



TOWNSHIP OF NUTLEY ON3 CAMPUS DEVELOPMENT REVIEW

Traffic Impact Study

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Lou Luglio, PE
NJ P.E. License #GE03940700

30 Montgomery Street, Suite 1340
Jersey City, NJ 07302
phone: (973) 639-9629

**Sam
Schwartz**

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EXECUTIVE SUMMARY

Sam Schwartz Consulting, L.L.C. (*Sam Schwartz*) has prepared this traffic impact study to evaluate the potential impacts associated with the proposed redevelopment at the former Hoffman-La Roche (Roche) site in the Township of Nutley and the City of Clifton, New Jersey. At the proposed project site, Hoffman-La Roche previously operated a pharmaceutical research/development facility and corporate office campus. Prior to ceased operations in 2015, the Roche campus was at full operational capacity and included administrative office space, production facilities, research labs, and maintenance/utility buildings.

The proposed project would be developed by Prism Capital Partners LLC (Prism) consisting in part of the redevelopment and reoccupation of existing buildings associated with Roche as well as the construction of new buildings. The Prism redevelopment (On 3) would consist of a medical school, general office space, research and development facilities, residential buildings, some retail amenities, and a hotel. As of October 2019, the medical school, general office, and research and development land use facilities are already in-place/reoccupied or under construction.

This study evaluates the potential traffic impacts to the Township of Nutley and the City of Clifton under full build out conditions.

Sam Schwartz understands that future development plans may not be currently known, however for a large redevelopment site like this, even an estimate of the potential new vehicle trips is extremely important to inform local officials and public of the potential traffic impacts and improvements that may be required. A piecemeal approach to traffic and transportation planning without understanding potential full build out conditions is ill advised. A build year of 2025 is estimated for full property redevelopment.

The estimates presented in this report are derived from the “Future Development” statistics provided on the developer’s website (www.on3nj.com, accessed December 18, 2019). Again, the goal of this assessment is to assist local leaders in Nutley and Clifton (and NJDOT indirectly) to make informed decisions based on the information currently available.



Image source: <https://on3nj.com/vision/> accessed on December 18, 2019

If Roche was still operational in lieu of the proposed project, the site would have generated 2,174 and 2,367 vehicle trips during weekday AM and PM peak hours, respectively. These trips are based on Roche full build out data provided by traffic reports submitted on behalf of Prism. The full-build conditions, the build year is estimated by *Sam Schwartz* to be 2025, proposed for the development by Prism would generate 2,717 and 3,167 vehicle trips during weekday AM and PM peak hours, respectively. In summary, the proposed project would generate additional 543 and 800 vehicle trips during weekday AM and PM peak hours, respectively, compared to Roche as shown in table below.

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	In	Out	Total	In	Out	Total
Roche Total Vehicle Trip Estimates	1,752	422	2,174	473	1,894	2,367
HLRON 3 Redevelopment Total Vehicle Trip Estimates	2,018	700	2,717	855	2,312	3,167
Total Increase from Roche	266	278	543	382	418	800
% Increase from Roche	15%	66%	25%	81%	22%	34%

Based on the developed traffic models, the additional vehicle trips generated by the Prism development would impact traffic operations in Nutley, Clifton, and the access to and from NJ 3 in both eastbound and westbound directions. In the 2025 Build Condition, during the AM Peak Hour, there would be eight (8) intersections with a combined 12 movements/lane groups which would operate with poor service levels and extended delays. During the PM Peak Hour, twelve (12) intersections would have a combined 24 movements/lane groups which would operate with poor service levels and extended delays.

Sam Schwartz reviewed mitigation measures proposed by others and developed other improvement concepts for locations and lane groups which would have poor service levels. With various mitigation measures, during AM Peak Hour, based on 2025 Build Conditions, three (3) study intersections would have a combined five (5) movements/lane groups which would continue to operate with poor service levels and extended delays. During PM Peak Hour, based on 2025 Build Conditions with recommended improvements, six (6)) study area intersections would be 14 movements/lane groups would operate with poor service levels and extended delays.

Sam Schwartz recommends further analysis to verify sufficient space/Right Of Way exists to implement some of the mitigation measures proposed by others. Additionally, based on the provided plans, it is not clear if sidewalks will be provided along the Darling Avenue/Bloomfield Avenue corridor.

Mitigation measures proposed by others also included two roundabout locations for Kingsland Avenue at Metro Boulevard and at Ideation Way. To evaluate the feasibility of the proposed roundabouts, design level plans which detail the number of lanes and geometric elements such as approach and deflection angles would be needed. As design level plans have not been provided, *Sam Schwartz* was not able to assess the feasibility of a roundabout in the two locations.

FIGURE 1 depicts the comparison of proposed improvements proposed by other previous studies, as well as from *Sam Schwartz*.

FIGURE 1: Proposed Improvements Comparison



INTRODUCTION

Sam Schwartz Consulting, L.L.C. (*Sam Schwartz*) has prepared this traffic impact study to evaluate the potential impacts associated with the proposed redevelopment at the former Hoffman-La Roche (Roche) site in the Township of Nutley and the City of Clifton, New Jersey. At the proposed project site, Hoffman-La Roche previously operated a pharmaceutical research/development facility and corporate office campus. Prior to ceased operations in 2015, the Roche campus was at full operational capacity and included administrative office space, production facilities, research labs, and maintenance/utility buildings.

The proposed project would be developed by Prism Capital Partners LLC (Prism) consisting in part of the redevelopment and reoccupation of existing buildings associated with Roche as well as the construction of new buildings. The Prism redevelopment (On 3) would consist of a medical school, general office space, research and development facilities, residential buildings, some retail amenities, and a hotel. As of October 2019, the medical school, general office, and research and development land use facilities are already in-place/reoccupied or under construction.

This study evaluates the traffic impacts to the Township of Nutley and the City of Clifton under full build out conditions. *Sam Schwartz* understands that future development plans may not be currently known. The estimates presented in this report are derived from the “Future Development” statistics provided on the developer’s website (www.on3nj.com, accessed December 18, 2019). The goal of this assessment is to assist local leaders in Nutley and Clifton to make informed decisions based on the information currently available.

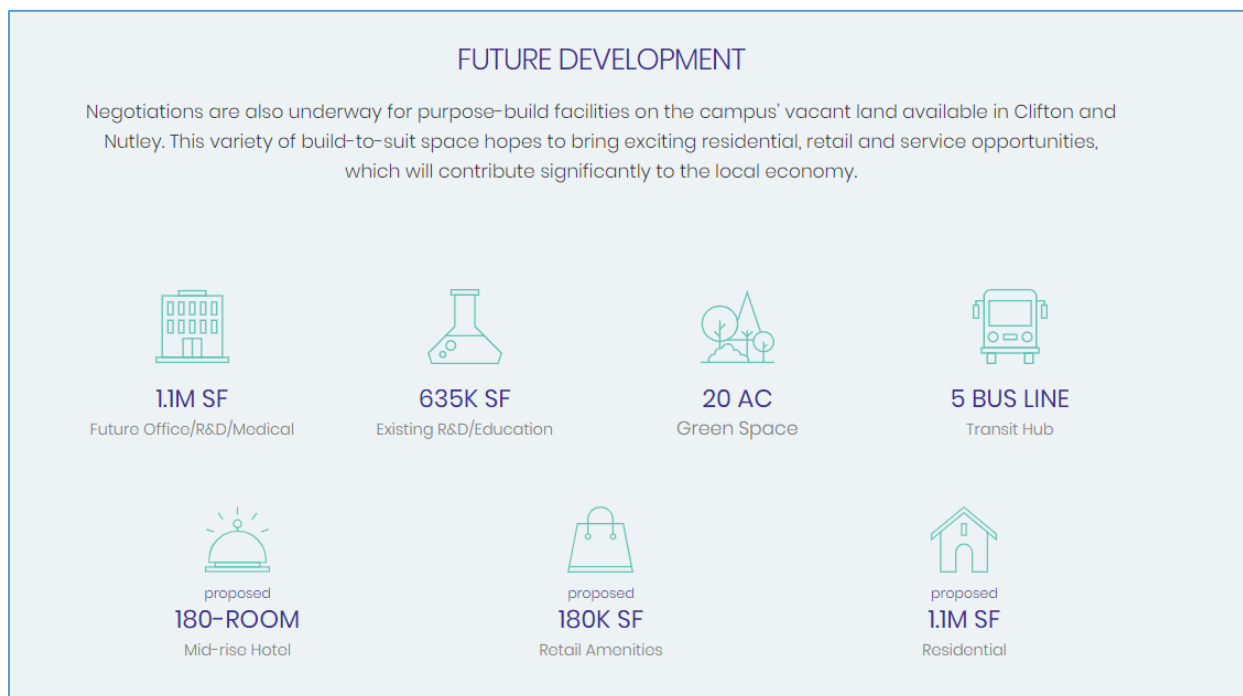


Image source: <https://on3nj.com/vision/> accessed on December 18, 2019

2019 EXISTING CONDITIONS

Proposed Project Location Description

The proposed project is located within two municipalities and two counties. The City of Clifton, Passaic County, to the north, and the Township of Nutley, Essex County to the north, in New Jersey The proposed project site is bounded by N.J.S.H. Route 3 East to the north, and Kingsland Street to the south. **FIGURE 2** depicts the proposed project location as well as study area intersections and the surrounding roadway network.

FIGURE 2: Proposed Project Location and Study Area Map



Roadway Network

The following major roadways are included within the study area:

Route 3

Route 3 is a New Jersey State Highway that runs east-west with three lanes in each direction. From eastbound Route 3, the proposed project site can be accessed via three right-in/right-out driveways. The posted speed limit is 55 miles per hour.

