CHAPTER 18: TRANSIT AND PEDESTRIANS

18.1 Overview

This chapter presents the potential impacts for transit and pedestrians as a result of implementing the Proposed Action. In terms of transit, the Project Area is served by three Staten Island Railway (SIR) stations (Tompkinsville Station, Stapleton Station, and Clifton Station) and eight New York City Transit (NYCT) bus routes (S51/S81, S52, S74/S84, S76/S86, and S78). The major pedestrian access connecting the Project Area (located on the east side of Bay Street) with the surrounding neighborhood is provided along Hannah, Wave, Prospect, Water, Canal and Thompson Streets.

As detailed in this chapter, no significant adverse transit and pedestrian impacts would occur as a result of the Proposed Action. SIR services would be sufficient to accommodate the projected SIR ridership demand generated by the Proposed Action in 2015 during all peak hours. All of the stairways analyzed are projected to operate at LOS B or better during each peak period. It is anticipated that the S51/S81 and S76 bus routes would have significant adverse impacts during the weekday PM and Saturday Midday peak periods as a result of the Proposed Action, but mitigation measures are available. No other significant adverse bus service impacts would occur. The pedestrian analysis for the Proposed Action reveals that the north and south crosswalks at three unsignalized intersections evaluated along Bay Street are projected to have significant adverse impacts during all periods. These crosswalks could be mitigated by installing a traffic signal at each location. No other significant adverse pedestrian impacts would occur as a result of the Proposed Action.

18.2 Methodology

Separate transit and pedestrian study areas are defined for the Proposed Action. The transit study area is comprised of the SIR line, SIR station elements, and NYCT bus routes within a one-quarter mile radius of the Proposed Project. The pedestrian study area is bounded by Front Street to the east, Bay Street to the west, Wave Street to the north and Thompson Street to the south. The study area is comprised of the street network that provides pedestrian access between Bay Street and the Project Area and would most likely be affected by the Proposed Action.

18.2.1 Transit Analysis Methodology

Station Stairways

Detailed SIR station pedestrian analyses were conducted at critical SIR locations in the Project Area using the analytical procedures consistent with Metropolitan Transit Authority (MTA)/NYCT capacity guidelines, which are based on the peak 15-minute period volumes. The results are organized into Level of Service (LOS) measures, which define the flow of pedestrians, and the level of congestion. Pedestrian LOS looks at the relative ease with which pedestrian movements are made and how much space is available to make them. Pedestrian LOS ranges from A (lowest level of congestion) to F

(highest level of congestion). For station stairways, LOS A is characterized by unrestricted flow while pedestrian flow is slightly restricted for LOS B. At LOS C, pedestrian movement is somewhat restricted but with a fluid rate of speed. Walking speeds are reduced and reverse flows and cross flows are severely restricted at LOS D. For LOS E, walking speed is restricted, there is insufficient room to pass, and counter-flow movements are difficult. LOS F is characterized by severe congestion with limited, to no pedestrian flow, starting and stopping, and the formation of queues.

The LOS for stairways, corridors, and ramps was evaluated based on the Volume/SVCD (service volume between LOS C and D) capacity ratio. The breakpoint between LOS C and LOS D at a volume to capacity (v/c) ratio of 1.00 has been established by MTA/NYCT as the minimum acceptable standard for pedestrian conditions. Therefore, LOS C/D is used to determine the design capacity of the critical stairways, corridors, and ramps locations in a station during each peak 15-minute period. The processing of pedestrians at LOS C/D for facilities such as stairways, corridors, and ramps is reduced by between 0 and 20 percent based upon opposing flow volumes. This accounts for the "friction" of pedestrians traveling in both directions. In accordance with MTA/NYCT guidance, the capacity of the stairways, corridors, and ramps is further reduced by 25 percent to account for peaking or surging within the 15-minute period. The LOS criteria for pedestrian stairways, corridors, and ramps are defined in Table 18-1.

Table 18-1: LOS Criteria for Stairways, Corridors, and Ramps

LOS	Volume/SVCD Ratio
A	$\leq$ 0.45
B	> 0.45 to $\leq$ 0.70
C	> 0.70 to $\leq$ 1.00
D	> 1.00 to $\leq$ 1.33
E	> 1.33 to $\leq$ 1.67
F	> 1.67

Source: CEQR Technical Manual (2001).

Bus

The operating conditions for bus service are measured in terms of the number of passengers carried per bus in the peak direction at the peak load point for each route. This is determined by dividing the peak hour passenger count by the number of buses during that hour. The bus load levels for each route were compared with NYCT loading guidelines of 65 passengers per standard bus at the peak load point during the rush hour and 93 persons per articulated bus at the peak load point.

18.2.2 Pedestrian Analysis Methodology

Crosswalk analyses were conducted at one signalized and eight unsignalized intersections in the study area. The crosswalk analyses conducted for the signalized intersections were performed using the analytical procedures described in the *Highway Capacity Manual*

(HCM); Special Report 209, 3rd Edition, 1994. The crosswalk analyses at the unsignalized intersections were performed using the procedures described in the HCM, 2000.

Signalized Intersections

The capacity of a signalized crosswalk is evaluated in terms of speed, density, space, and flow. LOS is evaluated on the basis of square feet per pedestrian. The calculation of pedestrian flow for crosswalks is based upon maximum surge, which represents the worst-case pedestrian flow. The maximum surge is defined as the point where the maximum numbers of pedestrians are in the crosswalk. This generally occurs shortly after the green/walk phase of a crosswalk begins. The number of left-turn and right-turn vehicles that would conflict with pedestrians crossing the intersection was incorporated into the crosswalk analysis.

A LOS between A and D reflects acceptable operating conditions, while LOS E and F represent undesirable operating conditions. Under LOS F conditions, pedestrian flow is sporadic and unstable, resulting in unavoidable contact among pedestrians. The peak 15-minute period volume is used to perform all surface pedestrian analyses. The LOS criteria for crosswalks, as defined in the HCM, are presented in Table 18-2.

Table 18-2: LOS Criteria for Crosswalks at Signalized Intersections

LOS	Space (Square Feet/Pedestrian)
A	$\geq$ 130
B	$\geq$ 40 and < 130
C	$\geq$ 24 and < 40
D	$\geq$ 15 and < 24
E	$\geq$ 6 and < 15
F	< 6

Source: Highway Capacity Manual; Special Report 209, 3rd Edition (1994).

Unsignalized Intersections

At unsignalized crossings, pedestrians must negotiate free flow traffic at midblock or intersection locations not controlled by a stop sign. Crossing an unsignalized location requires pedestrian judgment in selecting an acceptable (critical) gap. A "critical gap" is the time in seconds below which a pedestrian will not attempt to begin crossing the street. If the gap available to pedestrians is greater than the critical gap, it is assumed that the pedestrian will cross the street (*HCM; Transportation Research Board; National Research Council, Washington, D.C., 2000).*

The LOS criteria for crosswalks at unsignalized intersections is based on pedestrian delay that is derived from the critical gap, the vehicular flow rate of the subject crossing, and

the mean vehicle headway. The LOS criteria for crosswalks at unsignalized intersections, as defined in the HCM, is presented in Table 18-3.

Table 18-3: LOS Criteria for Crosswalks at Unsignalized Intersections

LOS	Average Delay Per Pedestrian (Seconds)	Likelihood of Risk-Taking Behavior*
A	< 5	Low
B	≥ 5 and < 10	
C	≥ 10 and < 20	Moderate
D	≥ 20 and < 30	
E	≥ 30 and < 45	High
F	≥ 45	Very High

Note: * Likelihood of acceptance of short gaps.
Source: Highway Capacity Manual (HCM), 2000.

18.3 Existing Conditions

18.3.1 Transit

The transit study area is served by three SIR stations (Tompkinsville, Stapleton, and Clifton) and eight NYCT bus routes (S51/S81, S52, S74/S84, S76/S86, and S78). The existing SIR stations and bus routes within the study area are presented in Figure 18-1.

Rail Service

The SIR operates 24 hours a day and seven days a week between St. George Ferry Terminal and Tottenville Station. A $2.00 fare is collected from passengers that board or exit the SIR at the St. George Ferry Terminal Station. Fares are not collected at any other stations.

During the AM peak period (7:00 to 9:00 AM), the southbound SIR trains (toward Tottenville Station) operate every 15-45 minutes at the three stations in the study area. In the northbound direction (toward St. George Ferry Terminal), some express SIR trains skip the Tompkinsville, Stapleton, and Clifton stations. As a result, three, six, and nine trains stop at the Tompkinsville, Stapleton, and Clifton Stations during the AM peak period, respectively. During the midday peak period (11:00 AM to 1:00 PM), the SIR trains operate every 30 minutes in both directions at the three SIR stations in the study area. During the PM peak period (4:00 PM to 7:00 PM), the northbound SIR trains operate every nine minutes at the three stations in the study area. In the southbound direction, some express SIR trains skip the Tompkinsville, Stapleton, and Clifton stations. As a result, nine, eight, and nine trains stop at the Tompkinsville, Stapleton, and Clifton Stations during the PM peak period, respectively. During the Saturday midday peak period (11:00 AM to 2:00 PM), the SIR trains operate every 30 minutes in both directions at the three SIR stations in the study area.

Not to Scale

Source: MTA NYCT July, 2004

New York City Economic Development Corporation

New Stapleton Waterfront Development Plan FEIS

Transit Study Area Map

The Louis Berger Group, Inc.

Figure 18-1

Rail Line Haul Capacity Analysis

The number of trains per hour and hourly volume at all SIR stations were available from NYCT Operations Planning, System Data & Research. The peak load points for the northbound SIR (to St. George Terminal) and southbound SIR (to Tottenville) serving the Project Area are summarized in Table 18-4. The northbound and southbound SIR currently operates below capacity. During the AM peak hour, the northbound peak load point is at the Grasmere Station with a v/c ratio of 0.32 and the southbound peak load point is at the Old Town Station with a v/c ratio of 0.17. During the PM peak hour, the northbound peak load point is at the Dongan Hills Station with a v/c ratio of 0.23, and the southbound peak load point is at the Old Town Station with a v/c ratio of 0.20.

Table 18-4: 2004 Existing Condition SIR Line Haul Capacity Analysis

Peak Hour	Direction	Station	Trains per Hour	Capacity per Train	Peak Hourly Capacity	Peak Hour Volume	V/C ratio
7:00-8:00 AM Peak Hour	To St. George (NB)	Grasmere	3	700	2,100	671	0.32
	To Tottenville (SB)	Old Town	2	700	1,400	238	0.17
5:00-6:00 PM Peak Hour	To St. George (NB)	Dongan Hills	1	700	700	160	0.23
	To Tottenville (SB)	Old Town	1	700	700	137	0.20

Source: NYCT Operations Planning, System Data & Research

Key Rail Station Elements

The Tompkinsville Station features a center platform serving both the northbound and southbound SIR. Access from the street to the Tompkinsville Station platform is provided by stairways located at the northern end (North Stairway) and southern end (South Stairway) of the platform. Since the Project Area is located south of this station, the South Stairway at this station was selected for stairway analysis.

The Stapleton Station also features a center platform serving both the northbound and southbound SIR. Access from the street to the Stapleton Station platform is provided by stairways located at the northern end (North Stairway) and southern end (South Stairway) of the platform. Since the South Stairway at the Stapleton Station is currently closed, pedestrian counts and analyses were only conducted for the North Stairway at this station.

