Traffic and Parking Analysis

HUMC/Mountainside Hospital Redevelopment Plan

in Glen Ridge Borough and Montclair Township

PREPARED FOR

H2M
119 Cherry Hill Road, Suite 110
Parsippany, NJ 07054
862.207.5900

PREPARED BY

1 Gateway Center, 15th Floor
Newark, NJ 07102
973.776.3700

Submitted: January 20, 2016

This report details traffic and parking analysis for the HUMC/Mountainside Hospital Redevelopment Plan. This report provides an analysis of current roadway and parking operations, and an assessment of potential future conditions based on conceptual plans provided by Hampshire Real Estate Companies Properties for a medical office building and new/reconfigured parking areas within the Redevelopment Area.

TRAFFIC ANALYSIS

I. Existing Conditions

A. Traffic Roadway Network

In the Redevelopment Area, Bay Avenue (CR-654) is an east/west roadway that ends at its intersection with Walnut Crescent to the west. It has one travel lane in each direction, and curbside parking is not permitted. Aside from an actuated pedestrian signal located at the front of the Mountainside Hospital, through traffic on this corridor has the right of way at driveways and intersections.

Claremont Avenue is an east/west roadway with its eastern extent terminating at the intersection with Walnut Crescent. It is one travel lane in each direction with limited on-street parking located along the south curb for residential units. Within the study area, thru traffic has the right of way except at a pedestrian crossing at the intersection with Pine Street and at a grade crossing (NJ Transit line) just west of that intersection.

Walnut Crescent is primarily a north-south roadway from Oxford Street to the signalized intersection with George Street. It carries one travel lane in each direction with curbside parking north of Roswell Terrace. The corridor is characterized by a number of stop-controlled intersections, with a traffic signal located at George Street.

Highland Avenue is a north-south roadway, which transitions into Walnut Crescent to the north at the signalized intersection with George Street, and into Baldwin Street to the south. It generally consists of one travel lane in each direction with limited permit parking allowed. There are two locations with pedestrian crossings. One is at the signalized intersection with George Street and the other is at the unsignalized intersection with Bay Street.

George Street is primarily a north-south roadway that begins at the signalized intersection with Highland Avenue and ends at a stop-controlled intersection with Claremont Avenue. From the intersection with Highland Avenue to its intersection with Sherwood Street, George Street is one lane in each direction. From its intersection with Sherwood Street to Claremont Avenue, George Street is one-way to the north, with parking permitted on the right side of the street.

Sherwood Street is a short two-way street with an east-west orientation from its intersection with George Street to the gate controlled access for hospital parking. On Sherwood Street, there are two residential homes, one of which is now a hospital-owned property.

B. Traffic Volumes

Vehicular turning movement counts were conducted by video on Tuesday, November 17, 2015, and on Tuesday November 24, 2015 between 7 AM and 9 AM between 4 PM and 6 PM. On Saturday, November 14, 2015 and Saturday, November 21, 2015, turning movement counts were conducted from 11:00 to 2:00pm. These times reflect the standard periods for AM, PM, and SAT peak periods. Video cameras were placed at the following locations:

1) Claremont Avenue and Pine Street
2) Claremont Avenue and George Street
3) Claremont Avenue and Walnut Crescent
4) Bay Avenue and Walnut Crescent
5) Bay Avenue and Child Care Center Driveway
6) Bay Avenue and Hospital Main Entrance Driveway
7) Bay Avenue and Sherman Avenue
8) Walnut Crescent and Roswell Terrace/Walnut Street
9) Walnut Crescent and Dental Office Driveway
10) Walnut Crescent and Hospital Emergency Department Driveway
11) Walnut Crescent/Highland Avenue and George Street
12) Highland Avenue and Bay Street
13) Highland Avenue and Laurel Place

In addition to turning movement counts, automatic traffic recorders (ATRs) were used to collect 24-hour traffic volume data along Walnut Crescent/Highland Avenue and along Bay Avenue for a duration of two weeks. This information was collected to calibrate total volumes through the area for the Synchro model and more definitively identify the peak time periods for Bay Avenue and Walnut Crescent/Highland Avenue.

Based on the results of the analysis, the following times of day were identified as the morning, evening and Saturday peak hours:

- AM: 7:45am-8:45am
- PM: 2:45pm-3:45pm
- Saturday: 12:00pm-1:00pm

C. Synchro Analysis

The analyses in this section were conducted using Synchro 8 software in accordance with Highway Capacity Manual (HCM) 2000 methodologies to determine the Levels of Service (LOS) based on intersection delays and volume-to-capacity ratios.

