



*Traffic and Parking Consultants  
Highway and Signal Design*

**MICHAEL MARIS ASSOCIATES, INC.**

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# **TRAFFIC IMPACT AND SHARED PARKING ANALYSES**

**SCHEME 1 REDEVELOPMENT PLAN  
HOFFMANN-LA ROCHE CAMPUS  
Nutley and Clifton, New Jersey**

**Prepared For: Hoffmann-LaRoche, Inc.  
340 Kingsland Street  
Nutley, NJ 07110-1199**

**Project No. 13-112  
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SECTION A  
INTRODUCTION

**SECTION A**  
**INTRODUCTION**

**A-1 PROJECT DESCRIPTION**

Michael Maris Associates, Inc. (MMA) was retained by Hoffmann-LaRoche, Inc. (Roche) to perform Traffic Impact and Shared Parking Analyses of the Scheme 1 Plan for the redevelopment of the Roche Campus in Nutley and Clifton, New Jersey. The Roche Campus is located south of Route 3 between its interchanges with Bloomfield Avenue and Passaic Avenue and extends southerly to Kingsland Street (see Exhibit No. 1 in Appendix A).

The Scheme 1 Plan, which was prepared by Perkins Eastman and dated September 30, 2013, identifies a potential development plan for the Campus consisting of the following components:

• Light Industrial	375,000 sf
• Bio Tech/Research & Development (R&D)	1,509,000 sf
• Office	679,000 sf
• Retail	215,000 sf
• Medical Office	75,000 sf
• Hotel	200 rooms
• Mid-Rise Residential	210 units
• Townhouses	118 units
• Condominiums	447 units
• Senior Housing	37 units

The Scheme 1 Plan shows that the main access to the overall development would be provided via First Avenue, which would commence at the existing right-in/right-out driveway from eastbound Route 3 and end at the existing full-movement driveway at Kingsland Street.

Another primary access would be provided via Seventh Avenue (or Isabella Street) from Bloomfield Avenue and secondary access would be provided via additional driveways from Kingsland Street.

## A-2 SCOPE OF STUDY

### 1. Traffic Impact Analyses

Traffic Impact Analyses were performed in order to identify the impact of the Scheme 1 Plan development and the required improvements to mitigate the impact. The following tasks were undertaken in the course of these analyses:

- a. The Study Locations to be analyzed were selected based on past experience with Roche and the anticipated distribution of the Scheme 1 Plan traffic generations.
- b. Traffic counts at the Study Locations were undertaken by MMA representatives during the preparation of a prior study which analyzed existing traffic conditions in the area. Since the majority of the Scheme 1 Plan will likely consist of employment components, the counts were undertaken during the morning and evening commuter periods in order to identify the existing peak-hour traffic volumes on the adjacent roadway system.
- c. The existing peak-hour traffic volumes were projected to a design year by an appropriate annual traffic growth rate in order to identify the future traffic volumes without the Scheme 1 Plan development.

- d. The traffic generations of the Scheme 1 Plan development components were estimated based on accepted published data taking into consideration mass transit utilization, car pooling and van pooling, and internal trips within the development.
- e. The distribution of the Scheme 1 Plan traffic generations through the Study Locations was identified by an assessment of the existing traffic volumes passing through the Study Locations.
- f. The Scheme 1 traffic generations at each Study Location were added to the projected traffic volumes in order to identify the future traffic volumes with the Scheme 1 Plan.
- g. Capacity Analyses were performed comparing the existing intersection capacities to the future traffic volumes with the Scheme 1 Plan generations.
- h. Where the Capacity Analyses indicated potential traffic flow problems, additional analyses were performed to identify roadway and signal improvements that would mitigate the impact of the Scheme 1 traffic generations.
- i. Preliminary cost estimates were made to identify the magnitude of the construction cost to implement the mitigation improvements.

## **2. Shared Parking Analyses**

Shared Parking Analyses were performed in order to identify the number of spaces that will be needed to serve the various development components of the Scheme 1 Plan. The following tasks were performed in the course of the Parking Needs Analyses:

- a. Because the site is large and there would be several parking areas, it was divided in Development Zones in order to estimate the number of spaces needed in each Zone.
- b. The peak-hour vehicle accumulations of the various development components identified in the Scheme 1 Plan were also estimated using accepted published data. Where applicable, credits were taken similar to those for the trip generation estimates in order to reflect mass transit utilization, van/car pooling and internal trips.
- c. The hourly weekday vehicle accumulations of the various development components were estimated and the parking accumulations in each Development Zone were identified using Shared Parking principals and accepted published data.
- d. The parking requirements in each Development Zone and the total site were identified by increasing the vehicle accumulations by an appropriate factor.



**SECTION B**

**TRAFFIC IMPACT ANALYSES**



**MICHAEL MARIS ASSOCIATES, INC.**

**SECTION B**  
**TRAFFIC IMPACT ANALYSES**

**B-1 STUDY LOCATIONS**

In order to determine whether the Scheme 1 Plan will have any impact on the adjacent roadway system, as well as identify improvements to mitigate any impact, it was necessary to identify and analyze those intersections that would serve the greatest amount of the development's traffic. Based upon past experience in the area, a review of the existing roadway network and the anticipated travel patterns of the development's traffic, it was decided that the future traffic volumes through the following intersections (Study Locations) should be analyzed in detail:

- Passaic Avenue and Westbound Route 3 On/Off Ramps
- Passaic Avenue and Eastbound Route 3 On/Off Ramps (Ward Avenue)
- Cathedral Avenue (Passaic Avenue) and Kingsland Street
- Kingsland Street and First Avenue (site Driveway)/Bloomfield Avenue
- Kingsland Street and Darling Avenue (Bloomfield Avenue)
- Bloomfield Avenue and Isabella Street (Site Driveway)
- Bloomfield Avenue and Eastbound Route 3 On/Off Ramps
- Bloomfield Avenue and Westbound Route 3 On/Off Ramps

**B-2 FIELD SURVEYS AND EXISTING TRAFFIC VOLUMES**

During the course of a prior study of existing traffic conditions, field visits were performed in the months of June and July of 2013 in order to observe current traffic flow conditions and to collect data regarding intersection geometries and traffic controls. Manual turning movement traffic counts were also undertaken at each Study Location on Wednesday, June 26, 2013 during the

peak morning commuter period of 7:00 AM to 9:00 AM and the peak evening commuter period of 4:00 PM to 7:00 PM.

A summary of the traffic counts shows that the Peak AM Highway Hour occurred between 8:30 and 9:30 AM, while the Peak PM Highway Hour occurred between 4:30 and 5:30 PM. The counted traffic volumes during each of the Peak Hours are presented on the attached Exhibits No. 2 and 3 in Appendix A.

### **B-3 YEAR 2023 “NO-BUILD” TRAFFIC VOLUMES**

The Year 2023 was selected as the Design Year for the traffic projections and analyses presented herein. In order to estimate the Year 2023 traffic volumes with the Phase 1 Plan, it was first necessary to estimate the Year 2023 “No-Build” Traffic Volumes (without the Scheme 1 Plan generations). Based on past experience, the existing traffic volumes at each Study Location were increased by an annual growth rate of 2.0 percent (20.0 percent overall) in order to reflect the general growth in the area.

### **B-4 SCHEME 1 PLAN GENERATIONS AND “BUILD” TRAFFIC VOLUMES**

#### **1. Traffic Generations**

Data published by the Institute of Transportation Engineers (ITE) in a publication entitled Trip Generation, 9<sup>th</sup> Edition was used to estimate the traffic generations of the Scheme 1 Plan. This publication is based on experience at existing developments and provides generation rates that can be applied to proposed developments in order to estimate their generations. The resulting trip generation estimates were then reduced as follows:

- The office, R&D and Light Industrial generations were reduced by 20 percent to reflect mass transit utilization and car or van pooling.
- The residential generations were reduced by 35 percent, consisting of 10 percent for mass transit use, 10 percent for car or van pooling, and 15 percent internal trips.
- The retail generations were reduced by 80 percent since it is expected that most, if not all, of the shoppers would originate from within the site.

Based on the above parameters, the traffic generations of the Scheme 1 Plan were estimated as presented in the attached Exhibit No. 4 which shows that the total development will generate 2,786 new trips during the Peak AM Highway Hour and 2,952 new trips during the Peak PM Highway Hour.

## 2. Traffic Distributions

The Scheme 1 Plan traffic generations were distributed on the Study Locations in accordance with an assessment of the existing traffic flow in the area. That assessment indicated the following general Arrival and Departure Distributions, which are shown in more detail on Exhibits No. 5 through 8. It is noted that separate driveway distributions were identified for some of the residential components due to their location and access.

- |   |            |
|---|------------|
| • To/from the west via Route 3            | 38 percent |
| • To/from the east via Route 3            | 38 percent |
| • To/from the west via Kingsland Street   | 6 percent  |
| • To/from the east via Kingsland Street   | 2 percent  |
| • To/from the north via Bloomfield Avenue | 8 percent  |
| • To/from the south via Bloomfield Avenue | 2 percent  |
| • To/from the north via Passaic Avenue    | 6 percent  |

As shown in the table and on the Exhibits, the distribution assessment indicates a strong orientation to Route 3 and it is expected that a substantial amount of the site-generated traffic will use the First Avenue driveway from eastbound Route 3. It should be noted that the Route 3 First Avenue driveway would be used by a much greater percent of the site traffic if there was also a direct connection to/from westbound Route 3. Without any direct connection, much of the westbound arriving and departing traffic will use the Passaic Avenue and Bloomfield Avenue interchanges to access the driveways.

### **3. Year 2015 “Build” Traffic Volumes**

The Scheme 1 Plan traffic generations were assigned to the roadway network in accordance with the Arrival and Departure Distributions, resulting in the Site Traffic Volumes presented on Exhibits No. 9 and 10 in Appendix A.

The Site Traffic Volumes were then added to the Year 2023 “No-build” Traffic Volumes, resulting in the Year 2023 “Build” Traffic Volumes presented on Exhibits No. 11 and 12. More details regarding the distribution calculations are presented in the tables in Exhibits No. 13 and 14.

## **B-6 CAPACITY ANALYSES AND FINDINGS**

Capacity Analyses are performed in order to identify traffic flow conditions using methodology described in the Highway Capacity Manual 2000 published by the Transportation Research Board, which present the analyses findings in terms of Levels of Service (LOS) and average delays. LOS “A/a” through “D/d” are generally considered acceptable for peak periods, LOS

“E/e” is considered to represent the theoretical intersection/approach capacity and LOS “F/f” reflects congestion and unacceptable traffic flow conditions.

## 1. Description of Analyses

For signalized intersections, LOS is defined in terms of delay, which is a measure of loss of travel time. Levels of Service criteria are stated in terms of the Average Control Delay per vehicle for the peak 15-minute period within the hour analyzed. Delay is dependent on a number of factors, including number of lanes, turning volumes, truck volumes, green to cycle length ratio, and volume to capacity ratio for each approach. The definitions of the LOS designations for signalized intersections are as follows:

<u>Level of Service</u>	<u>Description</u>	<u>Average Delay Per Veh (sec)</u>
A	Free Flow	10.0 or less
B	Mostly Free Flow	10.1 to 20.0
C	Somewhat Restricted	20.1 to 35.0
D	Some short Delays	35.1 to 55.0
E	At Capacity	55.1 to 80.0
F	Congestion	80.1 or greater

Unsignalized intersections are seldom critical to the major streets, since through traffic on the main roadway generally has the right-of-way. However, main roadway volumes are of great significance to the capacity of the minor cross street. Therefore, Unsignalized Intersection Analyses are based on the gap acceptance model which relies on three basic elements; the size and availability of gaps in the major traffic stream; the usefulness of these gaps to the minor street drivers; and the relative priority of the various traffic streams at the intersection.

The LOS criteria are stated in terms of the Average Control Delay for each minor movement for the peak 15-minute period within the hour. Control 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; this time includes initial deceleration delay, queue move-up time, stopped delay and final acceleration delay. The Average Control Delay for any particular minor movement is a function of the capacity of the approach and the degree of saturation. The criteria for the various LOS designations for unsignalized intersections are given in the following table:

<u>Level of Service</u>	<u>Expected Delay to Minor Street Traffic</u>	<u>Average Total Delay (Sec./Veh.)</u>
a	Little or No Delay	10.0 or Less
b	Short Traffic Delays	10.1 to 15.0
c	Average Traffic Delays	15.1 to 25.0
d	Traffic Delays	25.1 to 35.0
e	Long Traffic Delays	35.1 to 50.0
f	Demand Exceeds Capacity	50.1 or Greater

## **2. Traffic Analyses Findings and Recommendations**

Capacity Analyses were performed for each Study Location comparing the existing intersection capacities to the Year 2023 "Build" Traffic Volumes. Additional Analyses were performed for intersections where potential traffic delays were indicated. The results of the Capacity Analyses are summarized on the attached Exhibit No. 15 in Appendix A and copies of the analyses are included in Appendix B.

Presented in the following pages are brief descriptions of the intersection geometries and traffic controls, the findings of the Capacity Analyses and, where required, recommended roadway and signal improvements and preliminary construction cost estimates for the improvements.

It is noted that roadway surveys have not been performed and that right-of-way information is not available. Some of the recommended improvements described herein may need right-of-way acquisition and, since the area surrounding the Roche Campus is heavily developed, right-of-way acquisition may not be possible. Consequently, in some cases, design standards for lane widths and lengths may need to be waived in order to implement the improvements. The extent of the design waivers and the required right-of-way and its associated cost will not be known until detailed surveys are undertaken and preliminary designs are performed.

**a. Route 3 and First Avenue**

- NJDOT Access Code

Route 3 and its interchanges are under the jurisdiction of the New Jersey Department of Transportation (NJDOT) and any access from Route 3 must receive an NJDOT Access Permit in accordance with the process described in the New Jersey State Highway Access Management Code (Access Code). It is noted that an Access Permit Application must be made even though the site is currently developed and several driveways exist from eastbound Route 3 because the proposed development would change the size of and introduce new uses on the site, such as the residential, hotel, and retail components.

The magnitude of the development under consideration would typically require a Major with Planning Access Application. In addition to detailed plans required by other application, a Major with Planning Application requires traffic studies to



identify the project's impacts on the NJDOT roadways, identification of mitigation improvements, and fair share financial contributions towards the improvements. However, the Access Code permits traffic credits for existing developments on sites and, although the existing buildings are vacant, it is likely that credits will be accepted by NJDOT. These traffic credits could reduce the NJDOT Access Permit Application requirements and it is recommended that a meeting be scheduled with NJDOT representatives as soon as a development plan is reasonably defined in order to discuss the First Avenue access and NJDOT's requirements and traffic credits.

- Anticipated Geometry and Estimated Costs

Regarding the First Avenue intersection, deceleration and acceleration lanes will be required along eastbound Route 3 in accordance with the NJDOT Access Code design criteria. The site has a substantial amount of frontage along Route 3 and it is not expected that there will be any difficulty in implementing this improvement. It is estimated that construction of the access will cost approximately \$ 400,000 to implement.

**b. Passaic Avenue and Westbound Route 3 On/Off Ramps**

- Intersection Geometry and Traffic Controls

The westbound Route 3 ramps split and intersect with Passaic Avenue at two locations. The northern intersection serves the Route 3 exiting right turns onto northbound Passaic Avenue and the southbound Passaic Avenue left turns onto Route 3, while the southern intersection serves the Route 3 ramp left turns to southbound Passaic Avenue and the northbound Passaic Avenue right turns onto the Route 3 ramp. The ramps then intersect, effectively forming three intersections in close proximity to each other. All three intersections are under "Stop" sign control.

All ramp approaches to the three intersections consist of one lane and the Passaic Avenue approaches consist of one wide lane which during the field visits was observed to operate as two lanes. Therefore, the Capacity Analyses of the northern

intersection were performed assuming that the Passaic Avenue southbound approach consists of one left-turn lane and one through lane, while the Capacity Analyses of the southern intersection were performed assuming that the Passaic Avenue northbound approach consists of one right-turn lane and one through lane.

- Year 2023 "Build" Traffic Conditions

The Capacity Analyses with the future traffic volumes show that all movements through the northern intersection will operate at acceptable Level of Service "d", or better, during both Peak Hours. However, the Capacity Analyses of the southern intersection show that the left turns exiting the ramp will experience very long delays and operate at unacceptable Level of Service "f" during both Peak Hours.

- Recommended Improvements and Estimated Costs

It is recommended that the Route 3 ramp be reconstructed to form a typical T-type intersection with Passaic Avenue and that the pavement be striped as shown on the attached Exhibit No. 16 in Appendix A. It is also recommended that a traffic signal be installed to control traffic. It is again noted that the Route 3 ramps are under NJDOT's jurisdiction and implementation of these improvements will require NJDOT approval.

It appears that the recommended improvements can be implemented within the existing right-of-way and that no additional right-of-way will be required. However, the lane widths along Passaic Avenue will need design waivers.

It is estimated that construction of the recommended improvements will cost approximately \$ 400,000.

- Year 2023 "Build" With Improvements Traffic Conditions

Capacity Analyses with the future traffic volumes and the recommended improvements show that all intersection movements will operate at acceptable Level of Service "D", or better, during both Peak Hours.

**c. Passaic Avenue and Eastbound Route 3 On/Off Ramps (Ward Avenue)**

- Intersection Geometry and Traffic Controls

Passaic Avenue intersects with Ward Avenue (eastbound Route 3 ramps) at a four-leg intersection that is controlled by “Stop” signs facing Ward Avenue.

