

Flatbush Avenue Pedestrian Study



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Executive Summary

The New York City Department of City Planning has undertaken the Flatbush Avenue Pedestrian Study. The purpose of this study is to improve pedestrian mobility and enhance safety at critical points along this important corridor.

The objectives of this study are:

- To examine existing pedestrian traffic flow and circulation within the Flatbush Avenue study area with a focus on problematic intersections.
- To develop recommendations which address issues associated with existing pedestrian conditions.

The study focuses on specific intersections as determined by an analysis of problematic locations based on pedestrian safety, circulation and mobility. This report presents detailed observations based on fieldwork, an analysis of existing land use and zoning, demographic and socioeconomic profiles, literature search; field data such as inventory of street and intersection geometry, conditions of sidewalks and streets, pedestrian circulation, pedestrian environment and accident data. In addition vehicle traffic volumes and classification counts were conducted at three intersections within the study area. Also pedestrian volumes were collected at three intersections and at five midblock locations.

Based on the results of the existing conditions analysis, the following improvements have been recommended:

Address Pedestrian – Vehicular Conflicts

- To install a Lead Pedestrian Interval (LPI) at two intersections
- To install “Yield to Pedestrian” signs at several intersections
- Increase enforcement

Address Pedestrian Safety

- Reduce illegal midblock crossings with signage, fencing, relocation of a bus stop
- To install “Stop Bars” 15 feet from crosswalk
- Install curb extensions to reduce crossing distance
- New crosswalk

Enhance Pedestrian Environment

- Put in landscaping/trees/planters on sidewalks and medians at several locations
- Install a raised concrete island for additional protection from vehicular traffic
- Install bus shelters at bus stops
- Repair sidewalks/curb cuts/ roadway in poor condition

Recommendations for future consideration:

- To install a “Countdown Signal” as a pilot program at two intersections
- Restrict left turns at one intersection

The recommendations made in this report are predicated upon further study and feasibility analyses prior to implementation.

Part A

Study Area and
Socioeconomic Characteristics

Introduction

Flatbush Avenue is an important corridor that serves many transportation needs for Brooklyn residents and businesses. As population and employment grow, the city explores options to improve pedestrian mobility and enhance safety at critical points along this corridor, including Church Avenue, Brooklyn College and Kings Plaza.

The Department of City Planning Transportation Division has conducted the Flatbush Avenue Pedestrian Study to examine and analyze pedestrian conditions at selected intersections along Flatbush Avenue and recommend specific street treatments, operational and policy changes to improve pedestrian mobility and enhance safety along this major corridor.

Along Flatbush Avenue intersections/locations were identified and analyzed if they presented five or more pedestrian accidents from 2004 - 2006, had safety issues for pedestrians, demonstrated problematic trends affecting pedestrian traffic, and/or presented opportunities for improvement in terms of the pedestrians' environment. Additionally one-way streets intersecting this major arterial at an angle were also analyzed since they presented potential problems for pedestrians crossing and turning vehicles.

This report is divided into four parts:

- Part A - Study Area and Socioeconomic Characteristics which contains a description of the study area and its population;
- Part B - Zoning and Land Use which explains in detail the zoning districts and the land uses within the area of study;
- Part C - Study Locations Analysis, includes a detailed analysis of several intersections in terms of pedestrian safety, mobility, circulation and recommendations;
- Part D, Appendices, contains the methodology used for the level of service analysis; traffic volume diagrams; standards for signage, bus shelters and trees; summary of literature search completed for this report.

Study Area

The study area is located geographically in the heart of Brooklyn and is bounded to the north by Empire Boulevard/ Ocean Avenue to the south by Avenue U and runs on Flatbush Avenue, a major arterial.

This main avenue touches many neighborhoods such as Flatbush, Midwood, Marine Park with one and two-family houses on tree lined streets and areas of apartment buildings. It is one of the city's longest commercial corridors and is home to many small and medium sized businesses.



Figure A-1 - Regional Context



Figure A-2 - Study Area

Socioeconomic Characteristics

Over the past five decades, the middle-class community in this central part of Brooklyn has undergone demographic changes. The current ethnic make-up of the community has people of American, Caribbean, Hispanic, European and Asian descent. It is an area of continued population growth. The population residing within the study area increased from 166,481 in the year 1990 to 171,442 in 2000 indicating a population increase of 3%.

