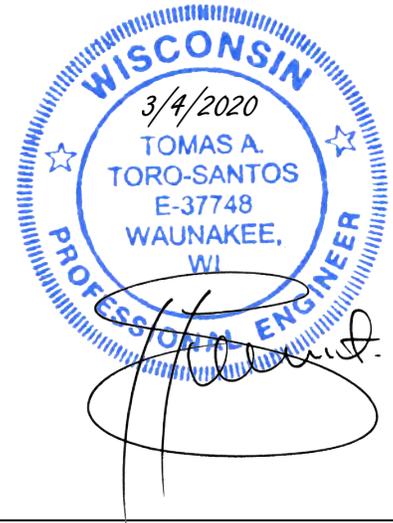


## Memorandum

To: Sean Roberts- Summit Smith, Shawn Zimny- Gilbane  
From: Tomas A. Toro, P.E., P.L.S. – JSD Professional Service, Inc.  
Re: Madison Yards Development  
Update to Trip Generation Calculations  
Kimley Horn Traffic Impact Evaluation Report  
JSD Project #: 19-9366  
Date: February 19, 2020 (**Revised March 4, 2020**)  
cc: Kevin Yeska- JSD, Jessica Vaughn- JSD



The purpose of this memorandum is to provide an update to the trip generation calculations included in the Hill Farms Mixed Use Development Traffic Impact Evaluation report dated December 6, 2017, prepared by Kimley-Horn and Associates, Inc., Saint Paul, Minnesota (included as **Attachment A** to this memorandum). The estimated vehicle trips were adjusted to reflect the current development proposals for Lots 2 and 3; as well as modifications to the proposed future land uses.

The initially reported trip estimates were updated based on current development proposals for Blocks 2, 3, 4 and 6; as well as modifications to future land uses, as confirmed by the landowner/developer and as outlined below:

- The Health/Fitness Club use has been removed from the site development programming;
- The Pharmacy/Drug Store use has been removed from the site development programming;
- The Medical/Dental Office use has been decreased from 152,370 square feet to 146,689 square feet;
- The General Office use has been decreased from 225,150 square feet to 205,600 square feet;
- The Shopping Center/Retail use has been reduced from 98,050 square feet to 35,565 square feet;
- As noted in the current development plans on Block 2, the overall hotel room count was reduced from 200 to 150 rooms;
- As noted in the current development plans on Block 2, the proposed grocery store floor area has been increased from 25,000 square feet to 50,000 square feet;
- The current development plans the total number of residential units has been increased from 350 to 390; and
- As noted on the current development plans on Block 4 a total of 10,000 square feet of retail space has been added.

In conducting the evaluation of estimated vehicle trips, JSD followed the same ITE methodology used by Kimley-Horn for the preparation of their December 6, 2017 report to update the trip generation calculations for the proposed development. After taking into consideration the aforementioned changes to the land uses, the revised trip generation calculations yielded a total amount of 10,197 new trips. When comparing with the 10,870 trips reported by Kimley-Horn, there was an overall **reduction of 1,123** in total trips. Refer to **Attachment B**, Updated Trip Generation Calculations, for the detailed set of computations.

As noted in the Conclusion and Recommendations Section of the initial Traffic Impact Evaluation, the following "...improvements were recommended to provide acceptable LOS within the project study area through the 2041 Horizon Year," including:

1. Installation of a "half-signal" at the intersection of Whitney Way and Sheboygan Avenue (City/Developer);



2. Timing improvements at the intersection of Whitney Way & Old Middleton Road (City);
3. Installation of a “half-signal” along University Avenue at the project access west of Segoe Road (Developer); and
4. Develop a Travel Demand Management Plan (TDMP) (Developer).

Of the above-referenced improvements, item three (3) is currently in place, and item four (4) was updated per Madison Area Transportation Planning Board, Transportation Options Program Manager comments. The updated TDMP document is provided as **Attachment C**.

With regard to items one (1) and two (2), given that there is a reduction in the overall trips, any further improvements to the transportation public infrastructure surrounding the project site area are not anticipated at this time.

It is also important to point out that the first phase of the Madison Yards development; which consists of Blocks 2, 3, 4 and 6, will only generate approximately 3,924 additional daily trips. This represents 38% of the estimated total daily trips to be generated by the development at full build-out conditions. This also reflects on the current need for improvements to street intersections surrounding the development; more specifically, improvements to the westbound left turn lane at University Avenue and N. Segoe Road, as described in item no. 20.d of the GDP approval letter issued by the City for the development (**Attachment D**). The TIE shows that the daily turn increase between now and full build-out conditions is 12 turns per day (1 at peak hour); while the projection for the horizon year 2041 will be an increase of 45 turns per day. The increase in turns resulting from the development of Phase 1 of the project, are not anticipated to impact the operation of the intersection significantly enough to require the proposed improvements at this time. JSD recommends that the aforementioned improvements to University Avenue and N. Segoe Road not be required at this time.

#### **Attachments**

- A: Hill Farms Mixed Use Development Traffic Impact Evaluation report dated December 6, 2017, prepared by Kimley-Horn and Associates, Inc.
- B: Updated Trip Generation Calculations
- C: Updated Transportation Demand Management Plan (TDMP)
- D: City of Madison GDP Approval Letter

# Traffic Impact Evaluation

## HILL FARMS MIXED USE DEVELOPMENT

Madison, Wisconsin

Prepared for:

SG Hill Farms LLC

Prepared by:

Kimley-Horn and Associates, Inc.  
Saint Paul, Minnesota

I certify that this Traffic Impact Evaluation has been prepared by me or under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.

By:



\_\_\_\_\_  
Brian R. Smalkoski, P.E.  
Wisconsin Registration # 41505-6  
Kimley-Horn and Associates, Inc.

Date:

\_\_\_\_\_  
12/6/2017

**TABLE OF CONTENTS**

Executive Summary	04
Introduction	05
Existing Conditions	07
Future Conditions	12
Intersection Operational Analysis	27
Conclusions and Recommendations	38

**TABLES**

Table 1. Analysis Scenarios	12
Table 2. ITE Trip Generation Data	17
Table 3. Trip Generation Calculation	18
Table 4. Level of Service Grading Descriptions	28
Table 5. Existing (2017) Conditions Capacity Summary – AM Peak Hour / PM Peak Hour	29
Table 6. Build-Out (2021) Background Conditions Capacity Summary – AM Peak Hour / PM Peak Hour	30
Table 7. Build-Out (2021) Total Conditions Capacity Summary – AM Peak Hour / PM Peak Hour	32
Table 8. Horizon (2041) Background Conditions Capacity Summary – AM Peak Hour / PM Peak Hour	34
Table 9. Horizon (2041) Total Conditions Capacity Summary – AM Peak Hour / PM Peak Hour	35

**EXHIBITS**

Exhibit 1. Site Location Map	06
Exhibit 2: Existing (2017) Functional Lane Assignments and Intersection Control	08
Exhibit 3. Existing (2017) Peak Hour Traffic Volumes	11
Exhibit 4. Build-Out (2021) Background Peak Hour Traffic Volumes	13
Exhibit 5. Horizon (2021) Background Peak Hour Traffic Volumes	14
Exhibit 6. Global Trip Distribution	21
Exhibit 7. State Office Building Trip Assignment	22
Exhibit 8. Mixed-Use Trip Assignment	23
Exhibit 9. Total Site Traffic Assignment	24
Exhibit 10. Build-Out (2021) Total Traffic Volumes	25
Exhibit 11. Horizon (2041) Total Traffic Volumes	26

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## EXECUTIVE SUMMARY

Kimley-Horn and Associates, Inc., (Kimley-Horn) was retained by SG Hill Farms, LLC, to evaluate the traffic impacts related to the proposed redevelopment of the Hill Farms Wisconsin State Department of Transportation (WisDOT) building property located in the southwest quadrant of the University Avenue/Segoe Road intersection in Madison, Wisconsin.

The development plan includes replacing the State Office Building currently on the property with a mixed-use development that includes a new 600,000-square foot building which is already under construction. The most recent version of the development plan is proposed to include the following land uses: 350 multi-family dwelling units, 200 hotel rooms, 225,150 square feet of general office space, 152,370 square feet of medical office space, 98,050 square feet of general retail space, 26,800 square feet of restaurant space, a 5,000-square foot pharmacy, a 40,650-square foot fitness club, and a 25,000-square foot grocery store. The development also includes a parking ramp located on the southwest portion of the development that has already been constructed and is currently being used by employees of the State Office Building.

Access to the site will be provided by six (6) driveway connections of the following types: one (1) full access half-signalized connection along University Avenue, one (1) unsignalized right-in/right-out connection along Old Middleton Road, one (1) unsignalized right-in/right-out connection along Segoe Road, two (2) unsignalized full access connections along Sheboygan Avenue serving the mixed-use development, and one (1) unsignalized full access connection along Sheboygan serving the government office building. Additionally, right-in/right-out access driveways are planned to facilitate movements to/from parking and loading located within specific block groups. Since these driveways only provide access only to individual block groups, the exact location and design of these supplemental driveways will be determined through the individual site design process.

Capacity analyses were performed for the study intersection for five scenarios (existing plus future years) during the weekday morning and evening peak hours. Based on the capacity analyses, the following improvements to be implemented by a combination of the City of Madison and the Developer, are recommended at the study intersections to better facilitate traffic operations for the 2041 Horizon Year:

- Installation of a “half-signal” at the intersection of Whitney Way & Sheboygan Avenue (City/Developer)
- Timing improvements at the intersection of Whitney Way & Old Middleton Road (City)
- Installation of a “half-signal” along University Avenue at the project access west of Segoe Road (Developer)
- Due to the high non-motorized mode-split anticipated for the development, it is recommended that a Travel Demand Management Plan (TDMP) be developed for the site (Developer)

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## INTRODUCTION

Kimley-Horn and Associates, Inc., (Kimley-Horn) was retained by SG Hill Farms, LLC, to evaluate the traffic impacts related to the redevelopment of the Hill Farms Wisconsin State Department of Transportation (WisDOT) building property located in the southwest quadrant of the University Avenue/Segoe Road intersection in Madison, Wisconsin.

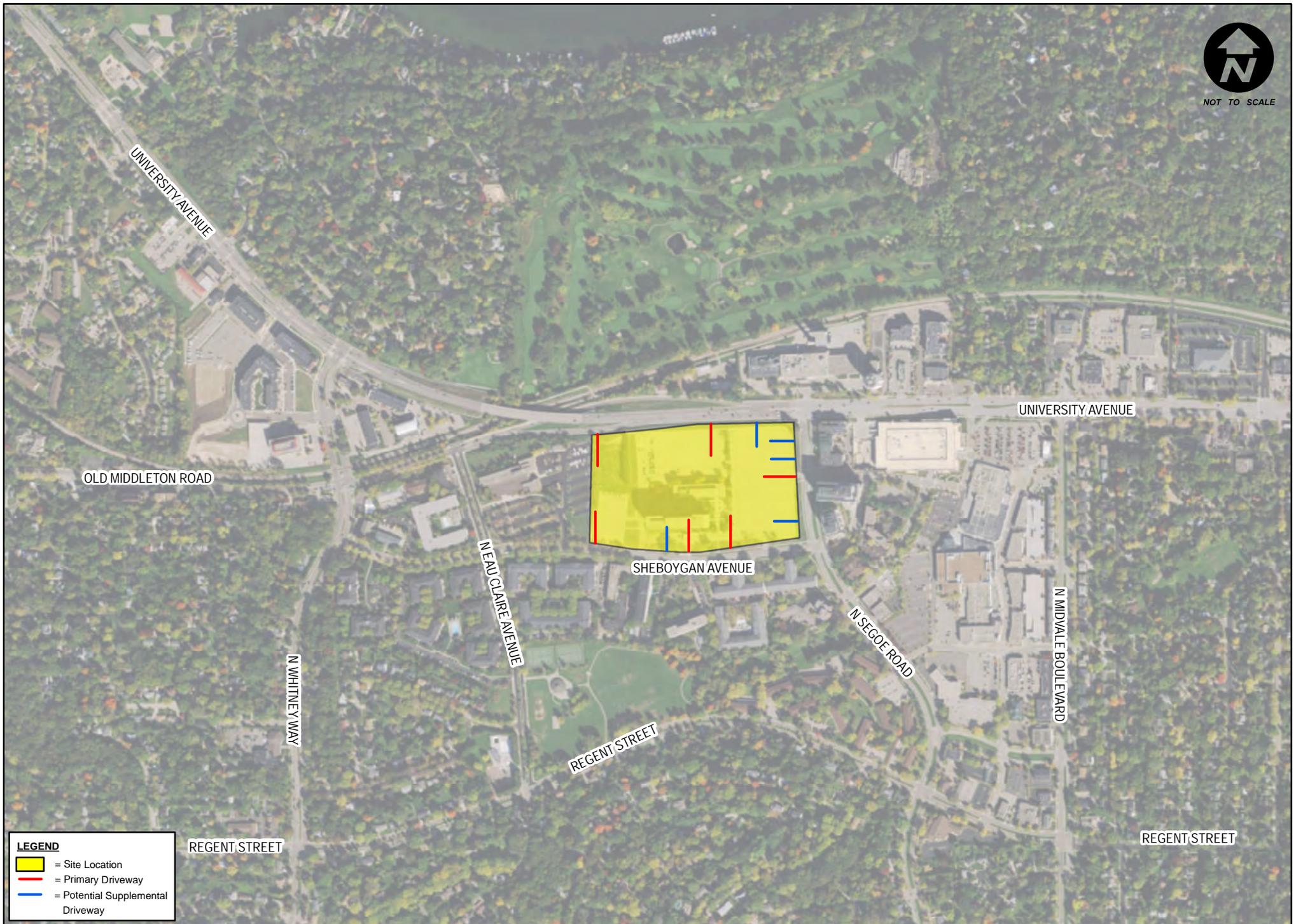
In addition to replacing the existing State Office Building with a 600,000 square foot building, which is already under construction, the most recent development plan proposes the following mix of land uses: 350 multi-family dwelling units, 200 hotel rooms, 225,150 square feet of general office space, 152,370 square feet of medical office space, 98,050 square feet of general retail space, 26,800 square feet of restaurant space, a 5,000-square foot pharmacy, a 40,650-square foot fitness club, and a 25,000-square foot grocery store. In addition, the plan includes the parking ramp newly constructed on the southwestern portion of the site. Currently, the ramp is being used by employees of the existing State Office Building. An aerial view of the study location, the surrounding roadway network, and the driveway locations is presented in **Exhibit 1**. The proposed site plan detailing the access driveways is included as an attachment.

