

4.8 Traffic and Transportation

Introduction

The following section examines the current and future transportation operations in the vicinity of the Patterson Crossing Retail Center. The current operations are based on the existing transportation network and are referred to herein as the Existing Conditions. Future transportation operations are examined for the No Build (without Patterson Crossing Retail Center) and Build (with the Patterson Crossing Retail Center) Conditions. Each of these future conditions is further divided to analyze transportation operations with and without transportation improvements that have been identified as warranted under the Existing and No Build Conditions.

Intersections internal to the site and the site access intersection are analyzed only under the Build Condition.

4.8.1 Existing Conditions

Regional Network

The subject site is located on New York State (NYS) Route 311 in the Towns of Kent and Patterson (see Chapter 2.0, Project Description). The generally east-west heading Interstate 84, runs in a north-south direction to the east of the site. The site is the corner parcel to the NYS Route 311/Interstate 84 interchange. NYS Route 311 connects to Interstate 84 880 feet from the site's primary access on NYS Route 311. Interstate 84 crosses the Hudson River by way of the Newburgh-Beacon Bridge at the Dutchess County/Orange County line and continues west into Pennsylvania. To the east, Interstate 84 leads to Interstate 684 and then continues into Connecticut. Interstate 684 ends at Interstate 84. Interstate 684 traffic may continue north on NYS Route 22.

Interstate 84 connects with major north-south highways including the Taconic State Parkway, US Route 9, Interstate 684, and Interstate 87. The Taconic State Parkway and Interstate 87 to the west and Interstate 684 to the east are freeway facilities. US Route 9 is a major arterial road located west of the project site. Interstate 84 is a major truck route serving warehouses and distribution center's in towns such as Fishkill, Newburgh, and Wallkill, and shopping centers in Danbury, Connecticut (Interstate 84/CT Route 7), along the US Route 9 corridor, and in the NY Towns of Southeast (NYS Route 312), and Carmel (US Route 6).

The other regional roadways in the proximity of the site are NYS Route 311, and NYS Route 52. NYS Route 311 is primarily a north-south route providing access between NYS Route 52, Interstate 84, and NYS Route 22 in eastern Putnam County. NYS Route 52 connects US Route 6 and NYS Route 311 before paralleling Interstate 84 toward the Hudson River.

Local Road Network

Figure 4.8-1 depicts the local road network in the vicinity of the subject site. The site has direct access to NYS Route 311. NYS Route 311 is a two lane arterial road which originates at NYS Route 52 west of the site in the Town of Kent and ends at US Route 22 northeast of the site in the Town of Patterson. Just east of the project site, Interstate 84 (Exit 18) has ramp connections to NYS Route 311.

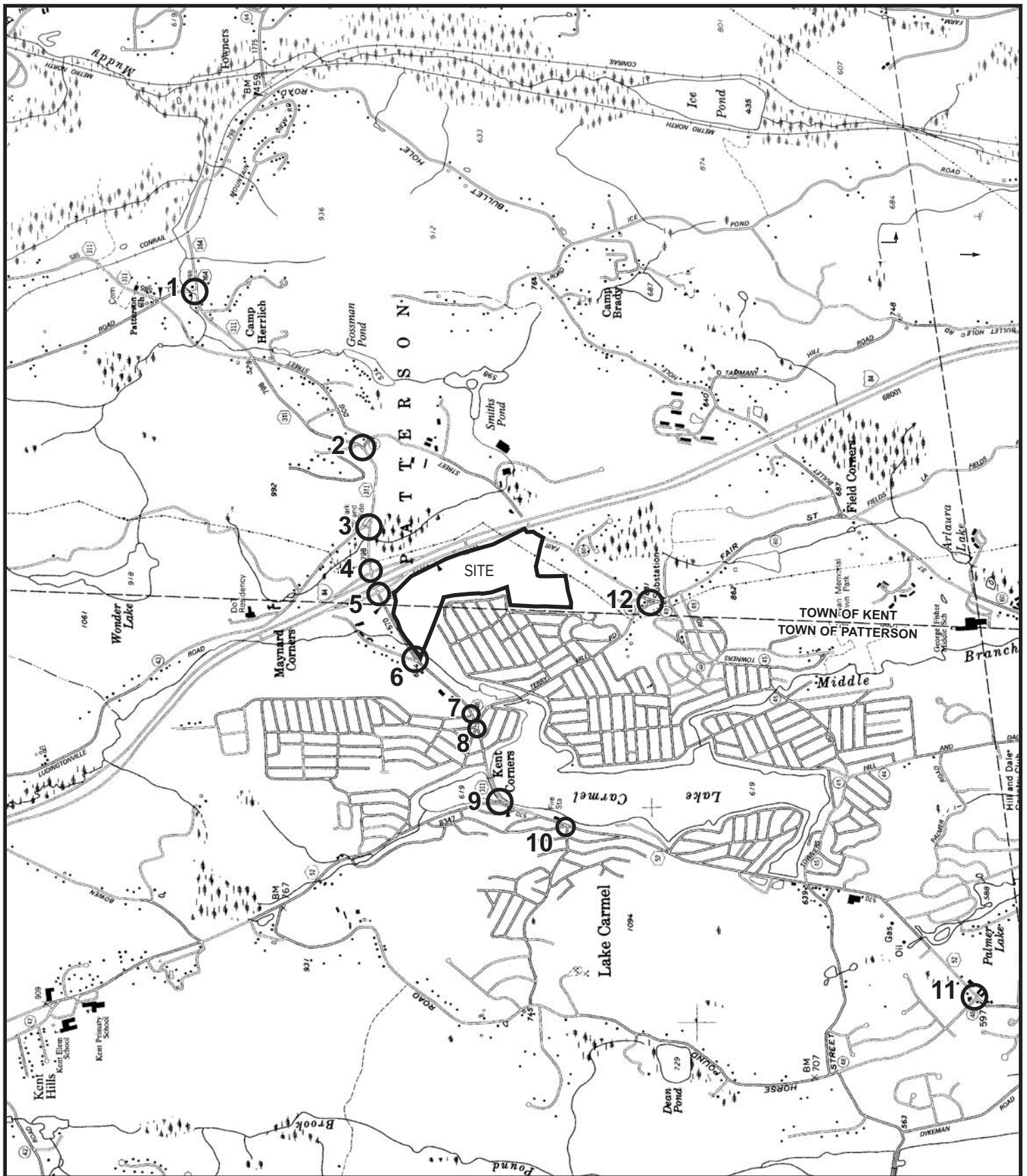
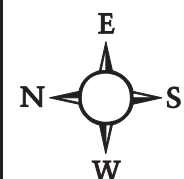


Figure 4.8-1: Local Road Network
Patterson Crossing Retail Center
Town of Patterson, Putnam County, New York
Base Map: USDOT Planimetric Map, Lake Carmel Quad
Scale: n/a



LEGEND

- Site Property Boundary
- Intersections Studied

The following intersections with NYS Route 311 were investigated in this traffic study. The numbers below correspond with the numbers used on Figure 4.8-1.

1. NYS Route 311 and NYS Route 164
2. NYS Route 311 and Fair Street (County Road 60)
3. NYS Route 311 and Ludingtonville Road (County Road 43)
4. NYS Route 311 and Westbound Ramp (Interstate 84 Exit 18)
5. NYS Route 311 and Eastbound Ramp (Interstate 84 Exit 18)
6. NYS Route 311 and Ludington Court
7. NYS Route 311 and Longfellow Drive
8. NYS Route 311 and Terry Hill Road (County Road 46)
9. NYS Route 311 and NYS Route 52

Other intersections studied included the following:

10. NYS Route 52 and Barrett Hill Road
11. NYS Route 52 and Horse Pound Road (County Road 48)
12. Fair Street (County Road 60) and Terry Hill Road (County Road 46)

Functional road classifications as described below are based on the Master Plan of the Town of Kent, except for NYS Route 164 which is in the Town of Patterson and is classified by the New York State Department of Transportation.

Although the intersection of NYS Route 311 and NYS Route 164 is shown on Figure 4.8-1 and subsequent volume figures as a single intersection, it is analyzed as three individual intersections because of its configuration with a triangular island. This is further described in the Existing Levels of Service subsection and can be seen in Appendix K, Figure K-1.

Barrett Hill Road

Barrett Hill Road is one of two collector roads connecting NYS Route 52 and the central part of Horse Pound Road. Barrett Hill Road is a two lane road providing access to local residents. Barrett Hill Road has steep grades and sharp horizontal curves. Clarkson Road intersects Barrett Hill Road where Barrett Hill Road intersects NYS Route 52. For the analyses conducted for this project, the Clarkson Road traffic is treated as part of the Barrett Hill Road approach to NYS Route 52 (see Appendix K, Figure K-2).

Fair Street (CR 60)

Fair Street (CR 60) is a two lane primary collector road. Fair Street intersects with NYS Route 311 at an unsignalized "T" intersection east of the site as shown in Appendix K, Figure K-3. Fair Street connects to Terry Hill Road and NYS Route 52 south of the site. Fair Street serves local residential, commercial, educational, and light industrial establishments in the Towns of Carmel, Patterson, and Southeast.

Horse Pound Road

Horse Pound Road is a two lane collector road intersecting NYS Route 52 at two locations in the Town of Kent. The southern intersection near the Carmel Town line, as shown in

Appendix K Figure K-4, is studied in this report. The lower portion of Horse Pound Road is County Road (CR) 48.

Longfellow Drive

Longfellow Drive is a local road intersecting NYS Route 311 approximately 200 feet east of Terry Hill Road as shown in Appendix K, Figure K-5. The intersection of Longfellow Drive with NYS Route 311 is a three way unsignalized intersection west of the site. Longfellow Drive serves the local residential area north of NYS Route 311 and east of North Terry Hill Road.

Ludington Court

Ludington Court is a local road. It intersects NYS Route 311 to the west of the proposed site access at a three way unsignalized intersection as shown in Appendix K, Figure K-6. Ludington Court, is a dead end serving local residences, a nursery, and Town Highway Facilities.

Ludingtonville Road (CR 43)

Ludingtonville Road (CR 43) is classified as an arterial road. It is a two lane road and intersects NYS Route 311 west of the site at a three way unsignalized intersection. Ludingtonville Road parallels Interstate 84 between Exit 17 and 18. Near Exit 17, Ludingtonville Road connects to NYS Route 52. Ludingtonville Road is yield controlled at NYS Route 311. The park-n-ride lot on the northeast corner holds approximately 50 vehicles with ingress from NYS Route 311 and egress to Ludingtonville Road. Refer to Appendix K, Figure K-7 for a depiction of this intersection and Park and Ride lot.

NYS Route 52

NYS Route 52 is classified as an arterial road. It is a two lane road running in a north-south direction to the east of the site. NYS Route 52 ends at US Route 6 in the Town of Carmel, approximately five miles south of the site. NYS Route 52 runs parallel to Interstate 84 and continues into Dutchess County to the north. NYS Route 52 intersects with NYS Route 311 at a three way signalized intersection as shown in Appendix K, Figure K-8, within a mile west of the project site. NYS Route 52 serves residential, commercial, and industrial establishments. The percentage of trucks in the traffic in one direction on weekday p.m. and Saturday peak hours ranges from one to five percent. For snow and ice control, Putnam County maintains NYS Route 52 between NYS Route 311 and US Route 6.

NYS Route 164

NYS Route 164 is a two lane minor arterial road classified according to New York Department of Transportation. NYS Route 164 intersects with NYS Route 311 at a three way unsignalized intersection with a central triangular island as depicted in Appendix K, Figure K-1. NYS Route 164 runs in an east-west direction, connecting NYS Route 311 and NYS Route 22 in the Town of Patterson. This road primarily serves residential, commercial and industrial traffic in the Town of Patterson. Putnam County provides snow and ice control on NYS Route 164 between NYS Route 311 and NYS Route 22. NYS Route 164 is unsuitable for heavy truck traffic because there are two bridges with low clearances over the roadway

Route 164. At each of the bridges, both directions of NYS Route 164 are forced to share the same low clearance lane.

NYS Route 311

NYS Route 311 is classified as an arterial two lane road and runs in an east-west direction immediately to the north of the site. It provides access to Interstate 84 at Exit 18. NYS Route 311 connects NYS Route 52 in the Town of Kent to NYS Route 22 in the Town of Patterson. The percentage of trucks in the traffic in one direction on weekday p.m. and Saturday peak hours ranges from zero to five percent.

Ramps of Interstate 84 at Exit 18

NYS Route 311 intersects with the eastbound and westbound ramps (Exit 18) of Interstate 84 east of the site. Both the intersections are four-way unsignalized intersections with only one way traffic allowed on the ramps leading to and from Interstate 84 as shown in Appendix K, Figure K-9. NYS Route 311 is three lanes wide where it intersects the ramps, providing an exclusive right turn lane leading to the Interstate. The eastbound right turn lane is approximately 200 feet long and the westbound turn lane approximately 125 feet long.

Terry Hill Road (County Road 46)

Terry Hill Road is classified as a collector road. Terry Hill Road is a two lane County road that intersects with Fair Street south of and NYS Route 311 west of the site. Terry Hill Road serves a residential neighborhood west of the site and provides access to other arterial roads in the area. The intersection of Terry Hill Road with NYS Route 311 is a four way unsignalized intersection, with northbound and southbound legs offset by less than 50 feet . Harvard Drive intersects North Terry Hill Road near NYS Route 311 as shown in Appendix K, Figure K-5. At this intersection, traffic from Harvard Drive is stopped at North Terry Road before NYS Route 311 and is therefore treated as part of the volume of North Terry Hill Road instead of a fifth intersection leg (see Appendix K, Figure K-5 aerial).

Speed Limit

The posted speed limit on NYS Route 311 varies from 30 mile per hour to 45 mile per hour in the study area. Near the site access, the speed limit of NYS Route 311 is 45 mile per hour which decreases to 30 mile per hour further west. The speed limit of other roads near NYS Route 311 are posted as follows:

- | | |
|-----------------------|--------|
| • US Route 52 | 40 mph |
| • Longfellow Road | 30 mph |
| • Ludington Court | 30 mph |
| • Fair Street | 40 mph |
| • Horse Pound Road | 35 mph |
| • Terry Hill Road | 30 mph |
| • Ludingtonville Road | 40 mph |

Collision Data

The collision data along NYS Route 311, NYS Route 52, and Fair Street were reviewed.

NYS Route 311

The frequency and severity of collisions at the NYS Route 311 studied intersections is given in Table 4.8-1. Intersections having ten or more reportable collisions in a three year period (minimum average of three collisions per year) were further analyzed for factors relating to the collisions. Table 4.8-2 further identifies the factors defining the collisions.

Table 4.8-1				
NYS Route 311 Collision Frequency and Severity Over Three Years				
**Intersections (Mile Marker)	Number of Collisions in a Three Year Period			
	Total	Injury	Property Damage Only	Not Reportable
NYS Route 311/ NYS Route 52 intersection (52 8405 1035)	7	3	2	2
NYS Route 311/ Terry Hill Road intersection (311 8401 1003)* ¹	14	9	4	1
NYS Route 311/ Ludington Court (311 8401 1107)	4	2	0	2
NYS Route 311/ Ramps of Interstate 84 (311 8401 1011)** ¹	17	5	7	5
NYS Route 311/ Ludingtonville Road (311 8401 1013)	2	0	1	1
NYS Route 311/ Fair Street (311 8401 1016)	3	0	2	1
NYS Route 311/ NYS Route 164 (311 8401 1000)	7	2	4	1
No fatalities at any of the above intersections.				
Covers period from June 1, 1999 to May 31, 2002.				
* Includes both Terry Hill Road and Longfellow Drive.				
**Includes two intersections (NYS Route 311 with on and off ramps of eastbound and westbound of Interstate 84).				
¹ See Table 4.8-2 for details.				
Source: New York State Department of Transportation August 17, 2004 and May 31, 2005.				

At the NYS Route 311/Terry Hill Road intersection, most of the collisions are left turn and rear end collisions. The most significant apparent factor for the rear end collisions is "Following too Close", and for the left turn collisions is "Failure to Yield Right-of-way".

Most of the collisions at the NYS Route 311 and ramps of Interstate 84 are right angle accidents. The most frequent factor contributing to collision at these intersections is "Failure to Yield Right-of-way".

New York State Route 52

Collision data were reviewed for NYS Route 52 from Horse Pound Road to NYS Route 311. Table 4.8-3 shows the frequency of collisions at key intersections and segments of NYS Route 52.

Table 4.8-2 Collision Summary for Locations with Ten or More Reportable Collisions Over Three Years		
Type	Frequency of Occurrence	
	NYS Route 311/ Terry Hill Road	NYS Route 311/ Ramps of Interstate 84
Reportable Collisions	13	12
Fixed Object Single Vehicle Accident ¹	0	1
Multi-Vehicle accident ¹	13	11
Pedestrian/bicyclist ¹	0	0
Wet Road ¹	5	1
Dry Road ¹	7	10
Rear end ¹	5	2
Left turn ¹	6	2
Right angle ¹	1	7
Parked ¹	0	0
Sideswipe ¹	0	0
Overtaking ¹	0	0
other ¹	1	1
Fell asleep/Alcohol ²	0	1
Driver inattention ²	0	0
Unsafe speed ²	1	0
Failure to yield ROW or disregard traffic control ²	3	8
Slippery pavement ²	2	0
View obstruction ²	0	0
Brakes Defective ²	0	0
Glare ²	0	0
Improper turn ²	0	0
Improper lane use ²	0	0
Following too close ²	4	0
Backing unsafe ²	0	0
Unsafe lane change ²	0	0
Other ²	3	3
Source: New York State Department of Transportation, August 17, 2004 and May 31, 2005.		
¹ Reportable Collisions from Table 4.8-1.		
² Reportable Collisions only with one or more apparent factors.		
³ Reportable and Non Reportable. Table Covers Period from June 1, 1999 to May 31, 2002.		

For all segments and intersections with ten or more reportable collisions, additional background information is provided in Table 4.8-4. The frequency of collisions relate to a combination of factors. The most common factors were "Following too Close" with 15 occurrences and "Failure to Yield Right-of-way or Disregard Traffic Control" with four occurrences. The most frequent type of collisions are rear end collisions with 15 occurrences

which can be attributed to "Following too Closely". The "Failure to Yield Right-of-way or Disregard to Traffic Controls", contributes to left turn collisions and right angle collisions. Rear end collisions tend to be common at signalized intersections as is indicated at NYS Route 52/ NYS Route 311 in Table 4.8-4.

Table 4.8-3
NYS Route 52 Collision Frequency and Severity Over Three Years

**Location (Mile Marker)	Number of Collisions in a Three Year Period	Injury	Property Damage Only	Not Reportable
NYS Rt 311/ NYS Rt 52 Intersection (52 8405 1035)	7	3	2	2
NYS Route 52 (52 8405 1035 to 1038)*	18	11	5	2
NYS Route 52 (52 8405 1039 to 1041)	2	2	0	0
NYS Route 52 (52 8405 1042 to 1044)	11	6	3	2
NYS Route 52 (52 8405 1045 to 1047)	6	5	0	1
NYS Rt 52/ Towners Road* intersection (52 8405 1045, 48)	13	9	3	1
NYS Route 52 (52 8405 1048 to 1050)*	12	7	4	1
NYS Route 52 (52 8405 1051 to 1053)	5	4	0	1
NYS Route 52/ Horse Pound Rd. intersection (52 8405 1056)****	0	0	0	0
NYS Route 52 (52 8405 1054 to 1057)***	8	5	1	2

No fatalities at any of the above intersections.

Covers period from June 1, 1999 to May 31, 2002.

* See Table 4.8-4 for sections or intersection with ten or more reportable collisions.

** Major intersections shown are not included in sections. Sections are three tenths of a mile except as noted.

*** Four tenths of a mile section.

**** Derived based on traffic control.

Source: New York State Department of Transportation dated June 3, 2004 and May 31, 2005.

Table 4.8-4			
NYS Route 52 Collision Summary for Locations with Ten or More Reportable Collisions Over Three Years			
Reportable Collisions	¹ Frequency of Occurrence between NYS Route 52 mile markers/intersections		
	1035 to 1038 0.3 miles	1048 to 1050 0.3 miles	NYS Rt 52 & Towners Intersection
Intersections ³ in segment	NYS Rt 311	Towners Road	
Total Reportable	16	11	12
Fixed Object Single Vehicle Accident	0	1	0
Multi-Vehicle accident	14	10	12
Pedestrian/bicyclist	0	0	0
Wet Road	2	2	0
Dry Road	11	8	10
Rear end	9	3	3
Left turn	0	1	4
Right angle	1	0	2
Parked	0	0	0
Sideswipe	0	0	0
Overtaking	0	2	0
other	2	1	0
Apparent Factors²			
Fell asleep or Alcohol	0	0	0
Driver inattention	0	0	0
Unsafe speed	1	0	0
Failure to yield ROW or disregard traffic control	2	0	2
Slippery pavement	1	0	0
View obstruction	0	0	0
Brakes Defective	0	0	0
Glare	0	0	0
Improper turn	0	0	0
Improper lane use	0	1	1
Following too close	7	4	4
Backing unsafe	0	0	0
Unsafe lane change	0	1	1
Other	0	2	2
Source: New York State Department of Transportation, June 3, 2004 and May 31, 2005. Table covers period from June 1, 1999 to May 31, 2002.			
¹ Reportable Collisions.			
² Reportable Collisions only with one or more apparent factors.			
³ Segment collisions excludes intersections with other roads.			

Fair Street (County Road 60)

Collision data was reviewed for Fair Street between NYS Route 311 and the Carmel town line. Table 4.8-5 shows the frequency of collisions at key intersections and segments of Fair Street. There are no segments with more than ten reportable collisions.

Table 4.8-5 Fair Street Collision Frequency and Severity Over Three Years				
Location (Node)	Number of Collisions in a Three Year Period	Injury	Property Damage Only	Not Reportable
Town of Carmel to Bullet Road	10	3	2	5
Bullet Road	4	1	3	0
Bullet Road to Tower Road	7	2	2	3
Tower Road	1	1	0	0
Tower Road to Noonan Drive	4	1	1	2
Noonan Drive	3	2	0	1
Noonan Drive to Terry Hill Road	2	2	0	0
Terry Hill Road	2	2	0	0
Terry Hill Road to NY Route 311	5	0	3	2
No fatalities at any of the above intersections. Covers period from June 1, 1999 to May 31, 2002. Source: New York State Department of Transportation, May 31, 2005. Source: New York State Department of Transportation dated May 21, 2004 and May 31, 2005.				

Fair Street at the five locations with the most collisions had most frequently right angle collisions (right or left turn) with "Failure to Yield Right-of-way or Disregarding Traffic Control". Less than a quarter of the collisions were with fixed objects. Slippery pavement was noted in almost all cases of wet road collisions.

NYS Route 311 Causeway

A portion of NYS Route 311 is two lanes along the causeway over Lake Carmel. The causeway is approximately 780 feet long with a pavement width of 27 feet. Guard rails are provided on each side of the crossway for the safety of the drivers. West of the causeway, NYS Route 311 intersects with NYS Route 52 at a traffic signal. All types of traffic are allowed on the causeway, including trucks.

Public Transportation

The public transportation systems in Putnam County include public and private bus systems, and railroads. Public transportation serving the area of the proposed site consists of bus service, operated by the Putnam County Bus System .

Bus Service

Putnam County provides limited bus service to the general vicinity of the project site through the Putnam County Area Rapid Transit (PART) System. The Putnam Plaza on US Route 6 is a hub for various bus routes. The PART Route 3 serves the neighborhood adjacent to the site via Fair Street and NYS Route 311 east of the site. The PART Route 5 serves the neighborhoods along NYS Route 52, NYS Route 311, Terry Hill Road and Fair Street. See Appendix J for route information. Putnam County is classified as a rural county and has an underutilized, subsidized transit system utilizing small buses.

Rail Service

Passenger rail service to points south and to New York City is available on the Metro North line. The closest passenger facilities to the site are on Front Street in the Town of Patterson and on Route 312 at Exit 19 of Interstate 84 in the Town of Southeast. The railroad facility extends north to Wassiac and south to Grand Central Station in New York City. Trains travel approximately once every 45 minutes or approximately once every two hours depending on the location. The Metro North railroad periodically adjusts the train sizes and frequency of trains to meet passenger demand.

Amtrak provides long distance transportation service with the nearest stops at Rhinecliff and Poughkeepsie. These include the Adirondack, Empire State, Ethan Allen Express and Maple Leaf trains. Amtrak connects passengers with national rail service through New York City, Albany and points north and west.

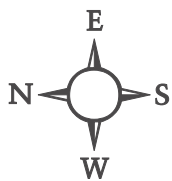
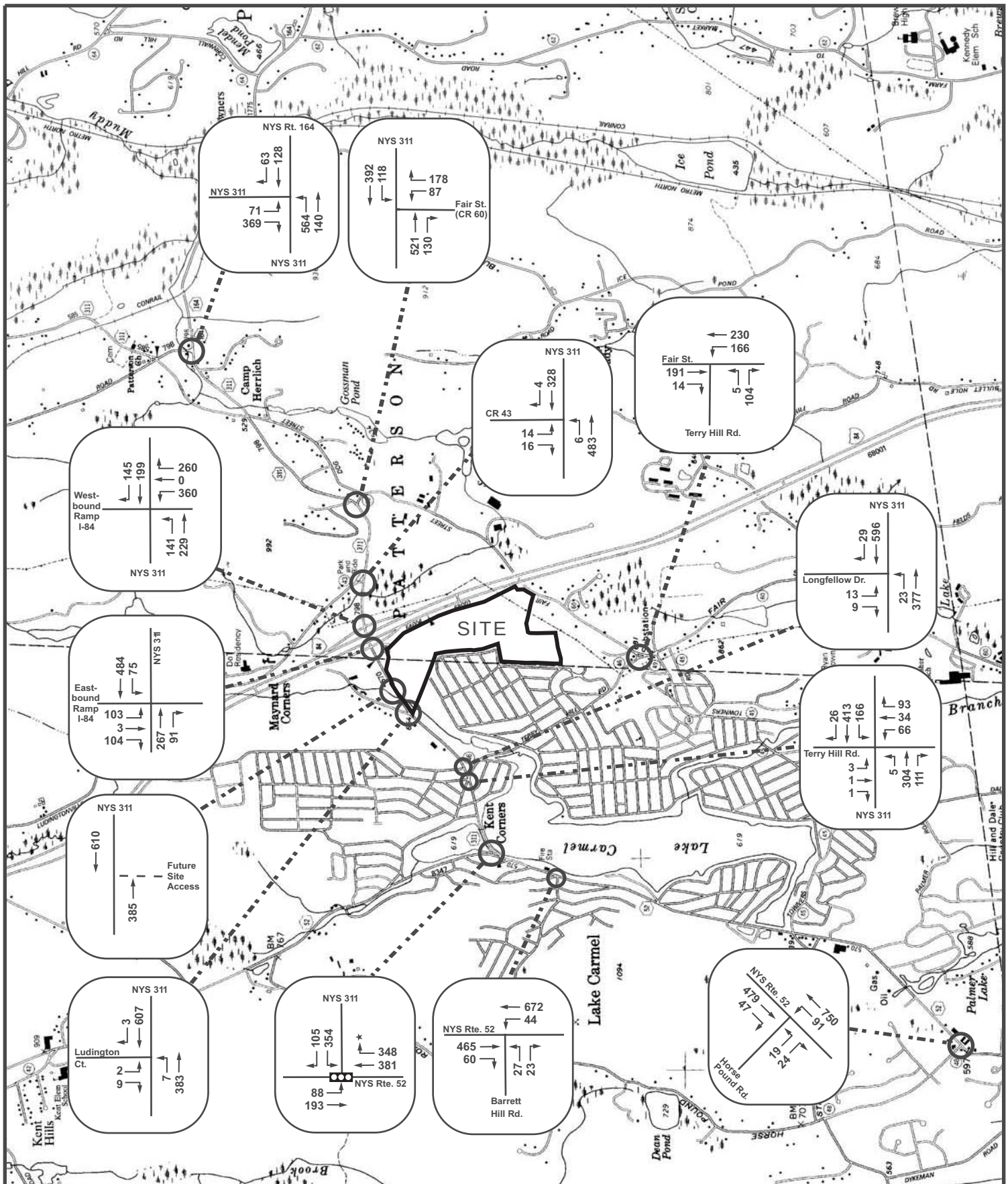
Existing Traffic

The traffic study reviews 2004/2005 Existing Conditions, based on recent traffic counts. The existing data forms the basis of the year 2010 No Build Condition (the scenario without the proposed action) and 2010 Build Condition (with the proposed action).

Figures 4.8-2, and 4.8-3 provide existing p.m. weekday and Saturday peak hour traffic at the studied intersections. All of the intersection figures depicting traffic volumes (i.e., Figures 4.8-2 through 4.8-11) simplify the intersection layouts. Actual intersection layouts are provided in Appendix K Figures K-1 to K-9. Improvement Schematics depicting potential improvements at each studied intersection in the vicinity of the project are included in Appendix K as Figures K-10 through K-16. Improvements are not identified at the intersections of NYS Route 311/Ludingtonville Road and NYS Route 311/Ludington Court, hence no improvement schematics are provided for these intersections.

Intersections are analyzed at the hour with the greatest traffic volume or "peak hour". The counts for p.m. peak hour traffic were collected on Thursday, April 15, 2004, and Thursday, July 29, 2004, from 4:00 p.m. to 7:00 p.m. Saturday peak hour counts were taken on April 3, 2004 and July 31, 2004 from 11:00 a.m. to 3:00 p.m.

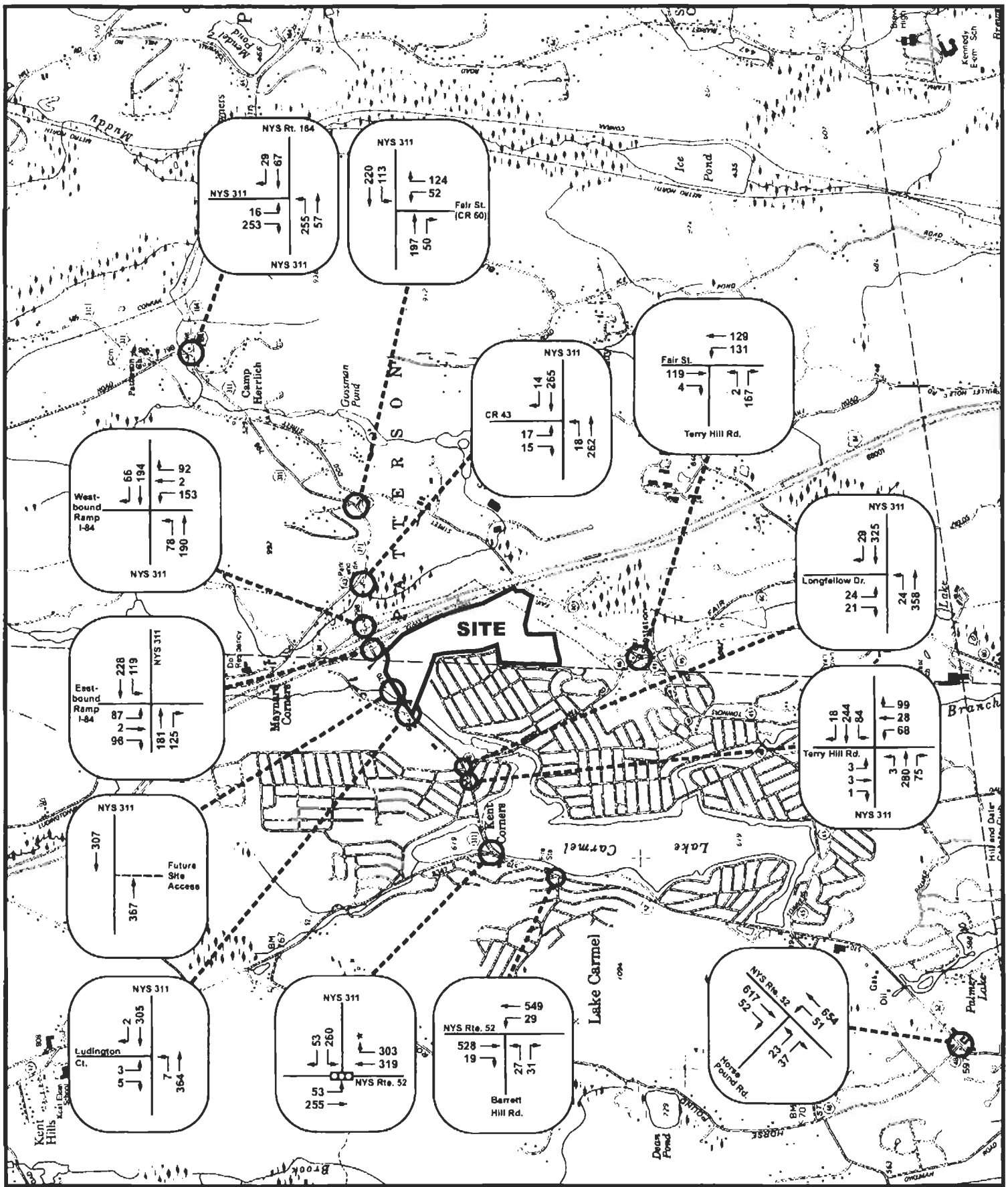
The p.m. and Saturday counts of NYS Route 311 with intersections of NYS Route 52, Terry Hill Road, Ludington Court, Ludingtonville Road and ramps of Interstate 84 were taken on Thursday, April 15, 2004, and Saturday, April 3, 2004.



- LEGEND**
- Site Property Boundary
 - Intersections Studied
 - Traffic Signal
 - Movement Controlled by Stop or Yield Sign

Figure 4.8-2: Existing PM Peak Hour Traffic
Patterson Crossing
 Town of Patterson, Putnam County, New York
 Base Map: USDOT Planimetric Map, Lake Carmel Quad
 Scale: n/a

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LEGEND

- Site Property Boundary
- Intersections Studied
- ▭ Traffic Signal
- ★ Movement Controlled by Stop or Yield Sign

Figure 4.8-3: Existing Saturday Peak Hour Traffic

Patterson Crossing

Town of Patterson, Putnam County, New York

Base Map: USDOT Planimetric Map, Lake Carmel Quad

Scale: n/a

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The traffic counts of NYS Route 311 intersections with Longfellow Drive, Fair Street, and NYS Route 164 were taken on Thursday, July 29, 2004, and Saturday, April 3, 2004.

The Horse Pound Road and Barrett Hill Road intersections with NYS Route 52, and the Terry Hill Road/Fair Street intersection were counted on Wednesday, March 30, 2005 and Saturday, April 2, 2005.

The weekday p.m. traffic peaks between 4:45 p.m. and 6:00 p.m., while on Saturday the traffic peaks from 12:00 noon to 3:00 p.m. depending upon the location. The peak hours for p.m. and Saturday traffic for the different intersections are shown in Table 4.8-6.

Table 4.8-6 Occurrence of Peak Traffic		
Intersections	P.M. Weekday Peak Hour	Saturday Peak Hour
NYS Route 311/ NYS Route 52	4:45 p.m. to 5:45 p.m.	12:15 p.m. to 1:15 p.m.
NYS Route 311/ Terry Hill Road	4:45 p.m. to 5:45 p.m.	12:15 p.m. to 1:15 p.m.
NYS Route 311/ Longfellow Drive	4:45 p.m. to 5:45 p.m.	12:30 p.m. to 1:30 p.m.
NYS Route 311/ Ludington Court	5:00 p.m. to 6:00 p.m.	12:15 p.m. to 1:15 p.m.
NYS Route 311/ Eastbound Ramp of I-84	4:45 p.m. to 5:45 p.m.	2:00 p.m. to 3:00 p.m.
NYS Route 311/ Westbound Ramp of I-84	5:00 p.m. to 6:00 p.m.	2:00 p.m. to 3:00 p.m.
NYS Route 311/ Ludingtonville Drive	5:00 p.m. to 6:00 p.m.	1:45 p.m. to 2:45 p.m.
NYS Route 311/ Fair Street	4:30 p.m. to 5:30 p.m.	12:30 p.m. to 1:30 p.m.
NYS Route 311/ NYS Route 164	4:30 p.m. to 5:30 p.m.	12:00 p.m. to 1:00 p.m.
NYS Route 52/Barrett Hill Road	4:45 p.m. to 5:45 p.m.	12:00 p.m. to 1:00 p.m.
NYS Route 52/Horse Pound Road	5:00 p.m. to 6:00 p.m.	12:15 p.m. to 1:15 p.m.
Fair Street/ Terry Hill Road	5:00 p.m. to 6:00 p.m.	12:00 p.m. to 1:00 p.m.

The occurrence of the p.m. traffic peak is mainly due to commuter traffic leaving the work place, while the Saturday trips are attributed to shopping or recreational trips.

Measures of Effectiveness

Level of Service Criteria

The Highway Capacity Manual and the Highway Capacity Software procedures document the methodology used for modeling levels of service, average vehicle delay, and volume to capacity ratios at both signalized and unsignalized intersections. Level of service is a measure of the operational quality of an intersection; level of service A is the highest, most efficient level, and level of service F is the lowest level. The operational quality of an intersection is based on the average amount of time a vehicle is delayed. Levels of service are examined by lane group, the set of lanes allowing common movement(s) on an approach. Approaches to intersections are assigned primary directions for clarity as depicted on the volume figures (4.8-2 to 4.8-11), with the exception of the intersection at NYS Route

311 and NYS Route 164. This intersection was broken into three separate intersections for the analysis.

The definitions of delays consider all delays including startup, deceleration, and acceleration delays. The New York State Department of Transportation prefers use of the Highway Capacity Manual methodologies over other traffic capacity methodologies.

Table 4.8-7 presents the levels of service criteria for unsignalized intersections.

Table 4.8-7 Unsignalized Intersections Level of Service Criteria	
Level of Service	Average Control Delay (Seconds Per Vehicle)
A	less than or equal to 10
B	greater than 10 and less than or equal to 15
C	greater than 15 and less than or equal to 25
D	greater than 25 and less than or equal to 35
E	greater than 35 and less than or equal to 50
F	greater than 50
SOURCE: <u>Highway Capacity Manual</u> , National Academy of Sciences, Transportation Research Board, National Research Council, Washington, DC, 2000.	

Table 4.8-8 presents the levels of service criteria for signalized intersections. The New York State Department of Transportation (NYS DOT) generally seeks a minimum level of service D (delay of 55 seconds or less for a signalized intersection) for all lane groups. The NYS DOT Highway Design Manual (page 5-92). The NYS DOT Highway Design Manual (page 5-92) notes, "In some cases, it may be necessary to accept level of service E or F on individual lane groups due to unreasonable costs or impacts associated with improving the level of service."

**Table 4.8-8
Signalized Intersections
Level of Service Criteria**

Level of Service	Average Control Delay (Seconds Per Vehicle)
A	less than or equal to 10
B	greater than 10 and less than or equal to 20
C	greater than 20 and less than or equal to 35
D	greater than 35 and less than or equal to 55
E	greater than 55 and less than or equal to 80
F	greater than 80
SOURCE: <u>Highway Capacity Manual</u> , National Academy of Sciences, Transportation Research Board, National Research Council, Washington, DC, 2000.	

The Highway Capacity Software model results apply to peak hour periods only and do not represent every minute of traffic operations. During off peak periods, which is the majority of the time, drivers typically will find operations adequate and much better than the modeled peak hour results. During peak periods the experience of individual drivers can vary, because the model calculates average delay.

Peak 15 minute traffic flows typically do not all occur in the same 15 minute period in the peak hour. The traffic model does not always account for the ability of the traffic signal to compensate for shifting traffic volumes and thus may overestimate delay. For unsignalized intersections, the model conservatively assumes peak approach volumes occur simultaneously.

Volume to Capacity Ratio

For signalized intersections, the volume to capacity ratio is an indication of the unused capacity or the ability of the intersection to process more traffic. It is possible to have a movement with a level of service A, B, C or D and be at capacity for the movement. It is also possible to have a movement with a level of service E or F with additional capacity available on the movement. The ability of an entire intersection to handle more traffic is a complex issue as traffic can be added to under capacity movements without impacting over capacity movements.

Queue Storage and Queue Length

Queue storage length is measured in "vehicles" for easy comparison. In general a standard vehicle's storage length is 25 feet which is equal to a passenger car of 19 feet plus six feet of empty storage space per vehicle. The 95th percentile projected queue lengths are also provided in "vehicles". The importance of queue storage varies widely. Inadequate right turn storage can reduce right turns on red. Inadequate turn storage can interfere with through traffic movements. Queue storage is most important where traffic can spill back into an adjacent intersection reducing capacity of the second intersection or into a weaving section at the interstate. Queues for extended lengths can block driveways. Queue storage is shown for approaches where spill back to another intersection or weaving section is a concern. The

queues are summarized using the 95th percentile although other percentile information is available in Appendix K. The highway capacity software does not account for the potential of reduced capacity and longer queues associated with queues exceeding lane lengths.

Existing Levels of Service

The result of the existing level of service analyses for the study intersections are summarized in Tables 4.8-9 and 4.8-10. The capacity analysis calculations are provided in Appendix K.

Signalized intersections operate at level of service C or better during peak hours at the study locations. Some of the minor street approaches at unsignalized intersections operate at level of service F during the p.m. peak hour which is typical for side streets on busier state roads.

The following summarizes the intersections with the lowest level of service. The northbound movement of Terry Hill Road at NYS Route 311 operated at level of service F in the p.m. peak hour. The level of service F is also exhibited by the northbound movement of Interstate 84 westbound ramps and Fair Street at NYS Route 311. The NYS Route 311 intersections with Terry Hill Road and Interstate 84 ramps are also locations with the highest frequency of collisions as previously shown in Tables 4.8-1 and 4.8-2.

Retail weekday peak traffic generally coincides with p.m. peak hour commuter traffic as commuters stop at retail establishments they normally pass by. Other commuters return home and then travel to retail stores. During the day many workers can not shop and hence the late afternoon tends to combine commuter and retail traffic. Saturdays traffic lacks the heavier weekday commuter pattern with shopping and recreational activities becoming more predominate and spread out. These retail trips tend to increase around midday as retail stores open at different hours in the morning and additional lunch trips are added. The largest regional shopping center in the area is the Danbury Shopping Mall (Interstate 84/CT Route 7) which is approximately 14 miles to the east of the site. Other major areas of retail activity include US Route 9 corridor (Interstate 84, Exit 13), Highland Shopping Center (Town of Southeast, Interstate 84, Exit 19 and NYS Route 312), Putnam Plaza (Town of Carmel, US Route 6), and Jefferson Valley Mall (Town of Yorktown, US Route 6).

The NYS Route 311/NYS Route 164 intersection is analyzed as three sub-intersections because of its geometry. NYS Route 311 is the major movement and an island separates NYS Route 164 left turn and right turn movements. The traffic island is sufficiently large as to reduce the influence of turning movements allowing analysis and treatment of the intersections as multiple intersections with limited conflicts.

The analysis of left turns onto NYS Route 52 northbound at Barrett Hill and at Horse Pound Roads during the Saturday peak hour and at Fair Street northbound at Terry Hill Road in the p.m. peak hour were based on an assumed five percent of the traffic being truck traffic. While no trucks were counted making these movements during the traffic data collection, this approach allowed for review of potential truck use of these intersections.

Table 4.8-9 Existing Level of Service Summary in the Town of Kent									
Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
NYS Route 311 and NYS Route 52									
NYS Route 311	WB - L	0.73	13.8	27.8	C	0.54	9.7	21.9	C
	WB - R (1)	0.26	3.9	17.7	B	0.13	2.0	16.2	B
NYS Route 52	NB - T	0.37	9.5	10.2	B	0.34	8.6	9.8	A
	SB - L, T	0.45	8.6	11.7	B	0.40	8.6	10.8	B
	Overall			16.8	B			13.8	B
NYS Route 311 and Terry Hill Road									
NYS Route 311	EB - L, T, R	0.00	0.01	8.2	A	0.00	0.01	7.8	A
	WB - L, T, R	0.15	0.53	8.8	A	0.08	0.27	8.4	A
Terry Hill Road	NB - L, T, R	0.87	7.31	69.8	F	0.60	3.78	24.0	C
	SB - L, T, R	0.08	0.26	30.9	D	0.05	0.16	22.7	C
NYS Route 311 and Longfellow Drive									
NYS Route 311	EB - L, T	0.03	0.08	8.9	A	0.02	0.07	8.1	A
Longfellow Drive	SB - L, R	0.12	0.40	18.8	C	0.14	0.49	14.2	B
NYS Route 311 and Ludington Court									
NYS Route 311	EB - L, T	0.01	0.02	8.7	A	0.01	0.02	8.0	A
Ludington Court	SB - L, R	0.04	0.14	13.8	B	0.02	0.06	12.0	B
NYS Route 52 and Barrett Hill Road									
NYS Route 52	NB - L, T	0.05	0.14	8.6	A	0.03	0.10	9.0	A
Barrett Hill Road	EB - L, R	0.24	0.90	24.0	C	0.28	1.11	24.6	C
NYS Route 52 and Horse Pound Road									
NYS Route 52	NB - L (3)	0.10	0.34	9.2	A	0.07	0.23	9.5	A
Horse Pound Road	EB - L, R	0.25	0.94	30.1	D	0.37	1.59	32.6	D
LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria).									
V/C is Volume to Capacity Ratio.									
95th % Queue (Veh.) is the 95th percentile queue length in vehicles.									
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.									
L = left, R = right, T = through,									
T, R = through and right, {e.g. WB-L (1) = Westbound left with storage for one vehicle}.									
Unsignalized intersections are shown in <i>Italics</i> .									

Table 4.8-10 Existing Level of Service Summary in Town of Patterson									
Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
<i>NYS Route 311 and I-84 Eastbound ramp</i>									
NYS Route 311	WB - L, T	0.07	0.22	8.4	A	0.11	0.39	8.3	A
I-84 EB ramp	SB - L, T (45)	0.50	2.55	33.9	D	0.35	1.49	22.8	C
	SB - R (45***)	0.21	0.78	13.0	B	0.15	0.53	10.6	B
<i>NYS Route 311 and I-84 Westbound ramp</i>									
NYS Route 311	EB - L, T	0.13	0.46	8.6	A	0.07	0.24	8.2	A
I-84 WB ramp	NB - L, T (32)	1.38	20.21	227.1	F	0.46	2.37	22.1	C
	NB - R (32***)	0.35	1.57	12.0	B	0.13	0.44	10.0	B
<i>NYS Route 311 and Ludingtonville Road</i>									
NYS Route 311	EB - L, T	0.01	0.02	8.1	A	0.02	0.05	7.9	A
Ludingtonville Road	NB - L, R	0.05	0.17	14.3	B	0.06	0.19	12.3	B
<i>NYS Route 311 and Fair Street</i>									
NYS Route 311	WB - L, T	0.14	0.48	9.5	A	0.10	0.33	8.2	A
Fair Street	NB - L, R	1.07	12.05	112.5	F	0.37	1.70	15.3	C
<i>NYS Route 311 and NYS Route 164 west</i>									
NYS Route 164	NB - L, R	0.58	3.29	40.8	E	0.17	0.61	15.0	B
<i>NYS Route 311 and NYS Route 164 east</i>									
NYS Route 311	SB - L, R	0.11	0.37	11.2	B	0.02	0.06	9.4	A
<i>NYS Route 311 and NYS Route 164 north</i>									
NYS Route 311	EB - L, T	0.07	0.24	8.9	A	0.01	0.04	7.9	A
NYS Route 164	NB - L, R	0.15	0.53	13.4	B	0.04	0.14	10.3	B
<i>Fair Street and Terry Hill Road</i>									
Fair Street	NB - L, T	0.14	0.49	8.2	A	0.10	0.32	7.7	A
Terry Hill Road	EB - L, R	0.21	0.77	11.1	B	0.21	0.80	10.1	B
LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria).									
V/C is Volume to Capacity Ratio									
95th % Queue (Veh.) is the 95th percentile queue length in vehicles.									
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.									
L = left, R = right, T = through,									
T,R = through and right, {e.g. WB-L (1)= Westbound left with storage for one vehicle}.									
Unsignalized intersections are shown in <i>Italics</i> .									
*** functional length includes shoulder.									

Improvements Warranted Under Existing Conditions

Intersection modifications used to improve level of service, such as left turn lanes, right turn lanes, center turn lanes, and traffic signals, also improve safety. Left turn lanes reduce rear

end collisions and can also reduce right angle collisions. A Policy of Geometric Design of Highway and Streets, American Association of State Highway and Transportation Officials, 2004 indicates that, under current traffic conditions, the following unsignalized intersections (presently without left turn lanes) on the state route meet the guidelines to be considered for a left turn lane:

1. NYS Route 311 and NYS Route 164
2. NYS Route 311 and Fair Street (County Road 60)
3. NYS Route 311 and Westbound Ramp (Interstate 84 Exit 18)
4. NYS Route 311 and Eastbound Ramp (Interstate 84 Exit 18)
5. NYS Route 311 and Longfellow Drive
6. NYS Route 311 and Terry Hill Road (County Road 46)
7. NYS Route 52 and Barrett Hill Road
8. Fair Street (County Road 60) and Terry Hill Road (County Road 46)

See Table 4.8-11 for intersection improvements that would be desirable or warranted under Existing Conditions.

There are three intersections that presently have more than 100 peak hour right turning vehicles under the Existing Condition;

- NYS Route 311 and NYS Route 164,
- NYS Route 311 and Fair Street (County Road 60); and
- NYS Route 311 and Terry Hill Road (County Road 46).

These intersections should be considered for right turn lanes under Existing Conditions. The provision of traffic signals would eliminate the need for some right turn lanes. NYS Route 311 to NYS Route 164 and Fair Street to NYS Route 311 would still benefit from right turn lane even if signalized.

The intersection of NYS Route 52 and NYS Route 311 is currently signalized. Observations at this intersection indicate vehicles are swinging wide turning left from NYS Route 52 or cutting the right turn short from NYS Route 311 and leaving the paved areas. Extending the pavement to widen existing lanes is suggested to address this existing condition. Widening the area of pavement would also extend the storage capacity of the NYS Route 311 approach.