The Clifton Station features separate northbound and southbound platforms. Access from the street to the southbound platform is provided by a stairway located at the north side of

the platform. Access from the street to the northbound platform is provided by stairways located at the northern end (North Stairway) and southern end (South Stairway) of the platform. Since the project site is located north of this station, only the North Stairways for both the northbound and southbound platforms were analyzed.

In summary, four key stairways were selected for stairway analyses within the study area: the South Stairway at the Tompkinsville Station, the North Stairway at the Stapleton Station, and the North Stairways of the northbound and southbound platforms at the Clifton Station.

Rail Station Element Data Collection

Pedestrian counts were conducted at the four key stairways during the AM (6:30 to 9:30 AM), Midday (11:30 AM to 2:30 PM), and PM (4:00 to 7:30 PM) peak periods in the spring of 2005 on a mid-week day (i.e. Tuesday, Wednesday, or Thursday) and in the fall of 2005 during the Midday period (11:00 AM to 2:00 PM) on a Saturday. These counts were summarized into 15-minute intervals during each peak period and provided in Appendix D-1. Measurements were taken of the total width at these stairways. The effective stairway widths were calculated by reducing the total width by six inches on either side of any obstructions (walls, handrails, etc.).

Rail Station Element Analysis

Detailed stairway analyses were conducted for the four key stairways in the study area. The results of the analyses indicated that these four stairways operate at LOS A during the weekday AM, Midday, and PM peak periods and the Saturday Midday period. The results of the station stairway analyses are provided in Table 18-5 and Appendix D-2.

Table 18-5: Level of Service for Stairways 2005 Existing Condition

Station	Description	Weekday Peak 15-Minute Period						Sat. Peak 15-Minute Period	
		AM		Midday		PM			
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
		V/ SVCD Ratio	LOS	V/ SVCD Ratio	LOS	V/ SVCD Ratio	LOS	V/ SVCD Ratio	LOS
Tompkinsville Station	South Stairway	0.01	A	0.01	A	0.00	A	0.01	A
Stapleton Station	North Stairway	0.05	A	0.04	A	0.05	A	0.06	A
Clifton Station	North Stairway (Northbound Platform)	0.05	A	0.01	A	0.04	A	0.01	A
Clifton Station	North Stairway (Southbound Platform)	0.06	A	0.05	A	0.04	A	0.02	A

Source: The Louis Berger Group, Inc. (2005).

Notes: (1) V/SVCD Ratio = Volume/Service Volume between LOS C and D Ratio
(2) LOS = Level of Service

Bus Service and Routes

Eight NYCT bus routes (S51/S81, S52, S74/S84, S76/S86, and S78) provide local and limited-stop bus service between the study area and various sections of Staten Island. A description of each bus route and the frequency of service during the weekday AM, Midday, and PM peak periods and the Saturday Midday period are provided below.

Route S51/S81

The NYCT S51/S81 bus routes provide local (S51) and limited-stop (S81) bus service between the St. George Ferry Terminal and Grant City. The S51/S81 bus route operates in the northbound and southbound directions on Bay Street within the study area. The NYCT S51 local bus route serves all bus stops on the route. In comparison, the NYCT S81 limited-stop buses serve selected bus stops (i.e. major streets) and skip all other bus stops (i.e. minor streets). The S51 local bus route operates at nine, 13, nine, and 30 minute headways in both directions during the weekday AM, Midday, and PM peak periods and the Saturday Midday period in the study area, respectively. The S81 limited-stop bus route only operates in the southbound direction (toward Grant City) during the PM peak period (4:30 to 6:15 PM) every 15 minutes on weekdays.

Route S52

The NYCT S52 bus route provides local bus service between the St. George Ferry Terminal and South Beach. The S52 bus route operates on Beach Street and Canal Street within the study area. The S52 local bus route operates every 20, 25, 15, and 30 minutes in both directions during the weekday AM, Midday, and PM peak periods and the Saturday Midday period, respectively.

Route S74/S84

The NYCT S74/S84 bus routes provide local (S74) and limited-stop (S84) bus service along the same route between the St. George Ferry Terminal and Tottenville. The S74/S84 bus route operates southbound on Bay Street south of Van Duzer Street, in both directions on Bay Street north of Van Duzer Street, and northbound on Van Duzer Street south of Swan Street within the study area. The NYCT S74 local buses serve all bus stops on the route while the NYCT S84 limited-stop buses serve selected bus stops (i.e. major streets) and skip all other bus stops (i.e. minor streets). The S74 local bus route operates every 15, 20, 15, and 15 minutes in both directions during the weekday AM, Midday, and PM peak periods and the Saturday Midday period, respectively. Limited-stop service (S84) is available on weekdays only in the southbound direction (toward Tottenville) during the PM peak period (4:30 to 6:00 PM) every 20 minutes.

Route S76/S86

The NYCT S76/S86 bus routes provide local (S76) and limited-stop (S86) bus service along the same route between the St. George Ferry Terminal and Oakwood Beach. The S76/S86 bus routes operate in both the northbound and southbound directions on Bay Street within the study area. The NYCT S76 local buses serve all bus stops on the route. In comparison, the NYCT S86 limited-stop buses serve selected bus stops (i.e. major streets) and skip all other bus stops (i.e. minor streets). Limited-stop service (S86) is available on weekdays only in the southbound direction (toward Oakwood Beach) during

the evening period from 4:50 to 10:00 PM every 15 minutes. The S76 local bus route operates at 12, 15, 15, and 30 minute intervals in both directions during the weekday AM, Midday, and PM peak periods and the Saturday Midday period, respectively.

Route S78
The NYCT S78 bus route provides local bus service between the St. George Ferry Terminal and Tottenville. Within the study area, the S78 bus route operates southbound on St. Pauls Avenue south of Victory Boulevard, eastbound on Beach Street, southbound on Water Street north of Wright Street, in both directions on Canal Street south of Wright Street, and toward St. George Ferry Terminal operates westbound on Wright Street west of Canal Street, northbound on Van Duzer Street north of Wright Street, and northbound on Bay Street south of Victory Boulevard within the study area. The S78 local bus route operates at 11, 15, 15, and 15 minute intervals in both directions during the AM, Midday, and PM peak periods and the Saturday Midday period, respectively.

Bus Capacity Analysis
The most recent bus ridership data were provided for the eight NYCT bus routes (S51/S81, S52, S74/S84, S76/S86, and S78) in the study area based on the NYCT Ride-Check survey results. These data were utilized to determine the peak hour bus service during the weekday AM, Midday, and PM peak hours and the Saturday Midday peak hour. Table 18-6A through Table 18-6D summarize the results of the existing bus conditions, including the number of buses per hour, maximum passenger volume at the peak load point, average passengers per bus, peak utilization, and available capacity on each route by direction in the weekday AM, Midday, and PM peak hours and the Saturday Midday peak hour, respectively. The results of the analysis indicated that all bus routes in the study area currently operate under capacity at their peak load points during the weekday AM, Midday, and PM peak hours and the Saturday Midday peak hour.

18.3.2 Pedestrians

Key Intersections
Currently, the major pedestrian access between Bay Street and the Project Area is provided along Hannah, Wave, Prospect, Water, Canal, and Thompson Streets. These roadways would most likely be affected by the Proposed Action and a total of nine key intersections (one signalized and eight unsignalized) surrounding the proposed development parcels were selected for crosswalk analyses. The locations of these nine intersections are presented in Table 18-7 and Figure 18-2.

Table 18-6A: AM Peak Hour Bus Capacity Analysis 2005 Existing Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers[1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	7	455	261	37	194
	SB	4	260	95	24	165
S52	NB	4	260	105	26	155
	SB	4	260	95	24	165
S74/S84[3]	NB	7	455	291	42	164
	SB	4	260	141	35	119
S76/S86[3]	NB	6	390	238	40	152
	SB	5	325	239	48	86
S78	NB	6	390	205	34	185
	SB	6	390	273	46	117

Source: NYCT Ride-Check Surveys.

Notes:
(1) All data is for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the transit study area.

Table 18-6B: Midday Peak Hour Bus Capacity Analysis 2005 Existing Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers[1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	3	195	61	20	134
	SB	4	260	105	26	155
S52	NB	3	195	70	23	125
	SB	3	195	52	17	143
S74/S84[3]	NB	3	195	72	24	123
	SB	4	260	101	25	159
S76/S86[3]	NB	4	260	86	22	174
	SB	4	260	107	27	153
S78	NB	4	260	86	22	174
	SB	4	260	90	23	170

Source: NYCT Ride-Check Surveys.

Notes:
(1) All data is for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the transit study area.

Table 18-6C: PM Peak Hour Bus Capacity Analysis 2005 Existing Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers[1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	5	325	172	34	153
	SB	6	390	164	27	226
S52	NB	4	260	68	17	192
	SB	3	195	84	28	111
S74/S84[3]	NB	4	260	113	28	147
	SB	5	325	162	32	163
S76/S86[3]	NB	4	260	93	23	167
	SB	7	455	194	28	261
S78	NB	4	260	120	30	140
	SB	5	325	144	29	181

Source: NYCT Ride-Check Surveys.

Notes:
(1) All data is for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the transit study area.

Table 18-6D: Saturday Midday Peak Hour Bus Capacity Analysis 2005 Existing Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers[1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	2	130	47	24	83
	SB	2	130	45	23	85
S52	NB	2	130	33	17	97
	SB	2	130	34	17	96
S74/S84[3]	NB	4	260	100	25	160
	SB	4	260	92	23	168
S76/S86[3]	NB	2	130	62	31	68
	SB	2	130	45	23	85
S78	NB	4	260	67	17	193
	SB	4	260	92	23	168

Source: NYCT Ride-Check Surveys.

Notes:
(1) All data is for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the transit study area.