Access to the site is proposed to be provided by six (6) driveway connections of the following types: one (1) full access half-signalized connection along University Avenue (for which off-site improvements are currently being constructed), one (1) unsignalized right-in/right-out connection along Old Middleton Road, one (1) unsignalized right-in/right-out connection along Segoe Road, two (2) unsignalized full access connections along Sheboygan Avenue serving the mixed-use development, and one (1) unsignalized full access connection along Sheboygan serving the government office building. Additionally, right-in/right-out access driveways are planned to facilitate movements to/from parking and loading located within specific block groups. Since these driveways only provide access only to individual block groups, the exact location and design of these supplemental driveways will be determined through the individual site design process.

This report presents and documents Kimley-Horn's data collection and field observations of traffic conditions in the surrounding area, summarizes the expected multimodal trip generation, and outlines an analysis of the relative transportation impacts of the proposed development.



NOT TO SCALE



**LEGEND**

-  = Site Location
-  = Primary Driveway
-  = Potential Supplemental Driveway

## EXISTING CONDITIONS

Kimley-Horn conducted a field visit to collect relevant information pertaining to existing land uses in the surrounding area, the adjacent street system, current traffic volumes and operating conditions, lane configurations and traffic control at nearby intersections, and other key roadway characteristics.

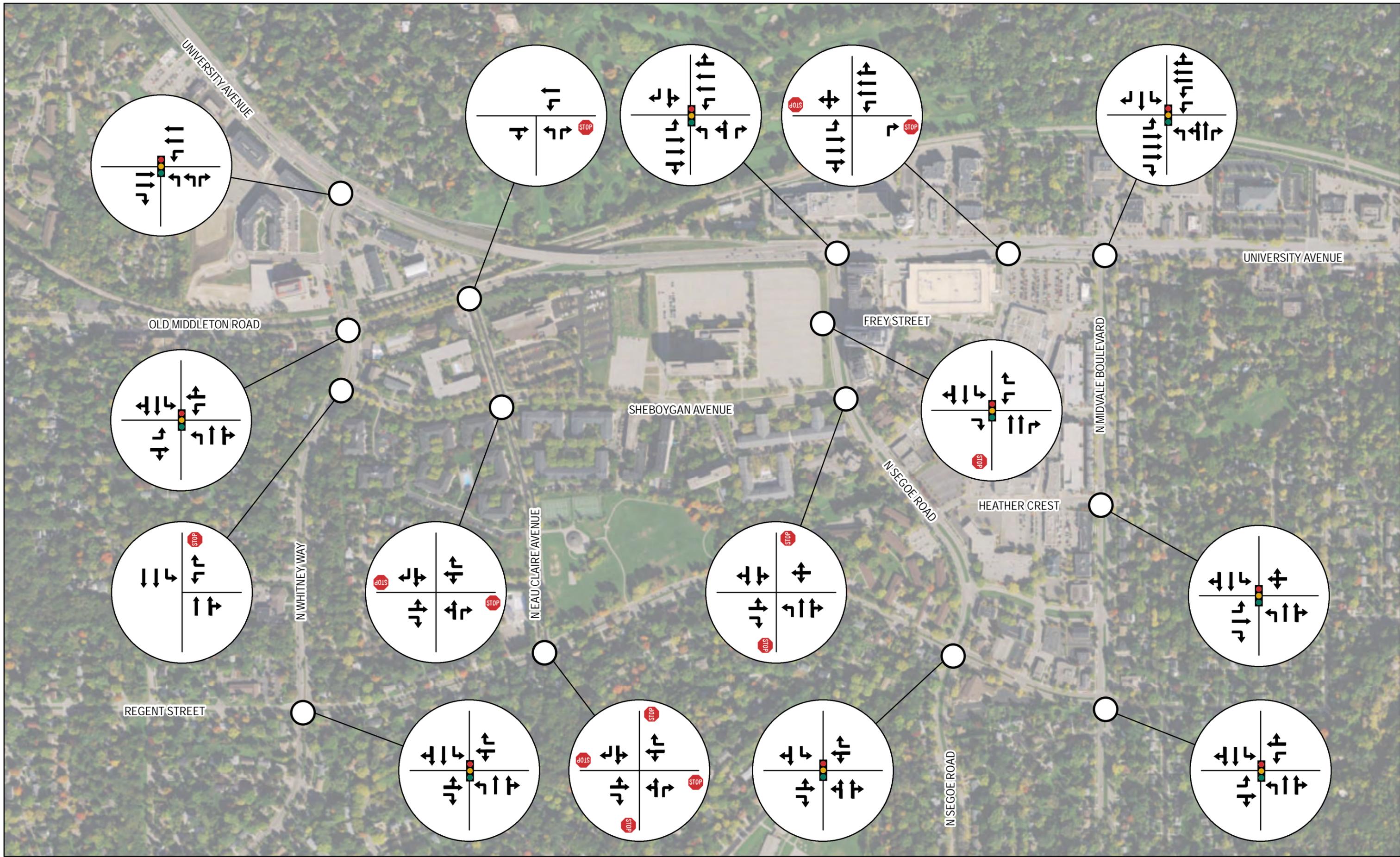
### Project Study Area

Based on discussion with City of Madison staff, the following intersections were included in the traffic impact analysis:

- Old Middleton Road & Eau Claire Avenue
- Old Middleton Road Ramps to/from University Avenue
- University Avenue & Segoe Road
- Sheboygan Avenue & Eau Claire Avenue
- Sheboygan Avenue & Segoe Road
- Segoe Road & Frey Street
- Whitney Way & Old Middleton Road
- Whitney Way & University Avenue
- Regent Street & Eau Claire Avenue
- Whitney Way & Sheboygan Avenue
- Whitney Way & Regent Street
- Segoe Road & Regent Street
- University Avenue & Midvale Boulevard
- Midvale Boulevard & Regent Street
- Midvale Boulevard & Heather Crest
- University Avenue & Maple Terrace / Hilldale Way
- University Avenue & Site Access to University Avenue
- Site Access Locations

**Exhibit 2** provides the functional lane assignments and intersection control at each of the study intersections. At several of the study intersection approaches with shared right-turn lanes, motorists use the paved shoulder to make right-turns rather than wait in a queue with the through and/or through and left-turn vehicles. These approaches, detailed below for each intersection, functionally operate with an exclusive right-turn lane and are shown as such in Exhibit 2.

- Old Middleton Road & Eau Claire Avenue – westbound approach
- Sheboygan Avenue & Eau Claire Avenue – all approaches
- Regent Street & Eau Claire Avenue – all approaches
- Whitney Way & Sheboygan Avenue – northbound approach
- Whitney Way & Regent Street – eastbound and westbound approaches
- Segoe Road & Regent Street – eastbound and westbound approaches



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## Area Land Uses

The subject site is currently occupied by the WisDOT Hill Farms State Office Building and surface parking lot. A parking ramp was recently constructed on the southwest quadrant of the property, and a new State Office Building is being constructed on the northwest quadrant of the development. The site is surrounded by single-family residential, multi-family residential, office, and retail land uses.

## Existing Roadway Characteristics

A field investigation was conducted within the study area. As a result of this visit, the following information was obtained about the existing roadway network.

**University Avenue** is a six-lane divided east-west roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is posted as 35 mph within the study area. Based on the City's Comprehensive Plan, University Avenue is classified as a Primary Arterial. The average daily traffic in the study area ranged from 26,800 to 53,250 based on 2015 City data.

**Segoe Road** is a four-lane divided north-south roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is posted as 30 mph within the study area. Based on the City's Comprehensive Plan, Segoe Road is classified as a Collector Street. The average daily traffic in the study area ranged from 6,550 to 8,400 based on 2015 City data.

**Sheboygan Avenue** is a two-lane undivided east-west roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is posted as 30 mph within the study area. Based on the City's Comprehensive Plan, Sheboygan Avenue is classified as a Collector Street. The average daily traffic in the study area ranged from 4,550 to 5,250 based on 2015 City data.

**Whitney Way** is a four-lane divided north-south roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is posted as 30 mph within the study area. Based on the City's Comprehensive Plan, Whitney Way is classified as a Standard Arterial. The average daily traffic in the study area ranged from 16,100 to 17,350 based on 2015 City data.

**Eau Claire Avenue** is a two-lane divided north-south roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is posted as 25 mph within the study area. Based on the City's Comprehensive Plan, Eau Claire Avenue is classified as a Collector Street. The average daily traffic in the study area ranged from 1,350 to 1,850 based on 2015 City data.

**Old Middleton Road** is a two-lane undivided east-west roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is posted as 30 mph within the study area. Based on the City's Comprehensive Plan, Old Middleton Road is classified as a Standard Arterial. The average daily traffic in the study area was 12,700 based on 2015 City data.

**Midvale Boulevard** is a four-lane divided north-south roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is posted as 30 mph within the study area. Based on the City's Comprehensive Plan, Midvale Boulevard is classified as a Standard Arterial. The average daily traffic in the study area ranged from 19,850 to 21,500 based on 2015 City data.

**Regent Street** is a two-lane divided east-west roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is posted as 30 mph within the study area. Based on the City's Comprehensive Plan, Regent Street is classified as a Collector Street. The average daily traffic in the study area ranged from 2,950 to 5,150 based on 2015 City data.

**Frey Street** is a two-lane undivided east-west roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is unposted within the study area. Based on the City's Comprehensive Plan, Frey Street is classified as a Local Street. No average daily traffic data is available for Frey Street.

