

# TRAFFIC IMPACT ANALYSIS FOR:

## PDQ STORE

South Parcel  
Gas Pumps / Car Wash / Retail Building  
North Parcel  
Assumed Strip Retail Center

Rogers Drive and S. Moorland Road/CTH O  
City of New Berlin, Waukesha County, Wisconsin

### Prepared For:

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Contact Person: Dan Burtler

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WisDOT TIA Prepare No. SE05-804-032



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# CHAPTER 1- INTRODUCTION

## A – PURPOSE OF REPORT AND STUDY OBJECTIVES

This report is a traffic impact review for the proposed PDQ Convenience Store with gas pumps and car wash plus, a retail strip shopping center building located in the northwest quadrant of S. Moorland Road and Rogers Drive in the City of New Berlin, Waukesha County, Wisconsin.

There was a traffic impact study previously prepared for this site in 2007 by Traffic Engineering Services, Inc. It has been requested to prepare a new traffic impact review for 2016 and 2026 that includes new count data, traffic crash data and updated site information.

## B – EXECUTIVE SUMMARY

Existing traffic has a poor level of service for eastbound Rogers at Moorland Road. Current traffic at the median break on Moorland Road and Rundle Spence Driveway has operated safely to this point. However the queue from the signal interferes with this crossing the County has directed that this median break be closed. Therefore, traffic distribution has been done for the Rundle Spence Driveway to Moorland Road operating as a right in / right out.

It is recommended to have a right turn lane westbound entering Rundle Spence driveway to Rogers Drive. There is currently pavement for this turn lane, but it needs to be extended to 150'.

Analysis of Rogers and Moorland Road shows that improvement can be derived from a dual left turn east bound and splitting eastbound and west bound into separate phases. The analysis in Signal 2000 shows that this does result in an improvement. It is recommended that as the City of New Berlin proceeds with rebuilding Rogers Drive it include a dedicated right turn lane, a center thru and left turn lane and a separate left turn lane. Thus, providing for the signal sequence change to be dual left hand turn from Rogers. These lane should be developed for a minimum of 150', plus transition.



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JN# 15E26

Dec 17, 2015, 2:10pm

EXHIBIT 1-1  
SITE PLAN  
PDQ  
MOORLAND AND ROGERS  
NEW BERLIN, WI  
SUBMITTAL DATE: 12-2015



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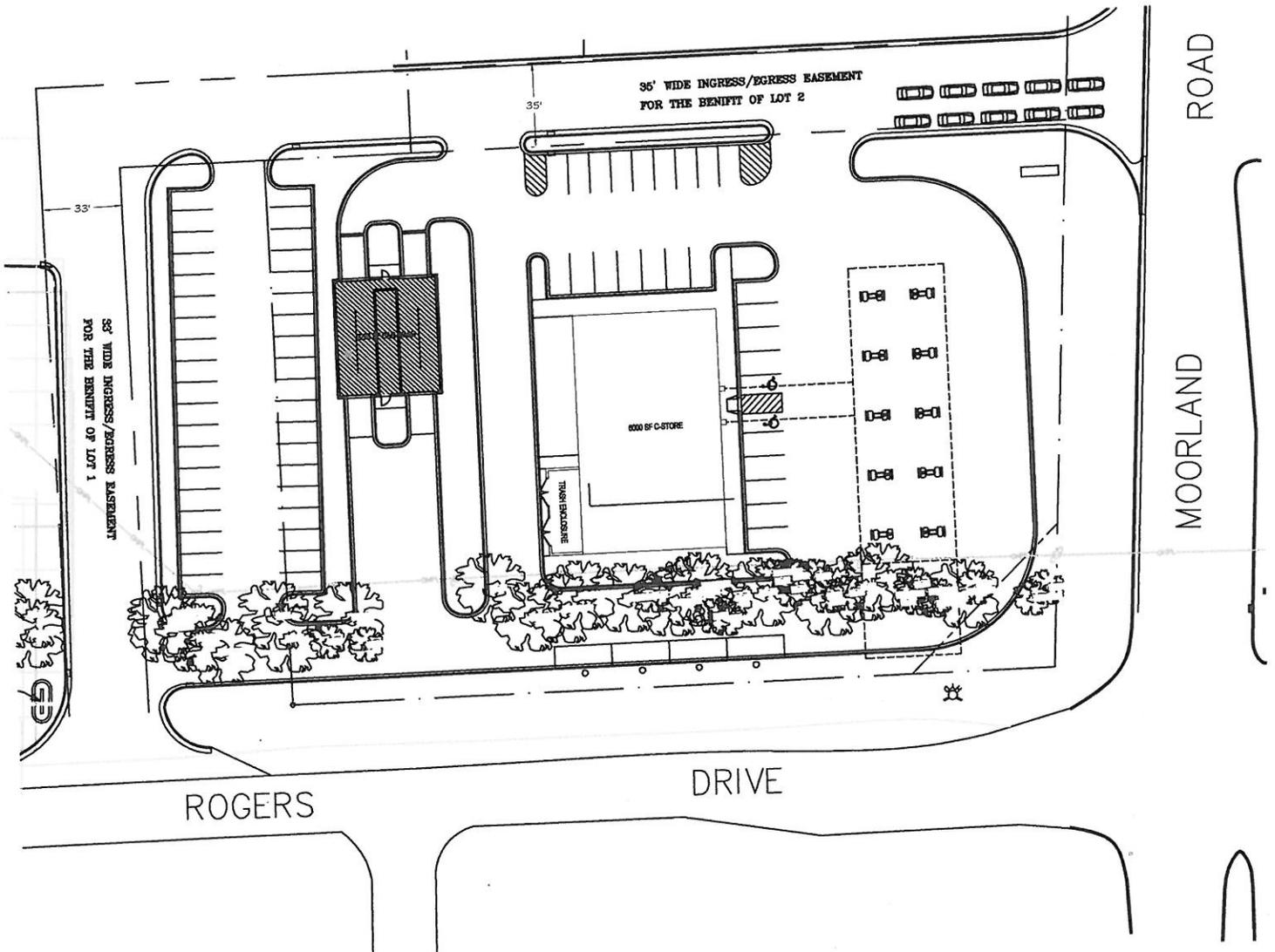


EXHIBIT 1-1A  
SITE PLAN (2016)  
PDQ  
MOORLAND AND ROGERS  
NEW BERLIN, WI  
SUBMITTAL DATE: 12-2015

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SERVICES, INC.

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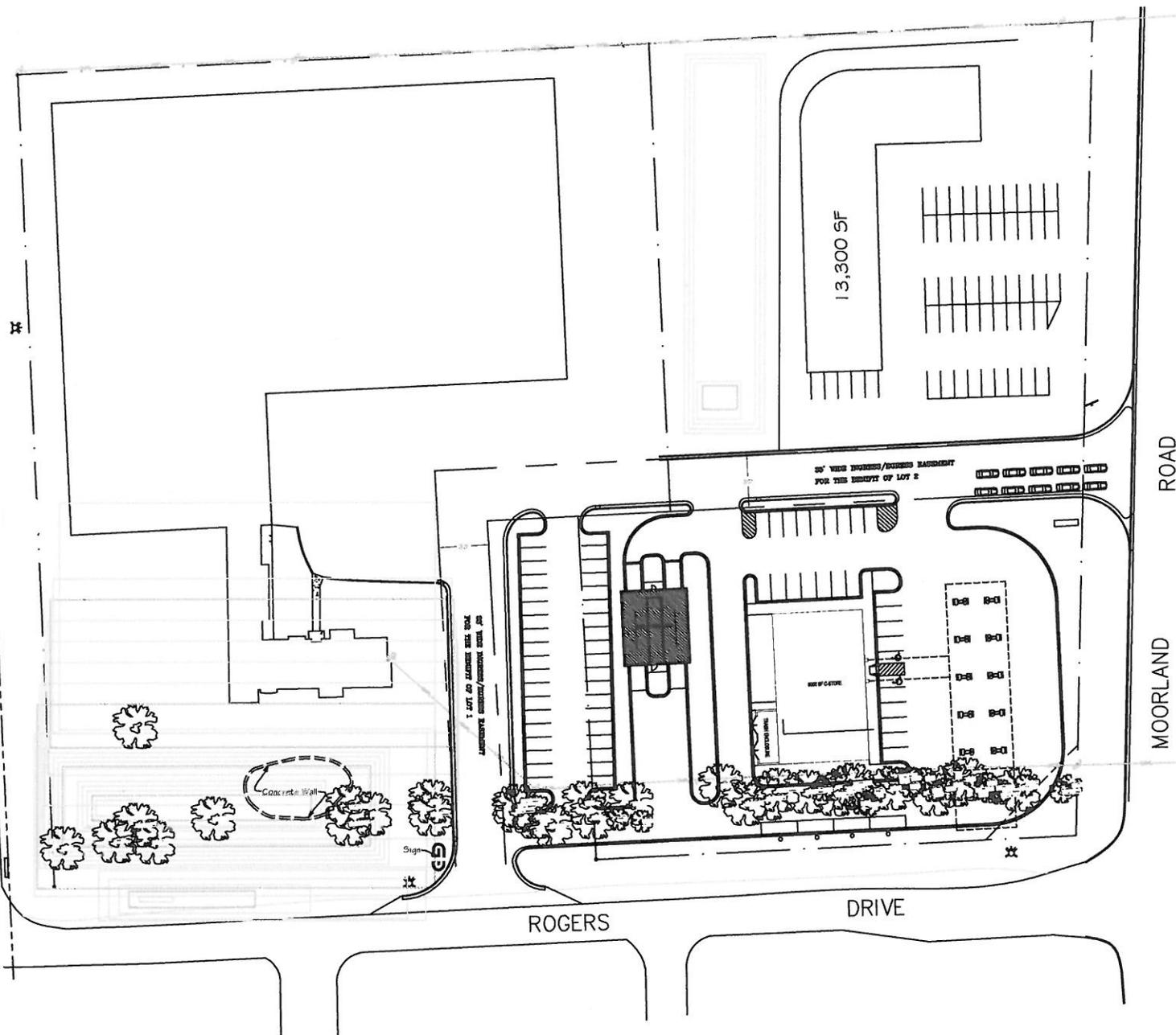


EXHIBIT 1-1B  
 SITE PLAN - INTERIM CONCEPT (2021)  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

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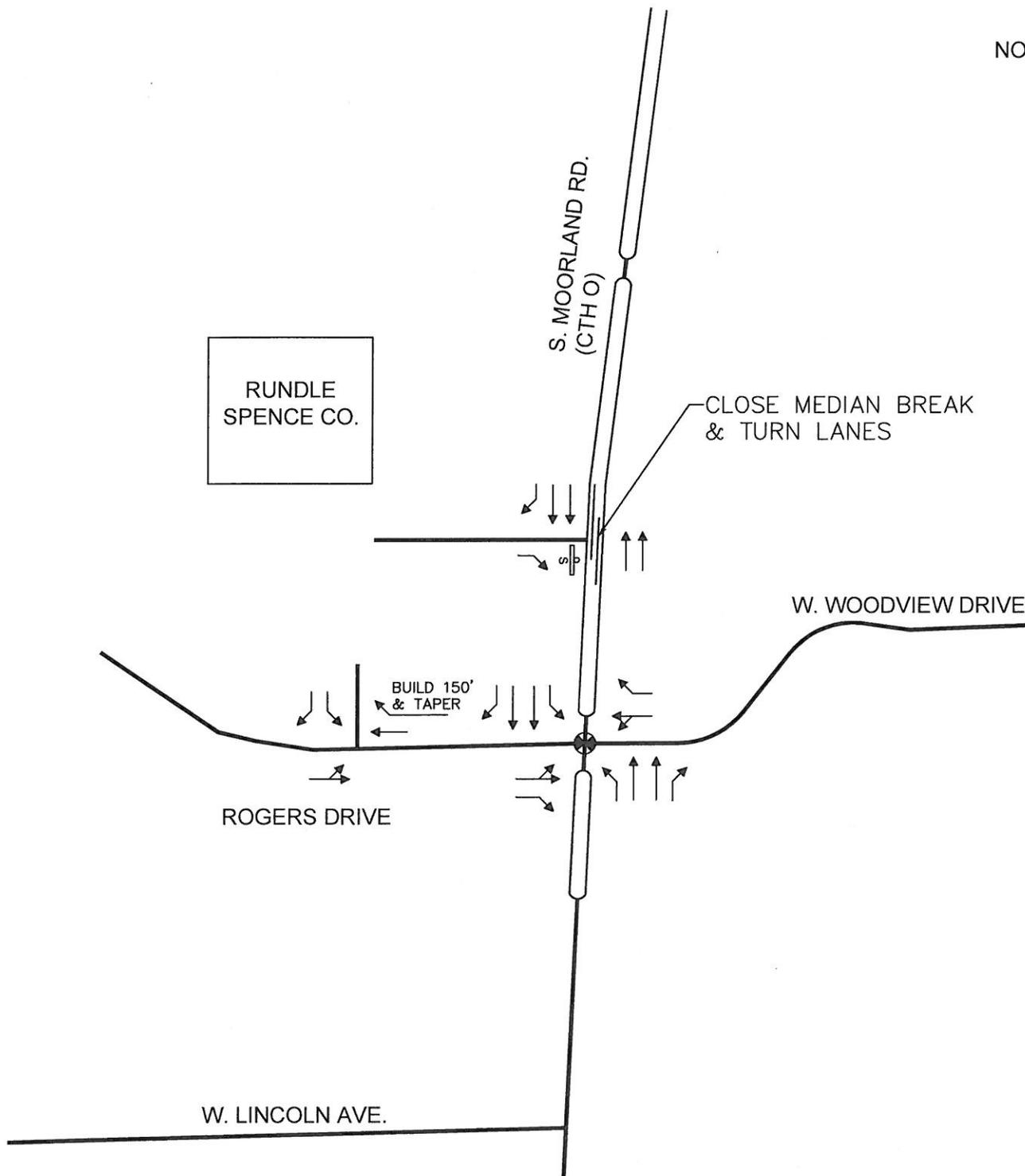


EXHIBIT 1-4  
 YEAR 2016 TOTAL TRAFFIC  
 RECOMMENDED IMPROVEMENTS  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE 12-2015

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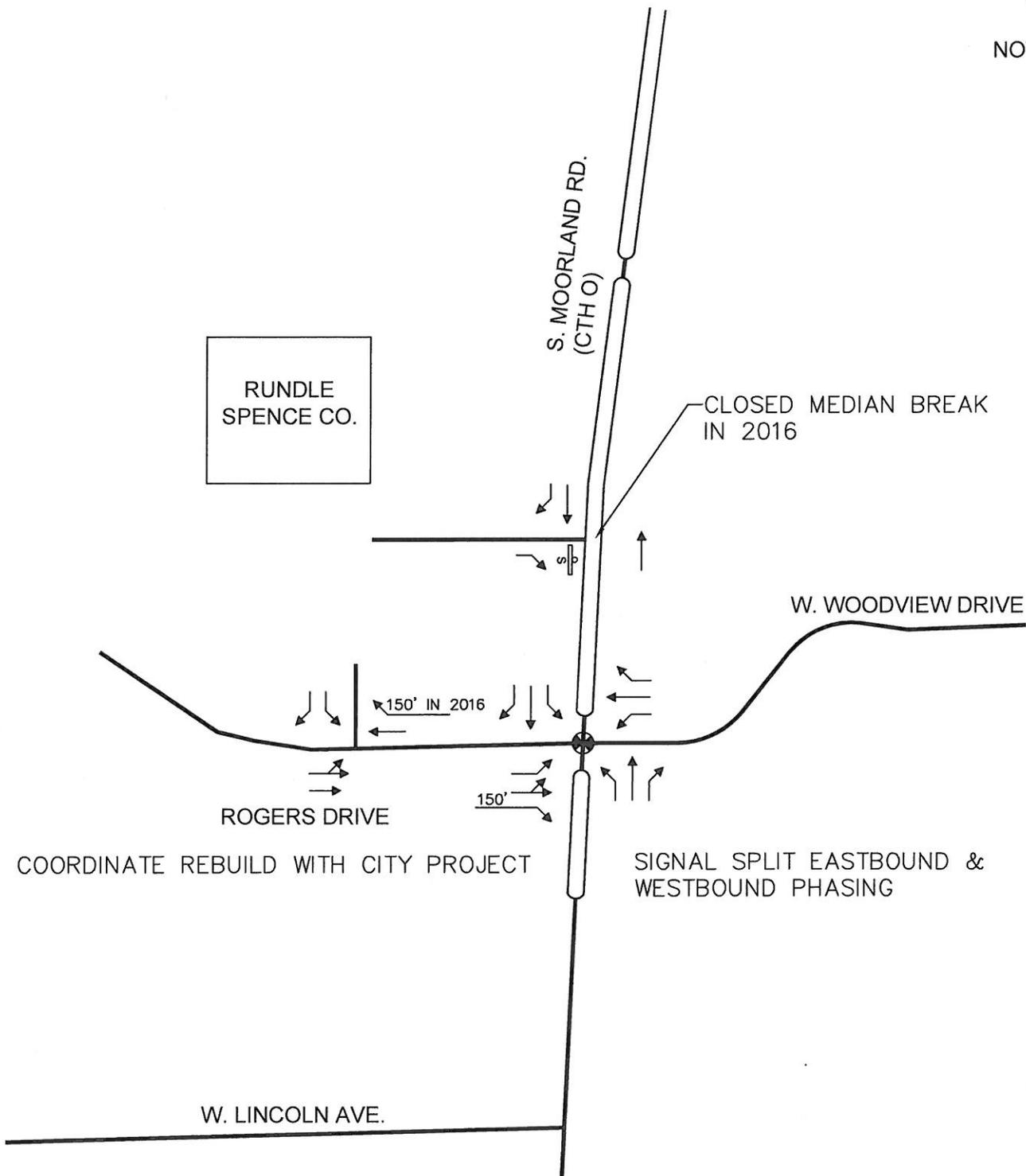


EXHIBIT 1-7  
 YEAR 2021 (INTERIM YEAR) TOTAL TRAFFIC  
 RECOMMENDED IMPROVEMENTS  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE 12-2015

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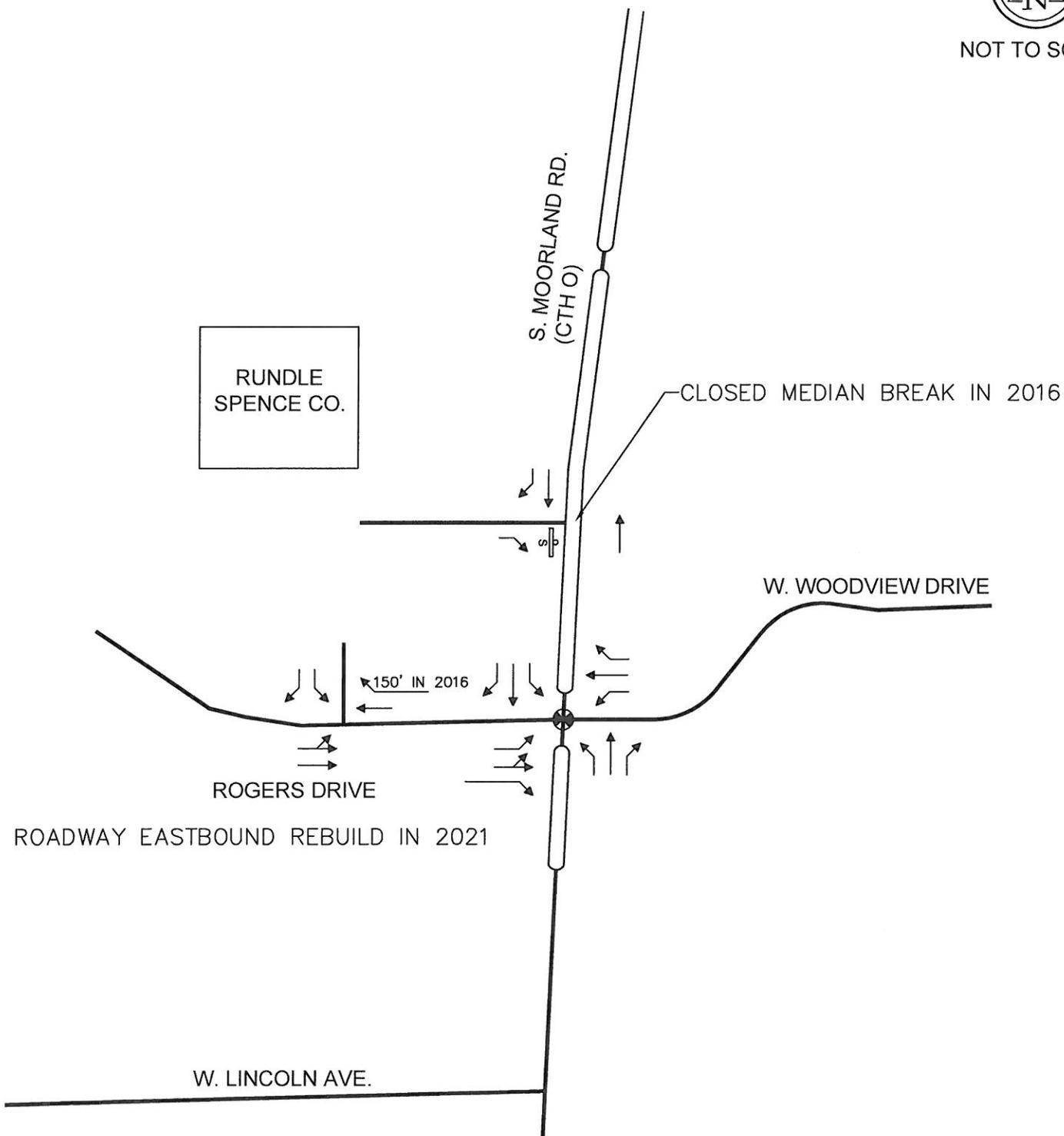


EXHIBIT 1-8  
 YEAR 2021 BACKGROUND TRAFFIC  
 RECOMMENDED IMPROVEMENTS  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE 12-2015



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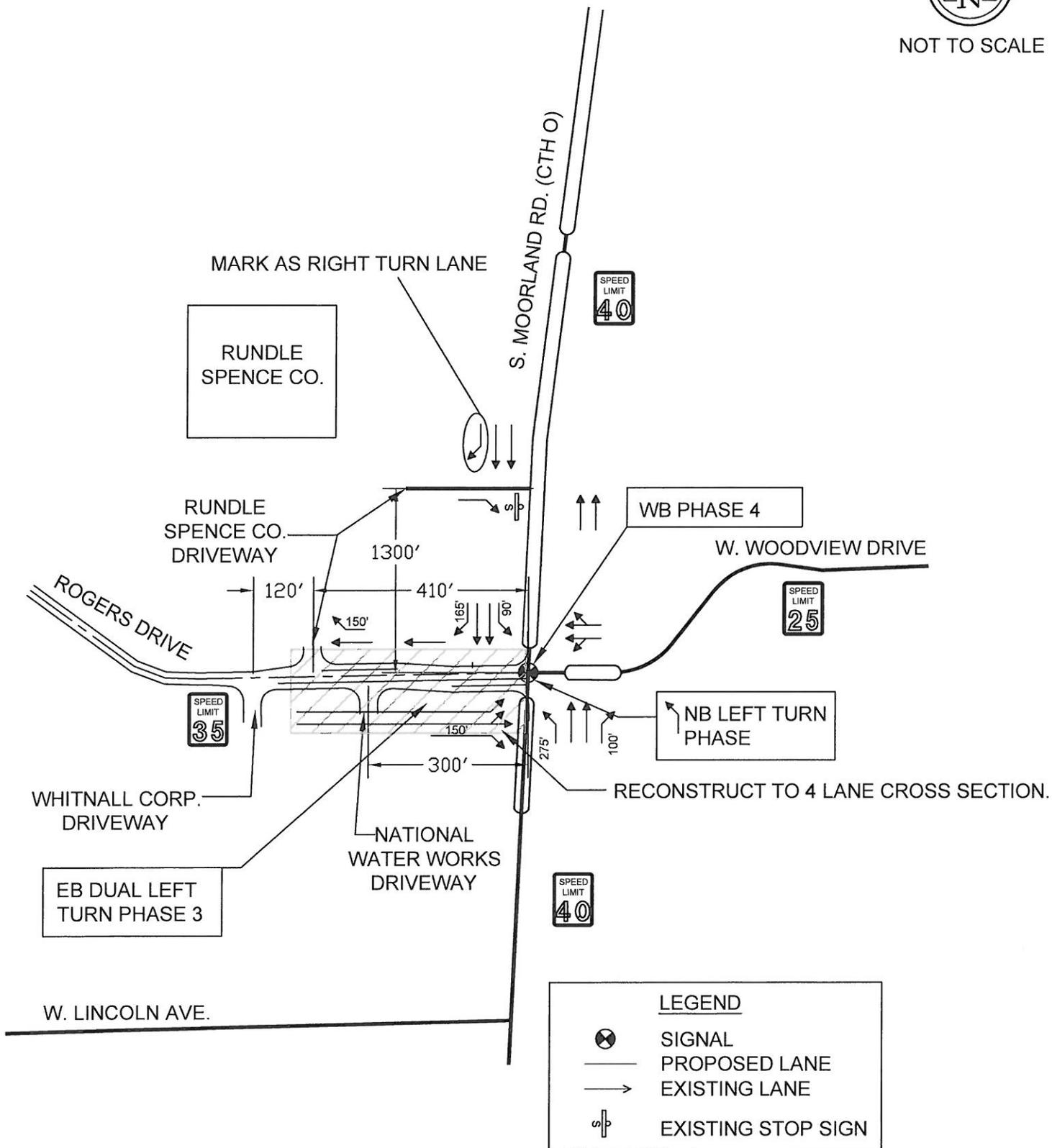


EXHIBIT 1-10  
 YEAR 2031 TOTAL TRAFFIC  
 RECOMMENDED IMPROVEMENTS  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE 12-2015

TRAFFIC ENGINEERING SERVICES, INC.