Rear end, right angle, and turning collisions account for most of the reportable collisions in road segments and intersections with ten or more collisions. Therefore, capacity improvements can also improve safety. To improve intersection level of service, right turn lanes, which allow right turning vehicles to pass by the longer delayed left turning vehicles on minor street approaches, can be incorporated. At signals, right turn lanes allow the minor street traffic to use less green signal time thereby improving the intersection capacity.

Signals create gaps in traffic that allow vehicles on the side street to safely enter the traffic stream or left turning traffic to cross traffic headed in the opposite direction. Without traffic signals, drivers become frustrated with the lack of adequate gaps to enter or cross the traffic stream and begin to use shorter gaps. This can lead to an increase in right angle collisions.

The Codes, Rules and Regulations of the State of New York defines 11 warrants "... that outline minimum conditions under which a traffic signal may be justified..." at a particular intersection. These Warrants are described below:

Warrant 1 minimum vehicular volume
Warrant 2 interruption of continuous flow
Warrant 3 minimum pedestrian volume
Warrant 4 school crossing
Warrant 5 progressive movement
Warrant 6 accident experience
Warrant 7 system warrant
Warrant 8 combination of warrants
Warrant 9 four hour volume
Warrant 10 peak hour delay
Warrant 11 peak hour volume

Warrants 1 and 2 assess traffic at an intersection over an extended period of time (eight hours), assigning minimum volume requirements to the arterial and minor streets over which a signal is warranted. Warrant 2 requires higher arterial and lower minor street approach traffic volumes than Warrant 1.

Warrant 3 requires a minimum of 50 pedestrian crossings per hour to warrant a signal at an intersection. With the exception of some village centers, this warrant is not typically met in suburban areas.

Warrant 4 is for established school crossings. No intersections in this area are anticipated to meet this warrant.

Warrant 5 establishes and/or improves coordinated signal systems; systems where the timing of more than one signal is required to improve traffic flow. With only one traffic signal currently in the vicinity of the project site, this warrant would not immediately apply. However, should some or all of the five candidate intersections on NYS Route 311 require signalization, this warrant might apply in the future.

The key requirement under Warrant 6 is the recording of a minimum of five collisions, over a 12 month period correctable by installation of a traffic signal, at a particular intersection. The trial of less restrictive methods, including incorporation of turn lanes, meeting minimum volume requirements, and not disrupting progressive flows, must also be met for a signal to be warranted.

Warrant 7 applies to the intersection of two arterial routes such as the intersection of the Interstate 84 ramps and NYS Route 311. This warrant requires that 1000 vehicles enter the intersection during a weekend or weekday peak hour and that other warrants (1, 2, 8, 9, and 11) are met within five years.

Warrant 8 suggests the need for a signal at intersections where both warrant 1 and warrant 2 are satisfied for 80% of the their volumes over an eight hour period.

Warrant 9 is similar to the 8 hour warrants (1 and 2) only the time period over which traffic volume is assessed is shorter (4 hours), the arterial traffic volume criteria are higher and the side street volume criteria varies with the arterial volume.

Warrant 10 requires high peak hour delays (of four vehicle hours) and minimum standards for peak hour volumes (of 800 arterial vehicles and 100 side street vehicles) to warrant a signal at an intersection.

Warrant 11 assesses peak hour traffic at an intersection over a shorter period of time (4 hours) than under Warrants 1 and 2 (which assess traffic for 8 hours) while assigning higher minimum volume requirements for the arterial and minor streets over which a signal is warranted.

NYS DOT machine count traffic data collected on state roads over 72 hours, in conjunction with peak hour data collected through manual counts at study intersections were reviewed to estimate the potential of each of the studied intersection to meet minimum volume requirements.

Under Existing Conditions, Warrants 3, 4, and 6 are not anticipated to be met for any of the studied intersections, therefore, these warrants are not discussed in the individual intersection sections that follow. See Appendix K for traffic signal warrant summaries.

NYS Route 311 and NYS Route 164

The intersection of NYS Route 311 and NYS Route 164 does not meet any traffic signal warrants under Existing Conditions.

NYS Route 311 and Fair Street

Based on data collected, six traffic signal warrants (Warrants 1, 2, 8, 9, 10, and 11) are met under Existing Conditions at the NYS Route 311/Fair Street intersection.

The minimum criteria for Warrant 1 (Minimum Vehicular Volumes) are 150 vehicles per hour approaching from the side street and 500 vehicles per hour approaching from the arterial over the same eight hour period. For Warrant 2 (Interruption of Continuous Flow), these minimum criteria are 75 vehicles per hour approaching from the side street and 750 vehicles per hour approaching from the arterial over the same eight hour period. Both warrants are met under Existing Conditions.

Under Existing Conditions, Warrant 5 would not apply to this intersection as the nearest signal is located over two miles away at the intersection of NYS Route 52 and NYS Route 311, too far to maintain progressions between signalized intersections on the network. The NYS Route 311/Fair Street signal might improve coordination between signals recommended at the Interstate 84/NYS Route 311 interchange. As such, Warrant 5 could be met if the westbound ramp signal recommended is built.

Warrant 7 applies to intersections that include at least one major highway. Fair Street terminates at NYS Route 311 and under the Town of Patterson Comprehensive Plan is considered a secondary Road and not a major highway. As such, this warrant is not met even though NYS Route 311 is considered a major road in the Town's Comprehensive Plan.

This intersection would meet the specified volume requirements of Warrant 8 under Existing Conditions as the volumes associated with this Warrant are less than those under Warrants 1 and 2, which, as noted previously, are met under this condition. Warrant 8 requires

alternative measures (e.g. turn lanes and signage) precede traffic signal installation. It is anticipated that Warrant 8 would be met even with the addition of a right turn lane on Fair Street.

Warrant 9 is similar to the 8 hour warrants (Warrants 1 and 2) and would be met for 10 hours under Existing Conditions.

Warrant 10 for a three approach intersection, requires a minimum volume of 650 vehicles passing through the intersection in an hour, 100 or more vehicles entering from a side street in that same hour, and a side road delay of over four vehicle hours. Under Existing Conditions, volume at this intersection is 1,426 vehicles, side street volume is 265 vehicles and the side street delay is greater than eight vehicle hours or over double delay requirements for meeting Warrant 10.

To meet the requirements of Warrant 11 (Peak Hour Volume Warrant), 160 vehicles would need to use the side road based on 1161 vehicles on the main road. The Existing Condition for the arterial road at this intersection for 1161 vehicles is a side street volume of 265 vehicles, thereby exceeding the minimum requirement for this warrant.

NYS Route 311 and Interstate 84 Westbound Ramps

The westbound ramps of Interstate 84 are the “roadways” with the highest minor street volumes in the network. Warrants 9, 10, and 11 are met under Existing Conditions at their intersection with NYS Route 311.

To meet the requirements for Warrant 10, a three approach intersection requires a minimum volume of 650 vehicles passing through the intersection in an hour and 100 or more vehicles entering from a side street in that same hour. The total number of vehicles entering the intersection (1334), 714 from the arterial and 620 from the side street, exceeds those established for this warrant. In addition, this intersection is estimated to have over five times the four vehicle hours of peak hour side street delay necessary to meet Warrant 10.

The volume requirements of Warrant 11 are met with 714 vehicles on the arterial over one hour and 620 vehicles, roughly 50 percent more than the requirement on the side street, over the same hour.

Although the location represents a crossing of two arterial roads, Warrant 7 can not be met because the volumes are insufficient to meet Warrant 2 within five years.

NYS Route 311 and Interstate 84 Eastbound Ramps

The assessment of the NYS Route 311/Interstate 84 eastbound ramp intersection indicates that Warrant 9 is the only warrant that could be met under Existing Conditions. With the existing lane geometry (one lane) and projected vehicle volumes, this intersection is a borderline case when considering the requirements of Warrant 9. The addition of a turn lane on the ramp, reflecting the current use of the shoulder as a right turn lane, makes the side street volume fall below the warrant’s requirements. The installation of a signal at this intersection may be tied to the installation of the westbound ramp signal for the purpose of queue management, however a conservative approach would suggest implementation of turn lanes under Existing Conditions to address the current delays and not the signal.

NYS Route 311 and Terry Hill Road

Based on the data collected, the intersection of NYS Route 311 and Terry Hill Road would meet Warrant 8 and Warrant 9 under Existing Conditions. Warrant 8 is the combination of 80% of Warrants 1 and 2. Warrants 10 and 11 are nearly met under the Existing Condition.

For a four approach intersection, Warrant 10 requires that 800 vehicles pass through the intersection in an hour, 100 or more enter it from the side street in that same hour, and the side street vehicle delay exceeds four hours. Under Existing Conditions the intersection traffic volume is 1223, the side street traffic volume is 193 but the side street vehicle delay is 3.7 vehicle hours. The vehicle delay falls slightly short of meeting requirements of the warrant.

For Warrant 11, an arterial volume of 1025 requires 200 vehicles on the side street approach to warrant a signal. The side street at this intersection, Terry Hill Road northbound, has a volume of 193 vehicles, slightly below the requirements of this warrant.

Table 4.8-11 Intersections Where Improvements are Warranted Under the Existing Condition	
Intersection	Improvements
NYS Route 164 and NYS Route 311	Add NYS Route 311 left and right turn lanes. (see Appendix K Figure K-10)
Fair Street and NYS Route 311	Signalize intersection. Add right turn on Fair Street (see Appendix K Figure K-11)
NYS Route 311 and I-84 Westbound ramp	Signalize intersection. Add NYS Route 311 left turn lane into I-84 Extend right turn lane onto I-84 Widen existing off ramp lane to formalize right-through lane as separate lane (see Appendix K Figure K-12)
NYS Route 311 and I-84 Eastbound ramp	Add westbound Route 311 left turn lane into the I-84 on-ramp. Widen existing off ramp lane to formalize right lane as separate lane (see Appendix K Figure K-12)
Terry Hill Road and NYS Route 311	Signalize intersection. Add left turn lanes on NYS Route 311. (see Appendix K Figure K-13)
NYS Route 52 and NYS Route 311	Widen NYS Route 311 to allow additional right turn storage. (see Appendix K Figure K-14)
NYS Route 52 and Barrett Hill Road	Add left turn lane on NYS Route 52 (see Appendix K Figure K-15)

4.8.2 Future Conditions Without the Project

No Build Condition Traffic

Typically a project's traffic impact is determined by comparing future traffic conditions without the project's traffic (2010 No-Build Conditions) to the traffic conditions with project-generated traffic (2010 Build Conditions).

The No-Build Condition is an interim scenario that establishes a future baseline condition. No-Build Conditions are ascertained based on a number of factors: (1) improvements in the

local road network that are planned or underway; (2) traffic from general population growth in the local area; and (3) traffic from identified development projects in the project site vicinity.

The New York State Department of Transportation (NYS DOT) has several projects listed in the Statewide Transportation Improvement Program (TIP). The currently approved TIP (August 2005) covers traffic improvement projects to be initiated and or completed during the period between October 1, 2006 and September 30, 2010. These projects are:

a) Rehabilitation Project which includes NYS Routes 52 and 311 between County Road 48 and Interstate 84 for rehabilitation (Project Identification Number 802136). Detail Design would occur in 2010 and construction sometime thereafter. Rehabilitation work typically includes drainage improvements, guiderail replacement, traffic signal upgrade, repaving, and extension of or addition of turn lanes for safety such as into Barrett Hill Road. The above project to be carried out by NYS DOT is in the preliminary stages and it is unclear the exact extent of the improvements to be completed. NYS Route 311 was repaved from NYS Route 52 to Ludingtonville Road in the fall of 2005.

b) Route 164/Route 311 intersection realignment and reconstruction, realignment of substandard horizontal curves, widening the shoulders (Project Identification Number 807102). Construction was scheduled for 2008 under a previous transportation improvement program however, it has been deleted from the current 2006-2010 program.

c) Interstate 84 Pavement Rehabilitation from Ludingtonville Road to Interstate 684 (Project Identification Number 806227). Construction is scheduled for 2006 per the TIP.

d) Route 164 State Force Armor Coat from NYS Route 311 to Farm Market Road (Project Identification Number 807103). This project was completed in 2005 and therefore is not included in the current TIP.

e) Putnam Park and Ride Lots Expansion Project includes addition of 100 parking spaces to existing Park and Ride facility at Interstate 84 and NYS Route 311 adjacent to Ludingtonville Road. The project also includes new parking spaces along Interstate 84 and US Route 6 in Town of Kent, Patterson, Carmel and Mahopac (Project Identification Number 880697). Construction is schedule for 2005/2006 per the TIP.

The above projects c) and d) to be undertaken by NYS DOT are intended as maintenance improvements. Project e) should improve vehicle occupancy. These improvements are not expected to increase the capacity of intersections, so these improvements were not taken into account in the capacity analysis for the future conditions (No Build Condition and Build Condition). The potential improvement sections discuss options to address future area traffic much of which could be included in a) and b) above. The No Build Condition assumes no improvement measures are undertaken through 2010 as a base condition. A separate analysis for a No Build Condition is undertaken assuming funded and other projects are completed to correct deficiencies in the network as described in Section 4.8.2.3.

The development projects which are pending before the Planning Boards or are approved (but not yet built) which are considered in the traffic review are listed in Tables 4.8-12 and 4.8-13. Appendix Tables L-1 and L-2 of Appendix L show trip rates and trips from no build projects.

The assignment of trips from No Build developments was projected based on a number of factors. These factors include the location of the project relative to the transportation network and potential vehicle or patron origins or destinations. Origins and destinations can vary. For example, in the p.m. weekday peak hour, trips from an office project would tend to originate at the office and travel toward residential housing consistent with the typical commuter pattern. For this assessment, 2000 census data was used to determine where people live. In the p.m. peak hour, a residential area would be a known destination with trips originating from numerous work places. Work to home trips can also be diverted to shopping opportunities. The existing traffic pattern provides an example of the future trips to and from various uses crossing through the local transportation network.

The intersection of NYS Route 52 and NYS Route 311 was recently improved by the NYS DOT by replacing one existing raised island with a smaller painted island. The improvement widens NYS Route 311 and increases storage at this intersection. It has been included in the analysis of all future conditions. Additional widening of NYS Route 311 to move curbs in areas where vehicles have traveled off of the pavement, on the interior curb and on the remaining raised island curb, has been identified as a future improvement (See Figure K-14 in Appendix K). This widening, which will be limited to expanding the road shoulders and is needed to improve safety, is not addressed in the capacity analysis for improved No Build or Build Conditions.

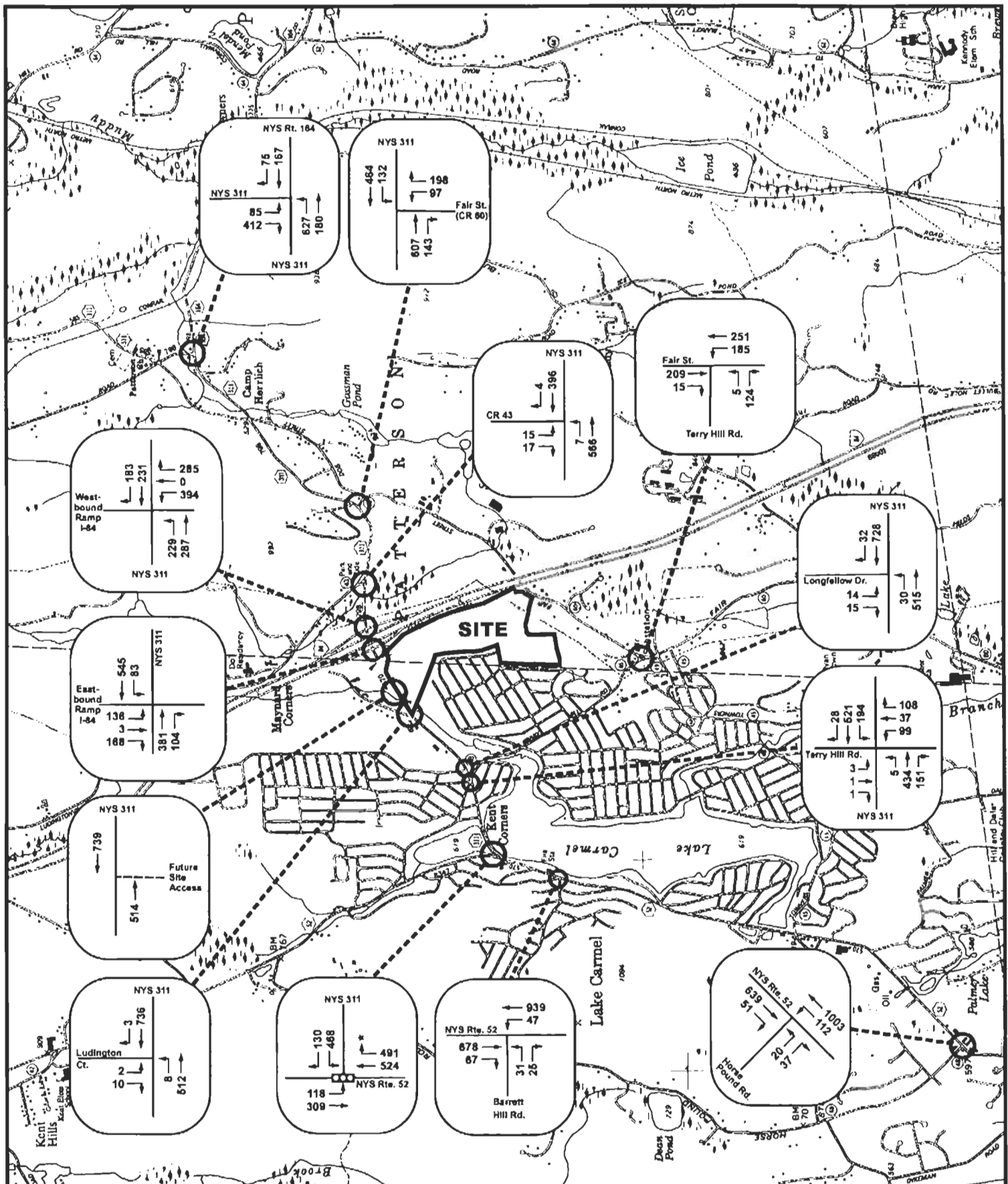
Table 4.8-12			
Approved or Pending Projects in Town of Carmel, Town of Kent, and Town of Patterson			
	Project Size, Type, Carmel	Status	Location
1	Michael Glen's, 23 single family residential units	Pending	Fair Street
2	Watson Labs expansion of 99,000 square feet from 111,400 to 210,400 square feet	Pending**	Stoneleigh Avenue
3	RPK Precision homes, 66 senior housing units	Pending**	Seminary Hill Road
4	Carmel Corporate 388 senior housing units non-residential 6,400 square feet	Approved	Stoneleigh Avenue
5	686 Stoneleigh Avenue Existing 4,930 square feet 2,100 square foot expansion to 7,030 square feet medical office	Pending	Stoneleigh Avenue
6	Springside 22 unit multi-family residential	Pending	Stoneleigh Avenue/ Drewville Road
7	Hillcrest Commons ** 150 senior attached units {250} 58,960 square feet office	Pending	NYS Route 52
8	Bank with Drive thru (3,200 square feet)	Occupied	NYS Route 52
9	Putnam Plaza Hannaford's and Retail Space 31,000 square feet	Approved and Vacant	US Route 6
10	Gateway Summit ** Hotel 150 rooms, Conference Center, Banquet Facility, Quality Restaurant 7,000 square feet, Auto Dealership 45,000 square feet, Office Space 17,600 square feet, Convenience Store 400 Square feet Senior Residences, 191 dwelling units Recreational Community Center 68,000 square feet	Pending	US Route 6
11	Fairways Senior Residences, 150 dwelling units**	Pending	Fair Street
Project, Size, and Type (Town of Kent)			
12	Barret Hill Subdivision, 19 single family residential units	Pending***	Barret Hill Drive
13	"Super A" Petroleum (12 fueling station with car wash)	Pending***	North of Dykeman Road
14	Pondview Town House, 44 single family residence	Pending	Off Fair Street****
15	Kent Manor, 303 town houses**	Under review by NYC DEP	Palmer Road and Hill and Dale Road
16	Kent Self Storage Project, 2 story 16,000 sq. ft	Approved*	NYS Route 311
17	Chestnut Petroleum, 2,440 square feet convenient and 2400 square feet retail	Approved	NYS Route 311
18	Sicuranza Site Plan 6,527 square feet retail building	Pending	NYS Route 52
19	Bottlegate Farm 2 barns 16,260 square feet Third building 2,900 square feet office and storage space	Approved	NYS Route 52
20	Town Complex 44,000 square feet	Approved*	NYS Route 52
*Completed after existing counts. ** This project has been reduced in scale and will generate less traffic *** Is no longer in review. ****Includes 33 units in Patterson and 11 in Kent			

Table 4.8-13 Approved or Pending Projects in Town of Patterson, and Town of Southeast			
	Project, Size, and Type and Location	Status as of Spring 2005	Location (direction from Project Site)
Town of Patterson			
21	Burdick Farms 37 single family units	Pending	Along Bullet Hole Road and McMaruns Road
22	BICAR Site Plan 4980 square foot Contractor Yard	Withdrawn	Commerce Street
23	Watch Tower Bible and Tract Society 172,800 square feet of Commercial and Residential including 500 dwelling units, office building Audio video Building and Maintenance building	Inactive	NYS Route 22
Town of Southeast			
24	The <i>Highlands Shopping Center</i> (377,000 square feet) partially constructed, pending bank, Michaels, and TJ Max 60,000 square feet, 6 additional stores 14,546 square feet,	Approved*	NYS Route 312
25	<i>Terravest Corporate Park</i> 80,000 square feet light industrial 212,000 square feet light industrial Ace Endico 60 dwelling units of senior single family residential	Approved	International Blvd.
26	Campus at Fields Corners 143 Single family units	Approved	Pugsley Road and NYS Route 312
27	Meadow at Deans Corners 103 Single Family Units	Approved	Deans Corners NYS Route 124
28	Mt. Ebo 168 units of assisted living	Approved	NYS Route 22
29	Orchard Hill LLC 200 room lodge 18 hole golf course 60 seat restaurant	Pending	Hardscrabble Road and Fields Lane. Towns of North Salem and Southeast
*Completed after existing counts. Last updated Spring 2005.			

Peak hour traffic volumes for the weekday p.m. and Saturday in the future No Build Condition are shown in Figures 4.8-4 and 4.8-5. These figures reflect the existing traffic plus the background traffic growth of one and half percent annually over five to six years plus other area projects. The background traffic growth rate of one and half percent per year was used to establish background growth to the build year of 2010. This time period reflects time for the site plan approval process with proposed construction anticipated to be complete during or prior to 2010.

No Build Level of Service (without Improvements)

Tables 4.8-14 and 4.8-15 show the level of service summary for the studied intersections for the No Build Condition. With the assumptions that all the projects will be approved and built by 2010 as proposed and considering background growth, there would be an increase in traffic on NYS Route 311 which would result in delays for turning movements from minor streets onto NYS Route 311.



LEGEND	
	Site Property Boundary
	Intersections Studied
	Traffic Signal
	Movement Controlled by Stop or Yield Sign

Figure 4.8-4: PM No Build Peak Hour Traffic
Patterson Crossing
Town of Patterson, Putnam County, New York
Base Map: USDOT Planimetric Map, Lake Carmel Quad
Scale: n/a

Tim Miller Associates, Inc., 10 North Street, Cold Spring, New York 10516 (845) 265-4400 Fax (845) 265-4418

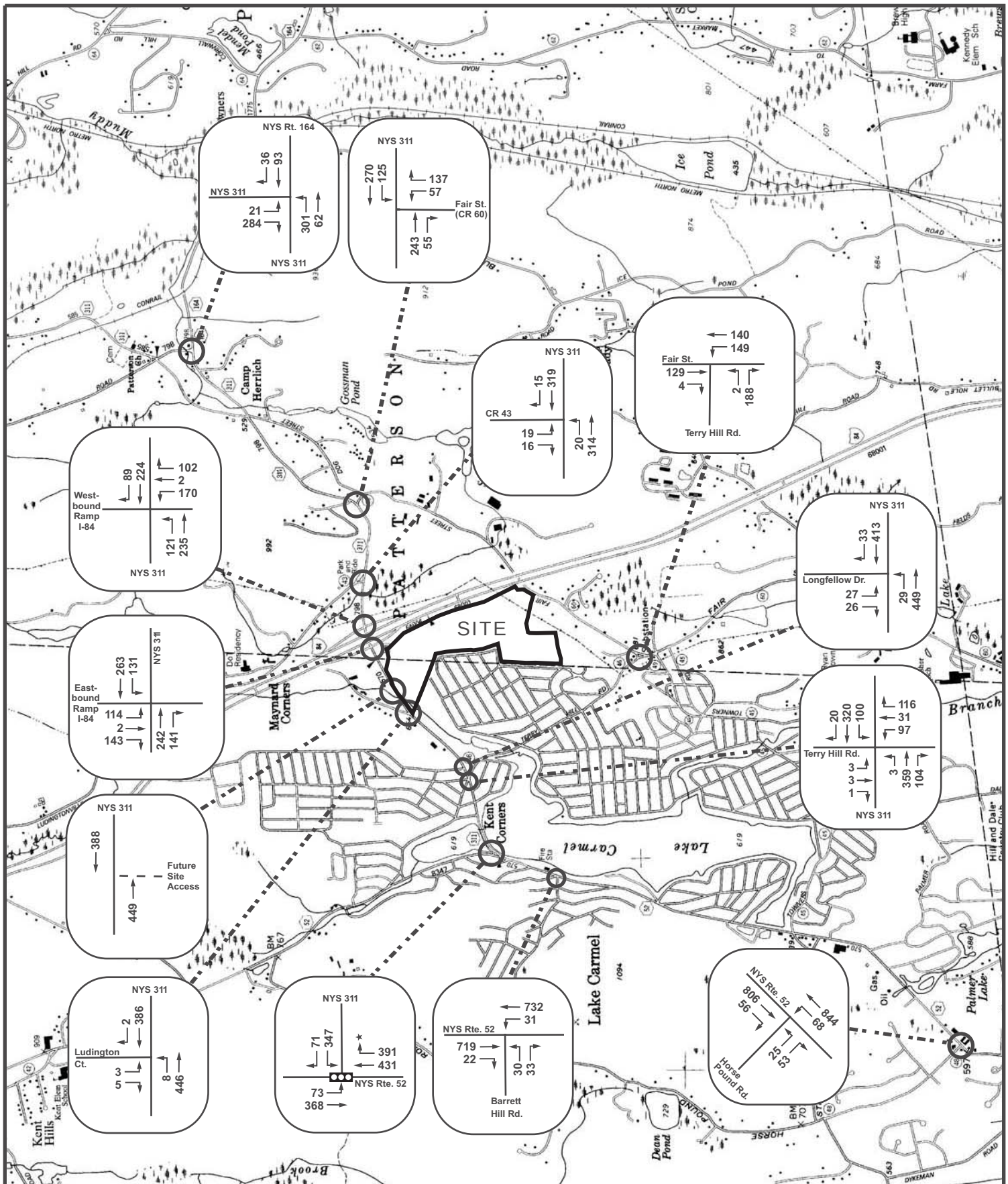


Table 4.8-14 No Build Level of Service Summary in the Town of Kent									
Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
NYS Route 311 and NYS Route 52									
NYS Route 311	WB - L	0.93	21.8	45.0	D*	0.69	13.3	26.2	C
	WB - R (2)	0.29	4.8	17.9	B	0.16	2.7	16.4	B
NYS Route 52	NB - T	0.51	13.5	11.8	B	0.46	11.8	11.1	B*
	SB - L, T	0.84	17.9	27.0	C*	0.60	13.3	14.1	B
	Overall			26.8	C*			16.5	B
NYS Route 311 and Terry Hill Road									
NYS Route 311	EB - L, T, R	0.00	0.01	8.5	A	0.00	0.01	8.1	A
	WB - L, T, R	0.20	0.76	9.7	A	0.11	0.37	8.9	A
Terry Hill Road	NB - L, T, R	**	24.25	**	F	1.21	15.45	**	F*
	SB - L, T, R	0.18	0.60	70.1	F*	0.08	0.27	35.0	D*
NYS Route 311 and Longfellow Drive									
NYS Route 311	EB - L, T	0.04	0.12	9.4	A	0.03	0.09	8.4	A
Longfellow Drive	SB - L, R	0.21	0.75	25.2	D*	0.21	0.76	17.4	C*
NYS Route 311 and Ludington Court									
NYS Route 311	EB - L, T	0.01	0.03	9.2	A	0.01	0.02	8.2	A
Ludington Court	SB - L, R	0.06	0.19	16.0	C*	0.03	0.08	13.6	B
NYS Route 52 and Barrett Hill Road									
NYS Route 52	NB - L, T	0.06	0.19	9.5	A	0.04	0.13	9.9	A
Barrett Hill Road	EB - L, R	0.53	2.54	62.1	F*	0.52	2.55	53.7	F*
NYS Route 52 and Horse Pound Road									
NYS Route 52	NB - L (3)	0.15	0.52	10.1	B*	0.11	0.38	10.7	B*
Horse Pound Road	EB - L, R	0.56	2.65	71.1	F*	0.78	4.61	97.1	F*
LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria).									
V/C is Volume to Capacity Ratio.									
95th % Queue (Veh.) is the 95th percentile queue length in vehicles.									
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.									
L = left, R = right, T = through,									
T, R = through and right, {e.g. WB-L (1) = Westbound left with storage for one vehicle}.									
Unsignalized intersections are shown in Italics.									
* Decline in level of service from the Existing Condition.									
** measure of effectiveness with either V/C greater than 2, queue greater than 30, or delay exceeds 120 seconds.									

Table 4.8-15
No Build Level of Service Summary in Town of Patterson

Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
NYS Route 311 and I-84 Eastbound ramp									
NYS Route 311	WB - L, T	0.09	0.28	8.9	A	0.13	0.47	8.6	A
I-84 EB ramp	SB - L, T (45)	0.90	6.63	96.5	F*	0.57	3.15	37.1	E*
	SB - R (45***)	0.36	1.66	15.8	C*	0.24	0.93	11.5	B
NYS Route 311 and I-84 Westbound ramp									
NYS Route 311	EB - L, T	0.23	0.91	9.4	A	0.12	0.41	8.5	A
I-84 WB ramp	NB - L, T (32)	**	**	**	F	0.71	4.98	44.5	E*
	NB - R (32***)	0.42	2.06	13.4	B	0.15	0.54	10.6	B
NYS Route 311 and Ludingtonville Road									
NYS Route 311	EB - L, T	0.01	0.02	8.3	A	0.02	0.06	8.1	A
Ludingtonville Road	NB - L, R	0.07	0.24	16.6	C*	0.08	0.26	13.7	B
NYS Route 311 and Fair Street									
NYS Route 311	WB - L, T	0.17	0.61	10.1	B*	0.12	0.40	8.4	A
Fair Street	NB - L, R	1.53	20.99	**	F	0.47	2.51	19.1	C
NYS Route 311 and NYS Route 164 west									
NYS Route 164	NB - L, R	0.92	7.17	97.0	F*	0.27	1.08	17.9	C*
NYS Route 311 and NYS Route 164 east									
NYS Route 311	SB - L, R	0.15	0.54	12.4	B	0.03	0.09	9.7	A
NYS Route 311 and NYS Route 164 north									
NYS Route 311	EB - L, T	0.09	0.31	9.3	A	0.02	0.06	8.1	A
NYS Route 164	NB - L, R	0.20	0.73	14.7	B	0.06	0.19	10.8	B
Fair Street and Terry Hill Road									
Fair Street	NB - L, T	0.16	0.57	8.3	A	0.11	0.37	7.8	A
Terry Hill Road	EB - L, R	0.25	1.00	11.6	B	0.24	0.95	10.3	B

LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria).

V/C is Volume to Capacity Ratio.

95th % Queue (Veh.) is the 95th percentile queue length in vehicles.

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.

L = left, R = right, T = through,

T, R = through and right, {e.g. WB-L (1)= Westbound left with storage for one vehicle}.

Unsignalized intersections are shown in Italics.

* Decline in level of service from the Existing Condition.

** measure of effectiveness with either V/C greater than 2, queue greater than 30, or delay exceeds 120 seconds.

No Build Condition with Traffic Improvements

As indicated in the No Build Condition Traffic portion of Section 4.8.2 this analysis takes into consideration several NYS DOT improvement projects along with other improvement needs identified in this document which should be completed on or before 2010. A list of the improvements needed under both the Existing and No Build Conditions is provided in Table 4.8-16. Levels of service for the No Build Condition with these improvements is shown in Tables 4.8-17 and 4.8-18. Most of these improvements will be required whether or not the project site is developed and some are already included on the Transportation Improvement Program. A further description of improvements is contained in Section 4.8.4.

The intersections discussed in this section are anticipated to have approaches that operate at level of service F by 2010 whether or not the Patterson Crossing Retail Center is built. The Fair Street, Terry Hill Road and Interstate 84 westbound ramp intersections with Route 311 are operating at level of service F under Existing Conditions in the p.m. peak hour and would continue to operate at level of service F in the No Build Condition without improvements. The intersection of NYS Route 311/NYS Route 164 was the subject of a recent article (Crash Puts Focus on Patterson Intersection, Terry Corcoran, The Journal News, September 21, 2005) describing existing safety concerns of local residents.

Modifications used to improve level of service, such as left turn lanes, right turn lanes, center turn lanes, and traffic signals, also improve safety. See Table 4.8-16 for improvements that are needed without the Patterson Crossing Retail Center development (Existing and No Build Conditions). Intersections needing left and/or right turning lanes are discussed in the Existing Conditions section as none are needed under the No Build Condition.

Two intersections, NYS Route 52/Barrett Hill Road and NYS Route 52/Horse Pond Road, need center turn lanes added under the No Build Condition. Center turn lanes, which allow vehicles making left turns out of minor streets to utilize gaps in one direction of arterial traffic flow at a time, can be used to improve capacity and safety. Without a center turning lane, turning vehicles must wait for a sufficient gap in both directions of arterial traffic flow before executing a left turn out of a side street. Center turn lanes should reduce right angle collisions.

Two intersections, NYS Route 311/NYS Route 164 and NYS Route 311/Interstate 84 Westbound Ramp, need to be signalized under the No Build Condition. As noted previously, signals create gaps in traffic that allow vehicles on the side street to safely enter the traffic stream or left turning traffic to cross traffic headed in the opposite direction. Without traffic signals, drivers become frustrated with the lack of adequate gaps to enter or cross the traffic stream and begin to use shorter gaps. This can lead to an increase in right angle collisions.

The following sections discuss each intersection studied and the improvements warranted under the No Build Condition. Under this Condition, Warrants 3, and 4, are not anticipated to be met for any of the studied intersections. For Warrant 6, a key requirement is meeting the minimum collision requirement (5 collisions in a 12 month period) which is based on historical collision data for the intersection. In the future, additional historical collision data may need to be reviewed to assess the intersection for collisions associated with future increased traffic volumes. These three warrants are not discussed in the individual intersection sections that follow, since they are not anticipated to be met.

NYS Route 52 and Barrett Hill Road

The level of service for traffic exiting Barrett Hill Road is anticipated to be F under the No Build Condition for both the weekday p.m. peak hour and Saturday peak hour. These delays reflect the difficulty left turning traffic from Barrett Hill Road has finding sufficient, simultaneous gaps in traffic traveling in both directions on NYS Route 52. A center turning lane would provide vehicles turning left out of Barrett Hill Road the opportunity to use a gap in southbound NYS Route 52 traffic to enter the center lane and then wait for a gap in northbound traffic to complete the merge onto NYS Route 52.

Splitting the left turn into two separate turns (first into the center lane and second onto northbound NYS Route 52) would reduce the delay at this intersection. The New York State Department of Transportation plans to install a left turn lane into Barrett Hill Road and has identified such improvement in its Transportation Improvement Program. Providing a haven for left turning traffic from Barrett Hill Road necessitates an expansion of the taper on the opposite side of the programmed left turn lane into Barrett Hill Road. Improving the left turn delay out of Barrett Hill Road would improve the level of service for the approach to D or better.

No improvements to this intersection beyond those noted under the Existing Condition are warranted under the No Build Condition.

NYS Route 52 and Horse Pound Road

As with Barrett Hill Road, the level of service for traffic exiting Horse Pound Road is anticipated to be F in the No Build Condition for both the weekday p.m. peak hour and Saturday peak hour. These delays reflect the difficulty left turning traffic from Horse Pound Road has finding sufficient, simultaneous gaps in traffic traveling in both directions on NYS Route 52. A center turning lane would provide vehicles turning left out of Horse Pound Road the opportunity to use a gap in southbound NYS Route 52 traffic to enter the center lane and then wait for a gap in northbound traffic to complete the merge onto NYS Route 52. Splitting the left turn into two separate turns (first into the center lane and second onto northbound NYS Route 52) reduces the delay.

Unlike Barrett Hill Road, the left turn into Horse Pound Road already exists. Providing a haven for left turning traffic from Horse Pound Road necessitates an expansion of the taper on the opposite side of the existing left turn lane into Horse Pound Road. Improving the left turn delay out of Horse Pound Road would improve the level of service for the approach to D or better.

NYS Route 311 and NYS Route 164 Traffic Signal Warrants

Traffic volumes under the No Build Condition are sustained long enough to meet volume Warrant 2. It is anticipated that this intersection will also meet Warrants 9, 10, and 11 under the No Build Condition.

Under the No Build Condition, volume requirements for Warrant 10 are met. Vehicular delay is approximately 4.5 vehicle hours for the left turn only, which exceeds the Warrant 10 delay requirements without consideration of the right turn. The volume requirements of Warrant 10 were met under Existing Conditions.

For Warrant 11 the arterial volume of 1304 vehicles needs the side street volume to exceed 200 vehicles (two lane side street). The side street volume for this intersection is projected to be 243 vehicles, thereby meeting the volume requirement.

NYS Route 311 and Fair Street Traffic Signal Warrants

One warrant (Warrant 5) would be met under the No Build Condition in addition to the six (Warrants 1, 2, 8, 9, 10, and 11) that would be met under Existing Conditions at the NYS Route 311/Fair Street intersection.

Warrant 5 is used to determine if the traffic signals should be installed as part of a coordinated signal system. Under the No Build Condition this warrant could apply if signals at NYS Route 311 /NYS Route 164 and NYS Route 311 and Interstate 84 westbound ramps were installed.

NYS Route 311 and Interstate 84 Eastbound Ramps Traffic Signal Warrants

The anticipated increase in traffic under the No Build Condition should result in this intersection meeting warrants 1, 8, 9, 10, and 11. Warrant 9 would be met under this Condition even if the ramp was improved by adding a dedicated turn lane unlike under the Existing Condition where the requirements of this Warrant were not met for the two lane configuration.

The side street delay of five vehicle hours exceeds Warrant 10 requirements by over 25 percent. In addition, the total intersection volume of 1,420 vehicles and the side street volume of 307 vehicles would also meet the warrant requirements which are set at 650 and 100 vehicle respectively.

For Warrant 11 the arterial volume of 1,113 vehicles requires a 250 vehicle side street volume. A side street volume projected at 307 vehicles exceeds these warrant requirements.

NYS Route 311 and Interstate 84 Westbound Ramps Traffic Signal Warrants

As previously described, in the Existing Conditions section the Interstate 84 westbound ramps meet warrants (9, 10, and 11). Warrants 1 and 8 would be met under the No Build Condition.

NYS Route 311 and Terry Hill Road Traffic Signal Warrants

Should no improvements be made to the Terry Hill Road/NYS Route 311 intersection, some traffic shifting to the Fair Street/NYS Route 311 intersection as an alternative route would be expected.

Under the No Build Condition the NYS Route 311 and Terry Hill Road intersection would meet four additional signal warrants (1, 2, 10, and 11). Warrants 8 and 9 were fully met, Warrants 1 and 2 were met to 80% and Warrants 10 and 11 were nearly met under the Existing Condition.

For a four approach intersection, Warrant 10 requires 800 vehicles to enter the intersection in an hour, 100 or more vehicles to enter from the side street in that same hour and the delay at the side road be over four vehicle hours. Under the No Build Condition, this intersection's

volume is 1,591, it's side street volume is 253, and it's side street vehicle delay is greater than eight vehicle hours. All the requirements of this Warrant are met by this intersection under the No Build Condition.

Based on 1,333 vehicles on the main road, Warrant 11 would require 125 vehicles on the side road to warrant a signal. Under the No Build Condition, the side road volume is expected to reach 253 vehicles and exceed the requirements of this warrant.

Table 4.8-16 Intersections Where Improvements are Warranted Under Existing and No Build Conditions	
Intersection	Improvements
NYS Route 164 and NYS Route 311	Add left and right turn lanes on NYS Route 311 Signalize intersection for No Build Condition (see Appendix K Figure K-10)
Fair Street/NYS Route 311	Signalize intersection. Add right turn on Fair Street (see Appendix K Figure K-11).
NYS Route 311 and I-84 Westbound ramp	Signalize intersection. Add NYS Route 311 left turn lane into I-84 Extend right turn lane onto I-84 Widen existing off ramp lane to formalize right-through lane as separate lane (see Appendix K Figure K-12)
NYS Route 311 and I-84 Eastbound ramp	Signalize intersection for No Build Condition Add westbound NYS Route 311 left turn lane into the I-84 on-ramp Widen existing off ramp lane to formalize right lane as separate lane (see Appendix K Figure K-12)
Terry Hill Road/NYS Route 311	Signalize intersection Add left turn lanes on NYS Route 311. (see Appendix K Figure K-13)
NYS Route 52/ NYS Route 311	Widen NYS Route 311 to allow additional right turn storage. Retime the signal for the No Build Condition (see Appendix K Figure K-14).
NYS Route 52 and Barrett Hill Road	Add a left turn lane on NYS Route 52 Add center turn lane on NYS Route 52 for No Build Condition (see Appendix K Figure K-15)
NYS Route 52 and Horse Pond Road	Add NYS Route 52 center turn lane for No Build Condition (see Appendix K Figure K-16)
See Appendix K for Preliminary Traffic Signal Warrant Summaries.	
* items in bold for No Build Condition, remainder for Existing Condition.	

The installation of five new signals on NYS Route 311 from Terry Hill Road to NYS Route 164 as warranted under the Existing and the No build Conditions and noted in Tables 4.8-11 and 4-8-16 will alter traffic flow in the area. A slower speed limit may be more appropriate for NYS Route 311 west of NYS Route 164 as the number of traffic signals increases.

Other measures should be considered to improve safety. The NYS DOT arterial management strategies recommends reducing access points to arterials for safety.

4.8.3 Future Conditions with the Project

Analysis of Site Access

Description of Site Access

The site access will be a two lane privately owned and maintained boulevard style drive that will be approximately 3,500 feet long and 30 feet wide. Parking lots are provided in front of each commercial building. The wide curb radius at the intersection of NYS Route 311/site access will provide easy turn movements from site access to NYS Route 311. Three horizontal and two vertical curves in the site access road will be provided for smooth transition of movement along the access. The maximum grade of the site access drive is 7.96 percent.

Sight Distance

Sight distance is the length of highway visible to a driver. A safe sight distance is the distance needed by a driver on a road, or a driver exiting a driveway or street, to verify that the road is clear and avoid conflicts with other vehicles. The sight lines must be kept free of objects that might interfere with the ability of drivers to see other vehicles. Features such as hills, curves in the road, vegetation, other landscaping, signs, and buildings can reduce sight distance.

There are two types of sight distance discussed below: "Stopping sight distance" and "Intersection sight distance"

Stopping sight distance provides drivers a view of the roadway sufficient to allow drivers to avoid a collision with the entering vehicle. The provision of stopping sight distance is fundamental to intersection operation, (A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, 5th ed, 2004).

Driveways should be located where stopping sight distance can be met or exceed the AASHTO values. (*Policy and Standards for Design of Entrances to State Highways*, New York State Department of Transportation, 2003).

Table 4.8-17 No Build with Improvements Level of Service Summary in Town of Kent									
Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
NYS Route 52 and NYS Route 311									
NYS Route 311 NYS Route 52	WB - L	0.72	15.4	20.7	C	0.64	11.9	21.5	C
	WB - R (2)	0.22	3.9	12.1	B	0.15	2.4	13.9	B
	NB - T	0.64	15.2	17.6	B	0.49	11.8	12.3	B
	SB - T	0.84	15.4	30.9	C	0.69	13.9	17.3	B
	Overall			21.6	B			16.6	B
NYS Route 311 and Terry Hill Road									
NYS Route 311 Terry Hill Road	EB - L (2)	0.02	0.1	9.2	A	0.01	0.1	9.7	A
	EB - T, R	0.80	20.1	20.1	C	0.68	15.0	16.2	B
	WB - L(5)	0.44	3.4	15.3	B	0.24	2.0	11.9	B
	WB - T, R	0.52	11.7	7.5	A	0.39	7.8	7.5	A
	NB - L, T, R	0.84	11.1	38.6	D	0.84	12.9	35.8	D*
	SB - L, T, R	0.47	3.5	21.4	C	0.03	0.3	16.3	B
	Overall			18.6	B			18.2	B
NYS Route 52 and Barrett Hill Road									
NYS Route 52	NB - L (2)	0.06	0.19	9.5	A	0.04	0.13	9.9	A
Barrett Hill Road	EB - L, R	0.25	0.97	22.9	C	0.29	1.14	23.6	C
NYS Route 52 and Horse Pound Road									
NYS Route 52	NB - L (3)	0.15	0.52	10.1	B	0.11	0.38	10.7	B
Horse Pound Road	EB - L, R	0.25	0.96	23.9	C	0.39	1.73	27.8	D
See Tables 4.8-7 and 4.8-8 for level of service criteria. Level of service for the signalized intersections are not directly comparable to the unsignalized level of service. NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound. L = left, R = right, T = through, T, R = through and right, (e.g. WB-L = Westbound left).									

Table 4.8-18 No Build with Signal Improvement - Level of Service Summary in Town of Patterson									
Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
NYS Route 311 and I-84 eastbound ramp									
NYS Route 311	EB - T	0.55	11.5	12.9	B	0.42	7.0	16.0	B
	EB - R (12)	0.18	2.7	10.0	A	0.29	3.9	15.1	B
NYS Route 311	WB - L(3)	0.13	1.3	7.2	A	0.18	2.4	5.9	A
	WB - T	0.48	2.9	1.1	A	0.27	1.2	0.8	A
I-84 EB ramp	SB - L, T (8)	0.44	5.1	21.9	C	0.36	4.3	20.5	C
	SB - R (16)	0.56	6.5	23.8	C	0.47	5.6	21.4	C
	Overall			10.3	B			11.8	B
NYS Route 311 and I-84 westbound ramp									
NYS Route 311	EB - L (8)	0.48	4.2	13.9	B*	0.24	2.9	12.1	B
	EB - T	0.41	5.2	6.8	A	0.32	4.8	8.4	A
NYS Route 311	WB - T	0.69	9.3	26.9	C	0.60	9.0	22.0	C
	WB - R (12)	0.65	7.4	25.7	C	0.28	3.3	18.5	B
I-84 WB ramp	NB - L (30)	0.56	11.5	14.3	B	0.31	5.2	13.9	B
	NB - T, R (10)	0.45	7.9	13.1	B	0.21	3.0	13.2	B
	Overall			16.0	B			14.7	B
NYS Route 311 and Fair Street									
NYS Route 311	EB - T, R	0.75	23.5	14.9	B	0.36	10.9	11.9	B
	WB - L, T	0.75	11.0	9.8	A	0.47	8.8	7.6	A
Fair Street	NB - L	0.47	4.5	29.0	C	0.17	2.9	28.5	C
	NB - R	0.51	8.0	21.1	C	0.46	7.6	31.3	C
	Overall			14.7	B			14.2	B
NYS Route 311 and NYS Route 164									
NYS Route 164	WB - L, R	0.85	11.7	40.3	D	0.41	4.6	21.7	C
NYS Route 311	NB - T	0.77	19.7	19.7	B	0.38	8.3	11.6	B
	NB - R (2)	0.13	1.6	2.1	A	0.06	0.7	2.0	A
NYS Route 311	SB - L (3)	0.19	1.3	12.3	B	0.04	0.4	5.1	A
	SB - T	0.36	7.4	5.4	A	0.31	6.1	5.2	A
	Overall			17.6	B			9.7	A
See Table 4.8-8 for level of service criteria. Level of service for the signalized intersections are not directly comparable to unsignalized level of service. NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound. L = left, R = right, T = through, T, R = through and right, (e.g. WB-L = Westbound left).									

Intersection sight distances should meet or exceed AASHTO values, however traffic signals can be used to mitigate nonconforming intersection sight distance (*Policy and Standards for Design of Entrances to State Highways*). The project site access to NYS Route 311 will require a traffic signal based on capacity needs. Sight distance concerns therefore relate

primarily to right-turn-on-red, flashing operation, sighting signal heads, and unprotected left turns from NYS Route 311. At the site access, the sight distance when looking right is 900 feet and when looking left is 790 feet as indicated in Table 4.8-19. Sight distance is not an issue when a signal is provided. The sight distances at the site access noted above would support off-peak flashing operation or right-turn-on-red operation.

The criteria for stopping sight distance and intersection sight distance is shown in Table 4.8-19, however, it should be noted, that sight distance is not generally at issue when an intersection is signalized and safety is enhanced by the control of traffic at all approaches.

Table 4.8-19 Car Sight Distance Criteria at Various Speeds		
	Stopping Sight Distance	Intersection Sight
Speed (miles per hour)	Distance in feet ²	Distance in feet ^{1, 2}
35	250	390
40	305	445
45	360	500
50	425	555
55	495	610
¹ Intersection Sight Distance Charts, New York State Department of Transportation, Appendix 5C, 2003.		
² A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, 5th ed, 2004 cars for stop controlled intersection.		