Kingsland Street (CR 644/Route 7)

Kingsland Street (CR 644) runs east-west with one lane in each direction and turn lanes at some intersections. The roadway enters New Jersey Department of Transportation (NJDOT) jurisdiction as Route 7 to the east of Cathedral Avenue. On-street parking is allowed, with some restrictions, along certain sections of Kingsland Street. The proposed project site can be accessed from the intersections of Bloomfield Avenue/Metro Boulevard along Kingsland Street. The posted speed limit is 25 miles per hour.

W. Passaic Avenue (CR 622)

W. Passaic Street runs east-west with one lane in each direction and turn lanes at some intersections. On-street parking is allowed with some restrictions along some sections of W. Passaic Avenue. The posted speed limit is 25 miles per hour.

Darling Avenue/Bloomfield Avenue (CR 622)

Darling Avenue runs north-south with one lane in each direction and turn lanes at some intersections. The roadway becomes Bloomfield Avenue and enters Passaic County jurisdiction to the north of Sylvan Road. Eastbound or westbound Route 3 can be accessed via ramps on Bloomfield Avenue. Generally, on-street parking is not allowed on Bloomfield Avenue. The posted speed limit is 25 miles per hour.

Cathedral Avenue (CR 644S/Route 7)

Cathedral Avenue runs north-south with one lane in each direction. Eastbound or westbound Route 3 can be accessed via ramps on Cathedral Avenue/Passaic Avenue. Generally, on-street parking is not allowed on Cathedral Avenue. The posted speed limit is 25 miles per hour within Township of Nutley and 35 miles per hour within City of Clifton.

Passaic Avenue/Main Avenue (CR 601)

Passaic Avenue runs north-south with one lane in each direction and turn lanes at some intersections. The roadway becomes Main Avenue and enters Passaic County jurisdiction to the north of Robert Street. On-street parking is allowed with some restrictions along some sections of Passaic Avenue. Eastbound or westbound Route 3 can be accessed via ramps on Passaic Avenue/Main Avenue. The posted speed limit is 25 miles per hour.

Pedestrian and Bicycle Facilities

In addition to crosswalks at study intersections, sidewalks are provided on both sides of Kingsland Street. Pedestrians are prohibited on Route 3. Dedicated bicycle facilities are limited in the study area.

Based on site observations, it appears that the pedestrian ramps are in compliant with NJDOT standards at the existing site access intersections of Kingsland Street (CR 622) and Bloomfield Avenue /Metro Boulevard, and Kingsland Street (CR 622) and Ideation Way.

Transit Facilities

There are NJ Transit bus stops located near the proposed project site as follows:

North/Immediately adjacent to proposed project site:

- Nearby the intersection of Metro Blvd and EB Route 3, NJ Transit bus routes 191/192/195 to/from New York City

South/Immediately adjacent to proposed project site:

- Nearby the intersection of Metro Blvd and Kingsland Street, NJ Transit bus route 13 to/from Nutley and Clifton; and NJ Transit bus route 192/199 to/from New York City

Data Collection

The data collection program for this study, included intersection turning movement counts, crosswalk pedestrians counts at eight signalized intersections; seven unsignalized intersections; and installation of three automatic traffic recorders (ATRs) in September and October of 2019. The counts were conducted from 7:00 AM to 9:00 AM and 4:00 PM to 7:00 PM. Vehicle volumes were collected in 15-minute intervals and classified as passenger cars and heavy vehicles. Pedestrian volumes in crosswalks were also collected during these periods. During the count periods, field observations were performed noting conditions that affected traffic operations (e.g., lane utilization, spillback, lane blockages, presence of Traffic Enforcement Agents [TEAs], parking maneuvers, etc.). A field inventory of the analyzed intersections was performed to identify parking regulations, pavement markings, and geometry to be used in the capacity analyses.

The following intersections are analyzed in this study:

1. Bloomfield Avenue (CR 622) and Route 3 westbound entry/exit ramps
2. Bloomfield Avenue (CR 622) and Route 3 eastbound entry/exit ramps
3. Route 3 and Metro Boulevard
4. Darling Avenue (CR622) and Kingsland Street/Passaic Avenue (CR644)
5. Kingsland Street (CR 622) and Bloomfield Avenue /Metro Boulevard
6. Kingsland Street (CR 622) and Ideation Way
7. Kingsland Street (CR 622) and Cathedral Avenue (Route 7)
8. Kingsland Street (Route 7) and Franklin Avenue (CR 645)
9. Kingsland Street (Route 7) and Main Avenue
10. Passaic Avenue (Route 7) and Route 3 westbound entry/exit ramps
11. Passaic Avenue (Route 7) and Kensington Avenue and Route 3 eastbound entry/exit ramps
12. Bloomfield Avenue and High Street (CR 650)
13. Main Avenue and Route 3 westbound entry/exit ramps
14. Main Avenue and Route 3 eastbound entry/exit ramps

15. Ward Avenue and Kensington Avenue

Capacity Analysis Procedures

The operations of the study area intersections were analyzed using the traffic analysis software Synchro (Version 10) and level of service (LOS) criteria from the Highway Capacity Manual (HCM). A description of level of service methodologies is provided below.

Signalized Intersections

The level of service (LOS) for a signalized intersection is based on the average stopped delay per vehicle for the various lane groups (grouping of movements in one or more travel lanes), the approaches, and the overall intersections. The levels of service are defined as shown in **Table 1**.

TABLE 1: Level of Service Criteria for Signalized Intersections (HCM, 6th Ed)

Level-of-Service (LOS)	Average Delay
A	≤ 10.0 seconds
B	> 10.0 and ≤ 20.0 seconds
C	> 20.0 and ≤ 35.0 seconds
D	> 35.0 and ≤ 55.0 seconds
E	> 55.0 and ≤ 80.0 seconds
F	> 80.0 seconds
Source: Transportation Research Board. <i>Highway Capacity Manual</i> , 2000.	

Although the HCM methodology calculates a volume-to-capacity (v/c) ratio, there is no strict relationship between v/c ratios and LOS as defined in the HCM. A high v/c ratio indicates substantial traffic passing through an intersection, but a high v/c ratio combined with low average delay represents the most efficient condition in terms of traffic engineering standards, where an approach or the entire intersection processes traffic close to its theoretical maximum with minimal delay. However, very high v/c ratios—especially those approaching or greater than 1.0—are often correlated with a deteriorated LOS. Other important variables affecting delay include cycle length, progression, and green time. LOS A and B indicate operating conditions with minimal delay. At LOS C, the number of vehicles stopping is higher, but congestion is still light. LOS D describes conditions where congestion levels are more noticeable and individual cycle failures (a conditions where motorists may have to wait for more than one green phase to clear the intersection) can occur. Conditions at LOS E and F reflect poor service levels and frequent cycle failures. The HCM methodology provides for a summary of the intersection's operating conditions by identifying the two critical movements (the worst case from each roadway) and calculating critical v/c ratio, delay, and LOS.

Unsignalized Intersections

For unsignalized intersections, the total delay is defined as the total elapsed time from which a vehicle stops at the end of the queue until the vehicle departs from the stop line. This includes the time required for the vehicle to travel from the last-in-queue to the first-in-queue position. The

average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. The LOS criteria for unsignalized intersections are defined in **Table 2**.

TABLE 2: Level of Service Criteria for Unsignalized Intersections (HCM, 6th Ed)

Level-of-Service (LOS)	Average Control Delay
A	≤ 10.0 seconds
B	> 10.0 and ≤ 15.0 seconds
C	> 15.0 and ≤ 25.0 seconds
D	> 25.0 and ≤ 35.0 seconds
E	> 35.0 and ≤ 50.0 seconds
F	> 50.0 seconds
Source: Transportation Research Board. <i>Highway Capacity Manual</i> , 2000.	

2019 Existing Conditions Traffic Analysis

The peak hours used for analysis were selected to correspond with the hour that has the highest amount of traffic at all 15 study area intersections based on current traffic conditions. The peak hours analyzed are as follows:

- Weekday Morning (AM) Peak Hour: 7:45 AM to 8:45 AM
- Weekday Evening (PM) Peak Hour: 5:30 PM to 6:30 PM

2019 Existing Conditions traffic volumes for the study intersections during the weekday AM and PM peak hours can be found in **APPENDIX**. The Existing Conditions LOS, delay, v/c ratio, and 95th percentile queue lengths for the study area intersections can be found in **APPENDIX**. The Synchro traffic analysis reports for the Existing Conditions can be found in **APPENDIX**.