JN# 15E26

Jan 14, 2016, 12:45pm

## CHAPTER 2 – PROPOSED DEVELOPMENT

### A – ON SITE DEVELOPMENT

#### Developers:

Supreme Structures, Inc. 2906 Marketplace Drive, Suite A Madison, WI 53719 Contact Person: Dan Burtler	PDQ Food Stores, Inc. 7601 Discover Drive Middleton, WI 53562
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**Location:** The property is located north of Rogers Drive and west of Moorland Road / CTH O. The development is located in the City of New Berlin, Waukesha County, Wisconsin. The site is east of Rundle Spence Supply Co. with PDQ store proposed south of the Rundle Spence Supply Co driveway to Moorland Road/CTH O and to the north is a detention pond with future development defined for analysis as a strip shopping center Both developments are proposed to use the Rundle Spence access to Moorland Road/CTH O and Rogers Drive.

### B – STUDY AREA

The review will include studying the following intersections:

Moorland Road / CTH O and Rogers Drive / W. Woodview Drive  
Moorland Road / CTH O and Rundle Spence Driveway  
Rogers Drive and Rundle Spence Driveway

The Site Location Map is shown on Exhibit 2-1.

The PDQ Store is to be complete in 2016 and is defined as 6,000 square feet of convenience store, 20 gas dispensary station and 2 car wash areas. The strip shopping center is to be completed in 2021 and is projected to be 17,000 square feet. A site plan is included as Exhibit 2-2. The development staging detail is included in Exhibit 2-3.

### C – OFF-SITE LAND USE AND DEVELOPMENT

No off-site development is schedule in this TIA. The existing and proposed land use for the study area is shown in Exhibit 2-4A and 2-4B.

### D – SITE ACCESSIBILITY

There are currently two access points to the property that are used for access to Rundle Spence Supply Company. These driveways are located on Moorland Road 1300 feet north of Rogers Drive and on Rogers Drive 410 west of Moorland Road. These access locations will continue for Rundle Spence Company and will be used for access to the PDQ development and future strip shopping center. No additional access points are requested.



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EXHIBIT 2-1  
SITE LOCATION MAP  
PDQ  
MOORLAND AND ROGERS  
NEW BERLIN, WI  
SUBMITTAL DATE: 11-2015

JN# 15E26

Dec 17, 2015, 2:16pm

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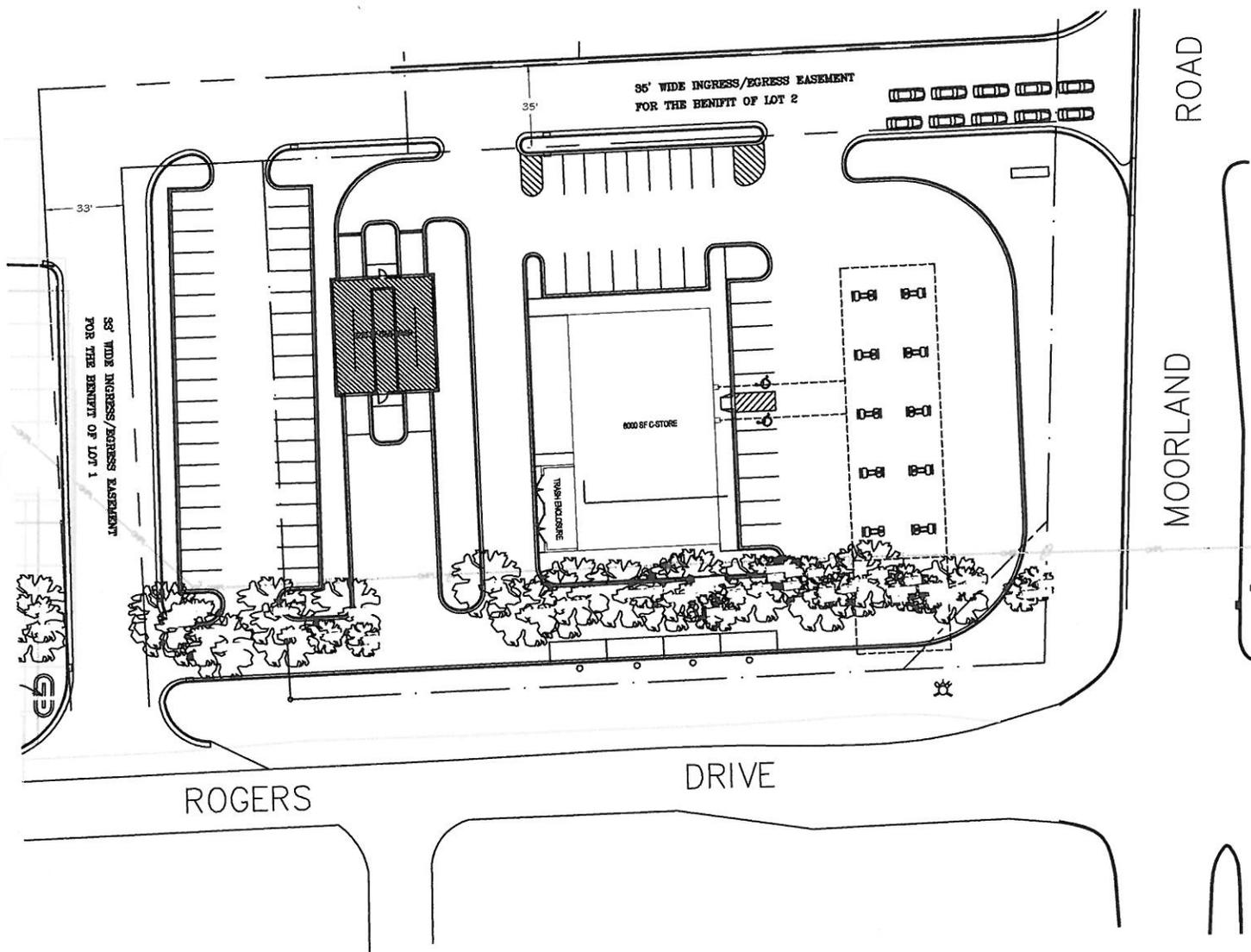


EXHIBIT 2-2  
 SITE PLAN  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 11-2015

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 SERVICES, INC.



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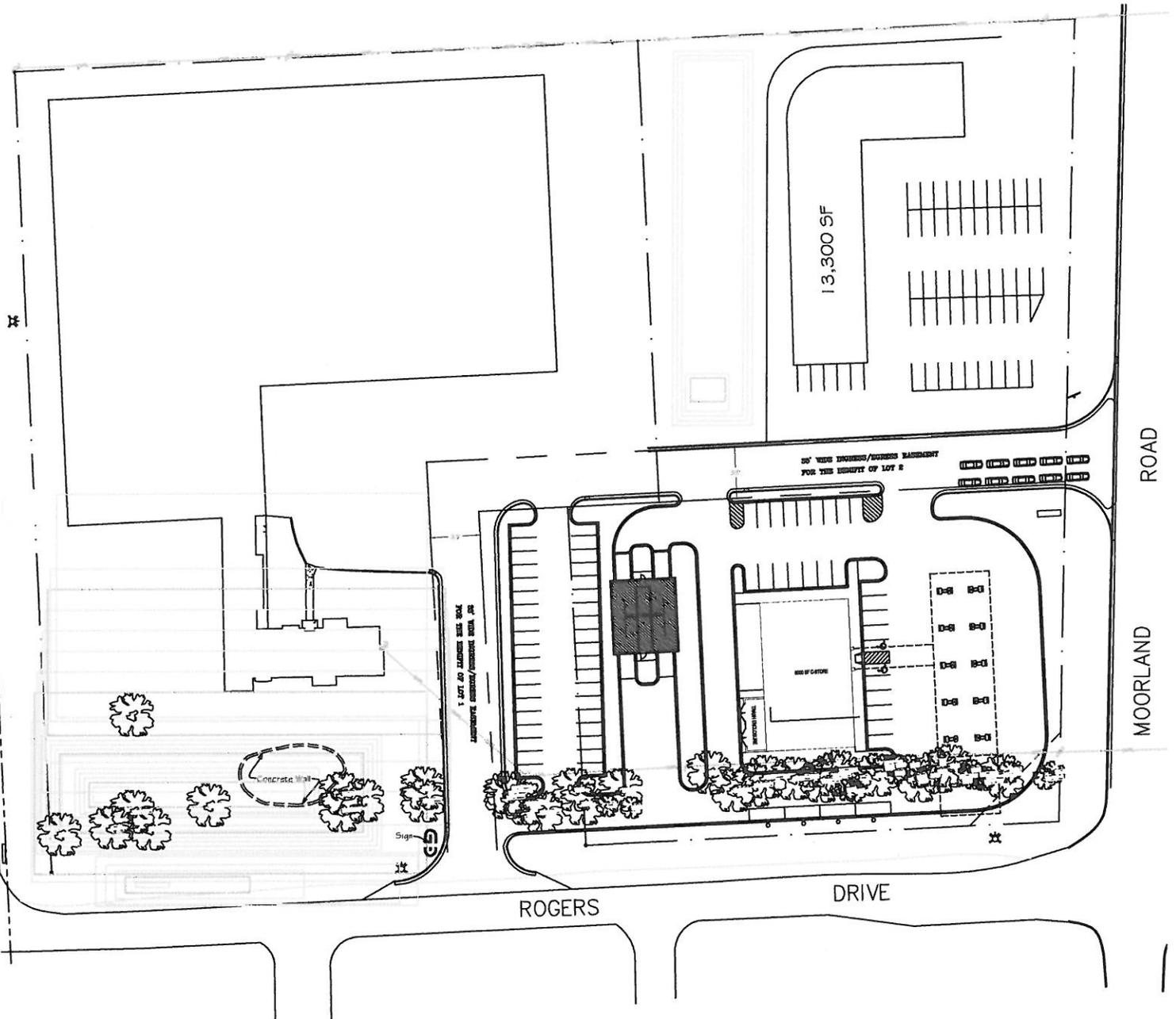


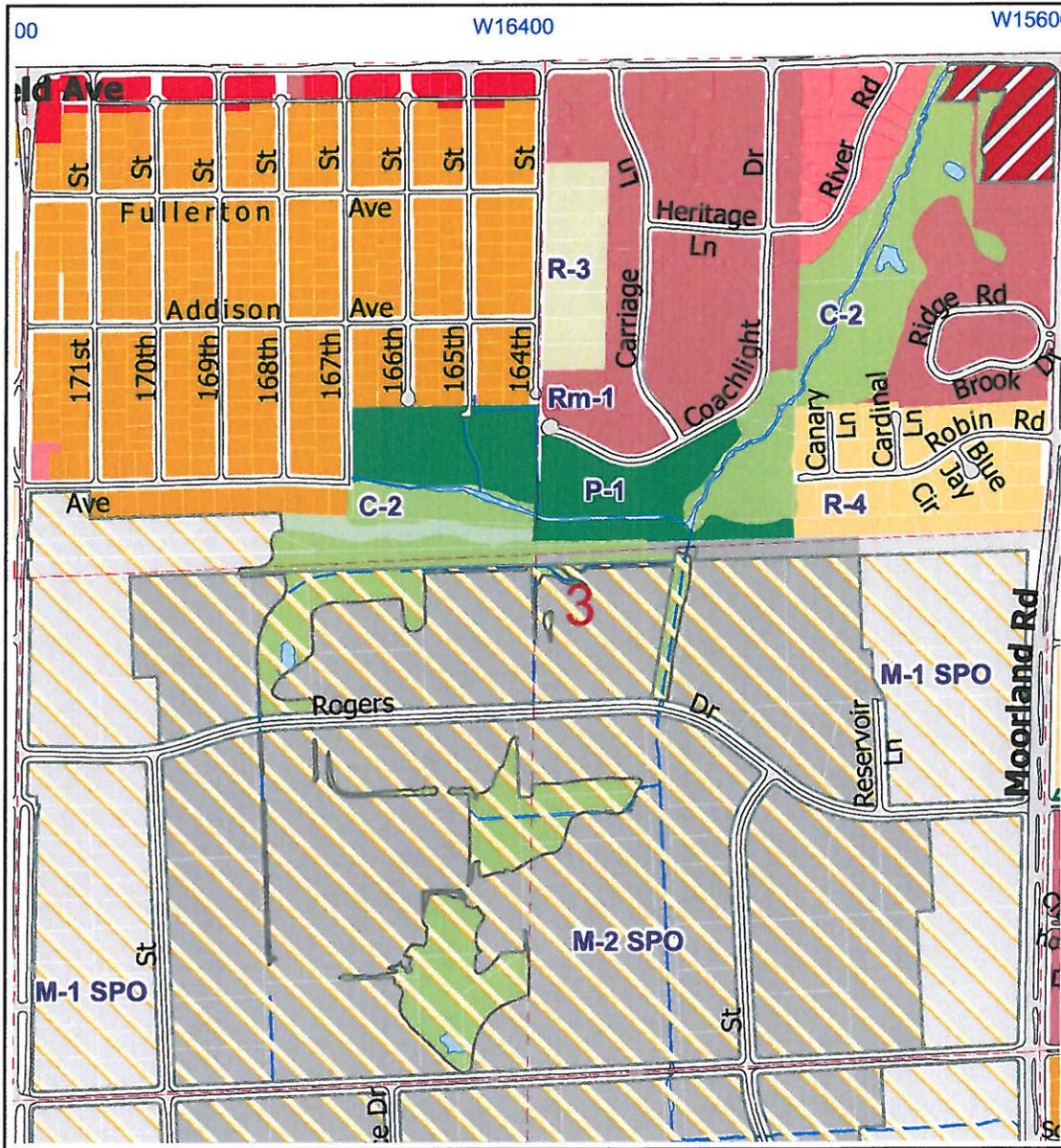
EXHIBIT 2-3  
 DEVELOPMENT STAGING DETAIL  
 - PDQ 2016 & RETAIL 2021  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 11-2015

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### Section 03



#### Legend

- |  |   |   |   |
|--|---|---|---|
| A-1 Agricultural                       | Rm-1 Multi-Family Residential           | I-1 Institutional                       | Zoning Overlay                          |
| A-2 Agricultural and Rural Holding     | B-1 Shopping Center                     | M-1 Light Manufacturing                 | Planned Unit Development District (PUD) |
| R-1 / R-2 Rural Estate S-F Residential | B-2 General Retail Sales & Service      | M-2 General Industrial                  | Special Conditions Apply (SCA)          |
| R-2E Residential Estate Single-Family  | B-3 General Comm. Sales & Bulk Storage  | Q-1 Quarrying and Extractive            | Special Plan Overlay District (SPO)     |
| R-3 Low-Density S-F Residential        | B-4 Automobile Oriented Bus. (Repeated) | L-1 Landfill                            | Conservation Easement                   |
| R-4 Low-Density S-F Residential        | B-5 Rural Commercial District           | P-1 Park                                |   |
| R-4.5 Medium-Density S-F Residential   | O-1 Office and Business Service         | C-1 Upland Conservancy                  |   |
| R-5 Medium-Density S-F Residential     | O-2 Business Park Development           | C-2 Shoreland-Wetland Conservancy       |   |
| Rd-1 Two-Family Residential            | O-3 Transitional Office District        | C-3 Perm. Open Space/Conservation Lands |   |

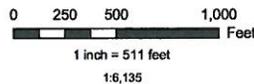


EXHIBIT 2-4A  
 EXISTING AND PROPOSED LAND  
 USE FOR STUDY AREA-WEST  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 11-2015



Dec 17, 2015, 2:17pm



## CHAPTER 3 – ANALYSIS OF EXISTING CONDITIONS

### A – PHYSICAL CHARACTERISTICS

The intersection of Rogers Drive and Moorland Road/CTH O is signalized. The traffic signal operates three phases with a leading left turn phase for southbound traffic. The traffic signal is part of a coordinated system.

### B – STUDY AREA

The study area is the intersection of Moorland Road/CTH O and Rogers Drive plus existing Rundle Spence Supply Co access driveways to Rogers Drive and Moorland Road/CTH O.

### C – OFF-SITE LAND USE AND DEVELOPMENT

No off-site land use or development is included in this study.

### D – SITE ACCESSIBILITY

Existing Site access is full access at both driveways.

The existing transportation system are summarized on Exhibit 3-1.

#### Moorland Road (CTH O) and Rogers Drive and W. Woodview Drive

Moorland Road is under the jurisdiction of Waukesha County and Rogers Drive is under City of New Berlin jurisdiction. The intersection is traffic signal controlled. The traffic signal at this intersection is operated and maintain by Waukesha County. Moorland Road is median divided and has southbound and northbound dedicated left, right turn lanes and two through lanes at Rogers Drive. The signal operates with three phases that includes a northbound left turn phase. Rogers is a two lane roadway that widens to three lanes at Moorland Road including a shared through and left and a dedicated right turn lane. There are multiple driveways to industrial type of developments along Rogers Drive. The roadway is a rural cross-section with gravel shoulders and ditches and curb and gutter at the Moorland Road intersection. The east approach is W. Woodview Road. W. Woodview Road is a two lane roadway with curb and gutter at the intersection with Moorland Road the roadway widens to three lanes that include two exiting lanes that are shared with the turn movement. W. Woodview Road is a public roadway that services single family and multi-family development.

#### Moorland Road/CTH O and Rundle Spence Driveway

The existing lane assignment on Moorland Road/CTH O includes a northbound left turn lane and two northbound through lanes and a distress lane. Southbound has two thru lanes, a left turn (U-turn lane) and one southbound right turn lane. The Rundle Spence Driveway is stop controlled and has two exit lanes.

#### Rogers Drive and Rundle Spence Driveway

The existing lane Rogers Drive assignment includes a shared through and right lane westbound and a shared through and left lane eastbound. The southbound driveway approach includes two exit lanes. The Rundle Spence Driveway is stop controlled.

#### Average Daily Traffic

Average Daily Traffic volumes are from historical Wisconsin Department of Transportation counts and 2016 has been summarized on Exhibit 3-2B. These historical volumes are used to establish a background traffic growth rate for the area. The average growth rate is 2.86% based on three locations that were

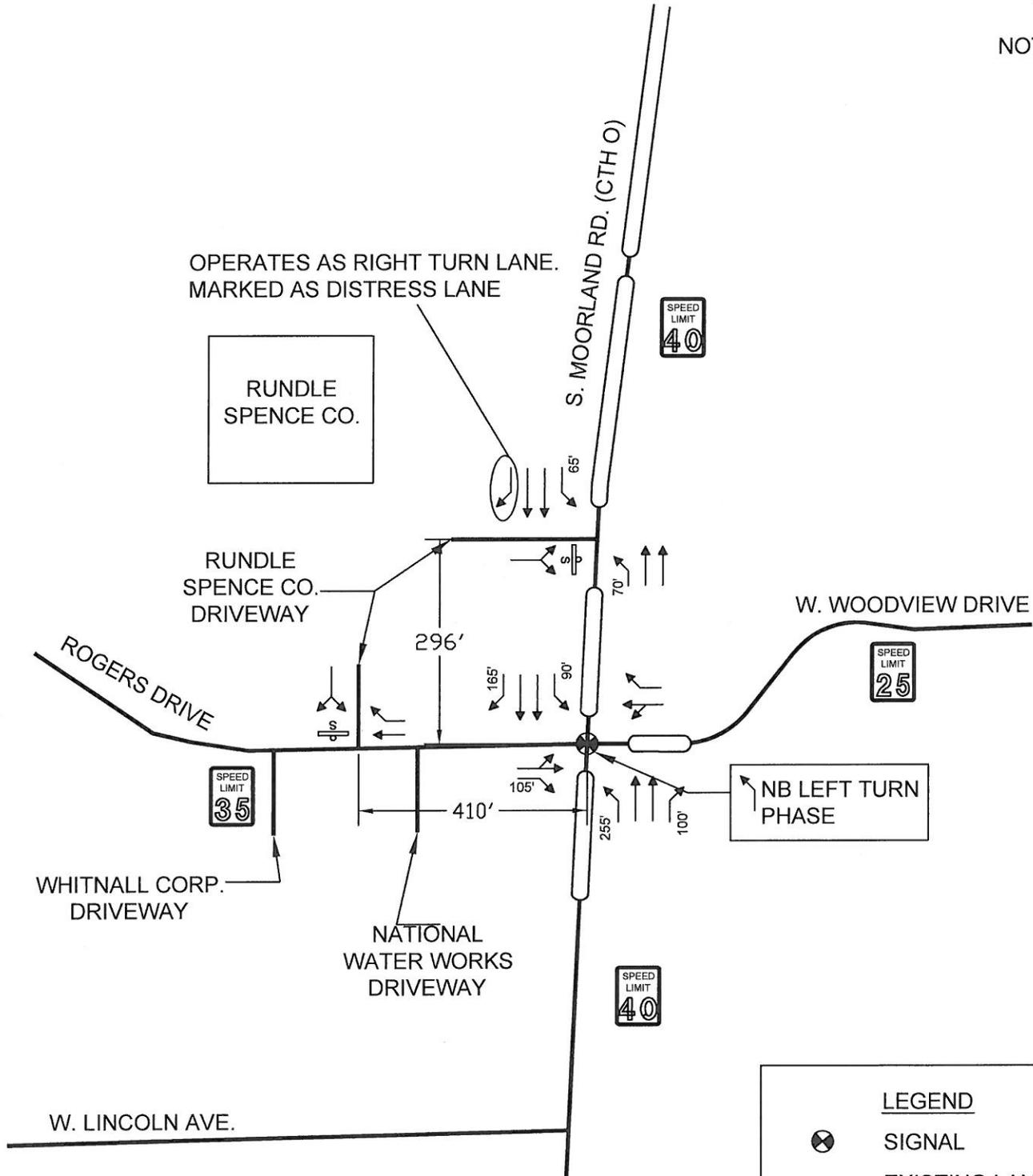
analyzed and included in appendix A. A 2% annual growth factor has been used to establish the future 2016 and 2026 background traffic volumes.

#### Existing Traffic Volumes

The existing traffic volume data at Moorland Road / CTH O and Rogers Drive are from count data collected on April 25, 2015. The existing traffic movement count data is summarized on Exhibit 3-2A. Two time periods have been established as the critical time periods to be studied, they are the AM Peak Hour of on street traffic (7:00 - 8:00 AM) and the PM Peak Hour of on Street traffic (4:45 - 5:45 PM). The peak hour factors are 0.90 and 0.97 respectively. A copy of the traffic counts are included in Appendix A. Intersection operations are included in Exhibit 3-3.