Both Passaic Avenue approaches consist of one wide lane, the eastbound Ward Avenue approach consists of one lane and the westbound Ward Avenue (Route 3 ramp) approach consists of one through/left-turn lane and one channelized right-turn lane.

- Year 2023 “Build” Traffic Conditions

The Capacity Analyses with the future traffic volumes show that both Ward Avenue approaches will experience long delays and operate at unacceptable Level of Service “f” during both Peak Hours.

- Recommended Improvements and Estimated Costs

It is recommended that the pavement be re-stripped as shown on the attached Exhibit No. 17 in Appendix A and that a traffic signal be installed to control traffic. The improvements to this intersection may also require NJDOT approval due to the Route 3 ramp traffic. It appears that the recommended improvements can be implemented within the existing right-of-way, although the lane widths along Passaic Avenue may need design waivers.

It is estimated that construction of the recommended improvements will cost approximately \$ 250,000.

- Year 2023 “Build” With Improvements Traffic Conditions

Capacity Analyses with the future traffic volumes and the recommended improvements show that all movements through the intersection will operate at acceptable Level of Service “D”, or better, during both Peak Hours.

**d. Cathedral Avenue (Passaic Avenue) and Kingsland Street**

- Intersection Geometry and Traffic Controls

Cathedral Avenue forms the north leg of a four-leg intersection with Kingsland Street and an existing Roche driveway forms the south leg.

All approaches to the intersection consist of one lane and traffic is controlled by a "Stop" sign facing the Cathedral Avenue approach.

- Year 2023 "Build" Traffic Conditions

The Capacity Analyses with the future traffic volumes show that the Cathedral Avenue approach will experience long delays and operate at unacceptable Level of Service "f" during both Peak Hours.

- Recommended Improvements and Estimated Costs

It is recommended that the pavement be re-striped as shown on the attached Exhibit No. 18 and that a traffic signal be installed to control traffic. It is noted that the Exhibit shows only right turns on the southbound approach. This recommendation was made because the southbound left-turn movement is very light (most left turns are made via a short connector to the north) and because a substantial amount of the Scheme 1 Plan traffic will be making the southbound right turn and the eastbound left turn.

It is estimated that construction of the recommended improvements will cost approximately \$ 250,000.

- Year 2023 "Build" With Improvements Traffic Conditions

Capacity Analyses with the future traffic volumes and the recommended improvements show that all movements through the intersection will operate at acceptable Level of Service "D", or better, during both Peak Hours.

e. **Kingsland Street and First Avenue (Site Driveway)/Bloomfield Avenue**

- **Intersection Geometry and Traffic Controls**

First Avenue (Site Driveway) intersects with Kingsland Street at a four-leg intersection, with the south leg being formed by Bloomfield Avenue. Traffic at the intersection is controlled by a three-phase traffic signal.

Both Kingsland Street approaches consist of one left-turn lane and one through/right-turn lane, the First Avenue approach consists of one right-turn lane and one through/left-turn lane, and the Bloomfield Avenue approach consists of one lane that permits all turns.

- **Year 2023 "Build" Traffic Conditions**

The Capacity Analyses with the future traffic volumes show that both Kingsland Street approaches will experience delays and operate at unacceptable Level of Service "F" during the Peak AM Highway Hour and that the First Avenue and Bloomfield Avenue approaches will operate at capacity during the Peak PM Highway Hour.

- **Recommended Improvements and Estimated Costs**

It is recommended that the Kingsland Street westbound approach be re-striped to add a separate right-turn lane (see Exhibit No. 19 and that the traffic signal operations be modified.

It is estimated that construction of the recommended improvements will cost approximately \$ 150,000.

- **Year 2023 "Build" With Improvements Traffic Conditions**

Capacity Analyses with the future traffic volumes and the recommended improvements show that all movements through the intersection will operate at acceptable Level of Service "D", or better, during both Peak Hours.

f. **Kingsland Street and Darling Avenue (Bloomfield Avenue)**

- Intersection Geometry and Traffic Controls

Kingsland Street intersects with Darling Avenue (Bloomfield Avenue) at a four-leg intersection that is under traffic signal control.

The Kingsland Street eastbound approach consists of one left-turn lane and one through lane with a short channelized right-turn lane and the westbound approach consists of one channelized right-turn lane and one through/left-turn lane. The Darling Avenue southbound approach consists of one channelized right-turn lane and one through/left-turn lane and only southbound traffic (away from the intersection) is permitted on the south leg of the intersection.

- Year 2023 "Build" Traffic Conditions

The Capacity Analyses with the future traffic volumes show that the eastbound left turns will experience delays and operate at unacceptable Level of Service "F" during both Peak Hours.

- Recommended Improvements and Estimated Costs

It is recommended that signal timing modifications be implemented at this intersection to better distribute the available green time (see Exhibit No. 20). The costs for this modification will be minimal.

- Year 2023 "Build" With Improvements Traffic Conditions

Capacity Analyses with the future traffic volumes and the recommended signal modification show that all movements through the intersection will operate at acceptable Level of Service "D", or better, during both Peak Hours.

**g. Bloomfield Avenue and Isabella Street (Site Driveway)**

The following findings and recommendations refer to the Bloomfield Avenue intersection with Isabella Street. However, the findings are based on traffic volumes for a major site-driveway intersection with Bloomfield Avenue and would apply to Seventh Avenue if it was selected as the major Bloomfield Avenue access instead Isabella Street.

- Intersection Geometry and Traffic Controls

Bloomfield Avenue intersects with Isabella Street at a T-type intersection that is under "Stop" sign control facing the Isabella Street approach. All approaches to the intersection consist of one lane.

- Year 2023 "Build" Traffic Conditions

Capacity Analyses with the future traffic volumes show that the traffic exiting Isabella Street will experience long delays and operate at unacceptable Level of Service "F" during the Peak PM Highway Hour (employee departure time).

- Recommended Improvements and Estimated Costs

It is recommended that the Bloomfield Avenue southbound approach consist of one left-turn lane and one through lane and that the Isabella Street (or Seventh Avenue) approach consist of a left-turn lane and a right-turn lane (see Exhibit No. 21) and that a traffic signal be installed. Additional right-of-way may be needed to implement these improvements.

It is estimated that construction of the recommended improvements will cost approximately \$ 300,000.

- Year 2023 "Build" With Improvements Traffic Conditions

Capacity Analyses with the recommended improvements show that all movements will operate at acceptable Level of Service "D", or better, during both Peak Hours.

#### **h. Bloomfield Avenue and Eastbound Route 3 On/Off Ramps**

- Intersection Geometry and Traffic Controls

The eastbound Route 3 ramps intersect with Bloomfield Avenue at a T-type intersection that is under traffic signal control.

The westbound ramp approach consists of one right-turn lane and one left-turn lane and both Bloomfield Avenue approaches consist of one wide lane which, during the field visits was observed to operate as two lanes. Therefore, the Capacity Analyses presented herein were performed assuming that Bloomfield Avenue is four lanes.

- Year 2023 "Build" Traffic Conditions

The Capacity Analyses with the future traffic volumes show that all approaches to this intersection will experience delays and operate at unacceptable Level of Service "F" during both Peak Hours.

- Recommended Improvements and Estimated Costs

It is recommended that the intersection be re-stripped as shown on Exhibit No. 22 and that the northbound approach of Bloomfield Avenue be widened to provide a separate right-turn lane onto the ramp and that the existing traffic signal be modified. It is noted that the Route 3 ramps are under NJDOT's jurisdiction and implementation of these improvements will require NJDOT approval.

The addition of a right-turn lane will likely require right-of-way from the adjacent NJDOT maintenance yard. Since the right-of-way would be used to improve the intersection, NJDOT may be willing to trade the right-of-way costs for the improvement costs. It is noted that the lane widths along Bloomfield Avenue will also need design waivers.

It is estimated that construction of the recommended improvements will cost approximately \$ 300,000.



- Year 2023 "Build" With Improvements Traffic Conditions

Capacity Analyses with the future traffic volumes and the recommended improvements show that all intersection movements will operate at acceptable Level of Service "D", or better, during both Peak Hours.

i. Bloomfield Avenue and Westbound Route 3 On/Off Ramps

- Intersection Geometry and Traffic Controls

The westbound Route 3 ramps intersect with Bloomfield Avenue at a T-type intersection that is under traffic signal control.

The ramp approach consists of one right-turn lane and one left-turn lane and both Bloomfield Avenue approaches consist of one wide lane which, during the field visits was observed to operate as two lanes. Therefore, the Capacity Analyses were performed assuming that Bloomfield Avenue is four lanes wide.

- Year 2023 "Build" Traffic Conditions

The Capacity Analyses with the future traffic volumes show that all approaches to this intersection will experience delays and operate at unacceptable Level of Service "F" during both Peak Hours.

- Recommended Improvements and Estimated Costs

It is recommended that the intersection be re-striped as shown on Exhibit No. 23 and that the Route 3 ramp approach be widened to provide a double left-turn lane. It is also recommended that the existing traffic signal be modified. It is noted that the Route 3 ramp is under NJDOT's jurisdiction and implementation of these improvements will require NJDOT approval.

The recommended widening could be accomplished within NJDOT right-of-way and, since the right-of-way would be used to improve the intersection, NJDOT may

be willing to trade the right-of-way for the improvement costs. It is again noted that the lane widths along Bloomfield Avenue will need design waivers.

It is estimated that construction of the recommended improvements will cost approximately \$ 300,000.

- Year 2023 "Build" With Improvements Traffic Conditions

Capacity Analyses with the future traffic volumes and the recommended improvements show that all intersection movements will operate at acceptable Level of Service "D", or better, during both Peak Hours.

## **B-7 TRAFFIC ANALYSES CONCLUSIONS**

Based on the analyses presented herein, it is the conclusion of Michael Maris Associates, Inc. that the traffic impact of the Scheme 1 Plan development can be mitigated with the improvements presented herein and with some design waivers. The analyses show that the recommended improvements, which are estimated to cost approximately \$ 2,350,000, will provide acceptable Levels of Service at all the impacted intersections.

SECTION C

SHARED PARKING ANALYSES



MICHAEL MARIS ASSOCIATES, INC.

## SECTION C

### SHARED PARKING ANALYSES

#### **C-1 DEVELOPMENT ZONES**

Shared Parking Analyses were performed in order to identify the parking spaces needed to serve the various development components of the Scheme 1 Plan. Because the site is large and there would be several parking areas, it was divided in Development Zones in order to estimate the number of spaces that will be needed in each Zone taking into account shared parking principals. The attached Exhibit No. 24 identifies the various Development Zones and Exhibit No. 25 lists the various development components within each Zone. It is noted that the development components within the various Zones were estimated since the Scheme 1 Plan does not provide a detailed breakdown.

#### **C-2 PARKING ESTIMATE METHODOLOGY**

The peak-hour and hourly parking generations within each Zone were estimated using data published by the Institute of Transportation Engineers in a publication entitled Parking Generation, Second Edition. Where applicable, credits were taken similar to those for the trip generation estimates in order to reflect mass transit utilization, van/car pooling and internal trips.

The ITE publication provides vehicle accumulation rates for various types of land uses that can be applied to proposed developments to estimate their parking accumulations during the

peak hour of the day. The same ITE publication also provides hourly variation percentages that can be applied to the peak accumulations to identify the hourly accumulations for each of the various land uses. For developments with more than one land use, the hourly accumulation of each use is calculated and the combined accumulations are considered to be the demand of the specific development (shared parking). It is noted that the resulting numbers reflect vehicle accumulations and that it is standard practice to increase the accumulations by a minimum of five (5) percent in order to identify the actual parking needs.

### **C-3 PARKING ESTIMATES**

The Development Summary (Exhibit No. 25) shows that four Development Zones (C, D, F and G) would have more than one development use. Therefore, shared parking analyses were performed for each of those four Zones. Presented in Exhibits No. 26 through 29 are the hourly vehicle accumulations generated by the various uses and the total hourly accumulations within each of the Zones.

Exhibit No. 30 presents the hourly accumulations of all the Zones, including those with one use, as well as the total hourly vehicle accumulations within the site. As the Exhibit shows, when the shared parking principals are applied to the whole site, the peak on-site vehicle accumulation will be 6,229 vehicles at 10:00 AM. However, as previously noted, it is standard practice to provide a minimum of five (5) percent excess parking. Therefore, based on the shared parking calculations, the overall Campus would need about 6,540 parking spaces.

**C-4 PARKING RECOMMENDATION**

The shared parking calculations are based on the assumption that all spaces will be available on a first-come basis and that employees and residents could park anywhere on the site. However, the size of the development and the distances between the various Zones would make shared parking for the whole site impractical. Therefore, it is recommended that the peak accumulation in each Zone be used to determine the number of spaces within each Zone, which should exceed the peak vehicle accumulations by a minimum of five (5) percent. Under this condition, the number of parking spaces needed within the Campus will be 7,352 spaces.

Respectfully submitted,  
**MICHAEL MARIS ASSOCIATES, INC.**



Michael Maris  
President



John Maris  
Vice President



Zafar Iqbal, P.E.  
Vice President  
mm  
att.