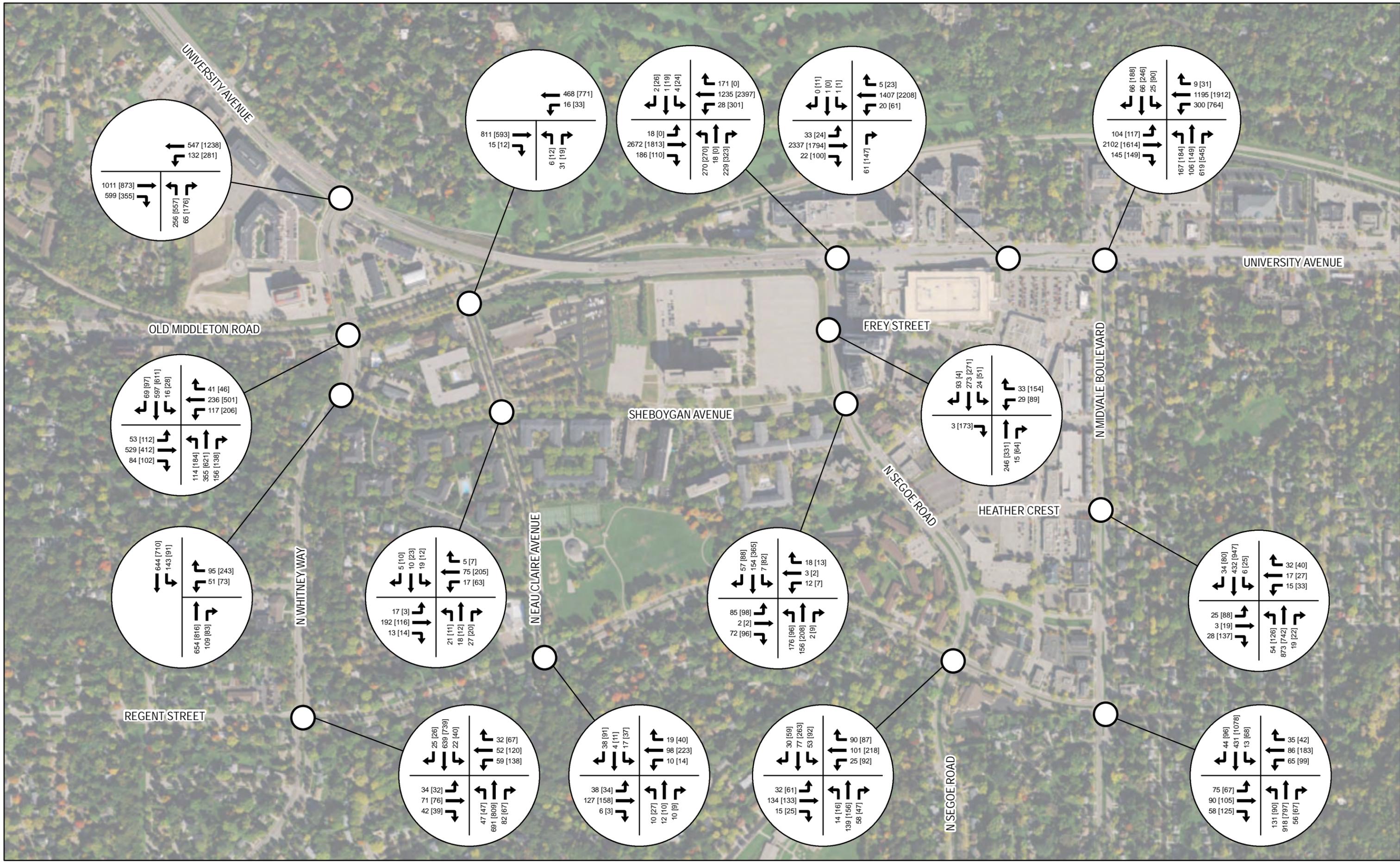
**Heather Crest** is a two-lane undivided east-west roadway, and is assumed to be under the jurisdiction of the City of Madison. The speed limit is posted as 30 mph within the study area. Based on the City's Comprehensive Plan, Heather Crest is classified as a Local Street. The average daily traffic in the study area was 1,650 based on 2015 City data.

### Traffic Count Data

Turning movement count data was collected at the study intersections at various times ranging from 2012 to 2017. The counts were collected during the AM peak period (7:00 AM to 9:00 AM) and the PM peak period (4:00 PM to 6:00 PM). The source of the count data is as follows:

- Counts from 2012 were provided by the City of Madison for the intersections of University Avenue & Segoe Road, Whitney Way & University Avenue, and Whitney Way & Old Middleton Road. These counts were adjusted to 2017 volumes by applying a 1.0% annual growth rate for five (5) years, as agreed upon by City of Madison staff.
- Turning movement counts were collected in 2016 by Kimley-Horn for the intersections of Eau Claire Avenue & Old Middleton Road, Eau Claire Avenue & Sheboygan Avenue, Segoe Road & Sheboygan Avenue, and Segoe Road & Frey Street. These counts were adjusted to 2017 volumes by applying a 1.0% annual growth rate for one (1) year, as agreed upon by City of Madison staff.
- Turning movement counts were collected in June 2017 by Gewalt Hamilton Associates, Inc., for the remaining study intersections. Since these counts were collected while school was not in session, the counts were grown by 7.5% based on guidance from the City of Madison staff.

The existing (2017) adjusted turning movement volumes are presented in **Exhibit 3**.



## FUTURE CONDITIONS

This section of the report outlines the proposed site plan, summarizes site-specific traffic characteristics, and develops future traffic projections for the analysis.

### Analysis Scenarios

Based on the City of Madison’s *Traffic Impact Analysis Guidelines*, the analysis should quantify intersection operations for Existing Conditions, Build-Out Conditions, and Horizon Conditions (typically 20 years beyond Build-Out). **Table 1** provides a summary of the multiple scenarios included as part of this analysis.

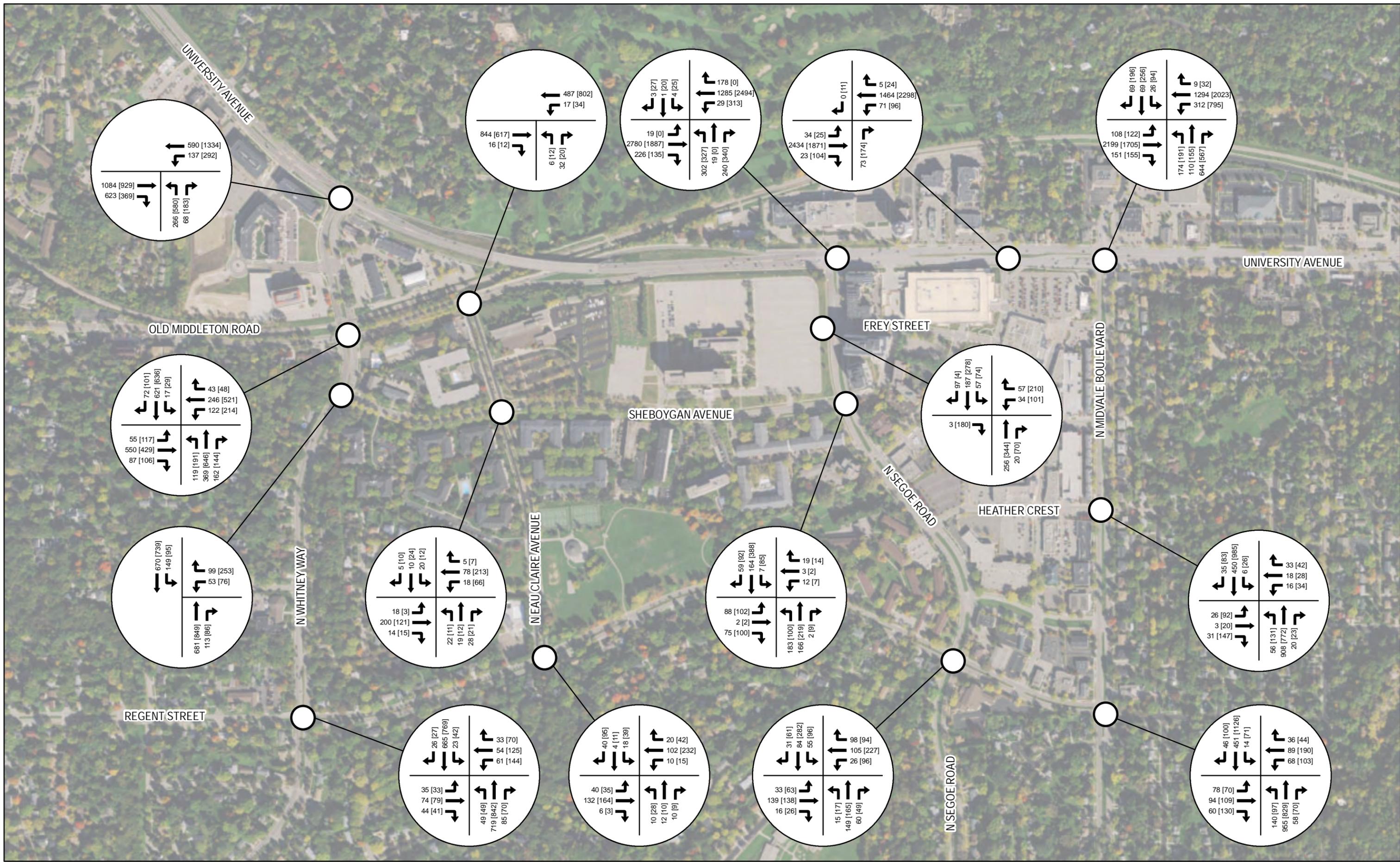
**Table 1. Analysis Scenarios**

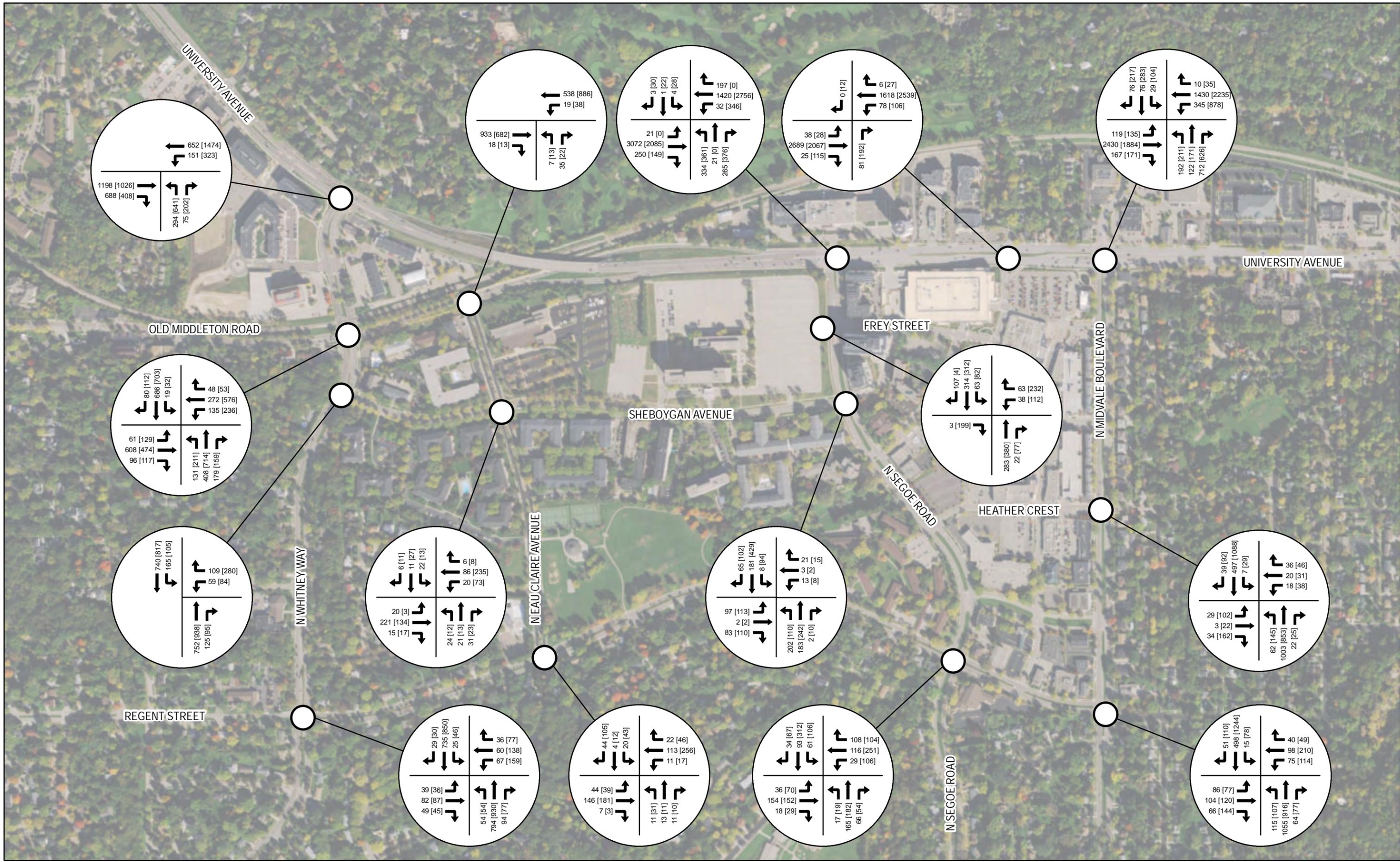
Scenario	Analysis Year	Roadway Conditions	Development Assumptions	Traffic Volumes
Existing	2017	Existing	Existing	Existing
Build-Out Background	2021	Existing	Existing	Existing + 4 years of Background Growth
Build-Out Total	2021	Existing + Half Signal on University Avenue	Build-Out of Hill Farms	Existing + 4 years of Background Growth + Project Traffic
Build-Out Total with Mitigation	2021	Existing + Half Signal on University Avenue + Off-Site Mitigation	Build-Out of Hill Farms	Existing + 4 years of Background Growth + Project Traffic
Horizon Year Background	2041	Existing	Existing	Existing + 24 years of Background Growth
Horizon Year Total	2041	Existing + Half Signal on University Avenue + Build-Out Mitigation	Build-Out of Hill Farms	Existing + 24 years of Background Growth + Project Traffic
Horizon Year Total with Mitigation	2041	Existing + Half Signal on University Avenue + Build-Out Mitigation + Horizon Mitigation	Build-Out of Hill Farms	Existing + 24 years of Background Growth + Project Traffic

### Background Growth

The proposed development is anticipated to be completed within four (4) years; therefore a 2021 Build-Out year was assumed. Existing traffic at the study intersections was grown at an agreed-upon rate of 0.5% annually for four (4) years to develop Build-Out Background (2021) traffic volumes. These volumes are presented in **Exhibit 4**.

