



Agenda
Pedestrian & Bicycle Safety Committee
January 10, 2017, 7 P.M.
Village Committee Room
3930 North Murray Avenue, Shorewood, WI

1. Call to order
2. Approval of December 13, 2016 Minutes
3. Public Comments
4. Report from Lt. Thomas Liebenthal on Ped and Bike Safety
5. Updates with staff liaison Tyler Burkart
6. Discuss Lake Drive Traffic Study
7. Discuss Bike Lanes in the Village
8. Update on the Wilson Drive Community Task Force
9. Future agenda items
10. Adjournment

DATED at Shorewood, Wisconsin, this 5th day of January, 2017,

VILLAGE OF SHOREWOOD
Tanya O'Malley
Village Clerk-Treasurer

It is possible that members of and possibly a quorum of members of other governmental bodies of the municipality may be in attendance at the above stated meeting to gather information; no action will be taken by any governmental body at the above stated meeting other than the governmental body specifically referred to above in this notice. Should you have any questions or comments regarding any items on this agenda, please contact the Village Manager's Office at 847-2700. Upon reasonable notice, efforts will be made to accommodate the needs of disabled individuals.



AT THE EDGE OF THE CITY AND
THE HEART OF EVERYTHING

MEMORANDUM

TO: Pedestrian and Bicycle Safety Committee
FROM: Tyler Burkart, Assistant Village Manager
DATE: January 10, 2017
RE: Summary of Lake Drive Traffic Study

OVERVIEW

The Pedestrian and Bicycle Safety Committee identified in their Master Plan in 2015 the desire for a bike lane on Lake Drive. The committee envisioned residents and visitors wanting to use Lake Drive to bike along scenic Lake Michigan. The plan expresses a bike lane as a safe and transparent method for bicyclists to use so motorists are aware of bicyclists when driving on Lake Drive. Due to the current width of the road, Lake Drive would need to be reduced to one lane in order to add space for bicyclists. Since Lake Drive is a state highway, the Wisconsin Department of Transportation (WisDOT) expressed the Village would need to complete a traffic count in order to restripe Lake Drive to be a two lane street instead of its current four lane configuration.

The Pedestrian and Bicycle Safety Committee recommended earlier in 2016 for the Village Board to approve funding for the completion of a Lake Drive traffic study. The Village Board approved the recommendation. Village staff asked for proposals to complete the study. Ken Voigt from Ayres Associates came back with the lowest bid. Mr. Voigt was the transportation engineer who also completed the Lake Drive traffic study for Whitefish Bay a number of years ago.

Attached to this memo is the Lake Drive traffic study performed by Ayers Associates. The study analyzes the entire segment of Lake Drive in the Village of Shorewood based on traffic counts, ability to make left turns, and traffic speeds. Based on Ayers Associates' assessment, the following is a summary of their findings:

- Traffic volumes on Lake Drive between Kensington Blvd. and Edgewood Dr. are relatively consistent ranging between 13,550 and 15,400 volume per day (vpd).
- 85th percentile traffic speeds along Lake Drive range between 38 and 43 mph.
- Mr. Voigt suggests converting Lake Drive to a two lane roadway during all times of the day should not negatively impact peak hour traffic.
- The report includes some recommendations on how to stripe Lake Drive so traffic can flow most effectively if roadway is reduced to two lanes. These recommendations are:
 - Prohibit parking either 500 feet or 750 just north and south of Capitol Drive on Lake Drive to allow cars to make turns on and off of Lake Drive.

- Prohibit parking for northbound traffic at intersections to allow traffic to pass on right when other motorists are attempting a left turn.
- Similar to Whitefish Bay, the report recommends installing a continuous white edge lane line pavement marking along both sides of Lake Drive except at intersections to provide an 11-foot wide traffic lane and an 11-foot shared use on-street parking/bike route curb lane. There is not enough width for a bike lane since a bike lane needs to be at least 5-feet in width while the parking lane needs to be 8-feet in width.
- The report also suggests the risk of a reduction in the annual WisDOT highway aid payment to the Village if Lake Drive is converted from four lanes to two lanes. Staff is reached out to WisDOT to learn how much potential aid would be lost if the lane reduction were to occur. According to WisDOT, the Village will not lose any highway aids by changing the road from 4-lanes to 2-lanes. The WisDOT indicated, if we allow on-street parking during anytime of the day, the State automatically assigns highway aids as if it is a 2-lane roadway. The Village currently receives \$21,142 for Lake Drive as a 2-lane roadway.
- The report finally recommends installing radar speed feedback signs to tame traffic speeds on Lake Drive.

NEXT STEPS

The Pedestrian and Bicycle Safety Committee will review the study over the next few months and make a recommendation to the Village Board. It is recommended for the committee not to make a recommendation right away in order to reflect on the study and gather public input on the potential reduction of Lake Drive to two lanes. The Village wants the Pedestrian and Bicycle Safety Committee to consider the following things in their recommendation to the Village Board:

- Should Lake Drive be reduced from four lanes to two lanes?
- If the committee determines Lake Drive should be reduced by two lanes, does the committee want to include all the suggestions provided by the transportation engineer in their final recommendation to the Village Board?
- Additionally, if the committee determines to reduce Lake Drive by two lanes, when is the most appropriate timing to restripe the roadway? The committee should consider that the Village's Long Range Financial Plan is estimating for Lake Drive to be resurfaced in 2019 and a potential full reconstruction of Lake Drive in 2026. In high traffic areas, painted pavement markings and striping typically lasts for one year.