The study area consists of 41 census tracts along Flatbush Avenue. In order to calculate the estimated population for 1990 and 2000 using the U.S. Census Data, the geographic percentage of each tract located within the area of study was multiplied by the total population of that tract. The population obtained per tract was then added to get the total population for the study area.

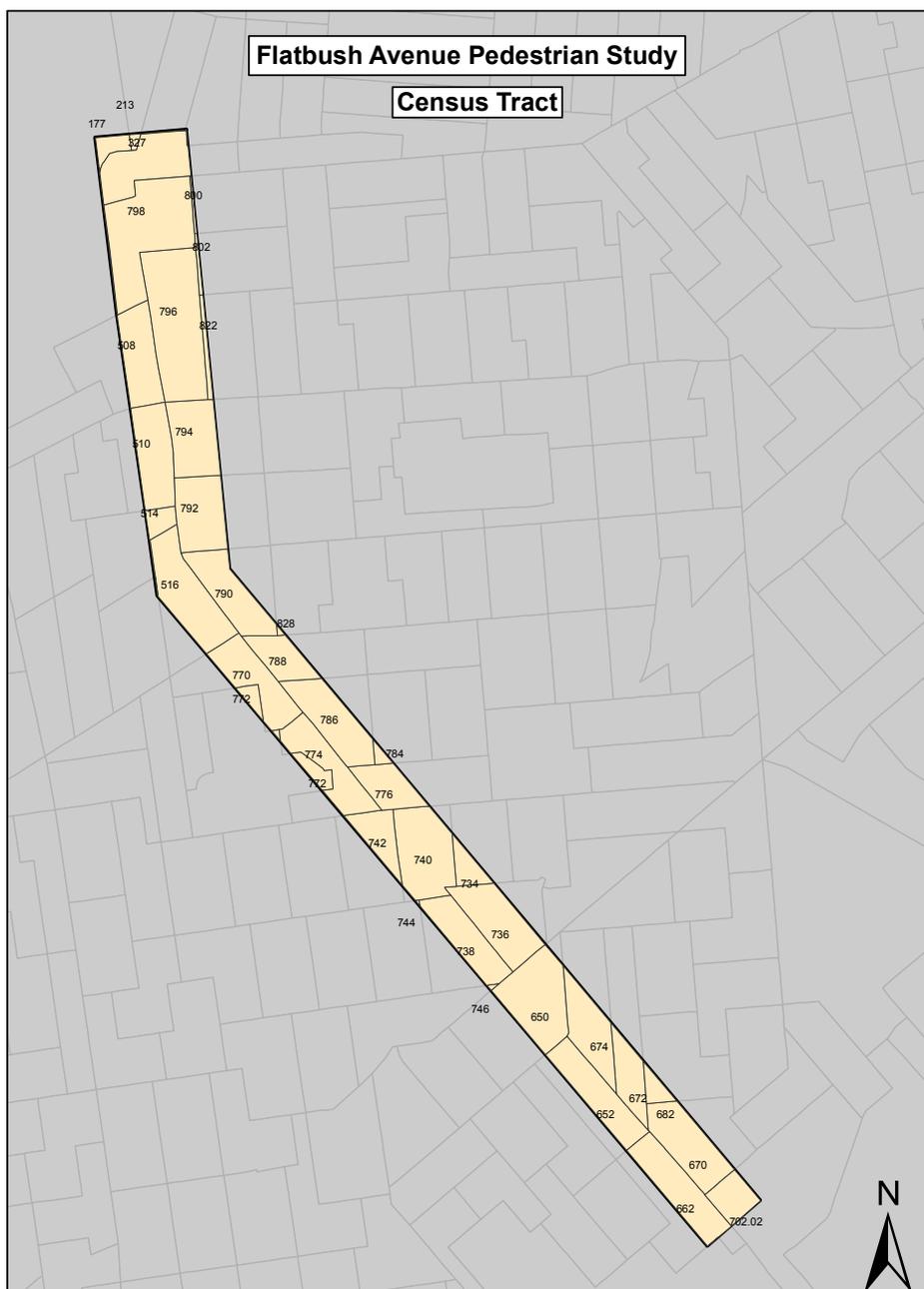


Figure A-3 - Census Tracts Map of Study Area

A journey-to-work modal split analysis was also done for this study using data from the census tracts that make up the study area. Journey-to-work modal split analyses were performed for both the local resident labor force and the people who traveled into the study area to work.