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**LEGEND**

- SIGNAL
- EXISTING LANE
- EXISTING STOP SIGN

EXHIBIT 3-1A  
 EXISTING TRANSPORTATION SYSTEM  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

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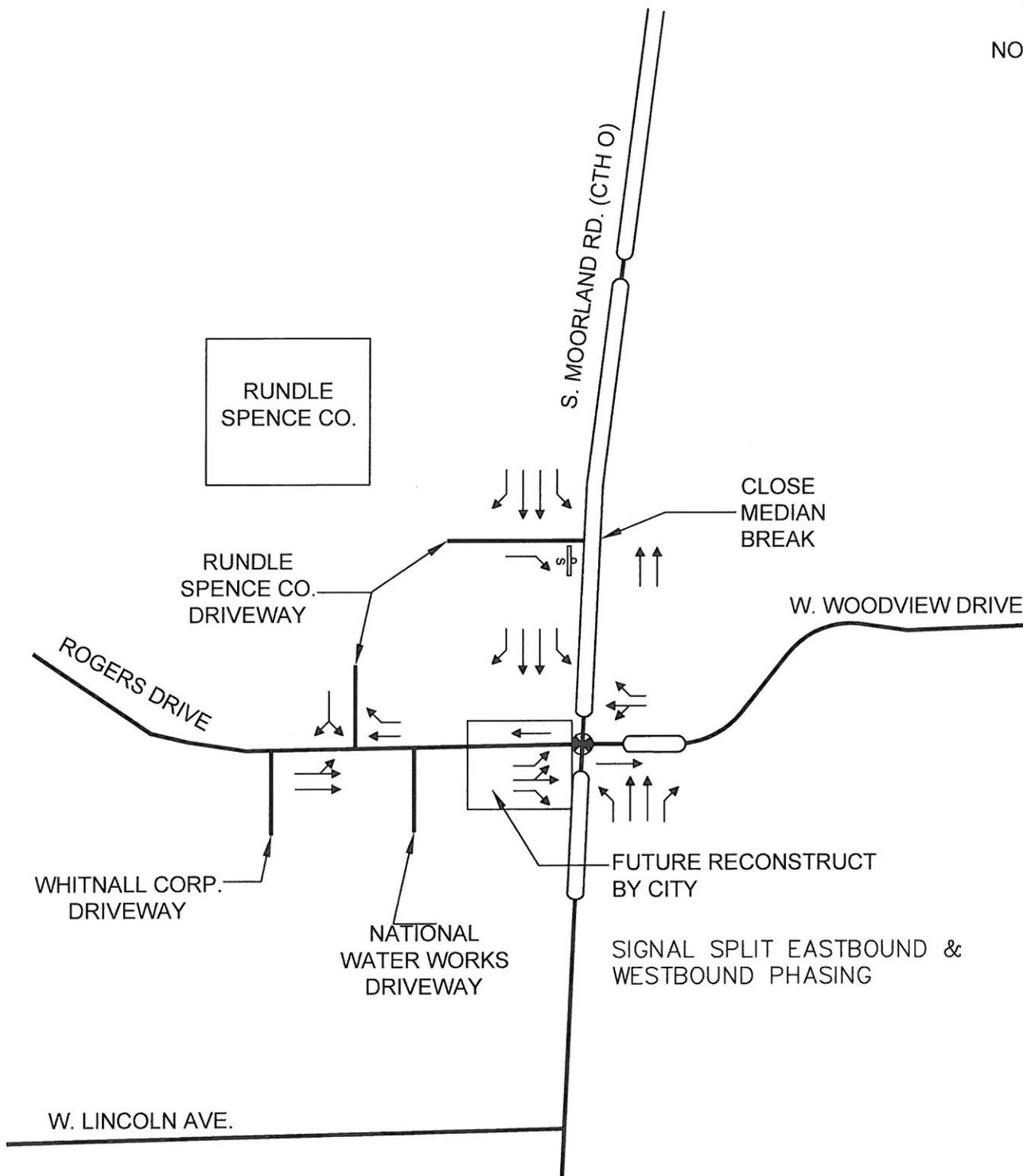


EXHIBIT 3-1B  
 PLANNED TRANSPORTATION SYSTEM  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

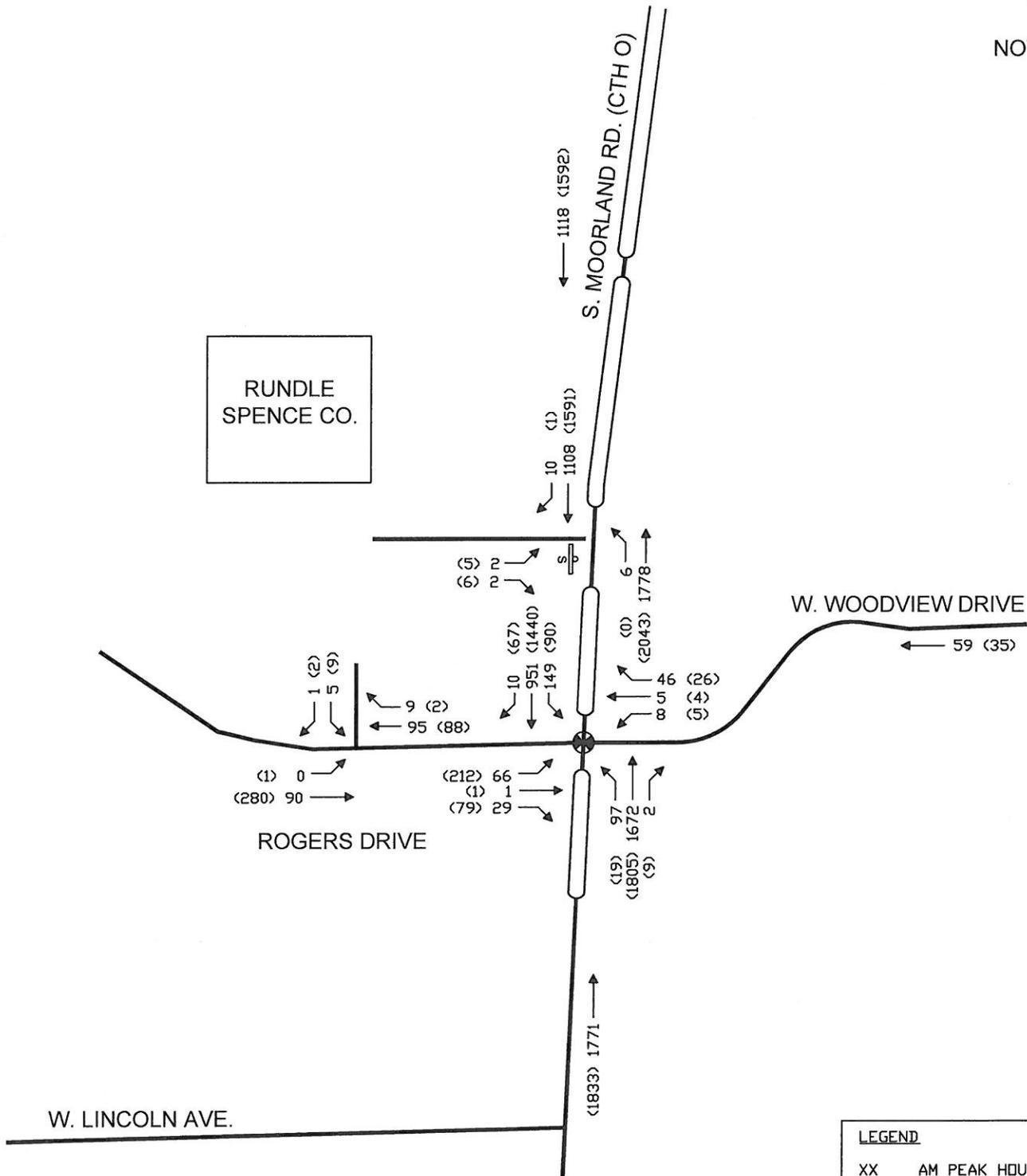
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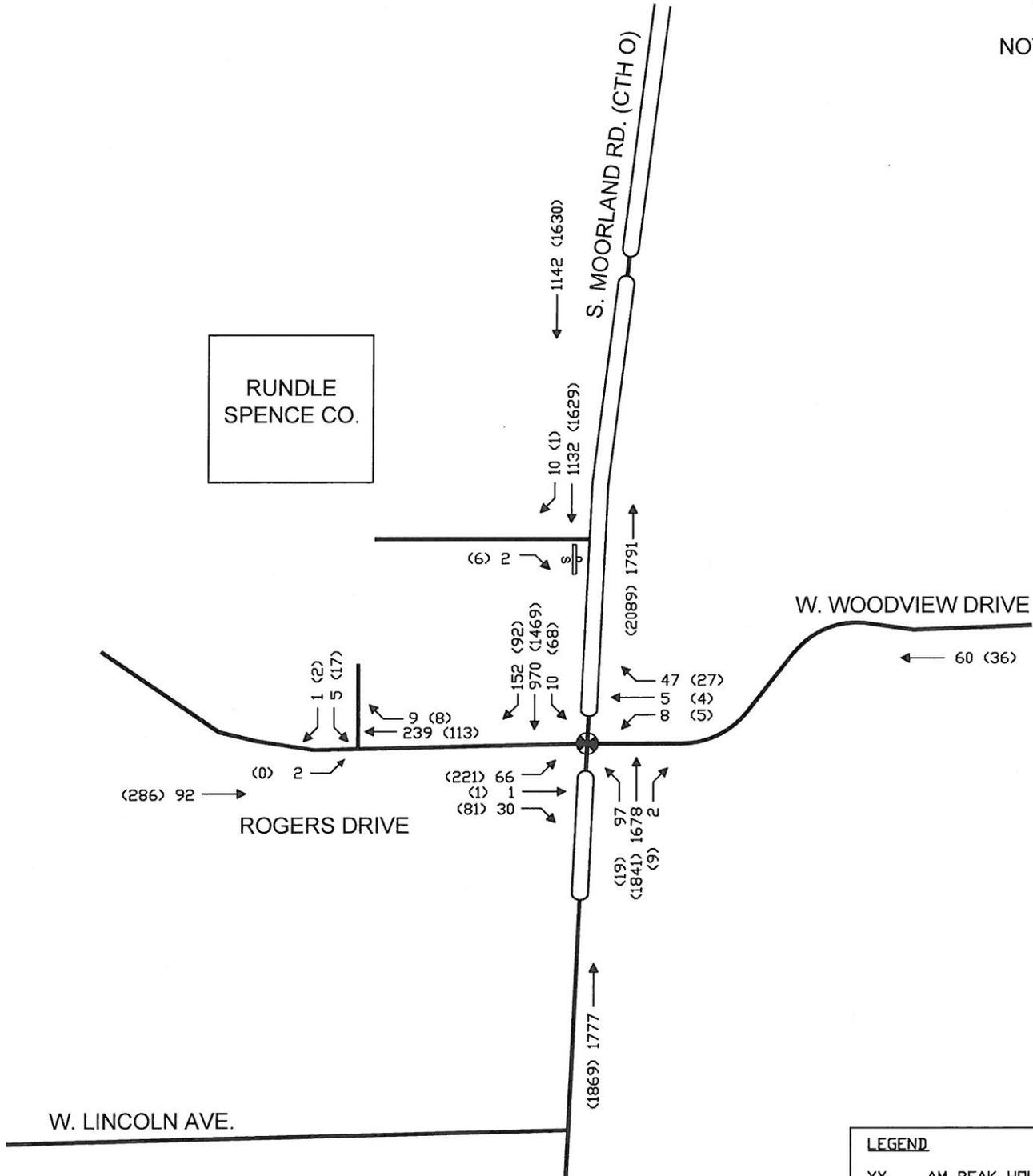
LEGEND	
XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 3-2A  
 YEAR 2015 EXISTING TRAFFIC VOLUMES  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015





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RUNDLE SPENCE CO.

**LEGEND**

XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 3-2B  
 YEAR 2016 BACKGROUND TRAFFIC VOLUMES  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

**TE** TRAFFIC ENGINEERING SERVICES, INC.

**Base Year (2016) Background Traffic Peak Hour Operating Conditions  
with Existing Geometrics**

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach												Over All LOS
			Northbound			Southbound			Westbound			Eastbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
1 Moorland & Rogers	Signal	AM	A	A	A	B	B	A	Shared			Shared			A B
		PM	A	B	A	E	B	A	C	C	A	D	C	A	
2 Moorland & Rundle Spence Drive	Stop Sign	AM	A									n/a	A	B	
		PM	A									n/a	A	C	
3 Rogers & Rundle Spence Drive	Stop Sign	AM			n/a	B	n/a	A					A	Shared	
		PM			na/	B	n/a	A					A		

EXHIBIT 3-3  
YEAR 2016 BACKGROUND TRAFFIC  
CAPACITY/LEVEL OF SERVICE ANALYSIS,  
EXISTING/PLANNED TRANSPORTATION SYSTEM  
PDQ  
MOORLAND AND ROGERS  
NEW BERLIN, WI  
SUBMITTAL DATE: 12-2015





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\* CRASH DATA IN APPENDIX BY REFERENCE NUMBER

RUNDLE SPENCE CO.



**LEGEND**

XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97
#	CRASH REFERENCE NUMBER

S. MOORLAND RD. (CTH 0)

W. WOODVIEW DRIVE

ROGERS DRIVE

**TES** TRAFFIC ENGINEERING SERVICES, INC.

EXHIBIT 3-4  
CRASH HISTORY  
PDQ  
MOORLAND AND ROGERS  
NEW BERLIN, WI  
SUBMITTAL DATE: 12-2015

## CHAPTER 4 – PROJECTED TRAFFIC

### A – BACKGROUND TRAFFIC FORECASTING

Future traffic volumes have been projected with a 2% annual growth rate for the existing traffic at Moorland Road and Rogers Drive. This growth rate has been established as the trend line from WisDOT historical counts from 1997 through 2005. A copy of these calculations are included in the Appendix. Background traffic volumes are shown in Exhibit 3-2A.

### B – SITE TRAFFIC FORECASTING

#### Development Traffic

##### Trip Generation

The development trip generation for all land uses are based on trip generation rates from the 9<sup>th</sup> Edition ITE (Institute of Transportation Engineers) Trip Generation manual. Below is a Trip generation chart that is also included as Exhibit 4-3A and 4-3B. The trips for each land use have separate tables.

##### Trip Distribution

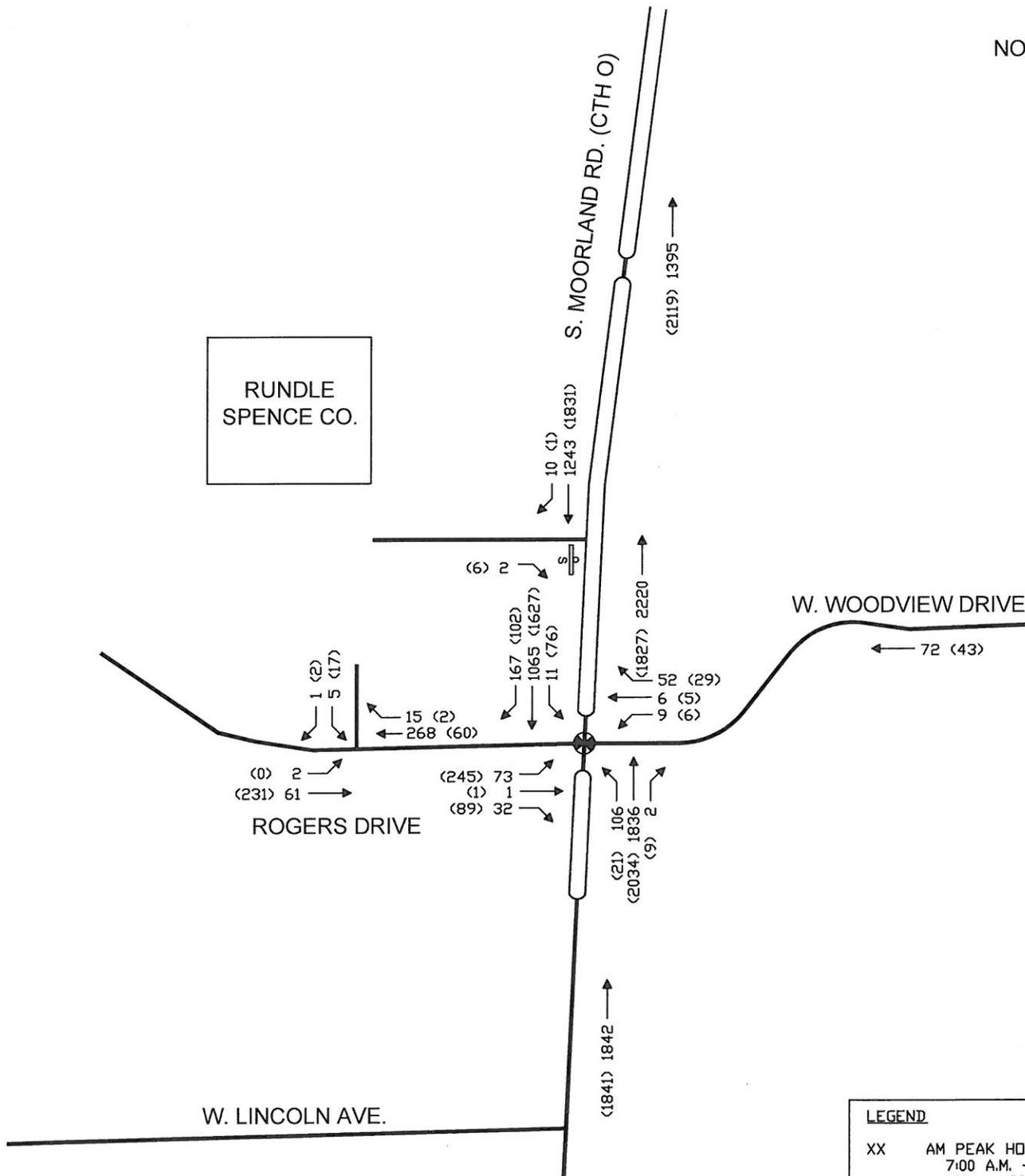
Trip distribution for the generated traffic has been based on existing traffic volumes at the intersections that were counted, knowledge of the area demographics, and engineering judgment. Exhibit 4-4 shows the percentages used to establish the trip distribution.







NOT TO SCALE



**LEGEND**

XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 4-1  
 YEAR 2021 BACKGROUND TRAFFIC VOLUMES  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

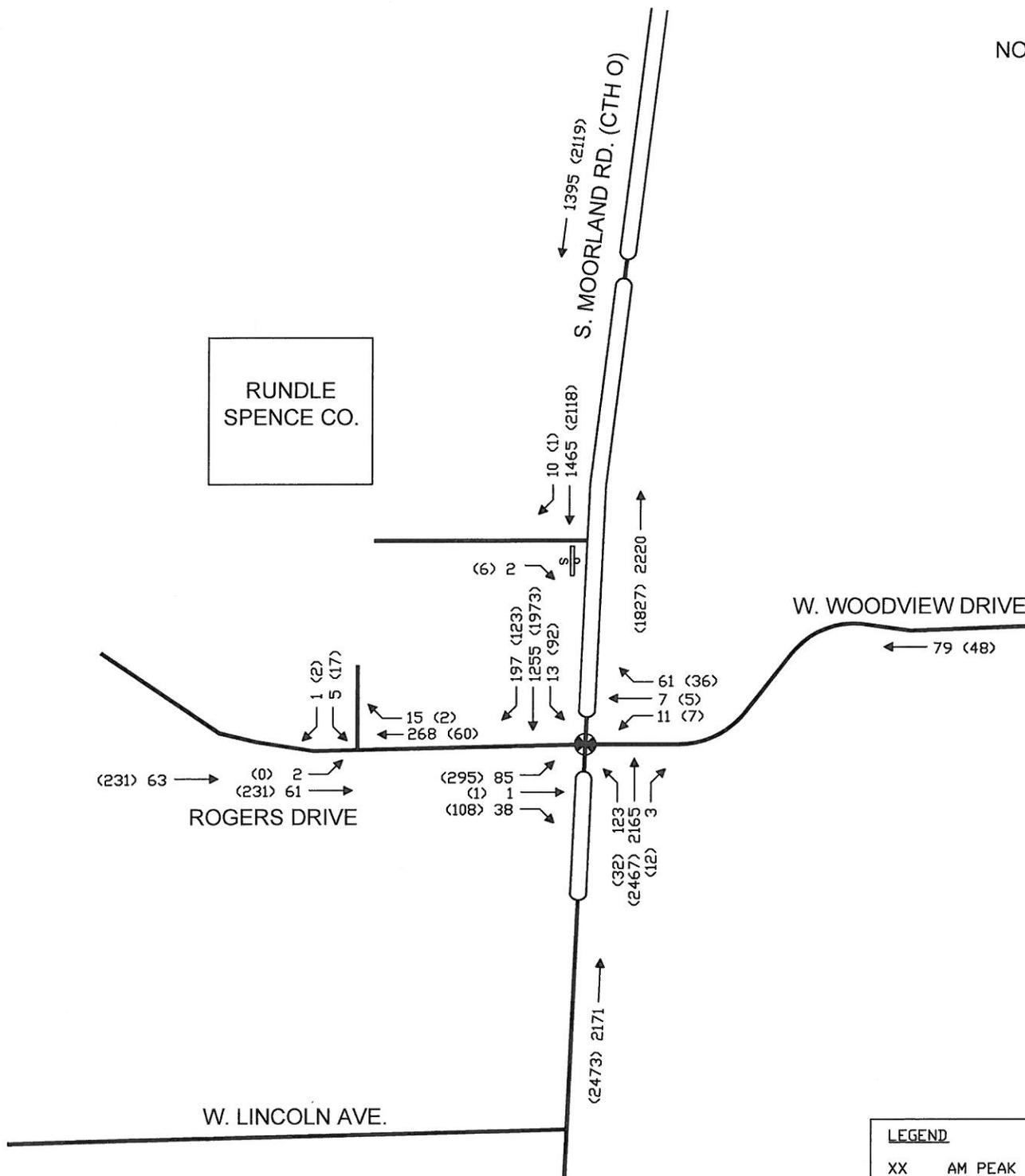


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LEGEND	
XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 4-2  
 YEAR 2031 BACKGROUND TRAFFIC VOLUMES  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015



JN# 15E26 Dec 17, 2015, 2:29pm

**PDQ Store**

Land Use	Size	ITE Code	Daily (Rate) Trips	AM Peak Hour (Rate) Trips			PM Peak Hour (Rate) Trips		
				In	Out	Total	In	Out	Total
Gasoline/Service Station w/Con and Car Wash	20 VFP*	946	(152.84) 3057	51% 109	49% 104	10.64 213	50% 133	50% 133	13.33 267
Total Generated Trips			3057	109	104	213	133	133	267
Linked Trips To Rundle Spence		1%	30	1	1	2	1	1	2
Total Driveway Trips			3027	108	103	211	132	132	265
PDQ Pass-by trips		40%	-1210	-43	-41	-84	-53	-53	-106
		0%	0	0	0	0	0	0	0
		0%	0	0	0	0	0	0	0
			0	0	0	0	0	0	0
			0	0	0	0	0	0	0
Total Pass-by and Linked Trips			-1240	-44	-42	-86	-54	-54	-108
Total New Trips			3027	64	61	125	79	79	157

EXHIBIT 4-3A  
 TRIP GENERATION TABLE - PDQ/2016  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015



**TRAFFIC ENGINEERING SERVICES, INC.**

**13,300 SQ FT Specialty Retail Center**

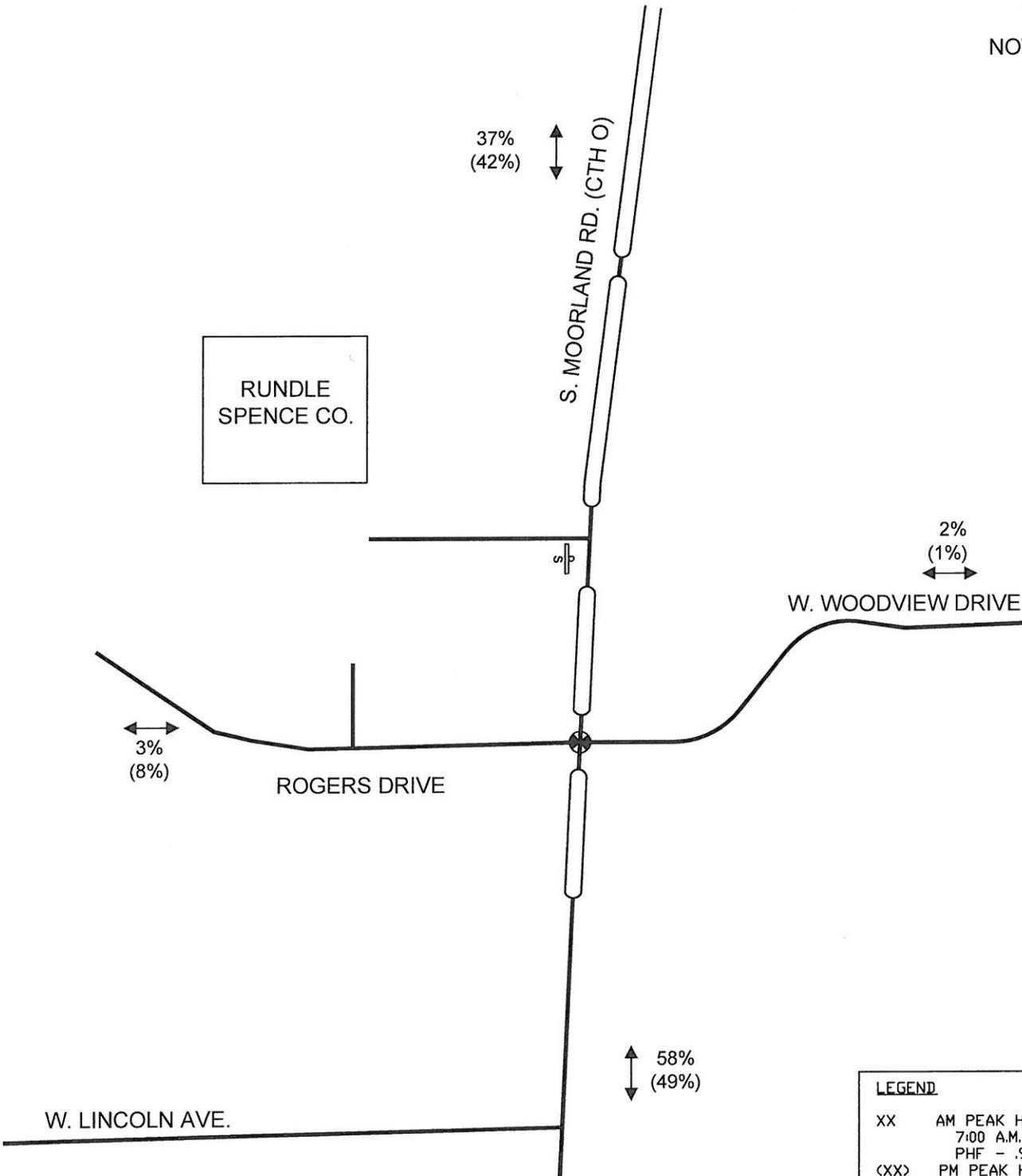
Land Use	Size	ITE Code	Daily (Rate) Trips	AM Peak Hour (Rate 820*) Trips			PM Peak Hour (Rate 826) Trips		
				In	Out	Total	In	Out	Total
Specialty Retail Center	13.3 1000 S.F.	826	44.32 589	62% 8	38% 5	0.96 13	44% 16	56% 20	2.71 36
* No AM is given for 826.									
Total Generated Trips			589	8	5	13	16	20	36
Linked Trips To Rundle Spence & PDQ			1%	5	0	0	0	0	0
Total Driveway Trips			584	8	5	13	16	20	36
Pass-by trips			20%	-117	-2	-1	-3	-3	-4
			0%	0	0	0	0	0	0
			0%	0	0	0	0	0	0
				0	0	0	0	0	0
				0	0	0	0	0	0
Total Pass-by Trips				-117	-2	-1	-3	-3	-4
Pass-by Trips used in analysis				-120	0	0	0	-5	-5
Total New Trips				464	8	5	13	11	15