MEMORANDUM

To: Mr. Chris Swartz, Village Manager

From: Ken Voigt, P.E., Senior Transportation Engineer

Date: December 6, 2016

Project Number: 49-0074.00

Re: Lake Drive Lane Reduction Study

Ayres Associates has been retained by the Village of Shorewood to study the feasibility of reducing the number of traffic lanes on the segment of Lake Drive within the village limits from a four-lane to a two-lane roadway to reduce traffic speeds and enhance pedestrian and bicyclist safety.

Existing Conditions

Lake Drive is currently a 44-foot wide street that allows non-peak hour on-street parking but operates as a 4-lane roadway with directional on-street parking restrictions during peak traffic time periods. During the morning peak traffic period southbound on-street parking is prohibited during the 7:00 to 9:00 AM time period. Conversely, during the evening peak traffic period northbound on-street parking is prohibited during the 4:00 to 6:00 PM time period. During other times of the day on-street parking is limited to a 2-hour duration.

Lake Drive at its intersection with Capitol Drive operates with a separate southbound through lane and a shared through/right turn lane. These two lanes extend south of Capitol Drive to its intersection with Shorewood Boulevard. Southbound on-street parking is prohibited during the 7:00 to 9:00 AM time period along the entire stretch of Lake Drive between the village Limits. During all other times of the day southbound on-street parking is prohibited within 130 feet of its southbound approach to Capitol Drive.

The northbound approach of Lake Drive operates with separate left turn and through traffic lanes. On-street parking along the northbound side of Lake Drive is prohibited along the entire segment of Lake Drive within the Village limits during the 4:00 to 6:00 PM time period. The exception to this peak hour parking restriction affects the northbound approach to Capitol Drive where on-street parking is prohibited all day long from Shorewood Boulevard to allow safe operation of the two lanes approaching Capitol Drive. Lake Drive is State Highway 32 with a posted speed limit of 30 mph.

Traffic Volume

As part of this study Ayres Associates collected traffic volume and speed data on Lake Drive over a 24-hour period on Tuesday, October 4, 2016. The following summarizes the variation in daily traffic levels along the study segment of Lake Drive.

Table 1: Traffic Volume Change Along Lake Drive (2016)

<u>Location</u>	<u>24-Hour Volume</u>
• South of Edgewood Avenue	13,550 vpd
• South of Capitol Drive	15,400 vpd
• North of Capitol Drive	14,800 vpd
• North of Kensington Boulevard	13,900 vpd*

Note: * count taken in 2010

As shown on Table 1, daily traffic volumes along Capitol Drive are relatively consistent between the southern and northern Village limits ranging between 13,550 vpd to 15,400 vpd. From a peak hour perspective, which has the greatest impact one intersection traffic operation, peak southbound volumes range between 1,230 vph to 1,350 vph during the morning peak hour with northbound evening peak hour volumes ranging between 1,100 vph to 1,220 vph along the study segment of Lake Drive. This hourly variation is not expected to significantly impact traffic operation along Lake Drive.

Traffic Speed

Traffic speed data was collected on Lake Drive south of Edgewood Avenue, which has a posted speed limit of 30 mph and is summarized on Table 2.

Table 2: Lake Drive Traffic Speeds South of Edgewood Avenue

<u>Direction of Travel</u>	<u>Average Speed</u>	<u>85th % Speed</u>	<u>% Exceeding Posted Speed</u>
Northbound	35-40 mph	39-46 mph	45-79 mph
Southbound	33-37 mph	38-43 mph	27-67 mph

Note: xx-yy, xx = speed in left lane, yy = speed in curb lane

As shown on Table 2, current traffic speeds exceed the existing 30 mph posted speed limit in both directions of travel on Lake Drive. Table 2 indicates that 85th percentile speeds range between 38 to 39 mph in the left lane and 43 to 46 mph in the curb lane.

As also shown on Table 2, the average speeds in the left lane average between 33 to 35 mph compared to curb lane speeds, which average between 37 to 40 mph. This pattern is particularly evident for traffic traveling in the north and southbound curb lanes where 67 to 79% of traffic is exceeding the speed limit. Fortunately, the curb lane volumes only comprise between 1 % to 24 % of the

total traffic on Lake Drive except for northbound evening peak hour traffic when it comprises approximately 44 percent of the northbound volume.

Overall, the traffic speed analysis along Lake Drive indicates that existing traffic speeds are significantly exceeding the posted speed limit on Lake Drive and that traffic speeds in the north and southbound curb lanes are higher than speeds in the center traffic lanes.