2000 census data indicates that the study area had a local resident labor force (16 years or older) of 66,591 workers who either worked at home or commuted to work. Of the total local resident labor force, 27 percent (18,197) used car, truck or van, and either drove alone or carpoled (see Table A-1). The majority of the car, truck or van usage occurred by those who drove alone (72.8 percent). Of the remaining local resident labor force, 65 percent (43,297) used public transit, 5 percent (3,190) walked to work, and 2 percent (1,277) worked at home. For those workers who commuted using public transportation, 70.5 percent (30,535) were by subways, 25 percent (10,812) by bus, 3.1 percent (1,360) by railroad, 1 percent (530) by taxicab, And 1 percent (367) by other means.

With regard to place of work data for the 2000 Census, 95 percent (61,690) of the local resident labor force (16 years or older) worked in New York City, while the remaining 5 percent (3,111) worked in various places outside of New York City. Of the local resident labor force who worked in New York City, 50.3 percent (31,060) worked in Kings County, 38.6 percent (23,811) worked in New York County, 7.8 percent (4,802) worked in Queens County, 2.1 percent (1,305) worked in Bronx County, and 1.2 percent (712) worked in Richmond County. The remaining local resident labor force worked in New York State outside of New York City (2.7 percent), New Jersey (1.6 percent), Connecticut (0.1 percent), and elsewhere (0.4 percent). See Table A-2.

Due to rounding in the CTPP and Census policies, there are differences between the total workers for the Modal Split (66,591) and for the Place of Work (64,801), the difference is only 1,790 people or 3% .

Table A -1

Modal Split for Workers 16 Years and Older Who Reside Within the Study Area

Census Tract	Means of Transportation														Total
	Car, Truck, or Van:	Drove Alone	Carpooled	Public Transportation	Bus, Streetcar, or Trolley	Subway	Railroad	Ferryboat	Taxicab	Motorcycle	Bicycle	Walked	Other means	Worked at Home	
177	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
213	395	255	140	1,285	120	1,090	40	25	10	20	10	115	25	50	1,900
323	364	220	144	1,110	230	830	30	-	20	-	-	155	-	10	1,639
325	500	435	65	1,510	315	1,090	90	-	15	-	15	145	-	30	2,200
327	275	195	80	1,215	135	975	90	15	-	4	20	25	-	10	1,549
508	889	590	299	3,225	660	2,465	30	-	70	-	15	250	4	105	4,488
510	785	465	320	2,314	494	1,705	60	10	45	-	20	165	25	70	3,379
514	680	405	275	2,355	325	1,965	40	-	25	-	30	100	10	35	3,210
516	725	560	165	2,435	890	1,485	40	-	20	-	35	130	25	60	3,410
518	400	330	70	1,090	100	930	25	-	35	-	-	50	10	90	1,640
650	285	255	30	265	100	165	-	-	-	-	-	85	15	15	665
652	270	235	35	170	35	135	-	-	-	-	-	50	-	4	494
662	335	260	75	150	55	95	-	-	-	-	-	40	-	10	535
670	685	570	115	424	270	150	4	-	-	-	-	40	10	4	1,163
672	310	200	110	235	110	125	-	-	-	-	-	40	-	10	595
674	325	255	70	459	160	280	15	-	4	-	-	55	-	4	843
682	584	490	94	284	105	175	4	-	-	20	-	65	-	15	968
702.02	104	80	24	10	-	10	-	-	-	-	-	-	-	-	114
734	339	210	129	435	210	185	40	-	-	-	-	15	15	30	834
736	570	395	175	780	295	485	-	-	-	-	4	55	35	55	1,499
738	534	435	99	620	295	295	20	-	10	-	-	55	15	45	1,269
740	525	435	90	859	380	475	4	-	-	-	-	85	15	45	1,529
742	455	405	50	744	120	620	-	-	4	-	15	30	-	35	1,279
744	530	395	135	278	79	195	-	-	4	-	4	55	-	25	892
746	369	265	104	375	90	250	35	-	-	-	4	40	4	10	802
770	460	320	140	865	240	625	-	-	-	-	-	50	-	15	1,390
772	499	310	189	740	210	500	30	-	-	-	-	90	20	15	1,364
774	365	320	45	769	140	600	25	-	4	-	-	50	15	55	1,254
776	605	435	170	1,155	330	760	55	-	10	-	4	70	4	45	1,883
784	409	325	84	635	180	415	40	-	-	-	-	40	-	25	1,109
786	434	320	114	1,178	300	870	4	-	4	-	-	60	-	70	1,742
788	319	225	94	1,020	305	600	70	-	45	-	-	70	-	10	1,419
790	425	330	95	1,695	525	1,065	50	-	55	-	-	125	35	10	2,290
792	395	295	100	725	180	515	20	-	10	-	4	30	-	20	1,174
794	164	130	34	478	169	305	4	-	-	-	4	25	10	-	681
796	645	375	270	2,985	640	2,150	175	-	20	-	25	150	10	50	3,865
798	615	330	285	2,685	565	1,990	85	-	45	-	-	145	20	70	3,535
800	445	335	110	1,120	230	790	55	-	45	-	-	75	15	25	1,680
802	414	310	104	1,535	255	1,225	45	-	10	-	10	50	10	15	2,034
822	400	240	160	2,215	705	1,395	115	-	-	-	-	230	20	70	2,935
828	370	305	65	870	265	555	20	10	20	-	-	85	-	15	1,340
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	18,197	13,245	4,952	43,297	10,812	30,535	1,360	60	530	44	219	3,190	367	1,277	66,591
Percent	27%			65%						0%	0%	5%	1%	2%	100%