The speed limit on northbound and southbound NYS Route 311 is 45 mile per hour near the site access. The placement of an additional five warranted traffic signals, plus the light proposed at the site access, along NYS Route 311 in the vicinity of the project site (at Terry Hill Road, the Interstate 84 ramps, Fair Street and NYS Route 164) and the rising traffic volumes on NYS Route 311 are anticipated to result in slower speeds along this section of the roadway as discussed in Section 4.8-2.

Construction Traffic/ Construction Delivery Traffic

The primary components of construction traffic are the construction vehicles arriving at the beginning of the construction period, trucks carrying materials onto the site, trucks carrying soil, and daily trips of workers. Truck movements for construction activity will access the site via NYS Route 311 to enter and exit the site. Construction truck traffic would access NYS Route 311 from Interstate 84 and travel 880 feet to the project site entrance on the state road except for local contractors as noted below. As a result, it is expected that heavy construction truck traffic would not travel local roads to reach the site. This should minimize road damage and limit impacts on the Towns roads resulting from construction vehicles. To the extent local contractors are employed, they will use state roads to move their equipment except between the contractor's yard and the state system. These contractors already use local roads to move equipment between their yards and job sites.

The construction workers typically arrive and depart the site prior to standard peak hours of traffic as would the initial construction vehicles. Trucks would bring construction materials (concrete, steel, wood, doors, windows) and remove the excess construction materials during

the day. The number of trucks moving soil to or from the site would depend on the grading requirements. The grading plan has been designed to closely balance earthwork thereby limiting trucks moving materials on- or off-site. The construction traffic will primarily be accessing NYS Route 311 via exit 18 of Interstate 84, with local contractor traffic using NYS Route 52, NYS Route 22, and NYS Route 164.

Potential Impacts

Build Condition Traffic

The proposed action includes development of a 405,850 square foot regional retail center. The project trip rate is summarized in Table 4.8-20. Access to the proposed development will be provided through a single access road off NYS Route 311. The proposed access would have a traffic signal and exclusive turn lanes into and out of the site. The second site access off of Echo Road would be for emergency use only.

The proposed action is expected to generate 1,571 external trips during the weekday p.m. peak hour and 2,152 external trips at the Saturday peak hour, including trips already passing the site. The trips exiting and entering the development are shown in Table 4.8-21.

Table 4.8-20				
Patterson Crossing Retail Center Trip Rate Summary				
Land Uses {ITE Code}	Trips			
	P.M. Peak Hour		Saturday Peak Hour	
	IN (Trips/ Unit)	OUT (Trips/ Unit)	IN (Trips/ Units)	OUT (Trips/ Units)
Commercial Development				
Shopping Center 405,850 square feet. {820}	1.866	2.022	2.757	2.545
Unit is 1,000 square feet for Commercial development. Trip Generation, Institute of Transportation Engineers, 7th edition, Washington, DC, 2003.				

Table 4.8-21						
Patterson Crossing Retail Center Trip Generation Summary						
Land Uses	Trips					
	P.M. Peak Hour			Saturday Peak Hour		
	IN (Trips)	OUT (Trips)	Total Trips	IN (Trips)	OUT (Trips)	Total Trips
Shopping Center 405,850 square feet	757	821	1578	1119	1033	2152
Trip Generation, Institute of Transportation Engineers, 7th edition, Washington, DC, 2003.						

External trips include passby trips and non-passby trips. Passby trips are trips already passing the site on NYS Route 311 that would be attracted into the site. Passby trips would account for 25% of external trips. Non-passby trips come from homes, businesses, and other land uses in the vicinity of the proposed retail center or are trips diverted from a road other

than NYS Route 311. The majority of diverted trips would be from Interstate 84 which has a large number of p.m. peak hour weekday commuter trips and Saturday shopping trips. Table 4.8-22 shows external passby and non-passby trips.

Table 4.8-22						
Patterson Crossing Retail Center Site Trips External						
Trip Type	Trips					
	P.M. Peak Hour			Saturday Peak Hour		
	IN (Trips)	OUT (Trips)	Total (Trips)	IN (Trips)	OUT (Trips)	Total (Trips)
External Total	757	821	1578	1119	1033	2152
Site passby (25%)	197	197	394	269	269	538
Site non-passby	560	624	1,184	850	764	1614
Trip Generation, Institute of Transportation Engineers, 7th edition, Washington D.C., 2003.						

Although the effect of traffic generated by the site may be found on roads in the nearby area, the bulk of the traffic would travel along NYS Route 311 between the site access and Exit 18 of Interstate 84. A portion of the future trips on Interstate 84 would be diverted to the site. For the purpose of this study diverted trips are included in non-passby trips. In addition, more than half of the passby trips are from vehicles on NYS Route 311 that are headed to or from Interstate 84.

An estimated 25 percent of site trips are already or will be on NYS Route 311. Of the remaining trips, 57 percent are expected to travel directly to/from Interstate 84. Of these, 42% of the trips are expected to travel from the south and the remaining 15% of trips are expected from the north.

Twenty-nine percent of trips for the project site are expected to come from the Towns of Kent and Carmel (from the west). This traffic will predominately use NYS Route 52 and NYS Route 311. The remaining 14% of trips would be from the Town of Patterson (from the east). The trips traveling west would come from NYS Route 164, NYS Route 311, and US Route 22 areas. The trip distribution from the site is shown in Figures 4.8-6 and 4.8-7 for the weekday p.m. and Saturday peak hour.

Passby trips are based on existing traffic patterns. Diverted trips from Interstate 84 appear in the analysis to be new trips.

Trip distributions are based on a number of factors including local population, existing and future land uses including existing retail outlets, and the local road network. The existing travel patterns are a reflection of the existing land uses and transportation network. Census data from 2000 was used to estimate market populations in the area. These market populations are influenced by other existing retail stores including the Highlands Shopping Center, and Danbury Fair Mall to the east, the Route 9 Corridor (Poughkeepsie Galleria, South Hills Mall, etc.) and shopping centers in Newburgh to the west, and Jefferson Valley

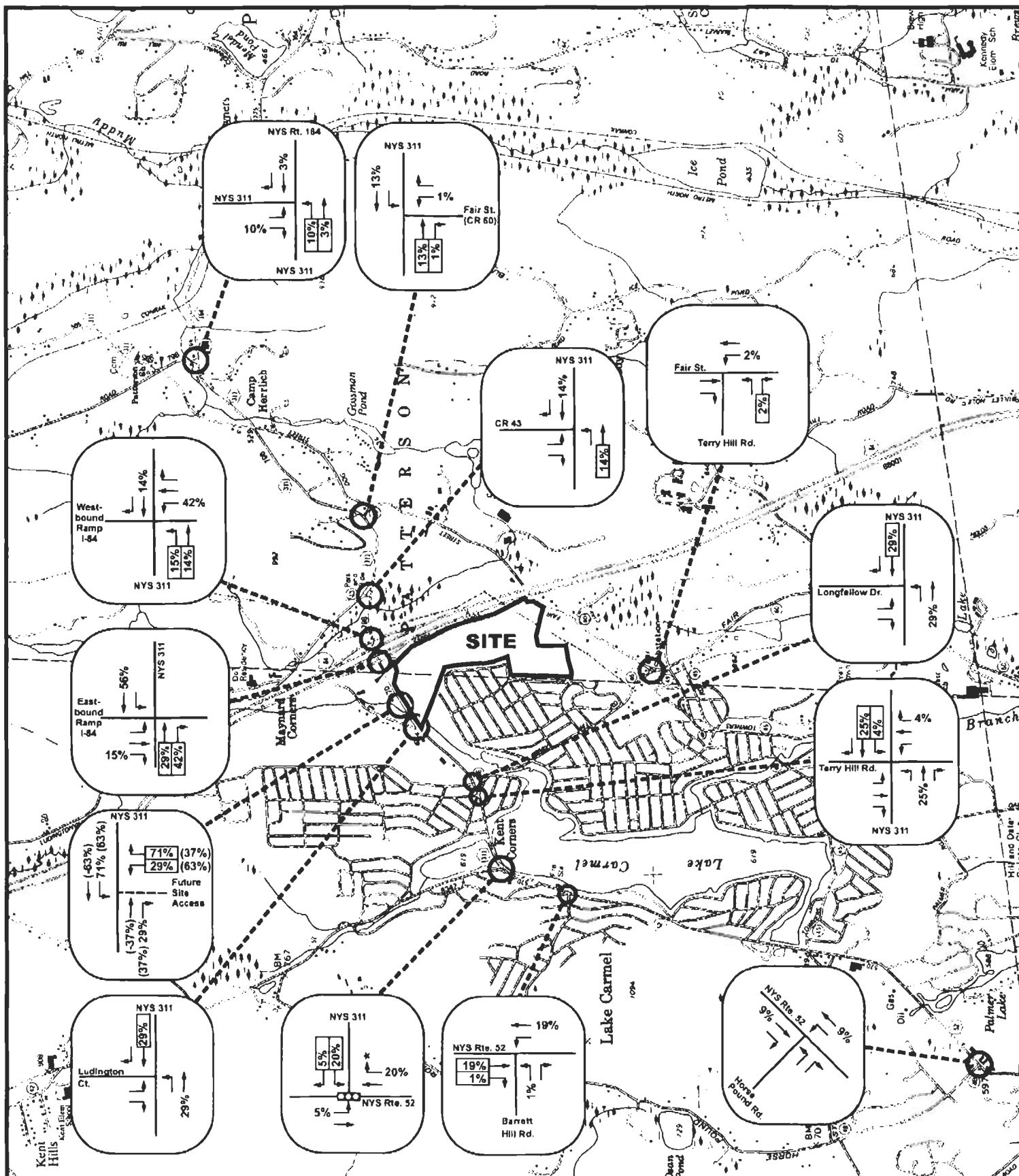
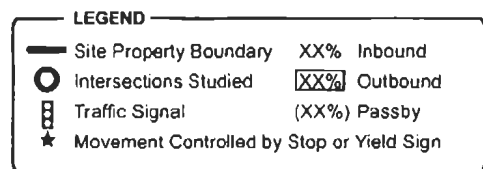


Figure 4.8-6: Percent Distribution
PM Peak Hour Traffic

Patterson Crossing
Town of Patterson, Putnam County, New York
Base Map: USDOT Planimetric Map, Lake Carmel Quad
Scale: n/a



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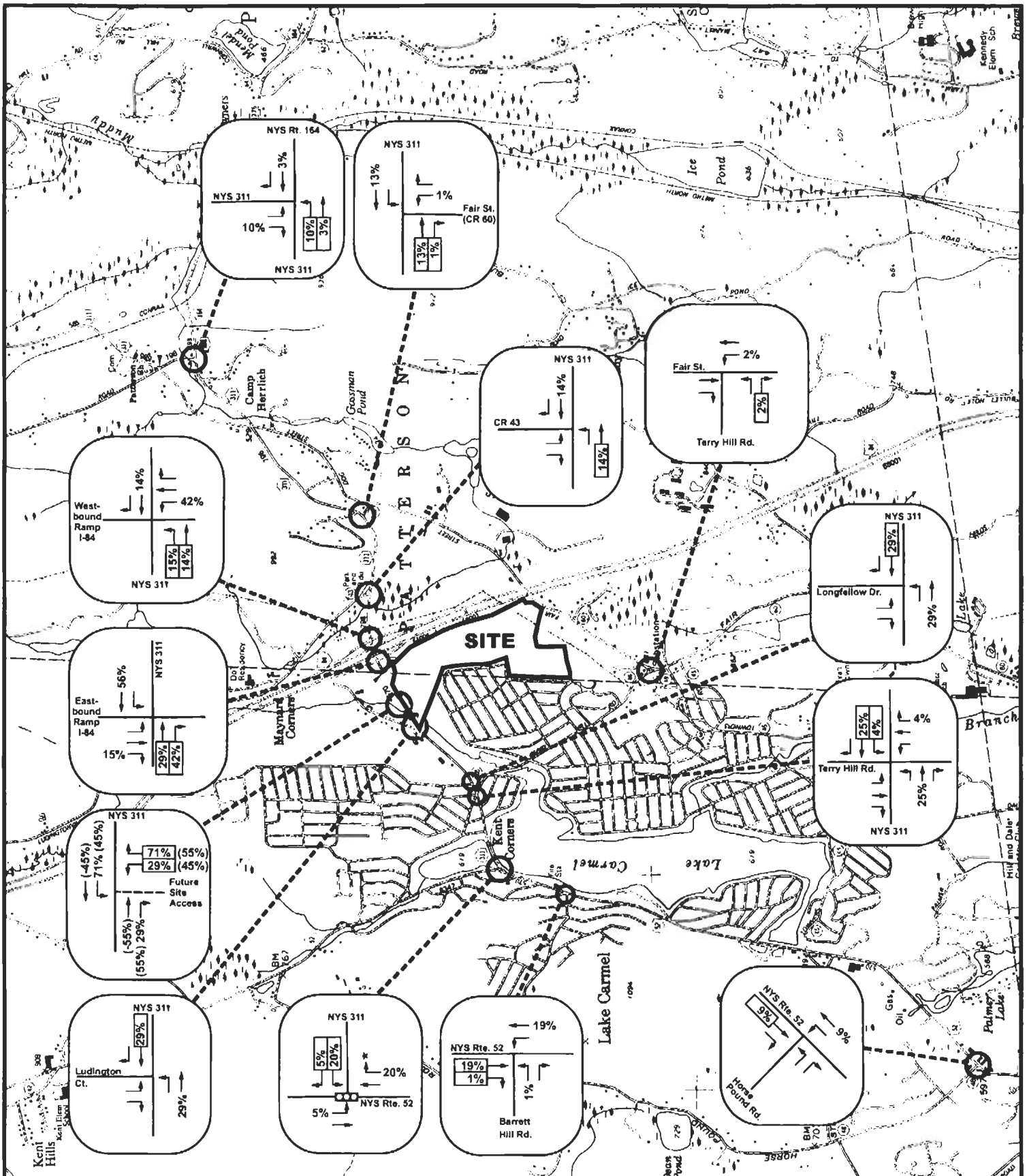


**Figure 4.8-7: Percent Distribution
Saturday Peak Hour Traffic
Patterson Crossing**

Town of Patterson, Putnam County, New York
Base Map: USDOT Planimetric Map, Lake Carmel Quad

Scale: n/a

Shopping Mall (Yorktown), Cortlandt Town Center (Cortlandt) and Shopping Malls in White Plains to the south.

Competing retailers can draw potential patrons away from the area of the proposed development and are therefore considered in the analysis. In addition, the availability of roadways, in particular Interstate 84, NY State 311, NYS Route 52, and US Route 6, is critical in assessing how drivers would arrive at the proposed retail center. Existing traffic patterns place some potential patrons in close proximity to the site making them easier to capture. Existing traffic patterns included both weekday commuter traffic and Saturday shopping traffic on Interstate 84. These patterns also provide insight into potential route assignments.

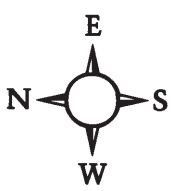
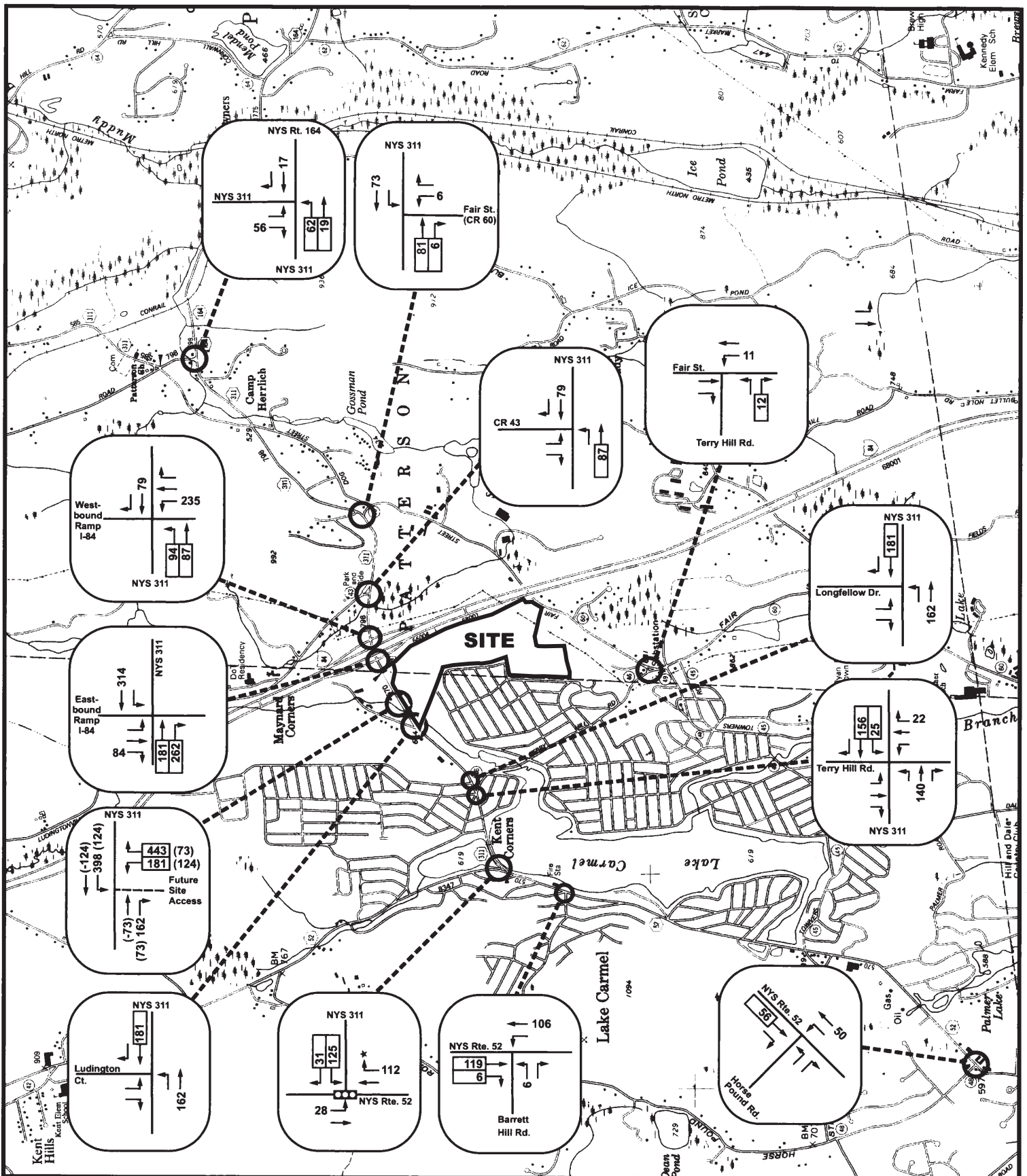
The market analysis (discussed in section 4.12) assesses the consumers within a 10 mile radius of the site and whether their disposable income will make the potential project profitable. It is assumed the transportation network provides reasonably easy access to the project site. The traffic analysis, on the other hand, which is concerned with route assignments and how vehicles will travel to and from the site, assesses the ability of the local road network to provide that access.

The site generated trips during the weekday p.m. and Saturday peak are shown in Figures 4.8-8 and 4.8-9. The site generated trips are added to No Build trips (Figures 4.8-4 and 4.8-5) to obtain Build Condition trips (Figure 4.8-10 and 4.8-11) for the development.

Seasonal Traffic

Daily shopping center trip generation is expected to be higher during the holiday shopping season. During this season many stores expand their hours. Shoppers make more use of off-peak shopping hours, choosing to shop early or late to avoid the crowds and thereby spread traffic volume out more evenly over the longer shopping period. While total shopping trips increase during this season, overall network traffic decreases according to NYS DOT season traffic data.

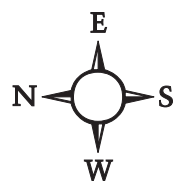
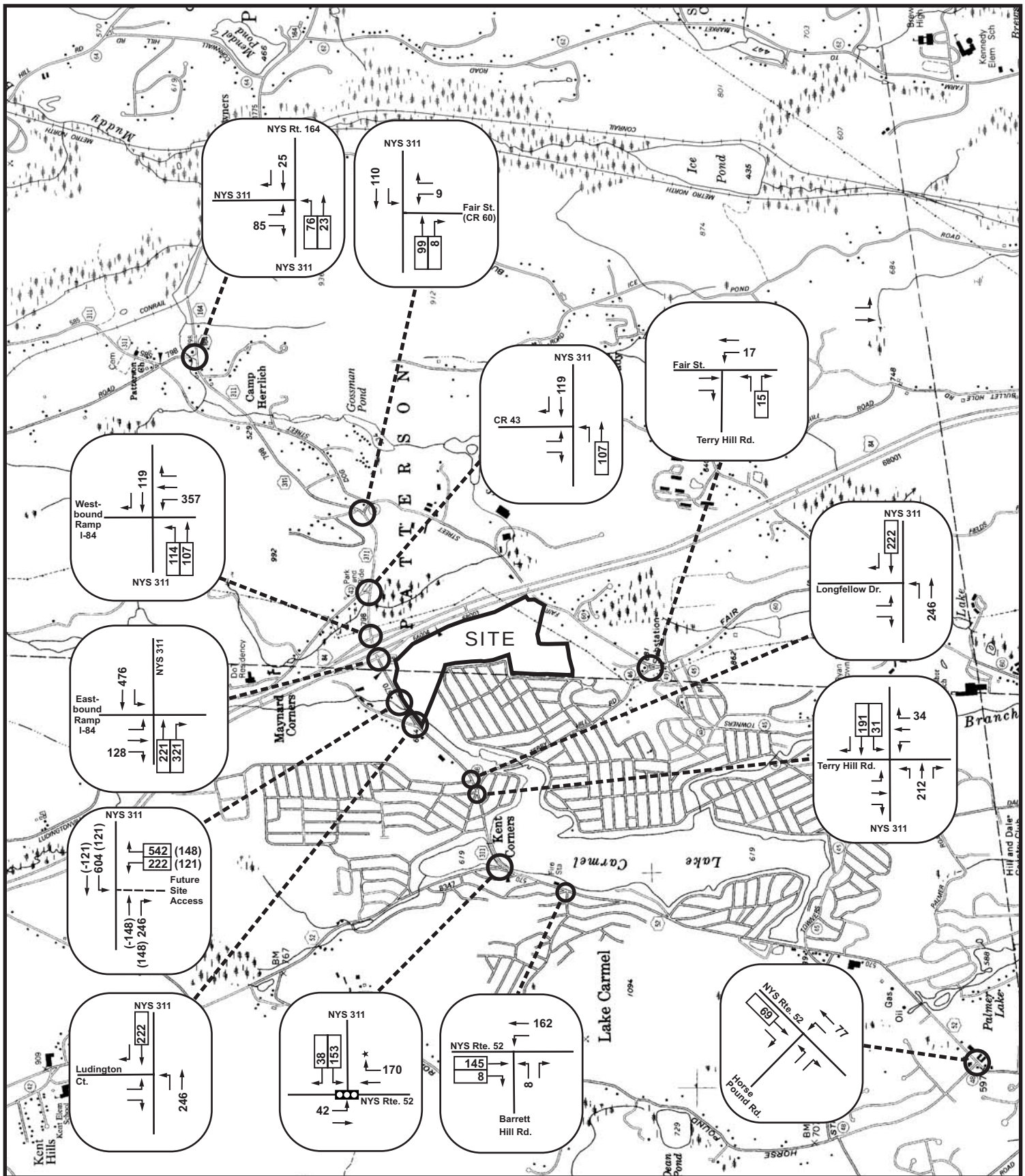
Table 4.8-23 shows the ITE trip generation rates for the holiday shopping peak hours. Table 4.8-24 compares the number of holiday peak hour trips to the typical peak hour traffic volume. P.m. peak hour volume is generally the same between non-holiday and holiday seasons whereas the Saturday peak hour volume is about 16% higher during the holiday season.



LEGEND

Site Property Boundary	Inbound
Intersections Studied	Outbound
Traffic Signal	(XX) Passby
Movement Controlled by Stop or Yield Sign	

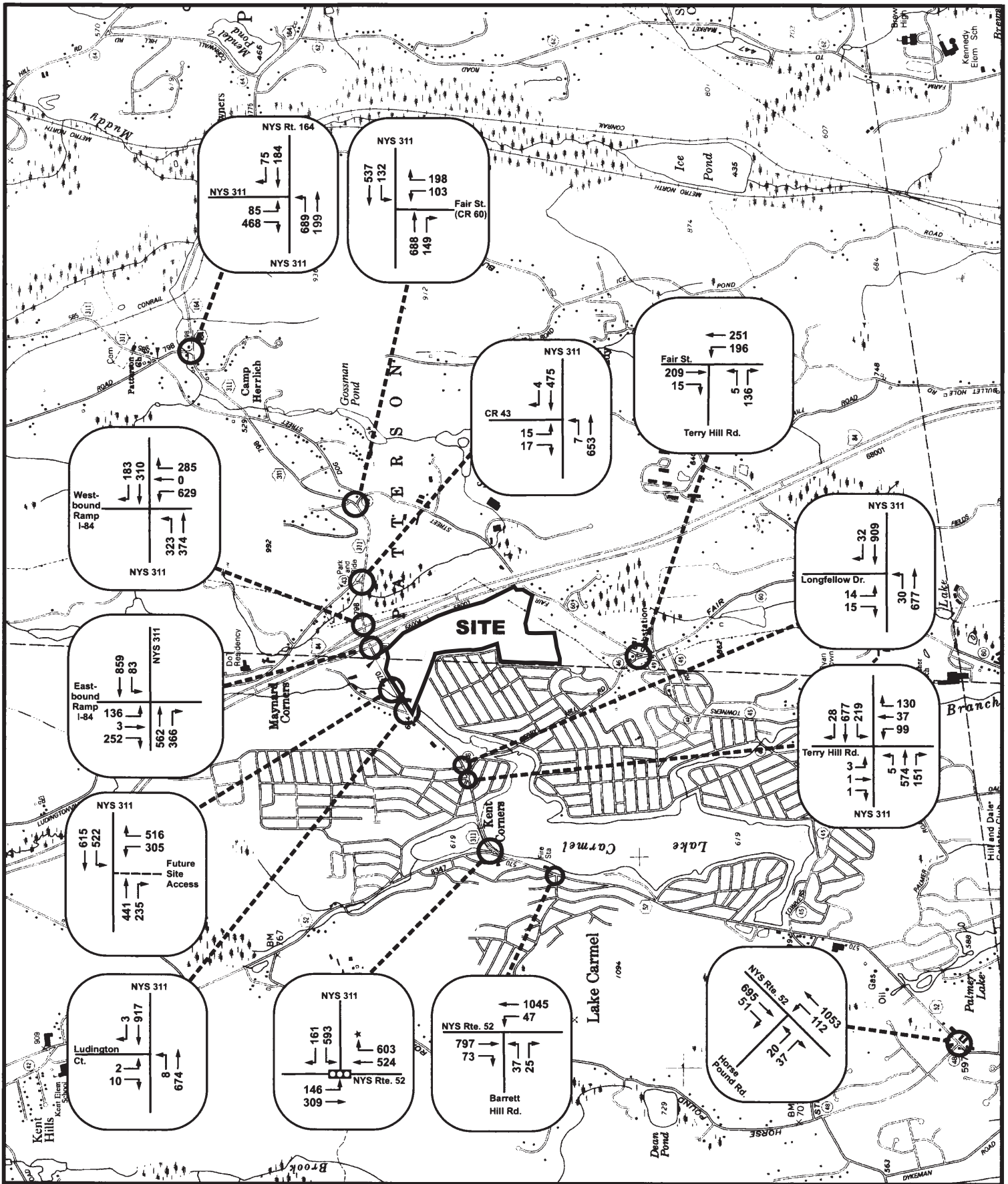
Figure 4.8-8: PM Site Generated Peak Hour Trips
Patterson Crossing
 Town of Patterson, Putnam County, New York
 Base Map: USDOT Planimetric Map, Lake Carmel Quad
 Scale: n/a



- LEGEND**
- Site Property Boundary
 - Intersections Studied
 - Traffic Signal
 - Movement Controlled by Stop or Yield Sign
 - XX Inbound
 - XX Outbound
 - (XX) Passby

Figure 4.8-9: Saturday Site Generated Peak Hour Traffic
Patterson Crossing
 Town of Patterson, Putnam County, New York
 Base Map: USDOT Planimetric Map, Lake Carmel Quad
 Scale: n/a

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LEGEND

- Site Property Boundary
- Intersections Studied
- Traffic Signal
- Movement Controlled by Stop or Yield Sign

Figure 4.8-10: PM Build Peak Hour Traffic
Patterson Crossing
 Town of Patterson, Putnam County, New York
 Base Map: USDOT Planimetric Map, Lake Carmel Quad
 Scale: n/a

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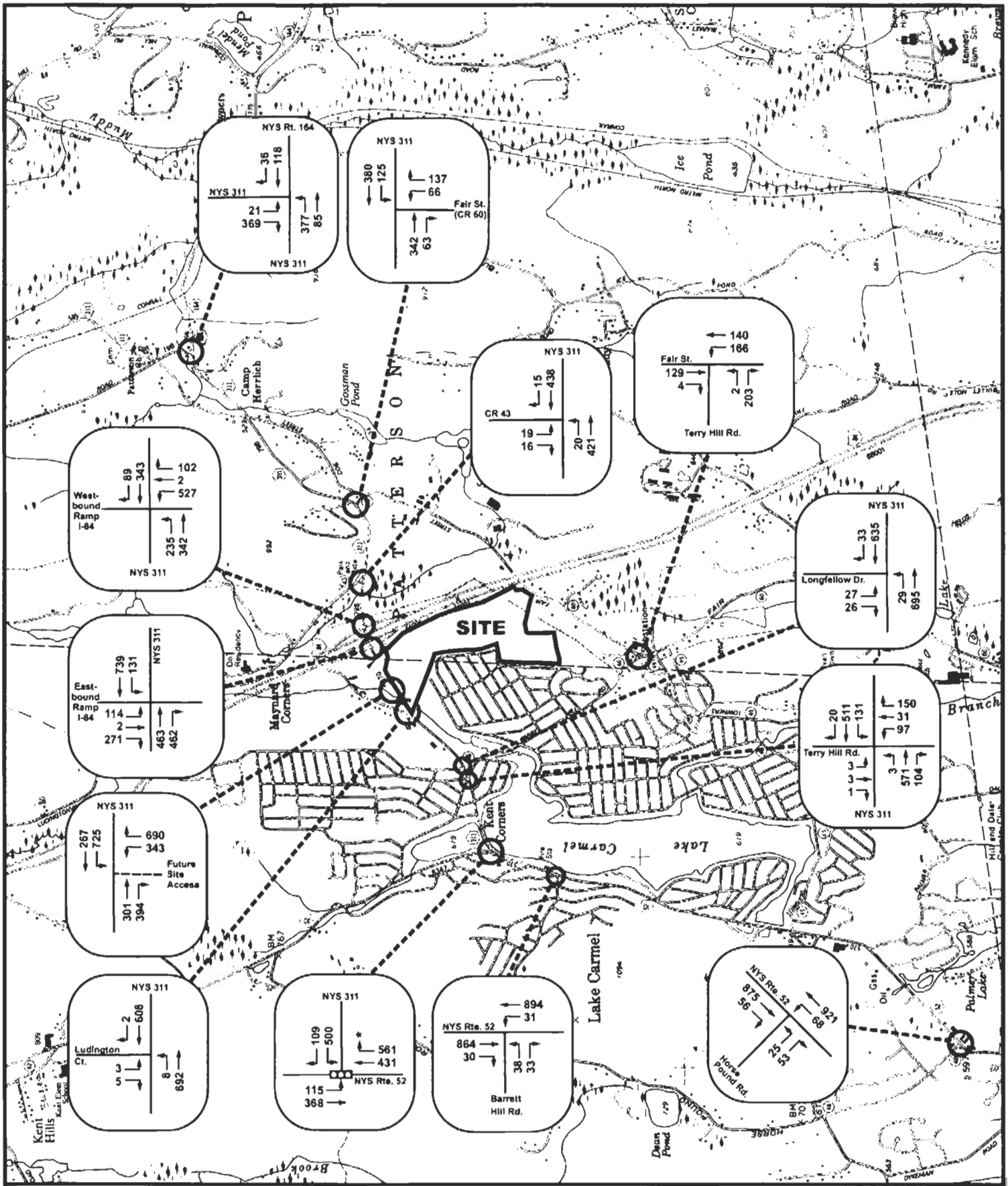


Table 4.8-23 Patterson Crossing Retail Center Project Trip Rate Summary Holiday Season				
Land Uses {ITE Code}	Trips			
	P.M. Peak Hour		Saturday Peak Hour	
	IN (Trips/ 1000 square feet)	OUT (Trips/ 1000 square feet)	IN (Trips/ 1000 square feet)	OUT (Trips/ 1000 square feet)
Commercial Development				
Shopping Center 405,850 square feet. {820}	1.943	1.943	3.147	3.024
Trip Generation, Institute of Transportation Engineers, 7th edition, Washington, DC, 2003.				

Table 4.8-24 Patterson Crossing Retail Center Project Trip Generation Summary						
Land Uses	Trips					
	P.M. Peak Hour			Saturday Peak Hour		
	IN (Trips)	OUT (Trips)	Total Trips	IN (Trips)	OUT (Trips)	Total Trips
Shopping Center 405,850 square feet - Typical	757	821	1578	1119	1033	2152
Shopping Center 405,850 square feet - Holiday Season	789	789	1578	1277	1227	2504
Trip Generation, Institute of Transportation Engineers, 7th edition, Washington, DC, 2003.						

Build Condition Level of Service

Tables 4.8-25 and 4.8-26 show the level of service summary for the studied intersections for the future Build Condition with the project. With the anticipated development of the project site there would be decreases in level of service on intersections along NYS Route 311. The delays entering NYS Route 311 would increase from Terry Hill Road, the ramps of Interstate 84 (Exit 18) and Fair Street. Potential modifications to provide levels of service D or better at all intersections are discussed in section 4.8.4.

Table 4.8-25 - Build Level of Service Summary in the Town of Kent

Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
NYS Route 311 and NYS Route 52									
NYS Route 311	WB - L	1.17	**	117.8	F*	1.00	26.6	59.9	E*
	WB - R (2)	0.36	5.9	18.8	B	0.24	4.1	17.3	B
NYS Route 52	NB - T	0.51	13.5	11.8	B	0.46	11.8	11.1	B
	SB - L, T	1.01	26.2	56.7	E*	0.80	17.6	22.3	C*
	Overall			61.0	E*			31.0	C*
NYS Route 311 and Terry Hill Road									
NYS Route 311	EB - L, T, R	0.01	0.02	9.1	A	0.00	0.01	8.7	A
	WB - L, T, R	0.26	1.05	10.7	B*	0.18	0.63	10.1	B*
Terry Hill Road	NB - L, T, R	**	**	**	F	**	**	**	F
	SB - L, T, R	**	**	**	F	0.38	1.20	**	F*
NYS Route 311 and Longfellow Drive									
NYS Route 311	EB - L, T	0.05	0.14	10.3	B*	0.03	0.11	9.1	A
Longfellow Drive	SB - L, R	0.32	1.29	41.7	E*	0.38	1.64	33.6	D*
NYS Route 311 and Ludington Court									
NYS Route 311	EB - L, T	0.01	0.03	9.9	A	0.01	0.03	9.0	A
Ludington Court	SB - L, R	0.08	0.27	20.5	C	0.05	0.14	20.7	B
NYS Route 52 and Barrett Hill Road									
NYS Route 52	NB - L, T	0.07	0.21	10.0	B*	0.05	0.15	10.8	B*
Barrett Hill Road	EB - L, R	0.85	4.52	**	F	1.00	5.68	**	F
NYS Route 52 and Horse Pound Road									
NYS Route 52	NB - L (3)	0.16	0.56	10.5	B	0.12	0.41	11.1	B
Horse Pound Road	EB - L, R	0.66	3.22	95.8	F	0.98	5.94	**	F
NYS Route 311 and Site Access									
NYS Route 311	EB - T	0.84	16.6	30.4	C	0.89	14.4	44.3	D
	EB - R (8)	0.31	4.9	6.1	A	0.62	11.9	11.8	B
NYS Route 311	WB - L (20)	0.80	12.4	22.1	C	0.92	19.2	22.7	C
	WB - T	0.53	12.7	7.0	A	0.25	2.7	2.9	A
Site Access	NB - L (40)	0.83	12.7	36.6	D	0.90	14.9	46.0	D
	NB - R (12)	0.68	14.9	12.7	B	0.76	19.0	12.0	B
	Overall			18.4	B			21.8	C

LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria).
V/C is Volume to Capacity Ratio. *Unsignalized intersections are shown in Italics.*

95th % Queue (Veh.) is the 95th percentile queue length in vehicles.

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.

L = left, R = right, T = through, {e.g. WB-L (1) = Westbound left with storage for one vehicle}).

* Decline in level of service from the No Build Condition.

** measure of effectiveness with either V/C greater than 2, queue greater than 30, or delay exceeds 120 seconds.

Table 4.8-26 Build Level of Service Summary in the Town of Patterson									
Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
NYS Route 311 and I-84 Eastbound ramp									
NYS Route 311	WB - L, T	0.13	0.46	11.5	B*	0.22	0.83	11.4	B
I-84 EB ramp	SB - L, T (45)	**	**	**	F	**	14.08	**	F*
	SB - R (45***)	0.85	7.60	53.5	F*	0.96	10.22	74.5	F*
NYS Route 311 and I-84 Westbound ramp									
NYS Route 311	EB - L, T	0.36	1.64	10.6	B*	0.26	1.07	9.8	A
I-84 WB ramp	NB - L, T (32)	**	15.74	**	F	**	**	**	F*
	NB - R (32***)	0.47	2.52	15.5	C*	0.18	0.65	11.7	B
NYS Route 311 and Ludingtonville Road									
NYS Route 311	EB - L, T	0.01	0.02	8.5	A	0.02	0.07	8.5	A
Ludingtonville Road	NB - L, R	0.10	0.32	19.6	C	0.12	0.39	17.2	C*
NYS Route 311 and Fair Street									
NYS Route 311	WB - L, T	0.18	0.68	10.6	B	0.13	0.45	8.9	A
Fair Street	NB - L, R	1.97	26.45	**	F	0.68	4.71	34.1	D*
NYS Route 311 and NYS Route 164 west									
NYS Route 164	NB - L, R	1.24	11.09	**	F	0.46	2.27	27.7	D*
NYS Route 311 and NYS Route 164 east									
NYS Route 311	SB - L, R	0.16	0.57	12.9	B	0.03	0.10	10.1	B*
NYS Route 311 and NYS Route 164 north									
NYS Route 311	EB - L, T	0.10	0.33	9.5	A	0.02	0.06	8.4	A
NYS Route 164	NB - L, R	0.22	0.81	15.8	C*	0.07	0.22	11.6	B
Fair Street and Terry Hill Road									
Fair Street	NB - L, T	0.17	0.61	8.4	A	0.12	0.42	7.9	A
Terry Hill Road	EB - L, R	0.28	1.12	11.8	B	0.26	1.05	10.5	B
LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria).									
V/C is Volume to Capacity Ratio.									
95th % Queue (Veh.) is the 95th percentile queue length in vehicles.									
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.									
L = left, R = right, T = through, {e.g. WB-L (1)= Westbound left with storage for one vehicle}.									
Unsignalized intersections are shown in <i>Italics</i> .									
* Decline in level of service from the No Build Condition.									
** measure of effectiveness with either V/C greater than 2, queue greater than 30, or delay exceeds 120 seconds.									
*** functional length includes shoulder.									

Internal Traffic Circulation

The applicant proposes a two-way road connecting to NYS Route 311 which will be used for exiting and entering the site. Truck traffic is diverted from employee and customer traffic using two drives near the entrance of the first building. The truck access roads run from the site access road to the rear of the buildings. Seven internal driveways are proposed to intersect the main site access road that will connect to customer/employee parking areas. Thus, the internal site is designed to separate most truck delivery services from customer activities and keep them away from the existing residential areas where possible. The majority of truck loading, unloading, and movement occurs behind the proposed buildings which limit visual and noise impacts to local residents. The customers and employees will use the front and/or side of the buildings for parking and access.

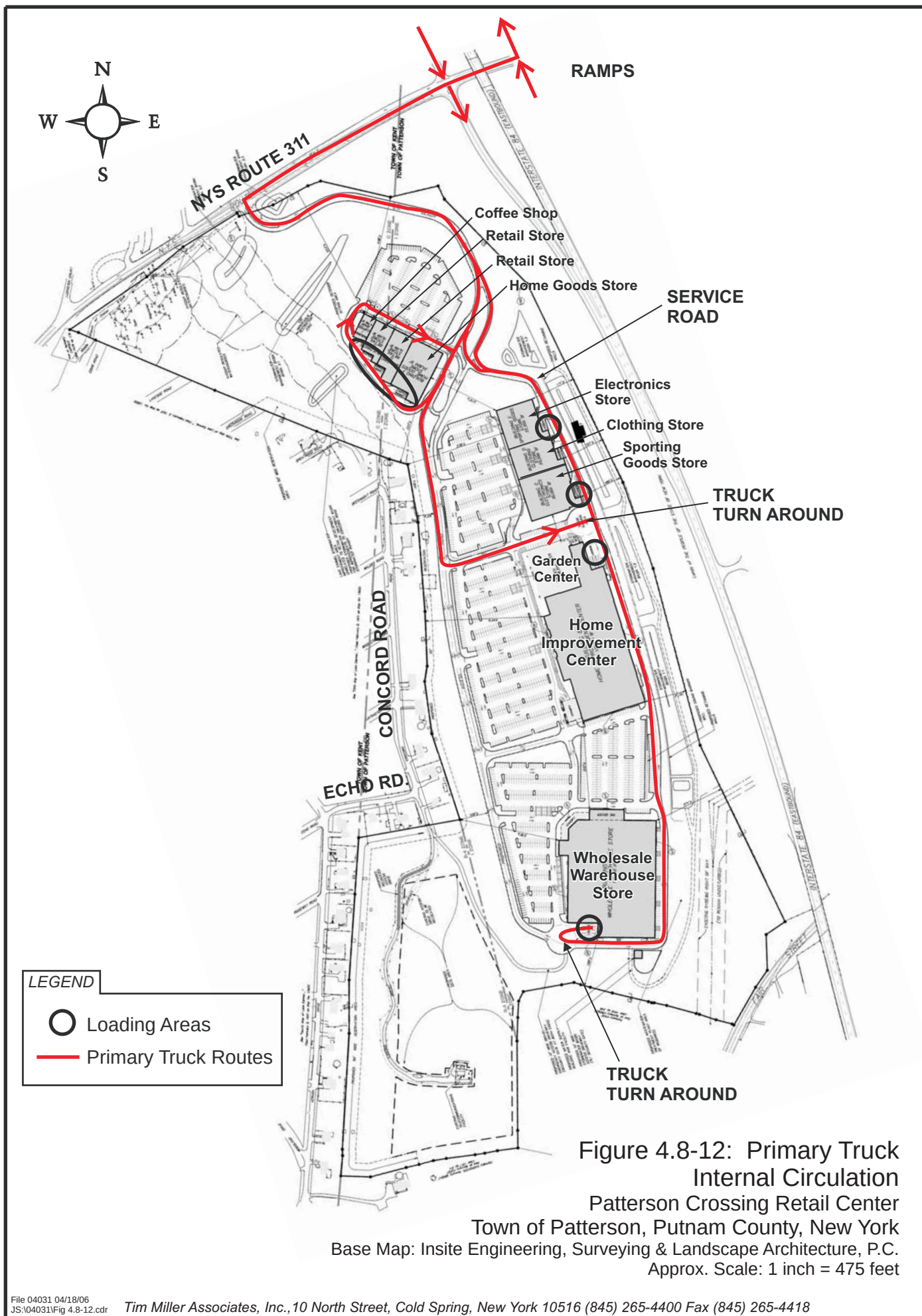
The site internal road has a separate left turn lane so trucks can be directed onto the rear service road behind the main buildings and away from houses along the western frontage road. A turn around is provided between the buildings to allow trucks to return to the site exit without traversing the western frontage road. Most of the major truck activities in the eastern part of the site will be buffered by the site buildings for visual and noise purposes from the nearby residential housing west of the project site. See Figure 4.8-12 for anticipated truck routing and access points. Tractor trailer trucks would be traveling to and from the Interstate 84 interchange. Smaller delivery trucks would also utilize Interstate 84 unless already making deliveries in nearby towns that would be accessed through local roadways.

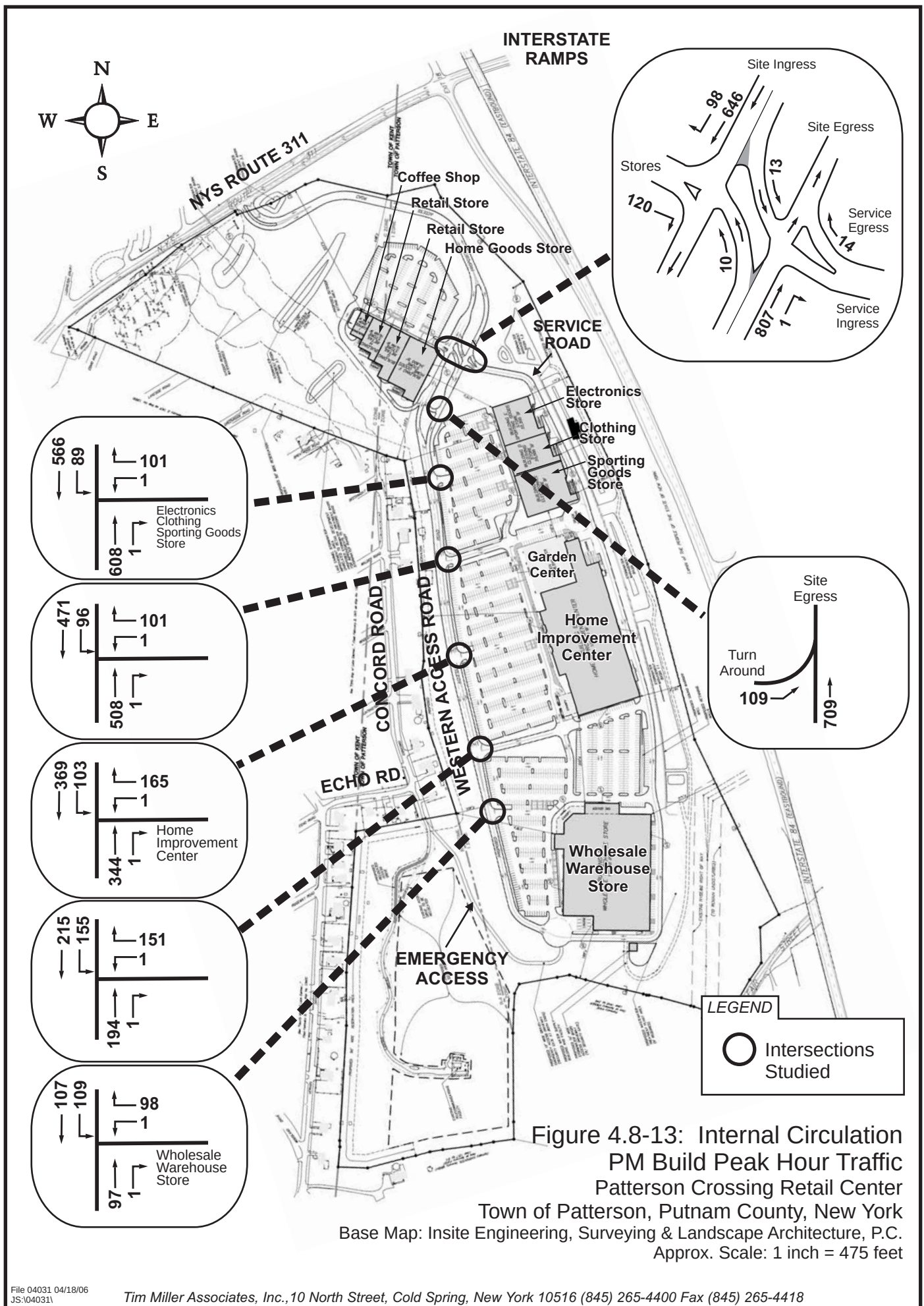
The first right turn on the access road brings vehicles to the home goods store, coffee shop, and two other retail stores. The second right turn is for truck access to those same buildings. Only right turns are permitted out of this portion of the site with exiting traffic using a median turnaround to exit the project site.