Lane Conversion Analysis

For reference purposes, Ayres Associates conducted a study in 2010 to convert the 4-lane roadway segment of Lake Drive north of Kensington Boulevard to a 2-lane roadway, which carries volumes similar to those on the Lake Drive segment in the Village of Shorewood. That study purpose was also to tame traffic speeds and enhance pedestrian safety. That lane conversion change has been successfully implemented by the Village of Whitefish Bay.

The Wisconsin Department of Transportation (WisDOT) has indicated they will require an operational analysis of the Lake Drive intersection with Capitol Drive to confirm that the proposed lane reduction plan will not jeopardize existing traffic operating conditions. WisDOT also noted that converting from 4-lane to 2-lane operation on Lake Drive could reduce the Department’s annual ‘Highway Aid’ payment to the Village.

Intersection operation is typically quantified based on its Level of Service (LOS) during peak traffic volume periods. Level of Service is defined as the average length of delay experienced by traffic entering an intersection over a 1-hour time period. Level of Service is categorized by grades of ‘A’ through ‘F’. Most public agencies define acceptable operation as LOS ‘C’ or ‘D’. Table 1 provides a brief summary of the different Levels of Service for intersection analysis.

Table 1: Intersection Level of Service Description

Level of Service (LOS)				
ALPHA LOS	NUMERIC LOS	SIGNALIZED DELAY (seconds/vehicle)	UNSIGNALIZED DELAY (seconds/vehicle)	DESCRIPTION
A	1.01 to 2.00	< 10	< 10	No Congestion, Minimal Delay
B	2.01 to 3.00	> 10 to 20	> 10 to 15	No Congestion
C	3.01 to 4.00	> 20 to 35	> 15 to 25	Minimal Congestion
D	4.01 to 5.00	> 35 to 55	> 25 to 35	Moderate Congestion
E	5.01 to 6.00	> 55 to 80	> 35 to 50	Severe Congestion
F	> 6.00	> 80	> 50	Extreme Congestion

Capitol Drive Intersection: As part of this study, Ayres Associates collected morning and evening peak period intersection turning movement counts at the

Lake Drive intersection with Capitol Drive. The traffic counts were taken during the morning 7:30 to 8:30 AM and evening 4:45 to 5:45 PM commuter traffic peak hours. Based on those traffic counts and existing traffic signals timings an analysis of peak period traffic operation was conducted and is summarized on Table 3.

Table 3: Peak Hour Operation of the Lake Drive Intersection with Capitol Drive.

Traffic Operation Conditions at Lake Drive and E Capitol Drive - HCM 2010 Methodology									
	Peak	MOE	Capitol Drive		Lake Drive		Lake Drive		Overall
			EBL	EBR	NBL	NBT	SBT	SBR	
Existing	AM Peak	LOS	C	C	B	A	D		D
		Queue (ft)	75	50	50	150	475		N/A
		Delay (sec)	23.2	26.3	19.3	9.6	49.4		38.0
	PM Peak	LOS	C	D	B	B	C		C
		Queue (ft)	150	50	75	650	275		N/A
		Delay (sec)	33.5	35.3	12.4	19.1	23.5		22.2

As shown on Table 3, southbound morning peak hour queuing with the prohibition of on-street parking during the 7:30 to 8:30 AM peak traffic hour extends a maximum of 475 feet on the southbound approach to Capitol Drive with maximum northbound queues on the Lake Drive approach to Capitol Drive extending a distance of 150 feet in the through traffic lane and 50 feet in the left turn lane. In comparison, during the evening peak hour southbound traffic on Lake Drive extends a maximum distance of 275 feet from Capitol Drive with a maximum northbound queue of 650 feet in the through traffic lane and 75 feet in the left turn lane.

This analysis indicates that the Lake Drive approaches to Capitol Drive will need to continue to provide two traffic lanes on both the north and southbound approaches to Lake Drive during peak traffic conditions. Southbound on-street parking should be prohibited a distance of 500 feet from Capitol Drive during the 7:00 to 9:00 AM time period and 300 feet during the evening 4:00 to 6:00 PM peak hour. Northbound on-street parking during the morning peak period should be prohibited a distance of 150 feet from Capitol Drive and 650 feet during the evening peak period.

Typical Residential Street Intersection: An additional analysis was conducted to determine typical Lake Drive operation at its intersections with existing residential neighborhood streets with a lane reduction condition and is summarized on Table 4. For this analysis it was assumed residential streets would experience 25 northbound left turns, 25 southbound right turns and 25 eastbound left and right turns.

Table 4: Peak Hour Lake Drive Operation at Typical Residential Street Intersections.