Source: U.S. Census 2000 CTPP

Table A - 2

Place of Work for Workers 16 Years and Older Who Reside Within the Study Area

Census Tract	Place of Work													Total	
	New York City (all counties)	New York County	Kings County	Queens County	Bronx County	Richmond County	New York State (Outside NYC)	Long Island	Westchester	New York Upstate	Connecticut State	New Jersey State	Elsewhere		
177	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
213	1,775	728	892	126	-	29	39	19	10	10	-	33	-	1,847	
323	1,509	647	652	192	14	4	40	10	30	-	-	-	-	1,549	
325	2,088	790	1,102	131	55	10	54	39	15	-	10	39	4	2,195	
327	1,442	619	609	136	39	39	44	24	20	-	-	22	-	1,508	
508	4,259	1,788	1,970	360	103	38	77	28	25	24	-	86	19	4,441	
510	3,130	1,194	1,587	252	83	14	57	47	-	10	29	94	20	3,330	
514	3,065	1,321	1,425	200	107	12	48	44	4	-	-	18	10	3,141	
516	3,217	1,276	1,556	338	43	4	112	68	10	34	-	30	25	3,384	
518	1,497	702	672	95	18	10	49	41	-	8	-	28	4	1,578	
650	617	198	337	62	10	10	18	14	-	4	-	-	-	635	
652	417	141	260	8	4	4	16	12	4	-	-	-	-	433	
662	485	142	298	10	10	25	22	22	-	-	15	-	-	522	
670	1,030	278	686	62	-	4	36	36	-	-	-	-	-	1,066	
672	537	207	286	34	10	-	15	15	-	-	-	10	-	562	
674	800	320	387	89	4	-	-	-	-	-	-	8	-	808	
682	881	244	506	75	19	37	29	29	-	-	-	4	-	914	
702.02	110	44	56	10	-	-	-	-	-	-	-	-	-	110	
734	744	241	437	44	18	4	46	46	-	-	-	10	-	800	
736	1,411	490	742	140	14	25	10	10	-	-	-	18	4	1,443	
738	1,184	402	648	120	4	10	57	32	25	-	-	8	-	1,249	
740	1,409	498	692	181	34	4	38	38	-	-	-	42	10	1,499	
742	1,162	414	623	81	40	4	39	29	10	-	-	22	-	1,223	
744	770	240	502	28	-	-	8	4	-	4	-	43	-	821	
746	711	277	370	36	4	24	34	34	-	-	-	20	10	775	
770	1,304	488	704	79	-	33	30	30	-	-	-	30	10	1,374	
772	1,265	474	625	98	54	14	28	18	10	-	-	8	10	1,311	
774	1,118	416	566	76	45	15	38	14	24	-	-	42	-	1,198	
776	1,643	652	790	138	49	14	84	80	-	4	4	22	4	1,757	
784	997	372	476	99	20	30	86	43	43	-	-	-	4	1,087	
786	1,623	692	824	38	59	10	63	43	10	10	-	20	-	1,706	
788	1,245	443	653	102	28	19	60	60	-	-	8	-	-	1,313	
790	2,139	843	1,063	170	34	29	55	55	-	-	-	44	8	2,246	
792	1,080	426	502	103	20	29	-	-	-	-	-	36	4	1,120	
794	650	219	310	91	20	10	4	4	-	-	-	10	-	664	
796	3,602	1,533	1,684	227	64	94	143	104	35	4	-	72	-	3,817	
798	3,313	1,367	1,672	210	50	14	84	25	44	15	-	55	65	3,517	
800	1,564	601	861	58	44	-	28	18	-	10	-	18	4	1,614	
802	1,825	831	783	143	54	14	77	69	8	-	-	127	-	2,029	
822	2,806	867	1,586	197	102	54	57	47	10	-	-	8	10	2,881	
828	1,266	386	666	163	29	22	41	41	-	-	-	23	4	1,334	
Total	61,690	23,811	31,060	4,802	1,305	712	1,766	1,292	337	137	66	1,050	229	64,801	
Percent	95.2%						2.7%					0.1%	1.6%	0.4%	100%