EXHIBIT 4-3B  
TRIP GENERATION TABLE - SPECIALTY RETAIL CENTER  
MOORLAND AND ROGERS  
NEW BERLIN, WI  
SUBMITTAL DATE: 12-2015





NOT TO SCALE



**LEGEND**

XX AM PEAK HOUR  
7:00 A.M. - 8:00 A.M.  
PHF - .90

<XX> PM PEAK HOUR  
4:30 P.M. - 5:30 P.M.  
PHF .97



JN# 15E26

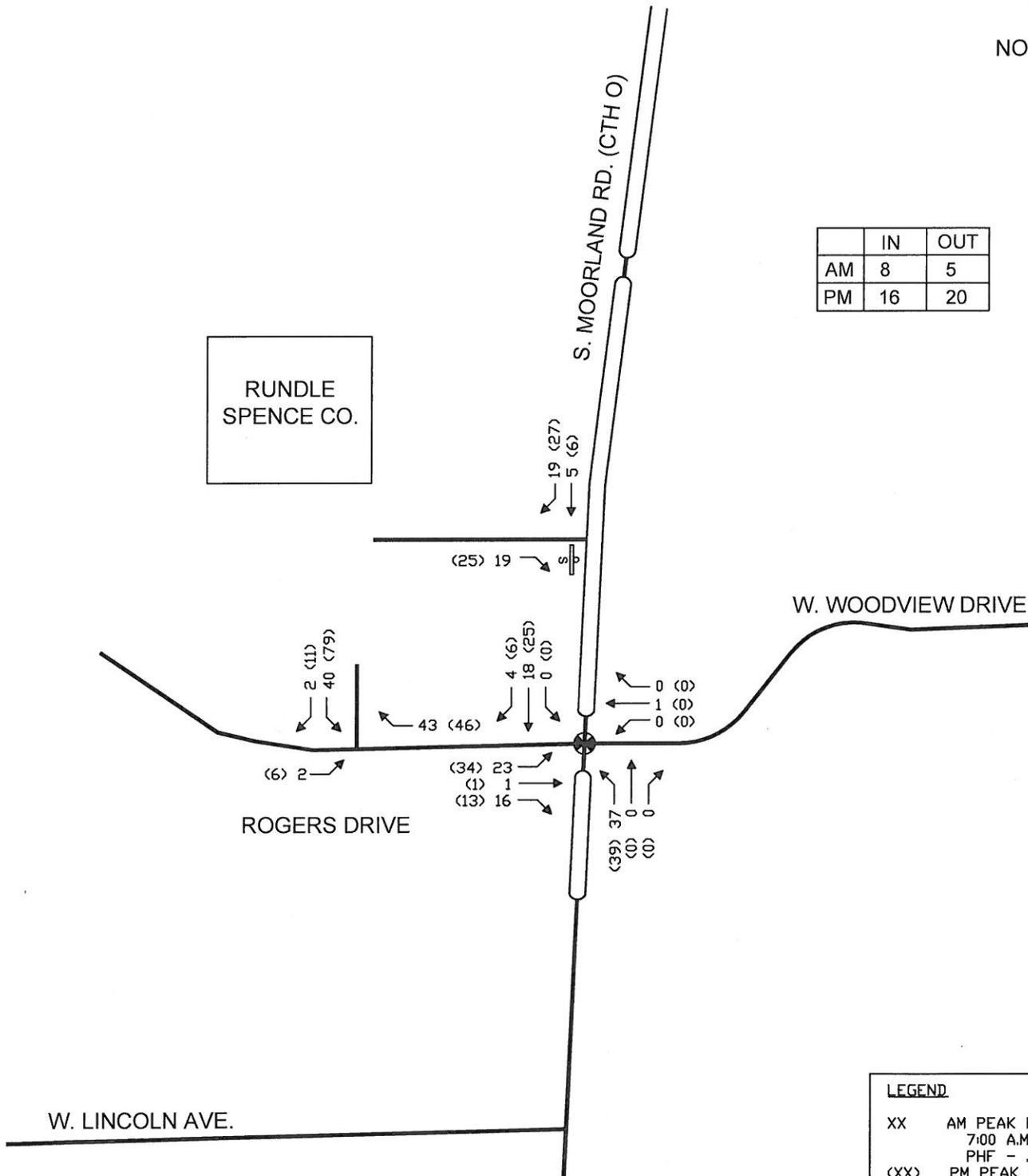
Dec 17, 2015, 2:30pm

EXHIBIT 4-4  
TRIP DISTRIBUTION  
PDQ  
MOORLAND AND ROGERS  
NEW BERLIN, WI  
SUBMITTAL DATE: 12-2015



NOT TO SCALE

	IN	OUT
AM	8	5
PM	16	20



**LEGEND**

XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 4-5A  
 YEAR 2016 ON SITE DEVELOPMENT TRAFFIC PDQ  
 NEW TRIPS  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015





NOT TO SCALE

	IN	OUT
AM	8	5
PM	16	20

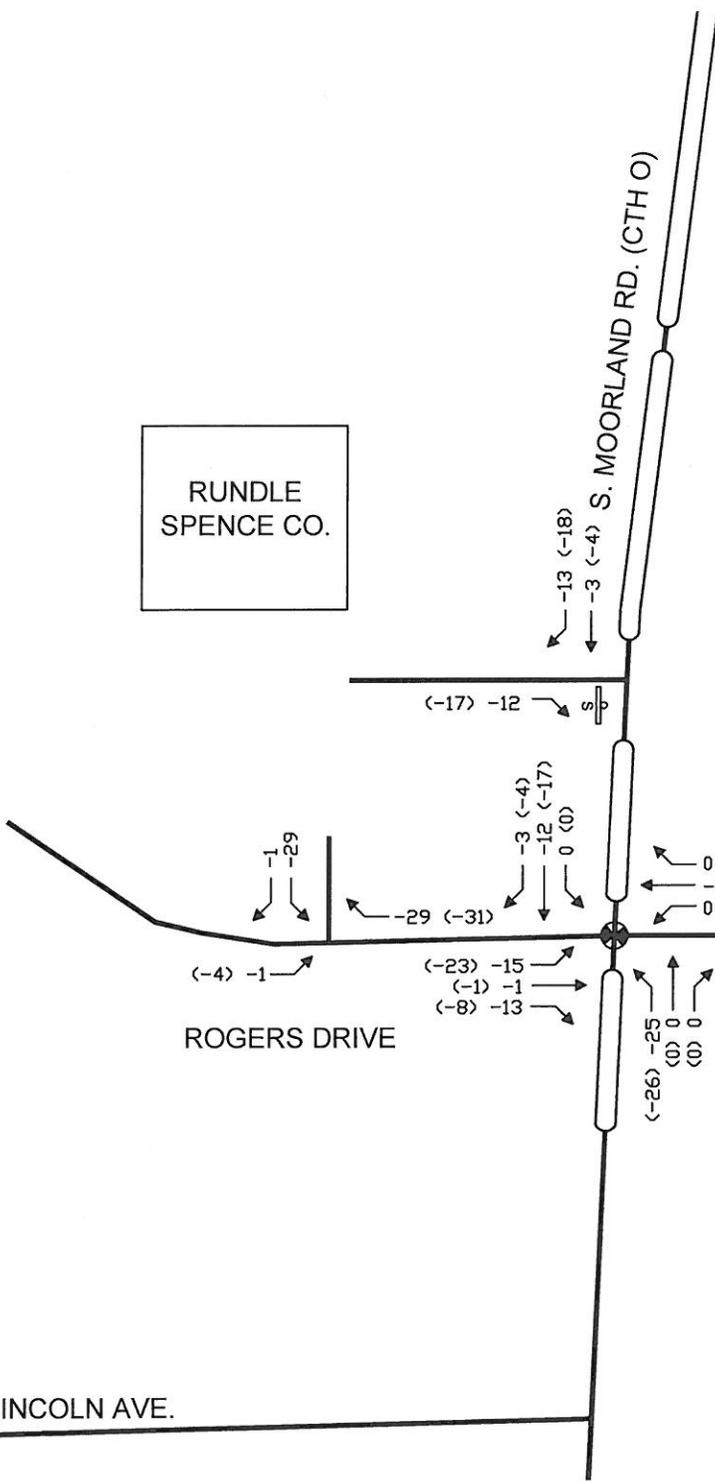
RUNDLE  
SPENCE CO.

S. MOORLAND RD. (CTH O)

W. WOODVIEW DRIVE

ROGERS DRIVE

W. LINCOLN AVE.



**LEGEND**

XX AM PEAK HOUR  
7:00 A.M. - 8:00 A.M.  
PHF - .90

<XX> PM PEAK HOUR  
4:30 P.M. - 5:30 P.M.  
PHF .97

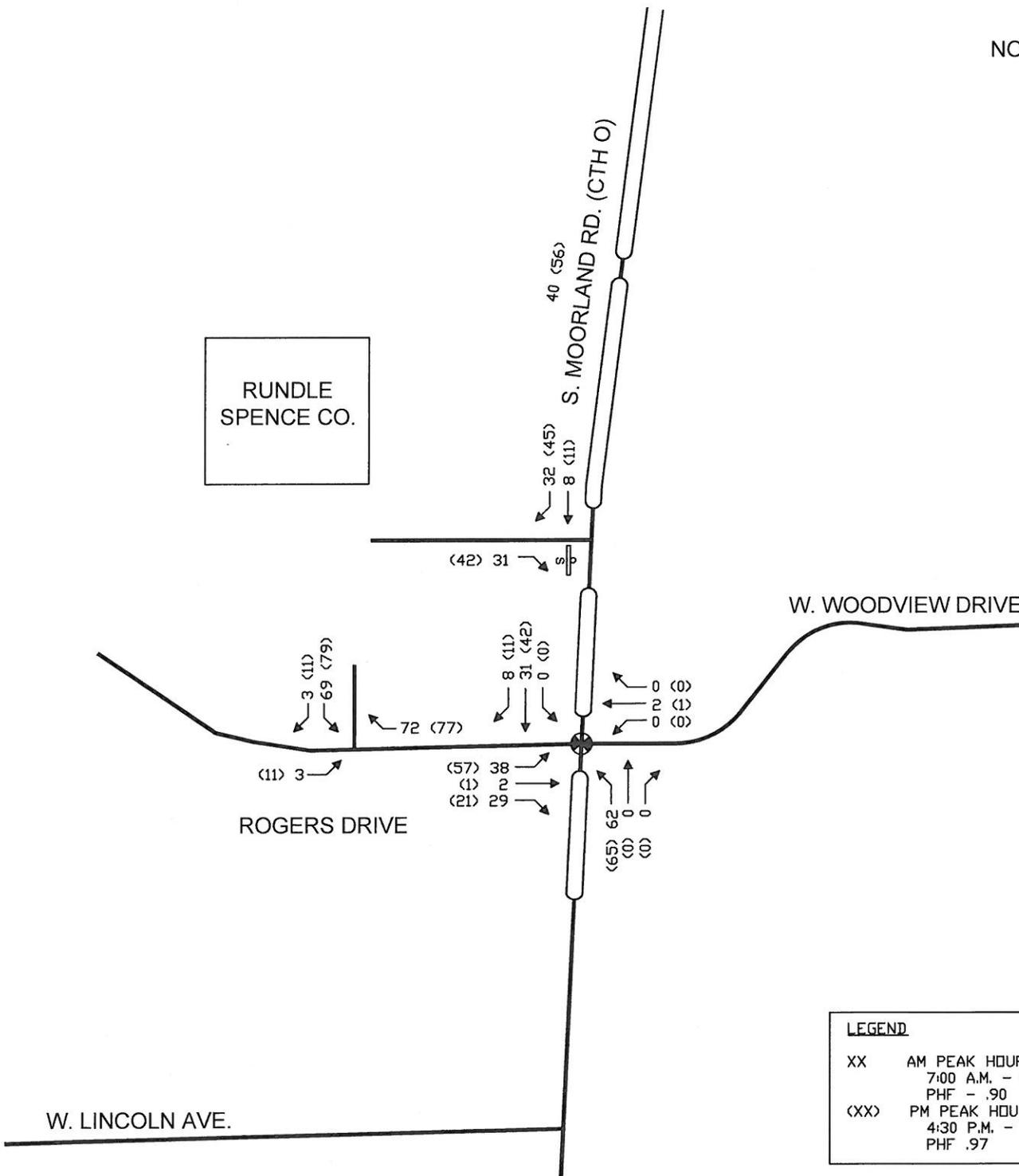
EXHIBIT 4-5C  
 YEAR 2016 ON SITE DEVELOPMENT TRAFFIC PDQ  
 PASS-BY TRIPS - 2016  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

 **TRAFFIC  
ENGINEERING  
SERVICES, INC.**

JN# 15E26 Dec 17, 2015, 2:32pm



NOT TO SCALE



LEGEND	
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EXHIBIT 4-5D  
 YEAR 2016 ON SITE DEVELOPMENT TRAFFIC PDQ  
 DRIVEWAY TRIPS - 2016  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015



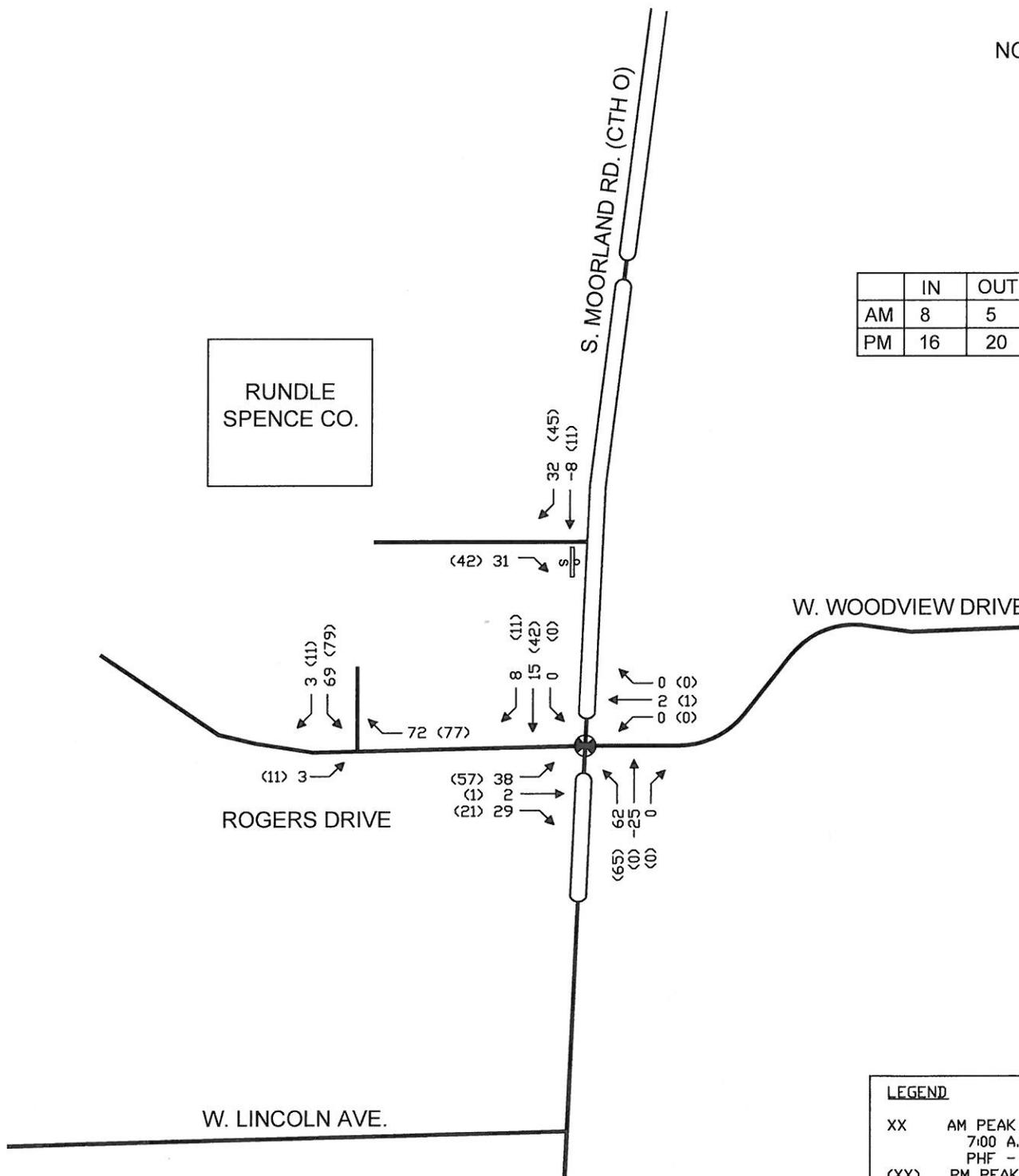
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Dec 17, 2015, 2:32pm



NOT TO SCALE

	IN	OUT
AM	8	5
PM	16	20



LEGEND	
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EXHIBIT 4-5E  
 YEAR 2016 ON SITE DEVELOPMENT TRAFFIC PDQ  
 ANALYSIS TRIPS - 2016  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

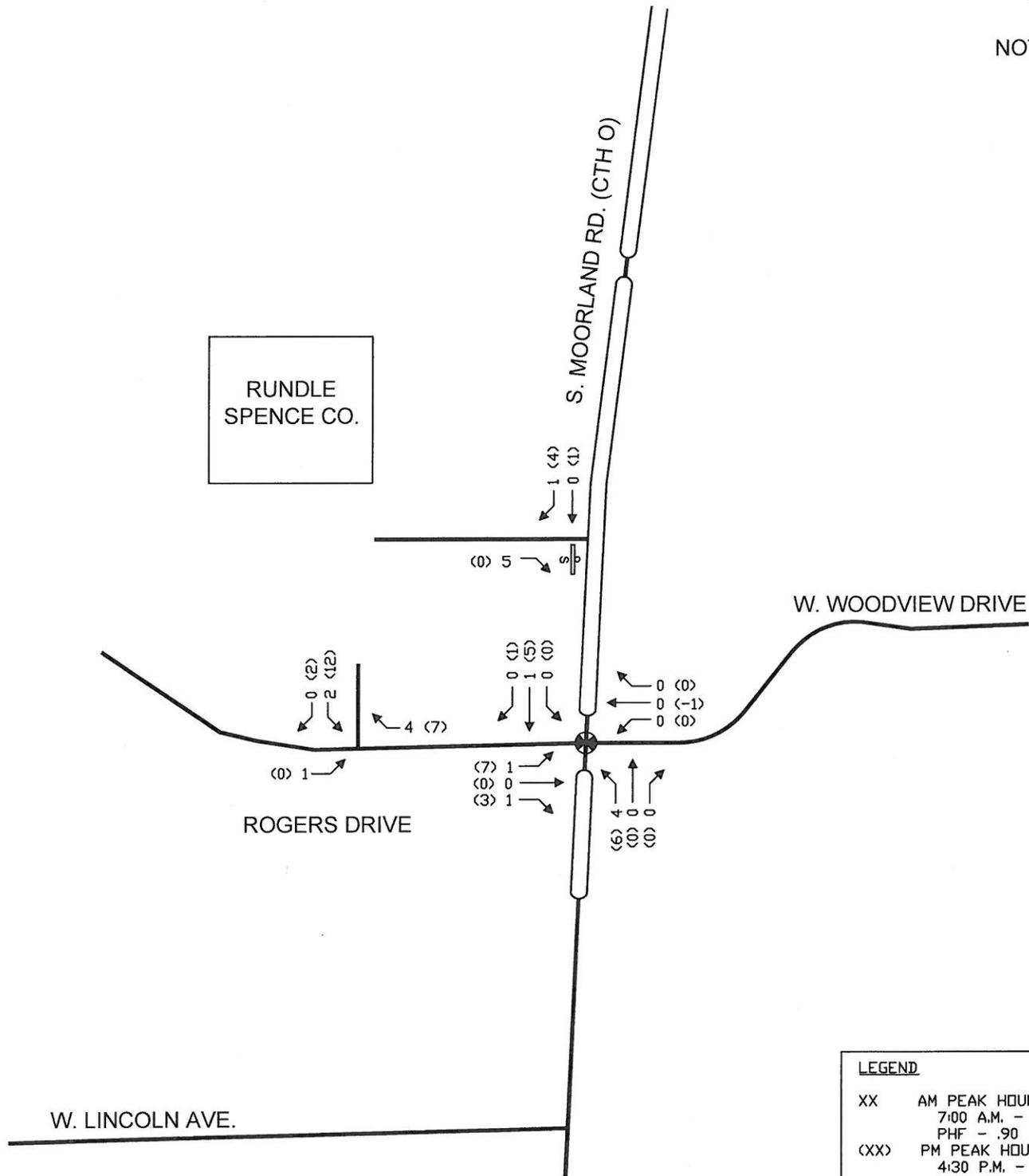
**TE** TRAFFIC ENGINEERING SERVICES, INC.