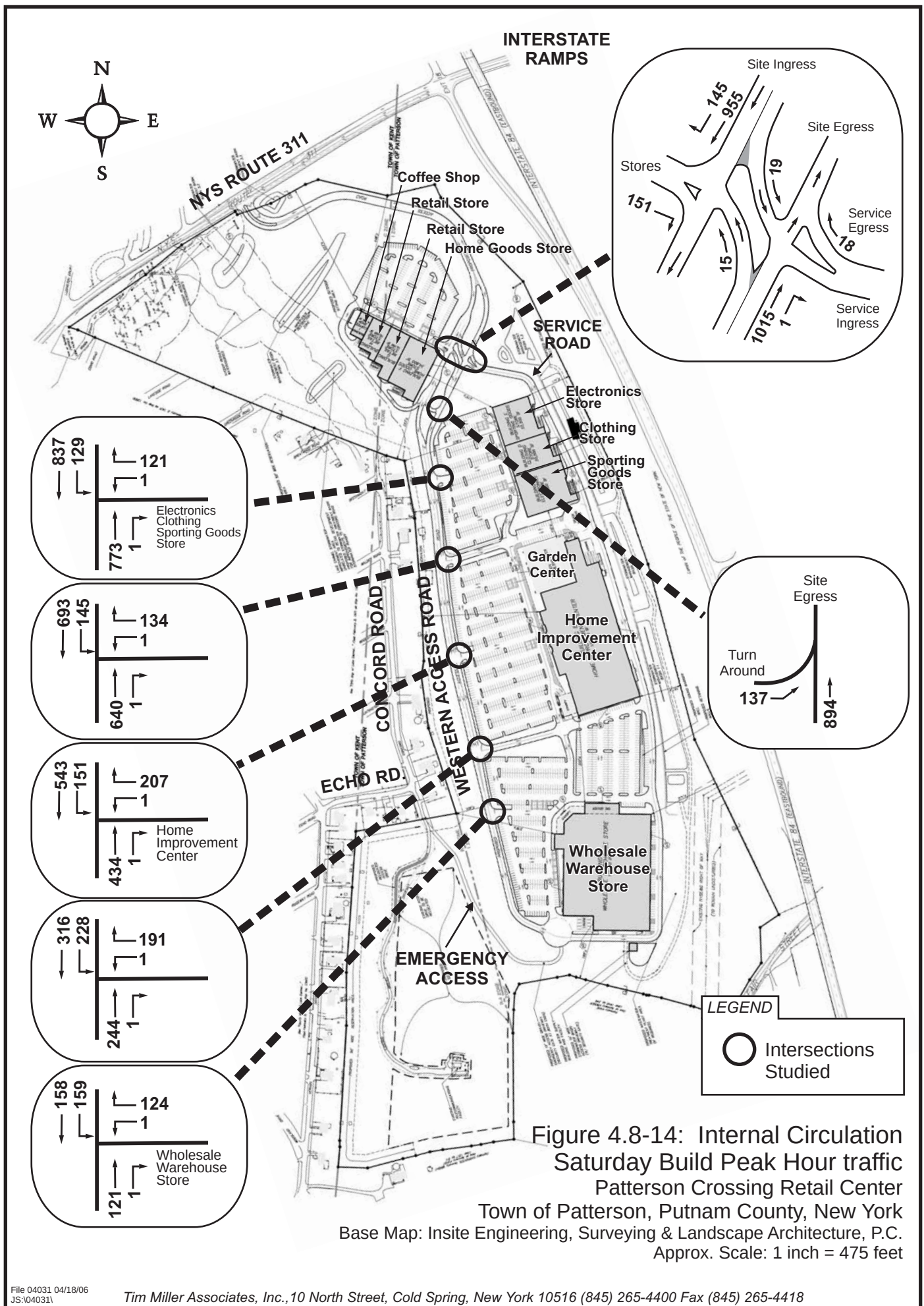
There is a second through lane along a portion of the western frontage road. This additional through lane will function at times as a left turn lane. There are six accesses to the southern part of the site. Major internal intersections are shown in Figures 4.8-13 and 4.8-14; one into each main parking area and one after each area that proceeds directly to buildings without aisle parking. A road runs directly in front of all of the buildings allowing ease of access between major parking areas and pickup/dropoff at the buildings.

The traffic demand on parking area driveways along the western frontage road was estimated based on the square footage of the building associated with that parking area. Where more than one access point to a building's parking area is proposed, trips were divided between the associated access points serving the parking area.

Access points between two buildings service both buildings. There is no parking along the driveway access aisles servicing two buildings, whereas there is parking along access aisles leading directly to individual buildings. Prohibiting parking along the access aisles serving two buildings improves mobility by eliminating parking conflicts (e.g. waiting for vehicles to pull into and out of parking spaces). The access aisles serving two buildings trade are thus projected to have slightly higher peak volumes than access aisles serving a single building. During off peak times when the parking conflicts are reduced and the probability of obtaining a parking space directly in front of the building entrance improves, the direct access aisle is expected to attract more use than the access aisle between two buildings.







Detailed plans for signing and stripping internal roads and parking areas will be provided as part of final site design.

The project site has an existing telecommunication facility with a driveway to Concord Road near Echo Road. An emergency access road connects the southern most point of the site near the wholesale warehouse store to the driveway of the telecommunication facility. In an emergency, should the site access be blocked, emergency access would occur through this access road.

The trip generation data included in Table 4.8-22 is based on a single land use, Shopping Center. These trips are referred to as external trips. The external trips begin or end off-site. Each vehicle arriving at and each vehicle leaving the proposed development is counted as a trip. External trips consist of passby trips, and non-passby trips. Internal trips, are not included in Table 4.8-22.

Internal trips are trips between uses on the site. Once on site, a vehicle may make multiple internal trips. The number of internal trips is related to the number of vehicles on-site and the number of uses on the site. The number of vehicles on site is related to the number of external trips associated with the proposed development. Based on the uses proposed on the site, the internal trips were projected as a standard 10 percent of the external trips.

Table 4.8-27 shows the internal trips and external trips anticipated on the internal site roads. The highest concentration of site trips occurs along the frontage road shown in Figures 4.8-13 and 4.8-14. These figures depict internal circulation during the p.m. and Saturday peak hours on the frontage road. Internal traffic using the internal roads directly in front of the buildings are not shown on Figures 4.8-13 and 4-8-14. Internal trips between uses in the same parking area (e.g. trips between the electronics store and clothing store) are also not shown on these figures. Internal trips between uses in the same parking area are likely to occur as pedestrian trips and are not included in Figures 4-8-13 and 4-8-14.

Table 4.8-27						
Patterson Crossing Retail Center Trips Internal and External						
Trip Type	Trips					
	P.M. Weekday Peak Hour			Saturday Peak Hour		
	IN (Trips)	OUT (Trips)	Total (Trips)	IN (Trips)	OUT (Trips)	Total (Trips)
Shopping Center 405,850 square feet (See Table 4.8-21) External trips	757	821	1,578	1,119	1,033	2,152
Internal (10%) ²	76	82	158	112	103	215
¹ Trip Generation, Institute of Transportation Engineers, 7th edition, Washington D.C., 2003.						
² A portion of these trips would be pedestrian trips.						

Table 4.8-28 shows the expected levels of service along the site's main frontage road. Level of service analysis is shown in Appendix K. Levels of service D or better are anticipated at all major internal site intersections.

Table 4.8-28
Internal Intersections Level of Service Summary

Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
Main Access Road and Truck Access to Service Road									
Truck Access	EB - T	0.05	0.16	20.2	C	0.11	0.36	27.2	D
Main Egress Road and Turn Around									
Turn Around	EB - L (5)	0.30	1.24	18.4	C	0.49	2.56	28.8	D
Main Access Road and Home Goods Access (includes Retail Stores and Cafe)									
Home Goods Access	WB - T	0.03	0.09	16.3	C	0.08	0.24	24.7	C
	EB - R	0.28	1.13	16.0	C	0.54	2.98	30.8	D
Main Access Road and Electronics Store Access (includes Clothing Store and Sporting Goods Store)									
Main Access Road	SB - L, T	0.10	0.32	9.2	A	0.16	0.59	10.2	B
Electronics Store Access	WB - L, R	0.26	1.01	16.5	C	0.40	1.86	23.6	C
Main Access Road and Sporting Goods Store Access (Adjacent to Garden Center)									
Main Access Road	SB - L, T	0.10	0.32	8.8	A	0.16	0.58	9.6	A
Sporting Goods Access	WB - L, R	0.22	0.82	14.4	B	0.36	1.60	19.1	C
Main Access Road and Home Improvement Access									
Main Access Road	SB - L, T	0.09	0.29	8.3	A	0.14	0.49	8.8	A
Home Improvement Access	WB - L, R	0.27	1.11	12.8	B	0.39	1.87	15.7	C
Main Access Road and Home Improvement and Wholesale Warehouse Access									
Main Access Road	SB - L, T	0.12	0.40	8.0	A	0.18	0.66	8.3	A
Home Improvement and Wholesale Access	WB - L, R	0.19	0.70	10.3	B	0.26	1.04	11.3	B
Main Access Road and Wholesale Warehouse Access									
Main Access Road	SB - L, T	0.08	0.25	7.6	A	0.11	0.38	7.8	A
Wholesale Warehouse Access	WB - L, R	0.11	0.37	9.2	A	0.14	0.50	9.6	A

LOS is Level-of-Service (see Table 4.8-7 for level-of-service criteria).

V/C is Volume to Capacity Ratio.

95th % Queue (Veh.) is the 95th percentile queue length in vehicles.

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.

L = left, R = right, T = through, T, R = through and right, (e.g. WB-L Westbound left).

Unsignalized intersections are shown in *Italics*.

4.8.4 Improvement Measures

Potential Area Improvements

Existing traffic volumes are already stressing the transportation network as evidenced by the current low levels of service at certain intersections. Additional projects in the area are expected to further increase delays at study intersections. The traffic generated by the project would increase traffic at all the studied intersections.

Geometric measures and signalization are needed to improve the level of service for certain intersections as listed in Tables 4.8-11 and 4.8-16. With the installation of the road and intersection improvements identified in this section, all signalized intersections would operate at levels of service D or better. The improved levels of service are shown in Tables 4.8-29 and 4.8-30. If potential funding of improvements is not secured or is untimely, then additional traffic delays would be projected until such time as improvements are complete.

Under the future No-build condition, improvement efforts are needed at the eight intersections listed below:

- NYS Route 52 and NYS Route 311 Intersection
- Terry Hill Road and NYS Route 311
- Fair Street and NYS Route 311
- Interstate 84 westbound Ramps and NYS Route 311
- Interstate 84 Eastbound Ramps and NYS Route 311
- NYS Route 311 and NYS Route 164
- NYS Route 52 and Barrett Hill Road
- NYS Route 52 and Horse Pound Road

Development of the site will generate \$6.2 to \$7.4 million in sales tax revenue per year to the County and \$7.0 to \$8.4 million per year to the State of New York. This will more than offset the costs for completing the highway infrastructure improvements noted. NYS Route 52 and NYS Route 311, where improvements are identified, are under State jurisdiction. No improvements have been suggested in this report for the intersection of Fair Street and Terry Hill Road, a County intersection based on the existing geometry favoring left turns onto Terry Hill Road.

NYS Route 52 and NYS Route 311 Intersection

NYS Route 52 is a single lane in both directions at its intersection with NYS Route 311. A channelized right turn movement is provided for northbound NYS Route 52. The level of service for the NYS Route 311 can be improved by adjusting signal timings.

The NYS Route 311/NYS Route 52 intersection would improve to level of service D or better in both the weekday p.m. and Saturday peak hour with signal timing adjustment and anticipated traffic. The diversion of traffic is anticipated from NYS Route 52 with the construction of a traffic signal at NYS Route 311 and Terry Hill Road. Although the Route 52 left turn movement at NYS Route 311 movement is longer in distance, it is safer than using Terry Hill Road/NYS Route 311 without a signal there. In weekday p.m. and Saturday peak hours 72 and 39 trips, respectively, are expected to be rerouted achieving acceptable level of service of D for all the approaches.

NYS Route 311 and Terry Hill Road

In the Existing Condition the level of service from northbound Terry Hill Road is operating at level of service F during the p.m. peak hour. The delays for Terry Hill Road will continue to increase in No Build and Build Conditions due to the increase in through traffic on NYS Route 311. The delays for NYS Route 311 and Terry Hill Road can be improved by signalizing the intersection and providing left turn lanes on NYS Route 311 in both directions. The capacity analysis in the improved condition for the NYS Route 311/Terry Hill Road intersection takes into account rerouting of traffic to Terry Hill Road from NYS Route 52 and Longfellow Drive.

The traffic analysis assumes a worse case scenario for the Terry Hill Road/NYS Route 52 intersection by assuming all peak hour traffic exiting Longfellow Drive diverts to North Terry Hill Road to take advantage of a future traffic signal. The Longfellow Drive analysis is also a worse case scenario by assuming there is no diversion to the Terry Hill signal. It is anticipated that some drivers would exercise the option of using an alternative route to the Terry Hill Road/NYS Route 52 traffic signal thereby reducing the volume of traffic moving from Longfellow Drive to NYS Route 52.

As part of the design for a NYS Route 52 left turn lane improvement at Terry Hill Road, a left turn lane into Longfellow Drive should be considered (Appendix K, Figure K-13) as both left turn lanes are warranted under the Existing Condition.

Any signalization of the Terry Hill Road/NYS Route 311 intersection may also divert traffic from Harvard Road to North Terry Hill Road improving safety at this intersection.

NYS Route 311 and Longfellow Drive

The delay for the southbound Longfellow Drive is expected to increase from approximately 24.0 seconds in the No Build Condition to 40.6 seconds in p.m. peak hour for the Build Condition. The delays could be less than projected because of the platooning effect of upstream and downstream traffic signals.

It is anticipated that during peak hours, delays on Longfellow Drive would be reduced when drivers choose to divert to Terry Hill Road where they can access NYS Route 311 at the proposed signal at NYS Route 311/Terry Hill Road. This would result in a reduction in the volume of traffic exiting Longfellow Drive onto NYS Route 52.

NYS Route 311 and Interstate 84 Eastbound and Westbound Ramps

The Interstate 84 ramps at NYS Route 311 are anticipated to operate at level of service F in the No Build and Build Condition. In this report both the intersections were examined independently. The distance between both the intersections is a few hundred feet. Signalization and coordination should provide a better level of service. Apart from signalization, certain geometric improvements are needed to achieve acceptable level of service including the following:

- a) Provide an extra through lane at westbound NYS Route 311 at eastbound off ramp.
- b) Widen both the off ramps so the right turn lanes can be striped as formal lanes.
- c) Provide a second left turn lane at off ramp of westbound Interstate 84.
- d) Provide a separate left turn lane for eastbound NYS Route 311.

The limited queue storage on NYS Route 311 between the Interstate 84 ramps must be considered when phasing the signals at these intersections.

The traffic signal analysis includes key aspects of signal timing including short cycle length and queue management. Short cycle lengths on the signals are important in maintaining the short queue lengths on NYS Route 311 between the Interstate 84 ramps. Queue management is as important as level of service when considering volume at an intersection. Priority needs to be given to the westbound off ramp traffic to avoid the potential of backing traffic up onto Interstate 84 through lanes. This ramp would have green time priority over the NYS Route 311 southbound approach to the intersection. As the volume of traffic on the ramp is expected to increase faster than the NYS Route 311 traffic traveling from Patterson, capacity on NYS Route 311 will need to be reduced to compensate for increases in ramp volumes. The purpose of adding traffic signals to NYS Route 311 is to shift capacity from NYS Route 311 to the side streets. The increased capacity for the minor street, permits the minor street traffic to enter NYS Route 311 more easily.

NYS Route 311 and Fair Street

The level of service for the minor street movements operates at level of service F during the Existing Condition in the p.m. peak hour period. The delays on Fair Street will increase in the No Build Condition and Build Condition. The delays on the minor movement of Fair Street can be reduced by signaling the intersection and adding a separate right turn on Fair Street.

NYS Route 311

The speed limit on NYS Route 311 should be reduced to 30 or 35 miles per hour to reflect the presence of five new warranted traffic signals (see Tables 4.8-11 and 16) and increased traffic volumes associated with the future traffic under the No Build Condition. Additional traffic volume and the proposed site access signal associated with the Build Condition would further the need for the reduction of the speed limit on NYS Route 311.

Overall Benefits

Network improvements will reduce delays to acceptable levels. The project is anticipated to capture trips passing by on Interstate 84 currently destined for other shopping opportunities. The project is also expected to capture commuter trips passing the site during the p.m. weekday commute and capture Saturday trips of local residents that might otherwise have left the Town, County, and/or state for other shopping opportunities. This will reduce the number of longer distant trips currently taken by local residents.

Table 4.8-29 Build with Improvement Level of Service Summary in Town of Kent									
Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
NYS Route 52 and NYS Route 311									
NYS Route 311 NYS Route 52	WB - L	0.89	23.0	32.3	C	0.92	21.6	40.5	D*
	WB - R (2)	0.28	4.9	12.6	B	0.23	3.7	14.7	B
	NB - T	0.64	15.2	17.6	B	0.49	11.8	12.3	B
	SB - T	0.96	19.5	50.2	D*	0.92	20.5	36.1	D*
	Overall			30.3	C*			29.2	C*
NYS Route 311 and Terry Hill Road									
NYS Route 311 Terry Hill Road	EB - L (2)	0.03	0.1	9.2	A	0.01	0.1	9.7	A
	EB - T, R	0.98	31.5	44.0	D	0.99	31.7	45.6	D*
	WB - L (5)	0.59	4.1	22.5	C*	0.42	2.8	20.8	C*
	WB - T, R	0.67	17.0	9.7	A	0.60	14.2	9.6	A
	NB - L, T, R	0.90	13.0	47.9	D	0.95	17.1	54.4	D*
	SB - L, T, R	0.61	4.6	25.9	C	0.03	0.3	16.3	B
	Overall			29.7	C*			33.7	C*
NYS Route 52 and Barrett Hill Road									
NYS Route 52	NB - L (2)	0.07	0.21	10.0	B*	0.05	0.15	10.8	B*
Barrett Hill Road	EB - L, R	0.34	1.41	29.4	D*	0.42	1.91	34.5	D*
NYS Route 52 and Horse Pound Road									
NYS Route 52	NB - L (3)	0.16	0.56	10.5	B	0.12	0.41	11.1	B
Horse Pound Road	EB - L, R	0.27	1.05	26.0	D*	0.43	2.01	32.2	D
LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria). V/C is Volume to Capacity Ratio. 95th % Queue (Veh.) is the 95th percentile queue length in vehicles. NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound. L = left, R = right, T = through, T, R = through and right, {e.g. WB-L (1)= Westbound left with storage for one vehicle}. Unsignalized intersections are shown in Italics.									
* Decline in level of service from the No Build Condition with improvements.									

Table 4.8-30
Build with Improvements Level of Service Summary in Town of Patterson

Intersection Roads	Lane Group (Approach Direction Movement)	P.M. Weekday Peak Hour				Saturday Peak Hour			
		V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS	V/C Ratio	95th % Queue (Veh.)	Delay (secs./ vehicle)	LOS
NYS Route 311 and I-84 eastbound ramp									
NYS Route 311	EB - T	0.81	20.5	20.6	C	0.80	16.2	25.8	C*
	EB - R (12)	0.62	11.8	14.4	B*	0.94	19.7	45.0	D*
NYS Route 311	WB - L (3)	0.17	1.3	12.2	B*	0.24	2.5	10.7	B*
	WB - T	0.75	8.7	3.9	A	0.76	8.9	4.1	A
I-84 EB ramp	SB - L, T (8)	0.44	5.1	21.9	C	0.36	4.3	20.5	C
	SB - R (16)	0.84	11.3	40.1	D*	0.89	13.4	45.1	D*
	Overall			15.6	B			23.0	C*
NYS Route 311 and I-84 westbound ramp									
NYS Route 311	EB - L (8)	0.75	8.0	23.0	C*	0.55	6.3	19.0	B
	EB - T	0.53	7.6	7.6	A	0.47	7.7	9.3	A
NYS Route 311	WB - T	0.93	15.8	51.8	D*	0.92	17.4	45.2	D*
	WB - R (12)	0.65	7.5	25.7	C	0.28	3.3	18.5	B
I-84 WB ramp	NB - L (30)	0.90	23.9	29.7	C*	0.95	25.0	43.3	D*
	NB - T, R (10)	0.45	7.9	13.1	B	0.21	3.0	13.2	B
	Overall			25.7	C*			30.1	C*
NYS Route 311 and Fair Street									
NYS Route 311	EB - T, R	0.84	28.9	18.9	B	0.49	15.9	13.2	B
	WB - L, T	0.87	14.5	17.3	B	0.63	11.9	10.1	B*
Fair Street	NB - L	0.50	4.9	29.3	C	0.20	3.4	28.8	C
	NB - R	0.51	8.0	21.1	C	0.46	7.6	31.3	C
	Overall			19.2	B			15.0	B
NYS Route 311 and NYS Route 164									
NYS Route 164	WB - L, R	0.90	13.3	49.0	D	0.49	5.7	22.4	C
NYS Route 311	NB - T	0.84	23.6	23.9	C*	0.47	10.6	12.7	B
	NB - R (3)	0.17	2.2	2.2	A	0.08	1.0	2.0	A
NYS Route 311	SB - L (2)	0.21	1.3	14.7	B	0.04	0.4	6.1	A
	SB - T	0.41	8.7	5.7	A	0.40	8.5	5.6	A
	Overall			20.5	C*			10.3	B*

See Table 4.8-8 for level of service criteria. Level of service for the signalized intersections are not directly comparable to unsignalized level of service.

V/C is Volume to Capacity Ratio.

95th % Queue (Veh.) is the 95th percentile queue length in vehicles.

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.

L = left, R = right, T = through, {e.g. WB-L (1)= Westbound left with storage for one vehicle}.

* Decline in level of service from the No Build Condition with improvements.

All intersections are signalized.

Table 4.8-31 displays the changes in traffic volumes occurring under various conditions on NYS Route 311 during the weekday p.m. and Saturday peak hour periods. The "Site Generated Volume" shows the additional number of vehicle peak hour trips that are projected to occur when Patterson Crossing Retail Center is complete. Since most of the traffic is destined to and from the interstate, increases beyond Interstate 84 to the East in Patterson, and to the West in Kent, are relatively modest during peak hours. Outside the peak hours, volumes East of Interstate 84 and West of the site would be lower than projected peak hour conditions and lower still than the peak fifteen minute rates used in the traffic analysis.

Tables 4.8-32 to 4.8-35 summarize changes in level of service.

Table 4.8-31 Changes in NYS Route 311 Traffic Volume Summary				
Intersection Roads and Condition	P.M. Weekday Peak Hour		Saturday Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Town of Patterson NYS Route 311 east of I-84				
Existing Volume	489	344	282	260
Future Growth (Background and other projects)	+83	+70	+55	+53
Future No Build Volume (Existing plus Future Growth)	572	414	337	313
Site Generated Volume	+87	+79	+107	+119
Future Build Volume (No Build plus Site Generated)	659	493	444	432
Town of Kent NYS Route 311 west of site access				
Existing Volume	385	610	367	307
Future Growth (Background and other projects)	+129	+129	+82	+81
Future No Build Condition (Existing plus Future Growth)	514	739	449	388
Site Generated Volume	+162	+181	+246	+222
Future Build Volume (No Build plus Site Generated)	676	920	695	610

Table 4.8-32
Level of Service for Improved Intersections All Conditions (Town of Kent)

	Lane Group (Approach Direction Movement)	Levels of Service					
Intersection Roads		P.M. Weekday Peak Hour			Saturday Peak Hour		
		Conditions			Conditions		
		Existing	No Build/ Build (without Improve- ments)	No Build/ Build (with Improve- ments)	Existing	No Build/ Build (without Improve- ments)	No Build/ Build (with Improve- ments)
NYS Route 52 and NYS Route 311							
NYS Route 311	WB - L	C	D*/F*	C/C	C	C/E*	C/D*
	WB - R	B	B/B	B/B	B	B/B	B/B
NYS Route 52	NB - T	B	B/B	B/B	A	B*/B	B/B
	SB - T	B	C*/E*	C*/D*	B	B/C*	B/D*
	Overall	B	C*/E*	B/C*	B	B/C*	B/C*
NYS Route 311 and Terry Hill Road							
NYS Route 311	EB - L			A/A			A/A
	EB - T, R	A(LTR)	A/A (LTR)	C*/D*	A(LTR)	A/A (LTR)	B*/D*
Terry Hill Road	WB - L	A (LTR)	A/B* (LTR)	B*/C*	A (LTR)	A/B* (LTR)	B*/C*
	WB - T, R			A/A			A/A
	NB - L, T, R	F	F/F	D/D	C	F*/F	D*/D*
	SB - L, T, R	D	F*/F	C/C	C	D*/F*	B/B
	Overall	--	--	B/C*	--	--	B/C*
NYS Route 52 and Barrett Hill Road							
NYS Route 52	NB - L	A	A/B*	A/B*	A	A/B*	A/B*
Barrett Hill Road	EB - L, R	C	F*/F	C/D*	C	F*/F	C/D*
NYS Route 52 and Horse Pound Road							
NYS Route 52	NB - L	A	B*/B	B*/B	A	B*/B	B*/B
Horse Pound Road	EB - L, R	D	F*/F	C/D*	D	F*/F	D/D

LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria).

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.

L = left, R = right, T = through, T, R = through and right, (LTR) = all direction {(e.g. WB-L)= Westbound left }.

Unsignalized intersections are shown in Italics.

-- LOS is not computed for overall nor free moving lane groups at unsignalized intersections.

* Decline in level of service from Existing to No Build, Existing to No Build With improvements, No Build to Build, or No Build with improvements to Build with improvements.

Table 4.8-33 - Level of Service for Improved Intersections All Conditions (Town of Patterson)

Intersection Roads	Lane Group (Approach Direction Movement)	Levels of Service					
		P.M. Weekday Peak Hour			Saturday Peak Hour		
		Conditions			Conditions		
		Existing	No Build/ Build (without improve- ments)	No Build/ Build (with improve- ments)	Existing	No Build/ Build (without improve- ments)	No Build/ Build (with improve- ments)
NYS Route 311 and I-84 eastbound ramp							
NYS Route 311	EB - T	--	--	B/C*	--	--	B/C*
	EB - R	--	--	A/B*	--	--	B/D*
NYS Route 311	WB - L	<i>A (L, T)</i>	<i>A/B* (L, T)</i>	A/B*	<i>A (L, T)</i>	<i>A/B* (L, T)</i>	A/B*
	WB - T			A/A			A/A
I-84 EB ramp	SB - L, T	<i>D</i>	<i>F*/F</i>	C/C	<i>C</i>	<i>E*/F*</i>	C/C
	SB - R	<i>B</i>	<i>C*/F*</i>	C/D*	<i>B</i>	<i>B/F*</i>	C*/D*
	Overall	--	--	B/B	--	--	B/C*
NYS Route 311 and I-84 westbound ramp							
NYS Route 311	EB - L	<i>A (L, T)</i>	<i>A/B* (L, T)</i>	B*/C*	<i>A (L, T)</i>	<i>A/A (L, T)</i>	B*/B
	EB - T			A/A			A/A
NYS Route 311	WB - T	--	--	C/D*	--	--	C/D*
	WB - R	--	--	C/C	--	--	B/B
I-84 WB ramp	NB - L	<i>F (L, T)</i>	<i>F/F (L, T)</i>	B/C*	<i>C (L, T)</i>	<i>E*/F* (L, T)</i>	B/D*
	NB - T, R	<i>B (R)</i>	<i>B/C* (R)</i>	B/B	<i>B (R)</i>	<i>B/B (R)</i>	B/B
	Overall	--	--	B/C*	--	--	B/C*
NYS Route 311 and Fair Street							
NYS Route 311	EB - T, R	--	--	B/B	--	--	B/B
	WB - L, T	<i>A (L, T)</i>	<i>B*/B (L, T)</i>	A/B*	<i>A (L, T)</i>	<i>A/A (L, T)</i>	A/B*
Fair Street	NB - L	<i>F (L, R)</i>	<i>F/F (L, R)</i>	C/C	<i>C (L, R)</i>	<i>C/D* (L, R)</i>	C/C
	NB - R			C/C			C/C
Overall		--	--	B/B	--	--	B/B
NYS Route 311 and NYS Route 164							
NYS Route 164	WB - L, R	<i>E (L, R)</i>	<i>F*/F (L, R)</i>	D/D	<i>B (L, R)</i>	<i>C*/D* (L, R)</i>	C*/C
NYS Route 311	NB - T	--	--	B/C*	--	--	B/B
	NB - R			A/A			A/A
NYS Route 311	SB - L	<i>B (L, T)</i>	<i>B/B (L, T)</i>	B/B	<i>A (L, T)</i>	<i>A/B* (L, T)</i>	A/A
	SB - T			A/A			A/A
Overall		--	--	B/C*	--	--	A/B*

LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria).

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound, L = left, R = right, T = through,

Unsignalized intersections are shown in italics.

-- LOS is not computed for overall nor free moving lane groups at unsignalized intersections.

Only part of NYS Route 311 NYS Route 164 shown.

* Decline in level of service from Existing to No Build, No Build to Build, or No Build with improvements to Build with improvements.

Table 4.8-34 Level of Service Summary Unimproved Intersections and Site Access							
Intersection Roads	Lane Group (Approach Direction Movement)	Levels of Service					
		P.M. Weekday Peak Hour			Saturday Peak Hour		
		Conditions			Conditions		
		Existing	No Build	Build	Existing	No Build	Build
<i>NYS Route 311 and Longfellow Drive</i>							
NYS Route 311	EB - L, T	A	A	B*	A	A	A
Longfellow Drive	SB - L, R	C	D*	(E*)**	B	C*	(D*)**
<i>NYS Route 311 and Ludington Court</i>							
NYS Route 311	EB - L, T	A	A	A	A	A	A
Ludington Court	SB - L, R	B	C*	C	B	B	B
<i>NYS Route 311 and Ludingtonville Road</i>							
NYS Route 311	EB - L, T	A	A	A	A	A	A
Ludingtonville Road	NB - L, R	B	C*	C	B	B	C*
<i>Fair Street and Terry Hill Road</i>							
Fair Street	NB - L, T	A	A	A	A	A	A
Terry Hill Road	EB - L, R	B	B	B	B	B	B
<i>NYS Route 311 and Site Access</i>							
NYS Route 311	EB - T	--	--	C	--	--	D
	EB - R	--	--	A	--	--	B
NYS Route 311	WB - L	--	--	C	--	--	C
	WB - T	--	--	A	--	--	A
Site Access	NB - L	--	--	D	--	--	D
	NB - R	--	--	B	--	--	B
	Overall	--	--	B	--	--	C
LOS is Level-of-Service (see Table 4.8-7 and 4.8-8 for level-of-service criteria).							
** Actual level of service anticipated to be better than shown as vehicles divert to North Terry Hill Road /NYS Route 311 traffic signal.							
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.							
L = left, R = right, T = through, {e.g. WB-L = Westbound left}.							
<i>Unsignalized intersections are shown in Italics.</i>							
* Decline in level of service from the previous condition.							
-- The site access intersections does not exist in the Existing and No Build Conditions							

Proposed Mitigation Measures

The Applicant understands that traffic continues to be a planning issue in the area, recognizes that a project like the Patterson Crossing Retail Center has the potential to exacerbate traffic conditions, and that a remedy is warranted. As set forth in this document,

most of the problems relating to poorly operating intersections in the vicinity of the proposed project exist under current conditions and are a result of regional and local growth that has taken place in Putnam County generally, and in the Towns of Patterson and Kent specifically. The majority of intersections that require improvements require them whether or not the Patterson Crossing Retail Center project is developed. Identified mitigation is warranted under the Existing Condition, No Build Future Condition and with the Proposed Action. Intersections in the area will require improvements as a result of background growth, other pending projects under consideration in the area, and traffic resulting from the Patterson Crossing Retail Center (see Table 4.8-35).

The improvements outlined in Table 4.8-35 will improve current conditions and allow the studied intersections to operate at acceptable levels with the project. The project will facilitate road and intersection improvements that will improve existing conditions as well as improvements necessary to mitigate project specific impacts, helping to pay for both. The Applicant will be responsible for mitigating the project specific impacts to the greatest extent practicable and will work with the NYS DOT and others to fund and construct other improvements that would help alleviate traffic issues under the current conditions.

Specifically, the Applicant is committed to participate in a significant way in the funding of intersection improvements in the area. In addition to the widening and signalization of Route 311 in front of the Applicant's property, the Applicant will work with the appropriate authorities to identify intersections where improvements are warranted as a result of the proposed action and will share in the cost of those improvements. The applicant also commits to working aggressively with the Town, the County and the DOT towards funding an improvement program for road and infrastructure updates in the project vicinity to ensure that the intersections in the study area operate at levels acceptable to the NYS DOT into the future.

With the noted improvements, all studied signalized intersections should perform at or better than level of service D (see Table 4.8-8), the minimum level of service recommended by NYS DOT for signalized intersections (NYS DOT Highway Design Manual page 5-92). In addition, with these improvements, all studied unsignalized intersection are anticipated to perform at level of service D or better with the exception of Longfellow Drive /NYS Route 311 intersection, which should perform at level of service E. A reduction in the delay at this intersection is expected as traffic diverts to an adjoining intersection (intersection of Terry Hill Road and NYS Route 311) which is to be signalized.

Table 4.8-35
Warranted Intersection Improvements

Table 4.8-35 Warranted Intersection Improvements								
Intersection (Appendix K figure)	NYS Route 164 and NYS Route 311 (Figure K-10)	Fair Street and NYS Route 311 (Figure K-11)	NYS Route 311 and I-84 Westbound ramp (Figure K-12)	NYS Route 311 and I-84 Eastbound ramp (Figure K-12)	Terry Hill Road and NYS Route 311 (Figure K-13)	NYS Route 52 and NYS Route 311 (Figure K-14)	NYS Route 52 and Barrett Hill Road (Figure K-15)	NYS Route 52 and Horse Pound Road (Figure K-16)
Existing Condition Improvements	Construct right and left turn lanes on NYS Route 311.	Signalize intersection. Construct right turn lane on Fair Street	Signalize intersection. Construct Route 311 left turn lane into I-84. Extend right turn lane onto I-84. Existing off ramp lane would be widened to formalize right-through lane.	Construct westbound Route 311 left turn lane into the I-84 on-ramp Existing off ramp lane would be widened to formalize right lane as separate lane	Signalize intersection. Construct left turn lanes on NYS Route 311.	widen NYS Route 311 to allow additional right turn storage.	Construct a left turn lane on NYS Route 52.	
No Build Condition Improvements	Signalize intersection.			Signalize intersection.		Retime traffic signal.	Construct center turn lane on NYS Route 52.	Construct center turn lane on NYS Route 52.
The site access is proposed to have left and right turn lanes into and out of the site in conjunction with a traffic signal. This site access improvement, in addition to the on-site road network, is included as part of the site design contained in the Build Condition.								

4.9 Noise

4.9.1 Background

Noise is generally defined as undesirable or unwanted sound. Even though noise is somewhat subjective, it affects the full range of human activities and should be considered in development planning. Most of the sounds heard in the environment are not composed of a single frequency but are a band of frequencies, each with a different intensity or level. Levels of noise are measured in units called decibels. Since the human ear cannot perceive all pitches or frequencies equally, sound measurements are adjusted or weighted to correspond to human hearing. This adjusted unit is known as the A-weighted decibel, or dBA, which is useful for gauging and comparing the subjective loudness of sounds.

Table 4.9-1 provides a comparison of typical decibel levels for various common sounds.

Table 4.9-1 Relative Loudness of Common Sounds Expressed in Decibels (dBA)		
Source	dBA	Subjective Description
Human breathing	5	Very faint
Rustle of leaves in wind	10	Very faint
Average whisper	20	Very faint
Average residence with stereo playing	30	Faint
Soft radio music in apartment	40	Faint
Average office	50	Moderate
Near freeway auto traffic	60	Moderate
Stenographic room	70	Loud
School cafeteria with untreated surfaces	80	Loud
Noisy factory	85	Very Loud
Noisy urban street	90	Very Loud
Auto horn at 10 feet	100	Very Loud
Accelerating motorcycle at few feet away	110	Deafening
Threshold of feeling: hard rock band	120	Deafening
Threshold of pain	130	Deafening
Jet engine at 300 feet	140	Deafening
Source: based on "The Noise Guidebook", U.S. Department of Housing and Urban Development, March 1985.		

Since dBA describes a noise level at just one instant while ambient noise levels are constantly varying, other ratings are used to describe noise levels, especially over extended periods. The equivalent noise level, or L_{eq} , is defined as the level of a continuous sound containing the same amount of acoustical energy as a fluctuating sound over the same period. L_{eq} is used in the prediction of future noise levels, by logarithmically adding the contributions from new noise sources to the existing ambient levels, and in relating annoyances to increased noise levels. L_{eq} is a generally accepted noise measurement criteria for noise assessments. To establish a representative interval, L_{eq} measurements are typically based on a monitoring period of no less than 15 minutes in duration.

Other common means of characterizing the noise environment include L_{90} , which represents the noise level exceeded ninety percent of the time during the period of measurement, and L_{Max} , which is the maximum sound level recorded during a noise monitoring period. The L_{Max} measurement generally reflects short-term impulsive noise sources such as honking horns, and is therefore not typically used for determining and/or designing noise attenuation measures.

A one decibel change in noise level is the smallest change detectable by the human ear under suitable laboratory conditions. However, under normal conditions, a change in noise level of two or three decibels is required for the average person to notice a difference. A reduction of 5 dBA is a readily noticeable change. Since decibels are measured logarithmically, a 10 dB change in noise level is a doubling or halving of the loudness of sound. Tables 4.9-2 and 4.9-3 characterize community perceptions of changes in noise levels and community responses to increases in noise levels.

Table 4.9-2 Perception of Changes in Noise Levels	
Change (dBA)	Average Ability to Perceive Changes in Noise Levels Human Perception of Change
2-3	Barely perceptible
5	Readily Noticeable
10	A doubling or halving of the loudness of sound
20	A dramatic change
40	Difference between a faintly audible sound and a very loud sound
Source: Bolt Baranek and Neuman, Inc. Fundamentals and Abatement of Highway Traffic Noise, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.	

4.9.2 Noise Standards

Town of Patterson Noise Standards

The Town of Patterson noise ordinance (Town Code Section 117-8) finds that *"it is...the policy of the Town Board to prevent any unreasonably loud, disturbing and unnecessary noise. Noise of such character, intensity, duration as to be detrimental to the life or health of any individual or contrary to the public welfare is prohibited"*.

The code provides a list of specific acts, among others that are declared to be "loud, disturbing and unnecessary noises in violation of the Code, "provided they create a noise exceeding seventy-five (75) decibels at the adjoining property line", but the specific noise creating acts are not exclusive.

Town of Kent Noise Standards

The Town of Kent noise ordinance (Local Law No. 4-1971, Local Law No. 5-1971), finds that *"unnecessary and unusual noises, particularly if continued for an unreasonable length of time, are or might be detrimental to the health of the residents of the Town"*.

Article I of the ordinance specifically limits the noise from certain activities between the hours of 11:00 p.m. and 7:00 a.m., including: 1) operating radios, televisions and similar

equipment, 2) noise from parties or gatherings, 3) building activity, and 4) "operating any motor vehicle, motorcycle, lawn mower, engine, or other equipment without an adequate muffler, properly installed and maintained as to prevent excessive or unusual noise", and 5) "operating any commercial vehicle for the purpose of pick-up or delivery of goods or refuse".

Article II of the ordinance prohibits operating a motor vehicle "in such a manner as to cause excessive squealing or other excessive noise of the tires or motor of said vehicle or motorcycle on the streets of the Town of Kent". Under this Article, noise is specifically limited for the improper operation or lack of equipment or maintenance of vehicles. In summary, noise from vehicles which are properly maintained and operated is not prohibited by the Town noise ordinance.

In addition, the Town of Kent ordinance references the New York State Vehicle and Traffic Law, Section 386. This law defines excessive or unusual motor vehicle noise as any sound of 88 decibels or more on the "A" scale as measured at a distance of fifty (50) feet from the center of the travel lane.

The Town of Patterson and Town of Kent regulatory provisions do not specifically govern environmental noise such as that emanating from a highway. For comparative purposes, the noise standards and guidelines promulgated by the Federal Highway Administration (FHWA), the NYS Department of Transportation (NYSDOT), and the U.S. Department of Housing and Urban Development (HUD) are provided in the following paragraphs.

FHWA Noise Guidelines

The FHWA guidelines recommend exterior design noise levels applicable to Federal highway projects adjacent to various land uses exposed to noise generated by vehicular traffic from highways. The FHWA establishes an exterior design noise threshold of 67 dBA (L_{eq}) for residential areas; however noises approaching this level are also considered. The definition of "approaching" is 1 dBA below the design noise level. Therefore, the FHWA recommends use of noise abatement measures in highway projects adjacent to residential areas where the noise level could exceed 66 dBA (L_{eq}).

NYSDOT Noise Standards

The NYSDOT Environmental Procedures Manual (August 1998) establishes noise impact criteria for use in its design of highway and non-highway projects. Noise impacts for highway projects are a refinement of the FHWA noise criteria that utilize a two prong approach to determine impacts: Criteria 1) if future noise levels are projected to approach 1 dBA of the National Abatement Criteria (NAC); and Criteria 2) if there is a substantial increase over existing noise levels. The NAC establishes absolute noise thresholds for various land use categories. The NAC threshold that would apply to the project site area (Category B) is 67 dBA (see 23 CFR Part 772). The NYSDOT would consider mitigation of noise impacts if the ambient noise levels exceed 66 dBA (L_{eq}) in a Category B area (Criteria #1), or if an increase of 6 dBA occurs over existing noise levels (Criteria #2).

HUD Noise Standards

HUD has adopted environmental noise standards for determining acceptability of federally-assisted projects and mitigation measures to ensure that activities assisted by HUD

will achieve the goal of attaining a suitable living environment. Although the proposed community is not subject to HUD guidelines, these standards represent valid goals for this development. Table 4.9-4 summarizes HUD site acceptability standards based on external noise levels. These standards reflect an EPA goal that exterior noise levels do not exceed an L_{dn} of 65 decibels.

Table 4.9-3 HUD Site Acceptability Standards	
	Outdoor dBA (L_{dn})
Acceptable	Not exceeding 65
Normally Unacceptable	65 to 75
Unacceptable	Above 75
Source: Title 24, Code of Federal Regulations, Part 51.103 (c), Exterior Standards.	

These standards reflect the EPA goal of not having continuous external noise levels exceed 65 decibels (dBA). This goal is not a mandated standard and does not account for cost or feasibility of attenuating to the set level. The 65 dBA criterion is more restrictive than the criteria used by the FHWA related to standards for noise for roadway design as noted above.

4.9.3 Existing On-Site Noise Levels

Local Noise Receptors

Analysis of existing and future noise levels requires the identification of noise receptors, or locations which can be expected to be affected by the noise generated from the project. As described in Section 2.0 Project Description, surrounding land use is primarily residential, although several businesses are located along NYS Route 311, north of the site, and on Fair Street, south of the site. The primary noise "receptor" in the vicinity of the project is the existing residential neighborhood located along the western edge of the site. This receptor includes residences along Vernon Drive, Concord Road, and the eastern ends of Brentwood Road and Greenridge Road. The project Scoping Document specifically identified three receptor locations to be monitored for noise, 1) *In the general area of northeast terminus of Greenwood Court*, 2) *At the property line abutting residential properties along Concord Road*, and 3) *at the property line abutting residential properties along Vernon Drive*. While the Scoping Document specified measurements at "Greenwood Court", no street with that name exists in the vicinity of the site. Instead, measurements were collected at the end of Greenridge Road which abuts the property. Measurements were collected at three monitoring locations along Concord Road, since it parallels the western property line. The three locations along Concord Road, as well as monitoring points at Vernon Drive and Greenridge Road, resulted in a total of five monitoring locations, as described below.

Existing On-site Noise Levels

No man-made noise is currently generated on the Patterson Crossing Retail Center property, since the site is undeveloped. Existing noise levels in the vicinity of the Patterson Crossing Retail Center site reflect surrounding land uses, which are primarily residential, but also include Interstate 84 and NYS Route 311. The highest levels of noise currently measured on the site are generated by the vehicular traffic on Interstate 84, which runs

along the eastern border of the property. Traffic noise from NYS Route 311 also affects the project site and nearby receptors, although to a lesser degree than that from Interstate 84. In addition to traffic generated noise, intermittent noise is generated from nearby residential areas, including noise from lawn mowers, dogs, and vehicles. Airplane fly overs are another source of noise but are not considered since no airports are located in the vicinity of the site.

In order to assess current noise conditions, noise measurements were collected on two dates, January 13, 2005 and April 7, 2005. Although measurements were collected during periods when leaves were not on the trees, seasonal difference is not expected to substantially influence noise measurements at the Patterson Crossing Retail Center site. As described below (4.9.5 Future Conditions), the site contains mature trees with a relatively open understory that do not provide effective noise reduction for traffic noise from Interstate 84 and Route 311.

All measurements were collected along the western edge of the site, adjacent to the residential receptor locations. Noise monitoring locations are provided in Figure 4.9-1 Noise Monitoring Location Plan. In general the monitoring locations are approximately 800 feet (Location 1) to 1700 feet (Location 4) from Interstate 84. Monitoring Location 5 is approximately 650 feet from NYS Route 311. The measurements were within ranges typical of a rural residential area near a major highway, and are shown in Table 4.9-5 - Current Noise Measurements, below.

Table 4.9-4 Current Noise Measurements		
Location	Time	Measurements dBA
	January 13, 2005	
Location 1: Concord Road & Beechmont Road	16:55-17:10	52.3
Location 2: Concord Road	17:15-17:30	50.2
Location 3: Concord Road and Echo Road	17:35-17:50	50.9
	April 7, 2005	
Location 2: Concord Road	17:10-17:25	47.9
Location 4: Vernon Drive	16:45-17:00	48.7
Location 5: End of Greenridge Road	17:35-17:50	50.5
<i>Measurements collected on January 13, 2005 and April 7, 2005 by TMA.</i>		

4.9.4 Future “No Build “ Conditions

It is anticipated that noise levels at and in the vicinity of the project site without the Patterson Crossing Retail Center project would be similar to current conditions. Minor increases in noise levels would be expected due to continued local growth and development and increases in traffic volumes on Interstate 84 and NYS Route 311.

Rather, some limited future development may occur along Fair Street, south of the site and along Route 311, north of the site. Physical constraints such as steep slopes and wetlands will also limit future growth and development in the vicinity of the site. Therefore, without the project, noise will increase proportionately with local residential and commercial growth and traffic volumes on nearby roadways.

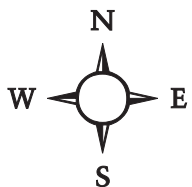


Figure 4.9-1: Noise Monitoring Locations
Patterson Crossing Retail Center
Town of Patterson and Town of Kent,
Putnam County, New York

Source: TMA, 04/07/05

Base Photo: NYS GIS Clearinghouse, 2004 Aerial

Scale: 1 inch = 560 feet



● Noise Monitoring Location

4.9.5 Future Conditions

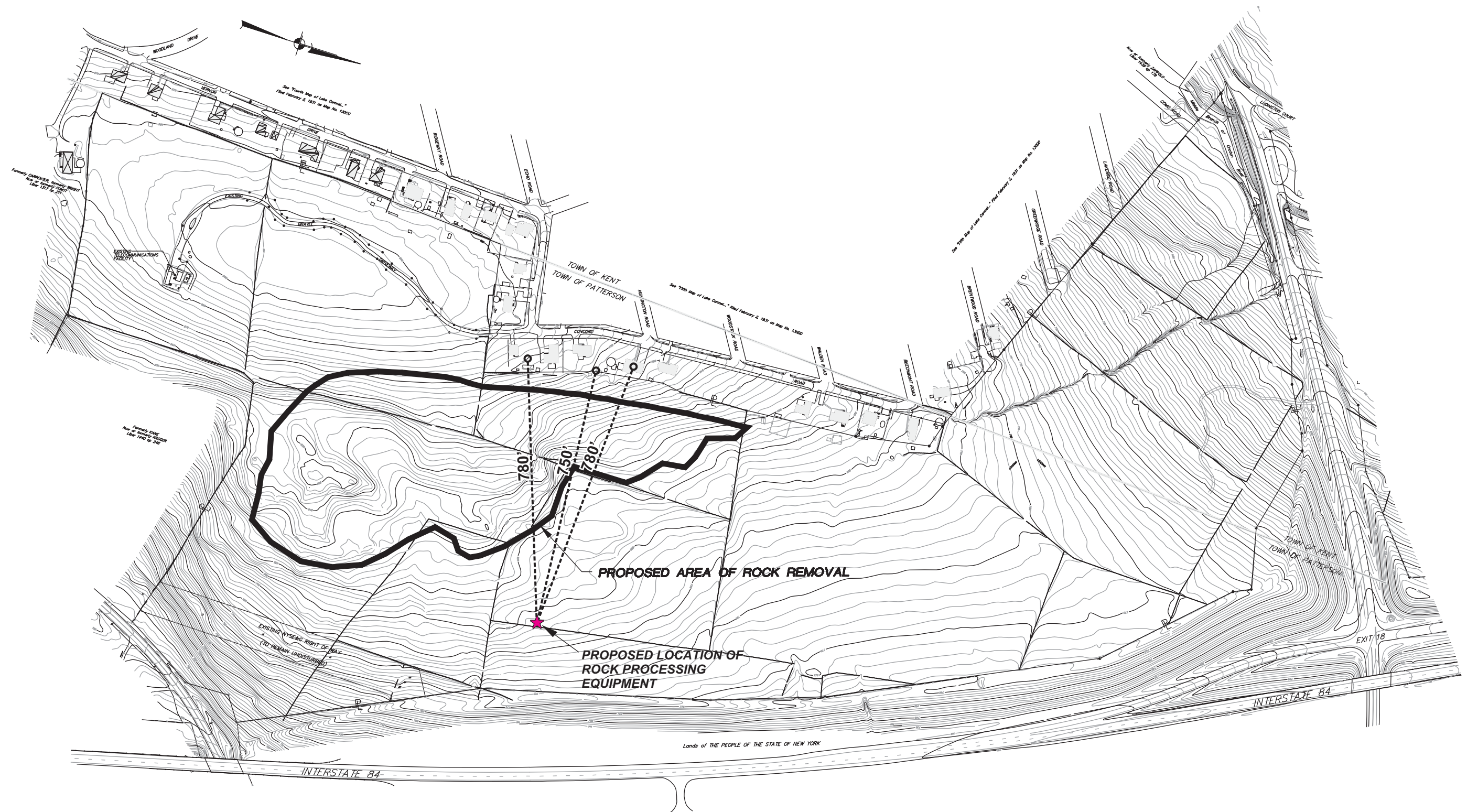
Short Term Noise Impacts During Construction

Local daytime ambient noise levels will increase both on and off of the project site during construction of the proposed roadways, utility lines, buildings and parking lots. Construction activities and the operation of construction equipment are an expected and required consequence of any new residential, commercial or industrial project, and cannot be avoided. Thus, some noise impacts would be expected. It is important to note that noise impacts as a result of construction activities are an, intermittent, short term, temporary impact, dependent on the construction activity and the proximity to the local receptors and will cease upon completion of the construction phase of the project. The following table, Table 4.9-6 Construction Noise Levels, shows representative maximum sound levels for diesel powered equipment and activities at a range of receptor distances.