Source: U.S. Census 2000 CTPP

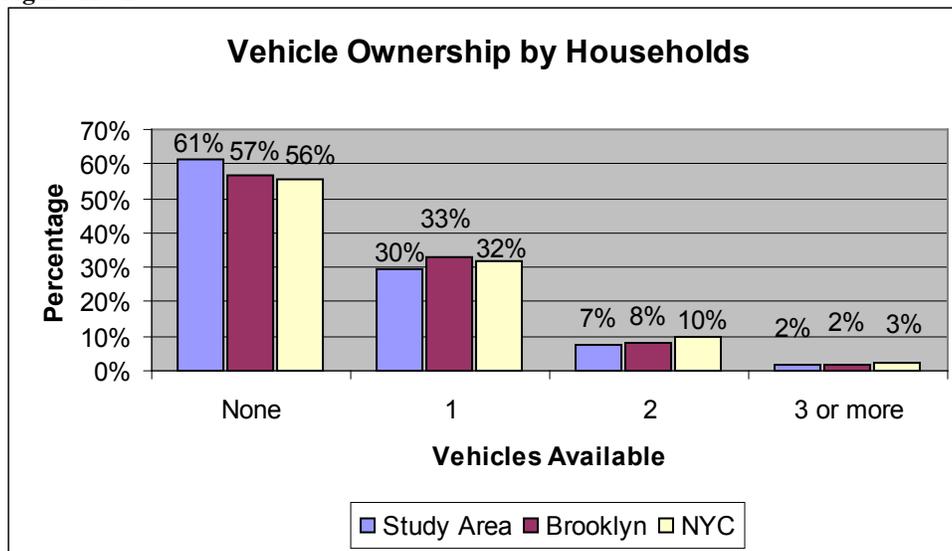
2000 census data indicates that the study area had a labor force (16 years or older) of 29,502 workers who traveled into the study area to work (inbound labor force) (see Table A-3). Of the total inbound labor force, 46 percent (13,522) used car, truck or van, either driving alone or carpooling. The bulk of the car, truck or van usage came from people who drove alone (76.7 percent). Of the remaining inbound labor force, 38 percent (11,144) used public transit, 11 percent (3,154) walked to work, 1 percent (197) bicycled, 1 percent (205) used other means of transportation, and 4 percent worked at home. For those workers who commuted using public transit, 43 percent (4,825) was on subways, 49 percent (5,441) on bus, 3 percent (343) on rail road, and 4 percent (447) on taxicab.

With regard to place of origin, 92 percent (25,887) of the inbound labor force (16 years or older) resided in New York City, while the remaining 8 percent (2,283) resided in various places outside of New York City. Of the inbound labor force who resided in New York City, 82 percent (21,165) resided in Kings County, 10 percent (2,526) resided in Queens County, 3 percent (813) resided in New York County, 2 percent (558) resided in Bronx County, and 3 percent (825) resided in Richmond County. The remaining inbound labor force resided in New York State outside of New York City (5 percent), Connecticut (0.1 percent), New Jersey (2 percent), and elsewhere (1 percent). See Table A-4.