**APPENDIX A**

**EXHIBITS**



**MICHAEL MARIS ASSOCIATES, INC.**

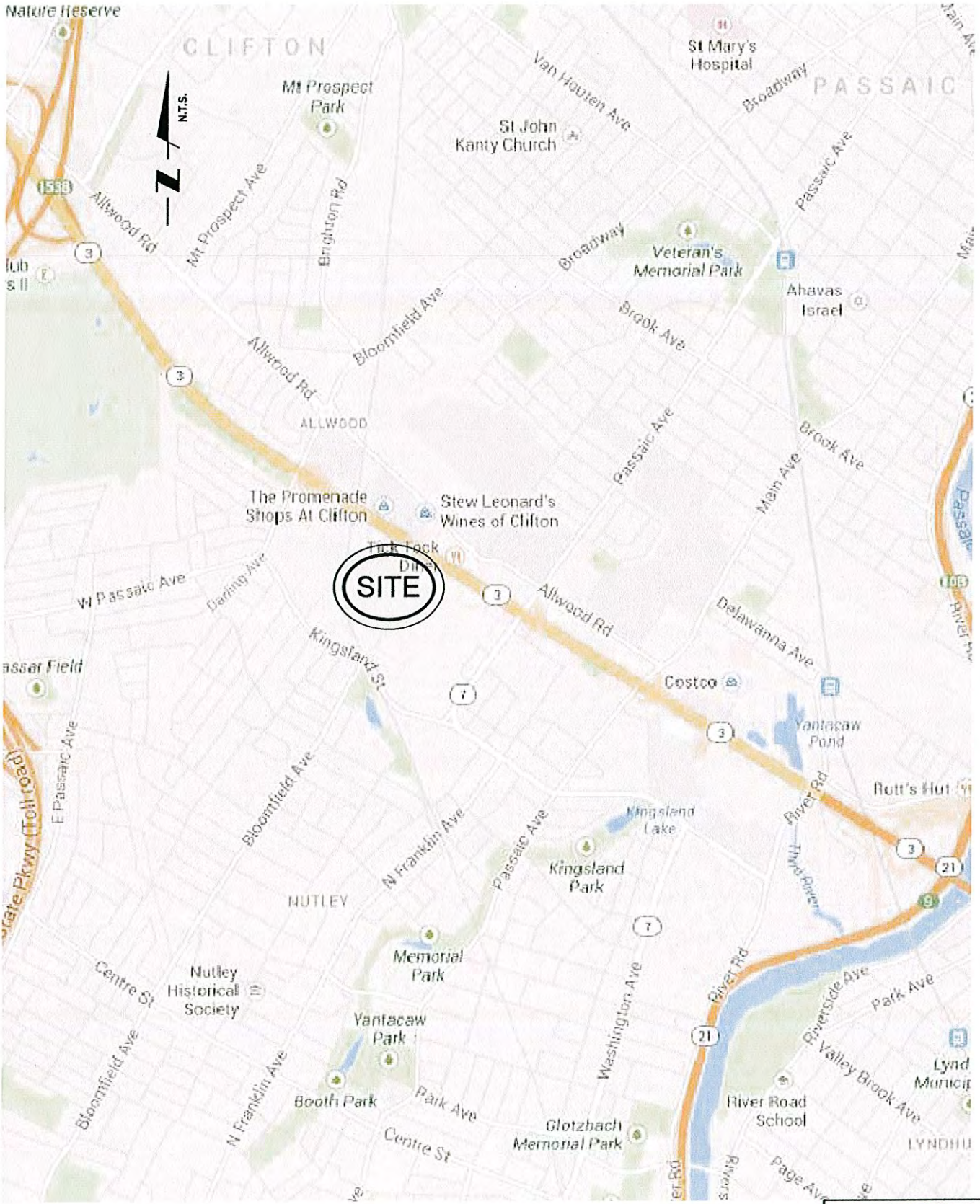


EXHIBIT NO. 1

**SITE LOCATION MAP**

**Roche Development  
Nutley & Clifton, New Jersey**

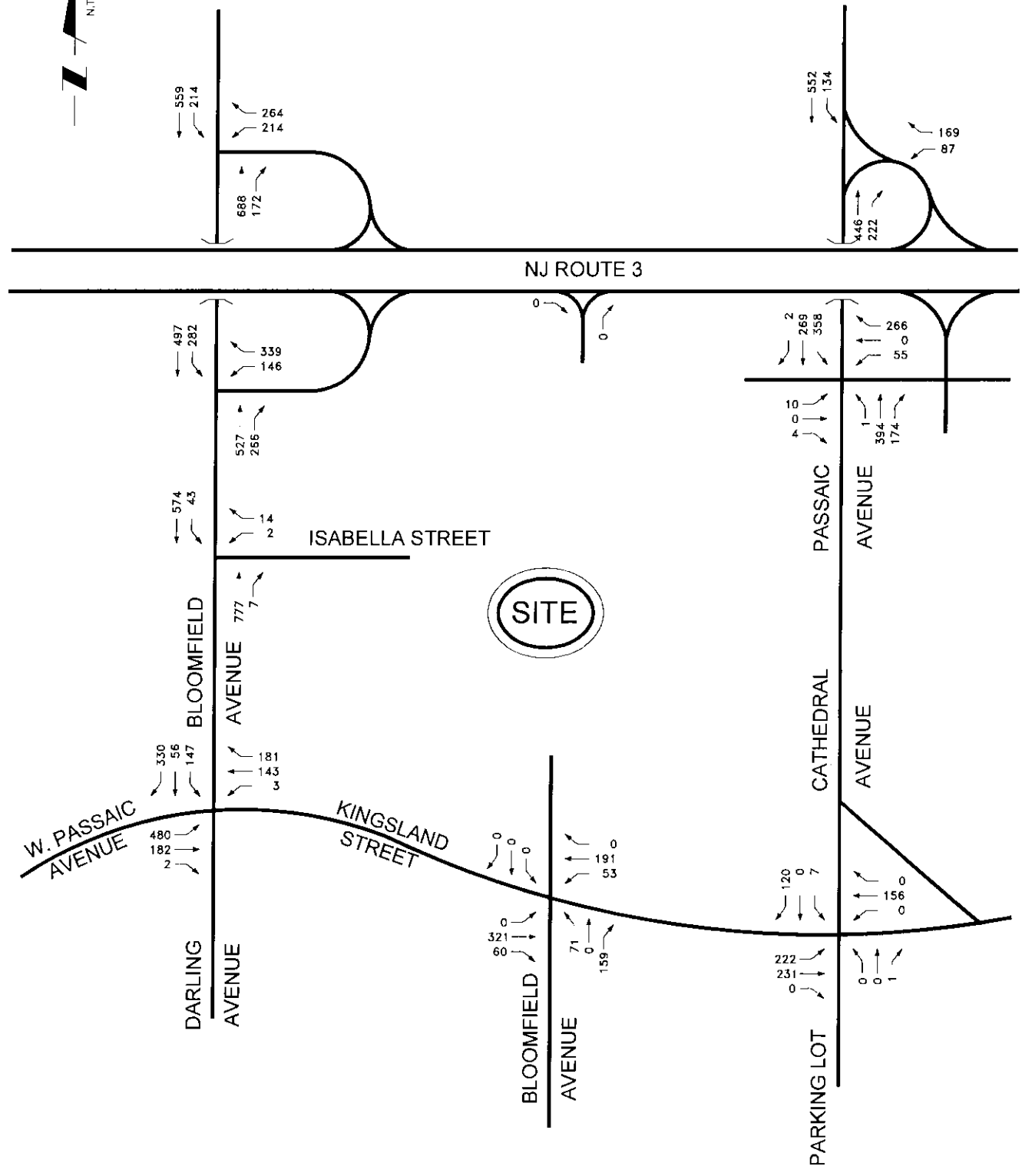
Project No. 13-112

November, 2013



**MICHAEL MARIS ASSOCIATES, INC.**





SITE

EXHIBIT NO. 2

PEAK AM HIGHWAY HOUR  
2013 EXISTING TRAFFIC VOLUMES

Roche Redevelopment  
Nutley & Clifton, New Jersey

Project No. 13-112

November 2013



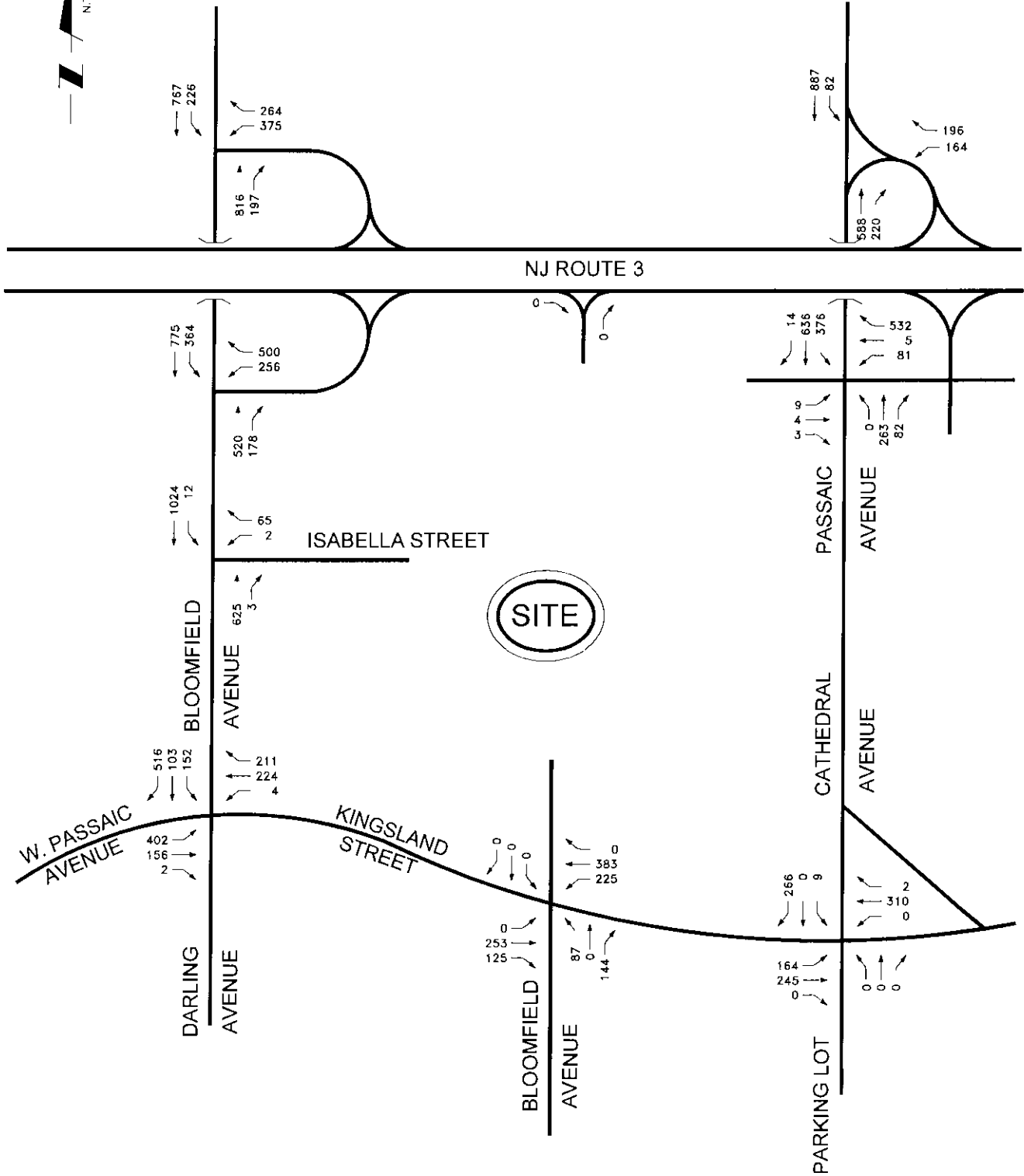


EXHIBIT NO. 3



MICHAEL MARIS ASSOCIATES, INC.

PEAK PM HIGHWAY HOUR  
2013 EXISTING TRAFFIC VOLUMES

Roche Redevelopment  
Nutley & Clifton, New Jersey

Project No. 13-112

November 2013

	PEAK AM HOUR			PEAK PM HOUR		
	Enter	Exit	Total	Enter	Exit	Total
<b>Light Industrial (375,000 GSF)</b>						
New Trips	311	42	353	45	334	379
Mass Transit Credit (10%)	-31	-4	-35	-5	-33	-38
Car Pool/Van Pool Credit(10%)	-31	-4	-35	-5	-33	-38
<b>Net New Trips</b>	<b>249</b>	<b>34</b>	<b>282</b>	<b>36</b>	<b>267</b>	<b>303</b>
<b>Office (679,000 GSF)</b>						
New Trips	780	106	886	143	696	839
Mass Transit Credit (10%)	-78	-11	-89	-14	-70	-84
Car Pool/Van Pool Credit(10%)	-78	-11	-89	-14	-70	-84
<b>Net New Trips</b>	<b>624</b>	<b>85</b>	<b>709</b>	<b>114</b>	<b>557</b>	<b>671</b>
<b>Bio Tech/R&amp;D (1,509,00 GSF)</b>						
New Trips	1,143	234	1,377	188	1,067	1,255
Mass Transit Credit (10%)	-114	-23	-138	-19	-107	-126
Car Pool/Van Pool Credit(10%)	-114	-23	-138	-19	-107	-126
<b>Net New Trips</b>	<b>914</b>	<b>187</b>	<b>1,102</b>	<b>150</b>	<b>854</b>	<b>1,004</b>
<b>Retail/Commercial (215,000GSF)</b>						
New Trips	451	277	728	480	520	1,000
Internal Credit (80%)	-361	-222	-582	-384	-416	-800
<b>Net New Trips</b>	<b>90</b>	<b>55</b>	<b>146</b>	<b>96</b>	<b>104</b>	<b>200</b>
<b>Hotel (200 Rooms)</b>						
<b>New Trips</b>	<b>63</b>	<b>43</b>	<b>106</b>	<b>61</b>	<b>59</b>	<b>120</b>
<b>Residential (328 Units)</b>						
Stick and Live/Work over retail)	38	83	121	85	61	146
Internal Credit (15%)	-6	-12	-18	-13	-9	-22
Mass Transit Credit (10%)	-4	-8	-12	-9	-6	-15
Car Pool/Van Pool Credit(10%)	-4	-8	-12	-9	-6	-15
<b>Net New Trips</b>	<b>25</b>	<b>54</b>	<b>79</b>	<b>55</b>	<b>40</b>	<b>95</b>
<b>Medical Office (75,000 GSF)</b>						
<b>New Trips</b>	<b>142</b>	<b>37</b>	<b>179</b>	<b>63</b>	<b>162</b>	<b>225</b>
<b>TOTAL NEW TRIPS</b>	<b>2,107</b>	<b>495</b>	<b>2,602</b>	<b>576</b>	<b>2,042</b>	<b>2,618</b>
<b>Age Restricted Townhouse (37 Units)</b>						
New Trips	2	5	7	6	5	11
<b>High End Condominium (447 Units)</b>						
New Trips	41	136	177	204	119	323
<b>TOTAL NEW TRIPS</b>	<b>43</b>	<b>141</b>	<b>184</b>	<b>210</b>	<b>124</b>	<b>334</b>

EXHIBIT NO. 4



MICHAEL MARIS ASSOCIATES, INC.

## TRIP GENERATION TABLE

Roche Development  
Nutley & Clifton, New Jersey

Project No. 13-112

November, 2013

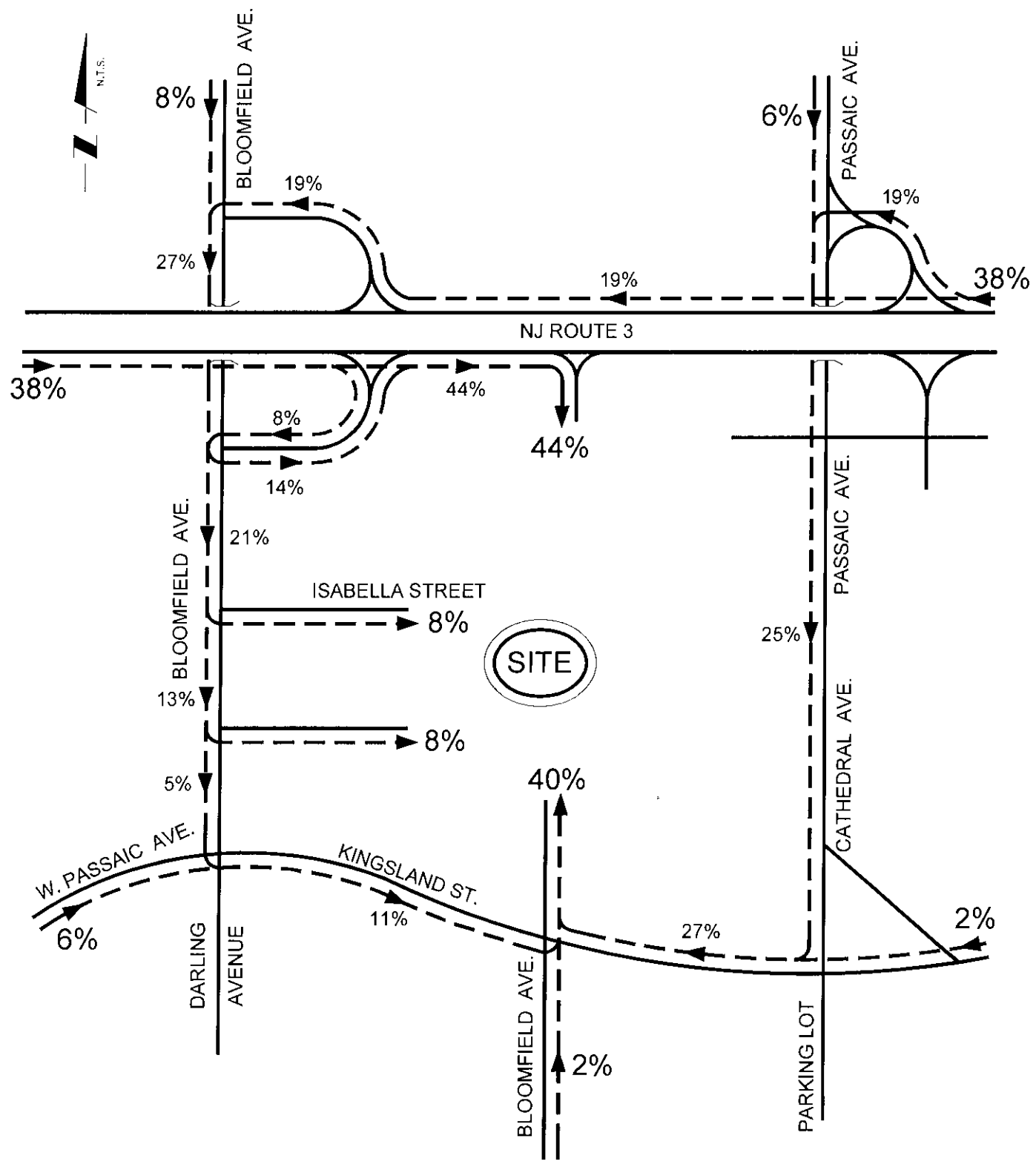


EXHIBIT NO. 5

ARRIVAL DISTRIBUTION  
MAIN SITE

Roche Redevelopment  
Nutley & Clifton, New Jersey

Project No. 13-112

November 2013



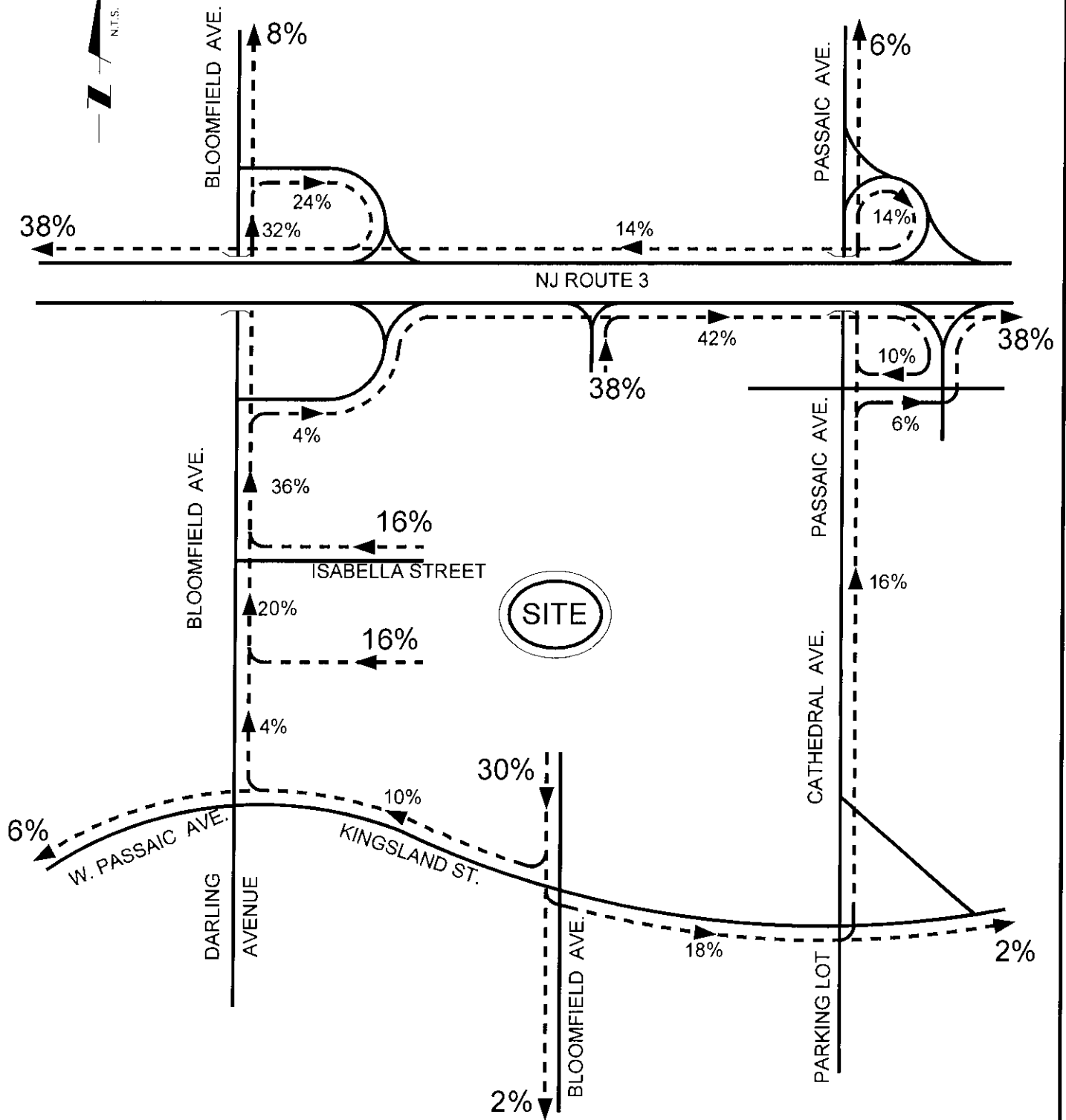


EXHIBIT NO. 6



MICHAEL MARIS ASSOCIATES, INC.