Table 4.9-5 Construction Noise Levels (dBA)				
	Maximum Sound Level			
Equipment/Activity	50 feet	200 feet	500 feet	1000 feet
Backhoe	82-84	70-72	62-64	56-58
Blasting	88-120	76-108	68-100	62-94
Concrete Pump	74-84	62-72	54-64	48-58
Generator	71-87	59-75	51-67	45-61
Hauler	83-86	71-74	63-66	57-60
Loader	86-90	74-78	66-70	60-64
Rock Drill	83-99	71-87	63-79	57-73
Rock Processing Equipment	93-95	81-83	73-75	65-67
Trucks	81-87	69-75	61-67	55-61
Source: Compiled from various sources by Tim Miller Associates, Inc.				

To the average person, a noise level increase of one to two dBA is barely perceptible; an increase of 5 dBA is definitely noticeable; an increase of 10 dBA is a large increase; and an increase of 20 dBA or more is perceived as a dramatic change. Annoyance to people frequently results from increases of 10 dBA or more, depending upon the frequency and duration of the noise events.

The level of impact from these construction noise sources depends upon the type and number of pieces of construction equipment being operated, the duration of the construction activities, as well as the receptors distance from the construction areas. Noise levels due to construction activities will vary widely, depending on the phase of construction activities. These activities will include clearing and excavations, drilling, grading activities, delivery of construction materials, and the actual construction of the various components of the proposed project. Rock processing will occur on the site during the initial phase of construction, when rough grading for the project is completed. It is expected that a single rock crusher will be used on a temporary basis to process the rock associated with the blasting activities. Noise impacts associated with this equipment will be short term and temporary. The rock processing equipment will be placed as far as practical from residents on Concord Road and Vernon Drive to lessen the noise impacts. The proposed locations of the rock processing equipment is shown in Figure 4.9-2. In this proposed location the rock



crusher will be relatively close to the rock removal area to minimize the truck activity on the site but also far enough away from the property line to limit the noise levels residences on Concord Road. The proposed location of the rock crusher is approximately 750 feet away from the western property boundary and approximately 780 feet from the closest house on Concord Road. As stated in Table 4.9-5 the rock crusher will emit a noise at approximately 93-95 dBA, at a distance of 500 feet away from the equipment the noise level should diminish to approximately 73-75 dBA. Since the distance from the equipment is proposed to be more than 500 feet we expect the noise level at the western property boundary and the houses to be less than 73 dBA.

The noisiest periods of construction will occur during site clearing and grading activities, when sections of the site are prepared for the new roadways, utilities and building foundations, although all site-generated construction activities will produce increased on-site noise levels.

It is anticipated that nearby residences on surrounding local roads, primarily Vernon Drive and Concord Road would experience temporary elevated noise levels for intermittent, short term periods during future construction of the retail development. Noise levels at the site property line are projected to range between 65 dBA and 90 dBA, depending on the actual location of construction equipment at any given time. Construction activities would be limited to times of day and days of week as noted in the mitigation section below.

Blasting Impacts

Rock removal is expected to be required around areas of rock outcrop primarily in the south-central portion of the project site. Construction methods, other than blasting will be evaluated, such as cutting, ripping, or chipping. Any blasting required would be done in full conformance with applicable codes. Potential blasting activities would be limited to the times and days noted in the mitigation section below.

Typically, blasting results in very short term, loud noise impacts. As indicated above, blasting may result in short term (seconds), noise in the range 68 to 100 dBA within 500 feet of the blasting site. Notification would be accomplished through mailings and by telephone calls to the residents. The mailings documenting the blasting schedule would be sent through the US Postal Service to the appropriate officials and all residents within 500 feet of the site. Phone calls to these residents would be made in the time frames specified above to provide additional notification of the pending blasting. The mailed notifications will include information regarding the blasting locations and the anticipated time during which the blasting would occur.

Removal of Trees

The reduction of trees on the site is not expected to substantially affect future noise levels for residents along the western property border, compared to current conditions. Noise studies indicate that vegetation can decrease highway traffic noise if it is high enough, wide enough and dense enough that it cannot be seen through (*Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA, June, 1995*). A vegetation buffer must consist of dense vegetation at least 200 feet thick in order to provide effective noise reduction. In contrast, deciduous trees, or wooded sites with a relatively open understory do not provide effective noise buffers.

The project site is currently covered by mature deciduous trees with a relatively open understory. In the summer months, with full vegetation, the line of site through the property is as great as 300 feet. In the winter months, with no leaves present, the site is obviously more open and the line of site longer. Based upon observations at the Patterson Crossing Retail Center site, the existing vegetation does not provide an effective noise barrier for the traffic noise from Interstate 84 or Route 311. The removal of the trees is unlikely to significantly increase noise levels for receptors located on Concord Road and Vernon Drive.

The introduction of buildings and retaining walls along Interstate 84, a noise barrier and a wooden fence along the western property line are expected to reduce traffic generated noise from Interstate 84 (see Section 4.9.6 Mitigation Measures, below). Physical barriers provide much greater traffic noise reduction than the existing deciduous tree cover.

Potential Impacts - Site Generated Project Noise

Project generated noise levels will be associated with a variety of on- and off-site factors, which include:

- normal vehicular traffic;
- truck deliveries for commercial merchandise;
- snow plowing and shoveling;
- garbage disposal activities;
- heating and air-conditioning equipment;

Operation of the retail facility will result in an increase in ambient noise levels in the immediate vicinity of the site. Operational noise will primarily result from vehicular traffic associated with the proposed commercial development. According to the site plan, an access driveway will be located approximately 100 feet from the property line for existing homes that are fronting on Concord Road. The access road comes within 75 feet of the property line at its closest point. The proposed location of the home improvement center will be approximately 400 feet from the nearest residential properties, on Concord Road. Residents along Vernon Drive will be a minimum of 500 feet from the access drive and approximately 750 feet from the proposed wholesale warehouse store. The building housing the proposed home goods store and cafe is the closest to the property line at approximately 200 feet from properties at the northern end of Concord Drive.

In order to estimate anticipated noise from the project, noise measurements were collected at a similar retail development in the Town of Monroe; the Harriman Commons shopping center. This development contains a Walmart Supercenter and a Home Depot, and also adjoins a highway, NYS Route 17 (future Interstate 86). In the case of the Harriman Commons project, the large retail buildings are located approximately 700 to 1000 feet from the highway. Three 15 minute noise measurements were collected at the Harriman Commons shopping center on January 13, 2005. Two measurements were collected in the parking lot near the front of the buildings and one measurement was collected in the rear of the Home Depot building to assess the impact of the building in lessening noise. The two measurements in the parking lot were 61.0 dBA and 54.4 dBA, respectively. The

measurement at the rear of the Home Depot building was 50.6 dBA. The measurements were collected between 3:00 and 5:00 p.m.

Based upon the Harriman Commons measurements, noise within the parking lots and adjacent to the access driveways will be in the range of 54 to 61 dBA. These noise levels range from 4.3 to 9.9 dBA above the average ambient noise conditions (50.1 dBA) along the western property line of the Patterson Crossing Retail Center site. It should be noted that noise levels are reduced (or attenuated) as noise travels over the ground surface from source to receptor. Noise studies typically use the figure of 3.0 dBA reduction per doubling of distance over a hard surface and a 4.5 dBA reduction per doubling of distance over soft ground (*The Noise Guidebook, US Department of Housing and Urban Development, March, 1985*). For example, a noise level of 60 dBA, measured 50 feet from the source would be reduced to 54 dBA at 200 feet over a hard ground surface and to 51 dBA at 200 feet over a soft ground surface.

Therefore, the future noise levels at the site property line are expected to be lower than the projected operational noise levels of 54 to 61 dBA, due to the reduction of noise over distance. Distance from the noise source would obviously influence the level of noise reduction. As described above, Concord Road residents are located closest to noise sources (within 75 feet from the access road and 400 feet from the proposed home improvement center). Therefore, a sustained noise level of 61 dBA measured at the future access road would be reduced to approximately 56.5 dBA over a 100 foot distance from the access road to properties on Concord Road (a 4.5 dBA reduction for a doubling of distance over soft ground). Residents along Vernon Drive will be a minimum of 500 feet from the proposed access drive and approximately 750 feet from the proposed wholesale warehouse store. Therefore, a sustained noise level of 61 dBA measured at the future access road will be reduced to 46 dBA over the 500 foot distance from the access road to properties on Vernon Drive (a 4.5 dBA reduction for each doubling of distance over soft ground). The projected noise levels described above are provided without any noise mitigation and only account for the lessening of noise over distance.

Noise mitigation is proposed for the Patterson Crossing Retail Center project which is expected to lower the projected operational noise levels for residents along the western edge of the property. Given the proposed noise mitigation, nearby receptors are not expected to be adversely affected by the anticipated operational noise from the project, as further described below.

4.9.6 Mitigation Measures

Several mitigation measures are proposed to reduce noise to nearby residents. These mitigation measures include planning and operational measures, as well as the construction of physical noise barriers, in conjunction with the project development and construction.

Construction Noise Mitigation

Construction activity would be limited to hours between 7:00 a.m. and 6:00 p.m., Monday through Saturday, exclusive of Sundays and national holidays. Typically, construction activities would be expected to cease prior to 6:00 p.m. All construction vehicles and equipment would be expected to be well maintained and operated in an efficient manner.

July 27, 2006

Should the need arise for blasting, any blasting would be done in full conformance with applicable codes. Prior to blasting, a general blasting schedule would be developed and a blasting permit would be obtained from the Building Inspector covering the specific blasting operation. Blasting would be conducted between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday, and would not be conducted on Saturdays, Sundays or national holidays. It is anticipated that rock blasting would occur for short periods of time over a two month interval.

The blasting contractor will notify all residents within 500 feet of the blasting location of the anticipated blasting date and time. Notification will be done through mailings and by telephone calls to residents as described in the Blasting Impacts section above.

The rock processing equipment will be placed as far as practical from residents on Concord Road and Vernon Drive to lessen the noise impacts associated with this operation. The processing equipment will be located as close to the eastern property border and Interstate 84 as practicable. In addition, a temporary berm of soil or rock will be constructed around the processing equipment to provide an effective noise barrier between the equipment and nearby residences. The earthen/rock berm combined with the distance between the rock processing equipment and nearby residents will minimize the noise impacts from the rock processing operation.

Operational Noise Mitigation

The Patterson Crossing Retail Center project has been designed to minimize impacts to adjoining residential properties, including impacts from noise. The majority of buildings will be located towards the eastern edge of the property, adjoining Interstate 84 and away from the existing residential development to the west. Therefore, noise generated at the front of buildings and in the home improvement center garden center will generally be 350 to 500 feet from properties on Concord Road. Loading docks and refuse collection areas for the retail buildings adjoining Interstate 84 will be located at the rear (east side) of the buildings. Noise associated with truck deliveries, unloading and garbage pick-up will be mitigated to a large degree by the location of the buildings between the loading docks and the residential properties along the western property line. Loading docks for the electronics store and a smaller retail store will be located within approximately 175 feet of the western property line.

To avoid impacting neighboring residents, no outdoor loudspeaker systems will be used in any of the proposed stores including the proposed home improvement center supply store and the wholesale warehouse store.

Physical Noise Mitigation

A noise wall is proposed to mitigate both operational noise and existing noise generated from Interstate 84. In addition, a naturally colored modular concrete block retaining wall is proposed along the entire length of the eastern property line. This landscaped wall will contribute to the reduction of Interstate 84 traffic generated noise for residential receptors on Concord Road/Vernon Drive. As described above, the row of retail buildings located between Interstate 84 and Concord Road/Vernon Drive residents will act as a noise barrier for the existing traffic noise from Interstate 84. Since there is a gap between the proposed wholesale warehouse store and the home improvement center, the applicant has proposed a sound barrier wall in this location to provide a more continuous noise barrier along the

Interstate. The proposed noise barrier will be 10 feet high and approximately 260 feet long. The area adjacent to the noise wall will be planted with trees and shrubs for a more natural setting. While the specific noise reductions for the combination of buildings and noise barrier have not been calculated, noise walls generally reduce noise levels 4 to 10 dBA (*The Noise Guidebook, US Department of Housing and Urban Development, March, 1985*). Noise reductions of greater than 10 dBA are difficult to achieve with noise barriers. Therefore, existing traffic noise from Interstate 84 will be reduced by 4 to 10 dBA for residents on Concord Road and Vernon Drive.

In general, noise walls or earthen berms are much more effective in reducing noise than vegetated buffers. As described above in Section 4.9.5 Potential Impacts - Site Generated Project Noise, a dense tree buffer, at least 200 feet in width is required to substantially reduce noise. The effectiveness of a vegetation buffer depends primarily on the denseness and width of the vegetation. The Patterson Crossing Retail Center site, with its deciduous trees and relatively open understory, does not contain the tree cover necessary to provide effective noise reduction. As described below, the combination of the buildings with solid noise barriers is expected to provide more effective noise reduction for Interstate 84 traffic noise than the current wooded buffer.

An eight-foot high wooden fence is proposed behind the residences along the western property boundary between the existing telecommunications facility to the south and Brentwood Road to the north. This fence will provide limited noise reduction for residents on Concord Road. The effectiveness of any fence or barrier in reducing noise will depend upon the material, thickness, height and length of the barrier. For the purposes of this analysis, it is assumed that the fence will be constructed as a solid wood fence. The noise reduction from the fence is estimated to be 4 to 6 dBA, based upon analysis provided in The Noise Guidebook (*U.S. Department of Housing and Urban Development, 1985*).

With the incorporation of the proposed physical noise barriers the anticipated maximum sustained noise levels produced at the access road are expected to be reduced from 56.5 dBA to levels ranging from 52.5 to 50.5 dBA. The higher estimated noise levels (52.5) are from 2.3 to 4.6 dBA higher than current noise levels for residents on Concord Road. As shown in Table 4.9-2, 2 to 3 dBA changes in noise levels are "barely perceptible", while a 5 dBA change is "readily noticeable".

It is expected that with the installation of the noise barriers and the proposed operational controls (e.g. locating loading areas behind buildings where possible), noise levels for residences adjoining the site will not change substantially from existing conditions.

4.10 Utilities

4.10.1 Wastewater Disposal

Existing Conditions

As undeveloped land, the site does not currently generate any wastewater. There is no public or private wastewater systems in the immediate area nor are there any plans to provide sewer service to this area. Nearby homes utilize individual septic systems on their respective properties for wastewater disposal.

Future Conditions

Wastewater and sewage service will be provided by on-site facilities that will be constructed as part of this project. Design flow for the proposed project of 10,740 gallons per day, is based on a combination of actual and estimated volumes. The project is proposed to be comprised of dry retail with the exception of the wholesale warehouse store (which will sell food and groceries) and the coffee shop, serving limited fast food. Water use and wastewater discharge will therefore be primarily associated with restroom usage. The use of water saving plumbing fixtures, as required by the building code, would further limit water usage at the site. Please note that irrigation water will be supplied by a separate system that will collect and store roof runoff for that purpose. Refer to Section 4.4.3 for details on the design flow rates used for the proposed project.

A collection system of gravity fed concrete septic tanks will service each building. Tank discharges will flow to a common effluent sewer main then be pumped from an effluent pump pit through a forcemain. A subsurface sewage treatment system (SSTS) would be employed to treat the wastewater pumped from the proposed buildings.

A hydrogeological investigation/mounding analysis (Appendix E) was performed by GeoDesign for the project's septic system to assess the soils and groundwater in relation to the discharge to the proposed SSTS. The analysis was based on field investigations, review of existing data and preparation of a three-dimensional computer model using an 11,000 gallon per day sewage flow rate applied to the area of the proposed SSTS. The simulation and analysis predicts there will be no leachate breakout at the ground surface, no leaching trench flooding and a minimum three year travel time for the treated water to reach the nearest property line. Refer to the Groundwater Mitigation Section (4.4.4) for a discussion of the recommendations made for the proposed SSTS.

The proposed primary SSTS, with an area of approximately 8.7 acres, would be located in the southeast corner of the site between the proposed emergency access driveway and the existing telecommunications facility gravel driveway. This location provides a minimum 185 foot buffer between the SSTS and the western property boundary. The suspected groundwater flow under the proposed SSTS system is presented in the Groundwater Existing Conditions Section (4.4.1) as flowing towards lower elevations west of the site, towards Lake Carmel, and towards the northeast, southeast and east, towards off-site wetlands at lower elevations. Effluent is generally treated in the first five feet of soils. Treated effluent that moves downgradient through 185 feet of material will be processed even further and the likelihood of elevated levels of constituents moving off-site is negligible.

July 27, 2006

Soil (witnessed by the Putnam County Department of Health [PCDOH] and the New York City Department of Environmental Protection [NYCDEP]) and percolation tests were performed in the vicinity of the proposed SSTS and in a second area located in the north end of the project site. The proposed SSTS would meet all the requirements and standards set forth by the PCDOH and the NYCDEP. The standards set forth by these agencies provide for the treatment of wastewater to protect human health, groundwater and surface water. As such, water quality impacts associated with the proposed method of wastewater treatment and disposal would not occur. The hydrogeologic study of the proposed subsurface treatment and discharge areas at the site considers normal treatment of wastewater and sufficient separation (and effluent travel time) to nearby receptors including potable wells on nearby properties. Furthermore, nitrate contamination of wells is generally a concern where shallow gravel or sand packed wells are used. The local wells surveyed as part of this project are all drilled into bedrock and are relatively deep; 150 to 500 feet. Thus, calculation of concentrations of nitrates in groundwater is not necessary nor is it within the standard of care to perform such estimates.

Although it is not anticipated that a wastewater treatment facility will be required as part of this project, space has been set aside on the east side of the project site behind the wholesale warehouse store for installation of such a facility should it be necessary. This alternative would be designed to treat wastewater to surface water discharge standards even though subsurface discharge would be employed. The subsurface disposal area would be located in the same area as the proposed SSTS.

The engineer's Preliminary Wastewater Report documenting the test results and details of the design of the wastewater treatment facilities can be found in Appendix M of this DEIS.

Mitigation

All wastewater will be treated on-site and discharged subsurface. Water quality impacts including increased levels of phosphorous will not result from the proposed project as designed, therefore, participation in the NYCDEP Pilot Phosphorous Offset Program will not be required.

In their hydrogeological investigation/mounding analysis report, GeoDesign recommends that a minimum of two feet of sand-gravel fill be placed over the proposed disposal area to increase separation between the bottom of the leach fields and the groundwater.

4.10.2 Electric and Gas

Existing Conditions

The area surrounding the project site currently has electric service provided by New York State Electric & Gas (NYSEG). The existing transmission lines provide electricity to the residences located to the west of the project site, as well as other nearby developments.

The site is currently undeveloped and does not generate any demand for electrical services, with the exception of the existing telecommunications facility, which is connected to NYSEG transmission lines. There is no natural gas service or transmission facilities in the area.

Future Conditions

The proposed development will generate new demand for electricity. Based on information developed by users of the proposed wholesale warehouse company, this 145,000 square foot space will typically have a connected load of 3,000 to 4,000 amps. By extrapolation, the entire project is expected to have a total connected load of approximately 10,000 to 13,000 amps.

This demand assumes that the building heating and cooling systems will all be electric, as presently proposed. If alternative energy sources are used, such as heating oil or geothermal systems, the electrical demand would be less. The Applicant is open to the possibility of exploring the use of economically viable alternative energy sources at one or more buildings at the development.

Correspondence with NYSEG indicates that facilities are in place to provide electrical service to the project without any capacity problems.

Mitigation

The design and plans will meet the requirements of the New York State Energy Code, as well as other applicable state and town building codes. All building systems, including electrical, mechanical, heating and insulation will be modern and energy-efficient. Similarly, the project will utilize energy efficient lighting fixtures and equipment to the greatest extent practicable, including the use of "Energy Star" rated merchandise.

All utility lines on the project site will be situated underground.

4.10.3 Solid Waste DisposalExisting Conditions

Patterson is comprised of two garbage districts. District 1 includes most of the Putnam Lake area, and is serviced by F & H Sanitation. District 1 garbage collection is paid via Town property taxes. District 2 includes all parts of the town outside of the Putnam Lake area. The solid waste is disposed of in Danbury, CT. Residents of District 2 receive municipal collections paid via fees that are collected with property taxes.

Future Conditions

The projected solid waste generation calculations for the proposed development are provided in Table 4.10-1. The project is expected to generate approximately 188.9 tons of solid waste material per year. Of this amount, approximately one third is expected to include recyclable materials. The solid wastes would be transported by private contractor to the existing disposal facilities in Danbury, CT. No municipal trash collection services are proposed for this development.

Table 4.10-1 Solid Waste Generation Calculations					
Use	Rate (tons/day)	Unit	Calculation (tons/day)	Calculation (tons/year)	
Retail	0.001	per employee (502)	= 0.502	x 365	= 183.2
Coffee Shop	0.00175	per employee (9)	= 0.01575	x 365	= 5.7
				TOTAL	= 188.9
Source: Urban Land Institute's (ULI) Development Impact Handbook (1995), ITE Trip Generation and Energy Information Administration					

Compactors and refuse storage areas would be located in the rear of the proposed buildings. For the three largest building pads in the southern portion of the site, the refuse storage area would be on the east side of the buildings, as far as possible from nearby residents. For the northern building pad, the refuse storage would be situated on the west side of the building, more than 250 feet from the closest residence on Brentwood Road. The dumpsters will not be visible from off-site properties due to screening, landscaping, and existing woodland vegetation to be retained. All of the refuse storage facilities would be screened and covered in order to minimize potential impacts relating to appearance, odors or nuisance animals. Supplemental measures, which may include additional fencing and the use of traps, would be employed to control nuisance animals if ever necessary. Dumpsters would also be emptied regularly; twice per week for all uses that include the preparation and/or sale of food and once per week for all other garbage facilities

Mitigation Measures

Solid wastes would be collected and transported by private contractors to the RESCO resource recovery facility in Peekskill. These materials will be inspected and recyclables will be separated from the remainder of the waste stream that becomes fuel for the waste-to-energy facility at RESCO. Ash material is landfilled at the Westchester County ash landfill in Cortlandt, NY.

Source reduction and recycling at the individual proposed commercial operations will help to minimize the wastes produced at the proposed development. A significant amount of packaging materials, including pallets and boxes, can be diverted from the waste stream and reused by delivery trucks. There will be a cost incentive passed onto the individual stores to reduce the volume of solid wastes produced encouraging the reuse of packaging materials and the separation of other recyclable materials, including plastic, glass, paper and cardboard from the waste stream. Recyclable only collection facilities and refuse storage dumpsters will be provided for all of the individual stores. Recyclable only collection cans and trash cans will also be provided for store patrons in various external locations between the stores and parking areas.

Several measures are proposed to control litter and maintain the development in a clean condition. First, all dumpsters and refuse storage areas will be covered and screened to physically contain solid wastes within designated areas. Second, trash cans and recyclable only cans will be placed in convenient locations between the parking lot and the stores for use by patrons. These facilities would have covered lids that will help to reduce the chance of litter falling out. Finally, the development would retain personnel to routinely patrol and remove litter from the project site. In addition, a street sweeping/vacuum vehicle would be

July 27, 2006

used on a weekly basis (more often as needed) to maintain trash-free project site roads and parking areas.

4.11 Community Services and Facilities*Introduction*

A new Putnam County Emergency Operations Center (EOC), which was recently developed, handles all emergency "911" calls. Currently, wireless calls are directed to the State Police dispatchers, but are anticipated to be integrated into the new system by the end of 2005. Dispatchers at the EOC, located in Carmel, have sophisticated computer systems which allow them to pinpoint the location of the call and dispatch the appropriate police, fire or emergency medical assistance, providing the quickest and most suitable response. The call center is expected to handle approximately 15,000 emergency calls annually. Putnam County Sheriff's Office will be operated as the backup system for emergency calls.

4.11.1 Police ProtectionExisting Conditions

For the Town of Patterson, police protection is provided by both the Putnam County Sheriff's Department and the New York State Police. The "closest car" concept is utilized in response to 911 emergency calls; either the Putnam County Sheriff's patrol unit, the New York State Police patrol unit or the Kent Patrol Unit would be dispatched. Typical response times would be under five minutes, depending on the location of the nearest patrol car.

The Putnam County Sheriff's Department is head quartered in Carmel, approximately four miles from the proposed project site. The Sheriff's Department has 83 sworn officers and a total force of 107 personnel. A minimum of one patrol is assigned to the Patterson area 24 hours per day by the Sheriff's Department. The service ratio is one deputy sheriff per 1,200 citizens. The planning standards ratio for police personnel provided by the Urban Land Institute (ULI) in their 1985 *Development Impact Assessment Handbook*, is 2 police per population of 1,000. The current staffing of the Sheriff's Department falls below this standard. The Sheriff's Department responds to approximately 32,000 to 33,000 calls for service per year.

Current staffing levels at the New York State Police, Brewster Barracks, includes 13 officers and four detectives. Seven police cars are based at the barracks, with anywhere from one to three on patrol at any given time.

The Town of Kent has its own Police Department. This force is comprised of 26 full-time employees, 21 sworn and 5 civilian. The employee make-up is as follows: 1 Lieutenant, 4 Sergeants, 3 Detectives, 11 Police Officers, 1 K-9 officer, 1 K9 Justice and 5 Dispatchers. At any given shift, there are a minimum of 2 officers on patrol and a typical emergency response time is less than three minutes. The Kent Police Department responds to approximately 10,000 calls per year. The ratio of police officers to population served is approximately 1.4 per 1,000 residents. This ratio is also below the ULI's planning standards. A new police facility has recently been constructed. This station is located on Route 52, approximately 1.5 miles from the proposed project.

Future Conditions

Police protection for the project site would be provided by a combination of Putnam County Sheriff's Office, Town of Kent Police Department and the New York State Police. The applicant does not operate projects that would allow for comparison of police and security demands. Based on need, individual stores may choose to employ their own security services.

The Putnam County Sheriff's Department anticipates no significant impact to service as a result of the proposed project¹. Due to the increase in development county wide, there is an expectation for an increase in law enforcement resources in the forthcoming years however, there is no specific plan to that effect.

The Town of Kent Police Department has made comment regarding the impacts of additional traffic on the local road network. (Details regarding future traffic conditions are discussed in Chapter 4.8, Transportation.) Chief Smith noted that impacts not related to traffic were difficult to determine at this time.²

The traffic associated with the increased activity due to the retail sales may require increased police presence in the project area. (Traffic projections and mitigation are discussed in Section 4.8, Transportation, of this document.)

To address access concerns, the Applicant proposes an emergency access drive connecting to an existing gravel driveway that accesses the existing cellular communications tower site. This existing drive connects to Echo Road. The proposed 12-foot wide emergency drive would split from the access drive just south of the property line, and connect with the retail parking area near the proposed wholesale warehouse store. The emergency access drive would be gated at both ends to prevent unauthorized use and plowed as required to allow unobstructed access throughout the year.

An eight-foot high wood fence and two rows of evergreen trees will be installed parallel to the western property line between the access drive to the existing communications facility and Brentwood Road to protect neighboring residences from pedestrian traffic cutting through their yards as a means to access the project site, as well as a providing a visual and noise buffer. A variance will be required for the installation of an eight-foot high fence, since §154-15 of the Town of Patterson Code limits fences to a maximum height of six feet. The proposed landscape plan indicates two staggered rows of evergreens being planted along the inside (development side) of the wood fence. The trees are proposed to be eight to ten feet tall at the time of planting. Refer to Drawing SP-2.2 in the attached drawing set for a complete list of evergreen species to be planted.

Mitigation

The site will be subject to routine patrols by the Putnam County Sheriff's Department.

In addition to the police protection provided by the local forces, other measures of site security will be provided by each of the retail establishments based on individual needs. Each store will have its own internal security system including burglar alarms, which would

¹ Letter from Chief Donald B. Smith, dated October 22, 2004 (Appendix B, Correspondence).

² Letter from Chief Donald L. Smith, Jr., dated October 14, 2004 (Appendix B, Correspondence).

be directly connected to the Putnam County Sheriff's Office, as well as security cameras. Some of the stores may also choose to hire their own security personnel. The stores will also have exterior lighting and security cameras to help deter criminal activity. Parking areas will be illuminated as an additional security measure. It is expected that the major stores at Patterson Crossing Retail Center will be served by private security guards on an as needed basis, possibly with car patrols during nighttime hours.

The proposed emergency access road will be restricted to emergency vehicles by installing a gate at both ends. Routine police patrols along Echo Road, and on-site security provided by the retail center, will further ensure no unauthorized use of this emergency access occurs.

The proposed eight-foot high fence and two rows of evergreen trees will prevent pedestrian access from the residential properties located along the west side of the project. Ongoing maintenance and repair of this fence will ensure continued prevention of unauthorized pedestrian access.

No additional security measures are anticipated at this time.

4.11.2 Fire Protection

Existing Conditions

There is a county wide Mutual Aid agreement in place in Putnam County³, which is a plan to allow assistance between all County Fire Departments. The Officer-in-Charge of the fire has the capability to request assistance whenever it is deemed necessary.

Fire protection for the Town of Patterson is provided by volunteers of the Patterson Fire Department and the Putnam Lake Fire Department. The Town is served by three firehouses between the two departments. The Patterson Fire Department's main station is located in the Hamlet of Patterson on NYS Route 311, approximately six miles from the project site. The Bullet Hole Road substation is located less than three miles from the project site and houses one engine. The third station is Putnam Lake Department's firehouse, located along Haviland Drive in Putnam Lake, approximately ten miles from the Patterson Crossing project location.

The Patterson Fire Department force is approximately 30 active members and 100 members total. They regularly look to increase the volunteer force. The ULI fire standards call for 1.65 fire personnel for every 1,000 population served. Based on 2000 US Census population of 11,300, the Patterson Fire Department service ratio for active members is approximately 2.65, which is well above the ULI's planning standard. Response time for the volunteer force is approximately 10 to 15 minutes during work hours, with a shorter response time of 5 to 10 minutes at night. The Fire Chief could normally respond in less than five minutes. The Department had approximately 500 responses in 2004⁴.

Patterson equipment totals 14 vehicles including three command vehicles, four pump trucks, two brush trucks, two tankers, a 100-foot aerial ladder truck, one ambulance and one heavy rescue vehicle. There is no plan to acquire additional equipment. Again, the Patterson Fire

³ Phone call with Adam Stiebeling, Deputy Commissioner of Putnam County Bureau of Emergency Services, on February 22, 2005.

⁴ Phone call with Chief Frank Smith on December 20, 2004.

Department's equipment supply exceeds ULI standards which could project a need of only three vehicles for the 11,300 population of the Town of Patterson.

The Patterson Fire Department main station also houses one full-time professional paramedic, which is provided by the County and shared between Putnam Lake, Brewster and Carmel.

Fire services for the Town of Kent are also provided by a volunteer fire department. The Lake Carmel Fire Department has approximately 125 volunteers, headed by Chief Robert Shannon II, and operates two stations. A new main headquarters was completed in 2003 and is located on Route 52 in Lake Carmel, which is less than two miles from the project location. The Lake Carmel Fire Department equipment includes four command and response vehicles, two pump trucks, three tankers, a brush truck, a rescue vehicle, and a marine rescue vehicle. This equipment is divided between the two stations, with one pump truck at each station and two of the tankers located at the main station. Additionally, an ambulance is located at the main station. Normal protocol is to have four medics scheduled on call at any time.

In 2004, the Lake Carmel Fire Department responded to 760 calls, of which 246 were for fires and 514 were calls for ambulance. The ULI standards estimates 36.5 EMS calls per 1,000 people. The Lake Carmel Fire department averaged 16.7 EMS calls per 1,000 people, based on the 2000 US Census population of 14,000 people in the Town of Kent. The total calls in 2004 increased by 15 percent from 2003 with a total of 658 calls.

Future Conditions

The Applicant met with the Patterson Fire Department and the Department has agreed to provide coverage to all of the Patterson Crossing Retail Center site, even though a small section is located within the Lake Carmel Fire District.⁵ Calls for fire/medical emergencies will be routed through the EOC, where dispatchers would notify the Patterson Fire Department. As a result, fire protection for all of the Patterson Crossing Retail Center will be provided by the Town of Patterson Fire District, which includes the Patterson Fire Department and the Putnam Lake Fire Department.

Response to vehicular accidents occurring at the project site will be determined based on the location of the accident. It is anticipated that accidents occurring at the entrance of the project at NYS Route 311 will trigger a response from the Lake Carmel Fire Department, since the entrance is in the Town of Kent, and accidents within the project site will be addressed by the Patterson Fire District. Should an instance arise where an accident occurs near the Town of Patterson /Town of Kent border and it is unclear which Fire District should respond, the dispatcher would call a fire department based on availability of resources. There are presently no issues that would be created by a fire department responding to an incident in the other district, and no repayment of funds for those services would be required⁶.

The Lake Carmel Fire Department's main station is located slightly closer, at just under two miles from the project site, than the Patterson Fire Department's Bullet Hole substation, which is approximately three miles away. The close proximity of both stations, in combination

⁵ Letter from Brian Burdick, Patterson Fire Department President, dated September 30, 2005.

⁶ Phone call with Adam Stiebeling, Deputy Commissioner of Putnam County Bureau of Emergency Services, on March 3, 2005.

with the mutual aid agreement, ensures adequate fire protection resources for the proposed Patterson Crossing Retail Center development.

The Patterson Crossing Retail Center project will result in the construction of 405,850 square feet of retail and coffee shop space, not including the garden center, through a combination of individual and shared buildings. There will be four main one-story buildings.

The largest building, and furthest from NYS Route 311, will house the proposed wholesale warehouse store with a total floor area of 145,000 square feet. A water supply and storage facility that would provide underground water storage tanks totaling 270,000 gallons to meet the fire protection measure needs for all buildings in the Patterson Crossing development is proposed just south of this building.

The second largest building, with a total of 135,200 square feet of retail space, is the proposed home improvement center store. In addition, a 28,200 square-foot garden center is proposed at the northwest corner of this building.

The third building, with a total of 72,200 square feet, would house three smaller stores, including a 30,000-square foot electronics store, a 20,000 square-foot clothing store and a sporting goods store with 22,200 square feet of floor area.

A fourth building is proposed with various uses including a 24,800 square foot home goods store, a 13,700 square foot retail store, a 4,750 square-foot coffee shop, and 10,200 square-feet of additional retail space.

Chief Frank Smith of the Patterson Fire Department requested a 60,000 gallon underground water storage tank be provided to accommodate fire protection services.⁷ The Patterson Crossing Retail Center plan proposes on-site water storage totaling 270,000 gallons, which is more than four times the amount requested. The Fire Department also noted that they are adequately equipped to handle anticipated fire emergencies at the proposed development. Increase cost to the towns would be minimal and based on the cost to respond to emergency calls as no new equipment would be required.

The Patterson Crossing Retail Center site plan will require Planning Board review and approval. During this site plan review process, the Planning Board is expected to refer the refined project plans to the Patterson Fire Inspector for final review to confirm that the site plan continues to adequately address all fire concerns, such as building access, circulation through the site by emergency vehicles, and water supply access.

Mitigation

The existing Mutual Aid agreement for all Fire Departments in Putnam County ensures that additional fire fighting and rescue resources are available if required.

The Applicant met with the Patterson Fire Department to discuss coverage for the project site. According to Chief Smith of the Patterson Fire Department, the proposed project would not result in a significant impact to the Patterson Fire Department. The Patterson Fire Department had all necessary equipment and manpower to respond to calls from the project site. Chief Smith had concerns regarding an adequate water supply for fire protection. It is

⁷ Chief Frank Smith, Patterson Fire Department, phone conversation, December 20, 2004.

anticipated that this will be provided by the proposed water supply and storage facility's 270,000 gallon storage tank(s), which will cover fire protection water requirements for the entire project site. The 270,000 gallon storage tank(s) for fire protection will be separate from the potable water supply. The potable supply will consist of a 10,000 gallon vented storage tank to provide chlorine contact, supplemental storage during peak flows, and cycling of the well supply pumps. All of the proposed tanks will be located in the area designated as Underground Storage Tanks.

Part of the taxes generated by the Patterson Crossing Retail Center will be distributed to the Patterson Fire Department, as discussed in Chapter 3, Economic and Social Benefits. This additional revenue would provide capital to the Patterson Fire Department for increased appropriations for the purchase of new fire equipment, if required in the future.

The detached building layout reduces the chances for a major fire to spread throughout the development. Additionally, no buildings are located adjacent to the residential homes to the west and a substantial buffer is provided by the parking areas. Additional fire protection measures will be incorporated into the design of the project. All buildings proposed in the Patterson Crossing Retail Center development will incorporate a fire sprinkler system.

The proposed access roads are designed to accommodate fire engines and truck traffic. In addition to the regular vehicular access from NYS Route 311, access for emergency vehicles will be provided from the existing cellular tower access road off Echo Road. Fire hydrants will be installed according to Town standards.

No additional mitigation is proposed.

4.11.3 Health Care Facilities

Existing Conditions

The new Putnam County Emergency Operations Center (EOC) was recently developed to handle emergency "911" calls. Dispatchers at the EOC have sophisticated computer systems which allow them to pinpoint the location of the call and dispatch the appropriate emergency medical assistance, providing the quickest and most suitable response. The Putnam County Sheriff's Office will operate as the backup system for emergency calls.

Ambulance provider information for Putnam County, as listed on the New York State Department of Health website, is shown in Table 3.12-1. The closest providers to the project site, which are most likely to respond to a call from the dispatchers are the Lake Carmel Fire Department, Patterson Fire Department #1, Putnam Lake Fire Department, and Watchtower Farms Medical Unit.

Table 4.11-1 Putnam County Ambulance Services		
Agency Name	Address	Level of Care
Brewster Southeast Joint Fire District	501 North Main Street, Brewster	Basic Life Support
Carmel Volunteer Ambulance Corps	6 Garrett Place, Carmel	Basic Life Support
Empire State Ambulance Corp.	43 Miller Road, Mahopac	Paramedic
Garrison Vol. Ambulance and First Aid Squad, Inc.	51 Old Highland Turnpike, Garrison	Basic Life Support
Kent Volunteer Fire Department	2490 Route 301, Carmel	Basic Life Support
Lake Carmel Fire Department	Rt. 52, Carmel	Basic Life Support
Mahopac Falls Volunteer Fire Department, Inc.	Luccaro Road, Mahopac Falls	Basic Life Support
Mahopac Volunteer Fire Department	741 Rte 6, Mahopac	Basic Life Support
Patterson Fire Department #1, Inc.	13 Burdick Road, Patterson	Basic Life Support
Philipstown Volunteer Ambulance Corps, Inc.	14 Cedar Street, Cold Spring	Basic Life Support
Putnam Lake Fire Department, Inc.	72 Fairfield and Haviland Drive, Patterson	Basic Life Support
Putnam Valley Volunteer Ambulance Corps, Inc.	269 Oscawana Lake Rd., Putnam Valley	Basic Life Support
Watchtower Farms Medical Unit-Patterson	100 Watchtower Drive, Patterson	Basic Life Support
Alamo Ambulance Service	South and Dutcher Avenue, Pawling	Basic Life Support

Several medical facilities serve the project area and are described below.

Located on Stoneleigh Avenue in Carmel, New York, the Putnam Hospital Center (PHC) serves a population of more than 150,000 in Putnam, northern Westchester and southern Dutchess counties. PHC is a 164-bed, not-for-profit, acute care hospital offering the highest quality medical, surgical, psychiatric, pediatric and obstetrical/gynecological care, as well as 24-hour emergency services and home health care. The hospital has 110 medical/surgical beds, a 10-bed intensive care unit, a 10-bed pediatric unit, a 14-bed maternity unit and a 20-bed adult psychiatric unit; a full range of inpatient and outpatient services are offered. PHC has a staff of over 300 physicians, surgeons and allied health professionals and approximately 1000 employees. Expanded facilities at PHC include a Certified Home Health Care Agency and Long Term Home Health Care Program, a Dialysis Center for outpatients, a birthing center, a state-of-the-art ambulatory surgery unit, MRI center, pain management program, outpatient radiology and physical therapy departments, 36 physicians' offices and administrative offices.

The Danbury Hospital has 371 beds and is located on Hospital Avenue in Danbury, Connecticut, which is approximately 15 miles from the project site. This hospital serves approximately 360,000 residents of western Connecticut and southeastern New York. Its specialized facilities include a Level II Trauma Center and Emergency Department, a Cancer Center, a Family Birth Center and Level II neonatal intensive care unit, a Cardiac Center, a Cardiac Catheterization Laboratory and Cardiac Rehabilitation Center, a Dialysis Unit, the Center for Ambulatory Surgery, an accredited sleep disorders center, advanced radiologic and oncology care via two linear accelerators, MRI, CAT, PET Scan and interventional radiology, Main Street Physical Rehabilitation Center, a pediatric pulmonary/asthma management program and the Seifert & Ford Family Community Health Center. Danbury Hospital has 10 clinical departments and a medical and dental staff of more than 500 physicians. The Hospital employs close to 3,000 people and 67 resident physicians.

The Hudson Valley Hospital Center (HVHC) is located just east of the City of Peekskill limits, on Crompond Road in Cortlandt Manor. It is approximately 19 miles south of the project site. HVHC has emergency facilities and provides a full range of medical services with specialty clinics for maternity, radiology, surgery, cardiology, breast care, arthritis and rehabilitation.

Additional hospitals are located in Montrose, Beacon and Poughkeepsie, New York.

Possible Impacts

The need for emergency care (either for customers or employees) at the Patterson Crossing Retail Center would be met by contacting the "911" call center, where a dispatcher would determine the type of emergency response required and send the nearest appropriate unit. The anticipated response times to the project site for first responders would be under five minutes.

Mitigation Measures

Emergency responders have established protocol for responding to emergency situations, including vehicular accidents. Police and fire personnel would respond to any vehicular accidents occurring on-site, with ambulance transport service responding as necessary.

Larger individual retail stores will have standard operating procedures for employees responding to emergency situations within the stores, as well as emergency first aid kits. No specific air lifting provisions are proposed as part of this project. Should the air lifting of trauma patients be required at the Patterson Crossing Retail Center, space in one of the parking areas could be utilized.

No mitigation measures specific to Health Care Facilities are proposed.

4.12 Socioeconomic

4.12.1 Existing Community Retail Centers

Downtown Patterson

The closest commercial district to the project site is located approximately three miles to the east in the Hamlet of Patterson. Extending along NYS Route 311 between Route 292 and just west of Route 22, the Hamlet is a mixed use area where commercial establishments consist mostly of local retail and service uses, with some contractor and small specialty retail stores that serve a wider market area. The limited number of shops are generally housed in one- and two-story wood frame buildings. The core of this downtown area extends several blocks west of the Patterson Metro North Station on Front Street. The traditional urban form of this Hamlet center is characterized by low scale buildings located close to the roadway, with sidewalks extending on both sides of NYS Route 311 in the Historic District.

Front Street runs parallel and adjacent to the Metro North railroad tracks. Across from the station to the south of NYS Route 311 are several wood frame commercial buildings housing a mini-mart, a granite installation business, and a Chinese take-out restaurant. The restaurant is housed in a three-story Victorian building with a mansard roof. There are several storefronts currently for rent along this street. Other uses include a Post Office and the Patterson Recreation Center. To the north of NYS Route 311 adjacent to the railroad tracks is the Patterson Town Hall.

While Front Street forms the easterly end of downtown Patterson, several businesses are present directly east of the railroad tracks, most prominently HB Benfield Electric Supplies which is housed in a large warehouse-type building. Patterson Materials Corp., a business geared towards supplying contractors and highway departments with bulk materials such as stone, gravel and asphalt, is located directly across NYS Route 311 from HB Benfield Electric Supplies. Peterson's Greenhouses is set back from the roadway just to the east and past the Town Justice offices and Town Library, and across from the Patterson Fire Department. Just beyond these uses is wooded open space that is part of the Great Swamp, the second largest wetland in New York State.

The heart of downtown Patterson extends to the west of Front Street where shops and services are housed in the ground floors of two-story buildings on the north side of the street. These include a nursery school/day care center, a telephone substation (Verizon) housed in a modern concrete building designed to match the historic context of the Hamlet, an ignition/generator contractor's establishment, a pub, an antique shop, a furniture shop, and a bathroom and kitchen contractor's shop. Most of these uses are housed in older wood frame buildings, with side streets nearby containing closely spaced single family residences. Further to the west is a small shopping plaza, the 311 Center, containing a pizzeria, a hair salon, a tanning salon, a deli and an insurance company. At the time of this writing, a pet boutique was to open in this plaza.

The remainder of the Hamlet area extending to the Town's historic center at Route 292 includes the Patterson Presbyterian Church and other older buildings, some dating back to when the Hamlet was known as Fredericksburg. The historic church (circa 1833) and the nearby Maple Avenue Cemetery (dating back to the 18th century), Grange Hall and War

Memorial are the heart of the Patterson Historic District. Further to the east, the conversion of farmland to luxury housing sites marks the end of the traditional Hamlet center.

Route 22 Patterson/Pawling

A wider range of shops and services can be found approximately one mile to the east along Route 22, which intersects with NYS Route 311. Route 22 contains more intensive commercial development, starting with Patterson Commons, a shopping center anchored by A&P and containing a video store, a carpet store, a salon, a bank, a sandwich shop, a dry cleaner, a computer sales and repair shop and a dollar store. Associated with this shopping center is Dunkin' Donuts and Baskin-Robbins ice cream shop. A smaller shopping plaza also on the north side of NYS Route 311 located just before this intersection contains a wine store, a gym, an insurance office, a collectors shop and a military supply store. At the intersection of Routes 311 and 22 are a gas station with a mini-mart, and an antiques shop. Immediately to the south of the antiques shop is a transmission and auto repair shop and a branch of Putnam County National Bank. Immediately to the north of the gas station is a furniture shop.

While it contains modern convenience shopping, home improvement supply establishments, newer restaurants, a real estate agency, and automotive sales and repair uses, Route 22 also retains some of the historic character in the area north of NYS Route 311. Several antique stores and Kessman Farms with its farm stand and the Heinchon Ice Cream shop (both located across the border in the Town of Pawling) are located in this area. Further north on Route 22 are additional restaurants including fast food establishments, a car wash, a bank, a supermarket, a furniture shop and the Dutchess Court Plaza with a number of service oriented companies, restaurants, health maintenance practices, a spa and a Radio Shack among others.

Between NYS Route 311 and Haviland Hollow Road (County Route 68) on Route 22 are light industrial uses, restaurants including the Alpine Restaurant and Lounge located at the base of the Thunder Ridge Ski Area. Also along this stretch of Route 22 are a paintball company, a nursery, a sporting goods shop, a store selling business products, and a graphics shop. NYSE&G maintains a substation on the west side of Route 22 just north of Route 68. There is a gas station, auto body shop a diner and two other restaurants along with antiques and furniture stores at the intersection of Routes 22 and 68.

Putnam Lake

Fifteen minutes to the east of the proposed development lies the lake community Putnam Lake. This area is mainly residential with many smaller, seasonal homes that have been converted to year round residences. There is evidence that some owners have recently or are currently upgrading and updating these residences. The main intersection and "downtown" area supporting this community contains multiple auto supply/repair companies, a market and discount liquor store, a pizzeria, two salons, a limousine service, a real estate agency, a bank, the fire house, dental offices and a martial arts establishment. Most of these businesses occupy one- and two-story buildings along Route 66. The bank building is a more modern glass and wood structure and the dental offices and martial arts establishment reside in a one story office building at the intersection of Routes 66 and 67. The vast majority of these businesses are setup to serve the local community.

Lake Carmel Hamlet

The southwestern side of the Town of Kent is characterized by rural and semi-rural development and open space, while suburban residential development and denser retail and service uses are located on the eastern side of the town in the Lake Carmel Hamlet. The Hamlet of Lake Carmel is the town's most significant business center. Other Kent hamlets include Ludingtonville, Kent Cliffs, and Gipsy Trail.

The Lake Carmel Hamlet, initially developed as a seasonal community of vacation homes on quarter acre lots, has evolved into a year-round community of single family homes. It is largely a bedroom community, with most workers commuting either to New York City or regional business centers such as White Plains, New York or Danbury, Connecticut.

Businesses that exist in the immediate vicinity of the project site and in the Lake Carmel Hamlet area are primarily located along NYS Route 311 and Route 52. The nearest businesses within the Town of Kent are dental offices housed in a wood frame building opposite the project site on the northern side of NYS Route 311. Across from the northwestern corner of the site on NYS Route 311 in the vicinity of Ludington Court is a self storage establishment and warehouse building. The Town of Kent Highway Department is located further to the north at the end of Ludington Court along with a commercial nursery.

Just west of the site on NYS Route 311 is a cluster of commercial buildings including the Lake Carmel General Store, McGuire's Pub, a Real Estate Office, an auto repair business, and a vacant brick building that formerly housed a wash and dry business. These businesses primarily serve the local population and have limited on-site parking. NYS Route 311 is not served by sidewalks in this area.

Further west on NYS Route 311 are a two-story apartment complex, a restaurant (Trattoria), single family homes and cottages, and a park beach. The main commercial node of the Lake Carmel Hamlet begins just over one mile southwest of the project site on Route 52. The Hamlet's commercial uses are generally one-to-two stories in height, with some being housed in wood frame structures that are in fair condition. Just before the main stretch of occupied commercial establishments are several smaller vacant structures including a former barber shop and a former gas station. Just east of these buildings is an older wood frame building, the Lake Carmel Business Center, housing law offices, a computer center, medical offices, a day spa and salon, a learning center and a wireless telephone sales establishment. Putnam County National Bank is one of the few newer and larger structures in the Lake Carmel Hamlet Center.

Like downtown Patterson, Lake Carmel Hamlet businesses are also primarily oriented to a local market, with only a few specialty stores that draw patrons from a larger market area. Extending from east to west along Route 52, businesses in the core section of the Hamlet include a new interior decorating store, a pharmacy, a vacant store front that housed Lake Carmel Hardware, a deli, a pizzeria, the local Humane Society Thrift Shop, Putnam County National Bank, a real estate agency, a used car dealership, a mechanical contractor's establishment, a former miniature golf business, a gun dealership, a wood furniture shop, a flower and gift shop, and a restaurant. Further to the east just before Towner Road are a small health/medical center building, an auto body shop and gas station, an apparel store (lingerie), a glass supply establishment, a clothing alterations shop, and a dry cleaner. Near Palmers Trail and further to the west are several businesses related to the construction

industry including Dill's Best Building Center and Garden Supply Store and Putnam County Stone & Masonry Supply.