Level of Service Methodology

Analyses of traffic conditions in urban areas are based on critical conditions at intersections and are defined in terms of levels of service. According to the *HCM 2000*, levels of service (LOS) at signalized intersections are defined in terms of a vehicle's control delay at the intersection, as follows:

LOS A – operations with very low delays, i.e., 10.0 seconds or less per vehicle.

- This occurs when signal progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all.

LOS B describes operations with delays in excess of 10.0 seconds up to 20.0 seconds per vehicle.

- This generally occurs with good progression and/or short cycle lengths. Again, most vehicles do not stop at the intersection.

LOS C describes operations with delays in excess of 20.0 seconds up to 35.0 seconds per vehicle.

- These higher delays may result from fair progression and/or longer cycle lengths. The number of vehicles stopping is noticeable at this level, although many still pass through the intersection without stopping.

LOS D describes operations with delays in excess of 35.0 seconds up to 55.0 seconds per vehicle.

- At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines.

LOS E describes operations with delays in excess of 55.0 seconds up to 80.0 seconds per vehicle.

- These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios.

LOS F describes operations with delays in excess of 80.0 seconds per vehicle.

- This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios with cycle failures. Poor progression and long cycle lengths may also contribute to such delays. Often, vehicles do not pass through the intersection in one signal cycle.

For unsignalized intersections, delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line:

LOS A describes operations with very low delay, i.e., 10.0 seconds or less per vehicle

LOS B describes operations with delays in excess of 10.0 seconds up to 15.0 seconds

LOS C has delays in excess of 15.0 seconds up to 25.0 seconds

LOS D, excess of 25.0 seconds up to 5.0 seconds per vehicle

LOS E, excess of 35.0 seconds up to 50.0 seconds per vehicle

- This is considered to be the limit of acceptable delay.

LOS F describes operation with delays in excess of 50.0 seconds per vehicle,

- This LOS is considered unacceptable to most drivers. This condition exists when there are insufficient gaps of suitable size in a major vehicular traffic stream to allow side street traffic to cross safely.

2. No Build Condition

The proposed Medical Office Building (MOB) is anticipated to be completed by 2018, with minimal additional "background traffic" growth from other future developments. For analysis purposes, the 2015 existing volumes within the study area were increased using a 1% growth rate per year in accordance with NJDOT's growth factor for urban minor arterials in order to obtain the future No Build traffic volumes. These results served as the baseline volume conditions for comparison purposes in this traffic impact analysis.

Table 1 displays the range of volumes per hour during the peak periods by direction along each of the roads that were measured using ATRs.

Table 1 – Peak Hour Volumes by Direction

Roadway	Claremont Avenue		Bay Avenue		Walnut Crescent	
Direction	Eastbound	Westbound	Eastbound	Westbound	Northbound	Southbound
AM peak	350-375	420-450	365-380	620-650	115-160	100-295
PM peak	420-445	350-375	500-545	440-480	140-245	165-240
SAT peak	370-385	340-360	415-435	410-430	55-90	75-145

In the No Build scenario, the intersection of Walnut Crescent and Bay Avenue would operate as it does today, unsignalized with the stop control for the northbound approach on Walnut Crescent. Based on the analysis, the intersection would operate at overall LOS A during the weekday AM and Saturday peaks, and overall LOS D during the weekday PM peak. The stop-controlled northbound approach would operate at LOS F during the weekday AM and PM peaks, and LOS C during the Saturday peak.

3. Build Condition

A. Trip Generation

Traffic projections were based on the October 2, 2015 Traffic Impact Analysis (TIA) report (No. 24GA27957900) by Atlantic Traffic+Design. The report referenced ITE Land Use Code 720: Medical-Dental Office Building for the 60,000-square foot development expected to generate the following trips, shown in ***Table 2.***

Table 2 - Peak Hour Traffic Increments

Peak Hour	In	Out	Total
Weekday AM	113	30	143
Weekday PM	60	154	214
Saturday Midday	124	94	218

B. Traffic Assignments

Project-related traffic was assigned throughout the network consistent with the methodology in the 2015 TIA report. These trips were distributed between two locations:

1) The medical office building driveway that would be located at the intersection of Bay Avenue and Walnut Crescent, with the proposed driveway aligning to the north opposite Walnut Crescent

2) The off-site parking facility entrance that would be located at Highland Avenue and what is the existing intersection with George Street

In the proposed redevelopment George Street would be reconfigured into a cul-de-sac, with ingress and egress provided from Claremont Avenue. There would no longer be access from Highland Avenue. Approximately two-thirds of the peak hour inbound and outbound trips would be utilizing the main entrance to the site, while the remaining one-third would be utilizing the off-street parking facility. This split would represent the distribution between visitors and employees.