Based on the analysis results, during weekday AM peak hour, all movements/lane groups would operate better than LOS F; during, weekday PM peak hour, the following movements/lane-groups would operate at LOS F:

Intersection 1: Bloomfield Avenue (CR 622) and Route 3 westbound entry/exit ramps
 Weekday PM peak hour

- The westbound left-turn movement

Intersection 2: Bloomfield Avenue (CR 622) and Route 3 eastbound entry/exit ramps
 Weekday PM peak hour

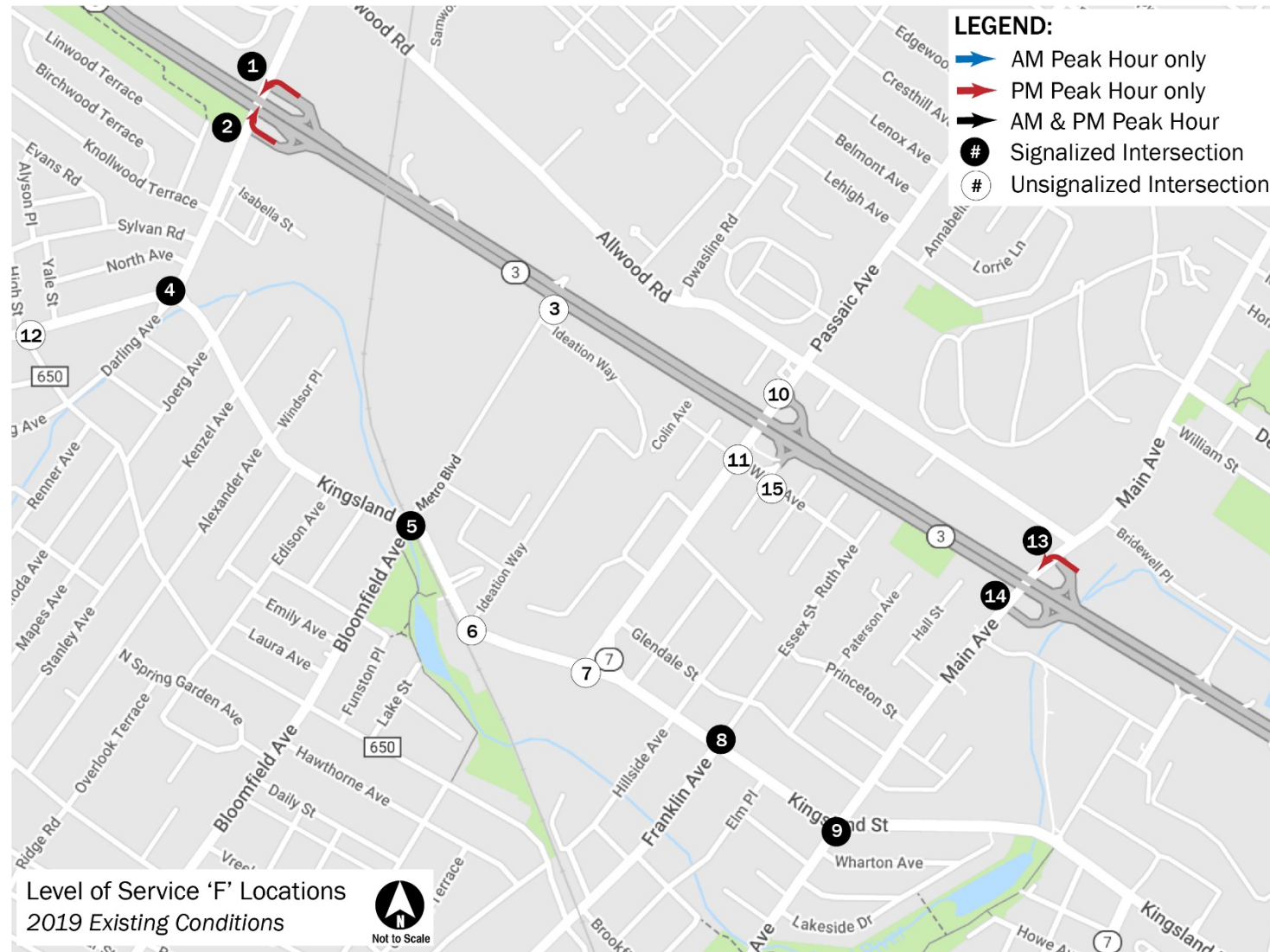
- The westbound right-turn movement

Intersection 13: Main Avenue and Route 3 westbound entry/exit ramps
 Weekday PM peak hour

- The westbound left-turn movement

Figure 3 depicts the lane groups/movements that are operating at LOS F in 2019 Existing Conditions.

FIGURE 3: Lane Groups/Movements Operating at Level of Service F (2019 Existing Conditions)



2025 NO-BUILD CONDITIONS

The 2025 No-Build Conditions (No-Build) serves as the baseline for which traffic impacts (if any) due to the proposed project are identified. The No-Build represents the traffic volumes in the future horizon year if the proposed development were not to be constructed and considers general background traffic growth as well as other nearby redevelopments. *Sam Schwartz* estimates full build out of the project to be in 2025. Therefore, the future No-Build horizon year represents future 2025 traffic conditions without the proposed development.

No-Build Traffic Volumes

An annual background growth rate of 1.5% percent was applied over a period of six years to the Build Conditions year of 2025. This growth rate is in accordance with the latest published NJDOT Access Permit Annual Background Growth Rate Table for Passaic and Essex Counties (April 2019 – April 2021). The 1.50% background growth rate is the average of annual growth rate for Minor Arterial and Collector for Passaic and Essex Counties. Since the existing driveway traffic volumes would not be affected by trends in background traffic, the background growth rate was applied only to the non-driveway, background traffic in the 2019 existing traffic volume network.

At the proposed project site, Hoffman-La Roche¹ previously operated a pharmaceutical research/development center and corporate offices. Roche ceased operation in 2015. When Roche campus was at full operational capacity were the following land uses:

- Administrative office space: 1,026,906 SF gross area
- Production facilities: 994,907 SF gross area
- Research labs: 1,345,180 SF gross area
- Maintenance and utility buildings: 162,877 SF gross area

Trip generation projections for the previous Roche development were prepared utilizing the ITE Trip Generation Manual, 10th Edition.

- Administrative office space: General Office Building (ITE Land Use 710)
- R&D Center: Research and Development Center (ITE Land Use 760)
- Production facilities: Manufacturing (ITE Land Use 140)

Trip generation credit was not calculated for the maintenance and utility buildings as the number of trips would be minimal.

Table 3 provides the ITE trip generation associated with the previous Roche development.

¹ The Hoffman-La Roche campus development and trip generations detail were sourced from Langan and Stonefield reports.

TABLE 3: Hoffman-La Roche Generated Trips

	Unit	Size	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
			In	Out	Total	In	Out	Total
General Office (ITE Land Use 710)	SF	1,026,906	853	139	992	167	874	1,041
Manufacturing (ITE Land Use 140)	SF	994,907	475	142	617	207	460	667
R&D Center (ITE Land Use 760)	SF	1,345,180	424	141	565	99	560	659
Utility (ITE Land Use 170)	SF	162,877	0	0	0	0	0	0
Total			1,752	422	2,174	473	1,894	2,367

To develop, conservative estimates of No-Build traffic volumes, it is assumed that Roche would be still operational in absence of proposed project up to the build year of 2025. It is also assumed that no geometric and operational modifications were implemented between the 2019 Existing Conditions to 2025 No-Build Conditions.

Trips generated by the Roche No-Build development were assigned to the study network and added to the baseline 2019 traffic volumes to estimate the 2025 No-Build Conditions traffic volume network.

To determine, how people would access the study area network, StreetLight² data sources from 2019 were used. StreetLight Data sources location-based services data from third-party smartphone apps with location components (about 300 in all), delivering a nearly real-time look at about 20 percent of a region's traffic. Based on StreetLight data, vehicle trip originations and destinations for general office land uses were developed.

The trips associated with Roche was assigned to study area network using 2019 StreetLight travel patterns which look at the wide-area vehicle trip originations and destinations for general office land use in vicinity of proposed development.

The details for No-Build traffic volumes for Roche as well as the background growth for peak hours are shown in the **APPENDIX**.

2025 No-Build Conditions traffic volumes for the study intersections during the weekday AM and PM peak hours can be found in **APPENDIX**.

No-Build Traffic Analysis

The 2025 No-Build Conditions LOS, delay, v/c ratio, and 95th percentile queue lengths for the study area intersections can be found in **APPENDIX**.

The Synchro traffic analysis for the 2025 No-Build Conditions can be found in **APPENDIX**.

² <https://www.streetlightdata.com/>

Based on the analysis results, not surprisingly and similar to the 2019 Existing Conditions, the following approaches/lane-groups would continue to operate at LOS F in 2025 No-Build Conditions:

Intersection 1: Bloomfield Avenue (CR 622) and Route 3 westbound entry/exit ramps

Weekday PM peak hour

- The westbound left-turn movement during

Intersection 2: Bloomfield Avenue (CR 622) and Route 3 eastbound entry/exit ramps

Weekday PM peak hour

- The westbound right-turn movement

Intersection 13: Main Avenue and Route 3 westbound entry/exit ramps

Weekday PM peak hour

- The westbound left-turn movement

Additionally, based on the analysis results following movements/lane-groups would deteriorate from LOS E or better to LOS F, between 2019 Existing Conditions and 2025 No-Build Conditions:

Intersection 1: Bloomfield Avenue (CR 622) and Route 3 westbound entry/exit ramps

Weekday AM Peak Hour

- The westbound left-turn movement
- The southbound left-through shared lane group

Intersection 2: Bloomfield Avenue (CR 622) and Route 3 eastbound entry/exit ramps

Weekday AM Peak Hour

- The northbound through-right shared lane group
- The southbound left turn movement

Weekday PM Peak Hour

- The northbound through-right shared lane group
- The southbound left turn movement

Intersection 4: Darling Avenue (CR622) and Kingsland Street/Passaic Avenue (CR644)

Weekday PM Peak Hour

- The eastbound left-turn movement

Intersection 5: Kingsland Street (CR 622) and Bloomfield Avenue /Metro Boulevard

Weekday AM Peak Hour

- The eastbound left-turn movement
- The westbound left-turn movement
- The westbound through-right shared lane group
- The northbound left-through-right shared lane group

