44%	9%	4%	8%	20%	17%	0%	0%	0%	100%
Weighted Average	**33.7%**	**7.9%**	**1.7%**	**10.2%**	**5.6%**	**26.9%**	**8.7%**	**3.9%**	**1.4%**	**100.0%**

SUNDAY SPORTS EVENT

Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	*TOTAL BY REGION*
Staten Island	92%	1%	1%	0%	1%	5%	0%	0%	0%	100%
Manhattan	19%	22%	4%	19%	1%	34%	0%	0%	0%	100%
Brooklyn	56%	1%	0%	0%	1%	42%	0%	0%	0%	100%
Bronx	41%	2%	0%	0%	4%	53%	0%	0%	0%	100%
Queens	61%	3%	1%	1%	1%	29%	6%	0%	0%	100%
Long Island	38%	0%	1%	0%	0%	3%	57%	0%	0%	100%
Westchester	83%	7%	0%	2%	5%	3%	0%	0%	0%	100%
Rockland	58%	0%	0%	4%	38%	0%	0%	0%	0%	100%
New Jersey	76%	3%	0%	1%	2%	1%	0%	12%	4%	100%
Connecticut	55%	9%	4%	6%	14%	12%	0%	0%	0%	100%
Weighted Average	**48.4%**	**8.4%**	**1.7%**	**6.6%**	**3.6%**	**20.5%**	**8.0%**	**2.0%**	**0.7%**	**100.0%**

Source: Vollmer Associates, 1987.

Note: Sunday modal splits estimated based on weeknight sports average using Sam Schwartz LLC surveys (2003).

Table 8: Projected Arrival Modal Splits By Region
(With MSG Relocation)

WEEKNIGHT CONCERT

Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	*TOTAL BY REGION*
Staten Island	77%	11%	0%	0%	0%	12%	0%	0%	0%	100%
Manhattan	13%	29%	1%	20%	4%	33%	0%	0%	0%	100%
Brooklyn	47%	3%	1%	0%	0%	49%	0%	0%	0%	100%
Bronx	49%	9%	0%	3%	3%	36%	0%	0%	0%	100%
Queens	53%	1%	2%	1%	0%	34%	9%	0%	0%	100%
Long Island	24%	2%	2%	0%	0%	2%	70%	0%	0%	100%
Westchester	19%	8%	0%	8%	59%	6%	0%	0%	0%	100%
Rockland	89%	0%	0%	0%	11%	0%	0%	0%	0%	100%
New Jersey	45%	1%	1%	2%	1%	2%	0%	33%	15%	100%
Connecticut	42%	5%	0%	32%	0%	21%	0%	0%	0%	100%
Weighted Average	**34.1%**	**9.1%**	**1.1%**	**6.4%**	**9.5%**	**21.0%**	**12.1%**	**4.6%**	**2.1%**	**100.0%**

WEEKNIGHT SPORTS EVENT

Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	*TOTAL BY REGION*
Staten Island	85%	4%	6%	0%	1%	4%	0%	0%	0%	100%
Manhattan	13%	18%	4%	23%	1%	41%	0%	0%	0%	100%
Brooklyn	62%	1%	0%	0%	0%	37%	0%	0%	0%	100%
Bronx	52%	2%	0%	0%	3%	43%	0%	0%	0%	100%
Queens	45%	3%	1%	1%	1%	42%	8%	0%	0%	100%
Long Island	27%	0%	1%	0%	0%	4%	68%	0%	0%	100%
Westchester	55%	7%	0%	8%	17%	12%	0%	0%	0%	100%
Rockland	49%	0%	0%	5%	46%	0%	0%	0%	0%	100%
New Jersey	58%	3%	0%	2%	5%	2%	0%	23%	8%	100%
Connecticut	47%	9%	4%	7%	18%	15%	0%	0%	0%	100%
Weighted Average	**36.2%**	**8.3%**	**1.8%**	**9.8%**	**5.1%**	**25.5%**	**8.4%**	**3.6%**	**1.3%**	**100.0%**

SUNDAY SPORTS EVENT

Region	Auto	Taxi	Limo	Walk	Bus	Subway	LIRR (Penn Station)	NJ Transit Rail	PATH	*TOTAL BY REGION*
Staten Island	95%	1%	1%	0%	0%	2%	0%	0%	0%	100%
Manhattan	21%	23%	5%	18%	1%	32%	0%	0%	0%	100%
Brooklyn	61%	1%	0%	0%	0%	38%	0%	0%	0%	100%
Bronx	44%	2%	0%	0%	4%	50%	0%	0%	0%	100%
Queens	65%	3%	1%	1%	1%	25%	5%	0%	0%	100%
Long Island	41%	0%	1%	0%	0%	3%	54%	0%	0%	100%
Westchester	89%	7%	0%	1%	2%	1%	0%	0%	0%	100%
Rockland	62%	0%	0%	3%	34%	0%	0%	0%	0%	100%
New Jersey	82%	3%	0%	1%	2%	1%	0%	9%	3%	100%
Connecticut	59%	9%	4%	5%	12%	10%	0%	0%	0%	100%
Weighted Average	**52.0%**	**8.8%**	**1.8%**	**6.1%**	**3.0%**	**18.7%**	**7.6%**	**1.5%**	**0.5%**	**100.0%**

Source: Vollmer Associates, 1987.

Table 9: Temporal Distribution of MSG Attendees

New York Rangers
Wednesday, March 26, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM		
6:15 PM - 6:30 PM	1	0%
6:30 PM - 6:45 PM	326	2%
6:45 PM - 7:00 PM	2,200	16%
7:00 PM - 7:15 PM	1,685	12%
7:15 PM - 7:30 PM	2,646	19%
7:30 PM - 7:45 PM	3,320	24%
7:45 PM - 8:00 PM	2,194	16%
8:00 PM - 8:15 PM	873	6%
8:15 PM - 8:30 PM	319	2%
8:30 PM - 8:45 PM	178	1%
8:45 PM - 9:00 PM		
9:00 PM - 9:15 PM		
9:15 PM - 9:30 PM		
9:30 PM - 9:45 PM		
Totals	**13,742**	**100%**
Peak Hour (7:00-8:00 PM)	**9,845**	**72%**

New York Rangers
Friday, April 4, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM		
6:15 PM - 6:30 PM		
6:30 PM - 6:45 PM	61	0%
6:45 PM - 7:00 PM	2,234	13%
7:00 PM - 7:15 PM	1,911	11%
7:15 PM - 7:30 PM	3,403	20%
7:30 PM - 7:45 PM	4,258	25%
7:45 PM - 8:00 PM	2,753	16%
8:00 PM - 8:15 PM	1,501	9%
8:15 PM - 8:30 PM	611	4%
8:30 PM - 8:45 PM	321	2%
8:45 PM - 9:00 PM		
9:00 PM - 9:15 PM		
9:15 PM - 9:30 PM		
9:30 PM - 9:45 PM		
Totals	**17,053**	**100%**
Peak Hour (7:00-8:00 PM)	**12,325**	**72%**

New York Knicks
Monday, March 24, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM	1	0%
6:15 PM - 6:30 PM	1	0%
6:30 PM - 6:45 PM	178	1%
6:45 PM - 7:00 PM	1,152	9%
7:00 PM - 7:15 PM	1,362	10%
7:15 PM - 7:30 PM	2,471	19%
7:30 PM - 7:45 PM	2,985	23%
7:45 PM - 8:00 PM	2,634	20%
8:00 PM - 8:15 PM	1,204	9%
8:15 PM - 8:30 PM	606	5%
8:30 PM - 8:45 PM	324	2%
8:45 PM - 9:00 PM	132	1%
9:00 PM - 9:15 PM	63	0%
9:15 PM - 9:30 PM		
9:30 PM - 9:45 PM		
Totals	**13,113**	**100%**
Peak Hour (7:00-8:00 PM)	**9,452**	**72%**

New York Knicks
Friday, March 28, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM		
6:15 PM - 6:30 PM		
6:30 PM - 6:45 PM	6,106	28%
6:45 PM - 7:00 PM	86	0%
7:00 PM - 7:15 PM	327	1%
7:15 PM - 7:30 PM	1,910	9%
7:30 PM - 7:45 PM	2,092	9%
7:45 PM - 8:00 PM	3,016	14%
8:00 PM - 8:15 PM	3,791	17%
8:15 PM - 8:30 PM	2,703	12%
8:30 PM - 8:45 PM	1,147	5%
8:45 PM - 9:00 PM	558	3%
9:00 PM - 9:15 PM	208	1%
9:15 PM - 9:30 PM	121	1%
9:30 PM - 9:45 PM		
Totals	**22,065**	**100%**
Peak Hour (7:30-8:00 PM)	**11,602**	**53%**

New York Knicks
Sunday, March 16, 2003

Time Period	Arrivals	Percent
5:30 PM - 5:45 PM	8,330	38%
5:45 PM - 6:00 PM	75	0%
6:00 PM - 6:15 PM	102	0%
6:15 PM - 6:30 PM	1,288	6%
6:30 PM - 6:45 PM	1,492	7%
6:45 PM - 7:00 PM	2,706	12%
7:00 PM - 7:15 PM	3,436	16%
7:15 PM - 7:30 PM	2,445	11%
7:30 PM - 7:45 PM	1,119	5%
7:45 PM - 8:00 PM	562	3%
8:00 PM - 8:15 PM	271	1%
8:15 PM - 8:30 PM	163	1%
8:30 PM - 8:45 PM	57	0%
8:45 PM - 9:00 PM		
9:00 PM - 9:15 PM		
Totals	**22,046**	**100%**
Peak Hour (6:30-7:30 PM)	**10,079**	**46%**

Red Hot Chili Peppers
Tuesday, May 20, 2003

Time Period	Arrivals	Percent
6:00 PM - 6:15 PM		
6:15 PM - 6:30 PM		
6:30 PM - 6:45 PM	16	0%
6:45 PM - 7:00 PM	561	4%
7:00 PM - 7:15 PM	446	3%
7:15 PM - 7:30 PM	1,044	7%
7:30 PM - 7:45 PM	1,639	11%
7:45 PM - 8:00 PM	2,036	13%
8:00 PM - 8:15 PM	1,850	12%
8:15 PM - 8:30 PM	1,857	12%
8:30 PM - 8:45 PM	1,929	13%
8:45 PM - 9:00 PM	1,403	9%
9:00 PM - 9:15 PM	1,149	7%
9:15 PM - 9:30 PM	862	6%
9:30 PM - 9:45 PM	599	4%
Totals	**15,391**	**100%**
Peak Hour (7:45-8:45 PM)	**7,672**	**50%**

Source: Sam Schwartz LLC, 2003.
Note: Event start times are indicated by shading.

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Similar to the projections made for the proposed multi-use facility, all event staff would be expected to arrive 2-3 hours prior to an event at MSG and would be on post prior to the gate opening time. For this reason, event staff would not be expected to travel during the peak arrival period of attendees.

Vehicle Occupancy
Table 10 shows the vehicle occupancies that will be used for attendees at a weeknight concert, weeknight sports event, and Sunday sports event; these were based on the Sam Schwartz LLC surveys.[10]

Table 10: Vehicle Occupancies

	Auto	Taxi
Weeknight Concert	2.5	2.6
Weeknight Sports Event	2.2	2.5
Sunday Sports Event	2.8	2.8

Source: Sam Schwartz LLC, 2003.

Projected Attendance Increases
Regardless of a potential relocation, the DGEIS will also consider that the overall attendance capacity of MSG would increase by approximately 18% (from 19,500 to 23,000). Although it has not been determined how this change would affect the event-specific seating capacities listed in Table 5, it is assumed that each capacity would increase by the same proportion. Based on a review of the existing 85th percentile attendances shown in Table 5, it is anticipated that the increased seating capacity would have an effect on three types of events (concerts, NBA basketball, and NHL hockey) because many of these events currently sell out and would be expected to draw additional attendees. As shown in Table 11, it is assumed that the 85th percentile attendances at these events would also increase by 18%. Conversely, events which do not currently sell out would not be expected to be impacted by the availability of additional seating.

Truck Trip Generation and Distribution
Incremental truck trips associated with the expansion of MSG will be forecasted using the methodologies provided within the Multi-Use Facility Transportation Planning Assumptions Technical Memorandum (November 11, 2003). Because there would be an 18% increase in attendance capacity, the number of truck deliveries on an average weekday (food, beverage, and other merchandise) would be expected to increase by the same proportion.[11]

Table 11: Events with Projected Attendance Increases

Event Type	Existing Capacity	Projected Capacity	Existing 85th Percentile Attendances			Projected 85th Percentile Attendances		
			Overall	Weekday	Weekend	Overall	Weekday	Weekend
Concert	20,629	24,332	17,977	18,301	16,476	21,204	21,586	19,433
NBA Basketball	20,024	23,618	19,023			22,437		
NHL Hockey	18,295	21,579	17,380			20,499		

Source: Madison Square Garden, 2003.
Note: Projected capacities and attendances assume an 18% increase.

[10] Sam Schwartz LLC, *Madison Square Garden Modal Split Analysis*, August 2003.
[11] An increase in truck trips associated with equipment for concerts and other events is not expected.

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Selection of Weekday Evening Event for Analysis Purposes

The Multi-Use Facility Transportation Planning Assumptions Technical Memorandum (November 11, 2003) evaluated potential combinations of simultaneous weekday evening events that could take place at MSG (a sports event or a concert) and at the multi-use facility (a football game, a stadium concert, an arena concert, or an arena sports event). The results of this analysis showed that the largest number of total vehicle trips would result from the combination of arrivals to a concert at MSG and arrivals to a football game at the multi-use facility. This particular combination of events will be analyzed for future conditions with the proposed action during the weekday evening peak hour (8-9 PM). A subsequent review of the simultaneous events held at the arena and theater in 2002 indicates that 8 of the 38 weekday concerts occurred on nights with concurrent theater events (not including events held in the theater lobby). It is expected that the probability of a theater event occurring at the same time of both a weeknight football game and a concert is unlikely[12]; therefore a theater event is not recommended to be included as part of the combination of reasonable worst-case events selected for analysis.[13]

Selection of Sunday Afternoon Event for Analysis Purposes

The Convention Center Expansion Transportation Planning Assumptions Technical Memorandum (October 24, 2003) determined that the Sunday 4-5 PM period would be the worst-case scenario for trips on a weekend as it would coincide with the peak hour of activity at the Convention Center and departures associated with a 1 PM football game at the adjacent multi-use facility. As shown in Table 2, the primary events held on Sundays at MSG in 2002 involved NBA basketball games and NHL hockey games.[14] In order to determine how arrivals and departures to these events would interface with the selected 4-5 PM peak hour, the starting and ending times of these events were examined (using typical event durations provided by MSG); these are compared in Table 12. As shown in this table, departures associated with the 1 PM Rangers games and arrivals associated with the 5 PM Rangers games would have the potential to occur during the 4-5 PM peak hour. The pattern of starting times for Knicks games shown in Table 12 would not be expected to result in arrivals/departures occurring during the 4-5 PM peak hour.

Table 12: Start and End Times of Sunday Sports Events at MSG in 2002

New York Knicks			New York Rangers		
Date	**Start Time**	**End Time**	**Date**	**Start Time**	**End Time**
2/3/02	12:00 PM	2:30 PM	2/10/02	1:00 PM	3:45 PM
2/24/02	12:00 PM	2:30 PM	12/1/02	1:00 PM	3:45 PM
3/3/02	3:00 PM	5:30 PM	12/8/02	1:00 PM	3:45 PM
11/10/02	4:00 PM	6:30 PM	3/17/02	3:00 PM	5:45 PM
2/17/02	7:00 PM	9:30 PM	9/22/02	5:00 PM	7:45 PM
11/24/02	7:00 PM	9:30 PM	9/29/02	5:00 PM	7:45 PM
12/22/02	7:00 PM	9:30 PM	11/3/02	5:00 PM	7:45 PM

Source: Madison Square Garden, 2003.

[12] Including the 2003 season, the New York Jets have only hosted a total of 14 Monday Night Football games since 1970 (an average of less than one per year).
[13] According to Madison Square Garden management, there would not be a theater in the new arena if MSG is relocated.
[14] WNBA basketball games and circus performances were excluded because they had lower 85th percentile attendances.

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A review of the 2003-04 Knicks' and Rangers' schedules indicates that a comparable pattern will occur on Sundays this season: the Knicks have one game scheduled at 1 PM, three games scheduled for 7 PM, and one game scheduled for 7:30 PM; all four of the Rangers games on Sunday are scheduled for 5 PM. Therefore, it is assumed that travel associated with Rangers games would generally have the greatest potential to overlap with the 4-5 PM peak hour.

As previously described, it was assumed that 75% of arrivals to a sports event at MSG would occur during the peak arrival hour. Based on projections made by the New York Jets for the temporal distribution of departures from the multi-use facility in an arena configuration, it is assumed that 90-95% of fans would leave MSG in the hour immediately following the end of an event, and that these departures would be concentrated within a 20-minute period (the time it would take to clear the arena). Therefore, it is expected that the majority of departures associated with a 1 PM game would occur during the 3-4 PM period. For this reason, it is recommended that the travel demand associated with arrivals to a 5 PM Rangers game should be included as part of the Sunday afternoon peak hour (4-5 PM) as this combination of events would have the greatest potential for traffic implications.

It should be noted that although there were no overlapping arena and theater events on Sundays (as shown in Table 4), there were five Sunday afternoon performances of "A Christmas Carol" in December (during the NFL football season) that began at 5 PM, and arrivals associated with this event would have a potential to overlap with the 4-5 PM peak hour. On these five Sundays, there were two Rangers games scheduled for 1 PM, one Knicks game scheduled for 7 PM, and two dark days in the arena. Because the start times of these theater events were staggered in such a way were did not coincide with arena events, it is not realistic to combine travel demand associated with both events. The travel demand associated with a Rangers game (an attendance capacity of 18,295) would be expected to be more conservative than the travel demand associated with "A Christmas Carol" (an attendance capacity of 5,600). Although the travel demand associated with a theater event will not be included in the Sunday afternoon peak hour, its associated parking demand will be included to provide for a more conservative analysis.

cc: L. Lennon
D. Fields

PB Team

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: September 28, 2004

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Multi-Use Facility Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1608

This technical memorandum provides a summary of the proposed transportation planning assumptions for the 75,000-seat multi-use facility that would be located in West Midtown Manhattan, on a block bounded on the north by West 34th Street, on the south by West 30th Street, on the east by Eleventh Avenue, and on the west by Route 9A (Twelfth Avenue). It also summarizes the methodology used in the selection of the combination of events to be selected for analysis at the multi-use facility and Madison Square Garden (MSG).

Initial Modal Split Projections

In an initial feasibility study[1] for the proposed multi-use facility, Eng-Wong Taub & Associates (EWT) made preliminary estimates that the overall transit share for a Sunday afternoon football game would be approximately 60%. The New York Jets organization further supplemented this preliminary estimate by conducting market studies of their season ticket holder base to assist in determining projected travel patterns to the multi-use facility. A telephone survey of current season ticket holders was completed by McLaughlin & Associates in the Fall of 2002 to provide an in-depth, definitive, and statistically accurate survey of projected transportation needs of season ticket holders in correlation with the new location of the multi-use facility.

At the time of this survey, there were approximately 20,000 season ticket holders, who collectively represent 100% of ticket sales to Jets home games. By completing 600 interviews with members of this group, a statistically significant sample was recorded which adequately represents this population. The sample of 600 season ticket holders was distributed to represent the geographic distribution of all season ticket holders by state and county. Geographic representation matched the home county for the high density areas of season ticket holders within the New York Metropolitan area. Random samples within state and counties were taken at an nth selection[2] within the full county and state ticket holder lists. The survey was conducted by professional interviewers via telephone between August 29 and September 5, 2002. For this

[1] STV Incorporated and Eng-Wong Taub & Associates, *West Side Sports and Exhibition Center Feasibility Study – Transportation Study Report*, January 2001

[2] A fractional selection that is repeated in sampling a database. For example, every 10th selection would include records 1, 11, 21, etc.

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sample of 600 New York Jets season ticket holders the accuracy is within ± 4.0% at a 95% confidence interval.

The survey asked interviewees several questions including:

- Would current season ticket holders maintain their tickets if the Jets moved to a stadium in West Midtown; and
- If they would maintain their tickets, how they would expect to travel to the new stadium, knowing that no new parking garages would be built to serve the stadium and that they would need to either find parking within existing facilities in the area or utilize other modes.

The results of the survey supported the initial modal split projections by EWT: approximately 70% of the season ticket holders said they would maintain their ticket subscriptions and take mass transit service. This choice was selected without the interviewees being informed that MTA-NYCT was considering extending the No. 7 subway line to the vicinity of the stadium, and possibly without realizing the proximity of the stadium to existing cross-Hudson ferry services.

Refined Modal Split Projections

In order to further refine its preliminary modal split projections for the multi-use facility, EWT utilized the results of the McLaughlin & Associates survey to determine the breakdown of fans that would travel to the stadium by trip origin and the modal splits by region. The McLaughlin & Associates survey determined that 12% of existing season ticket holders would not renew their tickets if the Jets moved to a West Midtown location. As shown in Table 1, the New York Jets season ticket holder base would be expected to shift towards a New York market (paralleling the demographic shift of fans from New York to New Jersey when the Jets moved from Shea Stadium in Flushing, Queens to the Meadowlands Sports Complex in East Rutherford, New Jersey in 1984), although it would still retain a substantial amount of season ticket holders in New Jersey due to a more central location on the west side of Manhattan and the availability of a one-seat transit ride from New Jersey.

An expanded breakdown of the existing and projected distribution of the Jets season ticket holder base for the New York Metropolitan area is shown in Table 2. This table shows an increase in trips from the five boroughs of New York City (20.9% projected versus 17.4% existing), Long Island (19.1% projected versus 15.5% existing), Westchester/Upstate New York (East of Hudson)/New England (14.3% projected versus 12.1% existing) and a decrease in trips from New Jersey (41.3% projected versus 51.0% existing).

Table 1: Historical and Projected Distribution of New York Jets Season Ticket Holders

Year *(Stadium, Location)*	**New York**	**New Jersey**	**Connecticut/ New England**
1983 *(Shea Stadium, Flushing, NY)*	75%	21%	4%
1987 *(Meadowlands, East Rutherford, NJ)*	56%	40%	4%
Existing (*Meadowlands, East Rutherford, NJ)*	45%	51%	4%
Projected *(Multi-Use Facility, West Midtown Manhattan, NY)*	53%	41%	6%

Source: Eng-Wong Taub & Associates, 2003.