Based on the City of Madison’s Traffic Impact Analysis guidelines, a 20-year Horizon period is also required to be analyzed. Therefore, Horizon Background (2041) volumes were developed by applying a 0.5% annual growth rate to the Existing (2017) traffic volumes for 24 years. These volumes are presented in **Exhibit 5**.





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## Development Characteristics & Site Access

The site is currently occupied by an approximately 432,544 square foot State Office Building and large surface parking lot and currently serves as the State Department of Transportation headquarters. As part of the site redevelopment, the following land uses are proposed:

- 600,000 square foot State Office Building
- 225,150 square feet of general office space
- 152,370 square feet of medical office space
- 98,050 square feet of general retail space
- 40,650-square foot fitness club
- 26,800 square feet of restaurant space
- 25,000-square foot grocery store
- 5,000 square foot pharmacy
- 350 multi-family dwelling units
- 200 hotel rooms

Access to the site will be provided by six (6) driveway connections of the following types: one (1) full access half-signalized connection along University Avenue, one (1) unsignalized right-in/right-out connection along Old Middleton Road, one (1) unsignalized right-in/right-out connection along Segoe Road, three (3) unsignalized full access connections along Sheboygan Avenue.

In addition, the development will be seeking additional right-in/right-out access driveways to facilitate movements to/from parking and loading located within specific block groups. The exact location and design of these supplemental driveways (to accommodate any anticipated on-site queues) will be determined through the individual site design process for the block groups as the exact location of the driveways and the land use mix for each block group have not been finalized. Analysis of these supplemental driveways were not included in this traffic study. Additional analysis, if requested by the City, will be provide at the time of the driveway permit application.

## Trip Generation

To calculate the passenger vehicle trips generated by the proposed mixed-use development, data was referenced from the Institute of Transportation Engineers (ITE) manual titled *Trip Generation, 9th Edition*. Due to the availability of public transportation options in the area and the nature of the land uses planned for the site, it is assumed that more non-auto activity would occur at this location than in typical auto-oriented suburban locations. Therefore, based upon available census data, previous studies completed in the area (and for the subject development), and the travel demand features planned as part of the site design for the subject development, the City of Madison has recommended an assumption of 30 percent for non-automotive site trips. Trip generation estimates are therefore discounted accordingly to calculate projected vehicle trips generated by the proposed development.

Given the mixed-use nature of the proposed development, reductions in site traffic were included to account for internally captured and pass-by vehicles.

### Internal Capture

Internal capture is defined as the practice of combined trips between an origin within the site and another on-site destination. Based upon the methodology included in the *ITE Trip Generation Handbook, 3<sup>rd</sup> Edition*, internal capture rates for the site were calculated as 21% for the morning peak hour and 26.5% for the evening peak hour. Since the State Office Building makes up a significant portion of the site trips, which will not be as integrated as a typical mixed-use site or the other areas on the site, the internal capture percentages were assumed to be 15% in the morning and 20% in the evening. This assumption indicates that a small percentage of customers would visit more than one destination within the site during the same trip, thereby reducing the number of new trips generated by the proposed uses on site. These volumes are therefore subtracted from the trip generation projections for the development.

### Pass-By Reduction

Pass-by traffic reflects the travel patterns of users who visit the site en-route to another destination. For example, someone accessing the site to visit the pharmacy on their way home in the evening would represent a pass-by trip. While these are new vehicles movements entering or exiting a driveway, they do not add new traffic to the streets and adjacent intersections since they are already driving by the site to their primary destination. Data in the *ITE Trip Generation Handbook, 3<sup>rd</sup> Edition*, provides the following averages for pass-by trip percentages during the evening peak hours, which were determined to be reasonable for the proposed uses on the site.

- Shopping Center – 34%
- Supermarket – 36%
- Pharmacy/Drugstore with Drive-Through Window – 49%
- High Turnover Sit-Down Restaurant – 43%

Since data is typically provided only for evening peak hour trips, and the uses are expected to exhibit similar pass-by characteristics in the morning as in the evening, the average evening rates were applied to both periods. Primary trips make up the remainder of site traffic, which is expected to travel directly from their origin to the site and back.

Based on information provided in ITE's *Trip Generation*, 9<sup>th</sup> edition, **Table 2** provides the trip generation rates, and directionality of traffic, for Daily and the AM/PM peak hour periods.

**Table 2. ITE Trip Generation Data**

Land Use	Unit	Daily	Weekday	
			AM Peak	PM Peak
Multi-Family Apartment (LUC 220)	Number of Dwelling Units	T = 6.65 * X 50% in/50% out	T = 0.61 * X 20% in/80% out	T = 0.62 * X 65% in/35% out
Hotel (LUC 310)	Number of Rooms	T = 8.92 * X 50% in/50% out	T = 0.67 * X 58% in/42% out	T = 0.70 * X 49% in/51% out
General Office Building (LUC 710)	Square Footage	T = 11.03 * X 50% in/50% out	T = 1.56 * X 88% in/12% out	T = 1.49 * X 17% in/83% out
Shopping Center (LUC 820)	Square Footage	T = 42.70 * X 50% in/50% out	T = 0.96 * X 62% in/38% out	T = 3.71 * X 48% in/52% out
High-Turnover (Sit-Down) Restaurant (LUC 932)	Square Footage	T = 127.15 * X 50% in/50% out	T = 10.81 * X 55% in/45% out	T = 9.85 * X 60% in/40% out
Health/Fitness Club (LUC 492)	Square Footage	T = 32.93 * X 50% in/50% out	T = 1.41 * X 50% in/50% out	T = 3.53 * X 57% in/43% out
Pharmacy with Drive-Through (LUC 881)	Square Footage	T = 96.91 * X 50% in/50% out	T = 3.45 * X 52% in/48% out	T = 9.91 * X 50% in/50% out
Medical-Dental Office Building (LUC 720)	Square Footage	T = 36.13 * X 50% in/50% out	T = 2.39 * X 79% in/21% out	T = 3.57 * X 28% in/72% out
Supermarket (LUC 850)	Square Footage	T = 102.24 * X 50% in/50% out	T = 3.40 * X 62% in/38% out	T = 9.48 * X 51% in/49% out

**Table 3** provides the trip generation calculations, and takes into account internal capture and pass-by reductions. Since traffic generated from the existing State Office Building is captured in the existing turning movement counts, the trip generation calculation only accounted for the increase in square footage, which is approximately 167,456 square feet (600,000 square feet proposed minus 432,544 square feet existing). Based on the calculation, the mixed-use development is anticipated to generate approximately 10,870 net new daily trips, 885 net new trips during the AM peak hour and 1,085 net new trips during the PM peak hour.

**Table 3. Trip Generation Calculation**

Land Use	Unit	Weekday						
		Daily	AM Peak			PM Peak		
			In	Out	Total	In	Out	Total
<i>UNADJUSTED TRIPS</i>								
Apartment (LUC 220)	350 Units	2,330	36	143	179	141	75	216
High-Turnover (Sit-Down) Restaurant (LUC 932)	26,800 sq. ft.	3,414	160	130	290	156	107	263
Medical-Dental Office Building (LUC 720)	152,370 sq. ft.	5,506	288	76	364	152	392	544
Shopping Center (LUC 820)	98,050 sq. ft.	4,190	58	36	94	173	190	363
Pharmacy/Drugstore w/ Drive-Through Window (LUC 881)	5,000 sq. ft.	486	9	8	17	25	25	50
General Office Building (LUC 710)	225,150 sq. ft.	2,486	310	42	352	57	279	336
Health/Fitness Club (LUC 492)	40,650 sq. ft.	1,340	29	28	57	82	61	143
Supermarket (LUC 850)	25,000 sq. ft.	2,556	53	32	85	121	116	237
Hotel (LUC 310)	200 Rooms	1,634	63	43	106	61	59	120
Government Office Building (LUC 710)	167,456 sq. ft.	1,848	230	31	261	43	207	250
<b>Total Trips</b>		<b>25,790</b>	<b>1,236</b>	<b>569</b>	<b>1,805</b>	<b>1,011</b>	<b>1,511</b>	<b>2,522</b>
<i>TRIP REDUCTIONS</i>								
Less 30% Non-Auto Trips		-7,737	-371	-171	-542	-303	-453	-756
Less 15% Internal Capture during AM and 20% during PM		-5,158	-185	-85	-270	-202	-302	-504
<b>Total Driveway Trips</b>		<b>12,895</b>	<b>680</b>	<b>313</b>	<b>993</b>	<b>506</b>	<b>756</b>	<b>1,262</b>
<i>PASS-BY TRIPS</i>								
Pass-by Trips (34% of Shopping Center Trips)		-712	-9	-9	-18	-31	-31	-62
Pass-by Trips (36% of Supermarket Trips)		-460	-9	-9	-18	-21	-21	-42
Pass-by Trips (49% of Pharmacy/Drug Store Trips)		-119	-2	-2	-4	-7	-7	-14
Pass-by Trips (43% of High Turn Over Restaurant Trips)		-734	-35	-35	-70	-29	-29	-58
<b>Total Pass-by Trips</b>		<b>-2,025</b>	<b>-55</b>	<b>-55</b>	<b>-110</b>	<b>-88</b>	<b>-88</b>	<b>-176</b>
<b>Total New Trips</b>		<b>10,870</b>	<b>625</b>	<b>258</b>	<b>883</b>	<b>418</b>	<b>668</b>	<b>1,086</b>

## Directional Distribution

The estimated distribution of site-generated traffic on the surrounding roadway network as it approaches and departs the site is a function of several variables, such as the nature of surrounding land uses, prevailing traffic volumes/patterns, and the ease with which motorists can travel various sections of the area roadway network. Based on discussion with City staff, the following global distribution was assumed: 25% to/from the west along University Avenue, 20% to/from the east along University Avenue, 10% to/from the west along Old Middleton Drive, 5% to/from the southwest along Regent Street, 15% to/from the south along Whitney Way, 10% to/from the south along Segoe Road, and 15% to/from the south along Midvale Boulevard. All pass-by traffic was assumed to come from University Avenue and assigned to the main site access just west of Segoe Road.

The global trip distribution is provided in **Exhibit 6**. Two different distributions were developed at the study intersections; **Exhibit 7** provides the distribution for the State Office Building and **Exhibit 8** provides the distribution for the Mixed-Use development. This is due to the fact that the State Office Building traffic access a dedicated parking garage for parking that is not open to the mixed-use traffic.

## Site Traffic Assignment

The site traffic assignment, representing traffic volumes associated with the proposed development at area intersections and the access driveways, is a function of the estimated trip generation (Table 3) and the directional distribution (Exhibit 7 and Exhibit 8). The peak hour site traffic assignment is presented in **Exhibit 9**. Pass-by traffic was assigned to the driveway access connections surrounding the site. Currently, all of the existing State Office Building employee traffic uses the parking garage access on Sheboygan Avenue. With the development of the mixed-use portion of the site, a second garage access will be provided. It is assumed that some of the existing employee traffic will use the site access on University Avenue rather than Sheboygan Avenue. This has been accounted for in the volume projections provided in **Exhibit 9**.

## Parking Analysis

A parking analysis was completed for the proposed development site. The developer is proposing to supply approximately 2,800 parking spaces with the mixed-use development. The State Office Building parking demand is served by the parking structure on the southwestern side of the site. State Office Building visitors and employees will be restricted to this parking structure, and the structure will not serve any of the parking demand for the multi-use development. The planned amount of parking stalls (2,800) is within the parking requirements outlined in City of Madison's Code of Ordinances. Based on the City of Madison's Code of Ordinances Section 28.141(4), the maximum number of parking stalls required for the mixed-use development is 3,815. Since the proposed site is located within a Suburban Employment (SE) zoning district, a minimum parking requirement is not provided for the land uses in the proposed development.