Traffic Operation Conditions at Lake Drive and Shorewood Blvd - HCM 2010 Methodology									
Configuration	Peak	MOE	Shorewood		Lake Drive		Lake Drive		Overall
			EBL	EBR	NBL	NBT	SBT	SBR	
Existing	AM Peak	LOS	F		C	A	A	A	A
		Queue (ft)	100		25	0	0	0	N/A
		Delay (sec)	102.8		15.0	0.7	0.0	0.0	3.1
	PM Peak	LOS	F		B	A	A	A	A
		Queue (ft)	75		25	0	0	0	N/A
		Delay (sec)	67.2		10.7	0.9	0.0	0.0	2.1
1 Lane	AM Peak	LOS	F		B	A	A	A	A
		Queue (ft)	100		25	0	0	0	N/A
		Delay (sec)	164.5		14.7	0.0	0.0	0.0	4.5
	PM Peak	LOS	F		B	A	A	A	A
		Queue (ft)	125		25	0	0	0	N/A
		Delay (sec)	200.7		10.5	0.0	0.0	0.0	4.6

The analysis summary on Table 4 reflects existing operation with a 2-lane southbound approach during the morning peak period and a 2-lane northbound approach during the evening peak hour. Table 4 also reflects intersection operation with one-lane approaches during both the morning and evening peak periods. The one-lane operation analysis includes all day parking restrictions opposite the residential eastbound approach to an intersection. The limited length of all-day parking restriction allows northbound through traffic to safely bypass a northbound left turning vehicle waiting for a gap in southbound traffic to enter a residential street.

As shown on Table 4, northbound and southbound traffic operation on Lake Drive is basically unaffected with conversion of Lake Drive from a 4-lane to a 2-lane roadway. However, converting Lake Drive to a 2-lane roadway can be expected to increase evening peak hour queuing on residential street intersections from 75 feet to 125 feet for eastbound traffic turning left or right onto Lake Drive along with increases in eastbound morning and evening peak hour average vehicle delays.

Traffic Speed Impact: According to the ITE report, *‘Designing Walkable Urban Thoroughfares: A Context Sensitive Approach’*, speed management on arterial streets can be accomplished through numerous techniques including enforcement, road diets, provision on on-street parking, narrowed travel lanes and speed actuated feedback signs.

The current width of Lake Drive is 44 feet allowing for four travel lanes of 11-foot width each during peak traffic time periods. During non-peak traffic periods, Lake Drive basically functions as a single 22-foot wide traffic lane unless a vehicle is

parked along the roadway curb. The 22-foot lane width perception provides a motorist with a sense of a 22-foot wide traffic lane which encourages speeding.

Converting Lake Drive to a 2-lane roadway requires installation of a continuous white edge line pavement marking for a single 11-foot wide traffic lane and a dedicated 11-foot wide curb lane for on-street parking and bicycle riders. Under this condition, the curb lane can be signed as a bike route but not stripped as a bike lane which requires a 5-foot width in addition to the requirement for an 8-foot wide parking lane.

It is also recommended for speed management purposes that a permanent southbound radar speed feedback sign be installed on Lake Drive north of Marion Street and that a northbound radar speed feedback sign be installed south of Menlo Boulevard to tame traffic speeds.

Conclusions

1. Traffic volumes along the study segment of Lake Drive between Kensington Boulevard and Edgewood Drive are relatively consistent ranging between 13, 550 to 15,400 vpd. Peak hour volumes are also consistent along Lake Drive.
2. 85th percentile traffic speeds on Lake Drive range between 38 to 43 mph with between 27 to 79 percent of the daily traffic exceeding the posted 30 mph speed limit.
3. On-street parking is prohibited along Lake Drive in the southbound direction from 7:00 to 9:00 AM and in the northbound direction from 4:00 to 6:00 PM. Two-hour parking is allowed along both sides of Lake Drive during the remainder of the day.
4. Based on direction from the Wisconsin Department of Transportation, since Lake Drive is a state highway (STH 32), converting Lake Drive operation to a 2-lane roadway during all times of the day should not negatively impact peak hour traffic operation of Lake Drive.
 - a. Lake Drive at its intersection with Capitol Drive should continue to operate with two southbound and northbound approach lanes. In the northbound direction the lanes should be dedicated with a separate left turn lane and a through traffic lane. Southbound on-street parking during the morning peak hour will need to be restricted within 500 feet of its approach to Capitol Drive, South of Capitol Drive southbound on-street parking should be prohibited all day for a distance of approximately 750 feet to allow the two through lanes to merge to a single lane at Shorewood Boulevard. Likewise, northbound Capitol Drive at its intersection with Capitol Drive should prohibit all day on-street parking from Shorewood Boulevard to Capitol Drive. North of Capitol Drive northbound on-