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Table 2: Existing and Projected Distribution of New York Jets Season Ticket Holders within New York Metropolitan Area

Regional Trip Origin	Existing (Meadowlands)	Projected (Multi-Use Facility)
Staten Island	5.7%	6.4%
Manhattan	5.7%	7.3%
Brooklyn	3.8%	4.4%
Bronx	1.2%	1.5%
Queens	1.0%	1.3%
Long Island	15.5%	19.1%
Westchester and Upstate (East of Hudson)	7.8%	8.8%
Rockland and Upstate (West of Hudson)	4.0%	4.4%
Northern New Jersey	41.4%	33.6%
Southern New Jersey	9.6%	7.7%
Connecticut and New England	4.3%	5.5%

Source: Eng-Wong Taub & Associates, 2003.

Modal split responses provided by the season ticket holders were then applied to the projected distribution in trip origins; these results are listed in Table 3, which also compares the results of the survey to other available sources of modal split data. Census journey-to-work data was utilized to confirm that the projected auto modal splits would at a minimum exceed those exhibited during the weekday AM peak hour (when transit usage to Manhattan is highest). It should be noted that 75% of current Jets season ticket holders have both held their tickets for more than ten years and are familiar with commuting to Manhattan. These two statistics indicate that the Jets have a stable fan base comprised of habitual travelers who are knowledgeable about the various transit options available for traveling to Manhattan.

Although projected auto modal splits would not exceed the census data for the Northern New Jersey region, it is important to note that 28% of ferry users from New Jersey are expected to drive to ferry landings on the west side of the Hudson River. When accounting for fans from New Jersey that would drive to ferry terminals in Weehawken, Hoboken, and Jersey City, the overall auto modal from the Northern and Southern New Jersey regions increases to 34.0% and 22.8%, respectively (the weighted average for auto usage from all regions increases to 31.7%).[3] Auto usage from Long Island is projected to be similar to current travel patterns during the weekday rush hours. Over 90% of Jets season ticket holders from Long Island have previously commuted to New York City; of these fans approximately 70% currently commute to New York City. A high transit share from Long Island is not unrealistic given the extensive service area of the Long Island Rail Road (LIRR) and the proximity of Penn Station to the location of the multi-use facility.

While auto modal splits by region from the Jets season ticket holder survey are lower than those surveyed at MSG (see Table 3), these were all weeknight events with late ending times; therefore attendees are anticipated to be more inclined to drive and not be subject to transit operations. Although the average of the overall MSG auto modal splits is 31.8%, it is important to point out that significant improvements have been made to Northern New Jersey rail service since 1987 (the year of the MSG surveys), notably the introduction of New Jersey Transit's Midtown Direct service from Dover and Gladstone to Penn Station in 1996. As shown in Table

[3] This occurrence is subsequently shown in Tables 4 and 5, which show projected primary and secondary modal splits by region to the multi-use facility, respectively.

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2, the modal splits from Northern New Jersey have the greatest effect on the weighted average modal splits because this region contains the largest proportion of the Jets' projected fan base.

Table 3: Comparison of Projected Multi-Use Facility Modal Splits to Other Available Data

Regional Trip Origin	Jets Season Ticket Holder Survey[1]		Madison Square Garden Surveys[2]		US Census Journey-to-Work Data[3]	
	Auto	Taxi	Auto	Taxi	Auto	Taxi
Staten Island	71.5%	-	77%	10%	18.5%	0.1%
Manhattan	3.2%	1.1%	12%	23%	7.2%	10.1%
Brooklyn	31.3%	-	53%	2%	8.7%	0.3%
Bronx	33.3%	-	47%	4%	10.2%	0.2%
Queens	24.9%	-	44%	3%	11.6%	0.1%
Long Island	15.4%	-	24%	2%	13.8%	0.2%
Westchester/Upstate (East of Hudson)	34.2%	-	40%	7%	13.6%	0.4%
Rockland/Upstate (West of Hudson)	72.2%	-	58%	0%	45.1%	-
Northern New Jersey	26.6%	-	50%	3%	32.4%	-
Southern New Jersey	17.3%	-			15.1%	-
Connecticut and New England	31.2%	-	42%	10%	13.1%	0.8%
Weighted Averages	**28.1%[4]**	**0.1%[4]**	**31.8%[5]**	**9.5%[5]**	**-**	**-**

Sources:
(1) Eng-Wong Taub & Associates, 2003. (2) Average of Vollmer Associates surveys conducted for a Cars concert on Thursday, October 29, 1987, a New York Knicks game on Monday, November 9, 1987, and a New York Rangers game on Tuesday, November 10, 1987. The "taxi" mode includes both taxis and limos. (3) 1990 US Census journey-to-work data to the Midtown Manhattan area (6:30-8:30 AM peak period). (4) Weighted averages were calculated by applying the surveyed regional modal splits to the Jets' projected fan base. (5) Average of overall modal splits for a Cars concert, New York Knicks game, and New York Rangers game based on the 1987 Vollmer survey data.

A comparison of both the MSG survey and census journey-to-work data revealed a significant underestimation of auto and taxi usage for Jets season ticket holders from Manhattan. For example, as shown in Table 3, the Jets season ticket survey indicated a 3.2% auto modal split from Manhattan; this compares to taxi modal splits of 12% and 7.2% from the MSG surveys and census data, respectively. In addition, the Jets season ticket survey indicated a 1.1% taxi modal split from Manhattan, compared to taxi modal splits of 23% and 10.1% from the MSG surveys and census data, respectively. Because the auto and taxi modal splits for Manhattan origins projected by the season ticket holder survey are believed to be unrealistic, these splits were adjusted to match the survey data from MSG. Additionally, it is recommended to include taxi modal splits of 2%, 4%, 10%, and 3% for Brooklyn, the Bronx, Staten Island, and Queens, respectively, also based on the results of the MSG surveys. Moreover, in order to provide for a more conservative analysis, 10% of all auto trips from Manhattan origins will be assumed to be drop-offs, therefore resulting in some autos traveling in both inbound and outbound directions during the analysis period.

Revised modal split information by region was formulated by the PB Team based on the Jets season ticket holder survey and the changes recommended above, and are summarized in Tables 4 and 5[4]. These tables include expanded modal splits (auto, taxi, commuter rail, subway, bus, and ferry) for both primary and secondary arrival modes. Primary and secondary modal splits were provided to account for changes in travel modes (e.g. auto users from New Jersey

[4] The projected modal splits and travel assignments were developed for a baseline scenario assuming completion of both the No. 7 subway extension and LIRR East Side Access to Grand Central Terminal. Projected variations in travel patterns that would occur without these projects are discussed later in this document.

Table 4: 2025 Projected Primary Modal Splits for Sunday Football Game at Multi-Use Facility

Regional Trip Origin	Auto	Taxi	LIRR (Penn Station)	LIRR (Grand Central)	NJ Transit Rail	NY Waterway Ferries	Metro-North Railroad	IRT Lexington Avenue Line	IND Sixth Avenue Line	BMT Broadway Line	IRT Seventh Avenue Line	IND Eighth Avenue Line	IRT Flushing Line (from Queens only)	NYCT Bus	Commuter Bus (e.g. NJ Transit)	Charter Bus	PATH	Staten Island Ferry (transfer to IRT Seventh Avenue Line)	*TOTAL BY REGION*
Staten Island	71.5%	10.0%												1.0%		0.2%		17.3%	**100.0%**
Manhattan	12.0%	23.0%						7.4%		3.7%	19.3%	10.3%		24.4%					**100.0%**
Brooklyn	31.3%	2.0%							6.0%	12.2%	18.2%	18.2%		12.1%					**100.0%**
Bronx	33.3%	4.0%						15.0%		1.3%	1.2%	7.5%		37.6%					**100.0%**
Queens	24.9%	3.0%	9.0%	9.0%								12.0%	24.0%	16.2%		1.8%			**100.0%**
Long Island	15.4%		42.3%	42.3%															**100.0%**
Westchester and Upstate (East of Hudson)	34.2%						59.2%	4.4%							1.9%	0.3%			**100.0%**
Rockland and Upstate (West of Hudson)	73.1%				5.3%		6.2%								14.3%	1.1%			**100.0%**
Northern New Jersey	34.0%				41.5%										4.7%	1.0%	18.8%		**100.0%**
Southern New Jersey	22.8%				51.0%										4.0%	0.4%	21.8%		**100.0%**
Connecticut and New England	31.2%						68.8%												**100.0%**
Weighted Average	**31.7%**	**2.5%**	**8.2%**	**8.2%**	**18.1%**	**0.0%**	**9.3%**	**1.2%**	**0.3%**	**0.8%**	**2.2%**	**1.8%**	**0.3%**	**3.2%**	**2.7%**	**0.5%**	**8.0%**	**1.1%**	**100.0%**

Notes:
Projections based on Eng-Wong Taub & Associates forecasts.

Table 5: 2025 Projected Secondary Modal Splits for Sunday Football Game at Multi-Use Facility

Regional Trip Origin	Auto	Taxi	LIRR (Penn Station)	LIRR (Grand Central)	NJ Transit Rail	NY Waterway Ferries	Metro-North Railroad	IRT Lexington Avenue Line	IND Sixth Avenue Line	BMT Broadway Line	IRT Seventh Avenue Line	IND Eighth Avenue Line	IRT Flushing Line (includes No. 7 subway extension trips)	NYCT Bus	Commuter Bus (e.g. NJ Transit)	Charter Bus	PATH	Staten Island Ferry (transfer to IRT Seventh Avenue Line)	*TOTAL BY REGION*
Staten Island	71.5%	10.0%											8.6%	1.0%		0.2%		8.6%	**100.0%**
Manhattan	12.0%	23.0%								1.8%	9.6%	10.3%	31.0%	12.2%					**100.0%**
Brooklyn	31.3%	2.0%							3.0%	6.1%	9.1%	18.2%	24.2%	6.0%					**100.0%**
Bronx	33.3%	4.0%										7.5%	17.6%	37.6%					**100.0%**
Queens	24.9%	3.0%	9.0%									12.0%	33.0%	16.2%		1.8%			**100.0%**
Long Island	15.4%		42.3%										42.3%						**100.0%**
Westchester and Upstate (East of Hudson)	34.2%												63.6%		1.9%	0.3%			**100.0%**
Rockland and Upstate (West of Hudson)	72.2%				3.1%	3.1%							6.2%		14.3%	1.1%			**100.0%**
Northern New Jersey	26.6%				28.3%	26.6%									4.7%	1.0%	12.8%		**100.0%**
Southern New Jersey	17.3%				41.0%	19.8%									4.0%	0.4%	17.5%		**100.0%**
Connecticut and New England	31.2%												68.8%						**100.0%**
Weighted Average	**28.8%**	**2.5%**	**8.2%**	**0.0%**	**12.8%**	**10.6%**	**0.0%**	**0.0%**	**0.1%**	**0.4%**	**1.1%**	**1.8%**	**22.3%**	**2.0%**	**2.7%**	**0.5%**	**5.6%**	**0.6%**	**100.0%**

Notes:
Projections based on Eng-Wong Taub & Associates forecasts.

that would switch to ferries and Metro-North riders that would switch to the No. 7 subway extension at Grand Central Terminal). The secondary modal splits represent the final travel modes that would be used to access the stadium (exclusive of walking). As shown in Tables 4 and 5, the average weighted auto splits for the primary and secondary arrival modes would be 31.7% and 28.8%, respectively.

Comparison of Modal Split Projections to Other Facilities

Although the projection of 28.8% auto usage is clearly different than the existing auto modal split for Jets football games at the Meadowlands (approximately 95%[5]), these facilities are inherently different in nature. The only transit access to the Meadowlands is via a single bus route to the Port Authority Bus Terminal in Manhattan (no direct transit access is available to any other points, including New Jersey). Additionally, the Meadowlands provides approximately 25,000 on-site parking spaces as well as opportunities for tailgating. With a seating capacity of approximately 80,000, the Meadowlands has an exceptionally high on-site parking rate that exceeds 30 parking spaces per 100 seats. This compares to NFL averages of 12 parking spaces per 100 seats for football-only stadiums and 14 parking spaces per 100 seats for multi-purpose stadiums.[6] These characteristics — a high rate of provided parking and poor transit access — offer little choice for fans aside from driving to the Meadowlands and directly contribute to a very large auto modal split.

When the Jets and New York Mets both played at Shea Stadium from 1964-1983, each had a 65% auto modal split.[7] This data collaborates with a 62% auto modal split that was more recently surveyed at a New York Mets game in July of 2001.[8] Although Shea Stadium provides for a much better comparison than the Meadowlands, it is only served by two transit lines (one subway line and one branch of the LIRR) and does not match the transit access provided by the West Midtown stadium location[9]. The stadium also contains approximately 7,700 on-site parking spaces (plus a few thousand uncontrolled overflow spaces) and has convenient access to the regional limited access highway system, including the Grand Central Parkway, Van Wyck Expressway, and Whitestone Expressway.

The only comparable sports facility in New York City that has transit accessibility similar to what would be available to the multi-use facility is MSG, located three blocks to the east. Both sites are situated within walking distance to Penn Station (served by Amtrak, New Jersey Transit, and all branches of the LIRR), numerous subway and bus lines, the Port Authority Bus Terminal, and PATH trains. Surveys of arriving attendees at several MSG events in the Fall of 1987 showed auto modal splits of 32% for a weeknight concert, 28% for a weeknight Knicks game, and 36% for a weeknight Rangers game.[10] Although the projected auto modal split of 28.8% for the multi-use facility would be somewhat lower than auto modal splits currently exhibited at MSG, it is important to keep in mind that the 75,000-seat stadium would draw approximately four times as many patrons as MSG events (its seating capacities range from 18,295 for hockey games to 20,629 for concerts). This level of fan attendance could be expected to be a major deterrence to driving to the stadium. Additionally, the multi-use facility would also be in close proximity to the proposed No. 7 subway extension (which would provide a direct connection between Grand Central Terminal) as well as ferry service from New Jersey. As previously mentioned, when auto users that would drive to ferry landings in New Jersey are taken into

[5] STV Incorporated and Eng-Wong Taub & Associates, *West Side Sports and Exhibition Center Feasibility Study – Transportation Study Report*, January 2001. This modal split includes some taxi usage.
[6] ITE Technical Council Committee 6A-50, *Traffic Operations Planning for Stadia and Arenas*, 1994.
[7] Traffic Considerations for Special Events*, Traffic Engineering*, June 1975, p. 42.
[8] *Shea Stadium Redevelopment FEIS* (2001), Table 11-1.
[9] MTA-NYCT bus usage is negligible and was only utilized by 0.2% of all attendees in the July 2001 survey.
[10] *Technical Memorandum A-4*, Madison Square Garden Attendance Profile, Vollmer Associates, 1987.

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account, the overall auto modal split rises to 31.7% and is comparable to that exhibited at weeknight sports events at MSG.

Given that the proposed multi-use facility would not be surrounded by controlled parking lots and that the availability of parking would be limited to existing off-street facilities within a 20-minute walk (the maximum distance that event attendees would be willing to walk from a stadium is generally one mile)[11], driving to the proposed stadium would offer limited benefits. Many of the existing parking facilities are located as far as a walk to mass transit services (e.g. Penn Station) and auto users would be subject to blockages by intense post-game pedestrian flows leaving the stadium. Studies have shown that repetitive, season-long events can encourage higher mode splits to transit.[12] Games that are sold out well in advance would give fans more of an opportunity to assess transit opportunities; most season ticket holders are long-term fans who create well-established travel routines on game days.

A similar phenomenon of a switch from high to low auto usage recently occurred following the opening of Pacific Bell Park in March 2000, which is located adjacent to downtown San Francisco. When the San Francisco Giants formerly played at 3Com Park at Candlestick Point, they recorded an auto usage of 95%. This multi-purpose stadium is similar in many aspects to the Meadowlands, as its provisions for public transportation during baseball games only included two bus routes. When the new ballpark opened, the auto usage dropped from 96% to 46% and even more astonishingly transit usage increased from 4% to 52%. Pacific Bell Park shares some of the similarities of the proposed multi-use facility in that it is located within walking distance to several transit facilities in a downtown area and that it also located adjacent to a ferry dock. However, it should be noted that the 40,800-seat capacity of Pacific Bell Park is nearly half the size of the proposed multi-use facility and that 4,800 dedicated parking spaces are provided on-site.[13]

As shown in Table 5, approximately 10.6% of all Jets fans (7,949 attendees) would be expected to utilize ferry service from New Jersey. Observations by EWT indicate that this type of usage would be similar to that currently experienced at Pittsburgh's Heinz Field, where approximately 6,000 to 7,000 fans (10% of all attendees) park near the Monongahela River and use ferry service to get to the stadium. Preliminary discussions between the New York Jets and New York Waterway indicate that the projected ferry demand would be well within capacity limits, as up to 20,000 riders could be accommodated during the pre- and post-game hours, if necessary.

Based on these comparisons, the projected 68.7% transit share to the multi-use facility is reasonable, given the propensity of New York City workers to take transit to work on a daily basis. With the highest level of daily transit ridership anywhere in the United States, it is expected that a stadium in Manhattan would capture a higher transit share than sports facilities in other cities. Other urban facilities with a comparable level of transit activity include the Georgia Dome (Atlanta Falcons, 50 to 55% via transit), Busch Stadium (St. Louis Cardinals, 35% via transit), Fenway Park (Boston Red Sox, 34% via transit), and the Trans World Dome (St. Louis Rams, 30% via transit).[14] Information obtained by EWT from the SkyDome in Toronto showed that the stadium was drawing approximately 55-60% of its fans by transit when it opened; this city is somewhat similar to New York City in that approximately 75% of its

[11] ITE Technical Council Committee 6A-50, *Traffic Operations Planning for Stadia and Arenas*, 1994.
[12] Ibid.
[13] Golden Gate Bridge, Highway and Transportation District, *Planning of Special Event Golden Gate Ferry Service to Pac Bell Park, San Francisco*, 2000.
[14] STV Incorporated and Eng-Wong Taub & Associates, *West Side Sports and Exhibition Center Feasibility Study – Transportation Study Report*, January 2001

downtown workers travel by transit on a typical weekday. It is interesting to note that transit use at three recently-constructed downtown football stadiums in the United States is higher than commuter usage in those cities on a typical weekday: transit usage is in Baltimore is approximately 23% on a game day, compared to 11% on a typical weekday; transit usage in Pittsburgh is approximately 14% on a game day, compared to 12% on a typical weekday; transit usage in Seattle is approximately 18% on a game day; compared to 7% on a typical weekday.[15]

Temporal Distributions for Attendees

For events at the multi-use facility, the critical analysis period would involve post-game departures as they are more heavily concentrated compared to pre-game arrivals. Based on projections by the New York Jets and observations at other NFL football stadiums by EWT, it is estimated that 75% of all fans would arrive to the stadium in the peak period (the hour immediately preceding kickoff) and that 85% of all fans would depart the stadium in the peak period (the hour immediately following the end of a game).[16] Because the stadium would have a 75,000-seat capacity, there would be 7,550 more fans in the peak departure hour compared to the peak arrival hour. The differences between concentrations of arriving and departing fans would be even more pronounced during the peak 15-minute periods: 30% of the total arrival demand would be anticipated to occur during the peak 15-minute period and 43% of the total departure demand would be anticipated to occur during the peak 15-minute period. (Gate opening times would be 2 hours prior to a stadium event.)

It is important to note that a significant number of fans generally depart the stadium before the end of a game (approximately 10 to 15% for an average game). The exact percentage of fans leaving can vary due to weather conditions and competitiveness of the game. Regardless of the outcome, some fans will always leave early due to inflexible post-game plans or a desire to avoid post-game traffic. Observations by EWT at a football game in Pittsburgh that went into overtime (representing the worst-case scenario for concentrations of post-game fan departures) indicated that approximately 5% of fans still left before the game concluded. Although a sell-out crowd of 75,000 attendees will be analyzed in the DGEIS, it should also be mentioned that this is a conservative measure and does not take into account the fact that 8-12% of seats at a typical New York Jets game are empty due to no shows.

Temporal Distributions for Event Staff

According to projections by the New York Jets, a typical NFL football game at the multi-use facility would require approximately 2,500 event staff, including ticket takers, ushers, security, custodial, medical, and food service personnel (nearly half of these would be concessionaires). Based on existing Jets policies, all event staff are expected to be on post 15 minutes prior to the gate opening time (2 hours before the start of an event) and would therefore not travel during the peak arrival period. Most event staff would arrive between 3 and 4 hours prior to a stadium event.

Similarly, the departures of event staff would not coincide with the peak departure period of attendees. Event staff would typically be dismissed between 40 minutes and 2 hours after the conclusion of a game (concessionaires would take the longest because they must cash out). Based on observations of existing patterns at the Meadowlands, it is assumed that 60 percent of employee departures would occur during the peak departure hour of attendees. It is important to note that the addition of employee departures to the peak departure hour would further increase

[15] Eng-Wong Taub & Associates, *West Midtown Manhattan Football Stadium Surveys & Recommendations*, 2003.
[16] Temporal distributions of arrivals were obtained for NFL stadiums located adjacent to downtown Baltimore and Cleveland.

the total amount of additional person trips (to 9,000 total attendees/employees) that would occur during the peak departure hour compared to the peak arrival hour. The origin/destinations and modal splits of employees will be based on the surveyed travel characteristics of the event staff at the adjacent Jacob Javits Convention Center.

Vehicle Occupancy

Projections by EWT assume an average occupancy of 3.0 persons per vehicle (autos, taxis, and limos combined) for Sunday football attendees. Although the average vehicle occupancy for Jets games at the Meadowlands is currently 2.75, a higher vehicle occupancy of 3.0 in Manhattan is recommended to account for significant parking costs and tolls on bridges/tunnels entering Manhattan, which provide a pricing disincentive to single-occupancy auto-based trips. It should be noted that a projected average vehicle occupancy of 3.0 correlates with previous surveys at professional football games in other cities.[17] As a comparison, the projected average vehicle occupancy of 3.0 compares to an average vehicle occupancy of 2.8 for both autos and taxis for a Sunday sports event at MSG.[18] Vehicle occupancies for larger events are also generally higher due to larger stadium capacities and repeat attendance.[19]

Truck Trip Generation and Distribution

Estimates provided by the New York Jets approximate that a total of seven truck deliveries would be expected at the multi-use facility on an average weekday (five trucks delivering food, beverages, merchandise, and other material for the concessionaire and two trucks for stadium operations). No truck deliveries would be expected for the concessionaire and stadium operations on weekends. Because weekday deliveries to the multi-use facility would occur during business hours, the temporal distribution of these trips will be based on those used for a retail land use, and is shown in Table 6.

