SUPPLEMENTAL FINAL ENVIRONMENTAL IMPACT STATEMENT (SFEIS)

River Knoll

40 CROTON DAM ROAD
TOWN OF OSSINING
WESTCHESTER COUNTY, NY

VOLUME 2

Traffic Study Appendix D
(Report Text Only Without Technical Appendices)

Prepared for: **Hudson Park Group LLC**
100 Brookfield Road
Fleetwood, NY10552

Lead Agency: **Town of Ossining Planning Board**

Prepared by:

Project 15064

Revised: **December 2022**

River Knoll

40 Croton Dam Road
Town of Ossining, NY 10562
Westchester County, NY
Tax Map Lot 89.08-1-83 (Town of Ossining)

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VOLUME 2

Traffic Study Appendix D

This Document Contains the Report Text Only (Without Technical Appendices)-- The Complete Report is Available in Electronic Format)

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TRAFFIC STUDY

RIVER KNOLL

40 CROTON DAM ROAD
TOWN OF OSSINING, NEW YORK

Prepared for:	**Hudson Park Group LLC** 100 Brookfield Road Fleetwood, NY 10552
Prepared by:	120 Bedford Road Armonk, NY 10504 JMC Project **15064**

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I. INTRODUCTION

This Traffic Study has been prepared to assess existing conditions as well as future traffic operations in association with the proposed River Knoll redevelopment located at 40 Croton Dam Road in the Town of Ossining, NY. The location of the site is illustrated on the figures included in Appendix B.

The subject property operated as a hospital since 1927. The Stony Lodge Hospital began closing in 2012. The Applicant's previous proposal consisted of demolishing the existing hospital and constructing a new three-story building with two levels of parking below providing a total of 188 apartment units. The previously proposed building consisted of 169 market-rate rental units and 19 affordable rental units. The previously proposed redevelopment included amenities for the residents such as a swimming pool, fitness center, yoga studio, club room, etc.

Based on input from the Town and residents, the Applicant has revised the proposed redevelopment of the property. The Applicant's current proposal consists of demolishing the existing hospital and constructing an age-restricted townhouse community. The age-restricted (55 or over) community proposes a total of 95 units with 85 units as market-rate and the remaining 10 as affordable units. The redevelopment proposes a clubhouse and swimming pool as amenities for the residents of the community. A bicycle rack for bicycle parking is proposed at the proposed clubhouse for the community.

The property is currently accessed via a single driveway located along Croton Dam Road. The previously proposed and currently proposed redevelopment will reconstruct a new and widened driveway at the same location as the existing driveway. The currently proposed redevelopment also proposes two emergency access only driveways with one connecting to Croton Dam Road located north of the main site driveway and the second connecting to Narragansett Avenue.

The proposed driveway connecting to Croton Dam Road provides two-way traffic flow. The single site access splits into two 26 foot wide two-way dead end roadways at an intersection within the property. One of the roads continues easterly from the site driveway and then curves to travel north to its terminus providing access to 64 units. This roadway provides an emergency access drive connecting to Narragansett Avenue which will include bollard and chain assemblies at both ends to prevent use except for emergency vehicles. The other road traverses in a northernly direction from the site driveway and curves to travel south to its terminus providing access to the remaining 31 units. This roadway provides an emergency access drive connecting to Croton Dam Road which will include bollard and chain assemblies at both ends to prevent use except for emergency vehicles.

II. EXISTING CONDITIONS

A. Existing Roadway Network

JMC performed field reconnaissance of the existing roadway network within the area of this Study in order to gather existing conditions data. This reconnaissance included a determination of lane widths, striping, horizontal and vertical alignments, signs, speed limits, pedestrian activities, traffic flows, sidewalks, curbing, etc. Traffic signal timing and phasing was obtained from the New York State Department of Transportation (NYSDOT).

NY 9A is generally a north/south state highway which changes to an east/west roadway within the study area. In the vicinity of the subject property, NY 9A provides two travel lanes in each direction and widens at intersections to provide additional lanes. It has a posted speed limit of 40 mph and on-street parking is prohibited.