Parking demand for the development was estimated for the site using the ITE *Parking Generation Manual, 4<sup>th</sup> Edition*. Based on the ITE manual, parking demand for the mixed-use development was calculated to be approximately 3,085 spaces. This is less than the maximum number of parking stalls required by the City Ordinance and slightly more than the amount of parking planned to be provided

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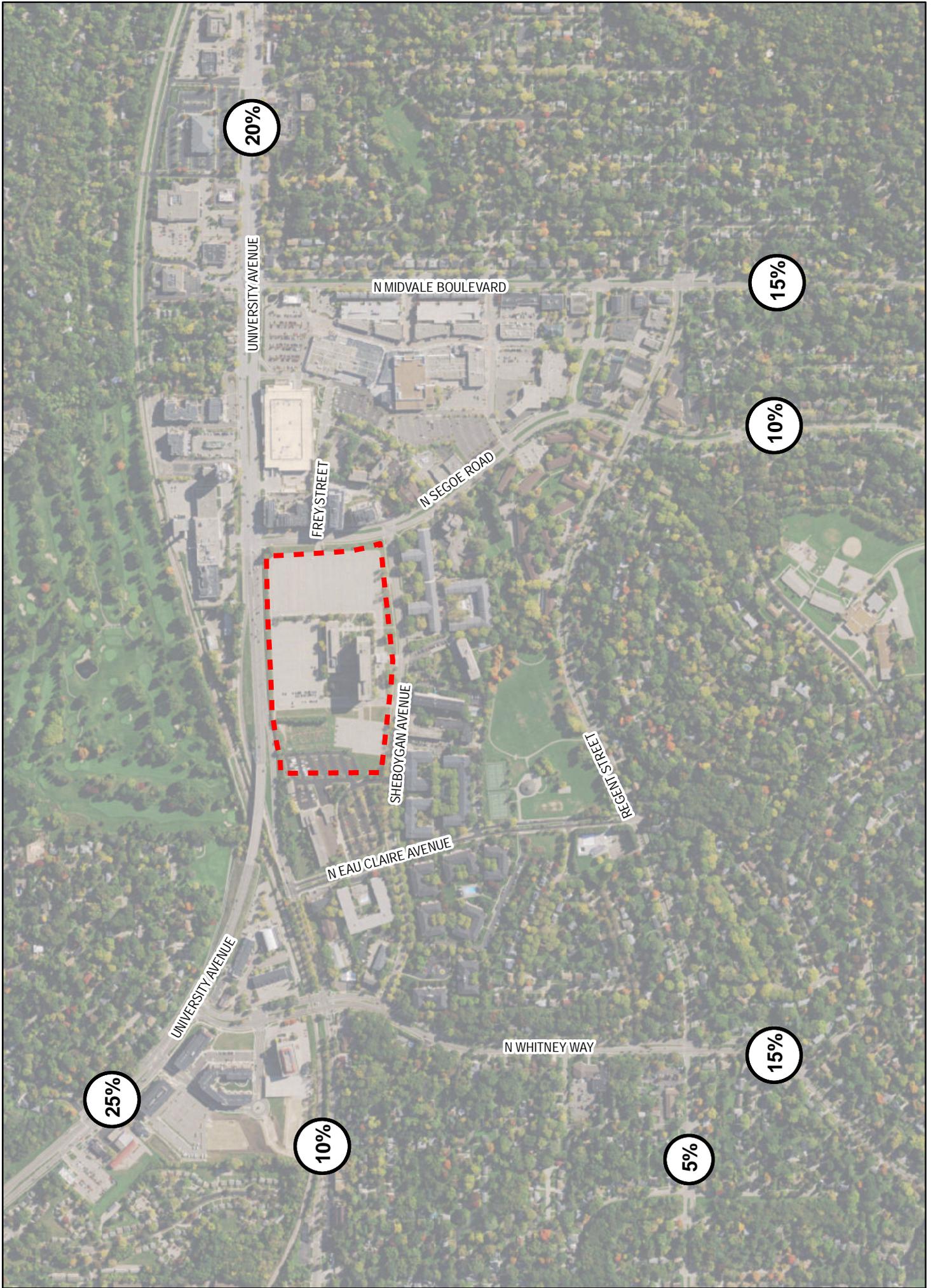
for the site. The ITE estimate is based on the weekday parking generation rates for each individual land use, and does not account for shared parking between land use types. The parking rates for urban areas were used where available; however, many of the land uses only have rates for suburban or undefined area types. Because the site is located in an urban environment, with a 30 percent non-motorized mode-split, the actual parking demand for the site is anticipated to be lower than the ITE estimate. The provided parking will be refined as individual site design process progresses for each block group. Tables detailing the City's parking requirements and the parking generation analysis are provided in the **Appendix**.

### **Build-Out Total (2021) Traffic Volumes**

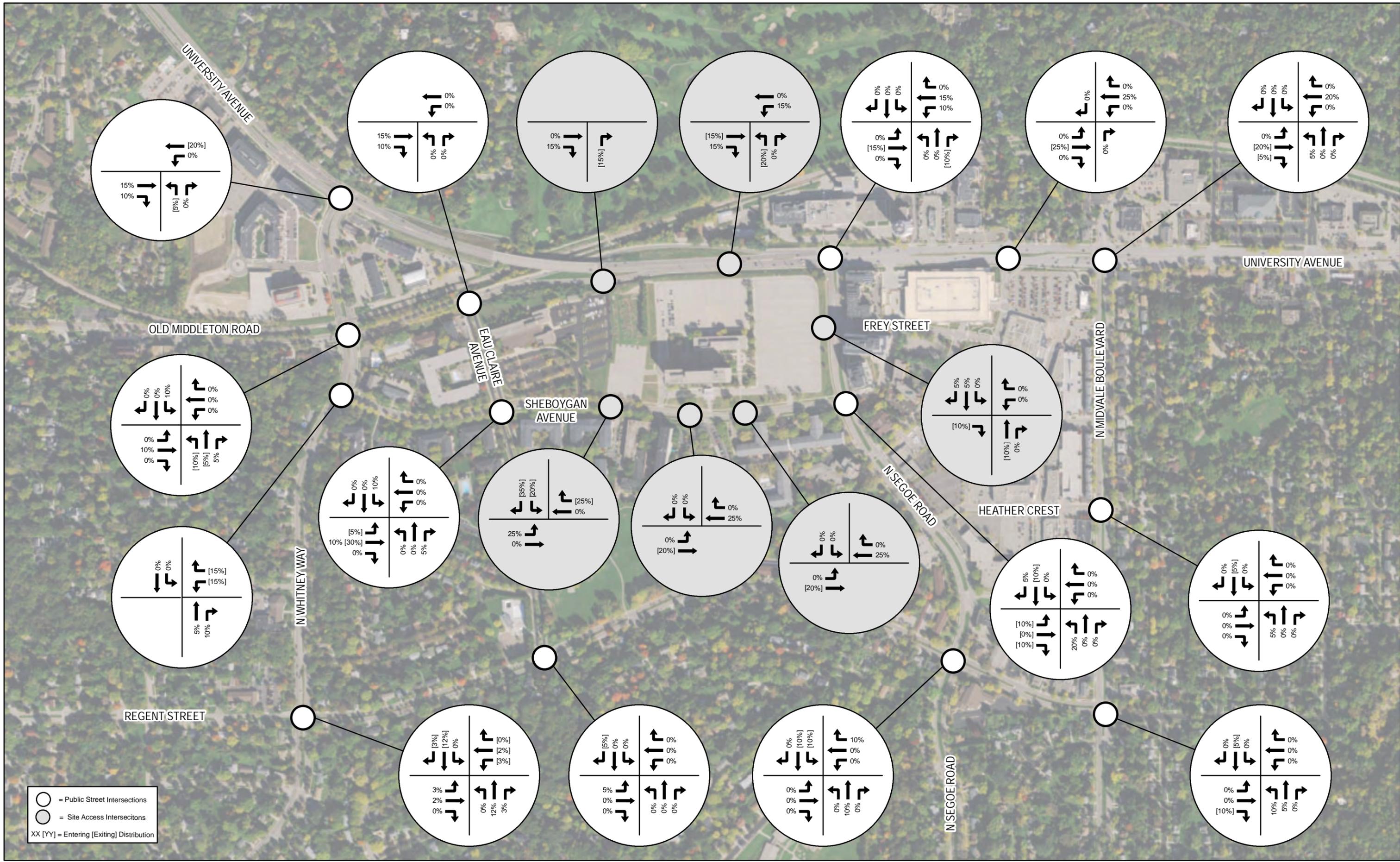
Build-Out Total (2021) traffic volumes were developed for the AM and PM peak hours at the study intersections by combining the Build-Out Background (2021) traffic volumes from Exhibit 4 and the total site traffic assignment from Exhibit 9. These volumes are presented in **Exhibit 10**.

### **Horizon Total (2041) Traffic Volumes**

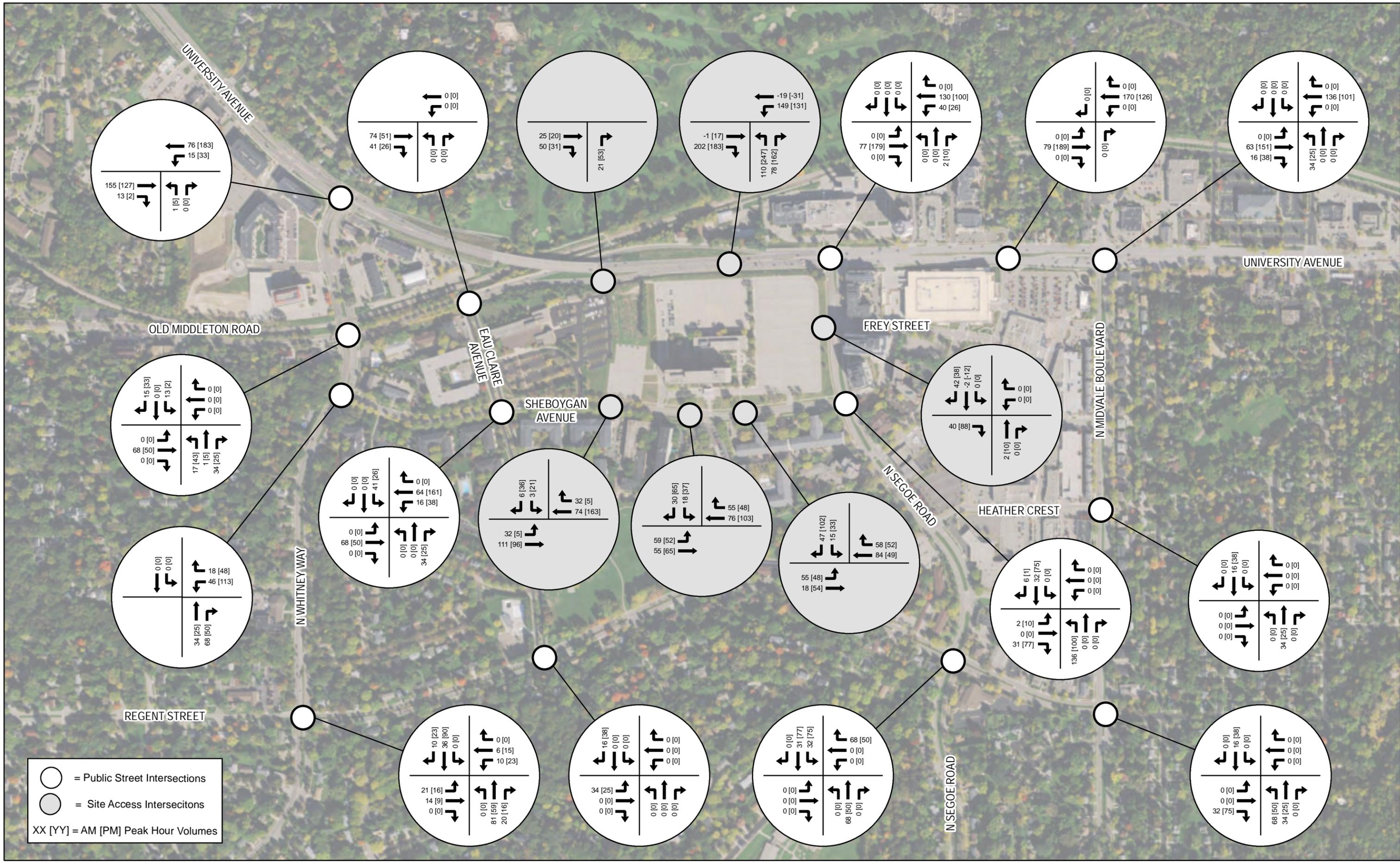
Horizon Total (2041) traffic volumes were developed for the AM and PM peak hours at the study intersections by combining the Horizon Background (2041) traffic volumes from Exhibit 5 and the total site traffic assignment from Exhibit 9. These volumes are presented in **Exhibit 11**.