Table 6: Projected Distribution of Truck Deliveries to the Multi-Use Facility

Analyzed Peak Hour	Percent of Daily Deliveries
Weekday AM (8-9 AM)	7.7%
Weekday MD (12-1 PM)	11.0%
Weekday PM (5-6 PM)	1.0%
Weekday EVE (7-8 PM)	0.0%
Weekday EVE (8-9 PM)	0.0%
Sunday PM (4-5 PM)	-

Source: Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 19.

Additional trucks would also be generated by the various types of events held at the multi-use facility and the largest demand would be associated with a stadium concert, in which up to 40 trucks would be expected. Although the arrivals of these trucks would typically be staggered in the days preceding a show, the trucks would typically depart on the day following the last show. Because only approximately four stadium concerts would be expected per year, this type of truck demand would not occur with enough frequency to warrant analysis. However, as a conservative estimate, an additional 10 truck deliveries per day will considered in the peak periods analyzed for traffic to represent the demand associated with an arena concert, which

[17] Whitlock, Edward M., Parking for Institutions and Special Events, ENO Foundation, Westport CT, 1982, p. 34.
[18] Sam Schwartz LLC, *Madison Square Garden Modal Split Analysis*, August 2003.
[19] ITE Technical Council Committee 6A-50, *Traffic Operations Planning for Stadia and Arenas*, 1994.

would be expected to occur on a more frequent basis. It was assumed that these truck trips would share the same temporal distribution as the other regular truck deliveries to the facility.

Variations in Projected Travel Patterns to the Multi-Use Facility

As previously discussed, projected modal splits and travel assignments to the multi-use facility were developed for a baseline scenario assuming completion of both the No. 7 subway extension and LIRR East Side Access to Grand Central Terminal. Because the LIRR East Side Access project would not be completed until 2012, it will not be included as part of the 2010 analyses. Without LIRR access to Grand Central Terminal, it is simply assumed that all LIRR riders would continue to travel to/from Penn Station.

Tables 7 and 8 summarize projected primary and secondary modal splits without the No. 7 subway extension; these assumptions will be used to forecast travel demand in the 2010 condition with only the multi-use facility. As noted on Table 7, it is assumed that projected primary auto modal splits would increase by 15% and that the projected taxi modal splits would increase by 10% to reflect reduced access to transit services. Table 8 shows that the overall secondary auto modal split would be 33.1%, or 4.3% greater than the overall secondary auto modal split with the No. 7 subway extension.

Selection of Combination of Weekday Evening Events for Analysis

While a Sunday afternoon football game would represent a worst-case scenario for trip generation during a weekend event (when combined with trips at the adjacent Convention Center, where trips associated with a weekend public show peak during the 3-5 PM period[20]); the multi-use facility would be designed to host a number of other events and would have the capability to switch from a stadium to an arena-type configuration. On a weekday evening, the multi-use facility could host a variety of possible events including a football game (e.g. Monday Night Football), a stadium concert with 55,000 seats, or an arena concert/sports event with 18,900 seats. In addition, there exists the possibility for a simultaneous concert or Knicks/Rangers game at MSG. For this reason, projected vehicle trips for capacity crowds at the two facilities were calculated during three separate time periods: 7:00-8:00 PM; 7:30-8:30 PM; and 8:00-9:00 PM. These time periods were selected to the account for typical starting times for events (7:30 PM for an arena sports event; 8:00 PM for a concert; and 9:00 PM for a football game) and potential overlap for arrivals between a combination of events. A potential overlap in arrivals and departures for simultaneous events was not considered because peak departures from the earliest event (a 7:30 PM arena sports event) would not begin until the end of the event (approximately 10:00 PM), well after the start of the latest event (a 9:00 PM football game).

Table 9 shows existing vehicle trips generated by a Knicks/Rangers game and a concert at MSG (both with capacity crowds). Modal splits and temporal distributions for the two events were based on the results of travel surveys conducted at MSG by Vollmer Associates in 1987[21] and Sam Schwartz LLC in 2003.[22] The table differentiates between inbound and outbound vehicle trips; all inbound taxi trips were assumed to have an equal number of outbound trips. Additionally, 10% of inbound auto trips from Manhattan were assumed to be drop-offs and therefore were treated similar to taxis in having outbound trips.

[20] Eng-Wong Taub & Associates, *Jacob K. Javits Convention Center Expansion Study, Technical Memorandum Travel Surveys*, May 15, 2003
[21] *Technical Memorandum A-4*, Madison Square Garden Attendance Profile, Vollmer Associates, 1987.
[22] Sam Schwartz LLC, *Madison Square Garden Modal Split Analysis*, August 2003.

Table 7: 2025 Projected Primary Modal Splits for Sunday Football Game at Multi-Use Facility (without No. 7 Subway Extension)

Regional Trip Origin	Auto	Taxi	LIRR (Penn Station)	LIRR (Grand Central)	NJ Transit Rail	NY Waterway Ferries	Metro-North Railroad	IRT Lexington Avenue Line	IND Sixth Avenue Line	BMT Broadway Line	IRT Seventh Avenue Line	IND Eighth Avenue Line	IRT Flushing Line (from Queens only)	NYCT Bus	Commuter Bus (e.g. NJ Transit)	Charter Bus	PATH	Staten Island Ferry (transfer to IRT Seventh Avenue Line)	*TOTAL BY REGION*
Staten Island	82.2%	11.0%												0.4%		0.1%		6.3%	**100.0%**
Manhattan	13.8%	25.3%						6.9%		3.4%	18.1%	9.7%		22.8%					**100.0%**
Brooklyn	36.0%	2.2%							5.6%	11.3%	16.9%	16.9%		11.2%					**100.0%**
Bronx	38.3%	4.4%						13.7%		1.2%	1.1%	6.9%		34.4%					**100.0%**
Queens	28.6%	3.3%	17.0%									11.3%	22.7%	15.3%		1.7%			**100.0%**
Long Island	17.7%		82.3%																**100.0%**
Westchester and Upstate (East of Hudson)	39.3%						54.6%	4.1%							1.8%	0.3%			**100.0%**
Rockland and Upstate (West of Hudson)	84.0%				3.2%		3.7%								8.5%	0.7%			**100.0%**
Northern New Jersey	39.2%				38.3%										4.3%	0.9%	17.3%		**100.0%**
Southern New Jersey	26.3%				48.7%										3.8%	0.4%	20.8%		**100.0%**
Connecticut and New England	35.9%						64.1%												**100.0%**
Weighted Average	**36.5%**	**2.8%**	**15.9%**	**0.0%**	**16.8%**	**0.0%**	**8.5%**	**1.1%**	**0.2%**	**0.8%**	**2.1%**	**1.7%**	**0.3%**	**2.9%**	**2.3%**	**0.4%**	**7.4%**	**0.4%**	**100.0%**

Notes:

Projections based on Eng-Wong Taub & Associates forecasts.

Table 8: 2025 Projected Secondary Modal Splits for Sunday Football Game at Multi-Use Facility (without No. 7 Subway Extension)

Regional Trip Origin	Auto	Taxi	LIRR (Penn Station)	LIRR (Grand Central)	NJ Transit Rail	NY Waterway Ferries	Metro-North Railroad	IRT Lexington Avenue Line	IND Sixth Avenue Line	BMT Broadway Line	IRT Seventh Avenue Line	IND Eighth Avenue Line	IRT Flushing Line (from Queens only)	NYCT Bus	Commuter Bus (e.g. NJ Transit)	Charter Bus	PATH	Staten Island Ferry (transfer to IRT Seventh Avenue Line)	*TOTAL BY REGION*
Staten Island	82.2%	11.0%												0.4%		0.1%		6.3%	**100.0%**
Manhattan	13.8%	25.3%								3.4%	21.5%	13.1%		22.8%					**100.0%**
Brooklyn	36.0%	2.2%							5.6%	11.3%	16.9%	16.9%		11.2%					**100.0%**
Bronx	38.3%	4.4%								1.2%	8.0%	13.7%		34.4%					**100.0%**
Queens	28.6%	3.3%	17.0%								11.3%	22.7%		15.3%		1.7%			**100.0%**
Long Island	17.7%		82.3%																**100.0%**
Westchester and Upstate (East of Hudson)	39.3%	10.9%									15.7%	15.7%		16.4%	1.8%	0.3%			**100.0%**
Rockland and Upstate (West of Hudson)	83.0%	0.7%			1.8%	2.3%					0.9%	0.9%		1.1%	8.5%	0.7%			**100.0%**
Northern New Jersey	30.6%				26.1%	26.2%									4.3%	0.9%	11.8%		**100.0%**
Southern New Jersey	19.9%				39.2%	20.0%									3.8%	0.4%	16.7%		**100.0%**
Connecticut and New England	35.9%	12.8%									16.0%	16.0%		19.2%					**100.0%**
Weighted Average	**33.1%**	**4.4%**	**15.9%**	**0.0%**	**12.0%**	**10.5%**	**0.0%**	**0.0%**	**0.2%**	**0.8%**	**4.8%**	**4.5%**	**0.0%**	**5.4%**	**2.3%**	**0.4%**	**5.3%**	**0.4%**	**100.0%**

Notes:

Projections based on Eng-Wong Taub & Associates forecasts.

Projected vehicle trips for four types of weeknight events at the multi-use facility are presented in Table 10. Travel characteristics for concert and other arena-type sports events at the multi-use facility were based on existing surveys of MSG events. It was assumed that a stadium concert would have a higher average vehicle occupancy than an arena concert due to a larger attendance capacity. The modal splits were then adjusted to account for the multi-use facility's location on the west side of Manhattan; this included increasing auto and taxi modal splits by 15% and 10%, respectively, as well as including ferry usage from New Jersey and Rockland/Orange counties in New York.

In order to forecast travel patterns for a weeknight football game, several adjustments were made to the projections originally developed by EWT for a Sunday afternoon game. These changes included shifting origins back towards a New York City base to account for fans that would travel to the game directly from work or from other locations within Manhattan. The average vehicle occupancy (autos, taxis, and limos combined) was also decreased from 3.0 to 2.75 to reflect the fact that fewer fans would be arriving from the suburbs (with fewer opportunities to carpool). Additionally, auto and taxi modal splits were decreased for Manhattan and suburban regions. These adjustments, which are shown in Table 11, were based on a review of initial projections made by EWT for a weeknight football game[23] and the variations in travel patterns between weekday and weekend sports events at MSG.[24]

In order to compare combinations of events at MSG and the multi-use facility, a matrix table was created to consider all possible combinations of events at the two venues. As indicated in Table 12, there are a total of eight possible combinations of events. For each of these events, the total number of inbound, outbound, and combined inbound/outbound vehicle trips were calculated for the 7:00-8:00 PM, 7:30-8:30 PM, and 8:00-9:00 PM time periods. Table 12 shows that a combination of a stadium concert at the multi-use facility and Knicks/Rangers game at MSG would generate the highest number of total vehicle trips (inbound and outbound combined) during the 7:00-8:00 PM and 7:30-8:30 PM time periods, generating 7,393 and 8,243 vehicle trips, respectively. The highest number of total vehicle trips during the 8:00-9:00 PM time period would be generated by a combination of a football game at the multi-use facility and a concert at MSG (a total of 8,623 vehicles), the highest number of vehicles in the three time periods. This can be attributed to the relatively high amount of concert arrivals (45%) compared to arrivals at Rangers/Knicks game (10%) during the same period. The temporal distributions of concert events tend to exhibit less pronounced peaking characteristics because there are usually opening acts before the headliner band and a significant amount of attendees typically arrive after the concert begins.

In order to compare background traffic volumes on the surrounding street network during these same time periods, traffic volumes on all north/south avenues between Route 9A (Twelfth Avenue) and Seventh Avenue were totaled on a screenline across West 34th Street, which lies adjacent to MSG and the multi-use facility. Table 13 displays the results of the screenline analysis and shows that traffic volumes consistently decrease from 7:00-9:00 PM (an approximate decrease of 3% over each 15-minute period).

[23] STV Incorporated and Eng-Wong Taub & Associates, *West Side Sports and Exhibition Center Feasibility Study – Transportation Study Report*, January 2001
[24] Sam Schwartz LLC, *Madison Square Garden Modal Split Analysis*, August 2003.

Table 9: Existing Madison Square Garden Vehicle Trips for Weekday Events

Event Type (Start Time)	Attendance Capacity	Modal Splits (Weighted Average)			Average Vehicle Occupancy			Time Period	Temporal Distribution	Vehicle Trips by Time Period								
										Auto		Taxi		Limo		Net		
		Auto	Taxi	Limo	Auto	Taxi	Limo			In	Out	In	Out	In	Out	In	Out	Total
Knicks/ Rangers 7:30 PM	19,160	33.7%	7.9%	1.7%	2.2	2.5	2.5	7:00 - 8:00 PM	75%	2,201	31	454	454	98	98	2,753	583	3,336
								7:30 - 8:30 PM	55%	1,614	23	333	333	72	72	2,019	427	2,446
								8:00 - 9:00 PM	10%	293	4	61	61	13	13	367	78	445
Concert 8:00 PM	20,629	31.7%	8.7%	1.1%	2.5	2.6	2.6	7:00 - 8:00 PM	35%	916	7	242	242	31	31	1,188	279	1,467
								7:30 - 8:30 PM	50%	1,308	10	345	345	44	44	1,697	399	2,096
								8:00 - 9:00 PM	45%	1,177	9	311	311	39	39	1,527	359	1,886

Sources:

Surveys at Madison Square Garden conducted by Vollmer Associates (1987) and Sam Schwartz LLC (2003).

Table 10: Projected Multi-Use Facility Vehicle Trips for Weeknight Events

Event Type (Start Time)	Attendance Capacity	Modal Splits (Weighted Average)			Average Vehicle Occupancy			Time Period	Temporal Distribution	Vehicle Trips by Time Period								
										Auto		Taxi		Limo		Net		
		Auto	Taxi	Limo	Auto	Taxi	Limo			In	Out	In	Out	In	Out	In	Out	Total
Football (Stadium) 9:00 PM	75,000	25.7%	3.6%	-	2.75	2.75	-	7:00 - 8:00 PM	25%	1,752	5	244	244	0	0	1,996	249	2,245
								7:30 - 8:30 PM	50%	3,504	11	488	488	0	0	3,992	499	4,491
								8:00 - 9:00 PM	75%	5,256	16	732	732	0	0	5,988	748	6,736
Concert (Stadium) 8:00 PM	55,000	35.0%	9.5%	1.2%	2.7	2.8	2.8	7:00 - 8:00 PM	35%	2,542	20	664	664	84	84	3,290	768	4,058
								7:30 - 8:30 PM	50%	3,632	29	948	948	120	120	4,700	1,097	5,796
								8:00 - 9:00 PM	45%	3,269	26	853	853	108	108	4,230	987	5,217
Sports (Arena) 7:30 PM	18,900	36.6%	8.7%	1.9%	2.2	2.5	2.5	7:00 - 8:00 PM	75%	2,358	33	493	493	108	108	2,959	634	3,593
								7:30 - 8:30 PM	55%	1,729	24	362	362	79	79	2,170	465	2,635
								8:00 - 9:00 PM	10%	314	4	66	66	14	14	395	85	479
Concert (Arena) 8:00 PM	18,900	35.0%	9.5%	1.2%	2.5	2.6	2.6	7:00 - 8:00 PM	35%	926	7	242	242	31	31	1,198	280	1,478
								7:30 - 8:30 PM	50%	1,323	11	345	345	44	44	1,712	399	2,111
								8:00 - 9:00 PM	45%	1,191	10	311	311	39	39	1,541	360	1,900

Notes:

Weeknight football projections based on Eng-Wong Taub & Associates forecasts. All other projections are based on surveys at Madison Square Garden conducted by Vollmer Associates (1987) and Sam Schwartz LLC (2003) and adjusted for West Midtown location.

Table 11: Projected Trip Origins and Secondary Modal Splits for Weeknight Football Game at Multi-Use Facility

Regional Trip Origin	Attendee Distribution		Total Attendees		Auto Modal Splits		Taxi Modal Splits		Auto Person Trips		Taxi Person Trips	
	Sunday	Weeknight	Sunday	Weeknight	Sunday	Weeknight	Sunday	Weeknight	Sunday	Weeknight	Sunday	Weeknight
Staten Island	6.4%	6.4%	4,800	4,800	71.5%	71.5%	10.0%	10.0%	3,432	3,432	480	480
Manhattan	7.3%	13.3%	5,475	9,975	12.0%	8.4%	23.0%	20.7%	657	838	1,259	2,065
Brooklyn	4.4%	4.4%	3,300	3,300	31.3%	31.3%	2.0%	2.0%	1,033	1,033	66	66
Bronx	1.5%	1.5%	1,125	1,125	33.3%	33.3%	4.0%	4.0%	375	375	45	45
Queens	1.3%	1.3%	975	975	24.9%	24.9%	3.0%	3.0%	243	243	29	29
Long Island	19.1%	17.7%	14,325	13,275	15.4%	12.3%	0.0%	0.0%	2,206	1,633	0	0
Westchester and Upstate (East of Hudson)	8.8%	8.1%	6,600	6,075	34.2%	27.4%	0.0%	0.0%	2,257	1,665	0	0
Rockland and Upstate (West of Hudson)	4.4%	4.1%	3,300	3,075	72.2%	58.5%	0.0%	0.0%	2,383	1,799	0	0
Northern New Jersey	33.6%	31.0%	25,200	23,250	26.6%	27.2%	0.0%	0.0%	6,703	6,324	0	0
Southern New Jersey	7.7%	7.1%	5,775	5,325	17.3%	18.3%	0.0%	0.0%	999	974	0	0
Connecticut and New England	5.5%	5.1%	4,125	3,825	31.2%	25.0%	0.0%	0.0%	1,287	956	0	0
Totals	**100.0%**	**100.0%**	**75,000**	**75,000**	**28.8%**	**25.7%**	**2.5%**	**3.6%**	**21,574**	**19,271**	**1,880**	**2,685**

Notes:

Projections based on Eng-Wong Taub & Associates forecasts and surveys at Madison Square Garden conducted by Vollmer Associates (1987) and Sam Schwartz LLC (2003).

Table 12: Total Weeknight Vehicle Trips Generated by Simultaneous Events at the Multi-Use Facility and Madison Square Garden

	Combination "A"			Combination "B"			Combination "C"			Combination "D"			Combination "E"			Combination "F"			Combination "G"			Combination "H"		
Event #1 →	*Football (Stadium)*			*Football (Stadium)*			*Concert (Stadium)*			*Concert (Stadium)*			*Sports (Arena)*			*Sports (Arena)*			*Concert (Arena)*			*Concert (Arena)*		
Event #2 →	*Knicks/Rangers*			*MSG Concert*			*Knicks/Rangers*			*MSG Concert*			*Knicks/Rangers*			*MSG Concert*			*Knicks/Rangers*			*MSG Concert*		
Time Period	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
7:00-8:00 PM	4,749	832	5,581	3,184	529	3,713	6,043	1,350	7,393	4,477	1,047	5,525	5,712	1,217	6,929	4,147	914	5,060	3,951	862	4,814	2,386	559	2,945
7:30-8:30 PM	6,011	926	6,937	5,689	898	6,587	6,719	1,524	8,243	6,396	1,496	7,892	4,189	892	5,081	3,867	864	4,731	3,731	827	4,557	3,409	799	4,207
8:00-9:00 PM	6,355	826	7,181	7,515	1,108	8,623	4,597	1,065	5,662	5,757	1,346	7,103	762	162	924	1,922	444	2,365	1,908	437	2,345	3,068	719	3,787

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Table 13: Screenline Traffic Volumes at West 34th Street

Time Period	Combined Traffic Volumes	Percent of Maximum Volumes
7:00 – 8:00 PM	10,574	100.0%
7:15 – 8:15 PM	10,237	96.8%
7:30 – 8:30 PM	9,920	93.8%
7:45 – 8:45 PM	9,561	90.4%
8:00 – 9:00 PM	9,237	87.4%

Source:
PB Team ATR Counts (Spring 2003)

Table 14 summarizes the maximum number of combined total vehicle trips for each of the three time periods and compares them as a percentage to the maximum number of trips (8,623 during the 8:00-9:00 PM time period). As shown in Table 14, the combined total vehicle trips in the 7:00-8:00 PM and 7:30-8:30 PM periods is 85.7% and 95.6% of this total, respectively. Based on these comparisons, the 8:00-9:00 PM time period appears to be the worst-case scenario for analysis since the variation in the number of vehicle trips that would be generated by the events outweighs the variation in the background traffic volumes. Therefore, the combination of a football game at the multi-use facility and a concert at MSG is recommended for analysis as it would have the greatest potential for traffic implications.

Table 14: Maximum Number of Combined Total Vehicle Trips

Time Period	Combined Total Vehicle Trips	Percent of Maximum Number of Trips
7:00 – 8:00 PM	7,393	85.7%
7:30 – 8:30 PM	8,243	95.6%
8:00 – 9:00 PM	8,623	100.0%

Selection of Combination of Sunday Afternoon Events for Analysis

As previously mentioned, the Sunday afternoon period will be analyzed assuming simultaneous events at the multi-use facility (a football game) and the adjacent convention center (a public show). In addition, travel demand associated with an 85th percentile attendance event at MSG will also be considered to provide for a more conservative analysis. The Madison Square Garden Relocation and Expansion Transportation Planning Assumptions Technical Memorandum (November 11, 2003) evaluated potential combinations of simultaneous Sunday afternoon events that could take place at MSG and the multi-use facility and determined that arrivals associated with a 5:00 pm Rangers game would have the greatest potential for traffic implications and therefore should be considered as part of the Sunday afternoon analysis period.

Analysis of Weekday Convention Event

Subsequent to the publication of the DGEIS, concurrent convention events at the expanded Convention Center and proposed multi-use facility were analyzed to represent the reasonable worst-case scenario for events occurring during the Weekday AM, Midday, and PM peak hours. A weekday trade show at the multi-use facility would be expected to draw an 85th percentile daily attendance of 8,625. The same trip generation assumptions in the Convention Center Expansion Transportation Planning Assumptions Technical Memorandum (September 28, 2004) were applied to a weekday convention event at the multi-use facility.

cc: L. Lennon
D. Fields

PB Team

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 25, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Museum Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1310

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of museum trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates
For weekdays, a daily trip generation rate of 27.4 person trips per 1,000 gross square feet (gsf) has been selected, which was developed from the *Museum of Modern Art Expansion FEIS* (2000)[1]. A Sunday daily trip generation rate of 20.6 person trips per 1,000 gsf was selected, based on the Saturday data contained within the *Museum of Modern Art Expansion FEIS*. It is important to note that many museums in New York City are open for the same hours on both Saturdays and Sundays; therefore travel patterns on both days are assumed to be fairly similar.