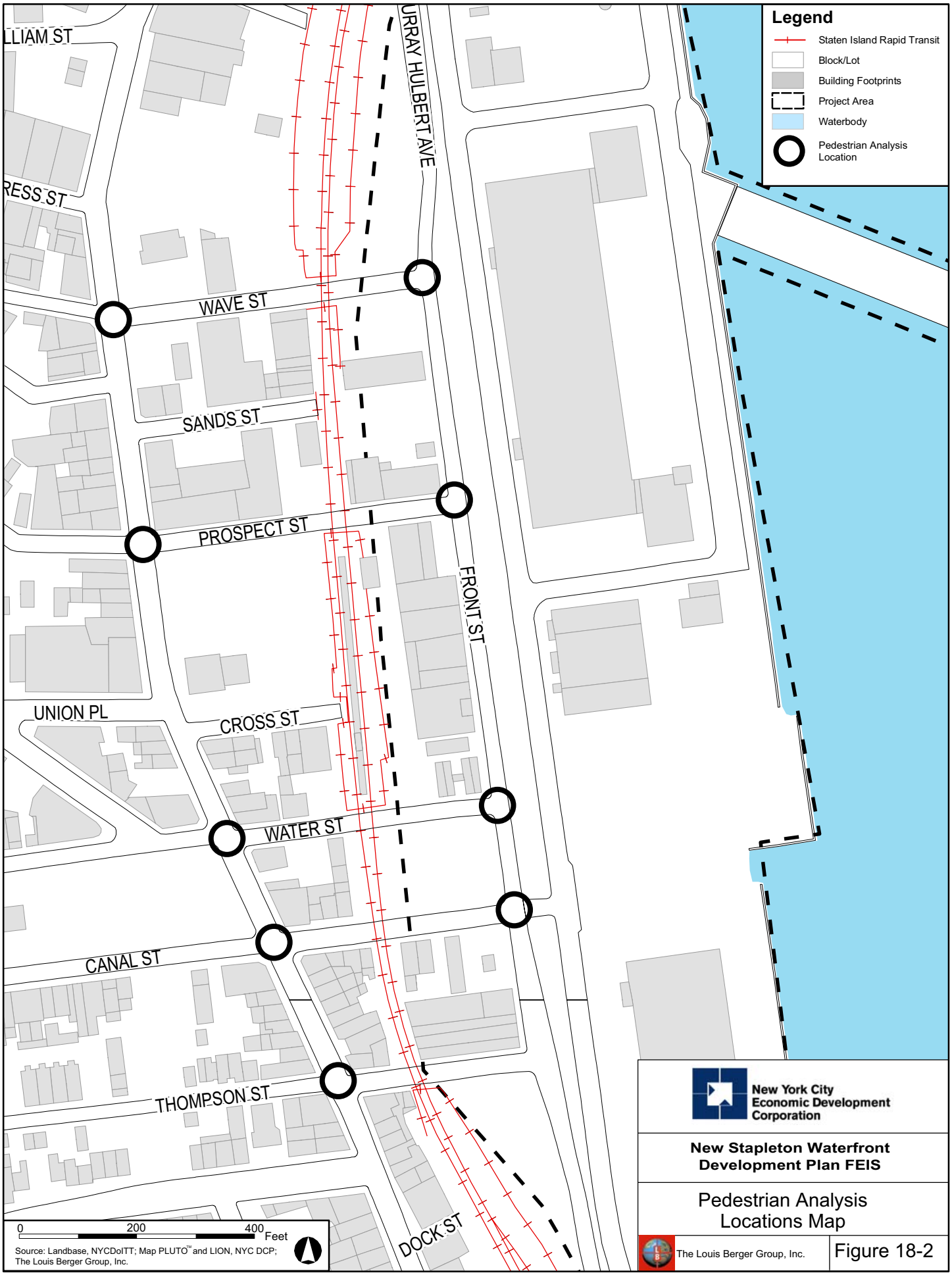
Legend
Staten Island Rapid Transit
Block/Lot
Building Footprints
Project Area
Waterbody
Pedestrian Analysis Location
LLIAM ST
RESS ST
URRAY HULBERT AVE
WAVE ST
SANDS ST
PROSPECT ST
FRONT ST
UNION PL
CROSS ST
WATER ST
CANAL ST
THOMPSON ST
DOCK ST
0
200
400 Feet
Source: Landbase, NYCDoITT; Map PLUTO™ and LION, NYC DCP; The Louis Berger Group, Inc.
New York City Economic Development Corporation
New Stapleton Waterfront Development Plan FEIS
Pedestrian Analysis Locations Map
The Louis Berger Group, Inc.
Figure 18-2

Table 18-7: Pedestrian Crosswalk Analysis Intersections

No.	East-West Streets	North-South Streets	Intersection Type
1	Wave Street	Bay Street	Unsignalized
2	Prospect Street	Bay Street	Unsignalized
3	Water Street	Bay Street	Unsignalized
4	Canal Street	Bay Street	Signalized
5	Thompson Street	Bay Street	Unsignalized
6	Wave Street	Front Street	Unsignalized
7	Prospect Street	Front Street	Unsignalized
8	Water Street	Front Street	Unsignalized
9	Canal Street	Front Street	Unsignalized

Pedestrian Data Collection

Pedestrian crosswalk counts were conducted on a mid-week day (Tuesday, Wednesday, or Thursday) in the spring of 2005 during the AM (6:30 to 9:30 AM), Midday (11:30 AM to 2:30 PM), and PM (4:00 to 7:30 PM) peak periods and on a Saturday in the fall of 2005 during the Midday period (11:00 AM to 2:00 PM). These counts are summarized into 15-minute intervals during each peak period and are provided in Appendix D-1. The peak 15-minute interval and peak hour pedestrian volumes for the 2005 Existing Condition during the four periods analyzed are provided in Appendix D-3.

A physical inventory of each key intersection was performed. Field reconnaissance surveys were conducted at these intersections to establish the existing physical characteristics including roadway widths, crosswalk widths, and bus stop locations. The "official" traffic signal timing data were obtained from the New York City Department of Transportation (NYCDOT) for the one signalized intersection (Canal Street and Bay Street).

Pedestrian Analysis

Crosswalks located at the one signalized intersection and eight unsignalized intersections in the study area were analyzed using the 2005 pedestrian data. All of the crosswalks located at the four Front Street intersections currently operate at LOS C or better during the weekday AM, Midday, and PM peak periods and the Saturday Midday peak period. The north and south crosswalks at the four unsignalized intersections on Bay Street at Wave Street, Prospect Street, Water Street, and Thompson Street operate at LOS F during the weekday AM, Midday, and PM peak periods and the Saturday Midday peak period. The results of the crosswalk analyses are summarized in Table 18-8 for the signalized intersection and Table 18-9 for the unsignalized intersections. Detailed capacity analysis worksheets are provided in Appendix D-4 for signalized intersection and Appendix D-5 for unsignalized intersections.

Table 18-8: Level of Service for Crosswalks at Signalized Intersection
2005 Existing Condition

Intersections	Cross-walks	Weekday Peak 15-Minute Period						Sat. Peak 15-Minute Period	
		AM		Midday		PM			
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
		SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
4. Canal Street and Bay Street	North	4379	A	1469	A	1095	A	1958	A
	East	641	A	1785	A	1068	A	649	A
	South	4850	A	7084	A	4850	A	787	A
	West	1933	A	228	A	483	A	208	A

Source: The Louis Berger Group, Inc. (2005)
Notes:
(1) SF/P = Square foot per Pedestrian
(2) LOS = Level of Service

Table 18-9: Level of Service for Crosswalks at Unsignalized Intersections 2005 Existing Conditions

Intersections	Cross-walks	Weekday Peak 15-Minute Period						Sat. Peak 15-Minute Period	
		AM		Midday		PM			
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Wave Street and Bay Street	North	0.0	A	103.9	F	106.6	F	71.9	F
	East	1.4	A	3.4	A	2.7	A	1.9	A
	South	102.8	F	124.4	F	110.6	F	80.5	F
	West	0.0	A	0.0	A	0.0	A	0.0	A
2. Prospect Street and Bay Street	North	95.0	F	122.2	F	0.0	A	78.4	F
	East	0.9	A	0.7	A	0.6	A	0.8	A
	South	99.2	F	123.3	F	125.4	F	86.7	F
	West	0.0	A	0.0	A	1.0	A	0.9	A
3. Water Street and Bay Street	North	198.3	F	248.6	F	128.7	F	96.0	F
	East	0.0	A	0.7	A	0.8	A	1.1	A
	South	100.1	F	120.3	F	0.0	A	0.0	A
	West	2.7	A	4.9	A	4.0	A	3.5	A
5. Thompson Street and Bay Street	North	0.0	A	83.4	F	103.0	F	59.0	F
	East	0.0	A	0.0	A	1.0	A	1.1	A
	South	106.0	F	101.7	F	124.0	F	69.0	F
	West	0.0	A	0.0	A	0.0	A	0.0	A
6. Wave Street and Front Street	North	0.0	A	0.0	A	0.0	A	0.0	A
	South	0.0	A	0.0	A	0.0	A	0.0	A
	West	0.0	A	0.0	A	0.0	A	0.0	A
7. Prospect Street and Front Street	North	0.0	A	0.0	A	15.3	C	0.0	A
	South	0.0	A	0.0	A	0.0	A	0.0	A
	West	0.0	A	0.0	A	1.2	A	0.0	A
8. Water Street and Front Street	North	0.0	A	0.0	A	0.0	A	0.0	A
	South	0.0	A	0.0	A	0.0	A	0.0	A
	West	0.0	A	0.0	A	0.0	A	0.0	A
9. Canal Street and Front Street	North	0.0	A	0.0	A	0.0	A	0.0	A
	South	0.0	A	0.0	A	0.0	A	0.0	A
	West	0.0	A	0.0	A	0.0	A	0.0	A

Source: The Louis Berger Group, Inc. (2005).

Notes:
(1) Delay in Seconds for Unsignalized Intersections
(2) LOS = Level of Service
Shaded areas represent LOS E or F.

Pedestrian Safety

Currently, Bay and Front Streets experience very low pedestrian volumes and moderate vehicular volumes during the weekday and Saturday peak periods. Since the Proposed Action would significantly increase traffic and pedestrian volumes along both Bay and Front Streets within the study area, pedestrian safety is an important consideration. As a result, accident data were collected and assessed to determine pedestrian safety at key intersections within the study area.

Accident data for 18 key intersections in the primary and secondary study areas were obtained from NYCDOT for the most recent three-year period from January 1, 2003 to December 31, 2005. Accidents are generally classified into two categories: "reportable" and "non-reportable" accidents. An accident is coded as non-reportable if there was no personal injury and no motorist accident report was filed, or no estimated dollar value of vehicular damage was entered on the motorist accident report, or the amount of vehicular damage did not exceed $1,000.

As shown in Table 18-10, 247 accidents occurred at these 18 intersections over the 3-year period. In terms of severity, no fatalities were reported at any of the key intersections within the study area over this period. Of the 247 accidents that occurred over the 3-year period, approximately 77% (189 accidents) were non-reportable and 23% (58 accidents) were reportable. A total of 90 people were injured as part of the 58 reportable accidents. Of these accidents, a total of 13 pedestrians (5%) and 3 bicyclists (1%) were involved. It should be noted that all the accidents that included either pedestrians or bicyclists occurred along Bay Street with none occurring along Front Street over the 3-year period.

Currently, pedestrian and bicycle movements are very low along Front Street between Wave and Thompson Streets. Pedestrians cross these intersections on Front Street without the benefit of either traffic signals or stop signs to control traffic. In addition, there are no painted crosswalks provided for pedestrians to cross Front Street in the study area. Along Bay Street between Wave Street and Broad Street, pedestrian crosswalks and signals are provided at Canal and Broad Streets. The pedestrian crossings along Bay Street at Wave, Prospect, Water, and Thompson Streets are unsignalized. The pedestrian LOS analysis results indicate that all of the north and south crosswalks at these four Bay Street intersections currently operate at LOS F during all time periods analyzed. The poor LOS and extensive delays identified for these north and south crosswalks are attributable to the difficulty pedestrians have finding gaps to safely cross Bay Street due to heavy traffic volumes in both the northbound and southbound directions during the peak periods.

Based on the CEQR Technical Manual, an intersection with five or more pedestrian accident occurrences in one year (out of the most recent three-year period for which data is available) is considered a high accident location. As shown in Table 18-10, since all of the key intersections in the study area experienced less than five pedestrian accidents over the most recent three-year period, none of these key intersections are considered high accident locations.