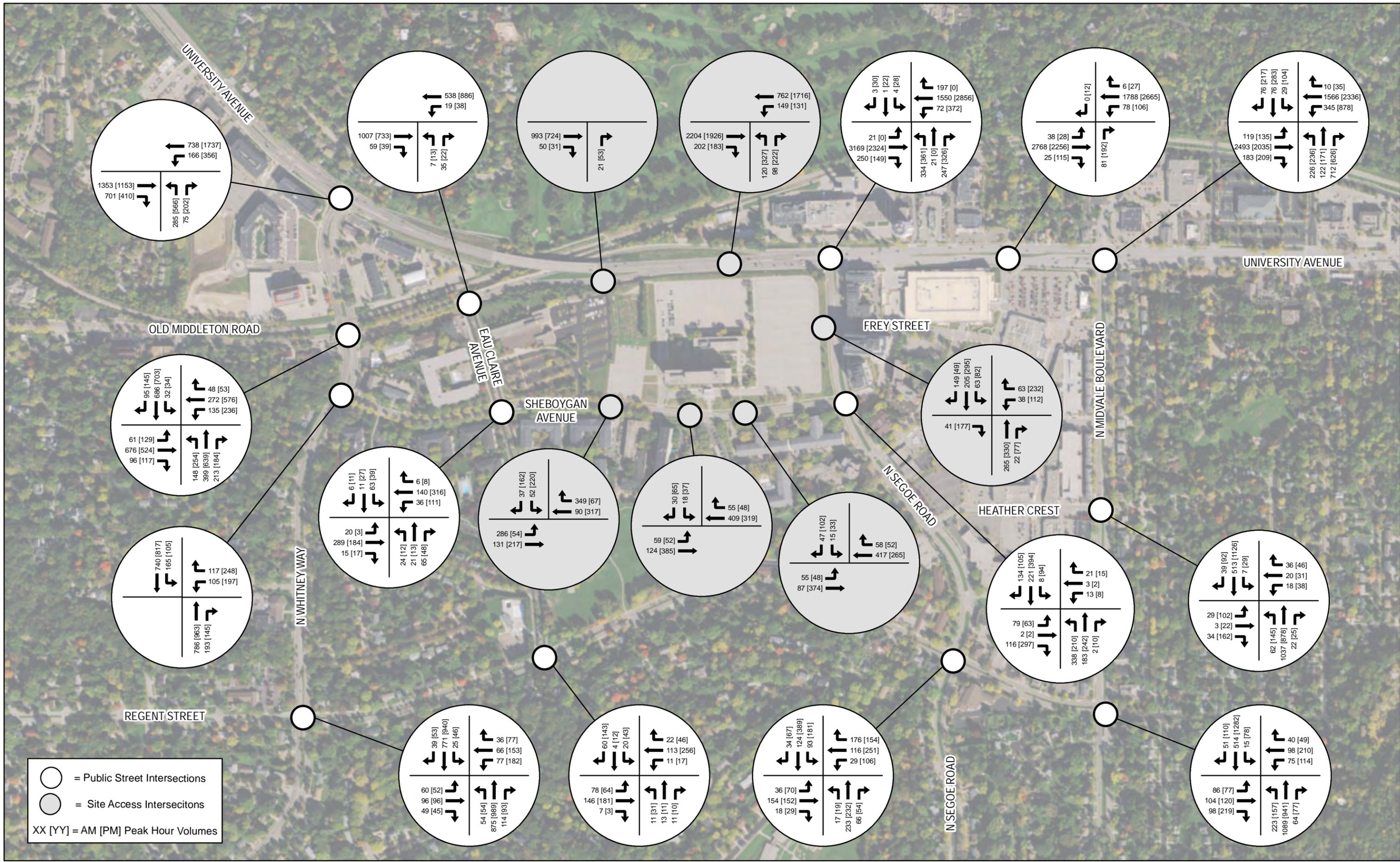
**EXHIBIT 6: GLOBAL TRIP DISTRIBUTION  
HILL FARMS MIXED USE DEVELOPMENT**











## INTERSECTION OPERATIONAL ANALYSIS

This section of the report summarizes the analysis of existing and future traffic conditions at the study intersections and details any improvements that may be necessary to ensure acceptable level of service.

### Capacity Analysis

Capacity analyses were conducted to assess existing and future background and build operating conditions of the study intersections during the weekday AM and PM peak hours. The capacity of an intersection quantifies its ability to accommodate traffic volumes and is expressed in terms of level of service (LOS), measured in average delay per vehicle. LOS grades range from A to F, with LOS A as the highest (best traffic flow and least delay), LOS E as saturated or at-capacity conditions, and LOS F as the lowest (oversaturated conditions). In most cases, LOS D is considered the lowest acceptable threshold by the City of Madison.

The LOS grades shown below, which are provided in the Transportation Research Board's Highway Capacity Manual (HCM), quantify and categorize the driver's discomfort, frustration, fuel consumption, and travel times experienced as a result of intersection control and the resulting traffic queuing. A detailed description of each LOS rating can be found in **Table 4**. Also provided in **Table 4** is the range of control delay for each rating (as detailed in the HCM). Because signalized intersections are expected to carry a larger volume of vehicles and stopping is required during red time, higher delays are tolerated for the corresponding LOS ratings.

**Table 4. Level of Service Grading Descriptions<sup>1</sup>**

Level of Service	Average Control Delay (seconds/vehicle)		Description
	Unsignalized	Signalized	
A	0 – 10	0 – 10	Minimal control delay; traffic operates at primarily free-flow conditions; unimpeded movement within traffic stream.
B	> 10 – 15	> 10 – 20	Minor control delay at signalized intersections; traffic operates at a fairly unimpeded level with slightly restricted movement within traffic stream.
C	> 15 – 25	> 20 – 35	Moderate control delay; movement within traffic stream more restricted than at LOS B; formation of queues contributes to lower average travel speeds.
D	> 25 – 35	> 35 – 55	Considerable control delay that may be substantially increased by small increases in flow; average travel speeds continue to decrease.
E	> 35 – 50	> 55 – 80	High control delay; average travel speed no more than 33 percent of free flow speed.
F <sup>2</sup>	> 50	> 80	Extremely high control delay; extensive queuing and high volumes create exceedingly restricted traffic flow.

<sup>1</sup> - Highway Capacity Manual 2010

<sup>2</sup> - All movements with a Volume to Capacity (v/C) ratio greater than 1 receive a rating of LOS F.

Synchro software was utilized to evaluate capacity of the study for the weekday AM and PM peak hours at the study intersections. Network peak hour factors of 0.94 and 0.97 were used for the AM and PM peak hours, respectively. A default value of 2% for heavy vehicles was used at all intersections. Existing signal timings obtained from the City of Madison were used at the signalized intersections along University Avenue and Segoe Road. Signal timings at all other signalized intersections were observed in the field.

#### Existing (2017) Conditions Capacity Analysis

**Table 5** summarizes the capacity analysis during the Existing Conditions AM and PM peak hours. The tables provide a summary of delay and LOS by approach as well as the overall intersection operations. Detailed information by movement is summarized in a table that is provided in the **Appendix**. The Synchro reports are also provided in the **Appendix**.

**Table 5. Existing (2017) Conditions Capacity Summary – AM Peak Hour / PM Peak Hour**

Intersection	Eastbound Approach		Westbound Approach		Northbound Approach		Southbound Approach		Overall Intersection	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
University Ave & Whitney Way	6.5 / 10.7	A / B	9.8 / 14.6	A / B	47.6 / 38.9	D / D			12.4 / 18.3	B / B
Whitney Way & Old Middleton Rd	35.5 / 35.9	D / D	15.7 / 24.9	B / C	23.4 / 21.5	C / C	38.5 / 30.7	D / C	29.9 / 27.5	C / C
Eau Claire Ave & Old Middleton Rd	--	--	--	--	19.9 / 24.3	C / C				
University Ave & Segoe Rd	39.4 / 41.3	D / D	21.6 / 21.8	C / C	51.9 / 40.4	D / D	58.0 / 75.4	E / E	35.5 / 31.7	D / C
University Ave & Hilldale Way	--	--	--	--	13.2 / 11.2	B / B	23.1 / 10.3	C / B		
University Ave & Midvale Blvd	25.3 / 52.6	C / D	22.1 / 158.7	C / F	79.2 / 163.8	E / F	51.7 / 114.7	D / F	34.9 / 122.3	C / F
Whitney Way & Sheboygan Ave			15.2 / 18.6	C / C	--	--	--	--		
Eau Claire Ave & Sheboygan Ave	--	--	--	--	10.9 / 11.2	B / B	11.6 / 12.6	B / B		
Segoe Rd & Frey St*	9.1 / 10.2	A / B	34.1 / 49.1	C / D	2.9 / 4.9	A / A	37.9 / 54.3	D / D		
Segoe Rd & Sheboygan Ave	14.0 / 16.7	B / C	12.2 / 12.5	B / B	--	--	--	--		
Midvale Blvd & Heather Crest	32.8 / 30.0	C / C	34.1 / 30.4	C / C	2.4 / 3.7	A / A	4.8 / 10.1	A / B	5.6 / 10.6	A / B
Whitway Way & Regent St	12.4 / 11.5	B / B	13.9 / 19.1	B / B	4.1 / 6.1	A / A	3.9 / 5.9	A / A	5.5 / 8.3	A / A
Eau Claire Ave & Regent St	8.3 / 9.4	A / A	7.5 / 9.5	A / A	7.3 / 8.3	A / A	7.1 / 8.0	A / A	7.8 / 9.1	A / A
Segoe Rd & Regent St	39.2 / 31.8	D / C	34.2 / 40.0	C / D	3.4 / 6.9	A / A	3.4 / 8.2	A / A	20.5 / 22.2	C / C
Midvale Blvd & Regent St	15.4 / 14.8	B / B	15.0 / 15.2	B / B	4.6 / 6.7	A / A	3.7 / 7.3	A / A	6.5 / 8.9	A / A

Note 1 - Gray boxes represent non-existent movements or that the overall intersection LOS is not applicable.

Note 2 - “—” represents free movements where delay is theoretically 0 seconds.

\* - The southbound delay shown is for the southbound left only; the southbound through movement is uninterrupted

All study intersections currently operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours, with the exception of University Avenue & Midvale Boulevard during the PM peak hour. The westbound, northbound, and southbound approaches of the University Avenue & Midvale Boulevard intersection operate at LOS F during the PM peak hour and the northbound approach operates at LOS E during the AM peak hour. At the intersection of University Avenue & Segoe Road, the southbound approach operates as LOS E during both peak hours. This is likely due to the limited green time provided to the approach as a result of the coordination along University Avenue and split phasing of the signal. These conditions are consistent with field observations conducted at the study intersections.

### Build-Out (2021) Conditions Capacity Analysis

The Build-Out analysis was performed for Background (without the addition of project traffic) and Total (with the addition of project traffic) conditions. Background conditions were performed using forecasted volumes provided in Exhibit 4, which represent existing turning movement volumes grown at a rate of 0.5% annually for four (4) years. Total conditions were performed using forecasted volumes provided in Exhibit 11, which represents existing turning movement volumes grown at a rate of 0.5% annually for four (4) years and the addition of project traffic provided in Exhibit 10. Based on

discussion with the City of Madison, the intersection of University Avenue & Maple Terrace (existing median opening) is planned to be converted to a signalized intersection with northbound and southbound left-turn movements prohibited as part of a safety improvement planned by the City of Madison.

**Table 6** summarizes the capacity analysis during the Build-Out (2021) Background AM and PM peak hours. The table provides a summary of delay and LOS by approach as well as the overall intersection operations. Detailed information by movement is summarized in a table that is provided in the **Appendix**. The Synchro reports are also provided in the **Appendix**.