Southeast

A similar retail development is located in the Town of Southeast at the intersection of NYS Route 312 and Interstate 84 (Exit 19). Known as the Highlands Shopping Center, this development is roughly 3.5 miles (approximately 5 minutes) south of the Proposed Action. The tenants at this retail center include Kohl's, Marshalls, Home Depot, Linens-n-Things, an arts and crafts store, a pet supply store, a Verizon store, an Applebees restaurant, and a Dunkin' Donuts among other smaller retailers.

4.12.2 Potential Impacts to Existing Community Retail Centers

Highlands Shopping Center

The Highlands Shopping Center has no wholesale warehouse, electronics, sporting goods or clothing stores. Some stores that are there, department, arts and crafts, pet supply and communications are not planned for the Patterson Crossing Retail Center. That being the case, there will be little overlap in retailers. The only Highlands Shopping Center retailers that would directly compete with potential retailers at Patterson Crossing Retail Center are the Home Depot and the Linens-n-Things. The home improvement center company proposed for the Patterson Crossing Retail Center has assessed the local demographics and competition and, as is evident from their interest to open a store at the proposed retail center, it can be concluded that the company has determined there exists sufficient market demographics to support both the existing Home Depot and their store. The proposed Home Goods Store would compete directly with the Linens-n-Things at the Highlands Shopping Center. The inclusion of a Home Goods Store in the proposed project would be supported by reasoning similar to that provided for the Home Improvement Store. Sufficient spending power is available in the market to support the new store even with consideration given to the competition presented by a similar retailer at the Highlands Shopping Center. Retail operators would not likely invest in the cost associated with a store in a location where the demographics would not support its viability.

There would also be some potential overlap between the wholesale warehouse store and the Marshalls and Kohl's department stores but patrons are expected to continue to shop at Marshalls and Kohl's for items not available at the wholesale warehouse store.

The limited overlap between the two developments would be expected to have little negative impact on the existing tenants at The Highlands Shopping Center's. In fact, the combination of these two retail centers would provide patrons with an increased ability to comparison shop and the potential for lower prices through added competition, especially in home improvement retail sector. Adding greater variety to the local retail landscape through development of the proposed project can be expected to draw additional patrons from more distant locations all looking to take advantage of the increased retail opportunities in the area. An increase in the number of retail stores would be expected to supplement the number of shoppers currently frequenting existing stores at the Highlands Shopping Center and elsewhere in the vicinity of the proposed project. It should also be noted that even with

the proposed development, there will continue to be voids in retail opportunities where shoppers will need to travel to other locations for certain types of goods.

Types of Commercial Establishments

Proposed commercial establishments at Patterson Crossing Retail Center are expected to serve a much wider market area than the businesses in the Lake Carmel, Putnam Lake and Patterson Hamlet areas. The sizes of the proposed businesses range from a 4,750 square-foot coffee shop, to eight larger establishments that range from 10,200 and 13,700 square-foot retail uses to a home improvement center and a wholesale warehouse store, with 135,200 square feet and 142,760 square feet respectively. All eight stores and the coffee shop will serve local residents as well as patrons traveling from surrounding towns and counties.

The overlap of goods and services provided by the proposed uses at Patterson Crossing Retail Center and the goods and services offered by establishments in the Lake Carmel, Putnam Lake and Patterson Hamlet is most apparent in the home improvement sector. The Hamlets of Lake Carmel and Patterson contain stores that specialize in construction material sales, garden supplies, and hardware. There are no stores in this sector located in Putnam Lake. Overlapping establishments in the home improvement sector might include HB Benfield Electric Supplies in Patterson or the Putnam County Stone & Masonry in Lake Carmel. However, these establishments are likely to provide more specialized products and assistance for area contractors that now patronize them. It is possible that spin-off business from the home improvement center may increase their customer base. Some Patterson Crossing Retail Center patrons traveling from Pawling and other points to the east who might not otherwise be in the area, will pass these businesses and may be inclined to stop and comparison shop.

Dill's Best Home Center is the most similar to the proposed home improvement center in terms of scale and products offered. The presence of a Dill's on Route 52 in Lake Carmel and along Route 22 in both Brewster and Pawling indicates the strength of the local market for this type of store. The addition of a much larger facility nearby offering similar products and levels of service can be expected to draw patrons from the existing Dill's stores to a greater extent than the product-specific home improvement establishments described above.

Other stores proposed at Patterson Crossing Retail Center that could potentially draw customers from businesses in the Lake Carmel and downtown Patterson commercial centers include the 20,000 square-foot clothing store, the 22,200 square-foot sporting goods store, and the electronic store as well as the wholesale warehouse store. Lake Carmel contains several apparel stores and downtown Patterson contains a military clothing store. The A&P located at the edge of the Patterson Hamlet, the market in Putnam Lake and the pharmacy located in Lake Carmel also provide some of the products that might be offered at a wholesale warehouse store. However, many of these existing stores are not likely to draw from the wider market area that would serve the highway oriented uses proposed at Patterson Crossing Retail Center, while others cater to specific niche markets not served by proposed uses at the proposed development. Local residents that shop at the Lake Carmel Pharmacy are likely to continue to do so for the personal service upon which they currently rely. The A&P at the intersection of Routes 311 and 22, the market in Putnam Lake and local deli's in the area provide convenience shopping distinct from the bulk purchase shopping for

which large scale wholesale warehouse stores are known. These existing businesses are likely to remain competitive and could potentially draw from the patrons that are destined for the Patterson Crossing Retail Center (with the exception of the market in Putnam Lake). The lingerie store in Lake Carmel and the military clothing store in Patterson, while apparel sales establishments, clearly serve very specific markets, and their patrons would not likely find the specific products offered by these shops at a larger, more general clothing and apparel store. The proposed electronics store would have some overlap with the Radio Shack in Pawling and the AVP Business Products on Route 22 in Patterson. However, these smaller retailers provide products and/or services to clientele in niche markets that would not be offered by a large scale electronics store.

The coffee shop proposed at Patterson Crossing Retail Center would also overlap to some degree with existing local restaurants. However, the coffee shop is expected to serve those patronizing Patterson Crossing Retail Center and is more likely to increase and enhance dining options in the area rather than supplant the existing restaurants. Customers and even workers at Patterson Crossing Retail Center will increase the range of visitors to the area, potentially increasing sales at existing eateries. The clientele that frequent the existing restaurants will most likely continue to do so into the future.

Affect of Proposed Commercial Uses on Hamlet Areas

The proposed project is expected to have an overall positive economic effect on nearby commercial centers in the Lake Carmel and Patterson Hamlets. The Putnam Lake community is too far removed from main the roadways that would be used to access the proposed development to be effected one way or the other by the Patterson Crossing Retail Center. Highway oriented businesses such as gas stations and convenience stores existing along access roads to the Patterson Crossing Retail Center are expected to see an increase in business. Some patrons of the proposed retail center would be expected to make purchases at local shops and take advantage of area restaurants and services.

At the same time, the introduction of over 400,000 square feet of retail space may draw some shopping dollars away from the surrounding downtown areas for some existing retailers that have a high degree of overlap with the goods and services to be provided at Patterson Crossing Retail Center. The increase in competition for a store like Dill's Best Home Center, which is located in Lake Carmel, Pawling and Brewster, could potentially lead to secondary displacement should these establishments no longer remain viable from a competitive standpoint. Although unlikely, should secondary displacement occur, the vacated site would most likely be reused by another commercial establishment allowed pursuant to zoning. This transition of businesses would not result in significant long term economic impacts to either the Lake Carmel or Route 22 commercial centers or in blighting of the immediate neighborhood, as land values remain high. Should these establishments be displaced, it is unlikely that their sites would remain vacant in the long term, given their size and prominent locations along main roadways.

Expected impacts to other neighborhood businesses resulting directly from secondary displacement would be limited to the temporary loss of patronage from employees of the closed store and from shoppers that had traveled to Dill's and stopped at other shops incidentally. Shoppers whose destination was another retail shop(s) in the vicinity of a closed business would be expected to continue to patronize the existing store(s). This limited change in the local retail landscape would last only as long as the retail space remains

vacant and may be offset by incidental shoppers whose original destination would be the Patterson Crossing Retail Center.

The proposed project is not expected to significantly alter the character or local economies of its surrounding downtown areas, or significantly alter the character of the Towns of Kent and Patterson. The location of the site at the crossroads of Interstate 84 and NYS Route 311, largely isolated visually from the surrounding Hamlet areas, make it ideally suited for large scale retail development. By increasing local spending and economic activity, and increasing the range of goods and services offered to Patterson, Kent and Putnam County residents, the proposed project is expected to strengthen the county's economy as a whole and enhance the quality of life of its residents. Long-vacant commercial sites in the hamlets may actually become occupied in the future with this increase in local business activity, due to the need for ancillary services for patrons and employees of the retail center.

4.12.3 Proposed Mitigation Measures

With the proposed retail development, the project site is not anticipated to generate significant costs to either the Town of Patterson or the Town of Kent. For instance, solid waste collection would be provided by a private carter and not by the municipalities. Snow plowing and road maintenance would be performed by private contractors and not at the expense of the towns. Similarly, the site would be served by a private water supply and wastewater treatment system which would be paid for by the applicant. Without an on-site resident population, the project would generate no demand for town recreation services, library services or costs to the school districts.

The site would be subject to routine patrols by local police forces, but as indicated in Chapter 11, the project is not expected to impact the police forces or require increases in staffing or material needs. In addition, a portion of the property tax and sales tax revenues generated by the project to the Town of Kent, Putnam County and the State of New York could be made available to augment the budgets of the Kent Police Department, the Putnam County Sheriff's Department, and the New York State Police Department respectively.

The project will also pay property taxes to the Patterson Fire District #1 and the Lake Carmel Fire District. These revenues are expected to offset the costs to the district associated with any periodic emergency responses.

The applicant is not seeking any tax incentives which would be applied to this project.

4.12.4 Retail Opportunities

There is limited existing retail development in the Towns of Patterson and Kent, as well as overall in Putnam County. The Hamlets of Lake Carmel, Putnam Lake and Patterson, located approximately one mile to the west, and eight and three miles to the east of the Patterson Crossing Retail Center project site respectively, have a very limited range of retail and service establishments. Existing businesses in these areas primarily serve the communities immediately surrounding them with neighborhood convenience retail and services. Existing businesses in the Hamlets of Patterson, Putnam Lake and Lake Carmel are also generally locally oriented and limited in terms of their variety of goods and hours of operations. The 1989 Town of Kent Comprehensive Plan describes the lack of shopping opportunities in the Town, stating that most residents drive to Carmel for supermarkets, and

that deficiencies probably exist with respect to other retail goods categories such as convenience stores, apparel stores, auto supply stores and full service and fast food restaurants.

According to 2004 data provided by Claritas, Inc., included in Appendix C, there are only four establishments within three miles of the project site that have over 20 employees, two are restaurants and two are retailers that deal in building materials, lumber and/or garden supplies. Stores within this three-mile radius are designed to serve the local community with their primary focus on convenience sales. These retail outlets are generally gas stations, automotive repair shops, food establishments, beauty salons, grocery and hardware stores, each stocking a limited selection of items.

The Highlands Shopping Center at approximately 3.5 miles from the proposed Patterson Crossing Retail Center site offers shoppers a Home Depot, a Linen-n-Things, Kohl's and Marshalls department stores, an Applebees restaurant and other smaller retail shops. A general description of existing businesses in the area is provided in Chapter 3.0 of this DEIS.

Existing Regional Shopping Opportunities

There is a limited selection of major retailers providing a wide range of goods and hours of operation in Putnam County. A listing of Putnam County retailers, provided by the Putnam County Economic Development Corporation to promote local shopping identifies 207 businesses located in the Town of Patterson. The retail business portion of the list is comprised of small, locally owned operations with only one chain store. The "big box" retailers in the area can be found at The Highlands Shopping Center in Southeast, New York and are limited to a Home Depot, a Linen-n-Things and the Kohl's and Marshalls department stores. Demand for such retailers in Putnam County is generally met through stores in neighboring counties and states, resulting in an export of shopping dollars and the need for residents to travel unnecessarily long distances to meet some of their shopping needs. Regional shopping opportunities providing major purchase options exist in Danbury and Brookfield, Connecticut, as well as in Westchester and Dutchess Counties in New York.

Those businesses closest to the project site include the Danbury Fair Mall (Danbury, Fairfield County, CT), the Westchester and Galleria Malls (White Plains, Westchester County, NY), the Poughkeepsie Galleria and South Hills Mall (Poughkeepsie, Dutchess County, NY), the Jefferson Valley Mall (Yorktown, Westchester County, NY), the Cortlandt Town Center (Cortlandt, Westchester County, NY), the Newburgh and Mid-Valley Malls (Newburgh, Orange County, NY). Each of these shopping destinations offer a number of anchor department or other "big-box" stores and a wide variety of smaller stores. Other retail opportunities are also available in the immediate vicinity of these shopping malls.

The Danbury Mall is located approximately 15 miles to the east, with an estimated drive time of 20 minutes. The Westchester and Galleria Malls are located approximately 36 miles to the south, with an estimated drive time of 45 minutes. The Poughkeepsie Galleria and South Hills Malls in Poughkeepsie, NY are located approximately 31 miles to the northwest, with an estimated drive time of 40 minutes. The Highlands Shopping Center is approximately 3.5 miles (roughly five minutes) south of the Proposed Action. The Jefferson Valley Mall is roughly 25 minutes and 18 miles and the Cortlandt Town Center lies approximately 38 minutes and 30 miles southwest of the Patterson Crossing Retail Center site. The larger

shopping centers in Newburgh, the Newburgh and Mid-Valley Malls, are both roughly half an hour drive and 25 miles west of the proposed development.

Disposable Income and Local Spending Habits

There is an estimated 5,639 households, averaging just under 3 persons per household for a total of 16,080 people living within three miles of the proposed project. The average household income in 2004 was nearly \$89,000 and increased to \$103,000 for households three to ten miles away. Putnam County's median household income is the highest of all New York State Counties¹. The retail trade potential for the three mile radius was estimated² at \$134 million in total sales potential, whereas the 2004 total consumer expenditures was only \$335,000. These values increase to a retail potential of \$1.6 billion and total consumer expenditure potential of \$3 million at retail establishments within ten miles of the project site. This shows that residents are generally traveling out of Putnam County for major purchases, likely due to the limited retail opportunities closer to their homes.

The proposed project will provide residents an alternative to long-distance shopping for major purchases by providing nearby retail establishments. This is anticipated to increase sales taxes for Putnam County by capturing a significant proportion of the retail spending that is currently captured at retail centers in surrounding parts of the region. The tax benefits of this project are discussed further in Chapter 3.0 of this DEIS.

Information relating to the economic characteristics of the residents of Patterson, Kent and Putnam County as a whole is provided in Table 4.12-1. According to 2000 US Census data, the income levels of the residents of Patterson, Kent and Putnam County are considerably higher than the national averages. The Census data also indicates that the poverty levels for both towns and for the County are much lower than the nation as a whole. The Census data demonstrates that the work force within both towns and the County is larger, more educated, and travels further to work than the national averages. The Census Data also shows a much higher percentage of owner occupied housing units (more than 80 percent) than the nation as a whole (66.2 percent).

This Census data suggests that the labor force of Patterson, Kent and Putnam County, as a whole, has relatively well paying jobs and disposable income to spend on homes and families. It is expected that as the cost of housing in Putnam County continues to rise, the average income level in the county will also continue to increase.

As indicated in Table 4.12-1, the average travel time to work in 2000 was more than 40 minutes for workers in the Towns of Kent and Patterson, which amounts to an average of 6.7 hours of weekly travel time per worker. These local residents must also travel out of the county (with the exception of the stores at The Highlands Shopping Center) to Westchester County, Dutchess County, Fairfield County to shop for a majority of goods offered at large retail centers. The convenience offered by the Patterson Crossing Retail Center will provide local residents with a shopping alternative that can reduce the amount of time spent on travel, resulting in fewer vehicle miles traveled, less wear and tear on cars, reduced fuel expenditures, and a decrease in automobile emissions.

¹ Putnam County Economic Development Corporation.

² Claritas, Inc., 2005.

Table 4.12-1 2000 Census Data			
	Number	Percent	U.S.
Town of Patterson			
Size of labor force *	5,798	66.4%	63.9%
Mean travel time to work	40.5 minutes	N.A.	25.5 minutes
Median household income	\$66,250	N.A.	\$41,994
Median family Income	\$75,746	N.A.	\$50,046
Per capita Income	\$26,103	N.A.	\$21,587
Families below poverty level	101	3.7%	9.2%
Individuals below poverty level	495	4.9%	12.4%
Bachelors degree or higher	2,204	28.8%	24.4%
Owner Occupied Housing Units	2,829	80.2% **	66.2%
Town of Kent			
Size of labor force *	7,649	71.2%	63.9%
Mean travel time to work	40.4 minutes	N.A.	25.5 minutes
Median household income	\$72,346	N.A.	\$41,994
Median family Income	\$79,716	N.A.	\$50,046
Per capita Income	\$29,984	N.A.	\$21,587
Families below poverty level	156	4.2%	9.2%
Individuals below poverty level	567	4.1%	12.4%
Bachelors degree or higher	2,741	28.8%	24.4%
Owner Occupied Housing Units	4,040	83.0% **	66.2%
Putnam County			
Size of labor force *	50,709	69.2%	63.9%
Mean travel time to work	38.4 minutes	N.A.	25.5 minutes
Median household income	\$72,279	N.A.	\$41,994
Median family Income	\$82,197	N.A.	\$50,046
Per capita Income	\$30,127	N.A.	\$21,587
Families below poverty level	687	2.7%	9.2%
Individuals below poverty level	4,110	4.4%	12.4%
Bachelors degree or higher	21,891	33.9%	24.4%
Owner Occupied Housing Units	26,885	82.2% **	66.2%
* Population 16 years and older			
** Percent of all occupied housing units			
Source: US 2000 Census			

As previously noted, because there are very limited shopping opportunities at retail centers in Putnam County, local residents that desire to shop at such centers spend a portion of their disposable income outside of Putnam County. As a result, the County does not benefit from the 3.5 percent sales tax that it would otherwise receive had these stores been located within the County.

Existing Travel Patterns, Vehicle Miles Traveled and Energy Consumption

In his 2005 Budget Message presented in September 2004, and in his 2004 State of the County Address, Putnam County Executive Robert J. Bondi noted the need for increased retail in Putnam County to avoid future increases in the County's sales tax rate.

In his 2006 Budget Message delivered in September of 2005, after noting the increases in the sales (1/2 percent) and property (10 percent) taxes and increases in costs exceeding

\$14 million over the past 5 years, he noted that “the County has benefited from increased sales tax revenue generated by the opening of the Highlands Retail Shopping Center”. Mr. Bondi stated the following: “Putnam County needs more retail shopping opportunities to generate the sales tax revenue necessary to fund our increasing mandated services and costs without raising taxes. Putnam County needs a second major retail shopping project, such as Patterson Crossing, to be approved quickly and begin generating sales tax dollars, otherwise our citizens will pay increasing sales and property taxes in future budgets. Without the additional sales tax dollars generated through increased shopping opportunities, the County will not be able to fund the debt service generated from an open space bond resolution without raising property taxes. There simply is not another source of revenue available to fund these purchases at this point in our history.” The proposed project would generate an estimated \$6.2 to \$7.4 million in sales tax revenue annually to the County thereby offsetting future cost increases and reducing the need for future tax increases at the County level.

County Executive Bondi, in his 2006 State of the County Address, discusses the need to keep more of local resident’s disposable income in the County and “solve the ‘Putnam Paradox’”. Currently, two thirds of the County’s resident’s disposal income, and its associated tax benefits, is spent outside of Putnam County. Mr. Bondi discussed a new partnering program that will “...help capture this ‘Putnam Paradox’ by providing an economic incentive to local municipalities to fast track smart commercial retail development.” through providing a “...portion of the future sales tax revenue generated from new shopping opportunities back to the local municipalities for a project that they desire.” This money could be used to assist in funding the development of “...a new library, town hall, or ball fields...”

In addition, the proposed project would support the County’s “Shop Putnam” initiative. Through this initiative, residents are made aware of the goods and services available to them at businesses throughout the County. As part of the initiative, the website ShopPutnamToday.com encourages citizens to patronize Putnam County businesses by providing a convenient source of information on locally available goods and services. The Putnam County Economic Development Corporation's website states that “[s]hopping locally helps our County's economy by supporting local businesses and creating jobs, especially for young people and senior citizens. It also keeps our sales tax dollars working for us by providing the revenue necessary to provide vital services while keeping sales and Real Property tax rates low.” The proposed action would provide short and long-term employment opportunities, expand the number and types of goods available locally, and provide a substantial amount of money to the County in the form of tax revenues all of which are in-line with the County’s initiative.

As stated above, the proposed project will benefit local residents by providing them with a wider variety of retail offerings than currently exists in Putnam County, precluding the need for them to travel long distances for comparative shopping and selection of goods that are currently available only in surrounding counties. This could potentially result in a significant reduction in vehicle miles traveled (VMT), resulting in lower vehicular emissions at the regional level, and a significant gas and time savings that would enhance quality of life for these residents.

For local households in the Towns of Kent and Patterson that might shop at the future Patterson Crossing Retail Center on a weekly basis instead of traveling to major retail stores in surrounding counties the reduction in distance traveled one way would be 10 to 15 miles

with a corresponding reduction in the annual VMT of 6% to 8%. With high gasoline prices in the region and the potential for prices to rise in the future, a saving of over \$150 per year per household in fuel costs could be realized assuming an average vehicle performance of 20 miles per gallon. This is based on a typical annual household VMT of approximately 18,400 miles per year.³

Additional information on travel patterns in the local road network is provided in Chapter 4.8.

³ New York State Energy and Research Authority (NYSERDA), 2002 NYS Energy Fast Facts, NYSERDA website, 2005.

4.13 Cultural Resources**4.13.1 Historic and Archaeological Resources****Existing Conditions**

Section 14.09 of the New York State Historic Preservation Act of 1980 establishes a review process for State agency activities affecting historic or cultural properties, requiring State agencies to consult with the Commissioner of the Office of Parks, Recreation and Historic Preservation (OPRHP) prior to approving a project. If a project requires any permits or is receiving funding/grants or any other approvals from State agencies, review by OPRHP is required. This project is subject to New York State Department of Transportation review and approval and thus must follow the criteria determined by OPRHP for cultural resource management, as set forth in the "Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State". These standards were developed by the New York Archaeological Council and adopted by the Office of Parks, Recreation and Historical Preservation to ensure uniformity in the review of cultural material in New York State.

Cultural Resource Management investigations are divided into three levels: Phases I, II and III. A project may receive OPRHP approval after the completion of any of these phases by a qualified archaeologist, based on the determination that the project site has undergone sufficient investigation to eliminate the probability of significant artifacts being recovered at that location. Phase I is subdivided into a Phase 1A and Phase 1B. The Phase 1A consists of a Literature Review and Sensitivity Assessment, which entails the following:

- 1) a review of pertinent published historic material pertaining to this portion of the Town;
- 2) a search of the historical or archeological site files of the New York Museum and the New York Historic Preservation Office to identify documented cultural resources located on or adjacent to the property, and;
- 3) a reconnaissance of the parcel to identify areas of greater and lesser potential for containing buried cultural remains, and to note areas where serious prior disturbance to upper soils may have eliminated such potential, and to photodocument any potentially affected standing structures over 50 years of age.

For any area that will potentially be disturbed by the proposed action, a Phase 1B Field Investigation is conducted, which involves a systematic, on-site field inspection to verify the presence or absence of archaeological or historic artifacts. The most common method for conducting a Phase 1B is systematic subsurface testing, which requires the excavation of small test pits at fixed intervals throughout the project site. The soil from these pits is examined for buried cultural remains. Significant findings can trigger the requirement of more extensive investigation via a Phase II or Phase III assessments. However, mitigation or avoidance of that portion of the site where remains are known or suspected may be accepted by OPRHP and allow the modified project to continue.

On the basis of a response letter from OPRHP dated June 29, 2004 (Appendix B), a Phase IA Literature Review and Sensitivity Analysis was conducted in September and October,

2004, and a Phase IB, Site Assessment, was conducted in September, 2005, by Columbia Heritage, LTD. The final Phase I report is included as Appendix N and summarized below.

Phase IA - Site Assessment Phase

Project Area Sensitivity

The study area consists of flat to sloping upland, formerly devoted to pasture. The Phase IA Analysis was conducted to evaluate the potential for proposed construction to cause impact to standing or buried Native American and/or European American era cultural resources.

Native American Era

No sites of Native American occupation are listed in the State Historic Preservation Office (SHPO) and New York State Museum files for this portion of the Croton River drainage within one mile of the study area. However, this area has not seen larger-scale construction projects during the era where cultural resource surveys are required. As a result, the number and range of Native American occupation sites present in this part of the Towns of Patterson and Kent are likely to be underrepresented.

The better-drained, flatter portions of the study area, are recognized to have seen what would be most likely have been seasonal occupation. The project site is considered to have above average potential to contain Native American cultural material. Therefore, a Stage IB Archaeological Field Reconnaissance was recommended for the flatter, better-drained areas.

European American Era

European American era settlement for this area dates to the early decades of the eighteenth century. Poorly drained soils in the lower elevations and little industrial potential resulted in the majority of the population to settle in other areas.

A below-average potential is assessed for buried cultural remains pertaining to this period of occupation to be present within the study area. Potential for the presence of remains of small individual buildings along the small portion of the affected area along NYS Route 311. In this subarea, subsurface sampling of locations to be affected by development that contain uppers soils is recommended.

Historical Structures

No structures stand within the area for which construction is proposed. A walkover of the site noted no structural remains or anomalies likely to indicate the presence of buried structures or other cultural features.

A search of the site files maintained by the New York State OPRHP in Albany indicated one property determined eligible of listing on the National Register of Historic Places is located in the vicinity of the study area. However, the Taconic State Parkway south of the Dutchess County limits, assigned Unique Site Number 07902.00025, passes well to the west of and out of sight of the study area. No structures currently listed, nominated or determined eligible for listing on the State or National Register of Historic Places were found within one mile of

the study area. All standing structures north and west of the study area date from during and after the World War II period. No buildings that meet the minimum age requirements for listing were identified adjacent to or with a view of the proposed development.

Phase IB - Site Identification Phase

The Phase IB, Site Identification Survey, was conducted to determine whether such cultural resources actually existed on the subject property. This entailed systematic subsurface sampling of the project area by means of hand-dug shovel test holes of which the contents were screened through hardware cloth to recover any cultural items.

Systematic archaeological sampling of portions of the approximately 90.5 acre parcel proposed for the Patterson Crossing commercial development encountered no evidence of Native American or Pre-World War II era European American cultural activity.

Potential Impacts

Since no historic structures currently listed, nominated or determined eligible for listing on the State or National Register of Historic Places nor any buildings that meet the minimum ages for listing were found on, near, or with a view of the project parcel, there will be no impact to historic resources.

As archaeological sampling identified no items associated with either the Native American occupation or pre-World War II era European American material, no on-site archeological resources will be impacted by the proposed development.

Mitigation Measures

The Phase I report, which summarizes the investigations conducted during the Phase IA and IB studies, concludes that no historic or cultural resources currently exist on or near the project parcel and no further investigation is required. A copy of this report has been submitted to OPRHP. Based on previous experience with OPRHP, the archaeologist anticipates that OPRHP reviewers will issue a finding that the project will have "No Impact" on archaeological and historic resources, allowing the project to proceed as proposed. The OPRHP letter will be included in the FEIS.

4.13.2 Visual Resources

NYSDEC Guidance on Assessing Visual Impacts

NYSDEC has developed a policy and guidance memorandum relating to assessing and mitigating visual impacts of facilities that are regulated by the agency and located in visual proximity to sensitive land uses. The guidance includes definitions of visual and aesthetic impacts, describes an analytical technique for assessing visual impact, and defines various mitigative measures available to eliminate or reduce adverse impacts. The visual assessment that is presented below has been conducted in accordance with the NYSDEC guidance and references various terms and procedures that are incorporated in the guidance.

When a proposed facility is potentially located within the viewshed of a designated aesthetic resource, a visual assessment is appropriate. *Viewshed* is the geographic area from which a facility may be seen. An *aesthetic resource* is a place, formally designated by a governing body, that is visited by the public for the purpose of enjoying its beauty. Designated resources in the area of the proposed project, if any exist, are evaluated in this study. Additionally, other scenic resources may be considered significant aesthetic resources for the purposes of the visual assessment based on their unique characteristics.

A visual assessment is an analytical technique that determines the viewshed of a particular facility, identifies aesthetic resources within the viewshed, determines the *potential impact* of the facility on aesthetic resources, and identifies strategies to avoid, eliminate or reduce adverse impacts. The visual assessment will often incorporate use of line-of-sight profiles to demonstrate potential visibility of the facility from a particular sensitive viewpoint located off the site. A line-of-sight profile is a to-scale graphic depiction of the topography taken along a straight path between two selected ground locations, with a straight line depicting the line of view between those two locations. This information often must be verified through in-field reconnaissance.

Variables associated with the actual visual experience are often presented in a visual analysis, such as atmospheric perspective (diminishing clarity and contrast of view due to atmospheric interference), and size perspective (reduction of apparent size of objects as distance increases). It is noted that mere visibility of a facility, even startling visibility, does not automatically mean it has an adverse visual or aesthetic impact. Aesthetic impact occurs when there is a demonstrated detrimental effect on the public enjoyment of an aesthetic resource. Visual impact occurs when designed mitigation strategies, or the mitigating effects of perspective, do not adequately reduce the visibility of a facility from an aesthetic resource to an insignificant level.

Existing Visual Character and Views into the Site

The project site is located in a setting of rolling topography and modest density residential neighborhoods and some existing commercial development, where views are generally limited by the nearby hills, vegetation and curving roadway corridors. The Route 84 corridor provides clear views onto the project site from the east while moderate density residential development that adjoins the property to the west -- single family residences on Concord Road, Echo Road, Vernon Drive and nearby locations -- all have views of parts of the site that are limited by the existing woodland vegetation and topography.

A visual resources survey was conducted from local roads in the project area in March 2005 and again in April 2006 to identify locations in the vicinity where the project site may be visible from roads and properties with public access. At the time of the surveys, leaves were off the trees and maximum visual exposure could be assessed. During times of the year when trees are in full leaf, the project site would be less visible, and visible from shorter distances than discussed in this chapter. The extent of the survey was initially determined by inspection of US Geological Survey topographic maps with the aid of 3D viewing computer software (*Terrain Navigator Pro*), which reveal the potential visibility of the project site based on topography. Thus, the survey encompassed the *potential viewshed* of the proposed project. The field survey refined this assessment based on limiting factors of the actual visibility of the site, accounting for topography, vegetation, and buildings. Photographs were taken from various locations to depict the existing conditions and are identified below.

The field survey identified the *actual viewshed* of specific locations in the site vicinity where the site and the proposed project would be visible. Figure 4.13-1, Key Map to Visual Sections, provides an overview of the study area. Figure 4.13-1A, Detail Map to Visual Sections, shows the locations where the line-of-sight profiles were constructed (shown in subsequent figures) that cross the project site.

The field survey included identification of any prominent land forms, land cover types, and the visual character of the site and local area. The survey also sought to identify natural areas of significant scenic value and structures of significant architectural design in the vicinity of the project.

Currently, the site is heavily wooded, with a mix of large deciduous trees and a sparse understory of small trees and herbaceous cover. In general, topography on the site slopes from a high point in the southwestern portion of the property down toward the east and northeast. Areas of steeper, wooded slopes exist in the southeastern and northwestern corners of the site. On the eastern side of the site, elevations on the site itself are notably higher than nearby roadways. The edge of the property is some 30 to 70 feet above the pavement elevation on Interstate 84, approximately 57 feet above the Route 311 roadway in the northeast corner, and approximately 20 feet above the Fair Street roadway elevation in the southeast corner of the property. Topography on the west side of the property tends to follow the elevations on adjoining land, plus or minus 10 feet.

Given the orientation of the project site on the north and east sides of a small ridge and the variability of the local topography, potential visibility of the site from local vantage points is notably limited. The potential viewshed of the project site is limited to a corridor that follows Interstate 84 with sight lines to the site no more than three-quarters of a mile to the south and north of the site. The photograph in Figure 4.13-1B illustrates the view from Interstate 84 for westbound traffic looking toward the project site where trees on the subject property appear on the horizon. Figure 4.13-1C is a photograph taken from Fair Street looking toward the project site, showing the wooded hillside at the southerly end of the site. The photograph in Figure 4.13-1D illustrates the view toward the site from Interstate 84 traveling eastbound. Potential views of the site are from points no more than 3,000 feet east due to the topography. The photograph in Figure 4.13-1E illustrates the view toward the site from Route 311 at Ludingtonville Road. Potential views of the site from points west are limited to the immediately adjacent properties and local roads due to the topography. The photographs in Figures 4.13-1F and 4.13-1G illustrate views toward the site from Concord Road at Echo Road and at Woodstock Road, respectively. The view from Route 311 immediately adjacent to the project site is of tree cover on the wooded hillside. The more distant view of the project site from Longfellow Drive, a local road northwest of the site, is depicted in Figure 4.13-H beyond the foreground trees and houses.

The local landform pattern consists of numerous rounded peaks at higher elevations that overlook Interstate 84 which passes through a series of valleys. Most of the land within the potential viewshed of the site consists of wooded cover types including areas of steeper slopes and wetlands. The Lake Carmel residential development dominates land west of the project site, primarily on west-facing slopes outside of the potential viewshed. The project site, which is located on northeast-facing slopes where there is little development largely due to natural constraints. The visual character of the immediate area can be generally characterized as rural development, consisting of single family homes, individual commercial

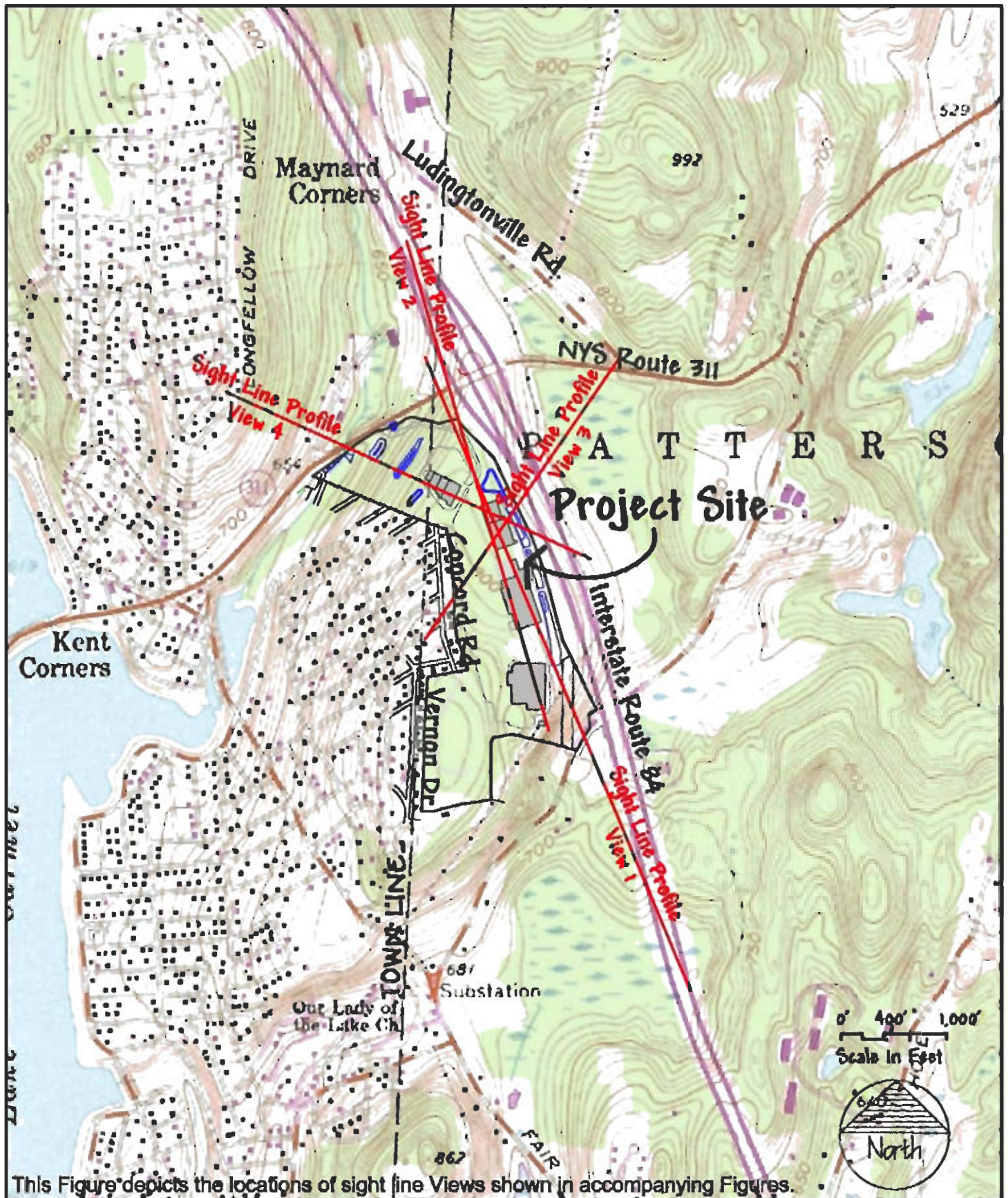


Figure 4.13-1: Key Map to Visual Sections
Patterson Crossing EIS

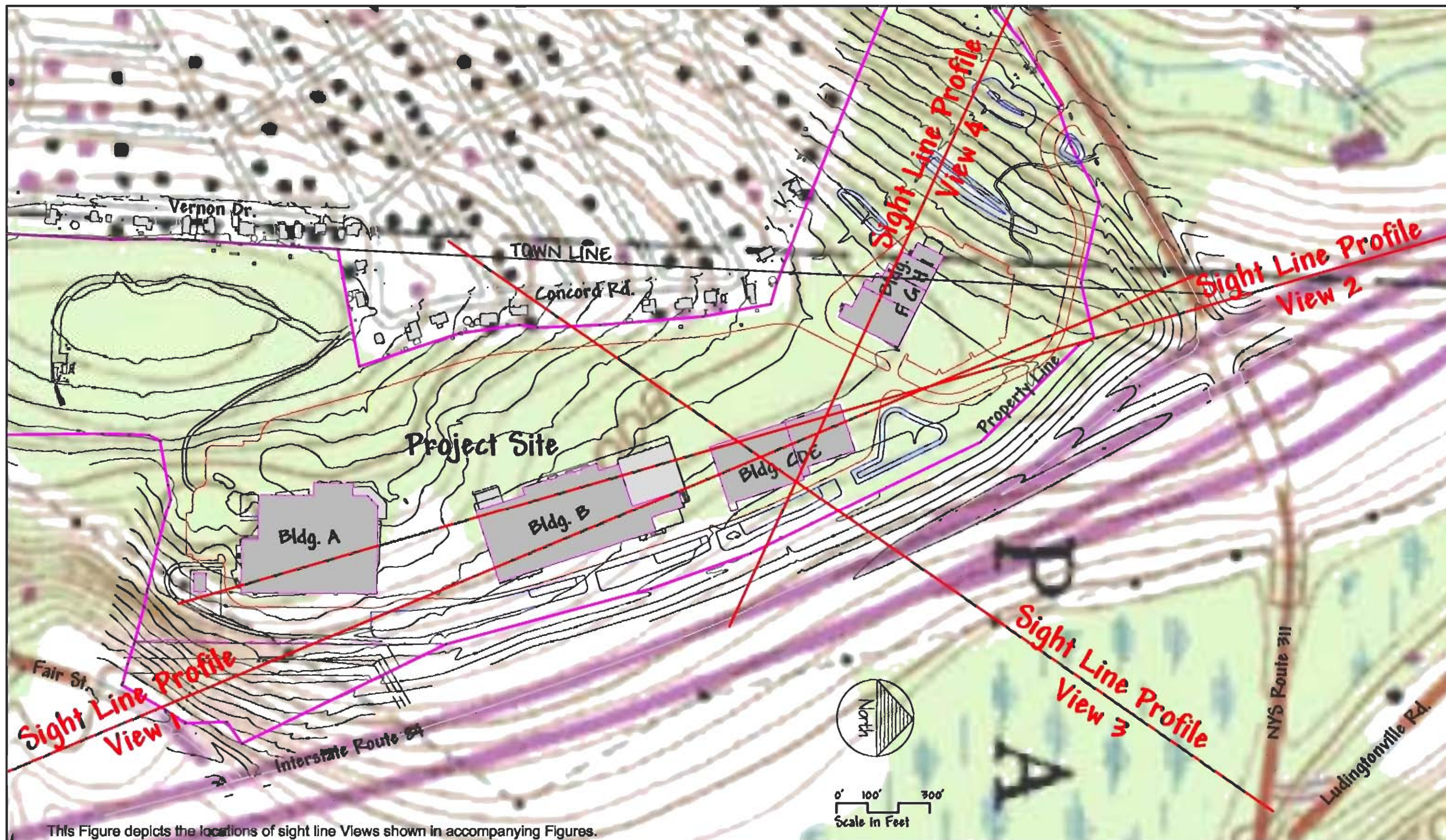
Towns of Patterson & Kent, Putnam County, New York

Base Map: USGS Topographic Quad: Lake Carmel

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Scale: 1" = 1,250'

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Scale: 1" = 300'

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Tim Miller Associates, Inc., 10 North Street, Cold Spring, New York 10516

Figure 4.13-1A: Detail Map to Visual Sections
Patterson Crossing Retail Center
Towns of Patterson & Kent, Putnam County, New York
Base Map: USGS Topographic Quad: Lake Carmel



Figure 4.13-1B: Photo from I-84 Westbound - View 1
Patterson Crossing Retail Center
Town of Patterson, Putnam County, New York
Date: March 15, 2006



Figure 4.13-1C: Photo from Fair Street - View 1
Patterson Crossing Retail Center
Town of Patterson, Putnam County, New York
Date: March 15, 2006

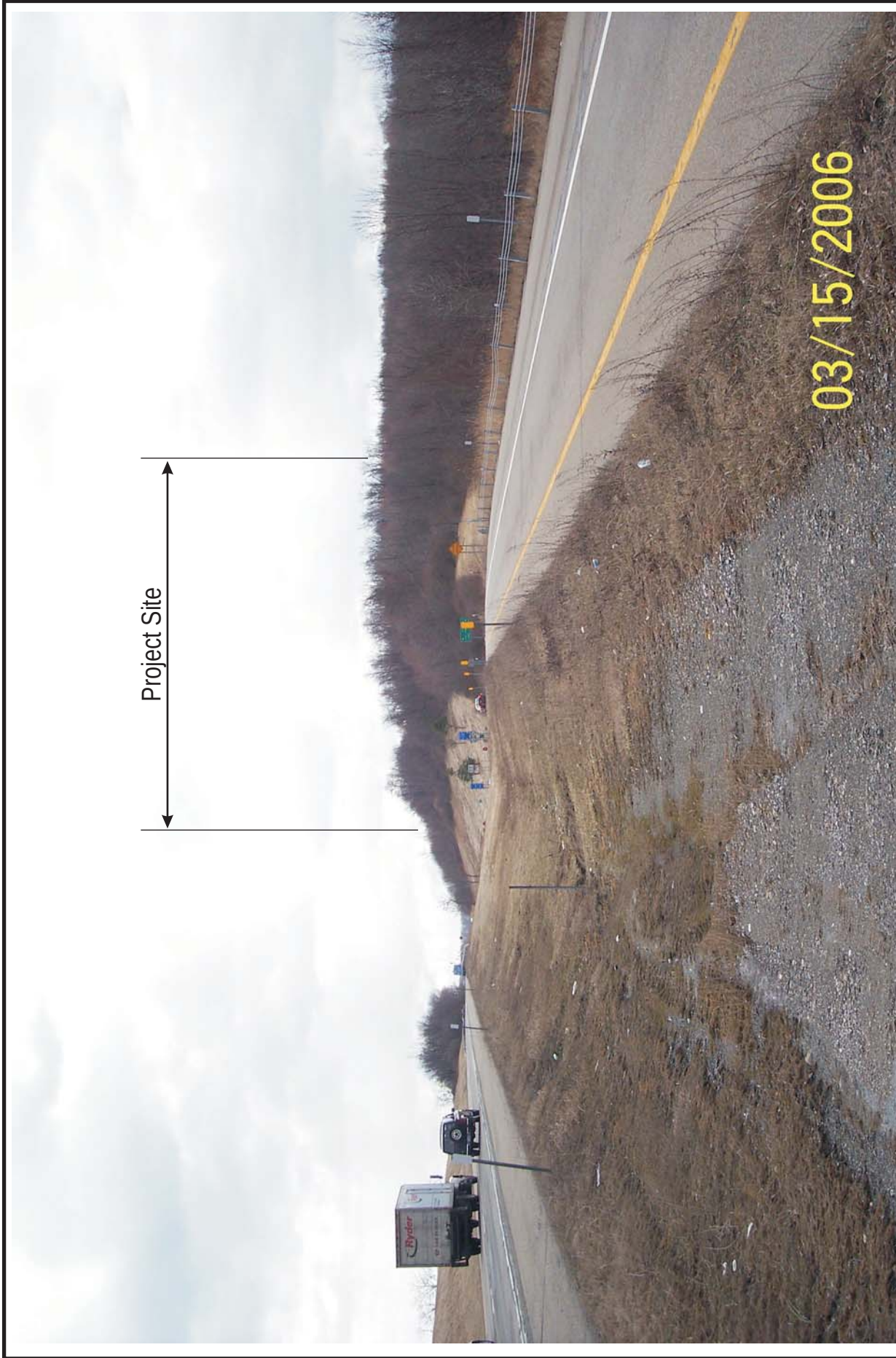


Figure 4.13-1D: Photo from I-84 Eastbound - View 2
Patterson Crossing Retail Center
Town of Patterson, Putnam County, New York
Date: March 15, 2006

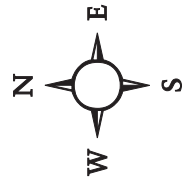




Figure 4.13-1E: Photo from Route 311 - View 3
 Patterson Crossing Retail Center
 Town of Patterson, Putnam County, New York
 Date: March 15, 2006

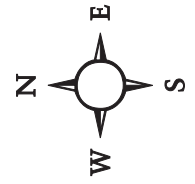


Figure 4.13-1F: Photo 1 from Concord Road
 Patterson Crossing Retail Center
 Town of Patterson, Putnam County, New York
 Date: March 15, 2006

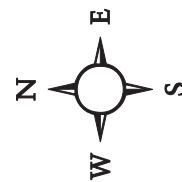


Figure 4.13-1G: Photo 2 from Concord Road
Patterson Crossing Retail Center
Town of Patterson, Putnam County, New York
Date: March 15, 2006

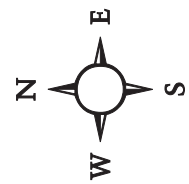


Figure 4.13-1H: Photo from Longfellow Drive - View 4
Patterson Crossing Retail Center
Town of Patterson, Putnam County, New York
Date: March 15, 2006

and retail establishments, and a roadway pattern dominated by an interstate limited access highway.

From the in-field reconnaissance, the actual project site viewshed was determined to encompass short portions of Interstate 84, Route 311, Fair Street, Concord Road, Echo Road, Vernon Drive and nearby locations, and a small portion of Longfellow Drive to the northwest. Existing views into the site are found to be limited by topography and the density of existing vegetation in the road corridors. From Interstate 84, the trees on the site are visible from fast moving vehicles such that the length of visibility of the site as measured in time would be about 70 seconds at sixty miles per hour. A short portion of Route 311 (about 6/10 mile) would allow views to the site while an even shorter portion of Fair Street (about 550 feet) would allow a view to the southernmost frontage of the subject property.

Concord Road, and portions of Echo Road and Vernon Drive, which are narrow residential streets west of the site, provide views between existing houses directly into the site. Although on private properties, views are possible from a number of residential backyards that abut the project site in this area. Views of the northern portion of the site are also possible over a distance of about 2,000 feet to the northwest on Longfellow Drive, from a viewer position that is higher and, thus, looking down on the site itself.

No site views were identified from other local roads in the site vicinity due to the natural conditions of the area.

Aesthetic Resources

There are no designated aesthetic resources or public facilities of cultural importance identified within the site viewshed that would be sensitive to changes in the visual environment. No structures of significant architectural design were identified in the vicinity of the project.

Potential Impacts

Construction of the project as proposed will remove some 68 acres of existing woods on the middle portions of the site and replace it with buildings, pavement, landscaping, lawn and stormwater basins, thus creating a change to the visual character of the site area. The four buildings are proposed to be situated on the east side of the property along the Interstate 84 frontage such that they will be visible from the highway. Parking and most circulation will occur west of the buildings and out of view from points east. Portions of the parking areas and the buildings beyond may be visible from residential properties immediately to the west and from public roads in the vicinity including Concord Road and the easternmost ends of Echo Road and several other roads. The two central buildings (labeled Building B and Buildings CDE on the Key Map) will have truck dock facilities located on the rear of the buildings facing the highway. Additionally, as previously stated, potential views of the two northern buildings (Building CDE and Building FGH) and associated parking and circulation are possible over a distance of about 2,000 feet from Longfellow Drive to the northwest. A short portion of Route 311 will have views to the site as well. These visual impacts were considered in detail in this analysis. A water storage tank proposed for the project will be located underground and out of sight from any location. The highest point of the site in the southern end of the property is proposed to remain wooded, and an existing telecommunications facility in this area will not change.