In addition to project-generated increments, trips associated with the valet parking would have to be reassigned throughout the network. In the existing conditions, visitors using valet parking would enter the parking lot from Walnut Crescent between Claremont Avenue and Roswell Terrace. Attendants would then drive the vehicles into the parking lot located on the west side of Highland Avenue, near George Street. In the future build condition, these trips would no longer be entering/exiting this driveway due to the relocation of the valet parking drop-off. Instead, these trips would enter the off-site parking lot and the valet parking would be contained within the off-site parking lot, eliminating the necessity for valet attendants to drive through the local roadways. This would result in a slight decrease in traffic (approximately 4, 16, and 25 vph during the AM, PM, and Saturday peaks, respectively).

C. Analysis of Build Scenario without Improvements

The future Build traffic volumes were obtained by adding the project-generated volumes to the future No Build traffic volumes. This Build condition would reflect the effects of the project-related traffic increments on the study area. The comparison between the No-Build and Build conditions reflects the impact of the additional site-generated traffic on the street network. This impact is assessed when a traffic movement experiences a significant increase in intersection delays and deteriorations in level of service.

The proposed 60,000 SF medical office building would increase peak hour traffic by 143, 214, and 218 vehicles per hour during the weekday AM, weekday PM, and Saturday peak hours, respectively. Peak hour traffic volumes along Bay Avenue would increase by approximately 10 to 55 vehicles per hour (vph) in the eastbound direction and 20 to 45 vph in the westbound direction. Along Claremont Avenue, traffic volumes

would increase by approximately 20 to 45 vph in the eastbound direction and 10 to 60 vph in the westbound direction. Peak hour traffic volumes along Walnut Crescent/Highland Avenue, south of Bay Avenue would increase by 5 to 45 vph in the northbound direction and 5 to 40 vph in the southbound direction.

For nearly all the intersection approaches in the study area, the levels of service remain relatively unchanged by the addition of project-related traffic increments. The exceptions are the northbound approach at Bay Avenue and Walnut Crescent, and the eastbound approach at Claremont Avenue and Walnut Crescent. The southbound approach at Bay Avenue and Walnut Crescent would be a new condition as the MOB driveway. ***Table 3*** shows the comparison of the No Build and Build conditions for these two locations indicating the delay in seconds and the LOS.

Table 3 - Bay Avenue and Walnut Crescent Intersection No Build vs Build

	AM		PM		SAT	
	No Build	**Build**	**No Build**	**Build**	**No Build**	**Build**
Eastbound	0.0 / A	1.1 / A	0.0 / A	0.5 / A	0.0 / A	1.1 / A
Westbound	3.5 / A	3.8 / A	2.9 / A	3.1 / A	1.6 / A	1.9 / A
Northbound	69.9 / F	225.8 / F	137.4 / F	465.7 / F	22.8 / C	54.6 / F
Southbound	-	51.0 / F	-	89.7 / F	-	29.7 / D
Overall	**8.2 / A**	**24.1 / C**	**27.8 / D**	**99.8 / F**	**2.8 / A**	**8.5 / A**

As shown in the table above, the intersection of Walnut Crescent and Bay Avenue would experience a deterioration in level of service from LOS A to LOS C in the AM peak and from LOS D to LOS F in the PM peak. Although the overall LOS would remain the same during the Saturday peak, the northbound movement would deteriorate from LOS C to LOS F. The northbound approach would experience the greatest increase in delays, ranging between approximately 33 to 330 seconds.

Table 4 - Claremont Avenue and Walnut Crescent No Build vs Build

	AM		PM		SAT	
	No Build	**Build**	**No Build**	**Build**	**No Build**	**Build**
Eastbound	0.5 / A	0.3 / A	0.3 / A	0.2 / A	0.4 / A	0.4 / A
Westbound	0.0 / A	0.0 / A	0.0 / A	0.0 / A	0.0 / A	0.0 / A
Southbound	30.5 / D	37.8 / E	28.1 / D	33.1 / E	21.5 / C	26.4 / D
Overall	**4.0 / A**	**5.6 / A**	**4.0 / A**	**4.1 / A**	**3.1 / A**	**3.6 / A**

As shown in ***Table 4***, the adjacent intersection of Claremont Avenue and Walnut Crescent would not deteriorate significantly in overall LOS but the southbound movement would deteriorate from LOS D to LOS E in the AM peak, and from LOS C to LOS D in the Saturday peak. Delays for the stop-controlled southbound movement are expected to increase by approximately 7 to 10 seconds.