Croton Dam Road is a north/south roadway connecting to Kitchawan Road in the north and Dale Avenue in the south. It provides one travel lane in each direction. The roadway has a posted speed limit of 30 mph and parking is prohibited on both sides of the street.

Kitchawan State Road is an east/west state roadway and is also referenced as NY 134. It provides one travel lane in each direction. The roadway has a posted speed limit of 30 mph and on-street parking is prohibited.

Pheasant Ridge Road and Feeney Road have tributary roads connecting to them; however, they terminate at a dead end. Cherry Hill Circle is a dead end roadway. All three of the roadways are general east/west roadways and provide one travel lane in each direction. The roadways have a speed limit of 30 mph and on-street parking is permitted.

Narragansett Avenue is generally a north/south roadway which changes to an east/west roadway at its northern end. It connects to Croton Dam Road in the north and Ryder Road in the south. It provides one travel lane in each direction and has a 30 mph speed limit. On-street parking is prohibited along the roadway.

Pershing Avenue, Grandview Avenue and Pine Avenue are east/west roadways which connect to Narragansett Avenue in the east. Pershing Avenue and Grandview Avenue connect to Croton Dam Road in the west. Cherry Hill Drive opposes Pershing Avenue at Croton Dam Road. Pine Avenue connects to Dale Avenue is the west. They provide one travel lane in each direction. The roadways have a posted speed limit of 30 mph and parking is permitted in certain locations along the roads.

Dale Avenue and Hawkes Avenue are north/south state roadways within the study area. These roads are also referenced as NY 134. They provide one travel lane in each direction. On-street parking is prohibited along Hawkes Avenue and is permitted on one side of Dale Avenue. The roadways have a posted speed limit of 30 mph.

In order to evaluate the changes in traffic associated with the proposed redevelopment, the following intersections have been analyzed:

1. Dale Avenue & Pine Avenue
2. Croton Dam Road & Hawkes Avenue
3. Croton Dam Road & Pershing Avenue with Cherry Hill Circle
4. Croton Dam Road & Site Driveway
5. Croton Dam Road & Grandview Avenue
6. Croton Dam Road & Narragansett Avenue

7. Croton Dam Road & Pheasant Ridge Road with Feeney Road
8. Croton Dam Road & Kitchawan State Road
9. Croton Dam Road & NY 9A

Pine Avenue intersects Dale Avenue at an unsignalized 'T' intersection. Both Dale Avenue approaches provide a single thru lane with shared turning movements. Pine Avenue provides a single travel lane with shared turning movements. Pine Avenue is controlled by a stop sign.

Croton Dam Road intersects Hawkes Avenue at a three-legged unsignalized intersection. Hawkes Avenue provides a single thru lane with shared turning movements in both directions. Croton Dam Road provides a single travel lane with shared turning movements and is stop sign controlled.

The intersection Croton Dam Road and Pershing Avenue with Cherry Hill Drive is a four-legged unsignalized intersection. Each approach provides a single travel lane with shared turning movements. The Pershing Avenue and Cherry Hill Circle are controlled by a stop sign.

The site driveway intersects Croton Dam Road at an unsignalized 'T' intersection. Both Croton Dam Road approaches provide a single thru lane with shared turning movements. The site driveway provides a single travel lane with shared turning movements. The site driveway is controlled by a stop sign.

Grandview Avenue intersects Croton Dam Road at an unsignalized 'T' intersection. Both Croton Dam Road approaches provide a single thru lane with shared turning movements. Grandview Avenue is controlled by a stop sign and provides a single travel lane with shared turning movements.

Narragansett Avenue intersects Croton Dam Road at an unsignalized intersection. Both Croton Dam Road approaches provide a single thru lane with shared turning movements.