Weekday PM Peak Hour

- The westbound left-turn movement

- The westbound through-right shared lane group
- The northbound left-through-right shared lane group
- The southbound left-through shared lane group

Intersection 6: Kingsland Street (CR 622) and Ideation Way
Weekday AM Peak Hour

- The southbound left-turn movement

Weekday PM Peak Hour

- The southbound left-turn movement
- The southbound right-turn movement

Intersection 7: Kingsland Street (CR 622) and Cathedral Avenue (Route 7)
Weekday AM Peak Hour

- The southbound left-right shared lane group

Weekday PM Peak Hour

- The southbound left-right shared lane group

Intersection 8: Kingsland Street (Route 7) and Franklin Avenue (CR 645)
Weekday PM Peak Hour

- The eastbound left-through-right shared lane group
- The westbound left-through-right shared lane group

Intersection 9: Kingsland Street (Route 7) and Main Avenue
Weekday AM Peak Hour

- The northbound left-right shared lane group

Weekday PM Peak Hour

- The eastbound left-turn movement
- The westbound left-through-right shared lane group
- The northbound left-through-right shared lane group
- The southbound left-through-right shared lane group

Intersection 10: Passaic Avenue (Route 7) and Route 3 westbound entry/exit ramps
Weekday AM Peak Hour

- The westbound left-turn movement

Weekday PM Peak Hour

- The westbound left-turn movement

Intersection 11: Ward Avenue and Route 3 eastbound entry/exit ramps
Weekday PM Peak Hour

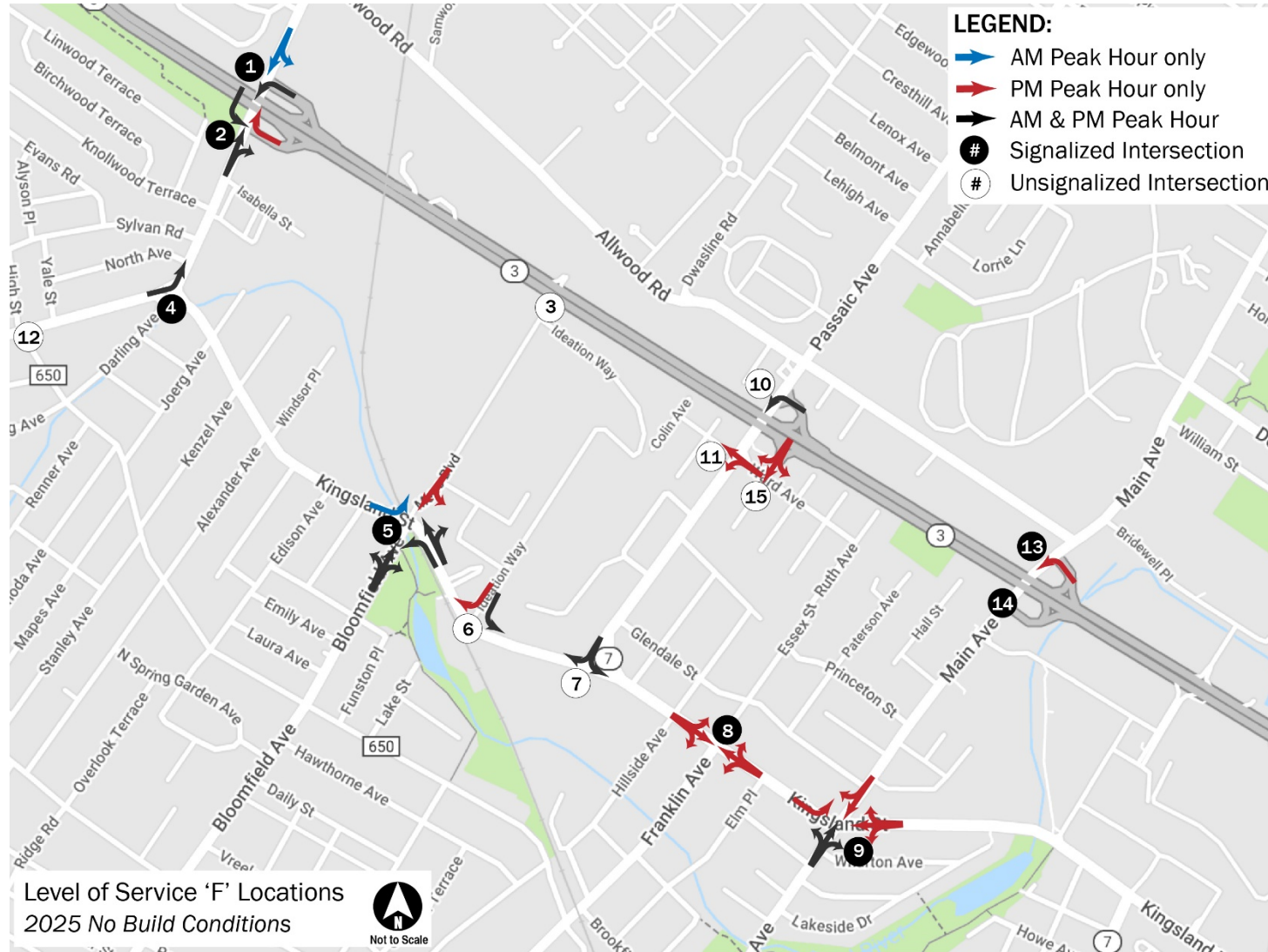
- The westbound left-through shared lane group

Intersection 15: Ward Avenue and Kensington Avenue
Weekday PM Peak Hour

- The southbound left-through-right shared lane group

Figure 4 depicts the lane groups/movements that are operating at LOS F in 2025 No Build Conditions.

FIGURE 4: Lane Groups/Movements Operating at Level of Service F (2025 No-Build Conditions)



REVIEW OF OTHER TRAFFIC IMPACT STUDIES

Sam Schwartz has reviewed following documents prepared by other consultants.

1. Traffic Impact Study for Seton-Hall Hackensack Meridian School of Medicine (HUMC) in township of Nutley and city of Clifton prepared by Langan Engineering & Environmental Services, Inc. (Langan) dated April 20, 2017.
 - Proposed 1,100 students at maximum enrollment and a 400-employee clinical research center.

This use is already approved, and relevant buildings are already in-place as of October 2019.

2. Traffic Impact Study for Quest Diagnostics Incorporated in city of Clifton prepared by Langan dated March 23, 2018.
 - A new 250,000-square-foot research and development facility will be constructed on the westerly portion of the proposed development and will be operated by Quest Diagnostics.
 - As part of study following roadway improvements proposed:
 - Construct minor widening along portions of Bloomfield Avenue between Isabella Street and the Route 3 eastbound ramp terminal to provide a left turn lane into Isabella Street and to provide a through lane and a through/right turn lane on the northbound approach to the ramp traffic signal.
 - Restripe the intersection of Bloomfield Avenue (CR 622) and NJ Route 3 Eastbound/Westbound Ramps to formalize the current traffic utilization of the road section as four lanes. The southbound approach to the Route 3 westbound ramp will provide a left/ through lane and a through lane; the northbound approach would provide a through lane and a through/right turn lane; the southbound approach to the Route 3 eastbound ramps would provide a left turn lane and a through lane. It is noted that the intersection is limited to restriping rather than widening due to the existing NJ Route 3 overpass. Restripe the receiving lanes north of the Route 3 westbound ramps to provide two lanes similar to the southbound side of Bloomfield Avenue. Adjust the traffic signal design and operations to accommodate the restriping and optimize the traffic signal timing.
 - Install a traffic signal at the intersection of Bloomfield Avenue (CR 622) and Isabella Street to provide more efficient operations. Coordinate the traffic signal with the Route 3 ramp traffic signals
 - Widen the Private Driveway approach to provide a left turn lane and a shared through/right turn lane.

This project is already approved. The relevant buildings are under construction as of October 2019 however roadway improvements are not-in-place as of October 2019.

Sam Schwartz reviewed the proposed mitigation measures for Bloomfield Avenue between Isabella Street and the Route 3 eastbound ramp and recommends further analysis to verify sufficient space exists to implement some of the mitigation measures proposed by others. Additionally, based on the provided plans, it is not clear if sidewalks will be provided along the Darling Avenue/Bloomfield Avenue corridor. Sidewalks should be provided along this section of Bloomfield Avenue.

3. Traffic Impact Letter Report for proposed roundabout at Kingsland and Ideation Way for the Township of Nutley prepared by Stonefield Engineering & Design (Stonefield) dated revised on April 22, 2019 (original dated June 9, 2018)
 - Stonefield has examined the potential traffic impacts of the proposed three (3)-leg roundabout at the currently stop-controlled intersection of Kingsland Street and Ideation Way in the Township of Nutley, New Jersey. The following planned developments assumed for future developments,
 - 1,100 students at maximum enrollment and a 400-employee clinical research center.
 - 250,000-square-foot research and development facility on the westerly portion of the proposed development and will be operated by Quest Diagnostics.
 - Proposed reoccupation of 100 & 200 Metro Boulevard, 111 Ideation Way, the construction of an associated parking structure for 100 & 200 Metro Boulevard,
 - The signal timings shift and changes to cycle lengths were proposed mitigations following intersections:
 - Intersection of Kingsland Street/West Passaic Avenue and Darling Avenue: Signal timing shifts
 - Intersection of Kingsland Street and Bloomfield Avenue/Metro Boulevard
 - Intersection of Kingsland Street and Passaic Avenue
 - A traffic signal is warranted at the intersection of Kingsland Street and Cathedral Avenue relates to any potential redevelopment on Block 2101, Lot 1 and Block 2000, Lots 1 through 5 (existing vacant site south of Kingsland Street with close gate across Cathedral Avenue). As such, a conceptual development plan of 190 Assisted Living units and 210 Multi-Family residential units was utilized in the requested signal warrant analysis.
 - As part of study following roadway improvements proposed:
 - Signal retimings were recommended at the intersections of Kingsland Street/West Passaic Avenue with Darling Avenue, Kingsland Street with Bloomfield Avenue, and Kingsland Street with Passaic Avenue

No development approvals have been requested. The proposed roundabout or recommended mitigations or signalization of the intersection of Kingsland Street and Cathedral Avenue are not in-place as of October 2019.