DEPARTURE DISTRIBUTION  
MAIN SITE

Roche Redevelopment  
Nutley & Clifton, New Jersey

Project No. 13-112

November 2013

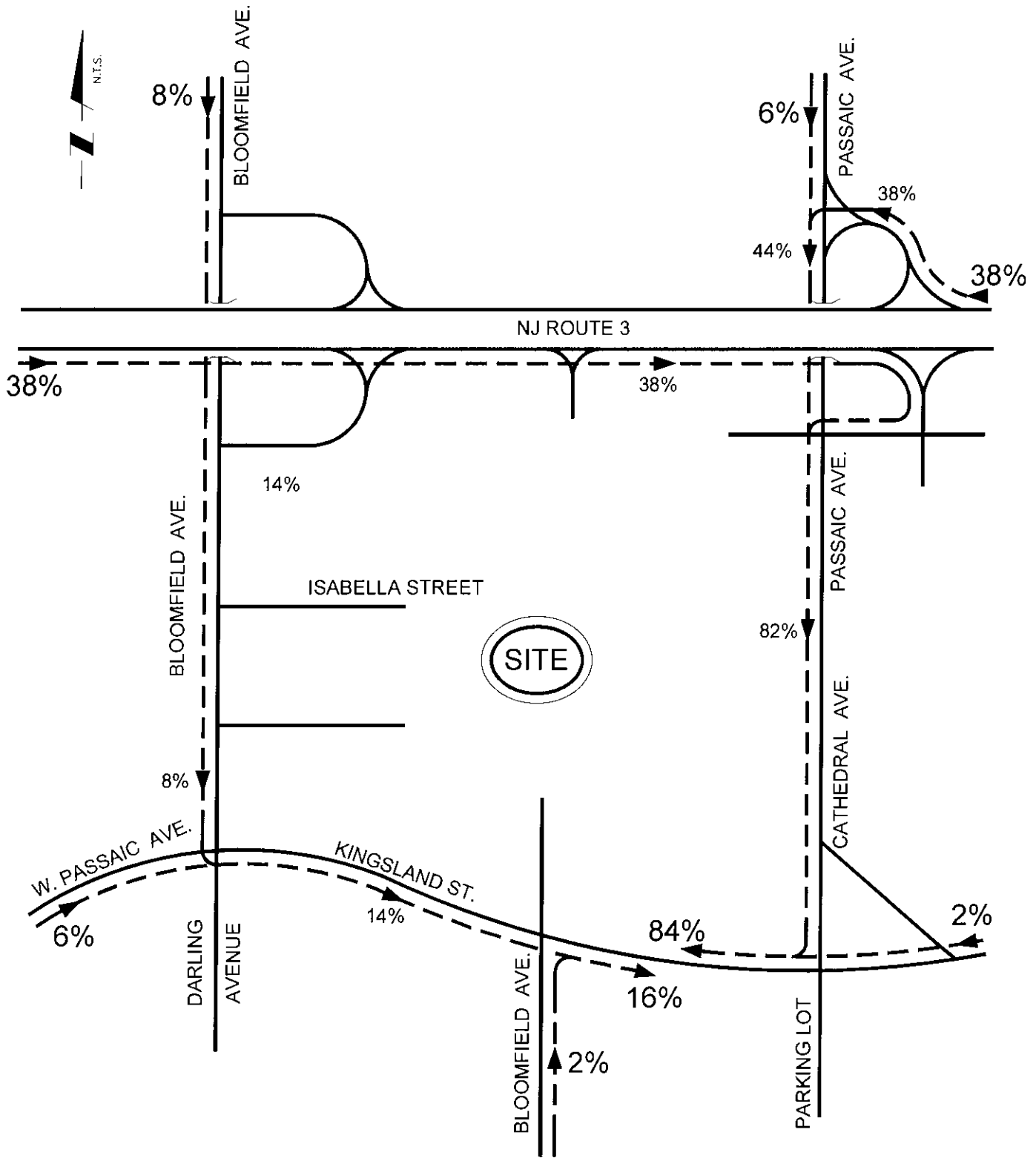


EXHIBIT NO. 7

ARRIVAL DISTRIBUTION  
AGE RESTRICTED AREA

Roche Redevelopment  
Nutley & Clifton, New Jersey

Project No. 13-112

November 2013



MICHAEL MARIS ASSOCIATES, INC.

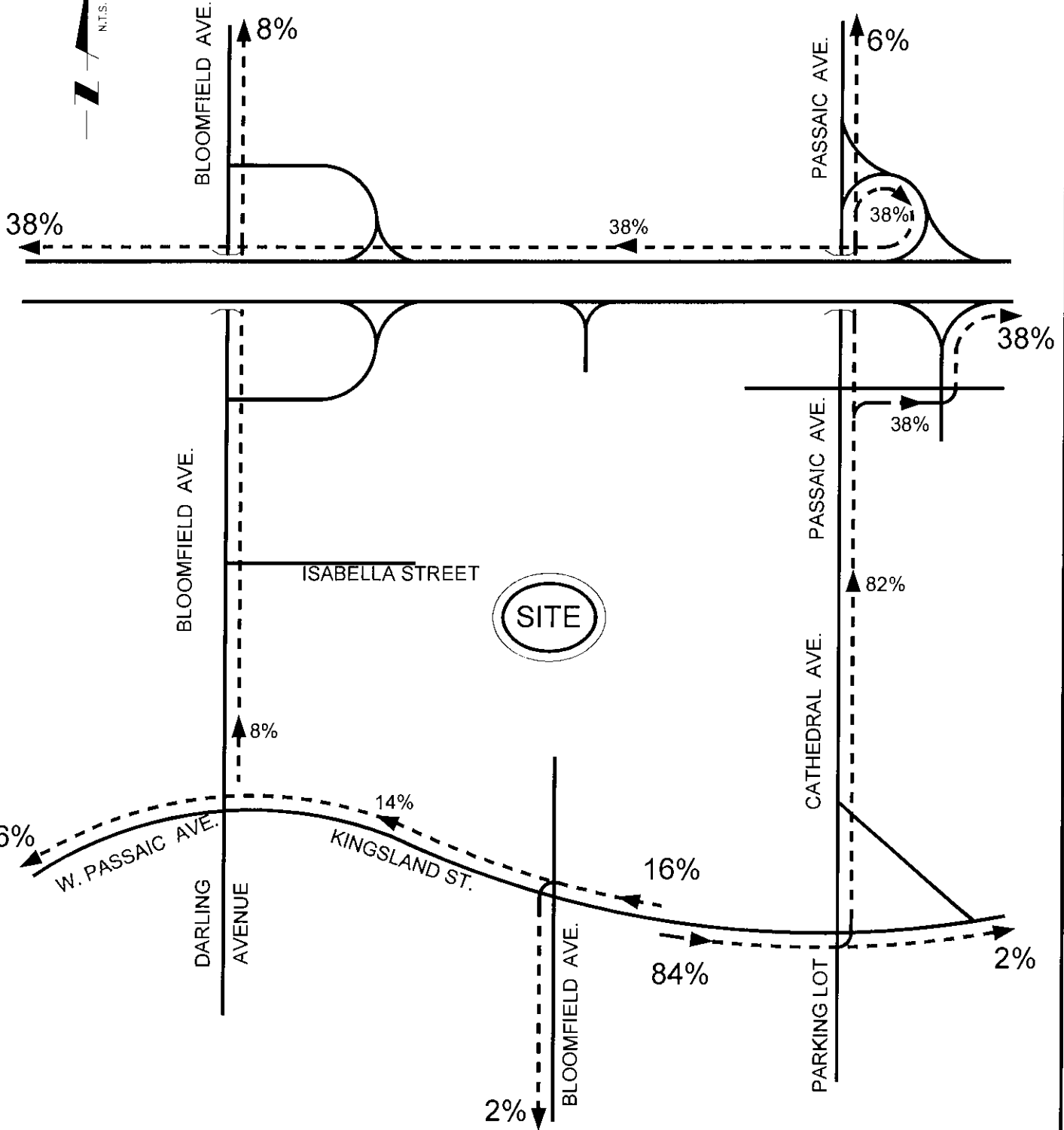


EXHIBIT NO. 8

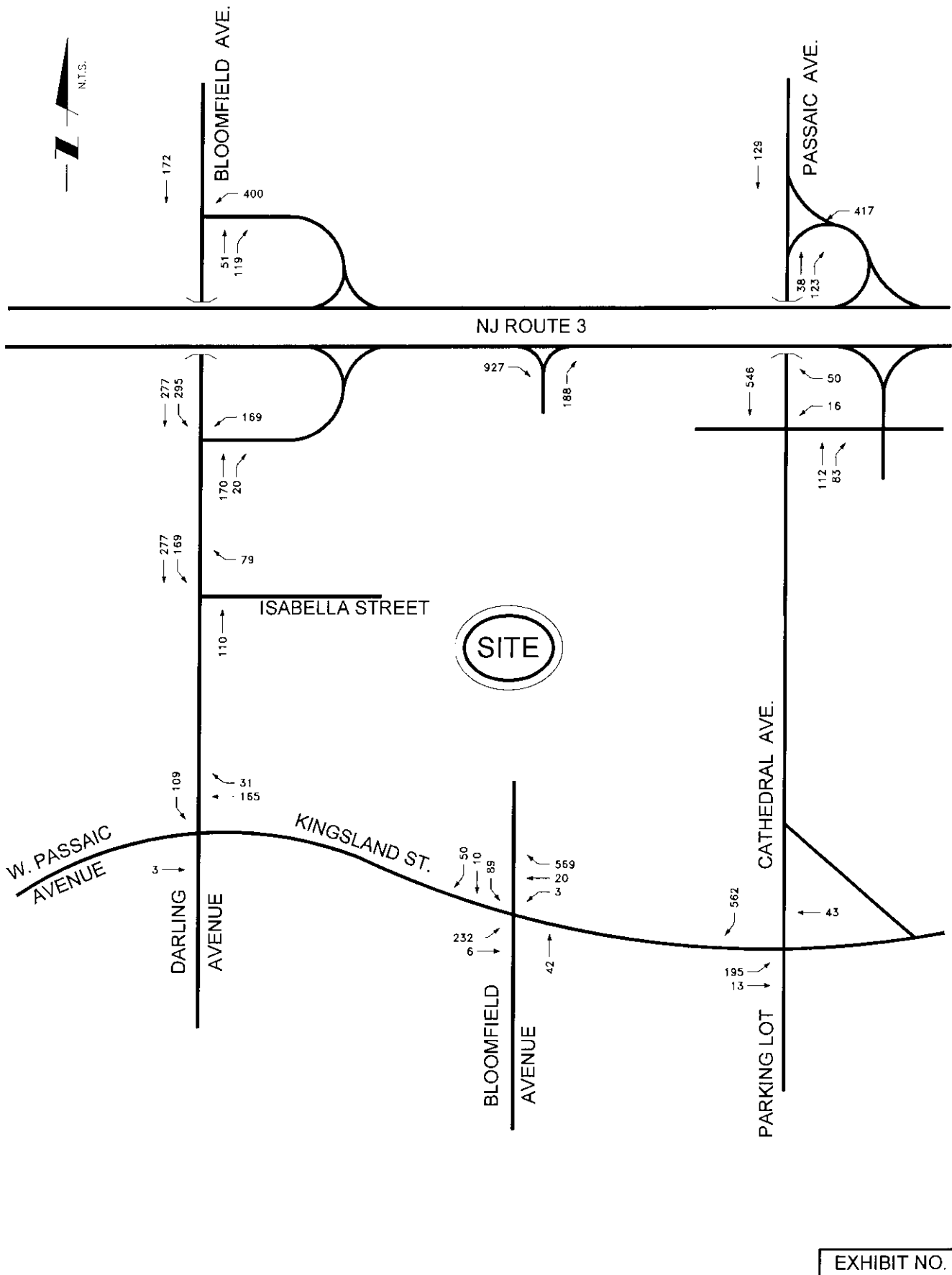


EXHIBIT NO. 9



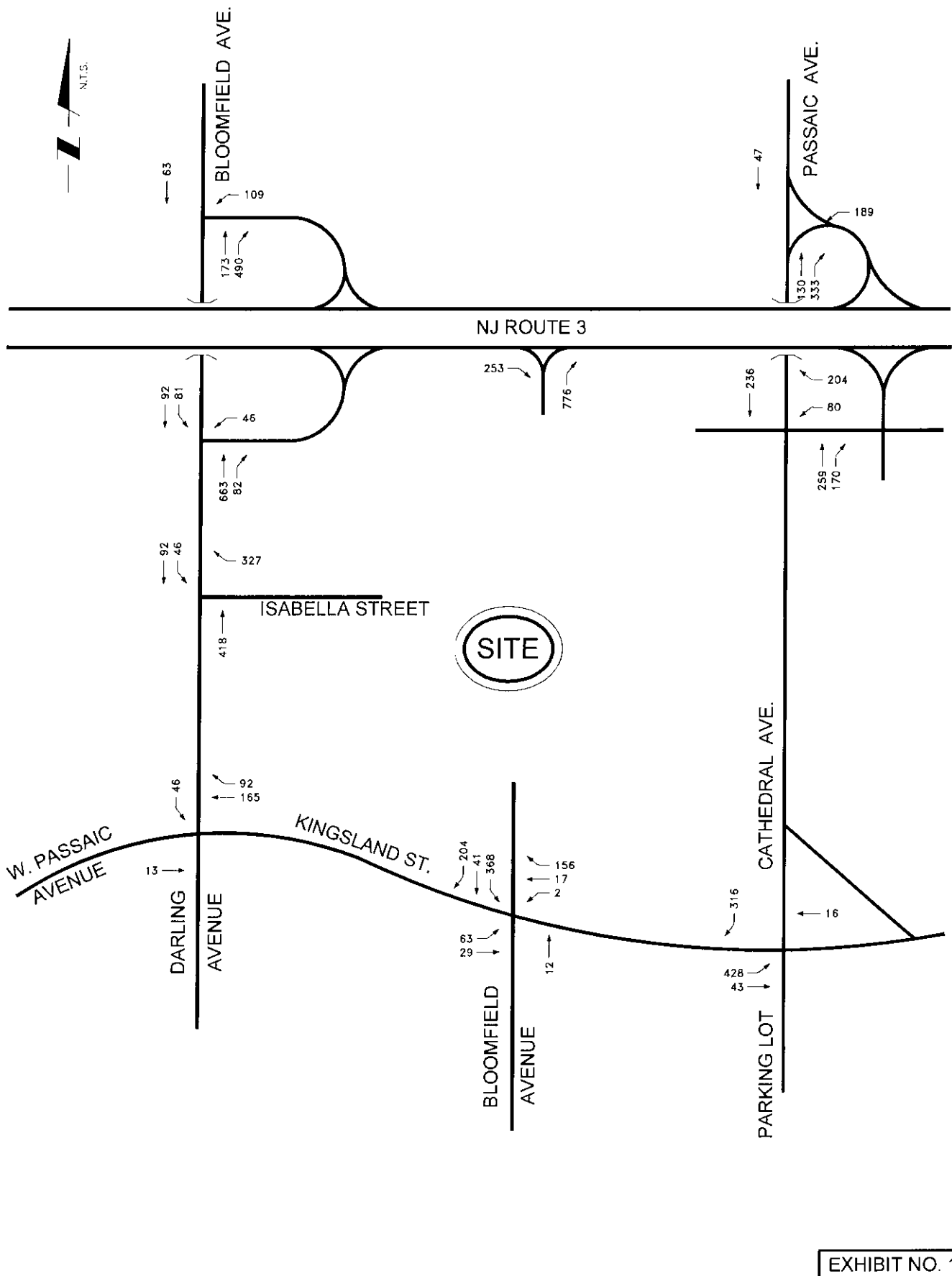


EXHIBIT NO. 10



MICHAEL MARIS ASSOCIATES, INC.