Temporal Distributions and In/Out Splits
Weekday temporal distributions and in/out splits were based on the existing distribution of weekday person trips in the *Museum of Modern Art Expansion FEIS* and were adjusted to equalize the total daily in and out trips. Table 2 summarizes temporal distributions and in/out splits for an expanded 24-hour weekday period. Similarly, Sunday temporal distributions and in/out splits were based on the existing distribution of Saturday person trips in the *Museum of Modern Art Expansion FEIS* and were adjusted to equalize the total daily in and out trips. Table 3 summarizes temporal distributions and in/out splits for an expanded 24-hour Sunday period.

Modal Splits
The projected museum site would be located in close proximity to the proposed 34th Street station on the No. 7 subway extension. Therefore, weekday modal splits were assumed to be similar to the weekday modal splits contained within the *Museum of Modern Art Expansion FEIS* (the Museum of Modern Art is located on West 53rd Street in Midtown Manhattan and also has

[1] This rate is also consistent with the daily trip generation rate of 26.6 persons per 1,000 gsf that was used for a cultural center in the *Hudson River Park FEIS* (1998).

Table 1: Museum Land Use
Transportation Planning Assumptions

Trip Generation:	(1) Weekday	(1,2) Sunday
Daily Person Trips	27.4	20.6
	per 1,000 gsf	

Temporal Distribution:	(2,3)
AM (8-9)	0.0%
MD (12-1)	7.2%
PM (5-6)	14.4%
EVE (7-8)	12.4%
EVE (8-9)	6.7%
SUN (4-5)	16.8%

In/Out Splits:	(2,3) In	Out
AM (8-9)	50%	50%
MD (12-1)	63%	37%
PM (5-6)	52%	48%
EVE (7-8)	34%	66%
EVE (8-9)	9%	91%
SUN (4-5)	36%	64%

Modal Splits:	(1,2) Weekday	Sunday
Auto	12%	14%
Taxi	10%	10%
Bus	7%	7%
Subway	29%	29%
Walk	39%	37%
Other	3%	3%
	100%	100%

Vehicle Occupancy:	(1)
Auto	2.34
Taxi	1.90

Truck Trip Generation:	(1) Weekday	(4) Sunday
	0.05	0.00
	per 1,000 gsf	

	(5,6)
AM (8-9)	9.6%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	Out
50%	50%

Sources:

1. Museum of Modern Art Expansion FEIS, 2000, Table 12-6.
2. Sunday travel characteristics assumed to be similar to Saturday patterns.
3. Museum of Modern Art Expansion FEIS, 2000, Table 12-5.
4. Assumes 5% of weekday trip generation rates.
5. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 15.
6. Sunday temporal distributions and in/out splits assumed to be similar to weekday patterns.

Table 2: Expanded Weekday 24-Hour Temporal Distributions and Modal Splits for Museum Land Use

Time Period	Temporal Distribution	In	Out	Modal Splits					
				Auto	Taxi	Bus	Subway	Walk	Other
12:00 AM - 1:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
1:00 AM - 2:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
2:00 AM - 3:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
3:00 AM - 4:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
4:00 AM - 5:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
5:00 AM - 6:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
6:00 AM - 7:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
7:00 AM - 8:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
8:00 AM - 9:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
9:00 AM - 10:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
10:00 AM - 11:00 AM	2.9%	94%	6%	12%	10%	7%	29%	39%	3%
11:00 AM - 12:00 PM	5.8%	80%	20%	12%	10%	7%	29%	39%	3%
12:00 PM - 1:00 PM	7.2%	63%	37%	12%	10%	7%	29%	39%	3%
1:00 PM - 2:00 PM	9.4%	53%	47%	12%	10%	7%	29%	39%	3%
2:00 PM - 3:00 PM	8.2%	50%	50%	12%	10%	7%	29%	39%	3%
3:00 PM - 4:00 PM	8.8%	45%	55%	12%	10%	7%	29%	39%	3%
4:00 PM - 5:00 PM	10.6%	51%	49%	12%	10%	7%	29%	39%	3%
5:00 PM - 6:00 PM	14.4%	52%	48%	12%	10%	7%	29%	39%	3%
6:00 PM - 7:00 PM	13.6%	54%	46%	12%	10%	7%	29%	39%	3%
7:00 PM - 8:00 PM	12.4%	34%	66%	12%	10%	7%	29%	39%	3%
8:00 PM - 9:00 PM	6.7%	9%	91%	12%	10%	7%	29%	39%	3%
9:00 PM - 10:00 PM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
10:00 PM - 11:00 PM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%
11:00 PM - 12:00 AM	0.0%	50%	50%	12%	10%	7%	29%	39%	3%

Notes:

1. Temporal distributions and in/out splits based on Museum of Modern Art Expansion FEIS, 2000, Table 12-5.
2. Modal splits based on Museum of Modern Art Expansion FEIS, 2000, Table 12-6.

Table 3: Expanded Sunday 24-Hour Temporal Distributions and Modal Splits for Museum Land Use

Time Period	Temporal Distribution	In	Out	Modal Splits					
				Auto	Taxi	Bus	Subway	Walk	Other
12:00 AM - 1:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
1:00 AM - 2:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
2:00 AM - 3:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
3:00 AM - 4:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
4:00 AM - 5:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
5:00 AM - 6:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
6:00 AM - 7:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
7:00 AM - 8:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
8:00 AM - 9:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
9:00 AM - 10:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
10:00 AM - 11:00 AM	4.1%	97%	3%	14%	10%	7%	29%	37%	3%
11:00 AM - 12:00 PM	11.1%	78%	22%	14%	10%	7%	29%	37%	3%
12:00 PM - 1:00 PM	12.4%	53%	47%	14%	10%	7%	29%	37%	3%
1:00 PM - 2:00 PM	14.0%	55%	45%	14%	10%	7%	29%	37%	3%
2:00 PM - 3:00 PM	14.5%	57%	43%	14%	10%	7%	29%	37%	3%
3:00 PM - 4:00 PM	15.2%	50%	50%	14%	10%	7%	29%	37%	3%
4:00 PM - 5:00 PM	16.8%	36%	64%	14%	10%	7%	29%	37%	3%
5:00 PM - 6:00 PM	11.9%	10%	90%	14%	10%	7%	29%	37%	3%
6:00 PM - 7:00 PM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
7:00 PM - 8:00 PM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
8:00 PM - 9:00 PM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
9:00 PM - 10:00 PM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
10:00 PM - 11:00 PM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%
11:00 PM - 12:00 AM	0.0%	50%	50%	14%	10%	7%	29%	37%	3%

Notes:

1. Temporal distributions and in/out splits based on Museum of Modern Art Expansion FEIS, 2000, Table 12-5.
2. Modal splits based on Museum of Modern Art Expansion FEIS, 2000, Table 12-6.

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good subway access). Sunday modal splits were
assumed to be similar to the Saturday modal splits contained within the *Museum of Modern Art Expansion FEIS*.

Vehicle Occupancy
Vehicle occupancy rates of 2.34 for autos and 1.90 for taxis have been selected, which are with the same as those used in the *Museum of Modern Art Expansion FEIS*.

Truck Trip Generation
The weekday truck trip generation rate of 0.05 truck trips per 1,000 gsf was based on the *Museum of Modern Art Expansion FEIS*; Sunday truck trip generation rates were conservatively assumed to be 5% of weekday rates[2]. The Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) data for office land uses was used in the selection of temporal distributions (shown in Table 1). No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day. The temporal distributions from *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* were used in place of those from the *Museum of Modern Art Expansion FEIS* because the temporal distributions from the latter (25% of all trips occurring during the weekday midday and PM peak hours) were assumed to be excessively conservative.

cc: L. Lennon
D. Fields

[2] The *Museum of Modern Art Expansion FEIS* did not include a Saturday daily truck trip generation rate.

PB Team

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FINAL

MEMORANDUM

TO: Distribution

FROM: E. Metzger
L. Lennon

DATE: May 20, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Office Modal Splits Technical Memorandum

CIN: MTA-NYCT/CM 1189R-C26501-00-C-20.00-PBT-03F-0905

I) Purpose/Background

The proposed rezoning and development of the Hudson Yards area will result in increased travel to and from the Far West Side of Manhattan. The number of new trips assigned to each mode of travel (auto, subway, bus, etc.) will determine the magnitude of potential transportation system impacts associated with the program. Given the scale of the proposed office development, a critical transportation planning assumption will be the number of office workers anticipated to use autos during the AM and PM peak hours in the future Build condition.

Multiple sources of data are available to estimate the projected auto modal share and they were found to yield a range of projected modal splits. The selection of an auto modal share is complicated by the lack of existing land uses in the study area similar to those proposed after the rezoning action and the significant change in transit availability in the study area with the extension of the No. 7 subway line.

This Technical Memorandum documents available data sources and describes their advantages and limitations. The following sources were evaluated:

- 1990 US Census journey-to-work data;
- Employee Commute Options surveys;
- Previous Environmental Impact Statements; and
- Midtown office building surveys; and
- The Regional Transit Forecasting Model

This technical memorandum describes the development of a projected modal split for office trips during the morning peak hour with the extension of the No. 7 line.

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II) 1990 US Census Journey-to-Work Data

An advantage to using journey-to-work data from the US Census is that it is a well recognized, federally sponsored data source, and is therefore highly defensible. 1990 US Census reverse journey-to-work data[2] (by workplace) was analyzed for census tracts covering the rezoning area (the area generally bounded on the north by West 42nd Street, on the south by West 23rd Street, on the east by Sixth Avenue, and on the west by the Hudson River/Twelfth Avenue). Because of the large size and varying characteristics of this area, these census tracts were grouped into three categories based on their proximity to existing north-south subway lines (e.g. the existing subway lines along Sixth, Seventh, and Eighth Avenues):

- Group 1: Census Tracts between Sixth and Eighth Avenues;
- Group 2: Census Tracts between Eighth and Tenth Avenues; and
- Group 3: Census Tracts between Tenth and Twelfth Avenues.

As shown in Table 1, the modal splits for census tracts within these groupings are fairly consistent and the average auto modal share increases as the distance to existing subway lines increases; the average auto modal share for Group 1 is 14.7 percent, the average auto modal share for Group 2 is 17.0 percent, and the average auto modal share for Group 3 is 28.4 percent. Although these characteristics are generally reflective of existing travel patterns in the area, changes to the study area based on the proposed rezoning initiative and associated No. 7 line extension minimize the applicability of this data for future Build conditions.

The proposed No. 7 line extension would improve accessibility to subways in the area and is anticipated to result in a significant change in the daily composition of transit users. A shift from significant amounts of manufacturing land uses to high-quality office space will also alter travel characteristics. In addition, the proposed zoning change is also anticipated to result in a decrease in the area's parking supply; less available parking is anticipated to shift the overall modal choice from auto use to transit.

In order to account for changes to the transportation patterns based upon the proposed rezoning action and the No. 7 line extension, a methodology was developed to evaluate empirical modal splits found in comparable areas of Manhattan. By identifying an existing area of Midtown Manhattan with similar land use and transportation characteristics as proposed for development in the study area, empirical comparison for the study area can be drawn. The area of Midtown Manhattan surrounding Grand Central Terminal (bounded on the north by East 56th Street, on the south by East 35th Street, on the east by First Avenue, and on the west by Fifth Avenue) includes the following comparable characteristics:

- a significant amount of high-end office space (including the Citicorp Center and the MetLife Building)
- limited north-south subway transit (only the IRT Lexington Avenue line);
- a commuter rail terminal (Grand Central Terminal);
- a tunnel providing access to/from Manhattan (Queens-Midtown Tunnel); and
- complimentary hotels and commercial space.

[2] Reverse journey-to-work data by workplace from the 2000 US Census is not presently available and is not expected to be released until this summer

Table 1: 1990 US Census Daily Journey-to-Work Data (by Workplace) for Rezoning Area

GROUP 1

Mode	Census Tracts Between Sixth and Eighth Avenues					Weighted Average
	91	95	101	109	113	
Auto	12.5%	18.9%	14.8%	14.2%	14.7%	**14.7%**
Taxi	1.5%	1.4%	1.8%	2.2%	2.4%	**2.1%**
Bus	11.1%	10.7%	11.9%	14.1%	17.0%	**14.4%**
Subway	48.8%	45.5%	46.2%	50.1%	47.0%	**47.8%**
Walk	12.7%	10.4%	3.1%	2.5%	2.8%	**3.8%**
Other	13.4%	13.1%	22.2%	16.9%	16.2%	**17.2%**

GROUP 2

Mode	Census Tracts Between Eighth and Tenth Avenues					Weighted Average
	93	97	103	111	115	
Auto	11.8%	14.5%	18.1%	17.3%	17.2%	**17.0%**
Taxi	1.8%	0.8%	0.6%	1.3%	1.9%	**1.3%**
Bus	8.1%	7.8%	11.8%	11.7%	14.3%	**12.3%**
Subway	29.6%	46.1%	53.6%	51.1%	50.1%	**49.7%**
Walk	29.5%	24.5%	4.1%	5.3%	4.9%	**7.3%**
Other	19.2%	6.3%	11.7%	13.3%	11.6%	**12.3%**

GROUP 3

Mode	Census Tracts Between Tenth and Twelfth Avenues					Weighted Average
	99	117	129			
Auto	27.3%	29.8%	29.3%			**28.4%**
Taxi	1.4%	1.3%	1.2%			**1.3%**
Bus	12.4%	8.6%	11.5%			**11.7%**
Subway	41.9%	52.6%	37.1%			**40.2%**
Walk	3.4%	0.3%	8.5%			**5.7%**
Other	13.6%	7.4%	12.5%			**12.6%**

WEIGHTED AVERAGE OF ALL GROUPS

Auto	Taxi	Bus	Subway	Walk	Other	Total
16.5%	**1.9%**	**13.8%**	**47.4%**	**4.7%**	**15.8%**	**100.0%**

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Based upon the 1990 US Census journey-to-work data (by workplace), the modal split for these census tracts can be used as the model for the future study area under the Build condition. Table 2 lists the representative census tracts.

Table 2: Representative Census Tracts for Determination of Comparable Modal Split Data

Census Tract	Northern Boundary	Southern Boundary	Eastern Boundary	Western Boundary
80	East 42nd Street	East 35th Street	Third Ave.	Park Ave.
82	East 42nd Street	East 35th Street	Park Ave.	Fifth Ave.
88	East 44th Street	East 39th Street	First Ave.	Third Ave.
90	East 49th Street	East 42nd Street	First Ave.	Third Ave.
92	East 49th Street	East 42nd Street	Third Ave.	Vanderbilt/Park Ave.
94	East 49th Street	East 42nd Street	Vanderbilt/Park Ave.	Fifth Ave
98	East 54th Street	East 49th Street	First Ave.	Third Ave.
100	East 56th Street	East 49th Street	Third Ave.	Park Ave.
102	East 56th Street	East 49th Street	Park Ave.	Fifth Ave.

Table 3 provides a summary of 1990 US Census journey-to-work data (by workplace) for census tracts within the Midtown Manhattan area (bounded on the north by 59th Street, on the south by 23rd Street, on the east by the East River, and on the west by the Hudson River) and highlights the representative census tracts listed above in Table 2. As shown in Table 3, auto modal shares within the representative census tracts range from 12.2 to 16.4 percent, compared to a range of 11.8 to 29.8 percent for the Midtown Manhattan area. This comparison is best illustrated by the map in Figure 1, which illustrates how auto modal shares are inversely dependent to the proximity to existing transit services (e.g. subway and commuter rail lines). As shown in Figure 1, auto modal shares within Midtown Manhattan are generally lowest in the area immediately surrounding Grand Central Terminal, ranging from 12 to 15 percent.

One disadvantage of this type of census journey-to-work data is it encompasses trips to all types of workplaces (e.g. retail, institutional) and is not solely restricted to office space. For this reason, 1990 US Census journey-to-work data (by workplace) was tabulated to see if there was a distinct difference in data from the World Trade Center (a homogeneous office complex) and tracts in the rest of Lower Manhattan. Table 4 shows this data, highlighting Census Tract 13, Block Group Zone 4 (representing the World Trade Center superblock, bounded on the north by Vesey Street, on the south by Liberty Street, on the east by Church Street, and on the west by West Street). As shown in Table 4, there is no visible difference between the journey-to-work data from this office complex and the rest of Lower Manhattan.

A second disadvantage of this type of journey-to-work data is it averages trips over the course of the entire day and may not accurately represent travel characteristics during the peak AM and PM rush hours. Consequently, peak hour 1990 US Census journey-to-work data (by workplace) was analyzed for the representative census tracts surrounding the Grand Central Terminal area and is presented in Table 5. Peak hour census journey-to-work data is grouped into trips to work originating during the following time periods:

Table 3: 1990 US Census Daily Journey-to-Work Data (by Workplace) for Midtown Manhattan Area

Census Tract	Auto	Taxi	Bus	Subway	Railroad	Walk	Worked at Home	Other	Total
56	13.5%	1.4%	13.4%	46.4%	17.7%	5.9%	0.4%	1.4%	**100.0%**
58	14.3%	1.5%	12.8%	46.8%	16.5%	6.1%	0.6%	1.3%	**100.0%**
62	19.8%	2.1%	15.1%	37.2%	10.1%	14.2%	0.0%	1.5%	**100.0%**
66	14.0%	0.9%	13.9%	26.8%	4.0%	31.7%	7.4%	1.3%	**100.0%**
68	15.5%	1.1%	12.5%	47.6%	10.9%	9.9%	1.1%	1.4%	**100.0%**
70	15.2%	0.7%	10.5%	25.5%	4.9%	34.2%	8.1%	0.7%	**100.0%**
72	14.5%	1.4%	15.3%	42.9%	13.4%	9.5%	1.7%	1.2%	**100.0%**
74	15.0%	1.9%	15.2%	43.5%	16.0%	6.6%	0.5%	1.3%	**100.0%**
76	15.1%	1.7%	14.1%	48.4%	14.7%	4.5%	0.7%	0.9%	**100.0%**
78	15.6%	0.7%	11.0%	41.3%	11.8%	14.0%	4.4%	1.3%	**100.0%**
80	*13.1%*	*1.6%*	*16.3%*	*44.2%*	*17.4%*	*5.6%*	*0.7%*	*1.1%*	***100.0%***
82	*13.2%*	*1.9%*	*16.6%*	*45.0%*	*17.3%*	*4.7%*	*0.3%*	*1.1%*	***100.0%***
84	14.2%	1.7%	15.7%	48.0%	15.1%	4.0%	0.4%	1.0%	**100.0%**
86	20.0%	1.2%	13.9%	33.8%	7.0%	17.0%	6.8%	0.4%	**100.0%**
88	*16.4%*	*1.7%*	*16.1%*	*41.5%*	*16.0%*	*6.5%*	*0.6%*	*1.1%*	***100.0%***
90	*14.7%*	*2.2%*	*18.1%*	*38.7%*	*13.4%*	*9.2%*	*1.8%*	*1.9%*	***100.0%***
91	12.5%	1.5%	11.1%	48.8%	8.3%	12.7%	4.1%	1.1%	**100.0%**
92	*12.2%*	*2.0%*	*15.9%*	*45.4%*	*18.8%*	*4.5%*	*0.1%*	*1.2%*	***100.0%***
93	11.8%	1.8%	8.1%	29.6%	3.8%	29.5%	12.8%	2.6%	**100.0%**
94	*13.3%*	*2.2%*	*15.5%*	*45.9%*	*17.5%*	*4.0%*	*0.0%*	*1.4%*	***100.0%***
95	18.9%	1.4%	10.7%	45.5%	10.3%	10.4%	1.8%	0.9%	**100.0%**
96	13.9%	1.8%	17.6%	47.4%	15.3%	3.0%	0.0%	1.0%	**100.0%**
97	14.5%	0.8%	7.8%	46.1%	3.3%	24.5%	2.3%	0.7%	**100.0%**
98	*13.9%*	*2.6%*	*15.6%*	*40.8%*	*12.6%*	*10.3%*	*2.7%*	*1.5%*	***100.0%***
99	26.3%	1.8%	14.8%	43.8%	9.7%	2.4%	0.5%	0.6%	**100.0%**
100	*13.0%*	*2.5%*	*16.3%*	*44.5%*	*15.6%*	*6.5%*	*0.3%*	*1.4%*	***100.0%***
101	14.8%	1.8%	11.9%	46.2%	20.5%	3.1%	0.3%	1.5%	**100.0%**
102	*12.9%*	*2.9%*	*17.5%*	*44.4%*	*15.3%*	*5.8%*	*0.0%*	*1.1%*	***100.0%***
103	18.1%	0.6%	11.8%	53.6%	9.7%	4.1%	1.3%	0.7%	**100.0%**
104	12.7%	2.1%	17.3%	46.4%	15.1%	5.2%	0.1%	1.1%	**100.0%**
106.01	15.5%	2.4%	9.5%	30.5%	3.7%	18.2%	17.9%	2.3%	**100.0%**
108	16.3%	2.5%	15.5%	45.8%	9.4%	8.1%	1.3%	1.0%	**100.0%**
109	14.2%	2.2%	14.1%	50.1%	15.7%	2.5%	0.3%	0.9%	**100.0%**
111	17.3%	1.3%	11.7%	51.1%	10.4%	5.3%	1.1%	1.8%	**100.0%**
112.01	13.8%	3.7%	17.2%	43.5%	11.7%	8.2%	0.7%	1.2%	**100.0%**
112.02	13.7%	3.9%	16.4%	42.1%	14.3%	8.0%	0.2%	1.5%	**100.0%**
112.03	15.7%	3.1%	16.9%	45.7%	8.2%	9.1%	0.5%	0.8%	**100.0%**
113	14.7%	2.4%	17.0%	47.0%	15.4%	2.8%	0.1%	0.7%	**100.0%**
115	17.2%	1.9%	14.3%	50.1%	10.1%	4.9%	0.9%	0.6%	**100.0%**
117	29.8%	1.3%	8.6%	52.6%	5.5%	0.3%	0.0%	1.9%	**100.0%**
119	15.2%	1.6%	14.9%	48.5%	15.1%	4.0%	0.1%	0.8%	**100.0%**
121	17.0%	1.9%	10.3%	39.2%	9.4%	16.1%	4.7%	1.4%	**100.0%**
125	12.4%	1.7%	16.5%	46.4%	17.6%	4.0%	0.1%	1.3%	**100.0%**
127	14.6%	2.9%	12.2%	36.5%	12.3%	17.7%	2.0%	1.8%	**100.0%**
129	29.3%	1.2%	11.5%	37.1%	8.5%	8.5%	2.8%	1.2%	**100.0%**
131	14.0%	2.4%	15.4%	47.4%	14.1%	5.4%	0.2%	1.0%	**100.0%**
133	23.9%	1.0%	12.4%	34.6%	6.7%	16.0%	4.0%	1.5%	**100.0%**
135	28.6%	2.3%	11.8%	42.6%	7.5%	5.4%	0.2%	1.5%	**100.0%**
137	14.1%	2.6%	15.8%	46.7%	11.5%	7.2%	1.3%	1.0%	**100.0%**
139	14.8%	1.4%	12.7%	41.1%	7.2%	16.0%	5.1%	1.6%	**100.0%**
145	17.7%	1.8%	15.7%	43.6%	10.0%	9.3%	0.9%	1.1%	**100.0%**
147	29.1%	2.4%	13.8%	35.3%	10.1%	7.1%	0.0%	2.2%	**100.0%**
Weighted Average	**14.5%**	**2.0%**	**15.3%**	**45.1%**	**14.7%**	**6.3%**	**0.7%**	**1.2%**	**100.0%**
Weighted Average of Shaded Tracts	***13.4%***	***2.2%***	***16.4%***	***44.0%***	***16.5%***	***5.7%***	***0.4%***	***1.3%***	***100.0%***

Notes:

1) "Midtown Area" is bounded on the north by 59th Street, on the south by 23rd Street, on the east by the East River, and on the west by the Hudson River.