**Table 6. Build-Out (2021) Background Conditions Capacity Summary – AM Peak Hour / PM Peak Hour**

Intersection	Eastbound Approach		Westbound Approach		Northbound Approach		Southbound Approach		Overall Intersection	
	Delay (\$/veh)	LOS	Delay (\$/veh)	LOS	Delay (\$/veh)	LOS	Delay (\$/veh)	LOS	Delay (\$/veh)	LOS
University Ave & Whitney Way	7.1 / 11.4	A / B	10.8 / 16.7	B / B	47.6 / 38.8	D / D			13.0 / 19.4	B / B
Whitney Way & Old Middleton Rd	37.5 / 39.2	D / D	16.9 / 32.2	B / C	24.8 / 23.2	C / C	40.8 / 31.4	D / D	31.7 / 30.7	C / C
Eau Claire Ave & Old Middleton Rd	--	--	--	--	21.5 / 26.5	C / D				
University Ave & Segoe Rd	64.0 / 46.5	E / D	17.9 / 29.2	B / C	54.1 / 46.0	D / D	58.0 / 81.6	E / F	49.4 / 38.2	D / D
University Ave & Hilldale Way	39.3 / 9.6	D / A	17.3 / 15.7	B / B	53.6 / 45.5	D / D	0.0 / 44.7	A / D	31.3 / 14.2	C / B
University Ave & Midvale Blvd	74.5 / 64.0	E / E	23.4 / 168.5	C / F	83.6 / 180.4	F / F	49.9 / 124.8	D / F	59.4 / 133.5	E / F
Whitney Way & Sheboygan Ave			15.8 / 19.8	C / C	--	--	--	--		
Eau Claire Ave & Sheboygan Ave	--	--	--	--	11.1 / 11.3	B / B	11.9 / 12.9	B / B		
Segoe Rd & Frey St*	9.2 / 10.4	A / B	32.5 / 48.9	C / D	4.2 / 5.6	A / A	35.8 / 55.7	D / E		
Segoe Rd & Sheboygan Ave	14.5 / 17.8	B / C	12.4 / 12.7	B / B	--	--	--	--		
Midvale Blvd & Heather Crest	39.5 / 37.2	D / D	41.1 / 36.4	D / D	2.4 / 3.7	A / A	4.9 / 9.7	A / A	6.2 / 11.6	A / B
Whitway Way & Regent St	12.8 / 11.7	B / B	14.7 / 21.0	B / C	4.1 / 6.3	A / A	3.9 / 6.0	A / A	5.6 / 8.7	A / A
Eau Claire Ave & Regent St	8.5 / 9.6	A / A	7.5 / 9.7	A / A	7.3 / 8.3	A / A	7.1 / 8.1	A / A	7.9 / 9.3	A / A
Segoe Rd & Regent St	39.3 / 31.3	D / C	34.4 / 39.7	C / D	3.5 / 7.4	A / A	3.6 / 8.8	A / A	20.5 / 22.2	C / C
Midvale Blvd & Regent St	16.0 / 18.3	B / B	15.6 / 19.0	B / B	4.6 / 6.8	A / A	3.7 / 7.6	A / A	6.7 / 9.7	A / A

Note 1 - Gray boxes represent non-existent movements or that the overall intersection LOS is not applicable.

Note 2 - “--” represents free movements where delay is theoretically 0 seconds.

\* - The southbound delay shown is for the southbound left only; the southbound through movement is uninterrupted

For the Build-Out (2021) Background AM and PM peak hours, delay that occurs during the existing conditions increases, particularly for the University Avenue & Midvale Boulevard intersection which is shown to operate at LOS E overall during the AM peak hour. In addition, the eastbound approach is shown to operate at LOS E for both peak hours, and the northbound approach is shown to operate at LOS F in the AM peak hour. Similarly, the southbound approach of the University & Segoe Road intersection is shown to operate at LOS F during the PM peak hour, and the eastbound approach is shown to operate at LOS E during the AM peak hour. The southbound left-turn movement at the Segoe Road & Frey Street intersections are shown to decrease to LOS E.

**Table 7** summarizes the capacity analysis during the Build-Out (2021) Total AM and PM peak hours. The table provides a summary of delay and LOS by approach as well as the overall intersection operations. Detailed information by movement is summarized in a table that is provided in the **Appendix**. The Synchro reports are also provided in the **Appendix**. Improvements are currently being constructed along University Avenue to accommodate the installation of a traffic signal at the main site access on University Avenue. As part of the improvement, a dedicated westbound left-turn lane into the development and a westbound acceleration lane for northbound left-turn exiting vehicles will be constructed and were assumed for future build conditions. All other site intersections were assumed to operate under minor-leg stop-control.

**Table 7. Build-Out (2021) Total Conditions Capacity Summary – AM Peak Hour / PM Peak Hour**

Intersection	Eastbound Approach		Westbound Approach		Northbound Approach		Southbound Approach		Overall Intersection	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
University Ave & Whitney Way	8.2 / 11.7	A / B	12.9 / 19.9	B / B	47.5 / 38.5	D / D			13.7 / 20.2	B / C
Whitney Way & Old Middleton Rd	44.1 / 45.5	D / D	18.8 / 36.6	B / D	29.1 / 39.9	C / D	44.5 / 33.7	D / C	36.2 / 38.8	D / D
Eau Claire Ave & Old Middleton Rd	--	--	--	--	26.6 / 31.3	D / D				
University Ave & Segoe Rd	98.6 / 67.7	F / E	18.9 / 33.8	B / C	54.3 / 46.1	D / D	58.0 / 81.6	E / F	69.2 / 48.7	E / D
University Ave & Hilldale Way	38.3 / 10.5	D / B	16.7 / 15.3	B / B	53.6 / 45.5	D / D	0.0 / 44.7	A / D	30.1 / 14.3	C / B
University Ave & Midvale Blvd	92.2 / 56.6	F / E	24.1 / 165.2	C / F	79.1 / 175.5	E / F	49.9 / 125.2	D / F	66.6 / 127.7	E / F
Whitney Way & Sheboygan Ave			21.2 / 70.5	C / F	--	--	--	--		
Eau Claire Ave & Sheboygan Ave	--	--	--	--	11.9 / 12.0	B / B	16.6 / 18.5	C / C		
Segoe Rd & Frey St*	9.5 / 10.3	A / B	32.5 / 48.9	C / D	4.1 / 5.5	A / A	35.8 / 55.7	D / E		
Segoe Rd & Sheboygan Ave	19.2 / 14.9	C / B	16.9 / 18.5	C / C	--	--	--	--		
Midvale Blvd & Heather Crest	39.5 / 37.2	D / D	41.1 / 36.4	D / D	2.5 / 3.8	A / A	4.9 / 9.9	A / A	6.1 / 11.6	A / B
Whitway Way & Regent St	12.7 / 11.7	B / B	12.8 / 16.8	B / B	5.3 / 8.8	A / A	4.9 / 8.4	A / A	6.5 / 10.0	A / B
Eau Claire Ave & Regent St	9.2 / 10.5	A / B	7.7 / 10.1	A / B	7.4 / 8.5	A / A	7.2 / 8.5	A / A	8.3 / 9.7	A / A
Segoe Rd & Regent St	39.3 / 30.9	D / C	33.9 / 37.7	C / D	3.6 / 7.6	A / A	3.7 / 9.6	A / A	19.2 / 20.7	B / C
Midvale Blvd & Regent St	17.8 / 23.2	B / C	16.9 / 23.5	B / C	4.7 / 16.2	A / B	3.7 / 9.9	A / A	7.1 / 15.1	A / B
<b>PROJECT DRIVEWAYS</b>										
Old Middleton Rd & Driveway 1	--	--	--	--	17.9 / 14.3	C / B				
University Ave & Driveway 2	19.2 / 22.6	B / C	5.4 / 1.6	A / A	41.7 / 29.7	D / C			17.2 / 15.0	B / B
Sheboygan Ave & Driveway 3	--	--	--	--			21.2 / 29.2	C / D		
Sheboygan Ave & Driveway 4	--	--	--	--			12.9 / 14.0	B / B		
Sheboygan Ave & Driveway 5	--	--	--	--			12.5 / 12.7	B / B		
Segoe Rd & Driveway 6	9.5 / 10.3	A / B			--	--	--	--		

Note 1 - Gray boxes represent non-existent movements or that the overall intersection LOS is not applicable.

Note 2 - “--” represents free movements where delay is theoretically 0 seconds.

\* - The southbound delay shown is for the southbound left only; the southbound through movement is uninterrupted

Overall intersections (and approaches) are anticipated to operate at an acceptable LOS during the AM and PM peak hours, with the exception of the following:

- **University Avenue & Segoe Road** – The overall intersection is anticipated to operate at LOS E during the AM peak hour.
  - Recommendation: The critical movement is the eastbound through during the AM peak hour. Since there are three eastbound through lanes provided today, there is not much opportunity to provide additional capacity for the through travel lanes. No geometric improvements are recommended at this time.

- **University Avenue & Midvale Boulevard** – The overall intersection is anticipated to operate at LOS E during the AM peak hour and LOS F during the PM peak hour.
  - Recommendation: The critical movement is the eastbound through and westbound left-turn during the AM and PM peak hours, respectively. Since there are three eastbound through lanes and dual westbound left-turn lanes provided today, there isn't much opportunity to provide additional capacity through travel lanes. No geometric improvements are recommended at this time.
  
- **Whitney Way & Sheboygan Avenue** – The westbound approach is anticipated to operate at LOS F during the PM peak hour.
  - Recommendation: Consider the installation of a “half-signal”, similar to what that is under construction at the main development access on University Avenue. Without the addition of site traffic, the approach operates at LOS E during the PM peak hour.
  
  - Based on a field review of the intersection, adequate sight distance for motorists does not appear to be available at the westbound approach of the intersection. Over the past 10 years (2007-2016) there have been 11 crashes at the intersection—7 of which involved westbound left-turning motorists and 2 of which involved westbound right-turning motorist. Additionally, 5 of the 11 crashes occurred on wet or snowy pavement. A crash diagram at the intersection for 2007-2016 is provided in the **Appendix**.
  
  - A traffic signal warrant analysis using the Manual on Uniform Traffic Control Devices (MUTCD) methodology was performed at the intersection using the existing AM and PM peak period turning movement volumes. Traffic signal warrants 2 and 3 are satisfied at this intersection. The traffic signal warrants analysis worksheet is provided in the **Appendix**.
  
  - Site traffic is projected to contribute approximately 10% of the future volume through the intersection (9% in the AM peak hour and 10% in the PM peak hour). If this recommendation were to move forward there would need to be negotiations with the City to determine what, if any, portion of the cost associated with the improvement should be the responsibility of the Hill Farms development.

#### Horizon (2041) Conditions Capacity Analysis

The Horizon analysis was completed for Background (without the addition of project traffic) and Total (with the addition of project traffic) conditions. Background conditions were performed using forecasted volumes provided in Exhibit 5, which represents existing turning movement volumes grown at a rate of 0.5% annually for 24 years. The Total conditions analyses were performed using forecasted volumes provided in Exhibit 12, which represent existing turning movement volumes grown at a rate of 0.5% annually for 24 years and the addition of project traffic provided in Exhibit 10.

**Table 8** summarizes the capacity analysis during the Build-Out Background AM and PM peak hours. The table provides a summary of delay and LOS by approach as well as the overall intersection

operations. Detailed information by movement is summarized in a table that is provided in the **Appendix**. The Synchro reports are also provided in the **Appendix**.

**Table 8. Horizon (2041) Background Conditions Capacity Summary – AM Peak Hour / PM Peak Hour**

Intersection	Eastbound Approach		Westbound Approach		Northbound Approach		Southbound Approach		Overall Intersection	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
University Ave & Whitney Way	8.1 / 12.7	A / B	12.3 / 22.8	B / C	47.6 / 39.4	D / D			14.0 / 22.7	B / C
Whitney Way & Old Middleton Rd	45.5 / 49.8	D / D	21.7 / 49.0	C / D	29.0 / 33.7	C / C	48.5 / 34.7	D / C	38.0 / 41.0	D / D
Eau Claire Ave & Old Middleton Rd	--	--	--	--	28.5 / 37.4	D / E				
University Ave & Segoe Rd	118.6 / 89.6	F / F	19.3 / 41.2	B / D	57.6 / 51.2	E / D	58.0 / 93.4	E / F	82.6 / 60.7	F / E
University Ave & Hilldale Way	58.8 / 8.9	E / A	20.8 / 20.2	C / C	53.7 / 45.3	D / D	0.0 / 44.4	A / D	44.4 / 16.3	D / B
University Ave & Midvale Blvd	128.9 / 59.9	F / E	25.0 / 199.5	C / F	121.0 / 224.5	F / F	49.8 / 155.3	D / F	92.5 / 155.3	F / F
Whitney Way & Sheboygan Ave			17.7 / 24.2	C / C	--	--	--	--		
Eau Claire Ave & Sheboygan Ave	--	--	--	--	11.5 / 11.8	B / B	12.3 / 13.6	B / B		
Segoe Rd & Frey St*	9.3 / 10.7	A / B	32.5 / 48.5	C / D	4.8 / 6.1	A / A	33.4 / 56.6	C / E		
Segoe Rd & Sheboygan Ave	16.1 / 21.1	C / C	13.0 / 13.7	B / B	--	--	--	--		
Midvale Blvd & Heather Crest	39.5 / 37.3	D / D	41.2 / 35.9	D / D	2.6 / 4.8	A / A	5.0 / 11.2	A / B	6.3 / 12.7	A / B
Whitway Way & Regent St	12.1 / 11.1	B / B	12.6 / 16.2	B / B	5.3 / 8.7	A / A	4.9 / 8.0	A / A	6.2 / 9.7	A / A
Eau Claire Ave & Regent St	8.8 / 10.3	A / B	7.7 / 10.5	A / B	7.4 / 8.6	A / A	7.2 / 8.4	A / A	8.1 / 9.9	A / A
Segoe Rd & Regent St	39.1 / 30.7	D / C	34.1 / 38.9	C / D	3.9 / 8.5	A / A	3.9 / 10.4	A / B	20.6 / 22.6	C / C
Midvale Blvd & Regent St	36.1 / 49.5	D / D	35.8 / 58.8	D / E	4.6 / 7.6	A / A	3.4 / 7.8	A / A	10.7 / 18.0	B / B

Note 1 - Gray boxes represent non-existent movements or that the overall intersection LOS is not applicable.