PEAK PM TRAFFIC VOLUMES  
SITE TRAFFIC VOLUMES

Roche Redevelopment  
Nutley & Clifton, New Jersey

Project No. 13-112

November 2013

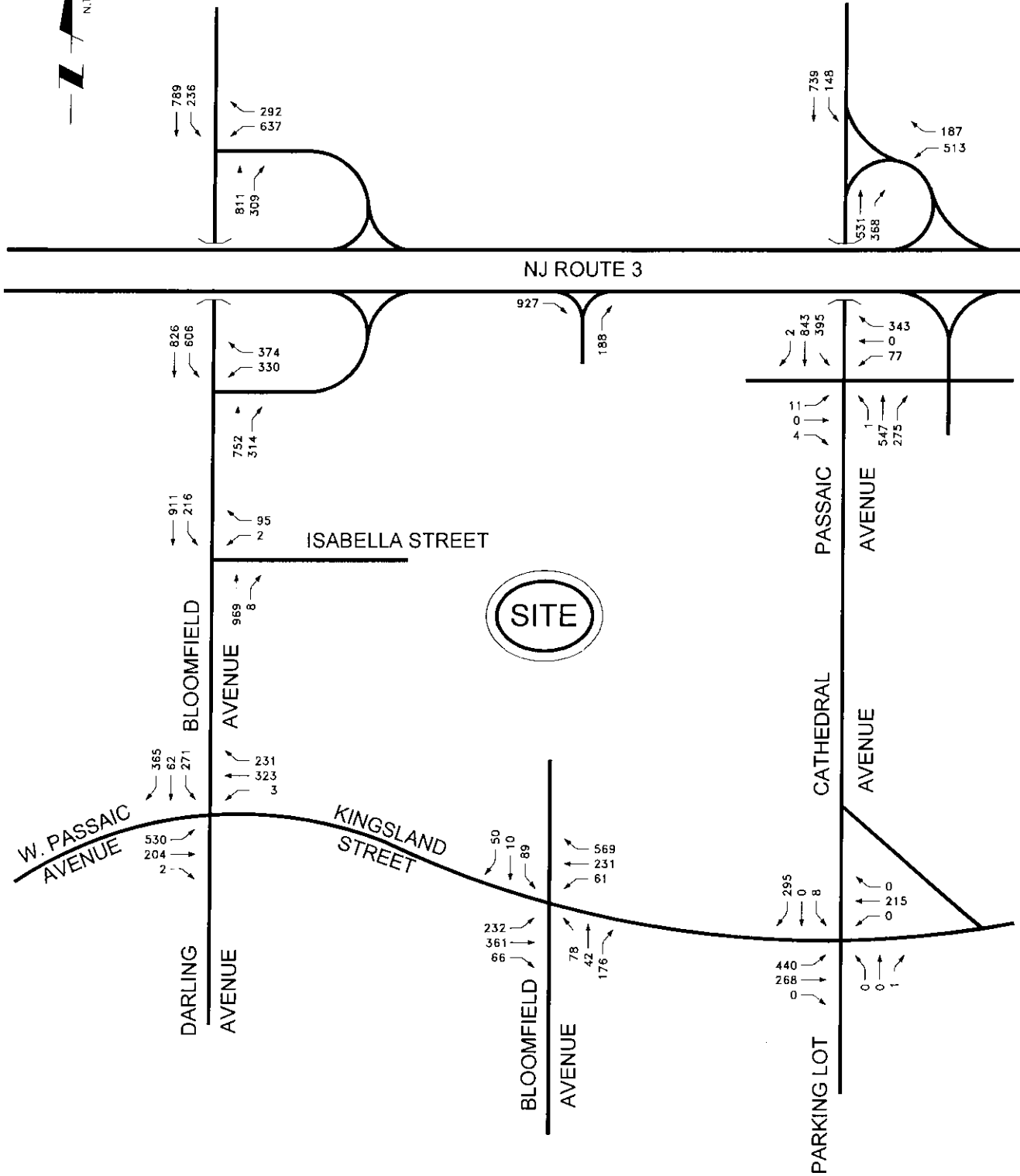


EXHIBIT NO. 11



MICHAEL MARIS ASSOCIATES, INC.

PEAK AM HIGHWAY HOUR  
2023 BUILD TRAFFIC VOLUMES

Roche Redevelopment  
Nutley & Clifton, New Jersey

Project No. 13-112

November 2013

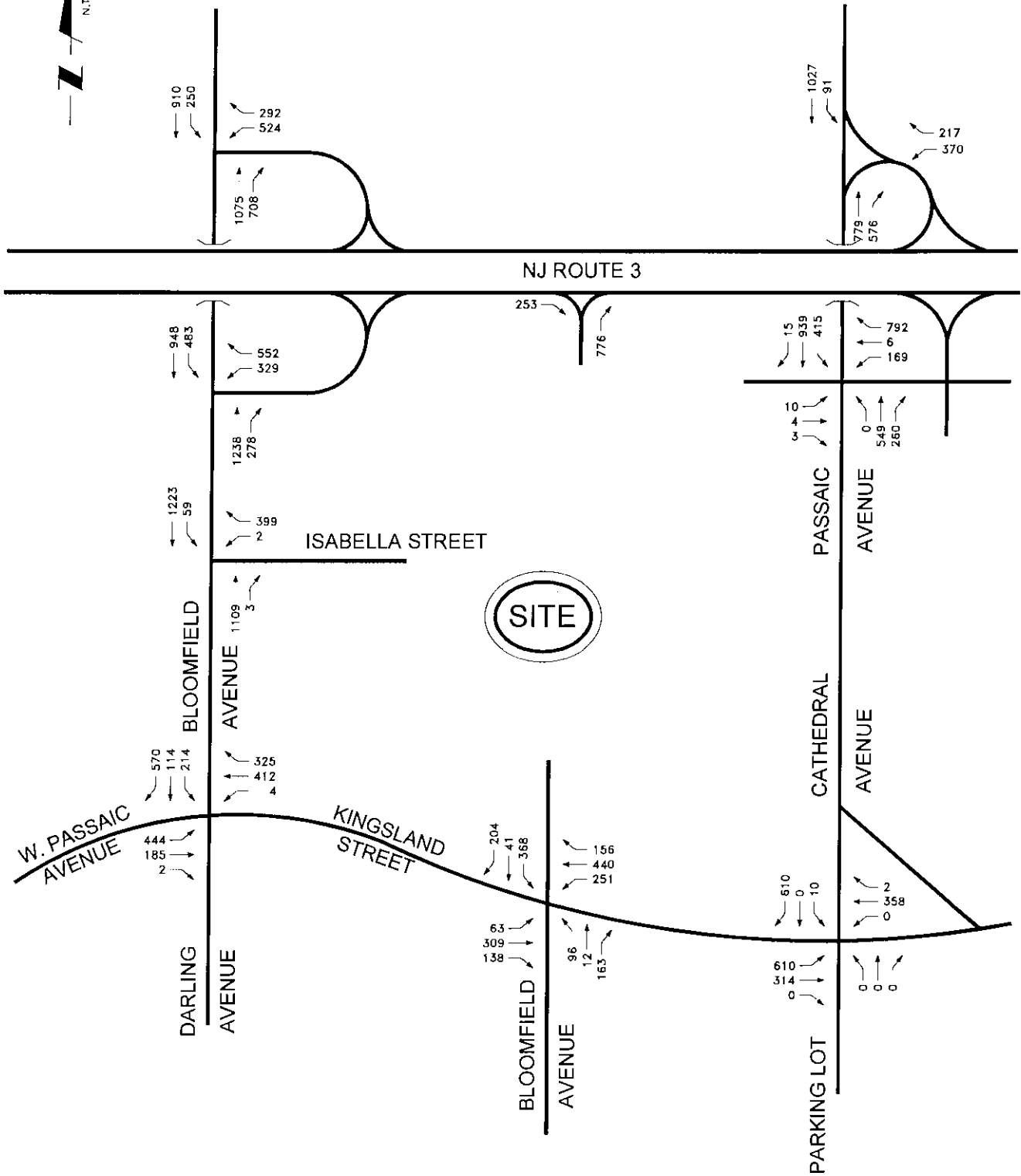


EXHIBIT NO. 12



MICHAEL MARIS ASSOCIATES, INC.

PEAK PM HIGHWAY HOUR  
2023 BUILD TRAFFIC VOLUMES

Roche Redevelopment  
Nutley & Clifton, New Jersey

Project No. 13-112

November 2013

PEAK AM HIGHWAY HOUR			2013 Existing Traffic Volumes	2023 No-Build Traffic Volumes	Roche Redevelopment								Total New Traffic Volumes	2023 Build Traffic Volumes	
Growth Factor					OTHER				AGE RESTRICTED						
					Enter		Exit		Enter		Exit				
1.10			%	Vol	%	Vol	%	Vol	%	Vol					
Bloomfield Ave. and Ramp from Rt 3 WB	Westbound	Left	214	236	19	400		0		0		0	400	637	
		Right	264	292		0		0		0		0	0	292	
	Northbound	Thru	688	760		0	8	40		0	8	11	51	811	
		Right	172	190		0	24	119		0		0	119	309	
	Southbound	Left	214	236		0		0		0		0	0	236	
		Thru	559	617	8	169		0	8	3		0	172	789	
<b>Int # 8</b>	<b>Intersection</b>		<b>2,111</b>	<b>2,332</b>	<b>27</b>	<b>569</b>	<b>32</b>	<b>158</b>	<b>8</b>	<b>3</b>	<b>8</b>	<b>11</b>	<b>742</b>	<b>3074</b>	
Bloomfield Ave. and Ramp from Rt 3 EB	Westbound	Left	146	161	8	169		0		0		0	169	330	
		Right	339	374		0		0		0		0	0	374	
	Northbound	Thru	527	582		0	32	158		0	8	11	170	752	
		Right	266	294		0	4	20		0		0	20	314	
	Southbound	Left	282	312	14	295		0		0		0	295	606	
		Thru	497	549	13	274		0	8	3		0	277	826	
<b>Int # 7</b>	<b>Intersection</b>		<b>2,057</b>	<b>2,272</b>	<b>35</b>	<b>737</b>	<b>36</b>	<b>178</b>	<b>8</b>	<b>3</b>	<b>8</b>	<b>11</b>	<b>930</b>	<b>3203</b>	
Bloomfield Ave. and Isabella Street	Westbound	Left	2	2		0		0		0		0	0	2	
		Right	14	15		0	16	79		0		0	79	95	
	Northbound	Thru	777	858		0	20	99		0	8	11	110	969	
		Right	7	8		0		0		0		0	0	8	
	Southbound	Left	43	47	8	169		0		0		0	169	216	
		Thru	574	634	13	274		0	8	3		0	277	911	
<b>Int # 6</b>	<b>Intersection</b>		<b>1,417</b>	<b>1,565</b>	<b>21</b>	<b>442</b>	<b>36</b>	<b>178</b>	<b>8</b>	<b>3</b>	<b>8</b>	<b>11</b>	<b>635</b>	<b>2201</b>	
W. Passaic Ave/ Kingsland St and Darling Ave.	Eastbound	Left	480	530		0		0		0		0	0	530	
		Thru	182	201		0		0	6	3		0	3	204	
		Right	2	2		0		0		0		0	0	2	
	Westbound	Left	3	3		0		0		0		0	0	3	
		Thru	143	158	6	126	6	30		0	6	8	165	323	
		Right	181	200		0	4	20		0	8	11	31	231	
	Southbound	Left	147	162	5	105		0	8	3		0	109	271	
		Thru	56	62		0		0		0		0	0	62	
		Right	330	365		0		0		0		0	0	365	
	<b>Int # 5</b>	<b>Intersection</b>		<b>1,524</b>	<b>1,683</b>	<b>11</b>	<b>232</b>	<b>10</b>	<b>50</b>	<b>14</b>	<b>6</b>	<b>14</b>	<b>20</b>	<b>307</b>	<b>1990</b>
	Kingsland St and Bloomfield Ave/ Site Entrance	Eastbound	Left	0	0	11	232		0		0		0	232	232
			Thru	321	355		0		0	14	6		0	6	361
Right			60	66		0		0		0		0	0	66	
Westbound		Left	53	59		0		0		0	2	3	3	61	
		Thru	191	211		0		0		0	14	20	20	231	
		Right	0	0	27	569		0		0		0	569	569	
Northbound		Left	71	78		0		0		0		0	0	78	
		Thru	0	0	2	42		0		0		0	42	42	
		Right	159	176		0		0	2	1		0	1	176	
Southbound		Left	0	0		0	18	89		0		0	89	89	
		Thru	0	0		0	2	10		0		0	10	10	
		Right	0	0		0	10	50		0		0	50	50	
<b>Int # 4</b>	<b>Intersection</b>		<b>855</b>	<b>944</b>	<b>40</b>	<b>843</b>	<b>30</b>	<b>149</b>	<b>16</b>	<b>7</b>	<b>16</b>	<b>23</b>	<b>1021</b>	<b>1965</b>	

EXHIBIT NO. 13



MICHAEL MARIS ASSOCIATES, INC.

PEAK AM HIGHWAY HOUR  
TRAFFIC PROJECTIONS

Roche Development  
Nutley & Clifton, New Jersey

Project No. 13-112

November, 2013

PEAK AM HIGHWAY HOUR			2013 Existing Traffic Volumes	2023 No-Build Traffic Volumes	Roche Redevelopment								Total New Traffic Volumes	2023 Build Traffic Volumes
Growth Factor					OTHER				AGE RESTRICTED					
					Enter		Exit		Enter		Exit			
1.10			%	Vol	%	Vol	%	Vol	%	Vol				
Kingsland St and Cathedral Ave/ Parking lot Entrance	Eastbound	Left	222	245	0	16	79	0	82	116	195	440		
		Thru	231	255	0	2	10	0	2	3	13	268		
		Right	0	0	0	0	0	0	0	0	0	0		
	Westbound	Left	0	0	0	0	0	0	0	0	0	0		
		Thru	156	172	2	42	0	2	1	0	43	215		
		Right	0	0	0	0	0	0	0	0	0	0		
	Northbound	Left	0	0	0	0	0	0	0	0	0	0		
		Thru	0	0	0	0	0	0	0	0	0	0		
		Right	1	1	0	0	0	0	0	0	0	1		
	Southbound	Left	7	8	0	0	0	0	0	0	0	8		
		Thru	0	0	0	0	0	0	0	0	0	0		
		Right	120	133	25	527	0	82	35	0	562	695		
Int # 3	Intersection	737	814	27	569	18	89	84	36	84	118	813	1627	
Passaic Avenue and Ramp from Route 3 EB	Eastbound	Left	10	11	0	0	0	0	0	0	0	11		
		Thru	0	0	0	0	0	0	0	0	0	0		
		Right	4	4	0	0	0	0	0	0	0	4		
	Westbound	Left	55	61	0	0	38	16	0	16	77			
		Thru	0	0	0	0	0	0	0	0	0			
		Right	266	294	0	10	50	0	0	50	343			
	Northbound	Left	1	1	0	0	0	0	0	0	1			
		Thru	394	435	0	10	50	0	44	62	112	547		
		Right	174	192	0	6	30	0	38	54	83	275		
	Southbound	Left	358	395	0	0	0	0	0	0	395			
		Thru	269	297	25	527	0	44	19	0	546	843		
		Right	2	2	0	0	0	44	0	0	0	2		
Int # 2	Intersection	1,533	1,693	25	527	26	129	82	35	82	116	806	2500	
Passaic Avenue and Ramp from Rt 3 WB	Westbound	Left	87	96	19	400	0	38	16	0	417	513		
		Right	169	187	0	0	0	0	0	0	187			
	Northbound	Thru	446	493	0	6	30	0	6	8	38	531		
		Right	222	245	0	14	69	0	38	54	123	368		
	Southbound	Left	134	148	0	0	0	0	0	0	148			
		Thru	552	610	6	126	0	6	3	0	129	739		
Int # 1	Intersection	1,610	1,778	25	527	20	99	44	19	44	62	707	2485	
Route 3 EB and Site Driveway	Eastbound	Thru	0	0	0	0	0	0	0	0	0			
		Right	0	0	44	927	0	0	0	0	927	927		
	Northbound	Right	0	0	0	38	188	0	0	188	188			
Int # 9	Intersection	0	0	44	927	38	188	0	0	0	0	1,115	1,115	

EXHIBIT NO. 13



MICHAEL MARIS ASSOCIATES, INC.

PEAK AM HIGHWAY HOUR  
TRAFFIC PROJECTIONS (CONT.)