The Croton Dam Road northbound approach is controlled by a stop sign. Narragansett Avenue provides a single travel lane with shared turning movements with a short channelized left turn pocket. For the purposes of the study and to obtain capacity analyses, the intersection has been analyzed as a typical 'T' intersection with stop sign control only on the minor street (Narragansett Avenue). Additionally, due to the short left turn pocket on Narragansett Avenue, this approach was analyzed as a single lane with shared turning movements.

The intersection Croton Dam Road and Pheasant Ridge Road with Feeney Road is a four-legged unsignalized intersection. Each approach provides a single travel lane with shared turning movements. The Pheasant Ridge Road and Feeney Road are controlled by a stop sign. Pheasant Ridge Road provides a small divisional island between its egress and ingress accesses at the intersection.

Kitchawan State Road intersects Croton Dam Road at a three-legged unsignalized intersection. Croton Dam Road provides a single thru lane with shared turning movements in both directions. Kitchawan State Road provides a single travel lane with shared turning movements and is stop sign controlled.

The intersection of Croton Dam Road and NY 9A is a signalized four-legged intersection. The NY 9A eastbound approach provides a 110 foot long separate left turn lane and two thru lanes as well as a 190 foot long right turn lane. The NY 9A westbound approach provides a 150 foot long separate left turn lane and two thru lanes with shared right turning movements. The northbound and southbound approaches provide a single travel lane with shared turning movements. The traffic signal provides a three phase operation. First, the NY 9A left turn lanes are provided the protected green indication which is then followed by the thru and right turn movements along NY 9A. This is then followed by the Croton Dam Road approaches which are given the green indication with permissive turning movements.

B. Existing Volumes

Due to the pandemic, traffic volumes on the roadways have created atypical traffic conditions with remote learning for schools and remote working for businesses. In order to complete the traffic analyses for this study, our office utilized the traffic count data previously conducted for the River Knolls redevelopment from the prior traffic study. These counts were conducted in the fall of 2016. The utilization of record count information prior to the pandemic for traffic studies has been the preferred alternative by the traffic engineering community to represent typical traffic conditions and is supported by the NYSDOT in their Traffic Data Collection Guidance during COVID-19 Pandemic memorandum, dated 08/11/2020. A copy of the NYSDOT's guidance has been included in Appendix F.

Traffic counts were performed at the studied intersections in order to quantify and analyze existing peak hour volumes as well as to establish base conditions for projecting future operations. The counts included pedestrian/bicycle activities and truck traffic.

Traffic counts were conducted from 6:00 – 10:00 AM and 3:00 – 7:00 PM on Thursday, September 29, 2016 for all the studied intersections. The weather conditions on September 29, 2016 were partly cloudy and dry. Additionally, all the studied intersections were counted from 9:00 AM – 1:00 PM on Saturday, October 15, 2016. The weather conditions on October 15, 2016 were sunny and dry. The peak hour volumes occurred between 7:15-8:15 AM during the weekday morning, 4:30-5:30 PM during the weekday afternoon and 10:30-11:30 AM during the Saturday midday. The intersection traffic count data is included in Appendix C. The peak hour volumes are shown on Figures 1 thru 3 "2016 Existing Volumes". All figures are included in Appendix B.

C. Intersection Analysis Methodology

The intersections have been analyzed based on the methodologies of the Highway Capacity

Manual 6th Edition. Information derived from the manual relative to the level of service criteria is provided below.

1. Level-of-Service Criteria for Signalized Intersections

Levels of Service (LOS) for signalized intersections are defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during ideal conditions: in the absence of traffic control, in the absence of geometric delay, in the absence of any incidents, and when there are no other vehicles on the road. Only the portion of total delay attributed to the control facility is quantified. This delay is called control delay. Control delay includes the delays of initial deceleration, move-up time in the queue, stops, and reacceleration. In this chapter, control delay may also be referred to as signal delay. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a peak 15-minute analysis period. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the volume/capacity (*v/c*) ratio for the lane group in question.

LOS A describes operations with very low control delay, up to 10 seconds per vehicle. This level of services occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LOS B describes operations with control delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both.