2) Highlighted census tracts have limited north-south subway access (are located between First and Fifth Avenues) and contain high-end office space within walking distance of Grand Central Terminal (between East 34th and East 59th Streets).

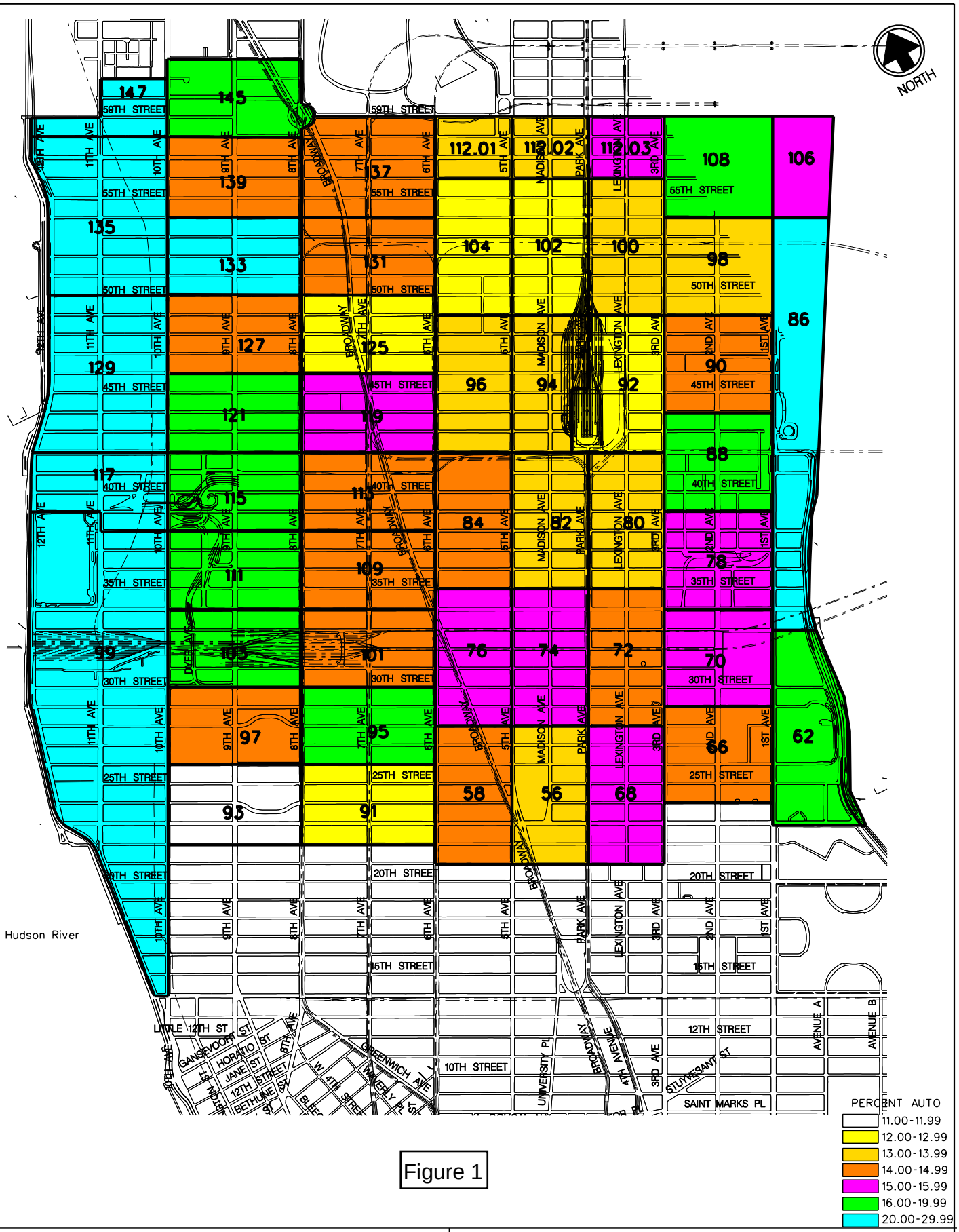

Figure 1

New York City Transit

New York City
Department of City Planning

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NUMBER 7 SUBWAY LINE EXTENSION /
FAR WEST MIDTOWN MANHATTAN REZONING
CM1189R / C26501

1990 US CENSUS JOURNEY TO WORK DATA (BY WORKPLACE)

Table 4: 1990 US Census Daily Journey-to-Work Data (by Workplace) for Lower Manhattan

Census Tract	Block Group Zone	Auto	Taxi	Bus	Subway	Railroad	Ferry	Walk	Worked at Home	Other	Total
7	1	16.5%	2.2%	15.1%	46.7%	15.3%	2.7%	1.0%	0.0%	0.5%	**100.0%**
7	2	14.7%	2.1%	12.2%	47.3%	19.9%	2.6%	1.2%	0.0%	0.0%	**100.0%**
7	3	14.0%	1.7%	12.8%	50.3%	17.7%	2.1%	1.2%	0.0%	0.3%	**100.0%**
9	1	15.4%	2.3%	12.3%	48.0%	17.2%	3.4%	1.0%	0.1%	0.4%	**100.0%**
9	2	15.7%	1.4%	13.6%	48.5%	15.6%	3.5%	1.2%	0.0%	0.6%	**100.0%**
13	1	13.6%	1.7%	14.0%	47.8%	20.4%	1.3%	1.0%	0.0%	0.3%	**100.0%**
13	2	16.7%	1.2%	13.4%	49.2%	15.8%	2.2%	1.1%	0.0%	0.3%	**100.0%**
13	3	16.8%	0.7%	11.6%	48.6%	18.5%	2.4%	1.0%	0.0%	0.4%	**100.0%**
13	*4*	*15.3%*	*1.1%*	*13.4%*	*46.4%*	*19.7%*	*2.3%*	*1.3%*	*0.1%*	*0.5%*	***100.0%***
15.01	1	19.8%	0.9%	11.0%	51.6%	11.2%	1.7%	3.0%	0.3%	0.3%	**100.0%**
15.01	2	16.9%	1.7%	11.9%	50.8%	11.8%	0.9%	5.3%	0.1%	0.5%	**100.0%**
15.02	1	18.7%	1.5%	13.4%	43.8%	17.3%	2.8%	1.5%	0.0%	1.0%	**100.0%**
15.02	2	16.6%	0.8%	13.3%	49.5%	15.7%	2.0%	1.4%	0.1%	0.6%	**100.0%**
21	1	18.1%	0.9%	12.3%	51.7%	13.5%	1.3%	1.4%	0.2%	0.5%	**100.0%**
21	2	15.4%	0.6%	12.0%	52.2%	15.1%	0.9%	1.9%	1.1%	0.7%	**100.0%**

Note:

Census Tract 13, Block Group Zone 4 is highlighted and represents the World Trade Center superblock (bounded on the north by Vesey Street, on the south by Liberty Street, on the east by Church Street, and on the west by West Street.

Table 5: 1990 US Census Journey-to-Work Data (by Workplace) for Midtown Area by Hour

Census Tract	5:30 am - 6:30 am						
	Auto	Bus	Subway	Railroad	Walk	Taxi	Total
80	*30.7%*	14.5%	26.1%	24.7%	2.2%	1.8%	**100.0%**
82	*19.9%*	19.3%	30.7%	23.4%	3.0%	3.8%	**100.0%**
88	*34.2%*	10.5%	29.3%	21.6%	2.0%	2.5%	**100.0%**
90	*27.2%*	22.7%	24.8%	15.4%	0.0%	9.9%	**100.0%**
92	*23.9%*	18.8%	29.2%	21.5%	1.9%	4.7%	**100.0%**
94	*21.9%*	22.7%	29.3%	21.0%	1.5%	3.7%	**100.0%**
98	*30.7%*	17.6%	32.4%	15.5%	0.0%	3.9%	**100.0%**
100	*25.5%*	19.5%	31.9%	19.9%	0.0%	3.2%	**100.0%**
102	*33.7%*	11.7%	33.5%	15.8%	1.2%	4.2%	**100.0%**
Average	***26.5%***	**17.8%**	**29.8%**	**20.4%**	**1.5%**	**4.0%**	**100.0%**

Census Tract	Entire Day						
	Auto	Bus	Subway	Railroad	Walk	Taxi	Total
80	*13.2%*	16.1%	44.9%	17.5%	5.9%	2.5%	**100.0%**
82	*13.2%*	16.2%	45.5%	17.3%	5.1%	2.6%	**100.0%**
88	*16.5%*	15.9%	42.1%	16.1%	6.7%	2.7%	**100.0%**
90	*14.9%*	18.3%	39.6%	13.6%	9.9%	3.7%	**100.0%**
92	*12.2%*	15.6%	45.7%	18.8%	4.6%	3.1%	**100.0%**
94	*13.3%*	15.2%	46.2%	17.5%	4.2%	3.5%	**100.0%**
98	*14.3%*	15.6%	42.3%	12.9%	11.0%	3.9%	**100.0%**
100	*13.0%*	16.1%	44.9%	15.7%	6.7%	3.6%	**100.0%**
102	*12.9%*	17.1%	44.8%	15.3%	5.9%	3.9%	**100.0%**
Average	***13.5%***	**16.2%**	**44.5%**	**16.6%**	**6.0%**	**3.3%**	**100.0%**

Census Tract	6:30 am - 7:30 am						
	Auto	Bus	Subway	Railroad	Walk	Taxi	Total
80	21.3%	19.2%	32.6%	21.5%	2.9%	2.6%	**100.0%**
82	24.4%	17.9%	28.4%	23.3%	3.0%	3.0%	**100.0%**
88	24.4%	16.9%	37.0%	17.2%	2.3%	2.2%	**100.0%**
90	23.9%	21.6%	30.6%	17.0%	4.4%	2.6%	**100.0%**
92	19.5%	16.7%	33.2%	23.6%	3.0%	4.1%	**100.0%**
94	21.5%	17.3%	31.8%	23.6%	1.5%	4.4%	**100.0%**
98	19.5%	18.2%	34.1%	20.9%	5.0%	2.3%	**100.0%**
100	25.4%	17.7%	31.9%	19.1%	1.6%	4.2%	**100.0%**
102	19.3%	18.1%	33.0%	22.2%	2.6%	4.8%	**100.0%**
Average	**21.9%**	**17.8%**	**32.5%**	**21.5%**	**2.6%**	**3.7%**	**100.0%**

Census Tract	7:30 - 9:30 am Period						
	Auto	Bus	Subway	Railroad	Walk	Taxi	Total
80	11.0%	16.1%	45.0%	19.0%	6.6%	2.3%	**100.0%**
82	10.0%	16.7%	46.9%	18.4%	5.3%	2.7%	**100.0%**
88	12.2%	16.9%	42.6%	18.2%	7.5%	2.5%	**100.0%**
90	12.5%	18.3%	39.4%	15.2%	11.1%	3.4%	**100.0%**
92	9.3%	16.1%	46.2%	20.3%	5.3%	2.8%	**100.0%**
94	10.5%	15.0%	47.4%	18.9%	4.9%	3.2%	**100.0%**
98	12.6%	16.6%	41.3%	14.5%	11.8%	3.2%	**100.0%**
100	10.2%	16.6%	44.7%	17.2%	7.6%	3.7%	**100.0%**
102	10.0%	17.8%	44.7%	16.8%	7.0%	3.6%	**100.0%**
Average	**10.6%**	**16.5%**	**45.0%**	**18.1%**	**6.8%**	**3.1%**	**100.0%**

Census Tract	7:30 am - 8:30 am						
	Auto	Bus	Subway	Railroad	Walk	Taxi	Total
80	13.7%	17.2%	40.5%	20.6%	5.2%	2.8%	**100.0%**
82	13.7%	19.0%	39.8%	21.5%	2.9%	3.1%	**100.0%**
88	13.9%	18.3%	36.8%	22.3%	6.1%	2.6%	**100.0%**
90	16.9%	18.2%	35.8%	17.2%	8.9%	3.0%	**100.0%**
92	11.3%	17.9%	40.0%	23.3%	4.2%	3.2%	**100.0%**
94	13.2%	15.4%	41.9%	21.3%	4.5%	3.8%	**100.0%**
98	17.5%	18.1%	33.4%	18.4%	9.4%	3.2%	**100.0%**
100	12.6%	17.0%	40.8%	19.8%	6.2%	3.7%	**100.0%**
102	12.8%	18.6%	39.6%	18.8%	6.6%	3.6%	**100.0%**
Average	**13.3%**	**17.6%**	**39.6%**	**20.8%**	**5.5%**	**3.3%**	**100.0%**

Census Tract	5:30 - 10:30 am Period						
	Auto	Bus	Subway	Railroad	Walk	Taxi	Total
80	12.9%	16.2%	43.7%	18.7%	6.0%	2.5%	**100.0%**
82	12.5%	16.8%	44.5%	18.5%	5.2%	2.7%	**100.0%**
88	14.7%	16.6%	41.7%	17.4%	7.1%	2.6%	**100.0%**
90	14.1%	18.6%	38.7%	14.7%	10.3%	3.7%	**100.0%**
92	11.1%	16.3%	44.6%	20.1%	4.9%	3.0%	**100.0%**
94	12.4%	15.6%	45.3%	18.7%	4.5%	3.6%	**100.0%**
98	13.6%	16.7%	41.0%	14.4%	10.9%	3.4%	**100.0%**
100	12.3%	16.6%	43.8%	16.8%	6.8%	3.7%	**100.0%**
102	12.0%	17.5%	43.8%	16.5%	6.3%	3.8%	**100.0%**
Average	**12.5%**	**16.6%**	**43.6%**	**17.8%**	**6.2%**	**3.3%**	**100.0%**

Census Tract	8:30 am - 9:30 am						
	Auto	Bus	Subway	Railroad	Walk	Taxi	Total
80	8.6%	15.2%	48.9%	17.6%	7.8%	1.9%	**100.0%**
82	7.3%	14.9%	52.1%	16.2%	7.1%	2.3%	**100.0%**
88	10.8%	15.8%	47.4%	14.8%	8.7%	2.5%	**100.0%**
90	9.5%	18.4%	41.9%	13.9%	12.7%	3.7%	**100.0%**
92	7.6%	14.6%	51.5%	17.7%	6.2%	2.5%	**100.0%**
94	8.3%	14.6%	52.1%	16.9%	5.3%	2.7%	**100.0%**
98	9.8%	15.8%	45.8%	12.4%	13.1%	3.1%	**100.0%**
100	8.3%	16.2%	47.9%	15.1%	8.7%	3.7%	**100.0%**
102	7.7%	17.2%	48.8%	15.2%	7.3%	3.7%	**100.0%**
Average	**8.4%**	**15.7%**	**49.2%**	**15.9%**	**7.8%**	**2.9%**	**100.0%**

Census Tract	Times other than 5:30 - 10:30 am						
	Auto	Bus	Subway	Railroad	Walk	Taxi	Total
80	15.7%	15.2%	56.0%	5.9%	4.3%	2.9%	**100.0%**
82	20.7%	10.5%	56.9%	5.3%	4.4%	2.2%	**100.0%**
88	31.1%	10.8%	45.0%	5.8%	3.8%	3.6%	**100.0%**
90	22.7%	15.2%	47.5%	4.1%	6.2%	4.2%	**100.0%**
92	22.4%	9.4%	55.7%	6.4%	2.2%	3.8%	**100.0%**
94	22.5%	12.3%	54.1%	7.3%	1.1%	2.7%	**100.0%**
98	18.5%	8.4%	51.1%	3.3%	11.8%	6.9%	**100.0%**
100	19.5%	11.9%	54.5%	5.8%	5.5%	2.8%	**100.0%**
102	20.2%	14.2%	53.0%	4.9%	2.7%	4.9%	**100.0%**
Average	**21.8%**	**11.9%**	**53.1%**	**5.7%**	**3.9%**	**3.6%**	**100.0%**

Census Tract	9:30 am - 10:30 am						
	Auto	Bus	Subway	Railroad	Walk	Taxi	Total
80	11.8%	13.7%	55.1%	8.8%	6.7%	4.0%	**100.0%**
82	16.5%	15.4%	47.7%	11.6%	7.1%	1.7%	**100.0%**
88	15.9%	15.0%	44.5%	9.0%	11.7%	3.8%	**100.0%**
90	13.3%	16.6%	44.8%	7.9%	12.4%	5.1%	**100.0%**
92	10.3%	16.6%	53.1%	12.3%	5.3%	2.5%	**100.0%**
94	12.2%	15.3%	52.1%	7.6%	6.1%	6.8%	**100.0%**
98	12.1%	15.4%	47.0%	6.9%	12.3%	6.3%	**100.0%**
100	8.7%	14.6%	54.6%	9.8%	9.5%	2.8%	**100.0%**
102	12.3%	15.9%	53.5%	7.6%	6.7%	4.0%	**100.0%**
Average	**12.3%**	**15.5%**	**51.0%**	**9.3%**	**8.0%**	**3.9%**	**100.0%**

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- the entire day;
- 5:30 am – 6:30 am;
- 6:30 am – 7:30 am;
- 7:30 am – 8:30 am;
- 8:30 am – 9:30 am;
- 9:30 am – 10:30 am; and
- outside of 5:30 – 10:30 am.

It is important to note that trips are only provided for the auto, bus, subway, railroad, walk, and taxi modes. Although the results from Table 5 for the entire day are extremely similar to those shown in Table 3, they are not exactly the same because Table 5 does not include persons who worked at home. As shown in Table 5 and Figure 2, there is a moderate variation in auto trips between these time periods. As expected, auto modal shares are highest during the 5:30 – 6:30 am period (ranging from 19.9 to 34.2 percent) when there is generally minimal traffic congestion on the highway network, and are lowest during the 8:30 – 9:30 am period (from 7.3 to 10.8 percent), at the peak of the morning rush hour. In contrast, subway modal shares are highest during the 9:30 – 10:30 am period. Table 5 also combines journey-to-work data for the 7:30 – 9:30 am peak period, which is generally used to represent the AM peak period. As shown in Table 5, for the 7:30 – 9:30 am peak period, the average auto modal share for the representative census tracts is 10.6 percent.

III) Employee Commute Options Surveys

Employee Commute Options (ECO) surveys ask employees how they commuted to work over the course of one week (driving alone, using transit, carpooling or vanpooling, telecommuting, biking, walking, or working a compressed work week schedule). Their purpose is to determine what methods are used to travel to work so that strategies can be implemented that reduce the occurrence of employees driving alone to work. The only ECO survey data available for the rezoning area is for a Chase Manhattan Bank office on West 33rd Street between Ninth and Tenth Avenues. As shown in Table 6, the results of a 1994 survey for this facility showed an auto modal share of 7.2 percent.

Table 6: 1994 Employee Commute Options Survey at 450 West 33rd Street

Auto	Bus	Subway	Railroad	Walk/Other	Total
7.2%	12.5%	51.6%	26.9%	1.8%	100.0%

Source: Philip Habib & Associates

An advantage of using ECO surveys is that they specifically represent travel characteristics for office land uses, and do not encompass other commercial land uses in the area (as the census journey-to-work data does). An example of this fact can be shown in the development of the Metrotech Center in Downtown Brooklyn. Before the construction of this office development, original travel forecasting assumptions estimated that there would be a 22 percent auto share. However, in the mid-1990s, the New York City Department of Transportation (NYCDOT) recommended changing the auto modal share to 13 percent for environmental assessments (refer to Table 7), using the results of ECO surveys from eleven sites in the area: Bear Stearns; Chase Manhattan Bank; ASA/DSA; Dime Savings Bank; Empire Blue Cross; Goldman Sachs; HRA/DSS; Morgan Stanley; NYC Finance Department; NYC Law Department; and Polytechnic University. However, the disadvantage of using ECO surveys is that they are only done for specific sites and may not represent area-wide characteristics of other offices in the area. Additionally, ECO surveys are conducted on a limited sample of workers, without necessarily confirming statistical significance; these results could have high variations.