Roche Development  
Nutley & Clifton, New Jersey

Project No. 13-112

November, 2013

PEAK PM HIGHWAY HOUR			2013 Existing Traffic Volumes	2023 No-Build Traffic Volumes	Roche Redevelopment								Total New Traffic Volumes	2023 Build Traffic Volumes
Growth Factor	1.10	Passenger Car				Truck								
		Enter			Exit		Enter		Exit					
				%	Vol	%	Vol	%	Vol	%	Vol			
Bloomfield Ave. and Ramp from Rt 3 WB	Westbound	Left	375	414	19	109	0	0	0	0	0	109	524	
		Right	264	292		0		0		0		0	292	
	Northbound	Thru	816	901	0	8	163	0	8	10	173	1,075		
		Right	197	218	0	24	490	0	0	0	490	708		
	Southbound	Left	226	250	0	0	0	0	0	0	0	0	250	
		Thru	767	847	8	46	0	0	8	17	0	63	910	
<b>Int # 8</b>			<b>2,645</b>	<b>2,922</b>	<b>27</b>	<b>156</b>	<b>32</b>	<b>653</b>	<b>8</b>	<b>17</b>	<b>8</b>	<b>10</b>	<b>836</b>	<b>3757</b>
Bloomfield Ave. and Ramp from Rt 3 EB	Westbound	Left	256	283	8	46	0	0	0	0	0	46	329	
		Right	500	552		0		0		0		0	552	
	Northbound	Thru	520	574	0	32	653	0	8	10	663	1,238		
		Right	178	197	0	4	82	0	0	0	82	278		
	Southbound	Left	364	402	14	81	0	0	0	0	81	483		
		Thru	775	856	13	75	0	0	8	17	0	92	948	
<b>Int # 7</b>			<b>2,593</b>	<b>2,864</b>	<b>35</b>	<b>202</b>	<b>36</b>	<b>735</b>	<b>8</b>	<b>17</b>	<b>8</b>	<b>10</b>	<b>963</b>	<b>3828</b>
Bloomfield Ave. and Isabella Street	Westbound	Left	2	2		0	0	0	0	0	0	2		
		Right	65	72		0	16	327	0	0	327	399		
	Northbound	Thru	625	690	0	20	408	0	8	10	418	1,109		
		Right	3	3	0	0	0	0	0	0	0	3		
	Southbound	Left	12	13	8	46	0	0	0	0	46	59		
		Thru	1,024	1,131	13	75	0	0	8	17	0	92	1,223	
<b>Int # 6</b>			<b>1,731</b>	<b>1,912</b>	<b>21</b>	<b>121</b>	<b>36</b>	<b>735</b>	<b>8</b>	<b>17</b>	<b>8</b>	<b>10</b>	<b>883</b>	<b>2795</b>
W. Passaic Ave/ Kingsland St and Darling Ave.	Eastbound	Left	402	444		0	0	0	0	0	0	444		
		Thru	156	172	0	0	0	6	13	0	13	185		
		Right	2	2	0	0	0	0	0	0	0	2		
	Westbound	Left	4	4	0	0	0	0	0	0	0	4		
		Thru	224	247	6	35	6	123	0	6	7	165	412	
	Right	211	233	0	4	82	0	8	10	92	325			
Southbound	Left	152	168	5	29	0	0	8	17	0	46	214		
	Thru	103	114	0	0	0	0	0	0	0	114			
Right	516	570	0	0	0	0	0	0	0	0	570			
<b>Int # 5</b>			<b>1,770</b>	<b>1,955</b>	<b>11</b>	<b>63</b>	<b>10</b>	<b>204</b>	<b>14</b>	<b>29</b>	<b>14</b>	<b>17</b>	<b>314</b>	<b>2270</b>
Kingsland St and Bloomfield Ave/ Site Entrance	Eastbound	Left	0	0	11	63	0	0	0	0	63	63		
		Thru	253	279	0	0	0	14	29	0	29	309		
		Right	125	138	0	0	0	0	0	0	0	138		
	Westbound	Left	225	249	0	0	0	0	0	2	2	2	251	
		Thru	383	423	0	0	0	0	0	14	17	17	440	
		Right	0	0	27	156	0	0	0	0	0	156	156	
	Northbound	Left	87	96	0	0	0	0	0	0	0	0	96	
		Thru	0	0	2	12	0	0	0	0	0	12	12	
		Right	144	159	0	0	0	0	2	4	0	4	163	
	Southbound	Left	0	0	0	18	368	0	0	0	368	368		
		Thru	0	0	0	2	41	0	0	0	41	41		
		Right	0	0	0	10	204	0	0	0	204	204		
<b>Int # 4</b>			<b>1,217</b>	<b>1,344</b>	<b>40</b>	<b>230</b>	<b>30</b>	<b>613</b>	<b>16</b>	<b>34</b>	<b>16</b>	<b>20</b>	<b>896</b>	<b>2241</b>

EXHIBIT NO. 14



MICHAEL MARIS ASSOCIATES, INC.

PEAK PM HIGHWAY HOUR  
TRAFFIC PROJECTIONS

Roche Development  
Nutley & Clifton, New Jersey

Project No. 13-112

November, 2013

PEAK PM HIGHWAY HOUR			2013 Existing Traffic Volumes	2023 No-Build Traffic Volumes	Roche Redevelopment								Total New Traffic Volumes	2023 Build Traffic Volumes
					Passenger Car				Truck					
					Enter		Exit		Enter		Exit			
Growth Factor	1.10				576		2042		210		124			
					%	Vol	%	Vol	%	Vol	%	Vol		
Kingsland St and Cathedral Ave/ Parking lot Entrance	Eastbound	Left	164	181	0	16	327	0	82	102	428	610		
		Thru	245	271	0	2	41	0	2	2	43	314		
		Right	0	0	0	0	0	0	0	0	0	0		
	Westbound	Left	0	0	0	0	0	0	0	0	0	0		
		Thru	310	342	2	12	0	2	4	0	16	358		
		Right	2	2	0	0	0	0	0	0	0	2		
	Northbound	Left	0	0	0	0	0	0	0	0	0	0		
		Thru	0	0	0	0	0	0	0	0	0	0		
		Right	0	0	0	0	0	0	0	0	0	0		
	Southbound	Left	9	10	0	0	0	0	0	0	0	10		
		Thru	0	0	0	0	0	0	0	0	0	0		
		Right	266	294	25	144	0	82	172	0	316	610		
Int # 3	Intersection	996	1,100	27	156	18	368	84	176	84	104	804	1904	
Passaic Avenue and Ramp from Route 3 EB	Eastbound	Left	9	10	0	0	0	0	0	0	0	10		
		Thru	4	4	0	0	0	0	0	0	0	4		
		Right	3	3	0	0	0	0	0	0	0	3		
	Westbound	Left	81	89	0	0	38	80	0	0	80	169		
		Thru	5	6	0	0	0	0	0	0	0	6		
		Right	532	588	0	10	204	0	0	0	204	792		
	Northbound	Left	0	0	0	0	0	0	0	0	0	0		
		Thru	263	291	0	10	204	0	44	55	259	549		
		Right	82	91	0	6	123	0	38	47	170	260		
	Southbound	Left	376	415	0	0	0	0	0	0	0	415		
		Thru	636	703	25	144	0	44	92	0	236	939		
		Right	14	15	0	0	0	0	0	0	0	15		
Int # 2	Intersection	2,005	2,215	25	144	26	531	82	172	82	102	949	3164	
Passaic Avenue and Ramp from Rt 3 WB	Westbound	Left	164	181	19	109	0	38	80	0	189	370		
		Right	196	217	0	0	0	0	0	0	0	217		
	Northbound	Thru	588	650	0	6	123	0	6	7	130	779		
		Right	220	243	0	14	286	0	38	47	333	576		
	Southbound	Left	82	91	0	0	0	0	0	0	0	91		
		Thru	887	980	6	35	0	6	13	0	47	1,027		
Int # 1	Intersection	2,137	2,361	25	144	20	408	44	92	44	55	699	3060	
Route 3 EB and Site Driveway	Eastbound	Thru	0	0	0	0	0	0	0	0	0	0		
		Right	0	0	44	253	0	0	0	0	253	253		
Int # 9	Northbound	Right	0	0	0	38	776	0	0	0	776	776		
		Intersection	0	0	44	253	38	776	0	0	0	0	1,029	1,029

EXHIBIT NO. 14



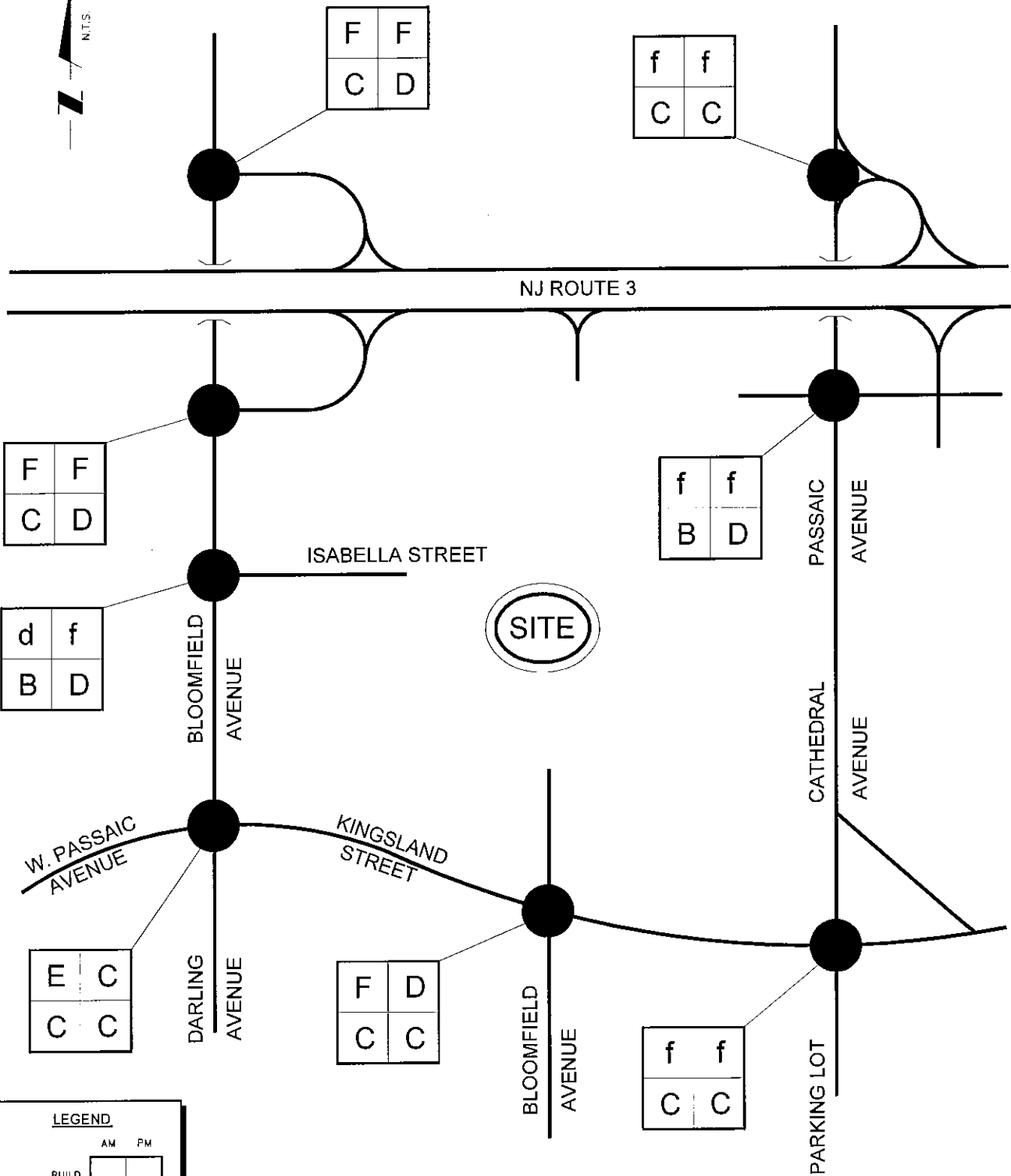
MICHAEL MARIS ASSOCIATES, INC.

PEAK PM HIGHWAY HOUR  
TRAFFIC PROJECTIONS (CONT.)

Roche Development  
Nutley & Clifton, New Jersey

Project No. 13-112

November, 2013



**LEGEND**

	AM	PM
BUILD		
BUILD W/IMPROVEMENT		

NOTES:  
 A = Signalized Intersection  
 a = Unsignalized Intersection

EXHIBIT NO. 15



MICHAEL MARIS ASSOCIATES, INC.