Table 18-10
Existing Accident Summary
01/01/2003 to 12/31/2005

No.	Intersections	Accident Types					
		By Severity			Pedestrian & Bicycle		
		NR	RPT	Total	PED	BIKE	Total
1	Bay Street and Victory Boulevard	28	6	**34**	4	0	**4**
2	Bay Street and Hannah Street	22	10	**32**	1	1	**2**
3	Bay Street and Swan Street/Van Duzer Street	5	0	**5**	0	0	**0**
4	Bay Street and Wave Street	6	1	**7**	1	0	**1**
5	Bay Street and Prospect Street	1	0	**1**	0	0	**0**
6	Bay Street and Water Street	12	7	**19**	3	0	**3**
7	Bay Street and Canal Street	15	4	**19**	0	2	**2**
8	Bay Street and Thompson Street	2	1	**3**	0	0	**0**
9	Bay Street and Broad Street	17	4	**21**	2	0	**2**
10	Bay Street and Vanderbilt Avenue	21	10	**31**	1	0	**1**
11	Bay Street and Edgewater Street/Front Street	14	0	**14**	0	0	**0**
12	Bay Street and Hylan Boulevard	33	3	**36**	1	0	**1**
13	Front Street and Hannah Street	3	1	**4**	0	0	**0**
14	Front Street and Wave Street	3	7	**10**	0	0	**0**
15	Front Street and Prospect Street	1	0	**1**	0	0	**0**
16	Front Street and Water Street	4	1	**5**	0	0	**0**
17	Front Street and Canal Street	2	3	**5**	0	0	**0**
18	Front Street and Thompson Street	0	0	**0**	0	0	**0**
Total		**189**	**58**	**247**	**13**	**3**	**16**
Percentage		**77%**	**23%**	**100%**	**5%**	**1%**	**6%**

Source: The Louis Berger Group, Inc. (2005)
Notes:
NR – Non Reportable Accidents RPT – Reportable Accidents
PED – Pedestrian Accidents BIKE – Bicycle Accidents

18.4 No Build Condition

18.4.1 No Build Transit and Pedestrian Volume Development

Future No Build transit and pedestrian volumes were established by applying a background growth rate of one percent per year in accordance with *CEQR Technical Manual* guidelines and discussions with NYCDOT. Based upon correspondence with New York City Department of City Planning (NYCDCP), Housing Preservation and Development (HPD), and the Staten Island Borough President's office, ten planned development projects have been identified within the study area (as noted in Table 17-4 in Chapter 17, "Traffic and Parking").

Trip generation and modal split assumptions were developed for each of the No Build projects based on studies conducted for comparable developments and EISs, the 2000

Census Transportation Planning Package (CTPP), standard professional references, and planning assumptions. Detailed descriptions of trip generation methodologies for the office, residential and local retail land uses can be found in Chapter 17, "Traffic and Parking" (section 17.3.1 Background Traffic Generation and Assignments). Person trips by mode that would be generated for these three developments during the weekday AM, Midday and PM peak hour periods and the Saturday Midday peak hour are provided in Table 18-11A through Table 18-11D.

Person trips projected to be generated by these ten developments were used in addition to the one percent background growth rate to develop future No Build transit and pedestrian volumes. The projected No Build Condition pedestrian crosswalk volumes for the four peak hours are provided in Appendix D.

18.4.2 Transit

Rail Line Haul Capacity Analysis

Based on the background growth projected for the study area, plus the additional growth anticipated for other anticipated projects in the area, demand for SIR service in the No Build Condition is projected to increase. As presented in Table 18-12, the existing frequency of SIR service would be sufficient to accommodate the projected demand in the No Build Condition during the weekday AM and PM peak hours.

Rail Station Element Analysis

Detailed SIR station stairway analyses were conducted for the four stairways at the Tompkinsville, Stapleton, and Clifton Stations for the No Build Condition. The four stairways are projected to operate at LOS A during the peak hour analyzed. The results of the station stairway analyses are provided in Table 18-13 and Appendix D-2.

Bus Analysis

Based on the background growth projected for the study area, plus the additional growth anticipated for other projects within the area, demand for bus service in the No Build Condition is projected to increase. As presented in Table 18-14A through Table 18-14D, the existing frequency of bus service would be sufficient to accommodate the projected demand in the No Build Condition for all bus routes during the peak hours (Weekday AM, Midday, and PM and Saturday Midday).

Table 18-11A: Person Trip Generation by Mode Weekday AM Peak Hour
No Build Condition

Site No.	Land Use	Auto		Taxi		Bus		SIR		Walk		Total	
		In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
1	Residential, Local Retail	3	10	0	1	3	9	2	6	11	20	19	46
2	Residential, Local Retail	11	52	0	1	6	30	2	9	10	18	29	110
3	Office, Local Retail	116	10	1	1	27	3	37	4	20	12	201	30
4	Pier 7 Site (Storage Space)	28	4	0	0	4	1	6	1	1	1	39	7
5	Local Retail	1	0	0	0	1	0	1	0	6	6	9	6
6	Industrial	11	2	0	0	2	0	3	0	1	0	17	2
7	Residential	6	33	0	0	4	18	1	5	1	7	12	63
8	Residential, Office	51	16	0	1	12	8	16	3	4	3	83	31
9	Residential	3	16	0	0	2	8	2	9	5	25	12	58
10	Residential, Local Retail	8	33	0	1	6	24	4	18	21	63	39	139
Total		**238**	**176**	**1**	**5**	**67**	**101**	**74**	**55**	**80**	**155**	**460**	**492**

Note: See *Chapter 17, "Traffic and Parking", Section 17.3.1 Background Traffic Generation and Assignment* for trip generation methodology

Table 18-11B: Person Trip Generation by Mode Weekday Midday Peak Hour
No Build Condition

Site No.	Land Use	Auto		Taxi		Bus		SIR		Walk		Total	
		In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
1	Residential, Local Retail	16	15	3	3	13	12	12	11	108	107	152	148
2	Residential, Local Retail	25	21	3	3	20	16	12	11	107	105	167	156
3	Office, Local Retail	83	94	4	5	17	18	23	24	173	178	300	319
4	Pier 7 Site (Storage Space)	10	10	0	0	1	0	1	2	5	6	17	18
5	Local Retail	9	8	2	2	7	7	7	7	73	72	98	96
6	Industrial	4	4	0	0	0	1	1	0	2	2	7	7
7	Residential	8	6	0	0	7	4	2	1	6	4	23	15
8	Residential, Office	31	36	0	1	4	4	5	5	18	19	58	65
9	Residential	6	4	0	0	4	3	4	2	9	7	23	16
10	Residential, Local Retail	20	46	5	4	16	34	15	28	144	185	200	297
Total		**212**	**244**	**17**	**18**	**89**	**99**	**82**	**91**	**645**	**685**	**1,045**	**1,137**

Note: See *Chapter 17, "Traffic and Parking", Section 17.3.1 Background Traffic Generation and Assignment* for trip generation methodology

Table 18-11C: Person Trip Generation by Mode Weekday PM Peak Hour No Build Condition

Site No.	Land Use	Auto		Taxi		Bus		SIR		Walk		Total	
		In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
1	Residential, Local Retail	20	13	2	3	17	11	14	9	95	88	148	124
2	Residential, Local Retail	64	27	3	2	38	17	16	10	89	82	210	138
3	Office, Local Retail	17	152	3	4	11	42	12	53	109	120	152	371
4	Pier 7 Site (Storage Space)	4	30	0	0	1	4	1	7	0	2	6	43
5	Local Retail	7	7	2	1	5	6	5	6	58	58	77	78
6	Industrial	2	12	0	0	0	2	0	3	0	1	2	18
7	Residential	34	12	0	0	19	7	6	1	7	2	66	22
8	Residential, Office	15	64	0	1	8	16	3	19	3	5	29	105
9	Residential	17	6	0	0	11	4	10	3	27	9	65	22
10	Residential, Local Retail	31	61	3	4	23	46	19	35	138	187	214	333
Total		**211**	**384**	**13**	**15**	**133**	**155**	**86**	**146**	**526**	**554**	**969**	**1,254**

Note: See *Chapter 17, "Traffic and Parking", Section 17.3.1 Background Traffic Generation and Assignment* for trip generation methodology

Table 18-11D: Person Trip Generation by Mode Saturday Midday Peak Hour 2015 No Build Condition

Site No.	Land Use	Auto		Taxi		Bus		SIR		Walk		Total	
		In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
1	Residential, Local Retail	23	20	3	4	19	17	16	15	131	127	192	183
2	Residential, Local Retail	46	36	3	4	36	28	18	16	136	129	239	213
3	Office, Local Retail	33	36	4	5	16	15	17	17	166	167	236	240
4	Pier 7 Site (Storage Space)	9	9	0	0	1	0	1	2	5	5	16	16
5	Local Retail	10	10	2	2	8	8	8	8	84	85	112	113
6	Industrial	4	4	0	0	0	1	1	0	2	2	7	7
7	Residential	20	15	0	0	16	11	5	3	14	9	55	38
8	Residential, Office	14	13	0	0	7	5	3	2	9	7	33	27
9	Residential	14	10	0	0	9	7	8	6	22	16	53	39
10	Residential, Local Retail	56	48	5	5	42	36	34	30	219	206	356	325
Total		**229**	**201**	**17**	**20**	**154**	**128**	**111**	**99**	**788**	**753**	**1,299**	**1,201**

Note: See *Chapter 17, "Traffic and Parking", Section 17.3.1 Background Traffic Generation and Assignment* for trip generation methodology

Table 18-12: SIR Line Haul Capacity Analysis
No Build Condition

Peak Hour	Direction	Station	Trains per Hour	Capacity per Train	Peak Hourly Capacity	Peak Hour Volume	V/C ratio
7:00-8:00 AM Peak Hour	To St. George (Northbound)	Grasmere	3	700	2,100	795	0.38
	To Tottenville (Southbound)	Old Town	2	700	1,400	297	0.21
5:00-6:00 PM Peak Hour	To St. George (Northbound)	Dongan Hills	1	700	700	225	0.32
	To Tottenville (Southbound)	Old Town	1	700	700	245	0.35

Source: NYCT Operations Planning, System Data & Research.

Table 18-13: Level of Service for Stairways
No Build Condition

Station	Description	Weekday Peak 15-Minute Period						Sat. Peak 15-Minute Period	
		AM		Midday		PM			
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
		V/ SVCD Ratio	LOS	V/ SVCD Ratio	LOS	V/ SVCD Ratio	LOS	V/ SVCD Ratio	LOS
Tompkinsville Station	South Stairway	0.02	A	0.01	A	0.01	A	0.01	A
Stapleton Station	North Stairway	0.08	A	0.06	A	0.09	A	0.09	A
Clifton Station	North Stairway (Northbound Platform)	0.06	A	0.01	A	0.04	A	0.01	A
Clifton Station	North Stairway (Southbound Platform)	0.06	A	0.05	A	0.05	A	0.03	A

Source: The Louis Berger Group, Inc. (2005).