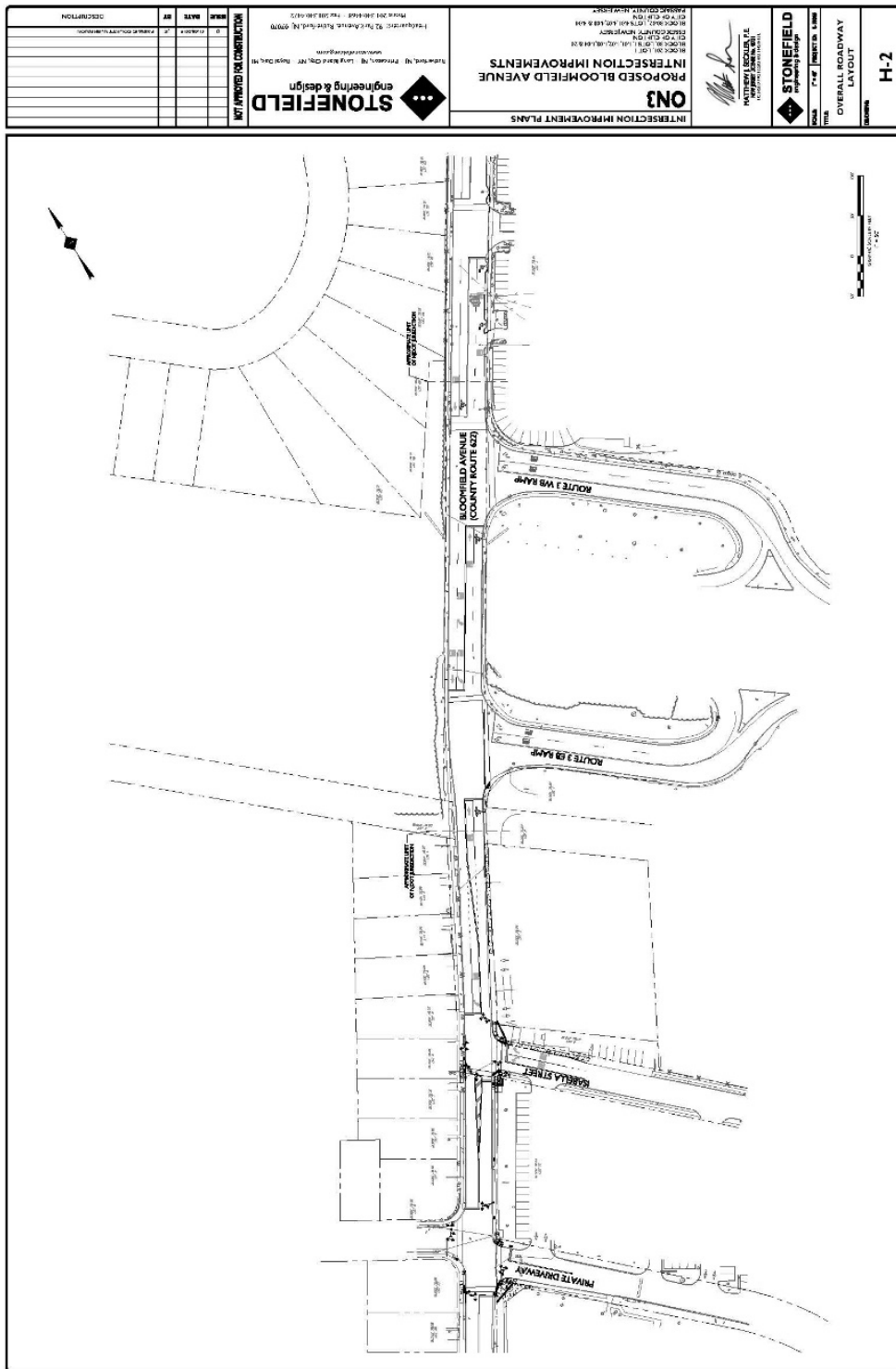
Sam Schwartz was unable to evaluate the feasibility of the roundabout proposed for Kingsland Street and Ideation Way. As design level plans have not been provided, *Sam Schwartz* was not able to assess the feasibility of a roundabout in this location. Design level plans provide information such as the number of lanes and geometric elements, like approach and deflection angles, are needed to perform the evaluation.

4. Traffic Impact Letter Report for proposed school of medicine garage for city of Clifton prepared by (Stonefield) dated May 24, 2019.
 - Proposed reoccupation of 100 & 200 Metro Boulevard, 111 Ideation Way, the construction of an associated parking structure for 100 & 200 Metro Boulevard, and the construction of the School of Medicine Garage. For the purpose of this analysis, a complete project “build out” is assumed within one (1) year of the preparation of this study. Therefore, trip generation projections for the previously approved HUMC and Quest Diagnostics developments were also included as part of “build out” and were obtained from Langan’s Traffic Impact Studies, dated April 20, 2017 and March 23, 2018, respectively.
 - Following mitigations were proposed mitigate traffic impacts associated with the redevelopment
 - Two inter-linked (2) traffic signals at the intersections of Bloomfield Avenue with Isabella Street and Knollwood Terrace;
 - Minor widening along Isabella Street to provide one (1) exclusive left-turn lane and one (1) exclusive right-turn lane at its intersection with Bloomfield Avenue;
 - Minor widening along Bloomfield Avenue between Isabella Street and the N.J.S.H. Route 3 East ramp to provide a new southbound left-turn lane into Isabella Street and a new exclusive northbound through lane at its intersection with the N.J.S.H. Route 3 East ramp;
 - Restriping along Bloomfield Avenue between the N.J.S.H. Route 3 ramps to provide two (2) lanes of travel in each direction with new lane assignments;
 - Minor widening along Bloomfield Avenue between the N.J.S.H. Route 3 West ramp and the signalized shopping center driveway to provide two (2) lanes of travel in each direction with new lane assignments; and
 - Signal retiming at the intersections of Bloomfield Avenue with the N.J.S.H. Route 3 ramps.

The signal timings improvement recommendations were based on different existing volume than what is being studied as part of this report therefore signal timing improvements were not included as part of 2025 Build Conditions. However, all recommended geometric improvements were included as part of 2025 Build Conditions.

Figure 5 depicts Bloomfield Avenue (CR 622) Improvements shown in Traffic Impact Letter Report for Proposed School of Medicine Garage for County of Passaic, New Jersey dated May 24, 2019 and prepared by Stonefield.

FIGURE 5: Bloomfield Avenue (CR 622) Improvements



Source: Stonefield Engineering & Design, Traffic Impact Letter Report dated May 24, 2019

DESCRIPTION OF THE PROPOSED PROJECT

Proposed Project

The proposed project would be developed by Prism Capital Partners, LLC (Prism) consisting of redevelopment of existing building associated with Roche and as well as addition of new buildings. Roche ceased operation in 2015. The proposed project would consist of following land uses³:

- Medical school and associated Research and Development (R & D) Center (Seton Hall-Hackensack Meridian Graduate School of Medicine): 1,100 students and 400 employees
- General office: 561,489 SF
- R & D Center (Quest Diagnostics): 250,000 SF
- R & D Center (111 Ideation Way): 154,335 SF

As of October 2019, it should be noted that above mentioned land uses are already in-place, in-construction, or have been approved.

In addition, following additional land uses are planned as part of proposed project and have been submitted for approval.

- Hotel: 266 room (as per report submitted by Stonefield on October 3, 2019)
- Medical office: 80,892 SF (as per report submitted by Stonefield on October 3, 2019)

In addition, as per the Prism ON3 website (<https://on3nj.com/vision/> accessed December 18, 2019), following additional land uses are listed as "Future Development" land uses.

- Residential: 1,100,000 SF
- Retail amenities: 180,000 SF
- General office: 307,387 SF
- R & D Center: 307,387 SF

As per the Prism website, 1,100,000 SF of future office/R&D/medical office is proposed. Out of which the R & D centers at Quest Diagnostics (250,000 SF) and 111 Ideation Way (154,335 SF), and Medical office (80,892 SF) is already been approved or is seeking approval. Therefore, the remaining 614,773 SF were split evenly between General office and R & D Center.

Proposed Project Site Access

Vehicular access would be provided along the north, west, and south sides of the proposed project site. The proposed project site could be access from EB Route 3 on north of proposed project site via three right-in/right-out access driveways. The proposed project site could be access from

³ Based on <https://on3nj.com/vision/> accessed on December 18, 2019.

south via intersection of Kingsland Street and Metro Blvd/Bloomfield Avenue, and intersection of Kingsland Street and Ideation Way.

As part of the previous Phases of the development, the intersection of Bloomfield Avenue and Isabella Street, and Bloomfield Avenue and Knollwood Terrace/Private Road would become signalized in the 2021 No-Build Conditions and would provide access to proposed project site from west.⁴

It is our understanding that a major access permit application has been submitted to NJDOT for modifications to the three driveways on Route 3. It is noted that the driveways appeared to be substandard per NJDOT standards.