Figure 2: Variation of 1990 US Census Journey-to-Work (by Workplace) Modal Shares By Time Period for Grand Central Terminal Area

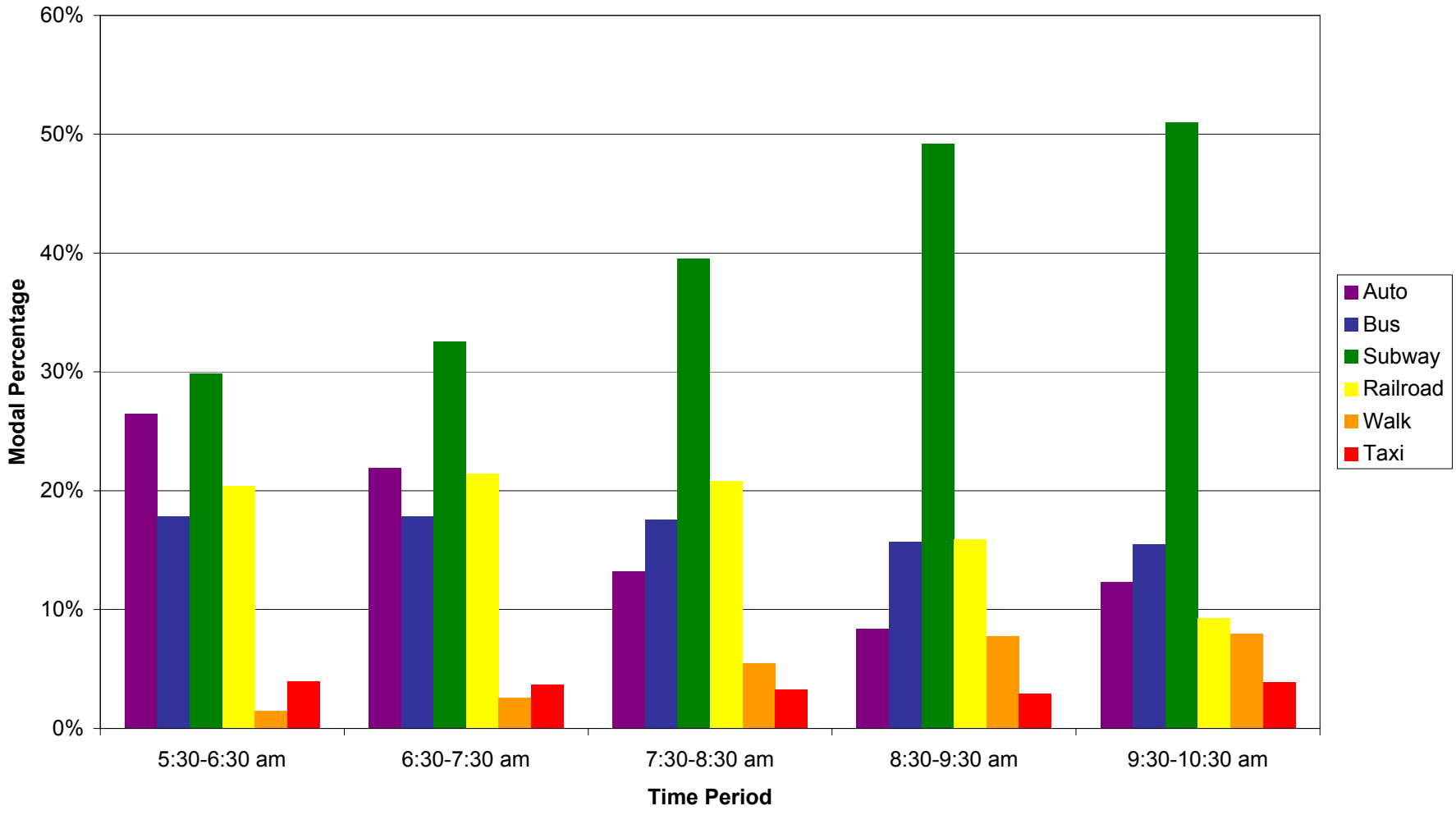

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Table 7: NYCDOT Modal Split Recommendations for Downtown Brooklyn Based on ECO Surveys

Auto	Bus	Subway	Railroad	Walk	Other	Total
13%	6%	65%	12%	3%	1%	100%

Source: Correspondence from Naim Rasheed of NYCDOT dated June 21, 1995

IV) Previous Environmental Impact Statements

Previous Environmental Impact Statements (EISs) were reviewed for developments in the Midtown Manhattan area to determine what modal splits were utilized in their transportation planning assumptions. The office modal splits for the AM peak hour from six EISs are presented in Table 8, which shows a range in auto modal shares from 5.0 to 13.7 percent. Although this data has been previously approved, there is a lack of consistency in modal splits between the different documents.

V) Midtown Office Building Surveys

In 1987, surveys were conducted at five major office buildings located adjacent to commuter rail terminals. These buildings included One Penn Plaza, Two Penn Plaza, and Five Penn Plaza adjacent to Penn Station and the Pan Am Building (now the MetLife Building) and the Park Avenue Atrium adjacent to Grand Central Terminal. The surveys obtained modal split information for arrivals between the hours of 7 and 10 am and showed that auto modal splits for the 8-9 am peak hour ranged from 2.0 to 4.5 percent (as shown in Table 9).

While these buildings represent a homogeneous population of office workers, they also exhibit distinct modal split characteristics due to their direct access to significant transit services, including a commuter rail terminal. As a result, these buildings would be expected to have some of the lowest auto modal shares in Midtown Manhattan. While the survey data may be applicable for the projected redevelopment of the Madison Square Garden site, it would not be representative of the transit accessibility throughout the core of the proposed redevelopment in Hudson Yards between Tenth and Eleventh Avenues.

VI) Regional Transit Forecasting Model

The Regional Transit Forecasting Model (RTFM) has been developed by the MTA to model regional travel in the New York metropolitan area, including NYCT subway and bus riders; commuters using Metro-North Railroad, Long Island Rail Road (LIRR), and New Jersey Transit; automobile travelers; and people using other travel modes, including taxi, bicycle, and walk. The model divides such trips into three types: home-based work (i.e. a trip to work from home), home-based other (i.e. a trip from home to another destination), and non-home based (i.e. a trip that begins away from home). The RTFM has been used for major transit studies in the region including the LIRR East Side Access Project, the MTA's Lower Manhattan Access Study, Metro-North's Penn Station Access Study, and the MTA's Second Avenue Subway Project.

The mode choice component is one of the most important aspects of the RTFM. This component predicts the shifts in market share for each mode of travel that would result from the changes to the transportation network. These predictions are based on the characteristics of trip makers, the trip purpose, and on the characteristics of each mode, including in-vehicle travel time, waiting time, fare, and number of transfers. Travel patterns in the RTFM are based on

Table 8: AM Peak Hour Modal Splits for Office Uses Contained in Previous Environmental Impact Statements

Mode	W. 57th St. Rezoning FEIS (2001)[1]	300 Madison Avenue FEIS (2000)[2]	42nd St. Development Project FSEIS (1994)[3]	Ninth Avenue Rezoning FEIS (1993)[4]	Ninth Avenue/33rd Street DEIS (1989)[5]	383 Madison Avenue FEIS (1989)[6]
Auto	13.7%	12.6%	5.0%	6.5%	6.5%	9.1%
Taxi	2.1%	1.6%	1.5%	1.5%	1.5%	2.5%
Bus	16.8%	16.6%	12.0%	13.0%	13.0%	16.6%
Subway	63.0%	44.7%	54.0%	76.5%	60.0%	44.7%
Railroad	--	21.4%	--	--	14.0%	19.3%
Walk	4.4%	3.1%	17.5%	2.5%	2.5%	7.3%
Other	0.0%	--	10.0%	0.0%	2.5%	0.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Sources:

1) Coliseum Rezoning FEIS (1997) - 1990 US Census Journey-to-Work Data

2) 1990 US Census Journey-to-Work Data for Grand Central Terminal Area

3) Developed from Various Surveys

4) "Recent EIS's for Other Development Proposals in the Area"

5) Adjusted Based on Rates Developed from 1985 West Midtown Travel Surveys

6) Bear, Stearns & Co. Employee Commute Options Survey Data

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1990 US Census journey-to-work data for commuters traveling to and from the existing study area.

Table 9: Midtown Office Building Surveys Modal Splits for the 8-9 am Peak Hour

Office Building	Modal Split					
	Auto	Taxi	Bus	Subway	Rail	Other
One Penn Plaza	3.3%	1.1%	11.4%	35.4%	40.5%	8.3%
Two Penn Plaza	3.6%	0.3%	10.2%	37.6%	37.9%	10.4%
Five Penn Plaza	4.3%	2.5%	12.5%	56.0%	20.3%	4.5%
Pan Am Building	4.5%	2.0%	14.9%	45.8%	23.7%	9.1%
The Atrium	2.0%	0.8%	16.3%	45.8%	29.1%	6.0%
Average	**3.5%**	**1.2%**	**12.6%**	**41.8%**	**32.7%**	**8.2%**

Source: Vollmer Associates

Table 10 provides a comparison of modal splits predicted by the RTFM for future 2020 baseline conditions both with and without the No. 7 line extension. Table 10 shows that introduction of the No. 7 line extension would alter travel characteristics, reducing the auto modal share from 17.4 to 15.1 percent. The RTFM output for baseline conditions is consistent with existing census journey-to-work data for census tracts between Eighth and Tenth Avenues (Table 1, Group 2) and that adding the No. 7 line extension would shift modal shares closer to values currently observed in census tracts between Sixth and Eighth Avenues (Table 1, Group 1), or those areas with better accessibility to transit services.

Table 10: 2020 Regional Transit Forecasting Model (RTFM) Modal Splits

RTFM Travel Mode	Baseline Conditions	With No. 7 Line Extension (Alt. 4A)
Auto (Drive Alone)	10.2%	8.8%
Auto (Shared-Ride)	7.3%	6.3%
Subtotal Auto	*17.4%*	*15.1%*
Walk-to-Commuter Rail	3.3%	3.4%
Drive-to-Commuter Rail	10.0%	10.5%
Walk-to-Transit (No Commuter Rail Use)	60.0%	62.3%
Drive-to-Transit (No Commuter Rail Use)	3.0%	3.0%
Subtotal Transit	*76.4%*	*79.2%*
Taxi	1.6%	1.4%
Walk	4.6%	4.3%

Note: Home-based work trips only to area bounded on the north by West 42nd Street, on the south by West 34th Street, on the east by Ninth Avenue, and on the west by Tenth Avenue.

An advantage of the RTFM model is that it provides a comparison between conditions with and without the No. 7 line extension. However, the RTFM is based on journey-to-work data for existing land uses under existing conditions. It is currently being updated and calibrated to better reflect future conditions in the study area. Current projections are therefore preliminary subject to change.

In general, the RTFM produces auto shares that are higher than anticipated based on the data described above. The model will likely be modified to reflect a net reduction in available off-street parking in the primary study area and proposed ferry and bus system improvements. Off-street parking capacity constraints in the vicinity of the Lincoln Tunnel coupled with an improved ferry system in close proximity to the proposed development may result in greater use of the

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ferry system for trips originating in New Jersey. It is expected that the projected auto share will decline as the model is refined.

VII) Discussion

The journey-to-work and office-specific auto modal shares identified in the data sources described previously range from a low of 3.5 percent to a high of 13.7 percent (see Table 11 for comparisons). While this range appears at first glance to be significant, it actually reflects differences in the data collected. For example, peak hour and office specific auto mode shares are always lower than daily auto shares or census journey-to-work auto shares which are based on a mix of land uses in a given zone. The lowest auto mode shares are found in surveys or studies that specifically address peak period office building related travel.

Table 11: Comparison of Modal Split Data Sources

Primary Data Sources: Journey to Work Trips	**Modal Splits**					
	Auto	**Taxi**	**Bus**	**Subway**	**Rail**	**Other**
1990 Census: Daily Journey-to-Work Data[1]	13.4%	2.2%	16.4%	44.0%	16.5%	7.3%
1990 Census: 7:30 – 9:30 am Journey-to-Work Data[2]	10.6%	3.1%	16.5%	45.0%	18.1%	6.8%
Primary Data Sources: Office Trips	**Auto**	**Taxi**	**Bus**	**Subway**	**Rail**	**Other**
Employee Commute Options Surveys (1 West Midtown Office Building for AM Peak Period)	7.2%	--	12.5%	51.6%	26.9%	1.8%
Midtown Office Building Surveys (5 Midtown Office Buildings for AM Peak Hour)	3.5%	1.2%	12.6%	41.8%	32.7%	8.2%
Secondary Data Sources	**Auto**	**Taxi**	**Bus**	**Subway**	**Rail**	**Other**
AM Peak Hour Office Rates from Previous Midtown/West Midtown Manhattan Environmental Impact Statements	5.0-13.7%	1.5-2.5%	12.0-16.8%	63.0-44.7%	19.3-21.4%	2.5-27.5%
Derived Data	**Auto**	**Taxi**	**Bus**	**Subway**	**Rail**	**Other**
Regional Transit Forecasting Model (RTFM): Existing Conditions (Daily)	17.4%	1.6%	63.0%[3]		13.3%	4.6%
Regional Transit Forecasting Model (RTFM): Projected Conditions (Daily)	15.1%	1.4%	65.3%[3]		13.9%	4.3%

Notes:
1) 1990 US Census daily journey-to-work data for the representative census tracts surrounding the Grand Central Terminal area.
2) 1990 US Census journey-to-work data for the 7:30-9:30 am peak period for the representative census tracts surrounding the Grand Central Terminal area.
3) The RTFM intrinsically combines bus and subway modes.

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Table 12 summarizes the advantages and disadvantages of each of the modal split data sources. It is proposed that the 1990 US Census journey-to work-data for the 7:30 – 9:30 am peak hour be used for the representative census tracts surrounding Grand Central Terminal area (an auto modal share of 10.6%).

Table 12: Advantages and Disadvantages of Modal Split Data Sources

Source of Data	Advantages	Disadvantages
1990 Census Journey-to-Work Files: Daily Travel Data	Well-recognized data source that is highly defensible. Selected tracts represent areas similar in land use and transit availability to projected conditions in the Hudson Yards area.	Encompasses trips to all types of workplaces (not solely offices). Does not reflect peak hour conditions. Appears to overestimate auto use.
1990 Census Journey-to-Work Files: Peak Period Data	Same as above. Reflects temporal variance in modal splits.	Encompasses trips to all types of workplaces (not solely offices). Peak hour data reflects time of departure, not time of arrival at workplace.
Employee Commute Options Survey	Specifically represents travel characteristics for office uses.	Survey conducted at a single building in the Hudson Yards area.
Previous Environmental Impact Statements	Mode share estimates have been previously approved.	Lack of consistency in modal splits between different documents reflects different primary source documents.
Midtown Office Building Surveys	Specifically represent travel characteristics of high-quality office uses in areas served by transit.	Transit accessibility not representative of proposed core office development.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 7, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Office Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1020

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of office trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a daily trip generation rate of 18.0 person trips per 1,000 gross square feet (gsf) of development has been selected, which is consistent with the *CEQR Technical Manual* and several EIS's for office buildings in Manhattan[1].

Because transportation impact analyses for office space are not typically performed outside of the weekday peak hours, there are limited sources of information available for developing a Sunday daily trip generation rate. Although the ITE *Trip Generation Manual* (6th Edition) is not typically used to develop rates for projects in New York City, it includes separate daily trip generation rates for weekdays, Saturdays, and Sundays. The ITE *Trip Generation Manual* can be used to develop a trip generation rate specific to a Manhattan office building by applying its ratio between Sunday and weekday rates to the standard weekday rate used for office developments in Manhattan (yielding a Sunday daily trip generation rate of 1.6 person trips per 1,000 gsf).

A review of previously published EIS's did not find a Sunday trip generation rate for office space in Manhattan. The *Coliseum Redevelopment FSEIS* included an analysis of a Saturday midday peak hour and used a Saturday daily trip generation rate of 0.9 person trips per 1,000 gsf. This assumption was based on the *Riverside South FEIS* (1991) and is 0.5% of the weekday rate. However, please note that it is unclear if any surveys were involved in the development of the Saturday daily trip generation rate for the *Riverside South FSEIS*.

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[1] *ABC West End Avenue Properties FEIS*, 1993.
Coliseum Redevelopment FSEIS, 1997.
770-780 Eighth Avenue EAS, 2001.
Hudson Square Rezoning DEIS, 2002.

Table 1: Office Land Use
Transportation Planning Assumptions

Trip Generation:

	(1) Weekday	(2) Sunday
Daily Person Trips	18.0	1.6

per 1,000 gsf

Temporal Distribution:

	(1,3,4)
AM (8-9)	11.8%
MD (12-1)	15.0%
PM (5-6)	13.7%
EVE (7-8)	0.9%
EVE (8-9)	0.3%
SUN (4-5)	8.5%

In/Out Splits:

	(1,3,4,5,6) In	Out
AM (8-9)	96%	4%
MD (12-1)	48%	52%
PM (5-6)	5%	95%
EVE (7-8)	20%	80%
EVE (8-9)	20%	80%
SUN (4-5)	14%	86%

Modal Splits:

	Build with Hudson Yards Development		Build without Hudson Yards Development	
	(7)	(1)	(8)	(1)
	AM, PM, EVE, SUN PM	MIDDAY	AM, PM, EVE, SUN PM	MIDDAY
Auto	10.7%	2%	16.3%	2%
Taxi	2.9%	3%	1.9%	3%
Bus	16.0%	6%	14.3%	6%
Subway	47.5%	6%	50.9%	6%
Railroad	17.0%	0%	11.3%	0%
Walk	5.9%	83%	5.3%	83%
	100.0%	100%	100.0%	100%

Vehicle Occupancy:

	(1)
Auto	1.65
Taxi	1.40

Truck Trip Generation:

	(1) Weekday	(9) Sunday
	0.15	0.01

per 1,000 gsf

	(1,4,10)
AM (8-9)	9.6%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	Out
50%	50%

Sources:

1. Coliseum Redevelopment FSEIS, 1997, Table 12-15.
2. Based on ratio between Sunday and weekday rates for ITE Land Use 710: General Office Building.
3. Pushkarev & Zupan, "Urban Space for Pedestrians," 1975, Table 2.7.
4. Sunday temporal distributions and in/out splits based on weekday patterns.
5. Hudson Square Rezoning DEIS, 2002, Table XIII-6.
6. 770-780 Eighth Avenue EAS, 2001, Table E-9.
7. 1990 US Census Reverse Journey-to-Work Data for Tracts between 23rd and 59th Streets, Third and Eighth Avenues.
8. 1990 US Census Reverse Journey-to-Work Data for Tracts 99, 103, 111, 115, 117, 129.
9. Assumes 5% of weekday trip generation rates.
10. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 15.

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Table 2 compares trip generation rates from the *Coliseum Redevelopment FSEIS* and rates developed using ratios between weekend and weekday rates from the ITE *Trip Generation Manual*. In order to utilize a consistent methodology for development of Sunday trip generation ratios for all applicable land uses (e.g. residential, local retail, etc.), it is recommended to use the ratios from the ITE *Trip Generation Manual*. Additionally, the rates in the ITE *Trip Generation Manual* are based on surveys at a number of locations.

Table 2: Comparison of Daily Trip Generation Rates
(person trips per 1,000 gsf of office space)

Source of Rates	Weekday	Saturday	Sunday
Developed Using Ratios from the ITE *Trip Generation Manual*	18.0[1]	3.9[2]	1.6[3]
Coliseum Redevelopment FSEIS	18.0[1]	0.9	not analyzed

Notes:
1) Standard weekday daily trip generation rate for Manhattan office uses (multi-tenant type buildings).
2) 18.0 trips * 0.215 (ratio of Saturday to weekday trips for ITE Land Use 710: General Office Building).
3) 18.0 trips * 0.089 (ratio of Sunday to weekday trips for ITE Land Use 710: General Office Building).

Temporal Distributions and In/Out Splits

For the weekday AM, midday, and PM peak hours, the selected temporal distributions and in/out splits shown in Table 1 are consistent with the rates outlined in the *CEQR Technical Manual*, Pushkarev and Zupan's *Urban Space for Pedestrians*, and other EIS's for office developments in Manhattan.

Limited information is available for temporal distributions and in/out splits of office trips outside of the normal weekday AM, midday, and PM peak hours. The entry/exit counts in *Urban Space for Pedestrians* were only conducted on weekdays for the 7:30 am – 7:30 pm period (which accounts for 98.8% of the total daily trips). A temporal distribution of 0.9% has been selected for the weekday 7-8 pm period, as was utilized in the *770-780 Eighth Avenue EAS*. For the weekday 8-9 pm period, a temporal distribution of 0.3% is conservatively proposed (this distribution and the in/out splits are based on an extrapolation of the 7:00 – 7:30 pm data from *Urban Space for Pedestrians*). The temporal distribution and in/out splits for the Sunday afternoon peak hour (4-5 pm) have been based on the weekday patterns established in *Urban Space for Pedestrians*, using the same methodologies that were used in the *Coliseum Redevelopment FSEIS*.

Table 3 summarizes temporal distributions and in/out splits for an expanded 24-hour period. The patterns for time periods outside of the analyzed peak hours were based on the temporal distributions in *Urban Space for Pedestrians*.

Modal Splits

As was generally agreed at the May 21, 2003 Travel Demand Forecasting Working Group meeting, 1990 US Census reverse journey-to-work data for the 7:30-9:30 am period for the Midtown Manhattan area (defined as the area bordered by 59th Street on the north, 23rd Street on the south, Third Avenue on the east, and Eighth Avenue on the west) will be used to forecast modal splits for office land uses in the future Build condition with the Hudson Yards Development (and the No. 7 subway line). These modal splits are listed in Table 1 and have been summarized for the auto, taxi, bus, subway, railroad, and walk modes. These modal splits will be utilized for the weekday AM, PM, evening, and Saturday afternoon peak hours. A separate set of modal split assumptions has been included for the weekday midday peak hour and is based on the *Coliseum Redevelopment FSEIS*.

Table 3: Daily Temporal Distributions and Modal Splits for Office Land Use

Time Period	Weekday/Sunday[1]			Modal Splits[2,3]					
	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
1:00 AM - 2:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
2:00 AM - 3:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
3:00 AM - 4:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
4:00 AM - 5:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	64.5%	0.0%	5.9%
5:00 AM - 6:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
6:00 AM - 7:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
7:00 AM - 8:00 AM	1.1%	90.0%	10.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
8:00 AM - 9:00 AM	11.8%	96.0%	4.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
9:00 AM - 10:00 AM	10.5%	90.0%	10.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
10:00 AM - 11:00 AM	3.8%	40.0%	60.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
11:00 AM - 12:00 PM	6.5%	40.0%	60.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
12:00 PM - 1:00 PM	15.0%	48.0%	52.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
1:00 PM - 2:00 PM	14.7%	57.0%	43.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
2:00 PM - 3:00 PM	7.0%	61.0%	39.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
3:00 PM - 4:00 PM	3.5%	48.0%	52.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
4:00 PM - 5:00 PM	8.5%	14.0%	86.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
5:00 PM - 6:00 PM	13.7%	5.0%	95.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
6:00 PM - 7:00 PM	2.7%	17.0%	83.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
7:00 PM - 8:00 PM	0.9%	20.0%	80.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
8:00 PM - 9:00 PM	0.3%	20.0%	80.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
9:00 PM - 10:00 PM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
10:00 PM - 11:00 PM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%
11:00 PM - 12:00 AM	0.0%	50.0%	50.0%	10.7%	2.9%	16.0%	47.5%	17.0%	5.9%

Notes:

1. Distributions based on Pushkarev & Zupan, "Urban Space for Pedestrians," 1975, Table 2.7.
2. Morning and afternoon modal splits based on 1990 US Census Reverse Journey-to-Work data for Tracts 99, 103, 111, 115, 117, 129.
3. Midday modal splits based on Coliseum Redevelopment FSEIS, 1997, Table 12-15.

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Existing census data were also tabulated for the Hudson Yards Development area for comparative purposes. As shown in Table 1, the major differences are that the Midtown Manhattan area has lower auto modal splits and higher commuter rail modal splits compared to the existing Hudson Yards Development area.