D. Analysis of Proposed Traffic Improvements

To mitigate traffic impacts at the intersection of Walnut Crescent and Bay Avenue, traffic improvements are proposed as part of the conceptual development plan for the MOB, created by Bohler Engineering. These improvements would include the following:

- Installation of a semi-actuated traffic signal with a 60-second cycle.
- Restriping the eastbound approach of Claremont Avenue to have an exclusive left turn lane and a shared through-right lane (the centerline would be shifted to the north).
- Restriping the westbound approach of Bay Avenue to have an exclusive left turn lane and a shared through-right lane (the centerline would be shifted to the south).
- Restriping the northbound approach of Walnut Crescent to have an exclusive left turn lane and a shared through-right lane (the centerline would be shifted to the west).

Table 5 - Bay Avenue and Walnut Crescent Build without Signal vs Proposed Improvements

	AM		PM		SAT	
	Build Without Signal	**Proposed Improvements**	**Build Without Signal**	**Proposed Improvements**	**Build Without Signal**	**Proposed Improvements**
Eastbound	1.1 / A	4.8 / A	0.5 / A	8.0 / A	1.1 / A	4.6 / A
Westbound	3.8 / A	4.9 / A	3.1 / A	6.2 / A	1.9 / A	4.1 / A
Northbound	225.8 / F	23.4 / C	465.7 / F	21.0 / C	54.6 / F	22.7 / C
Southbound	51.0 / F	22.0 / C	89.7 / F	19.5 / B	29.7 / D	22.1 / C
Overall	**24.1 / C**	**6.9 / A**	**99.8 / F**	**10.8 / B**	**8.5 / A**	**7.2 / A**

Note: Signalized and unsignalized conditions use different LOS criteria

As shown in ***Table 5,*** the proposed improvements at Bay Avenue and Walnut Crescent would improve the overall Build condition LOS for the intersection in the AM and PM peak periods from LOS D to LOS A and LOS F to LOS B, respectively. The Saturday peak would be remain unchanged at LOS A. The greatest benefits from these improvements would be experienced at the minor approaches to the intersection: the southbound approach from the MOB driveway and the northbound approach from Walnut Crescent/Highland Avenue. Some additional minor delays would be experienced on the eastbound and westbound approaches to the intersection, but they would still operate at an LOS A.

Table 6 – Claremont Avenue and Walnut Crescent No Build vs Build with Proposed Improvements

	AM		PM		SAT	
	No Build	**Proposed Improvements**	**No Build**	**Proposed Improvements**	**No Build**	**Proposed Improvements**
Eastbound	0.5 / A	0.3/ A	0.3 / A	0.2 / A	0.4 / A	0.4/ A
Westbound	0.0 / A	0.0/ A	0.0 / A	0.0 / A	0.0 / A	0.0/ A
Southbound	30.5 / D	37.8/ E	28.1 / D	34.6/ D	21.5 / C	26.3/ D
Overall	**4.0 / A**	**5.1 / A**	**4.0 / A**	**4.3 / A**	**3.1 / A**	**3.6 / A**

As ***Table 6*** shows, this analysis of the proposed improvements indicate they would have a deleterious effect on the southbound Walnut Crescent approach. The eastbound and westbound approaches would remain generally unchanged as LOS A and the overall LOS would operate as an A. However, the southbound approach for Walnut Crescent would decline from LOS D to LOS E in the AM peak, from LOS D to LOS E in the PM peak, and from LOS C to LOS D during the Saturday peak with the development of the MOB and the associated proposed improvements.

At this intersection, this analysis differs from the results provided in Atlantic's TIS, which reported a LOS B in the AM peak, a LOS A in the PM peak, and an LOS A in the SAT peak under No-Build conditions. Atlantic's analysis indicates that all peak periods would operate at an LOS A with the proposed improvements.

The reason for the difference in LOS between the analyses of Atlantic Design and VHB is due to the configuration used at this intersection. The Atlantic Design analysis identifies the southbound Walnut Crescent as a through-right movement, as oppose to VHB's analysis which depicts it as a shared left-right movement. In the calculations for delay, there is a delay assigned to turning vehicles in terms of finding gap time in conflicting movements, unlike vehicles making the through movement. The geometry of the intersection features curvature in the roadway, and to be more conservative, VHB's analysis depicts it as a left-turn. However, since the southbound left is not exactly a 90 degree turn one would find at a standard intersection, the critical gap was reduced in order to not fully penalize the southbound movement.