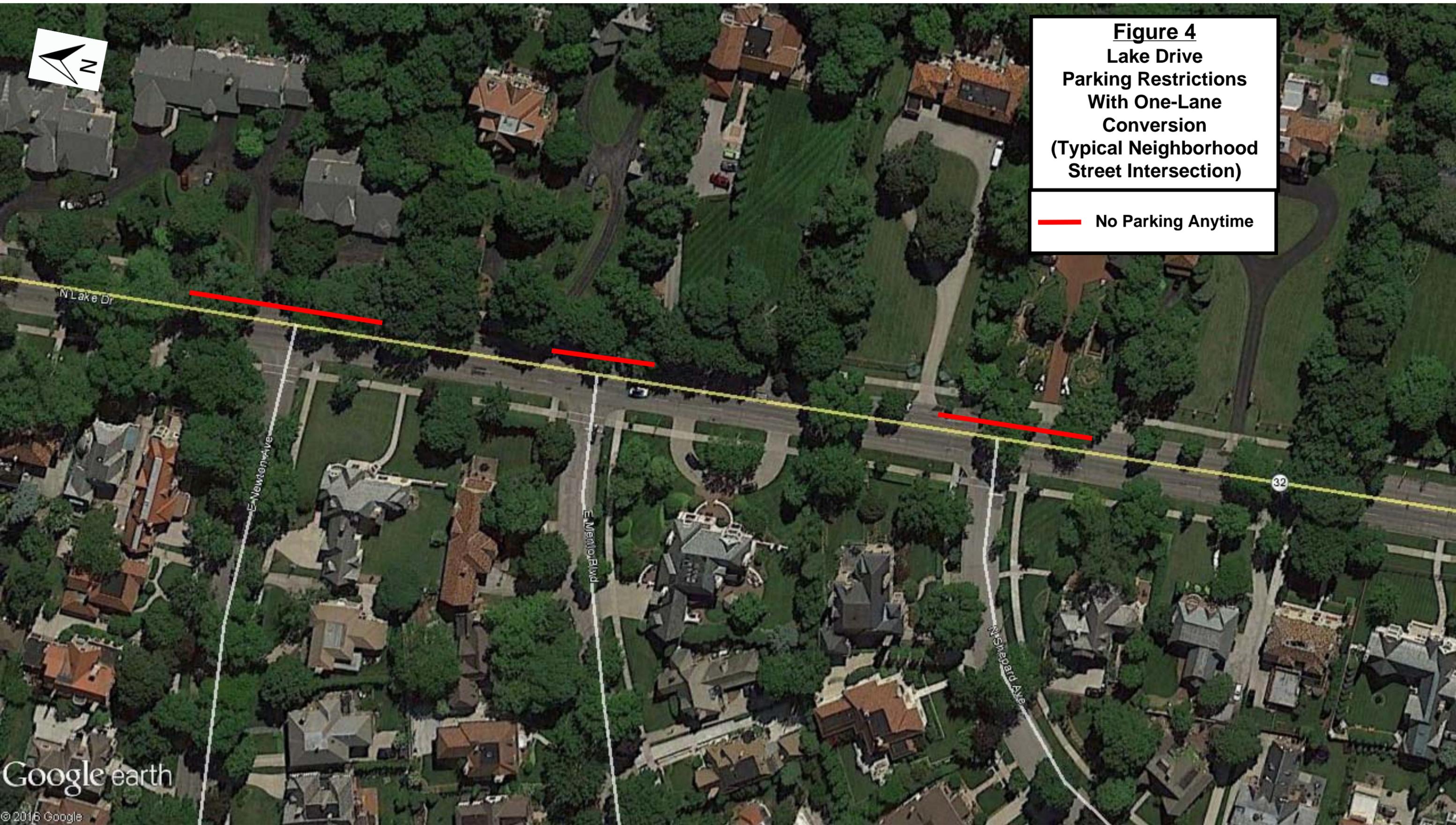
street parking can remain unchanged from existing conditions at Atwater Park.

- b. Lake Drive at its intersections with residential neighborhood streets should prohibit northbound all day on-street parking across from each residential street to allow northbound traffic to bypass northbound left turning vehicles.
 - c. The WisDOT has indicated that converting Lake Drive from 4-lane to 2-lane operation could reduce the annual WisDOT 'Highway Aid' payment amount to the Village.
5. Traffic speeds on Lake Drive can be tamed by installing a continuous white edge lane line pavement marking along both sides of Lake Drive except at its intersections with east-west cross streets. The white edge line pavement marking should provide an 11-foot wide through traffic lane and an 11 foot-wide shared use on-street parking/bike route curb lane.
6. In addition to the conversion of Lake Drive from a 4-lane to a 2-lane roadway, radar speed feedback signs should be installed to tame traffic speeds on southbound Lake Drive north of Marion Street with a southbound radar speed feedback sign installed south of Menlo Boulevard.



Figure 4
Lake Drive
Parking Restrictions
With One-Lane
Conversion
(Typical Neighborhood
Street Intersection)