Trip Generation

The trip generation and assignment estimates were prepared for two peak hours: Weekday AM peak hour and Weekday PM Peak Hour.

The proposed development can be characterized by the following Institute of Transportation Engineers (ITE), 10th Edition Land Use Codes:

- Medical school: University/College (ITE Land Use 550)
- General Office: General Office Building (ITE Land Use 710)
- R&D Center: Research and Development Center (ITE Land Use 760)
- Residential: Multifamily Housing - High Rise (ITE Land Use 222)
- Retail Amenities: Shopping Center (ITE Land Use 820)
- Hotel: Hotel (ITE Land Use 310)

Trip Generation Adjustment

Internal Capture/Linked Trips

Internal capture trips are trips that occur within a mixed-use development and are generated wholly within that development (i.e., both origin and destination are within one development). The NCHRP 684 Internal Trip Capture Estimation Tool was developed by Texas A&M University to perform such adjustments and is referenced in the ITE Trip Generation Handbook as a methodology to be used for mixed-use developments such as the project site. The tool was used in this analysis to account for the adjustments necessitated by the aforementioned site contextual factors and characteristics of the proposed development.

In addition, linked trips are trips that have multiple destinations and are typical for mixed-use sites. Considering the various types of land uses as part of the proposed project, it was assumed that there would be trips to the retail amenities land use that are linked to the other uses proposed for the proposed project site. In accordance with NJDOT guidelines for internal capture trips, a linked trip credit of 20 percent was applied to the retail amenities land use.

⁴ Traffic Impact Letter Report for Proposed Ambulatory Care Center and Parking Garage prepared by Stonefield dated October 3, 2019

Conservatively, no credit was taken for pass-by trips in this analysis because of type of land uses proposed. The proposed land uses are destination trips and would not be going to the site otherwise.

Vehicle Occupancy

ITE baseline vehicle trip ends and vehicle occupancy rates were used as a means of converting the ITE vehicle trip ends into person-trips for the analysis. A conservative vehicle occupancy of 1.00 persons per vehicle was assumed (notwithstanding vehicle occupancy rates already reflected in the ITE rates).

Alternative Mode Reduction

To determine the appropriate alternative modes (transit and non-motorized) percentages for the analysis, data from the U.S. Census Bureau was reviewed for the townships of Nutley and Clifton.

Transit and non-motorized mode share percentages were based on U.S. Census Bureau data for the townships of Nutley and Clifton from the 2013-2017 American Community Survey 5-Year Estimates for Workers 16 Years and Over – Modes of Transportation, Table B08006, which represents commuter trips originating from the census tract (“journey to work”). The analysis also considered the 2012-2016 American Community Survey 5-Year Estimates, Table A202105 – Means of Transportation (18) (Workers 16 years and over), which is an estimate of the “reverse journey to work” mode share and can be used for employees.

According to the Census data for journey to work, approximately 13% and 5% of commuters from the townships of Nutley and Clifton, respectively were using transit and non-motorized modes for means of transportation. This percentages were factored in trip generation analysis.

According to the Census data for reverse-journey to work, approximately 7% and 9% of commuters from the townships of Nutley and Clifton, respectively were using transit and non-motorized modes for means of transportation. This percentages were factored in trip generation analysis.

Trip Generation Results

The detailed trip generation estimates are shown in **Table 4**. The proposed project is anticipated to generate an additional 1,127 and 1,425 vehicle trips to the proposed project site during the Weekday AM and Weekday PM Peak hours, respectively.

TABLE 4: Prism Full Build Proposed Project Generated Trips

Buildings already in-place/under construction in 2018/2019

	Unit	Size	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
			In	Out	Total	In	Out	Total
University/College (ITE Land Use 550) - HUMC	Student	1,100	188	53	241	123	262	385
R&D Center (ITE Land Use 760) - HUMC	Employee	400	163	26	189	19	172	191
R&D Center (ITE Land Use 760) - Quest Diagnostics	SF	250,000	427	114	541	65	439	504
General Office (ITE Land Use 710) - 100 and 200 Metro Blvd	SF	561,489	476	78	554	94	492	586
R&D Center (ITE Land Use 760) - 111 Ideation Way	SF	154,335	49	16	65	11	65	76
Total			1,303	287	1,590	312	1,430	1,742

Additional Proposed HLRON 3 Redevelopment

			Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Unit	Size	In	Out	Total	In	Out	Total
Without Adjustment ²								
Multifamily Housing - High Rise (ITE Land Use 222)	DU	1,100	77	244	321	233	149	383
Hotel (ITE Land Use 310)	Room	266	75	52	128	88	85	173
Medical Office (ITE Land Use 720)	SF	80,892	144	41	185	77	199	276
General Office Building (ITE Land Use 710)	SF	307,387	271	44	315	53	278	331
R&D Center (ITE Land Use 760)	SF	307,387	97	32	129	12	67	79
Shopping Center (ITE Land Use 820)	SF	180,000	150	92	242	403	437	839
Vehicle Trip Generation Estimates without Adjustment			815	505	1,320	867	1,214	2,081
With Adjustment								
Internal Capture Percentage ³			-6%	-9%	---	-24%	-17%	---
Internal Capture Trips ³			-46	-46	-92	-209	-209	-418
Additional Internal Capture Trips From/To Retail as per NJDOT Guidelines			-30	-18	-48	-81	-87	-168
External Transit-Trips ⁵			-50	-43	-93	-43	-63	-106
External Non-Motorized Trips ⁶			26	15	41	9	27	36
Vehicle Trip Generation Estimates with Adjustment			715	413	1,127	543	882	1,425

HLRON 3 Redevelopment Vehicle Trips Comparison

HLRON 3 Redevelopment Total Vehicle Trip Estimates	2018	700	2717	855	2312	3167
Roche Total Vehicle Trip Estimates	1752	422	2174	473	1894	2367
Total Increase from Roche	266	278	543	382	418	800
% Increase from Roche	15%	66%	25%	81%	22%	34%

Notes

1. Based on <https://on3nj.com/vision/>. Accessed on October 18, 2019. Proposed office/R&D/Medical land use split equally for trip generation purposes. Assumed size of average dwelling unit is 1,000 sf.
2. Vehicle trip generation estimates without adjustment based on ITE Trip Generation Manual, 10th Edition for Weekday Peak Hour of Adjacent Street Traffic.
3. Internal capture percentage and trips, external transit trips are based in a tool referenced in ITE Trip Gen Handbook (3rd Ed) and developed by Texas A&M University.
4. A vehicle occupancy of 1.00 was assumed for NCHRP method to maintain conservative analysis (notwithstanding vehicle occupancies already reflected in ITE rates; therefore, one vehicle trip end = one person-trip).
5. External transit trips include 7% for office and 13% for residential land use based on U.S. Census Bureau, American Community Survey 2013-2017 5-year estimates. For all other land use, 5% transit trips assumed.
6. External non-motorized trips include 9% for office and 5% for residential land use based on U.S. Census Bureau, American Community Survey 2013-2017 5-year estimates. For all other land use, 0% external non-motorized trips assumed.

Trip Distribution & Assignment

To determine, how people would access the study area network, StreetLight⁵ data sources from 2019 were used. StreetLight Data sources location-based services data from third-party smartphone apps with location components (about 300 in all), delivering a nearly real-time look at about 20 percent of a region's traffic. Based on StreetLight data, vehicle trip originations and destinations for residential, general office, retail and hotel land uses were developed.

The trip assignment percentages for each study period and each land use were applied to the project-generated trips to calculate the project generated traffic volume network. Detailed inbound and outbound trip assignments and project generated total trips can be found in the **APPENDIX**.

Access to Eastbound Route 3 from Kingsland Street via Metro Blvd (Cut-thru)

It should be noted that as part of proposed project, vehicles can now access eastbound Route 3 from south of the ON3 campus via Bloomfield Avenue and Kingsland Street using internal roadways (Metro Boulevard and Ideation Way). Previously Metro Blvd was a gated private roadway. The ON3 development has made Metro Blvd open to the general public and has removed the security gates.

It may possible that existing vehicles from south of proposed project site will cut-thru Metro Blvd to avoid congestion on Darling Avenue/Bloomfield Avenue, Passaic Avenue and Main Avenue as Metro Blvd is now a public access roadway. For the purpose of this analysis, it is assumed that some of the vehicles with destination on eastbound Route 3 past Main Avenue would use the cut-thru from the proposed project site with following origins.

- 50% vehicles with origin on eastbound West Passaic Avenue and access eastbound Route 3 via Bloomfield Avenue on-ramp
- 100% vehicles with origin on eastbound West Passaic Avenue and access eastbound Route 3 via Passaic Avenue on-ramp
- 100% vehicles with origin on eastbound West Passaic Avenue and access eastbound Route 3 via Main Avenue on-ramp
- 100% vehicles with origin on northbound Bloomfield Avenue (south of site) and access eastbound Route 3 via Passaic Avenue on-ramp
- 100% vehicles with origin on northbound Bloomfield Avenue (south of site) and access eastbound Route 3 via Main Avenue on-ramp
- 5% vehicles on northbound Garden State Parkway between exit 150 for Hoover Avenue and exit 151 for Montclair/Nutley
- 5% vehicles on northbound Garden State Parkway between exit 151 for Montclair/Nutley and 153A for Route 3 eastbound

Detailed trip assignments for cut-thru traffic can be found in the **APPENDIX**.