Cross-sectional diagrams were prepared to accurately illustrate the potential visibility of the project from various key viewpoints around the site. These were drawn to scale using the site survey and USGS topographic mapping. Locations and sizes of features on the ground were verified using recent aerial photography and in-field observations. Existing tree heights are shown 40 to 50 feet high in the diagrams based on the observations. Figure 4.13-1A is a Detail Map to the visual section diagrams drawn at 1" = 300' scale to match the scale of the diagrams. The descriptive analyses that follow refer to the relevant portions of the cross-sectional diagrams.

Views from Interstate 84

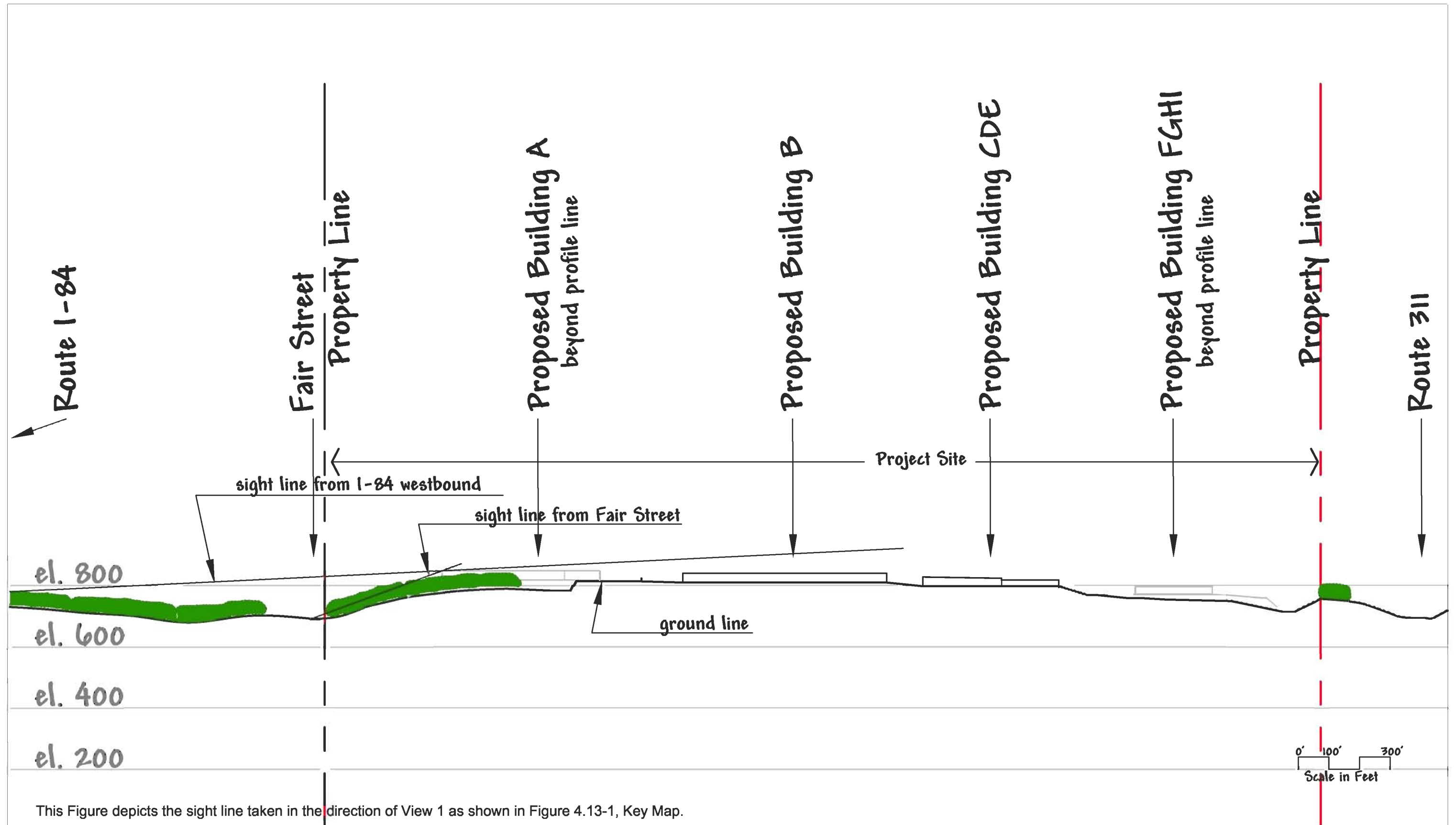
As this is a commercial/retail project, its visibility from major transportation routes is not only desirable for the project tenants but is necessary for the long term viability and success of the development. The project site is situated such that the proposed buildings can be seen from Interstate 84 as one passes the site. As depicted in Figure 4.13-2, drawn at 1" = 300' scale, the project will first become visible from a point some 3,000 feet east, from westbound vehicles. The project will first become visible from eastbound vehicles at a point some 3,000 feet west of the site. Profile Figure 4.13-3, drawn at 1" = 300' scale, depicts the line of sight from eastbound vehicles as they approach the site. The two central buildings that parallel Interstate 84 (Building B and Building CDE) will overlook the highway at a position somewhat higher than the highway itself. Due to the elevation of the proposed buildings and the location of intervening vegetation within the highway right-of-way, the buildings will only be partially visible through the trees as eastbound and westbound vehicles pass the site (sight line is shown in Figure 4.13-4). As previously indicated, the site development will be viewed from Interstate 84 from fast moving vehicles and within a corridor that includes other such development both east and west of the project site.

Following construction of the proposed project, views of the site from Interstate 84 will change from a wooded knoll to a developed site, situated above the vegetated slope at the edge of the highway right-of-way. From the most distant viewpoints on Interstate 84, removal of the tree canopy will be the most noticeable change, while the buildings and signs will become evident from closer points along the highway before passing the site. Naturally colored modular concrete block and landscape plantings have been proposed along the Interstate 84 side of the property, as well as a site specific lighting plan that specifies maximum light levels and integral light control devices, to offset visual impacts to passing motorists. Refer to further discussion below regarding site lighting.

Views from Route 311

A short portion of Route 311 (about 6/10 mile) in the vicinity of its intersection with Ludingtonville Road (to the northeast of the project site) would allow partial views to the site. As shown in Figure 4.13-4, a sight line from Route 311 will reveal a portion of the site development on the slope on the opposite side of Interstate 84, with intervening trees limiting this view.

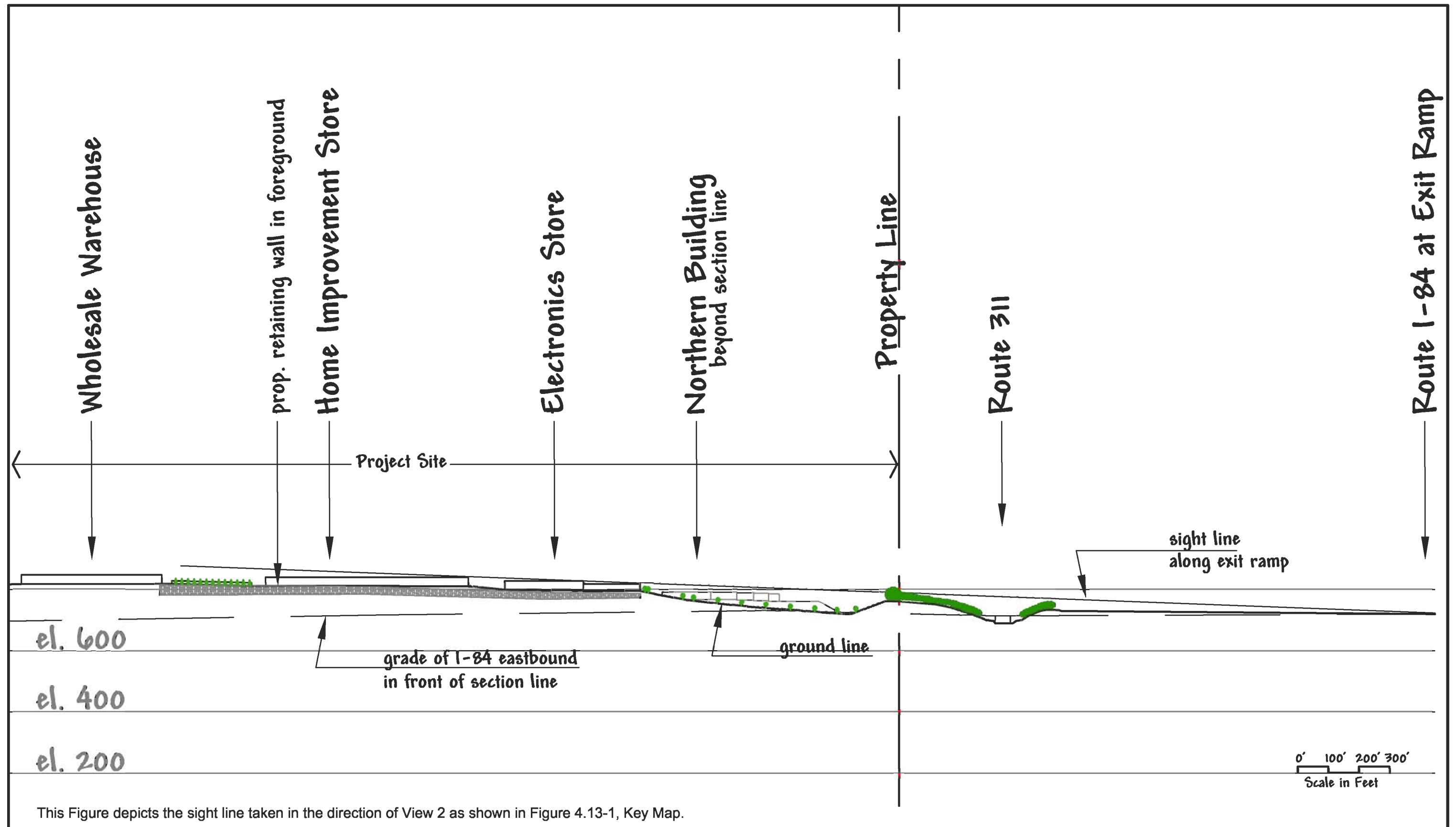
While a portion of the site frontage borders Route 311 west of Interstate 84, existing topography limits views into the project site to the northernmost end of the property where only the entrance road will be visible. Removal of trees in areas of the proposed stormwater basins will open the tree canopy on the north end of the site, although the visibility of proposed site features (including the roads, buildings and parking area at Building FGHI) will



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Scale: 1" = 300'

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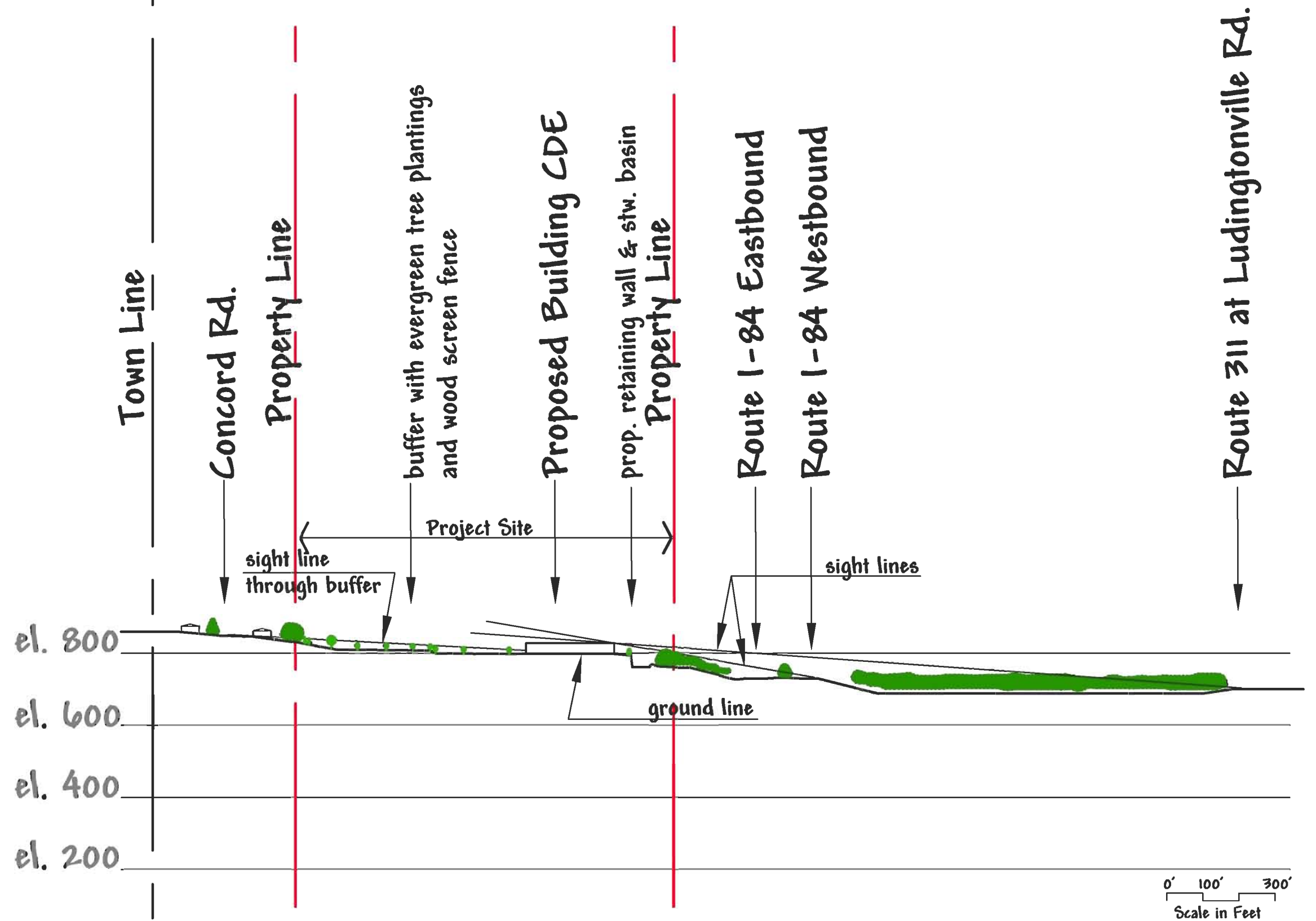
Figure 4.13-2: Line of Sight Profile from I-84 Westbound - View 1
Patterson Crossing Retail Center
Towns of Patterson & Kent, Putnam County, New York
Source: Tim Miller Associates, Inc.



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Scale: 1" = 300'

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Figure 4.13-3: Line of Sight Profile from I-84 Eastbound - View 2
Patterson Crossing EIS
Towns of Patterson & Kent, Putnam County, New York
Source: Tim Miller Associates, Inc.



This Figure depicts the sight line taken in the direction of View 3 as shown in Figure 4.13-1, Key Map.

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 Scale: 1" = 300'

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Figure 4.13-4: Line of Sight Profile from Route 311 Westbound - View 3
 Patterson Crossing Retail Center
 Towns of Patterson & Kent, Putnam County, New York
 Source: Tim Miller Associates, Inc.

be obscured (even in winter) given that Route 311 is located significantly lower than the developed portions of the site. Refer to Figure 4.13-5.

Views from Fair Street

A very small portion of site frontage exists on Fair Street, with wooded land sloping up from the road onto the project site. Proposed Building A will be situated beyond an area of trees proposed to remain and at an elevation about 126 feet above the road elevation. Given these factors, the potential visibility of the project will be insignificant from Fair Street. Refer to Figure 4.13-2 showing the sight line from Fair Street.

Views from Concord Road and Vernon Drive Vicinity

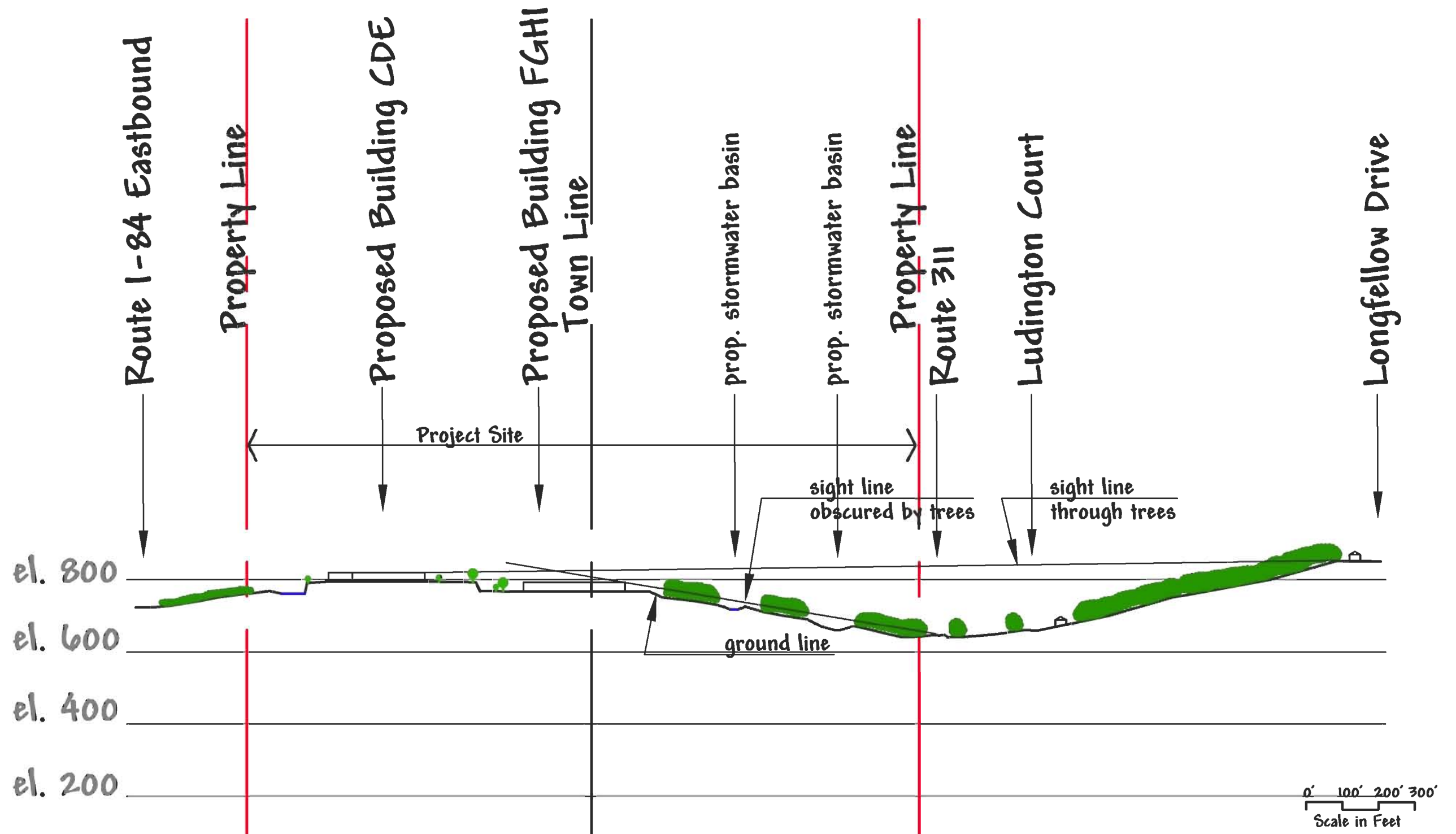
Concord Road, Echo Road, Vernon Drive and nearby streets are located immediately west of the project site and comprise the eastern perimeter of the Lake Carmel residential area. Most of the properties bordering the project site contain single family houses on small lots, most of which also have small back yards with lawns that reach the common property line with the subject project. Concord Road generally follows a small ridgeline so that the road itself is at a higher elevation than the land on either side of it, thereby limiting potential views onto the project site from public roads to the immediate area. Vernon Drive is situated west of the ridge and opposite the portion of the project site that is proposed to remain in its current wooded condition. The eastern end of Echo Road connects Vernon to Concord in one block, providing potential views to the east into the project site. These conditions are depicted in Figures 4.7-1, Aerial Photograph, and 4.13-1, Key Map to Visual Sections.

Figure 4.13-4 shows a typical sight line taken from Concord Road into the proposed site development. The project plans call for preservation of a 25' wide (minimum) "Reservation Area", in its present condition, along the common property line with the adjacent Concord Road properties from Brentwood Road on the north end to the existing telecommunications facility drive to the south. A double row of evergreen trees is proposed 25 feet inside the property line along this side of the site to further buffer views into the project from adjoining properties, in addition to plantings of street trees (deciduous shade trees) along the proposed perimeter road. An eight foot high solid wood fence will be constructed along the residential edge of the preservation area to further limit views of the proposed retail center from the identified town roads.

Views from Longfellow Drive

Views of the northern portion of the site development will be possible from Longfellow Drive, a local residential street about 2,000 feet to the northwest. From a viewer position that is slightly higher than the site, the northern end of the site is visible from a very limited area and between houses and through tree cover on Longfellow Drive. Portions of the two northernmost buildings on the project site will be visible through and over the intervening trees, particularly in winter, as shown in Figure 4.13-5. The on-site landscaping will breakup expanses of parking lots from view, and the distance will ameliorate the visibility of the roofs of the two buildings to some extent.

No views of the proposed site development project will occur from other roads in the local area due to existing tree cover and topography.



This Figure depicts the sight line taken in the direction of View 4 as shown in Figure 4.13-1, Key Map.

Figure 4.13-5: Line of Sight Profile from Route 311 & Longfellow Dr. - View 4

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Scale: 1" = 300'

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Patterson Crossing Retail Center
Towns of Patterson & Kent, Putnam County, New York
Source: Tim Miller Associates, Inc.

Landscaping, Signage and Lighting

The proposed development plan includes landscaping, signage and lighting for aesthetics, information and safety purposes. While specific design plans have not yet been developed, the conceptual designs for this development include street trees and lighting along all internal roads and in the parking areas. The tree plantings would provide shade along the roadways and in parking islands throughout the project and would be an integral part of the "look" of the retail center. Landscape plantings of ornamental shrubs would also be provided in the larger parking lot islands. These plantings would include combinations of ornamental grasses, evergreen and flowering shrubs, ornamental trees and shade trees. Along the western property line, the landscaping plan will include a combination of evergreen trees planted in a continuous, double row to provide an effective buffer for the neighboring properties to the west. An eight foot high solid wood fence is also proposed along the residential neighborhood side of the evergreen screen to provide an additional visual barrier for neighboring residences. Additional landscaping will be provided around the proposed noise wall and retaining walls along the eastern property boundary.

An entrance sign is proposed at the vehicular access point to the project on Route 311 in the Town of Kent. The proposed free-standing sign location is shown on the overall site plan as FS-1, located immediately west of the main entrance drive. A second project sign visible to motorists on Interstate 84 would be located on the eastern side of the property (northeastern corner) in the Town of Patterson and facing the highway. This free-standing sign, which is shown on the overall site plan as FS-2, will meet the requirements of the NYS Thruway Authority for a commercial sign adjacent to Interstate 84. The proposed signs will include identification of the primary tenants of the Patterson Crossing Retail Center and will be designed to strike a balance between users needs and Town regulations. A table on the overall site plan specifies the wording and sizes of the proposed free-standing and building-mounted signs. A variance for all signs not in conformance with Town Zoning Codes will be sought from the Town of Patterson Zoning Board of Appeals and/or the Town of Kent Zoning Board as required.

Site lighting is proposed to illuminate the site at night to provide pedestrian and vehicle safety and security throughout the developed portion of the project site and has been designed to comply with applicable Town standards. Applicable requirements of §154-22.1F of the lighting standards of the Town Code are the following:

- (1) The maximum illumination at the property line adjacent to a residential zone shall not exceed 0.2 foot-candles measured at 30 inches above the ground.
- (3) The maximum height for any pole-mounted luminare located in a nonresidential zoning district shall be 18 feet.
- (6) All exterior lighting shall have full shielding, with recessed bulbs, and the light fixtures must be installed in a horizontal position.
- (7) Externally lit signs and display, building and aesthetic lighting must be directionally shielded and appropriately screened to prevent the lamp from being visible or to prevent direct glare off site.
- (8) Vegetation screens shall not be employed to serve as the primary means for controlling glare. Rather, glare control shall be achieved primarily through the use of such means as cutoff fixtures, shields and baffles, and the appropriate application of fixture-mounting height, wattage, aiming angle and fixture placement.

Site lighting has been designed to comply with the Town Code and accepted industry guidance for parking lot lighting of the Illuminating Engineering Society of North America (IESNA). IESNA recommends a minimum illuminance value for parking lots of 0.2 foot-candles (measured at the ground) and a uniformity ratio (maximum-to-minimum illuminance) of not greater than 20:1.¹

A regular pattern of pole-mounted lights will illuminate the entrance area, internal roadways and parking lots. Maximum light levels in the parking lot areas will range from 2.3 to 3.4 foot-candles, except near the north and south sides of Building A which will be approximately 4.4 to 5.0 foot-candles to facilitate safe truck loading areas. Average light levels on parking lots will range from 0.9 to 1.7 foot-candles. Maximum light levels on the roadway areas will range from 3.1 to 3.6 foot-candles, with average levels of 0.8 to 1.3 foot-candles. A luminaire mounting height of 18 feet and luminaire styles will be specified that will provide sufficient ground illumination while minimizing the light spillage to non-pavement areas. Luminaires near adjacent residential properties are proposed in locations that will avoid light spillage across the property line. Lights will be oriented so that no lighting sources will be visible from any residential property nearby (no glare). No light trespass from the project will exceed 0.01 foot-candles at the property line, except at the site access.

It is anticipated that a minimum level of all-night illumination will be maintained at the site for safety and security after operating hours. After-hours lighting is anticipated to operate from 11:00 PM to 6:00 AM. Maximum after-hours light levels in the pavement areas will be approximately 4.7 foot-candles, with average levels of approximately 0.4 foot-candles. No light trespass from the project after hours will exceed 0.01 foot-candles at the property line, except at the site access. Intensity of the light on the ground surface is the determining factor relative to impacts to neighboring uses and it can be measured in the field. While portions of the illuminated site will be visible from off-site, lamp characteristics and pole spacing in this project will be designed to avoid light emissions at the property line and have minimal effect on neighboring residential uses.

For travelers on Interstate 84, light emitted from site lighting will be the most noticeable change at night. The Patterson Code and the NYS Thruway Authority require that there be no off-site glare from lighting. The proposed lighting levels and will meet the requirements of the Town Code and the NYS Thruway Authority for lighting adjacent to Interstate 84.

Clear metal halide (175 watt) lamps will be specified in this project for the primary site lighting. Metal halide (MH) lamps offer superior optical control (ability to the control light emitted) and color rendition. The light appears cool white and illuminates the landscape in a natural light. Low-pressure sodium (LPS) lamps will not be proposed for this site. LPS lamps have poor optical control, and the light itself appears yellow-orange with very poor color rendition. Colors in the landscape appear as shades of gray. High-pressure sodium (HPS) lamps have excellent energy efficiency, superior optical control, and are very low maintenance. The light tends to have a slight yellowish appearance and poor color rendition of landscape objects. A detailed lighting plan with luminaire specifications is included in the full size plan set. A detail of the proposed light pole standard will be included in the final site plan. A reduction of the plan showing the projected light levels on the site (photometrics), and specifying maximum light trespass at the property lines, is presented in Figure 4.13-6. The plan shows photometric contours in the following increments: 0.25, 0.5, 1.0 and 2.0

¹ IESNA *Lighting Ready Reference*: Figure 61, Recommended Maintained Illuminance Values for Parking Lots, IESNA, RR-03 Fourth Edition.

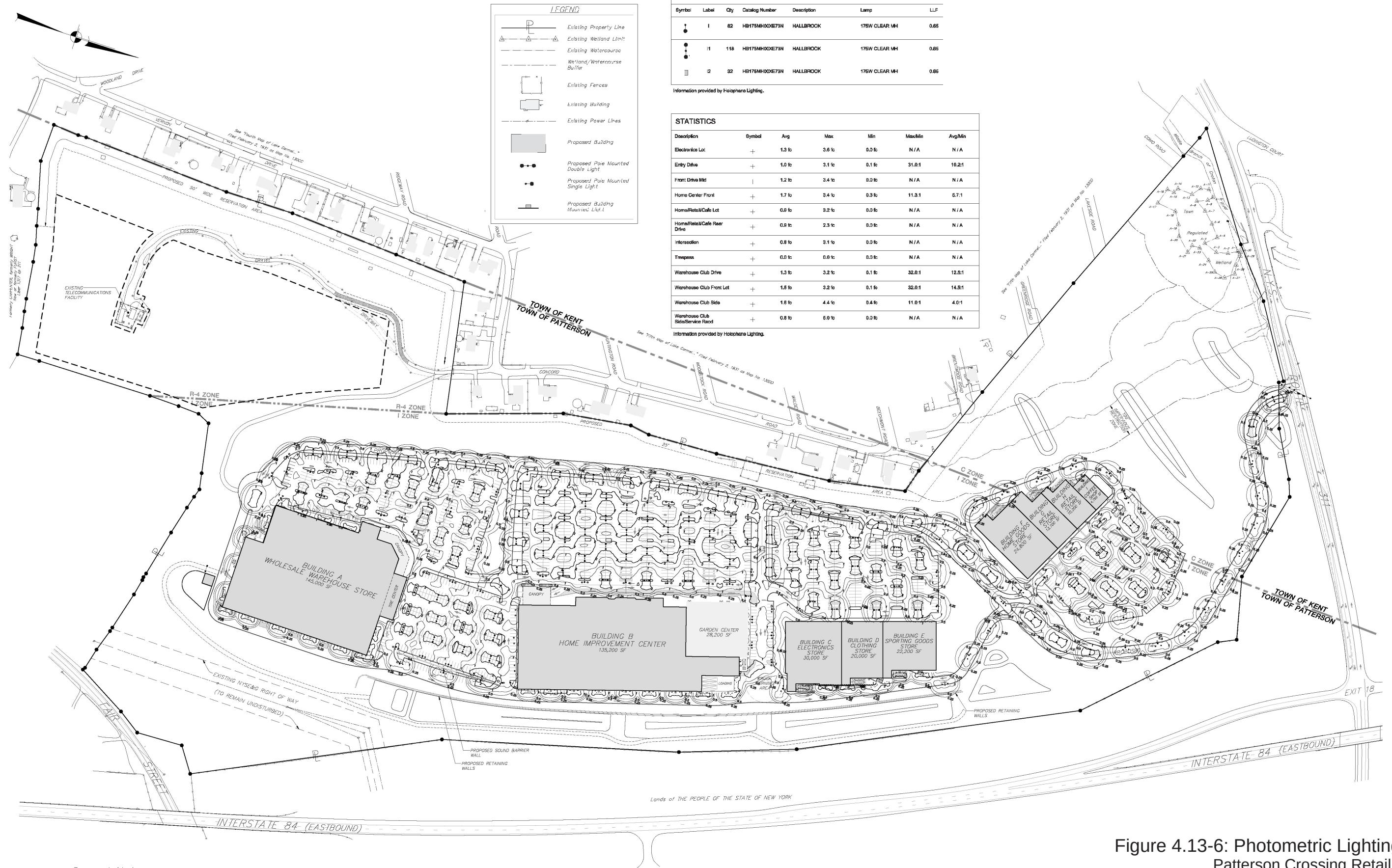


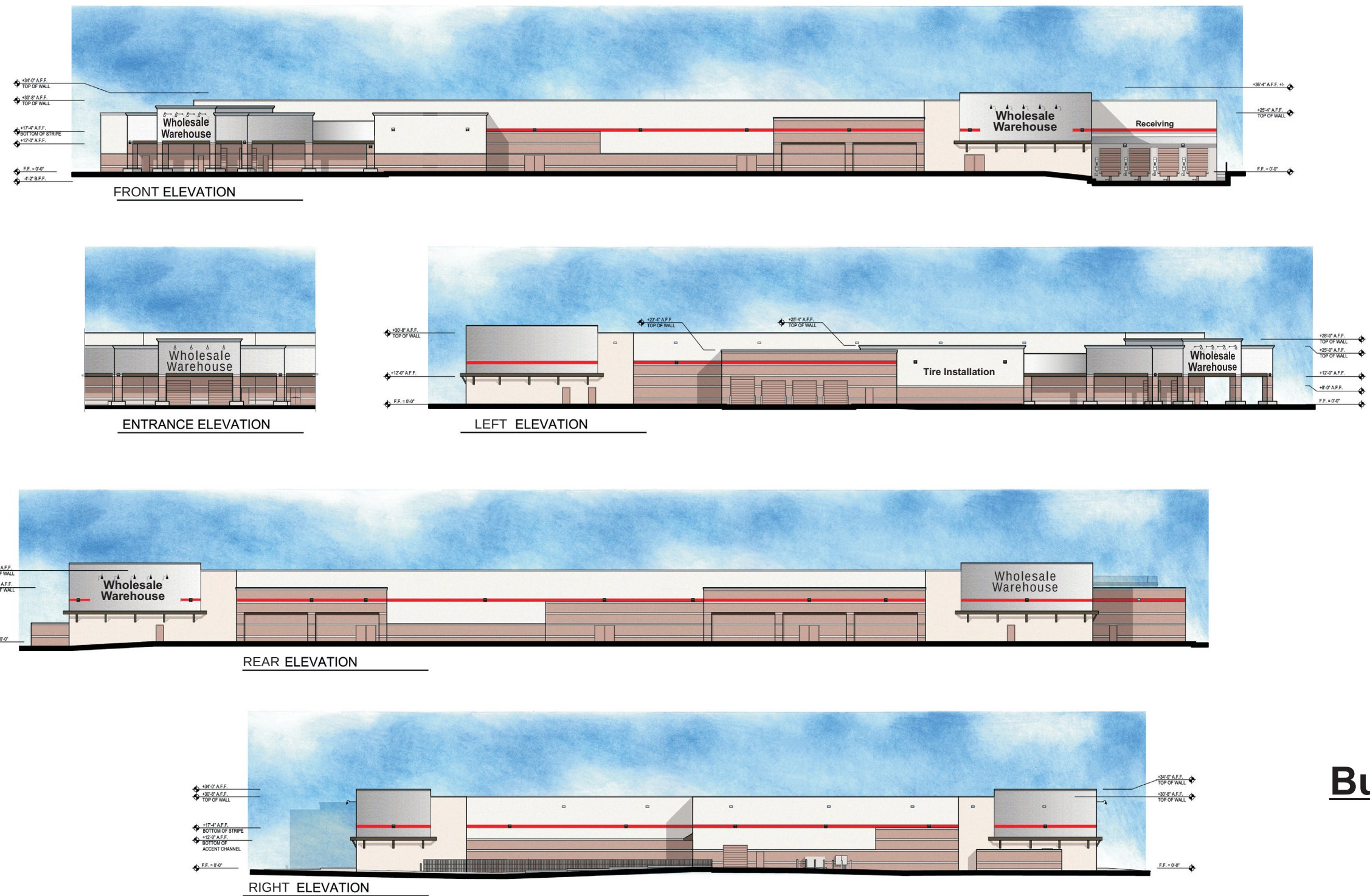
Figure 4.13-6: Photometric Lighting Plan
Patterson Crossing Retail Center
Town of Patterson and Town of Kent,
Putnam County, New York
Source: Insite Engineering, Surveying & Landscape Architecture, P.C
Date: 03/24/06
Scale: 1 inch = 300 feet

foot-candles. A conceptual plan of the after-hours light levels is being developed where all site lighting will be equipped with light control devices (timers and/or dimmers) to automatically reduce site illumination after hours. The reduced late-night lighting is designed to provide safe lighting conditions for minor vehicle movement (such as for night deliveries, if any) and security. Given the lighting specifications proposed and as shown in the photometric lighting plans, there will be no measurable light levels emitted from this project onto any adjoining property 200 feet from the property line during operating hours, and with the exception at the site access, no measurable light levels emitted after operating hours from this project at the property line.

Proposed Mitigation Measures

The proposed project plan for the site will result in various changes to views of the landscape from identified nearby locations. As described above, the viewshed of the project will largely be limited to Interstate 84 due to adherence to property line setback requirements, the proposed landscaping and tree preservation, and overall design of the facility. Visibility of the site from Route 311 will be very limited due to topography. The removal of trees on the property will be visible from a relatively small and localized area in the Interstate 84 corridor due to the topography of the area. The project as proposed, however, will not dominate the view from any publicly accessible location. The development plan optimizes the location of the subject property adjacent to an interstate transportation corridor for visibility and for access. The design of the structures, including architecturally modified front and rear elevations, as well as their physical siting, project access, and utilization of the site as they affect visibility have been considered in this project. Figures 4.13-7 and 4.13-8 depict preliminary building elevations of the two primary tenants in the project (Building A, Wholesale Warehouse Store, and Building B, Home Improvement Center, respectively). Primary building-mounted signage is conceptually shown on the elevations. The elevations include parapet walls that are integral to the building facade which are intended to hide roof-mounted mechanical equipment from view. Roof-mounted equipment that is more than one foot higher than the parapet wall and located closer than twenty feet from the edge of the roof will be hidden by a decorative screen that matches the style and color of the building. Particular attention will be paid to potential views from existing residences located west of the project site. Full size architectural plans and details will be submitted for review at a later time. These plans will depict specific building details including locations and sizes of signs and roof-mounted equipment. The full size architectural plans will include a table of building sign sizes that will demonstrate compliance with Town of Patterson sign standards.

Design of the project signs and lighting will consider their potential visibility from off-site locations to minimize the visual impact to residential properties. The height, size and location of signs will be designed for optimal visibility from Interstate 84 and at the project entrance road. Lighting height, size, intensity, and glare will be considered in the lighting design for the project to minimize the visual impact to the surrounding area. Hours of lighting will focus on the hours of nighttime operation of the stores, with reduced security lighting during non-operating hours (1100 PM to 6:00 AM). The project plan calls for automatic lighting control devices to reduce illumination over the entire site after hours. This will reduce light trespass off of the site at night by a reduction in the number of luminaires that are lit overnight. IESNA recommends a minimum illuminance of 0.1 foot-candles for parking facilities during periods of nonuse to conserve energy by turning off or reducing the intensity of lighting fixtures.



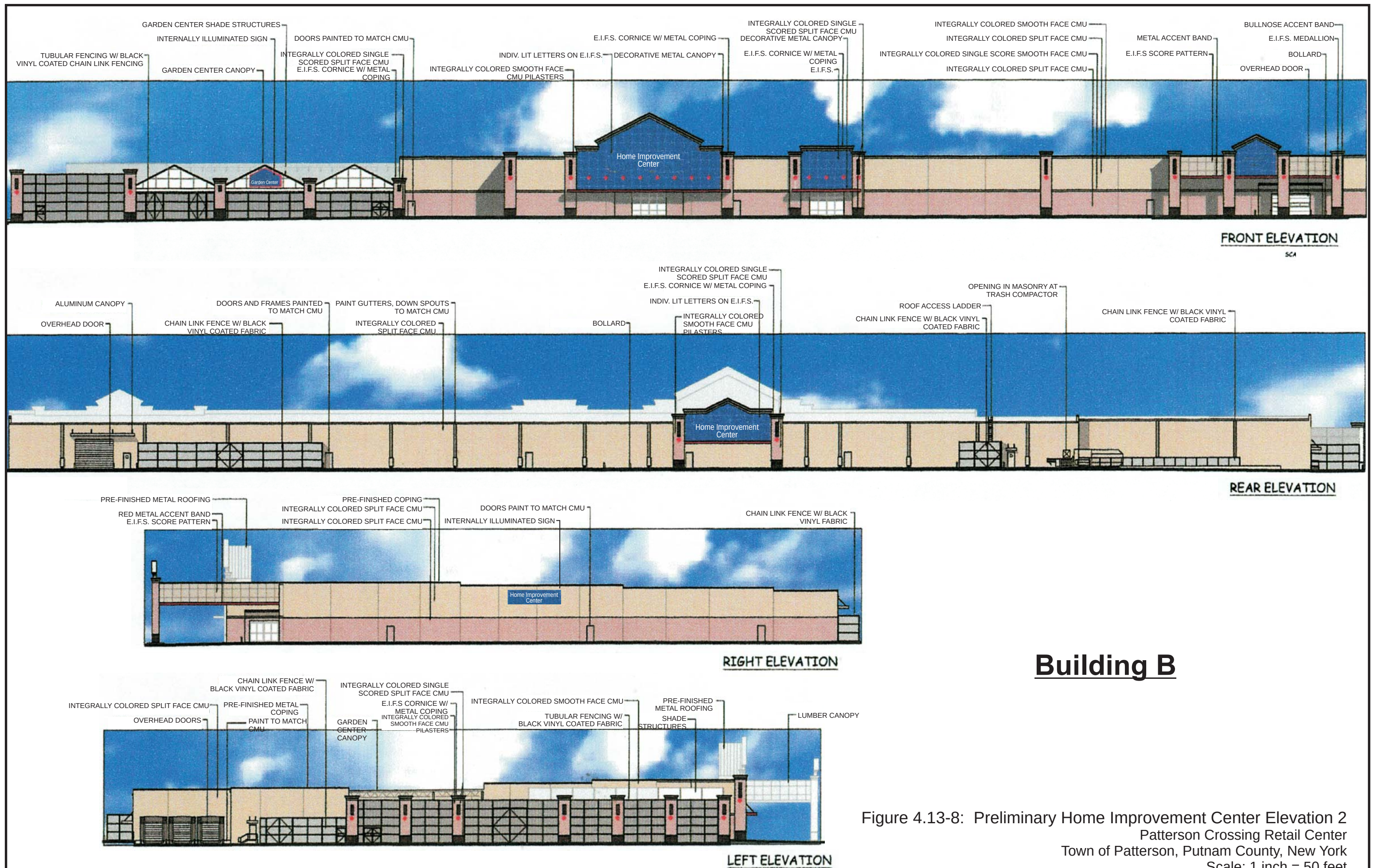
Building A

Figure 4.13-7: Preliminary Wholesale Warehouse Elevation 1

Patterson Crossing Retail Center
Town of Patterson, Putnam County, New York

Source: MulvannyG2 Architecture 10/06/05

Scale: 1 inch = 50 feet



Through the careful selection of building colors and materials that will not create stark visibility of the project from off-site, visual impact of the proposed buildings will be minimized. An on-site water supply tank has been placed underground to avoid its visibility. Additionally, the project landscaping is designed to be visually attractive, functional, and low maintenance to create a long lasting complement to the area. Where the project is located adjacent to residential properties, a landscaped buffer strip is proposed that will include evergreen tree planting and a wooden fence to minimize adverse views from these uses. Along the Interstate 84 corridor naturally colored modular concrete block will be used for the proposed retaining walls and the areas surrounding the walls will be planted with native trees and shrubs.

The location of the project within the Interstate 84 corridor limits the projects potential for visual impacts; this project will have no significant adverse visual impact. The greatest visual impact resulting from the development of the proposed project would be to the Interstate 84 corridor. The project includes landscape elements, the construction of architecturally modified front and rear store elevations and preserves trees on the steepest sloped areas to minimize adverse effects. The project design also includes an extensive landscaped buffer adjacent to the residential land to the west limiting impacts to this neighborhood. No views from significant aesthetic resources have been identified that will be adversely affected by this project. The wooded character of the site will change to a developed site in response to the growing demand for retail development from the continued growth of the region. Since the project plans incorporate landscaping and other provisions to create a unified and environmentally sensitive plan that is suited to the site, further mitigation measures are not required.

4.14 Cumulative Impacts

Cumulative impacts are impacts on the natural and human environment which result from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions, regardless of what person, agency or entity undertakes such other actions. Cumulative impacts may result from the accumulation of repeated actions (“additive impacts”) or from the synergistic interaction of multiple actions (“interactive impacts”). Additive impacts are caused by the accumulation of repeated actions from a single source that amass impacts on a given resource. Interactive impacts are a repeated single action or a group of actions that interact with each other or accumulate to cause a new kind of impact. Actions are interactive when they synergistically influence each other to the point where the resulting impacts are greater, and often different, than the impacts of the sum of the individual actions.

As a commercial project, Patterson Crossing Retail Center would not increase the population in eastern Putnam County or generate any new school children. As such, the project would not contribute to any cumulative impact relating to many municipal services such as recreation, social services, or educational services. The project would not be served by public water or sewer, on-site wells and septic treatment would be utilized, and would therefore not contribute to any cumulative impacts related to any municipal water or sewer infrastructure. As described in Chapter 4.4, the well pump test demonstrates that the projected water use from the project would not impact wells on surrounding properties. Likewise, the proposed septic treatment is situated and designed to meet all requirements to avoid potential impacts to off-site wells. In addition, the development would be served by private solid waste carting companies and would not rely on municipal waste removal.

The proposed development, in conjunction with other projects of significant size with applications pending before the Towns of Patterson, Kent, Carmel and Southeast will contribute to cumulative impacts for certain resource categories. “Significant size” is defined by the lead agency in the DEIS scope as residential projects of more than 49 units and commercial projects of 40,000 square feet or more (see Table 4.14-1 for a list of proposed projects meeting these criteria). The various resource categories to which the project will contribute towards cumulative impacts include ecology (decreased habitat), traffic (increased volumes), energy consumption (increased demand), solid wastes (increased generation), police, fire, and EMS protection (increased demand), and air quality (increased vehicular and mechanical emissions). As described in the DEIS, mitigation measures are proposed to address the anticipated adverse impacts from the project to these resource categories.

Table 4.14-1 Approved or Pending Significant Projects in Towns of Carmel, Kent, Patterson and Southeast		
Project Name and Location	Size and Type	Status as of March 2006
Patterson Crossing Retail Center NYS Route 311, Patterson	405,800 sf retail development	Pending
Watson Labs Stoneleigh Avenue, Carmel	expansion of 99,000 sf	Pending
RPK Precision homes Seminary Hill Road, Carmel	66 senior housing units	Pending
Carmel Corporate Stoneleigh Avenue, Carmel	388 senior housing units and 6,400 square foot non-residential	Approved
Hillcrest Commons NYS Route 52, Carmel	150 units senior attached units, 58,960 sf office	Pending - Yes
Gateway Summit NYS Route 6, Carmel	Hotel 150 rooms, Conference Center, Banquet Facility, 7,000 sf Restaurant, 45,000 sf Auto Dealership, 17,600 sf Office Space, 400 sf Convenience Store, 191 Senior units, 68,000 sf Recreational Community Center	Pending - Yes
Fairways Senior Residences Fair Street, Carmel	150 senior housing units	Pending
Kent Manor Palmer Road and Hill and Dale Road, Kent	303 town houses	Approved
Chestnut Petroleum* NYS Route 311, Kent	2,440 sf convenient and 2400 sf retail	Approved
Town Municipal Complex NYS Route 52, Kent	44,000 sf	Approved
The Highlands Shopping Center NYS Route 312, Southeast	377,000 sf	Approved
Terravest Corporate Park International Blvd, Southeast	80,000 sf light industrial 212,000 sf light industrial Ace Endico 60 units of senior single family residential	Approved
Campus at Fields Corners Pugsley Road and Route 312, Southeast	143 Single family units	Approved - Yes
Meadow at Deans Corners Deans Corners Route 124, Southeast	103 Single Family Units	Approved
Mt Ebo Route 22, Southeast	168 units of assisted living	Approved
Orchard Hill LLC Hardscrabble Road and Fields Lane. North Salem	200 room lodge 18 hole golf course 60 seat restaurant	Pending
Notes: * Included in DEIS scope due to proximity to Patterson Crossing Retail Center site, not scale of project. - Projects have changed since this list was compiled in Spring 2005.		

4.14.1 Possible Cumulative Impacts

Ecology. From a cumulative perspective, the disturbance and loss of wildlife habitat on the project site contributes to overall losses of wildlife habitat in the region resulting from human activity and development. The proposed development of the project site would result in a net reduction of open space available as wildlife habitat. The importance of existing park land in the region would continue to increase as existing habitat areas are eliminated by development. The project site does not currently function as a significant wildlife corridor to off-site habitat areas, due to the surrounding roadways and development. Therefore, the project would not fragment an existing wildlife corridor between off-site habitat areas.

Traffic. The traffic analysis provided in Chapter 4.8 evaluates a future condition that includes traffic from annual background growth and other approved or pending developments in Patterson, Kent, Carmel and Southeast that are expected to built by the year Patterson Crossing Retail Center is operational. The cumulative impacts on traffic from the proposed project along with existing and anticipated future traffic on all of the study intersections and roadways is presented in Chapter 4.8 as the future "Build Condition". With the road improvement and mitigation measures described in Chapter 4.8, the traffic resulting from the proposed development in conjunction with anticipated growth would not significantly impact the operation of the study intersections and roadways.

Energy Consumption. The proposed retail development will increase demand for electricity to meet its energy needs. As new construction, the project must meet current applicable building code standards and utilize modern equipment, which will help to minimize the increased energy demands. If alternative energy sources are used, such as heating oil or geothermal systems, the electrical demand would be less. The applicant is open to the possibility of exploring the use of economically viable alternative energy sources at one or more buildings in this development.

In addition, gasoline and/or diesel fuel will be consumed during the construction activities and by shoppers, employees, and delivery vehicles when the project is operational. The creation of a local shopping destination in eastern Putnam County will have the benefit of reducing gasoline consumption for many residents that currently travel to more distant retail centers. The overall energy demands created by the project would contribute to the cumulative energy demands generated within the eastern Putnam County, however, significant energy-related impacts are not anticipated.

Solid Wastes. As described in Chapter 4-10, the Patterson Crossing Retail Center development is projected to generate approximately 189 tons per year of solid wastes. Of this amount, approximately one third is expected to include recyclable materials. The solid waste generated by the project would add to the overall waste stream produced within eastern Putnam County. However, as this waste would be privately carted to the existing RESCO resource recovery facility in Peekskill, the project is not anticipated to contribute to any significant cumulative impacts relating to solid waste collection or disposal.

Police, Fire, and EMS protection. As described in Chapter 4-11, the Patterson Crossing Retail Center development is expected to have minimal increases on demand for local police, fire and EMS service providers. These service providers also face increasing demands by other development projects in eastern Putnam County, which can result in a strain on their resources (i.e. personnel, equipment, etc.). The property tax revenues

Cumulative Impacts

March 28, 2006

generated by the Patterson Crossing Retail Center development could be expected to help offset any added strain put on these service providers as a result of the project, and contribute towards their continued improvements.