Based on this analysis of the journey-to-work 2000 census data, the local resident and the inbound labor forces that make use of public transportation or walk to and from work within the study area significantly contribute to the number of pedestrians on the streets in the area of study and are part of the street network on a daily basis.

This is reinforced with the fact that 61 percent of the households located within the study area do not have a vehicle as illustrated in Figure A-2. In contrast, 39 percent of the households have at least one or more vehicles available. Of these households only 76 percent have one car, followed by 19 percent with two cars, and 4 percent with three or more.

Figure A - 2



Source: U.S. Census 2000

Due to rounding in the CTPP and Census policies, there are differences between the total workers for the Modal Split (29,502) and for the Place of Origin (28,170), the difference is only 1,332 people or 4.5% .

Table A - 3

Modal Split for Workers 16 Years and Older Who Travel into the Study Area

Census Tract	Means of Transportation														Total
	Car, Truck, or Van:	Drove Alone	Carpooled	Public Transportation	Bus, Streetcar, or Trolley	Subway	Railroad	Ferryboat	Taxicab	Motorcycle	Bicycle	Walked	Other means	Worked at Home	
177	160	125	35	170	50	100	10	-	10	-	15	25	-	-	370
213	765	605	160	765	210	500	20	-	35	-	-	40	-	50	1,620
323	110	65	45	99	35	60	4	-	-	-	-	20	-	10	239
325	260	215	45	228	60	150	4	10	4	-	15	50	-	30	583
327	160	125	35	110	60	40	10	-	-	-	-	25	-	10	305
508	578	420	158	685	360	260	45	-	20	-	10	195	-	105	1,573
510	170	105	65	310	175	100	-	10	25	10	-	130	10	70	700
514	120	100	20	174	65	75	15	4	15	-	10	60	4	35	403
516	265	155	110	329	165	150	4	-	10	-	-	65	-	60	719
518	214	175	39	124	50	60	4	-	10	-	15	60	-	90	503
650	229	195	34	160	90	45	-	-	25	-	-	110	-	15	514
652	484	390	94	130	85	30	-	-	15	-	-	75	-	4	693
662	695	550	145	420	245	115	15	25	20	-	-	125	-	10	1,250
670	184	140	44	65	55	10	-	-	-	-	-	15	-	4	268
672	382	340	42	144	100	40	4	-	-	-	-	20	-	10	556
674	140	115	25	44	20	10	10	4	-	-	-	65	-	4	253
682	154	125	29	30	20	10	-	-	-	-	-	4	-	15	203
702.02	430	280	150	160	125	25	-	-	10	-	15	30	-	-	635
734	155	115	40	35	10	15	-	-	10	-	-	10	-	30	230
736	190	160	30	180	75	65	30	-	10	-	-	70	10	55	505
738	418	325	93	134	75	55	4	-	-	-	-	60	4	45	661
740	298	270	28	340	205	105	20	-	10	-	15	50	20	45	768
742	154	140	14	130	40	90	-	-	-	-	25	50	-	35	394
744	29	25	4	25	25	-	-	-	-	-	-	-	-	25	79
746	1,045	825	220	369	254	105	-	-	10	-	4	165	35	10	1,628
770	259	190	69	149	85	60	-	-	4	-	-	75	-	15	498
772	1,790	1,365	425	1,745	760	885	60	15	25	10	4	345	10	15	3,919
774	315	275	40	369	190	155	4	10	10	-	-	90	10	55	839
776	105	85	20	115	45	70	-	-	-	-	-	15	-	45	280
784	40	30	10	29	4	25	-	-	-	-	-	30	-	25	124
786	324	240	84	245	135	90	10	-	10	-	-	95	-	70	734
788	200	175	25	170	45	90	-	-	35	-	-	55	-	10	435
790	164	135	29	135	70	55	-	-	10	-	-	30	10	10	349
792	370	245	125	315	105	165	10	-	35	-	-	80	10	20	795
794	734	570	164	855	515	285	10	-	45	-	10	360	20	-	1,979
796	559	360	199	724	360	325	35	-	4	-	25	175	10	50	1,543
798	170	115	55	369	144	215	-	10	-	-	10	65	15	70	699
800	135	105	30	90	40	50	-	-	-	-	4	40	-	25	294
802	210	170	40	164	129	20	15	-	-	-	10	55	-	15	454
822	210	110	100	210	120	60	-	-	30	-	10	55	20	70	575
828	148	120	28	100	40	60	-	-	-	-	-	70	-	15	333
Total	13,522	10,375	3,147	11,144	5,441	4,825	343	88	447	20	197	3,154	188	1,277	29,502
Percent	46%			38%						0%	1%	11%	1%	4%	100%