⁵ <https://www.streetlightdata.com/>

2025 BUILD CONDITIONS

The No-Build Conditions analysis forms the future baseline to which projected increments associated with the proposed project are added to establish the 2025 Build Conditions. To develop 2025 Build conditions, the trips associated with Roche development were removed and trips associated with proposed project were added.

2025 Build Conditions traffic volumes for the Weekday AM and Weekday PM Peak hours can be found in the **APPENDIX**.

The 2025 No-Build Conditions and 2025 Build Conditions LOS, delay, v/c ratio, and 95th percentile queue lengths comparison for the study area intersections can be found in **APPENDIX**.

Based on the analysis results, the following approaches/lane-groups would continue to operate at LOS F in 2025 Build Conditions:

Intersection 1: Bloomfield Avenue (CR 622) and Route 3 westbound entry/exit ramps

Weekday AM Peak Hour

- The westbound left-turn movement
- The southbound left-through shared lane group

Weekday PM Peak Hour

- The westbound left-turn movement

Intersection 2: Bloomfield Avenue (CR 622) and Route 3 eastbound entry/exit ramps

Weekday AM Peak Hour

- The southbound left turn movement

Weekday PM Peak Hour

- The westbound right-turn movement
- The southbound left-turn movement

Intersection 4: Darling Avenue (CR622) and Kingsland Street/Passaic Avenue (CR644)

Weekday PM Peak Hour

- The eastbound left-turn movement

Intersection 5: Kingsland Street (CR 622) and Bloomfield Avenue /Metro Boulevard

Weekday AM Peak Hour

- The eastbound left-turn movement
- The westbound through-right shared lane group
- The northbound left-through-right shared lane group

Weekday PM Peak Hour

- The westbound left-turn movement
- The westbound through-right shared lane group
- The northbound left-through-right shared lane group
- The southbound left-through shared lane group

Intersection 6: Kingsland Street (CR 622) and Ideation Way

Weekday AM Peak Hour

- The southbound left-turn movement

Weekday PM Peak Hour

- The southbound left-turn movement

Intersection 7: Kingsland Street (CR 622) and Cathedral Avenue (Route 7)

Weekday AM Peak Hour

- The southbound left-right shared lane group

Weekday PM Peak Hour

- The southbound left-right shared lane group

Intersection 8: Kingsland Street (Route 7) and Franklin Avenue (CR 645)

Weekday PM Peak Hour

- The eastbound left-through-right shared lane group
- The westbound left-through-right shared lane group

Intersection 9: Kingsland Street (Route 7) and Main Avenue

Weekday AM Peak Hour

- The northbound left-right shared lane group

Weekday PM Peak Hour

- The eastbound left-turn movement
- The westbound left-through-right shared lane group
- The northbound left-through-right shared lane group
- The southbound left-through-right shared lane group

Intersection 10: Passaic Avenue (Route 7) and Route 3 westbound entry/exit ramps

Weekday AM Peak Hour

- The westbound left-turn movement

Weekday PM Peak Hour

- The westbound left-turn movement

Intersection 11: Ward Avenue and Route 3 eastbound entry/exit ramps

Weekday PM Peak Hour

- The westbound left-through shared lane group

Intersection 13: Main Avenue and Route 3 westbound entry/exit ramps

Weekday PM peak hour

- The westbound left-turn movement

Intersection 15: Ward Avenue and Kensington Avenue

Weekday PM Peak Hour

- The southbound left-through-right shared lane group

Based on the analysis results, between 2025 No-Build Conditions and 2025 Build Conditions, following movements/lane-groups would deteriorate from LOS E or better to LOS F:

Intersection 1: Bloomfield Avenue (CR 622) and Route 3 westbound entry/exit ramps

Weekday PM Peak Hour

- The northbound through-right turn shared lane group
- The southbound left-through shared lane group

Intersection 5: Kingsland Street (CR 622) and Bloomfield Avenue /Metro Boulevard

Weekday PM Peak Hour

- The eastbound left-turn movement

Intersection 8: Kingsland Street (Route 7) and Franklin Avenue (CR 645)

Weekday AM Peak Hour

- The westbound left-through-right shared lane group

Intersection 9: Kingsland Street (Route 7) and Main Avenue

Weekday AM Peak Hour

- The eastbound left-turn movement

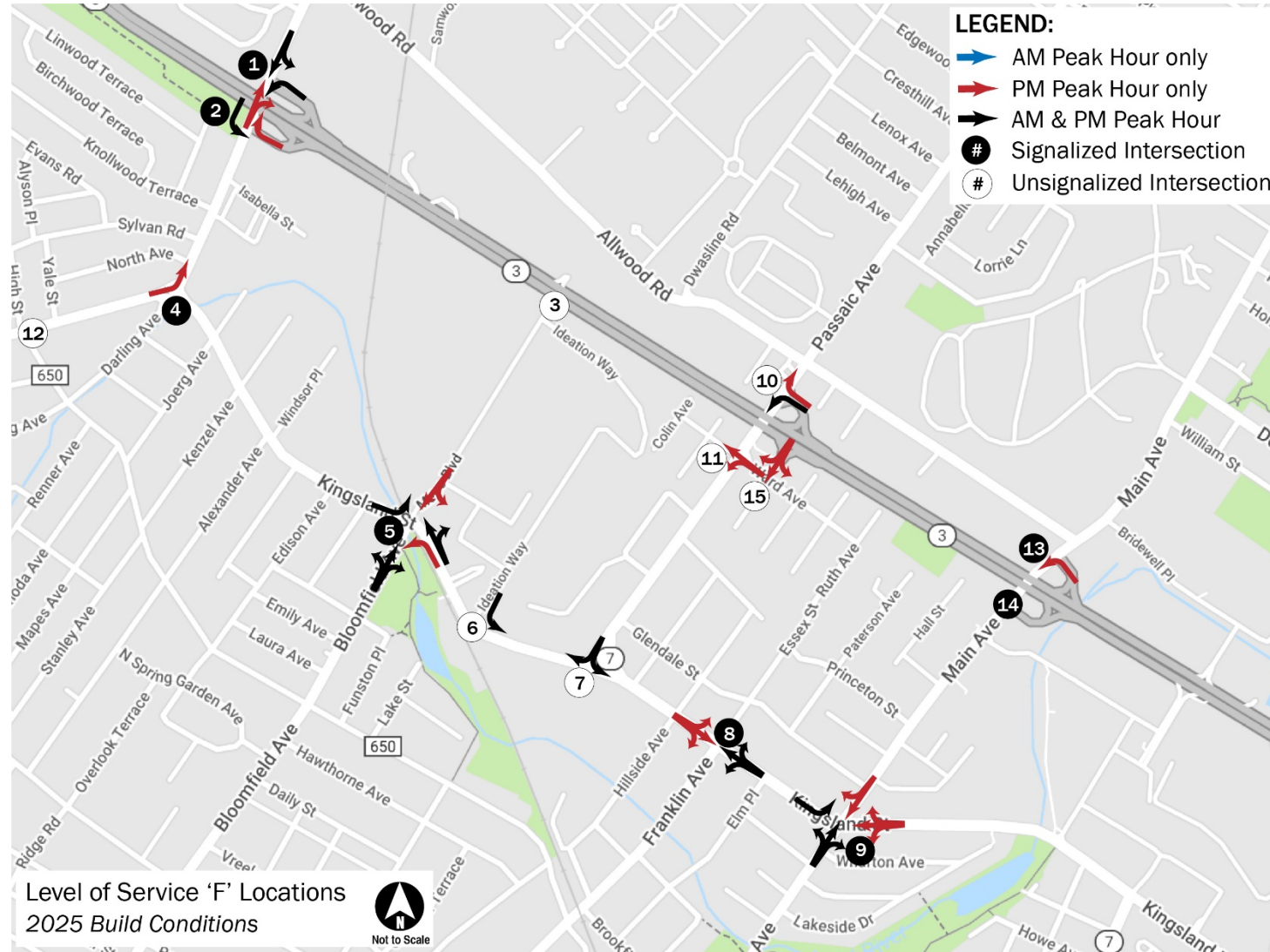
Intersection 10: Passaic Avenue (Route 7) and Route 3 westbound entry/exit ramps

Weekday PM Peak Hour

- The westbound right-turn movement

Figure 6 depicts the lane groups/movements that are operating at LOS F in 2025 Build Conditions.

FIGURE 6: Lane Groups/Movements Operating at Level of Service F (2025 Build Conditions)



2025 BUILD CONDITIONS WITH IMPROVEMENTS

Recommendations made in the Stonefield report, and full build out conceptual sketch prepared by Topology (<http://topology.is/>) indicates proposed roundabouts at the intersection of Bloomfield Avenue/Metro Boulevard and Kingsland Street, and the intersection of Ideation Way and Kingsland Street. These recommendations were included to develop recommended improvements.

The following roadway improvements are recommended to improve level of service for individual lane groups/movement at some intersections regardless of any specific impact criteria.

Intersection 1: Bloomfield Avenue (CR 622) and Route 3 westbound entry/exit ramps

- The signal timing shift or geometric improvements would deteriorate LOS for other lane groups/movements, therefore no improvements are recommended.
- Additional improvements to improve the level of operations cannot be made within existing Right-of-Way and would require some level of Right-of-Way acquisition. Additional study would be required to determine utility and environmental impacts and/or required permits.

Intersection 2: Bloomfield Avenue (CR 622) and Route 3 eastbound entry/exit ramps

- For AM peak hour, Transfer 5 seconds of green time from NB/SB phase to exclusive SB phase
- For PM peak hour, the signal timing shift or geometric improvements would deteriorate LOS for other lane groups/movements, therefore no improvements are recommended.
- Additional improvements to improve the level of operations cannot be made within existing Right-of-Way and would require some level of Right-of-Way acquisition. Additional study would be required to determine utility and environmental impacts and/or required permits.