E. Analysis of Additional/Alternative Improvements

As part of this traffic analysis, several alternatives to the conceptual plan's proposed improvements were analyzed to measure the potential for greater improvements to LOS at the two key intersections.

1. Additional Traffic Signal at Claremont Avenue and Walnut Crescent

In addition to the new signal at the intersection of Walnut Crescent and Bay Avenue, there are other improvements to consider which would improve the flow of traffic in the area.

The adjacent intersection of Claremont Avenue and Walnut Crescent could be signalized to improve conditions, particularly for the southbound approach of Walnut Crescent, which is currently stop-controlled. In this scenario, the southbound movement would operate at a LOS D the AM and PM peak hours as an unsignalized intersection, but improve to LOS B or C with signalization, with decreases in delay as high as 18 seconds.

Two scenarios were analyzed – one where both signals would operate as fully actuated signals (***Table 7)***, and one where both signals would be coordinated ***(Table 8).*** In general, the fully-actuated signals would provide better delays for the minor approaches (northbound-southbound), while the coordinated signals would provide slightly better delays for the major approaches (eastbound-westbound) which would be assigned longer green phases due to the higher traffic volumes on these approaches. Both scenarios would result in lower delays for the southbound approach and slightly higher delays for the major eastbound and westbound movements, but those major approaches would still operate at LOS A.

Table 7 - Claremont Avenue and Walnut Crescent Build without Additional Signal vs Build with Additional Signal (Fully Actuated)

	AM		PM		SAT	
	Proposed Improvements	**Additional Signal**	**Proposed Improvements**	**Additional Signal**	**Proposed Improvements**	**Additional Signal**
Eastbound	0.3 / A	4.7 / A	0.2 / A	5.1 / A	0.4 / A	5.0 / A
Westbound	0.0 / A	5.8 / A	0.0 / A	5.6 / A	0.0 / A	5.1 / A
Southbound	37.8 / E	24.5 / B	34.6 / D	16.6 / B	26.3 / D	15.2 / B
Overall	**5.1 / A**	**7.9 / A**	**4.3 / A**	**6.7 / A**	**3.6 / A**	**6.4 / A**

Note: Signalized and unsignalized conditions use different LOS criteria

Table 8 - Claremont Avenue and Walnut Crescent Build without Additional Signal vs Build with Additional Signal (Coordinated)

	AM		PM		SAT	
	Proposed Improvements	**Coordinated Signal**	**Proposed Improvements**	**Coordinated Signal**	**Proposed Improvements**	**Coordinated Signal**
Eastbound	0.3 / A	4.6 / A	0.2 / A	4.8 / A	0.4 / A	4.4 / A
Westbound	0.0 / A	3.6 / A	0.0 / A	4.4 / A	0.0 / A	3.4 / A
Southbound	37.8 / E	25.8 / C	34.6 / D	25.6 / C	26.3 / D	25.6 / C
Overall	**5.1 / A**	**6.9 / A**	**4.3 / A**	**7.1 / A**	**3.6 / A**	**6.7 / A**

Note: Signalized and unsignalized conditions use different LOS criteria

2. Reconfigured eastbound approach at Bay Avenue and Walnut Crescent

As previously discussed, the conceptual plan proposes the following improvements to lane configurations sin the Redevelopment Area:

- Restriping the eastbound approach of Claremont Avenue to have an exclusive left turn lane and a shared thru-right lane (the centerline would be shifted to the north).
- Restriping the westbound approach of Bay Avenue to have an exclusive left turn lane and a shared thru-right lane (the centerline would be shifted to the south).
- Restriping the northbound approach of Walnut Crescent to have an exclusive left turn lane and a shared thru-right lane (the centerline would be shifted to the west).

Based on the analysis, the eastbound left turn volume would be approximately 40 vehicles or less during the peak hours and should not warrant an exclusive left turn lane. Given the short cycle length, the 95th percentile queues for the eastbound shared left-through lane would not exceed 125 feet (5 car lengths).

Alternatively, it would be recommended to restripe the proposed eastbound approach of Claremont Avenue to have a shared left-through lane and an exclusive right turn lane.

Parking Analysis

1. Existing Conditions

There are currently approximately 1045 parking spaces for the hospital in the Redevelopment Area. They are located in a number of facilities, shown in ***Table 9*** with their designation and parking capacity.