Source: U.S. Census 2000 CTPP

Table A - 4

Place of Origin for Workers 16 Years and Older Who Travel into the Study Area to Work

Census Tract	Place of Origin													Total
	New York City (all counties)	New York County	Kings County	Queens County	Bronx County	Richmond County	New York State (Outside NYC)	Long Island	Westchester	New York Upstate	Connecticut State	New Jersey State	Elsewhere	
177	312	19	247	32	4	10	18	8	10	-	4	-	-	334
213	1,417	108	941	204	94	70	98	94	-	4	-	38	36	1,589
323	192	4	150	34	-	4	4	-	-	4	-	14	-	210
325	509	10	411	70	-	18	44	26	18	-	-	-	-	553
327	266	10	218	38	-	-	15	15	-	-	-	4	-	285
508	1,433	39	1,224	98	29	43	62	58	-	4	-	27	4	1,526
510	666	24	598	34	-	10	4	4	-	-	-	4	-	674
514	367	10	288	65	-	4	14	14	-	-	-	4	-	385
516	628	29	502	63	14	20	28	18	10	-	-	28	8	692
518	476	39	392	25	10	10	18	4	4	10	-	10	-	504
650	479	-	389	43	10	37	14	14	-	-	-	-	-	493
652	600	-	488	56	4	52	42	42	-	-	-	10	10	662
662	1,042	38	809	114	10	71	86	86	-	-	4	12	4	1,148
670	207	10	185	8	-	4	26	26	-	-	-	14	-	247
672	413	-	288	85	18	22	75	67	-	8	4	4	-	496
674	214	25	157	28	-	4	4	4	-	-	-	-	10	228
682	180	-	137	33	10	-	10	10	-	-	-	-	10	200
702.02	551	4	446	16	-	85	66	56	-	10	-	-	-	617
734	220	-	152	24	-	44	4	4	-	-	-	-	-	224
736	415	-	401	-	-	14	36	32	-	4	-	4	10	465
738	614	-	512	98	-	4	18	18	-	-	-	8	4	644
740	637	29	497	69	34	8	58	48	-	10	4	18	-	717
742	367	4	315	38	10	-	4	4	-	-	-	14	-	385
744	68	-	68	-	-	-	-	-	-	-	-	-	-	68
746	1,396	34	1,220	106	10	26	100	96	-	4	-	22	58	1,576
770	411	8	327	36	40	-	41	41	-	-	-	8	10	470
772	3,476	166	2,853	321	49	87	185	139	32	14	10	98	32	3,801
774	751	45	619	53	10	24	32	28	4	-	-	8	4	795
776	266	15	217	34	-	-	8	8	-	-	-	-	-	274
784	114	20	90	4	-	-	10	10	-	-	-	-	-	124
786	651	24	534	49	34	10	50	30	-	20	-	8	-	709
788	374	4	322	34	-	14	18	18	-	-	-	-	-	392
790	307	4	269	24	-	10	8	8	-	-	-	-	-	315
792	688	22	580	41	10	35	46	42	-	4	-	12	-	746
794	1,805	26	1,600	148	-	31	82	82	-	-	-	14	4	1,905
796	1,360	14	1,086	176	72	12	76	72	-	4	4	30	12	1,482
798	619	-	452	105	58	4	10	10	-	-	-	34	-	663
800	230	-	188	14	-	28	38	38	-	-	-	-	-	268
802	367	4	293	56	14	-	32	24	8	-	4	18	-	421
822	544	15	481	38	-	10	10	10	-	-	-	15	-	569
828	255	10	219	12	14	-	40	40	-	-	-	15	4	314
Total	25,887	813	21,165	2,526	558	825	1,534	1,348	86	100	34	495	220	28,170
Percent	92%						5%				0.1%	2%	1%	100%

Source: U.S. Census 2000 CTPP