Notes:
(1) V/SVCD Ratio = Volume/(Service Volume between LOS C and D) Ratio
(2) LOS = Level of Service

Table 18-14A: AM Peak Hour Bus Capacity
No Build Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers[1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	7	455	341	49	114
	SB	4	260	160	40	100
S52	NB	4	260	116	29	144
	SB	4	260	105	26	155
S74/S84[3]	NB	7	455	328	47	127
	SB	4	260	164	41	96
S76/S86[3]	NB	6	390	277	46	113
	SB	5	325	281	56	44
S78	NB	6	390	232	39	158
	SB	6	390	310	52	80

Source: NYCT Ride-Check Surveys.
Notes:
(1) All data are for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the study area.

Table 18-14B: Midday Peak Hour Bus Capacity
No Build Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers[1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	3	195	122	41	73
	SB	4	260	169	42	91
S52	NB	3	195	77	26	118
	SB	3	195	57	19	138
S74/S84[3]	NB	3	195	91	30	104
	SB	4	260	122	30	138
S76/S86[3]	NB	4	260	113	28	147
	SB	4	260	138	35	122
S78	NB	4	260	106	26	154
	SB	4	260	109	27	151

Source: MTA NYCT Ride-Check Surveys.
Notes:
(1) All data are for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the study area.

Table 18-14C: PM Peak Hour Bus Capacity
No Build Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers [1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	5	325	275	55	50
	SB	6	390	270	45	120
S52	NB	4	260	75	19	185
	SB	3	195	93	31	102
S74/S84[3]	NB	4	260	140	35	120
	SB	5	325	194	39	131
S76/S86[3]	NB	4	260	130	32	130
	SB	7	455	242	35	213
S78	NB	4	260	148	37	112
	SB	5	325	173	35	152

Source: NYCT Ride-Check Surveys.
Notes:
(1) All data are for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the study area.

Table 18-14D: Saturday Midday Peak Hour Bus Capacity
No Build Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers [1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	2	130	127	63	3
	SB	2	130	127	63	3
S52	NB	2	130	36	18	94
	SB	2	130	38	19	92
S74/S84[3]	NB	4	260	126	32	134
	SB	4	260	118	29	142
S76/S86[3]	NB	2	130	100	50	30
	SB	2	130	84	42	46
S78	NB	4	260	90	23	170
	SB	4	260	118	29	142

Source: NYCT Ride-Check Surveys.
Notes:
(1) All data are for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the study area.

18.4.3 Pedestrian Analysis

Pedestrian crosswalk analyses were conducted at the one signalized and eight unsignalized intersections using the projected No Build Condition traffic and pedestrian volumes. The results of the signalized intersection crosswalk analysis are summarized in Table 18-15 and detailed capacity analysis worksheets are provided in Appendix D-4. The results of the LOS analysis revealed that all the crosswalks at the Canal Street and Bay Street intersection are projected to continue to operate at the same LOS as the Existing Condition during the weekday AM, Midday, and PM and Saturday Midday 15-minute peak periods.

Table 18-15: Level of Service for Crosswalks at Signalized Intersection 2015 No Build Condition

Intersections	Cross-walks	Weekday Peak 15-Minute Period						Sat. Peak 15-Minute Period	
		AM		Midday		PM			
		(1) SF/P	(2) LOS	(1) SF/P	(2) LOS	(1) SF/P	(2) LOS	(1) SF/P	(2) LOS
4. Canal Street and Bay Street	North	4379	A	979	A	730	A	1175	A
	East	458	A	397	A	377	A	311	A
	South	4850	A	2361	A	1617	A	590	A
	West	1933	A	177	A	341	A	165	A

Source: The Louis Berger Group, Inc. (2005).
Notes:
(1) SF/P = Square foot per Pedestrian
(2) LOS = Level of Service

The results of the unsignalized intersection crosswalk analyses are summarized in Table 18-16 and detailed capacity analysis worksheets are provided in Appendix D-5. The results of the LOS analyses revealed that all the crosswalks at the four Bay Street unsignalized intersections are projected to continue to operate at the same LOS (east and west crosswalks at LOS A and north and south crosswalks at LOS F) as the Existing Condition during the weekday AM, Midday, and PM and Saturday Midday 15-minute peak periods. For the four Front Street intersections, all crosswalks are projected to operate at an acceptable LOS (C or better) during the Saturday peak period. During the weekday AM, Midday, and PM peak periods, most of the north and south crosswalks at the Front Street intersections are projected to worsen from LOS C to D or from LOS D to E.

Table 18-16: Level of Service for Crosswalks at Unsignalized Intersections No Build Conditions

Intersections	Cross-walks	Weekday Peak 15-Minute Period						Sat. Peak 15-Minute Period	
		AM		Midday		PM			
		(1) Delay	(2) LOS	(1) Delay	(2) LOS	(1) Delay	(2) LOS	(1) Delay	(2) LOS
1. Wave Street and Bay Street	North	0.0	A	864.9	F	460.1	F	122.7	F
	East	1.3	A	4.0	A	2.9	A	2.3	A
	South	177.9	F	504.2	F	475.3	F	139.7	F
	West	0.0	A	0.0	A	0.0	A	0.0	A
2. Prospect Street and Bay Street	North	163.3	F	*	F	969.8	F	525.5	F
	East	1.2	A	1.4	A	1.7	A	1.5	A
	South	361.3	F	*	F	*	F	*	F
	West	1.0	A	1.0	A	0.8	A	0.8	A
3. Water Street and Bay Street	North	792.1	F	*	F	*	F	358.2	F
	East	0.0	A	1.0	A	1.1	A	0.8	A
	South	179.1	F	*	F	612.1	F	140.7	F
	West	3.2	A	6.1	B	5.2	B	4.0	A
5. Thompson Street and Bay Street	North	0.0	A	329.0	F	219.5	F	105.6	F
	East	1.1	A	0.0	A	0.8	A	0.9	A
	South	418.1	F	199.1	F	277.6	F	128.5	F
	West	0.0	A	0.0	A	0.0	A	0.0	A
6. Wave Street and Front Street	North	0.0	A	0.0	A	0.0	A	0.0	A
	South	0.0	A	0.0	A	0.0	A	0.0	A
	West	0.0	A	0.0	A	0.0	A	0.0	A
7. Prospect Street and Front Street	North	0.0	A	0.0	A	23.6	D	0.0	A
	South	0.0	A	0.0	A	0.0	A	0.0	A
	West	0.0	A	0.0	A	1.6	A	0.0	A
8. Water Street and Front Street	North	0.0	A	0.0	A	0.0	A	0.0	A
	South	0.0	A	0.0	A	0.0	A	0.0	A
	West	0.0	A	0.0	A	0.0	A	0.0	A
9. Canal Street and Front Street	North	0.0	A	0.0	A	0.0	A	0.0	A
	South	0.0	A	0.0	A	0.0	A	0.0	A
	West	0.0	A	0.0	A	0.0	A	0.0	A

Source: The Louis Berger Group, Inc. (2005).
Notes:
(1) Delay in Seconds for Unsignalized Intersections
(2) LOS = Level of Service
* represent delays that exceed 1000 seconds
Shaded areas represent LOS E or F.

Pedestrian Safety
The pedestrian LOS analysis results indicate that all of the north and south crosswalks at the four unsignalized intersections along Bay Street are projected to operate at LOS F during all time periods analyzed in the future No Build condition. The poor LOS and extensive delays identified for these north and south crosswalks are projected to worsen in the future No Build condition due to anticipated background pedestrian and traffic growth in the study area.

18.5 Build Condition

18.5.1 Trip Generation

As described in Chapter 2, "Analytical Framework", the overall Reasonable Worst-Case Development Scenario (RWCDS) consists of approximately 75,000 square feet of office space (multi-tenant); 75,000 square feet of sportsplex space; 667,500 square feet of residential space (638 dwelling units); 22,500 square feet of restaurant space; a 1,000 seat catering hall; 83,700 square feet of local retail space, 1,725 parking spaces, and 12 acres of open space. Six development parcels (A and B1 through B5), the area west of Front Street (Area C), and public open space (waterfront esplanade, Pier Place, and the Cove) have been identified as part of the Proposed Action and a parcel map is provided in Figure 1-4. A detailed description of each development component can be found in Chapter 1, "Project Description."

Trip generation and modal split assumptions were developed for each of the Build projects based on studies conducted for comparable developments and EISs, the 2000 Census Transportation Planning Package (CTPP), standard professional references, and planning assumptions. Detailed descriptions of trip generation methodologies for the office, residential and local retail land uses can be found in Chapter 17, "Traffic and Parking." The person trips projected for the Proposed Action were estimated based on the trip generation and modal split assumptions and calculations developed for the weekday AM, Midday and PM peak hours and Saturday Midday peak hour and provided in Table 18-17A through Table 18-17D.

Table 18-17A: Person Trip Generation by Mode Weekday AM Peak Hour
Build Condition

Parcel No.	Land Uses	Auto		Taxi		Bus		SIR		Walk		Total	
		In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
A	Residential	8	41	0	1	4	23	1	7	2	8	**15**	**80**
B1	Restaurant, Catering Hall	20	5	1	0	2	0	1	0	2	0	**26**	**5**
B2	Sportsplex, Local Retail	25	36	1	1	7	6	5	3	8	22	**46**	**68**
B3	Residential, Specialty Retail	10	43	1	0	6	25	3	9	22	27	**42**	**104**
B4	Office	91	7	1	0	21	1	29	2	7	1	**149**	**11**
B5	Residential	6	32	0	0	3	18	1	5	1	6	**11**	**61**
C	Residential, Retail	21	95	1	1	12	55	5	18	29	42	**68**	**211**
Open Space		4	1	0	0	1	0	1	0	21	4	**27**	**5**
Total		**185**	**260**	**5**	**3**	**56**	**128**	**46**	**44**	**92**	**110**	**384**	**545**

Table 18-17B: Person Trip Generation by Mode Weekday Midday Peak Hour
Build Condition

Parcel No.	Land Uses	Auto		Taxi		Bus		SIR		Walk		Total	
		In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
A	Residential	10	7	0	0	8	6	3	1	7	5	**28**	**19**
B1	Restaurant, Catering Hall	275	225	10	6	17	16	11	11	23	22	**336**	**280**
B2	Sportsplex, Local Retail	45	63	2	3	11	14	8	11	40	42	**106**	**133**
B3	Residential, Specialty Retail	32	44	6	7	25	34	23	26	244	252	**330**	**363**
B4	Office	53	61	0	1	3	4	8	9	29	34	**93**	**109**
B5	Residential	8	6	0	0	6	5	2	1	6	4	**22**	**16**
C	Residential, Retail	60	54	9	8	47	41	34	31	318	314	**468**	**448**
Open Space		8	4	0	0	1	1	1	1	40	21	**50**	**27**
Total		**491**	**464**	**27**	**25**	**118**	**121**	**90**	**91**	**707**	**694**	**1433**	**1395**

Table 18-17C: Person Trip Generation by Mode Weekday PM Peak Hour Build Condition

Parcel No.	Land Uses	Auto		Taxi		Bus		SIR		Walk		Total	
		In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
A	Residential	42	15	1	0	23	8	7	2	8	2	**81**	**27**
B1	Restaurant, Catering Hall	242	71	9	2	10	4	6	4	14	6	**281**	**87**
B2	Sportsplex, Local Retail	61	85	2	4	13	18	10	12	35	39	**121**	**158**
B3	Residential, Specialty Retail	32	70	5	6	23	45	20	25	195	203	**275**	**349**
B4	Office	3	111	0	1	1	25	1	35	0	9	**5**	**181**
B5	Residential	34	11	0	0	19	6	5	2	7	2	**65**	**21**
C	Residential, Retail	127	61	7	7	77	41	38	28	261	248	**510**	**385**
Open Space		4	4	0	0	0	1	0	1	18	23	**22**	**29**
Total		**545**	**428**	**24**	**20**	**166**	**148**	**87**	**109**	**538**	**532**	**1360**	**1237**