JN# 15E26

Dec 17, 2015, 2:32pm



NOT TO SCALE



LEGEND	
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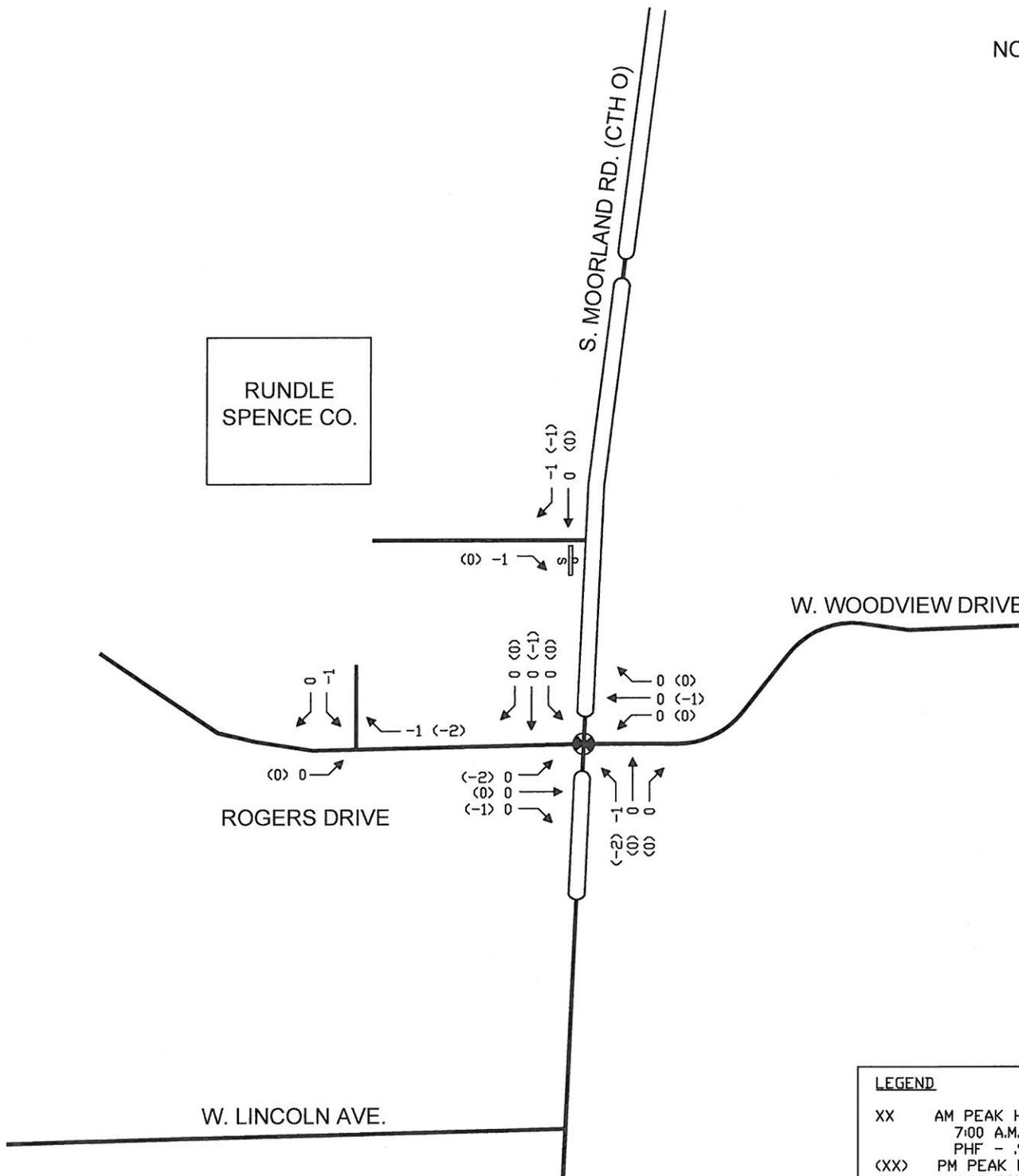
EXHIBIT 4-6A  
 INTERIM YEAR (2021) ON SITE DEVELOPMENT  
 TRAFFIC ASSIGNMENT SHOPPING CENTER  
 NEW TRIPS - 2021  
 PDQ & SPECIALITY RETAIL  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015



JN# 15E26 Dec 17, 2015, 2:33pm



NOT TO SCALE



LEGEND	
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(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

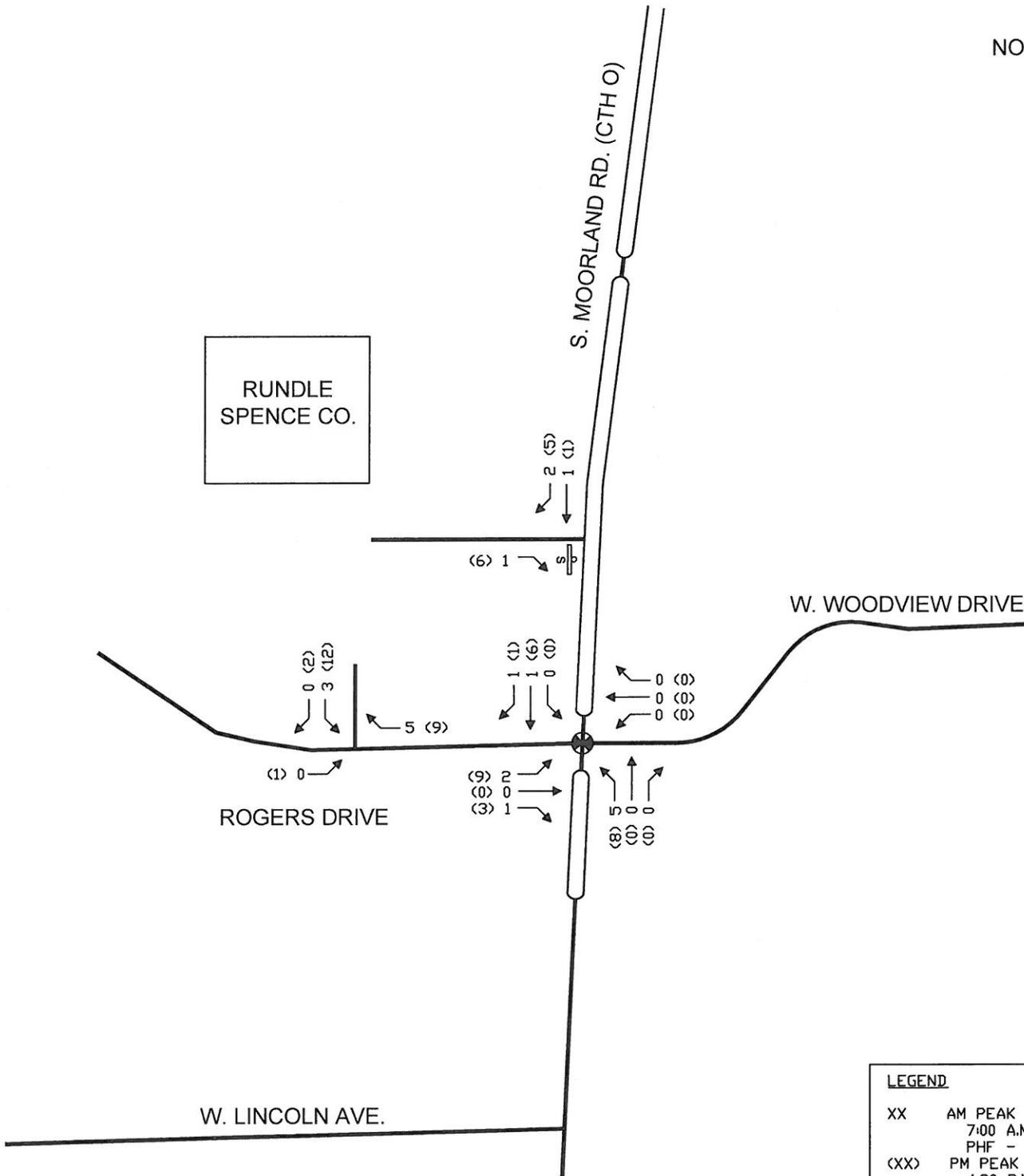
EXHIBIT 4-6C  
 INTERIM YEAR (2021) ON SITE DEVELOPMENT  
 TRAFFIC ASSIGNMENT SHOPPING CENTER  
 PASS-BY TRIPS - 2021  
 PDQ & SPECIALITY RETAIL  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

 TRAFFIC ENGINEERING SERVICES, INC.

JN# 15E26 Dec 17, 2015, 2:33pm



NOT TO SCALE



LEGEND	
XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 4-6D  
 INTERIM YEAR (2021) ON SITE DEVELOPMENT  
 TRAFFIC ASSIGNMENT SHOPPING CENTER  
 DRIVEWAY TRIPS - 2021  
 PDQ & SPECIALITY RETAIL  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015



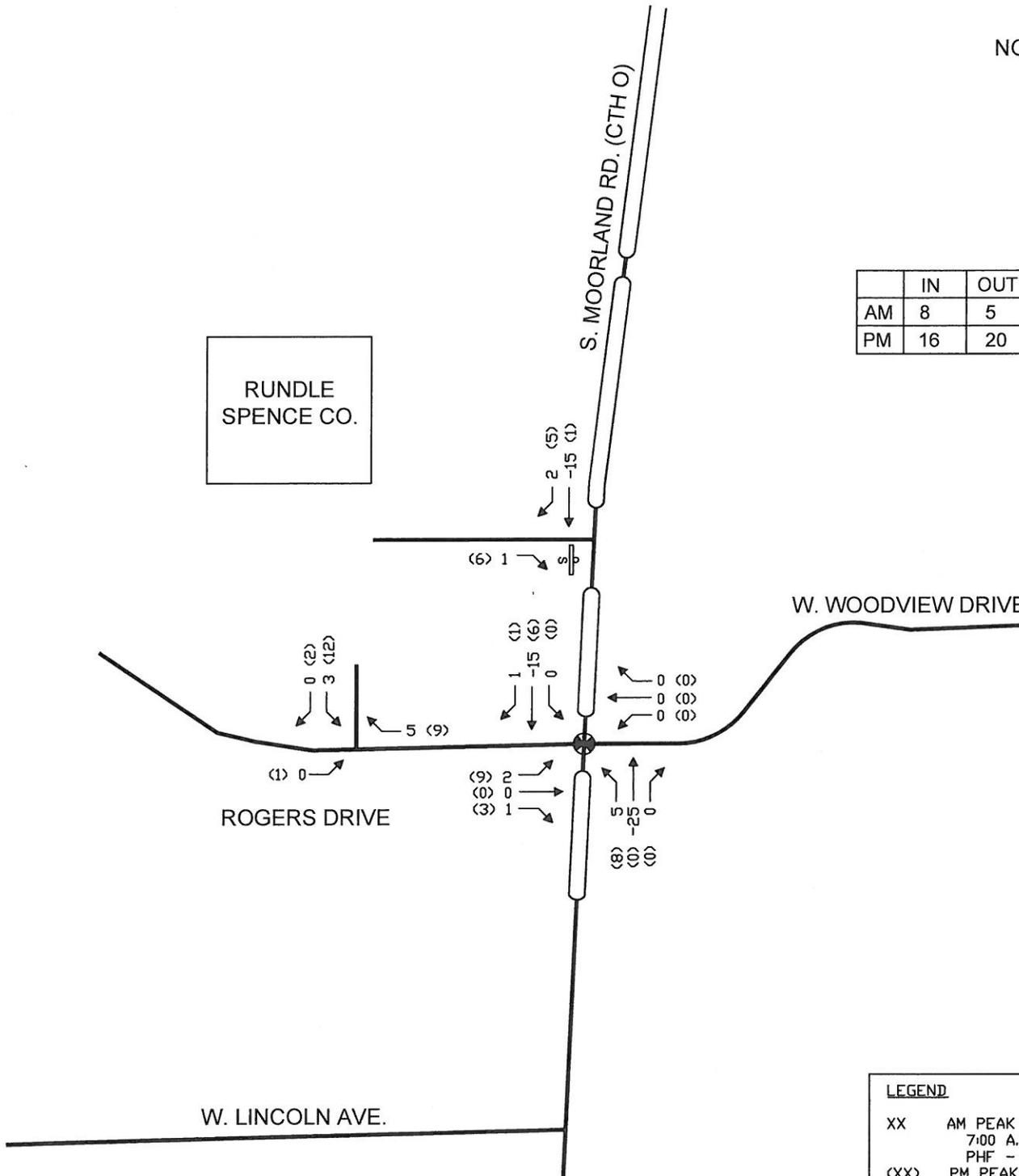
JN# 15E26

Dec 17, 2015, 2:34pm



NOT TO SCALE

	IN	OUT
AM	8	5
PM	16	20



LEGEND	
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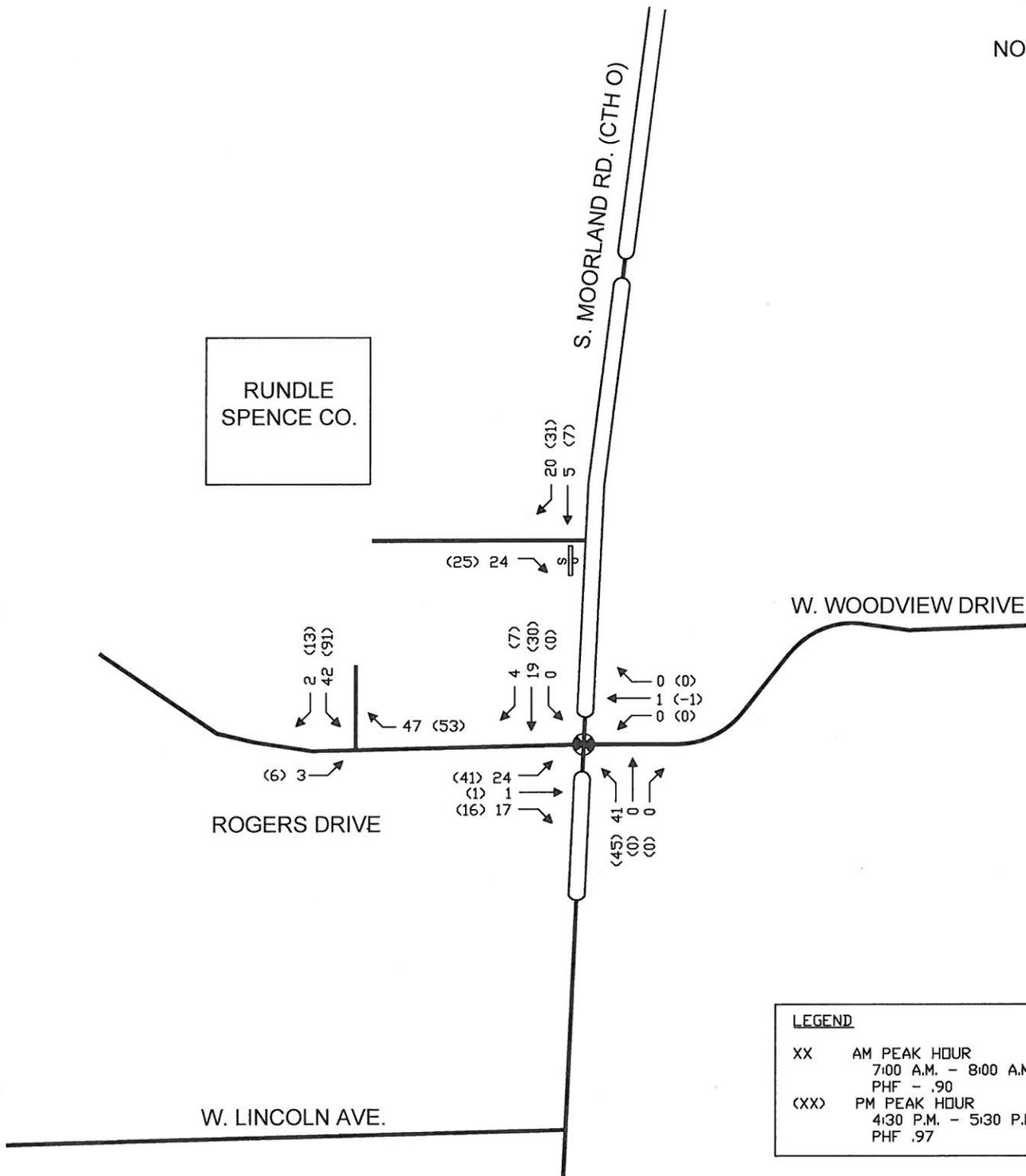
EXHIBIT 4-6E  
 INTERIM YEAR (2021) ON SITE DEVELOPMENT  
 TRAFFIC ASSIGNMENT SHOPPING CENTER  
 ANALYSIS TRIPS - 2021  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

TRAFFIC  
 ENGINEERING  
 SERVICES, INC.

JN# 15E26 Dec 17, 2015, 2:33pm



NOT TO SCALE



LEGEND	
XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 4-7A  
 INTERIM 2021 AND 2031 ON SITE TOTAL TRAFFIC ASSIGNMENT  
 NEW TRIPS - 2021 AND 2031  
 PDQ & SPECIALITY RETAIL  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

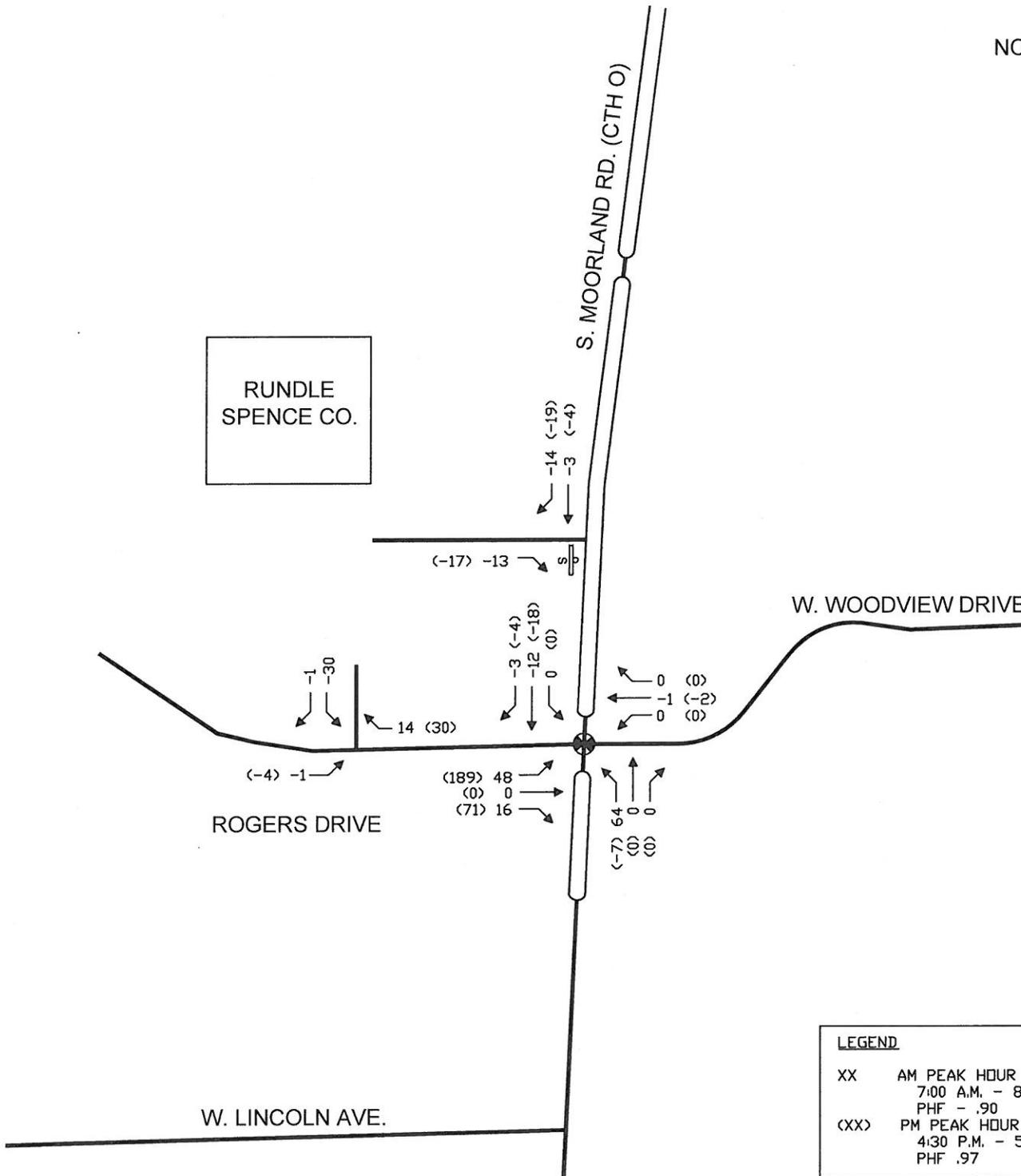


JN# 15E26

Dec 17, 2015, 2:34pm



NOT TO SCALE



LEGEND	
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<XX>	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 4-7C  
 INTERIM 2021 AND 2031 ON SITE TOTAL TRAFFIC ASSIGNMENT  
 PASS-BY TRIPS - 2021 AND 2031  
 PDQ & SPECIALITY RETAIL  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015



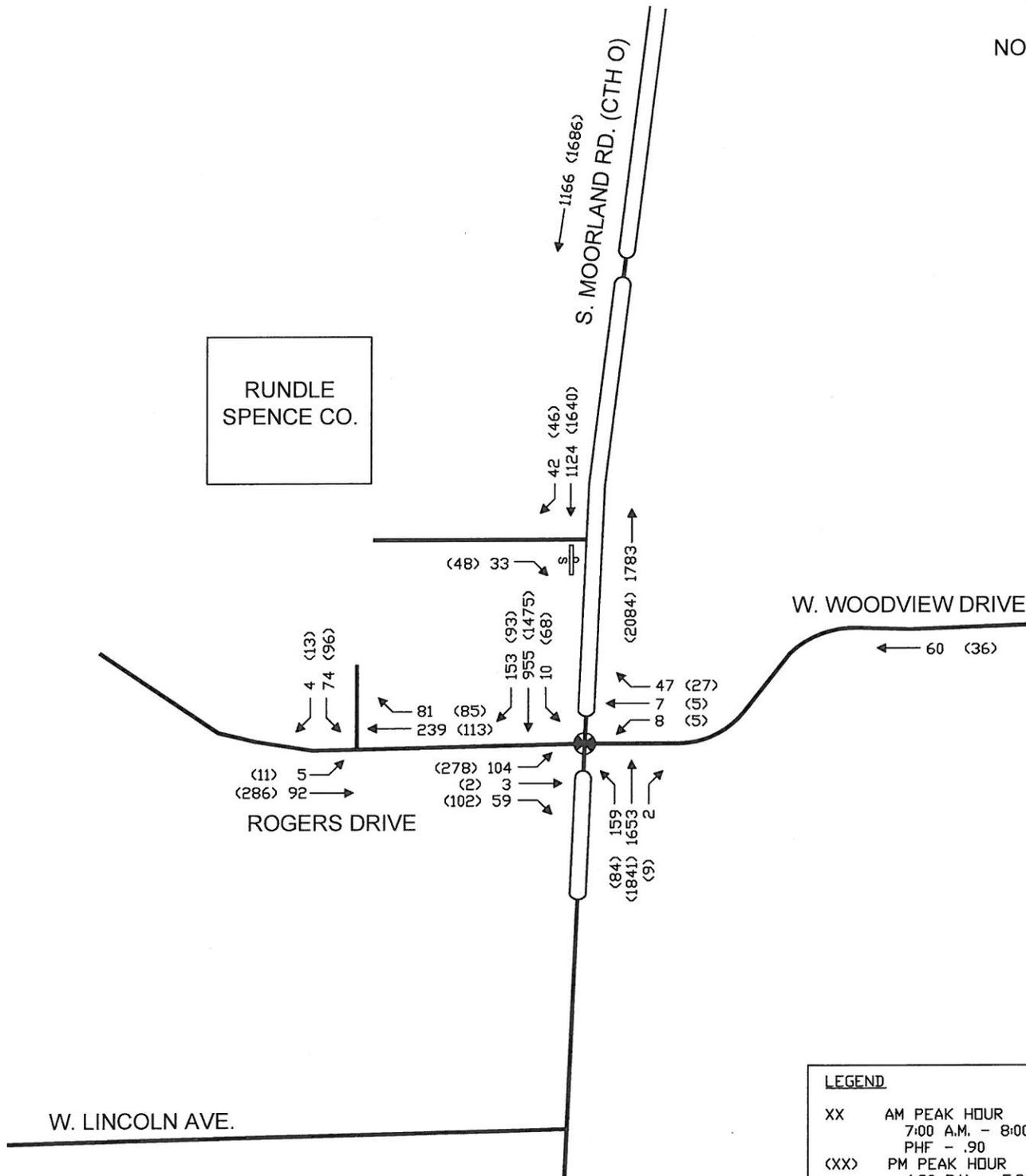
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NOT TO SCALE



**LEGEND**

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PHF - .90

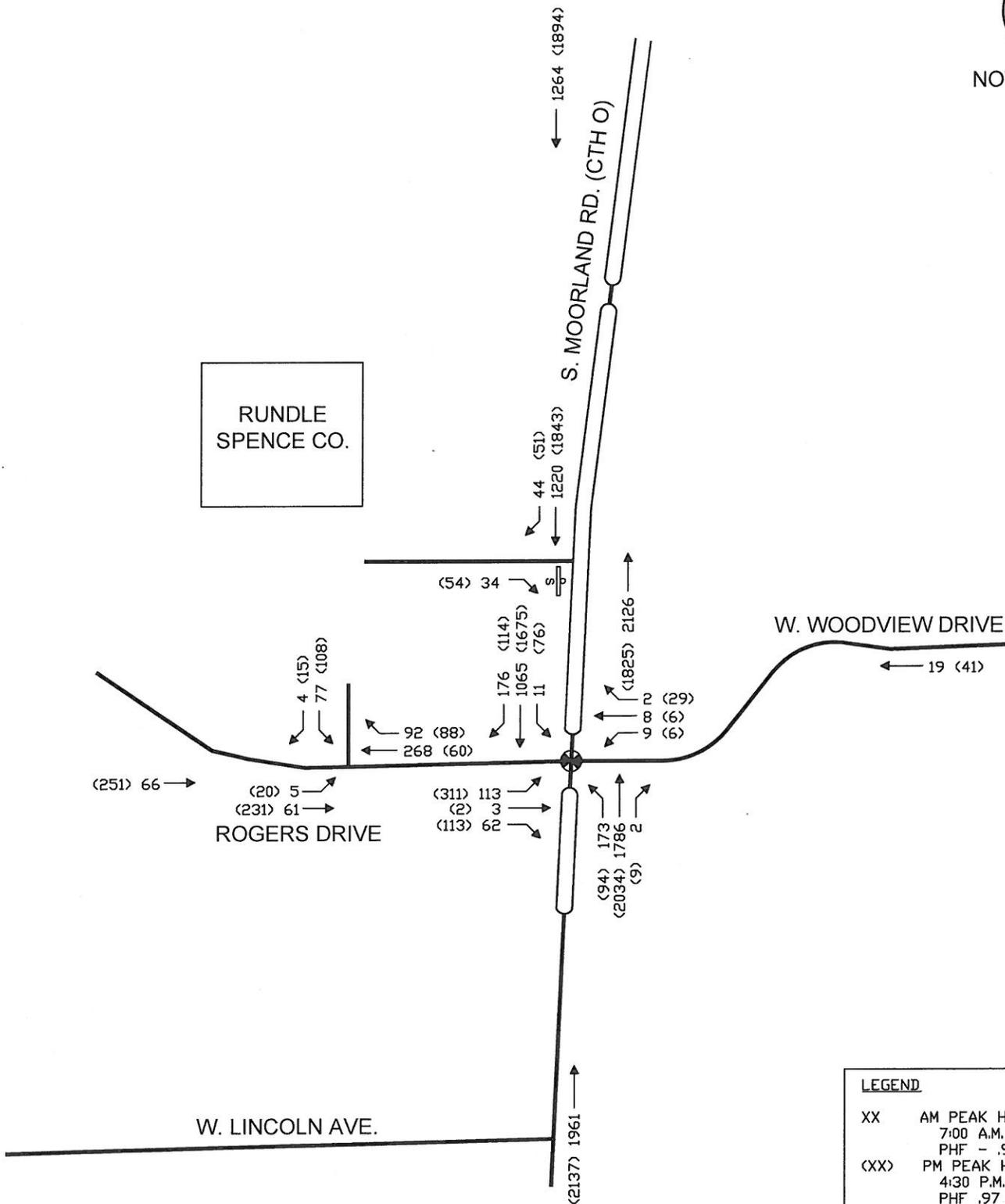
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PHF .97