As shown in Table 3, the modal splits utilized for the weekday AM, PM, evening, and Saturday afternoon peak hours were assumed for the midnight – 11 am and 2 pm – midnight periods and the modal splits utilized for the weekday midday peak hour were assumed for the 11 am – 2 pm period.

Vehicle Occupancy

Vehicle occupancy rates of 1.65 for autos and 1.40 for taxis have been selected, which are generally consistent with the *CEQR Technical Manual* and other EIS's for office developments in Midtown Manhattan (see citations above).

Truck Trip Generation

The Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) was used in the selection of a weekday truck trip generation rate (0.15 truck trips per 1,000 gsf) and temporal distributions (shown in Table 1). No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day.

Because a limited amount of information is available for the generation of truck trips on Sundays, it is proposed that Sunday truck trip generation rates be assumed to be 5% of weekday rates and based on weekday patterns. These are the same methodologies that were used in the *Coliseum Redevelopment FSEIS*.

cc: L. Lennon
D. Fields

PB Team

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 7, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Post Office Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1208

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development trip generation rates for a U.S. Post Office for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are being developed because as a result of the proposed project, there is a potential for the displacement of the Times Square Station Post Office located on West 42nd Street between Eighth and Ninth Avenues, which is approximately 72,000 gross square feet (gsf) in size. Trip generation rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a total daily trip generation rate of 130 person trips per 1,000 gsf has been selected, which was developed from the ITE *Trip Generation Manual* (6th Edition)[1]. Because this particular post office branch is closed on Sundays, no weekend trip generation rates were developed. No previously published EIS's were found containing trip generation rates for post offices in Manhattan.

As shown in Table 1, a 25 percent credit for linked trips was subsequently applied to the total daily trip generation rates, yielding in a net weekday daily trip generation rate of 98 person trips per 1,000 gsf. The assumption of 25 percent linked trips is consistent with the *CEQR Technical Manual* for types of retail uses (which attract similar types of walk-by trips).

Temporal Distributions and In/Out Splits

For the weekday AM and PM peak hours, the selected temporal distributions are based on the ITE *Trip Generation Manual*. Because the ITE *Trip Generation Manual* does not include data outside of the weekday AM and PM peak hours, assumptions for temporal distributions were made for all other periods. Since this post office is located adjacent to the Port Authority Bus Terminal, trips would be expected to peak during the rush hours as well as the midday lunch hour. Therefore, temporal distributions were assumed to be similar to those for office buildings in Pushkarev and Zupan's *Urban Space for Pedestrians* (1975). Because of the relatively even

[1] Adapted from ITE Land Use 732: United States Post Office: 108.19 trips * 1.14 (assumed auto occupancy) / 95% (assumed auto modal share).

Table 1: Post Office Land Use
Transportation Planning Assumptions

Trip Generation:

	(1,2) Weekday
Total Daily Person Trips	130
Net Daily Person Trips	98
	per 1,000 gsf

Temporal Distribution:

	(1,3)
AM (8-9)	7.4%
MD (12-1)	12.0%
PM (5-6)	10.0%
EVE (7-8)	1.0%
EVE (8-9)	0.0%

In/Out Splits:

	(1,3) In	Out
AM (8-9)	50%	50%
MD (12-1)	50%	50%
PM (5-6)	50%	50%
EVE (7-8)	50%	50%
EVE (8-9)	50%	50%

Modal Splits:

	(4)
Auto	2%
Taxi	3%
Bus	6%
Subway	6%
Railroad	0%
Walk	83%
	100%

Vehicle Occupancy:

	(4)
Auto	1.65
Taxi	1.40

Truck Trip Generation:

	(4) Weekday
	0.15
	per 1,000 gsf

	(4,5)
AM (8-9)	9.6%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%

In	Out
50%	50%

Sources:

1. ITE Trip Generation, 6th Edition, Land Use 732: United States Post Office
   Daily trip generation rates based on auto occupancy of 1.14 and auto modal split of 95%.
2. Net trips assume 25% linked trips as per CEQR Technical Manual, 3O-23.
3. Weekday midday and evening temporal distributions based on PB Team assumptions.
4. Coliseum Redevelopment FSEIS, 1997, Table 12-15.
5. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 15.

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distribution between arrivals and departures in the ITE *Trip Generation Manual* for the AM and PM peak hours, in/out splits were assumed to be even for the entire day. Table 2 summarizes temporal distributions and in/out splits for an expanded 24-hour period. Although the post office is only open from 8:30 am – 5:30 pm, a small percentage of trips were assigned outside of these hours to account for the availability of non-window services (access to post office boxes and stamp vending machines) during the 6 am – 8:30 am and 5:30 pm – 8 pm periods.

Modal Splits
The selected modal split assumptions for all peak hours were assumed to be similar to those used for in the Local Retail Trip Generation Transportation Planning Assumptions Technical Memorandum, which includes an 83% walk share. As shown in Table 2, modal splits were assumed to remain constant over the entire day.

Vehicle Occupancy
Vehicle occupancy rates of 1.65 for autos and 1.40 for taxis have been selected, which are consistent with the auto occupancy rates used in the Local Retail Trip Generation Transportation Planning Assumptions Technical Memorandum.

Truck Trip Generation
The truck trip generation rates and temporal distributions were assumed to be similar to those used in the Office Trip Generation Transportation Planning Assumptions Technical Memorandum and include a weekday truck trip generation rate of 0.15 trips per 1,000 gsf (this post office branch does not include vehicle storage). No weekend truck trip generation rates were developed because this post office is closed on Sundays.

cc: L. Lennon
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Table 2: Daily Temporal Distributions and Modal Splits for Post Office Land Use

Time Period	Weekday[1]			Modal Splits[2]					
	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
1:00 AM - 2:00 AM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
2:00 AM - 3:00 AM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
3:00 AM - 4:00 AM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
4:00 AM - 5:00 AM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
5:00 AM - 6:00 AM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
6:00 AM - 7:00 AM	0.6%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
7:00 AM - 8:00 AM	2.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
8:00 AM - 9:00 AM	7.4%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
9:00 AM - 10:00 AM	11.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
10:00 AM - 11:00 AM	8.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
11:00 AM - 12:00 PM	7.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
12:00 PM - 1:00 PM	12.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
1:00 PM - 2:00 PM	10.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
2:00 PM - 3:00 PM	7.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
3:00 PM - 4:00 PM	8.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
4:00 PM - 5:00 PM	13.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
5:00 PM - 6:00 PM	10.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
6:00 PM - 7:00 PM	3.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
7:00 PM - 8:00 PM	1.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
8:00 PM - 9:00 PM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
9:00 PM - 10:00 PM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
10:00 PM - 11:00 PM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%
11:00 PM - 12:00 AM	0.0%	50.0%	50.0%	2.0%	3.0%	6.0%	6.0%	0.0%	83.0%

Notes:

1. Weekday distributions based on office land use in Pushkarev & Zupan, "Urban Space for Pedestrians," 1975, Table 2.7.
2. Modal splits based on local retail land use in Coliseum Redevelopment FSEIS, 1997, Table 12-15.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 27, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Recreation Center Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1333

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of recreation center[1] trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, three previously published EIS's were found to include daily trip generation rates for a relatively similar types of land uses in Manhattan. The *Coliseum Redevelopment FSEIS* (1997) contains a daily trip generation rate of 44.7 person trips per 1,000 gross square feet (gsf) for a health club facility. The *Chelsea Piers FEIS* (1993) contains a daily trip generation rate of 30 person trips per 1,000 gsf for a track and gym facility. The *42nd Street Development Project: General Project Plan Amendment FSEIS* (1994) contains a daily trip generation rate of 35.6 person trips per 1,000 gsf for a recreational multi-activity facility.[2] The rate of 44.7 person trips per 1,000 gsf from the *Coliseum Redevelopment FSEIS* for a health club land use was selected as the basis for the trip generation assumptions because it is believed to best represent a recreation center/YMCA-type land use and is also the most conservative.

Only one of the previously published EIS's contained a weekend trip generation rate; the *Coliseum Redevelopment FSEIS* included a Saturday daily trip generation rate of 29.5 trips per 1,000 gsf, but did not include a Sunday daily trip generation rate. Although the ITE *Trip Generation Manual* is not typically used to develop rates for projects in New York City, it includes separate daily trip generation rates for weekdays, Saturdays, and Sundays. The ITE *Trip Generation Manual* can be used to develop a trip generation rate specific to a Manhattan recreation center by applying its ratio between weekday and Sunday rates to the weekday rate

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[1] The recreation center land use is assumed to exhibit the same characteristics as a YMCA facility. These facilities typically contain tracks, gyms, swimming pools, basketball and volleyball courts, weightlifting equipment, classrooms, and locker rooms.

[2] This type of facility was defined as potentially including any of the following components: children's play center, miniature golf, billiards, darts, batting cages, basketball hoops, volleyball, indoor driving range, bowling, televised sports, bars, snack food, or retail.

Table 1: Recreation Center Land Use
Transportation Planning Assumptions

Trip Generation:	(1) Weekday	(2) Sunday
Daily Person Trips	44.7	26.6
	per 1,000 gsf	

Temporal Distribution:	(3,4,5)
AM (8-9)	5.8%
MD (12-1)	7.4%
PM (5-6)	7.6%
EVE (7-8)	5.6%
EVE (8-9)	4.4%
SUN (4-5)	10.0%

In/Out Splits:	(3,4,5) In	Out
AM (8-9)	66%	34%
MD (12-1)	58%	42%
PM (5-6)	34%	66%
EVE (7-8)	47%	53%
EVE (8-9)	39%	61%
SUN (4-5)	42%	58%

Modal Splits:	(1)
Auto	4%
Taxi	9%
Bus	5%
Subway	12%
Railroad	0%
Walk	70%
	100%

Vehicle Occupancy:	(1)
Auto	1.40
Taxi	1.40

Truck Trip Generation:	(6) Weekday	(7) Sunday
	0.04	0.00
	per 1,000 gsf	

	(5,8)
AM (8-9)	7.7%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	Out
50%	50%

Sources:

1. Coliseum Redevelopment FSEIS, 1997, Table 12-15 (Health Club).
2. Based on ratio between Sunday and weekday rates for ITE Land Use 495: Recreational Community Center.
3. ITE Land Use 495: Recreational Community Center.
4. Alamo YMCA DEIR, 2002, Attachment B.
5. Sunday temporal distributions and in/out splits based on weekday patterns.
6. 42nd Street Development Project: General Project Plan Amendment FSEIS, 1994, Table II.I-32.
7. Assumes 5% of weekday trip generation rates.
8. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 19.

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for a health club in Manhattan in the *Coliseum Redevelopment FSEIS* (yielding a Sunday daily trip generation rate of 26.6 person trips per 1,000 gsf).[3] In order to utilize a consistent methodology for development of Sunday trip generation ratios for all applicable land uses (e.g. residential, office, etc.), it is recommended to use the ratios from the ITE *Trip Generation Manual*. It should be mentioned that most YMCA's and recreational centers in Manhattan are closed on Sundays; a weekend trip generation rate for this type of facility was included to provide for a more conservative analysis. Moreover, no credit was taken for pass-by trips for a recreation center land use, although previous studies have shown that 55 percent of health club users represent pass-by trips.[4]

Table 2: Comparison of Daily Trip Generation Rates for Recreation Center Uses (person trips per 1,000 gsf of local retail space)

Source of Rates	Weekday	Saturday	Sunday
Coliseum Redevelopment FSEIS[1]	44.7	29.5	n/a
Chelsea Piers FEIS[2]	30.0	n/a	n/a
42nd Street Development Project: General Project Plan Amendment FSEIS[3]	35.6	n/a	n/a
Developed Using Ratios from the ITE *Trip Generation Manual*	44.7[4]	17.8[5]	26.6[6]

Notes:
1) Rates are for a health club facility.
2) Rates are for a track and gym facility.
3) Rates are for a recreational multi-activity entertainment facility.
3) Utilizes weekday daily trip generation rate from *Coliseum Redevelopment FSEIS* (Table 12-15).
5) 44.7 trips * 0.398 (ratio of Saturday to weekday trips for ITE Land Use 495: Recreational Community Center).
6) 44.7 trips * 0.594 (ratio of Sunday to weekday trips for ITE Land Use 495: Recreational Community Center).

Temporal Distributions and In/Out Splits

For the weekday AM and PM peak hours, the selected temporal distributions and in/out splits are based on the ITE *Trip Generation Manual*. Because the ITE *Trip Generation Manual* does not include data outside of the weekday AM and PM peak hours, assumptions for temporal distributions and in/out splits were made for the weekday midday, weekday evening and Sunday afternoon peak hours. These assumptions were based on daily temporal distributions at the Fairfield/Suisun City YMCA in California[5] and a review of operating hours at YMCA's in Manhattan and recreation centers in Manhattan operated by the City of New York/Parks and Recreation. It should be noted that the temporal distribution selected for the Sunday afternoon peak hour (10.0%) is similar to the temporal distribution for the Saturday midday (1-2 pm) period that was used in the *Coliseum Redevelopment FSEIS* (9.8%).

Table 3 summarizes temporal distributions for an expanded 24-hour period for both a weekday and a Sunday. The patterns for time periods outside of the weekday AM and PM peak hours were assumed, using the temporal distributions from the Fairfield/Suisun City YMCA as a guide.

[3] The ratio between ITE Sunday and Saturday rates was not applied to the Saturday daily trip generation rate from the *Coliseum Redevelopment FSEIS* due to the wide variation between ITE Saturday and Sunday rates.
[4] *42nd Street Development Project: General Project Plan Amendment FSEIS*, Table II.I-30.
[5] *Alamo YMCA DEIR*, 2002, Attachment B.

Table 3: Expanded 24-Hour Temporal Distributions and Modal Splits for Recreation Center Land Use

Time Period	Weekday[1]			Sunday[2]			Modal Splits[3]				
	Temporal Distribution	In	Out	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Walk
12:00 AM - 1:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%
1:00 AM - 2:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%
2:00 AM - 3:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%
3:00 AM - 4:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%
4:00 AM - 5:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%
5:00 AM - 6:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%
6:00 AM - 7:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%
7:00 AM - 8:00 AM	3.8%	74%	26%	0.0%	50%	50%	4%	9%	5%	12%	70%
8:00 AM - 9:00 AM	5.8%	66%	34%	11.0%	69%	31%	4%	9%	5%	12%	70%
9:00 AM - 10:00 AM	10.3%	43%	57%	10.0%	41%	59%	4%	9%	5%	12%	70%
10:00 AM - 11:00 AM	7.6%	45%	55%	9.5%	42%	58%	4%	9%	5%	12%	70%
11:00 AM - 12:00 PM	7.5%	49%	51%	9.5%	46%	54%	4%	9%	5%	12%	70%
12:00 PM - 1:00 PM	7.4%	58%	42%	10.0%	60%	40%	4%	9%	5%	12%	70%
1:00 PM - 2:00 PM	7.3%	62%	38%	10.0%	61%	39%	4%	9%	5%	12%	70%
2:00 PM - 3:00 PM	7.5%	50%	50%	9.5%	47%	53%	4%	9%	5%	12%	70%
3:00 PM - 4:00 PM	7.1%	58%	42%	10.5%	55%	45%	4%	9%	5%	12%	70%
4:00 PM - 5:00 PM	9.4%	42%	58%	10.0%	42%	58%	4%	9%	5%	12%	70%
5:00 PM - 6:00 PM	7.6%	34%	66%	10.0%	34%	66%	4%	9%	5%	12%	70%
6:00 PM - 7:00 PM	8.7%	49%	51%	0.0%	50%	50%	4%	9%	5%	12%	70%
7:00 PM - 8:00 PM	5.6%	47%	53%	0.0%	50%	50%	4%	9%	5%	12%	70%
8:00 PM - 9:00 PM	4.4%	39%	61%	0.0%	50%	50%	4%	9%	5%	12%	70%
9:00 PM - 10:00 PM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%
10:00 PM - 11:00 PM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%
11:00 PM - 12:00 AM	0.0%	50%	50%	0.0%	50%	50%	4%	9%	5%	12%	70%

Notes:

1. Weekday temporal distributions and in/out splits based on ITE Land Use 495 (Recreational Community Center) and Alamo YMCA DEIR, 2002, Attachment B
2. Sunday temporal distributions and in/out splits based on weekday patterns and adjusted to reflect weekend operating hours.
3. Modal splits based on Coliseum Redevelopment FSEIS, 1997, Table 12-15 (Health Club).

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Modal Splits

The selected modal split assumptions for all peak hours were based on the health club facility in the *Coliseum Redevelopment FSEIS*. It should be noted that modal split assumptions for a health club facility in the *42nd Street Development Project: General Project Plan Amendment FSEIS* also include a 70 percent auto modal split. As shown in Table 3, modal splits were assumed to remain constant over the entire day.

Vehicle Occupancy

A vehicle occupancy rate of 1.40 for both autos and taxis has been selected, based on the *Coliseum Redevelopment FSEIS*.

Truck Trip Generation

A weekday truck trip generation rate of 0.04 truck trips per 1,000 gsf was selected based on the *42nd Street Development Project: General Project Plan Amendment FSEIS*. This is the same rate contained in the *Chelsea Piers FEIS*. The truck trip generation rate from the *Coliseum Redevelopment FSEIS* was not used because it is unclear what this rate is based on. The Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) was used in the selection of temporal distributions (shown in Table 1) and were based on a retail land use. No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day. Sunday truck trip generation rates be assumed to be 5% of weekday rates and based on weekday patterns.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: August 7, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Residential Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1067

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of residential trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates

For weekdays, a daily trip generation rate of 8.075 person trips per dwelling unit has been selected, which is consistent with the *CEQR Technical Manual* and several EIS's for residential projects in Manhattan[1].

Because transportation impact analyses for residential space are not typically performed outside of the weekday peak hours, there are limited sources of information available for developing a Sunday daily trip generation rate. The *Coliseum Redevelopment FSEIS* was the only previously published EIS that was found to include a daily trip generation rate for a residential land use on a weekend. This EIS used the same daily trip generation rate for a Saturday as it did for a weekday (this was based on the *Riverside South FEIS* (1991) and is believed to be an assumption).

Although the ITE *Trip Generation Manual* (6th Edition) is not typically used to develop rates for projects in New York City, it includes separate daily trip generation rates for weekdays, Saturdays, and Sundays. The ITE *Trip Generation Manual* can be used to develop a trip generation rate specific to Manhattan residential development by applying its ratio between Sunday and weekday rates to the standard weekday rate for residential uses in Manhattan (yielding a Sunday daily trip generation rate of 7.138 person trips per dwelling unit).

Table 2 compares trip generation rates from the *Coliseum Redevelopment FSEIS* and rates developed using ratios between weekend and weekday rates from the ITE *Trip Generation*

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[1] *ABC West End Avenue Properties FEIS,* 1993.
Coliseum Redevelopment FSEIS, 1997.
River Center FEIS, 1999.

Table 1: Residental Land Use
Transportation Planning Assumptions

Trip Generation:	(1) Weekday	(2) Sunday
Daily Person Trips	8.075	7.138
	per dwelling unit	

Temporal Distribution:	(1,3,4,5)
AM (8-9)	9.1%
MD (12-1)	4.7%
PM (5-6)	10.7%
EVE (7-8)	8.3%
EVE (8-9)	3.8%
SUN (4-5)	7.2%

In/Out Splits:	(1,3,5,6) In	Out
AM (8-9)	15%	85%
MD (12-1)	50%	50%
PM (5-6)	70%	30%
EVE (7-8)	65%	35%
EVE (8-9)	65%	35%
SUN (4-5)	70%	30%

Modal Splits:	Hudson Yards Area with No. 7 Subway Extension (7)	Hudson Yards Area without No. 7 Subway Extension (8)
Auto	6.6%	6.2%
Taxi	6.5%	7.1%
Bus	5.8%	11.4%
Subway	37.5%	35.7%
Railroad	2.0%	1.2%
Walk	40.3%	36.4%
Other	1.3%	2.0%
	100.0%	100.0%

Vehicle Occupancy:	(1)
Auto	1.65
Taxi	1.40

Truck Trip Generation:	(1,9,10) Weekday	(11) Sunday
	0.03	0.00
	per dwelling unit	

	(1,5,9)
AM (8-9)	12.2%
MD (12-1)	8.7%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	2.0%

In	Out
50%	50%

Sources:

1. Coliseum Redevelopment FSEIS, 1997, Table 12-15.
2. Based on ratio between Sunday and weekday rates for ITE Land Use 220: Apartment.
3. 770-780 Eighth Avenue EAS, 2001, Table E-9.
4. Pushkarev & Zupan, "Urban Space for Pedestrians," 1975, Table 2.7.
5. Sunday temporal distributions and in/out splits based on weekday patterns.
6. Regent Tower EAS, 2000, Attachment D.
7. 2000 US Census Journey-to-Work Data for Tracts between 23rd and 59th Streets, Third and Eighth Avenues.
8. 2000 US Census Journey-to-Work Data for Tracts 99, 103, 111, 115, 117, 129.
9. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 16.
10. Hudson Square Rezoning DEIS, 2002.
11. Assumes 5% of weekday trip generation rates.

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Manual. In order to utilize a consistent methodology for development of Sunday trip generation ratios for all applicable land uses (e.g. office, local retail, etc.), it is recommended to use the ratios from the ITE *Trip Generation Manual*, which are based on surveys at a number of locations.

Table 2: Comparison of Daily Trip Generation Rates for Residential Uses (person trips per dwelling unit)

Source of Rates	Weekday	Saturday	Sunday
Coliseum Redevelopment FSEIS	8.075[1]	8.075	n/a
Developed Using Ratios from the ITE *Trip Generation Manual*	8.075[1]	7.784[2]	7.138[3]

Notes:
1) Standard weekday daily trip generation rate for Manhattan residential uses.
2) 8.075 trips * 0.964 (ratio of Saturday to weekday trips for ITE Land Use 220: Apartment).
3) 8.075 trips * 0.884 (ratio of Sunday to weekday trips for ITE Land Use 220: Apartment).

Temporal Distributions and In/Out Splits

For the weekday AM, midday, and PM peak hours, the selected temporal distributions and in/out splits shown in Table 1 are consistent with the rates outlined in the *CEQR Technical Manual* and other EIS's for residential developments in Manhattan (see citations above). Temporal distributions for the weekday 7-8 pm and 8-9 pm period were based on Pushkarev & Zupan's *Urban Space for Pedestrians* (1975) and in/out splits for these same time periods were based on the *Regent Tower EAS* (2000).