 **No Parking Anytime**



**Lake Drive
Parking Restrictions
With Two-Lane
Conversion
(Typical Neighborhood
Street Intersection)**

— No Parking Anytime

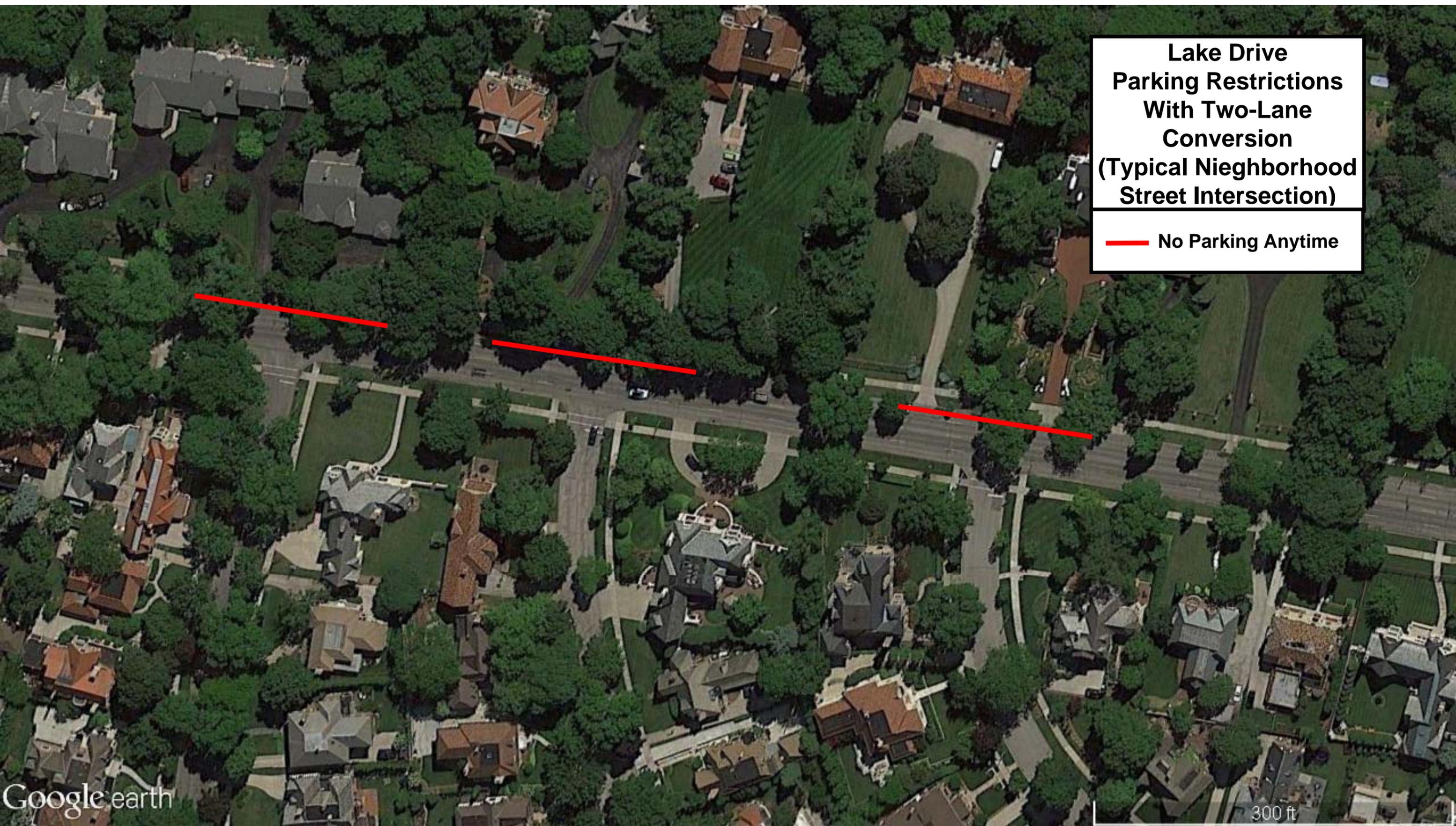
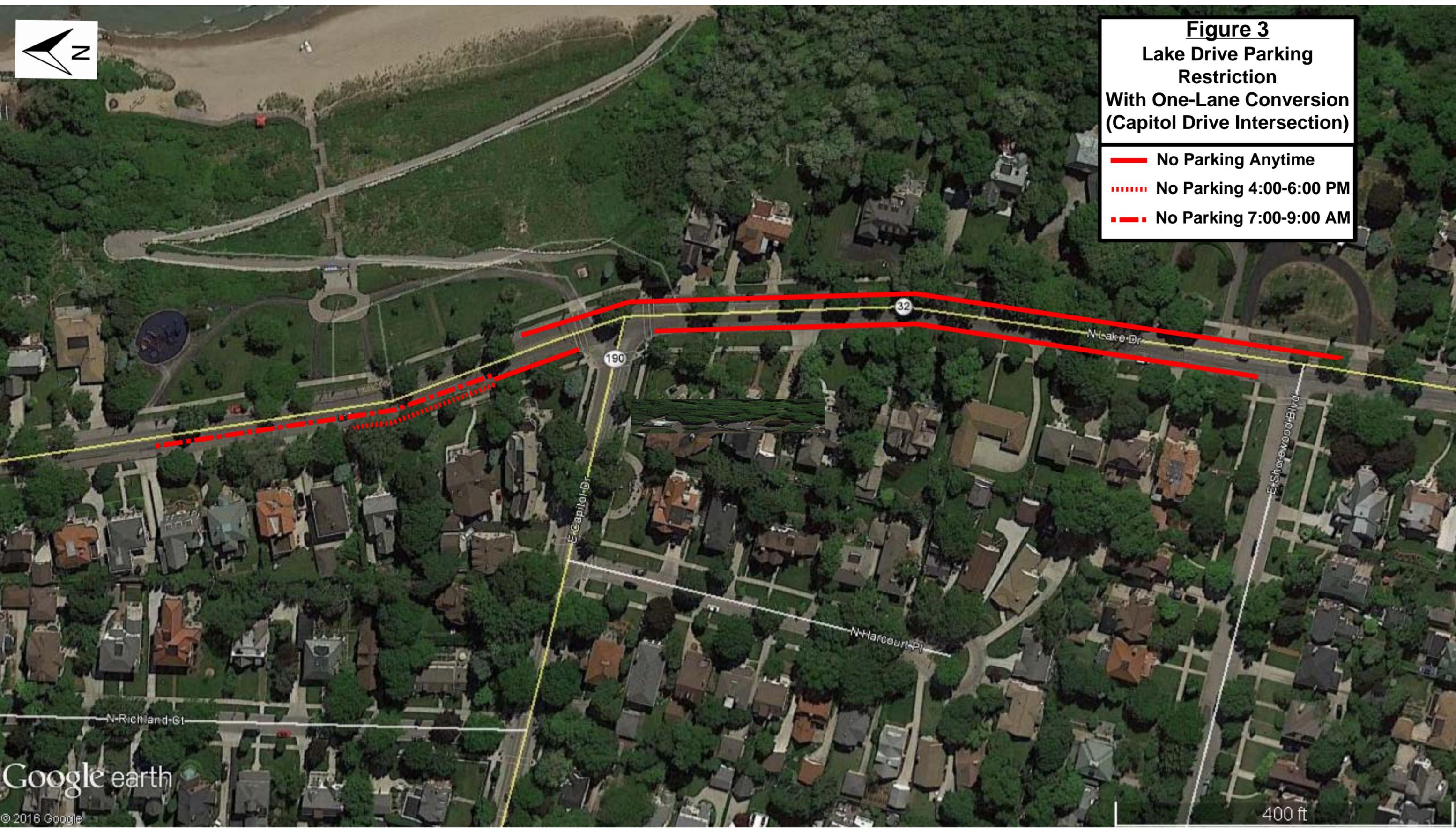
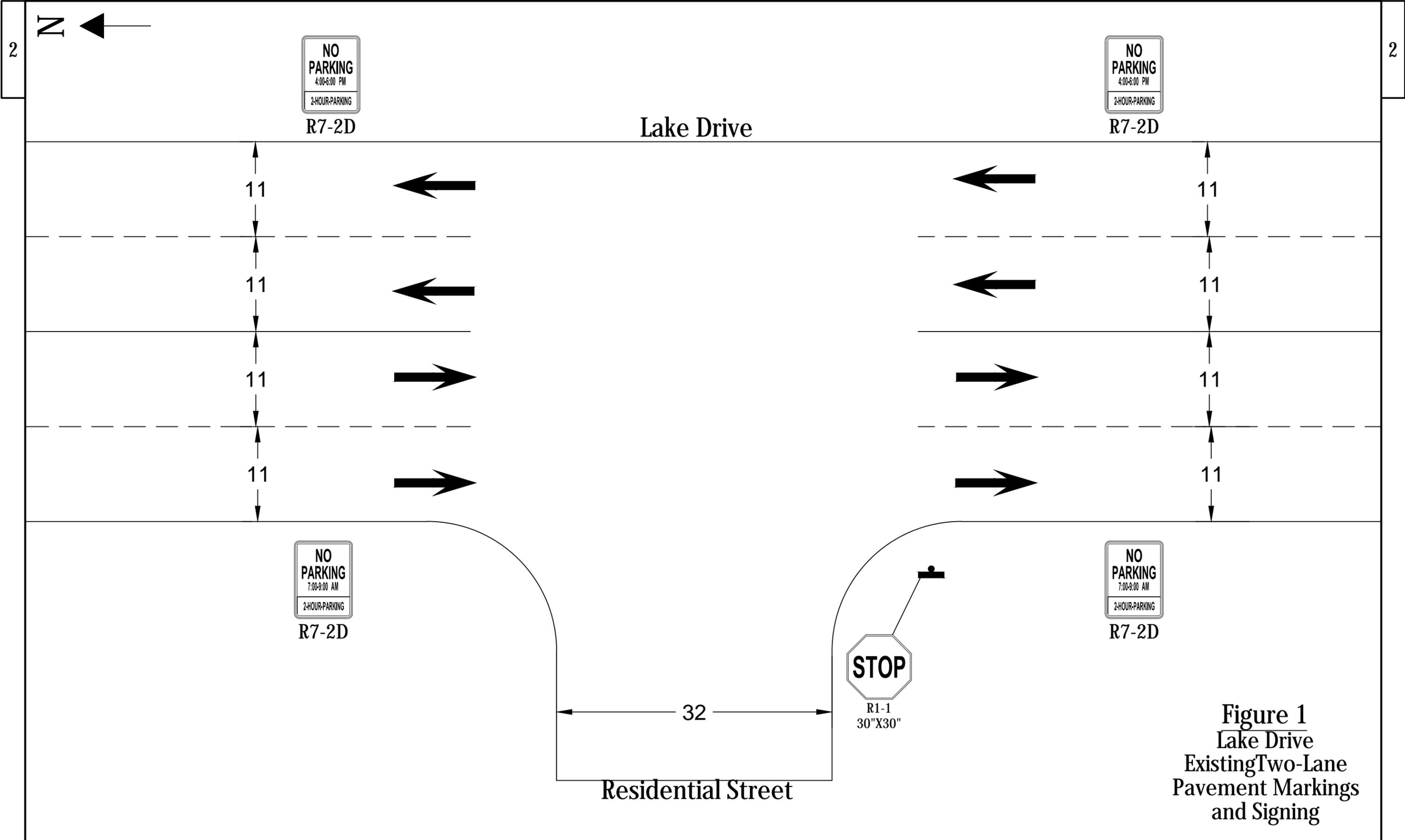