EXHIBIT 4-14  
INTERIM 2021 AND 2031 ON SITE  
TOTAL TRAFFIC ASSIGNMENT  
YEAR 2016 TOTAL TRAFFIC VOLUMES  
PDQ  
MOORLAND AND ROGERS  
NEW BERLIN, WI  
SUBMITTAL DATE: 12-2015

 **TRAFFIC ENGINEERING SERVICES, INC.**  
JN# 15E26 Dec 17, 2015, 2:57pm



NOT TO SCALE



LEGEND	
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EXHIBIT 4-15  
 INTERIM 2021 AND 2031 ON SITE  
 TOTAL TRAFFIC ASSIGNMENT  
 YEAR 2021 TOTAL TRAFFIC VOLUMES  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

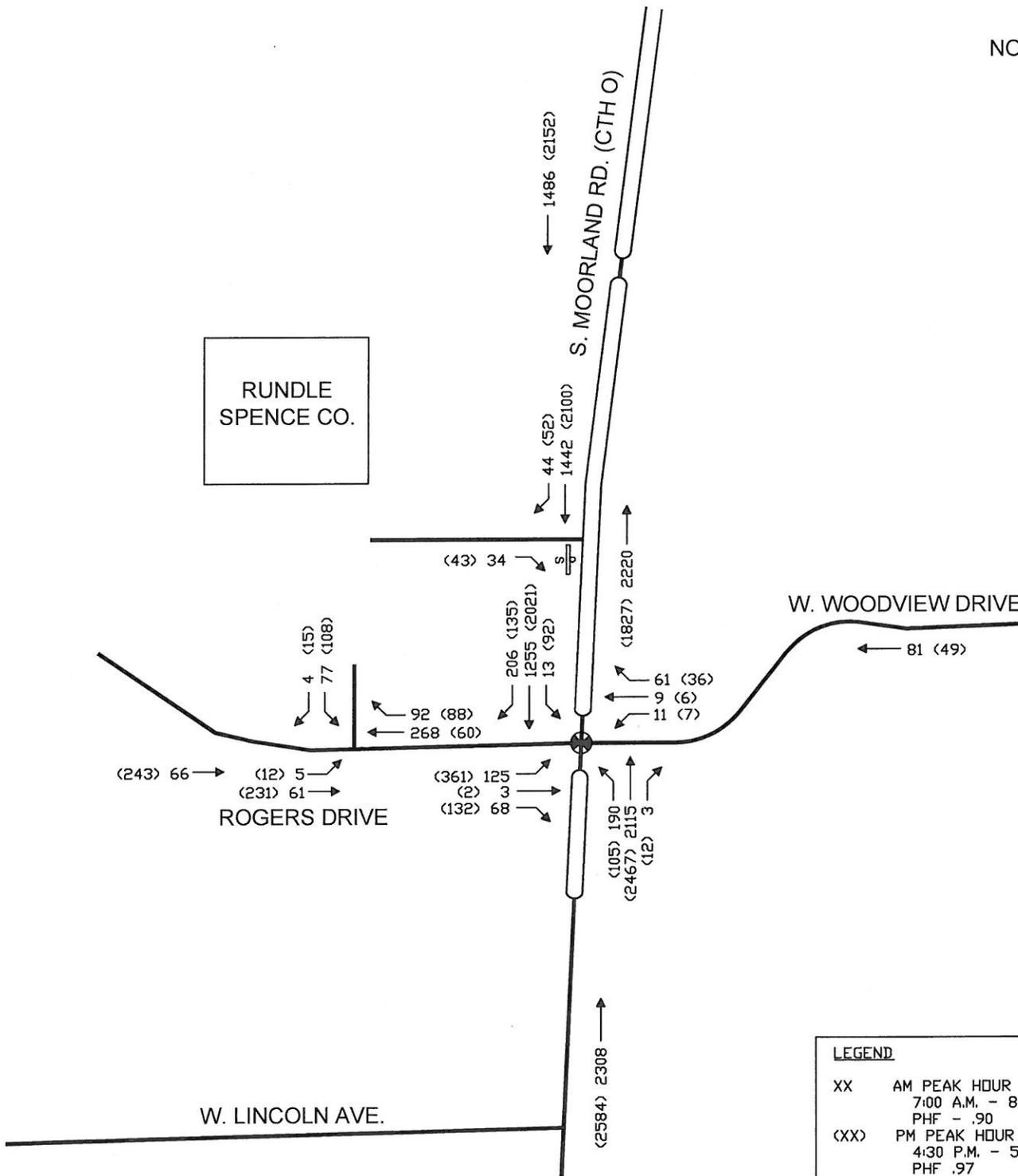


JN# 15E26

Dec 17, 2015, 2:46pm



NOT TO SCALE



**LEGEND**

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7:00 A.M. - 8:00 A.M.  
PHF - .90

<XX> PM PEAK HOUR  
4:30 P.M. - 5:30 P.M.  
PHF .97

EXHIBIT 4-16  
 INTER 2021 AND 2031 ON SITE TOTAL ASSIGNMENT  
 YEAR 2031 TOTAL TRAFFIC VOLUMES  
 PDQ & SPECIALITY RETAIL  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

**TE** TRAFFIC ENGINEERING SERVICES, INC.

JN# 15E26

Dec 17, 2015, 2:46pm

## CHAPTER 5 – TRAFFIC AND IMPROVEMENT ANALYSIS

### A – SITE ACCESS

Use existing driveways.

### B – CAPACITY/LEVEL OF SERVICE ANALYSIS

#### Existing Geometrics Analysis

The Year 2016 background traffic (Exhibit 3-2B) was analyzed. There are two critical locations for current traffic operations Moorland median break and the eastbound left turn. Neither location has a poor crash history. The Moorland Road queue southbound at Rogers Drive extends across the Moorland median break setting conditions that demonstrate the potential for sever crashes from left turns.

The median break on Moorland Road was mandated to close by Waukesha County. Analysis was with this closure and right in and out for this driveway. Rogers Drive eastbound left turn requires a dual left turn with split phasing for eastbound and westbound at Moorland Road. Synchro analysis did not demonstrate the improvement with the dual left turn so HCS and Signal 2000 were used. HCS will not model split phasing eastbound and westbound. Signal 2000 verified the benefit of a dual left turn.

#### Improvements Analysis

Existing and Existing with development Intersection Operations have been analyzed using SYNCHRO software for the signalized intersection of Moorland Road and Rogers Drive and the stop controlled driveways to Moorland and Rogers Drive.

The AM peak hour of on-street traffic from 7:00 – 8:00 AM and the PM peak hour of on street traffic from 4:30 - 5:30 PM have been analyzed. SYNCHRO reports intersection operations with a Level of Service (LOS) grade. Definitions of the Level of Service grades are included in Appendix A. The software analysis provides LOS for all traffic movements that have a conflict with other traffic. Therefore, free flowing through or right turning movements will not have a separate Level of Service output listed in the output summary report.

The summary of the SYNCHRO output for 2021 and 2031 traffic without development traffic for all intersections are in Exhibit 5-1A and 5-1B. The signalized intersection has been analyzed with an optimization for the 2021 and 2031 without development and the same signal timing was used for 2021 and 2031 with development for comparison purposes.

The overall level of service for the intersection on Moorland Road and Rogers Drive shows a delay increase for the southbound through and northbound left turn when the development traffic is added in 2016. However the LOS does not stay within acceptable levels. A level of service D or above is considered acceptable. Except EBL and SB in PM peak operates at a level of service at or above D under each condition. The LOS for the driveway to Moorland Road has acceptable delay under current conditions. However due to the existing site design there is an alternative access to Moorland Road through the driveway to Rogers Drive. This allows the use of the traffic signal to provide safe and efficient ingress and egress to the site. When the development traffic is added the LOS is acceptable at the driveway to Moorland Road. As operations fail at the Moorland Road driveway the alternative access to Rogers Drive will become the primary access for ingress and egress. The trip distribution has been changed to show the impact of closing the Moorland Road median break and increase the volume at the Rogers Driveway to get to the Signal at Moorland Road and Rogers Drive because the required case scenario has been analyzed.

SYNCHRO includes a queue length evaluation for each lane group. All lanes have sufficient storage capacity in 2016 with full development.

The summary of SYNCHRO output for 2016 with development traffic is included as Exhibit 5-6. This analysis includes all intersections within the study area.

The staged construction represents 2016 with PDQ and 2021 with PDQ and strip shopping center. 2031 is both with background traffic growth

The study intersections have been analyzed using SYNCHRO software for the signalized intersection of Moorland Road and Rogers Drive and the stop controlled driveways to Moorland and Rogers Drive.

The AM peak hour of on-street traffic from 7:00 – 8:00 AM and the PM peak hour of on street traffic from 4:30 - 5:30 PM have been analyzed. SYNCHRO reports intersection operations with a Level of Service (LOS) grade. Definitions of the Level of Service grades are included in Appendix A. The software analysis provides LOS for all traffic movements that have a conflict with other traffic. Therefore, free flowing through or right turning movements will not have a separate Level of Service output listed in the output summary report.

The summary of the SYNCHRO output for 2031 traffic without development traffic for all intersections are in Exhibit 5-2. The signalized intersection has been analyzed with an optimization for the 2031 without development and the same signal timing was used for 2031 with development for comparison purposes.

The overall level of service for the intersection on Moorland Road and Rogers Drive shows a slight delay increase for the southbound through and northbound left turn when the development traffic is added in 2021. The LOS will drop from a D to an E. A level of service D or above is considered acceptable. The analysis did not take into account that the approach volumes to the intersection from the north have arrivals that are in platoons due to the traffic signal at Moorland Road and Greenfield Avenue and if analyzed with corridor operations would improve operations. The traffic signal is within a system and will adjust the timing to improve operation.

The LOS for the driveway to Moorland Road has no significant delay under 2031 conditions with and without development traffic. However due to the existing site design there is an alternative access to Moorland Road through the driveway to Rogers Drive. This allows the use of the traffic signal to provide safe and efficient ingress and egress to the site. As operations change at the Moorland Road driveway the alternative access to Rogers Drive will become the primary access for ingress and egress. The trip distribution has been changed to eliminate the left turn volume exiting the Moorland Road Driveway and increase the volume at the Rogers Driveway to get to the signal at Moorland Road and Rogers Drive has been analyzed.

## C – QUEUING ANALYSIS

SYNCHRO includes a queue length evaluation for each lane group. All lanes have sufficient storage capacity in 2016 with PDQ development.

The summary of SYNCHRO output for 2016 with development traffic is included as Exhibit 5-20. This analysis includes all intersection with in the study area.

## D - PEDESTRIAN, BICYCLE AND MULTI-USE TRAIL CONSIDERATIONS

There are no additional traffic considerations.

## E – SPEED CONSIDERATIONS

Speed limits on the intersections involved are as follows:

Rogers Drive 35 MPH

Moorland Road 40 MPH

Woodview Drive 25 MPH

Speed limits will stay as they are and no changes will be needed.

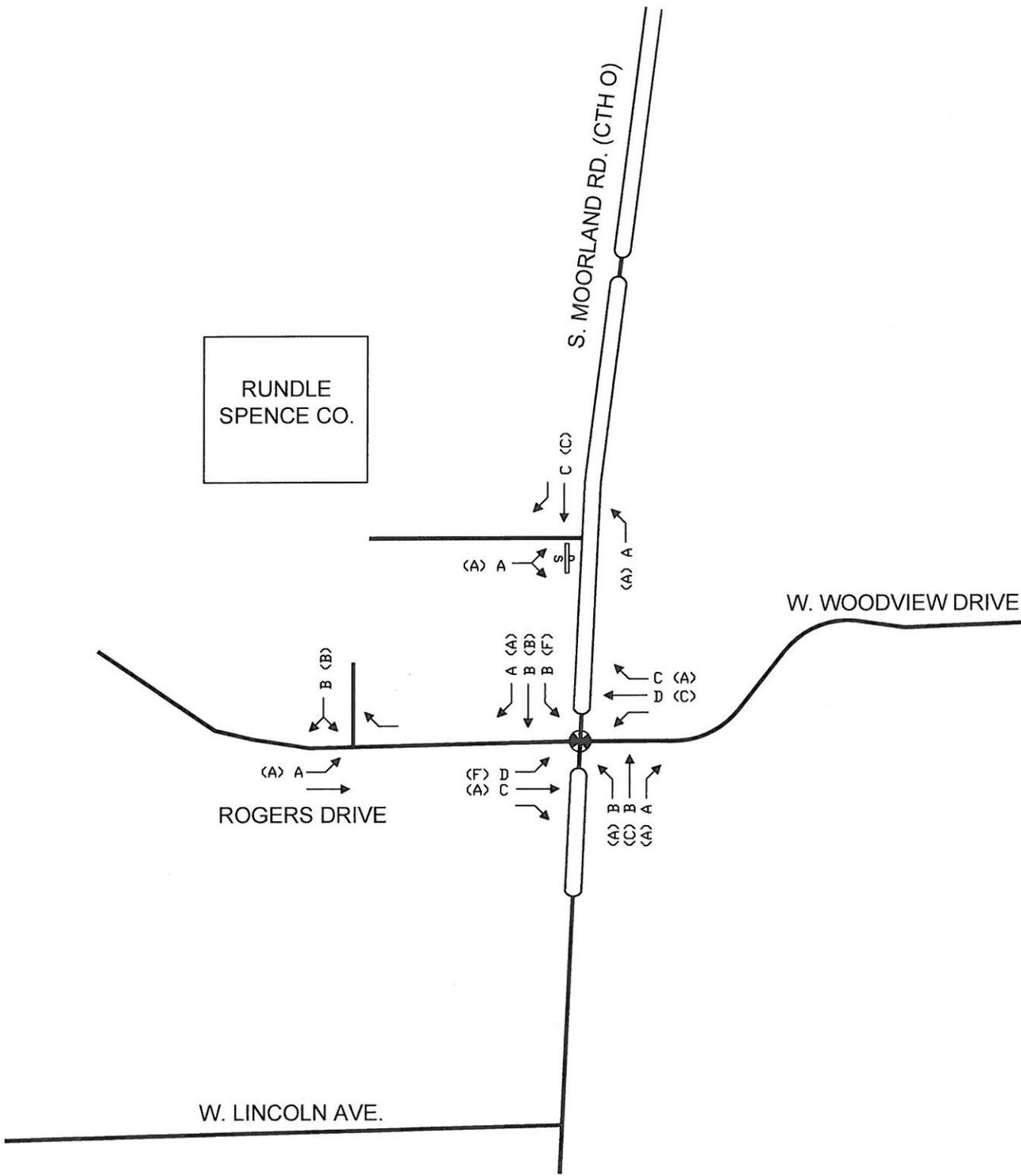


EXHIBIT 5-1A  
 CAPACITY/LEVEL OF SERVICE ANALYSIS,  
 EXISTING/PLANNED TRANSPORTATION SYSTEM  
 YEAR 2016 BACKGROUND TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

**TE** TRAFFIC ENGINEERING SERVICES, INC.

JN# 15E26

Dec 30, 2015, 2:45pm

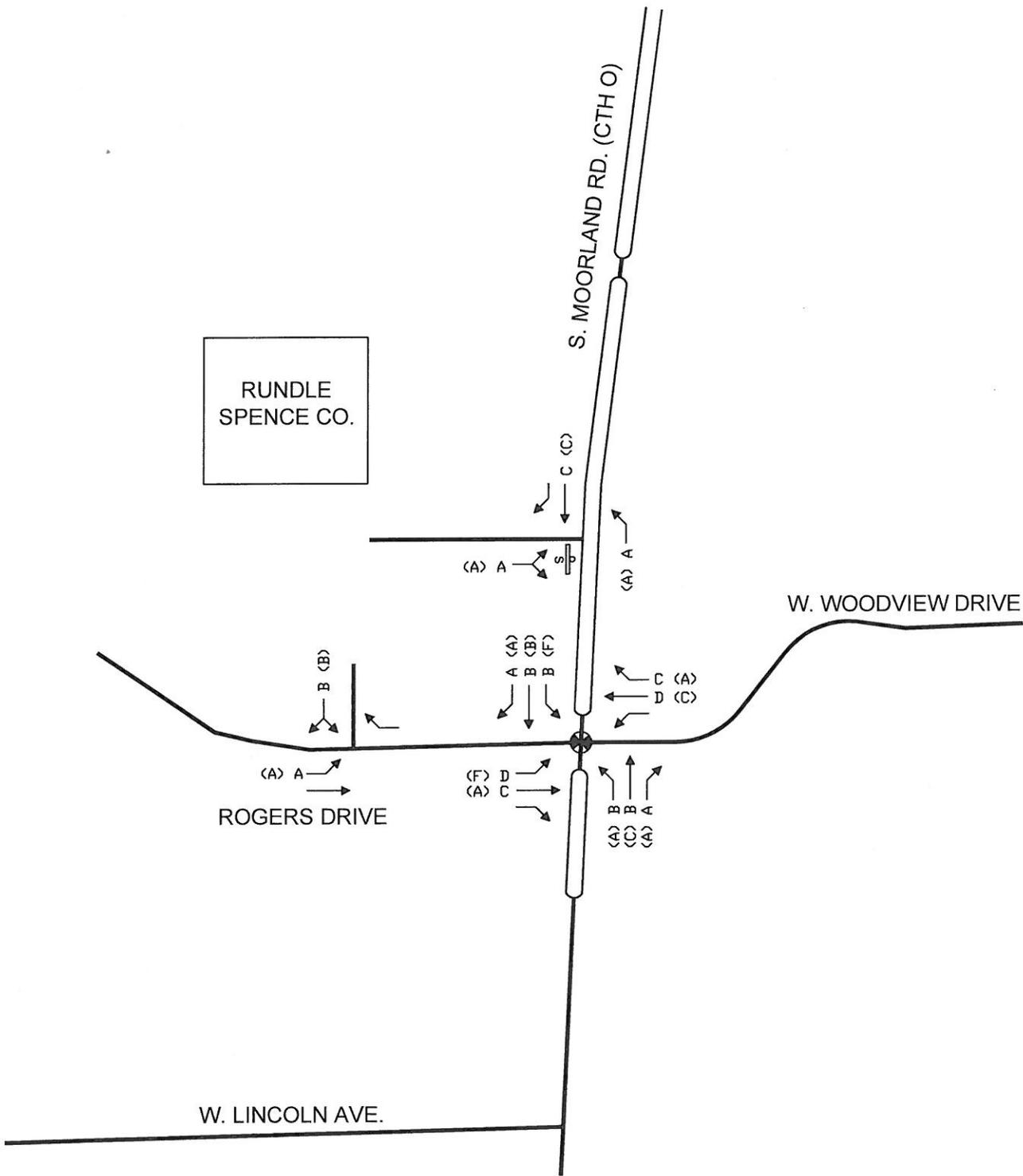


EXHIBIT 5-2  
 CAPACITY/LEVEL OF SERVICE ANALYSIS,  
 EXISTING/PLANNED TRANSPORTATION SYSTEM  
 YEAR 2031 BACKGROUND TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

 **TRAFFIC  
 ENGINEERING  
 SERVICES, INC.**

JN# 15E26

Dec 30, 2015, 2:46pm

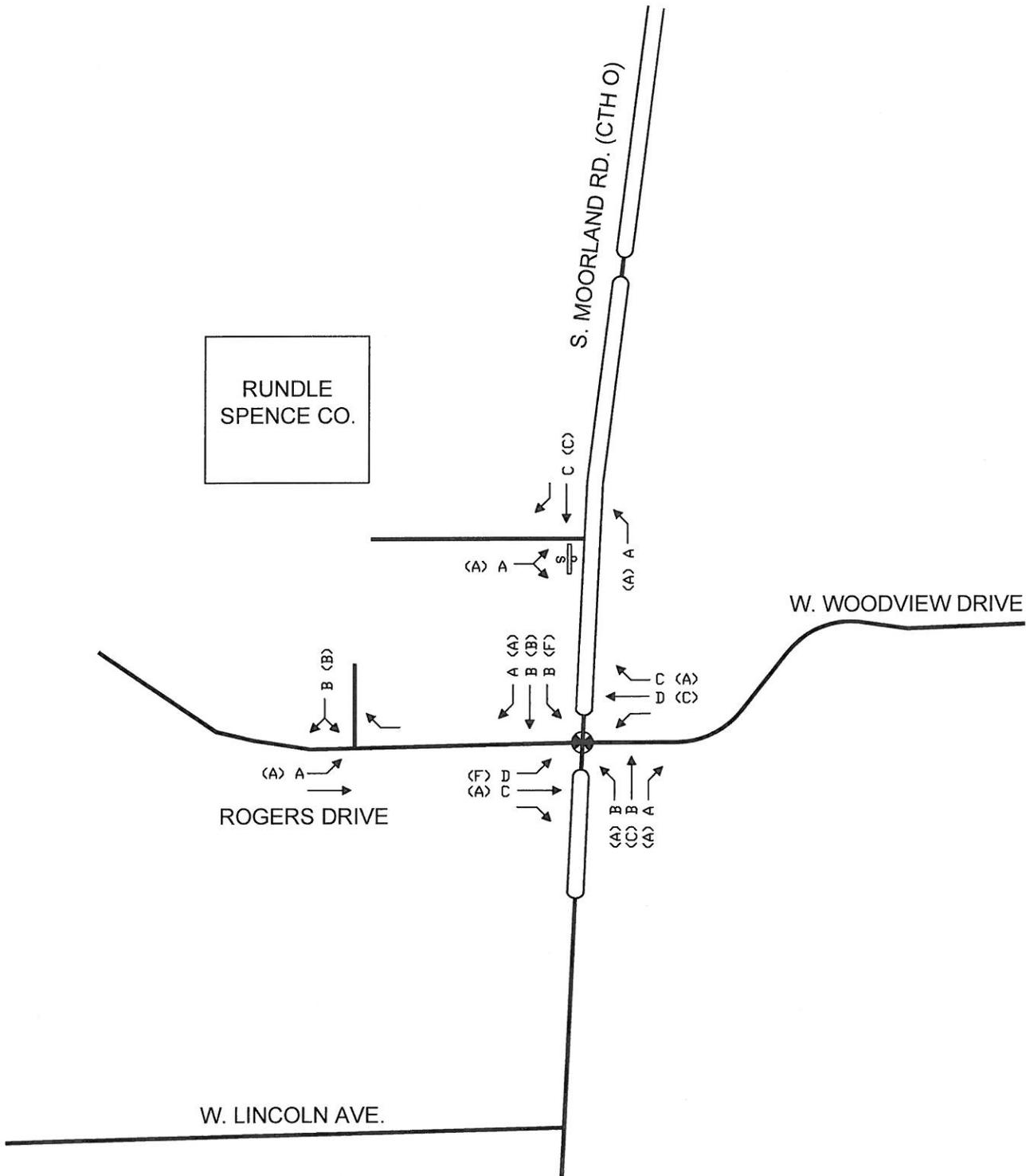


EXHIBIT 5-2B  
 CAPACITY/LEVEL OF SERVICE ANALYSIS,  
 EXISTING/PLANNED TRANSPORTATION SYSTEM  
 YEAR 2021 BACKGROUND TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