LOS C describes operations with control delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both.

LOS D describes operations with control delay greater than 35 and up to 55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop, and the proportion of vehicles not stopping declines.

LOS E describes operations with control delay greater than 55 and up to 80 seconds per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with control delay in excess of 80 seconds per vehicle and/or the arrival flow rates exceed the capacity of the intersection. It will also occur at high v/c ratios below 1.0 with many individual cycle failures. If the volume-to-capacity (v/c) is greater than 1.0, the LOS is considered an F, even if the delays are lower than 80 seconds.

The LOS criteria for signalized intersections are presented below.

Signalized Level of Service Criteria		
Control Delay (Seconds/Vehicle)	**LOS by Volume-to-Capacity Ratio**	
	v/c ≤ 1.0	**v/c > 1.0**
≤10	A	F
>10 and ≤20	B	F
>20 and ≤35	C	F
>35 and ≤55	D	F
>55 and ≤80	E	F
>80	F	F

For approach-based and intersection-wide assessments, LOS is defined solely by control delay.

2. Level of Service for Unsignalized Intersections

The Levels of Service (LOS) for Two Way Stop Control (TWSC) and All Way Stop Control (AWSC) intersections and Roundabouts are determined by the computed or measured control delay and are defined for each minor movement. LOS is not defined for the intersection as a whole for TWSC intersections. LOS criteria are presented below.

Unsignalized Level of Service Criteria		
Control Delay (Seconds/Vehicle)	**LOS by Volume-to-Capacity Ratio**	
	v/c ≤ 1.0	**v/c > 1.0**
≤10	A	F
>10 and ≤15	B	F
>15 and ≤25	C	F
>25 and ≤35	D	F
>35 and ≤50	E	F
>50	F	F

For TWSC intersections, the LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or the intersection as a whole at TWSC intersections. For approach-based and intersection-wide assessments at AWSC intersections and roundabouts, LOS is defined solely by control delay.

Average control delay less than 10 seconds/vehicle are defined as LOS A. Follow-up times of less than 5 seconds/vehicle have been measured when there is no conflicting traffic, so control delays of less than 10 seconds/vehicle are appropriate for low flow conditions. If the volume-to-capacity (v/c) is greater than 1.0, the LOS is considered an F, even if the delays are lower than 50 seconds.

The LOS criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. A number of driver behavior considerations combine to make delays at signalized intersections less onerous than delays at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, whereas drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at an unsignalized intersections versus that at signalized intersections. For these reasons, it is considered that the control delay threshold for any given LOS would be less for an unsignalized intersection than it would be for a signalized intersection.

D. <u>Existing Operations</u>

The intersection capacity analyses based on existing volumes and conditions are shown on Tables 2 through 4. The specific volume/capacity ratios, delay for average vehicle in seconds and the associated levels of service are summarized for each lane group, the approach as well as the overall intersection as applicable on Tables 2 through 4. All tables are included in Appendix A.

During the peak weekday AM hour, the overall intersection of Croton Dam Road and NY 9A operates at a level of service C. The NY 9A westbound left turn lane operates at a level of service F while the eastbound left turn lane operates at a level of service E. The NY 9A eastbound approach and thru lanes operate at a level of service C. The Croton Dam Road northbound and southbound approaches operate at a level of service E. All other movements at the studied intersections operate at a level of service B or better.

During the peak weekday PM hour, the overall intersection of Croton Dam Road and NY 9A operates at a level of service E. Both NY 9A left turn lanes operate at a level of service

F. The NY 9A westbound thru and right turning movements operate over capacity and at a level of service F. The Croton Dam Road approaches and the NY 9A westbound approach operate at a level of service E. All other movements at the studied intersections operate at a level of service B or better.

During the peak Saturday midday hour, the overall intersection of Croton Dam Road and NY 9A operates at a level of service C. The NY 9A westbound left turn lane operates at a level of service F while the eastbound left turn lane operates at a level of service D. The NY 9A westbound thru/right lanes and approach operate at a level of service C. The Croton Dam Road southbound approach operates at a level of service D. All other movements at the studied intersections operate at a level of service B or better.