Intersection 4: Darling Avenue (CR622) and Kingsland Street/Passaic Avenue (CR644)

- For Weekday AM peak Hour, transfer 4 seconds of green time from WB phase to exclusive EB left turn phase
- For Weekday PM peak Hour, transfer 7 seconds of green time from WB phase to exclusive EB left turn phase

Intersection 5: Kingsland Street (CR 622) and Bloomfield Avenue /Metro Boulevard

- Restripe WB from one exclusive left turn lane and one through-right shared lane to one exclusive left turn lane, one through lane, and one exclusive 50' right turn lane
- Restripe SB from one through-left shared lane and one exclusive right turn lane to one exclusive left turn lane, and one through-right shared lane
- For AM peak hour, transfer 4 seconds of green time from EB/WB phase to NB/SB phase
- For PM peak hour, transfer 1 second of green time from NB/SB phase to EB/WB phase
- Additional improvements to improve the level of operations cannot be made within existing Right-of-Way and would require some level of Right-of-Way acquisition. Additional study would be required to determine utility and environmental impacts and/or required permits.

Intersection 6: Kingsland Street (CR 622) and Ideation Way

- Signalize intersection
- Restripe EB from one left-through shared lane to one 100' exclusive left turn lane and one through lane
- Restripe WB from one right-through shared lane to one 100' exclusive right turn lane and one through lane

Intersection 7: Kingsland Street (CR 622) and Cathedral Avenue (Route 7)

- Signalize intersection
- Restripe EB from one left-through shared lane to one 600' exclusive left turn lane and one through lane
- Additional improvements to improve the level of operations cannot be made within existing Right-of-Way and would require some level of Right-of-Way acquisition. Additional study would be required to determine utility and environmental impacts and/or required permits.

Intersection 8: Kingsland Street (Route 7) and Franklin Avenue (CR 645)

- For Weekday AM peak Hour, transfer 4 seconds of green time from NB/SB phase to EB/WB phase
- For Weekday PM peak Hour, transfer 6 seconds of green time from NB/SB phase to EB/WB phase
- Additional improvements to improve the level of operations cannot be made within existing Right-of-Way and would require some level of Right-of-Way acquisition. Additional study would be required to determine utility and environmental impacts and/or required permits.

Intersection 9: Kingsland Street (Route 7) and Main Avenue

- The signal timing shift or geometric improvements would deteriorate LOS for other lane groups/movements, therefore no improvements are recommended.
- Additional improvements to improve the level of operations cannot be made within existing Right-of-Way and would require some level of Right-of-Way acquisition. Additional study would be required to determine utility and environmental impacts and/or required permits.

Intersection 10: Passaic Avenue (Route 7) and Route 3 westbound entry/exit ramps

- Signalize intersection

Intersection 11: Passaic Avenue (Route 7) and Route 3 eastbound entry/exit ramps

- Signalize intersection

Intersection 13: Main Avenue and Route 3 westbound entry/exit ramps

- For AM peak hour, transfer 4 seconds of green time from NB/SB phase to EB/WB phase
- For PM peak hour, transfer 6 seconds of green time from NB/SB phase to EB/WB phase

Intersection 14: Main Avenue and Route 3 eastbound entry/exit ramps

- For PM peak hour, transfer 5 seconds of green time from NB/SB phase to EB/WB phase

Intersection 15: Ward Avenue and Kensington Avenue

- Signalize intersection

Based on the analysis results, the following approaches/lane-groups would continue to operate at LOS F in 2025 Build with Improvements Conditions:

Intersection 1: Bloomfield Avenue (CR 622) and Route 3 westbound entry/exit ramps

Weekday AM Peak Hour

- The westbound left-turn movement
- The southbound left-through shared lane group

Weekday PM Peak Hour

- The westbound left-turn movement
- The northbound through-right turn shared lane group
- The southbound left-through shared lane group

Intersection 2: Bloomfield Avenue (CR 622) and Route 3 eastbound entry/exit ramps

Weekday PM Peak Hour

- The westbound right-turn movement
- The southbound left turn movement

Intersection 5: Kingsland Street (CR 622) and Bloomfield Avenue /Metro Boulevard

Weekday PM Peak Hour

- The westbound left-turn movement
- The southbound left-turn movement

Intersection 7: Kingsland Street (CR 622) and Cathedral Avenue (Route 7)

Weekday AM Peak Hour

- The southbound left-right shared lane group

Weekday PM Peak Hour

- The eastbound left-turn movement
- The westbound through-right shared lane group

Intersection 8: Kingsland Street (Route 7) and Franklin Avenue (CR 645)

Weekday PM Peak Hour

- The westbound left-through-right shared lane group

Intersection 9: Kingsland Street (Route 7) and Main Avenue

Weekday AM Peak Hour

- The eastbound left-turn movement
- The northbound left-right shared lane group

Weekday PM Peak Hour

- The eastbound left-turn movement
- The westbound left-through-right shared lane group
- The northbound left-through-right shared lane group
- The southbound through-right shared lane group

The 2025 No-Build Conditions, 2025 Build Conditions, and 2025 Build Conditions with Improvements LOS, delay, v/c ratio, and 95th percentile queue lengths comparison for the study area intersections can be found in **APPENDIX**.

Figure 7 depicts the lane groups/movements that are operating at LOS F in 2025 Build with Improvements Conditions. **Figure 8** depicts the recommended improvements with comparison between improvements recommended by others.

FIGURE 7: Lane Groups/Movements Operating at Level of Service F (2025 Build with Improvements Conditions)

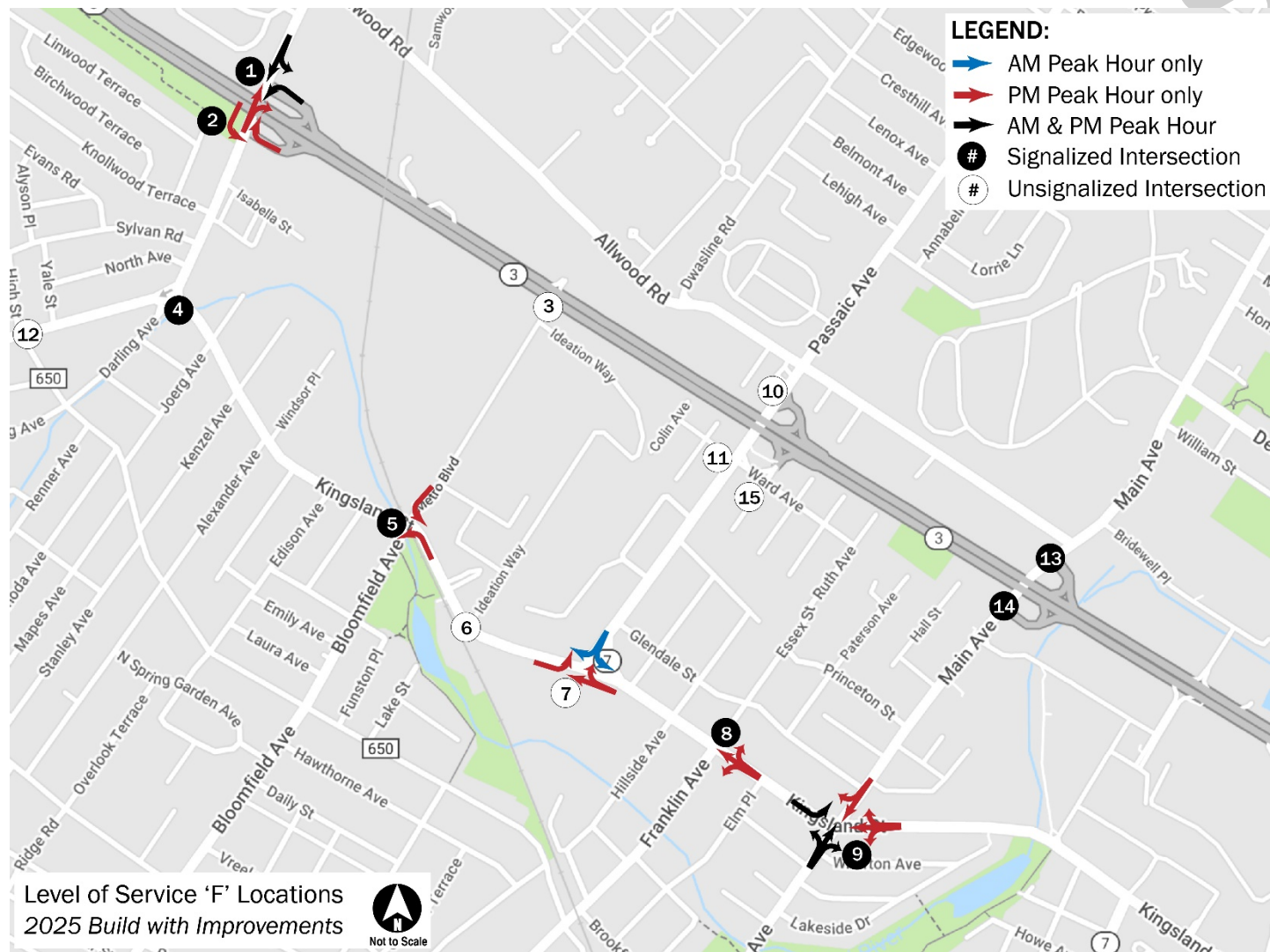


FIGURE 8: Recommended Improvements