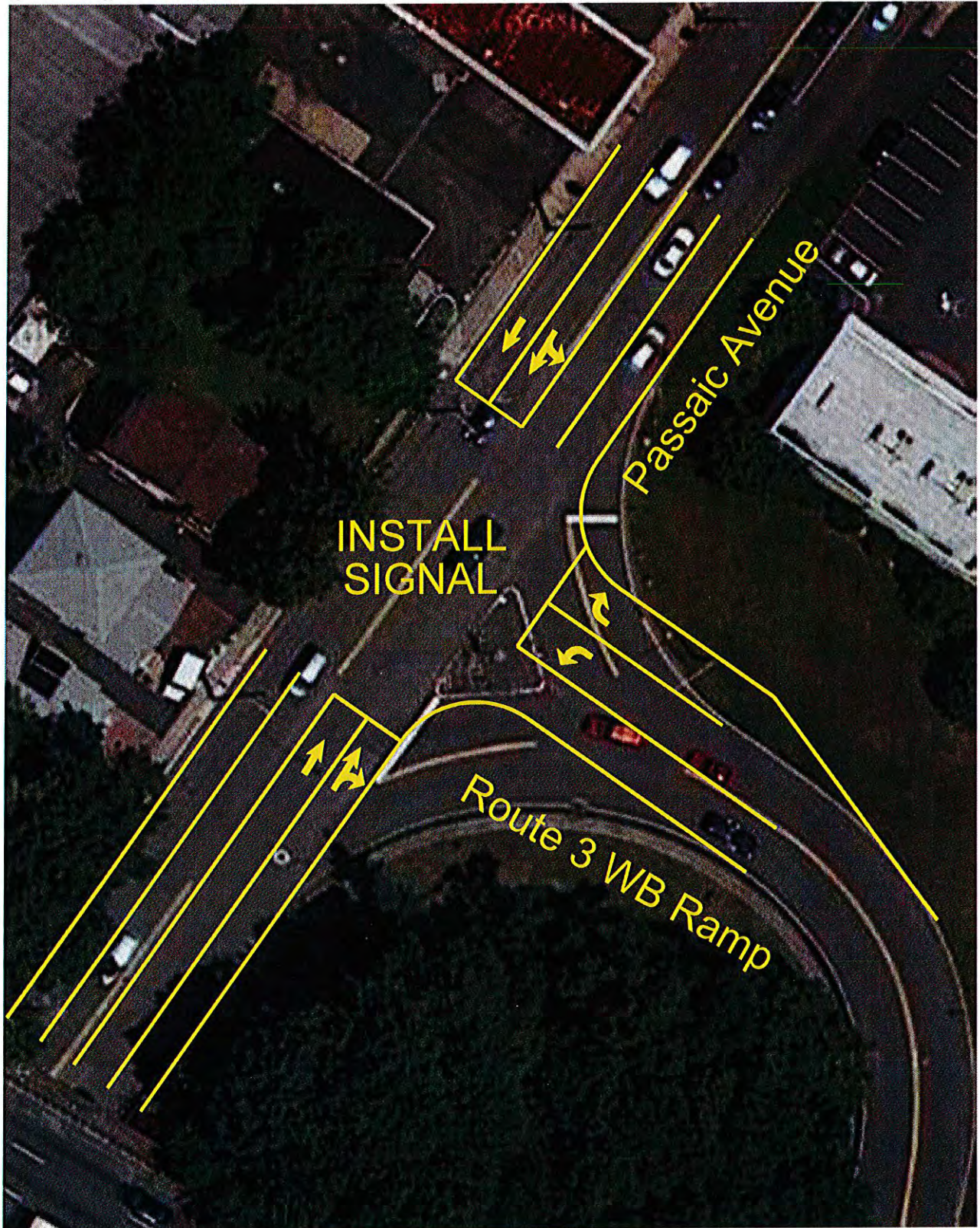
LEVEL OF SERVICE SUMMARY

Roche Redevelopment  
 Nutley & Clifton, New Jersey

Project No. 13-112

November 2013





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EXHIBIT NO. 16



**MICHAEL MARIS ASSOCIATES, INC.**

**PROPOSED IMPROVEMENTS  
PASSAIC AVENUE AND RT 3 WB RAMP**

*Roche Redevelopment  
Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013

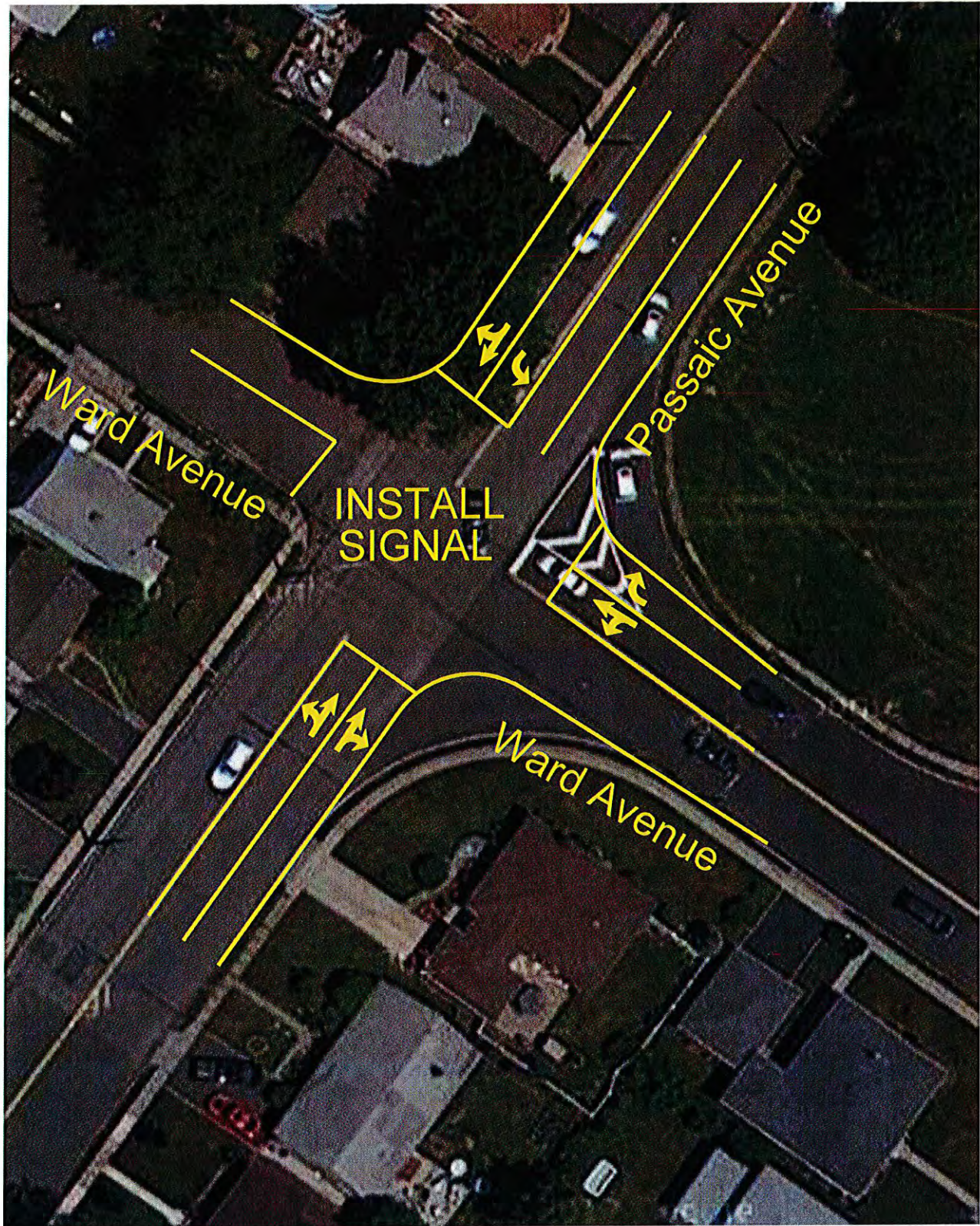


EXHIBIT NO. 17



**MICHAEL MARIS ASSOCIATES, INC.**

PROPOSED IMPROVEMENTS  
PASSAIC AVENUE AND RT 3 EB RAMP

*Roche Redevelopment  
Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013

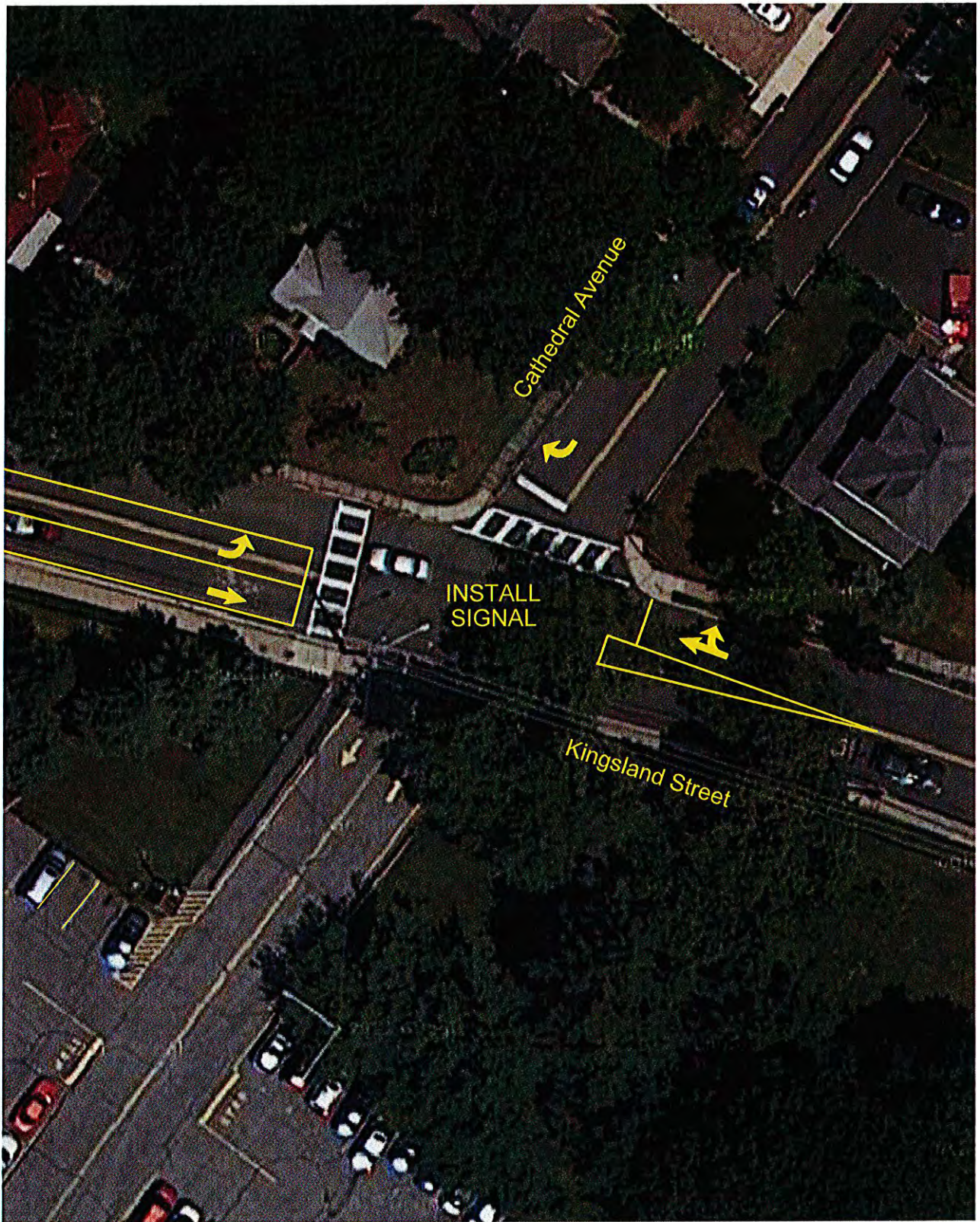


EXHIBIT NO. 18



**MICHAEL MARIS ASSOCIATES, INC.**

**PROPOSED IMPROVEMENTS  
KINGSLAND STREET AND CATHEDRAL AVENUE**

*Roche Redevelopment  
Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013

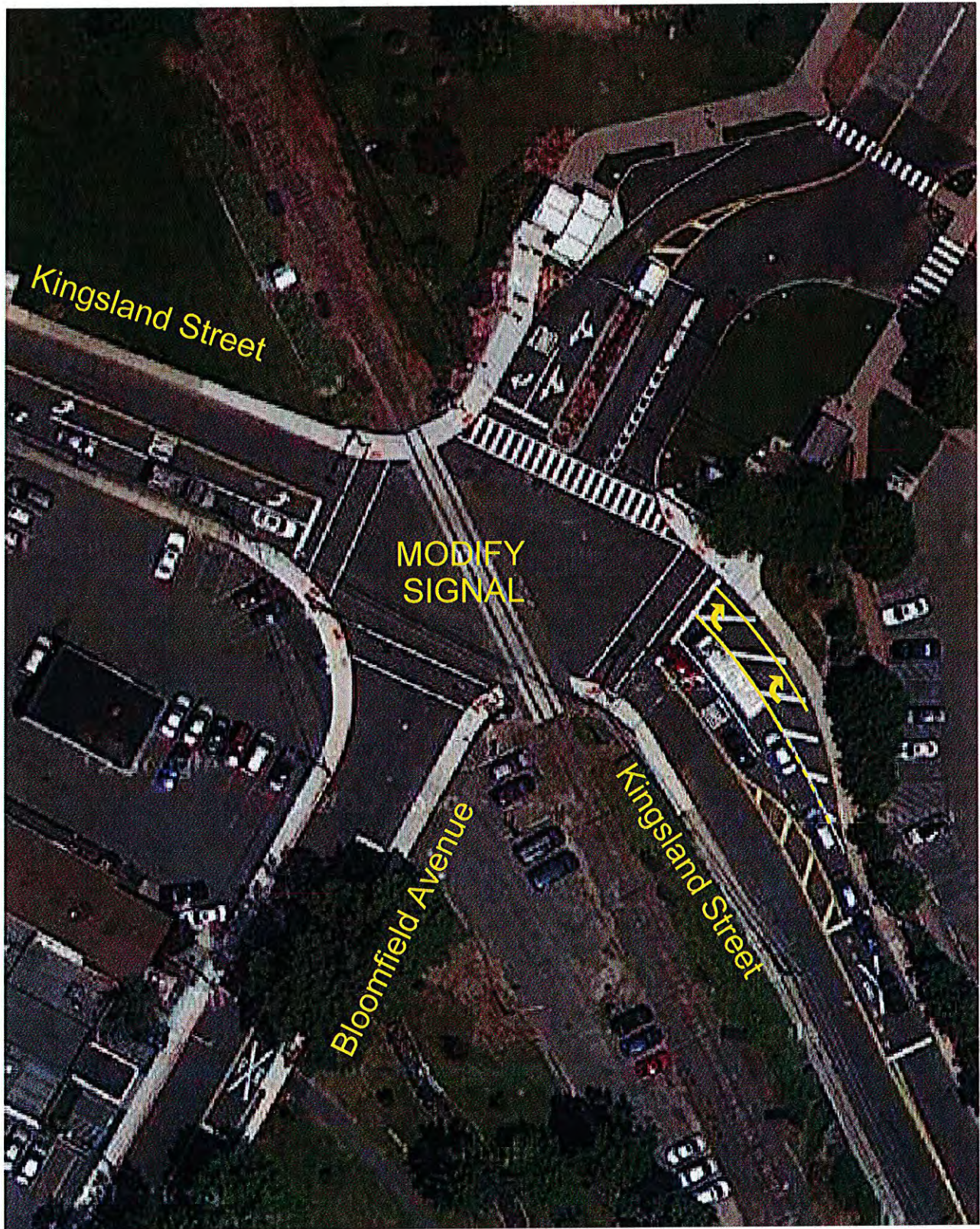


EXHIBIT NO. 19

PROPOSED IMPROVEMENTS  
KINGSLAND STREET AND BLOOMFIELD AVENUE

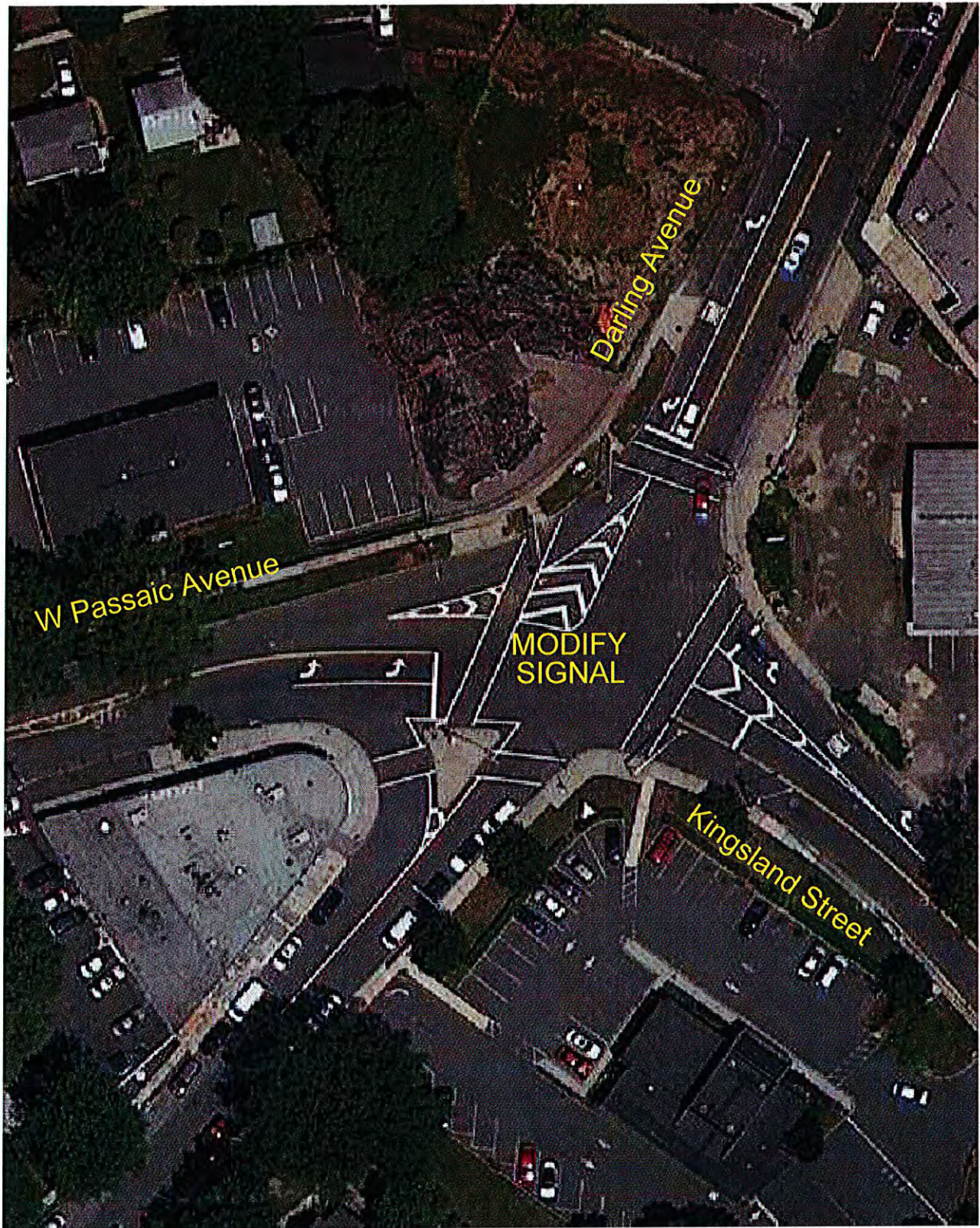
*Roche Redevelopment  
Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013



**MICHAEL MARIS ASSOCIATES, INC.**



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EXHIBIT NO. 20



MICHAEL MARIS ASSOCIATES, INC.

PROPOSED IMPROVEMENTS  
KINGSLAND STREET/ W PASSAIC STREET  
AND DARLING AVENUE  
Roche Redevelopment  
Nutley & Clifton, New Jersey


Project No. 13-112

November, 2013

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EXHIBIT NO. 21

 **MICHAEL MARIS ASSOCIATES, INC.**

PROPOSED IMPROVEMENTS  
BLOOMFIELD AVENUE AND ISABELLA STREET  
Roche Redevelopment  
Nutley & Clifton, New Jersey  
Project No. 13-112 November, 2013

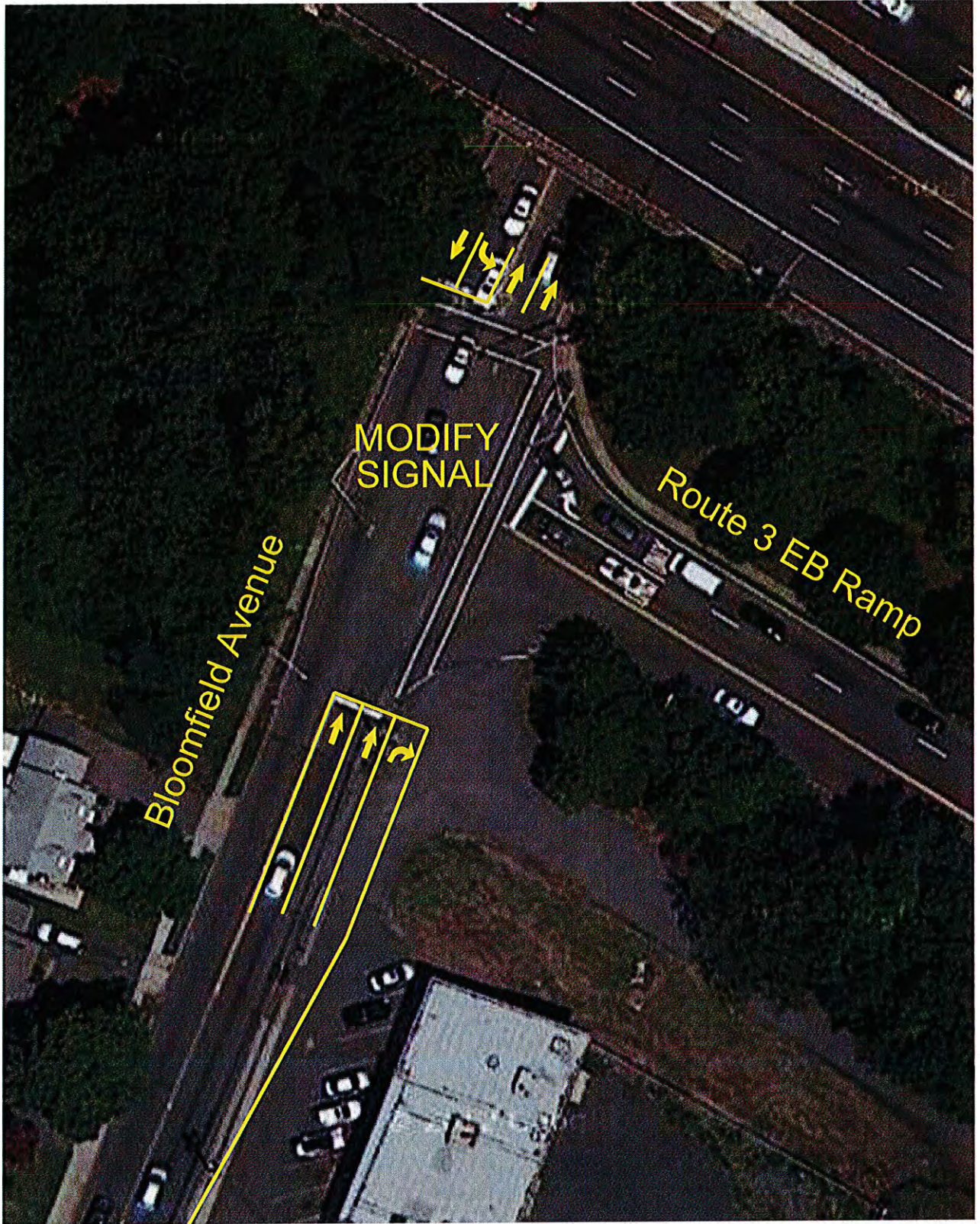


EXHIBIT NO. 22

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MICHAEL MARIS ASSOCIATES, INC.