Table 18-17D: Person Trip Generation by Mode Saturday Midday Peak Hour Build Condition

Parcel No.	Land Uses	Auto		Taxi		Bus		SIR		Walk		Total	
		In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
A	Residential	44	15	1	0	25	9	7	2	8	3	**85**	**29**
B1	Restaurant, Catering Hall	260	75	10	2	10	5	7	3	14	7	**301**	**92**
B2	Sportsplex, Local Retail	90	57	4	2	22	10	16	7	46	37	**178**	**113**
B3	Residential, Specialty Retail	72	42	7	6	46	29	28	24	234	227	**387**	**328**
B4	Office	1	24	0	0	0	6	0	8	0	2	**1**	**40**
B5	Residential	36	12	0	0	20	7	6	2	7	2	**69**	**23**
C	Residential, Retail	137	68	8	8	84	45	43	31	301	287	**573**	**439**
Open Space		10	5	0	0	2	1	2	1	53	29	**67**	**36**
Total		**650**	**298**	**30**	**18**	**209**	**112**	**109**	**78**	**663**	**594**	**1661**	**1100**

18.5.2 Transit

Rail Line Haul Capacity Analysis

The Proposed Action would generate 103 SIR passengers (55 Inbound and 48 Outbound) during the AM and 216 SIR passengers (91 Inbound and 125 Outbound) during the PM peak hours. Based on existing SIR ridership at the three stations in the study area, it was assumed that 46 percent of the inbound SIR passengers would originate from the north while the remaining 54 percent would originate from the south during the AM peak hour. For the outbound SIR passengers, it was assumed that eight percent would travel north while the remaining of 92 percent would travel south. During the PM peak hour, it is anticipated that that 21 percent of the inbound SIR passengers would originate from the north while the other 79 percent would originate from the south. For the outbound SIR passengers, it was assumed that 14 percent would travel north while the remaining of 86 percent would travel south.

The project-generated SIR passengers were added to the No Build Condition SIR volumes to develop the Build Condition passenger volumes. As presented in Table 18-18, the existing frequency of SIR service would be sufficient to accommodate the projected SIR ridership demand in the Build Condition during the peak hours.

Table 18-18: SIR Line Haul Capacity Analysis
Build Condition

Peak Hour	Direction	Station	Trains per Hour	Capacity per Train	Peak Hourly Capacity	Peak Hour Volume	V/C ratio
7:00-8:00 AM Peak Hour	To St. George (Northbound)	Grasmere	3	700	2,100	855	0.41
	To Tottenville (Southbound)	Old Town	2	700	1,400	327	0.23
5:00-6:00 PM Peak Hour	To St. George (Northbound)	Dongan Hills	1	700	700	309	0.44
	To Tottenville (Southbound)	Old Town	1	700	700	357	0.51

Source: NYCT Operations Planning, System Data & Research.

The *CEQR Technical Manual* defines a significant rail impact in one of two ways: 1) if the No Build v/c ratio is projected to be 1.0 or higher and the Proposed Action generates five or more transit riders per car, or 2) if the No Build v/c ratio is projected to be below 1.0 and the passengers projected for the Build Condition cause the v/c ratio to be 1.0 or higher. Based upon the analysis, the existing frequency of SIR service would be sufficient to accommodate the projected SIR ridership demand generated by the Proposed

Action in 2015 during all peak hours. As a result, no significant adverse SIR capacity impact would be anticipated as a result of the Proposed Action.

Rail Station Element Analysis

The Proposed Action would generate 103, 197, 216, and 227 SIR trips during the weekday AM, Midday, and PM peak hours and the Saturday Midday peak hour, respectively. The project-generated SIR person trips were assigned to the closest stations for each of the proposed development sites. Since most of the development parcels would be located in close proximity to the Stapleton Station, all SIR trips projected for the proposed development parcels were assigned to the Stapleton Station with the exception of Parcel A. SIR trips projected to be generated by Parcel A, which is located at the north end of the Project Area, were assigned to the Tompkinsville Station. No new project generated SIR trips were assigned to the Clifton Station. The project generated SIR person trips were added to the No Build Condition stairway volumes to develop the Build Condition station stairway volumes.

Detailed SIR station stairway analyses were conducted for the four stairways at the Tompkinsville, Stapleton, and Clifton Stations for the Build Condition. The four stairways are projected to operate at LOS A during the peak hours analyzed. The results of the station stairway analyses are provided in Table 18-19 and Appendix D-2.

Table 18-19: Level of Service for Stairways
Build Condition

Station	Description	Weekday Peak 15-Minute Period						Sat. Peak 15-Minute Period	
		AM		Midday		PM			
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
		V/ SVCD Ratio	LOS	V/ SVCD Ratio	LOS	V/ SVCD Ratio	LOS	V/ SVCD Ratio	LOS
Tompkinsville Station	South Stairway	0.03	A	0.02	A	0.02	A	0.02	A
Stapleton Station	North Stairway	0.13	A	0.17	A	0.22	A	0.21	A
Clifton Station	North Stairway (Northbound Platform)	0.06	A	0.01	A	0.04	A	0.01	A
Clifton Station	North Stairway (Southbound Platform)	0.06	A	0.05	A	0.05	A	0.03	A

Source: The Louis Berger Group, Inc. (2005).

Notes:
(1) V/SVCD Ratio = Volume/Service Volume between LOS C and D Ratio
(2) LOS = Level of Service

As described in the *CEQR Technical Manual*, stairway impacts are determined in terms of the width increment threshold (stairway widening) needed to restore the future LOS with the Proposed Action to the future No Build Condition. Impacts are identified for a location if it is projected to operate at LOS D, E, or F in the No Build Condition and requires a widening of six, three, or one inches, respectively, to return the future conditions with the Proposed Action to the No Build Condition. Since all of the stairways analyzed are projected to operate at LOS B or better during each peak period as a result of the Proposed Action, no significant adverse stairway impacts would occur at the three SIR stations.

Bus Analysis

The Proposed Action would generate 194, 256, 335, and 369 bus passengers during the weekday AM, Midday, and PM and Saturday Midday peak hours, respectively. These people were assigned to bus routes that serve the area within a ¼- mile walking distance from each of the proposed development parcels. Based on the existing bus ridership data on bus routes within these areas, it was assumed that 43 percent of the bus passengers would originate from the north while the remaining 57 percent would originate from the south during the weekday AM and PM peak hours. For the Weekday and Saturday Midday peak hours, it was assumed that 55 percent of the bus passengers would originate from the north while the remaining 45 percent would originate from the south.

The projected bus passengers were added to the No Build Condition bus volumes to develop bus passenger volumes for the Build Condition. As presented in Table 18-20A through Table 18-20D, the existing frequency of bus service would be sufficient to accommodate the projected demand in the Build Condition for all bus routes during the weekday AM and Midday peak hours. Available passenger capacity in the AM peak hour would range from five on the southbound S76/S86 to 155 on the southbound S52. Available passenger capacity in the Midday peak hour would range from 12 on the northbound S51/S81 to 152 on the northbound S78. During the weekday PM and Saturday Midday peak periods, the existing service on the S51/S81 and S76 routes would not be sufficient to accommodate the projected passengers generated by the Proposed Action. Capacity shortfall projected for the northbound S51/S81 would be 31 passengers during the weekday PM peak hour. Capacity shortfalls projected for the northbound and southbound S51/S81 and S76 would range from 23 to 80 passengers during the Saturday Midday peak hour.

A significant bus impact is defined in the *CEQR Technical Manual* when the projected bus load levels exceed the maximum capacity at the maximum load point. It is anticipated that the S51/S81 and S76 routes would have significant adverse impact during the weekday PM and Saturday Midday peak periods as a result of the Proposed Action.

Table 18-20A: AM Peak Hour Bus Capacity Build Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers[1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	7	455	385	55	70
	SB	4	260	207	52	53
S52	NB	4	260	116	29	144
	SB	4	260	105	26	155
S74/S84[3]	NB	7	455	332	47	123
	SB	4	260	169	42	91
S76/S86[3]	NB	6	390	313	52	77
	SB	5	325	320	64	5
S78	NB	6	390	236	39	154
	SB	6	390	315	52	75

Source: NYCT Ride-Check Surveys.

Notes:
(1) All data is for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the study area.

Table 18-20B: Midday Peak Hour Bus Capacity Build Condition

Bus Routes	Direc-tion	Buses per Hour[1]	Hourly Capacity[2]	Hourly Passengers[1]	Average Passengers per Bus	Hourly Available Capacity
S51/S81[3]	NB	3	195	183	61	12
	SB	4	260	245	61	15
S52	NB	3	195	77	26	118
	SB	3	195	57	19	138
S74/S84[3]	NB	3	195	93	31	102
	SB	4	260	124	31	136
S76/S86[3]	NB	4	260	154	38	106
	SB	4	260	191	48	69
S78	NB	4	260	108	27	152
	SB	4	260	111	28	149

Source: NYCT Ride-Check Surveys.

Notes:
(1) All data is for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available
(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.
(3) Data include both routes as they service the same corridor within the study area.

Table 18-20C: PM Peak Hour Bus Capacity Build Condition

Bus Routes	Direc-tion	Buses per Hour(1)	Hourly Capacity(2)	Hourly Passengers (1)	Average Passengers per Bus	Hourly Available Capacity
S51/S81(3)	NB	5	325	356	71	-31
	SB	6	390	348	58	42
S52	NB	4	260	75	19	185
	SB	3	195	93	31	102
S74/S84(3)	NB	4	260	145	36	115
	SB	5	325	199	40	126
S76/S86(3)	NB	4	260	198	49	62
	SB	7	455	309	44	146
S78	NB	4	260	153	38	107
	SB	5	325	178	36	147

Source: NYCT Ride-Check Surveys.

Notes:

(1) All data is for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available

(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.

(3) Data include both routes as they service the same corridor within the study area.

Table 18-20D: Saturday Midday Peak Hour Bus Capacity Build Condition

Bus Routes	Direc-tion	Buses per Hour(1)	Hourly Capacity(2)	Hourly Passengers (1)	Average Passengers per Bus	Hourly Available Capacity
S51/S81(3)	NB	2	130	210	105	-80
	SB	2	130	209	104	-79
S52	NB	2	130	36	18	94
	SB	2	130	38	19	92
S74/S84(3)	NB	4	260	131	33	129
	SB	4	260	124	31	136
S76/S86(3)	NB	2	130	165	83	-35
	SB	2	130	153	76	-23
S78	NB	4	260	95	24	165
	SB	4	260	124	31	136

Source: NYCT Ride-Check Surveys.

Notes:

(1) All data is for peak load points in 2003 and 2004, most recent NYCT Ride-Check Surveys data available

(2) Hourly capacity based on NYCT guideline of 65 passengers per bus.