III. PROJECTED CONDITIONS

A. No-Build Volumes

In order to project future traffic increases to the year 2025, the existing volumes were increased by a general growth rate of 1% per year compounded annually. Based on discussions with the Village of Ossining's Planning Department and the Town of Ossining's Building Department, we have incorporated the traffic volumes associated with the proposed Parth Knolls, LLC residential development located at 87 Hawkes Avenue in Ossining has been incorporated in the study. The traffic volumes associated from the proposed Sunshine Children's Home & Rehabilitation Center in New Castle, the proposed Upper Westchester Muslim Society development in New Castle and the proposed Hudson Ridge Wellness Center development in Cortlandt will not generate substantial traffic volumes in the study area and have been considered as part of the general growth volumes.

Table 1 and Table 1A depict the traffic volumes associated with the reoccupancy of the previous hospital use on the development property based on traffic counts conducted at the site driveway in 2006. The traffic figure of the 2006 site driveway volumes and a traffic generation table from the "Due Diligence Traffic Study" prepared by Schoor Depalma

Engineers and Consultants has been included in Appendix C. The Hospital had 250 employees, with multiple shifts coming and going 24 hours a day. In addition, delivery trucks, including large multi-axle trucks, came daily with food and supplies, as did ambulances 24 hours a day. Family members came by car to visit, usually in the evening and weekends. Staff came by even when not working, to pick up paychecks and meet with their supervisors. Outside agencies sent staff daily to coordinate care, and job seekers visited daily weekdays and weekends in significant numbers. Vans were used to transport patients daily to outside medical specialists and emergency rooms, when ambulances were not used. Regional conferences were regularly held on-site with outside visitors from the County and State. Federal Express and UPS came daily more than once for deliveries and pickups. By State regulation, incidents involving the patients required State reporting and police investigation, which by law required the local police to be involved and necessitated frequent trips by police cars. In summary, there was constant traffic. In addition, there have always been, and there continue to be, outpatients coming for treatment.

The reoccupancy of the hospital volumes based on the 2006 counts are shown on Figure 8 and have been incorporated into the no-build volumes. The resulting 2025 no-build volumes represent traffic operation in 2025 with reoccupancy of the hospital use (without the redevelopment of the site).

During the peak weekday AM hour, the Grandview Avenue approach to its intersection with Croton Dam Road is projected to increase in delay from a level of service A under existing conditions to a level of service B under no-build conditions. The overall intersection of Croton Dam Road and NY 9A is projected to increase in delay to operate at a level of service D while the Croton Dam Road approaches are projected to increase in delay to operate at a level of service F under no-build conditions. The NY 9A eastbound approach and thru lanes are projected to increase in delay to operate at a level of service D under no-build conditions. All other movements at the studied intersections under no-build conditions are projected to operate at same levels of service during the peak weekday AM hour as experienced under existing conditions.

During the peak weekday PM hour, the Grandview Avenue approach to its intersection with Croton Dam Road is projected to increase in delay from a level of service A under existing conditions to a level of service B under no-build conditions. At the intersection of Croton Dam Road and NY 9A, the westbound approach and both Croton Dam Road approaches are projected to increase in delay to operate at a level of service F under no-build conditions. All other movements at the studied intersections under no-build conditions are projected to operate at same levels of service during the peak weekday PM hour as experienced under existing conditions.

During the peak Saturday midday hour, the Pershing Avenue approach to its intersection with Croton Dam Road is projected to decrease in delay from a level of service B under existing conditions to a level of service A under no-build conditions. At the intersection of Croton Dam Road and NY 9A, the eastbound left turn lane and Croton Dam Road northbound approach are projected to increase in delay to operate at a level of service E under no-build conditions. The NY 9A eastbound approach is projected to increase in delay from a level of service A under existing conditions to a level of service B under no-build conditions. All other movements at the studied intersections under no-build conditions are projected to operate at same levels of service during the peak Saturday midday hour as experienced under existing conditions.