PROPOSED IMPROVEMENTS  
BLOOMFIELD AVENUE AND ROUTE 3 EB RAMP

Roche Redevelopment  
Nutley & Clifton, New Jersey

Project No. 13-112

November, 2013

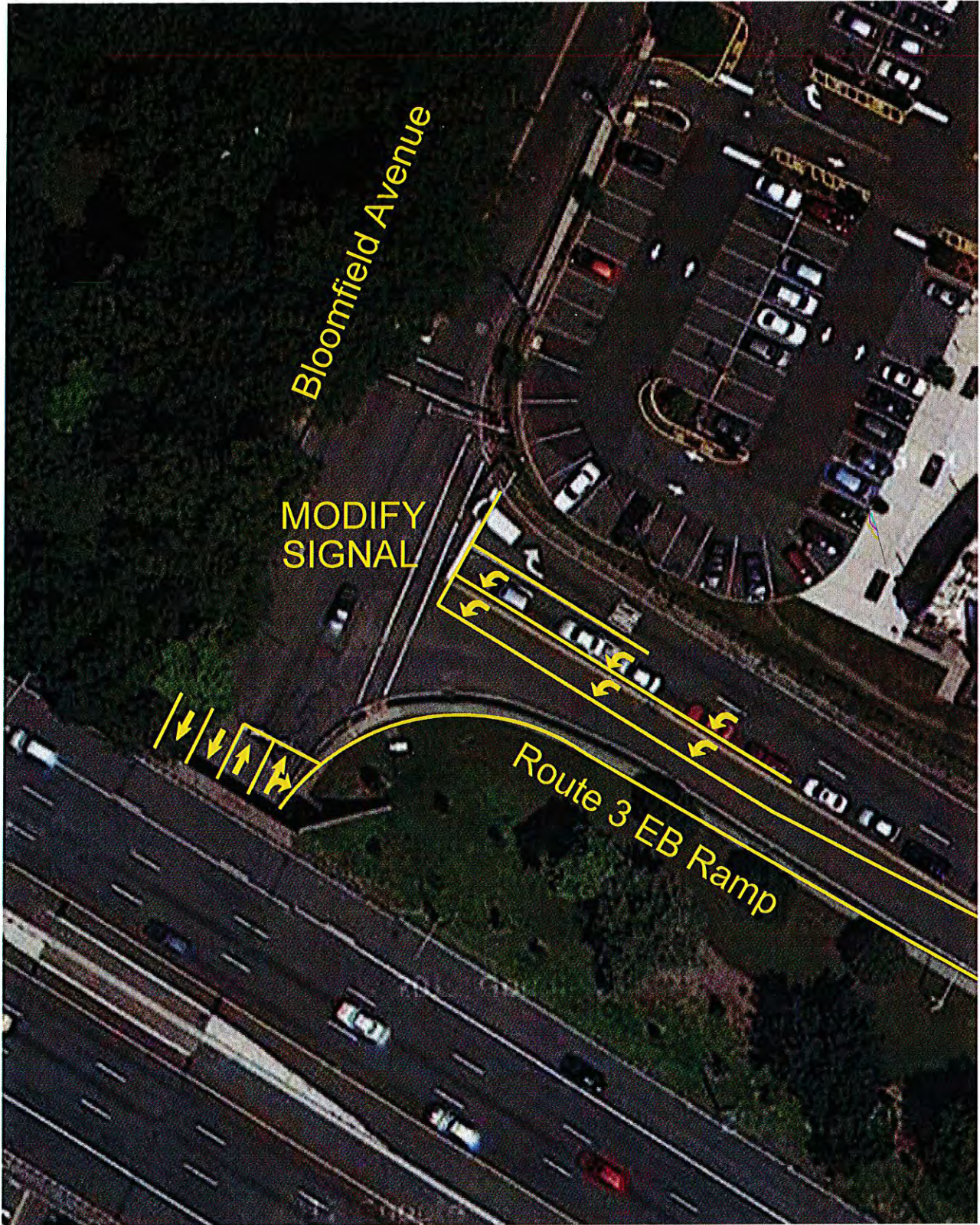


EXHIBIT NO. 23

FILE: G:\Data\CAD\06921\brd\_prt.dwg



MICHAEL MARIS ASSOCIATES, INC.

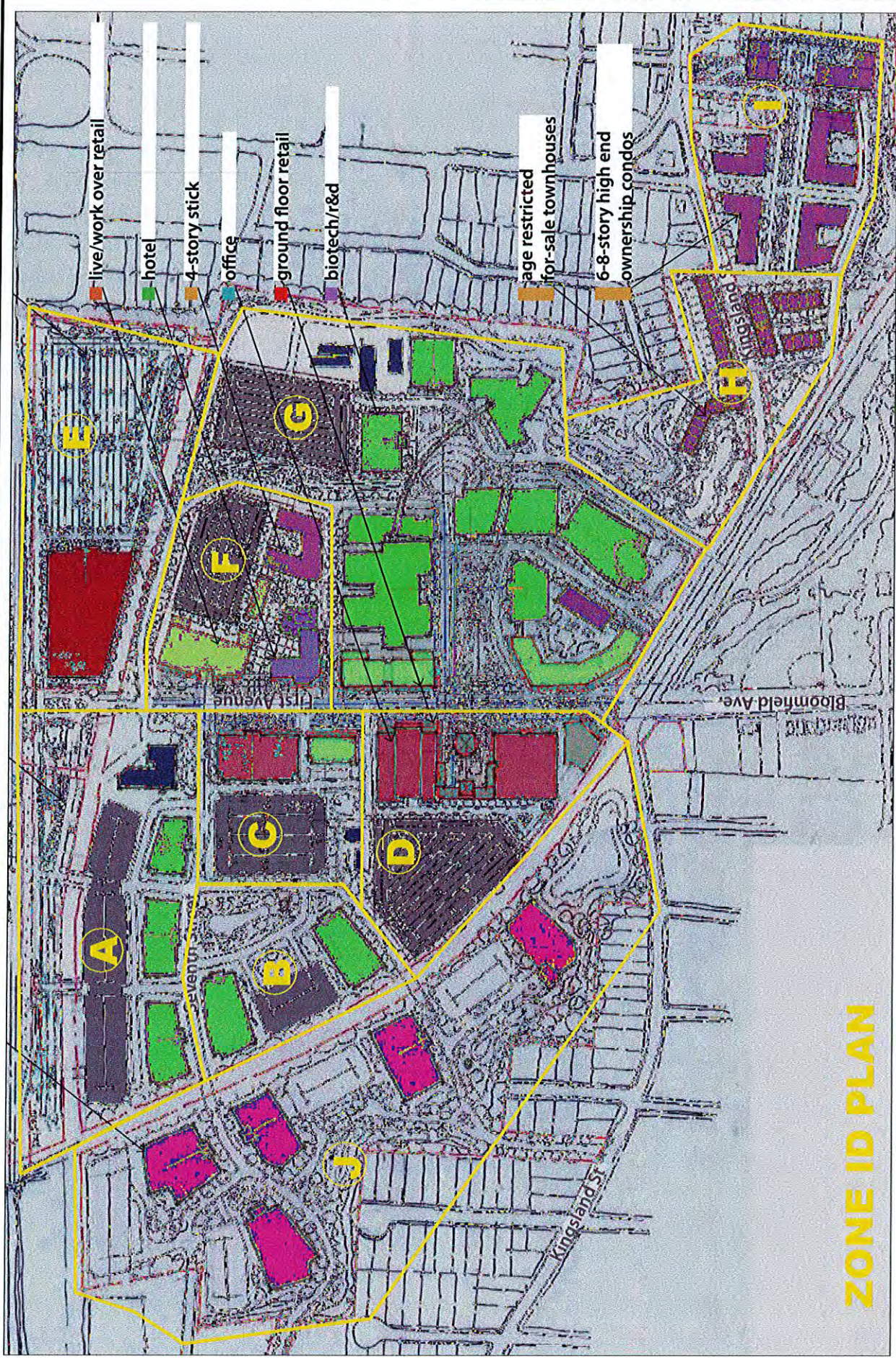
PROPOSED IMPROVEMENTS  
BLOOMFIELD AVENUE AND ROUTE 3 WB RAMP

*Roche Redevelopment*  
*Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013



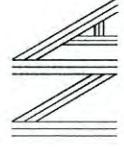


# ZONE ID PLAN

EXHIBIT NO. 24

## ZONE IDENTIFICATION PLAN

Roche Development  
 Nantley & Clifton, New Jersey  
 Project No. 13-112  
 November, 2013



**MICHAEL MARIS ASSOCIATES, INC.**

**DEVELOPMENT SUMMARY BY ZONE**

COMPONENTS	A	B	C	D	E	F	G	H	I	J	TOTALS
LIGHT INDUSTRIAL										375,000 SF	375,000 SF
BIO TECH/R&D	185,000 SF	140,000 SF					1,184,000 SF				1,509,000 SF
OFFICE			115,000 SF	564,000 SF							679,000 SF
RETAIL			36,000 SF	72,000 SF		35,000 SF	72,000 SF				215,000 SF
MID-RISE RESIDENTIAL			27 UNITS			350 UNITS	140 UNITS				210 UNITS
MEDICAL OFFICE					75,000 SF						75,000 SF
HOTEL						200 RMS					200 RMS
TOWNHOUSES						94 UNITS	24 UNITS				118 UNITS
SENIOR HOUSING								37 UNITS			37 UNITS
CONDOMINIUMS									447 UNITS		447 UNITS

EXHIBIT NO. 25

**PROPOSED DEVELOPMENT BY ZONE**



**MICHAEL MARIS ASSOCIATES, INC.**

*Roche Development  
Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013

# ZONE "C" SHARED PARKING ESTIMATES

<u>TIME</u>	<u>OFFICE</u> (115,000 SF)	<u>RETAIL</u> (36,000 SF)	<u>MID-RES</u> (27 UNITS)	<u>TOTAL</u>
7:00 AM	187	17	21	225
8:00 AM	251	17	14	282
9:00 AM	302	23	12	337
10:00 AM	318	22	11	<b>351</b>
11:00 AM	312	26	11	349
12:00 PM	286	28	10	324
1:00 PM	245	28	11	284
2:00 PM	267	25	11	303
3:00 PM	258	25	13	296
4:00 PM	229	25	15	269
5:00 PM	146	24	21	191
6:00 PM	80	24	23	127

- (1) OFFICE PEAK-HOUR GENERATION = 318 SPACES
- (2) RETAIL PEAK-HOUR GENERATION = 28 SPACES
- (3) RESIDENTIAL PEAK-HOUR GENERATION = 34

EXHIBIT NO. 26



**MICHAEL MARIS ASSOCIATES, INC.**

ZONE 'C' PARKING

*Roche Development  
Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013

## ZONE "D" SHARED PARKING ESTIMATES

<u>TIME</u>	<u>OFFICE</u> (564,000 SF)	<u>RETAIL</u> (72,000 SF)	<u>TOTAL</u>
7:00 AM	919	34	953
8:00 AM	1,230	34	1,264
9:00 AM	1,479	46	1,525
10:00 AM	1,557	44	<b>1,601</b>
11:00 AM	1,526	52	1,578
12:00 PM	1,401	56	1,457
1:00 PM	1,199	56	1,255
2:00 PM	1,308	50	1,358
3:00 PM	1,261	50	1,311
4:00 PM	1,121	50	1,171
5:00 PM	716	48	764
6:00 PM	389	48	437

(1) OFFICE PEAK-HOUR GENERATION = 1,557 SPACES

(2) RETAIL PEAK-HOUR GENERATION = 56 SPACES

EXHIBIT NO. 27

ZONE 'D' PARKING

*Roche Development  
Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013



**MICHAEL MARIS ASSOCIATES, INC.**

## ZONE "F" SHARED PARKING ESTIMATES

TIME	RETAIL (35,000 SF)	MID-RES (350 UNITS)	HOTEL (200 RMS)	TOWNHOUSES (94 UNITS)	TOTAL
7:00 AM	17	273	296	58	<b>644</b>
8:00 AM	17	181	277	38	513
9:00 AM	23	150	268	32	473
10:00 AM	22	141	253	30	446
11:00 AM	26	137	237	29	429
12:00 PM	28	132	237	28	425
1:00 PM	28	137	231	29	425
2:00 PM	25	146	225	31	427
3:00 PM	25	164	216	34	439
4:00 PM	25	198	219	42	484
5:00 PM	24	269	216	57	566
6:00 PM	24	304	228	64	620

- (1) RETAIL PEAK-HOUR GENERATION = 28 SPACES
- (2) MID-RES PEAK-HOUR GENERATION = 441 SPACES
- (3) HOTEL PEAK-HOUR GENERATION = 308
- (4) TOWNHOUSES PEAK-HOUR GENERATION = 93

EXHIBIT NO. 28



ZONE 'F' PARKING

*Roche Development  
Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013

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## ZONE "G" SHARED PARKING ESTIMATES

<u>TIME</u>	<u>R&amp;D</u> (1,184,000 SF)	<u>RETAIL</u> (72,000 SF)	<u>MID-RES</u> (140 UNITS)	<u>TOWNHOUSES</u> (24 UNITS)	<u>TOTAL</u>
7:00 AM	1,411	34	109	15	1,569
8:00 AM	1,890	34	72	10	2,006
9:00 AM	2,272	46	60	8	2,386
10:00 AM	2,392	44	56	8	2,500
11:00 AM	2,344	52	55	7	2,458
12:00 PM	2,153	56	53	7	2,269
1:00 PM	1,842	56	55	7	1,960
2:00 PM	2,009	50	58	8	2,125
3:00 PM	1,938	50	65	9	2,062
4:00 PM	1,722	50	79	11	1,862
5:00 PM	1,100	48	107	15	1,286
6:00 PM	598	48	121	17	784

- (1) R&D PEAK-HOUR GENERATION = 2,392 SPACES
- (2) RETAIL PEAK-HOUR GENERATION = 56 SPACES
- (3) MID-RES PEAK-HOUR GENERATION = 176 SPACES
- (4) TOWNHOUSES PEAK-HOUR GENERATION = 24 SPACES

EXHIBIT NO. 29

ZONE 'G' PARKING

*Roche Development*  
Nutley & Clifton, New Jersey

Project No. 13-112

November, 2013



MICHAEL MARIS ASSOCIATES, INC.

**TOTAL CAMPUS SHARED PARKING ESTIMATES**

TIME	ZONE A	ZONE B	ZONE C	ZONE D	ZONE E	ZONE F	ZONE G	ZONE H	ZONE I	ZONE J	TOTAL
7:00 AM	221	167	225	953	49	<b>644</b>	1569	15	275	186	4,304
8:00 AM	295	224	282	1264	173	513	2006	10	182	233	5,182
9:00 AM	355	269	337	1525	230	473	2386	8	151	250	5,984
10:00 AM	<b>374</b>	<b>283</b>	<b>351</b>	<b>1601</b>	<b>270</b>	<b>446</b>	<b>2500</b>	<b>8</b>	<b>142</b>	<b>254</b>	<b>6,229</b>
11:00 AM	367	277	349	1578	270	429	2458	7	137	254	6,126
12:00 PM	337	255	324	1457	238	425	2269	7	133	247	5,692
1:00 PM	288	218	284	1255	219	425	1960	7	137	328	5,121
2:00 PM	314	238	303	1358	243	427	2125	8	146	<b>338</b>	5,500
3:00 PM	303	229	296	1311	251	439	2062	9	164	321	5,385
4:00 PM	269	204	269	1171	232	484	1862	11	199	260	4,961
5:00 PM	172	130	191	764	140	566	1286	15	270	210	3,744
6:00 PM	94	71	127	437	170	620	784	<b>17</b>	<b>306</b>	210	2,836

- (1) ZONE A PEAK-HOUR GENERATION = 374 SPACES
- (2) ZONE B PEAK-HOUR GENERATION = 283 SPACES
- (3) ZONE C PEAK-HOUR GENERATION = 351 SPACES
- (4) ZONE D PEAK-HOUR GENERATION = 1,601 SPACES
- (5) ZONE E PEAK-HOUR GENERATION = 270 SPACES
- (6) ZONE F PEAK-HOUR GENERATION = 644 SPACES
- (7) ZONE G PEAK-HOUR GENERATION = 2,500 SPACES
- (8) ZONE H PEAK-HOUR GENERATION = 24 SPACES
- (9) ZONE I PEAK-HOUR GENERATION = 443 SPACES
- (10) ZONE J PEAK-HOUR GENERATION = 338 SPACES
- (11) THE SUM OF THE PEAK-HOUR GENERATIONS OF ALL ZONES = **6,684 SPACES (DESIRED = 7,352)**

EXHIBIT NO. 30



**MICHAEL MARIS ASSOCIATES, INC.**

**TOTAL PARKING ESTIMATES**

*Roche Development  
Nutley & Clifton, New Jersey*

Project No. 13-112

November, 2013

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**APPENDIX B**  
**CAPACITY ANALYSES**