(3) Data include both routes as they service the same corridor within the study area.

(4) Shaded area indicated additional service is recommended

18.5.3 Pedestrians

Street Mapping/Demapping and Realignment

To improve vehicular and pedestrian circulation throughout the Project Area, Front Street between Hannah and Bay Street would be realigned. In addition, several unmapped cross streets currently connecting Front Street to Bay Street would be officially mapped as part of the Proposed Action. The Proposed Action would also provided better pedestrian and bicycle linkages between the Stapleton community and shoreline to the north and south. This would coincide with development plans for a bicycle and walkway route/esplanade along the North Shore. Such linkages would reduce barriers to access and use of the area, and create a distinct sense of place. Between Wave Street and Thompson Street, the realignment of Front Street would have a sidewalk, one parking lane, one bike lane, and one traffic lane in each direction. A detailed description of street mapping/demapping and realignment is presented in Chapter 1, "Project Description."

Traffic signals and striped crosswalks would be provided along Front Street at the Wave Street, Prospect Street, and Canal Street intersections as part of the implementation of the Proposed Action. A preliminary signal warrant analysis indicated that signal warrants would be satisfied at these three unsignalized intersections. Since traffic signals would not be provided along Front Street at the Water Street and Thompson Street intersections, striped crosswalks would not be provided at these locations.

Project-Generated Pedestrian Volumes

The proposed development parcels are located along Front Street between Hannah Street and Vanderbilt Avenue (as shown in Figure 1-4 in Chapter 1, "Project Description"). Pedestrians would travel to the Project Area via Bay Street, Front Street, and local streets that connect Bay Street to the waterfront (i.e. Wave Street, Prospect Street, Water Street, Canal Street, and Thompson Street). Project generated pedestrians for each of the development parcels were assigned to the off site street network that includes nine intersections in the study area. The following are intersection pedestrian assignment assumptions for each mode of travel: auto, taxi, bus, SIR, and walk-only:

Auto: It was assumed that autos would all park within or adjacent to each of the development parcels. Since people walking between their car and their ultimate destination would not need to cross any local streets, these persons were not added to the off site street network.

Taxi: It was assumed that persons traveling by taxi would be dropped off or picked up on or adjacent to the development parcels. Therefore, taxi passengers were not added to the off site street network.

Bus: Bus passengers were assigned to the local street network along the most logical path between the nearest applicable bus stop for bus routes S51/S81, S52, S74/S84, S76/S86, and S78 and the development parcels. Detailed inbound and outbound bus passenger assignments to the off site street network for each of the development parcels are presented in Appendix D-6.

SIR: SIR passengers were assigned to the local street network along the most logical path between the closest SIR station and their ultimate on-site destination. Detailed inbound SIR passenger assignments for each of the development parcels

are presented in Appendix D-6 (outbound SIR passengers would walk along the same path to the station but in the opposite direction).

Walk: It was assumed that all pedestrian walk trips (no other mode of travel) would travel from areas to the north, west, and south of the Proposed Action (east is the New York Harbor). Since most of the existing area population resides west of the Project Area, it was assumed that the majority of the trips would be from/to west of Bay Street. Detailed inbound pedestrian assignments to the local street network for each of the development parcels are presented in Appendix D-6 (outbound pedestrians would walk along the same path to the point of origin but in the opposite direction).

It should be noted that no new pedestrians were assigned to cross Bay Street at the Thompson Street unsignalized intersection. Pedestrian trips would be more likely to cross Bay Street at the Broad Street (to the south) and Canal Street (to the north) signalized intersections to avoid the heavy conflicting traffic on Bay Street. Since crosswalks are not proposed on Front Street at either the Water Street or Thompson Street unsignalized intersection, no new pedestrians were assigned to cross Front Street at these two locations. Pedestrians that are anticipated to cross Front Street were assigned to use crosswalks provided at the three other Front Street intersections (Wave, Prospect, and Canal Streets) that are proposed to be signalized.

The projected local street network pedestrian volumes were added to the No Build Condition pedestrian volumes to generate Build Condition pedestrian volumes. The projected Build Condition pedestrian crosswalk volumes are provided in Appendix D-3.

Future Build Pedestrian Analysis

Pedestrian crosswalk analyses were conducted in the study area at the four signalized intersections (one existing and three proposed) and five unsignalized intersections using the 2015 Future Build traffic and pedestrian volumes. The results of the signalized intersection crosswalk analyses are summarized in Table 18-21 and detailed capacity analysis worksheets are provided in Appendix D-4. The results of the LOS analyses revealed that all of the crosswalks at the four signalized intersections would operate at an acceptable LOS (LOS B or better) during the weekday AM, Midday, PM and Saturday Midday 15-minute peak periods under the Proposed Action.

Table 18-21: Level of Service for Crosswalks at Signalized Intersections Build Condition

Intersections	Cross-walks	Weekday Peak 15-Minute Period						Sat. Peak 15-Minute Period	
		AM		Midday		PM			
		(1) SF/P	(2) LOS	(1) SF/P	(2) LOS	(1) SF/P	(2) LOS	(1) SF/P	(2) LOS
4. Canal Street and Bay Street	North	487	A	122	B	109	B	137	A
	East	320	A	162	A	160	A	155	A
	South	373	A	151	A	121	B	120	B
	West	725	A	90	B	149	A	120	B
6. Wave Street and Front Street	North	923	A	154	A	205	A	168	A
	South	331	A	85	B	96	B	85	B
	West	1172	A	147	A	195	A	167	A
7. Prospect Street and Front Street	North	633	A	133	A	137	A	141	A
	South	197	A	55	B	60	B	55	B
	West	345	A	56	B	67	B	62	B
9. Canal Street and Front Street	North	316	A	82	B	99	B	96	B
	South	268	A	122	B	134	A	141	A
	West	502	A	105	B	123	B	121	B

Source: The Louis Berger Group, Inc. (2005).
Notes:
(1) SF/P = Square foot per Pedestrian
(2) LOS = Level of Service

The results of the five unsignalized intersection crosswalk analyses are summarized in Table 18-22 and detailed capacity analysis worksheets are provided in Appendix D-4. For the four unsignalized intersections analyzed along Bay Street, all of the east and west crosswalks at these intersections are projected to operate at an acceptable LOS (LOS B or better) during the weekday AM, Midday, PM and Saturday Midday 15-minute peak periods. However, all of the north and south crosswalks at these Bay Street intersections would continue to operate at LOS F during all time periods with an overall increase in delays. The poor LOS and extensive delays projected for these north and south crosswalks are attributable to the difficulty pedestrians have to find gaps to cross Bay Street or Front Street due to heavy traffic volumes projected in both the northbound and southbound directions during the peak periods.

For the Front Street and Water Street unsignalized intersection, the crosswalks are projected to continue to operate at LOS A during all of the peak hours in the Build Condition.

Table 18-22: Level of Service for Crosswalks at Unsignalized Intersections Build Conditions

Intersections	Cross-walks	Weekday Peak 15-Minute Period						Sat. Peak 15-Minute Period	
		AM		Midday		PM			
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Wave Street and Bay Street	North	558.2	F	*	F	*	F	*	F
	East	1.9	A	4.7	A	3.8	A	3.3	A
	South	*	F	*	F	*	F	*	F
	West	0.0	A	0.0	A	0.0	A	0.0	A
2. Prospect Street and Bay Street	North	*	F	*	F	*	F	*	F
	East	0.9	A	1.8	A	2.8	A	2.3	A
	South	*	F	*	F	*	F	*	F
	West	0.9	A	0.8	A	0.7	A	1.3	A
3. Water Street and Bay Street	North	*	F	*	F	*	F	*	F
	East	0.8	A	1.8	A	1.5	A	1.3	A
	South	*	F	*	F	*	F	*	F
	West	3.4	A	6.2	B	5.6	B	4.3	A
5. Thompson Street and Bay Street	North	0.0	A	*	F	*	F	265.6	F
	East	0.7	A	0.7	A	1.4	A	1.1	A
	South	*	F	928.5	F	*	F	356.5	F
	West	0.0	A	0.0	A	0.0	A	0.0	A
8. Water Street and Front Street	North	0.0	A	0.0	A	0.0	A	0.0	A
	South	0.0	A	0.0	A	0.0	A	0.0	A
	West	0.0	A	1.2	A	0.9	A	1.1	A

Source: The Louis Berger Group, Inc. (2005).

Notes:
(1) Delay in Seconds for Unsignalized Intersections
(2) LOS = Level of Service
* represent delays that exceed 1000 seconds.
Shaded areas represent LOS E or F.

The criteria presented in the *CEQR Technical Manual* were used to determine significant pedestrian impacts in the study area in 2015. Analysis results from the Build Condition were compared with the No Build Condition. For signalized intersections, the threshold for determining crosswalk impacts is associated with a minimum average occupancy of 20 square feet per pedestrian (mid-LOS D). Crosswalks in the No Build Condition that are projected to have an average occupancy below 20 square feet per pedestrian may be impacted if the average occupancy falls by one square foot per pedestrian or more as a result of the Proposed Action. The maximum surge conditions were used in the analysis of crosswalks at the signalized intersections. Based upon the crosswalk impact criteria for signalized intersections, no significant adverse pedestrian crosswalk impacts have

been identified for the Bay Street and Canal Street signalized intersection as a result of the Proposed Action.

Currently, pedestrians volumes crossing Bay Street at Thompson Street are very low (range from 8 to 21 pedestrians) during the four peak hours analyzed. As mentioned earlier, no new pedestrians would be assigned to use to the north and south crosswalks as part of the Proposed Action. However, delays at these crossings are still projected to worsen because pedestrians would have more difficulty find crossing gaps to cross Bay Street due to an increase in the projected northbound and southbound traffic volumes on Bay Street. It should be noted that the crosswalk analysis performed for unsignalized intersections does not take into consideration the stoppage of traffic at adjacent signalized intersections. In the case of the Bay Street and Thompson Street intersection, signals located approximately 300 feet from the intersection would provide more gaps for pedestrian to cross Bay Street. Based on the field observations, pedestrians were able to find gaps to cross Bay Street at Thompson Street when the traffic signal at the two adjacent signalized intersections located at Canal Street and Broad Street turn red. Therefore, the projected increase in delays projected as part of the Proposed Action would not have a significant adverse pedestrian crosswalk impact at this intersection.

It is anticipated that the three unsignalized intersections (Wave Street, Prospect Street, and Water Street) evaluated along Bay Street would have significant adverse impacts during all peak periods analyzed. The crosswalks impacted at these intersections are presented in Table 18-22. During these periods, the north and south crosswalks at these intersections are projected to operate at LOS F due to the conflict of heavy northbound and southbound vehicular traffic with the eastbound and westbound pedestrians. The average delay per pedestrian for these crosswalks would increase substantially from the No Build Condition to the Build Condition during all peak periods.

Pedestrian Safety

The Proposed Action would significantly increase both traffic and pedestrian volumes along Bay and Front Streets at Wave, Prospect, Water, Canal and Thompson Streets. As part of the Proposed Project, Front Street between Hannah and Bay Street would be realigned to improve vehicular and pedestrian circulation throughout the study area. Front Street between Wave Street and Thompson Street is proposed to be realigned with a sidewalk, parking lane, bike lane, and one travel lane in each direction. Traffic signals and striped crosswalks are proposed at three intersections along Front Street (Wave Street, Prospect Street, and Canal Street) as part of the implementation of the Proposed Action. As a result of these intersection improvements, it is not anticipated that these intersections would become high accident locations as defined by CEQR as a result of the Proposed Action.