Table 9: Existing Parking Facilities in the Redevelopment Area

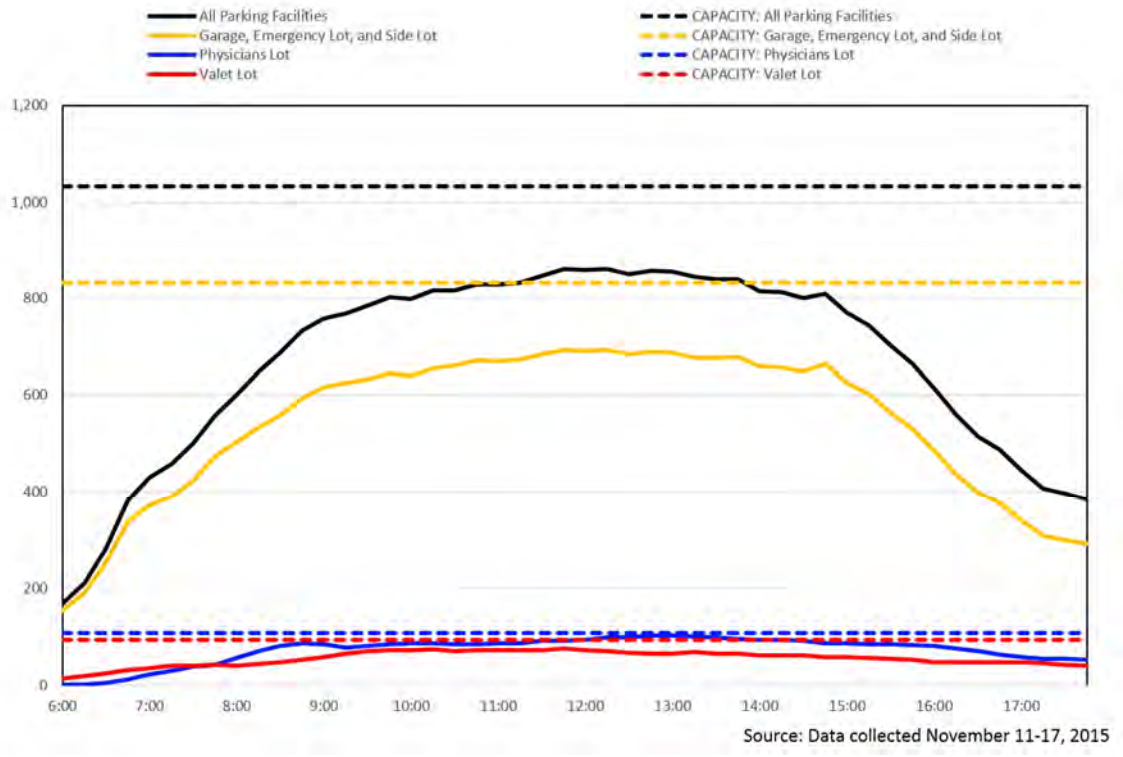
Facility	Capacity
Garage	680
Emergency Lot	39
Side Surface Lot	114
Physician Lot	107
Radiology	12
Valet	93
Total	**1045**

There are also 44 spaces in a lot on Sherman Street in Montclair. These spaces are outside the Redevelopment Area and are located more than one-quarter mile from the hospital's main entry. Additionally, utilization rates for the Radiology lot were not measured. This is a non-gated and relatively isolated lot designated strictly for Radiology and Oncology visits. Overall, the employees and visitors to the hospital are unlikely to use that lot.

Parking utilization counts were taken at approximately 7:00am and 9:00am during the weekday to create establish baseline parking demand. This information was supplemented by 12 hours of video data (6:00am to 6:00pm) to record vehicles entering and exiting the parking facilities.

The 7:00am count was conducted prior to that the hospital's administrative staff and nursing shifts to determine utilization at its approximate lowest level. This information was supplemented by 12 hours of video data (6:00am to 6:00pm) to record vehicles entering and exiting the parking facilities. **Figure 1** shows parking utilization through the 12 hour period.

Figure 1: Existing Parking Utilization



Peak utilization for all lots in the Redevelopment Area took place at the 12:15 to 12:30pm 15-minute increment. The lots were 83.35% filled during that time. This means that about 172 spaces in the area were available at the time of peak utilization. Peak utilization for the measured lots and the total parking are shown in the figure below. Because the parking garage, emergency lot, and side surface lot are managed at the same entry and exit points, these counts were combined into one location. Utilization percentages during the peak period are shown in ***Table 10***.