The temporal distribution for the Sunday afternoon peak hour (4-5 pm) has been based on the weekday 4-5 pm period in *Urban Space for Pedestrians;* the in/out split for the Sunday afternoon peak hour (4-5 pm) was based on the weekday 4-5 pm period in the *Regent Tower EAS*. It should be noted that the temporal distribution selected for the Sunday afternoon peak hour (7.2%) is similar to the temporal distribution for the Saturday midday (1-2 pm) period that was used in the *Coliseum Redevelopment FSEIS* (7.0%).

Table 3 summarizes temporal distributions and in/out splits for an expanded 24-hour period; weekday 24-hour patterns were based on the *Regent Tower EAS* and Sunday 24-hour patterns were based on PB Team assumptions.

Modal Splits

As was generally agreed at the May 21, 2003 Travel Demand Forecasting Working Group meeting, US Census data for the Midtown Manhattan area (defined as the area bordered by 59th Street on the north, 23rd Street on the south, Third Avenue on the east, and Eighth Avenue on the west) will be used to forecast future office modal splits in the future Build condition with the Hudson Yards Development (and the No. 7 line). In a similar manner, 2000 US Census journey-to-work data for residents of the Midtown Manhattan area were tabulated to forecast future residential modal splits in the Hudson Yards Development with the No. 7 line. These modal splits are listed in Table 1 and have been summarized for the auto, taxi, bus, subway, railroad, and walk modes. In contrast, existing census data were also tabulated for the Hudson Yards Development area for comparative purposes. As shown in Table 1, the Midtown Manhattan area has higher walk modal splits and lower bus modal splits compared to the existing Hudson Yards Development area. As shown in Table 3, modal splits were assumed to remain constant over the course of the entire day.

Table 3: Expanded 24-Hour Temporal Distributions and Modal Splits for Residential Land Use

Time Period	Weekday[1]			Sunday[2]			Modal Splits[3]						
	Temporal Distribution	In	Out	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk	Other
12:00 AM - 1:00 AM	1.7%	50.0%	50.0%	1.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	0.0%	40.3%	3.3%
1:00 AM - 2:00 AM	0.7%	50.0%	50.0%	1.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	0.0%	40.3%	3.3%
2:00 AM - 3:00 AM	0.4%	50.0%	50.0%	0.5%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	0.0%	40.3%	3.3%
3:00 AM - 4:00 AM	0.2%	50.0%	50.0%	0.2%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	0.0%	40.3%	3.3%
4:00 AM - 5:00 AM	0.2%	50.0%	50.0%	0.2%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	0.0%	40.3%	3.3%
5:00 AM - 6:00 AM	0.3%	50.0%	50.0%	0.3%	40.0%	60.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
6:00 AM - 7:00 AM	0.6%	15.0%	85.0%	0.5%	30.0%	70.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
7:00 AM - 8:00 AM	3.9%	15.0%	85.0%	2.0%	25.0%	75.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
8:00 AM - 9:00 AM	9.1%	15.0%	85.0%	5.0%	30.0%	70.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
9:00 AM - 10:00 AM	6.6%	22.5%	77.5%	7.0%	40.0%	60.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
10:00 AM - 11:00 AM	5.0%	40.0%	60.0%	7.0%	40.0%	60.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
11:00 AM - 12:00 PM	4.4%	50.0%	50.0%	7.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
12:00 PM - 1:00 PM	4.7%	50.0%	50.0%	7.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
1:00 PM - 2:00 PM	4.6%	50.0%	50.0%	7.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
2:00 PM - 3:00 PM	4.2%	50.0%	50.0%	7.2%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
3:00 PM - 4:00 PM	5.4%	60.0%	40.0%	7.2%	60.0%	40.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
4:00 PM - 5:00 PM	7.2%	70.0%	30.0%	7.2%	70.0%	30.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
5:00 PM - 6:00 PM	10.7%	70.0%	30.0%	7.2%	62.0%	38.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
6:00 PM - 7:00 PM	9.4%	70.0%	30.0%	7.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
7:00 PM - 8:00 PM	8.3%	65.0%	35.0%	6.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
8:00 PM - 9:00 PM	3.8%	65.0%	35.0%	4.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
9:00 PM - 10:00 PM	2.9%	25.0%	75.0%	3.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
10:00 PM - 11:00 PM	3.3%	50.0%	50.0%	3.0%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%
11:00 PM - 12:00 AM	2.4%	50.0%	50.0%	2.5%	50.0%	50.0%	6.6%	6.5%	5.8%	37.5%	2.0%	40.3%	1.3%

Notes:

1. Weekday distributions based on Regent Tower EAS, 2000.
2. Sunday distributions based on PB Team assumptions.
3. Modal splits based on 2000 US Census Journey-to-Work data for Tracts 99, 103, 111, 115, 117, 129.

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Vehicle Occupancy

Vehicle occupancy rates of 1.65 for autos and 1.40 for taxis have been selected, which are generally consistent with the *CEQR Technical Manual* and other EIS's for residential developments in Manhattan (see citations above).

Truck Trip Generation

The Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) was used in the selection of a weekday truck trip generation rate (0.03 truck trips per dwelling unit) and temporal distributions (shown in Table 1). No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day.

Because a limited amount of information is available for the generation of truck trips on Sundays, it is proposed that Sunday truck trip generation rates be assumed to be 5% of weekday rates and based on weekday patterns. These are the same methodologies that were used in the *Coliseum Redevelopment FSEIS*.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: September 24, 2003

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Theater Trip Generation Transportation Planning Assumptions

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-03F-1362

This technical memorandum provides a summary of the transportation planning assumptions proposed to be utilized for the development of trip generation rates for the traffic, parking, transit, and pedestrian analyses of the DGEIS for an off-Broadway theater. These rates are presented in Table 1 and their selection process is discussed below in further detail.

Daily Trip Generation Rates
A daily trip generation rate of 2.68 person trips per seat has been selected, which is consistent with the *770-780 Eighth Avenue EAS* (2001) and the *42nd Street Development Project: General Project Plan Amendment FSEIS* (1994) for a theater land use. It was assumed that the Sunday daily trip generation rate would be the same as on a weekday since theaters typically have both matinees and evening performances on Sundays.

Temporal Distributions and In/Out Splits
Temporal distributions and in/out splits were developed for theater patrons using typical start times of 2 pm for matinee performances and 8 pm for evening performances, assuming a show run time of approximately two hours.[1] As illustrated in Table 2, which shows temporal distribution for an expanded 24-hour daily period, it was assumed that all patron trips would occur in the hour immediately preceding and following a performance. Employee trips during other hours were assumed to be negligible and were not included accounted for.

Modal Splits
As shown in Table 1, separate modal splits will be utilized for matinee performances (weekday midday, weekday evening, and Sunday afternoon peak hours) and evening performances (weekday evening peak hour) and were based on the *770-780 Eighth Avenue EAS*.

[1] Based on a review of existing performance schedules and run times at several off-Broadway theaters in the area (Douglas Fairbanks Theater, John Houseman Studio Theater, and the Westside Theatre).

Table 1: Theater Land Use
Transportation Planning Assumptions

Trip Generation:

	(1,2) Weekday/Sunday
Daily Person Trips	2.68 per seat

Temporal Distribution:

	(3)
AM (8-9)	0.0%
MD (12-1)	0.0%
PM (5-6)	0.0%
EVE (7-8)	25.0%
EVE (8-9)	0.0%
SUN (4-5)	25.0%

In/Out Splits:

	(3) In	Out
AM (8-9)	50%	50%
MD (12-1)	50%	50%
PM (5-6)	50%	50%
EVE (7-8)	100%	0%
EVE (8-9)	50%	50%
SUN (4-5)	0%	100%

Modal Splits:

	(1) AM, MD, PM, SUN PM	(1) EVE
Auto	20%	33%
Taxi	10%	33%
Bus	33%	3%
Subway	8%	6%
Railroad	20%	2%
Walk	9%	23%
	100%	100%

Vehicle Occupancy:

	(1) AM, MD, PM, SUN PM	(1) EVE
Auto	3.10	2.30
Taxi	2.20	2.30

Truck Trip Generation:

(1) Weekday	(4) Sunday
0.01	0.00

per seat

	(5)
AM (8-9)	9.6%
MD (12-1)	11.0%
PM (5-6)	1.0%
EVE (7-8)	0.0%
EVE (8-9)	0.0%
SUN (4-5)	1.0%

In	Out
50%	50%

Sources:

1. 770-780 Eighth Avenue EAS, 2001, Table E-9.
2. Sunday daily trip generation rate assumed to be the same as a weekday.
3. PB Team assumptions assuming 2 pm and 8 pm performances each having a run time of 2 hours.
4. Assumes 5% of weekday trip generation rates.
5. Federal Highway Administration, "Curbside Pickup and Delivery and Arterial Traffic Impacts," 1981, Figure 15.

Table 2: Daily Temporal Distributions and Modal Splits for Theater Land Use

Time Period	Weekday/Sunday[1]			Modal Splits[2]					
	Temporal Distribution	In	Out	Auto	Taxi	Bus	Subway	Railroad	Walk
12:00 AM - 1:00 AM	0.0%	50%	50%	20%	10%	33%	28%	0%	9%
1:00 AM - 2:00 AM	0.0%	50%	50%	20%	10%	33%	28%	0%	9%
2:00 AM - 3:00 AM	0.0%	50%	50%	20%	10%	33%	28%	0%	9%
3:00 AM - 4:00 AM	0.0%	50%	50%	20%	10%	33%	28%	0%	9%
4:00 AM - 5:00 AM	0.0%	50%	50%	20%	10%	33%	28%	0%	9%
5:00 AM - 6:00 AM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
6:00 AM - 7:00 AM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
7:00 AM - 8:00 AM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
8:00 AM - 9:00 AM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
9:00 AM - 10:00 AM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
10:00 AM - 11:00 AM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
11:00 AM - 12:00 PM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
12:00 PM - 1:00 PM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
1:00 PM - 2:00 PM	25.0%	100%	0%	20%	10%	33%	8%	20%	9%
2:00 PM - 3:00 PM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
3:00 PM - 4:00 PM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
4:00 PM - 5:00 PM	25.0%	0%	100%	20%	10%	33%	8%	20%	9%
5:00 PM - 6:00 PM	0.0%	50%	50%	20%	10%	33%	8%	20%	9%
6:00 PM - 7:00 PM	0.0%	50%	50%	33%	33%	3%	6%	2%	23%
7:00 PM - 8:00 PM	25.0%	100%	0%	33%	33%	3%	6%	2%	23%
8:00 PM - 9:00 PM	0.0%	50%	50%	33%	33%	3%	6%	2%	23%
9:00 PM - 10:00 PM	0.0%	50%	50%	33%	33%	3%	6%	2%	23%
10:00 PM - 11:00 PM	25.0%	0%	100%	33%	33%	3%	6%	2%	23%
11:00 PM - 12:00 AM	0.0%	50%	50%	33%	33%	3%	6%	2%	23%

Notes:

1. Temporal distributions and in/out splits based on PB Team assumptions assuming 2 pm and 8 pm performances each having a run time of 2 hours.
2. Modal splits based on 770-780 Eighth Avenue EAS, 2001, Table E-9.

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Vehicle Occupancy

For matinee performances, vehicle occupancy rates of 3.10 for autos and 2.20 for taxis were selected, and for evening performances vehicle occupancy rates of 2.30 for both autos and taxis were selected. These rates were based on the *770-780 Eighth Avenue EAS*.

Truck Trip Generation

A weekday truck trip generation rate of 0.01 truck trips per seat was selected based on the *770-780 Eighth Avenue EAS*. The Federal Highway Administration's *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts* (1981) was used in the selection of temporal distributions (shown in Table 1) and were based on an office land use. No truck trips were assumed to occur during the weekday 7-8 pm and 8-9 pm peak hours because as mentioned in *Curbside Pickup and Delivery Operations and Arterial Traffic Impacts*, the temporal distribution of truck trips in downtown areas is typically restricted to the 9 am – 5 pm business day. Sunday truck trip generation rates were assumed to be 5% of weekday rates and based on weekday patterns.

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FINAL

MEMORANDUM

TO: G. Price, NYC Department of City Planning
M. Amjadi, NYC Department of City Planning

FROM: E. Metzger

DATE: June 9, 2004

RE: CM-1189R/C-26501– Preparation of a Draft and Final Environmental Impact Statement and Provision of Transit Engineering Services for the Proposed No. 7 Subway Extension-Far West Midtown Manhattan Rezoning

SUBJECT: Results of Supplemental New York Jets Season Ticket Holder Survey

CIN: MTA-NYC Transit/CM 1189R-C26501-00-C-1.00-DCP-04F-2391

The Co-Lead Agencies conducted a supplemental survey of New York Jets season ticket holders to test transportation planning assumptions used in the DGEIS. This technical memorandum compares the results of the new survey with the trip generation assumptions contained within the Multi-Use Facility Transportation Planning Assumptions technical memorandum, which were based on previous studies of New York Jets season ticket holders[1] and a review of travel characteristics at comparable facilities. The New York Jets season ticket holder base is a clear design class that accounts for virtually all of the ticket sales; the composition of this population group is very stable with very little annual turnover.

The new survey was conducted by telephone from May 5-10, 2004 by Schulman, Ronca & Bucuvalas, Inc. (an independent firm retained by the PB Team at the request of the Co-Lead Agencies) and asked 600 current season ticket holders approximately 20 questions pertaining to their expected travel patterns to the proposed Multi-Use Facility. The results of the survey can be used to determine the projected geographic distribution of attendees, anticipated modal splits, and other characteristics of travel for Sunday afternoon and weekday evening football games. The survey has an accuracy of approximately ± 4.0%.

Sunday Afternoon Football Game Travel Projections

The results of the new survey, which are summarized in Table 1, show that 27.6% of the respondents would use autos to travel to a Sunday afternoon football game, 1.5% would use taxis or limos, 65.4% would use mass transit, and 5.5% were unsure which mode of travel they would use. Excluding the group that was unsure from the calculations would result in adjusted modal splits of approximately 29.2% for autos, 1.6% for taxis or limos, and 69.3% for mass transit.

Because the location of the proposed Multi-Use Facility would be expected to result in a slight demographic shift of the New York Jets season ticket holder base towards a New York market,

[1] STV Incorporated and Eng-Wong Taub & Associates, *West Side Sports and Exhibition Center Feasibility Study – Transportation Study Report*, January 2001; New York Jets Season Ticket Holders Survey - John McLaughlin & Associates, 2002; and Eng-Wong Taub & Associates, *West Midtown Manhattan Football Stadium Surveys & Recommendations*, February 2003.

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the results of the new survey were tabulated on a regional basis and then applied to the projected New York Jets season ticket holder base to obtain an overall weighted average of modal splits. As shown in Table 1, the application of the projected fan base would have a limited effect on the overall modal splits (i.e., an auto share of 29.1% versus 29.2%).

Table 1: Sunday Afternoon Football Game Modal Splits From New Survey of Jets Fans

	Auto	Taxi/Limo	Mass Transit	Unsure	Total
New Survey including "Unsure" Responses	27.6%	1.5%	65.4%	5.5%	100.0%
Adjusted New Survey without "Unsure" Responses	29.2%	1.6%	69.3%	-	100.0%
Adjusted New Survey Applied to Projected Fan Base for Manhattan Facility Location	29.1%	1.7%	69.2%	-	100.0%
Adjusted New Survey Applied to Projected Fan Base with No. 7 Extension	22.0%	1.3%	76.7%	-	100.0%

Note: Values may not sum to 100.0% due to rounding.

For respondents who initially said they would use autos, taxis or limos, or were unsure how they would travel to the proposed Multi-Use Facility, a follow-up question was asked in which they were informed that there was a plan to extend the No. 7 subway to provide direct access to the proposed Multi-Use Facility, and that it would offer transfers to the Long Island Rail Road, Metro-North Railroad, MTA-NYCT subways and buses, and New Jersey Transit buses. The results of this question showed that the overall mass transit share could rise an additional 7.5% to a total of 76.7%.[2]

It should be noted that a portion of those surveyed may have already been aware of plans to extend the No. 7 subway to the Hudson Yards and may have factored this knowledge into their initial response. That is, the initial adjusted response of a 29.2% auto share may be influenced by knowledge of the proposed subway extension and be artificially low. This knowledge would have no effect on the 22.0% auto share following a description of the proposed extension of the No. 7 subway by the interviewer.

Table 2 presents the projected modal splits used to assess impacts in the DGEIS, including the primary and secondary modal splits. Primary modal shares address the initial modes on a trip while the secondary modal shares describe the final modes used to arrive at a destination (e.g., the proposed Multi-Use Facility). The difference between primary and secondary modes accounts for multi-modal trips. For example, travelers who drive from home in northern New Jersey to a trans-Hudson ferry service have auto as their primary travel mode and ferry as their secondary travel mode. Unlike the DGEIS projections, the new survey did not specifically differentiate between primary and secondary travel modes.

Both Sunday auto shares projected by the new survey (29.1% without the No. 7 Extension and 22.0% with the No. 7 Extension) are lower than the auto shares employed in the DGEIS (primary and secondary auto shares of 36.5% and 33.1%, respectively, without the No. 7

[2] Among the respondents who said they would use autos, taxis or limos to travel to the proposed Multi-Use Facility with the No. 7 Subway extension, additional respondents also indicated that they would use mass transit if other incentives were made available (e.g., peripheral parking facilities or combined transit tickets).

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Extension, and primary and secondary auto shares of 31.7% and 28.8%, respectively, with the No. 7 Extension). Thus, the DGEIS auto share assumptions, with and without the subway extension, are conservative when compared to this new independent survey of season ticket holders.

Table 2: Sunday Afternoon Football Game Modal Splits Used in DGEIS

	Auto	Taxi/Limo	Mass Transit	Unsure	Total
Primary Modal Splits (without No. 7 Extension)	36.5%	2.8%	60.7%	-	100.0%
Secondary Modal Splits (without No. 7 Extension)	33.1%	4.5%	62.5%	-	100.0%
Primary Modal Splits (with No. 7 Extension)	31.7%	2.5%	65.8%	-	100.0%
Secondary Modal Splits (with No. 7 Extension)	28.8%	2.5%	68.7%	-	100.0%

Note: Values may not sum to 100.0% due to rounding.

The new survey included questions about how many passengers respondents generally drive with to current games at the Meadowlands, when they would expect to depart the vicinity of the proposed Multi-Use Facility after a Sunday afternoon game, and where in relationship to the proposed Multi-Use Facility they would expect to drive to park their vehicles. The results of the survey show an existing average auto occupancy rate of 3.2 persons per vehicle and that 77% of attendees would expect to depart the proposed Multi-Use Facility area within an hour immediately following the end of a game. As a comparison, the DGEIS uses a vehicle occupancy rate of 3.0 and a peak hour departure temporal distribution of 85%, both of which are conservative assumptions compared to the new survey findings. The DGEIS conservatively assumes that all auto users would park in the immediate area of the proposed Multi-Use Facility.

Weekday Evening Football Game Travel Projections

In order to forecast travel patterns for a weekday evening football game in the DGEIS, adjustments were made to the Sunday afternoon travel projections based on a review of initial travel projections made by Eng-Wong Taub & Associates and the variations in existing travel patterns between weekday and weekend sports events at Madison Square Garden (MSG).[3] The new survey included specific questions pertaining to respondents' anticipated origins for a weekday evening football game (e.g. an increased number of attendees would be expected to travel from locations within Manhattan, including offices) and their expected mode of travel.

Table 3 presents a comparison of projected origins for attendees of a weekday evening football game at the proposed Multi-Use Facility and modal split projections are shown in Table 4. Unlike the previous projections, the new survey included a separate modal split for walk-only trips. As shown in Table 4, the new survey indicates an auto share of 32.7%, this increased to 33.3% when excluding the group that was unsure from the calculations. The application of the surveyed trip origins to the regional modal splits yields an overall average weighted auto modal share of 32.6%, compared to a primary auto share of 25.7 % with the No. 7 Subway extension. (refer to Table 5).

[3] Sam Schwartz LLC, *Madison Square Garden Modal Split Analysis*, August 2003.

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Table 3: Comparison of Projected Origins for Attendees at Weekday Evening Football Game

Regional Trip Origin	New Survey (Weeknight Origins)	DGEIS Projections (Weeknight Origins)
Staten Island	3.0%	6.4%
Manhattan	18.2%	13.3%
Brooklyn	2.4%	4.4%
Bronx	1.4%	1.5%
Queens	5.4%	1.3%
Long Island	14.4%	17.6%
Westchester and Upstate (West of Hudson)	7.5%	8.1%
Rockland and Upstate (East of Hudson)	3.0%	4.1%
Northern New Jersey	28.6%	31.0%
Southern New Jersey	11.8%	7.1%
Connecticut and New England	4.3%	5.1%
Totals	100.0%	100.0%

Note: Values may not sum to 100.0% due to rounding.

Table 4: Weekday Evening Game Modal Splits From New Survey of Jets Fans

	Auto	Taxi/Limo	Mass Transit	Walk	Unsure	Total
New Survey including "Unsure" Responses [4]	32.7%	2.0%	60.2%	3.2%	2.0%	100.0%
Adjusted New Survey without "Unsure" Responses	33.3%	2.0%	61.4%	3.3%	-	100.0%
Adjusted New Survey for Manhattan Facility Location Applied to Surveyed Trip Origins	32.6%	2.0%	61.5%	3.9%	-	100.0%

Note: Values may not sum to 100.0% due to rounding.

Table 5: Weekday Evening Game Modal Splits Used in DGEIS

	Auto	Taxi/Limo	Mass Transit	Walk	Unsure	Total
Primary Modal Splits (with No. 7 Extension)	25.7%	3.6%	70.7%		-	100.0%

Note: Values may not add up to 100.0% due to rounding.

The results of the new survey indicate that there would be a higher auto modal share among New York Jets season ticket holders on weekdays compared to on a Sunday. This difference likely reflects attendees that would drive to work in Manhattan on a weekday (primary mode), travel to the proposed Multi-Use Facility from their office in the evening by another mode (such as by mass transit), and then drive home following a game. According to the results of the new survey, 38% of current New York Jets season ticket holders currently commute to or within New York City. Based on the results shown in Table 4, it also appears that a portion of the New York Jets season ticket holder base currently works in Midtown within walking distance to the proposed location of the Multi-Use Facility.

[4] As a result of the order in which the survey questions were asked, some respondents were previously informed about plans to extend the No. 7 subway. The results of the survey shown in Table 4 assume that the No. 7 Subway extension would be constructed.

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The new survey also included questions to respondents as to when they would expect to arrive in the vicinity of the proposed Multi-Use Facility before a weekday evening game. The survey showed that 55% of attendees would expect to arrive at the proposed Multi-Use Facility area within an hour immediately preceding the start of a game. This compares to a peak hour arrival temporal distribution of 75% that was utilized in the DGEIS. The new survey did not include separate vehicle occupancy information for a weekday evening game.

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