Our office requested accidents reports from the Town/Village of Ossining Police Department as well as New York State Department of Transportation for all the studied intersections and the roadway segments between the intersections from 01/01/2009 to 11/15/2017. Data from the accident reports have been provided in Tables AR1 thru AR34. This data incorporates 3 years of accident data when the former hospital use was in operation. Tables AR1 thru AR17 represent accident data when the former hospital use was in operation. Tables AR18 thru AR34 represent accidents after the former hospital was closed. Table ARS contained in Appendix A provides a summary of the accidents by location and year as well as the statewide and location accident rates. Table ARS compiles the data shown on Tables AR1 thru AR34.

While the former hospital use was in operation, there were 3 accidents within the study area. One accident occurred at the intersection of Dale Avenue & Pine Avenue which involved a rear end accident having a contributing factor of backing unsafely. The other two accidents occurred along Dale Avenue between Pine Avenue and Croton Dam Road. One of these two accidents was a sideswipe accident and the other was a right angle accident. These accidents involved driver inattention and failure to yield right-of-way. There were no other reported accidents in the study area during this time period.

Since the hospital has been closed, there have been 4 accidents at the intersection of Dale Avenue and Pine Avenue. One of the accidents involved a non-fatal injury and the majority of the contributing factors for the accidents were backing unsafely and driver inattention. There was one accident along Dale Avenue between Pine Avenue and Croton Dam Road which was a right angle accident involving backing unsafely. At the intersection of Croton Dam Road and Hawkes Avenue, there was two rear end accidents and one sideswipe accident due to defective brakes and failure to keep right. At the intersection of Croton Dam Road and Cherry Road, there was one right angle accident due to driver inexperience and failure to yield right-of-way. There was one fixed object accident along Croton Dam Road between the site driveway and Grandview Avenue. There was one fixed object accident due to the driver falling asleep along Croton Dam Road between Grandview Avenue and Narragansett Avenue. There was one right turn, one right angle, one fixed object, and one accident with an animal at the intersection of Croton Dam Road and Narragansett Avenue which involved an impaired driver, aggressive driving, passing too closely, animal actions, and pavement slippery. There was one fixed object accident and one head-on accident at the intersection of Croton Dam Road and Pheasant Ridge Road both due to driver inattention. There was one left turn accident at the intersection of Croton Dam Road and Kitchawan State Road due to driver failure to yield the right-of-way.At the intersection of NY 9A and Croton Dam Road, there were eleven rear end, eight sideswipe, two right angle, two fixed object, one left turn, and one animal accident. The majority of accidents at the intersection of NY 9A and Croton Dam Road had contributing factors of improper lane usage and driver inattention. There were no other reported accidents in the study area during this time period.

We also provided a comparison to the New York State statewide average accident rate which is represented as an accident rate per million entering vehicles at the intersection. Based on our comparison, accident rates at Intersections #1, 2, 3, 6, 7, and 9 are above the statewide averages. Due to the relatively low traffic volumes along Croton Dam Road between both connections to NY 134 as well as along Pine Avenue, the accident rates appear higher than the statewide averages even though there a relatively small number of accidents over the three-year analysis period. For example, the intersection of Croton Dam Road & Hawkes Road experienced 2 accidents from 11/16/2014 to 11/15/2017 which less than one accident per year. However, due to the relatively low daily traffic volumes (4,610 vehicles per day as shown on Table AR20), the accident rate is 0.40 accidents per million entering vehicles which is a little over 2 times higher than the statewide average. The intersection of NY 9A and Croton Dam Road experiences typical accidents for a signalized intersection with the majority of reported accidents being rear end and sideswipe. An overhead 'signal ahead' sign is provided for the southbound NY 9A approach to the intersection of Croton Dam Road. Even though these 6 studied intersections experience accident rates above the statewide average, the relatively low projected traffic volumes associated with the proposed development are not anticipated to significantly affect the existing accident patterns throughout the surrounding network. For example, the projected development traffic at Intersection #1 is anticipated to be 3, 3, and 5 trips during the peak weekday AM, weekday PM, and Saturday midday hours, which represents 0.42%, 0.46%, and 0.87% of the overall traffic at this intersection during their respective peak hours. Additionally, it should be noted that the proposed development as shown on Table 1A represents a reduction in traffic volumes during the studied peak hours compared to the previous hospital volumes.