Note 2 - “--” represents free movements where delay is theoretically 0 seconds.

\* - The southbound delay shown is for the southbound left only; the southbound through movement is uninterrupted

For the Horizon (2041) Background AM and PM peak hours, delay that occurs during Build-Out background conditions increases, particularly for the University Avenue & Segoe Road intersection which is shown to operate at LOS F overall during the AM peak hour and LOS E during the PM peak hour. The intersection of University Avenue & Midvale Boulevard operates at a LOS F in both the AM and PM peak hours. The northbound approach of the Eau Claire Avenue & Old Middleton Road intersection and the westbound approach of the Midvale Boulevard & Regent Street intersection are shown to operate at LOS E for the PM peak hour.

**Table 9** summarizes the capacity analysis during the Build-Out Total AM and PM peak hours. The table provides a summary of delay and LOS by approach as well as the overall intersection operations. Detailed information by movement is summarized in a table that is provided in the **Appendix**. The Synchro reports are also provided in the **Appendix**. As previously detailed, a dedicated westbound left-turn lane into the development and a westbound acceleration lane for northbound left-turn exiting vehicles are currently being constructed at the proposed half-signalized site access location along University Avenue, and were assumed for future build conditions. All other site intersections were assumed to operate under minor-leg stop-control. Geometric improvements

recommended in the Build-Out (2021) Total conditions analysis were included in the Horizon (2041) Total conditions analysis.

**Table 9. Horizon (2041) Total Conditions Capacity Summary – AM Peak Hour / PM Peak Hour**

Intersection	Eastbound Approach		Westbound Approach		Northbound Approach		Southbound Approach		Overall Intersection	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
University Ave & Whitney Way	9.3 / 13.1	A / B	14.5 / 35.8	B / D	47.7 / 38.6	D / D			14.9 / 28.3	B / C
Whitney Way & Old Middleton Rd	56.5 / 65.7	E / E	24.1 / 52.4	C / D	34.7 / 54.1	C / D	53.4 / 35.7	D / D	44.7 / 51.7	D / D
Eau Claire Ave & Old Middleton Rd	--	--	--	--	37.3 / 45.8	E / E				
University Ave & Segoe Rd	156.6 / 134.9	F / F	20.5 / 49.2	C / D	57.9 / 50.6	E / D	58.0 / 93.4	E / F	104.2 / 82.7	F / F
University Ave & Hilldale Way	71.2 / 9.6	E / A	20.1 / 20.0	C / B	53.7 / 45.3	D / D	0.0 / 44.4	A / D	50.9 / 16.3	D / B
University Ave & Midvale Blvd	149.4 / 57.7	F / E	26.0 / 198.4	C / F	112.7 / 220.3	F / F	49.8 / 156.1	D / F	100.0 / 151.9	F / F
Whitney Way & Sheboygan Ave			20.1 / 21.7	C / C	14.7 / 12.5	B / C	1.5 / 5.3	A / A	9.6 / 11.5	A / B
Eau Claire Ave & Sheboygan Ave	--	--	--	--	12.4 / 12.5	B / B	17.8 / 20.2	C / C		
Segoe Rd & Frey St*	9.6 / 10.7	A / B	32.5 / 48.5	C / D	4.8 / 6.0	A / A	33.4 / 56.6	C / E		
Segoe Rd & Sheboygan Ave	23.5 / 16.9	C / C	18.3 / 23.4	C / C	--	--	--	--		
Midvale Blvd & Heather Crest	39.6 / 37.3	D / D	41.2 / 35.9	D / D	2.4 / 4.5	A / A	4.5 / 11.5	A / B	6.0 / 12.5	A / B
Whitway Way & Regent St	13.9 / 11.7	B / B	14.2 / 20.3	B / C	5.6 / 9.6	A / A	5.1 / 9.0	A / A	6.8 / 11.1	A / B
Eau Claire Ave & Regent St	9.5 / 11.3	A / B	7.8 / 11.0	A / B	7.6 / 8.8	A / A	7.4 / 8.8	A / A	8.5 / 10.4	A / B
Segoe Rd & Regent St	39.1 / 30.1	D / C	33.7 / 37.5	C / D	4.0 / 8.8	A / A	4.1 / 11.5	A / B	19.4 / 21.6	B / C
Midvale Blvd & Regent St	41.3 / 45.7	D / D	34.7 / 35.9	C / D	12.2 / 21.6	B / C	13.3 / 30.0	B / C	17.8 / 29.7	B / C
<b>PROJECT DRIVEWAYS</b>										
Old Middleton Rd & Driveway 1	--	--	--	--	19.9 / 15.3	C / C				
University Ave & Driveway 2	22.6 / 28.8	C / C	5.0 / 1.6	A / A	41.2 / 28.9	D / C			19.2 / 17.7	B / B
Sheboygan Ave & Driveway 3	--	--	--	--			25.0 / 40.0	D / E		
Sheboygan Ave & Driveway 4	--	--	--	--			13.3 / 14.6	B / B		
Sheboygan Ave & Driveway 5	--	--	--	--			12.8 / 13.2	B / B		
Segoe Rd & Driveway 6	9.6 / 10.7	A / B			--	--	--	--		

Note 1 - Gray boxes represent non-existent movements or that the overall intersection LOS is not applicable.

Note 2 - “—” represents free movements where delay is theoretically 0 seconds.

\* - The southbound delay shown is for the southbound left only; the southbound through movement is uninterrupted

With the geometric improvements recommended to mitigate Build-Out (2021) conditions, overall intersections (and approaches) are anticipated to operate at an acceptable LOS during the AM and PM peak hours, with the exception of the following:

- **Whitney Way & Old Middleton Road** – The eastbound approach is anticipated to operate at LOS E during both the AM and PM peak hours.
  - Recommendation: Review the intersection operations for signal timing improvements.

- **Eau Claire Avenue & Old Middleton Road** – The northbound approach is anticipated to operate at LOS E during the AM and PM peak hours.
  - Recommendation: The side-street stop controlled vehicles are anticipated to experience longer than desirable wait times to make a turn onto Old Middleton Road. Due to the low volume of the approach, and the fact that the volume-to-capacity ratio of the approach is low, no improvements are recommended.
- **University Avenue & Segoe Road** – The overall intersection is anticipated to operate at LOS F during the AM and PM peak hours.
  - Recommendation: As previously detailed, since there are three existing eastbound through lanes, providing additional capacity through travel lanes is not feasible at this location. No geometric improvements are recommended at this time.
- **University Avenue & Hilldale Way** – The eastbound approach is anticipated to operate at LOS E during the AM peak hour.
  - Recommendation: Continue to provide signal coordination improvements along the University Avenue corridor.
- **University Avenue & Midvale Boulevard** – The overall intersection is anticipated to operate at LOS F during the AM and PM peak hours.
  - Recommendation: As previously detailed, since there are three eastbound through lanes and dual westbound left-turn lanes provided today, there isn't much opportunity to provide additional capacity through travel lanes. No geometric improvements are recommended at this time.
- **Segoe Road & Sheboygan Avenue** – The westbound approach is anticipated to operate at LOS C during the PM peak hour.
  - Recommendation: The side-street stop controlled vehicles are anticipated to experience longer than desirable wait times to make a turn onto Segoe Road. Due to the low volume of the approach, and the fact that the volume-to-capacity ratio of the approach is low, no improvements are recommended.
  - The City has asked that an analysis be performed at this intersection for consideration of a roundabout. Based on the level of service analysis using SIDRA (assuming a multi-lane roundabout), the intersection is anticipated to operate at LOS A during the Horizon Year Total AM and PM peak hours with a roundabout.
    - Although the roundabout has the potential to improve level of service at the intersection, significant right-of-way impacts to the northwest and southwest quadrants of the intersection would be anticipated. **Exhibit A** in the Appendix provides a hand sketch of a dual-lane roundabout to show the potential right-of-way impacts using an inscribed circle diameter ranging from 150 feet to 180 feet. It should be noted that because of the location of the Venture building on the northeast corner of the intersection, the roundabout is not oriented in the center of the existing intersection, and a realignment of Segoe Road to the

west will be necessary. Right-of-way impacts from the realignment impacts are not accounted for in the hand sketch.

- If the City would like to still consider a roundabout at this location, further studies and analysis will be necessary.
- The intersection was also analyzed under traffic signal control based on a request from the City. Based on the level of service analysis using Synchro, the intersection would be anticipated to operate at LOS B during the Horizon Year Total AM and PM peak hours with a traffic signal. The Synchro reports for the intersection analysis are provided in the **Appendix**.
- This intersection should be monitored to determine if additional intersection control is warranted in the future.
- **Sheboygan Avenue & Garage Access Driveway** – The southbound approach is anticipated to operate at LOS E during the PM peak hour.
  - Recommendation: It is expected that state employee traffic will divert to the other access connections if backups start to occur. This intersection should be monitored to determine if additional intersection control is warranted in the future.

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## CONCLUSION & RECOMMENDATIONS

Kimley-Horn and Associates, Inc., (Kimley-Horn) was retained by SG Hill Farms, LLC, to evaluate the traffic impacts related to the proposed mixed-use development located on the south side of University Avenue, west of Segoe Road in City of Madison, Wisconsin.

The development plan includes replacing the existing 432,544 square foot State Office Building with a 600,000 square foot building which is already under construction. The development will also include the following land uses: 350 multi-family dwelling units, 200 hotel rooms, 225,150 square feet of general office space, 152,370 square feet of medical office space, 98,050 square feet of general retail space, 26,800 square feet of restaurant space, a 5,000 square foot pharmacy, a 40,650 square foot fitness club, and a 25,000 square foot grocery store. The development also includes a parking ramp located on the southwest portion of the development that has already been constructed and is being used by employees of the State Office Building.

Access to the site will be provided by six (6) driveway connections of the following types: one (1) full access signalized connection along University Avenue, one (1) unsignalized right-in/right-out connection along Old Middleton Road, one (1) unsignalized right-in/right-out connection along Segoe Road, two (2) unsignalized full access connections along Sheboygan Avenue serving the mixed-use development, and one (1) unsignalized full access connection along Sheboygan serving the government office building. Supplemental right-in/right-out access driveways are also planned to facilitate movements to/from parking and loading located within specific block groups. These driveways will only provide access to individual block groups, and are anticipated to reduce the impacts of site traffic on the primary driveways. The exact location and design of these supplemental driveways will be determined through the individual site design process.

A capacity analysis was performed for the study intersection for five (5) scenarios during the weekday AM and PM peak hours. Based on the capacity analysis, the following improvements are recommended to provide acceptable LOS at within the project study area through the 2041 Horizon Year:

- Installation of a “half-signal” at the intersection of Whitney Way & Sheboygan Avenue (City/Developer)
- Timing improvements at the intersection of Whitney Way & Old Middleton Road (City)
- Installation of a “half-signal” along University Avenue at the project access west of Segoe Road (Developer)
- Due to the high non-motorized mode-split anticipated for the development, it is recommended that a Travel Demand Management Plan (TDMP) be developed for the site. (Developer)

## APPENDIX

Conceptual Site Plan

Traffic Count Data

Parking Generation Table

Existing Conditions (2017) Synchro Reports

Build-Out Conditions (2021) Synchro Reports

Crash History at Whitney Way & Sheboygan Avenue

Signal Warrant Analysis at Whitney Way & Sheboygan Avenue

Horizon Conditions (2041) Synchro Reports

Roundabout Sketch at Segoe Road & Sheboygan Avenue

Synchro Traffic Signal Analysis at Segoe Road & Sheboygan Avenue

## CONCEPTUAL SITE PLAN



# HILL FARMS DEVELOPMENT MASTER PLAN DIAGRAM

PLAN VIEW 7/6/2017