 **TRAFFIC  
 ENGINEERING  
 SERVICES, INC.**

JN# 15E26

Dec 30, 2015, 2:47pm



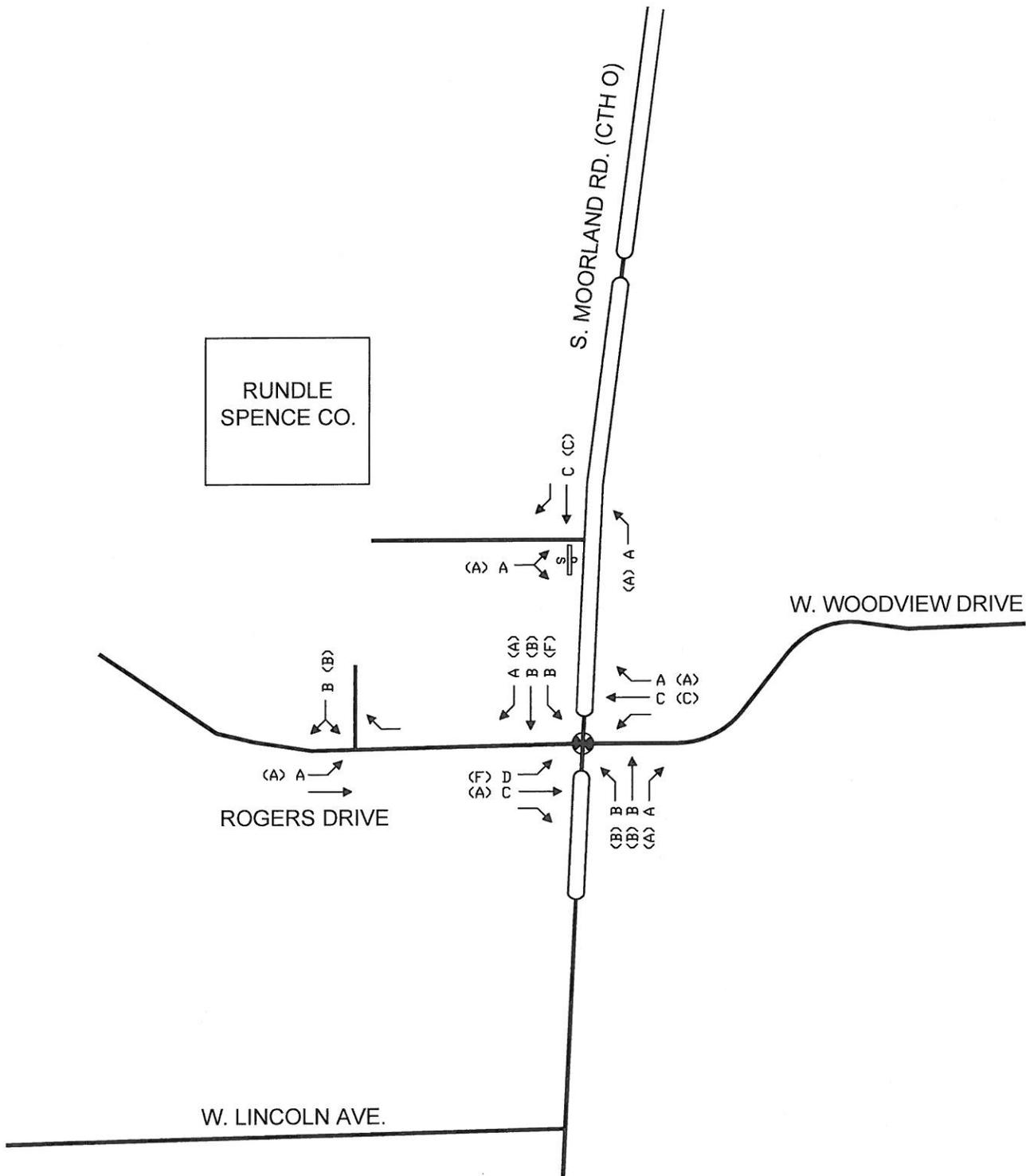


EXHIBIT 5-6A  
 CAPACITY/LEVEL OF SERVICE ANALYSIS,  
 EXISTING/PLANNED TRANSPORTATION SYSTEM  
 YEAR 2021 TOTAL TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

 **TRAFFIC  
 ENGINEERING  
 SERVICES, INC.**

JN# 15E26

Dec 30, 2015, 2:48pm

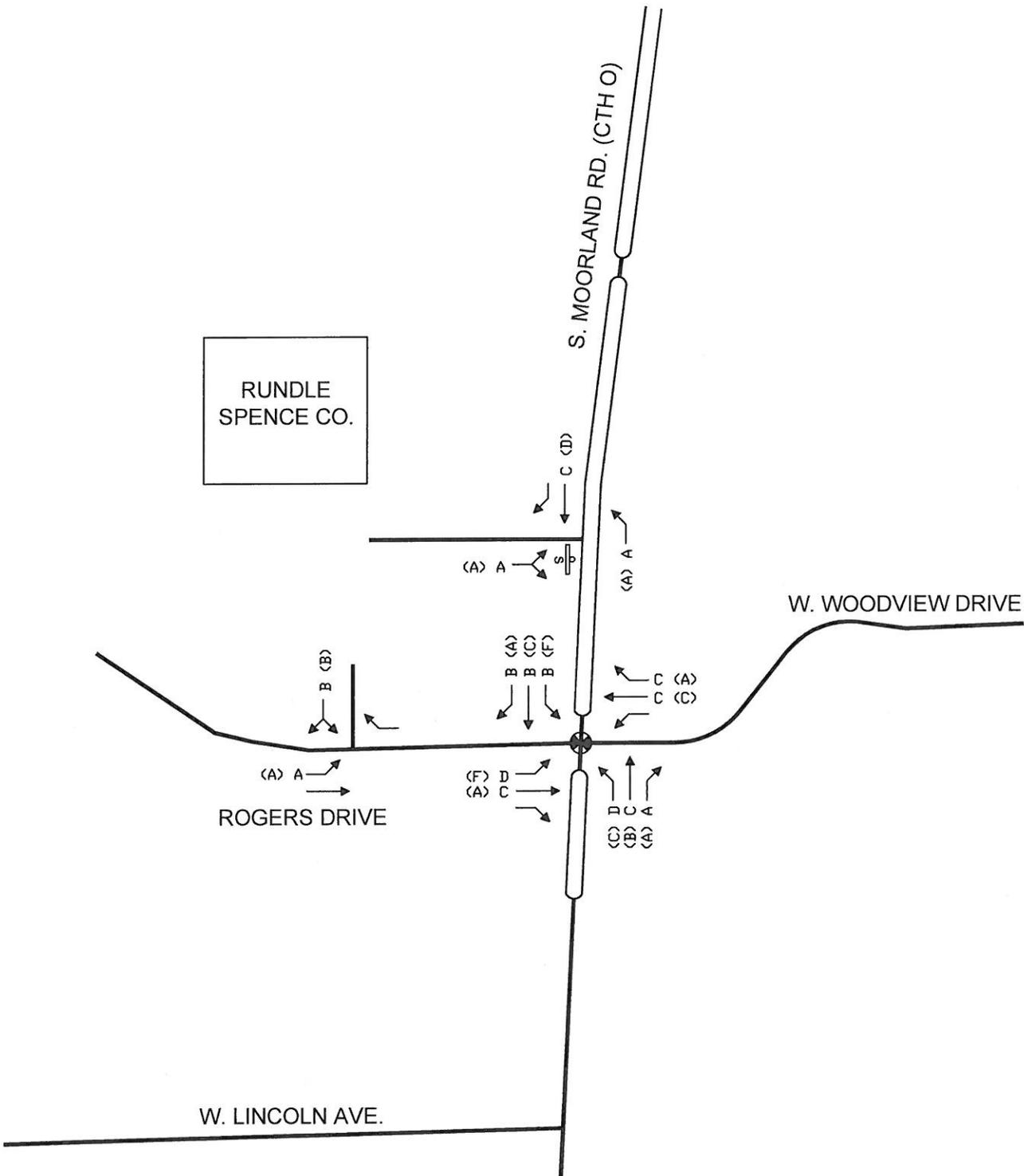


EXHIBIT 5-8  
 CAPACITY/LEVEL OF SERVICE ANALYSIS,  
 EXISTING/PLANNED TRANSPORTATION SYSTEM  
 YEAR 2031 TOTAL TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015



JN# 15E26

Dec 30, 2015, 2:48pm

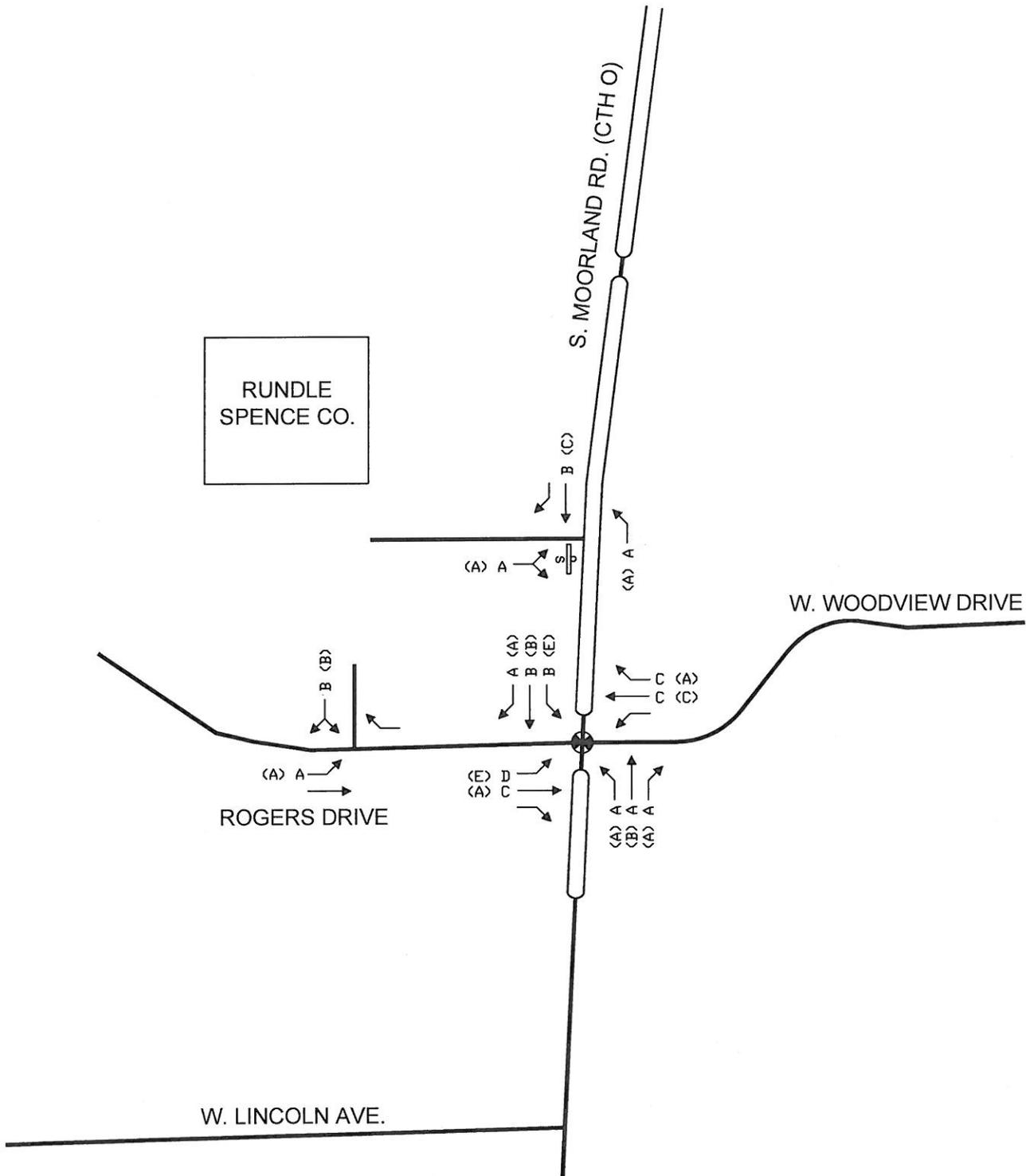


EXHIBIT 5-9  
 CAPACITY/LEVEL OF SERVICE ANALYSIS,  
 IMPROVED TRANSPORTATION SYSTEM  
 YEAR 2016 BACKGROUND TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

 **TRAFFIC  
 ENGINEERING  
 SERVICES, INC.**

JN# 15E26

Dec 30, 2015, 2:49pm

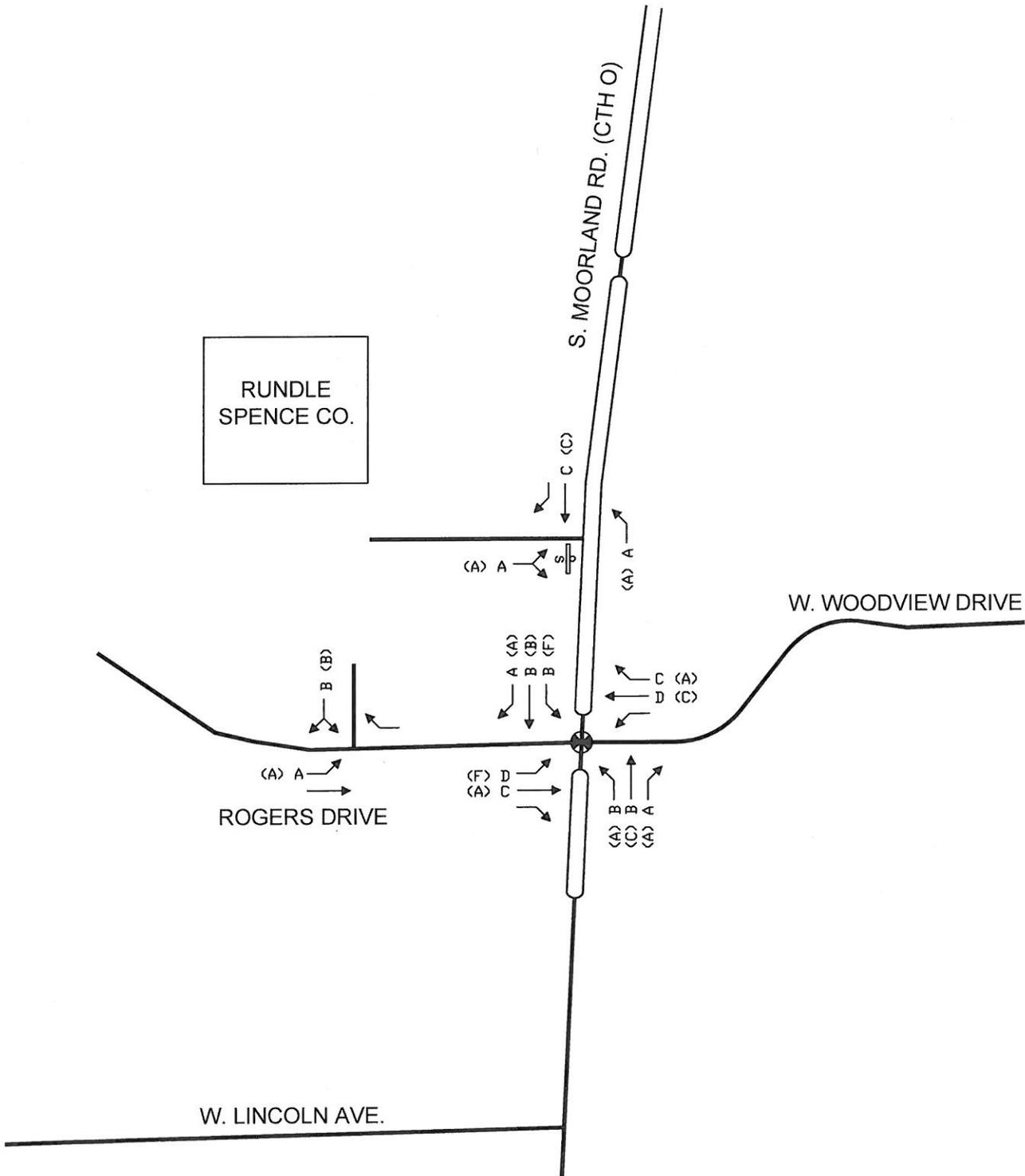


EXHIBIT 5-12  
 CAPACITY/LEVEL OF SERVICE ANALYSIS,  
 IMPROVED TRANSPORTATION SYSTEM  
 YEAR 2031 BACKGROUND TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

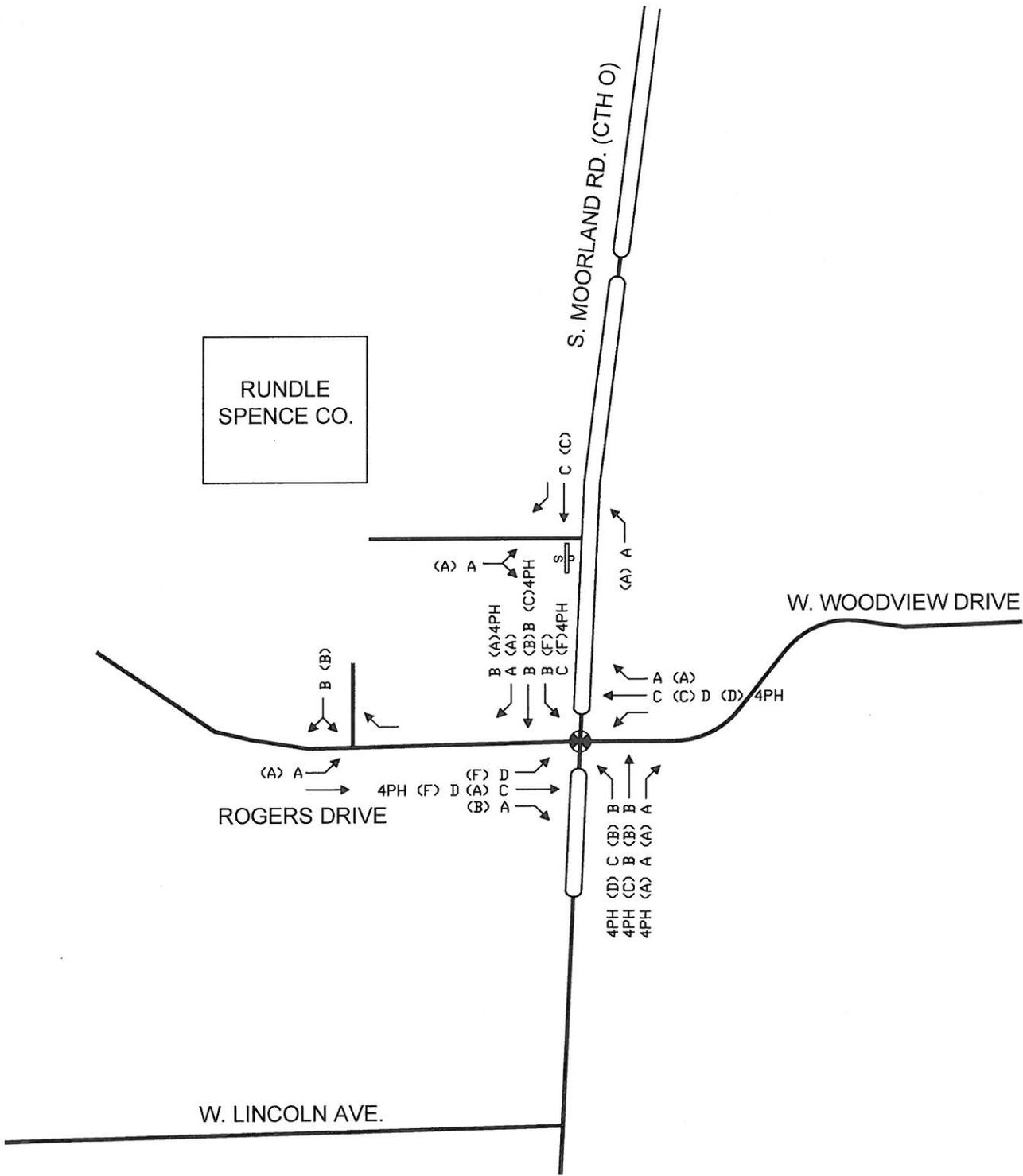


EXHIBIT 5-15  
 CAPACITY/LEVEL OF SERVICE ANALYSIS,  
 IMPROVED TRANSPORTATION SYSTEM  
 YEAR 2021 TOTAL TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015

**TE** TRAFFIC ENGINEERING SERVICES, INC.

JN# 15E26

Dec 30, 2015, 2:50pm

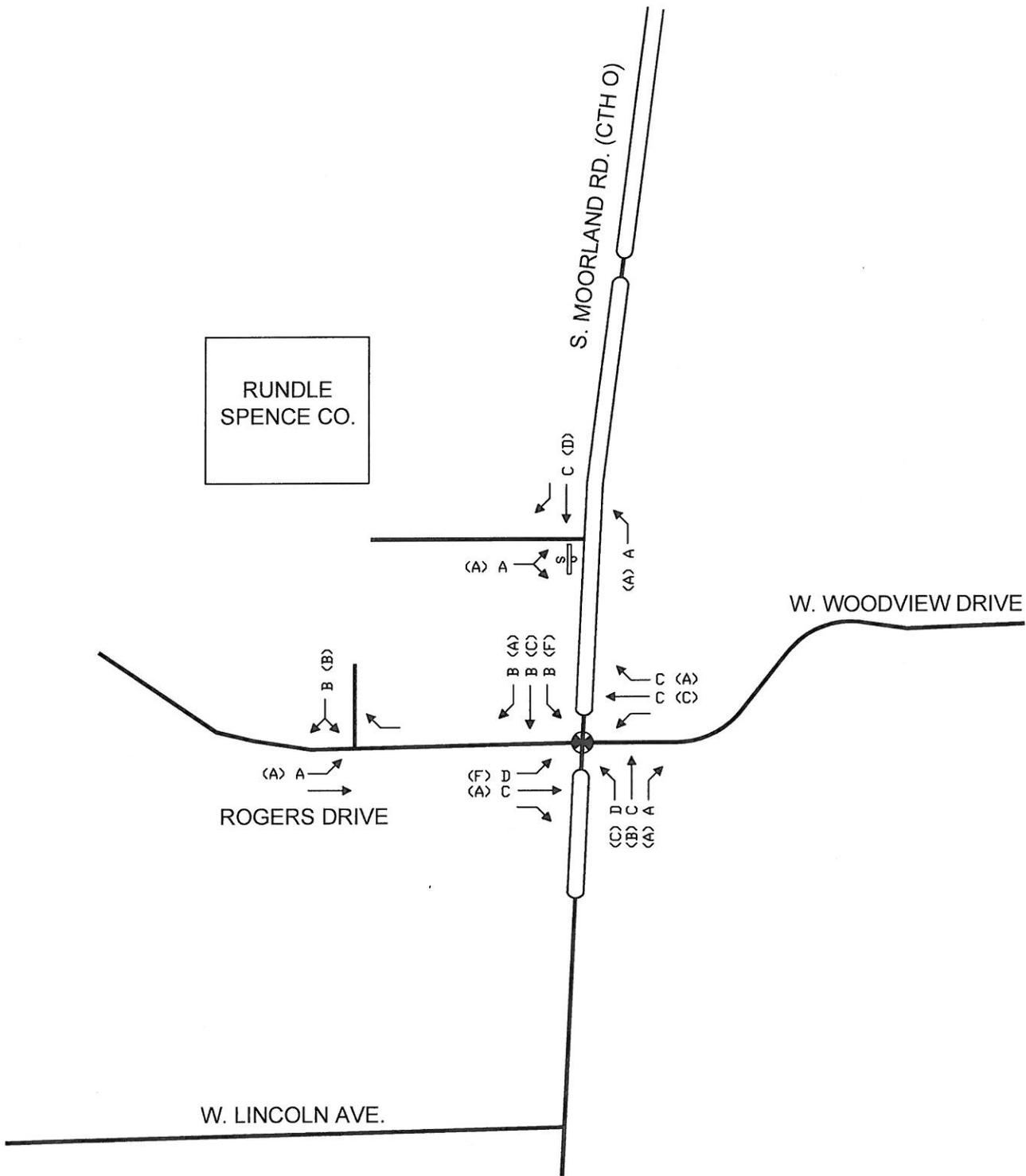
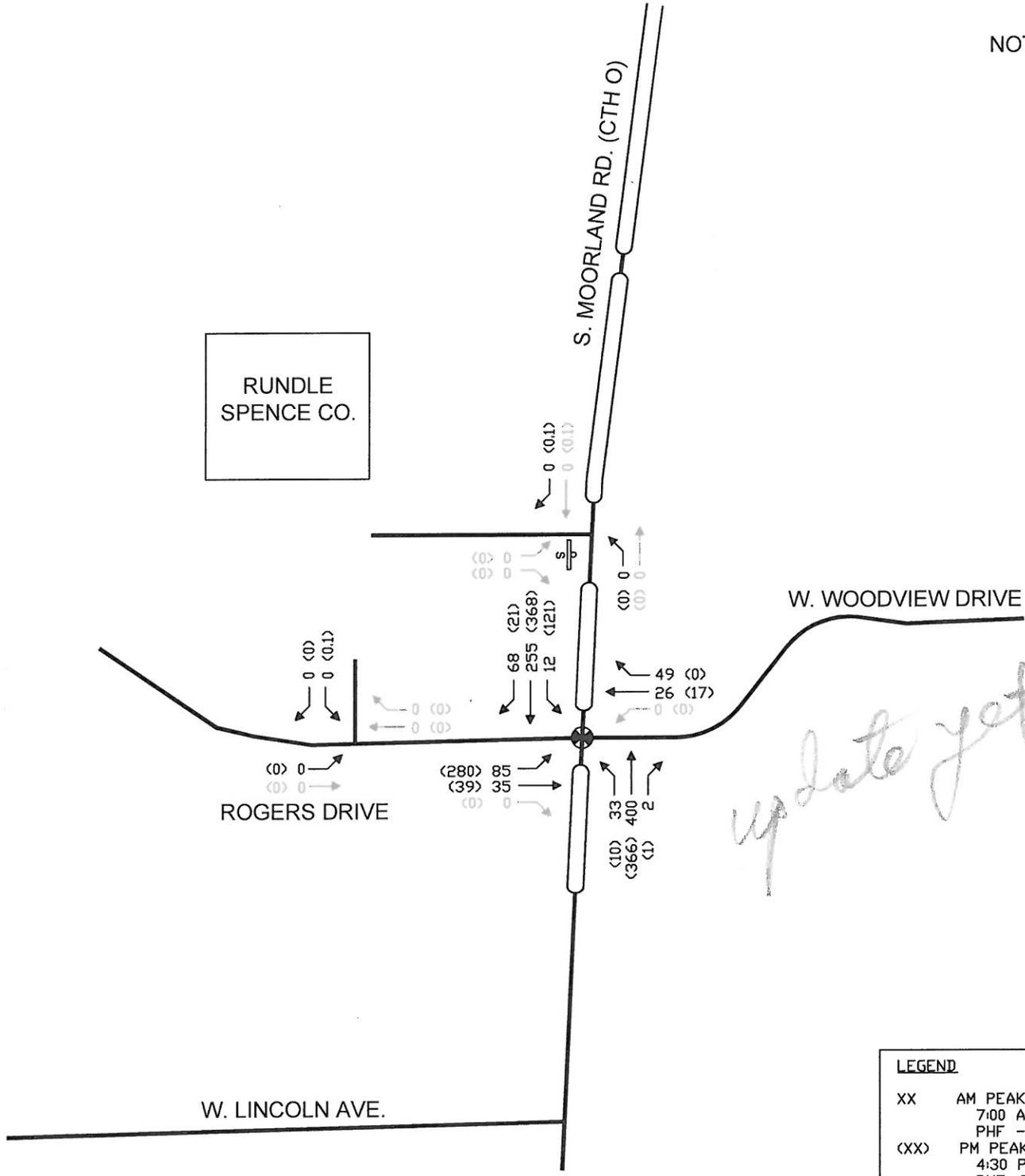