B. Build Volumes

The projected traffic associated with the previously proposed 188 apartment unit redevelopment and the currently proposed 95 age-restricted unit redevelopment is based on vehicle trip information published by the Institute of Transportation Engineers (ITE) in its publication "Trip Generation Manual, 11th Edition." Table 1 shows the traffic volumes associated with the reoccupancy of the former hospital land use and the previously proposed redevelopment as well as the net change in traffic volumes between them. The previously proposed redevelopment incorporated a shuttle service to transport residents to and from the train station. The previously proposed redevelopment resulted in approximately 32, 43 and 24 net additional driveway trips during the peak weekday AM, weekday PM, and Saturday midday hours, respectively, compared to the former hospital. Table 1A shows the traffic volumes associated with the reoccupancy of the former hospital land use and the currently proposed redevelopment as well as the net change in traffic volumes between them. The currently proposed redevelopment no longer proposes a shuttle service to and from the train station. The currently proposed redevelopment results in a reduction of approximately 31, 35, and 28 net driveway trips during the peak weekday AM, weekday PM, and Saturday midday hours, respectively, compared to the former hospital. The projected peak hour volumes for the proposed age-restricted redevelopment are relatively low compared to other residential uses. The primary trips for the currently proposed redevelopment have been shown in the figures in Appendix B.

The primary trips were routed through the studied intersections based on existing traffic volumes and the roadway network. The no-build volumes minus the reoccupied hospital volumes plus the currently proposed redevelopment traffic results in 2025 Build Volumes which reflect projected volumes after the completion and occupancy of the proposed redevelopment.

A sight distance analysis has been conducted for the proposed driveway. A speed study was conducted for vehicles traveling along Croton Dam Road in the vicinity of the existing site access. The speed study collected data from 9/18/2015 to 9/27/2015 for both directions of travel along Croton Dam Road (160 feet north of the existing property access on Croton Dam Road). Based on the speed study, the 85th percentile speed for both directions along Croton Dam Road is 43 mph in the vicinity of the existing site access. The speed study data is contained in Appendix G.

Utilizing the 85th percentile speed, our office calculated the desirable stopping and intersection sight distances based on AASHTO guidelines. The desirable stopping sight distance based on 43 mph is 335 mph in both directions along Croton Dam Road. For vehicles making a left turn (looking right) from the proposed site driveway, the desirable intersection sight distance based on 43 mph is 474 feet. For vehicles making a right turn (looking left) from the proposed site driveway, the desirable intersection sight distance based on 43 mph is 411 feet. A sight distance plan was prepared and is enclosed in Appendix G.

The existing decorative walls adjacent to the existing site access are proposed to be relocated as part of the proposed redevelopment for the proposed site access to outside of the driver's intersection sight line. Based on the sight distance analysis and the relocation of the existing decorative walls outside of the sight line, the intersection sight distances based on 43 mph are accommodated for the proposed site driveway along Croton Dam Road.

IV. FINDINGS & CONCLUSION

Intersection capacity analysis computed based on the Build Volumes indicate that the intersections will operate at the same or better levels of service as projected for the No-Build Volumes except for one turning movement during the peak Saturday midday hour. Projected operations with the proposed redevelopment are shown on Tables 2 through 4.