Table 10: Parking Utilization by Facility in the Peak Period

Facility	Percent Utilized
Garage, Emergency Lot, and Side Lot	83.19%
Physicians Lot	91.59%
Valet Lot	75.27%
All Parking Facilities	**83.35%**

Although the Physician's lot reached 91.59% at 12:15pm, parking constraints in the future are not a concern. The lot is dedicated parking for hospital physicians, and is likely managed to ensure that there is one spot for each parking access card. The peak utilization for this lot actually reached 96.26% at 1:00pm.

There is on-street parking with a two-hour time limit on streets in Montclair around the Redevelopment Area. Parking in the Hospital Zone in Glen Ridge is regulated by permit only. A weekday on-street parking count was conducted between 12:30 and 1:00pm to identify possible hospital-oriented parking during the facilities' peak period. Thirty-six (36) vehicles were counted around the Redevelopment Area. It is probable that not all of these cars were parked to avoid using the parking facilities documented in this report. These cars were located on residential side streets or next to other uses. It is also probable that at least some were parked to avoid using the designated facilities. George Street had the highest number of vehicles parked on-street (17). Allocating all of the on-street parking into the facilities would not greatly impact existing hospital parking availability. Overall, the existing parking supply meets the existing parking demand with adequate capacity to spare.

2. Future Demand

Future demand was calculated based on the development of the proposed MOB. While the last conceptual plan (Revision 2, dated January 4, 2016) for the proposed development segmented parking into multiple facilities, the Redevelopment Area served by the parking facilities consists of two principal uses: the MOB and the existing hospital. ***Table 11*** shows the capacities for these two uses in the redevelopment area. In some cases, the parking capacity proposed from the conceptual plan differs from the existing count taken by VHB (for example, the parking garage). These discrepancies are minor, representing less than a one percent difference between the two numbers. To maintaining consistency in this study, VHB has deferred to the concept plan for proposed parking figures.

Table 11: Proposed Parking Capacities

Facility	Proposed
Proposed MOB Parking	
On-site	198
Off-site	102
MOB Subtotal	**300**
Hospital Parking	
Radiology/Oncology Lot	27
ER Lot	141
Parking Garage	677
Doctor/Outpatient Lot	220
Sherman Street Lot	65
Hospital Subtotal	**1130**
TOTAL	**1430**

The plan for the approximately 60,000 square foot MOB proposes 300 parking spaces split between two lots: on-site with the development, and off-site with an entrance from Highland Avenue. While the physical location of the lots may have an effect on traffic generation in the area, they do not affect parking demand

for the proposed MOB. The Institute of Traffic Engineers (ITE) *Parking Generation Manual: 4th Edition* was used to determine parking demand for the MOB. Medical Office Buildings are categorized under Land Use Code 720. The formula for calculating weekday peak period parking demand is as follows:

$$P=3.40x - 13$$

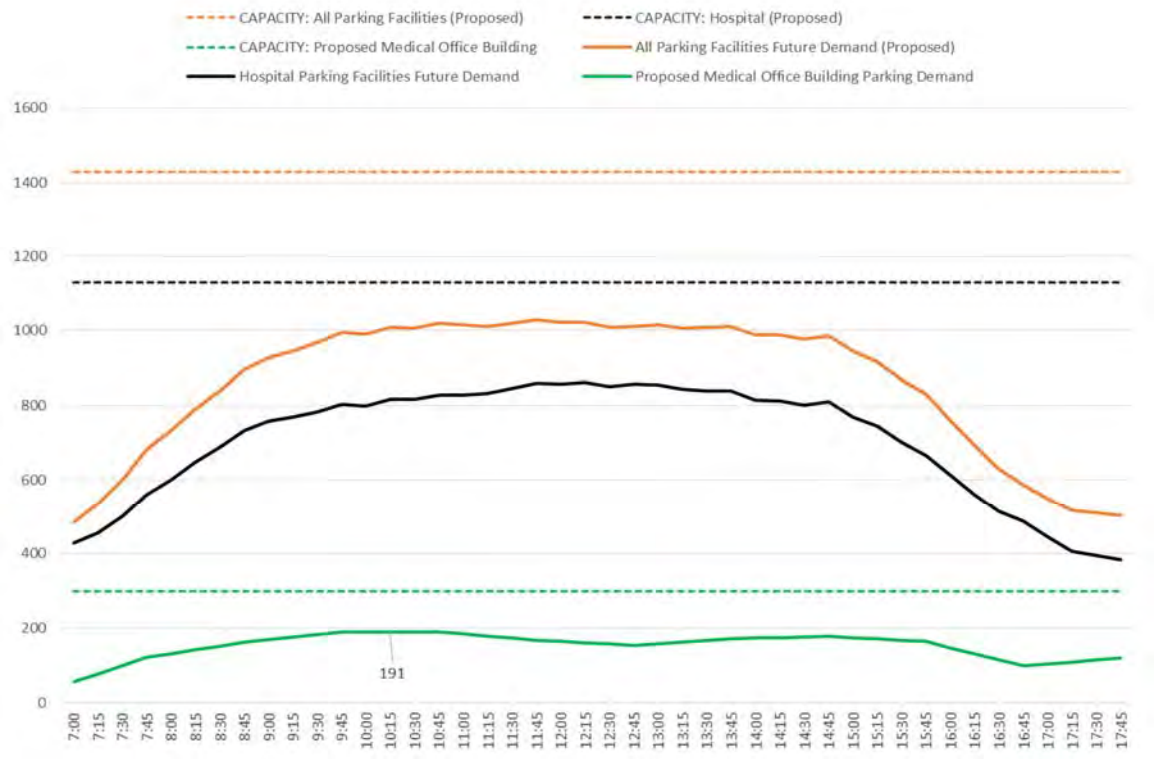
P – Parking Demand
X – 1,000 square feet Gross Floor Area