Figure 3
Lake Drive Parking
Restriction
With One-Lane Conversion
(Capitol Drive Intersection)

- No Parking Anytime
- ⋯** No Parking 4:00-6:00 PM
- - -** No Parking 7:00-9:00 AM





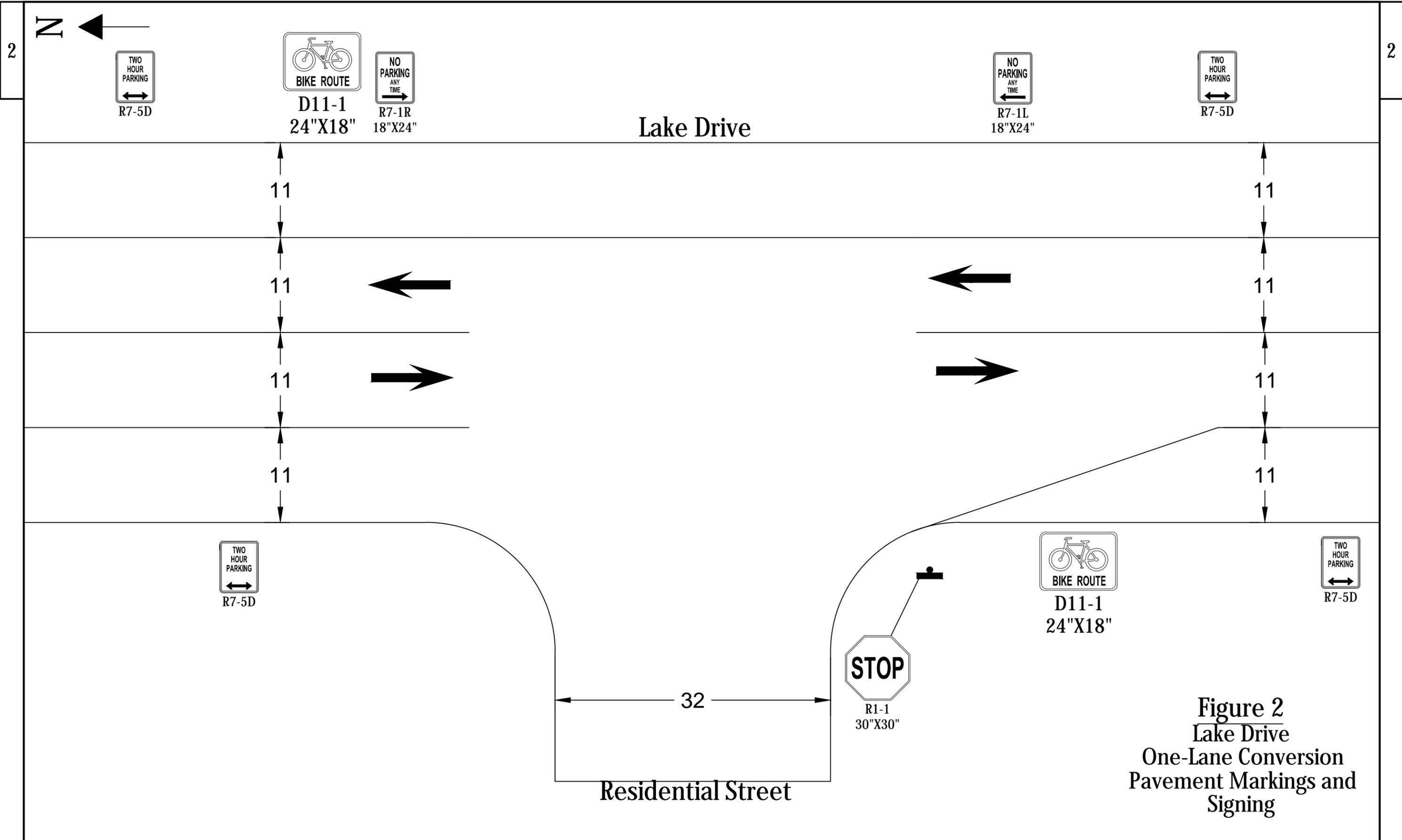


Figure 2
Lake Drive
One-Lane Conversion
Pavement Markings and
Signing