During the peak weekday AM hour, the Grandview Avenue approach to its intersection with Croton Dam Road is projected to decrease in delay from a level of service B under no-build conditions to a level of service A under build conditions. All other movements at the studied intersections under build conditions are projected to operate at same levels of service during the peak weekday AM hour as projected under no-build conditions. The overall delay under build conditions at the intersection of NY 9A and Croton Dam Road is projected to decrease compared to no-build conditions.

During the peak weekday PM hour, the Grandview Avenue approach to its intersection with Croton Dam Road is projected to decrease in delay from a level of service B under no-build conditions to a level of service A under build conditions. All other movements at the studied intersections under build conditions are projected to operate at same levels of service during the peak weekday PM hour as projected under no-build conditions. The overall delay under build conditions at the intersection of NY 9A and Croton Dam Road is projected to decrease compared to no-build conditions.

During the peak Saturday midday hour, the Pershing Avenue approach to its intersection with Croton Dam Road is projected to increase in delay by 0.2 seconds from a level of service A under no-build conditions to a level of service B under build conditions. At the intersection of NY 9A & Croton Dam Road, the NY 9A eastbound left turn lane is projected to decrease in delay from a level of service E under no-build conditions to a level of service D under build conditions. Additionally, the Croton Dam Road northbound approach to NY 9A is projected to decrease in delay from a level of service E under no-build conditions to a level of service D under build conditions. All other movements at the studied intersections under build conditions are projected to operate at same levels of service during the peak Saturday midday hour as projected under no-build conditions.

As previously mentioned, the proposed age-restricted redevelopment is a relatively low traffic generator compared to other residential uses. When you compare the proposed redevelopment's traffic to the other traffic volumes at the intersection of NY 9A & Croton Dam Road, the proposed redevelopment's traffic represents less than 0.4% of the traffic at the intersection. The proposed redevelopment's traffic represents 0.29%, 0.34%, and 0.55% of the overall intersection volumes at the NY 9A and Croton Dam Road under build conditions during the peak weekday AM, weekday PM, and Saturday midday hours, respectively.

Additionally, a queuing analysis was performed at the studied intersections. Tables 5 thru 7 are included in Appendix A and depict the queuing for the three studied conditions (Existing, No Build, Build). The storage lengths depicted in the tables are measured to the nearest intersection of two streets. Based on the queuing analysis, the available storage length can accommodate the projected queue lengths for all approaches at the studied intersections, except for the eastbound left turn and northbound approach at the intersection of NY 9A and Croton Dam Road. These particular movements exceed the available queue length under existing conditions.

We have compared the currently proposed development to the previously proposed development. We have provided the operations at the studied intersections with the previous proposed development to Tables 2 thru 4 for comparison purposes. The previously proposed development generally has a greater impact at the studied intersections compared to the currently proposed development since the age-restricted development has a significantly reduced unit count and is a relatively low traffic generator. The previously proposed development results in two level of service degradations during the peak weekday AM hour, three level of service degradations during the peak weekday PM hour, and one level of service degradation during the peak Saturday midday hour compared to the currently proposed development as shown on Tables 2 thru 4.

The previously proposed development considered an improvement at the intersection of Croton Dam Road and NY 9A. Per the request of the Town's traffic consultant, we provided the projected traffic operations at this intersection with these considered improvements for the previously proposed and the currently proposed development volumes. The currently proposed age-restricted development does not propose the previously proposed improvements at this intersection and is only shown for reference. In general, the considered improvements provide an improved overall intersection delay and improved overall level of service compared to no-build conditions. The Applicant proposes to install "Do Not Block the Box" signage and striping along northbound Croton Dam Road at the intersection with Kitchawan State Road. Figure CI-1 has been included in Appendix B to depict the conceptual improvements proposed associated with the age-restricted development. The operations with the considered improvements have been depicted on Tables 2 thru 4.

Based on the above, it is the professional opinion of JMC that the redevelopment of the site to 95 units of age-restricted housing will not have a significant impact on traffic operations in the study area compared to the no-build conditions, and results in reduced traffic volumes compared to the prior hospital use.

Respectfully submitted,
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