Based on the calculations, the peaking parking demand (between 10:00am and 12:00pm) for a 60,000 square foot Medical Office Building is 191

$$191 = 3.40(60) - 13$$

The hospital parking demand can be determined by the current parking utilization, assessed as part of the existing conditions. Since the uses at the hospital are not changing under the proposed MOB, there is no change expected in the current level of demand for hospital parking. Additionally, 85 new spaces are proposed through a parking reconfiguration and the construction of an additional surface lot adjacent to Highland Avenue, which add to the available capacity. ***Figure 2*** shows the future proposed parking capacity and demand for the MOB, the hospital, and both uses combined.

Figure 2: Future Proposed Parking Demand and Capacity



As ***Figure 2*** shows, there is adequate parking capacity to meet existing and future demand for the proposed MOB development and current hospital operations.

The current proposed parking capacities would also satisfy a reasonable increase in future demand. There is a peak parking demand of 861 spaces under existing conditions. An increase of that peak demand by 30% would result in a demand for 1,119 spaces at the peak, which would still be slightly less than the parking capacity currently proposed by the hospital.

The proposed MOB site provides even more capacity for future growth. While this demand is based on other parking studies of a similar use, the 300 proposed MOB spaces would be able to accommodate a 50% increase in peak parking demand.

3. Conclusions

A. Traffic

Based on the results of the analysis, the proposed redevelopment would primarily affect two intersections within the Redevelopment Area: Bay Avenue/Walnut Crescent and Claremont Avenue/Walnut Crescent. The improvements provided in the conceptual plan do provide some benefits to delay associated with the proposed MOB, but would also have some negative effects on delay – primarily on the southbound approach at the Claremont Avenue/Walnut Crescent intersection. The following changes to the proposed conceptual plan are recommended:

1) Installation of a second fully-actuated signalized intersection at Claremont Avenue and Walnut Crescent. This would provide benefits to vehicular delay at the southbound approach from Walnut Crescent, while adding minimal additional delay associated with eastbound and westbound traffic.

2) Reconfiguration of lanes of the eastbound approach at the Bay Avenue/Walnut Crescent intersection from an exclusive left turn lane with a right-through lane to a left-through lane with an exclusive right turn lane. The volumes from the west into the proposed MOB site do not warrant a dedicated left turn lane, while the recommended lane configuration would better balance traffic volumes at the intersection.

B. Parking

Currently, parking demand for Parking demand at Mountainside Hospital is adequately met by the existing parking supply. This parking supply also includes 93 spaces for valet parking at the proposed MOB site, which would be removed for the MOB development. The conceptual parking plan for the redevelopment area proposes a net gain of 85 spaces, bringing the total parking capacity for the hospital to 1130. This would meet existing peak parking demand of 861 spaces and future growth of up to 30%.

The proposed MOB site proposes 300 parking spaces, equivalent to 5 spaces per 1,000 square feet gross floor area. The proposed supply of spaces provide enough capacity for the projected peak period demand of 191 spaces based on the formula derived from the ITE's Parking Generation Manual: 4th Edition. This capacity is able to meet an increase in future demand of up to 50%.