Air Quality. The air quality analysis provided in Chapter 4.15 evaluates a future condition that includes the Patterson Crossing Retail Center emissions as well as the vehicular emissions of “build condition” traffic, which includes annual background growth and other approved or pending developments in eastern Putnam County. As described in Chapter 4.15, cumulative significant air quality impacts are not anticipated to result in the future build condition.

4.15 Air Quality

4.15.1 Existing Conditions

Air quality is a relative measure of the amount of noxious substances, natural and manmade, that occur in the air. Certain airborne gases and particles can cause or contribute to the deterioration and/or destruction of biological life as well as damage to property and other physical components of the environment. Air contaminants or pollutants can be defined as solid particles, liquefied particles, and vapor or gases, which are discharged into, or form in, the outdoor atmosphere. Air quality in any particular location is influenced by contaminants discharged into the atmosphere and by regional and local climatic and weather conditions. Atmospheric conditions such as sunlight, rainfall and humidity, air turbulence, temperature differences, and wind speed and direction can disperse, intensify or chemically change or alter the composition of air contaminants.

Background Air Quality

The Federal Clean Air Act (1990) and its amendments, required each state to develop a State Implementation Plan (SIP) in order to provide a regulatory framework to implement the requirements of the Act. The SIPs describe how each state will attain and maintain air quality standards. The New York SIP adopted ambient air quality standards (AAQS) from a list of seven pollutants identified by the US Environmental Protection Agency (USEPA). Attainment of the AAQS is required under the Act, and each state has a designated time period to bring non-conforming areas into compliance. The AAQS establish levels to protect the health (primary standard) and welfare (secondary standard) of the general public with an adequate margin of safety. These standards are designed to protect the most vulnerable segment of the population such as children, the elderly and the infirm, which are more susceptible to respiratory infections and other air quality-related health problems. Locations of source-receptors considered in assessing air quality are schools, hospitals and convalescent homes as well as other related facilities. Potential receptors within one half mile of the project site include: residential properties. No other sensitive receptors (such as nursing homes or health care facilities) were noted in the vicinity of the project site. There are no known stationary air pollution sources located in the vicinity of the project site.

New York State is divided into nine (9) Air Quality Control Regions (AQCR), in order to evaluate air quality by geographic region. The towns of Patterson and Kent, New York are located in the southern portion of the Region 3 AQCR, which includes the following counties; Rockland, Orange, Putnam, Westchester, Sullivan, Dutchess and Ulster. The Federal criteria pollutants currently monitored within the Region 3 include: sulfur dioxide (SO₂), ozone (O₃), total suspended particulates, inhalable particulates (PM₁₀), and lead. The remaining criteria pollutants; carbon monoxide (CO), nitrogen dioxide (NO₂), are not monitored in the Region 3 AQCR, but are monitored in Region 2 AQCR, which includes the five boroughs of New York City. The sources of these contaminants, their effect on human health and the nation's welfare, and their final disposition in the atmosphere vary considerably. Particulate standards include only those particles with nominal diameters less than 10 microns which are inhalable.

Air contaminants which typically are of concern with respect to vehicle-related projects include ozone, carbon monoxide, nitrogen oxides, and lead. Air contaminants typically of concern with respect to heating and hot water systems of residential projects include sulfur

dioxide and inhalable particulate matter. Sources of air pollution are generally characterized as mobile or non-point sources (transportation-related) or stationary sources (e.g., a smokestack). In general, the primary pollutants related to mobile sources are carbon monoxide (CO), nitrogen oxides (NO_x), and Hydrocarbons. Oxidants, primarily ozone, results from the breakdown of NO_x compounds in the atmosphere by sunlight. Total suspended particulates are the result of both mobile sources, as well as industrial sources and operations. Stationary sources, primarily manufacturing or utility operations result in the addition of sulfur dioxides (SO₂), nitrogen oxides (NO_x), hydrocarbons and particulates to the atmosphere. Sources of air pollutants are summarized in Table 4.15-1, below.

Table 4.15-1 Principal Sources of Community Air Pollutants in Urban Areas	
Pollutant	Principal Sources
Carbon Monoxide (CO)	Motor Vehicles (90%) Other Combustion Sources (10%)
Oxidants (primarily Ozone)	Produced by the Action of Sunlight on HC and NO _x Compounds in the Atmosphere
Nitrogen Oxides (NO _x)	Stationary Source Combustion (50%) Mobile Sources (50%)
Hydrocarbons (HC)	Motor Vehicles (60%) Industrial Process and Evaporative Losses from Storage Facilities (40%)
Particulates (part)	Many Sources (Stationary and Mobile) Including Crushing and Grinding Operations and Natural Resources
Sulfur Dioxide (SO ₂)	Electric Power Generation (40%) Space Heating (30%) Other Combustion of Fuels in Industrial Processes (30%)
Sources: DGEIS for IBM - Proposed Re-zoning, IBM Properties, Town of Fishkill, October 3, 1983, prepared by Ronald A. Freeman Associates, P.C. Consulting Engineers NYSDEC Region 3, NYS Air Quality Report, Ambient Air Monitoring System Annual Report 1992-DAR-93-1 Note: The percentage figures represent approximate contributions for the sources identified in middle-latitude areas. For more specific information, refer to the annual reports of the Council on Environmental Quality.	

Table 4.15-2, below presents a summary of 2004 data for monitoring stations located closest to the project site, in the Region 3 AQCRs. This data provides information on existing air quality. Use of the regional data to represent the project site provides a reasonable evaluation of local air quality, since the NYSDEC monitoring locations are located to characterize regional ambient air quality. Based upon 2004 data, all criteria contaminants have achieved acceptable levels within Putnam and Westchester County.

Table 4.15-2
Regional Air Quality Data Summary

Monitoring Location	Pollutant	Period	Concentration ⁽¹⁾	Air Quality Standard ⁽²⁾
Mt. Ninham	Ozone (O ₃)	Annual	0.028 ppm	Standard ⁽²⁾
		1-Hour	0.089 ppm	0.12 ppm
Mt. Ninham	Sulfur Dioxide (SO ₂)	Annual	0.0022 ppm	0.03 ppm
		24-Hour	0.014 ppm	0.14 ppm
		3-Hour	0.041 ppm	0.50 ppm
Mt. Ninham ⁽⁴⁾	Inhalable Particulates (PM ₁₀)	Annual	14 g/m ³	50 g/m ³
Mamaroneck ⁽⁵⁾	Lead (Pb)	Annual	0.03 g/m ³	-----

NOTES:

- (1) The listed concentration for all short term standards (i.e., less than annual) is the 2nd highest recorded value, since the air quality standard allows one exceedance of the standard on a calendar year basis, with the exception of lead.
- (2) The table lists the primary standards for all pollutants. The secondary TSP standard is 260 g/m³.
- (3) The CO monitoring data is from background monitoring stations.
- (4) Monitoring was discontinued in 1998; therefore, the listed concentration is from 1998.
- (5) Monitoring was discontinued in 1995; therefore, the listed concentration is from 1995.

The trend in the air quality has shown no significant change, but has been approximately the same over the last few years for most pollutants, with the exception of SO₂. The SO₂ annual average concentrations measured at the Mt. Ninham monitor have increased by approximately 15 percent each year from 1995-1997. From 1998-2001 the level of SO₂ annual average concentrations remained between 2.5 ppb and 2.3 ppb. Just recently in 2002 the average concentration dropped down to 2.2 ppb the lowest it has been since 1995. Nevertheless, the annual average remains well below the air quality standard.

It is expected that this project will have no appreciable affect on the area ozone levels. However, the project could impact carbon monoxide levels at various intersections surrounding the project site due to project generated traffic. An air quality screening analysis was performed for all intersections studied in the traffic analysis. A refined air quality analysis was performed to establish existing Carbon Monoxide (CO) at one intersection in the vicinity of the proposed project. The selected intersection (NYS Route 311 and Interstate 84 EB Exit Ramps) was chosen for its high traffic volume and level of service rating, and therefore, will provide a worst-case scenario for existing CO levels in the vicinity of the project site. The State agency for Transportation (NYSDOT) developed the methodology used in the analysis to evaluate ambient air quality as well as any impacts resulting from the proposed project.

A site specific (microscale) CO air quality analysis was performed to evaluate the existing conditions at the project site, using New York State Department of Transportation (NYSDOT) air quality evaluation methodology. This includes the use of approved vehicle emissions and air quality dispersion models. The refined analysis indicates that the area surrounding this intersection (mentioned above) is meeting air quality standards. Including the background levels at this site, the level is less than one third of the 8-hour air quality standard. Since the selected intersection represents a worst-case scenario, existing CO

levels in the vicinity of the project site are expected to be at or below the levels predicted by the analysis performed for Route 311 and Interstate 84 EB Ramps. The detailed air quality analysis of the existing conditions is presented in Appendix I.

Existing Air Pollution Sources

Land use in the vicinity of the project site is primarily single-family residential, local commercial and undeveloped open space. There are no major sources of stationary air pollution emissions in the vicinity of the project site.

4.15.2 Future “No Build” Condition

A traffic air quality impact analysis for the year 2010 without the project (No Build) was prepared at the same intersection as the existing analysis, to determine expected CO concentrations at and around the site for mobile and stationary sources. There are no stationary sources in the vicinity of the project site. The impact analysis results indicate that CO levels, for the “No Build” condition, will be within established air quality standards for both 1-hour and 8-hour averaging periods consistent with the New York SIP.

4.15.3 Future “Build” Condition - Possible Impacts

Air quality impacts associated with the proposed project were assessed to determine whether these proposals would have an adverse impact on the surrounding general population. Air quality impacts from construction activities were assessed along with a determination of impacts from project induced traffic along the primary access routes to and from the project site.

Construction related impacts would vary based on the proximity of the activities to the adjacent properties and the type and amount of construction equipment used for each project phase. However, to address potential air quality impacts from construction related activities, mitigative measures have been proposed for specific construction activities to minimize the overall impact on the air quality. If mitigative measures are properly applied, adverse air quality impacts should be minimized; therefore, a quantitative impact analysis related to construction activities has not been provided. Air quality impacts from projected vehicular traffic associated with the project have been analyzed for build year 2010.

Mobile Source Analysis

The primary pollutants associated with vehicular exhaust emissions are nitrogen dioxide (NO₂), hydrocarbons (HC), and carbon monoxide (CO). Since short term exposure to elevated CO concentrations can have acute health impacts, state and Federal AAQS have been developed for ambient CO concentrations requisite to protect the health and welfare of the general public with an adequate margin of safety. There are no short term health standards (currently enforced) for NO₂ and HC, since the primary concern with these pollutants is their role in the photochemical reactions that lead to the formation of secondary pollutants known as ozone and “smog” which are known lung and eye irritants. Since ozone and smog formation is a slow process, which occurs outside the primary impact area of the project, these pollutants are only reviewed on a regional (mesoscale) and not a local (microscale) basis. The screening analysis of the various intersections under review revealed that traffic generated by the proposed project was insufficient to require a refined

air analysis of any intersection. However, one intersection was selected for a refined analysis to quantify the actual impacts expected. The intersection chosen for the refined analysis was chosen to show a worse-case scenario for all intersections. The intersection chosen is located at Route 311 and Interstate 84 EB Ramps.

Analytical protocols were used to evaluate year 2010 air quality levels including the traffic from the proposed project (Build). The impact analysis results indicate that CO levels for "Build" conditions will be within established air quality standards for both 1-hour and 8-hour averaging periods. Additionally, the analysis shows that traffic generated air quality pollutant levels are expected to increase from existing conditions to "No Build" and "Build" conditions due to the natural increase in traffic with or without the site being developed. However, levels at the worst-case receptor will be at 50 percent of the 8-hour standard. The detailed analysis of the "Build" conditions is provided in Appendix I. The impact analysis results indicate that CO levels, for the "No Build" condition, will be within established air quality standards for both 1-hour and 8-hour averaging periods consistent with the New York SIP.

Construction Impacts

Construction activities would have a potential impact on the local air quality through generation of fugitive or airborne dust. Fugitive dust is generated during ground clearing and excavation activities, and generally when soils are exposed during dry periods. Throughout the construction period, passage of delivery trucks and other vehicles over temporary dirt roads and other exposed soil surfaces would also generate fugitive dust. Residences, on Concord Road, closest to the proposed areas of grading and would have the greatest potential to be impacted by dust.

When conditions are favorable for dust generation, dust control can be provided through appropriate measures to reduce off-site impacts as well as improve on-site working conditions. Standard fugitive dust mitigation measures are described on the next page.

Construction-related air emissions will result from the use of diesel fuel as a source of energy for construction vehicles and equipment. On-site mitigation measures are proposed as a part of the project during construction to limit dispersal of particulate matter. Well maintained diesel engines are more fuel efficient than gasoline engines, however, they are a source of some air pollutants. Pollution from these engines comes from the combustion process in the form of exhaust. The major pollutants resulting from diesel fuel include the following:

- Hydrocarbons - Unburned or partially burned fuel molecules consist of hydrocarbons that can react in the atmosphere to form ground-level ozone, a major component of smog that can cause a range of respiratory health problems.
- Carbon monoxide - Emissions from diesel engines contain very low levels of carbon monoxide in comparison to gasoline engines. Carbon monoxide is a colorless, odorless gas that combines with the blood and limits its ability to transport oxygen. Carbon monoxide is the result of incomplete combustion of fuel.
- Nitrogen oxides - Because diesel engines consume fuel and air, and create heat, nitrogen from the air can be transformed into nitrogen oxides. This reddish brown gas can irritate the lungs and eyes. Nitrogen oxides react with hydrocarbons in the atmosphere to form ground-level ozone. Nitrogen oxides also contribute to acid rain.

- Particulate matter - Smoke from diesel engines contains microscopic airborne carbon particles that result from fuel combustion. The smoke from properly maintained diesel engines should not be visible. Exhaust fumes that are thick and black occur when diesel engines are poorly maintained or maintained improperly. Particulate matter can damage the respiratory system and contribute to the odor associated with diesel exhaust.

The operation of the facilities proposed for the project will result in minor increases in the overall atmospheric air pollutant burden. Heating and air conditioning systems may release small amounts of air pollutants that when compared to the regional burden are insignificant and should not cause an exacerbation of applicable standards or guidelines. The net difference in total air pollution burden is considered to be minimal for this proposed new construction project. The relative air pollution burden added by the construction and operation of the project is insignificant when compared to the current and expected conditions in 2010.

4.15.4 Mitigation Measures

The air quality analysis of the proposed project focused on carbon monoxide (CO) impacts from traffic generated by the project, which is the critical impact from an air quality perspective. The analyses show that the existing conditions for the year 2004 along with the “No Build” and “Build” conditions for the year 2010 are not expected to cause a violation of the current regulatory standards. Therefore, no mitigation measures during facility operations would be required beyond those anticipated in the traffic analysis. The traffic analysis was performed at selected intersections and contained a variety of mitigation measures consisting of intersection roadway configuration modifications and signalizations changes. The air quality analysis included these proposed changes, and therefore, the project as designed will contain adequate safeguards keeping truck idling times limited to 5 minutes or less to maintain air quality standards. During construction, standard mitigation measures such as dust control and others should be adequate to maintain air quality levels within applicable standards.

Dust Control Measures During Construction Activities

Construction activities on the project site would have a potential impact on the local air quality through generation of fugitive or airborne dust. Fugitive dust is generated during ground clearing and excavation activities. Throughout the construction period, passage of delivery trucks and other vehicles over temporary dirt roads and other exposed soil surfaces also generates fugitive dust

With proper site maintenance and careful attention to construction activities, impacts from fugitive dust can be maintained below the state or Federal AAQS at off-site properties. Although exhaust emissions from construction equipment is not as significant as fugitive dust generation, particulates from diesel exhaust emission should also be controlled through proper tuning of the vehicles engine and maintenance of the air pollution controls. This would minimize additional contribution to site generated particulate emissions during construction.

Fugitive dust may be generated by grading and excavation, and the truck traffic on temporary dirt roads. Standard construction dust control methods would be employed to

ensure that construction generated dust does not impact off-site residents. These methods include:

- Minimizing the area of grading at any one time and stabilizing exposed areas with mulch and seed as soon as practicable;
- Minimizing vehicle movement over areas of exposed soil, and covering all trucks transporting soil; and
- Unpaved areas subject to traffic would be sprayed with water to reduce dust generation.

The potential for emissions from construction vehicle exhaust can be reduced by the proper maintenance of engines and air pollution controls.

5.0 ALTERNATIVES

The regulations implementing the New York State Environmental Quality Review Act (SEQRA) require:

“a description and evaluation of the range of reasonable alternatives to the action that are feasible, considering the objectives and capabilities of the project sponsor. The description and evaluation of each alternative should be at a level of detail sufficient to permit a comparative assessment of the alternatives discussed. The range of alternatives must include the no action alternative. The no action alternative discussion should evaluate the adverse or beneficial site changes that are likely to occur in the reasonably foreseeable future, in the absence of the proposed action.”

In addition to the proposed plan, the following alternative development concepts, as set forth in the Scoping Document, are examined in this DEIS:

- No Action Alternative
- Alternative Scale or Magnitude
- Alternative Use

5.1 No Action Alternative

In accordance with SEQRA regulations, the No Action Alternative must evaluate the adverse or beneficial site changes that are likely to occur in the reasonably foreseeable future in the absence of the proposed action.

The No Action Alternative is the scenario that would occur if no development were to take place at the site. Under this alternative, the site would remain in its current undeveloped state and no improvements would occur.

This alternative is not likely, considering the objectives of the applicant, the allowable uses permitted under local zoning, the relative scarcity of developable land that can be readily accessed by major roadways, and the increasing demand for such land in the market place. In order for the site to remain vacant, either a government agency or a conservation organization would need to purchase the property for permanent open space protection and compensate the property owner accordingly. Such use of the site would not be consistent with the designated zoning uses at the property.

This alternative would not support the Comprehensive Plans for either the Town or Patterson or the Town of Kent, both of which identified the lack of existing retail facilities and the potential for future retail development in the project area. The revised draft of the Comprehensive Plan of the Town of Patterson specifically describes the project area, located at the intersection of Interstate 84 and Route 311, as being an appropriate location for large scale non-residential development.

Additionally, this alternative would not support the 2003 draft master plan for Putnam County, known as “Vision 2010”, since it would not provide residents the opportunities to live and work locally. This alternative would be contradictory to the County’s “Shop Putnam Today” program, which was designed to help stem the drain of retail dollars to neighboring counties.

Although inconsistent with the objectives of the local governments, the No Action alternative would eliminate some of the impacts identified in this report, whether adverse or beneficial.

Should the proposed action not occur, none of the direct impacts of construction identified in this report would take place. Impacts of the No Action Alternative are compared to those of the proposed action by subject area below.

Geology, Soils and Topography: Under the No Action alternative, there would be no introduction of buildings and new parking areas into the site. There would be no associated disturbance or removal of on-site vegetation and no increase for erosion due to construction related activities. Changes would not occur at the project site that would alter geology, soils or topography as a direct result of the No Action Alternative.

Groundwater: No impacts to or use of groundwater would result from the No Action alternative.

Surface Water, Wetlands, Streams and Waterbodies: Since no construction would occur at the project site, there would be no change to the existing surface water drainage patterns or impact on water resources due to increased water demand.

Vegetation and Wildlife: Under the No Action alternative, the disturbance or removal of on-site vegetation and the introduction of buildings and parking areas on the site would not occur, avoiding any increases in impervious surfaces where wooded area now exist. Without the proposed construction of the Patterson Crossing Retail Center, the site vegetation would remain undisturbed and continue to provide areas of habitat and cover for local wildlife in the area.

Traffic and Transportation: The No Action Alternative eliminates the additional construction traffic that would be generated by the Patterson Crossing Retail Center development. The No Action plan would not change the traffic patterns that presently occur in the site area. The additional traffic generated by the retail opportunities at the site would not be added to the local road network and any potential increases in noise and vehicle emissions from site traffic would not occur. No new site access road nor emergency access road would be constructed as part of this alternative. Without the new site access, the additional NYS Route 311 turn lanes and signalization of its intersection with the site access would not be implemented by the applicant. Under this alternative, traffic conditions in the project area would be the same as the "Future No Build" conditions sited in Section 4.8, Transportation. Specifically, the number of intersections at the worst levels of service (that is level of service E or F) would increase from the existing four to eight, unless transportation improvements are provided with or without the project. Tax revenues would be unavailable to offset state and county road improvement under the No Build Condition.

Noise: No noise-related impacts would result from the No Action Alternative.

Community Facilities and Utilities: Since a No Action Alternative involves no changes to physical conditions at the proposed site, no impacts to community services would occur. There would be no demand for emergency services, and no improvement to those services as a result of tax generation at the site. There would be no additional demand for utilities and no change to existing utilities under the No Action alternative.

Socioeconomic: No tax benefits resulting from the retail development would be realized for either the Town of Patterson or Kent, the school district, or Putnam County. The anticipated property and sales tax revenues would not occur. No jobs, either short term construction related or long term as a result of the retail and restaurant establishments, would be created in the area.

Cultural Resources: There would be no change to the visual environment and no impact to cultural resources under the No Action Alternative.

Cumulative Impacts: The No Action Alternative would not contribute to any cumulative impacts in the region.

Air Quality: No air quality related impacts would result from the No Action Alternative.

5.2 Alternative Scale or Magnitude

The Scope requests that two alternatives be examined that address an alternative scale or magnitude of the project. These two alternatives are discussed below.

5.2.1 Alternate Site Plan Layout

Building Orientation

An alternative layout for a retail project was considered that concentrated the proposed buildings on the western side of the property and the parking on the eastern side. This layout is illustrated as Figure 5-1, Building Orientation Alternative. This alternative provides approximately 426,000 square feet of building space, a 28,600 square foot garden center and 2,138 parking spaces. The mixture of buildings and uses in this layout include the following:

- Building A - Restaurant, 5,000 square feet
- Building B - Retail, 8,000 square feet
- Building C - Retail, 22,400 square feet
- Building D - Office Supplies, 23,400 square feet
- Building E - Supermarket, 62,100 square feet
- Building F - Home Goods Store, 31,300 square feet
- Building G - Discount Department Store, 125,400 square feet
- Building H - Restaurant, 6,000 square feet
- Building J - Retail, 7,500 square feet
- Building K - Home Improvement Store (134,600 square feet) and Garden Center (28,600 square feet)

Impacts of the Building Orientation Alternative are compared to those of the proposed action by subject area below.

Geology, Soils and Topography: Land-related impacts associated with this development would be comparable to those described for the proposed development. Clearing and grading for the parking areas and buildings would be more than the proposed project, due to the increase in gross floor area and required parking spaces.

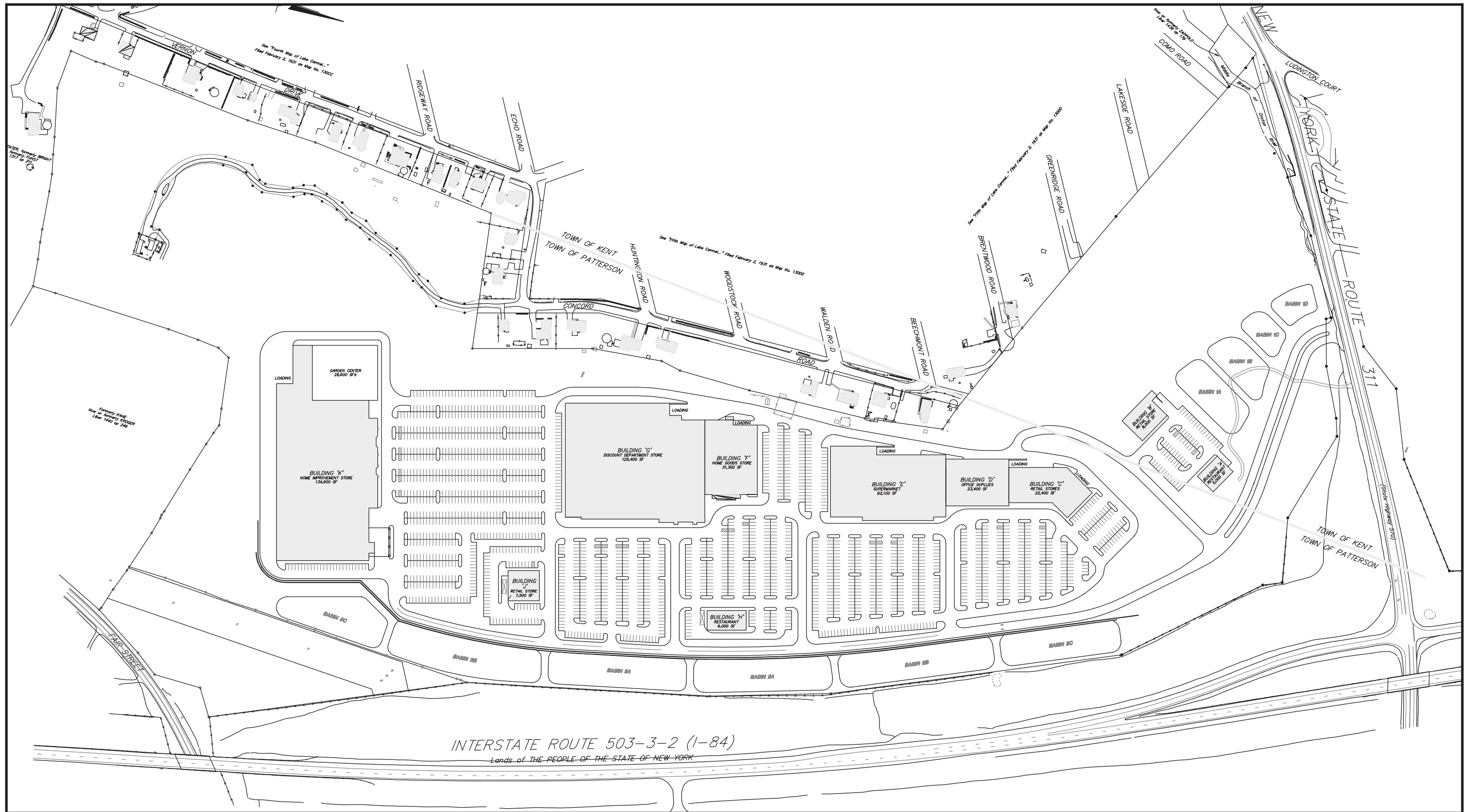


Figure 5-1: Building Orientation Alternative
Patterson Crossing Retail Center
Town of Patterson and Town of Kent,
Putnam County, New York
Source: Insite Engineering, Surveying & Landscape
Architecture, P.C. (06/05)
Scale: 1 inch = 300 feet

Groundwater: The impacts to groundwater associated with this alternative would be greater than that associated with the proposed development as a result of the increased impervious surface area (preventing infiltration) and the increased daily water usage (requiring more water be drawn from the wells).

Surface Water, Wetlands, Streams and Waterbodies: The changes to the local drainage patterns, runoff and water resources associated with this alternative would be similar to those described for the proposed development. Water detention basins would be provided for both this alternative and the proposed project, resulting in no increase in off-site stormwater run-off rates or associated erosion and siltation.

Vegetation and Wildlife: A slightly larger area would be developed with this alternative, resulting in more impacts to plant and animal resources due to the increase removal of vegetation and impervious surfaces.

Traffic and Transportation: This alternative would generate slightly more traffic than the proposed development, and have a greater potential to impact local roads and intersections.

Noise: With the proposed buildings and associated loading areas located closer to the existing homes on Concord Road along with the anticipated increased traffic, this project would have a greater potential to generate noise-related impacts to those residents.

Community Facilities and Utilities: Like the proposed development, this commercial alternative would have minimal demand for community facilities and be served by its own water and wastewater systems.

Socioeconomic: Like the proposed development, this commercial alternative would generate a substantial amount of tax revenues in terms of property taxes and sales taxes, and would generate similar levels of employment for construction-related and permanent jobs.

Cultural Resources: As with the proposed action, this alternative would have no impact on historic or archeological. However, since the proposed retail buildings would be sited along the western side of the property, the visual impacts would be significantly greater for the adjacent residential properties, which would be much closer to the proposed buildings. The distance between the nearest house and retail building would be reduced to approximately 100 feet, compared to just over 200 feet in the proposed development.

Cumulative Impacts: This alternative's contribution to cumulative impacts would be greater than that of the proposed development.

Air Quality: This alternative would involve slightly greater impacts to air with respect to construction and operational emissions when compared to the proposed development. However, the difference is not expected to be significant or noticeable.

Multistory parking facility

An alternative which incorporated a multistory parking facility for approximately 1,000 vehicles was considered. Typical costs for construction of such above ground parking

facilities range from \$15,000 to \$23,000 per parking space. Construction costs for below ground parking facilities typically cost \$18,000 or more per parking space due to the additional construction requirements and infrastructure, such as ventilation systems. For areas where rock removal is required, construction costs may exceed \$30,000 per parking space. Thus a 1,000 space above ground parking garage would cost between \$15 and \$23 million and an equivalent below ground facility would cost \$18 million or more. To pay for this, the development would require an increase in leasable floor area. Although a parking garage would reduce the area of impervious surface by paved parking, the necessary additional retail buildings would offset this, resulting in little to no overall reduction in impervious surfaces. Without this additional floor space, the center could not be leased at reasonable rates and would therefore fail. The Applicant does not believe that the cost of this additional construction is justified, since the environmental impacts are the same or greater (more construction related to the garage and more traffic associated with additional retail floor space) required. Community impacts would also increase with the construction of a parking garage, since neighboring residents would incur additional visual impacts as a result of multilevel parking garage and noise and air pollution related to its construction.

5.2.2 Alternate Project Size

Under this alternative the northernmost building pad (consisting of three retail stores and a coffee shop) and associated parking area would be eliminated. This alternative has a total of 353,100 square feet of building area, a decrease by 52,750 square feet from the 405,850 square feet proposed with the Patterson Crossing Retail Center plan. The plan for this alternative calls for 1,766 and will provide a total of 1,773 parking spaces. This alternative simplifies the internal road network by eliminating the turning lanes proposed to accommodate the vehicular movements into and out of the northernmost building pad that is part of the proposed development. The site plan for this alternative is shown on Figure 5-2, Alternate Project Size.

It should be noted that this alternative, by reducing the total area of retail development at the project site, does not utilize the site to its full potential, does not provide retail synergy between tenants, nor does it provide adequate gross square footage for ancillary retail. This scenario would likely result in the development of other sites in the area to provide supporting retail space and food services for the existing market demand. This alternative would increase traffic congestion, vehicle emissions and vehicle miles traveled along local roads. The development of associated retail and services at other sites would have increased impacts than the proposed development, such as visual resources.

Impacts of this alternative are similar or less than those of the proposed action for all subject areas. There will be less impacts to geology, groundwater, surface water, vegetation and wildlife, and cultural resources due to the reduced amount of disturbance. The reduction in development proposed with this alternative would also result in less traffic, noise and air quality impacts generated by the site, and would also result in a decreased tax revenue generation for the taxing districts. The cumulative impacts would be less than that of the proposed development, until such time as other retail sites are developed.

The applicant is unlikely to pursue this alternative for a variety of financial reasons.

Geology, Soils and Topography: This alternative would have reduced impacts on land-related resources by not developing the northernmost building pad.

Groundwater: This alternative would have reduced impacts on groundwater resources. The smaller size of this development would result in a reduced demand for groundwater as compared to the proposed development. Also, due to the reduced area of impervious surfaces resulting from buildings and parking areas with this alternative, a greater amount of precipitation would infiltrate back into the groundwater supply.

Surface Water, Wetlands, Streams and Waterbodies: The changes to the local drainage patterns, runoff and water resources associated with this alternative would be generally similar to those described for the proposed development. Water detention basins would be provided for both this alternative and the proposed project, resulting in no increase in off-site stormwater run-off or associated erosion and siltation.

Vegetation and Wildlife: This alternative would result in less ecology-related impacts by not developing the northernmost building pad. More vegetation and habitat would remain undisturbed on the project site.

Traffic and Transportation: Due to the decreased retail floor area associated with this alternative, there would be less traffic generated by this alternative.

Noise: This alternative would eliminate the closest buildings to the residences located to the west, and would help to reduce the potential for noise impacts to these residences. With this alternative, the retail building closest to a residential structure would be approximately 380 feet away.

Community Facilities and Utilities: Like the proposed development, this commercial alternative would have minimal demand for community facilities and be served by its own water and wastewater systems. Impacts to community facilities would be the same as the proposed project. This alternative would have a slightly lower requirement for utilities, due to the elimination of three retail stores and a cafe.

Socioeconomic: This alternative would generate less tax revenues in terms of property taxes and sales taxes and lower levels of employment for permanent jobs than the proposed project. It would create a similar number of construction-related jobs.

Cultural Resources: With less overall disturbance, this alternative would have reduced potential for impacts on cultural resources when compared with the proposed plan. The visual impacts would be less by eliminating the northernmost building pad. There would be no impacts to historic or archeological resources as a result of developing this project.

Cumulative Impacts: This alternative's contribution to cumulative impacts would be less than that of the proposed development.

Air Quality: With less traffic generated and less construction and operational emissions, this alternative would have slightly less air-related impacts than the proposed development.

5.3 Alternative Use

An alternative consistent with the existing site zoning was considered. This alternative evaluates the development of the project parcel as light industrial. The site plan prepared for this alternative shows four buildings of warehouse space, totaling 740,000 square feet. However, due to lower parking requirements for warehousing, only 802 parking spaces are proposed for this alternative. The site plan for the Light Industrial Alternative is shown in Figure 5-3.

A comparison of impacts on a category by category basis is provided below.

Geology, Soils and Topography: Although the building footprints are larger, the reduced area required for parking results in this alternative having reduced impacts to the land as the proposed development.

Groundwater: Since water usage for warehousing is generally limited to employee restroom usage, this alternative would have a smaller demand for groundwater as compared to the proposed development. More infiltration of precipitation into groundwater would occur as the impervious area would be less than under the proposed action.

Surface Water, Wetlands, Streams and Waterbodies: The Light Industrial Alternative would result in similar impacts to surface water as the proposed Patterson Crossing Retail Center. Water detention basins would be provided for both this alternative and the proposed project, resulting in no net increase in the rate of off-site stormwater run-off or associated erosion and siltation.

Vegetation and Wildlife: Due to the reduction in the amount of impervious area, this alternative would involve a reduced impact to plant and animal resources, as compared to the proposed development.

Traffic and Transportation: This alternative would generate less traffic than the proposed development and have a reduced potential to impact local roads and intersections. The internal road system in this alternative would be simplified, by eliminating the turning lanes proposed to accommodate the vehicular movements into and out of the northernmost building pad that is in the proposed development.

Noise: This alternative would generate less traffic overall and all operational activities would be within buildings. However, an increase in the number of large truck trips to the site would be expected to generate a greater amount of noise. In addition, the large building size would result in increased noise during construction. This alternative would be expected to generate similar amounts of noise as the proposed action.

Community Facilities and Utilities: Like the proposed development, this industrial alternative would have minimal demand for community facilities and be served by its own water and wastewater systems. Impacts would thus be similar as the proposed project.

Socioeconomic: This alternative would have less economic benefits than the proposed development since it will generate less property and sales tax revenues than the proposed development and create fewer permanent jobs; the number of construction related jobs is expected to be roughly the same as the proposed action.

Cultural Resources: As with the proposed plan, this alternative would have no impacts on historic or archeological resources. The visual impacts would be greater to the residents of the adjacent dwelling as compared to the proposed development, since the buildings would be closer to the western property line in this alternative. Additionally, the warehouse buildings would most likely be less visually appealing than the proposed commercial structures.

Cumulative Impacts: This alternative's contribution to cumulative impacts would be less overall than that of the proposed development.

Air Quality: Under this alternative, automobile traffic generated would be less, truck traffic would be higher, construction related air quality impacts would be expected to be similar if not slightly higher and operational impacts the same or slightly lower. Therefore, overall, this alternative would have similar air-related impacts, as compared to the proposed development.

Table 5-2 Comparison of Alternatives					
	Proposed Development	No Action	Alternate Building Layout	Alternate Project Size	Alternative Use
Land Use	Retail	Vacant	Retail	Retail	Light Industrial
Intensity of Use	405,850 sf	Vacant	426,000 sf	353,100 sf	740,000 sf
Number of Parking Spaces/Square Footage	1,886/376,800	None	2,138/427,600	1,773/354,600	802/160,400
Geology, Soils, Topography	119,000 CY of Rock Excavation, 68.4 Acres of Grading, 566,500 CY of cut, 12.3 Acres of Disturbance to 15%+ Slopes	No Disturbance to Soils or Rock Excavation Required	Increased Impact due to greater area of impervious surface	Reduced Impact due to less area of impervious surface	Reduced Impact due to less area of impervious surface
Groundwater ¹	10,740 gallons per day (gpd) and 32.26 Acres of Impervious Area.	No Water Use or Impervious Surfaces Required	Increased Impact: 11,457 gpd and 35.4 Acres of Impervious Area	Reduced Impact: 8,799 gpd and 30.9 Acres of Impervious Area	Reduced Impact: 4,884 gpd and 29.6 Acres of Impervious Area.
Surface Water, Wetlands, Streams and Waterbodies ²	Impacts Related to 32.26 Acres of Impervious Area Addressed by SWPPP, BMPs and LID	No Impact	Similar Impact	Similar Impact	Similar Impact

¹ Water usage for other retail stores and light industrial warehouse uses in the alternatives are based on information provided by probable tenants and/or on the NYSDEC "Design Standards for Wastewater Treatment Works". Water usage for supermarkets and restaurants are based on information provided by the project engineer, Insite Engineering, Surveying & Landscape Architecture, P.C. Refer to Tables 4.4-1, 4.4-2 and 4.4-3 herein for details regarding hydraulic loading rates.

² Impervious Area provided by Insite Engineering, Surveying & Landscape Architecture, P.C., 2006

Table 5-2 (Continued) Comparison of Alternatives				
	Proposed Development	No Action	Alternate Building Layout	Alternate Project Size
Vegetation and Wildlife	68.4 Acres of Site Disturbance, 58 Acres of Vegetative Cover	No Impact	Increased Impact due to greater area of impervious surface and area to be cleared	Reduced Impact due to less impervious surface and smaller area to be cleared
Traffic and Transportation ³	1,571 external trips weekday and 2,152 at Saturday peak hours	No Impact	Increased Impact: 1,629 trips weekday and 2,220 trips Saturday peak hours	Reduced Impact: 345 trips and 317 trips for AM and PM peak hours respectively
Noise	Variable Increases Based on Phase of Construction and Operation	No Impact: No construction, operation or traffic-generated noise	Increased Impact: Larger retail area would result in more construction, operation and traffic-generated noise	Similar Impact: Larger building area results in increased construction noise - use results in increased truck and reduced auto noise.
Community Facilities and Utilities	Services In-place, Wastewater Processed On-site	No Impact	Similar Impact: Services In-place, Wastewater Processed On-site	Similar Impact: Services In-place, Wastewater Processed On-site
Socioeconomic ⁴	516 Full- time Jobs Created During Operation-, Significant Tax Benefits	No Job Creation, No Tax Benefit	Similar Tax Benefits: 503 Full-time Jobs Created During Operation	Less Tax Benefits: 407 Full-time Jobs Created During Operation

³ Traffic estimates for alternatives provided by Tim Miller Associates, Inc., 2006.

⁴ Number of employees is based on information provided by the Energy Information Administration website (www.eia.doe.gov).

Table 5-2 (Continued)
Comparison of Alternatives

	Proposed Development	No Action	Alternate Building Layout	Alternate Project Size	Alternative Use
Historic Resources	No Historic or Archeological Resource Impact	No Impact	No Historic or Archeological Resource Impact	No Historic or Archeological Resource Impact	No Historic or Archeological Resource Impact
Visual Resources	Limited Visual Impact	No Impact	Increased Impact: Larger building and parking area	Reduce Impact: Smaller building and parking area, fewer buildings, less road area	Increased Impact: Larger building area
Cumulative Impacts	Impacts Would Occur due to impervious area, traffic, noise, air and construction affects	No Impact	Increased Impacts due to larger size of project	Reduced Impacts due to smaller size of project	Overall, Reduced Impacts
Air Quality	Construction and Traffic Related Impacts, No Operational Impacts	No Impact	Increased Impact: Larger area of construction and increased traffic, No operational impacts	Reduced Impact: Smaller area of construction and decreased traffic, No operational impacts	Similar Overall Impact: Larger building area results in increased construction impacts, increased truck traffic, reduced auto traffic

Source: Tim Miller Associates, Inc.

6.0 ENVIRONMENTAL IMPACTS THAT CANNOT BE AVOIDED IF THE PROPOSED ACTION IS IMPLEMENTED

The development of the proposed Patterson Crossing Retail Center is not expected to result in significant adverse environmental impacts which cannot be avoided. Potential on, and off site, impacts that may occur as a result of the development of the proposed retail center on the project are discussed in the individual chapters of this DEIS. Measures incorporated into the proposal to avoid, and minimize, potential adverse impacts are also discussed in these chapters. To mitigate any potential unavoidable adverse impacts, the proposed action incorporates environmentally responsible design and maintenance practices. These practices include Low Impact Development (LID) measures such as pervious pavers and the recycling of rain water for general irrigation purposes, the construction of physical noise barriers, and the preservation of open space on the project site. Some unavoidable impacts would be temporary or short term impacts associated with the construction of the project, while others would be long term impacts associated with the occupation and use of the site.

Short Term Adverse Impacts

- soil disturbance, steep slopes disturbance, and potential erosion
- disturbance to woodlands and associated wildlife habitats
- increased traffic associated with construction on the site and on local roads (see Section 4.8.3)
- increased local noise from construction

Long Term Adverse Impacts

- increase in impervious surfaces and decrease in vegetative cover
- loss of woodland vegetation and associated wildlife habitats
- increase in traffic to the area network (see Section 4.8, Figures 4.8-8 and 4.8-9)
- increase in delays from increase in traffic (see Section 4.8 and discussion below)
- reduction in level of service from increases in traffic volume (see Section 4.8, Tables 4.8-29, 4.8-30, and 4.8-31)
- increase in local noise levels from traffic
- change in the local visual environment

As traffic increases, vehicle delays will increase as noted in Section 4.8 herein. Vehicular delay is the criteria used (Tables 4.8-7 and 4.8-8) to describe the ability of the traffic to move through the network (Level of Service).

Section 4.8 lays out a comprehensive list of actions to improve traffic operations. Included in this section is a discussion of impacts associated with the project should improvements to

Unavoidable Impacts

July 27, 2006

the road network be made prior to the development of the project and should these improvements not be made prior to development of the project. Local roads would experience temporary impacts associated with the development of the Patterson Crossing Retail Center and other nearby projects until such time as road improvements discussed in Section 4.8 are completed.

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed action would result in the development of a 405,850 square foot retail center on a 90.5 acre site with associated parking, roadways, and landscaped areas. Overall, approximately 68.4 acres of the site would be disturbed during construction. Of this total disturbance, approximately 32.26 acres would be covered by impervious surfaces including buildings, roadways, parking, and sidewalks and approximately 36.0 acres would be committed to lawn or landscaped areas. The project would preserve 22.1 acres of the site including 18.5 acres of forest and 3.6 acres of meadow/brushland. This area would remain as undisturbed open space. Once the project is constructed, 68.4 acres of the site would be unavailable for other uses in the future.

Development of the proposed project would result in the loss or disturbance of existing wildlife habitat in approximately 68.4 acres of the site. Once the project is completed, approximately 22.1 acres would consist of undisturbed forest and meadow. This portion of the site would serve as future wildlife habitat. In addition, approximately 36.0 acres of the site would consist of lawn or landscaped areas which would also provide habitat for wildlife species adapted to these vegetative communities.

The finite resources that would be irretrievably committed by implementation of the proposed action are the materials and energy required for construction and for maintenance of the Patterson Crossing Retail Center after construction is completed. Construction would involve the commitment of a variety of natural resources. These include, but are not necessarily limited to concrete, asphalt, steel, lumber, paint products, topsoil, and other building materials. However, it should be noted that many of the materials accumulated for construction may at some time be recycled or reused. In addition, the operation of construction equipment and the proposed Patterson Crossing Retail Center would result in consumption of fossil fuels and other finite energy sources. When completed, the operation of the proposed facilities would require electricity and the use of fossil fuels either directly as heating fuel or indirectly as electricity. There would also be future commitment of water resources and solid waste disposal requirements associated with the project.

Construction of the project would require a substantial commitment of person hours of labor, which can be viewed as beneficial to the community, the local economy, and the construction industry with respect to the generation of jobs. Based on labor hour estimates included in the Development Impact Assessment Handbook, published by the Urban Land Institute (1994), and accounting for secondary employment resulting from the construction, this project would be expected to generate approximately 151 person-years of employment. (Refer to Section 3.0 for further discussion of the project's effects on employment.) At full build-out this project is expected to provide up to 549 full-time employment positions.

Other manpower commitments which could be required for an emergency, would include the services of the police department, fire department, or ambulance corps.

8.0 GROWTH INDUCING ASPECTS

8.1 Population

The proposed project is in an area long planned for commercial use and is well supported by transportation infrastructure. The site is being developed in response to the population growth that has occurred in the region over the past 10 years. The proposed project would fill a void in large-scale retail uses in Putnam County that does not currently contain retail facilities of this configuration. The proposed project would be expected to increase the number of visitors to this area and could result in added drive-by traffic and additional business for some local stores, while potentially drawing customers from other local businesses. As described in Chapter 4.12, the increase in competition for some existing retailers could potentially lead to secondary displacement should a particular establishment no longer remain competitive. However, it is unlikely that these sites would remain vacant in the long-term given their size and prominent locations along NYS Route 311 and would likely be reoccupied by other commercial establishments permitted by zoning. Therefore, no significant long term economic impacts to either the Lake Carmel or Route 22 commercial centers would be expected.

A possible reuse scenario for sites that could potentially experience secondary displacement would be residential development. However, residential reuse of formerly commercial sites would not be expected to result in significant increases in population or community growth due to the limited number of sites that would potentially experience this type of displacement. In addition, residential redevelopment would likely require a separate environmental review process which would address potential impacts to community services and other social and economic effects resulting from the introduction of a new residential population. Therefore, no significant growth-inducing effect on existing community services or facilities would be expected.

As described in Chapter 3.0 of this document, the proposed Patterson Crossing Retail Center is expected to generate approximately 549 permanent jobs. These jobs would most likely be filled by residents of Putnam and the adjacent counties where the unemployment rate in 2005 was just over four percent. Since it is expected that the majority of these workers would live within commuting distance of the proposed project, no significant population increases would be expected. The number of future workers that would potentially relocate their households to the Town of Patterson or the Town of Kent to reside closer to their place of employment can not be determined at this time, however, any increase in local resident population due to the proposed project would be expected to be relatively small, and would not be expected to induce further growth. Existing and proposed housing resources within Patterson and Kent would be expected to accommodate any workers that could potentially relocate from outside the region.

8.2 Support Facilities

No new businesses would be expected to be created in the Towns of Patterson and Kent to serve the new facilities at Patterson Crossing Retail Center. The area surrounding the project site already contains retail and service establishments, such as gas stations and automotive-related businesses, banks and food stores, which serve local businesses and residents. The proposed project would be expected to be supplied with goods for sale from businesses located within other parts of the region and country, or from other countries.

Existing local businesses that could potentially experience an increase in business activity from the proposed stores, visitors, and workers at the Patterson Crossing Retail Center might include package delivery establishments, local deli's and restaurants, gas stations, banks, and possibly local produce suppliers for the proposed coffee shop. Significant creation of new businesses to support Patterson Crossing Retail Center is not anticipated.

The project would promote increased construction employment in the short-term and, on a cumulative basis, a long-term increase in demand for commercial goods and services that would be expected to have a steady multiplier effect in the project area.

8.3 Development Potential

The project area is already served by established infrastructure including an extensive roadway network. The construction of the proposed project would not introduce new roadways or allow for the development of other vacant or underutilized parcels which are currently inaccessible. Due to the limited availability of vacant land in the project area, the amount of development that would be expected to result from the introduction of this new use would not be expected to be significant.

9.0 Effects on the Use and Conservation of Energy Resources

Energy consumption would occur during construction and operation of the proposed project. During construction, energy would be used for power equipment and various construction vehicles. Once construction is completed and the project occupied, energy will be required for heating, air conditioning, and the use of various appliances and electrical equipment. It is not expected that this energy use would be higher than what is typical for this type of development.

At a minimum, all future buildings and facilities on this site would be designed and built in conformance with the energy conservation regulations of the New York State Energy and Building Codes. The specific designs of the energy conversion systems for the proposed project have not yet been completed. Therefore, it is not possible at this time to examine the extent of energy consumption or conservation. However, it is expected that modern heating and cooling systems and energy efficient appliances would be utilized, where possible, to conserve energy resources.

The project will also reduce travel time, mileage and fuel consumption for local residents that currently travel long distances to shopping centers out of the county or state. The proposed project will benefit local residents by providing them with a wider variety of retail offerings than currently exists in Putnam County, precluding the need for them to travel long distances for comparative shopping and selection of goods that are currently available only in surrounding counties. This could potentially result in a significant reduction in vehicle miles traveled (VMT), thereby reducing gas usage and vehicular emissions at the regional level. For local households in the Towns of Kent and Patterson that might shop at the future Patterson Crossing Retail Center on a weekly basis instead of traveling to major retail stores in surrounding counties the reduction in distance traveled one way would be 10 to 15 miles with a corresponding reduction in the annual VMT of 6% to 8%. With gasoline prices in the region now averaging near \$3.00 per gallon and the potential for prices to rise in the future, a saving of over \$150 per year in fuel costs would be realized. This is based on vehicle mileage of 20 miles per gallon and a typical annual household VMT of approximately 18,400 miles per year.¹

¹ New York State Energy and Research Authority (NYSERDA), 2002 NYS Energy Fast Facts, NYSERDA website, 2005.