It is anticipated that generating measurable traffic and pedestrian volumes along Bay Street at the unsignalized intersections (Wave Street, Prospect Street, and Water Street) would result in increasingly unsafe conditions in the future Build condition.

18.6 Mitigation Measures

18.6.1 Transit

The S51/S81 and S76 routes would have significant adverse impacts as a result of the Proposed Action during the weekday PM and Saturday Midday peak periods. According to the *CEQR Technical Manual* and NYCT guidelines, additional bus service is recommended along routes when passenger volumes are projected to exceed the maximum capacity at the maximum load point. The NYCT general policy is to provide additional bus service where demand warrants increased service, taking into account financial and operational constraints. Capacity shortfalls identified on the S51/S81 route could be met by adding one northbound bus trip during the weekday PM peak hour and adding two northbound and two southbound bus trips during the Saturday Midday peak period. Capacity shortfalls identified on the S76 route could be met by adding one northbound and one southbound bus trip during the Saturday Midday peak period. No other significant adverse bus impacts would occur as a result of the Proposed Action.

18.6.2 Pedestrians

The north and south crosswalks at the three unsignalized intersections on Bay Street are projected to have significant adverse impacts as a result of the Proposed Action during all periods. These crosswalks could be mitigated by installing a traffic signal at each location. A preliminary signal warrant analysis indicated that signal warrants would be satisfied at these three impacted unsignalized intersections.

For these three intersections, the signal timing used in the pedestrian analysis coincided with the traffic analysis (Chapter 17, "Traffic and Parking," Section 17.5, Traffic Mitigation). The results of the crosswalk analysis at the affected locations with the mitigation measures in place are summarized in Table 18-23A through Table 18-23D. Detailed capacity analysis worksheets are provided in Appendix D-4. The results of the analyses indicate that with mitigation, all crosswalks at these five intersections would operate at LOS C or better during the weekday AM, Midday, and PM and the Saturday Midday peak period in 2015.

Table 18-23A: Level of Service for Crosswalks AM Peak 15-Minute Period 2015 Future Conditions

Intersection	Cross-walks	No Build Condition (Unsignalized)		Build Condition (Unsignalized)		Mitigation Condition (Signalized)		Mitigation Measure
		(1)	(2)	(1)	(2)	(3)	(2)	
		Delay	LOS	Delay	LOS	SP/F	LOS	
1. Wave Street and Bay Street	North	0.0	A	558.2	F	434.0	A	Install Traffic Signal
	East	1.3	A	1.9	A	235.0	A	
	South	177.9	F	*	F	188.0	A	
	West	0.0	A	0.0	A	144.0	A	
2. Prospect Street and Bay Street	North	163.3	F	*	F	185.0	A	Install Traffic Signal
	East	1.2	A	0.9	A	241.0	A	
	South	361.3	F	*	F	188.0	A	
	West	1.0	A	0.9	A	208.0	A	
3. Water Street and Bay Street	North	792.1	F	*	F	186.0	A	Install Traffic Signal
	East	0.0	A	0.8	A	281.0	A	
	South	179.1	F	*	F	262.0	A	
	West	3.2	A	3.4	A	473.0	A	

Source: The Louis Berger Group, Inc. (2005).

Notes:
(1) Delay in Seconds for Unsignalized Intersections
(2) LOS = Level of Service
(3) SF/P = Square foot per Pedestrian for Signalized Intersections
* represent delays that exceed 1000 seconds
Shaded areas represent LOS E or F.

Table 18-23B: Level of Service for Crosswalks Midday Peak 15-Minute Period 2015 Future Conditions

Intersection	Cross-walks	No Build Condition (Unsignalized)		Build Condition (Unsignalized)		Mitigation Condition (Signalized)		Mitigation Measure
		(1)	(2)	(1)	(2)	(3)	(2)	
		Delay	LOS	Delay	LOS	SP/F	LOS	
1. Wave Street and Bay Street	North	864.9	F	*	F	57.0	B	Install Traffic Signal
	East	4.0	A	4.7	A	104.0	B	
	South	504.2	F	*	F	47.0	B	
	West	0.0	A	0.0	A	44.0	B	
2. Prospect Street and Bay Street	North	*	F	*	F	77.0	B	Install Traffic Signal
	East	1.4	A	1.8	A	54.0	B	
	South	*	F	*	F	82.0	B	
	West	1.0	A	0.8	A	112.0	B	
3. Water Street and Bay Street	North	*	F	*	F	79.0	B	Install Traffic Signal
	East	1.0	A	1.8	A	166.0	A	
	South	*	F	*	F	63.0	B	
	West	6.1	B	6.2	B	202.0	A	

Source: The Louis Berger Group, Inc. (2005).

Notes:
(1) Delay in Seconds for Unsignalized Intersections
(2) LOS = Level of Service
(3) SF/P = Square foot per Pedestrian for Signalized Intersections
* represent delays that exceed 1000 seconds
Shaded areas represent LOS E or F.

Table 18-23C: Level of Service for Crosswalks PM Peak 15-Minute Period 2015 Future Conditions

Intersection	Cross-walks	No Build Condition (Unsignalized)		Build Condition (Unsignalized)		Mitigation Condition (Signalized)		Mitigation Measure
		(1)	(2)	(1)	(2)	(3)	(2)	
		Delay	LOS	Delay	LOS	SP/F	LOS	
1. Wave Street and Bay Street	North	460.1	F	*	F	68.0	B	Install Traffic Signal
	East	2.9	A	3.8	A	89.0	B	
	South	475.3	F	*	F	47.0	B	
	West	0.0	A	0.0	A	38.0	C	
2. Prospect Street and Bay Street	North	969.8	F	*	F	73.0	B	Install Traffic Signal
	East	1.7	A	2.8	A	59.0	B	
	South	*	F	*	F	67.0	B	
	West	0.8	A	0.7	A	113.0	B	
3. Water Street and Bay Street	North	*	F	*	F	101.0	B	Install Traffic Signal
	East	1.1	A	1.5	A	116.0	B	
	South	612.1	F	*	F	70.0	B	
	West	5.2	B	5.6	B	134.0	A	

Source: The Louis Berger Group, Inc. (2005).

Notes:
(1) Delay in Seconds for Unsignalized Intersections
(2) LOS = Level of Service
(3) SF/P = Square foot per Pedestrian for Signalized Intersections
* represent delays that exceed 1000 seconds
Shaded areas represent LOS E or F.

Table 18-23D: Level of Service for Crosswalks
Saturday Midday Peak 15-Minute Period
2015 Future Conditions

Intersection	Cross-walks	No Build Condition (Unsignalized)		Build Condition (Unsignalized)		Mitigation Condition (Signalized)		Mitigation Measure
		(1)	(2)	(1)	(2)	(3)	(2)	
		Delay	LOS	Delay	LOS	SP/F	LOS	
1. Wave Street and Bay Street	North	122.7	F	*	F	80.0	B	Install Traffic Signal
	East	2.3	A	3.3	A	84.0	B	
	South	139.7	F	*	F	56.0	B	
	West	0.0	A	0.0	A	42.0	B	
2. Prospect Street and Bay Street	North	525.5	F	*	F	80.0	B	Install Traffic Signal
	East	1.5	A	2.3	A	63.0	B	
	South	*	F	*	F	86.0	B	
	West	0.8	A	1.3	A	138.0	A	
3. Water Street and Bay Street	North	358.2	F	*	F	139.0	A	Install Traffic Signal
	East	0.8	A	1.3	A	165.0	A	
	South	140.7	F	*	F	80.0	B	
	West	4.0	A	4.3	A	162.0	A	

Source: The Louis Berger Group, Inc. (2005).

Notes:
(1) Delay in Seconds for Unsignalized Intersections
(2) LOS = Level of Service
(3) SF/P = Square foot per Pedestrian for Signalized Intersections
* represent delays that exceed 1000 seconds
Shaded areas represent LOS E or F.

Pedestrian Safety

As mentioned previously, traffic signals and striped crosswalks are proposed at three intersections along Front Street (Wave Street, Prospect Street, and Canal Street) as part of the implementation of the Proposed Action. In addition, pedestrian crosswalks and traffic signals are also proposed along Bay Street (Wave Street, Prospect Street, and Water Street) to mitigate the projected significant adverse pedestrian and traffic impacts as a result of the Proposed Action. The results of the analyses indicate that with the proposed improvements, all crosswalks at these six intersections are projected to operate at LOS C or better during all peak periods analyzed in the Build Condition. The proposed traffic signals and crosswalks along Bay and Front Streets within the study area would provide improved pedestrian and bicycle linkages between the Stapleton community and shoreline to the north and south. As a result of these intersection improvements, it is not anticipated that these intersections would become high accident locations as defined by CEQR as a result of the Proposed Action.

18.7 Conclusion

The analysis results indicate that the existing frequency of SIR services would be sufficient to accommodate the projected SIR ridership demand generated by the Proposed Action in 2015 during all peak hours. As a result, no significant adverse SIR capacity impact would be anticipated as a result of the Proposed Action

All of the stairways analyzed are projected to operate at LOS B or better during each peak period as a result of the Proposed Action, no significant adverse stairway impacts would occur at the three SIR stations.

It is anticipated that the S51/S81 and S76 routes would have significant adverse impact during the weekday PM and Saturday Midday peak periods as a result of the Proposed Action. The NYCT general policy is to provide additional bus service where demand warrants increased service, taking into account financial and operational constraints. Capacity shortfalls identified on the S51/S81 route could be met by adding one northbound bus trip during the weekday PM peak hour and adding two northbound and two southbound bus trips during the Saturday Midday peak period. Capacity shortfalls identified on the S76 route could be met by adding one northbound and one southbound bus trip during the Saturday Midday peak period. No other significant adverse bus impacts would occur as a result of the Proposed Action.

Traffic signals and striped crosswalks would be provided at three intersections along Front Street (at Wave Street, Prospect Street, and Canal Street) as part of the implementation of the Proposed Action. It is anticipated that the north and south crosswalks at the three unsignalized intersections evaluated along Bay Street (at Wave Street, Prospect Street, and Water Street) are projected to have significant adverse impacts as a result of the Proposed Action during all periods. These crosswalks could be mitigated by installing a traffic signal at each location. A preliminary signal warrant analysis indicated that signal warrants would be satisfied at three proposed signalized intersections along Front Street and the three impacted unsignalized intersections along Bay Street. The results of the analyses indicate that with mitigation, all crosswalks at these six intersections would operate at LOS C or better during the weekday AM, Midday, and PM and the Saturday Midday peak period in 2015. As a result, no other significant adverse pedestrian impacts would occur as a result of the Proposed Action.

The proposed traffic signals and crosswalks along Bay and Front Streets within the study area would provide improved pedestrian and bicycle linkages between the Stapleton community and shoreline to the north and south. As a result of these intersection improvements, it is not anticipated that these intersections would become high accident locations as defined by CEQR as a result of the Proposed Action.

In conclusion, no significant adverse transit and pedestrian impacts would occur as a result of the Proposed Action.