EXHIBIT 5-17  
 CAPACITY/LEVEL OF SERVICE ANALYSIS,  
 IMPROVED TRANSPORTATION SYSTEM  
 YEAR 2031 TOTAL TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 12-2015



NOT TO SCALE



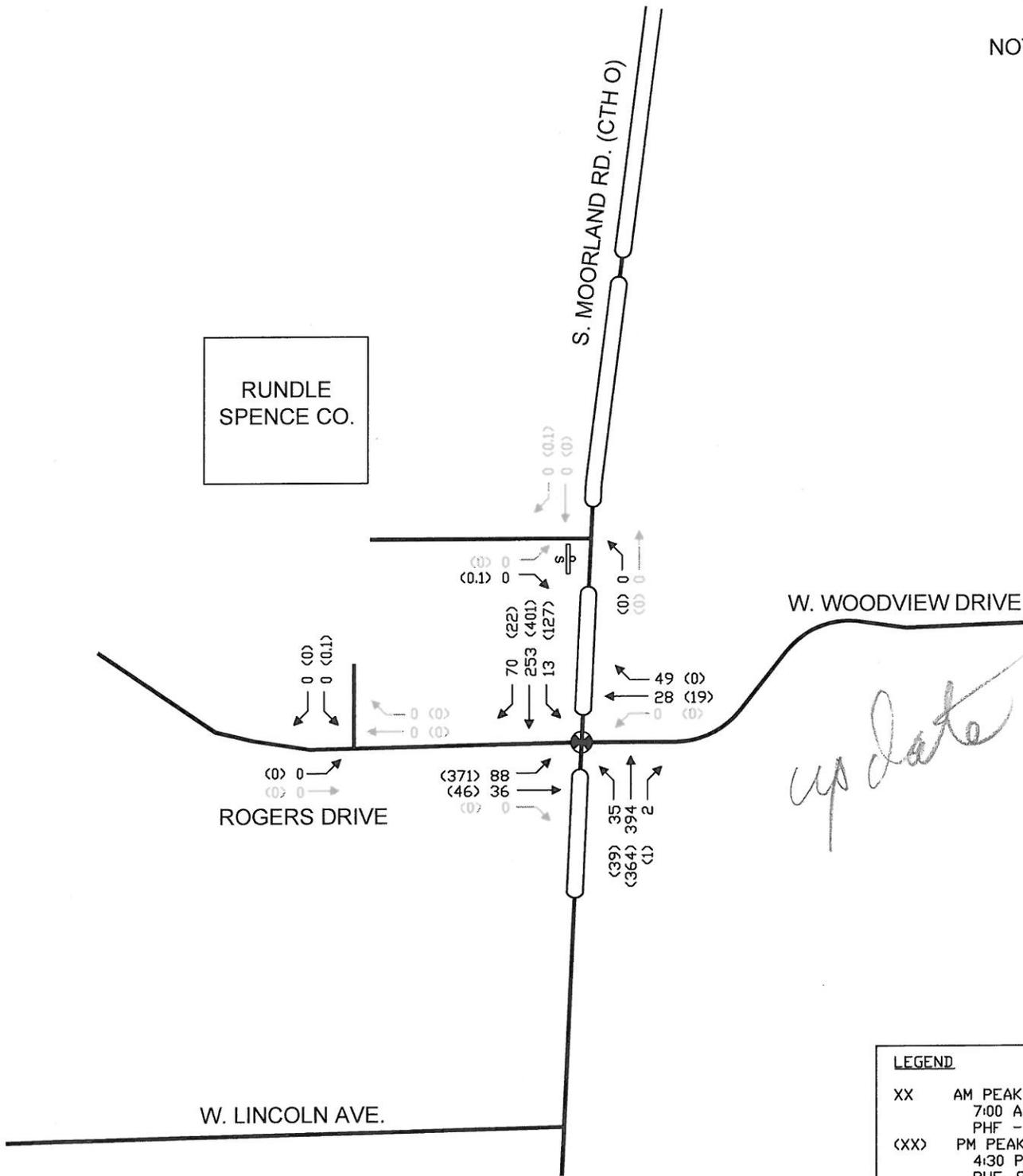
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EXHIBIT 5-18  
 MAXIMUM QUEUE LENGTHS, IMPROVED  
 TRANSPORTATION SYSTEM  
 YEAR 2016 BACKGROUND TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 11-2015





NOT TO SCALE



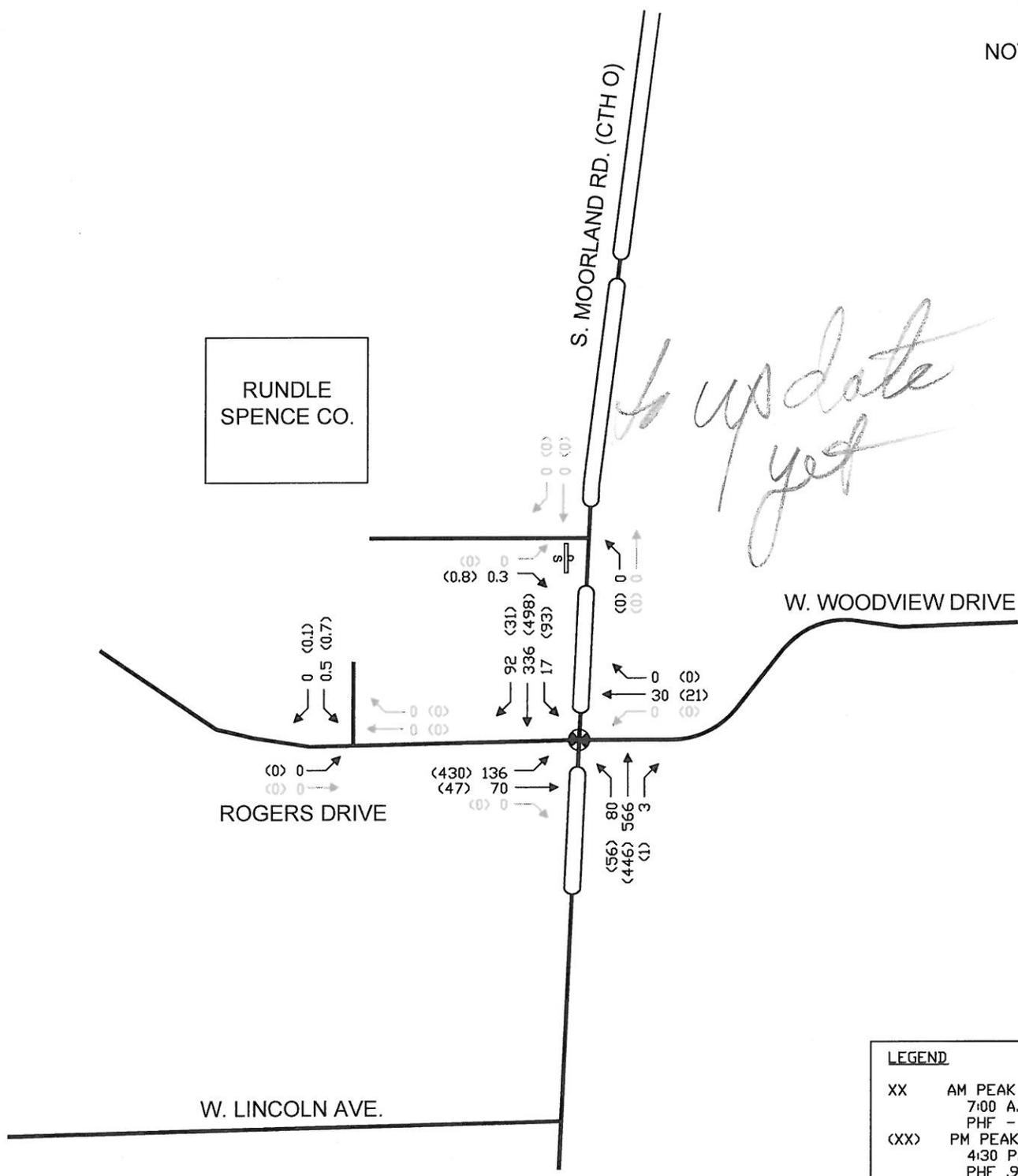
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EXHIBIT 5-20  
 MAXIMUM QUEUE LENGTHS, IMPROVED  
 TRANSPORTATION SYSTEM  
 YEAR 2016 TOTAL TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 11-2015





NOT TO SCALE



*update yet*

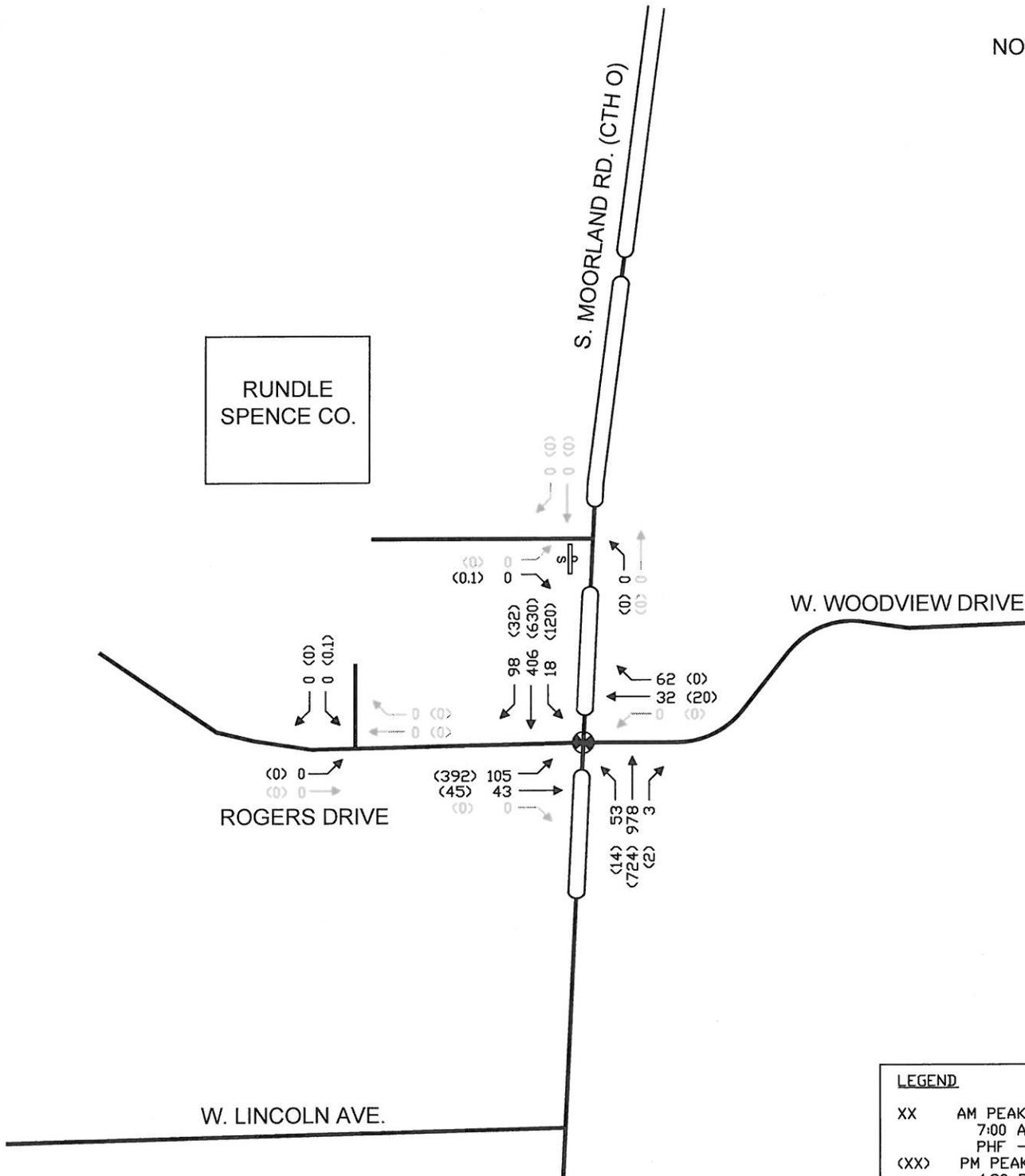
LEGEND	
XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 5-20A  
 MAXIMUM QUEUE LENGTHS, IMPROVED  
 TRANSPORTATION SYSTEM  
 YEAR 2021 TOTAL TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 11-2015

**TRAFFIC ENGINEERING SERVICES, INC.**



NOT TO SCALE



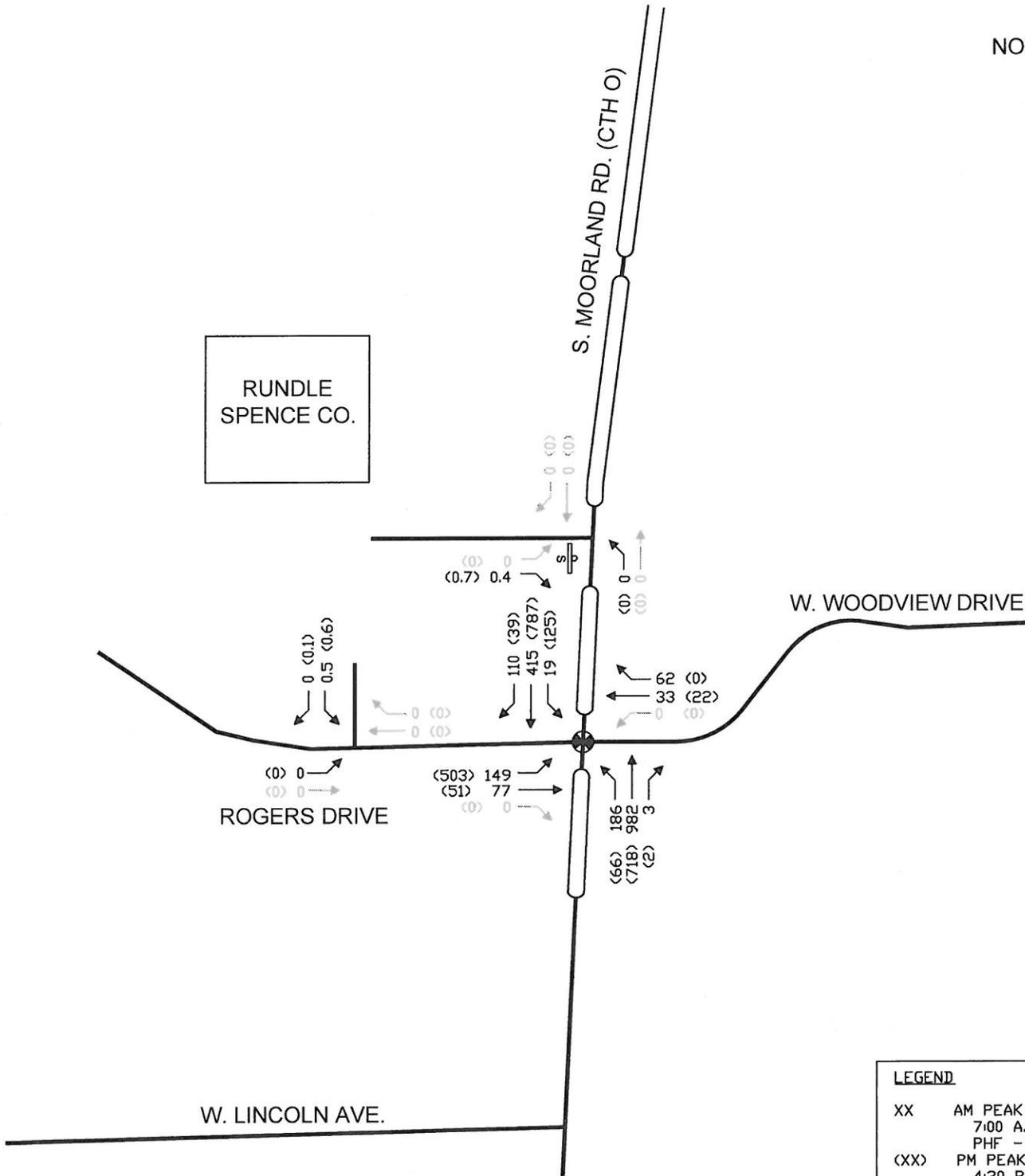
LEGEND	
XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 5-24  
 MAXIMUM QUEUE LENGTHS, IMPROVED  
 TRANSPORTATION SYSTEM  
 YEAR 2031 BACKGROUND TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 11-2015





NOT TO SCALE



LEGEND	
XX	AM PEAK HOUR 7:00 A.M. - 8:00 A.M. PHF - .90
(XX)	PM PEAK HOUR 4:30 P.M. - 5:30 P.M. PHF .97

EXHIBIT 5-26  
 MAXIMUM QUEUE LENGTHS, IMPROVED  
 TRANSPORTATION SYSTEM  
 YEAR 2031 TOTAL TRAFFIC  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 11-2015



TRAFFIC ENGINEERING SERVICES, INC.



Rogers Drive Westbound  
Nov 2015



Rogers Drive Eastbound  
Nov 2015



Moorland Southbound  
looking North Nov 2015

EXHIBIT 5-27  
INTERSECTION SIGHT DISTANCE  
PHOTOS/DRAWINGS  
PDQ  
MOORLAND AND ROGERS  
NEW BERLIN, WI  
SUBMITTAL DATE: 11-2015

## CHAPTER 6 – CONCLUSIONS AND RECOMMENDATIONS

### A – RECOMMENDATIONS

Existing traffic has a poor level of service for eastbound Rogers at Moorland Road. Current traffic at the median break on Moorland Road and Rundle Spence Driveway has operated safely to this point. However the queue from the signal interferes with this crossing the County has directed that this median break be closed. Therefore, traffic distribution has been done for the Rundle Spence Driveway to Moorland Road operating as a right in / right out.

It is recommended to have a right turn lane westbound entering Rundle Spence driveway to Rogers Drive. There is currently pavement for this turn lane, but it needs to be extended to 150’.

Analysis of Rogers and Moorland Road shows that improvement can be derived from a dual left turn east bound and splitting eastbound and west bound into separate phases. The analysis in Signal 2000 shows that this does result in an improvement. It is recommended that as the City of New Berlin proceeds with rebuilding Rogers Drive it include a dedicated right turn lane, a center thru and left turn lane and a separate left turn lane. Thus, providing for the signal sequence change to be dual left hand turn from Rogers. These lane should be developed for a minimum of 150’, plus transition.

### B – CONCLUSIONS

The proposed PDQ Store and Retail development will generate 138 new trips during the AM Peak hour and 183 new trips in the PM peak hour. The recommendations for the adjacent roadways and intersections as well as on-site are defined below and also graphically shown on Exhibit 6-1.

#### **Moorland Road and Rogers Drive and W. Woodview Drive**

The intersection’s signal operations have been analyzed as an intersection within a system. There are signals to the north and the south at Greenfield and Lincoln that are a part of the corridor traffic signal system. All phases are actuated and will not accommodate the additional development traffic.

It is recommended to improve Rogers approach to this intersection. Rogers is currently a two lane roadway that widens to a three lane about 125 feet west of Moorland Road. The three lane cross section has a shared through and left lane and a 95-foot right turn lane.

It is recommended to construct curb and gutter along this entire length to create an urban cross section.

The improvements will allow for ingress and egress from Rogers to the development site to operate safely and efficiently. There is currently 20% trucks on Rogers Drive, the recommended roadway improvement will lessen the lane switching that a by-pass lane at Rundle Spence driveway would have required.

#### **Moorland Road and Rundle Spence Driveway**

It is recommended to pavement mark the southbound paved shoulder area as a right turn lane. It is currently cross hatched out as a shoulder. It is recommended to remove the existing paint and repaint with a 150-foot right turn lane with a 150-taper.

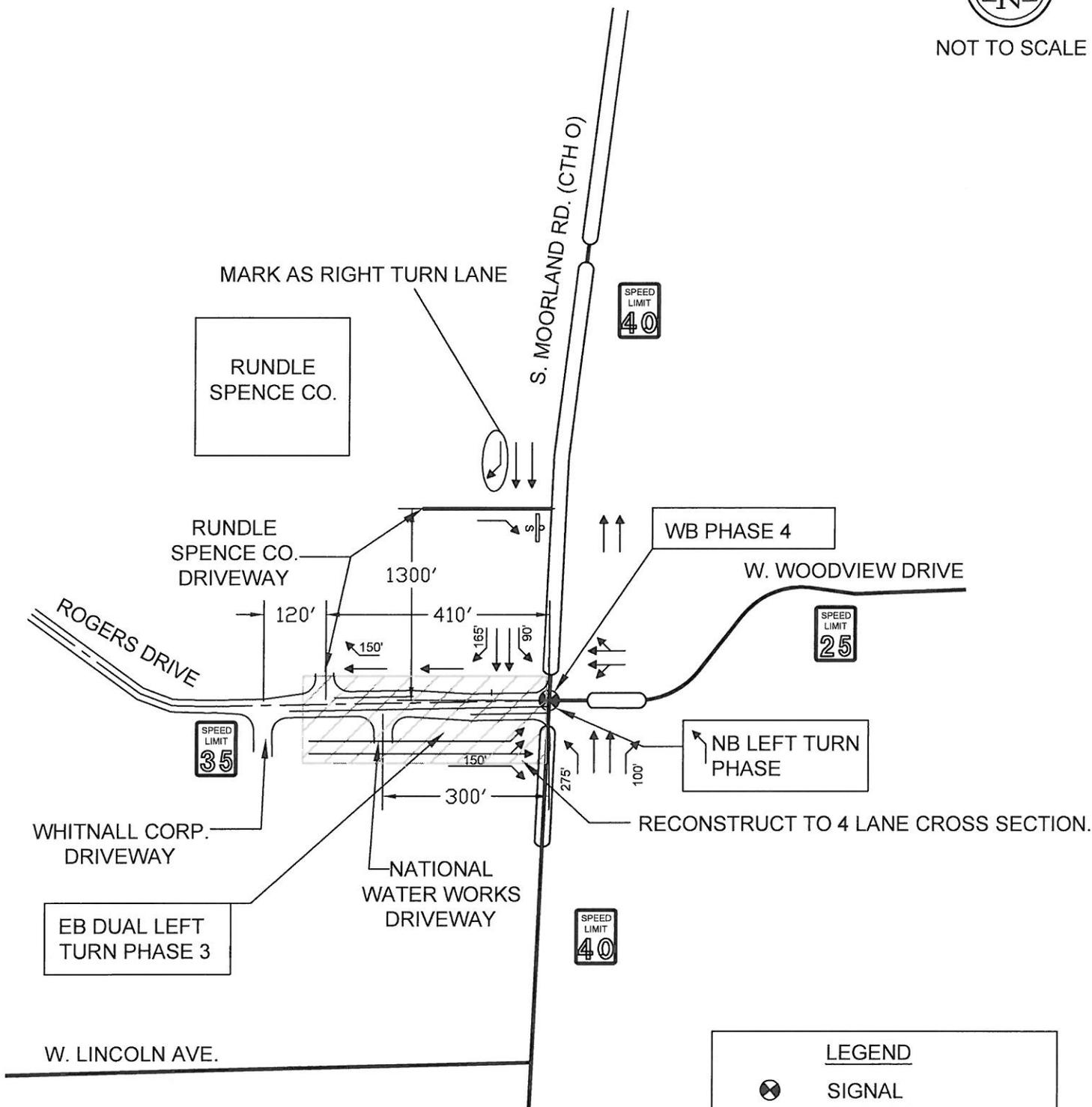
The alternative access to Moorland Road via Rogers Drive will give drivers the option to use the Rogers Drive access and then turn at the traffic signal at Moorland Road and Rogers Drive for ingress and egress to the site.

#### **Rogers Drive and Rundle Spence Driveway**

A westbound right turn lane should be constructed with the reconstruction of Rogers Drive by the City of New Berlin. The existing paved turn lane can function until the full improvement.



NOT TO SCALE



LEGEND	
	SIGNAL
	PROPOSED LANE
	EXISTING LANE
	EXISTING STOP SIGN

EXHIBIT 6-1  
 INTERSECTION CONCEPTUAL DRAWING  
 PDQ  
 MOORLAND AND ROGERS  
 NEW BERLIN, WI  
 SUBMITTAL DATE: 01-2016

TRAFFIC ENGINEERING SERVICES, INC.